SIEMENS

SIMATIC PCS 7
Library PAC3200

Description of Functions

04/2008

Safety Guidelines

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

⚠ DANGER

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

⚠ WARNING

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

⚠ CAUTION

with a safety alert symbol, indicates that minor personal injury can result if proper precautions are not taken.

CAUTION

without a safety alert symbol, indicates that property damage can result if proper precautions are not taken.

NOTICE

indicates that an unintended result or situation can occur if the corresponding information is not taken into account.

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

Qualified Personnel

The device/system may only be set up and used in conjunction with this documentation. Commissioning and operation of a device/system may only be performed by **qualified personnel**. Within the context of the safety notes in this documentation qualified persons are defined as persons who are authorized to commission, ground and label devices, systems and circuits in accordance with established safety practices and standards.

Prescribed Usage

Note the following:

⚠ WARNING

This device may only be used for the applications described in the catalog or the technical description and only in connection with devices or components from other manufacturers which have been approved or recommended by Siemens. Correct, reliable operation of the product requires proper transport, storage, positioning and assembly as well as careful operation and maintenance.

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Disclaimer of Liability

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

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1 Introduction

1.1 General

The software package **SIMATIC PCS 7 block library PAC3200** is used to connect the SENTRON PAC3200 Power Monitoring Device to a SIMATIC PCS 7 process control system and comprises the following components:

- Block library with:
    - o PAC32DIA: Diagnostic block
    - o PAC32DRV: PCS 7 block for acquisition of measured values
    - o User objects and operating blocks for operating and observing measured data on the OS
- Online help in German and English
- Manual in German and English

The block library can be implemented in the PCS 7 versions V6.1 SP1 and V7.0.

1.2 Further documentation

You can find further details in the following manuals:

- o Manual for the SENTRON PAC3200 Power Monitoring Device
- o Operating instructions for the SENTRON PAC3200 Power Monitoring Device
- o Manual for the PAC PROFIBUS DP expansion module
- o Operating instructions for the PAC PROFIBUS DP expansion module

1.3 Installing the library

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

1.4 Hardware configurations

The driver concept for PAC3200 supports operation of PAC3200 as a DP slave directly connected to the DP master system as well as connected following a Y-link DPV0 or DPV1.

PAC3200 Power Monitoring Devices are integrated via GSD SI018163.gsd

The following I/O configuration applies for PAC3200:

- Outputs: 2 bytes of digital control data
- Inputs: 112 bytes of binary status and diagnostics (4 bytes) as well as measured values (108 bytes)

This configuration corresponds to **Basic type 3** of PAC3200.

1.5 Configuration in HW Config

In HW Config, PAC3200 is installed with the corresponding GSD file (see above) and with basic type 3.

Please note that PAC3200 is implemented in interrupt mode "DPV1" with enabled diagnostic interrupts.

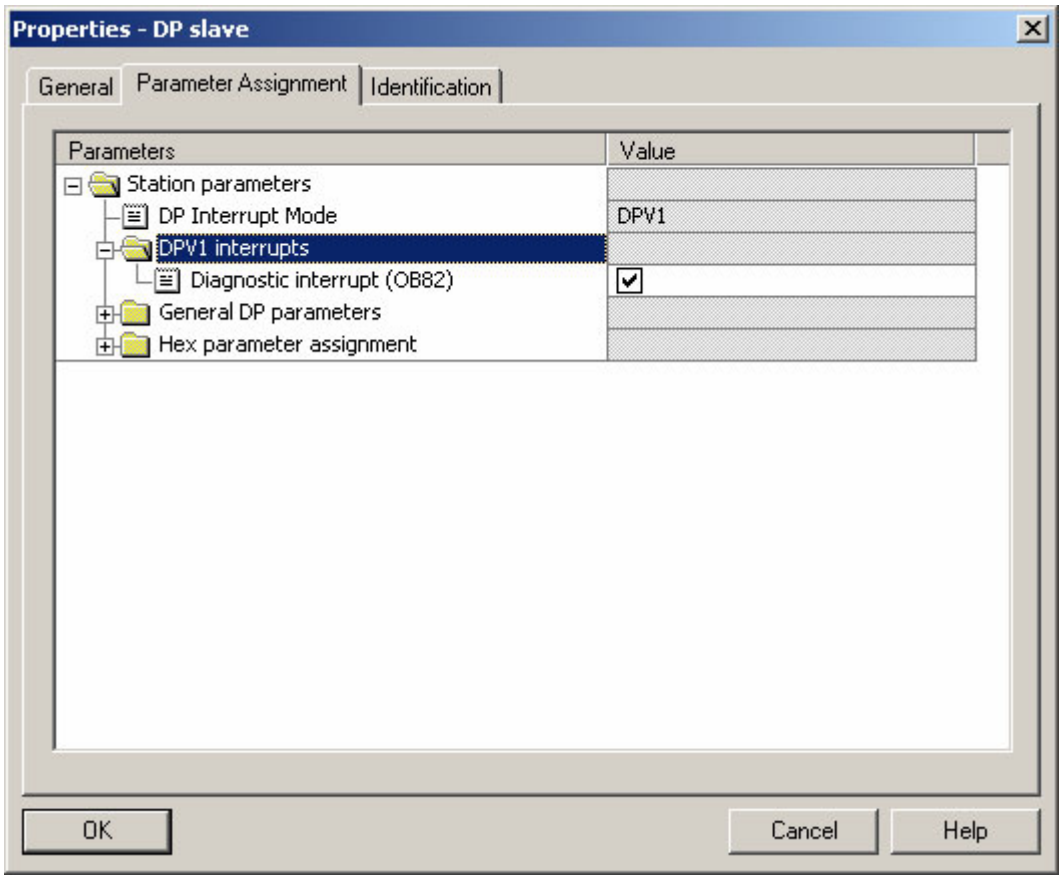


Figure 1 - 1 Properties of the PAC3200 device directly connected to the DP master system

If PAC3200 is connected following a Y-link DPV0 or DPV1, PAC3200 must be configured in HW Config as a 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. For details of the effect that this has on the response of the blocks, refer to Section 3 Description of the blocks.

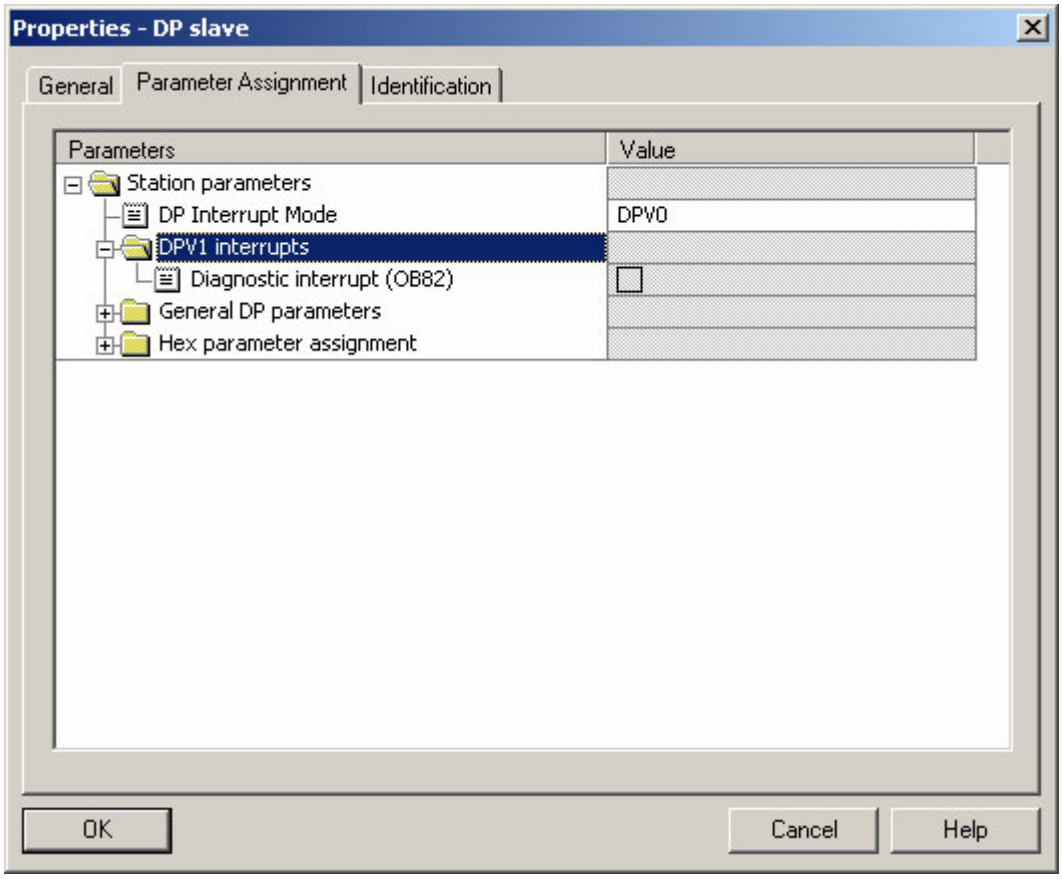


Figure 1 - 2 Properties of the PAC3200 device connected following a Y link

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

The LADDR parameter input of the driver block must be connected to the start address of the inputs of the PAC3200 device.

The assignment of the cyclic interface is included in the description of the driver block.

2 Information about the library

2.1 Overview of the blocks

The library contains the following blocks:

Name	Function	Number
PAC32DIA	Diagnostic block	FB1080
PAC32DRV	PCS 7 driver block for acquisition of measured values	FB1081
UDT_DIAG_PAC3200	Data type for diagnostic information	UDT1080

2.2 General information about OS typicals

2.2.1 Faceplates

Faceplates are configured with the Graphics Designer using the templates and PCS7-specific standard views (Trend, Batch, and Alarm) provided by the Faceplate Designer. If other user objects and functions are required, they can be added.

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

Two icons and a group/loop display with all the necessary displays are provided for the driver block. The relevant group display is called using the icons.

Overview

The display forms part of the @PG_PAC32DRV_OVERVIEW.PDL / @PL_PAC32DRV.PDL basic displays.

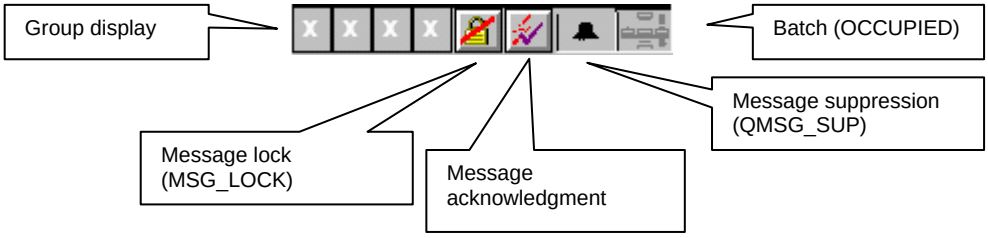


Figure 2 - 1 Section of the overview display

Trend (@PCS7_PAC32DRV_trend.pdl)

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

- StandardTrend: 2: Online values with 5 minute time axis
  > 2: Archive values with time axis of the value entered (in minutes)
- ReturnPath: .AVGCUR Structural element name starting with a full stop
  : Separators
  CO_GREEN Color for curve
  , Separators between two online values

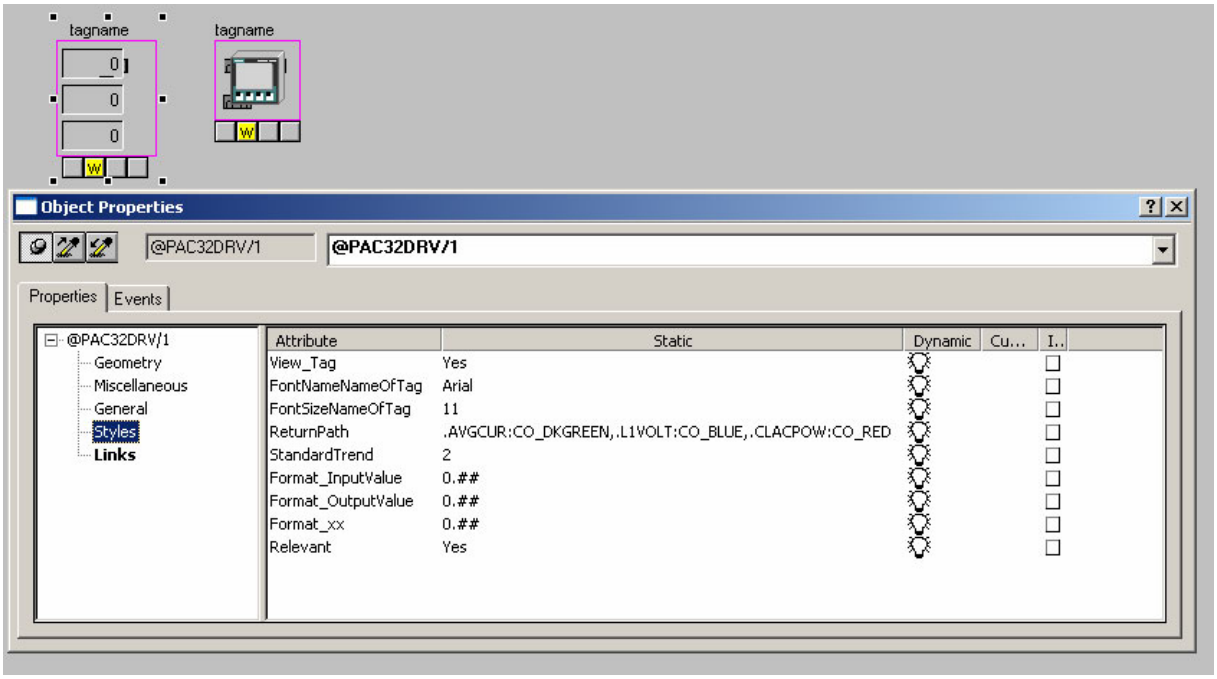


Figure 2 - 2 Trend setting on the icon

2.2.2 Symbols

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

Template diagrams @PCS7Typicals_PAC32DRV.pdl / @Template_PAC32DRV.pdl

The icons can be found in the template diagrams @PCS7Typicals_PAC32DRV.pdl and @Template_PAC32DRV.pdl.

When using the "Create/Update Block Icons" function, PCS7 accesses the file @PCS7Typicals_PAC32DRV.pdl.

When manually copying the icons into a process display, you must use the icons from the @Template_PAC32DRV.pdl file.

Different variants of block icons

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

Connection to the measuring point

For the driver blocks, there are two icons that are linked to the associated measuring point using the "Connect picture block to tag structure" function.

The icons contain the following visible information:

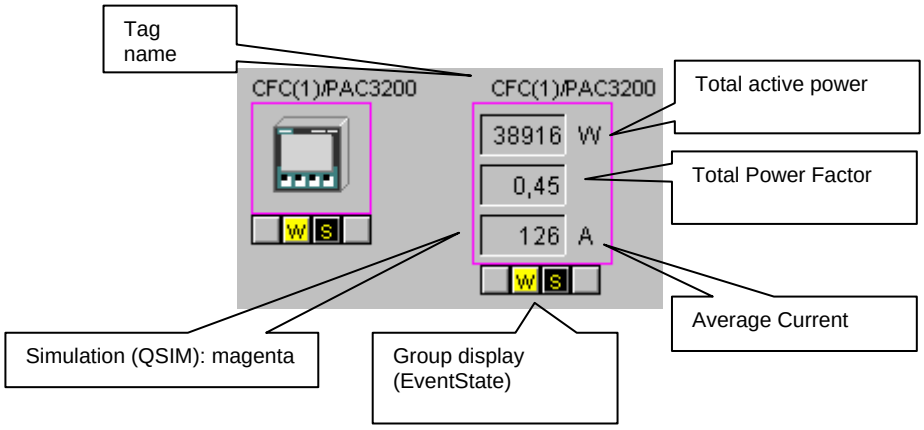


Figure 2 - 3 Symbols in Graphics Designer

3 Description of blocks

3.1 Diagnostic block PAC32DIA

FB1080

3.1.1 Calling OBs

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

OB1 Cyclic program
OB82 Diagnostic interrupt
OB83 Insert/remove module interrupt
OB85 Program error
OB86 Rack failure
OB100 Warm restart

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

3.1.2 Called blocks

The block calls the following blocks:

SFC6 RD_SINFO
SFC51 RDSYSST

3.1.3 Function

The PAC32DIA block is responsible for diagnosis of the PAC3200 devices.

If PAC3200 is directly connected to the DP master system, the block evaluates the acyclic events that are relevant for PAC3200 (start-up, DP station failure, module fault), generates quality code and diagnostic information for the MOD_PAX0 block and provides the driver block with status information via parameter output OMODE.

In the case of operation following a Y link DPV1, diagnostic information cannot be supplied to the driver block. The block evaluates start-up, DP station failure and module faults and provides the driver block with this information via parameter output OMODE.

This block is not used in the case of connection following Y link DPV0.

3.1.4 Message behavior

The block has no message behavior. The messages for DP station failure and module fault are generated by the MOD_PAX0 block (in the case of direct connection to the DP master system) or PADP_L00 (in the case of connection following the Y link DPV0) or OB_DIAG1 (in the case of connection following the Y link DPV1).

