SIEMENS

Industrial controls

PAC3200 & PAC4200 for SIMATIC PCS7
Advanced Process Library PAC3200 & PAC4200 for SIMATIC PCS 7

Function Manual

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Basic principles

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1.1 Supported hardware

The Advanced Process Library PAC3200 & PAC4200 for SIMATIC PCS 7 supports the 7KM PAC PROFIBUS DP and 7KM PAC SWITCHED ETHERNET expansion modules of the PAC3200, PAC3220 and PAC4200 power monitoring device as of version V4.0 or V2.1.

1.1.1 I/O configuration

The following I/O configuration is preset for the PAC3200, PAC3220 and PAC4200 power monitoring devices:

- Outputs: 4 control bytes
- Inputs: 4 status bytes, 40 bytes measured values, 4 bytes limit violations and 4 to 8 bytes status of digital inputs

For this configuration, the following parameters must be set for each PAC3200 / PAC3220 or PAC4200 power monitoring device:

- **Basic type 1**
- **Basic type 2**
- **Limit violations**
- **Digital inputs status**

Slot	Module	Order number	I address	Q address
0	*PAC3200*	*7KM9300-0AE01-0AA0*		
X1	*PN-IO*			
X1 P1 R	*Port 1*			
X1 P2 R	*Port 2*			
1	Basic Type 1		112...131	6...7
2	Basic Type 2		132...155	
3	Limit Violations		156...159	
4	Digital Inputs Status		160...163	

Figure 1-1 I/O configuration PAC3200 / PAC3220 under PROFINET IO

In the case of the PAC4200 power monitoring device, the **Digital inputs status module 1** or **2** can be specified if a PAC 4DI/2DO expansion module is fitted.

Slot	Module	Order number	I address	Q address
0	*PAC4200*	*7KM9300-0AE01-0AA0*		
X1	*PN-IO*			
X1 P1 R	*Port 1*			
X1 P2 R	*Port 2*			
1	Basic Type 1		112...131	6...7
2	Basic Type 2		132...155	
3	Limit Violations		156...159	
4	Digital Inputs Status		160...163	
5	Status DI Module 2		164...167	

Figure 1-2 PAC4200 I/O configuration using PROFINET IO

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

The parameters of the `AddrIn` parameter input of the DrvPAC driver block must be assigned with the start address of the inputs of basic type 1.

1.1.2 Hardware configuration

The driver concept for PAC3200, PAC3220 und PAC4200 power monitoring devices supports operation of the PAC3200 / PAC3220 / PAC4200 as a DP slave directly on the DP master system as well as following a DP/PA-Link in an H-system.

In addition, you can also integrate the PAC3200, PAC3220 and PAC4200 power monitoring devices into SIMATIC PCS 7 via PROFINET IO.

The PAC3200, PAC3220 and PAC4200 power monitoring devices can be integrated via the GSD files SI028163.gsd, SI038163.gsd or SI038173.gsd.

For PROFINET IO, use the GSDML file GSDML-V2.34-Siemens-PAC_V30-20191014.xml.

Note that the PAC3200, PAC3220 and PAC4200 power monitoring devices are used in the "DPV1" DP alarm mode with enabled diagnostic interrupts. The Advanced Process Library PAC3200 & PAC4200 for SIMATIC PCS 7 does not support the hardware interrupts.

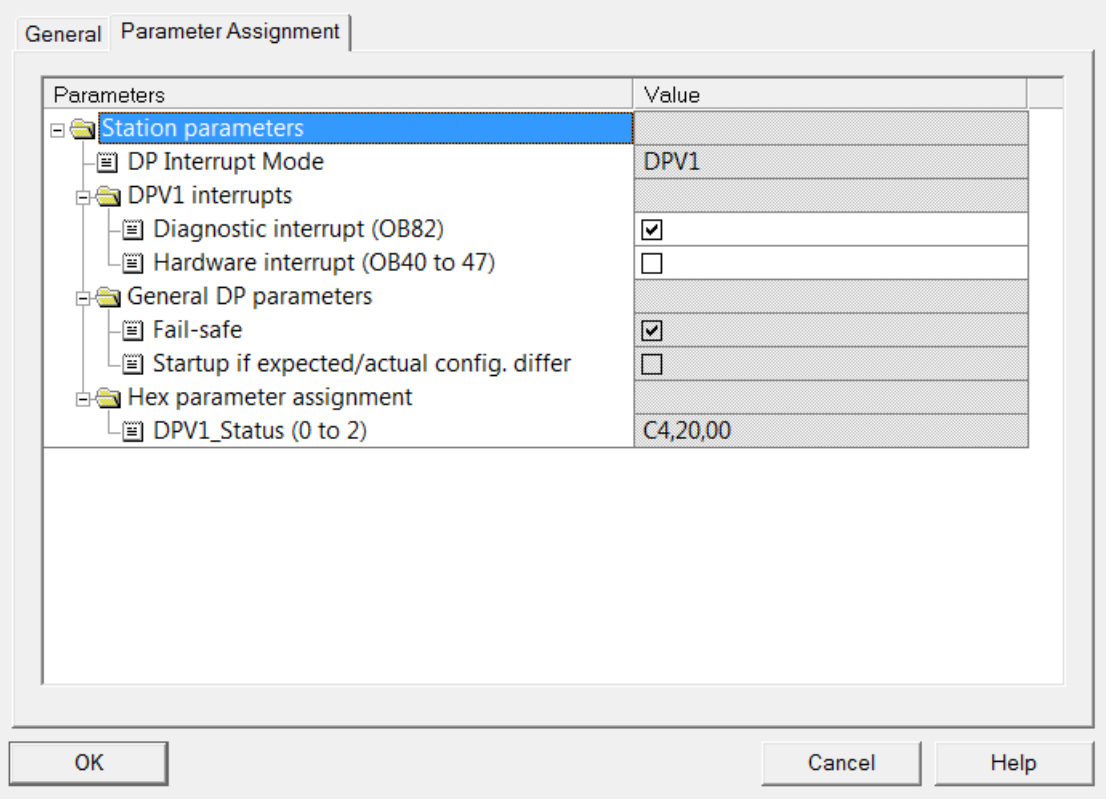


Figure 1-3 Properties of a PAC4200 power monitoring device directly connected to the DP master system

If the PAC3200, PAC3220 or PAC4200 power monitoring devices are operated in an H-system behind a DP/PA-Link, the PAC3200 / PAC3220 / PAC4200 must be configured as DPV0 slave. All acyclic services and interrupts are deactivated. This means that the device no longer outputs diagnostic interrupts and data records can no longer be read from the device. You can see the effects of this on the behavior of the blocks by reading the description of the blocks in chapters "PAC_DIA diagnostics block (Page 15)" to "Measured value block PACMnMx (Page 139)".

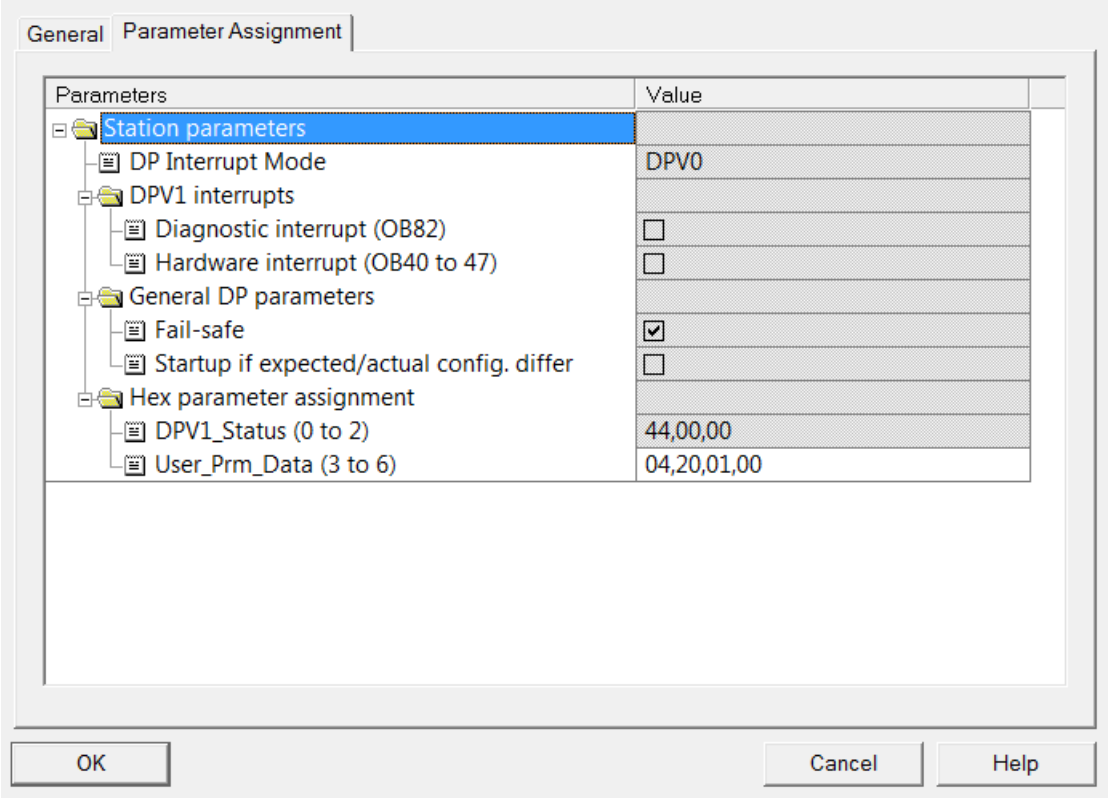


Figure 1-4 Properties window of a PAC4200 power monitoring device downstream of a DP/PA-Link

1.2 Parameterizable behavior via the feature I/O

The PAC3200, PAC4200 and PACMnMx measured value blocks have two inputs with the designation `Feature` and `Feature2`. You can influence different behaviors of the blocks using these inputs.

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

Bit number	Meaning	Block
0	Setting the startup response (Page 9)	PAC3200, PAC4200
1	Characteristics for the "out of service" mode (Page 10)	PAC3200, PAC4200
5	Defining the device type (Page 10)	PACMnMx
8	Read the configuration automatically (Page 11)	PAC3200, PAC4200
22	Update acknowledgment and error status of the message call (Page 11)	PAC3200, PAC4200
24	Enable local operator permission (Page 12)	PAC3200, PAC4200, PACMnMx
25	Suppression of all messages (Page 12)	PAC3200, PAC4200
28	Disable switching points (Page 13)	PAC3200, PAC4200
29	Signaling limit violation (Page 13)	PAC3200, PAC4200

The `Feature2` bits are assigned in the following order:

Bit number	Meaning	Block
0	Suppression of the message "Voltage out of range" (Page 13)	PAC3200, PAC4200
1	Suppression of the message "Current out of range" (Page 13)	PAC3200, PAC4200

1.2.1 Setting the startup response

`Feature` bit

Number of the `Feature` bit: 0

You define the startup response of the function blocks using this `Feature` bit.

Note

This `Feature bit` has no function in "out of service" mode. The measuring point remains in "out of service" mode following warm restart of the CPU.

Note

The restart routine of the blocks resets the following outputs during OB100 execution:

- `Limx_Act` switching point outputs

This causes an outgoing message on initialization of the Alarm8_P in OB100, and an incoming message following expiry of the RunUpCyc counter at the cyclic interrupt level.

Note

In the case of full download with AS stop, the blocks (for `Feature`.Bit 0 = 1) cannot continue in their previous mode following restart.

Default setting: 0

Bit = 0 Starting the block in the "On" mode
:
Bit = 1 Starting the block in the last main mode
:

1.2.2 Characteristics for the "out of service" mode

`Feature` bit

Number of the `Feature` bit: 1

You use this `Feature` bit to define the characteristics of the technological block depending on the interconnectable input parameter `OosLi` = 1.

Default setting: 0

Bit = 0: The "In progress" status is displayed in the faceplate of the assigned technological block and in the block icon (see below). A 0-1 edge change of the input parameter `OosLi` has no further influence on the behavior of the technological block. The previous status is retained. No change in the "Out of service" mode is executed.

Bit = 1: Switching over to "Out of service" mode takes place provided the block is in "On" mode. If this requirement is not met, the mode does not change. The "In progress" status is additionally displayed in the faceplate of the assigned technological block and in the block icon regardless of the change of operating mode. No message is issued to indicate whether a mode change has taken place.

The state indicator for "in progress" looks like this:

A 1-0 edge change of the `OosLi` input parameter has no effect on the behavior of the technological block. The previous state is retained.

1.2.3 Defining the device type

`Feature` bit

Number of the `Feature` bit: 5

You use this `Feature` bit to define which device type is used.

Default setting: 0

Bit = 0 The PAC3200 / PAC3220 is used.
:
Bit = 1 The PAC4200 is used.
:

1.2.4 Read the configuration automatically

`Feature` bit

Number of the `Feature` bit: 8

This `Feature` bit determines whether the configuration data is automatically read out when the controller is restarted (OB100) or when the PAC3200 / PAC3220 / PAC4200 power monitoring device is available again via the PROFIBUS / PROFINET IO (OB86, rack restore).

If the PAC3200, PAC3220 or PAC4200 power monitoring devices are connected in an H-system behind a DP/PA Link, the configuration data cannot be read. In this case, setting Feature bit 8 has no effect.

The configuration data encompasses the following values:

- Parameter
- Measured values

Note

The configuration data is read out via acyclic services. Since only 8 cyclic services can be run simultaneously on each PROFIBUS/PROFINET line, their execution can be delayed considerably. This can be the case, for example, if all devices are reading out their configuration data at the same time after a return of the PROFIBUS/PROFINET line. If more than eight devices are using the acyclic services, we recommend that `Feature` bit 8 not be set. Instead, update the configuration data in the faceplate via the parameter view or the specific measured value view after a change.

Bit = 0 The configuration data is not read out automatically on restart of the controller (OB100)
: and rack restore (OB86). After the data has been changed, it must be read out via the parameter view in the faceplate.

Bit = 1 The configuration data is read out automatically on restart of the controller (OB100)
: and rack restore (OB86).

1.2.5 Update acknowledgment and error status of the message call

`Feature` bit

Number of the `Feature` bit: 22

You use this `Feature` bit to select whether or not the acknowledgment and error status of the message calls at the block output are to be updated.

Default setting: 0

Bit = 0: The `MsgErr1/2/3/4`, `MsgStat1/2/3/4` and `MsgAckn1/2/3/4` block outputs are set to the defaults and are not updated. The block will run faster with this setting.

Bit = 1 The `MsgErr1/2/3/4`, `MsgStat1/2/3/4` and `MsgAckn1/2/3/4` block outputs are updated based on the feedback from the lower-level message blocks. The lower-level message blocks are called in each 3rd cycle while an acknowledgment is expected or error information is present.

1.2.6 Enable local operator permission

Feature bit

Number of the Feature bit: 24

You use this `Feature` bit to activate local operation for a technological block. The local operator permission is an upstream operator permission. It is determined prior to the operator permissions of the user administration and prior to the enabling of the block and is implemented via the standard OpStations APL block. You can find more details in the online help of the OpStations block.

If there is no local operator permission, operation of a block instance on an OS is generally disabled. If local operator permission is given, operator permission is determined normally via user administration and the block.

The local operator permission is set instance-specific. This means that block instances are enabled or disabled independently of each other for an operator input at an operator station.

Default setting: 0

Bit = 0: Deactivated

Bit = 1: Activated

1.2.7 Suppression of all messages

`Feature` bit

Number of the `Feature` bit: 25

You use this `Feature` bit to define whether or not all messages of the block are to be suppressed at `MsgLock` = 1.

Bit = 0: Process messages are suppressed.

Bit = 1: All messages are suppressed.

1.2.8 Disable switching points

`Feature` bit

Number of the `Feature` bit: 28

You use this `Feature` bit to define whether or not the switching point functionality (`LimX_Act` outputs) of a limit is also to be deactivated when the message (`MsgLock` = 1) is deactivated.

Default setting: 0

Bit = 0: The switching point is not suppressed.
Bit = 1: The switching point is suppressed.

1.2.9 Signaling limit violation

`Feature` bit

Number of the `Feature` bit: 29

You use this `Feature` bit to define how a limit violation is output at the `LimX_Act` limit outputs.

Default setting: 0

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

1.2.10 Suppression of the message "Voltage out of range"

`Feature2` bit

Number of the `Feature2` bit: 0

You use this `Feature2` bit to define whether or not the message of the block is to be suppressed.

Default setting: 0

Bit = 0: Process message is not suppressed.
Bit = 1: Process message is suppressed.

1.2.11 Suppression of the message "Current out of range"

`Feature2` bit

Number of the `Feature2` bit: 1

You use this `Feature2` bit to define whether or not the message of the block is to be suppressed.

Default setting: 0

Bit = 0: Process message is not suppressed.
Bit = 1: Process message is suppressed.

PAC_DIA diagnostics block

2

2.1 Description of PAC_DIA

Object name (type + number) and family

Type + number:	FB 1083
Family:	SENTRON

Application area of PAC_DIA

The block is used for the following application:

- Monitoring a PAC3200 / PAC3220/ PAC4200 power monitoring device

Operating principle

The PAC_DIA block performs the diagnostics of the PAC3200, PAC3220 and PAC4200 power monitoring devices. The diagnostic information of the PAC3200 / PAC3220 / PAC4200 is transferred to the blocks MOD_PAX0 / MOD_PAL0 and DrvPAC. The PAC_DIA block forms the quality code (signal status) of the PAC3200 / PAC3220/ PAC4200 and passes it on to the MOD_PAX0 / MOD_PAL0 and DrvPAC blocks.

Configuration

When using the CFC function "Generate module driver", the following is carried out automatically:

- The PAC_DIA block is integrated into OB1, OB40, OB82, OB83, OB85, OB86 and OB100 of its runtime group after the runtime group of the OB_DIAG1/OB_DIAG1_PN.
- Parameters are assigned for the inputs `SUBN1_ID`, `SUBN2_ID`, `SUBN_TYP`, `RACK_NO`, `DPA_LINK` and `PNIODVC`.
- The logical start address `LADDR` of the device is parameterized.
- The diagnostic address `DADDR` of the device is parameterized.
- The `EN and RACKF` inputs are connected to the `EN_F`, `QRACKF`, `SUBN1ERR` and `SUBN2ERR` outputs of the upstream block OB_DIAG1 / OB_DIAG_PN.
- The outputs `QMODF`, `OMODE` and `PA_DIAG` are interconnected with the inputs `MODF`, `MODE_00` and `PA_DIAG` of the MOD_PAX0 / MOD_PAL0 block.
- The output `QUALITY` is interconnected with the input `QC_00` of the MOD_PAX0 / MOD_PAL0 block or with the input `ST` of the DrvPAC block.
- The output `QDIAG_INF` is interconnected with the input `DiagInf` of the DrvPACL block.

Startup characteristics

The module ID of the addressed DP slave is read out and a check is made to see if it agrees with the configured module ID. If this is not the case, the output `QMODF` (module fault) is set.

In the case of interfacing via PROFINET IO, a check is made as to whether the addressed PN device exists. If this is not the case, the output `QMODF` (module fault) is set.

2.2 Functions of PAC_DIA

The functions for this block are listed in the following.

Read diagnostic data from PAC3200 / PAC3220 / PAC4200

If the PAC3200 / PAC3220 / PAC4200 triggers a diagnostic interrupt, the system function RALRM (SFB54) reads the device-specific diagnostic data.

Since the PAC3200 / PAC3220 / PAC4200 switches to DPV0 mode in an H-System behind a DP/PA-Link, the device-specific diagnostic data cannot be read.

The read information is transferred to the MOD_PAX0/MOD_PAL0 and the DrvPAC block where it is evaluated.

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

The diagnostic events are assigned to the maintenance status as follows:

Diagnostic event	Maintenance status	QUALITY	PA DIAG
Internal communication not ready	Maintenance requirement high	16#00	16#00000100
Internal communication is faulty			
Data invalid (CRC error)			
Data invalid (frame error)			
Data invalid (timeout)			
PAC3200/PAC4200 firmware, module incompatible			
Expected and actual configuration differ			
Digital outputs cannot be remote-controlled	Maintenance requested	16#80	16#00200000
Energy counter write operation failed			
QRACKF/QMODF	Bad, not specified	16#00	16#00000000

Setting the outputs OMODE

If a higher-level error is present, the HighWord of the output OMODE is set to 16#40. For additional information, refer to chapter "Error characteristics of PAC_DIA (Page 18)", section "Higher-level errors".

2.3 Error characteristics of PAC_DIA

The following errors are displayed with this block:

- Higher-level errors
- Module faults
- Group errors

Higher-level errors

If a higher-level rack fault is active at the input `RACKF`, the output `QRACKF` is set.

Module faults

If an incorrect module ID of the connected module is read out from the block or if the device does not exist, the `QMODF` output is set.

Group errors

If one of the previously listed errors is active, or maintenance is requested, the output `QERR` is set.

2.4 Connections of PAC_DIA

Input parameters

Parameter	Description	Type	Default
DADDR	Diagnostic address of the device	INT	0
DPA_LINK	Connection of the device: 0 = Direct on the DP master system 1 = Downstream of the DP/PA-Link	BOOL	0
EN	1 = Called block is being processed	BOOL	1
EN_DIAG	1 = Enable diagnostics	BOOL	0
LADDR	Local start address of the device	INT	0
PNIODVC	1 = PROFINET IO device	BOOL	0
RACK_NO	Rack number	BYTE	16#00
RACKF	1 = Rack fault	BOOL	0
SUBN_TYP	1 = External DP interface	BOOL	0
SUBN1_ID	Number of primary DP master system/PN-IO system 1 ID (100 ... 115)	BYTE	16#FF
SUBN1ERR	1 = Error in primary DP master system/error in PN-IO device 1	BOOL	0
SUBN2_ID	Number of redundant DP master system/PN-IO system 1 ID (100 ... 115)	BYTE	16#FF
SUBN2ERR	1 = Error in redundant DP master system/error in PN-IO device 2	BOOL	0

In-out parameters

Parameter	Description	Type	Default
ACC_ID	1 = Accept new settings	BOOL	1

Output parameters

Parameter	Description	Type	Default
ENO	1 = Block algorithm executed without errors	BOOL	0
OMODE	Value status	DWORD	16#00000000
PA_DIAG	PA field devices diagnostic information	DWORD	16#00000000
QDIAG_INF	Diagnostic information	STRUCT • COMNRDY : BOOL • ... • BOOL_04 : BOOL	- • 0 • ... • 0
QERR	1 = Group error	BOOL	0
QMODF	1 = Module fault	BOOL	0
QRACKF	1 = Rack fault	BOOL	0

Parameter	Description	Type	Default
QUALITY	Quality code (signal status) of the device	BYTE	16#00
RACK1ERR	Reserved	BOOL	0
RACK2ERR	Reserved	BOOL	0

DrvPAC driver block

3

3.1 Application area of DrvPAC

Object name (type + number) and family

Type + number:	FB 1084
Family:	SENTRON

Application area of DrvPAC

The block is used for the following applications:

- Transmission of cyclic and acyclic data from and to a PAC3200 / PAC 3220 / PAC4200 power monitoring device

Operating principle

The block cyclically reads and writes all cyclic data of a PAC3200 / PAC3220 / PAC4200 power monitoring devices from and to the process image.

The block reads and writes acyclic data of the PAC3200 / PAC3220 / PAC4200 from and to the device.

Configuration

Integrate the block in the CFC editor into a cyclic interrupt OB (OB30 to OB38).

When using the "Generate module driver" CFC function, the following is carried out automatically:

- The member variables of the input structure `Addr` are parameterized with the addresses configured in HW Config. The input `Addr.Input1` receives the input address of base type 1 and the input `Addr.Output` receives the output address of base type 1.
  Input `Addr.Input2` receives the input address of base type 2. The input `Addr.Input3` receives the input address of the limit violations. The `Addr.Input4` input is assigned the input address of the status of the digital inputs. The `Addr.Input5` input is assigned the input address of the status of the digital inputs belonging to the PAC 4DI/2DO expansion module (if available).
- The `ST` and `DiagInf` inputs are interconnected with the `QUALITY` and `QDIAGINF` blocks of the upstream PAC_DIA block.
- The `MS` input is interconnected with the `O_MS` output of the upstream PAC_DIA block.

You must write the input address of base type 1 of the PAC3200 / PAC3220 / PAC4200 power monitoring devices generated with HW Config to the input parameter `AddrIn`.

There is a template for the DrvPAC block for measuring point types in the Advanced Process Library PAC3200 & PAC4200 for SIMATIC PCS 7 as an example:

Example of measuring point type:

- Templates of PAC3200 and PAC4200 (Page 169)

Startup characteristics

The block has no startup response.

3.2 Functions of DrvPAC

The functions for this block are listed in the following.

Reading cyclic values from the process image

With each block call, the status bytes, the measured values, the limit violations and the status of the digital inputs of the PAC3200 / PAC3220 / PAC4200 are read from the (sub)process image and written to the output2 `CyclData.PacState`, `CyclData.L1Cur`, `CyclData.L2Cur`, `CyclData.L3Cur`, `CyclData.Cur3PhAvg`, `CyclData.ToActPow`, `CyclData.L12Volt`, `CyclData.L23Volt`, `CyclData.L31Volt`, `CyclData.VoltLL3PhAvg`, `CyclData.Act1T1EnImp`, `CyclData.Act2T1EnImp`, `CyclData.ToPowFact`, `CyclData.LmtVltns`, `CyclData.InDigIn0`, `CyclData.InDigIn1`, `CyclData.ExDigIn0`, `CyclData.ExDigIn1`, `CyclData.ExDigIn2` and `CyclData.ExDigIn3` and their signal status.

Writing cyclic control bytes to the process image

The control bytes of the breaker are written cyclically from the `CyclData.PacCtrl` output to the process image.

Read acyclic values from the PAC3200 / PAC3220 / PAC4200

The number of the data record that is to be read is written into the `AcyclData.ReqRd` output. As a result, reading of acyclic data is triggered. At the same time, the `AcyclData.BlkRd` output must contain a block number and the `AcyclData.LenRd` output must contain the length of the data record in bytes.

After the read operation has been completed (with or without errors), the block copies the block number to the `AcyclData.RdyRead` output. The data read is then located in the `AcyclData.Input` output structure, and the return value of the RDREC call (SFB52) in the `AcyclData.RetValRd` output tag. You can find the meanings of the return values in the online help of the RDREC block.

The block repeats the read request after a temporary fault up to five times with a delay of three seconds in each case before the request is terminated with a temporary fault. In addition, the block does not evaluate the return value.

Write acyclic values to the PAC3200 / PAC3220 / PAC4200

The `AcyclData.ReqWr` output triggers writing of acyclic data. To do this the number of the data record to be written is written to this output. At the same time, the `AcyclData.BlkWr` output must contain a block number, the `AcyclData.LenWr` output must contain the length of the data record in bytes and the data to be written in the `AcyclData.Output` output structure.

When the write operation has been completed (with or without errors), the block copies the block number to the `AcyclData.RdyWrite` output, and the return value of the WRREC call (SFB53) to the `AcyclData.RetValWr` output tag. You can find the meanings of the return values in the online help of the WRREC block.

The block repeats the write request after a temporary fault up to five times with a delay of three seconds in each case before the request is terminated with a temporary fault. In addition, the block does not evaluate the return value.

When the corresponding bit is set in the `DiagInf` input parameter, the block overwrites the `AcyclData.RetValWr` output tag with the following error codes:

Bit in **DiagInf**	Meaning	Error code in **AcyclData.RetValWr**
INVALACTION	Invalid action (write-protection active)	16#000B
INVALDR47	Invalid data for data set 47	16#002F
INVALDR48	Invalid data for data set 48	16#0030
INVALDR207	Invalid data for data set 207	16#00CF

Hold last values

If there is no connection to the PAC3200 / PAC3220 / PAC4200 power monitoring device (input `Mode` <> 16#80xxxxxx or input `Csf` = TRUE), the block keeps the last valid values.

Since the block reads the acyclic data only on request, the data does not change if there is no connection from the PAC3200 / PAC3220 / PAC4200.

Signal status for measured values

The signal status of the measured values in the `CyclicData` output structure is formed from the higher-level error, the `ST` input and the PMD diagnosis and status. If there is a higher-level error, e.g. rack failure (input `Mode` <> 16#80xxxxxx or input `Csf` = TRUE), the status 16#00 is output. In PMD diagnostics and status, the "Voltage out of range" and "Current out of range" status has an effect on the signal status (16#68). The effects of the diagnostics of the PAC3200 / PAC3220 / PAC4200 on the `ST` input are described in the section "Functions of PAC_DIA (Page 17)".

3.3 Fault response of DrvPAC

The following errors are displayed in this block:

- Higher-level errors

Higher-level errors

A higher-level error is indicated by 1 at output parameter `QCsf` if the signal status in the HighWord of the input parameter `Mode` is set to a value other than 16#80 or input `Csf` is set to TRUE.

3.4 Connections of DrvPAC

Input parameters

Parameter	Description	Type	Default
AddrIn	Input address of the PAC3200 / PAC3220 / PAC4200	INT	0
Addr	Addresses of the PAC3200 / PAC3220 / PAC4200 power monitoring device	STRUCT[1)]	-1
Csf	1 = External fault (control system fault)	BOOL	0
DiagInf	Diagnostic information	STRUCT • COMNRDY : BOOL • ... • BOOL_04 : BOOL	- • 0 • ... • 0
DpaLink	Connection of the device: 0 = Direct on the DP master system 1 = Downstream of the DP/PA-Link	BOOL	0
EN	1 = Called block is being processed	BOOL	1
MS_Release	1 = Release for maintenance	BOOL	0
MS	Maintenance status	DWORD	16#00000000
ST	Quality code (signal status) of the PAC3200 / PAC3220 / PAC4200 power monitoring device	BYTE	16#00

1) Configuration of the input structure `Addr`

Table 3-1 Configuration of the input structure `Addr`

Addr	STRUCT	Address of the PAC3200 / PAC3220 / PAC4200
-	Input1 : INT	Input address of basic type 1
-	Input2 : INT	Input address of basic type 2
-	Input3 : INT	Input address of limit violations
-	Input4 : INT	Input address of the status of digital inputs
-	Input5 : INT	Input address of the status of digital inputs of the PAC 4DI/2DO expansion module
-	Output: INT	Output address of basic type 1
-	**END_STRUCT**	

In-out parameters

Parameter	Description	Type	Default
DataXchg	Bidirectional data exchange channel Bit 0 byte 0: Release for maintenance	DWORD	16#00000000
Mode	Value status	DWORD	16#00000000

Output parameters

Parameter	Description	Type	Default
AcyclData	Acyclic data	STRUCT[1)]	-1
CyclData	Cyclic data of the breaker	STRUCT[2)]	-1
ENO	1 = Block algorithm executed without errors	BOOL	0
OosAct	Breaker out of service, maintenance in progress	STRUCT • Value : BOOL • ST: BYTE	- • 0 • 16#80
QCsf	1 = External fault (control system fault)	BOOL	0
QDiagInf	Diagnostic information	STRUCT • COMNRDY : BOOL • ... • BOOL_04 : BOOL	- • 0 • ... • 0

1) Output structure `AcyclData`:

2) Output structure `CyclData`

Table 3-2 Output structure `AcyclData`

AcyclData	STRUCT	-	Description
-	BlkRd : INT	-	Block number for read request
-	ReqRd : INT	-	Request to read the data record with this number (-1 = no request)
-	LenRd : INT	-	Length of the data set to be read in bytes
-	BlkWr : INT	-	Block number for write request
-	ReqWr : INT	-	Request to write the data record with this number (-1 = no request)
-	LenWr : INT	-	Length of the data set to be written in bytes
-	RdyRead : INT	-	A data record with this breaker address has been read (-1 = no data record has been read)
-	RdyWrite : INT	-	The data record with this breaker address has been written to (-1 = no data record has been written to)
-	RetValRd : WORD	-	Return value of the SFB RDREC (SFB52) of the read request
-	RetValWr : WORD	-	Return value of the SFB WRREC (SFB53) of the write request or error code in the case of diagnostics errors
-	Input	STRUCT	Data read from the PAC3200 / PAC3220 / PAC4200
-		Para0 : DWORD	Value of the input data
-		...	...
-		Para59 : DWORD	Value of the input data
-		END_STRUCT	

AcyclData	STRUCT	-	Description
-	Output	STRUCT	Data to be written to the PAC3200 / PAC3220 / PAC4200
-		Para0 : DWORD	Value of the output data
-		...	...
-		Para59 : DWORD	Value of the output data
-		END_STRUCT	
-	**END_STRUCT**		

Table 3-3 Output structure `CyclData`

CyclData	STRUCT	Description
-	Csf : BOOL	1 = External fault (control system fault)
-	DpaLink : BOOL	Connection of the device: 0 = Direct on the DP master system 1 = Downstream of the DP/PA-Link
-	PacState : WORD	PMD diagnostics and status
-	PacCtrl : WORD	Control bytes
-	L1Cur : STRUCT • Value : REAL • ST: BYTE	Current L1
-	L2Cur : STRUCT • Value : REAL • ST: BYTE	Current L2
-	L3Cur : STRUCT • Value : REAL • ST: BYTE	Current L3
-	Cur3PhAvg : STRUCT • Value : REAL • ST: BYTE	3-phase average current
-	ToActPow : STRUCT • Value : REAL • ST: BYTE	Total active power
-	L12Volt : STRUCT • Value : REAL • ST: BYTE	Voltage L1-L2
-	L23Volt : STRUCT • Value : REAL • ST: BYTE	Voltage L2-L3
-	L31Volt : STRUCT • Value : REAL • ST: BYTE	Voltage L3-L1

CyclData	STRUCT	Description
-	VoltLL3PhAvg : STRUCT • Value : REAL • ST: BYTE	3-phase average voltage L-L
-	Act1T1EnImp : DWORD	Active energy import tariff 1 DWORD 1
-	Act2T1EnImp : DWORD	Active energy import tariff 1 DWORD 2
-	ToPowFact : STRUCT • Value : REAL • ST: BYTE	Total power factor
-	LmtVltns : DWORD	Limit violations
-	InDigIn0 : STRUCT • Value : BOOL • ST: BYTE	Status digital input 0.0
-	InDigIn1 : STRUCT • Value : BOOL • ST: BYTE	Status digital input 0.1
-	ExDigIn0 : STRUCT • Value : BOOL • ST: BYTE	Status digital input x.0 of module 1/2
-	ExDigIn1 : STRUCT • Value : BOOL • ST: BYTE	Status digital input x.1 of module 1/2
-	ExDigIn2 : STRUCT • Value : BOOL • ST: BYTE	Status digital input x.2 of module 1/2
-	ExDigIn3 : STRUCT • Value : BOOL • ST: BYTE	Status digital input x.3 of module 1/2
-	**END_STRUCT**	

PAC3200 measured value block

4

4.1 Description of PAC3200

Object name (type + number) and family

Type + number:	FB 1085
Family:	SENTRON

Application area of PAC3200

The block is used for the following applications:

- Interface block of the driver blocks of the PAC3200 / PAC3220 power monitoring device for the user program and for visualization

Operating principle

The driver block receives measurement and diagnostic data from a PAC3200 / PAC3220 power monitoring device. The PAC3200 block prepares this measured and diagnostic data and makes it available for further use in the user program and for visualization.

