ABB solar inverters

Firmware manual
PVS800 central inverters

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List of related manuals

Hardware manuals and guides	Code (English)
PVS800-57 hardware manual	*3AUA0000053689*

Firmware manuals and guides	
PVS800 firmware manual	*3AUA0000058422*
Application guide: Adaptive program for PVS800	*3AUA0000091276*

Option manuals and guides	
RETA-01 Ethernet Adapter Module User's Manual	*3AFE64539736*
RMBA-01 Modbus Adapter Module User's Manual	*3AFE64498851*
NETA-21 Remote Monitoring Tool User's manual	*3AUA0000096939*
Manuals and quick guides for I/O extension modules, fieldbus adapters, etc.	

Firmware manual

PVS800 central inverters

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3AUA0000058422 Rev D
EN
EFFECTIVE: 2016-09-23

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1

Introduction to the manual

What this chapter contains

This chapter describes the contents of the manual. It also contains information on the applicability of the manual, safety instructions, target audience, related documents and terms and abbreviations.

Applicability

The manual is applicable to PVS800 central inverters with the following control program versions:

Control program	Version	See...
Master control program	GSXR7400 and later	Parameter *04.01 SW PACKAGE VER*
Inverter control program	ISXR7400 and later	

Safety instructions

Obey all safety instructions delivered with the inverter.

- Read the complete safety instructions before you install, commission, or use the inverter. The complete safety instructions are given at the beginning of the hardware manual.
- Read the software function specific warnings and notes before changing the default settings of the function. These warnings and notes are presented together with the parameter descriptions wherever appropriate.
- Read the task specific safety instructions before starting the task. These safety instructions are presented together with the procedure wherever appropriate.

Target audience

This manual is intended for people who commission, adjust the parameters of, or operate, monitor or troubleshoot PVS800 central inverters.

The reader is expected to know the standard electrical wiring practices, electronic components, and electrical schematic symbols.

Contents of the manual

The chapters of this manual are briefly described below.

- *Introduction to the manual* (this chapter).
- *Using the control panel* gives instructions for using the control panel.
- *Start-up* describes the start-up procedure of the PVS800.
- *Program features* describes the firmware features of the PVS800.
- *Master control program parameters* describes the parameters of the master control program.
- *Inverter control program parameters* describes the parameters of the inverter control program.
- *Fault tracing* lists all alarm and fault messages with possible causes and corrective actions.
- *Fieldbus control* describes how the PVS800 inverter can be controlled by external devices over a communication network.

Terms and abbreviations

Term	Definition
AC80, AC800M	Types of ABB programmable logic controllers
AGDR	Gate Driver Board. Controls the output semiconductors of the inverter module. There is one AGDR board per phase.
AGPS	Gate Driver Power Supply Board. An optional board within inverter modules used to implement the Prevention of Unexpected Start-up function.
APBU	PPCS Branching and Data Logger Unit. Handles the communication between the inverter control unit and parallel-connected inverter modules.
APOW	Power supply board located in the inverter module
DDCS	Serial communication protocol used in ABB inverters
DHCP	Dynamic Host Configuration Protocol
DriveWindow	PC tool for operating, controlling and monitoring ABB inverters
FCI	Fieldbus communication interface for the ABB S800 I/O system
FPROM	Field programmable read-only memory
INT	Main Circuit Interface Board (located in each inverter module)
INU	Inverter unit
LCL	Passive line filter
MCP	Master control program. See also *RDCU*.
MPPT	Maximum power point tracking

Term	Definition
NAMU	Auxiliary measuring unit
NDBU	DDCS branching unit
NETA	Ethernet adapter module (optional)
PGND board	Grounding monitoring board
RAIO	Analog I/O extension module (optional)
RAM	Random-access memory
RDCO	DDCS Communication Option; a satellite board that can be snapped on the RMIO board to add the number of fiber optic channels available
RDCU	Type of control unit. The PVS800 contains two RDCUs. One of the RDCUs [A41] controls the inverter unit, the other [A43] contains the master control program. The RDCU houses the RMIO board.
RDIO	Digital I/O extension module (optional)
RDNA	DeviceNet adapter module (optional)
RETA	Ethernet and Modbus TCP adapter module (optional)
RMBA	Modbus adapter module (optional)
RMIO	Control and I/O board contained within the RDCU
RPBA	PROFIBUS adapter module (optional)

2

Using the control panel

What this chapter contains

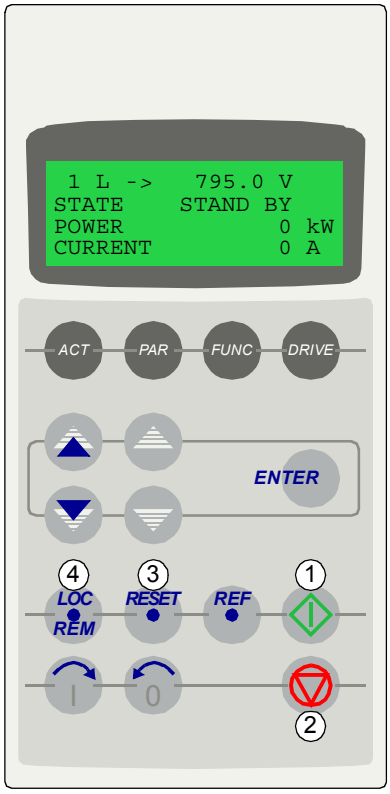
This chapter describes how to use the control panel CDP 312R.

General

The control panel can be used to control the PVS800 central inverter, read status data, and adjust parameters. The inverter is programmable through a set of parameters.

The communication between the CDP 312R control panel and the inverter uses the Modbus protocol. The communication speed of the bus is 9600 bit/s. You can connect 31 stations (inverters, drives, etc.) and one panel to the bus. Each station must have a unique ID number.

Overview of the panel



The LCD type display has four lines of 20 characters.

The language is selected at start-up. The control panel has four operation modes:

- Actual Signal Display mode (ACT key)
- Parameter mode (PAR key)
- Function mode (FUNC key)
- Control Unit Selection mode (DRIVE key)

The use of single arrow keys, double arrow keys and ENTER depend on the operation mode of the panel.

The control keys are:

No.	Used to
1	Start
2	Stop
3	Fault reset
4	Change between Local/Remote (external) control

Identification display

When the control panel is connected to the panel link for the first time, or when the inverter is powered up, the identification display shows the panel software version:

```
CDP312 PANEL  V5.30
```

After the identification display, the panel enters the Control Unit Selection mode and displays the following program information:

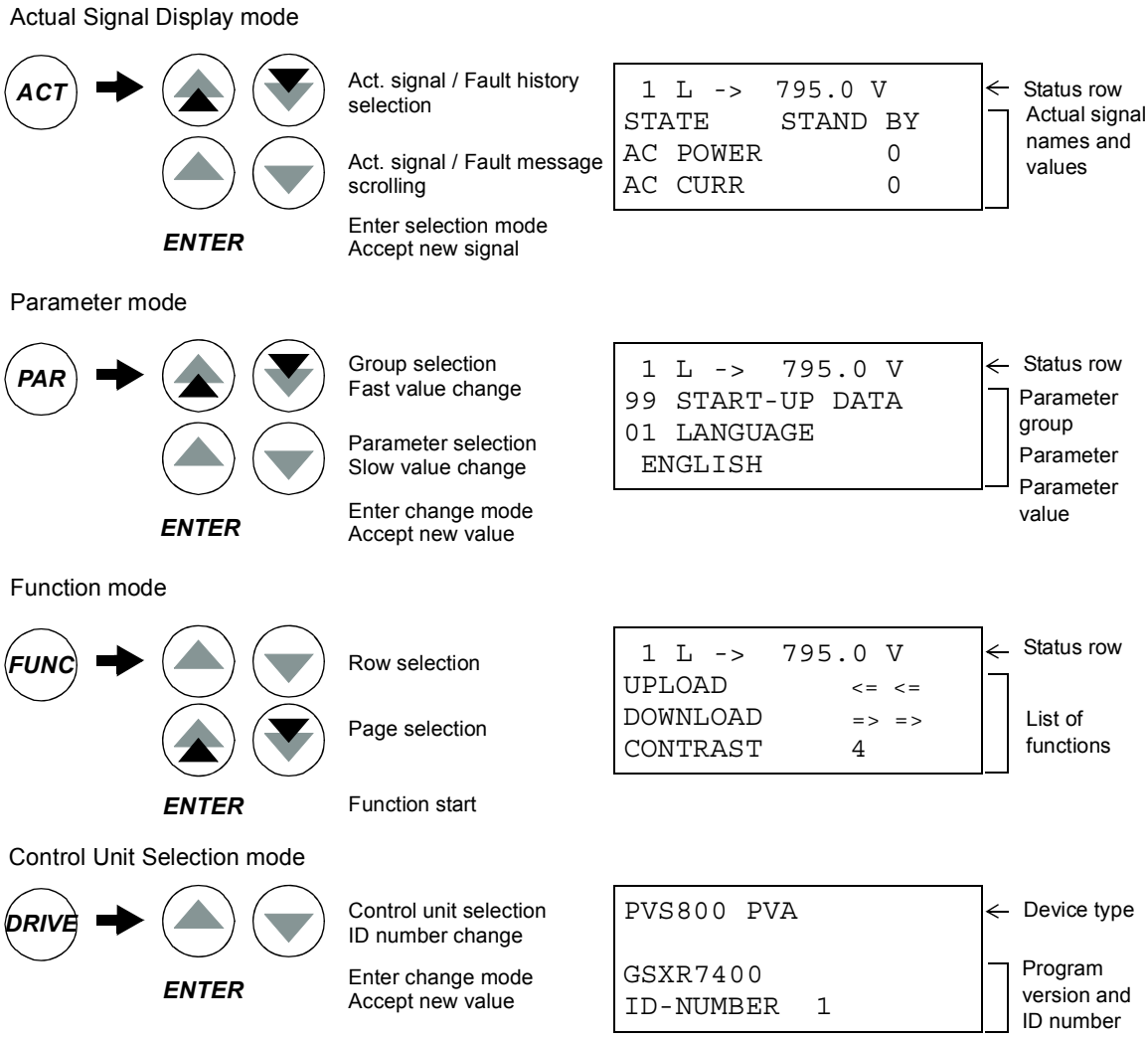
```
PVS800 PVA

GSXR7400
ID-NUMBER  1
```

After a few seconds, the display is cleared, and the Actual Signal Display mode appears.

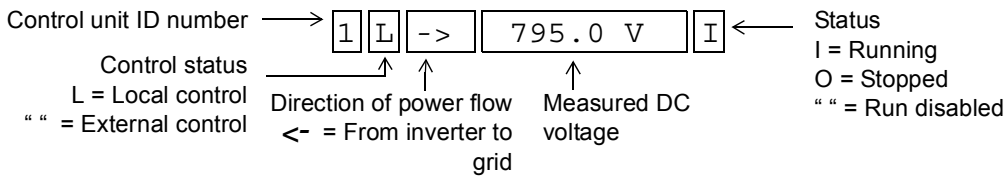
Panel operation mode keys and displays

The control panel keys allow you to select status data, parameters and change parameter settings. The figure below shows the mode selection keys of the panel, and the basic operations and displays in each mode.



Status row

The figure below describes the status row digits.



PVS800 control with the panel

You can use the panel to:

- start and stop the PVS800
- reset any fault and alarm messages
- change between local and external control locations.

The panel can be used for PVS800 control only when the PVS800 is under local control and the status row is visible on the display.

- L indicates local control on the panel display
- A blank space in the same location indicates external control (through I/O or fieldbus interface).

Remote control allows the following controls:

- Monitoring actual signals
- Setting parameters
- Uploading parameters
- Setting ID number.

Note: Operational commands (eg, start/stop) cannot be given from the panel when the PVS800 is in remote control.

Control units of the PVS800

The PVS800 central inverter contains two control units:

- Master control unit (running the master control program)
- Inverter control unit (running the inverter control program).

The control panel is wired to both control units through a Y-splitter.

The PVS800 can be configured and monitored through the master control program (by default, ID 1). To access the parameters and alarm/fault information of the inverter control program, see *Control Unit Selection mode* on page *23* for instructions on how to switch the panel between the control units.

How to start and stop the PVS800

Step	Action	Press Key	Display
1.	To show the status row.		1 -> 795.0 V STATE STAND BY AC POWER 0 AC CURR 0
2.	To switch to local control. (Only if the PVS800 is not in local control already, ie, if there is no L on the first row of the display.) **Note:** Switching to local control can be prevented by parameter *16.04 LOCAL LOCK*.See page *70*.		1 L -> 795.0 V STATE STAND BY AC POWER 0 AC CURR 0
3.	To stop.		1 L -> 795.0 V STATE STAND BY AC POWER 0 AC CURR 0
4.	To start.		1 L <- 795.0 V I STATE SLEEP AC POWER 0 AC CURR 0

Actual Signal Display mode

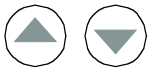
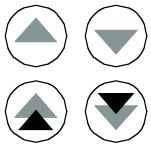
The Actual Signal Display mode includes two displays: the Actual Signal Display and the Fault History Display.

In this mode, you can:

- view three actual signals on the display at a time
- select the actual signals to be displayed
- view the fault history
- reset the fault history.

The panel enters the Actual Signal Display mode by pressing the ***ACT*** key, or if no key is pressed within one minute. If a fault is active, the panel shows the Fault History Display before the panel enters the Actual Signal Display mode. If the Control Unit Selection mode is active, the panel shows the Status Display of the Control Unit Selection mode.

How to select the actual signals for display

Step	Action	Press key	Display
1.	To enter the Actual Signal Display mode.		1 L -> 795.0 V STATE STAND BY AC POWER 0 AC CURR 0
2.	To select a row (a blinking cursor indicates the selected row).		1 L -> 795.0 V STATE STAND BY AC POWER 0 AC CURR 0
3.	To enter the actual signal selection function.	***ENTER***	1 L -> 795.0 V 1 ACTUAL SIGNALS 10 AC POWER [kW] 0
4.	To select an actual signal. To change the actual signal group.		1 L -> 795.0 V 1 ACTUAL SIGNALS 14 REACTIVE POWER 0
5.	To accept the selection and to return to the Actual Signal Display mode.	***ENTER***	1 L -> 795.0 V STATE STAND BY REACTIVE 0 AC CURRE 0
6.	To cancel the selection and keep the original selection, press any of the mode selection keys. The selected keypad mode is entered.		1 L -> 795.0 V STATE STAND BY AC POWER 0 AC CURR 0

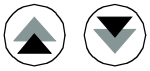
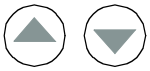
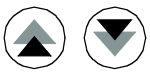
How to display the full name of actual signals

Step	Action	Press key	Display
1.	To display the full name of three actual signals.	**Hold** 	1 L -> 795.0 V PVA STATES AC POWER [kW] AC CURRENT L1
2.	To return to the Actual Signal Display mode.	**Release** 	1 L -> 795.0 V STATE STAND BY AC POWER 0 AC CURR 0

How to view and reset the fault history

Note:

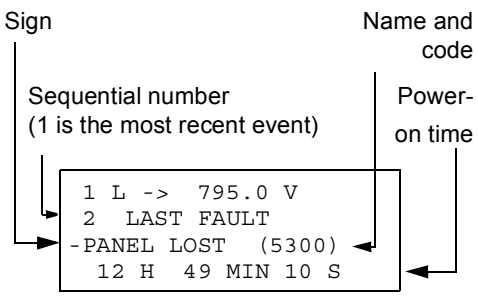
- Fault history cannot be reset if there are active faults or alarms.
- When viewing the fault history of master control program, fault and alarm messages generated by inverter control program are shown with a sign ”>” before the name of fault or alarm.
- More information on the fault/alarm is stored in the fault history of the inverter control program. To switch to the inverter control program and view its fault history, see *How to select a control unit and change its panel link ID number* on page *23*. See also *Fault history* on page *48*.

Step	Action	Press key	Display
1.	To enter the Actual Signal Display mode.		1 L -> 795.0 V STATE STAND BY AC POWER 0 AC CURR 0
2.	To enter the Fault History Display.		1 L -> 795.0 V 2 LAST FAULT -PANEL LOST (5300) 20 H 49 MIN 56 S
3.	To select the previous (UP) or the next fault/alarm (DOWN). To clear the Fault History.	 	1 L -> 795.0 V 2 LAST FAULT H MIN S 1 L -> 795.0 V 2 LAST FAULT +SYSTEM START (1087) 12 H 49 MIN 10 S
4.	To return to the Actual Signal Display mode.		1 L -> 795.0 V STATE STAND BY AC POWER 0 AC CURR 0

About the fault history

The fault history restores information on the 16 latest events (faults, alarms and resets) of the control program. The table below shows how the events are stored in the fault history.

A Fault History View



Event	Information on display
PVS800 detects a fault and generates a fault message.	Sequential number of the event and LAST FAULT text Name of the fault and a “+” sign in front of the name Total power-on time
User resets the fault message.	Sequential number of the event and LAST FAULT text RESET FAULT text Total power-on time
PVS800 generates an alarm message.	Sequential number of the event and LAST WARNING text Name of the alarm and a “+” sign in front of the name Total power-on time
PVS800 deactivates the alarm message.	Sequential number of the event and LAST WARNING text Name of the alarm and a “-” sign in front of the name Total power-on time

How to display and reset an active fault

Step	Action	Press Key	Display
1.	To display an active fault.	ACT	1 L -> 795.0 V PVS800 PVA *** FAULT *** PANEL LOSS (5300)
2.	To reset the fault.	RESET	1 L -> 795.0 V STATE STAND BY AC POWER 0 AC CURRE 0

Parameter mode

In the Parameter mode, you can:

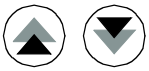
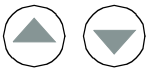
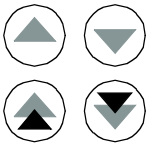
- view parameter values
- change parameter settings.

The panel enters the Parameter mode by pressing the ***PAR*** key.

Note: Certain parameters do not allow changes. If tried, no change is accepted, and the following warning is displayed:

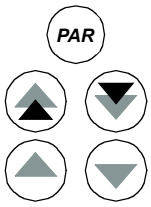
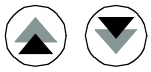
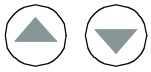
```
**WARNING**
WRITE ACCESS DENIED
PARAMETER SETTING
NOT POSSIBLE
```

How to select a parameter and change the value

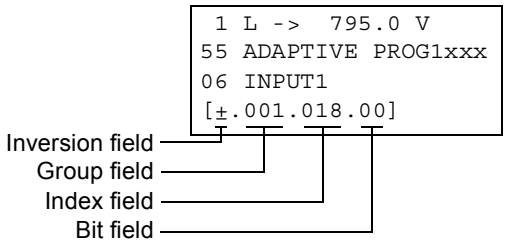
Step	Action	Press key	Display
1.	To enter the Parameter mode.		1 L -> 795.0 V 10 CMD GROUP 01 RESET CMD NOT SET
2.	To select a group. When the arrow button is pressed down, only the parameter group name is displayed. When the button is released also the first parameter of the group is displayed.		1 L -> 795.0 V 13 ANALOGUE INPUTS 01 AI1 CONV MODE NORMAL
3.	To select a parameter within a group. When the arrow button is pressed down, only the parameter name is displayed. When the button is released also the parameter value is displayed.		1 L -> 795.0 V 13 ANALOGUE INPUTS 15 EXT1 AI1 HW MODE UNIPOLAR
4.	To enter the parameter setting function.	***ENTER***	1 L -> 795.0 V 13 ANALOGUE INPUTS 15 EXT1 AI1 HW MODE [UNIPOLAR]
5.	To change the parameter value. (slow change for numbers and text) (fast change for numbers only)		1 L -> 795.0 V 13 ANALOGUE INPUTS 15 EXT1 AI1 HW MODE [BIPOLAR]
6a.	To save the new value.	***ENTER***	1 L -> 795.0 V 13 ANALOGUE INPUTS 15 EXT1 AI1 HW MODE BIPOLAR
6b.	To cancel the new setting and keep the original value, press any of the mode selection keys. The selected mode is entered.		1 L -> 795.0 V 13 ANALOGUE INPUTS 15 EXT1 AI1 HW MODE UNIPOLAR

How to adjust a source selection parameter

The value in most of the parameters is used directly in the control program. The source selection parameters are an exception because the values point to another parameter whose values are used in the control program. Therefore, the procedure to set source selection parameters differs from that of other parameters.

Step	Action	Press Key	Display
1.	See the table above to • enter the Parameter mode • select the correct parameter group and parameter • enter the parameter setting mode.		1 L -> 795.0 V 55 ADAPTIVE PROG1 06 INPUT1 +.000.000.00
2.	To scroll between the inversion, group, index and bit fields.[1)]		1 L -> 795.0 V 55 ADAPTIVE PROG1 06 INPUT1 [±.000.000.00]
3.	To adjust the value of a field.		1 L -> 795.0 V 55 ADAPTIVE PROG1 06 INPUT1 [±.000.018.00]
4.	To accept the value.	ENTER	1 L -> 795.0 V 55 ADAPTIVE PROG1 06 INPUT1 +.000.018.00

1)



Inversion field inverts the selected parameter value. Plus sign (+): no inversion, minus (-) sign: inversion.

Bit field selects the bit number (relevant only if the parameter value is a packed Boolean word).

Index field selects the parameter index.

Group field selects the parameter group.

Note: Instead of pointing to another parameter, it is also possible to define a constant by the source selection parameter. Proceed as follows:

1. Change the inversion field to C.
   The appearance of the row changes. The rest of the lines is now a constant setting field.
2. Give the constant value to the constant setting field.
3. Press **ENTER** to accept.

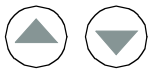
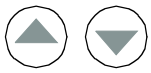
Function mode

The Function mode allows you to adjust the contrast of the display.

The panel enters the Function mode by pressing the ***FUNC*** key.

Note: PVS800 does not support Upload and Download functions visible in the Function mode.

How to set the contrast of the display

Step	Action	Press Key	Display
1.	To enter the Function mode.		1 L -> 795.0 V UPLOAD <= <= DOWNLOAD => => CONTRAST 4
2.	To enter the page that contains the upload, download and contrast functions.		1 L -> 795.0 V UPLOAD <= <= DOWNLOAD => => CONTRAST 4
3.	To select a function (a flashing cursor indicates the selected function).		1 L -> 795.0 V UPLOAD <= <= DOWNLOAD => => CONTRAST 4
4.	To enter the contrast setting function.	***ENTER***	1 L -> 795.0 V CONTRAST [4]
5.	To adjust the contrast.		1 L -> 795.0 V CONTRAST [7]
6.a	To accept the selected value.	***ENTER***	1 L -> 795.0 V UPLOAD <= <= DOWNLOAD => => CONTRAST 7
6.b	To cancel the new setting and retain the original value by pressing any of the mode selection keys. The selected mode is entered.		1 L -> 795.0 V MSW 0 AC POWER 0 AC CURRE 0

Control Unit Selection mode

The Control Unit Selection mode can be used to switch the control panel between master control unit and inverter control unit.

In the Control Unit Selection mode, it is possible to:

- select the control unit (master or inverter) with which the control panel communicates
- change the identification number of a control unit
- view the status of the control units connected to the panel.

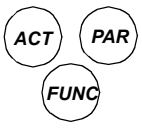
The panel enters the Control Unit Selection mode by pressing the **DRIVE** key.

Each on-line control unit must have an individual identification number (ID). By default,

- the ID number of the master control unit (master control program) is 1
- the ID number of the inverter control unit (inverter control program) is 2.

Note: The default ID number settings of the two control units of the PVS800 should not be changed unless the PVS800 is to be connected to a panel link (constructed by using optional NBCI-xx modules) with other PVS800 inverters on-line.

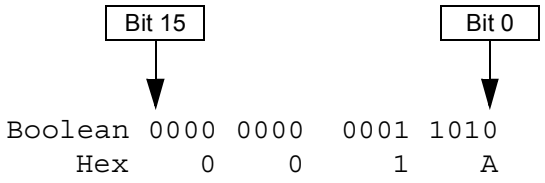
How to select a control unit and change its panel link ID number

Step	Action	Press key	Display
1.	To enter the Control Unit Selection mode.		PVS800 PVA GSXR7400 ID-NUMBER 1
2.	To select the next control unit/view. The ID number of the current control unit is changed by first pressing ***ENTER*** (the brackets round the ID number appear) and then adjusting the value with arrow buttons. The new value is accepted with ***ENTER***. Switch off the power to the control unit, to validate its new ID number setting. The status display of all devices connected to the Panel Link is shown after the last individual station. If all stations do not fit on the display at once, press the double-arrow up to view the rest of them.		PVS800 xxxx_5PV ISXR7400 ID-NUMBER 2 1$\vec{o}$ Status Display Symbols: $\vec{o}$ = Stopped F = Tripped on a fault
3.	To connect to the last displayed control unit and to enter another mode, press one of the mode selection keys. The selected mode is entered.		

Reading and entering packed Boolean values on the display

Some actual values and parameters are packed Boolean, that is, each individual bit has a defined meaning (explained at the corresponding signal or parameter). On the control panel, packed Boolean values are read and entered in hexadecimal format.

In this example, bits 1, 3 and 4 of the packed Boolean value are On:



3

Start-up

What this chapter contains

This chapter describes the start-up procedure of the PVS800 central inverter.

Start-up procedure

Use local control when you start up the inverter.

Note: Keep in hand the grid specification from grid operator.

☑	Description	Comments
SAFETY		
☐	 **WARNING!** Obey all safety instructions delivered with the inverter. See the hardware manual. Only qualified electricians are allowed to start-up the inverter.	
PRIMARY CHECKS		
☐	Make sure that the mechanical and electrical installation and other preparations are made according to the instructions given in the hardware manual.	-
COMMISSIONING APBU		
☐	Set APBU battery dip switch (S3:6) from OFF to ON.	-
☐	Upload the available APBU logger data from user, last and first loggers from APBU to PC.	

☑	Description	Comments
START AND STOP SETTINGS		
☐	Adjust the start settings. • *31.04 UDC START LIM* (page *79*). This value must be lower than the open-circuit voltage of the solar generator. • *31.05 UDC START DLY* (page *79*). The correct setting minimizes the number of unnecessary starts during low light conditions.	0.9 × open circuit voltage is a good initial estimate for *31.04 UDC START LIM*.
☐	If necessary, adjust the stop settings. • *31.07 UDC STOP DLY* (page *80*) • *31.10 POWER STOP LIM* (page *80*) • *31.11 POWER STOP DLY* (page *80*) • *31.12 GOTO SLEEP MODE* (page *80*)	The default values are suitable for most installations.
☐	Monitor the operation of the inverter and fine-tune the voltage levels and delays for optimal performance.	You must continue the monitoring for at least a couple of days.
AUTOMATIC FAULT RESET		
☐	If necessary, enable the automatic reset logic. • *30.04 RESET DELAY [s]* (page *78*) • *30.05 NUMBER OF TRIALS* (page *78*) • *30.11 AUTO RESET MASK* (page *79*)	You are recommended to enable the automatic reset logic if the inverter is not controlled through the fieldbus interface.
GRID CONNECTION		
☐	Adjust the settings for Grid monitoring with parameters *44.02 OVER FREQ 1 LIM* … *44.17 OVER VOLT 2 TIME* (pages *157*…*158*). • Undervoltage • Overvoltage • Underfrequency • Overfrequency	These settings are usually specified by the grid operator.
☐	Adjust the settings for Cut-in condition checking with parameters *44.18 CUT-IN CHECK ENA* … *44.23 CUT-IN DELAY* (pages *159*…*159*). These settings define the voltage and frequency ranges where the inverter can start, as well as a connection delay.	These settings are usually specified by the grid operator.
ACTIVE POWER LIMITATION		
☐	Adjust the settings for Active power limitation from grid overfrequency with the following parameters. • *42.07 P FREQ LIM ENA* … *42.11 P LIMITING FREQ 3* (pages *153*…*154*) • *42.13 P(f) RETURN DELAY* (page *154*) • *42.14 P(f) RETURN RAMP* (page *154*)	These settings are usually specified by the grid operator.
☐	Adjust the settings for Active power limitation from grid overvoltage with parameters *42.20 UAC PLIM MODE SEL* … *42.27 UAC PLIM LEVEL 2* (pages *155*…*156*).	These settings are usually specified by the grid operator.
☐	Adjust the settings for active power ramping after start with parameters with parameters *42.05 RESTR ACTPOW GRD1* (page *152*) and *42.06 RESTR ACTPOW GRD2* (page *153*).	These settings are usually specified by the grid operator.

☑	Description	Comments
☐	Check whether external active power limitation (that is, an active power limitation signal outside of the inverter) is needed. You can write the power limit value to parameter *31.16 POWER LIMITING* (page *81*).	You can limit the output power of the inverter, for example, to protect the AC network in certain situations.
REACTIVE POWER		
☐	If the inverter is used for generating reactive power (capacitive or inductive), check the setting of parameter *42.12 POWER PRIORITY* (page *154*). By default, the inverter considers active power more important than reactive power if the current limit is reached.	-
☐	Select the reactive power reference type with parameter *24.03 Q POWER REF SEL* (page *74*). If you use reference type UAC REF, Q(U) REF or COS PHI f(P), adjust the characteristic curve and/or other necessary settings.	**Note:** The reference value for reactive power (parameter *24.02 Q POWER REF*) must be written according to the selected reference type.
☐	If necessary, enable the reactive power compensation mode with parameter *24.04 Q POWER AT LOW DC* (page *74*). In this mode, the inverter can generate reactive power even when there is no active power available from the solar generator (that is, during night-time).	**Note:** The inverter does not need the solar generator to generate reactive power.
☐	Set the maximum allowed reactive current with parameters *24.22 IQ CAP LIMIT* (page *138*) and *24.23 IQ IND LIMIT* (page *138*).	-
LOW VOLTAGE RIDE-THROUGH		
☐	If necessary, enable the Low voltage ride-through (LVRT) function with parameter *40.01 LVRT MODE* (page *146*).	These settings are usually specified by the grid operator.
☐	Adjust the LVRT settings with parameters *40.03 LVRT RETURN RAMP* … *40.28 LVRT U/Un END* (pages *146*…*148*). • Dip curve • Return ramp for active power	These settings are usually specified by the grid operator.
☐	Adjust the Grid support settings with parameters *41.01 GRID SUPPORT MODE* … *41.11 RT IQREF* (pages *148*…*150*). • Grid support curve **OR** • Fixed current reference	These settings are usually specified by the grid operator.
ANTI-ISLANDING		
☐	If necessary, enable island detection with parameter *45.01 ISLAND DETECTION* (page *160*).	These settings are usually specified by the grid operator. **Note:** If you select the restart mode, Low voltage ride-through (LVRT) is needed for a fast restart (delay less than 30 seconds).
☐	If necessary, adjust the settings for Anti-islanding with parameters *45.02 ANTI-ISLAND MODE* … *45.06 ANTI-ISLAND DELAY* (pages *160*…*161*).	These settings are usually specified by the grid operator.

