

ABB industrial drives

ACS580MV primary control program

Firmware manual





List of related manuals in English

Option manuals and guides	Code (English)
<i>ACS-AP-x assistant control panels user's manual</i>	3AUA0000085685
<i>Drive composer Start-up and maintenance PC tool User's manual</i>	3AUA0000094606
<i>ACS580MV hardware manual</i>	2UBB004520
<i>Manuals and quick guides for I/O extension modules, fieldbus adapters, encoder interfaces, etc.</i>	
<i>EN_Cybersecurity_guide_A_A4.pdf</i>	link

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Firmware manual

ACS580MV primary control program

Table of contents



Table of contents

1. Introduction to the manual

What this chapter contains	11
Applicability	11
Safety instructions	11
Target audience	11
Contents of the manual	12
Related documents	12
Terms and abbreviations	13
Cybersecurity disclaimer	14

2. Using the control panel

3. Control locations and operating modes

What this chapter contains	17
Local control vs. external control	18
Local control	18
External control	19
Operating modes of the drive	20
Speed control mode	21
Frequency control mode	21
Special control modes	21

4. Program features

What this chapter contains	23
Drive configuration and programming	24
Programming via parameters	24
Adaptive programming	25
Control interfaces	26
Programmable analog inputs	26
Programmable analog outputs	26
Programmable digital inputs and outputs	26
Programmable relay outputs	26
Programmable I/O extensions	27
Fieldbus control	27
Motor control	28
Master/follower functionality	28
Scalar control	34
Vector control	35
Reference ramping	35
Constant speeds/frequencies	36
Critical speeds/frequencies	36
Jogging	38
DC magnetization	40



6 Table of contents

Application control	41
Process PID control	41
DC voltage control	44
Overvoltage control	44
Undervoltage control (power loss ride-through)	44
Emergency stop	45
Motor thermal protection	45
Other programmable protection functions	47
Automatic fault resets	48
Diagnostics	49
Fault and warning messages, data logging	49
Signal supervision	49
Maintenance timers and counters	49
Energy saving calculators	49
Load analyzer	50
Miscellaneous	52
User parameter sets	52
User lock	52
Parameter checksum calculation	53
Data storage parameters	53



5. Parameters

What this chapter contains	55
Terms and abbreviations	55
Summary of parameter groups	56
01 Actual values	59
03 Input references	63
04 Warnings and faults	64
05 Diagnostics	66
06 Control and status words	67
07 System info	77
10 Standard DI, RO	80
11 Standard DIO	86
12 Standard AI	86
13 Standard AO	91
14 I/O extension module 1	95
15 I/O extension module 2	117
16 I/O extension module 3	120
17 Control hub IO	124
19 Operation mode	125
20 Start/stop/direction	126
21 Start/stop mode	135
22 Speed reference selection	139
23 Speed reference ramp	145
24 Speed reference conditioning	150
25 Speed control	155
26 Torque reference chain	166
28 Frequency reference chain	173
30 Limits	182
31 Fault functions	188

32 Supervision	193
33 Generic timer & counter	196
34 Protections	203
35 Motor thermal protection	205
36 Load analyzer	211
40 Process PID set 1	215
41 Process PID set 2	228
45 Energy efficiency	230
46 Monitoring/scaling settings	233
47 Data storage	235
49 Panel port communication	238
50 Fieldbus adapter (FBA)	240
51 FBA A settings	246
52 FBA A data in	248
53 FBA A data out	248
54 FBA B settings	249
55 FBA B data in	250
56 FBA B data out	251
59 Embedded Ethernet	251
60 DDCS communication	253
61 D2D and DDCS transmit data	257
62 D2D and DDCS receive data	258
70 Power module values phase A	261
71 Power module values phase B	263
72 Power module values phase C	263
81 System control and monitoring	264
82 Charging, MCB control	269
83 Cooling system	274
84 Motor temperature monitoring	277
85 SBU control and monitoring	279
87 AC500 I/O interface	283
90 Feedback selection	285
96 System	285
97 Motor control	295
98 User motor parameters	296
99 Motor data	297



6. Additional parameter data

What this chapter contains	299
Terms and abbreviations	299
Fieldbus addresses	300
Parameter groups 1...9	301
Parameter groups 10...99	306

7. Fault tracing

What this chapter contains	343
Safety	343
Indications	343
Warnings and faults	343

8 Table of contents

Pure events	344
Editable messages	344
Warning/fault history and analysis	344
Event log	344
Other data loggers	345
Parameters that contain warning/fault information	345
Warning messages	345
Fault messages	361

8. Fieldbus control through a fieldbus adapter

What this chapter contains	383
System overview	383
Basics of the fieldbus control interface	385
Control word and Status word	386
References	387
Actual values	388
Contents of the fieldbus Control word	389
Contents of the fieldbus Status word	390
The state diagram	391
Setting up the drive for fieldbus control	392
Parameter setting example: FPBA (PROFIBUS DP)	393
The start sequence for the parameter example:	394

9. Synchronized bypass function

What this chapter contains	395
Terms and abbreviations	395
Overview	396
System setup	396
I/O device and signals	397
SBU control	398
Sync to mains sequence	398
VSD sequence	398
Reference chain	398
Start sequence of sync to mains	400
Parameter setting example	401

10. Control chain diagrams

What this chapter contains	405
Speed reference source selection I	406
Speed reference source selection II	407
Speed reference ramping and shaping	408
Motor feedback configuration	409
Load feedback and position counter configuration	410
Speed error calculation	411
Speed controller	412
Torque reference source selection and modification	413
Operating mode selection	414
Reference selection for torque controller	415

Torque limitation	416
Torque controller	417
Frequency reference selection	418
Frequency reference modification	419
Master/Follower communication I (Master)	420
Master/Follower communication II (Follower)	421
Process PID setpoint and feedback source selection	422
Process PID controller	423





1

Introduction to the manual

What this chapter contains

This chapter describes the contents of the manual. It also contains information on the compatibility, safety and intended audience.

Applicability

This manual applies to the ACS580MV primary control program (version 2.74).

The firmware version of the control program is visible in parameter [07.05 Firmware version](#), or the System info in the main menu on the control panel.

Safety instructions

Follow all safety instructions delivered with the drive.

- Read the **complete safety instructions** before you install, commission, or use the drive. The complete safety instructions are delivered with the drive as part of the *Hardware manual*.
- Read the **firmware function-specific warnings and notes** before changing parameter values. These warnings and notes are included in the parameter descriptions presented in chapter [Parameters](#).

Target audience

This manual is intended for people who design, commission, or operate the drive system.

Contents of the manual

This manual contains the following chapters:

- [*Using the control panel*](#) provides basic instructions for the use of the control panel.
- [*Control locations and operating modes*](#) describes the control locations and operating modes of the drive.
- [*Program features*](#) contains descriptions of the features of the ACS580MV primary control program.
- [*Parameters*](#) describes the parameters used to program the drive.
- [*Additional parameter data*](#) contains further information on the parameters.
- [*Fault tracing*](#) lists the warning and fault messages with possible causes and remedies.
- [*Fieldbus control through a fieldbus adapter*](#) describes the communication to and from a fieldbus network using an optional fieldbus adapter module.
- [*Control chain diagrams*](#) showing the parameter structure within the drive.

Related documents

A list of related manuals is printed on the inside of the front cover.

Terms and abbreviations

Term/abbreviation	Definition
ACS-AP-S	Type of control panel used with ACS580MV drives
AI	Analog input; interface for analog input signals
AO	Analog output; interface for analog output signals
BCU	Control unit used in ACS580MV drives based on BCON controller.
DC link	DC circuit between rectifier and inverter
DDCS	Distributed drives communication system; a protocol used in optical fiber communication
DI	Digital input; interface for digital input signals
DIO	Digital input/output; interface that can be used as a digital input or output
DO	Digital output; interface for digital output signals
Drive	Frequency converter for controlling AC motors. The drive consists of a several power modules which are connecting the grid side to the inverter side. The ACS580MV primary control program is used to control the inverter part of the drive.
FAIO-01	Optional analog I/O extension module
FBA	Fieldbus adapter
FCAN-0x	Optional CANopen adapter
FDCO-0x	Optional DDCS communication module
FDNA-0x	Optional DeviceNet adapter
FECA-01	Optional EtherCAT® adapter
FENA-11	Optional Ethernet/IP adapter
FIO-01	Optional digital I/O extension module
FIO-11	Optional analog I/O extension module
FLON-0x	Optional LONWORKS® adapter
FPBA-0x	Optional PROFIBUS DP adapter
FSCA-0x	Optional Modbus adapter
FSO-xx	Optional safety functions module
HTL	High-threshold logic
IGBT	Insulated gate bipolar transistor; a voltage-controlled semiconductor type widely used in inverters and IGBT supply units due to their easy controllability and high switching frequency
I/O	Input/Output

Term/abbreviation	Definition
Network control	With fieldbus protocols based on the Common Industrial Protocol (CIP™), such as DeviceNet and Ethernet/IP, denotes the control of the drive using the Net Ctrl and Net Ref objects of the ODVAAC/DC Drive Profile. For more information, see www.odva.org , and the following manuals: • <i>FDNA-01 DeviceNet adapter module User's manual</i> (3AFE68573360 [English]), and • <i>FENA-01/-11 Ethernet adapter module User's manual</i> (3AUA0000093568 [English]).
Parameter	User-adjustable operation instruction to the drive, or signal measured or calculated by the drive
PID controller	Proportional–integral–derivative controller. Drive speed control is based on PID algorithm.
PM	Power module (semiconductor stack).
PLC	Programmable logic controller
Power unit	Contains the power electronics and power connections of the drive (or inverter module). The drive control unit is connected to the power unit.
PTC	Positive temperature coefficient
RDCO-0x	Optional DDCS communication module
RFG	Ramp function generator.
RO	Relay output; interface for a digital output signal. Implemented with a relay.
TTL	Transistor-transistor logic
UPS	Uninterruptible power supply; power supply equipment with battery to maintain output voltage during power failure

Cybersecurity disclaimer

This product is designed to be connected to and to communicate information and data via a network interface. It is Customer's sole responsibility to provide and continuously ensure a secure connection between the product and Customer network or any other network (as the case may be). Customer shall establish and maintain any appropriate measures (such as but not limited to the installation of firewalls, application of authentication measures, encryption of data, installation of anti-virus programs, etc) to protect the product, the network, its system and the interface against any kind of security breaches, unauthorized access, interference, intrusion, leakage and/or theft of data or information. ABB and its affiliates are not liable for damages and/or losses related to such security breaches, any unauthorized access, interference, intrusion, leakage and/or theft of data or information.

See also section [User lock](#) (page 52).

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Using the control panel

Refer to [ACS-AP-x assistant control panels user's manual](#) (3AUA0000085685 [English]).

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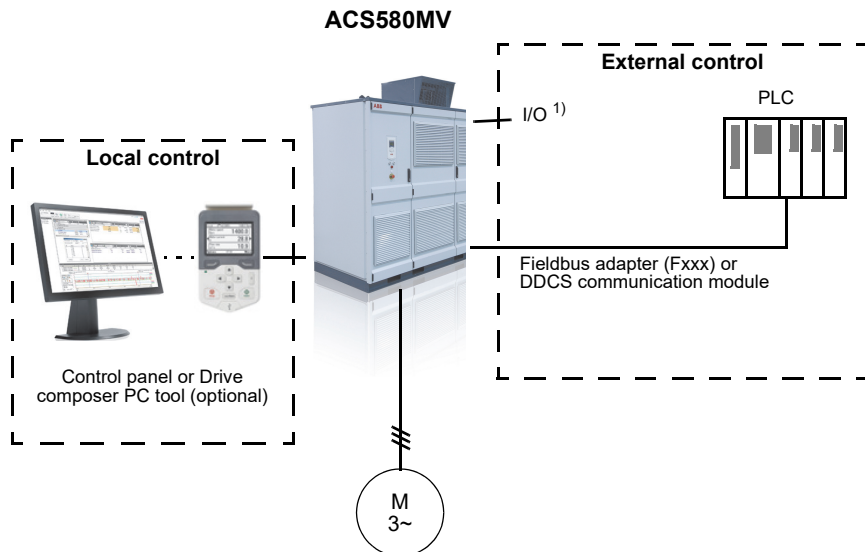
Control locations and operating modes

What this chapter contains

This chapter describes the control locations and operating modes supported by the control program.

Local control vs. external control

The ACS580MV has two main control locations: external and local. The control location is selected with the Loc/Rem key on the control panel or in the PC tool.



1) Extra inputs/outputs can be added by installing optional I/O extension modules (FIO-xx) in drive slots.

Local control

The control commands are given from the control panel keypad or from a PC equipped with Drive composer when the drive is set to local control. Speed mode are available for local control; frequency mode is available when scalar motor control mode is used (see parameter [19.16 Local control mode](#)).

Local control is mainly used during commissioning and maintenance. The control panel always overrides the external control signal sources when used in local control. Changing the control location to local can be prevented by parameter [19.17 Local control disable](#).

The user can select by a parameter ([49.05 Communication loss action](#)) how the drive reacts to a control panel or PC tool communication break. (The parameter has no effect in external control.)

■ External control

When the drive is in external control, control commands are given through

- the I/O terminals (digital and analog inputs), or optional I/O extension modules
- an optional fieldbus adapter module
- the external (DDCS) controller interface
- the control panel

Two external control locations, EXT1 and EXT2, are available. The user can select the sources of the start and stop commands separately for each location by parameters [20.01...20.10](#). The operating mode can be selected separately for each location, which enables quick switching between different operating modes. Selection between EXT1 and EXT2 is done via any binary source such as a digital input or fieldbus control word (see parameter [19.11 Ext1/Ext2 selection](#)). The source of reference is selectable for each operating mode separately.

The control location selection is checked on a 2 ms time level.

Using the control panel as an external control source

The control panel can also be used as a source of start/stop commands and/or reference in external control. Selections for the control panel are available in the start/stop command source and reference source selection parameters.

Reference source selection parameters have two selections for the control panel. The difference between the two selections is in the initial reference value after the reference source switches to the control panel.

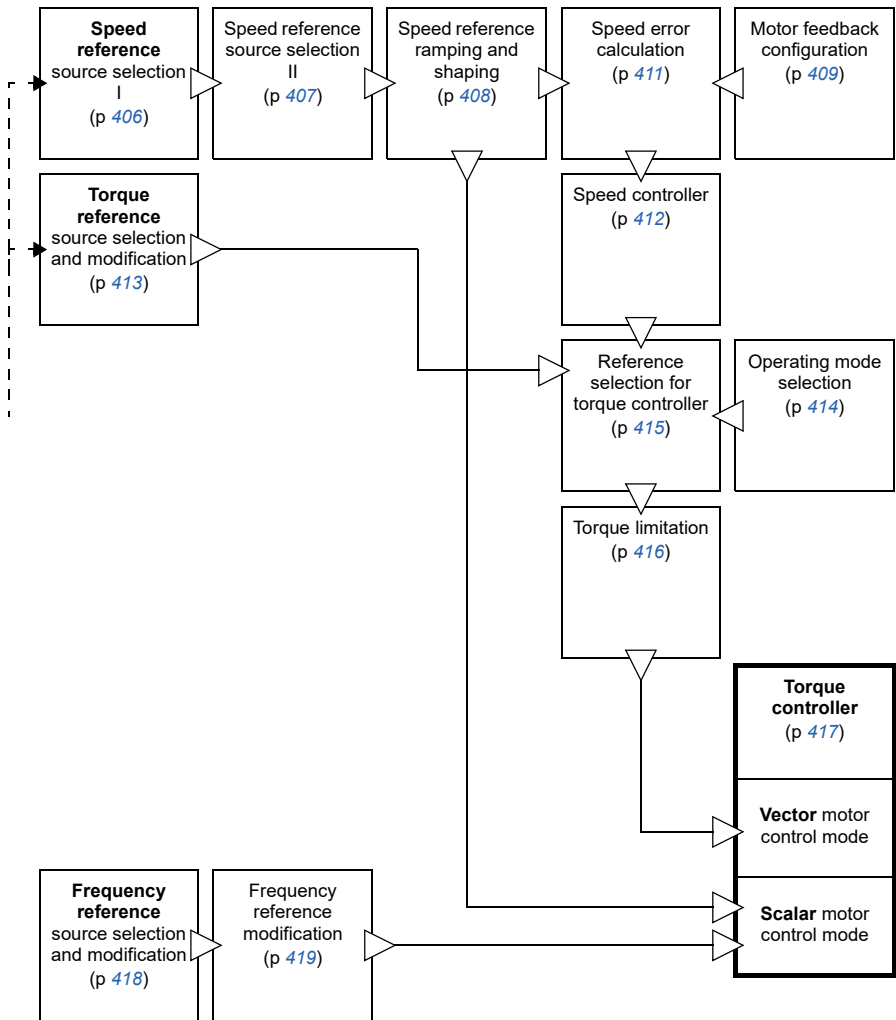
The panel reference is saved whenever another reference source is selected. If the reference source selection parameter is set to [Control panel \(ref saved\)](#), the saved value is used as the initial reference when control switches back to the panel. Note that only one type of reference can be saved at a time: for example, attempting to use the same saved reference with different operating modes causes the drive to trip on [7083 Panel reference conflict](#). The panel reference can be separately limited by parameters in group [49 Panel port communication](#).

With the reference source selection parameter set to [Control panel \(ref copied\)](#), the initial panel reference value depends on whether the operating mode changes with the reference source. If the source switches to the panel and the operating mode does not change, the last reference from the previous source is adopted. If the operating mode changes, the drive actual value corresponding to the new mode is adopted as the initial value.

Operating modes of the drive

The drive can operate in several operating modes with different types of reference. The mode is selectable for each control location (Local, EXT1 and EXT2) in parameter group [19 Operation mode](#).

The following is a general representation of the reference types and control chains. The page numbers refer to detailed diagrams in chapter [Control chain diagrams](#).



■ Speed control mode

The motor follows a speed reference given to the drive. This mode is used with estimated speed as feedback.

Speed control mode is available in both local and external control. It is also available in both scalar and vector control modes.

■ Frequency control mode

The motor follows a frequency reference given to the drive. Frequency control is only available in scalar motor control mode.

■ Special control modes

In addition to the control modes mentioned above, the following special control modes are available:

- Emergency stop modes Off1 and Off3: Drive stops along the defined deceleration ramp and drive modulation stops.
 - Jogging mode: Drive starts and accelerates to the defined speed when the jogging signal is activated. For more information, see section [Jogging](#) (page 38).
-

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Program features

What this chapter contains

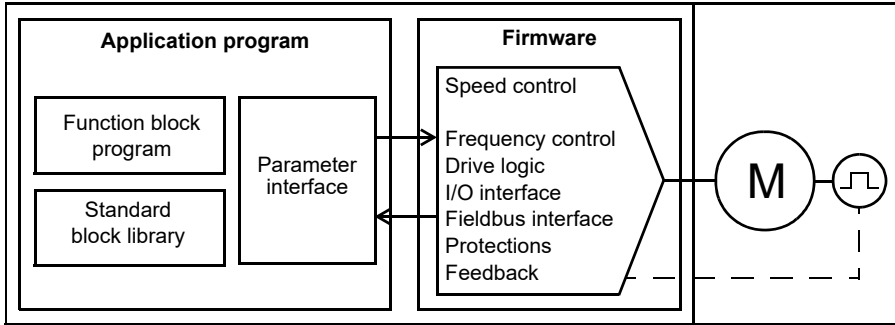
The control program contains all of the parameters (including actual signals) within the drive. This chapter describes some of the more important functions within the control program, how to use them and how to program them to operate.

Drive configuration and programming

The drive control program is divided into two parts:

- firmware program
- application program.

Drive control program



The firmware program performs the main control functions, including speed control, drive logic (start/stop), I/O, feedback, communication and protection functions. Firmware functions are configured and programmed with parameters, and can be extended by application programming.

■ Programming via parameters

Parameters configure all of the standard drive operations and can be set via

- the control panel, as described in chapter [Using the control panel](#)
- the Drive composer PC tool, as described in *Drive composer user's manual* (3AUA0000094606 [English]), or
- the fieldbus interface, as described in chapters [Fieldbus control through a fieldbus adapter](#).

All parameter settings are stored automatically to the permanent memory of the drive. However, if an external +24 V DC power supply is used for the drive control unit, it is highly recommended to force a save by using parameter [96.07 Parameter save manually](#) before powering down the control unit after any parameter changes have been made.

If necessary, the default parameter values can be restored by parameter [96.06 Parameter restore](#).

■ Adaptive programming

Note: Adaptive programming function is not supported by current ACS580MV software version.

Conventionally, the user can control the operation of the drive by parameters. However, the standard parameters have a fixed set of choices or a setting range. To further customize the operation of the drive, an adaptive program can be constructed out of a set of function blocks.

The Drive composer pro PC tool (version 1.10 or later, available separately) has an Adaptive programming feature with a graphical user interface for building the custom program. The function blocks include the usual arithmetic and logical functions, as well as eg. selection, comparison and timer blocks. The program can contain a maximum of 20 blocks. The adaptive program is executed on a 10 ms time level.

For selecting input to the program, the user interface has pre-selections for the physical inputs, common actual values, and other status information of the drive. Parameter values as well as constants can also be defined as inputs. The output of the program can be used eg. as a start signal, external event or reference, or connected to the drive outputs. Note that connecting the output of the adaptive program to a selection parameter will write-protect the parameter.

The status of the adaptive program is shown by parameter [07.30 Adaptive program status](#). The adaptive program can be disabled by [96.201 Disable adaptive program](#).

For more information, see the *Adaptive programming application guide* (3AXD50000028574 [English]).

Control interfaces

■ Programmable analog inputs

The control unit has two programmable analog inputs. Each of the inputs can be independently set as a voltage (0/2...10 V or -10...10 V) or current (0/4...20 mA) input by a jumper or switch on the control unit. Each input can be filtered, inverted and scaled. The number of analog inputs can be increased by installing FIO-11 or FAIO-01 I/O extensions (see [Programmable I/O extensions](#) below).

Settings

Parameter group [12 Standard AI](#) (page 86).

■ Programmable analog outputs

The control unit has two current (0...20 mA) analog outputs. Each output can be filtered, inverted and scaled. The number of analog outputs can be increased by installing FIO-11 or FAIO-01 I/O extensions (see [Programmable I/O extensions](#) below).

Settings

Parameter group [13 Standard AO](#) (page 91).

■ Programmable digital inputs and outputs

The control unit has six digital inputs, a digital start interlock input, and two digital input/outputs (I/O that can be set as either an input or an output).

One digital input (DI6) doubles as a PTC thermistor input. See section [Motor thermal protection](#) (page 45).

The number of digital inputs/outputs can be increased by installing FIO-01 or FIO-11 I/O extensions (see [Programmable I/O extensions](#) below).

Settings

Parameter groups [10 Standard DI, RO](#) (page 80) and [11 Standard DIO](#) (page 86).

■ Programmable relay outputs

The control unit has three relay outputs. The signal to be indicated by the outputs can be selected by parameters.

Relay outputs can be added by installing FIO-01 I/O extensions.

Settings

Parameter group [10 Standard DI, RO](#) (page 80).

■ Programmable I/O extensions

Inputs and outputs can be added by using I/O extension modules. One to three modules can be mounted on the slots of the control unit.

The table below shows the number of I/O on the control unit as well as optional I/O extension modules.

Location	Digital inputs (DI)	Digital I/Os (DIO)	Analog inputs (AI)	Analog outputs (AO)	Relay outputs (RO)
Control unit	6 + DIIL	2	2	2	3
FIO-01	-	4	-	-	2
FIO-11	-	2	3	1	-
FAIO-01	-	-	2	2	-

Three I/O extension modules can be activated and configured using parameter groups 14...16.

Note: Each configuration parameter group contains parameters that display the values of the inputs on that particular extension module. These parameters are the only way of utilizing the inputs on I/O extension modules as signal sources. To connect to an input, choose the setting *Other* in the source selector parameter, then specify the appropriate value parameter (and bit, for digital signals) in group 14, 15 or 16.

Settings

Parameter groups [14 I/O extension module 1](#) (page 95), [15 I/O extension module 2](#) (page 117) and [16 I/O extension module 3](#) (page 120).

■ Fieldbus control

The drive can be connected to several different automation systems through its fieldbus interfaces. See chapter [Fieldbus control through a fieldbus adapter](#) (page 383).

Settings

Parameter groups [50 Fieldbus adapter \(FBA\)](#) (page 240), [51 FBA A settings](#) (page 246), [52 FBA A data in](#) (page 248), and [53 FBA A data out](#) (page 248)

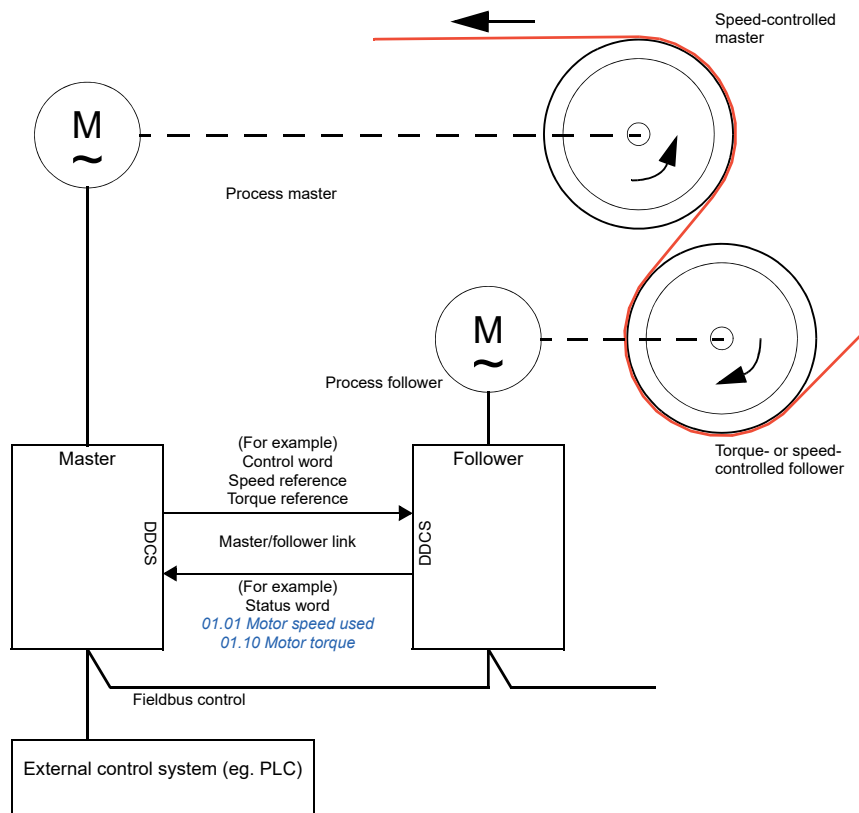
Motor control

■ Master/follower functionality

General

The master/follower functionality can be used to link several drives together so that the load can be evenly distributed between the drives. This is ideal in applications where the motors are coupled to each other via gearing, chain, belt, etc.

The external control signals are typically connected to one drive only which acts as the master. The master controls up to 10 followers by sending broadcast messages over an electrical cable or fiber optic link. The master can read feedback signals from up to 3 selected followers.



The master drive is typically speed-controlled and the other drives follow its torque or speed reference. In general, a follower should be

- torque-controlled when the motor shafts of the master and the follower are rigidly coupled by gearing, chain etc. so that no speed difference between the drives is possible
- speed-controlled when the motor shafts of the master and the follower are flexibly coupled so that a slight speed difference is possible. When both the master and the follower are speed-controlled, drooping is also typically used (see parameter [25.08 Drooping rate](#)). The distribution of load between the master and follower can alternatively be adjusted as described under [Load share function with a speed-controlled follower](#) below.

Note: With a speed-controlled follower (without load sharing), pay attention to the acceleration and deceleration ramp times of the follower. If the ramp times are set longer than in the master, the follower will follow its own acceleration/deceleration ramp times rather than those from the master. In general, it is recommended to set identical ramp times in both the master and the follower(s). Any ramp shape settings (see parameters [23.16...23.19](#)) should only be applied in the master.

In some applications, both speed control and torque control of the follower are required. In those cases, the operating mode can be switched by parameter ([19.12 Ext1 control mode](#) or [19.14 Ext2 control mode](#)). Another method is to set one external control location to speed control mode, the other to torque control mode. Then, a digital input of the follower can be used to switch between the control locations. See chapter [Control locations and operating modes](#) (page 19).

With torque control, follower parameter [26.15 Load share](#) can be used to scale the incoming torque reference for optimal load sharing between the master and the follower. Some torque-controlled follower applications, eg. where the torque is very low, or very low speed operation is required, may require encoder feedback.

If a drive needs to quickly switch between master and follower statuses, one user parameter set (see page [52](#)) can be saved with the master settings, another with the follower settings. The suitable settings can then be activated using eg. digital inputs.

Load share function with a speed-controlled follower

Load sharing between the master and a speed-controlled follower can be used in various applications. The load share function is implemented by fine-tuning the follower speed reference with an additional trim signal based on a torque reference. The torque reference is selected by parameter [23.42 Follower speed corr torq source](#) (by default, reference 2 received from the master). Load share is adjusted by parameter [26.15 Load share](#) and activated by the source selected by [23.40 Follower speed correction enable](#). Parameter [23.41 Follower speed correction gain](#) provides a gain adjustment for the speed correction. The final correction signal added to the speed reference is shown by [23.39 Follower speed correction out](#). See the block diagram on page [420](#).

Notes:

- The function can be enabled only when the drive is a speed-controlled follower in remote control mode.
- Drooping ([25.08 Drooping rate](#)) is ignored when the load share function is active.
- The master and follower should have the same speed control tuning values.
- The speed correction term is limited by the speed error window parameters [24.44 Speed error window low](#) and [24.43 Speed error window high](#). An active limitation is indicated by [06.19 Speed control status word](#).
- For a reliable ramp stop of a follower,
 - both [24.43 Speed error window high](#) and [24.44 Speed error window low](#) must be set smaller than [21.06 Zero speed limit](#) (or speed error window control disabled altogether by [24.41 Speed error window control enable](#)), and
 - [24.11 Speed correction](#) must be set smaller than [21.06 Zero speed limit](#).

Communication

A master/follower link can be built by connecting the drives together with fiber optic cables (may require additional equipment depending on existing drive hardware). The medium is selected by parameter [60.01 M/F communication port](#).

Parameter [60.03 M/F mode](#) defines whether the drive is the master or a follower on the communication link. Typically, the speed-controlled process master drive is also configured as the master in the communication.

The communication on the master/follower link is based on the DDCS protocol, which employs data sets (specifically, data set 41). One data set contains three 16-bit words. The contents of the data set are freely configurable using parameters [61.01...61.03](#). The data set broadcast by the master typically contains the control word, speed reference and torque reference, while the followers return a status word with two actual values.

The default setting of parameter [61.01 M/F data 1 selection](#) is *Follower CW*. With this setting in the master, a word consisting of bits 0...11 of [06.01 Main control word](#) and four bits selected by parameters [06.45...06.48](#) is broadcast to the followers. However, bit 3 of the follower control word is modified so that it remains on as long as the master is modulating, and its switching to 0 causes the follower to coast to a stop. This is to synchronize the stopping of both master and follower.

Note: When the master is ramping down to a stop, the follower observes the decreasing reference but receives no stop command until the master stops modulating and clears bit 3 of the follower control word. Because of this, the maximum and minimum speed limits on the follower drive should not have the same sign – otherwise the follower would be pushing against the limit until the master finally stops.

Three words of additional data can optionally be read from each follower. The followers from which data is read are selected by parameter [60.14 M/F follower](#)

selection in the master. In each follower drive, the data to be sent is selected by parameters 61.01...61.03. The data is transferred in integer format over the link, and displayed by parameters 62.28...62.36 in the master. The data can then be forwarded to other parameters using 62.04...62.12.

To indicate faults in the followers, each follower must be configured to transmit its status word as one of the above-mentioned data words. In the master, the corresponding target parameter must be set to *Follower SW*. The action to be taken when a follower is faulted is selected by 60.17 *Follower fault action*. External events (see parameter group 31 *Fault functions*) can be used to indicate the status of other bits of the status word.

Block diagrams of the master/follower communication are presented on pages 420 and 419.

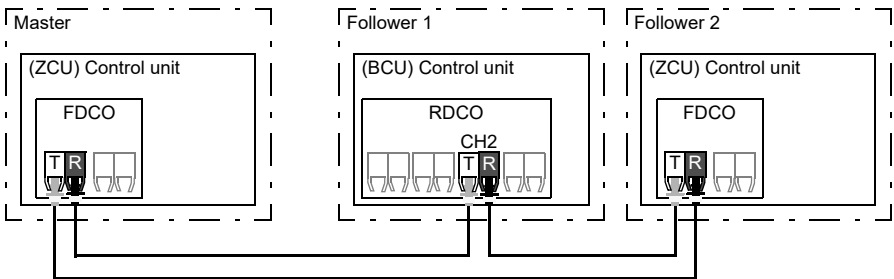
Construction of the master/follower link

The master/follower link is formed by connecting the drives together using either

- fiber optic cables. Drives with a *ZCU* control unit require an additional FDCO DDCS communication module; drives with a *BCU* control unit require an RDCO module.

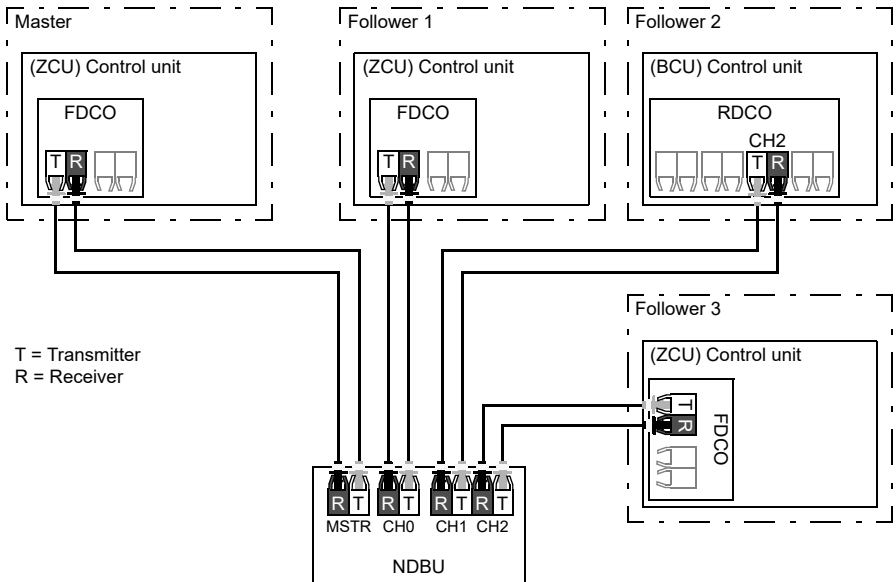
Connection examples are shown below. Note that a star configuration using fiber optic cables requires an NDBU-95C DDCS branching unit.

Ring configuration with fiber optic cables

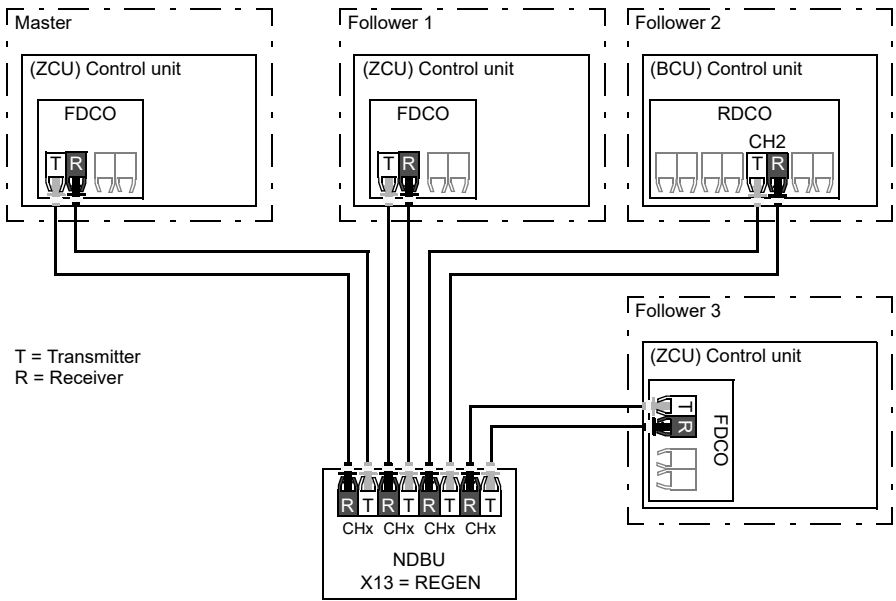


T = Transmitter; R = Receiver

Star configuration with fiber optic cables (1)



Star configuration with fiber optic cables (2)



Example parameter settings

The following is a checklist of parameters that need to be set when configuring the master/follower link. In this example, the master broadcasts the Follower control word, a speed reference and a torque reference. The follower returns a status word and two actual values (this is not compulsory but is shown for clarity).

Master settings:

- Master/follower link activation
 - *60.01 M/F communication port* (fiber optic channel)
 - (*60.02 M/F node address* = 1)
 - *60.03 M/F mode* = *DDCS master* (for both fiber optic and wire connection)
 - *60.05 M/F HW connection* (*Ring* or *Star* for fiber optic, *Star* for wire)
- Data to be broadcast to the followers
 - *61.01 M/F data 1 selection* = *Follower CW* (Follower control word)
 - *61.02 M/F data 2 selection* = *Used speed reference*
 - *61.03 M/F data 3 selection* = *Torque reference act 5*
- Data to be read from the followers (optional)
 - *60.14 M/F follower selection* (selection of followers that data is read from)
 - *62.04 Follower node 2 data 1 sel ... 62.12 Follower node 4 data 3 sel* (mapping of data received from followers)

Follower settings:

- Master/follower link activation
 - *60.01 M/F communication port* (fiber optic channel)
 - *60.02 M/F node address* = 2...60
 - *60.03 M/F mode* = *DDCS follower* (for both fiber optic and wire connection)
 - *60.05 M/F HW connection* (*Ring* or *Star* for fiber optic, *Star* for wire)
 - Mapping of data received from master
 - *62.01 M/F data 1 selection* = *CW 16bit*
 - *62.02 M/F data 2 selection* = *Ref1 16bit*
 - *62.03 M/F data 3 selection* = *Ref2 16bit*
 - Selection of operating mode and control location
 - *19.12 Ext1 control mode* = *Speed* or *Torque*
 - *20.01 Ext1 commands* = *M/F link*
 - *20.02 Ext1 start trigger type* = *Level*
 - Selection of reference sources
 - *22.11 Speed ref1 source* = *M/F reference 1*
 - *26.11 Torque ref1 source* = *M/F reference 2*
 - Selection of data to be sent to master (optional)
 - *61.01 M/F data 1 selection* = *SW 16bit*
 - *61.02 M/F data 2 selection* = *Act1 16bit*
 - *61.03 M/F data 3 selection* = *Act2 16bit*
-

Specifications of the fiber optic master/follower link

- Maximum fiber optic cable length:
 - FDCO-01/02 or RDCO-04 with POF (Plastic Optic Fiber): 30 m
 - FDCO-01/02 or RDCO-04 with HCS (Hard-clad Silica Fiber): 200 m
 - For distances up to 1000 m, use two NOCR-01 optical converter/repeaters with glass optic cable (GOF, 62.5 micrometers, Multi-Mode)
- Transmission rate: 4 Mbit/s
- Total performance of the link: < 5 ms to transfer references between the master and followers.
- Protocol: DDCS (Distributed Drives Communication System)

Settings and diagnostics

Parameter groups [60 DDCS communication](#) (page 253), [61 D2D and DDCS transmit data](#) (page 257) and [62 D2D and DDCS receive data](#) (page 258).

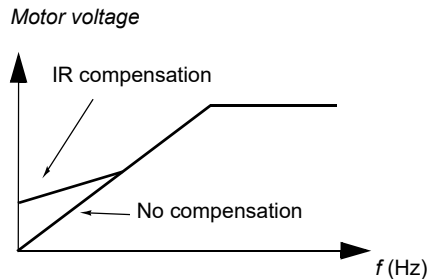
■ Scalar control

It is possible to select scalar control as motor control method. In scalar control mode, the switching of the output semiconductors is controlled to achieve the constant ratio between motor voltage and frequency (V/f) thus achieving constant flux. The reference value for the motor frequency (or speed) can be set by various sources and the voltage is adjusted accordingly.

Motor control and protection requires measurement of the DC voltages and two motor phase currents. Stator flux is calculated by integrating the motor voltage in vector space. Actual motor shaft speed is not needed for the motor control.

IR compensation for scalar motor control

IR compensation (also known as voltage boost) is available only when the motor control mode is scalar. When IR compensation is activated, the drive gives an extra voltage boost to the motor at low speeds. IR compensation is useful in applications that require a high break-away torque. In step-up applications, voltage cannot be fed through the transformer at 0 Hz, so an additional breakpoint is available for defining the compensation near zero frequency.



In vector control, no IR compensation is possible or needed as it is applied automatically.

Settings

- Parameters [19.20 Scalar control reference unit](#) (page 126), [97.13 IR compensation](#) (page 296).
- Parameter group [28 Frequency reference chain](#) (page 173).

■ Vector control

ACS580MV supports vector control mode. The switching of the output semiconductors is controlled to achieve the required stator flux and motor torque. The reference value for the torque controller comes from the speed controller.

Motor control requires measurement of the DC voltage and two motor phase currents. Stator flux is calculated by integrating the motor voltage in vector space. Motor torque is calculated as a cross product of the stator flux and the rotor current. Actual motor shaft speed is not needed for the motor control.

See also section [Scalar control](#)(page 34).

■ Reference ramping

Acceleration and deceleration ramping times can be set individually for speed and frequency reference.

With a speed or frequency reference, the ramps are defined as the time it takes for the drive to accelerate or decelerate between zero speed or frequency and the value defined by parameter [46.01 Speed scaling](#) or [46.02 Frequency scaling](#). The user can switch between two preset ramp sets using a binary source such as a digital input. For speed reference, also the shape of the ramp can be controlled.

Special acceleration/deceleration ramps

The acceleration/deceleration times for the jogging function can be defined separately; see section [Jogging](#) (page 38).

A deceleration ramp can be defined for emergency stop ("Off3" mode).

Settings

- Speed reference ramping: Parameters [23.11...23.19](#) and [46.01](#) (pages [145](#) and [233](#)).
 - Frequency reference ramping: Parameters [28.71...28.75](#) and [46.02](#) (pages [179](#) and [233](#)).
 - Jogging: Parameters [23.20](#) and [23.21](#) (page [148](#)).
 - Emergency stop ("Off3" mode): Parameter [23.23 Emergency stop time](#) (page [148](#)).
-

■ Constant speeds/frequencies

Constant speeds and frequencies are predefined references that can be quickly activated, for example, through digital inputs. It is possible to define up to 7 constant speeds for speed control and 7 constant frequencies for frequency control.



WARNING: Constant speeds and frequencies override the normal reference irrespective of where the reference is coming from.

Settings

Parameter groups [22 Speed reference selection](#) (page 139) and [28 Frequency reference chain](#) (page 173).

■ Critical speeds/frequencies

Critical speeds (sometimes called “skip speeds”) can be predefined for applications where it is necessary to avoid certain motor speeds or speed ranges because of, for example, mechanical resonance problems.

The critical speeds function prevents the reference from dwelling within a critical band for extended times. When a changing reference ([22.87 Speed reference act 7](#)) enters a critical range, the output of the function ([22.01 Speed ref unlimited](#)) freezes until the reference exits the range. Any instant change in the output is smoothed out by the ramping function further in the reference chain.

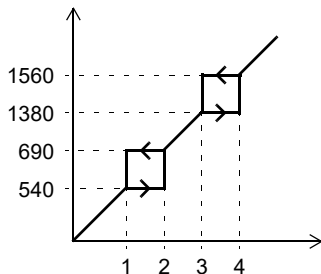
The function is also available for scalar motor control with a frequency reference. The input of the function is shown by [28.96 Frequency ref act 7](#), the output by [28.97 Frequency ref unlimited](#).

Example

A fan has vibrations in the range of 540 to 690 rpm and 1380 to 1560 rpm. To make the drive avoid these speed ranges,

- enable the critical speeds function by turning on bit 0 of parameter [22.51 Critical speed function](#), and
- set the critical speed ranges as in the figure below.

[22.01 Speed ref unlimited](#) (rpm)
(output of function)



1	Par. 22.52 = 540 rpm
2	Par. 22.53 = 690 rpm
3	Par. 22.54 = 1380 rpm
4	Par. 22.55 = 1560 rpm

[22.87 Speed reference act 7](#) (rpm)
(input of function)

Settings

- Critical speeds: parameters [22.51](#)...[22.57](#) (page [143](#))
- Critical frequencies: parameters [28.51](#)...[28.57](#) (page [178](#)).

Jogging

The jogging function enables the use of a momentary switch to briefly rotate the motor. The jogging function is typically used during servicing or commissioning to control the machinery locally.

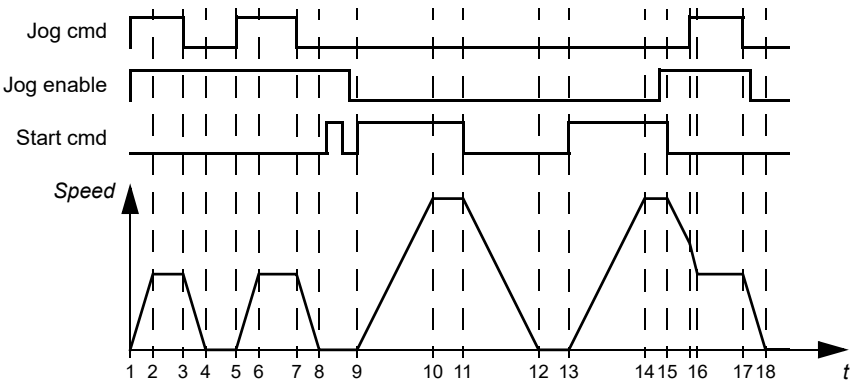
Two jogging functions (1 and 2) are available, each with their own activation sources and references. The signal sources are selected by parameters [20.26 Jogging 1 start source](#) and [20.27 Jogging 2 start source](#). When jogging is activated, the drive starts and accelerates to the defined jogging speed ([22.42 Jogging 1 ref](#) or [22.43 Jogging 2 ref](#)) along the defined jogging acceleration ramp ([23.20 Acc time jogging](#)). After the activation signal switches off, the drive decelerates to a stop along the defined jogging deceleration ramp ([23.21 Dec time jogging](#)).

The figure and table below provide an example of how the drive operates during jogging. In the example, the ramp stop mode is used (see parameter [21.03 Stop mode](#)).

Jog cmd = State of source set by [20.26 Jogging 1 start source](#) or [20.27 Jogging 2 start source](#)

Jog enable = State of source set by [20.25 Jogging enable](#)

Start cmd = State of drive start command.



Phase	Jog cmd	Jog enable	Start cmd	Description
1-2	1	1	0	Drive accelerates to the jogging speed along the acceleration ramp of the jogging function.
2-3	1	1	0	Drive follows the jog reference.
3-4	0	1	0	Drive decelerates to zero speed along the deceleration ramp of the jogging function.
4-5	0	1	0	Drive is stopped.

Phase	Jog cmd	Jog enable	Start cmd	Description
5-6	1	1	0	Drive accelerates to the jogging speed along the acceleration ramp of the jogging function.
6-7	1	1	0	Drive follows the jog reference.
7-8	0	1	0	Drive decelerates to zero speed along the deceleration ramp of the jogging function.
8-9	0	1->0	0	Drive is stopped. As long as the jog enable signal is on, start commands are ignored. After jog enable switches off, a fresh start command is required.
9-10	x	0	1	Drive accelerates to the speed reference along the selected acceleration ramp (parameters 23.11...23.19).
10-11	x	0	1	Drive follows the speed reference.
11-12	x	0	0	Drive decelerates to zero speed along the selected deceleration ramp (parameters 23.11...23.19).
12-13	x	0	0	Drive is stopped.
13-14	x	0	1	Drive accelerates to the speed reference along the selected acceleration ramp (parameters 23.11...23.19).
14-15	x	0->1	1	Drive follows the speed reference. As long as the start command is on, the jog enable signal is ignored. If the jog enable signal is on when the start command switches off, jogging is enabled immediately.
15-16	0->1	1	0	Start command switches off. The drive starts to decelerate along the selected deceleration ramp (parameters 23.11...23.19). When the jog command switches on, the decelerating drive adopts the deceleration ramp of the jogging function.
16-17	1	1	0	Drive follows the jog reference.
17-18	0	1->0	0	Drive decelerates to zero speed along the deceleration ramp of the jogging function.

See also the block diagram on page [408](#).

Notes:

- Jogging is not available when the drive is in local control.
- Jogging cannot be enabled when the drive start command is on, or the drive started when jogging is enabled. Starting the drive after the jog enable switches off requires a fresh start command.



WARNING! If jogging is enabled and activated while the start command is on, jogging will activate as soon as the start command switches off.

- If both jogging functions are activated, the one that was activated first has priority.
- Jogging uses the speed control mode.
- Ramp shape times (parameters [23.16](#)...[23.19](#)) do not apply to jogging acceleration/deceleration ramps.
- The inching functions activated through fieldbus (see [06.01 Main control word](#), bits 8...9) use the references and ramp times defined for jogging, but do not require the jog enable signal.

Settings

Parameters [20.25 Jogging enable](#) (page [134](#)), [20.26 Jogging 1 start source](#) (page [134](#)), [20.27 Jogging 2 start source](#) (page [134](#)), [22.42 Jogging 1 ref](#) (page [143](#)), [22.43 Jogging 2 ref](#) (page [143](#)), [23.20 Acc time jogging](#) (page [148](#)) and [23.21 Dec time jogging](#) (page [148](#)).

■ DC magnetization

DC magnetization depending on the selected start mode ([21.01 Start mode](#) or [21.19 Scalar start mode](#)), it can be applied to guarantee the highest possible breakaway torque. By adjusting the magnetization time ([21.02 Magnetization time](#)), it is possible to synchronize the motor start. [21.10 DC current reference](#) is effective in scalar control mode.

Settings

Parameters [21.19 Scalar start mode](#), [21.02 Magnetization time](#), [21.01 Start mode](#) and [21.10 DC current reference](#).

Application control

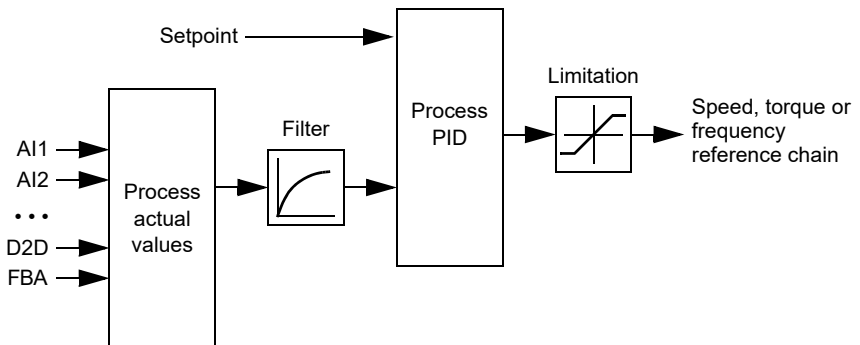
■ Process PID control

There is a built-in process PID controller in the drive. The controller can be used to control process variables such as pressure, flow or fluid level.

In process PID control, a process reference (setpoint) is connected to the drive instead of a speed reference. An actual value (process feedback) is also brought back to the drive. The process PID control adjusts the drive speed in order to keep the measured process quantity (actual value) at the desired level (setpoint).

Process PID control operates on a 2 ms time level.

The simplified block diagram below illustrates the process PID control. For a more detailed block diagram, see page [422](#).



The control program contains two complete sets of process PID controller settings that can be alternated whenever necessary; see parameter [40.57 PID set1/set2 selection](#).

Note: Process PID control is only available in external control; see section [Local control vs. external control](#) (page [20](#)).

Quick configuration of the process PID controller

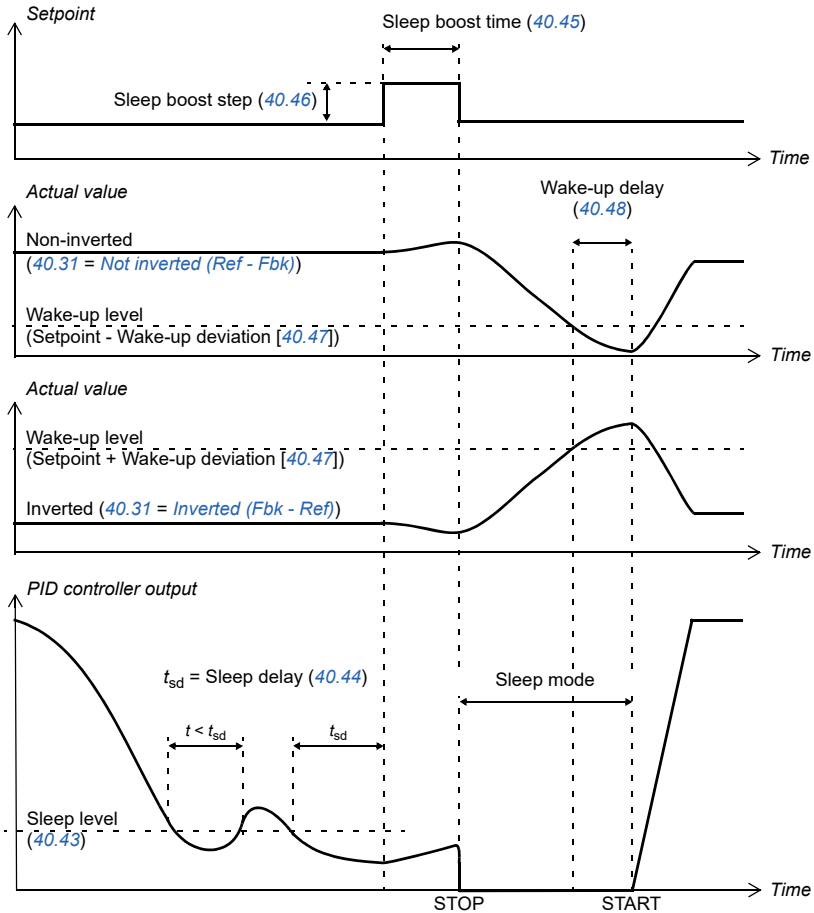
1. Activate the process PID controller (parameter [40.07 Set 1 PID operation mode](#)).
2. Select a feedback source (parameters [40.08...40.11](#)).
3. Select a setpoint source (parameters [40.16...40.25](#)).
4. Set the gain, integration time, derivation time, and the PID output levels ([40.32 Set 1 gain](#), [40.33 Set 1 integration time](#), [40.34 Set 1 derivation time](#), [40.36 Set 1 output min](#) and [40.37 Set 1 output max](#)).
5. The PID controller output is shown by parameter [40.01 Process PID output actual](#). Select it as the source of, for example, [22.11 Speed ref1 source](#).

Sleep function for process PID control

The sleep function can be used in PID control applications that involve relatively long periods of low demand (for example, a tank is at level). During such periods, the sleep function saves energy by stopping the motor completely, instead of running the motor slowly below the efficient operating range of the system. When the feedback changes, the PID controller wakes the drive up.

Note: The sleep function is disabled when mechanical brake control (see page [44](#)) is active.

Example: The drive controls a pressure boost pump. The water consumption falls at night. As a consequence, the process PID controller decreases the motor speed. However, due to natural losses in the pipes and the low efficiency of the centrifugal pump at low speeds, the motor would never stop rotating. The sleep function detects the slow rotation and stops unnecessary pumping after the sleep delay has passed. The drive shifts into sleep mode, still monitoring the pressure. The pumping resumes when the pressure falls under the wake-up level (setpoint - wake-up deviation) and the wake-up delay has passed.



Tracking

In tracking mode, the PID block output is set directly to the value of parameter [40.50](#) (or [41.50](#)) *Set 1 tracking ref selection*. The internal I term of the PID controller is set so that no transient is allowed to pass on to the output, so when the tracking mode is left, normal process control operation can be resumed without a significant bump.

Settings

- Parameter [96.04 Macro select](#) (macro selection)
- Parameter groups [40 Process PID set 1](#) (page [310](#)) and [41 Process PID set 2](#) (page [323](#)).

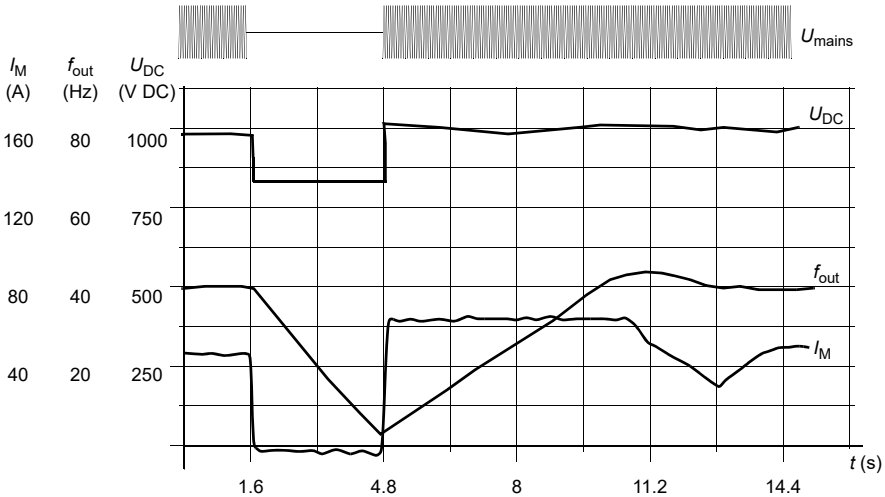
DC voltage control

■ Overvoltage control

Overvoltage control of the intermediate DC link is typically needed when the motor is in generating mode. The motor can generate when it decelerates or when the load overhauls the motor shaft, causing the shaft to turn faster than the applied speed or frequency. To prevent the DC voltage from exceeding the overvoltage control limit, the overvoltage controller automatically decreases the generating torque when the limit is reached. The overvoltage controller also increases any programmed deceleration times if the limit is reached; to achieve shorter deceleration times, a brake chopper and resistor may be required.

■ Undervoltage control (power loss ride-through)

If the incoming supply voltage is cut off, the drive will continue to operate by utilizing the kinetic energy of the rotating motor. The drive will be fully operational as long as the motor rotates and generates energy to the drive. The drive can continue operation until undervoltage fault is tripped.



U_{DC} = intermediate circuit voltage of the drive, f_{out} = output frequency of the drive, I_M = motor current
 Loss of supply voltage at nominal load ($f_{out} = 40$ Hz). The intermediate circuit DC voltage drops to the minimum limit. The controller keeps the voltage steady as long as the mains is switched off. The drive runs the motor in generator mode. The motor speed falls but the drive is operational as long as the motor has enough kinetic energy.

■ Emergency stop

The emergency stop signal is connected to the input selected by parameter [21.05 Emergency stop source](#). An emergency stop can also be generated through fieldbus (parameter [06.01 Main control word](#), bits 0...2).

- The mode of the emergency stop is Off3: Stop by the emergency stop ramp defined by parameter [23.23 Emergency stop time](#).

Notes:

- The installer of the equipment is responsible for installing the emergency stop devices and all additional devices needed for the emergency stop function to fulfill the required emergency stop categories. For more information, contact your local ABB representative.
- After an emergency stop signal is detected, the emergency stop function cannot be canceled even though the signal is canceled.
- If the minimum (or maximum) torque limit is set to 0%, the emergency stop function may not be able to stop the drive.

Settings

Parameters [06.17 Drive status word 2](#) (page 69), [06.18 Start inhibit status word](#) (page 70), [21.05 Emergency stop source](#) (page 130), [23.23 Emergency stop time](#) (page 148).

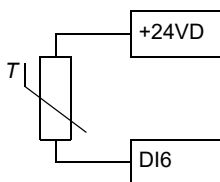
■ Motor thermal protection

The control program features a motor temperature monitoring function.

The motor temperature can be monitored using sensors installed in the windings.

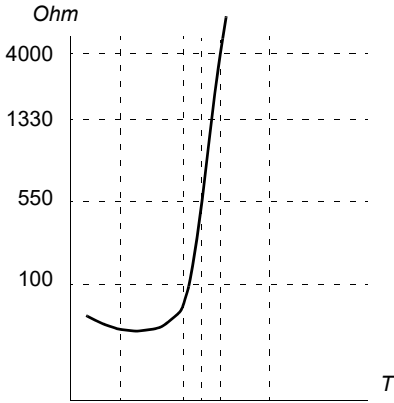
Temperature monitoring using PTC sensors

One PTC sensor can be connected to digital input DI6.



The resistance of the PTC sensor increases when its temperature rises. The increasing resistance of the sensor decreases the voltage at the input, and eventually its state switches from 1 to 0, indicating overtemperature.

The figure below shows typical PTC sensor resistance values as a function of temperature.



For detailed wiring information, refer to the *Hardware Manual* of the drive.

Temperature monitoring using Pt100 sensors

1...3 Pt100 sensors can be connected in series to an analog input and an analog output.

The analog output feeds a constant excitation current of 9.1 mA through the sensor. The sensor resistance increases as the motor temperature rises, as does the voltage over the sensor. The temperature measurement function reads the voltage through the analog input and converts it into degrees Celsius.

It is possible to adjust the motor temperature supervision limits and select how the drive reacts when overtemperature is detected.

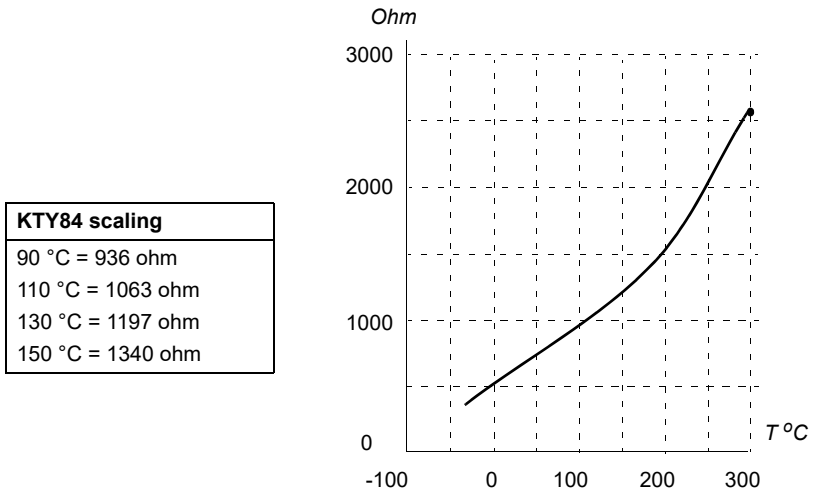
For the wiring of the sensor, refer to the *Hardware Manual* of the drive.

Temperature monitoring using KTY84 sensors

One KTY84 sensor can be connected to an analog input and an analog output on the control unit.

The analog output feeds a constant excitation current of 2.0 mA through the sensor. The sensor resistance increases as the motor temperature rises, as does the voltage over the sensor. The temperature measurement function reads the voltage through the analog input and converts it into degrees Celsius.

The figure and table below show typical KTY84 sensor resistance values as a function of the motor operating temperature.



It is possible to adjust the motor temperature supervision limits and select how the drive reacts when overtemperature is detected.

For the wiring of the sensor, refer to the *Hardware Manual* of the drive.

Motor fan control logic (parameters [35.100...35.106](#))

If the motor has an external cooling fan, it is possible to use a drive signal (for example, running/stopped) to control the starter of the fan via a relay or digital output. A digital input can be selected for fan feedback. A loss of the feedback signal will optionally cause a warning or a fault.

Start and stop delays can be defined for the fan. In addition, a feedback delay can be set to define the time within which feedback must be received after the fan starts.

Settings

Parameter group [35 Motor thermal protection](#) (page [205](#)).

■ Other programmable protection functions

External events (parameters [31.01...31.10](#))

Five different event signals from the process can be connected to selectable inputs to generate trips and warnings for the driven equipment. When the signal is lost, an external event (fault, warning, or a mere log entry) is generated. The contents of the messages can be edited on the control panel by selecting **Menu - Settings - Edit texts**.

Stall protection (parameters [31.24](#)...[31.28](#))

The drive protects the motor in a stall situation. It is possible to adjust the supervision limits (current, frequency and time) and choose how the drive reacts to a motor stall condition.

Overspeed protection (parameter [31.30](#))

The user can set overspeed limits by specifying a margin that is added to the currently-used maximum and minimum speed limits.

Local control loss detection (parameter [49.05](#))

The parameter selects how the drive reacts to a control panel or PC tool communication break.

■ Automatic fault resets

The drive can automatically reset itself after overcurrent, overvoltage, undervoltage and external faults. The user can also specify a fault that is automatically reset.

By default, automatic resets are off and must be specifically activated by the user.

Settings

Parameters [31.12](#)...[31.16](#) (page [190](#)).

Diagnostics

■ Fault and warning messages, data logging

See chapter [Fault tracing](#) (page 343).

■ Signal supervision

Three signals can be selected to be supervised by this function. Whenever a supervised signal exceeds or falls below predefined limits, a bit in [32.01 Supervision status](#) is activated, and a warning or fault generated. The contents of the message can be edited on the control panel by selecting **Menu - Settings - Edit texts**.

The supervised signal is low-pass filtered.

Settings

Parameter group [32 Supervision](#) (page 193).

■ Maintenance timers and counters

The program has six different maintenance timers or counters that can be configured to generate a warning when a pre-defined limit is reached. The contents of the message can be edited on the control panel by selecting **Menu - Settings - Edit texts**.

The timer/counter can be set to monitor any parameter. This feature is especially useful as a service reminder.

There are three types of counters:

- On-time timers. Measures the time a binary source (for example, a bit in a status word) is on.
- Signal edge counters. The counter is incremented whenever the monitored binary source changes state.
- Value counters. The counter measures, by integration, the monitored parameter. An alarm is given when the calculated area below the signal peak exceeds a user-defined limit.

Settings

Parameter group [33 Generic timer & counter](#) (page 196).

■ Energy saving calculators

This feature consists of the following functionalities:

- An energy optimizer that adjusts the motor flux in such a way that the total system efficiency is maximized
- A counter that monitors used and saved energy by the motor and displays them in

kWh, currency or volume of CO2 emissions, and

- A load analyzer showing the load profile of the drive (see separate section on page 50).

Note: The accuracy of the energy savings calculation is directly dependent on the accuracy of the reference motor power given in parameter [45.19 Comparison power](#).

Settings

Parameter group [45 Energy efficiency](#) (page 230).

■ Load analyzer

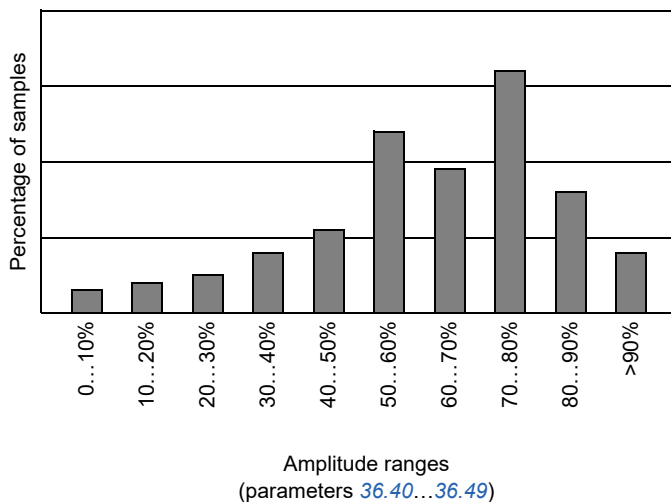
Peak value logger

The user can select a signal to be monitored by a peak value logger. The logger records the peak value of the signal along with the time the peak occurred, as well as motor current, DC voltage and motor speed at the time of the peak. The peak value is sampled at 2 ms intervals.

Amplitude loggers

The control program has two amplitude loggers. Depending on the setting of parameter [36.08 Logger function](#), the loggers are active continuously or only when the drive is modulating.

For amplitude logger 2, the user can select a signal to be sampled at 200 ms intervals, and specify a value that corresponds to 100%. The collected samples are sorted into 10 read-only parameters according to their amplitude. Each parameter represents an amplitude range 10 percentage points wide, and displays the percentage of the collected samples that have fallen within that range.



Amplitude logger 1 is fixed to monitor motor current, and cannot be reset. With amplitude logger 1, 100% corresponds to the maximum output current of the drive ($I_{\max}$). The measured current is logged continuously. The distribution of samples is shown by parameters 36.20...36.29.

Settings

Parameter group 36 *Load analyzer* (page 211).

Miscellaneous

■ User parameter sets

The drive supports four user parameter sets that can be saved to the permanent memory and recalled using drive parameters. It is also possible to use digital inputs to switch between user parameter sets.

A user parameter set contains all editable values in parameter groups 10...99 except

- I/O extension module settings (groups 14...16)
- data storage parameters (group 47)
- fieldbus communication settings (groups 51...56)

As the motor settings are included in the user parameter sets, make sure the settings correspond to the motor used in the application before recalling a user set.

Settings

Parameters [96.10...96.13](#) (page [287](#)).

■ User lock

For better cyber security, it is highly recommended that you set a master pass code to prevent eg. the changing of parameter values and/or the loading of firmware and other files.



WARNING! ABB will not be liable for damages or losses caused by the failure to activate the user lock using a new pass code. See [Cyber security disclaimer](#) (page [2](#)). The user defined master pass code cannot be overridden. If the master pass code is lost, a re-commissioning of the drive is necessary.

To activate the user lock for the first time, enter the default pass code, 10000000, into [96.02 Pass code](#). This will make parameters [96.100...96.102](#) visible. Then enter a new pass code into [96.100 Change user pass code](#), and confirm the code in [96.101 Confirm user pass code](#). In [96.102 User lock functionality](#), define the actions that you want to prevent (we recommend you select all the actions unless otherwise required by the application).

To close the user lock, enter an invalid pass code into [96.02 Pass code](#), activate [96.08 Control board boot](#), or cycle the power. With the lock closed, parameters [96.100...96.102](#) are hidden.

To reopen the lock, enter your pass code into [96.02 Pass code](#). This will again make parameters [96.100...96.102](#) visible.

Settings

Parameters [96.02](#) (page [286](#)) and [96.100...96.102](#) (page [294](#)).

■ Parameter checksum calculation

A parameter checksum can be calculated from a user-definable set of parameters to monitor changes in the drive configuration. The calculated checksum is compared to 1...4 reference checksums; in case of a mismatch, an event (a pure event, warning or fault) is generated.

By default, the set of parameters included in the calculation contain most parameters with the exception of

- actual signals
- parameter group [47 Data storage](#)
- parameters that are activated to validate new settings (such as [51.27](#) and [96.07](#))
- parameters that are not saved to the flash memory (such as [96.24...96.26](#))
- dynamic parameters (eg. parameters that vary according to hardware), and
- application program parameters.

The default set can be edited using the Drive customizer PC tool.

Settings

Parameters [96.53...96.59](#) (page [291](#)).

■ Data storage parameters

Twenty-four (sixteen 32-bit, eight 16-bit) parameters are reserved for data storage. These parameters are unconnected by default and can be used for linking, testing and commissioning purposes. They can be written to and read from using other parameters' source or target selections.

Settings

Parameter group [47 Data storage](#) (page [235](#)).



Parameters

What this chapter contains

The chapter describes the parameters, including actual signals, of the control program.

Terms and abbreviations

Term	Definition
Actual signal	Type of <i>parameter</i> that is the result of a measurement or calculation by the drive, or contains status information. Most actual signals are read-only, but some (especially counter-type actual signals) can be reset.
Def	(In the following table, shown on the same row as the parameter name) The default value of a parameter.
FbEq16	(In the following table, shown on the same row as the parameter range, or for each selection) 16-bit fieldbus equivalent: The scaling between the value shown on the panel and the integer used in communication when a 16-bit value is selected for transmission to an external system. A dash (-) indicates that the parameter is not accessible in 16-bit format. The corresponding 32-bit scalings are listed in chapter <i>Additional parameter data</i> (page 299).
Other	The value is taken from another parameter. Choosing “Other” displays a parameter list in which the user can specify the source parameter.
Other [bit]	The value is taken from a specific bit in another parameter. Choosing “Other” displays a parameter list in which the user can specify the source parameter and bit.
Parameter	Either a user-adjustable operating instruction for the drive, or an <i>actual signal</i> .
p.u.	Per unit

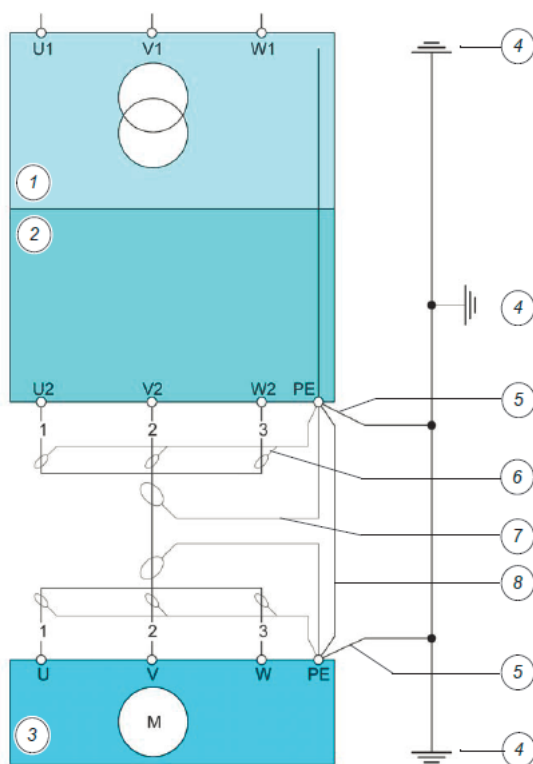
Summary of parameter groups

Group	Contents	Page
01 Actual values	Basic signals for monitoring the drive.	59
03 Input references	Values of references received from various sources.	63
04 Warnings and faults	Information on warnings and faults that occurred last.	64
05 Diagnostics	Various run-time-type counters and measurements related to drive maintenance.	66
06 Control and status words	Drive control and status words.	67
07 System info	Drive hardware and firmware information.	77
10 Standard DI, RO	Configuration of digital inputs and relay outputs.	80
11 Standard DIO	Configuration of digital input/outputs.	86
12 Standard AI	Configuration of standard analog inputs.	86
13 Standard AO	Configuration of standard analog outputs.	91
14 I/O extension module 1	Configuration of I/O extension module 1.	95
15 I/O extension module 2	Configuration of I/O extension module 2.	117
16 I/O extension module 3	Configuration of I/O extension module 3.	120
17 Control hub IO	Monitoring of Control Hub input/output signals.	124
19 Operation mode	Selection of local and external control location sources and operating modes.	125
20 Start/stop/direction	Start/stop/direction and run/start/jog enable signal source selection; positive/negative reference enable signal source selection.	126
21 Start/stop mode	Start and stop modes; emergency stop mode and signal source selection; DC magnetization settings;	135
22 Speed reference selection	Speed reference selectionSee the control chain diagrams on pages 406...408.	139
23 Speed reference ramp	Speed reference ramp settings (programming of the acceleration and deceleration rates for the drive).	145
24 Speed reference conditioning	Speed error calculation; speed error window control.	145
25 Speed control	Speed controller settings.	145
26 Torque reference chain	Settings for the torque reference chain.	161
28 Frequency reference chain	Settings for the frequency reference chain.	173
30 Limits	Drive operation limits.	182
31 Fault functions	Configuration of external events; selection of behavior of the drive upon fault situations.	188
32 Supervision	Configuration of signal supervision functions 1...3.	193
33 Generic timer & counter	Configuration of Generic timers/counters.	196
34 Protections	Motor protection functions	203
35 Motor thermal protection	Motor thermal protection settings such as temperature measurement configuration and motor fan control configuration.	205
36 Load analyzer	Peak value and amplitude logger settings.	211
40 Process PID set 1	Settings for the energy saving calculators.	215
41 Process PID set 2	Settings for the energy saving calculators.	228
45 Energy efficiency	Settings for the energy saving calculators.	230

Group	Contents	Page
46 Monitoring/scaling settings	Speed supervision settings; actual signal filtering; general scaling settings.	233
47 Data storage	Data storage parameters that can be written to and read from using other parameters' source and target settings.	235
49 Panel port communication	Communication settings for the control panel port on the drive.	238
50 Fieldbus adapter (FBA)	Fieldbus communication configuration.	240
51 FBA A settings	Fieldbus adapter A configuration.	246
52 FBA A data in	Selection of data to be transferred from drive to fieldbus controller through fieldbus adapter A.	248
53 FBA A data out	Selection of data to be transferred from fieldbus controller to drive through fieldbus adapter A.	248
54 FBA B settings	Fieldbus adapter B configuration.	249
55 FBA B data in	Selection of data to be transferred from drive to fieldbus controller through fieldbus adapter B.	250
56 FBA B data out	Selection of data to be transferred from fieldbus controller to drive through fieldbus adapter B.	251
59 Embedded Ethernet	Configuration of the embedded fieldbus (EFB) interface.	251
70 Power module values phase A	Power module measurements from all power modules of phase A.	261
71 Power module values phase B	Power module measurements from all power modules of phase B.	263
72 Power module values phase C	Power module measurements from all power modules of phase C.	263
81 System control and monitoring	The application software parameters used for system control and monitoring.	264
82 Charging, MCB control	MCB control (drive charging control).	269
83 Cooling system	Converter cooling system control.	274
84 Motor temperature monitoring	Converter cooling system control.	277
85 SBU control and monitoring	Synchronized bypass unit(SBU) configuration.	279
87 AC500 I/O interface	Configuration of AC500 digital inputs and relay / transistor outputs.	283
90 Feedback selection	Motor and load feedback configuration.	285
96 System	Language selection; access levels; parameter save and restore; control unit reboot; user parameter sets; unit selection.	285
97 Motor control	Motor model settings.	295
98 User motor parameters	Motor values supplied by the user that are used in the motor model.	296
99 Motor data	Motor configuration settings.	297

Naming convention

The labeling of the converter and motor electrical variables is based on the following convention:



1	Input transformer (TRU)
2	Drive
3	Motor
4	Earth electrode
5	Ground cable
6	Cable screen
7	Cable shield
8	Equipotential bonding conductor

Refer to the HW manual for more details.

Parameter listing

No.	Name/Value	Description	Def/FbEq16
01 Actual values		Basic signals for monitoring the drive. All parameters in this group are read-only unless otherwise noted.	
01.01	<i>Motor speed used</i>	Measured or estimated motor speed depending on which type of feedback is used (see parameter 90.41 Motor feedback selection). A filter time constant for this signal can be defined by parameter 46.11 Filter time motor speed .	-
	-30000.00 ... 30000.00 rpm	Measured or estimated motor speed.	See par. 46.01
01.02	<i>Motor speed estimated</i>	Estimated motor speed in rpm. A filter time constant for this signal can be defined by parameter 46.11 Filter time motor speed .	-
	-30000.00 ... 30000.00 rpm	Estimated motor speed.	See par. 46.01
01.03	<i>Motor speed %</i>	Shows the value of 01.01 Motor speed used in percent of the synchronous speed of the motor.	10 = 1%
	-1000.00 ... 1000.00%	Measured or estimated motor speed.	See par. 46.01
01.06	<i>Output frequency</i>	Estimated drive output frequency in Hz. A filter time constant for this signal can be defined by parameter 46.12 Filter time output frequency .	-
	-600.00 ... 600.00 Hz	Estimated output frequency.	See par. 46.02
01.07	<i>Motor current</i>	Measured motor current (rms).	-
	0.00 ... 30000.00 A	Motor current.	1A = 1A
01.08	<i>Grid current</i>	Measured transformer primary side current (rms).	-
	0.00 ... 585.00 A	Grid current.	1A = 1A
01.10	<i>Motor torque</i>	Motor torque in percent of the nominal motor torque. See also parameter 01.30 Nominal torque scale . A filter time constant for this signal can be defined by parameter 46.13 Filter time motor torque .	-
	-1600.0 ... 1600.0%	Motor torque.	See par. 46.03
01.11	<i>DC voltage</i>	Measured DC link voltage. When the drive is charged or modulating, this parameter displays an average of DC link voltages of all power modules. During the discharge, this parameter displays the maximum of all active power modules' DC link voltages. This parameter displays zero when all power modules are off. This parameter displays the last value that power module connects BCU when power module lost connection with BCU.	-
	0.00 ... 2000.00 V	DC link voltage.	10 = 1 V
01.13	<i>Output voltage</i>	Calculated motor voltage in V AC.	-
	0...20000 V	Motor voltage.	1 = 1 V

No.	Name/Value	Description	Def/FbEq16
01.14	<i>Output power</i>	Drive output power. The unit is selected by parameter 96.16 Unit selection . A filter time constant for this signal can be defined by parameter 46.14 Filter time power out .	-
	-32768.00 ... 32767.00 kW or hp	Output power.	1 = 1 unit
01.15	<i>Output power % of motor nom</i>	Shows the value of 01.14 Output power in percent of the nominal power of the motor.	-
	-300.00 ... 300.00%	Output power.	1 = 1%
01.17	<i>Motor shaft power</i>	Estimated mechanical power at motor shaft. The unit is selected by parameter 96.16 Unit selection . A filter time constant for this signal can be defined by parameter 46.14 Filter time power out .	-
	-32768.00 ... 32767.00 kW or hp	Motor shaft power.	1 = 1 unit
01.18	<i>Inverter GWh motoring</i>	Amount of energy that has passed through the drive (in either direction) in full gigawatt-hours. The minimum value is zero.	-
	0...32767 GWh	Energy in GWh.	1 = 1 GWh
01.19	<i>Inverter MWh motoring</i>	Amount of energy that has passed through the drive (in either direction) in full megawatt-hours. Whenever the counter rolls over, 01.18 Inverter GWh motoring is incremented. The minimum value is zero.	-
	0...1000 MWh	Energy in MWh.	1 = 1 MWh
01.20	<i>Inverter kWh motoring</i>	Amount of energy that has passed through the drive (in either direction) in full kilowatt-hours. Whenever the counter rolls over, 01.19 Inverter MWh motoring is incremented. The minimum value is zero.	-
	0...1000 kWh	Energy in kWh.	10 = 1 kWh
01.24	<i>Flux actual %</i>	Used flux reference in percent of nominal flux of motor.	-
	0...200%	Flux reference.	1 = 1%
01.29	<i>Speed change rate</i>	Rate of speed reference change after the speed ramp generator.	-
	-15000 ... 15000 rpm/s	Rate of speed change.	1 = 1 rpm/s
01.30	<i>Nominal torque scale</i>	Torque that corresponds to 100% of nominal motor torque. Note: This value is copied from parameter 99.12 Motor nominal torque if entered. Otherwise the value is calculated from other motor data.	-
	0.000... 4000000.000N.m	Nominal torque.	1 = 100 unit
01.31	<i>Ambient temperature</i>	Measured ambient temperature in the inverter unit cabinet.	-
	-100.0... 500.0 °C	Ambient temperature.	1 = 1 °C
01.32	<i>Trafo winding U1 temperature</i>	Measured transformer winding temperature in phase U1.	-
	-100.0... 500.0 °C	Transformer winding U1 temperature.	1 = 1 °C
01.33	<i>Trafo winding V1 temperature</i>	Measured transformer winding temperature in phase V1.	-
	-100.0... 500.0 °C	Transformer winding V1 temperature.	1 = 1 °C

No.	Name/Value	Description	Def/FbEq16
01.34	<i>Trafo winding W1 temperature</i>	Measured transformer winding temperature in phase W1.	-
	-100.0... 500.0 °C	Transformer winding W1 temperature.	1 = 1 °C
01.35	<i>INU air pressure</i>	Measured air pressure drop across the inverter unit cabinet.	-
	-1000.0.... 1000.0 pa	INU air pressure.	1 = 1 pa
01.40	<i>Phase U2 motor current</i>	Measured motor current in phase U2.	-
	-825 ... 825 A	Motor current phase U2.	1A = 1A
01.41	<i>Phase V2 motor current</i>	Measured motor current in phase V2.	-
	-825 ... 825 A	Motor current phase V2.	1A = 1A
01.42	<i>Phase W2 motor current</i>	Measured motor current in phase W2.	-
	-825 ... 825 A	Motor current phase W2.	1A = 1A
01.43	<i>Phase U2 motor voltage</i>	Measured motor voltage phase U2.	-
	-20500 ... 20500 V	Motor voltage phase U2.	1V = 1V
01.44	<i>Phase V2 motor voltage</i>	Measured motor voltage phase V2.	-
	-20500 ... 20500 V	Motor voltage phase V2.	1V = 1V
01.45	<i>Phase W2 motor voltage</i>	Measured motor voltage phase W2.	-
	-20500 ... 20500 V	Motor voltage phase W2.	1V = 1V
01.46	<i>Phase A average DC voltage</i>	Average DC link voltage of power modules in phase A. The average DC voltage displayed in this parameter is valid during discharge up to the point when all power modules turn off (stop communicating with BCU). After all power modules are turned off, this parameter keeps the last value of DC link voltage before the turn off.	-
	0 ... 1400 V	Average DC link voltage phase A.	1V = 1V
01.47	<i>Phase B average DC voltage</i>	Average DC link voltage of power modules in phase B. See parameter 01.46 for more details.	-
	0 ... 1400 V	Average DC link voltage phase B.	1V = 1V
01.48	<i>Phase C average DC voltage</i>	Average DC link voltage of power modules in phase C. See parameter 01.46 for more details.	-
	0 ... 1400 V	Average DC link voltage phase C.	1V = 1V
01.49	<i>Phase U1 grid current</i>	Measured transformer primary side current in phase U1.	-
	-825 ... 825 A	Grid current phase U1.	1A = 1A
01.50	<i>Phase V1 grid current</i>	Measured transformer primary side current in phase V1.	-
	-825 ... 825 A	Grid current phase V1.	1A = 1A
01.51	<i>Phase W1 grid current</i>	Measured transformer primary side current in phase W1.	-
	-825 ... 825 A	Grid current phase W1.	1A = 1A

No.	Name/Value	Description	Def/FbEq16
01.52	<i>Phase A average secondary voltage</i>	Average secondary input voltage (phase-to-phase rms) of power modules in Phase A.	-
	0 ... 1500 V	Average secondary input voltage phase A.	1V = 1V
01.53	<i>Phase B average secondary voltage</i>	Average secondary input voltage (phase-to-phase rms) of power modules in Phase B.	-
	0 ... 1500 V	Average secondary input voltage phase B.	1V = 1V
01.54	<i>Phase C average secondary voltage</i>	Average secondary input voltage (phase-to-phase rms) of power modules in Phase C.	-
	0 ... 1500 V	Average secondary input voltage phase C.	1V = 1V
01.61	<i>Abs motor speed used</i>	Absolute value of <i>01.01 Motor speed used</i> .	-
	0.00 ... 30000.00 rpm	Measured or estimated motor speed.	See par. 46.01
01.62	<i>Abs motor speed %</i>	Absolute value of <i>01.03 Motor speed %</i> .	-
	0.00 ... 1000.00%	Measured or estimated motor speed.	10 = 1%
01.63	<i>Abs output frequency</i>	Absolute value of <i>01.06 Output frequency</i> .	-
	0.00 ... 600.00 Hz	Estimated output frequency.	See par. 46.02
01.64	<i>Abs motor torque</i>	Absolute value of <i>01.10 Motor torque</i> .	-
	0.0 ... 1600.0%	Motor torque.	See par. 46.03
01.65	<i>Abs output power</i>	Absolute value of <i>01.14 Output power</i> .	-
	0.00 ... 32767.00 kW or hp	Output power.	1 = 1 unit
01.66	<i>Abs output power % motor nom</i>	Absolute value of <i>01.15 Output power % of motor nom</i> .	-
	0.00 ... 300.00%	Output power.	10 = 1%
01.68	<i>Abs motor shaft power</i>	Absolute value of <i>01.17 Motor shaft power</i> .	-
	0.00 ... 32767.00 kW or hp	Motor shaft power.	1 = 1 unit
01.70	<i>Ambient temperature %</i>	Measured temperature of incoming cooling air. The amplitude range of 0...100% corresponds to 0...60 °C or 32...140 °F. See also <i>01.31 Ambient temperature</i> .	-
	-200.00 ... 200.00%	Cooling air temperature.	1 = 1%
01.170	<i>SBU grid voltage</i>	Parameter displays the actual grid voltage for SBU application.	-
	0 ... 20000 V	Grid voltage.	1V = 1V
01.171	<i>SBU motor voltage</i>	Parameter displays the actual drive output voltage on motor side for SBU application.	-
	0 ... 20000 V	Motor voltage.	1V = 1V
01.201	<i>Motor current % of motor nom</i>	Show the value of <i>01.07 Motor current</i> in percentage of the measured motor current.	-
	0.00 ... 1000.00%	Output motor current.	1 = 1%

No.	Name/Value	Description	Def/FbEq16
03 Input references		Values of references received from various sources. All parameters in this group are read-only unless otherwise noted.	
03.01	<i>Panel reference</i>	Reference 1 given from the control panel or PC tool. Unit (rpm, Hz or %) depends on parameter Local ref unit.	-
	-100000.00 ... 100000.00	Control panel or PC tool reference.	1 = 10
03.02	<i>Panel reference 2</i>	Remote reference given from the control panel or PC tool.	-
	-30000.00 ... 30000.00	Remote control panel or PC tool reference.	1 = 10
03.05	<i>FB A reference 1</i>	Reference 1 received through fieldbus adapter A. See also chapter <i>Fieldbus control through a fieldbus adapter</i> (page 383).	-
	-100000.00 ... 100000.00	Reference 1 from fieldbus adapter A.	1 = 10
03.06	<i>FB A reference 2</i>	Reference 2 received through fieldbus adapter A.	-
	-100000.00 ... 100000.00	Reference 2 from fieldbus adapter A.	1 = 10
03.07	<i>FB B reference 1</i>	Reference 1 received through fieldbus adapter B.	-
	-100000.00 ... 100000.00	Reference 1 from fieldbus adapter B.	1 = 10
03.08	<i>FB B reference 2</i>	Reference 2 received through fieldbus adapter B.	-
	-100000.00 ... 100000.00	Reference 2 from fieldbus adapter B.	1 = 10
03.13	<i>M/F or D2D ref1</i>	Master/follower reference 1 received from the master. The value has been scaled according to parameter 60.10 M/F ref1 type. See also section <i>Master/follower functionality</i> (page 31).	1 = 10
	-30000.00 ... 30000.00	Scaled reference 1 received from master.	1 = 10
03.14	<i>M/F or D2D ref2</i>	Master/follower reference 2 received from the master. The value has been scaled according to parameter 60.11 M/F ref2 type.	1 = 10
	-30000.00 ... 30000.00	Scaled reference 2 received from master.	1 = 10
03.30	<i>FB A reference 1 int32</i>	Reference 1 received through fieldbus adapter A as a 32-bit integer.	-
	-2147483648 ... 2147483647	Reference 1 from fieldbus adapter A.	-
03.31	<i>FB A reference 2 int32</i>	Reference 2 received through fieldbus adapter A as a 32-bit integer.	-
	-2147483648 ... 2147483647	Reference 2 from fieldbus adapter A.	-

No.	Name/Value	Description	Def/FbEq16
04 Warnings and faults		Information on warnings and faults that occurred last. For explanations of individual warning and fault codes, see chapter Fault tracing . All parameters in this group are read-only unless otherwise noted.	
04.01	<i>Tripping fault</i>	Code of the 1st active fault (the fault that caused the current trip).	-
	0000h...FFFFh	1st active fault.	1 = 1
04.02	<i>Active fault 2</i>	Code of the 2nd active fault.	-
	0000h...FFFFh	2nd active fault.	1 = 1
04.03	<i>Active fault 3</i>	Code of the 3rd active fault.	-
	0000h...FFFFh	3rd active fault.	1 = 1
04.04	<i>Active fault 4</i>	Code of the 4th active fault.	-
	0000h...FFFFh	4th active fault.	1 = 1
04.05	<i>Active fault 5</i>	Code of the 5th active fault.	-
	0000h...FFFFh	5th active fault.	1 = 1
04.06	<i>Active warning 1</i>	Code of the 1st active warning.	-
	0000h...FFFFh	1st active warning.	1 = 1
04.07	<i>Active warning 2</i>	Code of the 2nd active warning.	-
	0000h...FFFFh	2nd active warning.	1 = 1
04.08	<i>Active warning 3</i>	Code of the 3rd active warning.	-
	0000h...FFFFh	3rd active warning.	1 = 1
04.09	<i>Active warning 4</i>	Code of the 4th active warning.	-
	0000h...FFFFh	4th active warning.	1 = 1
04.10	<i>Active warning 5</i>	Code of the 5th active warning.	-
	0000h...FFFFh	5th active warning.	1 = 1
04.11	<i>Latest fault</i>	Code of the 1st stored (non-active) fault.	-
	0000h...FFFFh	1st stored fault.	1 = 1
04.12	<i>2nd latest fault</i>	Code of the 2nd stored (non-active) fault.	-
	0000h...FFFFh	2nd stored fault.	1 = 1
04.13	<i>3rd latest fault</i>	Code of the 3rd stored (non-active) fault.	-
	0000h...FFFFh	3rd stored fault.	1 = 1
04.14	<i>4th latest fault</i>	Code of the 4th stored (non-active) fault.	-
	0000h...FFFFh	4th stored fault.	1 = 1
04.15	<i>5th latest fault</i>	Code of the 5th stored (non-active) fault.	-
	0000h...FFFFh	5th stored fault.	1 = 1
04.16	<i>Latest warning</i>	Code of the 1st stored (non-active) warning.	-
	0000h...FFFFh	1st stored warning.	1 = 1
04.17	<i>2nd latest warning</i>	Code of the 2nd stored (non-active) warning.	-
	0000h...FFFFh	2nd stored warning.	1 = 1
04.18	<i>3rd latest warning</i>	Code of the 3rd stored (non-active) warning.	-
	0000h...FFFFh	3rd stored warning.	1 = 1

No.	Name/Value	Description	Def/FbEq16
04.19	4th latest warning	Code of the 4th stored (non-active) warning.	-
	0000h...FFFFh	4th stored warning.	1 = 1
04.20	5th latest warning	Code of the 5th stored (non-active) warning.	-
	0000h...FFFFh	5th stored warning.	1 = 1
04.23	Tripping fault Aux code	Aux code of the 1st active fault (the fault that caused the current trip).	-
	0000 0000h...FFFF FFFFh	Aux code of 1st active fault.	1=1
04.24	Active fault 2 Aux code	Aux code of the 2nd active fault.	-
	0000 0000h...FFFF FFFFh	Aux code of 2nd active fault.	1=1
04.25	Active fault 3 Aux code	Aux code of the 3rd active fault.	-
	0000 0000h...FFFF FFFFh	Aux code of 3rd active fault.	1=1
04.26	Active fault 4 Aux code	Aux code of the 4th active fault.	-
	0000 0000h...FFFF FFFFh	Aux code of 4th active fault.	1=1
04.27	Active fault 5 Aux code	Aux code of the 5th active fault.	-
	0000 0000h...FFFF FFFFh	Aux code of 5th active fault.	1=1
04.40	Event word1	User-defined event word. This word collects the status of the events (warnings, faults or pure events) selected by parameters 04.41...04.72. For each event, an auxiliary code can optionally be specified for filtering. This parameter is read-only.	-

Bit	Name	Description
0	User bit 0	1 = Event selected by parameters 04.41 (and 04.42) is active
1	User bit 1	1 = Event selected by parameters 04.43 (and 04.44) is active
...	...	...
15	User bit 15	1 = Event selected by parameters 04.71 (and 04.72) is active

	0000h...FFFFh	User-defined event word.	1 = 1
04.41	Event word1 bit0 code	Selects the hexadecimal code of an event (warning, fault or pure event) whose status is shown as bit 0 of 04.40 Event word1. The event codes are listed in chapter Fault tracing (page 343).	0000h
	0000h...FFFFh	Code of event.	1=1

No.	Name/Value	Description	Def/FbEq16
04.42	<i>Event word1 bit0 aux code</i>	Specifies an auxiliary code for the event selected by the previous parameter. The selected event is indicated by the event word only if its auxiliary code matches the value of this parameter. With a value of 0000 0000h, the event word will indicate the event regardless of the auxiliary code.	0000 0000h
	0000 0000h...FFFF FFFFh	Code of warning, fault or pure event.	1=1
04.43	<i>Event word1 bit1 code</i>	Selects the hexadecimal code of an event (warning, fault or pure event) whose status is shown as bit 1 of <i>04.40 Event word1</i> . The event codes are listed in chapter <i>Fault tracing</i> (page 343).	0000h
	0000h... FFFFh	Code of event.	1=1
04.44	<i>Event word1 bit1 aux code</i>	Specifies an auxiliary code for the event selected by the previous parameter. The selected event is indicated by the event word only if its auxiliary code matches the value of this parameter. With a value of 0000 0000h, the event word will indicate the event regardless of the auxiliary code.	0000 0000h
	0000 0000h...FFFF FFFFh	Code of warning, fault or pure event.	1=1
...	...	...	...
04.71	<i>Event word1 bit15 code</i>	Selects the hexadecimal code of an event (warning, fault or pure event) whose status is shown as bit 15 of <i>04.40 Event word1</i> . The event codes are listed in chapter <i>Fault tracing</i> (page 343).	0000h
	0000h... FFFFh	Code of event.	1=1
04.72	<i>Event word1 bit15 aux code</i>	Specifies an auxiliary code for the event selected by the previous parameter. The selected event is indicated by the event word only if its auxiliary code matches the value of this parameter. With a value of 0000 0000h, the event word will indicate the event regardless of the auxiliary code.	0000 0000h
	0000 0000h...FFFF FFFFh	Code of warning, fault or pure event.	1=1
05 Diagnostics		Various run-time-type counters and measurements related to drive maintenance. All parameters in this group are read-only unless otherwise noted.	
05.01	<i>On-time counter</i>	On-time counter. The counter runs when the drive is powered.	-
	0...65535 days	On-time counter.	1 = 1 day
05.02	<i>Run-time counter</i>	Motor run-time counter. The counter runs when the inverter modulates.	-
	0...65535 days	Motor run-time counter.	1 = 1 day
05.09	<i>Time from power-up</i>	500-microsecond ticks elapsed since the last boot of the control unit.	-
	0...4294967295	500-microsecond ticks since last boot.	1 = 1
05.41	<i>Main fan service counter</i>	Not applicable for ACS580MV.	-
	0...150%	Main cooling fan age.	1 = 1%

No.	Name/Value	Description	Def/FbEq16
05.42	<i>Aux. fan service counter</i>	Not applicable for ACS580MV.	-
	0...150%	Auxiliary cooling fan age.	1 = 1%
05.112	<i>Maximum IGBT temperature</i>	Maximum of all IGBT temperature displayed in Group 70, 71 and 72	-
	0...141°C		10 = 1°C
06 Control and status words		Drive control and status words.	
06.01	<i>Main control word</i>	The main control word of the drive. This parameter shows the control signals as received from the selected sources (such as digital inputs, the fieldbus interfaces and the application program). The bit assignments of the word are as described on page 389. The related status word and state diagram are presented on pages 390 and 391 respectively. Note: Bits 12...15 can be used to carry additional control data, and used as a signal source by any binary-source selector parameter. This parameter is read-only.	-
	0000h...FFFFh	Main control word.	1 = 1
06.02	<i>Application control word</i>	The drive control word received from the application program (if any). The bit assignments are described on page 389. This parameter is read-only.	-
	0000h...FFFFh	Application program control word.	1 = 1
06.03	<i>transparent control word</i>	The unaltered control word received from the PLC through fieldbus adapter A. This parameter is read-only.	-
	00000000h ... FFFFFFFFh	Control word received through fieldbus adapter A.	-
06.04	<i>FBA B transparent control word</i>	The unaltered control word received from the PLC through fieldbus adapter B. This parameter is read-only.	-
	00000000h ... FFFFFFFFh	Control word received through fieldbus adapter B.	1 = 1
06.11	<i>Main status word</i>	Main status word of the drive. The bit assignments are described on page 390. The related control word and state diagram are presented on pages 389 and 391 respectively. This parameter is read-only.	-
	0000h...FFFFh	Main status word.	1 = 1

No.	Name/Value	Description	Def/FbEq16
06.16	Drive status word 1	Drive status word 1. This parameter is read-only.	-

Bit	Name	Description
0	Enabled	1 = Start enable (20.19) signals is present. Note: This bit is not affected by the presence of a fault.
1	Inhibited	1 = Start inhibited. See parameters 06.18 and 06.25 for the source of the inhibiting signal.
2	DC charged	1 = DC circuit has been charged
3	Ready to start	1 = Drive is ready to receive a start command
4	Following reference	1 = Drive is ready to follow given reference
5	Started	1 = Drive has been started
6	Modulating	1 = Drive is modulating (output stage is being controlled)
7	Limiting	1 = Any operating limit (speed, torque, etc.) is active
8	Local control	1 = Drive is in local control
9	Network ctrl	1 = Drive is in <i>network control</i> (see page 14)
10	Ext1 active	1 = Control location EXT1 active
11	Ext2 active	1 = Control location EXT2 active
12	Reserved	
13	Start request	1 = Start requested
14...15	Reserved	

0000h...FFFFh	Drive status word 1.	1 = 1

No.	Name/Value	Description	Def/FbEq16
06.17	Drive status word 2	Drive status word 2. This parameter is read-only.	-

Bit	Name	Description
0	Identification run done	1 = Motor identification (ID) run has been performed
1	Magnetized	1 = The motor has been magnetized
2	Torque control	1 = Torque control mode active
3	Speed control	1 = Speed control mode active
4	Voltage control	Not applicable for ACS580MV
5	Safe reference active	1 = A "safe" reference is being applied by functions such as parameters 49.05 and 50.02
6	Last speed active	1 = A "last speed" reference is being applied by functions such as parameters 49.05 and 50.02
7	Loss of reference	1 = Reference signal lost
8	Emergency stop failed	1 = Emergency stop failed (see parameters 31.32 and 31.33)
9	Jogging active	1 = Jogging enable signal is on
10	Above limit	1 = Actual speed, frequency or torque equals or exceeds limit (defined by parameters 46.31 ... 46.33). Valid in both directions of rotation.
11	Emergency stop active	1 = An emergency stop command signal is active, or the drive is stopping after receiving an emergency stop command.
12	Reduced run	1 = Reduced run active (see section Parameter group 47 Data storage (page 235) , on page 53)
13	Reserved	
14	Stop failed	Not applicable for ACS580MV
15	Reserved	

0000h...FFFFh	Drive status word 2.	1 = 1

No.	Name/Value	Description	Def/FbEq16
06.18	Start inhibit status word	Start inhibit status word. This word specifies the source of the inhibiting signal that is preventing the drive from starting. The conditions marked with an asterisk (*) only require that the start command is cycled. In all other instances, the inhibiting condition must be removed first. See also parameter 06.25 Drive inhibit status word 2, and 06.16 Drive status word 1, bit 1. This parameter is read-only.	-

Bit	Name	Description
0	Not ready run	1 = DC voltage is missing or drive has not been parametrized correctly. Check the parameters in groups 95 and 99.
1	Ctrl location changed	* 1 = Control location has changed
2	SSW inhibit	1 = Control program is keeping itself in inhibited state
3	Fault reset	* 1 = A fault has been reset
4	Lost start enable	1 = Start enable signal missing
5	Lost run enable	1 = Run enable signal missing
6	FSO inhibit	1 = Operation prevented by FSO-xx safety functions module
7	STO	1 = Safe torque off active
8	Current calibration ended	* 1 = Current calibration routine has finished
9	ID run ended	* 1 = Motor identification run has finished
10	Auto phase ended	* 1 = Autophasing routine has finished
11	Off1	1 = Emergency stop signal (mode off1)
12	Em Off2	1 = Emergency stop signal (mode off2)
13	Em Off3	1 = Emergency stop signal (mode off3)
14	Auto reset inhibit	1 = The autoreset function is inhibiting operation
15	Jogging active	1 = The jogging enable signal is inhibiting operation This bit is true when change from remote Control to local control after jogging is running.

0000h...FFFFh	Start inhibit status word.	1 = 1

No.	Name/Value	Description	Def/FbEq16																																				
06.19	<i>Speed control status word</i>	Speed control status word. This parameter is read-only.	-																																				
<table><tr><th>Bit</th><th>Name</th><th>Description</th></tr><tr><td>0</td><td>Zero speed</td><td>1 = Drive is running at zero speed</td></tr><tr><td>1</td><td>Forward</td><td>1 = Drive is running in forward direction above zero speed limit (par. 21.06)</td></tr><tr><td>2</td><td>Reverse</td><td>1 = Drive is running in reverse direction above zero speed limit (par. 21.06)</td></tr><tr><td>3</td><td>Out of window</td><td>1 = Speed error window control active (see par. 24.41)</td></tr><tr><td>4</td><td>Internal speed feedback</td><td>1 = Estimated speed feedback used (see par. 90.41)</td></tr><tr><td>5</td><td>Encoder 1 feedback</td><td>Not applicable for ACS580MV</td></tr><tr><td>6</td><td>Encoder 2 feedback</td><td>Not applicable for ACS580MV</td></tr><tr><td>7</td><td>Constant speed req</td><td>1 = A constant speed or frequency has been selected; see par. 06.20.</td></tr><tr><td>8</td><td>MF speed corr min</td><td>1 = Minimum limit of speed correction (in a speed-controlled follower) has been reached.</td></tr><tr><td>9</td><td>MF speed corr max</td><td>1 = Maximum limit of speed correction (in a speed-controlled follower) has been reached.</td></tr><tr><td>10...15</td><td>Reserved</td><td></td></tr></table>				Bit	Name	Description	0	Zero speed	1 = Drive is running at zero speed	1	Forward	1 = Drive is running in forward direction above zero speed limit (par. 21.06)	2	Reverse	1 = Drive is running in reverse direction above zero speed limit (par. 21.06)	3	Out of window	1 = Speed error window control active (see par. 24.41)	4	Internal speed feedback	1 = Estimated speed feedback used (see par. 90.41)	5	Encoder 1 feedback	Not applicable for ACS580MV	6	Encoder 2 feedback	Not applicable for ACS580MV	7	Constant speed req	1 = A constant speed or frequency has been selected; see par. 06.20.	8	MF speed corr min	1 = Minimum limit of speed correction (in a speed-controlled follower) has been reached.	9	MF speed corr max	1 = Maximum limit of speed correction (in a speed-controlled follower) has been reached.	10...15	Reserved	
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10...15	Reserved																																						
0000h...FFFFh		Speed control status word.	1 = 1																																				
06.20	<i>Constant speed status word</i>	Constant speed/frequency status word. Indicates which constant speed or frequency is active (if any). See also parameter 06.19 <i>Speed control status word</i> , bit 7, and section <i>Constant speeds/frequencies</i> (page 36). This parameter is read-only.	-																																				
<table><tr><th>Bit</th><th>Name</th><th>Description</th></tr><tr><td>0</td><td>Constant speed 1</td><td>1 = Constant speed or frequency 1 selected</td></tr><tr><td>1</td><td>Constant speed 2</td><td>1 = Constant speed or frequency 2 selected</td></tr><tr><td>2</td><td>Constant speed 3</td><td>1 = Constant speed or frequency 3 selected</td></tr><tr><td>3</td><td>Constant speed 4</td><td>1 = Constant speed or frequency 4 selected</td></tr><tr><td>4</td><td>Constant speed 5</td><td>1 = Constant speed or frequency 5 selected</td></tr><tr><td>5</td><td>Constant speed 6</td><td>1 = Constant speed or frequency 6 selected</td></tr><tr><td>6</td><td>Constant speed 7</td><td>1 = Constant speed or frequency 7 selected</td></tr><tr><td>7...15</td><td>Reserved</td><td></td></tr></table>				Bit	Name	Description	0	Constant speed 1	1 = Constant speed or frequency 1 selected	1	Constant speed 2	1 = Constant speed or frequency 2 selected	2	Constant speed 3	1 = Constant speed or frequency 3 selected	3	Constant speed 4	1 = Constant speed or frequency 4 selected	4	Constant speed 5	1 = Constant speed or frequency 5 selected	5	Constant speed 6	1 = Constant speed or frequency 6 selected	6	Constant speed 7	1 = Constant speed or frequency 7 selected	7...15	Reserved										
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2	Constant speed 3	1 = Constant speed or frequency 3 selected																																					
3	Constant speed 4	1 = Constant speed or frequency 4 selected																																					
4	Constant speed 5	1 = Constant speed or frequency 5 selected																																					
5	Constant speed 6	1 = Constant speed or frequency 6 selected																																					
6	Constant speed 7	1 = Constant speed or frequency 7 selected																																					
7...15	Reserved																																						
0000h...FFFFh		Constant speed/frequency status word.	1 = 1																																				

72 Parameters

No.	Name/Value	Description	Def/FbEq16
06.25	Drive inhibit status word 2	Drive inhibit status word 2. This word specifies the source of the inhibiting signal that is preventing the drive from starting. See also parameter 06.18 Start inhibit status word, and 06.16 Drive status word 1, bit 1. This parameter is read-only.	-

Bit	Name	Description
0	Follower drive	1 = A follower drive is preventing the master from starting.
1	Application	1 = The application program is preventing the drive from starting.
2	Reserved	
3	Encoder feedback	Reserved
4	Ref source parametrization	Reserved
5	Starting freezed	Reserved
6	No Motor Data	Reserved
7	Cap Reforming	1= Capacitor reforming function enabled
8	PM SW Force DL	1= Power module software force download enabled
9...15	Reserved	

	0000h...FFFFh	Start inhibit status word.	1 = 1
06.29	MSW bit 10 sel	Selects a binary source whose status is transmitted as bit 10 of 06.11 Main status word.	Above limit
	False	0.	0
	True	1.	1
	Above limit	Bit 10 of 06.17 Drive status word 2 (see page 69).	2
	Other [bit]	Source selection (see Terms and abbreviations on page 55).	-
06.30	MSW bit 11 sel	Selects a binary source whose status is transmitted as bit 11 of 06.11 Main status word.	Ext ctrl loc
	False	0.	0
	True	1.	1
	Ext ctrl loc	Bit 11 of 06.01 Main control word (see page 67).	2
	Other [bit]	Source selection (see Terms and abbreviations on page 55).	-
06.31	MSW bit 12 sel	Selects a binary source whose status is transmitted as bit 12 of 06.11 Main status word.	Ext run enable
	False	0.	0
	True	1.	1
	Ext run enable	Inverted bit 5 of 06.18 Start inhibit status word (see page 70).	2
	Other [bit]	Source selection (see Terms and abbreviations on page 55).	-
06.32	MSW bit 13 sel	Selects a binary source whose status is transmitted as bit 13 of 06.11 Main status word.	False
	False	0.	0
	True	1.	1
	Other [bit]	Source selection (see Terms and abbreviations on page 55).	-
06.33	MSW bit 14 sel	Selects a binary source whose status is transmitted as bit 14 of 06.11 Main status word.	False
	False	0.	0

No.	Name/Value	Description	Def/FbEq16
	True	1.	1
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
	0000h...FFFFh	Supply unit status word.	1 = 1
06.45	<i>Follower CW user bit 0 selection</i>	Selects a binary source whose status is transmitted as bit 12 of the Follower control word to follower drives. (Bits 0...11 of the Follower control word are taken from <i>06.01 Main control word</i> .) See also section <i>Master/follower functionality</i> (page 31).	<i>MCW user bit 0</i>
	False	0.	0
	True	1.	1
	MCW user bit 0	Bit 12 of <i>06.01 Main control word</i> (see page 67).	2
	MCW user bit 1	Bit 13 of <i>06.01 Main control word</i> (see page 67).	3
	MCW user bit 2	Bit 14 of <i>06.01 Main control word</i> (see page 67).	4
	MCW user bit 3	Bit 15 of <i>06.01 Main control word</i> (see page 67).	5
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
06.46	<i>Follower CW user bit 1 selection</i>	Selects a binary source whose status is transmitted as bit 13 of the Follower control word to follower drives. (Bits 0...11 of the Follower control word are taken from <i>06.01 Main control word</i> .)	<i>MCW user bit 1</i>
	False	0.	0
	True	1.	1
	MCW user bit 0	Bit 12 of <i>06.01 Main control word</i> (see page 67).	2
	MCW user bit 1	Bit 13 of <i>06.01 Main control word</i> (see page 67).	3
	MCW user bit 2	Bit 14 of <i>06.01 Main control word</i> (see page 67).	4
	MCW user bit 3	Bit 15 of <i>06.01 Main control word</i> (see page 67).	5
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
06.47	<i>Follower CW user bit 2 selection</i>	Selects a binary source whose status is transmitted as bit 14 of the Follower control word to follower drives. (Bits 0...11 of the Follower control word are taken from <i>06.01 Main control word</i> .)	<i>MCW user bit 2</i>
	False	0.	0
	True	1.	1
	MCW user bit 0	Bit 12 of <i>06.01 Main control word</i> (see page 67).	2
	MCW user bit 1	Bit 13 of <i>06.01 Main control word</i> (see page 67).	3
	MCW user bit 2	Bit 14 of <i>06.01 Main control word</i> (see page 67).	4
	MCW user bit 3	Bit 15 of <i>06.01 Main control word</i> (see page 67).	5
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
06.48	<i>Follower CW user bit 3 selection</i>	Selects a binary source whose status is transmitted as bit 15 of the Follower control word to follower drives. (Bits 0...11 of the Follower control word are taken from <i>06.01 Main control word</i> .)	<i>MCW user bit 3</i>
	False	0.	0
	True	1.	1
	MCW user bit 0	Bit 12 of <i>06.01 Main control word</i> (see page 67).	2
	MCW user bit 1	Bit 13 of <i>06.01 Main control word</i> (see page 67).	3

74 Parameters

No.	Name/Value	Description	Def/FbEq16
	MCW user bit 2	Bit 14 of <i>06.01 Main control word</i> (see page 67).	4
	MCW user bit 3	Bit 15 of <i>06.01 Main control word</i> (see page 67).	5
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
06.50	<i>User status word 1</i>	User-defined status word. This word shows the status of the binary sources selected by parameters <i>06.60...06.75</i> . This parameter is read-only.	-

Bit	Name	Description
0	User status bit 0	Status of source selected by parameter <i>06.60</i>
1	User status bit 1	Status of source selected by parameter <i>06.61</i>
...	...	...
15	User status bit 15	Status of source selected by parameter <i>06.75</i>

	0000h...FFFFh	User-defined status word.	1 = 1
06.60	<i>User status word 1 bit 0 sel</i>	Selects a binary source whose status is shown as bit 0 of <i>06.50 User status word 1</i> .	<i>False</i>
	False	0.	0
	True	1.	1
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
06.61	<i>User status word 1 bit 1 sel</i>	Selects a binary source whose status is shown as bit 1 of <i>06.50 User status word 1</i> .	<i>Out of window</i>
	False	0.	0
	True	1.	1
	Out of window	Bit 3 of <i>06.19 Speed control status word</i> (see page 71).	2
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
06.62	<i>User status word 1 bit 2 sel</i>	Selects a binary source whose status is shown as bit 2 of <i>06.50 User status word 1</i> .	<i>Emergency stop failed</i>
	False	0.	0
	True	1.	1
	Emergency stop failed	Bit 8 of <i>06.17 Drive status word 2</i> (see page 69).	2
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
06.63	<i>User status word 1 bit 3 sel</i>	Selects a binary source whose status is shown as bit 3 of <i>06.50 User status word 1</i> .	<i>Magnetized</i>
	False	0.	0
	True	1.	1
	Magnetized	Bit 1 of <i>06.17 Drive status word 2</i> (see page 69).	2
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
06.64	<i>User status word 1 bit 4 sel</i>	Selects a binary source whose status is shown as bit 4 of <i>06.50 User status word 1</i> .	<i>Run disable</i>
	False	0.	0
	True	1.	1
	Run disable	Bit 5 of <i>06.18 Start inhibit status word</i> (see page 70).	2
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-

No.	Name/Value	Description	Def/FbEq16
06.65	<i>User status word 1 bit 5 sel</i>	Selects a binary source whose status is shown as bit 5 of <i>06.50 User status word 1</i> .	<i>False</i>
	False	0.	0
	True	1.	1
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
06.66	<i>User status word 1 bit 6 sel</i>	Selects a binary source whose status is shown as bit 6 of <i>06.50 User status word 1</i> .	<i>False</i>
	False	0.	0
	True	1.	1
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
06.67	<i>User status word 1 bit 7 sel</i>	Selects a binary source whose status is shown as bit 7 of <i>06.50 User status word 1</i> .	<i>Identification run done</i>
	False	0.	0
	True	1.	1
	Identification run done	Bit 0 of <i>06.17 Drive status word 2</i> (see page 69).	2
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
06.68	<i>User status word 1 bit 8 sel</i>	Selects a binary source whose status is shown as bit 8 of <i>06.50 User status word 1</i> .	<i>Start inhibition</i>
	False	0.	0
	True	1.	1
	Start inhibition	Bit 7 of <i>06.18 Start inhibit status word</i> (see page 70).	2
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
06.69	<i>User status word 1 bit 9 sel</i>	Selects a binary source whose status is shown as bit 9 of <i>06.50 User status word 1</i> .	<i>Limiting</i>
	False	0.	0
	True	1.	1
	Limiting	Bit 7 of <i>06.16 Drive status word 1</i> (see page 68).	2
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
06.70	<i>User status word 1 bit 10 sel</i>	Selects a binary source whose status is shown as bit 10 of <i>06.50 User status word 1</i> .	<i>Torque control</i>
	False	0.	0
	True	1.	1
	Torque control	Bit 2 of <i>06.17 Drive status word 2</i> (see page 69).	2
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
06.71	<i>User status word 1 bit 11 sel</i>	Selects a binary source whose status is shown as bit 11 of <i>06.50 User status word 1</i> .	<i>Zero speed</i>
	False	0.	0
	True	1.	1
	Zero speed	Bit 0 of <i>06.19 Speed control status word</i> (see page 71).	2
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-

No.	Name/Value	Description	Def/FbEq16
06.72	User status word 1 bit 12 sel	Selects a binary source whose status is shown as bit 12 of 06.50 User status word 1.	Internal speed feedback
	False	0.	0
	True	1.	1
	Internal speed feedback	Bit 4 of 06.19 Speed control status word (see page 71).	2
	Other [bit]	Source selection (see Terms and abbreviations on page 55).	-
06.73	User status word 1 bit 13 sel	Selects a binary source whose status is shown as bit 13 of 06.50 User status word 1.	False
	False	0.	0
	True	1.	1
	Other [bit]	Source selection (see Terms and abbreviations on page 55).	-
06.74	User status word 1 bit 14 sel	Selects a binary source whose status is shown as bit 14 of 06.50 User status word 1.	False
	False	0.	0
	True	1.	1
	Other [bit]	Source selection (see Terms and abbreviations on page 55).	-
06.75	User status word 1 bit 15 sel	Selects a binary source whose status is shown as bit 15 of 06.50 User status word 1.	False
	False	0.	0
	True	1.	1
	Other [bit]	Source selection (see Terms and abbreviations on page 55).	-
06.100	User control word 1	User-defined control word 1. This parameter is read-only.	-

Bit	Name	Description
0	User control word 1 bit 0 sel	User-defined bit.
1	User control word 1 bit 1 sel	User-defined bit.
...	...	...
15	User control word 1 bit 15 sel	User-defined bit.