You can find further detailed descriptions about configuring, the operating principle, visualization and operation in the following sections.

Configuration

Integrate the block in the CFC editor into a cyclic interrupt OB (OB30 to OB38). In addition, the block is integrated automatically into the startup OB (OB100). To connect the I/O signals, the driver block DrvPAC (cyclic and acyclic data of the PAC3200 / PAC3220) must be called in the same cyclic interrupt OB **before** the PAC3200. The `AcyclData` and `CyclData` output structures of the DrvPAC block are interconnected with the same-name inputs of the PAC3200 block.

There is a template for the PAC3200 block for measuring point types in the Advanced Process Library PAC3200 & PAC4200 for SIMATIC PCS 7 as an example:

Example of measuring point type:

- "Templates of PAC3200 and PAC4200 (Page 169)"

Note

The PAC3200 block internally calls the ChkREAL (FC260) and SelST16 (FC369) APL blocks. These APL blocks are not supplied with the Advanced Process Library PAC3200 & PAC4200 for SIMATIC PCS 7. If these two blocks are not yet in your project, copy them from the APL library to your project before you download the project to the controller.

The block uses the PAC3200_LimSrc enumeration. You must copy this from the SENTRON PAC APL block library into the respective project. To do this, open the SENTRON PAC APL in the SIMATIC Manager. Select the PAC3200_LimSrc enumeration under "Shared Declarations > Enumerations" and copy it into your project.

The limit messages (`MsgEvId1 – MsgEvId2, SIG1 – SIG3`) contain a text from user text libraries. You must copy the user text libraries from the SENTRON PAC APL block library into the respective project. To do this, open the SENTRON PAC APL in the SIMATIC Manager. Select the "Text Libraries" folder and copy it into your project. If a folder for user text libraries already exists in your project, copy the PAC3200_LimSrc and PAC_LimMode user text libraries into this folder.

Startup characteristics

You define the startup characteristics for this block via the `Feature` bit "Setting the startup response".

After startup, the messages are suppressed for the number of cycles parameterized in the `RunUpCyc` value.

Status word assignment for status 1 parameter

For the description of the individual parameters, see chapter "I/Os of PAC3200 (Page 48)".

Status bit	Parameter
0	`Occupied`
1	`BatchEn`
2	Not used
3	`OosAct.Value`
4	`OosLi.Value`
5	Not used
6	`OnAct.Value`
7 ... 13	Not used
14	Invalid signal
15	`VoltOutOfRng.Value`
16	`CurOutOfRng.Value`
17	`MxPlsRateEx.Value`
18	`WriteProt.Value`
19	Local operator permission `Feature` is active
20 ... 25	Not used
26	`DpaLink.Value`

Status bit	Parameter
27 ... 28	Not used
29	MS_RelOp
30	UserAna1 interconnected
31	UserAna2 interconnected

Status word assignment for status 2 parameter

Status bit	Parameter
0	Lim0_Act
1	Lim1_Act
2	Lim2_Act
3	Lim3_Act
4	Lim4_Act
5	Lim5_Act
6 ... 11	Not used
12	InLim0Mon
13	InLim1Mon
14	InLim2Mon
15	InLim3Mon
16	InLim4Mon
17	InLim5Mon
18 ... 30	Not used
31	MsgLock.Value

Status word assignment for status 3 parameter

Status bit	Parameter
0	Lim0_MsgEn
1	Lim1_MsgEn
2	Lim2_MsgEn
3	Lim3_MsgEn
4	Lim4_MsgEn
5	Lim5_MsgEn
6 ... 11	Not used
12	Energy counter successfully reset
13 ... 20	Not used
21	CyclData.Csf
22	1 = Error when reading the acyclic data (active for one cycle only)
23	1 = Error when writing the acyclic data (active for one cycle only)
24 ... 31	Not used

4.2 Operating modes of PAC3200

The block can be operated in the following modes:

- On
- Out of service

For the PAC3200, the general descriptions of operating modes are identical with those of the APL. You can find the descriptions in the online help of the standard APL blocks.

4.3 Functions of PAC3200

The functions for this block are listed in the following.

Configuration data

All configuration data are read out depending on `Feature` bit 8 at CPU startup or rack restore. This can also be initiated in the Parameter view or in the individual measured value views of the faceplate with "Read configuration data".

With a positive edge at the `RdDataLi.Value` input, the acyclic measured values are read once. You will find the acyclic measured values below in the table from "Voltage L1-N" to "Apparent energy tariff 2".

Note

As long as the acyclic measured values are being read via the `RdDataLi` input, "Read configuration data" cannot be triggered in the faceplate or via the `Feature` bit 8.

The `DataRdOK.Value` output is set when the acyclic measured values have been successfully read. The `DataRdOK.Value` output is reset when reading of the acyclic measured values is started.

All writeable configuration data of the PAC3200 / PAC3220 is transferred to the PAC3200 / PAC3220 via acyclic services when the corresponding block input is changed. The respective output always shows the value of the last checkback signal.

If the PAC3200 / PAC3220 power monitoring device is connected in an H-system behind a DP/PA-Link, the configuration data cannot be read or written.

Note

For this reason, "Read configuration data" must be initiated once to ensure the displayed data is up to date.

The PAC3200 function block reads the configuration data via "Flexible Access" data record 47. First, the register addresses and register lengths for the read parameters are written to the data record, and then the data record is read out. Data record 48 is used to write configuration data.

The PAC3200 possesses the following configuration data with corresponding register addresses and register lengths:

Description	Block parameter (input/output)	Register address	Register length
Voltage L1-N	`L1Volt`	16#0001	2
Voltage L2-N	`L2Volt`	16#0003	2
Voltage L3-N	`L3Volt`	16#0005	2
Apparent power L1	`L1ApPow`	16#0013	2
Apparent power L2	`L2ApPow`	16#0015	2
Apparent power L3	`L3ApPow`	16#0017	2
Active power L1	`L1ActPow`	16#0019	2
Active power L2	`L2ActPow`	16#001B	2

Description	Block parameter (input/output)	Register address	Register length
Active power L3	L3ActPow	16#001D	2
Reactive power L1	L1ReaPow	16#001F	2
Reactive power L2	L2ReaPow	16#0021	2
Reactive power L3	L3ReaPow	16#0023	2
Power factor L1	L1PowFact	16#0025	2
Power factor L2	L2PowFact	16#0027	2
Power factor L3	L3PowFact	16#0029	2
Line frequency	Frequency	16#0037	2
3-phase average voltage L-N	VoltLN3PhAvg	16#0039	2
Total apparent power	ToApPow	16#003F	2
Total reactive power VARn	ToReaPow	16#0043	2
Amplitude unbalance voltage	VoltUnbal	16#0047	2
Amplitude unbalance current	CurUnbal	16#0049	2
Active energy import tariff 1	Act1T1EnImp	16#0321	4
	Act2T1EnImp		
Active energy export tariff 1	Act1T1EnExp	16#0329	4
	Act2T1EnExp		
Reactive energy import tariff 1	Rea1T1EnImp	16#0332	4
	Rea2T1EnImp		
Reactive energy export tariff 1	Rea1T1EnExp	16#0339	4
	Rea2T1EnExp		
Apparent energy tariff 1	Ap1T1Energy	16#0341	4
	Ap2T1Energy		
Active energy import tariff 2	Act1T2EnImp	16#0325	4
	Act2T2EnImp		
Active energy export tariff 2	Act1T2EnExp	16#032D	4
	Act2T2EnExp		
Reactive energy import tariff 2	Rea1T2EnImp	16#0335	4
	Rea2T2EnImp		
Reactive energy export tariff 2	Rea1T2EnExp	16#033D	4
	Rea2T2EnExp		
Apparent energy tariff 2	Ap1T2Energy	16#0345	4
	Ap2T2Energy		
Active energy import tariff 1	ActT1EnImp	16#0AF1	2
Active energy export tariff 1	ActT1EnExp	16#0AF5	2
Reactive energy import tariff 1	ReaT1EnImp	16#0AF9	2
Reactive energy export tariff 1	ReaT1EnExp	16#0AFD	2
Apparent energy tariff 1	ApT1Energy	16#0B01	2
Active energy import tariff 2	ActT2EnImp	16#0AF3	2
Active energy export tariff 2	ActT2EnExp	16#0AF7	2
Reactive energy import tariff 2	ReaT2EnImp	16#0AFB	2
Reactive energy export tariff 2	ReaT2EnExp	16#0AFF	2

Description	Block parameter (input/output)	Register address	Register length
Apparent energy tariff 2	ApT2Energy	16#0B03	2
Voltage transformer (yes/no)	VoltTransf	16#C353	2
Primary voltage	PrimVolt	16#C355	2
Secondary voltage/measured voltage	SecoVolt	16#C357	2
Primary current	PrimCur	16#C35B	2
Secondary current	SecoCur	16#C35D	2
Minimum current	MinCur	16#C363	2
Limit 0 monitoring (yes/no)	InLim0Mon/Lim0Mon	16#C38F	2
Limit 0 hysteresis	InLim0Hys/Lim0Hys	16#C391	2
Limit 0 pickup delay	InLim0PckpDl/Lim0 PckpDl	16#C393	2
Limit 0 source	InLim0Src/Lim0Src	16#C397	2
Limit 0 threshold	InLim0Thld/Lim0Thld	16#C399	2
Limit 0 mode (greater than/less than)	InLim0Mode/Lim0Mode	16#C39B	2
Limit 1 monitoring (yes/no)	InLim1Mon/Lim1Mon	16#C39D	2
Limit 1 hysteresis	InLim1Hys/Lim1Hys	16#C39F	2
Limit 1 pickup delay	InLim1PckpDl/Lim1 PckpDl	16#C3A1	2
Limit 1 source	InLim1Src/Lim1Src	16#C3A5	2
Limit 1 threshold	InLim1Thld/Lim1Thld	16#C3A7	2
Limit 1 mode (greater than/less than)	InLim1Mode/Lim1Mode	16#C3A9	2
Limit 2 monitoring (yes/no)	InLim2Mon/Lim2Mon	16#C3AB	2
Limit 2 hysteresis	InLim2Hys/Lim2Hys	16#C3AD	2
Limit 2 pickup delay	InLim2PckpDl/Lim2 PckpDl	16#C3AF	2
Limit 2 source	InLim2Src/Lim2Src	16#C3B3	2
Limit 2 threshold	InLim2Thld/Lim2Thld	16#C3B5	2
Limit 2 mode (greater than/less than)	InLim2Mode/Lim2Mode	16#C3B7	2
Limit 3 monitoring (yes/no)	InLim3Mon/Lim3Mon	16#C3B9	2
Limit 3 hysteresis	InLim3Hys/Lim3Hys	16#C3BB	2
Limit 3 pickup delay	InLim3PckpDl/Lim3 PckpDl	16#C3BD	2
Limit 3 source	InLim3Src/Lim3Src	16#C3C1	2
Limit 3 threshold	InLim3Thld/Lim3Thld	16#C3C3	2
Limit 3 mode (greater than/less than)	InLim3Mode/Lim3Mode	16#C3C5	2
Limit 4 monitoring (yes/no)	InLim4Mon/Lim4Mon	16#C3C7	2
Limit 4 hysteresis	InLim4Hys/Lim4Hys	16#C3C9	2
Limit 4 pickup delay	InLim4PckpDl/Lim4 PckpDl	16#C3CB	2
Limit 4 source	InLim4Src/Lim4Src	16#C3CF	2
Limit 4 threshold	InLim4Thld/Lim4Thld	16#C3D1	2
Limit 4 mode (greater than/less than)	InLim4Mode/Lim4Mode	16#C3D3	2
Limit 5 monitoring (yes/no)	InLim5Mon/Lim5Mon	16#C3D5	2
Limit 5 hysteresis	InLim5Hys/Lim5Hys	16#C3D7	2
Limit 5 pickup delay	InLim5PckpDl/Lim5 PckpDl	16#C3D9	2
Limit 5 source	InLim5Src/Lim5Src	16#C3DD	2

Description	Block parameter (input/output)	Register address	Register length
Limit 5 threshold	`InLim5Thld/Lim5Thld`	16#C3DF	2
Limit 5 mode (greater than/less than)	`InLim5Mode/Lim5Mode`	16#C3E1	2

Limit monitoring

You parameterize limit monitoring in powerconfig. You can monitor 6 limits. To this end, you parameterize which value is to be monitored (source) and whether it is to be monitored for a high or a low limit (mode). You can also parameterize the threshold, the hysteresis and a delay. You can deactivate monitoring of each limit.

You can also define these settings on the block.

In the faceplate you can only change the mode, the threshold and the hysteresis.

Note

The block only supports the values listed here as a setting for the data source.

- `InLimXSrc/LimXSrc`: Source:
  - 0 = VoltageL1-N
  - 1 = VoltageL2-N
  - 2 = VoltageL3-N
  - 3 = VoltageL1-L2
  - 4 = VoltageL2-L3
  - 5 = VoltageL3-L1
  - 6 = CurrentL1
  - 7 = CurrentL2
  - 8 = CurrentL3
  - 9 = Apparent_powerL1
  - 10 = Apparent_powerL2
  - 11 = Apparent_powerL3
  - 12 = Active_powerL1
  - 13 = Active_powerL2
  - 14 = Active_powerL3
  - 15 = Reactive_powerL1
  - 16 = Reactive_powerL2
  - 17 = Reactive_powerL3
  - 18 = Power_factorL1
  - 19 = Power_factorL2
  - 20 = Power_factorL3
  - 27 = Frequency
  - 28 = 3PhaseD-VoltL-N
  - 29 = 3PhaseD-VoltL-L
  - 30 = 3PhaseD-current
  - 31 = Apparent_powerG
  - 32 = Active_powerTot
  - 33 = Reactive_powerG
  - 34 = Power_factorG
  - 35 = AmplUnsymVolt
  - 36 = AmplUnsymCurr
- `InLimXMon/LimXMon`: monitoring (yes/no)
  - 0 = no
  - 1 = yes

- `InLimXMode/LimXMode`: Mode:
  - 0 = greater than
  - 1 = less than
- `InLimXThld/LimXThld`: Threshold
- `InLimXHys/LimXHys`: Hysteresis
- `InLimXPckpDl/LimXPckpDl`: Delay

The "X" in `InLimXSrc / LimXSrc` stands for the limits 0 to 5.

For an active limit violation to disappear, the actual value must be below a hysteresis (`LimXHys` outputs).

Result of the limit monitor

The result of the limit monitor is made available at the interconnectable output parameters:

- `LimX_Act` (X = limits 0 to 5) = 1
  Limit X reached, exceeded or undershot

Via `Feature`.Bit 29 ("Signaling limit violation (Page 13)"), you can define whether the output parameter triggers limit monitoring with the value "0" or the value "1".

Via `Feature`.Bit 28 ("Disable switching points (Page 13)"), you disable the limit monitoring with activated message suppression (`MsgLock` = 1)

Switching on the limit monitoring

The monitoring is always switched on via the input parameters:

- `InLimXMon` = 1: Monitoring of limit X (X = limits 0 to 5).

When the block is integrated, message output is not suppressed (all `LimX_MsgEn` parameters are assigned the value 1 by default). Messages can only be issued if the limit monitor of the additional analog value has been activated.

Message suppression of the limit monitoring

The messages belonging to the limit monitor are suppressed via the parameters:

- `LimX_MsgEn` = 0:
  Limit X messages are suppressed.

The "X" in `LimX_MsgEn` stands for the limits 0 to 5.

When the block is integrated, message output is not suppressed (all `LimX_MsgEn` parameters are assigned the value 1 by default). Messages can only be issued if the limit monitor of the additional analog value has been activated.

Sending commands

The following commands can be sent via the PAC3200 block:

- "Reset energy counter" (`RstEnCntrsOp` in the On mode)
- "Reset energy counter" (via interconnectable input `ResetEnCLi`)
- "Reset the minimum values" (positive edge `RstMnValLi.Value`)
- "Reset the maximum values" (positive edge `RstMxValLi.Value`)
- "Switch to high tariff" (positive edge `TrffHighLi.Value`)
- "Switch to low tariff" (positive edge `TrffLowLi.Value`)

All commands remain for one second in the in-out parameter `CyclData.PacCtrl`. If the same command is sent again during this time, it will be lost.

Setting digital outputs

You switch the digital output 0.0 of the PAC3200 via the `SwtchOt0InLi` input:

- Digital output 0.0 = `SwtchOt0InLi.Value`

The value for the digital output 0.0 is written into the `CyclData.PacCtrl` in-out parameter and is sent cyclically to the module.

Parameterizing units of measured values

You can parameterize the units of the following measured values at block inputs. If necessary, the measured values are then converted in the faceplate of the PAC3200 and the set unit is displayed.

Measured variable	Units of the device	Units at the block	Possible settings for displays on the faceplate	Parameter
Current	A	A	• 0 = A • 1 = kA	`UnitCur`
Voltage	V	V	• 0 = V • 1 = kV	`UnitVolt`
Active power	W	W, kW	• 0 = W/VA/var • 1 = kW/kVA/kVar • 2 = MW/MVA/MVar	`UnitPower`
Apparent power	VA	VA, kVA		
Reactive power	var	var, kvar		
Active energy	Wh	Wh, kWh	• 0 = kWh/kVAh/kvarh • 1 = MWh/MVAh/Mvarh • 2 = GWh/GVAh/Gvarh	`UnitEnergy`
Apparent energy	VAh	VAh, kVAh		
Reactive energy	Varh	Varh, kvarh		

Suppressing messages via the parameter `MsgLock`

This block has the standard function "Suppressing messages via the `MsgLock` parameter" described in the APL online help.

Forming the signal status for blocks

This block has the standard function "Forming and outputting signal status for technological blocks" described in detail in the APL Online Help.

The worst signal status `ST_Worst` for the block is formed from the following parameters:

- `GrpErr.Value`
- `L1Cur.ST`
- `L12Volt.ST`

Release for maintenance

This block has the standard function "Release for maintenance" described in the APL Online Help.

Group errors

The following parameters are taken into account for forming the group error `GrpErr`:

- `CyclData.Csf`
- `FaultExt`

Configurable reactions via the `Feature` and `Feature2` I/O

The following reactions are available for this block at the respective bits of the `Feature` I/O:

Bit	Function
0	Setting the startup response (Page 9)
1	Characteristics for the "out of service" mode (Page 10)
8	Read the configuration automatically (Page 11)
22	Update acknowledgment and error status of the message call (Page 11)
24	Enable local operator permission (Page 12)
25	Suppression of all messages (Page 12)
28	Disable switching points (Page 13)
29	Signaling limit violation (Page 13)

The following reactions are available for this block at the respective bits of the `Feature2` I/O:

Bit	Function
0	Suppression of the message "Voltage out of range" (Page 13)
1	Suppression of the message "Current out of range" (Page 13)

Operator permissions

This block has the standard function Operator permissions described in the APL Online Help.

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

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 ... 7	Not used
8	1 = Operator can change mode of limit 0.
9	1 = Operator can change message suppression of limit 0.
10	1 = Operator can change threshold of limit 0.
11	1 = Operator can change hysteresis of limit 0.
12	1 = Operator can change mode of limit 1.
13	1 = Operator can change message suppression of limit 1.
14	1 = Operator can change threshold of limit 1.
15	1 = Operator can change hysteresis of limit 1.
16	1 = Operator can change mode of limit 2.
17	1 = Operator can change message suppression of limit 2.
18	1 = Operator can change threshold of limit 2.
19	1 = Operator can change hysteresis of limit 2.
20	1 = Operator can change mode of limit 3.
21	1 = Operator can change message suppression of limit 3.
22	1 = Operator can change threshold of limit 3.
23	1 = Operator can change hysteresis of limit 3.
24	1 = Operator can change mode of limit 4.
25	1 = Operator can change message suppression of limit 4.
26	1 = Operator can change threshold of limit 4.
27	1 = Operator can change hysteresis of limit 4.
28	1 = Operator can change mode of limit 5.
29	1 = Operator can change message suppression of limit 5.
30	1 = Operator can change threshold of limit 5.
31	1 = Operator can change hysteresis of limit 5.

The block has the following permissions for the `OS1Perm` parameter:

Bit	Function
0 ... 26	Not used
27	1 = Operator can read configuration data from the PAC3200 / PAC3220.
28	1 = Operator can write configuration data to the PAC3200 / PAC3220.
29	1 = Operator can switch on the Release for maintenance function
30	1 = Operator can reset the energy counter.
31	Not used

Display and operator input area for measured and limit values

The high and low limiting of the measured values and limit values in the faceplate are defined by the parameterization at the following structured variables:

- Current: `Cur_OpScale`
- Voltage L-N: `VoltLN_OpScale`
- Voltage L-L: `VoltLL_OpScale`
- Active power/apparent power/reactive power: `Power_OpScale`
- Total active power/total apparent power/total reactive power: `TotPow_OpScale`
- Power factor: `PowFact_OpScale`

Displaying auxiliary values

This block has the standard "Display auxiliary values" function (`UserAna1` or `UserAna2` inputs), which is described in the APL online help.

Calling other faceplates

This block has the standard function "Calling other faceplates" described in the APL Online Help.

Generating instance-specific messages

This block has the standard function "Generating instance-specific messages" described in the APL Online Help.

SIMATIC BATCH functionality

This block has the standard function "SIMATIC BATCH functionality" described in the APL Online Help.

4.4 Troubleshooting of PAC3200

You can find general information for troubleshooting all blocks in the section "Error handling" in the Online Help.

The following errors can be displayed with this block:

- Error number

Overview of the error numbers

The following error numbers are output via the `ErrorNum` I/O:

Error number	Meanings of the error numbers
-1	Default value when integrating the block, the block is not being processed
0	There is no fault.
30	`CyclData.L1Cur` is not a valid number
31	`CyclData.L2Cur` is not a valid number
32	`CyclData.L3Cur` is not a valid number
33	`CyclData.ToActPow` is not a valid number
34	`CyclData.L12Volt` is not a valid number
35	`CyclData.L23Volt` is not a valid number
36	`CyclData.L31Volt` is not a valid number
37	`CyclData.ToPowFact` is not a valid number
51	Two I/Os are set simultaneously: In the "On" mode: `Lim0M0dOp` and `Lim0M1dOp`, `Lim1M0dOp` and `Lim1M1dOp`, `Lim2M0dOp` and `Lim2M1dOp`, `Lim3M0dOp` and `Lim3M1dOp`, `Lim4M0dOp` and `Lim4M1dOp`, `Lim5M0dOp` and `Lim5M1dOp`

4.5 Messages from PAC3200

The following messages can be displayed with this block:

- Control system faults
- Process messages
- Instance-specific messages

Control system faults

The following control system fault messages are issued:

Message instance	Message name	Message class	Event
MsgEvId1	SIG4	AS control system message - error	$$BlockComment$$ Error while reading the configuration data
MsgEvId1	SIG5	AS control system message - error	$$BlockComment$$ Error while writing the configuration data
MsgEvId1	SIG6	AS control system message - Fault	$$BlockComment$$ Voltage out of range
MsgEvId1	SIG7	AS control system message - Fault	$$BlockComment$$ Current out of range
MsgEvId1	SIG8	AS control system message - Fault	$$BlockComment$$ Maximum pulse rate exceeded
MsgEvId2	SIG4	AS control system message - Fault	$$BlockComment$$ External error has occurred

Explanation: $$BlockComment$$: Content of the instance-specific comment

Process messages

Message instance	Message name	Message class	Event
MsgEvId1	SIG1	AS control system message - error	$$BlockComment$$ @5Y%t#PAC3200_LimSrc@ - @6Y %t#PAC_LimMode@ violated
MsgEvId1	SIG2	AS control system message - error	$$BlockComment$$ @7Y%t# PAC3200_LimSrc@ - @8Y %t#PAC_LimMode@ violated
MsgEvId1	SIG3	AS control system message - error	$$BlockComment$$ @9Y%t#PAC3200_LimSrc @ - @10Y %t#PAC_LimMode@ violated
MsgEvId2	SIG1	AS control system message - error	$$BlockComment$$ @5Y%t#PAC3200_LimSrc@ - @6Y %t#PAC_LimMode@ violated
MsgEvId2	SIG2	AS control system message - error	$$BlockComment$$ @7Y%t# PAC3200_LimSrc@ - @8Y %t#PAC_LimMode@ violated
MsgEvId2	SIG3	AS control system message - error	$$BlockComment$$ @9Y%t#PAC3200_LimSrc @ - @10Y %t#PAC_LimMode@ violated

Explanation: $$BlockComment$$: Content of the instance-specific comment

Instance-specific messages

With this block, you have the option of using an instance-specific message.

Message instance	Message name	Message class	Event
MsgEvId2	SIG5	AS control system message - Fault	$$BlockComment$$ External message 1
MsgEvId2	SIG6	AS control system message - Fault	$$BlockComment$$ External message 2
MsgEvId2	SIG7	AS control system message - Fault	$$BlockComment$$ External message 3

Explanation: $$BlockComment$$: Content of the instance-specific comment

Auxiliary values for the `MsgEvId1` message instance

Auxiliary value	Parameter
1	BatchName
2	StepNo
3	BatchID
4	ExtVa104
5	InLim0Src
6	InLim0Mode
7	InLim1Src
8	InLim1Mode
9	InLim2Src
10	InLim2Mode

Auxiliary values for the `MsgEvId2` message instance

Auxiliary value	Parameter
1	BatchName
2	StepNo
3	BatchID
4	ExtVa204
5	InLim3Src
6	InLim3Mode
7	InLim4Src
8	InLim4Mode
9	InLim5Src
10	InLim5Mode

4.6 I/Os of PAC3200

Input parameters

Parameter	Description	Type	Default
BatchEn	1 = Enable allocation	BOOL	0
BatchID	Batch number	DWORD	16#00
BatchName	Batch name	STRING [32]	-
Cur_OpScale	Current: Limit value for scale in bar chart display of the faceplate	STRUCT • High : REAL • Low: REAL	- • 99.9 • 0.0
EN	1 = Called block is being processed	BOOL	1
ExtMsg1	Binary input for freely selectable message 1	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
ExtMsg2	Binary input for freely selectable message 2	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
ExtMsg3	Binary input for freely selectable message 3	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
ExtVa104	Auxiliary value 4 for messages (MsgEvID1)	ANY	-
ExtVa204	Auxiliary value 4 for messages (MsgEvID2)	ANY	-
FaultExt	1 = External fault	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Feature	I/O for additional functions (see "Functions of PAC3200 (Page 35)")	STRUCT	-
Feature2	I/O for additional functions (see "Functions of PAC3200 (Page 35)")	STRUCT	-
InEnergyDay	Day on which the energy counter was last reset	INT	0
InEnergyHour	Hour in which the energy counter was last reset	INT	0
InEnergyMinute	Minute in which the energy counter was last reset	INT	0
InEnergyMonth	Month in which the energy counter was last reset	INT	0
InEnergySecond	Second in which the energy counter was last reset	INT	0
InEnergyYear	Year in which the energy counter was last reset	INT	0
InLim0Hys	Limit 0 hysteresis	REAL	0.0
InLim0Mode	Limit 0 mode: 0 = greater than, 1 = less than	BOOL	0
InLim0Mon	Limit 0 monitoring: 0 = No, 1 = Yes	BOOL	0
InLim0PckpDl	Limit 0 pickup delay [s]	DWORD	16#00000000
InLim0Src	Limit 0 source	DINT	0
InLim0Thld	Limit 0 threshold	REAL	24.0
InLim1Hys	Limit 1 hysteresis	REAL	0.0

Parameter	Description	Type	Default
InLim1Mode	Limit 1 mode: 0 = greater than, 1 = less than	BOOL	0
InLim1Mon	Limit 1 monitoring: 0 = No, 1 = Yes	BOOL	0
InLim1PckpDl	Limit 1 pickup delay [s]	DWORD	16#00000000
InLim1Src	Limit 1 source	DINT	0
InLim1Thld	Limit 1 threshold	REAL	24.0
InLim2Hys	Limit 2 hysteresis	REAL	0.0
InLim2Mode	Limit 2 mode: 0 = greater than, 1 = less than	BOOL	0
InLim2Mon	Limit 2 monitoring: 0 = No, 1 = Yes	BOOL	0
InLim2PckpDl	Limit 2 pickup delay [s]	DWORD	16#00000000
InLim2Src	Limit 2 source	DINT	0
InLim2Thld	Limit 2 threshold	REAL	24.0
InLim3Hys	Limit 3 hysteresis	REAL	0.0
InLim3Mode	Limit 3 mode: 0 = greater than, 1 = less than	BOOL	0
InLim3Mon	Limit 3 monitoring: 0 = No, 1 = Yes	BOOL	0
InLim3PckpDl	Limit 3 pickup delay [s]	DWORD	16#00000000
InLim3Src	Limit 3 source	DINT	0
InLim3Thld	Limit 3 threshold	REAL	24.0
InLim4Hys	Limit 4 hysteresis	REAL	0.0
InLim4Mode	Limit 4 mode: 0 = greater than, 1 = less than	BOOL	0
InLim4Mon	Limit 4 monitoring: 0 = No, 1 = Yes	BOOL	0
InLim4PckpDl	Limit 4 pickup delay [s]	DWORD	16#00000000
InLim4Src	Limit 4 source	DINT	0
InLim4Thld	Limit 4 threshold	REAL	24.0
InLim5Hys	Limit 5 hysteresis	REAL	0.0
InLim5Mode	Limit 5 mode: 0 = greater than, 1 = less than	BOOL	0
InLim5Mon	Limit 5 monitoring: 0 = No, 1 = Yes	BOOL	0
InLim5PckpDl	Limit 5 pickup delay [s]	DWORD	16#00000000
InLim5Src	Limit 5 source	DINT	0
InLim5Thld	Limit 5 threshold	REAL	24.0
Lim0_MsgEn	1 = activate message for limit 0	BOOL	1
Lim1_MsgEn	1 = activate message for limit 1	BOOL	1
Lim2_MsgEn	1 = activate message for limit 2	BOOL	1
Lim3_MsgEn	1 = activate message for limit 3	BOOL	1
Lim4_MsgEn	1 = activate message for limit 4	BOOL	1
Lim5_MsgEn	1 = activate message for limit 5	BOOL	1
Lim0M0dOp*	1 = Limit 0 mode: greater than via operation	BOOL	0
Lim0M1dOp*	1 = Limit 0 mode: less than via operation	BOOL	0
Lim1M0dOp*	1 = Limit 1 mode: greater than via operation	BOOL	0
Lim1M1dOp*	1 = Limit 1 mode: less than via operation	BOOL	0
Lim2M0dOp*	1 = Limit 2 mode: greater than via operation	BOOL	0
Lim2M1dOp*	1 = Limit 2 mode: less than via operation	BOOL	0
Lim3M0dOp*	1 = Limit 3 mode: greater than via operation	BOOL	0
Lim3M1dOp*	1 = Limit 3 mode: less than via operation	BOOL	0

Parameter	Description	Type	Default
Lim4M0dOp*	1 = Limit 4 mode: greater than via operation	BOOL	0
Lim4M1dOp*	1 = Limit 4 mode: less than via operation	BOOL	0
Lim5M0dOp*	1 = Limit 5 mode: greater than via operation	BOOL	0
Lim5M1dOp*	1 = Limit 5 mode: less than via operation	BOOL	0
Lim0Unit*	Limit 0 unit	STRING[4]	V
Lim1Unit*	Limit 1 unit	STRING[4]	V
Lim2Unit*	Limit 2 unit	STRING[4]	V
Lim3Unit*	Limit 3 unit	STRING[4]	V
Lim4Unit*	Limit 4 unit	STRING[4]	V
Lim5Unit*	Limit 5 unit	STRING[4]	V
MS_RelOp*	1 = Release for maintenance via OS operator	BOOL	0
MsgEvId1	Message number (automatically assigned)	DWORD	16#00000000
MsgEvId2	Message number (automatically assigned)	DWORD	16#00000000
MsgLock	1 = Suppress process messages. You can find more detailed information in the APL Online Help in the chapter "Suppressing messages via the MsgLock parameter".	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Occupied	1 = Occupied by a batch	BOOL	0
OnOp*	1 = "On" mode via operator	BOOL	0
OosLi	1 = "Out of service", via interconnection or SFC	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
OosOp*	1 = "Out of service", via operator	BOOL	0
OpSt_In	Input parameter for the local operator permission, to be interconnected with the Out output parameter of the upstream OpStations block. You can find more detailed information in the APL online help in the chapter "Description of the OpStations".	DWORD	16#00000000
OS_Perm	I/O for operator permission (see Functions of PAC3200 (Page 35))	STRUCT	-
OS1Perm	I/O for operator permission (see Functions of PAC3200 (Page 35))	STRUCT	-
Power_OpScale	Power: Limit value for scale in bar chart display of the faceplate	STRUCT • High : REAL • Low: REAL	- • 49999.9 • -49999.9
PowFact_OpScale	Power factor: Limit value for scale in bar chart display of the faceplate	STRUCT • High : REAL • Low: REAL	- • 1.0 • 0.0
RdCfgOp*	1 = Read out all configuration data from the power monitoring device	BOOL	0
RdDataLi	1 = "Read acyclic measured values" via interconnection or SFC	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80

Parameter	Description	Type	Default
ResetEnCLi	1 = Reset energy counter of the device	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
RstEnCntrsOp*	1 = Reset energy counter via operator	BOOL	0
RstMnValLi	1 = "Reset minimum values" via interconnection or SFC	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
RstMxValLi	1 = "Reset maximum values" via interconnection or SFC	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
RunUpCyc	Number of cycles at startup within which messages are suppressed	INT	3
SampleTime	Sampling time [s] (automatically assigned)	REAL	0.1
SelFp1	Call of a block stored in this parameter as an additional faceplate in the standard view You can find more detailed information in the APL online help in the chapter "Calling other faceplates".	ANY	-
SelFp2	Call of a block stored in this parameter as an additional faceplate in the preview You can find more detailed information in the APL online help in the chapter "Calling other faceplates".	ANY	-
StepNo	Batch step number	DWORD	16#00000000
TotPow_OpScale	Total power: Limit value for scale in bar chart display of the faceplate	STRUCT • High : REAL • Low: REAL	- • 99999.9 • -99999.9
TrffHighLi	1 = "Switch to high tariff", via interconnection or SFC	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
TrffLowLi	1 = "Switch to low tariff", via interconnection or SFC	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
UA1unit	Measuring unit for the analog auxiliary value 1	INT	0
UA2unit	Measuring unit for the analog auxiliary value 2	INT	0
UserAna1	Analog auxiliary value 1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#FF
UserAna2	Analog auxiliary value 2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#FF
UnitCur	Current unit for OS	INT	0
UnitEnergy	Energy unit for OS	INT	0
UnitPower	Power unit for OS	INT	1
UnitVolt	Voltage unit for OS	INT	0

Parameter	Description	Type	Default
UserStatus	Freely assignable bits for use in PCS 7 OS	BYTE	16#00
VoltLL_OpScale	Voltage L-L: Limit value for scale in bar chart display of the faceplate	STRUCT • High : REAL • Low: REAL	- • 999.9 • 0.0
VoltLN_OpScale	Voltage L-N: Limit value for scale in bar chart display of the faceplate	STRUCT • High : REAL • Low: REAL	- • 499.9 • 0.0
WrCfgOp*	1 = Write all configuration data into the power monitoring device	BOOL	0

* The block algorithm can write back values to these inputs during processing of the block.