☑	Description	Comments
CONNECTION TO THE REMOTE SYSTEM		
☐	If the inverter is equipped with the NETA-01 Ethernet adapter module, and the module is used for transmitting data to the remote monitoring portal, configure the remote monitoring according to *ABB Remote monitoring portal user's manual* (3AUA0000098904 [English]).	-
AUTOMATIC START		
☐	If you want the inverter to start automatically after an auxiliary power loss, configure the automatic start functionality.	**Note:** If automatic start is in use, the inverter will start even if the start button has not been pressed on the control panel.

4

Program features

What this chapter contains

This chapter describes the program features of the PVS800 central inverter. For each feature, there is a list of related parameters, faults and alarms if applicable.

Control interfaces

Local vs. External control

The PVS800 central inverter can be controlled/monitored:

- locally from control panel
- locally from DriveWindow PC tool (connect the fibre optic cables to DDCS channel CH3 on the RDCO DDCS Communication Option module)
- externally through I/O and/or the fieldbus interface.

With control panel or DriveWindow PC tool, the user can change parameters, view/reset the fault history, and stop the inverter.

Control panel

Both control units of the PVS800 can be monitored and controlled locally from a single CDP 312R control panel. Most of the essential functions (start, stop, fault reset, etc.) of the inverter are available through the master control program. In case the parameters, fault history, etc. of the inverter unit must be accessed, select control unit ID 2 in Control Unit Selection mode (see page *23*).

DriveWindow

DriveWindow and other tools can be connected to DDCS channel CH3 on the master control unit (RDCU, designation A43), either in a ring or a star configuration using NDBU branching units. With multiple inverters, different node numbers must be set for each inverter before starting the communication (see parameter *70.15 CH3 NODE ADDR*, page *106*). This setting can be made with control panel CDP 312R or by a point-to-point connection with DriveWindow. The new node address becomes valid on the next power-up of the control unit.

Fieldbus

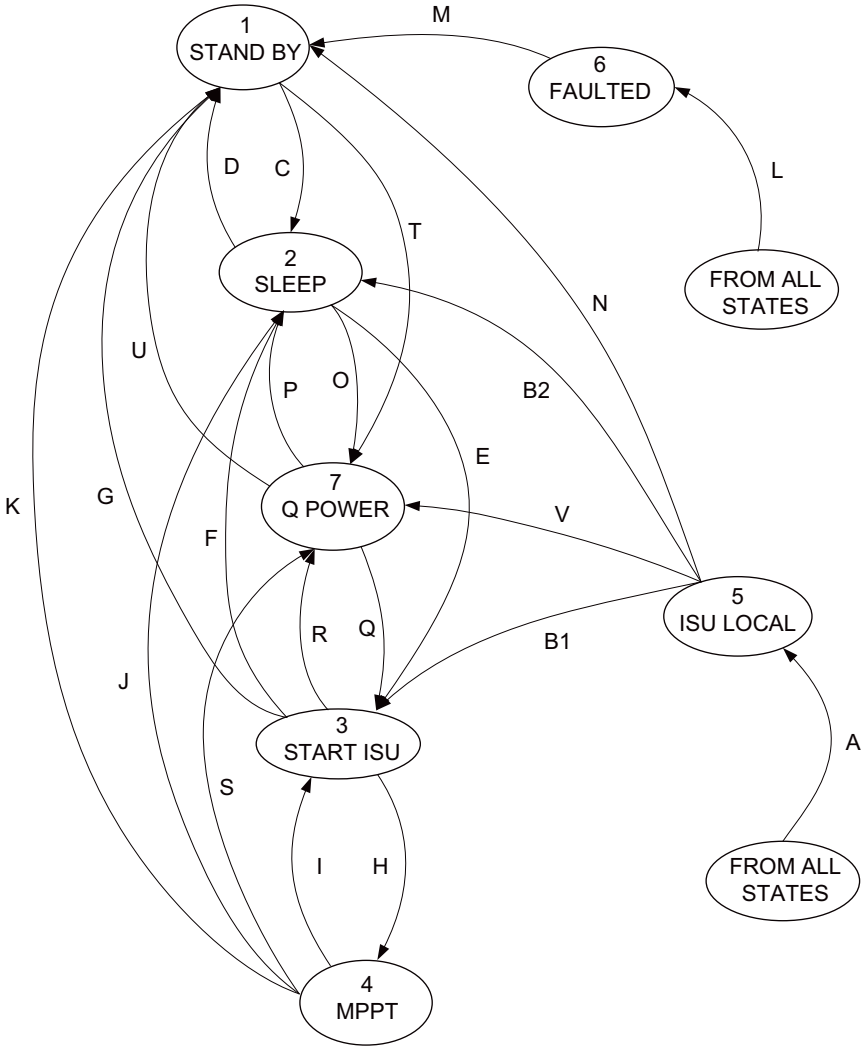
For information on how to control/monitor the PVS800 through an external control system, see chapter *Fieldbus control* (page *197*).

I/O

The PVS800 can be controlled and monitored with digital and analog signals connected to the master control unit. See the hardware manual for the available connections. See also section *Automatic fault reset* (page *47*).

PVS800 state machine

The PVS800 follows the state machine shown below.



The following table describes the PVS800 machine states. The required signals are shown in the table describing the conditions of state transitions.

State	Description
STANDBY	The inverter is powered and it is waiting for a start command. The power-up initialization routine is performed and the inverter unit is ready. There are no active faults. The DC and AC contactors are open.
SLEEP	The start command is active but the inverter is waiting for all start conditions to be filled. The start conditions includes a sufficient DC voltage level and corresponding time delay as well as wake up signals.
START ISU	The start command is active and all start conditions are met. The start command is sent to the inverter unit and the cut-in procedure is activated. The inverter synchronizes and connects to the grid if all required conditions are fulfilled. After the grid connection, the DC contactors will be closed.
MPPT	The maximum power point tracker (MPPT) state is the normal operation state of the PVS800 when the inverter is feeding power to the grid. The inverter is producing maximal power under available conditions.

State	Description
ISU LOCAL	The inverter control unit is switched to the local control mode. This mode can be used, eg, for testing and commissioning purposes even without the DC power. For more information about the ISU local mode, see section *Starting the inverter unit without solar generator power* on page *34*.
FAULTED	The PVS800 is set to the faulted state when a fault occurs in the master control program or in the inverter control program. The inverter is stopped and AC and DC contactors are opened.
Q POWER	Reactive power compensation mode is activated, the start command is active and the inverter is waiting for all start conditions to be met. In this state, reactive power can be generated with the DC contactor open. The inverter stays running until the reactive power reference falls below a certain level for a certain time delay. The inverter is then stopped and the AC contactor opened. When the reactive power reference reaches the same level again, the AC contactor is closed and the inverter started again.

The conditions for state transitions are as follows:

A	*08.05 PVA STATUS WORD* bit 1 = 1
B1	*08.05 PVA STATUS WORD* bit 1 = 0 **AND** $U_{DC} \geq$ *31.04 UDC START LIM* **AND** start command ON
B2	*08.05 PVA STATUS WORD* bit 1 = 0 **AND** $U_{DC} <$ *31.04 UDC START LIM* **AND** start command ON **AND** *24.04 Q POWER AT LOW DC* = OFF
C	Start command ON **AND** *08.05 PVA STATUS WORD* bit 3 = 1 **AND** *31.01 ENABLE MPPT* = 1 **AND** *24.04 Q POWER AT LOW DC* = OFF
D	Start command removed **OR** *08.05 PVA STATUS WORD* bit 3 = 0 **OR** *31.01 ENABLE MPPT* = 0
E	$U_{DC} \geq$ *31.04 UDC START LIM* **AND** *31.05 UDC START DLY* elapsed **AND** *31.13 WAKE UP SOURCE* > *31.14 WAKE UP START LIM* **AND** *31.15 WAKE UP START DLY* elapsed **AND** *08.07 GND STATUS WORD* bit 2 = 1
F	$U_{DC} <$ *31.06 UDC STOP LIM* **AND** *31.07 UDC STOP DLY* elapsed **AND** *24.04 Q POWER AT LOW DC* = OFF
G	Start command removed **OR** *08.05 PVA STATUS WORD* bit 3 = 0 **OR** *31.01 ENABLE MPPT* = 0
H	*08.05 PVA STATUS WORD* bit 0 = 1
I	*08.05 PVA STATUS WORD* bit 0 = 0
J	($U_{DC} <$ *31.06 UDC STOP LIM* **AND** *31.07 UDC STOP DLY* elapsed) **OR** (*31.09 POWER SOURCE* < *31.10 POWER STOP LIM* **AND** *31.11 POWER STOP DLY* elapsed) **AND** *24.04 Q POWER AT LOW DC* = OFF
K	Start command removed **OR** *31.01 ENABLE MPPT* = 0 **OR** *08.05 PVA STATUS WORD* bit 3 = 0
L	A fault occurred. Exception: From the ISU LOCAL mode, the inverter is not set to the FAULTED state even if a fault occurs.
M	Reset command was given
N	*08.05 PVA STATUS WORD* bit 1 = 0 **AND** start command OFF
O	*24.04 Q POWER AT LOW DC* = ON
P	*24.04 Q POWER AT LOW DC* = OFF
Q	$U_{DC} \geq$ *31.04 UDC START LIM* **AND** *31.05 UDC START DLY* elapsed **AND** *31.13 WAKE UP SOURCE* > *31.14 WAKE UP START LIM* **AND** *31.15 WAKE UP START DLY* elapsed **AND** *08.07 GND STATUS WORD* bit 2 = 1

R	U_{DC} < *31.06 UDC STOP LIM* **AND** *31.07 UDC STOP DLY* elapsed **AND** *24.04 Q POWER AT LOW DC* = ON
S	(U_{DC} < *31.06 UDC STOP LIM* **AND** *31.07 UDC STOP DLY* elapsed) **OR** (*31.09 POWER SOURCE* < *31.10 POWER STOP LIM* **AND** *31.11 POWER STOP DLY* elapsed) **AND** *24.04 Q POWER AT LOW DC* = ON
T	Start command ON **AND** *24.04 Q POWER AT LOW DC* = ON **AND***08.05 PVA STATUS WORD* bit 3 = 1 **AND** *31.01 ENABLE MPPT* = 1
U	Start command OFF **OR** *08.05 PVA STATUS WORD* bit 3 = 0 **OR** *31.01 ENABLE MPPT* = 0
V	*08.05 PVA STATUS WORD* bit 1 = 0 **AND** U_{DC} < *31.04 UDC START LIM* **AND** start command ON **AND** *24.04 Q POWER AT LOW DC* = ON

The parameters above are described in chapter *Master control program parameters*.

Maximum power point tracking (MPPT)

The maximum power point of a solar panel refers to the point on the output current/voltage curve where the product of current and voltage is at maximum. The current and voltage are dependent on solar radiation and panel temperature, so the maximum power point may move on the curve. There may even be multiple maximum points.

The internal Maximum power point tracking (MPPT) function of the PVS800 automatically operates the solar panels at their maximum power point under all conditions.

External MPPT reference

In normal use, the internal MPPT algorithm provides the PVS800 with a DC reference. An external DC reference can alternatively be used if necessary.

Settings

Inverter control program: Parameter group *39 MPPT CONTROL* (page *145*)

Diagnostics

Master control program: Parameters *08.04 PVA STATES* (page *58*) and *08.05 PVA STATUS WORD* (page *59*)

Operation voltages

The normal operation range of the maximum power point tracking (MPPT) depends on the inverter nominal power according to the table below.

Inverter power	MPPT range
100 kW, 250 kW, 500 kW	450…825 V
315 kW, 630 kW, 875 kW	525…825 V
1000 kW	600…850 V

Starting the inverter unit without solar generator power

The inverter unit of the PVS800 can be started in local control with the solar generator disconnected (with DC contactor open) as long as the inverter is connected to the grid. This special mode can be used for testing during commissioning or troubleshooting. In this mode the inverter does not produce active power.

In the ISU local mode the inverter can be run without solar modules connected to the inverter, for example, to test the start-up procedure in an existing AC grid. DC contactors are not closed in the ISU LOCAL mode.

Settings

- To switch control to the inverter control program, see instructions in *Control Unit Selection mode* on page *23*.
- To switch to the local control mode and start the inverter, see instructions in *How to start and stop the PVS800* on page *16*.

Grid identification

At first start, the inverter unit adapts itself to the grid automatically. No grid data needs to be set by the user.

During identification, the grid voltage, frequency and phase order are recognized. This takes approximately four seconds.

Automatic grid identification is active by default. This means that the grid identification is repeated every time when the PVS800 is started after a break in the auxiliary power supply. Automatic grid identification can be deactivated with parameter *99.08 AUTO LINE ID RUN* (page *175*) if the grid identification is successfully completed during commissioning. Manual grid identification can also be chosen.

Settings

Inverter control program: Parameters *99.07 LINE SIDE ID RUN* (page *174*) and *99.08 AUTO LINE ID RUN* (page *175*)

Diagnostics

- Master control program: Parameter *09.11 SUPPLY FAULT WORD*, bit 9 (page *60*)
- Fault *>NET VOLT (3285)* (page *183*)

Cut-in condition checking

In some grid codes it is required that the grid is normal for a specified time before the inverter can start. The PVS800 can be set to perform a cut-in condition (that is, start condition) check for the grid based on measurements from the NAMU board. The check makes sure that the inverter will not start until the grid frequency and voltage are within pre-defined limits for longer than an adjustable delay.

If other start conditions (for example, the DC voltage) give a permission to start, but the cut-in condition check fails, the inverter generates an alarm.

Settings

Inverter control program: Parameters *44.18 CUT-IN CHECK ENA* … *44.23 CUT-IN DELAY* (pages *159*…*159*)

Diagnostics

Alarm *>RUN DISABLE (8194)* (page *184*)

DC overvoltage monitoring

The PVS800 will not start if the measured DC voltage exceeds an internal start limit (1000 V by default). The voltage must remain below the limit for 60 seconds before the inverter can start.

If the DC voltage exceeds an internal limit (900 V by default) while the inverter is running in the MPPT mode, the inverter will go to Sleep mode. This may be caused by active power limitation or incorrect solar array sizing.

Diagnostics

- Master control program: Parameter *09.15 PVA ALARM WORD*, bit 6 (page *62*)
- Alarm *UDC HIGH LIM (32A7)* (page *184*)

Automatic start after a power-up

The PVS800 can be set to start automatically after the auxiliary power to the control units is switched on. This enables the PVS800 to start after a power failure without the need of an operator locally pressing the Start button.

To use this functionality, I/O control must be enabled (*10.02 ENABLE I/O CTRL*, page *64*). If a constant start command is selected by parameter *10.04 I/O START SOURCE* (page *64*), the PVS800 will start automatically after the auxiliary power is switched On. The default input for the Start/Stop signal is digital input DI2 on the master control unit [A43]. A constant value 1 can be selected by setting parameter *10.04 I/O START SOURCE* to C.00001. Note that a wire connection to DI2 is not needed.

If the PVS800 is equipped with an emergency stop relay (option +Q951), it must be acknowledged before the Start command is accepted. This can be done with a relay output on the master control unit (see parameter *10.03 EM STOP AUTORESET*, page *64* and the hardware manual).

WARNING! If I/O control is enabled and a Start command is active, the PVS800 will start after the auxiliary power to the control units is switched On.

Settings

Master control program: Parameters *10.02 ENABLE I/O CTRL* … *10.05 I/O RESET SOURCE* (page *64*)

Diagnostics

Alarm *IO START ENA (61AA)* (page *182*)

Reactive power control

The PVS800 is capable of generating a selectable amount of reactive power to the grid (positive = capacitive, negative = inductive). A reference value for the reactive power can be given through the CDP312R control panel, PC tools, fieldbuses or PLC. Other inputs (like analog and digital inputs) can be used with an adaptive program.

A reference type for the reactive power can be selected from eight different formats, see parameter *24.03 Q POWER REF SEL* (page *74*). A reference value must be finally written to a parameter *24.02 Q POWER REF* (page *72*) according to the selected reference format. Minimum limits for the reactive power reference are available in parameters *24.08 COS PHI CAP LIMIT* and *24.09 COS PHI IND LIMIT* (page *137*).

Note: The PVS800 can generate reactive power according to the given reference if the current limit of the inverter is not exceeded. If the PVS800 is already feeding maximum allowed current to the grid, parameter *42.12 POWER PRIORITY* defines if active or reactive power is limited. In this case the actual reactive power and the reactive power reference may not be the same.

See also section *Operation voltages* on page *34*.

Settings

- Master control program: Parameter group *24 REACTIVE POWER* (page *72*)
- Inverter control program: Parameters *24.08 COS PHI CAP LIMIT* (page *137*), *24.09 COS PHI IND LIMIT* (page *137*) and *42.12 POWER PRIORITY* (page *154*)

Diagnostics

Master control program: Parameter *01.14 REACTIVE POWER* (page *51*)

Reactive power compensation

The PVS800 can be used for reactive power compensation even if the inverter is not producing active power. Reactive power compensation can be done without any power from the solar generator.

When the reactive power compensation mode is activated with parameter *24.04 Q POWER AT LOW DC* (page *74*), the inverter always goes to the Q POWER state instead of the SLEEP state when low DC voltage or output power is available in the evening. In the Q POWER state, the DC contactor is always open. The inverter stays running until the reactive power reference falls below the level defined by parameter *24.06 Q POW ZERO MARGIN* (page *137*) for the time defined by *24.05 Q POWER STOP DLY* (page *137*). The inverter is then stopped and the AC contactor opened. When the reactive power reference reaches the zero margin again, the AC contactor is closed and the inverter started again.

Transition actions to the reactive power compensation mode and MPPT mode are automatic and based on normal starting and stopping triggers, such as the DC voltage and output power level. Reactive power generation is not stopped during the transition actions. In the reactive power compensation mode, the inverter uses the same reactive power reference as in the MPPT mode.

See also section *PVS800 state machine* (page *31*).

Settings

- Master control program: Parameters *24.02 Q POWER REF* (page *72*), *24.03 Q POWER REF SEL* (page *74*) and *24.04 Q POWER AT LOW DC* (page *74*)
- Inverter control program: Parameters *24.05 Q POWER STOP DLY* (page *137*) and *24.06 Q POW ZERO MARGIN* (page *137*)

Diagnostics

- Master control program: Parameters *01.14 REACTIVE POWER* (page *51*) and *08.04 PVA STATES* (page *58*)
- Inverter control program: Parameters *07.01 MAIN CTRL WORD*, bit 4 (page *120*) and *08.06 MPPT STATUS* bit 14 (page *123*)

Active power limitation

The active output power of the PVS800 can be limited using an external source (for example, through the grid operator). The power limitation signal can be directly sent to the PVS800 via the CDP312R control panel, PC tools, fieldbuses or PLC. Other inputs like analog and digital inputs can be used with an adaptive program.

A limitation signal for the active power must be written to parameter *31.16 POWER LIMITING* (page *81*). There is a ramping for the active power limitation (by default, a 10-second ramp if there is a stepwise change of 100% in the limitation signal).

An active power limitation is indicated by *08.08 LIMIT WORD* (page *60*). The active power can also be limited by the inverter itself. This may happen, for example, if the ambient temperature exceeds limits or if the reactive power is prioritized and the inverter current limit is reached.

Settings

Master control program: Parameters *31.16 POWER LIMITING* (page *81*)

Inverter control program: Parameters *42.12 POWER PRIORITY* (page *154*) and *90.04 D SET 12 VAL 1* (page *108*)

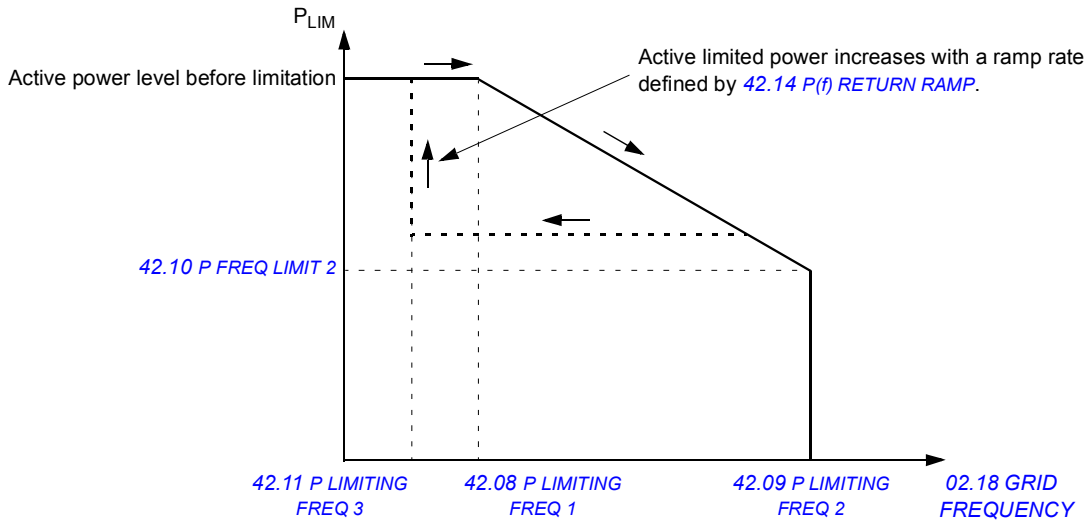
Diagnostics

Master control program: Parameter *08.08 LIMIT WORD* (page *60*)

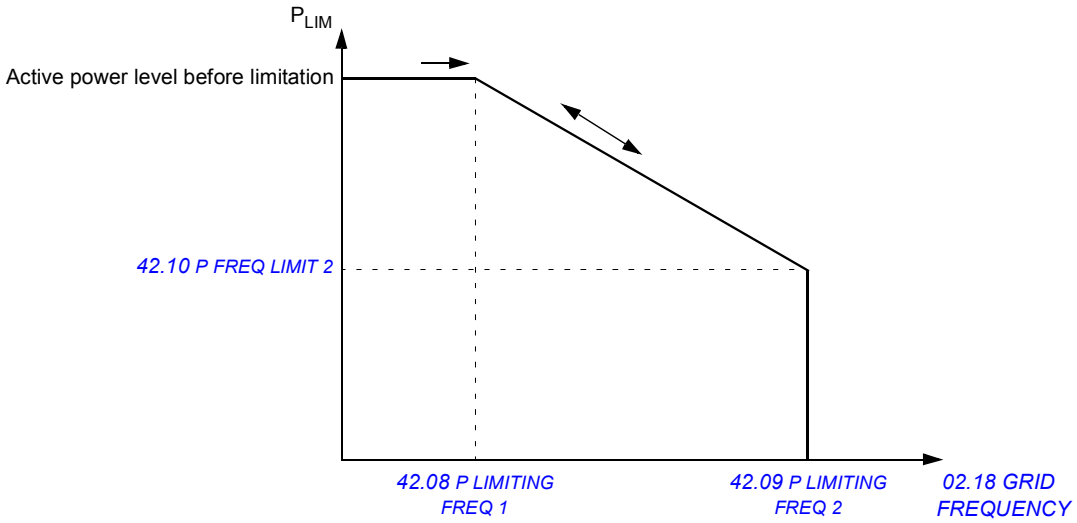
Active power limitation from grid overfrequency

In some grid codes and standards it is required that active power is limited as the grid frequency increases. The PVS800 has an adjustable active power limitation based on the measured grid frequency. The active power limitation curve can be of two types: incremental or free-running.

The diagram below shows an example of the incremental curve.



The diagram below shows an example of the free-running curve.



Settings

Inverter control program: Parameters *42.07 P FREQ LIM ENA* … *42.11 P LIMITING FREQ 3* (pages *153*…*154*), *42.13 P(f) RETURN DELAY* (page *154*) and *42.14 P(f) RETURN RAMP* (page *154*)

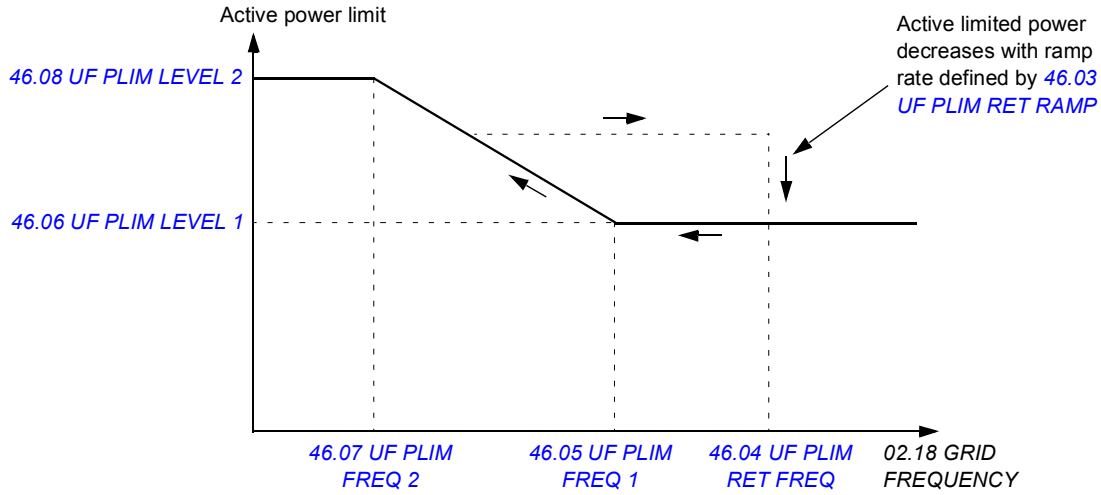
Diagnostics

Inverter control program: *08.03 LIMIT WORD* (page *122*)

Active power limitation during grid underfrequency

In some grid codes and standards it is required that the maximum active output power of the inverter is increased as the grid frequency decreases. The PVS800 has an adjustable active power limitation curve based on the measured grid frequency.

The active power limit starts to increase when the grid frequency is below *46.05 UF PLIM FREQ 1* as shown in the figure below. The active power limit cannot decrease while the grid underfrequency situation is ongoing. As the grid frequency returns to a normal level defined by parameter *46.04 UF PLIM RET FREQ*, the active power limit is ramped down to the level defined by parameter *46.06 UF PLIM LEVEL 1*.



Settings

Inverter control program: Parameters *46.01 UF PLIM MODE SEL* (page *162*) … *46.08 UF PLIM LEVEL 2* (page *162*)

Diagnostics

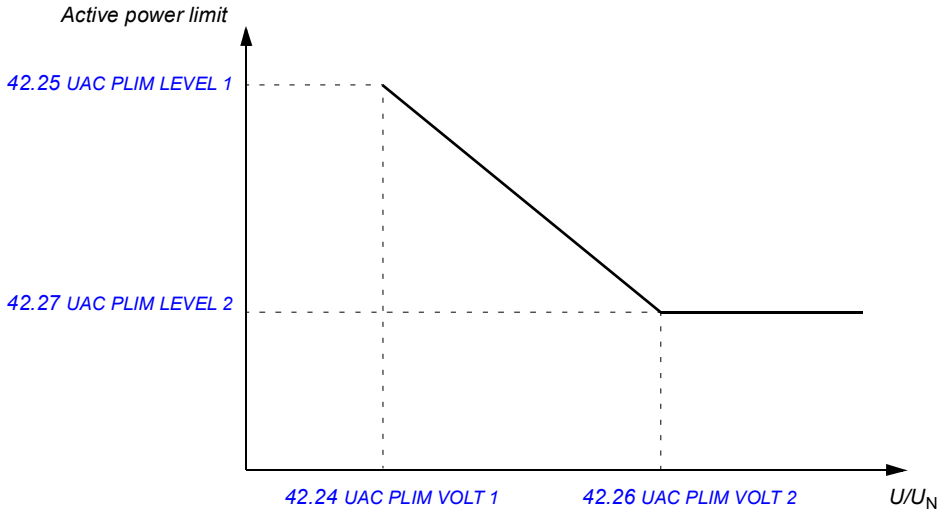
Inverter control program: Parameters *08.03 LIMIT WORD* (page *122*) and *08.07 GRID CODE STATUS* (page *123*)

Active power limitation from grid overvoltage

In some grid codes and standards it is required that active power is limited as the grid voltage increases. The PVS800 has an adjustable active power limitation based on the measured grid voltage. The active power limitation curve can be of two types: incremental or free-running.

The input for the active power limitation from grid overvoltage can be selected between the measured AC voltage and a 10-minute moving average of the AC voltage.

The diagram below shows an example of the limitation curve.



Settings

Inverter control program: Parameters *42.20 UAC PLIM MODE SEL* … *42.27 UAC PLIM LEVEL 2* (pages *155*…*156*)

Diagnostics

Inverter control program: *08.03 LIMIT WORD* (page *122*)

Increase rate limitation for active power in the MPPT mode

In the MPPT mode, the ramp-up rate of active power can be limited with a function defined by parameters in inverter control program parameter group *42 GENER POWER LIMIT*. Increase rate limitation is not used until active power ramp-up after the start is completed.