3.1.5 Error behavior

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

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

3.1.6 I/O access error

From the viewpoint of the I/O configuration, PAC3200 is a "compact" DP slave, i.e. it always has a fixed I/O configuration. It can therefore be assumed that if an I/O access error occurs, the entire DP slave must have failed (which is reported shortly afterwards).

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

3.1.7 Module fault

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

3.1.8 Read diagnostics data from PAC3200

If the PAC3200 outputs a diagnostics alarm, system function RDSYSST (SFC51) will activate reading of the device-specific diagnostics data.

The device-specific diagnostics data is also read out using the system function RDSYSST (SFC51) following a CPU restart and rack start-up.

When PAC3200 is connected following a Y link, it switches over to DPV0 mode, so the device-specific diagnostics data cannot be read. The driver block will in this case evaluate the device diagnostics data and device status from the process image of the inputs.

The read information is transferred to the MOD_PAX0 block and the driver block where it is evaluated.

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

Diagnostic events are assigned to maintenance status as follows:

Diagnostic event	**Maintenance status**	**QUALITY**	**PA_DIAG**
Internal communication not ready	Maintenance requirement is high	16#24	16#0000_0100
Internal communication is faulty			
Data invalid (CRC error)			
Data invalid (frame error)			
Data invalid (timeout)			
Firmware PAC,Module incompatible			
Invalid value for operating hours counter or universal counter			
Invalid value for energy counter			
Invalid settings for the Power Monitoring Device			
Invalid settings for the limit values			
Voltage out of range	Maintenance requirement is medium	16#68	16#0020_0000
Current out of range			
Maximum pulse rate exceeded			
Simulation (QSIM output parameter of the driver block is set)	Device is in simulation mode	16#60	16#0000_0400

3.1.9 Start-up characteristics

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

3.1.10 Block parameters

The as-supplied state of the block displayed in CFC is shown in the "I/O" column : I/O name **bold** = I/O is visible, normal = I/O is invisible.

I/O (parameter)	Comment	Data type	Default	Type	OCM
EN_DIAG	1=Enable read diagnostic data	BOOL	FALSE	I	
MODE	Parameter OMODE of PAC32DRV	WORD	0	I	
LADDR	Logical address of module	INT	0	I	
DADDR	Diagnostic address of module	INT	0	I	
DPA_LINK	Device connection: 0= DP-MASTER, 1=DP/PA-LINK	BOOL	FALSE	I	
SUBN_TYP	1=External DP-Interface	BOOL	FALSE	I	
SUBN1_ID	ID of Primary Subnet	BYTE	16#FF	I	
SUBN2_ID	ID of Redundant Subnet	BYTE	16#FF	I	
RACK_NO	Rack number	BYTE	16#00	I	
RACKF	1=Rack Failure	BOOL	FALSE	I	
SUBN1ERR	1=Slave 1 Failure	BOOL	FALSE	I	
SUBN2ERR	1=Slave 2 Failure	BOOL	FALSE	I	
SIM_ON	1=Activate simulation	BOOL	FALSE	I	
ACC_ID	1=Accept new Mode settings	BOOL	TRUE	IO	
QERR	1=Error	BOOL	FALSE	O	
QMODF	1=Module Failure	BOOL	FALSE	O	
QRACKF	1=Rack Failure	BOOL	FALSE	O	
RACK1ERR	1=DP slave system failure (primary)	BOOL	FALSE	O	
RACK2ERR	1=DP slave system failure (redundant)	BOOL	FALSE	O	
QUALITY	Quality code of process value	BYTE	0	O	
OMODE	Status MODE	DWORD	0	O	
PA_DIAG	Diagnostic information for maintenance	DWORD	0	O	
QDIAG_INF	Diagnostic information	UDT_DIAG _PAC3200		O	

Structure of OMODE

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

Structure of UDT_DIAG_PAC3200

Byte, bit	Meaning
Byte 0, bit 0	Internal communication not ready
Byte 0, bit 1	Internal communication is faulty
Byte 0, bit 2	Data invalid (CRC error)
Byte 0, bit 3	Data invalid (frame error)
Byte 0, bit 4	Data invalid (timeout)
Byte 0, bit 5	Firmware PAC,Module incompatible
Byte 0, bit 6	Voltage out of range
Byte 0, bit 7	Current out of range
Byte 1, bit 0	Maximum pulse rate exceeded
Byte 1, bit 1	Limit Violations
Byte 1, bit 2	Output not remote operated
Byte 1, bit 3	Invalid value for operating hours counter or universal counter
Byte 1, bit 4	Invalid value for energy counter
Byte 1, bit 5	Invalid settings for the Power Monitoring Device
Byte 1, bit 6	Invalid settings for the limit values
Byte 1, bit 7	Spare

3.2 PAC32DRV driver block

FB1081

3.2.1 Calling OBs

The OB watchdog interrupt in which the block is installed (e.g. OB32). Also in OB100 (performed automatically in CFC, see start-up characteristics).

3.2.2 Called blocks

The block calls the following blocks:

SFB35	ALARM_8P
SFB52	RDREC
SFC6	RD_SINFO
SFC20	BLKMOV

3.2.3 Function

The PAC32DRV block is used for measured value acquisition and it forms the interface to the OS.

Measured value acquisition

The block reads measured values from the cyclic process image.

When PAC3200 is directly connected to the DP master system, the block also reads data records 72, 73, 74, 76 and 205 with the system function block RDREC (SFB52). Data records 72, 73, 74 and 76 contain the maximum and minimum values for current, voltage, power or power factor and the maximum values for THD-R voltage or THD-R current. Data record 205 contains all the tariffs for energy.

The data records are read in a defined cycle. The interval in which the data records can be read can be set using the input parameter CYCLE_T in seconds. The default setting is 60 seconds. A cycle of 0 seconds or less means that no data records will be read.

Input EN_RDWR can also be used to deactivate the reading of data records (EN_RDWR=0).

Resetting of measured values

The block can transfer three commands to PAC3200 via the cyclic process image. The commands are detected on a rising edge transition of PAC3200 and executed.

The three commands are: reset the minimum values (parameter RESMINVAL = 1), reset the maximum values (parameter RESMAXVAL = 1) and reset the energy counters (parameter RESENERGY = 1).

The parameters RESMINVAL, RESMAXVAL and RESENERGY are reset 10 seconds after the command has been output.

Parameterization of star or delta connection

Input parameter STRDLTCH indicates whether the voltage for star or delta connection is displayed in the faceplate.

STRDLTCH = 0 indicates star connection, STRDLTCH = 1 indicates delta connection. The default setting is star connection.

3.2.4 Message behavior

PAC32DRV issues the following messages:

Message block	Message number	Block parameter	Message text	Message class
MSG_EVID1	1	QAH_L1CUR	Alarm high: Current L1	AH
	2	QAL_L1CUR	Alarm low: Current L1	AL
	3	QWH_L1CUR	Warning high: Current L1	WH
	4	QWL_L1CUR	Warning low: Current L1	WL
	5	QAH_L2CUR	Alarm high: Current L2	AH
	6	QAL_L2CUR	Alarm low: Current L2	AL
	7	QWH_L2CUR	Warning high: Current L2	WH
	8	QWL_L2CUR	Warning low: Current L2	WL
MSG_EVID2	1	QAH_L3CUR	Alarm high: Current L3	AH
	2	QAL_L3CUR	Alarm low: Current L3	AL
	3	QWH_L3CUR	Warning high: Current L3	WH
	4	QWL_L3CUR	Warning low: Current L3	WL
	5	QAH_L1VOLT	Alarm high: Voltage L1	AH
	6	QAL_L1VOLT	Alarm low: Voltage L1	AL
	7	QWH_L1VOLT	Warning high: Voltage L1	WH
	8	QWL_L1VOLT	Warning low: Voltage L1	WL
MSG_EVID3	1	QAH_L2VOLT	Alarm high: Voltage L2	AH
	2	QAL_L2VOLT	Alarm low: Voltage L2	AL
	3	QWH_L2VOLT	Warning high: Voltage L2	WH
	4	QWL_L2VOLT	Warning low: Voltage L2	WL
	5	QAH_L3VOLT	Alarm high: Voltage L3	AH
	6	QAL_L3VOLT	Alarm low: Voltage L3	AL
	7	QWH_L3VOLT	Warning high: Voltage L3	WH
	8	QWL_L3VOLT	Warning low: Voltage L3	WL
MSG_EVID4	1	QAH_L12VOLT	Alarm high: Voltage L1 – L2	AH
	2	QAL_L12VOLT	Alarm low: Voltage L1 – L2	AL
	3	QWH_L12VOLT	Warning high: Voltage L1 – L2	WH
	4	QWL_L12VOLT	Warning low: Voltage L1 – L2	WL
	5	QAH_L23VOLT	Alarm high: Voltage L2 – L3	AH
	6	QAL_L23VOLT	Alarm low: Voltage L2 – L3	AL
	7	QWH_L23VOLT	Warning high: Voltage L2 – L3	WH
	8	QWL_L23VOLT	Warning low: Voltage L2 – L3	WL
MSG_EVID5	1	QAH_L31VOLT	Alarm high: Voltage L3 – L1	AH
	2	QAL_L31VOLT	Alarm low: Voltage L3 – L1	AL
	3	QWH_L31VOLT	Warning high: Voltage L3 – L1	WH
	4	QWL_L31VOLT	Warning low: Voltage L3 – L1	WL
	5	QAH_ACPOW	Alarm high: Active power	AH
	6	QAL_ACPOW	Alarm low: Active power	AL
	7	QWH_ACPOW	Warning high: Active power	WH
	8	QWL_ACPOW	Warning low: Active power	WL

Message block	Message number	Block parameter	Message text	Message class
MSG_EVID6	1	QAH_L1POWFA	Alarm high: Power factor L1	AH
	2	QAL_L1POWFA	Alarm low: Power factor L1	AL
	3	QWH_L1POWFA	Warning high: Power factor L1	WH
	4	QWL_L1POWFA	Warning low: Power factor L1	WL
	5	QAH_L2POWFA	Alarm high: Power factor L2	AH
	6	QAL_L2POWFA	Alarm low: Power factor L2	AL
	7	QWH_L2POWFA	Warning high: Power factor L2	WH
	8	QWL_L2POWFA	Warning low: Power factor L2	WL
MSG_EVID7	1	QAH_L3POWFA	Alarm high: Power factor L3	AH
	2	QAL_L3POWFA	Alarm low: Power factor L3	AL
	3	QWH_L3POWFA	Warning high: Power factor L3	WH
	4	QWL_L3POWFA	Warning low: Power factor L3	WL
	5	QAH_CLPOWFA	Alarm high: Collective power factor	AH
	6	QAL_CLPOWFA	Alarm low: Collective power factor	AL
	7	QWH_CLPOWFA	Warning high: Collective power factor	WH
	8	QWL_CLPOWFA	Warning low: Collective power factor	WL
MSG_EVID8	1	QE_COMNRDY	Internal communication not ready	PLC pr ctrlerror
	2	QE_COMFAIL	Internal communication failed	PLC pr ctrl error
	3	QE_CRCER	Data invalid (CRC error)	PLC pr ctrl error
	4	QE_FRMER	Data invalid (Frame error)	PLC pr ctrl error
	5	QE_TIMEOUT	Data invalid (Timeout)	PLC pr ctrl error
	6	QE_FMMISMCH	Firmware PAC,Module incompatible	PLC pr ctrl error
	7	QE_VOLTOVER	Voltage out of range	PLC pr ctrl error
	8	QE_CUROVER	Current out of range	PLC pr ctrl error
MSG_EVID9	1	QE_PULSOVER	Maximum pulse rate exceeded	PLC pr ctrl error
	2	QE_LIMVIOL	Limit violations	PLC pr ctrl error
	3	QE_OUTNORE	Outputs not remote operated	PLC pr ctrl error
	4	QE_INVLWORK	Invalid value for operating hours or universal counter	PLC pr ctrl error
	5	QE_INVLENER	Invalid value. for energy counter	PLC pr ctrl error
	6	QE_INPRMMET	Invalid settings for Power Monitoring Device	PLC pr ctrl error
	7	QE_INPRMLIM	Invalid settings for limits	PLC pr ctrl error
	8	--	--	--

Auxiliary values

EV_ID	Auxiliary value	Block parameters
MSG_EVID1 - MSG_EVID9	1	BA_NA
	2	STEP_NO
	3	BA_ID
	4	AUX_PR04
	5	AUX_PR05
	6	AUX_PR06
	7	AUX_PR07
	8	AUX_PR08
	9	AUX_PR09
	10	AUX_PR10

3.2.5 Assignment of the cyclic process image

Only basic type 3 is supported.

Name	Inputs	Outputs
Digital control data		2
Device diagnostics and device status	4	
Voltage V_{a-n}	4	
Voltage V_{b-n}	4	
Voltage V_{c-n}	4	
Voltage V_{a-b}	4	
Voltage V_{b-c}	4	
Voltage V_{c-a}	4	
Current a	4	
Current b	4	
Current c	4	
Power factor a	4	
Power factor b	4	
Power factor c	4	
THD-R voltage a	4	
THD-R voltage b	4	
THD-R voltage c	4	
THD-R current a	4	
THD-R current b	4	
THD-R current c	4	
Frequency	4	
Average Current	4	
Total Apparent Power	4	
Total active power	4	
Total active power	4	
Total Power Factor	4	
Amplitude Unbalance - Voltage	4	
Amplitude Unbalance - Current	4	
Demand Period	4	
Number of bytes	112	2

3.2.6 Addressing and module driver

The I/O addresses of PAC3200 must lie completely within the process image of the CPU. In the CFC chart, the LADDR input is connected to the base address of the PAC3200 device. The O_01 output is connected to the output base address of the PAC3200 device.

Procedure: Select input -> right mouse button -> connection to operand... -> input (e.g. EW512). Select output -> right mouse button -> connection to operand... -> input (e.g. AW512). Then the module driver automatically installs all required driver blocks.

If PAC3200 is directly connected to the DP master system, the module driver connects block outputs OMODE, QRACKF and QMODF to inputs MODE00, QRACKF and MODF of block MOD_PAX0 and the module driver connects input DIAG_INF to output QDIAG_INF of diagnostics block PAC32DIA. The QSIM block output is connected to input SIM_ON of diagnostics block PAC32DIA by the module driver.

In the case of operation following a Y-link DPV1, the module driver connects block inputs MODE, RACKF and DIAG_INF to outputs OMODE, QRACKF and QDIAG_INF of diagnostics block PAC32DIA. The QSIM block output is connected to input SIM_ON of diagnostics block PAC32DIA by the module driver.

In the case of operation following a Y-link DPV0, the module driver connects block inputs MODE and RACKF to outputs OMODE00 and QRACKF of diagnostics block PADP_L00.

The block input BASADR is parameterized with the logical base address of the PAC3200 device by the module driver.

The input DPA_LINK is parameterized with the connection mode of the PAC3200 device by the module driver.

- DPA_LINK = 0 → Directly connected to the DP master
- DPA_LINK = 1 → Connected following a DP/PA link

3.2.7 Simulation

Block input SIM_ON is used to switch driver block PAC32DRV to simulation mode. In simulation mode, measured values are not read from the PAC3200 device, neither through the cyclic process image nor from a data record.

Instead of this, the following inputs are used as simulated measured values:

I/O (parameter)	Meaning	Data type	Default	Type	OCM
SIM_CUR	Simulated current value	REAL	300.0	I	
SIM_VOLT	Simulated voltage value	REAL	400.0	I	
SIM_POW	Simulated power value	REAL	600.0	I	
SIM_POWFAC	Simulated power factor value	REAL	0.85	I	
SIM_DW1ENER	Simulated DWORD 1 energy value	DWORD	0	I	
SIM_DW2ENER	Simulated DWORD 2 energy value	DWORD	0	I	

The following default values are used for all other measured values, maximum values or minimum values:

Measured value	**Default value**
Device diagnostics and device status	0
Minimum current	0
Maximum current	100
Minimum voltage (delta connection)	0
Maximum voltage (delta connection)	430
Minimum voltage (star connection)	0
Maximum voltage (star connection)	260
Minimum power	0
Maximum power	600
Minimum power factor	0.7
Maximum power factor	0.9
Amplitude Unbalance - Voltage	0.1
Amplitude Unbalance - Current	0.1
THD-R current	2.5
THD-R voltage	2.5
Maximum THD-R current	5.0
Maximum THD-R voltage	5.0
Demand Period	0

3.2.8 Processing the diagnostics data of the PAC3200 device

If PAC3200 is directly connected to the DP master system, the block processes the diagnostic information that is supplied to it from diagnostics block PAC32DIA via the input DIAG_INF.

When PAC3200 is connected following a Y-link, the driver block evaluates the device diagnostics and device status from the process image of the inputs.

3.2.9 Start-up characteristics

On starting, messages are deactivated (OB100).

3.2.10 Block parameters

The as-supplied state of the block displayed in CFC is shown in the "I/O" column : I/O name **bold** = I/O is visible, normal = I/O is invisible.

