SIEMENS

Programming and Operating Manual

Industrial Controls

Function Block Library SIMOCODE pro for SIMATIC PCS 7

SIMOCODE pro PCS 7 Library "V7.0+SP4" / "V7-V9 Migration V8.0+SP2"

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SIEMENS

Industrial Controls

SIMOCODE pro
SIMOCODE pro PCS 7 Library V7.0+SP4 / V7-V9 Migration V8.0+SP2

Programming and Operating Manual

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Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

⚠ DANGER

indicates that death or severe personal injury **will** result if proper precautions are not taken.

⚠ WARNING

indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠ CAUTION

indicates that minor personal injury can result if proper precautions are not taken.

NOTICE

indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

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We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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Table of contents

Introduction 1

1.1 Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines, and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions only form one element of such a concept.

Customer is responsible to prevent unauthorized access to its plants, systems, machines and networks. Systems, machines and components should only be connected to the enterprise network or the internet if and to the extent necessary and with appropriate security measures (e.g. use of firewalls and network segmentation) in place.

Additionally, Siemens' guidance on appropriate security measures should be taken into account. For more information about industrial security, please visit:
http://www.siemens.com/industrialsecurity.

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends to apply product updates as soon as available and to always use the latest product versions. Use of product versions that are no longer supported, and failure to apply latest updates may increase customer's exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed under
http://www.siemens.com/industrialsecurity.

1.2 Product specific security information

Product specific security information

This library is designed to run under the PCS 7 environment. Therefore, it is recommended to follow the security principles for PCS 7 to support a secure operation, such as:

- User rights
- Password protection of
  - WinCC
  - SIRIUS devices

For more information, click here (https://support.industry.siemens.com/cs/document/60119725).

1.3 General

Validity of the documentation

This Programming and Operating Manual applies to the following versions of the SIMOCODE pro for SIMATIC PCS 7 Block Library:

- SIMOCODE pro PCS 7 Library V7.0+SP4
- SIMOCODE pro PCS 7 Migration Library V8.0+SP1

Components of the software

The software contains the following components:

- Block library with:
  - Diagnostics blocks for integration of the SIMOCODE pro modules into the driver concept of PCS 7
  - Signal blocks for controlling SIMOCODE pro C / V / S in all available control functions
  - Blocks for displaying and parameterizing measured values/limit values and statistical data
  - User text libraries with fault and warning texts for the fault and warning messages of the signal blocks
  - User objects and operator-control blocks for operating and monitoring SIMOCODE pro on the OS
- Online help in English, German and French

1.4 Installing the library

To start the installation, please insert the CD in the CD-ROM drive on your PG/PC and launch the "install.bat" program. All the other information you need will be provided during the installation process. Please also read the information in the readmefile.

1.5 Hardware configurations

The driver concept for SIMOCODE pro supports operation of SIMOCODE pro as a DP slave connected direct to the DP master system as well as connected following a Y link DPV1. Operation as S7 slave direct on the DP master system continues to be supported.

Please note that use of the SIMOCODE pro V timestamping function following a Y link DPV1 is only possible in conjunction with the IM 153-2 interface module from 6ES7153-2B..1-0XB0.

SIMOCODE pro C / V / S can be integrated both as a standard slave (via GSD) and as an S7 slave (via the Object Manager). There are also appropriate GSD files available for integration as PDM object.

The following modules and configurations are supported:

1. SIMOCODE pro C (integrated via GSD SI0180fd.gs?) direct on the DP master system or following a Y link DPV1
2. SIMOCODE pro V (integrated via GSD SI1180fd.gs? / SI1280fd.gs?) direct on the DP master system or following a Y link DPV1
3. SIMOCODE pro S (integrated via GSD SI0181a7.gs?) direct on the DP master system or following a Y link DPV1
4. SIMOCODE pro C (integrated with PDM via GSD SI2180fd.gs?) direct on the DP master system or following a Y link DPV1
5. SIMOCODE pro V (integrated with PDM via GSD SI3180fd.gs? / SI3280fd.gs?) direct on the DP master system or following a Y link DPV1
6. SIMOCODE pro C (integrated via the Object Manager (OM) SIMOCODE pro) direct on the DP master system
7. SIMOCODE pro V (integrated via the Object Manager (OM) SIMOCODE pro) direct on the DP master system
8. SIMOCODE pro S (integrated via the Object Manager (OM) SIMOCODE pro) direct on the DP master system

The following I/O configurations (default) are supported for SIMOCODE pro C / V / S:

- Outputs: 2 bytes of digital receive data
- Inputs: 4 bytes of send data (2 bytes of digital feedback messages; 2 bytes of analog send data, e.g. motor current)

This configuration corresponds to basic type 2 for SIMOCODE pro V / S.

Alternatively, SIMOCODE pro V can also have the following I/O configuration:

- Outputs:
  4 bytes of receive data (2 bytes of digital receive data, 2 bytes of analog receive data)
- Inputs:
  10 bytes of send data (2 bytes of digital feedback messages; 8 bytes of analog send data, e.g. motor current, power factor, conductor voltage)

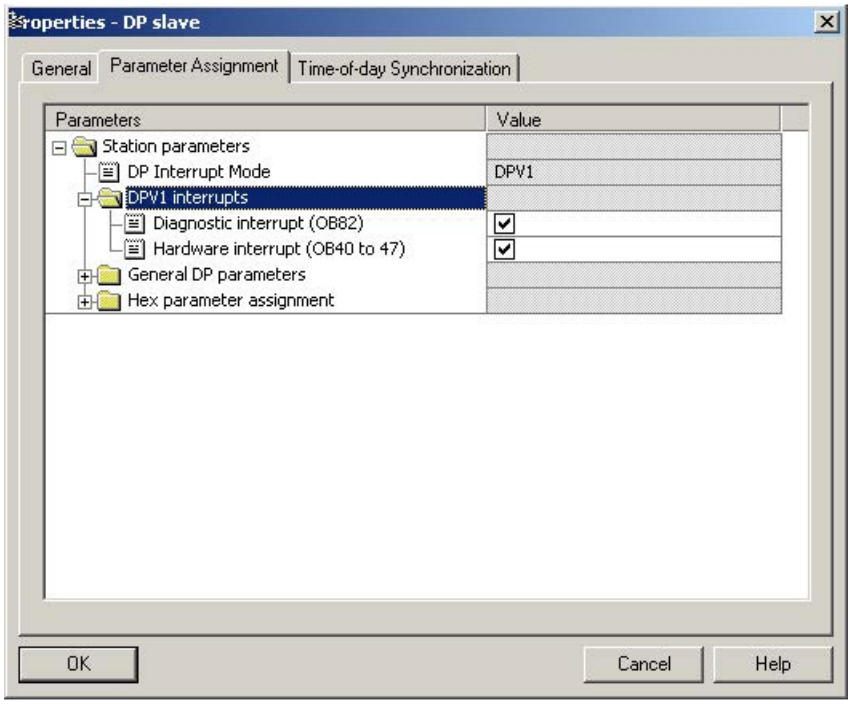
This configuration corresponds to basic type 1. The additional data of basic type 1 is analyzed or described in the measured value block.

In conjunction with the fail-safe expansion module DM-F PROFIsafe for SIMOCODE pro V, the PROFIsafe module configurations with PROFIsafe slot for GSD, GSD - PDM and OM SIMOCODE pro are also supported (1 F-DO).

1.6 Configuring in HW Config

In HW Config, SIMOCODE pro is installed with the relevant GSD file (see above), and in the case of SIMOCODE pro V with basic type 1 or basic type 2. It can still also be installed as an S7 slave. However, the SIMOCODE ES software must be installed for this purpose.

Please note that SIMOCODE pro is used in interrupt mode "DPV1" with enabled diagnostic interrupt and process interrupt.



The addresses of inputs and outputs must be located in the process image partition that is assigned to the watchdog interrupt OB in which the signal block is called.

The parameter inputs IN_01 (2 bytes of binary data) and IN_23 (2 bytes of motor current) as well as the parameter outputs O_01 (2 bytes of binary data) of the signal blocks must be connected with the associated inputs or outputs of the SIMOCODE pro device.

The parameter inputs IN_01 (2 bytes of binary data), IN_45, IN_67 and IN_89 (2 bytes of analog send values when using basic type 1) as well as the parameter output O_23 (2 bytes of analog receive data when using basic type 1) of the measured value block must be connected with the associated inputs or outputs of the SIMOCODE pro device.

The assignment of the cyclic interface is included in the description of the signal blocks and the measured value block.

1.7 Configuring in SIMOCODE ES

For the signal blocks to function correctly, a range of SIMOCODE pro parameters must have quite specific settings. Those parameters that define the assignment of the cyclic I/O interface are especially affected.

These parameters are represented in **bold**.

In addition, the overview below represents the parameters that are already preset for the control function in the templates for application selection in the SIMOCODE ES software. The settings are suggestions and depend heavily on the actual wiring of the SIMOCODE pro inputs and outputs.

These parameters are represented in *italics*.

Other parameters must also be set, e.g. for motor protection. These are not described here.

General settings (valid for all control functions)

These parameters are valid for all control functions:

Device parameters → Bus parameters		
DP address	**Appropriately**	**—**
Diagnosis triggered by device fault	**Active**	**—**
Diagnosis triggered by process faults	**Active**	**—**
Diagnosis triggered by process warnings	**Active**	**—**
Diagnosis triggered by process messages	*Not active*	**—**
Startup parameter block	**Active**	**Parameter assignment takes place with SIMOCODE ES or SIMATIC PDM**

Standard functions → Test/reset		
Test 1	**Cyclic receive bit 0.3**	—
Reset 1	**Cyclic receive bit 0.6**	—
Emergency start	**Cyclic receive bit 0.4**	—

1.8 Configuring of the fail-safe, digital PROFIsafe module

From event status E06, SIMOCODE pro V supports the fail-safe module DM-F PROFIsafe with which safety-oriented tripping of the motor is possible from an F-CPU via PROFIBUS / PROFIsafe.

From the perspective of the fail-safe section of the controller that transfers fail-safe signals via PROFIBUS / PROFIsafe, the DM-F PROFIsafe represents a digital output with which the two relay enabling circuits of the DM-F PROFIsafe modules can be switched on simultaneously or tripped with fail-safety .

To enable fail-safe tripping of the DM-F PROFIsafe by the F-CPU, the PROFIsafe module must be configured in addition to the module for basic type 1 or 2 when integrating via GSD or PDM. When integrating via OMSIMOCODE pro, configuring must be carried out with PROFIsafe.

Address assignment

Of the addresses assigned on the DM-F PROFIsafe module, the following output address in the F-CPU is reserved for user data:

Byte in F-CPU	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
x+0	—	—	—	—	—	—	—	Output

Note

You are only allowed to access the address reserved for user data (output byte x, bit 0). The other address areas assigned to the DM-F PROFIsafe are reserved for safety-oriented communication between the DM-F PROFIsafe module and the F-CPU in accordance with PROFIsafe.

Additional information

You can find detailed information on accessing the F I/O in the manual S7 F / FH Systems, Configuring and Programming (www.siemens.com/industrial-controls/manuals)".

Assignment of the PROFIsafe address

PROFIsafe address

Each failsafe DM-F PROFIsafe digital module has its own PROFIsafe address. You must set the PROFIsafe address before you start up the module.

PROFIsafe address assignment

The PROFIsafe addresses (F_Source_Add, F_Dest_Add) are automatically assigned when you configure the DM-F PROFIsafe module in STEP 7.

You can find the PROFIsafe address that must be set on the DM-F PROFIsafe in HWConfig under the object properties for the PROFIsafe module; it is shown in decimal and hexadecimal notation in the F_Dest_Add parameter. After converting this address to binary notation, you can use the DIP address switch to set it and store it on the DM-F PROFIsafe.

Please refer to the system manual "SIMOCODE pro Safety (www.siemens.com/industrial-controls/manuals)" for further information on using the fail-safe digital modules.

An icon for the fail-safe output must be entered in HW Config. In conjunction with F systems, this icon is then connected in CFC with the fail-safe channel driver (output VALUE). When integrating SIMOCODE pro V with GSD file via the Object Manager (OM), the F_CH_BO block is used as the channel driver.

Information about the library

2

2.1 Overview of the blocks

The library contains the following blocks:

Block type	Control functions	Name	Number
Diagnostics block	—	SMC_DIAG	FB2000
Measured value block	—	SMC_MEAS	FB2002
Statistics block	—	SMC_STAT	FB2003
Block for timestamping	—	SMC_TIME	FB2014
Signal processing blocks for:			
Direct starter	DIR, SOFT	SMC_DIR	FB2004
Reversing starter	REV, SOFT	SMC_REV	FB2005
Star-delta starter	STAR	SMC_STAR	FB2006
Star-delta reversing starter	REVS	SMC_REVS	FB2007
Dahlander/pole-changing switch	DAHL, POL	SMC_DAHL	FB2008
Dahlander/pole-changing reversing starter	DAHL REV, POL REV	SMC_REVD	FB2009
Solenoid valve	VALVE	SMC_VAL	FB2010
Positioner	POS	SMC_POS	FB2011
Overload	OVL	SMC_OVL	FB2012
Circuit breaker	CB	SMC_CB	FB2013

Although SIMOCODE pro V supports all control functions, SIMOCODE pro C / S supports only some control functions. Only the appropriate signal processing blocks (motor blocks) can therefore be used in conjunction with SIMOCODE pro C / S.

Control function		SIMOCODE pro C	SIMOCODE pro V	SIMOCODE pro S
SMC_OVL	Overload relay	Supported	Supported	Supported
SMC_DIR	Direct starter	Supported	Supported	Supported
SMC_DIR	Soft starter	Not supported	Supported	Supported
SMC_REV	Reversing starter	Supported	Supported	Supported
SMC_REV	Soft starter with reversing contactor	Not supported	Supported	Not supported
SMC_CB	Circuit breaker	Supported	Supported	Supported
SMC_STAR	Star-delta starter	Not supported	Supported	Supported
SMC_REVS	Star-delta reversing starter	Not supported	Supported	Not supported
SMC_DAHL	Dahlander/pole-changing starter	Not supported	Supported	Not supported
SMC_REVD	Dahlander/pole-changing reversing starter	Not supported	Supported	Not supported
SMC_VAL	Valve	Not supported	Supported	Not supported
SMC_POS	Positioner	Not supported	Supported	Not supported

2.2 User text libraries

The user text libraries SMC_Errors and SMC_Warnings are available in the Text Libraries folder of the library. They contain the texts for the fault and warning messages that are integrated into the messages of the signal blocks.

For integration of the texts into the messages, the user text libraries must be copied to the desired project.

The texts are inserted into the messages in accordance with the following syntax:

@<No. of the auxiliary value><Element type><Specified format>@

Example: @4W%t#SMC_Warnings@

- Number of the auxiliary value = 4
- Element type = W (= WORD)
- Specified format = %t#<Name of the text library>

2.3 General information about OS typicals

2.3.1 Faceplates

Faceplates are configured with Graphics Designer using the templates and PCS 7-specific standard views (Trend, Batch, and Alarm) provided by Faceplate Designer. If other user objects and functions are required, they can be added.

The faceplates described are provided as functional and tested examples and can be adapted by the user.

An icon and group display/loop display with all the necessary screens is created for the different signal blocks and the block for timestamping. The relevant group display is called using the icon. The faceplates for the measured value and the statistics block can be called from the faceplate of the signal block. The call buttons are only visible if the relevant blocks are available (the inputs EN_MEAS and EN_STAT must be parameterized by the user).

A description that allows the user to adapt the faceplates (description of interface to the SIMOCODE blocks, description of operating and display functions) is provided along with the faceplates.

Overview

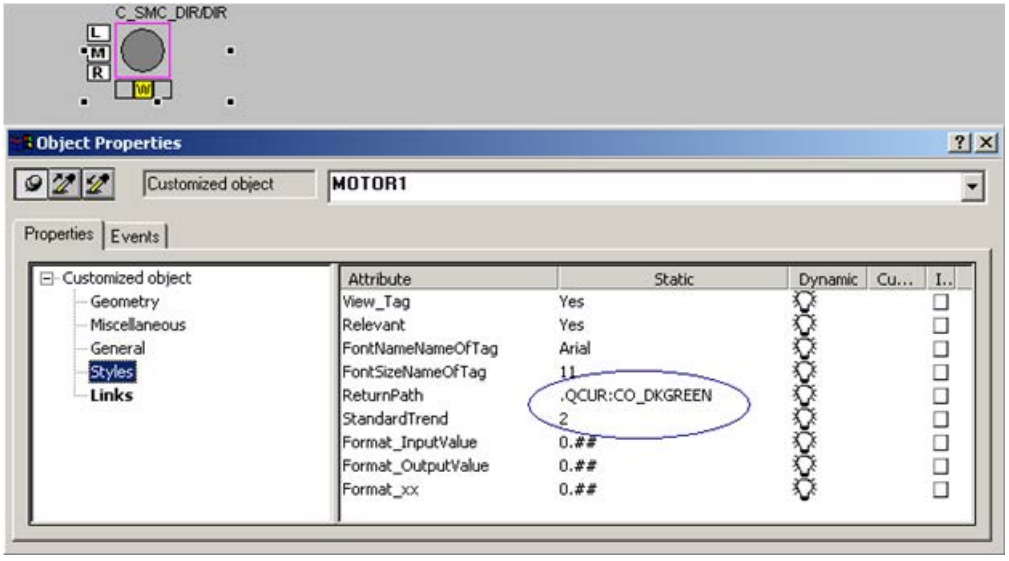
The display forms part of the @PG_SMC_xxx_OVERVIEW.PDL / @PL_SMC_xxx_OVERVIEW.PDL basic displays.

① Group display
② Message lock (MSG_LOCK)
③ Message acknowledgment
④ Message suppression (QMSG_SUP)
⑤ Batch (OCCUPIED)

Trend (@PCS7_trend.pdl)

The "ReturnPath" and "StandardTrend" properties must be parameterized on the icon to incorporate a trend in a faceplate.

•	StandardTrend	2	Online values with 5 min. time axis
		> 2	Archive values with time axis of the value entered (in min.)
•	ReturnPath	.QCUR	Structural element name starting with a full stop
		:	Separator
		CO_GREEN	Color for trend



2.3.2 Symbols

The process picture icons are based on the process icons provided by Faceplate Designer. The diagrams are schematic diagrams.

Template diagrams @PCS7_Typicals_SMC.pdl / @Template_SMC.pdl

The icons can be found in the template diagrams @PCS7_Typicals_SMC.pdl and @Template_SMC.pdl. To be able to use the functions "Create/Update Block Icons" in the SIMATIC Manager or "Update Block Icons" in Graphics Designer, you must copy the icons of the file @PCS7_Typicals_SMC.pdl into the file @PCS7Typicals.pdl or those of the file @Template_SMC.pdl into @Template.pdl.

When using the "Create/Update Block Icons" function, PCS 7 accesses the file @PCS7Typicals.pdl.

When manually copying the icons into a process picture, you must use the icons from the @Template_SMC.pdl file.

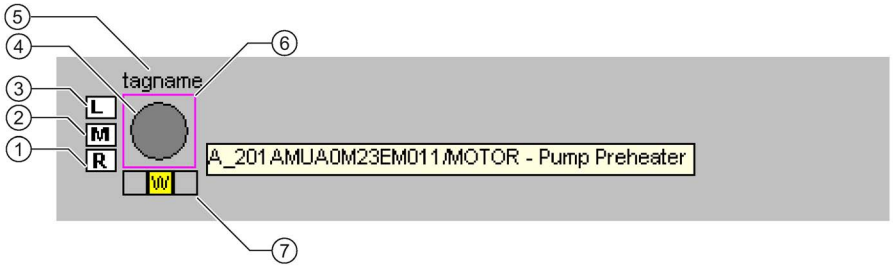
Different variants of block icons

There may be several variants of block icons for one measuring point. These variants are distinguished by the "type" attribute: The value of this attribute describes the variant. For example, if you look at a variant of the block icon for a valve, you will find the value "@Valve/2". You use the part of the value displayed after the "/" to control which variant of the block icon is produced. You therefore have to enter this part in the object properties for the block instance. If you do not enter any parameters in the object properties for the block instance, the standard block icon is produced automatically: This is the block icon with the "/1" label for the "type" attribute, e.g. "@Valve/1".

Connection to the measuring point

For the different blocks, there is one icon that is linked to the associated measuring point using the "Connect picture block to tag structure" function.

The icons contain the following visible information:



① Operator control modality (QREMOTE)
② Operating mode (QMAN_AUT)
③ Interlocking (LOCK / LOCK_ON / V_LOCK / VL_xxx)
④ Technological icon (VSTATUS)
⑤ Equipment identifier (tag name)
⑥ Simulation (QSIM): Magenta
Test mode (QCST): Yellow
⑦ Group display (EventState)

Description of the blocks 3

3.1 Diagnostics block SMC_DIAG

FB2000

Calling OBs

The block must be installed in the processing sequence in the following OBs (occurs automatically in the CFC):

OB1	Cyclic program
OB40	Process alarm
OB82	Diagnostic interrupt
OB83	Insert/remove interrupt
OB85	Program execution error
OB86	Rack fault
OB100	Warm restart

Installation is performed automatically by means of the function "Generate Module Driver".

Called blocks

The block calls the following blocks:

SFB52	RDREC
SFB54	RALRM
SFC6	RD_SINFO
SFC50	RD_LGADR
SFC51	RDSYSST
SFC54	TIME_TCK

3.1.1 Function

The SMC_DIAG block is responsible for diagnosis of the SIMOCODE pro device. The block evaluates the acyclic events that are relevant for SIMOCODE pro (start-up, DP station failure, module fault), generates quality code and diagnostic information for the MOD_PAX0 / MOD_PAL0 blocks, and provides the signal processing block with status information via parameter output OMODE.

3.1.2 Signaling response

The block has no signaling response. The messages for DP station failure and module fault are generated by the MOD_PAX0 block (in the case of direct connection to the DP master system) or MOD_PAL0 (in the case of connection following the Y link).

3.1.3 Failure of the DP master/DP slave

Failure of the DP master or DP slave has already been determined by the previous OB_DIAG1 block and evaluated by the RACKF, SUBN1ERR and SUBN2ERR inputs.

In the event of a fault, the identifier for "higher-level fault" (OMODE = 16#40xxxxxx) is entered for output OMODE.

3.1.4 I/O access error

From the perspective of the I/O configuration, SIMOCODE pro is a "compact" DP slave, that is, it always has a fixed I/O configuration. It can therefore be assumed that if an I/O access error occurs, the entire DP slave must have failed (usually reported shortly afterwards).

I/O access errors are not evaluated any further, for this reason.

3.1.5 Module fault

Following a restart and when ACC_ID = TRUE, the module addressed with LADDR is checked. SZL ID xC91 is read for this purpose. If the module addressed with LADDR does not exist, the output QMODF is set and the identifier for "higher-level fault" (OMODE = 16#40xxxxxx) is entered for the output OMODE.

3.1.6 Reading the SIMOCODE pro diagnostics data

If the SIMOCODE pro outputs a process interrupt, the system function block RALRM (SFB54) will activate reading of the device-specific diagnostics data.

Following a CPU restart and rack restore, diagnostics data set DS92 is read out with system function block RDREC (SFB52). At CPU restart and rack restore when operating the SIMOCODE pro following the Y-Link, the read-out takes place with a delay of 1 minute to ensure that all available components have completed power-up.

The information read is transferred to the MOD_PAX0 or MOD_PAL0 block, the signal processing block and the measured value block and evaluated there.

The diagnostics data can also be displayed on a Maintenance Station (MS).

Diagnostic events are assigned to the maintenance status as follows:

Diagnostics event	Maintenance status	QUALITY	PA_DIAG
Status – TPF	Local operation/function check	16#8C	16#0000_0200
Warnings	Maintenance requirement is medium	16#68	16#0020_0000
Faults	Maintenance requirement is high	16#24	16#0000_0100

3.1.7 Start-up characteristics

In OB100, the identifier for "start-up" (OMODE = 16#xx01xxxx)" is entered for the output OMODE.

3.1.8 SMC_DIAG block parameters

Element	Type	Kind	Meaning	HMI
ACC_ID	BOOL	IO	1 = Accept MODE settings	N
CST	BOOL	I	1 = Test active	N
DADDR	INT	I	Diagnostic address	N
DPA_LINK	BOOL	I	Slave connection: 0 = DP master system 1 = Link	N
EN_DIAG	BOOL	I	1 = Diagnostics event active	N
GR_ERR	BOOL	I	1 = General fault of signal block	N
LADDR	INT	I	Start address of the inputs	N
MODE	WORD	I	Value status and operating mode	N
OMODE	DWORD	O	Status MODE	N
PA_DIAG	DWORD	O	Diagnostics information	N
QDIAG_INF	UDT_ DIAG	O	Diagnostics structure for signal blocks	N
QEN_RDWR	BOOL	O	1 = Enable reading/writing of data set for: • Signal processing blocks • Measured value blocks • Statistics blocks	N
QERR	BOOL	O	1 = General fault	N
QERR_RD	BOOL	O	1 = Error read record	N
QMEAS_INF	UDT_ MEAS	O	Measured value structure for measured value block	N
QMODF	BOOL	O	1 = Module fault	N
QRACKF	BOOL	O	1 = Rack fault	N
QUALITY	BYTE	O	Quality code	N
RACK_NO	BYTE	I	DP slave address	N
RACK1ERR	BOOL	O	1 = Fault in DP slave (primary)	N
RACK2ERR	BOOL	O	1 = Fault in DP slave (redundant)	N
RACKF	BOOL	I	1 = Rack fault	N
SUBN_TYP	BOOL	I	1 = External DP interface	N
SUBN1_ID	BYTE	I	ID of the primary master system	N
SUBN1ERR	BOOL	I	1 = Fault of primary master system	N
SUBN2_ID	BYTE	I	ID of the redundant master system	N
SUBN2ERR	BOOL	I	1 = Fault of redundant master system	N

Table 3- 1 Structure of QMODE

Byte	Value		Meaning
Byte 3	16#80:	Valid data	—
	16#40:	Invalid data	Higher-level fault
Byte 2	16#01:	Restart (OB100)	—
Byte 1; 0	16#0000	—	Irrelevant

Table 3- 2 Structure of UDT_DIAG

Element	Type	Meaning
GR_ERR	BOOL	General fault
GR_WRN	BOOL	General warning
FLT_F9	BOOL	Fault F9
PARFF16	BOOL	Parameter error F16
BUS_PLC	BOOL	Bus/PLC fault
BOOL_05	BOOL	Reserve
BOOL_06	BOOL	Reserve
BOOL_07	BOOL	Reserve
BYTE_10	BOOL	Reserve
DD_17	BYTE	Diagnostics data Byte 17 Warnings
DD_18	BYTE	Diagnostics data Byte 18 Warnings
DD_19	BYTE	Diagnostics data Byte 19 Warnings
DD_20	BYTE	Diagnostics data Byte 20 Warnings
DD_21	BYTE	Diagnostics data Byte 21 Warnings
DD_22	BYTE	Diagnostics data Byte 22 Warnings
DD_24	BYTE	Diagnostics data Byte 24 Faults
DD_25	BYTE	Diagnostics data Byte 25 Faults
DD_26	BYTE	Diagnostics data Byte 26 Faults
DD_27	BYTE	Diagnostics data Byte 27 Faults
DD_28	BYTE	Diagnostics data Byte 28 Faults
DD_29	BYTE	Diagnostics data Byte 29 Faults
DD_30	BYTE	Diagnostics data Byte 30 Faults
DD_31	BYTE	Diagnostics data Byte 31 Faults

Table 3- 3 Structure of UDT_MEAS

Element	Type	Meaning
QU_WL	BOOL	Lower warning limit voltage violated
QU_AL	BOOL	Lower alarm limit voltage violated
QCPHI_WL	BOOL	Lower warning limit power factor violated
QCPHI_AL	BOOL	Lower alarm limit power factor violated
QP_AH	BOOL	Upper alarm limit active power violated
QP_WH	BOOL	Upper warning limit active power violated
QP_WL	BOOL	Lower warning limit active power violated
QP_AL	BOOL	Lower alarm limit active power violated
QAI_AH	BOOL	Upper alarm limit analog input violated
QAI_WH	BOOL	Upper warning limit analog input violated
QAI_WL	BOOL	Lower warning limit analog input violated
QAI_AL	BOOL	Lower alarm limit analog input violated
QT_AH	BOOL	Upper alarm limit temperature violated
QT_WH	BOOL	Upper warning limit temperature violated
QEF_WH	BOOL	Lower warning limit ground fault violated
QEF_AH	BOOL	Lower alarm limit ground fault violated

3.2 Block for measured value function SMC_MEAS

FB2002

Calling OBs

The OB watchdog interrupt in which you install the block (e.g. OB32). Also in OB100 (see start-up characteristics).

SMC_MEAS must be installed in the same chart as the associated signal block and have the name MEAS. The information as to whether or not the measured value block is available is parameterized in the signal block at input EN_MEAS.

Called blocks

The block calls the following blocks:

SFB35	ALARM_8P
SFB52	RDREC
SFC6	RD_SINFO
SFC20	BLKMOV

3.2.1 Parameter assignment in SIMOCODE ES

To be able to read or write measured values via the cyclic I/O interface, some SIMOCODE pro parameters must have quite specific settings. This especially affects the parameters that define the assignment of the cyclic I/O interface.

This functionality is only available on basic type 1.

Outputs → Cyclic send data	
Byte 4 to 5	e.g. power factor (only if current/voltage measuring module available)
Byte 6 to 7	e.g. temperature module – max. temperature (only if module available)
Byte 8 to 9	e.g. analog module – input 1 (only if module available)

Outputs → Analog module	
Assigned analog output value:	Cyclic receive analog value (only if analog module available)
Start value of value range:	0 (corresponds to 0/4 mA)
End value of value range:	1728 (corresponds to 20 mA)

Please note that when outputting the analog control value via the SMC_MEAS block, the value output is standardized already in the block. For this reason, please parameterize the above-named values as the start or end value of the value range.

3.2.2 Function

The block reads measured values from the SIMOCODE pro via data set DS94 and reads limit value data with data set DS132.

Reading of data set 94 supplies only the measured values actually provided by the basic unit or the modules used, depending on the type of the (SIMOCODE pro C / V / S) basic unit, and depending on the modules used in the case of SIMOCODE pro V.

Measured value	SIMOCODE pro C SIMOCODE pro V E01	SIMOCODE pro V from event status E02	SIMOCODE pro S
Thermal motor model	Available	Available	Available
Phase unbalance	Available	Available	Available
Cos φ	Not available	Available with UM	Not available
Max. current I_max	Available	Available	Available
Current I_L1	Available	Available	Available
Current I_L2	Available	Available	Available
Current I_L3	Available	Available	Available
Last trip current	Available	Available	Available
Time to trip	Available	Available	Available
Recovery time	Available	Available	Available
Voltage U_L1	Not available	Available with UM	Not available
Voltage U_L2	Not available	Available with UM	Not available
Voltage U_L3	Not available	Available with UM	Not available
A-module - output	Not available	Available with AM	Not available
A-module – input 1	Not available	Available with AM	Not available
A-module – input 2	Not available	Available with AM	Not available
T module – max. temperature	Not available	Available with TM	Available with TM
T module - temperature 1	Not available	Available with TM	Available with TM
T module – temperature 2	Not available	Available with TM	Available with TM
T module – temperature 3	Not available	Available with TM	Available with TM
Active power P	Not available	Available with UM	Not available
Apparent power S	Not available	Available with UM	Not available
Ground fault current	Not available	Available with EM+	Available with EM+
Ground fault - last trip current	Not available	Available with EM+	Available with EM+

3.2.3 Assignment of the cyclic process image

When using basic type 1, bytes 2 to 3 of the cyclic receive data and bytes 4 to 9 of the cyclic send data can also be assigned.

Table 3- 4 Assignment of O_23: Analog value output to SIMOCODE pro

Byte	Control interface
2 … 3	Analog value 1

Table 3- 5 Assignment of IN_45, IN_67 and IN_89: Feedback messages from SIMOCODE pro

Byte	Cyclic send data	Block parameter
4 … 5	Values parameterized in SIMOCODE ES	IN_45
6 … 7		IN_67
8 … 9		IN_89

3.2.4 Reading of measured values

Mode

For inputs IN_45, IN_67 and IN_89, there are parameter inputs MODEIN45, MODEIN67 and MODEIN89 that can be used to determine whether the measured values are read cyclically (MODEINxx <> 0) or acyclically (MODEINxx = 0).

This additionally includes the information for the inputs concerning which measured value is to be connected in the case of cyclic communication.

Table 3- 6 Assignment of MODExxxx

MODE16#xx	Meaning for input	
0	Measured value is read out from the data set	
1	Cyclic measured value	Voltage U_L1
2		Voltage U_L2
3		Voltage U_L3
4		Power factor
5		Active power
6		Analog input 1
7		Analog input 2
8		Max. temperature
9		Temperature T1
A		Temperature T2
B		Temperature T3
C		Thermal motor model
D		Phase unbalance
E		Current I_L1
F		Current L2
10		Current I_L3
11		Time to trip
12		Cooling down period
13		Maximum current
14		Ground fault current
15		Ground fault - last trip current

If the active power is to read in cyclically, two consecutive inputs with the same value have to be configured, e.g. MODEIN45 and MODEIN67 or MODEIN67 and MODEIN89 has to be configured to 5 as the active power is assigned a double word in SIMOCODE pro. If this is not the case, QP 0 is output.

Acyclic reading

Reading of data set 94 is initiated either via the interconnectable input parameter L_RD_DATA, in the OS when selecting the faceplate, or by OS operation (RD_DATA).

The read data is output in standardized form at the output parameters QUL1-3 (voltage UL1-3), QCPHI (power factor), QP (active power), QAI1-2 (analog input 1 and 2), QTM (max. temperature), QT1-3 (temperature 1 to 3), QTR (thermal motor model), QPU (phase unbalance), QCUR (maximum current), QCUR_L1 (current L1), QCUR_L2 (current L2), QCUR_L3 (current L3), TRIP_CUR (last trip current), TRIP_T (time to trip), COOL_T (cooling down period), ETRP_CUR (ground fault current) and ELTRP_CUR (ground fault - last trip current).

If a fault occurs, the values are set to zero and the output QERR_RD = TRUE is set.

3.2.5 Writing to the analog output

The analog output can be written cyclically to the SIMOCODE pro.

The switch LINK_ON is used to parameterize whether the operator controllable input AO_OP (LINK_ON = FALSE) or the interconnectable input AO (LINK_ON = TRUE) is used.

If the interconnectable input is selected, the operator input is adjusted to the interconnectable input.

3.2.6 Reading of limit values

Reading of data set 132 is initiated either via the interconnectable input parameter L_RD_DATA, in the OS when selecting the faceplate, or by OS operation (RD_DATA).

The data read is output in a standardized form (analog values) at the output parameters:

- U_WL, U_AL (limit values min. voltage) / QU_WL QU_AL (limit value violations voltage)
- CPHI_WL, CPHI_AL (limit values power factor) / QCPHI_WL, QCPHI_AL (limit value violations power factor)
- P_AH, P_WH, P_WL, P_AL (limit values active power), QP_AH, QP_WH, QP_WL, QP_AL (limit value violations active power)
- AI1_AH, AI1_WH, AI1_WL, AI1_AL (limit values analog input 1), QAI1_AH, QAI1_WH, QAI1_WL, QAI1_AL (limit value violations analog input 1)
- TM_AH, TM_WH (limit values max. temperature), QTM_AH, QTM_WH (limit value violations max. temperature)
- EF_WH, EF_AH (limit values ground-fault current), QEF_WH, QEF_AH (limit value violation ground-fault current)

If a fault occurs, the values are set to zero and the output QERR_RD = TRUE is set.

3.2.7 Signaling response

Table 3- 7 SMC_MEAS issues the following messages:

Message block	Message number	Block parameter	Message text	Message class
MSG_EVID1	1	QU_WL	$$BlockComment$$ Min. voltage warning down	WL
	2	QU_AL	$$BlockComment$$ Min. voltage alarm down	AL
	3	QCPHI_WL	$$BlockComment$$ Power factor warning down	WL
	4	QCPHI_AL	$$BlockComment$$ Power factor alarm down	AL
	5	QP_AH	$$BlockComment$$ Active power alarm up	AH
	6	QP_WH	$$BlockComment$$ Active power warning up	WH
	7	QP_WL	$$BlockComment$$ Active power warning down	WL
	8	QP_AL	$$BlockComment$$ Active power alarm down	AL
MSG_EVID2	9	QAI1_AH	$$BlockComment$$ Analog input 1 alarm up	AH
	10	QAI1_WH	$$BlockComment$$ Analog input 1 warning up	WH
	11	QAI1_WL	$$BlockComment$$ analog input 1 warning down	WL
	12	QAI1_AL	$$BlockComment$$ Analog input 1 alarm down	AL
	13	QTM_AH	$$BlockComment$$ Max. temperature alarm up	AH
	14	QTM_WH	$$BlockComment$$ Max. temperature warning up	WH
	15	QEF_WH	$$BlockComment$$ External ground fault warning up	WH
	16	QEF_AH	$$BlockComment$$ External ground fault alarm up	AH

Messages 15 to 16 are not assigned a fixed meaning and can be activated using parameters MSG_15 to MSG_16.

Table 3- 8 The ALARM_8P auxiliary values are assigned as follows:

Message block	Message number	Auxiliary value	Block parameter	Meaning
MSG_EVID1	—	1	BA_NA	Batch name
	—	2	STEP_NO	Batch step number
	—	3	BA_ID	Batch ID
	—	4	AUX_PR04	Free
	—	5	AUX_PR05	Free
	—	6	AUX_PR06	Free
	—	7	AUX_PR07	Free
	—	8	AUX_PR08	Free
	—	9	AUX_PR09	Free
	—	10	AUX_PR10	Free
MSG_EVID2	—	1	BA_NA	Batch name
	—	2	STEP_NO	Batch step number
	—	3	BA_ID	Batch ID
	—	4	AUX_PR14	Free
	—	5	AUX_PR15	Free
	—	6	AUX_PR16	Free
	—	7	AUX_PR17	Free
	—	8	AUX_PR18	Free
	—	9	AUX_PR19	Free
	—	10	AUX_PR20	Free

Auxiliary values AUX_PR04 to AUX_PR10 and AUX_PR14 to AUX_PR20 are freely available.

The messages can be switched off separately for each measured value using the inputs M_SUP_xx. The default value of the inputs M_SUP_xx is TRUE, that is, message suppression is active.

3.2.8 Start-up characteristics

Messages are suppressed in OB100.

3.2.9 Block parameter SMC_MEAS

Element	Type	Kind	Meaning	HMI
AI1_AH	REAL	O	Upper alarm limit analog input 1	Y
AI1_AL	REAL	O	Lower alarm limit analog input 1	Y
AI1_WH	REAL	O	Upper warning limit analog input 1	Y
AI1_WL	REAL	O	Lower warning limit analog input 1	Y
AO	REAL	I	Interconnectable input for analog output	N
AO_OP	REAL	IO	Operator controllable input for analog output	Y
AO_OP_EN	BOOL	I	1 = Operator enable for input of the analog output	N
AUX_PRxx	ANY	IO	Auxiliary value x (x = 04 to 10, 14 to 20)	N
BA_ID	DWORD	I	BATCH: Consecutive batch number	Y
BA_NA	STRING [32]	I	BATCH designation	Y
COOL_T	REAL	O	Cooling down period	Y
CPHI_AL	REAL	O	Lower alarm limit power factor	Y
CPHI_WL	REAL	O	Lower warning limit power factor	Y
EF_WH	REAL	O	Earth-fault H alarm	N
EF_AH	REAL	O	Earth-fault HH alarm	N
EN_RD	BOOL	I	1 = Enable reading of data set	N
ETRP_CUR	REAL	O	Earth-fault current in [A]	Y
ELTRP_CUR	REAL	O	Earth fault - last trip current [A]	Y
IN_01	WORD	I	Inputs DP0.0 to 1.7	N
IN_45	WORD	I	Analog input DP4.0 basic type 1	N
IN_67	WORD	I	Analog input DP6.0 basic type 1	N
IN_89	WORD	I	Analog input DP8.0 basic type 1	N
L_RD_DATA	BOOL	I	Interconnectable input 0 → 1: Reading of data sets	N
LADDR	INT	I	Start address of the inputs	N
LINK_ON	BOOL	I	Interconnectable input for selecting the input for analog output: 1 = Interconnection is active, 0 = Operation is active	Y
M_SUP_AI	BOOL	I	1 = Message suppression active for limit value violations of the analog input	Y
M_SUP_CP	BOOL	I	1 = Message suppression active for power factor limit value violations	Y
M_SUP_P	BOOL	I	1 = Message suppression active for power limit value violations	Y
M_SUP_T	BOOL	I	1 = Message suppression active for temperature limit value violations	Y
M_SUP_U	BOOL	I	1 = Message suppression active for voltage limit value violations	Y
M_SUP_EM	BOOL	I	1 = Suppress earth fault alarm	Y
MEAS_INF	UDT_ MEAS	I	Measured value structure of SMC_DIAG	N
MO_AIHR	REAL	I	Bar upper limit analog input	Y
MO_AILR	REAL	I	Bar lower limit analog input	Y
MO_AOHR	REAL	I	Bar upper limit analog output	Y

Element	Type	Kind	Meaning	HMI
MO_AOLR	REAL	I	Bar lower limit analog output	Y
MO_CPHR	REAL	I	Bar upper limit power factor	Y
MO_CPLR	REAL	I	Bar lower limit power factor	Y
MO_EHR	REAL	I	Bar upper limit earth fault	Y
MO_ELR	REAL	I	Bar lower limit earth fault	Y
MO_PHR	REAL	I	Bar upper limit active power	Y
MO_PLR	REAL	I	Bar lower limit active power	Y
MO_THR	REAL	I	Bar upper limit max. temperature	Y
MO_TLR	REAL	I	Bar lower limit max. temperature	Y
MO_UHR	REAL	I	Bar upper limit min. voltage	Y
MO_ULR	REAL	I	Bar lower limit min. voltage	Y
MODE	DWORD	I	Mode of OMODE of the SMC_DIAG	N
MODEIN45	BYTE	I	Mode of input IN_45	N
MODEIN67	BYTE	I	Mode of input IN_67	N
MODEIN89	BYTE	I	Mode of input IN_89	N
MSG_ACK1	WORD	O	Messages acknowledged ALARM8_P block 1	N
MSG_ACK2	WORD	O	Messages acknowledged ALARM8_P block 2	N
MSG_EVID1	DWORD	I	Event ID of ALARM8_P block 1	N
MSG_EVID2	DWORD	I	Event ID of ALARM8_P block 2	N
MSG_STAT1	WORD	O	MESSAGE1: STATUS output	N
MSG_STAT2	WORD	O	MESSAGE2: STATUS output	N
NM_AI1HR	REAL	I	Upper standardization limit of analog input 1	N
NM_AI1LR	REAL	I	Lower standardization limit of analog input 1	N
NM_AI2HR	REAL	I	Upper standardization limit of analog input 2	N
NM_AI2LR	REAL	I	Lower standardization limit of analog input 2	N
NM_AOHR	REAL	I	Upper standardization limit of analog output	N
NM_AOLR	REAL	I	Lower standardization limit of analog output	N
O_23	WORD	O	Analog output DP2.0 basic type 1	N
P_AH	REAL	O	Upper alarm limit active power	Y
P_AL	REAL	O	Lower alarm limit active power	Y
P_WH	REAL	O	Upper warning limit active power	Y
P_WL	REAL	O	Lower warning limit active power	Y
QAI1	REAL	Ô	Analog input 1	Y
QAI1_AH	BOOL	O	Upper alarm limit analog input 1 violated	N
QAI1_AL	BOOL	O	Lower alarm limit analog input 1 violated	N
QAI1_WH	BOOL	O	Upper warning limit analog input 1 violated	N
QAI1_WL	BOOL	O	Lower warning limit analog input 1 violated	N
QAI2	REAL	O	Analog input 2	Y
QAO	REAL	O	Analog output	Y
QAO_OP	BOOL	O	1 = Operator enable for input of the analog output	Y
QCPHI	REAL	O	Power factor	Y
QCPHI_AL	BOOL	O	Lower alarm limit power factor violated	N
QCPHI_WL	BOOL	O	Lower warning limit power factor violated	N
QCUR	REAL	O	Max. motor current in %Ie	Y

Element	Type	Kind	Meaning	HMI
QCUR_Lx	REAL	O	Current phase Lx (x = 1 to 3)	Y
QEF_WH	BOOL	O	Upper warning limit earth fault tripping current violated	N
QEF_AH	BOOL	O	Upper alarm limit earth fault tripping current violated	N
QEN_RDWR	BOOL	O	1 = Enable read/write records	N
QERR	BOOL	O	1 = Program error	N
QERR_RD	BOOL	O	1 = Error while reading the data sets	N
QMSG_ERR	BOOL	O	1 = ALARM8_P error	N
QMSG_SUP	BOOL	O	1 = Message suppression	Y
QP	REAL	O	Active power	Y
QP_AH	BOOL	O	Upper alarm limit active power violated	N
QP_AL	BOOL	O	Lower alarm limit active power violated	N
QP_WH	BOOL	O	Upper warning limit active power violated	N
QP_WL	BOOL	O	Lower warning limit active power violated	N
QPU	REAL	O	Phase unbalance	Y
QRD_OP	BOOL	O	1 = Operator enable Read data set	Y
QRD_STAT	WORD	O	Return value of the SFB RDREC	N
QT1	REAL	O	Temperature T1	Y
QT2	REAL	O	Temperature T2	Y
QT3	REAL	O	Temperature T3	Y
QTM	REAL	O	Max. temperature	Y
QTM_AH	BOOL	O	Upper alarm limit max. temperature violated	N
QTM_WH	BOOL	O	Upper warning limit max. temperature violated	N
QTR	REAL	O	Thermal motor model	Y
QU_AL	BOOL	O	Lower alarm limit min. voltage violated	N
QU_WL	BOOL	O	Lower warning limit min. voltage violated	N
QUL1	REAL	O	Voltage U_L1	Y
QUL2	REAL	O	Voltage U_L2	Y
QUL3	REAL	O	Voltage U_L3	Y
RACKF	BOOL	I	1 = Rack fault	N
RD_DATA	BOOL	IO	0 → 1: Reading of data sets	Y
RUNUPCYC	INT	I	Number of initial run cycles after CPU restart	N
SAMPLE_T	REAL	I	Sampling time in [s]	N
STEP_NO	DWORD	I	Batch step number	Y
TM_AH	REAL	O	Upper alarm limit max. temperature	Y
TM_WH	REAL	O	Upper warning limit max. temperature	Y
TRIP_CUR	REAL	O	Tripping current	Y
TRIP_T	REAL	O	Time to trip	Y
U_AL	REAL	O	Lower alarm limit min. voltage	Y
U_WL	REAL	O	Lower warning limit min. voltage	Y

3.2.10 Description of the faceplate

The faceplate is called from the "LIMITS" view of the signal processing block SMC_xxx.

The following views are available:

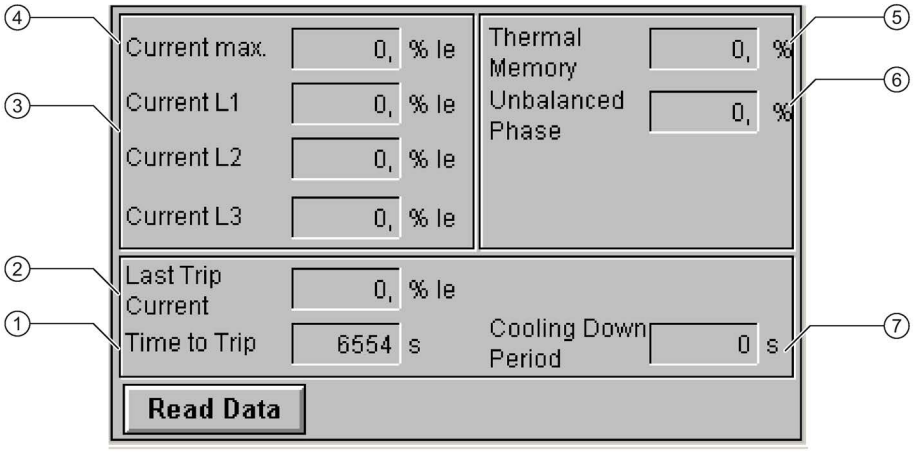
Overview	OVERVIEW
Standard	STANDARD
Voltage	STANDARD_2
Power factor	STANDARD_3
Active power	STANDARD_4
Analog input	STANDARD_5
Analog output	STANDARD_6
Temperature	STANDARD_7
Ground fault	STANDARD_8
Messages	—

The file name is composed as follows: @PG_SMC_MEAS_<View>.PDL

The PCS 7 standard display is used for the Messages views.

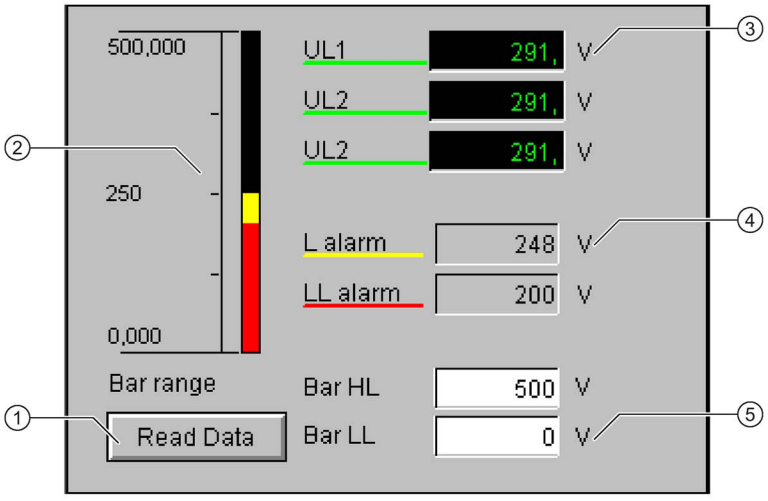
The structure of the individual views of faceplates is described below.

Standard (STANDARD)



① Ground fault - last trip current (ELTRP_CUR)
② Ground fault current (ETRP_CUR)
③ Time to trip (TRIP_T)
④ Last trip current (TRIP_CUR)
⑤ Phase currents (QCUR_L1, QCUR_L2, QCUR_L3)
⑥ Maximum current (QCUR)
⑦ Thermal motor model (QTR)

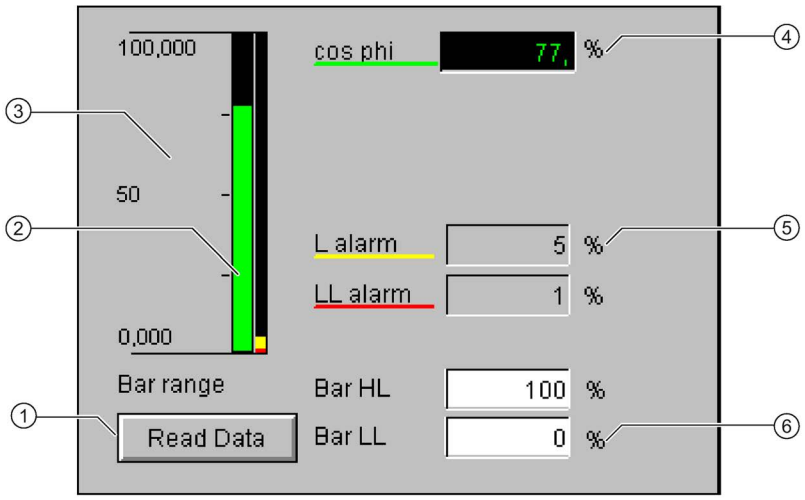
Voltage (STANDARD_2)



① Read Data (RD_DATA)
② Limit value display (U_WL, U_AL)
③ Voltage values (QULx, QULx#unit, QULx#shortcut, x = 1-3)
④ Limits (U_WL, U_AL)
⑤ Bar range (MO_UHR, MO_ULR)

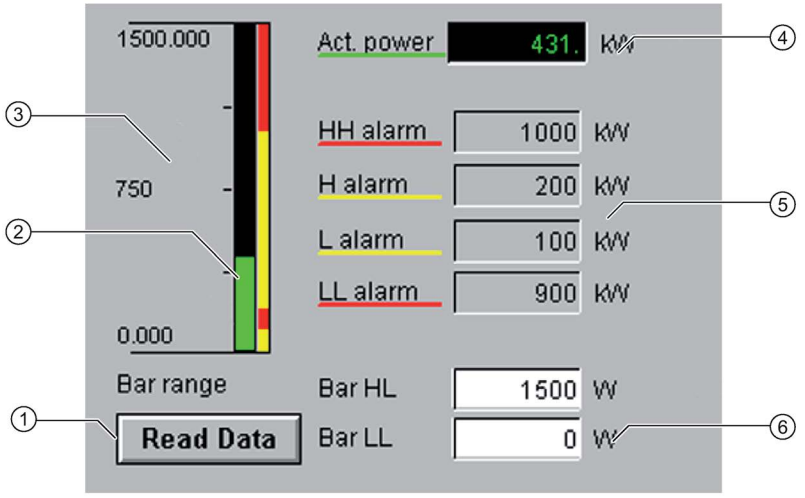
To adapt the labeling of the voltage values to the type of voltage (line-to-line voltage/phase voltage), the texts U Lx at the attributes S7_shortcut of the block parameter QULx can be changed.

Power factor (STANDARD_3)



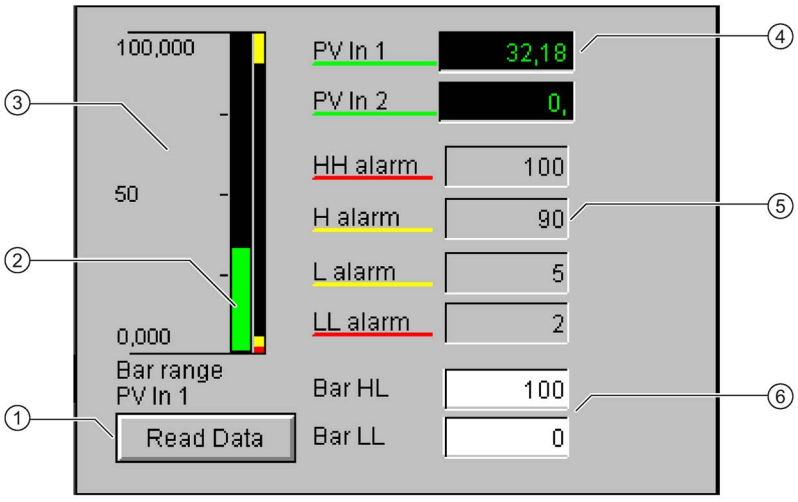
① Read Data (RD_DATA)
② Limit value display (CPHI_WL, CPHI_AL)
③ Actual value bar (QCPHI, MO_CPHR, MO_CPLR)
④ Power factor (QPHI, QCPHI#unit, QCPHI#shortcut)
⑤ Limits (CPHI_WL, CPHI_AL)
⑥ Bar range (MO_CPHR, MO_CPLR)

Active power (STANDARD_4)



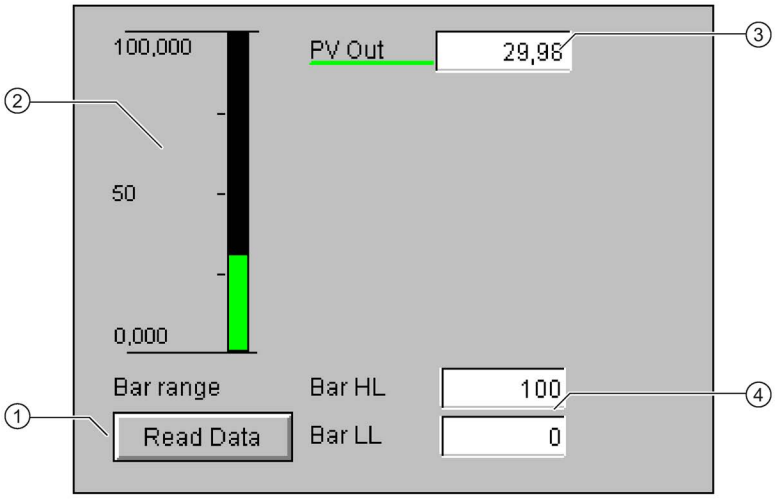
① Read Data (RD_DATA)
② Limit value display (P_AH, P_WH, P_WL, P_AL)
③ Actual value bar (QP, MO_PHR, MO_PLR)
④ Power value (QP, QP#unit, QP#shortcut)
⑤ Limits (P_AH, P_WH,P_WL, P_AL)
⑥ Bar range (MO_PHR, MO_PLR)

Analog input (STANDARD_5)



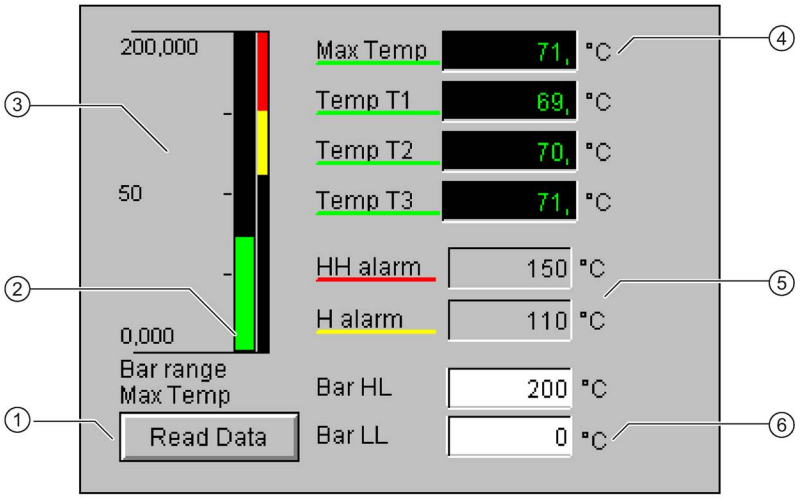
① Read Data (RD_DATA)
② Limit value display (AI1_AH, AI1_WH, AI1_WL, AI1_AL)
③ Actual value bar (QAI1, MO_AIHR, MO_AILR)
④ Analog values(QAIx, QAIx#unit, QAIx#shortcut, x = 1-2)
⑤ Limits (AI1_AH, AI1_WH, AI1_WL, AI1_AL)
⑥ Bar range (MO_AIHR, MO_AILR)

Analog output (STANDARD_6)



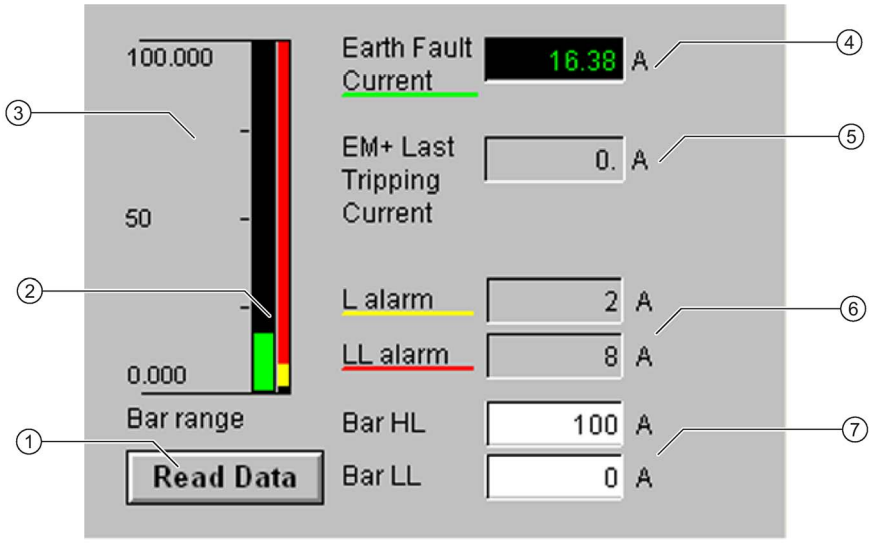
① Read Data (RD_DATA)
② Actual value bar (QAO, MO_AOHR, MO_AOLR)
③ Analog value (QAO, QAO#unit, QAO#shortcut)
④ Bar range (MO_AOHR, MO_AOLR)

Temperature (STANDARD_7)



① Read Data (RD_DATA)
② Limit value display (TM_AH, TM_WH)
③ Actual value bar (QTM, MO_THR, MO_TLR)
④ Temperature values (QTx, QTx, QTx#unit, QTx#shortcut, x = M, 1-3)
⑤ Limits (TM_AH, TM_WH)
⑥ Bar range (MO_THR, MO_TLR)

Ground fault (STANDARD_8)



① Read Data (RD_DATA)
② Limit value display (EF_AH, EF_WH)
③ Actual value bar (ETRP_CUR, MO_EHR, MO_ELR)
④ Ground fault value (ETRP_CUR)
⑤ Last trip current (ELTRP_CUR)
⑥ Limits (EF_AH, EF_WH)
⑦ Bar range (MO_EHR, MO_ELR)

3.3 Block for statistical function SMC_STAT

FB2003

Calling OBs

The watchdog interrupt OB in which you install the block (e.g. OB32). Also in OB100 (see start-up characteristics).

