

SITRANS Library for S7-300

Function Manual

Functions of the faceplates

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Panel blocks, general

2

Configurable response using
the Feature I/O

3

SITRANS FC430

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SITRANS LR PA

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SITRANS P

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SITRANS F M MAG 6000

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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.

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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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Functions of the faceplates

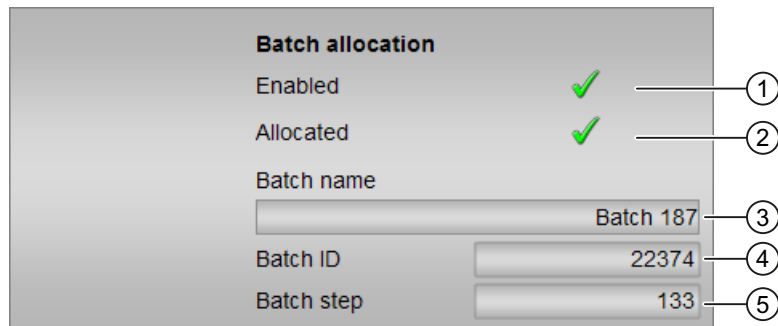
1.1 Batch view

Batch view

This area shows a display of the batch that is currently running (*Batchview*).

You can use the internal tag "@APLBatchEnable" to enable/disable the "Batch" button in the toolbar.

Value of @APLBatchEnable	Operating the "Batch" button in the toolbar	Icon of the "Batch" button in the toolbar
0	Disabled	
1	Enabled	



The screenshot shows the 'Batch allocation' faceplate with the following elements and callouts:

- (1) 'Enabled' status with a green checkmark.
- (2) 'Allocated' status with a green checkmark.
- (3) 'Batch name' field displaying 'Batch 187'.
- (4) 'Batch ID' field displaying '22374'.
- (5) 'Batch step' field displaying '133'.

(1) "Enabled"

This area shows you if the block is enabled for operation via SIMATIC BATCH (*BatchEn* = 1).

(2) "Allocated"

This area shows if the block is currently in use by SIMATIC BATCH (*Occupied* = 1).

(3) "Batch name"

This area shows the name of the batch that is currently running (*Batchname*).

(4) "Batch ID"

This area shows the identification number of the batch that is currently running (*BatchID*).

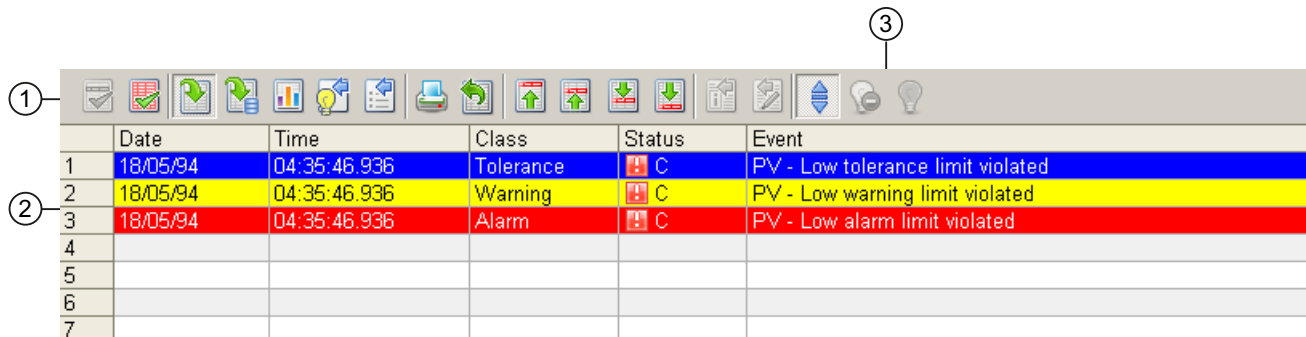
The batch view is disabled if *BatchID* = 16#00000000.

(5) "Batch step"

This area shows the step number of the batch that is currently running (StepNo) .

1.2 Alarm view

Message view



	Date	Time	Class	Status	Event
1	18/05/94	04:35:46.936	Tolerance	! C	PV - Low tolerance limit violated
2	18/05/94	04:35:46.936	Warning	! C	PV - Low warning limit violated
3	18/05/94	04:35:46.936	Alarm	! C	PV - Low alarm limit violated
4					
5					
6					
7					

(1) Toolbar

If the short-term archive list is selected, a new button appears in the toolbar:



You can use this button to toggle between the "History" and "Operator messages" views.

You must be registered with the "Higher process control" operating permission in order to export and hide messages.

(2) Display area for alarms

For additional information about the alarm view, refer to the *WinCC Information System* Online Help.

(3) "Hide messages" button

Messages can be displayed and/or hidden with this button. The view of this button changes accordingly:



Show messages

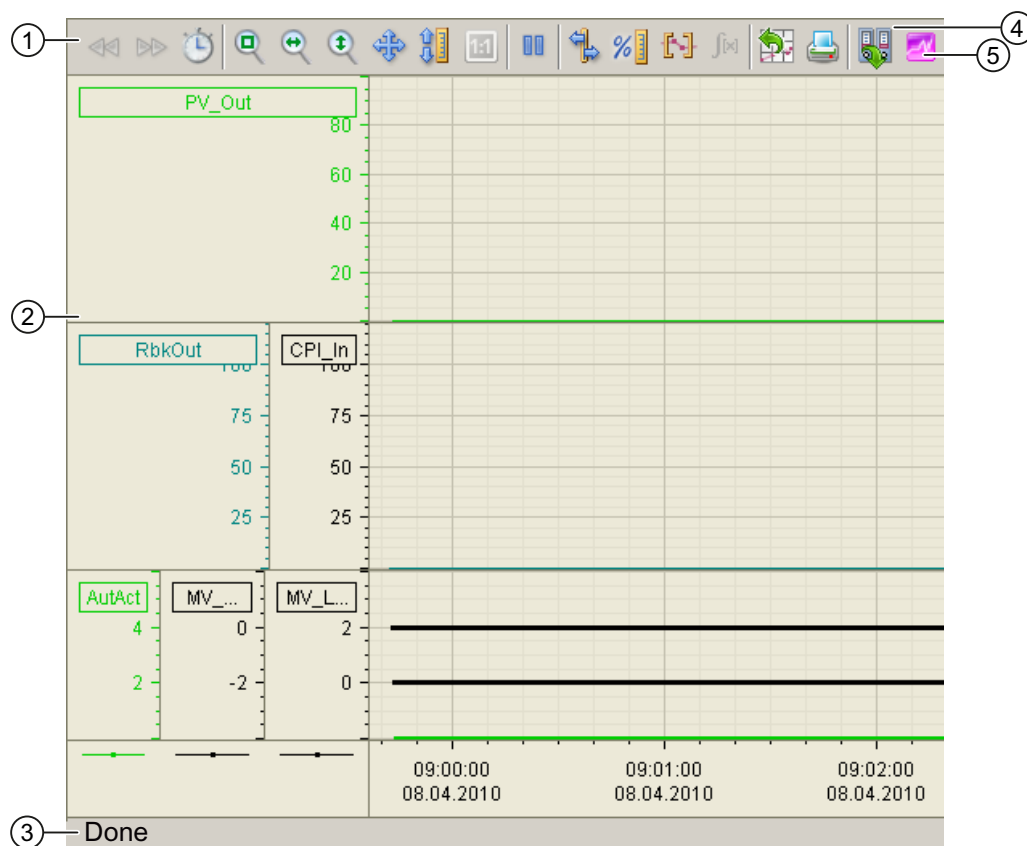


Hide messages

"Higher process controlling" operating permission is required and manual hiding must be active. You can find additional information in the manual "Process Control System PCS 7 Operator Station".

1.3 Trend view

Trend view



(1) Toolbar

(2) Display area for trends

(3) Status bar

(4) Button for switching between archive tags and online tags. The status bar shows if the trend view is working with online data or archive data.

(5) Button for opening the "Scatter plot" window

The Export button is only visible and operable with the "Higher-level process control" operating permission.

For additional information about the trend view, refer to the *WinCC Information System* Online Help.

Configuration of the trend view

The trend view can be configured so that archive values are displayed immediately after opening. A prerequisite for this is that archive variables exist. Proceed as follows:

- A "1" is attached at the block icon in the "TrendPictureName" property. A semicolon is used as the separator to the name of the trend view.
Example: @pg_apl_trendPID_Statistic.pdl;1

Special considerations for controllers

You can select two different representations for the display area:

1. Detailed display (default setting):

Display area consisting of three coordinate systems:

- Setpoint trend, actual value trend;
- Manipulated variable, control performance index trend;
- Binary trend via automatic/manual, manipulated variable at high or low limit

Open the scatterplot diagram with the user button (number 2) in the toolbar. It shows a coordinate system with the process value on the value axis and the manipulated variable or position feedback on the X axis. A new value pair is entered into the coordinate system with each cycle.

If you want to use the detail display, you need to enter the following in the block icon under Trends in the WinCC Graphics Designer:

TrendPictureName = @pg_apl_trendPID_Statistic.pdl

2. Simple display:

Display area consisting of two coordinate systems:

- Setpoint trend, actual value trend;
- Manipulated variable;

If you want to use the simple display, you need to enter the following in the block icon under Trends in the WinCC Graphics Designer:

TrendPictureName = @pg_apl_trendPID.pdl

Notes on step controllers with position feedback:

If you use a step controller with position feedback as the controller type, you need to enter the following in the block icon under Trends in the WinCC Graphics Designer:

TrendConfiguration5 = *.MV#Value;...

TrendConfiguration6 = .RbkOut#Value;...

The following applies to all other controller types (default setting):

TrendConfiguration5 = .MV#Value;...

TrendConfiguration6 = *.RbkOut#Value;...

Panel blocks, general

To operate and monitor the process on an operator panel in addition to using an OS it is necessary to use interface blocks (Pxxx) for communication. These blocks form the HMI interface with the operator panel.

For example to operate and monitor the field device MAG 6000 via OS and an operator panel, it is necessary to implement the following blocks:

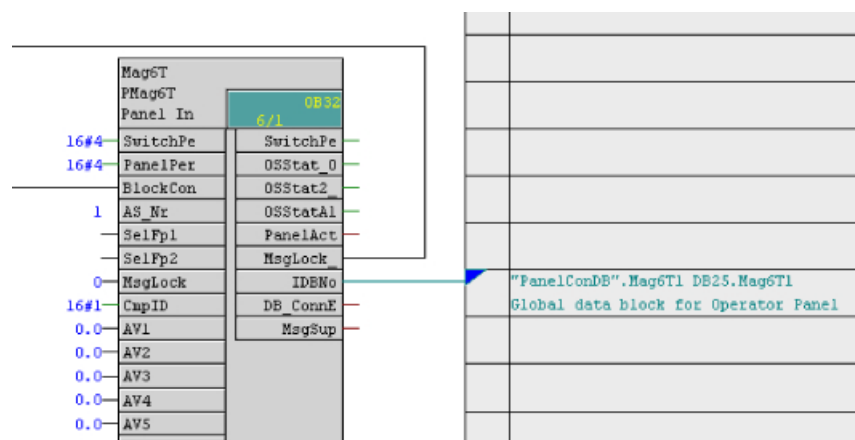
- Technological function block Mag6T to operate the field device MAG 6000
- Operator panel function block PMag6T as interface to function block Mag6T and the panel (WinCC-flexible)

The technological block and panel block communicate using an ANY pointer connection. In other words, communication can be established simply by connecting the BlockConnector input of the panel block to any output (apart from ENO) of the technological block. All necessary values are read and written using this connection.

If an error is detected in this connection (for example, if the BlockConnector input is connected to a technological block that is not associated with the panel block), the DB_ConnErr output of the panel block is set to 1.

The instance DBs of the operator panel blocks act as the HMI interface with the operator panel. They have an individually defined "structure" which is dependent on the type of equipment concerned.

Create a data block, used as 'communication-DB', in the S7 program. The numbers of the instance data blocks of the used panel blocks are stored in this block as integers. Connect the IDBNo output of the panel interface block to the parameter of the DB.

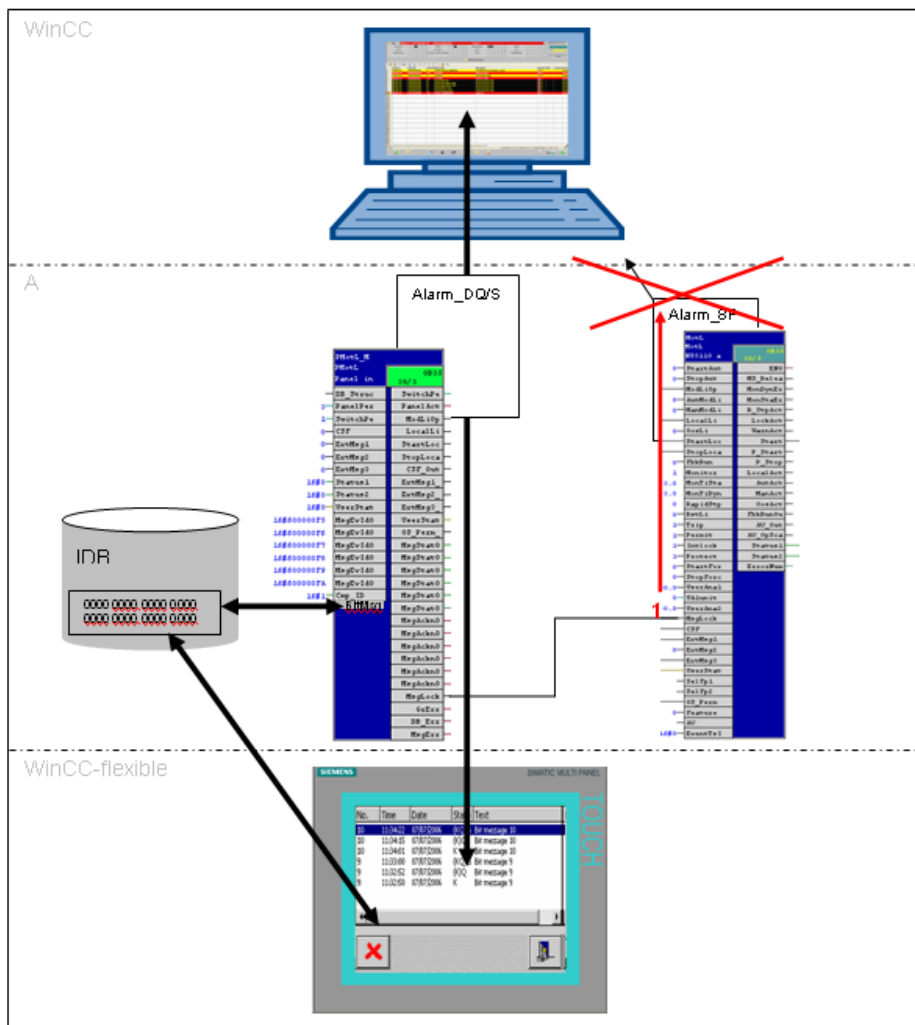


Note

It is sufficient to use one DB containing the IDB number entries of the panel blocks used.

PCS 7 messaging

It trivially applies that all messages on the technological block are also present on the panel block.



In the message view of the WinCC-flexible faceplate, the message classes "S7 messages", "S7 controller control system messages" and "S7 warning" are displayed. Note that messages

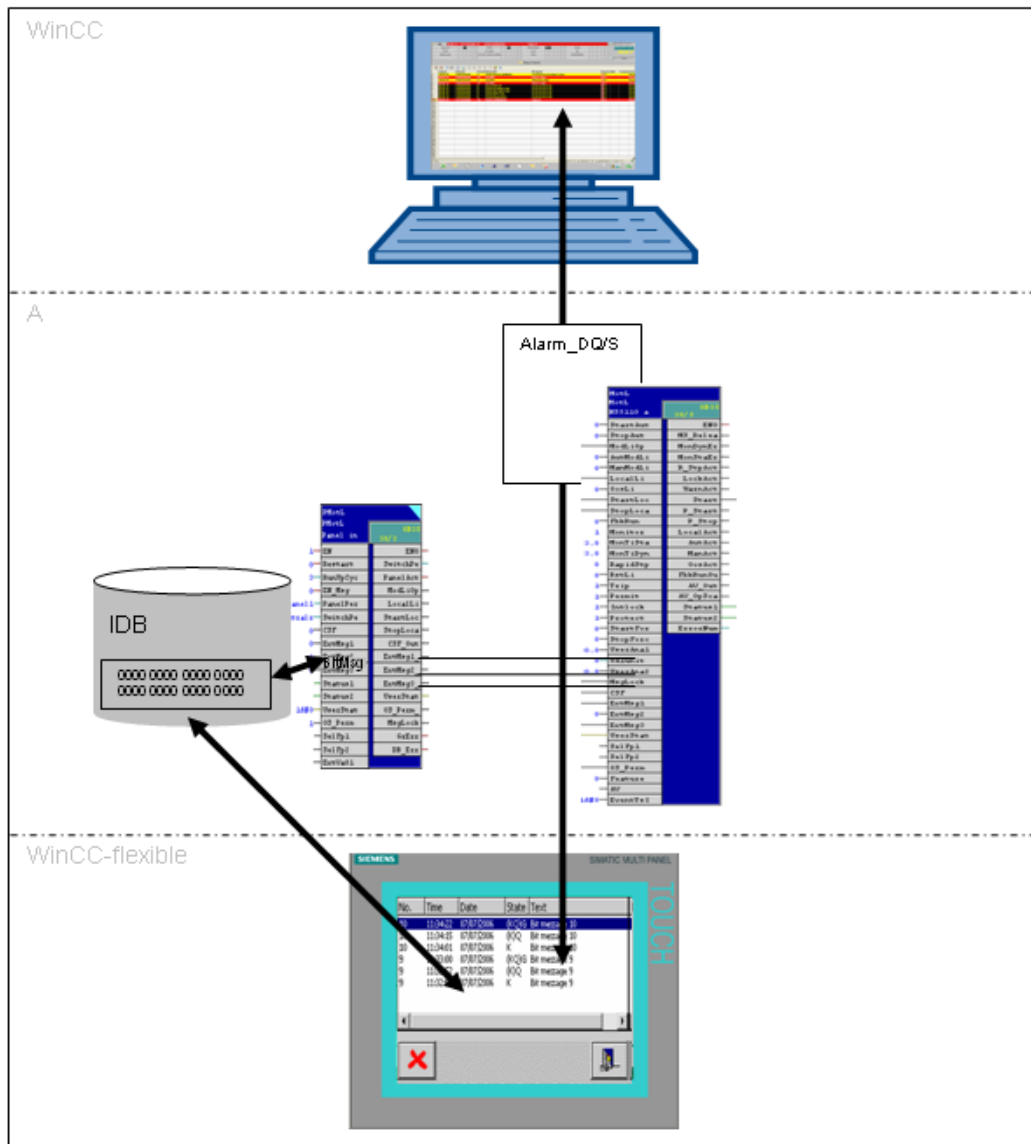
of the message class "S7 process message" or "S7 tolerance" are not displayed by the system broken down by instances in the message view of the WinCC-flexible faceplate. Messages of these classes must be displayed by a separate message view in the WinCC-flexible project. A separate filter is required for the instance granular view of the messages in the message view of the WinCC-flexible faceplate. This filter consists of the instance DB number of the panel function block and the value configured at the AS_No input of the panel block. The value of the filter is transferred to the panel via the Op_MsgFilter input for filtering. When the ALARM_DQ messages are generated at the panel block, the content of the message filter is added to the message text of the message. The messages can then be filtered on the operator panel using the message filter provided by Op_MsgFilter.

An unambiguous value must be configured at the AS_No input for every AS in the project.

Values between 1 and 999 are permissible at the AS_No input.

S7 messaging

The panel function block PMag6T offers a word input as a message interface to provide the bit messaging for creating messages at the operator panel. In addition, the messages are automatically generated according to the message number procedure. The technological block S7Mag6T generates the messages using an integrated calling of the AlarmDQ/Alarm_SC functions and sends them to the operator station (OS) and the operator panel (OP). The controller transmits a message number and message text to the control units.



In the message view of the WinCC-flexible faceplate, the message classes "S7 messages", "S7 controller control system messages" and "S7 warning" are displayed. Note that messages of the message class "S7 process message" or "S7 tolerance" are not displayed by the system broken down by instances in the message view of the WinCC-flexible faceplate. Messages of these classes must be displayed by a separate message view in the WinCC-flexible project. A separate filter is required for the instance granular view of the messages in the message view of the WinCC-flexible faceplate. This comprises the instance DB number of the panel

function block and the value parameterized at the "AS_NR" input of the panel block. The filter value is forwarded to the panel via the "OP_MSG_FILTER" input for filtering and to the technological block via the ANY pointer connection for message generation. When generating the ALARM_DQ messages on the technological block, the content of the message filter is also written into the text of the message.

The messages can then be filtered on the operator panel using the message filter provided by "OP_MSG_FILTER".

An unambiguous value must be configured at the "AS_NR" input for every AS in the project. Values between 1 and 999 are permitted at the "AS_NR" input.

2.2 Operating philosophy for operator panel (OP) and operator station (OS)

All operator stations have two standard operating levels, the operating levels 5 and 6. An operator with operating level 5 "Process controlling" can perform all switching operations, i.e. all technological devices can be activated/deactivated or the operating mode can be switched from manual to automatic and vice versa.

An operator with operating level 6 "Higher process controlling" can change parameters provided to the operator by a faceplate.

Additional operating level 1100 for PCS 7:

An operator with operating level 1100 "Highest process controlling" can simulate process values and release the process tag for maintenance.

Only operating level 5 is available on the operator panel. Thus it is not possible to change parameters from the OP or switch to out of service mode.

2.3 Operator control and monitoring with WinCC flexible

Introduction

With the SITRANS library for WinCC flexible you get pre-configured faceplate blocks. The block icons and faceplates are preconfigured with the necessary variables and functions. When items are inserted into the screen, the variables and connections are generated in addition to the graphic objects. All you have to do is adapt them according to the project-specific conditions. Note that a separate variables container is required for each block icon and each faceplate.

You can display the process values of several technological blocks of the same type in one window. To define which process values are to be displayed on the faceplate, click the relevant block icon.

Note

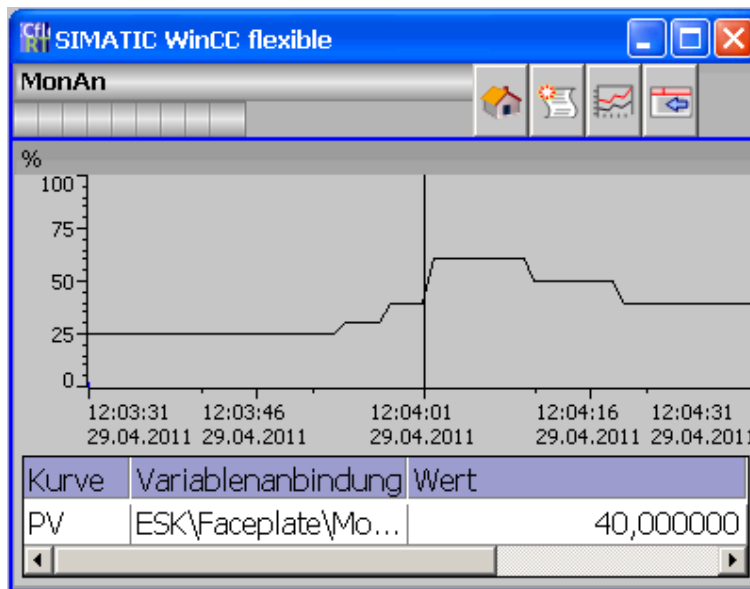
You can enable the Auxiliary Value View using the EnAux input of the panel block.

Views

The blocks provide the following views:

- Standard view
- Message view (some blocks)
- Trend view (some blocks)
- Associated value view

Trend view



Connect variables for trend view

If the faceplate provides a trend view (), you have to connect the variable(s) to be displayed as described (the example shows PMonAn with OpPV view):

-
- 00000000000000000000000000000000
- A**
- Auxiliary Value 1** %
- Auxiliary Value 2** %
- Auxiliary Value 3** %
- Auxiliary Value 4** %
- | Trend | Tag connection | value | Dx |
|--------|----------------|-------|----|
| Curve1 | Var1 | 0 | 10 |

- MonAnL (Faceplate instance)

Properties

General

Animations

Events

Properties

Permission

Permission_PCS7

Permission_S7

PermissionTextlistPCS7

PermissionTextlistS7

Pointer

PointerFaceplate

Process

Op_PV

Op_PV_Grad

Trend

RangeHigh

RangeLow

Trend

Unit

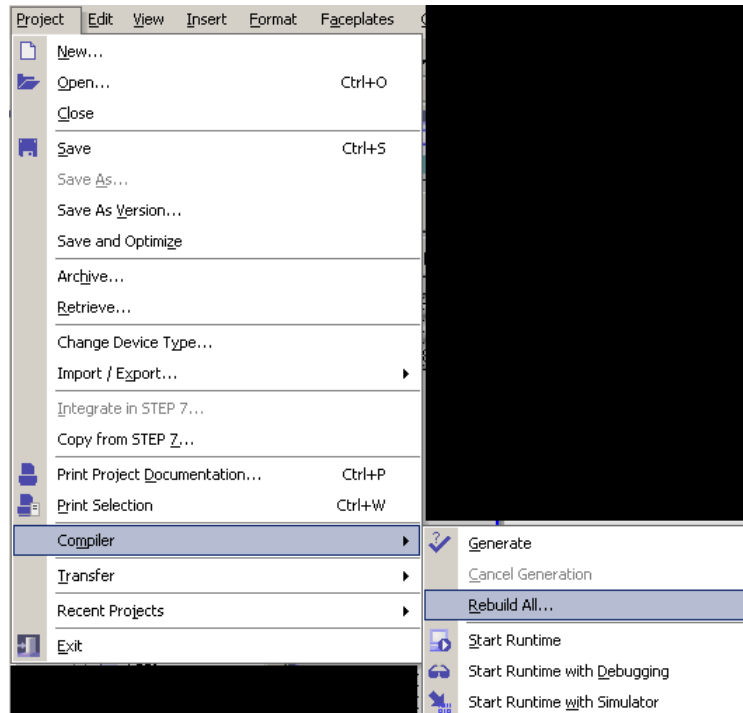
XAxis

-
- The screenshot shows the 'Trend type' configuration window for the 'PV' section. The 'Trend type' is set to 'Realtime cy...'. The 'Source settings' dropdown is open, showing a tree structure under 'Faceplate' with 'MonAn' selected. The 'Side' is 'Left' and 'Foreground c...' is '0, 0, 0'. A 'Trend tag' dropdown is set to '<undefined>'. A 'Pulse' dropdown is also visible. A secondary window on the right shows a table with columns 'Icon', 'Name', and 'Info', listing various database pointers like 'MonAn.Aux1', 'MonAn.Aux2', etc., with 'MonAn.Op_PV' highlighted.
- | Icon | Name | Info |
|--------------|---------------------|---------------------|
| <undefined> | <undefined> | |
| DB [Pointer] | MonAn.Aux1 | DB [Pointer] DBD... |
| DB [Pointer] | MonAn.Aux2 | DB [Pointer] DBD... |
| DB [Pointer] | MonAn.Aux3 | DB [Pointer] DBD... |
| DB [Pointer] | MonAn.Aux4 | DB [Pointer] DBD... |
| DB [Pointer] | MonAn.MsgFilter | DB [Pointer] DBD... |
| DB [Pointer] | MonAn.Op_PV | DB [Pointer] DBD 2 |
| DB [Pointer] | MonAn.Op_PV_G... | DB [Pointer] DBD 6 |
| DB [Pointer] | MonAn.OSStateAL | DB [Pointer] DBD... |
| DB [Pointer] | MonAn.Permission... | DB [Pointer] DBD... |

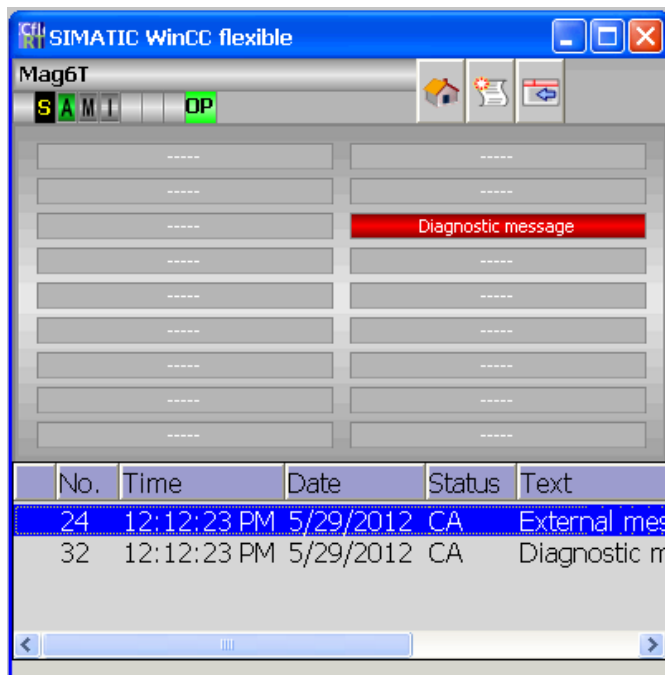
5. Connected variable:



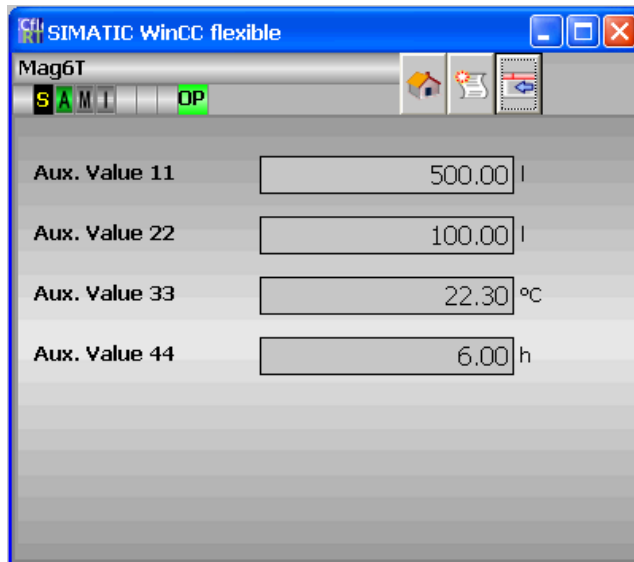
6. After changing a variable, you have to compile the project.



Message view



Associated value view



2.4 Operator control and monitoring with WinCC (PCS 7 OS)

Icons and views

Block icon

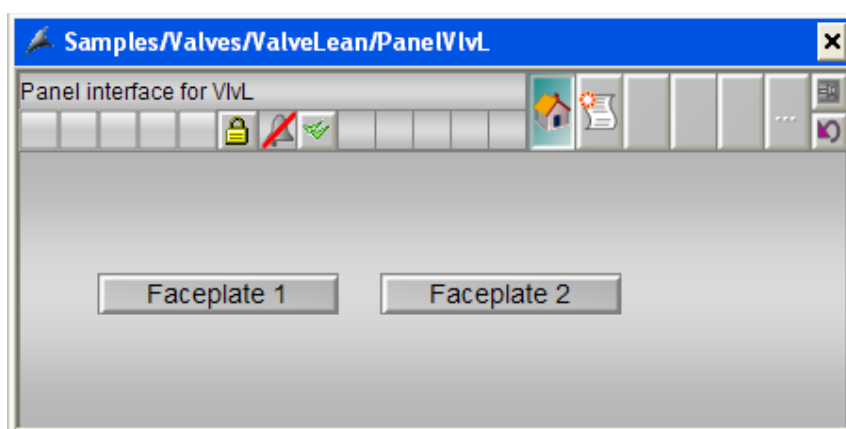


Views

The blocks provide the following views:

- Standard view
- Message view (some blocks)

Standard view



Configurable response using the Feature I/O

3.1 Configurable functions using the Feature I/O

Configurable functions using the Feature I/O

Some blocks have an input called `Feature`. This input can be used to influence the way in which the block works.

The `Feature` Bits are assigned in the following order:

Bit number	Meaning	Block
0	Setting the startup characteristics (Page 24)	Mag6T, Lut400, SipPS2, SitransT, SitransP, SitrP_PA, SitrFC43, SitrLRPA, SitrLRHA, Mr200
1	Reaction to the out of service mode (Page 25)	Mag6T, Lut400, SipPS2, SitransT, SitransP, SitrP_PA, SitrFC43, SitrLRPA, SitrLRHA, Mr200
2	Resetting the commands for changing the mode (Page 26)	Mag6T, SipPS2
3	Enabling resetting of commands for the control settings (Page 26)	Mag6T, SipPS2, SitrP_PA
4	Set switch or button mode (Page 27)	Mag6T, SipPS2, SitrP_PA, SitrFC43
5	Control via auxiliary valve	SipPS2
6	Disabling opening and closing	SipPS2
7	Separate delay times for each alarm	Mag6T
8	Read configuration data automatically (Page 28)	Mag6T
	Separate delay times for each alarm	SipPS2
9	AUTOHOTSPOT	Mag6T, SipPS2
10	Exiting local mode (Page 28)	Mag6T, SipPS2
11	Pause dosing at flow alarm (Page 29)	Mag6T
	Activating the run time of feedback signals	SipPS2
17	Activating bumpless changeover to automatic mode (Page 30)	Mag6T
22	Update acknowledgment and error status of the message call (Page 30)	Mag6T, Lut400, SipPS2, SitransT, SitransP, SitrP_PA, SitrFC43, SitrLRPA, SitrLRHA, Mr200
24	Enabling local operating permission (Page 30)	Mag6T, SipPS2
25	AUTOHOTSPOT	Mag6T, SipPS2
28	Disabling operating points (Page 31)	Mag6T, Lut400, SipPS2

3.2 Setting the startup characteristics

Bit number	Meaning	Block
29	Signaling limit violation (Page 32)	Mag6T, Lut400, SipPS2, SitransT, SitransP, SitrP_PA, SitrFC43, SitrLRHA
30	Resetting depending on the operating mode (Page 32)	Mag6T, SipPS2
31	AUTOHOTSPOT	Mag6T, SipPS2

For more information about the feature bits please refer to the APL online help.

See also

Activating reset of protection / errors in manual mode (Page 33)

3.2 Setting the startup characteristics

Feature bit

Number of the `Feature` bit: 0

Setting the startup characteristics

With this `Feature` bit you set the startup characteristics of the function blocks.

Note

This `Feature` Bit has no function in the "Out of service" operating mode. The process tag remains in the "Out of service" operating mode after a warm restart of the CPU.

Note

The restart routines of the blocks reset the following outputs in OB100:

- Operating point outputs `xx_AH_Act`, `xx_AL_Act`, `xx_WH_Act`, and `xx_WL_Act`

This causes an outgoing message when initializing `Alarm8_P` in OB100 and an incoming message after expiry of the `RunUpCycle` counter in the cyclic interrupt level.

Note

During a complete download with AS stop, the blocks (with `Feature.Bit0 = 1`) cannot resume operation in their previous mode and control when restarted.

Setting the startup characteristics for the Mag6T block

Bit = 0: Starting the block in manual mode and in defined position. The totalizers are reset and held ('Hold' command). Dosing is switched off (Stop command) if it is configured, and the setpoint is set to internal.

Bit = 1: The block operates with the last valid commands before CPU-stop, stored at the Oldxxx inputs, for the totalizers and the dosing unit. These inputs can be read back before a complete download.

Setting the startup characteristics for the SitrFC43 block

Bit = 0: Starting the block in manual mode and in defined position. The totalizers are held ('Hold' command). Dosing is switched off (Stop command) if it is configured, and the setpoint is set to internal.

Bit = 1: The block operates with the last valid commands before CPU-stop, stored at the Oldxxx inputs, for the totalizers and the dosing unit. These inputs can be read back before a complete download.

Setting the startup characteristics for Lut400, SipPS2, SitransT, SitransP, SitrP_PA, SitrLRPA, SitrLRHA and Mr200 blocks

Bit = 0: The most recently stored values are reset on startup

Bit = 1: The most recently used value at the output parameter Out is output on startup.

See also

Description of S7Mag6T (Page 205)

3.3 Reaction to the out of service mode

Feature bit

Number of the `Feature` bit: 1

Reaction to the Out of service mode

You can use this `Feature` bit to define the response of the technological block depending on the connectable input parameter `OosLi = 1` or `Oos2Li = 1`.

The default setting is 0.

- **Bit = 0:** The symbol for the "In progress" status (see below) appears in the block icon and in the faceplate of the assigned technologic block. A change 0-1 in the edge of the input parameter `OosLi` or `Oos2Li` has no further influence on the response of the technological block, the initial status is retained. No switch to the "Out of service" mode is performed.
- **Bit = 1:** The mode switches to "Out of service" assuming that the block is "On" or "Manual" mode. If this is not the case, the mode does not change. The symbol for the "In progress" (see below) status also appears in the block icon and in the faceplate of the assigned technologic block regardless of the mode change. No message is output to indicate whether or not the mode change took place.

The status display for "In progress" appears as follows:



A change 0-1 in the edge of the input parameter `OosLi` or `Oos2Li` has no influence on the response of the technological block, the initial status is retained.

3.4 Resetting the commands for changing the mode

Feature Bit

Number of the `Feature` bit: 2

Resetting the commands for changing the mode

With this `Feature` bit you define how the block handles the incoming control commands `DSP_IntLi`, `DSP_ExtLi` (for setpoint of the dosing unit) as well as `AutModLi` and `ManModLi` or `AutMod2Li` and `ManMod2Li`.
The default setting is 0.

Bit = 0: The control commands are not reset by the block. If there are two pending control commands for changing mode, the mode is not changed. In this case, the note text "Invalid command" is displayed in the faceplate.

Bit = 1: The control commands are reset by the block. This, for example, ensures that if a control command is sent from the SFC, the command is reset automatically after a step is exited.

3.5 Enabling resetting of commands for the control settings

Feature Bit

Number of the `Feature` bit: 3

Enabling resetting of commands for the control settings

With this `Feature` bit you select how the block handles commands for the control settings (e.g. "totalizer Hold" or "Start dosing") via the interconnected input parameters.
The default setting is 0.

Bit = 0: The control commands are not reset by the block. If there are two commands relating to the control settings at the same time, the status of the control settings is retained. In this case, the "Invalid signal" message is displayed in the standard view of the faceplate.

Bit = 1: The control commands are reset by the block. This, for example, ensures that if a control command is sent from the SFC, the command is reset automatically after a step is exited.

3.6 Set switch or button mode

Feature bit

Number of the Feature bit: 4

Setting switch or button mode (input signal as pulse signal or as static signal)

You can use this Feature bit to select the mode switchover between manual and automatic mode and to determine whether the setpoint is selected with a switch or with two 1-active control inputs (buttons). This Feature bit has no influence on the control commands sent to the module such as e.g. 'Stop counter' or 'Start dosing'.

The Feature bit affects the following control inputs:

- Mode switchover (parameters AutModLi and ManModLi or AutMod2Li and ManMod2Li)
- Internal and external setpoint input of the dosing unit (parameters DSP_ExtLi and DSP_IntLi)

The Feature bit acts on control inputs in the form of a pulse (button mode) or a static signal (switch mode).

You can find the commands for controlling the block in the relevant section on block operating modes. They are always the parameters that are used for the automatic operation of a block.

Bit = 0: Button mode: Each automatic command is assigned to a control input. This has a latching reaction and is 1-active.

Mode:

- AutModLi/AutMod2Li = 1 for setting "Automatic" operating mode
- ManMod1Li/ManMod2Li = 1 for setting "Manual" operating mode

Setpoint selection:

- DSP_ExtLi = 1 to select the external setpoint and
- DSP_IntLi = 1 to select the internal setpoint

Bit = 1: Switching mode: two static automatic commands are assigned to a control input.

Mode:

- AutModLi/AutMod2Li = 1 for setting "Automatic" operating mode
- ManMod1Li/ManMod2Li = 0 for setting "Manual" operating mode

Setpoint selection:

- DSP_ExtLi = 1 to select the external setpoint
- DSP_IntLi = 0 to select the internal setpoint

The ManMod1Li/ManMod2Li and DSP_IntLi inputs have no effects.

3.7 Read configuration data automatically

Feature bit

Number of the `Feature` bit: 8

Read configuration data automatically

Using this `Feature` bit you define if the configuration data is read out automatically at the restart of the control (OB100) or the re-accessibility of the device via Profibus (OB86, return of the rack).

The configuration may be for example:

- Units
- Scale
- Warning limit, alarm limit, and hysteresis.
- Setpoint and compensation.

Note

The configuration data is read by means of acyclic services. At each Profibus cable only 8 acyclic services can be performed simultaneously. So it is possible that the execution (for example after a return of the Profibus cable) of the data is done with a noticeable delay, if all participants read out their configuration data at the same time. So do not set the `Feature` bit 8 if more than 8 participants use acyclic services and update the configuration data after a change with the parameter view in the faceplate.

Bit = 0: The configuration data is not read out automatically at restart of the control (OB100) and return of the rack (OB86). Changed data have to be read out using the parameter view in the faceplate.

Bit = 1: The configuration data is read out automatically at restart of the control (OB100) and return of the rack (OB86).

3.8 Exiting local mode

Feature bit

Number of the `Feature` bit: 10

Reaction to exiting local mode

Use this `Feature` bit to define how the "Local mode" is to be exited with `LocalSetting = 1` or `LocalSetting = 2` and if the mode is not specified by `AutMod1Li` or `ManMod1Li` or `AutMod2Li` or `ManMod2Li`.

Default setting is 0

Bit = 0: Exiting local mode in manual mode (bumpless because the control signals are continuously adjusted).

Bit = 1: When local mode is exited, the mode changes back to the last mode that was active prior to local mode (not bumpless).

For more detailed information, refer to the description of Local mode of the Standard APL blocks.

3.9 Resetting via input signals in the event of interlocking (Protection) or errors

Feature Bit

Number of the `Feature` bit: 9

Resetting the block in the event of interlocking (only Protection: Input parameter `Protect`) or errors via input signals

With this `Feature` bit, you define how automatic control is to be re-enabled after an active interlock.

The default setting is 0.

Bit = 0: After an interlock (only Protection: Input parameter `Protect`) or errors, the system can only be restarted using a reset command. Reset is initiated either by operator input in the faceplate or via the interconnectable input parameter (`RstLi = 1`) in the block. Thereafter, the currently pending command takes effect in automatic mode.

Bit = 1: It is also possible to reset with a 0-1 edge change in the control signal in automatic mode.

3.10 Pause dosing at flow alarm

Feature bit

Number of the `Feature` bit: 11

Pause in dosing in the event of a flow alarm

With this `Feature` bit you enable pausing at a flow alarm.

Default setting is 0

Bit = 0: Disabled, dosing is not paused when a flow alarm occurs.

Bit = 1: Enabled, dosing is changed to "Pause dosing" when a flow alarm occurs.

3.11 Activating bumpless changeover to automatic mode

Feature bit

Number of the Feature bit: 17

Bumpless switchover

You can use this Feature bit to enable the bumpless switchover from local/manual mode to automatic mode.

Default setting is 0

Bit = 0: Bumpless switchover is disabled. You can switch from local/manual mode to automatic mode at any time.

Bit = 1: Bumpless switchover from local/manual mode to automatic mode is enabled. A switchover from local/manual mode to automatic mode is only possible if the control settings of the local/manual mode and automatic modes match. If switchover occurs at a different point in time, this is indicated in the faceplate with the text "Switchover error".

3.12 Update acknowledgment and error status of the message call

Feature bit

Number of the Feature bit: 22

Update acknowledgment and error status of the message call

You can use the Feature bit to determine if the acknowledgment and error status of the message call at the block output should be updated.

The default setting is 0.

- **Bit = 0:** The `MsgErr1/2/3`, `MsgStat1/2/3` and `MsgAckn1/2/3` block outputs are set to the default setting and not updated. The block will run faster with this setting.
- **Bit = 1:** The block outputs `MsgErr1/2/3`, `MsgStat1/2/3` and `MsgAckn1/2/3` are updated using the feedback messages of the subordinate message blocks. The subordinate message blocks are called in every 2nd cycle if an acknowledgment is waited for or if error information is present.

3.13 Enabling local operating permission

Feature bit

Number of the Feature bit: 24

Enabling local operator authorization

You can use this `Feature` bit to enable local permission for a technologic block. Local operator authorization is an upstream operator control permission which is determined before the operator authorizations for user management and the release of the block, and is realized via the Standard APL-block OpStations block. Details can be found in the APL Online Help of the OpStations block.

If local operator authorization is missing, operation of a block instance on an OS is usually blocked. Otherwise, when local operator authorization is allowed, the operator control permission is normally determined through user management and the block.

Local operating permission can be set for each specific instance; in other words, block instances can be enabled or disabled for use on an operator station independently of one another.

The default setting is 0.

Bit = 0: Disabled

Bit = 1: Enabled

3.14 Suppression of all messages

Feature Bit

Number of the `Feature` bit: 25

Suppression of all messages

You can use this `Feature` bit to determine whether all messages of the block are to be suppressed.

Bit = 0: Process messages are suppressed.

Bit = 1: All messages are suppressed.

3.15 Disabling operating points

Feature bit

Number of the `Feature` bit: 28

Disabling operating points

You can use this `Feature` bit to define whether the operating point functionality (`xx_Ax_Act/xx_Wx_Act` outputs) of a limit are also to be deactivated when the message (`MsgLock = 1`) is deactivated.

The default setting is 0.

3.17 Resetting depending on the operating mode

Bit = 0: Operating point is not suppressed

Bit = 1: Operating point is suppressed

3.16 Signaling limit violation

Feature bit

Number of the `Feature` bit: 29

Signaling limit violation

With this `Feature` bit, you specify how limit violation should be sent to the respective limit outputs. This concerns the outputs for the limits of the volume flow (`VF_AH_Act`, `VF_WH_Act`, `VF_WL_Act`, `VF_AL_Act`) and the totalizers 1 or 2 (`Tot1_AH_Act`, `Tot1_WH_Act`, `Tot1_VF_WL_Act`, `Tot1_AL_Act` or `Tot2_AH_Act`, `Tot2_WH_Act`, `Tot2_VF_WL_Act`, `Tot2_AL_Act`)

The default setting is 0.

Bit = 0: Output value of the limit output = 1 (1 active)

Bit = 1: Output value of the limit output = 0 (0 active)

3.17 Resetting depending on the operating mode

Feature bit

Number of the `Feature` bit: 30

Resetting depending on the operating mode

When the "Protection" interlock, feedback error ("Runtime error", "Control error") or "Motor protection" signal is present again, use this `Feature` bit to specify if a reset can be made depending on the mode only by the operator in manual mode or only by the automatic I/Os in automatic mode.

Resetting to manual mode is enabled with `Feature` Bit 31 (Activating reset of protection / errors in manual mode (Page 33)). Also refer to the "Resetting the block in case of interlocks or errors" section of the manual of the Standard APL blocks.

The default setting is 0.

Bit = 0: Resetting is independent of the operating mode

Bit = 1: In manual mode, manual resetting by the operator is only possible if `Feature` bit 31 is set, otherwise resetting is not required in manual mode.

In automatic mode, only resetting via automatic connections is possible, regardless of `Feature` bit 31. This is carried out by a 0-1 change in edge at the `RstLi` input or - with the `Feature` bit 9 set - by a 0-1 change in edge at the automatic inputs e.g. `DSrtAut`.

3.18 Activating reset of protection / errors in manual mode

Feature bit

Number of the `Feature` bit: 31

Activating reset of protection / errors in manual mode

Use this `Feature` bit to specify whether a reset is necessary once the "Protection" interlock signal is present again. Also refer to the "Resetting the block in case of interlocks or errors" section of the manual of the Standard APL blocks.

The default setting is 0.

Bit = 0: No resetting necessary in manual mode.

Bit = 1: Resetting is necessary in manual mode. The reset is performed using the "Reset" button (`RstOp` = 1) or, in CFC, using the input parameter `RstLi`.

3.18 Activating reset of protection / errors in manual mode

SITRANS FC430

4.1 S7SiFC43

4.1.1 Description of S7SiFC43

Object name (type + number) and family

Type + number: FB 2639

Family: Sitrans

Area of application for S7SiFC43

The block is used for the following application:

- Interface block between the driver blocks of the HART module SITRANS FC430 (referred to below as FC430) for the user program and visualization.

How it works

The S7SiFC430 block prepares the process data received by driver blocks from a FC430 and makes the data available for further use in the user program and for visualization. Data entered in the faceplate or via the block inputs is transferred to the FC430 by means of driver blocks and the SiFC43Dr block (FB2631).

The function block supports all PDM configurations of the max. four HART auxiliary variables of the FC430.

Note

Below, block parameters are identified e.g. by PV/SV/TV/QV_OpScaleH, PV/SV/TV/QV_OpScaleL where the PV_OpScaleH/L, SV_OpScaleH/L, TV_OpScaleH/L and QV_OpScaleH/L inputs are intended for the HART variables PV, SV, TV and QV.

Configuration

In the CFC editor, install the block in a cyclic interrupt OB (OB30 to OB38). The block is also installed automatically in the startup OB (OB 100). Moreover, to connect the I/O signals, it is imperative to call the driver block PiDr64 (acyclic data) in the same interrupt OB and startup OB (OB100) **before** the S7SiFC43 block in each case. The output structure `AcyclData` of the PiDr64 block is interconnected to the input with the same name of the SiFC43Dr block. The `SxRdReq`, `SxWrReq` and `Para` output structures of the SiFC43Dr block are interconnected to the `RdReq`, `WrReq` and `Para` inputs of the S7SiFC43 block. The SiFC43Dr block must be called after the PiDr64 and before the S7SiFC43 block.

Feature Bit 7 = TRUE means that the block takes over the message limits when reading the configuration data from the device. The maximum and minimum values for the alarm and warning limits of the process values are configured at the `LimPV/SV/TV/QV_OpScaleH`, `LimPV/SV/TV/QV_OpScaleL` inputs, or read out from the device if Feature bit 7 is set for synchronization of the message configuration with the device.

Measuring ranges of the corresponding measured values are configured at the `PV/SV/TV/QV_OpScaleH`, `LimPV/SV/TV/QV_OpScaleL` inputs.

Dosing function

If dosing is used, the following must be configured:

1. Configuration of a dosing mode in PDM
2. Setting of Feature bit 14 (activate dosing) to TRUE
3. Supply of `SV` input with the current dosing quantity via a 4 to 20 mA input
4. Supply of `FbkDosVlv` input with the current feedback of the dosing valve via a digital input

Note

The dosing valve requires a binary feedback of its current state. The feedback of the dosing valve must be interconnected to the `FbkDosVlv` input so that the new dosing state is read out by means of acyclic communication in the event of a change. Start of dosing is also transmitted to the device by means of acyclic communication. Since, in contrast to cyclic data transmission, this can take several cycles, the FC430 is not suitable for applications in which dosing operations have to be started in rapid succession.

Note

The S7SiFC43 block contains two templates for process tag types with or without dosing function in the SITRANS Library as an example with an application of this block with or without dosing; Template of S7SiFC43 (Page 73).

Note

The user text library "S7SiFC43_MeasVal" must be copied from the Sitrans Library to the STEP 7 project prior to the OS compilation. To do this, open the SITRANS Lib from the Simatic Manager using File -> Open... -> Libraries. Copy the "S7SiFC43_MeasVal" file from the library (directory: Blocks+Templates\Text Libraries) into a user text library folder created using the S7 program in your STEP 7 project.

Startup characteristics

Use the Feature Bit Setting the startup characteristics (Page 24) to define the startup characteristics of this block.

The messages are suppressed after startup for the number of cycles set at `RunUpCyc`.

Status word allocation for `Status1` parameter

You can find a description for each parameter in section I/Os of S7SiFC43 (Page 53).

Status bit	Parameter
0	Occupied
1	BatchEn
2	Not used
3	OosPVAct
4	OosPVLi
5	Not used
6	OnPVAct
7	OosSVAct
8	OosSVLi
9	AutSVAct
10	LocalSVAct
11	OnSVAct
12	OosTVAct
13	OosTVLi
14	AutTVAct
15	LocalTVAct
16	OnTVAct
17	OosQVAct
18	OosQVLi
19	AutQVAct
20	xFeatLocalAuth
21	OnQVAct
22	LocalQVAct
23	Not used
24	Dosing state "Stopped"
25	Dosing state "Running"
26	Dosing state "Pause"
27	Dosing state "Cleaning"
28	Automatic preview 1 = Dosing "Stopped"
29	Automatic preview 1 = Dosing "Running"
30	Automatic preview 1 = Dosing "Pause"
31	Automatic preview 1 = Dosing "Cleaning"

Status word allocation for `Status2` parameter

Status bit	Parameter
0 - 15	Not used
16	SV: Current totalizer command 1 = Positive and negative
17	SV: Current totalizer command 1 = Positive

Status bit	Parameter
18	SV: Current totalizer command 1 = Negative
19	SV: Current totalizer command 1 = Hold
20	SV: Automatic preview totalizer command 1 = Positive and negative
21	SV: Automatic preview totalizer command 1 = Positive
22	SV: Automatic preview totalizer command 1 = Negative
23	SV: Automatic preview totalizer command 1 = Hold
24	TV: Current totalizer command 1 = Positive and negative
25	TV: Current totalizer command 1 = Positive
26	TV: Current totalizer command 1 = Negative
27	TV: Current totalizer command 1 = Hold
28	TV: Automatic preview totalizer command 1 = Positive and negative
29	TV: Automatic preview totalizer command 1 = Positive
30	TV: Automatic preview totalizer command 1 = Negative
31	TV: Automatic preview totalizer command 1 = Hold

Status word allocation for status3 parameter

Status bit	Parameter
0 - 1	Not used
2	QV: Current totalizer command 1 = Positive and negative
3	QV: Current totalizer command 1 = Positive
4	QV: Current totalizer command 1 = Negative
5	QV: Current totalizer command 1 = Hold
6	QV: Automatic preview totalizer command 1 = Positive and negative
7	QV: Automatic preview totalizer command 1 = Positive
8	QV: Automatic preview totalizer command 1 = Negative
9	QV: Automatic preview totalizer command 1 = Hold
10	PV_AH_Act
11	PV_WH_Act
12	PV_WL_Act
13	PV_AL_Act
14	PV_AH_En
15	PV_WH_En
16	PV_WL_En
17	PV_AL_En
18	PV_AH_MsgEn
19	PV_WH_MsgEn
20	PV_WL_MsgEn
21	PV_AL_MsgEn
22	GradHUpAct
23	GradHDnAct
24	GradLAct

Status bit	Parameter
25	GradHUpEn
26	GradHDnEn
27	GradLEn
28	GradHUpMsgEn
29	GradHDnMsgEn
30	GradLMsgEn
31	0 = falling measured value 1 = rising measured value

Status word allocation for Status4 parameter

Status bit	Parameter
0	Not used
1	DSP_ExtAct
2	Not used
3	MsgLock
4	SV_AH_Act
5	SV_WH_Act
6	SV_WL_Act
7	SV_AL_Act
8	SV_AH_En
9	SV_WH_En
10	SV_WL_En
11	SV_AL_En
12	SV_AH_MsgEn
13	SV_WH_MsgEn
14	SV_WL_MsgEn
15	SV_AL_MsgEn
16	TV_AH_En
17	TV_WH_En
18	TV_WL_En
19	TV_AL_En
20	TV_AH_MsgEn
21	TV_WH_MsgEn
22	TV_WL_MsgEn
23	TV_AL_MsgEn
24 - 31	Not used

Status word allocation for status5 parameter

Status bit	Parameter
0	TV_AH_Act
1	TV_WH_Act
2	TV_WL_Act
3	TV_AL_Act
4	QV_AH_Act
5	QV_WH_Act
6	QV_WL_Act
7	QV_AL_Act
8	QV_AH_En
9	QV_WH_En
10	QV_WL_En
11	QV_AL_En
12	QV_AH_MsgEn
13	QV_WH_MsgEn
14	QV_WL_MsgEn
15	QV_AL_MsgEn
16	"Interlock" button is enabled
17 - 18	Not used
19	1 = Intlock is active
20 - 21	Not used
22	Display for interlocks in block icon
23	1 = Any Interlock is active
24	ForcedSrt
25	ForcedStp
26	ForcedPause
27	ForcedCont
28	Not used
29	Interlocks not released
30	1 = Error when reading acyclic data (active only for the duration of one cycle)
31	1 = Error when writing acyclic data (active only for the duration of one cycle)

Status word allocation for status6 parameter

Status bit	Parameter
0	QWronDev
1	External control system fault (CSF)
2	Mode switchover error
3	SV is configured as dosing unit
4	SV is configured as totalizer
5	TV is configured as totalizer
6	QV is configured as totalizer

Status bit	Parameter
7 - 10	Not used
11	SV input is used
12	TV input is used
13	QV input is used
14	1 = At least one PV message is released
15	1 = At least one SV message is released
16	1 = At least one TV message is released
17	1 = At least one QV message is released
18	"Custody transfer mode" is active
19	Not used
20	LocalSVAct
21 - 22	Not used
23	Mode switchover error

4.1.2 Operating modes of S7SiFC43

Every HART auxiliary variable configured with PDM in the device has its own operating mode switchover. The operating modes of the S7SiFC43 block selectable in each case depend on whether a totalizer or dosing value is configured for the respective HART auxiliary variable or only a simple measured value.

Operating modes of S7SiFC43 for simple measured value

The block can be operated using the following modes:

- On
- Out of service

"On"

You can find general information about the "On" mode in the "On" section.

"Out of service"

You can find general information about the "Out of service" mode in the Out of service section.

The descriptions of the operating modes are identical for SitrFC43 and the APL; refer to the online help for the standard APL blocks for information on them.

Operating modes of S7SiFC43 for totalizer or dosing value

The block can be operated using the following modes:

- Local mode
- Automatic mode
- Manual mode
- Out of service

The general descriptions of the operating modes are identical for S7SiFC43 and the APL; refer to the online help for the standard APL blocks for information on them.

The next section provides additional block-specific information relating to the general descriptions.

"Local mode"

"Local mode" supports the transfer of the following commands to the totalizer:

- "Positive and negative" (positive edge `BalSV/TV/QVLocal`)
- "Positive" (positive edge `PosSV/TV/QVLocal`)
- "Negative" (positive edge `NegSV/TV/QVLocal`)
- "Hold" (`HoldSV/TV/QVLocal`).

If you set the block to "Local mode", the control is only influenced by the "local" signals of the totalizers (input parameters `BalSV/TV/QVLocal = 1`, `PosSV/TV/QVLocal = 1`, `NegSV/TV/QVLocal = 1` and `HoldSV/TV/QVLocal = 1`).

"Local mode" supports the transfer of the following commands to the dosing unit:

- "Start" (positive edge `DSrtLocal`)
- "Continue" (`DContLocal = 1`)
- "Pause" (`DPauseLocal = 1`)
- "Stop" (`DStpLocal = 1`)

Note

Unlike the general description, only the values 0, 1 and 3 can be set at the `LocalSetting` parameter. Tracking in "local" mode is not possible with S7SiFC43.

"Automatic mode"

"Automatic mode" supports the transfer of the following commands to the totalizer:

- "Positive and negative" (positive edge `BalSV/TV/QVAut`)
- "Positive" (positive edge `PosSV/TV/QVAut`)
- "Negative" (positive edge `NegSV/TV/QVAut`)
- "Hold" (`HoldSV/TV/QVAut = 1`)

"Automatic mode" supports the transfer of the following commands to the dosing unit:

- "Start" (positive edge `DSrtAut`)
- "Continue" (`DContAut = 1`)
- "Pause" (`DPauseAut = 1`)
- "Stop" (`DStpAut = 1`)

"Manual mode"

"Manual mode" supports the transfer of the following commands to the totalizer:

- "Positive and negative" (positive edge `BalSV/TV/QVMan`)
- "Positive" (positive edge `PosSV/TV/QVMan`)
- "Negative" (positive edge `NegSV/TV/QVMan`)
- "Hold" (`HoldSV/TV/QVMan = 1`)

"Manual mode" enables the transfer of the following commands to the dosing unit:

- "Start" (positive edge `DSrtMan`)
- "Continue" (`DContMan = 1`)
- "Pause" (`DPauseMan = 1`)
- "Stop" (`DStpMan = 1`)

"Out of service"

For general information about the "out of service" mode, refer to the APL Online Help.

4.1.3 Functions of S7SiFC43

The functions for this block are listed below.

Configuration Data

The configuration data comprises the units, the configuration of the `PV_In` input and the HART auxiliary variables `SV`, `QV` and `PV` and the limits for messages. After a change is made in the device, reading of configuration data must be triggered with "Read configuration data" in the parameter view of the faceplate. If the parameters were read back before a complete download to the PLC, the configuration does not need to be reloaded from the device.

The message limits of the S7SiFC43 are only transferred to the device when the alarm configuration is synchronized with the device (`Feature Bit 7 = TRUE`).

The S7SiFC43 function block has the following configuration data which can be read out of the FC430 by means of the "Read configuration data" command:

Description	Block parameters (I/O)
Configuration of <code>PV</code> , <code>SV</code> , <code>TV</code> , <code>QV</code> inputs	<code>PV_Meas0</code> , <code>PV_Meas1</code> , <code>PV_Meas2</code> , <code>PV_Meas3</code> , <code>PV_Meas4</code>
Configuration of totalizer	<code>Tot1/2/3Ch</code>
Configuration of dosing value	<code>InDinputSel/DinputSel</code>
Units <code>PV</code> , <code>SV</code> , <code>TV</code> , <code>QV</code>	<code>PV/SV/TV/QV_Unit</code> <code>Mfl_Unit</code> , <code>Vfl_Unit</code> <code>DSP_Unit</code>
Scaling <code>PV</code>	<code>ScaleIn</code>
Names for fractions A and B	<code>FractnATxt</code> , <code>FractnBTxt</code>

Limits PV, SV, TV, QV	InPV/SV/TV/QV_AH_Lim, PV/SV/TV/QV_AH_Lim InPV/SV/TV/QV_WH_Lim, PV/SV/TV/QV_WH_Lim InPV/SV/TV/QV_WL_Lim, PV/SV/TV/QV_WL_Lim InPV/SV/TV/QV_AL_Lim, PV/SV/TV/QV_AL_Lim InPV/SV/TV/QV_Hyst, PV/SV/TV/QV_Hyst
Limit values of the limits	LimPV/SV/TV/QVOpScale
Preset value of totalizer	InSV/TV/QVPreVal, SV/TV/QVPreVal
Totalizer command	BalSV/TV/QVMan PosSV/TV/QVMan NegSV/TV/QVMan HoldSV/TV/QVMan
Low flow cut-off suppression (mass/volume)	InMflZFSupp/MflZFSupp InVflZFSupp/VflZFSupp
Type of dosing	DMode
Active dosing recipe	DActRecOp
Dosing recipe name	InRcp1/2/3/4/5Name
Dosing compensation	DCompOp/DComp
Dosing cycle counter	DCyclCnt
Dosing state	DState

Limit monitoring

The block monitors the process values PV_In, SV, TV and QV if they are configured for limits. All values are written cyclically from the module into the process image of the controller. Configuration of the limits is carried out either by means of PDM and imported by reading the configuration data from the block, or can be carried out on the block independent of the module (see Feature bit 7).

You can monitor the process values PV_In, SV, TV and QV for the following high and low alarm and warning limits:

- (In) PV/SV/TV/QV_AH_Lim: Limit for high alarm
- (In) PV/SV/TV/QV_AL_Lim: Limit for low alarm
- (In) PV/SV/TV/QV_Hyst: Hysteresis
- (In) PV/SV/TV/QV_WH_Lim: Limit for high warning
- (In) PV/SV/TV/QV_WL_Lim: Limit for low warning

The result of limit monitoring is returned at the interconnectable output parameters:

- PV/SV/TV/QV_AH_Act = 1: Limit for high alarm reached or exceeded
- PV/SV/TV/QV_AL_Act = 1: Limit for low alarm reached or undershot
- PV/SV/TV/QV_WH_Act = 1: Limit for high warning reached or exceeded
- PV/SV/TV/QV_WL_Act = 1: Limit for low warning reached or undershot

Monitoring is always enabled using the input parameters:

- PV/SV/TV/QV_AH_En = 1: Monitoring of the high alarm limits
- PV/SV/TV/QV_AL_En = 1: Monitoring of the low alarm limits

- PV/SV/TV/QV_WH_En = 1: Monitoring of the high warning limits
- PV/SV/TV/QV_WL_En = 1: Monitoring of the low warning limits

The corresponding message is suppressed using the parameters:

- PV/SV/TV/QV_AH_MsgEn = 0: Alarm (high) messages are suppressed
- PV/SV/TV/QV_AL_MsgEn = 0: Alarm (low) messages are suppressed
- PV/SV/TV/QV_WH_MsgEn = 0: Warning (high) messages are suppressed
- PV/SV/TV/QV_WL_MsgEn = 0: Warning (low) messages are suppressed

You can define a hysteresis (PV/SV/TV/QV_Hyst) for the limits, for example to suppress signal flatter. You can also modify the limits and hysteresis via the faceplate.

Gradient monitoring

The gradient PV_Grad is calculated by means of a delay function configurable using LagTime. During calculation of the gradient, jumps in the input value PV_In are smoothed.

The peak values of the gradient are output in the output parameters PV_GradNP (negative gradient) and PV_GradPP (positive gradient). These are reset when the operator enters the corresponding command for resetting.

The slope of the gradient PV_Grad can be monitored for the following limits:

- Limit (high) for the positive gradient (GradHUpLim)
- Limit (high) for the negative gradient (GradHDnLim)
- Limit (low) for the absolute gradient (GradLLim)

Activation of the individual monitoring functions is carried out at the corresponding "Enable" parameters, e.g. GradHUpEn for activating the high gradient limit for positive gradients (GradHUpLim).

Reaching or violation of your defined limits is indicated at the corresponding "Active" output parameters, e.g. by means of GradHUpAct = 1 for the limit (high) for the positive gradient.

Messages can be output for these alarms. You can activate these as follows:

- Message for alarms (high) for the positive gradient: GradHUpMsgEn = 1
- Message for alarms (high) for the negative gradient: GradHDnMsgEn = 1
- Message for alarms (low) for the absolute gradient: GradLMsgEn = 1

Suppressing messages using the MsgLock parameter

This block provides the standard "Suppressing messages using the MsgLock parameter" function that is described in the APL Online Help.

Selecting a unit of measure

The units for the process values PV_In, SV, TV and QV are configured on the FC430 device via PDM and read out by operator action in the "Parameters" faceplate view with "Read configuration".

Configurable reactions using the Feature I/O

The following responses are available for this block at the respective bits of the Feature I/O. If a description is not available here, it can be referenced in the APL Online Help.

Bit	Feature
0	Define the startup characteristics
1	Reaction to the Out of service mode
2	Reset the commands for switching the operating mode
3	Enable resetting of commands for the control settings
4	Set switch or button mode
6	Release the zero balancing in the parameter view in the faceplate
7	1 = Message limits are read from the device and transferred to the device in case of a change
10	Exit local mode
11	Stop dosing in the event of a flow alarm
12	Read dosing state automatically During the start of the controller and when the connection between device and controller is reestablished after an interruption, the dosing state is read automatically by means of acyclic communication. Note:: Only 8 acyclic read jobs can be executed simultaneously for each Profibus line. If additional devices want to read acyclic data simultaneously, the read job is canceled with an error. Alternatively, the dosing state can be read with the click of a button in the faceplate.
14	Enable dosing mode
17	Activate smooth change from manual to automatic mode
22	Update acknowledgment and error status of the message call
23	1 = Separate evaluation for excluded and simulated interlock signals
24	Enable local operator authorization
25	Suppress all messages if <code>MsgLock = 1</code>
26	Reaction of the switching points in "Out of service" mode
28	Disable switching points
29	Signaling limit violation

Operator authorizations

This block provides the standard operator permissions that are described in the APL Online Help.

The block has the following permissions for the `OS_Perm` parameter:

Bit	Function
0	1 = Operator can switch PV to "On" mode
1	1 = Operator can switch PV to "Out of service" mode
2	1 = Operator can switch SV to "Automatic" mode
3	1 = Operator can switch SV to "Manual" mode
4	1 = Operator can switch SV to "Local" mode
5	1 = Operator can switch SV to "On" mode
6	1 = Operator can switch SV to "Out of service" mode

7	1 = Operator can switch TV to "Automatic" mode
8	1 = Operator can switch TV to "Manual" mode
9	1 = Operator can switch TV to "Local" mode
10	1 = Operator can switch TV to "On" mode
11	1 = Operator can switch TV to "Out of service" mode
12	1 = Operator can switch QV to "Automatic" mode
13	1 = Operator can switch QV to "Manual" mode
14	1 = Operator can switch QV to "Local" mode
15	1 = Operator can switch QV to "On" mode
16	1 = Operator can switch QV to "Out of service" mode
17	Not used
18	1 = Operator can reset the maximum values
19	1 = Operator can activate / deactivate messages with GradHUpMsgEn
20	1 = Operator can activate / deactivate messages with GradHDnMsgEn
21	1 = Operator can activate / deactivate messages with GradLMsgEn
22 - 23	Not used
24	1 = Operator can change the limit (PV) for the high alarm
25	1 = Operator can change the limit (PV) for the high warning
26	1 = Operator can change the limit (PV) for the hysteresis
27	1 = Operator can change the limit (PV) for the low alarm
28	1 = Operator can change the limit (PV) for the low warning
29	1 = Operator can change the value for the high gradient limit for positive gradients (GradHUpLim)
30	1 = Operator can change the value for the high gradient limit for negative gradients (GradHDnLim)
31	1 = Operator can change the value for the low gradient limit for positive and negative gradients (GradLLim)

The block has the following permissions for the OS1Perm parameter:

Bit	Function
0	1 = Operator can activate / deactivate messages with PV_AH_MsgEn
1	1 = Operator can activate / deactivate messages with PV_WH_MsgEn
2	1 = Operator can activate / deactivate messages with PV_WL_MsgEn
3	1 = Operator can activate / deactivate messages with PV_AL_MsgEn
4	1 = Operator can change the limit (SV) for the high alarm
5	1 = Operator can change the limit (SV) for the high warning
6	1 = Operator can change the limit (SV) for the hysteresis
7	1 = Operator can change the limit (SV) for the low alarm
8	1 = Operator can change the limit (SV) for the low warning
9	1 = Operator can activate / deactivate messages with SV_AH_MsgEn
10	1 = Operator can activate / deactivate messages with SV_WH_MsgEn
11	1 = Operator can activate / deactivate messages with SV_WL_MsgEn
12	1 = Operator can activate / deactivate messages with SV_AL_MsgEn
13	1 = Operator can change the limit (TV) for the high alarm

14	1 = Operator can change the limit (TV) for the high warning
15	1 = Operator can change the limit (TV) for the hysteresis
16	1 = Operator can change the limit (TV) for the low alarm
17	1 = Operator can change the limit (TV) for the low warning
18	1 = Operator can activate / deactivate messages with TV_AH_MsgEn
19	1 = Operator can activate / deactivate messages with TV_WH_MsgEn
20	1 = Operator can activate / deactivate messages with TV_WL_MsgEn
21	1 = Operator can activate / deactivate messages with TV_AL_MsgEn
22	1 = Operator can change the limit (QV) for the high alarm
23	1 = Operator can change the limit (QV) for the high warning
24	1 = Operator can change the limit (QV) for the hysteresis
25	1 = Operator can change the limit (QV) for the low alarm
26	1 = Operator can change the limit (QV) for the low warning
27	1 = Operator can activate / deactivate messages with QV_AH_MsgEn
28	1 = Operator can activate / deactivate messages with QV_WH_MsgEn
29	1 = Operator can activate / deactivate messages with QV_WL_MsgEn
30	1 = Operator can activate / deactivate messages with QV_AL_MsgEn
31	Not used

The block has the following permissions for the OS2Perm parameter:

Bit	Function
0	SV: 1 = Operator can enter the totalizer command 'Positive and negative count'
1	SV: 1 = Operator can enter the 'Only positive count' totalizer command
2	SV: 1 = Operator can enter the 'Only negative count' totalizer command
3	SV: 1 = Operator can enter the 'Hold' totalizer command
4	SV: 1 = Operator can reset the totalizer
5	SV: 1 = Operator can preset the totalizer
6	TV: 1 = Operator can enter the totalizer command 'Positive and negative count'
7	TV: 1 = Operator can enter the 'Only positive count' totalizer command
8	TV: 1 = Operator can enter the 'Only negative count' totalizer command
9	TV: 1 = Operator can enter the 'Hold' totalizer command
10	TV: 1 = Operator can reset the totalizer
11	TV: 1 = Operator can preset the totalizer
12	QV: 1 = Operator can enter the totalizer command 'Positive and negative count'
13	QV: 1 = Operator can enter the 'Only positive count' totalizer command
14	QV: 1 = Operator can enter the 'Only negative count' totalizer command
15	QV: 1 = Operator can enter the 'Hold' totalizer command
16	QV: 1 = Operator can reset the totalizer
17	QV: 1 = Operator can preset the totalizer
18	1 = Operator can start dosing
19	1 = Operator can cancel dosing
20	1 = Operator can stop dosing
21	1 = Operator can continue dosing
22	1 = Operator can start the dosing cleaning program

23	1 = Operator can reset the dosing cycle counter
24	1 = Operator can select external setpoint
25	1 = Operator can select internal setpoint
26	1 = Operator can select dosing recipe
27	1 = Operator can change dosing quantity
28	SV: 1 = Operator can change preset value of totalizer
29	TV: 1 = Operator can change preset value of totalizer
30	QV: 1 = Operator can change preset value of totalizer
31	1 = Operator can start automatic zero balancing

The block has the following permissions for the `OS3Perm` parameter:

Bit	Function
0	1 = Operator can read configuration data and dosing state from device
1	1 = Operator can write configuration data to device
2	1 = Operator can enter password
3	Not used

Display and operating range for process values and limits

The inputs `PV_OpScaleH/L` are used as display and operating range for the process value `PV_In`.