I/O (parameter)	**Comment**	**Data type**	**Default**	**Type**	**OCM**
MODE	Parameter OMODE of PAC32DIA	DWORD	16#8000FFFF	I	
LADDR	Base Adress of PAC3200 Module	WORD	0	I	
BASADR	Base Adress of PAC3200 Module	INT	0	I	
RACKF	1=Rack Failure	BOOL	FALSE	I	
DIAG_INF	Diagnostic information of PAC32DRV	UDT_DIAG _PAC3200		I	
DPA_LINK	Device connection: 0= DP-MASTER, 1=DP/PA-LINK	BOOL	FALSE	I	x
SIM_ON	1=Activate simulation	BOOL	FALSE	I	
SIM_CUR	Simulation value current	REAL	300.0	I	
SIM_VOLT	Simulation value voltage	REAL	400.0	I	

I/O (parameter)	Comment	Data type	Default	Type	OCM
SIM_POW	Simulation value power	REAL	600.0	I	
SIM_POWFAC	Simulation value power factor	REAL	0.85	I	
SIM_DW1ENER	Simulation value energy DWORD 1	DWORD	0	I	
SIM_DW2ENER	Simulation value energy DWORD 2	DWORD	0	I	
STRDLTCH	1=Delta connection	BOOL	FALSE	I	x
UNITVOLT	Voltage unit	BYTE	0	I	x
UNITACPOW	Active power unit	BYTE	0	I	x
UNITAPPOW	Apparent power unit	BYTE	0	I	x
UNITREPOW	Reactive power unit	BYTE	0	I	x
UNITACENER	Active energy unit	BYTE	0	I	x
UNITAPENER	Apparent energy unit	BYTE	0	I	x
UNITREENER	Reactive energy unit	BYTE	0	I	x
SAMPLE_T	Sample Time [s]	REAL	0.1	I	
CYCLE_T	Cycle time of cyclic reading of DRs [s]	REAL	60.0	I	x
RUNUPCYC	Lag: Number of Run Up Cycles	INT	10	I	
MSG_EVID1	Message ID message block 1	DWORD	0	I	
MSG_EVID2	Message ID message block 2	DWORD	0	I	
MSG_EVID3	Message ID message block 3	DWORD	0	I	
MSG_EVID4	Message ID message block 4	DWORD	0	I	
MSG_EVID5	Message ID message block 5	DWORD	0	I	
MSG_EVID6	Message ID message block 6	DWORD	0	I	
MSG_EVID7	Message ID message block 7	DWORD	0	I	
MSG_EVID8	Message ID message block 8	DWORD	0	I	
MSG_EVID9	Message ID message block 9	DWORD	0	I	
EN_RDWR	1=Enable read / write record	BOOL	TRUE	I	
MSG_LOCK	1=Messages locked	BOOL	FALSE	I	x
BA_EN	Batch Enable	BOOL	FALSE	I	x
OCCUPIED	Occupied by Batch	BOOL	FALSE	I	x
BA_ID	Batch ID	DWORD	0	I	x
BA_NA	Batch Name	STRING[32]		I	x
STEP_NO	Batch Step Number	DWORD	0	I	x
CUR_HL	Current high limit	REAL	0.0	I	x
CUR_HW	Current high warning	REAL	0.0	I	x
CUR_LW	Current low warning	REAL	0.0	I	x
CUR_LL	Current low limit	REAL	0.0	I	x
CUR_HLHS	Current high limit hysteresis	REAL	0.0	I	x
CUR_LLHS	Current low limit hysteresis	REAL	0.0	I	x
VOLT_HL	Voltage high limit	REAL	0.0	I	x
VOLT_HW	Voltage high warning	REAL	0.0	I	x
VOLT_LW	Voltage low warning	REAL	0.0	I	x
VOLT_LL	Voltage low limit	REAL	0.0	I	x
VOLT_HLHS	Voltage high limit hysteresis	REAL	0.0	I	x
VOLT_LLHS	Voltage low limit hysteresis	REAL	0.0	I	x
POWFA_HL	Power factor high limit	REAL	0.0	I	x
POWFA_HW	Power factor high warning	REAL	0.0	I	x
POWFA_LW	Power factor low warning	REAL	0.0	I	x
POWFA_LL	Power factor low limit	REAL	0.0	I	x
POWFA_HLHS	Power factor high limit hysteresis	REAL	0.0	I	x
POWFA_LLHS	Power factor low limit hysteresis	REAL	0.0	I	x

I/O (parameter)	Comment	Data type	Default	Type	OCM
POW_HL	Power high limit	REAL	0.0	I	x
POW_HW	Power high warning	REAL	0.0	I	x
POW_LW	Power low warning	REAL	0.0	I	x
POW_LL	Power low limit	REAL	0.0	I	x
POW_HLHS	Power high limit hysteresis	REAL	0.0	I	x
POW_LLHS	Power low limit hysteresis	REAL	0.0	I	x
RESMINVAL	1=Reset min. values	BOOL	FALSE	IO	x
RESMAXVAL	1=Reset max. values	BOOL	FALSE	IO	x
RESENERGY	1=Reset energy counters	BOOL	FALSE	IO	x
AUX_PR04	Auxiliary Value 04	ANY		IO	
AUX_PR05	Auxiliary Value 05	ANY		IO	
AUX_PR06	Auxiliary Value 06	ANY		IO	
AUX_PR07	Auxiliary Value 07	ANY		IO	
AUX_PR08	Auxiliary Value 08	ANY		IO	
AUX_PR09	Auxiliary Value 09	ANY		IO	
AUX_PR10	Auxiliary Value 10	ANY		IO	
QERR	1=Error	BOOL	FALSE	O	x
QBAD	1=Bad process value	BOOL	FALSE	O	x
QSIM	1=Simulation active	BOOL	FALSE	O	x
QAH_L1CUR	1=Alarm high: Current L1	BOOL	FALSE	O	
QAL_L1CUR	1=Alarm low: Current L1	BOOL	FALSE	O	
QWH_L1CUR	1=Warning high: Current L1	BOOL	FALSE	O	
QWL_L1CUR	1=Warning low: Current L1	BOOL	FALSE	O	
QAH_L2CUR	1=Alarm high: Current L2	BOOL	FALSE	O	
QAL_L2CUR	1=Alarm low: Current L2	BOOL	FALSE	O	
QWH_L2CUR	1=Warning high: Current L2	BOOL	FALSE	O	
QWL_L2CUR	1=Warning low: Current L2	BOOL	FALSE	O	
QAH_L3CUR	1=Alarm high: Current L3	BOOL	FALSE	O	
QAL_L3CUR	1=Alarm low: Current L3	BOOL	FALSE	O	
QWH_L3CUR	1=Warning high: Current L3	BOOL	FALSE	O	
QWL_L3CUR	1=Warning low: Current L3	BOOL	FALSE	O	
QAH_L1VOLT	1=Alarm high: Voltage L1	BOOL	FALSE	O	
QAL_L1VOLT	1=Alarm low: Voltage L1	BOOL	FALSE	O	
QWH_L1VOLT	1=Warning high: Voltage L1	BOOL	FALSE	O	
QWL_L1VOLT	1=Warning low: Voltage L1	BOOL	FALSE	O	
QAH_L2VOLT	1=Alarm high: Voltage L2	BOOL	FALSE	O	
QAL_L2VOLT	1=Alarm low: Voltage L2	BOOL	FALSE	O	
QWH_L2VOLT	1=Warning high: Voltage L2	BOOL	FALSE	O	
QWL_L2VOLT	1=Warning low: Voltage L2	BOOL	FALSE	O	
QAH_L3VOLT	1=Alarm high: Voltage L3	BOOL	FALSE	O	
QAL_L3VOLT	1=Alarm low: Voltage L3	BOOL	FALSE	O	
QWH_L3VOLT	1=Warning high: Voltage L3	BOOL	FALSE	O	
QWL_L3VOLT	1=Warning low: Voltage L3	BOOL	FALSE	O	
QAH_L12VOLT	1=Alarm high: Voltage L1 – L2	BOOL	FALSE	O	
QAL_L12VOLT	1=Alarm low: Voltage L1 – L2	BOOL	FALSE	O	
QWH_L12VOLT	1=Warning high: Voltage L1 – L2	BOOL	FALSE	O	
QWL_L12VOLT	1=Warning low: Voltage L1 – L2	BOOL	FALSE	O	
QAH_L23VOLT	1=Alarm high: Voltage L2 – L3	BOOL	FALSE	O	
QAL_L23VOLT	1=Alarm low: Voltage L2 – L3	BOOL	FALSE	O	
QWH_L23VOLT	1=Warning high: Voltage L2 – L3	BOOL	FALSE	O	
QWL_L23VOLT	1=Warning low: Voltage L2 – L3	BOOL	FALSE	O	
QAH_L31VOLT	1=Alarm high: Voltage L3 – L1	BOOL	FALSE	O	

I/O (parameter)	Comment	Data type	Default	Type	OCM
QAL_L31VOLT	1=Alarm low: Voltage L3 – L1	BOOL	FALSE	O	
QWH_L31VOLT	1=Warning high: Voltage L3 – L1	BOOL	FALSE	O	
QWL_L31VOLT	1=Warning low: Voltage L3 – L1	BOOL	FALSE	O	
QAH_ACPOW	1=Alarm high: Active power	BOOL	FALSE	O	
QAL_ACPOW	1=Alarm low: Active power	BOOL	FALSE	O	
QWH_ACPOW	1=Warning high: Active power	BOOL	FALSE	O	
QWL_ACPOW	1=Warning low: Active power	BOOL	FALSE	O	
QAH_L1POWFA	1=Alarm high: Power factor L1	BOOL	FALSE	O	
QAL_L1POWFA	1=Alarm low: Power factor L1	BOOL	FALSE	O	
QWH_L1POWFA	1=Warning high: Power factor L1	BOOL	FALSE	O	
QWL_L1POWFA	1=Warning low: Power factor L1	BOOL	FALSE	O	
QAH_L2POWFA	1=Alarm high: Power factor L2	BOOL	FALSE	O	
QAL_L2POWFA	1=Alarm low: Power factor L2	BOOL	FALSE	O	
QWH_L2POWFA	1=Warning high: Power factor L2	BOOL	FALSE	O	
QWL_L2POWFA	1=Warning low: Power factor L2	BOOL	FALSE	O	
QAH_L3POWFA	1=Alarm high: Power factor L3	BOOL	FALSE	O	
QAL_L3POWFA	1=Alarm low: Power factor L3	BOOL	FALSE	O	
QWH_L3POWFA	1=Warning high: Power factor L3	BOOL	FALSE	O	
QWL_L3POWFA	1=Warning low: Power factor L3	BOOL	FALSE	O	
QAH_CLPOWFA	1=Alarm high: Collective power factor	BOOL	FALSE	O	
QAL_CLPOWFA	1=Alarm low: Collective power factor	BOOL	FALSE	O	
QWH_CLPOWFA	1=Warning high: Collective power factor	BOOL	FALSE	O	
QWL_CLPOWFA	1=Warning low: Collective power factor	BOOL	FALSE	O	
QE_COMNRDY	1=Communication with PAC not ready	BOOL	FALSE	O	x
QE_COMFAIL	1=Communication with PAC failed	BOOL	FALSE	O	x
QE_CRCER	1=Data invalid (CRC error)	BOOL	FALSE	O	x
QE_FRMER	1=Data invalid (Frame error)	BOOL	FALSE	O	x
QE_TIMEOUT	1=Data invalid (Timeout)	BOOL	FALSE	O	x
QE_FMMISMCH	1=Firmware mismatch	BOOL	FALSE	O	x
QE_VOLTOVER	1=Voltage overload	BOOL	FALSE	O	x
QE_CUROVER	1=Current overload	BOOL	FALSE	O	x
QE_PULSOVER	1=Pulse output overload	BOOL	FALSE	O	x
QE_LIMVIOL	1=Limit violations	BOOL	FALSE	O	x
QE_OUTNORE	1=Outputs not remote operated	BOOL	FALSE	O	x
QE_INVLWORK	1=Invalid value for work/configurable counter	BOOL	FALSE	O	x
QE_INVLENER	1=Invalid value for energy counter	BOOL	FALSE	O	x
QE_INPRMMET	1=Invalid parameter value for metering function	BOOL	FALSE	O	x
QE_INPRMLIM	1=Invalid parameter value for limit violations	BOOL	FALSE	O	x
QMSG_ERR	1=Message Error	BOOL	FALSE	O	
QMSG_SUP	1=Message Suppression Active	BOOL	FALSE	O	x
MSG_STAT1	Message block 1: STATUS Output	WORD	0	O	

I/O (parameter)	Comment	Data type	Default	Type	OCM
MSG_STAT2	Message block 2: STATUS Output	WORD	0	O	
MSG_STAT3	Message block 3: STATUS Output	WORD	0	O	
MSG_STAT4	Message block 4: STATUS Output	WORD	0	O	
MSG_STAT5	Message block 5: STATUS Output	WORD	0	O	
MSG_STAT6	Message block 6: STATUS Output	WORD	0	O	
MSG_STAT7	Message block 7: STATUS Output	WORD	0	O	
MSG_STAT8	Message block 8: STATUS Output	WORD	0	O	
MSG_STAT9	Message block 9: STATUS Output	WORD	0	O	
MSG_ACK1	Message block 1: ACK_STATE Output	WORD	0	O	
MSG_ACK2	Message block 2: ACK_STATE Output	WORD	0	O	
MSG_ACK3	Message block 3: ACK_STATE Output	WORD	0	O	
MSG_ACK4	Message block 4: ACK_STATE Output	WORD	0	O	
MSG_ACK5	Message block 5: ACK_STATE Output	WORD	0	O	
MSG_ACK6	Message block 6: ACK_STATE Output	WORD	0	O	
MSG_ACK7	Message block 7: ACK_STATE Output	WORD	0	O	
MSG_ACK8	Message block 8: ACK_STATE Output	WORD	0	O	
MSG_ACK9	Message block 9: ACK_STATE Output	WORD	0	O	
L1CUR_LID	Current L1 limit id	WORD	16#FFFF	O	x
L2CUR_LID	Current L2 limit id	WORD	16#FFFF	O	x
L3CUR_LID	Current L3 limit id	WORD	16#FFFF	O	x
L1VOLT_LID	Voltage L1 limit id	WORD	16#FFFF	O	x
L2VOLT_LID	Voltage L2 limit id	WORD	16#FFFF	O	x
L3VOLT_LID	Voltage L3 limit id	WORD	16#FFFF	O	x
ACPOW_LID	Active power limit id	WORD	16#FFFF	O	x
L1POWFA_LID	Power factor L1 limit id	WORD	16#FFFF	O	x
L2POWFA_LID	Power factor L2 limit id	WORD	16#FFFF	O	x
L3POWFA_LID	Power factor L3 limit id	WORD	16#FFFF	O	x
CLPOWFA_LID	Collective power factor limit id	WORD	16#FFFF	O	x
QUALITY	Quality Code of process value	BYTE	0	O	
O_01	Control Bytes DP 0.0-1.7	WORD	0	O	
MINVALDATE	Last min. values reset date	STRING[10]		O	x
MINVALTIME	Last min. values reset time	STRING[8]		O	x
MAXVALDATE	Last max. values reset date	STRING[10]		O	x
MAXVALTIME	Last max. values reset time	STRING[8]		O	x
ENERGYDATE	Last energy counters reset date	STRING[10]		O	x
ENERGYTIME	Last energy counters reset time	STRING[8]		O	x

I/O (parameter)	Comment	Data type	Default	Type	OCM
STATDIAG	Device Diagnostics and Status	DWORD		O	x
L1VOLT	Voltage PH-N L1	REAL		O	x
L2VOLT	Voltage PH-N L2	REAL		O	x
L3VOLT	Voltage PH-N L3	REAL		O	x
L12VOLT	Voltage PH-PH L1-L2	REAL		O	x
L23VOLT	Voltage PH-PH L2-L3	REAL		O	x
L31VOLT	Voltage PH-PH L3-L1	REAL		O	x
L1CUR	Current L1	REAL		O	x
L2CUR	Current L2	REAL		O	x
L3CUR	Current L3	REAL		O	x
L1POWFA	Power factor L1	REAL		O	x
L2POWFA	Power factor L2	REAL		O	x
L3POWFA	Power factor L3	REAL		O	x
L1TCUR	THD-R current L1	REAL		O	x
L2TCUR	THD-R current L2	REAL		O	x
L3TCUR	THD-R current L3	REAL		O	x
L1TVOLT	THD-R voltage L1	REAL		O	x
L2TVOLT	THD-R voltage L2	REAL		O	x
L3TVOLT	THD-R voltage L3	REAL		O	x
FREQUENCY	Frequency	REAL		O	x
AVGCUR	Average current	REAL		O	x
CLAPPOW	Collective apparent power	REAL		O	x
CLACPOW	Collective active power	REAL		O	x
CLREPOW	Collective reactive power	REAL		O	x
CLPOWFA	Collective Power Factor	REAL		O	x
AMPUVOLT	Amplitude unbalance voltage	REAL		O	x
AMPUCUR	Amplitude unbalance vurrent	REAL		O	x
RLPPL	Real load profile period length	REAL		O	x
MAXL1CUR	Max. current L1	REAL		O	x
MAXL2CUR	Max. current L2	REAL		O	x
MAXL3CUR	Max. current L3	REAL		O	x
MINL1CUR	Min. current L1	REAL		O	x
MINL2CUR	Min. current L2	REAL		O	x
MINL3CUR	Min. current L3	REAL		O	x
MAXL1VOLT	Max. voltage PH-N L1	REAL		O	x
MAXL2VOLT	Max. voltage PH-N L2	REAL		O	x
MAXL3VOLT	Max. voltage PH-N L3	REAL		O	x
MAXL12VOLT	Max. voltage PH-PH L1-L2	REAL		O	x
MAXL23VOLT	Max. voltage PH-PH L2-L3	REAL		O	x
MAXL31VOLT	Max. voltage PH-PH L3-L1	REAL		O	x
MINL1VOLT	Min. voltage PH-N L1	REAL		O	x
MINL2VOLT	Min. voltage PH-N L2	REAL		O	x
MINL3VOLT	Min. voltage PH-N L3	REAL		O	x
MINL12VOLT	Min. voltage PH-PH L1-L2	REAL		O	x
MINL23VOLT	Min. voltage PH-PH L2-L3	REAL		O	x
MINL31VOLT	Min. voltage PH-PH L3-L1	REAL		O	x
MAXL1POWFA	Max. power factor L1	REAL		O	x
MAXL2POWFA	Max. power factor L2	REAL		O	x
MAXL3POWFA	Max. power factor L3	REAL		O	x
MAXCLAPPOW	Max. collective apparent power	REAL		O	x
MAXCLACPOW	Max. collective active power	REAL		O	x
MAXCLREPOW	Max. collective reactive power	REAL		O	x