SMC_STAT must be installed in the same chart as the associated signal block and have the name STAT. The information as to whether or not the statistics block is available is parameterized in the signal block at input EN_STAT.

Called blocks

The block calls the following blocks:

SFB52	RDREC
SFB53	WRREC
SFC6	RD_SINFO

3.3.1 Function

The block reads and writes statistical information from SIMOCODE pro via the data sets DS94 and DS95.

Reading of data set 95 supplies only the values supported by the type of (SIMOCODE pro C / V / S) basic unit. Unsupported values are read and displayed as zero.

Value	SIMOCODE pro C	SIMOCODE pro V	SIMOCODE pro S
Operating hours	Yes	Yes	Yes
Downtime	Yes	Yes	Yes
Permissible starts	Yes	Yes	Yes
Number of overload trips	Yes	Yes	Yes
Number of starts	Yes	Yes	Yes
Cooling down period	Yes	Yes	Yes
Last trip current	Yes	Yes	Yes
Timer 1 Actual value	Yes	Yes	Yes
Timer 2 Actual value	Yes	Yes	Yes
Timer 3 Actual value	Not available	Yes	Not available
Timer 4 Actual value	Not available	Yes	Not available
Counter 1 - Actual value	Yes	Yes	Yes
Counter 2 - Actual value	Yes	Yes	Yes
Counter 3 - Actual value	Not available	Yes	Not available
Counter 4 - Actual value	Not available	Yes	Not available
Energy counter	Not available	Yes	Not available

3.3.2 Reading statistical data

Reading of data sets 94 and 95 is initiated either via the interconnectable input parameter L_RD_DATA, in the OS when selecting the faceplate, or by OS operation (RD_DATA).

The read data is output at the output parameters or in/out parameters OPH / QOPH (Operating Hours), N_STRT / QN_STRT (Number of Starts), P_STRT / QP_STRT (Permissible Starts), COUNTx (Counter statuses 1 to 4), TIMERx (Timers 1 to 4), COOL_T (Cooling Down Period), TRIP_CUR (Trip Current), N_OVL / QN_OVL (Number of Overload Trips), STOP_T / QSTOP_T (Motor Stopped Time) and EGY / QEGY (Energy).

If a fault occurs, the values are set to zero and the output QERR_RD = TRUE is set.

3.3.3 Writing statistical data

The operating hours (OPH), the number of starts (N_STRT), the permissible starts (P_STRT), the number of overload trips (N_OVL), the motor stopped time (STOP_T) and the energy counter (EGY) can be written via data set DS95 to the SIMOCODE pro.

The block initiates writing of the data set when these values change. Following successful writing, reading of DS95 is initiated to update the display in the faceplate, and the in/out and output parameters OPH, QOPH, N_STRT, QN_STRT, P_STRT, QP_STRT, N_OVL, QN_OVL, STOP_T, QSTOP_T, EGY and QEGY are adjusted to the effective values.

If writing was not possible, the output QERR_WR = TRUE is set.

3.3.4 Signaling response

The block has no signaling response.

3.3.5 Start-up characteristics

The block has no start-up characteristics.

3.3.6 Block parameters SMC_STAT

Element	Type	Kind	Meaning	HMI
COOL_T	REAL	O	Cooling down period	Y
COUNTx	DINT	O	Counter value counter x (x = 1 to 4)	Y
EGY	REAL	IO	Energy counter	Y
EN_RDWR	BOOL	I	1 = Enable reading/writing of data set	N
IN_01	WORD	I	Inputs DP0.0 to 1.7	N
L_RD_DATA	BOOL	I	Interconnectable input 0 → 1: Reading of the data set	N
LADDR	INT	I	Start address of the inputs	N
MODE	DWORD	I	Mode of OMODE of the SMC_DIAG	N
N_OVL	REAL	IO	Number of overload trips	Y
N_STRT	REAL	IO	Number of starts	Y
OPH	REAL	IO	Operating hours	Y
P_STRT	REAL	IO	Permissible starts	Y
QEGY	REAL	O	Energy counter	N
QEN_RDWR	BOOL	O	1 = Enable reading/writing of data set	N
QERR	BOOL	O	1 = Program error	N
QERR_RD	BOOL	O	1 = Error while reading the data set	N
QERR_WR	BOOL	O	1 = Error while writing the data set	N
QN_OVL	REAL	O	Number of overload trips	N
QN_STRT	REAL	O	Number of starts	N
QOPH	REAL	O	Operating hours	N
QP_STRT	REAL	O	Permissible starts	N
QRD_STAT	WORD	O	Return value of the SFB RDREC	N
QRDWR_OP	BOOL	O	1 = Operator enable Read/write data set	Y
QSTOP_T	REAL	O	Downtime	N
QWR_STAT	WORD	O	Return value of the SFB WRREC	N
RACKF	BOOL	I	1 = Rack fault	N
RD_DATA	BOOL	IO	0 → 1: Reading of the data set	Y
RUNUPCYC	INT	I	Number of initial run cycles after CPU restart	N
STOP_T	REAL	IO	Downtime	Y
TIMERx	REAL	O	Timer value timer x (x = 1 to 4)	Y
TRIP_CUR	REAL	O	Tripping current	Y

3.3.7 Description of the faceplate

The faceplate is called from the "MAINTENANCE" view of the signal processing block SMC_xxx.

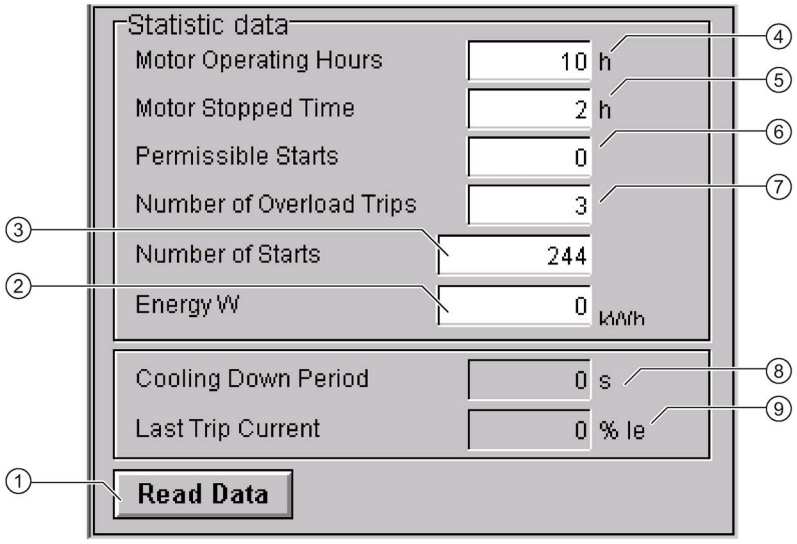
The following views are available:

Overview	OVERVIEW
Standard	STANDARD
Maintenance	MAINTENANCE

The file name is composed as follows: @PG_SMC_STAT_<View>.PDL

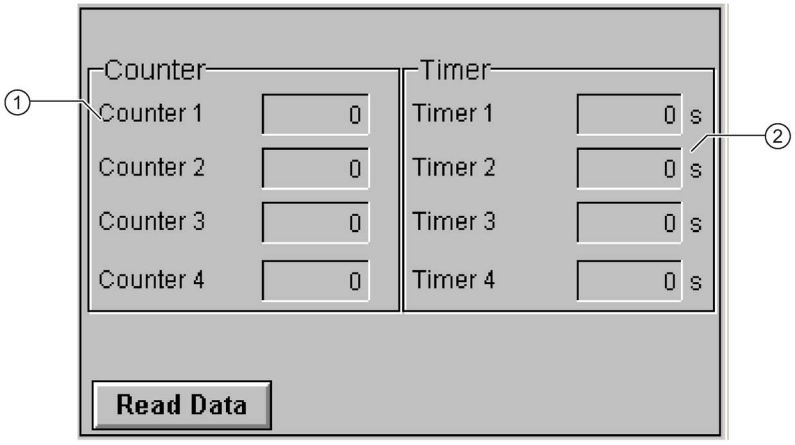
The structure of the individual views of faceplates is described below.

Standard (STANDARD)



① Read data sets (RD_DATA)
② Energy counters (EGY)
③ Number of starts (N_STRT)
④ Operating hours (OPH)
⑤ Motor stop time (STOP_T)
⑥ Permissible starts (P_STRT)
⑦ Number of overload trips (N_OVL)
⑧ Cooling down period (COOL_T)
⑨ Last trip current (TRIP_CUR)

Maintenance (MAINTENANCE)



① Counter value x (COUNTx)
② Timer value x (TIMERx)

3.4 Block for timestamping SMC_TIME

FB2014

Calling OBs

The watchdog interrupt OB in which you install the block (e.g. OB32). Also in OB100 (see start-up characteristics) and OB40 (hardware interrupt OB).

SMC_TIME must be installed in the same chart as the associated signal block.

Called blocks

The block calls the following blocks:

SFB35	ALARM_8P
SFB52	RDREC
SFB54	RALRM
SFC6	RD_SINFO
SFC20	BLKMOV

3.4.1 Configuring for the use of the SIMOCODE pro V timestamping

On the SIMOCODE pro V, the timestamped information is transferred analogously to SIMATIC S7 IM 153-2.

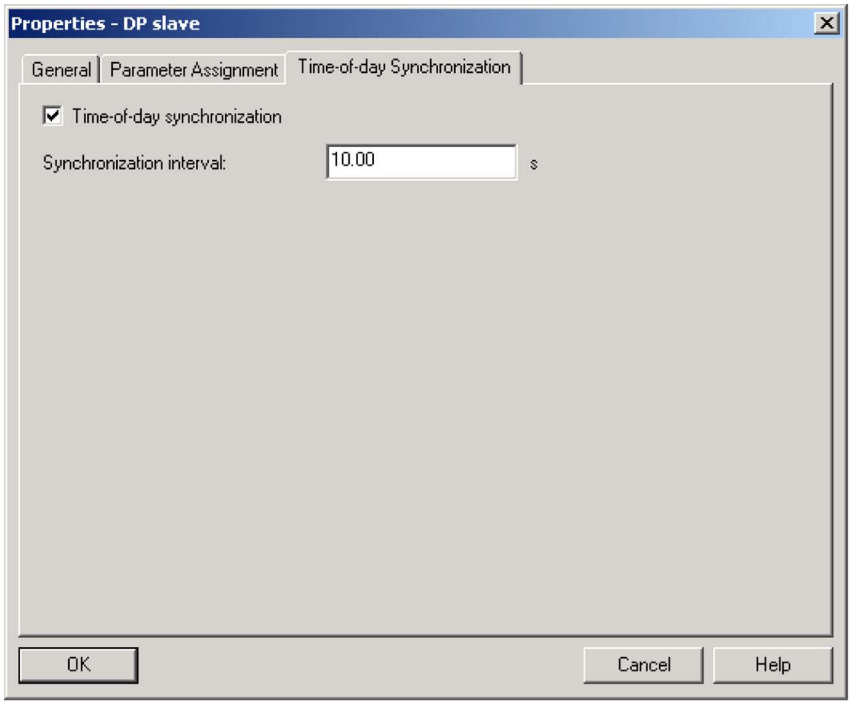
Please note also the configuring information given in Chapters 4.1 to 4.3 of the manual "PCS 7 Process Control System, 10 ms Timestamping".

Requirement

To use the SIMOCODE pro V timestamping, the DP master used must support the function for time-of-day synchronization via PROFIBUS.

Time-of-day synchronization for SIMOCODE pro V is activated in STEP 7HW Config in the slave properties under "Time-of-day Synchronization".

The set synchronization interval must agree with the configuring of the time-of-day master.



3.4.2 Parameter assignment in SIMOCODE ES

SIMOCODE pro V can timestamp up to 8 digital signals with high temporal precision (10 ms). In the process, every change in the state of the digital signals will be recorded.

Standard functions → Timestamping	
Timestamping active	**Active**
Timestamping – Input 0	Freely assignable, e.g. status - general fault
Timestamping – Input 1	Freely assignable
Timestamping – Input 2	Freely assignable
Timestamping – Input 3	Freely assignable
Timestamping – Input 4	Freely assignable
Timestamping – Input 5	Freely assignable
Timestamping – Input 6	Freely assignable
Timestamping – Input 7	Freely assignable

3.4.3 Function

The block evaluates the alarm information of the calling hardware interrupt OB that contains the status of timestamping, the data set number (DS12, DS13 or DS14) of the message buffer in which the initiating events were entered with timestamp, and the number of entries.

If the data is available, the block reads the data set and reports the events with the supplied timestamp.

Information of up to 17 hardware interrupts can be stored. if the maximum number is exceeded, the information is lost. The hardware interrupts are processed sequentially, that is, only when all entered events of a data set have been reported is the next data set read.

3.4.4 Reading events with timestamping

Reading of data sets 12, 13 or 14 is initiated if the interrupt information of the hardware interrupt OBOB40 contains a pointer to entries in a message buffer for interrupt timestamping.

The signal status and the timestamps of the individual events transferred by SIMOCODE pro are reported to WinCC using the block ALARM_8P of the type 'alarm_t'. As a result, the generated message contains the timestamp from the entry in the message buffer.

In the case of the events, a distinction is made between signal messages and special messages.

The signal messages are output to the outputs QMSG_0 to QMSG_7. The meaning of the signal messages can be parameterized in SIMOCODE ES.

Table 3- 9 There are 5 special messages:

Identifier	Meaning
0x01	Startup data
0x02	Time-of-day frame failure
0x04	Time-of-day difference between frame and int. clock > 1 second
0x05	STOP of the timestamping functionality
0x06	Buffer full

If a fault occurs, the signal messages and special messages contain the last value and the output QERR_RD = TRUE is set.

3.4.5 Signaling response

The message blocks are only called if a status change is detected in the special messages or signal messages.

Table 3- 10 SMC_TIME issues the following messages:

Message block	Message number	Block parameter	Message text	Message class
MSG_EVID1	1	—	$$BlockComment$$ Startup data	S
	2	—	$$BlockComment$$ Time-of-day frame failure	S
	3	—	$$BlockComment$$Time-of-day difference between frame and int. clock > 1 second	S
	4	—	$$BlockComment$$ STOP of the timestamping functionality	S
	5	QOFLOW	$$BlockComment$$ Buffer full	S
	6	—	—	—
	7	—	—	—
	8	—	—	—
MSG_EVID2	9	QMSG_0	$$BlockComment$$ Input 0	—
	10	QMSG_1	$$BlockComment$$ Input 1	—
	11	QMSG_2	$$BlockComment$$ Input 2	—
	12	QMSG_3	$$BlockComment$$ Input 3	—
	13	QMSG_4	$$BlockComment$$ Input 4	—
	14	QMSG_5	$$BlockComment$$ Input 5	—
	15	QMSG_6	$$BlockComment$$ Input 6	—
	16	QMSG_7	$$BlockComment$$ Input 7	—

Table 3- 11 The ALARM_8P auxiliary values are assigned as follows:

Message block	Message number	Auxiliary value	Block parameter	Meaning
MSG_EVID1	—	1	—	Timestamp for messages in ISP format
	—	2	BA_NA	Batch name
	—	3	STEP_NO	Batch step number
	—	4	BA_ID	Batch ID
	—	5	AUX_PR05	Free
	—	6	AUX_PR06	Free
	—	7	AUX_PR07	Free
	—	8	AUX_PR08	Free
	—	9	AUX_PR09	Free
	—	10	AUX_PR10	Free
MSG_EVID2	—	1	—	Timestamp for messages in ISP format
	—	2	BA_NA	Batch name
	—	3	STEP_NO	Batch step number
	—	4	BA_ID	Batch ID
	—	5	AUX_PR05	Free
	—	6	AUX_PR06	Free
	—	7	AUX_PR07	Free
	—	8	AUX_PR08	Free
	—	9	AUX_PR09	Free
	—	10	AUX_PR10	Free

The auxiliary values AUX_PR05 … AUX_PR10 are freely available.

Each signal message can be switched off separately via the inputs M_SUP_Sx.

3.4.6 Start-up characteristics

Messages are suppressed in OB100.

3.4.7 SMC_TIME block parameters

Element	Type	Kind	Meaning	HMI
AUX_PRxx	ANY	IO	Auxiliary value x (x = 05 to 10)	N
BA_ID	DWORD	I	BATCH: Consecutive batch number	Y
BA_NA	STRING [32]	I	BATCH designation	Y
DADDR	INT	I	Diagnostic address	N
EN_RD	BOOL	I	1 = Enable reading of data set	N
IN_01	WORD	I	Inputs DP0.0 to 1.7	N
MODE	DWORD	I	Mode of OMODE of the SMC_DIAG	N
MSG_ACK1	WORD	O	Messages acknowledged ALARM8_P block 1	N
MSG_ACK2	WORD	O	Messages acknowledged ALARM8_P block 2	N
MSG_EVID1	DWORD	I	Event ID of ALARM8_P block 1	N
MSG_EVID2	DWORD	I	Event ID of ALARM8_P block 2	N
MSG_STAT1	WORD	O	MESSAGE1: STATUS output	N
MSG_STAT2	WORD	O	MESSAGE2: STATUS output	N
M_SUP_Sx	BOOL	I	1 = Message suppression active for signal input x (x = 0 to 7)	Y
QERR	BOOL	O	1 = Program error	N
QEN_RDWR	BOOL	O	1 = Enable reading/writing of data set	N
QERR_RD	BOOL	O	1 = Error while reading the data set	N
QOFLOW	BOOL	O	1 = Buffer overflow	N
QMSG_ERR	BOOL	O	1 = ALARM8_P error	N
QMSG_SUP	BOOL	O	1 = Message suppression	Y
QMSG_x	BOOL	O	Signal input x (x = 0 to 7)	N
QRD_STAT	WORD	O	Return value of the SFB RDREC	N
QTSTACT	BOOL	O	1 = Timestamping active	Y
QSTATUS	BYTE	O	Status of the special messages	N
QSYNC_OK	BOOL	O	1 = Synchronization available	N
RACKF	BOOL	I	1 = Rack fault	N
RUNUPCYC	INT	I	Number of initial run cycles after CPU restart	N
STEP_NO	DWORD	I	Batch step number	Y

Table 3- 12 Structure of QSTATUS

Bit	Meaning
0	Startup data
1	Time-of-day frame failure
2	Time-of-day difference between frame and int. clock > 1 second
3	STOP of the timestamping functionality
4	Buffer full
5	—
6	—
7	—
8	—

3.4.8 Description of the faceplate

The faceplate has its own icon that is used to call it up.

① Timestamping active (QTSTACT)

The following views are available:

Overview	OVERVIEW
Messages	—

3.5 SMC_DIR: Signal processing block for direct starter/soft starter control function

FB2004

Calling OBs

The watchdog interrupt OB in which you install the block (e.g. OB32). Also in OB100 (see start-up characteristics).

Called blocks

The block calls the following blocks:

SFB35	ALARM_8P
SFB52	RDREC
SFB53	WRREC
SFC6	RD_SINFO
SFC20	BLKMOV
SFC21	FILL

3.5.1 Parameter assignment in SIMOCODE ES

For the signal blocks to function correctly, a range of SIMOCODE pro parameters must have quite specific settings. Those parameters that define the assignment of the cyclic I/O interface are especially affected.

These parameters are represented in **bold**.

In addition, the overview below represents the parameters that are already preset for the control function in the templates for application selection in the SIMOCODE ES software. The settings are suggestions and depend heavily on the actual wiring of the SIMOCODE pro inputs and outputs.

These parameters are represented in *italics*.

Other parameters must also be set, e.g. for motor protection. These are not described here. Parameter assignment for the extended I/O interface of basic type 1 is represented in the following chapter: Parameter assignment in SIMOCODE ES (Page 33)

Direct starter control function

Motor control → Control stations		
Operation mode selector S1	**Cyclic receive bit 0.5**	—
Operation mode selector S2	*Fixed level 1*	—

Local control [LC]		
Off	*BU - Input 2*	—
On	*BU - Input 1*	—
Operator enable local 2 off	*Active*	—
Operator enable local 2 on	*Active*	—
Operator enable remote off	**Not active**	—
Operator enable remote on	**Not active**	—

PLC/PCS [DP]		
Off	**Cyclic receive – bit 0.1**	—
On	**Cyclic receive – bit 0.2**	—
Operator enable local 2 off	**Not active**	—
Operator enable local 2 on	**Not active**	—
Operator enable remote off	**Active**	—
Operator enable remote on	**Active**	—

Operator Panel [OP]		
Off	*OP button 4*	—
On	*OP button 3*	—
Operator enable local 2 off	*Active*	—
Operator enable local 2 on	*Active*	—
Operator enable remote off	**Not active**	—
Operator enable remote on	**Not active**	—

Motor control → Control function → Control commands		
Off	**Enabled control command - Off**	—
On>	**Enabled control command – On>**	—

Motor control → Control function → Operating mode		
Non-maintained command mode	*Not active/active*	*The setting of the parameter influences the parameter JOG_ON in the SIMOCODE signal block:* *Non-maintained command mode not active: JOG_ON = FALSE* *Non-maintained command mode active: JOG_ON = TRUE*

Motor control → Control function → Auxiliary control inputs		
Feedback ON	**Status - Motor current flowing**	—

Outputs → Basic unit		
BU – Output 1	*Contactor control QE1*	—

Outputs → Operator panel LEDs		
LED green 3	*Display QLE> (on>)*	—
LED green 4	*Display QLA (off)*	—

Outputs → Cyclic send data		
Byte 0, bit 0	**Not connected**	—
Byte 0, bit 1	**Status - Off**	—
Byte 0, bit 2	**Status – On>**	—
Byte 0, bit 3	**Message – Pre-warning overload**	—
Byte 0, bit 4	**Not connected**	—
Byte 0, bit 5	**Status – Remote mode**	—
Byte 0, bit 6	**Status – General fault**	—
Byte 0, bit 7	**Status - General warning**	—
Byte 1, bit 0	Not connected	Freely assignable
Byte 1, bit 1	**Status - Test position (TPF)**	—
Byte 1, bit 2	Not connected	Freely assignable
Byte 1, bit 3	Not connected	Freely assignable
Byte 1, bit 4	Not connected	Freely assignable
Byte 1, bit 5	Not connected	Freely assignable
Byte 1, bit 6	Not connected	Freely assignable
Byte 1, bit 7	Not connected	Freely assignable
Bytes 2 to 3	**Max. current Imax**	—

Soft starter control function 3RW402 / 3RW403 / 3RW404

Motor control → Control stations		
Operation mode selector S1	**Cyclic receive bit 0.5**	—
Operation mode selector S2	*Fixed level 1*	—

Local control [LC]		
Off	*BU - Input 2*	—
On	*BU - Input 1*	—
Operator enable local 2 off	*Active*	—
Operator enable local 2 on	*Active*	—
Operator enable remote off	**Not active**	—
Operator enable remote on	**Not active**	—

PLC/PCS [DP]		
Off	**Cyclic receive – bit 0.1**	—
On	**Cyclic receive – bit 0.2**	—
Operator enable local 2 off	**Not active**	—
Operator enable local 2 on	**Not active**	—
Operator enable remote off	**Active**	—
Operator enable remote on	**Active**	—

Operator Panel [OP]		
Off	*OP button 4*	—
On	*OP button 3*	—
Operator enable local 2 off	*Active*	—
Operator enable local 2 on	*Active*	—
Operator enable remote off	**Not active**	—
Operator enable remote on	**Not active**	—

Motor control → Control function → Control commands		
Off	**Enabled control command - Off**	—
On>	**Enabled control command – On>**	—

Motor control → Control function → Operating mode		
Non-maintained command mode	*Not active/active*	*The setting of the parameter influences the parameter JOG_ON in the SIMOCODE signal block:* *Non-maintained command mode not active: JOG_ON = FALSE* *Non-maintained command mode active: JOG_ON = TRUE*

Motor control → Control function → Auxiliary control inputs		
Feedback ON	**Status - Motor current flowing**	—

Motor control → Control function → Timings		
Execution time	**Greater than soft ramp-down time**	—

Outputs → Basic unit		
BU – Output 1	*Contactor control QE1*	—
BU – Output 2	Signal conditioner 4 output	—
BU – Output 3	Contactor control *QE4*	—

Outputs → Operator panel LEDs		
LED green 3	*Display QLE> (on>)*	—
LED green 4	*Display QLA (off)*	—

Outputs → Cyclic send data		
Byte 0, bit 0	**Not connected**	—
Byte 0, bit 1	**Status - Off**	—
Byte 0, bit 2	**Status – On>**	—
Byte 0, bit 3	**Message – Pre-warning overload**	—
Byte 0, bit 4	**Not connected**	—
Byte 0, bit 5	**Status – Remote mode**	—
Byte 0, bit 6	**Status – General fault**	—
Byte 0, bit 7	**Status - General warning**	—
Byte 1, bit 0	Not connected	Freely assignable
Byte 1, bit 1	**Status - Test position (TPF)**	—
Byte 1, bit 2	Not connected	Freely assignable
Byte 1, bit 3	Not connected	Freely assignable
Byte 1, bit 4	Not connected	Freely assignable
Byte 1, bit 5	Not connected	Freely assignable
Byte 1, bit 6	Not connected	Freely assignable
Byte 1, bit 7	Not connected	Freely assignable
Bytes 2 to 3	**Max. current Imax**	—

Standard functions → External faults		
External fault 1	BU - Input 4	Signal output soft starter fault
External fault 1 – Response	Tripping	—

Logic blocks → Signal conditioner 4		
Signal conditioner – Type	*Edge rising with memory*	—
Signal conditioner – Input	*Contactor control 3 – QE3*	—
Signal conditioner – Reset	*Timer 4 output*	—

Soft starter control function 3RW405 / 3RW406 / 3RW407

Motor control → Control stations		
Operation mode selector S1	**Cyclic receive bit 0.5**	—
Operation mode selector S2	*Fixed level 1*	—

Local control [LC]		
Off	*BU - Input 2*	—
On	*BU - Input 1*	—
Operator enable local 2 off	*Active*	—
Operator enable local 2 on	*Active*	—
Operator enable remote off	**Not active**	—
Operator enable remote on	**Not active**	—

PLC/PCS [DP]		
Off	**Cyclic receive – bit 0.1**	—
On	**Cyclic receive – bit 0.2**	—
Operator enable local 2 off	**Not active**	—
Operator enable local 2 on	**Not active**	—
Operator enable remote off	**Active**	—
Operator enable remote on	**Active**	—

Operator Panel [OP]		
Off	*OP button 4*	—
On	*OP button 3*	—
Operator enable local 2 off	*Active*	—
Operator enable local 2 on	*Active*	—
Operator enable remote off	**Not active**	—
Operator enable remote on	**Not active**	—

Motor control → Control function → Control commands		
Off	**Enabled control command - Off**	—
On>	**Enabled control command – On>**	—

Motor control → Control function → Operating mode		
Non-maintained command mode	*Not active/active*	*The setting of the parameter influences the parameter JOG_ON in the SIMOCODE signal block:* *Non-maintained command mode not active: JOG_ON = FALSE* *Non-maintained command mode active: JOG_ON = TRUE*

Motor control → Control function → Auxiliary control inputs		
Feedback ON	**Status - Motor current flowing**	—

Motor control → Control function → Timings		
Execution time	**Greater than soft ramp-down time**	—

Outputs → Basic unit		
BU – Output 1	*Contactor control QE1*	—
BU – Output 2	*Contactor control QE3*	—
BU – Output 3	Contactor control *QE4*	—

Outputs → Operator panel LEDs		
LED green 3	*Display QLE> (on>)*	—
LED green 4	*Display QLA (off)*	—

Outputs → Cyclic send data		
Byte 0, bit 0	**Not connected**	—
Byte 0, bit 1	**Status - Off**	—
Byte 0, bit 2	**Status – On>**	—
Byte 0, bit 3	**Message – Pre-warning overload**	—
Byte 0, bit 4	**Not connected**	—
Byte 0, bit 5	**Status – Remote mode**	—
Byte 0, bit 6	**Status – General fault**	—
Byte 0, bit 7	**Status - General warning**	—
Byte 1, bit 0	Not connected	Freely assignable
Byte 1, bit 1	**Status - Test position (TPF)**	—
Byte 1, bit 2	Not connected	Freely assignable
Byte 1, bit 3	Not connected	Freely assignable
Byte 1, bit 4	Not connected	Freely assignable
Byte 1, bit 5	Not connected	Freely assignable
Byte 1, bit 6	Not connected	Freely assignable
Byte 1, bit 7	Not connected	Freely assignable
Bytes 2 to 3	**Max. current Imax**	—

Standard functions → External faults		
External fault 1	BU - Input 4	Signal output soft starter fault
External fault 1 – Response	Tripping	—

3.5.2 Function

The block is installed by the user in a cyclic watchdog interrupt OB (e.g. OB32). Parameter inputs IN_01 and IN_23 as well as parameter output O_01 are also interconnected by the user with the associated icons for inputs or outputs of the associated SIMOCODE pro device.

SMC_DIR accesses the data provided by SIMOCODE pro via inputs IN_01 (2 bytes of binary data) and IN_23 (2 bytes of motor current).

Data is transferred to SIMOCODE pro via the output O_01 (2 bytes of binary data).

The configuration of the inputs and outputs is determined here by SIMOCODE pro basic type 2.

Access to the inputs and outputs takes place exclusively via the process image.

The block uses the input parameter MODE to determine whether the inputs IN_01 and IN_23 are valid. In the case of a higher-level fault, all inputs are read by SIMOCODE pro with "0" and output to the relevant outputs of the block.

3.5.3 Assignment of the cyclic process image

Table 3- 13 Assignment of O_01: Output commands to SIMOCODE pro

Bit	Control interface
0.0	—
0.1	Off
0.2	On> → On
0.3	Test 1
0.4	Emergency start
0.5	Local/remote control station
0.6	Reset
0.7	—
1.0 … 1.7	User-specific outputs

Table 3- 14 Assignment of IN_0: Feedback messages from SIMOCODE pro

Bit	Cyclic send data	Block parameter
0.0	—	—
0.1	Status – Off	QSTOP
0.2	Status – On	QRUN
0.3	Message – Pre-warning overload	QOVL
0.4	—	—
0.5	Status – Remote mode	QREMOTE
0.6	Status - General fault	QGR_ERR
0.7	Status - General warning	QGR_WRN
1.0	—	—
1.1	Status - Test position (TPF)	QCST
1.2 … 1.7	—	—

The input parameter IN_01 is additionally copied to the output Q_IN_01.

The motor current is transferred via the input parameter IN_23 as an unsigned 2-byte value. SIMOCODE pro always transfers the current here as a percentage of the set current in a range from 0 to 1000%. The motor current is output via QCUR.

Assignment of bytes 2 / 3 of the analog control interface and bytes 4 to 9 of the cyclic send data when using basic type 1 is described in the following chapter: Assignment of the cyclic process image (Page 35)

3.5.4 Operating modes

Changing the control station (REMOTE, LOCAL)

The control station is changed via the interconnectable function input REM_L if the input REM_SEL is set, or via the function input REM_ON_OP set by the OS.

The function input (REMOP_EN) influences the operator enable (QLOCOP) for operating via the OS.

The operating mode of the control station is output via QREMOTE (1 = REMOTE, 0 = LOCAL). QREMOTE corresponds here to the bit DP 0.5 of the SIMOCODE pro.

In LOCAL mode, the controller is completely switched off via the SMC_DIRblock. Control is then only possible via a control station connected direct to the SIMOCODE pro. It is still possible to acknowledge the fault.

Changing the operating modes (MANUAL, AUTO) when REMOTE is selected

If QREMOTE = TRUE, changeover between the two operating modes MANUAL and AUTOMATIC takes place either via OS operation using AUT_ON_OP (LIOP_SEL = 0) or via the interconnection of the input AUT_L (LIOP_SEL = 1).

The function inputs (MANOP_EN, AUTOP_EN) influence the operator enables (QMANOP, QAUTOP) for operating via the OS.

The operating mode is output at output QMAN_AUT (1 = AUTO, 0 = MANUAL).

Changing the control station for MANUAL

In REMOTE mode, the operating mode MANUAL can be controlled either via the OS or via the interconnectable function inputs. The changeover for this takes place via the interconnectable function input LINK_MAN.

3.5.5 Control stations for MANUAL and AUTOMATIC mode

General information

The PLC/DP control station of the SIMOCODE pro (that is, DP0.1 and DP0.2) is level-active. The On command is stored in the SIMOCODE pro. The Off command (DP0.1) takes priority over the On command (DP0.2).

Control of the SIMOCODE pro via AS/OS is only possible in REMOTE mode.

AUTOMATIC

In automatic mode, the SIMOCODE pro control functions are controlled via the interconnectable function input AUTO_ON (TRUE = On, FALSE = Off).

Control without non-maintained command mode (JOG_ON = FALSE)

At one edge of the command input, the associated control bit is set in the interface until the SIMOCODE pro sends the relevant feedback message, or a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the automatic interface.

Control with non-maintained command mode (JOG_ON = TRUE)

The corresponding control bit in the interface is set as long as the command input = TRUE or if a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the automatic interface. The Stop command is not necessary for switching the device off but is nevertheless set by the block if no On command is active.

MANUAL

In manual mode, the SIMOCODE pro is controlled either via the function input MAN_ON (TRUE = On, FALSE = Off set by the OS or via the interconnectable function inputs L_ON and L_OFF.

The inputs for the operator enables ON_OP_EN / OFFOP_EN set the outputs QON_OP / QOFF_OP for operation using the OS.

At one edge of the command input, the associated control bit is set in the interface until the SIMOCODE pro sends the relevant feedback message, or a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the interconnectable manual interface.

The Off command takes priority over the On command (no edge evaluation!).

After changing to manual mode, the commands are not forwarded to the inputs until there is a positive edge change when L_ON / L_OFF is active.

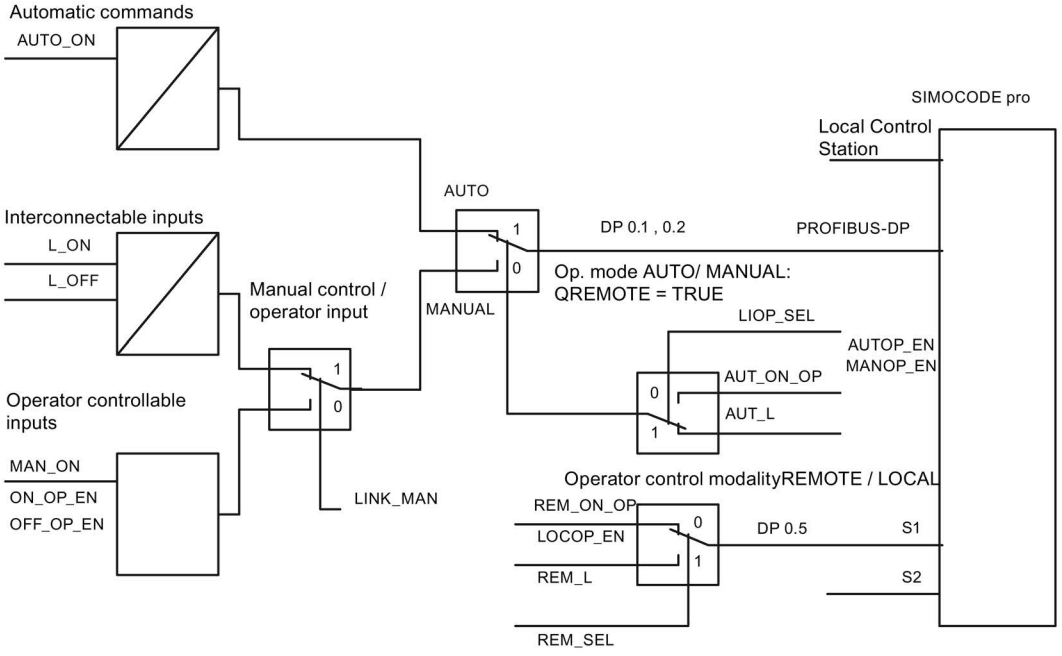
Control without non-maintained command mode (JOG_ON = FALSE)

At one edge of the command input, the associated control bit is set in the interface until the SIMOCODE pro sends the relevant feedback message, or a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the interconnectable inputs. The operator controllable input MAN_ON is adjusted when tripped.

Control with non-maintained command mode (JOG_ON = TRUE)

The corresponding control bit in the interface is set as long as the command input = TRUE or if a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the automatic interface. The Stop command is not necessary for switching the device off but is nevertheless set by the block if no On command is active.

3.5.6 Overview of control stations, operating modes, and operator control modalities



3.5.7 Simulation

The simulation mode is activated using the input SIM_ON and takes priority over all other operating modes. If SIM_ON = TRUE, the block processes the simulation values (SIM_I01: binary data, SIM_I23: motor current) instead of the process values of SIMOCODE pro (IN_01, IN_23). QSIM, QUALITY and QBAD are output accordingly. The process output (O_01) is output with "0" if simulation is active. The command status is combined with the output QSTATUS.

A block must be programmed for the simulation. The output QSTATUS can be evaluated and this information can be used to form the simulation feedback message (SIM_I01, SIM_I23). Assignment corresponds to assignment of the process inputs/process output and can be found in the following chapter: Assignment of the cyclic process image (Page 69)

3.5.8 Interlocking

The interlocks LOCK and LOCK_ON are only effective in REMOTE mode and are valid in the operating mode MANUAL and AUTO for all control stations of the SMC_DIR block.

An active lock input prevents switching and disables control stations for MANUAL and AUTO. The control bit is set permanently.

LOCK always takes priority over LOCK_ON.

Revoking of LOCK_ON switches the motor to the operating mode AUTO corresponding to the control station for AUTO. In MANUAL, the motor is switched off.

3.5.9 Local Interruption

The output QLOC_INT indicates in REMOTE that operation via the local control station (connected direct to SIMOCODE pro) has changed the current switching state.

QLOC_INT is also set if the switching state requested via REMOTE has not been reached within the monitoring time set using TIME_MON and no general fault has occurred (e.g. due to a higher-priority Off command at the SIMOCODE pro general control station). This monitoring is switched off with TIME_MON = 0 or MONITOR = FALSE.

If QLOC_INT = TRUE, the control outputs are reset.

QLOC_INT is reset via the inputs RESET (operator controllable) / L_RESET (interconnectable). The input RESET is reset after acknowledgment. If L_RESET is active permanently, QLOC_INT is set for the duration of the cycle if the requirements given above are met.

Monitoring is deactivated at initial startup by setting MONITOR = FALSE.

3.5.10 Current and current limit monitoring

Current

The motor current is transferred via the input parameter IN_23 as an unsigned 2-byte value. SIMOCODE pro always transfers the current here as a percentage of the set current in a range from 0 to 1000%.

Current limits

The current limit values are read out from the data set DS130. Reading of the data set is initiated either via the interconnectable input parameter L_RD_DATA, in the OS when selecting the limit value view, or by OS operation (RD_DATA). The output QEN_RDWR is reset during communication.

The data read is output to the in/out parameters Alarm high (CUR_AH), Alarm low (CUR_AL), Warning high (CUR_WH) and Warning low (CUR_WL).

If a fault occurs, the values are set to zero and the output QERR_RD = TRUE is set.

The limit values can also be parameterized in the faceplate. If the values are changed, they are written to SIMOCODE pro.

The signaling response in the case of limit value violations are parameterized with SIMOCODE ES or SIMATIC PDM. Under Monitoring functions → Current limits, the response to trip level/warning level is set for this purpose as follows:

Trip level:	disabled or tripping
Warning level:	disabled or warning

If a fault occurs when writing, the values are reset to "0" and the output QERR_WR = TRUE is set.

Overshooting or undershooting of the limit values results in transmission of the relevant message provided the limit value message has not been completely switched off via the parameter M_SUP_C (default is: switched off). Limit value violation messages are generated in the SIMOCODE pro and evaluated in the block. The outputs QCUR_AH, QCUR_AL, QCUR_WH and QCUR_WL are set accordingly.

Range limits

The range limits for the limit bars are parameterized using the function inputs MO_PVHR and MO_PVLR and can be adjusted in the OS.

3.5.11 Signaling response

Table 3- 15 SMC_DIR issues the following messages:

Message block	Message number	Block parameter	Message text	Message class
MSG_EVID1	1	QGR_WRN	$$BlockComment$$ General warning: @4W%t#SMC_Warnings@ @5W%t#SMC_Warnings@ @6W%t#SMC_Warnings@	WH
	2	QGR_ERR	$$BlockComment$$ General fault: @7%t#SMC_Errors@	AH
	3	QCUR_AH	$$BlockComment$$ Current alarm up	AH
	4	QCUR_WH	$$BlockComment$$ Current warning up	WH
	5	QCUR_WL	$$BlockComment$$ Current warning down	WL
	6	QCUR_AL	$$BlockComment$$ Current alarm down	AL
	7	QCST	$$BlockComment$$ Test feedback	WH
	8	MSG_8	Free	—
MSG_EVID2	9	MSG_9	Free	—
	10	MSG_10	Free	—
	11	MSG_11	Free	—
	12	MSG_12	Free	—
	13	MSG_13	Free	—
	14	MSG_14	Free	—
	15	MSG_15	Free	—
	16	MSG_16	Free	—

The free message inputs are not assigned a fixed meaning and can be activated using the parameters MSG_x (x = 8 to 16) on the SMC_DIR.

Table 3- 16 The ALARM_8P auxiliary values are assigned as follows:

Message block	Message number	Auxiliary value	Block parameter	Meaning
MSG_EVID1	—	1	BA_NA	Batch name
	—	2	STEP_NO	Batch step number
	—	3	BA_ID	Batch ID
	1	4	WRN_NO1	Warning number 1
		5	WRN_NO2	Warning number 2
	2	6	WRN_NO3	Warning number 3
		7	ERR_NO1	Fault number 1
		8	ERR_NO2	Fault number 2
		9	ERR_NO3	Fault number 3
		10	—	—
MSG_EVID2	—	1	BA_NA	Batch name
	—	2	STEP_NO	Batch step number
	—	3	BA_ID	Batch ID
	—	4	AUX_PR14	Free
	—	5	AUX_PR15	Free
	—	6	AUX_PR16	Free
	—	7	AUX_PR17	Free
	—	8	AUX_PR18	Free
	—	9	AUX_PR19	Free
	—	10	AUX_PR20	Free

The auxiliary values AUX_PR14 … AUX_PR20 are freely available.

The limit value messages can be suppressed via the input M_SUP_C. The default value of the input M_SUP_C is TRUE, that is, message suppression is active.

For the messages "General warning" and "General fault", the diagnostics block SMC_DIAG supplies the detailed information that is interconnected via the structure DIAG_INF to SMC_DIR.

General warning (message number 1)

The message General warning is derived from the diagnostics structure DIAG_INF formed by the block SMC_DIAG.

Three auxiliary values are transferred as additional information together with the message General warning. The auxiliary values correspond to the contents of the warning numbers WRN_NO1, WRN_NO2 and WRN_NO3 and contain the first three warning causes found.

The user text library SMC_Warnings is available for the warnings. This contains the precise fault texts and is supplemented dynamically in the message.

General fault (message number 2)

The message General fault is derived from the diagnostics structure DIAG_INF formed by the block SMC_DIAG.

One auxiliary value is transferred as additional information together with the message General fault. The auxiliary value corresponds to the contents of the fault number ERR_NO1 and contains the first fault cause found.

The auxiliary values 8 and 9 are interconnected with the parameters ERR_NO2 and ERR_NO3 and can be appended to the message if required.

The user text library SMC_Errors is available for the faults. This contains the precise error texts and is supplemented dynamically in the message.

Current limit messages (message number 3 to 6)

The current limit messages are formed by the SIMOCODE pro and are contained in the diagnostics structure DIAG_INF.

Test feedback (message number 7)

The message "Test feedback" is derived direct from the SIMOCODE pro information (DP 1.1 Send).

Free messages (message number 8 of the message block 1, message numbers 1 to 8 of message block 2)

There is no block-internal assignment to a specific function for these messages. It can be activated via a parameter input (MSG_8 to MSG_16) and can be used, for example, for reporting of Local_Interruption, the operating mode SIMULATION, or any other signal.

3.5.12 Reset response

In principle, every fault detected by SIMOCODE pro must be acknowledged. This is done via the bit DP0.6 Recv. Reset is only carried out by SIMOCODE pro if there is no active On command. Reset either resets the General fault (QGR_ERR) if the cause of the fault no longer exists, or it results in acknowledgment of the fault if the cause of the fault still exists. An acknowledged fault automatically results in resetting of the general fault following removal of the fault cause.

Reset can be carried out either via the interconnectable function input L_SMCRESET or via the OS operator controllable function input SMCRESET.

L_SMCRESET is level-active. SMCRESET is reset by the block following evaluation.

The reset function is transparent from the block's perspective, that is, there is no logical combination with other signals, and independent of the operating mode (LOCAL / REMOTE).

3.5.13 Start-up characteristics

At CPU startup, the block is switched to manual mode and the Off command is output. For this purpose, the block must be called from the startup OB. After startup, the messages are suppressed for the number of cycles parameterized in the RUNUPCYC value.

3.5.14 Time response

The block must be called via a watchdog interrupt OB. The sampling time of the block is entered in the parameter SAMPLE_T.

3.5.15 SMC_DIR block parameters

Element	Type	Kind	Meaning	HMI
AUT_L	BOOL	I	Interconnectable input for MAN / AUTO (0 = Manual / 1 = Auto)	N
AUT_ON_OP	BOOL	IO	Control input: 0 = Manual, 1 = Auto	Y
AUTO_ON	BOOL	I	Automatic value: 1 = On, 0 = Off	N
AUTOP_EN	BOOL	I	1 = Operator enable for Auto	N
AUX_PRxx	ANY	IO	Auxiliary value x (x = 11 to 20)	N
BA_EN	BOOL	I	BATCH record release	Y
BA_ID	DWORD	I	BATCH: Consecutive batch number	Y
BA_NA	STRING [32]	I	BATCH designation	Y
CST	BOOL	I	1 = Test mode	N
CUR_AH	REAL	IO	Upper alarm limit current	Y
CUR_AL	REAL	IO	Lower alarm limit current	Y
CUR_WH	REAL	IO	Upper warning limit current	Y
CUR_WL	REAL	IO	Lower warning limit current	Y
DD_17_20	DWORD	O	DS92 Byte 17 to 20: General warning additional info 1	Y
DD_21_22	WORD	O	DS92 Byte 21 to 22: General warning additional info 2	Y
DD_24_27	DWORD	O	DS92 Byte 24 to 27: General fault additional info 1	Y
DD_28_31	DWORD	O	DS92 Byte 28 to 31: General fault additional info 2	Y
DIAG_INF	UDT_ DIAG	I	Diagnostics structure of SMC_DIAG	N
EM_START	BOOL	I	Emergency start	Y
EN_MEAS	BOOL	I	1 = Measured value block available	Y
EN_RDWR	BOOL	I	1 = Enable reading/writing of data set	N
EN_STAT	BOOL	I	1 = Statistics block available	Y
ERR_NOx	INT	O	Fault number x (x = 1 to 6)	Y
I1_x	BOOL	I	User-defined outputs DP1.x (x = 0 to 7)	N
IN_01	WORD	I	Inputs DP0.0 to 1.7	N
IN_23	WORD	I	Input motor current	N

Element	Type	Kind	Meaning	HMI
JOG_ON	BOOL	I	1 = Non-maintained command mode active	N
L_OFF	BOOL	I	Manual control: 1 = Off	N
L_ON	BOOL	I	Manual control: 1 = ON	N
L_RD_DATA	BOOL	I	Interconnectable input 0 → 1: Reading of the data set	N
L_RESET	BOOL	I	Configurable input for resetting QLOC_INT	N
L_SMCRESET	BOOL	I	Interconnectable input for resetting	N
LADDR	INT	I	Start address of the inputs	N
LINK_MAN	BOOL	I	0 = Operator input active 1 = Manual control via interconnectable inputs	N
LIOP_SEL	BOOL	I	Interconnectable input for manual/AUTO changeover (AUT_L: 1 = Interconnection is active 0 = Operation is active	N
LOCK	BOOL	I	1 = Lock (OFF)	Y
LOCK_ON	BOOL	I	1 = Lock (ON)	Y
LOCOP_EN	BOOL	I	1 = Operator enable for LOCAL	N
M_SUP_C	BOOL	I	1 = Message suppression active for current limit value violations	Y
MAN_ON	BOOL	IO	Control input: 1 = ON, 0 = OFF	Y
MANOP_EN	BOOL	I	1 = Operator enable for Manual	N
MO_PVHR	REAL	I	Bar upper limit	Y
MO_PVLR	REAL	I	Bar lower limit	Y
MODE	DWORD	I	Mode of OMODE of the SMC_DIAG	N
MONITOR	BOOL	I	Monitoring: 1 = ON	Y
MSG_ACK1	WORD	O	Messages acknowledged ALARM8_P block 1	N
MSG_ACK2	WORD	O	Messages acknowledged ALARM8_P block 2	N
MSG_EVID1	DWORD	I	Event ID of ALARM8_P block 1	N
MSG_EVID2	DWORD	I	Event ID of ALARM8_P block 2	N
MSG_STAT1	WORD	O	MESSAGE1: STATUS output	N
MSG_STAT2	WORD	O	MESSAGE2: STATUS output	N
MSG_x	BOOL	I	Free message input x (x = 8 to 16)	N
O_01	WORD	O	Outputs DP0.0 to 1.7	N
OCCUPIED	BOOL	I	BATCH record ID	Y
OFFOP_EN	BOOL	I	1 = Operator enable for OFF	N
ON_OP_EN	BOOL	I	1 = Operator enable for ON	N
OOS	BOOL	I	Reserve	Y
Q_IN_01	WORD	O	Inputs DP0.0 to 1.7	N
QAUTOP	BOOL	O	1 = Operator enable for Auto	Y
QBAD	BOOL	O	1 = Invalid process value	Y
QBUS_PLC	BOOL	O	Bus/PLC fault	Y
QCST	BOOL	O	1 = Test active (DP1.1)	Y
QCUR	REAL	O	Motor current % Ie	Y
QCUR_AH	BOOL	O	Upper alarm limit current violated	N

Element	Type	Kind	Meaning	HMI
QCUR_AL	BOOL	O	Lower alarm limit current violated	N
QCUR_WH	BOOL	O	Upper warning limit current violated	N
QCUR_WL	BOOL	O	Lower warning limit current violated	N
QEM_STRT	BOOL	O	1 = Emergency start active	N
QEN_RDWR	BOOL	O	1 = Enable reading/writing of data set	N
QERR	BOOL	O	1 = Program error	N
QERR_RD	BOOL	O	1 = Error while reading the data set	N
QERR_WR	BOOL	O	1 = Error while writing the data set	N
QFLT_F9	BOOL	O	Fault F9	Y
QGR_ERR	BOOL	O	General fault (DP0.6)	N
QGR_WRN	BOOL	O	General warning (DP0.7)	N
QLOC_INT	BOOL	O	1 = Local interruption	Y
QLOCOP	BOOL	O	1 = Operator enable for LOCAL / REMOTE	Y
QMAN_AUT	BOOL	O	0 = Manual, 1 = Automatic	Y
QMANOP	BOOL	O	1 = Operator enable for Manual	Y
QMSG_ERR	BOOL	O	1 = ALARM8_P error	N
QMSG_SUP	BOOL	O	1 = Message suppression	Y
QOFF_OP	BOOL	O	1 = Operator enable for OFF	Y
QON_OP	BOOL	O	1 = Operator enable for ON	Y
QOP_ERR	BOOL	O	1 = General operator error	N
QPARFF16	BOOL	O	Parameter error F16	Y
QRD_STAT	WORD	O	Return Value of the SFB RDREC	N
QRDWR_OP	BOOL	O	1 = Operator enable Read/write data set	Y
QREMOTE	BOOL	O	1 = REMOTE mode (DP0.5)	Y
QRUN	BOOL	O	Status: 1 = Motor ON (DP0.2)	Y
QSIM	BOOL	O	1 = Simulation active	Y
QSTATUS	WORD	O	Command status (outputs DP0.0 to 1.7)	N
QSTOP	BOOL	O	Status: 1 = Motor OFF (DP0.1)	Y
QUALITY	BYTE	O	Quality code	N
QWR_STAT	WORD	O	Return Value of the SFB WRREC	N
RACKF	BOOL	I	1 = Rack fault	N
RD_DATA	BOOL	IO	0 → 1: Reading of the data set	Y
REM_L	BOOL	I	Interconnectable input for LOCAL / REMOTE(0 = LOCAL / 1 = REMOTE)	N
REM_ON_OP	BOOL	IO	Control input: 0 = LOCAL 1 = REMOTE	Y
REM_SEL	BOOL	I	Interconnectable input for LOCAL / REMOTE changeover (REM_L): 1 = Interconnection is active 0 = Operation is active	N
RESET	BOOL	IO	Control input for resetting QLOC_INT	N
RUNUPCYC	INT	I	Number of initial run cycles after CPU restart	N

Element	Type	Kind	Meaning	HMI
SAMPLE_T	REAL	I	Sampling time in [s]	N
SIM_I01	WORD	I	Simulation value IN_01	N
SIM_I23	WORD	I	Simulation value IN_23	N
SIM_ON	BOOL	I	1 = Simulation	Y
SMCRESET	BOOL	IO	Operator controllable reset input for faults	Y
STEP_NO	DWORD	I	Batch step number	Y
TIME_MON	REAL	I	Monitoring time in [s]	Y
USTATUS	WORD	I	Status word in VSTATUS, freely user-assignable	N
VSTATUS	DWORD	O	Status for status displays for block icon	Y
WRN_NOx	INT	O	Warning number x (x = 1 to 6)	Y

Table 3- 17 Structure of VSTATUS

Bit	Parameter
0	OCCUPIED
1	BA_EN
2	QSIM
3	QMAN_AUT
4	QCST
5	QGR_ERR
6	QGR_WRN
7	QLOC_INT
8	LOCK / LOCK_ON
9	QRUN
10	QSTOP
11	—
12	—
13	—
14	—
15	—
16 … 31	USTATUS

3.5.16 Status displays for icons

Status	Parameter	View
Off	QSTOP = 1	
On	QRUN = 1	
Not available	QBAD =	

3.5.17 Description of faceplates

The available faceplates are described in this chapter.

The following views are available:

Overview	OVERVIEW
Standard	STANDARD
Limits	LIMITS
Maintenance	MAINTENANCE
Faults	MESSAGE1
Warnings	MESSAGE2
Messages	—
Trend	—
Batch	—

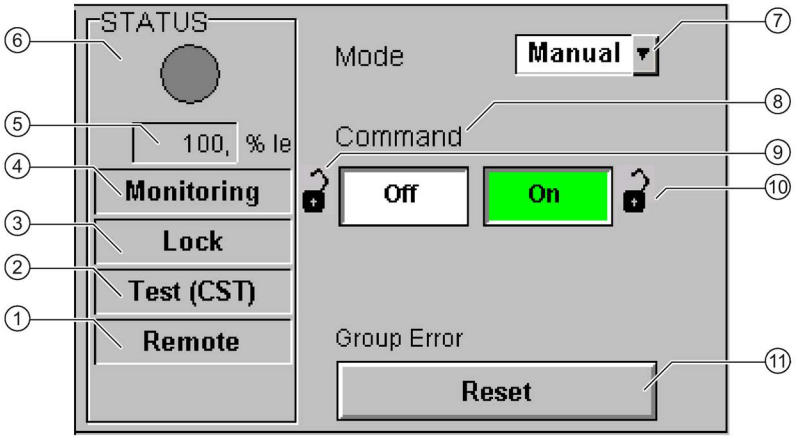
The file name is composed as follows: @PG_SMC_DIR_<View>.PDL

The PCS 7 standard displays are used for the message, trend and batch views.

The structure of the individual views of faceplates is described below.

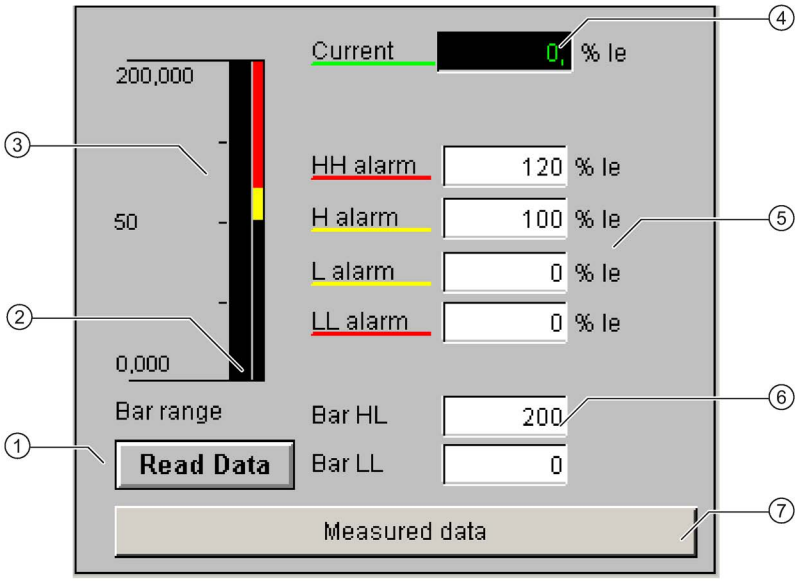
Standard (STANDARD)

The status display is a user object comprising several status displays. The status display corresponds to the representation from the process image icon.