Settings

Inverter control program: Parameters *42.17 MPPT P RAMP ENA* (page *155*) and *42.18 MPPT P RAMP UP* (page *155*)

Diagnostics

Inverter control program: Parameter *08.03 LIMIT WORD* (page *122*)

Active power ramp-up after a grid fault

If the PVS800 ends up with a grid fault and a new start is made after a fault reset, it is possible to limit active power with a ramp. When a fault is cleared by resetting and the PVS800 is started up again, the active power is increased with a ramp rate defined by parameter *42.05 RESTR ACTPOW GRD1* (page *152*).

Grid faults are LVRT faults, external grid monitoring faults and NAMU grid monitoring faults. These faults are listed below:

RT NET LOST	(32A1)	9.11 SUPPLY FAULT WORD	bit 9
GRID MON FLT	(8189)	9.10 PV FLT ALM WORD	bit 0

AC UNDERFREQ	(3142)	9.01 FAULT WORD 1	bit 8
AC OVERFREQ	(3141)	9.01 FAULT WORD 1	bit 9
AC UNDERVOLT	(3120)	9.01 FAULT WORD 1	bit 10
AC OVERVOLT	(3110)	9.01 FAULT WORD 1	bit 11

Parameter *42.06 RESTR ACTPOW GRD2* (page *153*) can be used if active power must be ramped up after other faults or after a stop.

Settings

- Inverter control program parameter for active power ramp-up when the PVS800 is started up after a grid fault: *42.05 RESTR ACTPOW GRD1* (page *152*)
- Inverter control program parameter for active power ramp-up when the PVS800 is started up after other faults or a stop: *42.06 RESTR ACTPOW GRD2* (page *153*)

Sleep mode

The PVS800 can be set to automatically go into sleep mode as the DC output voltage of the solar panels and/or output power of the inverter falls below a specified limit in the evening. The inverter disconnects from the grid, but the PVS800 still monitors the output of the panels, and automatically starts when the DC voltage rises above a pre-defined level.

See also section *PVS800 state machine* (page *31*).

Settings

Master control program: Parameter group *31 PVA CONTROL* (page *79*)

Diagnostics

Master control program: Parameter *08.04 PVA STATES* (page *58*)

Low voltage ride-through (LVRT)

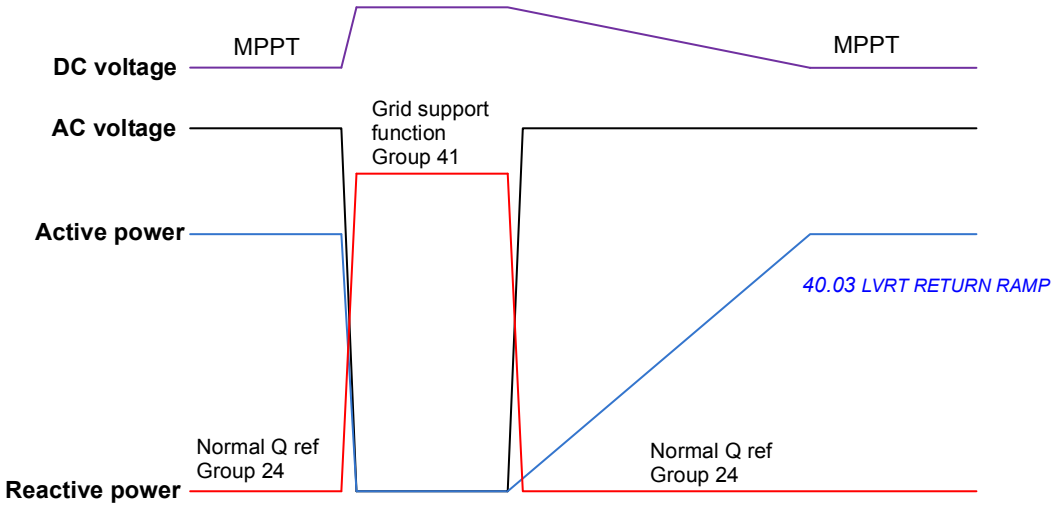
The Low voltage ride through (LVRT) function is used to cope with voltage dips in the grid. The function is programmable, and the user can define when the inverter must stay connected to the grid (that is, the depth and length of the grid voltage transient) and when the inverter is required to disconnect.

In addition to the LVRT function, grid support is also available. This means a possibility to support the grid by feeding capacitive reactive current to the grid when the grid voltage stays below a defined area.

For the Grid support function to work, LVRT must be active and the grid support settings be set in parameter group *41 GRID SUPPORT* (page *148*). The reactive current reference is defined as a function of the grid voltage. Four different voltage levels can be defined. When grid voltage is between the defined levels, linear interpolation is used to calculate the exact reactive current reference.

The Grid support function is activated and the operation mode is selected with parameter *41.01 GRID SUPPORT MODE* (page *148*). The amount of grid support is defined by parameters *41.03*…*41.10* (pages *149*…*150*). A fixed amount of reactive current can be given with parameter *41.11 RT IQREF* (page *150*). If the value of parameter *41.11 RT IQREF* is non-zero, then parameters *41.03*…*41.10* are bypassed. The reactive current ramp-up time during LVRT can be changed with parameter *41.12 RT IQ RAMP UP* (page *150*).

See the diagram below.



Settings

Parameters are visible but password-protected. The PVS800 must to be stopped before parameters can be changed.

Inverter control program:

- Parameters for LVRT: *40.01 LVRT MODE* (page *146*), *40.03 LVRT RETURN RAMP* … *40.28 LVRT U/Un END* (pages *146*…*148*) and *42.02 GENLIM RAMP UP* (page *152*)
- Parameters for Grid support: Group *41 GRID SUPPORT*(page *148*)

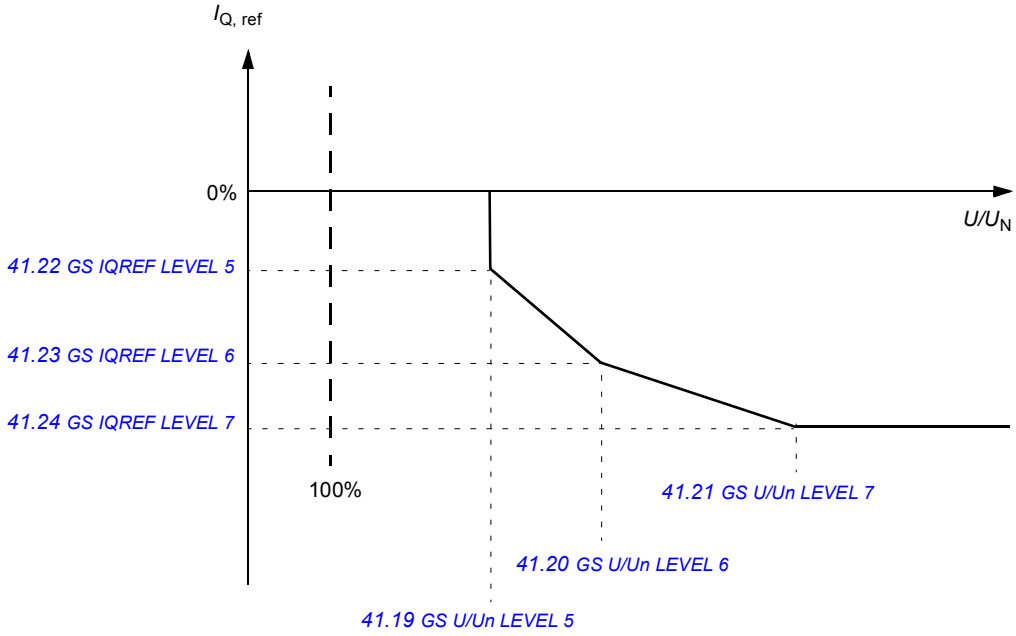
Diagnostics

- Inverter control program: Parameter *08.01 MAIN STATUS WORD* (page *121*)
- Alarm *LVRT RIDETRGH (32A0)* (page *190*)
- Fault *RT NET LOST (32A1)* (page *193*)

High voltage ride-through (HVRT)

The High voltage ride-through (HVRT) function is similar to Low voltage ride-through, except that it is used to cope with voltage peaks instead of voltage dips. The function is programmable, and the user can define when inductive reactive current must be generated. Inductive reactive current helps to reduce grid overvoltage.

The diagram below illustrates the operation of the function.



Settings

Inverter control program: Parameters *41.19 GS U/Un LEVEL 5* (page *151*) … *41.24 GS IQREF LEVEL 7* (page *151*)

Diagnostics

Inverter control program: Parameter *08.01 MAIN STATUS WORD* (page *121*)

Grid monitoring for voltage and frequency

The PVS800 can monitor grid conditions (voltage and frequency) with internal measurements or with an external grid monitoring device (usually a grid monitoring relay). Depending on the installation country, an external third party -certified relay may be needed.

Grid monitoring relay (options +Q969, +Q974 and +Q975)

The output of the grid monitoring relay is a signal that informs whether the grid is OK. The grid monitoring signal is connected to the RDIO-01 module installed on RDCU A41. See the hardware manual for connection details. The usage mode of the external grid monitoring can be selected from parameter *39.06 GRIDMON SUPV MODE* (page *145*).

Internal grid monitoring

The internal grid monitoring is based on three-phase voltage measurements via a NAMU measurement board. A positive sequence of the grid voltage (*01.11 MAINS VOLTAGE*, page *117*) and a grid frequency (*02.18 GRID FREQUENCY*, page *119*) are calculated from measurements. These values are compared against protection limits to see if the grid is OK. The internal grid monitoring has three operation modes: alarm (the inverter continues to run with a grid monitoring alarm), fault (the inverter stops with a grid monitoring fault) and none (the internal grid monitoring is disabled).

The internal grid monitoring has two adjustable settings for under voltage, over voltage, under frequency and over frequency. Each of these settings has its own adjustable time delay (that is, how long time the grid must be in an abnormal condition before the inverter reacts). Settings for the internal grid monitoring can be found from parameter group *44 GRID MONITORING* (page *156*).

Settings

Inverter control program:

- Parameters *39.06 GRIDMON SUPV MODE* (page *145*) and *39.07 GRIDMON RESTR DLY* (page *145*)
- Parameter group *44 GRID MONITORING* (page *156*)

Diagnostics

- Inverter control program: Signals *01.11 MAINS VOLTAGE* (page *117)*, *02.18 GRID FREQUENCY* (page *119*)
- Alarms *AC OVERVOLT (31A0)* (page *185*), *AC UNDERVOLT (31A1)* (page *185*), *AC OVERFREQ (31A2)* (page *185*), *AC UNDERFREQ (31A3)* (page *185*)
- Faults *AC OVERVOLT (3110)* (page *185*), *AC UNDERVOLT (3120)* (page *185*), *AC OVERFREQ (3141)* (page *185*), *AC UNDERFREQ (3142)* (page *185*)

Anti-islanding

Anti-islanding is used to prevent an island situation in an electrical network. An island in electrical network is a situation in which a generator is powering a part of the network even though power from the electrical utility network is cut off. Islanding can be dangerous to people working with the network and not realizing that the circuit is still powered. For that reason, distributed power generators must detect islanding and immediately stop producing power to the network.

In the PVS800, anti-islanding has two operation modes:

- fault (the inverter stops with an anti-islanding fault)
- restart (the inverter stops with an anti-islanding alarm and restarts after a user-adjustable delay).

In addition, anti-islanding has two different methods:

- passive anti-islanding
- reactive power variation (RPV).

Passive anti-islanding attempts to detect transient changes on the network frequency and use that information to decide whether the network is present. The island situation is theoretically possible if the load within the network matches the feeding power when there is a network failure. The above-mentioned situation cannot be detected only with the passive anti-island monitoring.

In addition to passive anti-islanding, the reactive power variation (RPV) can be used to verify the existence of the electrical network. With the RPV method, a small pulse type signal is injected to the network and the passive method is used to monitor rate changes in the network frequency.

Settings

Inverter control program: Parameter group *45 ANTI-ISLANDING* (page *160*)

Diagnostics

- Fault *>ANTI-ISLAND (819F)* (page *179*)
- Alarm *ANTI-ISLAND (81A0)* (page *186*)
- Fault *ANTI-ISLAND (8193)* (page *186*)

DC input current measurement

The total DC current can be measured from the DC bus with a current transducer. Parameter *01.18 DC CURRENT* shows the measured current.

As an option, the DC current can be measured from each DC input individually to detect possible inoperative DC inputs. If the current of any input deviates from the average current of all measured inputs, the inverter generates an alarm. The number of the supported DC inputs is 4…16. The current can be measured in both directions. All individual DC input currents are shown in parameter group *03 ACTUAL SIGNALS* (page *53*).

Note:

- The RAIO-01 analog I/O extensions used in DC current measurements must be set to RAIO-DDCS in parameter group *98 OPTION MODULES* (page *110*).

Settings

Master control program: Parameter groups *13 ANALOGUE INPUTS* (page *65*), *26 DC INPUT CONFIG* (page *75*) and *98 OPTION MODULES* (page *110*)

Diagnostics

- Master control program: Parameter group *03 ACTUAL SIGNALS* (page *53*), parameters *01.18 DC CURRENT* (page *51*) and *26.04 DC INPUT STATUS* (page *76*)
- Alarm *DC INPUT DEV (2185)* (page *180*)

String monitoring

The inverter software includes a string monitoring functionality that is based on measured string currents inside junction boxes. Measured values are sent via Modbus to the inverter and stored to inverters parameters.

With the string monitoring function, faulty strings can be detected based on the decreased string current. For more information, see *PVS-JB-8-M junction box with monitoring for PVS800 central inverters user's manual* (3AUA0000087106 [English]).

Settings

- See master control program parameter groups *30 FAULT FUNCTIONS* (page *77*), *32 STRING BOX ADDR* (page *82*) and *33 STRING MON SET* (page *83*)
- For status information, see master control program parameter groups *34 STRING MON STAT* (page *85*), *35 ENABLED STRINGS* (page *87*), *36 SBOX CUR DEV STA* (page *88*) and *40 STRING BOX 1 & 2* … *49 STRING BOX 19 & 20* (pages *89*…*93*)

Diagnostics

- Alarms: *SBOX 1 LINK (6195)* … *SBOX 20 LINK (61A8)* (page *184*)

Mailbox function

The Mailbox function can be used for parameter read and write operations targeted to either the master control unit or inverter control unit. When the function is used, only one communication adapter is required in the master control unit. The input and output values for the function are in master control program parameter group *28 MAILBOX*. If the read or write operation is targeted to the inverter control unit, an offset of 10000 must be added to the parameter address.

Settings

Master control program: Parameter group *28 MAILBOX* (page *76*)

Automatic fault reset

The PVS800 can be configured to reset its faults automatically. All faults excluding the inverter unit short circuit fault can be reset with the automatic reset function. The number of reset tries, as well as the interval between the individual resets, can be set by master control program parameters *30.04 RESET DELAY [s]* (page *78*) and *30.05 NUMBER OF TRIALS* (page *78*).

There is also an option to switch off the automatic reset function for certain faults. These faults are defined with parameter *30.11 AUTO RESET MASK* (page *79*).

WARNING! If the PVS800 was running before it was stopped by a fault, it will restart after a successful automatic reset and wake-up delay (if set).

Settings

Master control program: Parameters *30.04 RESET DELAY [s]* (page *78*), *30.05 NUMBER OF TRIALS* (page *78*) and *30.11 AUTO RESET MASK* (page *79*)

Diagnostics

- Master control program: Parameters *09.14 PVA FAULT WORD*, bit 8 (page *61*) and *09.15 PVA ALARM WORD*, bit 3 (page *62*)
- Alarm *AUTORESET A (6081)* (page *179*)
- Fault *AUTORESET F (6080)* (page *179*)

Fault history

Both control programs of the PVS800 have their own fault history. The fault logger of the master control program creates a history of all internal events of the master control program. To access the fault history, follow the directions under *How to view and reset the fault history* (page *18*).

Selected fault and warning events originating in the inverter unit are compiled into master control program parameters *09.11 SUPPLY FAULT WORD* (page *60*), *09.12 SUPPLY ALARM WORD* (page *61*), *09.14 PVA FAULT WORD* (page *61*) and *09.15 PVA ALARM WORD* (page *62*). These events are distinguished by a preceding “>” sign in the log and on the control panel display.

If a general warning *ISU WARNING (8186)* (page *182*) or general fault *ISU FAULT (8185)* (page *182*) is present in the fault history of the master control program, the fault history of the inverter control program should be checked to find out the exact cause. This can be done using the control panel by selecting control unit ID 2 in Control Unit Selection mode (see page *23*), and by viewing the fault history as described under *How to view and reset the fault history* (page *18*).

For more information about fault logging and tracing, see chapter *Fault tracing* (page *177*).

Diagnostics

- Master control program: Parameters *09.11 SUPPLY FAULT WORD* (page *60*) and *09.12 SUPPLY ALARM WORD* (page *61*)
- Inverter control program: Parameter group *09 FAULT WORDS* (page *125*)

Adaptive programming with DriveAP 2.x

Conventionally, the user can control the operation of the PVS800 by parameters. Each parameter has a fixed set of choices or a setting range, which makes programming easy but limits the choices. Adaptive programming makes free customization of the PVS800 master control program possible without the need for a special programming tool or language.

The adaptive program is built of standard function blocks included in the **master** control program (the **inverter** control program is not intended to be programmed this way). The DriveAP 2.x PC tool or the CDP 312R control panel is the programming tool.

The maximum size of the adaptive program is 10 blocks on 10 ms time level and 20 blocks on 100 ms time level. The user can document the program by drawing it on block diagram template sheets (maximum of 10 sheets).

For more information, see *Application guide: Adaptive program for PVS800 central inverters* (3AUA0000091276 [English]).

5

Master control program parameters

What this chapter contains

The chapter describes the parameters of the master control program of the PVS800. All connections discussed in the parameter descriptions of this chapter refer to those of the master control unit (RDCU unit, designation A43) unless otherwise indicated. This control unit is shown as “PVS800 PVA”, and has the ID number 1. The control program revision is of the format GSXR7xxx.

Parameter groups 10…99 are user-adjustable. Parameter groups 1…9 (actual signals) are only for monitoring (read-only, ie, no user setting is possible), though data can be written into the Control Words (parameter group 7) through an external control system.

Note: Some parameters cannot be changed when the PVS800 is running.

Terms and abbreviations

Term	Definition
Actual signal	Type of parameter that is the result of a measurement or calculation by the inverter. Actual signals can be monitored, but not adjusted, by the user. Parameter groups 1…9 typically contain actual signals.
B	Boolean
C	Character string
Def.	Default value
FbEq	Fieldbus equivalent: The scaling between the value shown on the panel and the integer used in serial communication. Serial communication data between fieldbus adapter and the control program is transferred in integer format. Thus, the actual and reference signal values are converted to 16-bit integer values. Fieldbus equivalent defines the scaling between the actual signal value in the control program and the integer equivalent used in serial communication. All the read and sent values are limited to 16 bits (-32768…32767). **Example 1:** If parameter *31.16 POWER LIMITING* in the master control program is set from an external control system, integer value 10000 corresponds to 100%.
I	Integer
P	Pointer
PB	Packed Boolean
R	Real
T	Data type (see B, C, I, R, PB)

Parameter groups 01…09

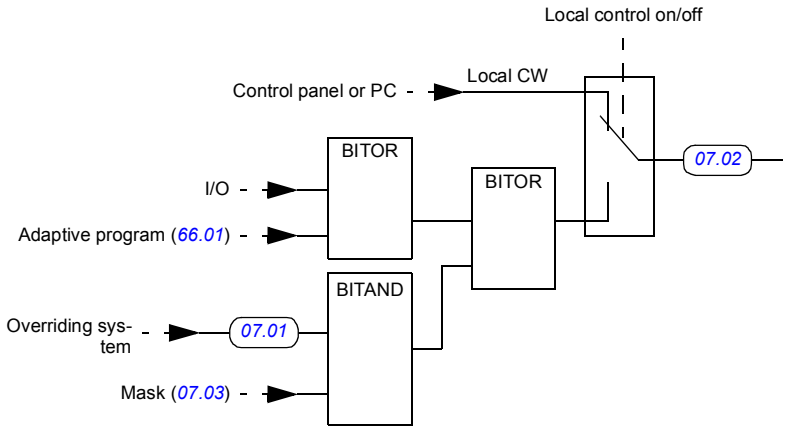
No.	Name/Value	Description	T	FbEq
01 ACTUAL SIGNALS		Various actual signals		
01.04	AC VOLTAGE L1	Measured grid voltage from the L1 phase	R	1 = 1 V
01.05	AC VOLTAGE L2	Measured grid voltage from the L2 phase	R	1 = 1 V
01.06	AC VOLTAGE L3	Measured grid voltage from the L3 phase	R	1 = 1 V
01.07	AC CURRENT L1	Measured output current from the L1 phase	R	1 = 1 A
01.08	AC CURRENT L2	Measured output current from the L2 phase	R	1 = 1 A
01.09	AC CURRENT L3	Measured output current from the L3 phase	R	1 = 1 A
01.10	AC POWER	Measured active power of the inverter: Positive = power flow from inverter to grid Negative = power flow from grid to inverter **Note:** Power values cannot be used to calculate the efficiency of inverter.	R	10 = 1 kW
01.11	AC POWER	Measured active power in percent of nominal power	R	100 = 1%
01.12	AC FREQUENCY	Measured grid frequency	R	100 = 1 Hz
01.13	COS PHI	Measured cosine phi	R	100 = 1
01.14	REACTIVE POWER	Measured reactive power of the inverter (positive = capacitive, negative = inductive)	R	10 = 1 kVAr
01.15	GRID IMPEDANCE	Reserved		1 = 1 ohm
01.16	INSUL RESISTANCE	Measured insulation resistance. This signal is valid only with option +Q954.	I	1 = 1 kohm
01.17	DC VOLTAGE	Reserved		1 = 1 V
01.18	DC CURRENT	Measured DC current	R	1 = 1 A
01.19	DC POWER	Shows measured or estimated DC power. Selection between measured and estimated values can be done with parameter *14.14 DC POWER SELECT*.	R	1 = 1 kW
01.20	INV TEMPERATURE	Estimated IGBT temperature of the inverter unit	R	1 = 1 °C
01.21	INV STATUS	Shows same status as in parameter *08.04 PVA STATES* (page *58*).	I	1 = 1
01.22	INV FAILURE	Inverter fault word **Bit / Value / Description** 0 / 1 / Inverter unit fault active 0 / 0 / No inverter unit fault active 1…15 / Reserved	PB	1 = 1
01.23	ALARM ACTIVE	Inverter alarm word **Bit / Value / Description** 0 / 1 / Inverter unit alarm active 0 / 0 / No inverter unit alarm active 1…15 / Reserved	PB	1 = 1
01.24	MAIN STATUS WORD	Shows same status as in parameter *08.01 MAIN STATUS WORD* (page *57*).	PB	1 = 1
01.25	TIME OF USAGE	Elapsed time counter. Runs when the control unit of the inverter unit is powered.	I	1 = 1 h
01.26	ENERGY PRODUCED	Counts the kilowatt hours of power flow from inverter to grid. Counter can be reset by parameter *16.09 RESET COUNTER* in the inverter control program (see page *134*).	I	1 = 100 kWh

No.	Name/Value	Description	T	FbEq
01.27	kWh COUNTER	Shows the kilowatts count from *01.26 ENERGY PRODUCED*. After 999 kilowatts, this counter wraps around to 0 and *01.28 MWh COUNTER* is incremented.	I	1 = 1
01.28	MWh COUNTER	Shows the megawatts count from *01.26 ENERGY PRODUCED*. After 999 megawatts, this counter wraps around to 0 and *01.29 GWh COUNTER* is incremented.	I	1 = 1
01.29	GWh COUNTER	Shows the gigawatts count from *01.26 ENERGY PRODUCED*.	I	1 = 1
01.30	BREAKER COUNTER	Counts main contactor closures. Counter can be reset by parameter *16.09 RESET COUNTER* in the inverter control program (see page *134*).	I	1 = 1
01.31	DC BREAKER COUNTR	Shows the number of DC contactor closures. Counter can be reset by parameter *16.17 RESET DC BRK CNT* in the inverter control program (see page *134*).	I	1 = 1
01.32	ENERGY LIMITING	Energy limit word **Bit** / **Value** / **Description** 0 / 1 / Power limitation active 1…15 / Reserved	PB	1 = 1
01.33	ENERGY LIM COUNTR	Reserved		1 = 1
01.34	PV MODULE DC MEAS	Measured solar generator voltage.	I	1 = 1
01.35	SOLAR RADIATION	Shows the value of the signal selected by parameter *14.01 SOLAR RADIATION* (see page *66*).	R	1 = 1 W/m^2
01.36	SOLAR IRRADIANCE	Shows the value of the signal selected by parameter *14.04 SOLAR IRRADIATION* (see page *67*).	R	1 = 1 W/m^2
01.37	PV MODULE TEMP	Shows the value of the signal selected by parameter *14.07 PV MODULE TEMP* (see page *67*).	R	1 = 1 °C
01.38	AMBIENT TEMP	Shows the value of the signal selected by parameter *14.08 AMBIENT TEMP* (see page *67*).	R	1 = 1 °C
01.39	EXTERNAL TEMP	Shows the value of the signal selected by parameter *14.09 EXTERNAL TEMP* (see page *68*).	R	1 = 1 °C
01.40	TRANSFORMER TEMP	Shows the value of the signal selected by parameter *14.10 TRA OIL TEMP* (see page *68*).	R	1 = 1 °C
01.41	TRANSF OIL LEV	Shows the value of the signal selected by parameter *14.11 TRA OIL LEVEL* (see page *68*).	R	1 = 1%
01.42	ISU ACTUAL 1	Data set 25, data word 1 transmitted by the inverter unit. See inverter parameter group *93 D SET TR ADDR* (page *171*).	I	1 = 1
01.43	ISU ACTUAL 2	Data set 25, data word 2 transmitted by the inverter unit. See inverter parameter group *93 D SET TR ADDR* (page *171*).	I	1 = 1
01.44	ISU ACTUAL 3	Data set 25, data word 3 transmitted by the inverter unit. See inverter parameter group *93 D SET TR ADDR* (page *171*).	I	1 = 1
02 ACTUAL SIGNALS		Various actual signals		
02.01	USED DC START LIM	Actual DC voltage start limit used (after photovoltaic cell temperature correction)	I	1 = 1
02.02	GND CURRENT ACT	Displays the actual grounding current measured by a PGND board (option +F282 / +F283). If the grounding option is not installed, the value of this signal is irrelevant.	R	1 = 0.02 mA

No.	Name/Value	Description	T	FbEq
02.03	MAINS VOLTAGE	Displays a mains voltage signal from the inverter control program.	R	1 = 1 V
02.04	CABINET TEMP	Shows the maximum value of measured cabinet temperature. This temperature is the highest temperature of the two PT100 sensors in PVS800.	R	1 = 1 °C
03 ACTUAL SIGNALS		Various actual signals		
03.01	DC CUR INPUT 1	Shows the measured current value of DC input 1.	R	10 = 1 A
03.02	DC CUR INPUT 2	Shows the measured current value of DC input 2.	R	10 = 1 A
03.03	DC CUR INPUT 3	Shows the measured current value of DC input 3.	R	10 = 1 A
03.04	DC CUR INPUT 4	Shows the measured current value of DC input 4.	R	10 = 1 A
03.05	DC CUR INPUT 5	Shows the measured current value of DC input 5.	R	10 = 1 A
03.06	DC CUR INPUT 6	Shows the measured current value of DC input 6.	R	10 = 1 A
03.07	DC CUR INPUT 7	Shows the measured current value of DC input 7.	R	10 = 1 A
03.08	DC CUR INPUT 8	Shows the measured current value of DC input 8.	R	10 = 1 A
03.09	DC CUR INPUT 9	Shows the measured current value of DC input 9.	R	10 = 1 A
03.10	DC CUR INPUT 10	Shows the measured current value of DC input 10.	R	10 = 1 A
03.11	DC CUR INPUT 11	Shows the measured current value of DC input 11.	R	10 = 1 A
03.12	DC CUR INPUT 12	Shows the measured current value of DC input 12.	R	10 = 1 A
03.13	DC CUR INPUT 13	Shows the measured current value of DC input 13.	R	10 = 1 A
03.14	DC CUR INPUT 14	Shows the measured current value of DC input 14.	R	10 = 1 A
03.15	DC CUR INPUT 15	Shows the measured current value of DC input 15.	R	10 = 1 A
03.16	DC CUR INPUT 16	Shows the measured current value of DC input 16.	R	10 = 1 A
04 INFORMATION		Program versions, control unit information		
04.01	SW PACKAGE VER	Displays the type and version of the firmware package. For PVS800 master control program revision 7xxx, the designation is GSXR7xxx.	C	-
04.02	DTC VERSION	Firmware version of a fixed part of the master control program that consists of operating system, communication control of the DDCS channels, and Modbus software of the control panel	C	-
04.03	APPLIC NAME	Displays the type and the version of the control program.	C	-
04.04	BOARD TYPE	Control board type	C	-
04.05	INV NOM POWER	Nominal power of the inverter unit	R	1 = 1
05 ANALOGUE INPUTS		Values of analog inputs		
05.01	BASIC AI1	Value of control unit analog input AI1 ±20000 = ±10 volts.	I	1 = 1
	-20000…20000	Value		
05.02	BASIC AI2	Value of control unit analog input AI2 ±20000 = ±20 mA.	I	1 = 1
	-20000…20000	Value		
05.03	BASIC AI3	Value of control unit analog input AI3 ±20000 = ±20 mA.	I	1 = 1
	-20000…20000	Value		
05.04	EXT1 AI1	Value of extension module 1 analog input AI1	I	1 = 1
	-20000…20000	Value		
05.05	EXT1 AI2	Value of extension module 1 analog input AI2	I	1 = 1
	-20000…20000	Value		