I/O (parameter)	Comment	Data type	Default	Type	OCM
MINL1POWFA	Min. power factor L1	REAL		O	x
MINL2POWFA	Min. power factor L2	REAL		O	x
MINL3POWFA	Min. power factor L3	REAL		O	x
MINCLAPPOW	Min. collective apparent power	REAL		O	x
MINCLACPOW	Min. collective active power	REAL		O	x
MINCLREPOW	Min. collective reactive power	REAL		O	x
MAXL1TVOLT	Max. THD-R voltage L1	REAL		O	x
MAXL2TVOLT	Max. THD-R voltage L2	REAL		O	x
MAXL3TVOLT	Max. THD-R voltage L3	REAL		O	x
MAXL1TCUR	Max. THD-R current L1	REAL		O	x
MAXL2TCUR	Max. THD-R current L2	REAL		O	x
MAXL3TCUR	Max. THD-R current L3	REAL		O	x
AEIT1DW1	Active energy import tariff 1 DWORD1	DWORD		O	x
AEIT1DW2	Active energy import tariff 1 DWORD2	DWORD		O	x
AEIT2DW1	Active energy import tariff 2 DWORD1	DWORD		O	x
AEIT2DW2	Active energy import tariff 2 DWORD2	DWORD		O	x
AEET1DW1	Active energy export tariff 1 DWORD1	DWORD		O	x
AEET1DW2	Active energy export tariff 1 DWORD2	DWORD		O	x
AEET2DW1	Active energy export tariff 2 DWORD1	DWORD		O	x
AEET2DW2	Active energy export tariff 2 DWORD2	DWORD		O	x
REIT1DW1	Reactive energy import tariff 1 DWORD1	DWORD		O	x
REIT1DW2	Reactive energy import tariff 1 DWORD2	DWORD		O	x
REIT2DW1	Reactive energy import tariff 2 DWORD1	DWORD		O	x
REIT2DW2	Reactive energy import tariff 2 DWORD2	DWORD		O	x
REET1DW1	Reactive energy export tariff 1 DWORD1	DWORD		O	x
REET1DW2	Reactive energy export tariff 1 DWORD2	DWORD		O	x
REET2DW1	Reactive energy export tariff 2 DWORD1	DWORD		O	x
REET2DW2	Reactive energy export tariff 2 DWORD2	DWORD		O	x
AET1DW1	Apparent energy tariff 1 DWORD1	DWORD		O	x
AET1DW2	Apparent energy tariff 1 DWORD2	DWORD		O	x
AET2DW1	Apparent energy tariff 2 DWORD1	DWORD		O	x
AET2DW2	Apparent energy tariff 2 DWORD2	DWORD		O	x

3.2.11 Assignment of block parameters to measured values

I/O (parameter)	Data type	Measured value
STATDIAG	DWORD	Device diagnostics and device status
L1VOLT	REAL	Voltage V_{a-n}
L2VOLT	REAL	Voltage V_{b-n}
L3VOLT	REAL	Voltage V_{c-n}
L12VOLT	REAL	Voltage V_{a-b}
L23VOLT	REAL	Voltage V_{b-c}
L31VOLT	REAL	Voltage V_{c-a}
L1CUR	REAL	Current a
L2CUR	REAL	Current b
L3CUR	REAL	Current c
L1POWFA	REAL	Power factor a
L2POWFA	REAL	Power factor b
L3POWFA	REAL	Power factor c
L1TCUR	REAL	THD-R current a
L2TCUR	REAL	THD-R current b
L3TCUR	REAL	THD-R current c
L1TVOLT	REAL	THD-R voltage a
L2TVOLT	REAL	THD-R voltage b
L3TVOLT	REAL	THD-R voltage c
FREQUENCY	REAL	Frequency
AVGCUR	REAL	Average Current
CLAPPOW	REAL	Total Apparent Power
CLACPOW	REAL	Total active power
CLREPOW	REAL	Total active power
CLPOWFA	REAL	Total Power Factor
AMPUVOLT	REAL	Amplitude Unbalance - Voltage
AMPUCUR	REAL	Amplitude Unbalance - Current
RLPPL	REAL	Demand Period
MAXL1CUR	REAL	Maximum current a
MAXL2CUR	REAL	Maximum current b
MAXL3CUR	REAL	Maximum current c
MINL1CUR	REAL	Minimum current a
MINL2CUR	REAL	Minimum current a
MINL3CUR	REAL	Minimum current a
MAXL1VOLT	REAL	Maximum voltage V_{a-n}
MAXL2VOLT	REAL	Maximum voltage V_{b-n}
MAXL3VOLT	REAL	Maximum voltage V_{c-n}
MAXL12VOLT	REAL	Maximum voltage V_{a-b}
MAXL23VOLT	REAL	Maximum voltage V_{b-c}
MAXL31VOLT	REAL	Maximum voltage V_{c-a}
MINL1VOLT	REAL	Minimum voltage V_{a-n}
MINL2VOLT	REAL	Minimum voltage V_{b-n}
MINL3VOLT	REAL	Minimum voltage V_{c-n}
MINL12VOLT	REAL	Minimum voltage V_{a-b}
MINL23VOLT	REAL	Minimum voltage V_{b-c}
MINL31VOLT	REAL	Minimum voltage V_{c-a}
MAXL1POWFA	REAL	Maximum power factor a
MAXL2POWFA	REAL	Maximum power factor b
MAXL3POWFA	REAL	Maximum power factor c

I/O (parameter)	Data type	Measured value
MAXCLAPPOW	REAL	Maximum total apparent power
MAXCLACPOW	REAL	Maximum total active power
MAXCLREPOW	REAL	Maximum total reactive power
MINL1POWFA	REAL	Minimum power factor a
MINL2POWFA	REAL	Minimum power factor b
MINL3POWFA	REAL	Minimum power factor c
MINCLAPPOW	REAL	Minimum total apparent power
MINCLACPOW	REAL	Minimum total active power
MINCLREPOW	REAL	Minimum total reactive power
MAXL1TVOLT	REAL	Maximum THD-R voltage a
MAXL2TVOLT	REAL	Maximum THD-R voltage b
MAXL3TVOLT	REAL	Maximum THD-R voltage c
MAXL1TCUR	REAL	Maximum THD-R current a
MAXL2TCUR	REAL	Maximum THD-R current b
MAXL3TCUR	REAL	Maximum THD-R current c
AEIT1DW1	DWORD	Active energy import tariff 1
AEIT1DW2	DWORD	
AEIT2DW1	DWORD	Active energy import tariff 2
AEIT2DW2	DWORD	
AEET1DW1	DWORD	Active Energy Export Tariff 1
AEET1DW2	DWORD	
AEET2DW1	DWORD	Active energy export tariff 2
AEET2DW2	DWORD	
REIT1DW1	DWORD	Reactive Energy Import Tariff 1
REIT1DW2	DWORD	
REIT2DW1	DWORD	Reactive energy import tariff 2
REIT2DW2	DWORD	
REET1DW1	DWORD	Reactive Energy Export Tariff 1
REET1DW2	DWORD	
REET2DW1	DWORD	Reactive energy export tariff 2
REET2DW2	DWORD	
AET1DW1	DWORD	Apparent Energy Tariff 1
AET1DW2	DWORD	
AET2DW1	DWORD	Apparent energy tariff 2
AET2DW2	DWORD	

3.2.12 Description of icons and faceplate

Block icon with 3 measured values

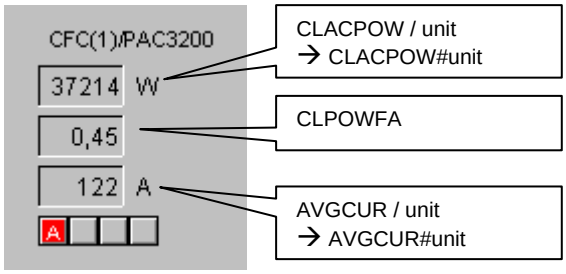


Figure 3 - 1 Icon with 3 measured values

Description of measured values

Element (parameters)	Meaning
CLACPOW	Total active power
CLPOWFA	Total Power Factor
AVGCUR	Average Current

Block symbol without measured values

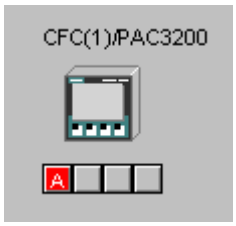


Figure 3 - 2 Icon without measured values

Faceplate

The faceplate available is described in this chapter.

The following views are available:

Standard with the tabs	Overview	STD_OVERVIEW
	Current/Voltage	STD_CURR_VOLT
	Power	STD_POWER
	Power factor	STD_POWER_FAC
	Energy	STD_WORK
	THD	STD_THD
Limits with the tabs	Current	LIMITS_CURR
	Voltage	LIMITS_VOLT
	Power	LIMITS_POWER
	Power factor	LIMITS_POWER_FAC
Units		UNITS
Maintenance		MAINTENANCE
Messages		
Trend		
Batch		

The file name is composed as follows: @PG_PAC32DRV_<view>.PDL

For the messages, trend and batch views, the displays @PCS7_PAC32DRV_alarm.pdl, @PCS7_PAC32DRV_trend.pdl and @PCS7_PAC32DRV_batch.pdl are used that are derived from the PCS 7 standard displays.

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

The appearance of the faceplates differ depending on whether the PAC3200 is connected directly to the DP master system or whether it is connected following a Y-link.

When the PAC3200 is connected following a Y-link, no data records can be read because the device following a Y-link switches to DPV0 mode. For this reason the maximum and minimum values for current, voltage, power or power factor and the maximum values for THD-R voltage or THD-R current cannot be read from the device. These measured values are therefore not indicated in the faceplates.

The faceplates in the figures below are shown for direct connection of PAC3200 to the DP master system.

In the figures, some measured values are highlighted in red or yellow. Limit violations have occurred for these measured values. Yellow indicates that a warning limit has been overshot or undershot. A measured value with a red background indicates that a limit has been overshot or undershot.

The limit values are entered in the limits view (LIMITS_xxx). A limit value with the value 0 means that this limit value is not monitored.

The unit prefixes (e.g. kW) for specific measured values can be set in the units view (UNITS). The display accuracy can be set such that it correlates with the accuracy of the measured values of the SENTRON PAC3200 Power Monitoring Device.

For each faceplate, a list of block parameters or measured values exist that is linked into the respective faceplate. If a block parameter has units, this is indicated with "/ unit". If the attribute "S7_unit" is used for the units, this is indicated by "→<parameter name>#unit". If this indication is not present, the units from the units view (UNITS) are displayed for this block parameter.

Standard – Overview tab sheet (STD_OVERVIEW) for star connection

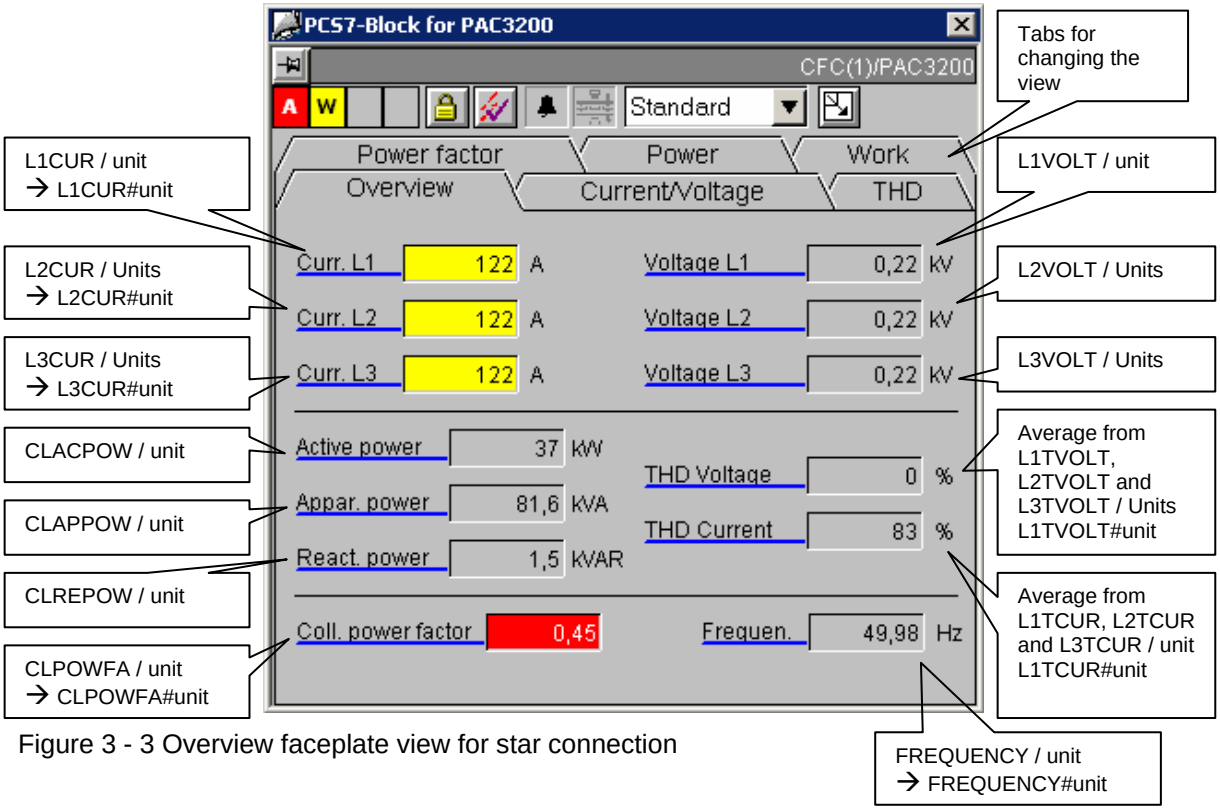


Figure 3 - 3 Overview faceplate view for star connection

Element (parameters)	Meaning	Display when PAC3200 is connected following Y-link
L1CUR	Current a	Yes
L2CUR	Current b	Yes
L3CUR	Current c	Yes
L1VOLT	Voltage V_{a-n}	Yes
L2VOLT	Voltage V_{b-n}	Yes
L3VOLT	Voltage V_{c-n}	Yes
CLACPOW	Total active power	Yes
CLAPPOW	Total Apparent Power	Yes
CLREPOW	Total Reactive Power	Yes
CLPOWFA	Total Power Factor	Yes
Average from L1TVOLT, L2TVOLT and L3TVOLT	Average from THD-R voltage a, THD-R voltage b and THD-R voltage c	Yes
Average from L1TCUR, L2TCUR and L3TCUR	Average from THD-R current a, THD-R current b and THD-R current c	Yes
FREQUENCY	Frequency	Yes

Standard – Overview tab sheet (STD_OVERVIEW) for delta connection

With the exception of the elements described here, the overview tab for delta connection corresponds to the overview tab for star connection.