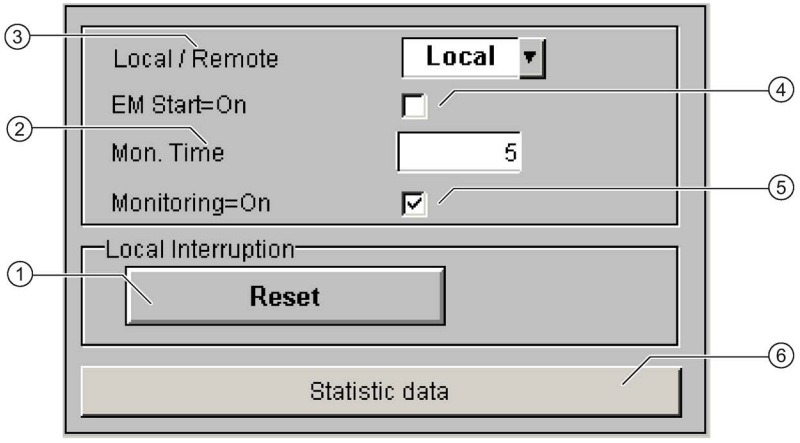
① Operator control modality (QREMOTE)
② Test (QCST)
③ Interlocking (LOCK / LOCK_ON)
④ Local Interruption (QLOC_INT)
⑤ Current (QCUR) / unit (QCUR#unit)
⑥ Status display (VSTATUS)
⑦ Operating mode (QMAN_AUT, AUT_ON_OP)
⑧ Command (MAN_ON)
⑨ LOCK
⑩ LOCK_ON
⑪ Acknowledgement (RESET)

Limits (LIMITS)



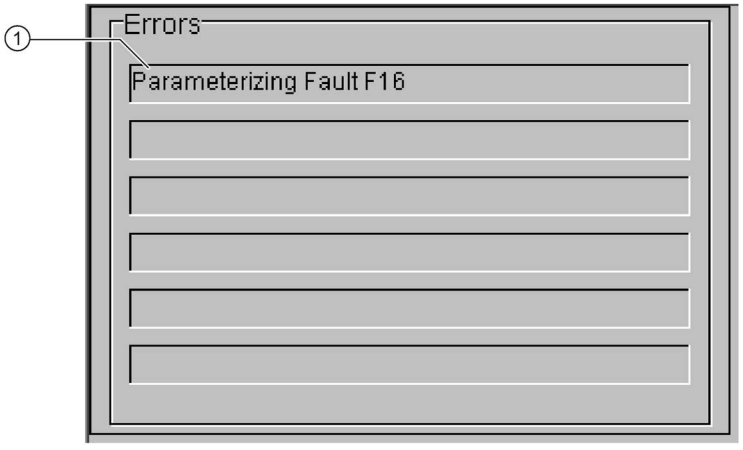
① Read Data (RD_DATA)
② Limit value display (CUR_AH, CUR_WH, CUR_WL, CUR_AL)
③ Actual value bar (QCUR, MO_PVHR, MO_PVLR)
④ Current value (QCUR, QCUR#unit)
⑤ Limits (CUR_AH, CUR_WH, CUR_WL, CUR_AL)
⑥ Bar range (MO_PVHR, MO_PVLR)
⑦ Call faceplate SMC_MEAS, visible if EN_MEAS = TRUE

Maintenance (MAINTENANCE)



① Acknowledge Local Interruption (RESET)
② Monitoring time for Local Interruption (TIME_MON)
③ Operator control modality Local / Remote (REM_ON_OP)
④ Activation Emergency Start (EM_START)
⑤ Activation Monitoring (MONITOR)
⑥ Call faceplate SMC_STAT, visible if EN_STAT = TRUE

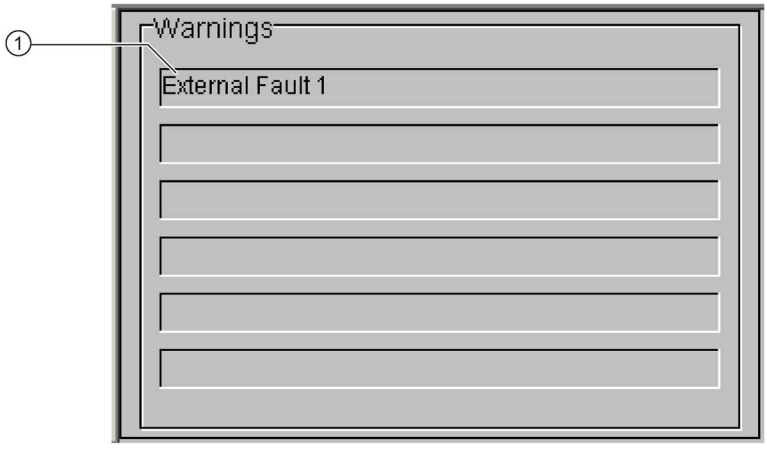
Faults (MESSAGE1)



① Text list with error description (ERR_NOx)

For error number 0, the text field is switched to invisible.

Warnings (MESSAGE2)



① Text list with error description (WRN_NOx)

For error number 0, the text field is switched to invisible.

3.6 SMC_REV: Signal processing block for reversing starter/soft reversing starter control function

FB2005

Calling OBs

The watchdog interrupt OB in which you install the block (e.g. OB32). Also in OB100 (see start-up characteristics).

Called blocks

The block calls the following blocks:

SFB35	ALARM_8P
SFB52	RDREC
SFB53	WRREC
SFC6	RD_SINFO
SFC20	BLKMOV
SFC21	FILL

3.6.1 Parameter assignment in SIMOCODE ES

For the signal blocks to function correctly, a range of SIMOCODE pro parameters must have quite specific settings. Those parameters that define the assignment of the cyclic I/O interface are especially affected.

These parameters are represented in **bold**.

In addition, the overview below represents the parameters that are already preset for the control function in the templates for application selection in the SIMOCODE ES software. The settings are suggestions and depend heavily on the actual wiring of the SIMOCODE pro inputs and outputs.

These parameters are represented in *italics*.

Other parameters must also be set, e.g. for motor protection. These are not described here. Parameter assignment for the extended I/O interface of basic type 1 is represented in the following chapter: Parameter assignment in SIMOCODE ES (Page 33)

Reversing starter control function

Motor control → Control stations		
Operation mode selector S1	**Cyclic receive bit 0.5**	—
Operation mode selector S2	*Fixed level 1*	—

Local control [LC]		
On<	*BU - Input 2*	—
Off	*BU - Input 2*	—
On>	*BU - Input 1*	—
Operator enable local 2 off	*Active*	—
Operator enable local 2 on	*Active*	—
Operator enable remote off	**Not active**	—
Operator enable remote on	**Not active**	—

PLC/PCS [DP]		
On<	**Cyclic receive – bit 0.0**	—
Off	**Cyclic receive – bit 0.1**	—
On>	**Cyclic receive – bit 0.2**	—
Operator enable local 2 off	**Not active**	—
Operator enable local 2 on	**Not active**	—
Operator enable remote off	**Active**	—
Operator enable remote on	**Active**	—

Operator Panel [OP]		
On>	*OP button 3*	—
Off	*OP button 4*	—
On<	*OP button 2*	—
Operator enable local 2 off	*Active*	—
Operator enable local 2 on	*Active*	—
Operator enable remote off	**Not active**	—
Operator enable remote on	**Not active**	—

Motor control → Control function → Control commands		
On<	**Enabled control command – On<**	—
Off	**Enabled control command - Off**	—
On>	**Enabled control command – On>**	—

Motor control → Control function → Operating mode		
Non-maintained command mode	*Not active/active*	*The setting of the parameter influences the parameter JOG_ON in the SIMOCODE signal block:* *Non-maintained command mode not active: JOG_ON = FALSE* *Non-maintained command mode active: JOG_ON = TRUE*
Saving change-over command	**Active**	—

Motor control → Control function → Auxiliary control inputs		
Feedback ON	**Status - Motor current flowing**	—

Outputs → Basic unit		
BU – Output 1	*Contactor control QE1*	—
BU – Output 2	*Contactor control QE2*	—

Outputs → Operator panel LEDs		
LED green 2	*Display QLE< (on<)*	—
LED green 3	*Display QLE> (on>)*	—
LED green 4	*Display QLA (off)*	—

Outputs → Cyclic send data		
Byte 0, bit 0	**Status – On<**	—
Byte 0, bit 1	**Status - Off**	—
Byte 0, bit 2	**Status – On>**	—
Byte 0, bit 3	**Message – Pre-warning overload**	—
Byte 0, bit 4	**Status – Interlocking time active**	—
Byte 0, bit 5	**Status – Remote mode**	—
Byte 0, bit 6	**Status – General fault**	—
Byte 0, bit 7	**Status - General warning**	—
Byte 1, bit 0	Not connected	Freely assignable
Byte 1, bit 1	**Status - Test position (TPF)**	—
Byte 1, bit 2	Not connected	Freely assignable
Byte 1, bit 3	Not connected	Freely assignable
Byte 1, bit 4	Not connected	Freely assignable
Byte 1, bit 5	Not connected	Freely assignable
Byte 1, bit 6	Not connected	Freely assignable
Byte 1, bit 7	Not connected	Freely assignable
Bytes 2 to 3	**Max. current Imax**	—

Soft starter control function with reversing contactor 3RW402 / 3RW403 / 3RW404

Motor control → Control stations		
Operation mode selector S1	**Cyclic receive bit 0.5**	—
Operation mode selector S2	*Fixed level 1*	—

Local control [LC]		
On<	*BU - Input 3*	—
Off	*BU - Input 2*	—
On>	*BU - Input 1*	—
Operator enable local 2 off	*Active*	—
Operator enable local 2 on	*Active*	—
Operator enable remote off	**Not active**	—
Operator enable remote on	**Not active**	—

PLC/PCS [DP]		
On<	**Cyclic receive – bit 0.0**	—
Off	**Cyclic receive – bit 0.1**	—
On>	**Cyclic receive – bit 0.2**	—
Operator enable local 2 off	**Not active**	—
Operator enable local 2 on	**Not active**	—
Operator enable remote off	**Active**	—
Operator enable remote on	**Active**	—

Operator Panel [OP]		
On>	*OP button 3*	—
Off	*OP button 4*	—
On<	*OP button 2*	—
Operator enable local 2 off	*Active*	—
Operator enable local 2 on	*Active*	—
Operator enable remote off	**Not active**	—
Operator enable remote on	**Not active**	—

Motor control → Control function → Control commands		
On<	**Enabled control command – On<**	—
Off	**Enabled control command - Off**	—
On>	**Enabled control command – On>**	—

Motor control → Control function → Operating mode		
Non-maintained command mode	*Not active/active*	*The setting of the parameter influences the parameter JOG_ON in the SIMOCODE signal block:* *Non-maintained command mode not active: JOG_ON = FALSE* *Non-maintained command mode active: JOG_ON = TRUE*
Saving change-over command	**Active**	—

Motor control → Control function → Auxiliary control inputs		
—	—	—

Motor control → Control function → Timings		
Execution time	**Greater than soft ramp-down time**	—
Feedback ON	**Status - Motor current flowing**	—

Outputs → Basic unit		
BU – Output 1	*Contactor control QE1*	—
BU – Output 2	*Contactor control QE2*	—

Outputs → Operator panel LEDs		
LED green 2	*Display QLE< (on<)*	—
LED green 3	*Display QLE> (on>)*	—
LED green 4	*Display QLA (off)*	—

Outputs → Digital module 1		
DM – Output 1	Contactor control QE3	—

Outputs → Cyclic send data		
Byte 0, bit 0	**Status – On<**	—
Byte 0, bit 1	**Status - Off**	—
Byte 0, bit 2	**Status – On>**	—
Byte 0, bit 3	**Message – Pre-warning overload**	—
Byte 0, bit 4	**Status – Interlocking time active**	—
Byte 0, bit 5	**Status – Remote mode**	—
Byte 0, bit 6	**Status – General fault**	—
Byte 0, bit 7	**Status - General warning**	—
Byte 1, bit 0	Not connected	Freely assignable
Byte 1, bit 1	**Status - Test position (TPF)**	—
Byte 1, bit 2	Not connected	Freely assignable
Byte 1, bit 3	Not connected	Freely assignable
Byte 1, bit 4	Not connected	Freely assignable
Byte 1, bit 5	Not connected	Freely assignable
Byte 1, bit 6	Not connected	Freely assignable
Byte 1, bit 7	Not connected	Freely assignable
Bytes 2 to 3	**Max. current Imax**	—

Standard functions → External faults		
External fault 1	BU - Input 4	Signal output soft starter fault
External fault 1 – Response	Tripping	—

Soft starter control function with reversing contactor 3RW405 / 3RW406 / 3RW407

Motor control → Control stations		
Operation mode selector S1	**Cyclic receive bit 0.5**	—
Operation mode selector S2	*Fixed level 1*	—

Local control [LC]		
On<	*BU - Input 3*	—
Off	*BU - Input 2*	—
On>	*BU - Input 1*	—
Operator enable local 2 off	*Active*	—
Operator enable local 2 on	*Active*	—
Operator enable remote off	**Not active**	—
Operator enable remote on	**Not active**	—

PLC/PCS [DP]		
On<	Cyclic receive – bit 0.0	—
Off	Cyclic receive – bit 0.1	—
On>	Cyclic receive – bit 0.2	—
Operator enable local 2 off	Not active	—
Operator enable local 2 on	Not active	—
Operator enable remote off	Active	—
Operator enable remote on	Active	—

Operator Panel [OP]		
On>	*OP button 3*	
Off	*OP button 4*	—
On<	*OP button 2*	—
Operator enable local 2 off	*Active*	—
Operator enable local 2 on	*Active*	—
Operator enable remote off	Not active	—
Operator enable remote on	Not active	—

Motor control → Control function → Control commands		
On<	Enabled control command – On<	—
Off	Enabled control command - Off	—
On>	Enabled control command – On>	—

Motor control → Control function → Operating mode		
Non-maintained command mode	*Not active/active*	*The setting of the parameter influences the parameter JOG_ON in the SIMOCODE signal block:* *Non-maintained command mode not active: JOG_ON = FALSE* *Non-maintained command mode active: JOG_ON = TRUE*
Saving change-over command	Active	—

Motor control → Control function → Auxiliary control inputs		
—	—	—

Motor control → Control function → Timings		
Execution time	Greater than soft ramp-down time	—
Feedback ON	Status - Motor current flowing	—

Outputs → Basic unit		
BU – Output 1	*Contactor control QE1*	—
BU – Output 2	*Contactor control QE2*	—
BU – Output 3	Contactor control *QE4*	—

Outputs → Operator panel LEDs		
LED green 2	*Display QLE< (on<)*	—
LED green 3	*Display QLE> (on>)*	—
LED green 4	*Display QLA (off)*	—

Outputs → Digital module 1		
DM – Output 1	Contactor control QE3	—

Outputs → Cyclic send data		
Byte 0, bit 0	Status – On<	—
Byte 0, bit 1	**Status - Off**	—
Byte 0, bit 2	**Status – On>**	—
Byte 0, bit 3	**Message – Pre-warning overload**	—
Byte 0, bit 4	**Status – Interlocking time active**	—
Byte 0, bit 5	**Status – Remote mode**	—
Byte 0, bit 6	**Status – General fault**	—
Byte 0, bit 7	**Status - General warning**	—
Byte 1, bit 0	Not connected	Freely assignable
Byte 1, bit 1	**Status - Test position (TPF)**	—
Byte 1, bit 2	Not connected	Freely assignable
Byte 1, bit 3	Not connected	Freely assignable
Byte 1, bit 4	Not connected	Freely assignable
Byte 1, bit 5	Not connected	Freely assignable
Byte 1, bit 6	Not connected	Freely assignable
Byte 1, bit 7	Not connected	Freely assignable
Bytes 2 to 3	**Max. current Imax**	—

Standard functions → External faults		
External fault 1	BU - Input 4	Signal output soft starter fault
External fault 1 – Response	Tripping	—

3.6.2 Function

The block is installed by the user in a cyclic watchdog interrupt OB (e.g. OB32). Parameter inputs IN_01 and IN_23 as well as parameter output O_01 are also interconnected by the user with the associated icons for inputs or outputs of the associated SIMOCODE pro device.

SMC_REV accesses the data provided by SIMOCODE pro via inputs IN_01 (2 bytes of binary data) and IN_23 (2 bytes of motor current).

Data is transferred to SIMOCODE pro via the output O_01 (2 bytes of binary data).

The configuration of the inputs and outputs is determined here by SIMOCODE pro basic type 2.

Access to the inputs and outputs takes place exclusively via the process image.

The block uses the input parameter MODE to determine whether the inputs IN_01 and IN_23 are valid. In the case of a higher-level fault, all inputs are read by SIMOCODE pro with "0" and output to the relevant outputs of the block.

3.6.3 Assignment of the cyclic process image

Table 3- 18 Assignment of O_01: Output commands to SIMOCODE pro

Bit	Control interface
0.0	On< → Left On
0.1	Off
0.2	On> → On
0.3	Test 1
0.4	Emergency start
0.5	Local/remote control station
0.6	Reset
0.7	—
1.0 … 1.7	User-specific outputs

Table 3- 19 Assignment of IN_0: Feedback messages from SIMOCODE pro

Bit	Cyclic send data	Block parameter
0.0	Status – On<	QRUN / QDIR = TRUE
0.1	Status – Off	QSTOP
0.2	Status – On>	QRUN / QDIR = FALSE
0.3	Message – Pre-warning overload	QOVL
0.4	Status - Interlocking time active	QLTA
0.5	Status – Remote mode	QREMOTE
0.6	Status - General fault	QGR_ERR
0.7	Status - General warning	QGR_WRN
1.0	—	—
1.1	Status - Test position (TPF)	QCST
1.2 … 1.7	—	—

The input parameter IN_01 is additionally copied to the output Q_IN_01.

The motor current is transferred via the input parameter IN_23 as an unsigned 2-byte value. SIMOCODE pro always transfers the current here as a percentage of the set current in a range from 0 to 1000%. The motor current is output via QCUR.

Assignment of bytes 2 / 3 of the analog control interface and bytes 4 to 9 of the cyclic send data when using basic type 1 is described in the following chapter: Assignment of the cyclic process image (Page 35)

3.6.4 Operating modes

Changing the control station (REMOTE, LOCAL)

The control station is changed via the interconnectable function input REM_L if the input REM_SEL is set, or via the function input REM_ON_OP set by the OS.

The function input (REMOP_EN) influences the operator enable (QLOCOP) for operating via the OS.

The operating mode of the control station is output via QREMOTE (1 = REMOTE, 0 = LOCAL). QREMOTE corresponds here to the bit DP 0.5 of the SIMOCODE pro.

In LOCAL mode, the controller is completely switched off via the SMC_REVblock. Control is then only possible via a control station connected direct to the SIMOCODE pro. It is still possible to acknowledge the fault.

Changing the operating modes (MANUAL, AUTO) when REMOTE is selected

If QREMOTE = TRUE, changeover between the two operating modes MANUAL and AUTOMATIC takes place either via OS operation using AUT_ON_OP (LIOP_SEL = 0) or via the interconnection of the input AUT_L (LIOP_SEL = 1).

The function inputs (MANOP_EN, AUTOP_EN) influence the operator enables (QMANOP, QAUTOP) for operating via the OS.

The operating mode is output at output QMAN_AUT (1 = AUTO, 0 = MANUAL).

Changing the control station for MANUAL

In REMOTE mode, the operating mode MANUAL can be controlled either via the OS or via the interconnectable function inputs. The changeover for this takes place via the interconnectable function input LINK_MAN.

3.6.5 Control stations for MANUAL and AUTOMATIC mode

General information

The PLC/DP control station of the SIMOCODE pro (that is, DP0.1 and DP0.2) is level-active. The On command is stored in the SIMOCODE pro. The Off command (DP0.1) takes priority over the On command (DP0.2).

Control of the SIMOCODE pro via AS/OS is only possible in REMOTE mode.

AUTOMATIC

In automatic mode, the SIMOCODE pro control functions are controlled via the interconnectable function inputs AUTO_ON (TRUE = On, FALSE = Off) and AUTO_DIR (TRUE = counter-clockwise, FALSE = clockwise).

Control without non-maintained command mode (JOG_ON = FALSE)

At one edge of the command input, the associated control bit is set in the interface until the SIMOCODE pro sends the relevant feedback message, or a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the automatic interface.

Control with non-maintained command mode (JOG_ON = TRUE)

The corresponding control bit in the interface is set as long as the command input = TRUE or if a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the automatic interface. The Stop command is not necessary for switching the device off but is nevertheless set by the block if no On command is active.

MANUAL

In manual mode, the SIMOCODE pro is controlled either via the function inputs FORW_ON, REV_ON and MOT_OFF set by the OS or via the interconnectable function inputs L_FORW, L_REV and L_OFF.

The inputs for the operator enables FW_OP_EN / RV_OP_EN / OFFOP_EN set the outputs QFORW_OP / QREV_OP / QOFF_OP for operation using the OS.

At one edge of the command input, the associated control bit is set in the interface until the SIMOCODE pro sends the relevant feedback message, or a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the interconnectable manual interface.

The Off command takes priority over the On command (no edge evaluation!).

The following priorities apply for the On commands:

Right takes priority over left.

After changing to manual mode, the commands are not forwarded to the inputs until there is a positive edge change when L_FORW / L_REV / L_OFF is active.

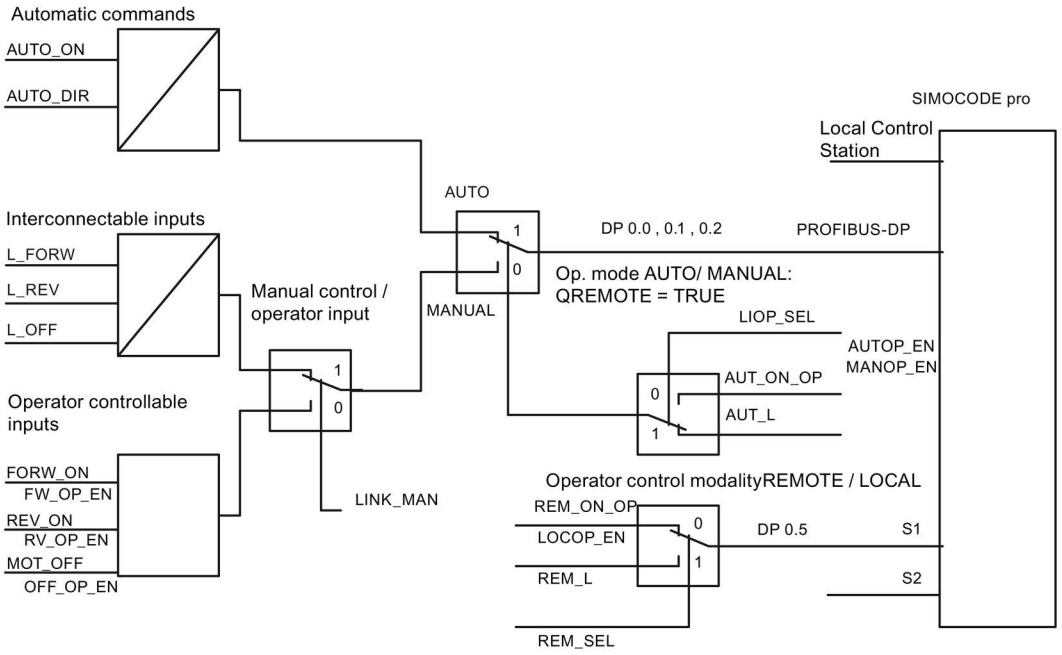
Control without non-maintained command mode (JOG_ON = FALSE)

At one edge of the command input, the associated control bit is set in the interface until the SIMOCODE pro sends the relevant feedback message, or a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the interconnectable inputs. The operator controllable inputs FORW_ON, REV_ON and MOT_OFF are adjusted when tripped.

Control with non-maintained command mode (JOG_ON = TRUE)

The corresponding control bit in the interface is set as long as the command input = TRUE or if a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the automatic interface. The Stop command is not necessary for switching the device off but is nevertheless set by the block if no On command is active.

3.6.6 Overview of control stations, operating modes, and operator control modalities



3.6.7 Simulation

The simulation mode is activated using the input SIM_ON and takes priority over all other operating modes. If SIM_ON = TRUE, the block processes the simulation values (SIM_I01: binary data, and SIM_I23: motor current) instead of the process values of SIMOCODE pro(IN_01, IN_23). QSIM, QUALITY and QBAD are output accordingly. The process output (O_01) is output with "0" if simulation is active. The command status is combined with the output QSTATUS.

A block must be programmed for the simulation. The output QSTATUS can be evaluated and this information can be used to form the simulation feedback message (SIM_I01, SIM_I23). Assignment corresponds to assignment of the process inputs/process output and can be found in the following chapter: Assignment of the cyclic process image (Page 95)

3.6.8 Interlocking

The interlocks LOCK and LOCK_ON are only effective in REMOTE mode and are valid in the operating mode MANUAL and AUTO for all control stations of the SMC_REV block.

An active lock input prevents switching and disables control stations for MANUAL and AUTO. The control bit is set permanently.

LOCK always takes priority over LOCK_ON.

The input LOCK_DIR(TRUE = counter-clockwise, FALSE = clockwise) determines the desired option for LOCK_ON.

Revoking of LOCK_ON switches the motor to the operating mode AUTO corresponding to the control station for AUTO. In MANUAL, the motor is switched off.

3.6.9 Local Interruption

The output QLOC_INT indicates in REMOTE that operation via the local control station (connected direct to SIMOCODE pro) has changed the current switching state.

QLOC_INT is also set if the switching state requested via REMOTE has not been reached within the monitoring time set using TIME_MON and no general fault has occurred (e.g. due to a higher-priority Off command at the SIMOCODE pro general control station). This monitoring is switched off with TIME_MON = 0 or MONITOR = FALSE.

If QLOC_INT = TRUE, the control outputs are reset.

QLOC_INT is reset via the inputs RESET (operator controllable) / L_RESET (interconnectable). The input RESET is reset after acknowledgment. If L_RESET is active permanently, QLOC_INT is set for the duration of the cycle if the requirements given above are met.

Monitoring is deactivated at initial startup by setting MONITOR = FALSE.

3.6.10 Current and current limit monitoring

Current

The motor current is transferred via the input parameter IN_23 as an unsigned 2-byte value. SIMOCODE pro always transfers the current here as a percentage of the set current in a range from 0 to 1000%.

Current limits

The current limit values are read out from the data set DS130. Reading of the data set is initiated either via the interconnectable input parameter L_RD_DATA, in the OS when selecting the limit value view, or by OS operation (RD_DATA). The output QEN_RDWR is reset during communication.

The data read is output to the in/out parameters Alarm high (CUR_AH), Alarm low (CUR_AL), Warning high (CUR_WH) and Warning low (CUR_WL).

If a fault occurs, the values are set to zero and the output QERR_RD = TRUE is set.

The limit values can also be parameterized in the faceplate. If the values are changed, they are written to SIMOCODE pro.

The signaling response in the case of limit value violations are parameterized with SIMOCODE ES or SIMATIC PDM. Under Monitoring functions → Current limits, the response to trip level/warning level is set for this purpose as follows:

Trip level:	disabled or tripping
Warning level:	disabled or warning

If a fault occurs when writing, the values are reset to "0" and the output QERR_WR = TRUE is set.

Overshooting or undershooting of the limit values results in transmission of the relevant message provided the limit value message has not been completely switched off via the parameter M_SUP_C (default is: switched off). Limit value violation messages are generated in the SIMOCODE pro and evaluated in the block. The outputs QCUR_AH, QCUR_AL, QCUR_WH and QCUR_WL are set accordingly.

Range limits

The range limits for the limit bars are parameterized using the function inputs MO_PVHR and MO_PVLR and can be adjusted in the OS.

3.6.11 Signaling response

Table 3- 20 SMC_REV issues the following messages:

Message block	Message number	Block parameter	Message text	Message class
MSG_EVID1	1	QGR_WRN	$$BlockComment$$ General warning: @4W%t#SMC_Warnings@ @5W%t#SMC_Warnings@ @6W%t#SMC_Warnings@	WH
	2	QGR_ERR	$$BlockComment$$ General fault: @7%t#SMC_Errors@	AH
	3	QCUR_AH	$$BlockComment$$ Current alarm up	AH
	4	QCUR_WH	$$BlockComment$$ Current warning up	WH
	5	QCUR_WL	$$BlockComment$$ Current warning down	WL
	6	QCUR_AL	$$BlockComment$$ Current alarm down	AL
	7	QCST	$$BlockComment$$ Test feedback	WH
	8	MSG_8	Free	—
MSG_EVID2	9	MSG_9	Free	—
	10	MSG_10	Free	—
	11	MSG_11	Free	—
	12	MSG_12	Free	—
	13	MSG_13	Free	—
	14	MSG_14	Free	—
	15	MSG_15	Free	—
	16	MSG_16	Free	—

The free message inputs are not assigned a fixed meaning and can be activated using the parameters MSG_x (x = 8 to 16) on the SMC_REV.

Table 3- 21 The ALARM_8P auxiliary values are assigned as follows:

Message block	Message number	Auxiliary value	Block parameter	Meaning
MSG_EVID1	—	1	BA_NA	Batch name
	—	2	STEP_NO	Batch step number
	—	3	BA_ID	Batch ID
	1	4	WRN_NO1	Warning number 1
		5	WRN_NO2	Warning number 2
	2	6	WRN_NO3	Warning number 3
		7	ERR_NO1	Fault number 1
		8	ERR_NO2	Fault number 2
		9	ERR_NO3	Fault number 3
		10	—	—

Message block	Message number	Auxiliary value	Block parameter	Meaning
MSG_EVID2	—	1	BA_NA	Batch name
	—	2	STEP_NO	Batch step number
	—	3	BA_ID	Batch ID
	—	4	AUX_PR14	Free
	—	5	AUX_PR15	Free
	—	6	AUX_PR16	Free
	—	7	AUX_PR17	Free
	—	8	AUX_PR18	Free
	—	9	AUX_PR19	Free
	—	10	AUX_PR20	Free

The auxiliary values AUX_PR14 … AUX_PR20 are freely available.

The limit value messages can be suppressed via the input M_SUP_C. The default value of the input M_SUP_C is TRUE, that is, message suppression is active.

For the messages "General warning" and "General fault", the diagnostics block SMC_DIAG supplies the detailed information that is interconnected via the structure DIAG_INF to SMC_REV.

General warning (message number 1)

The message General warning is derived from the diagnostics structure DIAG_INF formed by the block SMC_DIAG.

Three auxiliary values are transferred as additional information together with the message General warning. The auxiliary values correspond to the contents of the warning numbers WRN_NO1, WRN_NO2 and WRN_NO3 and contain the first three warning causes found.

The user text library SMC_Warnings is available for the warnings. This contains the precise fault texts and is supplemented dynamically in the message.

General fault (message number 2)

The message General fault is derived from the diagnostics structure DIAG_INF formed by the block SMC_DIAG.

One auxiliary value is transferred as additional information together with the message General fault. The auxiliary value corresponds to the contents of the fault number ERR_NO1 and contains the first fault cause found.

The auxiliary values 8 and 9 are interconnected with the parameters ERR_NO2 and ERR_NO3 and can be appended to the message if required.

The user text library SMC_Errors is available for the faults. This contains the precise error texts and is supplemented dynamically in the message.

Current limit messages (message number 3 to 6)

The current limit messages are formed by the SIMOCODE pro and are contained in the diagnostics structure DIAG_INF.

Test feedback (message number 7)

The message "Test feedback" is derived direct from the SIMOCODE pro information (DP1.1 Send).

Free messages (message number 8 of the message block 1, message numbers 1 to 8 of message block 2)

There is no block-internal assignment to a specific function for these messages. It can be activated via a parameter input (MSG_8 to MSG_16) and can be used, for example, for reporting of Local_Interruption, the operating mode SIMULATION, or any other signal.

3.6.12 Reset response

In principle, every fault detected by SIMOCODE pro must be acknowledged. This is done via the bit DP0.6 Recv. Reset is only carried out by SIMOCODE pro if there is no active On command. Reset either resets the General fault (QGR_ERR) if the cause of the fault no longer exists, or it results in acknowledgment of the fault if the cause of the fault still exists. An acknowledged fault automatically results in resetting of the general fault following removal of the fault cause.

Reset can be carried out either via the interconnectable function input L_SMCRESET or via the OS operator controllable function input SMCRESET.

L_SMCRESET is level-active. SMCRESET is reset by the block following evaluation.

The reset function is transparent from the block's perspective, that is, there is no logical combination with other signals, and independent of the operating mode (LOCAL / REMOTE).

3.6.13 Start-up characteristics

At CPU startup, the block is switched to manual mode and the Off command is output. For this purpose, the block must be called from the startup OB. After startup, the messages are suppressed for the number of cycles parameterized in the RUNUPCYC value.

3.6.14 Time response

The block must be called via a watchdog interrupt OB. The sampling time of the block is entered in the parameter SAMPLE_T.

3.6.15 SMC_REV block parameters

Element	Type	Kind	Meaning	HMI
AUT_L	BOOL	I	Interconnectable input for MAN / AUTO (0 = Manual / 1 = Auto)	N
AUT_ON_OP	BOOL	IO	Control input: 0 = Manual, 1 = Auto	Y
AUTO_DIR	BOOL	I	Automatic value: 1 = left, 0 = right	N
AUTO_ON	BOOL	I	Automatic value: 1 = On, 0 = Off	N
AUTOP_EN	BOOL	I	1 = Operator enable for Auto	N
AUX_PRxx	ANY	IO	Auxiliary value x (x = 11 to 20)	N
BA_EN	BOOL	I	BATCH record release	Y
BA_ID	DWORD	I	BATCH: Consecutive batch number	Y
BA_NA	STRING [32]	I	BATCH designation	Y
CST	BOOL	I	1 = Test mode	N
CUR_AH	REAL	IO	Upper alarm limit current	Y
CUR_AL	REAL	IO	Lower alarm limit current	Y
CUR_WH	REAL	IO	Upper warning limit current	Y
CUR_WL	REAL	IO	Lower warning limit current	Y
DD_17_20	DWORD	O	DS92 Byte 17 to 20: General warning additional info 1	Y
DD_21_22	WORD	O	DS92 Byte 21 to 22: General warning additional info 2	Y
DD_24_27	DWORD	O	DS92 Byte 24 to 27: General fault additional info 1	Y
DD_28_31	DWORD	O	DS92 Byte 28 to 31: General fault additional info 2	Y
DIAG_INF	UDT_ DIAG	I	Diagnostics structure of SMC_DIAG	N
EM_START	BOOL	I	Emergency start	Y
EN_MEAS	BOOL	I	1 = Measured value block available	Y
EN_RDWR	BOOL	I	1 = Enable reading/writing of data set	N
EN_STAT	BOOL	I	1 = Statistics block available	Y
ERR_NOx	INT	O	Fault number x (x = 1 to 6)	Y
FORW_ON	BOOL	IO	Control input: 1 = RIGHT ON	Y
FW_OP_EN	BOOL	I	1 = Operator enable for RIGHT ON	N
I1_x	BOOL	I	User-defined outputs DP1.x (x = 0 to 7)	N
IN_01	WORD	I	Inputs DP0.0 to 1.7	N
IN_23	WORD	I	Input motor current	N
JOG_ON	BOOL	I	1 = Non-maintained command mode active	N
L_FORW	BOOL	I	Manual control: 1 = right on	N
L_OFF	BOOL	I	Manual control: 1 = Off	N
L_RD_DATA	BOOL	I	Interconnectable input 0 to 1: Reading of the data set	N
L_RESET	BOOL	I	Configurable input for resetting QLOC_INT	N
L_REV	BOOL	I	Manual control: 1 = left on	N
L_SMCRESET	BOOL	I	Interconnectable input for resetting	N
LADDR	INT	I	Start address of the inputs	N

Element	Type	Kind	Meaning	HMI
LINK_MAN	BOOL	I	0 = Operator input active 1 = Manual control via interconnectable inputs	N
LIOP_SEL	BOOL	I	Interconnectable input for manual/auto changeover (AUT_L): 1 = Interconnection is active 0 = Operation is active	N
LOCK	BOOL	I	1 = Lock (OFF)	Y
LOCK_DIR	BOOL	I	Direction of rotation with LOCK_ON: 1 = left, 0 = right	Y
LOCK_ON	BOOL	I	1 = Lock (ON)	Y
LOCOP_EN	BOOL	I	1 = Operator enable for LOCAL	N
M_SUP_C	BOOL	I	1 = Message suppression active for current limit value violations	Y
MANOP_EN	BOOL	I	1 = Operator enable for Manual	N
MO_PVHR	REAL	I	Bar upper limit	Y
MO_PVLR	REAL	I	Bar lower limit	Y
MODE	DWORD	I	Mode of OMODE of the SMC_DIAG	N
MONITOR	BOOL	I	Monitoring: 1 = ON	Y
MOT_OFF	BOOL	IO	Control input: 1 = OFF	Y
MSG_ACK1	WORD	O	Messages acknowledged ALARM8_P block 1	N
MSG_ACK2	WORD	O	Messages acknowledged ALARM8_P block 2	N
MSG_EVID1	DWORD	I	Event ID of ALARM8_P block 1	N
MSG_EVID2	DWORD	I	Event ID of ALARM8_P block 2	N
MSG_STAT1	WORD	O	MESSAGE1: STATUS output	N
MSG_STAT2	WORD	O	MESSAGE2: STATUS output	N
MSG_x	BOOL	I	Free message input x (x = 8 to 16)	N
O_01	WORD	O	Outputs DP0.0 to 1.7	N
OCCUPIED	BOOL	I	BATCH record ID	Y
OFFOP_EN	BOOL	I	1 = Operator enable for OFF	N
OOS	BOOL	I	Reserve	Y
Q_IN_01	WORD	O	Inputs DP0.0 to 1.7	N
QAUTOP	BOOL	O	1 = Operator enable for Auto	Y
QBAD	BOOL	O	1 = Invalid process value	Y
QBUS_PLC	BOOL	O	Bus/PLC fault	Y
QCST	BOOL	O	1 = Test active (DP1.1)	Y
QCUR	REAL	O	Motor current % Ie	Y
QCUR_AH	BOOL	O	Upper alarm limit current violated	N
QCUR_AL	BOOL	O	Lower alarm limit current violated	N
QCUR_WH	BOOL	O	Upper warning limit current violated	N
QCUR_WL	BOOL	O	Lower warning limit current violated	N
QDIR	BOOL	O	Status direction of rotation: 1 = left, 0 = right	Y
QEM_STRT	BOOL	O	1 = Emergency start active	N
QEN_RDWR	BOOL	O	1 = Enable reading/writing of data set	N
QERR	BOOL	O	1 = Program error	N
QERR_RD	BOOL	O	1 = Error while reading the data set	N

Element	Type	Kind	Meaning	HMI
QERR_WR	BOOL	O	1 = Error while writing the data set	N
QFLT_F9	BOOL	O	Fault F9	Y
QFORW_OP	BOOL	O	1 = Operator enable for RIGHT ON	Y
QGR_ERR	BOOL	O	General fault (DP0.6)	N
QGR_WRN	BOOL	O	General warning (DP0.7)	N
QLOC_INT	BOOL	O	1 = Local interruption	Y
QLOCOP	BOOL	O	1 = Operator enable for LOCAL / REMOTE	Y
QLTA	BOOL	O	1 = Interlocking time active (DP0.4)	Y
QMAN_AUT	BOOL	O	0 = Manual, 1 = Automatic	Y
QMANOP	BOOL	O	1 = Operator enable for Manual	Y
QMSG_ERR	BOOL	O	1 = ALARM8_P error	N
QMSG_SUP	BOOL	O	1 = Message suppression	Y
QOFF_OP	BOOL	O	1 = Operator enable for OFF	Y
QOP_ERR	BOOL	O	1 = General operator error	N
QPARFF16	BOOL	O	Parameter error F16	Y
QRD_STAT	WORD	O	Return value of the SFB RDREC	N
QRDWR_OP	BOOL	O	1 = Operator enable Read/write data set	Y
QREMOTE	BOOL	O	1 = REMOTE mode (DP0.5)	Y
QREV_OP	BOOL	O	1 = Operator enable for LEFT ON	Y
QRUN	BOOL	O	Status: 1 = Motor ON (DP0.2)	Y
QSIM	BOOL	O	1 = Simulation active	Y
QSTATUS	WORD	O	Command status (outputs DP0.0 to 1.7)	N
QSTOP	BOOL	O	Status: 1 = Motor OFF (DP0.1)	Y
QUALITY	BYTE	O	Quality code	N
QWR_STAT	WORD	O	Return value of the SFB WRREC	N
RACKF	BOOL	I	1 = Rack fault	N
RD_DATA	BOOL	IO	0 → 1 : Reading of the data set	Y
REM_L	BOOL	I	Interconnectable input for LOCAL / REMOTE(0 = LOCAL / 1 = REMOTE)	N
REM_ON_OP	BOOL	IO	Control input: 0 = LOCAL, 1 = REMOTE	Y
REM_SEL	BOOL	I	Interconnectable input for LOCAL / REMOTE changeover (REM_L): 1 = Interconnection is active 0 = Operation is active	N
RESET	BOOL	IO	Control input for resetting QLOC_INT	N
REV_ON	BOOL	IO	Control input: 1 = LEFT ON	Y
RUNUPCYC	INT	I	Number of initial run cycles after CPU restart	N
RV_OP_EN	BOOL	I	1 = Operator enable for LEFT ON	N
SAMPLE_T	REAL	I	Sampling time in [s]	N
SIM_I01	WORD	I	Simulation value IN_01	N
SIM_I23	WORD	I	Simulation value IN_23	N
SIM_ON	BOOL	I	1 = Simulation	Y
SMCRESET	BOOL	IO	Operator controllable reset input for faults	Y

Element	Type	Kind	Meaning	HMI
STEP_NO	DWORD	I	Batch step number	Y
TIME_MON	REAL	I	Monitoring time in [s]	Y
USTATUS	WORD	I	Status word in VSTATUS, freely user-assignable	N
VSTATUS	DWORD	O	Status for status displays for block icon	Y
WRN_NOx	INT	O	Warning number x (x = 1 to 6)	Y

Table 3- 22 Structure of VSTATUS

Bit	Parameter
0	OCCUPIED
1	BA_EN
2	QSIM
3	QMAN_AUT
4	QCST
5	QGR_ERR
6	QGR_WRN
7	QLOC_INT
8	LOCK / LOCK_ON
9	QRUN
10	QSTOP
11	QDIR
12	—
13	—
14	—
15	—
16 … 31	USTATUS

3.6.16 Status displays for icons

Status	Parameter	View
Off	QSTOP = 1	
Right On	QRUN = 1 QDIR = 0	
Left On	QRUN = 1 QDIR = 1	
Not available	QBAD = 1	

3.6.17 Description of faceplates

The available faceplates are described in this chapter.

The following views are available:

Overview	OVERVIEW
Standard	STANDARD
Limits	LIMITS
Maintenance	MAINTENANCE
Faults	MESSAGE1
Warnings	MESSAGE2
Messages	—
Trend	—
Batch	—

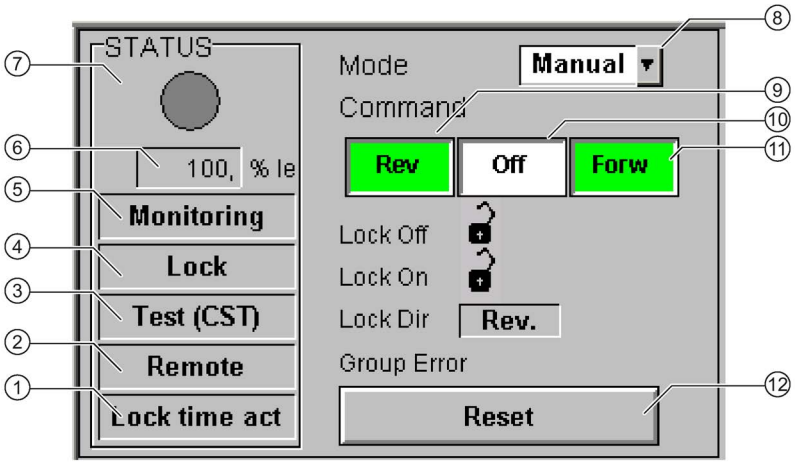
The file name is composed as follows: @PG_SMC_REV_<View>.PDL

The PCS 7 standard displays are used for the message, trend and batch views.

The structure of the individual views of faceplates is described below.

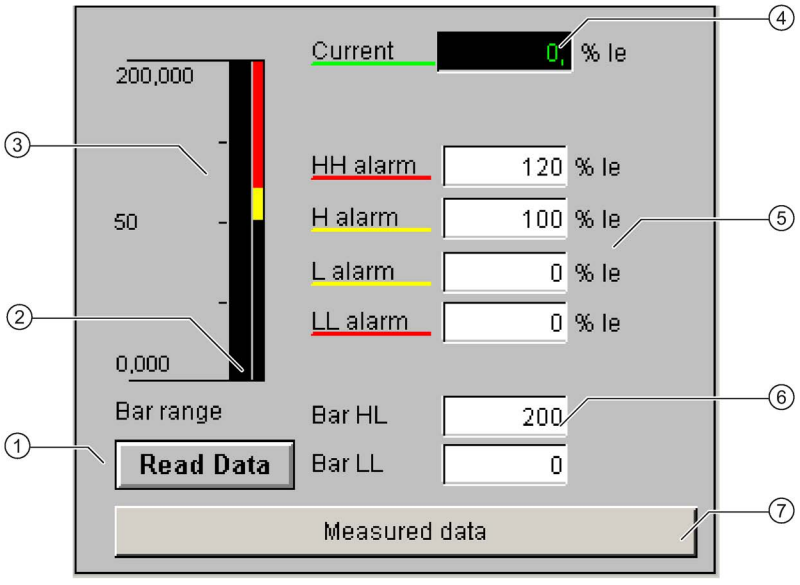
Standard (STANDARD)

The status display is a user object comprising several status displays. The status display corresponds to the representation from the process image icon.



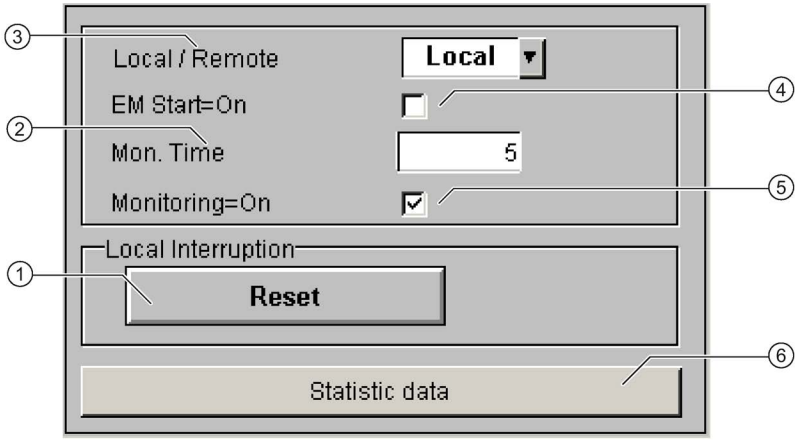
① Interlocking time (QLTA)
② Operator control modality (QREMOTE)
③ Test (QCST)
④ Interlocking (LOCK / LOCK_ON)
⑤ Local Interruption (QLOC_INT)
⑥ Current (QCUR) / unit (QCUR#unit)
⑦ Status display (VSTATUS)
⑧ Operating mode (QMAN_AUT, AUT_ON_OP)
⑨ Command Left On (REV_ON)
⑩ Command Off (MOT_OFF)
⑪ Command Right On (FORW_ON)
⑫ Acknowledgement (RESET)

Limits (LIMITS)



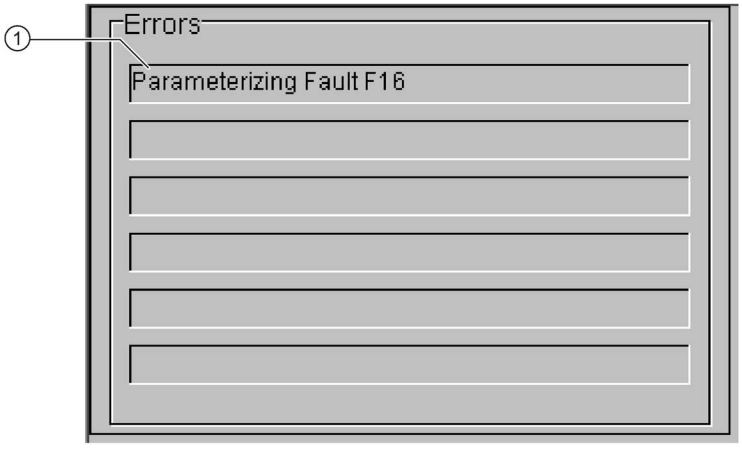
① Read Data (RD_DATA)
② Limit value display (CUR_AH, CUR_WH, CUR_WL, CUR_AL)
③ Actual value bar (QCUR, MO_PVHR, MO_PVLR)
④ Current value (QCUR, QCUR#unit)
⑤ Limits (CUR_AH, CUR_WH, CUR_WL, CUR_AL)
⑥ Bar range (MO_PVHR, MO_PVLR)
⑦ Call faceplate SMC_MEAS, visible if EN_MEAS = TRUE

Maintenance (MAINTENANCE)



① Acknowledge Local Interruption (RESET)
② Monitoring time for Local Interruption (TIME_MON)
③ Operator control modality Local / Remote (REM_ON_OP)
④ Activation Emergency Start (EM_START)
⑤ Activation Monitoring (MONITOR)
⑥ Call faceplate SMC_STAT, visible if EN_STAT = TRUE

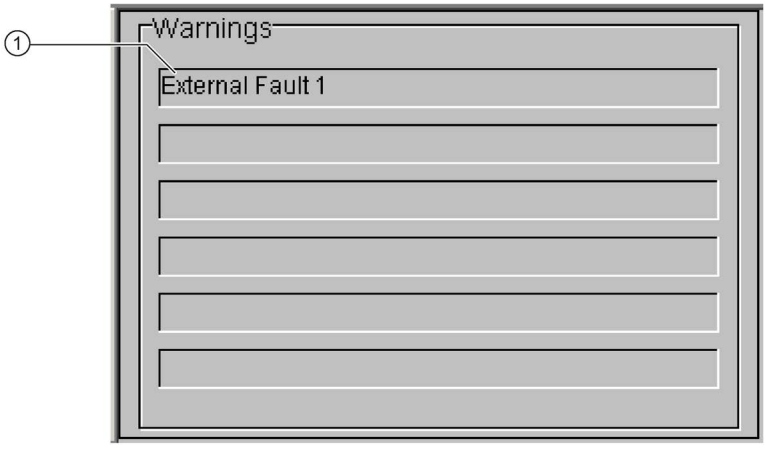
Faults (MESSAGE1)



① Text list with error description (ERR_NOx)

For error number 0, the text field is switched to invisible.

Warnings (MESSAGE2)



① Text list with error description (WRN_NOx)

For error number 0, the text field is switched to invisible.

3.7 SMC_STAR: Signal processing block for the star-delta starter control function

FB2006

Calling OBs

The watchdog interrupt OB in which you install the block (e.g. OB32). Also in OB100 (see start-up characteristics).

Called blocks

The block calls the following blocks:

SFB35	ALARM_8P
SFB52	RDREC
SFB53	WRREC
SFC6	RD_SINFO
SFC20	BLKMOV
SFC21	FILL

3.7.1 Parameter assignment in SIMOCODE ES

For the signal blocks to function correctly, a range of SIMOCODE pro parameters must have quite specific settings. Those parameters that define the assignment of the cyclic I/O interface are especially affected.

These parameters are represented in **bold**.

In addition, the overview below represents the parameters that are already preset for the control function in the templates for application selection in the SIMOCODE ES software. The settings are suggestions and depend heavily on the actual wiring of the SIMOCODE pro inputs and outputs.

These parameters are represented in *italics*.

Other parameters must also be set, e.g. for motor protection. These are not described here. Parameter assignment for the extended I/O interface of basic type 1 is represented in the following chapter: Parameter assignment in SIMOCODE ES (Page 33)

Reversing starter control function

Motor control → Control stations		
Operation mode selector S1	**Cyclic receive bit 0.5**	—
Operation mode selector S2	*Fixed level 1*	—

Local control [LC]		
Off	*BU - Input 2*	—
On	*BU - Input 1*	—
Operator enable local 2 off	*Active*	—
Operator enable local 2 on	*Active*	—
Operator enable remote off	**Not active**	—
Operator enable remote on	**Not active**	—

PLC/PCS [DP]		
Off	**Cyclic receive – bit 0.1**	—
On	**Cyclic receive – bit 0.2**	—
Operator enable local 2 off	**Not active**	—
Operator enable local 2 on	**Not active**	—
Operator enable remote off	**Active**	—
Operator enable remote on	**Active**	—

Operator Panel [OP]		
Off	*OP button 4*	—
On	*OP button 2*	—
Operator enable local 2 off	*Active*	—
Operator enable local 2 on	*Active*	—
Operator enable remote off	**Not active**	—
Operator enable remote on	**Not active**	—

Motor control → Control function → Control commands		
Off	**Enabled control command - Off**	—
On>	**Enabled control command – On>**	—

Motor control → Control function → Operating mode		
Non-maintained command mode	*Not active/active*	*The setting of the parameter influences the parameter JOG_ON in the SIMOCODE signal block:* *Non-maintained command mode not active: JOG_ON = FALSE* *Non-maintained command mode active: JOG_ON = TRUE*
Saving change-over command	**Active**	—

Motor control → Control function → Auxiliary control inputs		
Feedback ON	**Status - Motor current flowing**	—

Outputs → Basic unit		
BU – Output 1	*Contactor control QE1*	—
BU – Output 2	*Contactor control QE2*	—
BU – Output 3	*Contactor control QE3*	—

Outputs → Operator panel LEDs		
LED green 3	*Display QLE> (on>)*	—
LED green 4	*Display QLA (off)*	—

Outputs → Cyclic send data		
Byte 0, bit 0	Not connected	Freely assignable
Byte 0, bit 1	**Status - Off**	—
Byte 0, bit 2	**Status – On>**	—
Byte 0, bit 3	**Message – Pre-warning overload**	—
Byte 0, bit 4	**Status - Change-over pause active**	—
Byte 0, bit 5	**Status – Remote mode**	—
Byte 0, bit 6	**Status – General fault**	—
Byte 0, bit 7	**Status - General warning**	—
Byte 1, bit 0	Not connected	Freely assignable
Byte 1, bit 1	**Status - Test position (TPF)**	—
Byte 1, bit 2	Not connected	Freely assignable
Byte 1, bit 3	Not connected	Freely assignable
Byte 1, bit 4	Not connected	Freely assignable
Byte 1, bit 5	Not connected	Freely assignable
Byte 1, bit 6	Not connected	Freely assignable
Byte 1, bit 7	Not connected	Freely assignable
Bytes 2 to 3	**Max. current Imax**	—

3.7.2 Function

The block is installed by the user in a cyclic watchdog interrupt OB (e.g. OB32). Parameter inputs IN_01 and IN_23 as well as parameter output O_01 are also interconnected by the user with the associated icons for inputs or outputs of the associated SIMOCODE pro device.

SMC_STAR accesses the data provided by SIMOCODE pro via inputs IN_01 (2 bytes of binary data) and IN_23 (2 bytes of motor current).

Data is transferred to SIMOCODE pro via the output O_01 (2 bytes of binary data).

The configuration of the inputs and outputs is determined here by SIMOCODE pro basic type 2.

Access to the inputs and outputs takes place exclusively via the process image.

The block uses the input parameter MODE to determine whether the inputs IN_01 and IN_23 are valid. In the case of a higher-level fault, all inputs are read by SIMOCODE pro with "0" and output to the relevant outputs of the block.

3.7.3 Assignment of the cyclic process image

Table 3- 23 Assignment of O_01: Output commands to SIMOCODE pro

Bit	Control interface
0.0	—
0.1	Off
0.2	On> → On
0.3	Test 1
0.4	Emergency start
0.5	Local/remote control station
0.6	Reset
0.7	—
1.0 … 1.7	User-specific outputs

Table 3- 24 Assignment of IN_0: Feedback messages from SIMOCODE pro

Bit	Cyclic send data	Block parameter
0.0	—	—
0.1	Status – Off	QSTOP
0.2	Status – On>	QRUN
0.3	Message – Pre-warning overload	QOVL
0.4	Status - Change-over pause active	QCOA
0.5	Status – Remote mode	QREMOTE
0.6	Status - General fault	QGR_ERR
0.7	Status - General warning	QGR_WRN
1.0	—	—
1.1	Status - Test position (TPF)	QCST
1.2 … 1.7	—	—

The input parameter IN_01 is additionally copied to the output Q_IN_01.

The motor current is transferred as an unsigned 2-byte value via the input parameter IN_23. SIMOCODE pro always transfers the current here as a percentage of the set current in a range from 0 to 1000%. The motor current is output via QCUR.

Assignment of bytes 2 / 3 of the analog control interface and bytes 4 to 9 of the cyclic send data when using basic type 1 is described in the following chapter: Assignment of the cyclic process image (Page 35)

3.7.4 Operating modes

Changing the control station (REMOTE, LOCAL)

The control station is changed via the interconnectable function input REM_L if the input REM_SEL is set, or via the function input REM_ON_OP set by the OS.

The function input (REMOP_EN) influences the operator enable (QLOCOP) for operating via the OS.

The operating mode of the control station is output via QREMOTE (1 = REMOTE, 0 = LOCAL). QREMOTE corresponds here to the bit DP 0.5 of the SIMOCODE pro.

In LOCAL mode, the controller is completely switched off via the SMC_STARblock. Control is then only possible via a control station connected direct to the SIMOCODE pro. It is still possible to acknowledge the fault.

Changing the operating modes (MANUAL, AUTO) when REMOTE is selected

If QREMOTE = TRUE, changeover between the two operating modes MANUAL and AUTOMATIC takes place either via OS operation using AUT_ON_OP (LIOP_SEL = 0) or via the interconnection of the input AUT_L (LIOP_SEL = 1).

The function inputs (MANOP_EN, AUTOP_EN) influence the operator enables (QMANOP, QAUTOP) for operating via the OS.

The operating mode is output at output QMAN_AUT(1 = AUTO, 0 = MANUAL).

Changing the control station for MANUAL

In REMOTE mode, the operating mode MANUAL can be controlled either via the OS or via the interconnectable function inputs. The changeover for this takes place via the interconnectable function input LINK_MAN.

3.7.5 Control stations for MANUAL and AUTOMATIC mode

General information

The PLC/DP control station of the SIMOCODE pro (that is, DP0.1 and DP0.2) is level-active. The On command is stored in the SIMOCODE pro. The Off command (DP0.1) takes priority over the On command (DP0.2).

Control of the SIMOCODE pro via AS / OS is only possible in REMOTE mode.

AUTOMATIC

In automatic mode, the SIMOCODE pro control functions are controlled via the interconnectable function input AUTO_ON (TRUE =On, FALSE =Off).

Control without non-maintained command mode (JOG_ON = FALSE)

At one edge of the command input, the associated control bit is set in the interface until the SIMOCODE pro sends the relevant feedback message, or a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the automatic interface.

Control with non-maintained command mode (JOG_ON = TRUE)

The corresponding control bit in the interface is set as long as the command input = TRUE or if a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the automatic interface. The Stop command is not necessary for switching the device off but is nevertheless set by the block if no On command is active.

MANUAL

In manual mode, the SIMOCODE pro is controlled either via the function input MAN_ON (TRUE = On, FALSE = Off set by the OS or via the interconnectable function inputs L_ON and L_OFF.

The inputs for the operator enables ON_OP_EN / OFFOP_EN set the outputs QON_OP / QOFF_OP for operation using the OS.

At one edge of the command input, the associated control bit is set in the interface until the SIMOCODE pro sends the relevant feedback message, or a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the interconnectable manual interface.

The Off command takes priority over the On command (no edge evaluation!).

After changing to manual mode, the commands are not forwarded to the inputs until there is a positive edge change when L_ON / L_OFF is active.

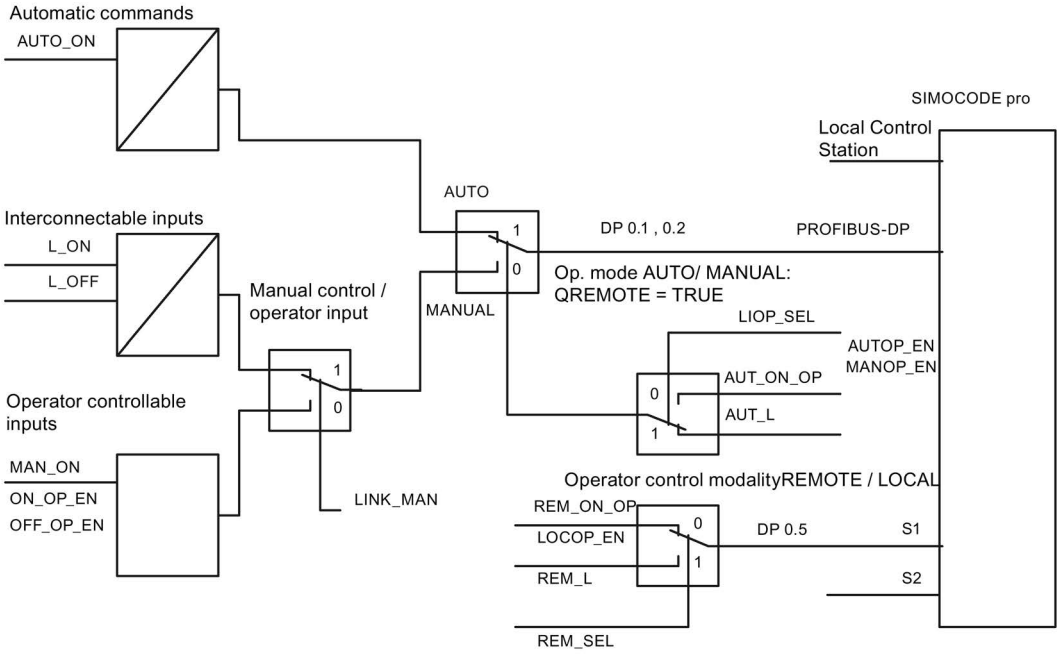
Control without non-maintained command mode (JOG_ON = FALSE)

At one edge of the command input, the associated control bit is set in the interface until the SIMOCODE pro sends the relevant feedback message, or a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the interconnectable inputs. The operator controllable input MAN_ON is adjusted when tripped.