No.	Name/Value	Description	T	FbEq
05.06	EXT2 AI1	Value of extension module 2 analog input AI1	I	1 = 1
	-20000…20000	Value		
05.07	EXT2 AI2	Value of extension module 2 analog input AI2	I	1 = 1
	-20000…20000	Value		
05.08	EXT3 AI1	Value of extension module 3 analog input AI1	I	1 = 1
	-20000…20000	Value		
05.09	EXT3 AI2	Value of extension module 3 analog input AI2	I	1 = 1
	-20000…20000	Value		
05.10	EXT4 AI1	Value of extension module 4 analog input AI1	I	1 = 1
	-20000…20000	Value		
05.11	EXT4 AI2	Value of extension module 4 analog input AI2	I	1 = 1
	-20000…20000	Value		
05.12	EXT5 AI1	Value of extension module 5 analog input AI1	I	1 = 1
	-20000…20000	Value		
05.13	EXT5 AI2	Value of extension module 5 analog input AI2	I	1 = 1
	-20000…20000	Value		
05.14	EXT6 AI1	Value of extension module 6 analog input AI1	I	1 = 1
	-20000…20000	Value		
05.15	EXT6 AI2	Value of extension module 6 analog input AI2	I	1 = 1
	-20000…20000	Value		
05.16	EXT7 AI1	Value of extension module 7 analog input AI1	I	1 = 1
	-20000…20000	Value		
05.17	EXT7 AI2	Value of extension module 7 analog input AI2	I	1 = 1
	-20000…20000	Value		
05.18	EXT8 AI1	Value of extension module 8 analog input AI1	I	1 = 1
	-20000…20000	Value		
05.19	EXT8 AI2	Value of extension module 8 analog input AI2	I	1 = 1
	-20000…20000	Value		
05.20	EXT9 AI1	Value of extension module 9 analog input AI1	I	1 = 1
	-20000…20000	Value		
05.21	EXT9 AI2	Value of extension module 9 analog input AI2	I	1 = 1
	-20000…20000	Value		
06 ANALOGUE OUTPUTS		Values of analog outputs		
06.01	BASIC AO1	Value of control unit analog output AO1	R	1 = 1483
	0…20 mA	Value		
06.02	BASIC AO2	Value of control unit analog output AO2	R	1 = 1483
	0…20 mA	Value		
06.03	EXT1 AO1	Value of extension module 1 analog output AO1	R	1 = 1483
	0…20 mA	Value		
06.04	EXT1 AO2	Value of extension module 1 analog output AO2	R	1 = 1483
	0…20 mA	Value		
06.05	EXT2 AO1	Value of extension module 2 analog output AO1	R	1 = 1483
	0…20 mA	Value		

No.	Name/Value	Description	T	FbEq
06.06	EXT2 AO2	Value of extension module 2 analog output AO2	R	1 = 1483
	0…20 mA	Value		
06.07	EXT3 AO1	Value of extension module 3 analog output AO1	R	1 = 1483
	0…20 mA	Value		
06.08	EXT3 AO2	Value of extension module 3 analog output AO2	R	1 = 1483
	0…20 mA	Value		
06.09	EXT4 AO1	Value of extension module 4 analog output AO1	R	1 = 1483
	0…20 mA	Value		
06.10	EXT4 AO2	Value of extension module 4 analog output AO2	R	1 = 1483
	0…20 mA	Value		
06.11	EXT5 AO1	Value of extension module 5 analog output AO1	R	1 = 1483
	0…20 mA	Value		
06.12	EXT5 AO2	Value of extension module 5 analog output AO2	R	1 = 1483
	0…20 mA	Value		
06.13	EXT6 AO1	Value of extension module 6 analog output AO1	R	1 = 1483
	0…20 mA	Value		
06.14	EXT6 AO2	Value of extension module 6 analog output AO2	R	1 = 1483
	0…20 mA	Value		
06.15	EXT7 AO1	Value of extension module 7 analog output AO1	R	1 = 1483
	0…20 mA	Value		
06.16	EXT7 AO2	Value of extension module 7 analog output AO2	R	1 = 1483
	0…20 mA	Value		
06.17	EXT8 AO1	Value of extension module 8 analog output AO1	R	1 = 1483
	0…20 mA	Value		
06.18	EXT8 AO2	Value of extension module 8 analog output AO2	R	1 = 1483
	0…20 mA	Value		
06.19	EXT9 AO1	Value of extension module 9 analog output AO1	R	1 = 1483
	0…20 mA	Value		
06.20	EXT9 AO2	Value of extension module 9 analog output AO2	R	1 = 1483
	0…20 mA	Value		
07 CONTROL WORDS		Control words. Main Control Word (MCW) is the principal means of controlling the PVS800 from an overriding system. Bits of the Main Control Word can be overridden locally using the control panel or a PC, the standard I/O, or an adaptive program. Master control program of the PVS800 switches between its states according to the bit-coded instructions of the final control word.		
07.01	MAIN CTRL WORD	Main Control Word (MCW), received from the overriding control system (see also parameter *90.01 D SET 10 VAL 1*).	PB	

<table>
<tr><th>No.</th><th>Name/Value</th><th>Description</th><th>T</th><th>FbEq</th></tr>
<tr><td></td><td colspan="2">
<table>
<tr><th>Bit</th><th>Name</th><th>Value</th><th>Description</th></tr>
<tr><td>0</td><td>ON/OFF</td><td>0 ⇒1</td><td>Inverter operation is enabled. Bit 0 and bit 3 must be controlled at the same time.</td></tr>
<tr><td></td><td></td><td>0</td><td>Operation is disabled.</td></tr>
<tr><td>1, 2</td><td colspan="3">Reserved</td></tr>
<tr><td>3</td><td>ON/OFF</td><td>0 ⇒1</td><td>Operation is enabled. Bit 0 and bit 3 must be controlled at the same time.</td></tr>
<tr><td></td><td></td><td>0</td><td>Operation is disabled.</td></tr>
<tr><td>4…6</td><td colspan="3">Reserved</td></tr>
<tr><td>7</td><td>RESET</td><td>0 ⇒1</td><td>Reset</td></tr>
<tr><td>8…15</td><td colspan="3">Reserved</td></tr>
</table>
</td><td></td><td></td></tr>
<tr><td>07.02</td><td>USED MCW</td><td>Shows the final control word that is used as the input for the PVS800 state machine (see page 31). For bit definitions, see parameter 07.01 MAIN CTRL WORD.
 
</td><td>PB</td><td></td></tr>
<tr><td>07.03</td><td>MAIN CTRL W MASK</td><td>Mask word for control word 07.01 MAIN CTRL WORD. If the mask is not used, set to FFFF (65535 int.). If, for example, bit 0 is masked, set to FFFE (65534 int.). Several bits can be masked at the same time.
Mask function is needed if there is a need to share the control of bits between the overriding system and the adaptive program (or I/O control). See parameter 66.01 CW, and the block CW in the Application guide: Adaptive program for PVS800 central inverters (3AUA0000091276 [English]).
<table>
<tr><th>Bit</th><th>Value</th><th>Description</th></tr>
<tr><td>0</td><td>0</td><td>Mask</td></tr>
<tr><td></td><td>1</td><td>No mask</td></tr>
<tr><td>1...15</td><td>0</td><td>Mask</td></tr>
<tr><td></td><td>1</td><td>No mask</td></tr>
</table></td><td>PB</td><td></td></tr>
<tr><td>07.04</td><td>ISU MCW</td><td>Shows the Main Control Word in use for the inverter unit (modified from 07.02 USED MCW). This word is the output of the PVS800 state machine (see page 31). For bit definitions, see 07.01 MAIN CTRL WORD.</td><td>PB</td><td></td></tr>
<tr><td>07.05</td><td>GND CTRL WORD</td><td>Displays an internal control word of the DC grounding.</td><td>PB</td><td></td></tr>
</table>

No.	Name/Value	Description	T	FbEq

Bit	Name	Value	Description
0	MPPT_MODE	1	Inverter is in the MPPT mode.
1	INSULATION_OK	1	Insulation is OK.
2	DC_TO_GROUND_VOLTAGE	1	DC to the GND voltage is present.
3	START_REQUEST	1	Start is requested.

08 STATUS WORDS		Status words. See also the control block diagrams in chapter *Program features*. Status Word (SW) is a word containing status information, sent by the PVS800 master control program to the external control system.		
08.01	MAIN STATUS WORD	Main Status Word. Combined from the Status Word of the inverter unit, and communication faults. Sent to the overriding control system. See *92 D SET TR ADDR*.	PB	

Bit	Name	Value	STATE/Description
0	RDY_ON	1	Ready to switch on = no fault
		0	Not ready to switch on = fault
1	RDY_RUN	1	Ready to operate = DC bus charged
		0	Not ready to operate
2	RDY_REF	1	Operation enabled
		0	Operation inhibited
3	TRIPPED	1	A fault occurred in the inverter.
4	HVRT	1	HVRT is ongoing.
		0	No HVRT
5...6	Reserved		
7	ALARM	1	A warning in the inverter.
8	MODULATING	1	Inverter is modulating.
		0	Inverter is not modulating.
9	REMOTE	1	Control location: REMOTE
		0	Control location: LOCAL
10	NET OK	1	Grid voltage is OK.
		0	Grid voltage is lost.
11	VOLTAGE DIP	1	Voltage dip is ongoing.
		0	No voltage dip
12	Reserved		
13	CHARGING		Combines bits 14 and 1.
	OR RDY_RUN	1	Ready to operate = DC bus charged or charging contactor closed.
		0	Not ready to operate or charging contactor open.
14	CHARGING	1	Charging contactor closed
		0	Charging contactor open
15	Reserved		

08.02	DI STATUS WORD	Digital input status word.	PB

Bit	Name	Description
0	Reserved	
1	DI1	Status of digital input 1 of control unit
2	DI2	Status of digital input 2 of control unit
3	DI3	Status of digital input 3 of control unit
4	DI4	Status of digital input 4 of control unit
5	DI5	Status of digital input 5 of control unit
6	DI6	Status of digital input 6 of control unit
7	DI7 (DIIL)	Status of digital input 7 of control unit
8…15	Reserved	

<table>
<tr><th>No.</th><th>Name/Value</th><th>Description</th><th>T</th><th>FbEq</th></tr>
<tr><td>08.03</td><td>EXT DI STATUS W</td><td>Extension module digital input status word. See also parameters 98.04…98.08.</td><td>PB</td><td></td></tr>
<tr><td></td><td colspan="4"><table>
<tr><th>Bit</th><th>Name</th><th>Description</th></tr>
<tr><td>0</td><td>Reserved</td><td></td></tr>
<tr><td>1</td><td>EXT1_DI1</td><td>Digital input 1 status on RDIO extension module 1</td></tr>
<tr><td>2</td><td>EXT1_DI2</td><td>Digital input 2 status on RDIO extension module 1</td></tr>
<tr><td>3</td><td>EXT1_DI3</td><td>Digital input 3 status on RDIO extension module 1</td></tr>
<tr><td>4</td><td>EXT2_DI1</td><td>Digital input 1 status on RDIO extension module 2</td></tr>
<tr><td>5</td><td>EXT2_DI2</td><td>Digital input 2 status on RDIO extension module 2</td></tr>
<tr><td>6</td><td>EXT2_DI3</td><td>Digital input 3 status on RDIO extension module 2</td></tr>
<tr><td>7</td><td>EXT3_DI1</td><td>Digital input 1 status on RDIO extension module 3</td></tr>
<tr><td>8</td><td>EXT3_DI2</td><td>Digital input 2 status on RDIO extension module 3</td></tr>
<tr><td>9</td><td>EXT3_DI3</td><td>Digital input 3 status on RDIO extension module 3</td></tr>
<tr><td>10</td><td>EXT4_DI1</td><td>Digital input 1 status on RDIO extension module 4</td></tr>
<tr><td>11</td><td>EXT4_DI2</td><td>Digital input 2 status on RDIO extension module 4</td></tr>
<tr><td>12</td><td>EXT4_DI3</td><td>Digital input 3 status on RDIO extension module 4</td></tr>
<tr><td>13</td><td>EXT5_DI1</td><td>Digital input 1 status on RDIO extension module 5</td></tr>
<tr><td>14</td><td>EXT5_DI2</td><td>Digital input 2 status on RDIO extension module 5</td></tr>
<tr><td>15</td><td>EXT5_DI3</td><td>Digital input 3 status on RDIO extension module 5</td></tr>
</table></td></tr>
<tr><td>08.04</td><td>PVA STATES</td><td>Indicates the state of the master control program. See section PVS800 state machine on page 31.</td><td>I</td><td>-</td></tr>
<tr><td></td><td>STANDBY</td><td>Power on, no faults, inverter unit not in the local mode</td><td></td><td>1</td></tr>
<tr><td></td><td>SLEEP</td><td>Start on but all start conditions have not been met.</td><td></td><td>2</td></tr>
<tr><td></td><td>START ISU</td><td>Start on, all start conditions are met. Start command sent to the inverter unit.</td><td></td><td>3</td></tr>
<tr><td></td><td>MPPT</td><td>Maximum power point tracking (MPPT) mode active. See section Maximum power point tracking (MPPT) on page 34.</td><td></td><td>4</td></tr>
<tr><td></td><td>ISU LOCAL</td><td>Inverter unit is switched into the local control mode.</td><td></td><td>5</td></tr>
<tr><td></td><td>FAULTED</td><td>Fault has occurred.</td><td></td><td>6</td></tr>
<tr><td></td><td>Q POWER</td><td>Inverter is in the reactive power compensation mode. See section Reactive power compensation on page 37.</td><td></td><td>7</td></tr>
</table>

No.	Name/Value	Description	T	FbEq
08.05	PVA STATUS WORD	Master control program status word. See also parameter *08.04 PVA STATES* and section *PVS800 state machine* on page *31*.	PB	

Bit	Name	Value	Description
0	MPPT	1	Inverter running in the MPPT mode. See parameter *39.01 MPPT CONTROL* (page *145*).
1	LOCAL MODE	1	Inverter in the local control mode, MPPT disabled, DC switch open.
2	START MPPT	1	Start command received; DC precharge or DC switch closure in progress before entering the MPPT mode.
3	RELAY INIT	0	Inverter unit initializing after power-on. Master control program remains in the STANDBY state.
		1	Inverter unit ready.
4	DC SWITCH STA	1	DC switch is closed.
5	GRIDMON RELAY RESTART	1	Grid monitoring relay has signaled a network failure. Inverter unit parametrized to restart after delay.
6	LOST ENERGY	1	Lost energy calculation active. Power limit set lower than PVS800 nominal power.
7	START ENA	1	Start is enabled by cut-in conditions. See parameters *44.18…44.23* (page *159*).
8	DC REF MIN	1	MPPT has reached the minimum DC reference. Check *39.05 MPPT DC REF MIN* (page *145*).
9	DC REF MAX	1	MPPT has reached the maximum DC reference. Check parameter *39.04 MPPT DC REF MAX* (page *145*).
10	DC CTRL LIM	1	External DC reference cannot be maintained because of power limiting.
11	DC RAMP AFTER LVRT	1	DC voltage is ramped down after voltage dip.
12	VOLTAGE SUPPRESSION	1	Grid voltage rise suppression -function is active.
13	ANTI-ISLAND RESTART	1	Anti-island restart delay is ongoing, the inverter operation is disabled until the delay has passed.
14	Q POW RUN	1	Inverter is running in the Q POWER state.
15	Reserved		

08.06	GND STATE	Displays the state of the DC grounding state machine.	I	

State	Name	Description
1	GROUNDING_OPEN	Grounding is open.
2	WAIT_INS_MEAS	Waiting for the insulation resistance measurement to be ready.
4	READ_INS_MEAS	Reading of the insulation resistance value.
8	CLOSING_GROUNDING	Grounding is commanded to be closed.
16	GROUNDING_CLOSED	Grounding is closed and the inverter start is allowed.
32	INVERTER_SLEEP	Inverter is in the sleep or standby mode.
64	GROUNDING_FAULTED	Grounding has faulted.
128	NOT_IN_USE	Grounding usage mode = OFF.

08.07	GND STATUS WORD	Displays a status word of the DC grounding.	PB	

Bit	Name	Description
0	ENABLE_DC_GND_MONITORING	1 = DC grounding monitoring is enabled.
1	DC_CONTACTOR_CLOSED	1 = Grounding contactor is closed.
2	START_ENABLE	1 = Inverter start is enabled.
3	ENABLE_DC_GND_CTRL	1 = DC grounding control is enabled.
4	MANUAL_CLOSED	1 = Grounding contactor is manually closed.
5	MANUAL_OPEN	1 = Grounding contactor is manually open.
6	OPEN_GND_ON_PVA_FAULT	1 = Grounding contactor is kept open when the inverter is in the faulted state.

No.	Name/Value	Description	T	FbEq
08.08	LIMIT WORD	Limit word from the Inverter control program signal *08.03 LIMIT WORD*.	PB	1 = 1
09 FAULT WORDS		Fault words. For possible causes and remedies, see chapter *Fault tracing*.		
09.10	IO FAULT WORD	Digital and analog extension module and control unit digital and analog I/O fault word.	PB	

Bit	Name	Description
0	DIO EXT1 ERROR	Error detected in digital extension module 1.
1	DIO EXT2 ERROR	Error detected in digital extension module 2.
2	DIO EXT3 ERROR	Error detected in digital extension module 3.
3	DIO EXT4 ERROR	Error detected in digital extension module 4.
4	DIO EXT5 ERROR	Error detected in digital extension module 5.
5	RMIO DIO ERROR	*DIGITAL IO (5442)* (page *180*)
6	EXT RDIO ERROR	*EXT DIO (7082)* (page *181*)
7	Reserved	
8	AIO EXT1 ERROR	Error detected in analog extension module 1.
9	AIO EXT2 ERROR	Error detected in analog extension module 2.
10	AIO EXT3 ERROR	Error detected in analog extension module 3.
11	AIO EXT4 ERROR	Error detected in analog extension module 4.
12	AIO EXT5 ERROR	Error detected in analog extension module 5.
13	RMIO AIO ERROR	*ANALOG IO (5441)* (page *179*)
14	EXT RAIO ERROR	*EXT AIO (7081)* (page *181*)
15	Reserved	

09.11	SUPPLY FAULT WORD	Fault word from the inverter control unit.	PB	

Bit	Fault
0	*>CHARGING F (3284)* (page *179*)
1	*>OVERCURR (2380)* (page *183*)
2	*>EXT DI5 (1081)* (page *181*)
3	*>PVS800 TEMP (4291)* (page *183*)
4	*>EXT DI4 (1080)* (page *181*)
5	*>EXT DI1 (1082)* (page *181*)
6	*>MAIN CNT F (2384)* (page *182*)
7	*>SHORT CIRC (2381)* (page *184*)
8	*>INTERNAL F (1083)* (page *182*)
9	*>NET VOLT (3285)* (page *183*)
10	*>COMM MODULE (7581)* (page *180*)
11	*>EXT DI7 (FF96)* (page *181*)
12	*>EARTH FAULT (2383)* (page *180*)
13	*>SYNCHRO FLT (8180)* (page *184*)
14	*>DC UNDERVLT (3282)* (page *180*)
15	*DC OVERVOLT (32AF)* (page *180*)
Bit value: 1 = fault, 0 = no fault	

<table>
<tr><th>No.</th><th>Name/Value</th><th>Description</th><th>T</th><th>FbEq</th></tr>
<tr><td>09.12</td><td>SUPPLY ALARM WORD</td><td>Alarm word from the inverter control unit.

<table><tr><th>Bit</th><th>Fault</th></tr><tr><td>0</td><td>>COMM MODULE (758A) (page 180)</td></tr><tr><td>1</td><td>>PANEL LOST (5382) (page 183)</td></tr><tr><td>2</td><td>>EXT DI1 ALM (1089) (page 181)</td></tr><tr><td>3</td><td>Reserved</td></tr><tr><td>4</td><td>>PVS800 TEMP (4292) (page 183)</td></tr><tr><td>5</td><td>Reserved</td></tr><tr><td>6</td><td>>PLIM EXT TMP (44AB) (page 183)</td></tr><tr><td>7</td><td>>QLIM EXT TMP (44AC) (page 184)</td></tr><tr><td>8</td><td>>QLIM PVS TMP (818F) (page 184)</td></tr><tr><td>9</td><td>>RUN DISABLE (8194) (page 184)</td></tr><tr><td>10</td><td>>NET LOST (32A6) (page 183)</td></tr><tr><td>11</td><td>>EXT DI7 ALM (108C) (page 181)</td></tr><tr><td>12</td><td>>RECHARGE ALM (32AA) (page 184)</td></tr><tr><td>13</td><td>>EXT DI4 ALM (108A) (page 181)</td></tr><tr><td>14</td><td>>EXT DI5 ALM (108B) (page 181)</td></tr><tr><td>15</td><td>Reserved</td></tr><tr><td colspan="2">Bit value: 1 = fault, 0 = no fault</td></tr></table></td><td>PB</td><td></td></tr>
<tr><td>09.13</td><td>AP FW</td><td>Alarm and fault word for the user’s events. Defined by function block A/F WORD. See Application guide: Adaptive program for PVS800 central inverters (3AUA0000091276 [English]).</td><td>PB</td><td></td></tr>
<tr><td>09.14</td><td>PVA FAULT WORD</td><td>Fault word

<table><tr><th>Bit</th><th>Fault</th></tr><tr><td>0</td><td>COMM MODULE (7510) (page 180)</td></tr><tr><td>1</td><td>CH2 COM LOSS (7520) (page 180)</td></tr><tr><td>2</td><td>>REVERSE POW (8187) (page 184)</td></tr><tr><td>3</td><td>>DC BRK TRP (8188) (page 180)</td></tr><tr><td>4</td><td>>GRID MONFLT (8189) (page 182)</td></tr><tr><td>5</td><td>>DC BRK LEV (818C) (page 180)</td></tr><tr><td>6</td><td>>DC BRK POS (818D) (page 180)</td></tr><tr><td>7</td><td>>BACKPOW LEV (818E) (page 179)</td></tr><tr><td>8</td><td>AUTORESET F (6080) (page 179)</td></tr><tr><td>9</td><td>EXT EVNT DI3 (9083) (page 181)</td></tr><tr><td>10</td><td>EXT EVNT DI4 (9084) (page 181)</td></tr><tr><td>11</td><td>EXT EVNT DI5 (9085) (page 181)</td></tr><tr><td>12</td><td>>ANTI-ISLAND (819F) (page 179)</td></tr><tr><td>13</td><td>EM STOP (F083) (page 180)</td></tr><tr><td>14</td><td>ISU FAULT (8185) (page 182)</td></tr><tr><td>15</td><td>Reserved</td></tr><tr><td colspan="2">Bit value: 1 = fault, 0 = no fault</td></tr></table></td><td>PB</td><td></td></tr>
</table>

No.	Name/Value	Description	T	FbEq
09.15	PVA ALARM WORD	Alarm word	PB	

Bit	Alarm
0	Reserved
1	*>PVS&PANEL DC (32A9)* (page *183*)
2	*PVA RUN ENA (FF54)* (page *183*). See also parameter *08.05 PVA STATUS WORD* bit 3.
3	*AUTORESET A (6081)* (page *179*)
4	*DC INPUT DEV (2185)* (page *180*)
5	*>LOST ENERGY (8190)* (page *182*)
6	*UDC HIGH LIM (32A7)* (page *184*)
7	*EXT EVNT DI3 (9083)* (page *181*)
8	*EXT EVNT DI4 (9084)* (page *181*)
9	*EXT EVNT DI5 (9085)* (page *181*)
10	Reserved
11	*RMBA LOST (61A9)* (page *184*)
12	*APP OVERLOAD (FFD9)* (page *179*)
13	*APPLIC 1 FLT (FFD6)* (page *179*)
14	*APPLIC 2 FLT (FFD7)* (page *179*)
15	*IO START ENA (61AA)* (page *182*)
Bit value: 1 = alarm, 0 = no alarm	

09.16	INV LAST FLT CODE	Shows the latest fault code of the inverter control unit.	PB	1 = 1
09.17	PVA ALARM WORD 2	Alarm word	PB	1 = 1

Bit	Alarm
0	*>MPPT MIN REF (32AD)* (page *183*)
1	*>MPPT MAX REF (32AE)* (page *183*)
2	*ISU WARNING (8186)* (page *182*)

09.18	IO FAULT WORD 2	Fault word	PB	1 = 1

Bit	Name	Description
0	AIO EXT6 ERROR	Error detected in analog extension module 6.
1	AIO EXT7 ERROR	Error detected in analog extension module 7.
2	AIO EXT8 ERROR	Error detected in analog extension module 8.
3	AIO EXT9 ERROR	Error detected in analog extension module 9.

09.20	FAULT CODE 1 LAST	Fieldbus code of the latest fault. See chapter *Fault tracing*.	PB	1 = 1
09.21	FAULT CODE 2 LAST	Fieldbus code of the 2nd latest fault. See chapter *Fault tracing*.	PB	1 = 1
09.22	FAULT CODE 3 LAST	Fieldbus code of the 3rd latest fault. See chapter *Fault tracing*.	PB	1 = 1
09.23	FAULT CODE 4 LAST	Fieldbus code of the 4th latest fault. See chapter *Fault tracing*.	PB	1 = 1
09.24	FAULT CODE 5 LAST	Fieldbus code of the 5th latest fault. See chapter *Fault tracing*.	PB	1 = 1
09.25	WARN CODE 1 LAST	Fieldbus code of the latest alarm. See chapter *Fault tracing*.	PB	1 = 1
09.26	WARN CODE 2 LAST	Fieldbus code of the 2nd latest alarm. See chapter *Fault tracing*.	PB	1 = 1
09.27	WARN CODE 3 LAST	Fieldbus code of the 3rd latest alarm. See chapter *Fault tracing*.	PB	1 = 1

No.	Name/Value	Description	T	FbEq
09.28	WARN CODE 4 LAST	Fieldbus code of the 4th latest alarm. See chapter *Fault tracing*.	PB	1 = 1
09.29	WARN CODE 5 LAST	Fieldbus code of the 5th latest alarm. See chapter *Fault tracing*.	PB	1 = 1

Parameter groups 10…99

No.	Name/Value	Description	Def	T	FbEq
10 CMD GROUP		Special commands			
10.01	RESET CMD	By setting this parameter to *RESET*, the reset command is sent to a faulted inverter unit. Value returns to *NOT SET* automatically after *RESET*.	NOT SET	B	
	NOT SET				0
	RESET				65535
10.02	ENABLE I/O CTRL	Enables/disables the I/O control, ie, PVS800 control through digital inputs. When the I/O control is enabled, start/stop and reset signals are read from inputs that are defined by parameters *10.04 I/O START SOURCE* and *10.05 I/O RESET SOURCE*. I/O control is parallel to the fieldbus and adaptive control words (see parameter *07.02 USED MCW*). Local control overrides I/O control.	NO	B	
	NO	I/O control disabled			0
	YES	I/O control enabled			1
10.03	EM STOP AUTORESET	Enables/disables an automatic reset of the emergency stop relay. See the *Hardware manual*. If enabled, digital output DO1 cannot be used for other purposes.	NO	I	
	NO	Automatic reset disabled			1
	DO1	Automatic reset of emergency stop relay enabled through digital output DO1. Reset pulse is active for 4 seconds after the auxiliary power is switched on.			2
10.04	I/O START SOURCE	Defines the source of the start/stop signal in I/O control (see parameter *10.02 ENABLE I/O CTRL*). **WARNING!** If the I/O control is enabled and a start command is active, the PVS800 will start after the auxiliary power to the control units has switched on. Default source is digital input DI2 on the master control unit.	+.008.002.02	P	
	-255.255.31 … +255.255.31 / C. -32768 …C. 32767	Parameter pointer: Inversion, group, index and bit fields. Bit number is effective only for blocks handling Boolean inputs.			
10.05	I/O RESET SOURCE	Defines the source of the reset signal in the I/O control (see parameter *10.02 ENABLE I/O CTRL*). Default source is digital input DI1 on the master control unit.	+.008.002.01	P	
	-255.255.31 … +255.255.31 / C. -32768 …C. 32767	Parameter pointer: Inversion, group, index and bit fields. Bit number is effective only for blocks handling Boolean inputs.			