0000h...FFFFh	User-defined control word 1.	1 = 1

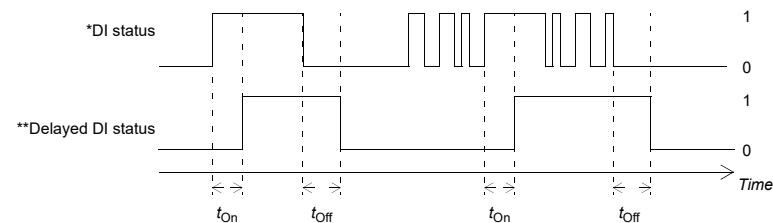
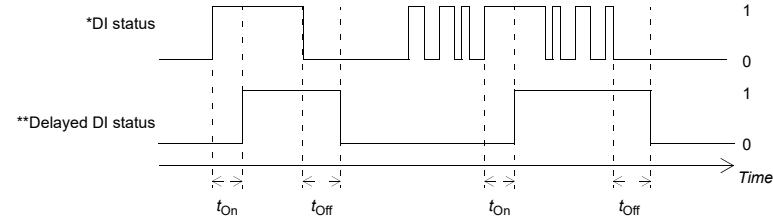
No.	Name/Value	Description	Def/FbEq16																								
06.101	User control word 2	User-defined control word 2. This parameter is read-only.	-																								
<table><tr><th>Bit</th><th>Name</th><th>Description</th></tr><tr><td>0</td><td>User control word 2 bit 0 sel</td><td>User-defined bit.</td></tr><tr><td>1</td><td>User control word 2 bit 1 sel</td><td>User-defined bit.</td></tr><tr><td>...</td><td>...</td><td>...</td></tr><tr><td>15</td><td>User control word 2 bit 15 sel</td><td>User-defined bit.</td></tr></table>				Bit	Name	Description	0	User control word 2 bit 0 sel	User-defined bit.	1	User control word 2 bit 1 sel	User-defined bit.	...	...	...	15	User control word 2 bit 15 sel	User-defined bit.									
Bit	Name	Description																									
0	User control word 2 bit 0 sel	User-defined bit.																									
1	User control word 2 bit 1 sel	User-defined bit.																									
...	...	...																									
15	User control word 2 bit 15 sel	User-defined bit.																									
0000h...FFFFh		User-defined control word 2.	1 = 1																								
06.110	Aux CW	Auxiliary control word	-																								
<table><tr><th>Bit</th><th>Name</th><th>Description</th></tr><tr><td>0</td><td>MCB feedback closed</td><td>1 = MCB feedback signal CLOSED is active.</td></tr><tr><td>1</td><td>Direction</td><td>0 = FORWARD, 1 = REVERSE.</td></tr><tr><td>2</td><td>MCB close cmd active</td><td>MCB close command is sent to digital output.</td></tr><tr><td>3</td><td>MCB feedback open</td><td>MCB feedback signal OPEN is active.</td></tr><tr><td>4</td><td>MCB close cmd monitor</td><td>MCB close command is given</td></tr><tr><td>5</td><td>DC link discharged</td><td>DC link is discharged</td></tr><tr><td>6...15</td><td>AUX CW bit 6...15</td><td>Reserved</td></tr></table>				Bit	Name	Description	0	MCB feedback closed	1 = MCB feedback signal CLOSED is active.	1	Direction	0 = FORWARD, 1 = REVERSE.	2	MCB close cmd active	MCB close command is sent to digital output.	3	MCB feedback open	MCB feedback signal OPEN is active.	4	MCB close cmd monitor	MCB close command is given	5	DC link discharged	DC link is discharged	6...15	AUX CW bit 6...15	Reserved
Bit	Name	Description																									
0	MCB feedback closed	1 = MCB feedback signal CLOSED is active.																									
1	Direction	0 = FORWARD, 1 = REVERSE.																									
2	MCB close cmd active	MCB close command is sent to digital output.																									
3	MCB feedback open	MCB feedback signal OPEN is active.																									
4	MCB close cmd monitor	MCB close command is given																									
5	DC link discharged	DC link is discharged																									
6...15	AUX CW bit 6...15	Reserved																									
0000h...FFFFh		Auxiliary control word.	1 = 1																								
06.111	Aux SW	Auxiliary status word	-																								
<table><tr><th>Bit</th><th>Name</th><th>Description</th></tr><tr><td>0</td><td>Drive is charged</td><td>1 = All Power modules send the information that they are charged; 0 = Not all Power modules send the information that they are charged.</td></tr><tr><td>1...15</td><td>AUX SW bit 1...15</td><td>Reserved.</td></tr></table>				Bit	Name	Description	0	Drive is charged	1 = All Power modules send the information that they are charged; 0 = Not all Power modules send the information that they are charged.	1...15	AUX SW bit 1...15	Reserved.															
Bit	Name	Description																									
0	Drive is charged	1 = All Power modules send the information that they are charged; 0 = Not all Power modules send the information that they are charged.																									
1...15	AUX SW bit 1...15	Reserved.																									
0000h...FFFFh		Auxiliary status word.	1 = 1																								
07 System info		Drive hardware and firmware information. All parameters in this group are read-only.																									
07.04	Firmware name	Firmware identification.	-																								
07.05	Firmware version	Version number of the firmware.	-																								
07.06	Loading package name	Name of the firmware loading package.	-																								
07.07	Loading package version	Version number of the firmware loading package.	-																								
07.08	Bootloader version	Version number of bootloader.	-																								
07.11	Cpu usage	Microprocessor load in percent.	-																								
0...100%		Microprocessor load.	1 = 1%																								

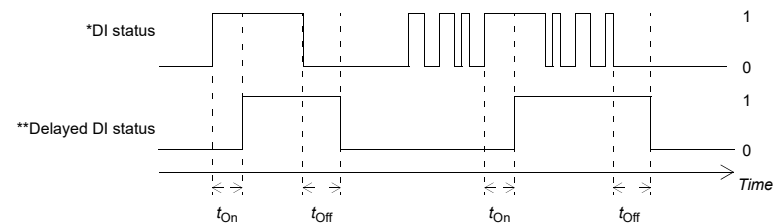
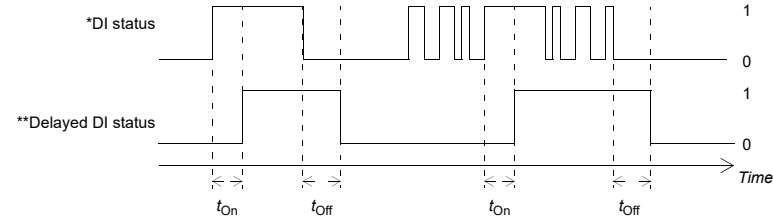
78 Parameters

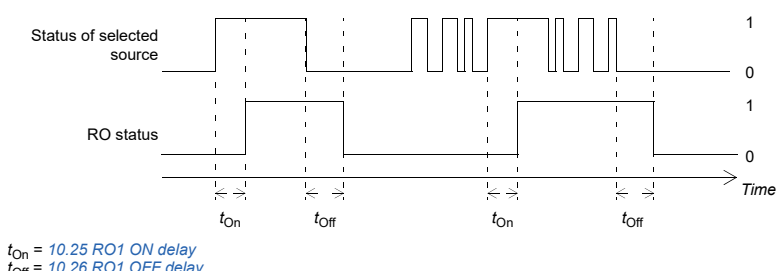
No.	Name/Value	Description	Def/FbEq16
07.14	<i>PM number per phase from license</i>	Power module number of each phase derived from drive license	-
	0...9		1 = 1
07.15	<i>Power module SW version</i>	Power module SW version (major.minor[.patch[.build]]) that is compatible with the current product software. If SW version of one or more power modules is different from the version specified in this parameter a SW download from BCON to all power modules shall be initiated. During SW download the fault <i>607E PM Software update in progress</i> shall be active.	0.00.0.0
	0.0.0.0...255.255.255.255	Power module SW version.	1 = 1 unit
07.16	<i>Control hub FW version</i>	Installed control hub FW version (major.minor[.patch[.build]]). It must be equal or bigger than <i>07.18 Control Hub FW version required</i> . Otherwise a the drive will trip with the fault <i>607D Control hub version incompatibility</i> .	0.00.0.0
	0.0.0.0...255.255.255.255	Installed control hub FW version.	1 = 1 unit
07.17	<i>CVMi2 FW version</i>	CVMi2 FW version (major.minor[.patch[.build]]).	0.00.0.0
	0.0.0.0...255.255.255.255	Installed CVMi2 FW version.	1 = 1 unit
07.18	<i>Control Hub FW version required</i>	Minimum control hub FW version (major.minor[.patch[.build]]) that is compatible with the current product software. If the control hub FW version (shown in <i>07.16 Control hub FW version</i> is older than the one specified in this parameter the drive shall trip with the fault <i>607D Control hub version incompatibility</i> .	0.00.0.0
	0.0.0.0...255.255.255.255	Required control hub FW version.	1 = 1 unit
07.19	<i>Power module rating</i>	Power module rating ID in the range from 1 to 9 (0: is undefined), according to the license key information.	0
	0...9	Power module rating R1 to R9	1 = 1 unit
07.20	<i>Power module type</i>	Power module type R.	-
07.23	<i>Application name</i>	First five ASCII letters of the name given to the application program in the programming tool. The full name is visible under System info on the control panel or the Drive composer PC tool. _N/A_ = None.	-
07.24	<i>Application version</i>	Application program version number given to the application program in the programming tool. Also visible under System info on the control panel or the Drive composer PC tool.	-
07.25	<i>Customization package name</i>	First five ASCII letters of the name given to the customization package. The full name is visible under System info on the control panel or the Drive composer PC tool. _N/A_ = None.	-
07.26	<i>Customization package version</i>	Customization package version number. Also visible under System info on the control panel or the Drive composer PC tool.	-

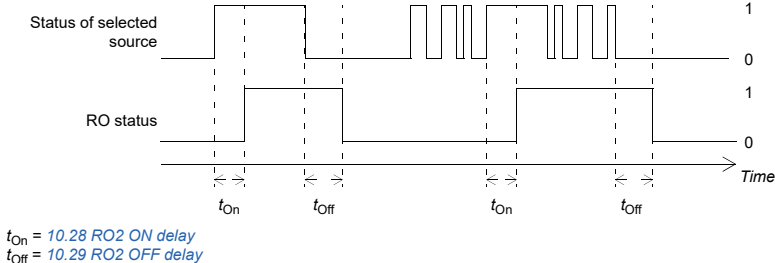
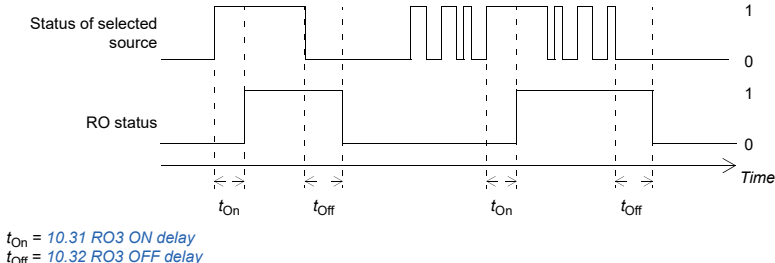
No.	Name/Value	Description	Def/FbEq16																								
07.30	Adaptive program status	Shows the status of the adaptive program. See section Adaptive programming (page 27).	-																								
<table><tr><th>Bit</th><th>Name</th><th>Description</th></tr><tr><td>0</td><td>Initialized</td><td>1 = Adaptive program initialized</td></tr><tr><td>1</td><td>Editing</td><td>1 = Adaptive program is being edited</td></tr><tr><td>2</td><td>Edit done</td><td>1 = Editing of adaptive program finished</td></tr><tr><td>3</td><td>Running</td><td>1 = Adaptive program running</td></tr><tr><td>4...13</td><td>Reserved</td><td></td></tr><tr><td>14</td><td>State changing</td><td>1 = State change in progress in adaptive programming engine</td></tr><tr><td>15</td><td>Faulted</td><td>1 = Error in adaptive program</td></tr></table>				Bit	Name	Description	0	Initialized	1 = Adaptive program initialized	1	Editing	1 = Adaptive program is being edited	2	Edit done	1 = Editing of adaptive program finished	3	Running	1 = Adaptive program running	4...13	Reserved		14	State changing	1 = State change in progress in adaptive programming engine	15	Faulted	1 = Error in adaptive program
Bit	Name	Description																									
0	Initialized	1 = Adaptive program initialized																									
1	Editing	1 = Adaptive program is being edited																									
2	Edit done	1 = Editing of adaptive program finished																									
3	Running	1 = Adaptive program running																									
4...13	Reserved																										
14	State changing	1 = State change in progress in adaptive programming engine																									
15	Faulted	1 = Error in adaptive program																									
	0000h...FFFFh	Adaptive program status.	1 = 1																								
07.40	IEC application Cpu usage peak	Displays the peak loading of the microprocessor caused by the application program. This parameter can, for example, be used to check the effect of a given application program functionality on the CPU load. The value is in percent of an internally-defined quota. Can be reset from the control panel by keeping Reset depressed for over 3 seconds.	-																								
	0.0 ... 100.0%	Peak microprocessor loading caused by application program.	10 = 1%																								
07.41	IEC application Cpu load average	Displays the average loading of the microprocessor caused by the application program. The value is in percent of an internally-defined quota.	-																								
	0.0 ... 100.0%	Average microprocessor loading caused by application program.	10 = 1%																								
07.110	PM SN selection	Power Module Serial Number Selection.	Not selected																								
	Not selected	None	0																								
	A1 module	A1 module	1																								
	A2 module	A2 module	2																								
	...	...	...																								
	A9 module	A9 module	9																								
	B1 module	B1 module	10																								
	B2 module	B2 module	11																								
	...	...	...																								
	B9 module	B9 module	18																								
	C1 module	C1 module	19																								
	C2 module	C2 module	20																								
	...	...	...																								
	C9 module	C9 module	27																								
07.111	PM SN part 1	Part 1 pf PM SN	-																								
07.112	PM SN part 2	Part 2 pf PM SN	-																								
07.113	PM SN part 3	Part 3 pf PM SN	-																								

No.	Name/Value	Description	Def/FbEq16																		
10 Standard DI, RO		Configuration of digital inputs and relay outputs.																			
10.01	DI status	Displays the electrical status of digital inputs DIIL and DI6...DI1. The activation/deactivation delays of the inputs (if any are specified) are ignored. Bits 0...5 reflect the status of DI1...DI6; bit 15 reflects the status of the DIIL input. Example: 1000000000010011b = DIIL, DI5, DI2 and DI1 are on, DI3, DI4 and DI6 are off. This parameter is read-only.	-																		
	0000h...FFFFh	Status of digital inputs.	1 = 1																		
10.02	DI delayed status	Displays the status of digital inputs DIIL and DI6...DI1. This word is updated only after activation/deactivation delays (if any are specified). Bits 0...5 reflect the delayed status of DI1...DI6; bit 15 reflects the delayed status of the DIIL input. This parameter is read-only.	-																		
	0000h...FFFFh	Delayed status of digital inputs.	1 = 1																		
10.03	DI force selection	The electrical statuses of the digital inputs can be overridden for eg. testing purposes. A bit in parameter 10.04 DI force data is provided for each digital input, and its value is applied whenever the corresponding bit in this parameter is 1.	0000h																		
<table><tr><th>Bit</th><th>Value</th></tr><tr><td>0</td><td>1 = Force DI1 to value of bit 0 of parameter 10.04 DI force data.</td></tr><tr><td>1</td><td>1 = Force DI2 to value of bit 1 of parameter 10.04 DI force data.</td></tr><tr><td>2</td><td>1 = Force DI3 to value of bit 2 of parameter 10.04 DI force data.</td></tr><tr><td>3</td><td>1 = Force DI4 to value of bit 3 of parameter 10.04 DI force data.</td></tr><tr><td>4</td><td>1 = Force DI5 to value of bit 4 of parameter 10.04 DI force data.</td></tr><tr><td>5</td><td>1 = Force DI6 to value of bit 5 of parameter 10.04 DI force data.</td></tr><tr><td>6...14</td><td>Reserved</td></tr><tr><td>15</td><td>1 = Force DIIL to value of bit 15 of parameter 10.04 DI force data.</td></tr></table>				Bit	Value	0	1 = Force DI1 to value of bit 0 of parameter 10.04 DI force data.	1	1 = Force DI2 to value of bit 1 of parameter 10.04 DI force data.	2	1 = Force DI3 to value of bit 2 of parameter 10.04 DI force data.	3	1 = Force DI4 to value of bit 3 of parameter 10.04 DI force data.	4	1 = Force DI5 to value of bit 4 of parameter 10.04 DI force data.	5	1 = Force DI6 to value of bit 5 of parameter 10.04 DI force data.	6...14	Reserved	15	1 = Force DIIL to value of bit 15 of parameter 10.04 DI force data.
Bit	Value																				
0	1 = Force DI1 to value of bit 0 of parameter 10.04 DI force data.																				
1	1 = Force DI2 to value of bit 1 of parameter 10.04 DI force data.																				
2	1 = Force DI3 to value of bit 2 of parameter 10.04 DI force data.																				
3	1 = Force DI4 to value of bit 3 of parameter 10.04 DI force data.																				
4	1 = Force DI5 to value of bit 4 of parameter 10.04 DI force data.																				
5	1 = Force DI6 to value of bit 5 of parameter 10.04 DI force data.																				
6...14	Reserved																				
15	1 = Force DIIL to value of bit 15 of parameter 10.04 DI force data.																				
	0000h...FFFFh	Override selection for digital inputs.	1 = 1																		
10.04	DI force data	Allows the data value of a forced digital input to be changed from 0 to 1. It is only possible to force an input that has been selected in parameter 10.03 DI force selection. Bit 0 is the forced value for DI1; bit 15 is the forced value for the DIIL input.	0000h																		
	0000h...FFFFh	Forced values of digital inputs.	1 = 1																		

No.	Name/Value	Description	Def/FbEq16
10.05	<i>DI1 ON delay</i>	Defines the activation delay for digital input DI1.	0.0 s
 $t_{On} = 10.05 \text{ DI1 ON delay}$ $t_{Off} = 10.06 \text{ DI1 OFF delay}$ *Electrical status of digital input. Indicated by 10.01 DI status. **Indicated by 10.02 DI delayed status.			
	0.0 ... 3000.0 s	Activation delay for DI1.	10 = 1 s
10.06	<i>DI1 OFF delay</i>	Defines the deactivation delay for digital input DI1. See parameter 10.05 DI1 ON delay.	0.0 s
	0.0 ... 3000.0 s	Deactivation delay for DI1.	10 = 1 s
10.07	<i>DI2 ON delay</i>	Defines the activation delay for digital input DI2.	0.0 s
 $t_{On} = 10.07 \text{ DI2 ON delay}$ $t_{Off} = 10.08 \text{ DI2 OFF delay}$ *Electrical status of digital input. Indicated by 10.01 DI status. **Indicated by 10.02 DI delayed status.			
	0.0 ... 3000.0 s	Activation delay for DI2.	10 = 1 s
10.08	<i>DI2 OFF delay</i>	Defines the deactivation delay for digital input DI2. See parameter 10.07 DI2 ON delay.	0.0 s
	0.0 ... 3000.0 s	Deactivation delay for DI2.	10 = 1 s

No.	Name/Value	Description	Def/FbEq16
10.13	<i>DI5 ON delay</i>	Defines the activation delay for digital input DI5.	0.0 s
 $t_{On} = 10.13 \text{ DI5 ON delay}$ $t_{Off} = 10.14 \text{ DI5 OFF delay}$ *Electrical status of digital input. Indicated by 10.01 DI status. **Indicated by 10.02 DI delayed status.			
	0.0 ... 3000.0 s	Activation delay for DI5.	10 = 1 s
10.14	<i>DI5 OFF delay</i>	Defines the deactivation delay for digital input DI5. See parameter 10.13 DI5 ON delay.	0.0 s
	0.0 ... 3000.0 s	Deactivation delay for DI5.	10 = 1 s
10.15	<i>DI6 ON delay</i>	Defines the activation delay for digital input DI6.	0.0 s
 $t_{On} = 10.15 \text{ DI6 ON delay}$ $t_{Off} = 10.16 \text{ DI6 OFF delay}$ *Electrical status of digital input. Indicated by 10.01 DI status. **Indicated by 10.02 DI delayed status.			
	0.0 ... 3000.0 s	Activation delay for DI6.	10 = 1 s
10.16	<i>DI6 OFF delay</i>	Defines the deactivation delay for digital input DI6. See parameter 10.15 DI6 ON delay.	0.0 s
	0.0 ... 3000.0 s	Deactivation delay for DI6.	10 = 1 s
10.21	<i>RO status</i>	Status of relay outputs RO3...RO1. Example: 00000001b = RO1 is energized, RO2...RO3 are de-energized.	-
	0000h...FFFFh	Status of relay outputs.	1 = 1
10.24	<i>RO1 source</i>	Selects a drive signal to be connected to relay output RO1.	<i>Ready run</i>
	Not energized	Output is not energized.	0
	Energized	Output is energized.	1
	Ready run	Bit 1 of 06.11 Main status word (see page 67).	2
	Enabled	Bit 0 of 06.16 Drive status word 1 (see page 68).	4
	Started	Bit 5 of 06.16 Drive status word 1 (see page 68).	5
	Magnetized	Bit 1 of 06.17 Drive status word 2 (see page 69).	6
	Running	Bit 6 of 06.16 Drive status word 1 (see page 68).	7

No.	Name/Value	Description	Def/FbEq16
	Ready ref	Bit 2 of 06.11 Main status word (see page 67).	8
	At setpoint	Bit 8 of 06.11 Main status word (see page 67).	9
	Reverse	Bit 2 of 06.19 Speed control status word (see page 71).	10
	Zero speed	Bit 0 of 06.19 Speed control status word (see page 71).	11
	Above limit	Bit 10 of 06.17 Drive status word 2 (see page 69).	12
	Warning	Bit 7 of 06.11 Main status word (see page 67).	13
	Fault	Bit 3 of 06.11 Main status word (see page 67).	14
	Fault (-1)	Inverted bit 3 of 06.11 Main status word (see page 67).	15
	Start request	Bit 13 of 06.16 Drive status word 1 (see page 68).	16
	Open brake command	Not supported.	22
	Ext2 active	Bit 11 of 06.16 Drive status word 1 (see page 68).	23
	Remote control	Bit 9 of 06.11 Main status word (see page 67).	24
	Supervision 1	Bit 0 of 32.01 Supervision status (see page 193).	33
	Supervision 2	Bit 1 of 32.01 Supervision status (see page 193).	34
	Supervision 3	Bit 2 of 32.01 Supervision status (see page 193).	35
	RO/DIO control word bit0	Bit 0 of 10.99 RO/DIO control word (see page 86).	40
	RO/DIO control word bit1	Bit 1 of 10.99 RO/DIO control word (see page 86).	41
	RO/DIO control word bit2	Bit 2 of 10.99 RO/DIO control word (see page 86).	42
	RO/DIO control word bit8	Bit 8 of 10.99 RO/DIO control word (see page 86).	43
	RO/DIO control word bit9	Bit 9 of 10.99 RO/DIO control word (see page 86).	44
	<i>Other [bit]</i>	Source selection (see Terms and abbreviations on page 55).	-
10.25	RO1 ON delay	Defines the activation delay for relay output RO1.	0.0 s
 $t_{On} = 10.25 \text{ RO1 ON delay}$ $t_{Off} = 10.26 \text{ RO1 OFF delay}$			
	0.0 ... 3000.0 s	Activation delay for RO1.	10 = 1 s
10.26	RO1 OFF delay	Defines the deactivation delay for relay output RO1. See parameter 10.25 RO1 ON delay .	0.0 s
	0.0 ... 3000.0 s	Deactivation delay for RO1.	10 = 1 s
10.27	RO2 source	Selects a drive signal to be connected to relay output RO2. For the available selections, see parameter 10.24 RO1 source .	<i>Running</i>

No.	Name/Value	Description	Def/FbEq16
10.28	<i>RO2 ON delay</i>	Defines the activation delay for relay output RO2.	0.0 s
 $t_{On} = 10.28 \text{ RO2 ON delay}$ $t_{Off} = 10.29 \text{ RO2 OFF delay}$			
	0.0 ... 3000.0 s	Activation delay for RO2.	10 = 1 s
10.29	<i>RO2 OFF delay</i>	Defines the deactivation delay for relay output RO2. See parameter 10.28 RO2 ON delay .	0.0 s
	0.0 ... 3000.0 s	Deactivation delay for RO2.	10 = 1 s
10.30	<i>RO3 source</i>	Selects a drive signal to be connected to relay output RO3. For the available selections, see parameter 10.24 RO1 source .	<i>Fault (-1)</i>
10.31	<i>RO3 ON delay</i>	Defines the activation delay for relay output RO3.	0.0 s
 $t_{On} = 10.31 \text{ RO3 ON delay}$ $t_{Off} = 10.32 \text{ RO3 OFF delay}$			
	0.0 ... 3000.0 s	Activation delay for RO3.	10 = 1 s
10.32	<i>RO3 OFF delay</i>	Defines the deactivation delay for relay output RO3. See parameter 10.31 RO3 ON delay .	0.0 s
	0.0 ... 3000.0 s	Deactivation delay for RO3.	10 = 1 s
10.51	<i>DI filter time</i>	Defines a filtering time for parameter 10.01 DI status .	10.0 ms
	0.3 ... 100.0 ms	Filtering time for 10.01 .	10 = 1 ms

No.	Name/Value	Description	Def/FbEq16
10.99	RO/DIO control word	Storage parameter for controlling the relay outputs and digital input/outputs eg. through the embedded fieldbus interface. To control the relay outputs (RO) and the digital input/outputs (DIO) of the drive, send a control word with the bit assignments shown below as Modbus I/O data. Set the target selection parameter of that particular data (58.101...58.124) to RO/DIO control word. In the source selection parameter of the desired output, select the appropriate bit of this word.	0000h

Bit	Name	Description
0	RO1	Source bits for relay outputs
1	RO2	RO1...RO3 (see parameters 10.24, 10.27 and 10.30).
2	RO3	
3...7	Reserved	
8	DIO1	Not applicable for ACS580MV.
9	DIO2	Not applicable for ACS580MV.
10...15	Reserved	

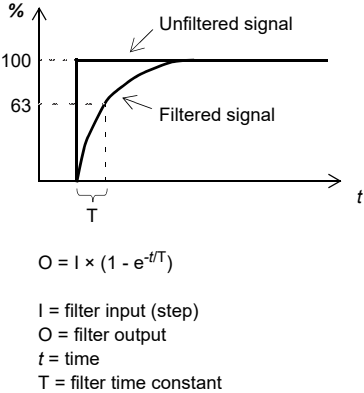
0000h...FFFFh	RO/DIO control word	1 = 1

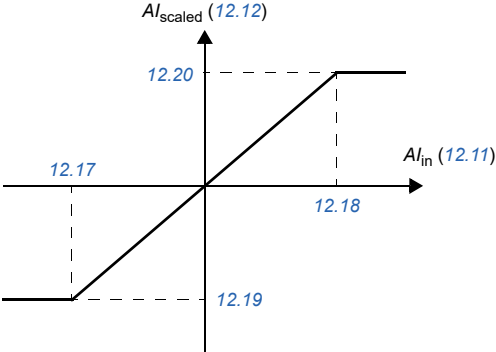
11 Standard DIO		Configuration of digital input/outputs. The DIO are internally used for the MCB control.										
11.01	DIO status	Displays the status of digital input/outputs DIO2...DIO1. The activation/deactivation delays (if any are specified) are ignored. Example: 0b00001 = DIO1 is on, remainders are off. This parameter is read-only	-									
<table><tr><th>Bit</th><th>Name</th><th>Function</th></tr><tr><td>0</td><td>Fault (-1)</td><td>1 = No fault, digital output</td></tr><tr><td>1</td><td>MCB feedback status CLOSED</td><td>1 = MCB feedback status closed active, digital input</td></tr></table>				Bit	Name	Function	0	Fault (-1)	1 = No fault, digital output	1	MCB feedback status CLOSED	1 = MCB feedback status closed active, digital input
Bit	Name	Function										
0	Fault (-1)	1 = No fault, digital output										
1	MCB feedback status CLOSED	1 = MCB feedback status closed active, digital input										
0000h...FFFFh		Status of digital input/outputs.	1 = 1									

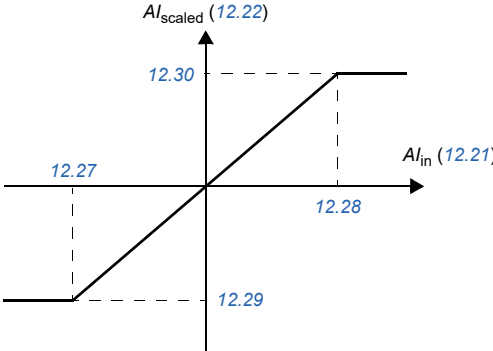
12 Standard AI		Configuration of standard analog inputs.	
12.01	<i>AI tune</i>	Triggers the analog input tuning function. Connect the signal to the input and select the appropriate tuning function.	
No action		AI tune is not activated.	0
AI1 min tune		Current analog input AI1 signal value is set as minimum value of AI1 into parameter 12.17 AI1 min . The value reverts back to <i>No action</i> automatically.	1
AI1 max tune		Current analog input AI1 signal value is set as maximum value of AI1 into parameter 12.18 AI1 max . The value reverts back to <i>No action</i> automatically.	2
AI2 min tune		Current analog input AI2 signal value is set as minimum value of AI2 into parameter 12.27 AI2 min . The value reverts back to <i>No action</i> automatically.	3

No.	Name/Value	Description	Def/FbEq16																		
	AI2 max tune	Current analog input AI2 signal value is set as maximum value of AI2 into parameter 12.28 AI2 max . The value reverts back to No action automatically.	4																		
12.03	AI supervision function	Selects how the drive reacts when an analog input signal moves out of the minimum and/or maximum limits specified for the input. The inputs and the limits to be observed are selected by parameter 12.04 AI supervision selection .	No action																		
	No action	No action taken.	0																		
	Fault	Drive trips on 80A0 AI supervision .	1																		
	Warning	Drive generates an A8A0 AI supervision warning.	2																		
	Last speed	Drive generates a warning (A8A0 AI supervision) and freezes the speed (or frequency) to the level the drive was operating at. The speed/frequency is determined on the basis of actual speed using 850 ms low-pass filtering.  WARNING! Make sure that it is safe to continue operation in case of a communication break.	3																		
	Speed ref safe	Drive generates a warning (A8A0 AI supervision) and sets the speed to the speed defined by parameter 22.41 Speed ref safe (or 28.41 Frequency ref safe when frequency reference is being used).  WARNING! Make sure that it is safe to continue operation in case of a communication break.	4																		
12.04	AI supervision selection	Specifies the analog input limits to be supervised. See parameter 12.03 AI supervision function .	0000h																		
<table><tr><th>Bit</th><th>Name</th><th>Description</th></tr><tr><td>0</td><td>AI1 < MIN</td><td>1 = Minimum limit supervision of AI1 active.</td></tr><tr><td>1</td><td>AI1 > MAX</td><td>1 = Maximum limit supervision of AI1 active.</td></tr><tr><td>2</td><td>AI2 < MIN</td><td>1 = Minimum limit supervision of AI2 active.</td></tr><tr><td>3</td><td>AI2 > MAX</td><td>1 = Maximum limit supervision of AI2 active.</td></tr><tr><td>4...15</td><td>Reserved</td><td></td></tr></table>				Bit	Name	Description	0	AI1 < MIN	1 = Minimum limit supervision of AI1 active.	1	AI1 > MAX	1 = Maximum limit supervision of AI1 active.	2	AI2 < MIN	1 = Minimum limit supervision of AI2 active.	3	AI2 > MAX	1 = Maximum limit supervision of AI2 active.	4...15	Reserved	
Bit	Name	Description																			
0	AI1 < MIN	1 = Minimum limit supervision of AI1 active.																			
1	AI1 > MAX	1 = Maximum limit supervision of AI1 active.																			
2	AI2 < MIN	1 = Minimum limit supervision of AI2 active.																			
3	AI2 > MAX	1 = Maximum limit supervision of AI2 active.																			
4...15	Reserved																				
0000h...FFFFh		Activation of analog input supervision.	1 = 1																		

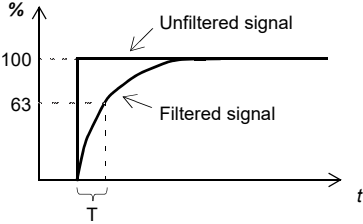
No.	Name/Value	Description	Def/FbEq16																											
12.05	AI supervision force	Activates analog input supervision separately for each control location (see section <i>Local control vs. external control</i> (page 18)). The parameter is primarily intended for analog input supervision when the input is connected to the application program and not selected as a control source by drive parameters.	0000h																											
<table><tr><th>Bit</th><th>Name</th><th>Description</th></tr><tr><td>0</td><td>AI1 Ext1</td><td>1 = AI1 supervision active when EXT1 is being used.</td></tr><tr><td>1</td><td>AI1 Ext2</td><td>1 = AI1 supervision active when EXT2 is being used.</td></tr><tr><td>2</td><td>AI1 Local</td><td>1 = AI1 supervision active when local control is being used.</td></tr><tr><td>3</td><td>Reserved</td><td></td></tr><tr><td>4</td><td>AI2 Ext1</td><td>1 = AI2 supervision active when EXT1 is being used.</td></tr><tr><td>5</td><td>AI2 Ext2</td><td>1 = AI2 supervision active when EXT2 is being used.</td></tr><tr><td>6</td><td>AI2 Local</td><td>1 = AI2 supervision active when local control is being used.</td></tr><tr><td>7...15</td><td>Reserved</td><td></td></tr></table>				Bit	Name	Description	0	AI1 Ext1	1 = AI1 supervision active when EXT1 is being used.	1	AI1 Ext2	1 = AI1 supervision active when EXT2 is being used.	2	AI1 Local	1 = AI1 supervision active when local control is being used.	3	Reserved		4	AI2 Ext1	1 = AI2 supervision active when EXT1 is being used.	5	AI2 Ext2	1 = AI2 supervision active when EXT2 is being used.	6	AI2 Local	1 = AI2 supervision active when local control is being used.	7...15	Reserved	
Bit	Name	Description																												
0	AI1 Ext1	1 = AI1 supervision active when EXT1 is being used.																												
1	AI1 Ext2	1 = AI1 supervision active when EXT2 is being used.																												
2	AI1 Local	1 = AI1 supervision active when local control is being used.																												
3	Reserved																													
4	AI2 Ext1	1 = AI2 supervision active when EXT1 is being used.																												
5	AI2 Ext2	1 = AI2 supervision active when EXT2 is being used.																												
6	AI2 Local	1 = AI2 supervision active when local control is being used.																												
7...15	Reserved																													
	0000 0000b ... 0111 0111b	Analog input supervision selection.	1 = 1																											
12.11	AI1 actual value	Displays the value of analog input AI1 in mA or V (depending on whether the input is set to current or voltage by a hardware setting). This parameter is read-only.	-																											
	-22.000 ... 22.000 mA or V	Value of analog input AI1.	1000 = 1 mA or V																											
12.12	AI1 scaled value	Displays the value of analog input AI1 after scaling. See parameters <i>12.19 AI1 scaled at AI1 min</i> and <i>12.20 AI1 scaled at AI1 max</i> . This parameter is read-only.	-																											
	-32768.000 ... 32767.000	Scaled value of analog input AI1.	1 = 1																											
12.15	AI1 unit selection	Selects the unit for readings and settings related to analog input AI1. Note: This setting must match the corresponding hardware setting on the drive control unit (see the hardware manual of the drive). Control board reboot (either by cycling the power or through parameter <i>96.08 Control board boot</i>) is required to validate any changes in the hardware settings.	V																											
	V	Volts.	2																											
	mA	Milliamperes.	10																											

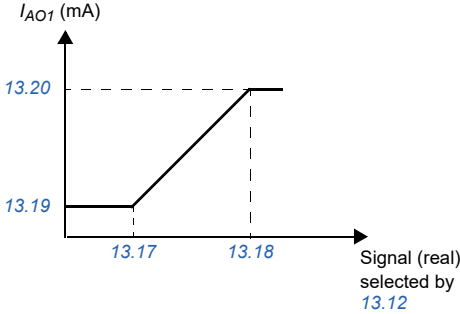
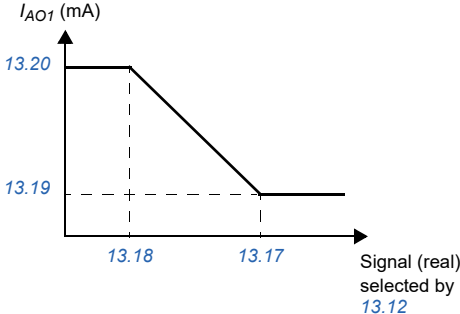
No.	Name/Value	Description	Def/FbEq16
12.16	<i>AI1 filter time</i>	Defines the filter time constant for analog input AI1.  $O = I \times (1 - e^{-t/T})$ I = filter input (step) O = filter output t = time T = filter time constant Note: The signal is also filtered due to the signal interface hardware (approximately 0.25 ms time constant). This cannot be changed by any parameter.	0.100 s
	0.000 ... 30.000 s	Filter time constant.	1000 = 1 s
12.17	<i>AI1 min</i>	Defines the minimum site value for analog input AI1. Set the value actually sent to the drive when the analog signal from plant is wound to its minimum setting.	0.000 mA or V
	-22.000 ... 22.000 mA or V	Minimum value of AI1.	1000 = 1 mA or V
12.18	<i>AI1 max</i>	Defines the maximum site value for analog input AI1. Set the value actually sent to the drive when the analog signal from plant is wound to its maximum setting.	20.000 mA or 10.000 V
	-22.000 ... 22.000 mA or V	Maximum value of AI1.	1000 = 1 mA or V

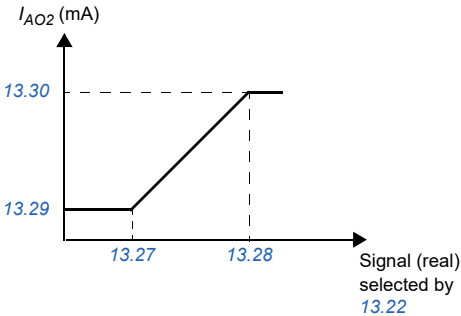
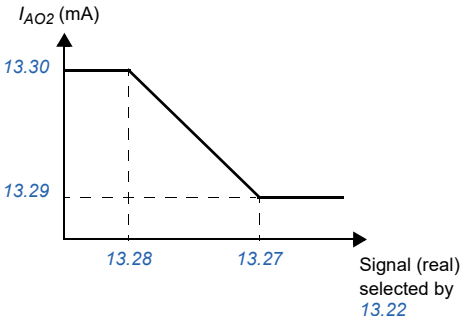
No.	Name/Value	Description	Def/FbEq16
12.19	<i>AI1 scaled at AI1 min</i>	Defines the real internal value that corresponds to the minimum analog input AI1 value defined by parameter 12.17 AI1 min. (Changing the polarity settings of 12.19 and 12.20 can effectively invert the analog input.) 	0.000
	-32768.000 ... 32767.000	Real value corresponding to minimum AI1 value.	1 = 1
12.20	<i>AI1 scaled at AI1 max</i>	Defines the real internal value that corresponds to the maximum analog input AI1 value defined by parameter 12.18 AI1 max. See the drawing at parameter 12.19 AI1 scaled at AI1 min.	1500.0
	-32768.000 ... 32767.000	Real value corresponding to maximum AI1 value.	1 = 1
12.21	<i>AI2 actual value</i>	Displays the value of analog input AI2 in mA or V (depending on whether the input is set to current or voltage by a hardware setting). This parameter is read-only.	-
	-22.000 ... 22.000 mA or V	Value of analog input AI2.	1000 = 1 mA or V
12.22	<i>AI2 scaled value</i>	Displays the value of analog input AI2 after scaling. See parameters 12.29 AI2 scaled at AI2 min and 12.30 AI2 scaled at AI2 max. This parameter is read-only.	-
	-32768.000 ... 32767.000	Scaled value of analog input AI2.	1 = 1
12.25	<i>AI2 unit selection</i>	Selects the unit for readings and settings related to analog input AI2. Note: This setting must match the corresponding hardware setting on the drive control unit (see the hardware manual of the drive). Control board reboot (either by cycling the power or through parameter 96.08 Control board boot) is required to validate any changes in the hardware settings.	<i>mA</i>
	V	Volts.	2
	mA	Milliamperes.	10
12.26	<i>AI2 filter time</i>	Defines the filter time constant for analog input AI2. See parameter 12.16 AI1 filter time.	0.100 s
	0.000 ... 30.000 s	Filter time constant.	1000 = 1 s

No.	Name/Value	Description	Def/FbEq16
12.27	<i>AI2 min</i>	Defines the minimum site value for analog input AI2. Set the value actually sent to the drive when the analog signal from plant is wound to its minimum setting.	0.000 mA or V
	-22.000 ... 22.000 mA or V	Minimum value of AI2.	1000 = 1 mA or V
12.28	<i>AI2 max</i>	Defines the maximum site value for analog input AI2. Set the value actually sent to the drive when the analog signal from plant is wound to its maximum setting.	20.000 mA or 10.000 V
	-22.000 ... 22.000 mA or V	Maximum value of AI2.	1000 = 1 mA or V
12.29	<i>AI2 scaled at AI2 min</i>	Defines the real value that corresponds to the minimum analog input AI2 value defined by parameter 12.27 <i>AI2 min</i> . (Changing the polarity settings of 12.29 and 12.30 can effectively invert the analog input.) 	0.000
	-32768.000 ... 32767.000	Real value corresponding to minimum AI2 value.	1 = 1
12.30	<i>AI2 scaled at AI2 max</i>	Defines the real value that corresponds to the maximum analog input AI2 value defined by parameter 12.28 <i>AI2 max</i> . See the drawing at parameter 12.29 <i>AI2 scaled at AI2 min</i> .	100.000
	-32768.000 ... 32767.000	Real value corresponding to maximum AI2 value.	1 = 1

13 Standard AO		Configuration of standard analog outputs.	
13.11	<i>AO1 actual value</i>	Displays the value of AO1 in mA. This parameter is read-only.	-
	0.000 ... 22.000 mA	Value of AO1.	1000 = 1 mA
13.12	<i>AO1 source</i>	Selects a signal to be connected to analog output AO1. Alternatively, sets the output to excitation mode to feed a constant current to a temperature sensor.	<i>Motor speed used</i>
	Zero	None.	0
	Motor speed used	01.01 <i>Motor speed used</i> (page 59).	1
	Output frequency	01.06 <i>Output frequency</i> (page 59).	3
	Motor current	01.07 <i>Motor current</i> (page 59).	4
	Motor torque	01.10 <i>Motor torque</i> (page 59).	6
	DC voltage	01.11 <i>DC voltage</i> (page 59).	7

No.	Name/Value	Description	Def/FbEq16
	Power inu out	01.14 Output power (page 60).	8
	Speed ref ramp in	23.01 Speed ref ramp input (page 145).	10
	Speed ref ramp out	23.02 Speed ref ramp output (page 145).	11
	Speed ref used	24.01 Used speed reference (page 145).	12
	Torq ref used	26.02 Torque reference used (page 161).	13
	Freq ref used	28.02 Frequency ref ramp output (page 173).	14
	Force Pt100 excitation	The output is used to feed an excitation current to 1...3 Pt100 sensors. See section Motor thermal protection (page 45).	20
	Force KTY84 excitation	The output is used to feed an excitation current to a KTY84 sensor. See section Motor thermal protection (page 45).	21
	Force PTC excitation	The output is used to feed an excitation current to 1...3 PTC sensors. See section Motor thermal protection (page 45).	22
	Force Pt1000 excitation	The output is used to feed an excitation current to 1...3 Pt1000 sensors. See section Motor thermal protection (page 45).	23
	AO1 data storage	13.91 AO1 data storage (page 95).	37
	AO2 data storage	13.92 AO2 data storage (page 95).	38
	<i>Other</i>	Source selection (see Terms and abbreviations on page 55).	-
13.16	AO1 filter time	Defines the filtering time constant for analog output AO1.  $O = I \times (1 - e^{-t/T})$ I = filter input (step) O = filter output t = time T = filter time constant	0.100 s
	0.000 ... 30.000 s	Filter time constant.	1000 = 1 s

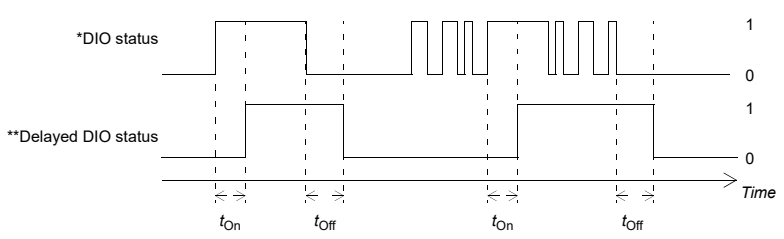
No.	Name/Value	Description	Def/FbEq16
13.17	AO1 source min	Defines the real minimum value of the signal (selected by parameter 13.12 AO1 source) that corresponds to the minimum required AO1 output value (defined by parameter 13.19 AO1 out at AO1 src min).  Programming 13.17 as the maximum value and 13.18 as the minimum value inverts the output. 	0.0
	-32768.0 ... 32767.0	Real signal value corresponding to minimum AO1 output value.	1 = 1
13.18	AO1 source max	Defines the real maximum value of the signal (selected by parameter 13.12 AO1 source) that corresponds to the maximum required AO1 output value (defined by parameter 13.20 AO1 out at AO1 src max). See parameter 13.17 AO1 source min.	1500.0
	-32768.0 ... 32767.0	Real signal value corresponding to maximum AO1 output value.	1 = 1
13.19	AO1 out at AO1 src min	Defines the minimum output value for analog output AO1. See also drawing at parameter 13.17 AO1 source min.	0.000 mA
	0.000 ... 22.000 mA	Minimum AO1 output value.	1000 = 1 mA
13.20	AO1 out at AO1 src max	Defines the maximum output value for analog output AO1. See also drawing at parameter 13.17 AO1 source min.	20.000 mA
	0.000 ... 22.000 mA	Maximum AO1 output value.	1000 = 1 mA

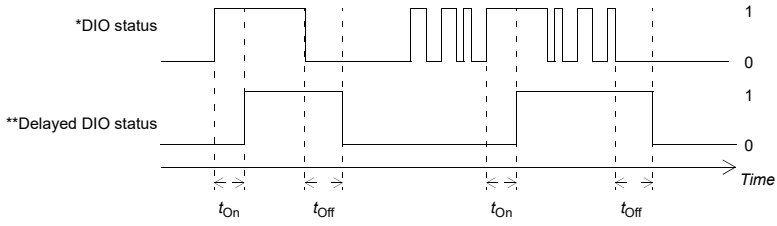
No.	Name/Value	Description	Def/FbEq16
13.21	AO2 actual value	Displays the value of AO2 in mA. This parameter is read-only.	-
	0.000 ... 22.000 mA	Value of AO2.	1000 = 1 mA
13.22	AO2 source	Selects a signal to be connected to analog output AO2. Alternatively, sets the output to excitation mode to feed a constant current to a temperature sensor. For the selections, see parameter 13.12 AO1 source.	Motor current
13.26	AO2 filter time	Defines the filtering time constant for analog output AO2. See parameter 13.16 AO1 filter time.	0.100 s
	0.000 ... 30.000 s	Filter time constant.	1000 = 1 s
13.27	AO2 source min	Defines the real minimum value of the signal (selected by parameter 13.22 AO2 source) that corresponds to the minimum required AO2 output value (defined by parameter 13.29 AO2 out at AO2 src min).  Programming 13.27 as the maximum value and 13.28 as the minimum value inverts the output. 	0.0
	-32768.0 ... 32767.0	Real signal value corresponding to minimum AO2 output value.	1 = 1

No.	Name/Value	Description	Def/FbEq16
13.28	<i>AO2 source max</i>	Defines the real maximum value of the signal (selected by parameter <i>13.22 AO2 source</i>) that corresponds to the maximum required AO2 output value (defined by parameter <i>13.30 AO2 out at AO2 src max</i>). See parameter <i>13.27 AO2 source min</i> .	100.0
	-32768.0 ... 32767.0	Real signal value corresponding to maximum AO2 output value.	1 = 1
13.29	<i>AO2 out at AO2 src min</i>	Defines the minimum output value for analog output AO2. See also drawing at parameter <i>13.27 AO2 source min</i> .	0.000 mA
	0.000 ... 22.000 mA	Minimum AO2 output value.	1000 = 1 mA
13.30	<i>AO2 out at AO2 src max</i>	Defines the maximum output value for analog output AO2. See also drawing at parameter <i>13.27 AO2 source min</i> .	20.000 mA
	0.000 ... 22.000 mA	Maximum AO2 output value.	1000 = 1 mA
13.91	<i>AO1 data storage</i>	Storage parameter for controlling analog output AO1 eg. through fieldbus. In <i>13.12 AO1 source</i> , select <i>AO1 data storage</i> . Then set this parameter as the target of the incoming value data. With the embedded fieldbus interface, simply set the target selection parameter of that particular data (<i>58.101...58.124</i>) to <i>AO1 data storage</i> .	0.00
	-327.68 ... 327.67	Storage parameter for AO1.	100 = 1
13.92	<i>AO2 data storage</i>	Storage parameter for controlling analog output AO2 eg. through fieldbus. In <i>13.22 AO2 source</i> , select <i>AO2 data storage</i> . Then set this parameter as the target of the incoming value data. With the embedded fieldbus interface, simply set the target selection parameter of that particular data (<i>58.101...58.124</i>) to <i>AO2 data storage</i> .	0.00
	-327.68 ... 327.67	Storage parameter for AO2.	100 = 1
14 I/O extension module 1		Configuration of I/O extension module 1. See also section <i>Programmable I/O extensions</i> (page 27). Note: The contents of the parameter group vary according to the selected I/O extension module type.	
14.01	<i>Module 1 type</i>	Activates (and specifies the type of) I/O extension module 1.	<i>None</i>
	None	Inactive.	0
	FIO-01	FIO-01.	1
	FIO-11	FIO-11.	2
	FDIO-01	Not applicable for ACS580MV.	3
	FAIO-01	FAIO-01.	4
14.02	<i>Module 1 location</i>	Specifies the slot (1...3) on the control unit of the drive into which the I/O extension module is installed.	<i>Slot 1</i>
	Slot 1	Slot 1.	1
	Slot 2	Slot 2.	2
	Slot 3	Slot 3.	3
	4...254	Reserved.	1 = 1
14.03	<i>Module 1 status</i>	Displays the status of I/O extension module 1.	<i>No option</i>
	No option	No module detected in the specified slot.	0

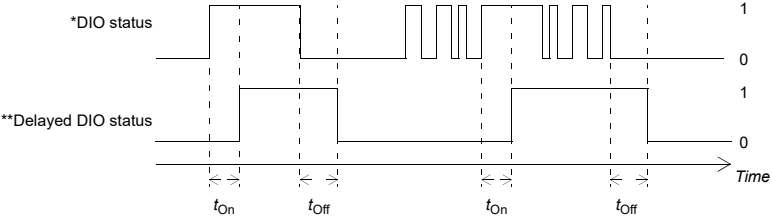
No.	Name/Value	Description	Def/FbEq16
	No communication	A module has been detected but cannot be communicated with.	1
	Unknown	The module type is unknown.	2
	FIO-01	An FIO-01 module has been detected and is active.	15
	FIO-11	An FIO-11 module has been detected and is active.	20
	FAIO-01	An FAIO-01 module has been detected and is active.	24
14.05	<i>DIO status</i>	(Visible when 14.01 Module 1 type = FIO-01 or FIO-11) Displays the status of the digital input/outputs on the extension module. The activation/deactivation delays (if any are specified) are ignored. Bit 0 indicates the status of DIO1. Note: The number of active bits in this parameter depends on the number of digital input/outputs on the extension module. Example: 00001001b = DIO1 and DIO4 are on, remainder are off. This parameter is read-only.	-
	0000h...FFFFh	Status of digital input/outputs.	1 = 1
14.06	<i>DIO delayed status</i>	(Visible when 14.01 Module 1 type = FIO-01 or FIO-11) Displays the delayed status of the digital input/outputs on the extension module. This word is updated only after activation/deactivation delays (if any are specified). Bit 0 indicates the status of DIO1. Note: The number of active bits in this parameter depends on the number of digital input/outputs on the extension module. Example: 0000001001b = DIO1 and DIO4 are on, remainder are off. This parameter is read-only.	-
	0000h...FFFFh	Delayed status of digital input/outputs.	1 = 1
14.08	<i>DIO filter time</i>	(Visible when 14.01 Module 1 type = FIO-01 or FIO-11) Defines a filtering time for parameter 14.05 DIO status. The filtering time will only affect the DIOs that are in input mode.	
	0.8...100.0 ms	Filtering time for 14.05.	10 = 1 ms
14.09	<i>DIO1 function</i>	(Visible when 14.01 Module 1 type = FIO-01 or FIO-11) Selects whether DIO1 of the extension module is used as a digital input or output.	<i>Input</i>
	Output	DIO1 is used as a digital output.	0
	Input	DIO1 is used as a digital input.	1
14.10	<i>DIO1 filter gain</i>	(Visible when 14.01 Module 1 type = FIO-11) Determines a filtering time for DIO1 when it is used as an input.	<i>7.5 us</i>
	7.5 us	7.5 microseconds.	0
	195 us	195 microseconds.	1
	780 us	780 microseconds.	2
	4.680 ms	4.680 milliseconds.	3
14.11	<i>DIO1 output source</i>	(Visible when 14.01 Module 1 type = FIO-01 or FIO-11) Selects a drive signal to be connected to digital input/output DIO1 of the extension module when parameter 14.09 DIO1 function is set to <i>Output</i>.	<i>Not energized</i>
	Not energized	Output is not energized.	0

No.	Name/Value	Description	Def/FbEq16
	Energized	Output is energized.	1
	Ready run	Bit 1 of 06.11 Main status word (see page 67).	2
	Enabled	Bit 0 of 06.16 Drive status word 1 (see page 68).	4
	Started	Bit 5 of 06.16 Drive status word 1 (see page 68).	5
	Magnetized	Bit 1 of 06.17 Drive status word 2 (see page 69).	6
	Running	Bit 6 of 06.16 Drive status word 1 (see page 68).	7
	Ready ref	Bit 2 of 06.11 Main status word (see page 67).	8
	At setpoint	Bit 8 of 06.11 Main status word (see page 67).	9
	Reverse	Bit 2 of 06.19 Speed control status word (see page 71).	10
	Zero speed	Bit 0 of 06.19 Speed control status word (see page 71).	11
	Above limit	Bit 10 of 06.17 Drive status word 2 (see page 69).	12
	Warning	Bit 7 of 06.11 Main status word (see page 67).	13
	Fault	Bit 3 of 06.11 Main status word (see page 67).	14
	Fault (-1)	Inverted bit 3 of 06.11 Main status word (see page 67).	15
	Start request	Bit 13 of 06.16 Drive status word 1 (see page 68).	16
	Open brake command	Not supported.	22
	Ext2 active	Bit 11 of 06.16 Drive status word 1 (see page 68).	23
	Remote control	Bit 9 of 06.11 Main status word (see page 67).	24
	Supervision 1	Bit 0 of 32.01 Supervision status (see page 193).	33
	Supervision 2	Bit 1 of 32.01 Supervision status (see page 193).	34
	Supervision 3	Bit 2 of 32.01 Supervision status (see page 193).	35
	RO/DIO control word bit0	Bit 0 of 10.99 RO/DIO control word (see page 86).	40
	RO/DIO control word bit1	Bit 1 of 10.99 RO/DIO control word (see page 86).	41
	RO/DIO control word bit2	Bit 2 of 10.99 RO/DIO control word (see page 86).	42
	RO/DIO control word bit8	Not applicable for ACS580MV.	43
	RO/DIO control word bit9	Not applicable for ACS580MV.	44
	Other [bit]	Source selection (see Terms and abbreviations on page 55).	-

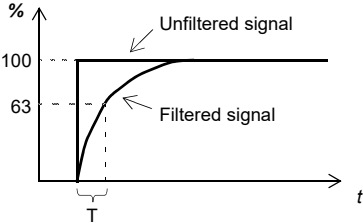
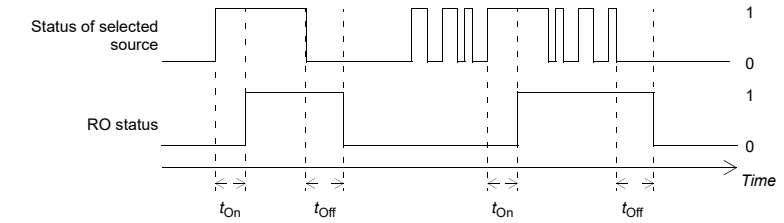
No.	Name/Value	Description	Def/FbEq16
14.12	DIO1 ON delay	(Visible when 14.01 Module 1 type = FIO-01 or FIO-11) Defines the activation delay for digital input/output DIO1.	0.0 s
 $t_{On} = 14.12$ DIO1 ON delay $t_{Off} = 14.13$ DIO1 OFF delay *Electrical status of DIO (in input mode) or status of selected source (in output mode). Indicated by 14.05 DIO status. **Indicated by 14.06 DIO delayed status.			
	0.0 ... 3000.0 s	Activation delay for DIO1.	10 = 1 s
14.13	DIO1 OFF delay	(Visible when 14.01 Module 1 type = FIO-01 or FIO-11) Defines the deactivation delay for digital input/output DIO1. See parameter 14.12 DIO1 ON delay.	0.0 s
	0.0 ... 3000.0 s	Deactivation delay for DIO1.	10 = 1 s
14.14	DIO2 function	(Visible when 14.01 Module 1 type = FIO-01 or FIO-11) Selects whether DIO2 of the extension module is used as a digital input or output.	Input
	Output	DIO2 is used as a digital output.	0
	Input	DIO2 is used as a digital input.	1
14.15	DIO2 filter gain	(Visible when 14.01 Module 1 type = FIO-11) Determines a filtering time for DIO2 when it is used as an input.	7.5 us
	7.5 us	7.5 microseconds.	0
	195 us	195 microseconds.	1
	780 us	780 microseconds.	2
	4.680 ms	4.680 milliseconds.	3
14.16	DIO2 output source	(Visible when 14.01 Module 1 type = FIO-01 or FIO-11) Selects a drive signal to be connected to digital input/output DIO2 when parameter 14.14 DIO2 function is set to Output. For the available selections, see parameter 14.11 DIO1 output source.	Not energized

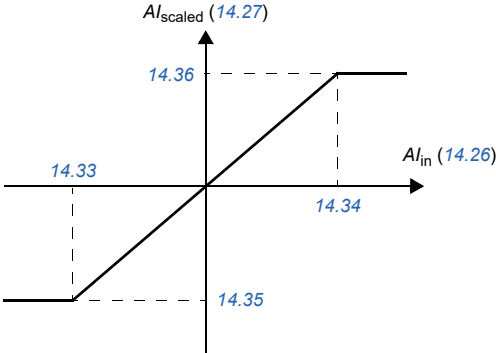
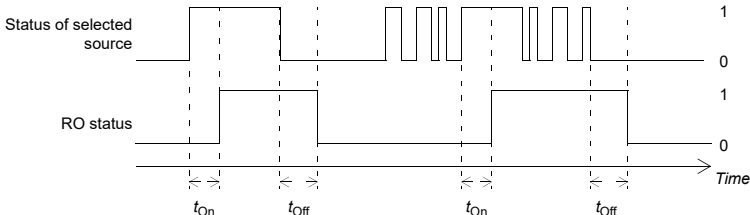
No.	Name/Value	Description	Def/FbEq16
14.17	DIO2 ON delay	(Visible when 14.01 Module 1 type = FIO-01 or FIO-11) Defines the activation delay for digital input/output DIO2.	0.0 s
 t_{On} = 14.17 DIO2 ON delay t_{Off} = 14.18 DIO2 OFF delay *Electrical status of DIO (in input mode) or status of selected source (in output mode). Indicated by 14.05 DIO status. **Indicated by 14.06 DIO delayed status.			
	0.0 ... 3000.0 s	Activation delay for DIO2.	10 = 1 s
14.18	DIO2 OFF delay	(Visible when 14.01 Module 1 type = FIO-01 or FIO-11) Defines the deactivation delay for digital input/output DIO2. See parameter 14.17 DIO2 ON delay.	0.0 s
	0.0 ... 3000.0 s	Deactivation delay for DIO2.	10 = 1 s
14.19	DIO3 function	(Visible when 14.01 Module 1 type = FIO-01) Selects whether DIO3 of the extension module is used as a digital input or output.	Input
	Output	DIO3 is used as a digital output.	0
	Input	DIO3 is used as a digital input.	1
14.19	AI supervision function	(Visible when 14.01 Module 1 type = FIO-11 or FAIO-01) Selects how the drive reacts when an analog input signal moves out of the minimum and/or maximum limits specified for the input. The inputs and the limits to be observed are selected by parameter 14.20 AI supervision selection.	No action
	No action	No action taken.	0
	Fault	Drive trips on 80A0 AI supervision.	1
	Warning	Drive generates an A8A0 AI supervision warning.	2
	Last speed	Drive generates a warning (A8A0 AI supervision) and freezes the speed (or frequency) to the level the drive was operating at. The speed/frequency is determined on the basis of actual speed using 850 ms low-pass filtering.  WARNING! Make sure that it is safe to continue operation in case of a communication break.	3
	Speed ref safe	Drive generates a warning (A8A0 AI supervision) and sets the speed to the speed defined by parameter 22.41 Speed ref safe (or 28.41 Frequency ref safe when frequency reference is being used).  WARNING! Make sure that it is safe to continue operation in case of a communication break.	4

No.	Name/Value	Description	Def/FbEq16																								
14.20	AI supervision selection	(Visible when 14.01 Module 1 type = FIO-11 or FAIO-01) Specifies the analog input limits to be supervised. See parameter 14.19 AI supervision function.	0000h																								
<table><tr><th>Bit</th><th>Name</th><th>Description</th></tr><tr><td>0</td><td>AI1 < MIN</td><td>1 = Minimum limit supervision of AI1 active.</td></tr><tr><td>1</td><td>AI1 > MAX</td><td>1 = Maximum limit supervision of AI1 active.</td></tr><tr><td>2</td><td>AI2 < MIN</td><td>1 = Minimum limit supervision of AI2 active.</td></tr><tr><td>3</td><td>AI2 > MAX</td><td>1 = Maximum limit supervision of AI2 active.</td></tr><tr><td>4</td><td>AI3 < MIN</td><td>1 = Minimum limit supervision of AI3 active(FIO-11 only).</td></tr><tr><td>5</td><td>AI3 < MIN</td><td>1 = Maximum limit supervision of AI3 active(FIO-11 only).</td></tr><tr><td>6...15</td><td>Reserved</td><td></td></tr></table>				Bit	Name	Description	0	AI1 < MIN	1 = Minimum limit supervision of AI1 active.	1	AI1 > MAX	1 = Maximum limit supervision of AI1 active.	2	AI2 < MIN	1 = Minimum limit supervision of AI2 active.	3	AI2 > MAX	1 = Maximum limit supervision of AI2 active.	4	AI3 < MIN	1 = Minimum limit supervision of AI3 active(FIO-11 only).	5	AI3 < MIN	1 = Maximum limit supervision of AI3 active(FIO-11 only).	6...15	Reserved	
Bit	Name	Description																									
0	AI1 < MIN	1 = Minimum limit supervision of AI1 active.																									
1	AI1 > MAX	1 = Maximum limit supervision of AI1 active.																									
2	AI2 < MIN	1 = Minimum limit supervision of AI2 active.																									
3	AI2 > MAX	1 = Maximum limit supervision of AI2 active.																									
4	AI3 < MIN	1 = Minimum limit supervision of AI3 active(FIO-11 only).																									
5	AI3 < MIN	1 = Maximum limit supervision of AI3 active(FIO-11 only).																									
6...15	Reserved																										
0000h...FFFFh		Activation of analog input supervision.	1 = 1																								
14.21	DIO3 output source	(Visible when 14.01 Module 1 type = FIO-01) Selects a drive signal to be connected to digital input/output DIO3 when parameter 14.19 DIO3 function is set to Output. For the available selections, see parameter 14.11 DIO1 output source.	Not energized																								
14.21	AI tune	(Visible when 14.01 Module 1 type =FIO-11or FAIO-01) Triggers the analog input tuning function, which enables the use of actual measurements as the minimum and maximum input values instead of potentially inaccurate estimates. Apply the minimum or maximum signal to the input and select the appropriate tuning function. See also the drawing at parameter 14.35 AI1 scaled at AI1 min.	No action																								
No action		Tuning action completed or no action has been requested.The parameter automatically reverts to this value after any tuning action.	0																								
AI1 min tune		The measured value of AI1 is set as the minimum value of AI1 into parameter 14.33 AI1 min.	1																								
AI1 max tune		The measured value of AI1 is set as the maximum value of AI1 into parameter 14.34 AI1 max.	2																								
AI2 min tune		The measured value of AI2 is set as the minimum value of AI2 into parameter 14.48 AI2 min.	3																								
AI2 max tune		The measured value of AI2 is set as the maximum value of AI2 into parameter 14.49 AI2 max.	4																								
AI3 min tune		The measured value of AI3 is set as the minimum value of AI3 into parameter 14.63 AI3 min.	5																								
AI3 max tune		The measured value of AI3 is set as the maximum value of AI3 into parameter 14.64 AI3 max.	6																								

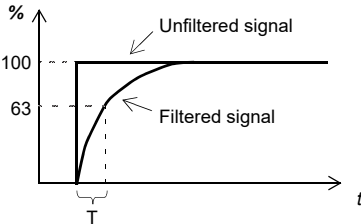
No.	Name/Value	Description	Def/FbEq16
14.27	DIO4 ON delay	(Visible when 14.01 Module 1 type = FIO-01) Defines the activation delay for digital input/output DIO4.	0.0 s
 $t_{On} = 14.27$ DIO4 ON delay $t_{Off} = 14.28$ DIO4 OFF delay *Electrical status of DIO (in input mode) or status of selected source (in output mode). Indicated by 14.05 DIO status. **Indicated by 14.06 DIO delayed status.			
	0.0 ... 3000.0 s	Activation delay for DIO4.	10 = 1 s
14.27	AI1 scaled value	(Visible when 14.01 Module 1 type = FIO-11 or FAIO-01) Displays the value of analog input AI1 after scaling. See parameter 14.35 AI1 scaled at AI1 min. This parameter is read-only.	-
	-32768.000 ... 32767.000	Scaled value of analog input AI1.	1 = 1
14.28	DIO4 OFF delay	(Visible when 14.01 Module 1 type = FIO-01) Defines the deactivation delay for digital input/output DIO4. See parameter 14.27 DIO4 ON delay.	0.0 s
	0.0 ... 3000.0 s	Deactivation delay for DIO4.	10 = 1 s
14.28	AI1 force data	(Visible when 14.01 Module 1 type = FIO-11 or FAIO-01) Forced value that can be used instead of the true reading of the input. See parameter 14.22 AI force selection.	0.000 mA
	-22.000 ... 22.000 mA or V	Forced value of analog input AI1.	1000 = 1 mA or V
14.29	AI1 HW switch position	(Visible when 14.01 Module 1 type = FIO-11 or FAIO-01) Shows the position of the hardware current/voltage selector on the I/O extension module. Note: The setting of the current/voltage selector must match the unit selection made in parameter 14.30 AI1 unit selection. I/O module reboot either by cycling the power or through parameter 96.08 Control board boot is required to validate any changes in the hardware settings.	-
	V	Volts.	2
	mA	Milliamperes.	10

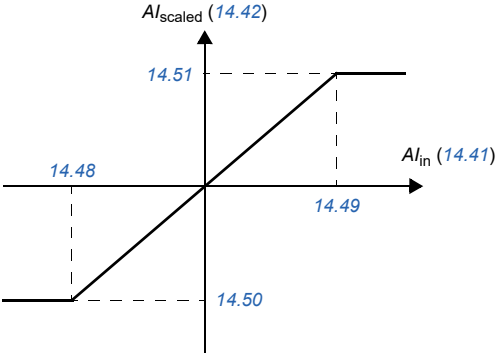
No.	Name/Value	Description	Def/FbEq16
14.30	<i>AI1 unit selection</i>	(Visible when 14.01 Module 1 type = FIO-11 or FAIO-01) Selects the unit for readings and settings related to analog input AI1. Note: This setting must match the corresponding hardware setting on the I/O extension module (see the manual of the I/O extension module). The hardware setting is shown by parameter 14.29 AI1 HW switch position. I/O module reboot either by cycling the power or through parameter 96.08 Control board boot is required to validate any changes in the hardware settings.	V
	V	Volts.	2
	mA	Milliamperes.	10
14.31	<i>RO status</i>	(Visible when 14.01 Module 1 type = FIO-01) Status of relay outputs on the I/O extension module. Example: 00000001b = RO1 is energized, RO2 is de-energized.	-
	0000h...FFFFh	Status of relay outputs.	1 = 1
14.31	<i>AI1 filter gain</i>	(Visible when 14.01 Module 1 type = FIO-11 or FAIO-01) Selects a hardware filtering time for AI1. See also parameter 14.32 AI1 filter time.	No filtering
	No filtering	No filtering.	0
	125 us	125 microseconds.	1
	250 us	250 microseconds.	2
	500 us	500 microseconds.	3
	1 ms	1 millisecond.	4
	2 ms	2 milliseconds.	5
	4 ms	4 milliseconds.	6
	7.9375 ms	7.9375 milliseconds.	7

No.	Name/Value	Description	Def/FbEq16
14.32	AI1 filter time	(Visible when 14.01 Module 1 type = FIO-11 or FAIO-01) Defines the filter time constant for analog input AI1.  $O = I \times (1 - e^{-t/T})$ I = filter input (step) O = filter output t = time T = filter time constant Note: The signal is also filtered due to the signal interface hardware. See parameter 14.31 AI1 filter gain.	0.040 s
	0.000 ... 30.000 s	Filter time constant.	1000 = 1 s
14.33	AI1 min	(Visible when 14.01 Module 1 type = FIO-11 or FAIO-01) Defines the minimum value for analog input AI1.	0.000 mA or V
	-22.000 ... 22.000 mA or V	Minimum value of AI1.	1000 = 1 mA or V
14.34	RO1 source	(Visible when 14.01 Module 1 type = FIO-01) Selects a drive signal to be connected to relay output RO1. For the available selections, see parameter 14.11 DIO1 output source.	Not energized
14.34	AI1 max	(Visible when 14.01 Module 1 type = FIO-11 or FAIO-01) Defines the maximum value for analog input AI1.	10.000 mA or V
	-22.000 ... 22.000 mA or V	Maximum value of AI1.	1000 = 1 mA or V
14.35	RO1 ON delay	(Visible when 14.01 Module 1 type = FIO-01) Defines the activation delay for relay output RO1.	0.0 s
 $t_{On} = 14.35$ RO1 ON delay $t_{Off} = 14.36$ RO1 OFF delay			
	0.0 ... 3000.0 s	Activation delay for RO1.	10 = 1 s

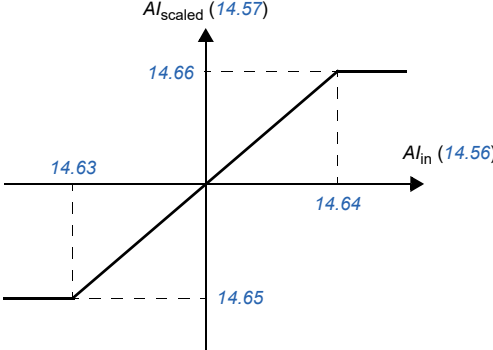
No.	Name/Value	Description	Def/FbEq16
14.35	AI1 scaled at AI1 min	(Visible when 14.01 Module 1 type = FIO-11 or FAIO-01) Defines the real value that corresponds to the minimum analog input AI1 value defined by parameter 14.33 AI1 min. 	0.000
	-32768.000 ... 32767.000	Real value corresponding to minimum AI1 value.	1 = 1
14.36	RO1 OFF delay	(Visible when 14.01 Module 1 type = FIO-01) Defines the deactivation delay for relay output RO1. See parameter 14.35 RO1 ON delay.	0.0 s
	0.0 ... 3000.0 s	Deactivation delay for RO1.	10 = 1 s
14.36	AI1 scaled at AI1 max	(Visible when 14.01 Module 1 type = FIO-11 or FAIO-01) Defines the real value that corresponds to the maximum analog input AI1 value defined by parameter 14.34 AI1 max. See the drawing at parameter 14.35 AI1 scaled at AI1 min.	100.000
	-32768.000 ... 32767.000	Real value corresponding to maximum AI1 value.	1 = 1
14.37	RO2 source	(Visible when 14.01 Module 1 type = FIO-01) Selects a drive signal to be connected to relay output RO2. For the available selections, see parameter 14.11 DIO1 output source.	Not energized
14.38	RO2 ON delay	(Visible when 14.01 Module 1 type = FIO-01) Defines the activation delay for relay output RO2.	0.0 s
 $t_{On} = 14.38$ RO2 ON delay $t_{Off} = 14.39$ RO2 OFF delay			
	0.0 ... 3000.0 s	Activation delay for RO2.	10 = 1 s

No.	Name/Value	Description	Def/FbEq16
14.39	RO2 OFF delay	(Visible when 14.01 Module 1 type = FIO-01) Defines the deactivation delay for relay output RO2. See parameter 14.38 RO2 ON delay.	0.0 s
	0.0 ... 3000.0 s	Deactivation delay for RO2.	10 = 1 s
14.41	AI2 actual value	(Visible when 14.01 Module 1 type = FIO-11 or FAIO-01) Displays the value of analog input AI2 in mA or V (depending on whether the input is set to current or voltage). This parameter is read-only.	-
	-22.000 ... 22.000 mA or V	Value of analog input AI2.	1000 = 1 mA or V
14.42	AI2 scaled value	(Visible when 14.01 Module 1 type = FIO-11 or FAIO-01) Displays the value of analog input AI2 after scaling. See parameter 14.50 AI2 scaled at AI2 min. This parameter is read-only.	-
	-32768.000 ... 32767.000	Scaled value of analog input AI2.	1 = 1
14.43	AI2 force data	(Visible when 14.01 Module 1 type = FIO-11 or FAIO-01) Forced value that can be used instead of the true reading of the input. See parameter 14.22 AI force selection.	0.000 mA
	-22.000 ... 22.000 mA or V	Forced value of analog input AI2.	1000 = 1 mA or V
14.44	AI2 HW switch position	(Visible when 14.01 Module 1 type = FIO-11 or FAIO-01) Shows the position of the hardware current/voltage selector on the I/O extension module. Note: The setting of the current/voltage selector must match the unit selection made in parameter 14.45 AI2 unit selection. I/O module reboot either by cycling the power or through parameter 96.08 Control board boot is required to validate any changes in the hardware settings.	-
	V	Volts.	2
	mA	Milliamperes.	10
14.45	AI2 unit selection	(Visible when 14.01 Module 1 type = FIO-11 or FAIO-01) Selects the unit for readings and settings related to analog input AI2. Note: This setting must match the corresponding hardware setting on the I/O extension module (see the manual of the I/O extension module). The hardware setting is shown by parameter 14.44 AI2 HW switch position. I/O module reboot either by cycling the power or through parameter 96.08 Control board boot is required to validate any changes in the hardware settings.	mA
	V	Volts.	2
	mA	Milliamperes.	10
14.46	AI2 filter gain	(Visible when 14.01 Module 1 type = FIO-11 or FAIO-01) Selects a hardware filtering time for AI2. See also parameter 14.47 AI2 filter time.	No filtering
	No filtering	No filtering.	0
	125 us	125 microseconds.	1
	250 us	250 microseconds.	2
	500 us	500 microseconds.	3

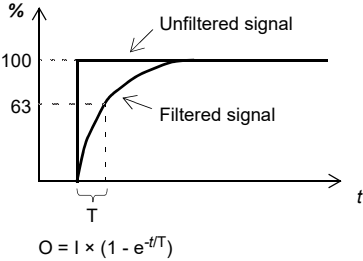
No.	Name/Value	Description	Def/FbEq16
	1 ms	1 millisecond.	4
	2 ms	2 milliseconds.	5
	4 ms	4 milliseconds.	6
	7.9375 ms	7.9375 milliseconds.	7
14.47	AI2 filter time	(Visible when 14.01 Module 1 type = FIO-11 or FAIO-01) Defines the filter time constant for analog input AI2.  $O = I \times (1 - e^{-t/T})$ I = filter input (step) O = filter output t = time T = filter time constant Note: The signal is also filtered due to the signal interface hardware. See parameter 14.46 AI2 filter gain.	0.100 s
	0.000 ... 30.000 s	Filter time constant.	1000 = 1 s
14.48	AI2 min	(Visible when 14.01 Module 1 type = FIO-11 or FAIO-01) Defines the minimum value for analog input AI2.	0.000 mA or V
	-22.000 ... 22.000 mA or V	Minimum value of AI2.	1000 = 1 mA or V
14.49	AI2 max	(Visible when 14.01 Module 1 type = FIO-11 or FAIO-01) Defines the maximum value for analog input AI2.	10.000 mA or V
	-22.000 ... 22.000 mA or V	Maximum value of AI2.	1000 = 1 mA or V

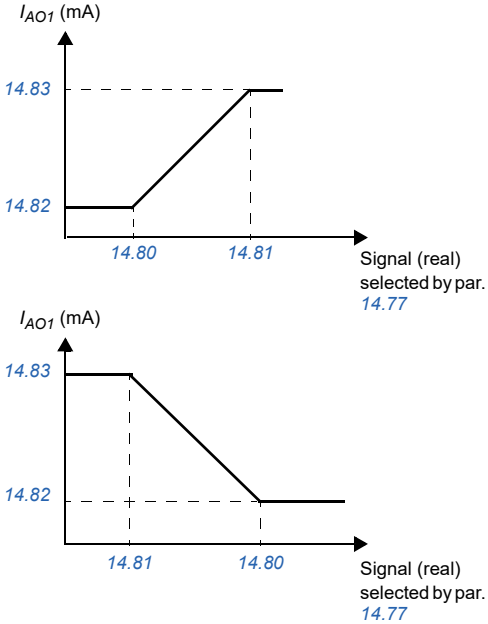
No.	Name/Value	Description	Def/FbEq16
14.50	<i>AI2 scaled at AI2 min</i>	(Visible when 14.01 Module 1 type = FIO-11 or FAIO-01) Defines the real value that corresponds to the minimum analog input AI2 value defined by parameter 14.48 AI2 min. 	0.000
	-32768.000 ... 32767.000	Real value corresponding to minimum AI2 value.	1 = 1
14.51	<i>AI2 scaled at AI2 max</i>	(Visible when 14.01 Module 1 type = FIO-11 or FAIO-01) Defines the real value that corresponds to the maximum analog input AI2 value defined by parameter 14.49 AI2 max. See the drawing at parameter 14.50 AI2 scaled at AI2 min.	100.000
	-32768.000 ... 32767.000	Real value corresponding to maximum AI2 value.	1 = 1
14.56	<i>AI3 actual value</i>	(Visible when 14.01 Module 1 type = FIO-11) Displays the value of analog input AI3 in mA or V (depending on whether the input is set to current or voltage). This parameter is read-only.	-
	-22.000 ... 22.000 mA or V	Value of analog input AI3.	1000 = 1 mA or V
14.57	<i>AI3 scaled value</i>	(Visible when 14.01 Module 1 type = FIO-11) Displays the value of analog input AI3 after scaling. See parameter 14.65 AI3 scaled at AI3 min. This parameter is read-only.	-
	-32768.000 ... 32767.000	Scaled value of analog input AI3.	1 = 1
14.58	<i>AI3 force data</i>	(Visible when 14.01 Module 1 type = FIO-11) Forced value that can be used instead of the true reading of the input. See parameter 14.22 AI force selection.	0.000 mA
	-22.000 ... 22.000 mA or V	Forced value of analog input AI3.	1000 = 1 mA or V
14.59	<i>AI3 HW switch position</i>	(Visible when 14.01 Module 1 type = FIO-11) Shows the position of the hardware current/voltage selector on the I/O extension module. Note: The setting of the current/voltage selector must match the unit selection made in parameter 14.60 AI3 unit selection. I/O module reboot either by cycling the power or through parameter 96.08 Control board boot is required to validate any changes in the hardware settings.	-
	V	Volts.	2

No.	Name/Value	Description	Def/FbEq16
	mA	Milliamperes.	10
14.60	<i>AI3 unit selection</i>	(Visible when <i>14.01 Module 1 type = FIO-11</i>) Selects the unit for readings and settings related to analog input AI3. Note: This setting must match the corresponding hardware setting on the I/O extension module (see the manual of the I/O extension module). The hardware setting is shown by parameter <i>14.59 AI3 HW switch position</i>. I/O module reboot either by cycling the power or through parameter <i>96.08 Control board boot</i> is required to validate any changes in the hardware settings.	<i>mA</i>
	V	Volts.	2
	mA	Milliamperes.	10
14.61	<i>AI3 filter gain</i>	(Visible when <i>14.01 Module 1 type = FIO-11</i>) Selects a hardware filtering time for AI3. See also parameter <i>14.62 AI3 filter time</i>.	<i>No filtering</i>
	No filtering	No filtering.	0
	125 us	125 microseconds.	1
	250 us	250 microseconds.	2
	500 us	500 microseconds.	3
	1 ms	1 millisecond.	4
	2 ms	2 milliseconds.	5
	4 ms	4 milliseconds.	6
	7.9375 ms	7.9375 milliseconds.	7
14.62	<i>AI3 filter time</i>	(Visible when <i>14.01 Module 1 type = FIO-11</i>) Defines the filter time constant for analog input AI3. $O = I \times (1 - e^{-t/T})$ I = filter input (step) O = filter output t = time T = filter time constant Note: The signal is also filtered due to the signal interface hardware. See parameter <i>14.61 AI3 filter gain</i>.	0.100 s
	0.000 ... 30.000 s	Filter time constant.	1000 = 1 s

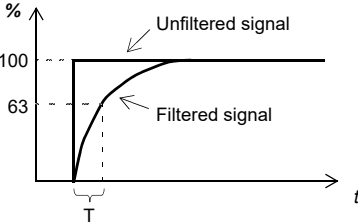
No.	Name/Value	Description	Def/FbEq16								
14.63	AI3 min	(Visible when 14.01 Module 1 type = FIO-11) Defines the minimum value for analog input AI3.	0.000 mA or V								
	-22.000 ... 22.000 mA or V	Minimum value of AI3.	1000 = 1 mA or V								
14.64	AI3 max	(Visible when 14.01 Module 1 type = FIO-11) Defines the maximum value for analog input AI3.	10.000 mA or V								
	-22.000 ... 22.000 mA or V	Maximum value of AI3.	1000 = 1 mA or V								
14.65	AI3 scaled at AI3 min	(Visible when 14.01 Module 1 type = FIO-11) Defines the real value that corresponds to the minimum analog input AI3 value defined by parameter 14.63 AI3 min. 	0.000								
	-32768.000 ... 32767.000	Real value corresponding to minimum AI3 value.	1 = 1								
14.66	AI3 scaled at AI3 max	(Visible when 14.01 Module 1 type = FIO-11) Defines the real value that corresponds to the maximum analog input AI3 value defined by parameter 14.64 AI3 max. See the drawing at parameter 14.65 AI3 scaled at AI3 min.	100.000								
	-32768.000 ... 32767.000	Real value corresponding to maximum AI3 value.	1 = 1								
14.71	AO force selection	(Visible when 14.01 Module 1 type = FIO-11 or FAIO-01) The value of the analog output can be overridden for eg. testing purposes. A forced value parameter (14.78 AO1 force data) is provided for the analog output, and its value is applied whenever the corresponding bit in this parameter is 1.	00b								
<table><tr><th>Bit</th><th>Value</th></tr><tr><td>0</td><td>1 = Force AO1 to value of parameter 14.78 AO1 force data.</td></tr><tr><td>1</td><td>1 = Force AO2 to value of parameter 14.88 AO2 force data (FAIO-01 only).</td></tr><tr><td>2...31</td><td>Reserved.</td></tr></table>				Bit	Value	0	1 = Force AO1 to value of parameter 14.78 AO1 force data.	1	1 = Force AO2 to value of parameter 14.88 AO2 force data (FAIO-01 only).	2...31	Reserved.
Bit	Value										
0	1 = Force AO1 to value of parameter 14.78 AO1 force data.										
1	1 = Force AO2 to value of parameter 14.88 AO2 force data (FAIO-01 only).										
2...31	Reserved.										
	00b...11b	Forced values selector for analog outputs.	1 = 1								
14.76	AO1 actual value	(Visible when 14.01 Module 1 type = FIO-11 or FAIO-01) Displays the value of AO1 in mA. This parameter is read-only.	-								
	0.000 ... 22.000 mA	Value of AO1.	1000 = 1 mA								

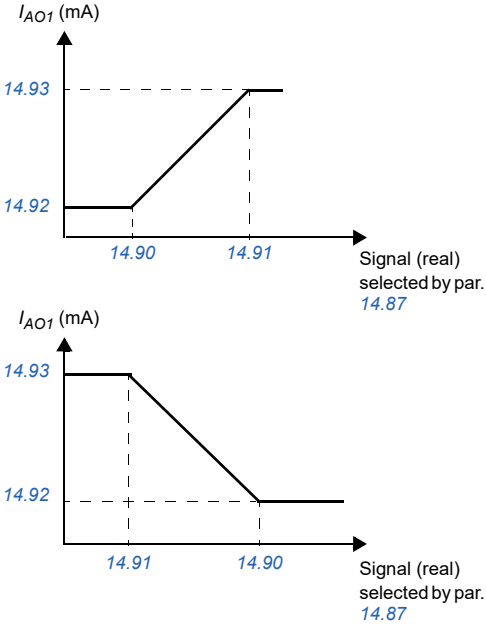
No.	Name/Value	Description	Def/FbEq16
14.77	<i>AO1 source</i>	(Visible when 14.01 Module 1 type = FIO-11 or FA/O-01) Selects a signal to be connected to analog output AO1. Alternatively, sets the output to excitation mode to feed a constant current to a temperature sensor.	<i>Zero</i>
	Zero	None.	0
	Motor speed used	<i>01.01 Motor speed used</i> (page 59).	1
	Output frequency	<i>01.06 Output frequency</i> (page 59).	3
	Motor current	<i>01.07 Motor current</i> (page 59).	4
	Motor torque	<i>01.10 Motor torque</i> (page 59).	6
	DC voltage	<i>01.11 DC voltage</i> (page 59).	7
	Power inu out	<i>01.14 Output power</i> (page 60).	8
	Speed ref ramp in	<i>23.01 Speed ref ramp input</i> (page 145).	10
	Speed ref ramp out	<i>23.02 Speed ref ramp output</i> (page 145).	11
	Speed ref used	<i>24.01 Used speed reference</i> (page 145).	12
	Torq ref used	<i>26.02 Torque reference used</i> (page 161).	13
	Freq ref used	<i>28.02 Frequency ref ramp output</i> (page 173).	14
	Force PT100 excitation	The output is used to feed an excitation current to 1...3 Pt100 sensors. See section <i>Motor thermal protection</i> (page 45).	20
	Force KTY84 excitation	The output is used to feed an excitation current to a KTY84 sensor. See section <i>Motor thermal protection</i> (page 45).	21
	Force PTC excitation	The output is used to feed an excitation current to 1...3 PTC sensors. See section <i>Motor thermal protection</i> (page 45).	22
	Force Pt1000 excitation	The output is used to feed an excitation current to 1...3 Pt1000 sensors. See section <i>Motor thermal protection</i> (page 45).	23
	AO1 data storage	<i>13.91 AO1 data storage</i> (page 95).	37
	AO2 data storage	<i>13.92 AO2 data storage</i> (page 95).	38
	<i>Other</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
14.78	<i>AO1 force data</i>	(Visible when 14.01 Module 1 type = FIO-11 or FA/O-01) Forced value that can be used instead of the selected output signal. See parameter 14.71 AO force selection.	0.000 mA
	0.000 ... 22.000 mA	Forced value of analog output AO1.	1000 = 1 mA

No.	Name/Value	Description	Def/FbEq16
14.79	AO1 filter time	(Visible when 14.01 Module 1 type = FIO-11 or FAIO-01) Defines the filtering time constant for analog output AO1.  $O = I \times (1 - e^{-t/T})$ I = filter input (step) O = filter output t = time T = filter time constant	0.100 s
	0.000 ... 30.000 s	Filter time constant.	1000 = 1 s

No.	Name/Value	Description	Def/FbEq16
14.80	AO1 source min	(Visible when 14.01 Module 1 type = FIO-11 or FAIO-01) Defines the real value of the signal (selected by parameter 14.77 AO1 source) that corresponds to the minimum AO1 output value (defined by parameter 14.82 AO1 out at AO1 src min).  The top graph shows a signal (real) selected by par. 14.77 on the x-axis. The y-axis is I_{AO1} (mA). The signal increases from 14.80 to 14.81, and the output current increases from 14.82 to 14.83 mA. The bottom graph shows a signal (real) selected by par. 14.77 on the x-axis. The y-axis is I_{AO1} (mA). The signal decreases from 14.81 to 14.80, and the output current decreases from 14.83 to 14.82 mA.	0.0
	-32768.0 ... 32767.0	Real signal value corresponding to minimum AO1 output value.	1 = 1
14.81	AO1 source max	(Visible when 14.01 Module 1 type = FIO-11 or FAIO-01) Defines the real value of the signal (selected by parameter 14.77 AO1 source) that corresponds to the maximum AO1 output value (defined by parameter 14.83 AO1 out at AO1 src max). See parameter 14.80 AO1 source min.	100.0
	-32768.0 ... 32767.0	Real signal value corresponding to maximum AO1 output value.	1 = 1
14.82	AO1 out at AO1 src min	(Visible when 14.01 Module 1 type = FIO-11 or FAIO-01) Defines the minimum output value for analog output AO1. See also drawing at parameter 14.80 AO1 source min.	0.000 mA
	0.000 ... 22.000 mA	Minimum AO1 output value.	1000 = 1 mA
14.83	AO1 out at AO1 src max	(Visible when 14.01 Module 1 type = FIO-11 or FAIO-01) Defines the maximum output value for analog output AO1. See also drawing at parameter 14.80 AO1 source min.	10.000 mA
	0.000 ... 22.000 mA	Maximum AO1 output value.	1000 = 1 mA

No.	Name/Value	Description	Def/FbEq16
14.86	<i>AO2 actual value</i>	(Visible when 14.01 Module 1 type = FAIO-01) Displays the value of AO2 in mA. This parameter is read-only.	-
	0.000 ... 22.000 mA	Value of AO2.	1000 = 1 mA
14.87	<i>AO2 source</i>	(Visible when 14.01 Module 1 type = FAIO-01) Selects a signal to be connected to analog output AO2. Alternatively, sets the output to excitation mode to feed a constant current to a temperature sensor.	<i>Zero</i>
	Zero	None.	0
	Motor speed used	<i>01.01 Motor speed used</i> (page 59).	1
	Output frequency	<i>01.06 Output frequency</i> (page 59).	3
	Motor current	<i>01.07 Motor current</i> (page 59).	4
	Motor torque	<i>01.10 Motor torque</i> (page 59).	6
	DC voltage	<i>01.11 DC voltage</i> (page 59).	7
	Power inu out	<i>01.14 Output power</i> (page 60).	8
	Speed ref ramp in	<i>23.01 Speed ref ramp input</i> (page 145).	10
	Speed ref ramp out	<i>23.02 Speed ref ramp output</i> (page 145).	11
	Speed ref used	<i>24.01 Used speed reference</i> (page 145).	12
	Torq ref used	<i>26.02 Torque reference used</i> (page 161).	13
	Freq ref used	<i>28.02 Frequency ref ramp output</i> (page 173).	14
	Force PT100 excitation	The output is used to feed an excitation current to 1...3 Pt100 sensors. See section <i>Motor thermal protection</i> (page 45).	20
	Force KTY84 excitation	The output is used to feed an excitation current to a KTY84 sensor. See section <i>Motor thermal protection</i> (page 45).	21
	Force PTC excitation	The output is used to feed an excitation current to 1...3 PTC sensors. See section <i>Motor thermal protection</i> (page 45).	22
	Force Pt1000 excitation	The output is used to feed an excitation current to 1...3 Pt1000 sensors. See section <i>Motor thermal protection</i> (page 45).	23
	AO1 data storage	<i>13.91 AO1 data storage</i> (page 95).	37
	AO2 data storage	<i>13.92 AO2 data storage</i> (page 95).	38
	<i>Other</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
14.88	<i>AO2 force data</i>	(Visible when 14.01 Module 1 type = FAIO-01) Forced value that can be used instead of the selected output signal. See parameter <i>14.71 AO force selection</i> .	0.000 mA
	0.000 ... 22.000 mA	Forced value of analog output AO2.	1000 = 1 mA

No.	Name/Value	Description	Def/FbEq16
14.89	AO2 filter time	(Visible when 14.01 Module 1 type = FAIO-01) Defines the filtering time constant for analog output AO2.  $O = I \times (1 - e^{-t/T})$ I = filter input (step) O = filter output t = time T = filter time constant	0.100 s
	0.000 ... 30.000 s	Filter time constant.	1000 = 1 s

No.	Name/Value	Description	Def/FbEq16
14.90	AO2 source min	(Visible when 14.01 Module 1 type = FAIO-01) Defines the real value of the signal (selected by parameter 14.87 AO2 source) that corresponds to the minimum AO2 output value (defined by parameter 14.92 AO2 out at AO2 src min).  The top graph shows a signal value of 14.90 corresponding to an output of 14.92, and a signal value of 14.91 corresponding to an output of 14.93. The bottom graph shows a signal value of 14.91 corresponding to an output of 14.92, and a signal value of 14.90 corresponding to an output of 14.93.	0.0
	-32768.0 ... 32767.0	Real signal value corresponding to minimum AO2 output value.	1 = 1
14.91	AO2 source max	(Visible when 14.01 Module 1 type = FAIO-01) Defines the real value of the signal (selected by parameter 14.87 AO2 source) that corresponds to the maximum AO2 output value (defined by parameter 14.93 AO2 out at AO2 src max). See parameter 14.90 AO2 source min.	100.0
	-32768.0 ... 32767.0	Real signal value corresponding to maximum AO2 output value.	1 = 1
14.92	AO2 out at AO2 src min	(Visible when 14.01 Module 1 type = FAIO-01) Defines the minimum output value for analog output AO2. See also drawing at parameter 14.90 AO2 source min.	0.000 mA
	0.000 ... 22.000 mA	Minimum AO2 output value.	1000 = 1 mA
14.93	AO2 out at AO2 src max	(Visible when 14.01 Module 1 type = FAIO-01) Defines the maximum output value for analog output AO2. See also drawing at parameter 14.90 AO2 source min.	10.000 mA
	0.000 ... 22.000 mA	Maximum AO2 output value.	1000 = 1 mA

No.	Name/Value	Description	Def/FbEq16
15 I/O extension module 2		Configuration of I/O extension module 2. See also section Programmable I/O extensions (page 27). Note: The contents of the parameter group vary according to the selected I/O extension module type.	
15.01	Module 2 type	See parameter 14.01 Module 1 type.	None
15.02	Module 2 location	See parameter 14.02 Module 1 location.	Slot 1
15.03	Module 2 status	See parameter 14.03 Module 1 status.	No option
15.05	DIO status	(Visible when 15.01 Module 2 type = FIO-01 or FIO-11) See parameter 14.05 DIO status.	-
15.06	DIO delayed status	(Visible when 15.01 Module 2 type = FIO-01 or FIO-11) See parameter 14.06 DIO delayed status.	-
15.08	DIO filter time	(Visible when 15.01 Module 2 type = FIO-01 or FIO-11) See parameter 14.08 DIO filter time.	10.0 ms
15.09	DIO1 function	(Visible when 15.01 Module 2 type = FIO-01 or FIO-11) See parameter 14.09 DIO1 function.	Input
15.10	DIO1 filter gain	(Visible when 15.01 Module 2 type = FIO-11) See parameter 14.10 DIO1 filter gain.	7.5 us
15.11	DIO1 output source	(Visible when 15.01 Module 2 type = FIO-01 or FIO-11) See parameter 14.11 DIO1 output source.	Not energized
15.12	DIO1 ON delay	(Visible when 15.01 Module 2 type = FIO-01 or FIO-11) See parameter 14.12 DIO1 ON delay.	0.0 s
15.13	DIO1 OFF delay	(Visible when 15.01 Module 2 type = FIO-01 or FIO-11) See parameter 14.13 DIO1 OFF delay.	0.0 s
15.14	DIO2 function	(Visible when 15.01 Module 2 type = FIO-01 or FIO-11) See parameter 14.14 DIO2 function.	Input
15.15	DIO2 filter gain	(Visible when 15.01 Module 2 type = FIO-11) See parameter 14.15 DIO2 filter gain.	7.5 us
15.16	DIO2 output source	(Visible when 15.01 Module 2 type = FIO-01 or FIO-11) See parameter 14.16 DIO2 output source.	Not energized
15.17	DIO2 ON delay	(Visible when 15.01 Module 2 type = FIO-01 or FIO-11) See parameter 14.17 DIO2 ON delay.	0.0 s
15.18	DIO2 OFF delay	(Visible when 15.01 Module 2 type = FIO-01 or FIO-11) See parameter 14.18 DIO2 OFF delay.	0.0 s
15.19	DIO3 function	(Visible when 15.01 Module 2 type = FIO-01) See parameter 14.19 DIO3 function.	Input
15.19	AI supervision function	(Visible when 15.01 Module 2 type = FIO-11 or FAIO-01) See parameter 14.19 AI supervision function.	No action
15.20	AI supervision selection	(Visible when 15.01 Module 2 type = FIO-11 or FAIO-01) See parameter 14.20 AI supervision selection.	0000h
15.21	DIO3 output source	(Visible when 15.01 Module 2 type = FIO-01) See parameter 14.21 DIO3 output source.	Not energized
15.22	DIO3 ON delay	(Visible when 15.01 Module 2 type = FIO-01) See parameter 14.22 DIO3 ON delay.	0.0 s
15.22	AI force selection	(Visible when 15.01 Module 2 type = FIO-11 or FAIO-01) See parameter 14.22 AI force selection.	00000000h

118 Parameters

No.	Name/Value	Description	Def/FbEq16
15.23	DIO3 OFF delay	(Visible when 15.01 Module 2 type = FIO-01) See parameter 14.23 DIO3 OFF delay.	0.0 s
15.24	DIO4 function	(Visible when 15.01 Module 2 type = FIO-01) See parameter 14.24 DIO4 function.	Input
15.26	DIO4 output source	(Visible when 15.01 Module 2 type = FIO-01) See parameter 14.26 DIO4 output source.	Not energized
15.26	AI1 actual value	(Visible when 15.01 Module 2 type = FIO-11 or FAIO-01) See parameter 14.26 AI1 actual value.	-
15.27	DIO4 ON delay	(Visible when 15.01 Module 2 type = FIO-01) See parameter 14.27 DIO4 ON delay.	0.0 s
15.27	AI1 scaled value	(Visible when 15.01 Module 2 type = FIO-11 or FAIO-01) See parameter 14.27 AI1 scaled value.	-
15.28	DIO4 OFF delay	(Visible when 15.01 Module 2 type = FIO-01) See parameter 14.28 DIO4 OFF delay.	0.0 s
15.28	AI1 force data	(Visible when 15.01 Module 2 type = FIO-11 or FAIO-01) See parameter 14.28 AI1 force data.	0.000 mA
15.29	AI1 HW switch position	(Visible when 15.01 Module 2 type = FIO-11 or FAIO-01) See parameter 14.29 AI1 HW switch position.	-
15.30	AI1 unit selection	(Visible when 15.01 Module 2 type = FIO-11 or FAIO-01) See parameter 14.30 AI1 unit selection.	mA
15.31	RO status	(Visible when 15.01 Module 2 type = FIO-01) See parameter 14.31 RO status.	-
15.31	AI1 filter gain	(Visible when 15.01 Module 2 type = FIO-11 or FAIO-01) See parameter 14.31 AI1 filter gain.	No filtering
15.32	AI1 filter time	(Visible when 15.01 Module 2 type = FIO-11 or FAIO-01) See parameter 14.32 AI1 filter time.	0.040 s
15.33	AI1 min	(Visible when 15.01 Module 2 type = FIO-11 or FAIO-01) See parameter 14.33 AI1 min.	0.000 mA or V
15.34	RO1 source	(Visible when 15.01 Module 2 type = FIO-01) See parameter 14.34 RO1 source.	Not energized
15.34	AI1 max	(Visible when 15.01 Module 2 type = FIO-11 or FAIO-01) See parameter 14.34 AI1 max.	10.000 mA or V
15.35	RO1 ON delay	(Visible when 15.01 Module 2 type = FIO-01) See parameter 14.35 RO1 ON delay.	0.0 s
15.35	AI1 scaled at AI1 min	(Visible when 15.01 Module 2 type = FIO-11 or FAIO-01) See parameter 14.35 AI1 scaled at AI1 min.	0.000
15.36	RO1 OFF delay	(Visible when 15.01 Module 2 type = FIO-01) See parameter 14.36 RO1 OFF delay.	0.0 s
15.36	AI1 scaled at AI1 max	(Visible when 15.01 Module 2 type = FIO-11 or FAIO-01) See parameter 14.36 AI1 scaled at AI1 max.	100.000
15.37	RO2 source	(Visible when 15.01 Module 2 type = FIO-01) See parameter 14.37 RO2 source.	Not energized
15.38	RO2 ON delay	(Visible when 15.01 Module 2 type = FIO-01) See parameter 14.38 RO2 ON delay.	0.0 s
15.39	RO2 OFF delay	(Visible when 15.01 Module 2 type = FIO-01) See parameter 14.39 RO2 OFF delay.	0.0 s

No.	Name/Value	Description	Def/FbEq16
15.41	<i>AI2 actual value</i>	(Visible when 15.01 Module 2 type = FIO-11 or FAIO-01) See parameter 14.41 AI2 actual value.	-
15.42	<i>AI2 scaled value</i>	(Visible when 15.01 Module 2 type = FIO-11 or FAIO-01) See parameter 14.42 AI2 scaled value.	-
15.43	<i>AI2 force data</i>	(Visible when 15.01 Module 2 type = FIO-11 or FAIO-01) See parameter 14.43 AI2 force data.	0.000 mA
15.44	<i>AI2 HW switch position</i>	(Visible when 15.01 Module 2 type = FIO-11 or FAIO-01) See parameter 14.44 AI2 HW switch position.	-
15.45	<i>AI2 unit selection</i>	(Visible when 15.01 Module 2 type = FIO-11 or FAIO-01) See parameter 14.45 AI2 unit selection.	mA
15.46	<i>AI2 filter gain</i>	(Visible when 15.01 Module 2 type = FIO-11 or FAIO-01) See parameter 14.46 AI2 filter gain.	No filtering
15.47	<i>AI2 filter time</i>	(Visible when 15.01 Module 2 type = FIO-11 or FAIO-01) See parameter 14.47 AI2 filter time.	0.100 s
15.48	<i>AI2 min</i>	(Visible when 15.01 Module 2 type = FIO-11 or FAIO-01) See parameter 14.48 AI2 min.	0.000 mA or V
15.49	<i>AI2 max</i>	(Visible when 15.01 Module 2 type = FIO-11 or FAIO-01) See parameter 14.49 AI2 max.	10.000 mA or V
15.50	<i>AI2 scaled at AI2 min</i>	(Visible when 15.01 Module 2 type = FIO-11 or FAIO-01) See parameter 14.50 AI2 scaled at AI2 min.	0.000
15.51	<i>AI2 scaled at AI2 max</i>	(Visible when 15.01 Module 2 type = FIO-11 or FAIO-01) See parameter 14.51 AI2 scaled at AI2 max.	100.000
15.56	<i>AI3 actual value</i>	(Visible when 15.01 Module 2 type = FIO-11) See parameter 14.56 AI3 actual value.	-
15.57	<i>AI3 scaled value</i>	(Visible when 15.01 Module 2 type = FIO-11) See parameter 14.57 AI3 scaled value.	-
15.58	<i>AI3 force data</i>	(Visible when 15.01 Module 2 type = FIO-11) See parameter 14.58 AI3 force data.	0.000 mA
15.59	<i>AI3 HW switch position</i>	(Visible when 15.01 Module 2 type = FIO-11) See parameter 14.59 AI3 HW switch position.	-
15.60	<i>AI3 unit selection</i>	(Visible when 15.01 Module 2 type = FIO-11) See parameter 14.60 AI3 unit selection.	mA
15.61	<i>AI3 filter gain</i>	(Visible when 15.01 Module 2 type = FIO-11) See parameter 14.61 AI3 filter gain.	No filtering
15.62	<i>AI3 filter time</i>	(Visible when 15.01 Module 2 type = FIO-11) See parameter 14.62 AI3 filter time.	0.100 s
15.63	<i>AI3 min</i>	(Visible when 15.01 Module 2 type = FIO-11) See parameter 14.63 AI3 min.	0.000 mA or V
15.64	<i>AI3 max</i>	(Visible when 15.01 Module 2 type = FIO-11) See parameter 14.64 AI3 max.	10.000 mA or V
15.65	<i>AI3 scaled at AI3 min</i>	(Visible when 15.01 Module 2 type = FIO-11) See parameter 14.65 AI3 scaled at AI3 min.	0.000
15.66	<i>AI3 scaled at AI3 max</i>	(Visible when 15.01 Module 2 type = FIO-11) See parameter 14.66 AI3 scaled at AI3 max.	100.000
15.71	<i>AO force selection</i>	(Visible when 15.01 Module 2 type = FIO-11 or FAIO-01) See parameter 14.71 AO force selection.	00b

No.	Name/Value	Description	Def/FbEq16
15.76	AO1 actual value	(Visible when 15.01 Module 2 type = FIO-11 or FAIO-01) See parameter 14.76 AO1 actual value.	-
15.77	AO1 source	(Visible when 15.01 Module 2 type = FIO-11 or FAIO-01) See parameter 14.77 AO1 source.	Zero
15.78	AO1 force data	(Visible when 15.01 Module 2 type = FIO-11 or FAIO-01) See parameter 14.78 AO1 force data.	0.000 mA
15.79	AO1 filter time	(Visible when 15.01 Module 2 type = FIO-11 or FAIO-01) See parameter 14.79 AO1 filter time.	0.100 s
15.80	AO1 source min	(Visible when 15.01 Module 2 type = FIO-11 or FAIO-01) See parameter 14.80 AO1 source min.	0.0
15.81	AO1 source max	(Visible when 15.01 Module 2 type = FIO-11 or FAIO-01) See parameter 14.81 AO1 source max.	100.0
15.82	AO1 out at AO1 src min	(Visible when 15.01 Module 2 type = FIO-11 or FAIO-01) See parameter 14.82 AO1 out at AO1 src min.	0.000 mA
15.83	AO1 out at AO1 src max	(Visible when 15.01 Module 2 type = FIO-11 or FAIO-01) See parameter 14.83 AO1 out at AO1 src max.	10.000 mA
15.86	AO2 actual value	(Visible when 15.01 Module 2 type = FAIO-01) See parameter 14.86 AO2 actual value.	-
15.87	AO2 source	(Visible when 15.01 Module 2 type = FAIO-01) See parameter 14.87 AO2 source.	Zero
15.88	AO2 force data	(Visible when 15.01 Module 2 type = FAIO-01) See parameter 14.88 AO2 force data.	0.000 mA
15.89	AO2 filter time	(Visible when 15.01 Module 2 type = FAIO-01) See parameter 14.89 AO2 filter time.	0.100 s
15.90	AO2 source min	(Visible when 15.01 Module 2 type = FAIO-01) See parameter 14.90 AO2 source min.	0.0
15.91	AO2 source max	(Visible when 15.01 Module 2 type = FAIO-01) See parameter 14.91 AO2 source max.	100.0
15.92	AO2 out at AO2 src min	(Visible when 15.01 Module 2 type = FAIO-01) See parameter 14.92 AO2 out at AO2 src min.	0.000 mA
15.93	AO2 out at AO2 src max	(Visible when 15.01 Module 2 type = FAIO-01) See parameter 14.93 AO2 out at AO2 src max.	10.000 mA
16 I/O extension module 3		Configuration of I/O extension module 3. See also section Programmable I/O extensions (page 27). Note: The contents of the parameter group vary according to the selected I/O extension module type.	
16.01	Module 3 type	See parameter 14.01 Module 1 type.	None
16.02	Module 3 location	See parameter 14.02 Module 1 location.	Slot 1
16.03	Module 3 status	See parameter 14.03 Module 1 status.	No option
16.05	DIO status	(Visible when 16.01 Module 3 type = FIO-01 or FIO-11) See parameter 14.05 DIO status.	-
16.06	DIO delayed status	(Visible when 16.01 Module 3 type = FIO-01 or FIO-11) See parameter 14.06 DIO delayed status.	-
16.08	DIO filter time	(Visible when 16.01 Module 3 type = FIO-01 or FIO-11) See parameter 14.08 DIO filter time.	10.0 ms

No.	Name/Value	Description	Def/FbEq16
16.09	<i>DIO1 function</i>	(Visible when 16.01 Module 3 type = FIO-01 or FIO-11) See parameter 14.09 DIO1 function.	<i>Input</i>
16.10	<i>DIO1 filter gain</i>	(Visible when 16.01 Module 3 type = FIO-11) See parameter 14.10 DIO1 filter gain.	<i>7.5 us</i>
16.11	<i>DIO1 output source</i>	(Visible when 16.01 Module 3 type = FIO-01 or FIO-11) See parameter 14.11 DIO1 output source.	<i>Not energized</i>
16.12	<i>DIO1 ON delay</i>	(Visible when 16.01 Module 3 type = FIO-01 or FIO-11) See parameter 14.12 DIO1 ON delay.	0.0 s
16.13	<i>DIO1 OFF delay</i>	(Visible when 16.01 Module 3 type = FIO-01 or FIO-11) See parameter 14.13 DIO1 OFF delay.	0.0 s
16.14	<i>DIO2 function</i>	(Visible when 16.01 Module 3 type = FIO-01 or FIO-11) See parameter 14.14 DIO2 function.	<i>Input</i>
16.15	<i>DIO2 filter gain</i>	(Visible when 16.01 Module 3 type = FIO-11) See parameter 14.15 DIO2 filter gain.	<i>7.5 us</i>
16.16	<i>DIO2 output source</i>	(Visible when 16.01 Module 3 type = FIO-01 or FIO-11) See parameter 14.16 DIO2 output source.	<i>Not energized</i>
16.17	<i>DIO2 ON delay</i>	(Visible when 16.01 Module 3 type = FIO-01 or FIO-11) See parameter 14.17 DIO2 ON delay.	0.0 s
16.18	<i>DIO2 OFF delay</i>	(Visible when 16.01 Module 3 type = FIO-01 or FIO-11) See parameter 14.18 DIO2 OFF delay.	0.0 s
16.19	<i>DIO3 function</i>	(Visible when 16.01 Module 3 type = FIO-01) See parameter 14.19 DIO3 function.	<i>Input</i>
16.19	<i>AI supervision function</i>	(Visible when 16.01 Module 3 type = FIO-11 or FAIO-01) See parameter 14.19 AI supervision function.	<i>No action</i>
16.20	<i>AI supervision selection</i>	(Visible when 16.01 Module 3 type = FIO-11 or FAIO-01) See parameter 14.20 AI supervision selection.	0000h
16.21	<i>DIO3 output source</i>	(Visible when 16.01 Module 3 type = FIO-01) See parameter 14.21 DIO3 output source.	<i>Not energized</i>
16.22	<i>DIO3 ON delay</i>	(Visible when 16.01 Module 3 type = FIO-01) See parameter 14.22 DIO3 ON delay.	0.0 s
16.22	<i>AI force selection</i>	(Visible when 16.01 Module 3 type = FIO-11 or FAIO-01) See parameter 14.22 AI force selection.	00000000h
16.23	<i>DIO3 OFF delay</i>	(Visible when 16.01 Module 3 type = FIO-01) See parameter 14.23 DIO3 OFF delay.	0.0 s
16.24	<i>DIO4 function</i>	(Visible when 16.01 Module 3 type = FIO-01) See parameter 14.24 DIO4 function.	<i>Input</i>
16.26	<i>DIO4 output source</i>	(Visible when 16.01 Module 3 type = FIO-01) See parameter 14.26 DIO4 output source.	<i>Not energized</i>
16.26	<i>AI1 actual value</i>	(Visible when 16.01 Module 3 type = FIO-11 or FAIO-01) See parameter 14.26 AI1 actual value.	-
16.27	<i>DIO4 ON delay</i>	(Visible when 16.01 Module 3 type = FIO-01) See parameter 14.27 DIO4 ON delay.	0.0 s
16.27	<i>AI1 scaled value</i>	(Visible when 16.01 Module 3 type = FIO-11 or FAIO-01) See parameter 14.27 AI1 scaled value.	-
16.28	<i>DIO4 OFF delay</i>	(Visible when 16.01 Module 3 type = FIO-01) See parameter 14.28 DIO4 OFF delay.	0.0 s

122 Parameters

No.	Name/Value	Description	Def/FbEq16
16.28	<i>AI1 force data</i>	(Visible when 16.01 Module 3 type = FIO-11 or FAIO-01) See parameter 14.28 AI1 force data.	0.000 mA
16.29	<i>AI1 HW switch position</i>	(Visible when 16.01 Module 3 type = FIO-11 or FAIO-01) See parameter 14.29 AI1 HW switch position.	-
16.30	<i>AI1 unit selection</i>	(Visible when 16.01 Module 3 type = FIO-11 or FAIO-01) See parameter 14.30 AI1 unit selection.	mA
16.31	<i>RO status</i>	(Visible when 16.01 Module 3 type = FIO-11) See parameter 14.31 RO status.	-
16.31	<i>AI1 filter gain</i>	(Visible when 16.01 Module 3 type = FIO-11 or FAIO-01) See parameter 14.31 AI1 filter gain.	No filtering
16.32	<i>AI1 filter time</i>	(Visible when 16.01 Module 3 type = FIO-11 or FAIO-01) See parameter 14.32 AI1 filter time.	0.040 s
16.33	<i>AI1 min</i>	(Visible when 16.01 Module 3 type = FIO-11 or FAIO-01) See parameter 14.33 AI1 min.	0.000 mA or V
16.34	<i>RO1 source</i>	(Visible when 16.01 Module 3 type = FIO-01) See parameter 14.34 RO1 source.	Not energized
16.34	<i>AI1 max</i>	(Visible when 16.01 Module 3 type = FIO-11 or FAIO-01) See parameter 14.34 AI1 max.	10.000 mA or V
16.35	<i>RO1 ON delay</i>	(Visible when 16.01 Module 3 type = FIO-01) See parameter 14.35 RO1 ON delay.	0.0 s
16.35	<i>AI1 scaled at AI1 min</i>	(Visible when 16.01 Module 3 type = FIO-11 or FAIO-01) See parameter 14.35 AI1 scaled at AI1 min.	0.000
16.36	<i>RO1 OFF delay</i>	(Visible when 16.01 Module 3 type = FIO-01) See parameter 14.36 RO1 OFF delay.	0.0 s
16.36	<i>AI1 scaled at AI1 max</i>	(Visible when 16.01 Module 3 type = FIO-11 or FAIO-01) See parameter 14.36 AI1 scaled at AI1 max.	100.000
16.37	<i>RO2 source</i>	(Visible when 16.01 Module 3 type = FIO-01) See parameter 14.37 RO2 source.	Not energized
16.38	<i>RO2 ON delay</i>	(Visible when 16.01 Module 3 type = FIO-01) See parameter 14.38 RO2 ON delay.	0.0 s
16.39	<i>RO2 OFF delay</i>	(Visible when 16.01 Module 3 type = FIO-01) See parameter 14.39 RO2 OFF delay.	0.0 s
16.41	<i>AI2 actual value</i>	(Visible when 16.01 Module 3 type = FIO-11 or FAIO-01) See parameter 14.41 AI2 actual value.	-
16.42	<i>AI2 scaled value</i>	(Visible when 16.01 Module 3 type = FIO-11 or FAIO-01) See parameter 14.42 AI2 scaled value.	-
16.43	<i>AI2 force data</i>	(Visible when 16.01 Module 3 type = FIO-11 or FAIO-01) See parameter 14.43 AI2 force data.	0.000 mA
16.44	<i>AI2 HW switch position</i>	(Visible when 16.01 Module 3 type = FIO-11 or FAIO-01) See parameter 14.44 AI2 HW switch position.	-
16.45	<i>AI2 unit selection</i>	(Visible when 16.01 Module 3 type = FIO-11 or FAIO-01) See parameter 14.45 AI2 unit selection.	mA
16.46	<i>AI2 filter gain</i>	(Visible when 16.01 Module 3 type = FIO-11 or FAIO-01) See parameter 14.46 AI2 filter gain.	No filtering
16.47	<i>AI2 filter time</i>	(Visible when 16.01 Module 3 type = FIO-11 or FAIO-01) See parameter 14.47 AI2 filter time.	0.100 s

No.	Name/Value	Description	Def/FbEq16
16.48	<i>AI2 min</i>	(Visible when 16.01 Module 3 type = FIO-11 or FAIO-01) See parameter 14.48 AI2 min.	0.000 mA or V
16.49	<i>AI2 max</i>	(Visible when 16.01 Module 3 type = FIO-11 or FAIO-01) See parameter 14.49 AI2 max.	10.000 mA or V
16.50	<i>AI2 scaled at AI2 min</i>	(Visible when 16.01 Module 3 type = FIO-11 or FAIO-01) See parameter 14.50 AI2 scaled at AI2 min.	0.000
16.51	<i>AI2 scaled at AI2 max</i>	(Visible when 16.01 Module 3 type = FIO-11 or FAIO-01) See parameter 14.51 AI2 scaled at AI2 max.	100.000
16.56	<i>AI3 actual value</i>	(Visible when 16.01 Module 3 type = FIO-11) See parameter 14.56 AI3 actual value.	-
16.57	<i>AI3 scaled value</i>	(Visible when 16.01 Module 3 type = FIO-11) See parameter 14.57 AI3 scaled value.	-
16.58	<i>AI3 force data</i>	(Visible when 16.01 Module 3 type = FIO-11) See parameter 14.58 AI3 force data.	0.000 mA
16.59	<i>AI3 HW switch position</i>	(Visible when 16.01 Module 3 type = FIO-11) See parameter 14.59 AI3 HW switch position.	-
16.60	<i>AI3 unit selection</i>	(Visible when 16.01 Module 3 type = FIO-11) See parameter 14.60 AI3 unit selection.	<i>mA</i>
16.61	<i>AI3 filter gain</i>	(Visible when 16.01 Module 3 type = FIO-11) See parameter 14.61 AI3 filter gain.	<i>No filtering</i>
16.62	<i>AI3 filter time</i>	(Visible when 16.01 Module 3 type = FIO-11) See parameter 14.62 AI3 filter time.	0.100 s
16.63	<i>AI3 min</i>	(Visible when 16.01 Module 3 type = FIO-11) See parameter 14.63 AI3 min.	0.000 mA or V
16.64	<i>AI3 max</i>	(Visible when 16.01 Module 3 type = FIO-11) See parameter 14.64 AI3 max.	10.000 mA or V
16.65	<i>AI3 scaled at AI3 min</i>	(Visible when 16.01 Module 3 type = FIO-11) See parameter 14.65 AI3 scaled at AI3 min.	0.000
16.66	<i>AI3 scaled at AI3 max</i>	(Visible when 16.01 Module 3 type = FIO-11) See parameter 14.66 AI3 scaled at AI3 max.	100.000
16.71	<i>AO force selection</i>	(Visible when 16.01 Module 3 type = FIO-11 or FAIO-01) See parameter 14.71 AO force selection.	00b
16.76	<i>AO1 actual value</i>	(Visible when 16.01 Module 3 type = FIO-11 or FAIO-01) See parameter 14.76 AO1 actual value.	-
16.77	<i>AO1 source</i>	(Visible when 16.01 Module 3 type = FIO-11 or FAIO-01) See parameter 14.77 AO1 source.	<i>Zero</i>
16.78	<i>AO1 force data</i>	(Visible when 16.01 Module 3 type = FIO-11 or FAIO-01) See parameter 14.78 AO1 force data.	0.000 mA
16.79	<i>AO1 filter time</i>	(Visible when 16.01 Module 3 type = FIO-11 or FAIO-01) See parameter 14.79 AO1 filter time.	0.100 s
16.80	<i>AO1 source min</i>	(Visible when 16.01 Module 3 type = FIO-11 or FAIO-01) See parameter 14.80 AO1 source min.	0.0
16.81	<i>AO1 source max</i>	(Visible when 16.01 Module 3 type = FIO-11 or FAIO-01) See parameter 14.81 AO1 source max.	100.0
16.82	<i>AO1 out at AO1 src min</i>	(Visible when 16.01 Module 3 type = FIO-11 or FAIO-01) See parameter 14.82 AO1 out at AO1 src min.	0.000 mA

No.	Name/Value	Description	Def/FbEq16
16.83	AO1 out at AO1 src max	(Visible when 16.01 Module 3 type = FIO-11 or FAIO-01) See parameter 14.83 AO1 out at AO1 src max.	10.000 mA
16.86	AO2 actual value	(Visible when 16.01 Module 3 type = FAIO-01) See parameter 14.86 AO2 actual value.	-
16.87	AO2 source	(Visible when 16.01 Module 3 type = FAIO-01) See parameter 14.87 AO2 source.	Zero
16.88	AO2 force data	(Visible when 16.01 Module 3 type = FAIO-01) See parameter 14.88 AO2 force data.	0.000 mA
16.89	AO2 filter time	(Visible when 16.01 Module 3 type = FAIO-01) See parameter 14.89 AO2 filter time.	0.100 s
16.90	AO2 source min	(Visible when 16.01 Module 3 type = FAIO-01) See parameter 14.90 AO2 source min.	0.0
16.91	AO2 source max	(Visible when 16.01 Module 3 type = FAIO-01) See parameter 14.91 AO2 source max.	100.0
16.92	AO2 out at AO2 src min	(Visible when 16.01 Module 3 type = FAIO-01) See parameter 14.92 AO2 out at AO2 src min.	0.000 mA
16.93	AO2 out at AO2 src max	(Visible when 16.01 Module 3 type = FAIO-01) See parameter 14.93 AO2 out at AO2 src max.	10.000 mA