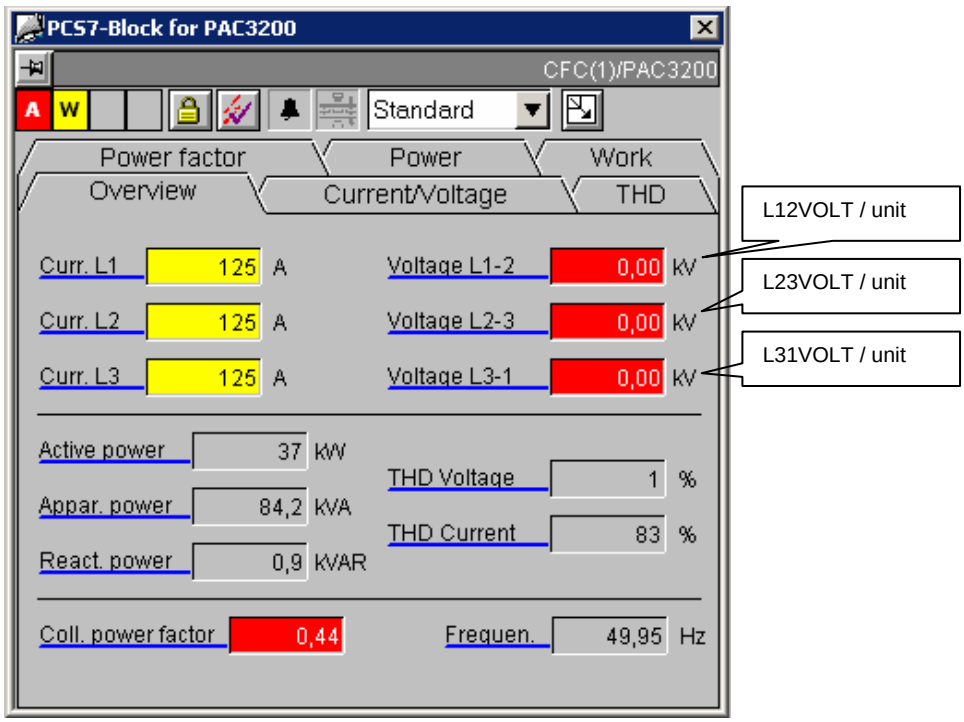


Figure 3 - 4 Overview faceplate view for delta connection

Element (parameters)	Meaning	Display when PAC3200 is connected following Y-link
L12VOLT	Voltage V_{a-b}	Yes
L23VOLT	Voltage V_{b-c}	Yes
L31VOLT	Voltage V_{c-a}	Yes

Standard – Current/voltage tab sheet (STD_CURR_VOLT) for star connection

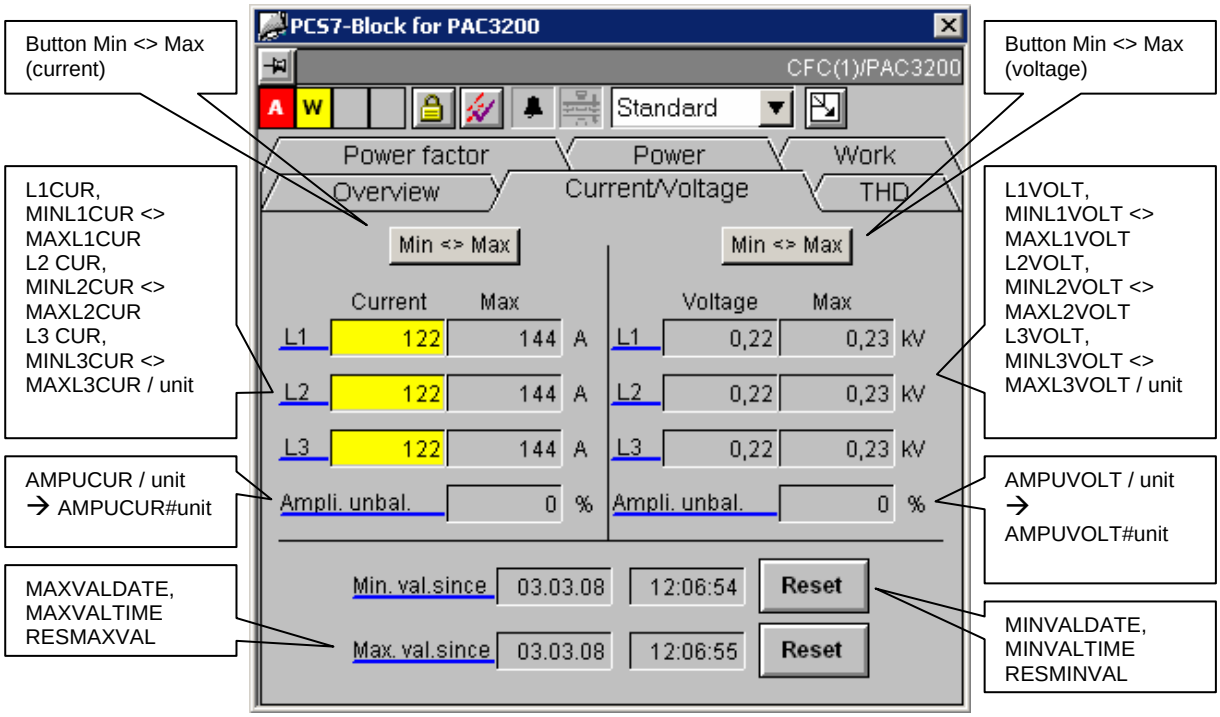


Figure 3 - 5 Current/voltage faceplate view for star connection

Element (parameters)	Meaning	Display when PAC3200 is connected following Y-link
L1CUR	Current a	Yes
L2CUR	Current b	Yes
L3CUR	Current c	Yes
Button Min <> Max (current)	Display changeover between minimum and maximum values	No
MAXL1CUR	Maximum current a	No
MAXL2CUR	Maximum current b	No
MAXL3CUR	Maximum current c	No
MINL1CUR	Minimum current a	No
MINL2CUR	Minimum current b	No
MINL3CUR	Minimum current c	No
AMPUCUR	Amplitude Unbalance - Current	Yes
L1VOLT	Voltage V_{a-n}	Yes
L2VOLT	Voltage V_{b-n}	Yes
L3VOLT	Voltage V_{c-n}	Yes
Button Min <> Max (voltage)	Display changeover between minimum and maximum values	No
MAXL1VOLT	Maximum voltage V_{a-n}	No
MAXL2VOLT	Maximum voltage V_{b-n}	No
MAXL3VOLT	Maximum voltage V_{c-n}	No
MINL1VOLT	Minimum voltage V_{a-n}	No
MINL2VOLT	Minimum voltage V_{b-n}	No

Element (parameters)	Meaning	Display when PAC3200 is connected following Y-link
MINL3VOLT	Minimum voltage V_{c-n}	No
AMPUVOLT	Amplitude unbalance - Voltage	Yes
MAXVALDATE, MAXVALTIME RESMAXVAL	Reset the maximum values and indicate the previous reset	Yes
MINVALDATE, MINVALTIME RESMINVAL	Reset the minimum values and indicate the previous reset	Yes

Standard – Current/voltage tab sheet (STD_CURR_VOLT) for delta connection

With the exception of the elements described here, the current/voltage tab for delta connection corresponds to the current/voltage tab for star connection.

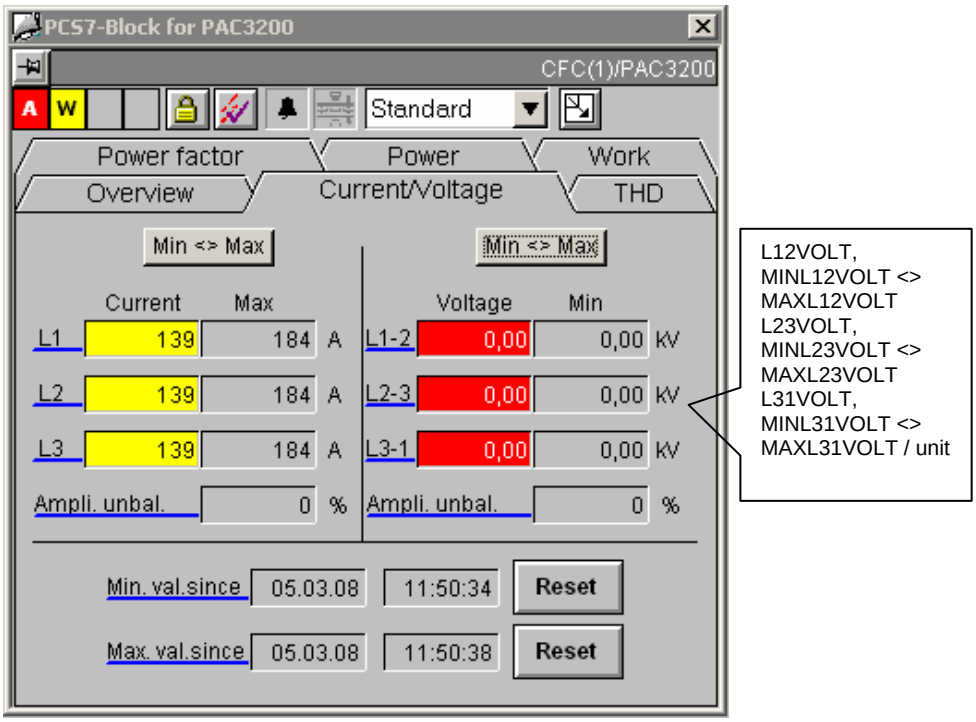


Figure 3 - 6 Current/voltage faceplate view for delta connection

Element (parameters)	Meaning	Display when PAC3200 is connected following Y-link
L12VOLT	Voltage V_{a-b}	Yes
L23VOLT	Voltage V_{b-c}	Yes
L31VOLT	Voltage V_{c-a}	Yes
MAXL12VOLT	Maximum voltage V_{a-b}	No
MAXL23VOLT	Maximum voltage V_{b-c}	No
MAXL31VOLT	Maximum voltage V_{c-a}	No

Element (parameters)	Meaning	Display when PAC3200 is connected following Y-link
MINL12VOLT	Minimum voltage V_{a-b}	No
MINL23VOLT	Minimum voltage V_{b-c}	No
MINL31VOLT	Minimum voltage V_{c-a}	No

Standard – Power tab sheet (STD_POWER)

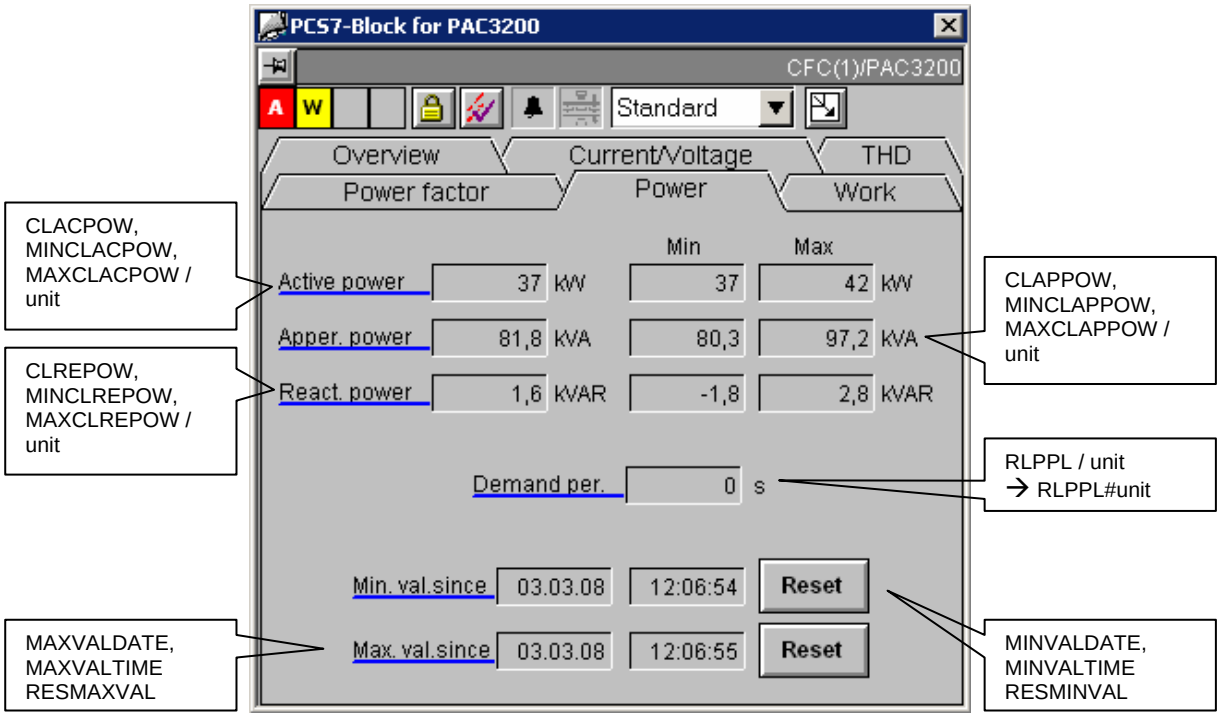


Figure 3 - 7 Power faceplate view

Element (parameters)	Meaning	Display when PAC3200 is connected following Y-link
CLACPOW	Total active power	Yes
CLAPPOW	Total apparent power	Yes
CLREPOW	Total reactive power	Yes
MAXCLACPOW	Maximum total active power	No
MAXCLAPPOW	Maximum total apparent power	No
MAXCLREPOW	Maximum total reactive power	No
MINCLACPOW	Minimum total active power	No
MINCLAPPOW	Minimum total apparent power	No
MINCLREPOW	Minimum total reactive power	No
RLPPL	Demand Period	Yes
MAXVALDATE, MAXVALTIME RESMAXVAL	Reset the maximum values and indicate the previous reset	Yes
MINVALDATE, MINVALTIME RESMINVAL	Reset the minimum values and indicate the previous reset	Yes

Standard – Power factor tab sheet (STD_POWER_FAC)

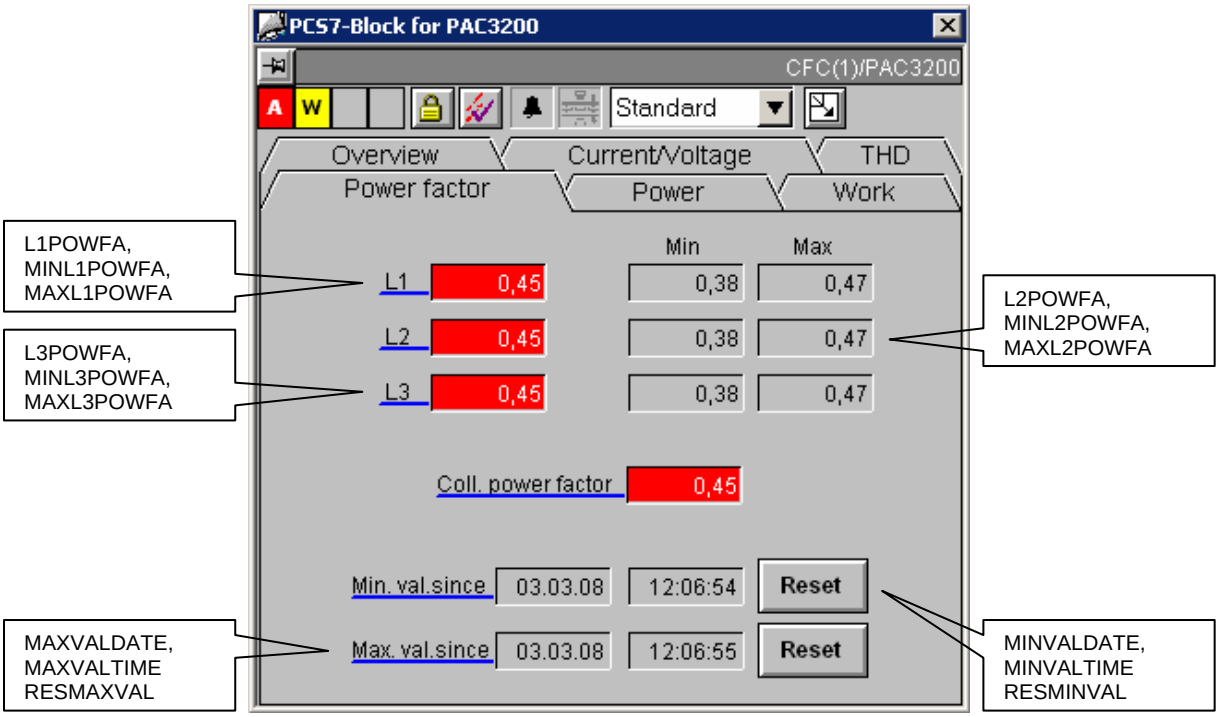


Figure 3 - 8 Power factor faceplate view

Element (parameters)	**Meaning**	**Display when PAC3200 is connected following Y-link**
L1POWFA	Power factor a	Yes
L2POWFA	Power factor b	Yes
L3POWFA	Power factor c	Yes
MAXL1POWFA	Maximum power factor a	No
MAXL2POWFA	Maximum power factor b	No
MAXL3POWFA	Maximum power factor c	No
MINL1POWFA	Minimum power factor a	No
MINL2POWFA	Minimum power factor b	No
MINL3POWFA	Minimum power factor c	No
MAXVALDATE, MAXVALTIME RESMAXVAL	Reset the maximum values and indicate the previous reset	Yes
MINVALDATE, MINVALTIME RESMINVAL	Reset the minimum values and indicate the previous reset	Yes

Standard – Work tab sheet (STD_WORK)