Generating instance-specific messages

This block provides one "Instance-specific message".

SIMATIC BATCH functionality

This block provides the standard "SIMATIC BATCH functionality" function that is described in the APL Online Help.

4.1.4 Error handling of S7SiFC43

For general information on error handling at all blocks, refer to the "Error handling" section in the APL Online Help.

The following errors can be displayed for this block:

- Error numbers
- Control system fault (`CSF`)

Control system fault (CSF)

An external signal can be activated via the `CSF` input. A control system fault is triggered if this signal = 1. Refer to the "Error handling" section in the APL Online Help.

4.1.5 S7SiFC43 messages

Messaging

The following messages can be generated for this block:

- Process control error
- Process messages
- Instance-specific message

Process control error

The following control system fault messages can be output:

Message instance	Message class	Event
MsgEvId20	PLC Process Control Message - Failure	External error has occurred (S7SiFC43: #@3X%3u@) [Batch-ID:@2X%3u@] [Auxiliary value:@1R%4.1f@]
MsgEvId21	PLC Process Control Message - Failure	Error while reading a data record (S7SiFC43: #@3X %3u@) [Batch-ID:@2X%3u@] [Auxiliary value:@1R %4.1f@]
MsgEvId22	PLC Process Control Message - Failure	Error while writing a data record (S7SiFC43: #@3X %3u@) [Batch-ID:@2X%3u@] [Auxiliary value:@1R %4.1f@]
MsgEvId23	PLC Process Control Message - Failure	Wrong password (S7SiFC43: #@3X%3u@) [Batch-ID:@2X %3u@] [Auxiliary value:@1R %4.1f@]
MsgEvId24	PLC Process Control Message - Error	No current dosing state read from device (S7SiFC43: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@ 1R%4.1f@]

You can interconnect an external fault (signal) to the input parameter `CSF`. If this signal changes to `CSF = 1`, a process control error is triggered (MsgEvId3, SIG4).

Process messages

Message instance	Message class	Event
MsgEvId01	Alarm - high	@1Y%t#S7SiFC43_MeasVal@ - High alarm limit violated (S7SiFC43: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2I%d@.@2Y%1u@]
MsgEvId02	Warning - high	@1Y%t#S7SiFC43_MeasVal@ - High warning limit violated (S7SiFC43: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2I%d@.@2Y%1u@]

MsgEvId03	Warning - low	@1Y%t#S7SiFC43_MeasVal@ - Low warning limit violated (S7SiFC43: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2l%d@.@2Y%1u@]
MsgEvId04	Alarm - low	@1Y%t#S7SiFC43_MeasVal@ - Low alarm limit violated (S7SiFC43: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2l%d@.@2Y%1u@]
MsgEvId05	Alarm - high	@1Y%t#S7SiFC43_MeasVal@ - High alarm limit violated (S7SiFC43: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2l%d@.@2Y%1u@]
MsgEvId06	Warning - high	@1Y%t#S7SiFC43_MeasVal@ - High warning limit violated (S7SiFC43: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2l%d@.@2Y%1u@]
MsgEvId07	Warning - low	@1Y%t#S7SiFC43_MeasVal@ - Low warning limit violated (S7SiFC43: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2l%d@.@2Y%1u@]
MsgEvId08	Alarm - low	@1Y%t#S7SiFC43_MeasVal@ - Low alarm limit violated (S7SiFC43: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2l%d@.@2Y%1u@]
MsgEvId09	Alarm - high	@1Y%t#S7SiFC43_MeasVal@ - High alarm limit violated (S7SiFC43: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2l%d@.@2Y%1u@]
MsgEvId10	Warning - high	@1Y%t#S7SiFC43_MeasVal@ - High warning limit violated (S7SiFC43: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2l%d@.@2Y%1u@]
MsgEvId11	Alarm - low	@1Y%t#S7SiFC43_MeasVal@ - Low warning limit violated (S7SiFC43: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2l%d@.@2Y%1u@]
MsgEvId12	Alarm - low	@1Y%t#S7SiFC43_MeasVal@ - Low alarm limit violated (S7SiFC43: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2l%d@.@2Y%1u@]
MsgEvId13	Alarm - high	@1Y%t#S7SiFC43_MeasVal@ - High alarm limit violated (S7SiFC43: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2l%d@.@2Y%1u@]
MsgEvId14	Warning - high	@1Y%t#S7SiFC43_MeasVal@ - High warning limit violated (S7SiFC43: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2l%d@.@2Y%1u@]
MsgEvId15	Warning - low	@1Y%t#S7SiFC43_MeasVal@ - Low warning limit violated (S7SiFC43: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2l%d@.@2Y%1u@]
MsgEvId16	Alarm - low	@1Y%t#S7SiFC43_MeasVal@ - Low alarm limit violated (S7SiFC43: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2l%d@.@2Y%1u@]
MsgEvId17	Alarm - high	Limit value (high) for the positive gradient violated (S7SiFC43: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]
MsgEvId18	Alarm - high	Limit value (high) for the negative gradient violated (S7SiFC43: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]
MsgEvId19	Alarm - low	Limit value (low) for absolute gradient violated (S7SiFC43: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]

Instance-specific message

You can use up to three instance-specific message with this block.

Message instance	Message class	Event
MsgEvd25	PLC Process Control Message - Failure	External message (S7SiFC43: #@3X%3u@) [Batch- ID:@2X%3u@] [Auxiliary value:@1R%4.1f@]

Associated values for message instances without limit violation

Associated value	Block parameter	Data Type
1	Aux	REAL
2	BatchID	DWORD
3	MsgFilter	DINT

Associated values for message instances with limit violation

Associated value	Block parameter	Data Type
1	PV_Meas0	BYTE
2	AuxByte (one or two digits after the decimal point, see Feature.Bit3)	BYTE
3	AuxWord (number before the decimal point: -32768 .. 32767)	WORD
4	BatchID	DWORD
5	MsgFilter	DINT

Message texts and their text numbers

The following table shows the message texts and their text numbers in the text library "S7SiFC43_MeasVal" for the S7SiFC block (FB 2639):

Text number	Message text
0	Mass flow
1	Volume flow
2	Density
3	Process media temperature
4	Corrected Volume flow
5	Fraction A
6	Fraction B
7	Fraction A %
8	Fraction B %
11	Totalizer 1

12	Totalizer 2
13	Totalizer 3

4.1.6 I/Os of S7SiFC43

I/Os of S7SiFC43

Input parameters

Parameter	Description	Type	Default
SlotHart	Slot number of the FC430 within the AI module in the ET 200M from HW Config	INT	0
PV_In	Process value (4 to 20 mA signal)	REAL	0.0
QCPV_In	Quality Code of Process Value (4..20mA signal)	BYTE	16#80
PV	First HART variable (primary variable)	REAL	0.0
QCPV	Quality Code of first HART variable (Primary variable)	BYTE	16#FF
SV	Second HART variable (secondary variable)	REAL	0.0
QCSV	Quality Code of second HART variable (Secondary variable)	BYTE	16#FF
TV	Third HART variable (tertiary variable)	REAL	0.0
QCTV	Quality Code of third HART variable (Tertiary variable)	BYTE	16#FF
QV	Fourth HART variable (quaternary variable)	REAL	0.0
QCQV	Quality Code of fourth HART variable (Quaternary variable)	BYTE	16#FF
FbkDosVlv	Feedback from dosing valve	BOOL	0
LagTime	Delay time [s]	REAL	10.0
PV_OpScaleH	High limit for scale in PV bar graph of faceplate	REAL	100.0
PV_OpScaleL	Low limit for scale in PV bar graph of faceplate	REAL	0.0
SV_OpScaleH	High limit for scale SV	REAL	100.0
SV_OpScaleL	Low limit for scale SV	REAL	0.0
TV_OpScaleH	High limit for scale TV	REAL	100.0
TV_OpScaleL	Low limit for scale TV	REAL	0.0
QV_OpScaleH	High limit for scale QV	REAL	100.0
QV_OpScaleL	Low limit for scale QV	REAL	0.0

Parameter	Description	Type	Default
DSP_LiOp	Dosing unit: Select setpoint source (internal/external): <ul style="list-style-type: none"> 1 = Via interconnection 0 = Via operator 	BOOL	0
DSP_ExtOp	Dosing unit: 1 = Select external setpoints via operator	BOOL	0
DSP_IntOp	Dosing unit: 1 = Select internal setpoints via operator	BOOL	0
DSP_ExtLi	Dosing unit: 1 = Select external setpoints via interconnection	BOOL	0
DSP_IntLi	Dosing unit: 1 = Select internal setpoints via interconnection	BOOL	0
SP_TrkExt	Dosing unit: 1 = Bumpless switch-over from external to internal set-point active	BOOL	1
DSP_Int	Dosing unit: Internal setpoint	REAL	0.0
DSP_Ext	Dosing unit: External setpoint	REAL	0.0
DSP1..5HiLim	Dosing unit: High limit for set-point, recipe 1..5	REAL	0.0
DSP1..5LoLim	Dosing unit: Low limit for setpoint, recipe 1..5	REAL	0.0
PV_Unit*	Unit for process value PV_In (4 to 20 mA signal)	INT	0
PV_UnitH*	Unit for process value PV (Hart auxiliary variable)	INT	0
SV_Unit*	Unit for process value SV (Hart auxiliary variable)	INT	0
TV_Unit*	Unit for process value TV (Hart auxiliary variable)	INT	0
QV_Unit*	Unit for process value QV (Hart auxiliary variable)	INT	0
Mfl_Unit	Unit for mass flow	INT	0
Vfl_Unit	Unit for volume mass	INT	0
InPassword	Password of FC430	DWORD	16#FFFFFFFF
InSVPreVal	Preset value, totalizer SV (analog TV,QV)	REAL	0.0
InPV_Hyst*	Limiter PV: Hysteresis for alarm and warning limits (analog SV,TV,QV)	REAL	0.0
InPV_AH_Lim*	Limiter PV: Alarm limit (high) (analog SV,TV,QV)	REAL	0.0
InPV_WH_Lim*	Limiter PV: Warning limit (high) (analog SV,TV,QV)	REAL	0.0
InPV_WL_Lim*	Limiter PV: Limit warning (low) (analog SV,TV,QV)	REAL	0.0

Parameter	Description	Type	Default
InPV_AL_Lim* (analog SV,TV,QV)	Limiter PV: Alarm limit (low)	REAL	0.0
PV_AH_En (analog SV,TV,QV)	1 = Activate process value PV (high) alarm	BOOL	1
PV_WH_En (analog SV,TV,QV)	1 = Activate process value PV (high) warning	BOOL	1
PV_WL_En (analog SV,TV,QV)	1 = Activate process value PV (low) warning	BOOL	1
PV_AL_En (analog SV,TV,QV)	1 = Activate process value PV (low) alarm	BOOL	1
PV_AH_MsgEn (analog SV,TV,QV)	1 = Activate message for process value PV (high) alarm	BOOL	1
PV_WH_MsgEn (analog SV,TV,QV)	1 = Activate message for process value PV (high) warning	BOOL	1
PV_WL_MsgEn (analog SV,TV,QV)	1 = Activate message for process value PV (low) warning	BOOL	1
PV_AL_MsgEn (analog SV,TV,QV)	1 = Activate message for process value PV (low) alarm	BOOL	1
GradHUPLim	Gradient monitoring: Limit (high) for the positive gradient	REAL	10.0
GradHDnLim	Gradient monitoring: Limit (high) for the negative gradient	REAL	10.0
GradLLim	Gradient monitoring: Limit (low) for the absolute gradient	REAL	1.0
BalSVAut (analog TV,QV)	Totalizer SV: Up counter for pos- itive flow and down counter for negative flow in automatic mode	BOOL	0
PosSVAut (analog TV,QV)	Totalizer SV: Increment only for positive flow in automatic mode	BOOL	0
NegSVAut (analog TV,QV)	Totalizer SV: Decrement only for negative flow in automatic mode	BOOL	0
HoldSVAut (analog TV,QV)	Totalizer SV: Stop totalizer in au- tomatic mode	BOOL	0
ReTotSVLi (analog TV,QV)	1 = Reset totalizer SV via inter- connection	BOOL	0
PreSVLi (analog TV,QV)	1 = Set totalizer SV via intercon- nection to the preset value InSVPreVal	BOOL	0
BalSVMan* (analog TV,QV)	Totalizer SV: Up counter for pos- itive flow and down counter for negative flow in manual mode	BOOL	0
PosSVMan* (analog TV,QV)	Totalizer SV: Increment only for positive flow in manual mode	BOOL	0

Parameter	Description	Type	Default
NegSVMan* (analog TV,QV)	Totalizer SV: Decrement only for negative flow in manual mode	BOOL	0
HoldSVMan* (analog TV,QV)	Totalizer SV: Stop totalizer in manual mode	BOOL	0
ReTotSVOp* (analog TV,QV)	1 = Reset totalizer SV via operator input	BOOL	0
PreSVOp* (analog TV,QV)	1 = Set totalizer SV via interconnection to the preset value InSVPreVal	BOOL	0
CTModeAct	Custody transfer mode active	BOOL	0
DosingEn	1 = Connected FC430 has the dosing functionality	BOOL	0
DMode	Dosing mode: 0 : Deactivated 1 : One-step dosing 2 : Two-step dosing 3 : Analog dosing	BYTE	0
DSrtAut	Dosing unit: 1 = Select Start in "automatic mode"	BOOL	0
DStpAut	Dosing unit: 1 = Select Cancel in "automatic mode"	BOOL	0
DPauseAut	Dosing unit: 1 = Select Pause in "automatic mode"	BOOL	0
DContAut	Dosing unit: 1 = Select Continue in "automatic mode"	BOOL	0
DSrtMan	Dosing unit: 1 = Select Start in "manual mode"	BOOL	0
DStpMan	Dosing unit: 1 = Select Cancel in "manual mode"	BOOL	0
DPauseMan	Dosing unit: 1 = Select Pause in "manual mode"	BOOL	0
DContMan	Dosing unit: 1 = Select Continue in "manual mode"	BOOL	0
DSrtClnOp	Dosing unit: 1 = Select Cleaning program in "manual mode"	BOOL	0
DActRecOp	Active dosing recipe (1..5)	BYTE	0
DActRecLi	Selection of active dosing recipe (1..5) in "automatic mode"	BYTE	0
InDCyclCnt	Dosing cycle counter (only for readback)	DWORD	0

Parameter	Description	Type	Default
InDInputSel	Selection of dosing variable: 0: Mass flow 1: Volume flow 4: Corrected volume flow 5: Fraction A 6: Fraction B (only for readback)	BYTE	0
InDCompMode	Compensation mode of dosing unit (only for readback)	BYTE	0
InDComp	Compensation value of dosing unit (only for readback)	REAL	0.0
InDSP_Unit	Dosing setpoint unit (only for readback)	INT	0
InRcp1..5Name	Dosing recipe name	S7-String	
Rcp1..5Op	Selection of active dosing recipe in "manual mode"	BOOL	0
RdDdataOp	Request from faceplate to read dosing data	BOOL	0
DRstCyclCOp	Request from faceplate to reset dosing totalizer	BOOL	0
DRstOp	Dosing unit: 1 = Reset interlock via operator	BOOL	0
DRstLi	Dosing unit: 1 = Reset interlock via interconnection	BOOL	1
PV_Meas0..1	Measured value that is interconnected at the PV_In input: 0: Mass flow 1: Volume flow 2: Density 3: Not used	BYTE	3
PV_Meas2..4	Measured value that is interconnected at the PV/SV/TV/QV input: 0: Mass flow 1: Volume flow 2: Density 3: Process media temperature 4: Corrected Volume flow 5: Fraction A 6: Fraction B 7: Fraction A % 8: Fraction B % 11: Totalizer 1 12: Totalizer 2 13: Totalizer 3 14: Not used 15: Dosing (only PV_Meas2)	BYTE	14

Parameter	Description	Type	Default
RdCfgOp	1 = Read all configuration data from FC430	BOOL	0
WrCfgOp	1 = Write all configuration data to FC430	BOOL	0
ZeroAdjOp	1 = Start automatic zero balancing	BOOL	0
InMflZFSupp	Low flow cut-off suppression (mass flow) (only for readback)	REAL	0.0
InVflZFSupp	Low flow cut-off suppression (volume flow) (only for readback)	REAL	0.0
GradHUpEn	1 = Enable gradient monitoring (high) for positive changes	BOOL	1
GradHDnEn	1 = Enable gradient monitoring (high) for negative changes	BOOL	1
GradLEn	1 = Enable gradient monitoring (low)	BOOL	0
GradHUpMsgEn	1 = Enable gradient (high) message for positive changes	BOOL	1
GradHDnMsgEn	1 = Enable gradient (high) message for negative changes	BOOL	1
GradLMsgEn	1 = Enable gradient (low) message for negative changes	BOOL	1
TimeFactor	Time unit: 0 = seconds 1 = minutes 2 = hours	INT	0
OnPVOp*	1 = PV "On" mode via operator	BOOL	0
OosPVOp* (analog SV,TV,QV)	1 = PV "Out of service" via OS operation	BOOL	0
OosPVLi (analog SV,TV,QV)	1 = PV "Out of service" via interconnection or SFC (0-1 edge transition)	BOOL	0
ModSVLiOp (analog TV,QV)	Switchover of SV operating mode between: 0 = Operator 1 = Interconnection or SFC	BOOL	0
AutModSVOp* (analog TV,QV)	1 = "Automatic mode" SV via operator (controlled by ModLiSVOp = 1)	BOOL	0
ManModSVOp* (analog TV,QV)	Switchover of SV operating mode between: 0 = Operator 1 = Interconnection or SFC	BOOL	0

Parameter	Description	Type	Default
AutModSVLi (analog TV,QV)	1 = "Automatic mode" SV via interconnection or SFC (controlled by ModLiSVOp = 0)	BOOL	0
ManModSVLi (analog TV,QV)	1 = "Manual mode" via interconnection or SFC (controlled by ModLiSVOp = 1)	BOOL	0
LocalSVLi (analog TV,QV)	1 = Activate SV "Local mode" via plant signals	BOOL	0
LocalSVOp* (analog TV,QV)	1 = SV "Local mode" via operator	BOOL	0
BalSVLocal (analog TV,QV)	Totalizer SV: Up counter for positive flow and down counter for negative flow in "Local mode"	BOOL	0
PosSVLocal (analog TV,QV)	Totalizer SV: Increment only for positive flow in Local mode	BOOL	0
NegSVLocal (analog TV,QV)	Totalizer SV: Decrement only for negative flow in "Local mode"	BOOL	0
HoldSVLocal (analog TV,QV)	Totalizer SV: Stop totalizer in "Local mode"	BOOL	0
DSrtLocal	Dosing unit: 1 = Select start in "local mode"	BOOL	0
DStpLocal	Dosing unit: 1 = Select Cancel in "local mode"	BOOL	0
DPauseLocal	Dosing unit: 1 = Select Pause in "local mode"	BOOL	0
DContLocal	Dosing unit: 1 = Select Continue in "local mode"	BOOL	0
DSPLocal	Dosing unit: Setpoint in "Local mode"	REAL	0.0
LocalSetting	"Local mode" properties (see "Local mode" in the APL Online Help)	INT	0
RstOp	1 = Reset peak values of gradient via operator	BOOL	0
Intlock	0 = Interlock of the dosing unit without reset is active; you can operate the block without reset once the interlock condition has been cleared 1 = Interlock of the dosing unit not activated	BOOL	1
Intl_En	1 = interlock of the dosing unit without reset (interlock, parameter Intlock) is active	BOOL	1
ForceDSrt	Dosing unit: 1 = Force start	BOOL	0
ForceDStp	Dosing unit: 1 = Force stop	BOOL	0
ForceDPause	Dosing unit: 1 = Force pause	BOOL	0
ForceDCont	Dosing unit: 1 = Force continue	BOOL	0

Parameter	Description	Type	Default
MsgLock	1 = Suppress process messages. For more information, refer to the "Suppressing messages using the MsgLock parameter" chapter in the APL online Help	BOOL	0
SampleTime	Sampling time [s] (assigned automatically)	REAL	0.1
RunUpCyc	Number of cycles in startup; messages are suppressed during these cycles	INT	3
MsgEvId01..25	Message number (assigned automatically)	DWORD	16#00000000
Aux	Message Associated Value	REAL	0.0
BatchEn	1 = Enable allocation	BOOL	0
BatchID	Batch ID	DWORD	16#00000000
BatchName	Batch name	S7-String	
StepNo	Batch step number	DWORD	16#00000000
Occupied	1 = Occupied by batch control	BOOL	0
CSF	1 = External error (control system fault)	BOOL	0
MsgFilter	Message Filter	DINT	0
CmpID	component identifier (not permissible: 0) Identification of the subsystem to which the message is assigned to Recommended values: <ul style="list-style-type: none"> low word: 1 to 65535 high word: 0 	DWORD	16#00000001
PERMIS	Switchover of the operator control permission	INT	2
ExtMsg	Binary input for freely selectable message 1	BOOL	0
OS_Perm	I/O for operating permissions	STRUCT <ul style="list-style-type: none"> • Bit 0 : BOOL ... • Bit31: BOOL 	- <ul style="list-style-type: none"> • 1 ... • 1
OS1Perm	I/O for operating permissions	STRUCT <ul style="list-style-type: none"> • Bit 0 : BOOL ... • Bit31: BOOL 	- <ul style="list-style-type: none"> • 1 ... • 1
OS2Perm	I/O for operating permissions	STRUCT <ul style="list-style-type: none"> • Bit 0 : BOOL ... • Bit31: BOOL 	- <ul style="list-style-type: none"> • 1 ... • 1

Parameter	Description	Type	Default
OS3Perm	I/O for operating permissions	STRUCT <ul style="list-style-type: none"> • Bit 0 : BOOL ... • Bit31: BOOL 	- <ul style="list-style-type: none"> • 1 ... • 1
Feature	I/O for additional functions	STRUCT <ul style="list-style-type: none"> • Bit 0 : BOOL • Bit 1 : BOOL • Bit 2 : BOOL ... • Bit 6 : BOOL • Bit 7 : BOOL ... • Bit31: BOOL 	- <ul style="list-style-type: none"> • 0 • 0 • 1 ... • 1 • 0 ... • 0
OldCmdTotSV (analog TV,QV)	Last command of the totalizer SV (only for readback)	BYTE	16#03
OldCmdDosSV	Last command of the totalizer SV	BYTE	16#03
ScaleInH	High Range of process value (only for read back.	REAL	0.0
ScaleInL	Low Range of process value (only for read back)	REAL	0.0
FractnUType	Measuring mode for fractions: 0: Mass 1: Volume	BYTE	16#00
FractnAtxt	Name for fraction A (configured in PDM)	S7-String	
FractnBtxt	Name for fraction B (configured in PDM)	S7-String	
Tot1Ch (analog Totalizer 2 und 3)	Process value totalizer 1: 0=Mass flow 1=Volume flow 4=Corrected volume flow 5=Fraction A 6=Fraction B)	BYTE	16#00
Ch2HwCnfg	Hardware configuration channel 2 (for internal use only)	BYTE	16#00
LimPV_OpScaleH (analog SV,TV,QV)	High limit for warning and alarm limits PV	REAL	1023000.0
LimPV_OpScaleL (analog SV,TV,QV)	Low limit for warning and alarm limits PV	REAL	0.0

In/out parameters

Parameter	Description
RdReq	If the structure is set for one of the member variables of type BOOL, the block passes on the job for reading the data stored for that purpose to the driver block. Only exactly one member variable is set to TRUE:
	STRUCT
	ManufacturerID : Manufacturer ID
	UserAccessLevel : Access rights
	DevVarAssin : Assignment of measured variables to Hart variables
	DevTotAssin : Assignment of measured variables to totalizers
	DevVarUnits : Units of measured variables
	MassVolFlowUnits: Units of mass and volume flow
	PV_Scale : Scaling PV
	LimOpScale : Limits for PV/SV/TV/QV messages
	LimOpScaleFAB : Limits for messages fractions A and B
	DosCfg : Dosing configuration
	ZFSupp : Low flow cut-off suppression
	CTMode : Custody transfer mode
	PV_Limits : Limits PV
	SV_Limits : Limits SV
	TV_Limits : Limits TV
	QV_Limits : Limits QV
	FractUnitType : Fraction unit type
	FractnATxt : Text fraction A
	FractnBTxt : Text fraction B
	DosingActRec : Active dosing recipe
	DosingRecNames13: Names of dosing recipes 1..3
	DosingRecNames45: Names of dosing recipes 4..5
	DosingSetpUnit : Dosing setpoint unit
	DosingComp : Dosing compensation
	DSetpoint : Dosing setpoint
	DosingCnt : Dosing counter
	DosingState : Dosing state
	TotSVCmd : SV: Current totalizer command
	TotTVCmd : TV: Current totalizer command
	TotQVCmd : QV: Current totalizer command
	PresetVal123 : Current preset values of totalizers END_STRUCT

Parameter	Description
WrReq	<p>If the structure is set for one of the member variables of type BOOL, the block passes on the job for writing the data stored for that purpose or for sending the corresponding command to the driver block. Only exactly one member variable is set to TRUE:</p> <p>STRUCT</p> <p>Password : Password</p> <p>PV_AH_Lim : PV - high alarm limit</p> <p>PV_WH_Lim : PV - high warning limit</p> <p>PV_WL_Lim : PV - low warning limit</p> <p>PV_AL_Lim : PV - low alarm limit</p> <p>PV_Hyst : PV - hysteresis</p> <p>SV_AH_Lim : SV - high alarm limit</p> <p>SV_WH_Lim : SV - high warning limit</p> <p>SV_WL_Lim : SV - low warning limit</p> <p>SV_AL_Lim : SV - low alarm limit</p> <p>SV_Hyst : SV - hysteresis</p> <p>TV_AH_Lim : TV - high alarm limit</p> <p>TV_WH_Lim : TV - high warning limit</p> <p>TV_WL_Lim : TV - low warning limit</p> <p>TV_AL_Lim : TV - low alarm limit</p> <p>TV_Hyst : TV - hysteresis</p> <p>QV_AH_Lim : QV - high alarm limit</p> <p>QV_WH_Lim : QV - high warning limit</p> <p>QV_WL_Lim : QV - low warning limit</p> <p>QV_AL_Lim : QV - low alarm limit</p> <p>QV_Hyst : QV - hysteresis</p> <p>ForceZerAdj : Force zero balancing</p> <p>ZeroAdjCmd : Zero balancing command</p> <p>DosingActRec : Active dosing recipe</p> <p>DosingComp : Dosing compensation</p> <p>DSetpoint : Dosing setpoint</p> <p>DosingCmd : Dosing command</p> <p>DRstCycCnt : Reset dosing counter</p> <p>TotSVCmd : SV: Current totalizer command</p> <p>TotTVCmd : TV: Current totalizer command</p> <p>TotQVCmd : QV: Current totalizer command</p> <p>TotSVReset : Reset totalizer SV</p> <p>TotTVReset : Reset totalizer TV</p> <p>TotQVReset : Reset totalizer QV</p> <p>PresetValSV : Preset value, totalizer SV</p> <p>PresetValTV : Preset value, totalizer TV</p> <p>PresetValQV : Preset value, totalizer QV</p> <p>ModeTotSV : Preset totalizer SV</p>

Parameter	Description
	ModeTotTV : Preset totalizer TV
	ModeTotQV : Preset totalizer QV

Parameter	Description
Para	<p>Values of parameters which are written to the device or read from it:</p> <p>STRUCT</p> <p>InProcess : Read/write data active</p> <p>_OK : Data successfully read/written</p> <p>Error : Error when reading/writing data</p> <p>RdDrErr : Error reading a data record</p> <p>WrDrErr : Error writing a data record</p> <p>FractnAtxt : Text fraction A</p> <p>FractnBtxt : Text fraction B</p> <p>InRcp1..5Name : Dosing recipe name 1..5</p> <p>InPassword : Password</p> <p>UserAccessLevel : Access rights</p> <p>PV_Meas0 : Measured value PV_In</p> <p>PV_Meas1 : Measured value PV</p> <p>PV_Meas2 : Measured value SV</p> <p>PV_Meas3 : Measured value TV</p> <p>PV_Meas4 : Measured value QV</p> <p>FractnUType : Measuring mode: (0=mass, 1=volume)</p> <p>Tot1Ch : Measured value totalizer 1</p> <p>Tot2Ch : Measured value totalizer 2</p> <p>Tot3Ch : Measured value totalizer 3</p> <p>SlotHart : Slot of AI Hart module</p> <p>SxDC : Internal use</p> <p>CTModeAct: Custody transfer mode active</p> <p>PV_Unit : Unit for PV</p> <p>SV_Unit : Unit for SV</p> <p>TV_Unit : Unit for TV</p> <p>QV_Unit : Unit for QV</p> <p>Mfl_Unit : Unit for mass flow</p> <p>Vfl_Unit : Unit for volume flow</p> <p>ZeroAdjOp : Start zero balancing</p> <p>MflZFSupp : Low flow cut-off suppression for mass flow</p> <p>VflZFSupp : Low flow cut-off suppression for volume flow</p> <p>Tot1Cmd : Totalizer command SV</p> <p>Tot2Cmd : Totalizer command TV</p> <p>Tot3Cmd : Totalizer command QV</p> <p>SVPreVal : Preset value, totalizer SV</p> <p>TVPreVal : Preset value, totalizer TV</p> <p>QVPreVal : Preset value, totalizer QV</p> <p>Ch2HwCnfg : BYTE; // channel 2 hardware configuration</p> <p>DMode : Dosing mode</p> <p>DActRec : Active dosing recipe</p> <p>DCyclCnt : Dosing counter value</p> <p>DinputSel : Measured variable of dosing value</p>

Parameter	Description
	DSP_Unit : Dosing value unit
	DCompMode : Dosing compensation mode
	DComp : Dosing compensation value
	DSetpoint : Dosing setpoint
	DosingCmd : Dosing command
	DosingState : Dosing state
	ScaleIn : Scaling for process value PV (only for internal use)
	LimPVOpScale : Maximum and minimum values for message limits PV
	LimSVOpScale : Maximum and minimum values for message limits SV
	LimTVOpScale : Maximum and minimum values for message limits TV
	LimQVOpScale : Maximum and minimum values for message limits QV
	InPV_AH_Lim : Limit PV alarm (high) for writing to device
	InPV_WH_Lim : Limit PV warning (high) for writing to device
	InPV_WL_Lim : Limit PV warning (low) for writing to device
	InPV_AL_Lim : Limit PV alarm (low) for writing to device
	InPV_Hyst : Hysteresis for PV alarm and warning limits for writing to device
	PV_AH_Lim : Limit PV alarm (high)
	PV_WH_Lim : Limit PV warning (high)
	PV_WL_Lim : Limit PV warning (low)
	PV_AL_Lim : Limit PV alarm (low)
	PV_Hyst : Hysteresis for PV alarm and warning limits
	InSV_AH_Lim : Limit SV alarm (high) for writing to device
	InSV_WH_Lim : Limit SV warning (high) for writing to device
	InSV_WL_Lim : Limit SV warning (low) for writing to device
	InSV_AL_Lim : Limit SV alarm (low) for writing to device
	InSV_Hyst : Hysteresis for SV alarm and warning limits for writing to device
	SV_AH_Lim : Limit SV alarm (high)
	SV_WH_Lim : Limit SV warning (high)
	SV_WL_Lim : Limit SV warning (low)
	SV_AL_Lim : Limit SV alarm (low)
	SV_Hyst : Hysteresis for SV alarm and warning limits
	InTV_AH_Lim : Limit TV alarm (high) for writing to device
	InTV_WH_Lim : Limit TV warning (high) for writing to device
	InTV_WL_Lim : Limit TV warning (low) for writing to device
	InTV_AL_Lim : Limit TV alarm (low) for writing to device
	InTV_Hyst : Hysteresis for TV alarm and warning limits for writing to device
	TV_AH_Lim : Limit TV alarm (high)
	TV_WH_Lim : Limit TV warning (high)
	TV_WL_Lim : Limit TV warning (low)
	TV_AL_Lim : Limit TV alarm (low)
	TV_Hyst : Hysteresis for TV alarm and warning limits

Parameter	Description
	InQV_AH_Lim : Limit QV alarm (high) for writing to device
	InQV_WH_Lim : Limit QV warning (high) for writing to device
	InQV_WL_Lim : Limit QV warning (low) for writing to device
	InQV_AL_Lim : Limit QV alarm (low) for writing to device
	InQV_Hyst : Hysteresis for QV alarm and warning limits for writing to device
	QV_AH_Lim : Limit QV alarm (high)
	QV_WH_Lim : Limit QV warning (high)
	QV_WL_Lim : Limit QV warning (low)
	QV_AL_Lim : Limit QV alarm (low)
	QV_Hyst : Hysteresis for QV alarm and warning limits

Parameter	Description	Type	Default
AcyclData	Acyclic data from driver block PiDr64 (interconnect this input with AcyclData output of PiDr64)	STRUCT <ul style="list-style-type: none"> SlotRd : INT ... RetValWr: WORD Input : STRUCT Output : STRUCT NewDiag : INT DiagData : STRUCT 	

Output parameters

Parameter	Description	Type	Default
QWronDev	1 = Wrong device connected	BOOL	1
PV_Out0..4	Process value output PV_In/PV/SV/TV/QV	STRUCT <ul style="list-style-type: none"> Value : BYTE ST : BYTE 	0.0
SVPreVal (analog TV,QV)	Preset value, totalizer SV	REAL	0.0
PV_Grad	Gradient value for process value PV	REAL	0.0
PV_GradPP	Gradient value for PV maximum peak value	REAL	0.0
PV_GradNP	Gradient value for PV minimum peak value	REAL	0.0

Parameter	Description	Type	Default
GradHUpAct	1 = Gradient alarm (high) for positive changes. 1 = Alarm (low) active. You can change the response for this parameter by setting Feature bit 28 (deactivate switching points) and Feature bit 29 (high/low signal limit violation) accordingly.	BOOL	0
GradHDnAct	1 = Gradient alarm (high) for negative changes. 1 = Alarm (low) active. You can change the response for this parameter by setting Feature bit 28 (deactivate switching points) and Feature bit 29 (high/low signal limit violation) accordingly.	BOOL	0
GradHLAct	1 = Gradient alarm (low). 1 = Alarm (low) active. You can change the response for this parameter by setting Feature bit 28 (deactivate switching points) and Feature bit 29 (high/low signal limit violation) accordingly.	BOOL	0
CmdTotSV (analog TV,QV)	Current command totalizer SV: <ul style="list-style-type: none"> 16#00: Up counter for positive flow and down counter for negative flow 16#01: Only up counter for positive flow 16#02: Only down counter for negative flow 16#03: Stop totalizer 	BYTE	16#03
CmdDosSV	Current command dosing unit: <ul style="list-style-type: none"> 16#01: Start 16#02: Stop 16#03: Pause 16#04: Resume 16#05: Cleaning program 	BYTE	16#00
ModeTotSV (analog TV,QV)	0 : Totalizer mode 2 : Use preset value	BYTE	16#03
DActRec	Active dosing recipe (1..5)	BYTE	16#00
DCyclCnt	Dosing cycle counter	DWORD	0
DinputSel	Selection of dosing variable: 0: Mass flow 1: Volume flow 4: Corrected volume flow 5: Fraction A 6: Fraction B	BYTE	0

Parameter	Description	Type	Default
DCompMode	Compensation mode of dosing unit	BYTE	16#00
DComp	Compensation value of dosing unit	REAL	0.0
DSP_Unit	Dosing setpoint unit	INT	0
DState	Current state of dosing unit: <ul style="list-style-type: none"> • 16#01: Start • 16#02: Stop • 16#03: Pause • 16#04: Resume • 16#05: Cleaning program 	BYTE	16#00
DosOn	1 = Dosing active	BOOL	0
DosEnd	1 = End of dosing	BOOL	0
DosStp	1 = Dosing stopped	BOOL	0
DosPause	1 = Dosing in pause state	BOOL	0
DosClean	1 = Dosing in cleaning state	BOOL	0
NoDState	1 = Current state of dosing unit unknown in block	BOOL	0
DLockAct	Dosing unit: 1 = at least one interlock (inputs Permit, Interlock, or Protect) is active	BOOL	0
GrpErr	1 = Group error pending	BOOL	0
RdyToStartSV	Dosing unit: 1 = Active start readiness	BOOL	0
RdyToResetSV	Dosing unit: 1 = Ready for reset via DRstLi input or commands in "automatic mode"	BOOL	0
OosPVAct (analog SV,TV,QV)	1 = Process value PV is "Out of service"	BOOL	0
OnPVAct (analog SV,TV,QV)	1 = Process value PV "On" is active	BOOL	1
LocalSVAct (analog TV,QV)	1 = SV "Local mode" active	BOOL	1
AutSVAct (analog TV,QV)	1 = SV "Automatic mode" active	BOOL	1
ManSVAct (analog TV,QV)	1 = SV "Manual mode" active	BOOL	1
MassFlow	Current mass flow	REAL	0.0
QCMassFlow	Quality code of Mass flow	BYTE	16#00
VolFlow	Volume flow	REAL	0.0

Parameter	Description	Type	Default
QCVolFlow	Quality code of Corrected Volume flow	BYTE	16#00
Density	Current density	REAL	0.0
QCDensity	Quality code of Density	BYTE	16#00
CVolFlow	Current corrected volume flow	REAL	0.0
QCCVolFlow	Quality code of Corrected Volume flow	BYTE	16#00
PMedTemp	Current process media temperature	REAL	0.0
QCPMedTemp	Quality code of Process media temperature	BYTE	16#00
FractA	Current fraction A value	REAL	0.0
QCFractA	Quality code of Fraction A	BYTE	16#00
FractB	Current fraction B value	REAL	0.0
QCFractB	Quality code of Fraction B	BYTE	16#00
FractAP	Current fraction A% value	REAL	0.0
QCFractAP	Quality code of Fraction A%	BYTE	16#00
FractBP	Current fraction B% value	REAL	0.0
QCFractBP	Quality code of Fraction B%	BYTE	16#00
Tot1	Current totalizer 1 value	REAL	0.0
QCTot1	Quality code of Totalizer 1	BYTE	16#00
Tot2	Current totalizer 2 value	REAL	0.0
QCTot2	Quality code of Totalizer 2	BYTE	16#00
Tot3	Current totalizer 3 value	REAL	0.0
QCTot3	Quality code of Totalizer 3	BYTE	16#00

Parameter	Description	Type	Default
DosQuant	Current dosing quantity	REAL	0.0
QCDosQuant	Quality code of Dosing Quantity	BYTE	16#00
MfIZFSupp	Low flow cut-off suppression (mass flow)	REAL	0.0
VfIZFSupp	Low flow cut-off suppression (volume flow)	REAL	0.0
PV_AH_Act (analog SV,TV,QV)	Limiter PV: 1 = Alarm (high) active. You can change the response for this parameter by setting Feature bit 28 (deactivate switching points) and Feature bit 29 (high/low signal limit violation) accordingly.	BOOL	0
PV_WH_Act (analog SV,TV,QV)	Limiter PV: 1 = Warning (high) active. You can change the response for this parameter by setting Feature bit 28 (deactivate switching points) and Feature bit 29 (high/low signal limit violation) accordingly.	BOOL	0
PV_WL_Act (analog SV,TV,QV)	Limiter PV: 1 = Warning (low) active. You can change the response for this parameter by setting Feature bit 28 (deactivate switching points) and Feature bit 29 (high/low signal limit violation) accordingly.	BOOL	0
PV_AL_Act (ana- log SV,TV,QV)	Limiter PV: 1 = Alarm (low) active. You can change the response for this parameter by setting Feature bit 28 (deactivate switching points) and Feature bit 29 (signal limit violation) accordingly.	BOOL	0
PV_AH_Lim (analog SV,TV,QV)	Alarm limit (high) PV	REAL	0.0
PV_WH_Lim (analog SV,TV,QV)	Warning limit (high) PV	REAL	0.0
PV_WL_Lim (analog SV,TV,QV)	Warning limit (low) PV	REAL	0.0
PV_AL_Lim (analog SV,TV,QV)	Alarm limit (low) PV	REAL	0.0

Parameter	Description	Type	Default
InPV_Hyst* (analog SV,TV,QV)	Limiter PV: Hysteresis for alarm and warning limits	REAL	0.0
DSP	Active setpoint for the dosing unit	REAL	0.0
DSP_ExtAct	1 = External dosing setpoint is active 0 = internal dosing setpoint is active	BOOL	0
DSP_ExtOut	External dosing setpoint; corresponds to input parameter DSP_Ext, limited by DSP_LoLim and DSP_HiLim	REAL	0.0
DSP_ExHiAct	Dosing unit: 1 = High limit for external setpoint has been reached	BOOL	0
DSP_ExLoAct	Dosing unit: 1 = Low limit for external setpoint has been reached	BOOL	0
Status1	Status word 1	DWORD	16#00000000
Status2	Status word 2	DWORD	16#00000000
Status3	Status word 3	DWORD	16#00000000
Status4	Status word 4	DWORD	16#00000000
Status5	Status word 5	DWORD	16#00000000
Status6	Status word 6	DWORD	16#00000000
Error0Num	Output of current error number for the 4 to 20 mA signal. For error numbers that can be output by this block, see the error handling of SitrFC43.	INT	-1
Error1Num	Output of current error numbers for the first HART variable. (primary variable). For error numbers that can be output by this block, see the error handling of SitrFC43.	INT	-1
Error2Num	Output of current error numbers for the second HART variable (secondary variable). For error numbers that can be output by this block, see the error handling of SitrFC43.	INT	-1
Error3Num	Output of current error numbers for the third HART variable (tertiary variable). For error numbers that can be output by this block, see the error handling of SitrFC43.	INT	-1
Error4Num	Output of current error numbers for the fourth HART variable (quaternary variable). For error numbers that can be output by this block, see the error handling of SitrFC43.	INT	-1
OS_PermOut	Display of OS_Perm	DWORD	16#FFFFFFFF

Parameter	Description	Type	Default
OS_PermLog	Display of OS_Perm with settings changed by the block algorithm	DWORD	16#FFFFFFFF
OS1PermOut	Display of OS1Perm	DWORD	16#FFFFFFFF
OS1PermLog	Display of OS1Perm with settings changed by the block algorithm	DWORD	16#FFFFFFFF
OS2PermOut	Display of OS2Perm	DWORD	16#FFFFFFFF
OS2PermLog	Display of OS2Perm with settings changed by the block algorithm	DWORD	16#FFFFFFFF
OS3PermOut	Display of OS3Perm	DWORD	16#FFFFFFFF
OS3PermLog	Display of OS3Perm with settings changed by the block algorithm	DWORD	16#FFFFFFFF
MsgErr1	1 = Message error 1 (ERROR output of first ALARM_8P)	BOOL	0
MsgStat1..25	Alarm status 1 (output ERROR of first ALARM_8P)	WORD	16#0000
MsgAckn1..25	Alarm acknowledgment status 1 (STATUS output of first ALARM_8P)	WORD	16#0000
ScaleOutH	High Range of process value (PV_OUT0)	REAL	0.0
ScaleOutL	Low Range of process value (PV_OUT0)	REAL	0.0

4.1.7 Block diagram of S7SiFC43

A block diagram is not provided for this block.

4.1.8 Template of S7SiFC43

This process tag type is used to connect a Sitrans FC430 with SCALING blocks to STEP 7 with or without dosing function (template 'Sitrans FC430 Dosing' and 'Sitrans FC430' respectively).

Note

The SCALE function takes an integer value (IN) and converts it to a real value in engineering units scaled between a low and a high limit (LO_LIM and HI_LIM). For more information on Scaling block press F1 for online help.

The Scaling block trims the value of `PVin` and SV 4 to 20 mA signal. The inputs for the Hart auxiliary variables of the function block S7SiFC43 (`PV`, `SV`, `TV`, `QV`) are interconnected with the corresponding input from HW Config.

The inputs `Laddr`, `Addr.Laddr0` and `Addr.Laddr1` of the PiDr64 block (`AcyclicData`) are configured with the address of the process value PV (not interconnected!).

The slot of the AI module is configured within ET200M at the `SlotHart` input (see HW Config). The `Feature` bit 14 is used to configure whether the dosing function is used.

4.1.9 Operator control and monitoring

4.1.9.1 S7SiFC43 views

Views of the S7SiFC43 block

The S7SiFC43 block has the following views:

- Standard view of S7SiFC43 (Page 74)
- Message view (see the APL Online Help)
- Limit view of S7SiFC43 (Page 80)
- Trend view (see the APL Online Help)
- Parameter view of S7SiFC43 (Page 85)
- Preview of S7SiFC43 (Page 87)
- Batch view (see the APL Online Help)
- Dosing view of S7SiFC43 (Page 92)

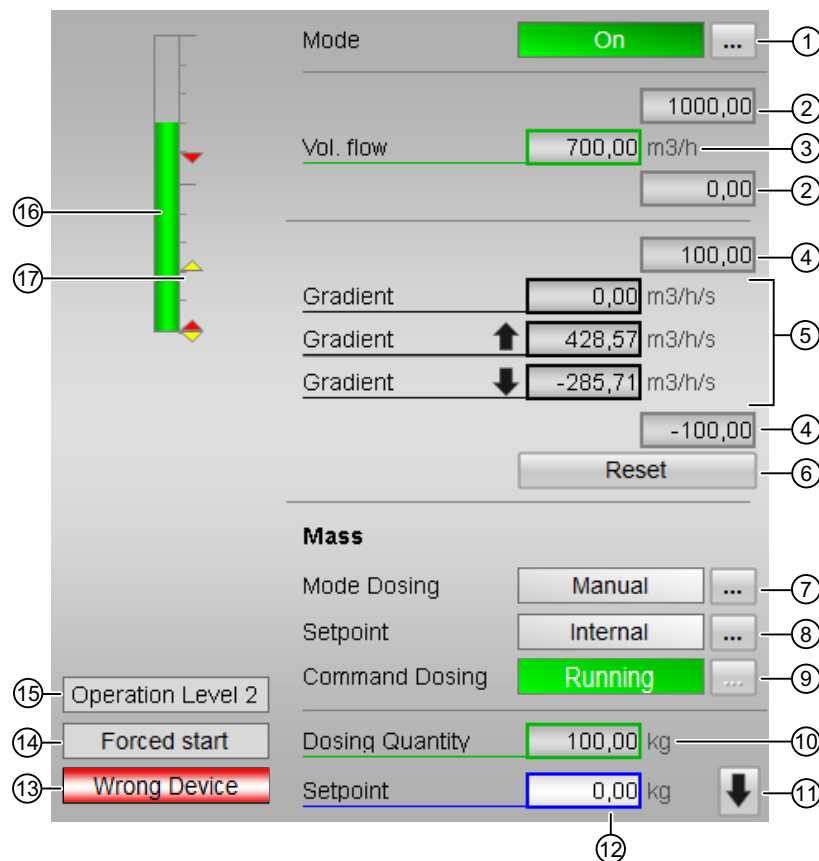
For general information on the faceplate and block icon, refer to the sections "Faceplate structure" and "Block icon structure" in the APL Online Help.

4.1.9.2 Standard view of S7SiFC43

The current process values for mass flow, volume flow, density, process media temperature, corrected volume flow, fraction A or B, fraction A or B in percent, or counter 1, 2 or 3 are displayed in the standard view depending on the configuration of the process value and the Hart auxiliary variables. If a measured value is not assigned to a variable, the field is hidden. The gradient values always refer to the process value `PV_In`. The standard view is divided into two parts.

Note

The following screenshots show a sample configuration for SV (dosing), TV (measured value) and QV (totalizer). The structure of the faceplate is always based on the individual configuration in PDM.



(1) Display and switchover of operating mode PV

This area provides information on the currently valid operating mode.

The following operating modes can be shown here:

- On (see the APL online help)
- Out of service (see APL Online Help)

For more information on changing the operating mode, refer to the "Switching operating states and operating modes" section in the APL Online Help.

(2) High and low scale range for the process value (PV)

These values provide information on the display range for the bar graph of the process value PV. The scale range is set in the engineering system with the PV_OpScaleH/L parameters (see Display and operating range for process values and limits).

(3) Display of process value (PV_In)

This area indicates the current process value (PV_In). The name of the configured measured value is displayed depending on the PV_Meas0 variable, in this case "Volume flow".

(4) High and low scale range for the gradient value

These values provide information on the display range for the bar graph of the gradient. The scale range corresponds to 10% of the scale range for the process value (PV): If you have entered a scale range for the process value of 0 to 100, for example, the scale range for the gradient is automatically defined as -10 to 10.

The current gradient value is displayed if one of the monitoring functions is enabled:

- Gradient monitoring for positive changes (GradHUpEn = 1)
- Gradient monitoring for negative changes (GradHDnEn = 1)
- Gradient monitoring (GradLEn = 1)

(5) Display of gradient

This area shows the current, minimum and maximum gradient values of the process value PV as well as rising and falling of the value. This display of the minimum and maximum gradient values functions like a slave pointer.

The current gradient value is displayed if one of the monitoring functions is enabled:

- Gradient monitoring for positive changes (GradHUpEn = 1)
- Gradient monitoring for negative changes (GradHDnEn = 1)
- Gradient monitoring (GradLEn = 1)

The maximum peak gradient value is displayed if the gradient monitoring function for positive changes is enabled (GradHUpEn = 1)

The minimum peak gradient value is displayed if the gradient monitoring function for negative changes is enabled (GradHDnEn = 1)

(6) Resetting of peak values of the gradient

Using these buttons you can reset the maximum or minimum peak value of the gradient (output parameters PV_GradPP and PV_GradNP).

The button is displayed if the gradient monitoring function for positive (GradHUpEn = 1) or negative (GradHDnEn = 1) changes is enabled.

(7) Display and switchover of operating mode SV

This area provides information on the currently valid operating mode. The operating mode switchover depends on whether or not a totalizer or dosing is configured.

The following operating modes can be shown here:

Without totalizer/dosing:

The following operating modes can be shown here:

- On (see the APL online help)
- Out of service (see APL Online Help)

With totalizer or dosing:

The block can be operated using the following modes:

- Local mode
- Automatic mode
- Manual mode
- Out of service

For more information on changing the operating mode, refer to the "Switching operating states and operating modes" section in the APL Online Help.

(8) Display and change the setpoint if dosing is configured

The following states can be shown and changed here:

- "Internal"
- "External"

For more information, refer to the "Manual and automatic mode for motors, valves and dosing units" section in the APL Online Help.

(9) Display and change the dosing unit: Start, resume, pause and stop

This area shows you the default operating state for the dosing unit. The following states can be shown and changed here:

- "Start"
- "Continue"
- "Pause"
- "Stop"

(10) Display of the dosed quantity

This area provides information on the currently dosed quantity.

(11) Change to second standard view

The second part of the two-part standard view of the faceplate can be selected here.

(12) Display and change the setpoint

This area displays the current dosing unit setpoint and lets you edit the setpoint in manual mode.

(13) and (14) Display area for block states

This area provides additional information on the operating state of the block:

- Forced control of dosing unit: "Forced start"/"Resume"/"Pause"/"Stop"
- "Wrong device"

(15) Display area for switch permission

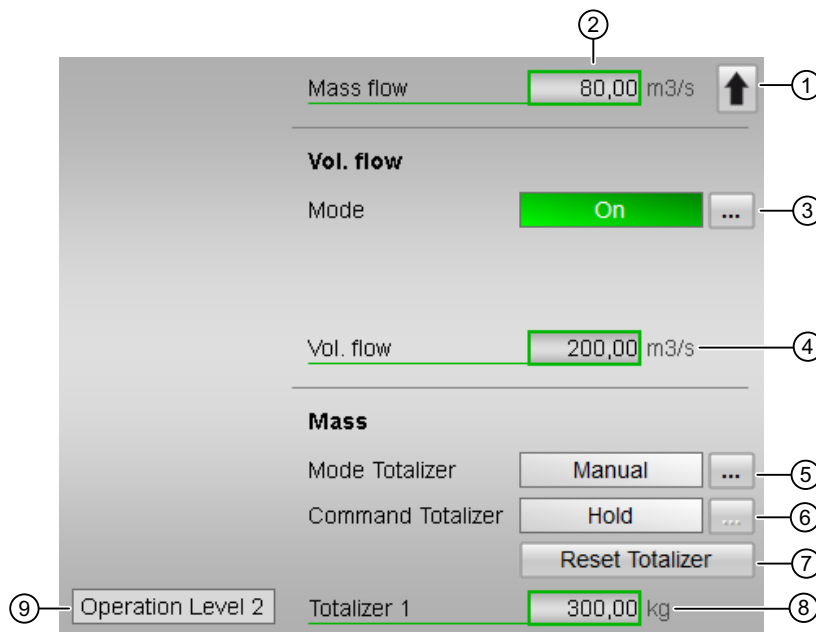
This area provides the text of the current OS, according to the enumeration configured at the PERMIS input.

(16) Bar graph for the "process value" (PV)

This area shows the current "process value" (PV) in the form of a bar graph. The visible area in the bar graph depends on the configuration in the engineering system (ES), see Display and operating range for process values and limits.

(17) Limit display

These small, colored triangles indicate the specified limits of the process value PV in the bar graph.

Second standard view**(1) Change to first standard view**

The first part of the two-part standard view of the faceplate can be selected here.

(2) Display of process value (PV)

This area indicates the current process value (PV). The name of the configured measured value is displayed depending on the PV_Meas1 variable, in this case "Mass flow".

(3) Display and switchover of operating mode TV

This area provides information on the currently valid operating mode. The operating mode switchover depends on whether or not a totalizer is configured.

The following operating modes can be shown here:

Without totalizer:

The following operating modes can be shown here:

- On (see the APL online help)
- Out of service (see APL Online Help)

With totalizer:

The block can be operated using the following modes:

- Local mode
- Automatic mode
- Manual mode
- Out of service

(4) Display of process value (TV)

This area indicates the current process value (TV). The name of the configured measured value is displayed depending on the PV_Meas2 variable, in this case "Volume flow".

(5) Display and switchover of operating mode QV

This area provides information on the currently valid operating mode. The operating mode switchover depends on whether or not a totalizer is configured.

The following operating modes can be shown here:

Without totalizer:

The following operating modes can be shown here:

- On (see the APL online help)
- Out of service (see APL Online Help)

With totalizer:

The block can be operated using the following modes:

- Local mode
- Automatic mode

- Manual mode
- Out of service

(6) Display and change the totalizer command QV: Positive and negative, positive, negative and hold

This area shows you the default operating state for the totalizer QV. The following states can be shown and executed here:

- "Positive and negative"
- "Positive"
- "Negative"
- "Hold"

If a totalizer is not configured, the area is switched to invisible.

(7) Reset totalizer

Reset the totalizer value to zero here.

(8) Display of the totalizer value

This area shows the current totalizer value of a configured totalizer.

(9) Display area for switch permission

This area provides the text of the current OS, according to the enumeration configured at the PERMIS input.

4.1.9.3 Limit view of S7SiFC43

The limits of the process and totalizer values can be specified in this view. The displayed texts depend on the configuration of the process values PV, SV, TV and QV.

Note

If the `Feature` bit 7 (synchronize alarm configuration with module) is set, the measuring range limits available in the module are written to the corresponding inputs when reading the configuration data.

If a process value is not configured, its limits are switched to invisible.

⑤ **Enabled operations** **Process value limits (PV)**

✓	☒ HH Mass flow	3000,00	m3/s	①
✓	☒ H Mass flow	2000,00	m3/s	
✓	Hysteresis	50,00	m3/s	
✓	☒ L Mass flow	1000,00	m3/s	
✓	☒ LL Mass flow	500,00	m3/s	

Process value limits (SV)

✓	☒ HH Totalizer 1	2000,00	L	②
✓	☒ H Totalizer 1	1500,00	L	
✓	Hysteresis	20,00	L	
✓	☒ L Totalizer 1	500,00	L	
✓	☒ LL Totalizer 1	100,00	L	

Gradient limits

✓	☒ H alarm	↑	10,00	m3/s/s	③
✓	☒ H alarm	↓	10,00	m3/s/s	
✓	☒ L alarm	↑↓	1,00	m3/s/s	

⑥ Password ⑦ ***** ④

(1) Process value limits PV

In this area, you can enter the limits for the process value PV. You can change the following limits:

- "HH alarm": High alarm
- "H warning": High warning
- "Hysteresis"
- "L warning": Low warning
- "LL alarm": Low alarm

(2) Process value limits SV

In this area, you can enter the limits for the process value SV. You can change the following limits:

- "HH alarm": High alarm
- "H warning": High warning
- "Hysteresis"

- "L warning": Low warning
- "LL alarm": Low alarm

(3) Gradient limits

You can enter gradient limits in this area. Refer to the "Changing values" section in the APL Online Help.

You can change the following limits:

- "H alarm $\uparrow$ ": Gradient for the upper gradient for positive changes
- "H alarm $\downarrow$ ": Gradient for the upper rate of rise for negative changes
- "L alarm $\uparrow\downarrow$ ": Gradient for the lower rate of rise (absolute)

(4) Change to second limit view

The second part of the two-part limit view of the faceplate can be selected here.

(5) Enabled operations

This area shows all operations for which special operator authorizations are assigned. They depend on the configuration in the engineering system (ES) that applies to this block.

Symbols for enabled operations:

- **Green check mark:** The OS operator can control this parameter
- **Gray check mark:** the OS operator cannot control this parameter at this time due to the process
- **Red cross:** The OS operator cannot control this parameter due to the configured AS operator permissions (OS_Perm or OS1Perm)

(6) Suppress messages

You can activate/deactivate messages by selecting the check mark.

(7) Password

A password must be entered before message limits can be changed in the device; this is entered here.

Second limit view

Enabled operations

Process value limits (TV)

☒	HH Totalizer 2	500000,00	m3
☒	H Totalizer 2	780000,00	m3
☒	Hysteresis	500,00	m3
☒	L Totalizer 2	10000,00	m3
☒	LL Totalizer 2	1000,00	m3

Process value limits (QV)

☒	HH Totalizer 3	90000,00	m3
☒	H Totalizer 3	8500,00	m3
☒	Hysteresis	50,00	m3
☒	L Totalizer 3	5000,00	m3
☒	LL Totalizer 3	1000,00	m3

Password: *****

(1) Change to first limit view

The first part of the two-part limit view of the faceplate can be selected here.

(2) Process value limits TV

In this area, you can enter the limits for the process value TV. You can change the following limits:

- "HH alarm": High alarm
- "H warning": High warning
- "Hysteresis"
- "L warning": Low warning
- "LL alarm": Low alarm

(3) Process value limits QV

In this area, you can enter the limits for the process value QV. You can change the following limits:

- "HH alarm": High alarm
- "H warning": High warning
- "Hysteresis"

- "L warning": Low warning
- "LL alarm": Low alarm

(4) Password

A password must be entered before message limits can be changed in the device; this is entered here.

(5) Enabled operations

This area shows all operations for which special operator authorizations are assigned. They depend on the configuration in the engineering system (ES) that applies to this block.

Symbols for enabled operations:

- **Green check mark:** The OS operator can control this parameter
- **Gray check mark:** the OS operator cannot control this parameter at this time due to the process
- **Red cross:** The OS operator cannot control this parameter due to the configured AS operating permissions (OS_Perm or OS1Perm)

(6) Suppress messages

You can activate/deactivate messages by selecting the check mark.

4.1.9.4 Parameter view of S7SiFC43

The screenshot displays the parameter view of the S7SiFC43 block. It is organized into sections with status indicators (green checkmarks) and numbered callouts (1-13).

Enabled operations Settings	
✓	Read config. data ... (1)
✓	Write config. data ... (2)
✓	Zero point adjust. ... (3)
Totalizer 1: Mass	
✓	Preset value 5,00 L/s (4)
✓	Set to preset ... (5)
Totalizer 2: Mass	
✓	Preset value 10,00 m3/s (6)
✓	Set to preset ... (7)
Totalizer 3: Mass	
✓	Preset value 10,00 m3/s (8)
✓	Set to preset ... (9)
Zero flow suppression	
	Massflow 0,00 (10)
	Volume flow 0,00 (11)
✓	Password ***** (12)

Callout 13 points to the 'Enabled operations Settings' header.

(1) Read/write configuration data

In this area, you can read all configuration data relevant to the block from FC430.

(2) Write configuration data

In this area, you can write all relevant configuration data, i.e. limits, to the FC430.

(3) Zero adjustment

The zero balancing in the FC430 is triggered here.

(4), (6) and (8) Totalizer preset value

In this area, you specify a preset value for the totalizer.

If a totalizer is not configured, the area is switched to invisible.

(5), (7) and (9) Set totalizer preset value

In this area, you can set the totalizers to the preset value with the click of a button.

If a totalizer is not configured, the area is switched to invisible.

(10) and (11) Low flow cut-off suppression

The low flow cut-off suppression for mass and volume flows is displayed in this area.

(12) Password

A password must be entered before message limits can be changed in the device when writing all configuration data; this is entered here.

(13) Enabled operations

This area shows all operations for which special operator authorizations are assigned. They depend on the configuration in the engineering system (ES) that applies to this block.

Symbols for enabled operations:

- **Green check mark:** The OS operator can control this parameter
- **Gray check mark:** the OS operator cannot control this parameter at this time due to the process
- **Red cross:** The OS operator is generally prohibited from using this parameter due to the configured AS operator control permissions (OS_Perm or OS1Perm)

4.1.9.5 Preview of S7SiFC43

The screenshot displays the configuration interface for the S7SiFC43 device. It includes the following elements:

- Mass flow:** A text field showing "50,00 m3/s" (labeled 1).
- Command Dosing:** A button labeled "Off" (labeled 2).
- Enabled operations: Mass flow:** A section with checkboxes for "Reset" (checked), "On" (checked), and "Out of service" (checked) (labeled 3).
- Enabled operations: Dosing Quantity:** A section with multiple checkboxes: "Start dosing" (checked), "Automatic" (checked), "Dosing SP ext." (checked), "Pause dosing" (checked), "Manual" (checked), "Dosing SP int." (checked), "Continue dosing" (checked), "Local" (checked), "Dosing SP Change" (checked), "Stop dosing" (checked), "Out of service" (checked), "Reset" (checked), and "Start cleaning" (checked) (labeled 4).
- Inputs and outputs:** A section with several input fields: "Interlock" (1), "Local Dosing" (0), "Local Start dosing" (0), "Local Pause dosing" (0), "Local Continue dos." (0), and "Local Stop dos." (0) (labeled 5).
- Navigation:** A downward arrow button at the bottom right (labeled 7).

Note

The following screenshots show a sample configuration for SV (dosing), TV (measured value) and QV (totalizer). The structure of the faceplate is always based on the individual configuration in PDM.

(1) Process value PV

This area displays the real process values PV.

(2) Automatic preview sv

This area shows you the dosing or totalizer command that is input after a switch from "manual mode" to "automatic mode".

If the block is in "automatic mode", the current dosing or totalizer command is displayed.

If a dosing unit or totalizer is not configured, the area is switched to invisible.

(3) Enabled operations pv

This area shows the operations for the process value PV for which special operating permissions are assigned. They depend on the configuration in the engineering system (ES) that applies to this block.

Symbols for enabled operations:

- **Green check mark:** The OS operator can control this parameter
- **Gray check mark:** the OS operator cannot control this parameter at this time due to the process
- **Red cross:** The OS operator cannot control this parameter due to the configured AS operator permissions (OS_Perm or OS1Perm)

The following enabled operations are shown here:

- **Reset:** You can reset the peak value of the gradient.
- **"On":** You can switch to "On" mode.
- **"Out of service":** You can switch to "Out of service" mode.

(4) Enabled operations sv

This area shows the operations for the process value SV for which special operating permissions are assigned. They depend on the configuration in the engineering system (ES) that applies to this block.

Symbols for enabled operations:

- **Green check mark:** The OS operator can control this parameter
- **Gray check mark:** the OS operator cannot control this parameter at this time due to the process
- **Red cross:** The OS operator cannot control this parameter due to the configured AS operator permissions (OS_Perm or OS1Perm)

The following enabled operations are shown here:

General enabled operations without dosing unit and without totalizer:

- **"On":** You can switch to "On" mode.
- **"Out of service":** You can switch to "Out of service" mode.

General enabled operations with dosing unit or totalizer:

- **"Automatic":** You can switch to "automatic mode".
- **"Manual":** You can switch to "manual mode".
- **"Local":** You can switch to "local mode".
- **"Out of service":** You can switch to "Out of service" mode.

Totalizer:

- **"Start Pos./Neg":** You can start the totalizer in positive and negative modes.
- **"Start Positive":** You can start the totalizer in positive mode.
- **"Start Negative":** You can start the totalizer in negative mode.

- "Hold": You can stop the totalizer.
- "Reset": You can reset the totalizer.

Dosing:

- "Start dosing": You can start the dosing procedure.
- "Pause dosing": You can pause the dosing procedure.
- "Resume dosing": You can resume the dosing procedure after a pause or cancellation.
- "Stop dosing": You can cancel the dosing procedure.
- "Start cleaning": You can start the cleaning program.
- "External dosing SP": You can use the external setpoint.
- "Internal dosing SP": You can use the internal setpoint.
- "Dosing SP Change": You can change the setpoint.
- "Reset": You can reset the dosing quantity.

(5) Display current control signals

Only if dosing is configured:

"Interlock":

0 = Interlocking without reset is active; you can operate the block without reset once the interlocking condition has disappeared

1 = Good state

(6) Display current control signals

This area shows the most important parameters for this block with the current selection:

Dosing unit:

- "Local dosing": 1 = Control signal for "Local mode" (LocalSVLi) is enabled
- "Local start": 1 = Block is started in "Local mode"
- "Local pause": 1 = Dosing paused in "Local mode"
- "Local resume": 1 = Dosing is resumed in "Local mode"
- "Local stop": 1 = Dosing is stopped in "Local mode"

Totalizer:

- "Local tot": 1 = Totalizer is operated in "Local mode"
- "Local P./N. tot": 1 = Totalizer counts positive and negative in "Local mode"
- "Local pos. tot": 1 = Totalizer counts positive in "Local mode"
- "Local Neg. tot": 1 = Totalizer counts negative in "Local mode"
- "Local Neg. Hold": 1 = Totalizer is in hold in "Local mode"

(7) Change to second preview

The second part of the two-part preview of the faceplate can be selected here.

Second preview

The first part of the two-part preview of the faceplate can be selected here.

(1) Change to first preview
(2) and (3) Automatic preview TV, QV**Totalizer:**

This area shows you the totalizer command of TV or QV that is input after a switch from "manual mode" to "automatic mode".

If the block is in "automatic mode", the current dosing or totalizer command is displayed.

Measured value:

This area displays the real process value (TV or QV).

If neither a totalizer nor a measured value is configured, the area is switched to invisible.

(4) and (5) Enabled operations TV, QV

This area shows the operations for the process value TV or QV for which special operating permissions are assigned. They depend on the configuration in the engineering system (ES) that applies to this block.

Symbols for enabled operations:

- **Green check mark:** The OS operator can control this parameter
- **Gray check mark:** the OS operator cannot control this parameter at this time due to the process
- **Red cross:** The OS operator is generally prohibited from using this parameter due to the configured AS operator control permissions (OS_Perm or OS1Perm)

The following enabled operations are shown here:

Measured value:

- "On": You can switch to "On" mode.
- "Out of service": You can switch to "Out of service" mode.

Totalizer:

- "Automatic": You can switch to "automatic mode".
- "Manual": You can switch to "manual mode".
- "Local": You can switch to "local mode".
- "Out of service": You can switch to "Out of service" mode.
- "Start Pos./Neg.": You can start the totalizer in positive and negative modes.
- "Start Positive": You can start the totalizer in positive mode.
- "Start Negative": You can start the totalizer in negative mode.
- "Hold": You can stop the totalizer.
- "Reset": You can reset the totalizer.

(6) Display current control signals

This area shows the most important parameters for this block with the current selection:

Dosing unit:

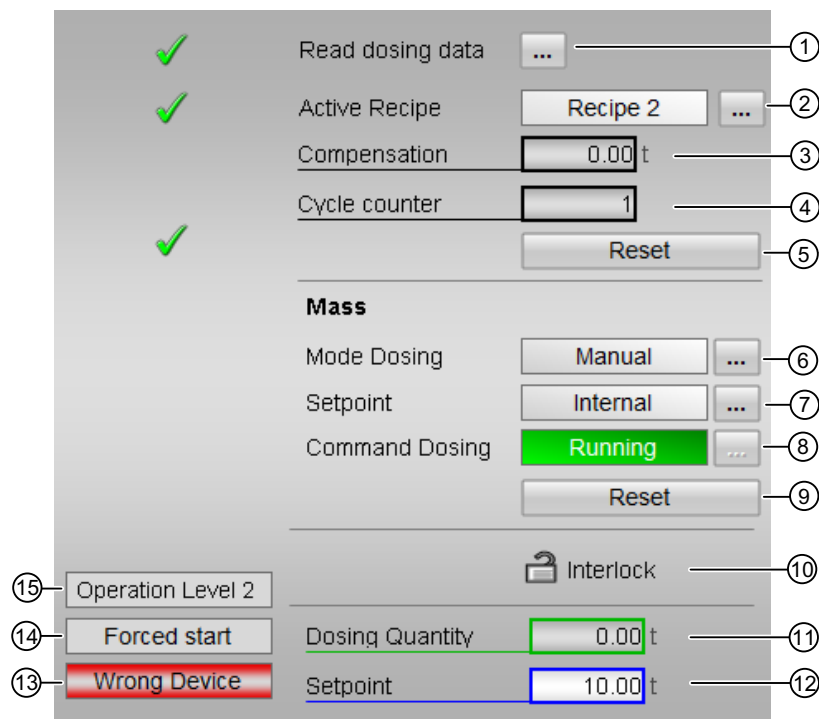
- "Local dosing": 1 = Control signal for "Local mode" (LocalSVLi) is enabled
- "Local start": 1 = Block is started in "Local mode"
- "Local pause": 1 = Dosing paused in "Local mode"
- "Local resume": 1 = Dosing is resumed in "Local mode"
- "Local stop": 1 = Dosing is stopped in "Local mode"

Totalizer:

- "Local tot": 1 = Totalizer is operated in "Local mode"
- "Local P./N. tot": 1 = Totalizer counts positive and negative in "Local mode"
- "Local pos. tot": 1 = Totalizer counts positive in "Local mode"
- "Local Neg. tot": 1 = Totalizer counts negative in "Local mode"
- "Local Neg. Hold": 1 = Totalizer is in hold in "Local mode"

4.1.9.6 Dosing view of S7SiFC43

The dosing view can only be selected if dosing is configured (Feature bit 14 = TRUE).

**(1) Read dosing data**

The "Read dosing data" button is used to read out the following values from the FC430:

- Names of all configured dosing recipes
- Active dosing recipe
- Current dosing setpoint
- Unit of current dosing setpoint
- Current dosing status
- Dosing counter value
- Compensation value of dosing unit

(2) Active dosing recipe

The active dosing recipe is selected and displayed here.

(3) Compensation

Display of compensation value for dosing.

(4) Dosing unit cycle counter

Display of number of dosing cycles carried out since last reset

(5) Reset dosing unit cycle counter

Reset dosing counter

(6) Display and switchover of dosing operating mode

This area provides information on the currently valid dosing operating mode.

The block can be operated using the following modes:

- Local mode
- Automatic mode
- Manual mode
- Out of service

For more information on changing the operating mode, refer to the "Switching operating states and operating modes" section in the APL Online Help.

(7) Display and change of setpoint if dosing is configured

The following states can be shown and changed here:

- "Internal"
- "External"

For more information, refer to the "Manual and automatic mode for motors, valves and dosing units" section in the APL Online Help.

(8) Display and change the dosing unit: Start, resume, pause and stop

This area shows you the default operating state for the dosing unit. The following states can be shown and changed here:

- "Start"
- "Continue"
- "Pause"
- "Stop"

(9) Reset the block

Click "Reset" for interlocks or errors. For more information, refer to the "Resetting the block in case of interlocks or errors" section in the APL Online Help.

(10) Operating area for the interlock functions of the block

You can use this button to control the interlock functions of the block. For more information, refer to the "Interlocks" section in the APL Online Help.

(11) Display of the dosed quantity

This area provides information on the currently dosed quantity.

(12) Display and change the setpoint

This area displays the current dosing unit setpoint and lets you edit the setpoint in manual mode.

(13) and (14) Display area for block states

This area provides additional information on the operating state of the block:

- "Wrong device"
- Forced control of dosing unit: "Forced start"/"Resume"/"Pause"/"Stop"

(15) Display area for switch permission

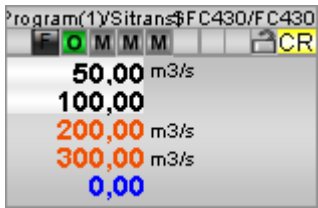
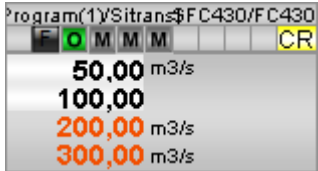
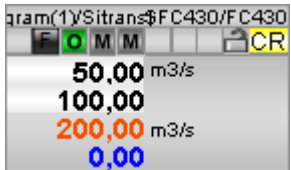
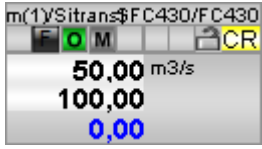
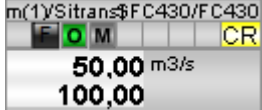
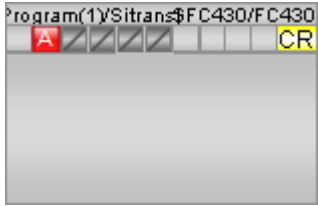
This area provides the text of the current OS, according to the enumeration configured at the PERMIS input.