17 Control hub IO		Monitoring of Control Hub input/output signals	
17.01	Control hub DO status	Displays the status of the digital outputs on the control hub. The activation/deactivation delays are not used. Bit 0 indicates the status of DO1. Note: The number of active bits in this parameter depends on the number of digital outputs on the control hub. Example: 00001001b = DO1 and DO4 are on, remainder are off. This parameter is read-only.	-
	0000h...FFFFh	Status of control hub digital outputs.	1 = 1
17.02	Control hub DO source	Displays selected drive signal to be connected to digital outputs of control hub. This parameter is read-only.	-
	0000h...FFFFh	Signal source for control hub digital outputs.	1 = 1
17.05	Control hub DI status	Displays the status of the digital inputs on the control hub. The activation/deactivation delays are not used. Bit 0 indicates the status of DI1. Note: The number of active bits in this parameter depends on the number of digital inputs on the control hub. Example: 00001001b = DI1 and DI4 are on, others are off. This parameter is read-only.	-

Bit	Function
0	1 = INU fan 1 status OK
1	1 = INU fan 2 status OK
2	1 = INU fan 3 status OK
3	1 = INU fan 4 status OK
4...15	Reserved

0000h...FFFFh	Status of control hub digital inputs	1 = 1

No.	Name/Value	Description	Def/FbEq16
19 Operation mode		Selection of local and external control location sources and operating modes. See also section <i>Operating modes of the drive</i> (page 20).	
19.01	<i>Actual operation mode</i>	Displays the operating mode currently used. See parameters 19.11...19.14. This parameter is read-only.	-
	Zero	None.	1
	Speed	Speed control (in DTC motor control mode).	2
	Torque	Torque control (in vector motor control mode).	3
	Min	The torque selector is comparing the output of the speed controller (25.01 <i>Torque reference speed control</i>) and torque reference (26.74 <i>Torque ref ramp out</i>) and the smaller of the two is used.	4
	Max	The torque selector is comparing the output of the speed controller (25.01 <i>Torque reference speed control</i>) and torque reference (26.74 <i>Torque ref ramp out</i>) and the greater of the two is used.	5
	Add	The speed controller output is added to the torque reference.	6
	Voltage	DC voltage control.	7
	Scalar (Hz)	Frequency control in scalar motor control mode.	10
	Scalar (rpm)	Speed control in scalar motor control mode.	11
	Forced magn.	Motor is in magnetizing mode.	20
19.11	<i>Ext1/Ext2 selection</i>	Selects the source for external control location EXT1/EXT2 selection. 0 = EXT1 1 = EXT2	<i>EXT1</i>
	EXT1	EXT1 (permanently selected).	0
	EXT2	EXT2 (permanently selected).	1
	FBAA MCW bit 11	Control word bit 11 received through fieldbus interface A.	2
	DI1	Digital input DI1 (10.02 <i>DI delayed status</i> , bit 0).	3
	DI2	Digital input DI2 (10.02 <i>DI delayed status</i> , bit 1).	4
	DI3	Digital input DI3 (10.02 <i>DI delayed status</i> , bit 2).	5
	DI4	Digital input DI4 (10.02 <i>DI delayed status</i> , bit 3).	6
	DI5	Digital input DI5 (10.02 <i>DI delayed status</i> , bit 4).	7
	DI6	Digital input DI6 (10.02 <i>DI delayed status</i> , bit 5).	8
	DIO1	Not applicable for ACS580MV.	11
	DIO2	Not applicable for ACS580MV.	12
	EFB MCW bit 11	Not applicable for ACS580MV.	32
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
19.12	<i>Ext1 control mode</i>	Selects the operating mode for external control location EXT1.	<i>Speed</i>
	Zero	None.	1
	Speed	Speed control. The torque reference used is 25.01 <i>Torque reference speed control</i> (output of the speed reference chain).	2

No.	Name/Value	Description	Def/FbEq16
	Torque	Torque control. The torque reference used is 26.74 Torque ref ramp out (output of the torque reference chain).	3
	Minimum	Combination of selections Speed and Torque : the torque selector compares the speed controller output (25.01 Torque reference speed control) and the torque reference (26.74 Torque ref ramp out) and selects the smaller of the two. If speed error becomes negative, the drive follows the speed controller output until speed error becomes positive again. This prevents the drive from accelerating uncontrollably if the load is lost in torque control.	4
	Maximum	Combination of selections Speed and Torque : the torque selector compares the speed controller output (25.01 Torque reference speed control) and the torque reference (26.74 Torque ref ramp out) and selects the greater of the two. If speed error becomes positive, the drive follows the speed controller output until speed error becomes negative again. This prevents the drive from accelerating uncontrollably if the load is lost in torque control.	5
	Add	Combination of selections Speed and Torque : Torque selector adds the speed reference chain output to the torque reference chain output.	6
19.14	Ext2 control mode	Selects the operating mode for external control location EXT2. For the selections, see parameter 19.12 Ext1 control mode .	Speed
19.16	Local control mode	Selects the operating mode for local control.	Speed
	Speed	Speed control. The torque reference used is 25.01 Torque reference speed control (output of the speed reference chain).	0
	Torque	Torque control. The torque reference used is 26.74 Torque ref ramp out (output of the torque reference chain).	1
19.17	Local control disable	Enables/disables local control (start and stop buttons on the control panel, and the local controls on the PC tool).  WARNING! Before disabling local control, ensure that the control panel is not needed for stopping the drive.	No
	No	Local control enabled.	0
	Yes	Local control disabled. Note: Make sure P81.15 = "parameter" firstly, and then set P19.17 to YES.	1
19.20	Scalar control reference unit	Selects the reference type for scalar motor control mode. See also section Operating modes of the drive (page 20).	Rpm
	Hz	Hz. The reference is taken from parameter 28.02 Frequency ref ramp output (output of the frequency control chain).	0
	Rpm	Rpm. The reference is taken from parameter 23.02 Speed ref ramp output (speed reference after ramping and shaping).	1
20 Start/stop/direction		Start/stop/direction and run/start/jog enable signal source selection; positive/negative reference enable signal source selection. For information on control locations, see section Local control vs. external control (page 18).	
20.01	Ext1 commands	Selects the source of start, stop and direction commands for external control location 1 (EXT1). See also parameters 20.02...20.05 .	In1 Start; In2 Dir
	Not selected	No start or stop command sources selected.	0

No.	Name/Value	Description	Def/FbEq16																		
	In1 Start	The source of the start and stop commands is selected by parameter 20.03 Ext1 in1 source. The state transitions of the source bits are interpreted as follows: <table><tr><th>State of source 1 (20.03)</th><th>Command</th></tr><tr><td>0 -> 1 (20.02 = Edge)</td><td>Start</td></tr><tr><td>1 (20.02 = Level)</td><td>Stop</td></tr></table>	State of source 1 (20.03)	Command	0 -> 1 (20.02 = Edge)	Start	1 (20.02 = Level)	Stop	1												
State of source 1 (20.03)	Command																				
0 -> 1 (20.02 = Edge)	Start																				
1 (20.02 = Level)	Stop																				
	In1 Start; In2 Dir	The source selected by 20.03 Ext1 in1 source is the start signal; the source selected by 20.04 Ext1 in2 source determines the direction. The state transitions of the source bits are interpreted as follows: <table><tr><th>State of source 1 (20.03)</th><th>State of source 2 (20.04)</th><th>Command</th></tr><tr><td>0</td><td>Any</td><td>Stop</td></tr><tr><td>0 -> 1 (20.02 = Edge)</td><td>0</td><td>Start forward</td></tr><tr><td>1 (20.02 = Level)</td><td>1</td><td>Start reverse</td></tr></table>	State of source 1 (20.03)	State of source 2 (20.04)	Command	0	Any	Stop	0 -> 1 (20.02 = Edge)	0	Start forward	1 (20.02 = Level)	1	Start reverse	2						
State of source 1 (20.03)	State of source 2 (20.04)	Command																			
0	Any	Stop																			
0 -> 1 (20.02 = Edge)	0	Start forward																			
1 (20.02 = Level)	1	Start reverse																			
	In1 Start fwd; In2 Start rev	The source selected by 20.03 Ext1 in1 source is the forward start signal; the source selected by 20.04 Ext1 in2 source is the reverse start signal. The state transitions of the source bits are interpreted as follows: <table><tr><th>State of source 1 (20.03)</th><th>State of source 2 (20.04)</th><th>Command</th></tr><tr><td>0</td><td>0</td><td>Stop</td></tr><tr><td>0 -> 1 (20.02 = Edge)</td><td>0</td><td>Start forward</td></tr><tr><td>1 (20.02 = Level)</td><td>0</td><td>Start reverse</td></tr><tr><td>0</td><td>0 -> 1 (20.02 = Edge)</td><td>Start reverse</td></tr><tr><td>1</td><td>1</td><td>Stop</td></tr></table>	State of source 1 (20.03)	State of source 2 (20.04)	Command	0	0	Stop	0 -> 1 (20.02 = Edge)	0	Start forward	1 (20.02 = Level)	0	Start reverse	0	0 -> 1 (20.02 = Edge)	Start reverse	1	1	Stop	3
State of source 1 (20.03)	State of source 2 (20.04)	Command																			
0	0	Stop																			
0 -> 1 (20.02 = Edge)	0	Start forward																			
1 (20.02 = Level)	0	Start reverse																			
0	0 -> 1 (20.02 = Edge)	Start reverse																			
1	1	Stop																			
	In1P Start; In2 Stop	The sources of the start and stop commands are selected by parameters 20.03 Ext1 in1 source and 20.04 Ext1 in2 source. The state transitions of the source bits are interpreted as follows: <table><tr><th>State of source 1 (20.03)</th><th>State of source 2 (20.04)</th><th>Command</th></tr><tr><td>0 -> 1</td><td>1</td><td>Start</td></tr><tr><td>Any</td><td>0</td><td>Stop</td></tr></table> Notes: - The start signal is always edge-triggered with this setting regardless of parameter 20.02 Ext1 start trigger type. - When source 2 is 0, the Start and Stop keys on the control panel are disabled.	State of source 1 (20.03)	State of source 2 (20.04)	Command	0 -> 1	1	Start	Any	0	Stop	4									
State of source 1 (20.03)	State of source 2 (20.04)	Command																			
0 -> 1	1	Start																			
Any	0	Stop																			

No.	Name/Value	Description	Def/FbEq16																
	In1P Start; In2 Stop; In3 Dir	The sources of the start and stop commands are selected by parameters 20.03 Ext1 in1 source and 20.04 Ext1 in2 source. The source selected by 20.05 Ext1 in3 source determines the direction. The state transitions of the source bits are interpreted as follows: <table border="1"> <thead> <tr> <th>State of source 1 (20.03)</th><th>State of source 2 (20.04)</th><th>State of source 3 (20.05)</th><th>Command</th></tr> </thead> <tbody> <tr> <td>0 -> 1</td><td>1</td><td>0</td><td>Start forward</td></tr> <tr> <td>0 -> 1</td><td>1</td><td>1</td><td>Start reverse</td></tr> <tr> <td>Any</td><td>0</td><td>Any</td><td>Stop</td></tr> </tbody> </table> Notes: - The start signal is always edge-triggered with this setting regardless of parameter 20.02 Ext1 start trigger type. - When source 2 is 0, the Start and Stop keys on the control panel are disabled.	State of source 1 (20.03)	State of source 2 (20.04)	State of source 3 (20.05)	Command	0 -> 1	1	0	Start forward	0 -> 1	1	1	Start reverse	Any	0	Any	Stop	5
State of source 1 (20.03)	State of source 2 (20.04)	State of source 3 (20.05)	Command																
0 -> 1	1	0	Start forward																
0 -> 1	1	1	Start reverse																
Any	0	Any	Stop																
	In1P Start fwd; In2P Start rev; In3 Stop	The sources of the start and stop commands are selected by parameters 20.03 Ext1 in1 source, 20.04 Ext1 in2 source and 20.05 Ext1 in3 source. The state transitions of the source bits are interpreted as follows: <table border="1"> <thead> <tr> <th>State of source 1 (20.03)</th><th>State of source 2 (20.04)</th><th>State of source 3 (20.05)</th><th>Command</th></tr> </thead> <tbody> <tr> <td>0 -> 1</td><td>Any</td><td>1</td><td>Start forward</td></tr> <tr> <td>Any</td><td>0 -> 1</td><td>1</td><td>Start reverse</td></tr> <tr> <td>Any</td><td>Any</td><td>0</td><td>Stop</td></tr> </tbody> </table> Note: The start signal is always edge-triggered with this setting regardless of parameter 20.02 Ext1 start trigger type.	State of source 1 (20.03)	State of source 2 (20.04)	State of source 3 (20.05)	Command	0 -> 1	Any	1	Start forward	Any	0 -> 1	1	Start reverse	Any	Any	0	Stop	6
State of source 1 (20.03)	State of source 2 (20.04)	State of source 3 (20.05)	Command																
0 -> 1	Any	1	Start forward																
Any	0 -> 1	1	Start reverse																
Any	Any	0	Stop																
	Control panel	The start and stop commands are taken from the control panel.	11																
	Fieldbus A	The start and stop commands are taken from fieldbus adapter A. Note: The start signal is always level-triggered with this setting regardless of parameter 20.02 Ext1 start trigger type.	12																
	Embedded fieldbus	Not applicable for ACS580MV.	14																
	M/F link	The start and stop commands are taken from another drive through the master/follower link. Note: The start signal is always level-triggered with this setting regardless of parameter 20.02 Ext1 start trigger type.	15																
	Application Program	Not applicable for ACS580MV.	21																
	ATF	Reserved.	22																
	DDCS controller	Not applicable for ACS580MV.	16																
20.02	Ext1 start trigger type	Defines whether the start signal for external control location EXT1 is edge-triggered or level-triggered. Note: This parameter is only effective when parameter 20.01 Ext1 commands is set to In1 Start, In1 Start; In2 Dir or In1 Start fwd; In2 Start rev.	Edge																
	Edge	The start signal is edge-triggered.	0																
	Level	The start signal is level-triggered.	1																

No.	Name/Value	Description	Def/FbEq16												
20.03	<i>Ext1 in1 source</i>	Selects source 1 for parameter <i>20.01 Ext1 commands</i> .	<i>DI1</i>												
	Not selected	0 (always off).	0												
	Selected	1 (always on).	1												
	DI1	Digital input DI1 (<i>10.02 DI delayed status</i> , bit 0).	2												
	DI2	Digital input DI2 (<i>10.02 DI delayed status</i> , bit 1).	3												
	DI3	Digital input DI3 (<i>10.02 DI delayed status</i> , bit 2).	4												
	DI4	Digital input DI4 (<i>10.02 DI delayed status</i> , bit 3).	5												
	DI5	Digital input DI5 (<i>10.02 DI delayed status</i> , bit 4).	6												
	DI6	Digital input DI6 (<i>10.02 DI delayed status</i> , bit 5).	7												
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-												
20.04	<i>Ext1 in2 source</i>	Selects source 2 for parameter <i>20.01 Ext1 commands</i> . For the available selections, see parameter <i>20.03 Ext1 in1 source</i> .	<i>DI2</i>												
20.05	<i>Ext1 in3 source</i>	Selects source 3 for parameter <i>20.01 Ext1 commands</i> . For the available selections, see parameter <i>20.03 Ext1 in1 source</i> .	<i>Not selected</i>												
20.06	<i>Ext2 commands</i>	Selects the source of start, stop and direction commands for external control location 2 (EXT2). See also parameters <i>20.07...20.10</i> .	<i>Not selected</i>												
	Not selected	No start or stop command sources selected.	0												
	In1 Start	The source of the start and stop commands is selected by parameter <i>20.08 Ext2 in1 source</i> . The state transitions of the source bits are interpreted as follows: <table border="1"><thead><tr><th>State of source 1 (<i>20.08</i>)</th><th>Command</th></tr></thead><tbody><tr><td>0 -> 1 (<i>20.07 = Edge</i>)</td><td>Start</td></tr><tr><td>1 (<i>20.07 = Level</i>)</td><td>Stop</td></tr></tbody></table>	State of source 1 (<i>20.08</i>)	Command	0 -> 1 (<i>20.07 = Edge</i>)	Start	1 (<i>20.07 = Level</i>)	Stop	1						
State of source 1 (<i>20.08</i>)	Command														
0 -> 1 (<i>20.07 = Edge</i>)	Start														
1 (<i>20.07 = Level</i>)	Stop														
	In1 Start; In2 Dir	The source selected by <i>20.08 Ext2 in1 source</i> is the start signal; the source selected by <i>20.09 Ext2 in2 source</i> determines the direction. The state transitions of the source bits are interpreted as follows: <table border="1"><thead><tr><th>State of source 1 (<i>20.08</i>)</th><th>State of source 2 (<i>20.09</i>)</th><th>Command</th></tr></thead><tbody><tr><td>0</td><td>Any</td><td>Stop</td></tr><tr><td>0 -> 1 (<i>20.07 = Edge</i>)</td><td>0</td><td>Start forward</td></tr><tr><td>1 (<i>20.07 = Level</i>)</td><td>1</td><td>Start reverse</td></tr></tbody></table>	State of source 1 (<i>20.08</i>)	State of source 2 (<i>20.09</i>)	Command	0	Any	Stop	0 -> 1 (<i>20.07 = Edge</i>)	0	Start forward	1 (<i>20.07 = Level</i>)	1	Start reverse	2
State of source 1 (<i>20.08</i>)	State of source 2 (<i>20.09</i>)	Command													
0	Any	Stop													
0 -> 1 (<i>20.07 = Edge</i>)	0	Start forward													
1 (<i>20.07 = Level</i>)	1	Start reverse													

No.	Name/Value	Description	Def/FbEq16																
	In1 Start fwd; In2 Start rev	The source selected by 20.08 Ext2 in1 source is the forward start signal; the source selected by 20.09 Ext2 in2 source is the reverse start signal. The state transitions of the source bits are interpreted as follows: <table><tr><th>State of source 1 (20.08)</th><th>State of source 2 (20.09)</th><th>Command</th></tr><tr><td>0</td><td>0</td><td>Stop</td></tr><tr><td>0 -> 1 (20.07 = <i>Edge</i>) 1 (20.07 = <i>Level</i>)</td><td>0</td><td>Start forward</td></tr><tr><td>0</td><td>0 -> 1 (20.07 = <i>Edge</i>) 1 (20.07 = <i>Level</i>)</td><td>Start reverse</td></tr><tr><td>1</td><td>1</td><td>Stop</td></tr></table>	State of source 1 (20.08)	State of source 2 (20.09)	Command	0	0	Stop	0 -> 1 (20.07 = <i>Edge</i>) 1 (20.07 = <i>Level</i>)	0	Start forward	0	0 -> 1 (20.07 = <i>Edge</i>) 1 (20.07 = <i>Level</i>)	Start reverse	1	1	Stop	3	
State of source 1 (20.08)	State of source 2 (20.09)	Command																	
0	0	Stop																	
0 -> 1 (20.07 = <i>Edge</i>) 1 (20.07 = <i>Level</i>)	0	Start forward																	
0	0 -> 1 (20.07 = <i>Edge</i>) 1 (20.07 = <i>Level</i>)	Start reverse																	
1	1	Stop																	
	In1P Start; In2 Stop	The sources of the start and stop commands are selected by parameters 20.08 Ext2 in1 source and 20.09 Ext2 in2 source. The state transitions of the source bits are interpreted as follows: <table><tr><th>State of source 1 (20.08)</th><th>State of source 2 (20.09)</th><th>Command</th></tr><tr><td>0 -> 1</td><td>1</td><td>Start</td></tr><tr><td>Any</td><td>0</td><td>Stop</td></tr></table> Notes: • The start signal is always edge-triggered with this setting regardless of parameter 20.07 Ext2 start trigger type. • When source 2 is 0, the Start and Stop keys on the control panel are disabled.	State of source 1 (20.08)	State of source 2 (20.09)	Command	0 -> 1	1	Start	Any	0	Stop	4							
State of source 1 (20.08)	State of source 2 (20.09)	Command																	
0 -> 1	1	Start																	
Any	0	Stop																	
	In1P Start; In2 Stop; In3 Dir	The sources of the start and stop commands are selected by parameters 20.08 Ext2 in1 source and 20.09 Ext2 in2 source. The source selected by 20.10 Ext2 in3 source determines the direction. The state transitions of the source bits are interpreted as follows: <table><tr><th>State of source 1 (20.08)</th><th>State of source 2 (20.09)</th><th>State of source 3 (20.10)</th><th>Command</th></tr><tr><td>0 -> 1</td><td>1</td><td>0</td><td>Start forward</td></tr><tr><td>0 -> 1</td><td>1</td><td>1</td><td>Start reverse</td></tr><tr><td>Any</td><td>0</td><td>Any</td><td>Stop</td></tr></table> Notes: • The start signal is always edge-triggered with this setting regardless of parameter 20.07 Ext2 start trigger type. • When source 2 is 0, the Start and Stop keys on the control panel are disabled.	State of source 1 (20.08)	State of source 2 (20.09)	State of source 3 (20.10)	Command	0 -> 1	1	0	Start forward	0 -> 1	1	1	Start reverse	Any	0	Any	Stop	5
State of source 1 (20.08)	State of source 2 (20.09)	State of source 3 (20.10)	Command																
0 -> 1	1	0	Start forward																
0 -> 1	1	1	Start reverse																
Any	0	Any	Stop																

No.	Name/Value	Description	Def/FbEq16																
	In1P Start fwd; In2P Start rev; In3 Stop	The sources of the start and stop commands are selected by parameters 20.08 Ext2 in1 source, 20.09 Ext2 in2 source and 20.10 Ext2 in3 source. The state transitions of the source bits are interpreted as follows: <table border="1"> <thead> <tr> <th>State of source 1 (20.08)</th><th>State of source 2 (20.09)</th><th>State of source 3 (20.10)</th><th>Command</th></tr> </thead> <tbody> <tr> <td>0 -> 1</td><td>Any</td><td>1</td><td>Start forward</td></tr> <tr> <td>Any</td><td>0 -> 1</td><td>1</td><td>Start reverse</td></tr> <tr> <td>Any</td><td>Any</td><td>0</td><td>Stop</td></tr> </tbody> </table> Note: The start signal is always edge-triggered with this setting regardless of parameter 20.07 Ext2 start trigger type.	State of source 1 (20.08)	State of source 2 (20.09)	State of source 3 (20.10)	Command	0 -> 1	Any	1	Start forward	Any	0 -> 1	1	Start reverse	Any	Any	0	Stop	6
State of source 1 (20.08)	State of source 2 (20.09)	State of source 3 (20.10)	Command																
0 -> 1	Any	1	Start forward																
Any	0 -> 1	1	Start reverse																
Any	Any	0	Stop																
	Control panel	The start and stop commands are taken from the control panel.	11																
	Fieldbus A	The start and stop commands are taken from fieldbus adapter A. Note: The start signal is always level-triggered with this setting regardless of parameter 20.07 Ext2 start trigger type.	12																
	Embedded fieldbus	Not applicable for ACS580MV.	14																
	M/F link	Not applicable for ACS580MV.	15																
	Application Program	Not applicable for ACS580MV.	21																
	ATF	Reserved.	22																
	DDCS controller	Not applicable for ACS580MV.	16																
20.07	Ext2 start trigger type	Defines whether the start signal for external control location EXT2 is edge-triggered or level-triggered. Note: This parameter is only effective when parameter 20.06 Ext2 commands is set to In1 Start, In1 Start; In2 Dir or In1 Start fwd; In2 Start rev.	Edge																
	Edge	The start signal is edge-triggered.	0																
	Level	The start signal is level-triggered.	1																
20.08	Ext2 in1 source	Selects source 1 for parameter 20.06 Ext2 commands. For the available selections, see parameter 20.03 Ext1 in1 source.	Not selected																
20.09	Ext2 in2 source	Selects source 2 for parameter 20.06 Ext2 commands. For the available selections, see parameter 20.03 Ext1 in1 source.	Not selected																
20.10	Ext2 in3 source	Selects source 3 for parameter 20.06 Ext2 commands. For the available selections, see parameter 20.03 Ext1 in1 source.	Not selected																

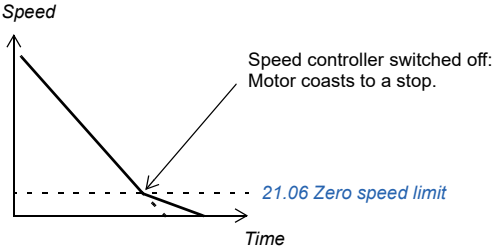
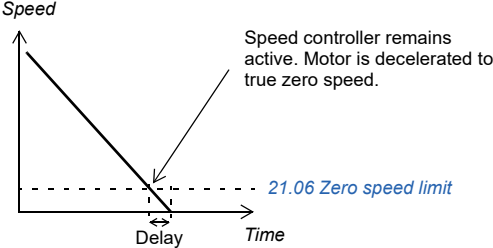
No.	Name/Value	Description	Def/FbEq16
20.19	<i>Enable start command</i>	Select the source for the start signal. 1 = Start enable. With the signal switched off, any drive start command is inhibited. Switching the signal off while the drive is running will not stop the drive. Switching the signal off while the drive is charged but not running will open MCB. Switching the signal off while the drive is not charged prevents the MCB from closing as long as this signal remains 0. Notes: • If a level-triggered start command is on when the start enable signal switches on, the drive will start. (An edge-triggered start signal must be cycled for the drive to start.) See parameters <i>20.02 Ext1 start trigger type</i>, <i>20.07 Ext2 start trigger type</i> and <i>20.29 Local start trigger type</i>. • The warning that indicates a missing signal can be suppressed using parameter <i>20.30 Enable signals warning function</i>.	<i>Selected</i>
	Not selected	0.	0
	Selected	1.	1
	DI1	Digital input DI1 (<i>10.02 DI delayed status</i> , bit 0).	2
	DI2	Digital input DI2 (<i>10.02 DI delayed status</i> , bit 1).	3
	DI3	Digital input DI3 (<i>10.02 DI delayed status</i> , bit 2).	4
	DI4	Digital input DI4 (<i>10.02 DI delayed status</i> , bit 3).	5
	DI5	Digital input DI5 (<i>10.02 DI delayed status</i> , bit 4).	6
	DI6	Digital input DI6 (<i>10.02 DI delayed status</i> , bit 5).	7
	DIO1	Not applicable for ACS580MV.	10
	DIO2	Not applicable for ACS580MV.	11
	DIIL	Not applicable for ACS580MV.	30
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-

No.	Name/Value	Description	Def/FbEq16
20.23	Positive speed enable	Selects the source of the positive speed enable command. 1 = Positive speed enabled. 0 = Positive speed interpreted as zero speed reference. In the figure below, 23.01 Speed ref ramp input is set to zero after the positive speed enable signal has cleared. Actions in different control modes: Speed control: Speed reference is set to zero and the motor is stopped along the currently active deceleration ramp. The rush controller prevents additional torque terms from running the motor in the positive direction. Torque control: The rush controller monitors the rotation direction of the motor.	Selected
20.23 Positive speed enable 20.24 Negative speed enable 23.01 Speed ref ramp input 01.01 Motor speed used			
		Example: The motor is rotating in the forward direction. To stop the motor, the positive speed enable signal is deactivated by a hardware limit switch (e.g. via digital input). If the positive speed enable signal remains deactivated and the negative speed enable signal is active, only reverse rotation of the motor is allowed.	
	Not selected	0.	0
	Selected	1.	1
	DI1	Digital input DI1 (10.02 DI delayed status, bit 0).	2
	DI2	Digital input DI2 (10.02 DI delayed status, bit 1).	3
	DI3	Digital input DI3 (10.02 DI delayed status, bit 2).	4
	DI4	Digital input DI4 (10.02 DI delayed status, bit 3).	5
	DI5	Digital input DI5 (10.02 DI delayed status, bit 4).	6
	DI6	Digital input DI6 (10.02 DI delayed status, bit 5).	7
	Other [bit]	Source selection (see Terms and abbreviations on page 55).	-
20.24	Negative speed enable	Selects the source of the negative speed reference enable command. See parameter 20.23 Positive speed enable.	Selected

No.	Name/Value	Description	Def/FbEq16
20.25	<i>Jogging enable</i>	Selects the source for a jog enable signal. (The sources for jogging activation signals are selected by parameters 20.26 Jogging 1 start source and 20.27 Jogging 2 start source.) 1 = Jogging is enabled. 0 = Jogging is disabled. Note: Jogging can be enabled only when no start command from an external control location is active. On the other hand, if jogging is already enabled, the drive cannot be started from an external control location (apart from inching commands through fieldbus). See section Jogging (page 38).	<i>Not selected</i>
	Not selected	0.	0
	Selected	1.	1
	DI1	Digital input DI1 (10.02 DI delayed status , bit 0).	2
	DI2	Digital input DI2 (10.02 DI delayed status , bit 1).	3
	DI3	Digital input DI3 (10.02 DI delayed status , bit 2).	4
	DI4	Digital input DI4 (10.02 DI delayed status , bit 3).	5
	DI5	Digital input DI5 (10.02 DI delayed status , bit 4).	6
	DI6	Digital input DI6 (10.02 DI delayed status , bit 5).	7
	<i>Other [bit]</i>	Source selection (see Terms and abbreviations on page 55).	-
20.26	<i>Jogging 1 start source</i>	If enabled by parameter 20.25 Jogging enable, selects the source for the activation of jogging function 1. (Jogging function 1 can also be activated through fieldbus regardless of parameter 20.25.) 1 = Jogging 1 active. Note: If both jogging 1 and 2 are activated, the one that was activated first has priority.	<i>Not selected</i>
	Not selected	0.	0
	Selected	1.	1
	DI1	Digital input DI1 (10.02 DI delayed status , bit 0).	2
	DI2	Digital input DI2 (10.02 DI delayed status , bit 1).	3
	DI3	Digital input DI3 (10.02 DI delayed status , bit 2).	4
	DI4	Digital input DI4 (10.02 DI delayed status , bit 3).	5
	DI5	Digital input DI5 (10.02 DI delayed status , bit 4).	6
	DI6	Digital input DI6 (10.02 DI delayed status , bit 5).	7
	<i>Other [bit]</i>	Source selection (see Terms and abbreviations on page 55).	-
20.27	<i>Jogging 2 start source</i>	If enabled by parameter 20.25 Jogging enable, selects the source for the activation of jogging function 2. (Jogging function 2 can also be activated through fieldbus regardless of parameter 20.25.) 1 = Jogging 2 active. For the selections, see parameter 20.26 Jogging 1 start source. Note: If both jogging 1 and 2 are activated, the one that was activated first has priority.	<i>Not selected</i>
20.29	<i>Local start trigger type</i>	Defines whether the start signal for local control (for example, control panel or PC tool) is edge-triggered or level-triggered.	<i>Edge</i>
	Edge	The start signal is edge-triggered.	0

No.	Name/Value	Description	Def/FbEq16									
	Level	The start signal is level-triggered.	1									
20.30	<i>Enable signals warning function</i>	Selects enable signal (eg. start enable) warnings to be suppressed. This parameter can be used to prevent these warnings from flooding the event log. Whenever a bit of this parameter is set to 1, the corresponding warning is suppressed, i.e. no warning is generated even if the signal is switched off. The bits of this binary number correspond to the following warnings:	00b									
<table><tr><th>Bit</th><th>Name</th><th>Warning</th></tr><tr><td>0</td><td>Enable Start</td><td><i>AFEA Power up</i></td></tr><tr><td>1...15</td><td>Reserved</td><td></td></tr></table>				Bit	Name	Warning	0	Enable Start	<i>AFEA Power up</i>	1...15	Reserved	
Bit	Name	Warning										
0	Enable Start	<i>AFEA Power up</i>										
1...15	Reserved											
00b...11h		Suppression of "enable signal missing" warnings.	1 = 1									
21 Start/stop mode		Start and stop modes; emergency stop mode and signal source selection; DC magnetization settings.										
21.01	<i>Start mode</i>	Selects the motor start function for the vector motor control mode, ie. when <i>99.04 Motor control mode</i> is set to vector. Note: • For the scalar motor control mode this parameter has no effect. Start mode for scalar motor control should be set in <i>21.19 Scalar start mode</i>. • Starting into a rotating motor is not possible when DC magnetizing is selected (Constant time). • This parameter cannot be changed while the drive is running. See also section <i>DC magnetization</i> (page 40).	<i>Automatic</i>									
Constant time		The drive pre-magnetizes the motor before start. The pre-magnetizing time is defined by parameter <i>21.02 Magnetization time</i> . This mode should be selected if constant pre-magnetizing time is required. This setting also guarantees the highest possible break-away torque when the pre-magnetizing time is set long enough. Note: This mode cannot be used to start into a rotating motor.  WARNING! The drive will start after the set magnetizing time has passed even if motor magnetization is not completed. In applications where a full break-away torque is essential, ensure that the constant magnetizing time is long enough to allow generation of full magnetization and torque.	1									
Automatic		Automatic start guarantees optimal motor start in most cases. It includes the flying start function (starting into a rotating motor). Speed searching area is limited by <i>30.11Minimum speed</i> , <i>30.12 Maximum speed</i> . Note: Par1.01 Motor speed used and Par1.02 Motor speed estimated are not actual motor speed during this 'speed searching' period before actual motor speed found.	2									

No.	Name/Value	Description	Def/FbEq16						
21.02	Magnetization time	Defines the pre-magnetization time when - parameter 21.01 Start mode is set to Constant time (in vector motor control mode), or - parameter 21.19 Scalar start mode is set to Constant time (in scalar motor control mode). After the start command, the drive automatically premagnetizes the motor for the set time. To ensure full magnetizing, set this parameter to the same value as, or higher than, the rotor time constant. If not known, use the rule-of-thumb value given in the table below: <table><tr><th>Motor rated power</th><th>Constant magnetizing time</th></tr><tr><td>10 to 200 kW</td><td>≥ 200 to 1000 ms</td></tr><tr><td>200 to 1000 kW</td><td>≥ 1000 to 2000 ms</td></tr></table> Note: This parameter cannot be changed while the drive is running.	Motor rated power	Constant magnetizing time	10 to 200 kW	≥ 200 to 1000 ms	200 to 1000 kW	≥ 1000 to 2000 ms	5000 ms
Motor rated power	Constant magnetizing time								
10 to 200 kW	≥ 200 to 1000 ms								
200 to 1000 kW	≥ 1000 to 2000 ms								
	0 ... 10000 ms	Constant DC magnetizing time.	1 = 1 ms						
21.03	Stop mode	Selects the way the motor is stopped when a stop command is received.	Coast						
	Coast	Stop by switching off the output semiconductors of the drive. The motor coasts to a stop.  WARNING! If a mechanical brake is used, ensure it is safe to stop the drive by coasting.	0						
	Ramp	Stop along the active deceleration ramp. See parameter group 23 Speed reference ramp on page 145.	1						
	Torque limit	Stop according to torque limits (parameters 30.19 and 30.20).	2						
21.05	Emergency stop source	Selects the source of the emergency stop signal. 0 = Emergency stop active 1 = Normal operation Note: This parameter cannot be changed while the drive is running.	Inactive (true)						
	Active (false)	0	0						
	Inactive (true)	1	1						
	DIIL	DIIL input (10.02 DI delayed status, bit 15).	2						
	DI1	Digital input DI1 (10.02 DI delayed status, bit 0).	3						
	DI2	Digital input DI2 (10.02 DI delayed status, bit 1).	4						
	DI3	Digital input DI3 (10.02 DI delayed status, bit 2).	5						
	DI4	Digital input DI4 (10.02 DI delayed status, bit 3).	6						
	DI5	Digital input DI5 (10.02 DI delayed status, bit 4).	7						
	DI6	Digital input DI6 (10.02 DI delayed status, bit 5).	8						
	DIO1	Not applicable for ACS580MV.	9						
	DIO2	Not applicable for ACS580MV.	10						
	Other [bit]	Source selection (see Terms and abbreviations on page 55).	-						

No.	Name/Value	Description	Def/FbEq16
21.06	<i>Zero speed limit</i>	Defines the zero speed limit. The motor is stopped along a speed ramp (when ramped stop is selected) until the defined zero speed limit is reached. After the zero speed delay, the motor coasts to a stop.	30.00 rpm
	0.00 ... 30000.00 rpm	Zero speed limit.	See par. 46.01
21.07	<i>Zero speed delay</i>	Defines the delay for the zero speed delay function. The function is useful in applications where a smooth and quick restarting is essential. During the delay, the drive knows the rotor position accurately. <u>Without zero speed delay:</u> The drive receives a stop command and decelerates along a ramp. When actual motor speed falls below the value of parameter 21.06 Zero speed limit, inverter modulation is stopped and the motor coasts to a standstill.  <u>With zero speed delay:</u> The drive receives a stop command and decelerates along a ramp. When actual motor speed falls below the value of parameter 21.06 Zero speed limit, the zero speed delay function activates. During the delay the function keeps the speed controller live: the inverter modulates, motor is magnetized and the drive is ready for a quick restart. Zero speed delay can be used e.g. with the jogging function. 	0 ms
	0 ... 30000 ms	Zero speed delay.	1 = 1 ms
21.10	<i>DC current reference</i>	Defines the DC current in percent of the motor nominal current. See section DC magnetization (page 40).	30.0%
	0.0 ... 100.0%	DC current reference	1 = 1%

No.	Name/Value	Description	Def/FbEq16
21.12	<i>Continuous magnetization command</i>	Activates/deactivates (or selects a source that activates/deactivates) continuous magnetization. Not applicable for ACS580. 0 = Normal operation 1 = Magnetization active	<i>Off</i>
	Off	0.	0
	On	1.	1
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
21.19	<i>Scalar start mode</i>	Selects the motor start function for the scalar control mode. Note: - The start function for the Vector motor control mode is selected by parameter <i>21.01 Start mode</i>. - This parameter cannot be changed while the drive is running. See also section <i>DC magnetization</i> (page 40).	<i>Normal</i>
	Normal	Immediate start from zero speed.	0
	Constant time	The drive pre-magnetizes the motor before start. The pre-magnetizing time is defined by parameter <i>21.02 Magnetization time</i> . This mode should be selected if constant pre-magnetizing time is required (e.g. if the motor start must be synchronized with the release of a mechanical brake). This setting also guarantees the highest possible break-away torque when the pre-magnetizing time is set long enough. Note: This mode cannot be used to start into a rotating motor.  WARNING! The drive will start after the set magnetizing time has passed even if motor magnetization is not completed. In applications where a full break-away torque is essential, ensure that the constant magnetizing time is long enough to allow generation of full magnetization and torque.	1
	Automatic	Automatic start guarantees optimal motor start in most cases. This setting can be used in applications where flying starts (i.e. starting into a rotating motor) are required. Speed searching area is limited by <i>30.11 Minimum speed</i> , <i>30.12 Maximum speed</i> , <i>30.13 Minimum frequency</i> and <i>30.14 Maximum frequency</i> . If scalar speed control mode is selected, speed searching range is: {+Max[Par30.12 , Par30.11],-Max[Par30.12 , Par30.11]}. If scalar frequency control mode is selected, frequency searching range is: {+Max[Par30.14 , Par30.13],-Max[Par30.14 , Par30.13]}. Note: Par1.01 Motor speed used and Par1.02 Motor speed estimated are not actual motor speed during this 'speed searching' period before actual motor speed found.	2

No.	Name/Value	Description	Def/FbEq16
22 Speed reference selection		Speed reference selection. See the control chain diagrams on pages 406...408.	
22.01	<i>Speed ref unlimited</i>	Displays the output of the speed reference selection block. See the control chain diagram on page 407. This parameter is read-only.	-
	-30000.00 ... 30000.00 rpm	Value of the selected speed reference.	See par. 46.01
22.11	<i>Speed ref1 source</i>	Selects speed reference source 1. Two signal sources can be defined by this parameter and 22.12 <i>Speed ref2 source</i>. A digital source selected by 22.14 <i>Speed ref1/2 selection</i> can be used to switch between the two sources, or a mathematical function (22.13 <i>Speed ref1 function</i>) applied to the two signals to create the reference.	<i>AI1 scaled</i>
	Zero	None.	0
	AI1 scaled	12.12 <i>AI1 scaled value</i> (see page 88).	1
	AI2 scaled	12.22 <i>AI2 scaled value</i> (see page 90).	2
	FB A ref1	03.05 <i>FB A reference 1</i> (see page 63).	4
	FB A ref2	03.06 <i>FB A reference 2</i> (see page 63).	5
	EFB ref1	Not applicable for ACS580MV.	8
	EFB ref2	Not applicable for ACS580MV.	9
	DDCS ctrl ref1	Not applicable for ACS580MV.	10
	DDCS ctrl ref2	Not applicable for ACS580MV.	11
	M/F reference 1	Not applicable for ACS580MV.	12
	M/F reference 2	Not applicable for ACS580MV.	13
	Motor potentiometer	Not supported.	15
	PID	Not applicable for ACS580MV.	16
	Control panel (ref saved)	Control panel reference, with initial value from last-used panel reference. See section <i>Using the control panel as an external control source</i> .	18

No.	Name/Value	Description	Def/FbEq16
	Control panel (ref copied)	Control panel reference, with initial value from previous source or actual value. See section Using the control panel as an external control source .	19
	<i>Other</i>	Source selection (see Terms and abbreviations on page 55).	-
22.12	<i>Speed ref2 source</i>	Selects speed reference source 2. For the selections, and a diagram of reference source selection, see parameter 22.11 Speed ref1 source .	<i>Zero</i>
22.13	<i>Speed ref1 function</i>	Selects a mathematical function between the reference sources selected by parameters 22.11 Speed ref1 source and 22.12 Speed ref2 source . See diagram at 22.11 Speed ref1 source .	<i>Ref1</i>
	Ref1	Signal selected by 22.11 Speed ref1 source is used as speed reference 1 as such (no function applied).	0
	Add (ref1 + ref2)	The sum of the reference sources is used as speed reference 1.	1
	Sub (ref1 - ref2)	The subtraction ([22.11 Speed ref1 source] - [22.12 Speed ref2 source]) of the reference sources is used as speed reference 1.	2
	Mul (ref1 × ref2)	The multiplication of the reference sources is used as speed reference 1.	3
	Min (ref1, ref2)	The smaller of the reference sources is used as speed reference 1.	4
	Max (ref1, ref2)	The greater of the reference sources is used as speed reference 1.	5
22.14	<i>Speed ref1/2 selection</i>	Configures the selection between speed references 1 and 2. See diagram at 22.11 Speed ref1 source . 0 = Speed reference 1 1 = Speed reference 2	<i>Follow Ext1/Ext2 selection</i>
	Speed reference 1	0.	0
	Speed reference 2	1.	1
	Follow Ext1/Ext2 selection	Speed reference 1 is used when external control location EXT1 is active. Speed reference 2 is used when external control location EXT2 is active. See also parameter 19.11 Ext1/Ext2 selection .	2
	DI1	Digital input DI1 (10.02 DI delayed status , bit 0).	3
	DI2	Digital input DI2 (10.02 DI delayed status , bit 1).	4
	DI3	Digital input DI3 (10.02 DI delayed status , bit 2).	5
	DI4	Digital input DI4 (10.02 DI delayed status , bit 3).	6
	DI5	Digital input DI5 (10.02 DI delayed status , bit 4).	7
	DI6	Digital input DI6 (10.02 DI delayed status , bit 5).	8
	DIO1	Not applicable for ACS580MV.	11
	DIO2	Not applicable for ACS580MV.	12
	<i>Other [bit]</i>	Source selection (see Terms and abbreviations on page 55).	-
22.15	<i>Speed additive 1 source</i>	Defines a reference to be added to the speed reference after reference selection (see page 406). For the selections, see parameter 22.11 Speed ref1 source . Note: For safety reasons, the additive is not applied when any of the stop functions are active.	<i>Zero</i>

No.	Name/Value	Description	Def/FbEq16
22.16	<i>Speed share</i>	Defines a scaling factor for the selected speed reference (speed reference 1 or 2, multiplied by the defined value). Speed reference 1 or 2 is selected by parameter <i>22.14 Speed ref1/2 selection</i> .	1.000
	-8.000 ... 8.000	Speed reference scaling factor.	1000 = 1
22.17	<i>Speed additive 2 source</i>	Defines a reference to be added to the speed reference after the speed share function (see page 406). For the selections, see parameter <i>22.11 Speed ref1 source</i> . Note: For safety reasons, the additive is not applied when any of the stop functions are active.	<i>Zero</i>
22.21	<i>Constant speed function</i>	Determines how constant speeds are selected, and whether the rotation direction signal is considered or not when applying a constant speed.	00b

Bit	Name	Information
0	Constant speed mode	1 = Packed: 7 constant speeds are selectable using the three sources defined by parameters <i>22.22</i> , <i>22.23</i> and <i>22.24</i> . 0 = Separate: Constant speeds 1, 2 and 3 are separately activated by the sources defined by parameters <i>22.22</i> , <i>22.23</i> and <i>22.24</i> respectively. In case of conflict, the constant speed with the smaller number takes priority.
1	Direction enable	1 = Start dir: To determine running direction for a constant speed, the sign of the constant speed setting (parameters <i>22.26...22.32</i>) is multiplied by the direction signal (forward: +1, reverse: -1). This effectively allows the drive to have 14 (7 forward, 7 reverse) constant speeds if all values in <i>22.26...22.32</i> are positive.  WARNING: If the direction signal is reverse and the active constant speed is negative, the drive will run in the forward direction. 0 = Accord Par: The running direction for the constant speed is determined by the sign of the constant speed setting (parameters <i>22.26...22.32</i>).
2...15	Reserved	

00b...11b	Constant speed configuration word.	1 = 1

No.	Name/Value	Description	Def/FbEq16																																				
22.22	<i>Constant speed sel1</i>	When bit 0 of parameter <i>22.21 Constant speed function</i> is 0 (Separate), selects a source that activates constant speed 1. When bit 0 of parameter <i>22.21 Constant speed function</i> is 1 (Packed), this parameter and parameters <i>22.23 Constant speed sel2</i> and <i>22.24 Constant speed sel3</i> select three sources whose states activate constant speeds as follows:	<i>DI5</i>																																				
<table border="1"> <thead> <tr> <th>Source defined by par. 22.22</th><th>Source defined by par. 22.23</th><th>Source defined by par. 22.24</th><th>Constant speed active</th></tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td><td>None</td></tr> <tr><td>1</td><td>0</td><td>0</td><td>Constant speed 1</td></tr> <tr><td>0</td><td>1</td><td>0</td><td>Constant speed 2</td></tr> <tr><td>1</td><td>1</td><td>0</td><td>Constant speed 3</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>Constant speed 4</td></tr> <tr><td>1</td><td>0</td><td>1</td><td>Constant speed 5</td></tr> <tr><td>0</td><td>1</td><td>1</td><td>Constant speed 6</td></tr> <tr><td>1</td><td>1</td><td>1</td><td>Constant speed 7</td></tr> </tbody> </table>				Source defined by par. 22.22	Source defined by par. 22.23	Source defined by par. 22.24	Constant speed active	0	0	0	None	1	0	0	Constant speed 1	0	1	0	Constant speed 2	1	1	0	Constant speed 3	0	0	1	Constant speed 4	1	0	1	Constant speed 5	0	1	1	Constant speed 6	1	1	1	Constant speed 7
Source defined by par. 22.22	Source defined by par. 22.23	Source defined by par. 22.24	Constant speed active																																				
0	0	0	None																																				
1	0	0	Constant speed 1																																				
0	1	0	Constant speed 2																																				
1	1	0	Constant speed 3																																				
0	0	1	Constant speed 4																																				
1	0	1	Constant speed 5																																				
0	1	1	Constant speed 6																																				
1	1	1	Constant speed 7																																				
	Not selected	0 (always off).	0																																				
	Selected	1 (always on).	1																																				
	DI1	Digital input DI1 (<i>10.02 DI delayed status</i> , bit 0).	2																																				
	DI2	Digital input DI2 (<i>10.02 DI delayed status</i> , bit 1).	3																																				
	DI3	Digital input DI3 (<i>10.02 DI delayed status</i> , bit 2).	4																																				
	DI4	Digital input DI4 (<i>10.02 DI delayed status</i> , bit 3).	5																																				
	DI5	Digital input DI5 (<i>10.02 DI delayed status</i> , bit 4).	6																																				
	DI6	Digital input DI6 (<i>10.02 DI delayed status</i> , bit 5).	7																																				
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-																																				
22.23	<i>Constant speed sel2</i>	When bit 0 of parameter <i>22.21 Constant speed function</i> is 0 (Separate), selects a source that activates constant speed 2. When bit 0 of parameter <i>22.21 Constant speed function</i> is 1 (Packed), this parameter and parameters <i>22.22 Constant speed sel1</i> and <i>22.24 Constant speed sel3</i> select three sources that are used to activate constant speeds. See table at parameter <i>22.22 Constant speed sel1</i> . For the selections, see parameter <i>22.22 Constant speed sel1</i> .	<i>Not selected</i>																																				
22.24	<i>Constant speed sel3</i>	When bit 0 of parameter <i>22.21 Constant speed function</i> is 0 (Separate), selects a source that activates constant speed 3. When bit 0 of parameter <i>22.21 Constant speed function</i> is 1 (Packed), this parameter and parameters <i>22.22 Constant speed sel1</i> and <i>22.23 Constant speed sel2</i> select three sources that are used to activate constant speeds. See table at parameter <i>22.22 Constant speed sel1</i> . For the selections, see parameter <i>22.22 Constant speed sel1</i> .	<i>Not selected</i>																																				
22.26	<i>Constant speed 1</i>	Defines constant speed 1 (the speed the motor will turn when constant speed 1 is selected).	300.00 rpm																																				
	-30000.00 ... 30000.00 rpm	Constant speed 1.	See par. <i>46.01</i>																																				
22.27	<i>Constant speed 2</i>	Defines constant speed 2.	0.00 rpm																																				
	-30000.00 ... 30000.00 rpm	Constant speed 2.	See par. <i>46.01</i>																																				

No.	Name/Value	Description	Def/FbEq16
22.28	<i>Constant speed 3</i>	Defines constant speed 3.	0.00 rpm
	-30000.00 ... 30000.00 rpm	Constant speed 3.	See par. 46.01
22.29	<i>Constant speed 4</i>	Defines constant speed 4.	0.00 rpm
	-30000.00 ... 30000.00 rpm	Constant speed 4.	See par. 46.01
22.30	<i>Constant speed 5</i>	Defines constant speed 5.	0.00 rpm
	-30000.00 ... 30000.00 rpm	Constant speed 5.	See par. 46.01
22.31	<i>Constant speed 6</i>	Defines constant speed 6.	0.00 rpm
	-30000.00 ... 30000.00 rpm	Constant speed 6.	See par. 46.01
22.32	<i>Constant speed 7</i>	Defines constant speed 7.	0.00 rpm
	-30000.00 ... 30000.00 rpm	Constant speed 7.	See par. 46.01
22.41	<i>Speed ref safe</i>	Defines a safe speed reference value that is used with supervision functions such as • 12.03 AI supervision function • 49.05 Communication loss action • 50.02 comm loss func • 50.32 FBA B comm loss func.	0.00 rpm
	-30000.00 ... 30000.00 rpm	Safe speed reference.	See par. 46.01
22.42	<i>Jogging 1 ref</i>	Defines the speed reference for jogging function 1. For more information on jogging, see page 38 .	0.00 rpm
	-30000.00 ... 30000.00 rpm	Speed reference for jogging function 1.	See par. 46.01
22.43	<i>Jogging 2 ref</i>	Defines the speed reference for jogging function 2. For more information on jogging, see page 38 .	0.00 rpm
	-30000.00 ... 30000.00 rpm	Speed reference for jogging function 2.	See par. 46.01
22.51	<i>Critical speed function</i>	Enables/disables the critical speeds function. Also determines whether the specified ranges are effective in both rotating directions or not. See also section Critical speeds/frequencies (page 36).	00b

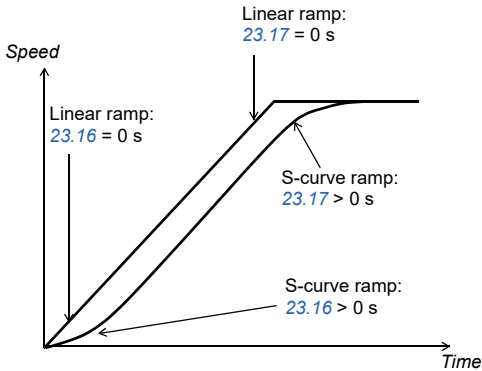
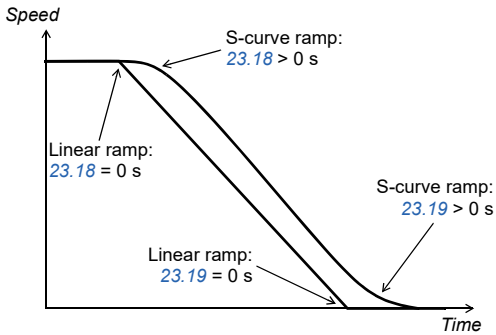
Bit	Name	Information
0	Enable	1 = Enable: Critical speeds enabled. 0 = Disable: Critical speeds disabled.
1	Sign mode	1 = Signed: The signs of parameters 22.52...22.57 are taken into account. 0 = Absolute: Parameters 22.52...22.57 are handled as absolute values. Each range is effective in both directions of rotation.
2...15	Reserved	

00b...11b	Critical speeds configuration word.	1 = 1

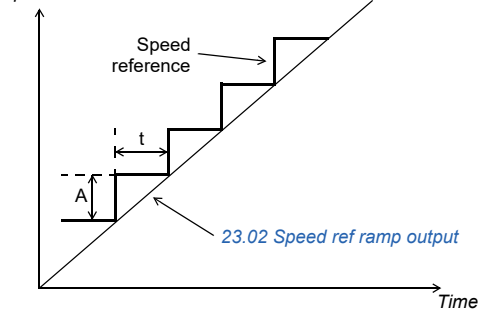
No.	Name/Value	Description	Def/FbEq16
22.52	<i>Critical speed 1 low</i>	Defines the low limit for critical speed range 1. Note: This value must be less than or equal to the value of 22.53 Critical speed 1 high .	0.00 rpm
	-30000.00 ... 30000.00 rpm	Low limit for critical speed 1.	See par. 46.01
22.53	<i>Critical speed 1 high</i>	Defines the high limit for critical speed range 1. Note: This value must be greater than or equal to the value of 22.52 Critical speed 1 low .	0.00 rpm
	-30000.00 ... 30000.00 rpm	High limit for critical speed 1.	See par. 46.01
22.54	<i>Critical speed 2 low</i>	Defines the low limit for critical speed range 2. Note: This value must be less than or equal to the value of 22.55 Critical speed 2 high .	0.00 rpm
	-30000.00 ... 30000.00 rpm	Low limit for critical speed 2.	See par. 46.01
22.55	<i>Critical speed 2 high</i>	Defines the high limit for critical speed range 2. Note: This value must be greater than or equal to the value of 22.54 Critical speed 2 low .	0.00 rpm
	-30000.00 ... 30000.00 rpm	High limit for critical speed 2.	See par. 46.01
22.56	<i>Critical speed 3 low</i>	Defines the low limit for critical speed range 3. Note: This value must be less than or equal to the value of 22.57 Critical speed 3 high .	0.00 rpm
	-30000.00 ... 30000.00 rpm	Low limit for critical speed 3.	See par. 46.01
22.57	<i>Critical speed 3 high</i>	Defines the high limit for critical speed range 3. Note: This value must be greater than or equal to the value of 22.56 Critical speed 3 low .	0.00 rpm
	-30000.00 ... 30000.00 rpm	High limit for critical speed 3.	See par. 46.01
22.81	<i>Speed reference act 1</i>	Displays the value of speed reference source 1 (selected by parameter 22.11 Speed ref1 source). See the control chain diagram on page 406 . This parameter is read-only.	-
	-30000.00 ... 30000.00 rpm	Value of reference source 1.	See par. 46.01
22.82	<i>Speed reference act 2</i>	Displays the value of speed reference source 2 (selected by parameter 22.12 Speed ref2 source). See the control chain diagram on page 406 . This parameter is read-only.	-
	-30000.00 ... 30000.00 rpm	Value of reference source 2.	See par. 46.01
22.83	<i>Speed reference act 3</i>	Displays the value of speed reference after the mathematical function applied by parameter 22.13 Speed ref1 function and reference 1/2 selection (22.14 Speed ref1/2 selection). See the control chain diagram on page 406 . This parameter is read-only.	-
	-30000.00 ... 30000.00 rpm	Speed reference after source selection.	See par. 46.01

No.	Name/Value	Description	Def/FbEq16
22.84	<i>Speed reference act 4</i>	Displays the value of speed reference after application of 1st speed additive (22.15 <i>Speed additive 1 source</i>). See the control chain diagram on page 406. This parameter is read-only.	-
	-30000.00 ... 30000.00 rpm	Speed reference after additive 1.	See par. 46.01
22.85	<i>Speed reference act 5</i>	Displays the value of speed reference after the application of the speed share scaling factor (22.16 <i>Speed share</i>). See the control chain diagram on page 406. This parameter is read-only.	-
	-30000.00 ... 30000.00 rpm	Speed reference after speed share scaling.	See par. 46.01
22.86	<i>Speed reference act 6</i>	Displays the value of speed reference after application of 2nd speed additive (22.17 <i>Speed additive 2 source</i>). See the control chain diagram on page 406. This parameter is read-only.	-
	-30000.00 ... 30000.00 rpm	Speed reference after additive 2.	See par. 46.01
22.87	<i>Speed reference act 7</i>	Displays the value of speed reference before application of critical speeds. See the control chain diagram on page 407. The value is received from 22.86 <i>Speed reference act 6</i> unless overridden by • any constant speed • a jogging reference • <i>network control</i> reference • control panel reference • safe speed reference. This parameter is read-only.	-
	-30000.00 ... 30000.00 rpm	Speed reference before application of critical speeds.	See par. 46.01
23 Speed reference ramp		Speed reference ramp settings (programming of the acceleration and deceleration rates for the drive). See the control chain diagram on page 408.	
23.01	<i>Speed ref ramp input</i>	Displays the used speed reference (in rpm) before it enters the ramping and shaping functions. See the control chain diagram on page 408. This parameter is read-only.	-
	-30000.00 ... 30000.00 rpm	Speed reference before ramping and shaping.	See par. 46.01
23.02	<i>Speed ref ramp output</i>	Displays the ramped and shaped speed reference in rpm. See the control chain diagram on page 408. This parameter is read-only.	-
	-30000.00 ... 30000.00 rpm	Speed reference after ramping and shaping.	See par. 46.01
23.11	<i>Ramp set selection</i>	Selects the source that switches between the two sets of acceleration/deceleration ramp times defined by parameters 23.12...23.15. 0 = Acceleration time 1 and deceleration time 1 are active 1 = Acceleration time 2 and deceleration time 2 are active	D14
	Acc/Dec time 1	0.	0
	Acc/Dec time 2	1.	1

No.	Name/Value	Description	Def/FbEq16
	DI1	Digital input DI1 (<i>10.02 DI delayed status</i> , bit 0).	2
	DI2	Digital input DI2 (<i>10.02 DI delayed status</i> , bit 1).	3
	DI3	Digital input DI3 (<i>10.02 DI delayed status</i> , bit 2).	4
	DI4	Digital input DI4 (<i>10.02 DI delayed status</i> , bit 3).	5
	DI5	Digital input DI5 (<i>10.02 DI delayed status</i> , bit 4).	6
	DI6	Digital input DI6 (<i>10.02 DI delayed status</i> , bit 5).	7
	DIO1	Not applicable for ACS580MV.	11
	DIO2	Not applicable for ACS580MV.	12
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
<i>23.12</i>	<i>Acceleration time 1</i>	Defines acceleration time 1 as the time required for the speed to change from zero to the speed defined by parameter <i>46.01 Speed scaling</i> (not to parameter <i>30.12 Maximum speed</i>). If the speed reference increases faster than the set acceleration rate, the motor speed will follow the acceleration rate. If the speed reference increases slower than the set acceleration rate, the motor speed will follow the reference. If the acceleration time is set too short, the drive will automatically prolong the acceleration in order not to exceed the drive torque limits.	20.000 s
	0.000 ...1800.000 s	Acceleration time 1.	10 = 1 s
<i>23.13</i>	<i>Deceleration time 1</i>	Defines deceleration time 1 as the time required for the speed to change from the speed defined by parameter <i>46.01 Speed scaling</i> (not from parameter <i>30.12 Maximum speed</i>) to zero. If the speed reference decreases slower than the set deceleration rate, the motor speed will follow the reference. If the reference changes faster than the set deceleration rate, the motor speed will follow the deceleration rate. If the deceleration rate is set too short, the drive will automatically prolong the deceleration in order not to exceed drive torque limits (or not to exceed a safe DC link voltage).	20.000 s
	0.000 ...1800.000 s	Deceleration time 1.	10 = 1 s
<i>23.14</i>	<i>Acceleration time 2</i>	Defines acceleration time 2. See parameter <i>23.12 Acceleration time 1</i> .	60.000 s
	0.000 ...1800.000 s	Acceleration time 2.	10 = 1 s
<i>23.15</i>	<i>Deceleration time 2</i>	Defines deceleration time 2. See parameter <i>23.13 Deceleration time 1</i> .	60.000 s
	0.000 ...1800.000 s	Deceleration time 2.	10 = 1 s

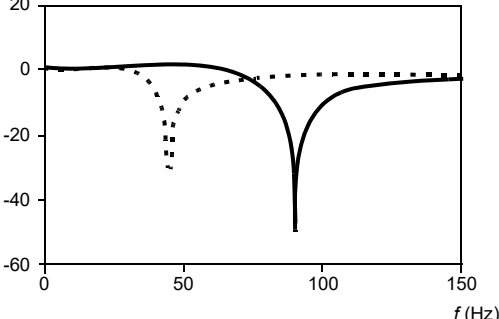
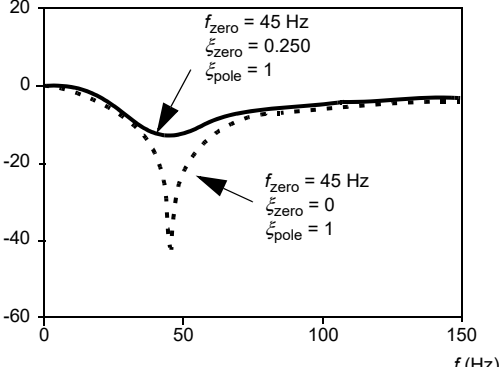
No.	Name/Value	Description	Def/FbEq16
23.16	Shape time acc 1	Defines the shape of the acceleration ramp at the beginning of the acceleration. 0.000 s: Linear ramp. Suitable for steady acceleration or deceleration and for slow ramps. 0.001...1000.000 s: S-curve ramp. S-curve ramps are ideal for lifting applications. The S-curve consists of symmetrical curves at both ends of the ramp and a linear part in between. Acceleration:  Deceleration: 	0.000 s
	0.000 ...1800.000 s	Ramp shape at start of acceleration.	10 = 1 s
23.17	Shape time acc 2	Defines the shape of the acceleration ramp at the end of the acceleration. See parameter 23.16 Shape time acc 1.	0.000 s
	0.000 ...1800.000 s	Ramp shape at end of acceleration.	10 = 1 s
23.18	Shape time dec 1	Defines the shape of the deceleration ramp at the beginning of the deceleration. See parameter 23.16 Shape time acc 1.	0.000 s
	0.000 ...1800.000 s	Ramp shape at start of deceleration.	10 = 1 s
23.19	Shape time dec 2	Defines the shape of the deceleration ramp at the end of the deceleration. See parameter 23.16 Shape time acc 1.	0.000 s
	0.000 ...1800.000 s	Ramp shape at end of deceleration.	10 = 1 s

No.	Name/Value	Description	Def/FbEq16
23.20	<i>Acc time jogging</i>	Defines the acceleration time for the jogging function i.e. the time required for the speed to change from zero to the speed value defined by parameter 46.01 Speed scaling .	60.000 s
	0.000 ...1800.000 s	Acceleration time for jogging.	10 = 1 s
23.21	<i>Dec time jogging</i>	Defines the deceleration time for the jogging function i.e. the time required for the speed to change from the speed value defined by parameter 46.01 Speed scaling to zero.	60.000 s
	0.000 ...1800.000 s	Deceleration time for jogging.	10 = 1 s
23.23	<i>Emergency stop time</i>	In speed control mode, this parameter defines the deceleration rate for emergency stop Off3 as the time it would take for the speed to decrease from the value of parameter 46.01 Speed scaling to zero. In frequency control mode, this parameter specifies the time it would take for the frequency to decrease from the value of 46.02 Frequency scaling to zero. Note: Emergency stop Off1 uses the standard deceleration ramp as defined by parameters 23.11...23.19 (speed and torque control) or 28.71...28.75 (frequency control).	3.000 s
	0.000 ...1800.000 s	Emergency stop Off3 deceleration time.	10 = 1 s
23.24	<i>Speed ramp in zero source</i>	Selects a source that forces the speed reference to zero just before it enters the ramp function. 0 = Force speed reference to zero before the ramp function 1 = Speed reference continues towards the ramp function as normal	<i>Inactive</i>
	Active	0.	0
	Inactive	1.	1
	DI1	Digital input DI1 (10.02 DI delayed status , bit 0).	2
	DI2	Digital input DI2 (10.02 DI delayed status , bit 1).	3
	DI3	Digital input DI3 (10.02 DI delayed status , bit 2).	4
	DI4	Digital input DI4 (10.02 DI delayed status , bit 3).	5
	DI5	Digital input DI5 (10.02 DI delayed status , bit 4).	6
	DI6	Digital input DI6 (10.02 DI delayed status , bit 5).	7
	DIO1	Not applicable for ACS580MV.	11
	DIO2	Not applicable for ACS580MV.	12
	<i>Other [bit]</i>	Source selection (see Terms and abbreviations on page 55).	-
23.26	<i>Ramp out balancing enable</i>	Selects the source for enabling/disabling speed reference ramp balancing. This function is used to generate a smooth transfer from a torque- or tension-controlled motor back to being speed-controlled. The balancing output would be tracking the present "line" speed of the application and when transfer is required, the speed reference can then be quickly "seeded" to the correct line speed. Balancing is also possible in the speed controller, see parameter 25.09 Speed ctrl balancing enable . See also parameter 23.27 Ramp out balancing ref . 0 = Disabled 1 = Enabled	<i>Not selected</i>
	Not selected	0.	0
	Selected	1.	1
	DI1	Digital input DI1 (10.02 DI delayed status , bit 0).	2
	DI2	Digital input DI2 (10.02 DI delayed status , bit 1).	3

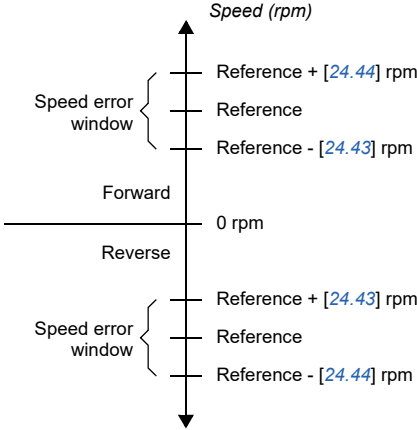
No.	Name/Value	Description	Def/FbEq16
	DI3	Digital input DI3 (<i>10.02 DI delayed status</i> , bit 2).	4
	DI4	Digital input DI4 (<i>10.02 DI delayed status</i> , bit 3).	5
	DI5	Digital input DI5 (<i>10.02 DI delayed status</i> , bit 4).	6
	DI6	Digital input DI6 (<i>10.02 DI delayed status</i> , bit 5).	7
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
23.27	<i>Ramp out balancing ref</i>	Defines the reference for speed ramp balancing. The output of the ramp generator is forced to this value when balancing is enabled by parameter <i>23.26 Ramp out balancing enable</i> .	0.00 rpm
	-30000.00 ... 30000.00 rpm	Speed ramp balancing reference.	See par. <i>46.01</i>
23.28	<i>Variable slope enable</i>	Activates the variable slope function, which controls the slope of the speed ramp during a speed reference change. This allows for a constantly variable ramp rate to be generated, instead of just the standard two ramps normally available. If the update interval of the signal from an external control system and the variable slope rate (<i>23.29 Variable slope rate</i>) are equal, the resulting speed reference (<i>23.02 Speed ref ramp output</i>) is a straight line. <i>Speed reference</i>  t = update interval of signal from external control system A = speed reference change during t This function is only active in remote control.	<i>Off</i>
	Off	Variable slope disabled.	0
	On	Variable slope enabled (not available in local control).	1
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
23.29	<i>Variable slope rate</i>	Defines the rate of the speed reference change when variable slope is enabled by parameter <i>23.28 Variable slope enable</i> . For the best result, enter the reference update interval into this parameter.	50 ms
	2...30000 ms	Variable slope rate.	1 = 1 ms

No.	Name/Value	Description	Def/FbEq16
23.39	<i>Follower speed correction out</i>	Displays the speed correction term for the load share function with a speed-controlled follower drive. See section <i>Load share function with a speed-controlled follower</i> (page 32). This parameter is read-only.	-
	-30000.00 ... 30000.00 rpm	Speed correction term.	See par. <i>46.01</i>
23.40	<i>Follower speed correction enable</i>	With a speed-controlled follower, selects the source for enabling/disabling the load share function. See section <i>Load share function with a speed-controlled follower</i> (page 32). 0 = Disabled 1 = Enabled	<i>Not selected</i>
	Not selected	0.	0
	Selected	1.	1
	DI1	Digital input DI1 (<i>10.02 DI delayed status</i> , bit 0).	2
	DI2	Digital input DI2 (<i>10.02 DI delayed status</i> , bit 1).	3
	DI3	Digital input DI3 (<i>10.02 DI delayed status</i> , bit 2).	4
	DI4	Digital input DI4 (<i>10.02 DI delayed status</i> , bit 3).	5
	DI5	Digital input DI5 (<i>10.02 DI delayed status</i> , bit 4).	6
	DI6	Digital input DI6 (<i>10.02 DI delayed status</i> , bit 5).	7
	DIO1	Not applicable for ACS580MV.	10
	DIO2	Not applicable for ACS580MV.	11
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
23.41	<i>Follower speed correction gain</i>	Adjusts the gain of the speed correction term in a speed-controlled follower. In effect, defines how accurately the follower follows the master torque. A greater value results in a more accurate performance. See section <i>Load share function with a speed-controlled follower</i> (page 32).	1.00%
	0.00 ... 100.00%	Speed correction term adjustment.	1 = 1%
23.42	<i>Follower speed corr torq source</i>	Selects the source of the torque reference for the load share function. See section <i>Load share function with a speed-controlled follower</i> (page 32).	<i>MF ref 2</i>
	NULL	None.	0
	MF ref 2	<i>03.14 M/F or D2D ref2</i> (page 63).	1
	<i>Other</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
24 Speed reference conditioning		Speed error calculation; speed error window control configuration; speed error step.	
24.01	<i>Used speed reference</i>	Displays the ramped and corrected speed reference (before speed error calculation). This parameter is read-only.	-
	-30000.00 ... 30000.00 rpm	Speed reference used for speed error calculation.	See par. <i>46.01</i>

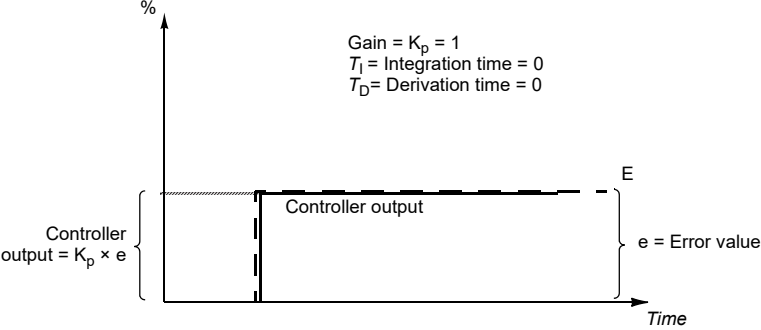
No.	Name/Value	Description	Def/FbEq16
24.02	<i>Used speed feedback</i>	Displays the speed feedback used for speed error calculation. This parameter is read-only.	-
	-30000.00 ... 30000.00 rpm	Speed feedback used for speed error calculation.	See par. 46.01
24.03	<i>Speed error filtered</i>	Displays the filtered speed error. This parameter is read-only.	-
	-30000.0 ... 30000.0 rpm	Filtered speed error.	See par. 46.01
24.04	<i>Speed error inverted</i>	Displays the inverted (unfiltered) speed error. This parameter is read-only.	-
	-30000.0 ... 30000.0 rpm	Inverted speed error.	See par. 46.01
24.11	<i>Speed correction</i>	Defines a speed reference correction, ie. a value added to the existing reference between ramping and limitation. This is useful to trim the speed if necessary, for example to adjust draw between sections of a paper machine. Note: For safety reasons, the correction is not applied when an emergency stop is active.  WARNING! If the speed reference correction exceeds 21.06 Zero speed limit, a ramp stop may be impossible. Make sure the correction is reduced or removed when a ramp stop is required.	0.00 rpm
	-10000.00 ... 10000.00 rpm	Speed reference correction.	See par. 46.01
24.12	<i>Speed error filter time</i>	Defines the time constant of the speed error low-pass filter. If the used speed reference changes rapidly, the possible interferences in the speed measurement can be filtered with the speed error filter. Reducing the ripple with this filter may cause speed controller tuning problems. A long filter time constant and fast acceleration time contradict one another. A very long filter time results in unstable control.	0 ms
	0...10000 ms	Speed error filtering time constant. 0 = filtering disabled.	1 = 1 ms
24.13	<i>RFE speed filter</i>	Enables/disables resonance frequency filtering. The filtering is configured by parameters 24.13...24.17. The speed error value coming to the speed controller is filtered by a common 2nd order band-elimination filter to eliminate the amplification of mechanical resonance frequencies. Note: Tuning the resonance frequency filter requires a basic understanding of frequency filters. Incorrect tuning can amplify mechanical oscillations and damage the drive hardware. To ensure the stability of the speed controller, stop the drive or disable the filtering before changing the parameter settings. 0 = Resonance frequency filtering disabled. 1 = Resonance frequency filtering enabled.	<i>Off</i>
	Off	0.	0
	On	1.	1

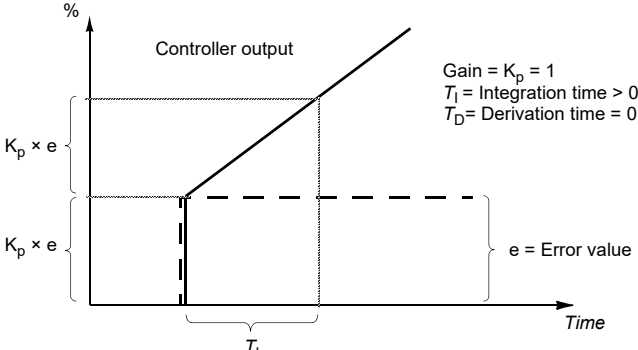
No.	Name/Value	Description	Def/FbEq16
24.14	Frequency of zero	Defines the zero frequency of the resonance frequency filter. The value must be set near the resonance frequency, which is filtered out before the speed controller. The drawing shows the frequency response. $20\log_{10} H(\omega)$  f (Hz)	45.00 Hz
	0.50 ... 500.00 Hz	Zero frequency.	1 = 1 Hz
24.15	Damping of zero	Defines the damping coefficient for parameter 24.14. The value of 0 corresponds to the maximum elimination of the resonance frequency. $20\log_{10} H(\omega)$  Note: To ensure that the resonance frequency band is filtered (rather than amplified), the value of 24.15 must be smaller than 24.17.	0.000
	-1.000 ... 1.000	Damping coefficient.	100 = 1

No.	Name/Value	Description	Def/FbEq16
24.16	<i>Frequency of pole</i>	Defines the frequency of pole of the resonance frequency filter. $20\log_{10} H(\omega)$ Note: If this value is very different from the value of 24.14, the frequencies near the frequency of pole are amplified, which can damage the driven machine.	40.00 Hz
	0.50 ... 500.00 Hz	Frequency of pole.	1 = 1 Hz
24.17	<i>Damping of pole</i>	Defines the damping coefficient for parameter 24.16. The coefficient shapes the frequency response of the resonance frequency filter. A narrower bandwidth results in better dynamic properties. By setting this parameter to 1, the effect of the pole is eliminated. $20\log_{10} H(\omega)$ Note: To ensure that the resonance frequency band is filtered (rather than amplified), the value of 24.15 must be smaller than 24.17.	0.250
	-1.000 ... 1.000	Damping coefficient.	100 = 1

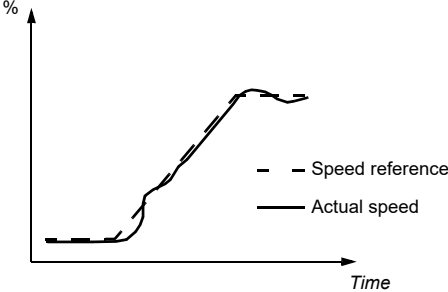
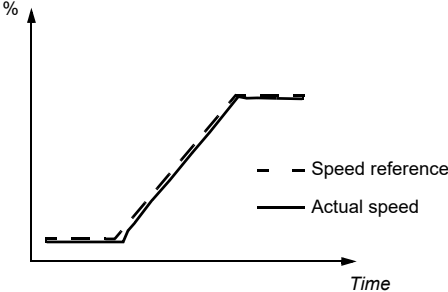
No.	Name/Value	Description	Def/FbEq16
24.41	Speed error window control enable	Enables/disables (or selects a source that enables/disables) speed error window control, sometimes also referred to as deadband control or strip break protection. It forms a speed supervision function for a torque-controlled drive, preventing the motor from running away if the material that is being held under tension breaks. Note: Speed error window control is only effective when the Add operating mode is active (see parameters 19.12 and 19.14), or when the drive is a speed-controlled follower (see page 32). In normal operation, window control keeps the speed controller input at zero so the drive stays in torque control. If the motor load is lost, then the motor speed will rise as the torque controller tries to maintain torque. The speed error (speed reference - actual speed) will increase until it exits the speed error window. When this is detected, the exceeding part of the error value is connected to the speed controller. The speed controller produces a reference term relative to the input and gain (25.02 Speed proportional gain) which the torque selector adds to the torque reference. The result is used as the internal torque reference for the drive. The activation of speed error window control is indicated by bit 3 of 06.19 Speed control status word. The window boundaries are defined by 24.43 Speed error window high and 24.44 Speed error window low as follows:  Note that it is parameter 24.44 (rather than 24.43) that defines the overspeed limit in both directions of rotation. This is because the function monitors speed error (which is negative in case of overspeed, positive in case of underspeed). 0 = Speed error window control disabled 1 = Speed error window control enabled	Disable
	Disable	0.	0
	Enable	1.	1
	Other [bit]	Source selection (see Terms and abbreviations on page 55).	-

No.	Name/Value	Description	Def/FbEq16
24.42	<i>Speed window control mode</i>	When speed error window control (see parameter 24.41 <i>Speed error window control enable</i>) is enabled, this parameter determines whether the speed controller only observes the proportional term instead of all three (P, I and D) terms.	<i>Normal speed control</i>
	Normal speed control	All three terms (parameters 25.02, 25.03 and 25.04) are observed by the speed controller.	0
	P-control	Only the proportional term (25.02) is observed by the speed controller. The integral and derivative terms are internally forced to zero.	1
24.43	<i>Speed error window high</i>	Defines the upper boundary of the speed error window. See parameter 24.41 <i>Speed error window control enable</i> .	0.00 rpm
	0.00 ... 3000.00 rpm	Upper boundary of speed error window.	See par. 46.01
24.44	<i>Speed error window low</i>	Defines the lower boundary of the speed error window. See parameter 24.41 <i>Speed error window control enable</i> .	0.00 rpm
	0.00 ... 3000.00 rpm	Lower boundary of speed error window.	See par. 46.01
24.46	<i>Speed error step</i>	Defines an additional speed error step given to the input of the speed controller (and added to the speed error value). This can be used in large drive systems for dynamic speed normalizing.  WARNING! Make sure the error step value is removed when a stop command is given.	0.00 rpm
	-3000.00 ... 3000.00 rpm	Speed error step.	See par. 46.01
25 Speed control		Speed controller settings.	
25.01	<i>Torque reference speed control</i>	Displays the speed controller output that is transferred to the torque controller. This parameter is read-only.	-
	-1600.0 ... 1600.0%	Limited speed controller output torque.	See par. 46.03

No.	Name/Value	Description	Def/FbEq16
25.02	Speed proportional gain	Defines the proportional gain (K_p) of the speed controller. Too high a gain may cause speed oscillation. The figure below shows the speed controller output after an error step when the error remains constant. Gain = $K_p = 1$ T_I = Integration time = 0 T_D = Derivation time = 0  If gain is set to 1.00, a 10% error (reference - actual value) in the motor synchronous speed produces a proportional term of 10%. Note: This parameter is automatically set by the speed controller autotune function.	10.00; 5.00 (95.21 b1/b2)
	0.00 ...250.00	Proportional gain for speed controller.	100 = 1

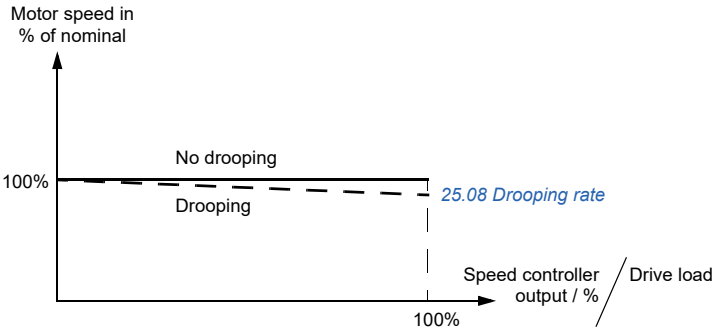
No.	Name/Value	Description	Def/FbEq16
25.03	Speed integration time	Defines the integration time of the speed controller. The integration time defines the rate at which the controller output changes when the error value is constant and the proportional gain of the speed controller is 1. The shorter the integration time, the faster the continuous error value is corrected. Setting the integration time to zero disables the I-part of the controller. This is useful to do when tuning the proportional gain; adjust the proportional gain first, then return the integration time. The integrator has anti-windup control for operation at a torque or current limit. The figure below shows the speed controller output after an error step when the error remains constant. 	2.50 s; 5.00 (95.21 b1/b2)
		Note: This parameter is automatically set by the speed controller autotune function.	
0.00 ... 1000.00 s		Integration time for speed controller.	10 = 1 s

No.	Name/Value	Description	Def/FbEq16
25.04	Speed derivation time	Defines the derivation time of the speed controller. Derivative action boosts the controller output if the error value changes. The longer the derivation time, the more the speed controller output is boosted during the change. If the derivation time is set to zero, the controller works as a PI controller, otherwise as a PID controller. The derivation makes the control more responsive for disturbances. For simple applications (especially those without an encoder), derivative time is not normally required and should be left at zero. The figure below shows the speed controller output after an error step when the error remains constant. The speed error derivative must be filtered with a low pass filter to eliminate external disturbances. Gain = $K_p = 1$ T_I = Integration time > 0 T_D = Derivation time > 0 T_s = Sample time period = 500 μs Δe = Error value change between two samples	0.000 s
25.05	Derivation filter time	Defines the derivation filter time constant. See parameter 25.04 Speed derivation time .	8 ms
	0...10000 ms	Derivation filter time constant.	1 = 1 ms

No.	Name/Value	Description	Def/FbEq16
25.06	<i>Acc comp derivation time</i>	Defines the derivation time for acceleration/(deceleration) compensation. In order to compensate for a high inertia load during acceleration, a derivative of the reference is added to the output of the speed controller. The principle of a derivative action is described under parameter 25.04 Speed derivation time. Note: As a general rule, set this parameter to the value between 50 and 100% of the sum of the mechanical time constants of the motor and the driven machine. The figure below shows the speed responses when a high inertia load is accelerated along a ramp. No acceleration compensation:  Acceleration compensation: 	0.00 s
	0.00 ... 1000.00 s	Acceleration compensation derivation time.	10 = 1 s
25.07	<i>Acc comp filter time</i>	Defines the acceleration (or deceleration) compensation filter time constant. See parameters 25.04 Speed derivation time and 25.06 Acc comp derivation time.	8.0 ms
	0.0 ... 1000.0 ms	Acceleration/deceleration compensation filter time.	1 = 1 ms

No.	Name/Value	Description	Def/FbEq16
25.08	<i>Drooping rate</i>	Defines the droop rate in percent of the nominal motor speed. Drooping decreases the drive speed slightly as the drive load increases. The actual speed decrease at a certain operating point depends on the droop rate setting and the drive load (= torque reference / speed controller output). At 100% speed controller output, drooping is at its nominal level, i.e. equal to the value of this parameter. The drooping effect decreases linearly to zero along with the decreasing load. The droop rate can be used e.g. to adjust the load sharing in a Master/Follower application run by several drives. In a Master/Follower application the motor shafts are coupled to each other. The correct droop rate for a process must be found out case by case in practice.	0.00%

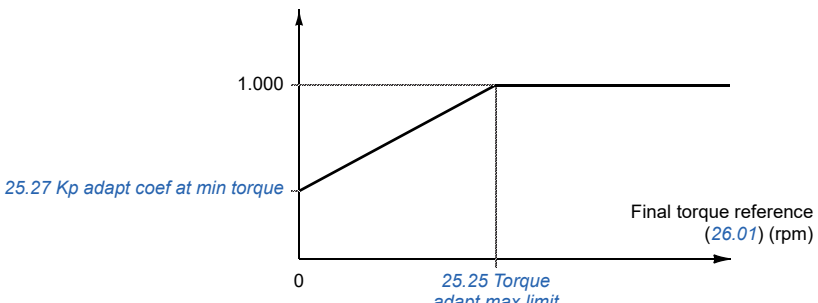
Speed decrease = Speed controller output × Drooping × Nominal speed
Example: Speed controller output is 50%, droop rate is 1%, nominal speed of the drive is 1500 rpm.
Speed decrease = 0.50 × 0.01 × 1500 rpm = 7.5 rpm.

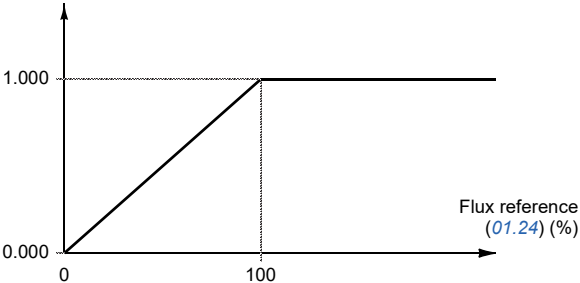


0.00 ... 100.00%	Droop rate.	100 = 1%
25.09 <i>Speed ctrl balancing enable</i>	Selects the source for enabling/disabling speed controller output balancing. This function is used to generate a smooth, “bumpless” transfer from a torque- or tension-controlled motor back to being speed-controlled. When balancing is enabled, the output of the speed controller is forced to the value of <i>25.10 Speed ctrl balancing ref.</i> Balancing is also possible in the ramp generator (see parameter <i>23.26 Ramp out balancing enable</i>). 0 = Disabled 1 = Enabled	<i>Not selected</i>
Not selected	0.	1
Selected	1.	2
DI1	Digital input DI1 (<i>10.02 DI delayed status</i> , bit 0).	2
DI2	Digital input DI2 (<i>10.02 DI delayed status</i> , bit 1).	3
DI3	Digital input DI3 (<i>10.02 DI delayed status</i> , bit 2).	4
DI4	Digital input DI4 (<i>10.02 DI delayed status</i> , bit 3).	5
DI5	Digital input DI5 (<i>10.02 DI delayed status</i> , bit 4).	6

No.	Name/Value	Description	Def/FbEq16
	DI6	Digital input DI6 (<i>10.02 DI delayed status</i> , bit 5).	7
	DIO1	Not applicable for ACS580MV.	10
	DIO2	Not applicable for ACS580MV.	11
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
25.10	<i>Speed ctrl balancing ref</i>	Defines the reference used in speed controller output balancing. The output of the speed controller is forced to this value when balancing is enabled by parameter <i>25.09 Speed ctrl balancing enable</i> .	0.0%
	-300.0 ... 300.0%	Speed control output balancing reference.	See par. <i>46.03</i>
25.11	<i>Speed control min torque</i>	Defines the minimum speed controller output torque.	-300.0%
	-1600.0 ... 0.0%	Minimum speed controller output torque.	See par. <i>46.03</i>
25.12	<i>Speed control max torque</i>	Defines the maximum speed controller output torque.	300.0%
	0.0 ... 1600.0%	Maximum speed controller output torque.	See par. <i>46.03</i>
25.13	<i>Min torq sp ctrl em stop</i>	Defines the minimum speed controller output torque during a ramped emergency stop (Off1 or Off3).	-400.0%
	-1600.0 ... 0.0%	Minimum speed controller output torque for ramped emergency stop.	See par. <i>46.03</i>
25.14	<i>Max torq sp ctrl em stop</i>	Defines the maximum speed controller output torque during a ramped emergency stop (Off1 or Off3).	400.0%
	0.0 ... 1600.0%	Maximum speed controller output torque for ramped emergency stop.	See par. <i>46.03</i>
25.15	<i>Proportional gain em stop</i>	Defines the proportional gain for the speed controller when an emergency stop is active. See parameter <i>25.02 Speed proportional gain</i> .	10.00; 5.00 (<i>95.21</i> b1/b2)
	1.00 ... 250.00	Proportional gain upon an emergency stop.	100 = 1

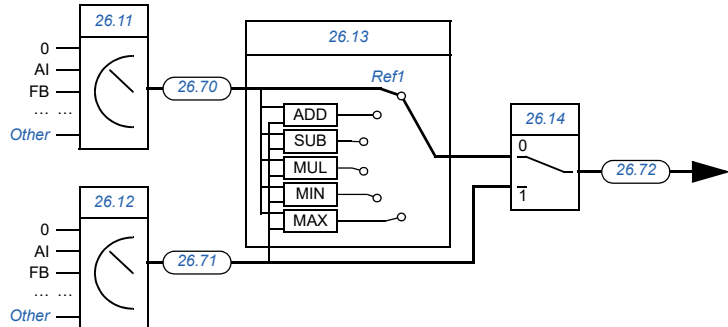
No.	Name/Value	Description	Def/FbEq16
25.18	<i>Speed adapt min limit</i>	Minimum actual speed for speed controller adaptation. Speed controller gain and integration time can be adapted according to actual speed (<i>90.01 Motor speed for control</i>). This is done by multiplying the gain (<i>25.02 Speed proportional gain</i>) and integration time (<i>25.03 Speed integration time</i>) by coefficients at certain speeds. The coefficients are defined individually for both gain and integration time. When actual speed is below or equal to <i>25.18 Speed adapt min limit</i>, the gain and integration time are multiplied by <i>25.21 Kp adapt coef at min speed</i> and <i>25.22 Ti adapt coef at min speed</i> respectively. When actual speed is equal to or above <i>25.19 Speed adapt max limit</i>, no adaptation takes place (the coefficient is 1). When actual speed is between <i>25.18 Speed adapt min limit</i> and <i>25.19 Speed adapt max limit</i>, the coefficients for the gain and integration time are calculated linearly on the basis of the breakpoints. Coefficient for K_p or T_i K_p = Proportional gain T_i = Integration time 25.21 Kp adapt coef at min speed or 25.22 Ti adapt coef at min speed Actual speed (90.01) (rpm) 0 25.18 Speed adapt min limit 25.19 Speed adapt max limit	0 rpm
	0...30000 rpm	Minimum actual speed for speed controller adaptation.	1 = 1 rpm
25.19	<i>Speed adapt max limit</i>	Maximum actual speed for speed controller adaptation. See parameter <i>25.18 Speed adapt min limit</i>.	0 rpm
	0...30000 rpm	Maximum actual speed for speed controller adaptation.	1 = 1 rpm
25.21	<i>Kp adapt coef at min speed</i>	Proportional gain coefficient at minimum actual speed. See parameter <i>25.18 Speed adapt min limit</i>.	1.000
	0.000 ... 10.000	Proportional gain coefficient at minimum actual speed.	1000 = 1
25.22	<i>Ti adapt coef at min speed</i>	Integration time coefficient at minimum actual speed. See parameter <i>25.18 Speed adapt min limit</i>.	1.000
	0.000 ... 10.000	Integration time coefficient at minimum actual speed.	1000 = 1

No.	Name/Value	Description	Def/FbEq16
25.25	<i>Torque adapt max limit</i>	Maximum torque reference for speed controller adaptation. Speed controller gain can be adapted according to the final unlimited torque reference (26.01 <i>Torque reference to TC</i>). This can be used to smooth out disturbances caused by a small load and backlashes. The functionality involves multiplying the gain (25.02 <i>Speed proportional gain</i>) by a coefficient within a certain torque range. When the torque reference is 0%, the gain is multiplied by the value of parameter 25.27 <i>Kp adapt coef at min torque</i>. When the torque reference is equal to or above 25.25 <i>Torque adapt max limit</i>, no adaptation takes place (the coefficient is 1). Between 0% and 25.25 <i>Torque adapt max limit</i>, the coefficient for the gain is calculated linearly on the basis of the breakpoints. Filtering can be applied on the torque reference using parameter 25.26 <i>Torque adapt filt time</i>.	0.0%
Coefficient for K_p (proportional gain)  25.27 <i>Kp adapt coef at min torque</i> 1.000 0 25.25 <i>Torque adapt max limit</i> Final torque reference (26.01) (rpm)			
	0.0 ... 1600.0%	Maximum torque reference for speed controller adaptation.	See par. 46.03
25.26	<i>Torque adapt filt time</i>	Defines a filter time constant for the adaptation, in effect adjusting the rate of change of the gain. See parameter 25.25 <i>Torque adapt max limit</i>.	0.000 s
	0.000 ... 100.000 s	Filter time for adaptation.	100 = 1 s
25.27	<i>Kp adapt coef at min torque</i>	Proportional gain coefficient at 0% torque reference. See parameter 25.25 <i>Torque adapt max limit</i>.	1.000
	0.000 ... 10.000	Proportional gain coefficient at 0% torque reference.	1000 = 1

No.	Name/Value	Description	Def/FbEq16
25.30	<i>Flux adaption enable</i>	Enables/disables speed controller adaptation based on motor flux reference (01.24 Flux actual %). The proportional gain of the speed controller is multiplied by a coefficient of 0...1 between 0...100% flux reference respectively. Coefficient for K_p (proportional gain) 	<i>Enable</i>
	Disable	Speed controller adaptation based on flux reference disabled.	0
	Enable	Speed controller adaptation based on flux reference enabled.	1
25.33	<i>Speed controller autotune</i>	Activates (or selects a source that activates) the speed controller autotune function. The autotune will automatically set parameters 25.02 Speed proportional gain, 25.03 Speed integration time and 25.37 Mechanical time constant. The prerequisites for performing the autotune routine are: - the motor identification run (ID run) has been successfully completed - the speed and torque limits (parameter group 30 Limits) have been set - speed feedback filtering (parameter group 90 Feedback selection), speed error filtering (24 Speed reference conditioning) and zero speed (21 Start/stop mode) have been set, and - the drive has been started and is running in speed control mode.  WARNING! The motor and machinery will run against the torque and speed limits during the autotune routine. MAKE SURE IT IS SAFE TO ACTIVATE THE AUTOTUNE FUNCTION! The autotune routine can be aborted by stopping the drive. 0 -> 1 = Activate speed controller autotune Note: The value does not revert to 0 automatically.	<i>Off</i>
	Off	0.	0
	On	1.	1
	<i>Other [bit]</i>	Source selection (see Terms and abbreviations on page 55).	-
25.34	<i>Speed controller autotune mode</i>	Defines a control preset for the speed controller autotune function. The setting affects the way the torque reference will respond to a speed reference step.	<i>Normal</i>
	Smooth	Slow but robust response.	0
	Normal	Medium setting.	1

No.	Name/Value	Description	Def/FbEq16
	Tight	Fast response. May produce too high a gain value for some applications.	2
25.37	<i>Mechanical time constant</i>	Mechanical time constant of the drive and the machinery as determined by the speed controller autotune function. The value can be adjusted manually.	-
	0.00 ... 1000.00 s	Mechanical time constant.	10 = 1 s
25.38	<i>Autotune torque step</i>	Defines an added torque value used by the autotune function. This value is scaled to motor nominal torque. Note that the torque used by the autotune function can also be limited by the torque limits (in parameter group 30 Limits) and nominal motor torque.	10.00%
	0.00 ... 100.00%	Autotune torque step.	100 = 1%
25.39	<i>Autotune speed step</i>	Defines a speed value added to the initial speed for the autotune routine. The initial speed (speed used when autotune is activated) plus the value of this parameter is the calculated maximum speed used by the autotune routine. The maximum speed can also be limited by the speed limits (in parameter group 30 Limits) and nominal motor speed. Note: The motor will exceed the calculated maximum speed slightly at the end of each acceleration stage.	10.00%
	0.00 ... 100.00%	Autotune speed step.	100 = 1%
25.40	<i>Autotune repeat times</i>	Determines how many acceleration/deceleration cycles are performed during the autotune routine. Increasing the value will improve the accuracy of the autotune function, and allow the use of smaller torque or speed step values.	10
	1...10	Number of cycles during autotune routine.	1 = 1
25.42	<i>Integral term enable</i>	Selects a source that enables/disables the integral (I) part of the speed controller. 0 = I-part disabled 1 = I-part enabled	<i>Selected</i>
	Not selected	0.	0
	Selected	1.	1
	DI1	Digital input DI1 (10.02 DI delayed status , bit 0).	2
	DI2	Digital input DI2 (10.02 DI delayed status , bit 1).	3
	DI3	Digital input DI3 (10.02 DI delayed status , bit 2).	4
	DI4	Digital input DI4 (10.02 DI delayed status , bit 3).	5
	DI5	Digital input DI5 (10.02 DI delayed status , bit 4).	6
	DI6	Digital input DI6 (10.02 DI delayed status , bit 5).	7
	DIO1	Not applicable for ACS580MV.	10
	DIO2	Not applicable for ACS580MV.	11
	<i>Other [bit]</i>	Source selection (see Terms and abbreviations on page 55).	-
25.53	<i>Torque prop reference</i>	Displays the output of the proportional (P) part of the speed controller. This parameter is read-only.	-
	-30000.0 ... 30000.0%	P-part output of speed controller.	See par. 46.03

No.	Name/Value	Description	Def/FbEq16
25.54	<i>Torque integral reference</i>	Displays the output of the integral (I) part of the speed controller. This parameter is read-only.	-
	-30000.0 ... 30000.0%	I-part output of speed controller.	See par. 46.03
25.55	<i>Torque deriv reference</i>	Displays the output of the derivative (D) part of the speed controller. This parameter is read-only.	-
	-30000.0 ... 30000.0%	D-part output of speed controller.	See par. 46.03
25.56	<i>Torque acc compensation</i>	Displays the output of the acceleration compensation function. This parameter is read-only.	-
	-30000.0 ... 30000.0%	Output of acceleration compensation function.	See par. 46.03
25.57	<i>Torque reference unbalanced</i>	Displays the acceleration-compensated output of the speed controller. This parameter is read-only.	-
	-30000.0 ... 30000.0%	Acceleration-compensated output of speed controller.	See par. 46.03
26 Torque reference chain		Settings for the torque reference chain.	
26.01	<i>Torque reference to TC</i>	Displays the final torque reference given to the torque controller in percent. This reference is then acted upon by various final limiters, like power, torque, load etc. This parameter is read-only.	-
	-1600.0 ... 1600.0%	Torque reference for torque control.	See par. 46.03
26.02	<i>Torque reference used</i>	Displays the final torque reference (in percent of motor nominal torque) given to the vector core, and comes after frequency, voltage and torque limitation. This parameter is read-only.	-
	-1600.0 ... 1600.0%	Torque reference for torque control.	See par. 46.03
26.08	<i>Minimum torque ref</i>	Defines the minimum torque reference. Allows for local limiting of the torque reference before it is passed on to the torque ramp controller. For absolute torque limiting, refer to parameter 30.19 <i>Minimum torque 1</i> .	-300.0%
	-1000.0 ... 0.0%	Minimum torque reference.	See par. 46.03
26.09	<i>Maximum torque ref</i>	Defines the maximum torque reference. Allows for local limiting of the torque reference before it is passed on to the torque ramp controller. For absolute torque limiting, refer to parameter 30.20 <i>Maximum torque 1</i> .	300.0%
	0.0 ... 1000.0%	Maximum torque reference.	See par. 46.03

No.	Name/Value	Description	Def/FbEq16
26.11	<i>Torque ref1 source</i>	Selects torque reference source 1. Two signal sources can be defined by this parameter and 26.12 <i>Torque ref2 source</i>. A digital source selected by 26.14 <i>Torque ref1/2 selection</i> can be used to switch between the two sources, or a mathematical function (26.13 <i>Torque ref1 function</i>) applied to the two signals to create the reference. 	<i>Zero</i>
	Zero	None.	0
	AI1 scaled	12.12 <i>AI1 scaled value</i> (see page 88).	1
	AI2 scaled	12.22 <i>AI2 scaled value</i> (see page 90).	2
	FB A ref1	03.05 <i>FB A reference 1</i> (see page 63).	4
	FB A ref2	03.06 <i>FB A reference 2</i> (see page 63).	5
	EFB ref1	Not applicable for ACS580MV.	8
	EFB ref2	Not applicable for ACS580MV.	9
	DDCS ctrl ref1	Not applicable for ACS580MV.	10
	DDCS ctrl ref2	Not applicable for ACS580MV.	11
	M/F reference1	Not applicable for ACS580MV.	12
	M/F reference2	Not applicable for ACS580MV.	13
	Motor potentiometer	Not applicable for ACS580MV.	15
	PID	Not applicable for ACS580MV.	16
	Control panel (ref saved)	Control panel reference, with initial value from last-used panel reference. See section <i>Using the control panel as an external control source</i> (page 21).	18
	Control panel (ref copied)	Control panel reference, with initial value from previous source or actual value. See section <i>Using the control panel as an external control source</i> (page 21).	19
	<i>Other</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
26.12	<i>Torque ref2 source</i>	Selects torque reference source 2. For the selections, and a diagram of reference source selection, see parameter 26.11 <i>Torque ref1 source</i>.	<i>Zero</i>

No.	Name/Value	Description	Def/FbEq16
26.13	<i>Torque ref1 function</i>	Selects a mathematical function between the reference sources selected by parameters 26.11 Torque ref1 source and 26.12 Torque ref2 source . See diagram at 26.11 Torque ref1 source .	<i>Ref1</i>
	Ref1	Signal selected by 26.11 Torque ref1 source is used as torque reference 1 as such (no function applied).	0
	Add (ref1 + ref2)	The sum of the reference sources is used as torque reference 1.	1
	Sub (ref1 - ref2)	The subtraction ([26.11 Torque ref1 source] - [26.12 Torque ref2 source]) of the reference sources is used as torque reference 1.	2
	Mul (ref1 × ref2)	The multiplication of the reference sources is used as torque reference 1.	3
	Min (ref1, ref2)	The smaller of the reference sources is used as torque reference 1.	4
	Max (ref1, ref2)	The greater of the reference sources is used as torque reference 1.	5
26.14	<i>Torque ref1/2 selection</i>	Configures the selection between torque references 1 and 2. See diagram at 26.11 Torque ref1 source . 0 = Torque reference 1 1 = Torque reference 2	<i>Torque reference 1</i>
	Torque reference 1	0.	0
	Torque reference 2	1.	1
	Follow Ext1/Ext2 selection	Torque reference 1 is used when external control location EXT1 is active. Torque reference 2 is used when external control location EXT2 is active. See also parameter 19.11 Ext1/Ext2 selection .	2
	DI1	Digital input DI1 (10.02 DI delayed status , bit 0).	3
	DI2	Digital input DI2 (10.02 DI delayed status , bit 1).	4
	DI3	Digital input DI3 (10.02 DI delayed status , bit 2).	5
	DI4	Digital input DI4 (10.02 DI delayed status , bit 3).	6
	DI5	Digital input DI5 (10.02 DI delayed status , bit 4).	7
	DI6	Digital input DI6 (10.02 DI delayed status , bit 5).	8
	<i>Other [bit]</i>	Source selection (see Terms and abbreviations on page 55).	-
26.15	<i>Load share</i>	Defines the scaling factor for the torque reference (the torque reference is multiplied by the value). This allows drives sharing the load between two motors on the same mechanical plant to be tailored to share the correct amount each, yet use the same master torque reference.	1.000
	-8.000 ... 8.000	Torque reference scaling factor.	1000 = 1
26.16	<i>Torque additive 1 source</i>	Selects the source of torque reference additive 1. Note: For safety reasons, the additive is not applied when an emergency stop is active. For the selections, see parameter 26.11 Torque ref1 source .	<i>Zero</i>
26.17	<i>Torque ref filter time</i>	Defines a low-pass filter time constant for the torque reference.	0.000 s
	0.000 ... 30.000 s	Filter time constant for torque reference.	1000 = 1 s

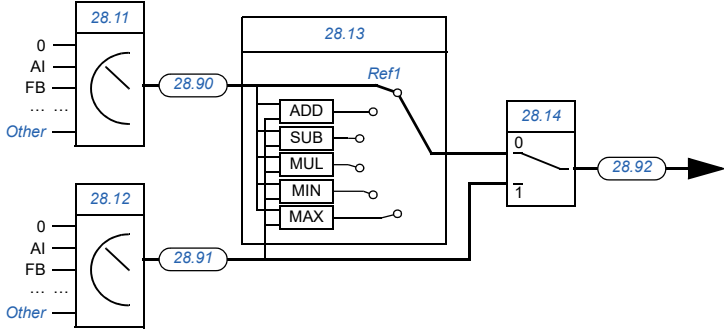
No.	Name/Value	Description	Def/FbEq16
26.18	<i>Torque ramp up time</i>	Defines the torque reference ramp-up time, ie. the time for the reference to increase from zero to nominal motor torque.	0.000 s
	0.000 ... 60.000 s	Torque reference ramp-up time.	100 = 1 s
26.19	<i>Torque ramp down time</i>	Defines the torque reference ramp-down time, ie. the time for the reference to decrease from nominal motor torque to zero.	0.000 s
	0.000 ... 60.000 s	Torque reference ramp-down time.	100 = 1 s
26.25	<i>Torque additive 2 source</i>	Selects the source of torque reference additive 2. The value received from the selected source is added to the torque reference after operating mode selection. Because of this, the additive can be used in speed and torque modes. Note: For safety reasons, the additive is not applied when an emergency stop is active.  WARNING! If the additive exceeds the limits set by parameters 25.11 Speed control min torque and 25.12 Speed control max torque, a ramp stop may be impossible. Make sure the additive is reduced or removed when a ramp stop is required eg. by using parameter 26.26 Force torque ref add 2 zero. For the selections, see parameter 26.11 Torque ref1 source.	<i>Zero</i>
26.26	<i>Force torque ref add 2 zero</i>	Selects a source that forces torque reference additive 2 (see parameter 26.25 Torque additive 2 source) to zero. 0 = Normal operation 1 = Force torque reference additive 2 to zero.	<i>Not selected</i>
	Not selected	0.	0
	Selected	1.	1
	DI1	Digital input DI1 (10.02 DI delayed status , bit 0).	2
	DI2	Digital input DI2 (10.02 DI delayed status , bit 1).	3
	DI3	Digital input DI3 (10.02 DI delayed status , bit 2).	4
	DI4	Digital input DI4 (10.02 DI delayed status , bit 3).	5
	DI5	Digital input DI5 (10.02 DI delayed status , bit 4).	6
	DI6	Digital input DI6 (10.02 DI delayed status , bit 5).	7
	DIO1	Not applicable for ACS580MV.	10
	DIO2	Not applicable for ACS580MV.	11
	<i>Other [bit]</i>	Source selection (see Terms and abbreviations on page 55).	-
26.41	<i>Torque step</i>	When enabled by parameter 26.42 Torque step enable, adds an additional step to the torque reference. A second torque step can be added using pointer parameters 26.43 Torque step pointer enable and 26.44 Torque step source. The two torque steps work independently of each other, and are summed up to calculate the total torque step. Note: For safety reasons, the torque step is not applied when an emergency stop is active.  WARNING! If the torque step exceeds the limits set by parameters 25.11 Speed control min torque and 25.12 Speed control max torque, a ramp stop may be impossible. Make sure the torque step is reduced or removed when a ramp stop is required eg. by using parameter 26.42 Torque step enable.	0.0%
	-300.0 ... 300.0%	Torque step.	See par. 46.03

No.	Name/Value	Description	Def/FbEq16
26.42	<i>Torque step enable</i>	Enables/disables a torque step (defined by parameter 26.41 Torque step).	<i>Disable</i>
	Disable	Torque step disabled.	0
	Enable	Torque step enabled.	1
26.43	<i>Torque step pointer enable</i>	Selects a source that enables/disables the torque step defined by parameter 26.44 Torque step source . See also parameter 26.41 Torque step . 1 = Torque step enabled.	<i>Selected</i>
	Not selected	0.	0
	Selected	1.	1
	DI1	Digital input DI1 (10.02 DI delayed status , bit 0).	2
	DI2	Digital input DI2 (10.02 DI delayed status , bit 1).	3
	DI3	Digital input DI3 (10.02 DI delayed status , bit 2).	4
	DI4	Digital input DI4 (10.02 DI delayed status , bit 3).	5
	DI5	Digital input DI5 (10.02 DI delayed status , bit 4).	6
	DI6	Digital input DI6 (10.02 DI delayed status , bit 5).	7
	DIO1	Not applicable for ACS580MV.	10
	DIO2	Not applicable for ACS580MV.	11
	<i>Other [bit]</i>	Source selection (see Terms and abbreviations on page 55).	-
26.44	<i>Torque step source</i>	Selects the source of the torque step enabled by 26.43 Torque step pointer enable .	<i>Zero</i>
	Zero	None.	0
	AI1 scaled	12.12 AI1 scaled value (see page 88).	1
	AI2 scaled	12.22 AI2 scaled value (see page 90).	2
	FB A ref1	03.05 FB A reference 1 (see page 63).	4
	FB A ref2	03.06 FB A reference 2 (see page 63).	5
	EFB ref1	03.09 EFB reference 1 (see page 122).	8
	M/F reference 1	03.13 M/F or D2D ref1 (see page 122).	12
	M/F reference 2	03.14 M/F or D2D ref2 (see page 122).	13
	Motor potentiometer	22.80 Motor potentiometer ref act (output of the motor potentiometer).	15
	PID	40.01 Process PID output actual (output of the process PID controller).	16
	Control panel (ref saved)	Control panel reference, with initial value from last-used panel reference. See section Using the control panel as an external control source (page 21).	18
	Control panel (ref copied)	Control panel reference, with initial value from previous source or actual value. See section Using the control panel as an external control source (page 21).	19
	<i>Other</i>	Source selection (see Terms and abbreviations on page 55).	-
26.51	<i>Oscillation damping</i>	Parameters 26.51...26.58 configure the oscillation damping function. This parameter enables (or selects a source that enables) the oscillation damping algorithm. 1 = Oscillation damping algorithm enabled	<i>Not selected</i>
	Not selected	0.	0

No.	Name/Value	Description	Def/FbEq16
	Selected	1.	1
	DI1	Digital input DI1 (<i>10.02 DI delayed status</i> , bit 0).	2
	DI2	Digital input DI2 (<i>10.02 DI delayed status</i> , bit 1).	3
	DI3	Digital input DI3 (<i>10.02 DI delayed status</i> , bit 2).	4
	DI4	Digital input DI4 (<i>10.02 DI delayed status</i> , bit 3).	5
	DI5	Digital input DI5 (<i>10.02 DI delayed status</i> , bit 4).	6
	DI6	Digital input DI6 (<i>10.02 DI delayed status</i> , bit 5).	7
	DIO1	Not applicable for ACS580MV.	10
	DIO2	Not applicable for ACS580MV.	11
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
26.52	<i>Oscillation damping out enable</i>	Determines (or selects a source that determines) whether the output of the oscillation damping function is applied to the torque reference or not. Note: Before enabling the oscillation damping output, adjust parameters 26.53...26.57. Then monitor the input signal (selected by 26.53) and the output (26.58) to make sure that the correction is safe to apply. 1 = Apply oscillation damping output to torque reference	<i>Not selected</i>
	Not selected	0.	0
	Selected	1.	1
	DI1	Digital input DI1 (<i>10.02 DI delayed status</i> , bit 0).	2
	DI2	Digital input DI2 (<i>10.02 DI delayed status</i> , bit 1).	3
	DI3	Digital input DI3 (<i>10.02 DI delayed status</i> , bit 2).	4
	DI4	Digital input DI4 (<i>10.02 DI delayed status</i> , bit 3).	5
	DI5	Digital input DI5 (<i>10.02 DI delayed status</i> , bit 4).	6
	DI6	Digital input DI6 (<i>10.02 DI delayed status</i> , bit 5).	7
	DIO1	Not applicable for ACS580MV.	10
	DIO2	Not applicable for ACS580MV.	11
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
26.53	<i>Oscillation compensation input</i>	Selects the input signal for the oscillation damping function. Note: Before changing this parameter run-time, disable the oscillation damping output using parameter 26.52. Monitor the behavior of 26.58 before re-enabling the output.	<i>Speed error</i>
	Speed error	24.01 Used speed reference - unfiltered motor speed. Note: This setting is not supported in scalar motor control mode.	0
	DC voltage	01.11 DC voltage. (The value is internally filtered.)	1
26.55	<i>Oscillation damping frequency</i>	Defines the center frequency of the oscillation damping filter. Set the value according to the number of oscillation peaks in the monitored signal (selected by 26.53) per second. Note: Before changing this parameter run-time, disable the oscillation damping output using parameter 26.52. Monitor the behavior of 26.58 before re-enabling the output.	31.0 Hz
	0.1 ... 60.0 Hz	Center frequency for oscillation damping.	10 = 1 Hz

No.	Name/Value	Description	Def/FbEq16
26.56	<i>Oscillation damping phase</i>	Defines a phase shift for the output of the filter. Note: Before changing this parameter run-time, disable the oscillation damping output using parameter 26.52. Monitor the behavior of 26.58 before re-enabling the output.	180 deg
	0...360 deg	Phase shift for oscillation damping function output.	10 = 1 deg
26.57	<i>Oscillation damping gain</i>	Defines a gain for the output of the oscillation damping function, ie. how much the output of the filter is amplified before it is added to the torque reference. Oscillation gain is scaled according to the speed controller gain so that changing the gain will not disturb oscillation damping. Note: Before changing this parameter run-time, disable the oscillation damping output using parameter 26.52. Monitor the behavior of 26.58 before re-enabling the output.	1.0%
	0.0 ... 100.0%	Gain setting for oscillation damping output.	10 = 1%
26.58	<i>Oscillation damping output</i>	Displays the output of the oscillation damping function. This value is added to the torque reference (as allowed by parameter 26.52 <i>Oscillation damping out enable</i>). This parameter is read-only.	-
	-1600.000 ... 1600.000%	Output of the oscillation damping function.	10 = 1%
26.70	<i>Torque reference act 1</i>	Displays the value of torque reference source 1 (selected by parameter 26.11 <i>Torque ref1 source</i>). This parameter is read-only.	-
	-1600.0 ... 1600.0%	Value of torque reference source 1.	See par. 46.03
26.71	<i>Torque reference act 2</i>	Displays the value of torque reference source 2 (selected by parameter 26.12 <i>Torque ref2 source</i>). This parameter is read-only.	-
	-1600.0 ... 1600.0%	Value of torque reference source 2.	See par. 46.03
26.72	<i>Torque reference act 3</i>	Displays the torque reference after the function applied by parameter 26.13 <i>Torque ref1 function</i> (if any), and after selection (26.14 <i>Torque ref1/2 selection</i>). This parameter is read-only.	-
	-1600.0 ... 1600.0%	Torque reference after selection.	See par. 46.03
26.73	<i>Torque reference act 4</i>	Displays the torque reference after application of reference additive 1. This parameter is read-only.	-
	-1600.0 ... 1600.0%	Torque reference after application of reference additive 1.	See par. 46.03
26.74	<i>Torque ref ramp out</i>	Displays the torque reference after limiting and ramping. This parameter is read-only.	-
	-1600.0 ... 1600.0%	Torque reference after limiting and ramping.	See par. 46.03
26.75	<i>Torque reference act 5</i>	Displays the torque reference after control mode selection. This parameter is read-only.	-
	-1600.0 ... 1600.0%	Torque reference after control mode selection.	See par. 46.03

No.	Name/Value	Description	Def/FbEq16
26.76	<i>Torque reference act 6</i>	Displays the torque reference after application of reference additive 2. This parameter is read-only.	-
	-1600.0 ... 1600.0%	Torque reference after application of reference additive 2.	See par. 46.03
26.77	<i>Torque ref add A actual</i>	Displays the value of the source of torque reference additive 2. This parameter is read-only.	-
	-1600.0 ... 1600.0%	Torque reference additive 2.	See par. 46.03
26.78	<i>Torque ref add B actual</i>	Displays the value of torque reference additive 2 before it is added to torque reference. This parameter is read-only.	-
	-1600.0 ... 1600.0%	Torque reference additive 2.	See par. 46.03
26.81	<i>Rush control gain</i>	Rush controller gain term.	10.0
	0.0 ... 10000.0	Rush controller gain (0.0 = disabled).	1 = 1
26.82	<i>Rush control integration time</i>	Rush controller integration time term.	2.0 s
	0.0 ... 10.0 s	Rush controller integration time (0.0 = disabled).	1 = 1 s
28 Frequency reference chain		Settings for the frequency reference chain. See the control chain diagrams on pages 418 and 419 .	
28.01	<i>Frequency ref ramp input</i>	Displays the used frequency reference before ramping. See the control chain diagram on page 419 . This parameter is read-only.	-
	-500.00 ... 500.00 Hz	Frequency reference before ramping.	See par. 46.02
28.02	<i>Frequency ref ramp output</i>	Displays the final frequency reference (after selection, limitation and ramping). See the control chain diagram on page 419 . This parameter is read-only.	-
	-500.00 ... 500.00 Hz	Final frequency reference.	See par. 46.02

No.	Name/Value	Description	Def/FbEq16
28.11	Frequency ref1 source	Selects frequency reference source 1. Two signal sources can be defined by this parameter and 28.12 Frequency ref2 source. A digital source selected by 28.14 Frequency ref1/2 selection can be used to switch between the two sources, or a mathematical function (28.13 Frequency ref1 function) applied to the two signals to create the reference.	Zero
			
Zero	None.	0	
AI1 scaled	12.12 AI1 scaled value (see page 88).	1	
AI2 scaled	12.22 AI2 scaled value (see page 90).	2	
FB A ref1	03.05 FB A reference 1 (see page 63).	4	
FB A ref2	03.06 FB A reference 2 (see page 63).	5	
EFB ref1	Not applicable for ACS580MV.	8	
EFB ref2	Not applicable for ACS580MV.	9	
DDCS ctrl ref1	Not applicable for ACS580MV.	10	
DDCS ctrl ref2	Not applicable for ACS580MV.	11	
M/F reference 1	Not supported.	12	
M/F reference 2	Not supported.	13	
Motor potentiometer	Not supported.	15	
PID	Not applicable for ACS580MV.	16	
Other	Source selection (see Terms and abbreviations on page 55).	-	
28.12	Frequency ref2 source	Selects frequency reference source 2. For the selections, and a diagram of reference source selection, see parameter 28.11 Frequency ref1 source.	Zero
28.13	Frequency ref1 function	Selects a mathematical function between the reference sources selected by parameters 28.11 Frequency ref1 source and 28.12 Frequency ref2 source. See diagram at 28.11 Frequency ref1 source.	Ref1
Ref1	Signal selected by 28.11 Frequency ref1 source is used as frequency reference 1 as such (no function applied).	0	
Add (ref1 + ref2)	The sum of the reference sources is used as frequency reference 1.	1	

No.	Name/Value	Description	Def/FbEq16
	Sub (ref1 - ref2)	The subtraction ([28.11 <i>Frequency ref1 source</i>] - [28.12 <i>Frequency ref2 source</i>]) of the reference sources is used as frequency reference 1.	2
	Mul (ref1 × ref2)	The multiplication of the reference sources is used as frequency reference 1.	3
	Min (ref1, ref2)	The smaller of the reference sources is used as frequency reference 1.	4
	Max (ref1, ref2)	The greater of the reference sources is used as frequency reference 1.	5
28.14	<i>Frequency ref1/2 selection</i>	Configures the selection between frequency references 1 and 2. See diagram at 28.11 <i>Frequency ref1 source</i> . 0 = Frequency reference 1 1 = Frequency reference 2	<i>Follow Ext1/Ext2 selection</i>
	Frequency reference 1	0.	0
	Frequency reference 2	1.	1
	Follow Ext1/Ext2 selection	Frequency reference 1 is used when external control location EXT1 is active. Frequency reference 2 is used when external control location EXT2 is active. See also parameter 19.11 <i>Ext1/Ext2 selection</i> .	2
	DI1	Digital input DI1 (10.02 <i>DI delayed status</i> , bit 0).	3
	DI2	Digital input DI2 (10.02 <i>DI delayed status</i> , bit 1).	4
	DI3	Digital input DI3 (10.02 <i>DI delayed status</i> , bit 2).	5
	DI4	Digital input DI4 (10.02 <i>DI delayed status</i> , bit 3).	6
	DI5	Digital input DI5 (10.02 <i>DI delayed status</i> , bit 4).	7
	DI6	Digital input DI6 (10.02 <i>DI delayed status</i> , bit 5).	8
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-

No.	Name/Value	Description	Def/FbEq16
28.21	Constant frequency function	Determines how constant frequencies are selected, and whether the rotation direction signal is considered or not when applying a constant frequency.	00b

Bit	Name	Information
0	Constant freq mode	1 = Packed: 7 constant frequencies are selectable using the three sources defined by parameters 28.22, 28.23 and 28.24. 0 = Separate: Constant frequencies 1, 2 and 3 are separately activated by the sources defined by parameters 28.22, 28.23 and 28.24 respectively. In case of conflict, the constant frequency with the smaller number takes priority.
1	Direction enable	1 = Start dir: To determine running direction for a constant frequency, the sign of the constant frequency setting (parameters 28.26...28.32) is multiplied by the direction signal (forward: +1, reverse: -1). This effectively allows the drive to have 14 (7 forward, 7 reverse) constant frequencies if all values in 28.26...28.32 are positive.  WARNING: If the direction signal is reverse and the active constant frequency is negative, the drive will run in the forward direction. 0 = According to Par: The running direction for the constant frequency is determined by the sign of the constant speed setting (parameters 28.26...28.32).