Control with non-maintained command mode (JOG_ON = TRUE)

The corresponding control bit in the interface is set as long as the command input = TRUE or if a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the automatic interface. The Stop command is not necessary for switching the device off but is nevertheless set by the block if no On command is active.

3.7.6 Overview of control stations, operating modes, and operator control modalities



3.7.7 Simulation

The simulation mode is activated using the input SIM_ON and takes priority over all other operating modes. If SIM_ON = TRUE, the block processes the simulation values (SIM_I01: binary data, SIM_I23: motor current) instead of the process values of SIMOCODE pro(IN_01, IN_23). QSIM, QUALITY and QBAD are output accordingly. The process output (O_01) is output with "0" if simulation is active. The command status is combined with the output QSTATUS.

A block must be programmed for the simulation. The output QSTATUS can be evaluated and this information can be used to form the simulation feedback message (SIM_I01, SIM_I23). Assignment corresponds to assignment of the process inputs/process output and can be found in the following chapter: Assignment of the cyclic process image (Page 117)

3.7.8 Interlocking

The interlocks LOCK and LOCK_ON are only effective in REMOTE mode and are valid in the operating mode MANUAL and AUTO for all control stations of the SMC_STAR block.

An active lock input prevents switching and disables control stations for MANUAL and AUTO. The control bit is set permanently.

LOCK always takes priority over LOCK_ON.

Revoking of LOCK_ON switches the motor to the operating mode AUTO corresponding to the control station for AUTO. In MANUAL, the motor is switched off.

3.7.9 Local Interruption

The output QLOC_INT indicates in REMOTE that operation via the local control station (connected direct to SIMOCODE pro) has changed the current switching state.

QLOC_INT is also set if the switching state requested via REMOTE has not been reached within the monitoring time set using TIME_MON and no general fault has occurred (e.g. due to a higher-priority Off command at the SIMOCODE pro general control station). This monitoring is switched off with TIME_MON = 0 or MONITOR = FALSE.

If QLOC_INT = TRUE, the control outputs are reset.

QLOC_INT is reset via the inputs RESET (operator controllable) / L_RESET (interconnectable). The input RESET is reset after acknowledgment. If L_RESET is active permanently, QLOC_INT is set for the duration of the cycle if the requirements given above are met.

Monitoring is deactivated at initial startup by setting MONITOR = FALSE.

3.7.10 Current and current limit monitoring

Current

The motor current is transferred via the input parameter IN_23 as an unsigned 2-byte value. SIMOCODE pro always transfers the current here as a percentage of the set current in a range from 0 to 1000%.

Current limits

The current limit values are read out from the data set DS130. Reading of the data set is initiated either via the interconnectable input parameter L_RD_DATA, in the OS when selecting the limit value view, or by OS operation (RD_DATA). The output QEN_RDWR is reset during communication.

The data read is output to the in/out parameters Alarm high (CUR_AH), Alarm low (CUR_AL), Warning high (CUR_WH) and Warning low (CUR_WL) .

If a fault occurs, the values are set to zero and the output QERR_RD = TRUE is set.

The limit values can also be parameterized in the faceplate. If the values are changed, they are written to SIMOCODE pro.

The signaling response in the case of limit value violations are parameterized with SIMOCODE ES or SIMATIC PDM. Under Monitoring functions → Current limits, the response to trip level/warning level is set for this purpose as follows:

Trip level:	disabled or tripping
Warning level:	disabled or warning

If a fault occurs when writing, the values are reset to "0" and the output QERR_WR = TRUE is set.

Overshooting or undershooting of the limit values results in transmission of the relevant message provided the limit value message has not been completely switched off via the parameter M_SUP_C (default is: switched off). Limit value violation messages are generated in the SIMOCODE pro and evaluated in the block. The outputs QCUR_AH, QCUR_AL, QCUR_WH and QCUR_WL are set accordingly.

Range limits

The range limits for the limit bars are parameterized using the function inputs MO_PVHR and MO_PVLR and can be adjusted in the OS.

3.7.11 Signaling response

Table 3- 25 SMC_STAR issues the following messages:

Message block	Message number	Block parameter	Message text	Message class
MSG_EVID1	1	QGR_WRN	$$BlockComment$$ General warning: @4W%t#SMC_Warnings@ @5W%t#SMC_Warnings@ @6W%t#SMC_Warnings@	WH
	2	QGR_ERR	$$BlockComment$$ General fault: 7%t#SMC_Errors@	AH
	3	QCUR_AH	$$BlockComment$$ Current alarm up	AH
	4	QCUR_WH	$$BlockComment$$ Current warning up	WH
	5	QCUR_WL	$$BlockComment$$ Current warning down	WL
	6	QCUR_AL	$$BlockComment$$ Current alarm down	AL
	7	QCST	$$BlockComment$$ Test feedback	WH
	8	MSG_8	Free	—
MSG_EVID2	9	MSG_9	Free	—
	10	MSG_10	Free	—
	11	MSG_11	Free	—
	12	MSG_12	Free	—
	13	MSG_13	Free	—
	14	MSG_14	Free	—
	15	MSG_15	Free	—
	16	MSG_16	Free	—

The free message inputs are not assigned a fixed meaning and can be activated using the parameters MSG_x (x = 8 to 16) on the SMC_STAR.

Table 3- 26 The ALARM_8P auxiliary values are assigned as follows:

Message block	Message number	Auxiliary value	Block parameter	Meaning
MSG_EVID1	—	1	BA_NA	Batch name
	—	2	STEP_NO	Batch step number
	—	3	BA_ID	Batch ID
	1	4	WRN_NO1	Warning number 1
		5	WRN_NO2	Warning number 2
	2	6	WRN_NO3	Warning number 3
		7	ERR_NO1	Fault number 1
		8	ERR_NO2	Fault number 2
		9	ERR_NO3	Fault number 3
		10	—	—

Message block	Message number	Auxiliary value	Block parameter	Meaning
MSG_EVID2	—	1	BA_NA	Batch name
	—	2	STEP_NO	Batch step number
	—	3	BA_ID	Batch ID
	—	4	AUX_PR14	Free
	—	5	AUX_PR15	Free
	—	6	AUX_PR16	Free
	—	7	AUX_PR17	Free
	—	8	AUX_PR18	Free
	—	9	AUX_PR19	Free
	—	10	AUX_PR20	Free

The auxiliary values AUX_PR14 … AUX_PR20 are freely available.

The limit value messages can be suppressed via the input M_SUP_C. The default value of the input M_SUP_C is TRUE, that is, message suppression is active.

For the messages "General warning" and "General fault", the diagnostics block SMC_DIAG supplies the detailed information that is interconnected via the structure DIAG_INF to SMC_STAR.

General warning (message number 1)

The message General warning is derived from the diagnostics structure DIAG_INF formed by the block SMC_DIAG.

Three auxiliary values are transferred as additional information together with the message General warning. The auxiliary values correspond to the contents of the warning numbers WRN_NO1, WRN_NO2 and WRN_NO3 and contain the first three warning causes found.

The user text library SMC_Warnings is available for the warnings. This contains the precise fault texts and is supplemented dynamically in the message.

General fault (message number 2)

The message General fault is derived from the diagnostics structure DIAG_INF formed by the block SMC_DIAG.

One auxiliary value is transferred as additional information together with the message General fault. The auxiliary value corresponds to the contents of the fault number ERR_NO1 and contains the first fault cause found.

The auxiliary values 8 and 9 are interconnected with the parameters ERR_NO2 and ERR_NO3 and can be appended to the message if required.

The user text library SMC_Errors is available for the faults. This contains the precise error texts and is supplemented dynamically in the message.

Current limit messages (message number 3 to 6)

The current limit messages are formed by the SIMOCODE pro and are contained in the diagnostics structure DIAG_INF.

Test feedback (message number 7)

The message "Test feedback" is derived direct from the SIMOCODE pro information (DP1.1 Send).

Free messages (message number 8 of the message block 1, message numbers 1 to 8 of message block 2)

There is no block-internal assignment to a specific function for these messages. It can be activated via a parameter input (MSG_8 to MSG_16) and can be used, for example, for reporting of Local_Interruption, the operating mode SIMULATION, or any other signal.

3.7.12 Reset response

In principle, every fault detected by SIMOCODE pro must be acknowledged. This is done via the bit DP0.6 Recv. Reset is only carried out by SIMOCODE pro if there is no active On command. Reset either resets the General fault (QGR_ERR) if the cause of the fault no longer exists, or it results in acknowledgment of the fault if the cause of the fault still exists. An acknowledged fault automatically results in resetting of the general fault following removal of the fault cause.

Reset can be carried out either via the interconnectable function input L_SMCRESET or via the OS operator controllable function input SMCRESET.

L_SMCRESET is level-active. SMCRESET is reset by the block following evaluation.

The reset function is transparent from the block's perspective, that is, there is no logical combination with other signals, and independent of the operating mode (LOCAL / REMOTE).

3.7.13 Start-up characteristics

At CPU startup, the block is switched to manual mode and the Off command is output. For this purpose, the block must be called from the startup OB. After startup, the messages are suppressed for the number of cycles parameterized in the RUNUPCYC value.

3.7.14 Time response

The block must be called via a watchdog interrupt OB. The sampling time of the block is entered in the parameter SAMPLE_T.

3.7.15 SMC_STAR block parameters

Element	Type	Kind	Meaning	HMI
AUT_L	BOOL	I	Interconnectable input for MAN / AUTO (0 = Manual / 1 = Auto)	N
AUT_ON_OP	BOOL	IO	Control input: 0 = Manual, 1 = Auto	Y
AUTO_ON	BOOL	I	Automatic value: 1 = On, 0 = Off	N
AUTOP_EN	BOOL	I	1 = Operator enable for Auto	N
AUX_PRxx	ANY	IO	Auxiliary value x (x = 11 to 20)	N
BA_EN	BOOL	I	BATCH record release	Y
BA_ID	DWORD	I	BATCH: Consecutive batch number	Y
BA_NA	STRING [32]	I	BATCH designation	Y
CST	BOOL	I	1 = Test mode	N
CUR_AH	REAL	IO	Upper alarm limit current	Y
CUR_AL	REAL	IO	Lower alarm limit current	Y
CUR_WH	REAL	IO	Upper warning limit current	Y
CUR_WL	REAL	IO	Lower warning limit current	Y
DD_17_20	DWORD	O	DS92 Byte 17 to 20: General warning additional info 1	Y
DD_21_22	WORD	O	DS92 Byte 21 to 22: General warning additional info 2	Y
DD_24_27	DWORD	O	DS92 Byte 24 to 27: General fault additional info 1	Y
DD_28_31	DWORD	O	DS92 Byte 28 to 31: General fault additional info 2	Y
DIAG_INF	UDT_ DIAG	I	Diagnostics structure of SMC_DIAG	N
EM_START	BOOL	I	Emergency start	Y
EN_MEAS	BOOL	I	1 = Measured value block available	Y
EN_RDWR	BOOL	I	1 = Enable reading/writing of data set	N
EN_STAT	BOOL	I	1 = Statistics block available	Y
ERR_NOx	INT	O	Fault number x (x = 1 to 6)	Y
I1_x	BOOL	I	User-defined outputs DP1.x (x = 0 to 7)	N
IN_01	WORD	I	Inputs DP0.0 to 1.7	N
IN_23	WORD	I	Input motor current	N
JOG_ON	BOOL	I	1 = Non-maintained command mode active	N
L_OFF	BOOL	I	Manual control: 1 = Off	N
L_ON	BOOL	I	Manual control: 1 = ON	N
L_RD_DATA	BOOL	I	Interconnectable input 0 → 1: Reading of the data set	N
L_RESET	BOOL	I	Configurable input for resetting QLOC_INT	N
L_SMCRESET	BOOL	I	Interconnectable input for resetting	N
LADDR	INT	I	Start address of the inputs	N
LINK_MAN	BOOL	I	0 = Operator input active 1 = Manual control via interconnectable inputs	N
LIOP_SEL	BOOL	I	Interconnectable input for manual/auto changeover (AUT_L): 1 = Interconnection is active 0 = Operation is active	N
LOCK	BOOL	I	1 = Lock (OFF)	Y

Element	Type	Kind	Meaning	HMI
LOCK_ON	BOOL	I	1 = Lock (ON)	Y
LOCOP_EN	BOOL	I	1 = Operator enable for LOCAL	N
M_SUP_C	BOOL	I	1 = Message suppression active for current limit value violations	Y
MAN_ON	BOOL	IO	Control input: 1 = ON, 0 = OFF	Y
MANOP_EN	BOOL	I	1 = Operator enable for Manual	N
MO_PVHR	REAL	I	Bar upper limit	Y
MO_PVLR	REAL	I	Bar lower limit	Y
MODE	DWORD	I	Mode of OMODE of the SMC_DIAG	N
MONITOR	BOOL	I	Monitoring: 1 = ON	Y
MSG_ACK1	WORD	O	Messages acknowledged ALARM8_P block 1	N
MSG_ACK2	WORD	O	Messages acknowledged ALARM8_P block 2	N
MSG_EVID1	DWORD	I	Event ID of ALARM8_P block 1	N
MSG_EVID2	DWORD	I	Event ID of ALARM8_P block 2	N
MSG_STAT1	WORD	O	MESSAGE1: STATUS output	N
MSG_STAT2	WORD	O	MESSAGE2: STATUS output	N
MSG_x	BOOL	I	Free message input x (x = 8 to 16)	N
O_01	WORD	O	Outputs DP0.0 to 1.7	N
OCCUPIED	BOOL	I	BATCH record ID	Y
OFFOP_EN	BOOL	I	1 = Operator enable for OFF	N
ON_OP_EN	BOOL	I	1 = Operator enable for ON	N
OOS	BOOL	I	Reserve	Y
Q_IN_01	WORD	O	Inputs DP0.0 to 1.7	N
QAUTOP	BOOL	O	1 = Operator enable for Auto	Y
QBAD	BOOL	O	1 = Invalid process value	Y
QBUS_PLC	BOOL	O	Bus/PLC fault	Y
QCOA	BOOL	O	1 = Change-over pause active (DP0.4)	Y
QCST	BOOL	O	1 = Test active (DP1.1)	Y
QCUR	REAL	O	Motor current % Ie	Y
QCUR_AH	BOOL	O	Upper alarm limit current violated	N
QCUR_AL	BOOL	O	Lower alarm limit current violated	N
QCUR_WH	BOOL	O	Upper warning limit current violated	N
QCUR_WL	BOOL	O	Lower warning limit current violated	N
QEM_STRT	BOOL	O	1 = Emergency start active	N
QEN_RDWR	BOOL	O	1 = Enable reading/writing of data set	N
QERR	BOOL	O	1 = Program error	N
QERR_RD	BOOL	O	1 = Error while reading the data set	N
QERR_WR	BOOL	O	1 = Error while writing the data set	N
QFLT_F9	BOOL	O	Fault F9	Y
QGR_ERR	BOOL	O	General fault (DP0.6)	N
QGR_WRN	BOOL	O	General warning (DP0.7)	N
QLOC_INT	BOOL	O	1 = Local interruption	Y

Element	Type	Kind	Meaning	HMI
QLOCOP	BOOL	O	1 = Operator enable for LOCAL / REMOTE	Y
QMAN_AUT	BOOL	O	0 = Manual, 1 = Automatic	Y
QMANOP	BOOL	O	1 = Operator enable for Manual	Y
QMSG_ERR	BOOL	O	1 = ALARM8_P Error	N
QMSG_SUP	BOOL	O	1 = Message suppression	Y
QOFF_OP	BOOL	O	1 = Operator enable for OFF	Y
QON_OP	BOOL	O	1 = Operator enable for ON	Y
QOP_ERR	BOOL	O	1 = General operator error	N
QPARFF16	BOOL	O	Parameter error F16	Y
QRD_STAT	WORD	O	Return value of the SFB RDREC	N
QRDWR_OP	BOOL	O	1 = Operator enable Read/write data set	Y
QREMOTE	BOOL	O	1 = REMOTE mode (DP0.5)	Y
QRUN	BOOL	O	Status: 1 = Motor ON (DP0.2)	Y
QSIM	BOOL	O	1 = Simulation active	Y
QSTATUS	WORD	O	Command status (outputs DP0.0 to 1.7)	N
QSTOP	BOOL	O	Status: 1 = Motor OFF (DP0.1)	Y
QUALITY	BYTE	O	Quality code	N
QWR_STAT	WORD	O	Return value of the SFB WRREC	N
RACKF	BOOL	I	1 = Rack fault	N
RD_DATA	BOOL	IO	0 → 1: Reading of the data set	Y
REM_L	BOOL	I	Interconnectable input for LOCAL / REMOTE (0 = LOCAL / 1 = REMOTE)	N
REM_ON_OP	BOOL	IO	Control input: 0 = LOCAL, 1 = REMOTE	Y
REM_SEL	BOOL	I	Interconnectable input for LOCAL / REMOTE changeover (REM_L): 1 = Interconnection is active 0 = Operation is active	N
RESET	BOOL	IO	Control input for resetting QLOC_INT	N
RUNUPCYC	INT	I	Number of initial run cycles after CPU restart	N
SAMPLE_T	REAL	I	Sampling time in [s]	N
SIM_I01	WORD	I	Simulation value IN_01	N
SIM_I23	WORD	I	Simulation value IN_23	N
SIM_ON	BOOL	I	1 = Simulation	Y
SMCRESET	BOOL	IO	Operator controllable reset input for faults	Y
STEP_NO	DWORD	I	Batch step number	Y
TIME_MON	REAL	I	Monitoring time in [s]	Y
USTATUS	WORD	I	Status word in VSTATUS, freely user-assignable	N
VSTATUS	DWORD	O	Status for status displays for block icon	Y
WRN_NOx	INT	O	Warning number x (x = 1 to 6)	Y

Table 3- 27 Structure of VSTATUS

Bit	Parameter
0	OCCUPIED
1	BA_EN
2	QSIM
3	QMAN_AUT
4	QCST
5	QGR_ERR
6	QGR_WRN
7	QLOC_INT
8	LOCK / LOCK_ON
9	QRUN
10	QSTOP
11	—
12	—
13	—
14	—
15	—
16 … 31	USTATUS

3.7.16 Status displays for icons

Status	Parameter	View
Off	QSTOP = 1	
A star	QSTOP = 0 QRUN = 0	
A triangle	QSTOP = 0 QRUN = 1	
Not available	QBAD = 1	

3.7.17 Description of faceplates

The available faceplates are described in this chapter.

The following views are available:

Overview	OVERVIEW
Standard	STANDARD
Limits	LIMITS
Maintenance	MAINTENANCE
Faults	MESSAGE1
Warnings	MESSAGE2
Messages	—
Trend	—
Batch	—

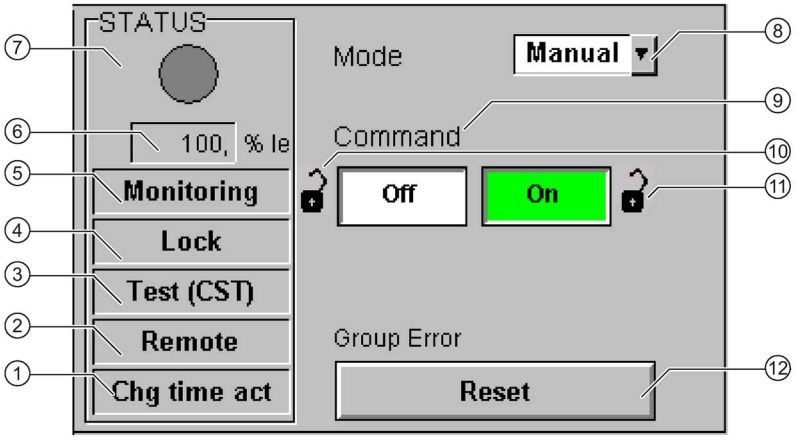
The file name is composed as follows: @PG_SMC_STAR_<View>.PDL

The PCS 7 standard displays are used for the message, trend and batch views.

The structure of the individual views of faceplates is described below.

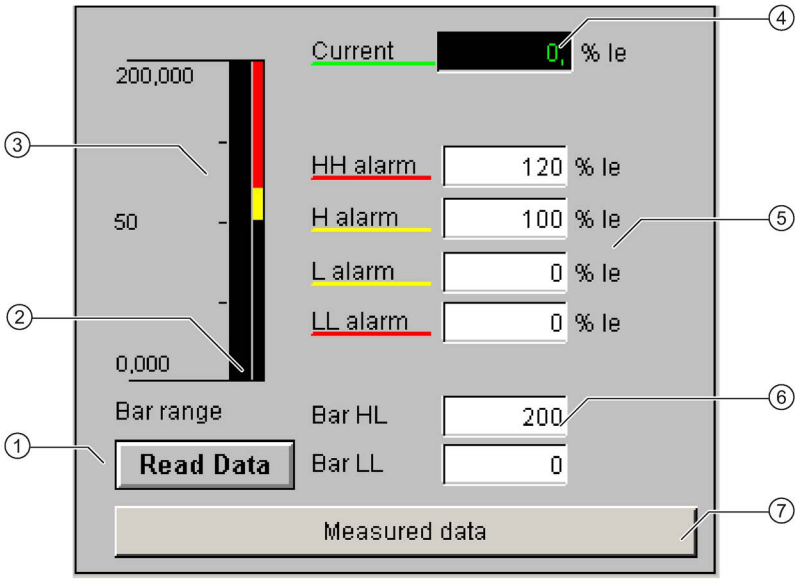
Standard (STANDARD)

The status display is a user object comprising several status displays. The status display corresponds to the representation from the process image icon.



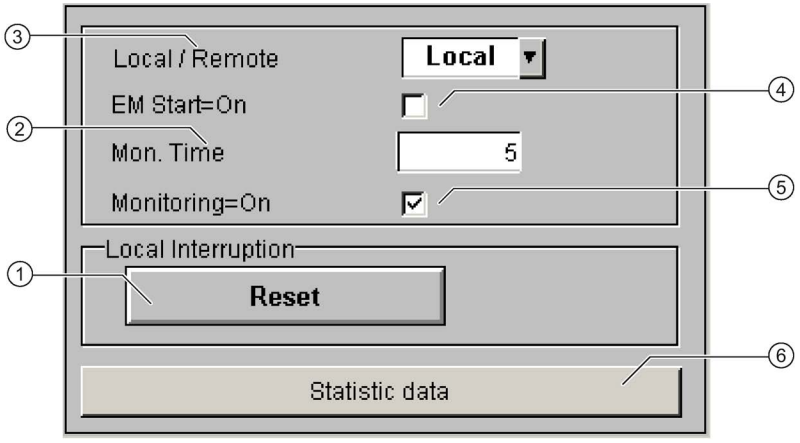
① Change-over pause (QCOA)
② Operator control modality (QREMOTE)
③ Test (QCST)
④ Interlocking (LOCK / LOCK_ON)
⑤ Local Interruption (QLOC_INT)
⑥ Current (QCUR)/ unit (QCUR#unit)
⑦ Status display (VSTATUS)
⑧ Operating mode (QMAN_AUT, AUT_ON_OP)
⑨ Command (MAN_ON)
⑩ LOCK
⑪ LOCK_ON
⑫ Acknowledgement (RESET)

Limits (LIMITS)



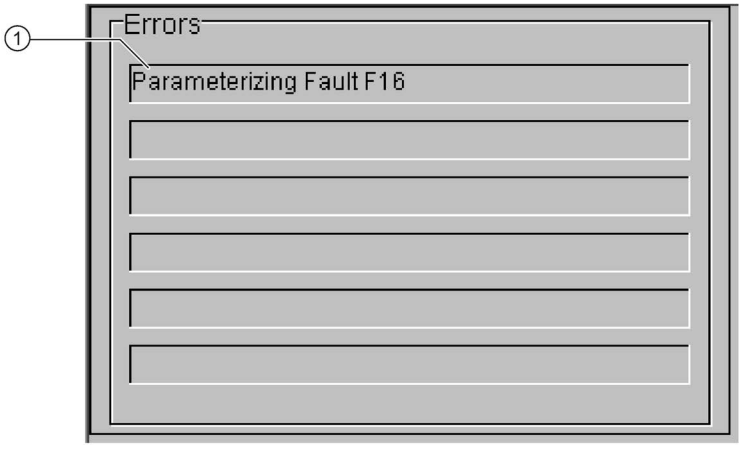
① Read Data (RD_DATA)
② Limit value display (CUR_AH, CUR_WH, CUR_WL, CUR_AL)
③ Actual value bar (QCUR, MO_PVHR, MO_PVLR)
④ Current value (QCUR, QCUR#unit)
⑤ Limits (CUR_AH, CUR_WH, CUR_WL, CUR_AL)
⑥ Bar range (MO_PVHR, MO_PVLR)
⑦ Call faceplate SMC_MEAS, visible if EN_MEAS = TRUE

Maintenance (MAINTENANCE)



① Acknowledge Local Interruption (RESET)
② Monitoring time for Local Interruption (TIME_MON)
③ Operator control modality Local / Remote (REM_ON_OP)
④ Activation Emergency Start (EM_START)
⑤ Activation Monitoring (MONITOR)
⑥ Call faceplate SMC_STAT, visible if EN_STAT = TRUE

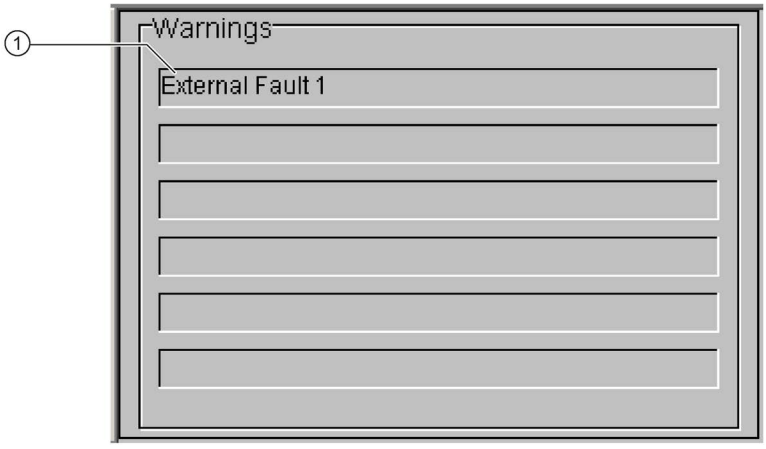
Faults (MESSAGE1)



① Text list with error description (ERR_NOx)

For error number 0, the text field is switched to invisible.

Warnings (MESSAGE2)



① Text list with error description (WRN_NOx)

For error number 0, the text field is switched to invisible.

3.8 SMC_REVS: Signal processing block for the star-delta reversing starter control function

FB2007

Calling OBs

The watchdog interrupt OB in which you install the block (e.g. OB32). Also in OB100 (see start-up characteristics).

Called blocks

The block calls the following blocks:

SFB35	ALARM_8P
SFB52	RDREC
SFB53	WRREC
SFC6	RD_SINFO
SFC20	BLKMOV
SFC21	FILL

3.8.1 Parameter assignment in SIMOCODE ES

For the signal blocks to function correctly, a range of SIMOCODE pro parameters must have quite specific settings. Those parameters that define the assignment of the cyclic I/O interface are especially affected.

These parameters are represented in **bold**.

In addition, the overview below represents the parameters that are already preset for the control function in the templates for application selection in the SIMOCODE ES software. The settings are suggestions and depend heavily on the actual wiring of the SIMOCODE pro inputs and outputs.

These parameters are represented in *italics*.

Other parameters must also be set, e.g. for motor protection. These are not described here. Parameter assignment for the extended I/O interface of basic type 1 is represented in the following chapter: Parameter assignment in SIMOCODE ES (Page 33)

Motor control → Control stations		
Operation mode selector S1	**Cyclic receive bit 0.5**	—
Operation mode selector S2	*Fixed level 1*	—

Local control [LC]		
On<	*BU - Input 3*	—
Off	*BU - Input 2*	—
On>	*BU - Input 1*	—
Operator enable local 2 off	*Active*	—
Operator enable local 2 on	*Active*	—
Operator enable remote off	**Not active**	—
Operator enable remote on	**Not active**	—

PLC/PCS [DP]		
On<	**Cyclic receive – bit 0.0**	—
Off	**Cyclic receive – bit 0.1**	—
On>	**Cyclic receive – bit 0.2**	—
Operator enable local 2 off	**Not active**	—
Operator enable local 2 on	**Not active**	—
Operator enable remote off	**Active**	—
Operator enable remote on	**Active**	—

Operator Panel [OP]		
On<	*OP button 2*	—
Off	*OP button 4*	—
On>	*OP button 3*	—
Operator enable local 2 off	*Active*	—
Operator enable local 2 on	*Active*	—
Operator enable remote off	**Not active**	—
Operator enable remote on	**Not active**	—

Motor control → Control function → Control commands		
On<	**Enabled control command – On<**	—
Off	**Enabled control command - Off**	—
On>	**Enabled control command – On>**	—

Motor control → Control function → Operating mode		
Non-maintained command mode	*Not active/active*	*The setting of the parameter influences the parameter JOG_ON in the SIMOCODE signal block:* *Non-maintained command mode not active: JOG_ON=FALSE* *Non-maintained command mode active: JOG_ON=TRUE*
Saving change-over command	**Active**	—

Motor control → Control function → Auxiliary control inputs		
Feedback ON	**Status - Motor current flowing**	—

Outputs → Basic unit		
BU – Output 1	*Contactor control QE1*	—
BU – Output 2	*Contactor control QE2*	—

Outputs → Operator panel LEDs		
LED green 2	*Display QLE< (on<)*	—
LED green 3	*Display QLE> (on>)*	—
LED green 4	*Display QLA (off)*	—

Outputs → Digital module 1		
DM – Output 1	*Contactor control QE3*	—
DM – Output 2	*Contactor control QE4*	—

Outputs → Cyclic send data		
Byte 0, bit 0	**Status – On<**	—
Byte 0, bit 1	**Status - Off**	—
Byte 0, bit 2	**Status – On>**	—
Byte 0, bit 3	**Message – Pre-warning overload**	—
Byte 0, bit 4	**Status - Change-over pause active**	—
Byte 0, bit 5	**Status – Remote mode**	—
Byte 0, bit 6	**Status – General fault**	—
Byte 0, bit 7	**Status - General warning**	—
Byte 1, bit 0	Not connected	Freely assignable
Byte 1, bit 1	**Status - Test position (TPF)**	—
Byte 1, bit 2	Not connected	Freely assignable
Byte 1, bit 3	**Status – Interlocking time active**	—
Byte 1, bit 4	Not connected	Freely assignable
Byte 1, bit 5	Not connected	Freely assignable
Byte 1, bit 6	Not connected	Freely assignable
Byte 1, bit 7	Not connected	Freely assignable
Bytes 2 to 3	**Max. current Imax**	—

Standard functions → Test/reset		
Test 1	Cyclic receive – bit 0.3	—
Reset 1	Cyclic receive – bit 0.6	—

Standard functions → Emergency start		
Emergency start – Input	Cyclic receive – bit 0.4	—

3.8.2 Function

The block is installed by the user in a cyclic watchdog interrupt OB (e.g. OB32). Parameter inputs IN_01 and IN_23 as well as parameter output O_01 are also interconnected by the user with the associated icons for inputs or outputs of the associated SIMOCODE pro device.

SMC_REVS accesses the data provided by SIMOCODE pro via inputs IN_01 (2 bytes of binary data) and IN_23 (2 bytes of motor current).

Data is transferred to SIMOCODE pro via the output O_01 (2 bytes of binary data).

The configuration of the inputs and outputs is determined here by SIMOCODE pro basic type 2.

Access to the inputs and outputs takes place exclusively via the process image.

The block uses the input parameter MODE to determine whether the inputs IN_01 and IN_23 are valid. In the case of a higher-level fault, all inputs are read by SIMOCODE pro with "0" and output to the relevant outputs of the block.

3.8.3 Assignment of the cyclic process image

Table 3- 28 Assignment of O_01: Output commands to SIMOCODE pro

Bit	Control interface
0.0	On< → Left On
0.1	Off
0.2	On> → Right On
0.3	Test 1
0.4	Emergency start
0.5	Local/remote control station
0.6	Reset
0.7	—
1.0 … 1.7	User-specific outputs

Table 3- 29 Assignment of IN_0: Feedback messages from SIMOCODE pro

Bit	Cyclic send data	Block parameter
0.0	Status – On<	QRUN / QDIR = TRUE
0.1	Status – Off	QSTOP
0.2	Status – On>	QRUN / QDIR = FALSE
0.3	Message – Pre-warning overload	QOVL
0.4	Status - Change-over pause active	QCOA
0.5	Status – Remote mode	QREMOTE
0.6	Status - General fault	QGR_ERR
0.7	Status - General warning	QGR_WRN
1.0	—	—
1.1	Status - Test position (TPF)	QCST
1.2	—	—
1.3	Status - Interlocking time active	QLTA
1.4 … 1.7	—	—

The input parameter IN_01 is additionally copied to the output Q_IN_01.

The motor current is transferred via the input parameter IN_23 as an unsigned 2-byte value. SIMOCODE pro always transfers the current here as a percentage of the set current in a range from 0 to 1000%. The motor current is output via QCUR.

Assignment of bytes 2 / 3 of the analog control interface and bytes 4 to 9 of the cyclic send data when using basic type 1 is described in the following chapter: Assignment of the cyclic process image (Page 35)

3.8.4 Operating modes

Changing the control station (REMOTE, LOCAL)

The control station is changed via the interconnectable function input REM_L if the input REM_SEL is set, or via the function input REM_ON_OP set by the OS.

The function input (REMOP_EN) influences the operator enable (QLOCOP) for operating via the OS.

The operating mode of the control station is output via QREMOTE (1 = REMOTE, 0 = LOCAL). QREMOTE corresponds here to the bit DP0.5 of the SIMOCODE pro.

In LOCAL mode, the controller is completely switched off via the SMC_REVSblock. Control is then only possible via a control station connected direct to the SIMOCODE pro. It is still possible to acknowledge the fault.

Changing the operating modes (MANUAL, AUTO) when REMOTE is selected

If QREMOTE = TRUE, changeover between the two operating modes MANUAL and AUTOMATIC takes place either via OS operation using AUT_ON_OP (LIOP_SEL = 0) or via the interconnection of the input AUT_L (LIOP_SEL = 1).

The function inputs (MANOP_EN, AUTOP_EN) influence the operator enables (QMANOP, QAUTOP) for operating via the OS.

The operating mode is output at output QMAN_AUT(1 = AUTO, 0 = MANUAL).

Changing the control station for MANUAL

In REMOTE mode, the operating mode MANUAL can be controlled either via the OS or via the interconnectable function inputs. The changeover for this takes place via the interconnectable function input LINK_MAN.

3.8.5 Control stations for MANUAL and AUTOMATIC mode

General information

The PLC/DP control station of the SIMOCODE pro (that is, DP0.1 and DP0.2) is level-active. The On command is stored in the SIMOCODE pro. The Off command (DP0.1) takes priority over the On command (DP0.2).

Control of the SIMOCODE pro via AS / OS is only possible in REMOTE mode.

AUTOMATIC

In automatic mode, the SIMOCODE pro control functions are controlled via the interconnectable function inputs AUTO_ON (TRUE = On, FALSE = Off) and AUTO_DIR (TRUE = counter-clockwise, FALSE = clockwise).

Control without non-maintained command mode (JOG_ON = FALSE)

At one edge of the command input, the associated control bit is set in the interface until the SIMOCODE pro sends the relevant feedback message, or a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the automatic interface.

Control with non-maintained command mode (JOG_ON = TRUE)

The corresponding control bit in the interface is set as long as the command input = TRUE or if a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the automatic interface. The Stop command is not necessary for switching the device off but is nevertheless set by the block if no On command is active.

MANUAL

In manual mode, the SIMOCODE pro is controlled either via the function inputs FORW_ON, REV_ON and MOT_OFF set by the OS or via the interconnectable function inputs L_FORW, L_REV and L_OFF.

The inputs for the operator enables FW_OP_EN / RV_OP_EN / OFFOP_EN set the outputs QFORW_OP / QREV_OP / QOFF_OP for operation using the OS.

At one edge of the command input, the associated control bit is set in the interface until the SIMOCODE pro sends the relevant feedback message, or a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the interconnectable manual interface.

The Off command takes priority over the On command (no edge evaluation!).

The following priorities apply for the On commands:

Right takes priority over left.

After changing to manual mode, the commands are not forwarded to the inputs until there is a positive edge change when L_FORW / L_REV / L_OFF is active.

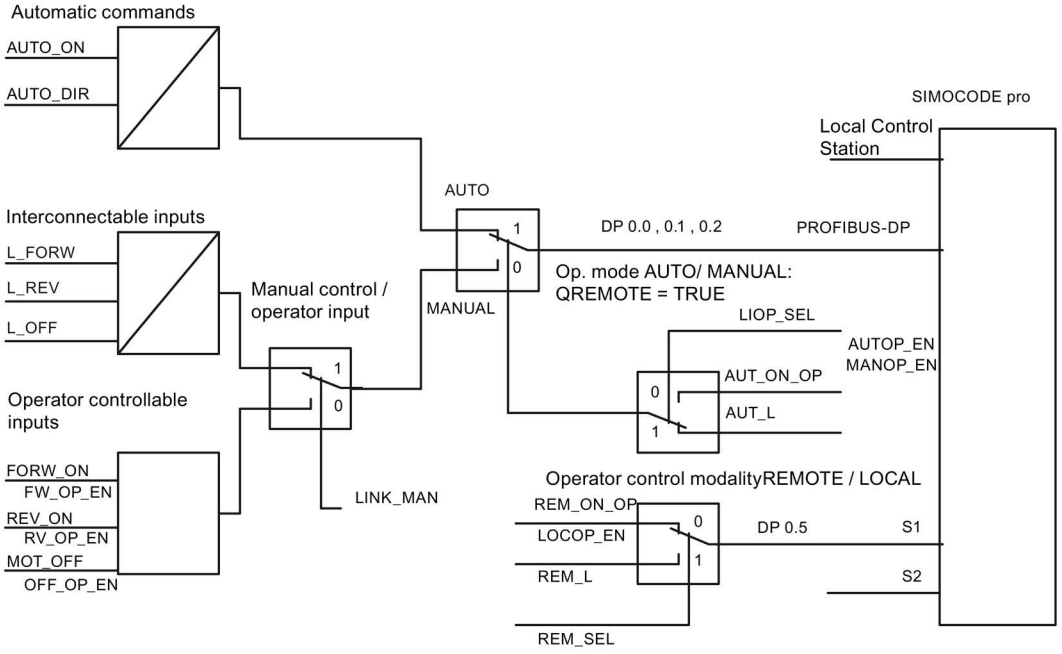
Control without non-maintained command mode (JOG_ON = FALSE)

At one edge of the command input, the associated control bit is set in the interface until the SIMOCODE pro sends the relevant feedback message, or a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the interconnectable inputs. The operator controllable inputs FORW_ON, REV_ON and MOT_OFF are adjusted when tripped.

Control with non-maintained command mode (JOG_ON = TRUE)

The corresponding control bit in the interface is set as long as the command input = TRUE or if a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the automatic interface. The Stop command is not necessary for switching the device off but is nevertheless set by the block if no On command is active.

3.8.6 Overview of control stations, operating modes, and operator control modalities



3.8.7 Simulation

The simulation mode is activated using the input SIM_ON and takes priority over all other operating modes. If SIM_ON = TRUE, the block processes the simulation values (SIM_I01: binary data, SIM_I23: motor current) instead of the process values of SIMOCODE pro(IN_01, IN_23). QSIM, QUALITY and QBAD are output accordingly. The process output (O_01) is output with "0" if simulation is active. The command status is combined with the output QSTATUS.

A block must be programmed for the simulation. The output QSTATUS can be evaluated and this information can be used to form the simulation feedback message (SIM_I01, SIM_I23). Assignment corresponds to assignment of the process inputs/process output and can be found in the following chapter: Assignment of the cyclic process image (Page 141)

3.8.8 Interlocking

The interlocks LOCK and LOCK_ON are only effective in REMOTE mode and are valid in the operating mode MANUAL and AUTO for all control stations of the SMC_REVS block.

An active lock input prevents switching and disables control stations for MANUAL and AUTO. The control bit is set permanently.

LOCK always takes priority over LOCK_ON.

The input LOCK_DIR(TRUE = counter-clockwise, FALSE = clockwise) determines the desired option for LOCK_ON.

Revoking of LOCK_ON switches the motor to the operating mode AUTO corresponding to the control station for AUTO. In MANUAL, the motor is switched off.

3.8.9 Local Interruption

The output QLOC_INT indicates in REMOTE that operation via the local control station (connected direct to SIMOCODE pro) has changed the current switching state.

QLOC_INT is also set if the switching state requested via REMOTE has not been reached within the monitoring time set using TIME_MON and no general fault has occurred (e.g. due to a higher-priority Off command at the SIMOCODE pro general control station). This monitoring is switched off with TIME_MON = 0 or MONITOR = FALSE.

The monitoring time is not started until the interlocking time has expired.

If QLOC_INT = TRUE, the control outputs are reset.

QLOC_INT is reset via the inputs RESET (operator controllable) / L_RESET (interconnectable). The input RESET is reset after acknowledgment. If L_RESET is active permanently, QLOC_INT is set for the duration of the cycle if the requirements given above are met.

Monitoring is deactivated at initial startup by setting MONITOR = FALSE.

3.8.10 Current and current limit monitoring

Current

The motor current is transferred via the input parameter IN_23 as an unsigned 2-byte value. SIMOCODE pro always transfers the current here as a percentage of the set current in a range from 0 to 1000%.

Current limits

The current limit values are read out from the data set DS130. Reading of the data set is initiated either via the interconnectable input parameter L_RD_DATA, in the OS when selecting the limit value view, or by OS operation (RD_DATA). The output QEN_RDWR is reset during communication.

The data read is output to the in/out parameters Alarm high (CUR_AH), Alarm low (CUR_AL), Warning high (CUR_WH) and Warning low (CUR_WL).

If a fault occurs, the values are set to zero and the output QERR_RD = TRUE is set.

The limit values can also be parameterized in the faceplate. If the values are changed, they are written to SIMOCODE pro.

The signaling response in the case of limit value violations are parameterized with SIMOCODE ES or SIMATIC PDM. Under Monitoring functions → Current limits, the response to trip level/warning level is set for this purpose as follows:

Trip level:	disabled or tripping
Warning level:	disabled or warning

If a fault occurs when writing, the values are reset to "0" and the output QERR_WR = TRUE is set.

Overshooting or undershooting of the limit values results in transmission of the relevant message provided the limit value message has not been completely switched off via the parameter M_SUP_C (default is: switched off). Limit value violation messages are generated in the SIMOCODE pro and evaluated in the block. The outputs QCUR_AH, QCUR_AL, QCUR_WH and QCUR_WL are set accordingly.

Range limits

The range limits for the limit bars are parameterized using the function inputs MO_PVHR and MO_PVLR and can be adjusted in the OS.

3.8.11 Signaling response

Table 3- 30 SMC_REVS issues the following messages:

Message block	Message number	Block parameter	Message text	Message class
MSG_EVID1	1	QGR_WRN	$$BlockComment$$ General warning: @4W%t#SMC_Warnings@ @5W%t#SMC_Warnings@ @6W%t#SMC_Warnings@	WH
	2	QGR_ERR	$$BlockComment$$ General fault: @7%t#SMC_Errors@	AH
	3	QCUR_AH	$$BlockComment$$ Current alarm up	AH
	4	QCUR_WH	$$BlockComment$$ Current warning up	WH
	5	QCUR_WL	$$BlockComment$$ Current warning down	WL
	6	QCUR_AL	$$BlockComment$$ Current alarm down	AL
	7	QCST	$$BlockComment$$ Test feedback	WH
	8	MSG_8	Free	—
MSG_EVID2	1	MSG_9	Free	—
	2	MSG_10	Free	—
	3	MSG_11	Free	—
	4	MSG_12	Free	—
	5	MSG_13	Free	—
	6	MSG_14	Free	—
	7	MSG_15	Free	—
	8	MSG_16	Free	—

The free message inputs are not assigned a fixed meaning and can be activated using the parameters MSG_x (x = 8 to 16) on the SMC_REVS.

Table 3- 31 The ALARM_8P auxiliary values are assigned as follows:

Message block	Message number	Auxiliary value	Block parameter	Meaning
MSG_EVID1	—	1	BA_NA	Batch name
	—	2	STEP_NO	Batch step number
	—	3	BA_ID	Batch ID
	1	4	WRN_NO1	Warning number 1
		5	WRN_NO2	Warning number 2
	2	6	WRN_NO3	Warning number 3
		7	ERR_NO1	Fault number 1
		8	ERR_NO2	Fault number 2
		9	ERR_NO3	Fault number 3
		10	—	—

Message block	Message number	Auxiliary value	Block parameter	Meaning
MSG_EVID2	—	1	BA_NA	Batch name
	—	2	STEP_NO	Batch step number
	—	3	BA_ID	Batch ID
	—	4	AUX_PR14	Free
	—	5	AUX_PR15	Free
	—	6	AUX_PR16	Free
	—	7	AUX_PR17	Free
	—	8	AUX_PR18	Free
	—	9	AUX_PR19	Free
	—	10	AUX_PR20	Free

The auxiliary values AUX_PR14 … AUX_PR20 are freely available.

The limit value messages can be suppressed via the input M_SUP_C. The default value of the input M_SUP_C is TRUE, that is, message suppression is active.

For the messages "General warning" and "General fault", the diagnostics block SMC_DIAG supplies the detailed information that is interconnected via the structure DIAG_INF to SMC_REVS.

General warning (message number 1)

The message General warning is derived from the diagnostics structure DIAG_INF formed by the block SMC_DIAG.

Three auxiliary values are transferred as additional information together with the message General warning. The auxiliary values correspond to the contents of the warning numbers WRN_NO1, WRN_NO2 and WRN_NO3 and contain the first three warning causes found.

The user text library SMC_Warnings is available for the warnings. This contains the precise fault texts and is supplemented dynamically in the message.

General fault (message number 2)

The message General fault is derived from the diagnostics structure DIAG_INF formed by the block SMC_DIAG.

One auxiliary value is transferred as additional information together with the message General fault. The auxiliary value corresponds to the contents of the fault number ERR_NO1 and contains the first fault cause found.

The auxiliary values 8 and 9 are interconnected with the parameters ERR_NO2 and ERR_NO3 and can be appended to the message if required.

The user text library SMC_Errors is available for the faults. This contains the precise error texts and is supplemented dynamically in the message.

Current limit messages (message number 3 to 6)

The current limit messages are formed by the SIMOCODE pro and are contained in the diagnostics structure DIAG_INF.

Test feedback (message number 7)

The message "Test feedback" is derived direct from the SIMOCODE pro information (DP1.1 Send).

Free messages (message number 8 of the message block 1, message numbers 1 to 8 of message block 2)

There is no block-internal assignment to a specific function for these messages. It can be activated via a parameter input (MSG_8 to MSG_16) and can be used, for example, for reporting of Local_Interruption, the operating mode SIMULATION, or any other signal.

3.8.12 Reset response

In principle, every fault detected by SIMOCODE pro must be acknowledged. This is done via the bit DP0.6 Recv. Reset is only carried out by SIMOCODE pro if there is no active On command. Reset either resets the General fault (QGR_ERR) if the cause of the fault no longer exists, or it results in acknowledgment of the fault if the cause of the fault still exists. An acknowledged fault automatically results in resetting of the general fault following removal of the fault cause.

Reset can be carried out either via the interconnectable function input L_SMCRESET or via the OS operator controllable function input SMCRESET.

L_SMCRESET is level-active. SMCRESET is reset by the block following evaluation.

The reset function is transparent from the block's perspective, that is, there is no logical combination with other signals, and independent of the operating mode (LOCAL / REMOTE).

3.8.13 Start-up characteristics

At CPU startup, the block is switched to manual mode and the Off command is output. For this purpose, the block must be called from the startup OB. After startup, the messages are suppressed for the number of cycles parameterized in the RUNUPCYC value.

3.8.14 Time response

The block must be called via a watchdog interrupt OB. The sampling time of the block is entered in the parameter SAMPLE_T.

3.8.15 SMC_REVS block parameters

Element	Type	Kind	Meaning	HMI
AUT_L	BOOL	I	Interconnectable input for MAN / AUTO (0 = Manual / 1 = Auto)	N
AUT_ON_OP	BOOL	IO	Control input: 0 = Manual, 1 = Auto	Y
AUTO_DIR	BOOL	I	Automatic value: 1 = left, 0 = right	N
AUTO_ON	BOOL	I	Automatic value: 1 = On, 0 = Off	N
AUTOP_EN	BOOL	I	1 = Operator enable for Auto	N
AUX_PRxx	ANY	IO	Auxiliary value x (x = 11 to 20)	N
BA_EN	BOOL	I	BATCH record release	Y
BA_ID	DWORD	I	BATCH: Consecutive batch number	Y
BA_NA	STRING [32]	I	BATCH designation	Y
CST	BOOL	I	1 = Test mode	N
CUR_AH	REAL	IO	Upper alarm limit current	Y
CUR_AL	REAL	IO	Lower alarm limit current	Y
CUR_WH	REAL	IO	Upper warning limit current	Y
CUR_WL	REAL	IO	Lower warning limit current	Y
DD_17_20	DWORD	O	DS92 Byte 17 to 20: General warning additional info 1	Y
DD_21_22	WORD	O	DS92 Byte 21 to 22: General warning additional info 2	Y
DD_24_27	DWORD	O	DS92 Byte 24 to 27: General fault additional info 1	Y
DD_28_31	DWORD	O	DS92 Byte 28 to 31: General fault additional info 2	Y
DIAG_INF	UDT_ DIAG	I	Diagnostics structure of SMC_DIAG	N
EM_START	BOOL	I	Emergency start	Y
EN_MEAS	BOOL	I	1 = Measured value block available	Y
EN_RDWR	BOOL	I	1 = Enable reading/writing of data set	N
EN_STAT	BOOL	I	1 = Statistics block available	Y
ERR_NOx	INT	O	Fault number x (x = 1 to 6)	Y
FORW_ON	BOOL	IO	Control input: 1 = RIGHT ON	Y
FW_OP_EN	BOOL	I	1 = Operator enable for RIGHT ON	N
I1_x	BOOL	I	User-defined outputs DP1.x (x = 0 to 7)	N
IN_01	WORD	I	Inputs DP0.0 to 1.7	N
IN_23	WORD	I	Input motor current	N
JOG_ON	BOOL	I	1 = Non-maintained command mode active	N
L_FORW	BOOL	I	Manual control: 1 = right on	N
L_OFF	BOOL	I	Manual control: 1 = Off	N
L_RD_DATA	BOOL	I	Interconnectable input 0 → 1: Reading of the data set	N
L_RESET	BOOL	I	Configurable input for resetting QLOC_INT	N
L_REV	BOOL	I	Manual control: 1 = left on	N
L_SMCRESET	BOOL	I	Interconnectable input for resetting	N
LADDR	INT	I	Start address of the inputs	N

Element	Type	Kind	Meaning	HMI
LINK_MAN	BOOL	I	0 = Operator input active 1 = Manual control via interconnectable inputs	N
LIOP_SEL	BOOL	I	Interconnectable input for manual/auto changeover (AUT_L): 1 = Interconnection is active 0 = Operation is active	N
LOCK	BOOL	I	1 = Lock (OFF)	Y
LOCK_DIR	BOOL	I	Direction of rotation with LOCK_ON: 1 = left, 0 = right	Y
LOCK_ON	BOOL	I	1 = Lock (ON)	Y
LOCOP_EN	BOOL	I	1 = Operator enable for LOCAL	N
M_SUP_C	BOOL	I	1 = Message suppression active for current limit value violations	Y
MANOP_EN	BOOL	I	1 = Operator enable for Manual	N
MO_PVHR	REAL	I	Bar upper limit	Y
MO_PVLR	REAL	I	Bar lower limit	Y
MODE	DWORD	I	Mode of OMODE of the SMC_DIAG	N
MONITOR	BOOL	I	Monitoring: 1 = ON	Y
MOT_OFF	BOOL	IO	Control input: 1 = OFF	Y
MSG_ACK1	WORD	O	Messages acknowledged ALARM8_P block 1	N
MSG_ACK2	WORD	O	Messages acknowledged ALARM8_P block 2	N
MSG_EVID1	DWORD	I	Event ID of ALARM8_P block 1	N
MSG_EVID2	DWORD	I	Event ID of ALARM8_P block 2	N
MSG_STAT1	WORD	O	MESSAGE1: STATUS output	N
MSG_STAT2	WORD	O	MESSAGE2: STATUS output	N
MSG_x	BOOL	I	Free message input x (x = 8 to 16)	N
O_01	WORD	O	Outputs DP0.0 to 1.7	N
OCCUPIED	BOOL	I	BATCH record ID	Y
OFFOP_EN	BOOL	I	1 = Operator enable for OFF	N
OOS	BOOL	I	Reserve	Y
Q_IN_01	WORD	O	Inputs DP0.0 to 1.7	N
QAUTOP	BOOL	O	1 = Operator enable for Auto	Y
QBAD	BOOL	O	1 = Invalid process value	Y
QBUS_PLC	BOOL	O	Bus/PLC fault	Y
QCOA	BOOL	O	1 = Change-over pause active (DP0.4)	Y
QCST	BOOL	O	1 = Test active (DP1.1)	Y
QCUR	REAL	O	Motor current % Ie	Y
QCUR_AH	BOOL	O	Upper alarm limit current violated	N
QCUR_AL	BOOL	O	Lower alarm limit current violated	N
QCUR_WH	BOOL	O	Upper warning limit current violated	N
QCUR_WL	BOOL	O	Lower warning limit current violated	N
QDIR	BOOL	O	Status direction of rotation: 1 = left 0 = right	Y
QEM_STRT	BOOL	O	1 = Emergency start active	N

Element	Type	Kind	Meaning	HMI
QEN_RDWR	BOOL	O	1 = Enable reading/writing of data set	N
QERR	BOOL	O	1 = Program error	N
QERR_RD	BOOL	O	1 = Error while reading the data set	N
QERR_WR	BOOL	O	1 = Error while writing the data set	N
QFLT_F9	BOOL	O	Fault F9	Y
QFORW_OP	BOOL	O	1 = Operator enable for RIGHT ON	Y
QGR_ERR	BOOL	O	General fault (DP0.6)	N
QGR_WRN	BOOL	O	General warning (DP0.7)	N
QLOC_INT	BOOL	O	1 = Local interruption	Y
QLOCOP	BOOL	O	1 = Operator enable for LOCAL / REMOTE	Y
QLTA	BOOL	O	1 = Interlocking time active (DP0.4)	Y
QMAN_AUT	BOOL	O	0 = Manual 1 = Automatic	Y
QMANOP	BOOL	O	1 = Operator enable for Manual	Y
QMSG_ERR	BOOL	O	1 = ALARM8_P Error	N
QMSG_SUP	BOOL	O	1 = Message suppression	Y
QOFF_OP	BOOL	O	1 = Operator enable for OFF	Y
QOP_ERR	BOOL	O	1 = General operator error	N
QPARFF16	BOOL	O	Parameter error F16	Y
QRD_STAT	WORD	O	Return value of the SFB RDREC	N
QRDWR_OP	BOOL	O	1 = Operator enable Read/write data set	Y
QREMOTE	BOOL	O	1 = REMOTE mode (DP0.5)	Y
QREV_OP	BOOL	O	1 = Operator enable for left on	Y
QRUN	BOOL	O	Status: 1 = Motor ON (DP0.2)	Y
QSIM	BOOL	O	1 = Simulation active	Y
QSTATUS	WORD	O	Command status (outputs DP0.0 to 1.7)	N
QSTOP	BOOL	O	Status: 1 = Motor OFF (DP0.1)	Y
QUALITY	BYTE	O	Quality code	N
QWR_STAT	WORD	O	Return value of the SFB WRREC	N
RACKF	BOOL	I	1 = Rack fault	N
RD_DATA	BOOL	IO	0 → 1: Reading of the data set	Y
REM_L	BOOL	I	Interconnectable input for LOCAL / REMOTE(0 = LOCAL / 1 = REMOTE)	N
REM_ON_OP	BOOL	IO	Control input: 0 = LOCAL, 1 = REMOTE	Y
REM_SEL	BOOL	I	Interconnectable input for LOCAL / REMOTE changeover (REM_L): 1 = Interconnection is active 0 = Operation is active	N
RESET	BOOL	IO	Control input for resetting QLOC_INT	N
REV_ON	BOOL	IO	Control input: 1 = left on	Y
RUNUPCYC	INT	I	Number of initial run cycles after CPU restart	N
RV_OP_EN	BOOL	I	1 = Operator enable for left on	N
SAMPLE_T	REAL	I	Sampling time in [s]	N

Element	Type	Kind	Meaning	HMI
SIM_I01	WORD	I	Simulation value IN_01	N
SIM_I23	WORD	I	Simulation value IN_23	N
SIM_ON	BOOL	I	1 = Simulation	Y
SMCRESET	BOOL	IO	Operator controllable reset input for faults	Y
STEP_NO	DWORD	I	Batch step number	Y
TIME_MON	REAL	I	Monitoring time in [s]	Y
USTATUS	WORD	I	Status word in VSTATUS, freely user-assignable	N
VSTATUS	DWORD	O	Status for status displays for block icon	Y
WRN_NOx	INT	O	Warning number x (x = 1 to 6)	Y

Table 3- 32 Structure of VSTATUS

Bit	Parameter
0	OCCUPIED
1	BA_EN
2	QSIM
3	QMAN_AUT
4	QCST
5	QGR_ERR
6	QGR_WRN
7	QLOC_INT
8	LOCK / LOCK_ON
9	QRUN
10	QSTOP
11	QDIR
12	—
13	—
14	—
15	—
16 … 31	USTATUS

3.8.16 Status displays for icons

Status	Parameter	View
Off	QSTOP = 1	
Right On Star	QSTOP = 0 QRUN = 0 QDIR = 0	
Right On Triangle	QSTOP = 0 QRUN = 1 QDIR = 0	
Left On Star	QSTOP = 0 QRUN = 0 QDIR = 1	
Left On Triangle	QSTOP = 0 QRUN = 1 QDIR = 1	
Not available	QBAD = 1	

3.8.17 Description of faceplates

The available faceplates are described in this chapter.

The following views are available:

Overview	OVERVIEW
Standard	STANDARD
Limits	LIMITS
Maintenance	MAINTENANCE
Faults	MESSAGE1
Warnings	MESSAGE2
Messages	—
Trend	—
Batch	—

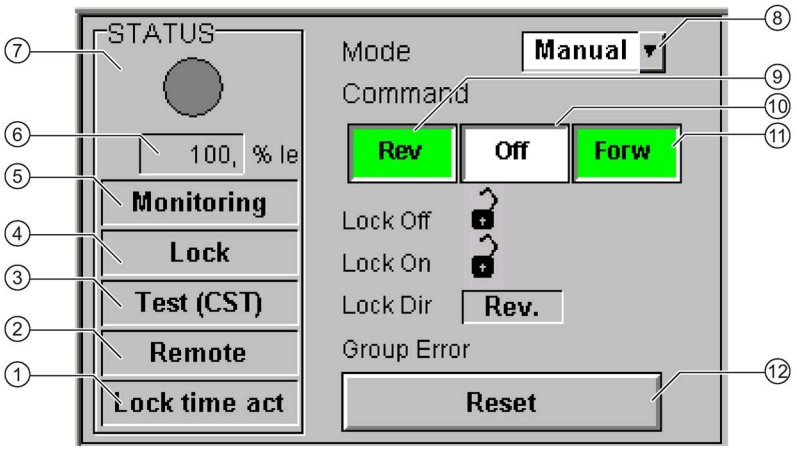
The file name is composed as follows: @PG_SMC_REVS_<View>.PDL

The PCS 7 standard displays are used for the message, trend and batch views.