4.1.9.7 Block icon for S7SiFC43**Block icons for S7SiFC43**

A variety of block icons are available with the following functions:

- Process tag type
- Limits (high/low)
- Violation of alarm and warning limits as well as the control system fault CSF
- Operating modes for PV, SV, TV and QV
- Signal status
- Process values (PV_In, SV, TV, QV)

The block icons from template @TemplateAPL_SITRANS.PDL:

Icons	Selection of the block icon in CFC	Special features
	1	PV, SV, TV and QV are used SV = dosing unit TV = totalizer
	2	PV, SV, TV and QV are used SV = totalizer TV = totalizer (no dosing unit configured)
	3	PV, SV and TV are used SV = dosing unit TV = totalizer
	4	PV, SV and TV are used SV = totalizer TV = totalizer (no dosing unit configured)
	5	PV and SV are used SV = dosing unit
	6	PV and SV are used SV = totalizer (no dosing unit configured)
	7	Only PV is used
	8	Example of block icon in the "Out of service" operating mode

Additional information on the block icon and the control options in the block icon is available in the following chapters:

- "Configuring the block icons" in the APL Online Help
- "Block icon structure" in the APL Online Help
- "Operation via the block icon" in the APL Online Help

4.2 SiFC43Dr

4.2.1 Description of SiFC43Dr

Object name (type + number) and family

Type + number: FB 2631

Family: SiFC43Dr

Application area of SiFC43Dr

The block is used for the following application:

- Interface block between the technological block SiFC43Dr and the driver block PiDr64 for reading and writing acyclic data.

How it works

The SiFC43Dr block receives requests via its output structures `SxRdReq` and `SxWrReq` to read data from the device or to write data to the device. Read data or data to be written is transferred via the `Para` output structure. The `AcyclData` input structure serves as an interface via which the read and write jobs are passed on to the PiDr64 driver block.

Configuration

The PiDr64, SiFC43Dr and S7SiFC43 blocks are inserted in a cyclic interrupt OB (OB30 to OB38) in exactly the execution sequence. The `AcyclData` output structure of the PiDr64 block is interconnected to the input with the same name of the SiFC43Dr block. The `SxRdReq`, `SxWrReq` and `Para` output structures of the SiFC43Dr block are interconnected to the `RdReq`, `WrReq` and `Para` inputs of the S7SiFC43 block.

Startup characteristics

This block does not have startup characteristics.

4.2.2 Operating modes of SiFC43Dr

This block does not have any operating modes.

4.2.3 I/Os of SiFC43Dr

Input parameters

This block has no input parameters.

In/out parameters

Parameter	Description	Type	Default
AcyclData	Acyclic data from driver block PiDr64 (interconnect this input with AcyclData output of PiDr64)	STRUCT <ul style="list-style-type: none"> • SlotRd : INT • ... • RetValWr: WORD • Input : STRUCT • Output : STRUCT • NewDiag : INT • DiagData : STRUCT 	

Output parameters

Parameter	Description
SxRdReq	If the structure is set for one of the member variables of type BOOL, the block passes on the job for reading the data stored for that purpose to the driver block. Only exactly one member variable is set to TRUE:
	STRUCT
	ManufacturerID : Manufacturer ID
	UserAccessLevel : Access rights
	DevVarAssin : Assignment of measured variables to Hart variables
	DevTotAssin : Assignment of measured variables to totalizers
	DevVarUnits : Units of measured variables
	MassVolFlowUnits: Units of mass and volume flow
	PV_Scale : Scaling PV
	LimOpScale : Limits for PV/SV/TV/QV messages
	LimOpScaleFAB : Limits for messages fractions A and B
	DosCfg : Dosing configuration
	ZFSupp : Low flow cut-off suppression
	CTMode : Custody transfer mode
	PV_Limits : Limits PV
	SV_Limits : Limits SV
	TV_Limits : Limits TV
	QV_Limits : Limits QV
	FractUnitType : Fraction unit type
	FractnATxt : Text fraction A
	FractnBTxt : Text fraction B
	DosingActRec : Active dosing recipe
	DosingRecNames13: Names of dosing recipes 1..3
	DosingRecNames45: Names of dosing recipes 4..5
	DosingSetpUnit : Dosing setpoint unit
	DosingComp : Dosing compensation
	DSetpoint : Dosing setpoint
	DosingCnt : Dosing counter
	DosingState : Dosing state
	TotSVCmd : SV: Current totalizer command
	TotTVCmd : TV: Current totalizer command
	TotQVCmd : QV: Current totalizer command
	PresetVal123 : Current preset values of totalizers END_STRUCT

Parameter	Description
SxWrReq	<p>If the structure is set for one of the member variables of type BOOL, the block passes on the job for writing the data stored for that purpose or for sending the corresponding command to the driver block. Only exactly one member variable is set to TRUE:</p> <p>STRUCT</p> <p>Password : Password</p> <p>PV_AH_Lim : PV - High alarm limit</p> <p>PV_WH_Lim : PV - High warning limit</p> <p>PV_WL_Lim : PV - Low warning limit</p> <p>PV_AL_Lim : PV - Low alarm limit</p> <p>PV_Hyst : PV - Hysteresis</p> <p>SV_AH_Lim : SV - High alarm limit</p> <p>SV_WH_Lim : SV - High warning limit</p> <p>SV_WL_Lim : SV - Low warning limit</p> <p>SV_AL_Lim : SV - Low alarm limit</p> <p>SV_Hyst : SV - Hysteresis</p> <p>TV_AH_Lim : TV - High alarm limit</p> <p>TV_WH_Lim : TV - High warning limit</p> <p>TV_WL_Lim : TV - Low warning limit</p> <p>TV_AL_Lim : TV - Low alarm limit</p> <p>TV_Hyst : TV - Hysteresis</p> <p>QV_AH_Lim : QV - High alarm limit</p> <p>QV_WH_Lim : QV - High warning limit</p> <p>QV_WL_Lim : QV - Low warning limit</p> <p>QV_AL_Lim : QV - Low alarm limit</p> <p>QV_Hyst : QV - Hysteresis</p> <p>ForceZerAdj : Force zero balancing</p> <p>ZeroAdjCmd : Zero balancing command</p> <p>DosingActRec : Active dosing recipe</p> <p>DosingComp : Dosing compensation</p> <p>DSetpoint : Dosing setpoint</p> <p>DosingCmd : Dosing command</p> <p>DRstCycCnt : Reset dosing counter</p> <p>TotSVCmd : SV: Current totalizer command</p> <p>TotTVCmd : TV: Current totalizer command</p> <p>TotQVCmd : QV: Current totalizer command</p> <p>TotSVReset : Reset totalizer SV</p> <p>TotTVReset : Reset totalizer TV</p> <p>TotQVReset : Reset totalizer QV</p> <p>PresetValSV : Preset value, totalizer SV</p> <p>PresetValTV : Preset value, totalizer TV</p> <p>PresetValQV : Preset value, totalizer QV</p> <p>ModeTotSV : Preset totalizer SV</p>

Parameter	Description
	ModeTotTV : Preset totalizer TV
	ModeTotQV : Preset totalizer QV

Parameter	Description
Para	<p>Values of parameters which are written to the device or read from it:</p> <p>STRUCT</p> <p>InProcess : Read/write data active</p> <p>_OK : Data successfully read/written</p> <p>Error : Error when reading/writing data</p> <p>RdDrErr : Error reading a data record</p> <p>WrDrErr : Error writing a data record</p> <p>FractnAtxt : Text fraction A</p> <p>FractnBtxt : Text fraction B</p> <p>InRcp1..5Name : Dosing recipe name 1..5</p> <p>InPassword : Password</p> <p>UserAccessLevel : Access rights</p> <p>PV_Meas0 : Measured value <i>PV_In</i></p> <p>PV_Meas1 : Measured value <i>PV</i></p> <p>PV_Meas2 : Measured value <i>SV</i></p> <p>PV_Meas3 : Measured value <i>TV</i></p> <p>PV_Meas4 : Measured value <i>QV</i></p> <p>FractnUType : Measuring mode: (0=mass, 1=volume)</p> <p>Tot1Ch : Measured value totalizer 1</p> <p>Tot2Ch : Measured value totalizer 2</p> <p>Tot3Ch : Measured value totalizer 3</p> <p>SlotHart : Slot of AI Hart module</p> <p>SxDC : Internal use</p> <p>CTModeAct: Custody transfer mode active</p> <p>PV_Unit : Unit for <i>PV</i></p> <p>SV_Unit : Unit for <i>SV</i></p> <p>TV_Unit : Unit for <i>TV</i></p> <p>QV_Unit : Unit for <i>QV</i></p> <p>Mfl_Unit : Unit for mass flow</p> <p>Vfl_Unit : Unit for volume flow</p> <p>ZeroAdjOp : Start zero balancing</p> <p>MflZFSupp : Low flow cut-off suppression for mass flow</p> <p>VflZFSupp : Low flow cut-off suppression for volume flow</p> <p>Tot1Cmd : Totalizer command <i>SV</i></p> <p>Tot2Cmd : Totalizer command <i>TV</i></p> <p>Tot3Cmd : Totalizer command <i>QV</i></p> <p>SVPreVal : Preset value, totalizer <i>SV</i></p> <p>TVPreVal : Preset value, totalizer <i>TV</i></p> <p>QVPreVal : Preset value, totalizer <i>QV</i></p> <p>Ch2HwCnfg : BYTE; // channel 2 hardware configuration</p> <p>DMode : Dosing mode</p> <p>DActRec : Active dosing recipe</p> <p>DCyclCnt : Dosing counter value</p> <p>DinputSel : Measured variable of dosing value</p>

Parameter	Description
	DSP_Unit : Dosing value unit
	DCompMode : Dosing compensation mode
	DComp : Dosing compensation value
	DSetpoint : Dosing setpoint
	DosingCmd : Dosing command
	DosingState : Dosing state
	ScaleIn : Scaling for process value PV (only for internal use)
	LimPVOpScale : Maximum and minimum values for message limits PV
	LimSVOpScale : Maximum and minimum values for message limits SV
	LimTVOpScale : Maximum and minimum values for message limits TV
	LimQVOpScale : Maximum and minimum values for message limits QV
	InPV_AH_Lim : Limit PV alarm (high) for writing to device
	InPV_WH_Lim : Limit PV warning (high) for writing to device
	InPV_WL_Lim : Limit PV warning (low) for writing to device
	InPV_AL_Lim : Limit PV alarm (low) for writing to device
	InPV_Hyst : Hysteresis for PV alarm and warning limits for writing to device
	PV_AH_Lim : Limit PV alarm (high)
	PV_WH_Lim : Limit PV warning (high)
	PV_WL_Lim : Limit PV warning (low)
	PV_AL_Lim : Limit PV alarm (low)
	PV_Hyst : Hysteresis for PV alarm and warning limits
	InSV_AH_Lim : Limit SV alarm (high) for writing to device
	InSV_WH_Lim : Limit SV warning (high) for writing to device
	InSV_WL_Lim : Limit SV warning (low) for writing to device
	InSV_AL_Lim : Limit SV alarm (low) for writing to device
	InSV_Hyst : Hysteresis for SV alarm and warning limits for writing to device
	SV_AH_Lim : Limit SV alarm (high)
	SV_WH_Lim : Limit SV warning (high)
	SV_WL_Lim : Limit SV warning (low)
	SV_AL_Lim : Limit SV alarm (low)
	SV_Hyst : Hysteresis for SV alarm and warning limits
	InTV_AH_Lim : Limit TV alarm (high) for writing to device
	InTV_WH_Lim : Limit TV warning (high) for writing to device
	InTV_WL_Lim : Limit TV warning (low) for writing to device
	InTV_AL_Lim : Limit TV alarm (low) for writing to device
	InTV_Hyst : Hysteresis for TV alarm and warning limits for writing to device
	TV_AH_Lim : Limit TV alarm (high)
	TV_WH_Lim : Limit TV warning (high)
	TV_WL_Lim : Limit TV warning (low)
	TV_AL_Lim : Limit TV alarm (low)
	TV_Hyst : Hysteresis for TV alarm and warning limits

Parameter	Description
	InQV_AH_Lim : Limit QV alarm (high) for writing to device
	InQV_WH_Lim : Limit QV warning (high) for writing to device
	InQV_WL_Lim : Limit QV warning (low) for writing to device
	InQV_AL_Lim : Limit QV alarm (low) for writing to device
	InQV_Hyst : Hysteresis for QV alarm and warning limits for writing to device
	QV_AH_Lim : Limit QV alarm (high)
	QV_WH_Lim : Limit QV warning (high)
	QV_WL_Lim : Limit QV warning (low)
	QV_AL_Lim : Limit QV alarm (low)
	QV_Hyst : Hysteresis for QV alarm and warning limits

4.2.4 Block diagram of SiFC43Dr

A block diagram is not provided for this block.

4.2.5 Template of SiFC43Dr

The SiFC43Dr block is used in the templates of the SiFC43.

4.2.6 Operator control & monitoring SiFC43Dr

Operator control & monitoring

The SiFC43Dr block cannot be operated or monitored.

SITRANS LR PA

5.1 S7SiLRPA

5.1.1 Description of S7SiLRPA

Object name (type + number) and family

Type + number: FB 2640

Family: Sitrans

Note

The S7SiLRPA block and its faceplate are oriented to the function principle of the PCS 7 APL Library that is not explained in detail in this document. The APL Manual is available for download from the Internet at Siemens Customer Support (<http://support.automation.siemens.com/WW/view/de/57265842> (contribution ID:57265842))

Area of application for S7SiLRPA

The block is used for the following applications:

- Interface block between the Profibus PA driver blocks of the Sitrans LR 200/250/260/560 module for the user program and for visualization

How it works

The S7SiLRPA block prepares the process data received from driver blocks from a Sitrans LR 250 and makes the data available for further use in the user program and for visualization. Data entered in the faceplate or via the block inputs is transferred to the Sitrans LR 250 by means of driver blocks.

The function block supports configuring of the Sitrans LR 250 with one or two inputs.

Configuration

Use the CFC editor to install the block in a cyclic interrupt OB (OB30 to OB38). The block is also installed automatically in the startup OB (OB 100). Moreover, to connect the I/O signals it is imperative to call driver block PiDr64 (acyclic data) in the same cyclic interrupt OB and startup OB (OB100) **before** the S7SiLRPA block is called. The output structure `AcyclData` of the PiDr64 block is interconnected to the input with the same name of the S7SiLRPA block.

The SITRANS Library contains two templates for process tag types as an example with an application scenario for the S7SiLRPA block with one or two analog inputs.

Example of a process tag type: Template of S7SiLRPA (Page 123)

Startup characteristics

Use the **Feature Bit Setting** the startup characteristics (Page 24) to define the startup characteristics of this block.

The messages are suppressed after startup for the number of cycles set at **RunUpCyc**.

Note

The user text library "S7SiLRPA_MeasVal" must be copied from the Sitrans Library to the STEP 7 project prior to the OS compilation. To do this, open the SITRANS Library from the Simatic Manager using File -> Open... -> Libraries. Copy the "S7SiLRPA_MeasVal" file from the library (directory: Blocks+Templates\Text Libraries) into a user text library folder created using the S7 program in your STEP 7 project.

Status word allocation for **Status1** parameter

You can find a description for each parameter in section I/Os of S7SiLRPA (Page 116).

Status bit	Parameter
0	Occupied
1	BatchEn
2	Not used
3	OosAct
4	OosLi
5	Not used
6	OnAct
7 - 19	Not used
20	Local operator permission (Feature Bit 24)
21 - 31	Not Used

Status word allocation for **Status2** parameter

You can find a description for each parameter in section I/Os of S7SiLRPA (Page 116).

Status bit	Parameter
0	MsgLock
1	PV1AH_Act
2	PV1WH_Act
3	PV1WL_Act
4	PV1AL_Act

Status bit	Parameter
5 - 6	Not used
7	PV1AH_En
8	PV1WH_En
9 - 10	Not used
11	PV1WL_En
12	PV1AL_En
13	PV1AH_MsgEn
14	PV1WH_MsgEn
15 - 16	Not used
17	PV1WL_MsgEn
18	PV1AL_MsgEn
19	GradHUpAct
20	GradHDnAct
21	GradLAct
22	GradHUpEn
23	GradHDnEn
24	GradLEn
25	GradHUpMsgEn
26	GradHDnMsgEn
27	GradLMsgEn
28	0 = decreasing measured value 1 = increasing measured value
29 - 31	Not used

Status word allocation for Status3 parameter

You can find a description for each parameter in section I/Os of S7SiLRPA (Page 116).

Status bit	Parameter
0 - 7	Not used
8	PV2AH_Act
9	PV2WH_Act
10	PV2WL_Act
11	PV2AL_Act
12	PV2AH_En
13	PV2WH_En
14 - 15	Not used
16	PV2WL_En
17	PV2AL_En
18	PV2AH_MsgEn
19	PV2WH_MsgEn
20 - 21	Not used
22	PV2WL_MsgEn

Status bit	Parameter
23	PV2AL_MsgEn
24	QWronDev
25	1 = error when reading acyclic data (active only for the duration of one cycle)
26	1 = error when writing acyclic data (active only for the duration of one cycle)
27	Analog input 2 (PV2) configured
28	Show value for fill time
29	Show value for empty time
30	Fill time and empty time visible
31	1 = display "Write configuration data" in the faceplate

5.1.2 Operating modes of S7SiLRPA

The block can be operated using the following modes:

- On
- Out of service

"On"

You can find general information about the "On" mode in the On chapter.

"Out of service"

You can find general information about the "Out of service" mode in the Out of service section.

The descriptions of the operating modes are identical for the S7SiLRPA and the APL; refer to the Online Help for the standard APL blocks for information on them.

5.1.3 Functions of S7SiLRPA

The functions for this block are listed below.

Configuration data

The configuration data comprises the units, the configuration of the PV inputs, and the limits for messages. After a change is made in the device, reading of configuration data must be triggered with "Read configuration data" in the parameter view of the faceplate. If the parameters were read back before a complete download to the PLC, the configuration does not need to be reloaded from the device.

The message limits of the S7SiLRPA are only transferred to the device when the alarm configuration is synchronized with the device (`Feature Bit7 = TRUE`).

The S7SiLRPA function block has the following configuration data which can be read out of the Sitrans LR 250 by means of the "Read configuration data" command:

Description	Block parameters (I/O)
Configuration of PV1 and PV2 inputs	PV1Meas PV2Meas
Vessel form	TankType
Units PV1 and PV2, user-specific units as well as maximum and minimum values for the alarm and warning limits of the process values	PV1Unit PV2Unit UsrUnit1 UsrUnit2 PV1OpScaleH PV1OpScaleL PV2OpScaleH PV2OpScaleL
Limits PV1	InPV1AH_Lim/PV1AH_Lim InPV1WH_Lim/PV1WH_Lim InPV1WL_Lim/PV1WL_Lim InPV1AL_Lim/PV1AL_Lim InPV1Hyst/PV1Hyst
LimitsPV2	InPV2AH_Lim/PV2AH_Lim InPV2WH_Lim/PV2WH_Lim InPV2WL_Lim/PV2WL_Lim InPV2AL_Lim/PV2AL_Lim InPV2Hyst/PV2Hyst

Limit monitoring

The block monitors the process value 1 PV1 and, if configured, the process value 2 PV2 for limits. Both values are cyclically integrated into the process image of the controller. Configuration of the limits is carried out either by means of PDM and imported by reading the configuration data from the block, or can be carried out on the block independent of the module (see Feature Bit7).

You can monitor the process value 1 PV1 and the process value 2 PV2 for the following high and low alarm and warning limits:

- PV1/PV2AH_Lim: Limit for high alarm
- PV1/PV2AL_Lim: Limit for low alarm
- PV1/PV2Hyst: Hysteresis
- PV1/PV2WH_Lim: Limit for high warning
- PV1/PV2WL_Lim: Limit for low warning

The result of limit monitoring is returned at the interconnectable output parameters:

- PV1/PV2AH_Act = 1: Limit for high alarm reached or exceeded
- PV1/PV2AL_Act = 1: Limit for low alarm reached or undershot
- PV1/PV2WH_Act = 1: Limit for high warning reached or exceeded
- PV1/PV2WL_Act = 1: Limit for low warning reached or undershot

Monitoring is always enabled using the input parameters:

- PV1/PV2AH_En = 1: Monitoring of the high alarm limits
- PV1/PV2AL_En = 1: Monitoring of the low alarm limits
- PV1/PV2WH_En = 1: Monitoring of the high warning limits
- PV1/PV2WL_En = 1: Monitoring of the low warning limits

The corresponding message is suppressed using the parameters:

- PV1/PV2AH_MsgEn = 0: Alarm (high) messages are suppressed
- PV1/PV2AL_MsgEn = 0: Alarm (low) messages are suppressed
- PV1/PV2WH_MsgEn = 0: Warning (high) messages are suppressed
- PV1/PV2WL_MsgEn = 0: Warning (low) messages are suppressed

You can define a hysteresis (PV1/PV2Hyst) for the limits, for example to suppress signal flatter. You can also modify the limits and hysteresis via the faceplate.

Gradient monitoring

The gradient PV1Grad is calculated by means of a delay function configurable using LagTime. During calculation of the gradient, jumps in the input value PV1 are smoothed.

The peak values of the gradient are output in the output parameters PV1GradNP (negative gradient) and PV1GradPP (positive gradient). These are reset when the operator enters the corresponding command for resetting.

The slope of the gradient PV1Grad can be monitored for the following limits:

- Limit (high) for the positive gradient (GradHUpLim)
- Limit (high) for the negative gradient (GradHDnLim)
- Limit (low) for the absolute gradient (GradLLim)

Activation of the individual monitoring functions is carried out at the corresponding "Enable" parameters, e.g. GradHUpEn for activating the high gradient limit for positive gradients (GradHUpLim).

Reaching or violation of your defined limits is indicated at the corresponding "Active" output parameters, e.g. by means of GradHUpAct = 1 for the limit (high) for the positive gradient.

Messages can be output for these alarms. You can activate these as follows:

- Message for alarms (high) for the positive gradient: GradHUpMsgEn = 1
- Message for alarms (high) for the negative gradient: GradHDnMsgEn = 1
- Message for alarms (low) for the absolute gradient: GradLMsgEn = 1

Suppressing messages using the MsgLock parameter

This block provides the standard "Suppressing messages using the MsgLock parameter" function that is described in the APL Online Help.

Selecting a unit of measure

The units for process value 1 PV1 and process value 2 PV2 are configured on the device of the Sitrans LR 250 via PDM and read by operator action in the "Parameters" faceplate view with "Read configuration".

Configurable reactions using the Feature I/O

The following response features are available for this block at the respective bits of the Feature connection. If a description is not available here, it can be referenced in the APL Online Help.

Bit	Feature
0	Setting the startup characteristics
1	Reaction to the Out of service mode
3	Two decimal places of aux. value in limit messages
6	1 = Activate calculation of fill time/empty time
7	1 = Message limits are read from the device and transferred to the device in case of a change
9	Reading configuration data automatically During the start of the controller and when the connection between device and controller is reestablished after an interruption, the configuration data is read automatically by means of acyclic communication. Only 8 acyclic read jobs can be executed simultaneously for each Profibus line. If additional devices want to read acyclic data simultaneously, the read job is canceled with an error. Alternatively, configuration data can also be read after a change in the device with the click of a button in the faceplate
22	Update acknowledgment and error status of the message call
24	Enable local operator authorization
25	Suppress all messages
26	Reaction of the switching points in "Out of service" mode
28	Disabling switching points
29	Signaling limit violation

For more information about the feature bits please refer to the APL online help.

Operator authorizations

This block provides the standard operating permissions that are described in the APL online help.

The block has the following permissions for the OS_Perm parameter:

Bit	Function
0	Not used
1	1 = Operator can switch to "On" mode
2	Not used
3	1 = Operator can switch to "Out of service" mode
4 - 6	Not used

7	1 = Operator can reset the maximum values
8	1 = Operator can activate / deactivate messages with GradHUpMsgEn
9	1 = Operator can activate / deactivate messages with GradHDnMsgEn
10	1 = Operator can activate / deactivate messages with GradLMsgEn
11 - 12	Not used
13	1 = Operator can change the limit (PV1) for the high alarm
14	1 = Operator can change the limit (PV1) for the high warning
15	Not used
16	1 = Operator can change the limit (PV1) for the hysteresis
17	1 = Operator can change the limit (PV1) for the low warning
18	1 = Operator can change the limit (PV1) for the low alarm
19	Not used
20	1 = Operator can change the value for the high gradient limit for positive gradients (GradHUpLim)
21	1 = Operator can change the value for the high gradient limit for negative gradients (GradHDnLim)
22	1 = Operator can change the value for the low gradient limit for positive and negative gradients (GradLLim)
23	Not used
24	1 = Operator can activate / deactivate messages with PV1AH_MsgEn
25	1 = Operator can activate / deactivate messages with PV1WH_MsgEn
26	1 = Operator can activate / deactivate messages with PV1WL_MsgEn
27	1 = Operator can activate / deactivate messages with PV1AL_MsgEn
28 - 31	Not used

The block has the following permissions for the OS1Perm parameter:

Bit	Function
0	1 = Operator can change the limit (PV2) for the high alarm
1	1 = Operator can change the limit (PV2) for the high warning
2	1 = Operator can change the limit (PV2) for the hysteresis
3	1 = Operator can change the limit (PV2) for the low alarm
4	1 = Operator can change the limit (PV2) for the low warning
5	1 = Operator can activate / deactivate messages with PV2AH_MsgEn
6	1 = Operator can activate / deactivate messages with PV2WH_MsgEn
7	1 = Operator can activate / deactivate messages with PV2WL_MsgEn
8	1 = Operator can activate / deactivate messages with PV2AL_MsgEn
9 - 13	Not used
14	1 = Operator can read the diagnostic values
15	1 = Operator can read the configuration data from the device
16	1 = Operator can write the configuration data to the device
17 - 31	Not used

Display and operating range for process values and limits

The scalings from the Sitrans LR 250 are read out as the display and operating range (PV1OpScaleH/L, PV2OpScaleH/L) for the process values PV1 and PV2.

Generating instance-specific messages

This block provides the standard "Generate instance-specific messages" function that is described in the APL Online Help.

SIMATIC BATCH functionality

This block provides the standard "SIMATIC BATCH functionality" function that is described in the APL Online Help.

5.1.4 Error handling of S7SiLRPA

For general information on error handling at all blocks, refer to the "Error handling" section in the APL Online Help.

The following errors can be displayed for this block:

- Error numbers
- Control system fault (CSF)

Control system fault (CSF)

An external signal can be activated via the CSF input. A process control error is triggered if this signal = 1. Refer to the "Error handling" chapter in the APL Online Help.

5.1.5 S7SiLRPA messaging

Messaging

The following messages can be generated for this block:

- Process control error
- Process messages
- Instance-specific messages

Process control errors

The following control system fault messages can be output:

Message instance	Message class	Event
MsgEvId12	AS process control message - fault	External error has occurred (S7SiLRPA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]
MsgEvId13	AS process control message - error	Error while reading a data record (S7SiLRPA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]
MsgEvId14	AS process control message - error	Error while writing a data record (S7SiLRPA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]

You can interconnect an external fault (signal) to the input parameter CSF. If this signal changes to CSF = 1, a process control error is triggered (MsgEvId12).

Process messages

Message instance	Message class	Event
MsgEvId01	Alarm - high	@1Y%t#S7SiLRPA_MeasVal@ - High alarm limit violated (S7SiLRPA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2I%d@.@2Y%1u@]
MsgEvId02	Warning - high	@1Y%t#S7SiLRPA_MeasVal@ - High warning limit violated (S7SiLRPA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2I%d@.@2Y%1u@]
MsgEvId03	Warning - low	@1Y%t#S7SiLRPA_MeasVal@ - Low warning limit violated (S7SiLRPA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2I%d@.@2Y%1u@]
MsgEvId04	Alarm - low	@1Y%t#S7SiLRPA_MeasVal@ - Low alarm limit violated (S7SiLRPA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2I%d@.@2Y%1u@]
MsgEvId05	Alarm - high	@1Y%t#S7SiLRPA_MeasVal@ - High alarm limit violated (S7SiLRPA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2I%d@.@2Y%1u@]
MsgEvId06	Warning - high	@1Y%t#S7SiLRPA_MeasVal@ - High warning limit violated (S7SiLRPA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2I%d@.@2Y%1u@]
MsgEvId07	Warning - low	@1Y%t#S7SiLRPA_MeasVal@ - Low warning limit violated (S7SiLRPA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2I%d@.@2Y%1u@]
MsgEvId08	Alarm - low	@1Y%t#S7SiLRPA_MeasVal@ - Low alarm limit violated (S7SiLRPA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2I%d@.@2Y%1u@]
MsgEvId09	Alarm - high	Limit value (high) for the positive gradient violated (S7SiLRPA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]

MsgEvId10	Alarm - high	Limit value (high) for the negative gradient violated (S7SiLRPA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]
MsgEvId11	Alarm - low	Limit value (low) for absolute gradient violated (S7SiLRPA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]

The content of the message text library "S7SiLRPA_MeasVal" is described below.

Instance-specific message

You can use one instance-specific message with this block.

Message instance	Message class	Event
MsgEvId15	AS process control message - fault	External message (S7SiLRPA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]

Associated values for message instances with limit violation

Associated value	Block parameter	Data Type
1	PV_Meas0	BYTE
2	AuxByte (one or two digits after the decimal point, see Feature.Bit3)	BYTE
3	AuxWord (number before the decimal point: -32768 .. 32767)	WORD
4	BatchID	DWORD
5	MsgFilter	DINT

Associated values for message instances without limit violation

Associated value	Block parameter	Data Type
1	Aux	REAL
2	BatchID	DWORD
3	MsgFilter	DINT

Message texts and their text numbers

The following table shows the message texts and their numbers in the text library "S7SiLRPA_MeasVal" for the S7SiLRPA block (FB 2640):

Text number	Message text
0	<Invalid value>
1	Volume
2	Level
3	Distance

5.1.6 I/Os of S7SiLRPA

Input parameters

Parameter	Description	Type	Default
DevType	Device type of SITRANS LR PA 0: No device 1: LR200PA 2: LR250PA 3: LR260PA 4: LR560PA	INT	0
PV1	Process value 1	REAL	0.0
QCPV1	Quality code of Process value 1		16#80
PV2	Process value 2	REAL	0.0
QCPV2	Quality code of process value 2		16#80
PV1Meas*	Measured value that is interconnected at the PV1 input: 0: <invalid value> 1: Volume 2: Fill level 3: Distance	BYTE	0
PV2Meas*	Measured value that is interconnected at the PV2 input: 0: <invalid value> 1: Volume 2: Fill level 3: Distance	BYTE	0
Channel1AI*	Channel 1 (read from device)	INT	-1
Channel2AI*	Channel 2 (read from device)	INT	-1
TankType*	Vessel form	BYTE	0
PV1Unit*	Measurement unit for process value 1 (PV1)	INT	0
PV2Unit*	Measurement unit for process value 2 (PV2)	INT	0
UsrUnit1*	User-specific unit for process value 1 (PV1)	S7-String	
UsrUnit2*	User-specific unit for process value 2 (PV2)	S7-String	
InAlgorithm	Echo algorithm	BYTE	16#00
InConfidenc	Echo confidence	BYTE	16#00
InEchoStren	Echo strength	BYTE	16#00
OnOp*	1 = "On" mode via operator	BOOL	0
OosOp*	1 = "Out of service", via OS operator	BOOL	0
OosLi	1 = "Out of service", via interconnection or SFC (0-1 edge transition)	BOOL	0

Parameter	Description	Type	Default
InPV1AH_Lim*	Limit sensor PV1: Alarm limit (high)	REAL	0.0
InPV1WH_Lim*	Limit sensor PV1: Warning limit (high)	REAL	0.0
InPV1Hyst*	Limit sensor PV1: Hysteresis for alarm and warning limits	REAL	0.0
InPV1WL_Lim*	Limit sensor PV1: Limit warning (low)	REAL	0.0
InPV1AL_Lim*	Limit sensor PV1: Alarm limit (low)	REAL	0.0
PV1AH_En	1 = Activate process value 1 alarm (high)	BOOL	1
PV1WH_En	1 = Activate process value 1 warning (high)	BOOL	1
PV1WL_En	1 = Activate process value 1 warning (low)	BOOL	1
PV1AL_En	1 = Activate process value 1 alarm (low)	BOOL	1
PV1AH_MsgEn	1 = Activate message for process value 1 alarm (high)	BOOL	1
PV1WH_MsgEn	1 = Activate message for process value 1 warning (high)	BOOL	1
PV1WL_MsgEn	1 = Activate message for process value 1 warning (low)	BOOL	1
PV1AL_MsgEn	1 = Activate message for process value 1 alarm (low)	BOOL	1
InPV2AH_Lim*	Limit sensor PV2: Alarm limit (high)	REAL	0.0
InPV2WH_Lim*	Limit sensor PV2: Warning limit (high)	REAL	0.0
InPV2Hyst*	Limit sensor PV2: Hysteresis for alarm and warning limits	REAL	0.0
InPV2WL_Lim*	Limit sensor PV2: Limit warning (low)	REAL	0.0
InPV2AL_Lim*	Limit sensor PV2: Alarm limit (low)	REAL	0.0
PV2AH_En	1 = Activate process value 2 alarm (high)	BOOL	0
PV2WH_En	1 = Activate process value 2 warning (high)	BOOL	0
PV2WL_En	1 = Activate process value 2 warning (low)	BOOL	0
PV2AL_En	1 = Activate process value 2 alarm (low)	BOOL	0
PV2AH_MsgEn	1 = Activate message for process value 2 alarm (high)	BOOL	1
PV2WH_MsgEn	1 = Activate message for process value 2 warning (high)	BOOL	1

Parameter	Description	Type	Default
PV2WL_MsgEn	1 = Activate message for process value 2 warning (low)	BOOL	1
PV2AL_MsgEn	1 = Activate message for process value 2 alarm (low)	BOOL	1
GradHUpLim	Gradient monitoring: Limit (high) for the positive gradient	REAL	10.0
GradHDnLim	Gradient monitoring: Limit (high) for the negative gradient	REAL	10.0
GradLLim	Gradient monitoring: Limit (low) for the absolute gradient	REAL	1.0
RstOp*	1 = Reset peak values of gradient via operator	BOOL	0
DeadTFiEm*	Deadband of the gradient value for display of fill time/empty time	REAL	0.0
LagTime	Delay time [s]	REAL	10.0
PV1OpScaleH	Volume flow: High limit for scale of bar display of faceplate	REAL	100.0
PV1OpScaleL	Volume flow: Low limit for scale of bar display of faceplate	REAL	0.0
PV2OpScaleH	Volume flow: High limit for scale of bar display of faceplate	REAL	100.0
PV2OpScaleL	Volume flow: Low limit for scale of bar display of faceplate	REAL	0.0
GradHUpEn	1 = Enable gradient monitoring (high) for positive changes	BOOL	1
GradHDnEn	1 = Enable gradient monitoring (high) for negative changes	BOOL	1
GradLEn	1 = Enable gradient monitoring (low)	BOOL	0
GradHUpMsgEn	1 = Enable gradient (high) message for positive changes	BOOL	1
GradHDnMsgEn	1 = Enable gradient (high) message for negative changes	BOOL	1
GradLMsgEn	1 = Enable gradient (low) message for negative changes	BOOL	1
TimeFactor	Time unit: 0 = seconds 1 = minutes 2 = hours	INT	0
MsgLock	1 = Suppress process messages.	BOOL	0
SampleTime	Sampling time [s] (assigned automatically)	REAL	0.1
RunUpCyc	Number of cycles in startup; messages are suppressed during these cycles	INT	3
MsgEvId01..15	Message number (assigned automatically)	DWORD	16#00000000
Aux	Message Associated Value	REAL	0.0
BatchEn	1 = Enable allocation	BOOL	0

Parameter	Description	Type	Default
BatchID	Batch ID	DWORD	16#00000000
BatchName	Batch name	S7-String	
StepNo	Batch step number	DWORD	16#00000000
Occupied	1 = Occupied by batch control	BOOL	0
MsgFilter	Message Filter	DINT	0
CmpID	component identifier (not permissible: 0) Identification of the subsystem to which the message is assigned to Recommended values: <ul style="list-style-type: none"> low word: 1 to 65535 high word: 0 	DWORD	16#00000001
PERMIS	Switchover of the operator control permission	INT	2
CSF	1 = External error (control system fault)	BOOL	0
ExtMsg	Binary input for freely selectable message	BOOL	0
UserStatus	Freely assignable bits for use in PCS 7 OS	BYTE	16#00
OS_Perm	I/O for operating permissions	STRUCT <ul style="list-style-type: none"> • Bit 0 : BOOL ... • Bit31: BOOL 	- <ul style="list-style-type: none"> • 1 ... • 1
OS1Perm	I/O for operating permissions	STRUCT <ul style="list-style-type: none"> • Bit 0 : BOOL ... • Bit31: BOOL 	- <ul style="list-style-type: none"> • 1 ... • 1
Feature	I/O for additional functions	STRUCT <ul style="list-style-type: none"> • Bit 0 : BOOL • Bit 1 : BOOL • Bit 2 : BOOL ... • Bit 6 : BOOL • Bit 7 : BOOL ... • Bit31: BOOL 	- <ul style="list-style-type: none"> • 0 • 0 • 1 ... • 1 • 0 ... • 0
MaxVol	Range of volume High Value (only for read back)	REAL	0.0
MinVol	Range of volume Low Value (only for read back)	REAL	0.0
CalInH	High range of calibration setpoints (only for read back)	REAL	0.0
CalInL	Low range of calibration setpoints (only for read back)	REAL	0.0

Parameter	Description	Type	Default
RdCfgOp*	1 = Read all configuration data from the Sitrans LR 250	BOOL	0
WrCfgOp*	1 = Write all configuration data to the Si-trans LR 250	BOOL	0

* Values can be written back to these inputs during processing of the block by the block algorithm.

In/out parameters

Parameter	Description	Type	Default
AcyclData	Acyclic data from driver block PiDr64 (interconnect this input with AcyclData output of PiDr64)	STRUCT <ul style="list-style-type: none"> SlotRd : INT ... RetValWr: WORD Input : STRUCT Output : STRUCT NewDiag : INT DiagData : STRUCT 	

Output parameters

Parameter	Description	Type	Default
QWronDev	1 = Wrong device connected	BOOL	1
PV1Out	Output for process value PV1	REAL	0.0
QCPV1Out	State of current Process value 1	BYTE	16#80
PV2Out	Output for process value PV2	REAL	0.0
QCPV2Out	State of current Process value 2	BYTE	16#80
TankFilled	Output for process value PV1 in [%]	REAL	0.0
TimeFillS	Fill time calculated with current gradient value [s]	REAL	0.0
TimeEmptyS	Empty time calculated with current gradient value [s]	REAL	0.0
TimeFill	Fill time calculated with current gradient value [s]	REAL	0.0
TimeEmpty	Empty time calculated with current gradient value [TEmptyUnit]	REAL	0.0
TFillUnit	Unit of TimeFill	INT	0
TEmptyUnit	Unit of TimeEmpty	INT	A0
Algorithm	Echo algorithm	BYTE	16#00
Confidenc	Echo confidence	BYTE	16#00
EchoStren	Echo strength	BYTE	16#00
PV1Grad	Gradient value for process value PV1	REAL	0.0
PV1GradPP	Gradient value for PV1, max. peak value	REAL	0.0
PV1GradNP	Gradient value for PV1, min. peak value	REAL	0.0

Parameter	Description	Type	Default
PV1AH_Act	Limit sensor PV1: 1 = Alarm (high) active. You can change the response for this parameter by setting Feature bit 28 (deactivate switching points) and Feature bit 29 (high/low signal limit violation) accordingly.	BOOL	0
PV1WH_Act	Limit sensor PV1: 1 = Warning (high) active. You can change the response for this parameter by setting Feature bit 28 (deactivate switching points) and Feature bit 29 (signal limit violation) accordingly.	BOOL	0
PV1WL_Act	Limit sensor PV1: 1 = Warning (low) active. You can change the response for this parameter by setting Feature bit 28 (deactivate switching points) and Feature bit 29 (signal limit violation) accordingly.	BOOL	0
PV1AL_Act	Limit sensor PV1: 1 = Alarm (low) active. You can change the response for this parameter by setting Feature bit 28 (deactivate switching points) and Feature bit 29 (signal limit violation) accordingly.	BOOL	0
PV2AH_Act	Limit sensor PV2: 1 = Alarm (high) active. You can change the response for this parameter by setting Feature bit 28 (deactivate switching points) and Feature bit 29 (high/low signal limit violation) accordingly.	BOOL	0
PV2WH_Act	Limit sensor PV2: 1 = Warning (high) active. You can change the response for this parameter by setting Feature bit 28 (deactivate switching points) and Feature bit 29 (signal limit violation) accordingly.	BOOL	0
PV2WL_Act	Limit sensor PV2: 1 = Warning (low) active. You can change the response for this parameter by setting Feature bit 28 (deactivate switching points) and Feature bit 29 (signal limit violation) accordingly.	BOOL	0
PV2AL_Act	Limit sensor PV2: 1 = Alarm (low) active. You can change the response for this parameter by setting Feature bit 28 (deactivate switching points) and Feature bit 29 (signal limit violation) accordingly.	BOOL	0
SumMsgAct	1 = Group signal is active	BOOL	0

5.1 S7SiLRPA

Parameter	Description	Type	Default
GradHUpAct	1 = Gradient alarm (high) for positive changes. You can change the response for this parameter by setting Feature bit 28 (deactivate switching points) and Feature bit 29 (signal limit violation) accordingly.	BOOL	0
GradHDnAct	1 = Gradient alarm (high) for negative changes. You can change the response for this parameter by setting Feature bit 28 (deactivate switching points) and Feature bit 29 (signal limit violation) accordingly.	BOOL	0
GradLAct	1 = Gradient alarm (low). You can change the response for this parameter by setting Feature bit 28 (deactivate switching points) and Feature bit 29 (signal limit violation) accordingly.	BOOL	0
OosAct	1 = Block is "Out of service"	BOOL	0
OnAct	1 = "On" mode enabled	BOOL	1
OS_PermOut	Display of OS_Perm	DWORD	16#FFFFFFFF
OS_PermLog	Display of OS_Perm with settings changed by the block algorithm	DWORD	16#FFFFFFFF
OS1PermOut	Display of OS1Perm	DWORD	16#FFFFFFFF
OS1PermLog	Display of OS1Perm with settings changed by the block algorithm	DWORD	16#FFFFFFFF
Status1	Status word 1	DWORD	16#00000000
Status2	Status word 2	DWORD	16#00000000
Status3	Status word 3	DWORD	16#00000000
MsgStat01..15	Alarm status 01..15	WORD	16#0000
MsgAckn01..15	Alarm acknowledgment status 01..15	WORD	16#0000
PV1AH_Lim	Alarm limit (high) PV1	REAL	0.0
PV1WH_Lim	Warning limit (high) PV1	REAL	0.0
PV1Hyst	Hysteresis Limit PV1	REAL	0.0
PV1WL_Lim	Warning limit (low) PV1	REAL	0.0
PV1AL_Lim	Alarm limit (low) PV1	REAL	0.0
PV2AH_Lim	Alarm limit (high) PV2	REAL	0.0
PV2WH_Lim	Warning limit (high) PV2	REAL	0.0
PV2Hyst	Hysteresis Limit PV2	REAL	0.0
PV2WL_Lim	Warning limit (low) PV2	REAL	0.0
PV2AL_Lim	Alarm limit (low) PV2	REAL	0.0

5.1.7 Block diagram of S7SiLRPA

A block diagram is not provided for this block.

5.1.8 Template of S7SiLRPA

This process tag type is used to connect a Sitrans LR 250 PA with driver blocks to STEP 7 with one ("Sitrans LRxxx PA" template) or two process values ("Sitrans LRxxx PA 2AI" template).

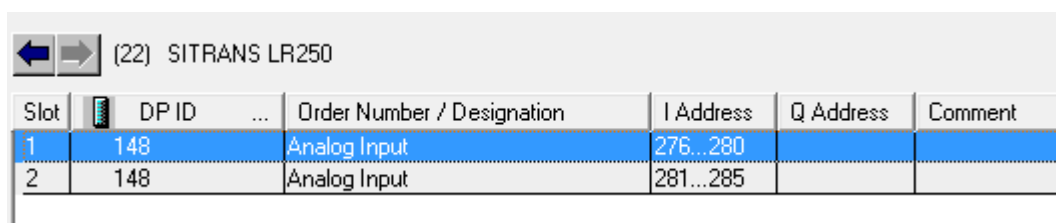
The cyclic values are transferred by the addresses connected at input parameters for process values PV1 and PV2, the acyclic values are transferred by the PiDr64 block from and to the device.

The process tag type contains the required interconnections between the blocks mentioned above. If a 2nd analog input is not configured in the HW Config, please use the "Sitrans LRxxx PA" template, otherwise the "Sitrans LRxxx PA 2AI" template.

The PV inputs (process values PV1 and PV2) of the S7SiLRPA block must be interconnected with the corresponding input double word from HW Config for instantiation of the template. The inputs Laddr and Addr of PiDr64 block.

(AcyclicData) is configured with the address shown in HW Config.

Configuration of Sitrans LR 250 in HW Config :



Slot	DP ID	Order Number / Designation	I Address	Q Address	Comment
1	148	Analog Input	276...280		
2	148	Analog Input	281...285		

PiDr64

Parameter	Addressing
Laddr	PV1 Input address (AI)
Addr.Laddr0	Diagnostic Address of Sitrans LR 250
Addr.Laddr1	Input address slot 1 (= PV1 Input address (AI))
Addr.Laddr2	Input address slot 2 (= PV2 Input address)(AI)
Addr.Laddr3/4/5/6	-1*

* Address -1 is set by default if no slot is configured.

5.1.9 Operator control & monitoring

5.1.9.1 Views of S7SiLRPA

Views of the SiLRPA block

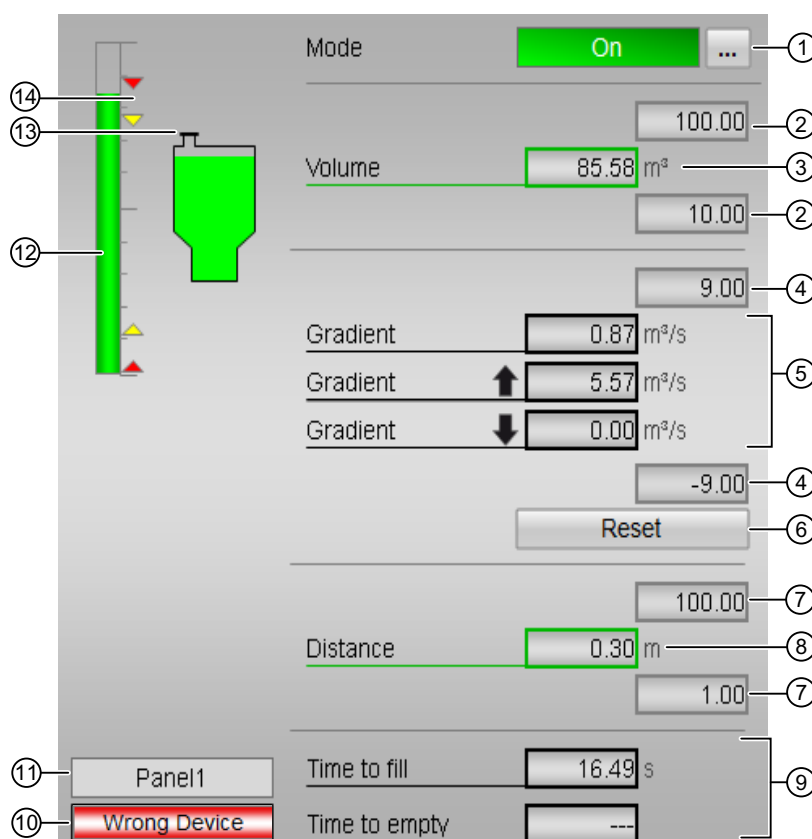
The SitrLRPA block has the following views:

- Standard view of S7SiLRPA (Page 125)
- Message view (see the APL online help)
- Limit view of S7SiLRPA (Page 128)
- Trend view (see the APL online help)
- Parameter view of S7SiLRPA (Page 130)
- Preview of S7SiLRPA (Page 131)
- Batch view (see the APL online help)

For general information on the faceplate and block icon, refer to the sections "Faceplate structure" and "Block icon structure" in the APL Online Help

5.1.9.2 Standard view of S7SiLRPA

Depending on the configuration of the first and second process values, the current process values for volume, level and distance are displayed. If a measured value is not assigned to a variable, the field is hidden. The gradient values always refer to the first process value PV1.



(1) Display and switchover of operating mode

This area provides information on the currently valid operating mode. The following operating modes can be shown here:

- On (see the APL online help)
- Out of service (see the APL Online Help)

For more information on changing the operating mode, refer to the "Switching operating states and operating modes" section in the APL Online Help.

(2) High and low scale range of the first process value (PV1)

These values provide information on the display range for the bar graph of the first process value PV1. The scale range is set in the engineering system with the PV1OpScaleH/L parameters, see Display and operating range for process values and limits.

(3) Display of first process value (PV1)

This area indicates the current first process value (PV1). The name of the configured measured value is displayed depending on the PV1Meas tag, in this case "Volume".

(4) High and low scale range for the gradient value

These values provide information on the display range for the bar graph of the gradient. The scale range corresponds to 10% of the scale range for the first process value (PV1): If you have entered a scale range for the process value of 0 to 100, for example, the scale range for the gradient is automatically defined as -10 to 10.

The current gradient value is displayed if one of the monitoring functions is enabled:

- Gradient monitoring for positive changes (GradHUpEn = 1)
- Gradient monitoring for negative changes (GradHDnEn = 1)
- Gradient monitoring (GradLEn = 1)

(5) Display of gradient

This area shows the current, minimum and maximum gradient values of the first process value PV1 as well as rising and falling of the value. This display of the minimum and maximum gradient value functions like a slave pointer.

The current gradient value is displayed if one of the monitoring functions is enabled:

- Gradient monitoring for positive changes (GradHUpEn = 1)
- Gradient monitoring for negative changes (GradHDnEn = 1)
- Gradient monitoring (GradLEn = 1)

The maximum peak gradient value is displayed if the gradient monitoring function for positive changes is enabled (GradHUpEn = 1)

The minimum peak gradient value is displayed if the gradient monitoring function for negative changes is enabled (GradHDnEn = 1)

(6) Resetting of peak values of the gradient

Using these buttons you can reset the maximum or minimum peak value of the gradient (output parameters PV1GradPP and PV1GradNP).

The button is displayed if the gradient monitoring function for positive (GradHUpEn = 1) or negative (GradHDnEn = 1) changes is enabled.

(7) High and low scale range for the second process value (PV2)

These values provide information on the display range for the bar graph of the first process value PV2. The scale range is set in the engineering system with the PV2OpScaleH/L parameters, see Display and operating range for process values and limits.

(8) Display of second process value (PV2)

This area indicates the current second process value (PV2). The name of the configured measured value is displayed depending on the PV2Meas tag, in this case "Distance".

(9) Display of fill time and empty time

Fill time and empty time are shown in this area if Feature bit 6 (Activate calculation of fill time/empty time) is enabled.

With a positive gradient value, a value is calculated for the fill time. With a negative gradient value, a value is calculated for the empty time.

The calculated times are only shown if the gradient value is outside the deadband (DeadTFiEm).

(10) Display area for block states

This area provides additional information on the operating state of the block

- "Wrong device"

(11) Display area for switch permission

This area provides the text of the current OS, according to the enumeration configured at the PERMIS input.

(12) Bar graph for the first "process value" (PV1)

This area shows the current first "process value" (PV1) in the form of a bar graph. The visible area in the bar graph depends on the configuration in the engineering system (ES). (see Display and operating range for process values and limits)

(13) Display of type of tank and level

This display shows you the configured type of tank. This is specified by the "TankType" value. In addition, the current level in the tank is displayed.

(14) Limit display

These small, colored triangles indicate the specified limits of the first process value PV1 in the bar graph.

5.1.9.3 Limit view of S7SiLRPA

The limits of the first process value PV1 and the second process value PV2 can be specified in this view. The displayed texts depend on the configuration of the process values PV1 and PV2.

⑤ **Enabled operations Volume**

✓	☒	H alarm Volume	90.00 m ³	①
✓	☒	H warn. Volume	80.00 m ³	
✓		Hysteresis	0.00 m ³	
✓	☒	L warn. Volume	20.00 m ³	
✓	☒	L alarm Volume	10.00 m ³	

Distance

✓	☒	H alarm Distance	85.00 m	②
✓	☒	H warn. Distance	80.00 m	
✓		Hysteresis	0.00 m	
✓	☒	L warn. Distance	15.00 m	
✓	☒	L alarm Distance	5.00 m	

Gradient limits

✓	☒	H alarm	↑ 10.00 m ³ /s	③
✓	☒	H alarm	↓ 10.00 m ³ /s	
✓	☒	L alarm	↑↓ 0.00 m ³ /s	

④

(1) Process value limits (PV1)

In this area, you can enter the limits for the first process value PV1. You can change the following limits:

- "H alarm": High alarm
- "H warning": High warning
- "Hysteresis"
- "L warning": Low warning
- "L alarm": Low alarm

Note

If the `Feature` bit 7 (synchronize alarm configuration with module) is set, the measuring range limits available in the module are written to the corresponding inputs when reading the configuration data.

(2) Process value limits (PV2)

In this area, you can enter the limits for the second process value PV2. You can change the following limits:

- "H alarm": High alarm
- "H warning": High warning
- "Hysteresis"
- "L warning": Low warning
- "L alarm": Low alarm

Note

If the `Feature` bit 7 (synchronize alarm configuration with module) is set, the measuring range limits available in the module are written to the corresponding inputs when reading the configuration data.

(3) Gradient limits

You can enter gradient limits in this area. Refer to the "Changing values" section in the APL online Help.

You can change the following limits:

- "H alarm $\uparrow$ ": Gradient for the upper gradient for positive changes
- "H alarm $\downarrow$ ": Gradient for the upper rate of rise for negative changes
- "L alarm $\uparrow\downarrow$ ": Gradient for the lower rate of rise (absolute)

(4) Suppress messages

You can activate/deactivate messages by selecting the check mark.

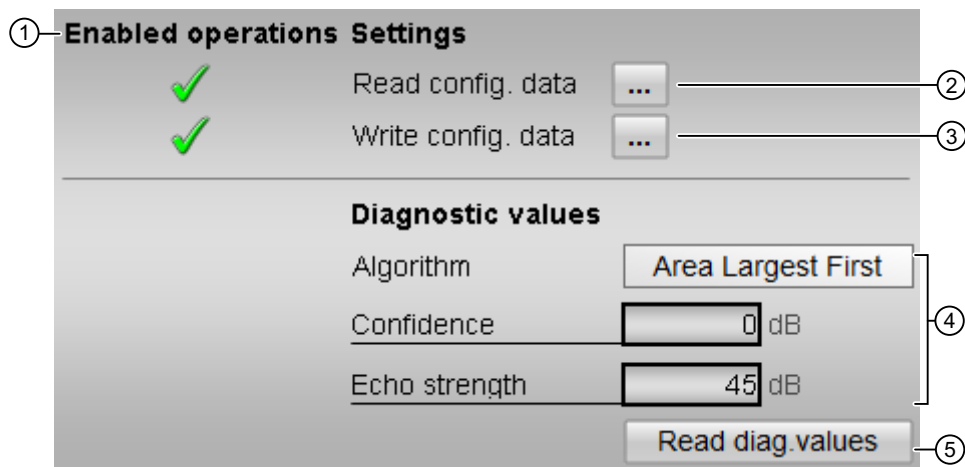
(5) Enabled operations

This area shows all operations for which special operator authorizations are assigned. They depend on the configuration in the engineering system (ES) that applies to this block.

Symbols for enabled operations:

- **Green check mark:** The OS operator can control this parameter.
- **Gray check mark:** The OS operator cannot control this parameter at this time due to the process
- **Red cross:** The OS operator can control this parameter due to the configured AS operating permissions (OS_Perm or OS1Perm)

5.1.9.4 Parameter view of S7SiLRPA



(1) Enabled operations

This area shows all operations for which special operator authorizations are assigned. They depend on the configuration in the engineering system (ES) that applies to this block.

Symbols for enabled operations:

- **Green check mark:** The OS operator can control this parameter
- **Gray check mark:** the OS operator cannot control this parameter at this time due to the process
- **Red cross:** The OS operator cannot control this parameter due to the configured AS operator permissions (OS_Perm or OS1Perm)

(2) Reading the configuration data

In this area, you can read all configuration data relevant to the block from Sitrans LR250 PA.

(3) Writing the configuration data

In this area, you can write all relevant configuration data, i.e. limits, to the Sitrans LR250 PA.

This area is only displayed if the Feature bit 7 (synchronize alarm configuration with module) is set.

(4) Diagnostic values

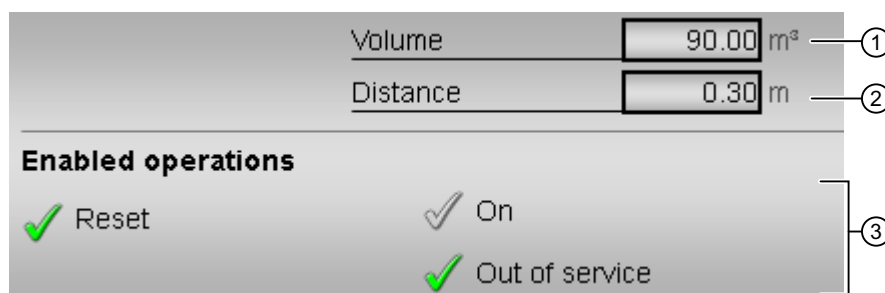
In this area the following values are displayed:

- Algorithm
- Confidence
- Echo strength

(5) Reading the Diagnostic values

In this area you can read all Diagnostic Values.

5.1.9.5 Preview of S7SiLRPA



(1) and (2) Process values

This area shows the real process values (PV1, PV2).

(3) Enabled operations

This area shows all operations for which special operator authorizations are assigned. They depend on the configuration in the engineering system (ES) that applies to this block.

Symbols for enabled operations:

- **Green check mark:** The OS operator can control this parameter
- **Gray check mark:** the OS operator cannot control this parameter at this time due to the process
- **Red cross:** The OS operator cannot control this parameter due to the configured AS operator permissions (OS_Perm or OS1Perm)

The following enabled operations are shown here:

General enabled operations:

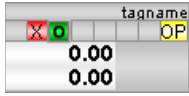
- "Reset": You can reset the peak value of the gradient.
- "On": You can switch to "On" mode.
- "Out of service": You can switch to "Out of service" mode.

5.1.9.6 Block icons for S7SiLRPA

A variety of block icons is available with the following functions:

- Process tag type
- Limits (high/low)
- Violation of alarm and warning limits as well as the control system fault CSF
- Operating modes
- Signal status
- Process value (PV1) and process value (PV2)

The block icons from template @TemplateAPL_SITRANS.PDL:

Icons	Selection of the block icon in CFC	Special features
	1	
	2	
	-	Block icon in "Out of service" mode (example of block icon type 1)

For more information on the block icon and operating options in the block icon, refer to the following sections in the APL online help:

- "Configuring the block icons"
- "Block icon structure"
- "Operation via the block icon"

SITRANS P PA

6.1 S7SiP_PA

6.1.1 Description of S7SiP_PA

Object name (type + number) and family

Type + number: FB 2641

Family: Sitrans

Area of application for S7SiP_PA

The block is used for the following applications:

- Interface block between the Profibus PA driver blocks of the SITRANS P300 PA/DSIII PA modules (referred to below as SITRANS P) for the user program and visualization

How it works

The S7SiP_PA block prepares the process data received from driver blocks from a SITRANS P and makes the data available for further use in the user program and for visualization. Data entered in the faceplate or via the block inputs is transferred to the SITRANS P by means of driver blocks.

The function block supports the configuration of the SitransP with and without totalizer.

Configuration

Use the CFC editor to install the block in a cyclic interrupt OB (OB30 to OB38). The block is also installed automatically in the startup OB (OB 100). Moreover, to connect the I/O signals it is imperative to call each of the driver blocks `FbAnIn` (cyclic data) and `PiDr64` (acyclic data) in the same cyclic interrupt OB and startup OB (OB100) **before** the `SiP_PA` block is called. The output structure `AcyclData` of the `PiDr64` block is interconnected to the input with the same name of the `S7SiP_PA` block.

The module with which communication takes place is set at the `DevType` input. Feature bit 7 = TRUE means that the block takes over the message limits when reading the configuration data from the device.

The maximum and minimum values for the alarm and warning thresholds of the process value are configured at the input `PV_OpScaleH/L`.

The S7SiP_PA contains two templates for process tag types as an example with an application scenario for the SITRANS Library block with and without totalizer, Template of S7SiP_PA (Page 155)

Note

The user text library "S7SiP_PA_MeasVal" must be copied from the Sitrans Library to the STEP 7 project prior to the OS compilation. To do this, open the SITRANS Library from the Simatic Manager using File -> Open... -> Libraries. Copy the "S7SiP_PA_MeasVal" file from the library (directory: Blocks+Templates\Text Libraries) into a user text library folder created using the S7 program in your STEP 7 project.

Startup characteristics

Use the **Feature Bit** Setting the startup characteristics (Page 24) to define the startup characteristics of this block.

The messages are suppressed after startup for the number of cycles set at **RunUpCyc**.

Status word allocation for **Status1** parameter

You can find a description for each parameter in section I/Os of S7SiP_PA (Page 146).

Status bit	Parameter
0	Occupied
1	BatchEn
2	Not used
3	OosAct
4	OosLi
5	AutAct
6	LocalAct
7	Mode switchover error
8	OnAct
9	Invalid signal status
10 - 19	Not used
20	Enable local operator authorization
21	Not used
22	Current totalizer command 1= Positive and negative
23	Current totalizer command 1= Positive
24	Current totalizer command 1= Negative
25	Current totalizer command 1= Hold
26	Automatic preview totalizer command 1= Positive and negative
27	Automatic preview totalizer command 1 = Positive
28	Automatic preview totalizer command 1= Negative
29	Automatic preview totalizer command 1= Hold
30 - 31	Not used

Status word allocation for Status2 parameter

Status bit	Parameter
0	MsgLock
1	PV_AH_Act
2	PV_WH_Act
3	PV_WL_Act
4	PV_AL_Act
5 - 6	Not used
7	PV_AH_En
8	PV_WH_En
9 - 10	Not used
11	PV_WL_En
12	PV_AL_En
13	PV_AH_MsgEn
14	PV_WH_MsgEn
15 - 16	Not used
17	PV_WL_MsgEn
18	PV_AL_MsgEn
19	GradHUpAct
20	GradHDnAct
21	GradLAct
22	GradHUpEn
23	GradHDnEn
24	GradLEn
25	GradHUpMsgEn
26	GradHDnMsgEn
27	GradLMsgEn
28	0 = decreasing measured value 1 = increasing measured value
29 - 31	Not used

Status word allocation for Status3 parameter

Status bit	Parameter
0 - 7	Not used
8	Tot_AH_Act
9	Tot_WH_Act
10	Tot_WL_Act
11	Tot_AL_Act
12	Tot_AH_En
13	Tot_WH_En
14	0 = When Feature Bit 7 is 0 or totalizer is not configured
16	Tot_WL_En

Status bit	Parameter
17	Tot_AL_En
18	Tot_AH_MsgEn
19	Tot_WH_MsgEn
20 - 21	Not used
22	Tot_WL_MsgEn
23	Tot_AL_MsgEn
24	QWronDev
25	1 = error when reading acyclic data (active only for the duration of one cycle)
26	1 = error when writing acyclic data (active only for the duration of one cycle)
27	Analog input (PV) configured
28	Totalizer (Tot) configured
29	Reset or presetting of the totalizer configured
30	Presetting of the totalizer configured
31	Min/max pointer view available in faceplate

6.1.2 Operating modes of S7SiP_PA

The selectable operating modes of the S7SiP_PA block depend on whether or not a totalizer is configured.

Operating modes of S7SiP_PA without totalizer

The block can be operated using the following modes:

- On
- Out of service

"On"

You can find general information about the "On" mode in the On chapter.

"Out of service"

You can find general information about the "Out of service" mode in the Out of service section.

The descriptions of the operating modes are identical for S7SiP_PA and the APL; refer to the online help for the standard APL blocks for information on them.

Operating modes of S7SiP_PA with totalizer

The block can be operated using the following modes:

- Local mode
- Automatic mode
- Manual mode
- Out of service

The general descriptions of the operating modes are identical for S7SiP_PA and the APL; refer to the online help for the standard APL blocks for information on them.

The next section provides additional block-specific information relating to the general descriptions.

"Local mode"

"Local mode" supports the transfer of the following commands to the totalizer:

- "Positive and negative" (positive edge `BalLocal`)
- "Positive" (positive edge `PosLocal`)
- "Negative" (positive edge `NegLocal`)
- "Hold" (`HoldLocal`)

If you set the block to "Local mode", the control is only influenced by the "local" signals of the counters (input parameters `BalLocal` = 1, `PosLocal` = 1, `NegLocal` = 1 and `HoldLocal` = 1).

Note

Unlike the general description, at the `LocalSetting` parameter only the values 0, 1 and 3 can be set. Tracking in "local" mode is not possible with S7SiP_PA.

"Automatic mode"

"Automatic mode" supports the transfer of the following commands to the totalizer:

- "Positive and negative" (positive edge `BalAut`)
- "Positive" (positive edge `PosAut`)
- "Negative" (positive edge `NegAut`)
- "Hold" (`HoldAut` = 1)

"Manual mode"

"Manual mode" supports the transfer of the following commands to the totalizer:

- "Positive and negative" (positive edge `BalMan`)
- "Positive" (positive edge `PosMan`)
- "Negative" (positive edge `NegMan`)
- "Hold" (`HoldMan` = 1)

"Out of service"

For general information about the "out of service" mode, refer to the APL Online Help.

6.1.3 S7SiP_PA functions

The functions for this block are listed below.

Configuration data

The configuration data comprises the units, the configuration of PV input and the limits for messages. After a change is made in the device, reading of configuration data must be triggered with "Read configuration data" in the parameter view of the faceplate. If the parameters were read back before a complete download to the PLC, the configuration does not need to be reloaded from the device.

The message limits of the S7SiP_PA are only transferred to the device when the alarm configuration is synchronized with the device (Feature bit7 = TRUE).

The S7SiP_PA function block has the following configuration data which can be read out of the SitransP by means of the "Read configuration data" command:

Description	Block parameters (I/O)
Configuration input PV	PV_Meas
Units PV and Tot, min/max pointer pressure, sensor and electronics temperature	PV_Unit Tot_Unit PMM_Unit SenTempUnit ElecTempUnit
Limits PV	InPV_AH_Lim/PV_AH_Lim InPV_WH_Lim/PV_WH_Lim InPV_WL_Lim/PV_WL_Lim InPV_AL_Lim/PV_AL_Lim InPV_Hyst/PV_Hyst
Limits Tot	InTot_AH_Lim/Tot_AH_Lim InTot_WH_Lim/Tot_WH_Lim InTot_WL_Lim/Tot_WL_Lim InTot_AL_Lim/v_AL_Lim InTot_Hyst/Tot_Hyst
Default	InPreVal/PreVal

Limit monitoring

The block monitors the process value PV and, if configured, the totalizer value Tot for limits. Both values are cyclically integrated into the process image of the controller. Configuration of the limits is carried out either by means of PDM and imported by reading the configuration data from the block, or can be carried out on the block independent of the module (see Feature bit 7).

You can monitor the process value PV and the totalizer value Tot for the following high and low alarm and warning thresholds:

- PV/Tot_AH_Lim: Limit for high alarm
- PV/Tot_AL_Lim: Limit for low alarm
- PV/Tot_Hyst: Hysteresis
- PV/Tot_WH_Lim: Limit for high warning
- PV/Tot_WL_Lim: Limit for low warning

The result of limit monitoring is returned at the interconnectable output parameters:

- PV/Tot_AH_Act = 1: Limit for high alarm reached or exceeded
- PV/Tot_AL_Act = 1: Limit for low alarm reached or undershot
- PV/Tot_WH_Act = 1: Limit for high warning reached or exceeded
- PV/Tot_WL_Act = 1: Limit for low warning reached or undershot

Monitoring is always enabled using the input parameters:

- PV/Tot_AH_En = 1: Monitoring of the high alarm limits
- PV/Tot_AL_En = 1: Monitoring of the low alarm limits
- PV/Tot_WH_En = 1: Monitoring of the high warning limits
- PV/Tot_WL_En = 1: Monitoring of the low warning limits

The corresponding message is suppressed using the parameters:

- PV/Tot_AH_MsgEn = 0: Alarm (high) messages are suppressed
- PV/Tot_AL_MsgEn = 0: Alarm (low) messages are suppressed
- PV/Tot_WH_MsgEn = 0: Warning (high) messages are suppressed
- PV/Tot_WL_MsgEn = 0: Warning (low) messages are suppressed

You can define a hysteresis (PVTot_Hyst) for the limits, for example to suppress signal flatter. You can also modify the limits and hysteresis via the faceplate.

Gradient monitoring

The gradient PV_Grad is calculated by means of a delay function configurable using LagTime. During calculation of the gradient, jumps in the input value PV are smoothed.

The peak values of the gradient are output in the output parameters PV_GradNP (negative gradient) and PV_GradPP (positive gradient). These are reset when the operator enters the corresponding command for resetting.

The slope of the gradient PV_Grad can be monitored for the following limits:

- Limit (high) for the positive gradient (GradHUpLim)
- Limit (high) for the negative gradient ((GradHDnLim)
- Limit (low) for the absolute gradient (GradLLim)

Activation of the individual monitoring functions is carried out at the corresponding "Enable" parameters, e.g. GradHUpEn for activating the high gradient limit for positive gradients (GradHUpLim).

Reaching or violation of your defined limits is indicated at the corresponding "Active" output parameters, e.g. by means of GradHUpAct = 1 for the limit (high) for the positive gradient.

Messages can be output for these alarms. You can activate these as follows:

- Message for alarms (high) for the positive gradient: `GradHUpMsgEn = 1`
- Message for alarms (high) for the negative gradient: `GradHDnMsgEn = 1`
- Message for alarms (low) for the absolute gradient: `GradLMsgEn = 1`

Suppressing messages using the `MsgLock` parameter

This block provides the standard "Suppressing messages using the `MsgLock` parameter" function that is described in the APL Online Help.

Selecting a unit of measure

The units for the process value `PV` and the totalizer value `Tot` are configured on the device of the SitransP via PDM and read by operator action in the "Parameters" faceplate view with "Read configuration".

Configurable reactions using the `Feature` I/O

The following characteristics are available for this block at the respective bits of the `Feature` I/O. The characteristics are described in the APL online help.

Bit	Feature
0	Setting the startup characteristics
1	Reaction to the Out of service mode
2	Reset the commands for switching the operating mode
3	Enabling resetting of commands for the control settings
4	Set switch or button mode
5	1 = Two decimal places of auxillary value in limit messages
6	Activation of cyclic reading of sensor and electronics temperature When the <code>Feature</code> bit 6 is set, the sensor and electronics temperature is read by means of acyclic data in the cycle configured at the input <code>TmpCycl</code> .

Note

Only 8 acyclic read jobs can be executed simultaneously for each Profibus line. If more devices want to read acyclic data simultaneously, which will become more likely with a short cycle time, the read job is canceled with an error. Alternatively, sensor and electronics temperature can be read with the click of a button in the faceplate.

Bit	Feature
7	Synchronize alarm configuration with device
9	Reading configuration data automatically During the start of the controller and when the connection between device and controller is reestablished after an interruption, the configuration data is read automatically by means of acyclic communication.

Note

Only 8 acyclic read jobs can be executed simultaneously for each Profibus line. If additional devices want to read acyclic data simultaneously, the read job is canceled with an error. Alternatively, configuration data can also be read after a change in the device with the click of a button in the faceplate.

Bit	Feature
10	Exiting local mode
17	Activate smooth change from manual to automatic mode
18	1 = Resetting/presetting of the Totalizers is configured in HW Config
19	1 = Resetting/presetting and mode switchover of the totalizer is configured in HW Config
22	Update acknowledgment and error status of the message call
24	Enable local operator authorization
25	Suppress all messages
26	Reaction of the switching points in "Out of service" mode
28	Disabling switching points
29	Signaling limit violation
30	1 = Min/max pointer view activated in faceplate

Operator authorizations

This block provides the standard operating permissions that are described in the APL online help.