00b...11b	Constant frequency configuration word.	1 = 1	
28.22	Constant frequency sel1	When bit 0 of parameter 28.21 Constant frequency function is 0 (Separate), selects a source that activates constant frequency 1. When bit 0 of parameter 28.21 Constant frequency function is 1 (Packed), this parameter and parameters 28.23 Constant frequency sel2 and 28.24 Constant frequency sel3 select three sources whose states activate constant frequencies as follows:	Not selected

Source defined by par. 28.22	Source defined by par. 28.23	Source defined by par. 28.24	Constant frequency active
0	0	0	None
1	0	0	Constant frequency 1
0	1	0	Constant frequency 2
1	1	0	Constant frequency 3
0	0	1	Constant frequency 4
1	0	1	Constant frequency 5
0	1	1	Constant frequency 6
1	1	1	Constant frequency 7

Not selected	0.	0
Selected	1.	1
DI1	Digital input DI1 (10.02 DI delayed status, bit 0).	2
DI2	Digital input DI2 (10.02 DI delayed status, bit 1).	3
DI3	Digital input DI3 (10.02 DI delayed status, bit 2).	4
DI4	Digital input DI4 (10.02 DI delayed status, bit 3).	5

No.	Name/Value	Description	Def/FbEq16
	DI5	Digital input DI5 (<i>10.02 DI delayed status</i> , bit 4).	6
	DI6	Digital input DI6 (<i>10.02 DI delayed status</i> , bit 5).	7
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
28.23	<i>Constant frequency sel2</i>	When bit 0 of parameter <i>28.21 Constant frequency function</i> is 0 (Separate), selects a source that activates constant frequency 2. When bit 0 of parameter <i>28.21 Constant frequency function</i> is 1 (Packed), this parameter and parameters <i>28.22 Constant frequency sel1</i> and <i>28.24 Constant frequency sel3</i> select three sources that are used to activate constant frequencies. See table at parameter <i>28.22 Constant frequency sel1</i> . For the selections, see parameter <i>28.22 Constant frequency sel1</i> .	<i>Not selected</i>
28.24	<i>Constant frequency sel3</i>	When bit 0 of parameter <i>28.21 Constant frequency function</i> is 0 (Separate), selects a source that activates constant frequency 3. When bit 0 of parameter <i>28.21 Constant frequency function</i> is 1 (Packed), this parameter and parameters <i>28.22 Constant frequency sel1</i> and <i>28.23 Constant frequency sel2</i> select three sources that are used to activate constant frequencies. See table at parameter <i>28.22 Constant frequency sel1</i> . For the selections, see parameter <i>28.22 Constant frequency sel1</i> .	<i>Not selected</i>
28.26	<i>Constant frequency 1</i>	Defines constant frequency 1 (the frequency the motor will turn when constant frequency 1 is selected).	0.00 Hz
	-500.00 ... 500.00 Hz	Constant frequency 1.	See par. <i>46.02</i>
28.27	<i>Constant frequency 2</i>	Defines constant frequency 2.	0.00 Hz
	-500.00 ... 500.00 Hz	Constant frequency 2.	See par. <i>46.02</i>
28.28	<i>Constant frequency 3</i>	Defines constant frequency 3.	0.00 Hz
	-500.00 ... 500.00 Hz	Constant frequency 3.	See par. <i>46.02</i>
28.29	<i>Constant frequency 4</i>	Defines constant frequency 4.	0.00 Hz
	-500.00 ... 500.00 Hz	Constant frequency 4.	See par. <i>46.02</i>
28.30	<i>Constant frequency 5</i>	Defines constant frequency 5.	0.00 Hz
	-500.00 ... 500.00 Hz	Constant frequency 5.	See par. <i>46.02</i>
28.31	<i>Constant frequency 6</i>	Defines constant frequency 6.	0.00 Hz
	-500.00 ... 500.00 Hz	Constant frequency 6.	See par. <i>46.02</i>
28.32	<i>Constant frequency 7</i>	Defines constant frequency 7.	0.00 Hz
	-500.00 ... 500.00 Hz	Constant frequency 7.	See par. <i>46.02</i>

No.	Name/Value	Description	Def/FbEq16
28.41	<i>Frequency ref safe</i>	Defines a safe frequency reference value that is used with supervision functions such as 12.03 AI supervision function 49.05 Communication loss action 50.02 comm loss func 50.32 FBA B comm loss func.	0.00 Hz
	-500.00 ... 500.00 Hz	Safe frequency reference.	See par. 46.02
28.51	<i>Critical frequency function</i>	Enables/disables the critical frequencies function. Also determines whether the specified ranges are effective in both rotating directions or not. See also section <i>Critical speeds/frequencies</i> (page 36).	00b

Bit	Name	Information
0	Enable	1 = Enable: Critical frequencies enabled.
		0 = Disable: Critical frequencies disabled.
1	Sign mode	1 = According to par: The signs of parameters 28.52...28.57 are taken into account.
		0 = Absolute: Parameters 28.52...28.57 are handled as absolute values. Each range is effective in both directions of rotation.

00b...11b	Critical frequencies configuration word.	1 = 1	
28.52	<i>Critical frequency 1 low</i>	Defines the low limit for critical frequency 1. Note: This value must be less than or equal to the value of 28.53 <i>Critical frequency 1 high</i> .	0.00 Hz
	-500.00 ... 500.00 Hz	Low limit for critical frequency 1.	See par. 46.02
28.53	<i>Critical frequency 1 high</i>	Defines the high limit for critical frequency 1. Note: This value must be greater than or equal to the value of 28.52 <i>Critical frequency 1 low</i> .	0.00 Hz
	-500.00 ... 500.00 Hz	High limit for critical frequency 1.	See par. 46.02
28.54	<i>Critical frequency 2 low</i>	Defines the low limit for critical frequency 2. Note: This value must be less than or equal to the value of 28.55 <i>Critical frequency 2 high</i> .	0.00 Hz
	-500.00 ... 500.00 Hz	Low limit for critical frequency 2.	See par. 46.02
28.55	<i>Critical frequency 2 high</i>	Defines the high limit for critical frequency 2. Note: This value must be greater than or equal to the value of 28.54 <i>Critical frequency 2 low</i> .	0.00 Hz
	-500.00 ... 500.00 Hz	High limit for critical frequency 2.	See par. 46.02
28.56	<i>Critical frequency 3 low</i>	Defines the low limit for critical frequency 3. Note: This value must be less than or equal to the value of 28.57 <i>Critical frequency 3 high</i> .	0.00 Hz
	-500.00 ... 500.00 Hz	Low limit for critical frequency 3.	See par. 46.02

No.	Name/Value	Description	Def/FbEq16
28.57	<i>Critical frequency 3 high</i>	Defines the high limit for critical frequency 3. Note: This value must be greater than or equal to the value of 28.56 Critical frequency 3 low .	0.00 Hz
	-500.00 ... 500.00 Hz	High limit for critical frequency 3.	See par. 46.02
28.71	<i>Freq ramp set selection</i>	Selects a source that switches between the two sets of acceleration/deceleration times defined by parameters 28.72...28.75 . 0 = Acceleration time 1 and deceleration time 1 are in force 1 = Acceleration time 2 and deceleration time 2 are in force	Acc/Dec time 1
	Acc/Dec time 1	0.	0
	Acc/Dec time 2	1.	1
	DI1	Digital input DI1 (10.02 DI delayed status , bit 0).	2
	DI2	Digital input DI2 (10.02 DI delayed status , bit 1).	3
	DI3	Digital input DI3 (10.02 DI delayed status , bit 2).	4
	DI4	Digital input DI4 (10.02 DI delayed status , bit 3).	5
	DI5	Digital input DI5 (10.02 DI delayed status , bit 4).	6
	DI6	Digital input DI6 (10.02 DI delayed status , bit 5).	7
	DIO1	Not applicable for ACS580MV.	11
	DIO2	Not applicable for ACS580MV.	12
	<i>Other [bit]</i>	Source selection (see Terms and abbreviations on page 55).	-
28.72	<i>Freq acceleration time 1</i>	Defines acceleration time 1 as the time required for the frequency to change from zero to the frequency defined by parameter 46.02 Frequency scaling (not to parameter 30.14 Maximum frequency) If the reference increases faster than the set acceleration rate, the motor will follow the acceleration rate. If the reference increases slower than the set acceleration rate, the motor frequency will follow the reference. If the acceleration time is set too short, the drive will automatically prolong the acceleration in order not to exceed the drive torque limits.	20.000 s
	0.000 ... 1800.000 s	Acceleration time 1.	10 = 1 s
28.73	<i>Freq deceleration time 1</i>	Defines deceleration time 1 as the time required for the frequency to change from the frequency defined by parameter 46.02 Frequency scaling (not from parameter 30.14 Maximum frequency) to zero.	20.000 s
	0.000 ... 1800.000 s	Deceleration time 1.	10 = 1 s
28.74	<i>Freq acceleration time 2</i>	Defines acceleration time 2. See parameter 28.72 Freq acceleration time 1 .	60.000 s
	0.000 ... 1800.000 s	Acceleration time 2.	10 = 1 s
28.75	<i>Freq deceleration time 2</i>	Defines deceleration time 2. See parameter 28.73 Freq deceleration time 1 .	60.000 s
	0.000 ... 1800.000 s	Deceleration time 2.	10 = 1 s

No.	Name/Value	Description	Def/FbEq16
28.76	<i>Freq ramp in zero source</i>	Selects a source that forces the frequency reference to zero. 0 = Force frequency reference to zero 1 = Normal operation	<i>Inactive</i>
	Active	0.	0
	Inactive	1.	1
	DI1	Digital input DI1 (<i>10.02 DI delayed status</i> , bit 0).	2
	DI2	Digital input DI2 (<i>10.02 DI delayed status</i> , bit 1).	3
	DI3	Digital input DI3 (<i>10.02 DI delayed status</i> , bit 2).	4
	DI4	Digital input DI4 (<i>10.02 DI delayed status</i> , bit 3).	5
	DI5	Digital input DI5 (<i>10.02 DI delayed status</i> , bit 4).	6
	DI6	Digital input DI6 (<i>10.02 DI delayed status</i> , bit 5).	7
	DIO1	Not applicable for ACS580MV.	11
	DIO2	Not applicable for ACS580MV.	12
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
28.77	<i>Freq ramp hold</i>	Selects a source that forces the output of the frequency ramp generator to actual frequency value. 0 = Force ramp output to actual frequency 1 = Normal operation	<i>Inactive</i>
	Active	0.	0
	Inactive	1.	1
	DI1	Digital input DI1 (<i>10.02 DI delayed status</i> , bit 0).	2
	DI2	Digital input DI2 (<i>10.02 DI delayed status</i> , bit 1).	3
	DI3	Digital input DI3 (<i>10.02 DI delayed status</i> , bit 2).	4
	DI4	Digital input DI4 (<i>10.02 DI delayed status</i> , bit 3).	5
	DI5	Digital input DI5 (<i>10.02 DI delayed status</i> , bit 4).	6
	DI6	Digital input DI6 (<i>10.02 DI delayed status</i> , bit 5).	7
	DIO1	Not applicable for ACS580MV.	11
	DIO2	Not applicable for ACS580MV.	12
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
28.78	<i>Freq ramp output balancing</i>	Defines a reference for frequency ramp balancing. The output of the ramp generator is forced to this value when balancing is enabled by parameter <i>28.79 Freq ramp out balancing enable</i> .	0.00 Hz
	-500.00 ... 500.00 Hz	Frequency ramp balancing reference.	See par. <i>46.02</i>
28.79	<i>Freq ramp out balancing enable</i>	Selects the source for enabling/disabling frequency ramp balancing. See parameter <i>28.78 Freq ramp output balancing</i> . 0 = Disabled 1 = Enabled	<i>Not selected</i>
	Not selected	0.	
	Selected	1.	
	DI1	Digital input DI1 (<i>10.02 DI delayed status</i> , bit 0).	2
	DI2	Digital input DI2 (<i>10.02 DI delayed status</i> , bit 1).	3
	DI3	Digital input DI3 (<i>10.02 DI delayed status</i> , bit 2).	4
	DI4	Digital input DI4 (<i>10.02 DI delayed status</i> , bit 3).	5

No.	Name/Value	Description	Def/FbEq16
	DI5	Digital input DI5 (<i>10.02 DI delayed status</i> , bit 4).	6
	DI6	Digital input DI6 (<i>10.02 DI delayed status</i> , bit 5).	7
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
28.90	<i>Frequency ref act 1</i>	Displays the value of frequency reference source 1 (selected by parameter <i>28.11 Frequency ref1 source</i>). See the control chain diagram on page 418. This parameter is read-only.	-
	-500.00 ... 500.00 Hz	Value of frequency reference source 1.	See par. 46.02
28.91	<i>Frequency ref act 2</i>	Displays the value of frequency reference source 2 (selected by parameter <i>28.12 Frequency ref2 source</i>). See the control chain diagram on page 418. This parameter is read-only.	-
	-500.00 ... 500.00 Hz	Value of frequency reference source 2.	See par. 46.02
28.92	<i>Frequency ref act 3</i>	Displays the frequency reference after the function applied by parameter <i>28.13 Frequency ref1 function</i> (if any), and after selection (<i>28.14 Frequency ref1/2 selection</i>). See the control chain diagram on page 418. This parameter is read-only.	-
	-500.00 ... 500.00 Hz	Frequency reference after selection.	See par. 46.02
28.96	<i>Frequency ref act 7</i>	Displays the frequency reference after application of constant frequencies, control panel reference, etc. See the control chain diagram on page 418. This parameter is read-only.	-
	-500.00 ... 500.00 Hz	Frequency reference 7.	See par. 46.02
28.97	<i>Frequency ref unlimited</i>	Displays the frequency reference after application of critical frequencies, but before ramping and limiting. See the control chain diagram on page 419. This parameter is read-only.	-
	-500.00 ... 500.00 Hz	Frequency reference before ramping and limiting.	See par. 46.02

No.	Name/Value	Description	Def/FbEq16
30 Limits		Drive operation limits.	
30.01	Limit word 1	Displays limit word 1. This parameter is read-only.	-

Bit	Name	Description
0	Torq lim	1 = Drive torque is being limited by the motor control (undervoltage control, current control, load angle control or pull-out control), or by the torque limits defined by parameters.
1	Spd ctl tlim min	1 = Speed controller output is being limited by 25.11 Speed control min torque
2	Spd ctl tlim max	1 = Speed controller output is being limited by 25.12 Speed control max torque
3	Torq ref max	1 = Torque reference ramp input is being limited by 26.09 Minimum torque ref, source of 30.25 Minimum torque sel. See diagram on page 187.
4	Torq ref min	1 = Torque reference ramp input is being limited by 26.08 Minimum torque ref, source of 30.18 Minimum torque sel. See diagram on page 187.
5	Tlim max speed	1 = Torque reference is being limited by the rush control because of maximum speed limit (30.12 Maximum speed)
6	Tlim min speed	1 = Torque reference is being limited by the rush control because of minimum speed limit (30.11 Minimum speed)
7	Max speed ref lim	1 = Speed reference is being limited by 30.12 Maximum speed
8	Min speed ref lim	1 = Speed reference is being limited by 30.11 Minimum speed
9	Max freq ref lim	1 = Frequency reference is being limited by 30.14 Maximum frequency
10	Min freq ref lim	1 = Frequency reference is being limited by 30.13 Minimum frequency
11	Reserved	
12	Sw freq ref lim	1 = Requested output frequency cannot be reached because of

0000h...FFFFh	Limit word 1.	1 = 1

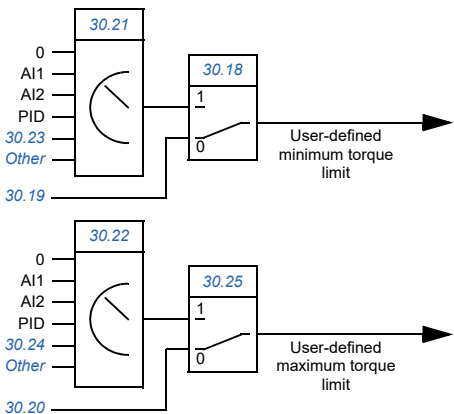
No.	Name/Value	Description	Def/FbEq16
30.02	<i>Torque limit status</i>	Displays the torque controller limitation status word. This parameter is read-only.	-

Bit	Name	Description
0	Undervoltage	*1 = Intermediate DC circuit undervoltage
1	Overvoltage	*1 = Intermediate DC circuit overvoltage
2	Minimum torque	*1 = Torque is being limited by 30.26 Power motoring limit , 30.27 Power generating limit or the source of 30.18 Minimum torque sel. See diagram on page 185 .
3	Maximum torque	*1 = Torque is being limited by 30.26 Power motoring limit , 30.27 Power generating limit or the source of 30.25 Maximum torque sel. See diagram on page 185 .
4	Internal current	1 = An inverter current limit (identified by bits ...11) is active
5	Load angle	Not applicable for ACS580MV.
6	Motor pullout	(With asynchronous motors only) 1 = Motor pull-out limit is active, ie. the motor cannot produce any more torque
7	Reserved	
8	Trafo current	1 = Trafo current overload limiter is active
9	Inv/mot current	*1 = Inverter/motor current overload limiter is active
10	User current	*1 = Output current is being limited by 30.17 Maximum current
11	Thermal IGBT	Not applicable for ACS580MV.
12	IGBT overtemperature	Not applicable for ACS580MV.
13	IGBT overload	Not applicable for ACS580MV.
14...15	Reserved	

*Only one out of bits 0...3, and one out of bits 9...13 can be on simultaneously. The bit typically indicates the limit that is exceeded first.

0000h...FFFFh	Torque limitation status word.	1 = 1
30.11	<i>Minimum speed</i>  WARNING! This value must not be higher than 30.12 Maximum speed .  WARNING! In frequency control mode, this limit is not effective. Make sure the frequency limits (30.13 and 30.14) are set appropriately if frequency control is used.	-1500.00 rpm
-30000.00 ... 30000.00 rpm	Minimum allowed speed.	See par. 46.01
30.12	<i>Maximum speed</i>  WARNING! This value must not be lower than 30.11 Minimum speed .  WARNING! In frequency control mode, this limit is not effective. Make sure the frequency limits (30.13 and 30.14) are set appropriately if frequency control is used.	1500.00 rpm
-30000.00 ... 30000.00 rpm	Maximum speed.	See par. 46.01

No.	Name/Value	Description	Def/FbEq16
30.13	Minimum frequency	Defines the minimum allowed frequency.  WARNING! This value must not be higher than 30.14 Maximum frequency.  WARNING! This limit is effective in frequency control mode only.	-50.00 Hz
	-500.00 ... 500.00 Hz	Minimum frequency.	See par. 46.02
30.14	Maximum frequency	Defines the maximum allowed frequency.  WARNING! This value must not be lower than 30.13 Minimum frequency.  WARNING! This limit is effective in frequency control mode only.	50.00 Hz
	-500.00 ... 500.00 Hz	Maximum frequency.	See par. 46.02
30.17	Maximum current	Defines the maximum allowed motor current. Motor current will be limited to the smaller value between this parameter and 34.50 Motor max overload current. See also the description of the overloading functionality in 34 Protections.	0.00 A
	0.00 ... 30000.00 A	Maximum motor current.	1 = 1 A

No.	Name/Value	Description	Def/FbEq16
30.18	Minimum torque sel	Selects a source that switches between two different predefined minimum torque limits. 0 = Minimum torque limit defined by 30.19 is active 1 = Minimum torque limit selected by 30.21 is active The user can define two sets of torque limits, and switch between the sets using a binary source such as a digital input. The minimum limit selection (30.18) is independent of the maximum limit selection (30.25). The first set of limits is defined by parameters 30.19 and 30.20. The second set has selector parameters for both the minimum (30.21) and maximum (30.22) limits that allows the use of a selectable analog source (such as an analog input).  The limit selection parameters are updated on a 10 ms time level. Note: In addition to the user-defined limits, torque may be limited for other reasons (such as power limitation). Refer to the block diagram on page 416.	Minimum torque 1
	Minimum torque 1	0 (minimum torque limit defined by 30.19 is active).	0
	Minimum torque 2 source	1 (minimum torque limit selected by 30.21 is active).	1
	DI1	Digital input DI1 (10.02 DI delayed status, bit 0).	2
	DI2	Digital input DI2 (10.02 DI delayed status, bit 1).	3
	DI3	Digital input DI3 (10.02 DI delayed status, bit 2).	4
	DI4	Digital input DI4 (10.02 DI delayed status, bit 3).	5
	DI5	Digital input DI5 (10.02 DI delayed status, bit 4).	6
	DI6	Digital input DI6 (10.02 DI delayed status, bit 5).	7
	DIO1	Not applicable for ACS580MV.	10
	DIO2	Not applicable for ACS580MV.	11
	Other [bit]	Source selection (see Terms and abbreviations on page 55).	-

No.	Name/Value	Description	Def/FbEq16
30.19	<i>Minimum torque 1</i>	Defines a minimum torque limit for the drive (in percent of nominal motor torque). See diagram at parameter 30.18 Minimum torque sel. The limit is effective when - the source selected by 30.18 Minimum torque sel is 0, or 30.18 is set to Minimum torque 1. Note: Do not set this parameter to 0% in an attempt to prevent reverse rotation. In an open-loop application, that is likely to prevent the motor from stopping altogether. To prevent reverse rotation, use the speed/frequency limits in this parameter group, or parameters 20.23/20.24.	-300.0%
	-1600.0 ... 0.0%	Minimum torque limit 1.	See par. 46.03
30.20	<i>Maximum torque 1</i>	Defines a maximum torque limit for the drive (in percent of nominal motor torque). See diagram at parameter 30.18 Minimum torque sel. The limit is effective when - the source selected by 30.25 Maximum torque sel is 0, or 30.25 is set to Maximum torque 1.	300.0%
	0.0 ... 1600.0%	Maximum torque 1.	See par. 46.03
30.21	<i>Minimum torque 2 source</i>	Defines the source of the minimum torque limit for the drive (in percent of nominal motor torque) when - the source selected by parameter 30.18 Minimum torque sel is 1, or 30.18 is set to Minimum torque 2 source. See diagram at 30.18 Minimum torque sel. Note: Any positive values received from the selected source are inverted.	Minimum torque 2
	Zero	None.	0
	AI1 scaled	12.12 AI1 scaled value (see page 88).	1
	AI2 scaled	12.22 AI2 scaled value (see page 90).	2
	PID	Not applicable for ACS580MV.	5
	Minimum torque 2	30.23 Minimum torque 2 .	6
	<i>Other</i>	Source selection (see Terms and abbreviations on page 55).	-
30.22	<i>Maximum torque 2 source</i>	Defines the source of the maximum torque limit for the drive (in percent of nominal motor torque) when - the source selected by parameter 30.25 Maximum torque sel is 1, or 30.25 is set to Maximum torque 2 source. See diagram at 30.18 Minimum torque sel. Note: Any negative values received from the selected source are inverted.	Maximum torque 2
	Zero	None.	0
	AI1 scaled	12.12 AI1 scaled value (see page 88).	1
	AI2 scaled	12.22 AI2 scaled value (see page 90).	2
	PID	Not applicable for ACS580MV.	5
	Maximum torque 2	30.24 Maximum torque 2 .	6
	<i>Other</i>	Source selection (see Terms and abbreviations on page 55).	-

No.	Name/Value	Description	Def/FbEq16
30.23	<i>Minimum torque 2</i>	Defines the minimum torque limit for the drive (in percent of nominal motor torque) when - the source selected by parameter <i>30.18 Minimum torque sel</i> is 1, and <i>30.21</i> is set to <i>Minimum torque 2</i>. Note: Do not set this parameter to 0% in an attempt to prevent reverse rotation. In an open-loop application, that is likely to prevent the motor from stopping altogether. To prevent reverse rotation, use the speed/frequency limits in this parameter group, or parameters <i>20.23/20.24</i> . See diagram at <i>30.18 Minimum torque sel</i> .	-300.0%
	-1600.0 ... 0.0%	Minimum torque limit 2.	See par. <i>46.03</i>
30.24	<i>Maximum torque 2</i>	Defines the maximum torque limit for the drive (in percent of nominal motor torque) when - the source selected by parameter <i>30.25 Maximum torque sel</i> is 1, and <i>30.22</i> is set to <i>Maximum torque 2</i>. See diagram at <i>30.18 Minimum torque sel</i> .	300.0%
	0.0 ... 1600.0%	Maximum torque limit 2.	See par. <i>46.03</i>
30.25	<i>Maximum torque sel</i>	Selects a source that switches between two different maximum torque limits. 0 = Maximum torque limit 1 defined by <i>30.20</i> is active 1 = Maximum torque limit selected by <i>30.22</i> is active See also parameter <i>30.18 Minimum torque sel</i> .	<i>Maximum torque 1</i>
	Maximum torque 1	0.	0
	Maximum torque 2 source	1.	1
	DI1	Digital input DI1 (<i>10.02 DI delayed status</i> , bit 0).	2
	DI2	Digital input DI2 (<i>10.02 DI delayed status</i> , bit 1).	3
	DI3	Digital input DI3 (<i>10.02 DI delayed status</i> , bit 2).	4
	DI4	Digital input DI4 (<i>10.02 DI delayed status</i> , bit 3).	5
	DI5	Digital input DI5 (<i>10.02 DI delayed status</i> , bit 4).	6
	DI6	Digital input DI6 (<i>10.02 DI delayed status</i> , bit 5).	7
	DIO1	Not applicable for ACS580MV.	10
	DIO2	Not applicable for ACS580MV.	11
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
30.26	<i>Power motoring limit</i>	Defines the maximum shaft power in motoring mode, ie. when power is being transferred from the motor to the machinery. The value is given in percent of nominal motor power.	300.00%
	0.00 ... 600.00%	Maximum shaft power in motoring mode.	1 = 1%
30.27	<i>Power generating limit</i>	Not applicable for ACS580MV.	-
	-600.00 ... 0.00%	Maximum shaft power in generating mode.	1 = 1%
30.40	<i>Rated output current</i>	Rated converter output current derived from license key. This parameter is read-only.	0 A
	0 ... 511 A	Rated converter output current.	1 = 1 A

No.	Name/Value	Description	Def/FbEq16
30.41	<i>Rated input current</i>	Rated converter input current derived from license key. This parameter is read-only.	0 A
	0 ... 511 A	Rated converter input current.	1 = 1 A

31 Fault functions		Configuration of external events; selection of behavior of the drive upon fault situations.	
31.01	<i>External event 1 source</i>	Defines the source of external event 1. See also parameter <i>31.02 External event 1 type</i> . 0 = Trigger event 1 = Normal operation	<i>Inactive (true)</i>
	Active (false)	0.	0
	Inactive (true)	1.	1
	DIIL	DIIL input (<i>10.02 DI delayed status</i> , bit 15).	2
	DI1	Digital input DI1 (<i>10.02 DI delayed status</i> , bit 0).	3
	DI2	Digital input DI2 (<i>10.02 DI delayed status</i> , bit 1).	4
	DI3	Digital input DI3 (<i>10.02 DI delayed status</i> , bit 2).	5
	DI4	Digital input DI4 (<i>10.02 DI delayed status</i> , bit 3).	6
	DI5	Digital input DI5 (<i>10.02 DI delayed status</i> , bit 4).	7
	DI6	Digital input DI6 (<i>10.02 DI delayed status</i> , bit 5).	8
	DIO1	Not applicable for ACS580MV.	11
	DIO2	Not applicable for ACS580MV.	12
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
31.02	<i>External event 1 type</i>	Selects the type of external event 1.	<i>Fault</i>
	Fault	The external event generates a fault.	0
	Warning	The external event generates a warning.	1
	Warning/Fault	If the drive is modulating, the external event generates a fault. Otherwise, the event generates a warning.	3
31.03	<i>External event 2 source</i>	Defines the source of external event 2. See also parameter <i>31.04 External event 2 type</i> . For the selections, see parameter <i>31.01 External event 1 source</i> .	<i>Inactive (true)</i>
31.04	<i>External event 2 type</i>	Selects the type of external event 2.	<i>Fault</i>
	Fault	The external event generates a fault.	0
	Warning	The external event generates a warning.	1
	Warning/Fault	If the drive is modulating, the external event generates a fault. Otherwise, the event generates a warning.	3
31.05	<i>External event 3 source</i>	Defines the source of external event 3. See also parameter <i>31.06 External event 3 type</i> . For the selections, see parameter <i>31.01 External event 1 source</i> .	<i>Inactive (true)</i>
31.06	<i>External event 3 type</i>	Selects the type of external event 3.	<i>Fault</i>
	Fault	The external event generates a fault.	0
	Warning	The external event generates a warning.	1

No.	Name/Value	Description	Def/FbEq16
	Warning/Fault	If the drive is modulating, the external event generates a fault. Otherwise, the event generates a warning.	3
31.07	<i>External event 4 source</i>	Defines the source of external event 4. See also parameter 31.08 External event 4 type . For the selections, see parameter 31.01 External event 1 source .	<i>Inactive (true)</i>
31.08	<i>External event 4 type</i>	Selects the type of external event 4.	<i>Fault</i>
	Fault	The external event generates a fault.	0
	Warning	The external event generates a warning.	1
	Warning/Fault	If the drive is modulating, the external event generates a fault. Otherwise, the event generates a warning.	3
31.09	<i>External event 5 source</i>	Defines the source of external event 5. See also parameter 31.10 External event 5 type . For the selections, see parameter 31.01 External event 1 source .	<i>Inactive (true)</i>
31.10	<i>External event 5 type</i>	Selects the type of external event 5.	<i>Fault</i>
	Fault	The external event generates a fault.	0
	Warning	The external event generates a warning.	1
	Warning/Fault	If the drive is modulating, the external event generates a fault. Otherwise, the event generates a warning.	3
31.11	<i>Fault reset selection</i>	Selects the source of an external fault reset signal. This signal will be observed even if it is not the active source in the current control location (EXT1/EXT2/Local). (A reset from the active source will be observed regardless of this parameter.) 0 → 1 = Reset	<i>DI3</i>
	Not selected	0.	0
	Selected	1.	1
	DI1	Digital input DI1 (10.02 DI' delayed status , bit 0).	2
	DI2	Digital input DI2 (10.02 DI' delayed status , bit 1).	3
	DI3	Digital input DI3 (10.02 DI' delayed status , bit 2).	4
	DI4	Digital input DI4 (10.02 DI' delayed status , bit 3).	5
	DI5	Digital input DI5 (10.02 DI' delayed status , bit 4).	6
	DI6	Digital input DI6 (10.02 DI' delayed status , bit 5).	7
	DIO1	Not applicable for ACS580MV.	10
	DIO2	Not applicable for ACS580MV.	11
	FBA MCW bit7	Control word bit 7 received through fieldbus interface A.	30
	EFB MCW bit 7	Not applicable for ACS580MV.	32
	<i>Other [bit]</i>	Source selection (see Terms and abbreviations on page 55).	-

No.	Name/Value	Description	Def/FbEq16																														
31.12	Autoreset selection	Selects faults that are automatically reset. The parameter is a 16-bit word with each bit corresponding to a fault type. Whenever a bit is set to 1, the corresponding fault is automatically reset. The number and interval of reset attempts are defined by parameters 31.14...31.16. Note: The autoreset function is only available in external control; see section <i>Local control vs. external control</i> (page 18). The bits of this binary number correspond to the following faults:	0000h																														
<table><tr><th>Bit</th><th>Fault</th></tr><tr><td>0</td><td>Overcurrent</td></tr><tr><td>1</td><td>Overvoltage</td></tr><tr><td>2</td><td>Undervoltage</td></tr><tr><td>3</td><td>AI supervision fault</td></tr><tr><td>4</td><td>Supply unit</td></tr><tr><td>5...7</td><td>Reserved</td></tr><tr><td>8</td><td>Application fault 1 (defined in the application program)</td></tr><tr><td>9</td><td>Application fault 2 (defined in the application program)</td></tr><tr><td>10</td><td>Selectable fault (see parameter 31.13 User selectable fault)</td></tr><tr><td>11</td><td>External fault 1 (from source selected by parameter 31.01 External event 1 source)</td></tr><tr><td>12</td><td>External fault 2 (from source selected by parameter 31.03 External event 2 source)</td></tr><tr><td>13</td><td>External fault 3 (from source selected by parameter 31.05 External event 3 source)</td></tr><tr><td>14</td><td>External fault 4 (from source selected by parameter 31.07 External event 4 source)</td></tr><tr><td>15</td><td>External fault 5 (from source selected by parameter 31.09 External event 5 source)</td></tr></table>				Bit	Fault	0	Overcurrent	1	Overvoltage	2	Undervoltage	3	AI supervision fault	4	Supply unit	5...7	Reserved	8	Application fault 1 (defined in the application program)	9	Application fault 2 (defined in the application program)	10	Selectable fault (see parameter 31.13 User selectable fault)	11	External fault 1 (from source selected by parameter 31.01 External event 1 source)	12	External fault 2 (from source selected by parameter 31.03 External event 2 source)	13	External fault 3 (from source selected by parameter 31.05 External event 3 source)	14	External fault 4 (from source selected by parameter 31.07 External event 4 source)	15	External fault 5 (from source selected by parameter 31.09 External event 5 source)
Bit	Fault																																
0	Overcurrent																																
1	Overvoltage																																
2	Undervoltage																																
3	AI supervision fault																																
4	Supply unit																																
5...7	Reserved																																
8	Application fault 1 (defined in the application program)																																
9	Application fault 2 (defined in the application program)																																
10	Selectable fault (see parameter 31.13 User selectable fault)																																
11	External fault 1 (from source selected by parameter 31.01 External event 1 source)																																
12	External fault 2 (from source selected by parameter 31.03 External event 2 source)																																
13	External fault 3 (from source selected by parameter 31.05 External event 3 source)																																
14	External fault 4 (from source selected by parameter 31.07 External event 4 source)																																
15	External fault 5 (from source selected by parameter 31.09 External event 5 source)																																
	0000h...FFFFh	Automatic reset configuration word.	1 = 1																														
31.13	User selectable fault	Defines the fault that can be automatically reset using parameter 31.12 Autoreset selection, bit 10. The faults are listed in chapter <i>Fault tracing</i> (page 362).	0000h																														
	0000h...FFFFh	Fault code.	10 = 1																														
31.14	Number of trials	Defines the maximum number of automatic resets that the drive is allowed to attempt within the time specified by 31.15 Total trials time. If the fault persists, subsequent reset attempts will be made at intervals defined by 31.16 Delay time. The faults to be automatically reset are defined by 31.12 Autoreset selection.	0																														
	0...5	Number of automatic resets.	10 = 1																														
31.15	Total trials time	Defines a time window for automatic fault resets. The maximum number of attempts made during any period of this length is defined by 31.14 Number of trials. Note: If the fault condition remains and cannot be reset, each reset attempt will generate an event and start a new time window. In practice, if the specified number of resets (31.14) at specified intervals (31.16) take longer than the value of 31.15, the drive will continue to attempt resetting the fault until the cause is eventually removed.	30.0 s																														
	1.0 ... 600.0 s	Time for automatic resets.	10 = 1 s																														

No.	Name/Value	Description	Def/FbEq16
31.16	<i>Delay time</i>	Defines the time that the drive will wait after a fault (or a previous reset attempt) before attempting an automatic reset. See parameter <i>31.12 Autoreset selection</i> .	0.0 s
	0.0 ... 120.0 s	Autoreset delay.	10 = 1 s
31.24	<i>Stall function</i>	Selects how the drive reacts to a motor stall condition. A stall condition is defined as follows: • The drive exceeds the stall current limit (<i>31.25 Stall current limit</i>), or actual current reaches internal current limit (bit 4 of Par <i>30.02 Torque limit status</i>), and • the output frequency is below the level set by parameter <i>31.27 Stall frequency limit</i> or the motor speed is below the level set by parameter <i>31.26 Stall speed limit</i>, and • the conditions above have been true longer than the time set by parameter <i>31.28 Stall time</i>.	<i>Warning and stop modulation</i>
	No action	None (stall supervision disabled).	0
	Warning and stop modulation	The drive generates an <i>A780 Motor stall</i> warning and stop modulation. The warning will be kept active for the time defined by Par31.28. When the warning is active, starting is inhibited (bit 5 of Par6.25 Drive inhibit status word 2).	1
	Fault	The drive trips on fault <i>7121 Motor stall</i> .	2
31.25	<i>Stall current limit</i>	Stall current limit in percent of the nominal current of the motor (parameter <i>99.06 Motor nominal current</i>). See parameter <i>31.24 Stall function</i> .	150.0%
	0.0 ... 1600.0%	Stall current limit.	-
31.26	<i>Stall speed limit</i>	Stall speed limit in rpm. See parameter <i>31.24 Stall function</i> .	40.00 rpm
	0.00 ... 10000.00 rpm	Stall speed limit.	See par. <i>46.01</i>
31.27	<i>Stall frequency limit</i>	Stall frequency limit. See parameter <i>31.24 Stall function</i> . Note: Setting the limit below 10 Hz is not recommended.	1.00 Hz
	0.00 ... 500.00 Hz	Stall frequency limit.	See par. <i>46.02</i>
31.28	<i>Stall time</i>	Stall time. See parameter <i>31.24 Stall function</i> .	20 s
	0 ... 3600 s	Stall time.	-

No.	Name/Value	Description	Def/FbEq16										
31.30	<i>Overspeed trip margin</i>	Defines, together with <i>30.11 Minimum speed</i> and <i>30.12 Maximum speed</i>, the maximum allowed speed of the motor (overspeed protection). If actual speed (<i>90.01 Motor speed for control</i>) exceeds the speed limit defined by parameter <i>30.11</i> or <i>30.12</i> by more than the value of this parameter, the drive trips on the <i>7310 Overspeed</i> fault. Example: If the maximum speed is 1420 rpm and speed trip margin is 300 rpm, the drive trips at 1720 rpm. <i>Speed (90.01)</i> Speed (90.01) Overspeed trip level 31.30 30.12 0 Time 30.11 31.30 Overspeed trip level	500.00 rpm										
	0.00 ... 10000.0 rpm	Overspeed trip margin.	See par. <i>46.01</i>										
31.40	<i>Disable warning messages</i>	Selects warnings to be suppressed. The parameter is a 16-bit word with each bit corresponding to a warning. Whenever a bit is set to 1, the corresponding warning is suppressed. The bits of this binary number correspond to the following warnings: <table><tr><th>Bit</th><th>Fault</th></tr><tr><td>0</td><td>Overvoltage</td></tr><tr><td>1...3</td><td>Reserved</td></tr><tr><td>4</td><td>CU (Control unit) battery</td></tr><tr><td>5...15</td><td>Reserved</td></tr></table>	Bit	Fault	0	Overvoltage	1...3	Reserved	4	CU (Control unit) battery	5...15	Reserved	0000b
Bit	Fault												
0	Overvoltage												
1...3	Reserved												
4	CU (Control unit) battery												
5...15	Reserved												
31.55	<i>Ext I/O comm loss event</i>	Selects how the drive reacts when the communication to an I/O extension module fails.	<i>Fault</i>										
	No action	No action taken.	0										
	Warning	The drive generates a warning, <i>A799 Ext I/O comm loss</i> .	1										
	Fault	The drive trips on a fault, <i>7082 Ext I/O comm loss</i> .	2										

No.	Name/Value	Description	Def/FbEq16															
32 Supervision		Configuration of signal supervision functions 1...3. Three values can be chosen to be monitored; a warning or fault is generated whenever predefined limits are exceeded. See also section Signal supervision (page 49).																
32.01	Supervision status	Signal supervision status word. Indicates whether the values monitored by the signal supervision functions are within or outside their respective limits. Note: This word is independent of the drive actions defined by parameters 32.06 , 32.16 and 32.26 .	000b															
<table><tr><th>Bit</th><th>Name</th><th>Description</th></tr><tr><td>0</td><td>Supervision 1 active</td><td>1 = Signal selected by 32.07 is outside its limits.</td></tr><tr><td>1</td><td>Supervision 2 active</td><td>1 = Signal selected by 32.17 is outside its limits.</td></tr><tr><td>2</td><td>Supervision 3 active</td><td>1 = Signal selected by 32.27 is outside its limits.</td></tr><tr><td>3...15</td><td>Reserved</td><td></td></tr></table>				Bit	Name	Description	0	Supervision 1 active	1 = Signal selected by 32.07 is outside its limits.	1	Supervision 2 active	1 = Signal selected by 32.17 is outside its limits.	2	Supervision 3 active	1 = Signal selected by 32.27 is outside its limits.	3...15	Reserved	
Bit	Name	Description																
0	Supervision 1 active	1 = Signal selected by 32.07 is outside its limits.																
1	Supervision 2 active	1 = Signal selected by 32.17 is outside its limits.																
2	Supervision 3 active	1 = Signal selected by 32.27 is outside its limits.																
3...15	Reserved																	
000...111b		Signal supervision status word.	1 = 1															
32.05	Supervision 1 function	Selects the mode of signal supervision function 1. Determines how the monitored signal (see parameter 32.07) is compared to its lower and upper limits (32.09 and 32.10 respectively). The action to be taken when the condition is fulfilled is selected by 32.06 .	Disabled															
Disabled		Signal supervision 1 not in use.	0															
Low		Action is taken whenever the signal falls below its lower limit.	1															
High		Action is taken whenever the signal rises above its upper limit.	2															
Abs low		Action is taken whenever the absolute value of the signal falls below its (absolute) lower limit.	3															
Abs high		Action is taken whenever the absolute value of the signal rises above its (absolute) upper limit.	4															
Both		Action is taken whenever the signal falls below its low limit or rises above its high limit.	5															
Abs both		Action is taken whenever the absolute value of the signal falls below its (absolute) low limit or rises above its (absolute) high limit.	6															
32.06	Supervision 1 action	Selects the action the drive takes when the value monitored by signal supervision 1 exceeds its limits. Note: This parameter does not affect the status indicated by 32.01 Supervision status .	No action															
No action		No action taken.	0															
Warning		A warning (A8B0 Signal supervision 1) is generated.	1															
Fault		The drive trips on 80B0 Signal supervision .	2															
Fault if running		If running,the drive trips on 80B0 Signal supervision .	3															
32.07	Supervision 1 signal	Selects the signal to be monitored by signal supervision function 1.	Zero															
Zero		None.	0															
Speed		01.01 Motor speed used (page 59).	1															
Frequency		01.06 Output frequency (page 59).	3															

No.	Name/Value	Description	Def/FbEq16
	Current	01.07 Motor current (page 59).	4
	Torque	01.10 Motor torque (page 59).	6
	DC voltage	01.11 DC voltage (page 59).	7
	Output power	01.14 Output power (page 60).	8
	AI1	12.11 AI1 actual value (page 88).	9
	AI2	12.21 AI2 actual value (page 90).	10
	Speed ref ramp in	23.01 Speed ref ramp input (page 145).	18
	Speed ref ramp out	23.02 Speed ref ramp output (page 145).	19
	Speed ref used	24.01 Used speed reference (page 150).	20
	Torque ref used	26.02 Torque reference used (page 166).	21
	Freq ref used	28.02 Frequency ref ramp output (page 173).	22
	Process PID output	Not applicable for ACS580MV.	24
	Process PID feedback	Not applicable for ACS580MV.	25
	<i>Other</i>	Source selection (see Terms and abbreviations on page 55).	-
32.08	Supervision 1 filter time	Defines a filter time constant for the signal monitored by signal supervision 1.	0.000 s
	0.000 ... 30.000 s	Signal filter time.	1000 = 1 s
32.09	Supervision 1 low	Defines the lower limit for signal supervision 1.	0.00
	-21474830.00 ... 21474830.00	Low limit.	-
32.10	Supervision 1 high	Defines the upper limit for signal supervision 1.	0.00
	-21474830.00 ... 21474830.00	Upper limit.	-
32.15	Supervision 2 function	Selects the mode of signal supervision function 2. Determines how the monitored signal (see parameter 32.17) is compared to its lower and upper limits (32.19 and 32.20 respectively). The action to be taken when the condition is fulfilled is selected by 32.16 .	<i>Disabled</i>
	Disabled	Signal supervision 2 not in use.	0
	Low	Action is taken whenever the signal falls below its lower limit.	1
	High	Action is taken whenever the signal rises above its upper limit.	2
	Abs low	Action is taken whenever the absolute value of the signal falls below its (absolute) lower limit.	3
	Abs high	Action is taken whenever the absolute value of the signal rises above its (absolute) upper limit.	4
	Both	Action is taken whenever the signal falls below its low limit or rises above its high limit.	5
	Abs both	Action is taken whenever the absolute value of the signal falls below its (absolute) low limit or rises above its (absolute) high limit.	6
32.16	Supervision 2 action	Selects the action the drive takes when the value monitored by signal supervision 2 exceeds its limits. Note: This parameter does not affect the status indicated by 32.01 Supervision status .	<i>No action</i>
	No action	No action taken.	0

No.	Name/Value	Description	Def/FbEq16
	Warning	A warning (<i>A8B1 Signal supervision 2</i>) is generated.	1
	Fault	The drive trips on <i>80B1 Signal supervision 2</i> .	2
	Fault if running	If running, the drive trips on <i>80B0 Signal supervision</i> .	3
32.17	<i>Supervision 2 signal</i>	Selects the signal to be monitored by signal supervision function 2. For the available selections, see parameter <i>32.07 Supervision 1 signal</i> .	<i>Zero</i>
32.18	<i>Supervision 2 filter time</i>	Defines a filter time constant for the signal monitored by signal supervision 2.	0.000 s
	0.000 ... 30.000 s	Signal filter time.	1000 = 1 s
32.19	<i>Supervision 2 low</i>	Defines the lower limit for signal supervision 2.	0.00
	-21474830.00 ... 21474830.00	Low limit.	-
32.20	<i>Supervision 2 high</i>	Defines the upper limit for signal supervision 2.	0.00
	-21474830.00 ... 21474830.00	Upper limit.	-
32.25	<i>Supervision 3 function</i>	Selects the mode of signal supervision function 3. Determines how the monitored signal (see parameter <i>32.27</i>) is compared to its lower and upper limits (<i>32.29</i> and <i>32.30</i> respectively). The action to be taken when the condition is fulfilled is selected by <i>32.26</i> .	<i>Disabled</i>
	Disabled	Signal supervision 3 not in use.	0
	Low	Action is taken whenever the signal falls below its lower limit.	1
	High	Action is taken whenever the signal rises above its upper limit.	2
	Abs low	Action is taken whenever the absolute value of the signal falls below its (absolute) lower limit.	3
	Abs high	Action is taken whenever the absolute value of the signal rises above its (absolute) upper limit.	4
	Both	Action is taken whenever the signal falls below its low limit or rises above its high limit.	5
	Abs both	Action is taken whenever the absolute value of the signal falls below its (absolute) low limit or rises above its (absolute) high limit.	6
32.26	<i>Supervision 3 action</i>	Selects the action the drive takes when the value monitored by signal supervision 3 exceeds its limits. Note: This parameter does not affect the status indicated by <i>32.01 Supervision status</i> .	<i>No action</i>
	No action	No action taken.	0
	Warning	A warning (<i>A8B2 Signal supervision 3</i>) is generated.	1
	Fault	The drive trips on <i>80B2 Signal supervision 3</i> .	2
	Fault if running	If running, the drive trips on <i>80B0 Signal supervision</i> .	3
32.27	<i>Supervision 3 signal</i>	Selects the signal to be monitored by signal supervision function 3. For the available selections, see parameter <i>32.07 Supervision 1 signal</i> .	<i>Zero</i>

No.	Name/Value	Description	Def/FbEq16
32.28	Supervision 3 filter time	Defines a filter time constant for the signal monitored by signal supervision 3.	0.000 s
	0.000 ... 30.000 s	Signal filter time.	1000 = 1 s
32.29	Supervision 3 low	Defines the lower limit for signal supervision 3.	0.00
	-21474830.00 ... 21474830.00	Low limit.	-
32.30	Supervision 3 high	Defines the upper limit for signal supervision 3.	0.00
	-21474830.00 ... 21474830.00	Upper limit.	-
33 Generic timer & counter		Configuration of Generic timers/counters. See also section <i>Maintenance timers and counters</i> (page 49).	
33.01	Counter status	Displays the maintenance timer/counter status word, indicating which maintenance timers/counters have exceeded their limits. This parameter is read-only.	-
Bit	Name	Description	
0	On-time1	1 = On-time timer 1 has reached its preset limit.	
1	On-time2	1 = On-time timer 2 has reached its preset limit.	
2	Edge 1	1 = Signal edge counter 1 has reached its preset limit.	
3	Edge 2	1 = Signal edge counter 2 has reached its preset limit.	
4	Value 1	1 = Value counter 1 has reached its preset limit.	
5	Value 2	1 = Value counter 2 has reached its preset limit.	
6...15	Reserved		
000000b...111111b		Maintenance time/counter status word.	1 = 1
33.10	On-time 1 actual	Displays the actual present value of on-time timer 1. The timer runs whenever the signal selected by parameter 33.13 On-time 1 source is on. When the timer exceeds the limit set by 33.11 On-time 1 warn limit, bit 0 of 33.01 Counter status is set to 1. The warning specified by 33.14 On-time 1 warn message is also given if enabled by 33.12 On-time 1 function. The timer can be reset from the Drive composer PC tool (by entering 0 for this parameter) or from the control panel by keeping Reset depressed for over 3 seconds.	-
	0...4294967295 s	Actual present value of on-time timer 1.	-
33.11	On-time 1 warn limit	Sets the warning limit for on-time timer 1.	0 s
	0...4294967295 s	Warning limit for on-time timer 1.	-

No.	Name/Value	Description	Def/FbEq16								
33.12	On-time 1 function	Configures on-time timer 1.	00b								
<table><tr><th>Bit</th><th>Function</th></tr><tr><td>0</td><td>Counter mode 0 = Loop: When the limit is reached, the counter is reset. The counter status (bit 0 of 33.01) switches to 1 for one second. The warning (if enabled) stays active for at least 10 seconds. 1 = Saturate: When the limit is reached, the counter status (bit 0 of 33.01) switches to 1, and remains so until 33.10 is reset. The warning (if enabled) also stays active until 33.10 is reset.</td></tr><tr><td>1</td><td>Warning enable 0 = Disable: No warning is given when the limit is reached 1 = Enable: A warning (see 33.14) is given when the limit is reached</td></tr><tr><td>2...15</td><td>Reserved</td></tr></table>				Bit	Function	0	Counter mode 0 = Loop: When the limit is reached, the counter is reset. The counter status (bit 0 of 33.01) switches to 1 for one second. The warning (if enabled) stays active for at least 10 seconds. 1 = Saturate: When the limit is reached, the counter status (bit 0 of 33.01) switches to 1, and remains so until 33.10 is reset. The warning (if enabled) also stays active until 33.10 is reset.	1	Warning enable 0 = Disable: No warning is given when the limit is reached 1 = Enable: A warning (see 33.14) is given when the limit is reached	2...15	Reserved
Bit	Function										
0	Counter mode 0 = Loop: When the limit is reached, the counter is reset. The counter status (bit 0 of 33.01) switches to 1 for one second. The warning (if enabled) stays active for at least 10 seconds. 1 = Saturate: When the limit is reached, the counter status (bit 0 of 33.01) switches to 1, and remains so until 33.10 is reset. The warning (if enabled) also stays active until 33.10 is reset.										
1	Warning enable 0 = Disable: No warning is given when the limit is reached 1 = Enable: A warning (see 33.14) is given when the limit is reached										
2...15	Reserved										
00b...11b		On-time timer 1 configuration word.	1 = 1								
33.13	On-time 1 source	Selects the signal to be monitored by on-time timer 1.	False								
False		Constant 0 (timer disabled).	0								
True		Constant 1.	1								
RO1		Bit 0 of 10.21 RO status (page 83).	2								
Other [bit]		Source selection (see Terms and abbreviations on page 55).	-								
33.14	On-time 1 warn message	Selects the optional warning message for on-time timer 1.	On-time 1 exceeded								
On-time 1 exceeded		A886 On-time 1. The message text can be edited on the control panel by choosing Menu – Settings – Edit texts.	0								
Clean device		A88C Device clean.	6								
Maintain additional cooling fan		A890 Additional cooling fan.	7								
Maintain cabinet fan		A88E Cabinet fan.	8								
Maintain DC capacitors		A88D DC capacitor.	9								
Maintain motor bearing		A880 Motor bearing.	10								
33.20	On-time 2 actual	Displays the actual present value of on-time timer 2. The timer runs whenever the signal selected by parameter 33.23 On-time 2 source is on. When the timer exceeds the limit set by 33.21 On-time 2 warn limit, bit 1 of 33.01 Counter status is set to 1. The warning specified by 33.24 On-time 2 warn message is also given if enabled by 33.22 On-time 2 function. The timer can be reset from the Drive composer PC tool (by entering 0 for this parameter) or from the control panel by keeping Reset depressed for over 3 seconds.	-								
0...4294967295 s		Actual present value of on-time timer 2.	-								
33.21	On-time 2 warn limit	Sets the warning limit for on-time timer 2.	0 s								
0...4294967295 s		Warning limit for on-time timer 2.	-								

No.	Name/Value	Description	Def/FbEq16								
33.22	On-time 2 function	Configures on-time timer 2.	00b								
<table><tr><th>Bit</th><th>Function</th></tr><tr><td>0</td><td>Counter mode 0 = Loop: When the limit is reached, the counter is reset. The counter status (bit 1 of 33.01) switches to 1 for one second. The warning (if enabled) stays active for at least 10 seconds. 1 = Saturate: When the limit is reached, the counter status (bit 1 of 33.01) switches to 1, and remains so until 33.20 is reset. The warning (if enabled) also stays active until 33.20 is reset.</td></tr><tr><td>1</td><td>Warning enable 0 = Disable: No warning is given when the limit is reached 1 = Enable: A warning (see 33.24) is given when the limit is reached</td></tr><tr><td>2...15</td><td>Reserved</td></tr></table>				Bit	Function	0	Counter mode 0 = Loop: When the limit is reached, the counter is reset. The counter status (bit 1 of 33.01) switches to 1 for one second. The warning (if enabled) stays active for at least 10 seconds. 1 = Saturate: When the limit is reached, the counter status (bit 1 of 33.01) switches to 1, and remains so until 33.20 is reset. The warning (if enabled) also stays active until 33.20 is reset.	1	Warning enable 0 = Disable: No warning is given when the limit is reached 1 = Enable: A warning (see 33.24) is given when the limit is reached	2...15	Reserved
Bit	Function										
0	Counter mode 0 = Loop: When the limit is reached, the counter is reset. The counter status (bit 1 of 33.01) switches to 1 for one second. The warning (if enabled) stays active for at least 10 seconds. 1 = Saturate: When the limit is reached, the counter status (bit 1 of 33.01) switches to 1, and remains so until 33.20 is reset. The warning (if enabled) also stays active until 33.20 is reset.										
1	Warning enable 0 = Disable: No warning is given when the limit is reached 1 = Enable: A warning (see 33.24) is given when the limit is reached										
2...15	Reserved										
	00b...11b	On-time timer 2 configuration word.	1 = 1								
33.23	On-time 2 source	Selects the signal to be monitored by on-time timer 2.	False								
	False	Constant 0 (timer disabled).	0								
	True	Constant 1.	1								
	RO1	Bit 0 of 10.21 RO status (page 83).	2								
	Other [bit]	Source selection (see Terms and abbreviations on page 55).	-								
33.24	On-time 2 warn message	Selects the optional warning message for on-time timer 2.	On-time 2 exceeded								
	On-time 2 exceeded	A887 On-time 2. The message text can be edited on the control panel by choosing Menu – Settings – Edit texts.	1								
	Clean device	A88C Device clean.	6								
	Maintain additional cool fan	A890 Additional cooling fan.	7								
	Maintain cabinet fan	A88E Cabinet fan.	8								
	Maintain DC capacitors	A88D DC capacitor.	9								
	Maintain motor bearing	A880 Motor bearing.	10								
33.30	Edge counter 1 actual	Actual present value of signal edge counter 1. The counter is incremented every time the signal selected by parameter 33.33 Edge counter 1 source switches on or off (or either, depending on the setting of 33.32 Edge counter 1 function). A divisor may be applied to the count (see 33.34 Edge counter 1 divider). When the counter exceeds the limit set by 33.31 Edge counter 1 warn limit, bit 2 of 33.01 Counter status is set to 1. The warning specified by 33.35 Edge counter 1 warn message is also given if enabled by 33.32 Edge counter 1 function. The counter can be reset from the Drive composer PC tool (by entering 0 for this parameter) or from the control panel by keeping Reset depressed for over 3 seconds.	-								
	0...4294967295	Actual present value of signal edge counter 1.	-								

No.	Name/Value	Description	Def/FbEq16
33.31	Edge counter 1 warn limit	Sets the warning limit for signal edge counter 1.	0
	0...4294967295	Warning limit for signal edge counter 1.	-
33.32	Edge counter 1 function	Configures signal edge counter 1.	0000b

Bit	Function
0	Counter mode 0 = Loop: When the limit is reached, the counter is reset. The counter status (bit 2 of 33.01) switches to 1 and remains so until the counter is again incremented. The warning (if enabled) stays active for at least 10 seconds. 1 = Saturate: When the limit is reached, the counter status (bit 2 of 33.01) switches to 1, and remains so until 33.30 is reset. The warning (if enabled) also stays active until 33.30 is reset.
1	Warning enable 0 = Disable: No warning is given when the limit is reached 1 = Enable: A warning (see 33.35) is given when the limit is reached
2	Count rising edges 0 = Disable: Rising edges are not counted 1 = Enable: Rising edges are counted
3	Count falling edges 0 = Disable: Falling edges are not counted 1 = Enable: Falling edges are counted
4...15	Reserved

0000b...1111b	Edge counter 1 configuration word.	1 = 1
33.33	Edge counter 1 source	Selects the signal to be monitored by signal edge counter 1. False
	False	Constant 0.
	True	Constant 1.
	RO1	Bit 0 of 10.21 RO status (page 83).
	Other [bit]	Source selection (see Terms and abbreviations on page 55).
33.34	Edge counter 1 divider	Defines a divisor for signal edge counter 1. Determines how many signal edges increment the counter by 1.
	1...4294967295	Divisor for signal edge counter 1.
33.35	Edge counter 1 warn message	Selects the optional warning message for signal edge counter 1. Edge counter 1 exceeded
	Edge counter 1 exceeded	A888 Edge counter 1. The message text can be edited on the control panel by choosing Menu – Settings – Edit texts.
	Counted main contactor	A884 Main contactor.
	Counted output relay	A881 Output relay.
	Counted motor starts	A882 Motor starts.
	Counted power ups	A883 Power ups.
	Counted DC charges	A885 DC charge.

No.	Name/Value	Description	Def/FbEq16
33.40	Edge counter 2 actual	Displays the actual present value of signal edge counter 2. The counter is incremented every time the signal selected by parameter 33.43 Edge counter 2 source switches on or off (or either, depending on the setting of 33.42 Edge counter 2 function). A divisor may be applied to the count (see 33.44 Edge counter 2 divider). When the counter exceeds the limit set by 33.41 Edge counter 2 warn limit, bit 3 of 33.01 Counter status is set to 1. The warning specified by 33.45 Edge counter 2 warn message is also given if enabled by 33.42 Edge counter 2 function. The counter can be reset from the Drive composer PC tool (by entering 0 for this parameter) or from the control panel by keeping Reset depressed for over 3 seconds.	-
	0...4294967295	Actual present value of signal edge counter 2.	-
33.41	Edge counter 2 warn limit	Sets the warning limit for signal edge counter 2.	0
	0...4294967295	Warning limit for signal edge counter 2.	-
33.42	Edge counter 2 function	Configures signal edge counter 2.	0000b

Bit	Function
0	Counter mode 0 = Loop: When the limit is reached, the counter is reset. The counter status (bit 3 of 33.01) remains 1 until the counter is again incremented. The warning (if enabled) stays active for at least 10 seconds. 1 = Saturate: After the limit is reached, the counter status (bit 3 of 33.01) remains 1 until 33.40 is reset. The warning (if enabled) also stays active until 33.40 is reset.
1	Warning enable 0 = Disable: No warning is given when the limit is reached 1 = Enable: A warning (see 33.45) is given when the limit is reached
2	Count rising edges 0 = Disable: Rising edges are not counted 1 = Enable: Rising edges are counted
3	Count falling edges 0 = Disable: Falling edges are not counted 1 = Enable: Falling edges are counted
4...15	Reserved

0000b...1111b	Edge counter 2 configuration word.	1 = 1	
33.43	Edge counter 2 source	Selects the signal to be monitored by signal edge counter 2. False	
	False	0.	0
	True	1.	1
	RO1	Bit 0 of 10.21 RO status (page 83).	2
	Other [bit]	Source selection (see Terms and abbreviations on page 55).	-
33.44	Edge counter 2 divider	Defines a divisor for signal edge counter 2. Determines how many signal edges increment the counter by 1.	1
	1...4294967295	Divisor for signal edge counter 2.	-

No.	Name/Value	Description	Def/FbEq16
33.45	<i>Edge counter 2 warn message</i>	Selects the optional warning message for signal edge counter 2.	<i>Edge counter 2 exceeded</i>
	Edge counter 2 exceeded	<i>A889 Edge counter 2.</i> The message text can be edited on the control panel by choosing Menu – Settings – Edit texts.	3
	Counted main contactor	<i>A884 Main contactor.</i>	11
	Counted output relay	<i>A881 Output relay.</i>	12
	Counted motor starts	<i>A882 Motor starts.</i>	13
	Counted power ups	<i>A883 Power ups.</i>	14
	Counted DC charges	<i>A885 DC charge.</i>	15
33.50	<i>Value counter 1 actual</i>	Displays the actual present value of value counter 1. The value of the source selected by parameter <i>33.53 Value counter 1 source</i> is read at one-second intervals and added to the counter. A divisor can be applied to the count (see <i>33.54 Value counter 1 divider</i>). When the counter exceeds the limit set by <i>33.51 Value counter 1 warn limit</i> , bit 4 of <i>33.01 Counter status</i> is set to 1. The warning specified by <i>33.55 Value counter 1 warn message</i> is also given if enabled by <i>33.52 Value counter 1 function</i> . The counter can be reset from the Drive composer PC tool (by entering 0 for this parameter) or from the control panel by keeping Reset depressed for over 3 seconds.	-
	-2147483008 ... 2147483008	Actual present value of value counter 1.	-
33.51	<i>Value counter 1 warn limit</i>	Sets the limit for value counter 1. With a positive limit, bit 4 of <i>33.01 Counter status</i> is set to 1 (and a warning optionally generated) when the counter is equal or greater than the limit. With a negative limit, bit 4 of <i>33.01 Counter status</i> is set to 1 (and a warning optionally generated) when the counter is equal or smaller than the limit. 0 = Counter disabled.	0
	-2147483008 ... 2147483008	Limit for value counter 1.	-

202 Parameters

No.	Name/Value	Description	Def/FbEq16								
33.52	Value counter 1 function	Configures value counter 1.	00b								
<table><tr><th>Bit</th><th>Function</th></tr><tr><td>0</td><td>Counter mode 0 = Loop: When the limit is reached, the counter is reset. The counter status (bit 4 of 33.01) switches to 1 for one second. The warning (if enabled) stays active for at least 10 seconds. 1 = Saturate: When the limit is reached, the counter status (bit 4 of 33.01) switches to 1, and remains so until 33.50 is reset. The warning (if enabled) also stays active until 33.50 is reset.</td></tr><tr><td>1</td><td>Warning enable 0 = Disable: No warning is given when the limit is reached 1 = Enable: A warning (see 33.55) is given when the limit is reached</td></tr><tr><td>2...15</td><td>Reserved</td></tr></table>				Bit	Function	0	Counter mode 0 = Loop: When the limit is reached, the counter is reset. The counter status (bit 4 of 33.01) switches to 1 for one second. The warning (if enabled) stays active for at least 10 seconds. 1 = Saturate: When the limit is reached, the counter status (bit 4 of 33.01) switches to 1, and remains so until 33.50 is reset. The warning (if enabled) also stays active until 33.50 is reset.	1	Warning enable 0 = Disable: No warning is given when the limit is reached 1 = Enable: A warning (see 33.55) is given when the limit is reached	2...15	Reserved
Bit	Function										
0	Counter mode 0 = Loop: When the limit is reached, the counter is reset. The counter status (bit 4 of 33.01) switches to 1 for one second. The warning (if enabled) stays active for at least 10 seconds. 1 = Saturate: When the limit is reached, the counter status (bit 4 of 33.01) switches to 1, and remains so until 33.50 is reset. The warning (if enabled) also stays active until 33.50 is reset.										
1	Warning enable 0 = Disable: No warning is given when the limit is reached 1 = Enable: A warning (see 33.55) is given when the limit is reached										
2...15	Reserved										
	00b...11b	Value counter 1 configuration word.	1 = 1								
33.53	Value counter 1 source	Selects the signal to be monitored by value counter 1.	Not selected								
	Not selected	None (counter disabled).	0								
	Motor speed	01.01 Motor speed used (see page 59).	1								
	Other	Source selection (see Terms and abbreviations on page 55).	-								
33.54	Value counter 1 divider	Defines a divisor for value counter 1. The value of the monitored signal is divided by this value before integration.	1.000								
	0.001 ... 2147483.000	Divisor for value counter 1.	-								
33.55	Value counter 1 warn message	Selects the optional warning message for value counter 1.	Value counter 1 exceeded								
	Value counter 1 exceeded	A88A Value integrator 1. The message text can be edited on the control panel by choosing Menu – Settings – Edit texts.	4								
	Maintain motor bearing	A880 Motor bearing.	10								
33.60	Value counter 2 actual	Displays the actual present value of value counter 2. The value of the source selected by parameter 33.63 Value counter 2 source is read at one-second intervals and added to the counter. A divisor can be applied to the count (see 33.64 Value counter 2 divider). When the counter exceeds the limit set by 33.61 Value counter 2 warn limit, bit 5 of 33.01 Counter status is set to 1. The warning specified by 33.65 Value counter 2 warn message is also given if enabled by 33.62 Value counter 2 function. The counter can be reset from the Drive composer PC tool (by entering 0 for this parameter) or from the control panel by keeping Reset depressed for over 3 seconds.	-								
	-2147483008 ... 2147483008	Actual present value of value counter 2.	-								

No.	Name/Value	Description	Def/FbEq16								
33.61	Value counter 2 warn limit	Sets the limit for value counter 2. With a positive limit, bit 5 of 33.01 Counter status is set to 1 (and a warning optionally generated) when the counter is equal or greater than the limit. With a negative limit, bit 5 of 33.01 Counter status is set to 1 (and a warning optionally generated) when the counter is equal or smaller than the limit. 0 = Counter disabled.	0								
	-2147483008 ... 2147483008	Limit for value counter 2.	-								
33.62	Value counter 2 function	Configures value counter 2.	00b								
<table><tr><th>Bit</th><th>Function</th></tr><tr><td>0</td><td>Counter mode 0 = Loop: When the limit is reached, the counter is reset. The counter status (bit 5 of 33.01) switches to 1 for one second. The warning (if enabled) stays active for at least 10 seconds. 1 = Saturate: When the limit is reached, the counter status (bit 5 of 33.01) switches to 1, and remains so until 33.60 is reset. The warning (if enabled) also stays active until 33.60 is reset.</td></tr><tr><td>1</td><td>Warning enable 0 = Disable: No warning is given when the limit is reached 1 = Enable: A warning (see 33.65) is given when the limit is reached</td></tr><tr><td>2...15</td><td>Reserved</td></tr></table>				Bit	Function	0	Counter mode 0 = Loop: When the limit is reached, the counter is reset. The counter status (bit 5 of 33.01) switches to 1 for one second. The warning (if enabled) stays active for at least 10 seconds. 1 = Saturate: When the limit is reached, the counter status (bit 5 of 33.01) switches to 1, and remains so until 33.60 is reset. The warning (if enabled) also stays active until 33.60 is reset.	1	Warning enable 0 = Disable: No warning is given when the limit is reached 1 = Enable: A warning (see 33.65) is given when the limit is reached	2...15	Reserved
Bit	Function										
0	Counter mode 0 = Loop: When the limit is reached, the counter is reset. The counter status (bit 5 of 33.01) switches to 1 for one second. The warning (if enabled) stays active for at least 10 seconds. 1 = Saturate: When the limit is reached, the counter status (bit 5 of 33.01) switches to 1, and remains so until 33.60 is reset. The warning (if enabled) also stays active until 33.60 is reset.										
1	Warning enable 0 = Disable: No warning is given when the limit is reached 1 = Enable: A warning (see 33.65) is given when the limit is reached										
2...15	Reserved										
	00b...11b	Value counter 2 configuration word.	1 = 1								
33.63	Value counter 2 source	Selects the signal to be monitored by value counter 2.	Not selected								
	Not selected	None (counter disabled).	0								
	Motor speed	01.01 Motor speed used (see page 59).	1								
	Other	Source selection (see Terms and abbreviations on page 55).	-								
33.64	Value counter 2 divider	Defines a divisor for value counter 2. The value of the monitored signal is divided by this value before integration.	1.000								
	0.001 ... 2147483.000	Divisor for value counter 2.	-								
33.65	Value counter 2 warn message	Selects the optional warning message for value counter 2.	Value counter 2 exceeded								
	Value counter 2 exceeded	A88B Value integrator 2. The message text can be edited on the control panel by choosing Menu – Settings – Edit texts.	5								
	Maintain motor bearing	A880 Motor bearing.	10								
34 Protections		Motor protection functions Note: All currents defined in this group are given in per unit (p.u.). Base value for motor currents is defined in parameter 99.06 Motor nominal current.									

No.	Name/Value	Description	Def/FbEq16
34.29	<i>Motor overload trip level</i>	Motor overload fault threshold current (absolute value). If this value is exceeded the drive trips on fault 2358 Motor overload trip . Absolute average value of all three phase motor currents is calculated and filtered by low pass filter with cutoff frequency defined by parameter 34.31 Mot overload filter cutoff freq	1.500 p.u.
	0.000 ... 10.000 p.u.	Overload current threshold.	1 = 1 p.u.
34.30	<i>Motor overload alarm level</i>	Motor overload alarm threshold current (absolute value). If this value is exceeded the drive generates an A283 Motor overload alarm warning. Absolute average value of all three phase motor currents is calculated and filtered by low pass filter with cutoff frequency defined by parameter 34.31 Mot overload filter cutoff freq	1.500 p.u.
	0.000 ... 10.000 p.u.	Overload current threshold.	1 = 1 p.u.
34.49	<i>Motor max cont current</i>	Maximum motor current (rms) for continuous operation. At this current motor can be operated continuously without risk of overheating.	1.100 p.u.
	0.000 ... 10.000 p.u.	Maximum motor current for continuous operation.	1 = 1 p.u.
34.50	<i>Motor max overload current</i>	Maximum motor current (rms) that can be allowed for a short period of time during overload operation. Motor can be operated at this current only for the time less or equal then defined in parameter 34.51 Motor overload duration . After such an overload operation motor current will be limited to value defined in parameter 34.49 Motor max cont current for 34.52 Motor overload recovery time to allow for motor cooling. After cooling time has elapsed, short term overloading can be allowed again so motor current limit will cycle between two values (34.49 Motor max cont current and 34.50 Motor max overload current) with periods 34.51 Motor overload duration and 34.52 Motor overload recovery time . Note: If motor maximum continuous or overload current exceeds overloading ability of the converter, motor current will be limited to lower value to avoid damage of the converter. Make sure that converter rating and overload ability match those of the motor.	1.200 p.u.
	0.000 ... 10.000 p.u.	Maximum motor current for short term overload operation.	1 = 1 p.u.
34.51	<i>Motor overload duration</i>	Maximum time during which motor can be overloaded. See the explanation for parameter 34.50 Motor max overload current .	60 s.
	0 ... 10000 s	Maximum motor overload duration.	1 = 1 s
34.52	<i>Motor overload recovery time</i>	Minimum cooling time for motor after overloading. See the explanation for parameter 34.50 Motor max overload current .	60 s.
	0 ... 10000 s	Minimum motor cooling time after overload operation.	1 = 1 s

No.	Name/Value	Description	Def/FbEq16
35 Motor thermal protection		Motor thermal protection settings such as temperature measurement configuration and motor fan control configuration. See also section Motor thermal protection (page 45).	
35.02	Measured temperature 1	Displays the temperature received through the source defined by parameter 35.11 Temperature 1 source . The unit is selected by parameter 96.16 Unit selection . Note: With a PTC sensor, the unit is ohms. This parameter is read-only.	-
	-60 ... 1000 °C, 0 ohm or [35.12] ohm	Measured temperature 1.	1 = 1 unit
35.03	Measured temperature 2	Displays the temperature received through the source defined by parameter 35.21 Temperature 2 source . Note: With a PTC sensor, the unit is ohms. This parameter is read-only.	-
	-60 ... 1000 °C, 0 ohm or [35.22] ohm	Measured temperature 2.	1 = 1 unit
35.04	FPTC status word	Displays the status of optional FPTC-xx thermistor protection modules. The word can be used as the source of eg. external events. Note: The “module found” bits are updated regardless of whether the corresponding module is activated. However, the “fault active” and “warning active” bits are not updated if the module is not activated. Modules are activated by parameter 35.30 FPTC configuration word . This parameter is read-only.	-

Bit	Name	Description
0	Module found in slot 1	1 = Yes: An FPTC-xx module has been detected in slot 1.
1	Fault active in slot 1	1 = Yes: The module in slot 1 has an active fault (4991).
2	Warning active in slot 1	1 = Yes: The module in slot 1 has an active warning (A497).
3	Module found in slot 2	1 = Yes: An FPTC-xx module has been detected in slot 2.
4	Fault active in slot 2	1 = Yes: The module in slot 2 has an active fault (4992).
5	Warning active in slot 2	1 = Yes: The module in slot 2 has an active warning (A498).
6	Module found in slot 3	1 = Yes: An FPTC-xx module has been detected in slot 3.
7	Fault active in slot 3	1 = Yes: The module in slot 3 has an active fault (4993).
8	Warning active in slot 3	1 = Yes: The module in slot 3 has an active warning (A499).
9...15	Reserved	

0000h...FFFFh	FPTC-xx status word.	1 = 1	
35.11	Temperature 1 source	Selects the source from which measured temperature 1 is read. Usually this source is from a sensor connected to the motor controlled by the drive, but it could be used to measure and monitor a temperature from other parts of the process as long as a suitable sensor is used as per the selection list.	Estimated temperature
	Disabled	None. Temperature monitoring function 1 is disabled.	0
	Estimated temperature	Estimated motor temperature. The temperature is estimated from an internal drive calculation.	1

No.	Name/Value	Description	Def/FbEq16
	KTY84 StdI/O / Extension I/O module	KTY84 sensor connected to the analog input selected by parameter 35.14 Temperature 1 AI source and an analog output. The analog input can be from the standard I/O or from an extension module. The following settings are required: - Set the hardware jumper or switch related to the analog input to U (voltage). Any change must be validated by a control unit reboot. - Set the appropriate analog input unit selection parameter in group 12 Standard AI to V (volt). - In parameter group 13 Standard AO, set the source selection parameter of the analog output to "Force KTY84 excitation". The analog output feeds a constant current through the sensor. As the resistance of the sensor increases along with its temperature, the voltage over the sensor increases. The voltage is read by the analog input and converted into degrees.	2
	KTY84 encoder module 1	KTY84 sensor connected to encoder interface 1. Not applicable for ACS580MV.	3
	KTY84 encoder module 2	KTY84 sensor connected to encoder interface 2. Not applicable for ACS580MV.	4
	1 x Pt100 analog I/O	Pt100 sensor connected to a standard analog input selected by parameter 35.14 Temperature 1 AI source and an analog output. The input and output can be on the drive control unit or on an extension module. The required settings are the same as with selection KTY84 analog I/O, except that the source selection parameter of the analog output must be set to Force Pt100 excitation.	5
	2 x Pt100 analog I/O	As selection 1 x Pt100 analog I/O , but with two sensors connected in series. Using multiple sensors improves measurement accuracy significantly.	6
	3 x Pt100 analog I/O	As selection 1 x Pt100 analog I/O , but with three sensors connected in series. Using multiple sensors improves measurement accuracy significantly.	7
	PTC DI6	PTC sensor connected to digital input DI6 (see the connection diagram on page 45). Note: Either 0 ohm (normal temperature) or 4000 ohm (excessive temperature) will be shown by 35.02 Measured temperature 1. By default, an excessive temperature will generate a warning as per parameter 35.13 Temperature 1 warning limit. If you want a fault instead, set 35.12 Temperature 1 fault limit to 4000 ohm.	8
	PTC analog I/O	PTC sensor connected to a standard analog input selected by parameter 35.14 Temperature 1 AI source and an analog output. The input and output can be on the drive control unit or on an extension module. The required settings are the same as with selection KTY84 analog I/O, except that the source selection parameter of the analog output must be set to Force PTC excitation.	20
	PTC encoder module 1	PTC sensor connected to encoder interface 1. See also parameters 91.21 Module 1 temp sensor type and 91.22 Module 1 temp filter time.	9

No.	Name/Value	Description	Def/FbEq16
	PTC encoder module 2	PTC sensor connected to encoder interface 2. See also parameters 91.24 Module 2 temp sensor type and 91.25 Module 2 temp filter time .	10
	Direct temperature	The temperature is taken from the source selected by parameter 35.14 Temperature 1 AI source .	11
	1 x Pt1000 analog I/O	Pt1000 sensor connected to a standard analog input selected by parameter 35.14 Temperature 1 AI source and an analog output. The input and output can be on the drive control unit or on an extension module. The required settings are the same as with selection KTY84 analog 10 , except that the source selection parameter of the analog output must be set to Force Pt1000 excitation .	13
	2 x Pt1000 analog I/O	As selection 1 x Pt1000 analog I/O , but with two sensors connected in series. Using multiple sensors improves measurement accuracy significantly.	14
	3 x Pt1000 analog I/O	As selection 1 x Pt1000 analog I/O , but with two sensors connected in series. Using multiple sensors improves measurement accuracy significantly.	15
35.12	Temperature 1 fault limit	Defines the fault limit for temperature monitoring function 1. When measured temperature 1 exceeds the limit, the drive trips on fault 4981 External temperature 1 . Note: With a PTC sensor, the unit is ohms.	130 °C or 266 °F
	-60 ... 1000 °C or ohm	Fault limit for temperature monitoring function 1.	1 = 1 unit
35.13	Temperature 1 warning limit	Defines the warning limit for temperature monitoring function 1. When measured temperature 1 exceeds this limit, a warning (A491 External temperature 1) is generated. Note: With a PTC sensor, the unit is ohms.	110 °C or 230 °F
	-60 ... 1000 °C or ohm	Warning limit for temperature monitoring function 1.	1 = 1 unit
35.14	Temperature 1 AI source	Selects the input for parameter 35.11 Temperature 1 source , selections KTY84 StdIO / Extension I/O module , 1 x Pt100 analog I/O , 2 x Pt100 analog I/O , 3 x Pt100 analog I/O and Direct temperature .	<i>Not selected</i>
	Not selected	None.	0
	AI1 actual value	Analog input AI1 on the control unit.	1
	AI2 actual value	Analog input AI2 on the control unit.	2
	<i>Other</i>	Source selection (see Terms and abbreviations on page 55).	-
35.21	Temperature 2 source	Selects the source from which measured temperature 2 is read. Usually this source is from a sensor connected to the motor controlled by the drive, but it could be used to measure and monitor a temperature from other parts of the process as long as a suitable sensor is used as per the selection list.	<i>Disabled</i>
	Disabled	None. Temperature monitoring function 2 is disabled.	0
	Estimated temperature	Estimated motor temperature. The temperature is estimated from an internal drive calculation.	1

No.	Name/Value	Description	Def/FbEq16
	KTY84 StdIO / Extension I/O module	KTY84 sensor connected to the analog input selected by parameter 35.24 Temperature 2 AI source and an analog output. The analog input can be from the standard I/O or from an extension module. The following settings are required: - Set the hardware jumper or switch related to the analog input to U (voltage). Any change must be validated by a control unit reboot. - Set the appropriate analog input unit selection parameter in group 12 Standard AI to V (volt). - In parameter group 13 Standard AO, set the source selection parameter of the analog output to "Force KTY84 excitation". The analog output feeds a constant current through the sensor. As the resistance of the sensor increases along with its temperature, the voltage over the sensor increases. The voltage is read by the analog input and converted into degrees.	2
	KTY84 encoder module 1	KTY84 sensor connected to encoder interface 1.	3
	KTY84 encoder module 2	KTY84 sensor connected to encoder interface 2.	4
	PT100 x1 StdIO	Pt100 sensor connected to a standard analog input selected by parameter 35.24 Temperature 2 AI source and an analog output. The following settings are required: - Set the hardware jumper or switch related to the analog input to U (voltage). Any change must be validated by a control unit reboot. - Set the appropriate analog input unit selection parameter in group 12 Standard AI to V (volt). - In parameter group 13 Standard AO, set the source selection parameter of the analog output to "Force Pt100 excitation". The analog output feeds a constant current through the sensor. As the resistance of the sensor increases along with its temperature, the voltage over the sensor increases. The voltage is read by the analog input and converted into degrees.	5
	PT100 x2 StdIO	As selection 1 x Pt100 analog I/O , but with two sensors connected in series. Using multiple sensors improves measurement accuracy significantly.	6
	PT100 x3 StdIO	As selection 1 x Pt100 analog I/O , but with three sensors connected in series. Using multiple sensors improves measurement accuracy significantly.	7
	PTC DI6	PTC sensor connected to digital input DI6 (see the connection diagram on page 45). Note: Either 0 ohm (normal temperature) or the value of parameter 35.22 Temperature 2 fault limit (excessive temperature) is shown.	8
	PTC encoder module 1	PTC sensor connected to encoder interface 1.	9
	PTC encoder module 2	PTC sensor connected to encoder interface 2.	10

No.	Name/Value	Description	Def/FbEq16
	Direct AI temperature	The temperature is taken from the source selected by parameter 35.24 Temperature 2 AI source .	11
35.22	Temperature 2 fault limit	Defines the fault limit for temperature monitoring function 2. See parameter 35.20 Temperature 2 action . Note: With a PTC sensor, the unit is ohms.	130 °C
	-60 ... 1000 °C	Fault limit for temperature monitoring function 2.	1 = 1 unit
35.23	Temperature 2 warning limit	Defines the warning limit for temperature monitoring function 2. See parameter 35.20 Temperature 2 action . Note: With a PTC sensor, the unit is ohms.	110 °C
	-60 ... 1000 °C	Warning limit for temperature monitoring function 2.	1 = 1 unit
35.24	Temperature 2 AI source	Selects the input for parameter 35.21 Temperature 2 source , selections KTY84 StdIO / Extension I/O module , PT100 x1 StdIO , PT100 x2 StdIO , PT100 x3 StdIO and Direct AI temperature .	<i>Not selected</i>
	Not selected	None.	0
	AI1 actual value	Analog input AI1 on the control unit.	1
	AI2 actual value	Analog input AI2 on the control unit.	2
	<i>Other</i>	Source selection (see Terms and abbreviations on page 55).	-
35.30	FPTC configuration word	Activates FPTC-xx thermistor protection modules installed on the control unit of the drive. Using this word, it is also possible to suppress the warnings (but not faults) from each module.	0010 1010b

Bit	Name	Description
0	Module in slot 1	1 = Yes: Module installed in slot 1.
1	Disable slot 1 warning	1 = Yes: Warnings from the module in slot 1 suppressed.
2	Module in slot 2	1 = Yes: Module installed in slot 2.
3	Disable slot 2 warning	1 = Yes: Warnings from the module in slot 2 suppressed.
4	Module in slot 3	1 = Yes: Module installed in slot 3.
5	Disable slot 3 warning	1 = Yes: Warnings from the module in slot 3 suppressed.
6...15	Reserved	

	0000 0000b ... 0011 1111b	FPTC-xx module configuration word.	1 = 1
35.100	DOL starter control source	Parameters 35.100...35.106 configure a monitored start/stop control logic for external equipment such as a contactor-controlled motor cooling fan. This parameter selects the signal that starts and stops the fan. 0 = Stop 1 = Start The output controlling the fan contactor is to be connected to parameter 35.105 , bit 1. On and off delays can be set for the fan by 35.101 and 35.102 respectively. A feedback signal from the fan can be connected to an input selected by 35.103 ; the loss of the feedback will optionally trigger a warning or fault (see 35.104 and 35.106).	<i>Off</i>
	Off	0 (function disabled).	0
	On	1.	1
	Running	Bit 6 of 06.16 Drive status word 1 (see page 68).	2

No.	Name/Value	Description	Def/FbEq16
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
35.101	<i>DOL starter on delay</i>	Defines a start delay for the motor fan. The delay timer starts when the control source selected by parameter 35.100 switches on. After the delay, bit 1 of 35.105 switches on.	0 s
	0...42949673 s	Motor fan start delay.	1 = 1 s
35.102	<i>DOL starter off delay</i>	Defines a stop delay for the motor fan. The delay timer starts when the control source selected by parameter 35.100 switches off. After the delay, bit 1 of 35.105 switches off.	20 min
	0...715828 min	Motor fan stop delay.	1 = 1 min
35.103	<i>DOL starter feedback source</i>	Selects the input for motor fan feedback signal. 0 = Stopped 1 = Running After the fan is started (bit 1 of 35.105 switches on), feedback is expected within the time set by 35.104.	<i>Not selected</i>
	Not selected	0.	0
	Selected	1.	1
	DI1	Digital input DI1 (10.02 DI delayed status, bit 0).	2
	DI2	Digital input DI2 (10.02 DI delayed status, bit 1).	3
	DI3	Digital input DI3 (10.02 DI delayed status, bit 2).	4
	DI4	Digital input DI4 (10.02 DI delayed status, bit 3).	5
	DI5	Digital input DI5 (10.02 DI delayed status, bit 4).	6
	DI6	Digital input DI6 (10.02 DI delayed status, bit 5).	7
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
35.104	<i>DOL starter feedback delay</i>	Defines a feedback delay for the motor fan. The delay timer starts when bit 1 of 35.105 switches on. If no feedback is received from the fan until the delay elapses, the action selected by 35.106 is taken. Note: This delay is only applied at start. If the feedback signal is lost during run, the action selected by 35.106 is taken immediately.	0 s
	0...42949673 s	Motor fan start delay.	1 = 1 s

No.	Name/Value	Description	Def/FbEq16
35.105	DOL starter status word	Status of the motor fan control logic. Bit 1 is the control output for the fan, to be selected as the source of, for example, a digital or relay output. The other bits indicate the statuses of the selected control and feedback sources, and the fault status. This parameter is read-only.	-

Bit	Name	Description
0	Start command	Status of fan control source selected by 35.100. 0 = Stop requested 1 = Start requested
1	Delayed start command	Fan control bit (delays observed). Select this bit as the source of the output controlling the fan. 0 = Stopped 1 = Started
2	DOL feedback	Status of fan feedback (source selected by 35.103). 0 = Stopped 1 = Running
3	DOL fault (-1)	Fault status. 0 = Fault (fan feedback missing). The action taken is selected by 35.106. 1 = No fault
4...15	Reserved	

0000b...1111b	Status of motor fan control logic.	1 = 1
35.106	DOL starter event type	Selects the action taken when missing fan feedback is detected by the motor fan control logic.
No action	No action taken.	0
Warning	The drive generates a warning (A781 Motor fan).	1
Fault	Drive trips on 71B1 Motor fan.	2

36 Load analyzer		Peak value and amplitude logger settings. See also section Load analyzer (page 50).	
36.01	PVL signal source	Selects the signal to be monitored by the peak value logger. The signal is filtered using the filtering time specified by parameter 36.02 PVL filter time. The peak value is stored, along with other pre-selected signals at the time, into parameters 36.10...36.15. The peak value logger can be reset using parameter 36.09 Reset loggers. The date and time of the last reset are stored into parameters 36.16 and 36.17 respectively.	Power inu out
Zero		None (peak value logger disabled).	0
Motor speed used		01.01 Motor speed used (page 59).	1
Output frequency		01.06 Output frequency (page 59).	3
Motor current		01.07 Motor current (page 59).	4
Motor torque		01.10 Motor torque (page 59).	6
Dc-voltage		01.11 DC voltage (page 59).	7
Power inu out		01.14 Output power (page 60).	8
Speed ref ramp in		23.01 Speed ref ramp input (page 145).	10

No.	Name/Value	Description	Def/FbEq16
	Speed ref ramped	23.02 Speed ref ramp output (page 145).	11
	Speed ref used	24.01 Used speed reference (page 145).	12
	Torq ref used	26.02 Torque reference used (page 161).	13
	Freq ref used	28.02 Frequency ref ramp output (page 173).	14
	Process PID out	40.01 Process PID output actual (page 215).	16
	Process PID fbk	40.02 Process PID feedback actual (page 215).	17
	Process PID act	40.03 Process PID setpoint actual (page 215).	18
	Process PID dev	40.04 Process PID deviation actual (page 216).	19
	<i>Other</i>	Source selection (see Terms and abbreviations on page 55).	-
36.02	<i>PVL filter time</i>	Defines a filtering time for the peak value logger. See parameter 36.01 PVL signal source .	2.00 s
	0.00 ... 120.00 s	Peak value logger filtering time.	100 = 1 s
36.06	<i>AL2 signal source</i>	Selects the signal to be monitored by amplitude logger 2. The signal is sampled at 200 ms intervals, and can be scaled using parameter 36.08 Logger function . The results are displayed by parameters 36.40...36.49 . Each parameter represents an amplitude range, and shows what portion of the samples fall within that range. Amplitude logger 2 can be reset using parameter 36.09 Reset loggers . The logger is also reset whenever the signal source or scaling is changed. The date and time of the last reset are stored into parameters 36.50 and 36.51 respectively.	<i>Ambient temperature</i>
	Zero	None (amplitude logger 2 disabled).	0
	Motor speed used	01.01 Motor speed used (page 59).	1
	Output frequency	01.06 Output frequency (page 59).	3
	Motor current	01.07 Motor current (page 59).	4
	Motor torque	01.10 Motor torque (page 59).	6
	DC voltage	01.11 DC voltage (page 59).	7
	Power inu out	01.14 Output power (page 60).	8
	Speed ref ramp in	23.01 Speed ref ramp input (page 145).	10
	Speed ref ramped	23.02 Speed ref ramp output (page 145).	11
	Speed ref used	24.01 Used speed reference (page 150).	12
	Torq ref used	26.02 Torque reference used (page 166).	13
	Freq ref used	28.02 Frequency ref ramp output (page 173).	14
	Process PID out	40.01 Process PID output actual (page 215).	16
	Process PID fbk	40.02 Process PID feedback actual (page 215).	17
	Process PID act	40.03 Process PID setpoint actual (page 215).	18
	Process PID dev	40.04 Process PID deviation actual (page 216).	19
	Ambient temperature	01.70 Ambient temperature % (page 120). The amplitude range of 0...100% corresponds to 0...60 °C or 32...140 °F.	20
	<i>Other</i>	Source selection (see Terms and abbreviations on page 55).	-
36.08	<i>Logger function</i>	Defines the signal value that corresponds to 100% amplitude.	100.00
	0.00 ... 32767.00	Signal value corresponding to 100%.	1 = 1

No.	Name/Value	Description	Def/FbEq16												
36.08	Logger function	Determines whether amplitude loggers 1 and 2 are active continuously or only when the drive is modulating.	-												
<table><tr><th>Bit</th><th>Name</th><th>Description</th></tr><tr><td>0</td><td>AL1</td><td>0 = Amplitude logger 1 active continuously 1 = Amplitude logger 1 active only when the drive is modulating</td></tr><tr><td>1</td><td>AL2</td><td>0 = Amplitude logger 2 active continuously 1 = Amplitude logger 2 active only when the drive is modulating</td></tr><tr><td>2...15</td><td colspan="2">Reserved</td></tr></table>				Bit	Name	Description	0	AL1	0 = Amplitude logger 1 active continuously 1 = Amplitude logger 1 active only when the drive is modulating	1	AL2	0 = Amplitude logger 2 active continuously 1 = Amplitude logger 2 active only when the drive is modulating	2...15	Reserved	
Bit	Name	Description													
0	AL1	0 = Amplitude logger 1 active continuously 1 = Amplitude logger 1 active only when the drive is modulating													
1	AL2	0 = Amplitude logger 2 active continuously 1 = Amplitude logger 2 active only when the drive is modulating													
2...15	Reserved														
	0000b...0011b	Amplitude logger activity selection.	1 = 1												
36.09	Reset loggers	Resets the peak value logger and/or amplitude logger 2. (Amplitude logger 1 cannot be reset.)	Done												
	Done	Reset completed or not requested (normal operation).	0												
	All	Reset both the peak value logger and amplitude logger 2.	1												
	PVL	Reset the peak value logger.	2												
	AL2	Reset amplitude logger 2.	3												
36.10	PVL peak value	Displays the peak value recorded by the peak value logger.	0.00												
	-32768.00 ... 32767.00	Peak value.	1 = 1												
36.11	PVL peak date	Displays the date on which the peak value was recorded.	-												
	-	Peak occurrence date.	-												
36.12	PVL peak time	Displays the time at which the peak value was recorded.	-												
	-	Peak occurrence time.	-												
36.13	PVL current at peak	Displays the motor current at the moment the peak value was recorded.	0.00 A												
	-32768.00 ... 32767.00 A	Motor current at peak.	1 = 1 A												
36.14	PVL DC voltage at peak	Displays the voltage in the intermediate DC circuit of the drive at the moment the peak value was recorded.	0.00 V												
	0.00 ... 2000.00 V	DC voltage at peak.	10 = 1 V												
36.15	PVL speed at peak	Displays the motor speed at the moment the peak value was recorded.	0.00 rpm												
	-32768.00 ... 32767.00 rpm	Motor speed at peak.	See par. 46.01												
36.16	PVL reset date	Displays the date on which the peak value logger was last reset.	-												
	-	Last reset date of the peak value logger.	-												
36.17	PVL reset time	Displays the time at which the peak value logger was last reset.	-												
	-	Last reset time of the peak value logger.	-												
36.20	AL1 below 10%	Displays the percentage of samples recorded by amplitude logger 1 that fall between 0 and 10%.	0.00%												
	0.00 ... 100.00%	Amplitude logger 1 samples between 0 and 10%.	1 = 1%												

No.	Name/Value	Description	Def/FbEq16
36.21	<i>AL1 10 to 20%</i>	Displays the percentage of samples recorded by amplitude logger 1 that fall between 10 and 20%.	0.00%
	0.00 ... 100.00%	Amplitude logger 1 samples between 10 and 20%.	1 = 1%
36.22	<i>AL1 20 to 30%</i>	Displays the percentage of samples recorded by amplitude logger 1 that fall between 20 and 30%.	0.00%
	0.00 ... 100.00%	Amplitude logger 1 samples between 20 and 30%.	1 = 1%
36.23	<i>AL1 30 to 40%</i>	Displays the percentage of samples recorded by amplitude logger 1 that fall between 30 and 40%.	0.00%
	0.00 ... 100.00%	Amplitude logger 1 samples between 30 and 40%.	1 = 1%
36.24	<i>AL1 40 to 50%</i>	Displays the percentage of samples recorded by amplitude logger 1 that fall between 40 and 50%.	0.00%
	0.00 ... 100.00%	Amplitude logger 1 samples between 40 and 50%.	1 = 1%
36.25	<i>AL1 50 to 60%</i>	Displays the percentage of samples recorded by amplitude logger 1 that fall between 50 and 60%.	0.00%
	0.00 ... 100.00%	Amplitude logger 1 samples between 50 and 60%.	1 = 1%
36.26	<i>AL1 60 to 70%</i>	Displays the percentage of samples recorded by amplitude logger 1 that fall between 60 and 70%.	0.00%
	0.00 ... 100.00%	Amplitude logger 1 samples between 60 and 70%.	1 = 1%
36.27	<i>AL1 70 to 80%</i>	Displays the percentage of samples recorded by amplitude logger 1 that fall between 70 and 80%.	0.00%
	0.00 ... 100.00%	Amplitude logger 1 samples between 70 and 80%.	1 = 1%
36.28	<i>AL1 80 to 90%</i>	Displays the percentage of samples recorded by amplitude logger 1 that fall between 80 and 90%.	0.00%
	0.00 ... 100.00%	Amplitude logger 1 samples between 80 and 90%.	1 = 1%
36.29	<i>AL1 over 90%</i>	Displays the percentage of samples recorded by amplitude logger 1 that exceed 90%.	0.00%
	0.00 ... 100.00%	Amplitude logger 1 samples over 90%.	1 = 1%
36.40	<i>AL2 below 10%</i>	Displays the percentage of samples recorded by amplitude logger 2 that fall between 0 and 10%.	0.00%
	0.00 ... 100.00%	Amplitude logger 2 samples between 0 and 10%.	1 = 1%
36.41	<i>AL2 10 to 20%</i>	Displays the percentage of samples recorded by amplitude logger 2 that fall between 10 and 20%.	0.00%
	0.00 ... 100.00%	Amplitude logger 2 samples between 10 and 20%.	1 = 1%
36.42	<i>AL2 20 to 30%</i>	Displays the percentage of samples recorded by amplitude logger 2 that fall between 20 and 30%.	0.00%
	0.00 ... 100.00%	Amplitude logger 2 samples between 20 and 30%.	1 = 1%
36.43	<i>AL2 30 to 40%</i>	Displays the percentage of samples recorded by amplitude logger 2 that fall between 30 and 40%.	0.00%
	0.00 ... 100.00%	Amplitude logger 2 samples between 30 and 40%.	1 = 1%
36.44	<i>AL2 40 to 50%</i>	Displays the percentage of samples recorded by amplitude logger 2 that fall between 40 and 50%.	0.00%
	0.00 ... 100.00%	Amplitude logger 2 samples between 40 and 50%.	1 = 1%
36.45	<i>AL2 50 to 60%</i>	Displays the percentage of samples recorded by amplitude logger 2 that fall between 50 and 60%.	0.00%
	0.00 ... 100.00%	Amplitude logger 2 samples between 50 and 60%.	1 = 1%

No.	Name/Value	Description	Def/FbEq16
36.46	AL2 60 to 70%	Displays the percentage of samples recorded by amplitude logger 2 that fall between 60 and 70%.	0.00%
	0.00 ... 100.00%	Amplitude logger 2 samples between 60 and 70%.	1 = 1%
36.47	AL2 70 to 80%	Displays the percentage of samples recorded by amplitude logger 2 that fall between 70 and 80%.	0.00%
	0.00 ... 100.00%	Amplitude logger 2 samples between 70 and 80%.	1 = 1%
36.48	AL2 80 to 90%	Displays the percentage of samples recorded by amplitude logger 2 that fall between 80 and 90%.	0.00%
	0.00 ... 100.00%	Amplitude logger 2 samples between 80 and 90%.	1 = 1%
36.49	AL2 over 90%	Displays the percentage of samples recorded by amplitude logger 2 that exceed 90%.	0.00%
	0.00 ... 100.00%	Amplitude logger 2 samples over 90%.	1 = 1%
36.50	AL2 reset date	Displays the date on which amplitude logger 2 was last reset.	-
	-	Last reset date of amplitude logger 2.	-
36.51	AL2 reset time	Displays the time at which amplitude logger 2 was last reset.	-
	-	Last reset time of amplitude logger 2.	-
40 Process PID set 1		Parameter values for process PID control. The drive contains a single active PID controller for process use, however two separate complete set-ups can be programmed and stored. The first set is made up of parameters 40.07...40.56*, the second set is defined by the parameters in group 41 Process PID set 2. The binary source that defines which set is used is selected by parameter 40.57 PID set1/set2 selection. See also the control chain diagrams on pages 422 and 423. *The remaining parameters in this group are common for both sets.	
40.01	Process PID output actual	Displays the output of the process PID controller. See the control chain diagram on page 423 . This parameter is read-only. The unit is selected by parameter 40.12 Set 1 unit selection .	-
	-32768.00 ... 32767.00	Process PID controller output.	1 = 1 unit
40.02	Process PID feedback actual	Displays the value of process feedback after source selection, mathematical function (parameter 40.10 Set 1 feedback function), and filtering. See the control chain diagram on page 422 . This parameter is read-only. The unit is selected by parameter 40.12 Set 1 unit selection .	-
	-32768.00 ... 32767.00	Process feedback.	1 = 1 unit
40.03	Process PID setpoint actual	Displays the value of process PID setpoint after source selection, mathematical function (40.18 Set 1 setpoint function), limitation and ramping. See the control chain diagram on page 423 . This parameter is read-only. The unit is selected by parameter 40.12 Set 1 unit selection .	-
	-32768.00 ... 32767.00	Setpoint for process PID controller.	1 = 1 unit

No.	Name/Value	Description	Def/FbEq16
40.04	Process PID deviation actual	Displays the process PID deviation. By default, this value equals setpoint - feedback, but deviation can be inverted by parameter 40.31 Set 1 deviation inversion. See the control chain diagram on page 423. This parameter is read-only. The unit is selected by parameter 40.12 Set 1 unit selection.	-
	-32768.00 ... 32767.00	PID deviation.	1 = 1 unit
40.05	Process PID trim output act	Displays the trimmed reference output. See the control chain diagram on page 423. This parameter is read-only. The unit is selected by parameter 40.12 Set 1 unit selection.	-
	-32768.00 ... 32767.00	Trimmed reference.	1 = 1 unit
40.06	Process PID status word	Displays status information on process PID control. This parameter is read-only.	-

Bit	Name	Value
0	PID active	1 = Process PID control active.
1	Setpoint frozen	1 = Process PID setpoint frozen.
2	Output frozen	1 = Process PID controller output frozen.
3	PID sleep mode	1 = Sleep mode active.
4	Sleep boost	1 = Sleep boost active.
5	Trim mode	1 = Trim function active.
6	Tracking mode	1 = Tracking function active.
7	Output limit high	1 = PID output is being limited by par. 40.37.
8	Output limit low	1 = PID output is being limited by par. 40.36.
9	Deadband active	1 = Deadband active (see par. 40.39)
10	PID set	0 = Parameter set 1 in use. 1 = Parameter set 2 in use.
11	Reserved	
12	Internal setpoint active	1 = Internal setpoint active (see par. 40.16...40.24)
13...15	Reserved	

	0000h...FFFFh	Process PID control status word.	1 = 1
40.07	Set 1 PID operation mode	Activates/deactivates process PID control. See also parameter 40.60 Set 1 PID activation source. Note: Process PID control is only available in external control; see section Local control vs. external control (page 20).	Off
	Off	Process PID control inactive.	0
	On	Process PID control active.	1
	On when drive running	Process PID control is active when the drive is running.	2
40.08	Set 1 feedback 1 source	Selects the first source of process feedback. See the control chain diagram on page 422.	A11 scaled
	Not selected	None.	0
	A11 scaled	12.12 A11 scaled value (see page 88).	1
	A12 scaled	12.22 A12 scaled value (see page 90).	2

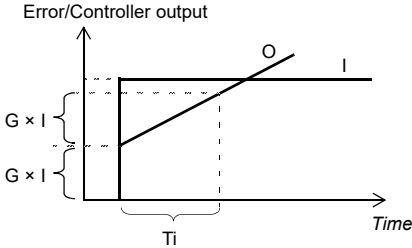
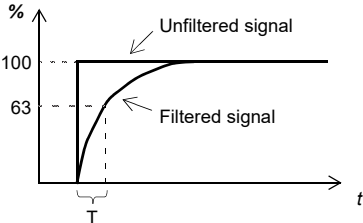
No.	Name/Value	Description	Def/FbEq16
	Freq in scaled	11.39 Freq in 1 scaled (see page 156).	3
	Motor current	01.07 Motor current (see page 59).	5
	Power inu out	01.14 Output power (see page 60).	6
	Motor torque	01.10 Motor torque (see page 59).	7
	Feedback data storage	40.91 Feedback data storage (see page 228).	10
	<i>Other</i>	Source selection (see Terms and abbreviations on page 55).	-
40.09	Set 1 feedback 2 source	Selects the second source of process feedback. For the selections, see parameter 40.08 Set 1 feedback 1 source .	<i>Not selected</i>
40.10	Set 1 feedback function	Defines how process feedback is calculated from the two feedback sources selected by parameters 40.08 Set 1 feedback 1 source and 40.09 Set 1 feedback 2 source .	<i>In1</i>
	In1	Source 1.	0
	In1+In2	Sum of sources 1 and 2.	1
	In1-In2	Source 2 subtracted from source 1.	2
	In1*In2	Source 1 multiplied by source 2.	3
	In1/In2	Source 1 divided by source 2.	4
	MIN(In1,In2)	Smaller of the two sources.	5
	MAX(In1,In2)	Greater of the two sources.	6
	AVE(In1,In2)	Average of the two sources.	7
	sqrt(In1)	Square root of source 1.	8
	sqrt(In1-In2)	Square root of (source 1 - source 2).	9
	sqrt(In1+In2)	Square root of (source 1 + source 2).	10
	sqrt(In1)+sqrt(In2)	Square root of source 1 + square root of source 2.	11
40.11	Set 1 feedback filter time	Defines the filter time constant for process feedback.	0.000 s
	0.000 ... 30.000 s	Feedback filter time.	1 = 1 s
40.12	Set 1 unit selection	Defines the unit for parameters 40.01...40.05 , 40.21...40.24 and 40.47 .	%
	rpm	rpm.	7
	%	%.	4
	Hz	Hz.	3
	PID user unit 1	User-definable unit 1. The name of the unit can be edited on the control panel by choosing Menu – Settings – Edit texts.	250

No.	Name/Value	Description	Def/FbEq16
40.14	<i>Set 1 setpoint scaling</i>	Defines, together with parameter <i>40.15 Set 1 output scaling</i> , a general scaling factor for the process PID control chain. The scaling can be utilized when, for example, the process setpoint is input in Hz, and the output of the PID controller is used as an rpm value in speed control. In this case, this parameter might be set to 50, and parameter <i>40.15</i> to the nominal motor speed at 50 Hz. In effect, the output of the PID controller = <i>[40.15]</i> when deviation (setpoint - feedback) = <i>[40.14]</i> and <i>[40.32]</i> = 1. Note: The scaling is based on the ratio between <i>40.14</i> and <i>40.15</i> . For example, the values 50 and 1500 would produce the same scaling as 1 and 30.	100.00
	-32768.00 ... 32767.00	Process setpoint base.	1 = 1
40.15	<i>Set 1 output scaling</i>	See parameter <i>40.14 Set 1 setpoint scaling</i> .	1500.00; 1800.00 (95.20 b0)
	-32768.00 ... 32767.00	Process PID controller output base.	1 = 1
40.16	<i>Set 1 setpoint 1 source</i>	Selects the first source of process PID setpoint. This setpoint is available in parameter <i>40.25 Set 1 setpoint selection</i> as setpoint 1. See the control chain diagram on page 422.	<i>Internal setpoint</i>
	Not selected	None.	0
	Control panel	<i>03.01 Panel reference</i> (see page 63). See section <i>Using the control panel as an external control source</i> (page 21).	1
	Internal setpoint	Internal setpoint. See parameter <i>40.19 Set 1 internal setpoint sel1</i> .	2
	AI1 scaled	<i>12.12 AI1 scaled value</i> (see page 88).	3
	AI2 scaled	<i>12.22 AI2 scaled value</i> (see page 90).	4
	Motor potentiometer	<i>22.80 Motor potentiometer ref act</i> (output of the motor potentiometer).	8
	Freq in scaled	<i>11.39 Freq in 1 scaled</i> (see page 156).	10
	Setpoint data storage	<i>40.92 Setpoint data storage</i> (see page 228).	24
	<i>Other</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
40.17	<i>Set 1 setpoint 2 source</i>	Selects the second source of process setpoint. This setpoint is available in parameter <i>40.25 Set 1 setpoint selection</i> as setpoint 2. For the selections, see parameter <i>40.16 Set 1 setpoint 1 source</i> .	<i>Not selected</i>
40.18	<i>Set 1 setpoint function</i>	Selects a mathematical function between the setpoint sources selected by parameters <i>40.16 Set 1 setpoint 1 source</i> and <i>40.17 Set 1 setpoint 2 source</i> .	<i>In1 or In2</i>
	In1 or In2	No mathematical function applied. The source selected by parameter <i>40.25 Set 1 setpoint selection</i> is used.	0
	In1+In2	Sum of sources 1 and 2.	1
	In1-In2	Source 2 subtracted from source 1.	2
	In1*In2	Source 1 multiplied by source 2.	3
	In1/In2	Source 1 divided by source 2.	4
	MIN(In1,In2)	Smaller of the two sources.	5

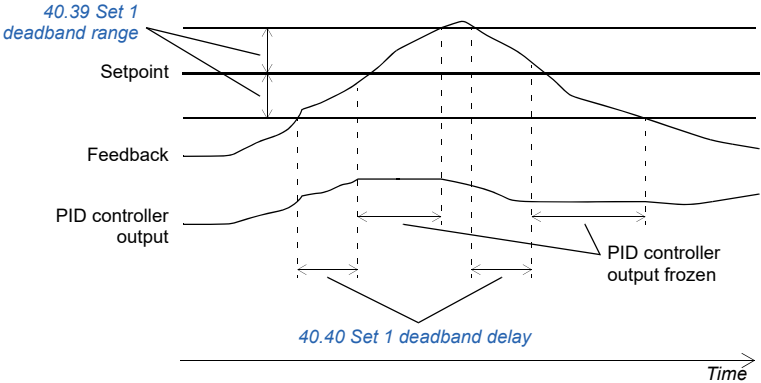
No.	Name/Value	Description	Def/FbEq16		
	MAX(ln1,ln2)	Greater of the two sources.	6		
	AVE(ln1,ln2)	Average of the two sources.	7		
	sqrt(ln1)	Square root of source 1.	8		
	sqrt(ln1-ln2)	Square root of (source 1 - source 2).	9		
	sqrt(ln1+ln2)	Square root of (source 1 + source 2).	10		
	sqrt(ln1)+sqrt(ln2)	Square root of source 1 + square root of source 2.	11		
40.19	Set 1 internal setpoint sel1	Selects, together with 40.20 Set 1 internal setpoint sel2, the internal setpoint out of the presets defined by parameters 40.21...40.24.	Not selected		
		Source defined by par. 40.19		Source defined by par. 40.20	Setpoint preset active
		0		0	1 (par. 40.21)
		1		0	2 (par. 40.22)
		0		1	3 (par. 40.23)
		1		1	4 (par. 40.24)
	Not selected	0.	0		
	Selected	1.	1		
	DI1	Digital input DI1 (10.02 DI delayed status, bit 0).	2		
	DI2	Digital input DI2 (10.02 DI delayed status, bit 1).	3		
	DI3	Digital input DI3 (10.02 DI delayed status, bit 2).	4		
	DI4	Digital input DI4 (10.02 DI delayed status, bit 3).	5		
	DI5	Digital input DI5 (10.02 DI delayed status, bit 4).	6		
	DI6	Digital input DI6 (10.02 DI delayed status, bit 5).	7		
	DIO1	Not applicable for ACS580MV.	10		
	DIO2	Not applicable for ACS580MV.	11		
	Other [bit]	Source selection (see Terms and abbreviations on page 55).	-		
40.20	Set 1 internal setpoint sel2	Selects, together with 40.19 Set 1 internal setpoint sel1, the internal setpoint out of the presets defined by parameters 40.21...40.24. See table at 40.19 Set 1 internal setpoint sel1.	Not selected		
	Not selected	0.	0		
	Selected	1.	1		
	DI1	Digital input DI1 (10.02 DI delayed status, bit 0).	2		
	DI2	Digital input DI2 (10.02 DI delayed status, bit 1).	3		
	DI3	Digital input DI3 (10.02 DI delayed status, bit 2).	4		
	DI4	Digital input DI4 (10.02 DI delayed status, bit 3).	5		
	DI5	Digital input DI5 (10.02 DI delayed status, bit 4).	6		
	DI6	Digital input DI6 (10.02 DI delayed status, bit 5).	7		
	DIO1	Not applicable for ACS580MV.	10		
	DIO2	Not applicable for ACS580MV.	11		
	Other [bit]	Source selection (see Terms and abbreviations on page 55).	-		

No.	Name/Value	Description	Def/FbEq16
40.21	<i>Set 1 internal setpoint 1</i>	Defines process setpoint preset 1. See parameter 40.19 Set 1 internal setpoint sel1 . The unit is selected by parameter 40.12 Set 1 unit selection .	0.00
	-32768.00 ... 32767.00	Process setpoint preset 1.	1 = 1 unit
40.22	<i>Set 1 internal setpoint 2</i>	Defines process setpoint preset 2. See parameter 40.19 Set 1 internal setpoint sel1 . The unit is selected by parameter 40.12 Set 1 unit selection .	0.00
	-32768.00 ... 32767.00	Process setpoint preset 2.	1 = 1 unit
40.23	<i>Set 1 internal setpoint 3</i>	Defines process setpoint preset 3. See parameter 40.19 Set 1 internal setpoint sel1 . The unit is selected by parameter 40.12 Set 1 unit selection .	0.00
	-32768.00 ... 32767.00	Process setpoint preset 3.	1 = 1 unit
40.24	<i>Set 1 internal setpoint 4</i>	Defines process setpoint preset 4. See parameter 40.19 Set 1 internal setpoint sel1 . The unit is selected by parameter 40.12 Set 1 unit selection .	0.00
	-32768.00 ... 32767.00	Process setpoint preset 4.	1 = 1 unit
40.25	<i>Set 1 setpoint selection</i>	Configures the selection between setpoint sources 1 (40.16) and 2 (40.17). This parameter is only effective when parameter 40.18 Set 1 setpoint function is set to <i>In1</i> or <i>In2</i> . 0 = Setpoint source 1 1 = Setpoint source 2	<i>Setpoint source 1</i>
	Setpoint source 1	0.	0
	Setpoint source 2	1.	1
	DI1	Digital input DI1 (10.02 DI delayed status , bit 0).	2
	DI2	Digital input DI2 (10.02 DI delayed status , bit 1).	3
	DI3	Digital input DI3 (10.02 DI delayed status , bit 2).	4
	DI4	Digital input DI4 (10.02 DI delayed status , bit 3).	5
	DI5	Digital input DI5 (10.02 DI delayed status , bit 4).	6
	DI6	Digital input DI6 (10.02 DI delayed status , bit 5).	7
	DIO1	Not applicable for ACS580MV.	10
	DIO2	Not applicable for ACS580MV.	11
	<i>Other [bit]</i>	Source selection (see Terms and abbreviations on page 55).	-
40.26	<i>Set 1 setpoint min</i>	Defines a minimum limit for the process PID controller setpoint.	0.00
	-32768.00 ... 32767.00	Minimum limit for process PID controller setpoint.	1 = 1
40.27	<i>Set 1 setpoint max</i>	Defines a maximum limit for the process PID controller setpoint.	32767.00
	-32768.00 ... 32767.00	Maximum limit for process PID controller setpoint.	1 = 1
40.28	<i>Set 1 setpoint increase time</i>	Defines the minimum time it takes for the setpoint to increase from 0% to 100%.	0.0 s
	0.0 ... 1800.0 s	Setpoint increase time.	1 = 1

No.	Name/Value	Description	Def/FbEq16
40.29	Set 1 setpoint decrease time	Defines the minimum time it takes for the setpoint to decrease from 100% to 0%.	0.0 s
	0.0 ... 1800.0 s	Setpoint decrease time.	1 = 1
40.30	Set 1 setpoint freeze enable	Freezes, or defines a source that can be used to freeze, the setpoint of the process PID controller. This feature is useful when the reference is based on a process feedback connected to an analog input, and the sensor must be serviced without stopping the process. 1 = Process PID controller setpoint frozen See also parameter 40.38 Set 1 output freeze enable .	Not selected
	Not selected	Process PID controller setpoint not frozen.	0
	Selected	Process PID controller setpoint frozen.	1
	DI1	Digital input DI1 (10.02 DI delayed status , bit 0).	2
	DI2	Digital input DI2 (10.02 DI delayed status , bit 1).	3
	DI3	Digital input DI3 (10.02 DI delayed status , bit 2).	4
	DI4	Digital input DI4 (10.02 DI delayed status , bit 3).	5
	DI5	Digital input DI5 (10.02 DI delayed status , bit 4).	6
	DI6	Digital input DI6 (10.02 DI delayed status , bit 5).	7
	DIO1	Not applicable for ACS580MV.	10
	DIO2	Not applicable for ACS580MV.	11
	Other [bit]	Source selection (see Terms and abbreviations on page 55).	-
40.31	Set 1 deviation inversion	Inverts the input of the process PID controller. 0 = Deviation not inverted (Deviation = Setpoint - Feedback) 1 = Deviation inverted (Deviation = Feedback - Setpoint) See also section Sleep function for process PID control (page 67).	Not inverted (Ref - Fbk)
	Not inverted (Ref - Fbk)	0.	0
	Inverted (Fbk - Ref)	1.	1
	Other [bit]	Source selection (see Terms and abbreviations on page 55).	-
40.32	Set 1 gain	Defines the gain for the process PID controller. See parameter 40.33 Set 1 integration time .	1.00
	0.10 ... 100.00	Gain for PID controller.	100 = 1

No.	Name/Value	Description	Def/FbEq16
40.33	Set 1 integration time	Defines the integration time for the process PID controller. This time needs to be set to the same order of magnitude as the reaction time of the process being controlled, otherwise instability will result.  I = controller input (error) O = controller output G = gain Ti = integration time Note: Setting this value to 0 disables the "I" part, turning the PID controller into a PD controller.	60.0 s
	0.0 ... 32767.0 s	Integration time.	1 = 1 s
40.34	Set 1 derivation time	Defines the derivation time of the process PID controller. The derivative component at the controller output is calculated on basis of two consecutive error values (E_{K-1} and E_K) according to the following formula: PID DERIV TIME $\times (E_K - E_{K-1})/T_S$, in which $T_S = 2$ ms sample time E = Error = Process reference - process feedback.	0.000 s
	0.000 ... 10.000 s	Derivation time.	1000 = 1 s
40.35	Set 1 derivation filter time	Defines the time constant of the 1-pole filter used to smooth the derivative component of the process PID controller.  $O = I \times (1 - e^{-t/T})$ I = filter input (step) O = filter output t = time T = filter time constant	0.0 s
	0.0 ... 10.0 s	Filter time constant.	10 = 1 s