No.	Name/Value	Description	Def	T	FbEq
13 ANALOGUE INPUTS		Configuration of analog inputs. The settings of I/O extension module 5 also apply to I/O extension modules 6, 7, 8 and 9.			
13.02	AI1 FILTER ms	Defines the filter time constant in milliseconds for analog input AI1. **Note:** Analog input AI1 is reserved for DC current measurement. Do not change the value of this parameter.	1000	I	
	1…30000	Value			1 = 1 ms
13.03	AI2 CONV MODE	Defines the conversion mode for analog input AI2.	NORMAL	I	
	NORMAL	Normal scaling: -20 mA … 0 … 20 mA = -20000…0…20000			1
	4 mA	4 mA scaling: 4 mA … 20 mA = 0…20000		I	2
13.04	AI2 FILTER ms	Defines the filter time constant in milliseconds for analog input AI2.	1		
	1…30000	Value			1 = 1 ms
13.06	AI3 FILTER ms	Defines the filter time constant in milliseconds for analog input AI3.	100	I	
	1…30000	Value			1 = 1 ms
13.15	EXT1 AI1 HW MODE	Configures the inputs and outputs of an RAIO analog I/O extension module. Operating mode of the analog inputs can be selected by using the configuration DIP switch (S2) on the circuit board of the module. Parameters must be set accordingly. RAIO-01 switch S2 settings (operating mode): <u>Bipolar mode</u> (positive and negative signals) ±0(4)…20 mA ±0(2)…10 V ±0…2 V Analog input AI1 Analog input AI2  <u>Unipolar mode</u> (positive signals only) Default 0(4)…20 mA 0(2)…10 V 0…2 V Analog input AI1 Analog input AI2  	UNIPOLAR	I	
	UNIPOLAR	Unipolar input mode			1
	BIPOLAR	Bipolar input mode			2

No.	Name/Value	Description	Def	T	FbEq
13.16	EXT1 AI2 HW MODE	See parameter *13.15 EXT1 AI1 HW MODE*.	UNIPOLAR	I	
	UNIPOLAR	Unipolar input mode			1
	BIPOLAR	Bipolar input mode			2
13.17	EXT1 AI1 CONV MOD	Defines the conversion mode for extension module 1 analog input AI1. Scaling is the same in both conversion modes (unipolar, bipolar).	NORMAL	I	
	NORMAL	Normal scaling: -20 mA / -2 V / -10 V … 0 … 20 mA / 2 V / 10 V = -20000 … 0 … 20000			1
	4 mA	4 mA scaling: 4…20 mA = 0…20000			2
	PT100	Scaling with Pt100 temperature measurement: 200 °C = 20000 if analog output feeds the following constant current to the Pt100 sensor: with 1 × Pt100: = 10 mA with 2 × Pt100: = 5 mA with 3 × Pt100: = 3.3 mA.			3
13.18	EXT1 AI2 CONV MOD	See parameter *13.17 EXT1 AI1 CONV MOD*.	NORMAL	I	
13.19	EXT1 AI1 FILT ms	Defines the filter time constant in milliseconds for external module 1 analog input AI1.	1000	I	
	0…30000	Value			1 = 1 ms
13.20	EXT1 AI2 FILT ms	Defines the filter time constant in milliseconds for external module 1 analog input AI2.	1000	I	
	0…30000	Value			1 = 1 ms
14 ACT SIGNAL SEL		Source selection for various actual signals			
14.01	SOLAR RADIATION	Defines a source signal that is linearly scaled by parameters *14.02 SOLAR RADIAT MIN* and *14.03 SOLAR RADIAT MAX*, and then shown by parameter *01.35 SOLAR RADIATION*.	+.000.000.00	P	
	-255.255.31 … +255.255.31 / C. -32768 … C. 32767	Parameter pointer or a constant value: • Parameter pointer: Inversion, group, index and bit fields. Bit number is effective only for blocks handling Boolean inputs. • Constant value: Inversion and constant fields. Inversion field must have value C to enable the constant setting.			
14.02	SOLAR RADIAT MIN	Defines the value displayed by *01.35 SOLAR RADIATION* when the source signal selected by *14.01 SOLAR RADIATION* is 0.	0	I	
	-32768…32767	Display value corresponding to signal value of 0			1 = 1

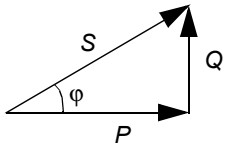
No.	Name/Value	Description	Def	T	FbEq
14.03	SOLAR RADIAT MAX	Defines the value displayed by *01.35 SOLAR RADIATION* when the source signal selected by *14.01 SOLAR RADIATION* is 20000.	20000	I	
	-32768…32767	Display value corresponding to signal value of 20000			1 = 1
14.04	SOLAR IRRADIATION	Defines a source signal that is linearly scaled by parameters *14.05 SOLAR IRRAD MIN* and *14.06 SOLAR IRRAD MAX*, and then shown by parameter *01.36 SOLAR IRRADIANCE*.	+.000.000.00	P	
	-255.255.31 … +255.255.31 / C. -32768 … C. 32767	Parameter pointer or a constant value: • Parameter pointer: Inversion, group, index and bit fields. Bit number is effective only for blocks handling Boolean inputs. • Constant value: Inversion and constant fields. Inversion field must have value C to enable the constant setting.			
14.05	SOLAR IRRAD MIN	Defines the value displayed by *01.36 SOLAR IRRADIANCE* when the source signal selected by *14.04 SOLAR IRRADIATION* is 0.	0	I	
	-32768…32767	Display value corresponding to signal value of 0			1 = 1
14.06	SOLAR IRRAD MAX	Defines the value displayed by *01.36 SOLAR IRRADIANCE* when the source signal selected by *14.04 SOLAR IRRADIATION* is 20000.	20000	I	
	-32768…32767	Display value corresponding to signal value of 20000			1 = 1
14.07	PV MODULE TEMP	Defines a source signal that is shown by parameter *01.37 PV MODULE TEMP*.	+.000.000.00	P	
	-255.255.31 … +255.255.31 / C. -32768 … C. 32767	Parameter pointer or a constant value: • Parameter pointer: Inversion, group, index and bit fields. Bit number is effective only for blocks handling Boolean inputs. • Constant value: Inversion and constant fields. Inversion field must have value C to enable the constant setting.			
14.08	AMBIENT TEMP	Defines a source signal that is shown by parameter *01.38 AMBIENT TEMP*.	+.000.000.00	P	
	-255.255.31 … +255.255.31 / C. -32768 … C. 32767	Parameter pointer or a constant value: • Parameter pointer: Inversion, group, index and bit fields. Bit number is effective only for blocks handling Boolean inputs. • Constant value: Inversion and constant fields. Inversion field must have value C to enable the constant setting.			

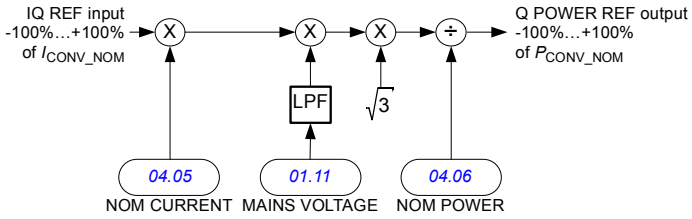
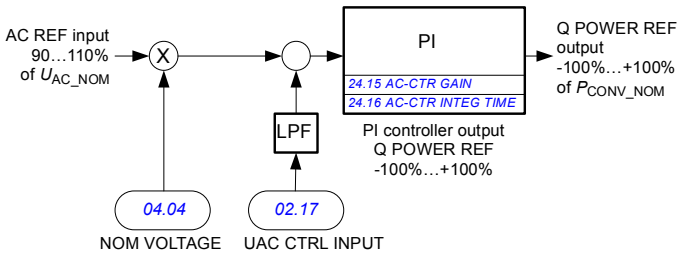
No.	Name/Value	Description	Def	T	FbEq
14.09	EXTERNAL TEMP	Defines a source signal that is shown by parameter *01.39 EXTERNAL TEMP*.	+.000.000.00	P	
	-255.255.31 … +255.255.31 / C. -32768 … C. 32767	Parameter pointer or a constant value: • Parameter pointer: Inversion, group, index and bit fields. Bit number is effective only for blocks handling Boolean inputs. • Constant value: Inversion and constant fields. Inversion field must have value C to enable the constant setting.			
14.10	TRA OIL TEMP	Defines a source signal that is shown by parameter *01.40 TRANSFORMER TEMP*.	+.000.000.00	P	
	-255.255.31 … +255.255.31 / C. -32768 … C. 32767	Parameter pointer or a constant value: • Parameter pointer: Inversion, group, index and bit fields. Bit number is effective only for blocks handling Boolean inputs. • Constant value: Inversion and constant fields. Inversion field must have value C to enable the constant setting.			
14.11	TRA OIL LEVEL	Defines a source signal that is linearly scaled by parameters *14.12 TRA OIL LEVEL MIN* and *14.13 TRA OIL LEVEL MAX*, and then shown by parameter *01.41 TRANSF OIL LEV*.	+.000.000.00	P	
	-255.255.31 … +255.255.31 / C. -32768 … C. 32767	Parameter pointer or a constant value: • Parameter pointer: Inversion, group, index and bit fields. Bit number is effective only for blocks handling Boolean inputs. • Constant value: Inversion and constant fields. Inversion field must have value C to enable the constant setting.			
14.12	TRA OIL LEVEL MIN	Defines the value displayed by *01.41 TRANSF OIL LEV* when the source signal selected by *14.11 TRA OIL LEVEL* is 0.	0	I	
	-32768…32767	Display value corresponding to signal value of 0			1 = 1
14.13	TRA OIL LEVEL MAX	Defines the value displayed by *01.41 TRANSF OIL LEV* when the source signal selected by *14.11 TRA OIL LEVEL* is 20000.	20000	I	
	-32768…32767	Display value corresponding to signal value of 20000			1 = 1
14.14	DC POWER SELECT	Selection between measured and estimated DC power.	MEASURED		
	MEASURED	*01.19 DC POWER* = *01.34 PV MODULE DC MEAS* x *01.18 DC CURRENT* / 1000			1
	ESTIMATED	*01.19 DC POWER* = Estimated DC power from the inverter control program.			2

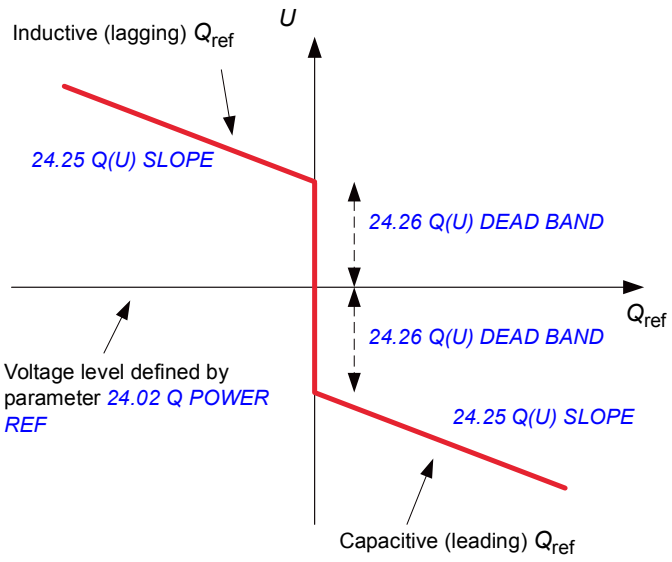
No.	Name/Value	Description	Def	T	FbEq
15 ANALOGUE OUTPUTS		It is possible to select a signal or parameter to control the analog outputs. Outputs can also be controlled from an overriding system.			
15.01	AO1 OFFSET	Defines analog output AO1 signal offset in milliamperes.	0 mA	R	
	0 mA … 20 mA	Value			1000 = 1 mA
15.02	AO1 SCALE	Defines the scale for analog output AO1. Defines the integer value that corresponds to the maximum output current (20 mA), eg, 20000 (default) = 20 mA.	20000	I	
	0…30000	Integer value			
15.03	AO2 OFFSET	See parameter *15.01 AO1 OFFSET*.	0 mA	R	
	0 mA … 20 mA	Value			1000 = 1 mA
15.04	AO2 SCALE	See parameter *15.02 AO1 SCALE*.	20000	I	
	0…30000	Integer value			
15.05	EXT1 AO1 OFFSET	See parameter *15.01 AO1 OFFSET*.	0 mA	R	
	0 mA … 20 mA	Value			1000 = 1 mA
15.06	EXT1 AO1 SCALE	See parameter *15.02 AO1 SCALE*.	20000	I	
	0…30000	Integer value			
15.07	EXT1 AO2 OFFSET	See parameter *15.01 AO1 OFFSET*.	0 mA	R	
	0 mA … 20 mA	Value			1000 = 1 mA
15.08	EXT1 AO2 SCALE	See parameter *15.02 AO1 SCALE*.	20000	I	
	0…30000	Integer value			
…	…	…	…	…	…
15.37	EXT9 AO1 OFFSET	See parameter *15.01 AO1 OFFSET*.	0 mA	R	
	0 mA … 20 mA	Value			1000 = 1 mA
15.38	EXT9 AO1 SCALE	See parameter *15.02 AO1 SCALE*.	20000	I	
	0…30000	Integer value			
15.39	EXT9 AO2 OFFSET	See parameter *15.01 AO1 OFFSET*.	0 mA	R	
	0 mA … 20 mA	Value			1000 = 1 mA
15.40	EXT9 AO2 SCALE	See parameter *15.02 AO1 SCALE*.	20000	I	
	0…30000	Integer value			
16 SYSTEM CTR INPUT		Parameter lock, local lock, parameter backup			
16.01	LOCAL CTRL LOST	Defines the action taken when the communication with the local control device (control panel or PC tool) is lost.	NO ACTION	I	
	NO ACTION	Loss of local control device does not cause an alarm or fault, or stop the master control program. **WARNING!** The PVS800 cannot be stopped if the master control program is set to the local control mode and the control device is not available.			1

No.	Name/Value	Description	Def	T	FbEq
	STOP PVA	Loss of local control device causes an alarm and stops the master control program.			2
16.02	PARAMETER LOCK	Selects the state of the parameter lock. With the parameter lock, you can prevent unauthorized changes by CDP 312R or the DriveWindow tool for parameter groups 0…99.	OPEN	B	
	LOCKED	Parameter changes are disabled.			65535
	OPEN	Parameter changes are enabled.			0
16.03	PASS CODE	Selects the pass code for the parameter lock. Default value of this parameter is 0. To open the parameter lock, change the value to 358. After the parameter lock is opened, the value changes automatically back to 0.	0	I	
	0…30000				1 = 1
16.04	LOCAL LOCK	Disables entering the local control mode (***LOC/REM*** key on the panel). **WARNING!** Before activating, ensure that the control panel is not needed for stopping the PVS800!	FALSE	B	
	FALSE	Local control allowed			0
	TRUE	Local control disabled			65535
16.05	PARAMETER BACKUP	Saves parameters from the RAM memory to the FPROM memory. Saving of parameters is needed only when parameter changes through an external control system have to be stored to the FPROM memory. **Note:** Parameter changes via the control panel or DriveWindow are immediately saved to the FPROM memory.	DONE	I	
	DONE	Parameter saving is completed.			0
	SAVE	Parameters are saved to the FPROM memory.			1
19 DATA STORAGE		These parameters are used as auxiliary data storage locations. Parameter group consists of unconnected parameters for linking, testing and commissioning purposes.			
19.01	DATA 1	Storage parameter for receiving from or sending to the overriding system. For example, if the signal from data set 10 word 3 (DW 10.3) is required for monitoring by DriveWindow, first set parameter *90.03 D SET 10 VAL 3* to 1901 (denoting parameter 19.01), then select parameter *19.01 DATA 1* for the desired DriveWindow monitoring channel.	0	I	
	-32768…32767	Value	-	-	1 = 1
19.02	DATA 2	See parameter *19.01 DATA 1*.	0	I	
	-32768…32767	Value			1 = 1
…	…	…	…		…

No.	Name/Value	Description	Def	T	FbEq
19.10	DATA 10	See parameter *19.01 DATA 1*.	0	I	
	-32768…32767	Value			1 = 1
19.11	NV STORE 1	Non-volatile storage 1 for any data in power shutdown. Data is written to this index and after power up it can ONCE be read from par. *19.13 STORED DATA 1*. **Note:** Requires that an RAPI-01C Auxiliary Power Interface module is fitted to the control unit.	0	I	
	-32768…32767	Value			1 = 1
19.12	NV STORE 2	Non-volatile storage 2 for any data in power shutdown. Data is written to this index and after power up it can ONCE be read from par. *19.14 STORED DATA 2*. **Note:** Requires that an RAPI-01C Auxiliary Power Interface module is fitted to the control unit.	0	I	
	-32768…32767	Value			1 = 1
19.13	STORED DATA 1	Non-volatile storage 1 for any data in power shutdown. Data type is unsigned integer. Stored data 1 (Par. *19.11 NV STORE 1*) can ONCE be read after power up from this parameter. **Note:** Requires that an RAPI-01C Auxiliary Power Interface module is fitted to the control unit.	0	I	
	-32768…32767	Value			1 = 1
19.14	STORED DATA 2	Non-volatile storage 2 for any data in power shutdown. Data type is unsigned integer. Stored data 2 (Par. *19.12 NV STORE 2*) can ONCE be read after power up from this parameter. **Note:** Requires that an RAPI-01C Auxiliary Power Interface module is fitted to the control unit.	0	I	
	-32768…32767	Value			1 = 1
19.15	DATA PB 1	Packed Boolean-type storage parameter for receiving from or sending to the overriding system. See parameter *19.01 DATA 1*.	0	PB	
	0…65535	Value			1 = 1
19.16	DATA PB 2	Packed Boolean-type storage parameter for receiving from or sending to the overriding system. See parameter *19.01 DATA 1*.	0	PB	
	0…65535	Value			1 = 1

No.	Name/Value	Description	Def	T	FbEq
23 DC VOLT REF		External DC voltage reference			
23.01	EXT MPPT DC REF	Shows the external DC voltage reference received from an overriding control device. External reference is used instead of the internal MPPT reference if enabled in the inverter control program. This DC reference is also used in the Q POWER mode when the external DC reference usage is enabled from the Inverter control program. See inverter unit control program parameter *39.08 ENA EXT DC REF* (page *145*).	0	I	
	0…1500	Reference value in volts.			1 = 1
24 REACTIVE POWER		Reactive power compensation. See also sections *Reactive power control* on page *36* and *Reactive power compensation* on page *37*.			
24.02	Q POWER REF	Defines a reference value for reactive power generation. Reference unit can be selected by parameter *24.03 Q POWER REF SEL*.	0	I	
	-32768….32767 (equals -327.68…327.67%)	Reference value when parameter *24.03 Q POWER REF SEL* is set to *PERCENT*. **Example:** A value of 10000 in parameter 24.02 Q POWER REF equals to 100% of inverter nominal power.			1 = 1
	-32768….32767 (equals -32768…32767 kVAr)	Reference value when parameter *24.03 Q POWER REF SEL* is set to *kVAr*. **Example:** A value of 100 in parameter 24.02 Q POWER REF equals to 100 kVAr.			1 = 1
	-8500…8500 (equals -85…85 deg)	Reference value when parameter *24.03 Q POWER REF SEL* is set to *PHI*. **Example:** A value of 500 in parameter *24.02 Q POWER REF* equals to phi = 5°: $\cos(\varphi) = \frac{P}{S} = \frac{P}{\sqrt{P^2 + Q^2}}$  Positive reference denotes capacitive load. Negative reference denotes inductive load. Values of parameter *24.02 Q POWER REF* are converted to degrees: -8500…8500 ≙ -85°…85°. Values above 8500 or below -8500 equal -85°/85°, since the range is limited to -8500/8500.			1 = 1
	-1000…-10000 (equals -0.10…-1.0) and 1000…10000 (equals 0.10…1.0)	Reference value when parameter *24.03 Q POWER REF SEL* is set to *COSPHI*. **Example:** A value of 9000 in parameter *24.02 Q POWER REF* equals to cos (phi) = 0.90. Positive reference denotes capacitive load. Negative reference denotes inductive load.			1 = 1

No.	Name/Value	Description	Def	T	FbEq
	-10000…10000 (equals -100…100% of *04.05 NOM AC CURRENT*)	Reference value when parameter *24.03 Q POWER REF SEL* is set to *IQ REF*.			1 = 1
					
	9000…10000…11000 (equals 90…100…110% of *04.04 NOM AC VOLTAGE*)	Defines the nominal voltage (ie, the voltage when the reactive power reference is zero) when parameter *24.03 Q POWER REF SEL* is set to *AC REF*. See also inverter control program parameters *24.18 AC-CTR LOW LIMIT* (page *138*) … *24.19 AC-CTR HIGH LIMIT* (page *138*).			1 = 1
					

No.	Name/Value	Description	Def	T	FbEq
	9000…10000…11000 (equals 90…100…110% of *04.04 NOM AC VOLTAGE*)	Defines the nominal voltage (ie, the voltage when the reactive power reference is zero) when parameter *24.03 Q POWER REF SEL* is set to *Q(U) REF*. See also inverter control program parameters *24.25 Q(U) SLOPE* (page *139*) … *24.28 Q(U) RAMP TIME* (page *139*).			1 = 1
					
24.03	Q POWER REF SEL	Selects the reference unit for parameter *24.02 Q POWER REF*.	kVAr	I	
	PERCENT	In percent of nominal power			1
	kVAr	kVar			2
	PHI	Angle phi			3
	COSPHI	Cos phi			4
	IQ REF	Reactive current reference selection			5
	AC REF	AC voltage control reference selection			6
	Q(U) REF	Q(U) control reference selection			7
	COS PHI f(P)	Cos phi = *f*(P) control reference selection. The reactive power reference value is defined from characteristic curve cos phi = *f*(P). The curve is defined by inverter control program parameters in group *25 REACTIVE POWER* (page *139*).			8
24.04	Q POWER AT LOW DC	Selects whether the reactive power compensation mode is used or not. When this mode is in use, reactive power can be generated even when no power is available from the PV array.	OFF	I	
	OFF	Reactive power compensation mode is not in use.			1
	ON	Reactive power compensation mode is in use.			2

No.	Name/Value	Description	Def	T	FbEq
25 DC GROUNDING		Parameter group for DC grounding settings			
25.01	GND MODE SELECT	Defines a usage mode of the DC grounding.	OFF	I	
	OFF	DC grounding control and monitoring are disabled.			0
	AUTO	DC grounding control and monitoring are enabled.			1
	CONT CLOSED	DC grounding contactor is manually closed (no monitoring). **Note**: This mode is used only for commissioning or servicing.			2
	CONT OPEN	DC grounding contactor is manually open (no monitoring).			3
26 DC INPUT CONFIG		DC input current measurement settings			
26.01	NR OF DC INPUTS	Defines the number of DC inputs.	OFF	I	-
	OFF	Not in use			0
	4 INPUTS	4 inputs			1
	5 INPUTS	5 inputs			2
	6 INPUTS	6 inputs			3
	7 INPUTS	7 inputs			4
	8 INPUTS	8 inputs			5
	9 INPUTS	9 inputs			6
	10 INPUTS	10 inputs			7
	11 INPUTS	11 inputs			8
	12 INPUTS	12 inputs			9
	13 INPUTS	13 inputs			10
	14 INPUTS	14 inputs			11
	15 INPUTS	15 inputs			12
	16 INPUTS	16 inputs			13
26.02	MIN DC CUR DEV	Defines the minimum deviation from the average DC input current after which the inverter generates alarm *DC INPUT DEV (2185)* if the alarm is enabled in parameter *26.06 DC INPUT MODE*.	20 A	R	
	0…1000 A	Minimum DC current deviation			10 = 1 A
26.03	DC INPUT MASK	Defines which DC inputs are included in the DC input current deviation calculation and diagnostics. • Bit value 1 = The corresponding DC input is included. • Bit value 0 = The corresponding DC input is not included. For example, binary value 1100 means that DC inputs 4 and 3 are included in the DC input current deviation calculation and diagnostics, but DC inputs 2 and 1 are not.	0xFFF	PB	
	0x0…0xFFFF	DC inputs included in the DC input current deviation calculation and diagnostics			1 = 1

No.	Name/Value	Description	Def	T	FbEq
26.04	DC INPUT STATUS	Indicates which DC inputs are in order and which DC inputs deviate from the average DC input current. The minimum deviation is defined by parameter *26.02 MIN DC CUR DEV*. The deviation must be present, at the minimum, for the duration defined by parameter *26.05 DC CUR DEV DELAY* before the inverter generates alarm *DC INPUT DEV (2185)* and the corresponding status bit is set to 1. • Bit value 1 = A deviation has occurred in the corresponding DC input. • Bit value 0 = The corresponding DC input is in order. For example, binary value 1100 means that a deviation has occurred in DC inputs 3 and 4.	0x0	PB	
	0x0…0xFFFF	DC input status			1 = 1
26.05	DC CUR DEV DELAY	Defines for how long DC current can deviate from the average DC input current before the inverter generates alarm *DC INPUT DEV (2185)* and the corresponding status bit in *26.04 DC INPUT STATUS* is set to 1.	900	R	
	0…3600 s	DC current deviation delay			10 = 1 s
26.06	DC INPUT MODE	Defines whether a deviation in the DC input currents causes alarm *DC INPUT DEV (2185)* or not.	OFF	I	
	OFF	No alarm is generated.			0
	ALARM	Alarm *DC INPUT DEV (2185)* is generated.			1
26.07	CUR TRANSDUC SEL	Defines the maximum measurable current of the current transducer used in DC input current measurements.	100 A	R	
	0…1000 A	Maximum measurable current of the current transducer			1 = 1 A
28 MAILBOX		Mailbox interface			
28.01	WRITE ADDRESS	Defines the address where the input data will be written to. If the address is greater than 10000, an offset of 10000 is subtracted from it, and the result is forwarded to the Inverter control program. Parameter writing is triggered if there is a non-zero value in this parameter. A zero value is automatically written to this parameter after the execution of parameter writing. **Example:** If the address is 2402, the write command will be targeted to Master control program parameter *24.02 Q POWER REF*. If the address is 11901, the write command will be targeted to Inverter control program parameter *19.01 DATA 1*.	0	I	
	0…30000	Address to be written. The address format is: (group number * 100) + index number.			1 = 1

No.	Name/Value	Description	Def	T	FbEq
28.02	INPUT DATA	Defines the value which will be written to the address defined by parameter *28.01 WRITE ADDRESS*.	0	I	
	-32768…32767	Data value			1 = 1
28.03	READ ADDRESS	Defines the address where the output data will be read from. If the address is greater than 10000, an offset of 10000 is subtracted from it, and the result is forwarded to the Inverter control program. **Example:** If the address is 134, the read command will be targeted to Master control program parameter *01.34 PV MODULE DC MEAS*. If the address is 10110, the read command will be targeted to Inverter control program parameter *01.10 DC VOLTAGE*.	0	I	
	0…30000	Address to be read. The address format is: (group number * 100) + index number.			1 = 1
28.04	WRITE ADDRESS FB	Shows feedback for the write operation: • Original write address if the write operation was successful • Zero if the write operation was not successful.	0	I	1 = 1
28.05	OUTPUT DATA	Shows the data that is read from the given read address. **Note:** If the read operation is not successful, the data in this parameter is not valid and it must be discarded.	0	I	1 = 1
28.06	READ ADDRESS FB	Shows feedback from the read operation: • Original read address if the read operation was successful • Zero if the read operation was not successful.	0	I	1 = 1
30 FAULT FUNCTIONS		Programmable protective functions			
30.01	DI3 EXT EVENT	Selects how the master control program reacts to the “0” state of digital input DI3. **Note**: Digital input DI3 is reserved for AC and DC overvoltage protection.	DI3=0 ALARMS	I	
	NO	No action			1
	DI3=0 ALARMS	If the digital input switches to 0, an alarm is given.			2
	DI3=0 FAULTS	If the digital input switches to 0, the master control program trips on a fault.			3
30.02	DI4 EXT EVENT	Selects how the master control program reacts to the “0” state of digital input DI4. **Note**: With option +G420 the digital input DI4 is reserved for DC cable overcurrent protection.	NO	I	
	NO	No action			1
	DI4=0 ALARMS	If the digital input switches to 0, an alarm is given.			2
	DI4=0 FAULTS	If the digital input switches to 0, the master control program trips on a fault.			3

No.	Name/Value	Description	Def	T	FbEq
30.03	DI5 EXT EVENT	Selects how the master control program reacts to the “0” state of digital input DI5.	NO	I	
	NO	No action			1
	DI5=0 ALARMS	If the digital input switches to 0, an alarm is given.			2
	DI5=0 FAULTS	If the digital input switches to 0, the master control program trips on a fault.			3
30.04	RESET DELAY [s]	Defines an interval for automatic resets.	60	I	
	0…32767 s	Automatic reset interval			1 = 1 s
30.05	NUMBER OF TRIALS	Defines how many automatic resets are attempted. 0 = Automatic reset disabled.	0	I	
	0…32767	Number of automatic resets			1 = 1
30.06	CURRENT DEV FUNC	Selects the fault function for the detected current deviation used in string box monitoring.	NO	I	
	NO	No specific fault function. The detected current deviation can be seen only in status words.			0
	ALARM	Inverter generates alarm BX CUR DEV if a current deviation is detected (X means the number of the communication channel). The detected deviation can also be seen in status words.			1
30.07	CURRENT DEV DELAY	Defines a time delay for the BX CUR DEV alarm. The current deviation must be present longer than this delay before the alarm is generated.	600 s	R	
	0.5…419430 s	Time delay for the BX CUR DEV alarm			10 = 1 s
30.08	SBOX LOST FUNC	Selects the fault function for a Modbus link lost.	NO	I	
	NO	No specific fault function. The status of the Modbus link can be seen only in status words.			0
	ALARM	Inverter generates alarm SBOX X LINK if a Modbus link is broken (X in the middle means the number of the communication channel). The status of the link can also be seen in status words.			1
30.09	SBOX LOST DELAY	Defines a time delay for the SBOX X LINK alarm. The link lost situation must be present longer than this delay before the alarm is generated.	60 s	R	
	0.5…419430 s	Time delay for the SBOX X LINK alarm			10 = 1 s
30.10	EM STOP FUNCTION	Selects how the master control program indicates an open emergency stop circuit. The status of the emergency stop circuit is shown in digital input 6.	FAULT	I	
	NO	No alarm indication			1

No.	Name/Value	Description	Def	T	FbEq
	ALARM	Alarm *EM STOP (F081)* is created. The alarm is active if: • Status of digital input 6 (DI6) = 0 • 20-second power-up-delay has elapsed • 30.10 EM STOP FUNCTION = ALARM.			2
	FAULT	Fault *EM STOP (F083)* is created. The fault is active if: • Status of digital input 6 (DI6) = 0 • 20-second power-up-delay has elapsed • 30.10 EM STOP FUNCTION = FAULT.			3
30.11	AUTO RESET MASK	Defines a mask for excluding certain faults from the automatic fault reset function. All other faults are reset by the automatic fault reset function if it is enabled. Bit value 1 means that the fault is reset by the automatic fault reset function and 0 means that the fault is not reset by automatic fault reset function. Bit 0 — External grid monitoring fault (from the grid monitoring relay) Bit 1 — Insulation resistance fault	0x03	PB	1 = 1
31 PVA CONTROL		Various master control program settings			
31.01	ENABLE MPPT	Enables/disables the operation of the PVS800. 0 = Force state of PVS800 to STAND BY. See also section *PVS800 state machine* on page *31*.	C.00001	P	
	-255.255.31 … +255.255.31 / C. -32768 … C. 32767	Parameter pointer or a constant value: • Parameter pointer: Inversion, group, index and bit fields. Bit number is effective only for blocks handling Boolean inputs. • Constant value: Inversion and constant fields. Inversion field must have value C to enable the constant setting.			
31.03	UDC MAX SCALE	Defines the DC voltage that corresponds to the DC measurement source signal value of 20000.	1200 V	R	
	0…2000 V	Value			1 = 1 V
31.04	UDC START LIM	Defines a start limit for the inverter. When the DC voltage exceeds this limit (and the master control program is started), the inverter is started.	600 V	R	
	450…2000 V	Start DC limit			1 = 1 V
31.05	UDC START DLY	Defines a delay for parameter *31.04 UDC START LIM*; the DC voltage must stay above the start limit for longer than the delay before the inverter is started.	10 min	R	
	0.0…10000.0 min	Delay for start DC limit			1 = 1 min