The block has the following permissions for the `OS_Perm` parameter:

Bit	Function
0	1 = Operator may switch to "automatic mode"
1	1 = Operator may switch to "manual mode"
2	1 = Operator may switch to "local mode"
3	1 = Operator can switch to "Out of service" mode
4	1 = Operator can switch to "On" mode
5 - 6	Not used
7	1 = Operator can reset the maximum values
8	1 = Operator can activate / deactivate messages with <code>GradHUpMsgEn</code>
9	1 = Operator can activate / deactivate messages with <code>GradHDnMsgEn</code>
10	1 = Operator can activate / deactivate messages with <code>GradLMsgEn</code>
11 - 12	Not used
13	1 = Operator can change the limit (PV) for the high alarm
14	1 = Operator can change the limit (PV) for the high warning
15	Not used
16	1 = Operator can change the limit (PV) for the hysteresis
17	1 = Operator can change the limit (PV) for the low warning

18	1 = Operator can change the limit (PV) for the low alarm
19	Not used
20	1 = Operator can change the value for the high gradient limit for positive gradients (GradHUpLim)
21	1 = Operator can change the value for the high gradient limit for negative gradients (GradHDnLim)
22	1 = Operator can change the value for the low gradient limit for positive and negative gradients (GradLLim)
23	Not used
24	1 = Operator can activate / deactivate messages with PV_AH_MsgEn
25	1 = Operator can activate / deactivate messages with PV_WH_MsgEn
26	1 = Operator can activate / deactivate messages with PV_WL_MsgEn
27	1 = Operator can activate / deactivate messages with PV_AL_MsgEn
28 - 31	Not used

The block has the following permissions for the OS1Perm parameter:

Bit	Function
0	1 = Operator can change the limit (Tot) for the high alarm
1	1 = Operator can change the limit (Tot) for the high warning
2	1 = Operator can change the limit (Tot) for the hysteresis
3	1 = Operator can change the limit (Tot) for the low warning
4	1 = Operator can change the limit (Tot) for the low alarm
5	1 = Operator can activate / deactivate messages with Tot_AH_MsgEn
6	1 = Operator can activate / deactivate messages with Tot_WH_MsgEn
7	1 = Operator can activate / deactivate messages with Tot_WL_MsgEn
8	1 = Operator can activate / deactivate messages with Tot_AL_MsgEn
9	1 = Operator may input the 'positive and negative count' totalizer command
10	1 = Operator may input the 'only positive count' totalizer command
11	1 = Operator may input the 'only negative count' totalizer command
12	1 = Operator may input the 'Hold' totalizer command
13	1 = Operator can reset the totalizer
14	1 = Operator can preset the totalizer
15	1 = Operator can read the configuration data from the device
16	1 = Operator can write the configuration data to the device
17	1 = Operator can read the min/max pointer values from the module
18	1 = Operator can reset the maximum min/max pointer value of the pressure
19	1 = Operator can reset the minimum min/max pointer value of the pressure
20	1 = Operator can reset the maximum min/max pointer value of the sensor temperature
21	1 = Operator can reset the minimum min/max pointer value of the sensor temperature
22	1 = Operator can reset the maximum min/max pointer value of the electronics temperature
23	1 = Operator can reset the minimum min/max pointer value of the electronics temperature

24	1 = Operator can read the sensor and electronics temperature from the module
25	1 = Operator can change the preset value of the totalizer
26 - 31	Not used

Display and operating range for process values and limits

The inputs `PV_OpScaleH/L` are used as display and operating range for the process value `PV_In`.

Generating instance-specific messages

This block provides the standard "Generate instance-specific messages" function that is described in the APL Online Help.

SIMATIC BATCH functionality

This block provides the standard "SIMATIC BATCH functionality" function that is described in the APL Online Help.

6.1.4 Error handling of S7SiP_PA

For general information on error handling at all blocks, refer to the "Error handling" section in the APL Online Help.

The following errors can be displayed for this block:

- Error numbers
- Control system fault (CSF)

Overview of error numbers

The I/Os `Error0Num` (process value `PV`) and `Error1Num` (totalizer value `Tot`) can be used to output the following error numbers:

Error number	Meaning of the error number
-1	Predefined value when inserting the block; the block is not executed.
0	There is no error.
30	The process value/totalizer value cannot be displayed in the REAL number field

Control system fault (CSF)

An external signal can be activated via the `CSF` input. A process control error is triggered if this signal = 1. Refer to the "Error handling" chapter in the APL Online Help.

6.1.5 S7SiP_PA messages

Messaging

The following messages can be generated for this block:

- Process control error
- Process messages
- Instance-specific message

Process control error

The following control system fault messages can be output:

Message instance	Message class	Event
MsgEvId12	PLC Process Control Message - Failure	External error has occurred (S7SiP_PA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]
MsgEvId13	PLC Process Control Message - Failure	Error while reading a data record (S7SiP_PA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]
MsgEvId14	PLC Process Control Message - Failure	Error while writing a data record (S7SiP_PA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]

You can interconnect an external fault (signal) to the input parameter `CSF`. If this signal changes to `CSF = 1`, a process control error is triggered (MsgEvId3, SIG4).

Process messages

Message instance	Message class	Event
MsgEvId01	Alarm - high	@1Y%t#S7SiP_PA_MeasVal@ - High alarm limit violated (S7SiP_PA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2I%d@.@2Y%1u@]
MsgEvId02	Warning - high	@1Y%t#S7SiP_PA_MeasVal@ - High warning limit violated (S7SiP_PA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2I%d@.@2Y%1u@]
MsgEvId03	Warning - low	@1Y%t#S7SiP_PA_MeasVal@ - Low warning limit violated (S7SiP_PA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2I%d@.@2Y%1u@]
MsgEvId04	Alarm - low	@1Y%t#S7SiP_PA_MeasVal@ - Low alarm limit violated (S7SiP_PA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2I%d@.@2Y%1u@]
MsgEvId05	Alarm - high	Totalizer - High alarm limit violated (S7SiP_PA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]
MsgEvId06	Warning - high	Totalizer - High warning limit violated (S7SiP_PA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]

MsgEvId07	Warning - low	Totalizer - Low warning limit violated (S7SiP_PA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]
MsgEvId08	Alarm - low	Totalizer - Low alarm limit violated (S7SiP_PA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]
MsgEvId09	Alarm - high	Limit value (high) for the positive gradient violated (S7SiP_PA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]
MsgEvId10	Warning - high	Limit value (high) for the positive gradient violated (S7SiP_PA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]
MsgEvId11	Alarm - low	Limit value (low) for absolute gradient violated (S7SiP_PA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]

Instance-specific message

You can use one instance-specific message with this block.

Message instance	Message class	Event
MsgEvId15	PLC Process Control Message - Failure	External message (S7SiP_PA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]

Associated values for message instances without limit violation

Associated value	Block parameter	Data Type
1	Aux	REAL
2	BatchID	DWORD
3	MsgFilter	DINT

Associated values for message instances with limit violation

Associated value	Block parameter	Data Type
1	PV_Meas0	BYTE
2	AuxByte (one or two digits after the decimal point, see Feature.Bit3)	BYTE
3	AuxWord (number before the decimal point: -32768 .. 32767)	WORD
4	BatchID	DWORD
5	MsgFilter	DINT

Message texts and their text numbers

The following table shows the message texts and their text numbers in the text library "S7SiP_PA_MeasVal" for the S7SiP_PA block (FB 2641):

Text number	Message text
1	<Invalid value>
2	Pressure
3	Volumetric flow
4	Mass flow
5	Level
6	Volume
7	Pressure (untrimmed)
8	Sensor temperature
9	Electronics temperature

6.1.6 I/Os of S7SiP_PA

Input parameters

Parameter	Description	Type	Default
DevType	Device type of SITRANS P 1: SitransP DSIII PA 1: SitransP P300 PA	INT	0
PV	Process value	BYTE	16#80
QCPV	Quality Code of Process Value	BYTE	16#80
Tot	Totalizer value	BYTE	16#80
QCTot	Quality Code of Totalizer	BYTE	16#80
PV_Meas*	Measured value that is interconnected at the PV input: 0: <invalid value> 1: Pressure 2: Volume flow 3: Mass flow 4: Fill level 5: Volume 6: Pressure (untrimmed) 7: Sensor temperature 8: Electronics temperature	BYTE	0
ChannelAI*	Channel (read by device)	INT	-1
AppSwitch*	Measuring mode switch (read by device)	INT	-1
PV_Unit*	Measurement unit for process value (PV)	INT	0
Tot_Unit*	Measurement unit for totalizer value (Tot)	INT	0

Parameter	Description	Type	Default
PMM_Unit*	Measurement unit for pressure of min/ max pointer	INT	0
SenTempUnit*	Unit of measure for sensor temperature	INT	0
ElecTempUni*	Unit of measure for electronics temperature	INT	0
TmpCycl	Cycle for reading sensor and electronics temperature (see <i>Feature</i> bit 6)	REAL	60.0
ModLiOp	Switchover of operating mode between: 0 = Operator 1 = Interconnection or SFC	BOOL	0
AutModOp*	1 = "Automatic mode" via interconnection or SFC (controlled by Mod1LiOp = 1)	BOOL	0
ManModOp*	Switchover of operating mode between: 0 = Operator 1 = Interconnection or SFC	BOOL	0
AutModLi	1 = "Automatic mode" via operator (controlled by Mod1LiOp = 0)	BOOL	0
ManModLi	1 = "Manual mode" via interconnection or SFC (controlled by Mod1LiOp = 1)	BOOL	0
LocalLi	1 = Activate "local mode" via plant signals	BOOL	0
LocalOp*	1 = "Local mode" via operator	BOOL	0
OnOp*	1 = "On" mode via operator	BOOL	0
OosOp*	1 = "Out of service", via OS operator	BOOL	0
OosLi	1 = "Out of service", via interconnection or SFC (0-1 edge transition)	BOOL	0
BalAut	Totalizer: Up counter for positive flow and down counter for negative flow in automatic mode	BOOL	0
PosAut	Totalizer: Increment only for positive flow in automatic mode	BOOL	0
NegAut	Totalizer: Decrement only for negative flow in automatic mode	BOOL	0
HoldAut	Totalizer: Stop of the counter in automatic mode	BOOL	0
ReTotLi	1 = Reset of the totalizer via interconnection	BOOL	0
PreTotLi	1 = Setting of the counter via interconnection to the preset value <i>InPreVal</i>	BOOL	0
BalMan*	Totalizer: Up counter for positive flow and down counter for negative flow in manual mode	BOOL	0
PosMan*	Totalizer: Increment only for positive flow in manual mode	BOOL	0
NegMan*	Totalizer: Decrement only for negative flow in manual mode	BOOL	0

Parameter	Description	Type	Default
HoldMan*	Totalizer: Stop counter in manual mode	BOOL	0
ReTotOp*	1 = Reset totalizer via operator input	BOOL	0
PreTotOp*	1 = Setting of the counter via interconnection to the preset value InPreVal via operator input	BOOL	0
BalLocal	Totalizer: Up counter for positive flow and down counter for negative flow in "Local mode"	BOOL	0
PosLocal	Totalizer: Increment only for positive flow in Local mode	BOOL	0
NegLocal	Totalizer: Decrement only for negative flow in "Local mode"	BOOL	0
HoldLocal	Totalizer: Stop counter in "Local mode"	BOOL	0
ReTotLocal	1 = Reset counter in "Local mode"	BOOL	0
PreTotLocal	1 = Setting of the counter via interconnection to the preset value InPreVal in "Local mode"	BOOL	0
LocalSetting	"Local mode" properties (see "Local mode" in the APL Online Help)	INT	0
InPV_AH_Lim*	Limiter PV: Alarm limit (high)	REAL	0.0
InPV_WH_Lim*	Limiter PV: Warning limit (high)	REAL	0.0
InPV_Hyst*	Limiter PV: Hysteresis for alarm and warning limits	REAL	0.0
InPV_WL_Lim*	Limiter PV: Limit warning (low)	REAL	0.0
InPV_AL_Lim*	Limiter PV: Alarm limit (low)	REAL	0.0
PV_AH_En	1 = Activate process value alarm (high)	BOOL	1
PV_WH_En	1 = Activate process value warning (high)	BOOL	1
PV_WL_En	1 = Activate process value warning (low)	BOOL	1
PV_AL_En	1 = Activate process value alarm (low)	BOOL	1
PV_AH_MsgEn	1 = Activate message for process value alarm (high)	BOOL	1
PV_WH_MsgEn	1 = Enable message for process value warning (high)	BOOL	1
PV_WL_MsgEn	1 = Enable message for process value warning (low)	BOOL	1
PV_AL_MsgEn	1 = Activate message for process value alarm (low)	BOOL	1
InTot_AH_Lim*	Limiter Tot: Alarm limit (high)	REAL	0.0

Parameter	Description	Type	Default
InTot_WH_Lim*	Limiter Tot: Warning limit (high)	REAL	0.0
InTot_Hyst*	Limiter Tot: Hysteresis for alarm and warning limits	REAL	0.0
InTot_WL_Lim*	Limiter Tot: Limit warning (low)	REAL	0.0
InTot_AL_Lim*	Limiter Tot: Alarm limit (low)	REAL	0.0
InPreVal	Presetting value for totalizer	REAL	0.0
Tot_AH_En	1 = Enable totalizer alarm (high)	BOOL	1
Tot_WH_En	1 = Enable totalizer warning (high)	BOOL	1
Tot_WL_En	1 = Enable totalizer warning (low)	BOOL	1
Tot_AL_En	1 = Enable totalizer alarm (low)	BOOL	1
Tot_AH_MsgEn	1 = Enable message for totalizer alarm (high)	BOOL	1
Tot_WH_MsgEn	1 = Enable message for totalizer warning (high)	BOOL	1
Tot_WL_MsgEn	1 = Enable message for process value warning (low)	BOOL	1
Tot_AL_MsgEn	1 = Enable message for totalizer alarm (low)	BOOL	1
GradHUpLim	Gradient monitoring: Limit (high) for the positive gradient	REAL	10.0
GradHDnLim	Gradient monitoring: Limit (high) for the negative gradient	REAL	10.0
GradLLim	Gradient monitoring: Limit (low) for the absolute gradient	REAL	1.0
RstOp*	1 = Reset peak values of gradient via operator	BOOL	0
LagTime	Delay time [s]	REAL	1.0
PV_OpScaleH	High limit for scale in PV bar graph of faceplate	REAL	100.0
PV_OpScaleL	Low Limit for scale in PV bar graph of faceplate	REAL	0.0
GradHUpEn	1 = Enable gradient monitoring (high) for positive changes	BOOL	1
GradHDnEn	1 = Enable gradient monitoring (high) for negative changes	BOOL	1
GradLEn	1 = Enable gradient monitoring (low)	BOOL	0
GradHUpMsgEn	1 = Enable gradient (high) message for positive changes	BOOL	1
GradHDnMsgEn	1 = Enable gradient (high) message for negative changes	BOOL	1
GradLMsgEn	1 = Enable gradient (high) message for negative changes	BOOL	1

Parameter	Description	Type	Default
TimeFactor	Time unit: 0 = seconds 1 = minutes 2 = hours	INT	0
MsgLock	1 = Suppress process messages.	BOOL	0
SampleTime	Sampling time [s] (assigned automatically)	REAL	0.1
RunUpCyc	Number of cycles in startup; messages are suppressed during these cycles	INT	3
MsgEvId1..15	Message number (assigned automatically)	DWORD	16#00000000
Aux	Message Associated Value	REAL	0.0
BatchEn	1 = Enable allocation	BOOL	0
BatchID	Batch ID	DWORD	16#00000000
BatchName	Batch name	S7-String	
StepNo	Batch step number	DWORD	16#00000000
Occupied	1 = Occupied by batch control	BOOL	0
CSF	1 = External error (control system fault)	BOOL	0
MsgFilter	Message Filter	DINT	0
CmpID	component identifier (not permissible: 0) Identification of the subsystem to which the message is assigned to Recommended values: <ul style="list-style-type: none"> low word: 1 to 65535 high word: 0 	DWORD	16#00000001
PERMIS	Switchover of the operator control permission	INT	2
ExtMsg	Binary input for freely selectable message 1	BOOL	0
UserStatus	Freely assignable bits for use in PCS 7 OS	BYTE	16#00
OS_Perm	I/O for operating permissions	STRUCT <ul style="list-style-type: none"> Bit 0 : BOOL ... Bit31: BOOL 	- <ul style="list-style-type: none"> 1 ... 1
OS1Perm	I/O for operating permissions	STRUCT <ul style="list-style-type: none"> Bit 0 : BOOL ... Bit31: BOOL 	- <ul style="list-style-type: none"> 1 ... 1

Parameter	Description	Type	Default
Feature	I/O for additional functions	STRUCT	-
		• Bit 0 : BOOL	• 0
		• Bit 1 : BOOL	• 0
		• Bit 2 : BOOL	• 1
		...	
		• Bit 6 : BOOL	• 1
		• Bit 7 : BOOL	• 0
		...	
		• Bit31: BOOL	• 0
RdCfgOp*	1 = Read all configuration data from Si-transP	BOOL	0
WrCfgOp*	1 = Write all configuration data to Si-transP	BOOL	0
RdTmpOp*	1 = Read sensor and electronics temperature from the device	BOOL	0
RdMinMax*	1 = Read all slave pointer values from the device	BOOL	0
RMaxPOp	1 = Reset max. slave pointer pressure	BOOL	0
RMinPOp	1 = Reset min. slave pointer pressure	BOOL	0
RMaxSTOp	1 = Reset max. slave pointer sensor temperature	BOOL	0
RMinSTOp	1 = Reset min. slave pointer sensor temperature	BOOL	0
RMaxETOp	1 = Reset max. slave pointer electronics temperature	BOOL	0
RMinETOp	1 = Reset min. slave pointer electronics temperature	BOOL	0
RMaxPLi	1 = Reset max. min/max pointer pressure, via interconnection or SFC (0-1 edge transition)	BOOL	0
RMinPLi	1 = Reset max. min/max pointer pressure, via interconnection or SFC (0-1 edge transition)	BOOL	0
RMaxSTLi	1 = Reset max. slave pointer sensor temperature, via interconnection or SFC (0-1 edge transition)	BOOL	0
RMinSTLi	1 = Reset min. slave pointer sensor temperature, via interconnection or SFC (0-1 edge transition)	BOOL	0
RMaxETLi	1 = Reset max. slave pointer electronics temperature, via interconnection or SFC (0-1 edge transition)	BOOL	0
RMinETLi	1 = Reset min. slave pointer electronics temperature, via interconnection or SFC (0-1 edge transition)	BOOL	0

Parameter	Description	Type	Default
RdMinMaxLi	1 = Read all slave pointer values from the device, via interconnection or SFC (0-1 edge transition)	BOOL	0
OldPV_Mode*	Last command of the totalizer This input is only used to read back the values to the CFC.		

* Values can be written back to these inputs during processing of the block by the block algorithm.

In/out parameters

Parameter	Description	Type	Default
AcyclData	Acyclic data from driver block PiDr64 (interconnect this input with AcyclData output of PiDr64)	STRUCT <ul style="list-style-type: none"> SlotRd : INT ... RetValWr: WORD Input : STRUCT Output : STRUCT NewDiag : INT DiagData : STRUCT 	

Output parameters

Parameter	Description	Type	Default
QWronDev	1 = Wrong device connected	BOOL	1
PV_Out	Output for process value PV	REAL	0.0
QCPV_Out	Quality code of output for process value PV	REAL	0.0
Tot_Out	Output for totalizer value Tot	REAL	0.0
QCTot_Out	Quality code of output for totalizer value Tot	REAL	0.0
PV_Set	0=Totalizer on 1= Reset totalizer 2= Preset totalizer	BYTE	0
PV_Mode	Command for totalizer: 0= Up counter for positive flow and down counter for negative flow in manual mode 1= Increment only for positive flow in manual mode 2= Decrement only for negative flow in manual mode 3= Stop counter in manual mode	BYTE	0
SenTemp	Output for process value for sensor temperature	REAL	0.0
QCSenTemp	Quality code of output for process value for sensor temperature	REAL	0.0

Parameter	Description	Type	Default
ElecTemp	Output for process value for electronics temperature	REAL	0.0
QCElecTemp	Quality code of output for process value for electronics temperature	REAL	0.0
PV_Grad	Gradient value process value PV	REAL	0.0
PV_GradPP	Gradient value PV maximum peak value	REAL	0.0
PV_GradNP	Gradient value PV minimum peak value	REAL	0.0
PV_AH_Act	Limiter PV: 1 = Alarm (high) active. You can change the response for this parameter by setting Feature bit 28 (deactivate switching points) and Feature bit 29 (high/low signal limit violation) accordingly.	BOOL	0
PV_WH_Act	Limiter PV: 1 = Warning (high) active. You can change the response for this parameter by setting Feature bit 28 (deactivate switching points) and Feature bit 29 (high/low signal limit violation) accordingly.	BOOL	0
PV_WL_Act	Limiter PV: 1 = Warning (low) active. You can change the response for this parameter by setting Feature bit 28 (deactivate switching points) and Feature bit 29 (high/low signal limit violation) accordingly.	BOOL	0
PV_AL_Act	Limiter PV: 1 = Alarm (low) active. You can change the response for this parameter by setting Feature bit 28 (deactivate switching points) and Feature bit 29 (high/low signal limit violation) accordingly.	BOOL	0
Tot_AH_Act	Alarm limit (high) Tot	BOOL	0
Tot_WH_Act	Warning limit (high) Tot	BOOL	0
Tot_WL_Act	Warning limit (low) Tot	BOOL	0
Tot_AL_Act	Alarm limit (low) Tot	BOOL	0
GradHUpAct	1 = Gradient alarm (high) for positive changes. You can change the response for this parameter by setting Feature bit 28 (deactivate switching points) and Feature bit 29 (high/low signal limit violation) accordingly.	BOOL	0
GradHDnAct	1 = Gradient alarm (high) for negative changes. You can change the response for this parameter by setting Feature bit 28 (deactivate switching points) and Feature bit 29 (high/low signal limit violation) accordingly.	BOOL	0

Parameter	Description	Type	Default
GradLAct	1 = Gradient alarm (low). You can change the response for this parameter by setting Feature bit 28 (deactivate switching points) and Feature bit 29 (high/low signal limit violation) accordingly.	BOOL	0
OosAct	1 = Block is "Out of service"	BOOL	0
OnAct	1 = "On" mode enabled	BOOL	0
LocalAct	1 = "Local mode" active	BOOL	1
AutAct	1 = "Automatic mode" active	BOOL	1
ManAct	1 = "Manual mode" active	BOOL	1
OS_PermOut	Display of OS_Perm	DWORD	16#FFFFFFFF
OS_PermLog	Display of OS_Perm with settings changed by the block algorithm	DWORD	16#FFFFFFFF
OS1PermOut	Display of OS1Perm	DWORD	16#FFFFFFFF
OS1PermLog	Display of OS1Perm with settings changed by the block algorithm	DWORD	16#FFFFFFFF
Status1	Status word 1	DWORD	16#00000000
Status2	Status word 2	DWORD	16#00000000
Status3	Status word 3	DWORD	16#00000000
MsgStat1..15	Message status 1 (output ERROR of first ALARM_8P)	WORD	16#0000
MsgAckn1..15	Message acknowledgment status 1 (output STATUS of first ALARM_8P)	WORD	16#0000
PV_AH_Lim	Alarm limit (high) PV	REAL	0.0
PV_WH_Lim	Warning limit (high) PV	REAL	0.0
PV_Hyst	Hysteresis Limit PV	REAL	0.0
PV_WL_Lim	Warning limit (low) PV	REAL	0.0
PV_AL_Lim	Alarm limit (low) PV	REAL	0.0
Tot_AH_Lim	Alarm limit (high) Tot	REAL	0.0
Tot_WH_Lim	Warning limit (high) Tot	REAL	0.0
Tot_Hyst	Hysteresis Limit Tot	REAL	0.0
Tot_WL_Lim	Warning limit (low) Tot	REAL	0.0
Tot_AL_Lim	Alarm limit (low) Tot	REAL	0.0
PreVal	Presetting value for totalizer	REAL	0.0
MaxPRst	Maximum value of resettable slave pointer for pressure	REAL	0.0
MinPRst	Minimum value of resettable slave pointer for pressure	REAL	0.0
MaxSTRst	Maximum value of resettable slave pointer for sensor temperature	REAL	0.0
MinSTRst	Minimum value of resettable slave pointer for sensor temperature	REAL	0.0

Parameter	Description	Type	Default
MaxETRst	Maximum value of resettable slave pointer for electronics temperature	REAL	0.0
MinETRst	Minimum value of resettable slave pointer for electronics temperature	REAL	0.0

6.1.7 Block diagram of S7SiP_PA

A block diagram is not provided for this block.

6.1.8 Template of S7SiP_PA

This process tag type is used to connect a SITRANS P PA with driver blocks to STEP 7 with and without totalizer ("SitransP PA Totalizer" template and "SitransP PA" template respectively).

The cyclic values are transferred by the addresses connected at input parameters for process values `PV1` and Totalizer, the acyclic values are transferred by the `PiDr64` block from and to the device.

The process tag type contains the required interconnections between the blocks mentioned above. If a totalizer is not configured in the HW Config, please use the "SitransP PA" template, otherwise the "SitransP PA Totalizer" template.

To instantiate the template, the `PV` inputs (process value `PV` and Totalizer) and the `S7SiP_PA` block are interconnected with the corresponding input double word from the HW Config. The Output "`PV_Set`" and "`PV_Mode`" of the `S7SiP_PA` block are connected with the corresponding output Byte from the HW Config.

The connected module type is configured at the `DevType` input. At the `Feature` bits 18 and 19 it must be configured whether a totalizer is connected and which of its functions are used, if necessary. All required information can be found in HW Config.

Configuration of Sitrans P DSIII PA in HW Config :

[10] SITRANS P DSIII PA 3.01						
Slot	DP ID	...	Order Number / Designation	I Address	Q Address	Comment
1	148		AI Output	517...521		
2	193		TOT Counter output, reset, mode	522...526	512...513	

PiDr64

Parameter	Addressing
Laddr	PV1 Input address (AI)
Addr.Laddr0	Diagnostic Address of Sitrans P DSIII PA
Addr.Laddr1	Input address slot 1 (= PV1 Input address (AI))

Parameter	Addressing
Addr.Laddr2	Input address slot 2 (Totalizer Input address)(AI)
Addr.Laddr3/4/5/6	-1*

* Address -1 is set by default if no slot is configured.

6.1.9 Operator control & monitoring

6.1.9.1 Views of S7SiP_PA

Views of the S7SiP_PA block

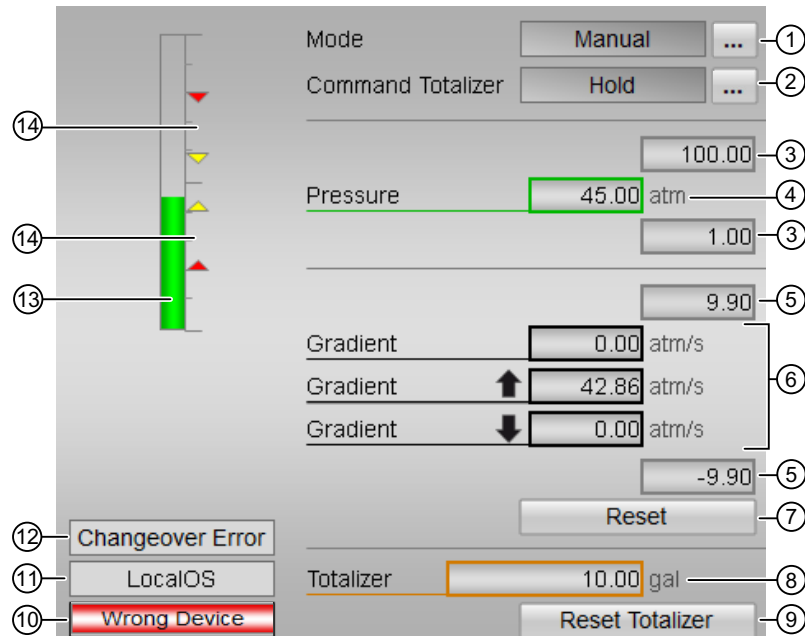
The SitrP_PA block has the following views:

- Standard View (Page 157)
- Message view (see the APL online help)
- Limit View (Page 160)
- Trend view (see the APL online help)
- Parameter View (Page 162)
- Preview (Page 163)
- Batch view (see the APL online help)
- Min/min/max pointer view (Page 165)

For general information on the faceplate and block icon, refer to the sections "Faceplate structure" and "Block icon structure" in the APL online help.

6.1.9.2 Standard view of S7SiP_PA

Depending on the configuration of the process value and the totalizer, the current process value for pressure, volume flow, mass flow, level, volume, pressure (untrimmed), sensor and electronics temperature, and the totalizer value are displayed. If a measured value is not assigned to a variable, the field is hidden. The gradient values always refer to the process value PV.



(1) Display and switch the operating mode

This area provides information on the currently valid operating mode. The operating mode switchover depends on whether or not a totalizer is configured.

Without totalizer:

The following operating modes can be shown here:

- On (see APL Online Help)
- Out of service (see APL Online Help)

With totalizer:

The block can be operated using the following modes:

- Local mode
- Automatic mode
- Manual mode
- Out of service

For more information on changing the operating mode, refer to the "Switching operating states and operating modes" section in the APL Online Help.

(2) Display and change the totalizer command: Positive and negative, positive, negative and hold

This area shows you the default operating state for the counters. The following states can be shown and executed here:

- "Positive and negative"
- "Positive"
- "Negative"
- "Hold"

If a totalizer is not configured, the area is switched to invisible.

(3) High and low scale range for the process value (PV)

These values provide information on the display range for the bar graph of the process value PV. The scale range is set in the engineering system with the PV_OpScale parameter, see Display and operating range for process values and limits.

(4) Display of the process value (PV)

This area indicates the current process value (PV). The name of the configured measured value is displayed depending on the PV_Meas variable, in this case "Pressure".

(5) High and low scale range for the gradient value

These values provide information on the display range for the bar graph of the gradient. The scale range corresponds to 10% of the scale range for the process value (PV): If you have entered a scale range for the process value of 0 to 100, for example, the scale range for the gradient is automatically defined as -10 to 10.

The current gradient value is displayed if one of the monitoring functions is enabled:

- Gradient monitoring for positive changes (GradHUpEn = 1)
- Gradient monitoring for negative changes (GradHDnEn = 1)
- Gradient monitoring (GradLEn = 1)

(6) Display of gradient

This area shows the current, minimum and maximum gradient value of the process value PV as well as rising and falling of the value. This display of the minimum and maximum gradient value functions like a slave pointer.

The current gradient value is displayed if one of the monitoring functions is enabled:

- Gradient monitoring for positive changes (GradHUpEn = 1)
- Gradient monitoring for negative changes (GradHDnEn = 1)
- Gradient monitoring (GradLEn = 1)

The maximum peak gradient value is displayed if the gradient monitoring function for positive changes is enabled (GradHUpEn = 1)

The minimum peak gradient value is displayed if the gradient monitoring function for negative changes is enabled (`GradHDnEn = 1`)

(7) Resetting of peak values of the gradient

Using these buttons you can reset the maximum or minimum peak value of the gradient (output parameters `PV_GradPP0` and `PV_GradNP0`).

The button is displayed if the gradient monitoring function for positive (`GradHUpEn = 1`) or negative changes (`GradHDnEn = 1`) is enabled.

(8) Display of the totalizer value

This area shows the current totalizer value.

If a totalizer is not configured, the area is switched to invisible.

(9) Resetting the totalizer value

Click on this button to reset the totalizer value.

If a totalizer is not configured, the area is switched to invisible.

(10) and (12) Display area for block states

This area provides additional information on the operating state of the block:

- "Invalid signal"/"Switchover error"
- "Wrong device"

(11) Display area for switch permission

This area provides the text of the current OS, according to the enumeration configured at the `PERMIS` input.

(13) Bar graph for the "process value" (PV)

This area shows the current "process value" (`PV`) in the form of a bar graph. The visible area in the bar graph depends on the configuration in the engineering system (ES), see Display and operating range for process values and limits.

(14) Limit display

These small, colored triangles indicate the specified limits of the process value `PV` in the respective bar graph.

6.1.9.3 Limit view of S7SiP_PA

The limits of the process value **PV** and the totalizer value can be specified in this view. The displayed texts depend on the configuration of the process value **PV**.

Enabled operations Pressure

☒	H alarm Pressure	80.00	atm
☒	H warn. Pressure	60.00	atm
☒	Hysteresis	0.00	atm
☒	L warn. Pressure	40.00	atm
☒	L alarm Pressure	20.00	atm

Totalizer limits

☒	H alarm	0.00	gal
☒	H warning	0.00	gal
☒	Hysteresis	0.00	gal
☒	L warning	0.00	gal
☒	L alarm	0.00	gal

Gradient limits

☒	H alarm	↑	10.00	atm/s
☒	H alarm	↓	10.00	atm/s
☒	L alarm	↑↓	1.00	atm/s

Callouts: 1 points to the 'H alarm Pressure' row; 2 points to the 'H warning' row; 3 points to the 'H alarm' gradient row; 4 points to the 'Enabled operations Pressure' header; 5 points to the 'H alarm' checkbox; 6 points to the 'L alarm' checkbox.

Figure 6-1 Limit-1-en

(1) Process value limits

In this area, you can enter the limits for the process value **PV**. You can change the following limits:

- "H alarm": High alarm
- "H warning": High warning
- "Hysteresis"
- "L warning": Low warning
- "L alarm": Low alarm

Note

If the **Feature** bit 7 (synchronize alarm configuration with module) is set, the measuring range limits available in the module are written to the corresponding inputs when reading the configuration data.

(2) Totalizer limits

In this area, you can enter the limits for the totalizer. You can change the following limits:

- "H alarm": High alarm
- "H warning": High warning
- "Hysteresis"
- "L warning": Low warning
- "L alarm": Low alarm

Note

If the `Feature` bit 7 (synchronize alarm configuration with module) is set, the measuring range limits available in the module are written to the corresponding inputs when reading the configuration data.

If a totalizer is not configured, its limits are switched to invisible.

(3) Gradient limits

You can enter gradient limits in this area. Refer to the "Changing values" section in the APL online Help.

You can change the following limits:

- "H alarm $\uparrow$ ": Gradient for the upper gradient for positive changes
- "H alarm $\downarrow$ ": Gradient for the upper rate of rise for negative changes
- "L alarm $\uparrow\downarrow$ ": Gradient for the lower rate of rise (absolute)

(4) Enabled operations

This area shows all operations for which special operator authorizations are assigned. They depend on the configuration in the engineering system (ES) that applies to this block.

Symbols for enabled operations:

- **Green check mark:** The OS operator can control this parameter
- **Gray check mark:** The OS operator cannot control this parameter at this time due to the process
- **Red cross:** The OS operator cannot control this parameter due to the configured AS operator authorizations (`OS_Perm` or `OS1Perm`)

(5) Message suppression/delays

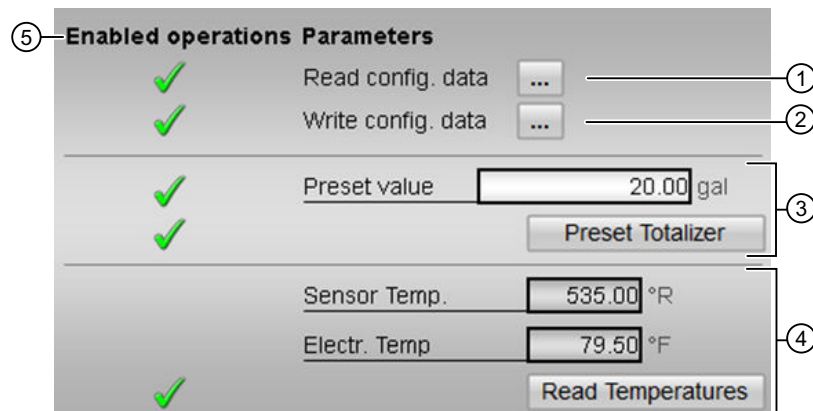
The message suppression indicates whether suppression of the associated message is activated in the AS block using the `xx_MsgEn` parameter. The output of messages is not suppressed when the block is installed (all `xx_MsgEn` parameters are set to 1 by default). Messages can only be output if limit monitoring of the additional analog value has been enabled.

Alarm delays are also displayed in this state; refer to the "Application of alarm delays" section in the APL Online Help.

(6) Suppress messages

You can activate/deactivate messages by selecting the check mark.

6.1.9.4 Parameter view of S7SiP_PA



(1) Reading the configuration data

In this area, you can read all configuration data relevant to the block from Sitrans P_PA.

(2) Writing the configuration data

In this area, you can write all relevant configuration data, i.e. limits, to the Sitrans P_PA.

(3) Totalizer preset value

In this area, you specify a preinstall value for the totalizer, and set the totalizer to this value with the click of a button.

If a totalizer is not configured, the area is switched to invisible.

(4) Sensor and electronics temperature

The sensor and electronics temperature is displayed here. Both values are read either with a button click in the faceplate or cyclically (see `TmpCycl` input and `Feature` bit 6, including note).

(5) Enabled operations

This area shows all operations for which special operator authorizations are assigned. They depend on the configuration in the engineering system (ES) that applies to this block.

Symbols for enabled operations:

- **Green check mark:** The OS operator can control this parameter
- **Gray check mark:** the OS operator cannot control this parameter at this time due to the process
- **Red cross:** the OS operator cannot control this parameter due to the configured AS operator control permissions (OS_Perm or OS1Perm).

6.1.9.5 Preview of S7SiP_PA

The screenshot displays the configuration interface for the S7SiP_PA block. It includes the following elements:

- Automatic Totalizer:** A button labeled "Hold" (1).
- Pressure:** A numeric input field showing "45.00" with the unit "atm" (2).
- Totalizer:** A numeric input field showing "10.00" with the unit "gal" (3).
- Enabled operations:** A section with two columns of checkboxes:
 - Start Balanced (checked)
 - Start Positive (checked)
 - Start Negative (checked)
 - Hold (checked)
 - Reset Totalizer (checked with a green checkmark)
 - Automatic (checked)
 - Manual (checked)
 - Local (checked)
 - Out of service (checked)
 - Read temperatures (checked with a green checkmark)
 (4)
- Inputs and outputs:** A section with four numeric input fields:
 - Local: 0
 - Local Bal. Tot.: 1
 - Local Pos. Tot.: 0
 - Local Neg. Tot.: 0
 - Local Hold Tot.: 0
 (5)

(1) Automatic preview

This area shows you the totalizer command that is input after a switched from "manual mode" to "automatic mode".

If the block is in "automatic mode", the current totalizer command is displayed.

(2) and (3) process values

This area shows the real process values (PV and Tot).

(4) Enabled operations

This area shows all operations for which special operator authorizations are assigned. They depend on the configuration in the engineering system (ES) that applies to this block.

Symbols for enabled operations:

- **Green check mark:** The OS operator can control this parameter
- **Gray check mark:** the OS operator cannot control this parameter at this time due to the process
- **Red cross:** The OS operator cannot control this parameter due to the configured AS operator permissions (OS_Perm or OS1Perm)

The following enabled operations are shown here:

General enabled operations:

- "Automatic": You can switch to "automatic mode".
- "Manual": You can switch to "manual mode".
- "Local": You can switch to "local mode".
- "Out of service": You can switch to "Out of service" mode.

Totalizer:

- "Start Pos./Neg": You can start the totalizer in positive and negative mode.
- "Start positive": You can start the totalizer in positive mode.
- "Start negative": You can start the totalizer in negative mode.
- "Hold": You can stop the totalizer.
- "Reset": You can reset the totalizer.

Other:

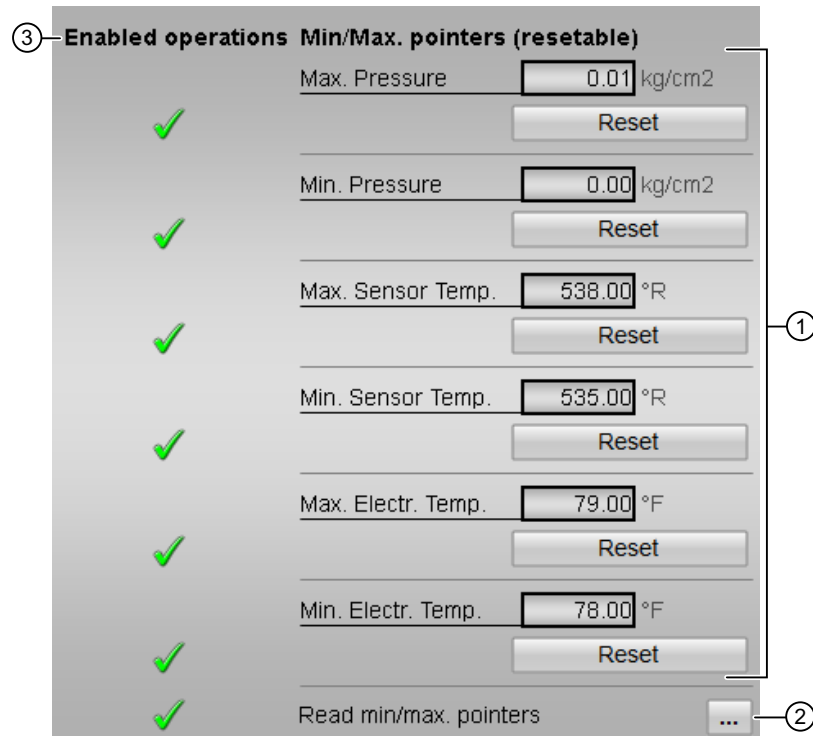
- "Read temperature": You can read the sensor and electronics temperature.

(5) Display current control signals

This area shows the most important parameters for this block with the current selection:

- "Local Tot": 1 = Totalizer is operated in "Local mode"
- "Local P./N. Tot": 1 = Totalizer counts positive and negative in "Local mode"
- "Local Pos. Tot": 1 = Totalizer counts positive in "Local mode"
- "Local Neg. Tot": 1 = Totalizer counts negative in "Local mode"
- "Local Neg. Hold": 1 = Totalizer is in hold in "Local mode"

6.1.9.6 Min/min/max pointer view of S7SiP_PA (resettable)



(1) Display and reset resettable slave pointer

The last values of the resettable min/max pointer read from the device are shown in this area, and reset if applicable. Min/max pointers which are not available in the device are not displayed.

- Maximum value slave pointer for pressure
- Minimum value resettable slave pointer for pressure
- Maximum value slave pointer for sensor temperature
- Minimum value slave pointer for sensor temperature
- Maximum value slave pointer for electronics temperature
- Minimum value slave pointer for electronics temperature

(2) Read out min/max pointers

In this area, you can read out the values of all slave pointers from the module.

(3) Enabled operations

This area shows all operations for which special operator authorizations are assigned. They depend on the configuration in the engineering system (ES) that applies to this block.

Symbols for enabled operations:

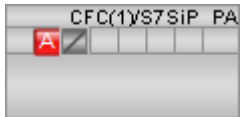
- **Green check mark:** The OS operator can control this parameter
- **Gray check mark:** the OS operator cannot control this parameter at this time due to the process
- **Red cross:** The OS operator cannot control this parameter due to the configured AS operator permissions (OS_Perm or OS1Perm)

6.1.9.7 Block icon for S7SiP_PA

A variety of block icons is available with the following functions:

- Process tag type
- Limits (high/low)
- Violation of alarm and warning limits as well as the control system fault CSF
- Operating modes
- Process value (PV)

The block icons from template @TemplateAPL_SITRANS.PDL:

Icons	Selection of the block icon in CFC	Special features
	1	Only PV is used
	-	Block icon in the "Out of service" operating mode
		Process value and totalizer are used

For more information on the block icon and operating options in the block icon, refer to the following sections in the APL online help:

- "Configuring the block icons"
- "Block icon structure"
- "Operation via the block icon"

SITRANS P

7.1 S7SitPHA

7.1.1 Description of S7SitPHA

Object name (type + number) and family

Type + number: FB 2635

Family: Sitrans

Area of application of S7SitPHA

The block is used for the following applications:

- Interface block between the driver blocks of the SITRANS P300/P500/DSIII modules (referred to below as SITRANS P) for the user program and visualization

How it works

The `S7SiPHA` block prepares the process data received from driver blocks from a SITRANS P and makes the data available for further use in the user program and for visualization. Data entered in the faceplate or via the block inputs is transferred to the SITRANS P by means of driver blocks.

The function block supports display of the 4 to 20 mA signal, the HART variables and the slave pointer according to the configuration of the `S7SiPHA`. The 4 to 20 mA signal, and not the first HART auxiliary variable PV, is always used as the process value if both contain the same physical variable.

Configuration

Use the CFC-Editor to install the block in a cyclic interrupt OB (OB30 to OB38). The block is also installed automatically in the startup OB (OB100). Moreover, to connect the I/O signals, it is imperative to call the driver blocks `SCALE` (cyclic data, 4 to 20 mA) and `PiDr64` (acyclic data) in the same interrupt OB and startup OB (OB100) **before** the `S7SiPHA` block in each case. The output structure `AcyclData` of the `PiDr64` block is interconnected to the input with the same name of the `S7SiPHA` block.

The `SlotHart` input receives the slot number of the `S7SiPHA` within the analog input module. The `Feature` bits 2 to 6 must be used to configure whether communication with the module is by means of the HART protocol and, if applicable, which HART variables are used.

`Feature` bit 7 = TRUE means that the block takes over the alarm configuration including limits when reading the configuration data from the device. If HART communication is used, reading out of the module configuration can be triggered in the WinCC faceplate. Otherwise, the

physical variable of the 4 to 20 mA signal (PV_Meas0 input), its unit (PV_Unit0 input), and its scaling (PV_OpScale input) must be entered manually.

Note

Correct configuration of the SlotHart input is a mandatory requirement and cannot be checked by the block.

The maximum and minimum values for the alarm and warning limits of the limiters 1 to 3 are parameterized at the inputs L1/2/3_ScaleH and L1/2/3_ScaleL. If the Feature Bit7 (synchronize alarm configuration with module) is set, the measuring range limits available in the module are written to the corresponding L1/2/3_ScaleH and L1/2/3_ScaleL inputs when reading the configuration data.

The SITRANS library contains a template for process tag types as an example with an application scenario for the SitransP block, Template of S7SitPHA (Page 192)

Note

The user text library "S7SitPHA_MeasVal" must be copied from the Sitrans Library to the PCS 7 project prior to the OS compilation. To do this, open the SITRANS Library from the Simatic Manager using File -> Open... -> Libraries. Copy the "S7SitPHA_MeasVal" file from the library (directory: Blocks+Templates\Text Libraries) into a user text library folder created using the S7 program in your PCS 7 project.

Startup characteristics

Use the Feature Bit Setting the startup characteristics (Page 24) to define the startup characteristics of this block.

The messages are suppressed after startup for the number of cycles set at RunUpCyc.

Status word allocation for Status1 parameter

You can find a description for each parameter in section I/Os of S7SitPHA (Page 181).

Status bit	Parameter
0	Occupied
1	BatchEn
2	Not used
3	OosAct
4	OosLi
5	Not used
6	OnAct
7 - 11	Not used
12	1 = error when reading acyclic data (active only for the duration of one cycle)
13	1 = Error when writing acyclic data (active only for the duration of one cycle)
14	SxGradPosNeg
15	GradHUpEn

Status bit	Parameter
16	GradHDnEn
17	GradLEn
18	1= L1_RespT used as delay time for all messages from limit sensor 1
19	1= L2_RespT used as delay time for all messages from limit sensor 2
20	1= Local authorization active
21	1= L3_RespT used as delay time for all messages from limit sensor 3
22 - 31	Not used

Status word allocation for Status2 parameter

Status bit	Parameter
0	MsgLock
1	L1_AH_Act
2	L1_WH_Act
3	Feature.Bit2 (HART communication on) and not QWronDev
4	QWronDev
5	L1_WL_Act
6	L1_AL_Act
7	L1_AH_En
8	L1_WH_En
9	L1_AH_En or L1_WH_En or L1_WL_En or L1_AL_En (any limit of the limit sensor 1 active)
10	Not used
11	L1_WL_En
12	L1_AL_En
13	L1_AH_MsgEn
14	L1_WH_MsgEn
15 - 16	Not used
17	L1_WL_MsgEn
18	L1_AL_MsgEn
19	GradHUpAct
20	GradHDnAct
21	GradLAct
22	GradHUpEn
23	GradHDnEn
24	GradLEn
25	GradHUpMsgEn
26	GradHDnMsgEn
27	GradLMsgEn
28	SxGradPosNeg
29 - 31	Not used

Status word allocation for **status3** parameter

Status bit	Parameter
0 - 7	Not used
8	Message delay InL1_AH_Lim
9	Message delay InL1_WH_Lim
10	Message delay InL1_WL_Lim
11	Message delay InL1_AL_Lim
12	Message delay InL2_AH_Lim
13	Message delay InL2_WH_Lim
14	Message delay InL2_WL_Lim
15	Message delay InL2_AL_Lim
16	Message delay InL3_AH_Lim
17	Message delay InL3_WH_Lim
18	Message delay InL3_WL_Lim
19	Message delay InL3_AL_Lim
20	Collection of message delays
21	The time L1_RespT read out of the device is used for the message delay
22	The time L2_RespT read out of the device is used for the message delay
23	The time L3_RespT read out of the device is used for the message delay
24 - 31	Not used

Status word allocation for **status4** parameter

Status bit	Parameter
0	L2_AH_Act
1	L2_WH_Act
2	L2_WL_Act
3	L2_AL_Act
4	L2_AH_En
5	L2_WH_En
6	L2_AH_En or L2_WH_En or L2_WL_En or L2_AL_En (any limit of the limit sensor 2 active)
7	L2_WL_En
8	L2_AL_En
9	L2_AH_MsgEn
10	L2_WH_MsgEn
11	L2_WL_MsgEn
12	L2_AL_MsgEn
13	L3_AH_Act
14	L3_WH_Act
15	L3_WL_Act
16	L3_AL_Act
17	L3_AH_En

Status bit	Parameter
18	L3_WH_En
19	L3_AH_En or L3_WH_En or L3_WL_En or L3_AL_En (any limit of the limit sensor 3 active)
20	L3_WL_En
21	L3_AL_En
22	L3_AH_MsgEn
23	L3_WH_MsgEn
24	L3_WL_MsgEn
25	L3_AL_MsgEn
26	Connected device is a SITRANS P500
27	Alarm limit (high) for PV_In (4 to 20 mA signal) (PV_In) active
28	Warning limit (high) for PV_In (4 to 20 mA signal) active
29	Warning limit (low) for PV_In (4 to 20 mA signal) active
30	Alarm limit (low) for PV_In (4 to 20 mA signal) active
31	Not used

7.1.2 Operating modes of S7SitPHA

The block can be operated using the following modes:

- On
- Out of service

"On"

You can find general information about the "On" mode in the On chapter.

"Out of service"

You can find general information about the "Out of service" mode in the Out of service section.

The descriptions of the operating modes are identical for SitransP and the APL; refer to the online help for the standard APL blocks for information on them.

7.1.3 Functions of S7SitPHA

The functions for this block are listed below.

Configuration data

The configuration data comprises units, configuration of the 4 to 20 mA signal and HART variables, and scaling of the 4 to 20 mA signal. After a change is made in the device, reading of configuration data must be triggered with "Read configuration data" in the parameter view of the faceplate. If the parameters were read back before a complete download to the PLC, the configuration does not need to be reloaded from the device.

The message limits of the SitransP are only transferred to the device if HART communication is used (Feature Bit2 = TRUE) and the alarm configuration is synchronized with the device (Feature Bit7 = TRUE).

The S7SitPHA function block has the following configuration data which can be read out of the SitransP by means of the "Read configuration data" command:

Description	Block parameters (I/O)	Read command P500	Read command P300/DSIII
Units of 4 to 20 mA signal and HART variables	PV_Unit0/PV_InUnitPV_Unit1/--- PV_Unit2/---PV_Unit3/---PV_Unit4/---	3/50	3/50
Unit of user value as string	UsrUnits	132	176
Scaling of 4 to 20 mA signal	ScaleInL/ScaleOutL ScaleInH/ScaleOutH	15	15
Limits/parameter assignment Limit sensor x (x=1/2/3)	InLx_AH_Lim/Lx_AH_Lim InLx_WH_Lim/Lx_WH_Lim InLx_WL_Lim/Lx_WL_Lim InLx_AL_Lim/Lx_AL_Lim InLx_Hyst/Lx_Hyst InLx_RespT/Lx_RespT InLx_Unit/--- InLx_DevVar/--- Lx_AlmAct/--- Lx_MonAct/--- Lx_MonTrig/--- Lx_AH/WH/WL/AL_En/--- Lx_AH/WH/WL/AL_MsgEn/---	169	178
Slave pointer (resettable/not resettable)	MaxPRst/MinPRst MaxSPRst/MinSPRst MaxSTRst/MinSTRst MaxETRst/MinETRst	172	162
Minimum and maximum limit values (x=1/2/3)	Lx_ScaleH/L	15	15/ 170/ 172

When writing the configuration data, only the limits of the limit sensors are transferred to the module in accordance with their configuration (Lx_MonAct, Lx_MonTrig), but not the configuration itself.

Note

If the module is used without HART communication, the inputs must be parameterized accordingly manually since reading out of the configuration from the module is not possible.

Note

If alarm or warning limits are deactivated in the module by means of PDM, these are set to the corresponding active warning or alarm limits or to the maximum or minimum value of the limit sensor (L1/2/3_ScaleH/L) for consistency reasons when loading modified active alarm or warning limits or the hysteresis value.

Limit monitoring

Up to three process values (limit sensors 1, 2 and 3) can be monitored for limits which are available on the module via the 4 to 20 mA signal or a HART auxiliary variable. Configuration of the limits is carried out either by means of PDM and imported by reading the configuration data from the block, or can be carried out on the block independent of the module (see Feature bit 7).

The SITRANS P500 module can only monitor one process value, the SITRANS P300/DSIII module up to three limits. If the message configuration is not applied by the module, the following values must be set manually (the two limit sensors L2 and L3 not occupied by the P500 module are always configured manually):

Parameter	Meaning
Lx_DevVar	Selection of monitored process value (the process value must be transferred cyclically as a 4 to 20 mA signal or HART auxiliary variable) If Lx_DevVar = "NotUsed" is selected, the enables for this limiter (Lx_AH/WH/WL/AL_En) are set to FALSE, and a message is not generated.
Lx_Unit	Unit of monitored process value
Lx_AH/WH/WL/AL_En	Enable monitoring of alarm limit
Lx_AH/WH/WL/AL_MsgEn	Enable message on violation of alarm limit

The Lx_AlmAct, Lx_MonAct and Lx_MonTrig inputs contain the message information read out of the module and are insignificant if the message configuration is not read out of the module.

You can monitor the process values (PV_In (4 to 20 mA signal), SV, TV, QV) for the following high and low alarm and warning limits:

- L1/2/3_AH_Lim: Limit for high alarm
- L1/2/3_AL_Lim: Limit for low alarm
- L1/2/3_Hyst: Hysteresis
- L1/2/3_Respt: Response time
- L1/2/3_WH_Lim: Limit for high warning
- L1/2/3_WL_Lim: Limit for low warning

The result of limit monitoring is returned at the interconnectable output parameters:

- L1/2/3_AH_Act = 1: Limit for high alarm reached or exceeded
- L1/2/3_AL_Act = 1: Limit for low alarm reached or undershot
- L1/2/3_WH_Act = 1: Limit for high warning reached or exceeded
- L1/2/3_WL_Act = 1: Limit for low warning reached or undershot

Monitoring is always enabled using the input parameters:

- L1/2/3_AH_En = 1: Monitoring of the high alarm limits
- L1/2/3_AL_En = 1: Monitoring of the low alarm limits
- L1/2/3_WH_En = 1: Monitoring of the high warning limits
- L1/2/3_WL_En = 1: Monitoring of the low warning limits

The corresponding message is suppressed using the parameters:

- `L1/2/3_AH_MsgEn = 0`: Alarm (high) messages are suppressed
- `L1/2/3_AL_MsgEn = 0`: Alarm (low) messages are suppressed
- `L1/2/3_WH_MsgEn = 0`: Warning (high) messages are suppressed
- `L1/2/3_WL_MsgEn = 0`: Warning (low) messages are suppressed

You can define a hysteresis (`L1/2/3_Hyst`) and a response time (`L1/2/3_RespT`) for the limits, for example to suppress signal flatter. You can also modify the limits, the hysteresis and the response time via the faceplate.

Gradient monitoring

The gradient `PV_Grad0` is calculated by means of a delay function configurable using `LagTime`. During calculation of the gradient, jumps in the input value `PV_In` are smoothed.

The peak values of the gradient are output in the output parameters `PV_GradNP0` (negative gradient) and `PV_GradPP0` (positive gradient). These are reset when the operator enters the corresponding command for resetting.

The slope of the gradient `PV_Grad` can be monitored for the following limits:

- Limit (high) for the positive gradient (`GradHUpLim`)
- Limit (high) for the negative gradient (`GradHDnLim`)
- Limit (low) for the absolute gradient (`GradLLim`)

Activation of the individual monitoring functions is carried out at the corresponding "Enable" parameters, e.g. `GradHUpEn` for activating the high gradient limit for positive gradients (`GradHUpLim`).

Reaching or violation of your defined limits is indicated at the corresponding "Active" output parameters, e.g. by means of `GradHUpAct = 1` for the limit (high) for the positive gradient.

Messages can be output for these alarms. You can activate these as follows:

- Message for alarms (high) for the positive gradient: `GradHUpMsgEn = 1`
- Message for alarms (high) for the negative gradient: `GradHDnMsgEn = 1`
- Message for alarms (low) for the absolute gradient: `GradLMsgEn = 1`

Suppressing messages using the `MsgLock` parameter

This block provides the standard "Suppressing messages using the `MsgLock` parameter" function that is described in the APL Online Help.

Selecting a unit of measure

The units for the 4 to 20 mA signal and the HART variables are configured on the device of the HART via PDM and read by an operator action in the "Parameters" faceplate view with "Read configuration" or configured by the user himself if SITRANS P communication does not exist.

Configurable reactions using the Feature I/O

The following characteristics are available for this block at the respective bits of the Feature I/O. The characteristics are described in the APL online help.

Bit	Feature
0	Setting the startup characteristics (Page 24)
1	Reaction to the out of service mode (Page 25)
2	1 = HART communication present between module and controller
3	1 = 1. HART auxiliary variable (PV) is available and visualized in the faceplate
4	1 = 2. HART auxiliary variable (SV) is available and visualized in the faceplate
5	1 = 3. HART auxiliary variable (TV) is available and visualized in the faceplate
6	1 = 4. HART auxiliary variable (QV) is available and visualized in the faceplate
7	1 = Alarm configuration is read from the device
8	1 = Two decimal places of aux. value in limit messages
9	0 = Use the APL parameters <code>Lx_AH/WL/AL_DC</code> or <code>_DG</code> as delay times for the messages 1 = The times <code>L1/L2/L3_ResPT</code> are used as delay times for all messages
22	Update acknowledgment and error status of the message call
24	Enable local operator authorization
25	Suppress all messages
26	Reaction of the switching points in "Out of service" mode
28	Disabling switching points
29	Signaling limit violation

For more information about the feature bits please refer to the APL online help.

Operator authorizations

This block provides the standard operating permissions that are described in the APL online help.

The block has the following permissions for the `OS_Perm` parameter:

Bit	Function
0	Not used
1	1 = Operator can switch to "On" mode
2	Not used
3	1 = Operator can switch to "Out of service" mode
4	1 = Operator can change the limit for the high alarm of limit sensor 1
5	1 = Operator can change the limit for the high warning of limit sensor 1
6	1 = Operator can change the value for the hysteresis of limit sensor 1
7	1 = Operator can change the value for the response time of limit sensor 1
8	1 = Operator can change the limit for the low warning of limit sensor 1
9	1 = Operator can change the limit for the low alarm of limit sensor 1
10	1 = Operator can reset the maximum values of the gradient
11 - 12	Not used

13	1 = Operator can change the limit for the high alarm of limit sensor 2
14	1 = Operator can change the limit for the high warning of limit sensor 2
15	1 = Operator can change the value for the hysteresis of limit sensor 2
16	1 = Operator can change the value for the response time of limit sensor 2
17	1 = Operator can change the limit for the low warning of limit sensor 2
18	1 = Operator can change the limit for the low alarm of limit sensor 2
19	Not used
20	1 = Operator can change the value for the high gradient limit for positive gradients (GradHUpLim)
21	1 = Operator can change the value for the high gradient limit for negative gradients (GradHDnLim)
22	1 = Operator can change the value for the low gradient limit for positive and negative gradients (GradLLim)
23	1 = Operator can change the limit for the high alarm of limit sensor 3
24	1 = Operator can change the limit for the high warning of limit sensor 3
25	1 = Operator can change the value for the hysteresis of limit sensor 3
26	1 = Operator can change the value for the response time of limit sensor 3
27	1 = Operator can change the limit for the low warning of limit sensor 3
28	1 = Operator can change the limit for the low alarm of limit sensor 3
29	1 = Operator can read the configuration data from the device
30	1 = Operator can write the configuration data to the device
31	Not used

The block has the following permissions for the `OS2Perm` parameter:

Bit	Funktion
0	1 = Operator can read the slave pointer values from the module
1	1 = Operator can reset the maximum slave pointer value of the pressure
2	1 = Operator can reset the minimum slave pointer value of the pressure
3	1 = Operator can reset the maximum slave pointer value of the static pressure
4	1 = Operator can reset the minimum slave pointer value of the static pressure
5	1 = Operator can reset the maximum slave pointer value of the sensor temperature
6	1 = Operator can reset the minimum slave pointer value of the sensor temperature
7	1 = Operator can reset the maximum slave pointer value of the electronics temperature
8	1 = Operator can reset the minimum slave pointer value of the electronics temperature
9	1 = Operator can activate / deactivate messages with <code>L1_AH_MsgEn</code>
10	1 = Operator can activate / deactivate messages with <code>L1_WH_MsgEn</code>
11	1 = Operator can activate / deactivate messages with <code>L1_WL_MsgEn</code>
12	1 = Operator can activate / deactivate messages with <code>L1_AL_MsgEn</code>
13	1 = Operator can activate / deactivate messages with <code>L2_AH_MsgEn</code>
14	1 = Operator can activate / deactivate messages with <code>L2_WH_MsgEn</code>
15	1 = Operator can activate / deactivate messages with <code>L2_WL_MsgEn</code>
16	1 = Operator can activate / deactivate messages with <code>L2_AL_MsgEn</code>
17	1 = Operator can activate / deactivate messages with <code>L3_AH_MsgEn</code>

18	1 = Operator can activate / deactivate messages with L3_WH_MsgEn
19	1 = Operator can activate / deactivate messages with L3_WL_MsgEn
20	1 = Operator can activate / deactivate messages with L3_AL_MsgEn
21	1 = Operator can activate / deactivate messages with GradHUpMsgEn
22	1 = Operator can activate / deactivate messages with GradHDnMsgEn
23	1 = Operator can activate / deactivate messages with GradLMsgEn
24 - 31	Not used

Display and operating range for process values and limits

The inputs PV_OpScaleH/L are used as display and operating range for the process value PV_In.

Generating instance-specific messages

This block provides the standard "Generate instance-specific messages" function that is described in the APL Online Help.

SIMATIC BATCH functionality

This block provides the standard "SIMATIC BATCH functionality" function that is described in the APL Online Help.

7.1.4 Error handling of S7SitPHA

For general information on error handling of all blocks, refer to the "Error handling" chapter in the APL Online Help.

The following errors can be displayed for this block:

- Error numbers
- Control system fault (CSF)

Overview of error numbers

The ErrorNum I/O can be used to output the following error numbers:

Error number	Meaning of the error number
-1	Predefined value when inserting the block; the block is not executed.
0	There is no error.
30	The process value can no longer be displayed in the REAL number field: PV_In : Error0Num PV : Error1Num SV : Error2Num TV : Error3Num QV : Error4Num

Control system fault (CSF)

An external signal can be activated via the CSF input. A process control error is triggered if this signal = 1. Refer to the "Error handling" chapter in the APL Online Help.

7.1.5 Message behavior of S7SitPHA

Messaging

The following messages can be generated for this block:

- Control system fault
- Process messages
- Instance-specific message

Control system fault

The following control system fault messages can be output:

Message instance	Message class	Event
MsgEvId16	PLC Process Control Message - Failure	External error has occurred (S7SitPHA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]
MsgEvId17	PLC Process Control Message - Error	Error while reading a data record (S7SitPHA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]
MsgEvId18	PLC Process Control Message - Error	Error while writing a data record (S7SitPHA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]

You can interconnect an external fault (signal) to the input parameter CSF. If this signal changes to CSF = 1, a control system fault is triggered (MsgEvId16).

Process messages

Message instance	Message class	Event
MsgEvId01	Alarm - high	@1Y%t#S7SitPHA_MeasVal@ - High alarm limit violated (S7SiLRHA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2I%d@.@2Y%1u@]
MsgEvId02	Warning - high	@1Y%t#S7SitPHA_MeasVal@ - High warning limit violated (S7SiLRHA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2I%d@.@2Y%1u@]
MsgEvId03	Warning - low	@1Y%t#S7SitPHA_MeasVal@ - Low warning limit violated (S7SiLRHA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2I%d@.@2Y%1u@]

MsgEvId04	Alarm - low	@1Y%t#S7SiPHA_MeasVal@ - Low alarm limit violated (S7SiLRHA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2I%d@.@2Y%1u@]
MsgEvId05	Alarm - high	@1Y%t#S7SiPHA_MeasVal@ - High alarm limit violated (S7SiLRHA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2I%d@.@2Y%1u@]
MsgEvId06	Warning - high	@1Y%t#S7SiPHA_MeasVal@ - High warning limit violated (S7SiLRHA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2I%d@.@2Y%1u@]
MsgEvId07	Warning - low	@1Y%t#S7SiPHA_MeasVal@ - Low warning limit violated (S7SiLRHA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2I%d@.@2Y%1u@]
MsgEvId08	Alarm - low	@1Y%t#S7SiPHA_MeasVal@ - Low alarm limit violated (S7SiLRHA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2I%d@.@2Y%1u@]
MsgEvId09	Alarm - high	@1Y%t#S7SiPHA_MeasVal@ - High alarm limit violated (S7SiLRHA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2I%d@.@2Y%1u@]
MsgEvId10	Warning - high	@1Y%t#S7SiPHA_MeasVal@ - High warning limit violated (S7SiLRHA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2I%d@.@2Y%1u@]
MsgEvId11	Warning - low	@1Y%t#S7SiPHA_MeasVal@ - Low warning limit violated (S7SiLRHA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2I%d@.@2Y%1u@]
MsgEvId12	Alarm - low	@1Y%t#S7SiPHA_MeasVal@ - Low alarm limit violated (S7SiLRHA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2I%d@.@2Y%1u@]
MsgEvId13	Alarm - high	Limit value (high) for the positive gradient violated (S7SiPHA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]
MsgEvId14	Alarm - high	Limit value (high) for the negative gradient violated (S7SiPHA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]
MsgEvId15	Alarm - low	Limit value (low) for absolute gradient violated (S7SiPHA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]

Instance-specific message

You can use one instance-specific message with this block.

Message instance	Message class	Event
MsgEvId19	PLC Process Control Message - Failure	External message (S7SiPHA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]

Associated values for message instances with limit violation

Associated value	Block parameter	Data Type
1	PV_Meas0	BYTE
2	AuxByte (one or two digits after the decimal point, see Feature.Bit3)	BYTE
3	AuxWord (number before the decimal point: -32768 .. 32767)	WORD
4	BatchID	DWORD
5	MsgFilter	DINT

Associated values for message instances without limit violation

Associated value	Block parameter	Data Type
1	Aux	REAL
2	BatchID	DWORD
3	MsgFilter	DINT

Message texts and their text numbers

The following table shows the message texts and their numbers in the text library "S7SitPHA_MeasVal" for the S7SitPHA block (FB 2635):

Text number	Message text
0	Pressure
1	Sensor temperature
2	Electronics temperature
3	Pressure
4	Level
5	Volume
6	Mass
7	Volume flow
8	Mass flow
9	User value
10	Static pressure

7.1.6 I/Os of S7SitPHA

Input parameters

Parameter	Description	Type	Default
SlotHart	Slot number of the SITRANS P within the AI module in the ET200M from HW Config	INT	0
DevType	Device type of SITRANS P 0: No device connected 1: SITRANS P DS III 2: SITRANS P300 3: SITRANS P500 4: SITRANS P310 5: SITRANS P410	INT	1
PV_In	Process value (4 to 20 mA signal)	REAL	0.0
QCPV_In	Quality Code of Process Value (4..20mA signal)	BYTE	16#80
PV	First HART variable (primary variable)	REAL	0.0
QCPV	Quality Code of first HART variable (Primary variable)	BYTE	16#FF
SV	Second HART variable (secondary variable)	REAL	0.0
QCSV	Quality Code of second HART variable (Secondary variable)	BYTE	16#FF
TV	Third HART variable (tertiary variable)	REAL	0.0
QCTV	Quality Code of third HART variable (Tertiary variable)	BYTE	16#FF
QV	Fourth HART variable (quaternary variable)	REAL	0.0
QCQV	Quality Code of fourth HART variable (Quaternary variable)	BYTE	16#FF
Lx_ScaleH* (x= 1,2,3)	Limit sensor x: Maximum value for the alarm and warning limits Note: If the Feature Bit7 (synchronize alarm configuration with module) is set, this input is written with the measuring range limits available in the module to the corresponding L1/2/3_ScaleH/L inputs when reading the configuration data.	REAL	100.0
Lx_ScaleL* (x= 1,2,3)	Limit sensor x: Minimum values for the alarm and warning limits Note: If the Feature Bit7 (synchronize alarm configuration with module) is set, this input is written with the measuring range limits available in the module to the corresponding L1/2/3_ScaleH/L inputs when reading the configuration data.	REAL	0.0
InLx_AH_Lim* (x= 1,2,3)	Limit sensor x: Alarm limit (high)	REAL	0.0

Parameter	Description	Type	Default
InLx_WH_Lim* (x= 1,2,3)	Limit sensor x: Warning limit (high)	REAL	0.0
InLx_Hyst* (x= 1,2,3)	Limit sensor x: Hysteresis for alarm and warning limits	REAL	0.0
InLx_RespT* (x= 1,2,3)	Limit sensor x: Response time	WORD	0
InLx_WL_Lim* (x= 1,2,3)	Limit sensor x: Limit warning (low)	REAL	0.0
InLx_AL_Lim* (x= 1,2,3)	Limit sensor x: Alarm limit (low)	REAL	0.0
InLx_Unit* (x= 1,2,3)	Limit sensor x: Unit	INT	0
InLx_DevVar* (x= 1,2,3)	Limit sensor x: Physical variable 0: Pressure 1: Sensor temperature 2: Electronics temperature 3: Pressure (untrimmed) 4: Fill level 5: Volume 6: Mass 7: Volume flow 8: Mass flow 9: User value 10: Static pressure 11: Not used	BYTE	16#00
Lx_AlmAct* (x= 1,2,3)	Limit sensor x: Alarm activation 1: Messages active	BYTE	16#00
Lx_MonAct* (x= 1,2,3)	Limit sensor x: Monitoring action 1: Warning 2: Warning and alarm	BYTE	16#00
Lx_MonTrig* (x= 1,2,3)	Limit sensor x: Monitoring trigger 1: High limit 2: Low limit 3: High and low limit	BYTE	16#00
Lx_A_DC* (x= 1,2,3)	Limit sensor x: Delay time for incoming alarms with overrange/ underrange process value or only with under- range process value [s]	REAL	0.0
Lx_A_DG* (x= 1,2,3)	Limit sensor x: Delay time for outgoing alarms with overrange/ underrange process value or only with under- range process value [s]	REAL	0.0

Parameter	Description	Type	Default
Lx_W_DC* (x= 1,2,3)	Limit sensor x: Delay time for incoming warnings with overrange/ underrange process value or only with under- range process value [s]	REAL	0.0
Lx_W_DG* (x= 1,2,3)	Limit sensor x: Delay time for outgoing warnings with overrange/ underrange process value or only with under- range process value [s]	REAL	0.0
Lx_AH_En* (x= 1,2,3)	Limit sensor x: 1 = Enable alarm limit (high)	BOOL	1
Lx_WH_En* (x= 1,2,3)	Limit sensor x: 1 = Enable warning limit (high)	BOOL	1
Lx_WL_En* (x= 1,2,3)	Limit sensor x: 1 = Enable warning limit (low)	BOOL	1
Lx_AL_En* (x= 1,2,3)	Limit sensor x: 1 = Enable alarm limit (high)	BOOL	1
Lx_AH_MsgEn* (x= 1,2,3)	Limit sensor x: 1 = Message for	BOOL	1
Lx_WH_MsgEn* (x= 1,2,3)	Limit sensor x: 1 = activate warning (high) message	BOOL	1
Lx_WL_MsgEn* (x= 1,2,3)	Limit sensor x: 1 = activate warning (low) message	BOOL	1
Lx_AL_MsgEn* (x= 1,2,3)	Limit sensor x: 1 = activate alarm (high) message	BOOL	1
GradHUpLim	Gradient monitoring: Limit (high) for the positive gradient	REAL	10.0
GradHDnLim	Gradient monitoring: Limit (high) for the negative gradient	REAL	10.0
GradLLim	Gradient monitoring: Limit (low) for the absolute gradient	REAL	1.0
RstOp*	1 = Reset peak values of gradient via operator	BOOL	0
LagTime	Delay time [s]	REAL	10.0
PV_OpScaleH	High limit for scale in PV bar graph of faceplate	REAL	100.0
PV_OpScaleL	Low limit for scale in PV bar graph of faceplate	REAL	0.0
PV_Unit0*	Unit for process value (4 to 20 mA signal)	INT	0
PV_Unit1*	Unit for the first HART variable (primary variable)	INT	0
PV_Unit2*	Unit for the second HART variable (secondary variable)	INT	0
PV_Unit3*	Unit for the third HART variable (tertiary variable)	INT	0
PV_Unit4*	Unit for the fourth HART variable (quaternary variable)	INT	0
GradHUpEn	1 = Enable gradient monitoring (high) for positive changes	BOOL	1
GradHDnEn	1 = Enable gradient monitoring (high) for nega- tive changes	BOOL	1

Parameter	Description	Type	Default
GradLEn	1 = Enable gradient monitoring (low)	BOOL	0
OnOp*	1 = "On" mode via operator	BOOL	0
OosOp*	1 = "Out of service", via OS operator	BOOL	0
OosLi	1 = "Out of service", via interconnection or SFC (0-1 edge transition)	BOOL	0
GradHUpMsgEn	1 = Enable gradient (high) message for positive changes	BOOL	1
GradHDnMsgEn	1 = Enable gradient (high) message for negative changes	BOOL	1
GradLMsgEn	1 = Enable gradient (high) message for negative changes	BOOL	1
TimeFactor	Time unit: 0 = seconds 1 = minutes 2 = hours	INT	0
MsgLock	1 = Suppress process messages.	BOOL	0
SampleTime	Sampling time [s] (assigned automatically)	REAL	0.1
RunUpCyc	Number of cycles in startup; messages are suppressed during these cycles	INT	3
MsgEvid01..19	Message number (assigned automatically)	DWORD	16#00000000
BatchEn	1 = Enable allocation	BOOL	0
BatchID	Batch ID	DWORD	16#00000000
BatchName	Batch name	S7-String	
StepNo	Batch step number	DWORD	16#00000000
Occupied	1 = Occupied by batch control	BOOL	0
CSF	1 = External error (control system fault)	BOOL	0
ExtMsg	Binary input for freely selectable message	BOOL	0
UserStatus	Freely assignable bits for use in PCS 7 OS	BYTE	16#00
OS_Perm	I/O for operating permissions	STRUCT • Bit 0 : BOOL ... • Bit31: BOOL	- • 1 ... • 1
OS2Perm	I/O for operating permissions	STRUCT • Bit 0 : BOOL ... • Bit31: BOOL	- • 1 ... • 1

Parameter	Description	Type	Default
Feature	I/O for additional functions	STRUCT <ul style="list-style-type: none"> • Bit 0 : BOOL • Bit 1 : BOOL • Bit 2 : BOOL • ... • Bit 6 : BOOL • Bit 7 : BOOL • ... • Bit31: BOOL 	- <ul style="list-style-type: none"> • 0 • 0 • 1 • 1 • 0 • 0
PV_Meas0*	Measured value that is interconnected at the PV_In input: 0: Pressure 1: Sensor temperature 2: Electronics temperature 3: Pressure (untrimmed) 4: Fill level 5: Volume 6: Mass 7: Volume flow 8: Mass flow 9: User value 10: Static pressure 11: Not used	BYTE	11
PV_Meas1*	Measured value that is interconnected at the PV input: 0: Pressure 1: Sensor temperature 2: Electronics temperature 3: Pressure (untrimmed) 4: Fill level 5: Volume 6: Mass 7: Volume flow 8: Mass flow 9: User value 10: Static pressure 11: Not used	BYTE	11
PV_Meas2*	Measured value that is interconnected at the SV input: 0: Pressure 1: Sensor temperature 2: Electronics temperature 3: Pressure (untrimmed) 4: Fill level 5: Volume 6: Mass 7: Volume flow 8: Mass flow 9: User value 10: Static pressure 11: Not used	BYTE	11

Parameter	Description	Type	Default
PV_Meas3*	Measured value that is interconnected at the TV input: 0: Pressure 1: Sensor temperature 2: Electronics temperature 3: Pressure (untrimmed) 4: Fill level 5: Volume 6: Mass 7: Volume flow 8: Mass flow 9: User value 10: Static pressure 11: Not used	BYTE	11
PV_Meas4*	Measured value that is interconnected at the QV input: 0: Pressure 1: Sensor temperature 2: Electronics temperature 3: Pressure (untrimmed) 4: Fill level 5: Volume 6: Mass 7: Volume flow 8: Mass flow 9: User value 10: Static pressure 11: Not used	BYTE	11
RdCfgOp*	1 = Read all configuration data from SitransP	BOOL	0
WrCfgOp*	1 = Write all configuration data to SitransP	BOOL	0
RdMinMax	1 = Read all slave pointer values from the device	BOOL	0
RMaxPOp	1 = Reset max. slave pointer pressure	BOOL	0
RMinPOp	1 = Reset min. slave pointer pressure	BOOL	0
RMaxSPOp	1 = Reset max. slave pointer static pressure	BOOL	0
RMinSPOp	1 = Reset min. slave pointer static pressure	BOOL	0
RMaxSTOp	1 = Reset max. slave pointer sensor temperature	BOOL	0
RMinSTOp	1 = Reset min. slave pointer sensor temperature	BOOL	0
RMaxETOp	1 = Reset max. slave pointer electronics temperature	BOOL	0
RMinETOp	1 = Reset min. slave pointer electronics temperature	BOOL	0
RMaxPLi	1 = Reset max. slave pointer pressure, via interconnection or SFC (0-1 edge transition)	BOOL	0
RMinPLi	1 = Reset min. slave pointer pressure, via interconnection or SFC (0-1 edge transition)	BOOL	0
RMaxSPLi	1 = Reset max. slave pointer static pressure, via interconnection or SFC (0-1 edge transition)	BOOL	0
RMinSPLi	1 = Reset min. slave pointer static pressure, via interconnection or SFC (0-1 edge transition)	BOOL	0

Parameter	Description	Type	Default
RMaxSTLi	1 = Reset max. slave pointer sensor temperature, via interconnection or SFC (0-1 edge transition)	BOOL	0
RMinSTLi	1 = Reset min. slave pointer sensor temperature, via interconnection or SFC (0-1 edge transition)	BOOL	0
RMaxETLi	1 = Reset max. slave pointer electronics temperature, via interconnection or SFC (0-1 edge transition)	BOOL	0
RMinETLi	1 = Reset min. slave pointer electronics temperature, via interconnection or SFC (0-1 edge transition)	BOOL	0
RdMinMaxLi	1 = Read all slave pointer values from the device, via interconnection or SFC (0-1 edge transition)	BOOL	0
ScaleInH*	High limit of measuring range of the 4 to 20 mA signal This input is only used to read back the values to the CFC.	REAL	0.0
ScaleInL*	Low limit of measuring range of the 4 to 20 mA signal This input is only used to read back the values to the CFC.	REAL	0.0

* Values can be written back to these inputs during processing of the block by the block algorithm.