The structure of the individual views of faceplates is described below.

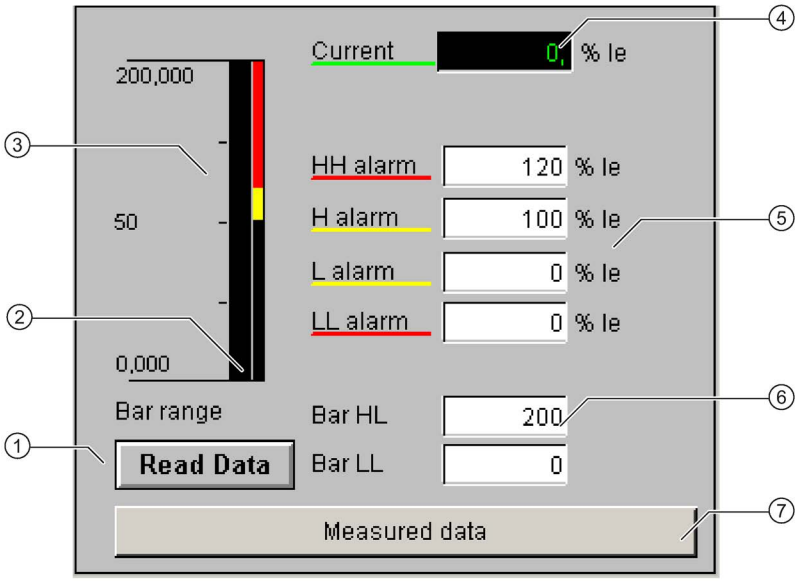
Standard (STANDARD)

The status display is a user object comprising several status displays. The status display corresponds to the representation from the process image icon.



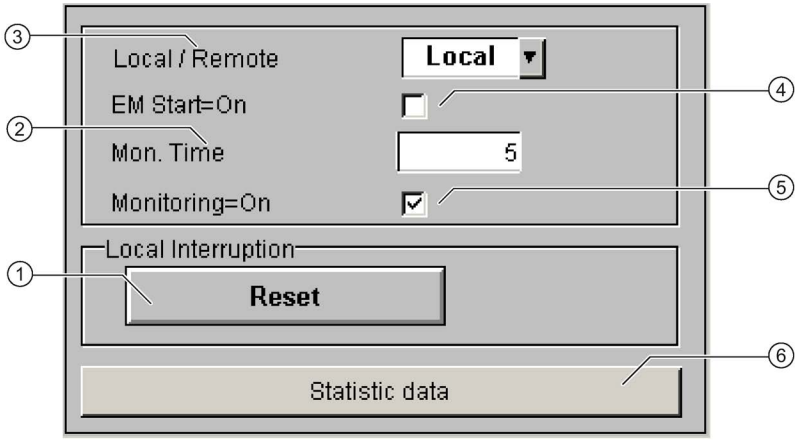
① Interlocking time (QLTA) / change-over pause (QCOA)
② Operator control modality (QREMOTE)
③ Test (QCST)
④ Interlocking (LOCK / LOCK_ON)
⑤ Local Interruption (QLOC_INT)
⑥ Current (QCUR)/ unit (QCUR#unit)
⑦ Status display (VSTATUS)
⑧ Operating mode (QMAN_AUT, AUT_ON_OP)
⑨ Command Left On (REV_ON)
⑩ Command Off (MOT_OFF)
⑪ Command Right On (FORW_ON)
⑫ Acknowledgement (RESET)

Limits (LIMITS)



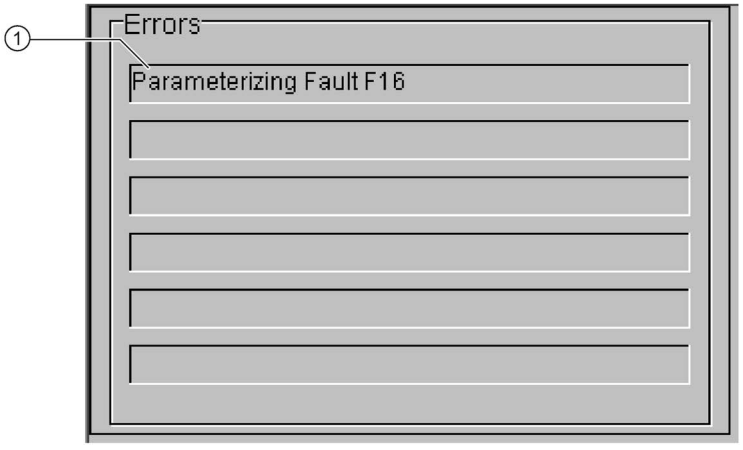
① Read Data (RD_DATA)
② Limit value display (CUR_AH, CUR_WH, CUR_WL, CUR_AL)
③ Actual value bar (QCUR, MO_PVHR, MO_PVLR)
④ Current value (QCUR, QCUR#unit)
⑤ Limits (CUR_AH, CUR_WH, CUR_WL, CUR_AL)
⑥ Bar range (MO_PVHR, MO_PVLR)
⑦ Call faceplate SMC_MEAS, visible if EN_MEAS = TRUE

Maintenance (MAINTENANCE)



① Acknowledge Local Interruption (RESET)
② Monitoring time for Local Interruption (TIME_MON)
③ Operator control modality Local / Remote (REM_ON_OP)
④ Activation Emergency Start (EM_START)
⑤ Activation Monitoring (MONITOR)
⑥ Call faceplate SMC_STAT, visible if EN_STAT = TRUE

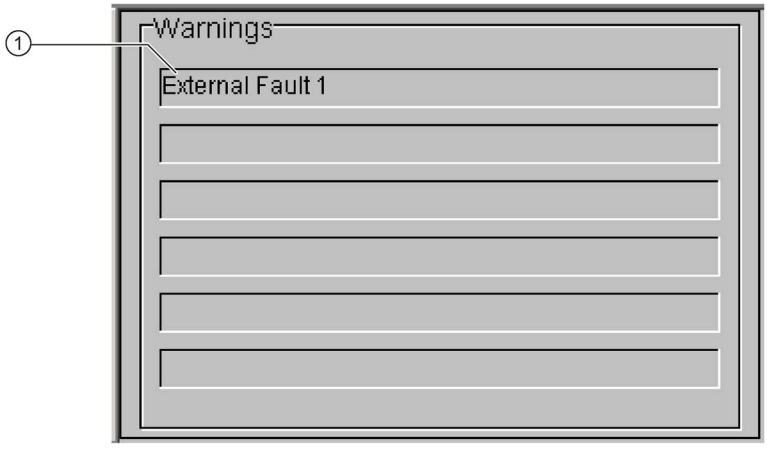
Faults (MESSAGE1)



① Text list with error description (ERR_NOx)

For error number 0, the text field is switched to invisible.

Warnings (MESSAGE2)



① Text list with error description (WRN_NOx)

For error number 0, the text field is switched to invisible.

3.9 SMC_DAHL: Signal processing block for the dahlander/pole-changing starter control function

FB2008

Calling OBs

The watchdog interrupt OB in which you install the block (e.g. OB32). Also in OB100 (see start-up characteristics).

Called blocks

The block calls the following blocks:

SFB35	ALARM_8P
SFB52	RDREC
SFB53	WRREC
SFC6	RD_SINFO
SFC20	BLKMOV
SFC21	FILL

3.9.1 Parameter assignment in SIMOCODE ES

For the signal blocks to function correctly, a range of SIMOCODE pro parameters must have quite specific settings. Those parameters that define the assignment of the cyclic I/O interface are especially affected.

These parameters are represented in **bold**.

In addition, the overview below represents the parameters that are already preset for the control function in the templates for application selection in the SIMOCODE ES software. The settings are suggestions and depend heavily on the actual wiring of the SIMOCODE pro inputs and outputs.

These parameters are represented in *italics*.

Other parameters must also be set, e.g. for motor protection. These are not described here. Parameter assignment for the extended I/O interface of basic type 1 is represented in the following chapter: Parameter assignment in SIMOCODE ES (Page 33)

Dahlander control function

Motor control → Control stations		
Operation mode selector S1	**Cyclic receive bit 0.5**	—
Operation mode selector S2	*Fixed level 1*	—

Local control [LC]		
Off	*BU - Input 2*	—
On>	*BU - Input 1*	—
On>>	*BU - Input 3*	—
Operator enable local 2 off	*Active*	—
Operator enable local 2 on	*Active*	—
Operator enable remote off	**Not active**	—
Operator enable remote on	**Not active**	—

PLC/PCS [DP]		
Off	**Cyclic receive – bit 0.1**	—
On>	**Cyclic receive – bit 0.2**	—
On>>	**Cyclic receive – bit 0.0**	—
Operator enable local 2 off	**Not active**	—
Operator enable local 2 on	**Not active**	—
Operator enable remote off	**Active**	—

Operator Panel [OP]		
Off	*OP button 4*	—
On>	*OP button 3*	—
On>>	*OP button 2*	—
Operator enable local 2 off	*Active*	—
Operator enable local 2 on	*Active*	—
Operator enable remote off	**Not active**	—
Operator enable remote on	**Not active**	—

Motor control → Control function → Control commands		
Off	**Released control command - OFF**	—
On>	**Enabled control command – On>**	—
On>>	**Enabled control command – On>**	—

Motor control → Control function → Operating mode		
Non-maintained command mode	*Not active/active*	*The setting of the parameter influences the parameter JOG_ON in the SIMOCODE signal block:* *Non-maintained command mode not active: JOG_ON = FALSE* *Non-maintained command mode active: JOG_ON = TRUE*
Saving change-over command	**Active**	—

Motor control → Control function → Auxiliary control inputs		
Feedback ON	**Status - Motor current flowing**	—

Outputs → Basic unit		
BU – Output 1	*Contactor control QE1*	—
BU – Output 2	*Contactor control QE2*	—
BU – Output 3	*Contactor control QE3*	—

Outputs → Operator panel LEDs		
LED green 2	*Display QLE>> (on>>)*	—
LED green 3	*Display QLE> (on>)*	—
LED green 4	*Display QLA (off)*	—

Outputs → Cyclic send data		
Byte 0, bit 0	**Status – On>**	—
Byte 0, bit 1	**Status - Off**	—
Byte 0, bit 2	**Status – On>**	—
Byte 0, bit 3	**Message – Pre-warning overload**	—
Byte 0, bit 4	**Status - Change-over pause active**	—
Byte 0, bit 5	**Status – Remote mode**	—
Byte 0, bit 6	**Status – General fault**	—
Byte 0, bit 7	**Status - General warning**	—
Byte 1, bit 0	Not connected	Freely assignable
Byte 1, bit 1	**Status - Test position (TPF)**	—
Byte 1, bit 2	Not connected	Freely assignable
Byte 1, bit 3	Not connected	Freely assignable
Byte 1, bit 4	Not connected	Freely assignable
Byte 1, bit 5	Not connected	Freely assignable
Byte 1, bit 6	Not connected	Freely assignable
Byte 1, bit 7	Not connected	Freely assignable
Byte 2-3	**Max. current Imax**	—

Pole-changing starter control function

Motor control → Control stations		
Operation mode selector S1	**Cyclic receive bit 0.5**	—
Operation mode selector S2	*Fixed level 1*	—

Local control [LC]		
Off	*BU - Input 2*	—
On>	*BU - Input 1*	—
On>>	*BU - Input 3*	—
Operator enable local 2 off	*Active*	—
Operator enable local 2 on	*Active*	—
Operator enable remote off	**Not active**	—
Operator enable remote on	**Not active**	—

PLC/PCS [DP]		
Off	*Cyclic receive – bit 0.1*	—
On>	*Cyclic receive – bit 0.2*	—
On>>	*Cyclic receive – bit 0.0*	—
Operator enable local 2 off	*Not active*	—
Operator enable local 2 on	*Not active*	—
Operator enable remote off	**Active**	—
Operator enable remote on	**Active**	—

Operator Panel [OP]		
Off	*OP button 4*	—
On>	*OP button 3*	—
On>>	*OP button 2*	—
Operator enable local 2 off	*Active*	—
Operator enable local 2 on	*Active*	—
Operator enable remote off	**Not active**	—
Operator enable remote on	**Not active**	—

Motor control → Control function → Control commands		
Off	**Released control command - OFF**	—
On>	**Enabled control command – On>**	—
On>>	**Enabled control command – On>**	—

Motor control → Control function → Operating mode		
Non-maintained command mode	*Not active/active*	*The setting of the parameter influences the parameter JOG_ON in the SIMOCODE signal block:* *Non-maintained command mode not active: JOG_ON = FALSE* *Non-maintained command mode active: JOG_ON = TRUE*
Saving change-over command	**Active**	—

Motor control → Control function → Auxiliary control inputs		
Feedback ON	**Status - Motor current flowing**	—

Outputs → Basic unit		
BU – Output 1	*Contactor control QE1*	—
BU – Output 2	*Contactor control QE2*	—

Outputs → Operator panel LEDs		
LED green 2	*Display QLE>> (on>>)*	—
LED green 3	*Display QLE> (on>)*	—
LED green 4	*Display QLA (off)*	—

Outputs → Cyclic send data		
Byte 0, bit 0	**Status – On>**	—
Byte 0, bit 1	**Status - Off**	—
Byte 0, bit 2	**Status – On>**	—
Byte 0, bit 3	**Message – Pre-warning overload**	—
Byte 0, bit 4	**Status - Change-over pause active**	—
Byte 0, bit 5	**Status – Remote mode**	—
Byte 0, bit 6	**Status – General fault**	—
Byte 0, bit 7	**Status - General warning**	—
Byte 1, bit 0	Not connected	Freely assignable
Byte 1, bit 1	**Status - Test position (TPF)**	—
Byte 1, bit 2	Not connected	Freely assignable
Byte 1, bit 3	Not connected	Freely assignable
Byte 1, bit 4	Not connected	Freely assignable
Byte 1, bit 5	Not connected	Freely assignable
Byte 1, bit 6	Not connected	Freely assignable
Byte 1, bit 7	Not connected	Freely assignable
Byte 2-3	**Max. current Imax**	—

3.9.2 Function

The block is installed by the user in a cyclic watchdog interrupt OB (e.g. OB32). Parameter inputs IN_01 and IN_23 as well as parameter output O_01 are also interconnected by the user with the relevant icons for inputs or outputs of the associated SIMOCODE pro device.

SMC_DAHL accesses the data provided by SIMOCODE pro via inputs IN_01 (2 bytes of binary data) and IN_23 (2 bytes of motor current).

Data is transferred to SIMOCODE pro via the output O_01 (2 bytes of binary data).

The configuration of the inputs and outputs is determined here by SIMOCODE pro basic type 2.

Access to the inputs and outputs takes place exclusively via the process image.

The block uses the input parameter MODE to determine whether the inputs IN_01 and IN_23 are valid. In the case of a higher-level fault, all inputs are read by SIMOCODE pro with "0" and output to the relevant outputs of the block.

3.9.3 Assignment of the cyclic process image

Table 3- 33 Assignment of O_01: Output commands to SIMOCODE pro

Bit	Control interface
0.0	On>> → Motor FAST On
0.1	Off
0.2	On> → Motor SLOW On
0.3	Test 1
0.4	Emergency start
0.5	Local/remote control station
0.6	Reset
0.7	—
1.0 ... 1.7	User-specific outputs

Table 3- 34 Assignment of IN_0: Feedback messages from SIMOCODE pro

Bit	Cyclic send data	Block parameter
0.0	Status – On>	QRUN / QSPEED = TRUE
0.1	Status – Off	QSTOP
0.2	Status – On>	QRUN / QSPEED = FALSE
0.3	Message – Pre-warning overload	QOVL
0.4	Status - Change-over pause active	QCOA
0.5	Status – Remote mode	QREMOTE
0.6	Status - General fault	QGR_ERR
0.7	Status - General warning	QGR_WRN
1.0	—	—
1.1	Status - Test position (TPF)	QCST
1.2 ... 1.7	—	—

The input parameter IN_01 is additionally copied to the output Q_IN_01.

The motor current is transferred via the input parameter IN_23 as an unsigned 2-byte value. SIMOCODE pro always transfers the current here as a percentage of the set current in a range from 0 to 1000%. The motor current is output via QCUR.

Assignment of bytes 2 / 3 of the analog control interface and bytes 4 to 9 of the cyclic send data when using basic type 1 is described in the following chapter: Assignment of the cyclic process image (Page 35)

3.9.4 Operating modes

Changing the control station (REMOTE, LOCAL)

The control station is changed via the interconnectable function input REM_L if the input REM_SEL is set, or via the function input REM_ON_OP set by the OS.

The function input (REMOP_EN) influences the operator enable (QLOCOP) for operating via the OS.

The operating mode of the control station is output via QREMOTE(1 = REMOTE, 0 = LOCAL). QREMOTE corresponds here to the bit DP 0.5 of the SIMOCODE pro.

In LOCAL mode, the controller is completely switched off via the SMC_DAHLblock. Control is then only possible via a control station connected direct to the SIMOCODE pro. It is still possible to acknowledge the fault.

Changing the operating modes (MANUAL, AUTO) when REMOTE is selected

If QREMOTE = TRUE, changeover between the two operating modes MANUAL and AUTOMATIC takes place either via OS operation using AUT_ON_OP (LIOP_SEL = 0) or via the interconnection of the input AUT_L (LIOP_SEL = 1).

The function inputs (MANOP_EN, AUTOP_EN) influence the operator enables (QMANOP, QAUTOP) for operating via the OS.

The operating mode is output at output QMAN_AUT(1 = AUTO, 0 = MANUAL).

Changing the control station for MANUAL

In REMOTE mode, the operating mode MANUAL can be controlled either via the OS or via the interconnectable function inputs. The changeover for this takes place via the interconnectable function input LINK_MAN.

3.9.5 Control stations for MANUAL and AUTOMATIC mode

General information

The PLC/DP control station of the SIMOCODE pro (that is, DP0.1 and 0.2) is level-active. The On command is stored in the SIMOCODE pro. The Off command (DP0.1) takes priority over the On command (DP0.2).

Control of the SIMOCODE pro via AS / OS is only possible in REMOTE mode.

AUTOMATIC

In automatic mode, the SIMOCODE pro control functions are controlled via the interconnectable function inputs AUTO_ON (TRUE = On, FALSE = Off) and AUTO_SPD (TRUE = Motor FAST, FALSE = Motor SLOW).

Control without non-maintained command mode (JOG_ON = FALSE)

At one edge of the command input, the associated control bit is set in the interface until the SIMOCODE pro sends the relevant feedback message, or a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the automatic interface.

Control with non-maintained command mode (JOG_ON = TRUE)

The corresponding control bit in the interface is set as long as the command input = TRUE or if a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the automatic interface. The Stop command is not necessary for switching the device off but is nevertheless set by the block if no On command is active.

MANUAL

In manual mode, the SIMOCODE pro is controlled either via the function inputs SP1_ON, SP2_ON and MOT_OFF set by the OS or via the interconnectable function inputs L_SP1, L_SP2 and L_OFF.

The inputs for the operator enables S1_OP_EN / S2_OP_EN / OFFOP_EN set the outputs QS1_OP / QS2_OP / QOFF_OP for operation using the OS.

At one edge of the command input, the associated control bit is set in the interface until the SIMOCODE pro sends the relevant feedback message, or a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the interconnectable manual interface.

The Off command takes priority over the On command (no edge evaluation!).

The following priorities apply for the On commands:

Slow takes priority over fast.

After changing to manual mode, the commands are not forwarded to the inputs until there is a positive edge change when L_SP1 / L_SP2 / L_OFF is active.

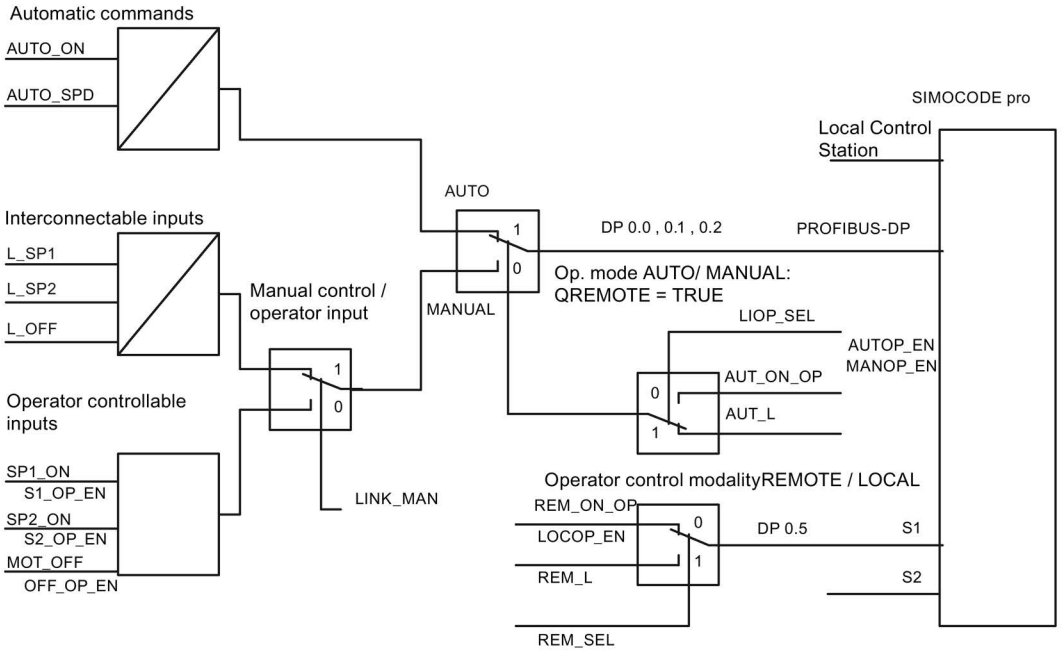
Control without non-maintained command mode (JOG_ON = FALSE)

At one edge of the command input, the associated control bit is set in the interface until the SIMOCODE pro sends the relevant feedback message, or a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the interconnectable inputs. The operator controllable inputs SP1_ON, SP2_ON and MOT_OFF are adjusted when tripped.

Control with non-maintained command mode (JOG_ON = TRUE)

The corresponding control bit in the interface is set as long as the command input = TRUE or if a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the automatic interface. The Stop command is not necessary for switching the device off but is nevertheless set by the block if no On command is active.

3.9.6 Overview of control stations, operating modes, and operator control modalities



3.9.7 Simulation

The simulation mode is activated using the input SIM_ON and takes priority over all other operating modes. If SIM_ON = TRUE, the block processes the simulation values (SIM_I01: binary data, SIM_I23: motor current) instead of the process values of SIMOCODE pro(IN_01, IN_23). QSIM, QUALITY and QBAD are output accordingly. The process output (O_01) is output with "0" if simulation is active. The command status is combined with the output QSTATUS.

A block must be programmed for the simulation. The output QSTATUS can be evaluated and this information can be used to form the simulation feedback message (SIM_I01, SIM_I23). Assignment corresponds to assignment of the process inputs/process output and can be found in the following chapter: Assignment of the cyclic process image (Page 165)

3.9.8 Interlocking

The interlocks LOCK and LOCK_ON are only effective in REMOTE mode and are valid in the operating mode MANUAL and AUTO for all control stations of the SMC_DAHL block.

An active lock input prevents switching and disables control stations for MANUAL and AUTO. The control bit is set permanently.

LOCK always takes priority over LOCK_ON.

The input LOCK_SPD (TRUE = Motor FAST, FALSE = Motor SLOW) determines the desired option for LOCK_ON.

Revoking of LOCK_ON switches the motor to the operating mode AUTO corresponding to the control station for AUTO. In MANUAL, the motor is switched off.

3.9.9 Local Interruption

The output QLOC_INT indicates in REMOTE that operation via the local control station (connected direct to SIMOCODE pro) has changed the current switching state.

QLOC_INT is also set if the switching state requested via REMOTE has not been reached within the monitoring time set using TIME_MON and no general fault has occurred (e.g. due to a higher-priority Off command at the SIMOCODE pro general control station). This monitoring is switched off with TIME_MON = 0 or MONITOR = FALSE.

The monitoring time is not started until the change-over pause has expired.

If QLOC_INT = TRUE , the control outputs are reset.

QLOC_INT is reset via the inputs RESET (operator controllable) / L_RESET (interconnectable). The input RESET is reset after acknowledgment. If L_RESET is active permanently, QLOC_INT is set for the duration of the cycle if the requirements given above are met.

Monitoring is deactivated at initial startup by setting MONITOR = FALSE.

3.9.10 Current and current limit monitoring

Current

The motor current is transferred via the input parameter IN_23 as an unsigned 2-byte value. SIMOCODE pro always transfers the current here as a percentage of the set current in a range from 0 to 1000%.

Current limits

The current limit values are read out from the data set DS130. Reading of the data set is initiated either via the interconnectable input parameter L_RD_DATA, in the OS when selecting the limit value view, or by OSoperation (RD_DATA). The output QEN_RDWR is reset during communication.

The data read is output to the in/out parameters Alarm high, (CUR_AH), Alarm low (CUR_AL), Warning high (CUR_WH) und Warning low (CUR_WL).

If a fault occurs, the values are set to zero and the output QERR_RD = TRUE is set.

The limit values can also be parameterized in the faceplate. If the values are changed, they are written to SIMOCODE pro.

The signaling response in the case of limit value violations are parameterized with SIMOCODE ES or SIMATIC PDM. Under Monitoring functions → Current limits, the response to trip level/warning level is set for this purpose as follows:

Trip level: disabled or tripping

Warning level: disabled or warning

If a fault occurs when writing, the values are reset to zero and the output QERR_WR = TRUE is set.

Overshooting or undershooting of the limit values results in transmission of the relevant message provided the limit value message has not been completely switched off via the parameter M_SUP_C (default is: switched off). Limit value violation messages are generated in the SIMOCODE pro and evaluated in the block. The outputs QCUR_AH, QCUR_AL, QCUR_WH and QCUR_WL are set accordingly.

Range limits

The range limits for the limit bars are parameterized using the function inputs MO_PVHR and MO_PVLR and can be adjusted in the OS.

3.9.11 Signaling response

Table 3- 35 SMC_DAHL issues the following messages:

Message block	Message number	Block parameter	Message text	Message class
MSG_EVID1	1	QGR_WRN	$$BlockComment$$ General warning: @4W%t#SMC_Warnings@ @5W%t#SMC_Warnings@ @6W%t#SMC_Warnings@	WH
	2	QGR_ERR	$$BlockComment$$ General fault: @7%t#SMC_Errors@	AH
	3	QCUR_AH	$$BlockComment$$ Current alarm up	AH
	4	QCUR_WH	$$BlockComment$$ Current warning up	WH
	5	QCUR_WL	$$BlockComment$$ Current warning down	WL
	6	QCUR_AL	$$BlockComment$$ Current alarm down	AL
	7	QCST	$$BlockComment$$ Test feedback	WH
	8	MSG_8	Free	—
MSG_EVID2	1	MSG_9	Free	—
	2	MSG_10	Free	—
	3	MSG_11	Free	—
	4	MSG_12	Free	—
	5	MSG_13	Free	—
	6	MSG_14	Free	—
	7	MSG_15	Free	—
	8	MSG_16	Free	—

The free message inputs are not assigned a fixed meaning and can be activated using the parameters MSG_x (x = 8 to 16) on the SMC_DAHL.

Table 3- 36 The ALARM_8P auxiliary values are assigned as follows:

Message block	Message number	Auxiliary value	Block parameter	Meaning
MSG_EVID1	—	1	BA_NA	Batch name
	—	2	STEP_NO	Batch step number
	—	3	BA_ID	Batch ID
	1	4	WRN_NO1	Warning number 1
		5	WRN_NO2	Warning number 2
	2	6	WRN_NO3	Warning number 3
		7	ERR_NO1	Fault number 1
		8	ERR_NO2	Fault number 2
		9	ERR_NO3	Fault number 3
		10	—	—
MSG_EVID2	—	1	BA_NA	Batch name
	—	2	STEP_NO	Batch step number
	—	3	BA_ID	Batch ID
	—	4	AUX_PR14	Free
	—	5	AUX_PR15	Free
	—	6	AUX_PR16	Free
	—	7	AUX_PR17	Free
	—	8	AUX_PR18	Free
	—	9	AUX_PR19	Free
	—	10	AUX_PR20	Free

The auxiliary values AUX_PR14 … AUX_PR20 are freely available.

The limit value messages can be suppressed via the input M_SUP_C. The default value of the input M_SUP_C is TRUE, that is, message suppression is active.

For the messages General warning and General fault, the diagnostics block SMC_DIAG supplies the detailed information that is interconnected via the structure DIAG_INF to SMC_DAHL.

General warning (message number 1)

The message General warning is derived from the diagnostics structure DIAG_INF formed by the block SMC_DIAG.

Three auxiliary values are transferred as additional information together with the message General warning. The auxiliary values correspond to the contents of the warning numbers WRN_NO1, WRN_NO2 and WRN_NO3 and contain the first three warning causes found.

The user text library SMC_Warnings is available for the warnings. This contains the precise fault texts and is supplemented dynamically in the message.

General fault (message number 2)

The message General fault is derived from the diagnostics structure DIAG_INF formed by the block SMC_DIAG.

One auxiliary value is transferred as additional information together with the message General fault. The auxiliary value corresponds to the contents of the fault number ERR_NO1 and contains the first fault cause found.

The auxiliary values 8 and 9 are interconnected with the parameters ERR_NO2 and ERR_NO3 and can be appended to the message if required.

The user text library SMC_Errors is available for the faults. This contains the precise error texts and is supplemented dynamically in the message.

Current limit messages (message number 3 to 6)

The current limit messages are formed by the SIMOCODE pro and are contained in the diagnostics structure DIAG_INF.

Test feedback (message number 7)

The message "Test feedback" is derived direct from the SIMOCODE pro information (DP1.1 Send).

Free messages (message number 8 of the message block 1, message numbers 1 to 8 of message block 2)

There is no block-internal assignment to a specific function for these messages. It can be activated via a parameter input (MSG_8 ... MSG_16) and can be used, for example, for reporting Local_Interruption, the operating mode SIMULATION, or any other signal.

3.9.12 Reset response

In principle, every fault detected by SIMOCODE pro must be acknowledged. This is done via the bit DP 0.6 Recv. Reset is only carried out by SIMOCODE pro if there is no active On command. Reset either resets the General fault (QGR_ERR) if the cause of the fault no longer exists, or it results in acknowledgment of the fault if the cause of the fault still exists. An acknowledged fault automatically results in resetting of the general fault following removal of the fault cause.

Reset can be carried out either via the interconnectable function input L_SMCRESET or via the OS operator controllable function input SMCRESET.

L_SMCRESET is level-active. SMCRESET is reset by the block following evaluation.

The reset function is transparent from the block's perspective, that is, there is no logical combination with other signals, and independent of the operating mode (LOCAL / REMOTE).

3.9.13 Start-up characteristics

At CPU startup, the block is switched to manual mode and the Off command is output. For this purpose, the block must be called from the startup OB. After startup, the messages are suppressed for the number of cycles parameterized in the RUNUPCYC value.

3.9.14 Time response

The block must be called via a watchdog interrupt OB. The sampling time of the block is entered in the parameter SAMPLE_T.

3.9.15 SMC_DAHL block parameters

Element	Type	Kind	Meaning	HMI
AUT_L	BOOL	I	Interconnectable input for MAN / AUTO (0 = Manual / 1 = Auto)	N
AUT_ON_OP	BOOL	IO	Control input: 0 = Manual, 1 = Auto	Y
AUTO_ON	BOOL	I	Automatic value: 1 = On, 0 = Off	N
AUTO_SPD	BOOL	I	Automatic value: 1 = fast, 0 = slow	N
AUTOP_EN	BOOL	I	1 = Operator enable for Auto	N
AUX_PRxx	ANY	IO	Auxiliary value x (x = 11 to 20)	N
BA_EN	BOOL	I	BATCH record release	Y
BA_ID	DWORD	I	BATCH: Consecutive batch number	Y
BA_NA	STRING [32]	I	BATCH designation	Y
CST	BOOL	I	1 = Test mode	N
CUR_AH	REAL	IO	Upper alarm limit current	Y
CUR_AL	REAL	IO	Lower alarm limit current	Y
CUR_WH	REAL	IO	Upper warning limit current	Y
CUR_WL	REAL	IO	Lower warning limit current	Y
DD_17_20	DWORD	O	DS 92 Byte 17 to 20: General warning additional info 1	Y
DD_21_22	WORD	O	DS 92 Byte 21 to 22: General warning additional info 2	Y
DD_24_27	DWORD	O	DS 92 Byte 24 to 27: General fault additional info 1	Y
DD_28_31	DWORD	O	DS 92 Byte 28 to 31: General fault additional info 2	Y
DIAG_INF	UDT_ DIAG	I	Diagnostics structure of SMC_DIAG	N
EM_START	BOOL	I	Emergency start	Y
EN_MEAS	BOOL	I	1 = Measured value block available	Y
EN_RDWR	BOOL	I	1 = Enable reading/writing of data set	N
EN_STAT	BOOL	I	1 = Statistics block available	Y
ERR_NOx	INT	O	Fault number x (x = 1 to 6)	Y
I1_x	BOOL	I	User-defined outputs DP1.x (x = 0 to 7)	N
IN_01	WORD	I	Inputs DP0.0 to 1.7	N

Element	Type	Kind	Meaning	HMI
IN_23	WORD	I	Input motor current	N
JOG_ON	BOOL	I	1 = Non-maintained command mode active	N
L_OFF	BOOL	I	Manual control: 1 = Off	N
L_RD_DATA	BOOL	I	Interconnectable input 0 → 1: Reading of the data set	N
L_RESET	BOOL	I	Configurable input for resetting QLOC_INT	N
L_SMCRESET	BOOL	I	Interconnectable input for resetting	N
L_SP1	BOOL	I	Manual control: 1 = Slow On	N
L_SP2	BOOL	I	Manual control: 1 = Fast On	N
LADDR	INT	I	Start address of the inputs	N
LINK_MAN	BOOL	I	0 = Operator input active, 1 = Manual control via interconnectable inputs	N
LIOP_SEL	BOOL	I	Interconnectable input for manual/Auto changeover AUT_L: 1 = Interconnection is active, 0 = Operation is active	N
LOCK	BOOL	I	1 = Lock (OFF)	Y
LOCK_ON	BOOL	I	1 = Lock (ON)	Y
LOCK_SPD	BOOL	I	Speed with LOCK_ON: 1 = fast, 0 = slow	Y
LOCOP_EN	BOOL	I	1 = Operator enable for LOCAL	N
M_SUP_C	BOOL	I	1 = Message suppression active for current limit value violations	Y
MANOP_EN	BOOL	I	1 = Operator enable for Manual	N
MO_PVHR	REAL	I	Bar upper limit	Y
MO_PVLR	REAL	I	Bar lower limit	Y
MODE	DWORD	I	Mode of OMODE of the SMC_DIAG	N
MONITOR	BOOL	I	Monitoring: 1 = ON	Y
MOT_OFF	BOOL	IO	Control input: 1 = OFF	Y
MSG_ACK1	WORD	O	Messages acknowledged Alarm 8p block 1	N
MSG_ACK2	WORD	O	Messages acknowledged Alarm 8p block 2	N
MSG_EVID1	DWORD	I	Event ID of the Alarm 8p block 1	N
MSG_EVID2	DWORD	I	Event ID of the Alarm 8p block 2	N
MSG_STAT1	WORD	O	MESSAGE 1: STATUS output	N
MSG_STAT2	WORD	O	MESSAGE 2: STATUS output	N
MSG_x	BOOL	I	Free message input x (x = 8 to 16)	N
O_01	WORD	O	Outputs DP0.0 to 1.7	N
OCCUPIED	BOOL	I	BATCH record ID	Y
OFFOP_EN	BOOL	I	1 = Operator enable for OFF	N
OOS	BOOL	I	Reserve	Y
Q_IN_01	WORD	O	Inputs DP0.0 to 1.7	N
QAUTOP	BOOL	O	1 = Operator enable for Auto	Y
QBAD	BOOL	O	1 = Invalid process value	Y
QBUS_PLC	BOOL	O	Bus/PLC fault	Y
QCOA	BOOL	O	1 = Change-over pause active (DP0.4)	Y
QCST	BOOL	O	1 = Test active (DP1.1)	Y
QCUR	REAL	O	Motor current % Ie	Y

Element	Type	Kind	Meaning	HMI
QCUR_AH	BOOL	O	Upper alarm limit current violated	N
QCUR_AL	BOOL	O	Lower alarm limit current violated	N
QCUR_WH	BOOL	O	Upper warning limit current violated	N
QCUR_WL	BOOL	O	Lower warning limit current violated	N
QEM_STRT	BOOL	O	1 = Emergency start active	N
QEN_RDWR	BOOL	O	1 = Enable reading/writing of data set	N
QERR	BOOL	O	1 = Program error	N
QERR_RD	BOOL	O	1 = Error while reading the data set	N
QERR_WR	BOOL	O	1 = Error while writing the data set	N
QFLT_F9	BOOL	O	Fault F9	Y
QGR_ERR	BOOL	O	General fault (DP0.6)	N
QGR_WRN	BOOL	O	General warning (DP0.7)	N
QLOC_INT	BOOL	O	1 = Local interruption	Y
QLOCOP	BOOL	O	1 = Operator enable for LOCAL / REMOTE	Y
QMAN_AUT	BOOL	O	0 = Manual, 1 = Automatic	Y
QMANOP	BOOL	O	1 = Operator enable for Manual	Y
QMSG_ERR	BOOL	O	1 = ALARM8_P Error	N
QMSG_SUP	BOOL	O	1 = Message suppression	Y
QOFF_OP	BOOL	O	1 = Operator enable for OFF	Y
QOP_ERR	BOOL	O	1 = General operator error	N
QPARFF16	BOOL	O	Parameter error F16	Y
QRD_STAT	WORD	O	Return value of the SFB RDREC	N
QRDWR_OP	BOOL	O	1 = Operator enable Read/write data set	Y
QREMOTE	BOOL	O	1 = REMOTE mode (DP0.5)	Y
QRUN	BOOL	O	Status: 1 = Motor ON (DP0.2)	Y
QS1_OP	BOOL	O	1 = Operator enable for SLOW ON	Y
QS2_OP	BOOL	O	1 = Operator enable for FAST ON	Y
QSIM	BOOL	O	1 = Simulation active	Y
QSPEED	BOOL	O	Status speed: 1 = fast, 0 = slow	Y
QSTATUS	WORD	O	Command status (outputs DP0.0 to 1.7)	N
QSTOP	BOOL	O	Status: 1 = Motor OFF (DP0.1)	Y
QUALITY	BYTE	O	Quality code	N
QWR_STAT	WORD	O	Return value of the SFB WRREC	N
RACKF	BOOL	I	1 = Rack fault	N
RD_DATA	BOOL	IO	0 → 1: Reading of the data set	Y
REM_L	BOOL	I	Interconnectable input for LOCAL / REMOTE (0 = LOCAL / 1 = REMOTE)	N
REM_ON_OP	BOOL	IO	Control input: 0 = LOCAL, 1 = REMOTE	Y
REM_SEL	BOOL	I	Interconnectable input for LOCAL / REMOTE changeover (REM_L): 1 = Interconnection is active, 0 = Operation is active	N
RESET	BOOL	IO	Control input for resetting QLOC_INT	N
RUNUPCYC	INT	I	Number of initial run cycles after CPU restart	N

Element	Type	Kind	Meaning	HMI
S1_OP_EN	BOOL	I	1 = Operator enable for SLOW ON	N
S2_OP_EN	BOOL	I	1 = Operator enable for FAST ON	N
SAMPLE_T	REAL	I	Sampling time in [s]	N
SIM_I01	WORD	I	Simulation value IN_01	N
SIM_I23	WORD	I	Simulation value IN_23	N
SIM_ON	BOOL	I	1 = Simulation	Y
SMCRESET	BOOL	IO	Operator controllable reset input for faults	Y
SP1_ON	BOOL	IO	Control input: 1 = SLOW ON	Y
SP2_ON	BOOL	IO	Control input: 1 = FAST ON	Y
STEP_NO	DWORD	I	Batch step number	Y
TIME_MON	REAL	I	Monitoring time in [s]	Y
USTATUS	WORD	I	Status word in VSTATUS, freely user-assignable	N
VSTATUS	DWORD	O	Status for status displays for block icon	Y
WRN_NOx	INT	O	Warning number x (x = 1 to 6)	Y

Table 3- 37 Structure of VSTATUS

Bit	Parameter
0	OCCUPIED
1	BA_EN
2	QSIM
3	QMAN_AUT
4	QCST
5	QGR_ERR
6	QGR_WRN
7	QLOC_INT
8	LOCK / LOCK_ON
9	QRUN
10	QSTOP
11	—
12	QSPEED
13	—
14	—
15	—
16 - 31	USTATUS

3.9.16 Status displays for icons

Status	Parameter	View
Off	QSTOP = 1	
Right On	QRUN = 1 QSPEED = 0	
Left On	QRUN = 1 QSPEED = 1	
Not available	QBAD = 1	

3.9.17 Description of the faceplate

The available faceplates are described in this chapter.

The following views are available:

Overview	OVERVIEW
Standard	STANDARD
Limits	LIMITS
Maintenance	MAINTENANCE
Faults	MESSAGE1
Warnings	MESSAGE2
Messages	—
Trend	—
Batch	—

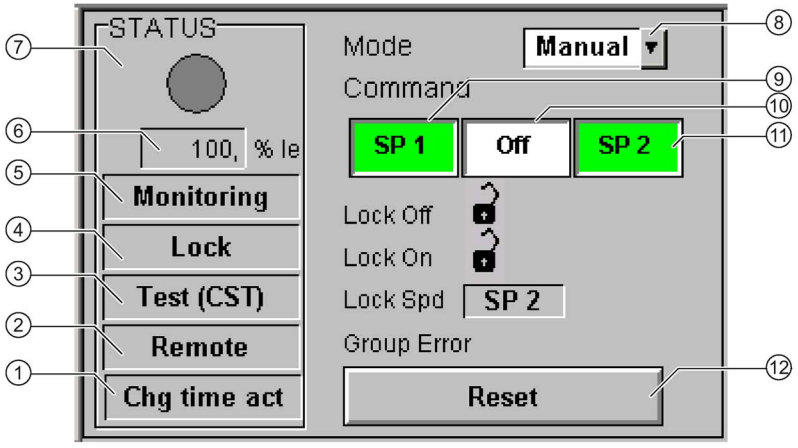
The file name is composed as follows: @PG_SMC_DAHL_<View>.PDL

The PCS 7 standard displays are used for the message, trend and batch views.

The structure of the individual views of faceplates is described below.

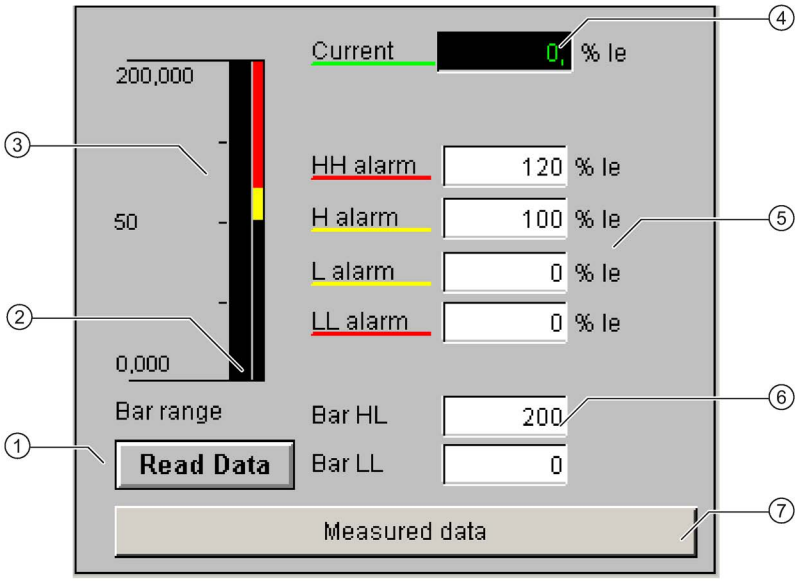
Standard (STANDARD)

The status display is a user object comprising several status displays. The status display corresponds to the representation from the process image icon.



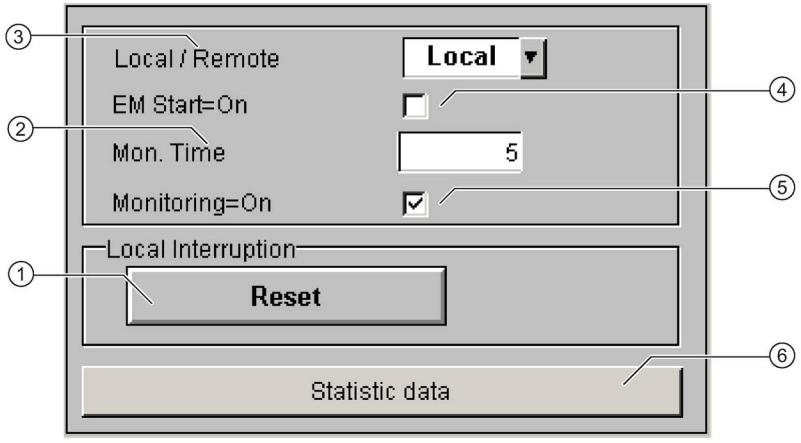
① Change-over pause (QCOA)
② Operator control modality (QREMOTE)
③ Test (QCST)
④ Interlocking (LOCK / LOCK_ON)
⑤ Local Interruption (QLOC_INT)
⑥ Current (QCUR)/ unit (QCUR#unit)
⑦ Status display (VSTATUS)
⑧ Operating mode (QMAN_AUT, AUT_ON_OP)
⑨ Command Slow On (SP1_ON)
⑩ Command Off (MOT_OFF)
⑪ Command Fast On (SP2_ON)
⑫ Acknowledgement (RESET)

Limits (LIMITS)



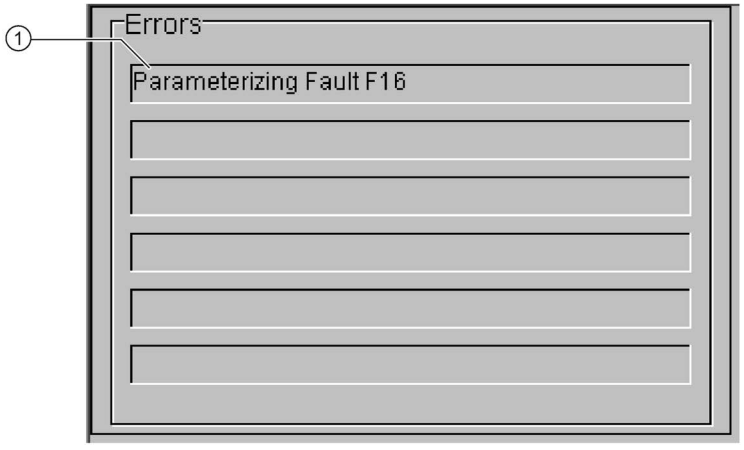
① Read Data (RD_DATA)
② Limit value display (CUR_AH, CUR_WH, CUR_WL, CUR_AL)
③ Actual value bar (QCUR, MO_PVHR, MO_PVLR)
④ Current value (QCUR, QCUR#unit)
⑤ Limits (CUR_AH, CUR_WH, CUR_WL, CUR_AL)
⑥ Bar range (MO_PVHR, MO_PVLR)
⑦ Call faceplate SMC_MEAS, visible if EN_MEAS = TRUE

Maintenance (MAINTENANCE)



① Acknowledge Local Interruption (RESET)
② Monitoring time for Local Interruption (TIME_MON)
③ Operator control modality Local / Remote (REM_ON_OP)
④ Activation Emergency Start (EM_START)
⑤ Activation Monitoring (MONITOR)
⑥ Call faceplate SMC_STAT, visible if EN_STAT = TRUE

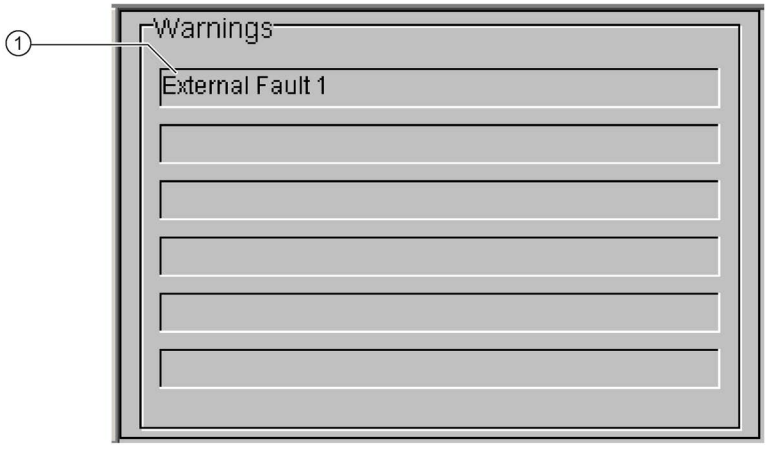
Faults (MESSAGE1)



① Text list with error description (ERR_NOx)

For error number 0, the text field is switched to invisible.

Warnings (MESSAGE2)



① Text list with error description (WRN_NOx)

For error number 0, the text field is switched to invisible.

3.10 SMC_REVD: Signal processing block for the dahlander reversing starter/pole-changing reversing starter control function

FB2009

Calling OBs

The watchdog interrupt OB in which you install the block (e.g. OB32). Also in OB100 (see start-up characteristics).

Called blocks

The block calls the following blocks:

SFB35	ALARM_8P
SFB52	RDREC
SFB53	WRREC
SFC6	RD_SINFO
SFC20	BLKMOV
SFC21	FILL

3.10.1 Parameter assignment in SIMOCODE ES

For the signal blocks to function correctly, a range of SIMOCODE pro parameters must have quite specific settings. Those parameters that define the assignment of the cyclic I/O interface are especially affected.

These parameters are represented in **bold**.

In addition, the overview below represents the parameters that are already preset for the control function in the templates for application selection in the SIMOCODE ES software. The settings are suggestions and depend heavily on the actual wiring of the SIMOCODE pro inputs and outputs.

These parameters are represented in *italics*.

Other parameters must also be set, e.g. for motor protection. These are not described here. Parameter assignment for the extended I/O interface of basic type 1 is represented in the following chapter: Parameter assignment in SIMOCODE ES (Page 33)

Dahlander reversing starter control function

Motor control → Control stations		
Operation mode selector S1	*Cyclic receive bit 0.5*	—
Operation mode selector S2	**Fixed level 1**	—

Local control [LC]		
On<<	*DM 1 – Input 2*	—
On<	*DM 1 – Input 1*	—
Off	*BU - Input 2*	—
On>	*BU - Input 1*	—
On>>	*BU - Input 3*	—
Operator enable local 2 off	*Active*	—
Operator enable local 2 on	*Active*	—
Operator enable remote off	**Not active**	—
Operator enable remote on	**Not active**	—

PLC/PCS [DP]		
On<<	**Cyclic receive – bit 1.0**	—
On<	**Cyclic receive – bit 1.2**	—
Off	**Cyclic receive – bit 0.1**	—
On>	**Cyclic receive – bit 0.2**	—
On>>	**Cyclic receive – bit 0.0**	—
Operator enable local 2 off	**Not active**	—
Operator enable local 2 on	**Not active**	—
Operator enable remote off	**Active**	—
Operator enable remote on	**Active**	—

Operator Panel [OP]		
Off	*OP button 4*	—
On>	*OP button 3*	—
On>>	*OP button 2*	—
<>/<<>>	*OP button 1*	—
Operator enable local 2 off	*Active*	—
Operator enable local 2 on	*Active*	—
Operator enable remote off	**Not active**	—
Operator enable remote on	**Not active**	—

Motor control → Control function → Control commands		
On<<	Enabled control command – On<	—
On<	Enabled control command – On<	—
Off	Released control command - Off	—
On>	Enabled control command – On>	—
On>>	Enabled control command – On>	—

Motor control → Control function → Operating mode		
Non-maintained command mode	*Not active/active*	*The setting of the parameter influences the parameter JOG_ON in the SIMOCODE signal block:* *Non-maintained command mode not active: JOG_ON = FALSE* *Non-maintained command mode active: JOG_ON = TRUE*
Saving change-over command	Active	—

Motor control → Control function → Auxiliary control inputs		
Feedback ON	Status - Motor current flowing	—

Outputs → Basic unit		
BU – Output 1	*Contactor control QE1*	—
BU – Output 2	*Contactor control QE2*	—
BU – Output 3	*Contactor control QE3*	—

Outputs → Operator panel LEDs		
LED green 1	*Truth table 6 output*	—
LED green 2	*Truth table 7 output*	—
LED green 3	*Truth table 8 output*	—
LED green 4	*Display QLA (Off)*	—

Outputs → Digital module 1		
DM – Output 1	*Contactor control QE4*	—
DM – Output 2	*Contactor control QE5*	—

Outputs → Cyclic send data		
Byte 0, bit 0	**Status – On>**	—
Byte 0, bit 1	**Status - Off**	—
Byte 0, bit 2	**Status – On>**	—
Byte 0, bit 3	**Message – Pre-warning overload**	—
Byte 0, bit 4	**Status - Change-over pause active**	—
Byte 0, bit 5	**Status – Remote mode**	—
Byte 0, bit 6	**Status – General fault**	—
Byte 0, bit 7	**Status - General warning**	—
Byte 1, bit 0	**Status – On<<**	—
Byte 1, bit 1	**Status - Test position (TPF)**	—
Byte 1, bit 2	**Status – On<**	—
Byte 1, bit 3	**Status – Interlocking time active**	—
Byte 1, bit 4	Not connected	Freely assignable
Byte 1, bit 5	Not connected	Freely assignable
Byte 1, bit 6	Not connected	Freely assignable
Byte 1, bit 7	Not connected	Freely assignable
Byte 2-3	**Max. current Imax**	—

Logic blocks → Truth table 3I / 1O → Truth table 6		
Input 1	*Not connected*	—
Input 2	*Status On<<*	—
Input 3	*Status On>>*	—
Logic	*01110000*	—

Logic blocks → Truth table 2I / 1O → Truth table 7		
Input 1	*Display QLE<*	—
Input 2	*Display QLE<<*	—
Logic	*0111*	—

Logic blocks → Truth table 2I / 1O → Truth table 8		
Input 1	*Display QLE>*	—
Input 2	*Display QLE>>*	—
Logic	*0111*	—

Pole-changing reversing starter control function

Motor control → Control stations		
Operation mode selector S1	**Cyclic receive bit 0.5**	—
Operation mode selector S2	*Fixed level 1*	—

Local control [LC]		
On<<	*DM 1 – Input 2*	—
On<	*DM 1 – Input 1*	—
Off	*BU - Input 2*	—
On>	*BU - Input 1*	—
On>>	*BU - Input 3*	—
Operator enable local 2 off	*Active*	—
Operator enable local 2 on	*Active*	—
Operator enable remote off	**Not active**	—
Operator enable remote on	**Not active**	—

PLC/PCS [DP]		
On<<	**Cyclic receive – bit 1.0**	—
On<	**Cyclic receive – bit 1.2**	—
Off	**Cyclic receive – bit 0.1**	—
On>	**Cyclic receive – bit 0.2**	—
On>>	**Cyclic receive – bit 0.0**	—
Operator enable local 2 off	**Not active**	—
Operator enable local 2 on	**Not active**	—
Operator enable remote off	**Active**	—
Operator enable remote on	**Active**	—

Operator Panel [OP]		
Off	*OP button 4*	—
On>	*OP button 3*	—
On>>	*OP button 2*	—
<>/<<>>	*OP button 1*	—
Operator enable local 2 off	*Active*	—
Operator enable local 2 on	*Active*	—
Operator enable remote off	**Not active**	—
Operator enable remote on	**Not active**	—

Motor control → Control function → Control commands		
On<<	**Enabled control command – On<**	—
On<	**Enabled control command – On<**	—
Off	**Released control command - Off**	—
On>	**Enabled control command – On>**	—
On>>	**Enabled control command – On>**	—

Motor control → Control function → Operating mode		
Non-maintained command mode	*Not active/active*	*The setting of the parameter influences the parameter JOG_ON in the SIMOCODE signal block:* *Non-maintained command mode not active: JOG_ON = FALSE* *Non-maintained command mode active: JOG_ON = TRUE*
Saving change-over command	**Active**	—

Motor control → Control function → Auxiliary control inputs		
Feedback ON	**Status - Motor current flowing**	—

Outputs → Basic unit		
BU – Output 1	*Contactor control QE1*	—
BU – Output 2	*Contactor control QE2*	—

Outputs → Operator panel LEDs		
LED green 1	*Truth table 6 output*	—
LED green 2	*Truth table 7 output*	—
LED green 3	*Truth table 8 output*	—
LED green 4	*Display QLA (Off)*	—

Outputs → Cyclic send data		
Byte 0, bit 1	**Status - Off**	—
Byte 0, bit 2	**Status – On>**	—
Byte 0, bit 3	**Message – Pre-warning overload**	—
Byte 0, bit 4	**Status - Change-over pause active**	—
Byte 0, bit 5	**Status – Remote mode**	—
Byte 0, bit 6	**Status – General fault**	—
Byte 0, bit 7	**Status - General warning**	—
Byte 1, bit 0	**Status – On<<**	—
Byte 1, bit 1	**Status - Test position (TPF)**	—
Byte 1, bit 2	**Status – On<**	—
Byte 1, bit 3	**Status – Interlocking time active**	—
Byte 1, bit 4	Not connected	Freely assignable
Byte 1, bit 5	Not connected	Freely assignable
Byte 1, bit 6	Not connected	Freely assignable
Byte 1, bit 7	Not connected	Freely assignable
Byte 2-3	**Max. current Imax**	—

Logic blocks → Truth table 3I / 1O → Truth table 6		
Input 1	*Not connected*	—
Input 2	*Status On<<*	—
Input 3	*Status On>>*	—
Logic	*01110000*	—

Logic blocks → Truth table 2I / 1O → Truth table 7		
Input 1	*Display QLE<*	—
Input 2	*Display QLE<<*	—
Logic	*0111*	—

Logic blocks → Truth table 2I / 1O → Truth table 8		
Input 1	*Display QLE>*	—
Input 2	*Display QLE>>*	—
Logic	*0111*	—

3.10.2 Function

The block is installed by the user in a cyclic watchdog interrupt OB (e.g. OB32). Parameter inputs IN_01 and IN_23 as well as parameter output O_01 are also interconnected by the user with the relevant icons for inputs or outputs of the associated SIMOCODE pro device.

SMC_REVD accesses the data provided by SIMOCODE pro via inputs IN_01 (2 bytes of binary data) and IN_23 (2 bytes of motor current).

Data is transferred to SIMOCODE pro via the output O_01 (2 bytes of binary data).

The configuration of the inputs and outputs is determined here by SIMOCODE pro basic type 2.

Access to the inputs and outputs takes place exclusively via the process image.

The block uses the input parameter MODE to determine whether the inputs IN_01 and IN_23 are valid. In the case of a higher-level fault, all inputs are read by SIMOCODE pro with "0" and output to the relevant outputs of the block.