No.	Name/Value	Description	Def	T	FbEq
31.06	UDC STOP LIM	Defines a sleep limit for the inverter. When the DC voltage falls below this limit, the inverter is stopped. If parameter *31.22 UDC STOP LIM AUTO* = ENABLED, the value of this parameter is automatically updated based on the measured grid voltage.	450 V	R	
	0…2000 V	Stop DC limit			1 = 1 V
31.07	UDC STOP DLY	Defines a delay for parameter *31.06 UDC STOP LIM*; the DC voltage must stay below the sleep limit for longer than the delay before the inverter is stopped.	30 min	R	
	0.0…10000.0 min	Value			1 = 1 min
31.09	POWER SOURCE	Defines the signal source that is used by the master control program state machine to determine output power. Default setting is the power measured by, and received from, the inverter unit (parameter *01.11 AC POWER*).	+.001.011.00	P	
	-255.255.31 … +255.255.31 / C. -32768 … C. 32767	Parameter pointer or a constant value: • Parameter pointer: Inversion, group, index and bit fields. Bit number is effective only for blocks handling Boolean inputs. • Constant value: Inversion and constant fields. Inversion field must have value C to enable the constant setting.			
31.10	POWER STOP LIM	Defines a stop limit for the inverter unit. When the output power falls below this limit, the inverter unit is stopped. Value of 10000 corresponds to the nominal power of the inverter unit. See also parameter *31.16 POWER LIMITING*.	150	I	
	0…20000	Output power stop limit			1 = 1
31.11	POWER STOP DLY	Defines a delay for parameter *31.10 POWER STOP LIM*; the output power must stay below the stop limit for longer than the delay before the inverter unit is stopped.	30 min	R	
	0.0…10000.0 min	Output power stop delay			1 = 1 min
31.12	GOTO SLEEP MODE	Defines which conditions must be true for the master control program to enter the sleep mode.	UDC OR POW	I	
	UDC AND POW	PVS800 will enter the sleep mode when both the DC voltage and output power are under their respective stop limits (and remain there until any stop delays elapse).			1
	UDC OR POW	PVS800 will enter the sleep mode when either the DC voltage or output power is under its respective stop limit (and remains there until the stop delay elapses).			2

No.	Name/Value	Description	Def	T	FbEq
31.13	WAKE UP SOURCE	Selects a source that can be used to wake up the PVS800. When the value of the monitored source exceeds the limit set by parameter *31.14 WAKE UP START LIM*, and remains there until the delay set by *31.15 WAKE UP START DLY* elapses, the inverter unit is started (provided that the conditions for the DC voltage, defined by other parameters in this group, are fulfilled). If no wake-up source is needed, leave parameters *31.13*…*31.15* at their default (zero) settings.	+.000.000.00	P	
	-255.255.31 … +255.255.31 / C. -32768 … C. 32767	Parameter pointer or a constant value: • Parameter pointer: Inversion, group, index and bit fields. Bit number is effective only for blocks handling Boolean inputs. • Constant value: Inversion and constant fields. Inversion field must have value C to enable the constant setting.			
31.14	WAKE UP START LIM	Defines a wake-up limit for the signal selected by parameter *31.13 WAKE UP SOURCE*.	0	I	
	0…20000	Wake-up limit			1 = 1
31.15	WAKE UP START DLY	Defines a wake-up delay for parameter *31.13 WAKE UP SOURCE*.	0 min	R	
	0.0…10000.0 min	Wake-up start delay			1 = 1
31.16	POWER LIMITING	Defines an external active power limit of PVS800 in percent of nominal power (parameter *04.06 NOM AC POWER*) of the inverter unit. If the value of parameter *31.16 POWER LIMITING* is smaller than the value of parameter *31.10 POWER STOP LIM*, the inverter goes to Sleep mode.	200%	R	
	0…200%	Active power limit			100 = 1%
31.17	CELL TEMP COEFF	Parameters *31.17*…*31.19* define a photovoltaic cell temperature correction that is applied to the DC voltage start level. Defines a temperature coefficient for the open-loop solar cell voltage. If set to zero, no temperature correction is applied. Coefficient must be given for a complete photovoltaic string.	0 V/K	R	
	-5…0 V/K	Cell temperature coefficient			100 = 1 V/K
31.18	CELL TEMP COR LIM	Limit for the effect of the temperature correction function. Base value for the DC voltage start level is read from parameter *31.04 UDC START LIM*.	3%	R	
	0…10%	Temperature correction limit			100 = 1%

No.	Name/Value	Description	Def	T	FbEq
31.19	CELL TEMP SOURCE	Defines a source from which the measured temperature of a photovoltaic cell is read.	+.001.037.00	P	
	-255.255.31 … +255.255.31 / C. -32768 … C. 32767	Parameter pointer or a constant value: • Parameter pointer: Inversion, group, index and bit fields. Bit number is effective only for blocks handling Boolean inputs. • Constant value: Inversion and constant fields. Inversion field must have value C to enable the constant setting.			
31.21	UDC HIGH DISABLE	Defines a mask for disabling the high DC voltage checking in certain situations.	0x03	PB	1 = 1

Bit	Description
0	1 = High DC voltage checking is not active when bit 11 in parameter *08.01 MAIN STATUS WORD* is set. 0 = High DC voltage checking is active regardless of bit 11 in parameter *08.01 MAIN STATUS WORD*.
1	1= High DC voltage checking is not active when bit 11 in parameter *08.05 PVA STATUS WORD* is set. 0 = High DC voltage checking is active regardless of bit 11 in parameter *08.05 PVA STATUS WORD*.
2	1 = High DC voltage checking is not active when bit 9 in *08.08 LIMIT WORD* is set. 0 = High DC voltage checking is active regardless of bit 9 in *08.08 LIMIT WORD*.

31.22	UDC STOP LIM AUTO	Enables or disables the automatic update of parameter *31.06 UDC STOP LIM*. If enabled, *31.06 UDC STOP LIM* = *02.03 MAINS VOLTAGE* x sqrt(2) + 15 V. *31.06 UDC STOP LIM* is updated automatically if the following conditions are met: • 31.22 UDC STOP LIM AUTO = ENABLED • 200 V < *02.03 MAINS VOLTAGE* < 450 V • Bit 11 (LEVEL1_DIP_STA) is clear in parameter *08.01 MAIN STATUS WORD*.	ENABLED		
	DISABLED	*31.06 UDC STOP LIM* is not updated automatically based on the mains voltage level.			0
	ENABLED	*31.06 UDC STOP LIM* is updated automatically based on the mains voltage level.			1
32 STRING BOX ADDR		Addresses for junction box communication channels. **Note:** Parameter group 32 STRING BOX ADDR is not visible if parameter *33.01ENABLE MONITORING* = FALSE.			
32.01	NR OF BOXES	Shows the number of the junction boxes configured.	0	I	
	0…20	Number of the junction boxes configured			1 = 1

No.	Name/Value	Description	Def	T	FbEq
32.03	BOX1 NODE ADDR	Defines the address for junction box communication channel 1. Zero address means that the communication channel is not configured and, thus, not used.	0	I	
	0…247	Address for communication channel 1			1 = 1
32.04	BOX2 NODE ADDR	Defines an address for junction box communication channel 2. Zero address means that the communication channel is not configured and, thus, not used.	0	I	
	0…247	Address for communication channel 2			1 = 1
…	…	…	…	…	…
32.22	BOX20 NODE ADDR	Defines an address for junction box communication channel 20. Zero address means that the communication channel is not configured and, thus, not used.	0	I	
	0…247	Address for communication channel 20			1 = 1
33 STRING MON SET		Settings for string monitoring			
33.01	ENABLE MONITORING	Enables communication for string monitoring. • If the communication is enabled, the master control unit cyclically polls the configured junction boxes. • If the communication is disabled, the master control unit does not communicate with the junction boxes.	FALSE	B	
	FALSE	String monitoring is disabled.			0
	TRUE	String monitoring is enabled.			1
33.02	CUR DEV CALC ENA	Enables current deviation calculation. String monitoring (see parameter *33.01*) must be enabled to receive the measured currents from the junction boxes.	FALSE	B	
	FALSE	Current deviation calculation is disabled.			0
	TRUE	Current deviation calculation is enabled.			1
33.03	MIN CUR DEVIATION	Defines the minimum current deviation for a status indication. If the difference between an average string current and a single string current is bigger than this setting, a deviation is noticed and the corresponding bit in parameters *36.01 BOX1 CUR DEV STA*…*36.20 BOX20 CUR DEV STA* is set. Average string current is calculated separately in each junction box from all enabled strings.	1 A	R	
	0…1000 A	Minimum current deviation for a status indication			1000 = 1 A
33.04	MB MASTER CYCLE	Defines the time between two master requests (polls) in cyclical communication. Time to poll all the configured junction boxes is then (*33.04 MB MASTER CYCLE*) x (*32.01 NR OF BOXES*).	1 s	R	
	0.2…1000 s	Modbus master cycle time			100 = 1 s

No.	Name/Value	Description	Def	T	FbEq
33.05	MB MASTER TIMEOUT	Defines a time-out for Modbus master requests. If the response for the master's request is not received within this time, the communication link is considered broken. Time-out counting is started when the request is sent from the Modbus master to the junction box.	0.3 s	R	
	0.2…1000 s	Modbus master time-out			100 = 1 s
33.06	MODBUS MODE	Selects the Modbus mode (master or slave) for the RMBA-01 module installed into RMIO slot 2. If the string monitoring function is used, this parameter must be set to MASTER.	SLAVE		
	SLAVE	RMBA-01 is used in the slave mode.			0
	MASTER	RMBA-01 is used in the master mode.			1
33.07	ACYC REQUEST MODE	Selects the type of the acyclical request. When the request is sent, it is either a read request or a write request. Only one register value is read or written within the request.	READ VALUE	B	
	READ VALUE	Read request will be sent to the junction box.			0
	WRITE VALUE	Write request will be sent to the junction box.			1
33.08	REQUEST NODE ADDR	Defines the station address where the acyclical request is sent.	0	I	
	0…247	Station address in the request. Address of 0 means a broadcast message; it should be used only in the write mode.			1 = 1
33.09	REQUEST REG ADDR	Defines the register address to be read or to be written. Writing a value to this parameter triggers sending of the acyclical request.	0	I	
	1…9999	Register address			1 = 1
33.10	ACYCLIC DATA	Defines or shows the data in acyclical communication. This parameter has three purposes: • If parameter *33.07 ACYC REQUEST MODE* is set to WRITE VALUE, this parameter defines the data that is written to a junction box register. • If parameter *33.07 ACYC REQUEST MODE* is set to READ VALUE, this parameter shows the data that is read from a junction box register. • If the Modbus master receives an error response, this parameter shows the exception code in the error response.	0		
	-32768…32767	Data in acyclical communication			1 = 1

No.	Name/Value	Description	Def	T	FbEq
34 STRING MON STAT		Status words for string monitoring			
34.01	LINK STATUS 1-16	Shows the Modbus link status for communication channels 1…16.	0	PB	

Bit	Value	Information
0…15	1	Link is OK; Modbus master is communicating with the junction box.
	0	Link is broken; Modbus master cannot communicate with the junction box. Either the communication channel is not configured in parameter group 32 or there is a communication break.

		Bit 0 is for the 1st communication channel, bit 1 is for the 2nd communication channel … and bit 15 is for the 16th communication channel			
	0…65535				1 = 1
34.02	LINK STATUS 17-20	Shows the Modbus link status for communication channels 17…20.	0	PB	

Bit	Value	Information
0…3	1	Link is OK; Modbus master is communicating with the junction box.
	0	Link is broken; Modbus master cannot communicate with the junction box. Either the communication channel is not configured in parameter group 32 or there is a communication break.

		Bit 0 is for the 17th communication channel, bit 1 is for the 18th communication channel … and bit 3 is for the 20th communication channel.			
	0…15				1 = 1
34.03	MONITORING STATUS	Status word for string monitoring.	0		

Bit	Value	Information
0	1	String monitoring is enabled.
	0	String monitoring is disabled.
1	1	Current deviation calculation is enabled.
	0	Current deviation calculation is disabled.
2	1	RMBA-01 is in the master mode.
	0	RMBA-01 is in the slave mode.
3	1	Write mode is selected for acyclical communication.
	0	Read mode is selected for acyclical communication.

	0…15				1 = 1

No.	Name/Value	Description	Def	T	FbEq
34.04	ACYC REQUEST STAT	Status word for acyclical communication. Status word during a successful acyclical request: 0x0001 (request sending is triggered) -> 0x0002 (request is sent) -> 0x0000 (a successful response). Bits 0, 2 and 3 are cleared when a request is sent. Bit 1 is cleared when an OK response is detected. Successful acyclical communication can be tested by comparing the request status word against a zero value.	0		

Bit	Value	Information
0	1	Request sending is triggered; the request will be sent when the communication bus is idle.
	0	No messages are waiting for to be sent.
1	1	Request is sent; the master is waiting for a response.
	0	Request processing is not active.
2	1	Time-out counter has expired (no response from the junction box).
	0	Time-out counter has not expired.
3	1	There was an exception code in the response from a junction box. Code is shown in parameter *33.10*.
	0	Response message from a junction box was successful (no exception code).
4	1	Input data in parameter *33.08* or *33.09* is invalid. Acyclical request is not sent.
	0	Input data in parameters *33.08* and *33.09* was valid when the message sending process was triggered.

	0…31				1 = 1
34.05	MB OK MSG CNT	Shows the number of OK messages received by the Modbus master since the last power-up.	0	PB	
	0…65535				1 = 1
34.06	MB ERR MSG CNT	Shows the number of error messages received by the Modbus master since the last power-up.	0	PB	
	0…65535				1 = 1
34.07	MB TIMEOUT CNT	Shows the number of the Modbus master requests that have ended to a time-out since the last power-up.	0	PB	
	0…65535				1 = 1

<table>
<tr><th>No.</th><th>Name/Value</th><th>Description</th><th>Def</th><th>T</th><th>FbEq</th></tr>
<tr><td>34.08</td><td>CUR DEV STA 1-16</td><td>Shows the current deviation status word for junction box communication channels 1…16.<table><tr><th>Bit</th><th>Value</th><th>Information</th></tr><tr><td>0…15</td><td>1</td><td>Current deviation is detected.</td></tr><tr><td></td><td>0</td><td>Current deviation is not detected.</td></tr></table>Bit 0 is for the 1st communication channel, bit 1 is for the 2nd communication channel … and bit 15 is for the 16th communication channel.</td><td>0</td><td>PB</td><td></td></tr>
<tr><td></td><td>0…65535</td><td></td><td></td><td></td><td>1 = 1</td></tr>
<tr><td>34.09</td><td>CUR DEV STA 17-20</td><td>Shows the current deviation status word for junction box communication channels 17…20.<table><tr><th>Bit</th><th>Value</th><th>Information</th></tr><tr><td>0…3</td><td>1</td><td>Current deviation is detected.</td></tr><tr><td></td><td>0</td><td>Current deviation is not detected.</td></tr></table>Bit 0 is for the 17th communication channel, bit 1 is for the 18th communication channel … and bit 3 is for the 20th communication channel.</td><td>0</td><td>PB</td><td></td></tr>
<tr><td></td><td>0…15</td><td></td><td></td><td></td><td>1 = 1</td></tr>
<tr><td colspan="2">35 ENABLED STRINGS</td><td>Strings that are part of current monitoring.
Note: Parameter group 35 ENABLED STRINGS is not visible if parameter 33.01ENABLE MONITORING = FALSE.</td><td></td><td></td><td></td></tr>
<tr><td>35.01</td><td>BOX1 STRING ENA</td><td>Defines which strings are enabled in junction box 1. One bit corresponds to one string in junction box channel 1.<table><tr><th>Bit</th><th>Value</th><th>Information</th></tr><tr><td>0…7</td><td>1</td><td>String channel is enabled in string monitoring and current deviation calculation.</td></tr><tr><td></td><td>0</td><td>String channel is disabled in string monitoring and current deviation calculation.</td></tr></table>Bit 0 is for the 1st string, bit 1 is for the 2nd string … and bit 7 is for the 8th string.</td><td>65535 = 0xFFFF</td><td>PB</td><td></td></tr>
<tr><td></td><td>0…255</td><td>Enabled strings in decimal format</td><td></td><td></td><td>1 = 1</td></tr>
</table>

<table>
<tr><th>No.</th><th>Name/Value</th><th>Description</th><th>Def</th><th>T</th><th>FbEq</th></tr>
<tr><td>35.02</td><td>BOX2 STRING ENA</td><td>Defines which strings are enabled in junction box 2. One bit corresponds to one string in junction box channel 2.<table><tr><th>Bit</th><th>Value</th><th>Information</th></tr><tr><td>0…7</td><td>1</td><td>String channel is enabled in string monitoring and current deviation calculation.</td></tr><tr><td></td><td>0</td><td>String channel is disabled in string monitoring and current deviation calculation.</td></tr></table>Bit 0 is for the 1st string, bit 1 is for the 2nd string … and bit 7 is for the 8th string.</td><td>65535 = 0xFFFF</td><td>PB</td><td></td></tr>
<tr><td></td><td>0…255</td><td>Enabled strings in decimal format</td><td></td><td></td><td>1 = 1</td></tr>
<tr><td>…</td><td>…</td><td>…</td><td>…</td><td>…</td><td>…</td></tr>
<tr><td>35.20</td><td>BOX20 STRING ENA</td><td>Defines which strings are enabled in junction box 20. One bit corresponds to one string in junction box channel 20.<table><tr><th>Bit</th><th>Value</th><th>Information</th></tr><tr><td>0…7</td><td>1</td><td>String channel is enabled in string monitoring and current deviation calculation.</td></tr><tr><td></td><td>0</td><td>String channel is disabled in string monitoring and current deviation calculation.</td></tr></table>Bit 0 is for the 1st string, bit 1 is for the 2nd string … and bit 7 is for the 8th string.</td><td>65535 = 0xFFFF</td><td>PB</td><td></td></tr>
<tr><td></td><td>0…255</td><td>Enabled strings in decimal format</td><td></td><td></td><td>1 = 1</td></tr>
<tr><td colspan="2">36 SBOX CUR DEV STA</td><td>String current deviation status information.
Note: Parameter group 36 SBOX CUR DEV STA is not visible if parameter 33.01ENABLE MONITORING = FALSE.</td><td></td><td></td><td></td></tr>
<tr><td>36.01</td><td>BOX1 CUR DEV STA</td><td>Shows the status of string current deviations in junction box communication channel 1.<table><tr><th>Bit</th><th>Value</th><th>Information</th></tr><tr><td>0…7</td><td>1</td><td>Current deviation is detected.</td></tr><tr><td></td><td>0</td><td>Current deviation is not detected.</td></tr></table>Bit 0 is for the 1st string, bit 1 is for the 2nd string … and bit 7 is for the 8th string.</td><td>0</td><td>PB</td><td></td></tr>
<tr><td></td><td>0…255</td><td></td><td></td><td></td><td>1 =1</td></tr>
</table>

<table>
<tr><th>No.</th><th>Name/Value</th><th>Description</th><th>Def</th><th>T</th><th>FbEq</th></tr>
<tr><td>36.02</td><td>BOX2 CUR DEV STA</td><td>Shows the status of string current deviations in junction box communication channel 2.<table><tr><th>Bit</th><th>Value</th><th>Information</th></tr><tr><td>0…7</td><td>1</td><td>Current deviation is detected.</td></tr><tr><td></td><td>0</td><td>Current deviation is not detected.</td></tr></table>Bit 0 is for the 1st string, bit 1 is for the 2nd string … and bit 7 is for the 8th string.</td><td>0</td><td>PB</td><td></td></tr>
<tr><td></td><td>0…255</td><td></td><td></td><td></td><td>1 = 1</td></tr>
<tr><td>…</td><td>…</td><td>…</td><td>…</td><td>…</td><td>…</td></tr>
<tr><td>36.20</td><td>BOX20 CUR DEV STA</td><td>Shows the status of string current deviations in junction box communication channel 20.<table><tr><th>Bit</th><th>Value</th><th>Information</th></tr><tr><td>0…7</td><td>1</td><td>Current deviation is detected.</td></tr><tr><td></td><td>0</td><td>Current deviation is not detected.</td></tr></table>Bit 0 is for the 1st string, bit 1 is for the 2nd string … and bit 7 is for the 8th string.</td><td>0</td><td>PB</td><td></td></tr>
<tr><td></td><td>0…255</td><td></td><td></td><td></td><td>1 = 1</td></tr>
<tr><td colspan="2">40 STRING BOX 1 & 2</td><td>Actual signals read from communication channels 1 and 2 (ie, junction boxes 1 and 2) using cyclical communication. Signals 40.01…40.27 are for junction box 1 and signals 40.36…40.62 are for junction box 2.
Note: Parameter group 40 STRING BOX 1 & 2 is not visible if parameter 33.01ENABLE MONITORING = FALSE.</td><td></td><td></td><td></td></tr>
<tr><td>40.01</td><td>BOX1 TYPE</td><td>Shows the junction box type (example: 0x040B).</td><td>0</td><td>PB</td><td>1 = 1</td></tr>
<tr><td>40.02</td><td>BOX1 SW VERSION</td><td>Shows the software version (example: 0x102A).</td><td>0</td><td>PB</td><td>1 = 1</td></tr>
<tr><td>40.03</td><td>BOX1 HW VERSION</td><td>Shows the hardware version (example: 0x0102).</td><td>0</td><td>PB</td><td>1 = 1</td></tr>
<tr><td>40.04</td><td>BOX1 NR OF CHAN</td><td>Shows the number of the current measurement channels.</td><td>0</td><td>I</td><td>1 = 1</td></tr>
<tr><td>40.05</td><td>BOX1 RESERVED D5</td><td>Shows the status of the string monitoring unit.<table><tr><td>0x0001</td><td>Normal mode, initialization</td></tr><tr><td>0x0002</td><td>Normal mode, running</td></tr><tr><td>0x0003</td><td>Normal mode, error</td></tr><tr><td>0x0100</td><td>Calibration mode, initialization</td></tr><tr><td>0x0200</td><td>Calibration mode, running</td></tr><tr><td>0x0300</td><td>Calibration mode, error</td></tr><tr><td>0x0400</td><td>Calibration mode has ended</td></tr></table></td><td>0</td><td>I</td><td>1 = 1</td></tr>
<tr><td>40.06</td><td>BOX1 RESERVED D6</td><td>Reserved</td><td>0</td><td>I</td><td>1 = 1</td></tr>
<tr><td>40.07</td><td>BOX1 OK MSG CNT</td><td>Shows the number of OK messages.</td><td>0</td><td>PB</td><td>1 = 1</td></tr>
<tr><td>40.08</td><td>BOX1 ER MSG CNT</td><td>Shows the number of error messages.</td><td>0</td><td>PB</td><td>1 = 1</td></tr>
</table>

No.	Name/Value	Description	Def	T	FbEq
40.09	BOX1 BOARD TEMP	Shows the temperature of the string monitoring unit.	0	R	10 = 1°C
40.10	ANALOG INPUT 1	Shows the measured current/voltage in analog input 1.	0	I	50 = 1 mA or 100 = 1 V
40.11	ANALOG INPUT 2	Shows the measured current/voltage in analog input 2.	0	I	2 = 1 mV
40.12	PT100 TEMP A	Shows the measured temperature in Pt100 channel A.	0	I	10 = 1°C
40.13	PT100 TEMP B	Shows the measured temperature in Pt100 channel B.	0	I	10 = 1°C
40.14	RESERVED D14	Reserved	0		
40.15	DI STATUS WORD	Shows the status of the digital inputs. Bit 1: Status of digital input 1 Bit 2: Status of digital input 2 Bit 3: Status of digital input 3	0	PB	1 = 1
40.16	RESERVED D16	Reserved			
40.17	RESERVED D17	Reserved			
40.18	RESERVED D18	Reserved			
40.19	RESERVED D19	Reserved			
40.20	STRING 1 AVG CUR	Shows the average current of string 1.	0	R	1000 = 1 A
40.21	STRING 2 AVG CUR	Shows the average current of string 2.	0	R	1000 = 1 A
…	…	…	…	…	…
40.35	STRING 16 AVG CUR	Shows the average current of string 16.	0	R	1000 = 1 A
40.36	BOX2 TYPE	Shows the junction box type (example: 0x040B).	0	PB	1 = 1
40.37	BOX2 SW VERSION	Shows the software version (example: 0x102A).	0	PB	1 = 1
40.38	BOX2 HW VERSION	Shows the hardware version (example: 0x0102).	0	PB	1 = 1
40.39	BOX2 NR OF CHAN	Shows the number of the current measurement channels.	0	I	1 = 1
40.40	BOX2 RESERVED D5	Shows the status of the string monitoring unit. 0x0001: Normal mode, initialization 0x0002: Normal mode, running 0x0003: Normal mode, error 0x0100: Calibration mode, initialization 0x0200: Calibration mode, running 0x0300: Calibration mode, error 0x0400: Calibration mode has ended			1 = 1
40.41	BOX2 RESERVED D6	Reserved			
40.42	BOX2 OK MSG CNT	Shows the number of OK messages.	0	PB	1 = 1
40.43	BOX2 ER MSG CNT	Shows the number of error messages.	0	PB	1 = 1
40.44	BOX2 BOARD TEMP	Shows the temperature of the string monitoring unit.	0	R	10 = 1°C

No.	Name/Value	Description	Def	T	FbEq
40.45	ANALOG INPUT 1	Shows the measured current/voltage in analog input 1.	0	I	50 = 1 mA or 100 = 1 V
40.46	ANALOG INPUT 2	Shows the measured current/voltage in analog input 2.	0	I	2 = 1 mV
40.47	PT100 TEMP A	Shows the measured temperature in Pt100 channel A.	0	I	10 = 1°C
40.48	PT100 TEMP B	Shows the measured temperature in Pt100 channel B.	0	I	10 = 1°C
40.49	RESERVED D14	Reserved			-
40.50	DI STATUS WORD	Shows the status of the digital inputs. Bit 1 Status of digital input 1 Bit 2 Status of digital input 2 Bit 3 Status of digital input 3	0	PB	1 = 1
40.51	RESERVED D16	Reserved			-
40.52	RESERVED D17	Reserved			-
40.53	RESERVED D18	Reserved			-
40.54	RESERVED D19	Reserved			-
40.55	STRING 1 AVG CUR	Shows the average current of string 1.	0	R	1000 = 1 A
40.56	STRING 2 AVG CUR	Shows the average current of string 2.	0	R	1000 = 1 A
…	…	…	…	…	…
40.70	STRING 16 AVG CUR	Shows the average current of string 16.	0	R	1000 = 1 A
41 STRING BOX 3 & 4		Actual signals read from communication channels 3 and 4 (ie, junction boxes 3 and 4) using cyclical communication. Signals 41.01…41.27 are for junction box 3 and signals 41.36…41.62 are for junction box 4. **Note:** Parameter group 41 STRING BOX 3 & 4 is not visible if parameter *33.01ENABLE MONITORING* = FALSE.			
		See group *40 STRING BOX 1 & 2* for the signal descriptions.			
42 STRING BOX 5 & 6		Actual signals read from communication channels 5 and 6 (ie, junction boxes 5 and 6) using cyclical communication. Signals 42.01…42.27 are for junction box 5 and signals 42.36…42.62 are for junction box 6. **Note:** Parameter group 42 STRING BOX 5 & 6 is not visible if parameter *33.01ENABLE MONITORING* = FALSE.			
		See group *40 STRING BOX 1 & 2* for the signal descriptions.			

No.	Name/Value	Description	Def	T	FbEq
43 STRING BOX 7 & 8		Actual signals read from communication channels 7 and 8 (ie, junction boxes 7 and 8) using cyclical communication. Signals 43.01…43.27 are for junction box 7 and signals 43.36…43.62 are for junction box 8. **Note:** Parameter group 43 STRING BOX 7 & 8 is not visible if parameter *33.01ENABLE MONITORING* = FALSE.			
		See group *40 STRING BOX 1 & 2* for the signal descriptions.			
44 STRING BOX 9 & 10		Actual signals read from communication channels 9 and 10 (ie, junction boxes 9 and 10) using cyclical communication. Signals 44.01…44.27 are for junction box 9 and signals 44.36…44.62 are for junction box 10. **Note:** Parameter group 44 STRING BOX 9 & 10 is not visible if parameter *33.01ENABLE MONITORING* = FALSE.			
		See group *40 STRING BOX 1 & 2* for the signal descriptions.			
45 STRING BOX 11 & 12		Actual signals read from communication channels 11 and 12 (ie, junction boxes 11 and 12) using cyclical communication. Signals 45.01…45.27 are for junction box 11 and signals 45.36…45.62 are for junction box 12. **Note:** Parameter group 45 STRING BOX 11 & 12 is not visible if parameter *33.01ENABLE MONITORING* = FALSE.			
		See group *40 STRING BOX 1 & 2* for the signal descriptions.			
46 STRING BOX 13 & 14		Actual signals read from communication channels 13 and 14 (ie, junction boxes 13 and 14) using cyclical communication. Signals 46.01…46.27 are for junction box 13 and signals 46.36…46.62 are for junction box 14. **Note:** Parameter group 46 STRING BOX 13 & 14 is not visible if parameter *33.01ENABLE MONITORING* = FALSE.			
		See group *40 STRING BOX 1 & 2* for the signal descriptions.			
47 STRING BOX 15 & 16		Actual signals read from communication channels 15 and 16 (ie, junction boxes 15 and 16) using cyclical communication. Signals 47.01…47.27 are for junction box 15 and signals 47.36…47.62 are for junction box 16. **Note:** Parameter group 47 STRING BOX 15 & 16 is not visible if parameter *33.01ENABLE MONITORING* = FALSE.			
		See group *40 STRING BOX 1 & 2* for the signal descriptions.			