In-out parameters

Parameter	Description	Type	Default
CyclData	Cyclic data from the DrvPAC driver block ⇒ You must connect this input to the CyclData output of the DrvPAC.	STRUCT • CSF : BOOL • ... • ExDigIn3 : STRUCT	
AcyclData	Acyclic data from the DrvPAC driver block ⇒ You must connect this input to the AcyclData output of the DrvPAC.	STRUCT • BlkRd : INT • ... • RetValWr : WORD • Input: STRUCT • Output: STRUCT	

Output parameters

Parameter	Description	Type	Default
Act1T1EnExp	Active energy export tariff 1 DWORD 1	DWORD	16#00000000
Act2T1EnExp	Active energy export tariff 1 DWORD 2	DWORD	16#00000000
Act1T1EnImp	Active energy import tariff 1 DWORD 1	DWORD	16#00000000
Act2T1EnImp	Active energy import tariff 1 DWORD 2	DWORD	16#00000000
ActT1EnExp	Active energy export tariff 1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80

Parameter	Description	Type	Default
ActT1EnExpkWh	Active energy export tariff 1 [kWh]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
ActT1EnImp	Active energy import tariff 1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
ActT1EnImpkWh	Active energy import tariff 1 [kWh]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Act1T2EnExp	Active energy export tariff 2 DWORD 1	DWORD	16#00000000
Act2T2EnExp	Active energy export tariff 2 DWORD 2	DWORD	16#00000000
Act1T2EnImp	Active energy import tariff 1 DWORD 2	DWORD	16#00000000
Act2T2EnImp	Active energy import tariff 2 DWORD 2	DWORD	16#00000000
ActT2EnExp	Active energy export tariff 2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
ActT2EnExpkWh	Active energy export tariff 2 [kWh]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
ActT2EnImp	Active energy import tariff 2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
ActT2EnImpkWh	Active energy import tariff 2 [kWh]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Ap1T1Energy	Apparent energy tariff 1 DWORD 1	DWORD	16#00000000
Ap2T1Energy	Apparent energy tariff 1 DWORD 2	DWORD	16#00000000
ApT1Energy	Apparent energy tariff 1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
ApT1EnergykVAh	Apparent energy tariff 1 [kVAh]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Ap1T2Energy	Apparent energy tariff 2 DWORD 1	DWORD	16#00000000
Ap2T2Energy	Apparent energy tariff 2 DWORD 2	DWORD	16#00000000

Parameter	Description	Type	Default
ApT2Energy	Apparent energy tariff 2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
ApT2Energykvarh	Apparent energy tariff 2 [kVAh]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
BscCnfgChngd	1 = Relevant parameter change	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
CnfgAct	1 = Device configuration menu is active	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Cur3PhAvg	3-phase average current	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
CurOutOfRng	1 = Current out of range	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
CurUnbal	Amplitude unbalance current	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
CurUnit	Current unit: A	INT	1209
DataRdOK	1 = acyclic measured values have been read successfully	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
DpaLink	Connection of the device: 0 = Direct on the DP master system 1 = Downstream of the DP/PA-Link	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
EnergyDay	Day on which the energy counter was last reset	INT	0
EnergyHour	Hour in which the energy counter was last reset	INT	0
EnergyMinute	Minute in which the energy counter was last reset	INT	0
EnergyMonth	Month in which the energy counter was last reset	INT	0
EnergySecond	Second in which the energy counter was last reset	INT	0
EnergyYear	Year in which the energy counter was last reset	INT	0
ENO	1 = Block algorithm executed without errors	BOOL	0
ErrorNum	Output of the active error number. The error numbers that this block can output can be found in the chapter "Troubleshooting of PAC3200 (Page 45)".	INT	-1
Frequency	Line frequency	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
FreqUnit	Frequency unit: Hz	INT	1077

Parameter	Description	Type	Default
GrpErr	1 = Group error present	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
InDigIn0Act	1 = Digital input 0.0 active	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
L1ActPow	Active power L1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L1ActPowkW	Active power L1 [kW]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L2ActPow	Active power L2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L2ActPowkW	Active power L2 [kW]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L3ActPow	Active power L3	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L3ActPowkW	Active power L3 [kW]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L1ApPow	Apparent power L1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L1ApPowkVA	Apparent power L1 [kVA]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L2ApPow	Apparent power L2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L2ApPowkVA	Apparent power L2 [kVA]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L3ApPow	Apparent power L3	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80

Parameter	Description	Type	Default
L3ApPowkVA	Apparent power L3 [kVA]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L1Cur	Current L1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L2Cur	Current L2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L3Cur	Current L3	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L1PowFact	Power factor L1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L2PowFact	Power factor L2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L3PowFact	Power factor L3	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L1ReaPow	Reactive power L1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L1ReaPowkvar	Reactive power L1 [kvar]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L2ReaPow	Reactive power L2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L2ReaPowkvar	Reactive power L2 [kvar]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L3ReaPow	Reactive power L3	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L3ReaPowkvar	Reactive power L3 [kvar]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80

Parameter	Description	Type	Default
L1Volt	Voltage L1-N	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L2Volt	Voltage L2-N	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L3Volt	Voltage L3-N	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L12Volt	Voltage L1-L2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L23Volt	Voltage L2-L3	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L31Volt	Voltage L3-L1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Lim0_Act	1 = limit 0 violated You can change the behavior of this parameter via the Feature bit 28 "Disable switching points (Page 13)" and via the Feature bit 29 "Signaling limit violation (Page 13)" .	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim1_Act	1 = limit 1 violated You can change the behavior of this parameter via the Feature bit 28 "Disable switching points (Page 13)" and via the Feature bit 29 "Signaling limit violation (Page 13)" .	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim2_Act	1 = limit 2 violated You can change the behavior of this parameter via the Feature bit 28 "Disable switching points (Page 13)" and via the Feature bit 29 "Signaling limit violation (Page 13)" .	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim3_Act	1 = limit 3 violated You can change the behavior of this parameter via the Feature bit 28 "Disable switching points (Page 13)" and via the Feature bit 29 "Signaling limit violation (Page 13)".	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim4_Act	1 = limit 4 violated You can change the behavior of this parameter via the Feature bit 28 "Disable switching points (Page 13)" and via the Feature bit 29 "Signaling limit violation (Page 13)" .	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim5_Act	1 = limit 5 violated You can change the behavior of this parameter via the Feature bit 28 "Disable switching points (Page 13)" and via the Feature bit 29 "Signaling limit violation (Page 13)" .	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim0Hys	Limit 0 hysteresis	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80

Parameter	Description	Type	Default
Lim0Mode	Limit 0 mode: 0 = greater than, 1 = less than	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim0Mon	Limit 0 monitoring: 0 = No, 1 = Yes	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim0PckpDl	Limit 0 pickup delay [s]	DWORD	16#00000000
Lim0Src	Limit 0 source	DINT	0
Lim0Thld	Limit 0 threshold	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Lim1Hys	Limit 1 hysteresis	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Lim1Mode	Limit 1 mode: 0 = greater than, 1 = less than	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim1Mon	Limit 1 monitoring: 0 = No, 1 = Yes	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim1PckpDl	Limit 1 pickup delay [s]	DWORD	16#00000000
Lim1Src	Limit 1 source	DINT	0
Lim1Thld	Limit 1 threshold	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Lim2Hys	Limit 2 hysteresis	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Lim2Mode	Limit 2 mode: 0 = greater than, 1 = less than	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim2Mon	Limit 2 monitoring: 0 = No, 1 = Yes	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim2PckpDl	Limit 2 pickup delay [s]	DWORD	16#00000000
Lim2Src	Limit 2 source	DINT	0
Lim2Thld	Limit 2 threshold	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80

Parameter	Description	Type	Default
Lim3Hys	Limit 3 hysteresis	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Lim3Mode	Limit 3 mode: 0 = greater than, 1 = less than	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim3Mon	Limit 3 monitoring: 0 = No, 1 = Yes	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim3PckpDl	Limit 3 pickup delay [s]	DWORD	16#00000000
Lim3Src	Limit 3 source	DINT	0
Lim3Thld	Limit 3 threshold	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Lim4Hys	Limit 4 hysteresis	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Lim4Mode	Limit 4 mode: 0 = greater than, 1 = less than	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim4Mon	Limit 4 monitoring: 0 = No, 1 = Yes	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim4PckpDl	Limit 4 pickup delay [s]	DWORD	16#00000000
Lim4Src	Limit 4 source	DINT	0
Lim4Thld	Limit 4 threshold	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Lim5Hys	Limit 5 hysteresis	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Lim5Mode	Limit 5 mode: 0 = greater than, 1 = less than	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim5Mon	Limit 5 monitoring: 0 = No, 1 = Yes	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim5PckpDl	Limit 5 pickup delay [s]	DWORD	16#00000000
Lim5Src	Limit 5 source	DINT	0

Parameter	Description	Type	Default
Lim5Thld	Limit 5 threshold	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
LimComb_Act	1 = Combination result active	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
LimitViolated	1 = Incoming or outgoing violation of a high or low limit	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
LimitViolations	Limit violations	DWORD	16#00000000
MinCur	Minimum current	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MS_Release	Release for maintenance: 1 = Permission for the operator	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
MsgAckn1	Message acknowledgment status (output ACK_STATE of the first ALARM_8P)	WORD	16#0000
MsgAckn2	Message acknowledgment status (output ACK_STATE of the second ALARM_8P)	WORD	16#0000
MsgErr1	1 = Message error (output ERROR of the first ALARM_8P)	BOOL	0
MsgErr2	1 = Message error (output ERROR of the second ALARM_8P)	BOOL	0
MsgStat1	Message status (output STATUS of the first ALARM_8P)	WORD	16#0000
MsgStat2	Message status (output STATUS of the first ALARM_8P)	WORD	16#0000
MxPlsRateEx	1 = Maximum pulse rate exceeded	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
OnAct	1 = "On" mode active	STRUCT • Value: BOOL • ST: BYTE	- • 1 • 16#80
OosAct	1 = Block is "Out of service"	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
OpSt_Out	Value of the input parameter OpSt_In, for further interconnecting with other blocks. Bit 31 of this parameter is occupied by Feature Bit 24	DWORD	16#00000000
OS_PermLog	Display of OS_Perm with the settings changed by the block algorithm	DWORD	16#FFFFFFFF
OS_PermOut	Display of OS_Perm	DWORD	16#FFFFFFFF
OS1PermLog	Display of OS1Perm with the settings changed by the block algorithm	DWORD	16#FFFFFFFF

Parameter	Description	Type	Default
OS1PermOut	Display of OS1Perm	DWORD	16#FFFFFFFF
PacState	PMD diagnostics and status	DWORD	16#00000000
PrimCur	Primary current	DWORD	16#00000000
PrimVolt	Primary voltage	DWORD	16#00000000
Rea1T1EnExp	Reactive energy export tariff 1 DWORD 1	DWORD	16#00000000
Rea2T1EnExp	Reactive energy export tariff 1 DWORD 2	DWORD	16#00000000
Rea1T1EnImp	Reactive energy import tariff 1 DWORD 1	DWORD	16#00000000
Rea2T1EnImp	Reactive energy import tariff 1 DWORD 2	DWORD	16#00000000
ReaT1EnExp	Reactive energy export tariff 1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
ReaT1EnExpkvarh	Reactive energy export tariff 1 [kvar]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
ReaT1EnImp	Reactive energy import tariff 1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
ReaT1EnImpkvar	Reactive energy import tariff 1 [kvar]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Rea1T2EnExp	Reactive energy export tariff 2 DWORD 1	DWORD	16#00000000
Rea2T2EnExp	Reactive energy export tariff 2 DWORD 2	DWORD	16#00000000
Rea1T2EnImp	Reactive energy import tariff 2 DWORD 1	DWORD	16#00000000
Rea2T2EnImp	Reactive energy import tariff 2 DWORD 2	DWORD	16#00000000
ReaT2EnExp	Reactive energy export tariff 2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
ReaT2EnExpkvar	Reactive energy export tariff 2 [kvar]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
ReaT2EnImp	Reactive energy import tariff 2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80

Parameter	Description	Type	Default
ReaT2EnImpkvar	Reactive energy import tariff 2 [kvar]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
SecoCur	Secondary current	DWORD	16#00000000
SecoVolt	Secondary voltage/measured voltage	DWORD	16#00000000
SnchFld	1 = no synchronization pulse	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
ST_Worst	Worst signal status	BYTE	16#80
Status1	Status word 1	DWORD	16#00000000
Status2	Status word 2	DWORD	16#00000000
Status3	Status word 3	DWORD	16#00000000
Status4	Reserved	DWORD	16#00000000
SumMsgAct	1 = Group signal is active	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
ToActPow	Total active power	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
ToActPowkW	Total active power [kW]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
ToApPow	Total apparent power	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
ToApPowkVA	Total apparent power [kVA]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
ToPowFact	Total power factor	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
ToReaPow	Total reactive power VARn	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
ToReaPowkvar	Total reactive power VARn [kvar]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80

Parameter	Description	Type	Default
UnbalUnit	Unit asymmetry: %	INT	1342
VoltLL3PhAvg	3-phase average voltage L-L	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
VoltLN3PhAvg	3-phase average voltage L-N	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
VoltOutOfRng	1 = Voltage out of range	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
VoltTransf	Voltage transformer: 0 = No, 1 = Yes	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
VoltUnbal	Amplitude unbalance voltage	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
VoltUnit	Voltage unit: V	INT	1240
WriteProt	1 = Write protection activated	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80

4.7 Operator control & monitoring

Views of PAC3200

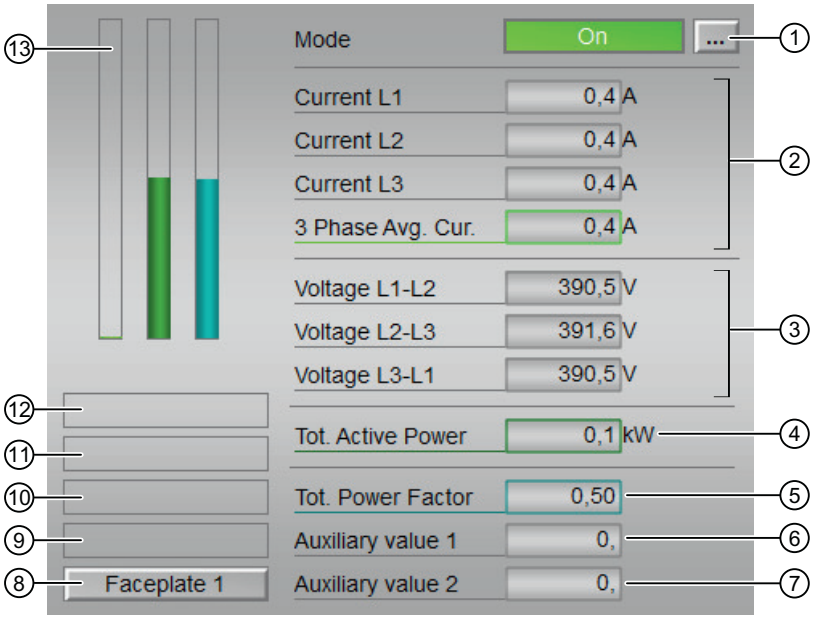
The PAC3200 block has the following views:

- Standard view of PAC3200
- Message view (see APL Online Help)
- Limit view of PAC3200
- Trend view (see APL Online Help)
- Parameter view of PAC3200
- Preview of PAC3200
- Memo view (see APL Online Help)
- Batch view (see APL Online Help)
- Current view of PAC3200
- Voltage view of PAC3200
- Power view of PAC3200
- Energy view of PAC3200
- Block icons for PAC3200

If the PAC3200 / PAC3220 power monitoring device is connected behind a DP/PA-Link in an H-system, the energy view of the PAC3200 / PAC3220 is not displayed.

You can find general information about the faceplate and the block icon in chapters "Structure of the faceplate" and "Structure of the block icon" in the APL Online Help.

Standard view of PAC3200



① Display and change the operating mode
② Display of currents including signal status
③ Display of voltages including signal status
④ Display of total active power including signal status
⑤ Display of total power factor including signal status
⑥ Display of auxiliary values
⑦ Display of auxiliary values
⑧ Button for jumping to the standard view of any faceplate
⑨ Display area for block states
⑩ Display area for states of the power monitoring device
⑪ Display area for states of the power monitoring device
⑫ Display area for block states
⑬ Bar chart display for 3-phase average of current, total active power and total power factor

Figure 4-1 Standard view of PAC3200

(1) Display and change the operating mode

This area shows you the currently valid operating mode. The following operating modes are displayed here:

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

For information on changing the operating mode, see chapter "Switching operating states and operating modes" in the APL Online Help.

(2) Display of currents including signal status

This area shows you the actual currents with the relevant signal status.

The following currents are displayed:

- Current L1
- Current L2
- Current L3
- 3-phase average current

(3) Display of voltages including signal status

This area shows you the actual voltages with the relevant signal status.

The following voltages are displayed:

- Voltage L1-L2
- Voltage L2-L3
- Voltage L3-L1

(4) Display of total active power including signal status

This area shows you the actual total active power with the relevant signal status.

(5) Display of total power factor including signal status

This area shows you the actual total power factor with the relevant signal status.

(6) and (7) Display of auxiliary values

In this area you can display two auxiliary values that have been configured in the Engineering System (ES). You can find more detailed information in the APL Online Help in chapter "Calling other faceplates".

(8) Button for jumping to the standard view of any faceplate

You use this jump button to reach the standard view of a block configured in the Engineering System (ES). The visibility of this jump button depends on the configuration in the engineering system (ES).

You can find more detailed information in the APL Online Help in chapter "Calling other faceplates".

(9) Display area for block states

This area shows you additional information on the operating state of the block:

- "Maintenance"

(10) Display area for states of the power monitoring device

This area shows you additional information on the operating state of the power monitoring device:

- "Write protection activated"

(11) Display area for states of the power monitoring device

This area shows you additional information on the operating state of the block:

- "Current out of range"
- "Voltage out of range"
- "Maximum pulse rate exceeded"

(12) Display area for block states

This area shows you additional information on the operating state of the block:

- "Invalid signal"
- "External fault"

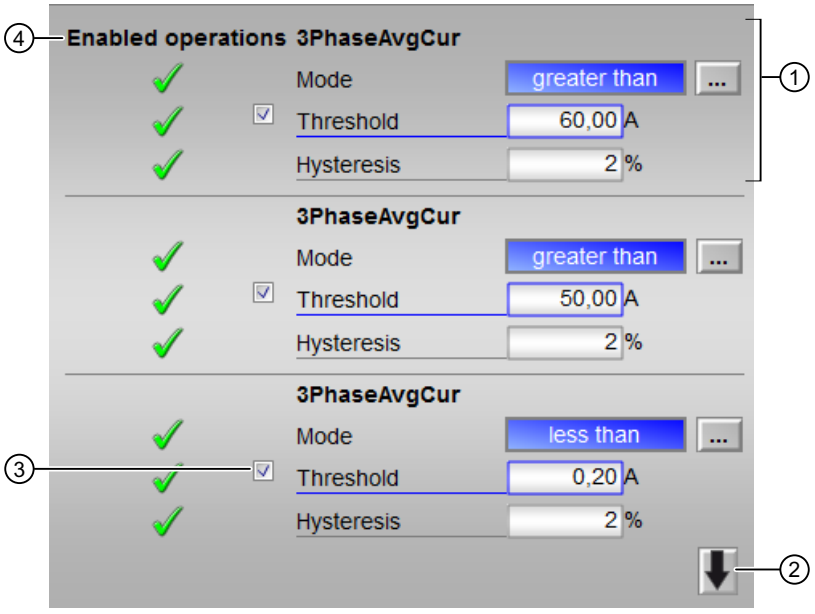
(13) Bar chart display for 3-phase average of current, total active power and total power factor

In the form of a bar chart, this area shows you:

- The actual "3-phase average current"
- The "total active power"
- The "total power factor"

The visible area in the bar chart display depends on the configuration in the Engineering System (ES).

Limit view of PAC3200



① Parameterizing a limit
② Button for jumping to the next or previous view
③ Activating messages
④ Enabled operations

Figure 4-2 Limit view of PAC3200

(1) Parameterizing a limit

In this area you can change the parameterization for a limit:

- "Mode": "greater than" or "less than"
- "Threshold"
- "Hysteresis"

This area is displayed once for every limit. There are 6 limits in total.

(2) Button for jumping to the next or previous view

You reach the next or the previous limit parameterization view by means of this button.

(3) Activating messages

In this area you activate messages for limits.

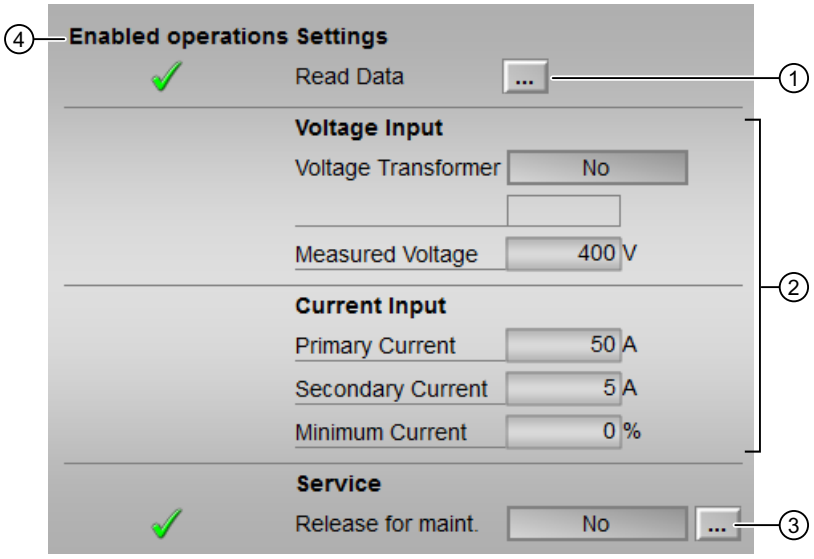
(4) Enabled operations

This area shows all the operator inputs for which there are special operator permissions. These are dependent on the configuration in the Engineering System (ES) that is to apply for this block.

Symbols for enabled operations:

- **Green checkmark**: the OS operator can process this parameter.
- **Gray checkmark**: the OS operator is temporarily unable to process this parameter for process reasons.
- **Red cross**: the OS operator must never process this parameter due to parameterized AS operator permissions (`OS_Perm` or `OS1Perm`).

Parameter view of PAC3200



① Read configuration data
② Basic settings
③ Service

Figure 4-3 Parameter view of PAC3200

(1) Read configuration data

In this area, you read all the configuration data of the PAC3200 power monitoring device.

(2) Basic parameters

This area shows the most important basic parameters of the PAC3200.

The following parameters are displayed:

- Voltage transformer
- Measured voltage if voltage transformer = No
- Primary voltage/secondary voltage if voltage transformer = Yes
- Primary current
- Secondary current
- Minimum current

(3) Service

In this area, you activate the following functions:

- "Release for maintenance"

You can find more detailed information on this area in the APL Online Help in chapter "Maintenance release".

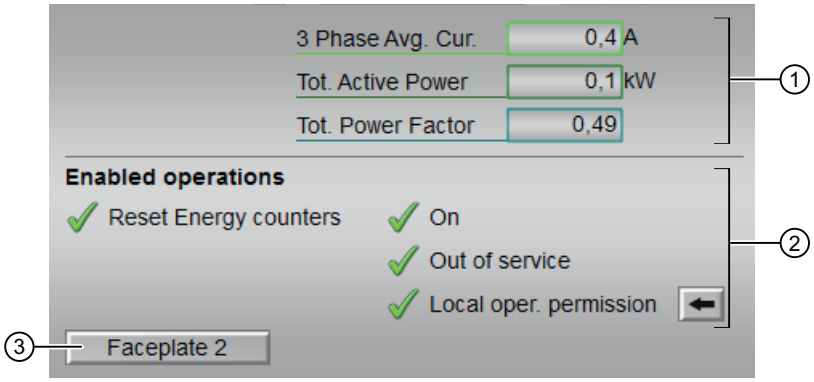
(4) Enabled operations

This area shows all the operator inputs for which there are special operator permissions. These are dependent on the configuration in the Engineering System (ES) that is to apply for this block.

Symbols for enabled operations:

- **Green checkmark**: the OS operator can process this parameter.
- **Gray checkmark**: the OS operator is temporarily unable to process this parameter for process reasons.
- **Red cross**: the OS operator must never process this parameter due to parameterized AS operator permissions (`OS_Perm` or `OS1Perm`).

Preview of PAC3200



① Process values
② Enabled operations
③ Button for jumping to the standard view of any faceplate

Figure 4-4 Preview of PAC3200

(1) Process values

The following real measured values are displayed to you in this area:

- 3-phase average current
- Total active power
- Total power factor

(2) Enabled operations

This area shows all the operator inputs for which there are special operator permissions. These are dependent on the configuration in the Engineering System (ES) that is to apply for this block.

Symbols for enabled operations:

- **Green checkmark**: the OS operator can process this parameter.
- **Gray checkmark**: the OS operator is temporarily unable to process this parameter for process reasons.
- **Red cross**: the OS operator must never process this parameter due to parameterized AS operator permissions (`OS_Perm` or `OS1Perm`).

The following enabled operations are displayed here:

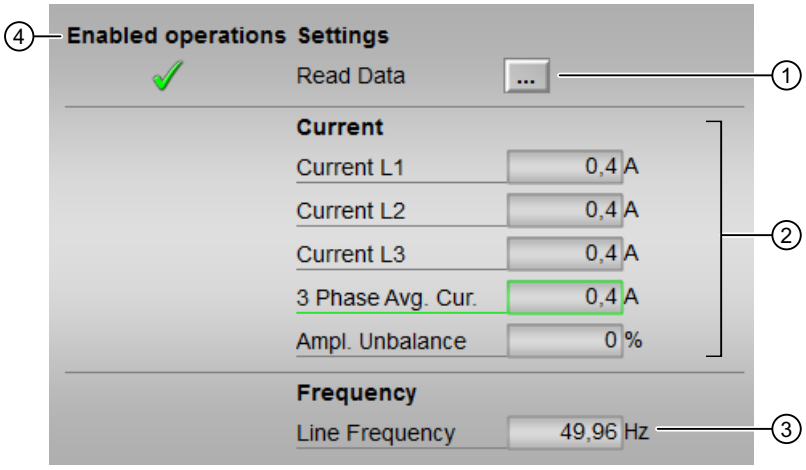
- "On": You may change to the "On" mode.
- "Out of service": You may change to "Out of service mode".
- "Reset energy counters": You may reset the energy counters
- "Local operation permission": You change to the standard view of the OpStations block via the ← button. You can find more information on this in the chapter "Operator permissions" in the APL Online Help.

(3) Button for jumping to the standard view of any faceplate

You use this jump button to reach the standard view of a block configured in the Engineering System (ES). The visibility of this jump button depends on the configuration in the engineering system (ES).

You can find more detailed information in the APL Online Help in chapter "Calling other faceplates".

Current view of PAC3200



① Read configuration data
② Display of the currents
③ Display of the line frequency including signal status
④ Enabled operations

Figure 4-5 Current view of PAC3200

(1) Read configuration data

In this area, you read all the configuration data of the PAC3200 power monitoring device.

(2) Display of currents

This area shows you the most important currents of the PAC3200 with the relevant signal status.

The following currents are displayed:

- Current L1
- Current L2

- Current L3
- 3-phase average current
- Amplitude unbalance current

(3) Display of line frequency including signal status

This area shows you the actual line frequency with the relevant signal status.

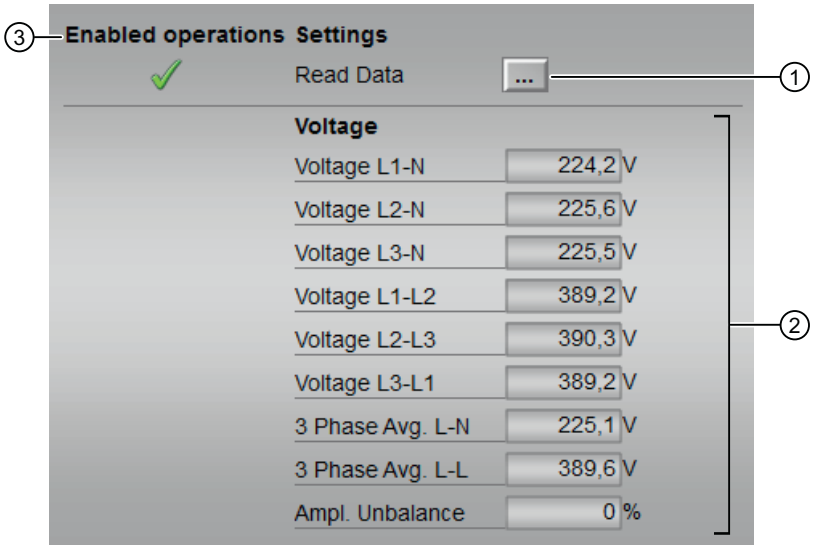
(4) Enabled operations

This area shows all the operator inputs for which there are special operator permissions. These are dependent on the configuring in the Engineering System (ES) that is to apply for this block.

Symbols for enabled operations:

- **Green checkmark**: the OS operator can process this parameter
- **Gray checkmark**: the OS operator is temporarily unable to process this parameter for process reasons
- **Red cross**: the OS operator must never process this parameter due to parameterized AS operator permissions (`OS_Perm` or `OS1Perm`).

Voltage view of PAC3200



① Read configuration data
② Display of voltages
③ Enabled operations

Figure 4-6 Voltage view of PAC3200

(1) Read configuration data

In this area, you read all the configuration data of the PAC3200 power monitoring device.

(2) Display of voltages

This area shows you the most important voltages of the PAC3200 with the relevant signal status.

The following voltages are displayed:

- Voltage L1-N
- Voltage L2-N
- Voltage L3-N
- Voltage L1-L2
- Voltage L2-L3
- Voltage L3-L1
- 3-phase average voltage L-N
- 3-phase average voltage L-L
- Amplitude unbalance voltage

(3) Enabled operations

This area shows all the operator inputs for which there are special operator permissions. These are dependent on the configuration in the Engineering System (ES) that is to apply for this block.