No.	Name/Value	Description	Def/FbEq16
40.36	<i>Set 1 output min</i>	Defines the minimum limit for the process PID controller output. Using the minimum and maximum limits, it is possible to restrict the operation range.	0.0
	-32768.0 ... 32767.0	Minimum limit for process PID controller output.	1 = 1
40.37	<i>Set 1 output max</i>	Defines the maximum limit for the process PID controller output. See parameter <i>40.36 Set 1 output min</i> .	1500.0; 1800.0 (95.20 b0)
	-32768.0 ... 32767.0	Maximum limit for process PID controller output.	1 = 1
40.38	<i>Set 1 output freeze enable</i>	Freezes (or defines a source that can be used to freeze) the output of the process PID controller, keeping the output at the value it was before freeze was enabled. This feature can be used when, for example, a sensor providing process feedback must to be serviced without stopping the process. 1 = Process PID controller output frozen See also parameter <i>40.30 Set 1 setpoint freeze enable</i> .	<i>Not selected</i>
	Not selected	Process PID controller output not frozen.	0
	Selected	Process PID controller output frozen.	1
	DI1	Digital input DI1 (<i>10.02 DI delayed status</i> , bit 0).	2
	DI2	Digital input DI2 (<i>10.02 DI delayed status</i> , bit 1).	3
	DI3	Digital input DI3 (<i>10.02 DI delayed status</i> , bit 2).	4
	DI4	Digital input DI4 (<i>10.02 DI delayed status</i> , bit 3).	5
	DI5	Digital input DI5 (<i>10.02 DI delayed status</i> , bit 4).	6
	DI6	Digital input DI6 (<i>10.02 DI delayed status</i> , bit 5).	7
	DIO1	Not applicable for ACS580MV.	10
	DIO2	Not applicable for ACS580MV.	11
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-

No.	Name/Value	Description	Def/FbEq16
40.39	Set 1 deadband range	Defines a deadband around the setpoint. Whenever process feedback enters the deadband, a delay timer starts. If the feedback remains within the deadband longer than the delay (40.40 Set 1 deadband delay), the PID controller output is frozen. Normal operation resumes after the feedback value leaves the deadband. 	0.0
	0.0 ... 32767.0	Deadband range.	1 = 1
40.40	Set 1 deadband delay	Delay for the deadband. See parameter 40.39 Set 1 deadband range.	0.0 s
	0.0 ... 3600.0 s	Delay for deadband area.	1 = 1 s
40.41	Set 1 sleep mode	Selects the mode of the sleep function. See also section <i>Sleep function for process PID control</i> (page 67).	Not selected
	Not selected	Sleep function disabled.	0
	Internal	The output of the PID controller is compared to the value of 40.43 Set 1 sleep level. If the PID controller output remains below the sleep level longer than the sleep delay (40.44 Set 1 sleep delay), the drive enters sleep mode. Parameters 40.44...40.48 are in force.	1
	External	The sleep function is activated by the source selected by parameter 40.42 Set 1 sleep enable. Parameters 40.44...40.46 and 40.48 are in force.	2
40.42	Set 1 sleep enable	Defines a source that is used to activate the PID sleep function when parameter 40.41 Set 1 sleep mode is set to External. 0 = Sleep function disabled 1 = Sleep function activated	Not selected
	Not selected	0.	0
	Selected	1.	1
	DI1	Digital input DI1 (10.02 DI delayed status, bit 0).	2
	DI2	Digital input DI2 (10.02 DI delayed status, bit 1).	3
	DI3	Digital input DI3 (10.02 DI delayed status, bit 2).	4

No.	Name/Value	Description	Def/FbEq16
	DI4	Digital input DI4 (<i>10.02 DI delayed status</i> , bit 3).	5
	DI5	Digital input DI5 (<i>10.02 DI delayed status</i> , bit 4).	6
	DI6	Digital input DI6 (<i>10.02 DI delayed status</i> , bit 5).	7
	DIO1	Not applicable for ACS580MV.	10
	DIO2	Not applicable for ACS580MV.	11
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
40.43	<i>Set 1 sleep level</i>	Defines the start limit for the sleep function when parameter <i>40.41 Set 1 sleep mode</i> is set to <i>Internal</i> .	0.0
	0.0 ... 32767.0	Sleep start level.	1 = 1
40.44	<i>Set 1 sleep delay</i>	Defines a delay before the sleep function actually becomes enabled, to prevent nuisance sleeping. The delay timer starts when the sleep condition selected by parameter <i>40.41 Set 1 sleep mode</i> becomes true, and resets if the condition becomes false.	60.0 s
	0.0 ... 3600.0 s	Sleep start delay.	1 = 1 s
40.45	<i>Set 1 sleep boost time</i>	Defines a boost time for the sleep boost step. See parameter <i>40.46 Set 1 sleep boost step</i> .	0.0 s
	0.0 ... 3600.0 s	Sleep boost time.	1 = 1 s
40.46	<i>Set 1 sleep boost step</i>	When the drive is entering sleep mode, the process setpoint is increased by this value for the time defined by parameter <i>40.45 Set 1 sleep boost time</i> . If active, sleep boost is aborted when the drive wakes up.	0.0
	0.0 ... 32767.0	Sleep boost step.	1 = 1
40.47	<i>Set 1 wake-up deviation</i>	When <i>40.41 Set 1 sleep mode</i> is set to <i>Internal</i> , this parameter defines the wake-up level as deviation between process setpoint and feedback. The unit is selected by parameter <i>40.12 Set 1 unit selection</i> . When the deviation exceeds the value of this parameter, and remains there for the duration of the wake-up delay (<i>40.48 Set 1 wake-up delay</i>), the drive wakes up. See also parameter <i>40.31 Set 1 deviation inversion</i> .	0.00 rpm, % or Hz
	-32768.00 ... 32767.00 rpm, % or Hz	Wake-up level (as deviation between process setpoint and feedback).	1 = 1 unit
40.48	<i>Set 1 wake-up delay</i>	Defines a wake-up delay for the sleep function to prevent nuisance wake-ups. See parameter <i>40.47 Set 1 wake-up deviation</i> . The delay timer starts when the deviation exceeds the wake-up level (<i>40.47 Set 1 wake-up deviation</i>), and resets if the deviation falls below the wake-up level. Note: The adjustment of this parameter should not cause the time interval between motor start and last stop less than 5s.	5.0 s
	0.00 ... 60.00 s	Wake-up delay.	1 = 1 s
40.49	<i>Set 1 tracking mode</i>	Activates (or selects a source that activates) tracking mode. In tracking mode, the value selected by parameter <i>40.50 Set 1 tracking ref selection</i> is substituted for the PID controller output. See also section <i>Tracking</i> (page 68). 1 = Tracking mode enabled	<i>Not selected</i>
	Not selected	0.	0
	Selected	1.	1

No.	Name/Value	Description	Def/FbEq16
	DI1	Digital input DI1 (<i>10.02 DI delayed status</i> , bit 0).	2
	DI2	Digital input DI2 (<i>10.02 DI delayed status</i> , bit 1).	3
	DI3	Digital input DI3 (<i>10.02 DI delayed status</i> , bit 2).	4
	DI4	Digital input DI4 (<i>10.02 DI delayed status</i> , bit 3).	5
	DI5	Digital input DI5 (<i>10.02 DI delayed status</i> , bit 4).	6
	DI6	Digital input DI6 (<i>10.02 DI delayed status</i> , bit 5).	7
	DIO1	Not applicable for ACS580MV.	10
	DIO2	Not applicable for ACS580MV.	11
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
40.50	<i>Set 1 tracking ref selection</i>	Selects the value source for tracking mode. See parameter <i>40.49 Set 1 tracking mode</i> .	<i>Not selected</i>
	Not selected	None.	0
	AI1 scaled	<i>12.12 AI1 scaled value</i> (see page 88).	1
	AI2 scaled	<i>12.22 AI2 scaled value</i> (see page 90).	2
	FB A ref1	<i>03.05 FB A reference 1</i> (see page 63).	3
	FB A ref2	<i>03.06 FB A reference 2</i> (see page 63).	4
	<i>Other</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
40.51	<i>Set 1 trim mode</i>	Activates the trim function and selects between direct and proportional trimming (or a combination of both). With trimming, it is possible to apply a corrective factor to the drive reference (setpoint). The output after trimming is available as parameter <i>40.05 Process PID trim output act</i> . See the control chain diagram on page 421.	<i>Off</i>
	Off	The trim function is inactive.	0
	Direct	The trim function is active. The trimming factor is relative to the maximum speed, torque or frequency; the selection between these is made by parameter <i>40.52 Set 1 trim selection</i> .	1
	Proportional	The trim function is active. The trimming factor is relative to the reference selected by parameter <i>40.53 Set 1 trimmed ref pointer</i> .	2
	Combined	The trim function is active. The trimming factor is a combination of both <i>Direct</i> and <i>Proportional</i> modes; the proportions of each are defined by parameter <i>40.54 Set 1 trim mix</i> .	3
40.52	<i>Set 1 trim selection</i>	Selects whether trimming is used for correcting the speed, torque or frequency reference.	<i>Torque</i>
	Torque	Torque reference trimming.	1
	Speed	Speed reference trimming.	2
	Frequency	Frequency reference trimming.	3
40.53	<i>Set 1 trimmed ref pointer</i>	Selects the signal source for the trim reference.	<i>Not selected</i>
	Not selected	None.	0
	AI1 scaled	<i>12.12 AI1 scaled value</i> (see page 88).	1
	AI2 scaled	<i>12.22 AI2 scaled value</i> (see page 90).	2
	FB A ref1	<i>03.05 FB A reference 1</i> (see page 63).	3

No.	Name/Value	Description	Def/FbEq16
	FB A ref2	03.06 FB A reference 2 (see page 63).	4
	<i>Other</i>	Source selection (see Terms and abbreviations on page 55).	-
40.54	<i>Set 1 trim mix</i>	When parameter 40.51 Set 1 trim mode is set to <i>Combined</i> , defines the effect of direct and proportional trim sources in the final trimming factor. 0.000 = 100% proportional 0.500 = 50% proportional, 50% direct 1.000 = 100% direct	0.000
	0.000 ... 1.000	Trim mix.	1 = 1
40.55	<i>Set 1 trim adjust</i>	Defines a multiplier for the trimming factor. This value is multiplied by the result of parameter 40.51 Set 1 trim mode . Consequently, the result of the multiplication is used to multiply the result of parameter 40.56 Set 1 trim source .	1.000
	-100.000 ... 100.000	Multiplier for trimming factor.	1 = 1
40.56	<i>Set 1 trim source</i>	Selects the reference to be trimmed.	<i>PID ref</i>
	PID ref	PID setpoint.	1
	PID output	PID controller output.	2
40.57	<i>PID set1/set2 selection</i>	Selects the source that determines whether process PID parameter set 1 (parameters 40.07...40.56) or set 2 (group 41 Process PID set 2) is used. 0 = Process PID parameter set 1 in use 1 = Process PID parameter set 2 in use	<i>Not selected</i>
	Not selected	0.	0
	Selected	1.	1
	DI1	Digital input DI1 (10.02 DI delayed status , bit 0).	2
	DI2	Digital input DI2 (10.02 DI delayed status , bit 1).	3
	DI3	Digital input DI3 (10.02 DI delayed status , bit 2).	4
	DI4	Digital input DI4 (10.02 DI delayed status , bit 3).	5
	DI5	Digital input DI5 (10.02 DI delayed status , bit 4).	6
	DI6	Digital input DI6 (10.02 DI delayed status , bit 5).	7
	DIO1	Not applicable for ACS580MV.	10
	DIO2	Not applicable for ACS580MV.	11
	<i>Other [bit]</i>	Source selection (see Terms and abbreviations on page 55).	-
40.60	<i>Set 1 PID activation source</i>	Selects a source that enables/disables process PID control. See also parameter 40.07 Set 1 PID operation mode . 0 = Process PID control disabled. 1 = Process PID control enabled.	<i>On</i>
	Off	0.	0
	On	1.	1
	Follow Ext1/Ext2 selection	Process PID control is disabled when external control location EXT1 is active, and enabled when external control location EXT2 is active. See also parameter 19.11 Ext1/Ext2 selection .	2
	DI1	Digital input DI1 (10.02 DI delayed status , bit 0).	3
	DI2	Digital input DI2 (10.02 DI delayed status , bit 1).	4
	DI3	Digital input DI3 (10.02 DI delayed status , bit 2).	5

No.	Name/Value	Description	Def/FbEq16
	DI4	Digital input DI4 (<i>10.02 DI delayed status</i> , bit 3).	6
	DI5	Digital input DI5 (<i>10.02 DI delayed status</i> , bit 4).	7
	DI6	Digital input DI6 (<i>10.02 DI delayed status</i> , bit 5).	8
	DIO1	Not applicable for ACS580MV.	11
	DIO2	Not applicable for ACS580MV.	12
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
40.91	<i>Feedback data storage</i>	Storage parameter for receiving a process feedback value eg. through the embedded fieldbus interface. The value can be sent to the drive as Modbus I/O data. Set the target selection parameter of that particular data (<i>58.101...58.124</i>) to <i>Feedback data storage</i> . In <i>40.08 Set 1 feedback 1 source</i> (or <i>40.09 Set 1 feedback 2 source</i>), select <i>Feedback data storage</i> .	-
	-327.68 ... 327.67	Storage parameter for process feedback.	100 = 1
40.92	<i>Setpoint data storage</i>	Storage parameter for receiving a process setpoint value eg. through the embedded fieldbus interface. The value can be sent to the drive as Modbus I/O data. Set the target selection parameter of that particular data (<i>58.101...58.124</i>) to <i>Setpoint data storage</i> . In <i>40.16 Set 1 setpoint 1 source</i> (or <i>40.17 Set 1 setpoint 2 source</i>), select <i>Setpoint data storage</i> .	-
	-327.68 ... 327.67	Storage parameter for process setpoint.	100 = 1
41 Process PID set 2		A second set of parameter values for process PID control. The selection between this set and first set (parameter group <i>40 Process PID set 1</i>) is made by parameter <i>40.57 PID set1/set2 selection</i> . See also parameters <i>40.01...40.06</i> , <i>40.91</i> , <i>40.92</i> , and the control chain diagrams on pages 596 and 597.	
41.07	<i>Set 2 PID operation mode</i>	See parameter <i>40.07 Set 1 PID operation mode</i> .	<i>Off</i>
41.08	<i>Set 2 feedback 1 source</i>	See parameter <i>40.08 Set 1 feedback 1 source</i> .	<i>A11 scaled</i>
41.09	<i>Set 2 feedback 2 source</i>	See parameter <i>40.09 Set 1 feedback 2 source</i> .	<i>Not selected</i>
41.10	<i>Set 2 feedback function</i>	See parameter <i>40.10 Set 1 feedback function</i> .	<i>In1</i>
41.11	<i>Set 2 feedback filter time</i>	See parameter <i>40.11 Set 1 feedback filter time</i> .	0.000 s
41.12	<i>Set 2 unit selection</i>	Defines the unit for parameters <i>41.21...41.24</i> and <i>41.47</i> .	%
	rpm	rpm.	7
	%	%.	4
	Hz	Hz.	3
	PID user unit 2	User-definable unit 2. The name of the unit can be edited on the control panel by choosing Menu – Settings – Edit texts.	249
41.14	<i>Set 2 setpoint scaling</i>	See parameter <i>40.14 Set 1 setpoint scaling</i> .	100.00
41.15	<i>Set 2 output scaling</i>	See parameter <i>40.15 Set 1 output scaling</i> .	1500.00; 1800.00 (<i>95.20 b0</i>)

No.	Name/Value	Description	Def/FbEq16
41.16	Set 2 setpoint 1 source	See parameter 40.16 Set 1 setpoint 1 source.	Internal setpoint
41.17	Set 2 setpoint 2 source	See parameter 40.17 Set 1 setpoint 2 source.	Not selected
41.18	Set 2 setpoint function	See parameter 40.18 Set 1 setpoint function.	In1 or In2
41.19	Set 2 internal setpoint sel1	See parameter 40.19 Set 1 internal setpoint sel1.	Not selected
41.20	Set 2 internal setpoint sel2	See parameter 40.20 Set 1 internal setpoint sel2.	Not selected
41.21	Set 2 internal setpoint 1	See parameter 40.21 Set 1 internal setpoint 1.	0.00
41.22	Set 2 internal setpoint 2	See parameter 40.22 Set 1 internal setpoint 2.	0.00
41.23	Set 2 internal setpoint 3	See parameter 40.23 Set 1 internal setpoint 3.	0.00
41.24	Set 2 internal setpoint 4	See parameter 40.24 Set 1 internal setpoint 4.	0.00
41.25	Set 2 setpoint selection	See parameter 40.25 Set 1 setpoint selection.	Setpoint source 1
41.26	Set 2 setpoint min	See parameter 40.26 Set 1 setpoint min.	0.00
41.27	Set 2 setpoint max	See parameter 40.27 Set 1 setpoint max.	32767.00
41.28	Set 2 setpoint increase time	See parameter 40.28 Set 1 setpoint increase time.	0.0 s
41.29	Set 2 setpoint decrease time	See parameter 40.29 Set 1 setpoint decrease time.	0.0 s
41.30	Set 2 setpoint freeze enable	See parameter 40.30 Set 1 setpoint freeze enable.	Not selected
41.31	Set 2 deviation inversion	See parameter 40.31 Set 1 deviation inversion.	Not inverted (Ref - Fbk)
41.32	Set 2 gain	See parameter 40.32 Set 1 gain.	1.00
41.33	Set 2 integration time	See parameter 40.33 Set 1 integration time.	60.0 s
41.34	Set 2 derivation time	See parameter 40.34 Set 1 derivation time.	0.000 s
41.35	Set 2 derivation filter time	See parameter 40.35 Set 1 derivation filter time.	0.0 s
41.36	Set 2 output min	See parameter 40.36 Set 1 output min.	0.0
41.37	Set 2 output max	See parameter 40.37 Set 1 output max.	1500.0; 1800.0 (95.20 b0)
41.38	Set 2 output freeze enable	See parameter 40.38 Set 1 output freeze enable.	Not selected
41.39	Set 2 deadband range	See parameter 40.39 Set 1 deadband range.	0.0
41.40	Set 2 deadband delay	See parameter 40.40 Set 1 deadband delay.	0.0 s
41.41	Set 2 sleep mode	See parameter 40.41 Set 1 sleep mode.	Not selected

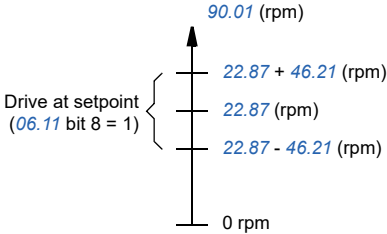
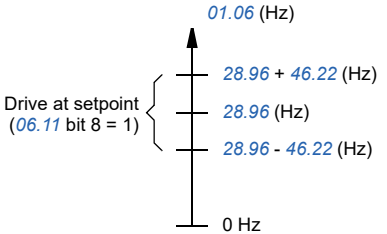
No.	Name/Value	Description	Def/FbEq16
41.42	<i>Set 2 sleep enable</i>	See parameter <i>40.42 Set 1 sleep enable</i> .	<i>Not selected</i>
41.43	<i>Set 2 sleep level</i>	See parameter <i>40.43 Set 1 sleep level</i> .	0.0
41.44	<i>Set 2 sleep delay</i>	See parameter <i>40.44 Set 1 sleep delay</i> .	60.0 s
41.45	<i>Set 2 sleep boost time</i>	See parameter <i>40.45 Set 1 sleep boost time</i> .	0.0 s
41.46	<i>Set 2 sleep boost step</i>	See parameter <i>40.46 Set 1 sleep boost step</i> .	0.0
41.47	<i>Set 2 wake-up deviation</i>	See parameter <i>40.47 Set 1 wake-up deviation</i> .	0.00 rpm, % or Hz
41.48	<i>Set 2 wake-up delay</i>	See parameter <i>40.48 Set 1 wake-up delay</i> .	5.0 s
41.49	<i>Set 2 tracking mode</i>	See parameter <i>40.49 Set 1 tracking mode</i> .	<i>Not selected</i>
41.50	<i>Set 2 tracking ref selection</i>	See parameter <i>40.50 Set 1 tracking ref selection</i> .	<i>Not selected</i>
41.51	<i>Set 2 trim mode</i>	See parameter <i>40.51 Set 1 trim mode</i> .	<i>Off</i>
41.52	<i>Set 2 trim selection</i>	See parameter <i>40.52 Set 1 trim selection</i> .	<i>Torque</i>
41.53	<i>Set 2 trimmed ref pointer</i>	See parameter <i>40.53 Set 1 trimmed ref pointer</i> .	<i>Not selected</i>
41.54	<i>Set 2 trim mix</i>	See parameter <i>40.54 Set 1 trim mix</i> .	0.000
41.55	<i>Set 2 trim adjust</i>	See parameter <i>40.55 Set 1 trim adjust</i> .	1.000
41.56	<i>Set 2 trim source</i>	See parameter <i>40.56 Set 1 trim source</i> .	<i>PID ref</i>
41.60	<i>Set 2 PID activation source</i>	See parameter <i>40.60 Set 1 PID activation source</i> .	<i>On</i>

45 Energy efficiency		Settings for the energy saving calculators. See also section <i>Energy saving calculators</i> (page 49).	
45.01	<i>Saved GW hours</i>	Displays the energy saved in GWh compared to direct-on-line motor connection. This parameter is incremented when <i>45.02 Saved MW hours</i> rolls over. This parameter is read-only (see parameter <i>45.21 Energy calculations reset</i>).	-
	0...65535 GWh	Energy savings in GWh.	1 = 1 GWh
45.02	<i>Saved MW hours</i>	Displays the energy saved in MWh compared to direct-on-line motor connection. This parameter is incremented when <i>45.03 Saved kW hours</i> rolls over. When this parameter rolls over, parameter <i>45.01 Saved GW hours</i> is incremented. This parameter is read-only (see parameter <i>45.21 Energy calculations reset</i>).	-
	0...999 MWh	Energy savings in MWh.	1 = 1 MWh
45.03	<i>Saved kW hours</i>	Displays the energy saved in kWh compared to direct-on-line motor connection. When this parameter rolls over, parameter <i>45.02 Saved MW hours</i> is incremented. This parameter is read-only (see parameter <i>45.21 Energy calculations reset</i>).	-
	0.0 ... 999.9 kWh	Energy savings in kWh.	10 = 1 kWh

No.	Name/Value	Description	Def/FbEq16
45.05	<i>Saved money x1000</i>	Displays the monetary savings in thousands compared to direct-on-line motor connection. This parameter is incremented when 45.06 Saved money rolls over. The currency is defined by parameter 45.17 Tariff currency unit . This parameter is read-only (see parameter 45.21 Energy calculations reset).	-
	0...4294967295 thousands	Monetary savings in thousands of units.	-
45.06	<i>Saved money</i>	Displays the monetary savings compared to direct-on-line motor connection. This value is calculated by multiplying the saved energy in kWh by the currently active energy tariff (45.14 Tariff selection). When this parameter rolls over, parameter 45.05 Saved money x1000 is incremented. The currency is defined by parameter 45.17 Tariff currency unit . This parameter is read-only (see parameter 45.21 Energy calculations reset).	-
	0.00 ... 999.99 units	Monetary savings.	1 = 1 unit
45.08	<i>CO2 reduction in kilotons</i>	Displays the reduction in CO ₂ emissions in metric kilotons compared to direct-on-line motor connection. This value is incremented when parameter 45.09 CO2 reduction in tons rolls over. This parameter is read-only (see parameter 45.21 Energy calculations reset).	-
	0...65535 metric kilotons	Reduction in CO ₂ emissions in metric kilotons.	1 = 1 metric kiloton
45.09	<i>CO2 reduction in tons</i>	Displays the reduction in CO ₂ emissions in metric tons compared to direct-on-line motor connection. This value is calculated by multiplying the saved energy in MWh by the value of parameter 45.18 CO2 conversion factor (by default, 0.5 metric tons/MWh). When this parameter rolls over, parameter 45.08 CO2 reduction in kilotons is incremented. This parameter is read-only (see parameter 45.21 Energy calculations reset).	-
	0.0 ... 999.9 metric tons	Reduction in CO ₂ emissions in metric tons.	1 = 1 metric ton
45.12	<i>Energy tariff 1</i>	Defines energy tariff 1 (price of energy per kWh). Depending on the setting of parameter 45.14 Tariff selection , either this value or 45.13 Energy tariff 2 is used for reference when monetary savings are calculated. The currency is defined by parameter 45.17 Tariff currency unit . Note: Tariffs are read only at the instant of selection, and are not applied retroactively.	1.000 units
	0.000 ... 4294967.295 units	Energy tariff 1.	-
45.13	<i>Energy tariff 2</i>	Defines energy tariff 2 (price of energy per kWh). See parameter 45.12 Energy tariff 1 .	2.000 units
	0.000 ... 4294967.295 units	Energy tariff 2.	-

No.	Name/Value	Description	Def/FbEq16
45.14	<i>Tariff selection</i>	Selects (or defines a source that selects) which pre-defined energy tariff is used. 0 = 45.12 Energy tariff 1 1 = 45.13 Energy tariff 2	Energy tariff 1
	Energy tariff 1	0.	0
	Energy tariff 2	1.	1
	DI1	Digital input DI1 (10.02 DI delayed status , bit 0).	2
	DI2	Digital input DI2 (10.02 DI delayed status , bit 1).	3
	DI3	Digital input DI3 (10.02 DI delayed status , bit 2).	4
	DI4	Digital input DI4 (10.02 DI delayed status , bit 3).	5
	DI5	Digital input DI5 (10.02 DI delayed status , bit 4).	6
	DI6	Digital input DI6 (10.02 DI delayed status , bit 5).	7
	DIO1	Not applicable for ACS580MV.	11
	DIO2	Not applicable for ACS580MV.	12
	<i>Other [bit]</i>	Source selection (see Terms and abbreviations on page 55).	-
45.17	<i>Tariff currency unit</i>	Specifies the currency used for the savings calculations.	EUR
	Local currency	Local currency.	100
	EUR	Euro.	101
	USD	US dollar.	102
45.18	<i>CO2 conversion factor</i>	Defines a factor for conversion of saved energy into CO ₂ emissions (kg/kWh or tn/MWh).	0.500 tn/MWh
	0.000 ... 65.535 tn/MWh	Factor for conversion of saved energy into CO ₂ emissions.	1 = 1 tn/MWh
45.19	<i>Comparison power</i>	Actual power that the motor absorbs when connected direct-on-line and operating the application. The value is used for reference when energy savings are calculated. Note: The accuracy of the energy savings calculation is directly dependent on the accuracy of this value. If nothing is entered here, then the nominal motor power is used by the calculation, but that may inflate the energy savings reported as many motors do not absorb nameplate power.	0.00 kW or hp
	0.00 ... 100000.00 kW or 0.00 ... 100000.00 hp	Motor power.	1 = 1 unit
45.21	<i>Energy calculations reset</i>	Resets the savings counter parameters 45.01...45.09	Done
	Done	Reset not requested (normal operation), or reset complete.	0
	Reset	Reset the savings counter parameters. The value reverts automatically to Done .	1

No.	Name/Value	Description	Def/FbEq16
46 Monitoring/scaling settings		Speed supervision settings; actual signal filtering; general scaling settings.	
46.01	<i>Speed scaling</i>	Defines the maximum speed value used to define the acceleration ramp rate and the initial speed value used to define the deceleration ramp rate (see parameter group 23 Speed reference ramp). The speed acceleration and deceleration ramp times are therefore related to this value (not to parameter 30.12 Maximum speed). Also defines the 16-bit scaling of speed-related parameters. The value of this parameter corresponds to 20000 in fieldbus communication.	1500.00 rpm
	0.10 ... 30000.00 rpm	Acceleration/deceleration terminal/initial speed.	1 = 1 rpm
46.02	<i>Frequency scaling</i>	Defines the maximum frequency value used to define the acceleration ramp rate and the initial frequency value used to define deceleration ramp rate (see parameter group 28 Frequency reference chain). The frequency acceleration and deceleration ramp times are therefore related to this value (not to parameter 30.14 Maximum frequency). Also defines the 16-bit scaling of frequency-related parameters. The value of this parameter corresponds to 20000 in fieldbus communication.	50.00 Hz
	0.10 ... 1000.00 Hz	Acceleration/deceleration terminal/initial frequency.	10 = 1 Hz
46.03	<i>Torque scaling</i>	Defines the 16-bit scaling of torque parameters. The value of this parameter (in percent of nominal motor torque) corresponds to 10000 in fieldbus communication.	100.0%
	0.1 ... 1000.0%	Torque corresponding to 10000 on fieldbus.	10 = 1%
46.04	<i>Power scaling</i>	Defines the output power value that corresponds to 10000 in fieldbus communication. The unit is selected by parameter 96.16 Unit selection .	1000.00 kW or hp
	0.10 ... 30000.00 kW or hp	Power corresponding to 10000 on fieldbus.	1 = 1 unit
46.05	<i>Current scaling</i>	Defines the 16-bit scaling of current parameters. The value of this parameter corresponds to 10000 in fieldbus communication.	10000 A
	0...30000 A	Current corresponding to 10000 on fieldbus.	-
46.06	<i>Speed ref zero scaling</i>	Defines a speed corresponding to a zero reference received from fieldbus (either the embedded fieldbus interface, or interface or FBA B). For example, with a setting of 500, the fieldbus reference range of 0...20000 would correspond to a speed of 500... [46.01] rpm. Note: This parameter is effective only with the ABB Drives communication profile.	0.00 rpm
	0.00 ... 30000.00 rpm	Speed corresponding to minimum fieldbus reference.	1 = 1 rpm
46.07	<i>Frequency ref zero scaling</i>	Defines a frequency corresponding to a zero reference received from fieldbus (either the embedded fieldbus interface, or interface or FBA B). For example, with a setting of 30, the fieldbus reference range of 0...20000 would correspond to a speed of 30... [46.02] Hz. Note: This parameter is effective only with the ABB Drives communication profile.	0.00 Hz
	0.00 ... 1000.00 Hz	Frequency corresponding to minimum fieldbus reference.	10 = 1 Hz

No.	Name/Value	Description	Def/FbEq16
46.11	<i>Filter time motor speed</i>	Defines a filter time for signals <i>01.01 Motor speed used</i> , <i>01.02 Motor speed estimated</i> .	500 ms
	0...20000 ms	Motor speed signal filter time.	1 = 1 ms
46.12	<i>Filter time output frequency</i>	Defines a filter time for signal <i>01.06 Output frequency</i> .	500 ms
	0...20000 ms	Output frequency signal filter time.	1 = 1 ms
46.13	<i>Filter time motor torque</i>	Defines a filter time for signal <i>01.10 Motor torque</i> .	100 ms
	0...20000 ms	Motor torque signal filter time.	1 = 1 ms
46.14	<i>Filter time power out</i>	Defines a filter time for signal <i>01.14 Output power</i> .	100 ms
	0...20000 ms	Output power signal filter time.	1 = 1 ms
46.21	<i>At speed hysteresis</i>	Defines the “at setpoint” limits for speed control of the drive. When the absolute difference between reference (<i>22.87 Speed reference act 7</i>) and actual speed (<i>90.01 Motor speed for control</i>) is smaller than <i>46.21 At speed hysteresis</i>, the drive is considered to be “at setpoint”. This is indicated by bit 8 of <i>06.11 Main status word</i>. 	100.00 rpm
	0.00 ... 30000.00 rpm	Limit for “at setpoint” indication in speed control.	See par. <i>46.01</i>
46.22	<i>At frequency hysteresis</i>	Defines the “at setpoint” limits for frequency control of the drive. When the absolute difference between reference (<i>28.96 Frequency ref ramp input</i>) and actual frequency (<i>01.06 Output frequency</i>) is smaller than <i>46.22 At frequency hysteresis</i>, the drive is considered to be “at setpoint”. This is indicated by bit 8 of <i>06.11 Main status word</i>. 	10.00 Hz
	0.00 ... 1000.00 Hz	Limit for “at setpoint” indication in frequency control.	See par. <i>46.02</i>

No.	Name/Value	Description	Def/FbEq16
46.23	<i>At torque hysteresis</i>	Defines the "at setpoint" limits for torque control of the drive. Not applicable for ACS580MV.	10.0%
	0.0 ... 300.0%	Limit for "at setpoint" indication in torque control.	See par. 46.03
46.31	<i>Above speed limit</i>	Defines the trigger level for "above limit" indication in speed control. When actual speed exceeds the limit, bit 10 of 06.17 <i>Drive status word 2</i> is set.	0.00 rpm
	0.00 ... 30000.00 rpm	"Above limit" indication trigger level for speed control.	See par. 46.01
46.32	<i>Above frequency limit</i>	Defines the trigger level for "above limit" indication in frequency control. When actual frequency exceeds the limit, bit 10 of 06.17 <i>Drive status word 2</i> is set.	0.00 Hz
	0.00 ... 1000.00 Hz	"Above limit" indication trigger level for frequency control.	See par. 46.02
46.33	<i>Above torque limit</i>	Defines the trigger level for "above limit" indication in torque control. When actual torque exceeds the limit, bit 10 of 06.17 <i>Drive status word 2</i> is set.	0.0%
	0.0 ... 1600.0%	"Above limit" indication trigger level for torque control.	See par. 46.03
46.42	<i>Torque decimals</i>	Defines the number of decimal places of torque-related parameters.	1
	0...2	Number of decimal places of torque parameters.	1 = 1

47 Data storage		Data storage parameters that can be written to and read from using other parameters' source and target settings. Note that there are different storage parameters for different data types. See also section <i>Data storage parameters</i> (page 53).	
47.01	<i>Data storage 1 real32</i>	Data storage parameter 1.	0.000
	-2147483.008 ... 2147483.008	32-bit data.	-
47.02	<i>Data storage 2 real32</i>	Data storage parameter 2.	0.000
	-2147483.008 ... 2147483.008	32-bit data.	-
47.03	<i>Data storage 3 real32</i>	Data storage parameter 3.	0.000
	-2147483.008 ... 2147483.008	32-bit data.	-
47.04	<i>Data storage 4 real32</i>	Data storage parameter 4.	0.000
	-2147483.008 ... 2147483.008	32-bit data.	-
47.05	<i>Data storage 5 real32</i>	Data storage parameter 5.	0.000
	-2147483.008 ... 2147483.008	32-bit data.	-

No.	Name/Value	Description	Def/FbEq16
47.06	<i>Data storage 6</i> <i>real32</i>	Data storage parameter 6.	0.000
	-2147483.008 ... 2147483.008	32-bit data.	-
47.07	<i>Data storage 7</i> <i>real32</i>	Data storage parameter 7.	0.000
	-2147483.008 ... 2147483.008	32-bit data.	-
47.08	<i>Data storage 8</i> <i>real32</i>	Data storage parameter 8.	0.000
	-2147483.008 ... 2147483.008	32-bit data.	-
47.11	<i>Data storage 1</i> <i>int32</i>	Data storage parameter 9.	0
	-2147483648 ... 2147483647	32-bit data.	-
47.12	<i>Data storage 2</i> <i>int32</i>	Data storage parameter 10.	0
	-2147483648 ... 2147483647	32-bit data.	-
47.13	<i>Data storage 3</i> <i>int32</i>	Data storage parameter 11.	0
	-2147483648 ... 2147483647	32-bit data.	-
47.14	<i>Data storage 4</i> <i>int32</i>	Data storage parameter 12.	0
	-2147483648 ... 2147483647	32-bit data.	-
47.15	<i>Data storage 5</i> <i>int32</i>	Data storage parameter 13.	0
	-2147483648 ... 2147483647	32-bit data.	-
47.16	<i>Data storage 6</i> <i>int32</i>	Data storage parameter 14.	0
	-2147483648 ... 2147483647	32-bit data.	-
47.17	<i>Data storage 7</i> <i>int32</i>	Data storage parameter 15.	0
	-2147483648 ... 2147483647	32-bit data.	-
47.18	<i>Data storage 8</i> <i>int32</i>	Data storage parameter 16.	0
	-2147483648 ... 2147483647	32-bit data.	-
47.21	<i>Data storage 1</i> <i>int16</i>	Data storage parameter 17.	0
	-32768 ... 32767	16-bit data.	1 = 1

No.	Name/Value	Description	Def/FbEq16
47.22	Data storage 2 int16	Data storage parameter 18.	0
	-32768 ... 32767	16-bit data.	1 = 1
47.23	Data storage 3 int16	Data storage parameter 19.	0
	-32768 ... 32767	16-bit data.	1 = 1
47.24	Data storage 4 int16	Data storage parameter 20.	0
	-32768 ... 32767	16-bit data.	1 = 1
47.25	Data storage 5 int16	Data storage parameter 21.	0
	-32768 ... 32767	16-bit data.	1 = 1
47.26	Data storage 6 int16	Data storage parameter 22.	0
	-32768 ... 32767	16-bit data.	1 = 1
47.27	Data storage 7 int16	Data storage parameter 23.	0
	-32768 ... 32767	16-bit data.	1 = 1
47.28	Data storage 8 int16	Data storage parameter 24.	0
	-32768 ... 32767	16-bit data.	1 = 1
47.31	Data storage 1 real32 type	Defines the scaling of parameter 47.01 Data storage 1 real32 to and from 16-bit integer format. This scaling is used when the data storage parameter is the target of received 16-bit data (defined in parameter group 62 D2D and DDCS receive data), or when the data storage parameter is the source of transmitted 16-bit data (defined in parameter group 61 D2D and DDCS transmit data). The setting also defines the visible range of the storage parameter.	<i>Unscaled</i>
	Unscaled	Data storage only. Range: -2147483.264 ... 2147473.264.	0
	Transparent	Scaling: 1 = 1. Range: -32768 ... 32767.	1
	General	Scaling: 1 = 100. Range: -327.68 ... 327.67.	2
	Torque	The scaling is defined by parameter 46.03 Torque scaling . Range: -1600.0 ... 1600.0.	3
	Speed	The scaling is defined by parameter 46.01 Speed scaling . Range: -30000.00 ... 30000.00.	4
	Frequency	The scaling is defined by parameter 46.02 Frequency scaling . Range: -500.00 ... 500.00.	5
47.32	Data storage 2 real32 type	Defines the 16-bit scaling of parameter 47.02 Data storage 2 real32 . See parameter 47.31 Data storage 1 real32 type .	<i>Unscaled</i>
47.33	Data storage 3 real32 type	Defines the 16-bit scaling of parameter 47.03 Data storage 3 real32 . See parameter 47.31 Data storage 1 real32 type .	<i>Unscaled</i>
47.34	Data storage 4 real32 type	Defines the 16-bit scaling of parameter 47.04 Data storage 4 real32 . See parameter 47.31 Data storage 1 real32 type .	<i>Unscaled</i>

No.	Name/Value	Description	Def/FbEq16
47.35	<i>Data storage 5 real32 type</i>	Defines the 16-bit scaling of parameter <i>47.05 Data storage 5 real32</i> . See parameter <i>47.31 Data storage 1 real32 type</i> .	<i>Unscaled</i>
47.36	<i>Data storage 6 real32 type</i>	Defines the 16-bit scaling of parameter <i>47.06 Data storage 6 real32</i> . See parameter <i>47.31 Data storage 1 real32 type</i> .	<i>Unscaled</i>
47.37	<i>Data storage 7 real32 type</i>	Defines the 16-bit scaling of parameter <i>47.07 Data storage 7 real32</i> . See parameter <i>47.31 Data storage 1 real32 type</i> .	<i>Unscaled</i>
47.38	<i>Data storage 8 real32 type</i>	Defines the 16-bit scaling of parameter <i>47.08 Data storage 8 real32</i> . See parameter <i>47.31 Data storage 1 real32 type</i> .	<i>Unscaled</i>
49 Panel port communication		Communication settings for the control panel port on the drive.	
49.01	<i>Node ID number</i>	Defines the node ID of the drive. All devices connected to the network must have a unique node ID. Note: For networked drives, it is advisable to reserve ID 1 for spare/replacement drives.	1
	1...32	Node ID.	1 = 1
49.03	<i>Baud rate</i>	Defines the transfer rate of the link.	<i>230.4 kbps</i>
	38.4 kbps	38.4 kbit/s.	1
	57.6 kbps	57.6 kbit/s.	2
	86.4 kbps	86.4 kbit/s.	3
	115.2 kbps	115.2 kbit/s.	4
	230.4 kbps	230.4 kbit/s.	5
49.04	<i>Communication loss time</i>	Sets a timeout for control panel (or PC tool) communication. If a communication break lasts longer than the timeout, the action specified by parameter <i>49.05 Communication loss action</i> is taken.	10.0 s
	0.1 ... 3000.0 s	Panel/PC tool communication timeout.	10 = 1 s
49.05	<i>Communication loss action</i>	Selects how the drive reacts to a control panel (or PC tool) communication break.	<i>No action</i>
	No action	No action taken.	0
	Fault	Drive trips on <i>7081 Panel loss</i> . This only occurs if control is expected from the control panel, or if supervision is forced using parameter <i>49.07 Panel comm supervision force</i> .	1
	Last speed	Drive generates an <i>A7EE Panel loss</i> warning and freezes the speed to the level the drive was operating at. The speed is determined on the basis of actual speed using 850 ms low-pass filtering. This only occurs if control is expected from the control panel, or if supervision is forced using parameter <i>49.07 Panel comm supervision force</i> .  WARNING! Make sure that it is safe to continue operation in case of a communication break.	2

No.	Name/Value	Description	Def/FbEq16															
	Speed ref safe	Drive generates an <i>A7EE Panel loss</i> warning and sets the speed to the speed defined by parameter <i>22.41 Speed ref safe</i> (or <i>28.41 Frequency ref safe</i> when frequency reference is being used). This only occurs if control is expected from the control panel, or if supervision is forced using parameter <i>49.07 Panel comm supervision force</i> .  WARNING! Make sure that it is safe to continue operation in case of a communication break.	3															
	Warning	Drive generates an <i>A7EE Panel loss</i> warning. This only occurs if control is expected from the control panel, or if supervision is forced using parameter <i>49.07 Panel comm supervision force</i> .  WARNING! Make sure that it is safe to continue operation in case of a communication break.	5															
<i>49.06</i>	<i>Refresh settings</i>	Applies the settings of parameters <i>49.01...49.05</i> . Note: Refreshing may cause a communication break, so reconnecting the drive may be required.	<i>Done</i>															
	Done	Refresh done or not requested.	0															
	Refresh	Refresh parameters <i>49.01...49.05</i> . The value reverts automatically to <i>Done</i> .	1															
<i>49.07</i>	<i>Panel comm supervision force</i>	Activates control panel communication monitoring separately for each control location (see section <i>Local control vs. external control</i> on page 20). The parameter is primarily intended for monitoring the communication with the panel when it is connected to the application program and not selected as a control source by drive parameters.	0000b															
<table><tr><th>Bit</th><th>Name</th><th>Value</th></tr><tr><td>0</td><td>Ext 1</td><td>1 = Communication monitoring active when Ext 1 is being used.</td></tr><tr><td>1</td><td>Ext 2</td><td>1 = Communication monitoring active when Ext 2 is being used.</td></tr><tr><td>2</td><td>Local</td><td>1 = Communication monitoring active when local control is being used.</td></tr><tr><td>3...15</td><td>Reserved</td><td></td></tr></table>				Bit	Name	Value	0	Ext 1	1 = Communication monitoring active when Ext 1 is being used.	1	Ext 2	1 = Communication monitoring active when Ext 2 is being used.	2	Local	1 = Communication monitoring active when local control is being used.	3...15	Reserved	
Bit	Name	Value																
0	Ext 1	1 = Communication monitoring active when Ext 1 is being used.																
1	Ext 2	1 = Communication monitoring active when Ext 2 is being used.																
2	Local	1 = Communication monitoring active when local control is being used.																
3...15	Reserved																	
	0000b...0111b	Panel communication monitoring selection.	1 = 1															
<i>49.08</i>	<i>Secondary comm. loss action</i>	Selects how the drive reacts to a control panel (or PC tool) communication break. This action is taken when - the panel is parametrized as an alternative control or reference source but is not currently the active source, and - communication supervision for the active control location is not forced by parameter <i>49.07 Panel comm supervision force</i>.	<i>No action</i>															
	No action	No action taken.	0															
	Warning	Drive generates an <i>A7EE Control panel loss</i> warning.  WARNING! Make sure that it is safe to continue operation in case of a communication break.	5															
<i>49.14</i>	<i>Panel speed reference unit</i>	Defines the unit for speed reference when given from the control panel.	<i>rpm</i>															
	rpm	rpm.	0															

No.	Name/Value	Description	Def/FbEq16
	%	Percent of parameter 46.01 Speed scaling .	1
49.15	Minimum ext speed ref panel	Defines a minimum limit for control panel speed reference in external control. In local control, the limits in parameter group 30 Limits are in force. See section Local control vs. external control (page 20).	-30000.00 rpm
	-30000.00 ... 30000.00 rpm	Minimum speed reference.	See par. 46.01
49.16	Maximum ext speed ref panel	Defines a maximum limit for control panel speed reference in external control. In local control, the limits in parameter group 30 Limits are in force. See section Local control vs. external control (page 20).	30000.00 rpm
	-30000.00 ... 30000.00 rpm	Maximum speed reference.	See par. 46.01
49.17	Minimum ext frequency ref panel	Defines a minimum limit for control panel frequency reference in external control. In local control, the limits in parameter group 30 Limits are in force. See section Local control vs. external control (page 20).	-500.00 Hz
	-500.00 ... 500.00 Hz	Minimum frequency reference.	See par. 46.02
49.18	Maximum ext frequency ref panel	Defines a maximum limit for control panel frequency reference in external control. In local control, the limits in parameter group 30 Limits are in force. See section Local control vs. external control (page 20).	500.00 Hz
	-500.00 ... 500.00 Hz	Maximum frequency reference.	See par. 46.02
50 Fieldbus adapter (FBA)		Fieldbus communication configuration. See also chapter Fieldbus control through a fieldbus adapter (page 383).	
50.01	enable	Enables/disables communication between the drive and fieldbus adapter A, and specifies the slot the adapter is installed into.	Disable
	Disable	Communication between drive and fieldbus adapter A disabled.	0
	Option slot 1	Communication between drive and fieldbus adapter A enabled. The adapter is in slot 1.	1
	Option slot 2	Communication between drive and fieldbus adapter A enabled. The adapter is in slot 2.	2
	Option slot 3	Communication between drive and fieldbus adapter A enabled. The adapter is in slot 3.	3
50.02	comm loss func	Selects how the drive reacts upon a fieldbus communication break. The time delay is defined by parameter 50.03 comm loss t out .	No action
	No action	No action taken.	0
	Fault	Communication break detection active. Upon a communication break, the drive trips on a 7510 FBA A communication fault and coasts to a stop.	1

No.	Name/Value	Description	Def/FbEq16
	Last speed	Communication break detection active. Upon a communication break, the drive generates a warning (A7C1 FBA A communication) and freezes the speed to the level the drive was operating at. The speed is determined on the basis of actual speed using 850 ms low-pass filtering.  WARNING! Make sure that it is safe to continue operation in case of a communication break.	2
	Speed ref safe	Communication break detection active. Upon a communication break, the drive generates a warning (A7C1 FBA A communication) and sets the speed to the value defined by parameter 22.41 Speed ref safe (when speed reference is being used) or 28.41 Frequency ref safe (when frequency reference is being used).  WARNING! Make sure that it is safe to continue operation in case of a communication break.	3
	Fault always	Drive trips on 7510 FBA A communication . This occurs even though no control is expected from the fieldbus.	4
	Warning	Drive generates an A7C1 FBA A communication warning. This occurs even though no control is expected from the fieldbus.  WARNING! Make sure that it is safe to continue operation in case of a communication break.	5
50.03	comm loss t out	Defines the time delay before the action defined by parameter 50.02 comm loss func is taken. Time count starts when the communication link fails to update the message. As a rule of thumb, this parameter should be set to at least 3 times the transmit interval of the master.	0.3 s
	0.3 ... 6553.5 s	Time delay.	1 = 1 s
50.04	ref1 type	Selects the type and scaling of reference 1 received from fieldbus adapter A. Note: Fieldbus-specific communication profiles may use different scalings. For more information, see the manual of the fieldbus adapter.	Auto
	Auto	Type and scaling are chosen automatically according to which reference chain (see settings Torque , Speed , Frequency) the incoming reference is connected to. If the reference is not connected to any chain, no scaling is applied (as with setting Transparent).	0
	Transparent	No scaling is applied (the 16-bit scaling is 1 = 1 unit).	1
	General	Generic reference with a scaling of 100 = 1 (ie. integer and two decimals).	2
	Torque	The scaling is defined by parameter 46.03 Torque scaling .	3
	Speed	The scaling is defined by parameter 46.01 Speed scaling .	4
	Frequency	The scaling is defined by parameter 46.02 Frequency scaling .	5
	Voltage	Not supported	8
	Load position	Not supported	11
50.05	ref2 type	Selects the type and scaling of reference 2 received from fieldbus adapter A. See parameter 50.04 ref1 type.	Auto

No.	Name/Value	Description	Def/FbEq16
50.07	<i>actual 1 type</i>	Selects the type/source and scaling of actual value 1 transmitted to fieldbus network through fieldbus adapter A. Note: Fieldbus-specific communication profiles may use different scalings. For more information, see the manual of the fieldbus adapter.	<i>Auto</i>
	Auto	Type/source and scaling follow the type of reference 1 selected by parameter <i>50.04 ref1 type</i> . See the individual settings below for the sources and scalings.	0
	Transparent	The value selected by parameter <i>50.10 act1 transparent source</i> is sent as actual value 1. No scaling is applied (the 16-bit scaling is 1 = 1 unit).	1
	General	The value selected by parameter <i>50.10 act1 transparent source</i> is sent as actual value 1 with a 16-bit scaling of 100 = 1 unit (ie. integer and two decimals).	2
	Torque	<i>01.10 Motor torque</i> is sent as actual value 1. The scaling is defined by parameter <i>46.03 Torque scaling</i> .	3
	Speed	<i>01.01 Motor speed used</i> is sent as actual value 1. The scaling is defined by parameter <i>46.01 Speed scaling</i> .	4
	Frequency	<i>01.06 Output frequency</i> is sent as actual value 1. The scaling is defined by parameter <i>46.02 Frequency scaling</i> .	5
	Position	Not supported	6
	Voltage	Not supported	8
	Load position	Not supported	11
50.08	<i>actual 2 type</i>	Selects the type/source and scaling of actual value 2 transmitted to fieldbus network through fieldbus adapter A. See parameter <i>50.07 actual 1 type</i> .	<i>Auto</i>
50.09	<i>SW transparent source</i>	Selects the source of the fieldbus status word when parameter <i>50.06 FBA A SW sel</i> is set to <i>Transparent mode</i> .	<i>Not selected</i>
	Not selected	No source selected.	-
	<i>Other</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
50.10	<i>act1 transparent source</i>	When parameter <i>50.07 actual 1 type</i> is set to <i>Transparent</i> , this parameter selects the source of actual value 1 transmitted to the fieldbus network through fieldbus adapter A.	<i>Not selected</i>
	Not selected	No source selected.	-
	<i>Other</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
50.11	<i>act2 transparent source</i>	When parameter <i>50.08 actual 2 type</i> is set to <i>Transparent</i> , this parameter selects the source of actual value 2 transmitted to the fieldbus network through fieldbus adapter A.	<i>Not selected</i>
	Not selected	No source selected.	-
	<i>Other</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
50.12	<i>debug mode</i>	Enables the display of raw (unmodified) data received from and sent to fieldbus adapter A in parameters <i>50.13...50.18</i> . This functionality should only be used for debugging.	<i>Disable</i>
	Disable	Display of raw data from fieldbus adapter A disabled.	0
	Fast	Display of raw data from fieldbus adapter A enabled.	1

No.	Name/Value	Description	Def/FbEq16
50.13	<i>control word</i>	Displays the raw (unmodified) control word sent by the master (PLC) to fieldbus adapter A if debugging is enabled by parameter 50.12 debug mode . This parameter is read-only.	-
	00000000h ... FFFFFFFFh	Control word sent by master to fieldbus adapter A.	-
50.14	<i>reference 1</i>	Displays raw (unmodified) reference REF1 sent by the master (PLC) to fieldbus adapter A if debugging is enabled by parameter 50.12 debug mode . This parameter is read-only.	-
	-2147483648 ... 2147483647	Raw REF1 sent by master to fieldbus adapter A.	-
50.15	<i>reference 2</i>	Displays raw (unmodified) reference REF2 sent by the master (PLC) to fieldbus adapter A if debugging is enabled by parameter 50.12 debug mode . This parameter is read-only.	-
	-2147483648 ... 2147483647	Raw REF2 sent by master to fieldbus adapter A.	-
50.16	<i>status word</i>	Displays the raw (unmodified) status word sent by fieldbus adapter A to the master (PLC) if debugging is enabled by parameter 50.12 debug mode . This parameter is read-only.	-
	00000000h ... FFFFFFFFh	Status word sent by fieldbus adapter A to master.	-
50.17	<i>actual value 1</i>	Displays raw (unmodified) actual value ACT1 sent by fieldbus adapter A to the master (PLC) if debugging is enabled by parameter 50.12 debug mode . This parameter is read-only.	-
	-2147483648 ... 2147483647	Raw ACT1 sent by fieldbus adapter A to master.	-
50.18	<i>actual value 2</i>	Displays raw (unmodified) actual value ACT2 sent by fieldbus adapter A to the master (PLC) if debugging is enabled by parameter 50.12 debug mode . This parameter is read-only.	-
	-2147483648 ... 2147483647	Raw ACT2 sent by fieldbus adapter A to master.	-

No.	Name/Value	Description	Def/FbEq16															
50.26	<i>comm supervision force</i>	Activates fieldbus communication monitoring separately for each control location (see section <i>Local control vs. external control</i> on page 20). The parameter is primarily intended for monitoring the communication with when it is connected to the application program and not selected as a control source by drive parameters.	0000b															
<table><tr><th>Bit</th><th>Name</th><th>Value</th></tr><tr><td>0</td><td>Ext 1</td><td>1 = Communication monitoring active when Ext 1 is being used.</td></tr><tr><td>1</td><td>Ext 2</td><td>1 = Communication monitoring active when Ext 2 is being used.</td></tr><tr><td>2</td><td>Local</td><td>1 = Communication monitoring active when local control is being used.</td></tr><tr><td>3...15</td><td>Reserved</td><td></td></tr></table>				Bit	Name	Value	0	Ext 1	1 = Communication monitoring active when Ext 1 is being used.	1	Ext 2	1 = Communication monitoring active when Ext 2 is being used.	2	Local	1 = Communication monitoring active when local control is being used.	3...15	Reserved	
Bit	Name	Value																
0	Ext 1	1 = Communication monitoring active when Ext 1 is being used.																
1	Ext 2	1 = Communication monitoring active when Ext 2 is being used.																
2	Local	1 = Communication monitoring active when local control is being used.																
3...15	Reserved																	
50.31	<i>FBA B enable</i>	Enables/disables communication between the drive and fieldbus adapter B, and specifies the slot the adapter is installed into.  WARNING! The FBA B is used for the internal IO controller. The parameters related to FBA B should be changed by authorized personnel only. This parameter is read-only.	<i>Option slot 2</i>															
	Option slot 2	Communication between drive and fieldbus adapter B enabled. The adapter is in slot 2.	2															
50.32	<i>FBA B comm loss func</i>	Selects how the drive reacts upon a fieldbus communication break. The time delay is defined by parameter <i>50.33 FBA B comm loss timeout</i> .  WARNING! A communication loss on FBA B (IO controller) is always causing a fault. This parameter is read-only.	<i>Fault</i>															
	Fault	Communication break detection active. Upon a communication break, the drive trips on a <i>E108 AC500 communication fault</i> fault and coasts to a stop.	1															
50.33	<i>FBA B comm loss timeout</i>	Defines the time delay before the action defined by parameter <i>50.32 FBA B comm loss func</i> is taken. Time count starts when the communication link fails to update the message. As a rule of thumb, this parameter should be set to at least 3 times the transmit interval of the master.	0.3 s															
	0.3 ... 6553.5 s	Time delay.	1 = 1 s															
50.34	<i>FBA B ref1 type</i>	Selects the type and scaling of reference 1 received from fieldbus adapter B. The scaling of the reference is defined by parameters <i>46.01...46.04</i> , depending on which reference type is selected by this parameter. For the selections, see parameter <i>50.04 ref1 type</i> .	<i>Speed or frequency</i>															
50.35	<i>FBA B ref2 type</i>	Selects the type and scaling of reference 2 received from fieldbus adapter B. The scaling of the reference is defined by parameters <i>46.01...46.04</i> , depending on which reference type is selected by this parameter. For the selections, see parameter <i>50.04 ref1 type</i> .	<i>Speed or frequency</i>															

No.	Name/Value	Description	Def/FbEq16
50.37	<i>FBA B actual 1 type</i>	Selects the type and scaling of actual value 1 transmitted to the fieldbus network through fieldbus adapter B. The scaling of the value is defined by parameters 46.01...46.04 , depending on which actual value type is selected by this parameter. For the selections, see parameter 50.07 actual 1 type .	<i>Auto</i>
50.38	<i>FBA B actual 2 type</i>	Selects the type and scaling of actual value 2 transmitted to the fieldbus network through fieldbus adapter B. The scaling of the value is defined by parameters 46.01...46.04 , depending on which actual value type is selected by this parameter. For the selections, see parameter 50.07 actual 1 type .	<i>Auto</i>
50.39	<i>FBA B SW transparent source</i>	Selects the source of the fieldbus status word when parameter 50.36 FBA B SW sel is set to <i>Transparent mode</i> .	<i>Not selected</i>
	Not selected	No source selected.	-
	<i>Other</i>	Source selection (see Terms and abbreviations on page 55).	-
50.40	<i>FBA B act1 transparent source</i>	When parameter 50.37 FBA B actual 1 type is set to <i>Transparent</i> , this parameter selects the source of actual value 1 transmitted to the fieldbus network through fieldbus adapter B.	<i>Not selected</i>
	Not selected	No source selected.	-
	<i>Other</i>	Source selection (see Terms and abbreviations on page 55).	-
50.41	<i>FBA B act2 transparent source</i>	When parameter 50.38 FBA B actual 2 type is set to <i>Transparent</i> , this parameter selects the source of actual value 2 transmitted to the fieldbus network through fieldbus adapter B.	<i>Not selected</i>
	Not selected	No source selected.	-
	<i>Other</i>	Source selection (see Terms and abbreviations on page 55).	-
50.42	<i>FBA B debug enable</i>	Enables the display of raw (unmodified) data received from and sent to fieldbus adapter B in parameters 50.43...50.48 . This functionality should only be used for debugging.	<i>Disable</i>
	Disable	Display of raw data from fieldbus adapter B disabled.	0
	Fast	Display of raw data from fieldbus adapter B enabled.	1
50.43	<i>FBA B control word</i>	Displays the raw (unmodified) control word sent by the master (PLC) to fieldbus adapter B if debugging is enabled by parameter 50.42 FBA B debug enable . This parameter is read-only.	-
	00000000h ... FFFFFFFFh	Control word sent by master to fieldbus adapter B.	-
50.44	<i>FBA B reference 1</i>	Displays raw (unmodified) reference REF1 sent by the master (PLC) to fieldbus adapter B if debugging is enabled by parameter 50.42 FBA B debug enable . This parameter is read-only.	-
	-2147483648 ... 2147483647	Raw REF1 sent by master to fieldbus adapter B.	-
50.45	<i>FBA B reference 2</i>	Displays raw (unmodified) reference REF2 sent by the master (PLC) to fieldbus adapter B if debugging is enabled by parameter 50.42 FBA B debug enable . This parameter is read-only.	-
	-2147483648 ... 2147483647	Raw REF2 sent by master to fieldbus adapter B.	-

No.	Name/Value	Description	Def/FbEq16
50.46	<i>FBA B status word</i>	Displays the raw (unmodified) status word sent by fieldbus adapter B to the master (PLC) if debugging is enabled by parameter <i>50.42 FBA B debug enable</i> . This parameter is read-only.	-
	00000000h ... FFFFFFFFh	Status word sent by fieldbus adapter B to master.	-
50.47	<i>FBA B actual value 1</i>	Displays raw (unmodified) actual value ACT1 sent by fieldbus adapter B to the master (PLC) if debugging is enabled by parameter <i>50.42 FBA B debug enable</i> . This parameter is read-only.	-
	-2147483648 ... 2147483647	Raw ACT1 sent by fieldbus adapter B to master.	-
50.48	<i>FBA B actual value 2</i>	Displays raw (unmodified) actual value ACT2 sent by fieldbus adapter B to the master (PLC) if debugging is enabled by parameter <i>50.42 FBA B debug enable</i> . This parameter is read-only.	-
	-2147483648 ... 2147483647	Raw ACT2 sent by fieldbus adapter B to master.	-
50.56	<i>FBA B comm supervision force</i>	Activates fieldbus communication monitoring separately for each control location (see section <i>Local control vs. external control</i> on page 20). The parameter is primarily intended for monitoring the communication with when it is connected to the application program and not selected as a control source by drive parameters.	0000b

Bit	Name	Value
0	Ext 1	1 = Communication monitoring active when Ext 1 is being used.
1	Ext 2	1 = Communication monitoring active when Ext 2 is being used.
2	Local	1 = Communication monitoring active when local control is being used.
3...15	Reserved	

51 FBA A settings	Fieldbus adapter A configuration.	
51.01 <i>type</i>	Displays the type of the connected fieldbus adapter module. 0 = Module is not found or is not properly connected, or is disabled by parameter <i>50.01 enable</i> ; 1 = FPBA; 32 = FCAN; 37 = FDNA; 128 , 132 = FENA-11; 135 = FECA; 136 = FEPL; 485 = FSCA.	-
51.02 <i>Par2</i>	Parameters <i>51.02...51.26</i> are adapter module-specific. For more information, see the documentation of the fieldbus adapter module. Note that not all of these parameters are necessarily in use.	-
	0...65535	Fieldbus adapter configuration parameter.
	...	...
51.26 <i>Par26</i>	See parameter <i>51.02 Par2</i> .	-
	0...65535	Fieldbus adapter configuration parameter.

No.	Name/Value	Description	Def/FbEq16
51.27	<i>par refresh</i>	Validates any changed fieldbus adapter module configuration settings. After refreshing, the value reverts automatically to <i>Done</i> . Note: This parameter cannot be changed while the drive is running.	<i>Done</i>
	Done	Refreshing done.	0
	Refresh	Refreshing.	1
51.28	<i>par table ver</i>	Displays the parameter table revision of the fieldbus adapter module mapping file (stored in the memory of the drive). In format axyz, where ax = major table revision number; yz = minor table revision number. This parameter is read-only.	-
		Parameter table revision of adapter module.	-
51.29	<i>drive type code</i>	Displays the drive type code in the fieldbus adapter module mapping file (stored in the memory of the drive). This parameter is read-only.	-
	0...65535	Drive type code stored in the mapping file.	1 = 1
51.30	<i>mapping file ver</i>	Displays the fieldbus adapter module mapping file revision stored in the memory of the drive in decimal format. This parameter is read-only.	-
	0...65535	Mapping file revision.	1 = 1
51.31	<i>D2 comm status</i>	Displays the status of the fieldbus adapter module communication.	-
	Not configured	Adapter is not configured.	0
	Initializing	Adapter is initializing.	1
	Time out	A timeout has occurred in the communication between the adapter and the drive.	2
	Configuration error	Adapter configuration error: mapping file not found in the file system of the drive, or mapping file upload has failed more than three times.	3
	Off-line	Fieldbus communication is off-line.	4
	On-line	Fieldbus communication is on-line, or fieldbus adapter has been configured not to detect a communication break. For more information, see the documentation of the fieldbus adapter.	5
	Reset	Adapter is performing a hardware reset.	6
51.32	<i>comm SW ver</i>	Displays the common program revision of the adapter module in format axyz, where a = major revision number, xy = minor revision number, z = correction number or letter. Example: 190A = revision 1.90A.	
		Common program revision of adapter module.	-
51.33	<i>appl SW ver</i>	Displays the application program revision of the adapter module in format axyz, where a = major revision number, xy = minor revision number, z = correction number or letter. Example: 190A = revision 1.90A.	
		Application program version of adapter module.	-

No.	Name/Value	Description	Def/FbEq16
52 FBA A data in		Selection of data to be transferred from drive to fieldbus controller through fieldbus adapter A. Note: 32-bit values require two consecutive parameters. Whenever a 32-bit value is selected in a data parameter, the next parameter is automatically reserved.	
52.01	data in1	Parameters 52.01...52.12 select data to be transferred from the drive to the fieldbus controller through fieldbus adapter A.	<i>None</i>
	None	None.	0
	CW 16bit	Control Word (16 bits)	1
	Ref1 16bit	Reference REF1 (16 bits)	2
	Ref2 16bit	Reference REF2 (16 bits)	3
	SW 16bit	Status Word (16 bits)	4
	Act1 16bit	Actual value ACT1 (16 bits)	5
	Act2 16bit	Actual value ACT2 (16 bits)	6
	CW 32bit	Control Word (32 bits)	11
	Ref1 32bit	Reference REF1 (32 bits)	12
	Ref2 32bit	Reference REF2 (32 bits)	13
	SW 32bit	Status Word (32 bits)	14
	Act1 32bit	Actual value ACT1 (32 bits)	15
	Act2 32bit	Actual value ACT2 (32 bits)	16
	SW2 16bit	Status Word 2 (16 bits)	24
	<i>Other</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
...	...	...	...
52.12	data in12	See parameter 52.01 data in1 .	<i>None</i>
53 FBA A data out		Selection of data to be transferred from fieldbus controller to drive through fieldbus adapter A. Note: 32-bit values require two consecutive parameters. Whenever a 32-bit value is selected in a data parameter, the next parameter is automatically reserved.	
53.01	data out1	Parameters 53.01...53.12 select data to be transferred from the fieldbus controller to the drive through fieldbus adapter A.	<i>None</i>
	None	None.	0
	CW 16bit	Control Word (16 bits)	1
	Ref1 16bit	Reference REF1 (16 bits)	2
	Ref2 16bit	Reference REF2 (16 bits)	3
	CW 32bit	Control Word (32 bits)	11
	Ref1 32bit	Reference REF1 (32 bits)	12
	Ref2 32bit	Reference REF2 (32 bits)	13
	CW2 16bit	Control Word 2 (16 bits)	21
	<i>Other</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
...	...	...	...
53.12	data out12	See parameter 53.01 data out1 .	<i>None</i>

No.	Name/Value	Description	Def/FbEq16
54 FBA B settings		Fieldbus adapter B configuration.	
54.01	<i>FBA B type</i>	Displays the type of the connected fieldbus adapter module. 0 = Module is not found or is not properly connected, or is disabled by parameter 50.31 FBA B enable ; 1 = FPBA; 32 = FCAN; 37 = FDNA; 128, 132 = FENA-11; 135 = FECA; 136 = FEPL; 485 = FSCA. This parameter is read-only.	-
54.02	<i>FBA B Par2</i>	Parameters 54.02...54.26 are adapter module-specific. For more information, see the documentation of the fieldbus adapter module. Note that not all of these parameters are necessarily in use.	-
	0...65535	Fieldbus adapter configuration parameter.	1 = 1
...	...	...	...
54.26	<i>Protocol sw ver</i>	See parameter 54.02 FBA B Par2 .	-
	0...65535	Fieldbus adapter configuration parameter.	1 = 1
54.27	<i>FBA B par refresh</i>	Validates any changed fieldbus adapter module configuration settings. After refreshing, the value reverts automatically to Done . Note: This parameter cannot be changed while the drive is running.	Done
	Done	Refreshing done.	0
	Refresh	Refreshing.	1
54.28	<i>FBA B par table ver</i>	Displays the parameter table revision of the fieldbus adapter module mapping file (stored in the memory of the drive). In format xyz, where ax = major table revision number; yz = minor table revision number. This parameter is read-only.	-
		Parameter table revision of adapter module.	-
54.29	<i>FBA B drive type code</i>	Displays the drive type code in the fieldbus adapter module mapping file (stored in the memory of the drive). This parameter is read-only.	-
	0...65535	Drive type code stored in the mapping file.	1 = 1
54.30	<i>FBA B mapping file ver</i>	Displays the fieldbus adapter module mapping file revision stored in the memory of the drive in decimal format. This parameter is read-only.	-
	0...65535	Mapping file revision.	1 = 1
54.31	<i>D2FBA B comm status</i>	Displays the status of the fieldbus adapter module communication.	-
	Not configured	Adapter is not configured.	0
	Initializing	Adapter is initializing.	1
	Time out	A timeout has occurred in the communication between the adapter and the drive.	2
	Configuration error	Adapter configuration error: mapping file not found in the file system of the drive, or mapping file upload has failed more than three times.	3
	Off-line	Fieldbus communication is off-line.	4

No.	Name/Value	Description	Def/FbEq16
	On-line	Fieldbus communication is on-line, or fieldbus adapter has been configured not to detect a communication break. For more information, see the documentation of the fieldbus adapter.	5
	Reset	Adapter is performing a hardware reset.	6
54.32	<i>FBA B comm SW ver</i>	Displays the common program revision of the adapter module in format axyz, where a = major revision number, xy = minor revision number, z = correction number or letter. Example: 190A = revision 1.90A.	
		Common program revision of adapter module.	-
54.33	<i>FBA B appl SW ver</i>	Displays the application program revision of the adapter module in format axyz, where a = major revision number, xy = minor revision number, z = correction number or letter. Example: 190A = revision 1.90A.	
		Application program version of adapter module.	-
55 FBA B data in		Selection of data to be transferred from drive to fieldbus controller through fieldbus adapter B.  WARNING! The FBA B is used for the internal IO controller. The parameters related to FBA B should be changed by authorized personnel only.	
55.01	<i>FBA B data in1</i>	Parameters 55.01...55.12 select data to be transferred from the drive to the fieldbus controller through fieldbus adapter B.	<i>None</i>
	None	None.	0
	CW 16bit	Control Word (16 bits)	1
	Ref1 16bit	Reference REF1 (16 bits)	2
	Ref2 16bit	Reference REF2 (16 bits)	3
	SW 16bit	Status Word (16 bits)	4
	Act1 16bit	Actual value ACT1 (16 bits)	5
	Act2 16bit	Actual value ACT2 (16 bits)	6
	CW 32bit	Control Word (32 bits)	11
	Ref1 32bit	Reference REF1 (32 bits)	12
	Ref2 32bit	Reference REF2 (32 bits)	13
	SW 32bit	Status Word (32 bits)	14
	Act1 32bit	Actual value ACT1 (32 bits)	15
	Act2 32bit	Actual value ACT2 (32 bits)	16
	SW2 16bit	Status Word 2 (16 bits)	24
	<i>Other</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
...	...	...	...
55.12	<i>FBA B data in12</i>	See parameter 55.01 <i>FBA B data in1</i> .	<i>None</i>

No.	Name/Value	Description	Def/FbEq16
56 FBA B data out		Selection of data to be transferred from fieldbus controller to drive through fieldbus adapter B.  WARNING! The FBA B is used for the internal IO controller. The parameters related to FBA B should be changed by authorized personnel only.	
56.01	FBA B data out1	Parameters 56.01...56.12 select data to be transferred from the fieldbus controller to the drive through fieldbus adapter B.	<i>None</i>
	None	None.	0
	CW 16bit	Control Word (16 bits)	1
	Ref1 16bit	Reference REF1 (16 bits)	2
	Ref2 16bit	Reference REF2 (16 bits)	3
	CW 32bit	Control Word (32 bits)	11
	Ref1 32bit	Reference REF1 (32 bits)	12
	Ref2 32bit	Reference REF2 (32 bits)	13
	CW2 16bit	Control Word 2 (16 bits)	21
	<i>Other</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
...	...	...	...
56.12	FBA B data out12	See parameter 56.01 FBA B data out1 .	<i>None</i>
59 Embedded Ethernet		Ethernet interface (connector XETH) configuration. WARNING! To make enable operation, we must follow the steps below: 1. Config 59.03~07 2. Enable 59.01 3. Enable 59.25 4. Refresh 59.08 To reconfigure Embedded Ethernet, we must follow the steps below: 1. Disable 59.25 2. Disable 59.01 3. Reconfigure 59.03~07 4. Enable 59.01 5. Enable 59.25 6. Refresh 59.08	
59.01	Emb Eth enable	Enables communication through the Ethernet interface.	<i>Disable</i>
	Disable	Communication disabled.	0
	Enable	Communication enabled.	1

No.	Name/Value	Description	Def/FbEq16																											
59.02	Emb Eth status	Displays the status of Ethernet communication. This parameter is read-only.	-																											
<table><tr><th>Bit</th><th>Name</th><th>Description</th></tr><tr><td>0</td><td>Bitrate</td><td>1 = 100 Mbit/s 0 = 10 Mbit/s</td></tr><tr><td>1</td><td>Connection type</td><td>1 = Full duplex 0 = Half duplex</td></tr><tr><td>2</td><td>Link state</td><td>1 = Link up 0 = Link down</td></tr><tr><td>3</td><td>Addr configured</td><td>1 = Yes 0 = No IP address adopted from DHCP, Auto-IP or static configuration.</td></tr><tr><td>4</td><td>Only link-local address</td><td>1 = Yes 0 = No An automatic, self-configured link local address of the form 169.254.x.y is being used.</td></tr><tr><td>5</td><td>Addr conflict error</td><td>1 = Conflict 0 = No conflict A duplicate IP address has been detected. Interface disabled.</td></tr><tr><td>6</td><td>Connected</td><td>1 = Yes 0 = No The interface is being used by an application.</td></tr><tr><td>7...15</td><td colspan="2">Reserved.</td></tr></table>				Bit	Name	Description	0	Bitrate	1 = 100 Mbit/s 0 = 10 Mbit/s	1	Connection type	1 = Full duplex 0 = Half duplex	2	Link state	1 = Link up 0 = Link down	3	Addr configured	1 = Yes 0 = No IP address adopted from DHCP, Auto-IP or static configuration.	4	Only link-local address	1 = Yes 0 = No An automatic, self-configured link local address of the form 169.254.x.y is being used.	5	Addr conflict error	1 = Conflict 0 = No conflict A duplicate IP address has been detected. Interface disabled.	6	Connected	1 = Yes 0 = No The interface is being used by an application.	7...15	Reserved.	
Bit	Name	Description																												
0	Bitrate	1 = 100 Mbit/s 0 = 10 Mbit/s																												
1	Connection type	1 = Full duplex 0 = Half duplex																												
2	Link state	1 = Link up 0 = Link down																												
3	Addr configured	1 = Yes 0 = No IP address adopted from DHCP, Auto-IP or static configuration.																												
4	Only link-local address	1 = Yes 0 = No An automatic, self-configured link local address of the form 169.254.x.y is being used.																												
5	Addr conflict error	1 = Conflict 0 = No conflict A duplicate IP address has been detected. Interface disabled.																												
6	Connected	1 = Yes 0 = No The interface is being used by an application.																												
7...15	Reserved.																													
	0000h...FFFFh	Embedded ethernet interface status word.	1 = 1																											
59.03	Emb Eth commrate	Selects the bit rate of the communication and determines if the communication can be simultaneously two-way (full duplex) or only one way (half duplex).	Auto-negotiate																											
	Auto-negotiate	Automatic transfer rate selection.	0																											
	100 Mbps, Full duplex	Bit rate 100 megabits per second, full duplex.	1																											
	100 Mbps, Half duplex	Bit rate 100 megabits per second, half duplex.	2																											
	10 Mbps, Full duplex	Bit rate 10 megabits per second, full duplex.	3																											
	10 Mbps, Half duplex	Bit rate 10 megabits per second, half duplex.	4																											
59.04	Emb Eth IP settings	Determines the IP addressing mode of the Ethernet interface.	Dynamic IP																											
	Static IP	A static IP address is specified by the following parameters.	0																											
	Dynamic IP	The IP address is obtained dynamically from a DHCP server.	1																											
	Dynamic IP LLA	The IP address is obtained dynamically from a DHCP server. If a DHCP server is not available (eg. in case of a point-to-point connection between the control unit and a PC), a link-local address in the range 169.254.xxx.xxx will be used.	2																											
59.05	Emb Eth IP address	Defines a static IP address for the Ethernet interface when parameter 59.04 Emb Eth IP settings is set to Static IP.	000.000.000.000																											
	000.000.000.000 ... 255.255.255.255	Static IP address.	-																											

No.	Name/Value	Description	Def/FbEq16
59.06	<i>Emb Eth subnet mask</i>	Defines an optional subnet mask for the Ethernet interface when parameter <i>59.04 Emb Eth IP settings</i> is set to <i>Static IP</i> .	000.000.000.000
	000.000.000.000 ... 255.255.255.255	Subnet mask.	-
59.07	<i>Emb Eth gateway</i>	Specifies the gateway for the Ethernet subnet (segment) if one is specified by parameter <i>59.06 Emb Eth subnet mask</i> .	000.000.000.000
	000.000.000.000 ... 255.255.255.255	Gateway address.	-
59.08	<i>Emb Eth par refresh List</i>	Validates any changes in the Ethernet settings.	<i>Done</i>
	Done	Normal operation.	0
	Configure	Validates any changed Ethernet interface configuration settings. Reverts automatically to <i>Done</i> .	1
59.25	<i>Ethernet PC tools</i>	Enables tool access via Ethernet.	<i>Enable</i>
	Disable	Communication disabled.	0
	Enable	Communication enabled.	1

60 DDCS communication		DDCS communication configuration. The DDCS protocol is used in the communication between - drives in a master/follower configuration (see page 31), - the drive and an external controller such as the AC 800M (see page 39). - the drive (or more precisely, an inverter unit) and the supply unit of the drive system (see page 41). All of the above utilize a fiber optic link which also requires an RDCO module (with BCU control units).	
60.01	<i>M/F communication port</i>	Selects the connection used by the master/follower functionality.	<i>Not in use</i>
	Not in use	None (communication disabled).	0
	Slot 1A	Channel A on FDCO module in slot 1 (with ZCU control unit only).	1
	Slot 2A	Channel A on FDCO module in slot 2 (with ZCU control unit only).	2
	Slot 3A	Channel A on FDCO module in slot 3 (with ZCU control unit only).	3
	Slot 1B	Channel B on FDCO module in slot 1 (with ZCU control unit only).	4
	Slot 2B	Channel B on FDCO module in slot 2 (with ZCU control unit only).	5
	Slot 3B	Channel B on FDCO module in slot 3 (with ZCU control unit only).	6
	RDCO CH 2	Channel 2 on RDCO module (with BCU control unit only).	12
60.02	<i>M/F node address</i>	Selects the node address of the drive for master/follower communication. No two nodes on-line may have the same address. Note: The allowable addresses for the master are 0 and 1. The allowable addresses for followers are 2...60.	1
	1...254	Node address.	

No.	Name/Value	Description	Def/FbEq16
60.03	<i>M/F mode</i>	Defines the role of the drive on the master/follower or drive-to-drive link.	<i>Not in use</i>
	Not in use	Master/follower functionality not active.	0
	DDCS master	The drive is the master on the master/follower (DDCS) link.	1
	DDCS follower	The drive is a follower on the master/follower (DDCS) link.	2
	DDCS forcing	The role of the drive on the master/follower (DDCS) link is defined by parameters <i>60.15 Force master</i> and <i>60.16 Force follower</i> .	5
60.05	<i>M/F HW connection</i>	Selects the topology of the master/follower link.	<i>Ring</i>
	Ring	The devices are connected in a ring topology. Forwarding of messages is enabled.	0
	Star	The devices are connected in a star topology (for example, through a branching unit). Forwarding of messages is disabled.	1
60.07	<i>M/F link control</i>	Defines the light intensity of the transmission LED of RDCO module channel CH2. (This parameter is effective only when parameter <i>60.01 M/F communication port</i> is set to <i>RDCO CH 2</i> . FDCO modules have a hardware transmitter current selector.) In general, use higher values with longer fiber optic cables. The maximum setting is applicable to the maximum length of the fiber optic link. See <i>Specifications of the fiber optic master/follower link</i> (page 38).	10
	1...15	Light intensity.	
60.08	<i>M/F comm loss timeout</i>	Sets a timeout for master/follower (DDCS) communication. If a communication break lasts longer than the timeout, the action specified by parameter <i>60.09 M/F comm loss function</i> is taken. As a rule of thumb, this parameter should be set to at least 3 times the transmit interval of the master.	100 ms
	0...65535 ms	Master/follower communication timeout.	
60.09	<i>M/F comm loss function</i>	Selects how the drive reacts to a master/follower communication break.	<i>Fault</i>
	No action	No action taken.	0
	Warning	The drive generates an <i>A7CB MF comm loss</i> warning. This only occurs if control is expected from the master/follower link, or if supervision is forced using parameter <i>60.32 M/F comm supervision force</i> .  WARNING! Make sure that it is safe to continue operation in case of a communication break.	1
	Fault	Drive trips on <i>7582 MF comm loss</i> . This only occurs if control is expected from the master/follower link, or if supervision is forced using parameter <i>60.32 M/F comm supervision force</i> .	2
	Fault always	Drive trips on <i>7582 MF comm loss</i> . This occurs even though no control is expected from the master/follower link.	3

No.	Name/Value	Description	Def/FbEq16
60.10	<i>M/F ref1 type</i>	Selects the type and scaling of reference 1 received from the master/follower link. The resulting value is shown by 03.13 M/F or D2D ref1 .	<i>Auto</i>
	Auto	Type and scaling are chosen automatically according to which reference chain (see settings Torque , Speed , Frequency) the incoming reference is connected to. If the reference is not connected to any chain, no scaling is applied (as with setting Transparent).	0
	Transparent	Reserved.	1
	General	Reserved.	2
	Torque	The scaling is defined by parameter 46.03 Torque scaling .	3
	Speed	The scaling is defined by parameter 46.01 Speed scaling .	4
	Frequency	The scaling is defined by parameter 46.02 Frequency scaling .	5
60.11	<i>M/F ref2 type</i>	Selects the type and scaling of reference 2 received from the master/follower link. The resulting value is shown by 03.14 M/F or D2D ref2 . For the selections, see parameter 60.10 M/F ref1 type .	<i>Torque</i>
60.12	<i>M/F act1 type</i>	Selects the type/source and scaling of actual value ACT1 transmitted to the master/follower link.	<i>Auto</i>
	Auto	Type/source and scaling follow the type of reference 1 selected by parameter 60.10 M/F ref1 type . See the individual settings below for the sources and scalings.	0
	Transparent	Reserved.	1
	General	Reserved.	2
	Torque	01.10 Motor torque is sent as actual value 1. The scaling is defined by parameter 46.03 Torque scaling .	3
	Speed	01.01 Motor speed used is sent as actual value 1. The scaling is defined by parameter 46.01 Speed scaling .	4
	Frequency	01.06 Output frequency is sent as actual value 1. The scaling is defined by parameter 46.02 Frequency scaling .	5
60.13	<i>M/F act2 type</i>	Selects the type/source and scaling of actual value ACT2 transmitted to the master/follower link.	<i>Auto</i>
	Auto	Type/source and scaling follow the type of reference 2 selected by parameter 60.11 M/F ref2 type . See the individual settings below for the sources and scalings.	0
	Transparent	Reserved.	1
	General	Reserved.	2
	Torque	01.10 Motor torque is sent as actual value 2. The scaling is defined by parameter 46.03 Torque scaling .	3
	Speed	01.01 Motor speed used is sent as actual value 2. The scaling is defined by parameter 46.01 Speed scaling .	4
	Frequency	01.06 Output frequency is sent as actual value 2. The scaling is defined by parameter 46.02 Frequency scaling .	5
60.14	<i>M/F follower selection</i>	(Effective in the master only.) Defines the followers from which data is read. See also parameters 62.28...62.33 .	<i>None</i>
	Follower node 2	Data is read from the follower with node address 2.	2
	Follower node 3	Data is read from the follower with node address 3.	4
	Follower node 4	Data is read from the follower with node address 4.	8

No.	Name/Value	Description	Def/FbEq16
	Follower nodes 2+3	Data is read from the followers with node addresses 2 and 3.	6
	Follower nodes 2+4	Data is read from the followers with node addresses 2 and 4.	10
	Follower nodes 3+4	Data is read from the followers with node addresses 3 and 4.	12
	Follower nodes 2+3+4	Data is read from the followers with node addresses 2, 3 and 4.	14
	None	None.	0
60.15	<i>Force master</i>	When parameter <i>60.03 M/F mode</i> is set to <i>DDCS forcing</i> , this parameter selects a source that forces the drive to be the master on the master/follower link. 1 = Drive is master on the master/follower link	<i>FALSE</i>
	FALSE	0.	0
	TRUE	1.	1
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
60.16	<i>Force follower</i>	When parameter <i>60.03 M/F mode</i> is set to <i>DDCS forcing</i> , this parameter selects a source that forces the drive to be a follower on the master/follower link. 1 = Drive is follower on the master/follower link	<i>FALSE</i>
	FALSE	0.	0
	TRUE	1.	1
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
60.17	<i>Follower fault action</i>	(Effective in the master only.) Selects how the drive reacts to a fault in a follower. See also parameter <i>60.23 M/F status supervision sel 1</i> . Note: Each follower must be configured to transmit its status word as one of the three data words in parameters <i>61.01...61.03</i> . In the master, the corresponding target parameter (<i>62.04...62.12</i>) must be set to <i>Follower SW</i> .	<i>Fault</i>
	No action	No action taken. Unaffected drives on the master/follower link will continue running.	0
	Warning	The drive generates a warning (<i>AFE7 Follower</i>).	1
	Fault	Drive trips on <i>FF7E Follower</i> . All followers will be stopped.	2
60.18	<i>Follower enable</i>	Interlocks the starting of the master to the status of the followers. See also parameter <i>60.23 M/F status supervision sel 1</i> . Note: Each follower must be configured to transmit its status word as one of the three data words in parameters <i>61.01...61.03</i> . In the master, the corresponding target parameter (<i>62.04...62.12</i>) must be set to <i>Follower SW</i> .	<i>Always</i>
	MSW bit 0	The master can only be started if all followers are ready to switch on (bit 0 of <i>06.11 Main status word</i> in each follower is on).	0
	MSW bit 1	The master can only be started if all followers are ready to operate (bit 1 of <i>06.11 Main status word</i> in each follower is on).	1
	MSW bits 0 + 1	The master can only be started if all followers are ready to switch on and ready to operate (bits 0 and 1 of <i>06.11 Main status word</i> in each follower are on).	2
	Always	The starting of the master is not interlocked to the status of the followers.	3

No.	Name/Value	Description	Def/FbEq16
	MSW bit 12	The master can only be started if user-definable bit 12 of <i>06.11 Main status word</i> in each follower is on. See parameter <i>06.31 MSW bit 12 sel.</i>	4
	MSW bits 0 + 12	The master can only be started if both bit 0 and bit 12 of <i>06.11 Main status word</i> in each follower are on.	5
	MSW bits 1 + 12	The master can only be started if both bit 1 and bit 12 of <i>06.11 Main status word</i> in each follower are on.	6
<i>60.31</i>	<i>M/F wake up delay</i>	Defines a wake-up delay during which no master/follower communication faults or warnings are generated. This is to allow all drives on the master/follower link to power up. The master cannot be started until the delay elapses or all monitored followers are found to be ready.	60.0 s
	0.0 ... 180.0 s	Master/follower wake-up delay.	10 = 1 s
<i>60.32</i>	<i>M/F comm supervision force</i>	Activates master/follower communication monitoring separately for each control location (see section <i>Local control vs. external control</i> on page 20). The parameter is primarily intended for monitoring the communication with master or follower when it is connected to the application program and not selected as a control source by drive parameters.	0000b

Bit	Name	Value
0	Ext 1	1 = Communication monitoring active when Ext 1 is being used.
1	Ext 2	1 = Communication monitoring active when Ext 2 is being used.
2	Local	1 = Communication monitoring active when local control is being used.
3...15	Reserved	

0000b...0111b	Master/follower communication monitoring selection.	1 = 1

61 D2D and DDCS transmit data		Defines the data sent to the DDCS link. See also parameter group 60 DDCS communication .	
61.01	M/F data 1 selection	Preselects the data to be sent as word 1 onto the master/follower link. See also parameter 61.25 M/F data 1 value , and section Master/follower functionality (page 31).	Follower CW
	None	None.	0
	CW 16bit	Control Word (16 bits)	1
	SW 16bit	Status Word (16 bits)	4
	Act1 16bit	Actual value ACT1 (16 bits) Note: Using this setting to send a reference to the follower is not recommended as the source signal is filtered. Use the "reference" selections instead.	5
	Act2 16bit	Actual value ACT2 (16 bits) Note: Using this setting to send a reference to the follower is not recommended as the source signal is filtered. Use the "reference" selections instead.	6

No.	Name/Value	Description	Def/FbEq16
	Follower CW	A word consisting of bits 0...11 of <i>06.01 Main control word</i> and the bits selected by parameters <i>06.45...06.48</i> . Note: Bit 3 of the follower control word is kept on as long as the master is modulating, and when it switches to 0, the follower coasts to a stop.	27
	Used speed reference	<i>24.01 Used speed reference</i> (page 226).	6145
	Torque reference act 5	<i>26.75 Torque reference act 5</i> (page 172).	6731
	Torque reference used	<i>26.02 Torque reference used</i> (page 166).	6658
	ACS800 System ctrl SW	A follower status word compatible with an ACS800 (System Control Program) master. With this setting, status word bit 0 is cleared whenever the run enable signal is missing.	28
	Follower CW B6 high	Otherwise identical to selection <i>Follower CW</i> , but bit 6 of the follower control word is also kept on as long as the master is modulating. This will allow the follower to stop along the stop ramp of the master.	29
	<i>Other</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-
<i>61.02</i>	<i>M/F data 2 selection</i>	Preselects the data to be sent as word 2 onto the master/follower link. See also parameter <i>61.26 M/F data 2 value</i> . For the selections, see parameter <i>61.01 M/F data 1 selection</i> .	<i>Used speed reference</i>
<i>61.03</i>	<i>M/F data 3 selection</i>	Preselects the data to be sent as word 3 onto the master/follower link. See also parameter <i>61.27 M/F data 3 value</i> . For the selections, see parameter <i>61.01 M/F data 1 selection</i> .	<i>Torque reference act 5</i>
<i>61.25</i>	<i>M/F data 1 value</i>	Displays the data to be sent onto the master/follower link as word 1 as an integer. If no data has been preselected by <i>61.01 M/F data 1 selection</i> , the value to be sent can be written directly into this parameter.	0
	0...65535	Data to be sent as word 1 in master/follower communication.	
<i>61.26</i>	<i>M/F data 2 value</i>	Displays the data to be sent onto the master/follower link as word 2 as an integer. If no data has been preselected by <i>61.02 M/F data 2 selection</i> , the value to be sent can be written directly into this parameter.	0
	0...65535	Data to be sent as word 2 in master/follower communication.	
<i>61.27</i>	<i>M/F data 3 value</i>	Displays the data to be sent onto the master/follower link as word 3 as an integer. If no data has been preselected by <i>61.03 M/F data 3 selection</i> , the value to be sent can be written directly into this parameter.	0
	0...65535	Data to be sent as word 3 in master/follower communication.	
62 D2D and DDCS receive data		Mapping of data received through the DDCS link. See also parameter group <i>60 DDCS communication</i> .	
<i>62.01</i>	<i>M/F data 1 selection</i>	(Follower only) Defines a target for the data received as word 1 from the master through the master/follower link. See also parameter <i>62.25 MF data 1 value</i> .	<i>None</i>
	None	None.	0

No.	Name/Value	Description	Def/FbEq16
	CW 16bit	Control Word (16 bits)	1
	Ref1 16bit	Reference REF1 (16 bits)	2
	Ref2 16bit	Reference REF2 (16 bits)	3
	<i>Other</i>	Source selection (see Terms and abbreviations on page 55).	-
62.02	<i>M/F data 2 selection</i>	(Follower only) Defines a target for the data received as word 2 from the master through the master/follower link. See also parameter 62.26 MF data 2 value . For the selections, see parameter 62.01 M/F data 1 selection .	<i>None</i>
62.03	<i>M/F data 3 selection</i>	(Follower only) Defines a target for the data received as word 3 from the master through the master/follower link. See also parameter 62.27 MF data 3 value . For the selections, see parameter 62.01 M/F data 1 selection .	<i>None</i>
62.04	<i>Follower node 2 data 1 sel</i>	Defines a target for the data received as word 1 from the first follower (ie. the follower with node address 2) through the master/follower link. See also parameter 62.28 Follower node 2 data 1 value .	<i>Follower SW</i>
	None	None.	0
	Follower SW	Status word of the follower. See also parameter 60.18 Follower enable .	26
	<i>Other</i>	Source selection (see Terms and abbreviations on page 55).	-
62.05	<i>Follower node 2 data 2 sel</i>	Defines a target for the data received as word 2 from the first follower (ie. the follower with node address 2) through the master/follower link. See also parameter 62.29 Follower node 2 data 2 value . For the selections, see parameter 62.04 Follower node 2 data 1 sel .	<i>None</i>
62.06	<i>Follower node 2 data 3 sel</i>	Defines a target for the data received as word 3 from the first follower (ie. the follower with node address 2) through the master/follower link. See also parameter 62.30 Follower node 2 data 3 value . For the selections, see parameter 62.04 Follower node 2 data 1 sel .	<i>None</i>
62.07	<i>Follower node 3 data 1 sel</i>	Defines a target for the data received as word 1 from the second follower (ie. the follower with node address 3) through the master/follower link. See also parameter 62.31 Follower node 3 data 1 value . For the selections, see parameter 62.04 Follower node 2 data 1 sel .	<i>Follower SW</i>
62.08	<i>Follower node 3 data 2 sel</i>	Defines a target for the data received as word 2 from the second follower (ie. the follower with node address 3) through the master/follower link. See also parameter 62.32 Follower node 3 data 2 value . For the selections, see parameter 62.04 Follower node 2 data 1 sel .	<i>None</i>
62.09	<i>Follower node 3 data 3 sel</i>	Defines a target for the data received as word 3 from the second follower (ie. the follower with node address 3) through the master/follower link. See also parameter 62.33 Follower node 3 data 3 value . For the selections, see parameter 62.04 Follower node 2 data 1 sel .	<i>None</i>

No.	Name/Value	Description	Def/FbEq16
62.10	<i>Follower node 4 data 1 sel</i>	Defines a target for the data received as word 1 from the third follower (ie. the follower with node address 4) through the master/follower link. See also parameter <i>62.34 Follower node 4 data 1 value</i> . For the selections, see parameter <i>62.04 Follower node 2 data 1 sel</i> .	<i>Follower SW</i>
62.11	<i>Follower node 4 data 2 sel</i>	Defines a target for the data received as word 2 from the third follower (ie. the follower with node address 4) through the master/follower link. See also parameter <i>62.35 Follower node 4 data 2 value</i> . For the selections, see parameter <i>62.04 Follower node 2 data 1 sel</i> .	<i>None</i>
62.12	<i>Follower node 4 data 3 sel</i>	Defines a target for the data received as word 3 from the third follower (ie. the follower with node address 4) through the master/follower link. See also parameter <i>62.36 Follower node 4 data 3 value</i> . For the selections, see parameter <i>62.04 Follower node 2 data 1 sel</i> .	<i>None</i>
62.25	<i>MF data 1 value</i>	(Follower only) Displays, in integer format, the data received from the master as word 1. Parameter <i>62.01 M/F data 1 selection</i> can be used to select a target for the received data. This parameter can also be used as a signal source by other parameters.	0
	0...65535	Data received as word 1 in master/follower communication.	
62.26	<i>MF data 2 value</i>	(Follower only) Displays, in integer format, the data received from the master as word 2. Parameter <i>62.02 M/F data 2 selection</i> can be used to select a target for the received data. This parameter can also be used as a signal source by other parameters.	0
	0...65535	Data received as word 2 in master/follower communication.	
62.27	<i>MF data 3 value</i>	(Follower only) Displays, in integer format, the data received from the master as word 3. Parameter <i>62.03 M/F data 3 selection</i> can be used to select a target for the received data. This parameter can also be used as a signal source by other parameters.	0
	0...65535	Data received as word 3 in master/follower communication.	
62.28	<i>Follower node 2 data 1 value</i>	Displays, in integer format, the data received from the first follower (ie. follower with node address 2) as word 1. Parameter <i>62.04 Follower node 2 data 1 sel</i> can be used to select a target for the received data. This parameter can also be used as a signal source by other parameters.	0
	0...65535	Data received as word 1 from follower with node address 2.	
62.29	<i>Follower node 2 data 2 value</i>	Displays, in integer format, the data received from the first follower (ie. follower with node address 2) as word 2. Parameter <i>62.05 Follower node 2 data 2 sel</i> can be used to select a target for the received data. This parameter can also be used as a signal source by other parameters.	0
	0...65535	Data received as word 2 from follower with node address 2.	

No.	Name/Value	Description	Def/FbEq16
62.30	<i>Follower node 2 data 3 value</i>	Displays, in integer format, the data received from the first follower (ie. follower with node address 2) as word 3. Parameter 62.06 Follower node 2 data 3 sel can be used to select a target for the received data. This parameter can also be used as a signal source by other parameters.	0
	0...65535	Data received as word 3 from follower with node address 2.	
62.31	<i>Follower node 3 data 1 value</i>	Displays, in integer format, the data received from the second follower (ie. follower with node address 3) as word 1. Parameter 62.07 Follower node 3 data 1 sel can be used to select a target for the received data. This parameter can also be used as a signal source by other parameters.	0
	0...65535	Data received as word 1 from follower with node address 3.	
62.32	<i>Follower node 3 data 2 value</i>	Displays, in integer format, the data received from the second follower (ie. follower with node address 3) as word 2. Parameter 62.08 Follower node 3 data 2 sel can be used to select a target for the received data. This parameter can also be used as a signal source by other parameters.	0
	0...65535	Data received as word 2 from follower with node address 3.	
62.33	<i>Follower node 3 data 3 value</i>	Displays, in integer format, the data received from the second follower (ie. follower with node address 3) as word 3. Parameter 62.09 Follower node 3 data 3 sel can be used to select a target for the received data. This parameter can also be used as a signal source by other parameters.	0
	0...65535	Data received as word 3 from follower with node address 3.	
62.34	<i>Follower node 4 data 1 value</i>	Displays, in integer format, the data received from the third follower (ie. follower with node address 4) as word 1. Parameter 62.10 Follower node 4 data 1 sel can be used to select a target for the received data. This parameter can also be used as a signal source by other parameters.	0
	0...65535	Data received as word 1 from follower with node address 4.	
62.35	<i>Follower node 4 data 2 value</i>	Displays, in integer format, the data received from the third follower (ie. follower with node address 4) as word 2. Parameter 62.11 Follower node 4 data 2 sel can be used to select a target for the received data. This parameter can also be used as a signal source by other parameters.	0
	0...65535	Data received as word 2 from follower with node address 4.	
62.36	<i>Follower node 4 data 3 value</i>	Displays, in integer format, the data received from the third follower (ie. follower with node address 4) as word 3. Parameter 62.12 Follower node 4 data 3 sel can be used to select a target for the received data. This parameter can also be used as a signal source by other parameters.	0
	0...65535	Data received as word 3 from follower with node address 4.	
70 Power module values phase A		Measured values from all power modules in phase A. Allows monitoring of measurements from power modules with the overriding system or PC tools. Note: Parameters in this group have correct values only when the drive is charged. With a discharged drive all parameters have default values. All parameters in this group are read only.	
70.01	<i>DSP temperature A1</i>	Measured temperature of the DSP in power module 1 of phase A.	-

No.	Name/Value	Description	Def/FbEq16
	0.0 ... 141.0 °C	Power module A1 DSP temperature.	10 = 1 °C
70.02	<i>IGBT1 temperature A1</i>	Measured temperature of the IGBT1 in power module 1 of phase A.	-
	0.0 ... 141.0 °C	Power module A1 IGBT1 temperature.	10 = 1 °C
70.03	<i>IGBT2 temperature A1</i>	Measured temperature of the IGBT2 in power module 1 of phase A.	-
	0.0 ... 141.0 °C	Power module A1 IGBT1 temperature.	10 = 1 °C
70.04	<i>IGBT3 temperature A1</i>	Measured temperature of the IGBT3 in power module 1 of phase A.	-
	0.0 ... 141.0 °C	Power module A1 IGBT1 temperature.	10 = 1 °C
70.05	<i>PM RX comm err count A1</i>	Total (cumulative) number of communication errors from control hub to power module 1 of phase A. This counter is set to zero if the drive is discharged and charged again. The counter is not saturated - when it reaches the maximum value, it wraps around and starts counting from 0.	-
	0...	Number of communication errors from control hub to power module A1.	1 = 1 unit
70.06	<i>Operating hours A1</i>	Number of hours the power module 1 of phase A has been in operation (charged).	-
	0.00... 4294967296	Power module A1 operation hours.	100 = 1 h
70.07	<i>1/3 DC link voltage A1</i>	Measured voltage across 1/3 of DC link in power module 1 of phase A.	-
	0.0...1323.0 V	Power module A1 1/3 DC link.	10 = 1 V
70.08	<i>2/3 DC link voltage A1</i>	Measured voltage across 2/3 of DC link in power module 1 of phase A.	-
	0.0...1323.0 V	Power module A1 2/3 DC link.	10 = 1 V
70.09	<i>5 volt power supply A1</i>	Actual measured voltage of the 5V power supply in power module 1 of phase A.	-
	0.0...30.0 V	Power module A1 5V power supply.	10 = 1 V
70.10	<i>Charging relay temperature A1</i>	Measured temperature of the charging relay in power module 1 of phase A.	-
	0.0 ... 141.0 °C	Power module A1 charging relay temperature.	10 = 1 °C
70.11	<i>3/3 DC link voltage A1</i>	Measured voltage across full DC link in power module 1 of phase A.	-
	0.0...1323.0 V	Power module A1 3/3 DC link.	10 = 1 V
70.12	<i>Hub RX comm err count A1</i>	Total (cumulative) number of communication errors from power module 1 of phase A to control hub. This counter is set to zero if the drive is discharged and charged again. The counter is not saturated - when it reaches the maximum value, it wraps around and starts counting from 0.	-
	0...	Number of communication errors from power module A1 to control hub.	1 = 1 unit
70.15	<i>Software version A1</i>	Software version on the power module 1 of phase A. Format: major.minor[.patch[.build]].	0.0.0.0
	0.0.0.0 ... 255.255.255.255	Power module A1 SW version.	1 = 1
70.16	<i>Hardware type A1</i>	Hardware type on the power module 1 of phase A.	0
	0...	Power module A1 HW type.	1 = 1

No.	Name/Value	Description	Def/FbEq16
70.17	Hardware rating A1	Hardware rating of the power module 1 of phase A.	0
	0...	Power module A1 HW rating.	1 = 1
70.21	DSP temperature A2	Parameters 70.21...70.177 display measured values from power modules 2 to 9 of phase A. There are 15 parameters per power module. For their description see parameters 70.01...70.17. Note: Not all parameters in this group are necessarily in use. Depending on the drive configuration there can be different number of power modules per phase.	-
	0.0 ... 141.0 °C	Power module A2 DSP temperature.	10 = 1 °C
	...	...	...
70.177	Hardware rating A9	See explanation for parameter 70.21 DSP temperature A2.	-
	0...	Power module A9 HW rating.	1 = 1

71 Power module values phase B		Measured values from all power modules in phase B. Allows monitoring of measurements from power modules with the overriding system or PC tools. Note: Parameters in this group have correct values only when the drive is charged. With a discharged drive all parameters have default values. All parameters in this group are read only.	
71.01	DSP temperature B1	Parameters 71.01...71.177 display measured values from all power modules of phase B. There are 15 parameters per power module. For their description see parameters 70.01...70.17. Note: Not all parameters in this group are necessarily in use. Depending on the drive configuration there can be different number of power modules per phase.	-
	0.0 ... 141.0 °C	Power module B1 DSP temperature.	10 = 1 °C
	...	...	...
71.177	Hardware rating B9	See explanation for parameter 71.01 DSP temperature B1.	-
	0...	Power module B9 HW rating.	1 = 1

72 Power module values phase C		Measured values from all power modules in phase C. Allows monitoring of measurements from power modules with the overriding system or PC tools. Note: Parameters in this group have correct values only when the drive is charged. With a discharged drive all parameters have default values. All parameters in this group are read only.	
72.01	DSP temperature C1	Parameters 71.01...72.177 display measured values from all power modules of phase C. There are 15 parameters per power module. For their description see parameters 70.01...70.17. Note: Not all parameters in this group are necessarily in use. Depending on the drive configuration there can be different number of power modules per phase.	-
	0.0 ... 141.0 °C	Power module C1 DSP temperature.	10 = 1 °C

No.	Name/Value	Description	Def/FbEq16										
...	...	...	...										
72.177	Hardware rating C9	See explanation for parameter 71.01 DSP temperature B1.	-										
	0...	Power module C9 HW rating.	1 = 1										
81 System control and monitoring		Application software parameters used for system control and monitoring.											
81.01	System control and monitor CW	System control and monitoring control word. Shows the control signals as received from fieldbus interface. If the converter is to be controlled by overriding system via fieldbus using cyclic communication, system control word from fieldbus should be linked to this parameter (should be set up in the parameter group 53 FBA A data out). This parameter is read-only.	0000h										
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Bit	Function												
0	1 = Local control disable												
1...15	Reserved												
	0000h...FFFFh	System control and monitoring control word.	1 = 1										
81.02	System control and monitor SW	System control and monitoring status word. Shows the system status signals from application program that can be read by overriding system via fieldbus interface. If the converter status is to be read by overriding system via fieldbus interface using cyclic communication, this parameter should be linked to the fieldbus system status word (should be set up in the parameter group 52 FBA A data in). This parameter is read-only.	0000h										
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Bit	Function												
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81.03	System control and monitor AW1	System control and monitoring alarm word 1. Shows system level active alarm signals from application program that can be read by overriding system via fieldbus interface. If converter alarms are to be read by overriding system via fieldbus interface using cyclic communication, this parameter should be linked to the fieldbus system alarm word 1 (should be set up in the parameter group 52 FBA A data in). This parameter is read-only.	0000h										

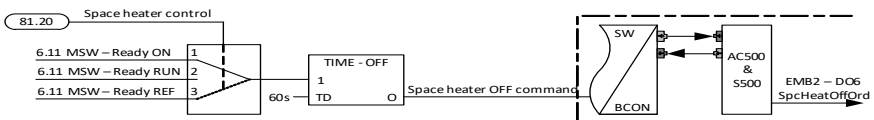
No.	Name/Value	Description	Def/FbEq16																																		
<table><tr><th>Bit</th><th>Function</th></tr><tr><td>0</td><td>1 = Trafo phase U1 temperature high</td></tr><tr><td>1</td><td>1 = Trafo phase V1 temperature high</td></tr><tr><td>2</td><td>1 = Trafo phase W1 temperature high</td></tr><tr><td>3</td><td>1 = Ambient temperature high</td></tr><tr><td>4</td><td>1 = Ambient temperature sensor failure</td></tr><tr><td>5</td><td>1 = Motor phase U1 temperature high</td></tr><tr><td>6</td><td>1 = Motor phase V1 temperature high</td></tr><tr><td>7</td><td>1 = Motor phase W1 temperature high</td></tr><tr><td>8</td><td>1 = Motor phase U2 temperature high</td></tr><tr><td>9</td><td>1 = Motor phase V2 temperature high</td></tr><tr><td>10</td><td>1 = Motor phase W2 temperature high</td></tr><tr><td>11</td><td>1 = Motor DE bearing temperature high</td></tr><tr><td>12</td><td>1 = Motor NDE bearing temperature high</td></tr><tr><td>13</td><td>1 = Converter space heater overload</td></tr><tr><td>14</td><td>1 = Motor space heater overload</td></tr><tr><td>15</td><td>Reserved</td></tr></table>				Bit	Function	0	1 = Trafo phase U1 temperature high	1	1 = Trafo phase V1 temperature high	2	1 = Trafo phase W1 temperature high	3	1 = Ambient temperature high	4	1 = Ambient temperature sensor failure	5	1 = Motor phase U1 temperature high	6	1 = Motor phase V1 temperature high	7	1 = Motor phase W1 temperature high	8	1 = Motor phase U2 temperature high	9	1 = Motor phase V2 temperature high	10	1 = Motor phase W2 temperature high	11	1 = Motor DE bearing temperature high	12	1 = Motor NDE bearing temperature high	13	1 = Converter space heater overload	14	1 = Motor space heater overload	15	Reserved
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0000h...FFFFh		System control and monitoring alarm word 1.	1 = 1																																		
81.04	System control and monitor AW2	System control and monitoring alarm word 2. Shows system level active alarm signals from application program. For the description how to read this parameter by overriding system via fieldbus interface see parameter 81.03 System control and monitor AW1. This parameter is read-only.	0000h																																		
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81.05	System control and monitor FW1	System control and monitoring fault word 1. Shows system level active fault signals from application program that can be read by overriding system via fieldbus interface. If converter faults are to be read by overriding system via fieldbus interface using cyclic communication, this parameter should be linked to the fieldbus system fault word 1 (should be set up in the parameter group 52 FBA A data in). This parameter is read-only.	0000h																																		

No.	Name/Value	Description	Def/FbEq16																																		
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	0000h...FFFFh	System control and monitoring fault word 1.	1 = 1																																		
81.06	System control and monitor FW2	System control and monitoring fault word 2. Shows system level active fault signals from application program. For the description how to read this parameter by overriding system via fieldbus interface see parameter 81.05 System control and monitor FW1. This parameter is read-only.	0000h																																		
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	0000h...FFFFh	System control and monitoring fault word 2.	1 = 1																																		
81.07	IO Controller version	IO controller SW version. If this value is not accordant with value in parameter 81.08 IO Controller version required, the IO controller SW version is not compatible with current drive SW. In this case a fault will be generated. This parameter is read-only.	0.0.0.0																																		
	0.0.0.0 ... 255.255.255.255	IO controller SW version.	1 = 1																																		

No.	Name/Value	Description	Def/FbEq16
81.08	<i>IO Controller version required</i>	Defines required IO controller SW version. This parameter is read-only.	0.0.0.0
	0.0.0.0 ... 255.255.255.255	Required IO controller SW version.	1 = 1
81.09	<i>IO Controller configuration refresh</i>	In case Drive reports <i>E104 IO Controller hardware configuration error</i> , refresh IO Controller configuration to match actual IO modules. After refreshing, the value reverts automatically to <i>Done</i> and IO Controller reboot and configure correct hardware.	<i>Done</i>
	Done	Refreshing done.	0
	Refresh	Refreshing.	1
81.10	<i>Control supply monitoring</i>	Enables/disables monitoring of the control power supply.	<i>Disabled</i>
	Disabled	Control supply monitoring is disabled.	0
	Alarm low active	An alarm will be generated if control supply failure feedback signal (EMB2 DI0) is FALSE.	1
	Alarm high active	An alarm will be generated if control supply failure feedback signal (EMB2 DI0) is TRUE.	2
	Fault low active	A fault will be generated if control supply failure feedback signal (EMB2 DI0) is FALSE.	3
	Fault high active	A fault will be generated if control supply failure feedback signal (EMB2 DI0) is TRUE.	4
81.11	<i>Control backup supply monitoring</i>	Enables/disables monitoring of the backup control power supply.	<i>Disabled</i>
	Disabled	Backup control supply monitoring is disabled.	0
	Low active	An alarm will be generated if backup control supply failure feedback signal (EMB2 DI1) is FALSE.	1
	High active	An alarm will be generated if backup control supply failure feedback signal (EMB2 DI1) is TRUE.	2
81.12	<i>Lamp test selection</i>	Enables testing of the cabinet front door lamps.	<i>Disabled</i>
	Disabled	Lamp test is disabled.	0
	DI lamp test	Lamp test is activated by digital input that is defined by parameters <i>81.13 Lamp test Grp+Indx</i> and <i>81.14 Lamp test BitNum</i> . Example: If parameter <i>81.12 Lamp test selection</i> is set to <i>DI lamp test</i> , parameter <i>81.13 Lamp test Grp+Indx</i> to 1001 and parameter <i>81.14 Lamp test BitNum</i> to 0 lamp test will be activated by the signal defined in <i>10.01 DI status</i> bit 0 which is BCON standard digital input DI1.	1
	Parameter	Lamp test is activated for 10s after which parameter automatically changes back to <i>Disabled</i> .	2
81.13	<i>Lamp test Grp+Indx</i>	Defines the parameter to be used as signal source for lamp test. This parameter is used if <i>81.12 Lamp test selection</i> is set to <i>DI lamp test</i> .	0
	0...32767	Lamp test source parameter.	1 = 1
81.14	<i>Lamp test BitNum</i>	Specifies the bit number of parameter <i>81.13 Lamp test Grp+Indx</i> to be used as signal source for lamp test.	0
	0...15	Lamp test source bit.	1 = 1

No.	Name/Value	Description	Def/FbEq16
81.15	<i>Local control disable source</i>	Enables/disables local control (open and close MCB, start and stop buttons on the control panel, and the local controls on the PC tool). Works in combination with parameter <i>19.17 Local control disable</i> .	<i>Parameter</i>
	Parameter	Local control disable is selected by parameter <i>19.17 Local control disable</i> .	0
	Par.81.01-b00	Local control disable is selected by overriding system through system control and monitoring control word (bit 0 of the parameter <i>81.01 System control and monitor CW</i>).	1
	DI local control disable	Local control disable is selected by a digital input which is defined by parameters <i>81.16 Local control disable Grp+Indx</i> and <i>81.17 Local control disable BitNum</i> .	2
81.16	<i>Local control disable Grp+Indx</i>	Defines the parameter to be used as signal source for local control disable. This parameter is used if <i>81.15 Local control disable source</i> is set to <i>DI local control disable</i> .	0
	0...32767	Local control disable source parameter.	1 = 1
81.17	<i>Local control disable BitNum</i>	Specifies the bit number of parameter <i>81.16 Local control disable Grp+Indx</i> to be used as signal source for local control disable.	0
	0...15	Local control disable source bit.	1 = 1
81.20	<i>Space heater control</i>	Selects the source of control signal for Space Heater OFF Command (connected to EMB2 - DO6).	<i>Not selected</i>

Overview of space heater control:



Not selected	No converter space heater is installed.	0
Ready run	Space Heater OFF Command is set (heater deactivated) as soon as the drive enters "Ready run" state. Space Heater OFF Command is reset (heater activated) as soon as the drive leaves "Ready run" state and delay time of 60s expires.	1
Ready ref	Space Heater OFF Command is set (heater deactivated) as soon as the drive enters "Ready ref" state. Space Heater OFF Command is reset (heater activated) as soon as the drive leaves "Ready ref" state and delay time of 60s expires.	2
81.21 Converter space heater monitoring	Selects the action the drive takes when the value monitored by digital signal.	Disable
Disable	No action taken.	0
Alarm active	A warning (E227 Converter space heater overload warning) is generated.	1
Fault active	The drive trips on E106 Converter space heater overload fault.	2

No.	Name/Value	Description	Def/FbEq16
81.22	<i>Motor space heater monitoring</i>	Selects the action the drive takes when the value monitored by digital signal.	<i>Disable</i>
	Disable	No action taken.	0
	Alarm active	A warning (<i>E228 Motor space heater overload warning</i>) is generated.	1
	Fault active	The drive trips on <i>E107 Motor space heater overload fault</i> .	2

82 Charging, MCB control	MCB control (drive charging control).		
82.01	<i>MCB/Charging CW</i>	MCB/Charging control word of the drive. Shows the MCB control signals as received from fieldbus interface. If MCB is to be controlled by overriding system via fieldbus, MCB control word from fieldbus should be linked to this parameter (should be set up in the parameter group <i>53 FBA A data out</i>). This parameter is read-only.	0000h

Bit	Function
0	1 = MCB ON command
1...15	Reserved

0000h...FFFFh	MCB/Charging control word.	1 = 1
82.02 MCB/Charging SW	MCB/Charging status word. Shows MCB status signals from application program that can be read by overriding system via fieldbus interface. If MCB status is to be read by overriding system via fieldbus interface, this parameter should be linked to the fieldbus MCB status word (should be set up in the parameter group 52 FBA A data in). This parameter is read-only.	0000h

Bit	Function
0	1 = MCB close command
1	1 = MCB open feedback
2	1 = MCB closed feedback
3	1 = MCB/Charging SW-bit 03
4	1 = MCB not available
5	1 = MCB ON inhibition
6	1 = MCB external protection
7	1 = MCB/Charging SW-bit 07
8	0 = MCB open command N
9	1 = MCB/Charging SW-bit 09
10	1 = MCB/Charging SW-bit 10
11	1 = Charging command
12	1 = Discharging command
13	1 = DC link charged
14...15	Reserved

0000h...FFFFh	MCB/charging status word.	1 = 1

No.	Name/Value	Description	Def/FbEq16																								
82.03	MCB/Charging AW1	MCB/Charging alarm word. Shows MCB related alarm signals from application program that can be read by overriding system via fieldbus interface. If MCB alarms are to be read by overriding system via fieldbus interface, this parameter should be linked to the fieldbus MCB alarm word (should be set up in the parameter group 52 FBA A data in). This parameter is read-only.	0000h																								
<table><tr><th>Bit</th><th>Function</th></tr><tr><td>0</td><td>1 = DC link not discharged</td></tr><tr><td>1</td><td>1 = INU door not closed</td></tr><tr><td>2...10</td><td>Reserved</td></tr><tr><td>11</td><td>1 = Charging count alarm</td></tr><tr><td>12</td><td>1 = MCB not available alarm</td></tr><tr><td>13</td><td>1 = MCB ON inhibited alarm</td></tr><tr><td>14</td><td>1 = MCB external protection alarm</td></tr><tr><td>15</td><td>Reserved</td></tr></table>				Bit	Function	0	1 = DC link not discharged	1	1 = INU door not closed	2...10	Reserved	11	1 = Charging count alarm	12	1 = MCB not available alarm	13	1 = MCB ON inhibited alarm	14	1 = MCB external protection alarm	15	Reserved						
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82.05	MCB/Charging FW1	MCB/Charging fault word. Shows MCB related fault signals from application program that can be read by overriding system via fieldbus interface. If MCB faults are to be read by overriding system via fieldbus interface, this parameter should be linked to the fieldbus MCB fault word (should be set up in the parameter group 52 FBA A data in). This parameter is read-only.	0000h																								
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82.20	MCB Ext1 commands	Defines the type of connection and source of MCB Open and MCB Close commands for external control location 1 (Ext1).	Control type 1																								
	Front door	External MCB control location is not selected. For MCB control the MCB ONLINE and OFFLINE push-buttons on the converter front door are used.	0																								

No.	Name/Value	Description	Def/FbEq16
	Control type 1	AC500 CPU – DI0 (two wire connection to open and close the MCB). MCB Open and Close command are connected to the same digital Input: 0V DC on AC500 CPU – DI0 = command to open the MCB 24V DC on AC500 CPU – DI0 = command to close the MCB.	1
	Control type 2	AC500 CPU – DI0P / DI1P (three-wire connection to open and close the MCB). MCB Open and Close commands are given by means of push-buttons (P stands for pulse). The close push-button is normally open and connected to digital input AC500 CPU – DI1. The open push-button is normally open and connected to digital input AC500 CPU – DI0.	2
	Comm. module	MCB Open and Close commands are received from master device (overriding system) via fieldbus interface The source of the MCB Open and Close commands is the parameter <i>82.01 MCB/Charging CW</i> .	3
<i>82.21</i>	<i>MCB Ext2 commands</i>	Defines the type of connection and source of MCB Open and MCB Close commands for external control location 2 (Ext2).	<i>Front door</i>
	Front door	External MCB control location is not selected. For MCB control the MCB ONLINE and OFFLINE push-buttons on the converter front door are used.	0
	Control type 1	AC500 CPU – DI0 (two wire connection to open and close the MCB). MCB Open and Close command are connected to the same digital Input: 0V DC on AC500 CPU – DI0 = command to open the MCB 24V DC on AC500 CPU – DI0 = command to close the MCB.	1
	Control type 2	AC500 CPU – DI0P / DI1P (three-wire connection to open and close the MCB). MCB Open and Close commands are given by means of push-buttons (P stands for pulse). The close push-button is normally open and connected to digital input AC500 CPU – DI1. The open push-button is normally open and connected to digital input AC500 CPU – DI0.	2
	Comm. module	MCB Open and Close commands are received from master device (overriding system) via fieldbus interface The source of the MCB Open and Close commands is the parameter <i>82.01 MCB/Charging CW</i> .	3
<i>82.26</i>	<i>MCB control signal</i>	Selection of MCB command signal.	<i>Steady signal</i>
	Pulse signal	Only a pulse signal is given to OPEN / CLOSE coils of the MCB. This setting should be used in case multiple coils are used to close, open and trip the MCB.	0
	Steady signal	A steady signal is given to OPEN / CLOSE coil of the MCB. This setting should be used in case only one high active coil is used to open and close the MCB. It is possible to have an additional tripping coil.	1