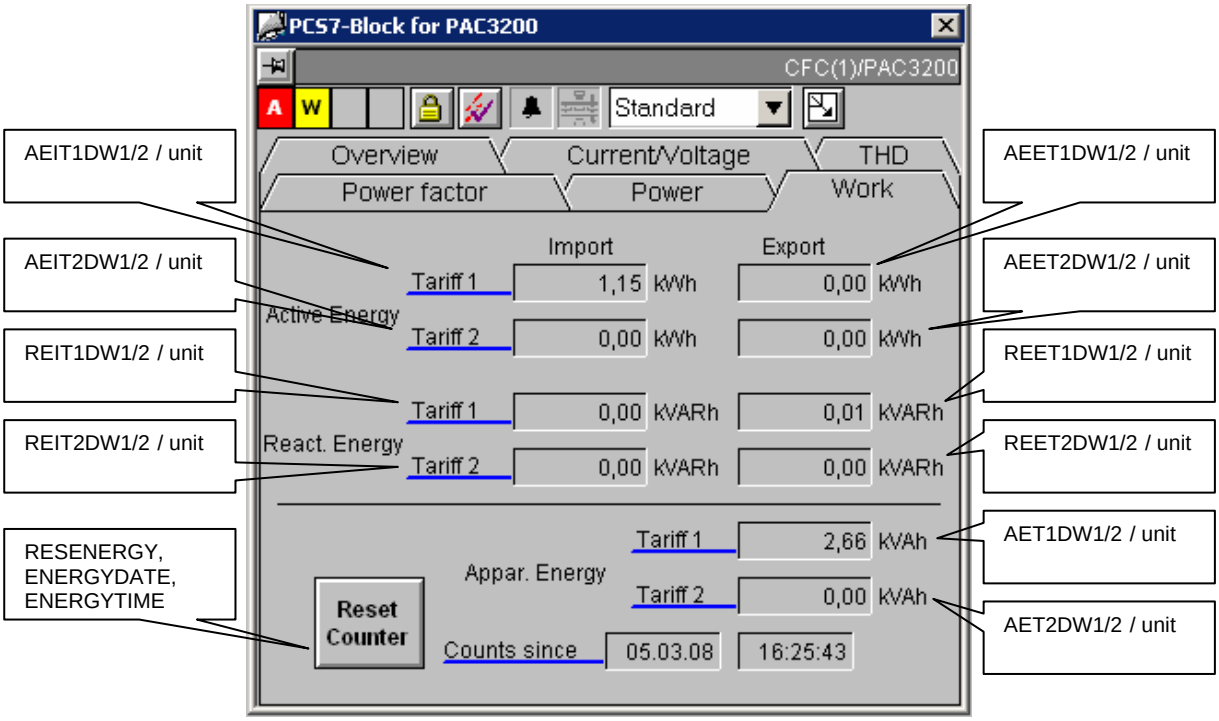


Figure 3 - 9 Work faceplate view

Element (parameters)	Meaning	Display when PAC3200 is connected following Y-link
AEIT1DW1 / AEIT1DW2	Active energy import tariff 1	No
AEIT2DW1 / AEIT2DW2	Active energy import tariff 2	No
AEET1DW1 / AEET1DW2	Active energy export tariff 1	No
AEET2DW1 / AEET2DW2	Active energy export tariff 2	No
REIT1DW1 / REIT1DW2	Reactive energy import tariff 1	No
REIT2DW1 / REIT2DW2	Reactive energy import tariff 2	No
REET1DW1 / REET1DW2	Reactive energy export tariff 1	No
REET2DW1 / REET2DW2	Reactive energy export tariff 2	No
AET1DW1 / AET1DW2	Apparent energy tariff 1	No
AET2DW1 / AET2DW2	Apparent energy tariff 2	No
RESENERGY, ENERGYDATE, ENERGYTIME	Reset the energy counters and indicate the previous reset	No

Standard – THD tab sheet (STD_THD)

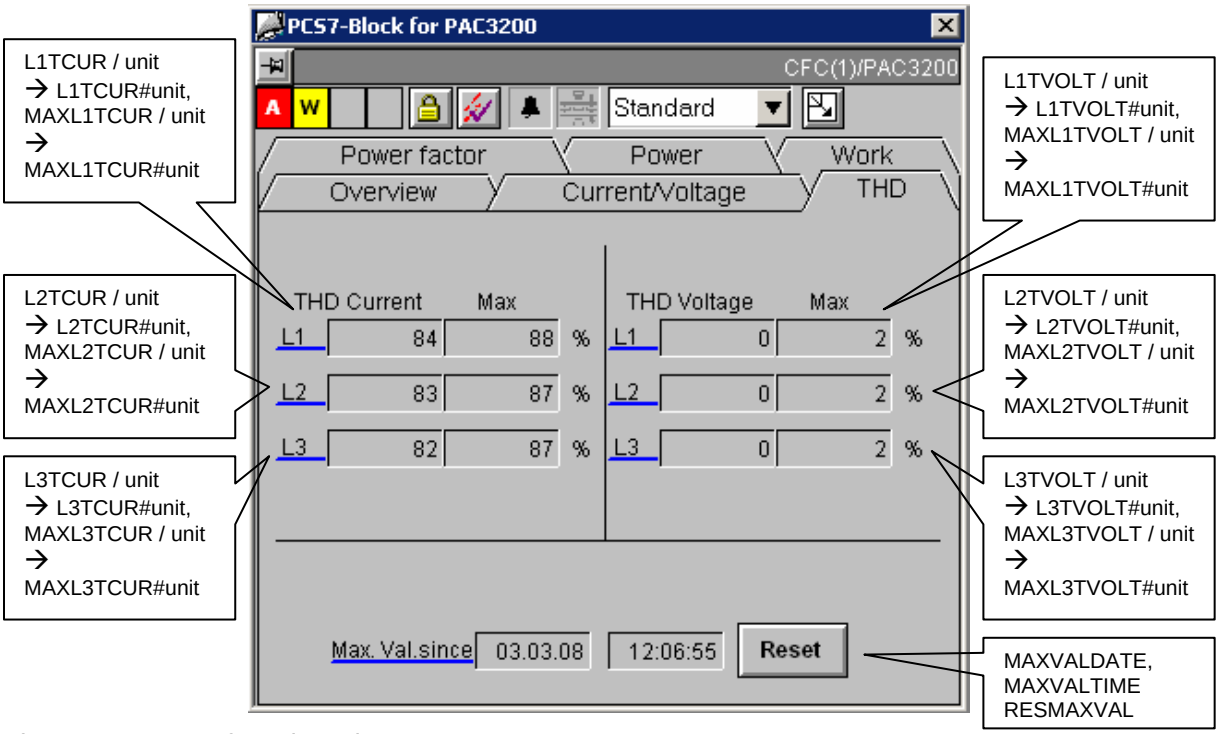


Figure 3 - 10 THD faceplate view

Element (parameters)	Meaning	Display when PAC3200 is connected following Y-link
L1TCUR	THD-R current a	Yes
L2TCUR	THD-R current b	Yes
L3TCUR	THD-R current c	Yes
MAXL1TCUR	Maximum THD-R current a	No
MAXL2TCUR	Maximum THD-R current b	No
MAXL3TCUR	Maximum THD-R current c	No
L1TVOLT	THD-R voltage a	Yes
L2TVOLT	THD-R voltage b	Yes
L3TVOLT	THD-R voltage c	Yes
MAXL1TVOLT	Maximum THD-R voltage a	No
MAXL2TVOLT	Maximum THD-R voltage b	No
MAXL3TVOLT	Maximum THD-R voltage c	No
MAXVALDATE, MAXVALTIME RESMAXVAL	Reset the maximum values and indicate the previous reset	Yes

Limits – Current tab sheet (LIMITS_CURR)

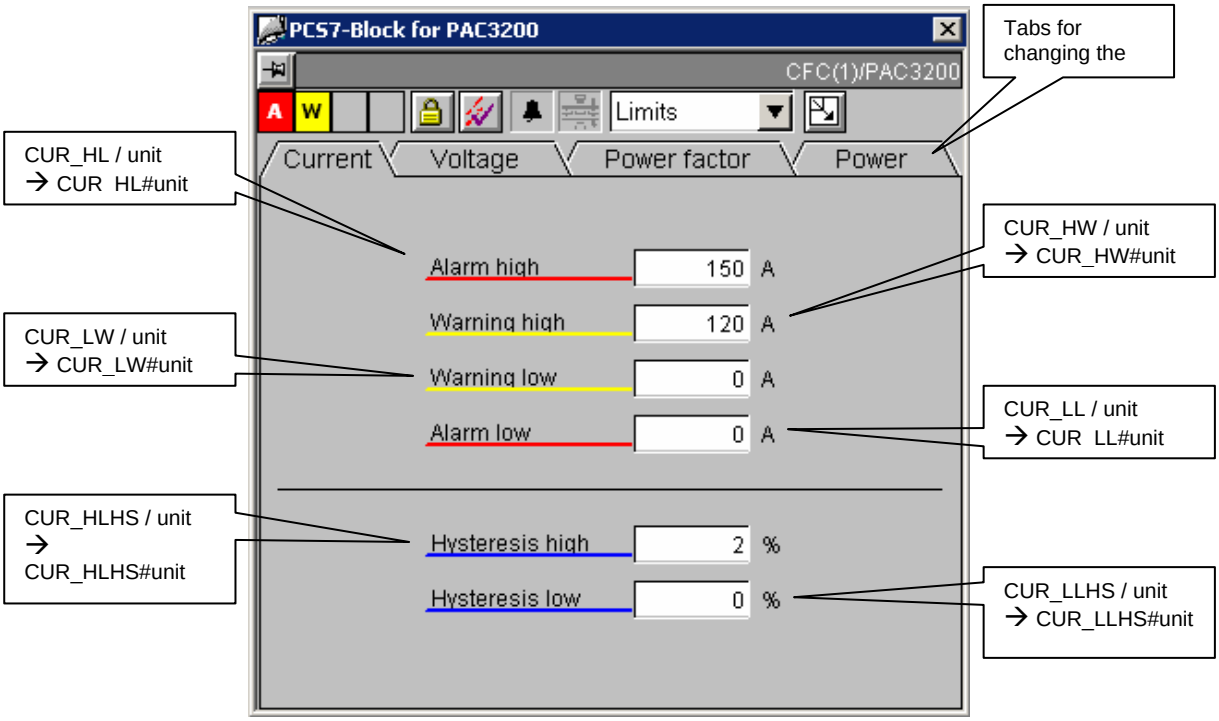


Figure 3 - 11 Limits faceplate view for current

Element (parameters)	Meaning	Display when PAC3200 is connected following Y-link
CUR_HL	Upper limit for current	Yes
CUR_HW	Upper warning limit for current	Yes
CUR_LW	Lower warning limit for current	Yes
CUR_LL	Lower limit for current	Yes
CUR_HLHS	Hysteresis for upper limit for current	Yes
CUR_LLHS	Hysteresis for lower limit for current	Yes

Limits – Voltage tab sheet (LIMITS_VOLT)

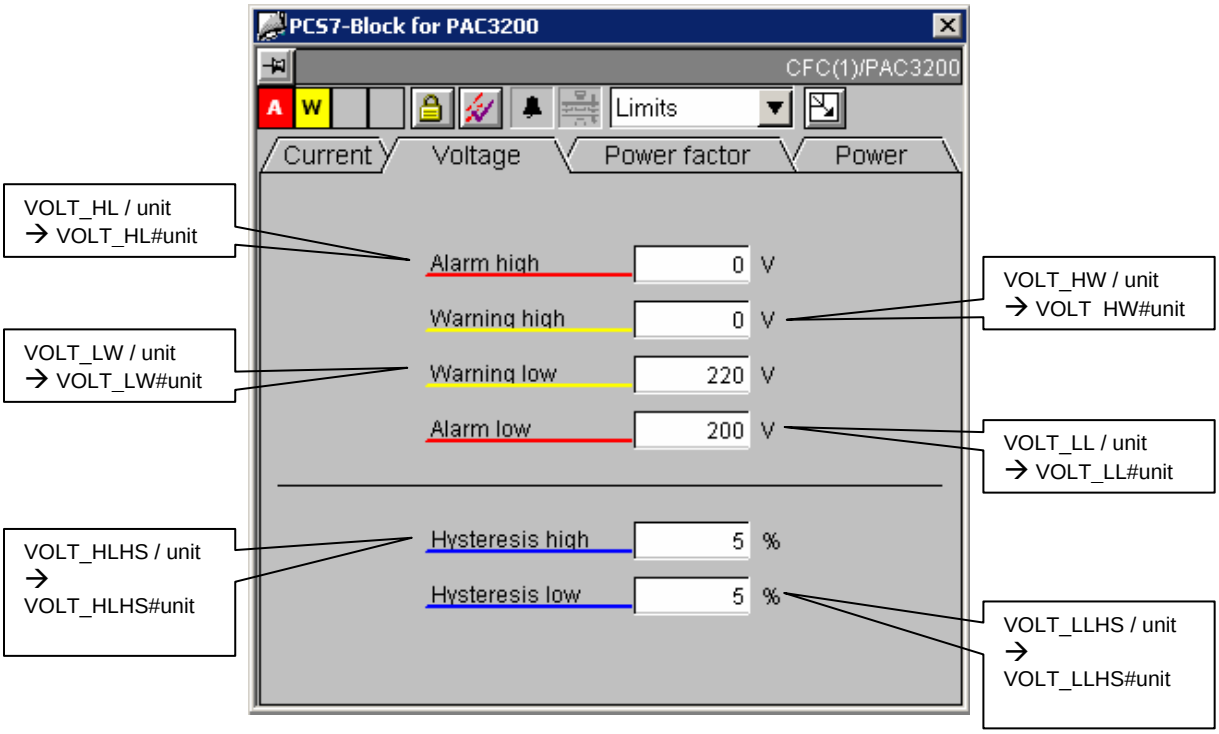


Figure 3 - 12 Limits faceplate view for voltage

Element (parameters)	Meaning	Display when PAC3200 is connected following Y-link
VOLT_HL	Upper limit for voltage	Yes
VOLT_HW	Upper warning limit for voltage	Yes
VOLT_LW	Lower warning limit for voltage	Yes
VOLT_LL	Lower limit for voltage	Yes
VOLT_HLHS	Hysteresis for upper limit for voltage	Yes
VOLT_LLHS	Hysteresis for lower limit for voltage	Yes

Limits – Power tab sheet (LIMITS_POWER)

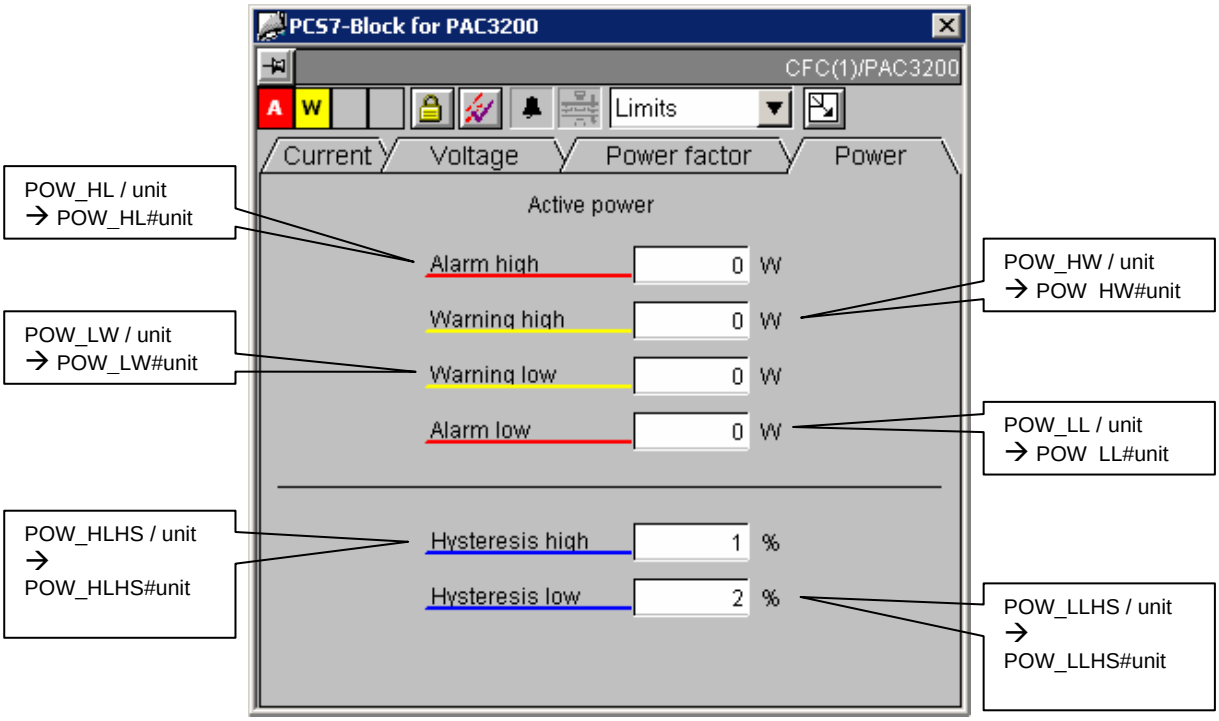


Figure 3 - 13 Limits faceplate view for power

Element (parameters)	Meaning	Display when PAC3200 is connected following Y-link
POW_HL	Upper limit for active power	Yes
POW_HW	Upper warning limit for active power	Yes
POW_LW	Lower warning limit for active power	Yes
POW_LL	Lower limit for active power	Yes
POW_HLHS	Hysteresis for upper limit for active power	Yes
POW_LLHS	Hysteresis for lower limit for active power	Yes

Limits – Power factor tab sheet (LIMITS_POWER_FAC)