Symbols for enabled operations:

- **Green checkmark**: the OS operator can process this parameter.
- **Gray checkmark**: the OS operator is temporarily unable to process this parameter for process reasons.
- **Red cross**: the OS operator must never process this parameter due to parameterized AS operator permissions (`OS_Perm` or `OS1Perm`).

Power view of PAC3200

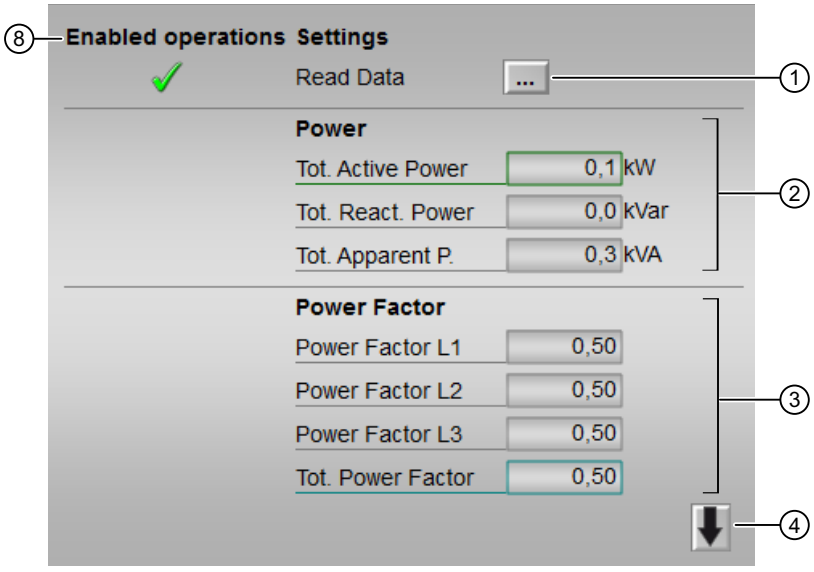
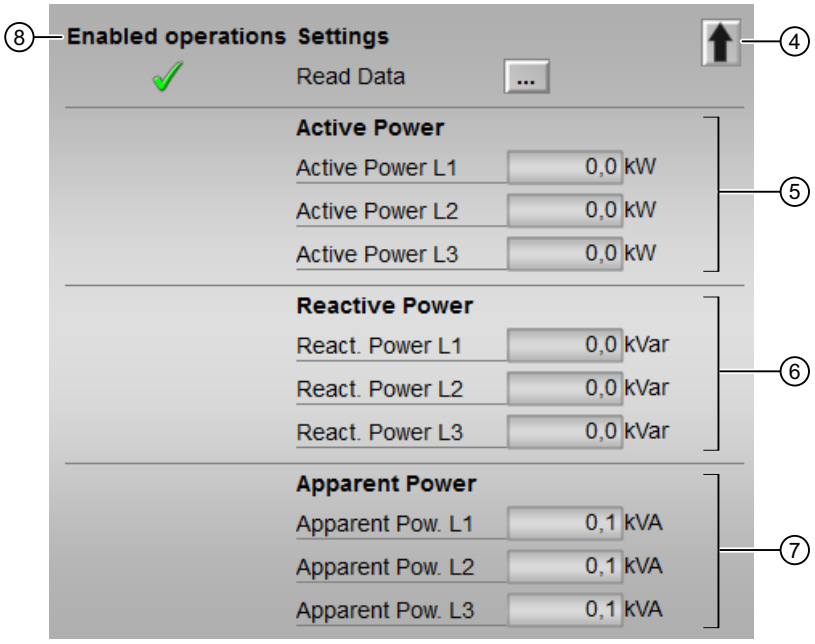


Figure 4-7 Power view of PAC3200 (1)



① Read configuration data
② Display of total power
③ Display of the power factor
④ Button for jumping to the next or previous view
⑤ Display of active power
⑥ Display of reactive power
⑦ Display of apparent power
⑧ Enabled operations

Figure 4-8 Power view of PAC3200 (2)

(1) Read configuration data

In this area, you read all the configuration data of the PAC3200 power monitoring device.

(2) Display of total power

This area shows you the most important total power values of the PAC3200 with the relevant signal status.

- Total active power
- Total reactive power VARn
- Total apparent power

(3) Display of power factor

This area shows you the most important power factors of the PAC3200 with the relevant signal status.

The following power factors are displayed:

- Power factor L1
- Power factor L2

- Power factor L3
- Total power factor

(4) Button for jumping to the next or previous view

You reach the next or previous part of the power view by means of this button.

(5) Display of active power

This area shows you the most important active powers of the PAC3200 with the relevant signal status.

The following active powers are displayed:

- Active power L1
- Active power L2
- Active power L3

(6) Display of reactive power

This area shows you the most important reactive powers of the PAC3200 with the relevant signal status.

The following reactive powers are displayed:

- Reactive power L1
- Reactive power L2
- Reactive power L3

(7) Display of apparent power

This area shows you the most important apparent powers of the PAC3200 with the relevant signal status.

The following apparent powers are displayed:

- Apparent power L1
- Apparent power L2
- Apparent power L3

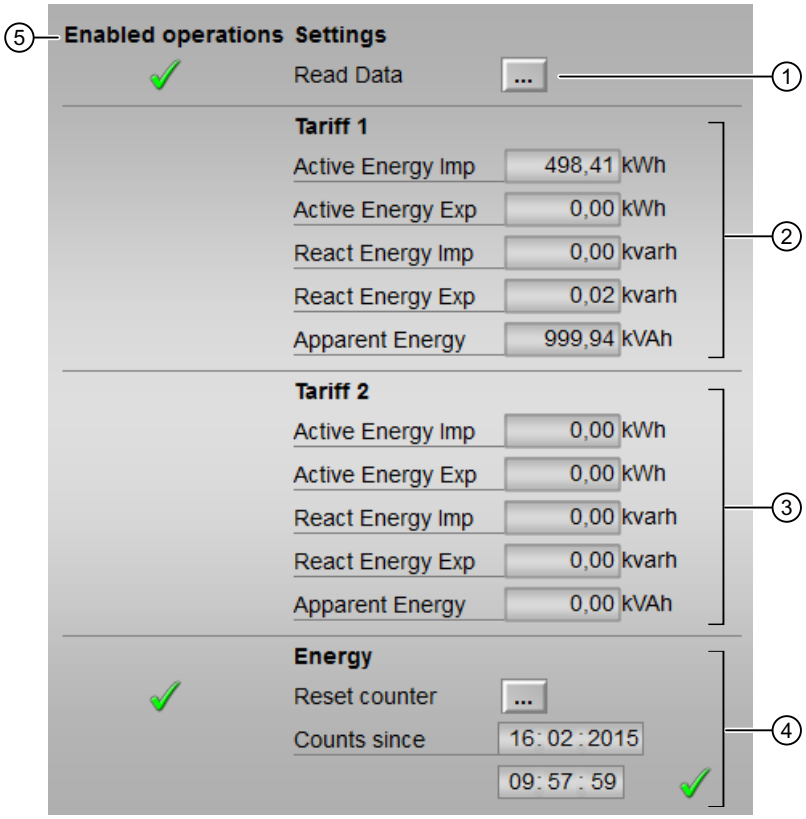
(8) Enabled operations

This area shows all the operator inputs for which there are special operator permissions. These are dependent on the configuration in the Engineering System (ES) that is to apply for this block.

Symbols for enabled operations:

- **Green checkmark**: the OS operator can process this parameter
- **Gray checkmark**: the OS operator is temporarily unable to process this parameter for process reasons
- **Red cross**: the OS operator must never process this parameter due to parameterized AS operator permissions (`OS_Perm` or `OS1Perm`).

Energy view of PAC3200



① Read configuration data
② Display of tariff 1 energy counters
③ Display of tariff 2 energy counters
④ Reset energy counters
⑤ Enabled operations

Figure 4-9 Energy view of PAC3200

(1) Read configuration data

In this area, you read all the configuration data of the PAC3200 power monitoring device.

(2) Display of tariff 1 energy counters

This area shows you the most important tariff 1 energy values of the PAC3200 with the relevant signal status.

The following energy values are displayed:

- Imported active energy
- Exported active energy
- Imported reactive energy
- Exported reactive energy
- Apparent energy

(3) Display of tariff 2 energy counters

This area shows you the most important tariff 2 energy values of the PAC3200 with the relevant signal status.

The following energy values are displayed:

- Imported active energy
- Exported active energy
- Imported reactive energy
- Exported reactive energy
- Apparent energy

(4) Reset energy counters

In this area you can reset the energy counters. A display shows you the date and the time at which the energy counters were last reset. The green checkmark is displayed when the energy counters have been successfully reset.

Note

If you reset the energy counters, you must wait until the green checkmark is displayed. If you close the display window or change the view while the energy counters are being reset, it may happen that the date and the time are not displayed correctly or reset even fails.

(5) Enabled operations

This area shows all the operator inputs for which there are special operator permissions. These are dependent on the configuring in the Engineering System (ES) that is to apply for this block.

Symbols for enabled operations:

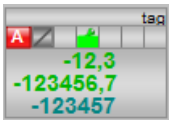
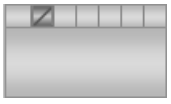
- **Green checkmark**: the OS operator can process this parameter
- **Gray checkmark**: the OS operator is temporarily unable to process this parameter for process reasons
- **Red cross**: the OS operator must never process this parameter due to parameterized AS operator permissions (`OS_Perm` or `OS1Perm`).

Block icons for PAC3200

Different block icons with the following functions are available:

- Measuring point type
- Display of errors or messages
- Operating modes
- Signal status, release for maintenance
- Memo display
- 3-phase average current (green)
- Total active power (dark green)

- Total power factor (blue-green)
- Counter value tariff 1, active energy import

Symbols	Selection of the block icon in CFC	Special characteristics
	1	Display of current, total active power, total power factor
	2	Display of current, total active power, total power factor
	3	Display of current, total active power, counter value tariff 1
	4	Display of current, total active power, counter value tariff 1
	-	Block icon in "Out of service" mode (example of block icon type 1)

Special characteristic for displaying the counter value:

The counter value is part of the acyclic data and is thus not updated cyclically. Instead, it needs a trigger to be read out anew from the device.

Acyclic data can be retrieved as follows:

- Trigger the "RdDataLi" block input
- Open the "@PG_PAC3200_Parameter" faceplate
- Open the "@PG_PAC3200_Current" faceplate
- Open the "@PG_PAC3200_Voltage" faceplate
- Open the "@PG_PAC3200_Energy" faceplate
- Open the "@PG_PAC3200_Power1" faceplate
- Open the "@PG_PAC3200_Power2" faceplate
- Trigger the "Read data" button in the faceplates listed

You can find additional information on the block icon and the operator input options in the following chapters of the APL Online Help:

- "Configuring the block icons"
- "Structure of the block icon"
- "Operator input using the block icon"

PAC4200 measured value block

5

5.1 Description of PAC4200

Object name (type and number) and family

Type + number:	FB 1086
Family:	SENTRON

Application area of PAC4200

The block is used for the following applications:

- Interface block of the driver blocks of the PAC4200 power monitoring device to the user program and the visualization system

Operating principle

The driver block receives measured and diagnostic data from a PAC4200 power monitoring device. The PAC4200 block prepares this measured and diagnostic data and makes it available for further use in the user program and for visualization.

You can find further detailed descriptions about configuring, the operating principle, visualization and operation in the following sections.

Configuration

Integrate the block in the CFC editor into a cyclic interrupt OB (OB30 to OB38). In addition, the block is integrated automatically into the startup OB (OB100). To connect the I/O signals, the DrvPAC driver block (cyclic and acyclic data of the PAC4200) has to be called in the same cyclic interrupt OB **before** the PAC4200. The `CyclData` and `AcyclData` output structures of the DrvPAC block are interconnected with the same-name inputs of the PAC4200 block.

There is a template for the PAC4200 block for measuring point types in the Advanced Process Library PAC3200 & PAC4200 for SIMATIC PCS 7 as an example:

Example of measuring point type:

- "Templates of PAC3200 and PAC4200 (Page 169)"

Note

The PAC4200 block internally calls the ChkREAL (FC260) and SelST16 (FC369) APL blocks. These blocks are not supplied with the Advanced Process Library PAC3200 & PAC4200 for SIMATIC PCS 7. If these two blocks are not yet in your project, copy them from the APL library to your project before you download the project to the controller.

The block uses the PAC4200_LimSrc enumeration. You must copy this from the SENTRON PAC APL block library into the respective project. To do this, open the SENTRON PAC APL in the SIMATIC Manager. Select the PAC4200_LimSrc enumeration under "Shared Declarations > Enumerations" and copy it into your project.

The limit messages (`MsgEvId1` to `MsgEvId4`, `SIG1` to `SIG3`) contain a text from user text libraries. You must copy the user text libraries from the SENTRON PAC APL block library into the respective project. To do this, open the SENTRON PAC APL in the SIMATIC Manager. Select the "Text Libraries" folder and copy it into your project. If a folder for user text libraries already exists in your project, copy the PAC4200_LimSrc and PAC_LimMode user text libraries into this folder.

Startup characteristics

You define the startup characteristics for this block via the `Feature` bit "Setting the startup response".

After startup, the messages are suppressed for the number of cycles parameterized in the `RunUpCyc` value.

Status word assignment for the Status1 parameters

For the description of the individual parameters, see chapter "I/Os of PAC4200 (Page 100)".

Status bit	Parameter
0	`Occupied`
1	`BatchEn`
2	Not used
3	`OosAct.Value`
4	`OosLi.Value`
5	Not used
6	`OnAct.Value`
7 ... 13	Not used
14	Invalid signal
15	`VoltOutOfRng.Value`
16	`CurOutOfRng.Value`
17	`MxPlsRateEx.Value`
18	`WriteProt.Value`
19	`Local operator permission Feature is active`
20 ... 25	Not used
26	`DpaLink.Value`

Status bit	Parameter
27 ... 28	Not used
29	MS_RelOp
30	UserAna1 interconnected
31	UserAna2 interconnected

Status word assignment for the parameter Status2

Status bit	Parameter
0	Lim0_Act
1	Lim1_Act
2	Lim2_Act
3	Lim3_Act
4	Lim4_Act
5	Lim5_Act
6	Lim6_Act
7	Lim7_Act
8	Lim8_Act
9	Lim9_Act
10	Lim10_Act
11	Lim11_Act
12	InLim0Mon
13	InLim1Mon
14	InLim2Mon
15	InLim3Mon
16	InLim4Mon
17	InLim5Mon
18	InLim6Mon
19	InLim7Mon
20	InLim8Mon
21	InLim9Mon
22	InLim10Mon
23	InLim11Mon
24 ... 30	Not used
31	MsgLock.Value

Status word assignment for the parameter Status3

Status bit	Parameter
0	Lim0_MsgEn
1	Lim1_MsgEn
2	Lim2_MsgEn
3	Lim3_MsgEn

Status bit	Parameter
4	`Lim4_MsgEn`
5	`Lim5_MsgEn`
6	`Lim6_MsgEn`
7	`Lim7_MsgEn`
8	`Lim8_MsgEn`
9	`Lim9_MsgEn`
10	`Lim10_MsgEn`
11	`Lim11_MsgEn`
12	Energy counter successfully reset
13 ... 20	Not used
21	`CyclData.Csf`
22	1 = Error when reading the acyclic data (active for one cycle only)
23	1 = Error when writing the acyclic data (active for one cycle only)
24 ... 31	Not used

5.2 Operating modes of PAC4200

The block can be operated in the following modes:

- On
- Out of service

For the PAC4200, the general descriptions of operating modes are identical with those of the APL. You can find the descriptions in the online help of the standard APL blocks.

5.3 Functions of PAC4200

The functions for this block are listed in the following.

Configuration data

All configuration data are read out depending on `Feature` bit 8 at CPU startup or rack restore. This can also be initiated in the Parameter view or in the individual measured value views of the faceplate with "Read configuration data".

With a positive edge at the `RdDataLi.Value` input, the acyclic measured values are read once. You will find the acyclic measured values below in the table from "Voltage L1-N" to "Apparent energy tariff 2".

Note

As long as the acyclic measured values are being read via the `RdDataLi` input, "Read configuration data" cannot be triggered in the faceplate or via the `Feature` bit 8.

The `DataRdOK.Value` output is set when the acyclic measured values have been successfully read. The `DataRdOK.Value` output is reset when reading of the acyclic measured values is started.

All configuration data of the PAC4200 that can be written is sent to the PAC4200 via acyclic services in the event of a change in the applicable block input. The respective output always shows the value of the last checkback signal.

If the PAC4200 power monitoring device is connected in an H system downstream of a DP/PA-Link, the configuration data cannot be read or written.

Note

For this reason, "Read configuration data" must be initiated once to ensure the displayed data is up to date.

The PAC4200 function block reads the configuration data via "Flexible Access" data record 47. First, the register addresses and register lengths for the read parameters are written to the data record, and then the data record is read out. Data record 48 is used to write configuration data.

The PAC4200 possesses the following configuration data with corresponding register addresses and register lengths:

Description	Block parameter (input/output)	Register address	Register length
Voltage L1-N	`L1Volt`	16#0001	2
Voltage L2-N	`L2Volt`	16#0003	2
Voltage L3-N	`L3Volt`	16#0005	2
Apparent power L1	`L1ApPow`	16#0013	2
Apparent power L2	`L2ApPow`	16#0015	2
Apparent power L3	`L3ApPow`	16#0017	2
Active power L1	`L1ActPow`	16#0019	2
Active power L2	`L2ActPow`	16#001B	2

Description	Block parameter (input/output)	Register address	Register length
Active power L3	L3ActPow	16#001D	2
Reactive power L1	L1ReaPow	16#001F	2
Reactive power L2	L2ReaPow	16#0021	2
Reactive power L3	L3ReaPow	16#0023	2
Power factor L1	L1PowFact	16#0025	2
Power factor L2	L2PowFact	16#0027	2
Power factor L3	L3PowFact	16#0029	2
THD voltage L1-L2	L12ThdVolt	16#002B	2
THD voltage L2-L3	L23ThdVolt	16#002D	2
THD voltage L3-L1	L31ThdVolt	16#002F	2
Line frequency	Frequency	16#0037	2
3-phase average voltage L-N	VoltLN3PhAvg	16#0039	2
Total apparent power	ToApPow	16#003F	2
Total reactive power VARn	ToReaPow	16#0043	2
Amplitude unbalance voltage	VoltUnbal	16#0047	2
Amplitude unbalance current	CurUnbal	16#0049	2
THD voltage L1	L1ThdVolt	16#0105	2
THD voltage L2	L2ThdVolt	16#0107	2
THD voltage L3	L3ThdVolt	16#0109	2
THD current L1	L1ThdCur	16#010B	2
THD current L2	L2ThdCur	16#010D	2
THD current L3	L3ThdCur	16#010F	2
Active energy import tariff 1	Act1T1EnImp	16#0321	4
	Act2T1EnImp		
Active energy export tariff 1	Act1T1EnExp	16#0329	4
	Act2T1EnExp		
Reactive energy import tariff 1	Rea1T1EnImp	16#0332	4
	Rea2T1EnImp		
Reactive energy export tariff 1	Rea1T1EnExp	16#0339	4
	Rea2T1EnExp		
Apparent energy tariff 1	Ap1T1Energy	16#0341	4
	Ap2T1Energy		
Active energy import tariff 2	Act1T2EnImp	16#0325	4
	Act2T2EnImp		
Active energy export tariff 2	Act1T2EnExp	16#032D	4
	Act2T2EnExp		
Reactive energy import tariff 2	Rea1T2EnImp	16#0335	4
	Rea2T2EnImp		
Reactive energy export tariff 2	Rea1T2EnExp	16#033D	4
	Rea2T2EnExp		
Apparent energy tariff 2	Ap1T2Energy	16#0345	4
	Ap2T2Energy		

Description	Block parameter (input/output)	Register address	Register length
Active energy import tariff 1	ActT1EnImp	16#0AF1	2
Active energy export tariff 1	ActT1EnExp	16#0AF5	2
Reactive energy import tariff 1	ReaT1EnImp	16#0AF9	2
Reactive energy export tariff 1	ReaT1EnExp	16#0AFD	2
Apparent energy tariff 1	ApT1Energy	16#0B01	2
Active energy import tariff 2	ActT2EnImp	16#0AF3	2
Active energy export tariff 2	ActT2EnExp	16#0AF7	2
Reactive energy import tariff 2	ReaT2EnImp	16#0AFB	2
Reactive energy export tariff 2	ReaT2EnExp	16#0AFF	2
Apparent energy tariff 2	ApT2Energy	16#0B03	2
Voltage transformer (yes/no)	VoltTransf	16#C353	2
Primary voltage	PrimVolt	16#C355	2
Secondary voltage/measured voltage	SecoVolt	16#C357	2
Primary current	PrimCur	16#C35B	2
Secondary current	SecoCur	16#C35D	2
Minimum current	MinCur	16#C363	2
Limit 0 monitoring (yes/no)	InLim0Mon/Lim0Mon	16#C38F	2
Limit 0 hysteresis	InLim0Hys/Lim0Hys	16#C391	2
Limit 0 pickup delay	InLim0PckpDl/Lim0 PckpDl	16#C393	2
Limit 0 source	InLim0Src/Lim0Src	16#C397	2
Limit 0 threshold	InLim0Thld/Lim0Thld	16#C399	2
Limit 0 mode (greater than/less than)	InLim0Mode/Lim0Mode	16#C39B	2
Limit 1 monitoring (yes/no)	InLim1Mon/Lim1Mon	16#C39D	2
Limit 1 hysteresis	InLim1Hys/Lim1Hys	16#C39F	2
Limit 1 pickup delay	InLim1PckpDl/Lim1 PckpDl	16#C3A1	2
Limit 1 source	InLim1Src/Lim1Src	16#C3A5	2
Limit 1 threshold	InLim1Thld/Lim1Thld	16#C3A7	2
Limit 1 mode (greater than/less than)	InLim1Mode/Lim1Mode	16#C3A9	2
Limit 2 monitoring (yes/no)	InLim2Mon/Lim2Mon	16#C3AB	2
Limit 2 hysteresis	InLim2Hys/Lim2Hys	16#C3AD	2
Limit 2 pickup delay	InLim2PckpDl/Lim2 PckpDl	16#C3AF	2
Limit 2 source	InLim2Src/Lim2Src	16#C3B3	2
Limit 2 threshold	InLim2Thld/Lim2Thld	16#C3B5	2
Limit 2 mode (greater than/less than)	InLim2Mode/Lim2Mode	16#C3B7	2
Limit 3 monitoring (yes/no)	InLim3Mon/Lim3Mon	16#C3B9	2
Limit 3 hysteresis	InLim3Hys/Lim3Hys	16#C3BB	2
Limit 3 pickup delay	InLim3PckpDl/Lim3 PckpDl	16#C3BD	2
Limit 3 source	InLim3Src/Lim3Src	16#C3C1	2
Limit 3 threshold	InLim3Thld/Lim3Thld	16#C3C3	2
Limit 3 mode (greater than/less than)	InLim3Mode/Lim3Mode	16#C3C5	2
Limit 4 monitoring (yes/no)	InLim4Mon/Lim4Mon	16#C3C7	2
Limit 4 hysteresis	InLim4Hys/Lim4Hys	16#C3C9	2

Description	Block parameter (input/output)	Register address	Register length
Limit 4 pickup delay	InLim4PckpDl/Lim4 PckpDl	16#C3CB	2
Limit 4 source	InLim4Src/Lim4Src	16#C3CF	2
Limit 4 threshold	InLim4Thld/Lim4Thld	16#C3D1	2
Limit 4 mode (greater than/less than)	InLim4Mode/Lim4Mode	16#C3D3	2
Limit 5 monitoring (yes/no)	InLim5Mon/Lim5Mon	16#C3D5	2
Limit 5 hysteresis	InLim5Hys/Lim5Hys	16#C3D7	2
Limit 5 pickup delay	InLim5PckpDl/Lim5 PckpDl	16#C3D9	2
Limit 5 source	InLim5Src/Lim5Src	16#C3DD	2
Limit 5 threshold	InLim5Thld/Lim5Thld	16#C3DF	2
Limit 5 mode (greater than/less than)	InLim5Mode/Lim5Mode	16#C3E1	2
Limit 6 monitoring (yes/no)	InLim6Mon/Lim6Mon	16#C3E3	2
Limit 6 hysteresis	InLim6Hys/Lim6Hys	16#C3E5	2
Limit 6 pickup delay	InLim6PckpDl/Lim6 PckpDl	16#C3E7	2
Limit 6 source	InLim6Src/Lim6Src	16#C3EB	2
Limit 6 threshold	InLim6Thld/Lim6Thld	16#C3ED	2
Limit 6 mode (greater than/less than)	InLim6Mode/Lim6Mode	16#C3EF	2
Limit 7 monitoring (yes/no)	InLim7Mon/Lim7Mon	16#C3F1	2
Limit 7 hysteresis	InLim7Hys/Lim7Hys	16#C3F3	2
Limit 7 pickup delay	InLim7PckpDl/Lim7 PckpDl	16#C3F5	2
Limit 7 source	InLim7Src/Lim7Src	16#C3F9	2
Limit 7 threshold	InLim7Thld/Lim7Thld	16#C3FB	2
Limit 7 mode (greater than/less than)	InLim7Mode/Lim7Mode	16#C3FD	2
Limit 8 monitoring (yes/no)	InLim8Mon/Lim8Mon	16#C3FF	2
Limit 8 hysteresis	InLim8Hys/Lim8Hys	16#C401	2
Limit 8 pickup delay	InLim8PckpDl/Lim8 PckpDl	16#C403	2
Limit 8 source	InLim8Src/Lim8Src	16#C407	2
Limit 8 threshold	InLim8Thld/Lim8Thld	16#C409	2
Limit 8 mode (greater than/less than)	InLim8Mode/Lim8Mode	16#C40B	2
Limit 9 monitoring (yes/no)	InLim9Mon/Lim9Mon	16#C40D	2
Limit 9 hysteresis	InLim9Hys/Lim9Hys	16#C40F	2
Limit 9 pickup delay	InLim9PckpDl/Lim9 PckpDl	16#C411	2
Limit 9 source	InLim9Src/Lim9Src	16#C415	2
Limit 9 threshold	InLim9Thld/Lim9Thld	16#C417	2
Limit 9 mode (greater than/less than)	InLim9Mode/Lim9Mode	16#C419	2
Limit 10 monitoring (yes/no)	InLim10Mon/Lim10Mon	16#C41B	2
Limit 10 hysteresis	InLim10Hys/Lim10Hys	16#C41D	2
Limit 10 pickup delay	InLim10PckpDl/Lim10PckpDl	16#C41F	2
Limit 10 source	InLim10Src/Lim10Src	16#C423	2
Limit 10 threshold	InLim10Thld/Lim10Thld	16#C425	2
Limit 10 mode (greater than/less than)	InLim10Mode/Lim10Mode	16#C427	2
Limit 11 monitoring (yes/no)	InLim11Mon/Lim11Mon	16#C429	2
Limit 11 hysteresis	InLim11Hys/Lim11Hys	16#C42B	2

Description	Block parameter (input/output)	Register address	Register length
Limit 11 pickup delay	`InLim11PckpDl/Lim11PckpDl`	16#C42D	2
Limit 11 source	`InLim11Src/Lim11Src`	16#C431	2
Limit 11 threshold	`InLim11Thld/Lim11Thld`	16#C433	2
Limit 11 mode (greater than/less than)	`InLim11Mode/Lim11Mode`	16#C435	2
Module slot 1 output mask	`Slt1OutPtMsk`	16#F64F	2
Module slot 2 output mask	`Slt2OutPtMsk`	16#F651	2
Write digital outputs of PAC 4DI/2DO expansion module	`WrExDigOutLi, DigOut0Ex, DigOut1Ex`	16#EA68	1

Limit monitoring

You parameterize limit monitoring in powerconfig. You can monitor 12 limits. To this end, you parameterize which value is monitored (source) and whether it is monitored for a high or a low limit (mode). You can also parameterize the threshold, the hysteresis and a delay. You can deactivate monitoring of each limit.

You can also define all these settings on the block.

In the faceplate you can only change the mode, the threshold and the hysteresis.

Note

The block only supports the values listed here as a setting for the data source.

- `InLimXSrc/LimXSrc`: Source:
  - 0 = VoltageL1-N
  - 1 = VoltageL2-N
  - 2 = VoltageL3-N
  - 3 = VoltageL1-L2
  - 4 = VoltageL2-L3
  - 5 = VoltageL3-L1
  - 6 = CurrentL1
  - 7 = CurrentL2
  - 8 = CurrentL3
  - 9 = Apparent_powerL1
  - 10 = Apparent_powerL2
  - 11 = Apparent_powerL3
  - 12 = Active_powerL1
  - 13 = Active_powerL2
  - 14 = Active_powerL3
  - 15 = Reactive_powerL1
  - 16 = Reactive_powerL2
  - 17 = Reactive_powerL3
  - 45 = Power_factorL1
  - 46 = Power_factorL2
  - 47 = Power_factorL3
  - 48 = THDVltgL1
  - 49 = THDVltgL2
  - 50 = THDVltgL3
  - 51 = THDCurrentL1
  - 52 = THDCurrentL2
  - 53 = THDCurrentL3
  - 54 = THDVltgL1-L2
  - 55 = THDVltgL2-L3
  - 56 = THDVltgL3-L1
  - 75 = Frequency
  - 76 = 3PhaseD-VoltL-N
  - 77 = 3PhaseD-VoltL-L
  - 78 = 3PhaseD-current

  - 79 = Apparent_powerG
  - 80 = Active_powerTot
  - 81 = Reactive_powerG
  - 90 = Power_factorG
  - 91 = AmplUnsymVolt
  - 92 = AmplUnsymCurr
- `InLimXMon/LimXMon`: monitoring (yes/no)
  - 0 = no
  - 1 = yes
- `InLimXMode/LimXMode`: Mode:
  - 0 = greater than
  - 1 = less than
- `InLimXThld/LimXThld`: Threshold
- `InLimXHys/LimXHys`: Hysteresis
- `InLimXPckpDl/LimXPckpDl`: Delay

The "X" in `InLimXSrc / LimXSrc` stands for the limits 0 to 11.

For an active limit violation to disappear, the actual value must be below a hysteresis (`LimXHys` outputs).

Result of the limit monitor

The result of the limit monitor is made available at the interconnectable output parameters:

- `LimX_Act` (X = limits from 0 to 11) = 1:
  Limit X reached, exceeded or undershot.

Via `Feature`.Bit 29 ("Signaling limit violation (Page 13)"), you can define whether the output parameter triggers limit monitoring with the value "0" or the value "1".

Via `Feature`.Bit 28 ("Disable switching points (Page 13)"), you disable the limit monitoring with activated message suppression (`MsgLock` = 1)

Switching on the limit monitoring

The monitoring is always switched on via the input parameters:

- `InLimXMon` = 1: Monitoring of limit X (X = limits 0 to 11).

Pre-assignment: All monitoring functions are deactivated.

Message suppression of the limit monitoring

Parameters:

- `LimX_MsgEn` = 0: (X = limits 0 to 11)
  Limit X messages are suppressed.

When the block is integrated, message output is not suppressed (all `LimX_MsgEn` parameters are assigned the value 1 by default). Messages can only be issued if the limit monitor of the additional analog value is activated.

Sending commands

The following commands can be sent via the PAC4200 block:

- "Reset energy counter" (`RstEnCntrsOp` in the "On" mode)
- "Reset the minimum values" (positive edge `RstMnValLi.Value`)
- "Reset the maximum values" (positive edge `RstMxValLi.Value`)
- "Switch to high tariff" (positive edge `TrffHighLi.Value`)
- "Switch to low tariff" (positive edge `TrffLowLi.Value`)

All commands remain for one second in the in-out parameter `CyclData.PacCtrl`. If the same command is sent again during this time, it will be lost.

Setting digital outputs

The digital outputs 0.0 and 0.1 of the PAC4200 can be switched via the `SwtchOt0InLi` and `SwtchOt1InLi` inputs:

- Digital output 0.0 = `SwtchOt0InLi.Value`
- Digital output 0.1 = `SwtchOt1InLi.Value`

The values for the digital outputs 0.0 and 0.1 are written into the `CyclData.PacCtrl` in-out parameter and are sent cyclically to the module.

When a PAC 4DI/2DO expansion module is fitted, the digital outputs x.0 and x.1 can be set via a positive edge at the `WrExDigOutLi` input.

Before the digital outputs are set, the slot on which the PAC 4DI/2DO expansion module is fitted is read out of the device.

The digital outputs then assume the following status:

- Digital output x.0 = `DigOut0Ex`
- Digital output x.1 = `DigOut1Ex`

As acyclic services are used when setting the digital outputs of the PAC 4DI/2DO expansion module, the digital outputs cannot be set when the PAC4200 power monitoring device is connected in an H system downstream of a DP/PA-Link.

Parameterizing units of measured values

The units of the following measured values can be parameterized at block inputs. If necessary, the measured values are then converted in the faceplate of the PAC4200 and the set unit is displayed.

Measured variable	Unit of the device and on the block	Possible setting for display on the faceplate	Parameter
Current	A	• 0 = A • 1 = kA	`UnitCur`
Voltage	V	• 0 = V • 1 = kV	`UnitVolt`
Active power	W	• 0 = W/VA/var • 1 = kW/kVA/kVar • 2 = MW/MVA/MVar	`UnitPower`
Apparent power	VA		
Reactive power	var		
Active energy	Wh	• 0 = kWh/kVAh/kvarh • 1 = MWh/MVAh/Mvarh • 2 = GWh/GVAh/Gvarh	`UnitEnergy`
Apparent energy	VAh		
Reactive energy	varh		

Suppressing messages via the parameter `MsgLock`

This block has the standard function "Suppressing messages via the `MsgLock` parameter" described in the APL Online Help.