No.	Name/Value	Description	Def/FbEq16
82.27	<i>MCB control pulse time</i>	Defines the pulse time (length) for MCB open / close command if <i>Pulse signal</i> signal is selected as control signal in parameter <i>82.26 MCB control signal</i> .	3 s
	1...10	MCB control pulse time.	1 = 1 s
82.28	<i>MCB closing time limit</i>	Maximum operating time for closing the MCB. If MCB has not reached the closed position within this time, a trip will be initiated.	3 s
	1...30	MCB maximum operating time for closing.	1 = 1 s
82.29	<i>MCB opening time limit</i>	Maximum operating time for opening the MCB. If the MCB has not reached the open position within this time, a trip will be initiated.	3 s
	1...10	MCB maximum operating time for opening.	1 = 1 s
82.30	<i>MCB feedback signal</i>	Defines the type of monitored feedback signals from MCB.	<i>Two signals</i>
	One signal	Only feedback signal CLOSED is monitored.	0
	Two signals	Both feedback signals, OPEN and CLOSED, are monitored.	1
82.40	<i>MCB available monitoring</i>	Selects an option for monitoring the availability of MCB. By default, DI6 of DX571 is used for MCB available signal. In such application, P85.21 Inductor bypass contactor control should set as "Disabled". If SBU bypass contactor function is activated, DI6 of DX571 should be connected to Inductor bypass contactor status CLOSE. P82.40 MCB available monitoring function need to set as "Disabled", or connect "MCB available signal" to other DI sources and set corresponding values in P82.42 MCB available Grp+indx and P82.43 MCB available BitNum.	<i>Disabled</i>
	Disabled	Signal 'MCB available' is not monitored.	0
	Alarm low active	The function is active if the signal selected in parameter <i>82.42 MCB available Grp+Indx</i> and <i>82.43 MCB available BitNum</i> is not set (FALSE). If DC link is discharged the alarm message <i>E209 MCB not available</i> is shown and the drive state changes to 'Not Ready on'. If DC link is charged only the alarm message <i>E209 MCB not available</i> is shown. The DC link remains charged.	1
	Alarm high active	The function is active if the signal selected in parameter <i>82.42 MCB available Grp+Indx</i> and <i>82.43 MCB available BitNum</i> is set (TRUE). The drive reaction is as described in option <i>Alarm low active</i> .	2
	Fault low active	The function is active if the signal selected in parameter <i>82.42 MCB available Grp+Indx</i> and <i>82.43 MCB available BitNum</i> is not set (FALSE). The drive trips on <i>E109 MCB not available</i> fault.	3
	Fault high active	The function is active if the signal selected in parameter <i>82.42 MCB available Grp+Indx</i> and <i>82.43 MCB available BitNum</i> is set (TRUE). The drive trips on <i>E109 MCB not available</i> fault.	4
82.41	<i>MCB available status</i>	Actual status of the signal 'MCB available'.	<i>Disabled</i>
	Disabled	Signal 'MCB available' is not monitored.	0

No.	Name/Value	Description	Def/FbEq16
	False	Signal 'MCB available' is not active (low).	1
	True	Signal 'MCB available' is active (high).	2
82.42	<i>MCB available Grp+Indx</i>	Defines the parameter to be used as signal source for MCB available monitoring. This parameter is used if <i>82.40 MCB available monitoring</i> is not set to <i>Parameter</i> .	8740
	0...32767	MCB available monitoring source parameter.	1 = 1
82.43	<i>MCB available BitNum</i>	Specifies the bit number of parameter <i>82.42 MCB available Grp+Indx</i> to be used as signal source for MCB available monitoring.	6
	0...15	MCB available monitoring source bit.	1 = 1
82.45	<i>MCB ON inhibition monitoring</i>	Monitoring of 'MCB ON inhibition' signal which is used to prevent an unexpected closing of MCB. If the drive is in 'Ready on' state and signal 'MCB ON inhibition' is active the drive state changes from 'Ready on' to 'Inhibit on' and closing of MCB (charging) is not possible. The alarm message <i>E20B MCB ON inhibited</i> is active. If the drive is in 'Ready run' or 'Ready ref' state and 'MCB ON Inhibition' signal becomes active there is no reaction. MCB will not be opened and the DC link stays charged.	<i>Disabled</i>
	Disabled	MCB ON inhibition function is disabled.	0
	Low active	The function is active if the signal selected in parameter <i>82.47 MCB ON inhibition Grp+Indx</i> and <i>82.48 MCB ON inhibition BitNum</i> is not set (FALSE).	1
	High active	The function is active if the signal selected in parameter <i>82.47 MCB ON inhibition Grp+Indx</i> and <i>82.48 MCB ON inhibition BitNum</i> is set (TRUE).	2
82.46	<i>MCB ON inhibition status</i>	Actual status of the signal 'MCB ON inhibition'	<i>Disabled</i>
	Disabled	Signal 'MCB ON inhibition' is not monitored.	0
	Inactive	Signal 'MCB ON inhibition' is not active (low).	1
	Active	Signal 'MCB ON inhibition' is active (high).	2
82.47	<i>MCB ON inhibition Grp+Indx</i>	Defines the parameter to be used as signal source for MCB ON inhibition monitoring. This parameter is used if <i>82.45 MCB ON inhibition monitoring</i> is set to <i>Low active</i> or <i>High active</i> .	0
	0...32767	MCB ON inhibition monitoring source parameter.	1 = 1
82.48	<i>MCB ON inhibition BitNum</i>	Specifies the bit number of parameter <i>82.47 MCB ON inhibition Grp+Indx</i> to be used as signal source for MCB ON inhibition monitoring.	0
	0...15	MCB ON inhibition monitoring source bit.	1 = 1
82.50	<i>MCB external protection monitoring</i>	Monitoring of an external MCB protection device.	<i>Disabled</i>
	Disabled	External MCB protection function is disabled.	0

No.	Name/Value	Description	Def/FbEq16				
	Alarm low active	The function is active if the signal selected in parameter 82.52 MCB external protection Grp+Indx and 82.53 MCB external protection BitNum is not set (FALSE). The alarm message E20A MCB external protection is active.	1				
	Alarm high active	The function is active if the signal selected in parameter 82.52 MCB external protection Grp+Indx and 82.53 MCB external protection BitNum is set (TRUE). The alarm message E20A MCB external protection is active.	2				
	Fault low active	The function is active if the signal selected in parameter 82.52 MCB external protection Grp+Indx and 82.53 MCB external protection BitNum is not set (FALSE). The drive trips on E10A MCB external protection fault.	3				
	Fault high active	The function is active if the signal selected in parameter 82.52 MCB external protection Grp+Indx and 82.53 MCB external protection BitNum is set (TRUE). The drive trips on E10A MCB external protection fault.	4				
82.51	MCB external protection status	Actual status of the signal 'MCB external protection'	Disabled				
	Disabled	Signal 'MCB external protection' is not monitored.	0				
	False	Signal 'MCB external protection' is not active (low).	1				
	True	Signal 'MCB external protection' is active (high).	2				
82.52	MCB external protection Grp+Indx	Defines the parameter to be used as signal source for MCB external protection monitoring. This parameter is used if 82.50 MCB external protection monitoring is set to other selection than Disabled .	0				
	0...32767	MCB external protection monitoring source parameter.	1 = 1				
82.53	MCB external protection BitNum	Specifies the bit number of parameter 82.52 MCB external protection Grp+Indx to be used as signal source for MCB external protection monitoring.	0				
	0...15	MCB external protection monitoring source bit.	1 = 1				
82.93	Charging overload event sel	Selects the event type for charging overload event.	Fault				
	Fault	The drive trips on fault D101 Charging count .					
	Warning	The drive generates a warning D240 Charging count .					
	No action	No action taken.					
83 Cooling system		Control of the converter cooling system.					
83.01	Cooling system CW	Converter cooling system control word. Shows the cooling control signals as received from fieldbus interface. If the converter cooling is to be controlled by overriding system via fieldbus, cooling system control word from fieldbus should be linked to this parameter (should be set up in the parameter group 53 FBA A data out). This parameter is read-only.	0000h				
<table><tr><th>Bit</th><th>Function</th></tr><tr><td>0...15</td><td>Reserved</td></tr></table>		Bit	Function	0...15	Reserved		
Bit	Function						
0...15	Reserved						
0000h...FFFFh		Converter cooling system control word.	1 = 1				

No.	Name/Value	Description	Def/FbEq16																																		
83.02	Cooling system SW	Converter cooling system status word. Shows cooling system status signals from application program that can be read by overriding system via fieldbus interface. If converter cooling system status is to be read by overriding system via fieldbus interface, this parameter should be linked to the fieldbus cooling system status word (should be set up in the parameter group 52 FBA A data in). This parameter is read-only.	0000h																																		
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Bit	Function																																				
0...15	Reserved																																				
0000h...FFFFh		Converter cooling system status word.	1 = 1																																		
83.03	Cooling system AW1	Converter cooling system alarm word 1. Shows cooling system related alarm signals from application program that can be read by overriding system via fieldbus interface. If cooling system alarms are to be read by overriding system via fieldbus interface, this parameter should be linked to the fieldbus cooling system alarm word 1 (should be set up in the parameter group 52 FBA A data in). This parameter is read-only.	0000h																																		
<table><tr><th>Bit</th><th>Function</th></tr><tr><td>0</td><td>1 = TRU cooling fan 1 overload alarm</td></tr><tr><td>1</td><td>1 = TRU cooling fan 2 overload alarm</td></tr><tr><td>2</td><td>1 = TRU cooling fan 3 overload alarm</td></tr><tr><td>3</td><td>1 = TRU cooling fan 4 overload alarm</td></tr><tr><td>4</td><td>Reserved</td></tr><tr><td>5</td><td>Reserved</td></tr><tr><td>6</td><td>1 = Cooling fans test run</td></tr><tr><td>7</td><td>Reserved</td></tr><tr><td>8</td><td>1 = INU cooling fan 1 overload alarm</td></tr><tr><td>9</td><td>1 = INU cooling fan 2 overload alarm</td></tr><tr><td>10</td><td>1 = INU cooling fan 3 overload alarm</td></tr><tr><td>11</td><td>1 = INU cooling fan 4 overload alarm</td></tr><tr><td>12</td><td>1 = TRU air filter dirty</td></tr><tr><td>13</td><td>1 = INU air pressure sensor failure</td></tr><tr><td>14</td><td>1 = INU air pressure low</td></tr><tr><td>15</td><td>1 = INU air pressure high</td></tr></table>				Bit	Function	0	1 = TRU cooling fan 1 overload alarm	1	1 = TRU cooling fan 2 overload alarm	2	1 = TRU cooling fan 3 overload alarm	3	1 = TRU cooling fan 4 overload alarm	4	Reserved	5	Reserved	6	1 = Cooling fans test run	7	Reserved	8	1 = INU cooling fan 1 overload alarm	9	1 = INU cooling fan 2 overload alarm	10	1 = INU cooling fan 3 overload alarm	11	1 = INU cooling fan 4 overload alarm	12	1 = TRU air filter dirty	13	1 = INU air pressure sensor failure	14	1 = INU air pressure low	15	1 = INU air pressure high
Bit	Function																																				
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4	Reserved																																				
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9	1 = INU cooling fan 2 overload alarm																																				
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12	1 = TRU air filter dirty																																				
13	1 = INU air pressure sensor failure																																				
14	1 = INU air pressure low																																				
15	1 = INU air pressure high																																				
0000h...FFFFh		Cooling system alarm word 1.	1 = 1																																		
83.04	Cooling system AW2	Converter cooling system alarm word 2. Shows cooling system related active alarm signals from application program. For the description how to read this parameter by overriding system via fieldbus interface see parameter 83.03 Cooling system AW1 . This parameter is read-only.	0000h																																		

No.	Name/Value	Description	Def/FbEq16																						
<table><tr><th>Bit</th><th>Function</th></tr><tr><td>0...15</td><td>Reserved</td></tr></table>				Bit	Function	0...15	Reserved																		
Bit	Function																								
0...15	Reserved																								
	0000h...FFFFh	Cooling system alarm word 2.	1 = 1																						
83.05	Cooling system FW1	Converter cooling system fault word 1. Shows cooling system related active fault signals from application program that can be read by overriding system via fieldbus interface. If cooling system faults are to be read by overriding system via fieldbus interface, this parameter should be linked to the fieldbus cooling system fault word 1 (should be set up in the parameter group 52 FBA A data in). This parameter is read-only.	0000h																						
<table><tr><th>Bit</th><th>Function</th></tr><tr><td>0</td><td>1 = TRU cooling fan 1 overload fault</td></tr><tr><td>1</td><td>1 = TRU cooling fan 2 overload fault</td></tr><tr><td>2</td><td>1 = TRU cooling fan 3 overload fault</td></tr><tr><td>3</td><td>1 = TRU cooling fan 4 overload fault</td></tr><tr><td>4...7</td><td>Reserved</td></tr><tr><td>8</td><td>1 = INU cooling fan 1 overload fault</td></tr><tr><td>9</td><td>1 = INU cooling fan 2 overload fault</td></tr><tr><td>10</td><td>1 = INU cooling fan 3 overload fault</td></tr><tr><td>11</td><td>1 = INU cooling fan 4 overload fault</td></tr><tr><td>12...15</td><td>Reserved</td></tr></table>				Bit	Function	0	1 = TRU cooling fan 1 overload fault	1	1 = TRU cooling fan 2 overload fault	2	1 = TRU cooling fan 3 overload fault	3	1 = TRU cooling fan 4 overload fault	4...7	Reserved	8	1 = INU cooling fan 1 overload fault	9	1 = INU cooling fan 2 overload fault	10	1 = INU cooling fan 3 overload fault	11	1 = INU cooling fan 4 overload fault	12...15	Reserved
Bit	Function																								
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11	1 = INU cooling fan 4 overload fault																								
12...15	Reserved																								
	0000h...FFFFh	Cooling system fault word 1.	1 = 1																						
83.06	Cooling system FW2	Converter cooling system fault word 2. Shows cooling system related active fault signals from application program. For the description how to read this parameter by overriding system via fieldbus interface see parameter 83.05 Cooling system FW2 . This parameter is read-only.	0000h																						
<table><tr><th>Bit</th><th>Function</th></tr><tr><td>0...15</td><td>Reserved</td></tr></table>				Bit	Function	0...15	Reserved																		
Bit	Function																								
0...15	Reserved																								
	0000h...FFFFh	Cooling system fault word 2.	1 = 1																						
83.12	Fan control	Selects operation mode for transformer and inverter unit cooling fans.	Auto run																						
	Auto run	Inverter and transformer unit cooling fans running continuously as soon as the drive is charged. If redundant fans are selected the continuous operation of the drive is guaranteed in case one standard fan fails. Switching to the redundant fan takes place automatically.	0																						
	Test run	Inverter and transformer unit standard and redundant cooling fans run for test purpose continuously. This option can be used to check direction of rotation, pressure etc.	1																						

No.	Name/Value	Description	Def/FbEq16																				
83.13	<i>Fan OFF delay</i>	Time delay after INU and TRU cooling fans are switched off after DC link is discharged. Note: The delay time is set to zero (fans off) if parameter <i>83.14 Fan EOFF stop</i> is enabled and the Emergency Off signal is active.	10 min																				
	0 ... 30 min	Switch off delay for INU and TRU cooling fans	1 = 1 min																				
83.14	<i>Fan EOFF stop</i>	Selects the operation of INU and TRU cooling fans in case an Emergency Off is detected.	<i>Enabled</i>																				
	Disabled	Cooling fans are not stopped in case of Emergency Off.	0																				
	Enabled	Cooling fans are stopped in case of Emergency Off.	1																				
83.15	<i>Fan alarm reset</i>	Reset command for active fan alarm. The signal resets the faulted cooling fans (redundant selection). Only the standard fans are running.	<i>Disabled</i>																				
	Disabled	Fan alarm reset command is not active.	0																				
	Enabled	Fan alarm reset command is active.	1																				
83.26	<i>Redundant fan cycle time</i>	Cycle time of redundant cooling fan group maintenance run. Redundant fans will be activated for maintenance purpose once every time interval specified in this parameter even if there is no failure of the standard fan group.	360.0 h																				
	2.0 ... 720.0 h	Redundant fan cycle time.	1 = 1 h																				
83.27	<i>Redundant fan run time</i>	Run time of redundant cooling fan group during one cycle time of maintenance run.	1.0 h																				
	1.0 ... 720.0 h	Redundant fan run time.	1 = 1 h																				
84 Motor temperature monitoring		Measured values from IO controller extension AI modules. Note: Parameters in this group are available only if extension AI temperature monitoring modules are installed on the IO Controller (option, not standard drive feature).																					
84.01	<i>Motor temperature monitor enable selection</i>	Measured motor winding phase U1 temperature.	-																				
<table><tr><th>Bit</th><th>Function</th></tr><tr><td>0</td><td>1 = Motor winding phase U1</td></tr><tr><td>1</td><td>1 = Motor winding phase V1</td></tr><tr><td>2</td><td>1 = Motor winding phase W1</td></tr><tr><td>3</td><td>1 = Motor winding phase U2</td></tr><tr><td>4</td><td>1 = Motor winding phase V2</td></tr><tr><td>5</td><td>1 = Motor winding phase W2</td></tr><tr><td>6</td><td>1 = Motor DE bearing</td></tr><tr><td>7</td><td>1 = Motor NDE bearing</td></tr><tr><td>8...15</td><td>Reserved</td></tr></table>				Bit	Function	0	1 = Motor winding phase U1	1	1 = Motor winding phase V1	2	1 = Motor winding phase W1	3	1 = Motor winding phase U2	4	1 = Motor winding phase V2	5	1 = Motor winding phase W2	6	1 = Motor DE bearing	7	1 = Motor NDE bearing	8...15	Reserved
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5	1 = Motor winding phase W2																						
6	1 = Motor DE bearing																						
7	1 = Motor NDE bearing																						
8...15	Reserved																						
84.02	<i>Motor winding phase U1 temperature</i>	Measured motor winding phase U1 temperature.	-																				
	-100.0... 500.0 °C	Motor winding phase U1 temperature.	1 = 1 °C																				

No.	Name/Value	Description	Def/FbEq16
84.03	<i>Motor winding phase U1 fault limit</i>	Defines the fault limit of the U1 temperature. Fault monitoring is enabled by 84.01 Motor temperature monitor enable selection	120 °C
	-100.0... 500.0 °C	Motor winding phase U1 temperature fault limit.	1 = 1 °C
84.04	<i>Motor winding phase U1 warning limit</i>	Defines the warning limit of the U1 temperature. Warning monitoring is enabled by 84.01 Motor temperature monitor enable selection	110 °C
	-100.0... 500.0 °C	Motor winding phase U1 temperature warning limit.	1 = 1 °C
84.05	<i>Motor winding phase V1 temperature</i>	Measured motor winding phase V1 temperature.	-
	-100.0... 500.0 °C	Motor winding phase V1 temperature.	1 = 1 °C
84.06	<i>Motor winding phase V1 fault limit</i>	Defines the fault limit of the V1 temperature. Fault monitoring is enabled by 84.01 Motor temperature monitor enable selection	120 °C
	-100.0... 500.0 °C	Motor winding phase V1 temperature fault limit.	1 = 1 °C
84.07	<i>Motor winding phase V1 warning limit</i>	Defines the warning limit of the V1 temperature. Warning monitoring is enabled by 84.01 Motor temperature monitor enable selection	110 °C
	-100.0... 500.0 °C	Motor winding phase V1 temperature warning limit.	1 = 1 °C
84.08	<i>Motor winding phase W1 temperature</i>	Measured motor winding phase W1 temperature.	-
	-100.0... 500.0 °C	Motor winding phase W1 temperature.	1 = 1 °C
84.09	<i>Motor winding phase W1 fault limit</i>	Defines the fault limit of the W1 temperature. Fault monitoring is enabled by 84.01 Motor temperature monitor enable selection	120 °C
	-100.0... 500.0 °C	Motor winding phase W1 temperature fault limit.	1 = 1 °C
84.10	<i>Motor winding phase W1 warning limit</i>	Defines the warning limit of the W1 temperature. Warning monitoring is enabled by 84.01 Motor temperature monitor enable selection	110 °C
	-100.0... 500.0 °C	Motor winding phase W1 temperature warning limit.	1 = 1 °C
84.11	<i>Motor winding phase U2 temperature</i>	Measured motor winding phase U2 temperature.	-
	-100.0... 500.0 °C	Motor winding phase U2 temperature.	1 = 1 °C
84.12	<i>Motor winding phase U2 fault limit</i>	Defines the fault limit of the U2 temperature. Fault monitoring is enabled by 84.01 Motor temperature monitor enable selection	120 °C
	-100.0... 500.0 °C	Motor winding phase U2 temperature fault limit.	1 = 1 °C
84.13	<i>Motor winding phase U2 warning limit</i>	Defines the warning limit of the U2 temperature. Warning monitoring is enabled by 84.01 Motor temperature monitor enable selection	110 °C
	-100.0... 500.0 °C	Motor winding phase U2 temperature warning limit.	1 = 1 °C
84.14	<i>Motor winding phase V2 temperature</i>	Measured motor winding phase V2 temperature.	-
	-100.0... 500.0 °C	Motor winding phase V2 temperature.	1 = 1 °C

No.	Name/Value	Description	Def/FbEq16
84.15	<i>Motor winding phase V2 fault limit</i>	Defines the fault limit of the V2 temperature. Fault monitoring is enabled by 84.01 Motor temperature monitor enable selection	120 °C
	-100.0... 500.0 °C	Motor winding phase V2 temperature fault limit.	1 = 1 °C
84.16	<i>Motor winding phase V2 warning limit</i>	Defines the warning limit of the V2 temperature. Warning monitoring is enabled by 84.01 Motor temperature monitor enable selection	110 °C
	-100.0... 500.0 °C	Motor winding phase V2 temperature warning limit.	1 = 1 °C
84.17	<i>Motor winding phase W2 temperature</i>	Measured motor winding phase W2 temperature.	-
	-100.0... 500.0 °C	Motor winding phase W2 temperature.	1 = 1 °C
84.18	<i>Motor winding phase W2 fault limit</i>	Defines the fault limit of the W2 temperature. Fault monitoring is enabled by 84.01 Motor temperature monitor enable selection	120 °C
	-100.0... 500.0 °C	Motor winding phase W2 temperature fault limit.	1 = 1 °C
84.19	<i>Motor winding phase W2 warning limit</i>	Defines the warning limit of the W2 temperature. Warning monitoring is enabled by 84.01 Motor temperature monitor enable selection	110 °C
	-100.0... 500.0 °C	Motor winding phase W2 temperature warning limit.	1 = 1 °C
84.20	<i>Motor DE bearing temperature</i>	Measured motor DE bearing temperature.	-
	-100.0... 500.0 °C	Motor DE bearing temperature.	1 = 1 °C
84.21	<i>Motor DE bearing temperature fault limit</i>	Defines the fault limit of the DE temperature. Fault monitoring is enabled by 84.01 Motor temperature monitor enable selection	120 °C
	-100.0... 500.0 °C	Motor DE bearing temperature fault limit.	1 = 1 °C
84.22	<i>Motor DE bearing temperature warning limit</i>	Defines the warning limit of the DE temperature. Warning monitoring is enabled by 84.01 Motor temperature monitor enable selection	110 °C
	-100.0... 500.0 °C	Motor DE bearing temperature warning limit.	1 = 1 °C
84.23	<i>Motor NDE bearing temperature</i>	Measured motor NDE bearing temperature.	-
	-100.0... 500.0 °C	Motor NDE bearing temperature.	1 = 1 °C
84.24	<i>Motor NDE bearing temperature fault limit</i>	Defines the fault limit of the NDE temperature. Fault monitoring is enabled by 84.01 Motor temperature monitor enable selection	120 °C
	-100.0... 500.0 °C	Motor NDE bearing temperature fault limit.	1 = 1 °C
84.25	<i>Motor NDE bearing temperature warning limit</i>	Defines the warning limit of the NDE temperature. Warning monitoring is enabled by 84.01 Motor temperature monitor enable selection	110 °C
	-100.0... 500.0 °C	Motor NDE bearing temperature warning limit.	1 = 1 °C
85 SBU control and monitoring		Synchronized bypass unit(SBU) configuration.	
85.01	<i>SBU control and monitoring CW</i>	The SBU control & monitoring - control word of the SBU application. This parameter shows the control signals received from fieldbus interface. This parameter is read-only.	0000h

No.	Name/Value	Description	Def/FbEq16																																		
<table><tr><th>Bit</th><th>Function</th></tr><tr><td>0</td><td>1 = Sync to mains mode</td></tr><tr><td>1</td><td>1 = Sync to VSD mode</td></tr><tr><td>2</td><td>1 = DOL command</td></tr><tr><td>3...15</td><td>Reserved</td></tr></table>				Bit	Function	0	1 = Sync to mains mode	1	1 = Sync to VSD mode	2	1 = DOL command	3...15	Reserved																								
Bit	Function																																				
0	1 = Sync to mains mode																																				
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3...15	Reserved																																				
	0000h...FFFFh	SBU control & monitoring - Control word.	1 = 1																																		
85.02	SBU control and monitoring SW	The SBU control & monitoring - status word of the SBU application. This parameter shows the status signals from application program. This parameter is read-only.	0000h																																		
<table><tr><th>Bit</th><th>Function</th></tr><tr><td>0</td><td>1 = SBU ready on</td></tr><tr><td>1</td><td>1 = SBU running</td></tr><tr><td>2</td><td>1 = SBU finished</td></tr><tr><td>3</td><td>1 = Voltage fre. & pha. matching</td></tr><tr><td>4</td><td>1 = Voltage RMS matching</td></tr><tr><td>5</td><td>1 = Sync permission</td></tr><tr><td>6</td><td>1 = Sync to mains mode</td></tr><tr><td>7</td><td>1 = Sync to VSD mode</td></tr><tr><td>8</td><td>1 = VSD mode</td></tr><tr><td>9</td><td>1 = Reserved</td></tr><tr><td>10</td><td>1 = Fieldbus control</td></tr><tr><td>11</td><td>1 = Bypass contactor closed</td></tr><tr><td>12</td><td>1 = MSS close command</td></tr><tr><td>13</td><td>1 = MB close command</td></tr><tr><td>14</td><td>1= MSS open/Inductor bypass contactor close command</td></tr><tr><td>15</td><td>1= MB open/Inductor bypass contactor open command</td></tr></table>				Bit	Function	0	1 = SBU ready on	1	1 = SBU running	2	1 = SBU finished	3	1 = Voltage fre. & pha. matching	4	1 = Voltage RMS matching	5	1 = Sync permission	6	1 = Sync to mains mode	7	1 = Sync to VSD mode	8	1 = VSD mode	9	1 = Reserved	10	1 = Fieldbus control	11	1 = Bypass contactor closed	12	1 = MSS close command	13	1 = MB close command	14	1= MSS open/Inductor bypass contactor close command	15	1= MB open/Inductor bypass contactor open command
Bit	Function																																				
0	1 = SBU ready on																																				
1	1 = SBU running																																				
2	1 = SBU finished																																				
3	1 = Voltage fre. & pha. matching																																				
4	1 = Voltage RMS matching																																				
5	1 = Sync permission																																				
6	1 = Sync to mains mode																																				
7	1 = Sync to VSD mode																																				
8	1 = VSD mode																																				
9	1 = Reserved																																				
10	1 = Fieldbus control																																				
11	1 = Bypass contactor closed																																				
12	1 = MSS close command																																				
13	1 = MB close command																																				
14	1= MSS open/Inductor bypass contactor close command																																				
15	1= MB open/Inductor bypass contactor open command																																				
	0000h...FFFFh	SBU Control & Monitoring - Status word	1 = 1																																		
85.03	SBU control and monitoring AW	The SBU control & monitoring - alarm word of the SBU application. This parameter shows the SBU related alarm signals from application program. This parameter is read-only.	0000h																																		

No.	Name/Value	Description	Def/FbEq16																								
<table><tr><th>Bit</th><th>Function</th></tr><tr><td>0</td><td>1 = Inductor temperature high</td></tr><tr><td>1</td><td>1 = Inductor temperature rising high</td></tr><tr><td>2</td><td>1 = Incorrect operation</td></tr><tr><td>3</td><td>1 = Inductor bypassed</td></tr><tr><td>4</td><td>1 = Sync to mains not finished</td></tr><tr><td>5</td><td>1 = MB not closed</td></tr><tr><td>6</td><td>1 = Sync to VSD not support</td></tr><tr><td>7</td><td>1 = Reserved</td></tr><tr><td>8</td><td>1 = Phase angle sync overtime</td></tr><tr><td>9</td><td>1 = RMS sync overtime</td></tr><tr><td>10... 15</td><td>Reserved</td></tr></table>				Bit	Function	0	1 = Inductor temperature high	1	1 = Inductor temperature rising high	2	1 = Incorrect operation	3	1 = Inductor bypassed	4	1 = Sync to mains not finished	5	1 = MB not closed	6	1 = Sync to VSD not support	7	1 = Reserved	8	1 = Phase angle sync overtime	9	1 = RMS sync overtime	10... 15	Reserved
Bit	Function																										
0	1 = Inductor temperature high																										
1	1 = Inductor temperature rising high																										
2	1 = Incorrect operation																										
3	1 = Inductor bypassed																										
4	1 = Sync to mains not finished																										
5	1 = MB not closed																										
6	1 = Sync to VSD not support																										
7	1 = Reserved																										
8	1 = Phase angle sync overtime																										
9	1 = RMS sync overtime																										
10... 15	Reserved																										
	0000h...FFFFh	SBU Control & Monitoring - Alarm word	1 = 1																								
85.04	<i>SBU control and monitoring FW</i>	The SBU control & monitoring - fault word of the SBU application. This parameter shows the SBU related fault signals from application program. This parameter is read-only.	0000h																								
<table><tr><th>Bit</th><th>Function</th></tr><tr><td>0</td><td>1 = MB control fault</td></tr><tr><td>1</td><td>1 = MSS control fault</td></tr><tr><td>2</td><td>1 = Reserved</td></tr><tr><td>3</td><td>1 = Bypass contactor control fault</td></tr><tr><td>4</td><td>1 = Inductor overtemperature</td></tr><tr><td>5</td><td>1 = Inductor temperature rising overhigh</td></tr><tr><td>6</td><td>1 = Voltage RMS sensor failure</td></tr><tr><td>7</td><td>1 = Inductor temperature sensor failure</td></tr><tr><td>8...15</td><td>Reserved</td></tr></table>				Bit	Function	0	1 = MB control fault	1	1 = MSS control fault	2	1 = Reserved	3	1 = Bypass contactor control fault	4	1 = Inductor overtemperature	5	1 = Inductor temperature rising overhigh	6	1 = Voltage RMS sensor failure	7	1 = Inductor temperature sensor failure	8...15	Reserved				
Bit	Function																										
0	1 = MB control fault																										
1	1 = MSS control fault																										
2	1 = Reserved																										
3	1 = Bypass contactor control fault																										
4	1 = Inductor overtemperature																										
5	1 = Inductor temperature rising overhigh																										
6	1 = Voltage RMS sensor failure																										
7	1 = Inductor temperature sensor failure																										
8...15	Reserved																										
	0000h...FFFFh	SBU Control & Monitoring - Fault word	1 = 1																								
85.05	<i>Ratio of grid voltage transformer</i>	Parameter defines the ratio of grid voltage transducer.	0.0																								
	0.0... 32767.0	Ratio of grid voltage transducer	1 = 1																								
85.06	<i>Ratio of converter voltage transformer</i>	Parameter defines the ratio of converter output voltage transducer.	0.0																								
	0.0... 32767.0	Ratio of converter output voltage transducer	1 = 1																								
85.07	<i>Voltage RMS deviation limit</i>	Parameter defines the limitation of voltage RMS between grid and converter output. If the deviation is in this value, SBU application regards voltage RMS is matching for synchronized bypass, else not.	1.0																								
	0.0... 10.0	Limitation of voltage RMS values deviation.	1 = 1%																								

No.	Name/Value	Description	Def/FbEq16
85.08	<i>Voltage RMS maximum deviation limit</i>	Parameter defines the maximum limitation of voltage RMS between grid and converter output. After 20 seconds from RMS start off adjusting, system monitoring this value to instead of <i>85.07 Voltage RMS deviation limit</i> to regard voltage RMS is matching for synchronized bypass or not.	5.0
	0.0... 10.0	Maximum limitation of voltage RMS values deviation.	1 = 1%
85.11	<i>SBU function enable</i>	This parameter enables the SBU function.	<i>Disabled</i>
	Disabled	SBU function control and monitoring are disabled.	0
	Enabled	SBU function control and monitoring are enabled.	1
85.12	<i>Motor control mode</i>	This parameter selects the single motor mode or multiple motors mode.	<i>Single motor</i>
	Single motor	Single motor mode is active. On BCU side, • MB, MSS control and monitor are active. • DOL mode can be selected.	0
	Multiple motors	Multiple motors mode is active. On BCU side, • MB, MSS control and monitor are not active. • DOL mode cannot be selected. Functions are moved to marshalling PLC.	1
85.13	<i>SBU control source</i>	Parameter defines the source of SBU control.	<i>IOs control</i>
	IOs control	SBU is controlled by IO command.	0
	Bus control	SBU is controlled by fieldbus.	1
85.14	<i>MB control signal</i>	Selection of MB command signal.	<i>Steady signal</i>
	Pulse signal	Only a pulse signal will be given to OPEN / CLOSE coil of the MB. It's used in case that multiple coils are used to close and open the MB.	0
	Steady signal	A steady signal will be given to OPEN / CLOSE coil of the MB. It's used in case that only one high active coil is used to close and open the MB.	1
85.15	<i>MSS control signal</i>	Selection of MSS command signal.	<i>Steady signal</i>
	Pulse signal	Only a pulse signal will be given to OPEN / CLOSE coil of the MSS. It's used in case that multiple coils are used to close and open the MSS.	0
	Steady signal	A steady signal will be given to OPEN / CLOSE coil of the MSS. It's used in case that only one high active coil is used to close and open the MSS.	1
85.16	<i>MB MSS BypassContact control time limit</i>	MB, MSS, Bypass contact control time limit. If device doesn't reach expected position in time limit, there will be a trip.	3s
	1...30	MB/MSS/Bypass contact maximum action time.	1=1s
85.20	<i>MB open control by direct online</i>	This parameter enables the MB breaker open control source from customer directly.	<i>Disabled</i>
	Disabled	MB open control directly is disabled.	0
	Enabled	MB open control directly is enabled.	1

No.	Name/Value	Description	Def/FbEq16																				
85.21	Inductor bypass contactor control	This parameter enable the inductor bypass contactor control. If SBU bypass contactor function is activated, DI6 of DX571 should be connected to Inductor bypass contactor status CLOSE. P82.40 MCB available monitoring function need to set as "Disabled", or connect "MCB available signal" to other DI sources and set corresponding values in P82.42 MCB available Grp+indx and P82.43 MCB available BitNum.	Disabled																				
	Disabled	Inductor bypass contactor control is disabled.	0																				
	Enabled	Inductor bypass contactor control is enabled.	1																				
85.22	Inductor bypass contactor control signal	Selection of inductor bypass contactor command signal.	Pulse signal																				
	Pulse signal	Only a pulse signal will be given to OPEN / CLOSE coil of the contactor. It's used in case that multiple coils are used to close and open the contactor.	0																				
	Steady signal	A steady signal will be given to OPEN / CLOSE coil of the contactor. It's used in case that only one high active coil is used to close and open the contactor.	1																				
85.30	Inductor temperature	Measured inductor temperature.	-																				
	-100.0... 500.0 °C	Inductor temperature.	1 = 1 °C																				
87 AC500 I/O interface		Configuration of AC500 digital inputs, relay / transistor outputs and analog inputs.																					
87.10	AC500 CPU DI status	Electrical status of AC500 CPU digital inputs DI7...DI0. Bits 0...7 reflect the status of DI0...DI7. Example: 0000000000001001b = DI3 and DI0 are on, all others are off. This parameter is read-only.	0000h																				
<table><tr><th>Bit</th><th>Function</th></tr><tr><td>0</td><td>1 = External ON/OFF Command1</td></tr><tr><td>1</td><td>1 = External ON/OFF Command2</td></tr><tr><td>2</td><td>1 = Local OFF command (push button)</td></tr><tr><td>3</td><td>1 = Local ON command (push button)</td></tr><tr><td>4</td><td>1 = MCB feedback status OPEN</td></tr><tr><td>5</td><td>1 = Converter space heater tripped</td></tr><tr><td>6</td><td>1 = Motor space heater tripped</td></tr><tr><td>7</td><td>1 = INU door locked</td></tr><tr><td>8...15</td><td>Reserved</td></tr></table>				Bit	Function	0	1 = External ON/OFF Command1	1	1 = External ON/OFF Command2	2	1 = Local OFF command (push button)	3	1 = Local ON command (push button)	4	1 = MCB feedback status OPEN	5	1 = Converter space heater tripped	6	1 = Motor space heater tripped	7	1 = INU door locked	8...15	Reserved
Bit	Function																						
0	1 = External ON/OFF Command1																						
1	1 = External ON/OFF Command2																						
2	1 = Local OFF command (push button)																						
3	1 = Local ON command (push button)																						
4	1 = MCB feedback status OPEN																						
5	1 = Converter space heater tripped																						
6	1 = Motor space heater tripped																						
7	1 = INU door locked																						
8...15	Reserved																						
	0000h...FFFFh	AC500 CPU digital inputs.	1 = 1																				
87.13	AC500 CPU DO status	Electrical status of AC500 CPU digital outputs DO5...DO0. Bits 0...5 reflect the status of DO0...DO5. Example: 0000000000001001b = DO3 and DO0 are on, all others are off. This parameter is read-only.	0000h																				

No.	Name/Value	Description	Def/FbEq16																				
<table><tr><th>Bit</th><th>Function</th></tr><tr><td>0</td><td>1 = MCB CLOSE command</td></tr><tr><td>1</td><td>0 = MCB OPEN commandvN</td></tr><tr><td>2</td><td>1 = ON - LED activation (Main supply ON indication)</td></tr><tr><td>3</td><td>1 = OFF - LED activation (Main supply OFF indication)</td></tr><tr><td>4</td><td>1 = System alarm</td></tr><tr><td>5...15</td><td>Reserved</td></tr></table>				Bit	Function	0	1 = MCB CLOSE command	1	0 = MCB OPEN commandvN	2	1 = ON - LED activation (Main supply ON indication)	3	1 = OFF - LED activation (Main supply OFF indication)	4	1 = System alarm	5...15	Reserved						
Bit	Function																						
0	1 = MCB CLOSE command																						
1	0 = MCB OPEN commandvN																						
2	1 = ON - LED activation (Main supply ON indication)																						
3	1 = OFF - LED activation (Main supply OFF indication)																						
4	1 = System alarm																						
5...15	Reserved																						
0000h...FFFFh		AC500 CPU digital outputs.	1 = 1																				
87.40	AC500 E P2 DI status	Electrical status of AC500 extension module P2 digital inputs DI7...DI0. Bits 0...7 reflect the status of DI0...DI7. Example: 0000000000001001b = DI3 and DI0 are on, all others are off. This parameter is read-only.	0000h																				
<table><tr><th>Bit</th><th>Function</th></tr><tr><td>0</td><td>1 = control supply failure</td></tr><tr><td>1</td><td>1 = control backup supply failure</td></tr><tr><td>2</td><td>1 = TRU fan1 status OK</td></tr><tr><td>3</td><td>1 = TRU fan2 status OK</td></tr><tr><td>4</td><td>1 = TRU fan3 status OK</td></tr><tr><td>5</td><td>1 = TRU fan4 status OK</td></tr><tr><td>6</td><td>1 = Bypass contactor status CLOSE</td></tr><tr><td>7</td><td>1 = INU door closed</td></tr><tr><td>8...15</td><td>Reserved</td></tr></table>				Bit	Function	0	1 = control supply failure	1	1 = control backup supply failure	2	1 = TRU fan1 status OK	3	1 = TRU fan2 status OK	4	1 = TRU fan3 status OK	5	1 = TRU fan4 status OK	6	1 = Bypass contactor status CLOSE	7	1 = INU door closed	8...15	Reserved
Bit	Function																						
0	1 = control supply failure																						
1	1 = control backup supply failure																						
2	1 = TRU fan1 status OK																						
3	1 = TRU fan2 status OK																						
4	1 = TRU fan3 status OK																						
5	1 = TRU fan4 status OK																						
6	1 = Bypass contactor status CLOSE																						
7	1 = INU door closed																						
8...15	Reserved																						
0000h...FFFFh		AC500 extension module P2 digital inputs.	1 = 1																				
87.43	AC500 E P2 DO status	Electrical status of AC500 extension module P2 digital outputs DO7...DO0. Bits 0...7 reflect the status of DO0...DO7. Example: 0000000000001001b = DO3 and DO0 are on, all others are off. This parameter is read-only.	0000h																				
<table><tr><th>Bit</th><th>Function</th></tr><tr><td>0</td><td>1 = fan group 1 ON</td></tr><tr><td>1</td><td>1 = fan group 2 ON</td></tr><tr><td>2</td><td>1 = fan group 3 ON</td></tr><tr><td>3</td><td>1 = fan group 4 ON</td></tr><tr><td>4</td><td>Reserved</td></tr><tr><td>5</td><td>1 = converter space heater OFF</td></tr><tr><td>6</td><td>1 = INU door unlock</td></tr><tr><td>7</td><td>1 = alarm fault LED</td></tr><tr><td>8...15</td><td>Reserved</td></tr></table>				Bit	Function	0	1 = fan group 1 ON	1	1 = fan group 2 ON	2	1 = fan group 3 ON	3	1 = fan group 4 ON	4	Reserved	5	1 = converter space heater OFF	6	1 = INU door unlock	7	1 = alarm fault LED	8...15	Reserved
Bit	Function																						
0	1 = fan group 1 ON																						
1	1 = fan group 2 ON																						
2	1 = fan group 3 ON																						
3	1 = fan group 4 ON																						
4	Reserved																						
5	1 = converter space heater OFF																						
6	1 = INU door unlock																						
7	1 = alarm fault LED																						
8...15	Reserved																						
0000h...FFFFh		AC500 extension module P2 digital outputs.	1 = 1																				

No.	Name/Value	Description	Def/FbEq16
90 Feedback selection		Motor and load feedback configuration. See also section <i>Jogging</i> (page 38), and the diagram on page 409.	
90.01	<i>Motor speed for control</i>	Displays the estimated motor speed that is used for motor control, ie. final motor speed feedback selected by parameter 90.41 <i>Motor speed for control</i> and filtered by 90.42 <i>Motor speed filter time</i> .	-
	-32768.00 ... 32767.00 rpm	Motor speed used for control.	See par. 46.01
90.41	<i>Motor feedback selection</i>	Selects the motor speed feedback value used during motor control.	
	Estimate	A calculated speed estimate is used.	0
90.42	<i>Motor speed filter time</i>	Defines a filter time for motor speed feedback used for control (90.01 <i>Motor speed for control</i>).	3ms
	0 ... 10000 ms	Motor speed filter time.	1 = 1 ms
96 System		Language selection; access levels; parameter save and restore; control unit reboot; user parameter sets; unit selection.	
96.01	<i>Language</i>	Selects the language of the parameter interface and other displayed information when viewed on the control panel. Notes: • Not all languages listed below are necessarily supported. • This parameter does not affect the languages visible in the Drive composer PC tool. (Those are specified under View – Settings.)	-
	Not selected	None.	0
	English	English.	1033
	Deutsch	German.	1031
	Español	Spanish.	3082
	Português	Portuguese.	2070
	Français	French.	1036
	Русский	Russian (Russia).	1049
	Polski	Polish.	1045
	Česky	Czech	1029
	Chinese (Simplified, PRC)	Simplified Chinese.	2052
	Türkçe	Turkish	1055

No.	Name/Value	Description	Def/FbEq16																				
96.02	Pass code	Pass codes can be entered into this parameter to activate further access levels (see parameter 96.03 Access levels active) or to configure the user lock. Entering "358" toggles the parameter lock, which prevents the changing of all other parameters through the control panel or the Drive composer PC tool. Entering the user pass code (by default, "10000000") enables parameters 96.100...96.102, which can be used to define a new user pass code and to select the actions that are to be prevented. Note: User pass code must be exactly 8 characters long. Entering an invalid pass code will close the user lock if open, ie. hide parameters 96.100...96.102. After entering the code, check that the parameters are in fact hidden. Note: You must change the default user pass code to maintain a high level of cyber security. <u>Store the code in a safe place – the protection cannot be disabled even by ABB if the code is lost.</u> See also section User lock (page 52).	0																				
	0...99999999	Pass code.	-																				
96.03	Access levels active	Shows which access levels have been activated by pass codes entered into parameter 96.02 Pass code. This parameter is read-only.	001b																				
<table><tr><th>Bit</th><th>Name</th></tr><tr><td>0</td><td>End user</td></tr><tr><td>1</td><td>Service</td></tr><tr><td>2</td><td>Advanced programmer</td></tr><tr><td>3...10</td><td>Reserved</td></tr><tr><td>11</td><td>OEM access level 1</td></tr><tr><td>12</td><td>OEM access level 2</td></tr><tr><td>13</td><td>OEM access level 3</td></tr><tr><td>14</td><td>Parameter lock</td></tr><tr><td>15</td><td>Reserved</td></tr></table>				Bit	Name	0	End user	1	Service	2	Advanced programmer	3...10	Reserved	11	OEM access level 1	12	OEM access level 2	13	OEM access level 3	14	Parameter lock	15	Reserved
Bit	Name																						
0	End user																						
1	Service																						
2	Advanced programmer																						
3...10	Reserved																						
11	OEM access level 1																						
12	OEM access level 2																						
13	OEM access level 3																						
14	Parameter lock																						
15	Reserved																						
	0000h...FFFFh	Active access levels.	-																				
96.06	Parameter restore	Restores the original settings of the control program, ie. parameter default values. Note: This parameter cannot be changed while the drive is running.	Done																				
	Done	Restoring is completed.	0																				
	Restore defaults	All editable parameter values are restored to default values, except • motor data • control panel/PC communication settings • I/O extension module settings • fieldbus adapter settings	8																				

No.	Name/Value	Description	Def/FbEq16
	Clear all	All editable parameter values are restored to default values, except control panel/PC communication settings PC tool communication is interrupted during the restoring.	62
	Reset all fieldbus settings	Fieldbus adapter and embedded fieldbus interface settings (parameter groups 50...59) are restored to default values. This will also restore the default settings of the fieldbus adapter if one is connected, potentially including settings that cannot be accessed through drive parameters.	32
96.07	<i>Parameter save manually</i>	Saves the valid parameter values to permanent memory. This parameter should be used to store values sent from a fieldbus, or when using an external power supply to the control board as the supply might have a very short hold-up time when powered off. Note: A new parameter value is saved automatically when changed from the PC tool or control panel but not when altered through a fieldbus adapter connection.	<i>Done</i>
	Done	Save completed.	0
	Save	Save in progress.	1
96.08	<i>Control board boot</i>	Changing the value of this parameter to 1 reboots the control unit (without requiring a power off/on cycle of the complete drive module). The value reverts to 0 automatically.	0
	0...1	1 = Reboot the control unit.	1 = 1
96.10	<i>User set status</i>	Shows the status of the user parameter sets. This parameter is read-only. See also section <i>User parameter sets</i> (page 52).	-
	n/a	No user parameter sets have been saved.	0
	Loading	A user set is being loaded.	1
	Saving	A user set is being saved.	2
	Faulted	Invalid or empty parameter set.	3
	User set 1	User set 1 has been loaded.	4
	User set 2	User set 2 has been loaded.	5
	User set 3	User set 3 has been loaded.	6
	User set 4	User set 4 has been loaded.	7
96.11	<i>User set save/load</i>	Enables the saving and restoring of up to four custom sets of parameter settings. See section <i>User parameter sets</i> (page 52). The set that was in use before powering down the drive is in use after the next power-up. Notes: - Hardware configuration settings such as I/O extension module, fieldbus and encoder configuration parameters (groups 14...16, 47, 51...56) are not included in user parameter sets. - Parameter changes made after loading a set are not automatically stored – they must be saved using this parameter.	
	No action	Load or save operation complete; normal operation.	0
	User set I/O mode	Load user parameter set using parameters <i>96.12 User set I/O mode in1</i> and <i>96.13 User set I/O mode in2</i> .	1

No.	Name/Value	Description	Def/FbEq16															
	Load set 1	Load user parameter set 1.	2															
	Load set 2	Load user parameter set 2.	3															
	Load set 3	Load user parameter set 3.	4															
	Load set 4	Load user parameter set 4.	5															
	Save to set 1	Save user parameter set 1.	18															
	Save to set 2	Save user parameter set 2.	19															
	Save to set 3	Save user parameter set 3.	20															
	Save to set 4	Save user parameter set 4.	21															
96.12	<i>User set I/O mode in1</i>	When parameter 96.11 <i>User set save/load</i> is set to <i>User set I/O mode</i> , selects the user parameter set together with parameter 96.13 <i>User set I/O mode in2</i> as follows:	<i>Not selected</i>															
		<table><tr><th>Status of source defined by par. 96.12</th><th>Status of source defined by par. 96.13</th><th>User parameter set selected</th></tr><tr><td>0</td><td>0</td><td>Set 1</td></tr><tr><td>1</td><td>0</td><td>Set 2</td></tr><tr><td>0</td><td>1</td><td>Set 3</td></tr><tr><td>1</td><td>1</td><td>Set 4</td></tr></table>		Status of source defined by par. 96.12	Status of source defined by par. 96.13	User parameter set selected	0	0	Set 1	1	0	Set 2	0	1	Set 3	1	1	Set 4
		Status of source defined by par. 96.12		Status of source defined by par. 96.13	User parameter set selected													
		0		0	Set 1													
		1		0	Set 2													
		0		1	Set 3													
1	1	Set 4																
	Not selected	0.	0															
	Selected	1.	1															
	DI1	Digital input DI1 (<i>10.02 DI delayed status</i> , bit 0).	2															
	DI2	Digital input DI2 (<i>10.02 DI delayed status</i> , bit 1).	3															
	DI3	Digital input DI3 (<i>10.02 DI delayed status</i> , bit 2).	4															
	DI4	Digital input DI4 (<i>10.02 DI delayed status</i> , bit 3).	5															
	DI5	Digital input DI5 (<i>10.02 DI delayed status</i> , bit 4).	6															
	DI6	Digital input DI6 (<i>10.02 DI delayed status</i> , bit 5).	7															
	<i>Other [bit]</i>	Source selection (see <i>Terms and abbreviations</i> on page 55).	-															
96.13	<i>User set I/O mode in2</i>	See parameter 96.12 <i>User set I/O mode in1</i> .	<i>Not selected</i>															
96.16	<i>Unit selection</i>	Selects the unit of parameter power.	00000b															
<table><tr><th>Bit</th><th>Name</th><th>Information</th></tr><tr><td>0</td><td>Power unit</td><td>0 = kW 1 = hp</td></tr><tr><td>1...15</td><td>Reserved</td><td></td></tr></table>				Bit	Name	Information	0	Power unit	0 = kW 1 = hp	1...15	Reserved							
Bit	Name	Information																
0	Power unit	0 = kW 1 = hp																
1...15	Reserved																	
	0000h...FFFFh	Unit selection word.	1 = 1															
96.20	<i>Time synchronization source</i>	Defines the 1st priority external source for synchronization of the drive's time and date.	<i>Panel link</i>															
	Internal	No external source selected.	0															
	Fieldbus A	Fieldbus interface A.	3															
	M/F	The master station on a master/follower link.	5															

No.	Name/Value	Description	Def/FbEq16
	Panel link	Control panel, or Drive composer PC tool connected to the control panel.	8
	Ethernet tool link	Drive composer PC tool through an FENA module.	9
96.24	<i>Full days since 1st Jan 1980</i>	Number of full days passed since beginning of the year 1980. This parameter, together with 96.25 <i>Time in minutes within 24 h</i> and 96.26 <i>Time in ms within one minute</i> makes it possible to set the date and time in the drive via the parameter interface from a fieldbus or application program. This may be necessary if the fieldbus protocol does not support time synchronization.	-
	1...59999	Days since beginning of 1980.	1 = 1
96.25	<i>Time in minutes within 24 h</i>	Number of full minutes passed since midnight. For example, the value 860 corresponds to 2:20 pm. See parameter 96.24 <i>Full days since 1st Jan 1980</i> .	0 min
	1...1439	Minutes since midnight.	1 = 1
96.26	<i>Time in ms within one minute</i>	Number of milliseconds passed since last minute. See parameter 96.24 <i>Full days since 1st Jan 1980</i> .	0 ms
	0...59999	Number of milliseconds since last minute.	1 = 1

No.	Name/Value	Description	Def/FbEq16
96.29	Time sync source status	Time source status word. This parameter is read-only.	-

Bit	Name	Description
0	Time tick received	1 = 1st priority tick received: Tick has been received from 1st priority source.
1	Aux Time tick received	1 = 2nd priority tick received: Tick has been received from 2nd priority source.
2	Tick interval is too long	1 = Yes: Tick interval too long (accuracy compromised).
3	DDCS controller	1 = Tick received: Tick has been received from an external controller.
4	Master/Follower	1 = Tick received: Tick has been received through the master/follower link. Not applicable for ACS580MV.
5	Reserved	
6	D2D	1 = Tick received: Tick has been received through the drive-to-drive link. Not applicable for ACS580MV.
7	FbusA	1 = Tick received: Tick has been received through fieldbus interface A.
8	FbusB	1 = Tick received: Tick has been received through fieldbus interface B.
9	EFB	1 = Tick received: Tick has been received through the embedded fieldbus interface. Not applicable for ACS580MV.
10	Ethernet	1 = Tick received: Tick has been received through the Ethernet port on type BCU control unit.
11	Panel link	1 = Tick received: Tick has been received from the control panel, or Drive composer PC tool connected to the control panel.
12	Ethernet tool link	1 = Tick received: Tick has been received from Drive composer PC tool through an FENA module.
13	Parameter setting	1 = Tick received: Tick has been set by parameters 96.24...96.26.
14	RTC	1 = RTC time in use: Time and date have been read from the real-time clock.
15	Drive On-Time	1 = Drive on-time in use: Time and date are displaying drive on-time.

	0000h...FFFFh	Time source status word 1.	1 = 1
96.31	Drive ID number	Specifies an ID number for the drive. The ID can be read by an external controller through DDCS, for example, for comparison with an ID contained by the controller's application.	0
	0...32767	ID number.	1 = 1
96.39	Power up event logging	Enables/disables power-up logging. When enabled, an event (B5A2 Power up) is logged by the drive upon each power-up.	Enable
	Disable	Power-up event logging disabled.	0
	Enable	Power-up event logging enabled.	1
96.51	Clear fault and event logger	Clears the contents of the event logs. See section Event log (page 344).	00000
	00001	Clear the event logs. (The value will automatically revert to 00000.)	1

No.	Name/Value	Description	Def/FbEq16																														
96.53	Actual checksum	Displays the actual parameter configuration checksum. The checksum is generated and updated whenever an action is selected in 96.54 Checksum action. The parameters included in the calculation have been pre-selected, but the selection can be edited using the Drive customizer PC tool. See also section Parameter checksum calculation (page 53).	0h																														
	00000000h... FFFFFFFFh	Actual checksum.	-																														
96.54	Checksum action	Selects how the drive reacts if the parameter checksum (96.53 Actual checksum) does not match any of the active approved checksums (96.56...96.59). The active checksums are selected by 96.55 Checksum control word.	No action																														
	No action	No action taken. (The checksum feature is not in use.)	0																														
	Pure event	The drive generates an event log entry (B686 Checksum mismatch).	1																														
	Warning	The drive generates a warning (A686 Checksum mismatch).	2																														
	Warning and prevent start	The drive generates a warning (A686 Checksum mismatch). Starting the drive is prevented.	3																														
	Fault	The drive trips on 6200 Checksum mismatch).	4																														
96.55	Checksum control word	Bits 0...3 select to which approved checksums (out of 96.56...96.59) the actual checksum (96.53) is compared. Bits 4...7 select an approved (reference) checksum parameter (96.56...96.59) into which the actual checksum from parameter 96.53 is copied.	00000000b																														
<table><tr><th>Bit</th><th>Name</th><th>Description</th></tr><tr><td>0</td><td>Approved checksum 1</td><td>1 = Enabled: Checksum 1 (96.56) is observed.</td></tr><tr><td>1</td><td>Approved checksum 1</td><td>1 = Enabled: Checksum 2 (96.57) is observed.</td></tr><tr><td>2</td><td>Approved checksum 1</td><td>1 = Enabled: Checksum 3 (96.58) is observed.</td></tr><tr><td>3</td><td>Approved checksum 1</td><td>1 = Enabled: Checksum 4 (96.59) is observed.</td></tr><tr><td>4</td><td>Set approved checksum 1</td><td>1 = Set: Copy value of 96.53 into 96.56.</td></tr><tr><td>5</td><td>Set approved checksum 1</td><td>1 = Set: Copy value of 96.53 into 96.57.</td></tr><tr><td>6</td><td>Set approved checksum 1</td><td>1 = Set: Copy value of 96.53 into 96.58.</td></tr><tr><td>7</td><td>Set approved checksum 1</td><td>1 = Set: Copy value of 96.53 into 96.59.</td></tr><tr><td>8...15</td><td>Reserved</td><td></td></tr></table>				Bit	Name	Description	0	Approved checksum 1	1 = Enabled: Checksum 1 (96.56) is observed.	1	Approved checksum 1	1 = Enabled: Checksum 2 (96.57) is observed.	2	Approved checksum 1	1 = Enabled: Checksum 3 (96.58) is observed.	3	Approved checksum 1	1 = Enabled: Checksum 4 (96.59) is observed.	4	Set approved checksum 1	1 = Set: Copy value of 96.53 into 96.56.	5	Set approved checksum 1	1 = Set: Copy value of 96.53 into 96.57.	6	Set approved checksum 1	1 = Set: Copy value of 96.53 into 96.58.	7	Set approved checksum 1	1 = Set: Copy value of 96.53 into 96.59.	8...15	Reserved	
Bit	Name	Description																															
0	Approved checksum 1	1 = Enabled: Checksum 1 (96.56) is observed.																															
1	Approved checksum 1	1 = Enabled: Checksum 2 (96.57) is observed.																															
2	Approved checksum 1	1 = Enabled: Checksum 3 (96.58) is observed.																															
3	Approved checksum 1	1 = Enabled: Checksum 4 (96.59) is observed.																															
4	Set approved checksum 1	1 = Set: Copy value of 96.53 into 96.56.																															
5	Set approved checksum 1	1 = Set: Copy value of 96.53 into 96.57.																															
6	Set approved checksum 1	1 = Set: Copy value of 96.53 into 96.58.																															
7	Set approved checksum 1	1 = Set: Copy value of 96.53 into 96.59.																															
8...15	Reserved																																
	00000000b... 11111111b	Checksum control word.	1 = 1																														
96.56	Approved checksum 1	Approved (reference) checksum 1.	0h																														
	00000000h... FFFFFFFFh	Approved checksum 1.	-																														
96.57	Approved checksum 2	Approved (reference) checksum 2.	0h																														
	00000000h... FFFFFFFFh	Approved checksum 2.	-																														

No.	Name/Value	Description	Def/FbEq16
96.58	Approved checksum 3	Approved (reference) checksum 3.	0h
	00000000h... FFFFFFFFh	Approved checksum 3.	-
96.59	Approved checksum 4	Approved (reference) checksum 4.	0h
	00000000h... FFFFFFFFh	Approved checksum 4.	-
96.61	User data logger status word	Provides status information on the user data logger (see page 475).	0000b

Bit	Name	Description
0	Running	1 = The user data logger is running. The bit is cleared after the post-trigger time has passed.
1	Triggered	1 = The user data logger has been triggered. The bit is cleared when the logger is restarted.
2	Data available	1 = The user data logger contains data that can be read. Note that the bit is not cleared because the data is saved to the memory unit.
3	Configured	1 = The user data logger has been configured. Note that the bit is not cleared because the configuration data is saved to the memory unit.
4...15	Reserved	

	0000b...1111b	User data logger status word.	1 = 1
96.63	User data logger trigger	Triggers, or selects a source that triggers, the user data logger.	Off
	Off	0.	0
	On	1.	1
	Other [bit]	Source selection (see Terms and abbreviations on page 55).	-
96.64	User data logger start	Starts, or selects a source that starts, the user data logger.	Off
	Off	0.	0
	On	1.	1
	Other [bit]	Source selection (see Terms and abbreviations on page 55).	-
96.66	Factory data logger start	Start factory data logger. Pure event B673 Factory data logger triggered will be triggered and a factory data logger will be attached to it. The factory data logger is written to SD card and can be plot in ACS580MV Data Analyzer. After factory data logger recording is finished, this parameter will change back to off.	Off
	Off	0.	0
	On	1.	1
96.70	License state	Shows the currently active license for converter.	Not initialized
	Not initialized	No license has been entered for the converter.	0
	Time limited	A time limited license is active. The time limited license is used for the routine test.	1

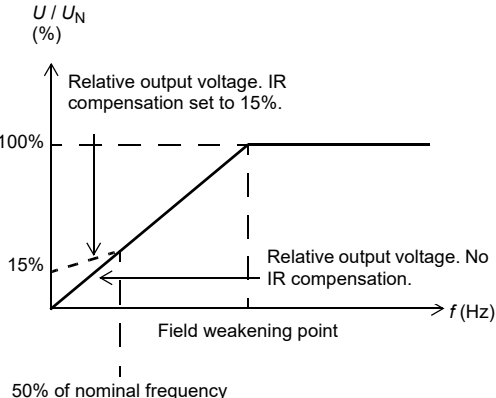
No.	Name/Value	Description	Def/FbEq16
	Trial	A trial license is active. The trial license is active, if: - the time limited license has expired and no time unlimited license has been entered - or - the BCU was exchanged and the currently entered license does not match the BCON SN. Note: In case BCU had to be exchanged contact your local ABB representative to obtain new license.	2
	Time unlimited	A time unlimited license is active.	3
	Expired	The trial license has expired. Operation of the converter is not possible until valid time unlimited license is entered.	4
96.71	<i>License key part 1</i>	First part of the license key. First 8 characters of the license key (counting from right to left) should be entered here.	00000000h
	00000000h...FFFF FFFFh	First part of the license key.	1 = 1
96.72	<i>License key part 2</i>	Second part of the license key. Characters 9-16 of the license key (counting from right to left) should be entered here.	00000000h
	00000000h...FFFF FFFFh	Second part of the license key.	1 = 1
96.73	<i>License key part 3</i>	Third part of the license key. Characters 17-24 of the license key (counting from right to left) should be entered here.	00000000h
	00000000h...FFFF FFFFh	Third part of the license key.	1 = 1
96.74	<i>License key part 4</i>	Fourth part of the license key. Characters 25-32 of the license key (counting from right to left) should be entered here.	00000000h
	00000000h...FFFF FFFFh	First part of the license key.	1 = 1
96.75	<i>License key refresh</i>	After entering a new license key, "Refresh" should be selected to refresh the license.	<i>Done</i>
	Done	License has been refreshed.	0
	Refresh	Refresh the license.	1

No.	Name/Value	Description	Def/FbEq16
96.100	Change user pass code	(Visible when user lock is open) To change the current user pass code, enter a new code into this parameter as well as 96.101 Confirm user pass code. A warning will be active until the new pass code is confirmed. To cancel changing the pass code, close the user lock without confirming. To close the lock, enter an invalid pass code in parameter 96.02 Pass code, activate parameter 96.08 Control board boot, or cycle the power. Only 8 digits can be used as user pass code. See also section User lock (page 52).	10000000
	10000000... 99999999	New user pass code.	-
96.101	Confirm user pass code	(Visible when user lock is open) Confirms the new user pass code entered in 96.100 Change user pass code. Only 8 digits can be used as user pass code.	
	10000000... 99999999	Confirmation of new user pass code.	-
96.102	User lock functionality	(Visible when user lock is open) Selects the actions or functionalities to be prevented by the user lock. Note that the changes made take effect only when the user lock is closed. See parameter 96.02 Pass code. Note: We recommend you select all the actions and functionalities unless otherwise required by the application.	0000h

Bit	Name	Information
0	Disable ABB access levels	1 = ABB access levels (service, advanced programmer, etc.; see 96.03) disabled
1	Freeze parameter lock state	1 = Changing the parameter lock state prevented, ie. pass code 358 has no effect
2	Disable file download	1 = Loading of files to drive prevented. This applies to - firmware upgrades - safety functions module (FSO-xx) configuration - parameter restore - loading an adaptive program - loading and debugging an application program - changing home view of control panel - editing drive texts - editing the favorite parameters list on control panel - configuration settings made through control panel such as time/date formats and enabling/disabling clock display.
3...10	Reserved	
11	Disable OEM access level 1	1 = OEM access level 1 disabled
12	Disable OEM access level 2	1 = OEM access level 2 disabled
13	Disable OEM access level 3	1 = OEM access level 3 disabled
14...15	Reserved	

0000h...FFFFh	Selection of actions to be prevented by user lock.	-

No.	Name/Value	Description	Def/FbEq16
96.201	Disable adaptive program	Enables/disables the adaptive program (if present). See also section Adaptive programming (page 25).	No
	No	Adaptive program enabled.	0
	Yes	Adaptive program disabled.	1
97 Motor control		Motor model settings.	
97.04	Voltage reserve	Defines the minimum allowed voltage reserve. When the voltage reserve has decreased to the set value, the drive enters the field weakening area. Note: This is an expert level parameter and should not be adjusted without appropriate skill. If the intermediate circuit DC voltage $U_{dc} = 550 \text{ V}$ and the voltage reserve is 5%, the RMS value of the maximum output voltage in steady-state operation is $0.95 \times 550 \text{ V} / \sqrt{2} = 369 \text{ V}$ The dynamic performance of the motor control in the field weakening area can be improved by increasing the voltage reserve value, but the drive enters the field weakening area earlier.	-2%
	-4 ... 50%	Voltage reserve.	1 = 1%
97.06	Flux reference select	Defines the source of flux reference. Note: This is an expert level parameter and should not be adjusted without appropriate skill.	User flux reference
	Zero	None.	0
	User flux reference	Parameter 97.07 User flux reference .	1
	Other	Source selection (see Terms and abbreviations on page 55).	-
97.07	User flux reference	Defines the flux reference when parameter 97.06 Flux reference select is set to User flux reference .	100.00%
	0.00 ... 200.00%	User-defined flux reference.	100 = 1%

No.	Name/Value	Description	Def/FbEq16
97.13	<i>IR compensation</i>	Defines the relative output voltage boost at zero speed (IR compensation). The function is useful in applications with a high break-away torque in scalar mode.  See also section <i>IR compensation for scalar motor control</i> on page 34. Note: This is an expert level parameter and should not be adjusted without appropriate skill.	0.25%
	0.00 ... 50.00%	Voltage boost at zero speed in percent of nominal motor voltage.	1 = 1%
	98 User motor parameters	Motor values supplied by the user that are used in the motor model. Note: Motor model is not applicable for scalar control mode. PM control is not applicable.	
98.02	<i>Rs user</i>	Defines the stator resistance R_S of the motor model. With a star-connected motor, R_S is the resistance of one winding. With a delta-connected motor, R_S is one-third of the resistance of one winding.	0.00000 p.u.
	0.00000 ... 0.50000 p.u.	Stator resistance in per unit.	-
98.03	<i>Rr user</i>	Defines the rotor resistance R_R of the motor model. Note: This parameter is valid only for asynchronous motors.	0.00000 p.u.
	0.00000 ... 0.50000 p.u.	Rotor resistance in per unit.	-
98.04	<i>Lm user</i>	Defines the main inductance L_M of the motor model. Note: This parameter is valid only for asynchronous motors.	0.00000 p.u.
	0.00000 ... 10.00000 p.u.	Main inductance in per unit.	-
98.05	<i>SigmaL user</i>	Defines the leakage inductance σL_S. Note: This parameter is valid only for asynchronous motors.	0.00000 p.u.
	0.00000 ... 1.00000 p.u.	Leakage inductance in per unit.	-

No.	Name/Value	Description	Def/FbEq16
98.09	<i>Rs user SI</i>	Defines the stator resistance R_S of the motor model.	0.00000 ohm
	0.00000 ... 100.00000 ohm	Stator resistance.	-
98.10	<i>Rr user SI</i>	Defines the rotor resistance R_R of the motor model. Note: This parameter is valid only for asynchronous motors.	0.00000 ohm
	0.00000 ... 100.00000 ohm	Rotor resistance.	-
98.11	<i>Lm user SI</i>	Defines the main inductance L_M of the motor model. Note: This parameter is valid only for asynchronous motors.	0.00 mH
	0.00 ...100000.00 mH	Main inductance.	1 = 10 mH
98.12	<i>SigmaL user SI</i>	Defines the leakage inductance σL_S . Note: This parameter is valid only for asynchronous motors.	0.00 mH
	0.00 ...100000.00 mH	Leakage inductance.	1 = 10 mH
99 Motor data		Motor configuration settings.	
99.06	<i>Motor nominal current</i>	Defines the nominal motor current. Must be equal to the value on the motor rating plate. Notes: - Correct motor operation requires that the magnetizing current of the motor does not exceed 90% of the nominal current of the drive. - This parameter cannot be changed while the drive is running.	0.0 A
	0.0 ... 6400.0 A	Nominal current of the motor.	1 = 1 A
99.07	<i>Motor nominal voltage</i>	Defines the nominal motor voltage supplied to the motor. This setting must match the value on the rating plate of the motor. Notes: - The stress on the motor insulation is always dependent on the drive supply voltage. This also applies to the case where the motor voltage rating is lower than that of the drive and the supply. - This parameter cannot be changed while the drive is running.	0.0 V
	0.0 ... 20000.0	Nominal voltage of the motor.	10 = 1 V
99.08	<i>Motor nominal frequency</i>	Defines the nominal motor frequency. This setting must match the value on the rating plate of the motor. Note: This parameter cannot be changed while the drive is running.	50.00 Hz
	0.00 ... 500.00 Hz	Nominal frequency of the motor.	10 = 1 Hz
99.09	<i>Motor nominal speed</i>	Defines the nominal motor speed. The setting must match the value on the rating plate of the motor. Note: This parameter cannot be changed while the drive is running.	0 rpm
	0 ... 30000 rpm	Nominal speed of the motor.	1 = 1 rpm

No.	Name/Value	Description	Def/FbEq16
99.10	<i>Motor nominal power</i>	Defines the nominal motor power. The setting must match the value on the rating plate of the motor. If nominal power is not shown on the rating plate, nominal torque can be entered instead in parameter 99.12. If multiple motors are connected to the drive, enter the total power of the motors. Note: This parameter cannot be changed while the drive is running.	0.00 kW or hp
	0.00 ... 10000.00 kW or 0.00 ... 10000.00 hp	Nominal power of the motor.	1 = 1 unit
99.11	<i>Motor nominal cosφ</i>	Defines the cosphi of the motor for a more accurate motor model. The value is not obligatory, but is useful with an asynchronous motor. The setting should match the value on the rating plate of the motor. Note: This parameter cannot be changed while the drive is running.	0.00
	0.00 ... 1.00	Cosphi of the motor.	100 = 1
99.12	<i>Motor nominal torque</i>	Defines the nominal motor shaft torque. This value can be given instead of nominal power (99.10) if shown on the rating plate of the motor. Notes: - This setting is an alternative to the nominal power value (99.10). If both are entered, 99.12 takes priority. - This parameter cannot be changed while the drive is running.	0.000 N·m
	0.000...4000000.000 N·m	Nominal motor torque.	1 = 1 unit
99.15	<i>Motor polepairs calculated</i>	Calculated number of pole pairs in the motor.	0
	0...1000	Number of pole pairs.	1 = 1
99.16	<i>Motor phase order</i>	Switches the rotation direction of motor. This parameter can be used if the motor turns in the wrong direction (for example, because of the wrong phase order in the motor cable), and correcting the cabling is considered impractical. Notes: Changing this parameter does not affect speed reference polarities, so positive speed reference will rotate the motor forward. The phase order selection just ensures that "forward" is in fact the correct direction.	U V W
	U V W	Normal.	0
	U W V	Reversed rotation direction.	1

6

Additional parameter data

What this chapter contains

This chapter lists the parameters with some additional data such as their ranges and 32-bit fieldbus scaling. For parameter descriptions, see chapter [Parameters](#) (page 55).

Terms and abbreviations

Term	Definition
Actual signal	Signal measured or calculated by the drive. Usually can only be monitored but not adjusted; some counter-type signals can however be reset.
Analog src	Analog source: the parameter can be set to the value of another parameter by choosing “Other”, and selecting the source parameter from a list. In addition to the “Other” selection, the parameter may offer other pre-selected settings.
Binary src	Binary source: the value of the parameter can be taken from a specific bit in another parameter value (“Other”). Sometimes the value can be fixed to 0 (false) or 1 (true). In addition, the parameter may offer other pre-selected settings.
Data	Data parameter.
FbEq32	32-bit fieldbus equivalent: The scaling between the value shown on the panel and the integer used in communication when a 32-bit value is selected for transmission to an external system. The corresponding 16-bit scalings are listed in chapter Parameters (page 55).
List	Selection list.

Term	Definition
No.	Parameter number.
PB	Packed Boolean (bit list).
Real	Real number.
Type	Parameter type. See Analog src , Binary src , List , PB , Real .

Fieldbus addresses

Refer to the *User’s manual* of the fieldbus adapter.

Parameter groups 1...9

No.	Name	Type	Range	Unit	FbEq32
01 Actual values					
01.01	Motor speed used	<i>Real</i>	-30000.00 ... 30000.00	rpm	100 = 1 rpm
01.02	Motor speed estimated	<i>Real</i>	-30000.00 ... 30000.00	rpm	100 = 1 rpm
01.03	Motor speed %	<i>Real</i>	-1000.00 ... 1000.00	%	100 = 1%
01.06	Output frequency	<i>Real</i>	-500.00 ... 500.00	Hz	100 = 1 Hz
01.07	Motor current	<i>Real</i>	0.00 ... 30000.00	A	100 = 1 A
01.08	Grid current	<i>Real</i>	0.00 ... 585.00	A	100 = 1 A
01.10	Motor torque	<i>Real</i>	-1600.0 ... 1600.0	%	10 = 1%
01.11	DC voltage	<i>Real</i>	0.00 ... 2000.00	V	100 = 1 V
01.13	Output voltage	<i>Real</i>	0...20000	V	1 = 1 V
01.14	Output power	<i>Real</i>	-32768.00 ... 32767.00	kW or hp	100 = 1 unit
01.15	Output power % of motor nom	<i>Real</i>	-300.00 ... 300.00	%	10 = 1%
01.17	Motor shaft power	<i>Real</i>	-32768.00 ... 32767.00	kW or hp	100 = 1 unit
01.18	Inverter GWh motoring	<i>Real</i>	0...32767	GWh	1 = 1 GWh
01.19	Inverter MWh motoring	<i>Real</i>	0...1000	MWh	1 = 1 MWh
01.20	Inverter kWh motoring	<i>Real</i>	0...1000	kWh	1 = 1 kWh
01.24	Flux actual %	<i>Real</i>	0...200	%	1 = 1%
01.29	Speed change rate	<i>Real</i>	-15000 ... 15000	rpm/s	1 = 1 rpm/s
01.30	Nominal torque scale	<i>Real</i>	0.000...4000000.000	N·m	1000 = 1 unit
01.31	Ambient temperature	<i>Real</i>	-100.0 ... 500.0	°C	1 = 1 °C
01.32	Trafo winding U1 temperature	<i>Real</i>	-100.0 ... 500.0	°C	1 = 1 °C
01.33	Trafo winding V1 temperature	<i>Real</i>	-100.0 ... 500.0	°C	1 = 1 °C
01.34	Trafo winding W1 temperature	<i>Real</i>	-100.0 ... 500.0	°C	1 = 1 °C
01.35	INU air pressure	<i>Real</i>	-1000.0 ... 1000.0	Pa	1 = 1 Pa
01.40	Phase U2 motor current	<i>Real</i>	-825 ... 825	A	1 = 1 A
01.41	Phase V2 motor current	<i>Real</i>	-825 ... 825	A	1 = 1 A
01.42	Phase W2 motor current	<i>Real</i>	-825 ... 825	A	1 = 1 A
01.43	Phase U2 motor voltage	<i>Real</i>	-20500 ... 20500	V	1 = 1 V
01.44	Phase V2 motor voltage	<i>Real</i>	-20500 ... 20500	V	1 = 1 V
01.45	Phase W2 motor voltage	<i>Real</i>	-20500 ... 20500	V	1 = 1 V
01.46	Phase A average DC voltage	<i>Real</i>	0 ... 1400	V	1 = 1 V
01.47	Phase B average DC voltage	<i>Real</i>	0 ... 1400	V	1 = 1 V
01.48	Phase C average DC voltage	<i>Real</i>	0 ... 1400	V	1 = 1 V
01.49	Phase U1 grid current	<i>Real</i>	-825 ... 825	A	1 = 1 A
01.50	Phase V1 grid current	<i>Real</i>	-825 ... 825	A	1 = 1 A
01.51	Phase W1 grid current	<i>Real</i>	-825 ... 825	A	1 = 1 A
01.52	Phase A average secondary voltage	<i>Real</i>	0 ... 1500	V	1 = 1 V
01.53	Phase B average secondary voltage	<i>Real</i>	0 ... 1500	V	1 = 1 V

No.	Name	Type	Range	Unit	FbEq32
01.54	Phase C average secondary voltage	<i>Real</i>	0 ... 1500	V	1 = 1 V
01.61	Abs motor speed used	<i>Real</i>	0.00 ... 30000.00	rpm	100 = 1 rpm
01.62	Abs motor speed %	<i>Real</i>	0.00 ... 1000.00	%	100 = 1 rpm
01.63	Abs output frequency	<i>Real</i>	0.00 ... 500.00	Hz	100 = 1 Hz
01.64	Abs motor torque	<i>Real</i>	0.0 ... 1600.0	%	10 = 1%
01.65	Abs output power	<i>Real</i>	0.00 ... 32767.00	kW or hp	100 = 1 unit
01.66	Abs output power % motor nom	<i>Real</i>	0.00 ... 300.00	%	10 = 1%
01.68	Abs motor shaft power	<i>Real</i>	0.00 ... 32767.00	kW or hp	100 = 1 unit
01.70	Ambient temperature %	<i>real32</i>	-200.00 ... 200.00	%	100 = 1%
01.170	SBU grid voltage	<i>Real</i>	0 ... 20000	V	1 = 1 V
01.171	SBU motor voltage	<i>Real</i>	0 ... 20000	V	1 = 1 V
01.201	Motor current % of motor nom	<i>Real</i>	0.00 ... 1000.00	%	10 = 1%
03 Input references					
03.01	Panel reference	<i>Real</i>	-100000.00 ... 100000.00	-	100 = 1
03.02	Panel reference 2	<i>Real</i>	-30000.00 ... 30000.00	-	100 = 1
03.05	FB A reference 1	<i>Real</i>	-100000.00 ... 100000.00	-	100 = 1
03.06	FB A reference 2	<i>Real</i>	-100000.00 ... 100000.00	-	100 = 1
03.07	FB B reference 1	<i>Real</i>	-100000.00 ... 100000.00	-	100 = 1
03.08	FB B reference 2	<i>Real</i>	-100000.00 ... 100000.00	-	100 = 1
03.13	M/F or D2D ref1	<i>real32</i>	-30000.00 ... 30000.00	-	100 = 1
03.14	M/F or D2D ref2	<i>real32</i>	-30000.00 ... 30000.00	-	100 = 1
03.30	FB A reference 1 int32	<i>real32</i>	-2147483648 ... 2147483647	-	1 = 1
03.31	FB A reference 2 int32	<i>real32</i>	-2147483648 ... 2147483647	-	1 = 1
04 Warnings and faults					
04.01	Tripping fault	<i>Data</i>	0000h...FFFFh	-	1 = 1
04.02	Active fault 2	<i>Data</i>	0000h...FFFFh	-	1 = 1
04.03	Active fault 3	<i>Data</i>	0000h...FFFFh	-	1 = 1
04.04	Active fault 4	<i>Data</i>	0000h...FFFFh	-	1 = 1
04.05	Active fault 5	<i>Data</i>	0000h...FFFFh	-	1 = 1
04.06	Active warning 1	<i>Data</i>	0000h...FFFFh	-	1 = 1
04.07	Active warning 2	<i>Data</i>	0000h...FFFFh	-	1 = 1
04.08	Active warning 3	<i>Data</i>	0000h...FFFFh	-	1 = 1
04.09	Active warning 4	<i>Data</i>	0000h...FFFFh	-	1 = 1
04.10	Active warning 5	<i>Data</i>	0000h...FFFFh	-	1 = 1
04.11	Latest fault	<i>Data</i>	0000h...FFFFh	-	1 = 1
04.12	2nd latest fault	<i>Data</i>	0000h...FFFFh	-	1 = 1
04.13	3rd latest fault	<i>Data</i>	0000h...FFFFh	-	1 = 1
04.14	4th latest fault	<i>Data</i>	0000h...FFFFh	-	1 = 1

No.	Name	Type	Range	Unit	FbEq32
04.15	5th latest fault	<i>Data</i>	0000h...FFFFh	-	1 = 1
04.16	Latest warning	<i>Data</i>	0000h...FFFFh	-	1 = 1
04.17	2nd latest warning	<i>Data</i>	0000h...FFFFh	-	1 = 1
04.18	3rd latest warning	<i>Data</i>	0000h...FFFFh	-	1 = 1
04.19	4th latest warning	<i>Data</i>	0000h...FFFFh	-	1 = 1
04.20	5th latest warning	<i>Data</i>	0000h...FFFFh	-	1 = 1
04.23	Tripping fault Aux code	<i>Data</i>	0000 0000h...FFFF FFFFh	-	1 = 1
04.24	Active fault 2 Aux code	<i>Data</i>	0000 0000h...FFFF FFFFh	-	1 = 1
04.25	Active fault 3 Aux code	<i>Data</i>	0000 0000h...FFFF FFFFh	-	1 = 1
04.26	Active fault 4 Aux code	<i>Data</i>	0000 0000h...FFFF FFFFh	-	1 = 1
04.27	Active fault 5 Aux code	<i>Data</i>	0000 0000h...FFFF FFFFh	-	1 = 1
04.40	Event word1	<i>Data</i>	0000h...FFFFh	-	1 = 1
04.41	Event word1 bit0 code	<i>Data</i>	0000h...FFFFh	-	1 = 1
04.42	Event word1 bit0 aux code	<i>Data</i>	0000 0000h...FFFF FFFFh	-	1 = 1
04.43	Event word1 bit1 code	<i>Data</i>	0000h...FFFFh	-	1 = 1
04.44	Event word1 bit1 aux code	<i>Data</i>	0000 0000h...FFFF FFFFh	-	1 = 1
...	...	...	...	...	...
04.71	Event word1 bit15 code	<i>Data</i>	0000h...FFFFh	-	1 = 1
04.72	Event word1 bit15 aux code	<i>Data</i>	0000 0000h...FFFF FFFFh	-	1 = 1
05 Diagnostics					
05.01	On-time counter	<i>Real</i>	0...65535	days	1 = 1 d
05.02	Run-time counter	<i>Real</i>	0...65535	days	1 = 1 d
05.09	Time from power-up	<i>uint32</i>	0...4294967295	-	1 = 1
05.41	Main fan service counter	<i>Real</i>	0...150	%	1 = 1%
05.42	Aux. fan service counter	<i>Real</i>	0...150	%	1 = 1%
05.112	Maximum IGBT temperature	<i>Real</i>	0...141	°C	10 = 1°C
06 Control and status words					
06.01	Main control word	<i>PB</i>	0000h...FFFFh	-	1 = 1
06.02	Application control word	<i>PB</i>	0000h...FFFFh	-	1 = 1
06.03	transparent control word	<i>PB</i>	00000000h...FFFFFFFFh	-	1 = 1
06.04	FBA B transparent control word	<i>PB</i>	00000000h...FFFFFFFFh	-	
06.11	Main status word	<i>PB</i>	0000h...FFFFh	-	1 = 1
06.16	Drive status word 1	<i>PB</i>	0000h...FFFFh	-	1 = 1
06.17	Drive status word 2	<i>PB</i>	0000h...FFFFh	-	1 = 1
06.18	Start inhibit status word	<i>PB</i>	0000h...FFFFh	-	1 = 1
06.19	Speed control status word	<i>PB</i>	0000h...FFFFh	-	1 = 1
06.20	Constant speed status word	<i>PB</i>	0000h...FFFFh	-	1 = 1
06.25	Drive inhibit status word 2	<i>PB</i>	0000h...FFFFh	-	1 = 1
06.29	MSW bit 10 sel	<i>Binary src</i>	-	-	1 = 1

No.	Name	Type	Range	Unit	FbEq32
06.30	MSW bit 11 sel	<i>Binary src</i>	-	-	1 = 1
06.31	MSW bit 12 sel	<i>Binary src</i>	-	-	1 = 1
06.32	MSW bit 13 sel	<i>Binary src</i>	-	-	1 = 1
06.33	MSW bit 14 sel	<i>Binary src</i>	-	-	1 = 1
06.45	Follower CW user bit 0 selection	<i>uint32</i>	-	-	1 = 1
06.46	Follower CW user bit 1 selection	<i>uint32</i>	-	-	1 = 1
06.47	Follower CW user bit 2 selection	<i>uint32</i>	-	-	1 = 1
06.48	Follower CW user bit 3 selection	<i>uint32</i>	-	-	1 = 1
06.50	User status word 1	<i>PB</i>	0000h...FFFFh	-	1 = 1
06.60	User status word 1 bit 0 sel	<i>Binary src</i>	-	-	1 = 1
06.61	User status word 1 bit 1 sel	<i>Binary src</i>	-	-	1 = 1
06.62	User status word 1 bit 2 sel	<i>Binary src</i>	-	-	1 = 1
06.63	User status word 1 bit 3 sel	<i>Binary src</i>	-	-	1 = 1
06.64	User status word 1 bit 4 sel	<i>Binary src</i>	-	-	1 = 1
06.65	User status word 1 bit 5 sel	<i>Binary src</i>	-	-	1 = 1
06.66	User status word 1 bit 6 sel	<i>Binary src</i>	-	-	1 = 1
06.67	User status word 1 bit 7 sel	<i>Binary src</i>	-	-	1 = 1
06.68	User status word 1 bit 8 sel	<i>Binary src</i>	-	-	1 = 1
06.69	User status word 1 bit 9 sel	<i>Binary src</i>	-	-	1 = 1
06.70	User status word 1 bit 10 sel	<i>Binary src</i>	-	-	1 = 1
06.71	User status word 1 bit 11 sel	<i>Binary src</i>	-	-	1 = 1
06.72	User status word 1 bit 12 sel	<i>Binary src</i>	-	-	1 = 1
06.73	User status word 1 bit 13 sel	<i>Binary src</i>	-	-	1 = 1
06.74	User status word 1 bit 14 sel	<i>Binary src</i>	-	-	1 = 1
06.75	User status word 1 bit 15 sel	<i>Binary src</i>	-	-	1 = 1

No.	Name	Type	Range	Unit	FbEq32
06.100	User control word 1	PB	0000h...FFFFh	-	1 = 1
06.101	User control word 2	PB	0000h...FFFFh	-	1 = 1
06.110	Aux CW	PB	0000h...FFFFh	-	1 = 1
06.111	Aux SW	PB	0000h...FFFFh	-	1 = 1
07 System info					
07.04	Firmware name	Data	-	-	1 = 1
07.05	Firmware version	Data	0.0.0.0...255.255.255.255	-	1 = 1
07.06	Loading package name	Data	-	-	1 = 1
07.07	Loading package version	Data	0.0.0.0...255.255.255.255	-	1 = 1
07.08	Bootloader version	Data	0.0.0.0...255.255.255.255	-	1 = 1
07.11	Cpu usage	Real	0...100	%	1 = 1%
07.14	PM number per phase from license	Data	0...9	-	1 = 1
07.15	Power module SW version	Data	0.0.0.0...255.255.255.255	-	1 = 1
07.16	Control hub FW version	Data	0.0.0.0...255.255.255.255	-	1 = 1
07.17	CVMI2 FW version	Data	0.0.0.0...255.255.255.255	-	1 = 1
07.18	Control Hub FW version required	Data	0.0.0.0...255.255.255.255	-	1 = 1
07.19	Power module rating	Data	0 - 9	-	1 = 1
07.20	Power module type	Data	-	-	1 = 1
07.23	Application name	Data	-	-	1 = 1
07.24	Application version	Data	-	-	1 = 1
07.25	Customization package name	Data	-	-	1 = 1
07.26	Customization package version	Data	-	-	1 = 1
07.30	Adaptive program status	PB	0000h...FFFFh	-	1 = 1
07.40	IEC application Cpu usage peak	Real	0.0 ... 100.0	%	10 = 1%
07.41	IEC application Cpu load average	Real	0.0 ... 100.0	%	10 = 1%
07.110	PM SN selection	List	-	-	1 = 1
07.111	PM SN part 1	Data	-	-	1 = 1
07.112	PM SN part 2	Data	-	-	1 = 1
07.113	PM SN part 3	Data	-	-	1 = 1

Parameter groups 10...99

No.	Name	Type	Range	Unit	FbEq32
10 Standard DI, RO					
10.01	DI status	<i>PB</i>	0000h...FFFFh	-	1 = 1
10.02	DI delayed status	<i>PB</i>	0000h...FFFFh	-	1 = 1
10.03	DI force selection	<i>PB</i>	0000h...FFFFh	-	1 = 1
10.04	DI force data	<i>PB</i>	0000h...FFFFh	-	1 = 1
10.05	DI1 ON delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
10.06	DI1 OFF delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
10.07	DI2 ON delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
10.08	DI2 OFF delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
10.09	DI3 ON delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
10.10	DI3 OFF delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
10.11	DI4 ON delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
10.12	DI4 OFF delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
10.13	DI5 ON delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
10.14	DI5 OFF delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
10.15	DI6 ON delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
10.16	DI6 OFF delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
10.21	RO status	<i>PB</i>	0000h...FFFFh	-	1 = 1
10.24	RO1 source	<i>Binary src</i>	-	-	1 = 1
10.25	RO1 ON delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
10.26	RO1 OFF delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
10.27	RO2 source	<i>Binary src</i>	-	-	1 = 1
10.28	RO2 ON delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
10.29	RO2 OFF delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
10.30	RO3 source	<i>Binary src</i>	-	-	1 = 1
10.31	RO3 ON delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
10.32	RO3 OFF delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
10.51	DI filter time	<i>Real</i>	0.3 ... 100.0	ms	10 = 1 ms
10.99	RO/DIO control word	<i>PB</i>	0000h...FFFFh	-	1 = 1
11 Standard DIO					
11.01	DIO status	<i>PB</i>	0000h...FFFFh	-	1 = 1
12 Standard AI					
12.01	AI tune	enum	0...4	-	
12.03	AI supervision function	<i>List</i>	0...4	-	1 = 1
12.04	AI supervision selection	<i>PB</i>	0000h...FFFFh	-	1 = 1
12.05	AI supervision force	<i>PB</i>	0000h...FFFFh	-	1 = 1
12.11	AI1 actual value	<i>Real</i>	-22.000 ... 22.000	mA or V	1000 = 1 unit

No.	Name	Type	Range	Unit	FbEq32
12.12	AI1 scaled value	<i>Real</i>	-32768.000 ... 32767.000	-	1000 = 1
12.15	AI1 unit selection	<i>List</i>	-	-	1 = 1
12.16	AI1 filter time	<i>Real</i>	0.000 ... 30.000	s	1000 = 1 s
12.17	AI1 min	<i>Real</i>	-22.000 ... 22.000	mA or V	1000 = 1 mA or V
12.18	AI1 max	<i>Real</i>	-22.000 ... 22.000	mA or V	1000 = 1 mA or V
12.19	AI1 scaled at AI1 min	<i>Real</i>	-32768.000 ... 32767.000	-	1000 = 1
12.20	AI1 scaled at AI1 max	<i>Real</i>	-32768.000 ... 32767.000	-	1000 = 1
12.21	AI2 actual value	<i>Real</i>	-22.000 ... 22.000	mA or V	1000 = 1 mA or V
12.22	AI2 scaled value	<i>Real</i>	-32768.000 ... 32767.000	-	1000 = 1
12.25	AI2 unit selection	<i>List</i>	-	-	1 = 1
12.26	AI2 filter time	<i>Real</i>	0.000 ... 30.000	s	1000 = 1 s
12.27	AI2 min	<i>Real</i>	-22.000 ... 22.000	mA or V	1000 = 1 mA or V
12.28	AI2 max	<i>Real</i>	-22.000 ... 22.000	mA or V	1000 = 1 mA or V
12.29	AI2 scaled at AI2 min	<i>Real</i>	-32768.000 ... 32767.000	-	1000 = 1
12.30	AI2 scaled at AI2 max	<i>Real</i>	-32768.000 ... 32767.000	-	1000 = 1
13 Standard AO					
13.11	AO1 actual value	<i>Real</i>	0.000 ... 22.000	mA	1000 = 1 mA
13.12	AO1 source	<i>Analog src</i>	-	-	1 = 1
13.16	AO1 filter time	<i>Real</i>	0.000 ... 30.000	s	1000 = 1 s
13.17	AO1 source min	<i>Real</i>	-32768.0 ... 32767.0	-	10 = 1
13.18	AO1 source max	<i>Real</i>	-32768.0 ... 32767.0	-	10 = 1
13.19	AO1 out at AO1 src min	<i>Real</i>	0.000 ... 22.000	mA	1000 = 1 mA
13.20	AO1 out at AO1 src max	<i>Real</i>	0.000 ... 22.000	mA	1000 = 1 mA
13.21	AO2 actual value	<i>Real</i>	0.000 ... 22.000	mA	1000 = 1 mA
13.22	AO2 source	<i>Analog src</i>	-	-	1 = 1
13.26	AO2 filter time	<i>Real</i>	0.000 ... 30.000	s	1000 = 1 s
13.27	AO2 source min	<i>Real</i>	-32768.0 ... 32767.0	-	10 = 1
13.28	AO2 source max	<i>Real</i>	-32768.0 ... 32767.0	-	10 = 1
13.29	AO2 out at AO2 src min	<i>Real</i>	0.000 ... 22.000	mA	1000 = 1 mA
13.30	AO2 out at AO2 src max	<i>Real</i>	0.000 ... 22.000	mA	1000 = 1 mA
13.91	AO1 data storage	<i>Real</i>	-327.68 ... 327.67	-	100 = 1
13.92	AO2 data storage	<i>Real</i>	-327.68 ... 327.67	-	100 = 1
14 I/O extension module 1					
14.01	Module 1 type	<i>List</i>	0...4	-	1 = 1
14.02	Module 1 location	<i>Real</i>	1...254	-	1 = 1
14.03	Module 1 status	<i>List</i>	0...24	-	1 = 1

308 Additional parameter data

No.	Name	Type	Range	Unit	FbEq32
<i>Common parameters for DIOx (14.01 Module 1 type = FIO-01 or FIO-11)</i>					
14.05	DIO status	<i>PB</i>	00000000h...FFFFFFFFh	-	1 = 1
14.06	DIO delayed status	<i>PB</i>	00000000h...FFFFFFFFh	-	1 = 1
<i>DIO1/DIO2 (14.01 Module 1 type = FIO-01 or FIO-11)</i>					
14.08	DIO filter time	<i>Real</i>	0.8...100.0	ms	10 = 1 ms
14.09	DIO1 function	<i>List</i>	0...1	-	1 = 1
14.10	DIO1 filter gain (Not visible when <i>14.01 Module 1 type = FIO-01</i>)	<i>List</i>	0...3	-	1 = 1
14.11	DIO1 output source	<i>Binary src</i>	-	-	1 = 1
14.12	DIO1 ON delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
14.13	DIO1 OFF delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
14.14	DIO2 function	<i>List</i>	0...1	-	1 = 1
14.15	DIO2 filter gain (Not visible when <i>14.01 Module 1 type = FIO-01</i>)	<i>List</i>	0...3	-	1 = 1
14.16	DIO2 output source	<i>Binary src</i>	-	-	1 = 1
14.17	DIO2 ON delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
14.18	DIO2 OFF delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
<i>DIO3/DIO4 (14.01 Module 1 type = FIO-01)</i>					
14.19	DIO3 function	<i>List</i>	0...1	-	1 = 1
14.21	DIO3 output source	<i>Binary src</i>	-	-	1 = 1
14.21	AI tune				
14.22	DIO3 ON delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
14.23	DIO3 OFF delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
14.24	DIO4 function	<i>List</i>	0...1	-	1 = 1
14.26	DIO4 output source	<i>Binary src</i>	-	-	1 = 1
14.27	DIO4 ON delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
14.28	DIO4 OFF delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
<i>RO1/RO2 (14.01 Module 1 type = FIO-01)</i>					
14.31	RO status	<i>PB</i>	0000h...FFFFh	-	1 = 1
14.34	RO1 source	<i>Binary src</i>	-	-	1 = 1
14.35	RO1 ON delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
14.36	RO1 OFF delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
14.37	RO2 source	<i>Binary src</i>	-	-	1 = 1
14.38	RO2 ON delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
14.39	RO2 OFF delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s

No.	Name	Type	Range	Unit	FbEq32
<i>Common parameters for AIx (14.01 Module 1 type = FIO-11 or FAIO-01)</i>					
14.19	AI supervision function	List	0...4	-	1 = 1
14.20	AI supervision selection	PB	0000h...FFFFh	-	1 = 1
14.22	AI force selection	PB	0000h...FFFFh	-	1 = 1
<i>AI1/AI2 (14.01 Module 1 type = FIO-11 or FAIO-01)</i>					
14.26	AI1 actual value	Real	-22.000 ... 22.000	mA or V	1000 = 1 unit
14.27	AI1 scaled value	Real	-32768.000 ... 32767.000	-	1000 = 1
14.28	AI1 force data	Real	-22.000 ... 22.000	mA or V	1000 = 1 unit
14.29	AI1 HW switch position	List	-	-	1 = 1
14.30	AI1 unit selection	List	-	-	1 = 1
14.31	AI1 filter gain	List	0...7	-	1 = 1
14.32	AI1 filter time	Real	0.000 ... 30.000	s	1000 = 1 s
14.33	AI1 min	Real	-22.000 ... 22.000	mA or V	1000 = 1 mA or V
14.34	AI1 max	Real	-22.000 ... 22.000	mA or V	1000 = 1 mA or V
14.35	AI1 scaled at AI1 min	Real	-32768.000 ... 32767.000	-	1000 = 1
14.36	AI1 scaled at AI1 max	Real	-32768.000 ... 32767.000	-	1000 = 1
14.41	AI2 actual value	Real	-22.000 ... 22.000	mA or V	1000 = 1 unit
14.42	AI2 scaled value	Real	-32768.000 ... 32767.000	-	1000 = 1
14.43	AI2 force data	Real	-22.000 ... 22.000	mA or V	1000 = 1 unit
14.44	AI2 HW switch position	List	-	-	1 = 1
14.45	AI2 unit selection	List	-	-	1 = 1
14.46	AI2 filter gain	List	0...7	-	1 = 1
14.47	AI2 filter time	Real	0.000 ... 30.000	s	1000 = 1 s
14.48	AI2 min	Real	-22.000 ... 22.000	mA or V	1000 = 1 mA or V
14.49	AI2 max	Real	-22.000 ... 22.000	mA or V	1000 = 1 mA or V
14.50	AI2 scaled at AI2 min	Real	-32768.000 ... 32767.000	-	1000 = 1
14.51	AI2 scaled at AI2 max	Real	-32768.000 ... 32767.000	-	1000 = 1
<i>AI3 (14.01 Module 1 type = FIO-11)</i>					
14.56	AI3 actual value	Real	-22.000 ... 22.000	mA or V	1000 = 1 unit
14.57	AI3 scaled value	Real	-32768.000 ... 32767.000	-	1000 = 1
14.58	AI3 force data	Real	-22.000 ... 22.000	mA or V	1000 = 1 unit
14.59	AI3 HW switch position	List	-	-	1 = 1
14.60	AI3 unit selection	List	-	-	1 = 1
14.61	AI3 filter gain	List	0...7	-	1 = 1
14.62	AI3 filter time	Real	0.000 ... 30.000	s	1000 = 1 s
14.63	AI3 min	Real	-22.000 ... 22.000	mA or V	1000 = 1 mA or V
14.64	AI3 max	Real	-22.000 ... 22.000	mA or V	1000 = 1 mA or V

No.	Name	Type	Range	Unit	FbEq32
14.65	AI3 scaled at AI3 min	<i>Real</i>	-32768.000 ... 32767.000	-	1000 = 1
14.66	AI3 scaled at AI3 max	<i>Real</i>	-32768.000 ... 32767.000	-	1000 = 1
<i>Common parameters for AOx (14.01 Module 1 type = FIO-11 or FAIO-01)</i>					
14.71	AO force selection	<i>PB</i>	00000000h...FFFFFFFFh	-	1 = 1
<i>AO1 (14.01 Module 1 type = FIO-11 or FAIO-01)</i>					
14.76	AO1 actual value	<i>Real</i>	0.000 ... 22.000	mA	1000 = 1 mA
14.77	AO1 source	<i>Analog src</i>	-	-	1 = 1
14.78	AO1 force data	<i>Real</i>	0.000 ... 22.000	mA	1000 = 1 mA
14.79	AO1 filter time	<i>Real</i>	0.000 ... 30.000	s	1000 = 1 s
14.80	AO1 source min	<i>Real</i>	-32768.0 ... 32767.0	-	10 = 1
14.81	AO1 source max	<i>Real</i>	-32768.0 ... 32767.0	-	10 = 1
14.82	AO1 out at AO1 src min	<i>Real</i>	0.000 ... 22.000	mA	1000 = 1 mA
14.83	AO1 out at AO1 src max	<i>Real</i>	0.000 ... 22.000	mA	1000 = 1 mA
<i>AO2 (14.01 Module 1 type = FAIO-01)</i>					
14.86	AO2 actual value	<i>Real</i>	0.000 ... 22.000	mA	1000 = 1 mA
14.87	AO2 source	<i>Analog src</i>	-	-	1 = 1
14.88	AO2 force data	<i>Real</i>	0.000 ... 22.000	mA	1000 = 1 mA
14.89	AO2 filter time	<i>Real</i>	0.000 ... 30.000	s	1000 = 1 s
14.90	AO2 source min	<i>Real</i>	-32768.0 ... 32767.0	-	10 = 1
14.91	AO2 source max	<i>Real</i>	-32768.0 ... 32767.0	-	10 = 1
14.92	AO2 out at AO2 src min	<i>Real</i>	0.000 ... 22.000	mA	1000 = 1 mA
14.93	AO2 out at AO2 src max	<i>Real</i>	0.000 ... 22.000	mA	1000 = 1 mA
15 I/O extension module 2					
15.01	Module 2 type	<i>List</i>	0...3	-	1 = 1
15.02	Module 2 location	<i>Real</i>	1...254	-	1 = 1
15.03	Module 2 status	<i>List</i>	0...2	-	1 = 1
<i>Common parameters for DIOx (15.01 Module 2 type = FIO-01 or FIO-11)</i>					
15.05	DIO status	<i>PB</i>	00000000h...FFFFFFFFh	-	1 = 1
15.06	DIO delayed status	<i>PB</i>	00000000h...FFFFFFFFh	-	1 = 1
<i>DIO1/DIO2 (15.01 Module 2 type = FIO-01 or FIO-11)</i>					
15.08	DIO filter time	<i>Real</i>	0.8...100.0	ms	10 = 1 ms
15.09	DIO1 function	<i>List</i>	0...1	-	1 = 1
15.10	DIO1 filter gain (Not visible when 15.01 Module 2 type = FIO-01)	<i>List</i>	0...3	-	1 = 1
15.11	DIO1 output source	<i>Binary src</i>	-	-	1 = 1
15.12	DIO1 ON delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
15.13	DIO1 OFF delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
15.14	DIO2 function	<i>List</i>	0...1	-	1 = 1

No.	Name	Type	Range	Unit	FbEq32
15.15	DIO2 filter gain (Not visible when 15.01 Module 2 type = FIO-01)	List	0...3	-	1 = 1
15.16	DIO2 output source	Binary src	-	-	1 = 1
15.17	DIO2 ON delay	Real	0.0 ... 3000.0	s	10 = 1 s
15.18	DIO2 OFF delay	Real	0.0 ... 3000.0	s	10 = 1 s
DIO3/DIO4 (15.01 Module 2 type = FIO-01)					
15.19	DIO3 function	List	0...1	-	1 = 1
15.21	DIO3 output source	Binary src	-	-	1 = 1
15.22	DIO3 ON delay	Real	0.0 ... 3000.0	s	10 = 1 s
15.23	DIO3 OFF delay	Real	0.0 ... 3000.0	s	10 = 1 s
15.24	DIO4 function	List	0...1	-	1 = 1
15.26	DIO4 output source	Binary src	-	-	1 = 1
15.27	DIO4 ON delay	Real	0.0 ... 3000.0	s	10 = 1 s
15.28	DIO4 OFF delay	Real	0.0 ... 3000.0	s	10 = 1 s
RO1/RO2 (15.01 Module 2 type = FIO-01)					
15.31	RO status	PB	0000h...FFFFh	-	1 = 1
15.34	RO1 source	Binary src	-	-	1 = 1
15.35	RO1 ON delay	Real	0.0 ... 3000.0	s	10 = 1 s
15.36	RO1 OFF delay	Real	0.0 ... 3000.0	s	10 = 1 s
15.37	RO2 source	Binary src	-	-	1 = 1
15.38	RO2 ON delay	Real	0.0 ... 3000.0	s	10 = 1 s
15.39	RO2 OFF delay	Real	0.0 ... 3000.0	s	10 = 1 s
Common parameters for AIx (15.01 Module 2 type = FIO-11 or FAIO-01)					
15.19	AI supervision function	List	0...4	-	1 = 1
15.20	AI supervision selection	PB	0000h...FFFFh	-	1 = 1
15.22	AI force selection	PB	00000000h...FFFFFFFFh	-	1 = 1
AI1/AI2 (15.01 Module 2 type = FIO-11 or FAIO-01)					
15.26	AI1 actual value	Real	-22.000 ... 22.000	mA or V	1000 = 1 unit
15.27	AI1 scaled value	Real	-32768.000 ... 32767.000	-	1000 = 1
15.28	AI1 force data	Real	-22.000 ... 22.000	mA or V	1000 = 1 unit
15.29	AI1 HW switch position	List	-	-	1 = 1
15.30	AI1 unit selection	List	-	-	1 = 1
15.31	AI1 filter gain	List	0...7	-	1 = 1
15.32	AI1 filter time	Real	0.000 ... 30.000	s	1000 = 1 s
15.33	AI1 min	Real	-22.000 ... 22.000	mA or V	1000 = 1 mA or V
15.34	AI1 max	Real	-22.000 ... 22.000	mA or V	1000 = 1 mA or V

312 Additional parameter data

No.	Name	Type	Range	Unit	FbEq32
15.35	AI1 scaled at AI1 min	<i>Real</i>	-32768.000 ... 32767.000	-	1000 = 1
15.36	AI1 scaled at AI1 max	<i>Real</i>	-32768.000 ... 32767.000	-	1000 = 1
15.41	AI2 actual value	<i>Real</i>	-22.000 ... 22.000	mA or V	1000 = 1 unit
15.42	AI2 scaled value	<i>Real</i>	-32768.000 ... 32767.000	-	1000 = 1
15.43	AI2 force data	<i>Real</i>	-22.000 ... 22.000	mA or V	1000 = 1 unit
15.44	AI2 HW switch position	<i>List</i>	-	-	1 = 1
15.45	AI2 unit selection	<i>List</i>	-	-	1 = 1
15.46	AI2 filter gain	<i>List</i>	0...7	-	1 = 1
15.47	AI2 filter time	<i>Real</i>	0.000 ... 30.000	s	1000 = 1 s
15.48	AI2 min	<i>Real</i>	-22.000 ... 22.000	mA or V	1000 = 1 mA or V
15.49	AI2 max	<i>Real</i>	-22.000 ... 22.000	mA or V	1000 = 1 mA or V
15.50	AI2 scaled at AI2 min	<i>Real</i>	-32768.000 ... 32767.000	-	1000 = 1
15.51	AI2 scaled at AI2 max	<i>Real</i>	-32768.000 ... 32767.000	-	1000 = 1
<i>AI3 (15.01 Module 2 type = FIO-11)</i>					
15.56	AI3 actual value	<i>Real</i>	-22.000 ... 22.000	mA or V	1000 = 1 unit
15.57	AI3 scaled value	<i>Real</i>	-32768.000 ... 32767.000	-	1000 = 1
15.58	AI3 force data	<i>Real</i>	-22.000 ... 22.000	mA or V	1000 = 1 unit
15.59	AI3 HW switch position	<i>List</i>	-	-	1 = 1
15.60	AI3 unit selection	<i>List</i>	-	-	1 = 1
15.61	AI3 filter gain	<i>List</i>	0...7	-	1 = 1
15.62	AI3 filter time	<i>Real</i>	0.000 ... 30.000	s	1000 = 1 s
15.63	AI3 min	<i>Real</i>	-22.000 ... 22.000	mA or V	1000 = 1 mA or V
15.64	AI3 max	<i>Real</i>	-22.000 ... 22.000	mA or V	1000 = 1 mA or V
15.65	AI3 scaled at AI3 min	<i>Real</i>	-32768.000 ... 32767.000	-	1000 = 1
15.66	AI3 scaled at AI3 max	<i>Real</i>	-32768.000 ... 32767.000	-	1000 = 1
<i>Common parameters for AOx (15.01 Module 2 type = FIO-11 or FAIO-01)</i>					
15.71	AO force selection	<i>PB</i>	00000000h...FFFFFFFh	-	1 = 1
<i>AO1 (15.01 Module 2 type = FIO-11 or FAIO-01)</i>					
15.76	AO1 actual value	<i>Real</i>	0.000 ... 22.000	mA	1000 = 1 mA
15.77	AO1 source	<i>Analog src</i>	-	-	1 = 1
15.78	AO1 force data	<i>Real</i>	0.000 ... 22.000	mA	1000 = 1 mA
15.79	AO1 filter time	<i>Real</i>	0.000 ... 30.000	s	1000 = 1 s
15.80	AO1 source min	<i>Real</i>	-32768.0 ... 32767.0	-	10 = 1
15.81	AO1 source max	<i>Real</i>	-32768.0 ... 32767.0	-	10 = 1
15.82	AO1 out at AO1 src min	<i>Real</i>	0.000 ... 22.000	mA	1000 = 1 mA
15.83	AO1 out at AO1 src max	<i>Real</i>	0.000 ... 22.000	mA	1000 = 1 mA
<i>AO2 (15.01 Module 2 type = FAIO-01)</i>					
15.86	AO2 actual value	<i>Real</i>	0.000 ... 22.000	mA	1000 = 1 mA

No.	Name	Type	Range	Unit	FbEq32
15.87	AO2 source	<i>Analog src</i>	-	-	1 = 1
15.88	AO2 force data	<i>Real</i>	0.000 ... 22.000	mA	1000 = 1 mA
15.89	AO2 filter time	<i>Real</i>	0.000 ... 30.000	s	1000 = 1 s
15.90	AO2 source min	<i>Real</i>	-32768.0 ... 32767.0	-	10 = 1
15.91	AO2 source max	<i>Real</i>	-32768.0 ... 32767.0	-	10 = 1
15.92	AO2 out at AO2 src min	<i>Real</i>	0.000 ... 22.000	mA	1000 = 1 mA
15.93	AO2 out at AO2 src max	<i>Real</i>	0.000 ... 22.000	mA	1000 = 1 mA
16 I/O extension module 3					
16.01	Module 3 type	<i>List</i>	0...3	-	1 = 1
16.02	Module 3 location	<i>Real</i>	1...254	-	1 = 1
16.03	Module 3 status	<i>List</i>	0...2	-	1 = 1
<i>Common parameters for DIOx (16.01 Module 3 type = FIO-01 or FIO-11)</i>					
16.05	DIO status	<i>PB</i>	00000000h...FFFFFFFFh	-	1 = 1
16.06	DIO delayed status	<i>PB</i>	00000000h...FFFFFFFFh	-	1 = 1
<i>DIO1/DIO2 (16.01 Module 3 type = FIO-01 or FIO-11)</i>					
16.08	DIO filter time	<i>Real</i>	0.8...100.0	ms	10 = 1 ms
16.09	DIO1 function	<i>List</i>	0...1	-	1 = 1
16.10	DIO1 filter gain (Not visible when 16.01 Module 3 type = FIO-01)	<i>List</i>	0...3	-	1 = 1
16.11	DIO1 output source	<i>Binary src</i>	-	-	1 = 1
16.12	DIO1 ON delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
16.13	DIO1 OFF delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
16.14	DIO2 function	<i>List</i>	0...1	-	1 = 1
16.15	DIO2 filter gain (Not visible when 16.01 Module 3 type = FIO-01)	<i>List</i>	0...3	-	1 = 1
16.16	DIO2 output source	<i>Binary src</i>	-	-	1 = 1
16.17	DIO2 ON delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
16.18	DIO2 OFF delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
<i>DIO3/DIO4 (16.01 Module 3 type = FIO-01)</i>					
16.19	DIO3 function	<i>List</i>	0...1	-	1 = 1
16.21	DIO3 output source	<i>Binary src</i>	-	-	1 = 1
16.22	DIO3 ON delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
16.23	DIO3 OFF delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
16.24	DIO4 function	<i>List</i>	0...1	-	1 = 1
16.26	DIO4 output source	<i>Binary src</i>	-	-	1 = 1
16.27	DIO4 ON delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
16.28	DIO4 OFF delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s

314 Additional parameter data

No.	Name	Type	Range	Unit	FbEq32
<i>RO1/RO2 (16.01 Module 3 type = FIO-01)</i>					
16.31	RO status	<i>PB</i>	0000h...FFFFh	-	1 = 1
16.34	RO1 source	<i>Binary src</i>	-	-	1 = 1
16.35	RO1 ON delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
16.36	RO1 OFF delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
16.37	RO2 source	<i>Binary src</i>	-	-	1 = 1
16.38	RO2 ON delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
16.39	RO2 OFF delay	<i>Real</i>	0.0 ... 3000.0	s	10 = 1 s
<i>Common parameters for AIx (16.01 Module 3 type = FIO-11 or FAIO-01)</i>					
16.19	AI supervision function	<i>List</i>	0...4	-	1 = 1
16.20	AI supervision selection	<i>PB</i>	0000h...FFFFh	-	1 = 1
16.22	AI force selection	<i>PB</i>	00000000h...FFFFFFFFh	-	1 = 1
<i>AI1/AI2 (16.01 Module 3 type = FIO-11 or FAIO-01)</i>					
16.26	AI1 actual value	<i>Real</i>	-22.000 ... 22.000	mA or V	1000 = 1 unit
16.27	AI1 scaled value	<i>Real</i>	-32768.000 ... 32767.000	-	1000 = 1
16.28	AI1 force data	<i>Real</i>	-22.000 ... 22.000	mA or V	1000 = 1 unit
16.29	AI1 HW switch position	<i>List</i>	-	-	1 = 1
16.30	AI1 unit selection	<i>List</i>	-	-	1 = 1
16.31	AI1 filter gain	<i>List</i>	0...7	-	1 = 1
16.32	AI1 filter time	<i>Real</i>	0.000 ... 30.000	s	1000 = 1 s
16.33	AI1 min	<i>Real</i>	-22.000 ... 22.000	mA or V	1000 = 1 mA or V
16.34	AI1 max	<i>Real</i>	-22.000 ... 22.000	mA or V	1000 = 1 mA or V
16.35	AI1 scaled at AI1 min	<i>Real</i>	-32768.000 ... 32767.000	-	1000 = 1
16.36	AI1 scaled at AI1 max	<i>Real</i>	-32768.000 ... 32767.000	-	1000 = 1
16.41	AI2 actual value	<i>Real</i>	-22.000 ... 22.000	mA or V	1000 = 1 unit
16.42	AI2 scaled value	<i>Real</i>	-32768.000 ... 32767.000	-	1000 = 1
16.43	AI2 force data	<i>Real</i>	-22.000 ... 22.000	mA or V	1000 = 1 unit
16.44	AI2 HW switch position	<i>List</i>	-	-	1 = 1
16.45	AI2 unit selection	<i>List</i>	-	-	1 = 1
16.46	AI2 filter gain	<i>List</i>	0...7	-	1 = 1
16.47	AI2 filter time	<i>Real</i>	0.000 ... 30.000	s	1000 = 1 s
16.48	AI2 min	<i>Real</i>	-22.000 ... 22.000	mA or V	1000 = 1 mA or V
16.49	AI2 max	<i>Real</i>	-22.000 ... 22.000	mA or V	1000 = 1 mA or V
16.50	AI2 scaled at AI2 min	<i>Real</i>	-32768.000 ... 32767.000	-	1000 = 1
16.51	AI2 scaled at AI2 max	<i>Real</i>	-32768.000 ... 32767.000	-	1000 = 1
<i>AI3 (16.01 Module 3 type = FIO-11)</i>					
16.56	AI3 actual value	<i>Real</i>	-22.000 ... 22.000	mA or V	1000 = 1 unit

No.	Name	Type	Range	Unit	FbEq32
16.57	AI3 scaled value	<i>Real</i>	-32768.000 ... 32767.000	-	1000 = 1
16.58	AI3 force data	<i>Real</i>	-22.000 ... 22.000	mA or V	1000 = 1 unit
16.59	AI3 HW switch position	<i>List</i>	-	-	1 = 1
16.60	AI3 unit selection	<i>List</i>	-	-	1 = 1
16.61	AI3 filter gain	<i>List</i>	0...7	-	1 = 1
16.62	AI3 filter time	<i>Real</i>	0.000 ... 30.000	s	1000 = 1 s
16.63	AI3 min	<i>Real</i>	-22.000 ... 22.000	mA or V	1000 = 1 mA or V
16.64	AI3 max	<i>Real</i>	-22.000 ... 22.000	mA or V	1000 = 1 mA or V
16.65	AI3 scaled at AI3 min	<i>Real</i>	-32768.000 ... 32767.000	-	1000 = 1
16.66	AI3 scaled at AI3 max	<i>Real</i>	-32768.000 ... 32767.000	-	1000 = 1
<i>Common parameters for AOx (16.01 Module 3 type = FIO-11 or FAIO-01)</i>					
16.71	AO force selection	<i>PB</i>	00000000h...FFFFFFFFh	-	1 = 1
<i>AO1 (16.01 Module 3 type = FIO-11 or FAIO-01)</i>					
16.76	AO1 actual value	<i>Real</i>	0.000 ... 22.000	mA	1000 = 1 mA
16.77	AO1 source	<i>Analog src</i>	-	-	1 = 1
16.78	AO1 force data	<i>Real</i>	0.000 ... 22.000	mA	1000 = 1 mA
16.79	AO1 filter time	<i>Real</i>	0.000 ... 30.000	s	1000 = 1 s
16.80	AO1 source min	<i>Real</i>	-32768.0 ... 32767.0	-	10 = 1
16.81	AO1 source max	<i>Real</i>	-32768.0 ... 32767.0	-	10 = 1
16.82	AO1 out at AO1 src min	<i>Real</i>	0.000 ... 22.000	mA	1000 = 1 mA
16.83	AO1 out at AO1 src max	<i>Real</i>	0.000 ... 22.000	mA	1000 = 1 mA
<i>AO2 (16.01 Module 3 type = FAIO-01)</i>					
16.86	AO2 actual value	<i>Real</i>	0.000 ... 22.000	mA	1000 = 1 mA
16.87	AO2 source	<i>Analog src</i>	-	-	1 = 1
16.88	AO2 force data	<i>Real</i>	0.000 ... 22.000	mA	1000 = 1 mA
16.89	AO2 filter time	<i>Real</i>	0.000 ... 30.000	s	1000 = 1 s
16.90	AO2 source min	<i>Real</i>	-32768.0 ... 32767.0	-	10 = 1
16.91	AO2 source max	<i>Real</i>	-32768.0 ... 32767.0	-	10 = 1
16.92	AO2 out at AO2 src min	<i>Real</i>	0.000 ... 22.000	mA	1000 = 1 mA
16.93	AO2 out at AO2 src max	<i>Real</i>	0.000 ... 22.000	mA	1000 = 1 mA
17 Control hub IO					
17.01	Control hub DO status	<i>PB</i>	00000000h...FFFFFFFFh	-	1 = 1
17.02	Control hub DO source	<i>PB</i>	00000000h...FFFFFFFFh	-	1 = 1
17.05	Control hub DI status	<i>PB</i>	00000000h...FFFFFFFFh	-	1 = 1
19 Operation mode					
19.01	Actual operation mode	<i>List</i>	-	-	1 = 1
19.11	Ext1/Ext2 selection	<i>Binary src</i>	-	-	1 = 1
19.12	Ext1 control mode	<i>List</i>	1...6	-	1 = 1