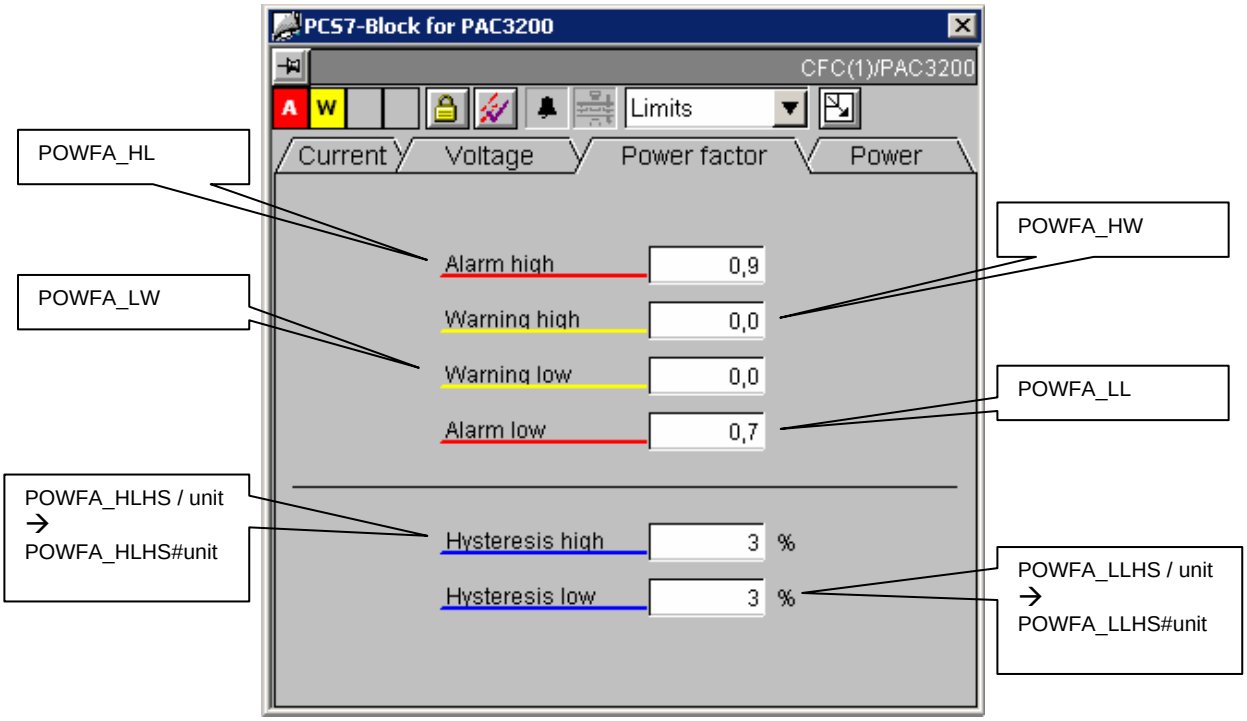


Figure 3 - 14 Limits faceplate view for power factor

Element (parameters)	Meaning	Display when PAC3200 is connected following Y-link
POWFA_HL	Upper limit for power factor	Yes
POWFA_HW	Upper warning limit for power factor	Yes
POWFA_LW	Lower warning limit for power factor	Yes
POWFA_LL	Lower limit for power factor	Yes
POWFA_HLHS	Hysteresis for upper limit for power factor	Yes
POWFA_LLHS	Hysteresis for lower limit for power factor	Yes

Units (UNITS)

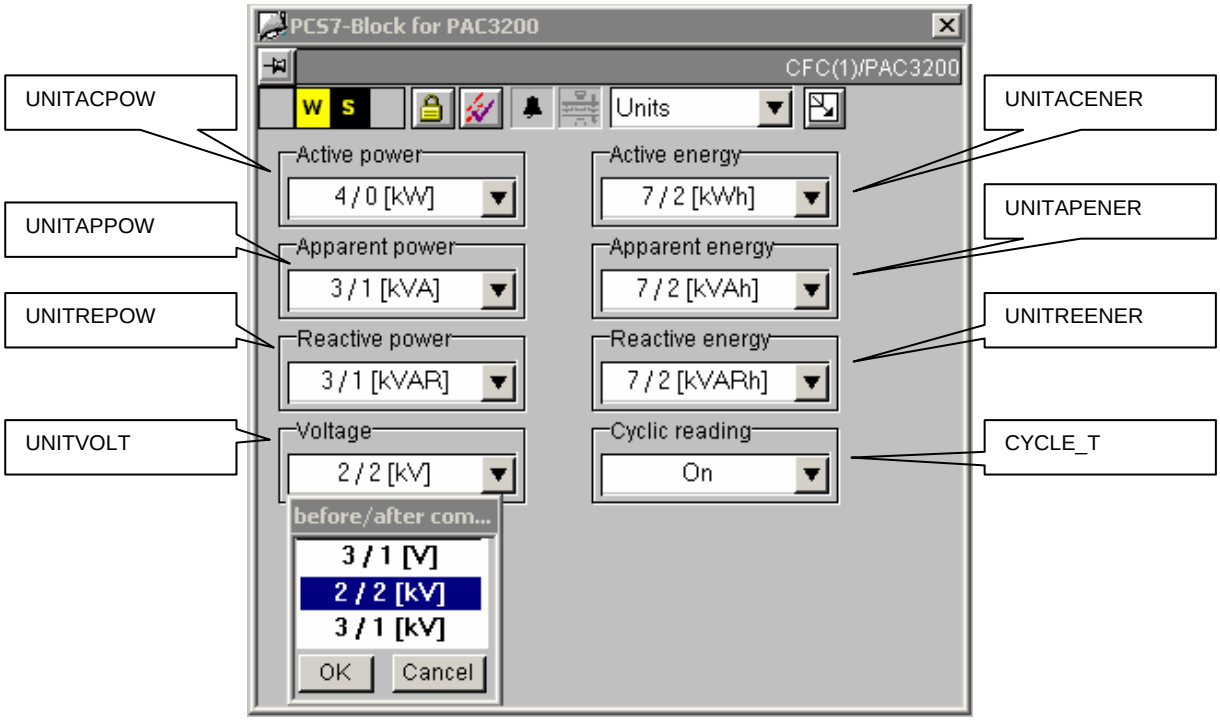


Figure 3 - 15 Units faceplate view

Element (parameters)	Meaning	Display when PAC3200 is connected following Y-link
UNITACPOW	Active power units	Yes
UNITAPPOW	Apparent power units	Yes
UNITREPOW	Reactive power units	Yes
UNITACENER	Active energy units	Yes
UNITAPENER	Apparent energy units	Yes
UNITREENER	Reactive energy units	Yes
UNITVOLT	Voltage units	Yes
CYCLE_T	Activation/deactivation of cyclic reading in cycles of 60 seconds	No

Possible settings of the combination boxes:

Measured value	**Decimal places before/after the point [units]**	**Measured value**	**Decimal places before/after the point [units]**
Active power	2 / 2 [W] 3 / 1 [kW] 4 / 0 [kW] 4 / 0 [MW]	Active energy	7 / 2 [kWh] 9 / 0 [kWh] 9 / 0 [MWh] 9 / 0 [GWh]
Apparent power	2 / 2 [VA] 3 / 1 [kVA] 4 / 0 [kVA] 4 / 0 [MVA]	Apparent Energy	7 / 2 [kVAh] 9 / 0 [kVAh] 9 / 0 [MVAh] 9 / 0 [GVAh]
Reactive power	2 / 2 [VAR] 3 / 1 [kVAR] 4 / 0 [kVAR] 4 / 0 [MVAR]	Reactive energy	7 / 2 [kVARh] 9 / 0 [kVARh] 9 / 0 [MVARh] 9 / 0 [GVARh]
Voltage	3 / 1 [V] 2 / 2 [kV] 3 / 1 [kV]		

Maintenance (MAINTENANCE)

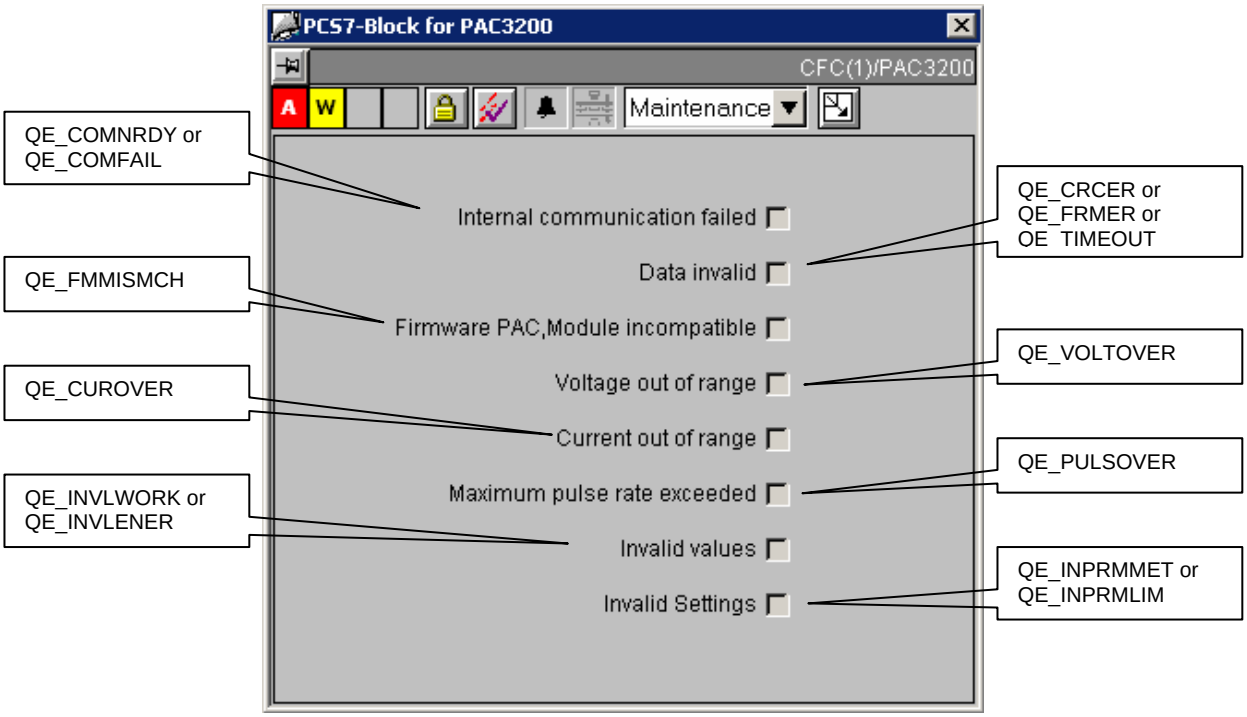


Figure 3 - 16 Maintenance faceplate view

Element (parameters)	Meaning	Display when PAC3200 is connected following Y-link
QE_COMNRDY QE_COMFAIL	Internal communication is faulty	Yes
QE_CRCER QE_FRMER QE_TIMEOUT	Data invalid	Yes
QE_FMMISMCH	Firmware PAC,Module incompatible	Yes
QE_VOLTOVER	Voltage out of range	Yes
QE_CUROVER	Current out of range	Yes
QE_PULSOVER	Maximum pulse rate exceeded	Yes
QE_INVLWORK QE_INVLENER	Invalid values	Yes
QE_INPRMMET QE_INPRMLIM	Invalid settings	Yes

4 Configuration manual

4.1 Configuring a measuring point

4.1.1 Writing the PLC program

The driver block PAC32DRV is integrated into a CFC chart and the LADDR input is connected to the base address of the PAC3200 device. The O_01 output is connected to the output base address of the PAC3200 device.

Procedure: Select input -> right mouse button -> connection to operand... -> input (e.g. EW512). Select output -> right mouse button -> connection to operand... -> output (e.g. AW512).

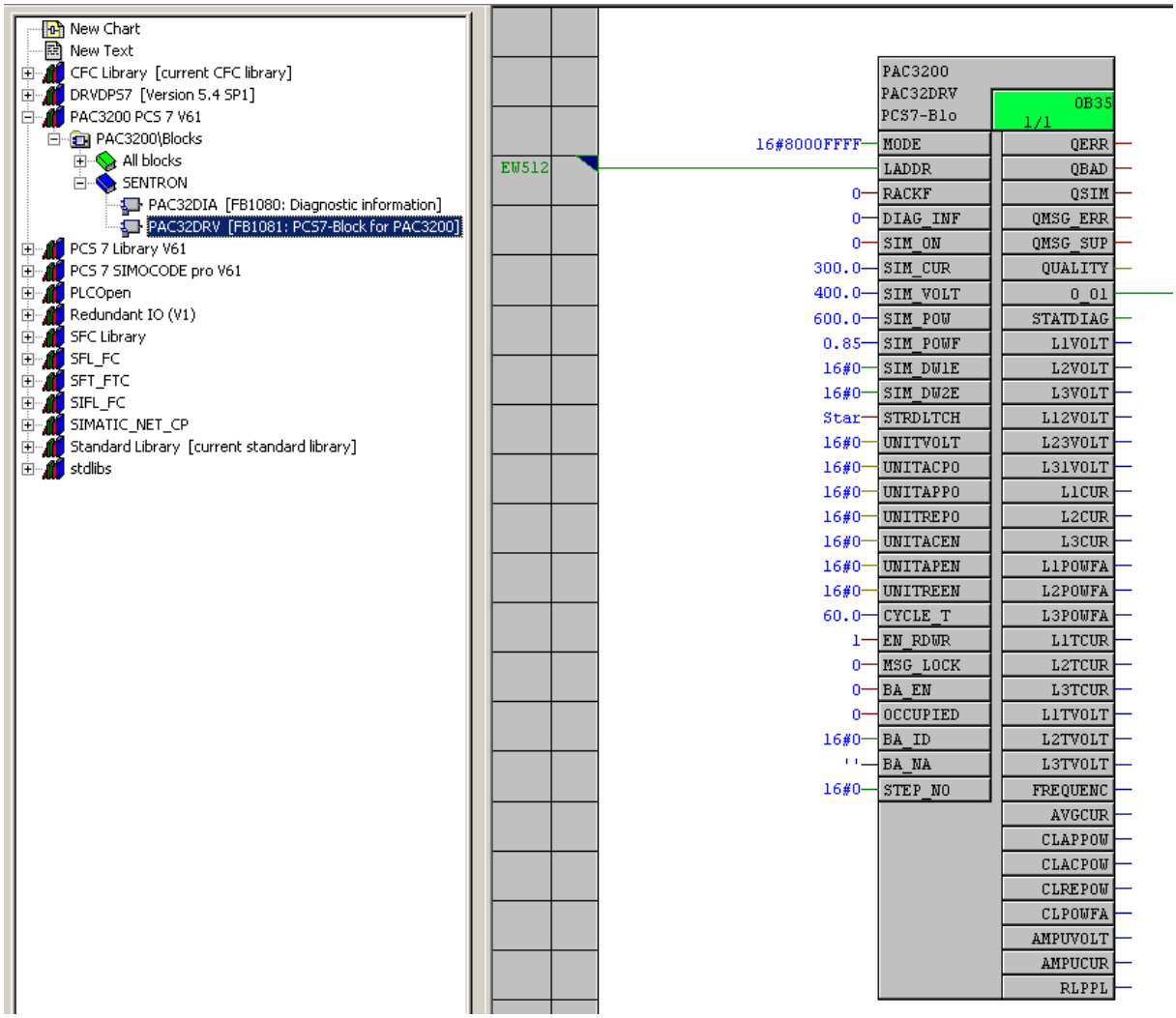


Figure 4 - 1 Driver block in CFC chart (not connected)

Then the module driver automatically installs all required driver blocks and connects the driver block. The module driver can be called as described below.