Forming the signal status for blocks

This block has the standard function "Forming and outputting signal status for technological blocks" described in detail in the APL Online Help.

The worst signal status `ST_Worst` for the block is formed from the following parameters:

- `GrpErr.Value`
- `L1Cur.ST`
- `L12Volt.ST`

Release for maintenance

This block has the standard function "Release for maintenance" described in the APL Online Help.

Group errors

The following parameters are taken into account when generating the group error `GrpErr`:

- `CyclData.Csf`
- `FaultExt`

Configurable reactions via the Feature and Feature2 I/O

The following reactions are available for this block at the respective bits of the `Feature` I/O:

Bit	Function
0	Setting the startup response (Page 9)
1	Characteristics for the "out of service" mode (Page 10)
8	Read the configuration automatically (Page 11)
22	Update acknowledgment and error status of the message call (Page 11)
24	Enable local operator permission (Page 12)
25	Suppression of all messages (Page 12)
28	Disable switching points (Page 13)
29	Signaling limit violation (Page 13)

The following reactions are available for this block at the respective bits of the `Feature2` I/O:

Bit	Function
0	Suppression of the message "Voltage out of range" (Page 13)
1	Suppression of the message "Current out of range" (Page 13)

Operator permissions

This block has the standard "Operator permissions" function described in the APL Online Help.

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

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 ... 7	Not used
8	1 = Operator can change mode of limit 0.
9	1 = Operator can change message suppression of limit 0.
10	1 = Operator can change threshold of limit 0.
11	1 = Operator can change hysteresis of limit 0.
12	1 = Operator can change mode of limit 1.
13	1 = Operator can change message suppression of limit 1.
14	1 = Operator can change threshold of limit 1.
15	1 = Operator can change hysteresis of limit 1.
16	1 = Operator can change mode of limit 2.
17	1 = Operator can change message suppression of limit 2.
18	1 = Operator can change threshold of limit 2.
19	1 = Operator can change hysteresis of limit 2.
20	1 = Operator can change mode of limit 3.
21	1 = Operator can change message suppression of limit 3.

Bit	Function
22	1 = Operator can change threshold of limit 3.
23	1 = Operator can change hysteresis of limit 3.
24	1 = Operator can change mode of limit 4.
25	1 = Operator can change message suppression of limit 4.
26	1 = Operator can change threshold of limit 4.
27	1 = Operator can change hysteresis of limit 4.
28	1 = Operator can change mode of limit 5.
29	1 = Operator can change message suppression of limit 5.
30	1 = Operator can change threshold of limit 5.
31	1 = Operator can change hysteresis of limit 5.

The block has the following permissions for the `OS1Perm` parameter:

Bit	Function
0	1 = Operator can change mode of limit 6.
1	1 = Operator can change message suppression of limit 6.
2	1 = Operator can change threshold of limit 6.
3	1 = Operator can change hysteresis of limit 6.
4	1 = Operator can change mode of limit 7.
5	1 = Operator can change message suppression of limit 7.
6	1 = Operator can change threshold of limit 7.
7	1 = Operator can change hysteresis of limit 7.
8	1 = Operator can change mode of limit 8.
9	1 = Operator can change message suppression of limit 8.
10	1 = Operator can change threshold of limit 8.
11	1 = Operator can change hysteresis of limit 8.
12	1 = Operator can change mode of limit 9.
13	1 = Operator can change message suppression of limit 9.
14	1 = Operator can change threshold of limit 9.
15	1 = Operator can change hysteresis of limit 10.
16	1 = Operator can change mode of limit 10.
17	1 = Operator can change message suppression of limit 10.
18	1 = Operator can change threshold of limit 10.
19	1 = Operator can change hysteresis of limit 10.
20	1 = Operator can change mode of limit 11.
21	1 = Operator can change message suppression of limit 11.
22	1 = Operator can change threshold of limit 11.
23	1 = Operator can change hysteresis of limit 11.
24 ... 26	Not used
27	1 = Operator can read the configuration data of the PAC4200
28	1 = Operator can write the configuration data to the PAC4200
29	1 = Operator can switch on the function "Release for maintenance".

Bit	Function
30	1 = Operator can reset the energy counter.
31	Not used

Display and operator input area for measured and limit values

The high and low limiting of the measured values and limit values in the faceplate are defined by the parameterization at the following structured variables:

- Current: `Cur_OpScale`
- Voltage L-N: `VoltLN_OpScale`
- Voltage L-L: `VoltLL_OpScale`
- Active power/apparent power/reactive power: `Power_OpScale`
- Total active power/total apparent power/total reactive power: `TotPow_OpScale`
- Power factor: `PowFact_OpScale`
- THD current/voltage: `THD_OpScale`

Displaying auxiliary values

This block has the standard function "Displaying auxiliary values" (inputs `UserAna1` or `UserAna2`) described in more detail in the Online Help of the APL.

Calling other faceplates

This block has the standard function "Calling other faceplates" described in the APL Online Help.

Generating instance-specific messages

This block has the standard function "Generating instance-specific messages" described in the APL Online Help.

SIMATIC BATCH functionality

This block has the standard function "SIMATIC BATCH functionality" described in the APL Online Help.

5.4 Troubleshooting of PAC4200

You can find general information for troubleshooting all blocks in the "Error handling" section in the Online Help.

The following errors can be displayed with this block:

- Error numbers

Overview of the error numbers

The following error numbers can be output via the `ErrorNum` I/O:

Error number	Meanings of the error numbers
-1	Default value when integrating the block, the block is not being processed
0	There is no fault.
30	`CyclData.L1Cur` is not a valid number.
31	`CyclData.L2Cur` is not a valid number.
32	`CyclData.L3Cur` is not a valid number.
33	`CyclData.ToActPow` is not a valid number.
34	`CyclData.L12Volt` is not a valid number.
35	`CyclData.L23Volt` is not a valid number.
36	`CyclData.L31Volt` is not a valid number.
37	`CyclData.ToPowFact` is not a valid number
51	Two I/Os are set simultaneously: In the "On" mode: `Lim0M0dOp` and `Lim0M1dOp`, `Lim1M0dOp` and `Lim1M1dOp`, `Lim2M0dOp` and `Lim2M1dOp`, `Lim3M0dOp` and `Lim3M1dOp`, `Lim4M0dOp` and `Lim4M1dOp`, `Lim5M0dOp` and `Lim5M1dOp`, `Lim6M0dOp` and `Lim6M1dOp`, `Lim7M0dOp` and `Lim7M1dOp`, `Lim8M0dOp` and `Lim8M1dOp`, `Lim9M0dOp` and `Lim9M1dOp`, `Lim10M0dOp` and `Lim10M1dOp`, `Lim11M0dOp` and `Lim11M1dOp`

5.5 Messages from PAC4200

The following messages can be displayed with this block:

- Control system faults
- Process messages
- Instance-specific messages

Control systems

The following control system fault messages can be output:

Message instance	Message name	Message class	Event
MsgEvId1	SIG4	AS control system message - error	$$BlockComment$$ Error while reading the configuration data
MsgEvId1	SIG5	AS control system message - error	$$BlockComment$$ Error while writing the configuration data
MsgEvId1	SIG6	AS control system message - Fault	$$BlockComment$$ Voltage out of range
MsgEvId1	SIG7	AS control system message - Fault	$$BlockComment$$ Current out of range
MsgEvId1	SIG8	AS control system message - Fault	$$BlockComment$$ Maximum pulse rate exceeded
MsgEvId2	SIG4	AS control system message - Fault	$$BlockComment$$ External error has occurred

Explanation: $$BlockComment$$: Content of the instance-specific comment

Process messages

Message instance	Message name	Message class	Event
MsgEvId1	SIG1	AS control system message - error	$$BlockComment$$ @5Y%t#PAC4200_LimSrc@ - @6Y %t#PAC_LimMode@ violated
MsgEvId1	SIG2	AS control system message - error	$$BlockComment$$ @7Y%t# PAC4200_LimSrc@ - @8Y %t#PAC_LimMode@ violated
MsgEvId1	SIG3	AS control system message - error	$$BlockComment$$ @9Y%t#PAC4200_LimSrc @ - @10Y %t#PAC_LimMode@ violated
MsgEvId2	SIG1	AS control system message - error	$$BlockComment$$ @5Y%t#PAC4200_LimSrc@ - @6Y %t#PAC_LimMode@ violated
MsgEvId2	SIG2	AS control system message - error	$$BlockComment$$ @7Y%t# PAC4200_LimSrc@ - @8Y %t#PAC_LimMode@ violated
MsgEvId2	SIG3	AS control system message - error	$$BlockComment$$ @9Y%t#PAC4200_LimSrc @ - @10Y %t#PAC_LimMode@ violated
MsgEvId3	SIG1	AS control system message - error	$$BlockComment$$ @5Y%t#PAC4200_LimSrc@ - @6Y %t#PAC_LimMode@ violated
MsgEvId3	SIG2	AS control system message - error	$$BlockComment$$ @7Y%t# PAC4200_LimSrc@ - @8Y %t#PAC_LimMode@ violated

Message instance	Message name	Message class	Event
MsgEvId3	SIG3	AS control system message - error	$$BlockComment$$ @9Y%t#PAC4200_LimSrc @ - @10Y %t#PAC_LimMode@ violated
MsgEvId4	SIG1	AS control system message - error	$$BlockComment$$ @5Y%t#PAC4200_LimSrc@ - @6Y %t#PAC_LimMode@ violated
MsgEvId4	SIG2	AS control system message - error	$$BlockComment$$ @7Y%t# PAC4200_LimSrc@ - @8Y %t#PAC_LimMode@ violated
MsgEvId4	SIG3	AS control system message - error	$$BlockComment$$ @9Y%t#PAC4200_LimSrc @ - @10Y %t#PAC_LimMode@ violated

Explanation: $$BlockComment$$: Content of the instance-specific comment

Instance-specific messages

With this block, you have the option of using an instance-specific message.

Message instance	Message name	Message class	Event
MsgEvId2	SIG5	AS control system message - Fault	$$BlockComment$$ External message 1
MsgEvId3	SIG4	AS control system message - Fault	$$BlockComment$$ External message 2
MsgEvId4	SIG4	AS control system message - Fault	$$BlockComment$$ External message 3

Explanation: $$BlockComment$$: Content of the instance-specific comment

Auxiliary values for the `MsgEvId1` message instance

Auxiliary value	Parameter
1	BatchName
2	StepNo
3	BatchID
4	ExtVa104
5	InLim0Src
6	InLim0Mode
7	InLim1Src
8	InLim1Mode
9	InLim2Src
10	InLim2Mode

Auxiliary values for the `MsgEvId2` message instance

Auxiliary value	Parameter
1	BatchName
2	StepNo

Auxiliary value	Parameter
3	BatchID
4	ExtVa204
5	InLim3Src
6	InLim3Mode
7	InLim4Src
8	InLim4Mode
9	InLim5Src
10	InLim5Mode

Auxiliary values for the MsgEvId3 message instance

Auxiliary value	Parameter
1	BatchName
2	StepNo
3	BatchID
4	ExtVa304
5	InLim6Src
6	InLim6Mode
7	InLim7Src
8	InLim7Mode
9	InLim8Src
10	InLim8Mode

Auxiliary values for the MsgEvId4 message instance

Auxiliary value	Parameter
1	BatchName
2	StepNo
3	BatchID
4	ExtVa404
5	InLim9Src
6	InLim9Mode
7	InLim10Src
8	InLim10Mode
9	InLim11Src
10	InLim11Mode

5.6 I/Os of PAC4200

Input parameters

Parameter	Description	Type	Default
BatchEn	1 = Enable allocation	BOOL	0
BatchID	Batch number	DWORD	16#00
BatchName	Batch name	STRING [32]	-
Cur_OpScale	Current: Limit value for scale in bar chart display of the faceplate	STRUCT • High : REAL • Low: REAL	- • 99.9 • 0.0
DigOut0Ex	1 = digital output x.0 of PAC 4DI/2DO expansion module	BOOL	0
DigOut1Ex	1 = digital output x.1 of PAC 4DI/2DO expansion module	BOOL	0
EN	1 = Called block is being processed	BOOL	1
ExtMsg1	Binary input for freely selectable message 1	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
ExtMsg2	Binary input for freely selectable message 2	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
ExtMsg3	Binary input for freely selectable message 3	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
ExtVa104	Auxiliary value 4 for messages (MsgEvID1)	ANY	-
ExtVa204	Auxiliary value 4 for messages (MsgEvID2)	ANY	-
ExtVa304	Auxiliary value 4 for messages (MsgEvID3)	ANY	-
ExtVa404	Auxiliary value 4 for messages (MsgEvID4)	ANY	-
FaultExt	1 = External fault	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Feature	I/O for additional functions (see Functions of PAC4200 (Page 84))	STRUCT	-
Feature2	I/O for additional functions (see Functions of PAC4200 (Page 84))	STRUCT	-
InEnergyDay	Day on which the energy counter was last reset	INT	0
InEnergyHour	Hour in which the energy counter was last reset	INT	0
InEnergyMinute	Minute in which the energy counter was last reset	INT	0
InEnergyMonth	Month in which the energy counter was last reset	INT	0
InEnergySecond	Second in which the energy counter was last reset	INT	0
InEnergyYear	Year in which the energy counter was last reset	INT	0
InLim0Hys	Limit 0 hysteresis	REAL	0.0
InLim0Mode	Limit 0 mode: 0 = greater than, 1 = less than	BOOL	0
InLim0Mon	Limit 0 monitoring: 0 = No, 1 = Yes	BOOL	0

Parameter	Description	Type	Default
InLim0PckpDl	Limit 0 pickup delay [s]	DWORD	16#00000000
InLim0Src	Limit 0 source	DINT	0
InLim0Thld	Limit 0 threshold	REAL	24.0
InLim1Hys	Limit 1 hysteresis	REAL	0.0
InLim1Mode	Limit 1 mode: 0 = greater than, 1 = less than	BOOL	0
InLim1Mon	Limit 1 monitoring: 0 = No, 1 = Yes	BOOL	0
InLim1PckpDl	Limit 1 pickup delay [s]	DWORD	16#00000000
InLim1Src	Limit 1 source	DINT	0
InLim1Thld	Limit 1 threshold	REAL	24.0
InLim2Hys	Limit 2 hysteresis	REAL	0.0
InLim2Mode	Limit 2 mode: 0 = greater than, 1 = less than	BOOL	0
InLim2Mon	Limit 2 monitoring: 0 = No, 1 = Yes	BOOL	0
InLim2PckpDl	Limit 2 pickup delay [s]	DWORD	16#00000000
InLim2Src	Limit 2 source	DINT	0
InLim2Thld	Limit 2 threshold	REAL	24.0
InLim3Hys	Limit 3 hysteresis	REAL	0.0
InLim3Mode	Limit 3 mode: 0 = greater than, 1 = less than	BOOL	0
InLim3Mon	Limit 3 monitoring: 0 = No, 1 = Yes	BOOL	0
InLim3PckpDl	Limit 3 pickup delay [s]	DWORD	16#00000000
InLim3Src	Limit 3 source	DINT	0
InLim3Thld	Limit 3 threshold	REAL	24.0
InLim4Hys	Limit 4 hysteresis	REAL	0.0
InLim4Mode	Limit 4 mode: 0 = greater than, 1 = less than	BOOL	0
InLim4Mon	Limit 4 monitoring: 0 = No, 1 = Yes	BOOL	0
InLim4PckpDl	Limit 4 pickup delay [s]	DWORD	16#00000000
InLim4Src	Limit 4 source	DINT	0
InLim4Thld	Limit 4 threshold	REAL	24.0
InLim5Hys	Limit 5 hysteresis	REAL	0.0
InLim5Mode	Limit 5 mode: 0 = greater than, 1 = less than	BOOL	0
InLim5Mon	Limit 5 monitoring: 0 = No, 1 = Yes	BOOL	0
InLim5PckpDl	Limit 5 pickup delay [s]	DWORD	16#00000000
InLim5Src	Limit 5 source	DINT	0
InLim5Thld	Limit 5 threshold	REAL	24.0
InLim6Hys	Limit 6 hysteresis	REAL	0.0
InLim6Mode	Limit 6 mode: 0 = greater than, 1 = less than	BOOL	0
InLim6Mon	Limit 6 monitoring: 0 = No, 1 = Yes	BOOL	0
InLim6PckpDl	Limit 6 pickup delay [s]	DWORD	16#00000000
InLim6Src	Limit 6 source	DINT	0
InLim6Thld	Limit 6 threshold	REAL	24.0
InLim7Hys	Limit 7 hysteresis	REAL	0.0
InLim7Mode	Limit 7 mode: 0 = greater than, 1 = less than	BOOL	0
InLim7Mon	Limit 7 monitoring: 0 = No, 1 = Yes	BOOL	0
InLim7PckpDl	Limit 7 pickup delay [s]	DWORD	16#00000000

Parameter	Description	Type	Default
InLim7Src	Limit 7 source	DINT	0
InLim7Thld	Limit 7 threshold	REAL	24.0
InLim8Hys	Limit 8 hysteresis	REAL	0.0
InLim8Mode	Limit 8 mode: 0 = greater than, 1 = less than	BOOL	0
InLim8Mon	Limit 8 monitoring: 0 = No, 1 = Yes	BOOL	0
InLim8PckpDl	Limit 8 pickup delay [s]	DWORD	16#00000000
InLim8Src	Limit 8 source	DINT	0
InLim8Thld	Limit 8 threshold	REAL	24.0
InLim9Hys	Limit 9 hysteresis	REAL	0.0
InLim9Mode	Limit 9 mode: 0 = greater than, 1 = less than	BOOL	0
InLim9Mon	Limit 9 monitoring: 0 = No, 1 = Yes	BOOL	0
InLim9PckpDl	Limit 9 pickup delay [s]	DWORD	16#00000000
InLim9Src	Limit 9 source	DINT	0
InLim9Thld	Limit 9 threshold	REAL	24.0
InLim10Mon	Limit 10 monitoring: 0 = No, 1 = Yes	BOOL	0
InLim10PckpDl	Limit 10 pickup delay [s]	DWORD	16#00000000
InLim10Src	Limit 10 source	DINT	0
InLim10Thld	Limit 10 threshold	REAL	24.0
InLim11Hys	Limit 11 hysteresis	REAL	0.0
InLim11Mode	Limit 11 mode: 0 = greater than, 1 = less than	BOOL	0
InLim11Mon	Limit 11 monitoring: 0 = No, 1 = Yes	BOOL	0
InLim11PckpDl	Limit 11 pickup delay [s]	DWORD	16#00000000
InLim11Src	Limit 11 source	DINT	0
InLim11Thld	Limit 11 threshold	REAL	24.0
Lim0_MsgEn	1 = activate message for limit 0	BOOL	1
Lim1_MsgEn	1 = activate message for limit 1	BOOL	1
Lim2_MsgEn	1 = activate message for limit 2	BOOL	1
Lim3_MsgEn	1 = activate message for limit 3	BOOL	1
Lim4_MsgEn	1 = activate message for limit 4	BOOL	1
Lim5_MsgEn	1 = activate message for limit 5	BOOL	1
Lim6_MsgEn	1 = activate message for limit 6	BOOL	1
Lim7_MsgEn	1 = activate message for limit 7	BOOL	1
Lim8_MsgEn	1 = activate message for limit 8	BOOL	1
Lim9_MsgEn	1 = activate message for limit 9	BOOL	1
Lim10_MsgEn	1 = activate message for limit 10	BOOL	1
Lim11_MsgEn	1 = activate message for limit 11	BOOL	1
Lim0M0dOp*)	1 = Limit 0 mode: greater than via operation	BOOL	0
Lim0M1dOp*)	1 = Limit 0 mode: less than via operation	BOOL	0
Lim1M0dOp*)	1 = Limit 1 mode: greater than via operation	BOOL	0
Lim1M1dOp*)	1 = Limit 1 mode: less than via operation	BOOL	0
Lim2M0dOp*)	1 = Limit 2 mode: greater than via operation	BOOL	0
Lim2M1dOp*)	1 = Limit 2 mode: less than via operation	BOOL	0
Lim3M0dOp*)	1 = Limit 3 mode: greater than via operation	BOOL	0

Parameter	Description	Type	Default
Lim3M1dOp*)	1 = Limit 3 mode: less than via operation	BOOL	0
Lim4M0dOp*)	1 = Limit 4 mode: greater than via operation	BOOL	0
Lim4M1dOp*)	1 = Limit 4 mode: less than via operation	BOOL	0
Lim5M0dOp*)	1 = Limit 5 mode: greater than via operation	BOOL	0
Lim5M1dOp*)	1 = Limit 5 mode: less than via operation	BOOL	0
Lim6M0dOp*)	1 = Limit 6 mode: greater than via operation	BOOL	0
Lim6M1dOp*)	1 = Limit 6 mode: less than via operation	BOOL	0
Lim7M0dOp*)	1 = Limit 7 mode: greater than via operation	BOOL	0
Lim7M1dOp*)	1 = Limit 7 mode: less than via operation	BOOL	0
Lim8M0dOp*)	1 = Limit 8 mode: greater than via operation	BOOL	0
Lim8M1dOp*)	1 = Limit 8 mode: less than via operation	BOOL	0
Lim9M0dOp*)	1 = Limit 9 mode: greater than via operation	BOOL	0
Lim9M1dOp*)	1 = Limit 9 mode: less than via operation	BOOL	0
Lim10M0dOp*)	1 = Limit 10 mode: greater than via operation	BOOL	0
Lim10M1dOp*)	1 = Limit 10 mode: less than via operation	BOOL	0
Lim11M0dOp*)	1 = Limit 11 mode: greater than via operation	BOOL	0
Lim11M1dOp*)	1 = Limit 11 mode: less than via operation	BOOL	0
Lim0Unit*)	Limit 0 unit	STRING[4]	V
Lim1Unit*)	Limit 1 unit	STRING[4]	V
Lim2Unit*)	Limit 2 unit	STRING[4]	V
Lim3Unit*)	Limit 3 unit	STRING[4]	V
Lim4Unit*)	Limit 4 unit	STRING[4]	V
Lim5Unit*)	Limit 5 unit	STRING[4]	V
Lim6Unit*)	Limit 6 unit	STRING[4]	V
Lim7Unit*)	Limit 7 unit	STRING[4]	V
Lim8Unit*)	Limit 8 unit	STRING[4]	V
Lim9Unit*)	Limit 9 unit	STRING[4]	V
Lim10Unit*)	Limit 10 unit	STRING[4]	V
Lim11Unit*)	Limit 11 unit	STRING[4]	V
MS_RelOp*)	1 = Release for maintenance via OS operator	BOOL	0
MsgEvId1	Message number (automatically assigned)	DWORD	16#00000000
MsgEvId2	Message number (automatically assigned)	DWORD	16#00000000
MsgEvId3	Message number (automatically assigned)	DWORD	16#00000000
MsgEvId4	Message number (automatically assigned)	DWORD	16#00000000
MsgLock	1 = Suppress process messages. Refer to the APL Online Help in the chapter "Suppressing messages via the MsgLock parameter".	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Occupied	1 = Occupied by a batch	BOOL	0
OnOp*)	1 = "On" mode via operator	BOOL	0
OosLi	1 = "Out of service", via interconnection or SFC	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80

Parameter	Description	Type	Default
OosOp*)	1 = "Out of service", via operator	BOOL	0
OpSt_In	Input parameter for local operator permission, to be interconnected with the output parameter Out of the upstream OpStations block (see chapter "Description of OpStations" in the APL Online Help).	DWORD	16#00000000
OS_Perm	I/O for operator permission (see Functions of PAC4200 (Page 84))	STRUCT	-
OS1Perm	I/O for operator permission (see Functions of PAC4200 (Page 84))	STRUCT	-
Power_OpScale	Power: Limit value for scale in bar chart display of the faceplate	STRUCT • High : REAL • Low: REAL	- • 49999.9 • -49999.9
PowFact_OpScale	Power factor: Limit value for scale in bar chart display of the faceplate	STRUCT • High : REAL • Low: REAL	- • 1.0 • 0.0
RdCfgOp*)	1 = Read out all configuration data from the power monitoring device	BOOL	0
RdDataLi	1 = "Read acyclic measured values" via interconnection or SFC	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
ResetEnCLi	1 = Reset energy counter of the device	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
RstEnCntrsOp*)	1 = Reset energy counter via operator	BOOL	0
RstMnValLi	1 = "Reset minimum values" via interconnection or SFC	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
RstMxValLi	1 = "Reset maximum values" via interconnection or SFC	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
RunUpCyc	Number of cycles at startup within which messages are suppressed	INT	3
SampleTime	Sampling time [s] (automatically assigned)	REAL	0.1
SelFp1	Calling of a block stored in this parameter as an additional faceplate in the standard view (see "Calling other faceplates" in the APL Online Help)	ANY	-
SelFp2	Calling of a block stored in this parameter as an additional faceplate in the preview (see "Calling other faceplates" in the APL Online Help)	ANY	-
StepNo	Batch step number	DWORD	16#00000000
THD_OpScale	THD current/voltage: Limit value for scale in bar chart display of the faceplate	STRUCT • High : REAL • Low: REAL	- • 200.0 • 0.0

Parameter	Description	Type	Default
TotPow_OpScale	Total power: Limit value for scale in bar chart display of the faceplate	STRUCT • High : REAL • Low: REAL	- • 99999.9 • -99999.9
TrffHighLi	1 = "Switch to high tariff", via interconnection or SFC	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
TrffLowLi	1 = "Switch to low tariff", via interconnection or SFC	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
UA1unit	Measuring unit for the analog auxiliary value 1	INT	0
UA2unit	Measuring unit for the analog auxiliary value 2	INT	0
UserAna1	Analog auxiliary value 1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#FF
UserAna2	Analog auxiliary value 2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#FF
UnitCur	Current unit for OS	INT	0
UnitEnergy	Energy unit for OS	INT	0
UnitPower	Power unit for OS	INT	1
UnitVolt	Voltage unit for OS	INT	0
UserStatus	Freely assignable bits for use in PCS 7 OS	BYTE	16#00
VoltLL_OpScale	Voltage L-L: Limit value for scale in bar chart display of the faceplate	STRUCT • High : REAL • Low: REAL	- • 999.9 • 0.0
VoltLN_OpScale	Voltage L-N: Limit value for scale in bar chart display of the faceplate	STRUCT • High : REAL • Low: REAL	- • 499.9 • 0.0
WrCfgOp*)[1]	1 = Write all configuration data into the power monitoring device	BOOL	0

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

In-out parameters

Parameter	Description	Type	Default
`CyclData`	Cyclic data from the DrvPAC driver block (this input must be interconnected with the output `CyclData` of the DrvPAC)	STRUCT • CSF : BOOL • ... • ExDigIn3 : STRUCT	-
`AcyclData`	Acyclic data from the DrvPAC driver block (this input must be interconnected with the output `AcyclData` of the DrvPAC)	STRUCT • BlkRd : INT • ... • RetValWr : WORD • Input: STRUCT • Output: STRUCT	-

Output parameters

Parameter	Description	Type	Default
`Act1T1EnExp`	Active energy export tariff 1 DWORD 1	DWORD	16#00000000
`Act2T1EnExp`	Active energy export tariff 1 DWORD 2	DWORD	16#00000000
`Act1T1EnImp`	Active energy import tariff 1 DWORD 1	DWORD	16#00000000
`Act2T1EnImp`	Active energy import tariff 1 DWORD 2	DWORD	16#00000000
`ActT1EnExp`	Active energy export tariff 1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
`ActT1EnExpkWh`	Active energy export tariff 1 [kWh]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
`ActT1EnImp`	Active energy import tariff 1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
`ActT1EnImpkWh`	Active energy import tariff 1 [kWh]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
`Act1T2EnExp`	Active energy export tariff 2 DWORD 1	DWORD	16#00000000
`Act2T2EnExp`	Active energy export tariff 2 DWORD 2	DWORD	16#00000000
`Act1T2EnImp`	Active energy import tariff 1 DWORD 2	DWORD	16#00000000
`Act2T2EnImp`	Active energy import tariff 2 DWORD 2	DWORD	16#00000000
`ActT2EnExp`	Active energy export tariff 2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
`ActT2EnExpkWh`	Active energy export tariff 2 [kWh]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80

Parameter	Description	Type	Default
ActT2EnImp	Active energy import tariff 2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
ActT2EnImpkWh	Active energy import tariff 2 [kWh]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Ap1T1Energy	Apparent energy tariff 1 DWORD 1	DWORD	16#00000000
Ap2T1Energy	Apparent energy tariff 1 DWORD 2	DWORD	16#00000000
ApT1Energy	Apparent energy tariff 1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
ApT1EnergykVAh	Apparent energy tariff 1 [kVAh]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Ap1T2Energy	Apparent energy tariff 2 DWORD 1	DWORD	16#00000000
Ap2T2Energy	Apparent energy tariff 2 DWORD 2	DWORD	16#00000000
ApT2Energy	Apparent energy tariff 2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
ApT2Energykvarh	Apparent energy tariff 2 [kVAh]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
BscCnfgChngd	1 = Relevant parameter change	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
CnfgAct	1 = Device configuration menu is active	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Cur3PhAvg	3-phase average current	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
CurOutOfRng	1 = Current out of range	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
CurUnbal	Amplitude unbalance current	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
CurUnit	Current unit: A	INT	1209
DataRdOK	1 = acyclic measured values have been read successfully	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80

Parameter	Description	Type	Default
DpaLink	Connection of the device: 0 = Direct on the DP master system 1 = Downstream of the DP/PA-Link	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
EnergyDay	Day on which the energy counter was last reset	INT	0
EnergyHour	Hour in which the energy counter was last reset	INT	0
EnergyMinute	Minute in which the energy counter was last reset	INT	0
EnergyMonth	Month in which the energy counter was last reset	INT	0
EnergySecond	Second in which the energy counter was last reset	INT	0
EnergyYear	Year in which the energy counter was last reset	INT	0
ENO	1 = Block algorithm executed without errors	BOOL	0
ErrorNum	Output of the active error number. The error numbers that this block can output can be found in chapter "Troubleshooting of PAC4200 (Page 96)".	INT	-1
ExDigIn0Act	1 = digital input x.0 of PAC 4DI/2DO expansion module active	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
ExDigIn1Act	1 = digital input x.1 of PAC 4DI/2DO expansion module active	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
ExDigIn2Act	1 = digital input x.2 of PAC 4DI/2DO expansion module active	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
ExDigIn3Act	1 = digital input x.3 of PAC 4DI/2DO expansion module active	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Frequency	Line frequency	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
FreqUnit	Frequency unit: Hz	INT	1077
GrpErr	1 = Group error present	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
InDigIn0Act	1 = Digital input 0.0 active	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
InDigIn1Act	1 = Digital input 0.1 active	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
L1ActPow	Active power L1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80

Parameter	Description	Type	Default
L1ActPowkW	Active power L1 [kW]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L2ActPow	Active power L2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L2ActPowkW	Active power L2 [kW]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L3ActPow	Active power L3	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L3ActPowkW	Active power L3 [kW]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L1ApPow	Apparent power L1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L1ApPowkVA	Apparent power L1 [kVA]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L2ApPow	Apparent power L2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L2ApPowkVA	Apparent power L2 [kVA]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L3ApPow	Apparent power L3	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L3ApPowkVA	Apparent power L3 [kVA]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L1Cur	Current L1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L2Cur	Current L2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80

Parameter	Description	Type	Default
L3Cur	Current L3	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L1PowFact	Power factor L1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L2PowFact	Power factor L2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L3PowFact	Power factor L3	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L1ReaPow	Reactive power L1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L1ReaPowkvar	Reactive power L1 [kvar]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L2ReaPow	Reactive power L2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L2ReaPowkvar	Reactive power L2 [kvar]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L3ReaPow	Reactive power L3	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L3ReaPowkvar	Reactive power L3 [kvar]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L1ThdCur	THD current L1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L2ThdCur	THD current L2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L3ThdCur	THD current L3	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80

Parameter	Description	Type	Default
L1ThdVolt	THD voltage L1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L2ThdVolt	THD voltage L2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L3ThdVolt	THD voltage L3	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L12ThdVolt	THD voltage L1-L2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L23ThdVolt	THD voltage L2-L3	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L31ThdVolt	THD voltage L3-L1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L1Volt	Voltage L1-N	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L2Volt	Voltage L2-N	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L3Volt	Voltage L3-N	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L12Volt	Voltage L1-L2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L23Volt	Voltage L2-L3	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
L31Volt	Voltage L3-L1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Lim0_Act	1 = limit 0 violated You can change the behavior of this parameter via the Feature bit 28 ("Disable switching points (Page 13)") and via the Feature bit 29 ("Signaling limit violation (Page 13)").	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80