In/out parameters

Parameter	Description	Type	Default
AcyclData	Acyclic data from driver block PiDr64 (interconnect this input with AcyclData output of PiDr64)	STRUCT <ul style="list-style-type: none"> SlotRd : INT ... RetValWr: WORD Input : STRUCT Output : STRUCT NewDiag : INT DiagData : STRUCT 	

Output parameters

Parameter	Description	Type	Default
QWronDev	1 = Wrong device connected	BOOL	1
PV_Out0	Process value output (4 to 20 mA signal)	STRUCT <ul style="list-style-type: none"> Value : REAL ST: BYTE 	- <ul style="list-style-type: none"> 0.0 16#80

Parameter	Description	Type	Default
PV_Out1	Output first HART variable (primary variable)	STRUCT <ul style="list-style-type: none"> Value : REAL ST: BYTE 	- <ul style="list-style-type: none"> 0.0 16#80
PV_Out2	Output second HART variable (secondary variable)	STRUCT <ul style="list-style-type: none"> Value : REAL ST: BYTE 	- <ul style="list-style-type: none"> 0.0 16#80
PV_Out3	Output third HART variable (tertiary variable)	STRUCT <ul style="list-style-type: none"> Value : REAL ST: BYTE 	- <ul style="list-style-type: none"> 0.0 16#80
PV_Out4	Output fourth HART variable (quaternary variable)	STRUCT <ul style="list-style-type: none"> Value : REAL ST: BYTE 	- <ul style="list-style-type: none"> 0.0 16#80
PV_Grad0	Process value gradient (4 to 20 mA signal)	REAL	0.0
PV_GradPP0	Gradient value, maximum peak value	REAL	0.0
PV_GradNP0	Gradient value, minimum peak value	REAL	0.0
Pressure	Output for process value for pressure	REAL	0.0
QCPressure	Quality code of current pressure	BYTE	16#00
SenTemp	Output for process value for sensor temperature	REAL	0.0
QCSenTemp	Quality code of current sensor temperature	BYTE	16#00
ElecTemp	Output for process value for electronics temperature	REAL	0.0
QCElecTemp	Quality code of Electronics temperature	BYTE	16#00
PresUntr	Output for process value for pressure (untrimmed)	REAL	0.0
QCPresUntr	Quality code of current pressure	BYTE	16#00
Level	Output for process value for level	REAL	0.0
QCLevel	Quality Code of Current level	BYTE	16#00
Volume	Output for process value for volume	REAL	0.0
QCVolume	Quality Code of Current Volume	BYTE	16#00
Mass	Output for process value for mass	REAL	0.0
QCMass	Quality Code of Current Mass	BYTE	16#00
VolFlow	Output for process value for volume flow	REAL	0.0
QCVol	Quality Code of Current Volumetric flow	BYTE	16#00
MassFlow	Output for process value for mass flow	REAL	0.0
QCMassFlow	Quality Code of Current Mass flow rate	BYTE	16#00
UserVal	Output for process value for user value	REAL	0.0
QCUserVal	Quality Code of Current User programmable "characteristic curve"	BYTE	16#00
StatPres	Output for process value for static pressure	REAL	0.0
QCStatPress	Quality Code of Current Static Pressure	BYTE	16#00

Parameter	Description	Type	Default
Lx_AH_Act (x= 1,2,3)	Limit sensor x: 1 = Alarm (high) active. You can change the response for this parameter by setting <i>Feature</i> bit 28 (deactivate switching points) and <i>Feature</i> bit 29 (high/low signal limit violation) accordingly.	BOOL	0
Lx_WH_Act (x= 1,2,3)	Limit sensor x: 1 = Warning (high) active. You can change the response for this parameter by setting <i>Feature</i> bit 28 (deactivate switching points) and <i>Feature</i> bit 29 (high/low signal limit violation) accordingly.	BOOL	0
Lx_WL_Act (x= 1,2,3)	Limit sensor x: 1 = Warning (low) active. You can change the response for this parameter by setting <i>Feature</i> bit 28 (deactivate switching points) and <i>Feature</i> bit 29 (high/low signal limit violation) accordingly.	BOOL	0
Lx_AL_Act (x= 1,2,3)	Limit sensor x: 1 = Alarm (low) active. You can change the response for this parameter by setting <i>Feature</i> bit 28 (deactivate switching points) and <i>Feature</i> bit 29 (high/low signal limit violation) accordingly.	BOOL	0
ScaleOutH	High limit of measuring range of 4 to 20 mA signal	REAL	0.0
ScaleOutL	Low limit of measuring range of 4 to 20 mA signal	REAL	0.0
PV_InUnit	Unit of measure for process value	INT	0
PresUnit	Unit for pressure	INT	0
STempUnit	Unit of measure for sensor temperature	INT	0
ETempUnit	Unit of measure for electronics temperature	INT	0
PUntUnit	Unit for untrimmed pressure	INT	0
LevelUnit	Unit for level	INT	0
VolUnit	Unit for volume	INT	0
MassUnit	Unit for mass	INT	0
VFlowUnit	Unit for volume mass	INT	0
MFlowUnit	Unit for mass flow	INT	0
UserUnit	Unit for user value	INT	0
StPrUnit	Unit for static pressure	INT	0
UsrUnitS	Unit of user value	STRING[5]	“
GradHUpAct	1 = Gradient alarm (high) for positive changes. You can change the response for this parameter by setting <i>Feature</i> bit 28 (deactivate switching points) and <i>Feature</i> bit 29 (high/low signal limit violation) accordingly.	BOOL	0

Parameter	Description	Type	Default
GradHDnAct	1 = Gradient alarm (high) for negative changes. You can change the response for this parameter by setting Feature bit 28 (deactivate switching points) and Feature bit 29 (high/low signal limit violation) accordingly.	BOOL	0
GradLAct	1 = Gradient alarm (low). You can change the response for this parameter by setting Feature bit 28 (deactivate switching points) and Feature bit 29 (high/low signal limit violation) accordingly.	BOOL	0
OosAct	1 = Block is "Out of service"	BOOL	0
OnAct	1 = "On" mode enabled	BOOL	1
OS_PermOut	Display of OS_Perm	DWORD	16#FFFFFFFF
OS_PermLog	Display of OS_Perm with settings changed by the block algorithm	DWORD	16#FFFFFFFF
OS2PermOut	Display of OS2Perm	DWORD	16#FFFFFFFF
OS2PermLog	Display of OS2Perm with settings changed by the block algorithm	DWORD	16#FFFFFFFF
Status1	Status word 1	DWORD	16#00000000
Status2	Status word 2	DWORD	16#00000000
Status3	Status word 3	DWORD	16#00000000
Status4	Status word 4	DWORD	16#00000000
Error0Num	Output of current error number for the 4 to 20 mA signal. For error numbers that can be output by this block, see Error handling of S7SitPHA (Page 177)	INT	-1
Error1Num	Output of current error number for the first HART variable (primary variable). For error numbers that can be output by this block, see Error handling of S7SitPHA (Page 177)	INT	-1
Error2Num	Output of current error number for the second HART variable (secondary variable). For error numbers that can be output by this block, see Error handling of S7SitPHA (Page 177)	INT	-1
Error3Num	Output of current error number for the third HART variable (tertiary variable). For error numbers that can be output by this block, see Error handling of S7SitPHA (Page 177)	INT	-1
Error4Num	Output of current error number for the fourth HART variable (quaternary variable). For error numbers that can be output by this block, see Error handling of S7SitPHA (Page 177)	INT	-1
MsgStat1..19	Message status 1..19	WORD	16#0000
MsgAckn1..19	Message acknowledgment status 1..19	WORD	16#0000
LxScaleAH_High (x= 1,2,3)	Limit sensor x: Maximum limit of alarm high of sensor x	REAL	0.0
LxScaleAH_Low (x= 1,2,3)	Limit sensor x: Minimum limit of alarm high of sensor x	REAL	0.0

Parameter	Description	Type	Default
LxScaleWH_High (x= 1,2,3)	Limit sensor x: Maximum limit of warning high of sensor x	REAL	0.0
LxScaleWH_Low (x= 1,2,3)	Limit sensor x: Minimum limit of warning high of sensor x	REAL	0.0
LxScaleHyst_High (x= 1,2,3)	Limit sensor x: Maximum limit of hysteresis	REAL	0.0
LxScaleAL_High (x= 1,2,3)	Limit sensor x: Maximum limit of alarm low of sensor x	REAL	0.0
LxScaleAL_Low (x= 1,2,3)	Limit sensor x: Minimum limit of alarm low of sensor x	REAL	0.0
LxScaleWL_High (x= 1,2,3)	Limit sensor x: Maximum limit of warning low of sensor x	REAL	0.0
LxScaleWL_Low (x= 1,2,3)	Limit sensor x: Minimum limit of warning low of sensor x	REAL	0.0
Lx_AH_Lim (x= 1,2,3)	Limit sensor x: Alarm limit (high)	REAL	0.0
Lx_WH_Lim (x= 1,2,3)	Limit sensor x: Warning limit (high)	REAL	0.0
Lx_WL_Lim (x= 1,2,3)	Limit sensor x: Limit warning (low)	REAL	0.0
Lx_AL_Lim (x= 1,2,3)	Limit sensor x: Alarm limit (low)	REAL	0.0
Lx_Hyst (x= 1,2,3)	Limit sensor x: Hysteresis for alarm and warning limits	REAL	0.0
Lx_RespT (x= 1,2,3)	Limit sensor x: Response time	INT	0
PV_AH_Lim	Alarm limit (high) if a limit sensor monitors PV_In	REAL	0.0
PV_WH_Lim	Warning limit (high) if a limit sensor monitors PV_In	REAL	0.0
PV_WL_Lim	Warning limit (low) if a limit sensor monitors PV_In	REAL	0.0
PV_AL_Lim	Alarm limit (low) if a limit sensor monitors PV_In	REAL	0.0
MaxPRst	Maximum value of resettable slave pointer for pressure	REAL	0.0
MinPRst	Minimum value of resettable slave pointer for pressure	REAL	0.0
MaxSPRst	Maximum value of resettable slave pointer for static pressure	REAL	0.0
MinSPRst	Minimum value of resettable slave pointer for static pressure	REAL	0.0
MaxSTRst	Maximum value of resettable slave pointer for sensor temperature	REAL	0.0
MinSTRst	Minimum value of resettable slave pointer for sensor temperature	REAL	0.0

Parameter	Description	Type	Default
MaxETRst	Maximum value of resettable slave pointer for electronics temperature	REAL	0.0
MinETRst	Minimum value of resettable slave pointer for electronics temperature	REAL	0.0

7.1.7 Block diagram of S7SitPHA

A block diagram is not provided for this block.

7.1.8 Template of S7SitPHA

This process tag type is used to connect a SITRANS P with SCALING driver blocks to STEP 7 (template 'SitransP HART').

Note

The SCALE function takes an integer value (IN) and converts it to a real value in engineering units scaled between a low and a high limit (LO_LIM and HI_LIM). For more information on Scaling block press F1 for online help.

The Scaling block trims the value of `PV_In`. The inputs for the Hart auxiliary variables of the function block S7SitPHA (`PV`, `SV`, `TV`, `QV`) are interconnected with the corresponding input from HW Config.

The inputs `Laddr`, `Addr.Laddr0` and `Addr.Laddr1` of the PiDr64 block (`AcyclicData`) are configured with the address of the process value PV (not interconnected!).

The `SlotHart` input receives the slot number of the SITRANS P module within the analog input module at the SitransP (`SitransP`) block. The `Feature` bits 2 to 6 must be used to configure whether communication with the module is by means of the HART protocol and, if applicable, which HART variables are used. All required values can be found in HW Config.

Note

Correct configuration of the `SlotHart` input is a mandatory requirement and cannot be checked by the block.

7.1.9 Operator control & monitoring

7.1.9.1 Views of S7SitPHA

Views of the SitransP block

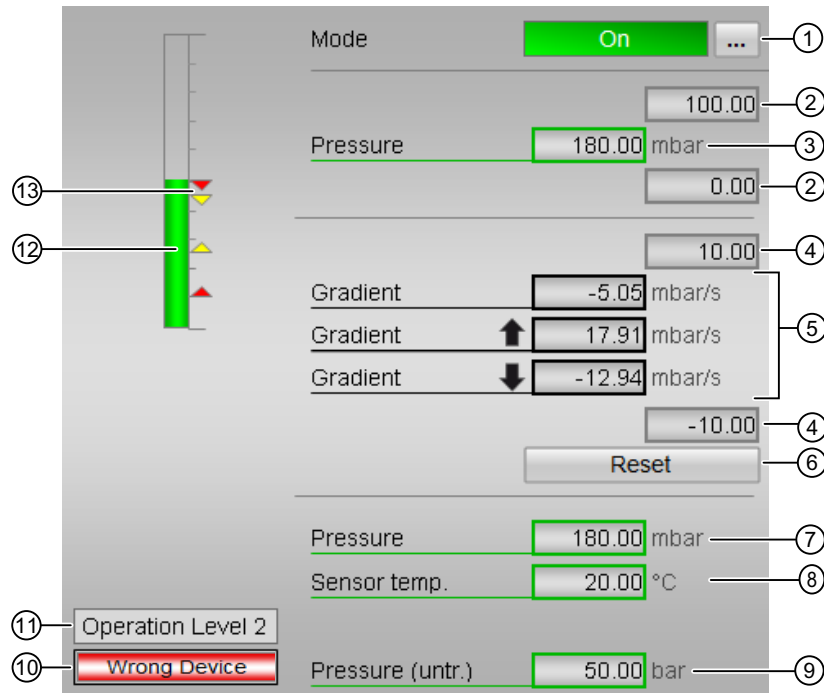
The SitransP block has the following views:

- Standard view of S7SitPHA (Page 194)
- Alarm view (Page 10)
- Limit view of S7SitPHA (Page 196)
- Trend view (Page 11)
- Parameter view of S7SitPHA (Page 199)
- Preview of S7SitPHA (Page 200)
- AUTOHOTSPOT
- Batch view (Page 9)
- Slave pointer view of S7SitPHA (resettable) (Page 201)
- Block icon for S7SitPHA (Page 203)

For general information on the faceplate and block icon, refer to the sections "Faceplate structure" and "Block icon structure" in the APL online help.

7.1.9.2 Standard view of S7SitPHA

Depending on the configuration of the 4 to 20 mA signal and the up to four HART variables in the standard view, the current process values for pressure, sensor temperature, electronics temperature, pressure (untrimmed), level, volume, mass, volume flow, mass flow, user value and/or static pressure are displayed. If a measured value is not assigned to a variable, the field is hidden. The gradient values always refer to the 4 to 20 mA signal.



(1) Display and switchover of operating mode

This area provides information on the currently valid operating mode. The following operating modes can be shown here:

- On (see the APL online help)
- Out of service (see APL online help)

For more information on changing the operating mode, refer to the "Switching operating states and operating modes" section in the APL Online Help.

(2) High and low scale range for the process value (4 to 20 mA signal)

These values provide information on the display range for the bar graph of the process value (4 to 20 mA signal). The scale range is set in the engineering system with the `PV_OpScaleH/L` parameter, see Display and operating range for process values and limits.

(3) Display of process value (4 to 20 mA signal) including signal status

This area indicates the current process value (4 to 20 mA signal) with the associated signal status. The name of the configured measured value is displayed depending on the PV_Meas0 variable, in this case "Pressure".

(4) High and low scale range for the gradient value

These values provide information on the display range for the bar graph of the gradient. The scale range corresponds to 10% of the scale range for the process value (4 to 20 mA signal): If you have entered a scale range for the process value of 0 to 100, for example, the scale range for the gradient is automatically defined as -10 to 10.

The current gradient value is displayed if one of the monitoring functions is enabled:

- Gradient monitoring for positive changes (GradHUpEn = 1)
- Gradient monitoring for negative changes (GradHDnEn = 1)
- Gradient monitoring (GradLEn = 1)

(5) Display of gradient

This area shows the current, minimum and maximum gradient values of the 4 to 20 mA signal as well as rising and falling of the value. This display of the minimum and maximum gradient value functions like a slave pointer.

The current gradient value is displayed if one of the monitoring functions is enabled:

- Gradient monitoring for positive changes (GradHUpEn = 1)
- Gradient monitoring for negative changes (GradHDnEn = 1)
- Gradient monitoring (GradLEn = 1)

The maximum peak gradient value is displayed if the gradient monitoring function for positive changes is enabled (GradHUpEn = 1)

The minimum peak gradient value is displayed if the gradient monitoring function for negative changes is enabled (GradHDnEn = 1)

(6) Resetting of peak values of the gradient

Using these buttons you can reset the maximum or minimum peak value of the gradient (output parameters PV_GradPP0 and PV_GradNP0).

The button is displayed if the gradient monitoring function for positive (GradHUpEn = 1) or negative changes (GradHDnEn = 1) is enabled.

(7), (8) and (9) Display of HART variables including signal status

This area provides information on the current process values of the HART variables with the corresponding signal status. The name of the configured measured value is displayed depending on the PV_Meas1...4 variable, in this case "Pressure", "Sensor temperature" and "Pressure (untrimmed)".

(10) Display area for block state

This area provides additional information on the operating state of the block:

- "Wrong device"

(11) Display area for switch permission

This area provides the text of the current OS, according to the enumeration configured at the PERMIS input.

(12) Bar graph for the "Process value" (4 to 20 mA signal)

This area shows the current "Process value" (4 to 20 mA signal) in the form of a bar graph. The visible area in the bar graph depends on the configuration in the engineering system (ES), see Display and operating range for process values and limits.

(13) Limit display

These small, colored triangles indicate the specified limits in the respective bar graph. They are only visible if the 4 to 20 mA signal is monitored by a limiter.

7.1.9.3 Limit view of S7SitPHA

The process value limits of the up to three limit sensors and the limits for the gradient monitoring of the 4 to 20 mA signal can be specified in this two-part view. The displayed texts depend on the configuration of the limit sensors on the block or in the module.

④ **Enabled operations Process value limits (PV)**

✓	☒ H alarm User value	50.00 bar	①
✓	☒ H warn. User value	45.00 bar	
✓	Hysteresis	0.00 bar	
✓	Response Time	0.00 s	
✓	☒ L warn. User value	25.00 bar	
✓	☐ L alarm User value	10.00 bar	

Gradient limits

✓	☒ H alarm	↑ 10.00 mbar/s	②
✓	☒ H alarm	↓ 10.00 mbar/s	
✓	☒ L alarm	↑↓ 1.00 mbar/s	

③

⑦ ⑧

Enabled operations Process value limits (PV)

Parameter	Value	Unit
H alarm Sensor temp.	75.00	°C
H warn. Sensor temp.	70.00	°C
Hysteresis	1.00	°C
Response Time	1.00	s
L warn. Sensor temp.	0.00	°C
L alarm Sensor temp.	17.00	°C
H alarm Pressure	95.00	bar
H warn. Pressure	88.00	bar
Hysteresis	3.00	bar
Response Time	1.00	s
L warn. Pressure	35.00	bar
L alarm Pressure	25.00	bar

(1), (5) and (6) Process value limits

In this area, you can enter the limits for the process value. You can change the following limits:

- "H alarm": High alarm
- "H warning": High warning
- "Hysteresis"
- "Delay time"
- "L warning": Low warning
- "L alarm": Low alarm

Depending on the configuration of the limit sensors, non-configured limits are not shown in the faceplate.

Note

The maximum and minimum values for the alarm and warning limits of the limiters 1 to 3 are configured at the inputs L1/2/3_ScaleH\L. If the Feature bit 7 (synchronize alarm configuration with module) is set, the measuring range limits available in the module are written to the corresponding L1/2/3_ScaleH\L inputs when reading the configuration data.

(2) Gradient limits

You can enter gradient limits in this area. Refer to the "Changing values" section in the APL online Help.

You can change the following limits:

- "H alarm $\uparrow$ ": Gradient for the upper gradient for positive changes
- "H alarm $\downarrow$ ": Gradient for the upper rate of rise for negative changes
- "L alarm $\uparrow\downarrow$ ": Gradient for the lower rate of rise (absolute)

(3) Switching between the two faceplate views

Display of the limits is divided between two faceplate views. It is possible to toggle between the two views here.

(4) Enabled operations

This area shows all operations for which special operator authorizations are assigned. They depend on the configuration in the engineering system (ES) that applies to this block.

Symbols for enabled operations:

- **Green check mark:** The OS operator can control this parameter
- **Gray check mark:** The OS operator cannot control this parameter at this time due to the process
- **Red cross:** The OS operator cannot control this parameter due to the configured AS operator authorizations (OS_Perm or OS1Perm)

(7) Message suppression/delays

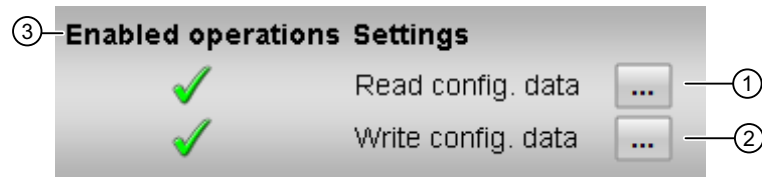
The message suppression indicates whether suppression of the associated message is activated in the AS block using the `xx_MsgEn` parameter. The output of messages is not suppressed when the block is installed (all `xx_MsgEn` parameters are set to 1 by default). Messages can only be output if limit monitoring of the additional analog value has been enabled.

Alarm delays are also displayed in this state; refer to the "Application of alarm delays" section in the APL Online Help.

(8) Suppress messages

You can activate/deactivate messages by selecting the check mark.

7.1.9.4 Parameter view of S7SitPHA



(1) Reading the configuration data

In this area, you can read all configuration data relevant to the block from SITRANS P.

(2) Writing the configuration data

In this area, you can write all relevant configuration data, i.e. limits, to the SITRANS P.

(3) Enabled operations

This area shows all operations for which special operator authorizations are assigned. They depend on the configuration in the engineering system (ES) that applies to this block.

Symbols for enabled operations:

- **Green check mark:** The OS operator can control this parameter
- **Gray check mark:** the OS operator cannot control this parameter at this time due to the process
- **Red cross:** the OS operator cannot control this parameter due to the configured AS operator control permissions (OS_Perm or OS1Perm).

7.1.9.5 Preview of S7SitPHA

The screenshot displays the S7SitPHA preview interface. It is divided into two main sections, labeled (1) and (2).

Section (1) shows process values:

Pressure	180.00 bar
Pressure	180.00 bar
Sensor temp.	20.00 °C
Pressure (untr.)	50.00 bar

Section (2) shows enabled operations:

Enabled operations

- ✓ Reset
- ✓ Automatic
- ✓ Out of service

Enabled operations

- ✓ Reset Max. Pressure
- ✓ Reset Min. Pressure
- ✓ Reset Max. Stat. Pressure
- ✓ Reset Min. Stat. Pressure
- ✓ Reset Max. Sensor Temp.
- ✓ Reset Min. Sensor Temp.
- ✓ Reset Max. Electr. Temp.
- ✓ Reset Min. Electr. Temp.

(1) Process values

This area shows the real process values (PV_In, PV, SV, TV, QV).

(2) Navigation button to the standard view of any faceplate

Use this navigation button to open the standard view of a block configured in the engineering system. The visibility of this navigation button depends on the configuration in the engineering system (ES).

You can find more information on this in the section "Opening additional faceplates" in the APL Online Help.

(3) Enabled operations

This area shows all operations for which special operator authorizations are assigned. They depend on the configuration in the engineering system (ES) that applies to this block.

Symbols for enabled operations:

- **Green check mark:** The OS operator can control this parameter
- **Gray check mark:** the OS operator cannot control this parameter at this time due to the process
- **Red cross:** The OS operator cannot control this parameter due to the configured AS operator permissions (OS_Perm or OS1Perm)

The following enabled operations are shown here:

General operator input enables for totalizers and dosing units:

- "On": You can switch to "On" mode.
- "Out of service": You can switch to "Out of service" mode.

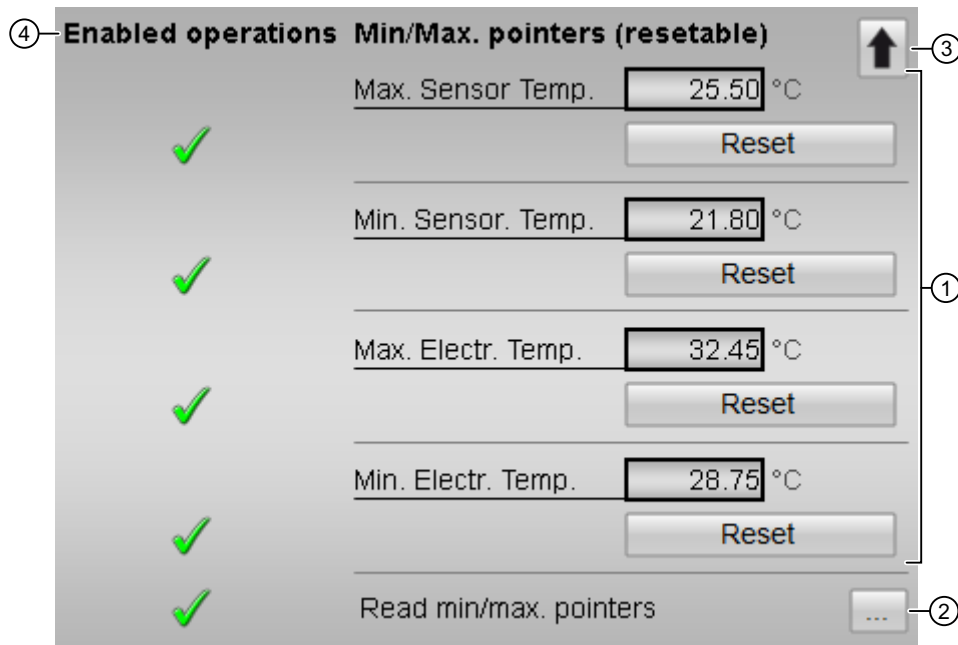
"Local operator authorization": Use the ← button to change to the standard view of the OpStations block. For more information, refer to the "Operator authorizations" section in the APL Online Help.

7.1.9.6 Slave pointer view of S7SitPHA (resettable)

④ **Enabled operations Min/Max. pointers (resettable)**

✓	Max. Pressure	<input type="text" value="0.52"/> mbar	<input type="button" value="Reset"/>
✓	Min. Pressure	<input type="text" value="-0.21"/> mbar	<input type="button" value="Reset"/>
✓	Max. Stat. Pressure	<input type="text" value="0.52"/> bar	<input type="button" value="Reset"/>
✓	Min. Stat. Pressure	<input type="text" value="0.29"/> bar	<input type="button" value="Reset"/>
✓	Read min/max. pointers	<input type="button" value="..."/>	<input type="button" value="↓"/>

① ② ③



(1) Display and reset resettable slave pointer

The last values of the resettable min/max pointer read from the device are shown in this area, and reset if applicable. Min/max pointers which are not available in the device are not displayed.

- Maximum value slave pointer for pressure
- Minimum value resettable slave pointer for pressure
- Maximum value slave pointer for static pressure
- Minimum value resettable slave pointer for static pressure
- Maximum value slave pointer for sensor temperature
- Minimum value slave pointer for sensor temperature
- Maximum value slave pointer for electronics temperature
- Minimum value slave pointer for electronics temperature

(2) Read out min/max pointers

In this area, you can read out the values of all slave pointers from the module

(3) Switching between the two faceplate views

Display of the slave pointers is divided between two faceplate views. It is possible to toggle between the two views here.

(4) Enabled operations

This area shows all operations for which special operator authorizations are assigned. They depend on the configuration in the engineering system (ES) that applies to this block.

Symbols for enabled operations:

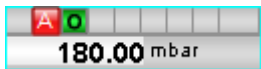
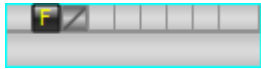
- **Green check mark:** The OS operator can control this parameter
- **Gray check mark:** the OS operator cannot control this parameter at this time due to the process
- **Red cross:** The OS operator cannot control this parameter due to the configured AS operator permissions (OS_Perm or OS1Perm)

7.1.9.7 Block icon for S7SitPHA

A variety of block icons is available with the following functions:

- Process tag type
- Limits (high/low)
- Violation of alarm and warning limits as well as the control system fault CSF
- Operating modes
- Signal status
- Process value (PV_In, 4 to 20 mA signal)

The block icons from template @TemplateAPL_SITRANS.PDL:

Icons	Selection of the block icon in CFC	Configuration in HW Config
	1	
	-	Block icon in the "Out of service" operating mode

For more information on the block icon and operating options in the block icon, refer to the following sections in the APL online help:

- "Configuring the block icons"
- "Block icon structure"
- "Operation via the block icon"

SITRANS F M MAG 6000

8.1 S7Mag6T

8.1.1 Description of S7Mag6T

Object name (type + number) and family

Type + number: FB 2605

Family: MAG6000

Note

The S7Mag6T block and its faceplate are oriented to the function principle of the PCS 7 APL Library that is not explained in detail in this document. The APL Manual is available for download from the Internet at Siemens Customer Support, <http://support.automation.siemens.com/WW/view/de/57265842> (contribution ID:57265842).

Area of application for S7Mag6T

The block is used for the following applications:

- Interface block of the MAG6000 driver blocks for the user program and visualization

How it works

The S7Mag6T prepares the process and diagnostics data received from MAG6000 driver blocks for further use in the user program and for visualization. Inputs via the faceplate or block inputs are transferred by driver blocks to the MAG6000.

In accordance with the configuration of the MAG6000 in the HW Config, the function block supports one or two totalizers or, instead of the second totalizer, the dosing functionality of the MAG6000.

Configuration

Use the CFC editor to install the block in a cyclic interrupt OB (OB30 to OB38). The block is also installed automatically in the startup OB (OB100).

Moreover, to connect the I/O signals it is imperative to call the driver blocks FbMag6T (cyclic data) and PiDr64 (non-cyclic data) in the same interrupt OB and startup OB (OB100) **before** S7Mag6T is called. The CyclData output structure of the PiDr64 block and the AcyclData output structure of the FbMag6T block are interconnected with the inputs of the same name at the S7Mag6T block.

The SITRANS Library contains a template for process tag types as an example with an application scenario for block S7Mag6T.

Examples of process tag types:

- Template of S7Mag6T (Page 239)

Startup characteristics

Use the **Feature Bit Setting the startup characteristics** (Page 24) to define the startup characteristics of this block.

The messages are suppressed after startup for the number of cycles set at **RunUpCyc**.

Status word allocation for **Status1** parameter

You can find a description for each parameter in section S7Mag6T connections (Page 225).

Status bit	Parameter
0	Occupied
1	BatchEn
2	Oos1Act and Oos2Act
3	Oos1Act
4	Oos2Act
5	Oos1Li
6	Oos2Li
7	Aut1Act and Aut2Act
8	Aut1Act
9	Aut2Act
10	Local1Act or Local2Act
11	Local1Act
12	Local2Act
13	DSP_ExtAct
14	DOnM
15	DOn
16	Mod1LiOp
17	Mod2LiOp
18	MS_Release
19	SimOn
20	Local operator permission (Feature Bit 24)
21	DOnRun
22	DOnStp
23	DOff
24	DOnPaused
25-29	Not used
30	UserAna1 interconnected
31	UserAna2 interconnected

Status word allocation for Status2 parameter

Status bit	Parameter
0	Flow
1	VF_AH_Act
2	VF_WH_Act
3	VF_WL_Act
4	VF_AL_Act
5	Tot1_AH_Act
6	Tot1_WH_Act
7	Tot1_WL_Act
8	Tot1_AL_Act
9	Tot2_AH_Act
10	Tot2_WH_Act
11	Tot2_WL_Act
12	Tot2_AL_Act
13	Totalizer1 counts in balanced mode (ModeTot1 = 16#00)
14	Totalizer1 counts only in positive mode (ModeTot1 = 16#01)
15	Totalizer1 counts only in negative mode (ModeTot1 = 16#02)
16	Totalizer1 counts in Hold state (ModeTot1 = 16#03)
17	Totalizer2 counts in balanced mode (ModeTot2 = 16#00)
18	Totalizer2 counts only in positive mode (ModeTot2 = 16#01)
19	Totalizer2 counts only in negative mode (ModeTot2 = 16#02)
20	Totalizer2 counts in Hold state (ModeTot2 = 16#03)
21	Invalid signal status
22	Totalizer 1 is configured (CyclData.ParaAvail.Bit0)
23	Totalizer 2 is configured (CyclData.ParaAvail.Bit1)
24	Dosing status (B_STA) is configured (CyclData.ParaAvail.Bit2)
25	Reset Totalizer 1 (SET_TOT) is configured (CyclData.ParaAvail.Bit3)
26	Command for Totalizer 1 (MODE_TOT) is configured (CyclData.ParaAvail.Bit4)
27	Reset Totalizer 2 (SET_TOT) is configured (CyclData.ParaAvail.Bit5)
28	Command for Totalizer 2 (MODE_TOT) is configured (CyclData.ParaAvail.Bit6)
29	Dosing command (B_CTR) is configured (CyclData.ParaAvail.Bit7)
30	Dosing setpoint (SETP) is configured (CyclData.ParaAvail.Bit8)
31	Dosing compensation (COMP) is configured (CyclData.ParaAvail.Bit9)

Status word allocation for Status3 parameter

Status bit	Parameter
0	VF_AH_En
1	VF_WH_En
2	VF_WL_En
3	VF_AL_En
4	Tot1_AH_En

8.1 S7Mag6T

Status bit	Parameter
5	Tot1_WH_En
6	Tot1_WL_En
7	Tot1_AL_En
8	Tot2_AH_En
9	Tot2_WH_En
10	Tot2_WL_En
11	Tot2_AL_En
12	VF_AH_MsgEn
13	VF_WH_MsgEn
14	VF_WL_MsgEn
15	VF_AL_MsgEn
16	Tot1_AH_MsgEn
17	Tot1_WH_MsgEn
18	Tot1_WL_MsgEn
19	Tot1_AL_MsgEn
20	Tot2_AH_MsgEn
21	Tot2_WH_MsgEn
22	Tot2_WL_MsgEn
23	Tot2_AL_MsgEn
24	Not used
25	Not used
26	Dosing timeout (DiagData.W22)
27	Dribbling dosing (DiagData.W23)
28	Negative dosing flow (DiagData.W24)
29	Not used
30	Any diagnostics message active (DiagData.xxx <> 0)
31	MsgLock

Status word allocation for Status4 parameter

Status bit	Parameter
0	"Interlock" button is enabled
1	"Permission" button is enabled
2	"Protection" button is enabled
3	1 = Intlockis active
4	1 = Permitis active
5	1 = Protectis active
6	"Interlock", "Permit" or "Protect" is enabled
7	"Interlock", "Permit" or "Protect" is active
8	ForcedSrt
9	ForcedStp
10	ForcedPause

Status bit	Parameter
11	ForceDCont
12	Totalizer 1: Mode switchover error
13	Totalizer 1/Dosing unit: Mode switchover error
14	Automatic preview 1 = Totalizer1: Command positive and negative
15	Automatic preview 1 = Totalizer1: Command positive
16	Automatic preview 1 = Totalizer1: Command negative
17	Automatic preview 1 = Totalizer1: Command Stop
18	Automatic preview 1 = Totalizer2: Command positive and negative
19	Automatic preview 1 = Totalizer2: Command positive
20	Automatic preview 1 = Totalizer2: Command negative
21	Automatic preview 1 = Totalizer2: Command Stop
22	Automatic preview 1 = Dosing start
23	Automatic preview 1 = Dosing stop
24	Automatic preview 1 = Dosing off
25	Automatic preview 1 = Dosing pause
26	Not used
27	Reset request in automatic mode
28	Neither "Interlock", nor "Permit", nor "Protect" is enabled
29	Oos1Li and Oos2Li if both totalizers are configured
30	Not used
31	Not used

Status word allocation for Status5 parameter

Status bit	Parameter
0	Effective signal 1 of the message block interconnected via EventTsIn
1	Effective signal 2 of the message block interconnected via EventTsIn
2	Effective signal 3 of the message block interconnected via EventTsIn
3	Effective signal 4 of the message block interconnected via EventTsIn
4	Effective signal 5 of the message block interconnected via EventTsIn
5	Effective signal 6 of the message block interconnected via EventTsIn
6	Effective signal 7 of the message block interconnected via EventTsIn
7	Effective signal 8 of the message block interconnected via EventTsIn
8	1 = error when reading acyclic data (active only for the duration of one cycle)
9	1 = error when writing acyclic data (active only for the duration of one cycle)
10	1 = External error
11	1 = dosing canceled (active only for the duration of one cycle)
12-31	Not used

8.1.2 Operating modes of S7Mag6T

Operating modes of S7Mag6T

The block can be operated using the following modes:

- Local mode
- Automatic mode
- Manual mode
- Out of service

Totalizers 1 and 2, or the dosing unit are assigned independent, separate operating modes.

The general descriptions of the operating modes are identical for S7Mag6T and the APL; refer to the Online Help for the standard APL blocks.

The next section provides additional block-specific information relating to the general descriptions.

"Local mode"

"Local mode" supports the transfer of the following commands to the totalizers 1 or 2:

- "Start balanced" (positive edge `Bal1Local` or `Bal2Local`)
- "Positive" (positive edge `Pos1Local` or `Pos2Local`)
- "Negative" (positive edge `Neg1Local` or `Neg2Local`)
- "Hold" (`Hold1Local` or `Hold2Local` = 1)

"Local mode" supports the transfer of the following commands to the dosing unit:

- "Start" (positive edge `DSrtLocal`)
- "Continue dosing" (`DContLocal` = 1)
- "Pause dosing" (`DPauseLocal` = 1)
- "Stop dosing" (`DStpLocal` = 1)

If you set the block to "Local mode", the control is only influenced by the "local" signals of the totalizers (input parameters `Bal1Local`/`Bal2Local` = 1, `Pos1Local`/`Pos2Local` = 1, `Neg1Local`/`Neg2Local` = 1 and `Hold1Local`/`Hold2Local` = 1) or of the dosing unit (input parameters `DSrtLocal` = 1, `DContLocal` = 1, `DPauseLocal` = 1 and `DStpLocal` = 1).

Note

Unlike the general description, at the `LocalSetting` parameter only the values 0, 1 and 3 can be set, i.e. tracking in "local" mode is not possible with S7Mag6T.

"Automatic mode"

"Automatic mode" supports the transfer of the following commands to the totalizers 1 or 2:

- "Start balanced" (positive edge `Bal1Aut` or `Bal2Aut`)
- "Positive" (positive edge `Pos1Aut` or `Pos2Aut`)
- "Negative" (positive edge `Neg1Aut` or `Neg2Aut`)
- "Hold" (`Hold1Aut` or `Hold2Aut` = 1)

"Automatic mode" supports the transfer of the following commands to the dosing unit:

- "Start" (positive edge `DSrtAut`)
- "Continue dosing" (`DContAut` = 1)
- "Pause dosing" (`DPauseAut` = 1)
- "Stop dosing" (`DStpAut` = 1)

"Manual mode"

"Manual mode" enables the transfer of the following commands to the totalizers 1 or 2:

- "Start balanced" (positive edge `Bal1Man` or `Bal2Man`)
- "Positive" (positive edge `Pos1Man` or `Pos2Man`)
- "Negative" (positive edge `Neg1Man` or `Neg2Man`)
- "Hold" (`Hold1Man` or `Hold2Man` = 1)

"Manual mode" enables the transfer of the following commands to the dosing unit:

- "Start" (positive edge `DSrtMan`)
- "Continue dosing" (`DContMan` = 1)
- "Pause dosing" (`DPauseMan` = 1)
- "Stop dosing" (`DStpMan` = 1)

"Out of service"

The block is not entirely "out of service" unless both totalizers are out of service. For general information about the "out of service" mode, refer to the APL Online Help

8.1.3 Functions of S7Mag6T**Functions of S7Mag6T**

The functions for this block are listed below.

Configuration data

All configuration data is read at the CPU startup or after rack recovery, depending on the feature bits 8. You may also initiate this procedure with "Read configuration data" in the parameter view of the faceplates.

All writable configuration data of MAG6000 is transferred by means of cyclic services to MAG6000 at the change of the corresponding block input and is then read back. The respective output always shows the last readback value. You may also use a faceplate control to write the configuration data.

Function block S7Mag6T provides the following configuration data with the corresponding slot/index address in MAG6000:

Description	Block parameters (I/O)	read/ write ena- bled	Slot	In- dex
Units for volume flow and totalizers 1 and 2	InVFUnit/VFUnit, InTot1Unit/ Tot1Unit, InTot2Unit/Tot2Unit	L	1	28
		L	2	27
		L	3	27
Limits for the volume flow display in faceplates	InVF_OpScale/VF_OpScale	R/W	1	28
Volume flow limits and hysteresis	InVF_AH_Lim/VF_AH_Lim, InVF_WH_Lim/VF_WH_Lim, InVF_WL_Lim/VF_WL_Lim, InVF_AL_Lim/VF_AL_Lim, InVF_Hyst/VF_Hyst	R/W	1	37
		R/W	1	39
		R/W	1	41
		R/W	1	43
		R/W	1	35
Totalizer 1 limits and hysteresis	InTot1_AH_Lim/Tot1_AH_Lim, InTot1_WH_Lim/Tot1_WH_Lim, InTot1_WL_Lim/Tot1_WL_Lim, InTot1_AL_Lim/Tot1_AL_Lim, InTot1_Hyst/Tot1_Hyst	R/W	2	34
		R/W	2	35
		R/W	2	36
		R/W	2	38
		R/W	2	33
Totalizer 2/dosing unit limits and hysteresis	InTot2_AH_Lim/Tot2_AH_Lim, InTot2_WH_Lim/Tot2_WH_Lim, InTot2_WL_Lim/Tot2_WL_Lim, InTot2_AL_Lim/Tot2_AL_Lim, InTot2_Hyst/Tot2_Hyst	R/W	3	34
		R/W	3	35
		R/W	3	36
		R/W	3	37
		R/W	3	23
Low flow cut-off suppression	InZF1Supp/ZF1Supp	R/W	1	217
Dosing setpoint	---/DSP	L*)	3	68
Compensation of the dosing unit	DCompOp/CompOp	L*)	3	69
Command Totalizer 1	internal use	L**)	2	30
Command Totalizer 2	internal use	L**)	3	30

*) The dosing setpoint and compensation values are transferred by means of cyclic data and then read back in acyclic mode

**) The Totalizer 1 and 2 commands are retrieved at CPU startup to determine the current totalizer state (refer to Feature bit)

Monitoring of volume flow limits

You can monitor the high/low alarm and warning limits for volume flow:

- VF_AH_Lim: Limit for high alarm
- VF_AL_Lim: Limit for low alarm
- VF_WH_Lim: Limit for high warning
- VF_WL_Lim: Limit for low warning

To clear a limit overshoot/undershoot error, it is necessary to recover the value to hysteresis limits (VF_Hyst outputs).

Result of the limit monitoring

The result of limit monitoring is returned at the interconnectable output parameters:

- VF_AH_Act = 1:
Limit for high alarm reached or exceeded
- VF_AL_Act = 1:
Limit for low alarm reached or undershot
- VF_WH_Act = 1:
Limit for high warning reached or exceeded
- VF_WL_Act = 1:
Limit for low warning reached or undershot

You can use Feature bit 29 (signal limit overshoot/undershoot) to determine whether the output parameter triggers limit monitoring with the value "0" or "1".

You may use Feature bit 28 (Disabling operating points) to disable limit monitoring while message suppression is active (MsgLock = 1).

Activating limit monitoring

Monitoring is always enabled using the input parameters:

- VF_AH_En = 1: Monitoring of the high alarm limits
- VF_AL_En = 1: Monitoring of the low alarm limits
- VF_WH_En = 1: Monitoring of the high warning limits
- VF_WL_En = 1: Monitoring of the low warning limits

Predefinition: All monitoring functions are activated.

Message suppression

The corresponding message is suppressed using the parameters:

- VF_AH_MsgEn = 0:
Alarm (high) messages are suppressed.
- VF_AL_MsgEn = 0:
Alarm (low) messages are suppressed.

- VF_WH_MsgEn = 0:
Warning (high) messages are suppressed.
- VF_WL_MsgEn = 0:
Warning (low) messages are suppressed.

The output of messages is not suppressed when the block is installed (all `xx_MsgEn` parameters are preset to 1). Messages can only be output if limit monitoring of the additional analog value has been enabled.

Suppressing messages using the `MsgLock` parameter

This block provides the standard function "Suppress messages using parameter `MsgLock`" that is described in the APL Online Help.

Selecting a unit of measure

The units of measure for Totalizers 1 and 2 are configured on the MAG6000 device by means of PDM and read a restart of the PLC when `Feature` bit 8 = `TRUE`, or after MAG6000 has returned to the Profibus, or by means of "Read Config" in the faceplate view.

Group error

The following parameter is taken into consideration when forming the group error `GrpErr`:

- `CyclData.Csf` (external error)

Configurable reactions using the `Feature` I/O

The following response features are available for this block at the respective bits of the `Feature` I/O:

Bit number	Meaning
0	Setting the startup characteristics (Page 24)
1	Reaction to the out of service mode (Page 25)
2	Resetting the commands for changing the mode (Page 26)
3	Enabling resetting of commands for the control settings (Page 26)
4	Set switch or button mode (Page 27)
8	Read configuration data automatically (Page 28)
10	Exiting local mode (Page 28)
11	Pause dosing at flow alarm (Page 29)
17	Activating bumpless changeover to automatic mode (Page 30)
22	Update acknowledgment and error status of the message call (Page 30)
24	Enabling local operating permission (Page 30)
25	AUTOHOTSPOT
28	Disabling operating points (Page 31)
29	Signaling limit violation (Page 32)

Bit number	Meaning
30	Resetting depending on the operating mode (Page 32)
31	Activating reset of protection / errors in manual mode (Page 33)

Operator permissions

This block provides the standard operator permissions that are described in the APL Online Help.

The block has the following permissions for the `OS_Perm` parameter:

Bit	Feature
0	Totalizer 1: 1 = Operator may switch to "automatic mode"
1	Totalizer 1: 1 = Operator may switch to "manual mode"
2	Totalizer 1: 1 = Operator may switch to "local mode"
3	Totalizer 1: 1 = Operator can switch to "Out of service" mode
4	Totalizer 2: 1 = Operator may switch to "automatic mode"
5	Totalizer 2: 1 = Operator may switch to "manual mode"
6	Totalizer 2: 1 = Operator may switch to "local mode"
7	Totalizer 2: 1 = Operator can switch to "Out of service" mode
8	Dosing unit: 1 = Operator may select external setpoints
9	Dosing unit: 1 = Operator may select internal setpoints
10	Dosing unit: 1 = operator may enter dosing setpoint
11	Dosing unit: 1 = Operator may enter compensation value
12	Dosing unit: 1 = Operator may enter low flow cut-off value
13	Not used
14	Totalizer 1: 1 = Operator may input the 'positive and negative count' command
15	Totalizer 1: 1 = Operator may input the 'only positive count' command
16	Totalizer 1: 1 = Operator may input the 'only negative count' command
17	Totalizer 1: 1 = Operator may input the 'Hold' command
18	Totalizer 1: 1 = Operator may reset the totalizer
19	Totalizer 2: 1 = Operator may input the 'positive and negative count' command
20	Totalizer 2: 1 = Operator may input the 'only positive count' command
21	Totalizer 2: 1 = Operator may input the 'only negative count' command
22	Totalizer 2: 1 = Operator may input the 'Hold' command
23	Totalizer 2: 1 = Operator may reset the totalizer
24	Not used
25	Not used
26	Not used
27	Not used
28	Dosing unit: 1 = operator may start dosing
29	Dosing unit: 1 = operator may cancel dosing
30	Dosing unit: 1 = Operator can stop dosing (pause)
31	Dosing unit: 1 = operator may resume dosing

The block has the following permissions for the `OS1Perm` parameter:

Bit	Feature
0	Not used
1	1 = Operator may edit the alarm high limit for VolFlow (volume flow)
2	1 = Operator may edit the warning high limit for VolFlow (volume flow)
3	1 = Operator may edit the hysteresis of limits for VolFlow (volume flow)
4	1 = Operator may edit the warning low limit for VolFlow (volume flow)
5	1 = Operator may edit the alarm low limit for VolFlow (volume flow)
6	1 = Operator may edit the alarm high limit for Tot1VF (Totalizer 1)
7	1 = Operator may edit the warning high limit for Tot1VF (Totalizer 1)
8	1 = Operator may edit the warning low limit for Tot1VF (Totalizer 1)
9	1 = Operator may edit the alarm low limit for Tot1VF (Totalizer 1)
10	1 = Operator may edit the alarm high limit for Tot2VF (Totalizer 2)
11	1 = Operator may edit the warning high limit for Tot2VF (Totalizer 2)
12	1 = Operator may edit the warning low limit for Tot2VF (Totalizer 2)
13	1 = Operator may edit the alarm low limit for Tot2VF (Totalizer 2)
14	1 = Operator may read the configuration data from MAG6000
15	1 = Operator may write the configuration data to MAG6000
16	Not used
17	1 = Operator can activate the simulation function
18	1 = Operator may edit the hysteresis of limits for Tot1VF (Totalizer 1)
19	1 = Operator may edit the hysteresis of limits for Tot2VF (Totalizer 2)
20	Not used
21-31	Not used

Display and operator input area for process values and setpoints

The high and low limits of volume flow in the faceplate are declared in the MAG6000 parameters. The values are read as configuration data from the device and saved to structured variable `VF_OpScale`.

Generating instance-specific messages

This block provides the standard "Generate instance-specific messages" function that is described in the APL Online Help.

Time stamp

This block receives a time stamp value via the `EventTSIn` input parameter. Refer to "Functions of EventTs" in the APL Online Help.

SIMATIC BATCH functionality

This block provides the standard function "SIMATIC BATCH Functionality" that is described in the APL Online Help.

See also

S7Mag6T connections (Page 225)

8.1.4 S7Mag6T totalizer functions

The functions for this block are listed below.

Totalizer

The block provides the following count modes:

- "Balanced"
- "Positive"
- "Negative"
- "Hold"

Status changes are executed by means of commands of the same name. You may change to any other state.

Monitoring count limits (Totalizer 1 / Totalizer 2)

You can monitor the high/low alarm and warning limits of the count values:

- Tot1_AH_Lim/Tot2_AH_Lim: Limit for high alarm
- Tot1_AL_Lim/Tot2_AL_Lim: Limit for low alarm
- Tot1_WH_Lim/Tot2_WH_Lim: Limit for high warning
- Tot1_WL_Lim/Tot2_WL_Lim: Limit for low warning

To clear a limit overshoot/undershoot error, it is necessary to recover the value to hysteresis limits (Tot1_Hyst/ Tot2_Hyst outputs).

Result of limit monitoring (Totalizer 1 / Totalizer 2)

The result of limit monitoring is returned at the interconnectable output parameters:

- Tot1_AH_Act/Tot2_AH_Act = 1:
Limit for high alarm reached or exceeded
- Tot1_AL_Act/Tot2_AL_Act = 1:
Limit for low alarm reached or undershot
- Tot1_WH_Act/Tot2_WH_Act = 1:
Limit for high warning reached or exceeded
- Tot1_WL_Act/Tot2_WL_Act = 1:
Limit for low warning reached or undershot

You can use Feature bit 29 (signal limit overshoot/undershoot) to determine whether the output parameter triggers limit monitoring with the value "0" or "1".

You may use `Feature` bit 28 (Disabling operating points) to disable limit monitoring while message suppression is active (`MsgLock` = 1).

Activating limit monitoring (Totalizer 1 / Totalizer 2)

Monitoring is always enabled using the input parameters:

- `Tot1_AH_En/Tot2_AH_En` = 1: Monitoring of the high alarm limits
- `Tot1_AL_En/Tot2_AL_En` = 1: Monitoring of the low alarm limits
- `Tot1_WH_En/Tot2_WH_En` = 1: Monitoring of the high warning limits
- `Tot1_WL_En/Tot2_WL_En` = 1: Monitoring of the low warning limits

Predefinition: All monitoring functions are activated.

Message suppression (Totalizer 1 / Totalizer 2)

The corresponding message is suppressed using the parameters:

- `Tot1_AH_MsgEn/Tot2_AH_MsgEn` = 0:
Alarm (high) messages are suppressed
- `Tot1_AL_MsgEn/Tot2_AL_MsgEn` = 0:
Alarm (low) messages are suppressed
- `Tot1_WH_MsgEn/Tot2_WH_MsgEn` = 0:
Warning (high) messages are suppressed
- `Tot1_WL_MsgEn/Tot2_WL_MsgEn` = 0:
Warning (low) messages are suppressed

The output of messages is not suppressed when the block is installed (all `xx_MsgEn` parameters are preset to 1). Messages can only be output if limit monitoring of the additional analog value has been enabled.

Operation in the faceplate

You can also edit the limits and the hysteresis using the faceplate.

Reset totalizer to zero

The Totalizer 1 or 2 value is reset in the module by means of the interconnectable parameter `ReTot1Li` or `ReTot2Li`. The reset is triggered by a 0 to 1 edge. You may also reset the count values to zero using the standard view of the faceplate.

8.1.5 S7Mag6T dosing unit functions

The functions for this block are listed below.

Status diagram

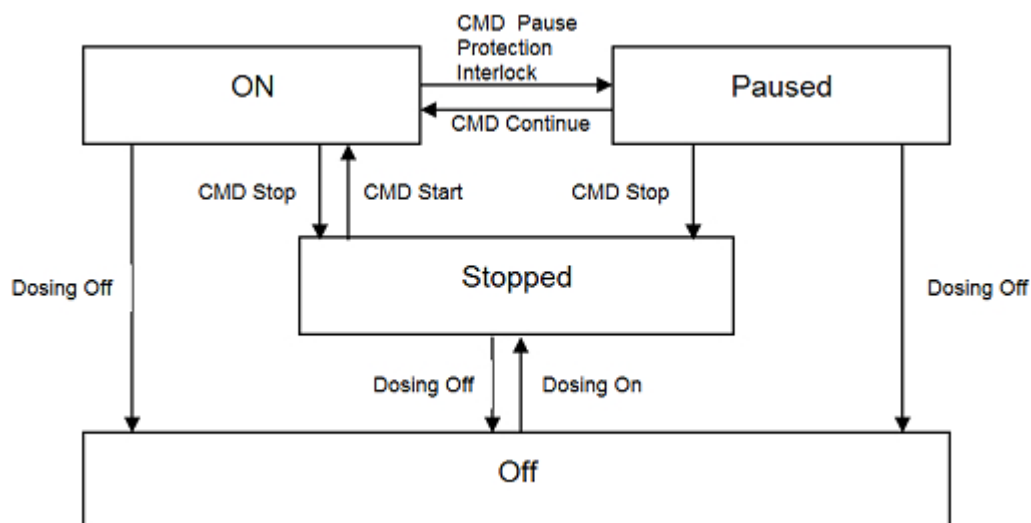
The block provides the following states:

- "Start"
- "Pause"
- "Stop"
- "Off"

Status changes are initiated by the following commands:

- "Start"
- "Continue"
- "Pause"
- "Stop"
- "Dosing On/Off"

"Dosing On" means that both dosing (input `DOnLi`) and the dosing screen form (input `DOnMLi`) are activated, which means that their value is `TRUE`.



Dosing can only be started if the dosing setpoint is greater than zero and no interlock is active.

However, the following status changes are also performed automatically:

Number in graphic (top)	Function
1	When the dosing quantity is reached, dosing terminates $Tot2VF \geq DSP$.
2	If the Intlock (interlock) input is set to <code>FALSE</code> , or if a volume flow alarm is triggered (see input parameter <code>Feature</code> bit 11), dosing changes to the "Pause" state.

Dosing screen form and Dosing start

Dosing can only start if the dosing screen form (input `DOnMLi`) as well as dosing (input `DOnLi`) are activated. Dosing is not activated if the dosing screen form is not active, regardless of whether or not input `DOnLi` is set to `TRUE`. Vice versa, while dosing is active it is not possible to deactivate the dosing screen form by setting input `DOnMLi` to `FALSE`.

Resetting the dosing quantity

The dosing quantity (output `Tot2VF`) is reset automatically at the start of a new dosing operation.

External/internal setpoint specification

This block provides the standard "Setpoint input - external/internal" function that is described in the APL Online Help. At the S7Mag6T block, the parameter names start with `DSP` (Dosing SetPoint) instead of `SP` (SetPoint) as in the APL.

Forcing operating states

The forcing of operating modes function lets you set the function block into a different operating mode using interconnectable input parameters, regardless of the currently active control. Inputs `ForceDSrt`, `ForceDStp`, `ForceDPause` and `ForceDCont` force the blocks into the states "Start", "Stop" or "Pause".

The "Pause" state can only be forced if the block is in the "Start" state.

The "Start" state can only be forced while one of the following states are active:

- "Pause"
- "Stop"

A forced start of the dosing unit is not possible in "Off" state.

Block icon: The block icon indicates forced states by means of of a red F and a crossed-out padlock.

Faceplate: An information text on the forced operating state is displayed in the standard view of the faceplate, for example, "Forced stop". This is also indicated by a crossed-out padlock:



Interlocks

This block provides the following interlock:

- Interlock without reset ("Interlock")

Refer to the "Interlocks" chapter in the APL Online Help.

Disabling interlocks

This block provides the standard "Deactivate interlocks" function that is described in the APL Online Help.

Note that you need to edit the message texts once again if you install a new block version in your project.

8.1.6 Error handling of S7Mag6T

Error handling of S7Mag6T

For general information on error handling at all blocks, refer to the "Error handling" chapter in the APL Online Help.

The following errors can be displayed for this block:

- Error numbers
- Mode switchover error

Overview of error numbers

The I/Os `Error1Num` (Totalizer 1) and `Error2Num` (Totalizer 2 or dosing unit) can be used to output the following error numbers:

Error number	Meaning of the error number
-1	Predefined value when inserting the block; the block is not executed.
0	There is no error.
12	At least one limit is not plausible, for example, because the alarm high limit is less than the warning high limit
41	The value for the I/O <code>LocalSetting</code> is not within the approved limit of 0, 1, or 3.
42	<code>LocalSetting = 0</code> and <code>LocalLi = 1</code>

48	DSP_LiOp = 1 and DSP_IntLi = 1 and DSP_ExtLi = 1
51	<p>AutModLi = 1 and ManModLi = 1 and Feature bit set switch or pushbutton mode = 0</p> <p>or two I/Os are set at the same time:</p> <ul style="list-style-type: none"> In "Local mode": Totalizer 1 or 2: BallLocal, Pos1Local, Neg1Local, Hold1Local or Bal2Local, Pos2Local, Neg2Local, Hold2Local Dosing unit: DSrtLocal (pos. edge), DStpLocal, DPauseLocal, DContLocal <p>With forcing of states: Dosing unit: ForceDSrt, ForceDStp, ForceDPause, ForceDCont</p> <ul style="list-style-type: none"> In "Automatic mode" with pushbutton mode: Totalizer 1 or 2: BallAut, Pos1Aut, Neg1Aut, Hold1Aut or Bal2Aut, Pos2Aut, Neg2Aut, Hold2Aut Dosing unit: DSrtAut (pos. edge), DStpAut, DContAut, DPauseAut In "Manual mode": Totalizer 1 or 2: BallMan, Pos1Man, Neg1Man, Hold1Man or Bal2Man, Pos2Man, Neg2Man, Hold2Man Dosing unit: DSrtMan, DStpMan, DPauseMan, DContMan

Mode switchover error

This error is output if you change the mode of the block from

- Manual to automatic mode or
- Local mode to automatic mode

and the previous state and the target state mismatch (bumpless changeover). You can only change the block mode if the subsequent state corresponds with the previous state.

You can activate/deactivate bumpless changeover by setting bit 17 at the `Feature I/O` (bumpless changeover to automatic mode).

The bumpless changeover from local to automatic mode is handled by means of the `LocalSetting` parameter as described in the "Local mode" chapter of the APL Online Help.

In the standard view of the faceplate, the text "Changeover error" is displayed in the event of an unwanted switchover with bumps.

The block retains local mode if the operator changes the mode from local to automatic and the error mentioned above occurs. The block changes to manual mode if the mode is changed from local to automatic over interconnected inputs and the error mentioned above occurs.

See also

S7Mag6T connections (Page 225)

8.1.7 S7Mag6T messaging

Messaging

The following messages can be generated for this block:

- Process control fault
- Process messages
- Instance-specific messages

Process control fault

The following control system fault messages can be output:

Message instance	Message class	Event
MsgEvId13	AS process control message - error	Error while reading the configuration data (S7Mag6T: @3X%3u@) [BatchID:@2X%3u@] [Associated value :@1R%4.1f@]
MsgEvId14	AS process control message - error	Error while writing the configuration data (S7Mag6T: @3X%3u@) [BatchID:@2X%3u@] [Associated value :@1R%4.1f@]
MsgEvId15	AS process control message - error	Diagnostics message 1 (Bit0..31: 0x@1X%08x@) (S7Mag6T: @3X%3u@) [BatchID:@2X%3u@]
MsgEvId16	AS process control message - error	Diagnostics message2 (Bit32..40: 0x@1X%04x@) (S7Mag6T: @3X%3u@) [BatchID:@2X%3u@]
MsgEvId17	AS process control message - error	Dosing message: 0x@1X%02x@ (S7Mag6T: @3X%3u@) [BatchID:@2X%3u@]
MsgEvId18	AS process control message - fault	External error has occurred (S7Mag6T: @3X%3u@) [BatchID:@2X%3u@] [Begleitwert:@1R%4.1f@]

Coding of the associated values of the diagnostics message (MsgEvId2, SIG7):

The associated values of the diagnostics message contain the coding of the bits in advanced diagnostics of MAG6000 which are displayed in hexadecimal format in the message. For information on advanced diagnostics, refer to the MAG6000 documentation.

Coding of the associated value of the dosing message (MsgEvId2, SIG8):

Bit	Hex notation	Meaning
0	16#01	Timeout
1	16#02	Dribbling
3	16#04	Negative flow

It is possible for several dosing messages to be active simultaneously.