No.	Name/Value	Description	Def	T	FbEq
48 STRING BOX 17 & 18		Actual signals read from communication channels 17 and 18 (ie, junction boxes 17 and 18) using cyclical communication. Signals 48.01…48.27 are for junction box 17 and signals 48.36…48.62 are for junction box 18. **Note:** Parameter group 48 STRING BOX 17 & 18 is not visible if parameter *33.01ENABLE MONITORING* = FALSE.			
		See group *40 STRING BOX 1 & 2* for the signal descriptions.			
49 STRING BOX 19 & 20		Actual signals read from communication channels 19 and 20 (ie, junction boxes 19 and 20) using cyclical communication. Signals 49.01…49.27 are for junction box 19 and signals 49.36…49.62 are for junction box 20. **Note:** Parameter group 49 STRING BOX 19 & 20 is not visible if parameter *33.01ENABLE MONITORING* = FALSE.			
		See group *40 STRING BOX 1 & 2* for the signal descriptions.			
50 MASTER ADAPTER N		These parameters are visible and need to be adjusted only when an Nxxx type fieldbus adapter module (optional) is installed. For details on the parameters, refer to the manual of the adapter module. **Note:** Any changes in these parameters take effect only after the next power-up of the adapter module.			
50.01	MODULE N TYPE	Module type and software version. NOT DEFINED = No module present.			
50.02 … 50.99	-	According to the module type			
51 MASTER ADAPTER		These parameters are visible and need to be adjusted only when a Rxxx type fieldbus adapter module (optional) is installed. For details on the parameters, refer to the manual of the adapter module. **Note:** Any changes in these parameters take effect only after the next power-up of the adapter module.			
51.01	MODULE TYPE	Module type and software version. NOT DEFINED = No module present.			
51.02 … 51.99	-	According to the module type			

No.	Name/Value	Description	Def	T	FbEq
52 STANDARD MODBUS		Settings for Standard Modbus Link. See chapter *Fieldbus control*. See also *RMBA-01 Modbus Adapter User's Manual* (3AFE64498851 [English]).			
52.01	STATION NUMBER	Defines the address of the device. Two units with the same address are not allowed on-line.	1	I	
	1…247	Address			
52.02	BAUDRATE	Defines the transfer rate of the link.	9600	I	
	600	600 bit/s			1
	1200	1200 bit/s			2
	2400	2400 bit/s			3
	4800	4800 bit/s			4
	9600	9600 bit/s			5
	19200	19200 bit/s			6
52.03	PARITY	Defines the use of parity and stop bits. Same setting must be used in all on-line stations.	NONE1 STOPBIT	I	
	NONE1STOPBIT	No parity bit, one stop bit			1
	NONE2STOPBIT	No parity bit, two stop bits			2
	ODD	Odd parity indication bit, one stop bit			3
	EVEN	Even parity indication bit, one stop bit			4
53 USER PARAMETERS		Adaptive programming settings			
53.01	NUMERIC 1	Defines a numeric parameter for adaptive programming.	0	I	
	-8388608…8388607	Numeric value			
53.02	NUMERIC 2	Defines a numeric parameter for adaptive programming.	0	I	
	-8388608…8388607	Numeric value			
…	…	…	…	…	
53.10	NUMERIC 10	Defines a numeric parameter for adaptive programming.	0	I	
	-8388608…8388607	Numeric value			
53.11	STRING 1	Defines an alarm or a fault text indication for the EVENT block.	MESSAGE1	C	
	0…9 characters	ASCII string type			
53.12	STRING 2	Defines an alarm or a fault text indication for the EVENT block.	MESSAGE2	C	
	0…9 characters	ASCII string type			
…	…	…	…	…	
53.24	STRING 14	Defines an alarm or a fault text indication for the EVENT block.	MESSAGE14	C	
	0…9 characters	ASCII string type			

<table>
<tr><th>No.</th><th>Name/Value</th><th>Description</th><th>Def</th><th>T</th><th>FbEq</th></tr>
<tr><td colspan="2">55 ADAPTIVE PROG1</td><td>Adaptive program task 1 settings:
selections of the function blocks and their input connections
diagnostics.
This parameter group is mainly used with adaptive programming. See section Adaptive programming with DriveAP 2.x (page 48) and Application guide: Adaptive program for PVS800 central inverters (3AUA0000091276 [English]).</td><td></td><td></td><td></td></tr>
<tr><td>55.01</td><td>STATUS</td><td>Shows the value of the adaptive program task 1 status word.</td><td>0</td><td>I</td><td></td></tr>
<tr><td></td><td>0…15</td><td>Table below shows the alternative bit states and the corresponding values on the control panel display.
If all the bits are FALSE (ie, 0), the state is STOPPED.<table><tr><th>Bit</th><th>Display</th><th>Meaning</th></tr><tr><td>0</td><td>1</td><td>Running</td></tr><tr><td>1</td><td>2</td><td>Editing</td></tr><tr><td>2</td><td>4</td><td>Checking</td></tr><tr><td>3</td><td>8</td><td>Faulted</td></tr></table></td><td></td><td></td><td></td></tr>
<tr><td>55.02</td><td>FAULTED PAR</td><td>Points out the faulted parameter in adaptive program task 1.</td><td>0</td><td>P</td><td></td></tr>
<tr><td></td><td>-255.255.31 … +255.255.31</td><td>Parameter pointer: Inversion, group, index and bit fields</td><td></td><td></td><td></td></tr>
<tr><td>55.05</td><td>BLOCK1</td><td>Selects the function block type for block 1 in adaptive program task 1.</td><td>NO</td><td>I</td><td></td></tr>
<tr><td></td><td>0…32768</td><td>Function block type</td><td></td><td></td><td></td></tr>
<tr><td>55.06</td><td>INPUT1</td><td>Selects the source for input 1 of block 1.</td><td>0</td><td>P</td><td></td></tr>
<tr><td></td><td>-255.255.31 … +255.255.31 /
C. -32768 … C. 32767</td><td>Parameter index or a constant value:
Parameter pointer: Inversion, group, index and bit fields. Bit number is effective only for blocks handling Boolean inputs.
Constant value: Inversion and constant fields. Inversion field must have value C to enable the constant setting.
Example: The state of digital input DI2 is connected to input 1 as follows:
Set this parameter to +08.02.02. (The adaptive program stores the state of digital input DI2 to bit 2 of actual signal 08.02.)
If you need an inverted value, switch the sign of the pointer value (-08.02.02).</td><td></td><td></td><td></td></tr>
<tr><td>55.07</td><td>INPUT2</td><td>Selects the source for input 2 of block 1.</td><td>0</td><td>P</td><td></td></tr>
<tr><td></td><td></td><td>See parameter 55.06 INPUT1.</td><td></td><td></td><td></td></tr>
<tr><td>55.08</td><td>INPUT3</td><td>Selects the source for input 3 of block 1.</td><td>0</td><td>P</td><td></td></tr>
<tr><td></td><td></td><td>See parameter 55.06 INPUT1.</td><td></td><td></td><td></td></tr>
<tr><td>55.09</td><td>OUTPUT</td><td>Stores and displays the output of block 1.</td><td>0</td><td>I</td><td></td></tr>
<tr><td></td><td></td><td>No user setting possible</td><td></td><td></td><td></td></tr>
</table>

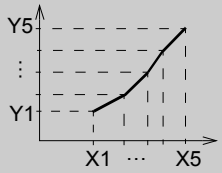
No.	Name/Value	Description	Def	T	FbEq
55.10	BLOCK2	Selects the function block type for block 2 in adaptive program task 1.	NO	I	
	0…32768	Function block type			
55.11	INPUT1	Selects the source for input 1 of block 2.	0	P	
		See parameter *55.06 INPUT1*.			
55.12	INPUT2	Selects the source for input 2 of block 2.	0	P	
		See parameter *55.06 INPUT1*.			
55.13	INPUT3	Selects the source for input 3 of block 2.	0	P	
		See parameter *55.06 INPUT1*.			
55.14	OUTPUT	Stores and displays the output of block 2.	0	I	
		No user setting possible			
55.15	BLOCK3	Selects the function block type for block 3 in adaptive program task 1.	NO	I	
	0…32768	Function block type			
…	…	…	…	…	
55.54	OUTPUT	Stores and displays the output of block 10.	0	I	
		No user setting possible			
56 ADAPT PROG1 CTRL		Adaptive program task 1 control. The update time of task 1 control is 10 ms. This parameter group is mainly used with the DriveAP 2.x PC tool. See parameter group *55 ADAPTIVE PROG1*.			
56.01	ADAPT PROG CMD	Selects the operation mode for adaptive program task 1.	EDIT	I	
	STOP	Stopped. The program cannot be edited.			1
	START	Running. The program cannot be edited.			2
	EDIT	Stops to edit the mode (ie, the execution of the task is stopped for editing). The program can be edited.			3
56.02	EDIT CMD	Selects the command for the block placed in the location defined by parameter *56.03 EDIT BLOCK*.	NO	I	
	NO	Home value. The value automatically reverts to *NO* after an editing command is executed. The program must be in the edit mode (see parameter *56.01 ADAPT PROG CMD*).			1
	PUSH	Shifts the block in the location defined by parameter *56.03 EDIT BLOCK* and the subsequent blocks one location up. A new block can be placed in the emptied location. The program must be in the edit mode (see parameter *56.01 ADAPT PROG CMD*).			2

No.	Name/Value	Description	Def	T	FbEq
	DELETE	Selects the block in the location defined by parameter *56.03 EDIT BLOCK* and shifts the subsequent blocks one step down. The program must be in the edit mode (see parameter *56.01 ADAPT PROG CMD*).			3
	PROTECT	Activation of the task protection: Read protects the input connections of the blocks. Activate as follows: - Ensure the task operation mode is set to *START* or *STOP* (parameter *56.01 ADAPT PROG CMD*). - Set the passcode by parameter *56.05 PASSCODE*. - Set this parameter to *PROTECT*. When protection is activated: - All parameters in group *55 ADAPTIVE PROG1* excluding the block output parameters are hidden (read protected). - It is not possible to switch the task operating mode (parameter *56.01 ADAPT PROG CMD*) to the edit mode. - Parameter *56.05 PASSCODE* is set to 0.			4
	UNPROTECT	Deactivation of the task protection: no read protection of the inputs of the blocks. Deactivate as follows: - Ensure the task operation mode is set to *START* or *STOP* (parameter *56.01 ADAPT PROG CMD*). - Set the passcode by parameter *56.05 PASSCODE*. - Set this parameter to *UNPROTECT*.			5
56.03	EDIT BLOCK	Defines the block location number for the command selected by parameter *56.02 EDIT CMD*.	0	I	
	1…15	Block location number			
56.04	TIMELEV_SEL	Indicates the fixed execution cycle time (10 ms) of adaptive program task 1. Also digital and analog inputs are read on this time level.	10ms	I	
56.05	PASSCODE	Defines the passcode, which activates/deactivates the protection of the input connections of the blocks. See parameter *56.02 EDIT CMD*.	0	I	
	0 h…FFFFFF h	Passcode. The setting reverts to 0 after the protection is activated/deactivated. **Note:** When you activate the protection, write down the passcode and store it for later use.			

<table>
<tr><th>No.</th><th>Name/Value</th><th>Description</th><th>Def</th><th>T</th><th>FbEq</th></tr>
<tr><td colspan="2">57 ADAPTIVE PROG2</td><td>Adaptive program task 2 settings:
- selections of the function blocks and their input connections
- diagnostics.
This parameter group is mainly used with the DriveAP 2.x PC tool. See section Adaptive programming with DriveAP 2.x (page 48) and Application guide: Adaptive program for PVS800 central inverters (3AUA0000091276 [English]).</td><td></td><td></td><td></td></tr>
<tr><td>57.01</td><td>STATUS</td><td>Shows the value of the adaptive program task 2 status word.</td><td>0</td><td>I</td><td></td></tr>
<tr><td></td><td>0…15</td><td>The table below shows the alternative bit states and the corresponding values on the control panel display.
If all the bits are FALSE (ie, 0), the state is STOPPED.
<table>
<tr><th>Bit</th><th>Display</th><th>Meaning</th></tr>
<tr><td>0</td><td>1</td><td>Running</td></tr>
<tr><td>1</td><td>2</td><td>Editing</td></tr>
<tr><td>2</td><td>4</td><td>Checking</td></tr>
<tr><td>3</td><td>8</td><td>Faulted</td></tr>
</table></td><td></td><td></td><td></td></tr>
<tr><td>57.02</td><td>FAULTED PAR</td><td>Points out the faulted parameter in adaptive program task 2.</td><td>0</td><td>P</td><td></td></tr>
<tr><td></td><td>-255.255.31 … +255.255.31</td><td>Parameter pointer: Inversion, group, index and bit fields.</td><td></td><td></td><td></td></tr>
<tr><td>57.05</td><td>BLOCK1</td><td>Selects the function block type for block 1 in adaptive program task 2.</td><td>NO</td><td>I</td><td></td></tr>
<tr><td></td><td>0…32768</td><td>Function block type</td><td></td><td></td><td></td></tr>
<tr><td>57.06</td><td>INPUT1</td><td>Selects the source for input 1 of block 1.</td><td>0</td><td>P</td><td></td></tr>
<tr><td></td><td>-255.255.31 … +255.255.31 /
C. -32768 … C. 32767</td><td>Parameter index or a constant value:
• Parameter pointer: Inversion, group, index and bit fields. The bit number is effective only for blocks handling Boolean inputs.
• Constant value: Inversion and constant fields. Inversion field must have value C to enable the constant setting.
Example: The state of digital input DI2 is connected to input 1 as follows:
• Set this parameter to +08.02.02. (The adaptive program stores the state of digital input DI2 to bit 2 of actual signal 08.02.)
• If you need an inverted value, switch the sign of the pointer value (-08.02.02).</td><td></td><td></td><td></td></tr>
<tr><td>57.07</td><td>INPUT2</td><td>Selects the source for input 2 of block 1.</td><td>0</td><td>P</td><td>-</td></tr>
<tr><td></td><td></td><td>See parameter 57.06 INPUT1.</td><td></td><td></td><td></td></tr>
<tr><td>57.08</td><td>INPUT3</td><td>Selects the source for input 3 of block 1.</td><td>0</td><td>P</td><td>-</td></tr>
<tr><td></td><td></td><td>See parameter 57.06 INPUT1.</td><td></td><td></td><td></td></tr>
<tr><td>57.09</td><td>OUTPUT</td><td>Stores and displays the output of block 1.</td><td>0</td><td>I</td><td>-</td></tr>
<tr><td></td><td></td><td>No user setting possible</td><td></td><td></td><td></td></tr>
</table>

No.	Name/Value	Description	Def	T	FbEq
57.10	BLOCK2	Selects the function block type for block 2 in adaptive program task 2.	NO	I	-
	0…32768	Function block type			
57.11	INPUT1	Selects the source for input 1 of block 2.	0	P	-
		See parameter *57.06 INPUT1*.			
57.12	INPUT2	Selects the source for input 2 of block 2.	0	P	-
		See parameter *57.06 INPUT1*.			
57.13	INPUT	Selects the source for input 3 of block 2.	0	P	-
		See parameter *57.06 INPUT1*.			
57.14	OUTPUT	Stores and displays the output of block 2.	0	I	-
		No user setting possible			
57.15	BLOCK3	Selects the function block type for block 3 in adaptive program task 2.	NO	I	-
	0…32768	Function block type			
…	…	…	…	…	…
57.104	OUTPUT	Stores and displays the output of block 20.		I	-
	0…32768	No user setting possible	0		
58 ADAPT PROG2 CTRL		Adaptive program task 2 control. Update time of task 2 control is 100 ms. This parameter group is mainly used with the DriveAP 2.x PC tool. See parameter group *57 ADAPTIVE PROG2*.			
58.01	ADAPT PROG CMD	Selects the operation mode for adaptive program task 2.	EDIT	I	
	STOP	Stopped. Program cannot be edited.			1
	START	Running. Program cannot be edited.			2
	EDIT	Stops to edit the mode. Program can be edited.			3
58.02	EDIT CMD	Selects the command for the block placed in the location defined by parameter *58.03 EDIT BLOCK*. Program must be in the editing mode (see parameter *58.01 ADAPT PROG CMD*).	NO	I	
	NO	Home value. Value automatically reverts to *NO* after an editing command is executed.			1
	PUSH	Shifts the block in the location defined by parameter *58.03 EDIT BLOCK* and the subsequent blocks one location up. New block can be placed in the emptied location.			2
	DELETE	Selects the block in the location defined by parameter *58.03 EDIT BLOCK* and shifts the subsequent blocks one step down.			3

No.	Name/Value	Description	Def	T	FbEq
	PROTECT	Activation of the task protection: Read-protects the input connections of the blocks. Activate as follows: - Ensure the task operation mode is set to *START* or *STOP* (parameter *58.01 ADAPT PROG CMD*). - Set the passcode by parameter *58.05 PASSCODE*. - Set parameter *58.02* to *PROTECT*. When protection is activated: - All parameters in group *57 ADAPTIVE PROG2* excluding the block output parameters are hidden (read-protected). - It is not possible to switch the task operating mode (parameter *58.01 ADAPT PROG CMD*) to the editing mode. - Parameter *58.05 PASSCODE* value is set to 0.			4
	UNPROTECT	Deactivation of the task protection: no read protection of the input connection of the blocks. Deactivate as follows: - Ensure the adaptive task operation mode is set to *START* or *STOP* (parameter *58.01 ADAPT PROG CMD*). - Set the passcode by parameter *58.05 PASSCODE*. - Set parameter *58.02* to *UNPROTECT*.			5
58.03	EDIT BLOCK	Defines the block location number for the command selected by parameter *58.02 EDIT CMD*.	0	I	-
	1…15	Block location number			
58.04	TIMELEV_SEL	Indicates the fixed execution cycle time of 100 ms for adaptive program task 2.	100ms	I	-
58.05	PASSCODE	Defines the passcode, which activates/deactivates the protection of the input connections of the blocks. See parameter *58.02 EDIT CMD*.	0	I	-
	0 h…FFFFFF h	Passcode. The setting restores to 0 after the protection is activated/deactivated. **Note:** When you activate the protection, write down the passcode and store it for later use.			

No.	Name/Value	Description	Def	T	FbEq
65 FUNC GENERATOR		Defines a five-point [(x1, y1), (x2, y2), (x3, y3), (x4, y4), (x5, y5)] function curve in the adaptive program. See blocks FUNG IN and FUNG OUT in *Application guide: Adaptive program for PVS800 central inverters* (3AUA0000091276 [English]). Function is executed on 100 ms time level. Function generator can be used, eg, for defining pump acceleration curves. 			
65.01	ENABLE	Activates the function.	OFF	B	
	OFF	Inactive			0
	ON	Active			65535
65.03	OUT	Defines the output of the function curve.	0	R	
	-32768…32767	Value			1 = 1
65.04	X1	Defines the value for the x-axis 1st point (x1, y1).	0	R	
	-32768…32767	Value			1 = 1
65.05	Y1	Defines the value for the y-axis 1st point (x1, y1).	0	R	
	-32768…32767	Value			1 = 1
65.06	X2	Defines the value for the x-axis 2nd point (x2, y2).	0	R	
	-32768…32767	Value			1 = 1
65.07	Y2	Defines the value for the y-axis 2nd point (x2, y2).	0	R	
	-32768…32767	Value			1 = 1
65.08	X3	Defines the value for the x-axis 3rd point (x3, y3).	0	R	
	-32768…32767	Value			1 = 1
65.09	Y3	Defines the value for the y-axis 3rd point (x3, y3).	0	R	
	-32768…32767	Value			1 = 1
65.10	X4	Defines the value for the x-axis 4th point (x4, y4).	0	R	
	-32768…32767	Value			1 = 1
65.11	Y4	Defines the value for the y-axis 4th point (x4, y4).	0	R	
	-32768…32767	Value			1 = 1
65.12	X5	Defines the value for the x-axis 5th point (x5, y5).	0	R	
	-32768…32767	Value			1 = 1
65.13	Y5	Defines the value for the y-axis 5th point (x5, y5).	0	R	
	-32768…32767	Value			1 = 1

No.	Name/Value	Description	Def	T	FbEq
66 ADAPTIVE CONNECT		This group consists of input type parameters for the adaptive program. **Note:** It is recommended that these parameter values be set with the DriveAP 2.x PC tool. See section *Adaptive programming with DriveAP 2.x* (page *48*) and *Application guide: Adaptive program for PVS800 central inverters* (3AUA0000091276 [English]).			
66.01	CW	Defines the input for block CW. See also parameter *07.02 USED MCW*.	0	P	

Bit	Name	Value	Description
0	ON/OFF	0 ⇒1	Inverter operation is enabled. Bit 0 and bit 3 must be controlled at the same time.
		0	Operation is disabled.
1, 2	Reserved		
3	ON/OFF	1	Operation is enabled.
		0	Operation is disabled.
4…6	Reserved		
7	RESET	0 ⇒1	Reset
8…15	Reserved		

	-255.255.31 … +255.255.31 / C. -32768 …C. 32767	Parameter pointer or a constant value: • Parameter pointer: Inversion, group, index and bit fields. Bit number is effective only for blocks handling Boolean inputs. • Constant value: Inversion and constant fields. Inversion field must have value C to enable the constant setting.			1 = 1
66.02	DO1	Defines the input for block DO1 which controls relay output RO1 on the control unit.	0	P	
		Signal index or constant value, see parameter *66.01 CW*.			1 = 1
66.03	DO2	Defines the input for block DO2 which controls relay output RO2 on the control unit.	-.008.001.03	P	
		Signal index or constant value, see parameter *66.01 CW*.			1 = 1
66.04	DO3	Defines the input for block DO3 which controls relay output RO3 on the control unit.	+.136.020.00	P	
		Signal index or constant value, see parameter *66.01 CW*.			1 = 1

No.	Name/Value	Description	Def	T	FbEq
66.05	EXT DO	Defines the input for block EXT DO which controls extension module digital outputs (EXT DO word). Updating interval is 100 ms.	0	P	

Bit	Name	Description
0	EXT1 DO1	Digital output 1 control on RDIO extension module 1
1	EXT1 DO2	Digital output 2 control on RDIO extension module 1
2	EXT2 DO1	Digital output 1 control on RDIO extension module 2
3	EXT2 DO2	Digital output 2 control on RDIO extension module 2
4	EXT3 DO1	Digital output 1 control on RDIO extension module 3
5	EXT3 DO2	Digital output 2 control on RDIO extension module 3
6	EXT4 DO1	Digital output 1 control on RDIO extension module 4
7	EXT4 DO2	Digital output 2 control on RDIO extension module 4
8	EXT5 DO1	Digital output 1 control on RDIO extension module 5
9	EXT5 DO2	Digital output 2 control on RDIO extension module 5
10…15	Reserved	

		Signal index or constant value, see parameter *66.01 CW*.			1 = 1
66.06	AO1	Defines the input for block AO1 which controls analog output 1 on the control unit.	0	P	
		Signal index or constant value, see parameter *66.01 CW*.			1 = 1
66.07	AO2	Defines the input for block AO2 which controls analog output 2 on the control unit.	0	P	
		Signal index or constant value, see parameter *66.01 CW*.			1 = 1
66.08	EXT1 AO1	Defines the input for block EXT1 AO1 which controls analog output 1 of extension module 1.	0	P	
		Signal index or constant value, see parameter *66.01 CW*.			1 = 1
66.09	EXT1 AO2	Defines the input for block EXT1 AO2 which controls analog output 2 of extension module 1.	0	P	
		Signal index or constant value, see parameter *66.01 CW*.			1 = 1
66.10	EXT2 AO1	Defines the input for block EXT2 AO1 which controls analog output 1 of extension module 2.	0	P	
		Signal index or constant value, see parameter *66.01 CW*.			1 = 1
66.11	EXT2 AO2	Defines the input for block EXT2 AO2 which controls analog output 2 of extension module 2.	0	P	
		Signal index or constant value, see parameter *66.01 CW*.			1 = 1
66.12	EXT3 AO1	Defines the input for block EXT3 AO1 which controls analog output 1 of extension module 3.	0	P	
		Signal index or constant value, see parameter *66.01 CW*.			1 = 1

No.	Name/Value	Description	Def	T	FbEq
66.13	EXT3 AO2	Defines the input for block EXT3 AO2 which controls analog output 2 of extension module 3.	0	P	
		Signal index or constant value, see parameter *66.01 CW*.			1 = 1
66.14	EXT4 AO1	Defines the input for block EXT4 AO1 which controls analog output 1 of extension module 4.	0	P	
		Signal index or constant value, see parameter *66.01 CW*.			1 = 1
66.15	EXT4 AO2	Defines the input for block EXT4 AO2 which controls analog output 2 of extension module 4.	0	P	
		Signal index or constant value, see parameter *66.01 CW*.			1 = 1
66.16	EXT5 AO1	Defines the input for block EXT5 AO1 which controls analog output 1 of extension module 5.	0	P	
		Signal index or constant value, see parameter *66.01 CW*.			1 = 1
66.17	EXT5 AO2	Defines the input for block EXT5 AO2 which controls analog output 2 of extension module 5.	0	P	
		Signal index or constant value, see parameter *66.01 CW*.			1 = 1
66.18	FUNC GEN	Defines an input for function generator input. This signal is mainly used with DriveAP PC tool.	0	P	
	C -32768 …C 32767	Constant value			1 = 1
66.19	AP AFW	Defines an alarm and fault word for the adaptive program.	0	P	
		Signal index or constant value, see parameter *66.01 CW*.			1 = 1
66.20	EXT6 AO1	Defines the input for block EXT6 AO1 which controls analog output 1 of extension module 6.	0	P	
		Signal index or constant value, see parameter *66.01 CW*.			1 = 1
66.21	EXT6 AO2	Defines the input for block EXT6 AO2 which controls analog output 2 of extension module 6.	0	P	
		Signal index or constant value, see parameter *66.01 CW*.			1 = 1
66.22	EXT7 AO1	Defines the input for block EXT7 AO1 which controls analog output 1 of extension module 7.	0	P	
		Signal index or constant value, see parameter *66.01 CW*.			1 = 1
66.23	EXT7 AO2	Defines the input for block EXT7 AO2 which controls analog output 2 of extension module 7.	0	P	
		Signal index or constant value, see parameter *66.01 CW*.			1 = 1

No.	Name/Value	Description	Def	T	FbEq
66.24	EXT8 AO1	Defines the input for block EXT8 AO1 which controls analog output 1 of extension module 8.	0	P	
		Signal index or constant value, see parameter *66.01 CW*.			1 = 1
66.25	EXT8 AO2	Defines the input for block EXT8 AO2 which controls analog output 2 of extension module 8.	0	P	
		Signal index or constant value, see parameter *66.01 CW*.			1 = 1
66.26	EXT9 AO1	Defines the input for block EXT9 AO1 which controls analog output 1 of extension module 9.	0	P	
		Signal index or constant value, see parameter *66.01 CW*.			1 = 1
66.27	EXT9 AO2	Defines the input for block EXT9 AO2 which controls analog output 2 of extension module 9.	0	P	
		Signal index or constant value, see parameter *66.01 CW*.			1 = 1
70 DDCS CONTROL		Settings for fibre optic channels			
70.01	CH0 NODE ADDR	Defines the node address for DDCS channel CH0. No two nodes online may have the same address.	1	R	
	1…254	Node address			1 = 1
70.02	CH0 LINK CONTROL	Defines the light intensity of the transmission LEDs. LEDs act as light sources for optic fibres which are connected to DDCS channel CH0. With the maximum length of fibre optic cable, set to 15.	10	R	
	1…15	Light intensity			1 = 1
70.03	CH0 BAUD RATE	Selects the communication speed of DDCS channel CH0. If FCI (Fieldbus Communication Interface) and fieldbus communication modules are used, the parameter has to be set to 4 Mbit/s. Otherwise, the external control system sets the communication speed automatically.	4 Mbit/s	I	
	8 Mbit/s	8 Mbit/s (not in use)			0
	4 Mbit/s	4 Mbit/s			1
	2 Mbit/s	2 Mbit/s (not in use)			2
	1 Mbit/s	1 Mbit/s			3