Parameter	Description	Type	Default
Lim1_Act	1 = limit 1 violated You can change the behavior of this parameter via the Feature bit 28 ("Disable switching points (Page 13)") and via the Feature bit 29 ("Signaling limit violation (Page 13)").	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim2_Act	1 = limit 2 violated You can change the behavior of this parameter via the Feature bit 28 ("Disable switching points (Page 13)") and via the Feature bit 29 ("Signaling limit violation (Page 13)").	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim3_Act	1 = limit 3 violated You can change the behavior of this parameter via the Feature bit 28 ("Disable switching points (Page 13)") and via the Feature bit 29 ("Signaling limit violation (Page 13)").	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim4_Act	1 = limit 4 violated You can change the behavior of this parameter via the Feature bit 28 ("Disable switching points (Page 13)") and via the Feature bit 29 ("Signaling limit violation (Page 13)").	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim5_Act	1 = limit 5 violated You can change the behavior of this parameter via the Feature bit 28 ("Disable switching points (Page 13)") and via the Feature bit 29 ("Signaling limit violation (Page 13)").	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim6_Act	1 = limit 6 violated You can change the behavior of this parameter via the Feature bit 28 ("Disable switching points (Page 13)") and via the Feature bit 29 ("Signaling limit violation (Page 13)").	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim7_Act	1 = limit 7 violated You can change the behavior of this parameter via the Feature bit 28 ("Disable switching points (Page 13)") and via the Feature bit 29 ("Signaling limit violation (Page 13)").	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim8_Act	1 = limit 8 violated You can change the behavior of this parameter via the Feature bit 28 ("Disable switching points (Page 13)") and via the Feature bit 29 ("Signaling limit violation (Page 13)").	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim9_Act	1 = limit 9 violated You can change the behavior of this parameter via the Feature bit 28 ("Disable switching points (Page 13)") and via the Feature bit 29 ("Signaling limit violation (Page 13)").	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim10_Act	1 = limit 10 violated You can change the behavior of this parameter via the Feature bit 28 ("Disable switching points (Page 13)") and via the Feature bit 29 ("Signaling limit violation (Page 13)").	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80

Parameter	Description	Type	Default
Lim11_Act	1 = limit 11 violated You can change the behavior of this parameter via the Feature bit 28 ("Disable switching points (Page 13)") and via the Feature bit 29 ("Signaling limit violation (Page 13)").	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim0Hys	Limit 0 hysteresis	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Lim0Mode	Limit 0 mode: 0 = greater than, 1 = less than	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim0Mon	Limit 0 monitoring: 0 = No, 1 = Yes	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim0PckpDl	Limit 0 pickup delay [s]	DWORD	16#00000000
Lim0Src	Limit 0 source	DINT	0
Lim0Thld	Limit 0 threshold	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Lim1Hys	Limit 1 hysteresis	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Lim1Mode	Limit 1 mode: 0 = greater than, 1 = less than	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim1Mon	Limit 1 monitoring: 0 = No, 1 = Yes	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim1PckpDl	Limit 1 pickup delay [s]	DWORD	16#00000000
Lim1Src	Limit 1 source	DINT	0
Lim1Thld	Limit 1 threshold	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Lim2Hys	Limit 2 hysteresis	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Lim2Mode	Limit 2 mode: 0 = greater than, 1 = less than	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim2Mon	Limit 2 monitoring: 0 = No, 1 = Yes	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80

Parameter	Description	Type	Default
Lim2PckpDl	Limit 2 pickup delay [s]	DWORD	16#00000000
Lim2Src	Limit 2 source	DINT	0
Lim2Thld	Limit 2 threshold	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Lim3Hys	Limit 3 hysteresis	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Lim3Mode	Limit 3 mode: 0 = greater than, 1 = less than	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim3Mon	Limit 3 monitoring: 0 = No, 1 = Yes	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim3PckpDl	Limit 3 pickup delay [s]	DWORD	16#00000000
Lim3Src	Limit 3 source	DINT	0
Lim3Thld	Limit 3 threshold	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Lim4Hys	Limit 4 hysteresis	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Lim4Mode	Limit 4 mode: 0 = greater than, 1 = less than	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim4Mon	Limit 4 monitoring: 0 = No, 1 = Yes	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim4PckpDl	Limit 4 pickup delay [s]	DWORD	16#00000000
Lim4Src	Limit 4 source	DINT	0
Lim4Thld	Limit 4 threshold	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Lim5Hys	Limit 5 hysteresis	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Lim5Mode	Limit 5 mode: 0 = greater than, 1 = less than	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80

Parameter	Description	Type	Default
Lim5Mon	Limit 5 monitoring: 0 = No, 1 = Yes	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim5PckpDl	Limit 5 pickup delay [s]	DWORD	16#00000000
Lim5Src	Limit 5 source	DINT	0
Lim5Thld	Limit 5 threshold	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Lim6Hys	Limit 6 hysteresis	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Lim6Mode	Limit 6 mode: 0 = greater than, 1 = less than	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim6Mon	Limit 6 monitoring: 0 = No, 1 = Yes	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim6PckpDl	Limit 6 pickup delay [s]	DWORD	16#00000000
Lim6Src	Limit 6 source	DINT	0
Lim6Thld	Limit 6 threshold	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Lim7Hys	Limit 7 hysteresis	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Lim7Mode	Limit 7 mode: 0 = greater than, 1 = less than	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim7Mon	Limit 7 monitoring: 0 = No, 1 = Yes	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim7PckpDl	Limit 7 pickup delay [s]	DWORD	16#00000000
Lim7Src	Limit 7 source	DINT	0
Lim7Thld	Limit 7 threshold	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Lim8Hys	Limit 8 hysteresis	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80

Parameter	Description	Type	Default
Lim8Mode	Limit 8 mode: 0 = greater than, 1 = less than	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim8Mon	Limit 8 monitoring: 0 = No, 1 = Yes	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim8PckpDl	Limit 8 pickup delay [s]	DWORD	16#00000000
Lim8Src	Limit 8 source	DINT	0
Lim8Thld	Limit 8 threshold	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Lim9Hys	Limit 9 hysteresis	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Lim9Mode	Limit 9 mode: 0 = greater than, 1 = less than	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim9Mon	Limit 9 monitoring: 0 = No, 1 = Yes	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim9PckpDl	Limit 9 pickup delay [s]	DWORD	16#00000000
Lim9Src	Limit 9 source	DINT	0
Lim9Thld	Limit 9 threshold	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Lim10Hys	Limit 10 hysteresis	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Lim10Mode	Limit 10 mode: 0 = greater than, 1 = less than	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim10Mon	Limit 10 monitoring: 0 = No, 1 = Yes	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim10PckpDl	Limit 10 pickup delay [s]	DWORD	16#00000000
Lim10Src	Limit 10 source	DINT	0
Lim10Thld	Limit 10 threshold	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80

Parameter	Description	Type	Default
Lim11Hys	Limit 11 hysteresis	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Lim11Mode	Limit 11 mode: 0 = greater than, 1 = less than	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim11Mon	Limit 11 monitoring: 0 = No, 1 = Yes	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim11PckpDl	Limit 11 pickup delay [s]	DWORD	16#00000000
Lim11Src	Limit 11 source	DINT	0
Lim11Thld	Limit 11 threshold	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Lim1Gate_Act	1 = logic function block 1 active	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim2Gate_Act	1 = logic function block 2 active	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim3Gate_Act	1 = logic function block 3 active	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Lim4Gate_Act	1 = logic function block 4 active	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
LimComb_Act	1 = Combination result active	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
LimitViolated	1 = Incoming or outgoing violation of a high or low limit	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
LimitViolations	Limit violations	DWORD	16#00000000
MinCur	Minimum current	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MS_Release	Release for maintenance: 1 = Permission for the operator	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
MsgAckn1	Message acknowledgment status (output ACK_STATE of the first ALARM_8P)	WORD	16#0000

Parameter	Description	Type	Default
MsgAckn2	Message acknowledgment status (output ACK_STATE of the second ALARM_8P)	WORD	16#0000
MsgAckn3	Message acknowledgment status (output ACK_STATE of the third ALARM_8P)	WORD	16#0000
MsgAckn4	Message acknowledgment status (output ACK_STATE of the fourth ALARM_8P)	WORD	16#0000
MsgErr1	1 = Message error (output ERROR of the first ALARM_8P)	BOOL	0
MsgErr2	1 = Message error (output ERROR of the second ALARM_8P)	BOOL	0
MsgErr3	1 = Message error (output ERROR of the third ALARM_8P)	BOOL	0
MsgErr4	1 = Message error (output ERROR of the fourth ALARM_8P)	BOOL	0
MsgStat1	Message status (output STATUS of the first ALARM_8P)	WORD	16#0000
MsgStat2	Message status (output STATUS of the first ALARM_8P)	WORD	16#0000
MsgStat3	Message status (output STATUS of the third ALARM_8P)	WORD	16#0000
MsgStat4	Message status (output STATUS of the fourth ALARM_8P)	WORD	16#0000
MxPlsRateEx	1 = Maximum pulse rate exceeded	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
OnAct	1 = "On" mode active	STRUCT • Value: BOOL • ST: BYTE	- • 1 • 16#80
OosAct	1 = Block is "Out of service"	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
OpSt_Out	Value of the input parameter OpSt_In, for further interconnecting with other blocks. Bit 31 of this parameter is occupied by Feature Bit 24	DWORD	16#00000000
OS_PermLog	Display of OS_Perm with the settings changed by the block algorithm	DWORD	16#FFFFFFFF
OS_PermOut	Display of OS_Perm	DWORD	16#FFFFFFFF
OS1PermLog	Display of OS1Perm with the settings changed by the block algorithm	DWORD	16#FFFFFFFF
OS1PermOut	Display of OS1Perm	DWORD	16#FFFFFFFF
PacState	PMD diagnostics and status	DWORD	16#00000000
PrimCur	Primary current	DWORD	16#00000000
PrimVolt	Primary voltage	DWORD	16#00000000
Rea1T1EnExp	Reactive energy export tariff 1 DWORD 1	DWORD	16#00000000
Rea2T1EnExp	Reactive energy export tariff 1 DWORD 2	DWORD	16#00000000
Rea1T1EnImp	Reactive energy import tariff 1 DWORD 1	DWORD	16#00000000
Rea2T1EnImp	Reactive energy import tariff 1 DWORD 2	DWORD	16#00000000
ReaT1EnExp	Reactive energy export tariff 1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80

Parameter	Description	Type	Default
ReaT1EnExpkvarh	Reactive energy export tariff 1 [kvar]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
ReaT1EnImp	Reactive energy import tariff 1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
ReaT1EnImpkvar	Reactive energy import tariff 1 [kvar]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
Rea1T2EnExp	Reactive energy export tariff 2 DWORD 1	DWORD	16#00000000
Rea2T2EnExp	Reactive energy export tariff 2 DWORD 2	DWORD	16#00000000
Rea1T2EnImp	Reactive energy import tariff 2 DWORD 1	DWORD	16#00000000
Rea2T2EnImp	Reactive energy import tariff 2 DWORD 2	DWORD	16#00000000
ReaT2EnExp	Reactive energy export tariff 2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
ReaT2EnExpkvar	Reactive energy export tariff 2 [kvar]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
ReaT2EnImp	Reactive energy import tariff 2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
ReaT2EnImpkvar	Reactive energy import tariff 2 [kvar]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
SecoCur	Secondary current	DWORD	16#00000000
SecoVolt	Secondary voltage/measured voltage	DWORD	16#00000000
Slt1OutPtMsk	Module slot 1 output mask	DWORD	16#00000000
Slt2OutPtMsk	Module slot 2 output mask	DWORD	16#00000000
SnchFld	1 = no synchronization pulse	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
ST_Worst	Worst signal status	BYTE	16#80
Status1	Status word 1	DWORD	16#00000000
Status2	Status word 2	DWORD	16#00000000
Status3	Status word 3	DWORD	16#00000000
Status4	Reserved	DWORD	16#00000000
SumMsgAct	1 = Group signal is active	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80

Parameter	Description	Type	Default
ToActPow	Total active power	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
ToActPowkW	Total active power [kW]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
ToApPow	Total apparent power	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
ToApPowkVA	Total apparent power [kVA]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
ToPowFact	Total power factor	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
ToReaPow	Total reactive power VARn	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
ToReaPowkvar	Total reactive power VARn [kvar]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
UnbalUnit	Unit asymmetry: %	INT	1342
VoltLL3PhAvg	3-phase average voltage L-L	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
VoltLN3PhAvg	3-phase average voltage L-N	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
VoltOutOfRng	1 = Voltage out of range	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
VoltTransf	Voltage transformer: 0 = No, 1 = Yes	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
VoltUnbal	Amplitude unbalance voltage	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
VoltUnit	Voltage unit: V	INT	1240
WriteProt	1 = Write protection activated	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80

5.7 Operator control & monitoring

Views of PAC4200

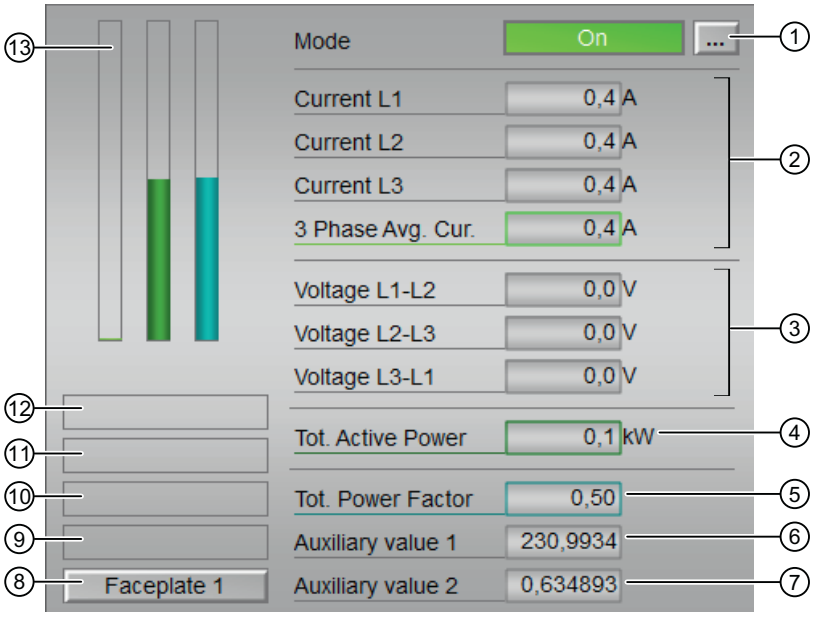
The PAC4200 block has the following views:

- Standard view of PAC4200
- Message view (see APL Online Help)
- Limit view of PAC4200
- Trend view (see APL Online Help)
- Parameter view of PAC4200
- Preview of PAC4200
- Memo view (see APL Online Help)
- Batch view (see APL Online Help)
- Current view of PAC4200
- Voltage view of PAC4200
- Power view of PAC4200
- Energy view of PAC4200
- Block icons for PAC4200

The energy view of the PAC4200 is not displayed if the PAC4200 power monitoring device is connected in an H system downstream of a DP/PA-Link.

You can find general information about the faceplate and the block icon in chapters "Structure of the faceplate" and "Structure of the block icon" in the APL Online Help.

Standard view of PAC4200



① Display and change the operating mode
② Display of currents including signal status
③ Display of voltages including signal status
④ Display of total active power including signal status
⑤ Display of total power factor including signal status
⑥ Display of auxiliary values
⑦ Display of auxiliary values
⑧ Button for jumping to the standard view of any faceplate
⑨ Display area for block states
⑩ Display area for states of the power monitoring device
⑪ Display area for states of the power monitoring device
⑫ Display area for block states
⑬ Bar chart display for 3-phase average of current, total active power and total power factor

Figure 5-1 Standard view of PAC4200

(1) Display and change the operating mode

This area shows you the currently valid operating mode. The following operating modes are displayed here:

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

For information on changing the operating mode, see chapter "Switching operating states and operating modes" in the APL Online Help.

(2) Display of currents including signal status

This area shows you the actual currents with the relevant signal status.

The following currents are displayed:

- Current L1
- Current L2
- Current L3
- 3-phase average current

(3) Display of voltages including signal status

This area shows you the actual voltages with the relevant signal status.

The following voltages are displayed:

- Voltage L1-L2
- Voltage L2-L3
- Voltage L3-L1

(4) Display of total active power including signal status

This area shows you the actual total active power with the relevant signal status.

(5) Display of total power factor including signal status

This area shows you the actual total power factor with the relevant signal status.

(6) and (7) Display of auxiliary values

In this area you can display two auxiliary values that have been configured in the Engineering System (ES). You can find more detailed information in the APL Online Help in chapter "Calling other faceplates".

(8) Button for jumping to the standard view of any faceplate

You use this jump button to reach the standard view of a block configured in the Engineering System (ES). The visibility of this jump button depends on the configuration in the engineering system (ES).

You can find more detailed information in the APL Online Help in chapter "Calling other faceplates".

(9) Display area for block states

This area shows you additional information on the operating state of the block:

- "Maintenance"

(10) Display area for states of the power monitoring device

This area shows you additional information on the operating state of the breaker:

- "Write protection activated"

(11) Display area for states of the power monitoring device

This area shows you additional information on the operating state of the block:

- "Current out of range"
- "Voltage out of range"
- "Maximum pulse rate exceeded"

(12) Display area for block states

This area shows you additional information on the operating state of the block:

- "Invalid signal"
- "External fault"

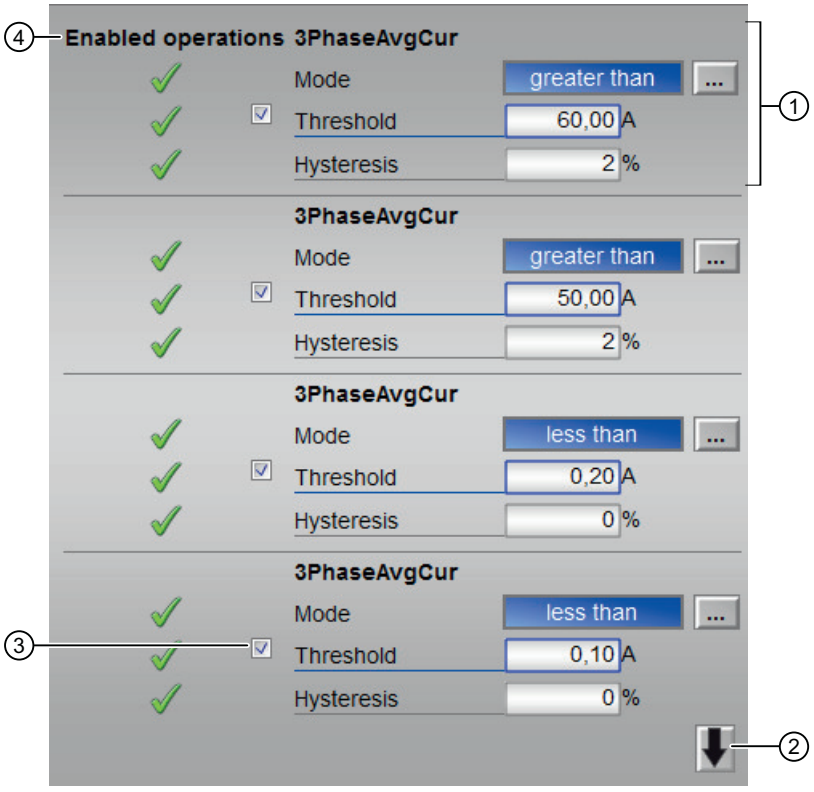
(13) Bar chart display for 3-phase average of current, total active power and total power factor

In the form of a bar chart, this area shows you:

- The actual "3-phase average current"
- The "total active power"
- The "total power factor"

Which area in the bar chart display is visible depends on the configuration in the Engineering System (ES).

Limit view of PAC4200



① Parameterizing a limit
② Button for jumping to the next or previous view
③ Activating messages
④ Enabled operations

Figure 5-2 Limit view of PAC4200

(1) Parameterizing a limit

In this area you can change the parameterization for a limit:

- "Mode": "greater than" or "less than"
- "Threshold"
- "Hysteresis"

This area is displayed once for every limit. There are 12 limits in total.

(2) Button for jumping to the next or previous view

You reach the next or the previous limit parameterization view by means of this button.

(3) Activating messages

In this area you can activate messages for limits.

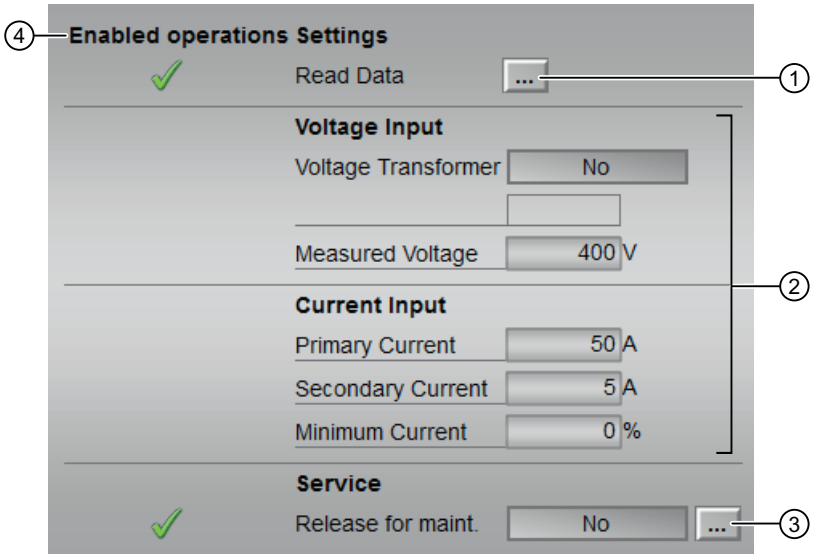
(4) Enabled operations

This area shows all the operator inputs for which there are special operator permissions. These are dependent on the configuration in the Engineering System (ES) that is to apply for this block.

Symbols for enabled operations:

- **Green checkmark**: the OS operator can process this parameter.
- **Gray checkmark**: the OS operator is temporarily unable to process this parameter for process reasons.
- **Red cross**: the OS operator must never process this parameter due to parameterized AS operator permissions (`OS_Perm` or `OS1Perm`).

Parameter view of PAC4200



① Read configuration data
② Basic settings
③ Service
④ Enabled operations

Figure 5-3 Parameter view of PAC3200

(1) Read configuration data

In this area, you read all the configuration data of the PAC4200 power monitoring device.

(2) Basic parameters

This area shows the most important basic parameters of the PAC4200.

The following parameters are displayed:

- Voltage transformer
- Measured voltage (if voltage transformer = No)
- Primary voltage/secondary voltage (if voltage transformer = Yes)

- Primary current
- Secondary current
- Minimum current

(3) Service

In this area, you activate the following functions:

- "Release for maintenance"

You can find more detailed information on this area in the APL Online Help in chapter "Maintenance release".

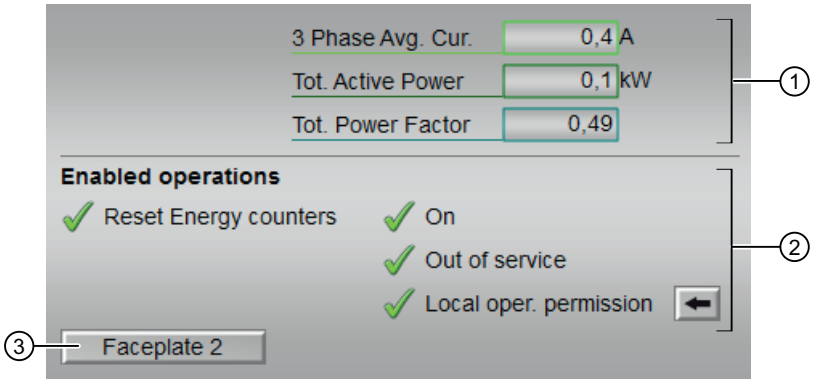
(4) Enabled operations

This area shows all the operator inputs for which there are special operator permissions. These are dependent on the configuration in the Engineering System (ES) that is to apply for this block.

Symbols for enabled operations:

- **Green checkmark**: the OS operator can process this parameter.
- **Gray checkmark**: the OS operator is temporarily unable to process this parameter for process reasons.
- **Red cross**: the OS operator must never process this parameter due to parameterized AS operator permissions (`OS_Perm` or `OS1Perm`).

Preview of PAC4200



① Process values
② Enabled operations
③ Button for jumping to the standard view of any faceplate

Figure 5-4 Preview of PAC4200

(1) Process values

The following real measured values are displayed to you in this area:

- 3-phase average current
- Total active power
- Total power factor

(2) Enabled operations

This area shows all the operator inputs for which there are special operator permissions. These are dependent on the configuration in the Engineering System (ES) that is to apply for this block.

Symbols for enabled operations:

- **Green checkmark**: the OS operator can process this parameter.
- **Gray checkmark**: the OS operator is temporarily unable to process this parameter for process reasons.
- **Red cross**: the OS operator must never process this parameter due to parameterized AS operator permissions (`OS_Perm` or `OS1Perm`).

The following enabled operations are displayed here:

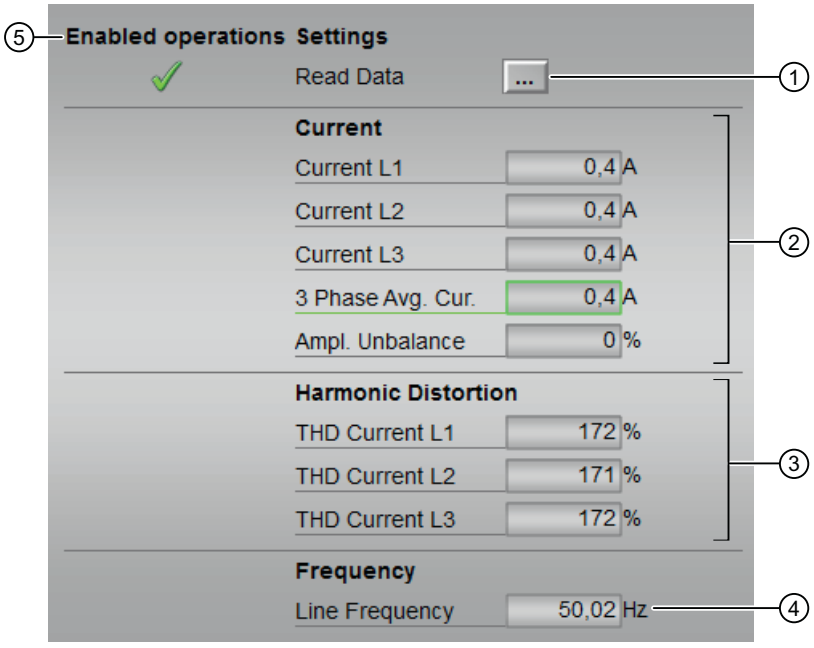
- "On": You may change to the "On" mode.
- "Out of service": You may change to "Out of service mode".
- "Reset energy counters": You may reset the energy counters.
- "Local operation permission": You change to the standard view of the OpStations block via the ← button. You can find more information on this in the chapter "Operator permissions" in the APL Online Help.

(3) Button for jumping to the standard view of any faceplate

You use this jump button to reach the standard view of a block configured in the Engineering System (ES). The visibility of this jump button depends on the configuration in the engineering system (ES).

You can find more detailed information in the APL Online Help in chapter "Calling other faceplates".

Current view of PAC4200



① Read configuration data
② Display of the currents
③ Display of the harmonic distortion
④ Display of the line frequency including signal status
⑤ Enabled operations

Figure 5-5 Current view of PAC4200

(1) Read configuration data

In this area, you read all the configuration data of the PAC4200 power monitoring device.

(2) Display of currents

This area shows you the most important currents of the PAC4200 with the relevant signal status.

The following currents are displayed:

- Current L1
- Current L2
- Current L3
- 3-phase average current
- Amplitude unbalance current

(3) Display of the harmonic distortion

This area shows you the most important THD currents of the PAC4200 with the relevant signal status.

The following THD currents are displayed:

- THD current L1
- THD current L2
- THD current L3

(4) Displaying line frequency including signal status

This area shows you the actual line frequency with the relevant signal status.

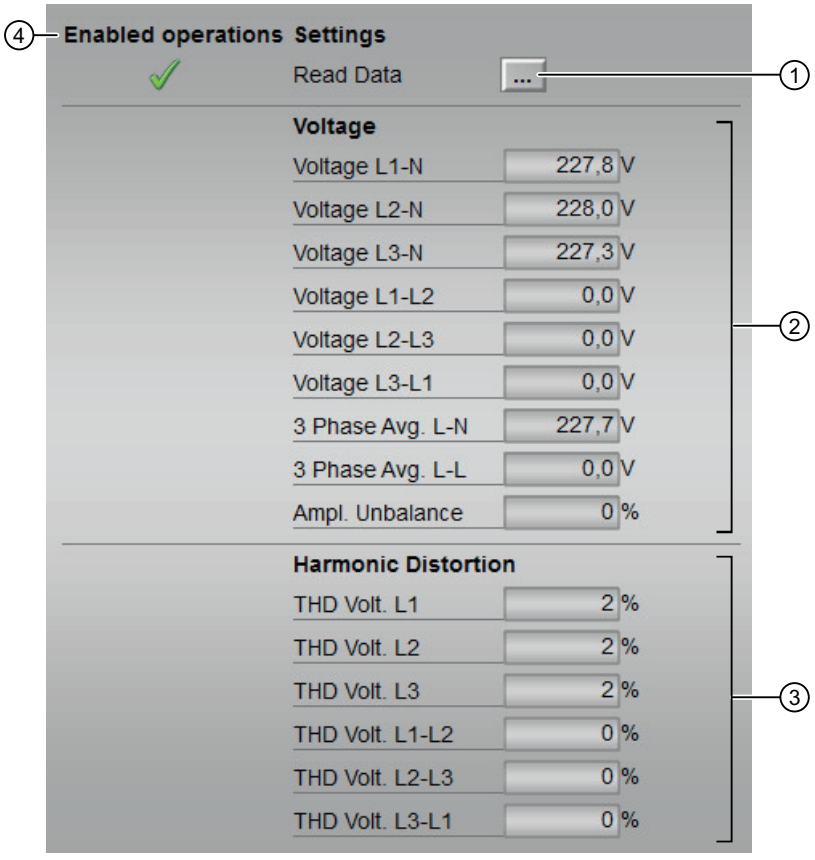
(5) Enabled operations

This area shows all the operator inputs for which there are special operator permissions. These are dependent on the configuration in the Engineering System (ES) that is to apply for this block.

Symbols for enabled operations:

- **Green checkmark**: the OS operator can process this parameter.
- **Gray checkmark**: the OS operator is temporarily unable to process this parameter for process reasons.
- **Red cross**: the OS operator must never process this parameter due to parameterized AS operator permissions (`OS_Perm` or `OS1Perm`).

Voltage view of PAC4200



① Read configuration data
② Display of voltages
③ Display of the harmonic distortion
④ Enabled operations

Figure 5-6 Voltage view of PAC4200

(1) Read configuration data

In this area, you read all the configuration data of the PAC4200 power monitoring device.

(2) Display of voltages

This area shows you the most important voltages of the PAC4200 with the relevant signal status.

The following voltages are displayed:

- Voltage L1-N
- Voltage L2-N
- Voltage L3-N
- Voltage L1-L2
- Voltage L2-L3
- Voltage L3-L1

- 3-phase average voltage L-N
- 3-phase average voltage L-L
- Amplitude unbalance voltage

(3) Display of the harmonic distortion

This area shows you the most important THD voltages of the PAC4200 with the relevant signal status.

The following THD voltages are displayed:

- THD voltage L1
- THD voltage L2
- THD voltage L3
- THD voltage L1-L2
- THD voltage L2-L3
- THD voltage L3-L1

(4) Enabled operations

This area shows all the operator inputs for which there are special operator permissions. These are dependent on the configuration in the Engineering System (ES) that is to apply for this block.

Symbols for enabled operations:

- **Green checkmark**: the OS operator can process this parameter.
- **Gray checkmark**: the OS operator is temporarily unable to process this parameter for process reasons.
- **Red cross**: the OS operator must never process this parameter due to parameterized AS operator permissions (`OS_Perm` or `OS1Perm`).

Power view of PAC4200

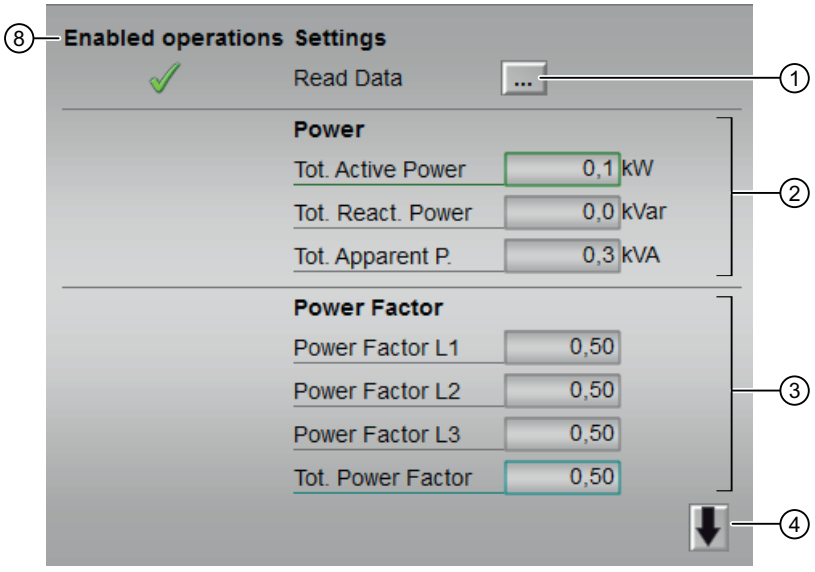
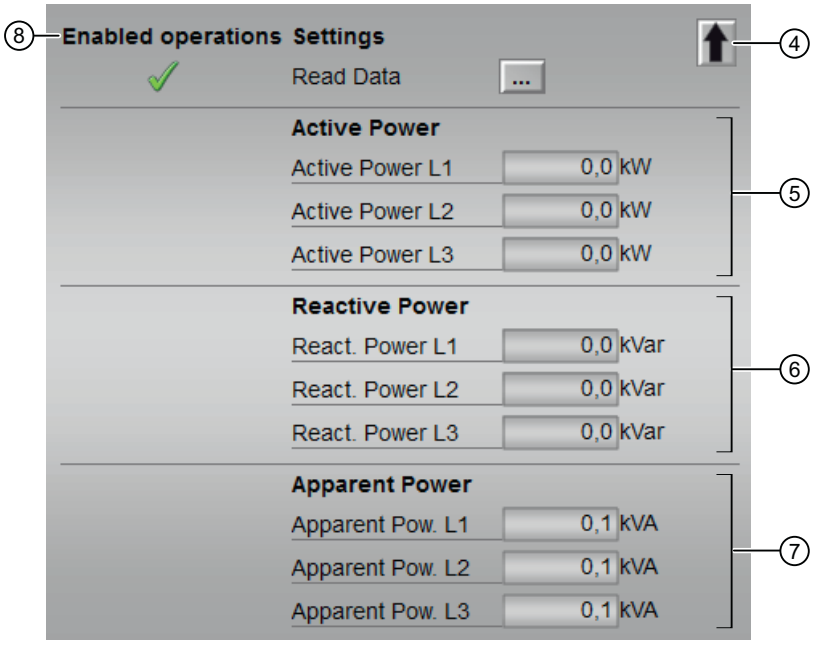


Figure 5-7 Power view of PAC4200 (1)



① Read configuration data
② Display of total power
③ Display of the power factor
④ Button for jumping to the next or previous view
⑤ Display of active power
⑥ Display of reactive power
⑦ Display of apparent power
⑧ Enabled operations

Figure 5-8 Power view of PAC4200 (2)

(1) Read configuration data

In this area, you read all the configuration data of the PAC4200 power monitoring device.