Process messages

Message instance	Message class	Event
MsgEvId01	Alarm - high	Volume flow - high alarm limit violated (S7Mag6T: @3X%3u@) [BatchID:@2X%3u@] [Associated value:@1R%4.1f@]
MsgEvId02	Warning - high	Volume flow - high warning limit violated(S7Mag6T: @3X%3u@) [BatchID:@2X%3u@] [Associated value:@1R%4.1f@]
MsgEvId03	Warning - low	Volume flow - low warning limit violated (S7Mag6T: @3X%3u@) [BatchID:@2X%3u@] [Associated value:@1R%4.1f@]
MsgEvId04	Alarm - low	Volume flow - low alarm limit violated (S7Mag6T: @3X%3u@) [BatchID:@2X%3u@] [Associated value:@1R%4.1f@]
MsgEvId05	Alarm - high	Totalizer 1 - High alarm limit violated (S7Mag6T: @3X%3u@) [BatchID:@2X%3u@] [Associated value:@1R%4.1f@]
MsgEvId06	Warning - high	Totalizer 1 - High warning limit violated(S7Mag6T: @3X%3u@) [BatchID:@2X%3u@] [Associated value:@1R%4.1f@]
MsgEvId07	Warning - low	Totalizer 1 -Low warning limit violated(S7Mag6T: @3X%3u@) [BatchID:@2X%3u@] [Associated value:@1R%4.1f@]
MsgEvId08	Alarm - low	Totalizer 1 - Low alarm limit violated(S7Mag6T: @3X%3u@) [BatchID:@2X%3u@] [Associated value:@1R%4.1f@]
MsgEvId09	Alarm - high	Totalizer 2 -High alarm limit violated (S7Mag6T: @3X%3u@) [BatchID:@2X%3u@] [Associated value:@1R%4.1f@]
MsgEvId10	Warning - high	Totalizer 2 - High warning limit violated (S7Mag6T: @3X%3u@) [BatchID:@2X%3u@] [Associated value:@1R%4.1f@]
MsgEvId11	Warning - low	Totalizer 2 - Low warning limit violated (S7Mag6T: @3X%3u@) [BatchID:@2X%3u@] [Associated value:@1R%4.1f@]
MsgEvId12	Alarm - low	Totalizer 2 - Low alarm limit violated (S7Mag6T: @3X%3u@) [BatchID:@2X%3u@] [Associated value:@1R%4.1f@]
MsgEvId19	Process message - with acknowledgment	Dosing canceled (S7Mag6T: @3X%3u@) [BatchID:@2X%3u@] [Begleitwert:@1R%4.1f@]

Associated values for the message instances

Associated value	Block parameters
1	Aux (MsgEvId15 = MsgAVD1, MsgEvId16= MsgAVD1, MsgEvId17 = MsgAVDos)
2	BatchID
3	MsgFilter

8.1.8 S7Mag6T connections

S7Mag6T connections

Input parameters

Parameter	Description	Type	Default
DSP_LiOp	Dosing unit: Select setpoint source (internal/external): <ul style="list-style-type: none"> 1 = Via interconnection 0 = Via operator 	BOOL	0
DSP_ExtOp	Dosing unit: 1 = Select external setpoints via operator	BOOL	0
DSP_IntOp	Dosing unit: 1 = Select internal setpoints via operator	BOOL	0
DSP_ExtLi	Dosing unit: 1 = Select external setpoints via interconnection	BOOL	0
DSP_IntLi	Dosing unit: 1 = Select internal setpoints via interconnection	BOOL	0
SP_TrkExt	Dosing unit: 1 = Bumpless switch-over from external to internal set-point active	BOOL	1
DSP_Int	Dosing unit: Internal setpoint	REAL	0.0
DSP_Ext	Dosing unit: External setpoint	REAL	0.0
QCDSPExt	Dosing unit: State of external set-point	BYTE	16#80
DSP_HiLim	Dosing unit: High limit for dosing quantity	REAL	100.0
DSP_LoLim	Dosing unit: Low limit for dosing quantity	REAL	0.0
InVFUnit	Unit of measure for volume flow	INT	0
InTot1Unit	Unit of measure for Totalizer 1	INT	0
InTot2Unit	Unit of measure for Totalizer 2/ dosing quantity	INT	0
InVF_Hyst	VF - Alarm Hysteresis	REAL	0.0
InVF_AH_Lim	Volume flow alarm (high) limit	REAL	0.0

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Parameter	Description	Type	Default
InVF_WH_Lim	Volume flow warning (high) limit	REAL	0.0
InVF_WL_Lim	Volume flow warning (low) limit	REAL	0.0
InVF_AL_Lim	Volume flow alarm (low) limit	REAL	0.0
VF_AH_En	1 = activate volume flow alarm (high)	BOOL	1
VF_WH_En	1 = activate volume flow warning (high)	BOOL	1
VF_WL_En	1 = activate volume flow warning (low)	BOOL	1
VF_AL_En	1 = activate volume flow alarm (high)	BOOL	1
VF_AH_MsgEn	1 = activate message for volume flow alarm (high)	BOOL	1
VF_WH_MsgEn	1 = activate message for volume flow warning (high)	BOOL	1
VF_WL_MsgEn	1 = activate message for volume flow warning (low)	BOOL	1
VF_AL_MsgEn	1 = activate message for volume flow alarm (low)	BOOL	1
InTot1_Hyst	Totalizer 1: hysteresis for alarm limits	REAL	0.0
InTot1_AH_Lim	Totalizer 1: alarm limit (high)	REAL	0.0
InTot1_WH_Lim	Totalizer 1: warning limit (high)	REAL	0.0
InTot1_WL_Lim	Totalizer 1: warning limit (low)	REAL	0.0
InTot1_AL_Lim	Totalizer 1: alarm limit (low)	REAL	0.0
Tot1_AH_En	Totalizer 1: 1 = activate (high) alarm	BOOL	1
Tot1_WH_En	Totalizer 1: 1 = activate (high) warning	BOOL	1
Tot1_WL_En	Totalizer 1: 1 = activate (low) warning	BOOL	1
Tot1_AL_En	Totalizer 1: 1 = activate (low) alarm	BOOL	1
Tot1_AH_MsgEn	Totalizer 1: 1 = activate alarm (high) message	BOOL	1
Tot1_WH_MsgEn	Totalizer 1: 1 = activate warning (high) message	BOOL	1
Tot1_WL_MsgEn	Totalizer 1: 1 = activate warning (low) message	BOOL	1
Tot1_AL_MsgEn	Totalizer 1: 1 = activate alarm (low) message	BOOL	1
InTot2_Hyst	Totalizer 2/Dosing unit: hysteresis for alarm limits	REAL	0.0
InTot2_AH_Lim	Totalizer 2/Dosing unit: alarm limit (high)	REAL	0.0

Parameter	Description	Type	Default
InTot2_WH_Lim	Totalizer 2/Dosing unit: warning limit (high)	REAL	0.0
InTot2_WL_Lim	Totalizer 2/Dosing unit: warning limit (low)	REAL	0.0
InTot2_AL_Lim	Totalizer 2/Dosing unit: alarm limit (low)	REAL	0.0
DosCancelMsgEn	Dosing unit: 1 = activate "Dosing aborted" message	BOOL	1
Tot2_AH_En	Totalizer 2/Dosing unit: 1 = activate (high) alarm	BOOL	1
Tot2_WH_En	Totalizer 2/Dosing unit: 1 = activate (high) warning	BOOL	1
Tot2_WL_En	Totalizer 2/Dosing unit: 1 = activate (low) warning	BOOL	1
Tot2_AL_En	Totalizer 2/Dosing unit: 1 = activate (low) alarm	BOOL	1
Tot2_AH_MsgEn	Totalizer 2/Dosing unit: 1 = activate alarm (high) message	BOOL	1
Tot2_WH_MsgEn	Totalizer 2/Dosing unit: 1 = activate warning (high) message	BOOL	1
Tot2_WL_MsgEn	Totalizer 2/Dosing unit: 1 = activate warning (low) message	BOOL	1
Tot2_AL_MsgEn	Totalizer 2/Dosing unit: 1 = activate alarm (low) message	BOOL	1
InVF_OpScaleH	Volume flow: High limit for scale of bar display of faceplate	REAL	0.0
InVF_OpScaleL	Volume flow: Low limit for scale of bar display of faceplate	REAL	0.0
Bal1Aut	Totalizer 1: Up counter for positive flow and down counter for negative flow in automatic mode	BOOL	0
Pos1Aut	Totalizer 1: Increment only with positive flow in auto mode	BOOL	0
Neg1Aut	Totalizer 1: Decrement only with negative flow in auto mode	BOOL	0
Hold1Aut	Totalizer 1: Stop of the totalizer in automatic mode	BOOL	0
ReTot1Li	Totalizer 1: 1 = Reset of the totalizer via interconnection	BOOL	0
Bal1Man	Totalizer 1: Up counter for positive flow and down counter for negative flow in manual mode	BOOL	0
Pos1Man	Totalizer 1: Increment only for positive flow in manual mode	BOOL	0
Neg1Man	Totalizer 1: Decrement only for negative flow in manual mode	BOOL	0
Hold1Man	Totalizer 1: Stop totalizer in manual mode	BOOL	0

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Parameter	Description	Type	Default
ReTot1Op	Totalizer 1: 1 = Reset totalizer via operator input	BOOL	0
Bal2Aut	Totalizer 2: Up counter for positive flow and down counter for negative flow in automatic mode	BOOL	0
Pos2Aut	Totalizer 2: Increment only with positive flow in auto mode	BOOL	0
Neg2Aut	Totalizer 2: Decrement only with negative flow in auto mode	BOOL	0
Hold2Aut	Totalizer 2: Stop of the totalizer in automatic mode	BOOL	0
ReTot2Li	Totalizer 2: 1 = Reset of the totalizer via interconnection	BOOL	0
Bal2Man	Totalizer 2: Up counter for positive flow and down counter for negative flow in manual mode	BOOL	0
Pos2Man	Totalizer 2: Increment only for positive flow in manual mode	BOOL	0
Neg2Man	Totalizer 2: Decrement only for negative flow in manual mode	BOOL	0
Hold2Man	Totalizer 2: Stop totalizer in manual mode	BOOL	0
ReTot2Op	Totalizer 2: 1 = Reset totalizer via operator input	BOOL	0
DOnMLi	Dosing unit: 1 = Dosing screen form is activated (DOnLi is detected)	BOOL	0
DOnLi	Dosing unit: 1 = Dosing is activated	BOOL	0
DSrtAut	Dosing unit: 1 = Select Start in "automatic mode"	BOOL	0
DStpAut	Dosing unit: 1 = Select Cancel in "automatic mode"	BOOL	0
DPauseAut	Dosing unit: 1 = Select Pause in "automatic mode"	BOOL	0
DContAut	Dosing unit: 1 = Select Continue in "automatic mode"	BOOL	0
DSrtMan	Dosing unit: 1 = Select Start in "manual mode"	BOOL	0
DStpMan	Dosing unit: 1 = Select Cancel in "manual mode"	BOOL	0
DPauseMan	Dosing unit: 1 = select pause in "manual mode"	BOOL	0
DContMan	Dosing unit: 1 = Select continue in "manual mode"	BOOL	0
DCompOp	Dosing unit: compensation (COMP)	REAL	0.0

Parameter	Description	Type	Default
DCompLoLim	Dosing unit: compensation low limit	REAL	0.0
RdCfgOp	1 = read all configuration data from MAG6000	BOOL	0
WrCfgOp	1 = write all configuration data to MAG6000	BOOL	0
InZFISupp	Dosing unit: Low flow cut-off suppression	REAL	0.0
Mod1LiOp	Totalizer 1: Switchover of operating mode between: 0 = Operator 1 = Interconnection or SFC	BOOL	0
AutMod1Op	Totalizer 1: 1 = "Automatic mode" via interconnection or SFC (controlled with Mod1LiOp = 1)	BOOL	0
ManMod1Op	Totalizer 1: Switchover of operating mode between: 0 = Operator 1 = Interconnection or SFC	BOOL	0
AutMod1Li	Totalizer 1: 1 = "Automatic mode" via operator (controlled by Mod1LiOp = 0)	BOOL	0
ManMod1Li	Totalizer 1: 1 = "Manual mode" via interconnection or SFC (controlled by Mod1LiOp = 1)	BOOL	0
Local1Li	Totalizer 1: 1 = Activate "local mode" via plant signals	BOOL	0
Local1Op	Totalizer 1: 1 = "Local mode" via operator	BOOL	0
Mod2LiOp	Totalizer 2/Dosing unit: Switchover of operating mode between: 0 = Operator 1 = Interconnection or SFC	BOOL	0
AutMod2Op	Totalizer 2/Dosing unit: 1 = "Automatic mode" via interconnection or SFC (controlled with Mod2LiOp = 1)	BOOL	0
ManMod2Op	Totalizer 2/Dosing unit: Switchover of operating mode between: 0 = Operator 1 = Interconnection or SFC	BOOL	0
AutMod2Li	Totalizer 2/Dosing unit: 1 = "Automatic mode" via operator (controlled by Mod2LiOp = 0)	BOOL	0
ManMod2Li	Totalizer 2/Dosing unit: 1 = "Manual mode" via interconnection or SFC (controlled by Mod2LiOp = 1)	BOOL	0

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Parameter	Description	Type	Default
Local2Li	Totalizer 2/Dosing unit: 1 = Activate "local mode" via plant signals	BOOL	0
Local2Op	Totalizer 2/Dosing unit: 1 = "Local mode" via operator	BOOL	0
On1Op	1 = "On" mode via operator (only if no totalizer is configured in HW Config)	BOOL	0
Oos1Op	Totalizer 1: 1 = "Out of service", via OS operator	BOOL	0
Oos1Li	Totalizer 1: 1 = "Out of service", via interconnection or SFC	BOOL	0
Oos2Op	Totalizer 1/Dosing unit: 1 = "Out of service", via OS operator	BOOL	0
Oos2Li	Totalizer 1/Dosing unit: 1 = "Out of service", via interconnection or SFC	BOOL	0
Bal1Local	Totalizer 1: up counter for positive flow and down counter for negative flow in "Local mode"	BOOL	0
Pos1Local	Totalizer 1: Increment only with positive flow in Local mode	BOOL	0
Neg1Local	Totalizer 1: Decrement only with negative flow in Local mode	BOOL	0
Hold1Local	Totalizer 1: Stop totalizer in "Local mode"	BOOL	0
Bal2Local	Totalizer 2/Dosing unit: up counter for positive flow and down counter for negative flow in "Local mode"	BOOL	0
Pos2Local	Totalizer 2/Dosing unit: Increment only with positive flow in Local mode	BOOL	0
Neg2Local	Totalizer 2/Dosing unit: Decrement only with negative flow in Local mode	BOOL	0
Hold2Local	Totalizer 2/Dosing unit: Stop totalizer in "Local mode"	BOOL	0
DSrtLocal	Dosing unit: 1 = select start in "local mode"	BOOL	0
DStpLocal	Dosing unit: 1 = select cancellation in "local mode"	BOOL	0
DPauseLocal	Dosing unit: 1 = select pause in "local mode"	BOOL	0
DContLocal	Dosing unit: 1 = select continue in "local mode"	BOOL	0
DSPLocal	Dosing unit: setpoint in "Local mode"	REAL	0.0

Parameter	Description	Type	Default
LocalSetting	"Local mode" properties (see "Local mode" in the APL Online Help)	INT	0
Intlock	0 = Interlock of the dosing unit without reset is active; you can operate the block without reset once the interlock condition has been cleared 1 = interlock of the dosing unit not activated	BOOL	1
Intl_En	1 = interlock of the dosing unit without reset (interlock, parameter Intlock) is active	BOOL	1
ForceDSrt	Dosing unit: 1 = Forced start	BOOL	0
ForceDStp	Dosing unit: 1 = force stop	BOOL	0
ForceDPause	Dosing unit: 1 = Force pause	BOOL	0
ForceDCont	Dosing unit: 1 = force continue	BOOL	0
MsgLock	1 = Suppress process messages. For more information, refer to the "Suppressing messages by means of parameter MsgLock" chapter in the APL Online Help	BOOL	0
RunUpCyc	Number of cycles in startup; messages are suppressed during these cycles	INT	3
MsgEvId01.. 19	Message number (assigned automatically)	DWORD	16#00000000
Aux	Message associated value	REAL	0.0
BatchEn	1 = Enable allocation	BOOL	0
BatchID	Batch ID	DWORD	16#00000000
BatchName	Batch name	S7-String	
StepNo	Batch step number	DWORD	16#00000000
Occupied	1 = In use by a batch	BOOL	0
MsgFilter	Message filter	DINT	0
CmpID	component identifier (not permissible: 0) Identification of the subsystem to which the message is assigned to Recommended values: <ul style="list-style-type: none"> low word: 1 to 65535 high word: 0 	DWORD	16#00000001
PERMIS	Switchover of the operator control permission	INT	2

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Parameter	Description	Type	Default
OS_Perm	I/O for operating permissions	STRUCT	-
		• Bit 0 : BOOL	• 0
		• ...	
		• Bit 31: BOOL	• 0
			• 0
OS1Perm	I/O for operating permissions	STRUCT	-
		• Bit 0 : BOOL	• 0
		• ...	
		• Bit 31: BOOL	• 0
			• 0
Feature	I/O for additional Functions of S7Mag6T (Page 211)	STRUCT	-
		• Bit 0 : BOOL	• 0
		• ...	
		• Bit 31: BOOL	• 0
			• 0
OldModeTot1	Last state of Totalizer 1 (output ModeTot1)	BYTE	16#03
OldModeTot2	Last state of Totalizer 2 (output ModeTot1)	BYTE	16#03
OldDCtr	Last state of the dosing unit (output DCtr)	BYTE	16#03

In/out parameters

Parameter	Description	Type	Default
CyclData	Cyclic data from driver block FbMag6T (interconnect this input with output CyclData of FbMag6T)	STRUCT	
		• CSF : BOOL	
		• ParaAvail : WORD	
		• Input : STRUCT	
		• Output : STRUCT	
AcyclData	Acyclic data from driver block PiDr64 (interconnect this input with output AcyclData of PiDr64verschaltet)	STRUCT	
		• SlotRd : INT	
		• ...	
		• RetValWr: WORD	
		• Input : STRUCT	
		• Output : STRUCT	
		• NewDiag : INT	
		• DiagData : STRUCT	

Output parameters

Parameter	Description	Type	Default
SetTot1	Totalizer 1: 16#01 = reset command output to the module (SET_TOT from HW Config)	BYTE	16#00
ModeTot1	<ul style="list-style-type: none"> • Totalizer 1: Command transferred to the module (MODE_TOT from HW Config): • 16#00: up counter for positive flow and down counter for negative flow in manual mode • 16#01: only up counter with positive flow • 16#02: only down counter with negative flow • 16#03: Stop totalizer 	BYTE	16#03
SetTot2	Totalizer 2: 16#01 = reset command output to the module (SET_TOT from HW Config)	BYTE	16#00
ModeTot2	<ul style="list-style-type: none"> • Totalizer 1: Command transferred to the module (MODE_TOT from HW Config): • 16#00 : up counter for positive flow and down counter for negative flow in manual mode • 16#01: only up counter with positive flow • 16#02: only down counter with negative flow • 16#03: Stop totalizer 	BYTE	16#03
DCTr	<ul style="list-style-type: none"> • Dosing unit: Command transferred to the module (B_CTR from HW Config): • Bit 0: 1 = start dosing • Bit 1: 1 = stop dosing • Bit 2: 1 = update setpoint and compensation • Bit 3: 1 = enable dosing • Bit 4: 1 = enable dosing screen form • Bit 5: 1 = set dosing pause • Bit 6: 1 = resume dosing 	BYTE	16#00
DStr	<ul style="list-style-type: none"> • 1= start dosing 	BOOL	0
DStp	<ul style="list-style-type: none"> • 1= stop dosing 	BOOL	0
DPause	<ul style="list-style-type: none"> • 1 = set dosing unit pause 	BOOL	0

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Parameter	Description	Type	Default
DResume	<ul style="list-style-type: none"> 1 = resume dosing 	BOOL	0
DOOn	1 = dosing enable	BOOL	0
DOOnM	1 = dosing screen form enable (DOOn is detected)	BOOL	0
DSta	Current dosing state from MAG6000 (B_STA from HW Config): <ul style="list-style-type: none"> 16#00: Dosing disabled 16#01: Dosing enabled but stopped 16#02: Dosing enabled and active 16#03: dosing enabled but in pause state 	BYTE	
DosEnd	1 = End of dosing	BOOL	0
DOOnRun	1 = dosing enabled and active (DSta =16#02)	BOOL	0
DOOnStp	1 = dosing enabled but stopped (DSta =16#01)	BOOL	0
DOOff	1 = dosing disabled (DSta =16#00)	BOOL	0
DOOnPaused	1 = dosing enabled, but in pause state (DSta =16#03)	BOOL	0
DLockAct	Dosing unit: 1 = at least one interlock (inputs Permit, Interlock, or Protect) is active	BOOL	0
GrpErr	1 = Group error pending	BOOL	0
RdyToStart2	Dosing unit: 1 = Active start readiness	BOOL	0
Oos1Act	Totalizer 1: 1 = Totalizer 1 "Out of service"	BOOL	0
On1Act	Totalizer 1: 1 = Totalizer 1 not "Out of service"	BOOL	0
Oos2Act	Totalizer 1/Dosing unit: 1 = Totalizer 1/ dosing unit "Out of service"	BOOL	0
On2Act	Totalizer 2/Dosing unit: 1 = Totalizer 1/ dosing unit not "Out of service"	BOOL	0
Local1Act	Totalizer 1: 1 = "Local mode" enabled	BOOL	0
Aut1Act	Totalizer 1: 1 = "Automatic mode" enabled	BOOL	0
Man1Act	Totalizer 1: 1 = "Manual mode" enabled	BOOL	0
Local2Act	Totalizer 2/Dosing unit: 1 = "Automatic mode" enabled	BOOL	0
Aut2Act	Totalizer 2/Dosing unit: 1 = "Manual mode" enabled	BOOL	0
Man2Act	Totalizer 2/Dosing unit: 1 = "Manual mode" enabled	BOOL	0
VolFlow	Current volume flow (AI from HW Config)	REAL	0
QCVolFlow	State of current volume flow (AI from HW Config)	BYTE	16#80

Parameter	Description	Type	Default
VF_AH_Act	1 = volume flow high alarm limit is active You can change the response for this parameter by setting Feature bit 28 (deactivate trigger points) and Feature bit 29 (signal limit overshoot/undershoot) accordingly.	BOOL	0
VF_WH_Act	1 = volume flow high limit warning is active You can change the response for this parameter by setting Feature bit 28 (deactivate trigger points) and Feature bit 29 (signal limit overshoot/undershoot) accordingly.	BOOL	0
VF_WL_Act	1 = volume flow low limit warning is active You can change the response for this parameter by setting Feature bit 28 (deactivate trigger points) and Feature bit 29 (signal limit overshoot/undershoot) accordingly.	BOOL	0
VF_AL_Act	1 = volume flow low limit alarm is active You can change the response for this parameter by setting Feature bit 28 (deactivate trigger points) and Feature bit 29 (signal limit overshoot/undershoot) accordingly.	BOOL	0
VF_AH_Lim	Volume flow alarm (high) limit	REAL	0.0
VF_WH_Lim	Volume flow warning (high) limit	REAL	0.0
VF_WL_Lim	Volume flow warning (low) limit	REAL	0.0
VF_AL_Lim	Volume flow alarm (low) limit	REAL	0.0
VF_Hyst	VF - Alarm Hysteresis	REAL	0.0
Tot1VF	Current value of Totalizer 1	REAL	0.0
QCTot1VF	State of current value of Totalizer 1	BYTE	16#80
Tot1_AH_Act	Totalizer 1: alarm limit (high) is active You can change the response for this parameter by setting Feature bit 28 (deactivate trigger points) and Feature bit 29 (signal limit overshoot/undershoot) accordingly.	BOOL	0
Tot1_WH_Act	Totalizer 1: warning limit (high) is active You can change the response for this parameter by setting Feature bit 28 (deactivate trigger points) and Feature bit 29 (signal limit overshoot/undershoot) accordingly.	BOOL	0

Parameter	Description	Type	Default
Tot1_WL_Act	Totalizer 1: warning limit (low) is active You can change the response for this parameter by setting Feature bit 28 (deactivate trigger points) and Feature bit 29 (signal limit overshoot/undershoot) accordingly.	BOOL	0
Tot1_AL_Act	Totalizer 1: alarm (low) limit is active You can change the response for this parameter by setting Feature bit 28 (deactivate trigger points) and Feature bit 29 (signal limit overshoot/undershoot) accordingly.	BOOL	0
Tot1_Hyst	Totalizer 1: hysteresis for alarm limits	REAL	0.0
Tot1_AH_Lim	Totalizer 1: alarm limit (high)	REAL	0.0
Tot1_WH_Lim	Totalizer 1: warning limit (high)	REAL	0.0
Tot1_WL_Lim	Totalizer 1: warning limit (low)	REAL	0.0
Tot1_AL_Lim	Totalizer 1: alarm limit (low)	REAL	0.0
Tot2VF	Current value of Totalizer 1/of dosing quantity	REAL	0.0
QCTot2VF	State of current value of totalizer 1 / dosage	BYTE	16#80
Tot2_AH_Act	Totalizer 2/Dosing unit: alarm limit (high) is active You can change the response for this parameter by setting Feature bit 28 (deactivate trigger points) and Feature bit 29 (signal limit overshoot/undershoot) accordingly.	BOOL	0
Tot2_WH_Act	Totalizer 2/Dosing unit: warning limit (high) is active You can change the response for this parameter by setting Feature bit 28 (deactivate trigger points) and Feature bit 29 (signal limit overshoot/undershoot) accordingly.	BOOL	0
Tot2_WL_Act	Totalizer 2/Dosing unit: warning limit (low) is active You can change the response for this parameter by setting Feature bit 28 (deactivate trigger points) and Feature bit 29 (signal limit overshoot/undershoot) accordingly.	BOOL	0
Tot2_AL_Act	Totalizer 2/Dosing unit: alarm (low) limit is active You can change the response for this parameter by setting Feature bit 28 (deactivate trigger points) and Feature bit 29 (signal limit overshoot/undershoot) accordingly.	BOOL	0

Parameter	Description	Type	Default
Tot2_Hyst	Totalizer 1/Dosing unit: hysteresis for alarm limits	REAL	0.0
Tot2_AH_Lim	Totalizer 2/Dosing unit: alarm limit (high)	REAL	0.0
Tot2_WH_Lim	Totalizer 2/Dosing unit: warning limit (high)	REAL	0.0
Tot2_WL_Lim	Totalizer 2/Dosing unit: warning limit (low)	REAL	0.0
Tot2_AL_Lim	Totalizer 2/Dosing unit: alarm limit (low)	REAL	0.0
DSP	Active setpoint for the dosing unit	REAL	0.0
QCDSP	State of current setpoint of dosing unit	BYTE	16#80
DSP_ExtAct	1 = external dosing setpoint is active 0 = internal dosing setpoint is active	BOOL	0
DSP_ExtOut	External dosing setpoint; corresponds to input parameter DSP_Ext, limited by DSP_LoLim and DSP_HiLim	REAL	0.0
QCDSP_ExtOut	State of external setpoint dosing unit	BYTE	16#80
DSP_ExHiAct	Dosing unit: 1 = High limit for external setpoint has been reached	BOOL	0
DSP_ExLoAct	Dosing unit: 1 = Low limit for external setpoint has been reached	BOOL	0
Status1	Status word 1	DWORD	16#00000000
Status2	Status word 2	DWORD	16#00000000
Status3	Status word 3	DWORD	16#00000000
Status4	Status word 4	DWORD	16#00000000
Status5	Status word 5	DWORD	16#00000000
Error1Num	Totalizer 1: Output of current error number. For error numbers that can be output by this block, see Error handling of S7Mag6T (Page 221)	INT	-1
Error2Num	Totalizer 1/Dosing unit: Output of current error number. For error numbers that can be output by this block, see Error handling of S7Mag6T (Page 221)	INT	-1
OS_PermOut	Displays of OS_Perm	DWORD	16#ffffff
OS_PermLog	Display of OS_Perm with settings changed by the block algorithm	DWORD	16#ffffff
OS1PermOut	Display of OS1Perm	DWORD	16#ffffff
OS1PermLog	Display of OS1Perm with settings changed by the block algorithm	DWORD	16#ffffff
OpSt_Out	Value of the input parameter OpSt_In, for further interconnection with other blocks. Bit 31 of this parameter is used by Feature bit 24	DWORD	16#00000000
ST_Worst	Worst signal status	BYTE	16#00

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Parameter	Description	Type	Default
QMsgErr	Message error	BOOL	0
MsgStat01..19	Message status 01..19	WORD	16#0000
MsgAckn01..19	Message acknowledgment status 01..19	WORD	16#0000
MsgAVDos	Associated value of the dosing message (MsgEvld2, SD_6)	BYTE	16#00
MsgAVD1	Associated value 1 of the diagnostics message (MsgEvld2, SD_4, bits 0..31)	DWORD	16#00000000
MsgAVD2	Associated value 2 of the diagnostics message (MsgEvld2, SD_5, bits 31..40)	WORD	16#0000
DComp	Dosing unit: current value of compensation	REAL	0.0
QCDCComp	Dosing unit: State of current value of compensation	BYTE	16#80
ZFISupp	Dosing unit: current value of low flow cut-out suppression	REAL	0.0
VF_OpScaleH	Volume flow: High limit for scale of bar display of faceplate	REAL	0.0
VF_OpScaleL	Volume flow: Low limit for scale of bar display of faceplate	REAL	0.0
VFUnit	Unit of measure for volume flow	INT	0
Tot1Unit	Unit of measure for Totalizer 1	INT	0
Tot2Unit	Unit of measure for Totalizer 2/dosing quantity	INT	0
DiagData	Advanced diagnostics data of MAG6000 (bits 0..40)	STRUCT <ul style="list-style-type: none"> • W20 : BOOL • ... • P97: BOOL • ErrNotSpec : BOOL • Reserve: BYTE 	<ul style="list-style-type: none"> • 0 • ... • 0 • ... • 0

8.1.9 Block diagram of S7Mag6T

Block diagram of S7Mag6T

A block diagram is not provided for this block.

8.1.10 Template of S7Mag6T

Template of S7Mag6T

This process tag type is used to connect a MAG6000 with the driver blocks to PCS 7.

The cyclic values are transferred to and from the device with FbMag6T, while non-cyclic data is transferred with PiDr64.

The process tag type contains the required interconnections between the blocks mentioned above.

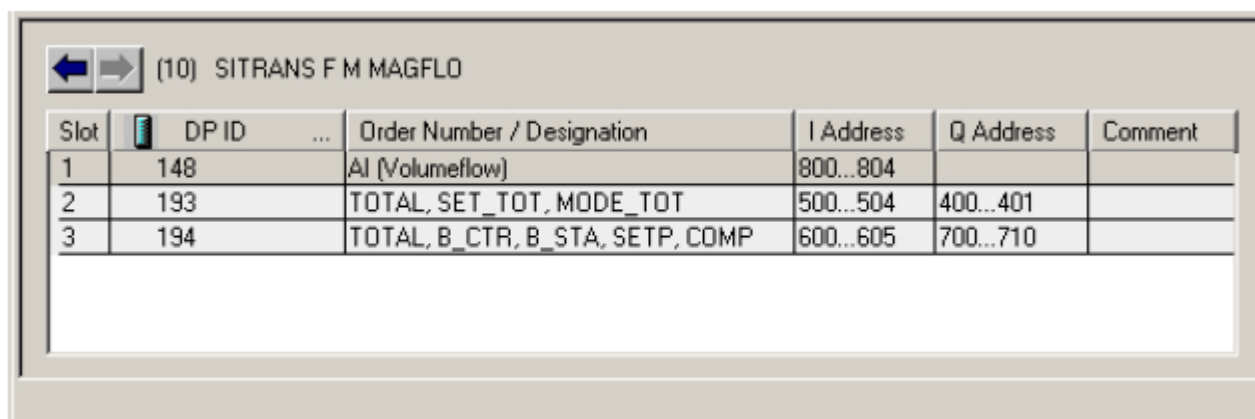
To instantiate the template, you must parameterize the volume flow address from the MAG6000 configuration at the inputs of the FbMag6T block (CyclicData) and of the PiDr64 block (AcyclicData) in HW Config as follows:

FbMag6T

Parameter	Addressing
AVolFlow	Volume flow input address (AI)
Addr.Tot1	Input address Totalizer 1 (TOTAL, slot 2)
Addr.SetTot1	Output address Reset Totalizer 1 (SET_TOT, slot 2)
Addr.ModeTot1	Output address command Totalizer 1 (MODE_TOT, slot 2)
Addr.Tot2	Input address Totalizer 2/dosing value (TOTAL, slot 3)
Addr.SetTot2	Output address Reset Totalizer 2 (SET_TOT, slot 3)
Addr.ModeTot2	Output address command Totalizer 2 (MODE_TOT, slot 3)
Addr.DCtr	Output address control byte (MODE_TOT, slot 3)
Addr.DSta	Input address dosing unit status (B_STA, slot 3)
Addr.DSetP	Output address dosing setpoint (SETP, slot 3)
Addr.DComp	Output address dosing unit compensation (SETP, slot 3)

The length of the elements have to be considered when the right address is selected.

Example:



The screenshot shows a software window titled "(10) SITRANS F M MAGFLO". It contains a table with the following data:

Slot	DP ID	Order Number / Designation	I Address	Q Address	Comment
1	148	AI [Volumeflow]	800...804		
2	193	TOTAL, SET_TOT, MODE_TOT	500...504	400...401	
3	194	TOTAL, B_CTR, B_STA, SETP, COMP	600...605	700...710	

Resultant configurations at block FbMag6T:

Inputs

- AVolFlow = 800
- Addr.Tot1 = 500 (4 Byte Real + 1 Byte Status)
- Addr.Tot2 = 600 (4 Byte Real + 1 Byte Status)
- Addr.DSta = 605 (1 Byte)

Outputs

- Addr.SetTot1 = 400 (1 Byte)
- Addr.ModeTot1 = 401 (1 Byte)
- Addr.SetTot2 = -1 (not configured)
- Addr.ModeTot2 = -1 (not configured)
- Addr.DCtr = 700 (1 Byte)
- Addr.DSetP = 701 (4 Byte Real + 1 Byte Status)
- Addr.DComp = 706 4 Byte Real + 1 Byte Status)

Address -1 is set by default if no value is configured.

PiDr64

Parameter	Addressing
Laddr	Volume flow input address (AI)
Addr.Laddr0	Diagnostics address of the MAG6000
Addr.Laddr1	Input address slot 1 (= volume flow input address(AI))
Addr.Laddr2	Input address slot 2
Addr.Laddr3	Input address slot 3
Addr.Laddr4/5/6	-1

Address -1 is set by default if no slot is configured.

See also

Description of S7Mag6T (Page 205)

8.1.11 Operator control and monitoring

8.1.11.1 S7Mag6T views

Views of the S7Mag6T block

The S7Mag6T block provides the following views:

- Standard view of S7Mag6T (Page 241)
- Message view (see the APL Online Help)
- Limit view of S7Mag6T (Page 246)
- Trend view (see the APL Online Help)
- Parameter view of S7Mag6T (Page 248)
- S7Mag6T preview (Page 249)
- Memo view (see the APL Online Help)
- Batch view (see the APL Online Help)
- S7Mag6T dosing view (Page 252)
- Block icon for S7Mag6T (Page 254)

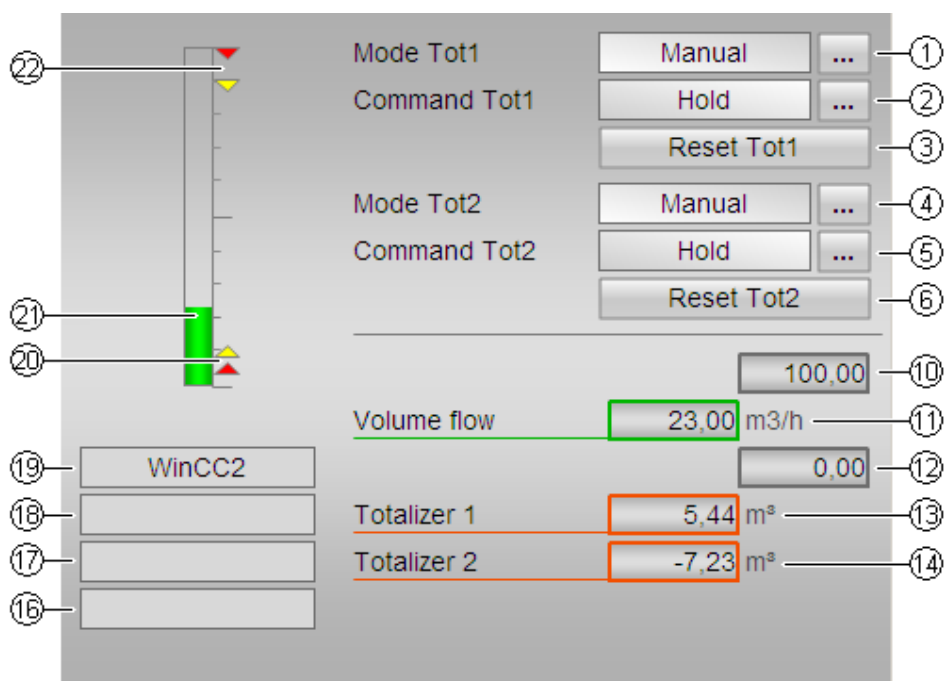
For general information on the faceplate and block icon, refer to the sections "Faceplate structure" and "Block icon structure" in the APL Online Help.

8.1.11.2 Standard view of S7Mag6T

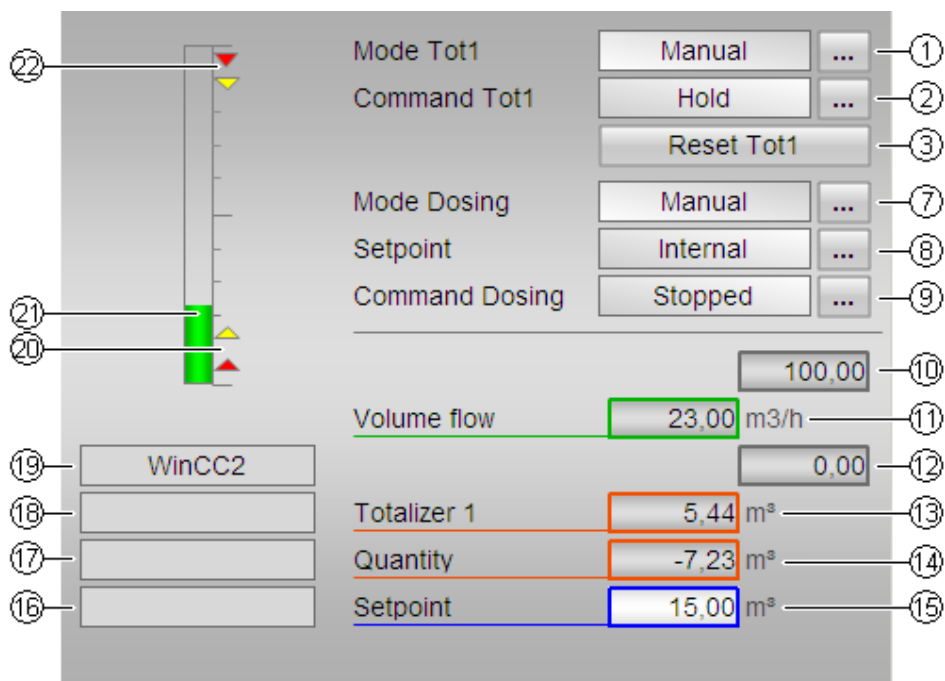
Standard view of S7Mag6T

Depending on the MAG6000 configuration in HW Config, the standard view displays the elements of Totalizer 1, or of Totalizers 1 and 2, or of Totalizer 1 and the dosing unit. The following two screenshots illustrate the standard view, one showing both totalizers, and the other showing Totalizer 1 and the dosing unit.

Totalizer 1 and Totalizer 2



Totalizer 1/Dosing unit



(1), (4) and (7) Display and switch the operating mode

This area provides information on the currently valid operating mode. The following operating modes can be shown here:

- Manual mode (see the APL Online Help)
- Automatic mode (see the APL Online Help)
- Local mode (see the APL Online Help)
- Out of service (see APL Online Help)

Totalizers 1 and 2, or the dosing unit are assigned independent, separate operating modes. The block parameters that you need for the respective operating mode are identified by the numbers 1 (Totalizer 1) or 2 (Totalizer 2, or dosing unit), e.g. `Mod1LiOp` or `Oos2Act`.

For more information on operating mode changeover, refer to the "Changeover of the operating state and operating mode" in the APL Online Help.

(2) and (5) Display and change the totalizer state: positive and negative, positive, negative and Hold

This area shows you the default operating state for the totalizers. The following states can be shown and executed here:

- "Balanced"
- "Positive"
- "Negative"
- "Hold"

(3) and (6) Resetting the totalizers

Reset the count value to zero in this area.

(8) Displaying and changing the setpoint of the dosing unit

The following states can be shown and changed here:

- "Internal"
- "External"

(9) Displaying and changing the dosing unit: Start, Resume, Pause, and Stop

This area shows you the default operating state for the dosing unit. The following states can be shown and changed here:

- "Start"
- "Continue"
- "Pause"
- "Stop"

(10) and (12) High and low scale range for the process value

These values provide information on the display range for the bar graph of the process value. The scaling range is set by means of PDM in MAG6000 and read by the function block as part of the configuration data.

(11) Display of the volume flow including signal status

This area displays the current volume flow and the associated signal state.

(13) and (14) Display of the count value, or of the metered quantity

This area displays the current count value of Totalizer 1 or 2, or the metered quantity.

(15) Displaying and changing the setpoint

The dosing quantity can only be reset in the "End" status.

(16) Display area for block states

This area provides additional information on the operating state of the block:

- "Invalid signal"
- "Changeover error"

(17) Display area for dosing unit states

This area provides additional information on the operating state of the block:

- "Forced start"
- "Force resume"
- "Force pause"
- "Force abort"
- "Request 0/1": A reset to "automatic mode" is expected.

(18) Display area for dosing unit states

This area provides additional information on the operating state of the dosing unit:

- "End"

(19) Display area for switch permission

This area provides the text of the current OS, according to the enumeration configured at the PERMIS input.

(20) and (22) Limit display for volume flow

These triangles show the VF_AH_Lim/VF_WH_Lim and VF_AL_Lim/VF_WL_Lim limits for the volume flow configured in the MAG6000.

(21) Bar graph for the volume flow

This area shows you a bar graph that visualizes the current volume flow. The visible area in the bar graph depends on the measurement range you configured in MAG6000.

See also

S7Mag6T views (Page 241)

8.1.11.3 Limit view of S7Mag6T

Limit view of S7Mag6T

④ **Enabled operations**

✓	H alarm	100,00	m ³ /h	①
✓	H warning	90,00	m ³ /h	
✓	Hysteresis VF	0,00	m ³ /h	
✓	L warning	8,00	m ³ /h	
✓	L alarm	3,00	m ³ /h	

Totalizer 1 limits

✓	H alarm	70,00	m ³	②
✓	H warning	80,40	m ³	
✓	Hysteresis Tot1	1,00	m ³	
✓	L warning	5,00	m ³	
✓	L alarm	0,00	m ³	

Totalizer 2 limits

✓	H alarm	900,40	m ³	③
✓	H warning	800,40	m ³	
✓	Hysteresis Tot2	0,00	m ³	
✓	L warning	-8,00	m ³	
✓	L alarm	-10,00	m ³	

Note

The (2) displays are hidden if no Totalizer 1 is configured in HW Config. The (3) displays are hidden if neither the Totalizer 2 nor the dosing unit is configured.

(1) Displaying and changing the volume flow limits

You may edit the following volume flow limits in this area:

- "H alarm"
- "H warning"
- "Flow hysteresis"

- "L warning"
- "L alarm"

(2) Displaying and changing the totalizer 1 limits

You may edit the following Totalizer 1 limits in this area:

- "H alarm"
- "H warning"
- "Totalizer 1 hysteresis"
- "L warning"
- "L alarm"

(3) Displaying and changing the totalizer 2 limits

You may edit the following Totalizer 2 limits in this area:

- "H alarm"
- "H warning"
- "Totalizer 2 hysteresis"
- "L warning"
- "L alarm"

(4) Enabled operations

This area shows all operations for which special operator control permissions are assigned. They depend on the configuration in the engineering system (ES) that applies to this block.

Symbols for enabled operations:

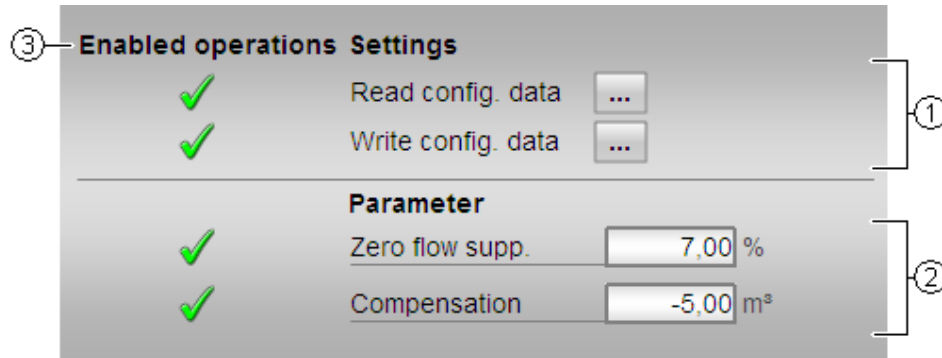
- **Green check mark:** the OS operator can control this parameter
- **Gray check mark:** the OS operator cannot control this parameter at this time due to the process
- **Red cross:** the OS operator cannot control this parameter due to the configured AS operator permissions (OS_Perm or OS1Perm)

See also

S7Mag6T views (Page 241)

8.1.11.4 Parameter view of S7Mag6T

Parameter view of S7Mag6T



(1) Read/write configuration data

This area lets you read all configuration data from your MAG6000, or transfer all configuration data from the block to MAG6000.

(2) Parameter

This area allows you to edit parameters and therefore manipulate the module settings. The compensation is only displayed if you configured the dosing unit in HW Config.

You can influence the following parameters:

- "Zero flow"
- "Compensation"

(3) Enabled operations

This area shows all operations for which special operator control permissions are assigned. They depend on the configuration in the engineering system (ES) that applies to this block.

Symbols for enabled operations:

- **Green check mark:** the OS operator can control this parameter
- **Gray check mark:** the OS operator cannot control this parameter at this time due to the process
- **Red cross:** the OS operator cannot control this parameter due to the configured AS operator control permissions (OS_Perm or OS1Perm).

See also

S7Mag6T views (Page 241)

8.1.11.5 S7Mag6T preview

S7Mag6T preview

Depending on the MAG6000 configuration in HW Config, the preview screen displays different elements. The following two screenshots illustrate the standard view, one showing both totalizers 1 and 2, and the other showing Totalizer 1 and the dosing unit.

Totalizer 1 and Totalizer 2

Automatic Tot1

Automatic Tot2

Enabled operations totalizer 1

- ✓ Start Balanced
- ✓ Start Positive
- ✓ Start Negative
- ✓ Hold
- ✓ Reset
- ✓ Automatic
- ✓ Manual
- ✓ Local
- ✓ Out of service

Enabled operations totalizer 2

- ✓ Start Balanced
- ✓ Start Positive
- ✓ Start Negative
- ✓ Hold
- ✓ Reset
- ✓ Automatic
- ✓ Manual
- ✓ Local
- ✓ Out of service

Inputs and outputs

Local Tot1	0	Local Tot2	0
Local Bal. Tot1	0	Local Bal. Tot2	0
Local Pos. Tot1	0	Local Pos. Tot2	0
Local Neg. Tot1	0	Local Neg. Tot2	0
Local Hold Tot1	0	Local Hold Tot2	0

Totalizer 1/Dosing unit

Automatic Tot1

Automatic Dosing

Enabled operations totalizer 1

- ✓ Start Balanced
- ✓ Start Positive
- ✓ Start Negative
- ✓ Hold
- ✓ Reset
- ✓ Automatic
- ✓ Manual
- ✓ Local
- ✓ Out of service

Enabled operations dosing

- ✓ Start dosing
- ✓ Stop dosing
- ✓ Pause dosing
- ✓ Continue dosing
- ✓ Automatic
- ✓ Manual
- ✓ Local
- ✓ Out of service
- ✓ Dosing SP ext.
- ✓ Dosing SP int.
- ✓ Dosing SP Change

Inputs and outputs

Interlock	<input type="text" value="1"/>		
Local Tot1	<input type="text" value="0"/>	Local Dosing	<input type="text" value="0"/>
Local Bal. Tot1	<input type="text" value="0"/>	Local Start dosing	<input type="text" value="0"/>
Local Pos. Tot1	<input type="text" value="0"/>	Local Pause dosing	<input type="text" value="0"/>
Local Neg. Tot1	<input type="text" value="0"/>	Local Continue dos.	<input type="text" value="0"/>
Local Hold Tot1	<input type="text" value="0"/>	Local Stop dos.	<input type="text" value="0"/>

(1) Automatic preview

This area shows you the block status after it has switched from "manual" to "automatic" mode. If the block is in "automatic mode", the current block state is displayed.

(2) Enabled operations

This area shows all operations for which special operator control permissions are assigned. They depend on the configuration in the engineering system (ES) that applies to this block.

Symbols for enabled operations:

- **Green check mark:** the OS operator can control this parameter
- **Gray check mark:** the OS operator cannot control this parameter at this time due to the process
- **Red cross:** the OS operator cannot control this parameter due to the configured AS operator control permissions (OS_Perm or OS1Perm).

The following enabled operations are shown here:

General operator input enables for totalizers and dosing units:

- "Automatic mode": You can switch to "automatic mode".
- "Manual": You can switch to "manual mode".
- "Local": You can switch to "local mode".
- "Out of service": You can switch to "Out of service" operating mode.

Totalizer 1 and Totalizer 2

- "Start Balanced": You may run the totalizer in positive and negative mode
- "Start Positive": You may start the totalizer in positive mode.
- "Start Negative": You may start the totalizer in negative mode.
- "Hold": You may stop the totalizer

Dosing unit:

- "Start dosing": You may start dosing
- "Stop dosing": You may abort dosing
- "Pause dosing": You may set the dosing pause state
- "Continue dosing": You may continue dosing
- "Dosing SP ext": You may use the external dosing setpoint
- "Dosing SP int.": You may use the internal dosing setpoint
- "Dosing SP Change": You may edit the dosing setpoint
- "Local operating permission": Use the ← button to change to the standard view of the OpStations block. For more information, refer to the "Operating permissions" chapter in the APL Online Help.

(3) Displaying current control signals

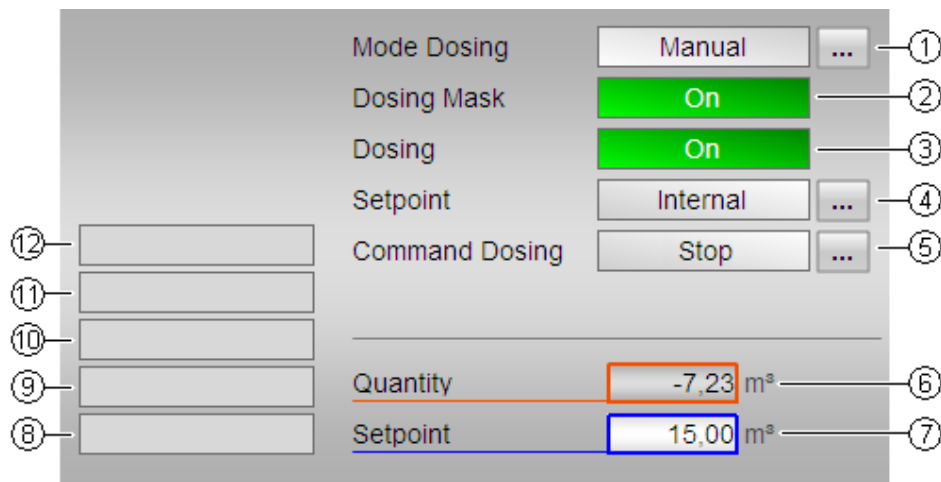
This area shows the most important parameters for this block with the current selection:

- "Interlock" (dosing unit only):
0 = Interlocking without reset is active; you can operate the block without reset once the interlocking condition has disappeared
1 = "Good" state
- "Local Tot1/Tot2/Dosing unit": 1 = totalizer 1/2 or dosing are operated in "local mode"

- "Local Bal. Tot1/2": 1 = Totalizer 1/2 positive and negative count in "local mode"
- "Local Pos. Tot1/2": 1 = Totalizer 1/2 positive count in "local mode"
- "Local Neg. Tot1/2": 1 = Totalizer 1/2 negative count in "local mode"
- "Local Neg. Hold": 1 = Totalizer 1/2 in "local mode" "Hold state"
- "Local start": 1 = dosing unit start in "local mode"
- "Local pause": 1 = dosing unit is set to pause state "local mode"
- "Local continue": 1 = dosing unit operation is resumed in "local mode"
- "Local cancel": 1 = dosing is aborted in "local mode"

See also

S7Mag6T views (Page 241)

8.1.11.6 S7Mag6T dosing view**S7Mag6T dosing view****(1) Display and switch the operating mode**

This area provides information on the currently valid operating mode. The following operating modes can be shown here:

- Manual mode (see the APL Online Help)
- Automatic mode (see the APL Online Help)
- Local mode (see the APL Online Help)
- Out of service (see APL Online Help)

The block parameters you need for dosing are identified by the number "2" ("Totalizer 2"), e.g. Mod2LiOp or Oos2Act.

For more information on operating mode changeover, refer to the "Changeover of the operating state and operating mode" in the APL Online Help.

(2) and (3) Display of the state of the dosing screen form and dosing

This area shows you the the state of the dosing screen form (block input DOnMLi) and of the dosing unit (block input DOnLi).

(4) Displaying and changing the setpoint of the dosing unit

The following states can be shown and changed here:

- "Internal"
- "External"

(5) Displaying and changing the dosing unit: Start, Resume, Pause, and Stop

This area shows you the default operating state for the dosing unit. The following states can be shown and changed here:

- "Start"
- "Continue"
- "Pause"
- "Stop"

(6) Display of metered quantity

This area shows you the current dosing quantity.

(7) Displaying and changing the setpoint

This area displays the current dosing unit setpoint and lets you edit the setpoint in manual mode.

(8) Display area for block states

This area provides additional information on the operating state of the block:

- "Invalid signal"
- "Flow"

(9) Display area for dosing unit states

This area provides additional information on the operating state of the dosing unit:

- "Forced start"
- "Force resume"

8.1 S7Mag6T

- "Force pause"
- "Force abort"
- "Request 0/1": A reset to "automatic mode" is expected.

(10), (11) und (12) Display area for dosing unit states

This area provides additional information on the operating state of the dosing unit:

- "Timeout"
- "Overflow"
- "Negative flow"

See also

S7Mag6T views (Page 241)

8.1.11.7 Block icon for S7Mag6T

Block icons for S7Mag6T

A variety of block icons are available with the following functions:

- Process tag type
- Limits (high/low)
- Alarm and warning limits overshoot/undershoot
- Operating modes
- Internal and external setpoint input (dosing unit only)
- Signal status, release for maintenance
- Force
- Interlocks (dosing unit only)
- Memo display
- Process values (black: volume flow, and orange: Totalizers 1 and 2, or metered quantity)
- Setpoint (blue, dosing unit only)

Icons	Selection of the block icon in CFC	Configuration in HW Config
	1	Totalizer 1 and the dosing unit
	2	Totalizer 1 and Totalizer 2
	3	Totalizer 1
	4	neither totalizer, nor dosing unit
	-	Block icon in "Out of service" mode (example with type 1 block icon)

In contrast to other icons, the S7Mag6T icon indicates two operating modes if both totalizers, or Totalizer 1 and the dosing unit are configured in HW Config. The block is only in "out of service" state if both totalizers, or Totalizer 2 and the dosing unit are out of service.

The status display visualizes the states of the operating equipment.

Message lock active:	
Local operating mode active:	
Automatic operating mode active:	
Manual operating mode active:	
Out of service:	
External setpoint active (dosing unit only):	
External setpoint inactive:	
Interlock active:	

Interlock inactive:	☐
Force control active:	F
Force control inactive:	☐
Switch permission:	

The following switching priorities are currently available:

- Operator panel: OP
- Control station OS (local control station): LCS
- Local OS: No icon

For more information on the block icon and operating options in the block icon, refer to the following chapters in the APL Online Help:

- "Configuring the block icons"
- "Block icon structure"
- "Operation via the block icon"

See also

S7Mag6T views (Page 241)

8.2 S7PMag6T

8.2.1 Description of S7PMag6T

Function

The S7PMag6T block is the interface to the operator panel for the technological block S7Mag6T.

Configuration notes

The `BlockConnector` input of the S7PMag6T must be interconnected to any desired S7Mag6T output. So the data that are important for the block (as information about states or messages) are automatically analyzed and displayed by the panel block.

Note

The `ENO` output must not be used for interconnection with the `Blockconnector` input.

Calling OBs

The cyclic interrupt OB into which you install the block (e.g. OB32). Additionally in the OB100 (see "Startup characteristics").

Startup characteristics

The `RunUpCyc` parameter can be used to specify for how long (number of cycles) the messages are to be suppressed.

`Restart = TRUE` can be used to simulate a restart.

Called blocks

SFC6	RD_SINFO
SFC24	TEST_DB

8.2.2 S7PMag6T connections

Input parameters

Parameter	Description	Type	Default
EN	1 = Called block will be processed	BOOL	1
Restart	Manual startup	BOOL	0
Op_ModeTot1	Operator Input Totalizer 1	WORD	16#0000
Op_Bal1Man	Operator Input Totalizer 1: Up counter for positive flow and down counter for negative flow in manual mode	BOOL	0
Op_Pos1Man	Operator Input Totalizer 1: Increment only for positive flow in manual mode	BOOL	0
Op_Neg1Man	Operator Input Totalizer 1: Decrement only for negative flow in manual mode	BOOL	0
Op_Hold1Man	Operator Input Totalizer 1: Stop totalizer in manual mode	BOOL	0

Parameter	Description	Type	Default
Op_ModeTot2	Operator Input Totalizer 2	WORD	16#0000
Op_Bal2Man	Operator Input Totalizer 2: Up counter for positive flow and down counter for negative flow in manual mode	BOOL	0
Op_Pos2Man	Operator Input Totalizer 2: Increment only for positive flow in manual mode	BOOL	0
Op_Neg2Man	Operator Input Totalizer 2: Decrement only for negative flow in manual mode	BOOL	0
Op_Hold2Man	Operator Input Totalizer 2: Stop totalizer in manual mode	BOOL	0
Op_DSrtMan	Operator Input Dosing: 1 = Select Start in "manual mode"	BOOL	0
Op_DStpMan	Operator Input Dosing: 1 = Select Cancel in "manual mode"	BOOL	0
Op_DPauseMan	Operator Input Dosing: Pause dosing in Manual Mode	BOOL	0
Op_DContMan	Operator Input Dosing: 1 = Select continue in "manual mode"	BOOL	0
Op_VolFlow	Operator Input Current volume flow (AI from HW Config)	REAL	0.0
Op_VF_HiLim	High Limit Volume flow	REAL	100.0
Op_VF_LoLim	Low Limit Volume flow	REAL	0.0
Op_Tot1VF	Operator Panel: Current value of Totalizer 1	REAL	0.0
Op_Tot2VF	Operator Panel: Current value of Totalizer 2	REAL	0.0
Op_DSP	Operator Panel Dosing: Current Setpoint	REAL	0.0
Op_DSP_HiLim	High Limit DSP	REAL	100.0
Op_DSP_LoLim	Low Limit DSP	REAL	0.0
EnAux	Enable associated value view	BOOL	0
Aux1	Associated value 1 (WinCC flexible parameter)	REAL	0.0
Aux2	Associated value 2 (WinCC flexible parameter)	REAL	0.0
Aux3	Associated value 3 (WinCC flexible parameter)	REAL	0.0
Aux4	Associated value 4 (WinCC flexible parameter)	REAL	0.0
OSStat	WinCC status	DWORD	16#00000000
OSStat2	Status 2 WinCC	DWORD	16#00000000
OSStatAI	Bit reporting procedure (WinCC flexible parameter)	DWORD	16#00000000
Op_MsgFilter	Message filter for WinCC flexible	DINT	0

Parameter	Description	Type	Default
Op_PermLog	Operator permission	DWORD	16#00000000
Op_Visibility	Object visibility	DWORD	16#00000000
SwitchPerm	Switch permission	INT	1
PanelPerm	Panel operating level	INT	3
BlockConnector	Connection to S7Mag6T block	ANY	
RunUpCyc	Number of run-up cycles with message suppression	INT	10
AS_Nr	AS number for message filter (max. 999)	INT	1

Output parameters

Parameter	Description	Type	Default
ENO		BOOL	0
SwitchPerm_Out	Switch permission	INT	1
OSStat_Out	WinCC status	DWORD	16#00000000
OSStat2_Out	Status 2 WinCC	DWORD	16#00000000
OSStatAI_Out	Bit reporting procedure (WinCC flexible parameter)	DWORD	16#00000000
PanelAct	Panel active	BOOL	0
MsgFilter	Message filter	DINT	0
IDBNo	Number instance DB	INT	0
DB_ConnErr	DB connection error	BOOL	1

Status word allocation for OSStatAI and OSStatAI_Out parameters

Bit0	BOOL			External error occurred (CSF)
...				
Bit5	BOOL			External message 1
Bit6	BOOL			External message 2
Bit7	BOOL			External message 3
Bit8	BOOL			Dosing Aborted
...				
Bit16	BOOL			VF_AH_Act
Bit17	BOOL			VF_WH_Act
Bit18	BOOL			VF_WL_Act
Bit19	BOOL			VF_AL_Act
Bit20	BOOL			ErrReadConfig

Bit21	BOOL			ErrWriteConfig
Bit22	BOOL			DiagMess
Bit23	BOOL			DosingMess
Bit24	BOOL			Tot1_AH_Act
Bit25	BOOL			Tot1_WH_Act
Bit26	BOOL			Tot1_WL_Act
Bit27	BOOL			Tot1_AL_Act
Bit28	BOOL			Tot2_AH_Act
Bit29	BOOL			Tot2_WH_Act
Bit30	BOOL			Tot2_WL_Act
Bit31	BOOL			Tot2_AL_Act

Status word allocation for OSStat and OSStat_Out parameters

Bit0	BOOL			Local1Act
Bit1	BOOL			Man1Act
Bit2	BOOL			Aut1Act
Bit3	BOOL			Oos1Act
Bit4	BOOL			Local2Act
Bit5	BOOL			Man2Act
Bit6	BOOL			Aut2Act
Bit7	BOOL			Oos2Act
Bit8	BOOL			Tot1Bal
Bit9	BOOL			Tot1Pos
Bit10	BOOL			Tot1Neg
Bit11	BOOL			Tot1Hold
Bit12	BOOL			Tot2Bal
Bit13	BOOL			Tot2Pos
Bit14	BOOL			Tot2Neg
Bit15	BOOL			Tot2Hold
Bit16	BOOL			DSrt
Bit17	BOOL			DStop
Bit18	BOOL			DOff
Bit19	BOOL			DPause
...	BOOL			-
Bit26	BOOL			Tot1Off
Bit27	BOOL			Tot2Off
Bit28				Oos1a2Act
Bit29	BOOL			PanelAct
Bit30				DSP_Ext
Bit31	BOOL			Error

Status word allocation for OSStat2 and OSStat2_Out parameters

Bit0	BOOL			DosingEnded
Bit1	BOOL			-
Bit2	BOOL			ForcedStart
Bit3	BOOL			ForcedAbort
Bit4	BOOL			ForcedPause
Bit5	BOOL			ForcedCont
Bit6	BOOL			Request01
Bit7	BOOL			InvalidSig
Bit8	BOOL			Flow
Bit9	BOOL			-
...				
Bit31	BOOL			-

8.2.3 Operator Control and Monitoring WinCC**Operator Control and Monitoring WinCC**

You will find more information in Panel blocks, general (Page 13)

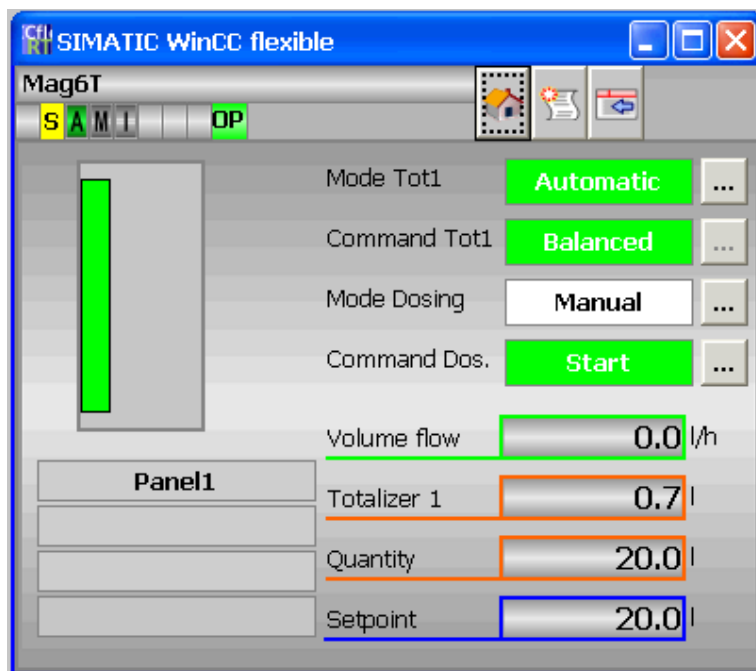
8.2.4 Operator Control and Monitoring WinCC flexible**8.2.4.1 Views****Operator Control and Monitoring WinCC flexible**

The block provides the following views:

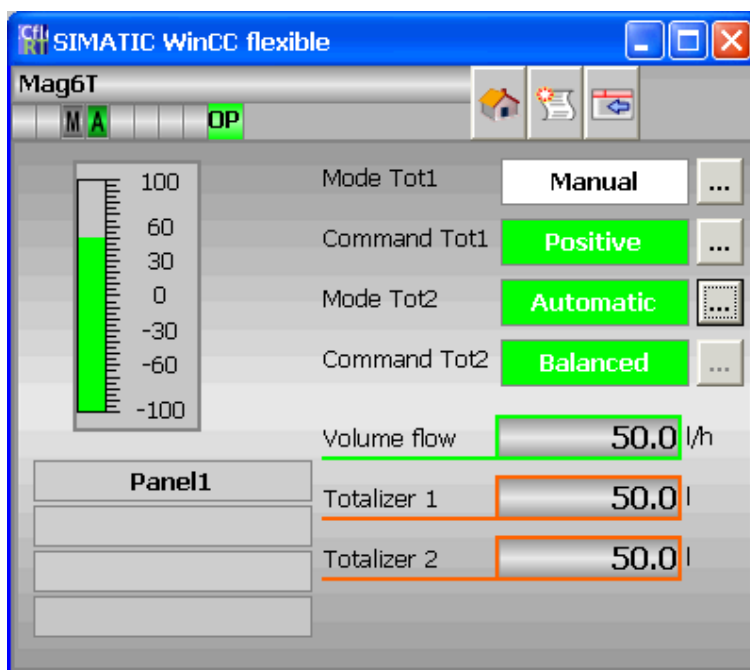
- Standard view of S7Mag6T (Page 262)
- Message view
- Associated value view

8.2.4.2 Standard view of S7Mag6T

Totalizer and dosing unit



Totalizer and totalizer

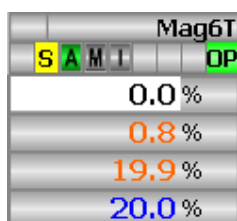


See also

Views (Page 261)

8.2.4.3 S7PMag6T block icon**Block symbols for PS7Mag6T**

Totalizer and dosing unit



Totalizer and totalizer

**8.3 FbMag6T****8.3.1 Description of FbMag6T****Object name (type + number) and family**

Type + number: FB 2600

Family: AdvLibPI

Area of application for FbMag6T

The block is used for the following applications:

- Transfer of cyclic data from and to a MAG6000 flow meter.

How it works

The block reads/writes all cyclic data of a MAG6000 from/to the process image in cyclic mode.

Note

All cyclic data of the MAG6000 configured in the HW Config. must be addressed within the process image.

Configuration

Use the CFC editor to install the block in a cyclic interrupt OB (OB30 to OB38).

When the CFC function "Generate module drivers" is used, the following occurs automatically:

- The member variables of input structure `Addr` (`.Tot1/2`, `.SetTot1/2`, `.ModeTot1/2`, `.DCtr`, `.DSta`, `.DSetP`, `.DComp`) are assigned the address parameters configured in HW Config. The member variable is assigned the value -1 if an element is not configured in HW Config.
- The `SubnTyp` input parameter is set to 1 if the MAG6000 is connected to a CPU via CP (external DP interface), otherwise to 0.
- The Mode in/out parameter is interconnected to the corresponding `OMode_xx` output parameter of the MOD_XXXX block.
- The `DataXchg` in/out parameter is interconnected to the corresponding `DataXchg_xx` output parameter of the MOD_XXXX block.
- The `MS` parameter is interconnected to the `O_MS` output parameter of the diagnostics driver block.

Write the volume flow (AI) address that was generated in HW Config to input parameter `AVolFlow`.

Note

If you are not using the CFC function "Generate module drivers", parameterize the addresses of input structure `Addr` and the Mode in/out parameter manually. The block expects the values `Mode = 16#80xxxxxx` for "I/O data can be read", and `16#00xxxxxx` (or `RackF = TRUE`) for "invalid I/O data".

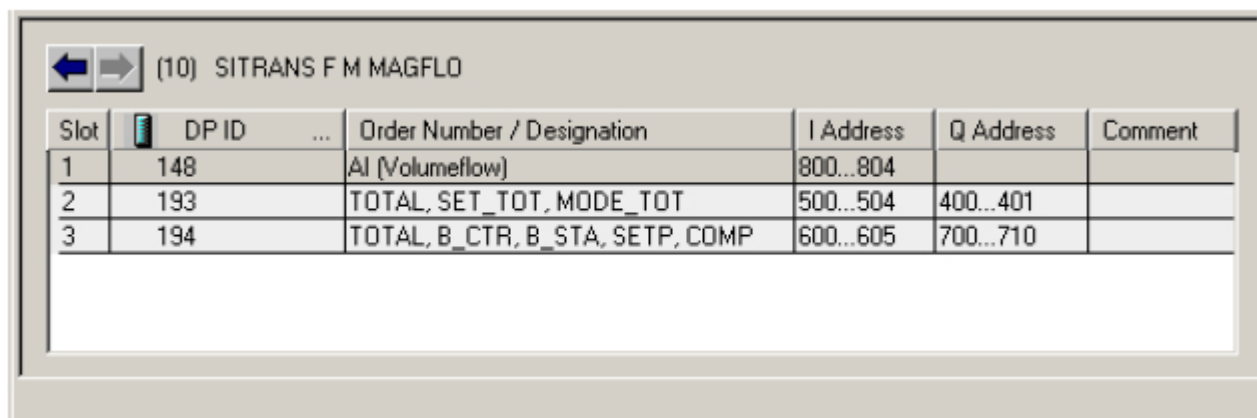
The `Addr` input structure gets the following values:

Parameter	Addressing
<code>AVolFlow</code>	Volume flow input address (AI)
<code>Addr.Tot1</code>	Input address Totalizer 1 (TOTAL, slot 2)
<code>Addr.SetTot1</code>	Output address Reset Totalizer 1 (SET_TOT, slot 2)
<code>Addr.ModeTot1</code>	Output address command Totalizer 1 (MODE_TOT, slot 2)
<code>Addr.Tot2</code>	Input address Totalizer 2/dosing value (TOTAL, slot 3)
<code>Addr.SetTot2</code>	Output address Reset Totalizer 2 (SET_TOT, slot 3)
<code>Addr.ModeTot2</code>	Output address command Totalizer 2 (MODE_TOT, slot 3)
<code>Addr.DCtr</code>	Output address control byte (MODE_TOT, slot 3)

Addr.DSta	Input address dosing unit status (B_STA, slot 3)
Addr.DSetP	Output address dosing setpoint (SETP, slot 3)
Addr.DComp	Output address dosing unit compensation (SETP, slot 3)

The length of the elements have to be considered when the right address is selected.

Example:



Slot	DP ID	...	Order Number / Designation	I Address	Q Address	Comment
1	148		AI (Volumeflow)	800...804		
2	193		TOTAL, SET_TOT, MODE_TOT	500...504	400...401	
3	194		TOTAL, B_CTR, B_STA, SETP, COMP	600...605	700...710	

Resultant configurations at block FbMag6T:

Inputs

- `AVolFlow` = 800
- `Addr.Tot1` = 500 (4 Byte Real + 1 Byte Status)
- `Addr.Tot2` = 600 (4 Byte Real + 1 Byte Status)
- `Addr.DSta` = 605 (1 Byte)

Outputs

- `Addr.SetTot1` = 400 (1 Byte)
- `Addr.ModeTot1` = 401 (1 Byte)
- `Addr.SetTot2` = -1 (not configured)
- `Addr.ModeTot2` = -1 (not configured)
- `Addr.DCtr` = 700 (1 Byte)
- `Addr.DSetP` = 701 (4 Byte Real + 1 Byte Status)
- `Addr.DComp` = 706 4 Byte Real + 1 Byte Status)

Address -1 is set by default if no value is configured.

A template for process tag types is available in the SITRANS Library as an example for the FbMag6T block:

Example of a process tag type:

- Template of Mag6T

Startup characteristics

- FbMag6T sets bit 16#xx01xxxx of the Mode input to signal a restart.
- The module ID is read from the addressed DP Slave and verified for consistency with that of MAG6000. Output `QModF` (module error) is set if the result is negative.
- OB100 transfers the following values to the module if the corresponding modules are configured in HW Config:
 - Reset the totalizer (SET_TOT): 16#00 (no Reset)
 - Command of totalizers (MODE_TOT): 16#04 (invalid command to prevent changes of the totalizer states)
 - Dosing commands (DCtr): 16#00 (no enable, no command)

Status word allocation for Status parameter

This block does not have the `Status` parameter.

8.3.2 Operating modes for FbMag6T

This block does not have any operating modes.

8.3.3 Functions of FbMag6T

The functions for this block are listed below.

Read cyclic values from process image

The process values are read from the process image (partition) at each block call and then written, including their signal states, to output structure `CyclData`. Input as well as to the outputs `VolFlow`, `Tot1VF` and `Tot2VF`. The values are addressed via input structure `Addr`, with -1 indicating that the corresponding value was not configured in HW Config.

Writing cyclic values to the process image

The source for values that are written cyclically to the process image depends on the setting at input parameter `SelStrInputs`:

- `SelStrInputs` = FALSE (default): The values and signal states for the I/O outputs are transferred from output structure `CyclData`. Output which is interconnected with visualization block `Mag6T`.
- `SelStrInputs` = TRUE: The values and signal states for the I/O outputs are transferred from the `SetTot1/2`, `ModeTot1/2`, `DCtr`, `DSetP`, `DComp` inputs and their signal states to the device.

Retain last values if I/O values are invalid

The block retains the last valid values if invalid I/O values were found (inputs $\neq$ 16#80xxxxxx or RackF = TRUE).

Signal state for process values

The signal state of process values (output structure `CyclicData.Inputs`) is derived from the higher-level error, or from the signal state returned by MAG6000. In the case of higher-level errors such as rack failure (inputs Mode $\neq$ 16#80xxxxxx or RackF = TRUE), status (.ST) 16#00 is output and otherwise the value provided by MAG6000.

Simulating signals

The block does not have a function for simulating process values.

8.3.4 Error handling of FbMag6T**Error handling of FbMag6T**

The following errors can be displayed for this block:

- Higher-level error
- Module errors

Higher-level error

Higher-level errors are indicated by the value 1 at output parameter `QRackF` if the signal state in the HighWord of input parameter `Mode` changes to a value other than 16#80, or if input `RackF` is set.

The `CyclData.Csf` output is set in addition, and the signal status 16#00 output in the output parameters `Input.VolFlow.ST`, `Input.Tot1VF.ST` and `Input.Tot2VF.ST` as well as at the outputs `QCVolFlow`, `QCTot1VF` and `QCTot2VF`.

Module errors

If an incorrect module ID of the connected DP slave is read from the block, output `QModF` will be set. The Quality Codes are set to 16#00 as with the higher-level error.

8.3.5 Messaging of FbMag6T**Messaging**

This block does not offer messaging.