3.10.3 Assignment of the cyclic process image

Table 3- 38 Assignment of O_01: Output commands to SIMOCODE pro

Bit	Control interface
0.0	On>> → Motor FAST Right On
0.1	Off
0.2	On> → Motor SLOW Right On
0.3	Test 1
0.4	Emergency start
0.5	Local/remote control station
0.6	Reset
0.7	—
1.0	On<< → Motor FAST Left On
1.1	—
1.2	On< → Motor SLOW Left On
1.3 – 1.7	User-specific outputs

Table 3- 39 Assignment of IN_0: Feedback messages from SIMOCODE pro

Bit	Cyclic send data	Block parameter
0.0	Status – On>	QRUN / QDIR = FALSE / QSPEED = TRUE
0.1	Status – Off	QSTOP
0.2	Status – On>	QRUN / QDIR = FALSE / QSPEED = FALSE
0.3	Message – Pre-warning overload	QOVL
0.4	Status - Change-over pause active	QCOA
0.5	Status – Remote mode	QREMOTE
0.6	Status - General fault	QGR_ERR
0.7	Status - General warning	QGR_WRN
1.0	Status – On<<	QRUN / QDIR = TRUE / QSPEED = TRUE
1.1	Status - Test position (TPF)	QCST
1.2	Status – On<	QRUN / QDIR = TRUE / QSPEED = FALSE
1.3	Status interlocking time active	QLTA
1.4-1.7	—	—

The input parameter IN_01 is additionally copied to the output Q_IN_01.

The motor current is transferred via the input parameter IN_23 as an unsigned 2-byte value. SIMOCODE pro always transfers the current here as a percentage of the set current in a range from 0 to 1000%. The motor current is output via QCUR.

Assignment of bytes 2 / 3 of the analog control interface and bytes 4 to 9 of the cyclic send data when using basic type 1 is described in the following chapter: Assignment of the cyclic process image (Page 35)

3.10.4 Operating modes

Changing the control station (REMOTE, LOCAL)

The control station is changed via the interconnectable function input REM_L if the input REM_SEL is set, or via the function input REM_ON_OP set by the OS.

The function input (REMOP_EN) influences the operator enable (QLOCOP) for operating via the OS.

The operating mode of the control station is output via QREMOTE(1 = REMOTE, 0 = LOCAL). QREMOTE corresponds here to the bit DP 0.5 of the SIMOCODE pro.

In LOCAL mode, the controller is completely switched off via the SMC_REVDblock. Control is then only possible via a control station connected direct to the SIMOCODE pro. It is still possible to acknowledge the fault.

Changing the operating modes (MANUAL, AUTO) when REMOTE is selected

If QREMOTE = TRUE, changeover between the two operating modes MANUAL and AUTOMATIC takes place either via OS operation using AUT_ON_OP(LIOP_SEL = 0) or via the interconnection of the input AUT_L(LIOP_SEL = 1).

The function inputs (MANOP_EN, AUTOP_EN) influence the operator enables (QMANOP, QAUTOP) for operating via the OS.

The operating mode is output at output QMAN_AUT(1 = AUTO, 0 = MANUAL) .

Changing the control station for MANUAL

In REMOTE mode, the operating mode MANUAL can be controlled either via the OS or via the interconnectable function inputs. The changeover for this takes place via the interconnectable function input LINK_MAN.

3.10.5 Control stations for MANUAL and AUTOMATIC mode

General information

The PLC/DP control station of the SIMOCODE pro (that is, DP0.0, 0.1, 0.2, 1.0 and 1.2) is level-active. The On command is stored in the SIMOCODE pro. The Off command (DP0.1) takes priority over the On command (DP0.0, 0.1, 1.0 or 1.2).

Control of the SIMOCODE pro via AS / OS is only possible in REMOTE mode.

AUTOMATIC

In automatic mode, the SIMOCODE pro control functions are controlled via the interconnectable function inputs AUTO_ON (TRUE = On, FALSE = Off), AUTO_DIR (TRUE = counter-clockwise, FALSE = clockwise) and AUTO_SPD (TRUE = Motor FAST, FALSE = Motor SLOW).

Control without non-maintained command mode (JOG_ON = FALSE)

At one edge of the command input, the associated control bit is set in the interface until the SIMOCODE pro sends the relevant feedback message, or a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the automatic interface.

Control with non-maintained command mode (JOG_ON = TRUE)

The corresponding control bit in the interface is set as long as the command input = TRUE or if a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the automatic interface. The Stop command is not necessary for switching the device off but is nevertheless set by the block if no On command is active.

MANUAL

In manual mode, the SIMOCODE pro is controlled either via the function inputs FWSP1_ON, FWSP2_ON, RVSP1_ON, RVSP2_ON and MOT_OFF set by the OS or via the interconnectable function inputs L_FWSP1, L_FWSP2, L_RVSP1, L_RVSP2 and L_OFF.

The inputs for the operator enables FS1OP_EN / FS2OP_EN / RS1OP_EN / RS2OP_EN / OFFOP_EN set the outputs QFS1_OP / QFS2_OP / QRS1_OP / QRS2_OP / QOFF_OP for operation using the OS.

At one edge of the command input, the associated control bit is set in the interface until the SIMOCODE pro sends the relevant feedback message, or a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the interconnectable manual interface.

The Off command takes priority over the On command (no edge evaluation!).

The following priorities apply for the On commands:

Right takes priority over left / slow takes priority over fast.

After changing to manual mode, the commands are not forwarded to the inputs until there is a positive edge change when L_FWSP1 / L_FWSP2 / L_RVSP1 / L_RVSP2 / L_OFF is active.

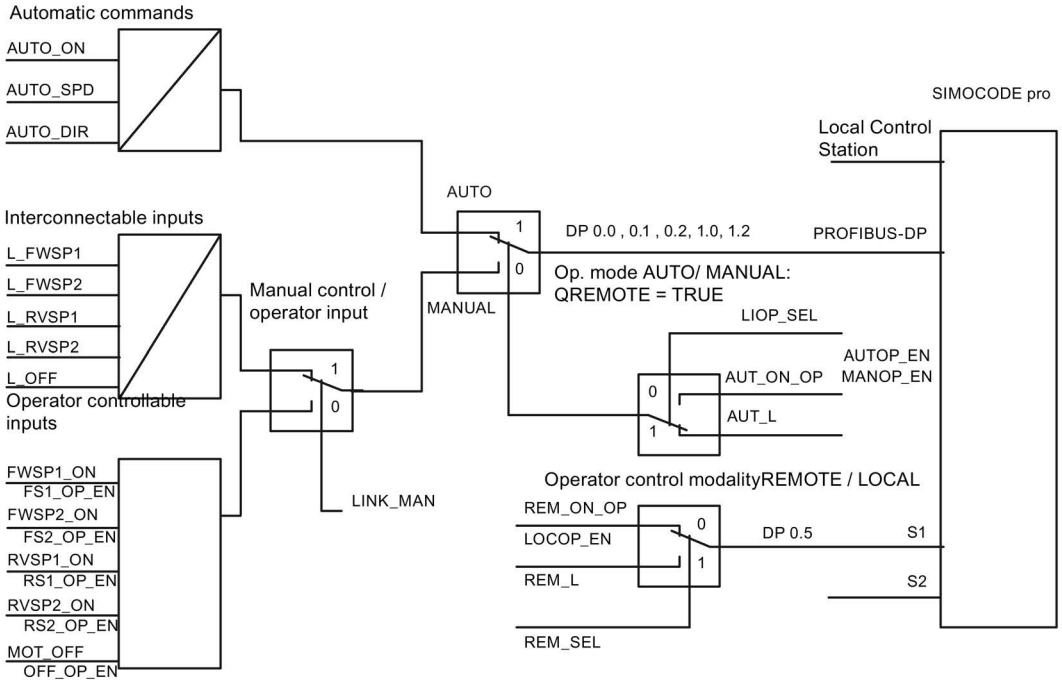
Control without non-maintained command mode (JOG_ON = FALSE)

At one edge of the command input, the associated control bit is set in the interface until the SIMOCODE pro sends the relevant feedback message, or a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the interconnectable inputs. The operator controllable inputs FWSP1_ON, FWSP2_ON, RVSP1_ON, RVSP2_ON and MOT_OFF are adjusted when tripped.

Control with non-maintained command mode (JOG_ON = TRUE)

The corresponding control bit in the interface is set as long as the command input = TRUE or if a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the automatic interface. The Stop command is not necessary for switching the device off but is nevertheless set by the block if no On command is active.

3.10.6 Overview of control stations, operating modes, and operator control modalities



3.10.7 Simulation

The simulation mode is activated using the input SIM_ON and takes priority over all other operating modes. If SIM_ON = TRUE, the block processes the simulation values (SIM_I01: binary data, SIM_I23: motor current) instead of the process values of SIMOCODE pro(IN_01, IN_23). QSIM, QUALITY and QBAD are output accordingly. The process output (O_01) is output with "0" if simulation is active. The command status is combined with the output QSTATUS.

A block must be programmed for the simulation. The output QSTATUS can be evaluated and this information can be used to form the simulation feedback message (SIM_I01, SIM_I23). Assignment corresponds to assignment of the process inputs/process output and can be found in the following chapter: Assignment of the cyclic process image (Page 190)

3.10.8 Interlocking

The interlocks LOCK and LOCK_ON are only effective in REMOTE mode and are valid in the operating mode MANUAL and AUTO for all control stations of the SMC_REVD block.

An active lock input prevents switching and disables control stations for MANUAL and AUTO. The control bit is set permanently.

LOCK always takes priority over LOCK_ON.

The inputs LOCK_DIR (TRUE = counter-clockwise, FALSE = clockwise) and LOCK_SPD (TRUE = Motor FAST, FALSE = Motor SLOW) determine the desired option for LOCK_ON.

Revoking of LOCK_ON switches the motor to the operating mode AUTO corresponding to the control station for AUTO. In MANUAL, the motor is switched off.

3.10.9 Local Interruption

The output QLOC_INT indicates in REMOTE that operation via the local control station (connected direct to SIMOCODE pro) has changed the current switching state.

QLOC_INT is also set if the switching state requested via REMOTE has not been reached within the monitoring time set using TIME_MON and no general fault has occurred (e.g. due to a higher-priority Off command at the SIMOCODE pro general control station). This monitoring is switched off with TIME_MON = 0 or MONITOR = FALSE.

The monitoring time is not started until the interlocking time or the change-over pause has expired.

If QLOC_INT = TRUE , the control outputs are reset.

QLOC_INT is reset via the inputs RESET (operator controllable) / L_RESET (interconnectable). The input RESET is reset after acknowledgment. If L_RESET is active permanently, QLOC_INT is set for the duration of the cycle if the requirements given above are met.

Monitoring is deactivated at initial startup by setting MONITOR = FALSE.

3.10.10 Current and current limit monitoring

Current

The motor current is transferred via the input parameter IN_23 as an unsigned 2-byte value. SIMOCODE pro always transfers the current here as a percentage of the set current in a range from 0 to 1000%.

Current limits

The current limit values are read out from the data set DS130. Reading of the data set is initiated either via the interconnectable input parameter L_RD_DATA, in the OS when selecting the limit value view, or by OS operation (RD_DATA). The output QEN_RDWR is reset during communication.

The data read is output to the in/out parameters Alarm high (CUR_AH), Alarm low (CUR_AL), Warning high (CUR_WH) and Warning low (CUR_WL).

If a fault occurs, the values are set to zero and the output QERR_RD = TRUE is set.

The limit values can also be parameterized in the faceplate. If the values are changed, they are written to SIMOCODE pro.

The signaling response in the case of limit value violations are parameterized with SIMOCODE ES or SIMATIC PDM. Under Monitoring functions → Current limits, the response to trip level/warning level is set for this purpose as follows:

Trip level: disabled or tripping

Warning level: disabled or warning

If a fault occurs when writing, the values are reset to zero and the output QERR_WR = TRUE is set.

Overshooting or undershooting of the limit values results in transmission of the relevant message provided the limit value message has not been completely switched off via the parameter M_SUP_C (default is: switched off). Limit value violation messages are generated in the SIMOCODE pro and evaluated in the block. The outputs QCUR_AH, QCUR_AL, QCUR_WH and QCUR_WL are set accordingly.

Range limits

The range limits for the limit bars are parameterized using the function inputs MO_PVHR and MO_PVLR and can be adjusted in the OS.

3.10.11 Signaling response

Table 3- 40 SMC_REVD issues the following messages:

Message block	Message number	Block parameter	Message text	Message class
MSG_EVID1	1	QGR_WRN	$$BlockComment$$ General warning: @4W%t#SMC_Warnings@ @5W%t#SMC_Warnings@ @6W%t#SMC_Warnings@	WH
	2	QGR_ERR	$$BlockComment$$ General fault: @7%t#SMC_Errors@	AH
	3	QCUR_AH	$$BlockComment$$ Current alarm up	AH
	4	QCUR_WH	$$BlockComment$$ Current warning up	WH
	5	QCUR_WL	$$BlockComment$$ Current warning down	WL
	6	QCUR_AL	$$BlockComment$$ Current alarm down	AL
	7	QCST	$$BlockComment$$ Test feedback	WH
	8	MSG_8	Free	—
MSG_EVID2	1	MSG_9	Free	—
	2	MSG_10	Free	—
	3	MSG_11	Free	—
	4	MSG_12	Free	—
	5	MSG_13	Free	—
	6	MSG_14	Free	—
	7	MSG_15	Free	—
	8	MSG_16	Free	—

The free message inputs are not assigned a fixed meaning and can be activated using the parameters MSG_x (x = 8 to 16) on the SMC_REVD.

Table 3- 41 The ALARM_8P auxiliary values are assigned as follows:

Message block	Message number	Auxiliary value	Block parameter	Meaning
MSG_EVID1	—	1	BA_NA	Batch name
	—	2	STEP_NO	Batch step number
	—	3	BA_ID	Batch ID
	1	4	WRN_NO1	Warning number 1
		5	WRN_NO2	Warning number 2
	2	6	WRN_NO3	Warning number 3
		7	ERR_NO1	Fault number 1
		8	ERR_NO2	Fault number 2
		9	ERR_NO3	Fault number 3
		10	—	—

Message block	Message number	Auxiliary value	Block parameter	Meaning
MSG_EVID2	—	1	BA_NA	Batch name
	—	2	STEP_NO	Batch step number
	—	3	BA_ID	Batch ID
	—	4	AUX_PR14	Free
	—	5	AUX_PR15	Free
	—	6	AUX_PR16	Free
	—	7	AUX_PR17	Free
	—	8	AUX_PR18	Free
	—	9	AUX_PR19	Free
	—	10	AUX_PR20	Free

The auxiliary values AUX_PR14 … AUX_PR20 are freely available.

The limit value messages can be suppressed via the input M_SUP_C. The default value of the input M_SUP_C is TRUE, that is, message suppression is active.

For the messages General warning and General fault, the diagnostics block SMC_DIAG supplies the detailed information that is interconnected via the structure DIAG_INF to SMC_REVD.

General warning (message number 1)

The message General warning is derived from the diagnostics structure DIAG_INF formed by the block SMC_DIAG.

Three auxiliary values are transferred as additional information together with the message General warning. The auxiliary values correspond to the contents of the warning numbers WRN_NO1, WRN_NO2 and WRN_NO3 and contain the first three warning causes found.

The user text library SMC_Warnings is available for the warnings. This contains the precise fault texts and is supplemented dynamically in the message.

General fault (message number 2)

The message General fault is derived from the diagnostics structure DIAG_INF formed by the block SMC_DIAG.

One auxiliary value is transferred as additional information together with the message General fault. The auxiliary value corresponds to the contents of the fault number ERR_NO1 and contains the first fault cause found.

The auxiliary values 8 and 9 are interconnected with the parameters ERR_NO2 and ERR_NO3 and can be appended to the message if required.

The user text library SMC_Errors is available for the faults. This contains the precise error texts and is supplemented dynamically in the message.

Current limit messages (message number 3 to 6)

The current limit messages are formed by the SIMOCODE pro and are contained in the diagnostics structure DIAG_INF.

Test feedback (message number 7)

The message "Test feedback" is derived direct from the SIMOCODE pro information (DP 1.1 Send) .

Free messages (message number 8 of the message block 1, message numbers 1 to 8 of message block 2)

There is no block-internal assignment to a specific function for these messages. It can be activated via a parameter input (MSG_8 ... MSG_16) and can be used, for example, for reporting Local_Interruption, the operating mode SIMULATION, or any other signal.

3.10.12 Reset response

In principle, every fault detected by SIMOCODE pro must be acknowledged. This is done via the bit DP 0.6 Recv. Reset is only carried out by SIMOCODE pro if there is no active On command. Reset either resets the General fault (QGR_ERR) if the cause of the fault no longer exists, or it results in acknowledgment of the fault if the cause of the fault still exists. An acknowledged fault automatically results in resetting of the general fault following removal of the fault cause.

Reset can be carried out either via the interconnectable function input L_SMCRESET or via the OS operator controllable function input SMCRESET.

L_SMCRESET is level-active. SMCRESET is reset by the block following evaluation.

The reset function is transparent from the block's perspective, that is, there is no logical combination with other signals, and independent of the operating mode (LOCAL / REMOTE).

3.10.13 Start-up characteristics

At CPU startup, the block is switched to manual mode and the Off command is output. For this purpose, the block must be called from the startup OB. After startup, the messages are suppressed for the number of cycles parameterized in the RUNUPCYC value.

3.10.14 Time response

The block must be called via a watchdog interrupt OB. The sampling time of the block is entered in the parameter SAMPLE_T.

3.10.15 SMC_REVD block parameters

Element	Type	Kind	Meaning	HMI
AUT_L	BOOL	I	Interconnectable input for MAN / AUTO (0 = Manual / 1 = Auto)	N
AUT_ON_OP	BOOL	IO	Control input: 0 = Manual, 1 = Auto	Y
AUTO_DIR	BOOL	I	Automatic value: 1 = left, 0 = right	N
AUTO_ON	BOOL	I	Automatic value: 1 = On, 0 = Off	N
AUTO_SPD	BOOL	I	Automatic value: 1 = fast, 0 = slow	N
AUTOP_EN	BOOL	I	1 = Operator enable for Auto	N
AUX_PRxx	ANY	IO	Auxiliary value x (x = 11 to 20)	Y
BA_EN	BOOL	I	BATCH record release	Y
BA_ID	DWORD	I	BATCH: Consecutive batch number	Y
BA_NA	STRING [32]	I	BATCH designation	N
CST	BOOL	I	1 = Test mode	Y
CUR_AH	REAL	IO	Upper alarm limit current	Y
CUR_AL	REAL	IO	Lower alarm limit current	Y
CUR_WH	REAL	IO	Upper warning limit current	Y
CUR_WL	REAL	IO	Lower warning limit current	Y
DD_17_20	DWORD	O	DS 92 Byte 17 to 20: General warning additional info 1	Y
DD_21_22	WORD	O	DS 92 Byte 21 to 22: General warning additional info 2	Y
DD_24_27	DWORD	O	DS 92 Byte 24 to 27: General fault additional info 1	Y
DD_28_31	DWORD	O	DS 92 Byte 28 to 31: General fault additional info 2	N
DIAG_INF	UDT_ DIAG	I	Diagnostics structure of SMC_DIAG	Y
EM_START	BOOL	I	Emergency start	Y
EN_MEAS	BOOL	I	1 = Measured value block available	N
EN_RDWR	BOOL	I	1 = Enable reading/writing of data set	Y
EN_STAT	BOOL	I	1 = Statistics block available	Y
ERR_NOx	INT	O	Fault number x (x = 1 to 6)	N
FS1OP_EN	BOOL	I	1 = Operator enable for RIGHT SLOW ON	N
FS2OP_EN	BOOL	I	1 = Operator enable for RIGHT FAST ON	N
FWSP1_ON	BOOL	IO	Control input: 1 = RIGHT SLOW ON	N
FWSP2_ON	BOOL	IO	Control input: 1 = RIGHT FAST ON	N
I1_x	BOOL	I	User-defined outputs DP1.x (x = 0 to 7)	N
IN_01	WORD	I	Inputs DP0.0 to 1.7	N
IN_23	WORD	I	Input motor current	N

Element	Type	Kind	Meaning	HMI
JOG_ON	BOOL	I	1 = Non-maintained command mode active	N
L_FWSP1	BOOL	I	Manual control: 1 = Right Slow On	N
L_FWSP2	BOOL	I	Manual control: 1 = Right Fast On	N
L_OFF	BOOL	I	Manual control: 1 = Off	N
L_RD_DATA	BOOL	I	Interconnectable input 0 → 1: Reading of the data set	N
L_RESET	BOOL	I	Configurable input for resetting QLOC_INT	Y
L_RVSP1	BOOL	I	Manual control: 1 = Left Slow On	Y
L_RVSP2	BOOL	I	Manual control: 1 = Left Fast On	Y
L_SMCRESET	BOOL	I	Interconnectable input for resetting	N
LADDR	INT	I	Start address of the inputs	Y
LINK_MAN	BOOL	I	0 = Operator input active, 1 = Manual control via interconnectable inputs	N
LIOP_SEL	BOOL	I	Interconnectable input for manual/auto changeover (AUT_L): 1 = Interconnection is active, 0 = Operation is active	Y
LOCK	BOOL	I	1 = Lock (OFF)	Y
LOCK_DIR	BOOL	I	Direction of rotation with LOCK_ON: 1 = left, 0 = right	N
LOCK_ON	BOOL	I	1= Lock (ON)	Y
LOCK_SPD	BOOL	I	Speed with LOCK_ON: 1 = fast, 0 = slow	Y
LOCOP_EN	BOOL	I	1 = Operator enable for LOCAL	N
M_SUP_C	BOOL	I	1 = Message suppression active for current limit value violations	N
MANOP_EN	BOOL	I	1 = Operator enable for Manual	N
MO_PVHR	REAL	I	Bar upper limit	N
MO_PVLR	REAL	I	Bar lower limit	N
MODE	DWORD	I	Mode of OMODE of the SMC_DIAG	N
MONITOR	BOOL	I	Monitoring: 1 = ON	N
MOT_OFF	BOOL	IO	Control input: 1 = OFF	N
MSG_ACK1	WORD	O	Messages acknowledged Alarm 8p block 1	Y
MSG_ACK2	WORD	O	Messages acknowledged Alarm 8p block 2	N
MSG_EVID1	DWORD	I	Event ID of the Alarm 8p block 1	N
MSG_EVID2	DWORD	I	Event ID of the Alarm 8p block 2	N
MSG_STAT1	WORD	O	MESSAGE 1: STATUS output	Y
MSG_STAT2	WORD	O	MESSAGE 2: STATUS output	Y
MSG_x	BOOL	I	Free message input x (x = 8 to 16)	Y
O_01	WORD	O	Outputs DP0.0 to 1.7	Y
OCCUPIED	BOOL	I	BATCH record ID	Y
OFFOP_EN	BOOL	I	1 = Operator enable for OFF	Y
OOS	BOOL	I	Reserve	Y
Q_IN_01	WORD	O	Inputs DP0.0 to 1.7	N
QAUTOP	BOOL	O	1 = Operator enable for Auto	N
QBAD	BOOL	O	1 = Invalid process value	N
QBUS_PLC	BOOL	O	Bus/PLC fault	N

Element	Type	Kind	Meaning	HMI
QCOA	BOOL	O	1 = Change-over pause active (DP0.4)	N
QCST	BOOL	O	1 = Test active (DP1.1)	N
QCUR	REAL	O	Motor current % Ie	N
QCUR_AH	BOOL	O	Upper alarm limit current violated	Y
QCUR_AL	BOOL	O	Lower alarm limit current violated	N
QCUR_WH	BOOL	O	Upper warning limit current violated	N
QCUR_WL	BOOL	O	Lower warning limit current violated	Y
QDIR	BOOL	O	Status direction of rotation: 1 = left, 0 = right	Y
QEM_STRT	BOOL	O	1 = Emergency start active	N
QEN_RDWR	BOOL	O	1 = Enable reading/writing of data set	Y
QERR	BOOL	O	1 = Program error	Y
QERR_RD	BOOL	O	1 = Error while reading the data set	N
QERR_WR	BOOL	O	1 = Error while writing the data set	Y
QFLT_F9	BOOL	O	Fault F9	Y
QFS1_OP	BOOL	O	1 = Operator enable for RIGHT SLOW ON	N
QFS2_OP	BOOL	O	1 = Operator enable for RIGHT FAST ON	Y
QGR_ERR	BOOL	O	General fault (DP0.6)	N
QGR_WRN	BOOL	O	General warning (DP0.7)	Y
QLOC_INT	BOOL	O	1 = Local interruption	Y
QLOCOP	BOOL	O	1 = Operator enable for LOCAL / REMOTE	Y
QLTA	BOOL	O	1 = Interlocking time active (DP1.3)	Y
QMAN_AUT	BOOL	O	0 = Manual, 1 = Automatic	Y
QMANOP	BOOL	O	1 = Operator enable for Manual	Y
QMSG_ERR	BOOL	O	1 = ALARM8_P Error	Y
QMSG_SUP	BOOL	O	1 = Message suppression	N
QOFF_OP	BOOL	O	1 = Operator enable for OFF	Y
QOP_ERR	BOOL	O	1 = General operator error	N
QPARFF16	BOOL	O	Parameter error F16	N
QRD_STAT	WORD	O	Return value of the SFB RDREC	N
QRDWR_OP	BOOL	O	1 = Operator enable Read/write data set	Y
QREMOTE	BOOL	O	1 = REMOTE mode (DP0.5)	N
QRS1_OP	BOOL	O	1 = Operator enable for LEFT SLOW ON	Y
QRS2_OP	BOOL	O	1 = Operator enable for LEFT FAST ON	N
QRUN	BOOL	O	Status: 1 = Motor ON (DP0.2)	N
QSIM	BOOL	O	1 = Simulation active	N
QSPEED	BOOL	O	Status speed: 1 = fast, 0 = slow	N
QSTATUS	WORD	O	Command status (outputs DP0.0 to 1.7)	N
QSTOP	BOOL	O	Status: 1 = Motor OFF (DP0.1)	N
QUALITY	BYTE	O	Quality code	N
QWR_STAT	WORD	O	Return value of the SFB WRREC	N
RACKF	BOOL	I	1 = Rack fault	Y
RD_DATA	BOOL	IO	0→1: Reading of the data set	Y

Element	Type	Kind	Meaning	HMI
REM_L	BOOL	I	Interconnectable input for LOCAL / REMOTE (0 = LOCAL / 1 = REMOTE)	Y
REM_ON_OP	BOOL	IO	Control input: 0 = LOCAL, 1 = REMOTE	Y
REM_SEL	BOOL	I	Interconnectable input for LOCAL / REMOTEchangeover (REM_L): 1 = Interconnection is active, 0 = Operation is active	Y
RESET	BOOL	IO	Control input for resetting QLOC_INT	Y
RS1OP_EN	BOOL	I	1 = Operator enable for LEFT SLOW ON	N
RS2OP_EN	BOOL	I	1 = Operator enable for LEFT FAST ON	Y
RUNUPCYC	INT	I	Number of initial run cycles after CPU restart	Y
RVSP1_ON	BOOL	IO	Control input: 1 = LEFT SLOW ON	Y
RVSP2_ON	BOOL	IO	Control input: 1 = LEFT FAST ON	Y
SAMPLE_T	REAL	I	Sampling time in [s]	N
SIM_I01	WORD	I	Simulation value IN_01	N
SIM_I23	WORD	I	Simulation value IN_23	N
SIM_ON	BOOL	I	1 = Simulation	Y
SMCRESET	BOOL	IO	Operator controllable reset input for faults	Y
STEP_NO	DWORD	I	Batch step number	Y
TIME_MON	REAL	I	Monitoring time in [s]	Y
USTATUS	WORD	I	Status word in VSTATUS, freely user-assignable	N
VSTATUS	DWORD	O	Status for status displays for block icon	Y
WRN_NOx	INT	O	Warning number x (x = 1 to 6)	Y

Table 3- 42 Structure of VSTATUS

Bit	Parameter
0	OCCUPIED
1	BA_EN
2	QSIM
3	QMAN_AUT
4	QCST
5	QGR_ERR
6	QGR_WRN
7	QLOC_INT
8	LOCK / LOCK_ON
9	QRUN
10	QSTOP
11	QDIR
12	QSPEED
13	—
14	—
15	—
16 - 31	USTATUS

3.10.16 Status displays for icons

Status	Parameter	View
Off	QSTOP = 1	
Right Motor SLOW On	QRUN = 1 QDIR = 0 QSPEED = 0	
Right Motor FAST On	QRUN = 1 QDIR = 0 QSPEED = 1	
Left Motor SLOW On	QRUN = 1 QDIR = 1 QSPEED = 0	
Left Motor FAST On	QRUN = 1 QDIR = 1 QSPEED = 1	
Not available	QBAD = 1	

3.10.17 Description of the faceplate

The available faceplates are described in this chapter.

The following views are available:

Overview	OVERVIEW
Standard	STANDARD
Limits	LIMITS
Maintenance	MAINTENANCE
Faults	MESSAGE1
Warnings	MESSAGE2
Messages	—
Trend	—
Batch	—

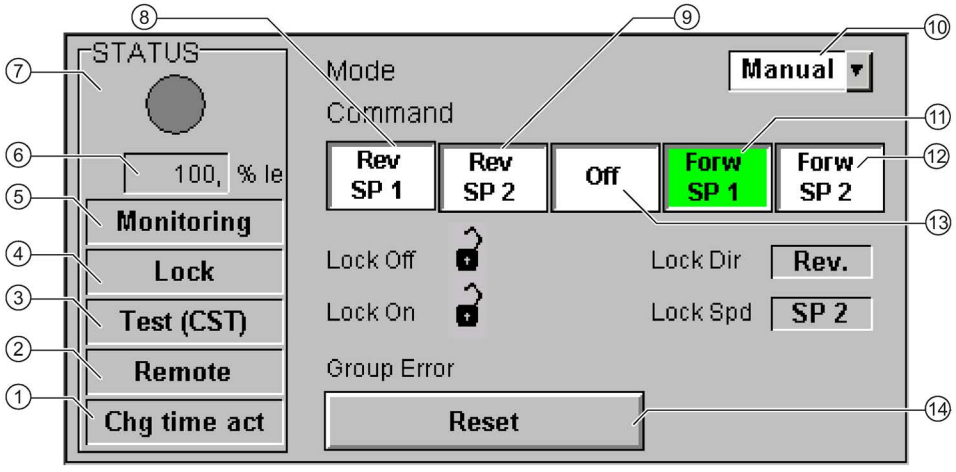
The file name is composed as follows: @PG_SMC_REVD_<View>.PDL

The PCS 7 standard displays are used for the message, trend and batch views.

The structure of the individual views of faceplates is described below.

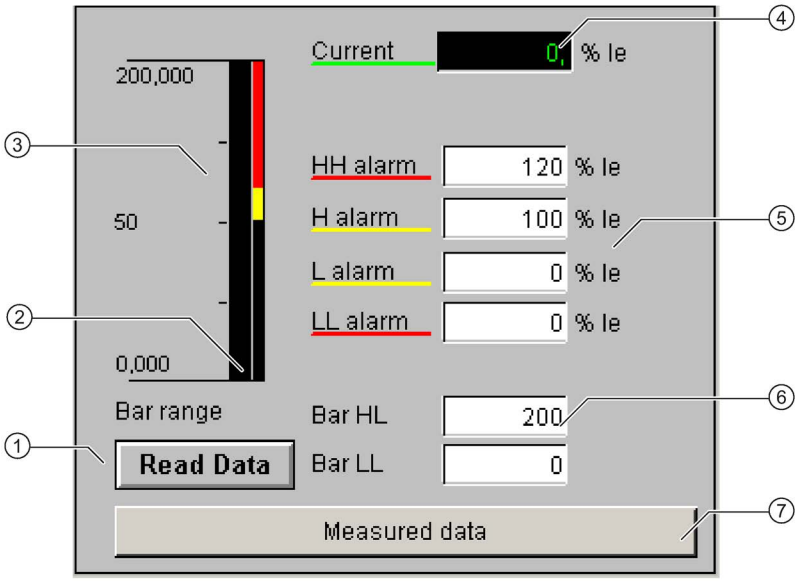
Standard (STANDARD)

The status display is a user object comprising several status displays. The status display corresponds to the representation from the process image icon.



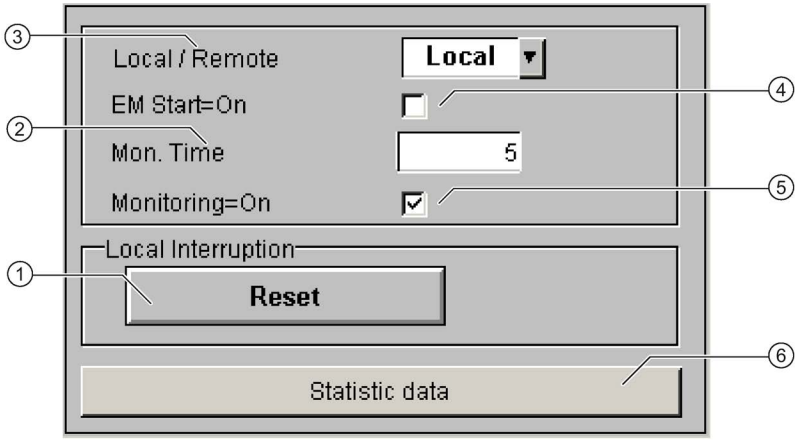
① Interlocking time (QLTA) / change-over pause (QCOA)
② Operator control modality (QREMOTE)
③ Test (QCST)
④ Interlocking (LOCK / LOCK_ON)
⑤ Local Interruption (QLOC_INT)
⑥ Current (QCUR) / unit (QCUR#unit)
⑦ Status display (VSTATUS)
⑧ Command Left Fast On (RVSP2_ON)
⑨ Command Left Slow On (RVSP1_ON)
⑩ Operating mode (QMAN_AUT, AUT_ON_OP)
⑪ Command Right Slow On (FWSP1_ON)
⑫ Command Right Fast On (FWSP2_ON)
⑬ Command Off (MOT_OFF)
⑭ Acknowledgement (RESET)

Limits (LIMITS)



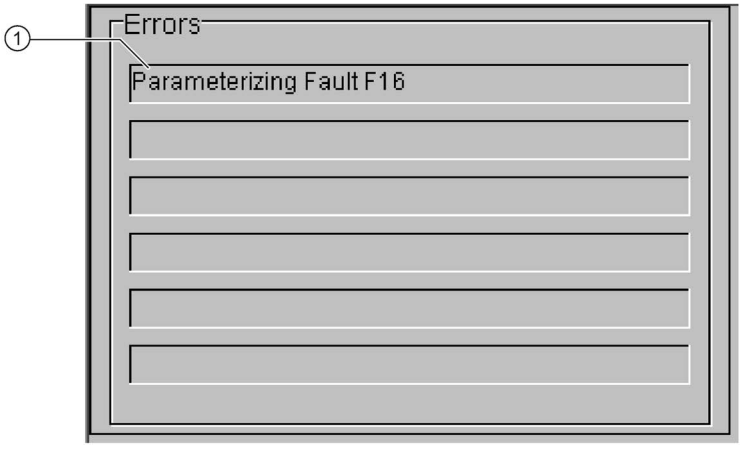
① Read Data (RD_DATA)
② Limit value display (CUR_AH, CUR_WH, CUR_WL, CUR_AL)
③ Actual value bar (QCUR, MO_PVHR, MO_PVLR)
④ Current value (QCUR, QCUR#unit)
⑤ Limits (CUR_AH, CUR_WH, CUR_WL, CUR_AL)
⑥ Bar range (MO_PVHR, MO_PVLR)
⑦ Call faceplate SMC_MEAS, visible if EN_MEAS = TRUE

Maintenance (MAINTENANCE)



① Acknowledge Local Interruption (RESET)
② Monitoring time for Local Interruption (TIME_MON)
③ Operator control modality Local / Remote (REM_ON_OP)
④ Activation Emergency Start (EM_START)
⑤ Activation Monitoring (MONITOR)
⑥ Call faceplate SMC_STAT, visible if EN_STAT = TRUE

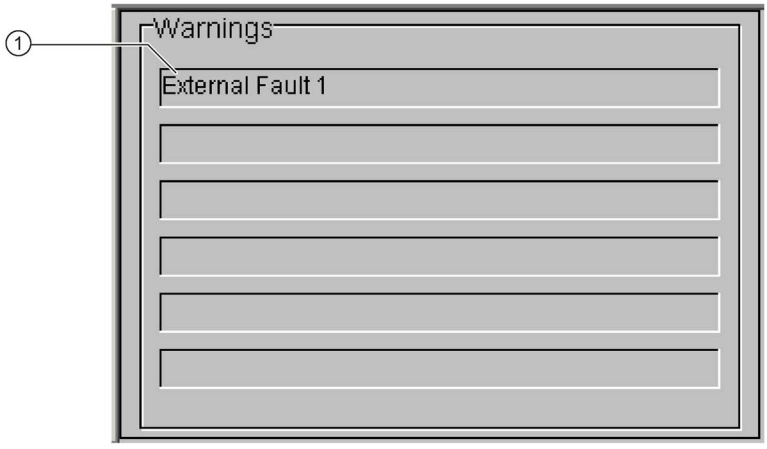
Faults (MESSAGE1)



① Text list with error description (ERR_NOx)

For error number 0, the text field is switched to invisible.

Warnings (MESSAGE2)



① Text list with error description (WRN_NOx)

For error number 0, the text field is switched to invisible.

3.11 SMC_VAL: Signal processing block for valve control function

FB2010

Calling OBs

The watchdog interrupt OB in which you install the block (e.g. OB32). Also in OB100 (see start-up characteristics).

Called blocks

The block calls the following blocks:

SFB35	ALARM_8P
SFC6	RD_SINFO
SFC20	BLKMOV

3.11.1 Calling OBs

The watchdog interrupt OB in which you install the block (e.g. OB32). Also in OB100 (see start-up characteristics).

3.11.2 Called blocks

The block calls the following blocks:

SFB35	ALARM_8P
SFC6	RD_SINFO
SFC20	BLKMOV

3.11.3 Parameter assignment in SIMOCODE ES

For the signal blocks to function correctly, a range of SIMOCODE pro parameters must have quite specific settings. Those parameters that define the assignment of the cyclic I/O interface are especially affected.

These parameters are represented in **bold**.

In addition, the overview below represents the parameters that are already preset for the control function in the templates for application selection in the SIMOCODE ES software. The settings are suggestions and depend heavily on the actual wiring of the SIMOCODE pro inputs and outputs.

These parameters are represented in *italics*.

Other parameters must also be set, e.g. for motor protection. These are not described here. Parameter assignment for the extended I/O interface of basic type 1 is represented in the following chapter: Parameter assignment in SIMOCODE ES (Page 33)

Dahlander reversing starter control function

Motor control → Control stations		
Operation mode selector S1	**Cyclic receive bit 0.5**	—
Operation mode selector S2	*Fixed level 1*	—

Local control [LC]		
Closed	*BU - Input 2*	—
Open	*BU - Input 1*	—
Operator enable local 2 off	*Active*	—
Operator enable local 2 on	*Active*	—
Operator enable remote off	**Not active**	—
Operator enable remote on	**Not active**	—

PLC/PCS [DP]		
Closed	**Cyclic receive – bit 0.1**	—
Open	**Cyclic receive – bit 0.2**	—
Operator enable local 2 off	**Not active**	—
Operator enable local 2 on	**Not active**	—
Operator enable remote off	**Active**	—
Operator enable remote on	**Active**	—

Operator Panel [OP]		
Closed	*OP button 4*	—
Open	*OP button 3*	—
Operator enable local 2 off	*Active*	—
Operator enable local 2 on	*Active*	—
Operator enable remote off	**Not active**	—
Operator enable remote on	**Not active**	—

Motor control → Control function → Control commands		
Off	**Released control command - Off**	—
On>	**Enabled control command – On>**	—

Motor control → Control function → Operating mode		
Non-maintained command mode	*Not active/active*	*The setting of the parameter influences the parameter JOG_ON in the SIMOCODE signal block:* *Non-maintained command mode not active: JOG_ON = FALSE* *Non-maintained command mode active: JOG_ON = TRUE*

Motor control → Control function → Auxiliary control inputs		
Feedback ON	**Status – On>**	—
Feedback closed	*BU - Input 3*	—
Feedback open	*BU - Input 4*	—

Outputs → Basic unit		
BU – Output 1	*Contactor control QE1*	—

Outputs → Operator panel LEDs		
LED green 3	*Display QLE> (on>)*	—
LED green 4	*Display QLA (off)*	—

Outputs → Cyclic send data		
Byte 0, bit 0	Not connected	—
Byte 0, bit 1	**Status - Off**	—
Byte 0, bit 2	**Status – On>**	—
Byte 0, bit 3	Not connected	—
Byte 0, bit 4	Not connected	—
Byte 0, bit 5	**Status – Remote mode**	—
Byte 0, bit 6	**Status – General fault**	—
Byte 0, bit 7	**Status - General warning**	—
Byte 1, bit 0	Not connected	Freely assignable
Byte 1, bit 1	Not connected	Freely assignable
Byte 1, bit 2	Not connected	Freely assignable
Byte 1, bit 3	Not connected	Freely assignable
Byte 1, bit 4	Not connected	Freely assignable
Byte 1, bit 5	Not connected	Freely assignable
Byte 1, bit 6	Not connected	Freely assignable
Byte 1, bit 7	Not connected	Freely assignable
Byte 2-3	Not connected	—

3.11.4 Function

The block is installed by the user in a cyclic watchdog interrupt OB (e.g. OB32). Parameter inputs IN_01 and IN_23 as well as parameter output O_01 are also interconnected by the user with the relevant icons for inputs or outputs of the associated SIMOCODE pro device.

SMC_CB accesses the data provided by SIMOCODE pro via inputs IN_01 (2 bytes of binary data) and IN_23 (2 bytes of motor current).

Data is transferred to SIMOCODE pro via the output O_01 (2 bytes of binary data).

The configuration of the inputs and outputs is determined here by SIMOCODE pro basic type 2.

Access to the inputs and outputs takes place exclusively via the process image.

The block uses the input parameter MODE to determine whether the inputs IN_01 and IN_23 are valid. In the case of a higher-level fault, all inputs are read by SIMOCODE pro with "0" and output to the relevant outputs of the block.

3.11.5 Assignment of the cyclic process image

Table 3- 43 Assignment of O_01: Output commands to SIMOCODE pro

Bit	Control interface
0.0	—
0.1	Closed
0.2	Open
0.3	Test1
0.4	Emergency start
0.5	Local/remote control station
0.6	Reset
0.7	—
1.0 ... 1.7	User-specific outputs

Table 3- 44 Assignment of IN_0: Feedback messages from SIMOCODE pro

Bit	Cyclic send data	Block parameter
0.0	—	—
0.1	Status – Closed	QCLOSED
0.2	Status – Open	QOPENED
0.3	—	—
0.4	—	—
0.5	Status – Remote mode	QREMOTE
0.6	Status - General fault	QGR_ERR
0.7	Status - General warning	QGR_WRN
1.0	—	—
1.1	Status - Test position (TPF)	QCST
1.2 ... 1.7	—	—

The input parameter IN_01 is additionally copied to the output Q_IN_01.

The motor current is transferred via the input parameter IN_23 as an unsigned 2-byte value. SIMOCODE pro always transfers the current here as a percentage of the set current in a range from 0 to 1000%. The motor current is output via QCUR.

3.11.6 Operating modes

Changing the control station (REMOTE, LOCAL)

The control station is changed via the interconnectable function input REM_L if the input REM_SEL is set, or via the function input REM_ON_OP set by the OS.

The function input (REMOP_EN) influences the operator enable (QLOCOP) for operating via the OS.

The operating mode of the control station is output via QREMOTE (1 = REMOTE, 0 = LOCAL). QREMOTE corresponds here to the bit DP 0.5 of the SIMOCODE pro.

In LOCAL mode, the controller is completely switched off via the SMC_VALblock. Control is then only possible via a control station connected direct to the SIMOCODE pro. It is still possible to acknowledge the fault.

Changing the operating modes (MANUAL, AUTO) when REMOTE is selected

If QREMOTE = TRUE , changeover between the two operating modes MANUAL and AUTOMATIC takes place either via OS operation using AUT_ON_OP(LIOP_SEL = 0) or via the interconnection of the input AUT_L (LIOP_SEL = 1).

The function inputs (MANOP_EN, AUTOP_EN) influence the operator enables (QMANOP, QAUTOP) for operating via the OS.

The operating mode is output at output QMAN_AUT(1 = AUTO, 0 = MANUAL).

Changing the control station for MANUAL

In REMOTE mode, the operating mode MANUAL can be controlled either via the OS or via the interconnectable function inputs. The changeover for this takes place via the interconnectable function input LINK_MAN.

3.11.7 Control stations for MANUAL and AUTOMATIC mode

General information

The PLC/DP control station of the SIMOCODE pro (that is, DP0.1 and 0.2) is level-active. The open command is stored in the SIMOCODE pro. The close command (DP0.1) takes priority over the open command(DP0.2).

Control of the SIMOCODE pro via AS / OS is only possible in REMOTE mode.

AUTOMATIC

In automatic mode, the SIMOCODE pro control functions are controlled via the interconnectable function input AUTO_OC (TRUE = Open, FALSE = Closed).

Control without non-maintained command mode (JOG_ON = FALSE)

At one edge of the command input, the associated control bit is set in the interface until the SIMOCODE pro sends the relevant feedback message, or a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the automatic interface.

Control with non-maintained command mode (JOG_ON = TRUE)

The corresponding control bit in the interface is set as long as the command input = TRUE or if a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the automatic interface. The Closed command is not necessary for closing the valve but is nevertheless set by the block if no Open command is active.

MANUAL

In manual mode, the SIMOCODE pro is controlled either via the function inputs OPEN_VAL and CLOS_VAL set by the OS or via the interconnectable function inputs L_OPEN and L_CLOSE.

The inputs for the operator enables OP_OP_EN / CL_OP_EN set the outputs QOP_OP / QCL_OP for operation using the OS.

At one edge of the command input, the associated control bit is set in the interface until the SIMOCODE pro sends the relevant feedback message, or a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the interconnectable manual interface.

The Closed command takes priority over the Open command (no edge evaluation!).

After changing to manual mode, the commands are not forwarded to the inputs until there is a positive edge change when L_OPEN / L_CLOSE is active.

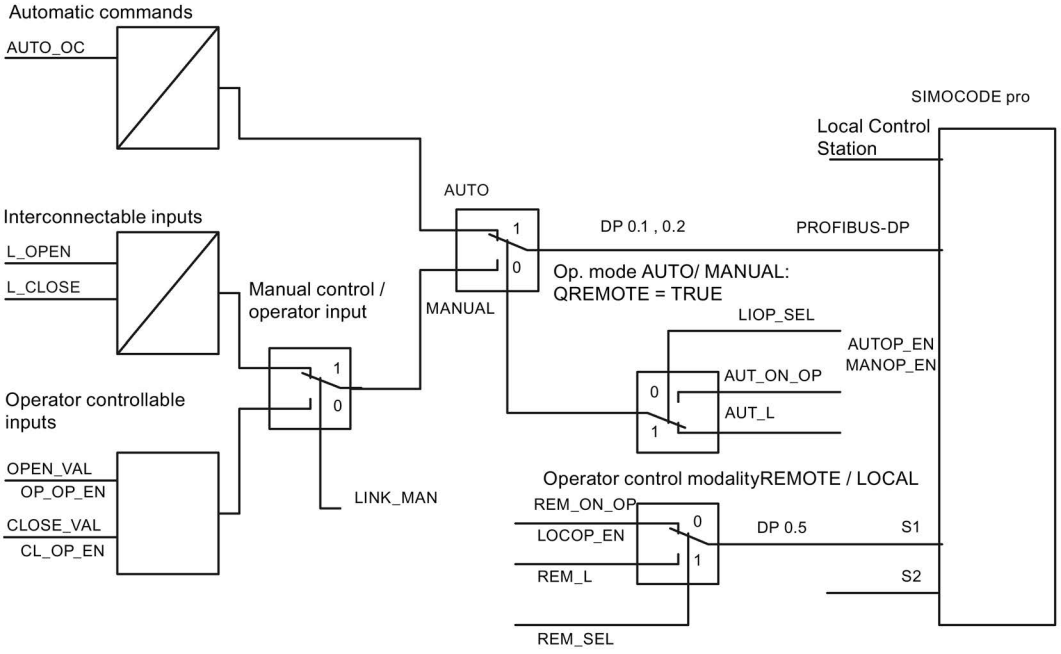
Control without non-maintained command mode (JOG_ON = FALSE)

At one edge of the command input, the associated control bit is set in the interface until the SIMOCODE pro sends the relevant feedback message, or a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the interconnectable inputs. The operator controllable inputs OPEN_VAL and CLOS_VAL are adjusted when tripped.

Control with non-maintained command mode (JOG_ON = TRUE)

The corresponding control bit in the interface is set as long as the command input = TRUE or if a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the automatic interface. The Closed command is not necessary for closing the valve but is nevertheless set by the block if no Open command is active.

3.11.8 Overview of control stations, operating modes, and operator control modalities



3.11.9 Simulation

The simulation mode is activated using the input SIM_ON and takes priority over all other operating modes. If SIM_ON = TRUE , the block processes the simulation values (SIM_I01: binary data) instead of the process values of SIMOCODE pro(IN_01). QSIM, QUALITY and QBAD are output accordingly. The process output (O_01) is output with "0" if simulation is active. The command status is combined with the output QSTATUS.

A block must be programmed for the simulation. The output QSTATUS can be evaluated and this information can be used to form the simulation feedback message (SIM_I01). Assignment corresponds to assignment of the process inputs/process output and can be found in the following chapter: Assignment of the cyclic process image (Page 212)

3.11.10 Interlocking

The interlocks V_LOCK, VL_CLOS and VL_OPEN are only effective in REMOTE mode and are valid in the operating mode MANUAL and AUTO for all control stations of the SMC_VAL block.

An active lock input prevents switching and disables control stations for MANUAL and AUTO. The control bit is set permanently.

The input SS_POS (TRUE = Open, FALSE = Closed) corresponds to the safe position and determines control in the case of V_LOCK.

The priorities range from high to low in the following order: V_LOCK → VL_CLOS → CL_OPEN

Revoking of the interlock input switches the valve to the operating mode AUTO corresponding to the control station for AUTO. In MANUAL, the valve is moved to the safe position.

3.11.11 Local Interruption

The output QLOC_INT indicates in REMOTE that operation via the local control station (connected direct to SIMOCODE pro) has changed the current switching state.

QLOC_INT is also set if the switching state requested via REMOTE has not been reached within the monitoring time set using TIME_MON and no general fault has occurred (e.g. due to a higher-priority Close command at the SIMOCODE pro general control station). This monitoring is switched off with TIME_MON = 0 or MONITOR =FALSE.

If QLOC_INT = TRUE, the control outputs are reset.

QLOC_INT is reset via the inputs RESET (operator controllable) / L_RESET (interconnectable). The input RESET is reset after acknowledgment. If L_RESET is active permanently, QLOC_INT is set for the duration of the cycle if the requirements given above are met.

Monitoring is deactivated at initial startup by setting MONITOR = FALSE.

3.11.12 Signaling response

Table 3- 45 SMC_VAL issues the following messages:

Message block	Message number	Block parameter	Message text	Message class
MSG_EVID1	1	QGR_WRN	$$BlockComment$$ General warning: @4W%t#SMC_Warnings@ @5W%t#SMC_Warnings@ @6W%t#SMC_Warnings@	WH
	2	QGR_ERR	$$BlockComment$$ General fault: @7%t#SMC_Errors@	AH
	3	QCST	$$BlockComment$$ Test feedback	WH
	4	MSG_4	Free	—
	5	MSG_5	Free	—
	6	MSG_6	Free	—
	7	MSG_7	Free	—
	8	MSG_8	Free	—
MSG_EVID2	1	MSG_9	Free	—
	2	MSG_10	Free	—
	3	MSG_11	Free	—
	4	MSG_12	Free	—
	5	MSG_13	Free	—
	6	MSG_14	Free	—
	7	MSG_15	Free	—
	8	MSG_16	Free	—

The free message inputs are not assigned a fixed meaning and can be activated using the parameters MSG_x (x = 4 to 16) on the SMC_VAL.

Table 3- 46 The ALARM_8P auxiliary values are assigned as follows:

Message block	Message number	Auxiliary value	Block parameter	Meaning
MSG_EVID1	—	1	BA_NA	Batch name
	—	2	STEP_NO	Batch step number
	—	3	BA_ID	Batch ID
	1	4	WRN_NO1	Warning number 1
		5	WRN_NO2	Warning number 2
	2	6	WRN_NO3	Warning number 3
		7	ERR_NO1	Fault number 1
		8	ERR_NO2	Fault number 2
		9	ERR_NO3	Fault number 3
		10	—	—

Message block	Message number	Auxiliary value	Block parameter	Meaning
MSG_EVID2	—	1	BA_NA	Batch name
	—	2	STEP_NO	Batch step number
	—	3	BA_ID	Batch ID
	—	4	AUX_PR14	Free
	—	5	AUX_PR15	Free
	—	6	AUX_PR16	Free
	—	7	AUX_PR17	Free
	—	8	AUX_PR18	Free
	—	9	AUX_PR19	Free
	—	10	AUX_PR20	Free

The auxiliary values AUX_PR14 … AUX_PR20 are freely available.

For the messages General warning and General fault, the diagnostics block SMC_DIAG supplies the detailed information that is interconnected via the structure DIAG_INF to SMC_VAL.

General warning (message number 1)

The message General warning is derived from the diagnostics structure DIAG_INF formed by the block SMC_DIAG.

Three auxiliary values are transferred as additional information together with the message General warning. The auxiliary values correspond to the contents of the warning numbers WRN_NO1, WRN_NO2 and WRN_NO3 and contain the first three warning causes found.

The user text library SMC_Warnings is available for the warnings. This contains the precise fault texts and is supplemented dynamically in the message.

General fault (message number 2)

The message General fault is derived from the diagnostics structure DIAG_INF formed by the block SMC_DIAG.

One auxiliary value is transferred as additional information together with the message General fault. The auxiliary value corresponds to the contents of the fault number ERR_NO1 and contains the first fault cause found.

The auxiliary values 8 and 9 are interconnected with the parameters ERR_NO2 and ERR_NO3 and can be appended to the message if required.

The user text library SMC_Errors is available for the faults. This contains the precise error texts and is supplemented dynamically in the message.

Current limit messages (message number 3)

The message Test feedback is derived direct from the SIMOCODE pro information (DP1.1 Send).

Free messages (message number 4 to 8 of message block 1, message numbers 1 to 8 of message block 2)

There is no block-internal assignment to a specific function for these messages. It can be activated via a parameter input (MSG_4 ... MSG_16) and can be used, for example, for reporting Local_Interruption, the operating mode SIMULATION, or any other signal.

3.11.13 Reset response

In principle, every fault detected by SIMOCODE pro must be acknowledged. This is done via the bit DP 0.6 Recv. Reset is only carried out by SIMOCODE pro if there is no active Open command. Reset either resets the General fault (QGR_ERR) if the cause of the fault no longer exists, or it results in acknowledgment of the fault if the cause of the fault still exists. An acknowledged fault automatically results in resetting of the general fault following removal of the fault cause.

Reset can be carried out either via the interconnectable function input L_SMCRESET or via the OS operator controllable function input SMCRESET.

L_SMCRESET is level-active. SMCRESET is reset by the block following evaluation.

The reset function is transparent from the block's perspective, that is, there is no logical combination with other signals, and independent of the operating mode (LOCAL / REMOTE).

With the Valve control function, the End position fault can only be reset by a counter-command. With this fault, the counter-command must be sent for fault acknowledgment in manual mode, for example, or via the local control station.

3.11.14 Start-up characteristics

At CPU startup, the block is switched to manual mode and the valve is taken to the safe position (SS_POS) . For this purpose, the block must be called from the startup OB. After startup, the messages are suppressed for the number of cycles parameterized in the RUNUPCYC value.

3.11.15 Time response

The block must be called via a watchdog interrupt OB. The sampling time of the block is entered in the parameter SAMPLE_T.

3.11.16 SMC_VAL block parameters

Element	Type	Kind	Meaning	HMI
AUT_L	BOOL	I	Interconnectable input for MAN / AUTO (0 = Manual / 1 = Auto)	N
AUT_ON_OP	BOOL	IO	Control input: 0 = Manual, 1 = Auto	Y
AUTO_OC	BOOL	I	Automatic value: 1 = open, 0 = closed	N
AUTOP_EN	BOOL	I	1 = Operator enable for Auto	N
AUX_PRxx	ANY	IO	Auxiliary value x (x = 11 to 20)	N
BA_EN	BOOL	I	BATCH record release	Y
BA_ID	DWORD	I	BATCH: Consecutive batch number	Y
BA_NA	STRING [32]	I	BATCH designation	Y
CL_OP_EN	BOOL	I	1 = Operator enable for CLOSED	N
CLOS_VAL	BOOL	IO	Control input: 1 = Positioner CLOSED	Y
CST	BOOL	I	1 = Test mode	N
DD_17_20	DWORD	O	DS 92 Byte 17 to 20: General warning additional info 1	Y
DD_21_22	WORD	O	DS 92 Byte 21 to 22: General warning additional info 2	Y
DD_24_27	DWORD	O	DS 92 Byte 24 to 27: General fault additional info 1	Y
DD_28_31	DWORD	O	DS 92 Byte 28 to 31: General fault additional info 2	Y
DIAG_INF	UDT_ DIAG	I	Diagnostics structure of SMC_DIAG	N
EM_START	BOOL	I	Emergency start	Y
EN_MEAS	BOOL	I	1 = Measured value block available	Y
EN_STAT	BOOL	I	1 = Statistics block available	Y
ERR_NOx	INT	O	Fault number x (x = 1 to 6)	Y
I1_x	BOOL	I	User-defined outputs DP1.x (x = 0 to 7)	N
IN_01	WORD	I	Inputs DP0.0 to 1.7	N
IN_23	WORD	I	Inputs DP2.0 to 3.7	N
JOG_ON	BOOL	I	1 = Non-maintained command mode active	N
L_CLOSE	BOOL	I	Manual control: 1 = Closed	N
L_OPEN	BOOL	I	Manual control: 1 = Open	N
L_RESET	BOOL	I	Configurable input for resetting QLOC_INT	N
L_SMCRESET	BOOL	I	Interconnectable input for resetting	N
LINK_MAN	BOOL	I	0 = Operator input active, 1 = Manual control via interconnectable inputs	N
LIOP_SEL	BOOL	I	Interconnectable input for manual/auto changeover (AUT_L): 1 = Interconnection is active, 0 = Operation is active	N
LOCOP_EN	BOOL	I	1 = Operator enable for LOCAL	N
MANOP_EN	BOOL	I	1 = Operator enable for Manual	N
MODE	DWORD	I	Mode of OMODE of the SMC_DIAG	N
MONITOR	BOOL	I	Monitoring: 1 = ON	Y
MSG_ACK1	WORD	O	Messages acknowledged Alarm 8p block 1	N
MSG_ACK2	WORD	O	Messages acknowledged Alarm 8p block 2	N
MSG_EVID1	DWORD	I	Event ID of the Alarm 8p block 1	N

Element	Type	Kind	Meaning	HMI
MSG_EVID2	DWORD	I	Event ID of the Alarm 8p block 2	N
MSG_STAT1	WORD	O	MESSAGE 1: STATUS output	N
MSG_STAT2	WORD	O	MESSAGE 2: STATUS output	N
MSG_x	BOOL	I	Free message input x (x = 4 to 16)	N
O_01	WORD	O	Outputs DP0.0 to 1.7	N
OCCUPIED	BOOL	I	BATCH record ID	Y
OOS	BOOL	I	Reserve	Y
OP_OP_EN	BOOL	I	1 = Operator enable for OPEN	N
OPEN_VAL	BOOL	IO	Control input: 1 = Positioner OPEN	Y
Q_IN_01	WORD	O	Inputs DP0.0 to 1.7	N
Q_IN_23	WORD	O	Inputs DP2.0 to 3.7	N
QAUTOP	BOOL	O	1 = Operator enable for Auto	Y
QBAD	BOOL	O	1 = Invalid process value	Y
QBUS_PLC	BOOL	O	Bus/PLC fault	Y
QCL_OP	BOOL	O	1 = Operator enable for CLOSED	Y
QCLOSED	BOOL	O	Status: 1 = Valve CLOSED (DP0.1)	Y
QCST	BOOL	O	1 = Test active (DP1.1)	Y
QEM_STRT	BOOL	O	1 = Emergency start active	N
QERR	BOOL	O	1 = Program error	N
QFLT_F9	BOOL	O	Fault F9	Y
QGR_ERR	BOOL	O	General fault (DP0.6)	N
QGR_WRN	BOOL	O	General warning (DP0.7)	N
QLOC_INT	BOOL	O	1 = Local interruption	Y
QLOCOP	BOOL	O	1 = Operator enable for LOCAL / REMOTE	Y
QMAN_AUT	BOOL	O	0 = Manual, 1 = Automatic	Y
QMANOP	BOOL	O	1 = Operator enable for Manual	Y
QMSG_ERR	BOOL	O	1 = ALARM8_P Error	N
QMSG_SUP	BOOL	O	1 = Message suppression	Y
QOP_ERR	BOOL	O	1 = General operator error	N
QOP_OP	BOOL	O	1 = Operator enable for OPEN	Y
QOPENED	BOOL	O	Status: 1 = Valve OPEN (DP0.2)	Y
QPARFF16	BOOL	O	Parameter error F16	Y
QREMOTE	BOOL	O	1 = REMOTE mode (DP0.5)	Y
QSIM	BOOL	O	1=Simulation active	Y
QSTATUS	WORD	O	Command status (outputs DP0.0 to 1.7)	N
QUALITY	BYTE	O	Quality code	N
RACKF	BOOL	I	1 = Rack fault	N
REM_L	BOOL	I	Interconnectable input for LOCAL / REMOTE (0 = LOCAL / 1 = REMOTE)	N
REM_ON_OP	BOOL	IO	Control input: 0 = LOCAL, 1 = REMOTE	Y
REM_SEL	BOOL	I	Interconnectable input for LOCAL / REMOTE changeover (REM_L): 1 = Interconnection is active, 0 = Operation is active	N

Element	Type	Kind	Meaning	HMI
RESET	BOOL	IO	Control input for resetting QLOC_INT	N
RUNUPCYC	INT	I	Number of initial run cycles after CPU restart	N
SAMPLE_T	REAL	I	Sampling time in [s]	N
SIM_I01	WORD	I	Simulation value IN_01	N
SIM_I23	WORD	I	Simulation value IN_23	N
SIM_ON	BOOL	I	1 = Simulation	Y
SMCRESET	BOOL	IO	Operator controllable reset input for faults	Y
SS_POS	BOOL	I	Idle position: 0 = Closed (Type C) 1 = Open (Type O)	Y
STEP_NO	DWORD	I	Batch step number	Y
TIME_MON	REAL	I	Monitoring time in [s]	Y
USTATUS	WORD	I	Status word in VSTATUS, freely user-assignable	N
V_LOCK	BOOL	I	1 = Lock (SS_POS)	Y
VL_CLOS	BOOL	I	1 = Lock (OFF)	Y
VL_OPEN	BOOL	I	1 = Lock (OPEN)	Y
VSTATUS	DWORD	O	Status for status displays for block icon	Y
WRN_NOx	INT	O	Warning number x (x = 1 to 6)	Y

Table 3- 47 Structure of VSTATUS

Bit	Parameter
0	OCCUPIED
1	BA_EN
2	QSIM
3	QMAN_AUT
4	QCST
5	QGR_ERR
6	QGR_WRN
7	QLOC_INT
8	V_LOCK / VL_CLOS / VL_OPEN
9	QOPENED
10	QCLOSED
11	—
12	—
13	—
14	—
15	—
16 - 31	USTATUS

3.11.17 Status displays for icons

Status	Parameter	View
Closed	QCLOSED = 1	
Open	QOPENED = 1	
Not available	QBAD = 1	

3.11.18 Description of the faceplate

The available faceplates are described in this chapter.