(2) Display of total power

This area shows you the most important total power values of the PAC4200 with the relevant signal status.

- Total active power
- Total reactive power VARn
- Total apparent power

(3) Display of power factor

This area shows you the most important power factors of the PAC4200 with the relevant signal status.

The following power factors are displayed:

- Power factor L1
- Power factor L2
- Power factor L3
- Total power factor

(4) Button for jumping to the next or previous view

You reach the next or previous part of the power view by means of this button.

(5) Display of active power

This area shows you the most important active powers of the PAC4200 with the relevant signal status.

The following active powers are displayed:

- Active power L1
- Active power L2
- Active power L3

(6) Display of reactive power

This area shows you the most reactive powers of the PAC4200 with the relevant signal status.

The following reactive powers are displayed:

- Reactive power L1
- Reactive power L2
- Reactive power L3

(7) Display of apparent power

This area shows you the most important apparent powers of the PAC4200 with the relevant signal status.

The following apparent powers are displayed:

- Apparent power L1
- Apparent power L2
- Apparent power L3

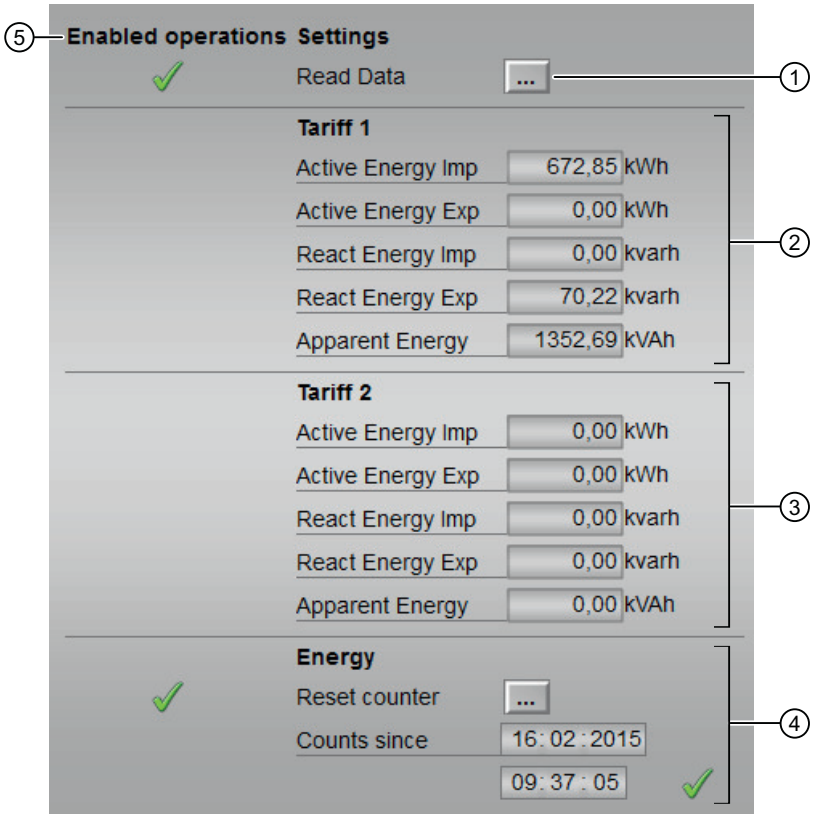
(8) Enabled operations

This area shows all the operator inputs for which there are special operator permissions. These are dependent on the configuration in the Engineering System (ES) that is to apply for this block.

Symbols for enabled operations:

- **Green checkmark**: the OS operator can process this parameter.
- **Gray checkmark**: the OS operator is temporarily unable to process this parameter for process reasons.
- **Red cross**: the OS operator must never process this parameter due to parameterized AS operator permissions (`OS_Perm` or `OS1Perm`).

Energy view of PAC4200



① Read configuration data
② Display of tariff 1 energy counters
③ Display of tariff 2 energy counters
④ Reset energy counters
⑤ Enabled operations

Figure 5-9 Energy view of PAC4200

(1) Read configuration data

In this area, you read all the configuration data of the PAC4200 power monitoring device.

(2) Display of tariff 1 energy counters

This area shows you the most important tariff 1 energy values of the PAC4200 with the relevant signal status.

The following energy values are displayed:

- Imported active energy
- Exported active energy
- Imported reactive energy
- Exported reactive energy
- Apparent energy

(3) Display of tariff 2 energy counters

This area shows you the most important tariff 2 energy values of the PAC4200 with the relevant signal status.

The following energy values are displayed:

- Imported active energy
- Exported active energy
- Imported reactive energy
- Exported reactive energy
- Apparent energy

(4) Reset energy counters

In this area you can reset the energy counters. A display shows you the date and the time at which the energy counters were last reset. The green checkmark is displayed when the energy counters have been successfully reset.

Note

If you reset the energy counters, you must wait until the green checkmark is displayed. If you close the display window or change the view while the energy counters are being reset, it may happen that the date and the time are not displayed correctly or reset even fails.

(5) Enabled operations

This area shows all the operator inputs for which there are special operator permissions. These are dependent on the configuration in the Engineering System (ES) that is to apply for this block.

Symbols for enabled operations:

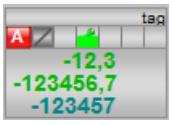
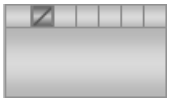
- **Green checkmark**: the OS operator can process this parameter.
- **Gray checkmark**: the OS operator is temporarily unable to process this parameter for process reasons.
- **Red cross**: the OS operator must never process this parameter due to parameterized AS operator permissions (`OS_Perm` or `OS1Perm`).

Block icons for PAC4200

Different block icons with the following functions are available:

- Measuring point type
- Display of errors or messages
- Operating modes
- Signal status, release for maintenance
- Memo display
- 3-phase average current (green)
- Total active power (dark green)

- Total power factor (blue-green)
- Counter value tariff 1, active energy import

Symbols	Selection of the block icon in CFC	Special characteristics
	1	Display of current, total active power, total power factor
	2	Display of current, total active power, total power factor
	3	Display of current, total active power, counter value tariff 1
	4	Display of current, total active power, counter value tariff 1
	-	Block icon in "Out of service" mode (with reference to the example of block icon type 1)

Special characteristic for displaying the counter value:

The counter value is part of the acyclic data and is thus not updated cyclically. Instead, it needs a trigger to be read out anew from the device.

Acyclic data can be retrieved as follows:

- Trigger the "RdDataLi" block input
- Open the "@PG_PAC3200_Parameter" faceplate
- Open the "@PG_PAC3200_Current" faceplate
- Open the "@PG_PAC3200_Voltage" faceplate
- Open the "@PG_PAC3200_Energy" faceplate
- Open the "@PG_PAC3200_Power1" faceplate
- Open the "@PG_PAC3200_Power2" faceplate
- Trigger the "Read data" button in the faceplates listed

You can find additional information on the block icon and the operator input options in the following chapters of the APL Online Help:

- "Configuring the block icons"
- "Structure of the block icon"
- "Operator input using the block icon"

Measured value block PACMnMx

6

6.1 Description of PACMnMx

Object name (type + number) and family

Type + number:	FB 1087
Family:	SENTRON

Application area of PACMnMx

The block is used for the following applications:

- Interface block of the driver blocks of the PAC3200 / PAC3220 or PAC4200 power monitoring device for the user program and for visualization

Operating principle

The PACMnMx block prepares the measurement data received by the driver block from a PAC3200, PAC3220 or PAC4200 power monitoring device and makes it available for further use in the user program and for visualization.

You can find further detailed descriptions about configuring, the operating principle, visualization and operation in the following sections.

Configuration

Integrate the block in the CFC editor into a cyclic interrupt OB (OB30 to OB38). In addition, the block is integrated automatically into the startup OB (OB100). In addition, the DrvPAC driver block (cyclic and acyclic data of the PAC3200 / PAC3220 / PAC4200) and the PAC3200 / PAC4200 block must be called in the same cyclic interrupt OB before the PACMnMx block.

The `AcyclData` output structure of the DrvPAC block is interconnected with the input of the PACMnMx block of the same name. The `OosAct` and `OnAct` outputs of the PAC3200/PAC4200 block are interconnected with the `OosLi` and `OnLi` inputs of the PACMnMx block. The `RstMnVal` and `RstMxVal` outputs of the PACMnMx block are interconnected with the `RstMnValLi` and `RstMxValLi` inputs of the PAC3200/PAC4200 block.

As the PACMnMx does not have a block icon of its own, the block icon of the PACMnMx can only be called up via the "Calling other faceplates" standard function of another APL block.

There is a template for the PACMnMx block for measuring point types in the Advanced Process Library PAC3200 & PAC4200 for SIMATIC PCS 7 as an example:

Example of measuring point type:

- "Templates of PAC3200 and PAC4200 (Page 169)"

Startup characteristics

The block has no startup response.

Status word assignment for the Status1 parameters

For the description of the individual parameters, see chapter "I/Os of PACMnMx (Page 147)".

Status bit	Parameter
0	`Occupied`
1	`BatchEn`
2	Not used
3	`OosAct.Value`
4 ... 5	Not used
6	`OnAct.Value`
7 ... 11	Not used
12	Minimum values successfully reset
13	Maximum values successfully reset
14 ... 18	Not used
19	Local operator permission `Feature` is active
20 ... 26	Not used
27	0 = PAC3200, 1 = PAC4200
28 ... 31	Not used

6.2 Modes of PACMnMx

The block adopts the mode of the PAC3200/PAC4200 block via the `OnLi` and `OssLi` inputs.

6.3 Functions of PACMnMx

Functions of PACMnMx

The functions for this block are listed in the following.

Read minimum and maximum values

"Read minimum and maximum values" can be triggered in the individual measured value views of the faceplate.

"Read minimum and maximum values" can also be triggered with a positive edge at the `RdDataLi.Value` input.

Note

As long as the minimum and maximum values are being read via the `RdDataLi` input, "Read minimum and maximum values" cannot be triggered in the faceplate.

The `DataRdOK.Value` output is set when the minimum and maximum values have been successfully read. The `DataRdOK.Value` output is reset when reading of the minimum and maximum values is started.

If the PAC3200 / PAC3220 / PAC4200 power monitoring device is connected behind a DP/PA-Link in an H system, the configuration data cannot be read or written.

Note

For this reason, "Read minimum and maximum values" must be initiated once to ensure the displayed data is up to date.

The PACMnMx function block reads the minimum and maximum values via "Flexible Access" data record 47. First, the register addresses and register lengths for the read parameters are written to the data record, and then the data record is read out.

The PACMnMx possesses the following measured values with corresponding register addresses and register lengths:

Description	Block parameter (output)	Register address	Register length
Maximum voltage L1-N	`MxL1Volt`	16#004B	2
Maximum voltage L2-N	`MxL2Volt`	16#004D	2
Maximum voltage L3-N	`MxL3Volt`	16#004F	2
Maximum voltage L1-L2	`MxL12Volt`	16#0051	2
Maximum voltage L2-L3	`MxL23Volt`	16#0053	2
Maximum voltage L3-L1	`MxL31Volt`	16#0055	2
Maximum current L1	`MxL1Cur`	16#0057	2
Maximum current L2	`MxL2Cur`	16#0059	2
Maximum current L3	`MxL3Cur`	16#005B	2

Description	Block parameter (output)	Register address	Register length
Maximum apparent power L1	MxL1ApPow	16#005D	2
Maximum apparent power L2	MxL2ApPow	16#005F	2
Maximum apparent power L3	MxL3ApPow	16#0061	2
Maximum active power L1	MxL1ActPow	16#0063	2
Maximum active power L2	MxL2ActPow	16#0065	2
Maximum active power L3	MxL3ActPow	16#0067	2
Maximum reactive power L1	MxL1ReaPow	16#0069	2
Maximum reactive power L2	MxL2ReaPow	16#006B	2
Maximum reactive power L3	MxL3ReaPow	16#006D	2
Maximum power factor L1	MxL1PowFact	16#006F	2
Maximum power factor L2	MxL2PowFact	16#0071	2
Maximum power factor L3	MxL3PowFact	16#0073	2
Maximum line frequency	MxFrequency	16#0081	2
Maximum 3-phase average voltage ph-n	MxVoltLN3PhAvg	16#0083	2
Maximum 3-phase average voltage L-L	MxVoltLL3PhAvg	16#0085	2
Maximum 3-phase average current	MxCur3PhAvg	16#0087	2
Maximum total apparent power	MxToApPow	16#0089	2
Maximum total active power	MxToActPow	16#008B	2
Maximum total reactive power VARn	MxToReaPow	16#008D	2
Maximum total power factor	MxToPowFact	16#008F	2
Minimum voltage L1-N	MnL1Volt	16#0091	2
Minimum voltage L2-N	MnL2Volt	16#0093	2
Minimum voltage L3-N	MnL3Volt	16#0095	2
Minimum voltage L1-L2	MnL12Volt	16#0097	2
Minimum voltage L2-L3	MnL23Volt	16#0099	2
Minimum voltage L3-L1	MnL31Volt	16#009B	2
Minimum current L1	MnL1Cur	16#009D	2
Minimum current L2	MnL2Cur	16#009F	2
Minimum current L3	MnL3Cur	16#00A1	2
Minimum apparent power L1	MnL1ApPow	16#00A3	2
Minimum apparent power L2	MnL2ApPow	16#00A5	2
Minimum apparent power L3	MnL3ApPow	16#00A7	2
Minimum active power L1	MnL1ActPow	16#00A9	2
Minimum active power L2	MnL2ActPow	16#00AB	2
Minimum active power L3	MnL3ActPow	16#00AD	2
Minimum reactive power L1	MnL1ReaPow	16#00AF	2
Minimum reactive power L2	MnL2ReaPow	16#00B1	2
Minimum reactive power L3	MnL3ReaPow	16#00B3	2
Minimum power factor L1	MnL1PowFact	16#00B5	2
Minimum power factor L2	MnL2PowFact	16#00B7	2
Minimum power factor L3	MnL3PowFact	16#00B9	2
Minimum line frequency	MnFrequency	16#00BB	2

Description	Block parameter (output)	Register address	Register length
Minimum 3-phase average voltage L-N	MnVoltLN3PhAvg	16#00BD	2
Minimum 3-phase average voltage L-L	MnVoltLL3PhAvg	16#00BF	2
Minimum 3-phase average current	MnCur3PhAvg	16#00C1	2
Minimum total apparent power	MnToApPow	16#00C3	2
Minimum total active power	MnToActPow	16#00C5	2
Minimum total reactive power VARn	MnToReaPow	16#00C7	2
Minimum total power factor	MnToPowFact	16#00C9	2
Minimum THD voltage L1-L2*)	MxL12ThdVolt	16#0C5B	2
Minimum THD voltage L2-L3*)	MxL23ThdVolt	16#0C61	2
Minimum THD voltage L3-L1*)	MxL31ThdVolt	16#0C67	2
Minimum THD voltage L1*)	MxL1ThdVolt	16#0CB5	2
Minimum THD voltage L2*)	MxL2ThdVolt	16#0CBB	2
Minimum THD voltage L3*)	MxL3ThdVolt	16#0CC1	2
Minimum THD current L1*)	MxL1ThdCur	16#0CC7	2
Minimum THD current L2*)	MxL2ThdCur	16#0CCD	2
Minimum THD current L3*)	MxL3ThdCur	16#0CD3	2

*) These measured values are read out for one PAC4200 only (Feature bit 5 = 1)

Parameterizing units of measured values

You can parameterize the units of the following measured values at block inputs. If necessary, the measured values are then converted in the faceplate of the PACMnMx block and the set unit is displayed.

Measured variable	Unit of the device and on the block	Possible setting for display on the faceplate	Parameter
Current	A	• 0 = A • 1 = kA	UnitCur
Voltage	V	• 0 = V • 1 = kV	UnitVolt
Active power	W	• 0 = W/VA/var • 1 = kW/kVA/kVar • 2 = MW/MVA/MVar	UnitPower
Apparent power	VA		
Reactive power	var		
Active energy	Wh	• 0 = kWh/kVAh/kvarh • 1 = MWh/MVAh/Mvarh • 2 = GWh/GVAh/Gvarh	UnitEnergy
Apparent energy	VAh		
Reactive energy	varh		

Forming the signal status for blocks

This block has the standard function "Forming and outputting signal status for technological blocks" described in detail in the APL Online Help.

The worst signal status `ST_Worst` for the block is formed from the following parameters:

- `GrpErr.Value`

Group errors

The following parameters are taken into account for forming the group error `GrpErr`:

- `FaultExt`

Parameterizable characteristics via the feature I/O

The following reactions are available for this block at the respective bits of the Feature I/O:

Bit	Function
5	"Defining the device type (Page 10)"
24	"Enable local operator permission (Page 12)"

Operator permissions

This block has the standard function Operator permissions described in the APL Online Help.

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

Bit	Function
0 ... 24	Not used
25	1 = Operator can reset the minimum values
26	1 = Operator can reset the maximum values
27	1 = Operator may read the minimum and maximum values from the PAC3200 / PAC3220 / PAC4200
28 ... 31	Not used

SIMATIC BATCH functionality

This block has the standard function "SIMATIC BATCH functionality" described in the APL Online Help.

6.4 Troubleshooting

The following errors can be displayed with this block:

- Error reading/writing the minimum and maximum values

Error reading/writing the minimum and maximum values

The `RdDrErr` or `WrDrErr` output is set for one cycle if an error occurs while reading the minimum and maximum values or writing the register addresses.

6.5 I/Os of PACMnMx

Input parameters

Parameter	Description	Type	Default
BatchEn	1 = Enable allocation	BOOL	0
BatchID	Batch number	DWORD	16#00
BatchName	Batch name	STRING [32]	-
DpaLink	Connection of the device: 0 = Direct on the DP master system 1 = Downstream of the DP/PA-Link	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
EN	1 = Called block is being processed	BOOL	1
FaultExt	1 = External fault	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
Feature	I/O for additional functions (see Functions of PACMnMx (Page 142))	STRUCT	-
InMnDay	Day on which the minimum values were last reset	INT	0
InMnHour	Hour in which the minimum values were last reset	INT	0
InMnMinute	Minute in which the minimum values were last reset	INT	0
InMnMonth	Month in which the minimum values were last reset	INT	0
InMnSecond	Second in which the minimum values were last reset	INT	0
InMnYear	Year in which the minimum values were last reset	INT	0
InMxDay	Day on which the maximum values were last reset	INT	0
InMxHour	Hour in which the maximum values were last reset	INT	0
InMxMinute	Minute in which the maximum values were last reset	INT	0
InMxMonth	Month in which the maximum values were last reset	INT	0
InMxSecond	Second in which the maximum values were last reset	INT	0
InMxYear	Year in which the maximum values were last reset	INT	0
Occupied	1 = Occupied by a batch	BOOL	0
OnLi	1 = "On" mode, via interconnection or SFC	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
OosLi	1 = "Out of service", via interconnection or SFC	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
OpSt_In	Input parameter for local operator permission, to be interconnected with the Out output parameter of the upstream OpStations block (see chapter "Description of OpStations" in the APL Online Help).	DWORD	16#00000000
OS_Perm	I/O for operator permission (see Functions of PACMnMx (Page 142))	STRUCT	-
RdCfgOp*)	1 = Read minimum and maximum values out of the power monitoring device	BOOL	0

Parameter	Description	Type	Default
RdDataLi	1 = "Read acyclic measured values" via interconnection or SFC	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
RstMnValOp*)	1 = Reset minimum values via operator	BOOL	0
RstMxValOp*)	1 = Reset maximum values via operator	BOOL	0
SampleTime	Sampling time [s] (automatically assigned)	REAL	0.1
UnitCur	Current unit for OS	INT	0
UnitEnergy	Energy unit for OS	INT	0
UnitPower	Power unit for OS	INT	1
UnitVolt	Voltage unit for OS	INT	0
UserStatus	Freely assignable bits for use in PCS 7 OS	BYTE	16#00
WrCfgOp*)	Reserved	BOOL	0

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

In-out parameters

Parameter	Description	Type	Default
AcyclData	Acyclic data from the DrvPAC driver block (this input must be interconnected with the output AcyclData of the DrvPAC)	STRUCT • BlkRd : INT • ... • RetValWr : WORD • Input: STRUCT • Output: STRUCT	-

Output parameters

Parameter	Description	Type	Default
ENO	1 = Block algorithm executed without errors	BOOL	0
DataRdOK	1 = acyclic measured values have been read successfully	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
FreqUnit	Frequency unit: Hz	INT	1077
GrpErr	1 = Group error present	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
MnDay	Day on which the minimum values were last reset	INT	0
MnHour	Hour in which the minimum values were last reset	INT	0
MnMinute	Minute in which the minimum values were last reset	INT	0

Parameter	Description	Type	Default
MnMonth	Month in which the minimum values were last reset	INT	0
MnSecond	Second in which the minimum values were last reset	INT	0
MnYear	Year in which the minimum values were last reset	INT	0
MnCur3PhAvg	Minimum 3-phase average current	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MnFrequency	Minimum line frequency	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MnL1ActPow	Minimum active power L1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MnL1ActPowkW	Minimum active power L1 [kW]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MnL2ActPow	Minimum active power L2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MnL2ActPowkW	Minimum active power L2 [kW]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MnL3ActPow	Minimum active power L3	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MnL3ActPowkW	Minimum active power L3 [kW]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MnL1ApPow	Minimum apparent power L1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MnL1ApPowkVA	Minimum apparent power L1 [kVA]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MnL2ApPow	Minimum apparent power L2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MnL2ApPowkVA	Minimum apparent power L2 [kVA]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80

Parameter	Description	Type	Default
MnL3ApPow	Minimum apparent power L3	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MnL3ApPowkVA	Minimum apparent power L3 [kVA]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MnL1Cur	Minimum current L1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MnL2Cur	Minimum current L2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MnL3Cur	Minimum current L3	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MnL1PowFact	Minimum power factor L1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MnL2PowFact	Minimum power factor L2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MnL3PowFact	Minimum power factor L3	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MnL1ReaPow	Minimum reactive power L1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MnL1ReaPowkvar	Minimum reactive power L1 [kvar]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MnL2ReaPow	Minimum reactive power L2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MnL2ReaPowkvar	Minimum reactive power L2 [kvar]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MnL3ReaPow	Minimum reactive power L3	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80

Parameter	Description	Type	Default
MnL3ReaPowkvar	Minimum reactive power L3 [kvar]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MnL1Volt	Minimum voltage L1-N	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MnL2Volt	Minimum voltage L2-N	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MnL3Volt	Minimum voltage L3-N	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MnL12Volt	Minimum voltage L1-L2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MnL23Volt	Minimum voltage L2-L3	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MnL31Volt	Minimum voltage L3-L1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MnToActPow	Minimum total active power	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MnToActPowkW	Minimum total active power [kW]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MnToApPow	Minimum total apparent power	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MnToApPowkVA	Minimum total apparent power [kVA]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MnToPowFact	Minimum total power factor	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MnToReaPow	Minimum total reactive power VARn	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80

Parameter	Description	Type	Default
MnToReaPowkvar	Minimum total reactive power VARn [kvar]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MnVoltLL3PhAvg	Maximum 3-phase average voltage LL	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MnVoltLN3PhAvg	Minimum 3-phase average voltage ph-n	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MxDay	Day on which the maximum values were last reset	INT	0
MxHour	Hour in which the maximum values were last reset	INT	0
MxMinute	Minute in which the maximum values were last reset	INT	0
MxMonth	Month in which the maximum values were last reset	INT	0
MxSecond	Second in which the maximum values were last reset	INT	0
MxYear	Year in which the maximum values were last reset	INT	0
MxCur3PhAvg	Maximum 3-phase average current	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MxFrequency	Maximum line frequency	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MxL1ActPow	Maximum active power L1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MxL1ActPowkW	Maximum active power L1 [kW]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MxL2ActPow	Maximum active power L2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MxL2ActPowkW	Maximum active power L2 [kW]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MxL3ActPow	Maximum active power L3	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MxL3ActPowkW	Maximum active power L3 [kW]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80

Parameter	Description	Type	Default
MxL1ApPow	Maximum apparent power L1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MxL1ApPowkVA	Maximum apparent power L1 [kVA]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MxL2ApPow	Maximum apparent power L2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MxL2ApPowkVA	Maximum apparent power L2 [kVA]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MxL3ApPow	Maximum apparent power L3	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MxL3ApPowkVA	Maximum apparent power L3 [kVA]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MxL1Cur	Maximum current L1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MxL2Cur	Maximum current L2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MxL3Cur	Maximum current L3	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MxL1PowFact	Maximum power factor L1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MxL2PowFact	Maximum power factor L2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MxL3PowFact	Maximum power factor L3	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MxL1ReaPow	Maximum reactive power L1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80

Parameter	Description	Type	Default
MxL1ReaPowkvar	Maximum reactive power L1 [kvar]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MxL2ReaPow	Maximum reactive power L2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MxL2ReaPowkvar	Maximum reactive power L2 [kvar]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MxL3ReaPow	Minimum reactive power L3	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MxL3ReaPowkvar	Maximum reactive power L3 [kvar]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MxL1Volt	Maximum voltage L1-N	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MxL2Volt	Minimum voltage L2-N	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MxL3Volt	Maximum voltage L3-N	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MxL12Volt	Maximum voltage L1-L2	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MxL23Volt	Maximum voltage L2-L3	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MxL31Volt	Maximum voltage L3-L1	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MxToActPow	Maximum total active power	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MxToActPowkW	Maximum total active power [kW]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80

Parameter	Description	Type	Default
MxToApPow	Maximum total apparent power	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MxToApPowkVA	Maximum total apparent power [kVA]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MxToPowFact	Maximum total power factor	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MxToReaPow	Maximum total reactive power VARn	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MxToReaPowkvar	Maximum total reactive power VARn [kvar]	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MxVoltLL3PhAvg	Maximum 3-phase average voltage L-L	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
MxVoltLN3PhAvg	Maximum 3-phase average voltage L-N	STRUCT • Value: REAL • ST: BYTE	- • 0.0 • 16#80
OnAct	1 = "On" mode active	STRUCT • Value: BOOL • ST: BYTE	- • 1 • 16#80
OosAct	1 = Block is "Out of service"	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
OpSt_Out	Value of the input parameter OpSt_In, for further interconnecting with other blocks. Bit 31 of this parameter is occupied by Feature Bit 24	DWORD	16#00000000
OS_PermLog	Display of OS_Perm with the settings changed by the block algorithm	DWORD	16#FFFFFFFF
OS_PermOut	Display of OS_Perm	DWORD	16#FFFFFFFF
RdDrErr	1 = Error reading the minimum and maximum values	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
RstMnVal	1 = Reset minimum values	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80

Parameter	Description	Type	Default
RstMxVal	1 = Reset maximum values	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80
ST_Worst	Worst signal status	BYTE	16#80
Status1	Status word 1	DWORD	16#00000000
Status2	Reserved	DWORD	16#00000000
Status3	Reserved	DWORD	16#00000000
Status4	Reserved	DWORD	16#00000000
ThdUnit	Harmonic distortion unit: %	INT	1342
WrDrErr	1 = Error writing the register addresses for the minimum and maximum values	STRUCT • Value: BOOL • ST: BYTE	- • 0 • 16#80

6.6 Operator control & monitoring

Views of PACMnMx

The PACMnMx block has the following views:

- Current view of PACMnMx
- Voltage view of PACMnMx
- Power view of PACMnMx
- Power factor view of PACMnMx
- Memo view (see APL Online Help)
- Batch view (see APL Online Help)

If the PAC3200 / PAC3220 / PAC4200 power monitoring device is connected behind a DP/PA-Link in an H system, the measured values of the PACMnMx cannot be read out.

You can find general information about the faceplate and the block icon in chapters "Structure of the faceplate" and "Structure of the block icon" in the APL Online Help.

Current view of PACMnMx

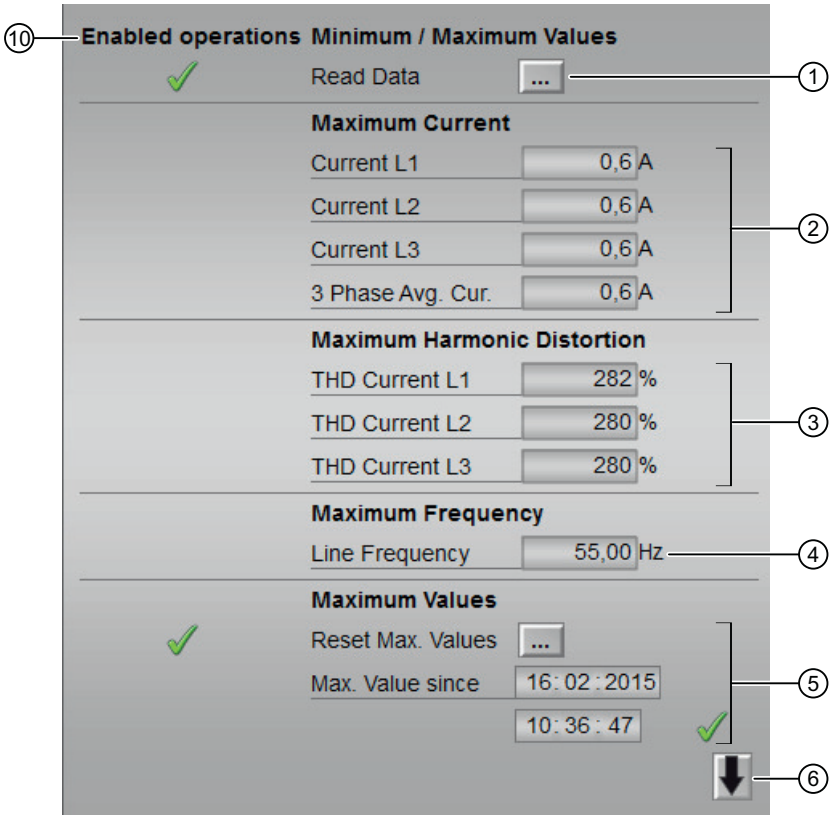
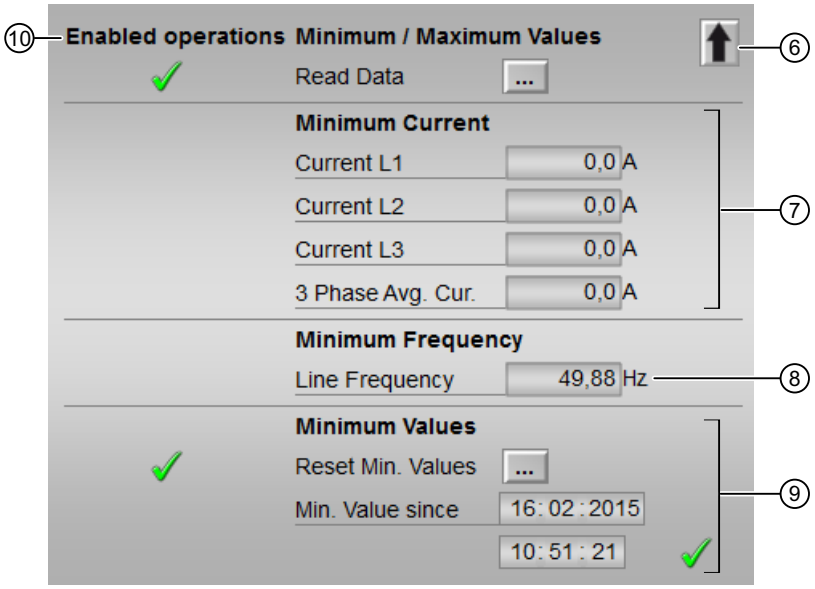


Figure 6-1 Current view of PACMnMx (1)



① Read minimum and maximum values
② Display of the maximum currents
③ Display of the maximum harmonic distortion
④ Display of the maximum line frequency including signal status
⑤ Reset of maximum values
⑥ Button for jumping to the next or previous view
⑦ Display of the minimum currents
⑧ Display of the minimum line frequency including signal status
⑨ Reset of minimum values
⑩ Enabled operations

Figure 6-2 Current view of PACMnMx (2)

(1) Read minimum and maximum values

In this area, you can find the minimum and maximum values of the PAC3200 / PAC3220 / PAC4200 power monitoring device.