8.3.6 I/Os of FbMag6T

Input parameters

Parameter	Description	Type	Default
AVolFlow	Volume flow (AI) address	INT	-1
Addr	Addresses in the process image	STRUCT ¹⁾	-1
SubnTyp	1 = external DP interface	BOOL	0
RackF	1 = DP slave failure (rack fault)	BOOL	0
SelStrInputs	0 = I/O output data originate from the CyclData structure 1 = I/O output data originate from inputs SetTot1/2, ModeTot1/2, DCtr, DSetP, DComp and their QualityCodes	BOOL	0
SetTot1	Totalizer 1: 16#01 = Reset command transferred to the module (SET_TOT from HW Config)	BYTE	16#16#0000
ModeTot1	Totalizer 1: Command transferred to the module (MODE_TOT from HW Config)	BYTE	16#00
SetTot2	Totalizer 2: 16#01 = reset command output to the module (SET_TOT from HW Config)	BYTE	16#00
ModeTot2	Totalizer 2: Command transferred to the module (MODE_TOT from HW Config)	BYTE	16#00
DCtr	Dosing unit: Command transferred to the module (B_CTR from HW Config):	BYTE	16#00
DSetP	Setpoint of the dosing unit (SETP)	REAL	0.0
QCDSsetP	Signal status for the setpoint of the dosing unit	BYTE	16#00
DComp	Compensation of the dosing unit (COMP)	REAL	0.0
QCDCComp	Signal status for the dosing unit compensation	BYTE	16#00
MS_Release	Release for maintenance (interconnected with MS_Release of the visualization block)	STRUCT <ul style="list-style-type: none"> Value : BOOL ST: BYTE 	<ul style="list-style-type: none"> 0 16#80
MS	Maintenance status	DWORD	16#00000000

¹⁾ Configuration of input structure Addr:

Addr	STRUCT	Volume flow (AI) address
	SetTot1 : INT	Totalizer 1 address: Reset command output to the module (SET_TOT from HW Config)

	ModeTot1: INT	Totalizer 1 address: Command transferred to the module (MODE_TOT from HW Config)
	SetTot2: INT	Totalizer 2 address: Reset command output to the module (SET_TOT from HW Config)
	ModeTot2: INT	Totalizer 2 address: Command transferred to the module (MODE_TOT from HW Config)
	DCTr: INT	Address dosing unit: Command transferred to the module (B_CTR from HW Config):
	DSta: INT	Address dosing unit: Dosing status (B_STA)
	DSetP: INT	Setpoint address of the dosing unit (SETP)
	DComp: INT	Compensation address of the dosing unit (COMP)
	END_STRUCT	

In/out parameters

Parameter	Description	Type	Default
Mode	Value status and measuring type	DWORD	16#00000000
DataXchg	Data communication	DWORD	16#00000000
ACC_ID	1 = accept MODE settings	BOOL	0

Output parameters

Parameter	Description	Type	Default
QRackF	1 = DP slave failure (rack fault)	BOOL	0
QModF	1 = Module error	BOOL	0
CyclData	Cyclic data	STRUCT ²⁾	0
VolFlow	Volume flow (AI)	REAL	0.0
QCVolFlow	Signal status for the volume flow	BYTE	16#00
Tot1VF	Volume flow totalizer 1	REAL	0.0
QCTot1VF	Signal status for volume flow totalizer 1	BYTE	16#00
Tot2VF	Volume flow totalizer 2	REAL	0.0
QCTot2VF	Signal status for volume flow totalizer 2	BYTE	16#00
DSta	Dosing unit: Dosing status (B_STA)	BYTE	16#00

²⁾Configuration of the output structure CyclData:

CyclData	STRUCT		Description
	Csf : INT		1 = Control system fault

	ParaAvail : INT		Availability of parameters from HW Config Bit 1: 1 = Dosing setpoint configured (SETP) Bit 2: 1 = Compensation configured (COMP) Bit 8: 1 = Totalizer 1 configured (TOTAL) Bit 9: 1 = Totalizer 1 configured (TOTAL) Bit 10: 1 = Dosing status configured (B_STA) Bit 11: 1 = Reset totalizer 1 configured (SET_TOT) Bit 12: 1 = Command totalizer 1 configured (MODE_TOT) Bit 13: 1 = Reset totalizer 2 configured (SET_TOT) Bit 14: 1 = Command totalizer 2 configured (MODE_TOT) Bit 15: 1 = Dosing commands configured (B_CTR)
	Input	STRUCT	Input data
		VolFlow : STRUCT • Value : BOOL • ST: BYTE	Volume flow (AI)
		Tot1VF : STRUCT • Value : BOOL • ST: BYTE	Volume flow totalizer 1
		Tot2VF : STRUCT • Value : BOOL • ST: BYTE	Volume flow totalizer 1
		DSta : BYTE	Dosing unit: Dosing status (B_STA)
		END_STRUCT	
	Output	STRUCT	Output data
		SetTot1 : BYTE	Reset control totalizer 1 (SET_TOT)
		ModeTot1 : BYTE	Mode control of totalizer 1 (MODE_TOT)
		SetTot2 : BYTE	Reset control totalizer 2 (SET_TOT)
		ModeTot2 : BYTE	Mode control of totalizer 2 (MODE_TOT)
		DCtr : BYTE	Dosing control (B_CTR)
		DSetP : STRUCT • Value : BOOL • ST: BYTE	Dosing setpoint (SETP)
		DComp : STRUCT • Value : BOOL • ST: BYTE	Dosing compensation (COMP)
		END_STRUCT	
	END_STRUCT		

8.3.7 Block diagram of FbMag6T

A block diagram is not provided for this block.

SIPART PS2

9.1 S7SipPS2

9.1.1 Description of S7SipPS2

Object name (type + number) and family

Type + number: FB 2633

Family: Sipart

Application area of S7SipPS2

The block is used for the following applications:

- Control of a Sipart PS2 with 0/4 to 20 mA with and without HART or Profibus PA I/O
- Control of an optional auxiliary valve for regulating the auxiliary power of the control valve

How it works

The Sipart PS2 is brought to a specified position using an analog activation signal.

The block forms the manipulated variable error from the difference between the activation signal and the acquired position feedback and can monitor it for adherence to high and low limits.

The control valve is monitored for the "Open"/"Closed" position. The block can be connected with a digital limit switch for this purpose. The block can generate the digital position signals itself through the adjustable limits for the "Open"/"Closed" position.

Missing feedback can be derived from the control in the block.

Various inputs are available for control purposes. The next chapters provide more detailed information on configuration, operating principles, visualization and operation.

Configuration

Use the CFC editor to install the block in a cyclic interrupt OB (OB30 to OB38). The block is also installed automatically in the startup OB (OB100).

The SITRANS Library contains templates for process tag types as examples with various application scenarios for the S7SipPS2 block.

Examples of process tag types:

- I/O via 0/4 to 20 mA signal (Sipart PS2 0,4-20mA)
- I/O via 4 to 20 mA signal with HART (Sipart PS2 HART)
- I/O via Profibus PA (Sipart PS2 Profibus PA)

The templates are described in more detail in Template of S7SipPS2 (Page 304).

When the SIPART PS2 is connected to the controller via Profibus PA, `Feature2.Bit2` must be set in order to read the configuration data. Optionally, `Feature2.Bit0 = TRUE` can then be used to evaluate the violation of the control deviation by the device and not by the block.

`Feature2.Bit1` specifies whether the optional alarm module is available; `Feature2.Bit3` specifies whether the TIM and LIM limits should be read and displayed.

If the Sipart PS2 is connected to the controller via neither HART nor Profibus PA, no configuration data can be read. The bits `OS_Perm.Bit29` and `OS_Perm.Bit30` are set to `FALSE` so that no configuration data can be read. Optionally, the values set on the device can be configured manually at the corresponding block inputs for visualization.

Note

If the Sipart PS2 is connected to the controller by means of HART communication and has a firmware version smaller than 5.00.00, the `Feature2.Bit4` must be set to `True` to enable the block to work correctly.

Startup characteristics

Use the `Feature Bit` Setting the startup characteristics (Page 24) to define the startup characteristics of this block.

The messages are suppressed after startup for the number of cycles set at `RunUpCyc`.

If the `Feature` bit "Set startup characteristics" = 0, the following applies to the startup characteristics:

- With `Feature` bit 16 = 0, the main valve (Sipart PS2) is closed
- With `Feature` bit 16 = 1, the main valve (Sipart PS2) travels to the neutral position

Status word allocation for `Status1` parameter

You can find a description for each parameter in section S7SipPS2 connections (Page 292).

Status bit	Parameter
0	Occupied
1	BatchEn
2	Not used
3	OosAct
4	OosLi
5	AutoAct
6	LocalAct

Status bit	Parameter
7	Not used
8	"Open"/"Closed" command control value (0 = "Closed", 1 ="Open")
9	FbkOpenOut
10	FbkCloseOut
11	1 = Feedback error control valve without control change
12	1 = Feedback error control valve due to control change
13	Not used
14	1 = Invalid signal status
15	1 = Mode switchover error
16	1 = Intlock is active
17 - 19	Not used
20	1 = Local authorization active
21	1 = Force
22	Automatic preview (1 = "Open")
23	1 = Bumpless switchover to "automatic mode" is active
24	1 = Actuator active (PosDiClose < MV <PosDiOpen)
25 - 26	Not used
27	"Open"/"Closed" command auxiliary valve (0 = "Closed", 1 ="Open")
28	FbkOpenAuxVOut (auxiliary valve)
29	FbkCloseAuxVOut (auxiliary valve)
30	1 = Feedback error auxiliary valve without control change
31	1 = Feedback error auxiliary valve due to control change

Status word allocation for Status2 parameter

Status bit	Parameter
0	1 = MsgLock Message suppression active
1	1 = "Open" and "Close" commands disabled (command line not visible)
2	1 = Display for interlocks in block icon
3	1 = Neutral position control valve "Open"
4	1 = Neutral position control valve "Closed"
5	1 = Neutral position control valve "Stop"
6	1 = Operator can reset the valve
7	WarnAct
8	1 = External manipulated variable active (MV_ExtAct)
9	1 = Forced manipulated variable (MV_Forced) is output unlimited at output MV
10	1 = Tracking of manipulated variable MV, MV_TrkOn = 1 and MV_ForOn = 0
11	1 = Manipulated variable greater than limit (low) for manipulated variable (MV > ManLoLim)
12	1 = Input parameter Rbk is not interconnected (RbkOut.ST = 16#FF)
13	1 = Input parameter FbkAuxVClose is interconnected
14	1 = Input parameter FbkAuxVOpen is interconnected

Status bit	Parameter
15	1 = Input parameter FbkClose is interconnected
16	1 = Input parameter FbkOpen is interconnected
17	FbkCloseOut
18	Reset request in automatic
19	1 = Input signals have no impact on "Local" mode when LocalSetting = 2 and LocalSetting = 4
20	1 = Control valve open
21	1 = Control valve closed
22	1 = Control valve opening
23	1 = Control valve closing
24	1 = Control valve in intermediate position ("Stop")
25	1 = Control valve has reached intermediate position (STOP)
26	1 = Command for opening the control valve active
27	1 = Command for closing the control valve active
28	1 = Command for stopping the control valve active
29	1 = Runtime error for open control valve
30	1 = Interlock information from preceding function block
31	Not used

Status word allocation for status3 parameter

Status bit	Parameter
0 - 7	Not used
8	1 = "Interlock" button is enabled
9 - 10	Not used
11	1 = Manipulated variable difference high limit violated (ER_AH_Act)
12	1 = Manipulated variable difference low limit violated (ER_AL_Act)
13	1 = Monitor manipulated variable difference high limit (ER_AH_En)
14	1 = Monitor manipulated variable difference low limit (ER_AL_En)
15	1 = Alarm manipulated variable difference high limit violation (ER_AH_MsgEn)
16	1 = Alarm manipulated variable difference low limit violation (ER_AL_MsgEn)
17	1 = Readback value high limit violated (RbkWH_Act)
18	1 = Readback value low limit violated (RbkWL_Act)
19	1 = Monitor readback value high limit (RbkWH_En)
20	1 = Monitor readback value low limit (RbkWL_En)
21	1 = Alarm readback value high limit violation (RbkWH_MsgEn)
22	1 = Alarm readback value low limit violation (RbkWL_MsgEn)
23	1 = Automatic preview control valve "Open"
24	1 = Automatic preview control valve "Closed"
25	1 = Automatic preview control valve "Stop"
26	1 = Show automatic preview in the standard view
27	1 = Auxiliary valve present

Status bit	Parameter
28	GrpErr
29	RdyToStart
30 - 31	Not used

Status word allocation for Status4 parameter

Status bit	Parameter
0	1 = External error
1	1 = error when reading acyclic data (active only for the duration of one cycle)
2	1 = error when writing acyclic data (active only for the duration of one cycle)
3	Cbk0 = 1 (Sipart in fail-safe state)
4	Cbk1 = 1 (request for local mode of Sipart)
5	Cbk2 = 1 (Sipart operated in local mode)
6	Cbk11 = 1 (enable for simulation of process values on Sipart)
7	Cbk16 = 1 (stroke integral exceeded)
8	Bin1 = 1: Message
9	Bin1 = 1: Configuration change blocked
10	Bin1 = 1: Configuration change blocked/manual
11	Bin1 = 1: Travel to end value
12	Bin1 = 1: Travel to start value
13	Bin1 = 1: Movement blocked
14	Bin2 = 1: Message
15	Bin2 = 1: Travel to end value
16	Bin2 = 1: Travel to start value
17	Bin2 = 1: Movement blocked
18	1 = Limit violation of alarm, SIA or MLS module
19	1 = A1: High alarm limit
20	1 = A1: High warning limit
21	1 = A1: Low warning limit
22	1 = A1: Low alarm limit
23	1 = A2: High alarm limit
24	1 = A2: High warning limit
25	1 = A2: Low warning limit
26	1 = A2: Low alarm limit
27	1 = Trigger threshold control deviation (Lim) exists
28	1 = Monitoring time control deviation (Tim) exists
29	OpenForce control valve
30	CloseForce control valve
31	Not used

Status word allocation for status5 parameter

Status bit	Parameter
0 - 1	Not used
2	1 = Readback value violates high alarm limit A1 (A1AH_Act)
3	1 = Readback value violates high warning limit A1 (A1WH_Act)
4	1 = Readback value violates low alarm limit A1 (A1WL_Act)
5	1 = Readback value violates high alarm limit A1 (A1AH_Act)
6	1 = Readback value violates high alarm limit A2 (A2AH_Act)
7	1 = Readback value violates high warning limit A2 (A2WH_Act)
8	1 = Readback value violates low alarm limit A2 (A2WL_Act)
9	1 = Readback value violates high alarm limit A2 (A2AH_Act)
10	1 = Readback value general module error (AModFlt_Act)
11	1 = Readback value fail-safe position (FailSav_Act)
12	1 = Readback value emergency operation (EmergOp_Act)
13	1 = Readback value stroke integral exceeded (PIExeed_Act)
14	1 = Limit violation of alarm, SIA or MLS module (warning)
15	Bin1 = 1: PST
16	Bin1 = 2: PST
17	1 = Message delay ER_AH_Lim
18	1 = Message delay ER_AL_Lim
19	1 = Message delay Rbk_WH_Lim
20	1 = Message delay Rbk_WL_Lim
21	Not used
22	1 = Message delay A1
23	1 = Message delay A2
24	Collection of message delays
25	1 = Alarm function is defined ($1 \leq AFct \leq 8$)
26	1 = Alarm function is defined ($1 \leq AFct \leq 8$)
27	QWronDev
28	A_AH_MsgEn
29	A_WH_MsgEn
30	A_WL_MsgEn
31	A_AL_MsgEn

Status word allocation for status6 parameter

Status bit	Parameter
0	Current monitoring time is visible
1	Current monitoring time for auxiliary valve is visible
2 - 31	Not used

9.1.2 Operating modes of S7SipPS2

The block can be operated using the following modes:

- Local mode
- Automatic mode
- Manual mode
- Out of service

The operating modes are described in more detail in the APL Online Help.

The next section provides additional block-specific information relating to the general descriptions.

"Local mode"

The block supports the local operating modes 2 and 4. The control settings for the block are therefore always made based on internal tracking of the feedback value.

You can find general information on "local mode", switching modes and bumpless switchover in the Local mode section.

"Automatic mode"

You can find general information on "automatic mode", switching modes and bumpless switchover in the section Manual and automatic mode for motors, valves and dosing units.

With auxiliary valve

In "automatic mode", the automatic commands affect the auxiliary valve, which you can

- "Open" (`OpenAut = 1`)
- "Close" (`CloseAut = 1`)

Without auxiliary valve

In "automatic mode", the automatic commands affect the control valve, which you can

- "Open" (`OpenAut = 1`)
- "Close" (`CloseAut = 1`)

Note

If no auxiliary valve is configured, no internal manipulated variable specifications can be made in "automatic mode". Manipulated variable specification is set to external when the mode is switched to "automatic".

"Manual mode"

You can find general information on "manual mode", switching modes and bumpless switchover in the section Manual and automatic mode for motors, valves and dosing units.

With auxiliary valve:

In "manual mode", the operator actions affect the auxiliary valve, which you can:

- "Open" (OpenMan = 1)
- "Close" (CloseMan = 1)

Without auxiliary valve:

In "manual mode", the operator actions affect the control valve, which you can:

- "Open" (OpenMan = 1)
- "Close" (CloseMan = 1)

Note

If no auxiliary valve is configured, no external manipulated variable specifications can be made in the manual operating mode. Manipulated variable specification is set to internal when the mode is switched to manual.

"Out of service"

You can find general information about the "out of service" mode in the Out of service section.

9.1.3 Functions of S7SipPS2

The functions for this block are listed below.

Reading and writing configuration data

This block uses the inputs RdCfgOp and WrCfgOp to read and write the configuration data from and to the Sipart. The inputs are set using the buttons "Read Config." or "Write Config." in the "Parameter" faceplate view.

Read parameters

- Bin1/Bin2 (function of BE1/BE2)
- MV_OpScale.Low/.High (manipulated variable limit start/end)
- AlarmFct (alarm function)
- AlarmLim1/2 (trigger threshold Alarm 1/2)
- Tim/QTim (monitoring time fault message 'Control deviation')
- Lim/QLim (response threshold fault message 'Control deviation')

Written parameters

- Tim (monitoring time fault message 'Control deviation')
- Lim (response threshold fault message 'Control deviation')

Interlocks

This block provides the following interlocks:

- Interlock without reset ("Interlock")

Refer to the "Interlocks" and "Influence of the signal status on the interlock" sections in the APL Online Help.

Resetting the block in case of interlocks or errors

This block provides the standard "Resetting the block in case of interlocks or errors" function that is described in the APL Online Help.

Group error

This block provides the standard "Output group error" function that is described in the APL Online Help.

The following parameters are taken into consideration when forming the group error:

- CSF
- MonDynErr
- MonStaErr
- MonDynAuxVErr
- MonStaAuxVErr

Outputting a signal for start readiness

This block provides the standard "Suppress messages" function using the `MsgLock` parameter that is described in the APL Online Help.

SIMATIC BATCH functionality

This block provides the standard "SIMATIC BATCH functionality" function that is described in the APL Online Help.

Tracking and limiting a manipulated variable

You can correct the manipulated variable output to the tracking value `MV_Trk` or the manipulated variable feedback `Rbk` to realize bumpless switchover. To track the manipulated variable output, you have to set the parameter `MV_TrkOn = 1`.

If the parameter `MV_TrkRbk = 0`, the manipulated variable output is corrected to the tracking value `MV_Trk`. The manipulated variable output `MV` is limited to the `MV_HiLim` and `MV_LoLim` parameters.

If the parameter `MV_TrkRbk = 1`, the manipulated variable output is tracked to the position feedback `Rbk`. There are no limits here.

The "Tracking" text is displayed additionally in the standard view of the faceplate.

Tracking has a higher priority than interlock for a control valve.

Forming the group status for interlocks

This block provides the standard "Form group status for interlock information" function that is described in the APL Online Help.

Forcing operating modes

This block provides the standard "Forcing operating modes" function that is described in the APL Online Help.

Note

If the block is operated with a auxiliary valve, the `OpenForce` and `CloseForce` commands also affect the auxiliary valve.

The high range limit (`MV_HiLim`) and the low range limit (`MV_LoLim`) are output at `MV` for `OpenForce` and `CloseForce` respectively.

With `CloseForce`, the auxiliary valve is closed, thereby triggering the neutral position of the control valve regardless of the `MV` output.

A configured ramp limit has no effect.

Feedback monitoring

This block provides the standard "Feedback monitoring" function that is described in the APL Online Help.

Digital feedback signals for the "Open" and "Closed" positions are formed from the position feedback:

- Feedback for "Open" position: $Rbk \geq PosDiOpen$
- Feedback for "Closed" position: $Rbk \leq PosDiClose$

Specifying control valve positions

There are the positions:

- Valve closed ("Closed")
- Valve closes
- Valve open ("Open")
- Valve opens
- Valve has reached defined position

Valve closed ("Closed")

When the control valve reaches the "Closed" position, the output is `FbkCloseOut.Value = 1`:

- With a binary limit switch for the "Closed" position (`NoFbkClose = 0`):

The valve is considered closed when `FbkCloseOut` is set. `FbkCloseOut` is set when `Rbk ≤ PosDiClose` and `FbkClose = 1`.

- Without a binary limit switch for the "Closed" position (`NoFbkClose = 1`):

The valve is considered closed when `FbkCloseOut` is set. `FbkCloseOut` is set when `Rbk ≤ PosDiClose`.

Valve closes

If the control valve travels in the direction of the "Close" position, the output `FbkClsgOut = 1`:

- `FbkClsgOut` is set when `MV.Value < RbkOut.Value` and `PosReached.Value` is not = 1.

Valve open ("Open")

When the control valve reaches the "Open" position, the output `FbkOpenOut.Value = 1`:

- With a binary limit switch for the "Open" position (`NoFbkOpen = 0`):

The valve is considered open when `FbkOpenOut` is set. `FbkOpenOut` is set when `Rbk ≥ PosDiOpen` and `FbkOpen = 1`.

- Without a binary limit switch for the "Open" position (`NoFbkOpen = 1`):

The valve is considered open when `FbkOpenOut` is set. `FbkOpenOut` is set when `Rbk ≥ PosDiOpen`.

Valve opens

If the control valve travels in the direction of the "Open" position, the output `FbkOpngOut = 1`:

- `FbkOpngOut` is set when `MV.Value > RbkOut.Value` and `PosReached.Value` is not = 1.

Valve has reached defined position

If the control valve is sent to a specified intermediate position (`MV > PosDiClose` and `MV < PosDiOpen`), the targeted position is reached when the difference `MV.Value - RbkOut.Value` is within the configured tolerance range $\pm \text{PosDeadBand}$ and thereby `ER.Value = 0.0`.

If the control valve is set to the end position "Open" (`MV.Value ≥ PosDiOpen`), this position is reached when `ER.Value = 0.0` and also `FbkOpenOut.Value = 1`.

If the control valve is set to the end position "Closed" (`MV.Value ≤ PosDiClose`), this position is reached when `ER.Value = 0.0` and also `FbkCloseOut.Value = 1`.

When the control valve reaches the specified position, the output `PosReached = 1` is set.

Dynamic monitoring

The monitoring is based on the effective feedback signals `FbkOpenOut` and `FbkCloseOut` and not directly on the feedback inputs `FbkOpen` and `FbkClose`.

The monitoring is only active if the control valve is within the control range. The operating range is determined by the limits `PosDiClose` and `PosDiOpen` ($\text{PosDiClose} < \text{Rbk} < \text{PosDiOpen}$).

When the control valve is within the control range, to reach one of the two end positions ($\text{MV} \geq \text{PosDiOpen}$ or $\text{MV} \leq \text{PosDiClose}$), the targeted end position must be reached within the time defined by `MonTiDynamic`.

If there are binary signals for the feedback of the control valve, the monitoring time for reaching the configured values for the "Open" (`PosDiOpen`) or "Closed" (`PosDiClose`) position of the manipulated variable is started (start `MonTiDynamic` if $\text{MV} \leq \text{PosDiClose}$ or $\text{MV} \geq \text{PosDiOpen}$).

A dynamic monitoring error is generated if:

- The "Closed" end position is targeted ($\text{MV} \leq \text{PosDiClose}$) and this position (`FbkCloseOut`) is not reached within the monitoring time `MonTiDynamic`.
- The "Closed" end position is targeted ($\text{MV} \leq \text{PosDiClose}$) and the feedback of the binary limit switch `FbkClose` is already within the operating range.
- The "Open" end position is targeted ($\text{MV} \geq \text{PosDiOpen}$) and this position (`FbkOpenOut`) is not reached within the monitoring time `MonTiDynamic`.
- The "Open" end position is targeted ($\text{MV} \geq \text{PosDiOpen}$) and the feedback of the binary limit switch `FbkOpen` is already within the operating range.

Static monitoring

The monitoring is based on the effective feedback signals `FbkOpenOut` and `FbkCloseOut` and not on the feedback inputs `FbkOpen` and `FbkClose`.

Monitoring is only active if the control valve is in the "Closed" or "Open" position and not in the neutral position. The "Closed" position is determined by the `PosDiClose` parameter and the "Open" position by the `PosDiOpen` parameter.

A static monitoring error is generated if:

- The "Closed" end position (`FbkCloseOut = 1`) is exited without a command having been issued first and the monitoring time `MonTiStatic` has expired.
- The "Closed" end position is reached (`FbkCloseOut = 1`), the feedback for the binary limit switch `FbkClose` is gone, and monitoring time `MonTiStatic` has expired.
- The "Open" end position (`FbkOpenOut = 1`) is exited without a command having been issued first and the monitoring time `MonTiStatic` has expired.
- The "Open" end position is reached (`FbkOpenOut = 1`), the feedback for the binary limit switch `FbkOpen` is gone, and monitoring time `MonTiStatic` has expired.

Deactivate feedback

This block provides the standard "Disabling feedback for valves" function that is described in the APL Online Help. Feedback monitoring can be deactivated separately for each feedback with `NoFbkOpen` or `NoFbkClose` as required.

Suppressing messages using the `MsgLock` parameter

This block provides the standard "Suppressing messages using the `MsgLock` parameter" function that is described in the APL Online Help.

Monitoring the feedback for the auxiliary valve

The auxiliary valve provides dynamic and static monitoring of the feedback. No special monitoring time can be configured for overseeing the retention of the end position of the auxiliary valve. If the end position is exited without the corresponding command, a "monitoring runtime error" is reported after expiration of the time configured under "Control".

Monitoring is disabled by default and no connections are displayed.

The following parameters can be used to monitor the auxiliary valve.

Parameter	Function
<code>FbkAuxVOpen</code>	1 = Auxiliary valve open feedback signal
<code>FbkAuxVClose</code>	1 = Auxiliary valve closed feedback signal
<code>NoFbkAuxVOpen</code>	1 = No feedback present for "auxiliary valve open" (default = 1)
<code>NoFbkAuxVClose</code>	1 = No feedback present for "auxiliary valve closed" (default = 1)
<code>MonitorAuxV</code>	1 = Feedback monitoring of the auxiliary valve (default = 0)
<code>MonAuxVTime</code>	Monitoring time after auxiliary valve operation in [s]
<code>MonDynAuxVErr</code>	Dynamic monitoring error pending
<code>MonStaAuxVErr</code>	Static monitoring error pending

Otherwise, the monitoring works like the monitoring function of the control valve.

Selecting a unit of measure

This block provides the standard "Select unit of measurement" function that is described in the APL Online Help.

Neutral position

This block provides the standard "Neutral position for motors, valves and actuators" function that is described in the APL Online Help.

The neutral position (de-energized state) for the auxiliary valve is set using the `SafePosAux` parameter.

- `SafePosAux = 0` means that the auxiliary valve closes with `Ctrl = 0` and opens with `Ctrl = 1`.
- `SafePosAux = 1` means that the auxiliary valve opens with `Ctrl = 0` and closes with `Ctrl = 1`.

The setting is made with the `SafePos` parameter for the control valve.

- `SafePos = 0` means that the control valve closes in the de-energized state (`MV` is set to `MV_OpScale.Low`)
- `SafePos = 1` means that the control valve opens in the de-energized state (`MV` is set to `MV_OpScale.High`)

- SafePos = 2 means that the control valve retains its position in the de-energized state (MV remains unchanged)
- The control valve is brought to the neutral position when the auxiliary valve is closed FbkAuxVCloseOut = 1.

Generating instance-specific messages

This block provides the standard "Generate instance-specific messages" function that is described in the APL Online Help.

Configurable reactions using the Feature/Feature2 parameter

An overview of all the reactions that are provided by the `Feature` parameter is available in section "Configurable response using the `Feature` I/O" in the APL Online Help. The following reactions are available for this block at the relevant bits:

Bit	Function
0	Setting the startup characteristics (Page 24)
1	Reaction to the out of service mode (Page 25)
2	Resetting the commands for changing the mode (Page 26)
3	Enabling resetting of commands for the control settings (Page 26)
4	Set switch or button mode (Page 27)
5	Control via auxiliary valve
6	Disabling opening and closing
8	Separate delay times for each alarm
9	Resetting via input signals in the event of errors
10	Exiting local mode (Page 28)
11	Activating the run time of feedback signals
15	Neutral position manipulated variable takes effect with "out of service" operating mode
16	Neutral position manipulated variable takes effect at startup
17	Enabling bumpless switchover to automatic mode for valves, motors, and dosing units
21	Enabling bumpless switchover to automatic mode for valves, motors, and dosing units
22	Update acknowledgment and error status of the message call (Page 30)
24	Enabling local operating permission (Page 30)
25	AUTOHOTSPOT
26	Reaction of the switching points in "Out of service" mode
27	Interlock display with LocalSetting 2 or 4
28	Disabling operating points (Page 31)
29	Signaling limit violation (Page 32)
30	Resetting depending on the operating mode (Page 32)
31	Activating reset of protection / errors in manual mode (Page 33)

In pushbutton mode (bit 4 = 0) the automatic commands in automatic mode are latching, in other words `OpenAut` and `CloseAut` can be reset to zero after changing the control. In manual and local modes, however, the automatic commands are not saved and in the absence of automatic commands the automatic control is tracked.

In switching mode (bit 4 = 1), control is selected with the OpenAut static signals. If input OpenAut is not set the valve is closed. Control via CloseAut is not needed. If the "Activate command reset for control" function (bit 3 = 1) is also activated, the OpenAut input is reset to the neutral position after evaluation in the block.

Note

Switching mode can only be used for configuration with the auxiliary valve.

There are also the following Feature bits in the Feature2 parameter:

Bit	Function
0	1 = Violation of the control deviation is not detected by the block, but rather by Sipart based on the LIM and TIM parameters. This requires Sipart to be connected via Profibus PA
1	1 = An alarm module is available whose configuration (AFct) and limits (A1/A2) can be read by the device
2	1 = The Sipart PS2 is connected to the controller via Profibus PA
3	1 = The values of Tim (monitoring time for control deviation) and Lim (trigger threshold for control deviation) are read out of the Sipart PS2, written into the Sipart PS2, and visualized in the faceplate
4	1 = The Sipart PS2 has a firmware version < 5.00.00

For more information about the feature bits please refer to the APL online help.

Alarm delays with two time values per limit pair

This block has the standard alarm delay function "Two time values per limit pair" for limit monitoring of the feedback and limit monitoring of the manipulated variable difference. This function is described in the APL Online Help.

The function here relates solely to the limits of the manipulated variable difference.

Digital feedback from the readback value

This block forms a digital position feedback for "Closed" and "Open" from the configured operating points of the position feedback values PosDiClose and PosDiOpen.

Operator authorizations

This block provides the standard "Operator authorization" function that is described in the APL Online Help.

The block has the following permissions for the OS_Perm parameter:

Bit	Function
0	1 = Operator may switch to "automatic mode"
1	1 = Operator may switch to "manual mode"
2	1 = Operator may switch to "local mode"
3	1 = Operator can switch to "Out of service" mode
4	1 = Operator can open the valve

5	1 = Operator can close the valve
6	1 = Operator can reset the valve
7	1 = Operator can define the monitoring time for startup
8	1 = Operator can define the monitoring time for runtime
9	1 = Operator can activate the monitoring function for the feedback signals of the control valve (bits 7 - 8)
10 - 23	Not used
24	1 = Operator can define the monitoring time of the auxiliary valve for startup
25	Not used
26	1 = Operator can activate the monitoring function for the feedback signals of the auxiliary valve (bit 24)
27 - 28	Not used
29	1 = Operator may read the configuration data from Sipart PS2
30	1 = Operator may write the configuration data to Sipart PS2
31	Not used

The block has the following operating permissions for the `OS1Perm` parameter:

Bit	Function
0 - 3	Not used
4	1 = Operator can switch the manipulated variable to external <code>MV_ExtOp</code>
5	1 = Operator can switch the manipulated variable to internal <code>MV_IntOp</code>
6	Not used
7	1 = Operator can change the manual manipulated variable <code>MV_Int</code>
8 - 9	Not used
10	1 = Operator can change the high limit of the manipulated variable <code>MV_HiLim</code>
11	1 = Operator can change the low limit of the manipulated variable <code>MV_LoLim</code>
12	1 = Operator can activate / deactivate messages with <code>Rbk_AH_MsgEn</code>
13	1 = Operator can activate / deactivate messages with <code>Rbk_AL_MsgEn</code>
14	1 = Operator can activate / deactivate messages with <code>A1_MsgEn</code>
15	1 = Operator can activate / deactivate messages with <code>A2_MsgEn</code>
16	1 = Operator can activate / deactivate messages with <code>ER_AH_MsgEn</code>
17	1 = Operator can activate / deactivate messages with <code>ER_AL_MsgEn</code>
18	1 = Operator can change the trigger threshold for control deviation in the <code>Sipart Lim</code>
19	1 = Operator can change the monitoring time for control deviation in the <code>Sipart Tim</code>
20	1 = Operator can activate manipulated variable tracking in manual mode <code>MV_TrkRbk</code>
21	1 = Operator can enable the bumpless switchover from external to internal <code>MV_TrkExt</code>
22 - 25	Not used
26	1 = Operator can change the limit (manipulated variable difference) for the high alarm <code>ER_AH_Lim</code>
27	1 = Operator can change the hysteresis (manipulated variable difference) <code>ER_Hyst</code>
28	1 = Operator can change the limit (manipulated variable difference) for the low alarm <code>ER_AL_Lim</code>

29	1 = The operator can change the limit (position feedback) for the high warning RbkWH_Lim
30	1 = Operator can change the hysteresis (position feedback) RbkHyst
31	1 = The operator can change the hysteresis (position feedback) for low warning RbkWL_Lim

Note

If you interconnect a parameter that is also listed in **OS_Perm** as a parameter, you have to reset the corresponding **OS_Perm** bit.

Generation of manipulated variables

The manipulated variable MV is formed as follows:

MV_Fo rOn	Close- Force	Open- Force	Man- Act	Au- tAct	MV =	Limit	State
1	0	0	-	-	MV_Forced	None	Forced tracking without limit
-	1	0	-	-	MV_OpScaleL	MV_OpScaleL	Forced close
-	0	1	-	-	MV_OpScaleH	MV_OpScaleH	Forced open
0	0	0	1	0	MV_Int	MV_HiLim MV_LoLim	Manual mode with internal manipulated variable
0	0	0	1	0	MV_ExtOut	MV_HiLim MV_LoLim	Manual mode with external manipulated variable and limit
0	0	0	0	1	MV_Int	MV_HiLim MV_LoLim	Automatic with external manipulated variable and limit
0	0	0	0	1	MV_ExtOut	MV_HiLim MV_LoLim	Automatic with external manipulated variable and limit
0	0	0	-	-	MV_Trk	MV_HiLim MV_LoLim	Tracking with limitation
0	0	0	0	-	Rbk	None	Tracking to position feedback without limit
0	0	0	0	0	Rbk	None	Local mode with tracking to position feedback without limit

Local-Act	MV_TrkOn	MV_TrkRbk	MV_ExtAct	MV =	Limit	State
-	-	-	-	MV_Forced	None	Forced tracking without limit
-	-	-	-	MV_OpScaleL	MV_OpScaleL	Forced close
-	-	-	-	MV_OpScaleH	MV_OpScaleH	Forced open
0	0	-	0	MV_Int	MV_HiLim MV_LoLim	Manual mode with internal manipulated variable
0	0	-	1	MV_ExtOut	MV_HiLim MV_LoLim	Manual mode with external manipulated variable and limit
0	0	-	1	MV_Int	MV_HiLim MV_LoLim	Automatic with external manipulated variable and limit
0	0	-	1	MV_ExtOut	MV_HiLim MV_LoLim	Automatic with external manipulated variable and limit
0	1	0	-	MV_Trk	MV_HiLim MV_LoLim	Tracking with limitation
0	1	1	-	Rbk	None	Tracking to position feedback without limit
1	-	-	-	Rbk	None	Local mode with tracking to position feedback without limit

"Actuator active" information

- With `PosReached.Value = 0`, the following applies:
With `PosDiClose < MV < PosDiOpen`, the control valve is detected as active and bit 24 is set in `Status1`.
- The following applies to `PosReached.Value = 1`: `Status1.Bit 24 = 0`

This status can be used to indicate a customized symbol in the process image, for example, and is saved in the status word (see Status word section in Description of S7SipPS2 (Page 271)).

General function "MV difference"

The manipulated variable difference is sent to the `ER` output and is calculated with the following formula:

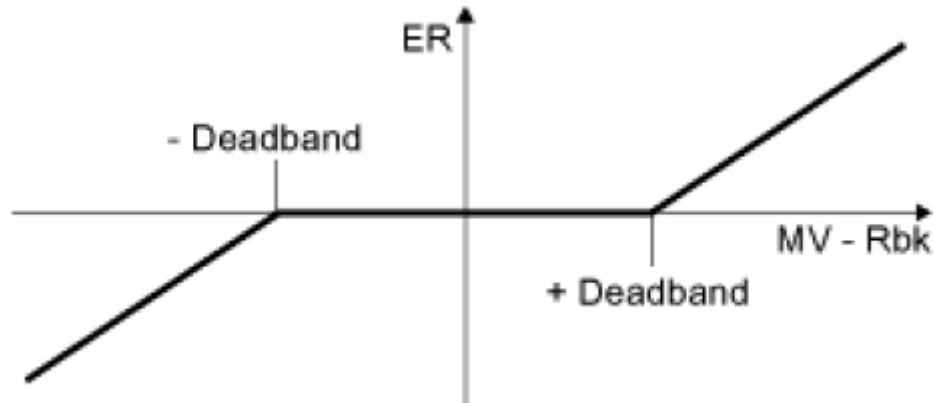
$$ER = MV - Rbk$$

If `ER` is within the dead band, `ER = 0` is set and the manipulated variable is considered reached.

Manipulated variable difference generation and dead band

The manipulated variable difference is formed by the effective manipulated variable MV and the position feedback Rbk , and sent to the ER output. A dead band can be set at the $PosDeadBand$ input:

- $PosDeadBand = 0$ Dead band is disabled
- $PosDeadBand \neq 0$ Dead band is enabled



Limit monitoring of manipulated variable and control error

This block provides the standard "Limit monitoring of the setpoint, manipulated variable and control error" function that is described in the APL Online Help.

Monitoring is disabled in the following situations:

- The auxiliary valve is closed
- The control valve is in the neutral position

Specifying warning times for control functions at motors and valves

This block provides the standard "Specifying warning times for control functions with motors and valves" function that is described in the APL Online Help.

The warning time affects the analog manipulated variable MV . The output is updated only with the specification of a new manipulated variable after the warning time has expired.

Warning time is ignored in tracking $MV_TrkOn = 1$ and in forced tracking MV_ForOn .

Deactivate feedback

This block provides the standard "Disabling feedback for valves" function that is described in the APL Online Help.

This function is available for both the control valve and auxiliary valve. The feedback for the auxiliary valve is disabled by default, connections are not displayed.

The disable setting is made with the $NoFbkOpen$ and $NoFbkClose$ parameters for the control valve.

The disable setting is made with the `NoFbkAuxVOpen` and `NoFbkAuxVClose` parameters for the auxiliary valve.

Button labels

This block provides the standard "Labeling buttons and texts" function that is described in the APL Online Help.

Instance-specific text can be configured for the following parameters:

- `OpenMan`
- `CloseMan`

9.1.4 Error handling of S7SipPS2

For general information on error handling at all blocks, refer to the "Error handling" section in the APL Online Help.

The following errors can be displayed for this block:

- Error numbers
- Mode switchover error
- Invalid input signals

Overview of error numbers

The `ErrorNum` I/O can be used to output the following error numbers:

Error number	Meaning of the error number
-1	Predefined value when inserting the block; the block is not executed.
0	No active fault
41	The value of the <code>LocalSetting</code> connection is outside the valid range. Valid values are 0, 2 and 4
42	<code>LocalSetting = 0</code> or <code>LocalSetting = 4</code> and <code>LocalLi = 1</code>
51	<code>AutModLi = 1</code> and <code>ManModLi = 1</code> <code>OpenAut = 1</code> and <code>CloseAut = 1</code> <code>OpenForce = 1</code> and <code>CloseForce = 1</code>
52	<code>LocalSetting = 2</code> or <code>4</code> and <code>SimOn = 1</code>

Mode switchover error

This error can be output by the block, see the "Error handling" section in the APL Online Help.

Invalid input signals

This error can be output by the block, see the "Error handling" section in the APL Online Help.

9.1.5 S7SipPS2 messaging

Messaging

The following messages can be generated for this block:

- Process control error
- Process messages

Process control error

The following control system fault messages can be output:

Message instance	Message class	Event
MsgEvId01	PLC Process Control Message - Failure	\$\$BlockComment\$\$ Feedback error (S7SipPS2: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]
MsgEvId06	PLC Process Control Message - Failure	\$\$BlockComment\$\$ External error has occurred (S7SipPS2: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]
MsgEvId11	PLC Process Control Message - Failure	\$\$BlockComment\$\$ Sipart - Fault (S7SipPS2: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]
MsgEvId15	PLC Process Control Message - Error	\$\$BlockComment\$\$ Error while reading configuration data (S7SipPS2: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]
MsgEvId16	PLC Process Control Message - Error	\$\$BlockComment\$\$ Error while writing configuration data (S7SipPS2: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]

Explanation:

\$\$BlockComment\$\$: Content of the instance-specific comment

You can interconnect an external fault (signal) to input parameter CSF. If this signal changes to CSF = 1, a process control error is triggered (MsgEvId06).

Process messages

Message instance	Message class	Event
MsgEvId02	Alarm - high	\$\$BlockComment\$\$ ER - High alarm limit violated (S7SipPS2: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]
MsgEvId03	Alarm - low	\$\$BlockComment\$\$ ER - Low alarm limit violated (S7SipPS2: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]
MsgEvId04	Warning - high	\$\$BlockComment\$\$ Rbk - High limit violated (S7SipPS2: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]
MsgEvId05	Warning - low	\$\$BlockComment\$\$ Rbk - Low limit violated (S7SipPS2: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]
MsgEvId07	Alarm - high	\$\$BlockComment\$\$ Sipart - High alarm limit violated (S7SipPS2: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]
MsgEvId08	Warning - high	\$\$BlockComment\$\$ Sipart - High warning limit violated (S7SipPS2: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]
MsgEvId09	Warning - low	\$\$BlockComment\$\$ Sipart - Low warning limit violated (S7SipPS2: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]
MsgEvId10	Alarm - low	\$\$BlockComment\$\$ Sipart - Low alarm limit violated (S7SipPS2: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]
MsgEvId12	Alarm - high	\$\$BlockComment\$\$ Sipart - Fail safe position (S7SipPS2: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]
MsgEvId13	Alarm - high	\$\$BlockComment\$\$ Sipart - Emergency operation (S7SipPS2: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]
MsgEvId14	Alarm - high	\$\$BlockComment\$\$ Sipart - Path integral exceeded (S7SipPS2: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]

Associated values

Associated value	Block parameter	Data Type
1	Aux	REAL
2	BatchID	DWORD
3	MsgFilter	DINT

9.1.6 S7SipPS2 connections

Input parameters

Parameter	Description	Type	Default
A1*	Response threshold, alarm 1 (Sipart alarm module)	REAL	0.0
A1Act	1 = Alarm 1 of alarm module active	BOOL	0
A2*	Response threshold, alarm 2 (Sipart alarm module)	REAL	0.0

Parameter	Description	Type	Default
A2Act	1 = Alarm 2 of alarm module active	BOOL	0
A_AH_MsgEn	1 = Enable A1/A2 alarm limit (high)	BOOL	1
A_AL_MsgEn	1 = Enable A1/A2 alarm limit (low)	BOOL	1
A_WH_MsgEn	1 = Enable A1/A2 warning limit (high)	BOOL	1
A_WL_MsgEn	1 = Enable A1/A2 warning limit (low)	BOOL	1
AcyclData	Acyclic data from driver block PiDr256 (interconnect this input with AcyclData output of PiDr256)	ANY	---
AFct*	Function of alarm module: 0: No function 1: A1=Min. Alarm, A2=Max. Alarm 2: A1=Min. Alarm, A2=Min. Alarm 3: A1=Max. Alarm, A2=Max. Alarm 4: A1=Min. Alarm, A2=Max. Alarm (inv) 5: A1=Min. Alarm, A2=Min. Alarm (inv) 6: A1=Max. Alarm, A2=Max. Alarm (inv)	BYTE	0
AModFlt	1 = Error message from the Sipart alarm module	BOOL	0
AutModLi*	1= "Automatic" mode via interconnection or SFC (controlled via ModLiOp = 1)	BOOL	0
AutModOp*	1 = "Automatic" mode via operator (controlled via ModLiOp = 0)	BOOL	0
BatchEn	1 = Enable allocation	BOOL	0
BatchID	Batch ID	DWORD	16#00000000
BatchName	Batch name	S7-String	
BE1	Binary input 1 (see Bin1 function)	BOOL	0
BE2	Binary input 2 (see Bin2 function)	BOOL	0

Parameter	Description	Type	Default
Bin1*	Function of the binary input BE1: 0: No function 1: Message only (NCC) 2: Message only (NOC) 3: Block configuration (NOC) 4: Block configuration and manual (NOC) 5: Travel valve to position YE (NOC) 6: Travel valve to position YA (NOC) 7: Block movement (NOC) 8: Travel valve to position YE (NCC) 9: Travel valve to position YA (NCC) 10: Block movement (NCC) 11: Partial stroke test (NOC) 12: Partial stroke test (NCC)	BYTE	0
Bin2*	Function of the binary input BE1: 0: No function 1: Message only (NCC) 2: Message only (NOC) 3: Travel valve to position YE (NOC) 4: Travel valve to position YA (NOC) 5: Block movement (NOC) 6: Travel valve to position YE (NCC) 7: Travel valve to position YA (NCC) 8: Block movement (NCC) 9: Partial stroke test (NOC) 10: Partial stroke test (NCC)	BYTE	0
BypProt	1 = Bypassing interlock is active in "local mode" and in simulation	BOOL	0
Cbk0	1 = Sipart in fail-safe position	BOOL	0
Cbk1	1 = Request for "local operation"	BOOL	0
Cbk16	1 = Stroke integral exceeded	BOOL	0
Cbk2	1 = Sipart is operated locally	BOOL	0
Cbk3	1 = Emergency operation is active	BOOL	0
Cbk7	1 = Maximum permitted controller monitoring exceeded (Lim/Tim)	BOOL	0
CloseAut*	1 = Select Close valve in "automatic mode"	BOOL	0

Parameter	Description	Type	Default
CloseForce	1 = Force valve closure	BOOL	0
CloseMan*	1 = Select Close valve in "manual mode"	BOOL	0
CSF	1 = External error (process control error)	BOOL	0
EN	1 = Called block will be processed	BOOL	1
ER_A_DC*	Delay for incoming alarms during manipulated variable difference monitoring	REAL	0.0
ER_A_DG*	Delay for outgoing alarms during manipulated variable difference monitoring	REAL	0.0
ER_AH_DC	Delay time for incoming alarms with overrange control deviation [s]	REAL	0.0
ER_AH_DG	Delay time for outgoing alarms with overrange control deviation [s]	REAL	0.0
ER_AH_En	1 = Activate alarm (high) for manipulated variable difference monitoring	BOOL	1
ER_AH_Lim	Alarm limit (high) for manipulated variable difference monitoring	REAL	100.0
ER_AH_MsgEn	1 = Activate messages for alarm (high) for manipulated variable difference monitoring	BOOL	1
ER_AL_Lim	Alarm limit (low) for manipulated variable difference monitoring	REAL	-100.0
ER_AL_En	1 = Activate alarm (low) for manipulated variable difference monitoring	BOOL	1
ER_AL_MsgEn	1 = Activate messages for alarm (low) for manipulated variable difference monitoring	BOOL	1
ER_Hyst	Alarm hysteresis for manipulated variable difference monitoring	REAL	1.0
FaultExt	1 = External error	BOOL	0
FbkAuxVClose	1 = Auxiliary valve closed feedback signal	BOOL	0
FbkAuxVOpen	1 = Auxiliary valve open feedback signal	BOOL	0
FbkClose	1 = Valve closed feedback signal	BOOL	0
FbkOpen	1 = Valve open feedback signal	BOOL	0
Feature	I/O for additional functions	STRUCT	-
		Bit 0: BOOL	0
		...	0
		Bit 31: BOOL	0

Parameter	Description	Type	Default
Feature2	I/O for additional functions	STRUCT	-
		Bit 0: BOOL	0
		...	0
		Bit 31: BOOL	0
Intl_En	1 = Interlock without reset (interlock, Intlock parameter) is active	BOOL	1
Intlock	0 = Interlocking without reset is active; you can operate the block without reset once the interlocking condition has disappeared 1 = Interlock not activated	BOOL	1
Lim*	Response threshold for "controller error" fault message	REAL	0.0
LocalLi	1 = Activate "local mode" via plant signal	BOOL	0
LocalOp*	1 = "Local mode" via operator	BOOL	0
LocalSetting	"Local" mode properties	INT	0
ManModLi*	1 = "Manual" mode via interconnection or SFC (controlled via ModLiOp = 1)	BOOL	0
ManModOp*	1 = "Manual mode" via: OS operator (controlled via ModLiOp = 0)	BOOL	1
ModLiOp	Switchover of operating mode between: 0 = Operator 1 = Interconnection or SFC	BOOL	0
MonAuxVTime*	Monitoring time for feedback monitoring of the auxiliary valve	REAL	3.0
Monitor	1 = Monitoring of control valve feedback	BOOL	1
MonitorAuxV	1 = Monitoring of auxiliary valve feedback	BOOL	1
MonSafePos	1 = Go to neutral position in the event of monitoring errors	BOOL	1
MonTiDynamic*	Monitoring time after operation in [s]	REAL	3.0
MonTiStatic*	Monitoring time for feedback errors without operation in [s]	REAL	3.0
MsgEvid01..16	Message number (assigned automatically)	DWORD	16#00000000
MsgLock	1 = Suppress process messages. For more information, refer to the "Suppressing messages by means of parameter MsgLock" section.	BOOL	0
MV_Ext	External manipulated variable	REAL	0.0

Parameter	Description	Type	Default
MV_ExtLi	Select external manipulated variable (via interconnection)	BOOL	0
MV_ExtOp*	Select external manipulated variable (via operator)	BOOL	0
MV_Forced	Forced manipulated variable that is not limited and assumes top priority	REAL	0.0
MV_ForOn	1 = Forced manipulated variable MV_Forced is output unlimited at output MV	BOOL	0
MV_HiLim	Limit (high) for manipulated variable MV	REAL	100.0
MV_Int*	Internal manipulated variable	REAL	0.0
MV_IntLi	Select internal manipulated variable (via interconnection)	BOOL	0
MV_IntOp*	Select internal manipulated variable (via operator)	BOOL	1
MV_LiOp	Select manipulated variable source (internal/external): 1 = Via interconnection 0 = Via operator	BOOL	0
MV_LoLim	Limit (low) for manipulated variable MV	REAL	0.0
MV_OpScaleH	OS display range for manipulated variable MV	REAL	100.0
MV_OpScaleL	OS display range for manipulated variable MV	REAL	0.0
MV_Trk	Tracking value for manipulated variable MV	REAL	0.0
MV_TrkExt	1 = Bumpless switchover from external to internal manipulated variable active	BOOL	0
MV_TrkOn	1 = Tracking of manipulated variable MV	BOOL	0
MV_TrkRbk	1 = Bumpless switchover of manipulated variable tracking active (track manipulated variable to position feedback)	BOOL	0
MV_Unit	Unit of measure for manipulated variable	INT	1342
NoFbkAuxVClose	1 = No "closed" feedback for auxiliary valve present	BOOL	1
NoFbkAuxVOpen	1 = No "open" feedback for auxiliary valve present	BOOL	1
NoFbkClose	1 = No feedback present for "control valve closed"	BOOL	0
NoFbkOpen	1 = No feedback present for "control valve open"	BOOL	0

Parameter	Description	Type	Default
Occupied	1 = In use by a batch	BOOL	0
OosLi	1 = "Out of service", via interconnection or SFC	BOOL	0
OosOp*	1 = "Out of service", via OS operator	BOOL	0
OpenAut*	1 = Select Open valve in "automatic mode"	BOOL	0
OpenForce	1 = Forced open of control valve	BOOL	0
OpenMan*	1 = Select Open valve in "manual mode"	BOOL	0
OS_Perm	I/O for operating permissions	STRUCT Bit 0: BOOL Bit 12: BOOL Bit 31: BOOL	- 1 1 1
OS1Perm	I/O for operating permissions	STRUCT Bit 0: BOOL ... Bit 31: BOOL	- 1 1 1
PosDeadBand	Dead band for forming manipulated variable difference	REAL	0.1
PosDiClose	Limit for control valve position "closed"	REAL	5.0
PosDiOpen	Limit for control valve position "open"	REAL	95.0
Rbk	Position feedback for display on OS	REAL	0.0
QCRbk	Quality code of Position feedback for display on OS	REAL	0.0
RbkHyst	Alarm hysteresis for position feedback	REAL	1.0
Rbk_WH_DC*	Delay time for incoming warning message of the position feedback with overrange/underrange process value or only with underrange process value [s]	REAL	0.0
Rbk_WH_DG*	Delay time for outgoing warning message of the position feedback with overrange/underrange process value or only with underrange process value [s]	REAL	0.0
Rbk_W_DC*	Delay time for incoming warning of the position feedback with overrange/underrange process value or only with underrange process value [s]	REAL	0.0

Parameter	Description	Type	Default
Rbk_W_DG*	Delay time for outgoing warning of the position feedback with overrange/underrange process value or only with underrange process value [s]	REAL	0.0
RbkWH_En	1 = Enable warning (high) for position feedback	BOOL	0
RbkWH_Lim	Limit for position feedback of warning (high)	REAL	90.0
A1_AWH_DC	A1: Delay time for incoming alarms/warnings with overrange process value [s]	REAL	0.0
A1_AWH_DG	A1: Delay time for outgoing alarms/warnings with overrange process value [s]	REAL	0.0
A1_AW_DC	A1: Delay time for incoming alarms/warnings with overrange/underrange process value or only with underrange process value [s]	REAL	0.0
A1_AW_DG	A1: Delay time for outgoing alarms/warnings with overrange/underrange process value or only with underrange process value [s]	REAL	0.0
A2_AWH_DC	A2: Delay time for incoming alarms/warnings with overrange process value [s]	REAL	0.0
A2_AWH_DG	A2: Delay time for outgoing alarms/warnings with overrange process value [s]	REAL	0.0
A2_AW_DC	A2: Delay time for incoming alarms/warnings with overrange/underrange process value or only with underrange process value [s]	REAL	0.0
A2_AW_DG	A2: Delay time for outgoing alarms/warnings with overrange/underrange process value or only with underrange process value [s]	REAL	0.0
RbkWH_MsgEn	1 = Enable messages for warning (high) for position feedback	BOOL	1
RbkWL_En	1 = Enable warning (low) for position feedback	BOOL	0
RbkWL_Lim	Limit for position feedback of warning (low)	REAL	10.0
RbkWL_MsgEn	1 = Enable messages for warning (low) for position feedback	BOOL	1
RdCfgOp	1 = Read all configuration data from Sipart	BOOL	0

Parameter	Description	Type	Default
RstLi*	1 = Reset via interconnection	STRUCT Value: BOOL ST: BYTE	- 0 16#80
RstOp*	1 = Reset via operator	BOOL	0
RunUpCyc	Number of cycles in startup; messages are suppressed during these cycles	INT	3
SafePos	Neutral position for control valve: 0 = Closed 1 = Open 2 = Stop	INT	0
SafePosAux	Neutral position for auxiliary valve: 1 = Open 0 = Closed	BOOL	0
SampleTime	Sampling time [s] (assigned automatically)	REAL	0.1
SlotHart	Number of the slot (channel) within the AO modules connected to the Sipart in the HW Config	INT	0
StepNo	Batch step number	DWORD	16#00000000
Tim*	Monitoring time for setting of "Controller error" fault message	REAL	0.0
TimeFactor	Time unit: 0 = seconds 1 = minutes 2 = hours	INT	0
WarnTiAut	Prewarning of valve movement in automatic mode in [s]	REAL	0.0
WarnTiMan	Prewarning of valve movement in manual mode in [s]	REAL	0.0
WrCfgOp*	1 = Write all configuration data to Sipart	BOOL	0

* Values can be written back to these inputs during processing of the block by the block algorithm.

Output parameters

Parameter	Description	Type	Default
A1_Act	1 = Alarm 1 of alarm module active	BOOL	0
A1AH_Act	1 = A1: High alarm enabled	BOOL	0
A1AL_Act	1 = A1: Low alarm enabled	BOOL	0
A1WH_Act	1 = A1: High warning enabled	BOOL	0
A1WL_Act	1 = A1: Low warning enabled	BOOL	0
A2_Act	1 = Alarm 2 of alarm module active	BOOL	0

Parameter	Description	Type	Default
A2AH_Act	1 = A2: High alarm enabled	BOOL	0
A2AL_Act	1 = A2: Low alarm enabled	BOOL	0
A2WH_Act	1 = A2: High warning enabled	BOOL	0
A2WL_Act	1 = A2: Low warning enabled	BOOL	0
AModFlt_Act	1 = Fault message of alarm module active	BOOL	0
AutAct	1 = "Automatic mode" enabled 0 = "Manual mode", "Local mode" or "Out of service" enabled	BOOL	0
AuxClosed	1 = Auxiliary valve is closed	BOOL	0
AuxClsing	1 = Auxiliary valve is closing	BOOL	0
AuxOpened	1 = Valve is open	BOOL	0
AuxOpning	1 = Auxiliary valve is opening	BOOL	0
CascaCut	Cascade connection: 1 = Control chain from master controller to secondary valve is interrupted	BOOL	0
Ctrl	Control output for auxiliary valve (depends on SafePosAuxV)	BOOL	0
Closed	1 = Valve is closed	BOOL	0
Closing	1 = Valve is closing	BOOL	0
ENO	1 = Block algorithm completed without errors	BOOL	0
EmergOp_Act	1 = Emergency operation is active (CbK3)	BOOL	0
ER	Manipulated variable difference	REAL	0.0
ER_AH_Act	1 = Alarm limit (high) for manipulated variable difference violated. You can change the response for this parameter by setting Feature bit 28 (deactivate switching points) and Feature bit 29 (high/low signal limit violation) accordingly.	BOOL	0
ER_AL_Act	1 = Alarm limit (low) for manipulated variable difference violated. You can change the response for this parameter by setting Feature bit 28 (deactivate switching points) and Feature bit 29 (high/low signal limit violation) accordingly.	BOOL	0
ErrorNum	Output of current error number. For error numbers that can be output by this block, see the error handling of VlvAnL	INT	-1

Parameter	Description	Type	Default
FailSav_Act	1 = Field device in fail-safe position (Cbk0)	BOOL	0
FbkAuxVCloseOut	1 = Auxiliary valve is closed	BOOL	0
FbkAuxVOpenOut	1 = Auxiliary valve is open	BOOL	0
FbkCloseOut	1 = Control valve is open	BOOL	0
FbkClsgOut	Control valve closing feedback	BOOL	0
FbkOpenOut	1 = Control valve is open	BOOL	0
FbkOpngOut	Control valve opening feedback	BOOL	0
GrpErr	1 = Group error pending	BOOL	0
LocalAct	1 = "Local mode" enabled	BOOL	0
LockAct	1 = Interlock is active	BOOL	0
ManAct	1 = "Manual mode" enabled	BOOL	1
MsgStat01..16	Message status	WORD	16#0000
MsgAck01..16	Message acknowledgment status	BOOL	0
MonDynAuxVErr	1 = Feedback error auxiliary valve due to output change	BOOL	0
MonDynErr	1 = Feedback error control valve due to control change	BOOL	0
MonStaAuxVErr	1 = Feedback error from auxiliary valve due to unexpected feedback change	BOOL	0
MonStaErr	1 = Feedback error from control valve due to unexpected feedback change	BOOL	0
MV	Manipulated variable	REAL	0.0
QCMV	Quality code of manipulated variable	BYTE	0
MV_ExtAct	1 = External manipulated variable active 0 = Internal manipulated variable active	BOOL	0
MV_ExtOut	Output for external manipulated variable	REAL	0.0
MV_HiAct	1 = Limit (high) of manipulated variable violated	BOOL	0
MV_LoAct	1 = Limit (low) of manipulated variable violated	BOOL	0
MV_RateTarget	Target manipulated variable for the gradient limitation	REAL	0.0
MV_UnitOut	Unit of measure for manipulated variable	INT	0
OosAct	1 = Block is "Out of service"	BOOL	0
Opened	1 = Valve is open	BOOL	0
Opening	1 = Valve is opening	BOOL	0

Parameter	Description	Type	Default
OS_PermLog	Display of OS_Perm with settings changed by the block algorithm	DWORD	16#FFFFFFFF
OS_PermOut	Display of OS_Perm	DWORD	16#FFFFFFFF
OS1PermLog	Display of OS1Perm with settings changed by the block algorithm	DWORD	16#FFFFFFFF
OS1PermOut	Display of OS1Perm	DWORD	16#FFFFFFFF
P_Rst	1= Pulse output for reset The parameter persists for one cycle after a reset.	BOOL	0
PIExeed_Act	1 = Stoke integral exceeded (Cbk16)	BOOL	0
PosReached	1 = Control valve has reached specified position	BOOL	0
QLim	Response threshold for "controller error" fault message	REAL	0.0
QTim	Monitoring time for setting of "Controller error" fault message	REAL	0.0
QWronDev	1 = Wrong device connected	BOOL	1
RbkOut	Position feedback output	REAL	0.0
RbkWH_Act	1 = Warning (high) active. You can change the response for this parameter by setting Feature bit 28 (deactivate switching points) and Feature bit 29 (high/low signal limit violation) accordingly.	BOOL	0
RbkWL_Act	1 = Warning (low) active. You can change the response for this parameter by setting Feature bit 28 (deactivate switching points) and Feature bit 29 (high/low signal limit violation) accordingly.	BOOL	0
RdyToReset	1 = Ready for reset via RstLi input or commands in "automatic mode"	BOOL	0
RdyToStart	1 = Active start readiness	BOOL	0
Status1	Status word 1	DWORD	16#00000000
Status2	Status word 2	DWORD	16#00000000
Status3	Status word 3	DWORD	16#00000000
Status4	Status word 4	DWORD	16#00000000
Status5	Status word 5	DWORD	16#00000000
Status6	Status word 6	DWORD	16#00000000
SumMsgAct	1 = Group message active	BOOL	0
WarnAct	1 = Prewarning for control valve movement away from neutral position active (WarnTiAut and WarnTiMan parameters)	BOOL	0

9.1.7 Template of S7SipPS2

SIPART PS2 0/4 to 20 mA

This template is used to connect a SIPART PS2 via a 0 to 20 mA or 4 to 20 mA signal without HART.

The inputs BE1/BE2, A1Act/A2Act and AModF of the S7SipPS2 block and the input blocks Readback (SCALE) and MV (UNSCALE) must be interconnected to the corresponding I/O addresses.

Because no configuration data can be read from the device acyclically, the following inputs of the Sipart PS2 block may need to be configured to match their setting in the device:

Block parameters	Parameters on SI-PART PS2	Meaning	Parameterization required
MV_OpScaleL/ MV_OpScaleH	35.YA/36.YE	Manipulated variable limit start/end	always
Bin1/Bin2	42.BIN1/43.BIN2	Function of the inputs BE1/BE2	When inputs BE1/BE2 are used
AFct	44.AFCT	Alarm function	When an alarm module is used (inputs A1Act/A2Act)
A1/A2	45.A1/46.A2	Response threshold Alarm1/Alarm2	When an alarm module is used (inputs A1Act/A2Act)
Tim/Lim	48.TIM/49.LIM	Monitoring time/Response threshold for fault message "Controller error"	When LIM and TIM are to be displayed in the faceplate

SIPART PS2 HART

This template is used when SIPART PS2 is connected to the controller via a HART module.

The inputs BE1/BE2, A1Act/A2Act and AModF of the S7SipPS2 block and the input blocks Readback (SCALE) and MV (UNSCALE) must be interconnected to the corresponding I/O addresses.

The Laddr input of the AcyclicData block is assigned the base address of the S7SipPS2 from the HW Config. The slot of the HART module must be configured at the SlotHart input of the S7SipPS2 block in HW Config.

SIPART PS2 Profibus PA

This template is used when the SIPART PS2 is connected to the controller via Profibus PA.

The inputs BE1/BE2, A1Act/A2Act, AModF Rbk and QCRbk of the S7SipPS2 block must be interconnected to the corresponding I/O addresses.

The Laddr input of the AcyclicData block is assigned the base address of the Sipart PS2 from the HW Config. The IN input of the CbkBy0, CbkBy1 and CbkBy2 blocks must be manually interconnected must be interconnected to the corresponding I/O address.

9.1.8 Operator control & monitoring

9.1.8.1 Views of S7SipPS2

Views of the S7SipPS2 block

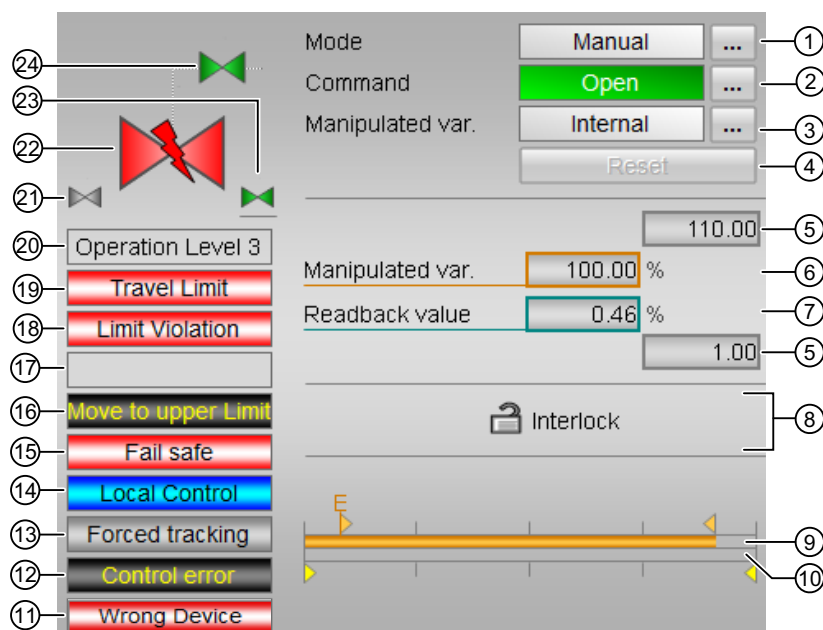
The SipPS2 block provides the following views:

- Standard view of S7SipPS2 (Page 305)
- Limit view of S7SipPS2 (Page 310)
- Alarm view (Page 10)
- Trend view (Page 11)
- Parameter view of S7SipPS2 (Page 313)
- Preview of S7SipPS2 (Page 315)
- Batch view (Page 9)
- S7SipPS2 block icon (Page 317)

For general information on the faceplate and block icon, refer to the sections "Faceplate structure" and "Block icon structure" in the APL Online Help.

9.1.8.2 Standard view of S7SipPS2

Standard view with auxiliary valve



(1) Display and switch the operating mode

This area provides information on the currently valid operating mode. The following operating modes can be shown here:

- Manual mode (see the APL Online Help)
- Automatic mode (see the APL Online Help)
- Local mode (see the APL Online Help)
- Out of service (see APL Online Help)

For more information on switching over of the operating mode, refer to the "Switchover of operating state and operating mode" section in the APL Online Help.

(2) Opening, closing and stopping the control valve

This area shows you the default operating state for the valve. The following states can be shown and executed here:

- "Open"
- "Close"
- "Stop" (display only, no operation possible)

"Close"/"open" command relates to the auxiliary valve. If no auxiliary valve is required for controlling the control valve, the "Open" and "Close" commands affect the control valve.

If text is configured for these commands, it is displayed as status text and as button labels for command selection. You can find additional information on this in the "Labeling buttons and texts" section in the APL Online Help.

For more information on switching over of the state, refer to the "Switchover of operating state and operating mode" section in the APL Online Help.

(3) Displaying and switching the default manipulated variable

This area shows how to specify the manipulated variable. The manipulated variable can be specified as follows:

- By the application ("External", CFC/SFC)
- By the user directly in the faceplate ("Internal").

For more information on switching over of the manipulated variable specification, refer to the "Switchover of operating state and operating mode" section in the APL Online Help.

(4) Resetting the block

Click "Reset" for interlocks or errors. For more information, refer to the "Resetting the block in case of interlocks or errors" section in the APL Online Help.

(5) High and low scale range for the manipulated variable

These values provide information on the display range for the bar graph of the manipulated variable. The scale range is defined on the Sipart and read by the block there.

(6) Displaying and changing the manipulated variable

This area shows the current manipulated variable.

The manipulated variable can only be changed by

- Internal manipulated variable specification (MV_ExtAct = 0) and
- an open auxiliary valve (due to the dependence on the standard function "Neutral position for motors, valves and controllers" that is described in the APL Online Help).

For more information about changing the manipulated variable, see the "Changing values" section in the APL Online Help.

(7) Display of the position feedback including signal status

This area shows the current feedback of the manipulated variable with the corresponding signal status.

(8) Operating area for the interlock functions of the block

This display is only visible when the corresponding block input is connected.

You can use this button to control the interlock functions of the block. For more information, refer to the "Interlock functions" section in the APL Online Help.

The following is displayed in addition to the buttons:

- Interlock status (see "Forming the group status for interlock information" section in the APL Online Help), for example:



(9) Bar graph for the manipulated variable

This area shows the current manipulated variable in the form of a bar graph. The visible area in the bar graph depends on the configuration in the Engineering System (ES).

The external manipulated variable is identified by the letter "E".

(10) Bar graph for position feedback

The dosing quantity can only be reset in the "End" status.

(11) Display area for block states

- "Wrong device"

(12) Display area for block states

This area provides additional information on the operating state of the block:

- "Error End position"
- "Control error"

- "Invalid signal"
- "Changeover error"

Additional information on these errors is available in the sections "Monitoring the feedbacks, Error handling", (subsection "Invalid input signals" and "Mode switchover error") in the APL Online Help.

(13) Display area for block states

This area provides additional information on the operating state of the block:

- "Forced open" (OpenForce)
- "Forced close" (CloseForce)
- "Forced tracking" (MV_ForOn)
- "Tracking" (MV_TrkOn)
- "Request 0/1": A reset to "automatic mode" is expected.

For more information, refer to the "Forcing operating states" section in the APL Online Help.

(14) Display area for state of the Sipart PS2

This area provides additional information on the Sipart PS2 module:

- "Local operation"

(15) Display area for state of the Sipart PS2

This area provides additional information on the Sipart PS2 module:

- "Fail-safe position"

(16) Display area for state of the binary input BE2

This area provides additional information on the binary input BE2 according to the configuration of Bin2:

- "Message Bin2"
- "Travel to end value"
- "Travel to start value"
- "Movement blocked"
- "PST" (Partial-Stroke-Test)

(17) Display area for state of the binary input BE1

This area provides additional information on the binary input BE1 according to the configuration of Bin1:

- "Message Bin1"
- "Configuration change blocked"
- "Configuration change blocked/Manual mode"
- "Travel to end value"
- "Travel to start value"
- "Movement blocked"
- "PST" (Partial-Stroke-Test)

(18) Display area for block states

This area provides additional information on the operating state of the block:

- "Limit violated"

(19) Display area for state of the Sipart PS2

This area provides additional information on the Sipart PS2 module:

- "Stroke integral exceeded"

(20) Display area for switch permission

This area provides the text of the current OS, according to the enumeration configured at the PERMIS input.

(21) Automatic preview

This display is only visible in "manual mode", in "local mode", or with a reset request in "automatic mode", when the current output signals are not identical to the control in "automatic mode".

The display shows what state the valve would assume if you switched from "manual" or "local" mode to "automatic mode", or performed a reset to "automatic mode".

(22) Status display of the control valve

You can find additional information on this in section S7SipPS2 block icon (Page 317).

(23) Representation of neutral position

This representation shows the neutral position for the control valve:

- **Green:** Neutral position is "Open"
- **Gray:** Neutral position is "Closed"
- **Light green:** Neutral position is "Stop"

(24) Picture of auxiliary valve

The small auxiliary valve and the associated line are only shown when the control valve has an additional auxiliary valve and it can be controlled. Configurable with `Feature` bit 5 at the block.

The current status of the auxiliary valve is graphically displayed here.

9.1.8.3 Limit view of S7SipPS2

Several values can be set by default in this view:

- Manipulated variable difference limits
- Readback value limits
- Manipulated variable operating range

The toolbars of the faceplate and the block icon indicate when the limits are reached or violated.

① Enabled operations Limits Alarm Module

☒ H alarm (AModule) 20.00 %

☒ H warning (AModule) 25.00 %

Manipulated var. difference (Sipart PS2)

☒ Limit (LIM) 10.00 %

☒ Monitoring time (TIM) 5.00 s

Manipulated var. difference limits (ER)

☒ H alarm 100.00 %

☐ Hysteresis 1.00 %

☒ L alarm -100.00 %

Readback value limits

☒ H warning 90.00 %

☐ Hysteresis 1.00 %

☒ L warning 10.00 %

Manipulated variable operating range

☒ H range 100.00 %

☒ L range 10.00 %

⑦ ⑧

(1) Enabled operations

This area shows all operations for which special operator authorizations are assigned. They depend on the configuration in the engineering system (ES) that applies to this block.

Symbols for enabled operations:

- **Green check mark:** The OS operator can control this parameter
- **Gray check mark:** the OS operator cannot control this parameter at this time due to the process
- **Red cross:** The OS operator cannot control this parameter due to the configured AS operator permissions (OS_Perm or OS1Perm)

(2) Actual value limits (Sipart alarm module)

The limits displayed here are the limits of the optional Sipart PS2 alarm module. You cannot change the values in the faceplate. Depending on the configuration of the alarm module (Afct input), the alarm limits (A1, A2) are shown as alarm high/low, alarm/warning high or alarm/warning low. The associated messages in WinCC are triggered by setting the inputs A1Act and A2Act.

(3) Limit and monitoring time manipulated variable difference (Sipart)

This area displays and may allow you to change the limit for the maximum manipulated variable difference (LIM) and the monitoring time (TIM) which must deviate from the manipulated variable before a fault message is triggered in the device. In the event of a limit violation, the general message "Sipart error" is output in WinCC.