No.	Name	Type	Range	Unit	FbEq32
19.14	Ext2 control mode	List	1...6	-	1 = 1
19.16	Local control mode	List	0...1	-	1 = 1
19.17	Local control disable	List	0...1	-	1 = 1
19.20	Scalar control reference unit	List	0...1	-	1 = 1
20 Start/stop/direction					
20.01	Ext1 commands	List	-	-	1 = 1
20.02	Ext1 start trigger type	List	0...1	-	1 = 1
20.03	Ext1 in1 source	Binary src	-	-	1 = 1
20.04	Ext1 in2 source	Binary src	-	-	1 = 1
20.05	Ext1 in3 source	Binary src	-	-	1 = 1
20.06	Ext2 commands	List	-	-	1 = 1
20.07	Ext2 start trigger type	List	0...1	-	1 = 1
20.08	Ext2 in1 source	Binary src	-	-	1 = 1
20.09	Ext2 in2 source	Binary src	-	-	1 = 1
20.10	Ext2 in3 source	Binary src	-	-	1 = 1
20.19	Enable start command	Binary src	-	-	1 = 1
20.23	Positive speed enable	Binary src	-	-	1 = 1
20.24	Negative speed enable	Binary src	-	-	1 = 1
20.25	Jogging enable	Binary src	-	-	1 = 1
20.26	Jogging 1 start source	Binary src	-	-	1 = 1
20.27	Jogging 2 start source	Binary src	-	-	1 = 1
20.29	Local start trigger type	uint16	0...1	-	1 = 1
20.30	Enable signals warning function	PB	00b...11b	-	1 = 1
21 Start/stop mode					
21.01	Start mode	List	0...2	-	1 = 1
21.02	Magnetization time	Real	0...10000	ms	1 = 1 ms
21.03	Stop mode	List	0...2	-	1 = 1
21.05	Emergency stop source	Binary src	-	-	1 = 1
21.06	Zero speed limit	Real	0.00 ... 30000.00	rpm	100 = 1 rpm
21.07	Zero speed delay	Real	0...30000	ms	1 = 1 ms
21.10	DC current reference	Real	0.0 ... 100.0	%	10 = 1%

No.	Name	Type	Range	Unit	FbEq32
21.12	Continuous magnetization command	<i>Binary src</i>	-	-	1 = 1
21.19	Scalar start mode	<i>List</i>	0...2	-	1 = 1
22 Speed reference selection					
22.01	Speed ref unlimited	<i>Real</i>	-30000.00 ... 30000.00	rpm	100 = 1 rpm
22.11	Speed ref1 source	<i>Analog src</i>	-	-	1 = 1
22.12	Speed ref2 source	<i>Analog src</i>	-	-	1 = 1
22.13	Speed ref1 function	<i>List</i>	0...5	-	1 = 1
22.14	Speed ref1/2 selection	<i>Binary src</i>	-	-	1 = 1
22.15	Speed additive 1 source	<i>Analog src</i>	-	-	1 = 1
22.16	Speed share	<i>Real</i>	-8.000 ... 8.000	-	1000 = 1
22.17	Speed additive 2 source	<i>Analog src</i>	-	-	1 = 1
22.21	Constant speed function	<i>PB</i>	00b...11b	-	1 = 1
22.22	Constant speed sel1	<i>Binary src</i>	-	-	1 = 1
22.23	Constant speed sel2	<i>Binary src</i>	-	-	1 = 1
22.24	Constant speed sel3	<i>Binary src</i>	-	-	1 = 1
22.26	Constant speed 1	<i>Real</i>	-30000.00 ... 30000.00	rpm	100 = 1 rpm
22.27	Constant speed 2	<i>Real</i>	-30000.00 ... 30000.00	rpm	100 = 1 rpm
22.28	Constant speed 3	<i>Real</i>	-30000.00 ... 30000.00	rpm	100 = 1 rpm
22.29	Constant speed 4	<i>Real</i>	-30000.00 ... 30000.00	rpm	100 = 1 rpm
22.30	Constant speed 5	<i>Real</i>	-30000.00 ... 30000.00	rpm	100 = 1 rpm
22.31	Constant speed 6	<i>Real</i>	-30000.00 ... 30000.00	rpm	100 = 1 rpm
22.32	Constant speed 7	<i>Real</i>	-30000.00 ... 30000.00	rpm	100 = 1 rpm
22.41	Speed ref safe	<i>Real</i>	-30000.00 ... 30000.00	rpm	100 = 1 rpm
22.42	Jogging 1 ref	<i>Real</i>	-30000.00 ... 30000.00	rpm	100 = 1 rpm
22.43	Jogging 2 ref	<i>Real</i>	-30000.00 ... 30000.00	rpm	100 = 1 rpm
22.51	Critical speed function	<i>PB</i>	00b...11b	-	1 = 1
22.52	Critical speed 1 low	<i>Real</i>	-30000.00 ... 30000.00	rpm	100 = 1 rpm
22.53	Critical speed 1 high	<i>Real</i>	-30000.00 ... 30000.00	rpm	100 = 1 rpm
22.54	Critical speed 2 low	<i>Real</i>	-30000.00 ... 30000.00	rpm	100 = 1 rpm
22.55	Critical speed 2 high	<i>Real</i>	-30000.00 ... 30000.00	rpm	100 = 1 rpm
22.56	Critical speed 3 low	<i>Real</i>	-30000.00 ... 30000.00	rpm	100 = 1 rpm
22.57	Critical speed 3 high	<i>Real</i>	-30000.00 ... 30000.00	rpm	100 = 1 rpm
22.81	Speed reference act 1	<i>Real</i>	-30000.00 ... 30000.00	rpm	100 = 1 rpm
22.82	Speed reference act 2	<i>Real</i>	-30000.00 ... 30000.00	rpm	100 = 1 rpm
22.83	Speed reference act 3	<i>Real</i>	-30000.00 ... 30000.00	rpm	100 = 1 rpm

No.	Name	Type	Range	Unit	FbEq32
22.84	Speed reference act 4	<i>Real</i>	-30000.00 ... 30000.00	rpm	100 = 1 rpm
22.85	Speed reference act 5	<i>Real</i>	-30000.00 ... 30000.00	rpm	100 = 1 rpm
22.86	Speed reference act 6	<i>Real</i>	-30000.00 ... 30000.00	rpm	100 = 1 rpm
22.87	Speed reference act 7	<i>Real</i>	-30000.00 ... 30000.00	rpm	100 = 1 rpm
23 Speed reference ramp					
23.01	Speed ref ramp input	<i>Real</i>	-30000.00 ... 30000.00	rpm	100 = 1 rpm
23.02	Speed ref ramp output	<i>Real</i>	-30000.00 ... 30000.00	rpm	100 = 1 rpm
23.11	Ramp set selection	<i>Binary src</i>	-	-	1 = 1
23.12	Acceleration time 1	<i>Real</i>	0.000 ... 1800.000	s	1000 = 1 s
23.13	Deceleration time 1	<i>Real</i>	0.000 ... 1800.000	s	1000 = 1 s
23.14	Acceleration time 2	<i>Real</i>	0.000 ... 1800.000	s	1000 = 1 s
23.15	Deceleration time 2	<i>Real</i>	0.000 ... 1800.000	s	1000 = 1 s
23.16	Shape time acc 1	<i>Real</i>	0.000 ... 1800.000	s	1000 = 1 s
23.17	Shape time acc 2	<i>Real</i>	0.000 ... 1800.000	s	1000 = 1 s
23.18	Shape time dec 1	<i>Real</i>	0.000 ... 1800.000	s	1000 = 1 s
23.19	Shape time dec 2	<i>Real</i>	0.000 ... 1800.000	s	1000 = 1 s
23.20	Acc time jogging	<i>Real</i>	0.000 ... 1800.000	s	1000 = 1 s
23.21	Dec time jogging	<i>Real</i>	0.000 ... 1800.000	s	1000 = 1 s
23.23	Emergency stop time	<i>Real</i>	0.000 ... 1800.000	s	1000 = 1 s
23.24	Speed ramp in zero source	<i>Binary src</i>	-	-	1 = 1
23.26	Ramp out balancing enable	<i>Binary src</i>	-	-	1 = 1
23.27	Ramp out balancing ref	<i>Real</i>	-30000.00 ... 30000.00	rpm	100 = 1 rpm
23.28	Variable slope enable	<i>List</i>	0...1	-	1 = 1
23.29	Variable slope rate	<i>Real</i>	2...30000	ms	1 = 1 ms
23.39	Follower speed correction out	<i>real32</i>	-30000.00 ... 30000.00	rpm	100 = 1 rpm
23.40	Follower speed correction enable	<i>uint32</i>	-	-	1 = 1
23.41	Follower speed correction gain	<i>real32</i>	0.00 ... 100.00	%	100 = 1%
23.42	Follower speed corr torq source	<i>uint32</i>	-	-	1 = 1
24 Speed reference conditioning					
24.01	Used speed reference	<i>Real</i>	-30000.00 ... 30000.00	rpm	100 = 1 rpm
24.02	Used speed feedback	<i>Real</i>	-30000.00 ... 30000.00	rpm	100 = 1 rpm
24.03	Speed error filtered	<i>Real</i>	-30000.0 ... 30000.0	rpm	100 = 1 rpm
24.04	Speed error inverted	<i>Real</i>	-30000.0 ... 30000.0	rpm	100 = 1 rpm
24.11	Speed correction	<i>Real</i>	-10000.00 ... 10000.00	rpm	100 = 1 rpm
24.12	Speed error filter time	<i>Real</i>	0...10000	ms	1 = 1 ms
24.13	RFE speed filter	<i>List</i>	0...1	-	1 = 1
24.14	Frequency of zero	<i>Real</i>	0.50 ... 500.00	Hz	10 = 1 Hz
24.15	Damping of zero	<i>Real</i>	-1.000 ... 1.000	-	100 = 1

No.	Name	Type	Range	Unit	FbEq32
24.16	Frequency of pole	<i>Real</i>	0.50 ... 500.00	Hz	10 = 1 Hz
24.17	Damping of pole	<i>Real</i>	-1.000 ... 1.000	-	100 = 1
24.41	Speed error window control enable	<i>Binary src</i>	-	-	1 = 1
24.42	Speed window control mode	<i>List</i>	0...1	-	1 = 1
24.43	Speed error window high	<i>Real</i>	0.00 ... 3000.00	rpm	100 = 1 rpm
24.44	Speed error window low	<i>Real</i>	0.00 ... 3000.00	rpm	100 = 1 rpm
24.46	Speed error step	<i>Real</i>	-3000.00 ... 3000.00	rpm	100 = 1 rpm
25 Speed control					
25.01	Torque reference speed control	<i>Real</i>	-1600.0 ... 1600.0	%	10 = 1%
25.02	Speed proportional gain	<i>Real</i>	0.00 ... 250.00	-	100 = 1
25.03	Speed integration time	<i>Real</i>	0.00 ... 1000.00	s	100 = 1 s
25.04	Speed derivation time	<i>Real</i>	0.000 ... 10.000	s	1000 = 1 s
25.05	Derivation filter time	<i>Real</i>	0...10000	ms	1 = 1 ms
25.06	Acc comp derivation time	<i>Real</i>	0.00 ... 1000.00	s	100 = 1 s
25.07	Acc comp filter time	<i>Real</i>	0.0 ... 1000.0	ms	10 = 1 ms
25.08	Drooping rate	<i>Real</i>	0.00 ... 100.00	%	100 = 1%
25.09	Speed ctrl balancing enable	<i>Binary src</i>	-	-	1 = 1
25.10	Speed ctrl balancing ref	<i>Real</i>	-300.0 ... 300.0	%	10 = 1%
25.11	Speed control min torque	<i>Real</i>	-1600.0 ... 0.0	%	10 = 1%
25.12	Speed control max torque	<i>Real</i>	0.0 ... 1600.0	%	10 = 1%
25.13	Min torq sp ctrl em stop	<i>Real</i>	-1600 ... 0	%	10 = 1%
25.14	Max torq sp ctrl em stop	<i>Real</i>	0...1600	%	10 = 1%
25.15	Proportional gain em stop	<i>Real</i>	1.00 ... 250.00	-	100 = 1
25.18	Speed adapt min limit	<i>Real</i>	0...30000	rpm	1 = 1 rpm
25.19	Speed adapt max limit	<i>Real</i>	0...30000	rpm	1 = 1 rpm
25.21	Kp adapt coef at min speed	<i>Real</i>	0.000 ... 10.000	-	1000 = 1
25.22	Ti adapt coef at min speed	<i>Real</i>	0.000 ... 10.000	-	1000 = 1
25.25	Torque adapt max limit	<i>Real</i>	0.0 ... 1600.0	%	10 = 1%
25.26	Torque adapt filt time	<i>Real</i>	0.000 ... 100.000	s	1000 = 1 s
25.27	Kp adapt coef at min torque	<i>Real</i>	0.000 ... 10.000	-	1000 = 1
25.30	Flux adaption enable	<i>List</i>	0...1	-	1 = 1
25.33	Speed controller autotune	<i>Binary src</i>	-	-	1 = 1
25.34	Speed controller autotune mode	<i>List</i>	0...2	-	1 = 1
25.37	Mechanical time constant	<i>Real</i>	0.00 ... 1000.00	s	100 = 1 s
25.38	Autotune torque step	<i>Real</i>	0.00 ... 100.00	%	100 = 1%
25.39	Autotune speed step	<i>Real</i>	0.00 ... 100.00	%	100 = 1%
25.40	Autotune repeat times	<i>Real</i>	1...10	-	1 = 1
25.42	Integral term enable	<i>uint32</i>	-	-	1 = 1

No.	Name	Type	Range	Unit	FbEq32
25.53	Torque prop reference	<i>Real</i>	-30000.0 ... 30000.0	%	10 = 1%
25.54	Torque integral reference	<i>Real</i>	-30000.0 ... 30000.0	%	10 = 1%
25.55	Torque deriv reference	<i>Real</i>	-30000.0 ... 30000.0	%	10 = 1%
25.56	Torque acc compensation	<i>Real</i>	-30000.0 ... 30000.0	%	10 = 1%
25.57	Torque reference unbalanced	<i>Real</i>	-30000.0 ... 30000.0	%	10 = 1%
26 Torque reference chain					
26.01	Torque reference to TC	<i>Real</i>	-1600.0 ... 1600.0	%	10 = 1%
26.02	Torque reference used	<i>Real</i>	-1600.0 ... 1600.0	%	10 = 1%
26.08	Minimum torque ref	<i>Real</i>	-1000.0 ... 0.0	%	10 = 1%
26.09	Maximum torque ref	<i>Real</i>	0.0 ... 1000.0	%	10 = 1%
26.11	Torque ref1 source	<i>Analog src</i>	-	-	1 = 1
26.12	Torque ref2 source	<i>Analog src</i>	-	-	1 = 1
26.13	Torque ref1 function	<i>List</i>	0...5	-	1 = 1
26.14	Torque ref1/2 selection	<i>Binary src</i>	-	-	1 = 1
26.15	Load share	<i>Real</i>	-8.000 ... 8.000	-	1000 = 1
26.16	Torque additive 1 source	<i>Analog src</i>	-	-	1 = 1
26.17	Torque ref filter time	<i>Real</i>	0.000 ... 30.000	s	1000 = 1 s
26.18	Torque ramp up time	<i>Real</i>	0.000 ... 60.000	s	1000 = 1 s
26.19	Torque ramp down time	<i>Real</i>	0.000 ... 60.000	s	1000 = 1 s
26.25	Torque additive 2 source	<i>Analog src</i>	-	-	1 = 1
26.26	Force torque ref add 2 zero	<i>Binary src</i>	-	-	1 = 1
26.41	Torque step	<i>Real</i>	-300.0 ... 300.0	%	10 = 1%
26.42	Torque step enable	<i>List</i>	0...1	-	1 = 1
26.43	Torque step pointer enable	<i>uint32</i>	-	-	1 = 1
26.44	Torque step source	<i>uint32</i>	-	-	1 = 1
26.51	Oscillation damping	<i>Binary src</i>	-	-	1 = 1
26.52	Oscillation damping out enable	<i>Binary src</i>	-	-	1 = 1
26.53	Oscillation compensation input	<i>List</i>	0...1	-	1 = 1
26.55	Oscillation damping frequency	<i>Real</i>	0.1 ... 60.0	Hz	10 = 1 Hz
26.56	Oscillation damping phase	<i>Real</i>	0...360	deg	1 = 1 deg
26.57	Oscillation damping gain	<i>Real</i>	0.0 ... 100.0	%	10 = 1%
26.58	Oscillation damping output	<i>Real</i>	-1600.000 ... 1600.000	%	1000 = 1%
26.70	Torque reference act 1	<i>Real</i>	-1600.0 ... 1600.0	%	10 = 1%
26.71	Torque reference act 2	<i>Real</i>	-1600.0 ... 1600.0	%	10 = 1%
26.72	Torque reference act 3	<i>Real</i>	-1600.0 ... 1600.0	%	10 = 1%
26.73	Torque reference act 4	<i>Real</i>	-1600.0 ... 1600.0	%	10 = 1%

No.	Name	Type	Range	Unit	FbEq32
26.74	Torque ref ramp out	<i>Real</i>	-1600.0 ... 1600.0	%	10 = 1%
26.75	Torque reference act 5	<i>Real</i>	-1600.0 ... 1600.0	%	10 = 1%
26.76	Torque reference act 6	<i>Real</i>	-1600.0 ... 1600.0	%	10 = 1%
26.77	Torque ref add A actual	<i>Real</i>	-1600.0 ... 1600.0	%	10 = 1%
26.78	Torque ref add B actual	<i>Real</i>	-1600.0 ... 1600.0	%	10 = 1%
26.81	Rush control gain	<i>Real</i>	0.0 ... 10000.0	-	10 = 1
26.82	Rush control integration time	<i>Real</i>	0.0 ... 10.0	s	10 = 1 s
28 Frequency reference chain					
28.01	Frequency ref ramp input	<i>Real</i>	-500.00 ... 500.00	Hz	100 = 1 Hz
28.02	Frequency ref ramp output	<i>Real</i>	-500.00 ... 500.00	Hz	100 = 1 Hz
28.11	Frequency ref1 source	<i>Analog src</i>	-	-	1 = 1
28.12	Frequency ref2 source	<i>Analog src</i>	-	-	1 = 1
28.13	Frequency ref1 function	<i>List</i>	0...5	-	1 = 1
28.14	Frequency ref1/2 selection	<i>Binary src</i>	-	-	1 = 1
28.21	Constant frequency function	<i>PB</i>	00b...11b	-	1 = 1
28.22	Constant frequency sel1	<i>Binary src</i>	-	-	1 = 1
28.23	Constant frequency sel2	<i>Binary src</i>	-	-	1 = 1
28.24	Constant frequency sel3	<i>Binary src</i>	-	-	1 = 1
28.26	Constant frequency 1	<i>Real</i>	-500.00 ... 500.00	Hz	100 = 1 Hz
28.27	Constant frequency 2	<i>Real</i>	-500.00 ... 500.00	Hz	100 = 1 Hz
28.28	Constant frequency 3	<i>Real</i>	-500.00 ... 500.00	Hz	100 = 1 Hz
28.29	Constant frequency 4	<i>Real</i>	-500.00 ... 500.00	Hz	100 = 1 Hz
28.30	Constant frequency 5	<i>Real</i>	-500.00 ... 500.00	Hz	100 = 1 Hz
28.31	Constant frequency 6	<i>Real</i>	-500.00 ... 500.00	Hz	100 = 1 Hz
28.32	Constant frequency 7	<i>Real</i>	-500.00 ... 500.00	Hz	100 = 1 Hz
28.41	Frequency ref safe	<i>Real</i>	-500.00 ... 500.00	Hz	100 = 1 Hz
28.51	Critical frequency function	<i>PB</i>	00b...11b	-	1 = 1
28.52	Critical frequency 1 low	<i>Real</i>	-500.00 ... 500.00	Hz	100 = 1 Hz
28.53	Critical frequency 1 high	<i>Real</i>	-500.00 ... 500.00	Hz	100 = 1 Hz
28.54	Critical frequency 2 low	<i>Real</i>	-500.00 ... 500.00	Hz	100 = 1 Hz
28.55	Critical frequency 2 high	<i>Real</i>	-500.00 ... 500.00	Hz	100 = 1 Hz
28.56	Critical frequency 3 low	<i>Real</i>	-500.00 ... 500.00	Hz	100 = 1 Hz
28.57	Critical frequency 3 high	<i>Real</i>	-500.00 ... 500.00	Hz	100 = 1 Hz
28.71	Freq ramp set selection	<i>Binary src</i>	-	-	1 = 1
28.72	Freq acceleration time 1	<i>Real</i>	0.000 ... 1800.000	s	1000 = 1 s
28.73	Freq deceleration time 1	<i>Real</i>	0.000 ... 1800.000	s	1000 = 1 s

No.	Name	Type	Range	Unit	FbEq32
28.74	Freq acceleration time 2	<i>Real</i>	0.000 ... 1800.000	s	1000 = 1 s
28.75	Freq deceleration time 2	<i>Real</i>	0.000 ... 1800.000	s	1000 = 1 s
28.76	Freq ramp in zero source	<i>Binary src</i>	-	-	1 = 1
28.77	Freq ramp hold	<i>Binary src</i>	-	-	1 = 1
28.78	Freq ramp output balancing	<i>Real</i>	-500.00 ... 500.00	Hz	100 = 1 Hz
28.79	Freq ramp out balancing enable	<i>Binary src</i>	-	-	1 = 1
28.90	Frequency ref act 1	<i>Real</i>	-500.00 ... 500.00	Hz	100 = 1 Hz
28.91	Frequency ref act 2	<i>Real</i>	-500.00 ... 500.00	Hz	100 = 1 Hz
28.92	Frequency ref act 3	<i>Real</i>	-500.00 ... 500.00	Hz	100 = 1 Hz
28.96	Frequency ref act 7	<i>Real</i>	-500.00 ... 500.00	Hz	100 = 1 Hz
28.97	Frequency ref unlimited	<i>Real</i>	-500.00 ... 500.00	Hz	100 = 1 Hz
30 Limits					
30.01	Limit word 1	<i>PB</i>	0000h...FFFFh	-	1 = 1
30.02	Torque limit status	<i>PB</i>	0000h...FFFFh	-	1 = 1
30.11	Minimum speed	<i>Real</i>	-30000.00 ... 30000.00	rpm	100 = 1 rpm
30.12	Maximum speed	<i>Real</i>	-30000.00 ... 30000.00	rpm	100 = 1 rpm
30.13	Minimum frequency	<i>Real</i>	-500.00 ... 500.00	Hz	100 = 1 Hz
30.14	Maximum frequency	<i>Real</i>	-500.00 ... 500.00	Hz	100 = 1 Hz
30.17	Maximum current	<i>Real</i>	0.00 ... 30000.00	A	100 = 1 A
30.18	Minimum torque sel	<i>List</i>	0...12	-	1 = 1
30.19	Minimum torque 1	<i>Real</i>	-1600.0 ... 0.0	%	10 = 1%
30.20	Maximum torque 1	<i>Real</i>	0.0 ... 1600.0	%	10 = 1%
30.21	Minimum torque 2 source	<i>List</i>	-	-	1 = 1
30.22	Maximum torque 2 source	<i>List</i>	-	-	1 = 1
30.23	Minimum torque 2	<i>Real</i>	-1600.0 ... 0.0	%	10 = 1%
30.24	Maximum torque 2	<i>Real</i>	0.0 ... 1600.0	%	10 = 1%
30.25	Maximum torque sel	<i>List</i>	-	-	1 = 1
30.26	Power motoring limit	<i>Real</i>	0.00 ... 600.00	%	100 = 1%
30.27	Power generating limit	<i>Real</i>	-600.00 ... 0.00	%	100 = 1 A
30.40	Rated output current	<i>Real</i>	0 ... 511	A	1 = 1 A
30.41	Rated input current	<i>Real</i>	0 ... 511	A	1 = 1 A
31 Fault functions					
31.01	External event 1 source	<i>Binary src</i>	-	-	1 = 1
31.02	External event 1 type	<i>List</i>	0...3	-	1 = 1
31.03	External event 2 source	<i>Binary src</i>	-	-	1 = 1
31.04	External event 2 type	<i>List</i>	0...3	-	1 = 1
31.05	External event 3 source	<i>Binary src</i>	-	-	1 = 1

No.	Name	Type	Range	Unit	FbEq32
31.06	External event 3 type	List	0...3	-	1 = 1
31.07	External event 4 source	Binary src	-	-	1 = 1
31.08	External event 4 type	List	0...3	-	1 = 1
31.09	External event 5 source	Binary src	-	-	1 = 1
31.10	External event 5 type	List	0...3	-	1 = 1
31.11	Fault reset selection	Binary src	-	-	1 = 1
31.12	Autoreset selection	PB	0000h...FFFFh	-	1 = 1
31.13	User selectable fault	Real	0000h...FFFFh	-	1 = 1
31.14	Number of trials	Real	0...5	-	1 = 1
31.15	Total trials time	Real	1.0 ... 600.0	s	10 = 1 s
31.16	Delay time	Real	0.0 ... 120.0	s	10 = 1 s
31.24	Stall function	List	0...2	-	1 = 1
31.25	Stall current limit	Real	0.0 ... 1600.0	%	10 = 1%
31.26	Stall speed limit	Real	0.00 ... 10000.00	rpm	100 = 1 rpm
31.27	Stall frequency limit	Real	0.00 ... 500.00	Hz	100 = 1 Hz
31.28	Stall time	Real	0...3600	s	1 = 1 s
31.30	Overspeed trip margin	Real	0.00 ... 10000.00	rpm	100 = 1 rpm
31.40	Disable warning messages	PB	0000h...FFFFh	-	1 = 1
31.55	Ext I/O comm loss event	uint16	0...2	-	1 = 1
32 Supervision					
32.01	Supervision status	PB	000b...111b	-	1 = 1
32.05	Supervision 1 function	List	0...6	-	1 = 1
32.06	Supervision 1 action	List	0...2	-	1 = 1
32.07	Supervision 1 signal	Analog src	-	-	1 = 1
32.08	Supervision 1 filter time	Real	0.000 ... 30.000	s	1000 = 1 s
32.09	Supervision 1 low	Real	-21474830.00 ... 21474830.00	-	100 = 1
32.10	Supervision 1 high	Real	-21474830.00 ... 21474830.00	-	100 = 1
32.15	Supervision 2 function	List	0...6	-	1 = 1
32.16	Supervision 2 action	List	0...2	-	1 = 1
32.17	Supervision 2 signal	Analog src	-	-	1 = 1
32.18	Supervision 2 filter time	Real	0.000 ... 30.000	s	1000 = 1 s
32.19	Supervision 2 low	Real	-21474830.00 ... 21474830.00	-	100 = 1
32.20	Supervision 2 high	Real	-21474830.00 ... 21474830.00	-	100 = 1
32.25	Supervision 3 function	List	0...6	-	1 = 1
32.26	Supervision 3 action	List	0...2	-	1 = 1

No.	Name	Type	Range	Unit	FbEq32
32.27	Supervision 3 signal	<i>Analog src</i>	-	-	1 = 1
32.28	Supervision 3 filter time	<i>Real</i>	0.000 ... 30.000	s	1000 = 1 s
32.29	Supervision 3 low	<i>Real</i>	-21474830.00 ... 21474830.00	-	100 = 1
32.30	Supervision 3 high	<i>Real</i>	-21474830.00 ... 21474830.00	-	100 = 1
33 Generic timer & counter					
33.01	Counter status	<i>PB</i>	000000b...111111b	-	1 = 1
33.10	On-time 1 actual	<i>Real</i>	0...4294967295	s	1 = 1 s
33.11	On-time 1 warn limit	<i>Real</i>	0...4294967295	s	1 = 1 s
33.12	On-time 1 function	<i>PB</i>	00b...11b	-	1 = 1
33.13	On-time 1 source	<i>Binary src</i>	-	-	1 = 1
33.14	On-time 1 warn message	<i>List</i>	-	-	1 = 1
33.20	On-time 2 actual	<i>Real</i>	0...4294967295	s	1 = 1 s
33.21	On-time 2 warn limit	<i>Real</i>	0...4294967295	s	1 = 1 s
33.22	On-time 2 function	<i>PB</i>	00b...11b	-	1 = 1
33.23	On-time 2 source	<i>Binary src</i>	-	-	1 = 1
33.24	On-time 2 warn message	<i>List</i>	-	-	1 = 1
33.30	Edge counter 1 actual	<i>Real</i>	0...4294967295	-	1 = 1
33.31	Edge counter 1 warn limit	<i>Real</i>	0...4294967295	-	1 = 1
33.32	Edge counter 1 function	<i>PB</i>	0000b...1111b	-	1 = 1
33.33	Edge counter 1 source	<i>Binary src</i>	-	-	1 = 1
33.34	Edge counter 1 divider	<i>Real</i>	1...4294967295	-	1 = 1
33.35	Edge counter 1 warn message	<i>List</i>	-	-	1 = 1
33.40	Edge counter 2 actual	<i>Real</i>	0...4294967295	-	1 = 1
33.41	Edge counter 2 warn limit	<i>Real</i>	0...4294967295	-	1 = 1
33.42	Edge counter 2 function	<i>PB</i>	0000b...1111b	-	1 = 1
33.43	Edge counter 2 source	<i>Binary src</i>	-	-	1 = 1
33.44	Edge counter 2 divider	<i>Real</i>	1...4294967295	-	1 = 1
33.45	Edge counter 2 warn message	<i>List</i>	-	-	1 = 1
33.50	Value counter 1 actual	<i>Real</i>	-2147483008 ... 2147483008	-	1 = 1
33.51	Value counter 1 warn limit	<i>Real</i>	-2147483008 ... 2147483008	-	1 = 1
33.52	Value counter 1 function	<i>PB</i>	00b...11b	-	1 = 1
33.53	Value counter 1 source	<i>Analog src</i>	-	-	1 = 1
33.54	Value counter 1 divider	<i>Real</i>	0.001 ... 2147483.000	-	1000 = 1
33.55	Value counter 1 warn message	<i>List</i>	-	-	1 = 1

No.	Name	Type	Range	Unit	FbEq32
33.60	Value counter 2 actual	<i>Real</i>	-2147483008 ... 2147483008	-	1 = 1
33.61	Value counter 2 warn limit	<i>Real</i>	-2147483008 ... 2147483008	-	1 = 1
33.62	Value counter 2 function	<i>PB</i>	00b...11b	-	1 = 1
33.63	Value counter 2 source	<i>Analog src</i>	-	-	1 = 1
33.64	Value counter 2 divider	<i>Real</i>	0.001 ... 2147483.000	-	1000 = 1
33.65	Value counter 2 warn message	<i>List</i>	-	-	1 = 1
34 Protections					
34.29	Motor overload trip level	<i>Real</i>	0.000 ... 10.000	p.u.	1 = 1 p.u.
34.30	Motor overload alarm level	<i>Real</i>	0.000 ... 10.000	p.u.	1 = 1 p.u.
34.49	Motor max cont current	<i>Real</i>	0.000 ... 10.000	p.u.	1 = 1 p.u.
34.50	Motor max overload current	<i>Real</i>	0.000 ... 10.000	p.u.	1 = 1 p.u.
34.51	Motor overload duration	<i>Real</i>	0 ... 10000	s	1 = 1 s
34.52	Motor overload recovery time	<i>Real</i>	0 ... 10000	s	1 = 1 s
35 Motor thermal protection					
35.02	Measured temperature 1	<i>Real</i>	-60 ... 1000 °C, 0 ohm or [35.12] ohm	°C or ohm	1 = 1 unit
35.03	Measured temperature 2	<i>Real</i>	-60 ... 1000 °C, 0 ohm or [35.22] ohm	°C or ohm	1 = 1 unit
35.04	FPTC status word	<i>PB</i>	0000h...FFFFh	-	1 = 1
35.11	Temperature 1 source	<i>List</i>	0...11	-	1 = 1
35.12	Temperature 1 fault limit	<i>Real</i>	-60 ... 1000 °C or ohm	°C or ohm	1 = 1 unit
35.13	Temperature 1 warning limit	<i>Real</i>	-60 ... 1000 °C or ohm	°C or ohm	1 = 1 unit
35.14	Temperature 1 AI source	<i>Analog src</i>	-	-	1 = 1
35.21	Temperature 2 source	<i>List</i>	0...11	-	1 = 1
35.22	Temperature 2 fault limit	<i>Real</i>	-60 ... 1000 °C or ohm	°C or ohm	1 = 1 unit
35.23	Temperature 2 warning limit	<i>Real</i>	-60 ... 1000 °C or ohm	°C or ohm	1 = 1 unit
35.24	Temperature 2 AI source	<i>Analog src</i>	-	-	1 = 1
35.30	FPTC configuration word	<i>PB</i>	0000h...FFFFh	-	1 = 1
35.100	DOL starter control source	<i>Binary src</i>	-	-	1 = 1
35.101	DOL starter on delay	<i>Real</i>	0...42949673	s	1 = 1 s
35.102	DOL starter off delay	<i>Real</i>	0...715828	min	1 = 1 min
35.103	DOL starter feedback source	<i>Binary src</i>	-	-	1 = 1
35.104	DOL starter feedback delay	<i>Real</i>	0...42949673	s	1 = 1 s
35.105	DOL starter status word	<i>PB</i>	0000b...1111b	-	1 = 1

No.	Name	Type	Range	Unit	FbEq32
35.106	DOL starter event type	List	0...2	-	1 = 1
36 Load analyzer					
36.01	PVL signal source	Analog src	-	-	1 = 1
36.02	PVL filter time	Real	0.00 ... 120.00	s	100 = 1 s
36.06	AL2 signal source	Analog src	-	-	1 = 1
36.07	AL2 signal scaling	Real	0.00 ... 32767.00	-	100 = 1
36.08	Logger function	List	00b...11b	-	1 = 1
36.09	Reset loggers	List	0...3	-	1 = 1
36.10	PVL peak value	Real	-32768.00 ... 32767.00	-	100 = 1
36.11	PVL peak date	Data	-	-	1 = 1
36.12	PVL peak time	Data	-	-	1 = 1
36.13	PVL current at peak	Real	-32768.00 ... 32767.00	A	100 = 1 A
36.14	PVL DC voltage at peak	Real	0.00 ... 2000.00	V	100 = 1 V
36.15	PVL speed at peak	Real	-32768.00 ... 32767.00	rpm	100 = 1 rpm
36.16	PVL reset date	Data	-	-	1 = 1
36.17	PVL reset time	Data	-	-	1 = 1
36.20	AL1 below 10%	Real	0.00 ... 100.00	%	100 = 1%
36.21	AL1 10 to 20%	Real	0.00 ... 100.00	%	100 = 1%
36.22	AL1 20 to 30%	Real	0.00 ... 100.00	%	100 = 1%
36.23	AL1 30 to 40%	Real	0.00 ... 100.00	%	100 = 1%
36.24	AL1 40 to 50%	Real	0.00 ... 100.00	%	100 = 1%
36.25	AL1 50 to 60%	Real	0.00 ... 100.00	%	100 = 1%
36.26	AL1 60 to 70%	Real	0.00 ... 100.00	%	100 = 1%
36.27	AL1 70 to 80%	Real	0.00 ... 100.00	%	100 = 1%
36.28	AL1 80 to 90%	Real	0.00 ... 100.00	%	100 = 1%
36.29	AL1 over 90%	Real	0.00 ... 100.00	%	100 = 1%
36.40	AL2 below 10%	Real	0.00 ... 100.00	%	100 = 1%
36.41	AL2 10 to 20%	Real	0.00 ... 100.00	%	100 = 1%
36.42	AL2 20 to 30%	Real	0.00 ... 100.00	%	100 = 1%
36.43	AL2 30 to 40%	Real	0.00 ... 100.00	%	100 = 1%
36.44	AL2 40 to 50%	Real	0.00 ... 100.00	%	100 = 1%
36.45	AL2 50 to 60%	Real	0.00 ... 100.00	%	100 = 1%
36.46	AL2 60 to 70%	Real	0.00 ... 100.00	%	100 = 1%
36.47	AL2 70 to 80%	Real	0.00 ... 100.00	%	100 = 1%
36.48	AL2 80 to 90%	Real	0.00 ... 100.00	%	100 = 1%
36.49	AL2 over 90%	Real	0.00 ... 100.00	%	100 = 1%
36.50	AL2 reset date	Data	-	-	1 = 1
36.51	AL2 reset time	Data	-	-	1 = 1

No.	Name	Type	Range	Unit	FbEq32
40 Process PID set 1					
40.01	Process PID output actual	real32	-32768.00 ... 32767.00	rpm, % or Hz	100 = 1 rpm, % or Hz
40.02	Process PID feedback actual	real32	-32768.00 ... 32767.00	rpm, % or Hz	100 = 1 rpm, % or Hz
40.03	Process PID setpoint actual	real32	-32768.00 ... 32767.00	rpm, % or Hz	100 = 1 rpm, % or Hz
40.04	Process PID deviation actual	real32	-32768.00 ... 32767.00	rpm, % or Hz	100 = 1 rpm, % or Hz
40.05	Process PID trim output act	real32	-32768.00 ... 32767.00	rpm, % or Hz	100 = 1 rpm, % or Hz
40.06	Process PID status word	uint16	0000h...FFFFh	-	1 = 1
40.07	Set 1 PID operation mode	uint16	0...2	-	1 = 1
40.08	Set 1 feedback 1 source	uint32	-	-	1 = 1
40.09	Set 1 feedback 2 source	uint32	-	-	1 = 1
40.10	Set 1 feedback function	uint16	0...11	-	1 = 1
40.11	Set 1 feedback filter time	real32	0.000 ... 30.000	s	1000 = 1 s
40.12	Set 1 unit selection	uint16	0...2	-	1 = 1
40.14	Set 1 setpoint scaling	real32	-32768.00 ... 32767.00	-	100 = 1
40.15	Set 1 output scaling	real32	-32768.00 ... 32767.00	-	100 = 1
40.16	Set 1 setpoint 1 source	uint32	-	-	1 = 1
40.17	Set 1 setpoint 2 source	uint32	-	-	1 = 1
40.18	Set 1 setpoint function	uint16	0...11	-	1 = 1
40.19	Set 1 internal setpoint sel1	uint32	-	-	1 = 1
40.20	Set 1 internal setpoint sel2	uint32	-	-	1 = 1
40.21	Set 1 internal setpoint 1	real32	-32768.00 ... 32767.00	rpm, % or Hz	100 = 1 rpm, % or Hz
40.22	Set 1 internal setpoint 2	real32	-32768.00 ... 32767.00	rpm, % or Hz	100 = 1 rpm, % or Hz
40.23	Set 1 internal setpoint 3	real32	-32768.00 ... 32767.00	rpm, % or Hz	100 = 1 rpm, % or Hz
40.24	Set 1 internal setpoint 4	real32	-32768.00 ... 32767.00	rpm, % or Hz	100 = 1 rpm, % or Hz
40.25	Set 1 setpoint selection	uint32	-	-	1 = 1
40.26	Set 1 setpoint min	real32	-32768.00 ... 32767.00	-	100 = 1
40.27	Set 1 setpoint max	real32	-32768.00 ... 32767.00	-	100 = 1
40.28	Set 1 setpoint increase time	real32	0.0 ... 1800.0	s	10 = 1 s
40.29	Set 1 setpoint decrease time	real32	0.0 ... 1800.0	s	10 = 1 s
40.30	Set 1 setpoint freeze enable	uint32	-	-	1 = 1
40.31	Set 1 deviation inversion	uint32	-	-	1 = 1
40.32	Set 1 gain	real32	0.10 ... 100.00	-	100 = 1
40.33	Set 1 integration time	real32	0.0 ... 32767.0	s	10 = 1 s
40.34	Set 1 derivation time	real32	0.000 ... 10.000	s	1000 = 1 s
40.35	Set 1 derivation filter time	real32	0.0 ... 10.0	s	10 = 1 s

No.	Name	Type	Range	Unit	FbEq32
40.36	Set 1 output min	real32	-32768.0 ... 32767.0	-	10 = 1
40.37	Set 1 output max	real32	-32768.0 ... 32767.0	-	10 = 1
40.38	Set 1 output freeze enable	uint32	-	-	1 = 1
40.39	Set 1 deadband range	real32	0.0 ... 32767.0	-	10 = 1
40.40	Set 1 deadband delay	real32	0.0 ... 3600.0	s	10 = 1 s
40.41	Set 1 sleep mode	uint16	0...2	-	1 = 1
40.42	Set 1 sleep enable	uint32	-	-	1 = 1
40.43	Set 1 sleep level	real32	0.0 ... 32767.0	-	10 = 1
40.44	Set 1 sleep delay	real32	0.0 ... 3600.0	s	10 = 1 s
40.45	Set 1 sleep boost time	real32	0.0 ... 3600.0	s	10 = 1 s
40.46	Set 1 sleep boost step	real32	0.0 ... 32767.0	-	10 = 1
40.47	Set 1 wake-up deviation	real32	-32768.00 ... 32767.00	rpm, % or Hz	100 = 1 rpm, % or Hz
40.48	Set 1 wake-up delay	real32	0.00 ... 60.00	s	100 = 1 s
40.49	Set 1 tracking mode	uint32	-	-	1 = 1
40.50	Set 1 tracking ref selection	uint32	-	-	1 = 1
40.51	Set 1 trim mode	uint16	0...3	-	1 = 1
40.52	Set 1 trim selection	uint16	1...3	-	1 = 1
40.53	Set 1 trimmed ref pointer	uint32	-	-	1 = 1
40.54	Set 1 trim mix	real32	0.000 ... 1.000	-	1000 = 1
40.55	Set 1 trim adjust	real32	-100.000 ... 100.000	-	1000 = 1
40.56	Set 1 trim source	uint16	1...2	-	1 = 1
40.57	PID set1/set2 selection	uint32	-	-	1 = 1
40.60	Set 1 PID activation source	uint32	-	-	1 = 1
40.91	Feedback data storage	real32	-327.68 ... 327.67	-	100 = 1
40.92	Setpoint data storage	real32	-327.68 ... 327.67	-	100 = 1
41 Process PID set 2					
41.07	Set 2 PID operation mode	uint16	0...2	-	1 = 1
41.08	Set 2 feedback 1 source	uint32	-	-	1 = 1
41.09	Set 2 feedback 2 source	uint32	-	-	1 = 1
41.10	Set 2 feedback function	uint16	0...11	-	1 = 1
41.11	Set 2 feedback filter time	real32	0.000 ... 30.000	s	1000 = 1 s
41.12	Set 2 unit selection	uint16	0...2	-	1 = 1
41.14	Set 2 setpoint scaling	real32	-32768 ... 32767	-	100 = 1
41.15	Set 2 output scaling	real32	-32768 ... 32767	-	100 = 1
41.16	Set 2 setpoint 1 source	uint32	-	-	1 = 1
41.17	Set 2 setpoint 2 source	uint32	-	-	1 = 1
41.18	Set 2 setpoint function	uint16	0...11	-	1 = 1
41.19	Set 2 internal setpoint sel1	uint32	-	-	1 = 1
41.20	Set 2 internal setpoint sel2	uint32	-	-	1 = 1
41.21	Set 2 internal setpoint 1	real32	-32768.0 ... 32767.0	rpm, % or Hz	100 = 1 rpm, % or Hz

No.	Name	Type	Range	Unit	FbEq32
41.22	Set 2 internal setpoint 2	<i>real32</i>	-32768.0 ... 32767.0	rpm, % or Hz	100 = 1 rpm, % or Hz
41.23	Set 2 internal setpoint 3	<i>real32</i>	-32768.0 ... 32767.0	rpm, % or Hz	100 = 1 rpm, % or Hz
41.24	Set 2 internal setpoint 4	<i>real32</i>	-32768.0 ... 32767.0	rpm, % or Hz	100 = 1 rpm, % or Hz
41.25	Set 2 setpoint selection	<i>uint32</i>	-	-	1 = 1
41.26	Set 2 setpoint min	<i>real32</i>	-32768.0 ... 32767.0	-	100 = 1
41.27	Set 2 setpoint max	<i>real32</i>	-32768.0 ... 32767.0	-	100 = 1
41.28	Set 2 setpoint increase time	<i>real32</i>	0.0 ... 1800.0	s	10 = 1 s
41.29	Set 2 setpoint decrease time	<i>real32</i>	0.0 ... 1800.0	s	10 = 1 s
41.30	Set 2 setpoint freeze enable	<i>uint32</i>	-	-	1 = 1
41.31	Set 2 deviation inversion	<i>uint32</i>	-	-	1 = 1
41.32	Set 2 gain	<i>real32</i>	0.1 ... 100.0	-	100 = 1
41.33	Set 2 integration time	<i>real32</i>	0.0 ... 3600.0	s	10 = 1 s
41.34	Set 2 derivation time	<i>real32</i>	0.0 ... 10.0	s	1000 = 1 s
41.35	Set 2 derivation filter time	<i>real32</i>	0.0 ... 10.0	s	10 = 1 s
41.36	Set 2 output min	<i>real32</i>	-32768.0 ... 32767.0	-	10 = 1
41.37	Set 2 output max	<i>real32</i>	-32768.0 ... 32767.0	-	10 = 1
41.38	Set 2 output freeze enable	<i>uint32</i>	-	-	1 = 1
41.39	Set 2 deadband range	<i>real32</i>	0.0 ... 32767.0	-	10 = 1
41.40	Set 2 deadband delay	<i>real32</i>	0.0 ... 3600.0	s	10 = 1 s
41.41	Set 2 sleep mode	<i>uint16</i>	0...2	-	1 = 1
41.42	Set 2 sleep enable	<i>uint32</i>	-	-	1 = 1
41.43	Set 2 sleep level	<i>real32</i>	0.0 ... 32767.0	-	10 = 1
41.44	Set 2 sleep delay	<i>real32</i>	0.0 ... 3600.0	s	10 = 1 s
41.45	Set 2 sleep boost time	<i>real32</i>	0.0 ... 3600.0	s	10 = 1 s
41.46	Set 2 sleep boost step	<i>real32</i>	0.0 ... 32767.0	-	10 = 1
41.47	Set 2 wake-up deviation	<i>real32</i>	-32768.00 ... 32767.00	rpm, % or Hz	100 = 1 rpm, % or Hz
41.48	Set 2 wake-up delay	<i>real32</i>	0.00 ... 60.00	s	100 = 1 s
41.49	Set 2 tracking mode	<i>uint32</i>	-	-	1 = 1
41.50	Set 2 tracking ref selection	<i>uint32</i>	-	-	1 = 1
41.51	Set 2 trim mode	<i>uint16</i>	0...3	-	1 = 1
41.52	Set 2 trim selection	<i>uint16</i>	1...3	-	1 = 1
41.53	Set 2 trimmed ref pointer	<i>uint32</i>	-	-	1 = 1
41.54	Set 2 trim mix	<i>real32</i>	0.000 ... 1.000	-	1000 = 1
41.55	Set 2 trim adjust	<i>real32</i>	-100.000 ... 100.000	-	1000 = 1
41.56	Set 2 trim source	<i>uint16</i>	1...2	-	1 = 1
41.60	Set 2 PID activation source	<i>uint32</i>	-	-	1 = 1
45 Energy efficiency					
45.01	Saved GW hours	<i>Real</i>	0...65535	GWh	1 = 1 GWh

No.	Name	Type	Range	Unit	FbEq32
45.02	Saved MW hours	<i>Real</i>	0...999	MWh	1 = 1 MWh
45.03	Saved kW hours	<i>Real</i>	0.0 ... 999.0	kWh	10 = 1 kWh
45.05	Saved money x1000	<i>Real</i>	0...4294967295	thousand	1 = 1 thousand
45.06	Saved money	<i>Real</i>	0.00 ... 999.99	(selectable)	100 = 1 unit
45.08	CO2 reduction in kilotons	<i>Real</i>	0...65535	metric kiloton	1 = 1 metric kiloton
45.09	CO2 reduction in tons	<i>Real</i>	0.0 ... 999.9	metric ton	10 = 1 metric ton
45.12	Energy tariff 1	<i>Real</i>	0.000 ... 4294967.295	(selectable)	1000 = 1 unit
45.13	Energy tariff 2	<i>Real</i>	0.000 ... 4294967.295	(selectable)	1000 = 1 unit
45.14	Tariff selection	<i>Binary src</i>	-	-	1 = 1
45.17	Tariff currency unit	<i>List</i>	100...102	-	1 = 1
45.18	CO2 conversion factor	<i>Real</i>	0.000 ... 65.535	metric ton/ MWh	1000 = 1 metric ton/MWh
45.19	Comparison power	<i>Real</i>	0.00 ... 100000.00 kW or 0.00 ... 100000.00 hp	kW or hp	1 = 1 unit
45.21	Energy calculations reset	<i>List</i>	0...1	-	1 = 1
46 Monitoring/scaling settings					
46.01	Speed scaling	<i>Real</i>	0.00 ... 30000.00	rpm	100 = 1 rpm
46.02	Frequency scaling	<i>Real</i>	0.10 ... 1000.00	Hz	100 = 1 Hz
46.03	Torque scaling	<i>Real</i>	0.1 ... 1000.0	%	10 = 1%
46.04	Power scaling	<i>Real</i>	0.10 ... 30000.00 kW	kW or hp	100 = 1 unit
46.05	Current scaling	<i>Real</i>	0...30000	A	1 = 1 A
46.06	Speed ref zero scaling	<i>Real</i>	0.00 ... 30000.00	rpm	100 = 1 rpm
46.07	Frequency ref zero scaling	<i>Real</i>	0.00 ... 1000.00	Hz	100 = 1 Hz
46.11	Filter time motor speed	<i>Real</i>	0...20000	ms	1 = 1 ms
46.12	Filter time output frequency	<i>Real</i>	0...20000	ms	1 = 1 ms
46.13	Filter time motor torque	<i>Real</i>	0...20000	ms	1 = 1 ms
46.14	Filter time power out	<i>Real</i>	0...20000	ms	1 = 1 ms
46.21	At speed hysteresis	<i>Real</i>	0.00 ... 30000.00	rpm	100 = 1 rpm
46.22	At frequency hysteresis	<i>Real</i>	0.00 ... 1000.00	Hz	100 = 1 Hz
46.23	At torque hysteresis	<i>Real</i>	0.00 ... 3000.00	%	1 = 1%
46.31	Above speed limit	<i>Real</i>	0.00 ... 30000.00	rpm	100 = 1 rpm
46.32	Above frequency limit	<i>Real</i>	0.00 ... 1000.00	Hz	100 = 1 Hz
46.33	Above torque limit	<i>Real</i>	0.0 ... 1600.0	%	10 = 1%
46.42	Torque decimals	<i>List</i>	0...2	-	1 = 1
47 Data storage					
47.01	Data storage 1 real32	<i>Real</i>	-2147483.008 ... 2147483.008	-	1000 = 1

No.	Name	Type	Range	Unit	FbEq32
47.02	Data storage 2 real32	<i>Real</i>	-2147483.008 ... 2147483.008	-	1000 = 1
47.03	Data storage 3 real32	<i>Real</i>	-2147483.008 ... 2147483.008	-	1000 = 1
47.04	Data storage 4 real32	<i>Real</i>	-2147483.008 ... 2147483.008	-	1000 = 1
47.05	Data storage 5 real32	<i>Real</i>	-2147483.008 ... 2147483.008	-	1000 = 1
47.06	Data storage 6 real32	<i>Real</i>	-2147483.008 ... 2147483.008	-	1000 = 1
47.07	Data storage 7 real32	<i>Real</i>	-2147483.008 ... 2147483.008	-	1000 = 1
47.08	Data storage 8 real32	<i>Real</i>	-2147483.008 ... 2147483.008	-	1000 = 1
47.11	Data storage 1 int32	<i>Real</i>	-2147483648 ... 2147483647	-	1 = 1
47.12	Data storage 2 int32	<i>Real</i>	-2147483648 ... 2147483647	-	1 = 1
47.13	Data storage 3 int32	<i>Real</i>	-2147483648 ... 2147483647	-	1 = 1
47.14	Data storage 4 int32	<i>Real</i>	-2147483648 ... 2147483647	-	1 = 1
47.15	Data storage 5 int32	<i>Real</i>	-2147483648 ... 2147483647	-	1 = 1
47.16	Data storage 6 int32	<i>Real</i>	-2147483648 ... 2147483647	-	1 = 1
47.17	Data storage 7 int32	<i>Real</i>	-2147483648 ... 2147483647	-	1 = 1
47.18	Data storage 8 int32	<i>Real</i>	-2147483648 ... 2147483647	-	1 = 1
47.21	Data storage 1 int16	<i>Real</i>	-32768 ... 32767	-	1 = 1
47.22	Data storage 2 int16	<i>Real</i>	-32768 ... 32767	-	1 = 1
47.23	Data storage 3 int16	<i>Real</i>	-32768 ... 32767	-	1 = 1
47.24	Data storage 4 int16	<i>Real</i>	-32768 ... 32767	-	1 = 1
47.25	Data storage 5 int16	<i>Real</i>	-32768 ... 32767	-	1 = 1
47.26	Data storage 6 int16	<i>Real</i>	-32768 ... 32767	-	1 = 1
47.27	Data storage 7 int16	<i>Real</i>	-32768 ... 32767	-	1 = 1
47.28	Data storage 8 int16	<i>Real</i>	-32768 ... 32767	-	1 = 1
47.31	Data storage 1 real32 type	<i>List</i>	0...5	-	1 = 1
47.32	Data storage 2 real32 type	<i>List</i>	0...5	-	1 = 1
47.33	Data storage 3 real32 type	<i>List</i>	0...5	-	1 = 1
47.34	Data storage 4 real32 type	<i>List</i>	0...5	-	1 = 1
47.35	Data storage 5 real32 type	<i>List</i>	0...5	-	1 = 1
47.36	Data storage 6 real32 type	<i>List</i>	0...5	-	1 = 1
47.37	Data storage 7 real32 type	<i>List</i>	0...5	-	1 = 1
47.38	Data storage 8 real32 type	<i>List</i>	0...5	-	1 = 1

No.	Name	Type	Range	Unit	FbEq32
49 Panel port communication					
49.01	Node ID number	<i>Real</i>	1...32	-	1 = 1
49.03	Baud rate	<i>List</i>	1...5	-	1 = 1
49.04	Communication loss time	<i>Real</i>	0.1 ... 3000.0	s	10 = 1 s
49.05	Communication loss action	<i>List</i>	0...5	-	1 = 1
49.06	Refresh settings	<i>List</i>	0...1	-	1 = 1
49.07	Panel comm supervision force	<i>PB</i>	0000h...FFFFh	-	1 = 1
49.08	Secondary comm. loss action	<i>List</i>	0...5	-	1 = 1
49.14	Panel speed reference unit	<i>List</i>	0...1	-	1 = 1
49.15	Minimum ext speed ref panel	<i>Real</i>	-30000.00 ... 30000.00	rpm	100 = 1 rpm
49.16	Maximum ext speed ref panel	<i>Real</i>	-30000.00 ... 30000.00	rpm	100 = 1 rpm
49.17	Minimum ext frequency ref panel	<i>Real</i>	-500.00 ... 500.00	Hz	100 = 1 Hz
49.18	Maximum ext frequency ref panel	<i>Real</i>	-500.00 ... 500.00	Hz	100 = 1 Hz
50 Fieldbus adapter (FBA)					
50.01	enable	<i>List</i>	0...3	-	1 = 1
50.02	comm loss func	<i>List</i>	0...5	-	1 = 1
50.03	comm loss t out	<i>Real</i>	0.3 ... 6553.5	s	10 = 1 s
50.04	ref1 type	<i>List</i>	0...11	-	1 = 1
50.05	ref2 type	<i>List</i>	0...11	-	1 = 1
50.07	actual 1 type	<i>List</i>	0...11	-	1 = 1
50.08	actual 2 type	<i>List</i>	0...11	-	1 = 1
50.09	SW transparent source	<i>Analog src</i>	-	-	1 = 1
50.10	act1 transparent source	<i>Analog src</i>	-	-	1 = 1
50.11	act2 transparent source	<i>Analog src</i>	-	-	1 = 1
50.12	debug mode	<i>List</i>	0...1	-	1 = 1
50.13	control word	<i>Data</i>	00000000h ... FFFFFFFFh	-	1 = 1
50.14	reference 1	<i>Real</i>	-2147483648 ... 2147483647	-	1 = 1
50.15	reference 2	<i>Real</i>	-2147483648 ... 2147483647	-	1 = 1
50.16	status word	<i>Data</i>	00000000h ... FFFFFFFFh	-	1 = 1
50.17	actual value 1	<i>Real</i>	-2147483648 ... 2147483647	-	1 = 1
50.18	actual value 2	<i>Real</i>	-2147483648 ... 2147483647	-	1 = 1
50.21	timelevel sel	<i>List</i>	0...3	-	1 = 1
50.26	comm supervision force	<i>PB</i>	0000h...FFFFh	-	1 = 1
50.31	FBA B enable	<i>List</i>	0...1	-	1 = 1
50.32	FBA B comm loss func	<i>Real</i>	0...5	-	1 = 1

No.	Name	Type	Range	Unit	FbEq32
50.33	FBA B comm loss timeout	List	0.3 ... 6553.5	s	10 = 1 s
50.34	FBA B ref1 type	List	0...5	-	1 = 1
50.35	FBA B ref2 type	List	0...5	-	1 = 1
50.37	FBA B actual 1 type	List	0...5	-	1 = 1
50.38	FBA B actual 2 type	Analog src	0...5	-	1 = 1
50.39	FBA B SW transparent source	Analog src	-	-	1 = 1
50.40	FBA B act1 transparent source	Analog src	-	-	1 = 1
50.41	FBA B act2 transparent source	List	-	-	1 = 1
50.42	FBA B debug enable	Data	0...1	-	1 = 1
50.43	FBA B control word	Real	00000000h ... FFFFFFFFh	-	1 = 1
50.44	FBA B reference 1	Real	-2147483648 ... 2147483647	-	1 = 1
50.45	FBA B reference 2	Data	-2147483648 ... 2147483647	-	1 = 1
50.46	FBA B status word	Real	00000000h ... FFFFFFFFh	-	1 = 1
50.47	FBA B actual value 1	Real	-2147483648 ... 2147483647	-	1 = 1
50.48	FBA B actual value 2		-2147483648 ... 2147483647	-	1 = 1
50.51	FBA B timelevel sel	List	0...3	-	1 = 1
50.56	FBA B comm supervision force	PB	0000h...FFFFh	-	1 = 1
51 FBA A settings					
51.01	type	List	-	-	1 = 1
51.02	Par2	Real	0...65535	-	1 = 1
...	...	...	...	...	
51.26	Par26	Real	0...65535	-	1 = 1
51.27	par refresh	List	0...1	-	1 = 1
51.28	par table ver	Data	-	-	1 = 1
51.29	drive type code	Real	0...65535	-	1 = 1
51.30	mapping file ver	Real	0...65535	-	1 = 1
51.31	D2 comm status	List	0...6	-	1 = 1
51.32	comm SW ver	Data	-	-	1 = 1
51.33	appl SW ver	Data	-	-	1 = 1
52 FBA A data in					
52.01	data in1	List	-	-	1 = 1
...	...	...	...	...	
52.12	data in12	List	-	-	1 = 1

No.	Name	Type	Range	Unit	FbEq32
53 FBA A data out					
53.01	data out1	List	-	-	1 = 1
...	...	...	...	...	
53.12	data out12	List	-	-	1 = 1
54 FBA B settings					
54.01	FBA B type				
54.02	FBA B Par2	UINT16	0...65535	-	
...	...	...	...	...	
54.26	Protocol sw ver	UINT16	0...65535	-	
54.27	FBA B par refresh	List	0...1	-	
54.28	FBA B par table ver	UINT16	0...65535	-	
54.29	FBA B drive type code	UINT16	0...65535	-	
54.30	FBA B mapping file ver	UINT16	0...65535	-	
54.31	D2FBA B comm status	List	0...6	-	
54.32	FBA B comm SW ver	UINT16	0...65535	-	
54.33	FBA B appl SW ver	UINT16	0...65535	-	
55 FBA B data in					
55.01	FBA B data in1	List	-	-	1 = 1
...	...	...	...	...	
55.12	FBA B data in12	List	-	-	1 = 1
56 FBA B data out					
56.01	FBA B data out1	List	-	-	1 = 1
...	...	...	...	...	
56.12	FBA B data out12	List	-	-	1 = 1
59 Embedded Ethernet					
59.01	Emb Eth enable	List	0...1	-	1 = 1
59.02	Emb Eth status	PB	0000h...FFFFh	-	1 = 1
59.03	Emb Eth commrate	List	0...4	-	1 = 1
59.04	Emb Eth IP settings	List	0...2	-	1 = 1
59.05	Emb Eth IP address	Real	0.0.0.0 ... 255.255.255.255	-	-
59.06	Emb Eth subnet mask	Real	0.0.0.0 ... 255.255.255.255	-	-
59.07	Emb Eth gateway	Real	0.0.0.0 ... 255.255.255.255	-	-
59.08	Emb Eth par refresh List	List	0...1	-	1 = 1
59.25	Ethernet PC tools	List	0...1	-	1 = 1
60 DDCS communication					
60.01	M/F communication port	uint16	-	-	-
60.02	M/F node address	uint16	1...254	-	-
60.03	M/F mode	uint16	0...6	-	-
60.05	M/F HW connection	uint16	0...1	-	-
60.07	M/F link control	uint16	1...15	-	-
60.08	M/F comm loss timeout	uint16	0...65535	ms	-

No.	Name	Type	Range	Unit	FbEq32
60.09	M/F comm loss function	uint16	0...3	-	-
60.10	M/F ref1 type	uint16	0...5	-	-
60.11	M/F ref2 type	uint16	0...5	-	-
60.12	M/F act1 type	uint16	0...5	-	-
60.13	M/F act2 type	uint16	0...5	-	-
60.14	M/F follower selection	uint32	0...16	-	-
60.15	Force master	uint32	-	-	1 = 1
60.16	Force follower	uint32	-	-	1 = 1
60.17	Follower fault action	uint16	0...2	-	-
60.18	Follower enable	uint16	0...6	-	-
60.31	M/F wake up delay	uint16	0.0 ... 180.0	s	10 = 1 s
60.32	M/F comm supervision force	uint16	0000h...FFFFh	-	1 = 1
61 D2D and DDCS transmit data					
61.01	M/F data 1 selection	uint32	-	-	-
61.02	M/F data 2 selection	uint32	-	-	-
61.03	M/F data 3 selection	uint32	-	-	-
61.25	M/F data 1 value	uint16	0...65535	-	-
61.26	M/F data 2 value	uint16	0...65535	-	-
61.27	M/F data 3 value	uint16	0...65535	-	-
62 D2D and DDCS receive data					
62.01	M/F data 1 selection	uint32	-	-	-
62.02	M/F data 2 selection	uint32	-	-	-
62.03	M/F data 3 selection	uint32	-	-	-
62.04	Follower node 2 data 1 sel	uint32	-	-	-
62.05	Follower node 2 data 2 sel	uint32	-	-	-
62.06	Follower node 2 data 3 sel	uint32	-	-	-
62.07	Follower node 3 data 1 sel	uint32	-	-	-
62.08	Follower node 3 data 2 sel	uint32	-	-	-
62.09	Follower node 3 data 3 sel	uint32	-	-	-
62.10	Follower node 4 data 1 sel	uint32	-	-	-
62.11	Follower node 4 data 2 sel	uint32	-	-	-
62.12	Follower node 4 data 3 sel	uint32	-	-	-
62.25	MF data 1 value	uint16	0...65535	-	-
62.26	MF data 2 value	uint16	0...65535	-	-
62.27	MF data 3 value	uint16	0...65535	-	-
62.28	Follower node 2 data 1 value	uint16	0...65535	-	-
62.29	Follower node 2 data 2 value	uint16	0...65535	-	-
62.30	Follower node 2 data 3 value	uint16	0...65535	-	-
62.31	Follower node 3 data 1 value	uint16	0...65535	-	-
62.32	Follower node 3 data 2 value	uint16	0...65535	-	-
62.33	Follower node 3 data 3 value	uint16	0...65535	-	-

No.	Name	Type	Range	Unit	FbEq32
62.34	Follower node 4 data 1 value	<i>uint16</i>	0...65535	-	-
62.35	Follower node 4 data 2 value	<i>uint16</i>	0...65535	-	-
62.36	Follower node 4 data 3 value	<i>uint16</i>	0...65535	-	-
70 Power module values phase A					
70.01	DSP temperature A1	<i>Real</i>	0.0 ... 141.0	°C	10 = 1 °C
70.02	IGBT1 temperature A1	<i>Real</i>	0.0 ... 141.0	°C	10 = 1 °C
70.03	IGBT2 temperature A1	<i>Real</i>	0.0 ... 141.0	°C	10 = 1 °C
70.04	IGBT3 temperature A1	<i>Real</i>	0.0 ... 141.0	°C	10 = 1 °C
70.05	PM RX comm err count A1	<i>Real</i>	0 ...	-	1 = 1 unit
70.06	Operating hours A1	<i>Real</i>	0.00 ...	h	100 = 1 h
70.07	1/3 DC link voltage A1	<i>Real</i>	0.0...1323.0	V	10 = 1 V
70.08	2/3 DC link voltage A1	<i>Real</i>	0.0...1323.0	V	10 = 1 V
70.09	5 volt power supply A1	<i>Real</i>	0.0...30.0	V	10 = 1 V
70.10	Charging relay temperature A1	<i>Real</i>	0.0 ... 141.0	°C	10 = 1 °C
70.11	3/3 DC link voltage A1	<i>Real</i>	0.0...1323.0	V	10 = 1 V
70.12	Hub RX comm err count A1	<i>Real</i>	0 ...	-	1 = 1 unit
70.15	Software version A1	<i>Data</i>	0.0.0.0 ... 255.255.255.255	-	1 = 1
70.16	Hardware type A1	<i>Data</i>	0 ...	-	1 = 1
70.17	Hardware rating A1	<i>Data</i>	0 ...	-	1 = 1
70.21	DSP temperature A2	<i>Real</i>	0.0 ... 141.0	°C	10 = 1 °C
...	...	...	...	...	...
70.177	Hardware rating A9	<i>Data</i>	0 ...	-	1 = 1
71 Power module values phase B					
71.01	DSP temperature B1	<i>Real</i>	0.0 ... 141.0	°C	10 = 1 °C
...	...	...	...	...	...
71.177	Hardware rating B9	<i>Data</i>	0 ...	-	1 = 1
72 Power module values phase C					
72.01	DSP temperature C1	<i>Real</i>	0.0 ... 141.0	°C	10 = 1 °C
...	...	...	...	...	...
72.177	Hardware rating C9	<i>Data</i>	0 ...	-	1 = 1
81 System control and monitoring					
81.01	System control and monitor CW	<i>PB</i>	0000h...FFFFh	-	1 = 1
81.02	System control and monitor SW	<i>PB</i>	0000h...FFFFh	-	1 = 1
81.03	System control and monitor AW1	<i>PB</i>	0000h...FFFFh	-	1 = 1
81.04	System control and monitor AW2	<i>PB</i>	0000h...FFFFh	-	1 = 1
81.05	System control and monitor FW1	<i>PB</i>	0000h...FFFFh	-	1 = 1
81.06	System control and monitor FW2	<i>PB</i>	0000h...FFFFh	-	1 = 1

No.	Name	Type	Range	Unit	FbEq32
81.07	IO Controller version	Data	0.0.0.0 ... 255.255.255.255	-	1 = 1
81.08	IO Controller version required	Data	0.0.0.0 ... 255.255.255.255	-	1 = 1
81.09	IO Controller configuration refresh	List	0...1	-	1 = 1
81.10	Control supply monitoring	List	0...4	-	1 = 1
81.11	Control backup supply monitoring	List	0...2	-	1 = 1
81.12	Lamp test selection	List	-	-	1 = 1
81.13	Lamp test Grp+Indx	Real	0 ... 32767	-	1 = 1
81.14	Lamp test BitNum	Real	0 ... 15	-	1 = 1
81.15	Local control disable source	List	-	-	1 = 1
81.16	Local control disable Grp+Indx	Real	0 ... 32767	-	1 = 1
81.17	Local control disable BitNum	Real	0 ... 15	-	1 = 1
81.20	Space heater control	List	-	-	1 = 1
81.21	Converter space heater monitoring	List	0...2	-	1 = 1
81.22	Motor space heater monitoring	List	0...2	-	1 = 1
82 Charging, MCB control					
82.01	MCB/Charging CW	PB	0000h...FFFFh	-	1 = 1
82.02	MCB/Charging SW	PB	0000h...FFFFh	-	1 = 1
82.03	MCB/Charging AW1	PB	0000h...FFFFh	-	1 = 1
82.05	MCB/Charging FW1	PB	0000h...FFFFh	-	1 = 1
82.20	MCB Ext1 commands	List	-	-	1 = 1
82.21	MCB Ext2 commands	List	-	-	1 = 1
82.26	MCB control signal	List	-	-	1 = 1
82.27	MCB control pulse time	Real	1 ... 10	s	1 = 1
82.28	MCB closing time limit	Real	1 ... 30	s	1 = 1
82.29	MCB opening time limit	Real	1 ... 10	s	1 = 1
82.30	MCB feedback signal	List	-	-	1 = 1
82.40	MCB available monitoring	List	-	-	1 = 1
82.41	MCB available status	List	-	-	1 = 1
82.42	MCB available Grp+Indx	Real	0 ... 32767	-	1 = 1
82.43	MCB available BitNum	Real	0 ... 15	-	1 = 1
82.45	MCB ON inhibition monitoring	List	-	-	1 = 1
82.46	MCB ON inhibition status	List	-	-	1 = 1
82.47	MCB ON inhibition Grp+Indx	Real	0 ... 32767	-	1 = 1
82.48	MCB ON inhibition BitNum	Real	0 ... 15	-	1 = 1
82.50	MCB external protection monitoring	List	-	-	1 = 1
82.51	MCB external protection status	List	-	-	1 = 1
82.52	MCB external protection Grp+Indx	Real	0 ... 32767	-	1 = 1

No.	Name	Type	Range	Unit	FbEq32
82.53	MCB external protection BitNum	<i>Real</i>	0 ... 15	-	1 = 1
82.93	Charging overload event sel	<i>List</i>	-	-	1 = 1
83 Cooling system					
83.01	Cooling system CW	<i>PB</i>	0000h...FFFFh	-	1 = 1
83.02	Cooling system SW	<i>PB</i>	0000h...FFFFh	-	1 = 1
83.03	Cooling system AW1	<i>PB</i>	0000h...FFFFh	-	1 = 1
83.04	Cooling system AW2	<i>PB</i>	0000h...FFFFh	-	1 = 1
83.05	Cooling system FW1	<i>PB</i>	0000h...FFFFh	-	1 = 1
83.06	Cooling system FW2	<i>PB</i>	0000h...FFFFh	-	1 = 1
83.12	Fan control	<i>List</i>	-	-	1 = 1
83.13	Fan OFF delay	<i>Real</i>	0 ... 30	min	1 = 1 min
83.14	Fan EOFF stop	<i>List</i>	-	-	1 = 1
83.15	Fan alarm reset	<i>List</i>	-	-	1 = 1
83.26	Redundant fan cycle time	<i>Real</i>	2.0 ... 720.0	h	1 = 1 h
83.27	Redundant fan run time	<i>Real</i>	1.0 ... 720.0	h	1 = 1 h
84 Motor temperature monitoring					
84.01	Motor temperature monitor enable selection	<i>PB</i>	0000h...FFFFh	-	1 = 1
84.02	Motor winding phase U1 temperature	<i>Real</i>	-100.0 ... 500.0	°C	1 = 1 °C
84.03	Motor winding phase U1 fault limit	<i>Real</i>	-100.0 ... 500.0	°C	1 = 1 °C
84.04	Motor winding phase U1 warning limit	<i>Real</i>	-100.0 ... 500.0	°C	1 = 1 °C
84.05	Motor winding phase V1 temperature	<i>Real</i>	-100.0 ... 500.0	°C	1 = 1 °C
84.06	Motor winding phase V1 fault limit	<i>Real</i>	-100.0 ... 500.0	°C	1 = 1 °C
84.07	Motor winding phase V1 warning limit	<i>Real</i>	-100.0 ... 500.0	°C	1 = 1 °C
84.08	Motor winding phase W1 temperature	<i>Real</i>	-100.0 ... 500.0	°C	1 = 1 °C
84.09	Motor winding phase W1 fault limit	<i>Real</i>	-100.0 ... 500.0	°C	1 = 1 °C
84.10	Motor winding phase W1 warning limit	<i>Real</i>	-100.0 ... 500.0	°C	1 = 1 °C
84.11	Motor winding phase U2 temperature	<i>Real</i>	-100.0 ... 500.0	°C	1 = 1 °C
84.12	Motor winding phase U2 fault limit	<i>Real</i>	-100.0 ... 500.0	°C	1 = 1 °C
84.13	Motor winding phase U2 warning limit	<i>Real</i>	-100.0 ... 500.0	°C	1 = 1 °C
84.14	Motor winding phase V2 temperature	<i>Real</i>	-100.0 ... 500.0	°C	1 = 1 °C

No.	Name	Type	Range	Unit	FbEq32
84.15	Motor winding phase V2 fault limit	<i>Real</i>	-100.0 ... 500.0	°C	1 = 1 °C
84.16	Motor winding phase V2 warning limit	<i>Real</i>	-100.0 ... 500.0	°C	1 = 1 °C
84.17	Motor winding phase W2 temperature	<i>Real</i>	-100.0 ... 500.0	°C	1 = 1 °C
84.18	Motor winding phase W2 fault limit	<i>Real</i>	-100.0 ... 500.0	°C	1 = 1 °C
84.19	Motor winding phase W2 warning limit	<i>Real</i>	-100.0 ... 500.0	°C	1 = 1 °C
84.20	Motor DE bearing temperature	<i>Real</i>	-100.0 ... 500.0	°C	1 = 1 °C
84.21	Motor DE bearing temperature fault limit	<i>Real</i>	-100.0 ... 500.0	°C	1 = 1 °C
84.22	Motor DE bearing temperature warning limit	<i>Real</i>	-100.0 ... 500.0	°C	1 = 1 °C
84.23	Motor NDE bearing temperature	<i>Real</i>	-100.0 ... 500.0	°C	1 = 1 °C
84.24	Motor NDE bearing temperature fault limit	<i>Real</i>	-100.0 ... 500.0	°C	1 = 1 °C
84.25	Motor NDE bearing temperature warning limit	<i>Real</i>	-100.0 ... 500.0	°C	1 = 1 °C
85 SBU control and monitoring					
85.01	SBU control and monitoring CW	<i>PB</i>	0000h...FFFFh	-	1 = 1
85.02	SBU control and monitoring SW	<i>PB</i>	0000h...FFFFh	-	1 = 1
85.03	SBU control and monitoring AW	<i>PB</i>	0000h...FFFFh	-	1 = 1
85.04	SBU control and monitoring FW	<i>PB</i>	0000h...FFFFh	-	1 = 1
85.05	Ratio of grid voltage transformer	<i>Real</i>	0.0 ... 32767.0	-	1 = 1
85.06	Ratio of converter voltage transformer	<i>Real</i>	0.0 ... 32767.0	-	1 = 1
85.07	Voltage RMS deviation limit	<i>Real</i>	0.0 ... 10.0	%	1 = 1 %
85.08	Voltage RMS maximum deviation limit	<i>Real</i>	0.0 ... 10.0	%	1 = 1 %
85.11	SBU function enable	<i>List</i>	0...1	-	1 = 1
85.12	Motor control mode	<i>List</i>	0...1	-	1 = 1
85.13	SBU control source	<i>List</i>	0...1	-	1 = 1
85.14	MB control signal	<i>List</i>	0...1	-	1 = 1
85.15	MSS control signal	<i>List</i>	0...1	-	1 = 1
85.16	MB MSS BypassContact control time limit	<i>Real</i>	1...30	s	1 = 1 s
85.20	MB open control by direct online	<i>List</i>	0...1	-	1 = 1
85.21	Inductor bypass contactor control	<i>List</i>	0...1	-	1 = 1

No.	Name	Type	Range	Unit	FbEq32
85.22	Inductor bypass contactor control signal	List	0...1	-	1 = 1
85.30	Inductor temperature	Real	-100.0 ... 500.0	°C	1 = 1°C
87 AC500 I/O interface					
87.10	AC500 CPU DI status	PB	0000h...FFFFh	-	1 = 1
87.13	AC500 CPU DO status	PB	0000h...FFFFh	-	1 = 1
87.40	AC500 E P2 DI status	PB	0000h...FFFFh	-	1 = 1
87.43	AC500 E P2 DO status	PB	0000h...FFFFh	-	1 = 1
90 Feedback selection					
90.01	Motor speed for control	Real	-32768.00 ... 32767.00	rpm	100 = 1 rpm
90.41	Motor feedback selection	List	0...2	-	1 = 1
90.42	Motor speed filter time	Real	0...10000	ms	1 = 1 ms
96 System					
96.01	Language	List	-	-	1 = 1
96.02	Pass code	Data	0...999999999	-	1 = 1
96.03	Access levels active	PB	0000h...FFFFh	-	1 = 1
96.06	Parameter restore	List	-	-	1 = 1
96.07	Parameter save manually	List	0...1	-	1 = 1
96.08	Control board boot	Real	0...1	-	1 = 1
96.10	User set status	List	-	-	-
96.11	User set save/load	List	-	-	-
96.12	User set I/O mode in1	Binary src	-	-	-
96.13	User set I/O mode in2	Binary src	-	-	-
96.16	Unit selection	PB	0000h...FFFFh	-	1 = 1
96.20	Time synchronization source	List	0...9	-	1 = 1
96.23	M/F and D2D clock synchronization	uint16	0...1	-	1 = 1
96.24	Full days since 1st Jan 1980	Real	1...59999	-	1 = 1
96.25	Time in minutes within 24 h	Real	0...1439	-	1 = 1
96.26	Time in ms within one minute	Real	0...59999	-	1 = 1
96.29	Time sync source status	PB	0000h...FFFFh	-	1 = 1
96.31	Drive ID number	Real	0...32767	-	1 = 1
96.39	Power up event logging	List	0...1	-	1 = 1
96.51	Clear fault and event logger	uint16	0...65535	-	1 = 1
96.53	Actual checksum	Real	00000000h...FFFFFFFFh	-	1 = 1
96.54	Checksum action	List	0...4	-	1 = 1
96.55	Checksum control word	PB	0000h...FFFFh	-	1 = 1
96.56	Approved checksum 1	Real	00000000h...FFFFFFFFh	-	1 = 1
96.57	Approved checksum 2	Real	00000000h...FFFFFFFFh	-	1 = 1
96.58	Approved checksum 3	Real	00000000h...FFFFFFFFh	-	1 = 1

No.	Name	Type	Range	Unit	FbEq32
96.59	Approved checksum 4	<i>Real</i>	00000000h...FFFFFFFFh	-	1 = 1
96.61	User data logger status word	<i>PB</i>	0000h...FFFFh	-	1 = 1
96.63	User data logger trigger	<i>Binary src</i>	-	-	-
96.64	User data logger start	<i>Binary src</i>	-	-	-
96.66	Factory data logger start	<i>List</i>	-	-	1 = 1
96.70	License state	<i>List</i>	-	-	-
96.71	License key part 1	<i>Real</i>	0000h...FFFFh	-	1 = 1
96.72	License key part 2	<i>Real</i>	0000h...FFFFh	-	1 = 1
96.73	License key part 3	<i>Real</i>	0000h...FFFFh	-	1 = 1
96.74	License key part 4	<i>Real</i>	0000h...FFFFh	-	1 = 1
96.75	License key refresh	<i>List</i>	-	-	-
<i>(Parameters 96.100...96.102 only visible when enabled by parameter 96.02)</i>					
96.100	Change user pass code	<i>Data</i>	10000000...99999999	-	1 = 1
96.101	Confirm user pass code	<i>Data</i>	10000000...99999999	-	1 = 1
96.102	User lock functionality	<i>PB</i>	0000h...FFFFh	-	1 = 1
96.201	Disable adaptive program	<i>List</i>	0...1	-	1 = 1
97 Motor control					
97.04	Voltage reserve	<i>Real</i>	-4...50	%	1 = 1%
97.06	Flux reference select	<i>Binary src</i>	-	-	1 = 1
97.07	User flux reference	<i>Real</i>	0.00 ... 200.00	%	100 = 1%
97.13	IR compensation	<i>Real</i>	0.00 ... 50.00	%	100 = 1%
98 User motor parameters					
98.02	Rs user	<i>Real</i>	0.0000...0.50000	p.u.	100000 = 1 p.u.
98.03	Rr user	<i>Real</i>	0.0000...0.50000	p.u.	100000 = 1 p.u.
98.04	Lm user	<i>Real</i>	0.0000...10.0000	p.u.	100000 = 1 p.u.
98.05	SigmaL user	<i>Real</i>	0.0000...1.0000	p.u.	100000 = 1 p.u.
98.09	Rs user SI	<i>Real</i>	0.0000...100.0000	ohm	100000 = 1 ohm
98.10	Rr user SI	<i>Real</i>	0.0000...100.0000	ohm	100000 = 1 ohm
98.11	Lm user SI	<i>Real</i>	0.00...100000.00	mH	1000 = 1 mH
98.12	SigmaL user SI	<i>Real</i>	0.00...100000.00	mH	1000 = 1 mH
99 Motor data					
99.06	Motor nominal current	<i>Real</i>	0.0 ... 6400.0	A	10 = 1 A
99.07	Motor nominal voltage	<i>Real</i>	0.0 ... 20000.0	V	10 = 1 V
99.08	Motor nominal frequency	<i>Real</i>	0.00 ... 500.00	Hz	10 = 1 Hz
99.09	Motor nominal speed	<i>Real</i>	0 ... 30000	rpm	1 = 1 rpm

No.	Name	Type	Range	Unit	FbEq32
99.10	Motor nominal power	Real	0.00 ... 10000.00 kW or 0.00 ... 10000.00 hp	kW or hp	1 = 1 unit
99.11	Motor nominal cosφ	Real	0.00 ... 1.00	-	100 = 1
99.12	Motor nominal torque	Real	0.000... 4000000.000	N·m	1000 = 1 unit
99.15	Motor polepairs calculated	Real	0 ... 1000	-	1 = 1
99.16	Motor phase order	Real	0 ... 1	-	1 = 1

7

Fault tracing

What this chapter contains

The chapter lists the warning and fault messages including possible causes and corrective actions. The causes of most warnings and faults can be identified and corrected using the information in this chapter. If not, an ABB service representative should be contacted.

Warnings and faults are listed below in separate tables. Each table is sorted by warning/fault code.

Safety



WARNING! Only qualified electricians are allowed to service the drive. Read the *Safety instructions* on the first pages of the Hardware manual before working on the drive.

Indications

■ Warnings and faults

Warnings and faults indicate an abnormal drive status. The codes and names of active warnings/faults are displayed on the control panel of the drive as well as the Drive composer PC tool. Only the codes of warnings/faults are available over fibdbus.

Warnings do not need to be reset; they stop showing when the cause of the warning ceases. Warnings do not latch and the drive will continue to operate the motor.

Faults do latch inside the drive and cause the drive to trip, and the motor stops. After the cause of a fault has been removed, the fault can be reset from a selectable

source (see parameter [31.11 Fault reset selection](#)) such as the control panel, Drive composer PC tool, the digital inputs of the drive, or fieldbus. After the fault is reset, the drive can be restarted. Note that some faults require a reboot of the control unit either by switching the power off and on, or using parameter [96.08 Control board boot](#) – this is mentioned in the fault listing wherever appropriate.

■ Pure events

In addition to warnings and faults, there are pure events that are only recorded in the event log of the drive. The codes of these events are included in the [Warning messages](#) table.

■ Editable messages

For some warnings and faults, the message text can be edited and instructions and contact information added. To edit these messages, choose **Menu - Settings - Edit texts** on the control panel.

Warning/fault history and analysis

■ Event log

The drive has two event logs. One log contains faults and fault resets; the other contains warnings, pure events, and clearing entries. Each log contains the 64 most recent events with a time stamp and other information.

The logs can be accessed separately from the main Menu on the control panel. The logs are displayed as a single list when viewed using the Drive composer PC tool.

The logs can be cleared using parameter [96.51 Clear fault and event logger](#).

Auxiliary codes

Some events generate an auxiliary code that often helps in pinpointing the problem. On the control panel, the auxiliary code is stored as part of the details of the event; in the Drive composer PC tool, the auxiliary code is shown in the event listing.

Factory data logger

The drive has a data logger that samples preselected drive values at 500-microsecond intervals. Approximately 22000 samples recorded immediately before and after the triggering event (such as a fault) are saved into the memory unit of the drive. The fault data is accessible in the event log when viewed in the Drive composer PC tool. (The fault data is not accessible through the control panel.)

The values that are recorded in the factory data log are [01.07 Motor current](#), [01.10 Motor torque](#), [01.11 DC voltage](#), [01.24 Flux actual %](#), [01.40 Phase U2 motor current](#), [01.41 Phase V2 motor current](#), [01.42 Phase W2 motor current](#), [01.43 Phase U2 motor voltage](#), [01.44 Phase V2 motor voltage](#), [01.45 Phase W2 motor voltage](#), [01.46 Phase A average DC voltage](#), [01.47 Phase B average DC voltage](#), [01.48 Phase C](#)

average DC voltage, 01.49 Phase U1 grid current, 01.50 Phase V1 grid current, 01.51 Phase W1 grid current, 01.52 Phase A average secondary voltage, 01.53 Phase B average secondary voltage, 01.54 Phase C average secondary voltage, 24.01 Used speed reference, 30.01 Limit word 1 and 90.01 Motor speed for control.
The selection of parameters cannot be changed by the user.

■ Other data loggers

User data logger

A custom data logger can be configured using the Drive composer PC tool. This functionality enables the free selection of up to eight drive parameters to be sampled at selectable intervals. The triggering conditions and the length of the monitoring period can also be defined by the user within the limit of approximately 8000 samples. The collected data is not automatically saved.

■ Parameters that contain warning/fault information

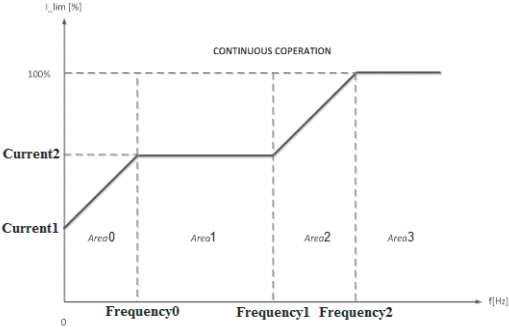
The drive is able to store a list of the active faults actually causing the drive to trip at the present time. The faults are displayed in parameter group *04 Warnings and faults* (page 64). The parameter group also displays a list of faults and warnings that have previously occurred.

■ Warning messages

Note: The list also contains events that only appear in the Event log.

Code (hex)	Warning	Cause	What to do
64FF	Fault reset	Fault reset has been demanded.	If the root cause for some of the active faults is still present after the reset, those faults will remain active. Root cause for the faults should be removed before reset is attempted.
A186	PM states mismatch	Control hub has detected a combination of power modules' (PM) states that is not valid.	Check POF wiring to PMs (or replace). Check control hub daughter boards (or replace). Check PM SW version and update if required. Contact your local ABB representative.

Code (hex)	Warning	Cause	What to do
A187	Trafo offset current out of range U1	Transformer primary current has exceeded internal limit with open MCB.	Check current sensor. Check CVM12 measurement board. Check the event log for an auxiliary code. The code indicates current p.u. value * 100, when warning is activated. For example, 0xA (Dec 10) means $0.10 * 30.41$ Rated input current * $\sqrt{2}$ is measured. After warning is activated, trafo current offset compensation stops. 1.49 Phase U1 grid current, 1.50 Phase V1 grid current, 1.51 Phase W1 grid current show measured current without offset compensation.
A188	Trafo offset current out of range V1	Transformer primary current has exceeded internal limit with open MCB.	Check current sensor. Check CVM12 measurement board. Check the event log for an auxiliary code. The code indicates current p.u. value * 100, when warning is activated. For example, 0xA (Dec 10) means $0.10 * 30.41$ Rated input current * $\sqrt{2}$ is measured. After warning is activated, trafo current offset compensation stops. 1.49 Phase U1 grid current, 1.50 Phase V1 grid current, 1.51 Phase W1 grid current show measured current without offset compensation.
A189	Motor offset current out of range U2	Measured motor phase currents are exceeding an internal limit with modulation stopped.	Check current sensor. Check CVM12 measurement board. Check the event log for an auxiliary code. The code indicates current p.u. value * 100, when warning is activated. For example, 0xA (Dec 10) means $0.10 * 30.40$ Rated output current * $\sqrt{2}$ is measured. After warning is activated, motor current offset compensation stops. 1.40 Phase U2 motor current, 1.41 Phase V2 motor current, 1.42 Phase W2 motor current show measured current without offset compensation.
A18A	Motor offset current out of range V2	Measured motor phase currents are exceeding an internal limit with modulation stopped.	Check current sensor. Check CVM12 measurement board. Check the event log for an auxiliary code. The code indicates current p.u. value * 100, when warning is activated. For example, 0xA (Dec 10) means $0.10 * 30.40$ Rated output current * $\sqrt{2}$ is measured. After warning is activated, motor current offset compensation stops. 1.40 Phase U2 motor current, 1.41 Phase V2 motor current, 1.42 Phase W2 motor current show measured current without offset compensation.

Code (hex)	Warning	Cause	What to do
A283	Motor overload alarm	Motor average current (absolute value) is high.	Check that the motor parameters in group 99 Motor data correspond to the motor rating plate. Check for proper delta/star connection of the motor. Check overload settings for the motor and settings for this alarm function (contact your local ABB representative).
A290	LF current limit effective	Low frequency current limit is effective.	Check motor load and drive ratings.
	 The graph shows the current limit I_{lim} [%] on the y-axis (0 to 100%) versus frequency f [Hz] on the x-axis. The curve starts at $Current1$ at $Frequency0$, rises linearly to $Current2$ at $Frequency1$, remains constant at $Current2$ until $Frequency2$, and then rises linearly to 100% at $Frequency2$. The area under the curve is divided into four regions: Area0 (below $Frequency0$), Area1 (between $Frequency0$ and $Frequency1$), Area2 (between $Frequency1$ and $Frequency2$), and Area3 (above $Frequency2$). A horizontal dashed line at 100% is labeled 'CONTINUOUS COOPERATION'. Current limitation curve method at low frequency Long time running at low speed may lead to reduced expected lifetime of drive. By default, when output frequency is running around low values ($Frequency2=10\text{Hz}$, $Frequency1=7\text{Hz}$, $Frequency0=2\text{Hz}$), maximum current is limited ($Current2=74\%$, $Current1=58\%$), which can affect the maximum torque output capability in the low frequency region. This current limit function is only activated once a parameterable delay time is reached (default 10 seconds).		
A2B1	Overcurrent	Output current has exceeded internal alarm limit.	Check motor load. Check acceleration times in parameter group 23 Speed reference ramp (rpm operation mode) or 28 Frequency reference chain (Hz operation mode). Also check parameters 46.01 Speed scaling and 46.02 Frequency scaling. Check motor and motor cable (including phasing and delta/star connection). Check there are no contactors opening and closing in motor cable. Check that the data in parameter group 99 Motor data corresponds to the motor rating plate. Check that there are no power factor correction capacitors or surge absorbers in motor cable.

Code (hex)	Warning	Cause	What to do
A2B3	Earth leakage	Drive has detected load unbalance typically due to earth fault in motor or motor cable.	Check that there are no power factor correction capacitors or surge absorbers in motor cable. Check for an earth fault in motor or motor cables by measuring the insulation resistances of motor and motor cable. If no earth fault can be detected, contact your local ABB representative.
A2B4	Short circuit	Short-circuit in motor cable(s) or motor.	Check motor and motor cable for cabling errors. Check that there are no power factor correction capacitors or surge absorbers in motor cable.
A3D0	Grid ridethrough	Grid voltage is below the internal threshold so the drive is operating in low voltage ridethrough mode.	Check the transformer secondary voltage.
A480	Motor cable overload(Editable message text)	Calculated motor cable temperature has exceeded warning limit.	Check the dimensioning of the motor cable in regard to required load. Check the settings in parameter group 35 Motor thermal protection .
A490	Incorrect temperature sensor setup	Sensor type mismatch	Check the settings of parameters 35.11 Temperature 1 source and 35.21 Temperature 2 source
			Check the wiring of the sensor. The auxiliary code (see the event log) identifies the interface module. (0 = Module 1, 1 = Module 2).
A491	External temperature 1 (Editable message text)	Measured temperature 1 has exceeded warning limit.	Check the value of parameter 35.02 Measured temperature 1 . Check the cooling of the motor (or other equipment whose temperature is being monitored). Check the setting of parameter 35.13 Temperature 1 warning limit .
A492	External temperature 2 (Editable message text)	Measured temperature 2 has exceeded warning limit.	Check the value of parameter 35.03 Measured temperature 2 . Check the cooling of the motor (or other equipment whose temperature is being monitored). Check the setting of parameter 35.23 Temperature 2 warning limit .
A4A0	Control board temperature	Control unit temperature is excessive.	Check the auxiliary code. See actions for each code below.
		1 Temperature above warning limit	Check ambient conditions.
		2 Thermistor damaged	Contact your local ABB representative for control unit replacement.
A5EA	Measurement circuit temperature	Problem with internal temperature measurement of the drive.	Contact your local ABB representative. For software version 2.00.0.3 and previous, download latest software (version after v2.00.0.3)

Code (hex)	Warning	Cause	What to do
A5ED	Measurement circuit ADC	Measurement circuit problem.	Contact your local ABB representative.
A5EE	Measurement circuit DFF	Measurement circuit problem.	Contact your local ABB representative.
A5F4	Control unit battery	The battery of the control unit is low.	Replace control unit battery. Refer to the HW manual for instructions on battery replacement. This warning can be suppressed using parameter 31.40 .
A684	SD card	Error related to SD card used to store data on BCU	Check the auxiliary code. See actions for all the codes below.
		1 No SD card	Insert a compatible, writable SD card into the SD CARD slot of the BCU
		2 SD card write-protected	
		3 SD card unreadable	
A685	Power fail saving	Power fail saving is requested too frequently due to oscillating power supply to the control unit. Some of the requests may have been discarded, potentially causing data loss.	Check the power supply of the control unit. If power internally from the drive, check the supply voltage of the drive.
A686	Checksum mismatch Programmable warning: 96.54 Checksum action	The calculated parameter checksum does not match any enabled reference checksum.	Check that all necessary approved (reference) checksums (96.56...96.59) are enabled in 96.55 Checksum control word . Check the parameter configuration. Using 96.55 Checksum control word , enable a checksum parameter and copy the actual checksum into that parameter.
A690	SD card write failed	Error happened while writing data to SD card located in BCON.	Customer should change a new SD card
		0x01 change directory fail	
		0x02 make directory fail	
		0x04 open file fail	
		0x10 read space fail	
		0x20 seek file current writing position fail	
		0x40 remove file fail	
		0x80 remove directory fail	
		0x640008 Write BCON information fail	
		0xC80008 Write event logger fail	
		0x0Y0008 (YY=2...E) Write Data logger (2...14) fail	
A6A4	Motor nominal value	The motor parameters are set incorrectly. The drive is not dimensioned correctly.	Check the settings of the motor parameters in parameter group 99 Motor data . Check that the drive is sized correctly for the motor.

Code (hex)	Warning	Cause	What to do
A6A5	No motor data	Parameters in group 99 have not been set.	Check that all the required parameters in parameter group 99 Motor data have been set. Note: It is normal for this warning to appear during the start-up and continue until the motor data is entered.
A6A6	Supply voltage unselected	The supply voltage has not been defined.	Set supply voltage parameter (contact your local ABB representative).
A6D1	FBA A parameter conflict	The drive does not have a functionality requested by a PLC (overriding system), or requested functionality has not been activated.	Check PLC (overriding system) programming. Check settings of parameter groups 50 Fieldbus adapter (FBA) and 51 FBA A settings .
A6D2	FBA B parameter conflict	The drive does not have a functionality requested by a PLC AC500, or requested functionality has not been activated.	Contact your local ABB representative.  WARNING! FBA B communication is reserved for drive internal communication and should not be changed by user.
A6E5	AI parametrization	The current/voltage hardware setting of an analog input does not correspond to parameter settings.	Check the event log for an auxiliary code. The code identifies the analog input whose settings are in conflict. Adjust either the hardware setting (dip switches on BCU) or parameter 12.15/12.25 . Note: Control board reboot (either by cycling the power or through parameter 96.08 Control board boot) is required to validate any changes in the hardware settings.
A6FA	Trial mode active	The drive is running in trial mode. After the trial mode has expired the drive will trip immediately and license update shall not be possible.	Contact ABB support line to get a valid license key. Enter a valid license key in parameters 96.71 License key part 1 , 96.72 License key part 2 , 96.73 License key part 3 , 96.74 License key part 4 and then set the parameter 96.75 License key refresh to "Refresh".
A6FB	Trial mode expires soon	The trial mode expires soon. After the trial mode has expired the drive will trip immediately and license update shall not be possible.	Contact ABB support line to get a valid license key. Enter a valid license key in parameters 96.71 License key part 1 , 96.72 License key part 2 , 96.73 License key part 3 , 96.74 License key part 4 and then set the parameter 96.75 License key refresh to "Refresh".

Code (hex)	Warning	Cause	What to do
A6FD	Rating parametrization failed	When the drive is modulating, it is not possible to change some parameters.	Check the auxiliary code. The code identifies the parameter whose writing was not possible. The format of the code is 0x0GGG 0III. "GGG" represents the parameter group in decimal representation. "III" represents the parameter index in decimal representation. This warning indicates that the entered license key has a different setting in a very important parameter. The parametrization is successful only if the drive is not modulating. If you are sure that the settings in the license key are correct, you can apply the changes by stopping the drive and refreshing the license key. If you are not sure if the settings in the license key are correct contact your local ABB representative and provide the auxiliary code.
A6FE	Rating not valid	The entered license key provides an invalid setting.	Check the auxiliary code. The code identifies the parameter whose setting was not valid. The format of the code is 0x0GGG 0III. "GGG" represents the parameter group in decimal representation. "III" represents the parameter index in decimal representation. Contact your local ABB representative and provide the auxiliary code.
A6FF	PIL PLL error	PIL PLL error is out of limit.	Monitor parameter 245.20. Check HW configuration. Check if grid is connected to converter output. Check if there is problem with CVMI board.
A780	Motor stall Programmable warning: 31.24 Stall function	Motor is operating in stall region because of e.g. excessive load or insufficient motor power.	Check motor load and drive ratings. Check fault function parameters 31.24...31.28.
A781	Motor fan Programmable warning: 35.106 DOL starter event type	No feedback received from external fan.	Check external fan (or other equipment controlled) by the logic. Check settings of parameters 35.100...35.106.
A799	Ext I/O comm loss Programmable warning: 31.55 Ext I/O comm loss event	The I/O extension module types specified by parameters do not match the detected configuration.	Check the auxiliary code (format XXYY YYYY). "XX" specifies the number of the I/O extension module (01: parameter group 14 I/O extension module 1, 02: 15 I/O extension module 2, 03: 16 I/O extension module 3). "YY YYYY" indicates the problem (see actions for each code below).

Code (hex)	Warning	Cause	What to do
	00 0001	Communication with module failed.	Check that the module is properly seated in its slot. Check that the module and the slot connector is not damaged. Try installing the module into another slot.
	00 0002	Module not found.	Check the type and location settings of the modules (parameters 14.01/14.02 , 15.01/15.02 or 16.01/16.02). Check that the module is properly seated in its slot. Check that the module and the slot connector is not damaged. Try installing the module into another slot.
	00 0003	Configuration of module failed.	
	00 0004	Configuration of module failed.	
A7AA	Extension AI parameterization	The hardware current/voltage setting of an analog input (on an I/O extension module) does not correspond to parameter settings.	Check the event log for an auxiliary code (format XX00 00YY). "XX" specifies the number of the I/O extension module (01 : parameter group 14 I/O extension module 1 , 02 : 15 I/O extension module 2 , 03 : 16 I/O extension module 3). "YY" specifies the analog input on the module. For example, in case of I/O extension module 1, analog input AI1 (auxiliary code 0100 0001), the hardware current/voltage setting on the module is shown by parameter 14.29 . The corresponding parameter setting is 14.30 . Adjust either the hardware setting on the module or the parameter to solve the mismatch. Note: Control board reboot (either by cycling the power or through parameter 96.08 Control board boot) is required to validate any changes in the hardware settings.
A7AB	Extension I/O configuration failure	The I/O extension module types and locations specified by parameters do not match the detected configuration.	Check the event log for an auxiliary code. The code indicates which I/O extension module is affected. Check the type and location settings of the modules (parameters 14.01 , 14.02 , 15.01 , 15.02 , 16.01 and 16.02). Check that the modules are properly installed.
A7CB	MF comm loss Programmable warning: 60.09 M/F comm loss function	Master/follower communication is lost.	Check the auxiliary code. The code indicates which node address (defined by parameter 60.02 in each drive) on the master/follower link is affected. Check settings of parameter group 60 DDCS communication . Check cable connections. If necessary, replace cables.
AFE7	Follower	A follower drive has tripped.	Check the auxiliary code. Add 2 to the code to find out the node address of the faulted drive. Correct the fault in the follower drive.

Code (hex)	Warning	Cause	What to do
A7C1	FBAA communication Programmable warning: 50.02 comm loss func	Cyclical communication between drive and fieldbus adapter module A or between PLC (overriding system) and fieldbus adapter module A is lost.	Check status of fieldbus communication. See user documentation of fieldbus interface. Check settings of parameter groups 50 Fieldbus adapter (FBA) , 51 FBA A settings , 52 FBA A data in and 53 FBA A data out . Check cable connections. Check if communication master is able to communicate.
A7C2	FBA B communication Programmable warning: 50.32 FBA B comm loss func	Cyclical communication between drive and fieldbus adapter module B or between AC500 PLC and fieldbus adapter module B is lost.	Contact your local ABB representative.  WARNING! FBA B communication is reserved for drive internal communication and should not be changed by user.
A7EE	Panel loss Programmable warning: 49.05 Communication loss action	Control panel or PC tool selected as active control location for drive has ceased communicating.	Check PC tool or control panel connection. Check control panel connector. Check BCON X13 connector pins. Disconnect and reconnect the control panel. Replace control panel in mounting platform.
A7F0	FSCA-01 firmware incompatible	FSCA-01 firmware version is incompatible with the drive software. Fieldbus communication will not be stable.	The warning is active if any of the FSCA-01 modules (used for FBAA and/or for FBA B communication) have incompatible FW version. Check parameter 54.33 FBA B appl SW ver to determine if the FSCA-01 module used for internal communication is having an incompatible FW version. Refer to the release notes for the list of compatible FW versions. If second FSCA-01 module is used for FBAA communication, check parameter 51.33 appl SW ver . Replace all FSCA-01 modules that have incompatible FW version with compatible ones.
A880	Motor bearing Programmable warnings: 33.14 On-time 1 warn message 33.24 On-time 2 warn message 33.55 Value counter 1 warn message 33.65 Value counter 2 warn message	Warning generated by an on-time timer or a value counter	Check the event log for an auxiliary code. Check the source of the warning corresponding to the code: 0: 33.13 On-time 1 source 1: 33.23 On-time 2 source 4: 33.53 Value counter 1 source 5: 33.63 Value counter 2 source .

Code (hex)	Warning	Cause	What to do
A881	Output relay	Warning generated by an edge counter Programmable warnings: 33.35 Edge counter 1 warn message 33.45 Edge counter 2 warn message	Check the event log for an auxiliary code. Check the source of the warning corresponding to the code: 2: 33.33 Edge counter 1 source 3: 33.43 Edge counter 2 source .
A882	Motor starts		
A883	Power ups		
A884	Main contactor		
A885	DC charge		
A886	On-time 1 (Editable message text) Programmable warning: 33.14 On-time 1 warn message	Warning generated by on-time timer 1	Check the source of the warning (parameter 33.13 On-time 1 source).
A887	On-time 2 (Editable message text) Programmable warning: 33.24 On-time 2 warn message	Warning generated by on-time timer 2	Check the source of the warning (parameter 33.23 On-time 2 source).
A888	Edge counter 1 (Editable message text) Programmable warning: 33.35 Edge counter 1 warn message	Warning generated by edge counter 1	Check the source of the warning (parameter 33.33 Edge counter 1 source).
A889	Edge counter 2 (Editable message text) Programmable warning: 33.45 Edge counter 2 warn message	Warning generated by edge counter 2	Check the source of the warning (parameter 33.43 Edge counter 2 source).
A88A	Value integrator 1 (Editable message text) Programmable warning: 33.55 Value counter 1 warn message	Warning generated by value counter 1	Check the source of the warning (parameter 33.53 Value counter 1 source).
A88B	Value integrator 2 (Editable message text) Programmable warning: 33.65 Value counter 2 warn message	Warning generated by value counter 2	Check the source of the warning (parameter 33.63 Value counter 2 source).
A88C	Device clean	Warning generated by an on-time timer Programmable warnings: 33.14 On-time 1 warn message 33.24 On-time 2 warn message	Check the event log for an auxiliary code. Check the source of the warning corresponding to the code: 0: 33.13 On-time 1 source 1: 33.23 On-time 2 source
A88D	DC capacitor		
A88E	Cabinet fan		
A88F	Cooling fan		
A890	Additional cooling fan		
A8A0	AI supervision Programmable warning: 12.03 AI supervision function	An analog signal is outside the limits specified for the analog input.	Check signal level at the analog input. Check the wiring connected to the input. Check the minimum and maximum limits of the input in parameter group 12 Standard AI .
A8B0	Signal supervision 1 (Editable message text) Programmable warning: 32.06 Supervision 1 action	Warning generated by the signal supervision 1 function	Check the source of the warning (parameter 32.07 Supervision 1 signal).
A8B1	Signal supervision 2 (Editable message text) Programmable warning: 32.16 Supervision 2 action	Warning generated by the signal supervision 2 function	Check the source of the warning (parameter 32.17 Supervision 2 signal).

Code (hex)	Warning	Cause	What to do
A8B2	Signal supervision 3 (Editable message text) Programmable warning: 32.26 Supervision 3 action	Warning generated by the signal supervision 3 function	Check the source of the warning (parameter 32.27 Supervision 3 signal).
A981	External warning 1 (Editable message text) Programmable warning: 31.01 External event 1 source 31.02 External event 1 type	Fault in external device 1	Check the external device. Check setting of parameter 31.01 External event 1 source .
A982	External warning 2 (Editable message text) Programmable warning: 31.03 External event 2 source 31.04 External event 2 type	Fault in external device 2	Check the external device. Check setting of parameter 31.03 External event 2 source .
A983	External warning 3 (Editable message text) Programmable warning: 31.05 External event 3 source 31.06 External event 3 type	Fault in external device 3	Check the external device. Check setting of parameter 31.05 External event 3 source .
A984	External warning 4 (Editable message text) Programmable warning: 31.07 External event 4 source 31.08 External event 4 type	Fault in external device 4	Check the external device. Check setting of parameter 31.07 External event 4 source .
A985	External warning 5 (Editable message text) Programmable warning: 31.09 External event 5 source 31.10 External event 5 type	Fault in external device 5	Check the external device. Check setting of parameter 31.09 External event 5 source .
A988	PM DC unbalance Warning	DC unbalance detected during capacitor reforming process. If sub capacitor voltage difference (compared to the average sub-capacitor voltage) is bigger than 80V, this warning will report.	Wait until capacitor reforming process is over. There will be several situations: 1 the warning is gone during/after capacitor reforming process. If so, nothing to do. 2 The warning is still existing even after capacitor reforming process, then the capacitor reforming process is failed. If so re-do capacitor reforming process? if failed again, replace the power module which still has problem.
AFAA	Autoreset	A fault is about to be autoreset.	Informative warning. See the settings in parameter group 31 Fault functions .
AFE1	Emergency stop (off2)	Drive has received an emergency stop (mode selection off2) command.	Check that it is safe to continue operation. Then return emergency stop push button to normal position. Restart drive.
AFE2	Emergency stop (off1 or off3)	Drive has received an emergency stop (mode selection off1 or off3) command.	If the emergency stop was unintentional, check the source selected by parameter 21.05 Emergency stop source .

Code (hex)	Warning	Cause	What to do
AFEA	Enable operation signal missing (Editable message text)	Enable operation signal not received	Check the setting of (and source selected by) parameter 20.19 Enable operation signal .
B5A2	Power up programmable event: 96.39 Power up event logging	The drive has been powered up.	Informative event.
B5A5	SW LP Version	Pure event to indicate the loading package software version information. This event will be triggered once after BCON reboot.	Pure information event. The aux code is a packaged version information in hexadecimal format. Each sub version number are represented by two hexadecimal numbers. For example, Aux. code: 0x02490003. 02: 2 49: 73 00: 0 03: 3 It means software version: 2.73.0.3
B670	Cap Reform Start	Capacitor reforming started.	Pure event – only appears in the event log for diagnostic purpose.
B671	Cap Reform Done	Capacitor reforming is done successfully.	Pure event – only appears in the event log for diagnostic purpose.
B672	Cap Reform Aborted	Capacitor reforming test was aborted	Pure event – only appears in the event log for diagnostic purpose.
B673	Factory data logger triggered	Factory data logger is triggered.	Pure event to show that factory data logger is triggered.
B674	Routine test start	Start Routine test	Pure event – only appears in the event log for diagnostic purpose.
B675	Routine test complete	Finish Routine test	Pure event – only appears in the event log for diagnostic purpose.
B676	Site commission start	Start Site commission	Pure event – only appears in the event log for diagnostic purpose.
B677	Site commission complete	Finish Site commission	Pure event – only appears in the event log for diagnostic purpose.
B686	Checksum mismatch Programmable event: 96.54 Checksum action	The calculated parameter checksum does not match any enabled reference checksum.	See A686 Checksum mismatch (page 348).
B690	Drive charged	This event is shown each time the drive is charged.	Pure event - only appears in the event log for diagnostic purposes.
B691	Drive starting	This event is shown each time the drive is starting.	Pure event - only appears in the event log for diagnostic purposes.
B692	Drive operating	This event is shown after the starting procedure is completed and the drive is able to follow the given reference.	Pure event - only appears in the event log for diagnostic purposes.
B693	Drive stopping	This event is shown each time the drive is stopping.	Pure event - only appears in the event log for diagnostic purposes.

Code (hex)	Warning	Cause	What to do
B694	Modulation stopped	This event is shown each time the modulation is stopped after a normal stop. Before modulation is stopped the drive shall ramp the motor speed to zero if parameter <i>21.03 Stop mode</i> is set to "Ramp". If parameter <i>21.03 Stop mode</i> is set to "Coast" the modulation is stopped as soon as the stop command is given.	Pure event - only appears in the event log for diagnostic purposes.
B695	Drive discharged	This event is shown each time the drive is discharged.	Pure event - only appears in the event log for diagnostic purposes.
B696	MCB on command	This event is shown each time the MCB close command given.	Pure event - only appears in the event log for diagnostic purposes.
B697	MCB off command	This event is shown each time the MCB open command given.	Pure event - only appears in the event log for diagnostic purposes.
B698	SBU MSS opened	This event is shown each time the MSS breaker is opened (state transition from RdyRun to RdyOn).	Pure event - only appears in the event log for diagnostic purposes.
C6A3	Notice	This notice is shown when changing language. This notice can be observed in SD card log.	This is an information and has no effect of drive operation. Nothing need to do.
C6B3	Notice	This notice is shown when parameter refreshment occurs. This notice can be observed in SD card log.	This is an information and has no effect of drive operation. Nothing need to do.
D23A	MCB ON inhibited after Sync to mains	MCB closed inhibited on single motor mode after sync to mains.	Stop sync to mains or change to multi motors mode.
D240	Charging count	There are too many DC link charging attempts.	Two attempts in Par 82.92 s is allowed to prevent DC capacitor overheating.
E200	Control supply alarm	Control supply alarm has been detected based on monitoring of the digital signal. Alarm is activated according to selection in <i>81.10 Control supply monitoring</i> .	Check the control supply failure alarm signal. Check setting of the parameter <i>81.10 Control supply monitoring</i> .
E201	Trafo phase U1 temperature high	The winding temperature of the indicated transformer primary phase is approaching temperature limit.	Check cooling of the transformer (door air inlet filter pads, fan operation). Check overload settings for transformer (contact your local ABB representative).
E202	Trafo phase V1 temperature high	The winding temperature of the indicated transformer primary phase is approaching temperature limit.	Check cooling of the transformer (door air inlet filter pads, fan operation). Check overload settings for transformer (contact your local ABB representative).

Code (hex)	Warning	Cause	What to do
E203	Trafo phase W1 temperature high	The winding temperature of the indicated transformer primary phase is approaching temperature limit.	Check cooling of the transformer (door air inlet filter pads, fan operation). Check overload settings for transformer (contact your local ABB representative).
E204	Ambient temperature high	The air inlet temperature of the inverter unit is approaching the maximum converter ambient temperature.	Check and improve the cooling of the electric room where converter is placed.
E205	INU air pressure high	The air pressure drop across the inverter unit is approaching the limit value.	Check PM heatsinks for dust pick up and clean if required. Check pressure drop sensor on control hub and replace control hub if required.
E206	Redundant fan running	Redundant fan group is active.	After fixing the root cause of the cooling fan failure, reset with parameter 83.15 Fan alarm reset .
E208	AC500 communication alarm	The watchdog supervision of the communication link between BCU and AC500 has detected a communication failure. Alarm is activated according to selection in parameter 50.32 FBA B comm loss func .	Check Modbus cable. Check FSCA-01 module. Check setting of parameter groups 54 FBA B settings , 55 FBA B data in and 56 FBA B data out (changes allowed only by ABB authorized personnel). Note: Make sure that up to maximum of two fieldbus extension modules are used on the BCU.
E209	MCB not available	MCB available signal is missing.	Check MCB available signal. Check setting of parameters: 82.40 MCB available monitoring , 82.42 MCB available Grp+Indx , 82.43 MCB available BitNum .
E20A	MCB external protection	MCB external protection active	Check MCB external protection signal. Check setting of parameters: 82.50 MCB external protection monitoring , 82.52 MCB external protection Grp+Indx , 82.53 MCB external protection BitNum .
E20B	MCB ON inhibited	MCB ON inhibition active.	Check MCB ON inhibition signal. Check setting of parameters: 82.45 MCB ON inhibition monitoring , 82.47 MCB ON inhibition Grp+Indx , 82.48 MCB ON inhibition BitNum .
E20C	Ambient temperature sensor failure	The air inlet temperature of the inverter unit has exceeded internal warning level.	Check air inlet temperature sensor wiring of the inverter unit.
E20D	TRU air filter dirty	Transformer unit air filter has been detected dirty.	Check air inlet filter pads on the transformer unit cabinet.
E20E	INU cooling fan 1 overload	Temperature relay integrated in INU cooling fan 1 has opened. A redundant fan group is activated.	Check wiring of fan 1 temperature contacts (open circuit, loose terminals). Check if fan is mechanically blocked or makes excessive noise (bearing problem).

Code (hex)	Warning	Cause	What to do
E20F	INU cooling fan 2 overload	Temperature relay integrated in INU cooling fan 2 has opened. A redundant fan group is activated.	Check wiring of fan 2 temperature contacts (open circuit, loose terminals). Check if fan is mechanically blocked or makes excessive noise (bearing problem).
E210	INU cooling fan 3 overload	Temperature relay integrated in INU cooling fan 3 has opened. A redundant fan group is activated.	Check wiring of fan 3 temperature contacts (open circuit, loose terminals). Check if fan is mechanically blocked or makes excessive noise (bearing problem).
E211	INU cooling fan 4 overload	Temperature relay integrated in INU cooling fan 4 has opened. A redundant fan group is activated.	Check wiring of fan 4 temperature contacts (open circuit, loose terminals). Check if fan is mechanically blocked or makes excessive noise (bearing problem).
E212	INU air pressure low	The air pressure drop across inverter unit is approaching lower limit value.	Check or replace inverter unit air inlet filter pads. Check pressure drop sensor and measuring tube on control hub and replace control hub or tube if required.
E213	INU air pressure sensor failure	The air pressure drop across the inverter unit has exceeded internal fault level.	Check pressure drop sensor and measuring tube on control hub and replace control hub or tube if required.
E214	TRU cooling fan 1 overload	Temperature relay integrated in TRU cooling fan 1 has opened. A redundant fan group is activated.	Check wiring of fan 1 temperature contacts (open circuit, loose terminals). Check if fan is mechanically blocked or makes excessive noise (bearing problem).
E215	TRU cooling fan 2 overload	Temperature relay integrated in TRU cooling fan 2 has opened. A redundant fan group is activated.	Check wiring of fan 2 temperature contacts (open circuit, loose terminals). Check if fan is mechanically blocked or makes excessive noise (bearing problem).
E216	TRU cooling fan 3 overload	Temperature relay integrated in TRU cooling fan 3 has opened. A redundant fan group is activated.	Check wiring of fan 3 temperature contacts (open circuit, loose terminals). Check if fan is mechanically blocked or makes excessive noise (bearing problem).
E217	DC link not discharged	DC link voltage is still high although the MCB open command was given 15 minutes ago. Or when BCON reboot, DC link voltage is high.	Check the MCB. It might happen that one or more MCB contacts are stuck in closed position.
E218	INU door not closed	During charging of the drive, the inverter unit door lock has reported that the door is not locked.	Lock the inverter unit door. Check internal wiring of the door lock signals (open circuit, loose terminals). Check if fan is mechanically blocked or makes excessive noise (bearing problem).

Code (hex)	Warning	Cause	What to do
E219	IO Controller version incompatible	IO Controller SW version (shown in parameter 81.07 IO Controller version) is lower than the expected value (shown in parameter 81.08 IO Controller version required).	Upgrade IO Controller SW (Contact your local ABB representative).
E21B	TRU cooling fan 4 overload	Temperature relay integrated in TRU cooling fan 4 has opened. A redundant fan group is activated.	Check wiring of fan 4 temperature contacts (open circuit, loose terminals). Check if fan is mechanically blocked or makes excessive noise (bearing problem).
E21D	Cooling fan test run	Cooling fans are operated in the test mode independent of drive state.	The fan test mode is controlled by parameter 83.12 Fan control . As soon as this parameter is set to "Auto run" the test run is ended and the alarm is removed.
E21E	Control backup supply alarm	Control backup supply alarm has been detected based on monitoring of the digital signal.	Check the control backup supply alarm signal. Check setting of the parameter 81.11 Control backup supply monitoring .
E21F	Motor phase U1 temperature high	The winding temperature of the indicated motor phase is approaching the temperature limit.	Check cooling of the motor. Check warning limit setting for the motor temperature 84.04 Motor winding phase U1 warning limit .
E220	Motor phase V1 temperature high	The winding temperature of the indicated motor phase is approaching the temperature limit.	Check cooling of the motor. Check warning limit setting for the motor temperature 84.07 Motor winding phase V1 warning limit .
E221	Motor phase W1 temperature high	The winding temperature of the indicated motor phase is approaching the temperature limit.	Check cooling of the motor. Check warning limit setting for the motor temperature 84.10 Motor winding phase W1 warning limit .
E222	Motor phase U2 temperature high	The winding temperature of the indicated motor phase is approaching the temperature limit.	Check cooling of the motor. Check warning limit setting for the motor temperature 84.13 Motor winding phase U2 warning limit .
E223	Motor phase V2 temperature high	The winding temperature of the indicated motor phase is approaching the temperature limit.	Check cooling of the motor. Check warning limit setting for the motor temperature 84.16 Motor winding phase V2 warning limit .
E224	Motor phase W2 temperature high	The winding temperature of the indicated motor phase is approaching the temperature limit.	Check cooling of the motor. Check warning limit setting for the motor temperature 84.19 Motor winding phase W2 warning limit .