(2) Display of maximum currents

This area shows you the maximum currents of the PAC3200 / PAC3220 / PAC4200 with the corresponding signal statuses.

The following currents are displayed:

- Maximum current L1
- Maximum current L2
- Maximum current L3
- Maximum 3-phase average current

(3) Display of maximum harmonic distortion

This area is displayed only if you are using a PAC4200 (`Feature` bit 5 = 1). This area shows you the maximum THD currents of the PAC4200 with the relevant signal status.

The following THD currents are displayed:

- Minimum THD current L1
- Minimum THD current L2
- Minimum THD current L3

(4) Display of the maximum line frequency including signal status

This area shows you the maximum line frequency with the relevant signal status.

(5) Reset of maximum values

In this area you can reset the maximum values. A display shows you the date and the time at which the maximum values were last reset. The green checkmark is displayed when the maximum values have been successfully reset.

Note

If you reset the maximum values, you must wait until the green checkmark is displayed. If you close the display window or change the view while the maximum values are being reset, it may happen that the date and the time are not displayed correctly or reset even fails.

(6) Button for jumping to the next or previous view

You reach the minimum or maximum values of the current view by means of this button.

(7) Display of minimum currents

This area shows you the minimum currents of the PAC3200 / PAC3220 / PAC4200 with the corresponding signal statuses.

(8) Display of the minimum line frequency including signal status

The following currents are displayed:

- Minimum current L1
- Minimum current L2
- Minimum current L3
- Minimum 3-phase average current

(9) Reset of minimum values

In this area you can reset the minimum values. A display shows you the date and the time at which the minimum values were last reset. The green checkmark is displayed when the minimum values have been successfully reset.

Note

If you reset the minimum values, you must wait until the green checkmark is displayed. If you close the display window or change the view while the minimum values are being reset, it may happen that the date and the time are not displayed correctly or reset even fails.

(10) Enabled operations

This area shows all the operator inputs for which there are special operator permissions. These are dependent on the configuration in the Engineering System (ES) that is to apply for this block.

Symbols for enabled operations:

- **Green checkmark**: the OS operator can process this parameter.
- **Gray checkmark**: the OS operator is temporarily unable to process this parameter for process reasons.
- **Red cross**: the OS operator must never process this parameter due to parameterized AS operator permissions (`OS_Perm` or `OS1Perm`).

Voltage view of PACMnMx

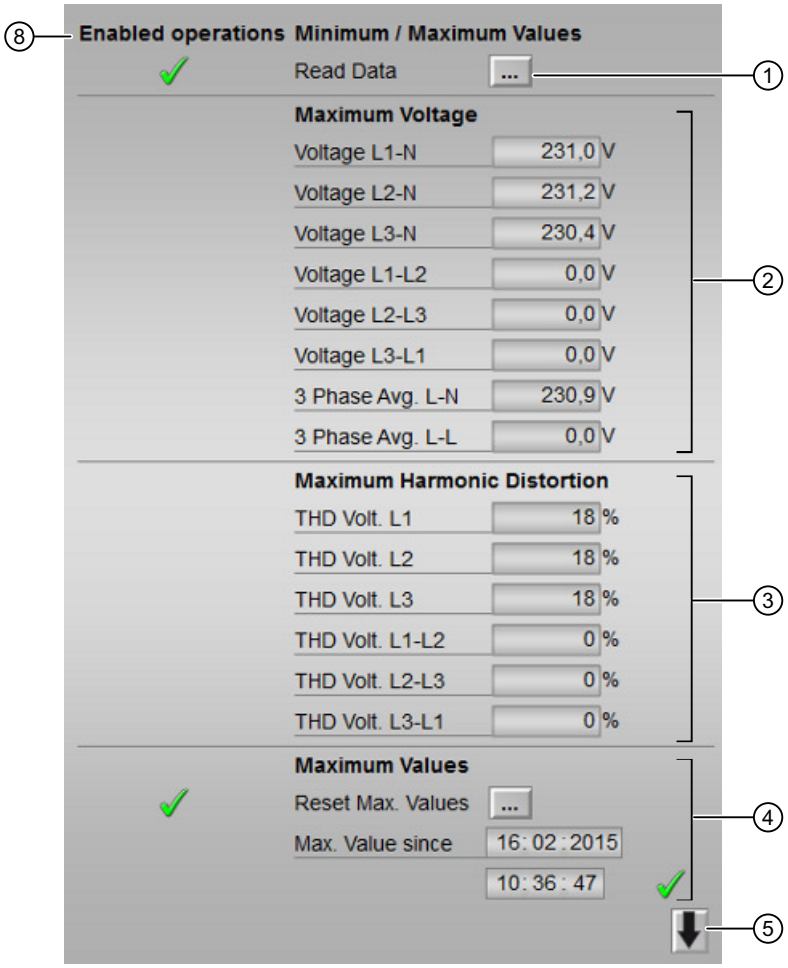
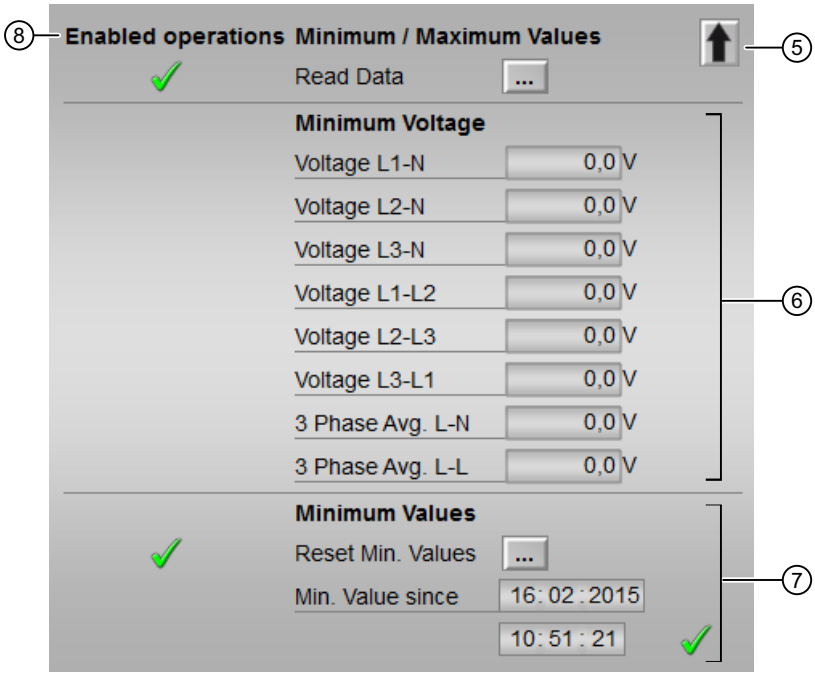


Figure 6-3 Voltage view of PACMnMx (1)



① Read minimum and maximum values
② Display of maximum voltages
③ Display of the maximum harmonic distortion
④ Reset of maximum values
⑤ Button for jumping to the next or previous view
⑥ Display of minimum voltages
⑦ Reset of minimum values
⑧ Enabled operations

Figure 6-4 Voltage view of PACMnMx (2)

(1) Read minimum and maximum values

In this area, you can find the minimum and maximum values of the PAC3200 / PAC3220 / PAC4200 power monitoring device.

(2) Display of maximum voltages

This area shows you the maximum voltages of the PAC3200 / PAC3220 / PAC4200 with the corresponding signal statuses.

The following voltages are displayed:

- Maximum voltage L1
- Maximum voltage L2
- Maximum voltage L3
- Maximum voltage L1-L2
- Maximum voltage L2-L3
- Maximum voltage L3-L1

- Maximum 3-phase average voltage ph-n
- Maximum 3-phase average voltage L-L

(3) Display of maximum harmonic distortion

This area is displayed only if you are using a PAC4200 (`Feature` bit 5 = 1). This area shows you the maximum THD voltages of the PAC4200 with the relevant signal status.

(4) Reset of maximum values

In this area you can reset the maximum values. A display shows you the date and the time at which the maximum values were last reset. The green checkmark is displayed when the maximum values have been successfully reset.

Note

If you reset the maximum values, you must wait until the green checkmark is displayed. If you close the display window or change the view while the maximum values are being reset, it may happen that the date and the time are not displayed correctly or reset even fails.

(5) Button for jumping to the next or previous view

You reach the minimum or maximum values of the voltage view by means of this button.

(6) Display of minimum voltages

This area shows you the minimum voltages of the PAC3200 / PAC3220 / PAC4200 with the corresponding signal statuses.

The following voltages are displayed:

- Minimum voltage L1
- Minimum voltage L2
- Minimum voltage L3
- Minimum voltage L1
- Minimum voltage L2
- Minimum voltage L3
- Minimum 3-phase average voltage ph-n
- Maximum 3-phase average voltage LL

(7) Reset of minimum values

In this area you can reset the minimum values. A display shows you the date and the time at which the minimum values were last reset. The green checkmark is displayed when the minimum values have been successfully reset.

Note

If you reset the minimum values, you must wait until the green checkmark is displayed. If you close the display window or change the view while the minimum values are being reset, it may happen that the date and the time are not displayed correctly or reset even fails.

(8) Enabled operations

This area shows all the operator inputs for which there are special operator permissions. These are dependent on the configuration in the Engineering System (ES) that is to apply for this block.

Symbols for enabled operations:

- **Green checkmark**: the OS operator can process this parameter.
- **Gray checkmark**: the OS operator is temporarily unable to process this parameter for process reasons.
- **Red cross**: the OS operator must never process this parameter due to parameterized AS operator permissions (`OS_Perm` or `OS1Perm`).

Power view of PACMnMx

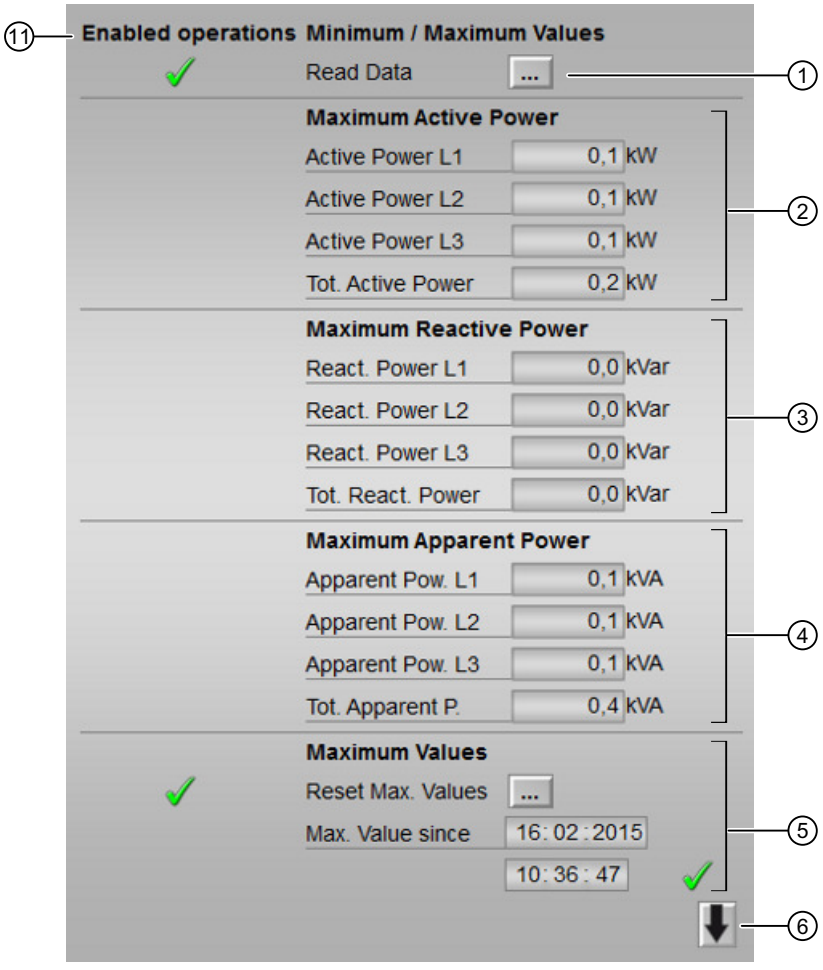
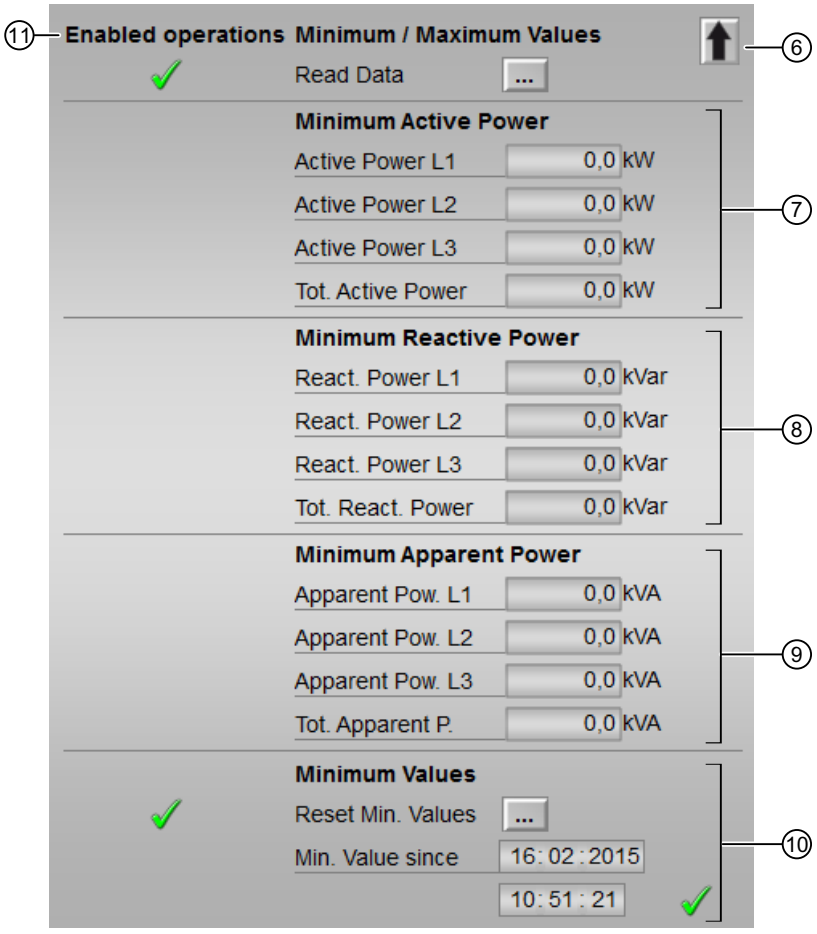


Figure 6-5 Power view of PACMnMx (1)



① Read minimum and maximum values
② Display of maximum active power
③ Display of maximum reactive power
④ Display of maximum apparent power
⑤ Reset of maximum values
⑥ Button for jumping to the next or previous view
⑦ Display of minimum active power
⑧ Display of minimum reactive power
⑨ Display of minimum apparent power
⑩ Reset of minimum values
⑪ Enabled operations

Figure 6-6 Power view of PACMnMx (2)

(1) Read minimum and maximum values

In this area, you can find the minimum and maximum values of the PAC3200 / PAC3220 / PAC4200 power monitoring device.

(2) Display of maximum active power

This area shows you the maximum active powers of the PAC3200 / PAC3220 / PAC4200 with the corresponding signal statuses.

The following active powers are displayed:

- Maximum active power L1
- Maximum active power L2
- Maximum active power L3
- Maximum total active power

(3) Display of maximum reactive power

This area shows you the maximum reactive powers of the PAC3200 / PAC3220 / PAC4200 with the corresponding signal statuses.

The following reactive powers are displayed:

- Maximum reactive power L1
- Maximum reactive power L2
- Maximum reactive power L3
- Maximum total reactive power

(4) Display of maximum apparent power

This area shows you the maximum apparent powers of the PAC3200 / PAC3220 / PAC4200 with the corresponding signal statuses.

The following apparent powers are displayed:

- Maximum apparent power L1
- Maximum apparent power L2
- Maximum apparent power L3
- Maximum total apparent power

(5) Reset of maximum values

In this area you can reset the maximum values. A display shows you the date and the time at which the maximum values were last reset. The green checkmark is displayed when the maximum values have been successfully reset.

Note

If you reset the maximum values, you must wait until the green checkmark is displayed. If you close the display window or change the view while the maximum values are being reset, it may happen that the date and the time are not displayed correctly or reset even fails.

(6) Button for jumping to the next or previous view

You reach the minimum or maximum values of the power view by means of this button.

(7) Display of minimum active power

This area shows you the minimum active powers of the PAC3200 / PAC3220 / PAC4200 with the corresponding signal statuses.

The following active powers are displayed:

- Minimum active power L1
- Minimum active power L2
- Minimum active power L3
- Minimum total active power

(8) Display of minimum reactive power

This area shows you the minimum reactive powers of the PAC3200 / PAC3220 / PAC4200 with the corresponding signal statuses.

The following reactive powers are displayed:

- Minimum reactive power L1
- Minimum reactive power L2
- Minimum reactive power L3
- Minimum total reactive power

(9) Display of minimum apparent power

This area shows you the minimum apparent powers of the PAC3200 / PAC3220 / PAC4200 with the corresponding signal statuses.

The following apparent powers are displayed:

- Minimum apparent power L1
- Minimum apparent power L2
- Minimum apparent power L3
- Minimum total apparent power

(10) Reset of minimum values

In this area you can reset the minimum values. A display shows you the date and the time at which the minimum values were last reset. The green checkmark is displayed when the minimum values have been successfully reset.

Note

If you reset the minimum values, you must wait until the green checkmark is displayed. If you close the display window or change the view while the minimum values are being reset, it may happen that the date and the time are not displayed correctly or reset even fails.

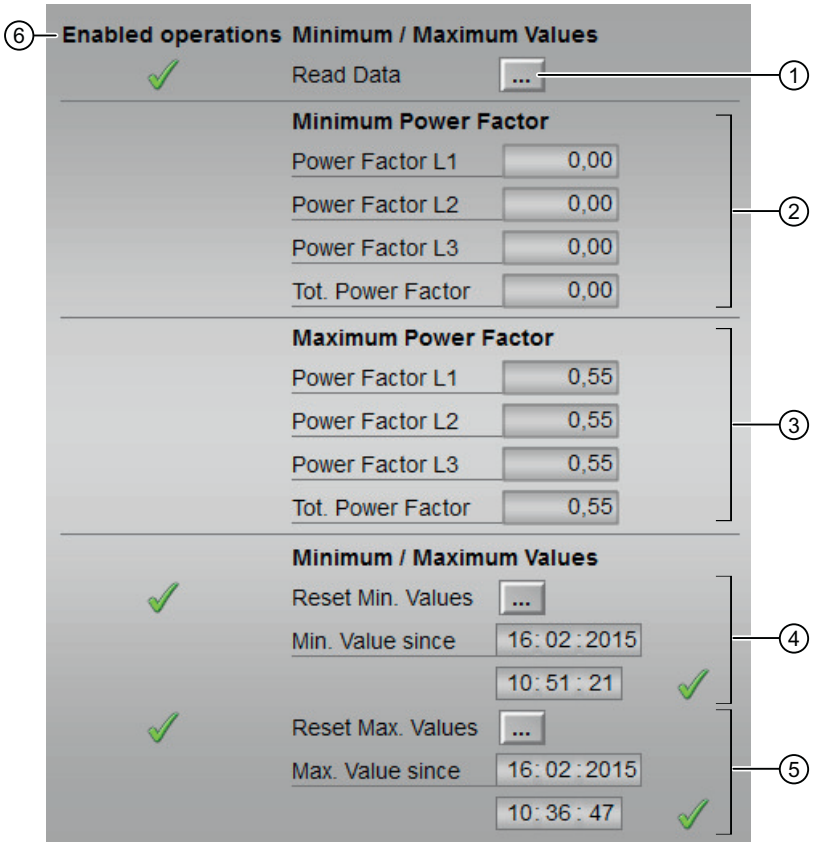
(11) Enabled operations

This area shows all the operator inputs for which there are special operator permissions. These are dependent on the configuring in the Engineering System (ES) that is to apply for this block.

Symbols for enabled operations:

- **Green checkmark**: the OS operator can process this parameter.
- **Gray checkmark**: the OS operator is temporarily unable to process this parameter for process reasons.
- **Red cross**: the OS operator must never process this parameter due to parameterized AS operator permissions (`OS_Perm` or `OS1Perm`).

Power factor view of PACMnMx



① Read minimum and maximum values
② Display of the minimum power factor
③ Display of the maximum power factor
④ Reset of minimum values
⑤ Reset of maximum values
⑥ Enabled operations

Figure 6-7 Power factor view of PACMnMx

(1) Read minimum and maximum values

In this area, you can find the minimum and maximum values of the PAC3200 / PAC3220 / PAC4200 power monitoring device.

(2) Display of the minimum power factor

This area shows you the minimum power factors of the PAC3200 / PAC3220 / PAC4200 with the corresponding signal statuses.

(3) Display of the maximum power factor

This area shows you the maximum power factors of the PAC3200 / PAC3220 / PAC4200 with the corresponding signal statuses.

The following power factors are displayed:

- Maximum power factor L1
- Maximum power factor L2
- Maximum power factor L3
- Maximum total power factor

(4) Reset of minimum values

In this area you can reset the minimum values. A display shows you the date and the time at which the minimum values were last reset. The green checkmark is displayed when the minimum values have been successfully reset.

Note

If you reset the minimum values, you must wait until the green checkmark is displayed. If you close the display window or change the view while the minimum values are being reset, it may happen that the date and the time are not displayed correctly or reset even fails.

(5) Reset of maximum values

In this area you can reset the maximum values. A display shows you the date and the time at which the maximum values were last reset. The green checkmark is displayed when the maximum values have been successfully reset.

Note

If you reset the maximum values, you must wait until the green checkmark is displayed. If you close the display window or change the view while the maximum values are being reset, it may happen that the date and the time are not displayed correctly or reset even fails.

(6) Enabled operations

This area shows all the operator inputs for which there are special operator permissions. These are dependent on the configuration in the Engineering System (ES) that is to apply for this block.

Symbols for enabled operations:

- **Green checkmark**: the OS operator can process this parameter.
- **Gray checkmark**: the OS operator is temporarily unable to process this parameter for process reasons.
- **Red cross**: the OS operator must never process this parameter due to parameterized AS operator permissions (`OS_Perm` or `OS1Perm`).

Templates of PAC3200 and PAC4200 7

7.1 General notes on the templates

This process tag type is used to connect a PAC3200 / PAC3220 / PAC4200 power monitoring device with the driver blocks to PCS 7.

The cyclic and acyclic values of the PAC3200 / PAC3220 / PAC4200 are transferred to and from the device using the DrvPAC block.

The DrvPAC block is connected to the PAC3200/PAC4200 block via the `AcyclicData` or `CyclicData` structures.

The PAC3200_MnMx and PAC4200_MnMx templates additionally contain the PACMnMx block. It is connected to the DrvPAC via the `AcyclicData` structure.

The measuring point types contain the necessary interconnections between the blocks named above.

To instantiate the templates, the `AddrIn` input of the DrvPAC block must be parameterized with the start address of the inputs of the PAC3200/PAC4200.

Note

The PAC3200 and PAC4200 blocks internally call the APL blocks ChkREAL (FC260) and SelST16 (FC369) that are not supplied with the Advanced Process Library PAC3200 & PAC4200 for SIMATIC PCS 7. If your project does not yet contain these two blocks, copy them into the controller from the APL library before loading your project.

The PAC3200/PAC4200 block uses the `PAC3200_LimSrc`/`PAC4200_LimSrc` enumeration. You must copy this from the SENTRON PAC APL block library into the respective project. To do this, open the SENTRON PAC APL in the SIMATIC Manager. Select the `PAC3200_LimSrc`/`PAC4200_LimSrc` enumeration under "Shared Declarations > Enumerations" and copy it into your project.

The limit messages contain a text from user text libraries. You must copy the user text libraries from the SENTRON PAC APL block library into the respective project. To do this, open the SENTRON PAC APL library in SIMATIC Manager, select the "Text Libraries" folder and copy it to your project. If a folder for user text libraries already exists in your project, copy the PAC3200_LimSrc, PAC4200_LimSrc and PAC_LimMode user text libraries into this folder.

7.2 PAC3200 template

This process tag type is used to connect a PAC3200 / PAC3220 power monitoring device with the driver blocks to PCS 7.

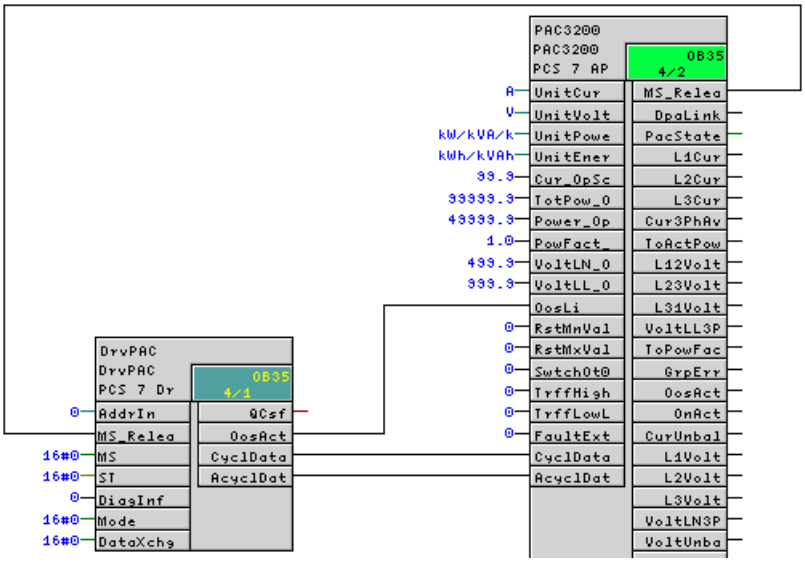


Figure 7-1 PAC3200 template

7.3 PAC3200_MnMx template

This process tag type is used to connect a PAC3200 / PAC3220 power monitoring device with the driver blocks to PCS 7.

The template contains the DrvPAC, PAC3200 and PACMnMx blocks.

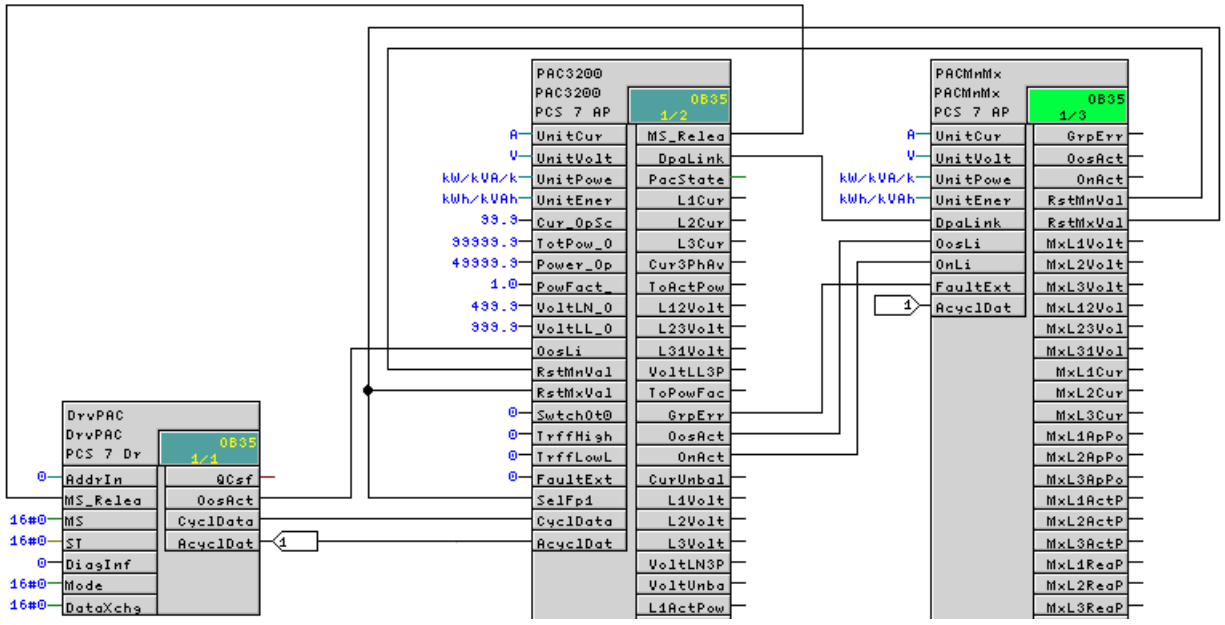


Figure 7-2 PAC3200_MnMx template

7.4 PAC4200 template

The measuring point types serve to connect a PAC4200 power monitoring device with the driver blocks to PCS 7.

The template contains the DrvPAC and PAC4200 blocks.

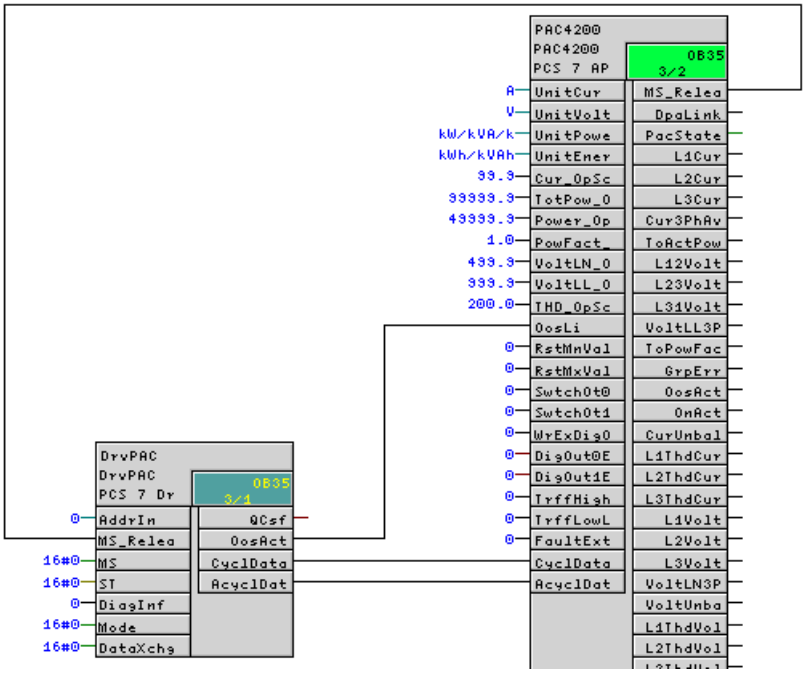


Figure 7-3 PAC4200 template

7.5 PAC4200_MnMx template

The measuring point types serve to connect a PAC4200 power monitoring device with the driver blocks to PCS 7.

The template contains the DrvPAC, PAC4200 und PACMnMx blocks.

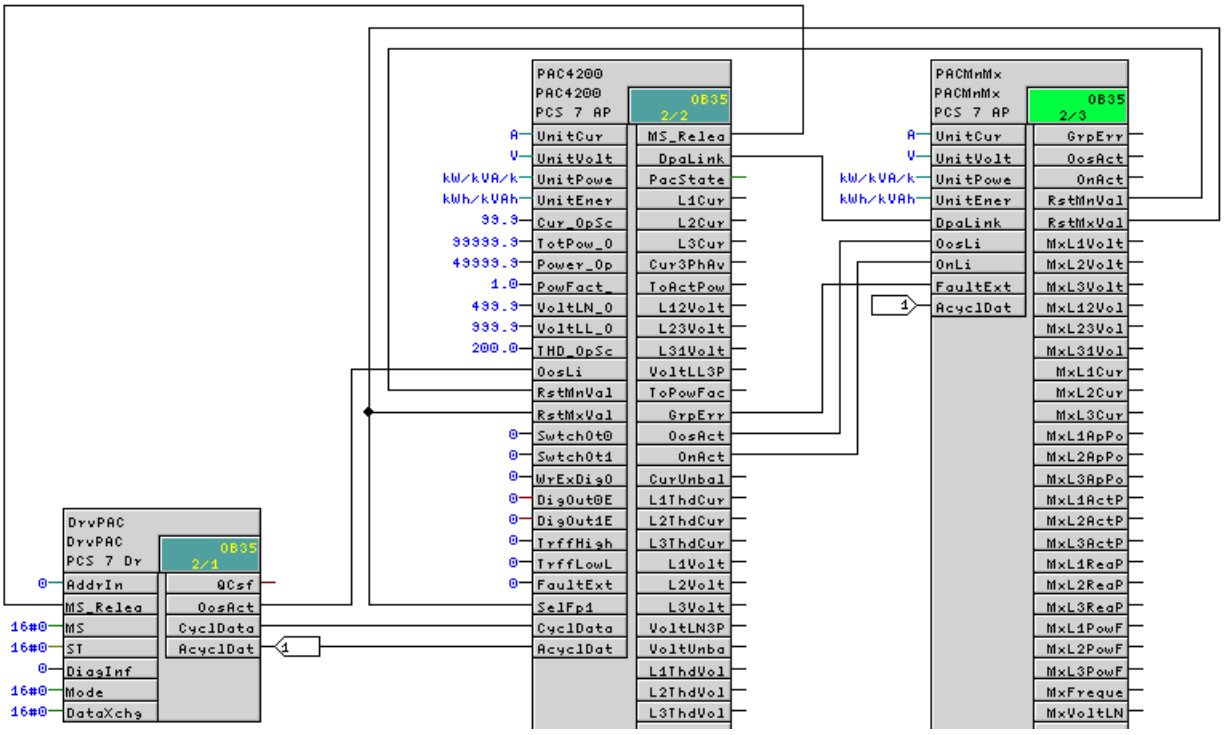


Figure 7-4 PAC4200_MnMx template