The following views are available:

Overview	OVERVIEW
Standard	STANDARD
Limits	LIMITS
Maintenance	MAINTENANCE
Faults	MESSAGE1
Warnings	MESSAGE2
Messages	—
Trend	—
Batch	—

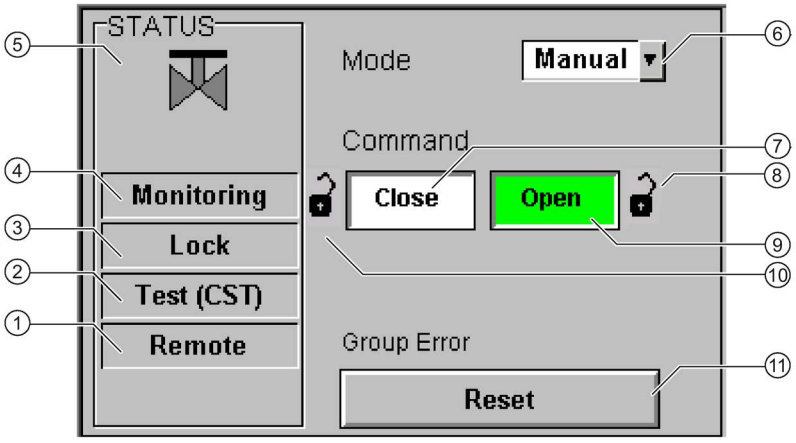
The file name is composed as follows: @PG_SMC_VAL_<View>.PDL

The PCS 7 standard displays are used for the message and batch views.

The structure of the individual views of faceplates is described below.

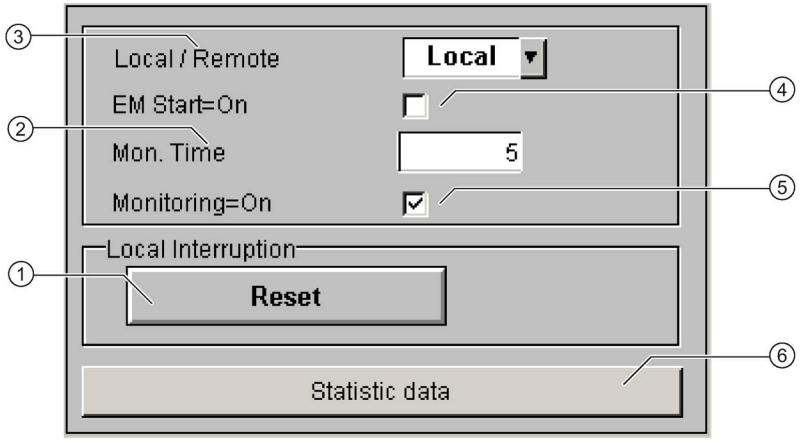
Standard (STANDARD)

The status display is a user object comprising several status displays. The status display corresponds to the representation from the process image icon.



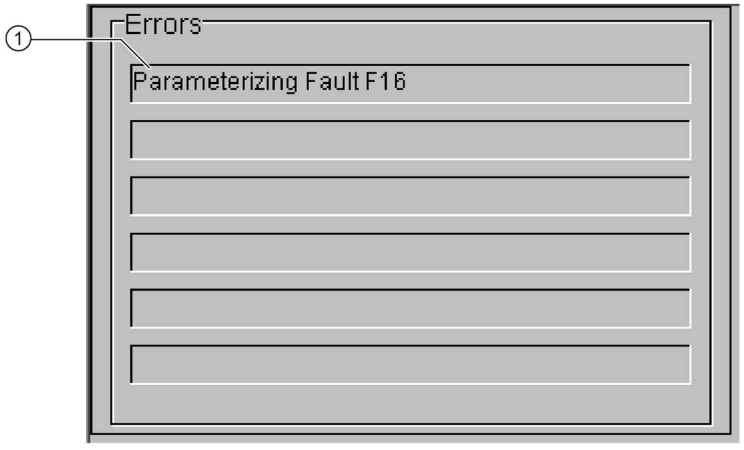
① Operator control modality (QREMOTE)
② Test (QCST)
③ Interlocking (V_LOCK , VL_OPEN; VL_CLOSE)
④ Local Interruption (QLOC_INT)
⑤ Status display (VSTATUS)
⑥ Operating mode (QMAN_AUT, AUT_ON_OP)
⑦ Close command (CLOSE_VAL)
⑧ (VL_OPEN / V_LOCK + SS_POS)
⑨ Open command (OPEN_VAL)
⑩ (VL_CLOSE / V_LOCK + SS_POS)
⑪ Acknowledgement (RESET)

Maintenance (MAINTENANCE)



① Acknowledge Local Interruption (RESET)
② Monitoring time for Local Interruption (TIME_MON)
③ Operator control modality Local / Remote (REM_ON_OP)
④ Activation Emergency Start (EM_START)
⑤ Activation Monitoring (MONITOR)
⑥ Call faceplate SMC_STAT, visible if EN_STAT = TRUE

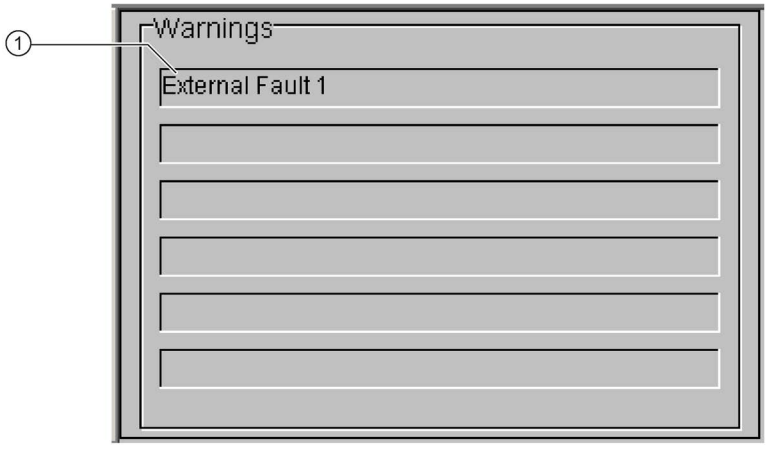
Faults (MESSAGE1)



① Text list with error description (ERR_NOx)

For error number 0, the text field is switched to invisible.

Warnings (MESSAGE2)



① Text list with error description (WRN_NOx)

For error number 0, the text field is switched to invisible.

3.12 SMC_POS: Signal processing block for positioner control function

FB2011

Calling OBs

The watchdog interrupt OB in which you install the block (e.g. OB32). Also in OB100 (see start-up characteristics).

Called blocks

The block calls the following blocks:

SFB35	ALARM_8P
SFB52	RDREC
SFB53	WRREC
SFC6	RD_SINFO
SFC20	BLKMOV
SFC21	FILL

3.12.1 Parameter assignment in SIMOCODE ES

For the signal blocks to function correctly, a range of SIMOCODE pro parameters must have quite specific settings. Those parameters that define the assignment of the cyclic I/O interface are especially affected.

These parameters are represented in **bold**.

In addition, the overview below represents the parameters that are already preset for the control function in the templates for application selection in the SIMOCODE ES software. The settings are suggestions and depend heavily on the actual wiring of the SIMOCODE pro inputs and outputs.

These parameters are represented in *italics*.

Other parameters must also be set, e.g. for motor protection. These are not described here. Parameter assignment for the extended I/O interface of basic type 1 is represented in the following chapter: Parameter assignment in SIMOCODE ES (Page 33)

Motor control → Control stations		
Operation mode selector S1	**Cyclic receive bit 0.5**	—
Operation mode selector S2	*Fixed level 1*	—

Local control [LC]		
Closed	*DM – Input 1*	—
Stop	*DM – Input 2*	—
Open	*DM – Input 3*	—
Operator enable local 2 off	*Active*	—
Operator enable local 2 on	*Active*	—
Operator enable remote off	**Not active**	—
Operator enable remote on	**Not active**	—

PLC/PCS [DP]		
Closed	*Cyclic receive – bit 0.0*	—
Stop	*Cyclic receive – bit 0.1*	—
Open	*Cyclic receive – bit 0.2*	—
Operator enable local 2 off	*Not active*	—
Operator enable local 2 on	*Not active*	—
Operator enable remote off	**Active**	—
Operator enable remote on	**Active**	—

Operator Panel [OP]		
Closed	*OP button 2*	—
Stop	*OP button 4*	—
Open	*OP button 3*	—
Operator enable local 2 off	*Active*	—
Operator enable local 2 on	*Active*	—
Operator enable remote off	**Not active**	—
Operator enable remote on	**Not active**	—

Motor control → Control function → Control commands		
On<	**Enabled control command – On<**	—
Off	**Released control command - Off**	—
On>	**Enabled control command – On>**	—

Motor control → Control function → Operating mode		
Non-maintained command mode	*Not active/active*	*The setting of the parameter influences the parameter JOG_ON in the SIMOCODE signal block:* *Non-maintained command mode not active: JOG_ON = FALSE* *Non-maintained command mode active: JOG_ON = TRUE*

Motor control → Control function → Auxiliary control inputs		
Feedback ON	**Status – On>**	—
Feedback closed	*BU - Input 2*	—
Feedback open	*BU - Input 3*	—
Torque closed	*BU - Input 1*	*(only positioner control function 2.3)*
Torque open	*BU - Input 4*	*(only positioner control function 2,4)*

Outputs → Basic unit		
BU – Output 1	*Contactor control QE1*	—

Outputs → Operator panel LEDs		
LED green 2	*Display QLE< (on<)*	—
LED green 3	*Display QLE> (on>)*	—
LED green 4	*Display QLA (off)*	—

Outputs → Cyclic send data		
Byte 0, bit 0	**Status – On<**	—
Byte 0, bit 1	**Status - Off**	—
Byte 0, bit 2	**Status – On>**	—
Byte 0, bit 3	**Message – Pre-warning overload**	—
Byte 0, bit 4	**Status – Interlocking time active**	—
Byte 0, bit 5	**Status – Remote mode**	—
Byte 0, bit 6	**Status – General fault**	—
Byte 0, bit 7	**Status - General warning**	—
Byte 1, bit 0	**Status – Positioner runs in Open direction**	—
Byte 1, bit 1	**Status - Test position (TPF)**	—
Byte 1, bit 2	**Status - Positioner runs in Close direction**	—
Byte 1, bit 3	Not connected	Freely assignable
Byte 1, bit 4	Not connected	Freely assignable
Byte 1, bit 5	Not connected	Freely assignable
Byte 1, bit 6	Not connected	Freely assignable
Byte 1, bit 7	Not connected	Freely assignable
Byte 2-3	**Max. current Imax**	—

3.12.2 Function

The block is installed by the user in a cyclic watchdog interrupt OB (e.g. OB32). Parameter inputs IN_01 and IN_23 as well as parameter output O_01 are also interconnected by the user with the relevant icons for inputs or outputs of the associated SIMOCODE pro device.

SMC_POS accesses the data provided by SIMOCODE pro via inputs IN_01 (2 bytes of binary data) and IN_23 (2 bytes of motor current).

Data is transferred to SIMOCODE pro via the output O_01 (2 bytes of binary data).

The configuration of the inputs and outputs is determined here by SIMOCODE pro basic type 2.

Access to the inputs and outputs takes place exclusively via the process image.

The block uses the input parameter MODE to determine whether the inputs IN_01 and IN_23 are valid. In the case of a higher-level fault, all inputs are read by SIMOCODE pro with "0" and output to the relevant outputs of the block.

3.12.3 Assignment of the cyclic process image

Table 3- 48 Assignment of O_01: Output commands to SIMOCODE pro

Bit	Control interface
0.0	Closed
0.1	Stop
0.2	Open
0.3	Test1
0.4	Emergency start
0.5	Local/remote control station
0.6	Reset
0.7	—
1.0 ... 1.7	User-specific outputs

Table 3- 49 Assignment of IN_0: Feedback messages from SIMOCODE pro

Bit	Cyclic send data	Block parameter
0.0	Status – Closed	QCLOSED
0.1	Status – Stop	QSTOP
0.2	Status – Open	QOPENED
0.3	—	—
0.4	Status – Interlocking time active	QLTA
0.5	Status – Remote mode	QREMOTE
0.6	Status - General fault	QGR_ERR
0.7	Status - General warning	QGR_WRN
1.0	Status – Positioner runs in Open direction	QOPENING
1.1	Status - Test position (TPF)	QCST
1.2	Status – Positioner runs in Close direction	QCLOSING
1.3 ... 1.7	—	—

The input parameter IN_01 is additionally copied to the output Q_IN_01.

The motor current is transferred via the input parameter IN_23 as an unsigned 2-byte value. SIMOCODE pro always transfers the current here as a percentage of the set current in a range from 0 to 1000%. The motor current is output via QCUR.

Assignment of bytes 2 / 3 of the analog control interface and bytes 4 to 9 of the cyclic send data when using basic type 1 is described in the following chapter: Assignment of the cyclic process image (Page 35)

3.12.4 Operating modes

Changing the control station (REMOTE, LOCAL)

The control station is changed via the interconnectable function input REM_L if the input REM_SEL is set, or via the function input REM_ON_OP set by the OS.

The function input (REMOP_EN) influences the operator enable (QLOCOP) for operating via the OS.

The operating mode of the control station is output via QREMOTE(1 = REMOTE, 0 = LOCAL). QREMOTE corresponds here to the bit DP 0.5 of the SIMOCODE pro.

In LOCAL mode, the controller is completely switched off via the SMC_POS block. Control is then only possible via a control station connected direct to the SIMOCODE pro. It is still possible to acknowledge the fault.

Changing the operating modes (MANUAL, AUTO) when REMOTE is selected

If QREMOTE = TRUE , changeover between the two operating modes MANUAL and AUTOMATIC takes place either via OS operation using AUT_ON_OP(LIOP_SEL = 0) or via the interconnection of the input AUT_L(LIOP_SEL = 1).

The function inputs (MANOP_EN, AUTOP_EN) influence the operator enables (QMANOP, QAUTOP) for operating via the OS.

The operating mode is output at output QMAN_AUT(1 = AUTO, 0 = MANUAL).

Changing the control station for MANUAL

In REMOTE mode, the operating mode MANUAL can be controlled either via the OS or via the interconnectable function inputs. The changeover for this takes place via the interconnectable function input LINK_MAN.

3.12.5 Control stations for MANUAL and AUTOMATIC mode

General information

The PLC/DP control station of the SIMOCODE pro (that is, DP0.1 and 0.2) is level-active. The open command is stored in the SIMOCODE pro. The close command (DP0.1) takes priority over the open command(DP0.2).

Control of the SIMOCODE pro via AS / OS is only possible in REMOTE mode.

AUTOMATIC

In automatic mode, the SIMOCODE pro control functions are controlled via the interconnectable function inputs AUTO_ON (TRUE = On, FALSE = Stop) and AUTO_OC (TRUE = Open, FALSE = Closed).

Control without non-maintained command mode (JOG_ON = FALSE)

At one edge of the command input, the associated control bit is set in the interface until the SIMOCODE pro sends the relevant feedback message, or a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the automatic interface.

Control with non-maintained command mode (JOG_ON = TRUE)

The corresponding control bit in the interface is set as long as the command input = TRUE or if a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the automatic interface. The Stop command is not necessary for stopping the positioner but is nevertheless set by the block if no open/close command is active.

MANUAL

In manual mode, the SIMOCODE pro is controlled either via the function inputs OPEN_VAL, CLOS_VAL and STOP_VAL set by the OS or via the interconnectable function inputs L_OPEN, L_CLOSE and L_STOP.

The inputs for the operator enables OP_OP_EN / CL_OP_EN / ST_OP_EN set the outputs QOP_OP / QCL_OP / QST_OP for operation using the OS.

At one edge of the command input, the associated control bit is set in the interface until the SIMOCODE pro sends the relevant feedback message, or a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the interconnectable manual interface.

The Stop command takes priority over the Open/Close command (no edge evaluation!).

After changing to manual mode, the commands are not forwarded to the inputs until there is a positive edge change when L_OPEN / L_CLOSE / L_STOP is active.

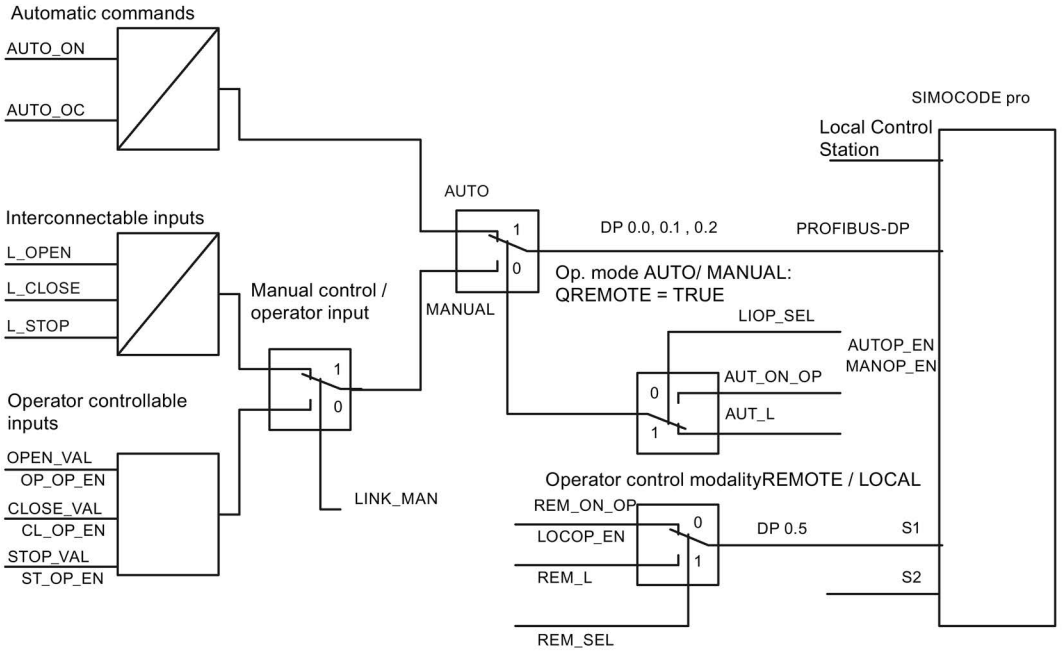
Control without non-maintained command mode (JOG_ON = FALSE)

At one edge of the command input, the associated control bit is set in the interface until the SIMOCODE pro sends the relevant feedback message, or a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the interconnectable inputs. The operator controllable inputs OPEN_VAL, CLOS_VAL and STOP_VAL are adjusted when tripped.

Control with non-maintained command mode (JOG_ON = TRUE)

The corresponding control bit in the interface is set as long as the command input = TRUE or if a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the automatic interface. The Stop command is not necessary for stopping the positioner but is nevertheless set by the block if no Open/Close command is active.

3.12.6 Overview of control stations, operating modes, and operator control modalities



3.12.7 Simulation

The simulation mode is activated using the input SIM_ON and takes priority over all other operating modes. If SIM_ON = TRUE, the block processes the simulation values (SIM_I01: binary data, SIM_I23: motor current) instead of the process values of SIMOCODE pro(IN_01, IN_23). QSIM, QUALITY and QBAD are output accordingly. The process output (O_01) is output with "0" if simulation is active. The command status is combined with the output QSTATUS.

A block must be programmed for the simulation. The output QSTATUS can be evaluated and this information can be used to form the simulation feedback message (SIM_I01, SIM_I23). Assignment corresponds to assignment of the process inputs/process output and can be found in the following chapter: Assignment of the cyclic process image (Page 231)

3.12.8 Interlocking

The locks V_LOCK, VL_CLOS, VL_OPEN and VL_HOLD are only effective in REMOTE mode and are valid in the operating mode MANUAL and AUTO for all control stations of the SMC_POS block.

An active lock input prevents switching and disables control stations for MANUAL and AUTO. The control bit is set permanently.

The input SS_POS (TRUE = Open, FALSE = Closed) corresponds to the safe position and determines control in the case of V_LOCK.

The priorities range from high to low in the following order: V_LOCK → VL_CLOS → CL_OPEN → VL_HOLD

Revoking of the interlock input switches the positioner to the operating mode AUTO corresponding to the control station for AUTO. In MANUAL, the valve is moved to the safe position.

3.12.9 Local Interruption

The output QLOC_INT indicates in REMOTE that operation via the local control station (connected direct to SIMOCODE pro) has changed the current switching state.

QLOC_INT is also set if the switching state requested via REMOTE has not been reached within the monitoring time set using TIME_MON and no general fault has occurred (e.g. due to a higher-priority Close command at the SIMOCODE pro general control station). This monitoring is switched off with TIME_MON = 0 or MONITOR = FALSE.

If QLOC_INT = TRUE, the control outputs are reset.

QLOC_INT is reset via the inputs RESET (operator controllable) / L_RESET (interconnectable). The input RESET is reset after acknowledgment. If L_RESET is active permanently, QLOC_INT is set for the duration of the cycle if the requirements given above are met.

Monitoring is deactivated at initial startup by setting MONITOR = FALSE.

3.12.10 Current and current limit monitoring

Current

The motor current is transferred via the input parameter IN_23 as an unsigned 2-byte value. SIMOCODE pro always transfers the current here as a percentage of the set current in a range from 0 to 1000%.

Current limits

The current limit values are read out from the data set DS130. Reading of the data set is initiated either via the interconnectable input parameter L_RD_DATA, in the OS when selecting the limit value view, or by OS operation (RD_DATA). The output QEN_RDWR is reset during communication.

The data read is output to the in/out parameters Alarm high (CUR_AH), Alarm low (CUR_AL), Warning high (CUR_WH) and Warning low (CUR_WL).

If a fault occurs, the values are set to zero and the output QERR_RD = TRUE is set.

The limit values can also be parameterized in the faceplate. If the values are changed, they are written to SIMOCODE pro.

The signaling response in the case of limit value violations are parameterized with SIMOCODE ES or SIMATIC PDM. Under Monitoring functions → Current limits, the response to trip level/warning level is set for this purpose as follows:

Trip level: disabled or tripping

Warning level: disabled or warning

If a fault occurs when writing, the values are reset to zero and the output QERR_WR = TRUE is set.

Overshooting or undershooting of the limit values results in transmission of the relevant message provided the limit value message has not been completely switched off via the parameter M_SUP_C (default is: switched off). Limit value violation messages are generated in the SIMOCODE pro and evaluated in the block. The outputs QCUR_AH, QCUR_AL, QCUR_WH and QCUR_WL are set accordingly.

Range limits

The range limits for the limit bars are parameterized using the function inputs MO_PVHR and MO_PVLR and can be adjusted in the OS.

3.12.11 Signaling response

Table 3- 50 SMC_POS issues the following messages:

Message block	Message number	Block parameter	Message text	Message class
MSG_EVID1	1	QGR_WRN	$$BlockComment$$ General warning: @4W%t#SMC_Warnings@ @5W%t#SMC_Warnings@ @6W%t#SMC_Warnings@	WH
	2	QGR_ERR	$$BlockComment$$ General fault: @7%t#SMC_Errors@	AH
	3	QCUR_AH	$$BlockComment$$ Current alarm up	AH
	4	QCUR_WH	$$BlockComment$$ Current warning up	WH
	5	QCUR_WL	$$BlockComment$$ Current warning down	WL
	6	QCUR_AL	$$BlockComment$$ Current alarm down	AL
	7	QCST	$$BlockComment$$ Test feedback	WH
	8	MSG_8	Free	—
MSG_EVID2	1	MSG_9	Free	—
	2	MSG_10	Free	—
	3	MSG_11	Free	—
	4	MSG_12	Free	—
	5	MSG_13	Free	—
	6	MSG_14	Free	—
	7	MSG_15	Free	—
	8	MSG_16	Free	—

The free message inputs are not assigned a fixed meaning and can be activated using the parameters MSG_x (x = 4 to 16) on the SMC_POS.

Table 3- 51 The ALARM_8P auxiliary values are assigned as follows:

Message block	Message number	Auxiliary value	Block parameter	Meaning
MSG_EVID1	—	1	BA_NA	Batch name
	—	2	STEP_NO	Batch step number
	—	3	BA_ID	Batch ID
	1	4	WRN_NO1	Warning number 1
		5	WRN_NO2	Warning number 2
	2	6	WRN_NO3	Warning number 3
		7	ERR_NO1	Fault number 1
		8	ERR_NO2	Fault number 2
		9	ERR_NO3	Fault number 3
		10	—	—
MSG_EVID2	—	1	BA_NA	Batch name
	—	2	STEP_NO	Batch step number
	—	3	BA_ID	Batch ID
	—	4	AUX_PR14	Free
	—	5	AUX_PR15	Free
	—	6	AUX_PR16	Free
	—	7	AUX_PR17	Free
	—	8	AUX_PR18	Free
	—	9	AUX_PR19	Free
	—	10	AUX_PR20	Free

The auxiliary values AUX_PR14 … AUX_PR20 are freely available.

The limit value messages can be suppressed via the input M_SUP_C. The default value of the input M_SUP_C is TRUE, that is, message suppression is active.

For the messages General warning and General fault, the diagnostics block SMC_DIAG supplies the detailed information that is interconnected via the structure DIAG_INF to SMC_POS.

General warning (message number 1)

The message General warning is derived from the diagnostics structure DIAG_INF formed by the block SMC_DIAG.

Three auxiliary values are transferred as additional information together with the message General warning. The auxiliary values correspond to the contents of the warning numbers WRN_NO1, WRN_NO2 and WRN_NO3 and contain the first three warning causes found.

The user text library SMC_Warnings is available for the warnings. This contains the precise fault texts and is supplemented dynamically in the message.

General fault (message number 2)

The message General fault is derived from the diagnostics structure DIAG_INF formed by the block SMC_DIAG.

One auxiliary value is transferred as additional information together with the message General fault. The auxiliary value corresponds to the contents of the fault number ERR_NO1 and contains the first fault cause found.

The auxiliary values 8 and 9 are interconnected with the parameters ERR_NO2 and ERR_NO3 and can be appended to the message if required.

The user text library SMC_Errors is available for the faults. This contains the precise error texts and is supplemented dynamically in the message.

Current limit messages (message number 3)

The current limit messages are formed by the SIMOCODE pro and are contained in the diagnostics structure DIAG_INF.

Test feedback (message number 7)

The message Test feedback is derived direct from the SIMOCODE pro information (DP1.1 Send).

Free messages (message number 8 of the message block 1, message numbers 1 to 8 of message block 2)

There is no block-internal assignment to a specific function for these messages. It can be activated via a parameter input (MSG_8 to MSG_16) and can be used, for example, for reporting Local_Interruption, the operating mode SIMULATION, or any other signal.

3.12.12 Reset response

In principle, every fault detected by SIMOCODE pro must be acknowledged. This is done via the bit DP 0.6 Recv. Reset is only carried out by SIMOCODE pro if there is no active Open/Close command. Reset either resets the General fault (QGR_ERR) if the cause of the fault no longer exists, or it results in acknowledgment of the fault if the cause of the fault still exists. An acknowledged fault automatically results in resetting of the general fault following removal of the fault cause.

Reset can be carried out either via the interconnectable function input L_SMCRESET or via the OS operator controllable function input SMCRESET.

L_SMCRESET is level-active. SMCRESET is reset by the block following evaluation.

The reset function is transparent from the block's perspective, that is, there is no logical combination with other signals, and independent of the operating mode (LOCAL / REMOTE).

With this control function, faults are also acknowledged by the Stop command or they can be reset only by a counter-command (Stalled positioner fault, End position fault). With these faults, the counter-command must be sent for fault acknowledgment, for example, in manual mode or via the local control station. The same applies for external faults that have been parameterized in such a way that they can only be acknowledged using an OFF command.

3.12.13 Start-up characteristics

At CPU startup, the block is switched to manual mode and the Stop command is output. For this purpose, the block must be called from the startup OB. After startup, the messages are suppressed for the number of cycles parameterized in the RUNUPCYC value.

3.12.14 Time response

The block must be called via a watchdog interrupt OB. The sampling time of the block is entered in the parameter SAMPLE_T.

3.12.15 SMC_POS block parameters

Element	Type	Kind	Meaning	HMI
AUT_L	BOOL	I	Interconnectable input for MAN / AUTO (0 = Manual / 1 = Auto)	N
AUT_ON_OP	BOOL	IO	Control input: 0 = Manual, 1 = Auto	Y
AUTO_OC	BOOL	I	Automatic value: 1 = Open, 0 = Closed	N
AUTO_ON	BOOL	I	Automatic value: 1 = On, 0 = Off	N
AUTOP_EN	BOOL	I	1 = Operator enable for Auto	N
AUX_PRxx	ANY	IO	Auxiliary value x (x = 11 to 20)	N
BA_EN	BOOL	I	BATCH record release	Y
BA_ID	DWORD	I	BATCH: Consecutive batch number	Y
BA_NA	STRING [32]	I	BATCH designation	Y
CL_OP_EN	BOOL	I	1 = Operator enable for CLOSED	N
CLOS_VAL	BOOL	IO	Control input: 1 = Positioner CLOSED	Y
CST	BOOL	I	1 = Test mode	N
CUR_AH	REAL	IO	Upper alarm limit current	Y
CUR_AL	REAL	IO	Lower alarm limit current	Y
CUR_WH	REAL	IO	Upper warning limit current	Y
CUR_WL	REAL	IO	Lower warning limit current	Y
DD_17_20	DWORD	O	DS 92 Byte 17 to 20: General warning additional info 1	Y
DD_21_22	WORD	O	DS 92 Byte 21 to 22: General warning additional info 2	Y
DD_24_27	DWORD	O	DS 92 Byte 24 to 27: General fault additional info 1	Y
DD_28_31	DWORD	O	DS 92 Byte 28 to 31: General fault additional info 2	Y
DIAG_INF	UDT_ DIAG	I	Diagnostics structure of SMC_DIAG	N
EM_START	BOOL	I	1 = Emergency start	Y
EN_MEAS	BOOL	I	1 = Measured value block available	Y
EN_RDWR	BOOL	I	1 = Enable reading/writing of data set	N
EN_STAT	BOOL	I	1 = Statistics block available	Y
ERR_NOx	INT	O	Fault number x (x = 1 to 6)	Y
I1_x	BOOL	I	User-defined outputs DP1.x (x = 0 to 7)	N

Element	Type	Kind	Meaning	HMI
IN_01	WORD	I	Inputs DP0.0 to 1.7	N
IN_23	WORD	I	Input motor current	N
JOG_ON	BOOL	I	1 = Non-maintained command mode active	N
L_CLOSE	BOOL	I	Manual control: 1 = Closed	N
L_OPEN	BOOL	I	Manual control: 1 = Open	N
L_RD_DATA	BOOL	I	Interconnectable input 0 → 1: Reading of the data set	N
L_RESET	BOOL	I	Configurable input for resetting QLOC_INT	N
L_SMCRESET	BOOL	I	Interconnectable input for resetting	N
L_STOP	BOOL	I	Manual control: 1 = Stop	N
LADDR	INT	I	Start address of the inputs	N
LINK_MAN	BOOL	I	0 = Operator input active, 1 = Manual control via interconnectable inputs	N
LIOP_SEL	BOOL	I	Interconnectable input for manual/auto changeover (AUT_L): 1 = Interconnection is active, 0 = Operation is active	N
LOCOP_EN	BOOL	I	1 = Operator enable for LOCAL	N
M_SUP_C	BOOL	I	1 = Message suppression active for current limit value violations	Y
MANOP_EN	BOOL	I	1 = Operator enable for Manual	N
MO_PVHR	REAL	I	Bar upper limit	Y
MO_PVLR	REAL	I	Bar lower limit	Y
MODE	DWORD	I	Mode of OMODE of the SMC_DIAG	N
MONITOR	BOOL	I	Monitoring: 1 = ON	Y
MSG_ACK1	WORD	O	Messages acknowledged Alarm 8p block 1	N
MSG_ACK2	WORD	O	Messages acknowledged Alarm 8p block 2	N
MSG_EVID1	DWORD	I	Event ID of the Alarm 8p block 1	N
MSG_EVID2	DWORD	I	Event ID of the Alarm 8p block 2	N
MSG_STAT1	WORD	O	MESSAGE 1: STATUS output	N
MSG_STAT2	WORD	O	MESSAGE 2: STATUS output	N
MSG_x	BOOL	I	Free message input x (x = 8 to 16)	N
O_01	WORD	O	Outputs DP0.0 to 1.7	N
OCCUPIED	BOOL	I	BATCH record ID	Y
OOS	BOOL	I	Reserve	Y
OP_OP_EN	BOOL	I	1 = Operator enable for OPEN	N
OPEN_VAL	BOOL	IO	Control input: 1 = Positioner OPEN	Y
Q_IN_01	WORD	O	Inputs DP0.0 to 1.7	N
QAUTOP	BOOL	O	1 = Operator enable for Auto	Y
QBAD	BOOL	O	1 = Invalid process value	Y
QBUS_PLC	BOOL	O	Bus/PLC fault	Y
QCL_OP	BOOL	O	1 = Operator enable for CLOSED	Y
QCLOSED	BOOL	O	Status: 1 = Positioner CLOSED (DP0.1)	Y
QCLOSING	BOOL	O	1 = Positioner closing (DP1.2)	Y
QCST	BOOL	O	1 = Test active (DP1.1)	Y
QCUR	REAL	O	Motor current % Ie	Y
QCUR_AH	BOOL	O	Upper alarm limit current violated	N
QCUR_AL	BOOL	O	Lower alarm limit current violated	N

Element	Type	Kind	Meaning	HMI
QCUR_WH	BOOL	O	Upper warning limit current violated	N
QCUR_WL	BOOL	O	Lower warning limit current violated	N
QEM_STRT	BOOL	O	1 = Emergency start active	N
QEN_RDWR	BOOL	O	1 = Enable reading/writing of data set	N
QERR	BOOL	O	1 = Program error	N
QERR_RD	BOOL	O	1 = Error while reading the data set	N
QERR_WR	BOOL	O	1 = Error while writing the data set	N
QFLT_F9	BOOL	O	Fault F9	Y
QGR_ERR	BOOL	O	General fault (DP0.6)	N
QGR_WRN	BOOL	O	General warning (DP0.7)	N
QLOC_INT	BOOL	O	1 = Local interruption	Y
QLOCOP	BOOL	O	1 = Operator enable for LOCAL / REMOTE	Y
QLTA	BOOL	O	1 = Interlocking time active (DP0.4)	Y
QMAN_AUT	BOOL	O	0 = Manual, 1 = Automatic	Y
QMANOP	BOOL	O	1 = Operator enable for Manual	Y
QMSG_ERR	BOOL	O	1 = ALARM8_P Error	N
QMSG_SUP	BOOL	O	1 = Message suppression	Y
QOP_ERR	BOOL	O	1 = General operator error	N
QOP_OP	BOOL	O	1 = Operator enable for OPEN	Y
QOPENED	BOOL	O	Status: 1 = Positioner OPEN (DP0.2)	Y
QOPENING	BOOL	O	1 = Positioner opening (DP1.0)	Y
QPARFF16	BOOL	O	Parameter error F16	Y
QRD_STAT	WORD	O	Return value of the SFB RDREC	N
QRDWR_OP	BOOL	O	1 = Operator enable Read/write data set	Y
QREMOTE	BOOL	O	1 = REMOTE mode (DP0.5)	Y
QSIM	BOOL	O	1 = Simulation active	Y
QST_OP	BOOL	O	1 = Operator enable for STOP	Y
QSTATUS	WORD	O	Command status (outputs DP0.0 to 1.7)	N
QUALITY	BYTE	O	Quality code	N
QWR_STAT	WORD	O	Return value of the SFB WRREC	N
RACKF	BOOL	I	1 = Rack fault	N
RD_DATA	BOOL	IO	0 → 1: Reading of the data set	Y
REM_L	BOOL	I	Interconnectable input for LOCAL / REMOTE (0 = LOCAL / 1 = REMOTE)	N
REM_ON_OP	BOOL	IO	Control input: 0 = LOCAL, 1 = REMOTE	Y
REM_SEL	BOOL	I	Interconnectable input for LOCAL / REMOTE changeover (REM_L): 1 = Interconnection is active, 0 = Operation is active	N
RESET	BOOL	IO	Control input for resetting QLOC_INT	N
RUNUPCYC	INT	I	Number of initial run cycles after CPU restart	N
SAMPLE_T	REAL	I	Sampling time in [s]	N
SIM_I01	WORD	I	Simulation value IN_01	N
SIM_I23	WORD	I	Simulation value IN_23	N
SIM_ON	BOOL	I	1 = Simulation	Y
SMCRESET	BOOL	IO	Operator controllable reset input for faults	Y

Element	Type	Kind	Meaning	HMI
SS_POS	BOOL	I	Idle position: 0 = Closed (Type C) 1 = Open (Type O)	Y
ST_OP_EN	BOOL	I	1 = Operator enable for STOP	N
STEP_NO	DWORD	I	Batch step number	Y
STOP_VAL	BOOL	IO	Control input: 1 = Positioner STOP	Y
TIME_MON	REAL	I	Monitoring time in [s]	Y
USTATUS	WORD	I	Status word in VSTATUS, freely user-assignable	N
V_LOCK	BOOL	I	1 = Lock (SS_POS)	Y
VL_CLOS	BOOL	I	1 = Lock (OFF)	Y
VL_HOLD	BOOL	I	1 = Lock (HOLD)	Y
VL_OPEN	BOOL	I	1 = Lock (OPEN)	Y
VSTATUS	DWORD	O	Status for status displays for block icon	Y
WRN_NOx	INT	O	Warning number x (x = 1 to 6)	Y

Table 3- 52 Structure of VSTATUS

Bit	Parameter
0	OCCUPIED
1	BA_EN
2	QSIM
3	QMAN_AUT
4	QCST
5	QGR_ERR
6	QGR_WRN
7	QLOC_INT
8	V_LOCK / VL_CLOS / VL_OPEN / VL_HOLD
9	QOPENED
10	QSTOP
11	QCLOSED
12	—
13	QOPENING
14	QCLOSING
15	—
16 ... 31	USTATUS

3.12.16 Status displays for icons

Status	Parameter	View
Stop	QCLOSED = 0 QOPENED = 0 QCLOSING = 0 QOPENING = 0	
Closed	QCLOSED = 1	
Open	QOPENED = 1	
Close	QCLOSING = 1	  Flashes
Open	QOPENING = 1	  Flashes
Not available	QBAD = 1	

3.12.17 Description of the faceplate

The available faceplates are described in this chapter.

The following views are available:

Overview	OVERVIEW
Standard	STANDARD
Limits	LIMITS
Maintenance	MAINTENANCE
Faults	MESSAGE1
Warnings	MESSAGE2
Messages	—
Trend	—
Batch	—

The file name is composed as follows: @PG_SMC_POS_<View>.PDL

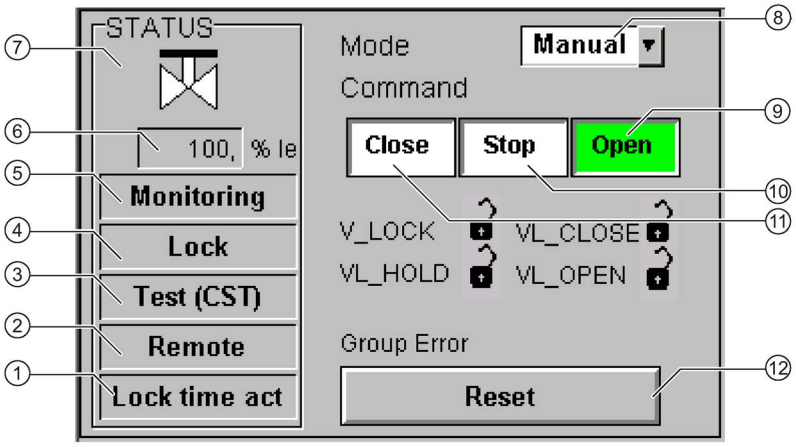
The PCS 7 standard displays are used for the message, trend and batch views.

The structure of the individual views of faceplates is described below.

Standard (STANDARD)

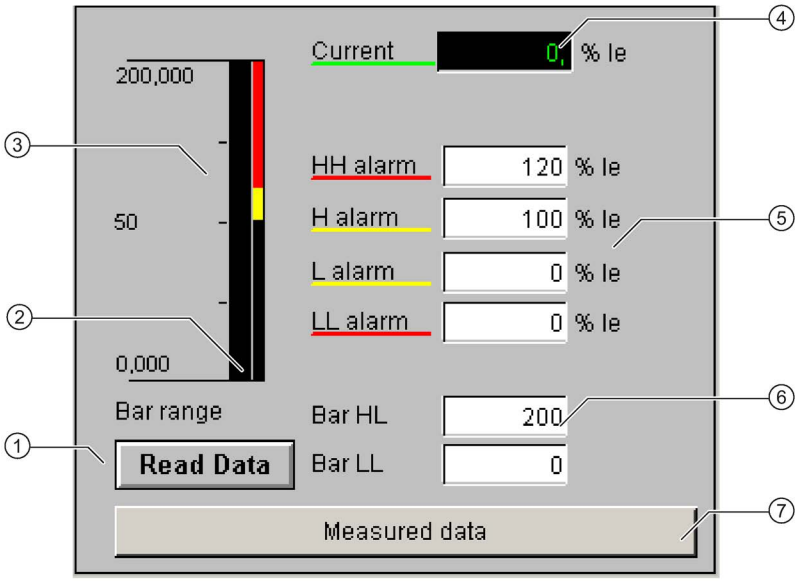
Status

The status display is a user object comprising several status displays. The status display corresponds to the representation from the process image icon.



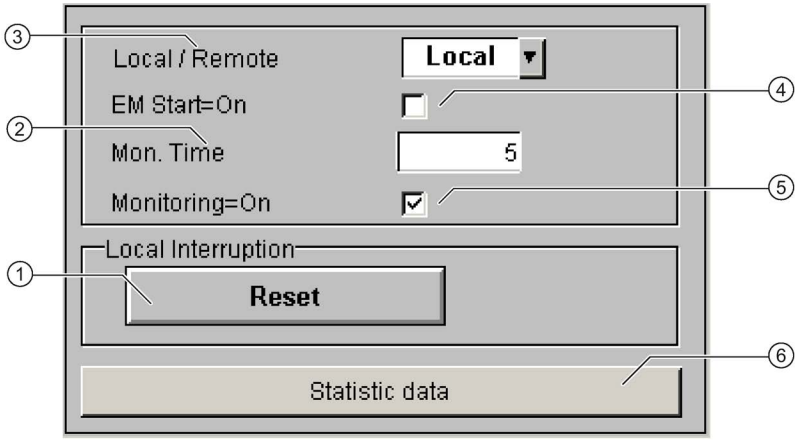
① Interlocking time (QLTA)
② Operator control modality (QREMOTE)
③ Test (QCST)
④ Interlocking (V_LOCK, VL_OPEN, VL_CLOSE, VL_HOLD)
⑤ Local Interruption (QLOC_INT)
⑥ Current (QCUR)/ unit (QCUR#unit)
⑦ Status display (VSTATUS)
⑧ Operating mode (QMAN_AUT, AUT_ON_OP)
⑨ Open command (OPEN_VAL)
⑩ Stop command (STOP_VAL)
⑪ Close command (CLOSE_VAL)
⑫ Acknowledgement (RESET)

Limits (LIMITS)



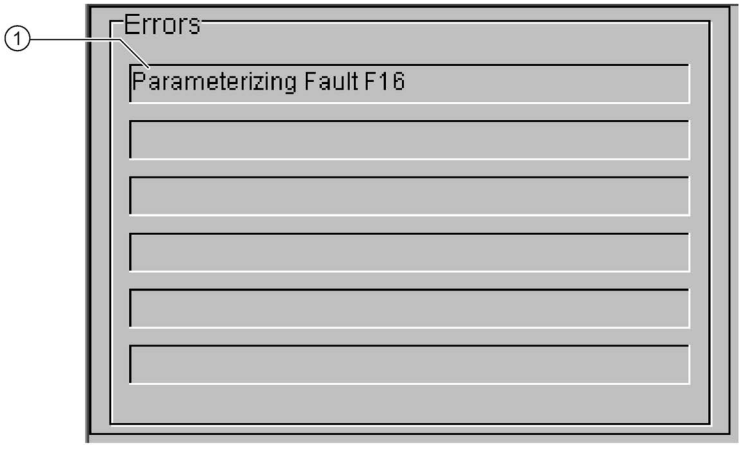
① Read Data (RD_DATA)
② Limit value display (CUR_AH, CUR_WH, CUR_WL, CUR_AL)
③ Actual value bar (QCUR, MO_PVHR, MO_PVLR)
④ Current value (QCUR, QCUR#unit)
⑤ Limits (CUR_AH, CUR_WH, CUR_WL, CUR_AL)
⑥ Bar range (MO_PVHR, MO_PVLR)
⑦ Call faceplate SMC_MEAS, visible if EN_MEAS = TRUE

Maintenance (MAINTENANCE)



① Acknowledge Local Interruption (RESET)
② Monitoring time for Local Interruption (TIME_MON)
③ Operator control modality Local / Remote (REM_ON_OP)
④ Activation Emergency Start (EM_START)
⑤ Activation Monitoring (MONITOR)
⑥ Call faceplate SMC_STAT, visible if EN_STAT = TRUE

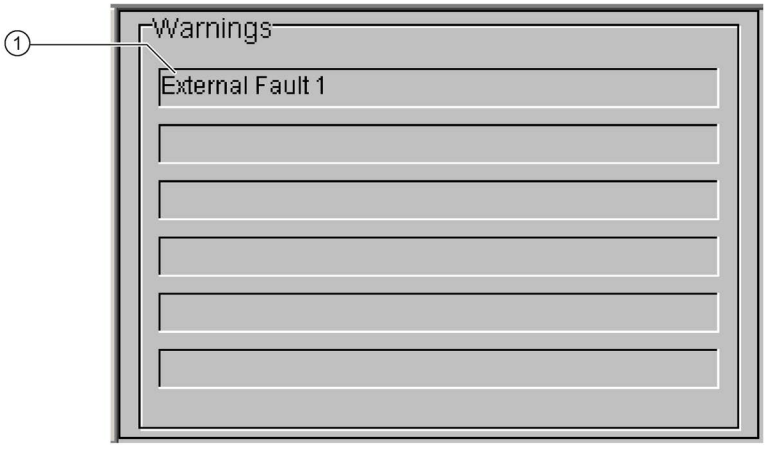
Faults (MESSAGE1)



① Text list with error description (ERR_NOx)

For error number 0, the text field is switched to invisible.

Warnings (MESSAGE2)



① Text list with error description (WRN_NOx)

For error number 0, the text field is switched to invisible.

3.13 SMC_OVL: Signal processing block for overload relay control function

FB2012

Calling OBs

The watchdog interrupt OB in which you install the block (e.g. OB32). Also in OB100 (see start-up characteristics).

Called blocks

The block calls the following blocks:

SFB35	ALARM_8P
SFB52	RDREC
SFB53	WRREC
SFC6	RD_SINFO
SFC20	BLKMOV
SFC21	FILL

3.13.1 Calling OBs

The watchdog interrupt OB in which you install the block (e.g. OB32). Also in OB100 (see start-up characteristics).

3.13.2 Called blocks

The block calls the following blocks:

SFB35	ALARM_8P
SFB52	RDREC
SFB53	WRREC
SFC6	RD_SINFO
SFC20	BLKMOV
SFC21	FILL

3.13.3 Parameter assignment in SIMOCODE ES

For the signal blocks to function correctly, a range of SIMOCODE pro parameters must have quite specific settings. Those parameters that define the assignment of the cyclic I/O interface are especially affected.

These parameters are represented in **bold**.

In addition, the overview below represents the parameters that are already preset for the control function in the templates for application selection in the SIMOCODE ES software. The settings are suggestions and depend heavily on the actual wiring of the SIMOCODE pro inputs and outputs.

These parameters are represented in *italics*.

Other parameters must also be set, e.g. for motor protection. These are not described here. Parameter assignment for the extended I/O interface of basic type 1 is represented in the following chapter: Parameter assignment in SIMOCODE ES (Page 33)

Motor control → Control function → Auxiliary control inputs		
Feedback ON	**Status - Motor current flowing**	—

Outputs → Basic unit		
BU – Output 3	**Contactor control 3 QE3**	—

Outputs → Cyclic send data		
Byte 0, bit 0	**Not connected**	—
Byte 0, bit 1	**Not connected**	—
Byte 0, bit 2	**Not connected**	—
Byte 0, bit 3	**Message – Pre-warning overload**	—
Byte 0, bit 4	**Not connected**	—
Byte 0, bit 5	**Not connected**	—
Byte 0, bit 6	**Status – General fault**	—
Byte 0, bit 7	**Status - General warning**	—
Byte 1, Bit 0-7	Not connected	Freely assignable
Byte 2-3	**Max. current Imax**	—

3.13.4 Function

The block is installed by the user in a cyclic watchdog interrupt OB (e.g. OB32). Parameter inputs IN_01 and IN_23 as well as parameter output O_01 are also interconnected by the user with the relevant icons for inputs or outputs of the associated SIMOCODE pro device.

SMC_OVL accesses the data provided by SIMOCODE pro via inputs IN_01 (2 bytes of binary data) and IN_23 (2 bytes of motor current).

Data is transferred to SIMOCODE pro via the output O_01 (2 bytes of binary data).

The configuration of the inputs and outputs is determined here by SIMOCODE pro basic type 2.

Access to the inputs and outputs takes place exclusively via the process image.

The block uses the input parameter MODE to determine whether the inputs IN_01 and IN_23 are valid. In the case of a higher-level fault, all inputs are read by SIMOCODE pro with "0" and output to the relevant outputs of the block.

3.13.5 Assignment of the cyclic process image

Table 3- 53 Assignment of O_01: Output commands to SIMOCODE pro

Bit	Control interface
0.0	—
0.1	—
0.2	—
0.3	Test 1
0.4	Emergency start
0.5	—
0.6	Reset
0.7	—
1.0 – 1.7	User-specific outputs

Table 3- 54 Assignment of IN_0: Feedback messages from SIMOCODE pro

Bit	Cyclic send data	Block parameter
0.0	—	—
0.1	—	—
0.2	—	—
0.3	Message – Pre-warning overload	QOVL
0.4	—	—
0.5	—	—
0.6	Status - General fault	QGR_ERR
0.7	Status - General warning	QGR_WRN
1.0	—	—
1.1	Status - Test position (TPF)	QCST
1.2 - 1.7	—	—

The input parameter IN_01 is additionally copied to the output Q_IN_01.

The motor current is transferred via the input parameter IN_23 as an unsigned 2-byte value. SIMOCODE pro always transfers the current here as a percentage of the set current in a range from 0 to 1000%. The motor current is output via QCUR.

Assignment of bytes 2 / 3 of the analog control interface and bytes 4 to 9 of the cyclic send data when using basic type 1 is described in the following chapter: Assignment of the cyclic process image (Page 35)

3.13.6 Simulation

The simulation mode is activated using the input SIM_ON and takes priority over all other operating modes. If SIM_ON = TRUE, the block processes the simulation values (SIM_I01: binary data, SIM_I23: motor current) instead of the process values of SIMOCODE pro(IN_01, IN_23). QSIM, QUALITY and QBAD are output accordingly. The process output (O_01) is output with "0" if simulation is active. The command status is combined with the output QSTATUS.

A block must be programmed for the simulation. The output QSTATUS can be evaluated and this information can be used to form the simulation feedback message (SIM_I01, SIM_I23). Assignment corresponds to assignment of the process inputs/process output and can be found in the following chapter: Assignment of the cyclic process image (Page 252)

3.13.7 Current and current limit monitoring

Current

The motor current is transferred via the input parameter IN_23 as an unsigned 2-byte value. SIMOCODE pro always transfers the current here as a percentage of the set current in a range from 0 to 1000%.

Current limits

The current limit values are read out from the data set DS130. Reading of the data set is initiated either via the interconnectable input parameter L_RD_DATA, in the OS when selecting the limit value view, or by OS operation (RD_DATA). The output QEN_RDWR is reset during communication.

The data read is output to the in/out parameters Alarm high (CUR_AH), Alarm low (CUR_AL), Warning high (CUR_WH) and Warning low (CUR_WL).

If a fault occurs, the values are set to zero and the output QERR_RD = TRUE is set.

The limit values can also be parameterized in the faceplate. If the values are changed, they are written to SIMOCODE pro.

The signaling response in the case of limit value violations are parameterized with SIMOCODE ES or SIMATIC PDM. Under Monitoring functions → Current limits, the response to trip level/warning level is set for this purpose as follows:

Trip level: disabled or tripping

Warning level: disabled or warning

If a fault occurs when writing, the values are reset to zero and the output QERR_WR = TRUE is set.

Overshooting or undershooting of the limit values results in transmission of the relevant message provided the limit value message has not been completely switched off via the parameter M_SUP_C (default is: switched off). Limit value violation messages are generated in the SIMOCODE pro and evaluated in the block. The outputs QCUR_AH, QCUR_AL, QCUR_WH and QCUR_WL are set accordingly.

Range limits

The range limits for the limit bars are parameterized using the function inputs MO_PVHR and MO_PVLR and can be adjusted in the OS.

3.13.8 Signaling response

Table 3- 55 SMC_OVL issues the following messages:

Message block	Message number	Block parameter	Message text	Message class
MSG_EVID1	1	QGR_WRN	$$BlockComment$$ General warning: @4W%t#SMC_Warnings@ @5W%t#SMC_Warnings@ @6W%t#SMC_Warnings@	WH
	2	QGR_ERR	$$BlockComment$$ General fault: @7%t#SMC_Errors@	AH
	3	QCUR_AH	$$BlockComment$$ Current alarm up	AH
	4	QCUR_WH	$$BlockComment$$ Current warning up	WH
	5	QCUR_WL	$$BlockComment$$ Current warning down	WL
	6	QCUR_AL	$$BlockComment$$ Current alarm down	AL
	7	QCST	$$BlockComment$$ Test feedback	WH
	8	MSG_8	Free	—
MSG_EVID2	1	MSG_9	Free	—
	2	MSG_10	Free	—
	3	MSG_11	Free	—
	4	MSG_12	Free	—
	5	MSG_13	Free	—
	6	MSG_14	Free	—
	7	MSG_15	Free	—
	8	MSG_16	Free	—

The free message inputs are not assigned a fixed meaning and can be activated using the parameters MSG_x (x = 4 to 16) on the SMC_OVL.

Table 3- 56 The ALARM_8P auxiliary values are assigned as follows:

Message block	Message number	Auxiliary value	Block parameter	Meaning
MSG_EVID1	—	1	BA_NA	Batch name
	—	2	STEP_NO	Batch step number
	—	3	BA_ID	Batch ID
	1	4	WRN_NO1	Warning number 1
		5	WRN_NO2	Warning number 2
	2	6	WRN_NO3	Warning number 3
		7	ERR_NO1	Fault number 1
		8	ERR_NO2	Fault number 2
		9	ERR_NO3	Fault number 3
		10	—	—
MSG_EVID2	—	1	BA_NA	Batch name
	—	2	STEP_NO	Batch step number
	—	3	BA_ID	Batch ID
	—	4	AUX_PR14	Free
	—	5	AUX_PR15	Free
	—	6	AUX_PR16	Free
	—	7	AUX_PR17	Free
	—	8	AUX_PR18	Free
	—	9	AUX_PR19	Free
	—	10	AUX_PR20	Free

The auxiliary values AUX_PR14 … AUX_PR20 are freely available.

The limit value messages can be suppressed via the input M_SUP_C . The default value of the input M_SUP_C is TRUE, that is, message suppression is active.

For the messages General warning and General fault, the diagnostics block SMC_DIAG supplies the detailed information that is interconnected via the structure DIAG_INF to SMC_OVL.

General warning (message number 1)

The message General warning is derived from the diagnostics structure DIAG_INF formed by the block SMC_DIAG.

Three auxiliary values are transferred as additional information together with the message General warning. The auxiliary values correspond to the contents of the warning numbers WRN_NO1, WRN_NO2 and WRN_NO3 and contain the first three warning causes found.

The user text library SMC_Warnings is available for the warnings. This contains the precise fault texts and is supplemented dynamically in the message.

General fault (message number 2)

The message General fault is derived from the diagnostics structure DIAG_INF formed by the block SMC_DIAG.

One auxiliary value is transferred as additional information together with the message General fault. The auxiliary value corresponds to the contents of the fault number ERR_NO1 and contains the first fault cause found.

The auxiliary values 8 and 9 are interconnected with the parameters ERR_NO2 and ERR_NO3 and can be appended to the message if required.