- Select the function "Generate module drivers" on compiling the CFC chart:

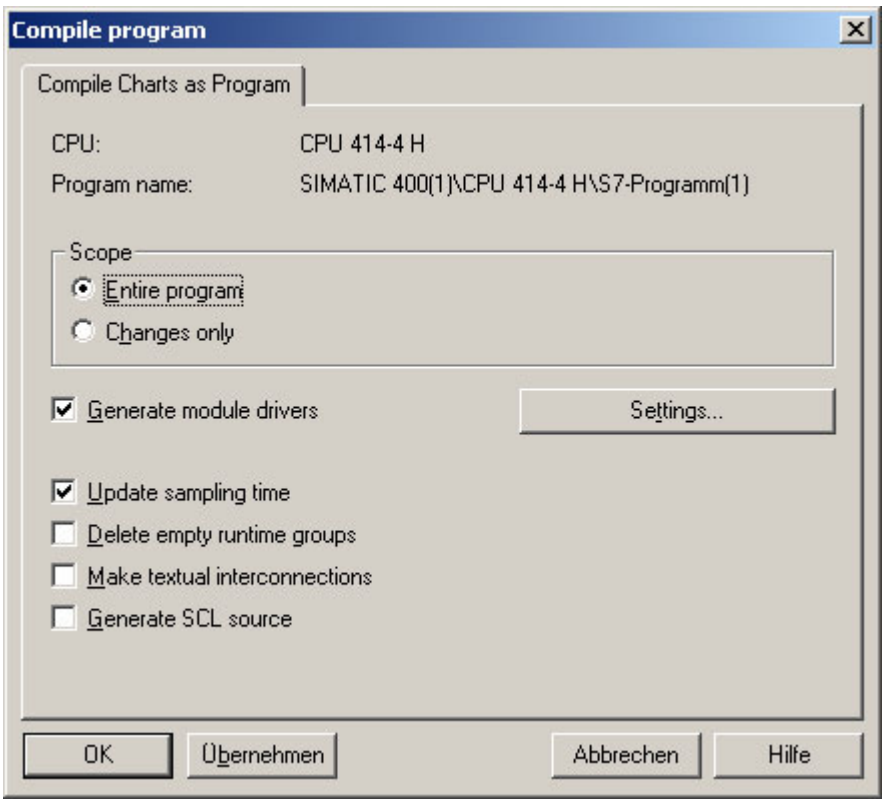


Figure 4 - 2 Compiling the program

- Or by selecting the chart folder -> Right mouse button -> Generate module drivers…:

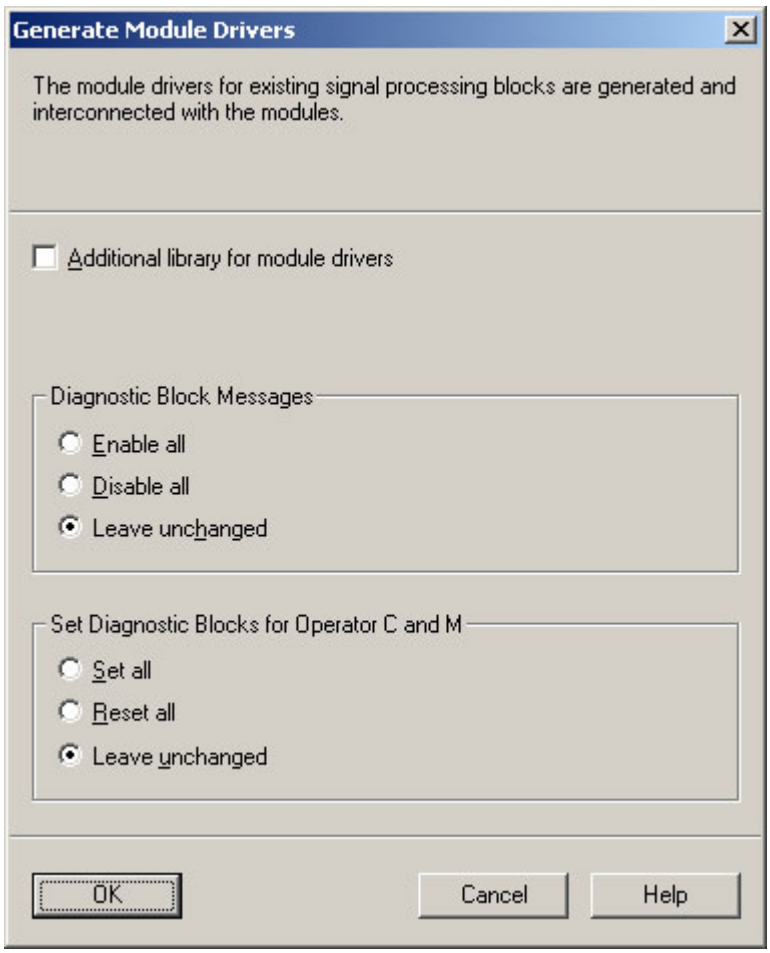


Figure 4 - 3 Generate module drivers

→The driver block connected by the module driver is supplied as the result:

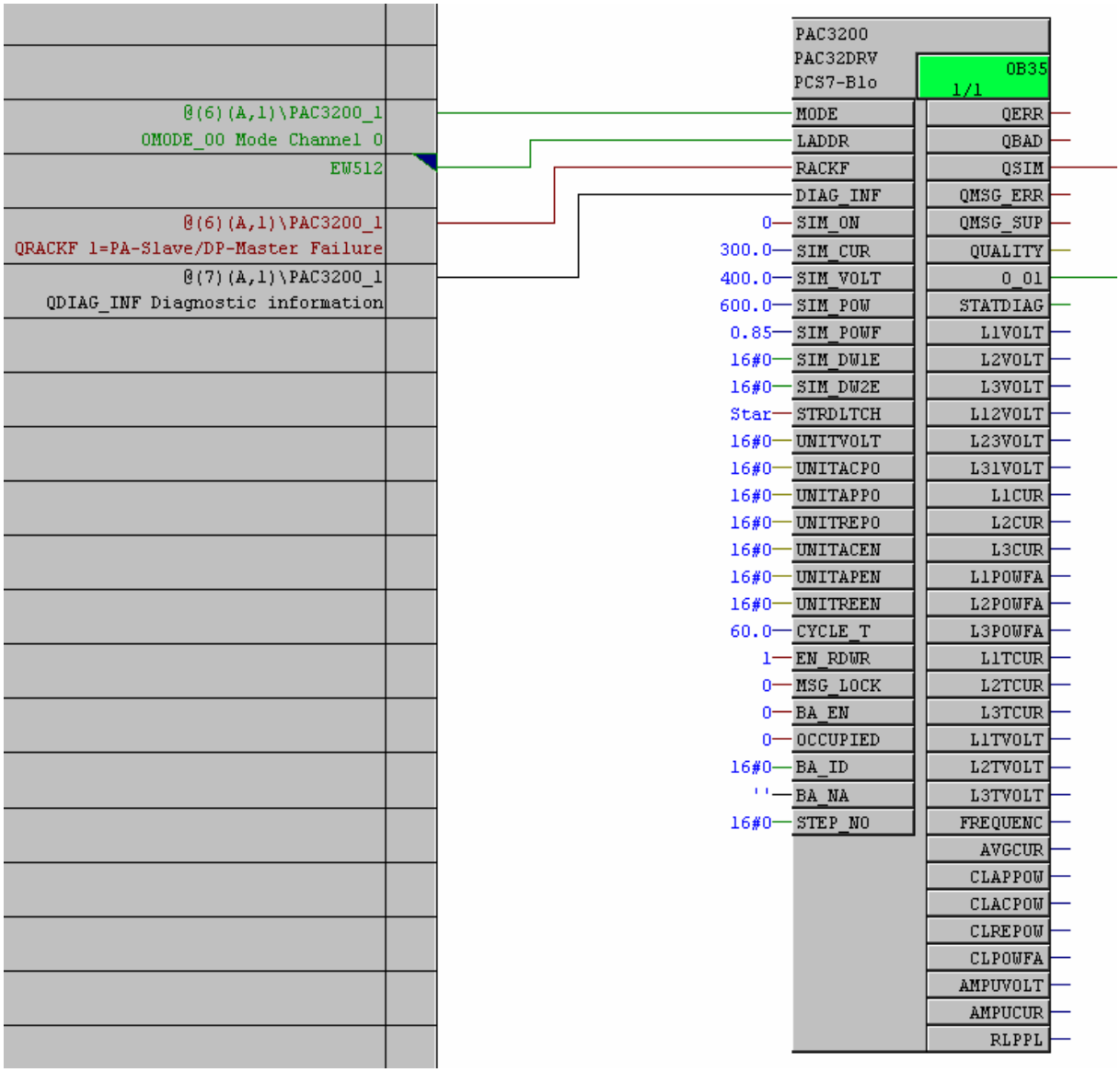


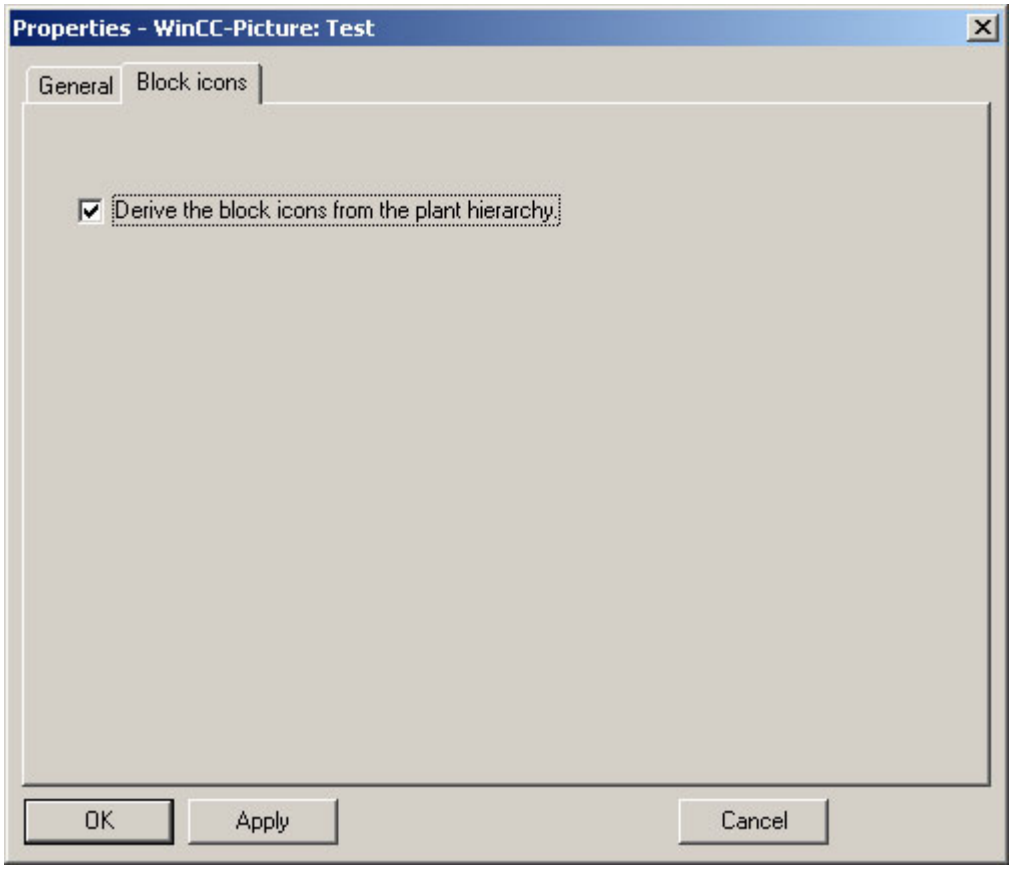
Figure 4 - 4 Driver block in CFC chart (fully connected)

The PLC program has now been created.

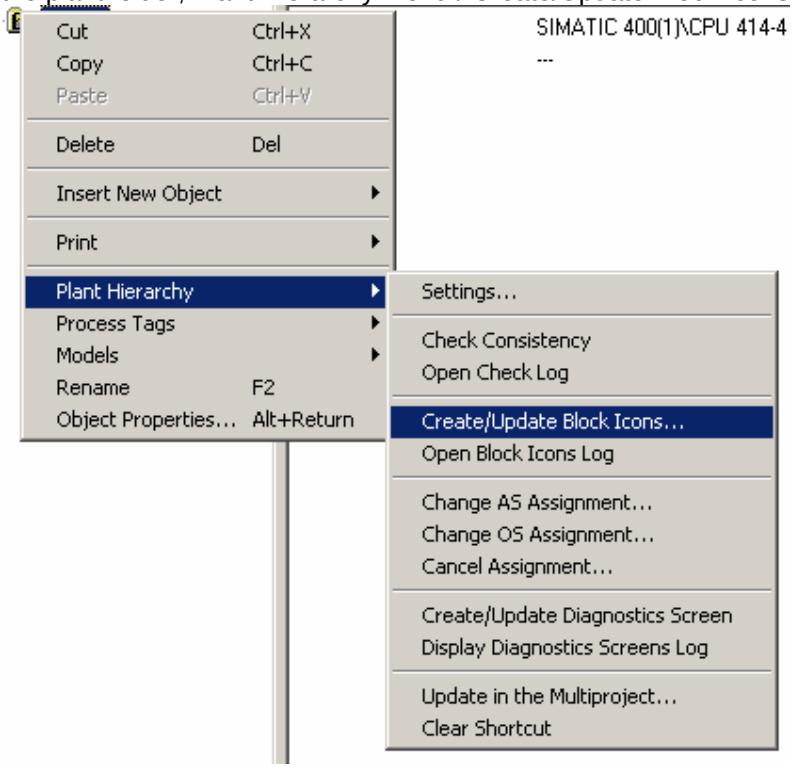
4.1.2 Connection to WinCC

After the PLC program has been created, the driver block can be connected to WinCC. The block icon that is associated with the driver block is used for this purpose that is installed in a process display in the following manner.

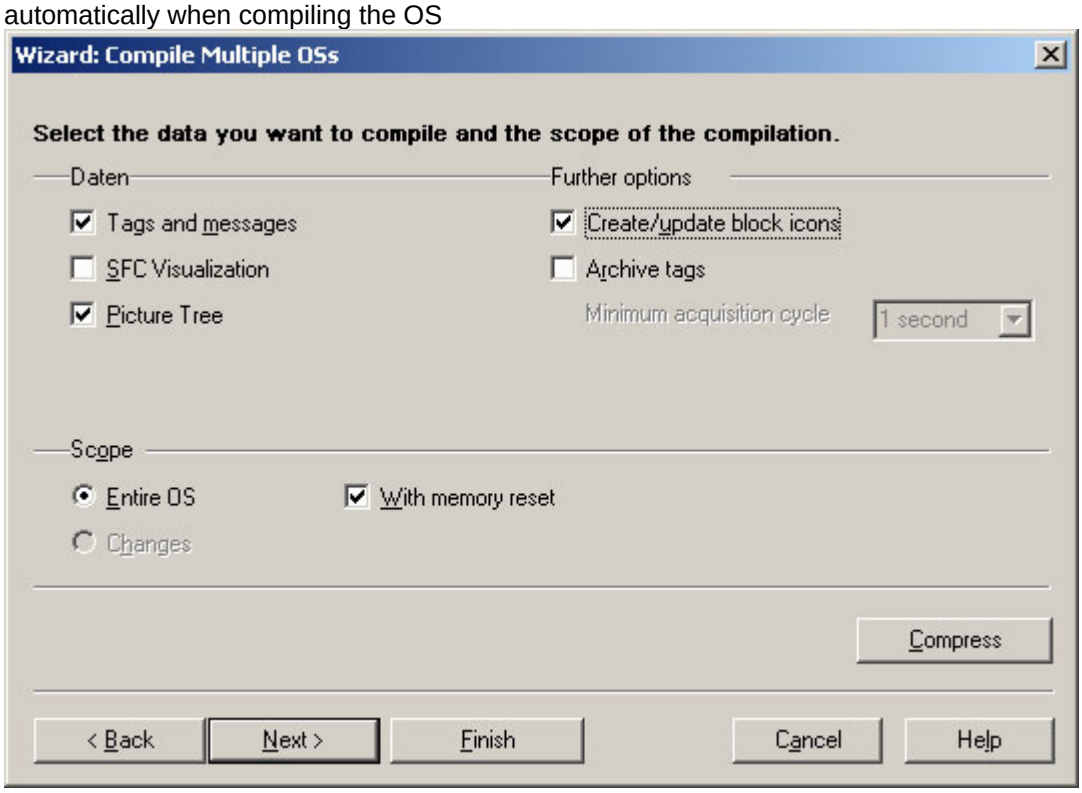
- The "Create/update block icons" function
  - should be selected from the properties dialog of WinCC display "Derive the block icons from the plant hierarchy"



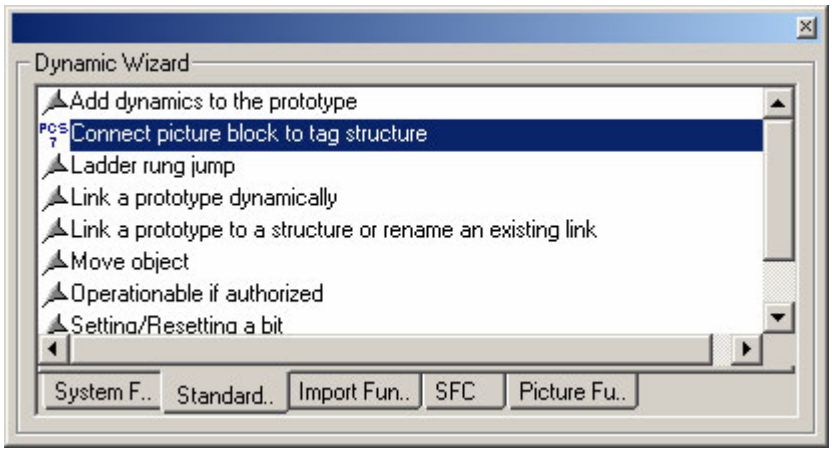
- should be manually created/updated in SIMATIC Manager / Plant view by selecting the plant folder, Plant Hierarchy menu / Create/Update Block Icons or



- automatically when compiling the OS



- Manually copy the user object from file @Template_PAC32DRV.pdl to the process display and run the "Connect picture block to tag structure" Dynamic Wizard



The driver block is now fully integrated into WinCC.

5 Technical data

The following meanings apply:

Block type name

The symbolic identifier in the library's icon table for the relevant FB. It must be unique to the project.

Object name

Consists of the type of block (FB) and the number.

Block length in load/work memory

Memory requirement of program code, once per block type.

Length of instance data in load/work memory

Memory requirement of an instance DB.

Temporary memory

The local data memory needed when calling the block in an execution level. This is limited depending on the CPU. If exceeded, you must check this in the CPU configuration and, if necessary, redistribute to OBs of the size actually needed.

Called blocks

The blocks stated here are used by the block in question and must be located in the user program. They are saved in the same library.

Block (type name)	Number	Block length in load/work memory (bytes)	Length of instance data in load/work memory (bytes)	Temporary memory (bytes)	Called blocks
PAC32DIA	1080	1988 / 1572	384 / 88	108	UDT1080 SFC6 SFC51
PAC32DRV	1081	17284 / 15178	3772 / 2240	62	UDT1080 SFB35 SFB52 SFC6 SFC20

6 Technical Support

Contact for technical problems and other questions

If you require technical support or you have questions about the product, contact Technical Support.

Utility	**Address, number**
Phone	+49 (0)180-50-50-222
Fax	+49 (0)180-50-50-223
Internet	http://www.siemens.de/automation/service&support
Support request	http://www.siemens.de/automation/support-request