If the limits LIM and TIM are not to be displayed, the `Feature2.Bit3` must be set to FALSE.

(4) Manipulated variable difference limits

In this area, you can enter the limits for the manipulated variable error. Refer to the "Changing values" section in the APL Online Help.

You can change the following limits:

- "H alarm": High alarm
- "Hysteresis"
- "L alarm": Low alarm

(5) Readback value limits (MV)

In this area, you can enter the limits for the readback value (position feedback). Refer to the "Changing values" section in the APL Online Help.

You can change the following limits:

- "H warning": High warning
- "Hysteresis"
- "L warning": Low warning

(6) Manipulated variable operating range (MV)

In this area, you can enter the limits for the manipulated variable operation range. Refer to the "Changing values" section in the APL Online Help.

You can change the following limits:

- "H range": Range limit high
- "L range": Range limit low

(7) Message suppression/delays

The message suppression indicates whether suppression of the associated message is activated in the AS block using the `xx_MsgEn` parameter. The output of messages is not suppressed when the block is installed (all `xx_MsgEn` parameters are set to 1 by default). Messages can only be output if limit monitoring of the additional analog value has been enabled.

Alarm delays are also displayed in this state; refer to the "Application of alarm delays" section in the APL Online Help.

(8) Suppress messages

You can activate/deactivate messages by selecting the check mark.

9.1.8.4 Parameter view of S7SipPS2

①	Enabled operations Monitoring	
✓	Control	3.00 s
✓	End position	3.00 s
✓	Monitoring	☒
	Monitoring auxiliary valve	
✓	Control	3.00 s
✓	Monitoring	☒
	Settings	
✓	MV := Rbk in tracking	☐
✓	MV := MV external	☐
	Parameter	
✓	Read config. data	...
✓	Write config. data	...

(1) Enabled operations

This area shows all operations for which special operator authorizations are assigned. They depend on the configuration in the engineering system (ES) that applies to this block.

Symbols for enabled operations:

- **Green check mark:** The OS operator can control this parameter
- **Gray check mark:** the OS operator cannot control this parameter at this time due to the process
- **Red cross:** the OS operator cannot control this parameter due to the configured AS operator control permissions (OS_Perm or OS1Perm).

(2) Monitoring

In this area, you change parameters and therefore influence the control valve. Refer to the "Changing values" section in the APL Online Help.

You can influence the following parameters:

- "Control": Monitoring time during opening and closing of the control valve (dynamic)
- "End position": Monitoring time of the end position of the control valve (static)

Enable monitoring

You can enable monitoring by selecting the check box (☒)

For more information, refer to the "Monitoring feedbacks" section in the APL Online Help.

(3) Monitoring auxiliary valve

As under (2) Monitoring, but only visible when there is an auxiliary valve. Only one common monitoring time can be entered for dynamic and static monitoring.

(4) Settings

- MV = Rbk in tracking mode: Correction is performed with the position feedback Rbk instead of the MV_Trk tracking value. The switchover from "Track manipulated variable" (MV_TrkOn = 1) to "Do not track manipulated variable" is bumpless (MV_TrkOn = 0). Set MV_TrkRbk parameter.
- MV = External MV: Bumpless switchover of the manipulated variable for manipulated variable switchover from external to internal. The internal manipulated variable is tracked to the external one. Set MV_TrkExt parameter.

(5) Read/write configuration data

This area lets you read all configuration data from the Sipart PS2, or transfer all configuration data from the block to Sipart PS2.

9.1.8.5 Preview of S7SipPS2

The screenshot displays the S7SipPS2 control interface. At the top, there is a tab labeled 'Automatic' and a 'Close' button. Below this, a list of parameters is shown with their current values: MV external (0.00 %), MV internal (0.00 %), MV difference (*** %), Permissible dev. (0.10 %), Open limit (95.00 %), Close limit (5.00 %), Track MV (0), and Tracking value (0.00 %). These parameters are grouped by a bracket labeled (2). Below the parameters, there is a section titled 'Enabled operations' which lists several functions with checkmarks: MV external, MV internal, Change MV, Open, Close, Reset, Automatic, Manual, Local, and Out of service. This section is grouped by a bracket labeled (3). At the bottom, there is a section titled 'Inputs and outputs' which lists four inputs: Interlock (1), Local (0), Feedback open (0), and Feedback close (0). This section is grouped by a bracket labeled (4). A bracket labeled (1) points to the 'Automatic' tab and 'Close' button area.

(1) Automatic preview

This shows the operating status of the control valve after it has switched from "manual" to "automatic" mode. If the block is in "automatic mode", the current block state is displayed.

(2) Preview area

- "Manipulated variable external": Display current external manipulated variable (MV_ExtOut).
- "Manipulated variable internal": Display current internal manipulated variable (MV_Int).

- "Manipulated variable difference": Current manipulated variable error (ER)
- "Permissible dev.": permitted $\pm$ deviation (PosDeadBand) of output manipulated variable. If the manipulated variable feedback Rbk is within this range, the manipulated variable is considered reached.
- "Limit Open": Limit (PosDiOpen) for forming the "Control valve Open" signal (FbkOpenOut). If the position feedback reaches this limit, the control valve is open.
- "Limit Closed": Limit (PosDiClose) for forming the "Control valve Closed" signal (FbkCloseOut). If the position feedback reaches this limit, the control valve is closed.
- "Track manipulated variable": (MV_TrkOn = 1) Manipulated variable is corrected to the tracking value. Tracking value for the effective manipulated variable for "Track manipulated variable"
With MV_TrkRbk = 1, Rbk is displayed here, with MV_TrkRbk = 0, MV_Trk is displayed.
- "Channel MV": Display of manipulated variable from output channel block
- "Auxiliary valve monitoring": Display of current monitoring time of the auxiliary valve.
- "Valve monitoring": Display of current monitoring time of the valve.

(3) Enabled operations

This area shows all operations for which special operator authorizations are assigned. They depend on the configuration in the engineering system (ES) that applies to this block.

Symbols for enabled operations:

- **Green check mark:** The OS operator can control this parameter
- **Gray check mark:** the OS operator cannot control this parameter at this time due to the process
- **Red cross:** The OS operator is generally prohibited from accessing this parameter due to the configured AS operator control permissions (OS_Perm or OS1Perm).

The following enabled operations are shown here:

- "Manipulated variable external": You can enable external manipulated variable specification
- "Manipulated variable internal": You can enable internal manipulated variable specification
- "Change MV": You can change the manipulated variable
- "Open": You can open the valve. The display always relates to the auxiliary valve and control valve. Neither the auxiliary valve nor the control valve can be opened if there is no enable.

For the control valve this means: If a new manipulated variable is greater than the current valve position, this new manipulated variable take effect.

If text is configured for this command, it is also displayed in brackets. You can find additional information on this in the "Labeling buttons and texts" section in the APL Online Help.

- "Close": You can close the valve. The display always relates to the auxiliary valve and control valve. Neither the auxiliary valve nor the control valve can be closed if there is no enable.

For the control valve this means: If a new manipulated variable is less than the current valve position, this new manipulated variable does not take effect and the control valve retains its position.

If text is configured for this command, it is also displayed in brackets. You can find additional information on this in the "Labeling buttons and texts" section in the APL Online Help.

- "Reset": You can reset the valve if interlocks or errors occur.
- "Automatic": You can switch to "automatic mode".
- "Manual": You can switch to "manual mode".
- "Local": You can switch to "local mode".
- "Out of service": You can switch to "Out of service" mode.

(4) Inputs and outputs

This area shows the most important parameters for this block with the current selection.

- "Interlock":
This display is only visible when the corresponding block input is connected.
 - 0 = Interlocking without reset is active; you can operate the block without reset once the interlocking condition has disappeared
 - 1 = "Good" state

- "Local": 1 = "Local mode" is enabled

Since, depending on the configuration, the block itself forms the digital feedback signals internally via the "Open" and "Closed" positions, the following reaction results from the "Feedback open" and "Feedback closed" signals.

- Control valve:
 - "Feedback open": The display is derived from the FbkOpenOut output. However, this output is formed from the configured limit for the "Open" position.
 - "Feedback close": The display is derived from the FbkCloseOut output. However, this output is formed from the configured limit for the "Closed" position.
- "Control auxiliary valve": only visible when there is a auxiliary valve
 - Control binary control Ctrl.Out
 - "Feedback Open auxiliary valve": FbkAuxVOpenOut.
 - "Feedback Closed auxiliary valve": FbkAuxVCloseOut.
 - "Control channel auxiliary valve": Signal for control of the auxiliary valve from the output channel block

9.1.8.6 S7SipPS2 block icon

A variety of block icons is available with the following functions:

- Alarm violation. Warning and tolerance limits as well as the control system fault CSF
- Operating modes

- Forcing states
- Interlocks
- Valve status display
- Display of feedback value (white, with decimal places)
- Operation of the manipulated variable
- Process tag type
- External/internal manipulated variable specification

The block icons from template @TemplateAPL_SITRANS.PDL:

Icons	Selection of the block icon in CFC	Special features
	1	-

Additional information on the block icon and the control options in the block icon is available in the following chapters:

- "Configuring the block icons" in the APL Online Help
- "Block icon structure" in the APL Online Help
- "Operation via the block icon" in the APL Online Help

Valve status display

The following valve states are shown here:

Icon	Meaning
	Valve open
	Valve closed
	Error at valve
	Valve is opening
	Valve is closing
	Valve stopped

SITRANS LR HART

10.1 S7SiLRHA

10.1.1 Description of S7SiLRHA

Object name (type + number) and family

Type + number: FB 2638

Family: Sitrans

Application area of SitrLRHA

The block is used for the following applications:

- Interface block between the HART driver blocks of the Sitrans LR 200, Sitrans LR 250, Sitrans LR 260 and Sitrans LR 560 modules (referred to below as Sitrans LR) for the user program and for visualization

How it works

The SitrLRHA block prepares the process data received from driver blocks from a Sitrans LR and makes the data available for further use in the user program and for visualization. Data entered in the faceplate or via the block inputs is transferred to the Sitrans LR by means of driver blocks.

The function block supports all PDM configurations of the up to four HART auxiliary variables of the Sitrans LR.

NOTE

In the following, block parameters are identified e.g. by PV/SV/TV/QV_OpScaleH, PV/SV/TV/QV_OpScaleL where the PV_OpScaleH/L, SV_OpScaleH/L, TV_OpScaleH/L and QV_OpScaleH/L inputs are meant for the HART variables PV, SV, TV and QV.

Configuration

Use the CFC editor to install the block in a cyclic interrupt OB (OB30 to OB38). The block is also installed automatically in the startup OB (OB 100). Moreover, to connect the I/O signals, it is imperative to call the Pcs7AnIn driver blocks (cyclic data, 4 to 20 mA), FbAnIn (HART variables) and PiDr64 (acyclic data) in the same interrupt OB and startup OB (OB100) **before** the SitrLRHA block in each case. The `AcyclData` output structure of the PiDr64 block is interconnected to the input with the same name of the SitrLRHA block.

The `SlotHart` input receives the slot number of the Sitrans LR within the analog input module. The `Feature` bit 2 must be used to configure whether communication with the module is by means of the HART protocol. If HART communication is used, reading out of the module configuration can be triggered in the WinCC faceplate. Otherwise, the device type of the Sitrans LR (`DevType` input), the physical variable of the 4 to 20 mA signal (`PV_Meas0` input), its unit (`PV_Unit0` input), and its scaling (`PV_OpScaleH/L` input) must be entered manually.

Note

Correct configuration of the `SlotHart` input is a mandatory requirement and cannot be checked by the block.

Measuring ranges of the corresponding measured values are parameterized at the `PV/SV/TV/QV_OpScaleH/L` inputs.

The SITRANS library contains a template for process tag types as an example with an application scenario for the `SitrLRHA` block.

Example of a process tag type: see section Template of S7SiLRHA (Page 336)

Note

The user text library "`SitrLRhA_MeasVal`" must be copied from the Sitrans Library to the PCS 7 project prior to the OS compilation. To do this, open the SITRANS Library from the Simatic Manager using File -> Open... -> Libraries. Copy the "`SitrLRPA_MeasVal`" file from the library (directory: Blocks+Templates\Text Libraries) into a user text library folder created using the S7 program in your PCS 7 project.

Startup characteristics

Use the `Feature` Bit Setting the startup characteristics (Page 24) to define the startup characteristics of this block.

The messages are suppressed after startup for the number of cycles set at `RunUpCyc`.

Status word allocation for `Status1` parameter

You can find a description for each parameter in section I/Os of S7SiLRHA (Page 330).

Status bit	Parameter
0	Occupied
1	BatchEn
2	Not used
3	OosAct
4	OosLi
5	Not used
6	OnAct
7 - 31	Not used

Status word allocation for `Status2` parameter

You can find a description for each parameter in section I/Os of S7SiLRHA (Page 330).

Status bit	Parameter
0	MsgLock
1	PV_AH_Act
2	PV_WH_Act
3	PV_WL_Act
4	PV_AL_Act
5 - 6	Not used
7	PV_AH_En
8	PV_WH_En
9 - 10	Not used
11	PV_WL_En
12	PV_AL_En
13	PV_AH_MsgEn
14	PV_WH_MsgEn
15 - 16	Not used
17	PV_WL_MsgEn
18	PV_AL_MsgEn
19	GradHUpAct
20	GradHDnAct
21	GradLAct
22	GradHUpEn
23	GradHDnEn
24	GradLEn
25	GradHUpMsgEn
26	GradHDnMsgEn
27	GradLMsgEn
28	0 = falling measured value 1 = rising measured value
29 - 31	Not used

Status word allocation for `Status3` parameter

You can find a description for each parameter in section I/Os of S7SiLRHA (Page 330).

Status bit	Parameter
0	1st HART auxiliary variable (PV) is available and visualized in the faceplate
1	2nd HART auxiliary variable (SV) is available and visualized in the faceplate
2	3rd HART auxiliary variable (TV) is available and visualized in the faceplate
3	4th HART auxiliary variable (QV) is available and visualized in the faceplate
4 - 23	Not used
24	QWronDev

Status bit	Parameter
25	1 = error when reading acyclic data (active only for the duration of one cycle)
26 - 27	Not used
28	Show value for fill time
29	Show value for empty time
30	Fill time and empty time visible
31	Not used

10.1.2 Operating modes of S7SiLRHA

The block can be operated using the following modes:

- On
- Out of service

"On"

You can find general information about the "On" mode in the On chapter.

"Out of service"

You can find general information about the "Out of service" mode in the Out of service section.

The descriptions of the operating modes are identical for the S7SiLRHA and the APL; refer to the online help for the standard APL blocks for information on them.

10.1.3 Functions of S7SiLRHA

The functions for this block are listed below.

Configuration data

The configuration data comprises units, configuration of the 4 to 20 mA signal and HART variables, scaling of the 4 to 20 mA signal, and the diagnostics values. After a change is made in the device, reading of configuration data must be triggered with "Read configuration data" in the parameter view of the faceplate. If the parameters were read back before a complete download to the PLC, the configuration does not need to be reloaded from the device.

The SitrLRHA function block has the following configuration data which can be read out of the Sitrans LR by means of the "Read configuration data" command:

Description	Block parameters (I/O)
Configuration of PV, SV, TV, QV inputs	PV_Meas0 PV_Meas1 PV_Meas2 PV_Meas3 PV_Meas4
Vessel form	TankType

Units PV, SV, TV, QV	PV_Unit0 PV_Unit1 PV_Unit2 PV_Unit3 PV_Unit4 PV_InUnit LevelUnit VolUnit DistUnit SpaceUnit
Scaling 4 ... 20 mA signal	ScaleIn.Low/ScaleOut.Low ScaleIn.High/ScaleOut.High
Diagnostics values	InAlgorithm/Algorithm InConfidenc/Confidenc InEchoStren/EchoStren

Note

If the module is used without HART communication, the inputs must be parameterized accordingly manually since reading out of the configuration from the module is not possible.

Limit monitoring

The block monitors the process value PV_In for limits. The value is cyclically integrated into the process image of the controller. The limits are configured on the block.

You can monitor the process value PV_In for the following high and low alarm and warning limits:

- PV_AH_Lim: Limit for high alarm
- PV_AL_Lim: Limit for low alarm
- PV_Hyst: Hysteresis
- PV1_WH_Lim: Limit for high warning
- PV1_WL_Lim: Limit for low warning

The result of limit monitoring is returned at the following interconnectable output parameters:

- PV_AH_Act = 1: Limit for high alarm reached or exceeded
- PV_AL_Act = 1: Limit for low alarm reached or undershot
- PV_WH_Act = 1: Limit for high warning reached or exceeded
- PV_WL_Act = 1: Limit for low warning reached or undershot

Monitoring is always enabled using the input parameters:

- PV_AH_En = 1: Monitoring of the high alarm limits
- PV_AL_En = 1: Monitoring of the low alarm limits
- PV_WH_En = 1: Monitoring of the high warning limits
- PV_WL_En = 1: Monitoring of the low warning limits

The corresponding message is suppressed using the parameters:

- PV_AH_MsgEn = 0: Alarm (high) messages are suppressed
- PV_AL_MsgEn = 0: Alarm (low) messages are suppressed
- PV_WH_MsgEn = 0: Warning (high) messages are suppressed
- PV_WL_MsgEn = 0: Warning (low) messages are suppressed

You can define a hysteresis (PV_Hyst) for the limits, for example to suppress signal flatter. You can also modify the limits and hysteresis via the faceplate.

Gradient monitoring

The gradient PV_Grad0 is calculated by means of a delay function configurable using LagTime. During calculation of the gradient, jumps in the input value PV_In are smoothed.

The peak values of the gradient are output in the output parameters PV_GradNP0 (negative gradient) and PV_GradPP0 (positive gradient). These are reset when the operator enters the corresponding command for resetting.

The slope of the gradient PV_Grad0 can be monitored for the following limits:

- Limit (high) for the positive gradient (GradHUpLim)
- Limit (high) for the negative gradient (GradHDnLim)
- Limit (low) for the absolute gradient (GradLLim)

Activation of the individual monitoring functions is carried out at the corresponding "Enable" parameters, e.g. GradHUpEn for activating the high gradient limit for positive gradients (GradHUpLim).

Reaching or violation of your defined limits is indicated at the corresponding "Active" output parameters, e.g. by means of GradHUpAct = 1 for the limit (high) for the positive gradient.

Messages can be output for these alarms. You can activate these as follows:

- Message for alarms (high) for the positive gradient: GradHUpMsgEn = 1
- Message for alarms (high) for the negative gradient: GradHDnMsgEn = 1
- Message for alarms (low) for the absolute gradient: GradLMsgEn = 1

Suppressing messages using the MsgLock parameter

This block provides the standard "Suppressing messages using the MsgLock parameter" function that is described in the APL Online Help.

Selecting a unit of measure

This block provides the standard function Selecting a unit of measure. The units for the 4 to 20 mA signal and the HART variables are configured on the device of the Sitrans LR via PDM and read by an operator action in the "Parameters" faceplate view with "Read configuration" or configured by the user himself if HART communication does not exist.

If volume is selected for the 4 to 20 mA signal or one of the HART variables (Sitrans LR 200 or LR 250), the volume unit must be configured at the PV_Unit0 and PV_Unit1 (4 to 20 mA signal) or PV_Unit2..4 (HART variables) inputs.

Configurable reactions using the Feature I/O

The following response features are available for this block at the respective bits of the Feature connection. If a description is not available here, it can be referenced in the APL Online Help.

Bit	Feature
0	Setting the startup characteristics
1	Reaction to the Out of service mode
2	1 = HART communication present between module and controller
3	1 = Two decimal places of aux. value in limit messages
6	1 = Activate calculation of fill time/empty time
22	Update acknowledgment and error status of the message call
24	Enable local operator authorization
25	Suppress all messages
26	Reaction of the switching points in "Out of service" mode
28	Disabling switching points
29	Signaling limit violation

For more information about the feature bits please refer to the APL online help.

Operator authorizations

This block provides the standard operating permissions that are described in the APL online help.

The block has the following permissions for the OS_Perm parameter:

Bit	Function
0	Not used
1	1 = Operator can switch to "On" mode
2	Not used
3	1 = Operator can switch to "Out of service" mode
4 - 6	Not used
7	1 = Operator can reset the maximum values
8	1 = Operator can activate / deactivate messages with GradHUpMsgEn
9	1 = Operator can activate / deactivate messages with GradHDnMsgEn
10	1 = Operator can activate / deactivate messages with GradLMsgEn
11 - 12	Not used
13	1 = Operator can change the limit (PV_In) for the high alarm
14	1 = Operator can change the limit (PV_In) for the high warning
15	Not used
16	1 = Operator can change the limit (PV_In) for the hysteresis

17	1 = Operator can change the limit (PV_In) for the low alarm
18	1 = Operator can change the limit (PV_In) for the low warning
19	Not used
20	1 = Operator can change the value for the high gradient limit for positive gradients (GradHUpLim)
21	1 = Operator can change the value for the high gradient limit for negative gradients (GradHDnLim)
22	1 = Operator can change the value for the low gradient limit for positive and negative gradients (GradLLim)
23	Not used
24	1 = Operator can activate / deactivate messages with PV_AH_MsgEn
25	1 = Operator can activate / deactivate messages with PV_WH_MsgEn
26	1 = Operator can activate / deactivate messages with PV_WL_MsgEn
27	1 = Operator can activate / deactivate messages with PV_AL_MsgEn
28 - 31	Not used

The block has the following permissions for the OS1Perm parameter:

Bit	Function
0 - 13	Not used
14	1 = Operator can read the diagnostics values from the device
15	1 = Operator can read the configuration data from the device
16	1 = Operator can write the configuration data from the device
17 - 31	Not used

Simulating signals

Simulation is triggered during runtime in the faceplate's parameter view by clicking on the "Simulation" button.

You can simulate the following values in the faceplate via an input:

The 4 to 20 mA signal (PV_Out0) in the standard view is specified via the input (SimPV0).

The HART variables (PV_Out1..4) are specified in the standard view via the inputs (SimPV1..4).

You can simulate the following values via an interconnection in the CFC:

- The level (SimLevLi, Level)
- The volume (SimVolLi, Volume)
- The distance (SimDisLi, Distance)
- The space (SimSpaLi, Space)

The Level, Volume, Distance and Space outputs are simulated in accordance with the module configuration when simulation is carried out via the faceplate. The simulation value of the 4 to 20 mA signal has a higher priority than the value of the first HART auxiliary variable PV.

Display and operating range for process values and limits

The inputs `PV_OpScaleH/L` are used as display and operating range for the process value `PV_In`.

Displaying auxiliary values

This block provides the standard "Display auxiliary values" function (`UserAna1` or `UserAna2` inputs); for more information, refer to the APL Online Help.

Opening additional faceplates

This block provides the standard "Call further faceplates" function that is described in the APL Online Help.

Generating instance-specific messages

This block provides the standard "Generate instance-specific messages" function that is described in the APL Online Help.

SIMATIC BATCH functionality

This block provides the standard "SIMATIC BATCH functionality" function that is described in the APL Online Help.

10.1.4 Error handling of S7SiLRHA

For general information on error handling at all blocks, refer to the "Error handling" section in the APL Online Help.

The following errors can be displayed for this block:

- Error numbers
- Control system fault (CSF)

Overview of error numbers

The I/Os `Error0Num` can be used to output the following error numbers:

Error number	Meaning of the error number
-1	Predefined value when inserting the block; the block is not executed.
0	There is no error.
30	The process value can no longer be displayed in the REAL number field: <code>PV_In</code> : <code>Error0Num</code> <code>PV</code> : <code>Error1Num</code> <code>SV</code> : <code>Error2Num</code> <code>TV</code> : <code>Error3Num</code> <code>QV</code> : <code>Error4Num</code>

Control system fault (CSF)

An external signal can be activated via the `CSF` input. A process control error is triggered if this signal = 1. Refer to the "Error handling" section in the APL Online Help.

10.1.5 Messages of S7SiLRHA

Messaging

The following messages can be generated for this block:

- Process control error
- Process messages
- Instance-specific message

Process control error

The following control system fault messages can be output:

Message instance	Message class	Event
MsgEvId08	PLC Process Control Message - Failure	External error has occurred (S7SiLRHA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]
MsgEvId09	PLC Process Control Message - Error	Error while reading a data record (S7SiLRHA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]

You can interconnect an external fault (signal) to the input parameter `CSF`. If this signal changes to `CSF = 1`, a process control error is triggered (MsgEvId2, SIG4).

Process messages

Message instance	Message class	Event
MsgEvId01	Alarm - high	@1Y%t#S7SiLRHA_MeasVal@ - High alarm limit violated (S7SiLRHA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2I%d@.@2Y%1u@]
MsgEvId02	Warning - high	@1Y%t#S7SiLRHA_MeasVal@ - High warning limit violated (S7SiLRHA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2I%d@.@2Y%1u@]
MsgEvId03	Warning - low	@1Y%t#S7SiLRHA_MeasVal@ - Low warning limit violated (S7SiLRHA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2I%d@.@2Y%1u@]
MsgEvId04	Alarm - low	@1Y%t#S7SiLRHA_MeasVal@ - Low alarm limit violated (S7SiLRHA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@2I%d@.@2Y%1u@]

MsgEvId05	Alarm - high	Limit value (high) for the positive gradient violated (S7SiLRHA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]
MsgEvId06	Alarm - high	Limit value (high) for the negative gradient violated (S7SiLRHA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]
MsgEvId07	Alarm - low	Limit value (low) for absolute gradient violated (S7SiLRHA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]

The content of the message text library "S7SiLRHA_MeasVal" is described below.

Instance-specific message

You can use up to three instance-specific message with this block.

Message instance	Message class	Event
MsgEvId10	PLC Process Control Message - Failure	External message (S7SiLRHA: #@3X%3u@) [BatchID:@2X%3u@] [Auxiliary value:@1R%4.1f@]

Associated values for message instances without limit violation

Associated value	Block parameter	Data Type
1	Aux	REAL
2	BatchID	DWORD
3	MsgFilter	DINT

Associated values for message instances with limit violation

Associated value	Block parameter	Data Type
1	PV_Meas0	BYTE
2	AuxByte (one or two digits after the decimal point, see Feature.Bit3)	BYTE
3	AuxWord (number before the decimal point: -32768 .. 32767)	WORD
4	BatchID	DWORD
5	MsgFilter	DINT

Message texts and their text numbers

The following table shows the message texts and their numbers in the text library "S7SiLRHA_MeasVal" for the S7SiLRHA block (FB 2638):

Text number	Message text
0	<Invalid value>
1	Volume
2	Level
3	Distance
4	Space

10.1.6 I/Os of S7SiLRHA

Input parameters

Parameter	Description	Type	Default
SlotHart	Slot number of the Sitrans LR within the AI module in the ET 200M from HW Config	INT	0
DevType	Device type of Sitrans LR 1: Sitrans LR 200 2: Sitrans LR 250 3: Sitrans LR 260 4: Sitrans LR 560	INT	0
PV_In	Process value (4 to 20 mA signal)	REAL	0.0
QCPV_In	Quality Code of Process Value (4..20mA signal)	BYTE	16#80
PV	First HART variable (primary variable)	REAL	0.0
QCPV	Quality Code of first HART variable (Primary variable)	BYTE	16#FF
SV	Second HART variable (secondary variable)	REAL	0.0
QCSV	Quality Code of second HART variable (Secondary variable)	BYTE	16#FF
TV	Third HART variable (tertiary variable)	REAL	0.0
QCTV	Quality Code of third HART variable (Tertiary variable)	BYTE	16#FF
QV	Fourth HART variable (quaternary variable)	REAL	0.0
QCQV	Quality Code of fourth HART variable (Quaternary variable)	BYTE	16#FF
InPV_AH_Lim	Limit sensor PV_In: Alarm limit (high)	REAL	0.0
InPV_WH_Lim	Limit sensor PV_In: Warning limit (high)	REAL	0.0
InPV_Hyst	Limit sensor PV_In: Hysteresis for alarm and warning limits	REAL	0.0

Parameter	Description	Type	Default
InPV_WL_Lim	Limit sensor PV_In: Limit warning (low)	REAL	0.0
InPV_AL_Lim	Limit sensor PV_In: Alarm limit (low)	REAL	0.0
PV_AH_En	1 = Activate process value PV_In (high) alarm	BOOL	1
PV_WH_En	1 = Activate process value PV_In (high) warning	BOOL	1
PV_WL_En	1 = Activate process value PV_In (low) warning	BOOL	1
PV_AL_En	1 = Activate process value PV_In (low) alarm	BOOL	1
PV_AH_MsgEn	1 = Activate message for process value PV_In (high) alarm	BOOL	1
PV_WH_MsgEn	1 = Activate message for process value PV_In (high) warning	BOOL	1
PV_WL_MsgEn	1 = Activate message for process value PV_In (low) warning	BOOL	1
PV_AL_MsgEn	1 = Activate message for process value PV_In (low) alarm	BOOL	1
GradHUpLim	Gradient monitoring: Limit (high) for the positive gradient	REAL	10.0
GradHDnLim	Gradient monitoring: Limit (high) for the negative gradient	REAL	10.0
GradLLim	Gradient monitoring: Limit (low) for the absolute gradient	REAL	1.0
RstOp*	1 = Reset peak values of gradient via operator	BOOL	0
DeadTFiEm*	Deadband of gradient value for display of fill time/empty time	REAL	0.0
LagTime	Delay time [s]	REAL	1.0
PV_OpScaleH	High limit for scale in PV bar graph of faceplate	REAL	100.0
PV_OpScaleL	Low limit for scale in PV bar graph of faceplate	REAL	0.0
SV_OpScaleH	High limit for scale SV	REAL	100.0
SV_OpScaleL	Low limit for scale SV	REAL	0.0
TV_OpScaleH	High limit for scale TV	REAL	100.0
TV_OpScaleL	Low limit for scale TV	REAL	0.0
QV_OpScaleH	High limit for scale QV	REAL	100.0
QV_OpScaleL	Low limit for scale QV	REAL	0.0
PV_Unit0*	Unit for process value (4 to 20 mA signal)	INT	0
PV_Unit1*	Unit for the first HART variable (primary variable)	INT	0
PV_Unit2*	Unit for the second HART variable (secondary variable)	INT	0
PV_Unit3*	Unit for the third HART variable (tertiary variable)	INT	0
PV_Unit4*	Unit for the fourth HART variable (quaternary variable)	INT	0
TankType*	Vessel form	BYTE	16#00
InAlgorithm*	Algorithm	BYTE	16#00
InConfidenc*	Echo quality	BYTE	16#00
InEchoStren*	Echo strength	BYTE	16#00

Parameter	Description	Type	Default
GradHUpEn	1 = Enable gradient monitoring (high) for positive changes	BOOL	1
GradHDnEn	1 = Enable gradient monitoring (high) for negative changes	BOOL	1
GradLEn	1 = Enable gradient monitoring (low)	BOOL	0
OnOp*	1 = "On" mode via operator	BOOL	0
OosOp*	1 = "Out of service", via OS operator	BOOL	0
OosLi	1 = "Out of service", via interconnection or SFC (0-1 edge transition)	BOOL	0
GradHUpMsgEn	1 = Enable gradient (high) message for positive changes	BOOL	1
GradHDnMsgEn	1 = Enable gradient (high) message for negative changes	BOOL	1
GradLMsgEn	1 = Enable gradient (high) message for negative changes	BOOL	1
TimeFactor	Time unit: 0 = seconds 1 = minutes 2 = hours	INT	0
MsgLock	1 = Suppress process messages.	BOOL	0
SampleTime	Sampling time [s] (assigned automatically)	REAL	0.1
RunUpCyc	Number of cycles in startup; messages are suppressed during these cycles	INT	3
MsgEvId01..10	Message number (assigned automatically)	DWORD	16#00000000
BatchEn	1 = Enable allocation	BOOL	0
BatchID	Batch ID	DWORD	16#00000000
BatchName	Batch name	S7-String	
StepNo	Batch step number	DWORD	16#00000000
Occupied	1 = Occupied by batch control	BOOL	0
CSF	1 = External error (control system fault)	BOOL	0
ExtMsg	Binary input for freely selectable message	BOOL	0
UserStatus	Freely assignable bits for use in PCS 7 OS	BYTE	16#00
OS_Perm	I/O for operating permissions	STRUCT • Bit 0 : BOOL ... • Bit31: BOOL	- • 1 ... • 1
OSlPerm	I/O for operating permissions	STRUCT • Bit 0 : BOOL ... • Bit31: BOOL	- • 1 ... • 1
OpSt_In	Input parameter for local operator authorization, to be interconnected with the Out output parameter of the upstream OpStations block	DWORD	16#00000000

Parameter	Description	Type	Default
Feature	I/O for additional functions	STRUCT <ul style="list-style-type: none"> • Bit 0 : BOOL • Bit 1 : BOOL • Bit 2 : BOOL • ... • Bit 6 : BOOL • Bit 7 : BOOL • ... • Bit31: BOOL 	- <ul style="list-style-type: none"> • 0 • 0 • 1 • 0 • 0 • 0
PV_Meas0	Measured value interconnected at the PV_In input: 0: Nor used 1: Volume 2: Fill level 3: Distance 4: Space	BYTE	0
PV_Meas1..4	Measured value interconnected at the PV/SV/TV/QV input: 0: Nor used 1: Volume 2: Fill level 3: Distance 4: Space	BYTE	14
RdCfgOp*	1 = Read all configuration data from Sitrans LR	BOOL	0
RdDiaVal*	1 = Read diagnostics values from Sitrans LR	BOOL	0
ScaleInH	High Range of process value (only for read back)	REAL	0.0
ScaleInL	Low Range of process value (only for read back)	REAL	0.0
MaxVol	Range of volume High Value (only for read back)	REAL	0.0
MinVol	Range of volume Low Value (only for read back)	REAL	0.0
CalInH	High range of calibration setpoints (only for read back)	REAL	0.0
CalInL	Low range of calibration setpoints (only for read back)	REAL	0.0

* Values can be written back to these inputs during processing of the block by the block algorithm.

In/out parameters

Parameter	Description	Type	Default
AcyclData	Acyclic data from driver block PiDr64 (interconnect this input with output AcyclData of PiDr64)	STRUCT <ul style="list-style-type: none"> SlotRd : INT ... RetValWr: WORD Input : STRUCT Output : STRUCT NewDiag : INT DiagData : STRUCT 	

Output parameters

Parameter	Description	Type	Default
QWronDev	1 = Wrong device connected	BOOL	1
PV_Out0	Process value output (4 to 20 mA signal)	REAL	0.0
PV_Out1	Output first HART variable (primary variable)	REAL	0.0
PV_Out2	Output second HART variable (secondary variable)	REAL	0.0
PV_Out3	Output third HART variable (tertiary variable)	REAL	0.0
PV_Out4	Output fourth HART variable (quaternary variable)	REAL	0.0
TankFilled	Output process value PV in [%]	REAL	0.0
TimeFillS	Fill time calculated with current gradient value [s]	REAL	0.0
TimeEmptyS	Empty time calculated with current gradient value [s]	REAL	0.0
TimeFill	Fill time calculated with current gradient value [TFillUnit]	REAL	0.0
TimeEmpty	Empty time calculated with current gradient value [TEmptyUnit]	REAL	0.0
TFillUnit	Unit of TimeFill	INT	0
TEmptyUnit	Unit of TimeEmpty	INT	0
Algorithm	Algorithm	BYTE	16#00
Confidenc	Echo quality	BYTE	16#00
EchoStren	Echo strength	BYTE	16#00
PV_Grad0	Process value gradient (4 to 20 mA signal)	REAL	0.0
PV_GradPP0	Gradient value, maximum peak value	REAL	0.0
PV_GradNP0	Gradient value, minimum peak value	REAL	0.0
Level	Current level	REAL	0.0
QCLevel	Quality code of current level	BYTE	16#00
Volume	Current volume	REAL	0.0
QCVolume	Quality code of current volume	BYTE	16#00
Distance	Current distance	REAL	0.0

Parameter	Description	Type	Default
QCDistance	Quality code current distance	BYTE	16#00
Space	Current space	REAL	0.0
QCSpace	Quality code of current space	BYTE	16#00
PV_AH_Act	Limit sensor PV_In: 1 = Alarm (high) active. You can change the response for this parameter by setting Feature bit 28 (deactivate switching points) and Feature bit 29 (high/low signal limit violation) accordingly.	BOOL	0
PV_WH_Act	Limit sensor PV_In: 1 = Warning (high) active. You can change the response for this parameter by setting Feature bit 28 (deactivate switching points) and Feature bit 29 (signal limit violation) accordingly.	BOOL	0
PV_WL_Act	Limit sensor PV_In: 1 = Warning (low) active. You can change the response for this parameter by setting Feature bit 28 (deactivate switching points) and Feature bit 29 (signal limit violation) accordingly.	BOOL	0
PV_AL_Act	Limit sensor PV_In: 1 = Alarm (low) active. You can change the response for this parameter by setting Feature bit 28 (deactivate switching points) and Feature bit 29 (signal limit violation) accordingly.	BOOL	0
SumMsgAct	1 = Group signal is active	BOOL	0
ScaleOutH	High range of process value	REAL	0.0
ScaleOutL	Low range of process value	REAL	0.0
PV_InUnit	Unit of measure for process value	INT	0
LevelUnit	Unit for level	INT	0
VolUnit	Unit for volume	INT	0
DistUnit	Unit for distance	INT	0
SpaceUnit	Unit for space	INT	0
GradHUpAct	1 = Gradient alarm (high) for positive changes. 1 = Alarm (low) active. You can change the response for this parameter by setting Feature bit 28 (deactivate switching points) and Feature bit 29 (signal limit violation) accordingly.	BOOL	0
GradHDnAct	1 = Gradient alarm (high) for negative changes. 1 = Alarm (low) active. You can change the response for this parameter by setting Feature bit 28 (deactivate switching points) and Feature bit 29 (signal limit violation) accordingly.	BOOL	0

10.1 S7SiLRHA

Parameter	Description	Type	Default
GradHDnAct	1 = Gradient alarm (low). 1 = Alarm (low) active. You can change the response for this parameter by setting Feature bit 28 (deactivate switching points) and Feature bit 29 (signal limit violation) accordingly.	BOOL	0
OosAct	1 = Block is "Out of service"	BOOL	0
OnAct	1 = "On" mode enabled	BOOL	0
OS_PermOut	Display of OS_Perm	DWORD	16#FFFFFFFF
OS_PermLog	Display of OS_Perm with settings changed by the block algorithm	DWORD	16#FFFFFFFF
OS1PermOut	Display of OS1Perm	DWORD	16#FFFFFFFF
OS1PermLog	Display of OS1Perm with settings changed by the block algorithm	DWORD	16#FFFFFFFF
OpSt_Out	Value of the input parameter OpSt_In, for further interconnection with other blocks. Bit 31 of this parameter is used by Feature bit 24	DWORD	16#00000000
Status1	Status word 1	DWORD	16#00000000
Status2	Status word 2	DWORD	16#00000000
Status3	Status word 3	DWORD	16#00000000
MsgStat1..10	Alarm status	WORD	16#0000
MsgAckn1..10	Alarm acknowledgment status	BOOL	16#0000
PV_AH_Lim	Alarm limit (high) PV_In	REAL	0.0
PV_WH_Lim	Warning limit (high) PV_In	REAL	0.0
PV_Hyst	Limit sensor PV_In: Hysteresis for alarm and warning limits	REAL	0.0
PV_WL_Lim	Warning limit (low) PV_In	REAL	0.0
PV_AL_Lim	Alarm limit (low) PV_In	REAL	0.0

10.1.7 Block diagram of S7SiLRHA

A block diagram is not provided for this block.

10.1.8 Template of S7SiLRHA

This process tag type is used to connect a Sitrans LR HART with driver blocks to STEP 7.

Note

The SCALE function takes an integer value (IN) and converts it to a real value in engineering units scaled between a low and a high limit (LO_LIM and HI_LIM). For more information on Scaling block press F1 for online help.

The Scaling block trims the value of `PVin` 4 to 20 mA signal. The inputs for the Hart auxiliary variables of the function block S7SiLRHA (`PV`, `SV`, `TV`, `QV`) are interconnected with the corresponding input from HW Config. The `Laddr` input of the PiDr64 block (`AcyclicData`) is configured with the address of the 4 to 20 mA signal (not interconnected!).

The `SlotHart` input receives the slot number of the SITRANS LR module within the analog input module at the Sitrans LR (`S7SiLRHA`) block. The `Feature` bit 2 must be used to configure whether communication with the module is by means of the HART protocol.

All required information can be found in HW Config.

Note

Correct configuration of the `SlotHart` input is a mandatory requirement and cannot be checked by the block.

10.1.9 Operator control & monitoring

10.1.9.1 Views of S7SiLRHA

Views of the SitrLRHA block

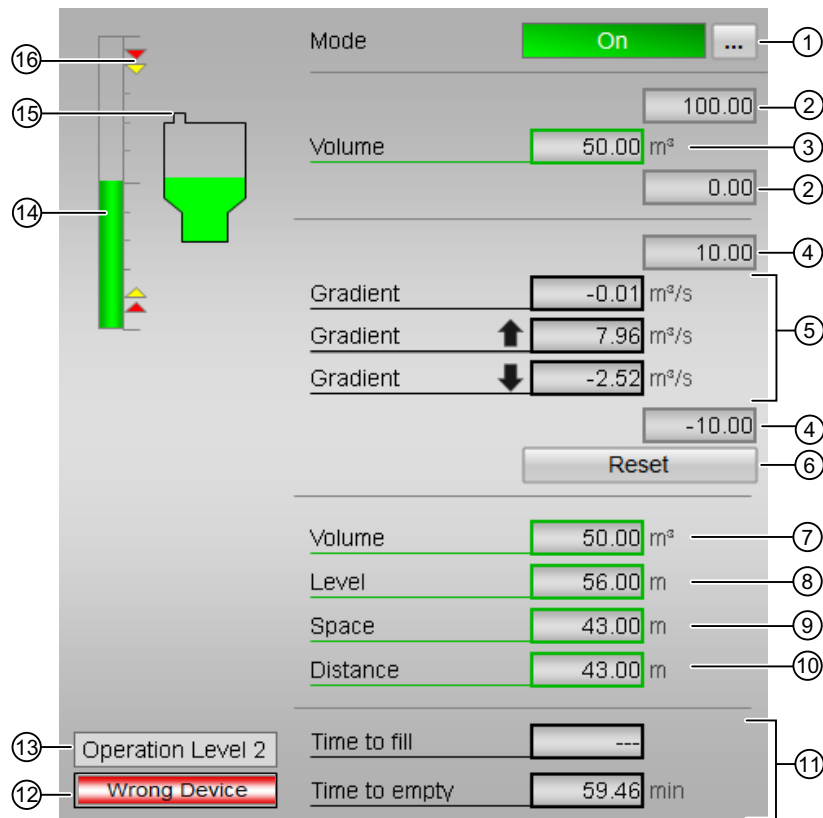
The SitrLRHA block has the following views:

- Standard view of S7SiLRHA (Page 338)
- Alarm view (Page 10)
- Limit view of S7SiLRHA (Page 341)
- Trend view (Page 11)
- Parameter view of S7SiLRHA (Page 342)
- Preview of S7SiLRHA (Page 343)
- Batch view (Page 9)

For general information on the faceplate and block icon, refer to the sections "Faceplate structure" and "Block icon structure" in the APL Online Help.

10.1.9.2 Standard view of S7SiLRHA

Depending on the configuration of the 4 to 20 mA signal and the up to four HART variables in the standard view, the current process values for volume, fill level, distance and space are displayed. If a measured value is not assigned to a variable, the field is hidden. The gradient values always refer to the 4 to 20 mA signal.



(1) Display and switch the operating mode

This area provides information on the currently valid operating mode. The following operating modes can be shown here:

- On (see the APL online help)
- Out of service (see the APL Online Help)

For more information on changing the operating mode, refer to the "Switching operating states and operating modes" section in the APL Online Help.

(2) High and low scale range for the first process value (4 to 20 mA signal)

These values provide information on the display range for the bar graph of the process value (4 to 20 mA signal). The scale range is set in the engineering system with the PV_OpScaleH \L parameter, see Display and operating range for process values and limits.

(3) Display of first process value (4 to 20 mA signal)

This area indicates the current process value (4 to 20 mA signal). The name of the configured measured value is displayed depending on the `PV_Meas0` variable, in this case "Volume".

(4) High and low scale range for the gradient value

These values provide information on the display range for the bar graph of the gradient. The scale range corresponds to 10% of the scale range for the process value (4 to 20 mA signal): If you have entered a scale range for the process value of 0 to 100, for example, the scale range for the gradient is automatically defined as -10 to 10.

The current gradient value is displayed if one of the monitoring functions is enabled:

- Gradient monitoring for positive changes (`GradHUpEn = 1`)
- Gradient monitoring for negative changes (`GradHDnEn = 1`)
- Gradient monitoring (`GradLEn = 1`)

(5) Display of gradient

This area shows the current, minimum and maximum gradient values of the 4 to 20 mA signal as well as rising and falling of the value. This display of the minimum and maximum gradient value functions like a slave pointer.

The current gradient value is displayed if one of the monitoring functions is enabled:

- Gradient monitoring for positive changes (`GradHUpEn = 1`)
- Gradient monitoring for negative changes (`GradHDnEn = 1`)
- Gradient monitoring (`GradLEn = 1`)

The maximum peak gradient value is displayed if the gradient monitoring function for positive changes is enabled (`GradHUpEn = 1`)

The minimum peak gradient value is displayed if the gradient monitoring function for negative changes is enabled (`GradHDnEn = 1`)

(6) Resetting of peak values of the gradient

Using these buttons you can reset the maximum or minimum peak value of the gradient (output parameters `PV_GradPP0` and `PV_GradNP0`).

The button is displayed if the gradient monitoring function for positive (`GradHUpEn = 1`) or negative (`GradHDnEn = 1`) changes is enabled.

(7), (8), (9) and (10) Display of HART variables

This area provides information on the current process values of the HART variables. The name of the configured measured value is displayed depending on the `PV_Meas1..4` variable, in this case "Volume", "Level", "Space" and "Distance".

(11) Display of fill time and empty time

Fill time and empty time are shown in this area if `Feature` bit 6 (Activate calculation of fill time/empty time) is enabled.

With a positive gradient value, a value is calculated for the fill time. With a negative gradient value, a value is calculated for the empty time.

The calculated times are only shown if the gradient value is outside the deadband (`DeadTFiEm`).

(12) Display area for block states

This area provides additional information on the operating state of the block:

- "Wrong device"

(13) Display area for switch permission

This area provides the text of the current OS, according to the enumeration configured at the `PERMIS` input.

(14) Bar graph for the first "Process value" (4 to 20 mA signal)

This area shows the current first "Process value" (4 to 20 mA signal) in the form of a bar graph. The visible area in the bar graph depends on the configuration in the engineering system (ES), see Display and operating range for process values and limits.

(15) Display of type of tank and level

This display shows you the configured type of tank. This is specified by the "TankType" value. In addition, the current level in the tank is displayed.

(16) Limit display

These small, colored triangles indicate the specified limits of the 4 to 20 mA signal in the bar graph.

10.1.9.3 Limit view of S7SiLRHA

The limits of the 4 to 20 mA signal and the limits for the gradient monitoring of the 4 to 20 mA signal can be specified in this view. The displayed texts depend on the configuration of the limit sensors on the block or in the module.

③ **Enabled operations Volume**

✓	☒	H alarm Volume	95.00 m³
✓	☐	H warn. Volume	90.00 m³
✓		Hysteresis VF	0.00 m³
✓	☒	L warn. Volume	10.00 m³
✓	☒	L alarm Volume	5.00 m³

①

Gradient limits

✓	☒	H alarm	↑	10.00 m³/s
✓	☒	H alarm	↓	10.00 m³/s
✓	☐	L alarm	↑↓	1.00 m³/s

②

④ ⑤

(1) Process value limits (4 to 20 mA signal)

In this area, you can enter the limits for the 4 to 20 mA signal. You can change the following limits:

- "H alarm": High alarm
- "H warning": High warning
- "Hysteresis"
- "L warning": Low warning
- "L alarm": Low alarm

(2) Gradient limits

You can enter gradient limits in this area. Refer to the "Changing values" section in the APL Online Help.

You can change the following limits:

- "H alarm ↑": Gradient for the upper gradient for positive changes
- "H alarm ↓": Gradient for the upper rate of rise for negative changes
- "L alarm ↑↓": Gradient for the lower rate of rise (absolute)

(3) Enabled operations

This area shows all operations for which special operator authorizations are assigned. They depend on the configuration in the engineering system (ES) that applies to this block.

Symbols for enabled operations:

Green check mark:

- The OS operator can control this parameter.

Gray check mark:

- The OS operator cannot control this parameter at this time due to the process

Red cross:

- The OS operator can control this parameter due to the configured AS operating permissions (OS_Perm or OS1Perm)

(4) Message suppression/delays

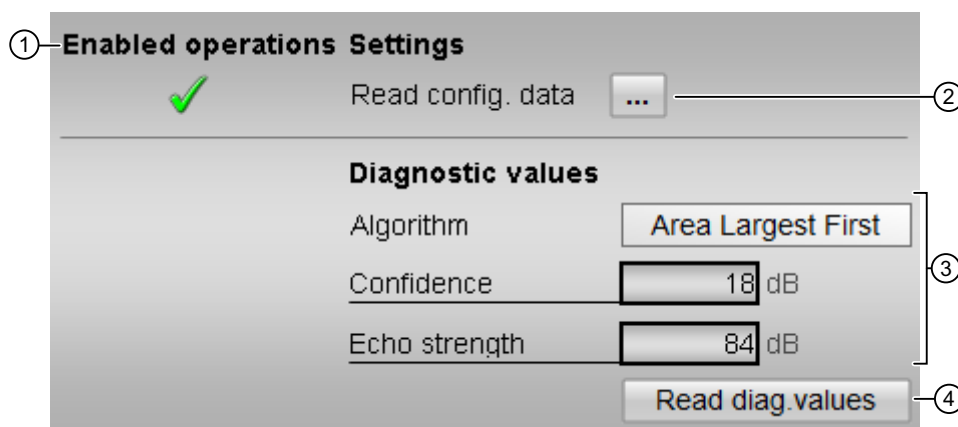
The message suppression indicates whether suppression of the associated message is activated in the AS block using the `xx_MsgEn` parameter. The output of messages is not suppressed when the block is installed (all `xx_MsgEn` parameters are set to 1 by default). Messages can only be output if limit monitoring of the additional analog value has been enabled.

Alarm delays are also displayed in this state; refer to the "Application of alarm delays" section in the APL Online Help.

(5) Suppress messages

You can activate/deactivate messages by selecting the check mark.

10.1.9.4 Parameter view of S7SiLRHA



(1) Enabled operations

This area shows all operations for which special operator authorizations are assigned. They depend on the configuration in the engineering system (ES) that applies to this block.

Symbols for enabled operations:

- **Green check mark:** The OS operator can control this parameter
- **Gray check mark:** the OS operator cannot control this parameter at this time due to the process
- **Red cross:** The OS operator cannot control this parameter due to the configured AS operating permissions (OS_Perm or OS1Perm)

(2) Reading the configuration data

In this area, you can read all configuration data relevant to the block from SITRANS LR.

(3) Diagnostics values

The diagnostics values for algorithm, echo quality and echo strength of the Sitrans LR are displayed in this area.

(4) Reading the diagnostics values

In this area, you can read the diagnostics values from SITRANS LR.

10.1.9.5 Preview of S7SiLRHA

Volume	56.00 m ³	①
Volume	56.00 m ³	
Level	56.00 m	
Space	43.00 m	
Distance	43.00 m	
Enabled operations		②
✓ Reset	✓ On	
	✓ Out of service	

(1) Process values

This area shows the real process values (PV_In, PV, SV, TV, QV).

(2) Enabled operations

This area shows all operations for which special operator authorizations are assigned. They depend on the configuration in the engineering system (ES) that applies to this block.

Symbols for enabled operations:

- **Green check mark:** The OS operator can control this parameter
- **Gray check mark:** the OS operator cannot control this parameter at this time due to the process
- **Red cross:** The OS operator cannot control this parameter due to the configured AS operating permissions (OS_Perm or OS1Perm)

The following enabled operations are shown here:

General enabled operations:

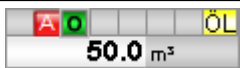
- "Reset": You can reset the peak value of the gradient.
- "On": You can switch to "On" mode.
- "Out of service": You can switch to "Out of service" mode.

10.1.9.6 Block icons for S7SiLRHA

A variety of block icons is available with the following functions:

- Process tag type
- Limits (high/low)
- Violation of alarm and warning limits as well as the control system fault CSF
- Operating modes for PV, SV, TV and QV
- Signal status
- Process value (PV_In, 4 to 20 mA signal)

The block icons from template @TemplateAPL_SITRANS.PDL:

Icons	Selection of the block icon in CFC	Special features
	1	
	-	Block icon in "Out of service" mode (example of block icon type 1)

For more information on the block icon and operating options in the block icon, refer to the following sections in the APL online help:

- "Configuring the block icons"
- "Block icon structure"
- "Operation via the block icon"

Driver blocks

11.1 PiDr64

11.1.1 Description of PiDr64

Object name (type + number) and family

Type + number: FB 2602

Family: AdvLibPI

Area of application for PiDr64

The block is used for the following applications:

- Exchange of acyclic data (data record length up to 64 bytes) with a DP slave
- Reading the diagnostics data of a DP slave

How it works

The block reads/writes acyclic data of a DP slave from/to the device.

Configuration

Use the CFC editor to install the block in a cyclic interrupt OB (OB30 to OB38).

When the CFC function "Generate module drivers" is used, the following occurs automatically:

- The member variables of input structure `Addr` (.Laddr0..6) are assigned the address parameters configured in HW Config. Input `Addr.Laddr0` is assigned the diagnostics address, and the other inputs `Addr.Laddr1..6` are assigned the logical address of the respective slot. The member variable is assigned the value -1 if a slot is not configured in HW Config.
- The Mode in/out parameter is interconnected to the corresponding `OMode_xx` output parameter of the MOD_XXXX block.

Write the first slot's address that was generated in HW Config to input parameter `Laddr`.

Note

If you are not using the CFC function "Generate module drivers", parameterize the addresses of input structure `Addr` and the Mode in/out parameter manually. The block expects the values `Mode = 16#80xxxxxx` for "I/O data can be read", and `16#00xxxxxx` (or `RackF = TRUE`) for "invalid I/O data".

The Addr input structure gets the following values:

Parameter	Addressing
Laddr	Volume flow input address (AI)
Addr.Laddr0	Diagnostics address of the MAG6000
Addr.Laddr1	Input address slot 1 (= volume flow input address(AI))
Addr.Laddr2	Input address slot 2
Addr.Laddr3	Input address slot 3
Addr.Laddr4/5/6	-1

Address -1 is set by default if no slot is configured.

A template for process tag types is available in the SITRANS Library as an example for the PiDr64 block:

Example of a process tag type:

- Template of Mag6T

Startup characteristics

The PiDr64 block resets the totalizer for the diagnostics data (output `AcyclData.NewDiag`) to zero and sets an internal bit memory to zero to read the current diagnostics data in the cyclic call.

Status word allocation for Status parameter

This block does not have the `Status` parameter.

11.1.2 Operating modes PiDr64

Operating modes PiDr64

This block does not have any operating modes.

11.1.3 Functions of PiDr64

Functions of PiDr64

The functions for this block are listed below.

Reading acyclic values from the DP slave

Reading of acyclic data is initiated by writing the number of the data record to be read to output `AcyclData.ReqRd`. The number of the slot from which the data is read must be set simultaneously at output `AcyclData.SlotRd`, while the data record length in bytes is set at output `AcyclData.LenRd`.

On completion of the read cycle (with/without error), the block copies the number of the data record that was read to output `AcyclData.RdyRead`. The read data is now available in output structure `AcyclData.Input`, while the return value of the RDREC call (SFB52) is set in output variable `AcyclData.RetValRd`. For information on the meaning of the return value, refer to the Online Help of the RDRECBLOCK.

If a temporary error occurs, the block repeats the read job up to five times at delay intervals of one second before the job is closed with a temporary error. Otherwise, the block does not evaluate the return value.

Writing acyclic values to the process image

Writing of acyclic data is initiated by writing the number of the data record to be written to output `AcyclData.ReqWr`. The number of the slot to which the data is written must be set simultaneously at output `AcyclData.SlotWr`, the data record length is set at output `AcyclData.LenWr`, and the data to be written is set at output structure `AcyclData.Output`.

On completion of the write job (with/without error), the block copies the number of the data record that was written to output `AcyclData.RdyWrite`, and the return value of the WRREC call (SFB53) to output variable `AcyclData.RetValRd`. For information on the meaning of the return value, refer to the Online Help of the WRRECBLOCK.

If a temporary error occurs, the block repeats the write job up to five times at delay intervals of one second before the job is closed with a temporary error. Otherwise, the block does not evaluate the return value.

Reading diagnostics data

If a diagnostics interrupt (OB82) is reported for the block instance, the diagnostics data is read and copied to output structure `AcyclData.DiagData`. Output `AcyclData.NewDiag` is incremented by one to signal new diagnostics data. The length of diagnostics data is limited to 20 bytes.

Retaining last values

Since the block only reads data on request, the data will not be changed if the connection to the DP slave is missing (Mode input $\neq 16\#80xxxxxx$ or `RackF = TRUE`). All jobs for reading/writing acyclic data are rejected if an error is pending.

Simulating signals

The block does not have a function for simulating process values.

11.1.4 Error handling of PiDr64

Error handling of PiDr64

The following errors can be displayed for this block:

- Higher-level error

Higher-level error

Higher-level errors are indicated by the value 1 at output parameter `QRackF` if the signal state in the `HighWord` of input parameter `Mode` changes to a value other than `16#80`, or if input `RackF` is set.

The diagnostics data for outgoing higher-level errors is read.

11.1.5 PiDr64 messaging

Messaging

This block does not offer messaging.

11.1.6 PiDr64 connections

PiDr64 connections

Input parameters

Parameter	Description	Type	Default
RackF	1 = DP slave failure (rack fault)	BOOL	0
Laddr	Logical base address of the DP slave	INT	-1
Addr	Slot addresses	STRUCT ¹⁾	-1

¹⁾ Configuration of input structure Addr:

Addr	STRUCT	Slot addresses
	Laddr0: INT	Logical base address of slot 0 (diagnostics address)
	Laddr1: INT	Logical base address of slot 1
	Laddr2: INT	Logical base address of slot 2
	Laddr3: INT	Logical base address of slot 3
	Laddr4: INT	Logical base address of slot 4
	Laddr5: INT	Logical base address of slot 5

	Laddr6: INT	Logical base address of slot 6
	END_STRUCT	

In/out parameters

Parameter	Description	Type	Default
Mode	Value status and measuring type	DWORD	16#00000000

Output parameters

Parameter	Description	Type	Default
QRackF	1 = DP slave failure (rack fault)	BOOL	0
AcyclData	Acyclic data	STRUCT2)	0

²⁾Configuration of the output structure AcyclData:

AcyclData	STRUCT		Description
	SlotRd : INT		Number of the slot for read requests
	ReqRd : INT		Request for reading the data record with this number (-1 = no request)
	LenRd : INT		Length in bytes of the data record to read
	SlotWr : INT		Number of the slot for write requests
	ReqWr : INT		Request for writing the data record with this number (-1 = no request)
	LenWr : INT		Length in bytes of the data record to write
	RdyRead : INT		The data record with this number was read (-1 = no data record read)
	RdyWrite : INT		The data record with this number was written (-1 = no data record written)
	RetValRd : WORD		Return value of SFB RDREC (SFB52) for the read job
	RetValWr : WORD		Return value of SFB WRREC (SFB53) for the read job
	Input	STRUCT	Data that was read from the DP slave
		Para0 : DWORD	Value of input data
		...	...
		Para15 : DWORD	Value of input data
		END_STRUCT	
	Output	STRUCT	Data to be written to the DP slave
		Para0 : DWORD	Value of output data
		...	...
		Para15 : DWORD	Value of output data
		END_STRUCT	

	NewDiag : INT		Totalizer that indicates new diagnostics data
	DiagData	STRUCT	Diagnostics data
		Para0 : DWORD	Diagnostics data
		...	...
		Para15 : DWORD	Diagnostics data
		END_STRUCT	
	END_STRUCT		

11.1.7 Block diagram of PiDr64

Block diagram of PiDr64

A block diagram is not provided for this block.

11.2 PiEI64

11.2.1 Description of PiEI64

Object name (type + number) and family

Type + number: FB 2603

Family: AdvLibPI

PiEI64 application area

The block is used for the following applications:

- Reading a parameter of the basic data type by means of acyclic data in combination with driver block AUTOHOTSPOT

How it works

The block initiates reading of the data record via driver block PiDr64 on request. A parameter of the elementary data type that is addressed via the block inputs is read from the data record and made available at the block output.

Note

The PiDr64 block is capable of simultaneous processing of several read jobs in successive order only. If read jobs are started by several blocks, the blocks are executed based on the call sequence. It is advisable to configure the program so that simultaneous initiation of multiple jobs is safely prevented.

Note

The data records are read by means of acyclic services. Since it is not possible to execute more than 8 acyclic services simultaneously per Profibus segment, you are responsible for preventing the simultaneous start of more than 8 jobs. For this reason, you are strongly advised not to use cyclic read services to read acyclic data. (Each instance of a PiDr64 block cannot process more than one read or write job simultaneously.)

Configuration

Use the CFC editor to install the block in a cyclic interrupt OB (OB30 to OB38). Interconnect the in/out structure `AcyclData` of the PiEI64 block to the output of the same name at the PiDr64 block.

The parameters to be read from the module are specified by means of the block inputs.

Parameter	Meaning
<code>DataType</code>	Specification of the data type of the parameter to read and of the output at which the parameter is made available: 1 = data type '101' (Simatic: Real with quality code), output: <code>OutRealQC</code> 2 = data type 'Float' (Simatic: Real), output: <code>OutReal</code> 3 = data type 'Uns8' (Simatic: Byte), output: <code>OutByte</code> 4 = data type 'Uns16' (Simatic: Word), output: <code>OutWord</code> 5 = data type 'Uns32' (Simatic: DWord), output: <code>OutDword</code>
<code>SlotNo</code>	Number of the slot in HW Config, which is assigned the data record
<code>AbsInd</code>	Absolute Index (= number) of the data record
<code>LenDr</code>	Length in bytes of the data record
<code>Offset</code>	Start address of the parameter in the read data record, e.g. as of byte 12

Startup characteristics

This block has no startup characteristics.

Status word allocation for status parameter

This block does not have the `Status` parameter.

See also

PiDr64
(Page 345)

11.2.2 Operating modes of PiEI64

Operating modes of PiEI64

This block does not have any operating modes.

11.2.3 Functions of PiEI64

Functions of PiEI64

The functions for this block are listed below.

Reading acyclic values

The reading of acyclic values is initiated by a positive edge at input `RdReq`. Output `ReqDetect` is set when the block has detected a positive edge. Once the job was transferred to the PiDr64 block, output `ReqActive` will be set to `TRUE`. The end of reading is indicated at outputs `RdyOK` (error-free) and `RdyErr` (error). These outputs remain set until input `RdReq` is set to `FALSE`. The return value of the RDREC call (SFB52) is copied to output `RetValRd` and, depending on the data type (input `DataType`), the read parameter is copied to the corresponding output (`Outxxx`).

11.2.4 Error handling of PiEI64

Error handling of PiEI64

The following errors can be displayed for this block:

- Parameter assignment error

Parameter assignment error

A parameter assignment error is given at the following conditions:

- Data record length (`LenDr`) is bigger than 64 bytes
- No data type or invalid data type selected (input `DataType` is less than 1 or greater than 5)
- Offset plus length of the selected data type exceeds the length of the data record (`LenDr`)

Output `QParaf` is set and read jobs are rejected if a parameter assignment error occurs.

11.2.5 PiEI64 messaging

Messaging

This block does not offer messaging.

11.2.6 PiEI64 connections

PiEI64 connections

Input parameters

Parameter	Description	Type	Default
RdReq	Read request with positive edge	BOOL	0
DataType	Data type selection: 1 = data type '101' (Simatic: Real with quality code) 2 = data type 'Float' (Simatic: Real) 3 = data type 'Uns8' (Simatic: Byte) 4 = data type 'Uns16' (Simatic: Word) 5 = data type 'Uns32' (Simatic: DWord)	INT	0
SlotNo	Number of the slot in HW Config, which is assigned the data record	INT	0
AbsInd	Absolute Index (= number) of the data record	INT	0
LenDr	Length in bytes of the data record	INT	0
Offset	Start address of the parameter in the read data record, e.g. as of byte 12	INT	0

In/out parameters

Parameter	Description	Type	Default
AcyclData	Acyclic data	STRUCT1)	0

¹⁾Configuration of the output structure AcyclData:

AcyclData	STRUCT		Description
	SlotRd : INT		Number of the slot for read requests
	ReqRd : INT		Request for reading the data record with this number (-1 = no request)

	LenRd : INT		Length in bytes of the data record to read
	SlotWr : INT		Number of the slot for write requests
	ReqWr : INT		Request for writing the data record with this number (-1 = no request)
	LenWr : INT		Length in bytes of the data record to write
	RdyRead : INT		The data record with this number was read (-1 = no data record read)
	RdyWrite : INT		The data record with this number was written (-1 = no data record written)
	RetValRd : WORD		Return value of SFB RDREC (SFB52) for the read job
	RetValWr : WORD		Return value of SFB WRREC (SFB53) for the read job
	Input	STRUCT	Data that was read from the DP slave
		Para0 : DWORD	Value of input data
		...	...
		Para15 : DWORD	Value of input data
		END_STRUCT	
	Output	STRUCT	Data to be written to the DP slave
		Para0 : DWORD	Value of output data
		...	...
		Para15 : DWORD	Value of output data
		END_STRUCT	
	NewDiag : INT		Totalizer that indicates new diagnostics data
	DiagData	STRUCT	Diagnostics data
		Para0 : DWORD	Diagnostics data
		...	...
		Para15 : DWORD	Diagnostics data
		END_STRUCT	
	END_STRUCT		

Output parameters

Parameter	Description	Type	Default
QParf	1 = parameter assignment error	BOOL	0
ReqDetect	Read job detected	BOOL	0
ReqActive	Read job is active, which means that it was transferred to the PiDr64 block	BOOL	0
RdyOK	1 = parameter was read without error	BOOL	0
RdyErr	1 = error when reading the parameter	BOOL	0
RetValRd	Return values of the RDREC block (SFB52)	BOOL	0
OutRealQC	Read parameter of data type Real plus quality code	STRUCT <ul style="list-style-type: none"> Value : REAL ST: BYTE 	<ul style="list-style-type: none"> 0.0 16#80

Parameter	Description	Type	Default
OutReal	Read parameter of data type Real	REAL	0.0
OutByte	Read parameter of data type Byte	BYTE	16#00
OutWord	Read parameter of data type Word	WORD	16#0000
OutDword	Read parameter of data type DWord	DWORD	16#00000000

11.2.7 Block diagram of PiEI64

Block diagram of PiEI64

A block diagram is not provided for this block.

11.3 PiStAr64

11.3.1 Description of PiStAr64

Object name (type + number) and family

Type + number: FB 2604

Family: AdvLibPI

Area of application for PiStAr64

The block is used for the following applications:

- Reading a parameter of data type String or Array of Byte (`OctStr`) by means of acyclic data in combination with PiDr64 driver block.

How it works

The block initiates reading of the data record via driver block PiDr64 on request. A parameter of the elementary data type that is addressed via the block inputs is read from the data record and made available at the block output.

Note

The PiDr64block is capable of simultaneous processing of several read jobs in successive order only. If read jobs are started by several blocks, the blocks are executed based on the call sequence. It is advisable to configure the program so that simultaneous initiation of multiple jobs is safely prevented.

Note

The data records are read by means of acyclic services. Since it is not possible to execute more than 8 acyclic services simultaneously per Profibus segment, you are responsible for preventing the simultaneous start of more than 8 jobs. For this reason, you are strongly advised not to use cyclic read services to read acyclic data. (Each instance of a PiDr64 block cannot process more than one read or write job simultaneously.)

Configuration

Use the CFC editor to install the block in a cyclic interrupt OB (OB30 to OB38). Interconnect the in/out structure `AcyclData` of the PiEI64 block to the output of the same name at the PiDr64 block.

The parameters to be read from the module are specified by means of the block inputs.

Parameter	Meaning
<code>DataType</code>	Specification of the data type of the parameter to be read and the output at which the parameter is made available: <ul style="list-style-type: none">• 0 = no data type selected• 1 = data type 'OctStr' (Simatic: Array of Byte)• 2 = data type 'VisStr' (Simatic: String)
<code>SlotNo</code>	Number of the slot in HW Config, which is assigned the data record
<code>AbsInd</code>	Absolute Index (= number) of the data record
<code>LenDr</code>	Length in bytes of the data record
<code>StrLen</code>	Total length of the string to be read ¹⁾
<code>Offset</code>	Start address of the parameter in the read data record, e.g. as of byte 12

¹⁾ Total length of the string to be read:

Note

For string with a length of 16 bytes and Simatic format, for example, you must parameterize 18 bytes accordingly because bytes 0 and 1 also contain the maximum and current length of the string.

Startup characteristics

This block has no startup characteristics.

Status word allocation for `status` parameter

This block does not have the `Status` parameter.

11.3.2 Operating modes of PiStAr64

Operating modes of PiStAr64

This block does not have any operating modes.

11.3.3 Functions of PiStAr64

Functions of PiStAr64

The functions for this block are listed below.

Reading acyclic values

The reading of acyclic values is initiated by a positive edge at input `RdReq`. Output `ReqDetect` is set when the block has detected a positive edge. Once the job was transferred to the PiDr64 block, output `ReqActive` will be set to `TRUE`. The end of reading is indicated at outputs `RdyOK` (error-free) and `RdyErr` (error). These outputs remain set until input `RdReq` is set to `FALSE`. The return value of the RDREC call (SFB52) is copied to output `RetValRd` and, depending on the data type (input `DataType`), the read parameter is copied to the corresponding output (`OuStruct`/`OuString`).

11.3.4 Error handling of PiStAr64

Error handling of PiStAr64

The following errors can be displayed for this block:

- Parameter assignment error

Parameter assignment error

A parameter assignment error is given at the following conditions:

- Data record length (`LenDr`) is bigger than 64 bytes
- No data type or invalid data type selected (input `DataType` is less than 1 or greater than 2)
- Offset plus length of the string (`StrLen`) exceeds the length of the data record (`LenDr`)

Output `QParaf` is set and read jobs are rejected if a parameter assignment error occurs.

11.3.5 PiStAr64 messaging

Messaging

This block does not offer messaging.

11.3.6 PiStAr64 connections

PiStAr64 connections

Input parameters

Parameter	Description	Type	Default
RdReq	Read request with positive edge	BOOL	0
DataType	Data type selection: 0 = no data type selected 1 = data type 'OctStr' (Simatic: Array of Byte) 2 = data type 'VisStr' (Simatic: String)	INT	0
SlotNo	Number of the slot in HW Config, which is assigned the data record	INT	0
AbsInd	Absolute Index (= number) of the data record	INT	0
LenDr	Length in bytes of the data record	INT	0
StrLen	Total length of the string or array of bytes, including the bytes for maximum and current length	INT	0
Offset	Start address of the parameter in the read data record, e.g. as of byte 12	INT	0

In/out parameters

Parameter	Description	Type	Default
AcyclData	Acyclic data	STRUCT1)	0

¹⁾Configuration of the output structure AcyclData:

AcyclData	STRUCT		Description
	SlotRd : INT		Number of the slot for read requests
	ReqRd : INT		Request for reading the data record with this number (-1 = no request)
	LenRd : INT		Length in bytes of the data record to read
	SlotWr : INT		Number of the slot for write requests
	ReqWr : INT		Request for writing the data record with this number (-1 = no request)

	LenWr : INT		Length in bytes of the data record to write
	RdyRead : INT		The data record with this number was read (-1 = no data record read)
	RdyWrite : INT		The data record with this number was written (-1 = no data record written)
	RetValRd : WORD		Return value of SFB RDREC (SFB52) for the read job
	RetValWr : WORD		Return value of SFB WRREC (SFB53) for the read job
	Input	STRUCT	Data that was read from the DP slave
		Para0 : DWORD	Value of input data
		...	...
		Para15 : DWORD	Value of input data
		END_STRUCT	
	Output	STRUCT	Data to be written to the DP slave
		Para0 : DWORD	Value of output data
		...	...
		Para15 : DWORD	Value of output data
		END_STRUCT	
	NewDiag : INT		Totalizer that indicates new diagnostics data
	DiagData	STRUCT	Diagnostics data
		Para0 : DWORD	Diagnostics data
		...	...
		Para15 : DWORD	Diagnostics data
		END_STRUCT	
	END_STRUCT		

Output parameters

Parameter	Description	Type	Default
QParf	1 = parameter assignment error	BOOL	0
ReqDetect	Read job detected	BOOL	0
ReqActive	Read job is active, which means that it was transferred to the PiDr64 block	BOOL	0
RdyOK	1 = parameter was read without error	BOOL	0
RdyErr	1 = error when reading the parameter	BOOL	0
RetValRd	Return values of the RDREC block (SFB52)	BOOL	0
OuStruct	Read array of bytes (OctStr)	STRUCT	-
		• Byte00: BYTE	• 16#00
		...	...
		• Byte59: BYTE	• 16#00
OuString	Read string	STRING[48]	''

11.3.7 Block diagram of PiStAr64

Block diagram of PiStAr64

A block diagram is not provided for this block.

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