The user text library SMC_Errors is available for the faults. This contains the precise error texts and is supplemented dynamically in the message.

Current limit messages (message number 3-6)

The current limit messages are formed by the SIMOCODE pro and are contained in the diagnostics structure DIAG_INF .

Test feedback (message number 7)

The message Test feedback is derived direct from the SIMOCODE pro information (DP1.1 Send).

Free messages (message number 7 to 8 of message block 1, message numbers 1 to 8 of message block 2)

There is no block-internal assignment to a specific function for these messages. It can be activated via a parameter input (MSG_7 ... MSG_16) and can be used, for example, for reporting Local_Interruption, the operating mode SIMULATION, or any other signal.

3.13.9 Reset response

In principle, every fault detected by SIMOCODE pro must be acknowledged. This is done via the bit DP 0.6 Recv. Reset either resets the General fault (QGR_ERR) if the cause of the fault no longer exists, or it results in acknowledgment of the fault if the cause of the fault still exists. An acknowledged fault automatically results in resetting of the general fault following removal of the fault cause.

Reset can be carried out either via the interconnectable function input L_SMCRESET or via the OS operator controllable function input SMCRESET.

L_SMCRESET is level-active. SMCRESET is reset by the block following evaluation.

3.13.10 Start-up characteristics

After startup, the messages are suppressed for the number of cycles parameterized in the RUNUPCYC value.

3.13.11 Time response

The block must be called via a watchdog interrupt OB. The sampling time of the block is entered in the parameter SAMPLE_T.

3.13.12 SMC_OVL block parameters

Element	Type	Kind	Meaning	HMI
AUX_PRxx	ANY	IO	Auxiliary value x (x = 11 to 20)	N
BA_EN	BOOL	I	BATCH record release	Y
BA_ID	DWORD	I	BATCH: Consecutive batch number	Y
BA_NA	STRING [32]	I	BATCH designation	Y
CST	BOOL	I	1 = Test mode	N
CUR_AH	REAL	IO	Upper alarm limit current	Y
CUR_AL	REAL	IO	Lower alarm limit current	Y
CUR_WH	REAL	IO	Upper warning limit current	Y
CUR_WL	REAL	IO	Lower warning limit current	Y
DD_17_20	DWORD	O	DS 92 Byte 17 to 20: General warning additional info 1	Y
DD_21_22	WORD	O	DS 92 Byte 21 to 22: General warning additional info 2	Y
DD_24_27	DWORD	O	DS 92 Byte 24 to 27: General fault additional info 1	Y
DD_28_31	DWORD	O	DS 92 Byte 28 to 31: General fault additional info 2	Y
DIAG_INF	UDT_ DIAG	I	Diagnostics structure of SMC_DIAG	N
EN_MEAS	BOOL	I	1 = Measured value block available	Y
EN_RDWR	BOOL	I	1 = Enable reading/writing of data set	N
EN_STAT	BOOL	I	1 = Statistics block available	Y
ERR_NOx	INT	O	Fault number x (x = 1 to 6)	Y
I1_x	BOOL	I	User-defined outputs DP1.x (x = 0 to 7)	N
IN_01	WORD	I	Inputs DP0.0 to 1.7	N
IN_23	WORD	I	Input motor current	N
L_RD_DATA	BOOL	I	Interconnectable input 0 → 1: Reading of the data set	N
L_SMCRESET	BOOL	I	Interconnectable input for resetting	N
LADDR	INT	I	Start address of the inputs	N
M_SUP_C	BOOL	I	1 = Message suppression active for current limit value violations	Y
MO_PVHR	REAL	I	Bar upper limit	Y
MO_PVLR	REAL	I	Bar lower limit	Y
MODE	DWORD	I	Mode of OMODE of the SMC_DIAG	N
MSG_ACK1	WORD	O	Messages acknowledged Alarm 8p block 1	N
MSG_ACK2	WORD	O	Messages acknowledged Alarm 8p block 2	N
MSG_EVID1	DWORD	I	Event ID of the Alarm 8p block 1	N
MSG_EVID2	DWORD	I	Event ID of the Alarm 8p block 2	N
MSG_STAT1	WORD	O	MESSAGE 1: STATUS output	N
MSG_STAT2	WORD	O	MESSAGE 2: STATUS output	N
MSG_x	BOOL	I	Free message input x (x = 8 to 16)	N
O_01	WORD	O	Outputs DP0.0 to 1.7	N
OCCUPIED	BOOL	I	BATCH record ID	Y
OOS	BOOL	I	Reserve	N

Element	Type	Kind	Meaning	HMI
Q_IN_01	WORD	O	Inputs DP0.0 to 1.7	N
QBAD	BOOL	O	1 = Invalid process value	Y
QBUS_PLC	BOOL	O	Bus/PLC fault	Y
QCST	BOOL	O	1 = Test active (DP1.1)	Y
QCUR	REAL	O	Current in % e	Y
QCUR_AH	BOOL	O	Upper alarm limit current violated	N
QCUR_AL	BOOL	O	Lower alarm limit current violated	N
QCUR_WH	BOOL	O	Upper warning limit current violated	N
QCUR_WL	BOOL	O	Lower warning limit current violated	N
QEN_RDWR	BOOL	O	1 = Enable reading/writing of data set	N
QERR	BOOL	O	1 = Program error	N
QERR_RD	BOOL	O	1 = Error while reading the data set	N
QERR_WR	BOOL	O	1 = Error while writing the data set	N
QFLT_F9	BOOL	O	Fault F9	Y
QGR_ERR	BOOL	O	General fault (DP0.6)	Y
QGR_WRN	BOOL	O	General warning (DP0.7)	N
QMSG_ERR	BOOL	O	1 = ALARM8_P Error	N
QMSG_SUP	BOOL	O	1 = Message suppression	Y
QPARFF16	BOOL	O	Parameter error F16	Y
QRD_STAT	WORD	O	Return value of the SFB RDREC	N
QRDWR_OP	BOOL	O	1 = Operator enable Read/write data set	Y
QSIM	BOOL	O	1 = Simulation active	Y
QSTATUS	WORD	O	Command status (outputs DP0.0 to 1.7)	N
QUALITY	BYTE	O	Quality code	N
QWR_STAT	WORD	O	Return value of the SFB WRREC	N
RACKF	BOOL	I	1 = Rack fault	N
RD_DATA	BOOL	IO	0 → 1: Reading of the data set	Y
RUNUPCYC	INT	I	Number of initial run cycles after CPU restart	N
SAMPLE_T	REAL	I	Sampling time in [s]	N
SIM_I01	WORD	I	Simulation value IN_01	N
SIM_I23	WORD	I	Simulation value IN_23	N
SIM_ON	BOOL	I	1 = Simulation	Y
SMCRESET	BOOL	IO	Operator controllable reset input for faults	Y
STEP_NO	DWORD	I	Batch step number	Y
TIME_MON	REAL	I	Monitoring time in [s]	Y
USTATUS	WORD	I	Status word in VSTATUS, freely user-assignable	N
VSTATUS	DWORD	O	Status for status displays for block icon	Y
WRN_NOx	INT	O	Warning number x (x = 1 to 6)	Y

Table 3- 57 Structure of VSTATUS

Bit	Parameter
0	OCCUPIED
1	BA_EN
2	QSIM
3	—
4	QCST
5	QGR_ERR
6	QGR_WRN
7	—
8	—
9	—
10	—
11	—
12	—
13	—
14	—
15	—
16 ... 31	USTATUS

3.13.13 Status displays for icons

Status	Parameter	View
Fault	QGR_ERR = 1	
OK	QGR_ERR = 0	
Not available	QBAD = 1	

3.13.14 Description of the faceplate

The available faceplates are described in this chapter.

The following views are available:

Overview	OVERVIEW
Standard	STANDARD
Limits	LIMITS
Faults	MESSAGE1
Warnings	MESSAGE2
Messages	—
Trend	—
Batch	—

The file name is composed as follows: @PG_SMC_OVL_<View>.PDL

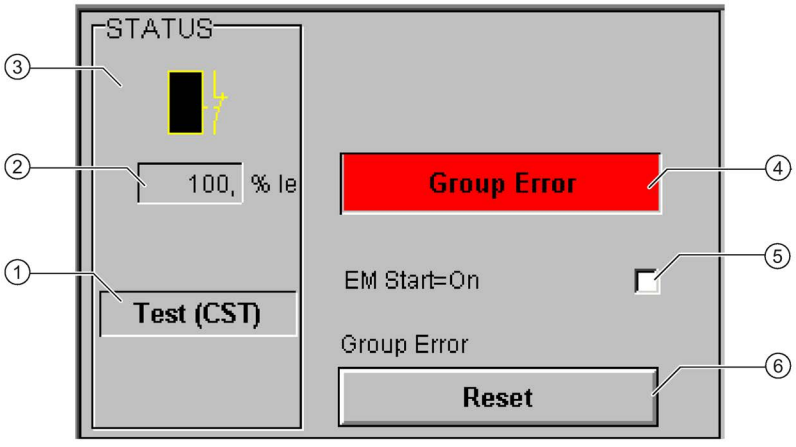
The PCS 7 standard displays are used for the message, trend and batch views.

The structure of the individual views of faceplates is described below.

Standard (STANDARD)

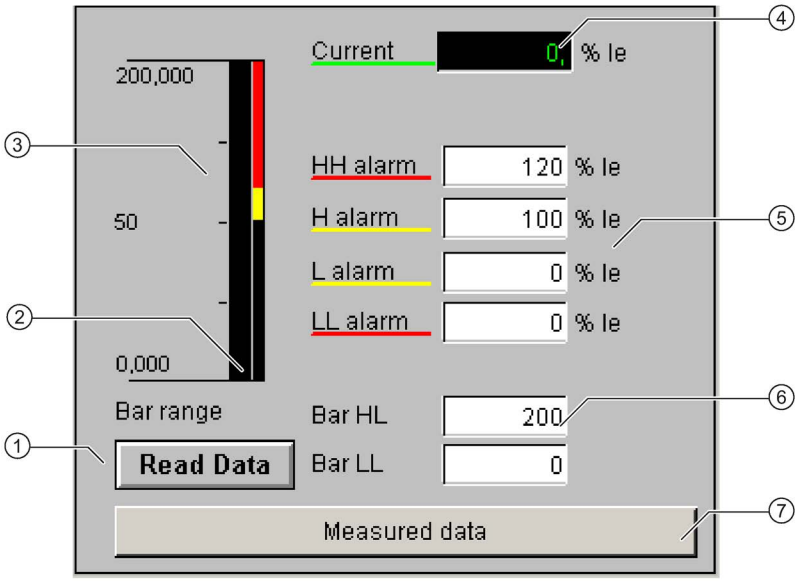
Status

The status display is a user object comprising several status displays. The status display corresponds to the representation from the process image icon.



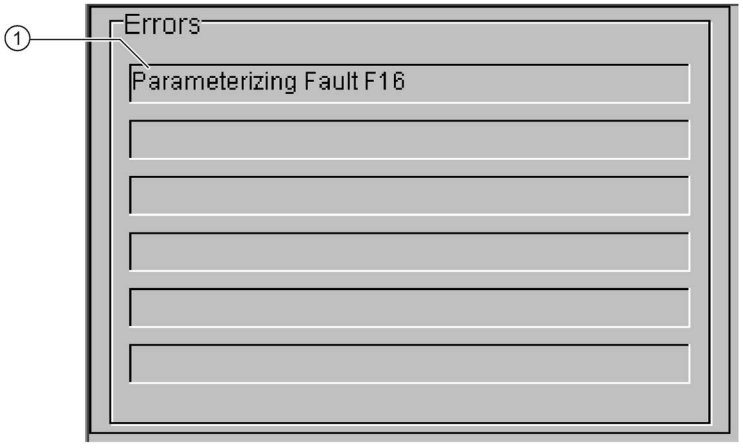
① Test (QCST)
② Current (QCUR)/ unit (QCUR#unit)
③ Status display (VSTATUS)
④ Status (QGR_ERR)
⑤ Activation Emergency Start (EM_START)
⑥ Acknowledgement (RESET)

Limits (LIMITS)



① Read Data (RD_DATA)
② Limit value display (CUR_AH, CUR_WH, CUR_WL, CUR_AL)
③ Actual value bar (QCUR, MO_PVHR, MO_PVLR)
④ Current value (QCUR, QCUR#unit)
⑤ Limits (CUR_AH, CUR_WH, CUR_WL, CUR_AL)
⑥ Bar range (MO_PVHR, MO_PVLR)
⑦ Call faceplate SMC_MEAS, visible if EN_MEAS = TRUE

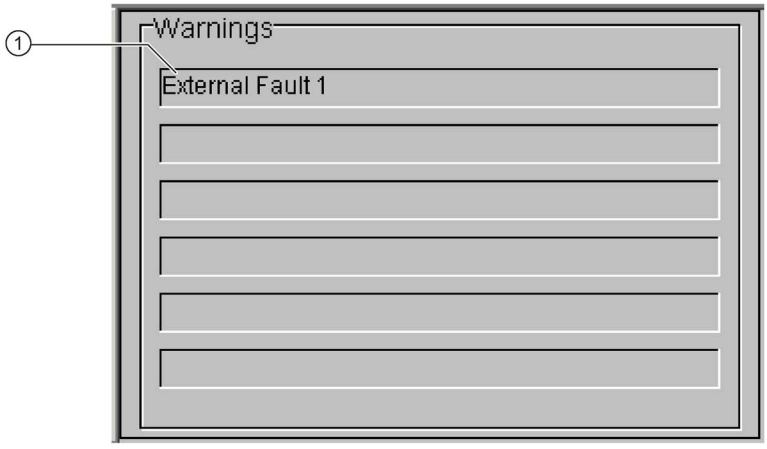
Faults (MESSAGE1)



① Text list with error description (ERR_NOx)

For error number 0, the text field is switched to invisible.

Warnings (MESSAGE2)



① Text list with error description (WRN_NOx)

For error number 0, the text field is switched to invisible.

3.14 SMC_CB: Signal processing block for circuit breaker control function

FB2013

Calling OBs

The watchdog interrupt OB in which you install the block (e.g. OB32). Also in OB100 (see start-up characteristics).

Called blocks

The block calls the following blocks:

SFB35	ALARM_8P
SFB52	RDREC
SFB53	WRREC
SFC6	RD_SINFO
SFC20	BLKMOV
SFC21	FILL

3.14.1 Parameter assignment in SIMOCODE ES

For the signal blocks to function correctly, a range of SIMOCODE pro parameters must have quite specific settings. Those parameters that define the assignment of the cyclic I/O interface are especially affected.

These parameters are represented in **bold**.

In addition, the overview below represents the parameters that are already preset for the control function in the templates for application selection in the SIMOCODE ES software. The settings are suggestions and depend heavily on the actual wiring of the SIMOCODE pro inputs and outputs.

These parameters are represented in *italics*.

Other parameters must also be set, e.g. for motor protection. These are not described here. Parameter assignment for the extended I/O interface of basic type 1 is represented in the following chapter: Parameter assignment in SIMOCODE ES (Page 33)

Motor control → Control stations		
Operation mode selector S1	**Cyclic receive bit 0.5**	—
Operation mode selector S2	*Fixed level 1*	—

Local control [LC]		
Off	*BU - Input 2*	—
On	*BU - Input 1*	—
Operator enable local 2 off	*Active*	—
Operator enable local 2 on	*Active*	—
Operator enable remote off	**Not active**	—
Operator enable remote on	**Not active**	—

PLC/PCS [DP]		
Off	**Cyclic receive – bit 0.1**	—
On	**Cyclic receive – bit 0.2**	—
Operator enable local 2 off	**Not active**	—
Operator enable local 2 on	**Not active**	—
Operator enable remote off	**Active**	—
Operator enable remote on	**Active**	—

Operator Panel [OP]		
Off	*OP button 4*	—
On	*OP button 3*	—
Operator enable local 2 off	*Active*	—
Operator enable local 2 on	*Active*	—
Operator enable remote off	**Not active**	—
Operator enable remote on	**Not active**	—

Motor control → Control function → Control commands		
Off	**Released control command - Off**	—
On>	**Enabled control command – On>**	—

Motor control → Control function → Operating mode		
Non-maintained command mode	*Not active/active*	*The setting of the parameter influences the parameter JOG_ON in the SIMOCODE signal block:* *Non-maintained command mode not active: JOG_ON = FALSE* *Non-maintained command mode active: JOG_ON = TRUE*

Motor control → Control function → Auxiliary control inputs		
Feedback ON	*BU - Input 3*	*Auxiliary switch of the circuit breaker*

Motor control → Control function → Timings		
Feedback time	**Greater than the motor runtime of the motorized operating mechanism of the circuit breaker,** **typ. 10 s**	**Auxiliary switch of the circuit breaker**

Outputs → Basic unit		
BU – Output 1	*Contactor control QE1*	—
BU – Output 2	*Contactor control QE3*	—

Outputs → Operator panel LEDs		
LED green 3	*Display QLE> (on>)*	—
LED green 4	*Display QLA (off)*	—

Outputs → Cyclic send data		
Byte 0, bit 0	**Not connected**	—
Byte 0, bit 1	**Status - Off**	—
Byte 0, bit 2	**Status – On>**	—
Byte 0, bit 3	**Message – Pre-warning overload**	—
Byte 0, bit 4	**Not connected**	—
Byte 0, bit 5	**Status – Remote mode**	—
Byte 0, bit 6	**Status – General fault**	—
Byte 0, bit 7	**Status - General warning**	—
Byte 1, bit 0	Not connected	Freely assignable
Byte 1, bit 1	**Status - Test position (TPF)**	—
Byte 1, bit 2	Not connected	Freely assignable
Byte 1, bit 3	Not connected	Freely assignable
Byte 1, bit 4	Not connected	Freely assignable
Byte 1, bit 5	Not connected	Freely assignable
Byte 1, bit 6	Not connected	Freely assignable
Byte 1, bit 7	Not connected	Freely assignable
Byte 2-3	**Max. current Imax**	—

Standard functions → External faults 1		
External fault 1	*BU - Input 4*	*Alarm switch of the circuit breaker*
Response	*Switch on*	—

3.14.2 Function

The block is installed by the user in a cyclic watchdog interrupt OB (e.g. OB32). Parameter inputs IN_01 and IN_23 as well as parameter output O_01 are also interconnected by the user with the relevant icons for inputs or outputs of the associated SIMOCODE pro device.

SMC_OVL accesses the data provided by SIMOCODE pro via inputs IN_01 (2 bytes of binary data) and IN_23 (2 bytes of motor current).

Data is transferred to SIMOCODE pro via the output O_01 (2 bytes of binary data).

The configuration of the inputs and outputs is determined here by the SIMOCODE pro basic type.

Access to the inputs and outputs takes place exclusively via the process image.

The block uses the input parameter MODE to determine whether the inputs IN_01 and IN_23 are valid. In the case of a higher-level fault, all inputs are read by SIMOCODE pro with "0" and output to the relevant outputs of the block.

3.14.3 Assignment of the cyclic process image

Table 3- 58 Assignment of O_01: Output commands to SIMOCODE pro

Bit	Control interface
0.0	—
0.1	Off
0.2	On> → On
0.3	Test 1
0.4	Emergency start
0.5	Local/remote control station
0.6	Reset
0.7	—
1.0 ... 1.7	User-specific outputs

Table 3- 59 Assignment of IN_0: Feedback messages from SIMOCODE pro

Bit	Cyclic send data	Block parameter
0.0	—	—
0.1	Status – Off	QOFF
0.2	Status – On	QON
0.3	Message – Pre-warning overload	QOVL
0.4	—	—
0.5	Status – Remote mode	QREMOTE
0.6	Status - General fault	QGR_ERR
0.7	Status - General warning	QGR_WRN
1.0	—	—
1.1	Status - Test position (TPF)	QCST
1.2 ... 1.7	—	—

The input parameter IN_01 is additionally copied to the output Q_IN_01.

The motor current is transferred via the input parameter IN_23 as an unsigned 2-byte value. SIMOCODE pro always transfers the current here as a percentage of the set current in a range from 0 to 1000%. The motor current is output via QCUR.

Assignment of bytes 2 / 3 of the analog control interface and bytes 4 to 9 of the cyclic send data when using basic type 1 is described in the following chapter: Assignment of the cyclic process image (Page 35)

3.14.4 Operating modes

Changing the control station (REMOTE, LOCAL)

The control station is changed via the interconnectable function input REM_L if the input REM_SEL is set, or via the function input REM_ON_OP set by the OS.

The function input (REMOP_EN) influences the operator enable (QLOCOP) for operating via the OS.

The operating mode of the control station is output via QREMOTE(1 = REMOTE, 0 = LOCAL). QREMOTE corresponds here to the bit DP 0.5 of the SIMOCODE pro.

In LOCAL mode, the controller is completely switched off via the SMC_CBblock. Control is then only possible via a control station connected direct to the SIMOCODE pro. It is still possible to acknowledge the fault.

Changing the operating modes (MANUAL, AUTO) when REMOTE is selected

If QREMOTE = TRUE, changeover between the two operating modes MANUAL and AUTOMATIK takes place either via OS operation using AUT_ON_OP (LIOP_SEL = 0) or via the interconnection of the input AUT_L (LIOP_SEL = 1).

The function inputs (MANOP_EN, AUTOP_EN) influence the operator enables (QMANOP, QAUTOP) for operating via the OS.

The operating mode is output at output QMAN_AUT (1 = AUTO, 0 = MANUAL).

Changing the control station for MANUAL

In REMOTE mode, the operating mode MANUAL can be controlled either via the OS or via the interconnectable function inputs. The changeover for this takes place via the interconnectable function input LINK_MAN.

3.14.5 Control stations for MANUAL and AUTOMATIC mode

General information

The PLC/DP control station of the SIMOCODE pro (that is, DP0.1 and 0.2) is level-active. The On command is stored in the SIMOCODE pro. The Off command (DP0.1) takes priority over the On command (DP0.2).

Control of the SIMOCODE pro via AS / OS is only possible in REMOTE mode.

AUTOMATIC

In automatic mode, the SIMOCODE pro control functions are controlled via the interconnectable function input AUTO_ON (TRUE = On, FALSE = Off).

Control without non-maintained command mode (JOG_ON = FALSE)

At one edge of the command input, the associated control bit is set in the interface until the SIMOCODE pro sends the relevant feedback message, or a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the automatic interface.

Control with non-maintained command mode (JOG_ON = TRUE)

The corresponding control bit in the interface is set as long as the command input = TRUE or if a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the automatic interface. The Off command is not necessary for switching the device off but is nevertheless set by the block if no On command is active.

MANUAL

In manual mode, the SIMOCODE pro is controlled either via the function input MAN_ON (TRUE = On, FALSE = Off) set by the OS or via the interconnectable function inputs L_ON and L_OFF.

The inputs for the operator enables ON_OP_EN / OFFOP_EN set the outputs QON_OP / QOFF_OP for operation using the OS.

At one edge of the command input, the associated control bit is set in the interface until the SIMOCODE pro sends the relevant feedback message, or a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the interconnectable manual interface.

The Off command takes priority over the On command (no edge evaluation!).

After changing to manual mode, the commands are not forwarded to the inputs until there is a positive edge change when L_ON / L_OFF is active.

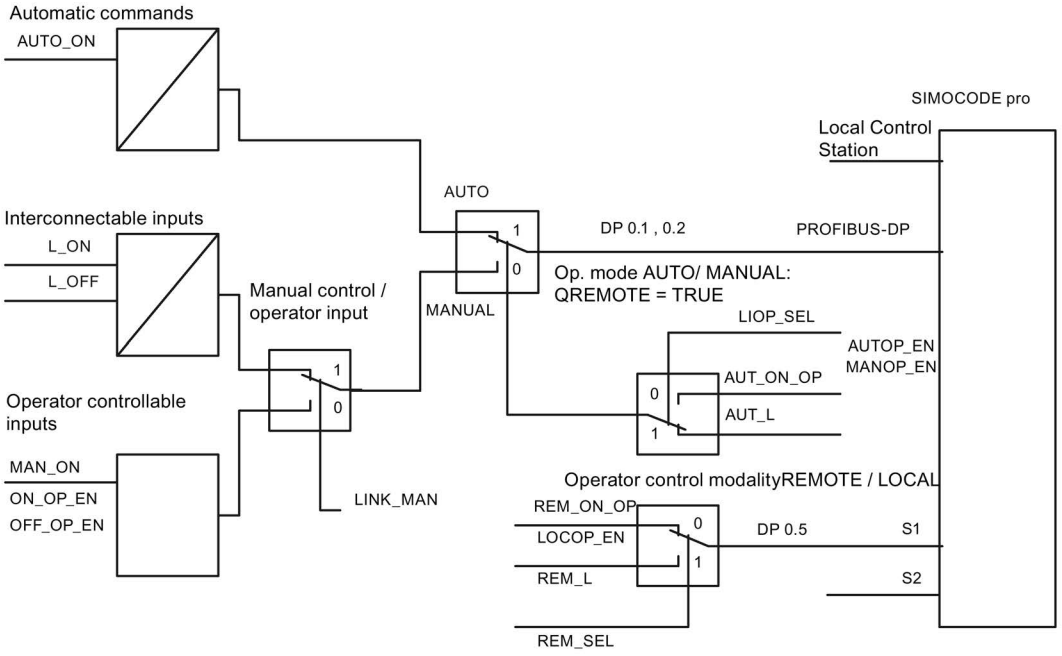
Control without non-maintained command mode (JOG_ON = FALSE)

At one edge of the command input, the associated control bit is set in the interface until the SIMOCODE pro sends the relevant feedback message, or a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the interconnectable inputs. The operator controllable input MAN_ON is adjusted when tripped.

Control with non-maintained command mode (JOG_ON = TRUE)

The corresponding control bit in the interface is set as long as the command input = TRUE or if a fault occurs (QGR_ERR = TRUE). If the fault is acknowledged, the control bit is set again if a command is active at the automatic interface. The Off command is not necessary for switching the device off but is nevertheless set by the block if no On command is active.

3.14.6 Overview of control stations, operating modes, and operator control modalities



3.14.7 Simulation

The simulation mode is activated using the input SIM_ON and takes priority over all other operating modes. If SIM_ON = TRUE, the block processes the simulation values (SIM_I01: binary data, SIM_I23: motor current) instead of the process values of SIMOCODE pro(IN_01, IN_23). QSIM, QUALITY and QBAD are output accordingly. The process output (O_01) is output with "0" if simulation is active. The command status is combined with the output QSTATUS.

A block must be programmed for the simulation. The output QSTATUS can be evaluated and this information can be used to form the simulation feedback message (SIM_I01, SIM_I23). Assignment corresponds to assignment of the process inputs/process output and can be found in the following chapter: Assignment of the cyclic process image (Page 269)

3.14.8 Interlocking

The interlocks LOCK and LOCK_ON are only effective in REMOTE mode and are valid in the operating mode MANUAL and AUTO for all control stations of the SMC_CB block.

An active lock input prevents switching and disables control stations for MANUAL and AUTO. The control bit is set permanently.

LOCK always takes priority over LOCK_ON.

Revoking of LOCK_ON switches the motor to the operating mode AUTO corresponding to the control station for AUTO. In MANUAL, the motor is switched off.

3.14.9 Local Interruption

The output QLOC_INT indicates in REMOTE that operation via the local control station (connected direct to SIMOCODE pro) has changed the current switching state.

QLOC_INT is also set if the switching state requested via REMOTE has not been reached within the monitoring time set using TIME_MON and no general fault has occurred (e.g. due to a higher-priority Off command at the SIMOCODE pro general control station). This monitoring is switched off with TIME_MON = 0 or MONITOR = FALSE.

If QLOC_INT = TRUE, the control outputs are reset.

QLOC_INT is reset via the inputs RESET (operator controllable) / L_RESET (interconnectable). The input RESET is reset after acknowledgment. If L_RESET is active permanently, QLOC_INT is set for the duration of the cycle if the requirements given above are met.

Monitoring is deactivated at initial startup by setting MONITOR = FALSE.

3.14.10 Current and current limit monitoring

Current

The motor current is transferred via the input parameter IN_23 as an unsigned 2-byte value. SIMOCODE pro always transfers the current here as a percentage of the set current in a range from 0 to 1000%.

Current limits

The current limit values are read out from the data set DS130. Reading of the data set is initiated either via the interconnectable input parameter L_RD_DATA, in the OS when selecting the limit value view, or by OS operation (RD_DATA). The output QEN_RDWR is reset during communication.

The data read is output to the in/out parameters Alarm high (CUR_AH), Alarm low (CUR_AL), Warning high (CUR_WH) and Warning low (CUR_WL).

If a fault occurs, the values are set to zero and the output QERR_RD = TRUE is set.

The limit values can also be parameterized in the faceplate. If the values are changed, they are written to SIMOCODE pro.

The signaling response in the case of limit value violations are parameterized with SIMOCODE ES or SIMATIC PDM. Under Monitoring functions → Current limits, the response to trip level/warning level is set for this purpose as follows:

Trip level: disabled or tripping

Warning level: disabled or warning

If a fault occurs when writing, the values are reset to zero and the output QERR_WR = TRUE is set.

Overshooting or undershooting of the limit values results in transmission of the relevant message provided the limit value message has not been completely switched off via the parameter M_SUP_C (default is: switched off). Limit value violation messages are generated in the SIMOCODE pro and evaluated in the block. The outputs QCUR_AH, QCUR_AL, QCUR_WH and QCUR_WL are set accordingly.

Range limits

The range limits for the limit bars are parameterized using the function inputs MO_PVHR and MO_PVLR and can be adjusted in the OS.

3.14.11 Signaling response

Table 3- 60 SMC_OVL issues the following messages:

Message block	Message number	Block parameter	Message text	Message class
MSG_EVID1	1	QGR_WRN	$$BlockComment$$ General warning: @4W%t#SMC_Warnings@ @5W%t#SMC_Warnings@ @6W%t#SMC_Warnings@	WH
	2	QGR_ERR	$$BlockComment$$ General fault: @7%t#SMC_Errors@	AH
	3	QCUR_AH	$$BlockComment$$ Current alarm up	AH
	4	QCUR_WH	$$BlockComment$$ Current warning up	WH
	5	QCUR_WL	$$BlockComment$$ Current warning down	WL
	6	QCUR_AL	$$BlockComment$$ Current alarm down	AL
	7	QCST	$$BlockComment$$ Test feedback	WH
	8	MSG_8	Free	—
MSG_EVID2	1	MSG_9	Free	—
	2	MSG_10	Free	—
	3	MSG_11	Free	—
	4	MSG_12	Free	—
	5	MSG_13	Free	—
	6	MSG_14	Free	—
	7	MSG_15	Free	—
	8	MSG_16	Free	—

The free message inputs are not assigned a fixed meaning and can be activated using the parameters MSG_x (x = 4 to 16) on the SMC_CB.

Table 3- 61 The ALARM_8P auxiliary values are assigned as follows:

Message block	Message number	Auxiliary value	Block parameter	Meaning
MSG_EVID1	—	1	BA_NA	Batch name
	—	2	STEP_NO	Batch step number
	—	3	BA_ID	Batch ID
	1	4	WRN_NO1	Warning number 1
		5	WRN_NO2	Warning number 2
	2	6	WRN_NO3	Warning number 3
		7	ERR_NO1	Fault number 1
		8	ERR_NO2	Fault number 2
		9	ERR_NO3	Fault number 3
		10	—	—
MSG_EVID2	—	1	BA_NA	Batch name
	—	2	STEP_NO	Batch step number
	—	3	BA_ID	Batch ID
	—	4	AUX_PR14	Free
	—	5	AUX_PR15	Free
	—	6	AUX_PR16	Free
	—	7	AUX_PR17	Free
	—	8	AUX_PR18	Free
	—	9	AUX_PR19	Free
	—	10	AUX_PR20	Free

The auxiliary values AUX_PR14 … AUX_PR20 are freely available.

The limit value messages can be suppressed via the input M_SUP_C. The default value of the input M_SUP_C is TRUE, that is, message suppression is active.

For the messages General warning and General fault, the diagnostics block SMC_DIAG supplies the detailed information that is interconnected via the structure DIAG_INF to SMC_CB.

General warning (message number 1)

The message General warning is derived from the diagnostics structure DIAG_INF formed by the block SMC_DIAG.

Three auxiliary values are transferred as additional information together with the message General warning. The auxiliary values correspond to the contents of the warning numbers WRN_NO1, WRN_NO2 and WRN_NO3 and contain the first three warning causes found.

The user text library SMC_Warnings is available for the warnings. This contains the precise fault texts and is supplemented dynamically in the message.

General fault (message number 2)

The message General fault is derived from the diagnostics structure DIAG_INF formed by the block SMC_DIAG.

One auxiliary value is transferred as additional information together with the message General fault. The auxiliary value corresponds to the contents of the fault number ERR_NO1 and contains the first fault cause found.

The auxiliary values 8 and 9 are interconnected with the parameters ERR_NO2 and ERR_NO3 and can be appended to the message if required.

The user text library SMC_Errors is available for the faults. This contains the precise error texts and is supplemented dynamically in the message.

Current limit messages (message number 3-6)

The current limit messages are formed by the SIMOCODE pro and are contained in the diagnostics structure DIAG_INF .

Test feedback (message number 7)

The message Test *feedback* is derived direct from the SIMOCODE pro information (DP1.1 Send).

Free messages (message number 8 of the message block 1, message numbers 1 to 8 of message block 2)

There is no block-internal assignment to a specific function for these messages. It can be activated via a parameter input (MSG_8 ... MSG_16) and can be used, for example, for reporting Local_Interruption, the operating mode SIMULATION, or any other signal.

3.14.12 Reset response

In principle, every fault detected by SIMOCODE pro must be acknowledged. This is done via the bit DP 0.6 Recv. Reset is only carried out by SIMOCODE pro if there is no active On command. Reset either resets the General fault (QGR_ERR) if the cause of the fault no longer exists, or it results in acknowledgment of the fault if the cause of the fault still exists. An acknowledged fault automatically results in resetting of the general fault following removal of the fault cause.

Reset can be carried out either via the interconnectable function input L_SMCRESET or via the OS operator controllable function input SMCRESET.

L_SMCRESET is level-active. SMCRESET is reset by the block following evaluation.

The reset function is transparent from the block's perspective, that is, there is no logical combination with other signals, and independent of the operating mode (LOCAL / REMOTE).

3.14.13 Start-up characteristics

At CPU startup, the block is switched to manual mode and the Off command is output. For this purpose, the block must be called from the startup OB. After startup, the messages are suppressed for the number of cycles parameterized in the RUNUPCYC value.

3.14.14 Time response

The block must be called via a watchdog interrupt OB. The sampling time of the block is entered in the parameter SAMPLE_T.

3.14.15 SMC_CB block parameters

Element	Type	Kind	Meaning	HMI
AUT_L	BOOL	I	Interconnectable input for MAN / AUTO (0 = Manual / 1 = Auto)	N
AUT_ON_OP	BOOL	IO	Control input: 0 = Manual, 1 = Auto	Y
AUTO_ON	BOOL	I	Automatic value: 1 = On, 0 = Off	N
AUTOP_EN	BOOL	I	1 = Operator enable for Auto	N
AUX_PRxx	ANY	IO	Auxiliary value x (x = 11 to 20)	N
BA_EN	BOOL	I	BATCH record release	Y
BA_ID	DWORD	I	BATCH: Consecutive batch number	Y
BA_NA	STRING [32]	I	BATCH designation	Y
CST	BOOL	I	1 = Test mode	N
CUR_AH	REAL	IO	Upper alarm limit current	Y
CUR_AL	REAL	IO	Lower alarm limit current	Y
CUR_WH	REAL	IO	Upper warning limit current	Y
CUR_WL	REAL	IO	Lower warning limit current	Y
DD_17_20	DWORD	O	DS 92 Byte 17 to 20: General warning additional info 1	Y
DD_21_22	WORD	O	DS 92 Byte 21 to 22: General warning additional info 2	Y
DD_24_27	DWORD	O	DS 92 Byte 24 to 27: General fault additional info 1	Y
DD_28_31	DWORD	O	DS 92 Byte 28 to 31: General fault additional info 2	Y
DIAG_INF	UDT_ DIAG	I	Diagnostics structure of SMC_DIAG	N
EM_START	BOOL	I	Emergency start	Y
EN_MEAS	BOOL	I	1 = Measured value block available	Y
EN_RDWR	BOOL	I	1 = Enable reading/writing of data set	N
EN_STAT	BOOL	I	1 = Statistics block available	Y
ERR_NOx	INT	O	Fault number x (x = 1 to 6)	Y
I1_x	BOOL	I	User-defined outputs DP1.x (x = 0 to 7)	N
IN_01	WORD	I	Inputs DP0.0 to 1.7	N
IN_23	WORD	I	Input motor current	N

Element	Type	Kind	Meaning	HMI
JOG_ON	BOOL	I	1 = Non-maintained command mode active	N
L_OFF	BOOL	I	Manual control: 1 = Off	N
L_ON	BOOL	I	Manual control: 1 = ON	N
L_RD_DATA	BOOL	I	Interconnectable input 0 → 1: Reading of the data set	N
L_RESET	BOOL	I	Configurable input for resetting QLOC_INT	N
L_SMCRESET	BOOL	I	Interconnectable input for resetting	N
LADDR	INT	I	Start address of the inputs	N
LINK_MAN	BOOL	I	0 = Operator input active, 1 = Manual control via interconnectable inputs	N
LIOP_SEL	BOOL	I	Interconnectable input for manual/auto changeover (AUT_L): 1 = Interconnection is active, 0 = Operation is active	N
LOCK	BOOL	I	1 = Lock (OFF)	Y
LOCK_ON	BOOL	I	1 = Lock (ON)	Y
LOCOP_EN	BOOL	I	1 = Operator enable for LOCAL	N
M_SUP_C	BOOL	I	1 = Message suppression active for current limit value violations	Y
MAN_ON	BOOL	IO	Control input: 1 = ON, 0 = OFF	Y
MANOP_EN	BOOL	I	1 = Operator enable for Manual	N
MO_PVHR	REAL	I	Bar upper limit	Y
MO_PVLR	REAL	I	Bar lower limit	Y
MODE	DWORD	I	Mode of OMODE of the SMC_DIAG	N
MONITOR	BOOL	I	Monitoring: 1 = ON	Y
MSG_ACK1	WORD	O	Messages acknowledged Alarm 8p block 1	N
MSG_ACK2	WORD	O	Messages acknowledged Alarm 8p block 2	N
MSG_EVID1	DWORD	I	Event ID of the Alarm 8p block 1	N
MSG_EVID2	DWORD	I	Event ID of the Alarm 8p block 2	N
MSG_STAT1	WORD	O	MESSAGE 1: STATUS output	N
MSG_STAT2	WORD	O	MESSAGE 2: STATUS output	N
MSG_x	BOOL	I	Free message input x (x = 8 to 16)	N
O_01	WORD	O	Outputs DP 0.0 to 1.7	N
OCCUPIED	BOOL	I	BATCH record ID	Y
OFFOP_EN	BOOL	I	1 = Operator enable for OFF	N
ON_OP_EN	BOOL	I	1 = Operator enable for ON	N
OOS	BOOL	I	Reserve	Y
Q_IN_01	WORD	O	Inputs DP 0.0 to 1.7	N
QAUTOP	BOOL	O	1 = Operator enable for Auto	Y
QBAD	BOOL	O	1 = Invalid process value	Y
QBUS_PLC	BOOL	O	Bus/PLC fault	Y
QCST	BOOL	O	1 = Test active (DP 1.1)	Y
QCUR	REAL	O	Current in % e	Y
QCUR_AH	BOOL	O	Upper alarm limit current violated	N
QCUR_AL	BOOL	O	Lower alarm limit current violated	N
QCUR_WH	BOOL	O	Upper warning limit current violated	N

Element	Type	Kind	Meaning	HMI
QCUR_WL	BOOL	O	Lower warning limit current violated	N
QEM_STRT	BOOL	O	1 = Emergency start active	N
QEN_RDWR	BOOL	O	1 = Enable reading/writing of data set	N
QERR	BOOL	O	1 = Program error	N
QERR_RD	BOOL	O	1 = Error while reading the data set	N
QERR_WR	BOOL	O	1 = Error while writing the data set	N
QFLT_F9	BOOL	O	Fault F9	Y
QGR_ERR	BOOL	O	General fault (DP 0.6)	N
QGR_WRN	BOOL	O	General warning (DP 0.7)	N
QLOC_INT	BOOL	O	1 = Local interruption	Y
QLOCOP	BOOL	O	1 = Operator enable for LOCAL / REMOTE	Y
QMAN_AUT	BOOL	O	0 = Manual, 1 = Automatic	Y
QMANOP	BOOL	O	1 = Operator enable for Manual	Y
QMSG_ERR	BOOL	O	1 = ALARM8_P Error	N
QMSG_SUP	BOOL	O	1 = Message suppression	Y
QOFF	BOOL	O	Status: 1 = Circuit breaker OFF (DP 0.1)	Y
QOFF_OP	BOOL	O	1 = Operator enable for OFF	Y
QON	BOOL	O	Status: 1 = Circuit breaker ON (DP 0.2)	Y
QON_OP	BOOL	O	1 = Operator enable for ON	Y
QOP_ERR	BOOL	O	1 = General operator error	N
QPARFF16	BOOL	O	Parameter error F16	Y
QRD_STAT	WORD	O	Return value of the SFB RDREC	N
QRDWR_OP	BOOL	O	1 = Operator enable Read/write data set	Y
QREMOTE	BOOL	O	1 = REMOTE mode (DP 0.5)	Y
QSIM	BOOL	O	1 = Simulation active	Y
QSTATUS	WORD	O	Command status (outputs DP 0.0 to 1.7)	N
QUALITY	BYTE	O	Quality code	N
QWR_STAT	WORD	O	Return value of the SFB WRREC	N
RACKF	BOOL	I	1 = Rack fault	N
RD_DATA	BOOL	IO	0 → 1: Reading of the data set	Y
REM_L	BOOL	I	Interconnectable input for LOCAL / REMOTE (0 = LOCAL / 1 = REMOTE)	N
REM_ON_OP	BOOL	IO	Control input: 0 = LOCAL, 1 = REMOTE	Y
REM_SEL	BOOL	I	Interconnectable input for LOCAL / REMOTE changeover (REM_L): 1 = Interconnection is active, 0 = Operation is active	N
RESET	BOOL	IO	Control input for resetting QLOC_INT	N
RUNUPCYC	INT	I	Number of initial run cycles after CPU restart	N
SAMPLE_T	REAL	I	Sampling time in [s]	N
SIM_I01	WORD	I	Simulation value IN_01	N
SIM_I23	WORD	I	Simulation value IN_23	N
SIM_ON	BOOL	I	1 = Simulation	Y
SMCRESET	BOOL	IO	Operator controllable reset input for faults	Y

Element	Type	Kind	Meaning	HMI
STEP_NO	DWORD	I	Batch step number	Y
TIME_MON	REAL	I	Monitoring time in [s]	Y
USTATUS	WORD	I	Status word in VSTATUS, freely user-assignable	N
VSTATUS	DWORD	O	Status for status displays for block icon	Y
WRN_NOx	INT	O	Warning number x (x = 1 to 6)	Y

Table 3- 62 Structure of VSTATUS

Bit	Parameter
0	OCCUPIED
1	BA_EN
2	QSIM
3	QMAN_AUT
4	QCST
5	QGR_ERR
6	QGR_WRN
7	QLOC_INT
8	LOCK / LOCK_ON
9	QON
10	QOFF
11	—
12	—
13	—
14	—
15	—
16 - 31	USTATUS

3.14.16 Status displays for icons

Status	Parameter	View
Off	QOFF = 1	
On	QON = 1	
Not available	QBAD = 1	

3.14.17 Description of the faceplate

The available faceplates are described in this chapter.

The following views are available:

Overview	OVERVIEW
Standard	STANDARD
Limits	LIMITS
Maintenance	MAINTENANCE
Faults	MESSAGE1
Warnings	MESSAGE2
Messages	—
Trend	—
Batch	—

The file name is composed as follows: @PG_SMC_CB_<View>.PDL

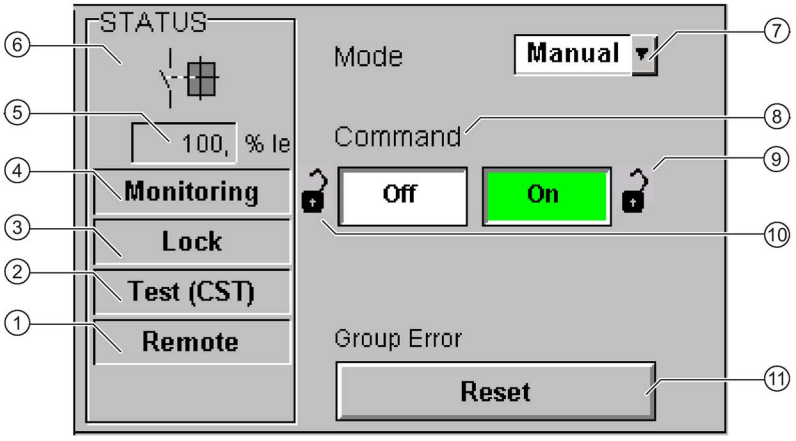
The PCS 7 standard displays are used for the message, trend and batch views.

The structure of the individual views of faceplates is described below.

Standard (STANDARD)

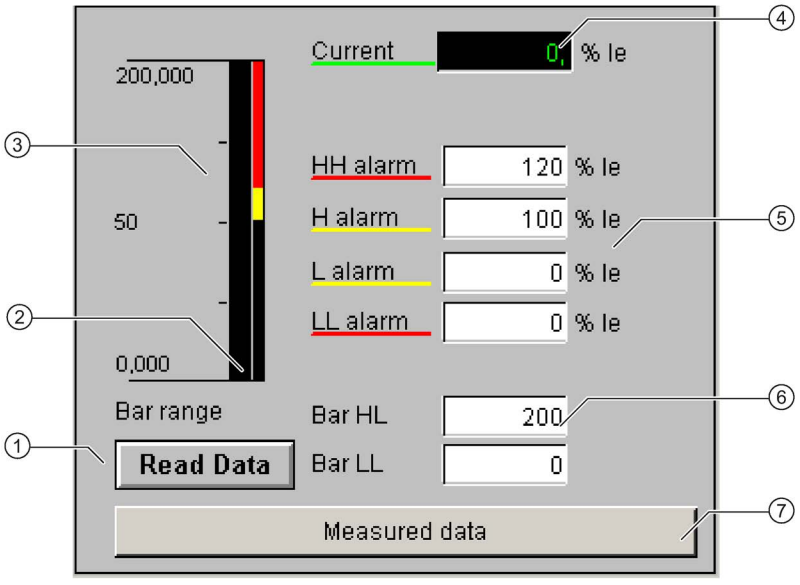
Status

The status display is a user object comprising several status displays. The status display corresponds to the representation from the process image icon.



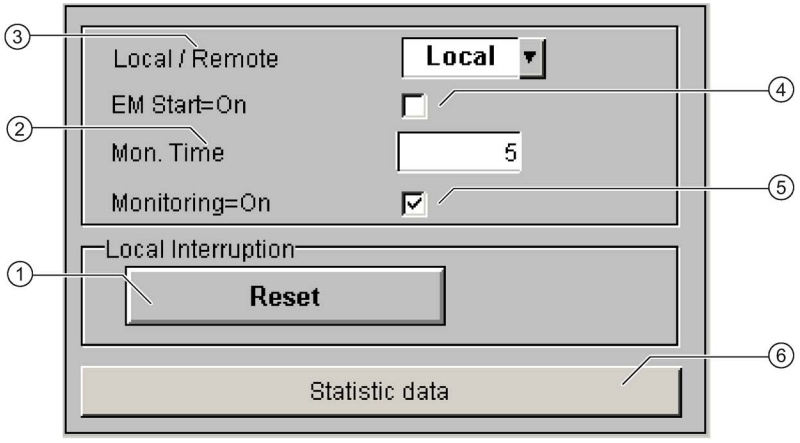
① Operator control modality (QREMOTE)
② Test (QCST)
③ Interlocking (LOCK / LOCK_ON)
④ Local Interruption (QLOC_INT)
⑤ Current (QCUR) / unit (QCUR#unit)
⑥ Status display (VSTATUS)
⑦ Operating mode (QMAN_AUT, AUT_ON_OP)
⑧ Command (MAN_ON)
⑨ (LOCK_ON)
⑩ (LOCK)
⑪ Acknowledgement (RESET)

Limits (LIMITS)



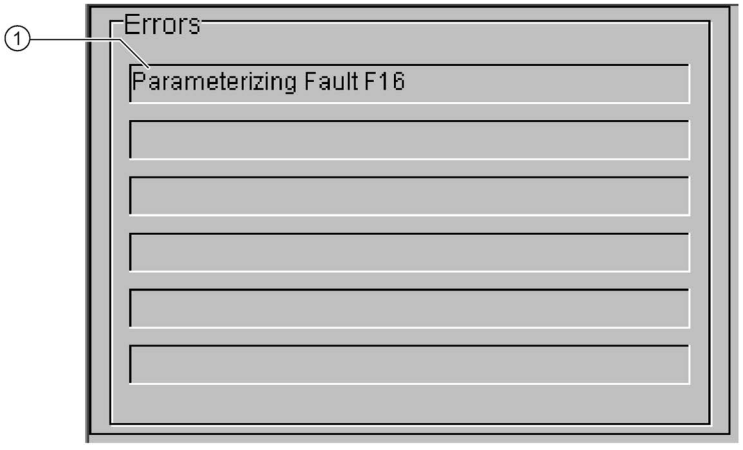
① Read Data (RD_DATA)
② Limit value display (CUR_AH, CUR_WH, CUR_WL, CUR_AL)
③ Actual value bar (QCUR, MO_PVHR, MO_PVLR)
④ Current value (QCUR, QCUR#unit)
⑤ Limits (CUR_AH, CUR_WH, CUR_WL, CUR_AL)
⑥ Bar range (MO_PVHR, MO_PVLR)
⑦ Call faceplate SMC_MEAS, visible if EN_MEAS = TRUE

Maintenance (MAINTENANCE)



① Acknowledge Local Interruption (RESET)
② Monitoring time for Local Interruption (TIME_MON)
③ Operator control modality Local / Remote (REM_ON_OP)
④ Activation Emergency Start (EM_START)
⑤ Activation Monitoring (MONITOR)
⑥ Call faceplate SMC_STAT, visible if EN_STAT = TRUE

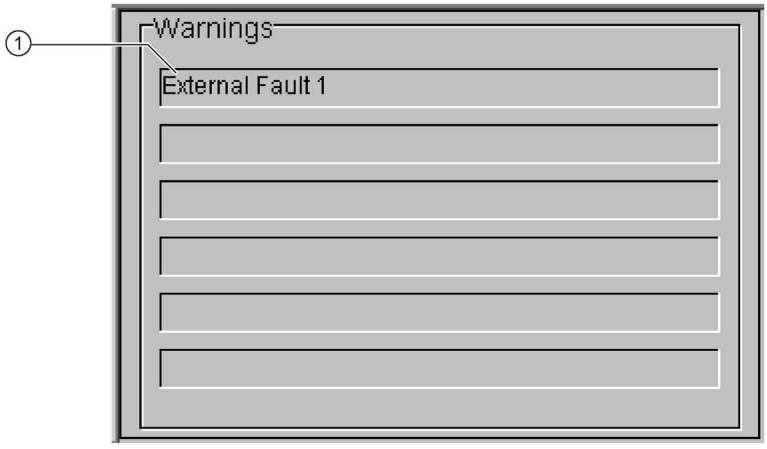
Faults (MESSAGE1)



① Text list with error description (ERR_NOx)

For error number 0, the text field is switched to invisible.

Warnings (MESSAGE2)



① Text list with error description (WRN_NOx)

For error number 0, the text field is switched to invisible.

Handling the driver generator

4

The Setup program installs xml files for the connection between the SIMOCODE pro modules and the driver generator.

The following modules and configurations are supported:

1. SIMOCODE pro C (integrated via GSD SI0180fd.gs?) direct on the DP master system or following a Y-Link DPV1
2. SIMOCODE pro V (integrated via GSD SI1180fd.gs?) direct on the DP master system or following a Y-Link DPV1
3. SIMOCODE pro S (integrated via GSD SI0181a7.gs?) direct on the DP master system or following a Y-Link DPV1
4. SIMOCODE pro C (integrated with PDM via GSD SI2180fd.gs?) direct on the DP master system or following a Y-Link DPV1
5. SIMOCODE pro V (integrated with PDM via GSD SI3180fd.gs?) direct on the DP master system or following a Y-Link DPV1
6. SIMOCODE pro C (integrated as S7 slave) direct on the DP master system
7. SIMOCODE pro V (integrated as S7 slave) direct on the DP master system
8. SIMOCODE pro S (integrated as S7 slave) direct on the DP master system

With SIMOCODE pro V, both basic types (basic type 1 and basic type 2) are supported.

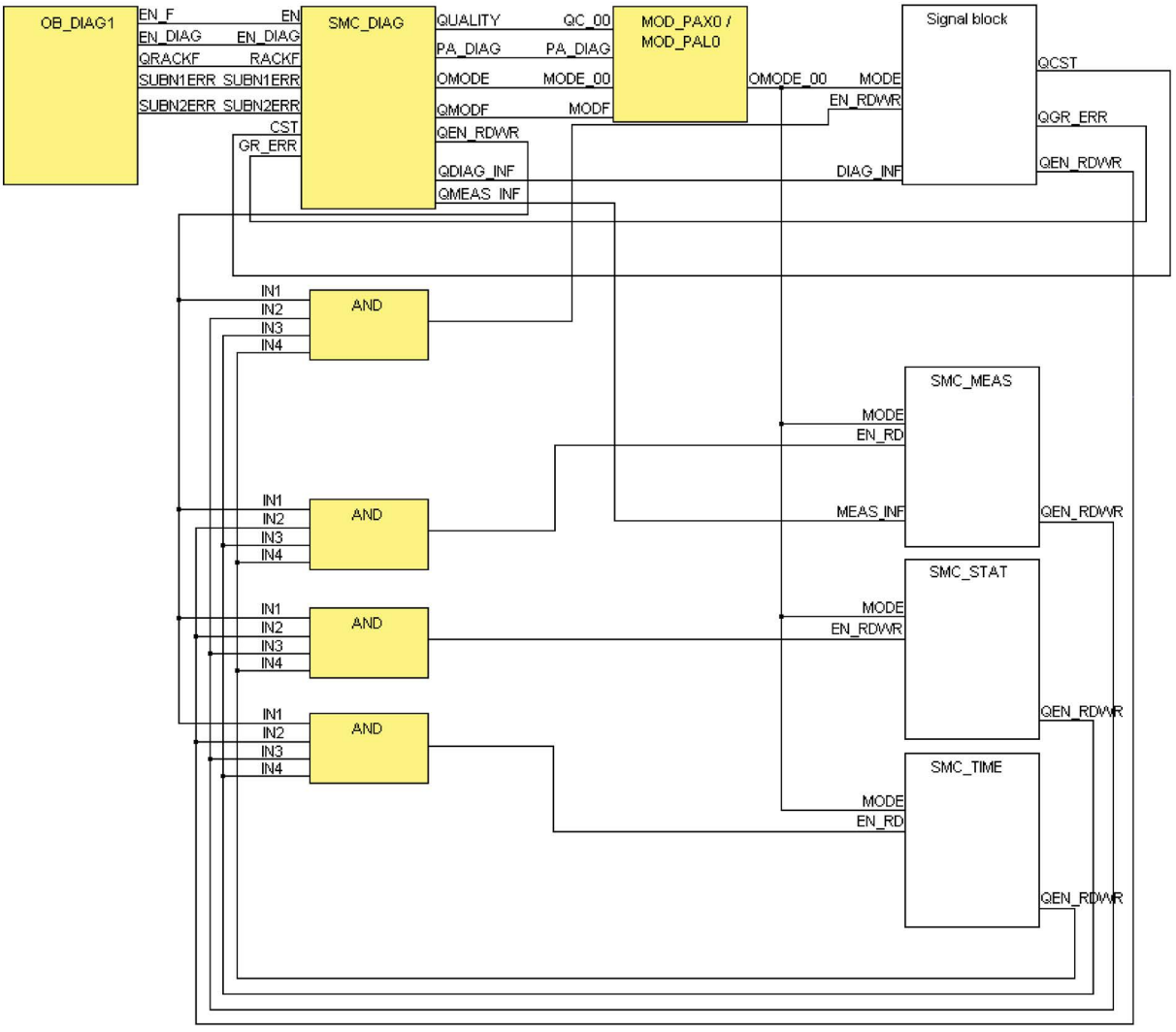
From the user's perspective, SIMOCODE pro is inserted in the hardware configuration via GSD (SI0180fd.gs? or SI1180fd.gs?) or SI0181a7.gs?) with basic type 2 compact or as an S7 slave. In so doing, all of the inputs and outputs used must be within the process image.

In the CFC, a signal processing block is inserted for each SIMOCODE pro and the connection to the hardware is established using symbolic addressing.

If the "Generate module driver" option is selected when compiling the CFC, all additionally required blocks are inserted, and the relevant parameters are linked and parameterized.

Schematic diagram of the interconnections of the driver generator

The white blocks must be positioned in the CFC by the user. SMC_MEAS and SMC_STAT are optional.



The yellow blocks are inserted by the driver generator.

Technical data

5

5.1 Technical data

Block (type name)[1)]	Number[2)]	Block length in load/work memory (bytes)[3)]	Length of instance data in load/work memory (bytes)[4)]	Temporary memory (bytes)[5)]	Blocks called [6)]
SMC_DIAG	FB2000	4596 / 3868	904 / 396	180	SFB52 SFB54 SFC6 SFC50 SFC51 SFC64
SMC_MEAS	FB2002	15390 / 13094	1802 / 980	242	SFB35 SFB52 SFC6 SFC20
SMC_STAT	FB2003	4932 / 4284	708 / 356	112	SFB35 SFB52 SFC6
SMC_DIR	FB2004	10382 / 8892	1580 / 738	224	SFB35 SFB52 SFB53 SFC6 SFC20 SFC21
SMC_REV	FB2005	11512 / 9938	1614 / 738	224	SFB35 SFB52 SFB53 SFC6 SFC20 SFC21
SMC_STAR	FB2006	11512 / 9938	1584 / 738	224	SFB35 SFB52 SFB53 SFC6 SFC20 SFC21
SMC_REVS	FB2007	11606 / 10022	1618 / 738	224	SFB35 SFB52 SFB53 SFC6 SFC20 SFC21

Block (type name)[1]	Number[2]	Block length in load/work memory (bytes)[3]	Length of instance data in load/work memory (bytes)[4]	Temporary memory (bytes)[5]	Blocks called [6]
SMC_DAHL	FB2008	11532 / 9956	1614 / 738	224	SFB35 SFB52 SFB53 SFC6 SFC20 SFC21
SMC_REVD	FB2009	13520 / 11822	1658 / 740	224	SFB35 SFB52 SFB53 SFC6 SFC20 SFC21
SMC_VAL	FB2010	7938 / 6688	1372 / 636	130	SFB35 SFC6 SFC20
SMC_POS	FB2011	12136 / 10518	1620 / 738	224	SFB35 SFB52 SFB53 SFC6 SFC20 SFC21
SMC_OVL	FB2012	8176 / 6946	1470 / 728	222	SFB35 SFB52 SFB53 SFC6 SFC20
SMC_CB	FB2013	10352 / 8866	1580 / 738	224	SFB35 SFB52 SFB53 SFC6 SFC20 SFC21
SMC_TIME	FB2014	11816 / 9854	1698 / 1000	194	SFB35 SFB52 SFB54 SFC6 SFC20

1) The symbolic identifier in the library's symbol table for the relevant FB. It must be unique in the project.

2) Consists of the type of block (FB) and the number.

3) Memory requirement of program code, once per block type

4) Memory requirement of an instance DB.

5) The local data memory needed when calling the block in an execution level. This is limited according to the specific CPU. If exceeded, you must check this in the CPU configuration and, if necessary, redistribute to OBs of the size actually needed.

6) The blocks stated here are used by the driver block in question and must be located in the user program. They are stored in the same library.