Code (hex)	Warning	Cause	What to do
E225	Motor DE bearing temperature high	The DE bearing temperature of the motor is approaching the temperature limit.	Check cooling of the motor. Check warning limit setting for the motor temperature 84.22 Motor DE bearing temperature warning limit .
E226	Motor NDE bearing temperature high	The NDE bearing temperature of the motor is approaching the temperature limit.	Check cooling of the motor. Check warning limit setting for the motor temperature 84.25 Motor NDE bearing temperature warning limit .
E227	Converter space heater overload warning	Converter space heater has been detected based on monitoring of the digital signal.	Check if the space heater short circuit or overload. Check setting of the parameter 81.21 Converter space heater monitoring .
E228	Motor space heater overload warning	Motor space heater has been detected based on monitoring of the digital signal.	Check if the space heater short circuit or overload. Check setting of the parameter 81.22 Motor space heater monitoring .
E229	Inductor temperature high	Inductor temperature is approaching the temperature limit.	Check cooling of the inductor.
E230	Inductor temperature rising high	Inductor temperature rising relative to ambient temperature is approaching the temperature rising limit.	Check cooling of the inductor.
E231	Incorrect operation	Customer gives Sync to mains and Sync to VSD command together.	Correct operation command.
E232	Inductor bypassed	Synchronize command is inhibited by inductor bypassed.	Stop the drive and open the inductor bypass contactor.
E233	Sync to mains not finished	Cannot exit Sync to mains mode if it is not finished when drive is running.	Stop the drive or wait until synchronize to mains is finished then exit Sync to mains mode.
E234	MB not closed	Sync to VSD mode command is inhibited by MB open status.	MB has already opened and motor can be controlled on VSD mode directly.
E235	Sync to VSD not support	Sync to VSD functionality isn't supported currently.	Contact your local ABB representative and pay attention to ABB latest released version.

Code (hex)	Warning	Cause	What to do
E237	Phase angle sync overtime	1 minute after synchronization is started, RSYC-01 board still doesn't send out stable SYNC signal.	Check wiring of the RSYC-01 board meets the specification. Check the RSYC-01 board. Monitor signal 12.21 AI2 actual value using Drive composer. Par12.21 should try to approach 5V in normal synchronizing process. If it keeps at a constant voltage, the RSYC-01 board is probably broken. Another board broken situation is that the voltage (angle and frequency) adjusting works. Par12.21 AI2 actual value can stay at about 5V stably, but BCON DI6 (signal 10.01 bit5) is always low (0). Check acceleration time and deceleration time settings, these two values should not be set to very long.
E238	RMS sync overtime	1 minute after synchronization is started, voltage RMS deviation is still out of the limit.	Check actual voltage of grid and motor terminal via Par1.170 SBU Grid voltage and Par1.171 SBU motor voltage. If the voltage is abnormal, check PT, voltage RMS transducer board and wiring.

■ Fault messages

Code (hex)	Fault	Cause	What to do
1010	Power module fault	A general PM fault has tripped the drive. A more detailed fault message with indication of which PM has a fault is followed to this message.	Check the more detailed fault message with the auxiliary code followed to this fault message. The code indicates which PM is affected.
1011	Control hub fault	Control hub detects a power fail or a pressure sensor error.	Check the control power supply. The fault may happen in case control power is lost. Check the FO connection between BCON and control hub. If no problem is identified with the power supply and connection to BCON replace the control hub. Aux code bits meaning (more than one bit can be 1 at same time): Bit0 =1 (0x1): Multilink frame error (from Control hub to BCON) Bit8 =1 (0x100): Multilink watchdog error (from Control hub to BCON) Bit16 =1 (0x10000): Control hub power fail Bit17 =1 (0x20000): Multilink frame error or watchdog error (from BCON to Control hub)

Code (hex)	Fault	Cause	What to do
1012	PM states mismatch	Control hub has detected a combination of PMs' states that is not valid.	Check POF wiring to PMs (or replace). Check control hub daughter boards (or replace). Check PM SW version and update if required. Contact your local ABB representative.
2110	Trafo overcurrent	The transformer primary current has exceeded internal fault limit.	Check the event log for an auxiliary code. The code indicates the threshold which has been exceeded: 1 - Hardware overcurrent (95% of maximum measurable current) 2 - Transformer overcurrent Check the primary cabling. Check the transformer. Contact your local ABB representative.
2113	Trafo no-load overcurrent	Transformer primary current has exceeded internal fault limit while converter is not modulating and the inrush current has declined after MCB has been closed.	There is a short circuit on the secondary side of the transformer => check transformer secondaries, wiring and PM input main power circuit. Transformer inrush current has not yet declined during the blanking time => fine tune the inrush current blanking time (Contact your local ABB representative).
2118	Unintended MCB closed	MCB close command is not given by drive	Check if MCB close command come from other sources, instead of drive.
211B	Grid current asymmetry	The difference between measured transformer primary currents has exceeded internal fault limit.	Check the event log for an auxiliary code. The code indicates which value has exceed the threshold: 1 - Difference of phase A and B current RMS values 2 - Difference of phase B and C current RMS values 3 - Difference of phase C and A current RMS values Check for grid voltage asymmetry. Check the fault limit settings (Contact your local ABB representative).
2281	Calibration	Measured offset of output phase current measurement or difference between output phase U2 and W2 current measurement is too big (the values are updated during current calibration).	Try performing the current calibration again (Contact your local ABB representative).

Code (hex)	Fault	Cause	What to do
2310	Overcurrent	Output current has exceeded internal fault limit.	Check motor load. Check acceleration times in parameter group 23 Speed reference ramp for rpm operation mode or in group 28 Frequency reference chain for Hz operation mode. Check motor and motor cable (including phasing and delta/star connection). Check that the start-up data in parameter group 99 Motor data corresponds to the motor rating plate. Check that there are no power factor correction capacitors or surge absorbers in motor cable.
2330	Earth leakage	Drive has detected load unbalance typically due to earth fault in motor or motor cable.	Check that there are no power factor correction capacitors or surge absorbers in motor cable. Check for an earth fault in motor or motor cables by measuring the insulation resistances of motor and motor cable. If no earth fault can be detected, contact your local ABB representative.
2340	Short circuit	Short-circuit in motor cable(s) or motor.	Check motor and motor cable. Check that there are no power factor correction capacitors or surge absorbers in motor cable.
2350	Motor overcurrent phase U2	The instantaneous motor current has exceeded internal fault limit.	Check the event log for an auxiliary code. The code indicates the threshold which has been exceeded: 1 - Inverter overcurrent 2 - Hardware overcurrent (95% of maximum measurable current) 3 - Motor overcurrent Check for motor cable phase to phase short circuit. Check for motor winding phase to phase short circuit. Check for proper delta/star connection of the motor. Check that the motor parameters in group 99 Motor data correspond to the motor rating plate. Check that there are no power factor correction capacitors or surge absorbers in motor cable. Check that "Automatic" is selected in parameter 21.19 Scalar start mode if a start into rotating motor is attempted. Check that restart after fault is not requested while motor is still magnetized (at least 2 rotor time constants should be allowed before a new start attempt).

Code (hex)	Fault	Cause	What to do
2351	Motor overcurrent phase V2	The instantaneous motor current has exceeded internal fault limit.	Check the event log for an auxiliary code. The code indicates the threshold which has been exceeded: 1 - Inverter overcurrent 2 - Hardware overcurrent (95% of maximum measurable current) 3 - Motor overcurrent Check for motor cable phase to phase short circuit. Check for motor winding phase to phase short circuit. Check for proper delta/star connection of the motor. Check that the motor parameters in group 99 Motor data correspond to the motor rating plate. Check that there are no power factor correction capacitors or surge absorbers in motor cable. Check that "Automatic" is selected in parameter 21.19 Scalar start mode if a start into rotating motor is attempted. Check that restart after fault is not requested while motor is still magnetized (at least 2 rotor time constants should be allowed before a new start attempt).
2352	Motor overcurrent phase W2	The instantaneous motor current has exceeded internal fault limit.	Check the event log for an auxiliary code. The code indicates the threshold which has been exceeded: 1 - Inverter overcurrent 2 - Hardware overcurrent (95% of maximum measurable current) 3 - Motor overcurrent Check for motor cable phase to phase short circuit. Check for motor winding phase to phase short circuit. Check for proper delta/star connection of the motor. Check that the motor parameters in group 99 Motor data correspond to the motor rating plate. Check that there are no power factor correction capacitors or surge absorbers in motor cable. Check that "Automatic" is selected in parameter 21.19 Scalar start mode if a start into rotating motor is attempted. Check that restart after fault is not requested while motor is still magnetized (at least 2 rotor time constants should be allowed before a new start attempt).

Code (hex)	Fault	Cause	What to do
2355	Motor phase U2 lost	The converter is operated at greater than 5% rated speed and one motor phase current undershoots the internal fault limit.	Check motor terminals and cabling for weak contact or open circuit.
2356	Motor phase V2 lost	The converter is operated at greater than 5% rated speed and one motor phase current undershoots the internal fault limit.	Check motor terminals and cabling for weak contact or open circuit.
2357	Motor phase W2 lost	The converter is operated at greater than 5% rated speed and one motor phase current undershoots the internal fault limit.	Check motor terminals and cabling for weak contact or open circuit.
2358	Motor overload trip	Motor average current (absolute value) is too high.	Check that the motor parameters in group 99 Motor data correspond to the motor rating plate. Check for proper delta/star connection of the motor. Check overload settings for the motor and settings for this fault function (contact your local ABB representative).
323A	PM charging timeout fault	PM charging time was longer than 2 seconds	Check the event log for an auxiliary code. The code indicates which PM is affected. Replace the faulty PM.
3230	PM DC link overvoltage	The measured DC link voltage of a PM has exceeded the maximum level.	Check the event log for an auxiliary code. The code indicates which PM is affected. Check converter primary voltage. Check the deceleration times in parameter group 23 Speed reference ramp for rpm operation mode or in group 28 Frequency reference chain for Hz operation mode. Use coast-to-stop function (if applicable). Use S curves. Reduce transformer primary tapping one step. Replace the PM (if always the same PM gives the fault).
3231	PM DC link undervoltage	The measured DC link voltage of a PM has undershot the minimum level.	Check the event log for an auxiliary code. The code indicates which PM is affected. Contact your local ABB representative.
3233	PM +5V power supply fault	The +5V power supply of a PM has failed.	Check the event log for an auxiliary code. The code indicates which PM is affected. Replace the faulty PM.
3234	PM +5V power supply regulation fault	The measured +5V power supply voltage of a PM is out of tolerance.	Check the event log for an auxiliary code. The code indicates which PM is affected. Replace the faulty PM.
3236	PM DC link capacitors not balanced	The series connected capacitors in the DC link of a PM are heavily unbalanced.	Check the event log for an auxiliary code. The code indicates which PM is affected. Replace the faulty PM.

Code (hex)	Fault	Cause	What to do
3237	PM input voltage deviation	The input voltage measurement of a PM has a large deviation compared to the average input voltages of all PMs.	Check the event log for an auxiliary code. The code indicates which PM is affected. Check PM input fuses. Replace the faulty PM. Check transformer secondary voltage.
3238	PM input overvoltage	The measured input voltage of a PM has exceeded the maximum level.	Check the event log for an auxiliary code. The code indicates which PM is affected. Check converter primary voltage. Reduce transformer primary tapping one step. Replace the PM (if always the same PM gives the fault).
3239	PM diode open circuit	PM rectifier's diode open circuit is detected.	Check the event log for an auxiliary code. The code indicates which PM is affected. Replace the faulty PM.
3280	Standby timeout	Drive start is requested but the DC link voltage is too low.	If parameters <i>20.02 Ext1 start trigger type</i> and/or <i>20.07 Ext2 start trigger type</i> are set to "Level" this fault might come immediately after closing the MCB. Use "Edge" trigger type instead. If the drive is controlled over fieldbus check the corresponding settings for fieldbus control.
3330	Motor voltage sense fault phase U2	The measured motor phase to ground voltage has exceeded internal fault level.	Check voltage divider resistance value. Check CVM12 board and wiring to it.
3331	Motor voltage sense fault phase V2	The measured motor phase to ground voltage has exceeded internal fault level.	Check voltage divider resistance value. Check CVM12 board and wiring to it.
3332	Motor voltage sense fault phase W2	The measured motor phase to ground voltage has exceeded internal fault level.	Check voltage divider resistance value. Check CVM12 board and wiring to it.
3333	Ground fault	The common mode motor voltage of the drive has exceeded internal fault limit.	Check for drive internal ground faults (secondary cabling, PMs, transformer, terminal unit). Check for drive external ground faults (motor cable, motor windings). Check the HVD board.
3381	Output phase loss	Motor circuit fault due to missing motor connection (all three phases are not connected).	Connect motor cable.
4100	Ambient temperature	Ambient temperature is too high.	Check proper cooling of the control unit cabinet.
4110	Control board temperature	Control board temperature is too high.	Check proper cooling of the control unit cabinet.
4220	PM heatsink overtemperature	Measured IGBT heatsink temperature of a PM has exceeded the maximum level.	Check the event log for an auxiliary code. The code indicates which PM is affected. Check heatsink fins for dust pick-up. Check PM to air channel gasket. Check the door air inlet filter pads.

Code (hex)	Fault	Cause	What to do
4221	PM HCB overtemperature	Measured charging relay temperature on Heavy Copper Board (HCB) of a PM has exceeded the maximum level.	Check the event log for an auxiliary code. The code indicates which PM is affected. Check heatsink fins for dust pick-up. Check PM to air channel gasket. Check the door air inlet filter pads.
4981	External temperature 1 (Editable message text)	Measured temperature 1 has exceeded fault limit.	Check the value of parameter 35.02 Measured temperature 1 . Check the cooling of the motor (or other equipment whose temperature is being measured). Check the value of parameter 35.12 Temperature 1 fault limit .
4982	External temperature 2 (Editable message text)	Measured temperature 2 has exceeded fault limit.	Check the value of parameter 35.03 Measured temperature 2 . Check the cooling of the motor (or other equipment whose temperature is being measured). Check the value of parameter 35.22 Temperature 2 fault limit .
5001	Control board power fail	The power supply of the control board was below the internal fault limit. This fault is also shown, if the control board is intentionally powered off.	Check the control power supply.
5002	CVMI2 power fail	The power supply of the CVMI2 is below the power fail voltage level.	Check both the negative and positive supply voltage of the CVMI2.
5010	PM HB1 short circuit turn off	The desaturation detection of the IGBTs in HB1 (half bridge 1) of a PM has detected a short circuit.	Check the event log for an auxiliary code. The code indicates which PM is affected. Check converter output terminals for a phase to phase short circuit. Replace the faulty PM.
5011	PM HB2 short circuit turn off	The desaturation detection of the IGBTs in HB2 (half bridge 2) of a PM has detected a short circuit.	Check the event log for an auxiliary code. The code indicates which PM is affected. Check converter output terminals for a phase to phase short circuit. Replace the faulty PM.
5012	PM HB1 or HB2 short circuit turn off	The desaturation detection of the IGBTs in HB1 (half bridge 1) or HB2 (half bridge 2) of a PM has detected a short circuit.	Check the event log for an auxiliary code. The code indicates which PM is affected. Check converter output terminals for a phase to phase short circuit. Replace the faulty PM.
5013	PM charging relay not closed	The voltage across the charging relay contact of a PM is larger than it would be expected if the contact was closed.	Check the event log for an auxiliary code. The code indicates which PM is affected. Replace the faulty PM.
5014	PM rating incompatibility	One or more power modules have different rating from the one specified by the drive license key. The converter can only operate if all power modules have the correct rating.	Check the event log for an auxiliary code. The code indicates which PM is affected. Replace the PM.

Code (hex)	Fault	Cause	What to do
5015	PM DC voltage sense fault	The DC link voltage measurement of a PM is out of range during self test.	Check the event log for an auxiliary code. The code indicates which PM is affected. Replace the faulty PM.
5016	PM heatsink temperature sense fault	The heatsink temperature measurement of a PM is out of range during self test.	Check the event log for an auxiliary code. The code indicates which PM is affected. Replace the faulty PM.
5017	PM HB1 and HB2 short circuit turn off	The desaturation detection of the IGBTs in HB1 (half bridge 1) and HB2 (half bridge 2) of a PM has detected a short circuit.	Check the event log for an auxiliary code. The code indicates which PM is affected. Check converter output terminals for a phase to phase short circuit. Replace the faulty PM.
5029	PM Sub Capacitor Overvoltage1	Power module sub capacitor over voltage set by Par95.90 during capacitor reforming process happened.	Check the auxiliary code which indicates which power module reported this fault. Try to do the capacitor reforming test again or replace the problematic power modules.
5030	PM Sub Capacitor Overvoltage2	Power module sub capacitor over voltage set by Par95.91 and last over time period set by Par95.92 during capacitor reforming process happened.	Check the auxiliary code which indicates which power module reported this fault. Try to do the capacitor reforming test again or replace the problematic power modules.
5031	Cap Reform failed	Capacitor reforming test was done and failed because DC unbalance warning is still active after specified time period.	Check Par 95.93, 95.94 and 95.95 which indicates which power module(s) caused this fault. Try to do the capacitor reforming test again or replace the problematic power modules.
5032	PIL grid contactor control fault	PIL grid contactor control fault. The feedback is not correct 3s after command is given.	Check wiring of control and feedback between converter and grid contactor. Check grid contactor.
5094	Measurement circuit temperature	Problem with internal temperature measurement of the drive.	Contact your local ABB representative.
50A1	Emergency OFF button pressed	Emergency OFF button on the cabinet door has been pressed.	Check that it is safe to release the emergency OFF button on the front door and if it is, release the emergency OFF button. If the emergency OFF button is released but the warning is still active, check the wiring of the signals from the emergency OFF button. Check if the shield cover inside SBU cabinet is installed correctly.
5691	Measurement circuit ADC	Measurement circuit fault.	Contact your local ABB representative.
5693	Measurement circuit DFF	Measurement circuit fault.	Contact your local ABB representative.
6000	Internal SW error	Internal software error	Contact your local ABB representative. Quote the auxiliary code (check the event details in the event log).

Code (hex)	Fault	Cause	What to do
607A	Trial mode expired	The entered license key of the drive is not valid and the trial mode time has expired.	Contact ABB support line to get a valid license key. Enter a valid license key in parameters 96.71 License key part 1 , 96.72 License key part 2 , 96.73 License key part 3 , 96.74 License key part 4 and then set the parameter 96.75 License key refresh to "Refresh".
607C	License key missing	License key for the drive has not been entered.	Contact ABB support line to get a valid license key. Enter a valid license key in parameters 96.71 License key part 1 , 96.72 License key part 2 , 96.73 License key part 3 , 96.74 License key part 4 and then set the parameter 96.75 License key refresh to "Refresh".
607D	Control hub version incompatibility	Incompatible version of the control hub firmware has been detected.	Check the parameter 07.16 Control hub FW version . If this version is older (smaller) than the 07.18 Control Hub FW version required the control hub FW needs to be upgraded. Contact your local ABB representative.
607E	PM Software update in progress	An incorrect software version on the power modules was identified and a software update is in progress. This fault is active due to safety reasons to keep the MCB open until valid SW is downloaded to all Power modules. SW download to Power modules lasts 4 minutes.	The fault cannot be reset until the SW download is finished. When the SW download is finished a fault 607F PM Software update done will be shown. Wait for the fault 607F PM Software update done to show up. Then it is possible to reset the fault and to re-charge the drive.
607F	PM Software update done	An incorrect software version on the power modules was identified and a software update was done.	Reset the fault.
6080	PM Software Checksum wrong	An incorrect software checksum number on the power modules was identified and a PM software update is in progress. This fault is active due to safety reasons to keep the MCB open until valid SW is downloaded to all Power modules. SW download to Power modules lasts 4 minutes.	The fault cannot be reset until the SW download is finished. When the SW download is finished a fault 607F PM Software update done will be shown. Wait for the fault 607F PM Software update done to show up. Then it is possible to reset the fault and to recharge the drive. Aux code meaning: Any bits=1 means corresponding power module's checksum number is wrong: Bit0=1: A1 ... Bit8=1: A9 Bit9=1: B1 ... Bit17=1: B9 Bit18=1: C1 ... Bit26=1: C9

Code (hex)	Fault	Cause	What to do
6110	PM configuration fail	An undefined fault code from a PM has been received.	Check the event log for an auxiliary code. The code indicates which PM is affected. Check PM SW version and update if required. Replace the PM (if always the same PM gives the fault). Contact your local ABB representative.
6111	PM undefined fault	An undefined fault code from a PM has been received.	Check the event log for an auxiliary code. The code indicates which PM is affected. Check PM SW version and update if required. Replace the PM (if always the same PM gives the fault). Contact your local ABB representative.
6112	PM undefined state	Control hub has detected an undefined PM state.	Note: It is normal for this fault to appear after drive discharge. If the fault reappears after reset: Check POF wiring to the PMs (or replace). Check control hub daughter boards (or replace). Check PM SW version and update if required. Contact your local ABB representative.
6120	CVM12 configuration fault	During initialization of the CVM12 measurement board a fault was detected.	Replace the CVM12 board.
6182	Unrecoverable SW Error	An unrecoverable error has occurred.	Check the event log for the fault code and auxiliary code and report those to your local ABB representative. Cycle the control power to reboot control boards.
6200	Checksum mismatch Programmable fault: 96.54 Checksum action	The calculated parameter checksum does not match any enabled reference checksum.	See A686 Checksum mismatch (page 348).
6306	FBA A mapping file	Fieldbus adapter A mapping file read error.	Contact your local ABB representative.
6307	FBA B mapping file	Fieldbus adapter B mapping file read error.	Contact your local ABB representative.
6481	Task overload	Internal fault	Reboot the control unit (using parameter 96.08 Control board boot) or by cycling power. If the problem persists, contact your local ABB representative.
6487	Stack overflow	Internal fault	Reboot the control unit (using parameter 96.08 Control board boot) or by cycling power. If the problem persists, contact your local ABB representative.
64A1	Internal file load	File read error	Reboot the control unit (using parameter 96.08 Control board boot) or by cycling power. If the problem persists, contact your local ABB representative.
64A2	Internal record load	Internal record load error	Contact your local ABB representative.

Code (hex)	Fault	Cause	What to do
64A3	Application loading	Application file incompatible or corrupted	Note: This fault cannot be reset. Check the event log for the auxiliary code and contact your local ABB representative.
64B0	Memory unit detached	The memory unit was detached when the control unit was powered.	Contact your local ABB representative.
64B1	Internal SSW fault	Internal fault	Contact your local ABB representative.
64B2	User set fault	Loading of user parameter set failed because • requested set does not exist • set is not compatible with control program • drive was switched off during loading.	Contact your local ABB representative.
64E1	Kernel overload	Operating system error	Note: This fault cannot be reset. Contact your local ABB representative.
6581	Parameter system	Parameter load or save failed	Try forcing a save using parameter 96.07 Parameter save manually . Retry.
6591	Backup/Restore Timeout	Backup or restore action takes too long.	Check panel / PC-tool connection to BCU. Abort current backup / restore and retry.
65A1	FBA A parameter conflict	The drive does not have a functionality requested by PLC (overriding system), or requested functionality has not been activated.	Check PLC programming. Check settings of parameter groups 50 Fieldbus adapter (FBA) and 51 FBA A settings .
65A2	FBA B parameter conflict	The drive does not have a functionality requested by PLC, or requested functionality has not been activated.	Contact your local ABB representative.  WARNING! FBA B communication is reserved for drive internal communication and should not be changed by user.
6881	Text data overflow	Internal fault	Reset the fault. If the fault persists contact your local ABB representative.
6882	Text 32-bit table overflow	Internal fault	Reset the fault. If the fault persists contact your local ABB representative.
6883	Text 64-bit table overflow	Internal fault	Reset the fault. If the fault persists contact your local ABB representative.
6885	Text file overflow	Internal fault	Reset the fault. Contact your local ABB representative if the fault persists.

Code (hex)	Fault	Cause	What to do
7081	Panel loss Programmable fault: 49.05 Communication loss action	Control panel or PC tool selected as active control location for drive has ceased communicating.	Check PC tool or control panel connection. Check control panel connector. Check BCON X13 connector pins. Disconnect and reconnect the control panel. Replace control panel in mounting platform.
7082	Ext I/O comm loss Programmable fault: 31.55 Ext I/O comm loss event	The I/O extension module types specified by parameters do not match the detected configuration.	See A799 Ext I/O comm loss (page 351).
7083	Panel reference conflict	Use of saved control panel reference in multiple control modes attempted.	The control panel reference can only be saved for one reference type at a time. Consider the possibility of using a copied reference instead of saved reference (see the reference selection parameter).
7121	Motor stall Programmable fault: 31.24 Stall function	Motor is operating in stall region because of e.g. excessive load or insufficient motor power.	Check motor load and drive ratings. Check fault function parameters 31.24...31.28 .
71B1	Motor fan Programmable fault: 35.106 DOL starter event type	No feedback received from external fan.	Check external fan (or other equipment controlled) by the logic. Check settings of parameters 35.100...35.106 .
7310	Overspeed	Motor is turning faster than highest allowed speed due to incorrectly set minimum/maximum speed, insufficient braking torque or changes in load when using torque reference.	Check minimum/maximum speed settings, parameters 30.11 Minimum speed and 30.12 Maximum speed for rpm operation mode or 30.13 Minimum frequency and 30.14 Maximum frequency for Hz operation mode. Check adequacy of motor braking torque. Check applicability of torque control.
73B0	Emergency ramp failed	Emergency stop did not finish within expected time.	Check the settings of parameters 31.32 Emergency ramp supervision and 31.33 Emergency ramp supervision delay . Check the predefined ramp times (23.11...23.19 for mode Off1, 23.23 for mode Off3).
73F0	Overfrequency	Motor is turning faster than highest allowed speed due to incorrectly set minimum/maximum frequency, insufficient braking torque or changes in load when using torque reference.	Check minimum/maximum frequency setting in parameters 30.13 Minimum frequency and 30.14 Maximum frequency . Check adequacy of motor braking torque. Check applicability of torque control.

Code (hex)	Fault	Cause	What to do
7510	FBA A communication Programmable fault: 50.02 comm loss func	Cyclical communication between drive and fieldbus adapter module A or between PLC (overriding system) and fieldbus adapter module A is lost.	Check status of fieldbus communication. See user documentation of fieldbus interface. Check settings of parameter groups 50 Fieldbus adapter (FBA) , 51 FBA A settings , 52 FBA A data in and 53 FBA A data out . Check cable connections. Check if communication master is able to communicate.
7520	FBA B communication Programmable fault: 50.32 FBA B comm loss func	Cyclical communication between drive and fieldbus adapter module B or between AC500 PLC and fieldbus adapter module B is lost.	Contact your local ABB representative.  WARNING! FBA B communication is reserved for drive internal communication and should not be changed by user.
7534	PM Rx link fault	A communication fault on the Rx communication channel of a PM has been detected.	Check the event log for an auxiliary code. The code indicates which PM is affected. Check POF wiring to the PM (or replace). Check control hub daughter board (or replace). Replace the PM.
7538	Control hub missing PM	A PM in the converter does not send data to the control hub. This fault can be caused by a faulty Tx channel of a PM and /or by a bad fiber optic connection from the PM to the control hub.	Check the event log for an auxiliary code. The code indicates which PM is affected. Inspect corresponding power module (PEBBs). Check POF wiring to the PM (or replace). Check control hub daughter board (or replace). Replace the PM.
7539	Hub RX comm err	A communication error was detected in the control hub on the receiver from one power module (PM). This can be caused by a malfunction on the PM or the fiber optic connection from the PM to the hub.	Check the event log for an auxiliary code. The code indicates which PM is affected. Check POF wiring to the PM (or replace). Check control hub daughter board (or replace). Replace the PM.

Code (hex)	Fault	Cause	What to do
7540	CVMI2 communication lost	There is communication error between BCON and CVMI2 board.	Check communication wiring from BCU to CVMI2 board. Check power supply wiring of CVMI2 board. Replace the CVMI2 board. Aux code meaning (more than one bit can be 1 at the same time): From CVMI to BCON: bit0 =1 (0x1): No communication latched bit1 =1 (0x2): Link error (3 continuous data check errors) bit2 =1 (0x4): Communication error (data check error) bit4-3: Data Transmission Protocol state machine 00 = NO CONNECTION (Not initialized) 01 = ESTABLISHING CONNECTION 10 = CONNECTION ESTABLISHED From BCON to CVMI: bit12 =1 (0x1000): Communication error (data check error) bit13 =1 (0x2000): Link error (3 continuous data check errors) bit14 =1 (0x4000): No communication latched bit15 =1 (0x8000): Data type is recognized and correct.
7582	MF comm loss Programmable fault: 60.09 M/F comm loss function	Master/follower communication is lost.	See A7CB MF comm loss (page 352).
FF7E	Follower	A follower drive has tripped.	Check the auxiliary code. Add 2 to the code to find out the node address of the faulted drive. Correct the fault in the follower drive.
80A0	AI supervision Programmable fault: 12.03 AI supervision function	An analog signal is outside the limits specified for the analog input.	Check signal level at the analog input. Check the wiring connected to the input. Check the minimum and maximum limits of the input in parameter group 12 Standard AI.
80B0	Signal supervision (Editable message text) Programmable fault: 32.06 Supervision 1 action	Fault generated by the signal supervision 1 function.	Check the source of the fault (parameter 32.07 Supervision 1 signal).
80B1	Signal supervision 2 (Editable message text) Programmable fault: 32.16 Supervision 2 action	Fault generated by the signal supervision 2 function.	Check the source of the fault (parameter 32.17 Supervision 2 signal).
80B2	Signal supervision 3 (Editable message text) Programmable fault: 32.26 Supervision 3 action	Fault generated by the signal supervision 3 function.	Check the source of the fault (parameter 32.27 Supervision 3 signal).

Code (hex)	Fault	Cause	What to do
9081	External fault 1 (Editable message text) Programmable fault: 31.01 External event 1 source 31.02 External event 1 type	Fault in external device 1.	Check the external device. Check setting of parameter 31.01 External event 1 source .
9082	External fault 2 (Editable message text) Programmable fault: 31.03 External event 2 source 31.04 External event 2 type	Fault in external device 2.	Check the external device. Check setting of parameter 31.03 External event 2 source .
9083	External fault 3 (Editable message text) Programmable fault: 31.05 External event 3 source 31.06 External event 3 type	Fault in external device 3.	Check the external device. Check setting of parameter 31.05 External event 3 source .
9084	External fault 4 (Editable message text) Programmable fault: 31.07 External event 4 source 31.08 External event 4 type	Fault in external device 4.	Check the external device. Check setting of parameter 31.07 External event 4 source .
9085	External fault 5 (Editable message text) Programmable fault: 31.09 External event 5 source 31.10 External event 5 type	Fault in external device 5.	Check the external device. Check setting of parameter 31.09 External event 5 source .
D101	Charging count	There are too many DC link charging attempts.	Two attempts in Par 82.92 s is allowed to prevent DC capacitor overheating.
E100	Trafo phase U1 overtemperature	The winding temperature of the indicated transformer primary phase has exceeded the temperature limit.	Check cooling of the transformer (door air inlet filter pads, fan operation). Check overload settings for the transformer (contact your local ABB representative).
E101	Trafo phase V1 overtemperature	The winding temperature of the indicated transformer primary phase has exceeded the temperature limit.	Check cooling of the transformer (door air inlet filter pads, fan operation). Check overload settings for the transformer (contact your local ABB representative).
E102	Trafo phase W1 overtemperature	The winding temperature of the indicated transformer primary phase has exceeded the temperature limit.	Check cooling of the transformer (door air inlet filter pads, fan operation). Check overload settings for the transformer (contact your local ABB representative).
E103	Ambient overtemperature	The air inlet temperature of the inverter unit has exceeded the maximum converter ambient temperature.	Check and improve the cooling of the electric room where converter is placed.
E104	IO Controller hardware configuration error	IO controller module doesn't match with the program hardware configuration.	Check actual hardware IO modules. Refresh 81.09 IO Controller configuration refresh to configure correct modules.

Code (hex)	Fault	Cause	What to do
E105	AC500 communication error	AC500 has detected communication errors between BCU and AC500 communication link.	Check Modbus cable. Check FSCA-01 module.
E106	Converter space heater overload fault	Converter space heater has been detected based on monitoring of the digital signal.	Check if the space heater short circuit or overload. Check setting of the parameter 81.21 Converter space heater monitoring .
E107	Motor space heater overload fault	Motor space heater has been detected based on monitoring of the digital signal.	Check if the space heater short circuit or overload. Check setting of the parameter 81.22 Motor space heater monitoring .
E108	AC500 communication fault	The watchdog supervision of the communication link between BCU and AC500 has detected a communication failure.	Check Modbus cable. Check FSCA-01 module. Check setting of parameter groups 54 FBA B settings , 55 FBA B data in and 56 FBA B data out (changes allowed only by ABB authorized personnel). Note: Make sure that up to maximum of two fieldbus extension modules are used on the BCU.
E109	MCB not available	MCB available signal is missing.	Check MCB available signal. Check setting of parameters: 82.40 MCB available monitoring , 82.42 MCB available Grp+Indx , 82.43 MCB available BitNum .
E10A	MCB external protection	MCB external protection is active.	Check MCB external protection signal. Check setting of parameters: 82.50 MCB external protection monitoring , 82.52 MCB external protection Grp+Indx , 82.53 MCB external protection BitNum .
E10B	MCB ON inhibited	MCB ON inhibition is active.	Check MCB ON inhibition signal. Check setting of parameters: 82.45 MCB ON inhibition monitoring , 82.47 MCB ON inhibition Grp+Indx , 82.48 MCB ON inhibition BitNum .
E10C	TRU cooling fan 1 overload	Temperature relay integrated in TRU cooling fan 1 has opened.	Check wiring of fan 1 temperature contacts (open circuit, loose terminals). Check if fan is mechanically blocked or makes excessive noise (bearing problem).
E10D	TRU cooling fan 2 overload	Temperature relay integrated in TRU cooling fan 2 has opened.	Check wiring of fan 2 temperature contacts (open circuit, loose terminals). Check if fan is mechanically blocked or makes excessive noise (bearing problem).

Code (hex)	Fault	Cause	What to do
E10E	TRU cooling fan 3 overload	Temperature relay integrated in TRU cooling fan 3 has opened.	Check wiring of fan 3 temperature contacts (open circuit, loose terminals). Check if fan is mechanically blocked or makes excessive noise (bearing problem).
E10F	Control supply failure	Control supply failure has been detected based on monitoring of the digital signal.	Check the control supply failure signal. Check setting of the parameter 81.10 Control supply monitoring .
E110	DC link charging timeout	DC link voltage has not reached the expected value after MCB has been closed.	Check fuses on all PMs. Check transformer connection to the grid. Check PM SW version and update if required.
E111	TRU cooling fan 4 overload	Temperature relay integrated in TRU cooling fan 4 has opened.	Check wiring of fan 4 temperature contacts (open circuit, loose terminals). Check if fan is mechanically blocked or makes excessive noise (bearing problem).
E113	INU cooling fan 1 overload	Temperature relay integrated in INU cooling fan 1 has opened.	Check wiring of fan 1 temperature contacts (open circuit, loose terminals). Check if fan is mechanically blocked or makes excessive noise (bearing problem).
E114	MCB control fault	MCB close command and MCB close feedback do not match.	Check if MCB has tripped on its own, by means of short circuit protection relay or overload protection relay and adapt MCB protection relay settings if required. Check MCB control wiring between ACS580MV and MCB.
E115	INU cooling fan 2 overload	Temperature relay integrated in INU cooling fan 2 has opened.	Check wiring of fan 2 temperature contacts (open circuit, loose terminals). Check if fan is mechanically blocked or makes excessive noise (bearing problem).
E116	INU cooling fan 3 overload	Temperature relay integrated in INU cooling fan 3 has opened.	Check wiring of fan 3 temperature contacts (open circuit, loose terminals). Check if fan is mechanically blocked or makes excessive noise (bearing problem).
E118	INU door not closed	During charging or operation of the drive, the inverter unit door lock sensor has reported that the door is not closed.	Close the inverter unit door. Check internal wiring of the door lock signals (open circuits, loose terminals).
E119	MCB discrepancy	MCB open feedback signal and MCB close feedback signal are active at the same time.	Check MCB control feedback signals wiring (open circuit, loose terminals).
E11A	INU cooling fan 4 overload	Temperature relay integrated in INU cooling fan 4 has opened.	Check wiring of fan 4 temperature contacts (open circuit, loose terminals). Check if fan is mechanically blocked or makes excessive noise (bearing problem).

Code (hex)	Fault	Cause	What to do
E11C	INU door not locked	During charging or operation of the drive, the inverter unit door lock has reported that the door is not locked.	Lock the inverter unit door. Check internal wiring of the door lock signals (open circuits, loose terminals).
E11D	Transformer temperature sensor failure	The winding temperature of the indicated transformer primary phase has exceeded internal fault level.	Check the auxiliary code. The code specifies the affected transformer primary phase as follows: 01: U1 02: V1 03: W1 04: U1 and V1 05: V1 and W1 06: U1 and W1 07: U1, V1 and W1. Check winding temperature sensor wiring for the indicated transformer primary phase.
E123	Motor phase U1 overtemperature	The winding temperature of the indicated motor phase has exceeded the temperature limit.	Check cooling of the motor. Check fault limit setting for the motor temperature 84.03 Motor winding phase U1 fault limit .
E124	Motor phase V1 overtemperature	The winding temperature of the indicated motor phase has exceeded the temperature limit.	Check cooling of the motor. Check fault limit setting for the motor temperature 84.06 Motor winding phase V1 fault limit .
E125	Motor phase W1 overtemperature	The winding temperature of the indicated motor phase has exceeded the temperature limit.	Check cooling of the motor. Check fault limit setting for the motor temperature 84.09 Motor winding phase W1 fault limit .
E126	Motor phase U2 overtemperature	The winding temperature of the indicated motor phase has exceeded the temperature limit.	Check cooling of the motor. Check fault limit setting for the motor temperature 84.12 Motor winding phase U2 fault limit .
E127	Motor phase V2 overtemperature	The winding temperature of the indicated motor phase has exceeded the temperature limit.	Check cooling of the motor. Check fault limit setting for the motor temperature 84.15 Motor winding phase V2 fault limit .
E128	Motor phase W2 overtemperature	The winding temperature of the indicated motor phase has exceeded the temperature limit.	Check cooling of the motor. Check fault limit setting for the motor temperature 84.18 Motor winding phase W2 fault limit .

Code (hex)	Fault	Cause	What to do
E129	Motor DE bearing overtemperature	The DE bearing temperature of the motor has exceeded the temperature limit.	Check cooling of the motor. Check fault limit setting for the motor temperature 84.21 Motor DE bearing temperature fault limit .
E12A	Motor NDE bearing overtemperature	The NDE bearing temperature of the motor has exceeded the temperature limit.	Check cooling of the motor. Check fault limit setting for the motor temperature 84.24 Motor NDE bearing temperature fault limit .
E130	Motor phase U1 temperature sensor failure	The winding temperature of the indicated motor phase has exceeded internal fault level.	Check winding temperature sensor wiring of the indicated motor phase.
E131	Motor phase V1 temperature sensor failure	The winding temperature of the indicated motor phase has exceeded internal fault level.	Check winding temperature sensor wiring of the indicated motor phase.
E132	Motor phase W1 temperature sensor failure	The winding temperature of the indicated motor phase has exceeded internal fault level.	Check winding temperature sensor wiring of the indicated motor phase.
E133	Motor phase U2 temperature sensor failure	The winding temperature of the indicated motor phase has exceeded internal fault level.	Check winding temperature sensor wiring of the indicated motor phase.
E134	Motor phase V2 temperature sensor failure	The winding temperature of the indicated motor phase has exceeded internal fault level.	Check winding temperature sensor wiring of the indicated motor phase.
E135	Motor phase W2 temperature sensor failure	The winding temperature of the indicated motor phase has exceeded internal fault level.	Check winding temperature sensor wiring of the indicated motor phase.
E136	Motor DE bearing temperature sensor failure	The DE bearing temperature has exceeded internal fault level.	Check temperature sensor wiring of the DE bearing.
E137	Motor NDE bearing temperature sensor failure	The NDE bearing temperature has exceeded internal fault level.	Check temperature sensor wiring of the NDE bearing.
E140	MSS control fault	MSS command and MSS feedback do not match.	Check if MSS has tripped on its own, by means of short circuit protection relay or overload protection relay and adapt MSS protection relay settings if required. Check MB control wiring between ACS580MV and MSS.

Code (hex)	Fault	Cause	What to do
E141	MB control fault	MB command and MB feedback do not match.	Check if MB has tripped on its own, by means of short circuit protection relay or overload protection relay and adapt MB protection relay settings if required. Check MB control wiring between ACS580MV and MB.
E143	Bypass contactor control fault	Command and feedback of contactor do not match.	Check if contactor has tripped on its own, by means of short circuit protection relay or overload protection relay and adapt contactor protection relay settings if required. Check contactor control wiring between ACS580MV and contactor.
E144	Inductor overtemperature	The inductor temperature has exceeded the temperature limit.	Check cooling of the inductor.
E145	Inductor temperature rising overhigh	Inductor temperature rising relative to ambient temperature has exceeded the temperature rising limit.	Check cooling of the inductor.
E146	Voltage transducer sensor failure	The measured RMS voltage of the grid or drive output for SBU has exceeded internal fault level.	Check the auxiliary code, the code specifies affected measuring sensor as follows: 01: Grid voltage 02: Drive output voltage 04: Grid and drive output voltages Check the voltage sensor wiring for the indicated place. Check MCR-VAC-UI-0-DC board.
E147	Inductor temperature sensor failure	The temperature of the inductor has exceeded internal fault level.	Check the wiring of the inductor temperature sensor.
FA90	STO diagnostics failure	This fault is triggered by internal diagnostic. Look at auxiliary code of this fault: Aux code = 1: The check sum verification in specified memory failed. Aux code = 2: The watchdog are triggered. Some timer function which should be reset in 2ms time level are not executed as expected. Possible causes: - CPU load is too high. Some tasks are not executed in specified time. - BCON board is broken.	Check signal of 7.11 Cpu usage. If it is very high, Contact your local ABB representative. Replace BCON board if the control board is broken.
FB11	Memory unit missing	No memory unit is attached to the control unit.	Power down the control unit. Check that the memory unit is properly inserted into the control unit.
		The memory unit attached to the control unit is empty.	Power down the control unit. Attach a memory unit (with the appropriate firmware) to the control unit.

Code (hex)	Fault	Cause	What to do
FB12	Memory unit incompatible	The memory unit attached to the control unit is incompatible.	Power down the control unit. Attach a compatible memory unit.
FB13	Memory unit FW incompatible	The firmware on the attached memory unit is incompatible with the drive.	Power down the control unit. Attach a memory unit with compatible firmware.
FB14	Memory unit FW load failed	The firmware on the attached memory unit could not be loaded to the drive.	Power down the control unit. Check that the memory unit is properly inserted into the control unit. If the problem persists, replace the memory unit.
FF81	FB A force trip	A fault trip command has been received through fieldbus adapter A.	Check the fault information provided by the PLC (overriding system).

8

Fieldbus control through a fieldbus adapter

What this chapter contains

This chapter describes how the drive can be controlled by external devices over a communication network (fieldbus) through an optional fieldbus adapter module.

The fieldbus control interface of the drive is described first, followed by a configuration example.

System overview

The drive can be connected to an external control system through an optional fieldbus adapter mounted onto the control unit of the drive. The drive actually has two independent interfaces for fieldbus connection, called “fieldbus adapter A” () and “fieldbus adapter B” (FBA B).



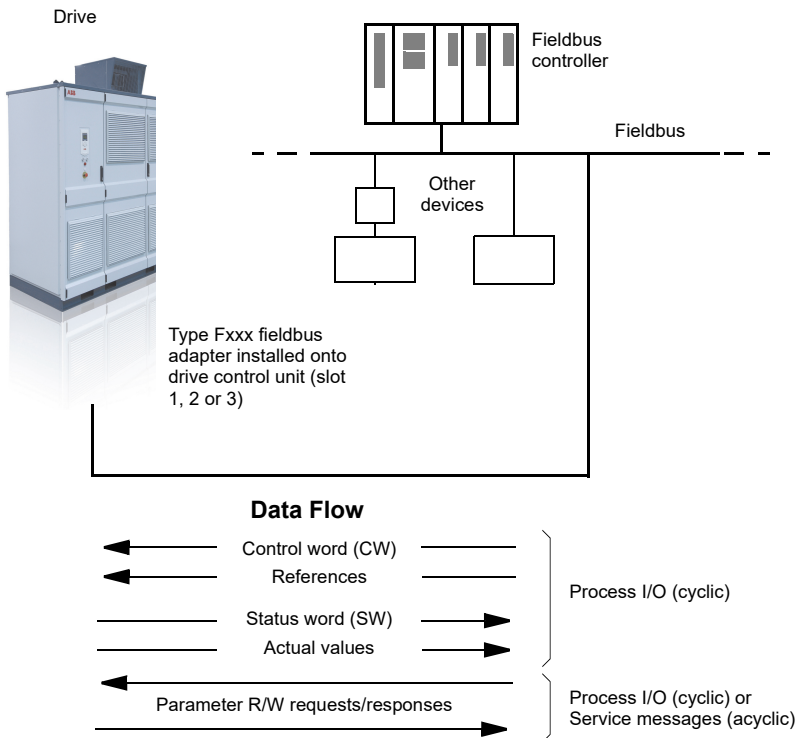
WARNING! Fieldbus adapter B (FBA B) is used for drive internal communication and therefore is not available for external communication. Parameters related to FBA B should not be changed by user.

The drive can be configured to receive all of its control information through the fieldbus interface, or the control can be distributed between the fieldbus interface and other available sources such as digital and analog inputs, depending on how control locations EXT1 and EXT2 are configured.

Fieldbus adapters are available for various communication systems and protocols, for example

- PROFIBUS DP (FPBA-01 adapter)
- CANopen (FCAN-01 adapter)
- DeviceNet (FDNA-01 adapter)
- EtherNet/IP™ (FENA-11 adapter)
- EtherCAT® (FECA-01 adapter).

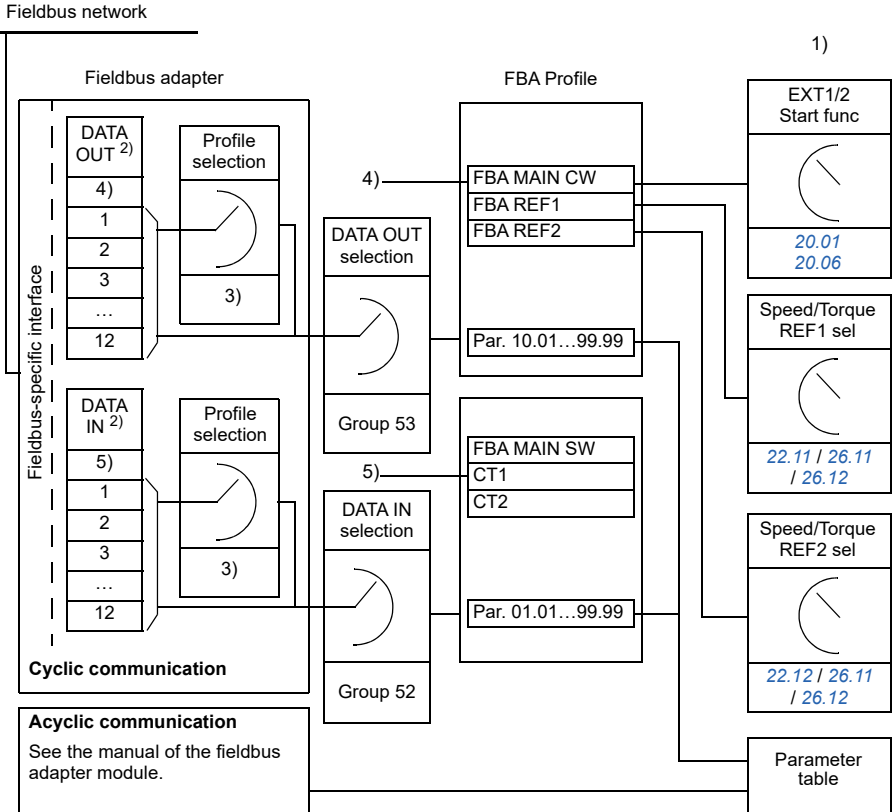
Note: The text and examples in this chapter describe the configuration of the fieldbus adapter () by parameters [50.01...50.21](#) and parameter groups 51...53.



Basics of the fieldbus control interface

The cyclic communication between a fieldbus system and the drive consists of 16- or 32-bit input and output data words. The drive is able to support a maximum of 12 data words (16 bits) in each direction.

Data transmitted from the drive to the fieldbus controller is defined by parameters [52.01 data in1](#) ... [52.12 data in12](#). The data transmitted from the fieldbus controller to the drive is defined by parameters [53.01 data out1](#) ... [53.12 data out12](#).



- 1) See also other parameters which can be controlled from fieldbus.
- 2) The maximum number of data words used is protocol-dependent.
- 3) Profile/instance selection parameters. Fieldbus module specific parameters. For more information, see the *User's Manual* of the appropriate fieldbus adapter module.
- 4) With DeviceNet, the control part is transmitted directly.
- 5) With DeviceNet, the actual value part is transmitted directly.

■ Control word and Status word

The Control word is the principal means for controlling the drive from a fieldbus system. It is sent by the fieldbus master station to the drive through the adapter module. The drive switches between its states according to the bit-coded instructions in the Control word, and returns status information to the master in the Status word.

The contents of the Control word and the Status word are detailed on pages [389](#) and [390](#) respectively. The drive states are presented in the state diagram (page [391](#)).

Debugging the network words

If parameter [50.12 debug mode](#) is set to *Enable*, the Control word received from the fieldbus is shown by parameter [50.13 control word](#), and the Status word transmitted to the fieldbus network by [50.16 status word](#). This “raw” data is very useful to determine if the fieldbus master is transmitting the correct data before handing control to the fieldbus network.

References

References are 16-bit words containing a sign bit and a 15-bit integer. A negative reference (indicating reversed direction of rotation) is formed by calculating the two's complement from the corresponding positive reference.

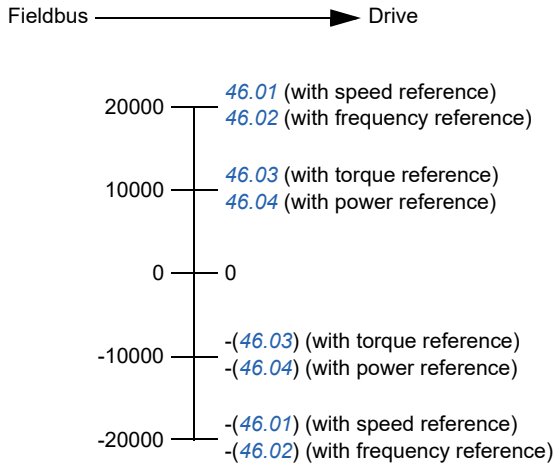
ABB drives can receive control information from multiple sources including analog and digital inputs, the drive control panel and a fieldbus adapter module. In order to have the drive controlled through the fieldbus, the module must be defined as the source for control information such as reference. This is done using the source selection parameters in groups [22 Speed reference selection](#), [26 Torque reference chain](#) and [28 Frequency reference chain](#).

Debugging the network words

If parameter [50.12 debug mode](#) is set to [Enable](#), the references received from the fieldbus are displayed by [50.14 reference 1](#) and [50.15 reference 2](#).

Scaling of references

The references are scaled as defined by parameters [46.01...46.04](#); which scaling is in use depends on the setting of [50.04 ref1 type](#) and [50.05 ref2 type](#).



The scaled references are shown by parameters [03.05 FB A reference 1](#) and [03.06 FB A reference 2](#).

■ **Actual values**

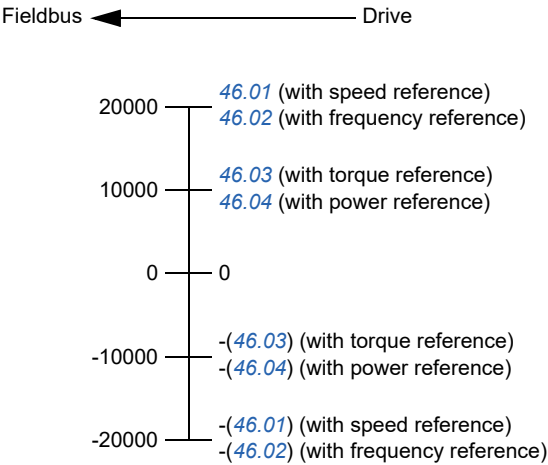
Actual values are 16-bit words containing information on the operation of the drive. The types of the monitored signals are selected by parameters *50.07 actual 1 type* and *50.08 actual 2 type*.

Debugging the network words

If parameter *50.12 debug mode* is set to *Enable*, the actual values sent to the fieldbus are displayed by *50.17 actual value 1* and *50.18 actual value 2*.

Scaling of actual values

The actual values are scaled as defined by parameters *46.01...46.04*; which scaling is in use depends on the setting of parameters *50.07 actual 1 type* and *50.08 actual 2 type*.



■ Contents of the fieldbus Control word

The upper case boldface text refers to the states shown in the state diagram (page 391).

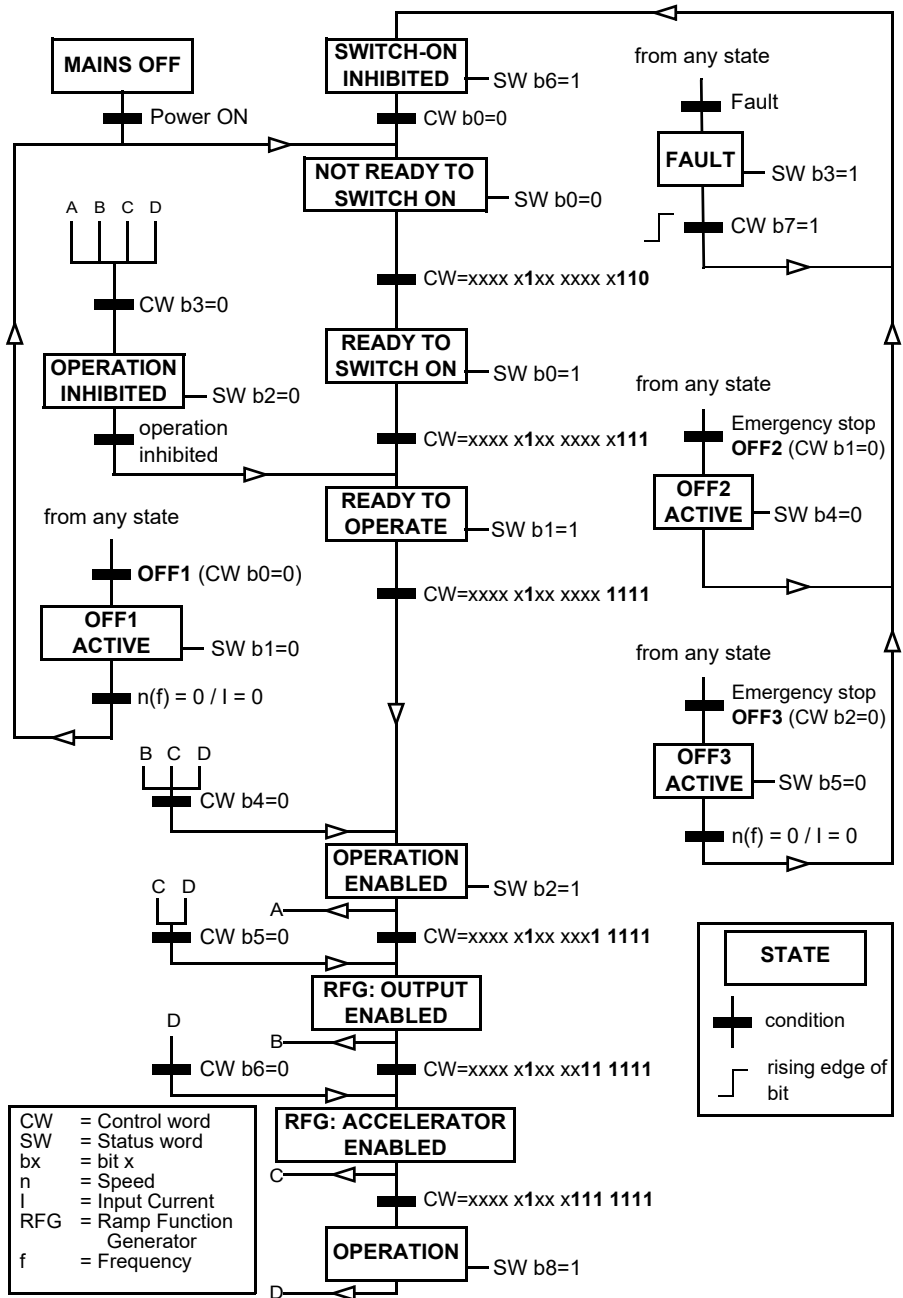
Bit	Name	Value	STATE/Description
0	Off1 control	1	Proceed to READY TO OPERATE .
		0	Stop along currently active deceleration ramp. Proceed to OFF1 ACTIVE ; proceed to READY TO SWITCH ON unless other interlocks (OFF2, OFF3) are active.
1	Off2 control	1	Continue operation (OFF2 inactive).
		0	Emergency OFF, coast to a stop. Proceed to OFF2 ACTIVE , proceed to SWITCH-ON INHIBITED .
2	Off3 control	1	Continue operation (OFF3 inactive).
		0	Emergency stop, stop within time defined by drive parameter. Proceed to OFF3 ACTIVE ; proceed to SWITCH-ON INHIBITED .  WARNING: Ensure motor and driven machine can be stopped using this stop mode.
3	Run	1	Proceed to OPERATION ENABLED . Note: Run enable signal must be active. If the drive is set to receive the Run enable signal from the fieldbus, this bit activates the signal.
		0	Inhibit operation. Proceed to OPERATION INHIBITED .
4	Ramp out zero	1	Normal operation. Proceed to RAMP FUNCTION GENERATOR: OUTPUT ENABLED .
		0	Force Ramp function generator output to zero. The drive will immediately decelerate to zero speed (observing the torque limits).
5	Ramp hold	1	Enable ramp function. Proceed to RAMP FUNCTION GENERATOR: ACCELERATOR ENABLED .
		0	Halt ramping (Ramp Function Generator output held).
6	Ramp in zero	1	Normal operation. Proceed to OPERATING . Note: This bit is effective only if the fieldbus interface is set as the source for this signal by drive parameters.
		0	Force Ramp function generator input to zero.
7	Reset	0=>1	Fault reset if an active fault exists. Proceed to SWITCH-ON INHIBITED . Note: This bit is effective only if the fieldbus interface is set as the source of the reset signal by drive parameters.
		0	Continue normal operation.
8	Inching 1	1	Accelerate to inching (jogging) setpoint 1. Notes: • Bits 4...6 must be 0. • See also section Jogging (page 38).
		0	Inching (jogging) 1 disabled.
9	Inching 2	1	Accelerate to inching (jogging) setpoint 2. See notes at bit 8.
		0	Inching (jogging) 2 disabled.
10	Remote cmd	1	Fieldbus control enabled.
		0	Control word and reference not getting through to the drive, except for bits 0...2.
11	Ext ctrl loc	1	Select External Control Location EXT2. Effective if control location is parameterized to be selected from fieldbus.
		0	Select External Control Location EXT1. Effective if control location is parameterized to be selected from fieldbus.
12 to 15	Reserved.		

■ Contents of the fieldbus Status word

The upper case boldface text refers to the states shown in the state diagram (page 391).

Bit	Name	Value	STATE/Description
0	Ready to switch ON	1	READY TO SWITCH ON.
		0	NOT READY TO SWITCH ON.
1	Ready run	1	READY TO OPERATE.
		0	OFF1 ACTIVE.
2	Ready ref	1	OPERATION ENABLED.
		0	OPERATION INHIBITED.
3	Tripped	1	FAULT.
		0	No fault.
4	Off 2 inactive	1	OFF2 inactive.
		0	OFF2 ACTIVE.
5	Off 3 inactive	1	OFF3 inactive.
		0	OFF3 ACTIVE.
6	Switch-on inhibited	1	SWITCH-ON INHIBITED.
		0	–
7	Warning	1	Warning active.
		0	No warning active.
8	At setpoint	1	OPERATING. Actual value equals reference = is within tolerance limits (see parameters 46.21...46.23).
		0	Actual value differs from reference = is outside tolerance limits.
9	Remote	1	Drive control location: REMOTE (EXT1 or EXT2).
		0	Drive control location: LOCAL.
10	User bit 4	-	See parameter 06.29 MSW bit 10 sel. (Default value is above limit)
11	User bit 0	-	See parameter 06.30 MSW bit 11 sel.
12	User bit 1	-	See parameter 06.31 MSW bit 12 sel.
13	User bit 2	-	See parameter 06.32 MSW bit 13 sel.
14	User bit 3	-	See parameter 06.33 MSW bit 14 sel.
15	Reserved		

The state diagram



Setting up the drive for fieldbus control

1. Install the fieldbus adapter module mechanically and electrically according to the instructions given in the *User's manual* of the module.
 2. Power up the drive.
 3. Enable the communication between the drive and the fieldbus adapter module with parameter [50.01 enable](#).
 4. With [50.02 comm loss func](#), select how the drive should react to a fieldbus communication break.
Note: This function monitors both the communication between the fieldbus master and the adapter module and the communication between the adapter module and the drive.
 5. With [50.03 comm loss t out](#), define the time between communication break detection and the selected action.
 6. Select application-specific values for the rest of the parameters in group [50 Fieldbus adapter \(FBA\)](#), starting from [50.04](#). Examples of appropriate values are shown in the tables below.
 7. Set the fieldbus adapter module configuration parameters in group [51 FBA A settings](#). As a minimum, set the required node address and the control profile.
 8. Define the process data transferred to and from the drive in parameter groups [52 FBA A data in](#) and [53 FBA A data out](#).
Note: Depending on the communication protocol and profile being used, the Control word and Status word may already be configured to be sent/received by the communication system.
 9. Save the valid parameter values to permanent memory by setting parameter [96.07 Parameter save manually](#) to [Save](#).
 10. Validate the settings made in parameter groups 51, 52 and 53 by setting parameter [51.27 par refresh](#) to [Refresh](#).
 11. Configure control locations EXT1 and EXT2 to allow control and reference signals to come from the fieldbus. Examples of appropriate values are shown in the tables below.
-

■ Parameter setting example: FPBA (PROFIBUS DP)

This example shows how to configure a basic speed control application that uses the PROFIdrive communication profile with PPO Type 2. The start/stop commands and reference are according to the PROFIdrive profile, speed control mode.

The reference values sent over the fieldbus have to be scaled within the drive so they have the desired effect. The reference value ± 16384 (4000h) corresponds to the range of speed set in parameter [46.01 Speed scaling](#) (both forward and reverse directions). For example, if [46.01](#) is set to 480 rpm, then 4000h sent over fieldbus will request 480 rpm.

Direction	PZD1	PZD2	PZD3	PZD4	PZD5	PZD6
Out	Control word	Speed reference	Acc time 1		Dec time 1	
In	Status word	Speed actual value	Motor current		DC voltage	

The table below gives the recommended drive parameter settings.

Drive parameter	Setting for ACS880 drives	Description
50.01 enable	1...3 = [slot number]	Enables communication between the drive and the fieldbus adapter module.
50.04 ref1 type	4 = <i>Speed</i>	Selects the fieldbus A reference 1 type and scaling.
50.07 actual 1 type	0 = <i>Speed or frequency</i>	Selects the actual value type and scaling according to the currently active Ref1 mode defined in parameter 50.04 .
51.01 type	1 = FPBA ¹⁾	Displays the type of the fieldbus adapter module.
51.02 Node address	3 ²⁾	Defines the PROFIBUS node address of the fieldbus adapter module.
51.03 Baud rate	12000 ¹⁾	Displays the current baud rate on the PROFIBUS network in kbit/s.
51.04 MSG type	1 = PPO1 ¹⁾	Displays the telegram type selected by the PLC configuration tool.
51.05 Profile	0 = PROFIdrive	Selects the Control word according to the PROFIdrive profile (speed control mode).
51.07 RPBA mode	0 = Disabled	Disables the RPBA emulation mode.
52.01 FBA data in1	4 = SW 16bit ¹⁾	Status word
52.02 FBA data in2	5 = Act1 16bit	Actual value 1
52.03 FBA data in3	01.07 ²⁾	Motor current
52.05 FBA data in5	01.11 ²⁾	DC voltage
53.01 FBA data out1	1 = CW 16bit ¹⁾	Control word
53.02 FBA data out2	2 = Ref1 16bit	Reference 1 (speed)
53.03 FBA data out3	23.12 ²⁾	Acceleration time 1

Drive parameter	Setting for ACS880 drives	Description
53.05 FBA data out5	23.13 ²⁾	Deceleration time 1
<i>51.27 par refresh</i>	1 = Refresh	Validates the configuration parameter settings.
<i>19.12 Ext1 control mode</i>	2 = Speed	Selects speed control as the control mode 1 for external control location EXT1.
<i>20.01 Ext1 commands</i>	12 = Fieldbus A	Selects fieldbus adapter A as the source of the start and stop commands for external control location EXT1.
<i>20.02 Ext1 start trigger type</i>	1 = Level	Selects a level-triggered start signal for external control location EXT1.
<i>22.11 Speed ref1 source</i>	4 = FB A ref1	Selects fieldbus A reference 1 as the source for speed reference 1.

¹⁾ Read-only or automatically detected/set

²⁾ Example

■ The start sequence for the parameter example:

Control word:

- 477h (1143 decimal) -> READY TO OPERATE
- 47Fh (1151 decimal) -> OPERATING (Speed mode)
- 477h(1143 decimal) -> READY TO OPERATE (Stop command)

MCB can also be controlled by fieldbus. For example, in EXT1 control mode, RS485 communication and ABB enhanced profile are used, parameters are set as below:

- Par 82.20 MCB EXT1 commands = Comm.module
- Par53.1 FBA data out 1 (just example) = 82.1

One operating sequence example is like below:

- 476h (1142 decimal) -> READY TO SWITCH ON
- Set register 40004 = 1 in up-level PLC to close MCB.
- 477h (1143 decimal) -> READY TO OPERATE
- 47Fh (1151 decimal) -> OPERATING (Speed mode)
- 477h(1143 decimal) -> READY TO OPERATE (Stop command)
- 476h (1142 decimal) -> READY TO SWITCH ON
- Set register 40004 = 0 in up-level PLC to open MCB.

Note: Don't use 47E to stop, otherwise it would discharge the MCB.

9

Synchronized bypass function

What this chapter contains

This chapter describes the drive extension function of synchronized bypass unit (SBU) application.

Terms and abbreviations

Term	Definition
SBU	Synchronized Bypass Unit.
DCS	Distributed Control System.
DOL	Direct Online.
MB	Motor Breaker.
MSS	Motor Starting Switch.
PT	Potential Transformer.
VSD	Variable Speed Drive.

Overview

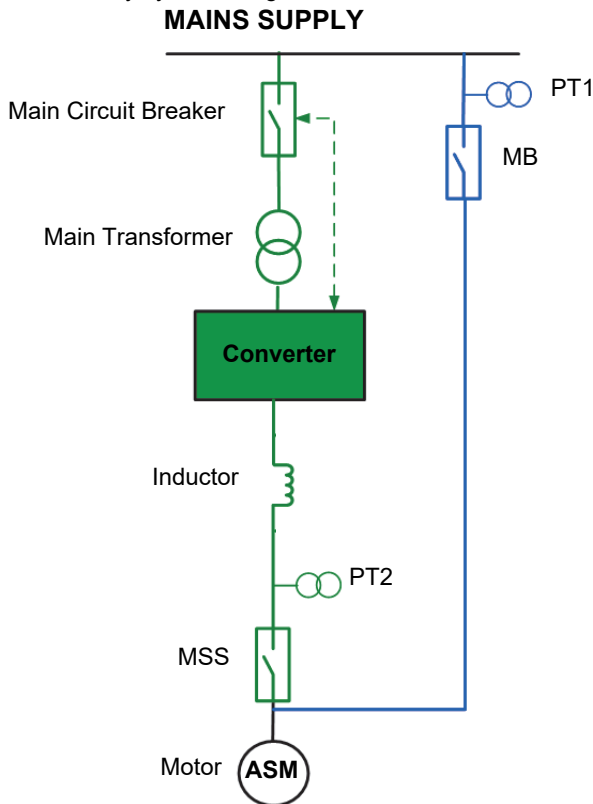
The SBU is used when motors have to be started in a weak network. In such a case the motors are accelerated to synchronous speed (nominal speed or frequency) via the converter with a predefined ramp, and afterwards they are connected direct online with a very short power interruption to the grid and motor.

The SBU function works with bumpless bypass or make before break mode, which are defined grid current shall be kept below nominal motor current of the starting motor during the starting and synchronization sequence.

Bumpless bypass (make before break) is working with decoupling inductor between converter and motor.

System setup

ACS580MV SBU function provides standard synchronization control for single motor solution. With this standard synchronization control, all the other functionalities like supporting multiple motors, breakers control and monitoring could be built either by ABB alternatives or by system integrators.



I/O device and signals

In SBU application, The I/O signals are connected to the ACS580MV drive by standard I/O devices and extension FIO-01 module.

The following table lists the signals that are provided to SBU function.

Device	I/O	Direct	Description
BCON	DI2	Input	Sync to mains mode selection command (enabled by 85.13 SBU control source is selected IOs control).
BCON	DI4	Input	Direct on line command (enabled by 85.13 SBU control source is selected IOs control).
BCON	DI6	Input	RSYC-01 board indicates frequency and phase matching
BCON	AI2	Input	RSYC-01 board adjusting signal BUF_OUT.
AC500 EMB P2	DI6	Input	Inductor bypass contactor feedback status CLOSED
AC500 Extension P0	AI0	Input	Grid voltage RMS measurement.
AC500 Extension P0	AI1	Input	Converter output voltage RMS measurement.
AC500 Extension P0	AI2	Input	Inductor temperature.
AC500 Extension P0	AO1	Output	Inductor temperature monitoring supply.
BCON FIO-01	DIO1	Input	MSS feedback status CLOSED
BCON FIO-01	DIO2	Input	MB feedback status CLOSED
BCON FIO-01	DIO3	Input/ Output	MSS OPEN command, or inductor bypass contactor CLOSE command
BCON FIO-01	DIO4	Input/ Output	MB OPEN command, or inductor bypass contactor OPEN command
BCON FIO-01	RO1	Output	MSS CLOSE command
BCON FIO-01	RO2	Output	MB CLOSE command

If SBU function is enabled by [85.11 SBU function enable](#), above signal interfaces are fixed except FIO-01 outputs, these four signals need to be configured by parameters.

SBU control

■ Sync to mains sequence

The synchronize to the mains function requires the drive output voltage and the grid voltage to be measured by voltage transformers. The measurements at the drive output and the grid side are inputs to the SBU cabinet related interface to determine the exact sync instant of the motor to the mains.

When drive works under sync mode, RSYC-01 board is used to adjust the difference of voltage frequency and angle between drive output and grid, and this board also indicates the frequency and phase is matching or not.

Drive BCU unit adjusts the difference of voltage RMS value between both.

After RSYC-01 board sends the frequency and phase matching signal, and the difference of the voltage RMS values is within the required limit, the MB breaker is closed first, and then the MSS breaker is opened, thus the sync to mains sequence is finished.



RSYC-01 board

■ VSD sequence

SBU function supports drive running on VSD mode.

From SBU system setup, MSS has to be closed and MB has to be opened before drive running on VSD mode.

Inductor bypass contactor is optional for customers. If customer has long term requirement of VSD running, It is better to bypass inductor for energy conservation.

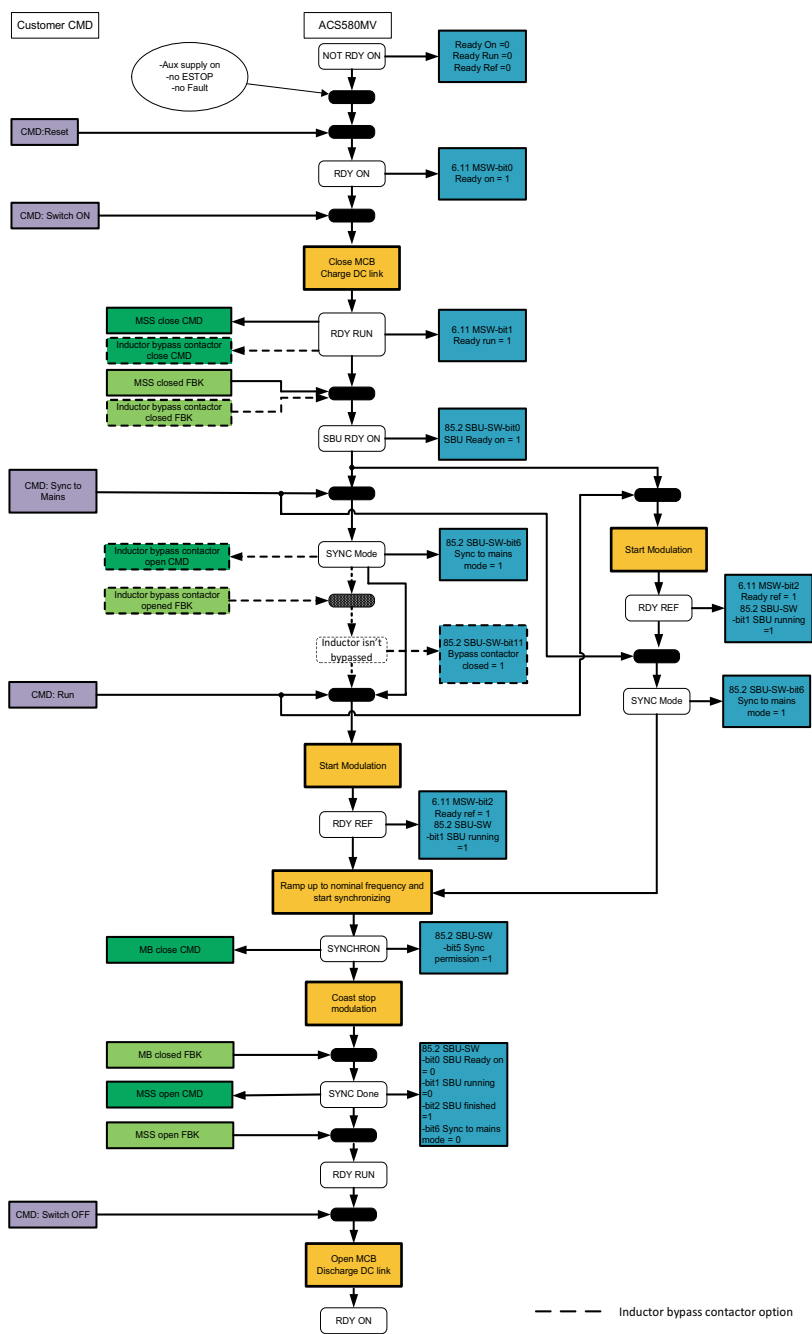
■ Reference chain

When sync mode is available, the speed or frequency reference is from [22.26 Constant speed 1](#) or [28.26 Constant frequency 1](#), which are selected by [22.22](#)

Constant speed sel1 and *28.22 Constant frequency sel1*. These four parameters are overridden by SBU function.

To make sure the correct reference chain is working on sync mode, user should confirm the *Speed reference source selection II* or *Reference selection for torque controller* carefully.

Start sequence of sync to mains



Parameter setting example

This example shows how to configure a SBU application. The start/stop commands and reference are according to the customer requirements.

The table below gives the recommended drive parameter settings.

Drive parameter	Setting for ACS580MV drives	Description
12.25 AI2 unit selection	V	Set unit to V
12.27 AI2 min	0 V	Set AI2 min value. Voltage range of RSYC-01 BUF OUT is 0~10V.
12.28 AI2 max	10 V	Set AI2 max value
16.01 Module 3 type	FIO-01	Select type of the extension module
16.02 Module 3 location	Slot 3	FIO-01 is installed on slot 3.
16.19 DIO3 function	Output	Select DIO3 as output. If two signals (open and close) are used for MSS control, this paramater needs to set.
16.21 DIO3 output source	P 85.2.14	MSS open command signal is from SBU function SW bit 14. If two signals (open and close) are used for MSS control, this paramater needs to set.
16.24 DIO4 function	Output	Select the DIO4 as the output. If two signals (open and close) are used for MB control, this paramater needs to set.
16.26 DIO4 output source	P 85.2.15	MB open command signal is from SBU function SW bit 15. If two signals (open and close) are used for MB control, this paramater needs to set.
16.34 RO1 source	P 85.2.12	MSS close command is from SBU function SW bit12.
16.37 RO2 source	P 85.2.13	MB close command is from SBU function SW bit13
19.11 Ext1/Ext2 selection	<i>EXT1</i>	Sync to main only works in external control (<i>EXT1</i> or <i>EXT2</i>).
20.01 Ext1 commands	<i>In1 Start; In2 Dir</i>	Select control commands source of external control location EXT1.
22.11 Speed ref1 source	<i>AI1 scaled</i>	Select speed reference source of external control location EXT1
20.24 Negative speed enable	<i>Not selected</i>	Disable negative speed
21.03 Stop mode	<i>Coast</i>	Select the way of motor stop.

Drive parameter	Setting for ACS580MV drives	Description
<i>28.11 Frequency ref1 source</i>	<i>AI1 scaled</i>	Select the speed reference source for external control location EXT1
<i>30.11 Minimum speed</i>	0	Define the minimum allowed motor speed
<i>30.12 Maximum speed</i>	2000 rpm	Define the maximum allowed motor speed. Maximum speed must be higher than motor nominal speed, so that converter output voltage frequency can be adjusted around the mains frequency.
<i>30.13 Minimum frequency</i>	0	Define the minimum allowed motor frequency
<i>30.14 Maximum frequency</i>	60 HZ	Define the maximum allowed motor frequency. Maximum frequency must be higher than motor nominal frequency, so that converter output voltage frequency can be adjusted around the mains frequency.
<i>85.05 Ratio of grid voltage transformer</i>	100	Define the ratio of grid PT (potential transformer). For example, if the ratio of PT is 11000V / 110V, set this value to 100. If the PT is provided by ABB, the type is RZL10 (11000V / 110V).
<i>85.06 Ratio of converter voltage transformer</i>	100	Define the ratio of converter PT (potential transformer).. For example, if the ratio of PT is 11000V/110V, set this value to 100. If the PT is provided by ABB, the type is RZL10 (11000V / 110V).
<i>85.11 SBU function enable</i>	<i>Enabled</i>	Enable SBU function.
<i>85.12 Motor control mode</i>	Single motor	If no marshallng PLC is selected (MSS, MB control signals are from FIO-01), set it to Single motor . In Single motormode , feedbacks of MSS and MB are monitored by BCU. If marshallng PLC is selected (MSS, MB control signals are from marshallng PLC), set it to Multi motor . In Multi motormode , feedbacks of MSS and MB are monitored by marshallng PLC, instead of BCU.

Drive parameter	Setting for ACS580MV drives	Description
<i>85.13 SBU control source</i>	<i>IOs control</i>	Select SBU control source. IOs control means: BCU DI2 0 [Symbol] 1, start Sync to main BCU DI4 1 [Symbol] 0, open MB (85.12 Motor control mode is Single motor and 82.20 MB open by direct online is Enabled). Fieldbus control means Sync to main and MB open command is from 85.1 SBU control and monitoring CW .
<i>85.14 MB control signal</i>	Steady signal	Select MB control signal. If it's pulse signal, pulse time is 3s.
<i>85.15 MSS control signal</i>	Steady signal	Select MSS control signal. If it's pulse signal, pulse time is 3s.
<i>85.20 MB open control by direct online</i>	<i>Disabled</i>	If it's enabled, 1 [Symbol] 0 of MB DOL command (BCU DI4, or 85.1 SBU control and monitoring CW bit 2) will open MB.
<i>97.40 Output choke inductance</i>	1.4 mH	Define the inductance of the output choke.

10

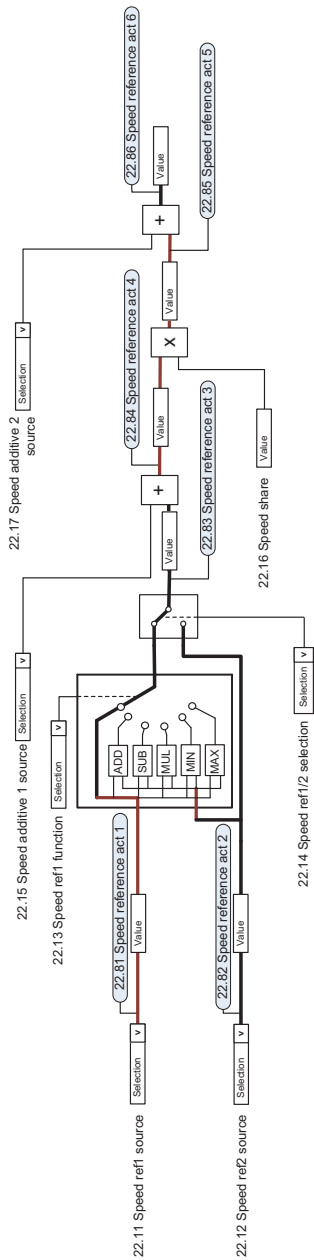
Control chain diagrams

What this chapter contains

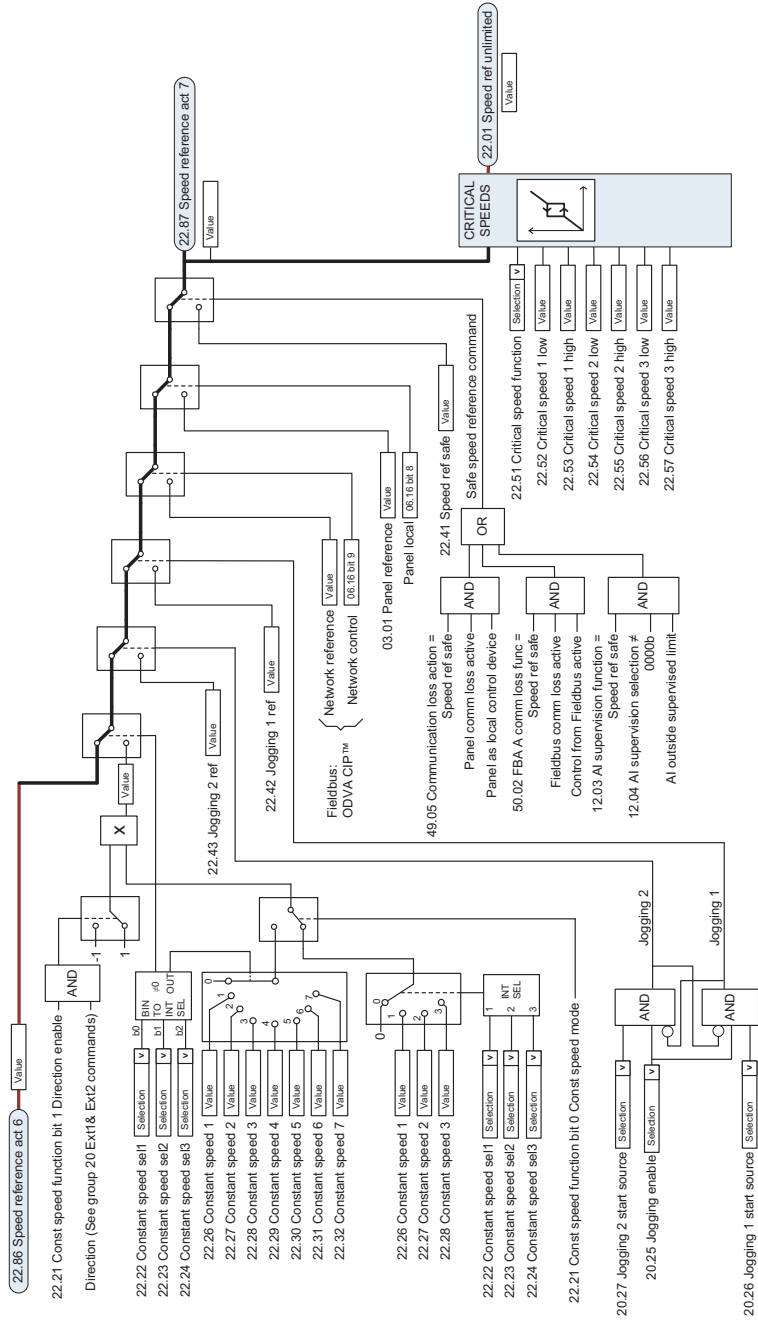
The chapter presents the reference chains of the drive. The control chain diagrams can be used to trace how parameters interact and where parameters have an effect within the drive parameter system.

For a more general diagram, see section [Operating modes of the drive](#) (page 20).

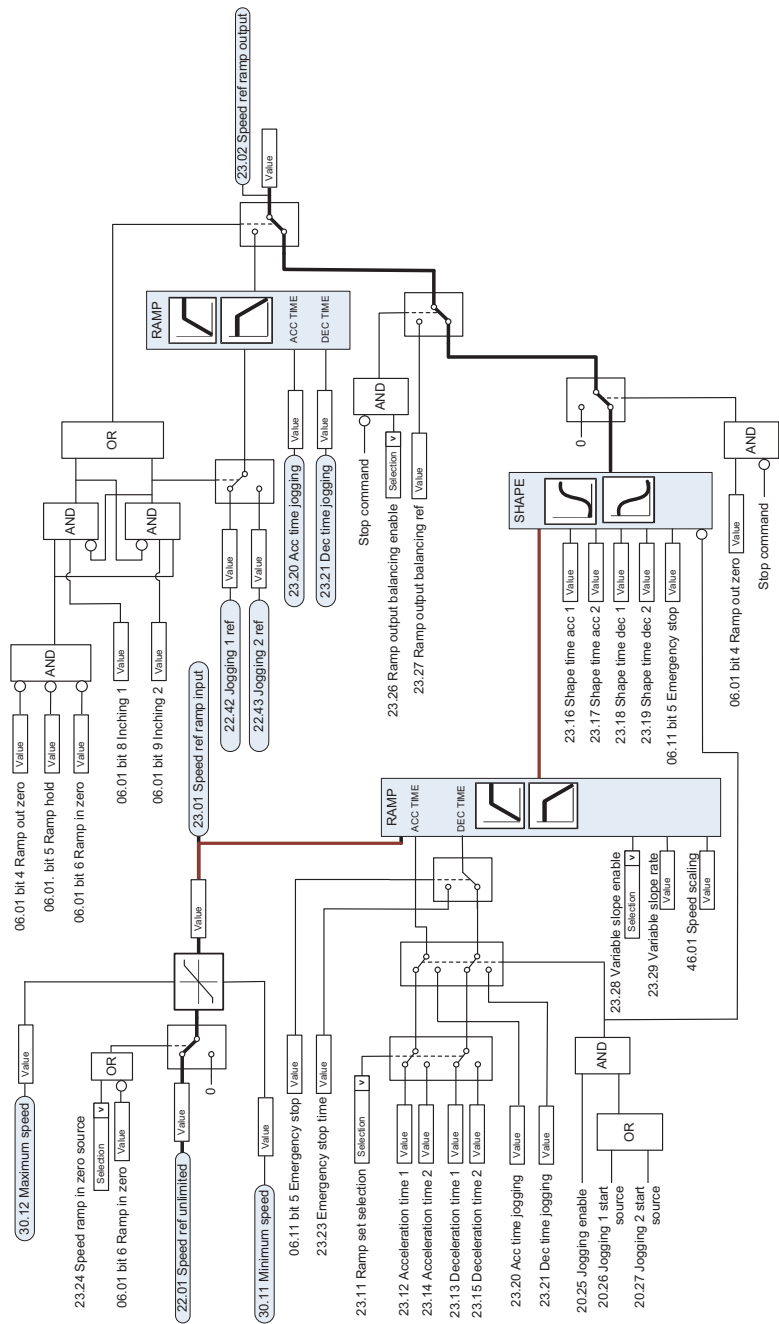
Speed reference source selection I



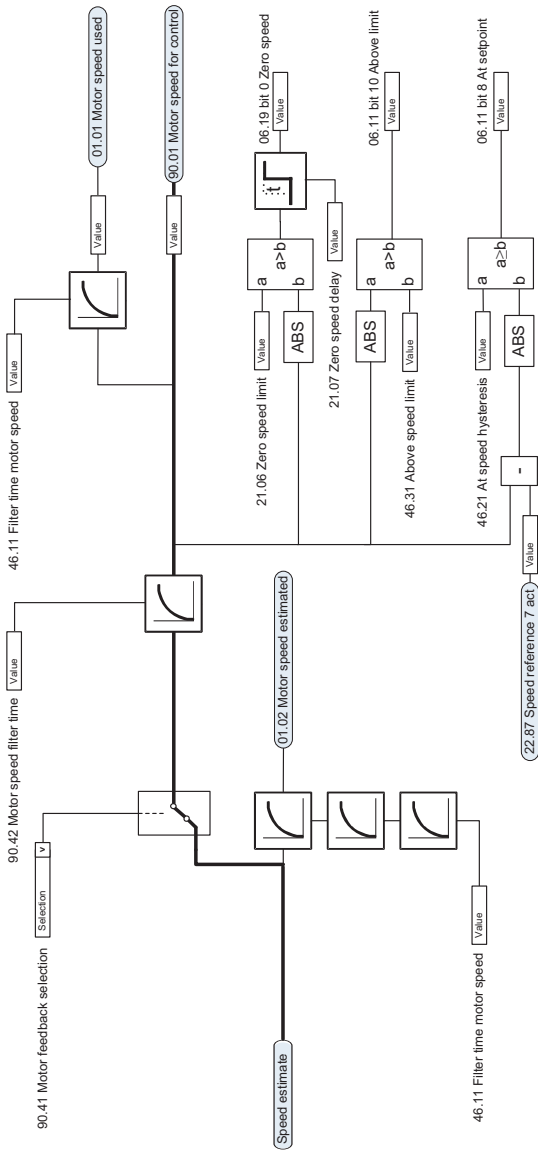
Speed reference source selection II



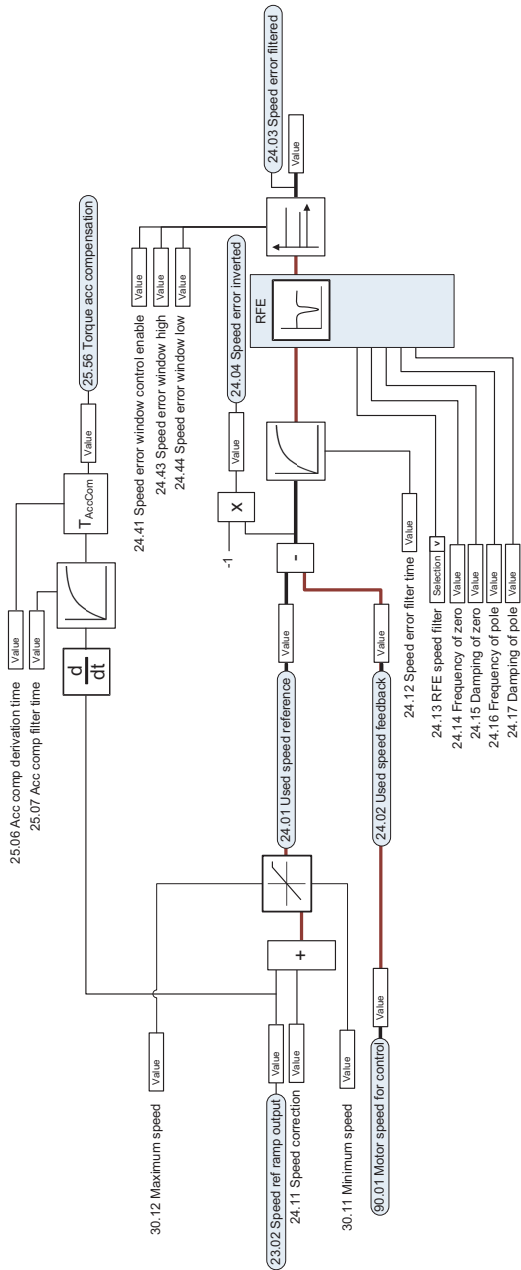
Speed reference ramping and shaping



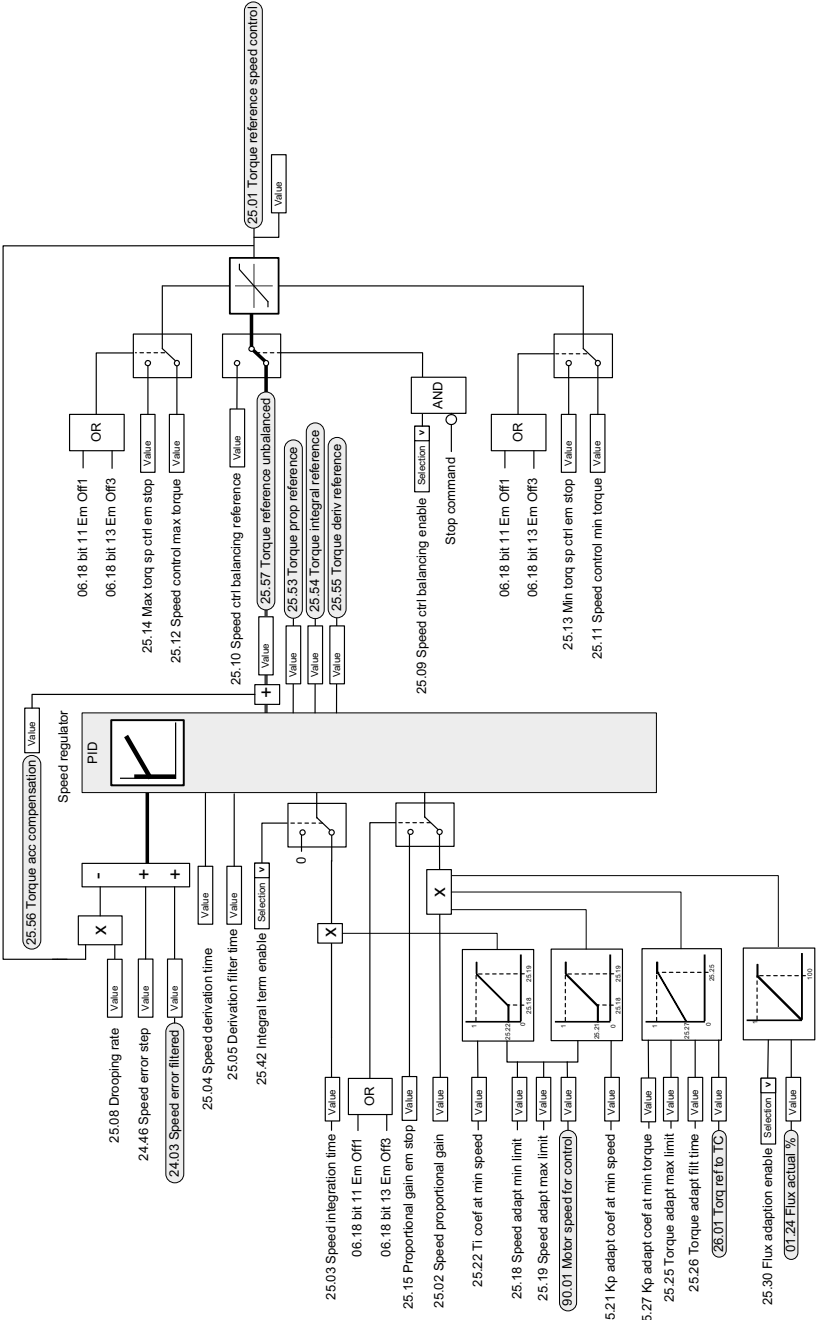
Motor feedback configuration



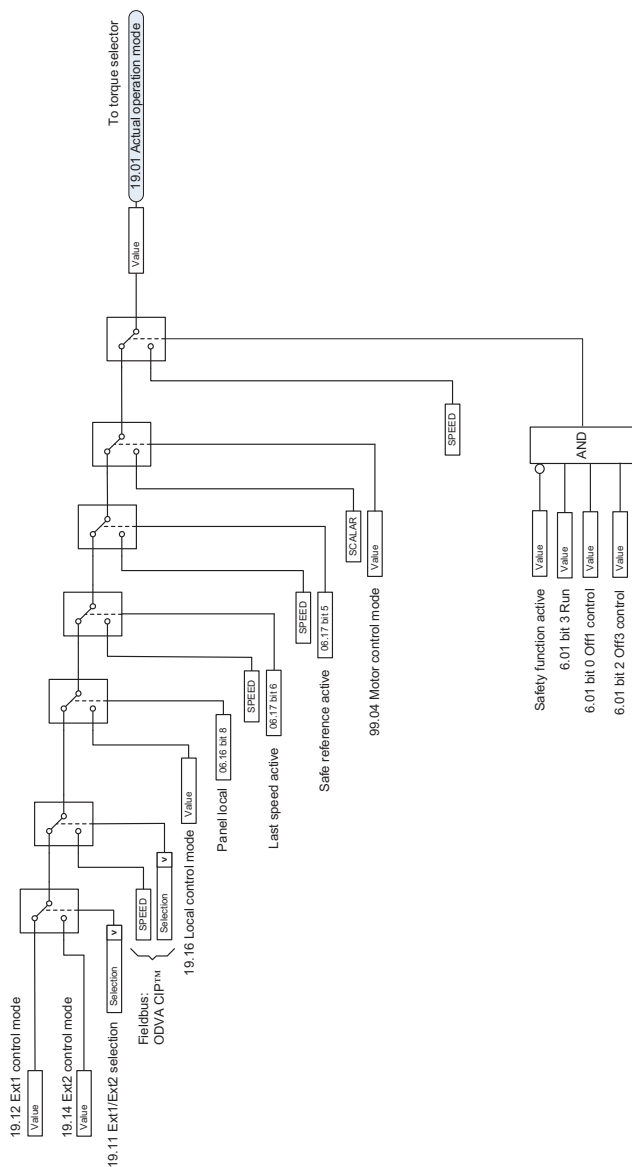
Speed error calculation



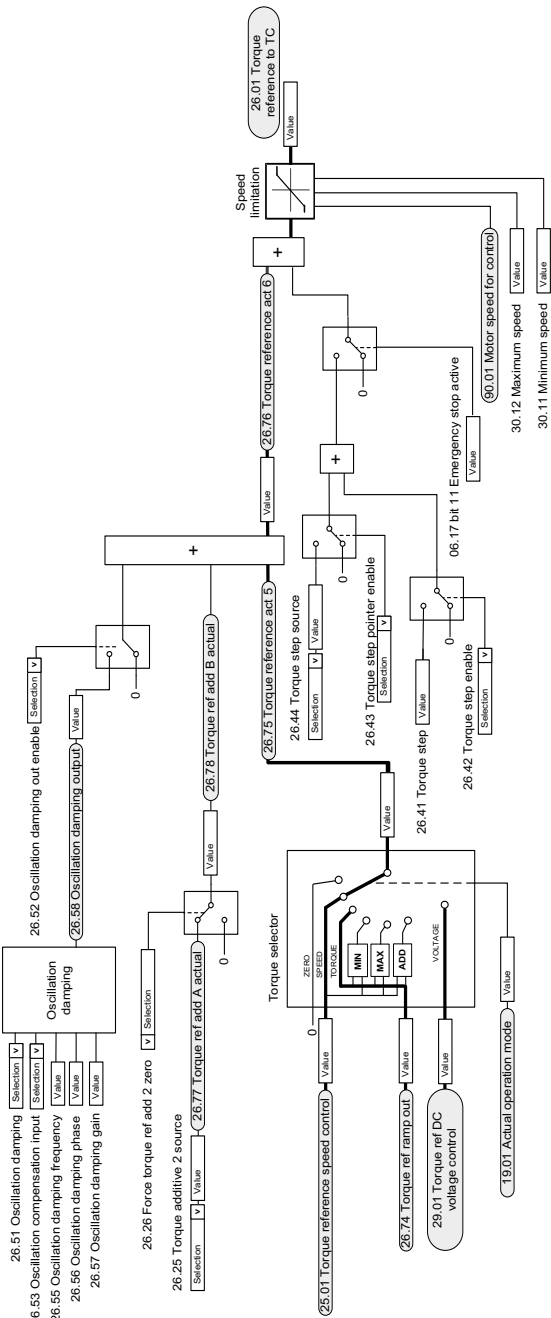
Speed controller



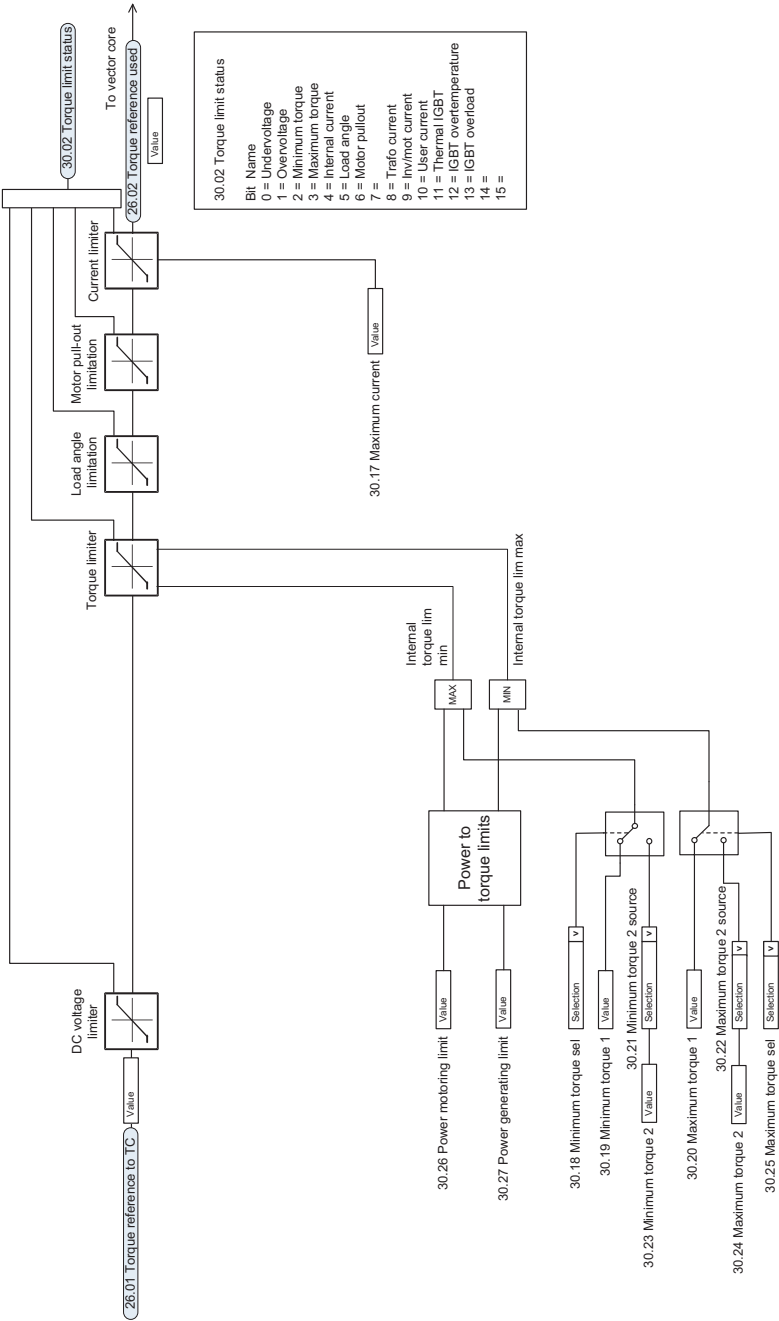
Operating mode selection



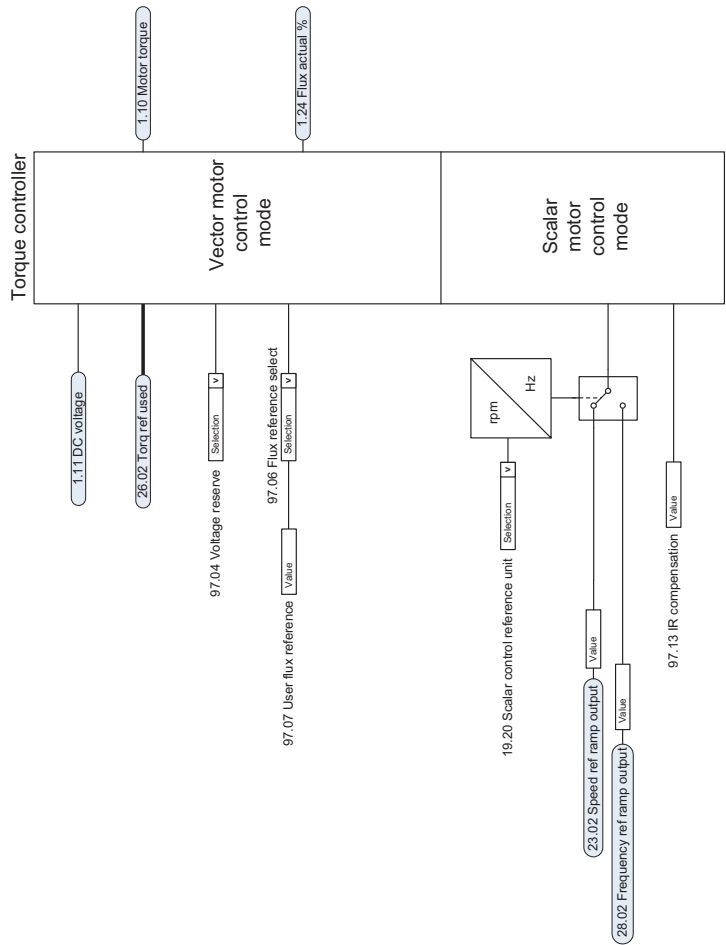
Reference selection for torque controller



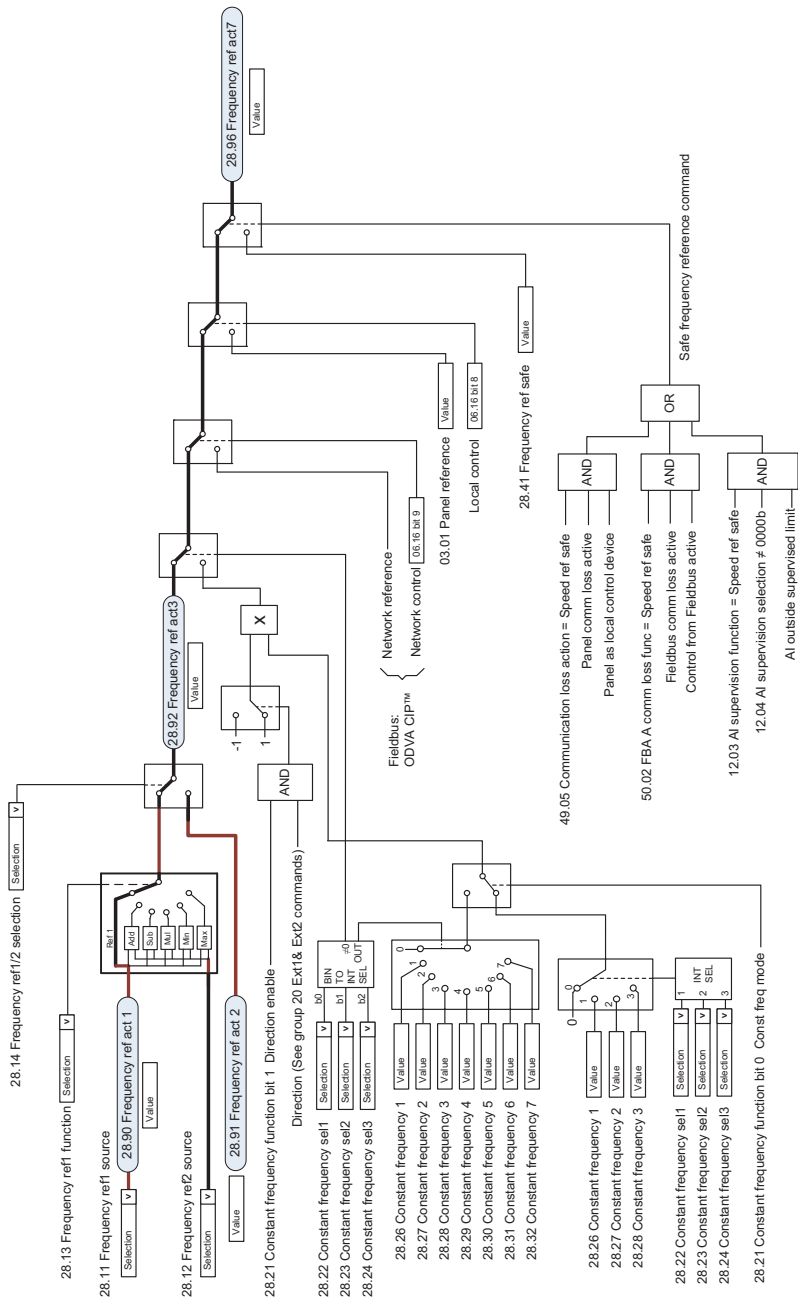
Torque limitation



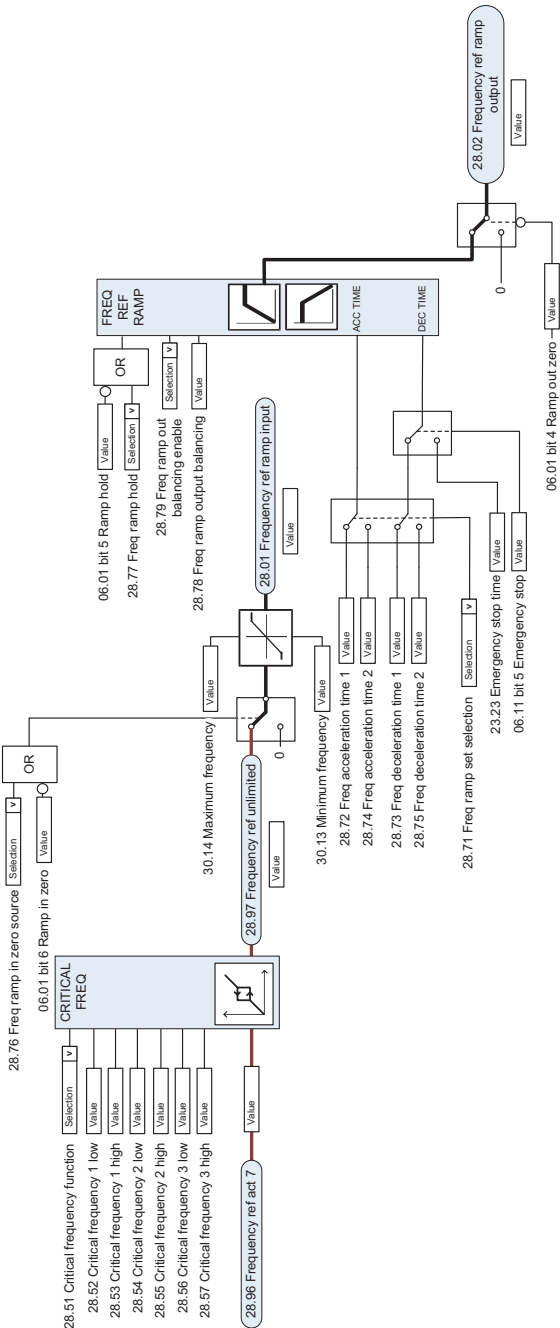
Torque controller



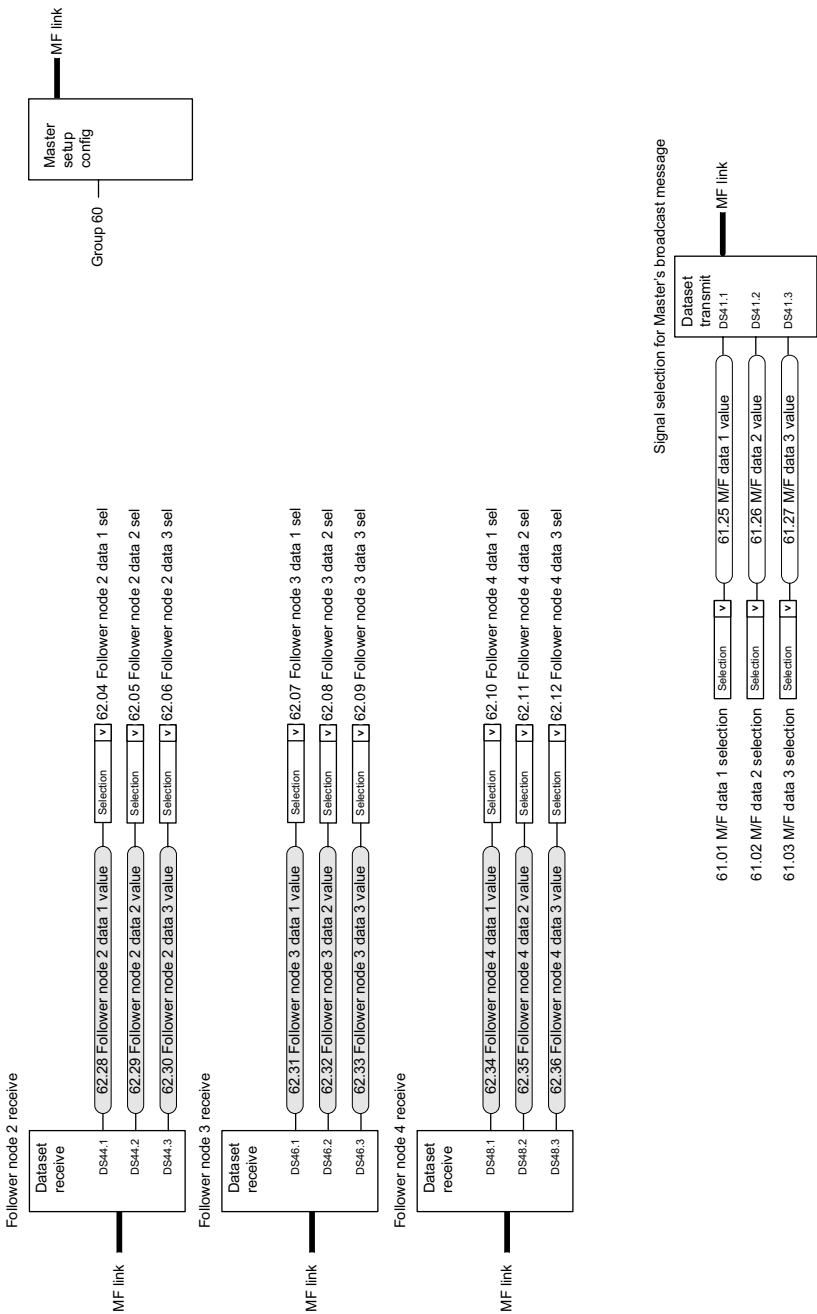
Frequency reference selection



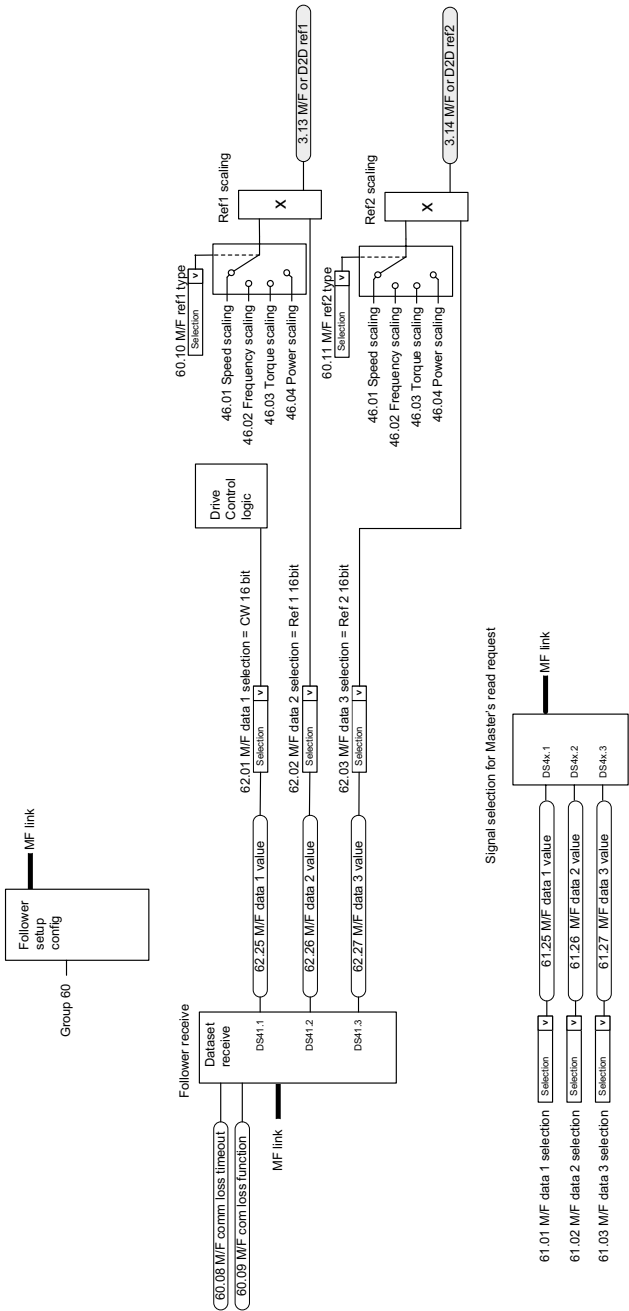
Frequency reference modification



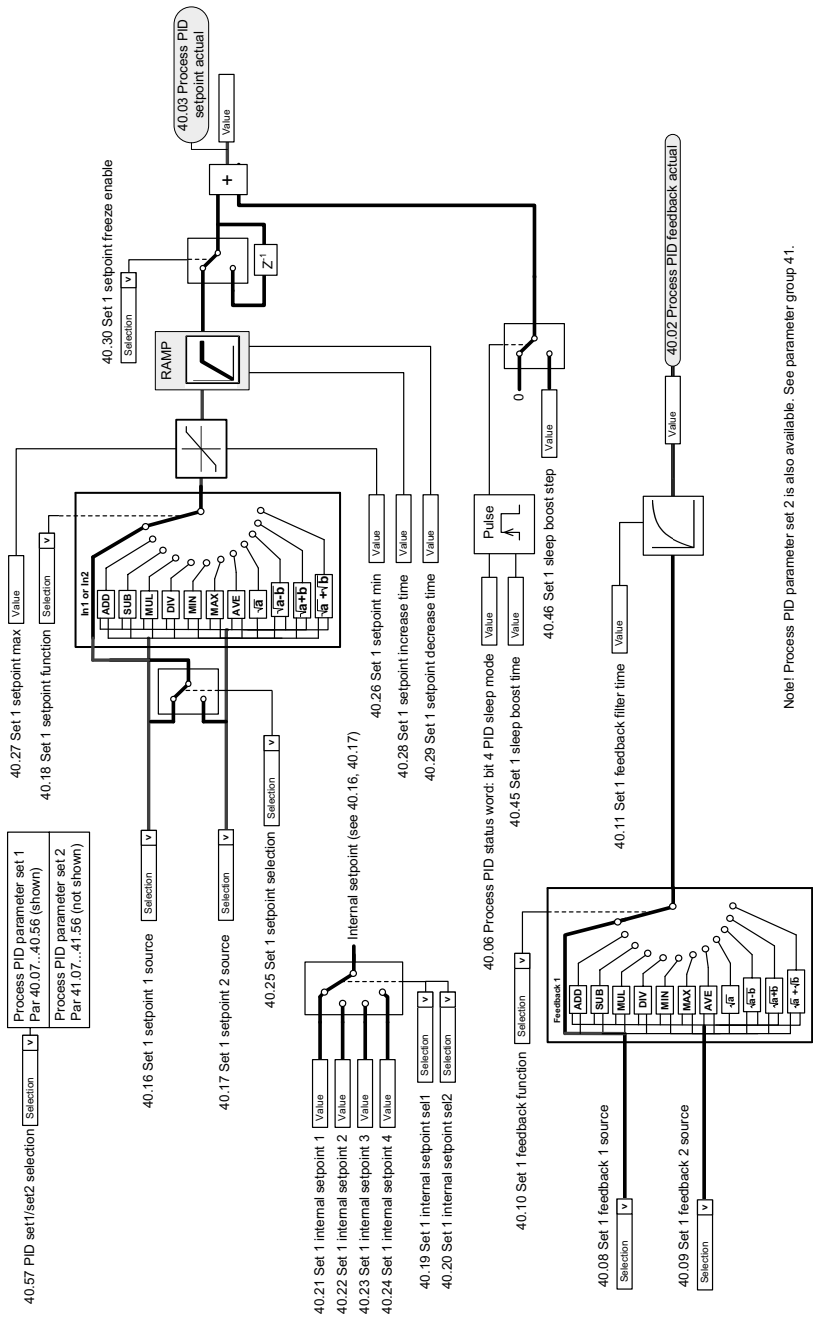
Master/Follower communication I (Master)



Master/Follower communication II (Follower)



Process PID setpoint and feedback source selection



Note! Process PID parameter set 2 is also available. See parameter group 41.

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