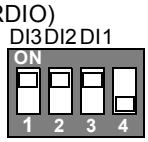
No.	Name/Value	Description	Def	T	FbEq
70.04	CH0 TIMEOUT	Defines the time delay before channel CH0 or type Rxxx fieldbus adapter interface communication break alarm/fault (COMM MODULE) is activated. Time count starts when the link fails to update the communication message. Action taken by the PVS800 on a communication break is defined by parameter *70.05 CH0 COM LOSS CTRL*. When the parameter is set to zero, time is not monitored and COMM MODULE fault is not indicated regardless of the value of parameter *70.05 CH0 COM LOSS CTRL*.	100 ms	R	
	0…60000 ms	Time			1 = 1 ms
70.05	CH0 COM LOSS CTRL	Selects how the PVS800 reacts when communication error on DDCS channel CH0 or on type Rxxx fieldbus adapter interface is detected. Time delay for the communication break alarm/fault activation is defined by parameter *70.04 CH0 TIMEOUT*. **Note:** This parameter is in use when external serial communication is activated by parameter *98.02 COMM. MODULE*.	FAULT	I	
	NO FAULT	PVS800 generates warning COMM MODULE.			1
	FAULT	PVS800 trips on fault COMM MODULE.			2
70.06	CH1 LINK CONTROL	Defines the light intensity of the transmission LEDs. LEDs act as light sources for optic fibres which are connected to DDCS channel CH1. With the maximum length of fibre optic cable, use value 15.	10	R	
	1…15	Light intensity			1 = 1
70.13	CH2 TIMEOUT	Defines the communication time-out for channel CH2 in milliseconds.	100 ms	I	
	0…10000	Time-out in milliseconds, 0 = not in use			1 = 1 ms
70.15	CH3 NODE ADDR	Defines the node address for DDCS channel CH3. No two nodes online may have the same address. Typically the setting needs to be changed when the master control unit is connected in a ring configuration which consists of several inverters and a PC with a DriveWindow PC tool. **Note:** The new node address becomes valid only after the next power-up of the control unit.	1	R	
	1…254	Node address			1 = 1
70.16	CH3 LINK CONTROL	Defines the light intensity of the transmission LEDs. LEDs act as light sources for optic fibres which are connected to DDCS channel CH3. With the maximum length of fibre optic cable, use value 15.	15	R	
	1…15	Light intensity			1 = 1

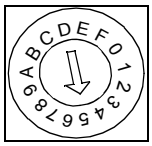
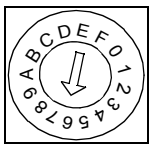
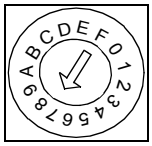
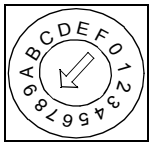
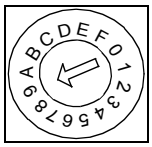
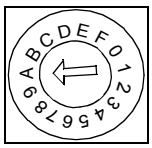
No.	Name/Value	Description	Def	T	FbEq
70.19	CH0 HW CONNECTION	Selects the topology of the DDCS channel CH0 link. **Note:** This parameter is not in use in the DriveBus mode.	RING	B	
	RING	Devices are connected in a ring.			0
	STAR	Devices are connected in a star.			65535
70.20	CH3 HW CONNECTION	Selects the topology of the DDCS channel CH3 link.	RING	B	
	RING	Control units are connected in a ring.			0
	STAR	Control units are connected in a star.			65535
70.32	CH2 HW CONNECTION	Selects the topology of the DDCS channel CH2 link.	STAR	B	
	RING	Devices are connected in a ring.			0
	STAR	Devices are connected in a star.			65535
71 DRIVEBUS COMM		Channel CH0 DriveBus settings			
71.01	CH0 DRIVEBUS MODE	Selects the communication mode for the DDCS channel CH0. New mode becomes valid only after the next power-up of the PVS800. Data is exchanged 4 times faster in the DriveBus mode than in the DDCS mode. Use the same value as the overriding control device.	NO	B	
	NO	DDCS mode			0
	YES	DriveBus mode			65535
81 CH2 RECEIVE ADDR		Addresses where the master control program writes data words from DDCS CH2			
81.01	CH2 DS27 VAL 1	Defines an address where data word 1 of dataset 27 is written.	104	I	
	0…20000	Update time is 500 ms.			1 = 1
81.02	CH2 DS27 VAL 2	Defines an address where data word 2 of dataset 27 is written.	105	I	
	0…20000	Update time is 500 ms.			1 = 1
81.03	CH2 DS27 VAL 3	Defines an address where data word 3 of dataset 27 is written.	106	I	
	0…20000	Update time is 500 ms.			1 = 1
81.04	CH2 DS29 VAL 1	Defines an address where data word 1 of dataset 29 is written.	113	I	
	0…20000	Update time is 500 ms.			1 = 1
81.05	CH2 DS29 VAL 2	Defines an address where data word 2 of dataset 29 is written.	808	I	
	0…20000	Update time is 500 ms.			1 = 1
81.06	CH2 DS29 VAL 3	Defines an address where data word 3 of dataset 29 is written.	203	I	
	0…20000	Update time is 500 ms.			1 = 1
81.07	CH2 DS31 VAL 1	Defines an address where data word 1 of dataset 31 is written.	108	I	
	0…20000	Update time is 500 ms.			1 = 1
81.08	CH2 DS31 VAL 2	Defines an address where data word 2 of dataset 31 is written.	109	I	
	0…20000	Update time is 500 ms.			1 = 1

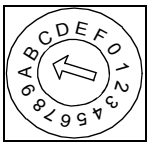
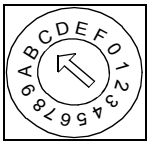
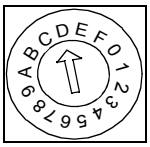
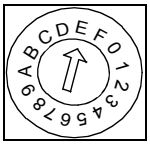
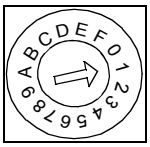
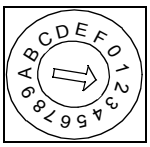
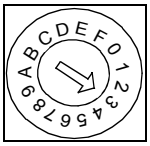
No.	Name/Value	Description	Def	T	FbEq
81.09	CH2 DS31 VAL 3	Defines an address where data word 3 of dataset 31 is written.	116	I	
	0…20000	Update time is 500 ms.			1 = 1
81.10	CH2 DS35 VAL 1	Defines an address where data word 1 of dataset 35 is written.	204	I	
	0…20000	Update time is 500 ms.			1 = 1
81.11	CH2 DS35 VAL 2	Defines an address where data word 2 of dataset 35 is written.	0	I	
	0…20000	Update time is 500 ms.			1 = 1
81.12	CH2 DS35 VAL 3	Defines an address where data word 3 of dataset 35 is written.	0	I	
	0…20000	Update time is 500 ms.			1 = 1
90 D SET REC ADDR		Addresses into which the master control program writes data sets received through CH0 (from the overriding control system). For more information, see the selected default actual signals or parameters.			
90.01	D SET 10 VAL 1	Defines the address into which the master control program writes value 1 of data set 10. Update time is 2 ms.	701	I	
	0…20000	Parameter or actual signal address			1 = 1
90.02	D SET 10 VAL 2	Defines the address into which the master control program writes value 2 of data set 10. Update time is 2 ms.	2301	I	
	0…20000	Parameter or actual signal address			1 = 1
90.03	D SET 10 VAL 3	Defines the address into which the master control program writes value 3 of data set 10. Update time is 2 ms.	2402	I	
	0…20000	Parameter or actual signal address			1 = 1
90.04	D SET 12 VAL 1	Defines the address into which the master control program writes value 1 of data set 12. Update time is 4 ms.	3116	I	
	0…20000	Parameter or actual signal address			1 = 1
90.05	D SET 12 VAL 2	Defines the address into which the master control program writes value 2 of data set 12. Update time is 4 ms.	0	I	
	0…20000	Parameter or actual signal address			1 = 1
90.06	D SET 12 VAL 3	Defines the address into which the master control program writes value 3 of data set 12. Update time is 4 ms.	0	I	
	0…20000	Parameter or actual signal address			1 = 1
…	…	…			
90.18	D SET 20 VAL 3	Defines the address into which the master control program writes value 3 of data set 20. Not in use by default.	0	I	
	0…20000	Parameter or actual signal address			1 = 1

No.	Name/Value	Description	Def	T	FbEq
91 D SET REC ADDR		Addresses into which the master control program writes data sets received through CH0 (from the overriding control system)			
91.01	D SET 22 VAL 1	Defines the address into which the master control program writes value 1 of data set 22. Not in use by default.	0	I	
	0…20000	Parameter or actual signal address			1 = 1
…	…	…			
91.06	D SET 24 VAL 3	Defines the address into which the master control program writes value 3 of data set 24. Not in use by default.	0	I	
	0…20000	Parameter or actual signal address			1 = 1
92 D SET TR ADDR		Addresses from which the master control program reads data sets to be sent through CH0 (to the overriding control system)			
92.01	D SET 11 VAL 1	Defines the address from which the master control program reads value 1 of data set 11. Update time is 2 ms.	801	I	
	0…20000	Parameter or actual signal address			1 = 1
92.02	D SET 11 VAL 2	Defines the address from which the master control program reads value 2 of data set 11. Update time is 2 ms.	110	I	
	0…20000	Parameter or actual signal address			1 = 1
92.03	D SET 11 VAL 3	Defines the address from which the master control program reads value 3 of data set 11. Update time is 2 ms.	107	I	
	0…20000	Parameter or actual signal address			1 = 1
92.04	D SET 13 VAL 1	Defines the address from which the master control program reads value 1 of data set 13. Update time is 4 ms.	0	I	
	0…20000	Parameter or actual signal address			1 = 1
92.05	D SET 13 VAL 2	Defines the address from which the master control program reads value 2 of data set 13. Update time is 4 ms.	0	I	
	0…20000	Parameter or actual signal address			1 = 1
92.06	D SET 13 VAL 3	Defines the address from which the master control program reads value 3 of data set 13. Update time is 4 ms.	0	I	
	0…20000	Parameter or actual signal address			1 = 1
92.07	D SET 15 VAL 1	Defines the address from which the master control program reads value 1 of data set 15. Update time is 10 ms. Not in use by default.	0	I	
	0…20000	Parameter or actual signal address			1 = 1
92.08	D SET 15 VAL 2	Defines the address from which the master control program reads value 2 of data set 15. Update time is 10 ms. Not in use by default.	0	I	
	0…20000	Parameter or actual signal address			1 = 1

No.	Name/Value	Description	Def	T	FbEq
92.09	D SET 15 VAL 3	Defines the address from which the master control program reads value 3 of data set 15. Update time is 10 ms. Not in use by default.	0	I	
	0…20000	Parameter or actual signal address			1 = 1
92.10	D SET 17 VAL 1	Defines the address from which the master control program reads value 1 of data set 17. Update time is 10 ms.	0	I	
	0…20000	Parameter or actual signal address			1 = 1
92.11	D SET 17 VAL 2	Defines the address from which the master control program reads value 2 of data set 17. Update time is 10 ms.	0	I	
	0…20000	Parameter or actual signal address			1 = 1
92.12	D SET 17 VAL 3	Defines the address from which the master control program reads value 3 of data set 17. Update time is 10 ms.	0	I	
	0…20000	Parameter or actual signal address			1 = 1
…	…	…			
92.18	D SET 21 VAL 3	Defines the address from which the master control program reads value 3 of data set 21. Not in use by default.	0	I	
	0…20000	Parameter or actual signal address			1 = 1
93 D SET TR ADDR		Addresses from which the master control program reads data sets to be sent through CH0 (to the overriding control system)			
93.01	D SET 23 VAL 1	Defines the address from which the master control program reads value 1 of data set 23. Not in use by default.	0	0	
	0…20000	Parameter or actual signal address			1 = 1
…	…	…			
93.06	D SET 25 VAL 3	Defines the address from which the master control program reads value 3 of data set 25. Not in use by default.	0	0	
	0…20000	Parameter or actual signal address			1 = 1
98 OPTION MODULES		Activation of optional modules and external serial communication. R-type fieldbus adapter modules are connected to Slot 1 or 2 of the control unit or via the optional AIMA-01 I/O Module Adapter connected to control unit DDCS channel CH1. Multiple AIMA-01 adapters are connected in a ring. N-type fieldbus adapter modules are connected to control unit DDCS channel CH0.			
98.02	COMM. MODULE	Selects an interface for the external control location.	NO	I	
	NO	Inverter communicates with direct parameter read/write commands without timeout monitoring. External dataset interface is not used, i.e. parameter values cannot be read or written through datasets.			1

No.	Name/Value	Description	Def	T	FbEq
	FIELDBUS	Activates dataset communication through datasets 1 and 2. With this selection the inverter expects cyclical data writing to dataset 1 (Modbus addresses 1...3) through RETA-01, RETA-02, or NETA-21. Timeout monitoring can be disabled by setting a value of 0 to parameter *70.04 CH0 TIMEOUT*. See also parameter group *70 DDCS CONTROL* and chapter *Fieldbus control* (page *197*).			2
	ADVANT/N-FB	Activates external dataset communication through datasets 10...25. With this selection the inverter expects cyclical data writing to dataset 10 (Modbus addresses 28..30) through RETA-01, RETA-02, or NETA-21. Timeout monitoring can be disabled by setting a value of 0 to parameter *70.04 CH0 TIMEOUT*. See also parameter group *70 DDCS CONTROL* and chapter *Fieldbus control* (page *197*).			3
	STD MODBUS	Activates external dataset communication through datasets 1 and 2. With this selection the inverter expects cyclical data writing to dataset 1 (Modbus addresses 1..3) through RMBA-01 Modbus adapter module. See Modbus parameter settings in group *52 STANDARD MODBUS*.			4
98.04	DI/O EXT1 LOC	Activates the communication to the optional digital I/O extension module 1 and defines the type and connection interface of the module. Faster DC input signal detection can be achieved by disabling the hardware filter of the digital input with the configuration DIP switch on the circuit board of the module. DIP switch S2 (RDIO) Hardware filtering: Enabled / Disabled  **Note:** Always enable the hardware filtering with an AC input signal.	NOT IN USE	I	
	NOT IN USE	Inactive			2
	RDIO-SLOT1	Communication active. Module type: RDIO. Connection interface: option slot 1 of the control unit.			3
	RDIO-SLOT2	Communication active. Module type: RDIO. Connection interface: option slot 2 of the control unit.			4

No.	Name/Value	Description	Def	T	FbEq
	RDIO-DDCS	Communication active. Module type: RDIO. Connection interface: Optional I/O module adapter (AIMA) that communicates with the control unit through a fibre optic DDCS link. Switch S1 5  **Note:** The module node number must be set to 5 with switch S1.			5
98.05	DI/O EXT2 LOC	See parameter *98.04 DI/O EXT1 LOC*. Switch S1 6 	NOT IN USE	I	
98.06	DI/O EXT3 LOC	See parameter *98.04 DI/O EXT1 LOC*. Switch S1 7 	NOT IN USE	I	
98.07	DI/O EXT4 LOC	See parameter *98.04 DI/O EXT1 LOC*. Switch S1 8 	NOT IN USE	I	
98.08	DI/O EXT5 LOC	See parameter *98.04 DI/O EXT1 LOC*. Switch S1 9 	NOT IN USE	I	
98.09	AI/O EXT1 LOC	Activates the communication to the optional analog I/O extension module 1, and defines the type and connection interface of the module.	NOT IN USE	I	
	NOT IN USE	Communication inactive			2
	RAIO-SLOT1	Communication active. Module type: RAIO. Connection interface: option slot 1 of the control unit.			3
	RAIO-SLOT2	Communication active. Module type: RAIO. Connection interface: option slot 2 of the control unit.			4
	RAIO-DDCS	Communication active. Module type: RAIO. Connection interface: Optional I/O module adapter (AIMA) that communicates with the control unit through a fibre optic DDCS link. Switch S1 A  **Note:** The module node number must be set to A with switch S1.			5

No.	Name/Value	Description	Def	T	FbEq
98.10	AI/O EXT2 LOC	See parameter *98.09 AI/O EXT1 LOC*. **Note**: The RAIO-01 modules with parameter selection RAIO-SLOT1 and RAIO-SLOT2. can be used as analogue outputs only. The inputs are disabled. B Switch S1 	NOT IN USE	I	
98.11	AI/O EXT3 LOC	See parameter *98.09 AI/O EXT1 LOC*. See also note in *98.10 AI/O EXT2 LOC*. C Switch S1 	NOT IN USE	I	
98.12	AI/O EXT4 LOC	See parameter *98.09 AI/O EXT1 LOC*. See also note in *98.10 AI/O EXT2 LOC*. D Switch S1 	NOT IN USE	I	
98.13	AI/O EXT5 LOC	See parameter *98.09 AI/O EXT1 LOC*. See also note in *98.10 AI/O EXT2 LOC*. E Switch S1 	NOT IN USE	I	
98.14	AI/O EXT6 LOC	See parameter *98.09 AI/O EXT1 LOC*. See also note in *98.10 AI/O EXT2 LOC*. 1 Switch S1 	NOT IN USE	I	
98.15	AI/O EXT7 LOC	See parameter *98.09 AI/O EXT1 LOC*. See also note in *98.10 AI/O EXT2 LOC*. 2 Switch S1 	NOT IN USE	I	
98.16	AI/O EXT8LOC	See parameter *98.09 AI/O EXT1 LOC*. See also note in *98.10 AI/O EXT2 LOC*. 3 Switch S1 	NOT IN USE	I	
98.17	AI/O EXT9 LOC	See parameter *98.09 AI/O EXT1 LOC*. See also note in *98.10 AI/O EXT2 LOC*. 4 Switch S1 	NOT IN USE	I	
99 START-UP DATA		Language, application macro selection, etc.			
99.01	LANGUAGE	Selects the display language.	ENGLISH	I	

No.	Name/Value	Description	Def	T	FbEq
99.02	APPLIC SELECTOR	Selects the application.	PHOTO-VOLTAIC	I	
	PHOTOVOLTAIC	Solar inverter			1
99.09	APPLIC RESTORE	Restores the original parameter settings.	0		I
	NO	No			0
	YES	Yes			1

6

Inverter control program parameters

What this chapter contains

This chapter describes the inverter control program parameters of the PVS800. All connections discussed in the parameter descriptions of this chapter refer to those of the inverter control unit (RDCU unit, designation A41) unless otherwise indicated. This control unit is shown as “PVS800 xxxx_5PV” (“xxxx” depending on power rating), and has the ID number 2. The control program revision is of the format ISXR7xxx.

Parameter groups 10…99 are usually user-adjustable. Parameter groups 1…9 (actual signals) are only for monitoring and read-only, though data can be written into the Control Words (parameter group 7) through an external control system.

WARNING! The PVS800 is intended to be configurable through the parameters of the master control program (see page *49*). Some parameters in the inverter control program may be accessed but are not listed in this manual at all; do not adjust these parameters without consulting with ABB as incorrect parameter values may cause malfunctioning or even damage to the equipment.

Note:

- Many parameters of the inverter control program are available through the master control program (see page *49*). In these cases, the description is provided at the master control program parameter; the *Description* field in the following table only includes a reference to the corresponding master control program (MCP) parameter and page number, for example “MCP *01.06 LINE CURRENT (51)*”.

- Some parameters cannot be changed when the PVS800 is running.
- The inverter control program parameters cannot be used to calculate the efficiency of the inverter.

Terms and abbreviations

Term	Definition
Actual signal	Type of parameter that is the result of a measurement or calculation by the control program. Actual signals can be monitored, but not adjusted, by the user. Parameter groups 1…9 typically contain actual signals.
B	Boolean
C	Character string
Def.	Default value
FbEq	Fieldbus equivalent: The scaling between the value shown on the panel and the integer used in serial communication.
I	Integer
P	Pointer
PB	Packed Boolean
R	Real
T	Data type (see B, C, I, R, PB)

Parameter groups 01…09

No.	Name/Value	Description	T	FbEq
01 ACTUAL SIGNALS				
01.01	PV CELL DC	MCP *01.34 PV MODULE DC MEAS* (*52*)	R	1 = 1 V
01.05	FREQUENCY	Measured or estimated grid frequency	R	100 = 1 Hz
01.06	LINE CURRENT	Calculated line current	R	1 = 1 A
01.07	REACTIVE POWER	MCP *01.14 REACTIVE POWER* (*51*)	R	1 = 1 kVAr
01.08	POWER	MCP *01.10 AC POWER* (*51*)	R	1 = 1 kW
01.09	POWER	MCP *01.11 AC POWER* (*51*)	R	100 = 1%
01.10	DC VOLTAGE	Measured DC voltage from the intermediate circuit	R	1 = 1 V
01.11	MAINS VOLTAGE	Measured grid voltage (amplitude of the positive sequence component)	R	1 = 1 V
01.12	PVS800 TEMP	MCP *01.20 INV TEMPERATURE* (*51*)	R	1 = 1°C
01.13	TIME OF USAGE	MCP *01.25 TIME OF USAGE* (*51*)	R	1 = 1 h
01.14	KWH SUPPLY	Energy fed into the network (= *01.17 KWH GENERATING* - *01.16 KWH MOTORING*). [kWh] Counter can be reset by parameter *16.09 RESET COUNTER*.	R	1 = 100 kWh
01.16	KWH MOTORING	Counts the kilowatt hours of power flow from network to the inverter. [kWh] Counter can be reset by parameter *16.09 RESET COUNTER*.	R	1 = 100 kWh
01.17	KWH GENERATING	MCP *01.26 ENERGY PRODUCED* (*51*)	R	1 = 100 kWh
01.19	AI1	Non-scaled value of analog input AI [V].	R	10000 = 10 V or 20 mA
01.20	AI2	Non-scaled value of analog input AI2 [mA].	R	20000 = 20 mA, 2 V or 10 V
01.21	AI3	Non-scaled value of analog input AI3 [mA].	R	20000 = 20 mA
01.22	RELAY OUTPUT	Status of the relay outputs. **Bit / Name / Usage** 0 / RMIO RO1 / Control of charging contactors. 1 / RMIO RO2 / Control of AC contactor K1.3 2 / RMIO RO3 / Control of AC contactor K1.1 3 / EXT1 RO1 / Control of DC contactor K2.1 4 / EXT1 RO2 / Control of DC contactor K2.2 5 / EXT2 RO1 / Control of AC contactor K1.2 6 / EXT2 RO2 / Control of DC contactor K2.3	I	1 = 1
01.23	AO1	Value of analog output 1 signal [mA].	R	20000 = 20 mA
01.24	AO2	Value of analog output 2 signal [mA].	R	20000 = 20 mA
01.26	LED PANEL OUTP	NLMD-01 LED panel output [%]. See parameter group *18 LED PANEL CTRL*.	R	1 = 1
01.27	COS PHI	MCP *01.13 COS PHI* (*51*)	R	100 = 1

No.	Name/Value	Description	T	FbEq
01.28	P LIMITED	Maximum instantaneous active power which the inverter can feed to the grid.	R	1 = 1 kW
01.29	INSUL RESISTANCE	Measured insulation resistance from the solar generator. This signal is valid only if the inverter is equipped with option +Q954. See parameter *16.18 INSUL MEAS SELECT*.	R	1 = 1 kOhm
01.30	BREAKER COUNTER	MCP *01.30 BREAKER COUNTER* (*52*)	R	1 = 1
01.31	FAN ON-TIME	Running time of the inverter cooling fan [h] Counter can be reset by parameter *16.09 RESET COUNTER*. Resetting is recommended when the fan is replaced.	R	1 = 10 h
01.36	CABINET TEMP 1	Displays a measured ICU cabinet temperature from PT100 connected to RMIO AI2	R	1 = 1 ºC
01.37	CABINET TEMP 2	Displays a measured DCU cabinet temperature from PT100 connected to RMIO AI3.	R	1 = 1 ºC
01.38	RUN-TIME	Running time counter. Runs when the inverter unit is modulating. Can be reset by using parameter *16.12 RESET RUN-TIME*.	R	1 = 10 h
01.39	EXT1 AI1	Non-scaled value of analog input AI1 on extension module 1. Range from 0 to maximum input value corresponds to 0…65520.	R	1 = 1
01.40	EXT1 AI2	Non-scaled value of analog input AI2 on extension module 1. Range from 0 to maximum input value corresponds to 0…65520.	R	1 = 1
01.41	EXT2 AI1	Non-scaled value of analog input AI1 on extension module 2. Range from 0 to maximum input value corresponds to 0…65520.	R	1 = 1
01.42	EXT2 AI2	Non-scaled value of analog input AI2 on extension module 2. Range from 0 to maximum input value corresponds to 0…65520.	R	1 = 1
01.43	DC CURRENT	Estimated DC current	R	1 = 1 A
01.44	DC POWER	Estimated DC power	R	1 = 1 kW
01.45	APPARENT POWER	Calculated apparent power.	R	1 = 1 kVA
01.46	LOST ENERGY AVG	Energy wasted whenever inverter power is limited by master control program parameter *31.16 POWER LIMITING* to a value below nominal. This value is a cumulative estimation based on average energy production.	R	1 = 1 kWh
02 ACTUAL SIGNALS				
02.01	GRID IA RMS	Measured RMS current from the A phase	R	1 = 1 A
02.02	GRID IB RMS	Measured RMS current from the B phase	R	1 = 1 A
02.03	GRID IC RMS	Measured RMS current from the C phase	R	1 = 1 A
02.04	60 s AVERAGE IQ	Shows a 60-second moving average of the actual reactive current. 100% corresponds to the parameter *04.05 NOM AC CURRENT*.	R	1 = 1%
02.05	DC REF Q-CTRL	Minimum voltage reference of DC circuit calculated by reactive power control	R	1 = 1 V
02.06	DC REF RAMP	Ramped and limited DC circuit voltage reference for power control	R	1 = 1 V
02.07	DC REF INITIALIZ	Initialized DC circuit voltage reference based on Line-side Identification. Voltage reference is calculated from DC voltage measurement and is approximately sqrt(2) × supply network voltage.	R	1 = 1 V

No.	Name/Value	Description	T	FbEq
02.08	60 s AVERAGE VOLT	Shows a 60-second moving average of the grid voltage. 100% corresponds to the parameter *04.04 NOM AC VOLTAGE*. **Note**: This parameter is updated only if grid support is activated with parameter *41.01 GRID SUPPORT MODE*.	R	1 = 1%
02.09	AVERAGE AC VOLT	Shows a 10-minute moving average value for the measured or estimated grid voltage.	R	10 = 1 V
02.10	NEG SEQUENCE VOLT	Negative sequence of the measured grid voltage. **Note**: This parameter is updated only if LVRT functionality is activated with parameter *40.01 LVRT MODE*.	R	1 = 1 V
02.11	U VOLTAGE RMS	Measured RMS voltage between phase U and ground. Phase voltages must be selected from parameter *40.24 RMS VOLTAGE CALC*. **Note**: Both phase voltage and line-to-line voltage cannot be shown at the same time. Either one of it will be zero.	R	1 = 1 V
02.12	V VOLTAGE RMS	Measured RMS voltage between phase V and ground. **Note**: Both phase voltage and line-to-line voltage cannot be shown at the same time. Either one of it will be zero.	R	1 = 1 V
02.13	W VOLTAGE RMS	Measured RMS voltage between phase W and ground. **Note**: Both phase voltage and line-to-line voltage cannot be shown at the same time. Either one of it will be zero.	R	1 = 1 V
02.14	U-V VOLTAGE RMS	Measured RMS voltage between phases U and V. Main voltages must be selected from *40.24 RMS VOLTAGE CALC*. **Note**: Both phase voltage and line-to-line voltage cannot be shown at the same time. Either one of it will be zero.	R	1 = 1 V
02.15	V-W VOLTAGE RMS	Measured RMS voltage between phases V and W. **Note**: Both phase voltage and line-to-line voltage cannot be shown at the same time. Either one of it will be zero.	R	1 = 1 V
02.16	W-U VOLTAGE RMS	Measured RMS voltage between phases W and U. **Note**: Both phase voltage and line-to-line voltage cannot be shown at the same time. Either one of it will be zero.	R	1 = 1 V
02.17	UAC CTRL INPUT	AC control feedback signal. See group *24 REACTIVE POWER*.	R	1 = 1 V
02.18	GRID FREQUENCY	Measured grid frequency with accuracy of 10 mHz	R	100 = 1 Hz
02.19	GRID ROCOF	Displays the calculated grid frequency change rate (ROCOF, rate of change of frequency).	R	100 = 1 Hz
02.20	FLUX X ACT	Flux vector X-component in percent of *04.04 NOM AC VOLTAGE*.	R	1 = 1%
02.21	FLUX Y ACT	Flux vector Y-component in percent of *04.04 NOM AC VOLTAGE*.	R	1 = 1%
02.22	FLUX X NET ACT	Measured grid voltage flux vector X-component in percent of *04.04 NOM AC VOLTAGE*.	R	1 = 1%
02.23	FLUX Y NET ACT	Measured grid voltage flux vector Y-component in percent of *04.04 NOM AC VOLTAGE*.	R	1 = 1%
03 ACTUAL SIGNALS		Monitoring signals		
03.03	50 Hz IDENTIFIC	TRUE: 50 Hz is initialized base frequency.	B	
03.04	60 Hz IDENTIFIC	TRUE: 60 Hz is initialized base frequency.	B	
03.12	PP 1 TEMP	Measured IGBT temperature of inverter module no. 1 [°C]	R	1 = 1°C
03.13	PP 2 TEMP	Measured IGBT temperature of inverter module no. 2 [°C]	R	1 = 1°C
03.14	PP 3 TEMP	Measured IGBT temperature of inverter module no. 3 [°C]	R	1 = 1°C

No.	Name/Value	Description	T	FbEq
03.15	PP 4 TEMP	Measured IGBT temperature of inverter module no. 4 [ºC]	R	1 = 1ºC
03.18	TEMP DIF MAX	Maximum phase temperature difference [ºC]. Measured from all phases.	R	1 = 1ºC
03.19	PHASE U TEMP DIF	Temperature difference between individual module phase U and the average temperature of the rest of the modules [ºC]	R	1 = 1ºC
03.20	PHASE V TEMP DIF	Temperature difference between individual module phase V and the average temperature of the rest of the modules [ºC]	R	1 = 1ºC
03.21	PHASE W TEMP DIF	Temperature difference between individual module phase W and the average temperature of the rest of the modules [ºC]	R	1 = 1ºC
03.43	PP 5 TEMP	Measured IGBT temperature of inverter module no. 5 [ºC]	R	1 = 1ºC
03.44	PP 6 TEMP	Measured IGBT temperature of inverter module no. 6 [ºC]	R	1 = 1ºC
03.45	PP 7 TEMP	Measured IGBT temperature of inverter module no. 7 [ºC]	R	1 = 1ºC
03.46	PP 8 TEMP	Measured IGBT temperature of inverter module no. 8 [ºC]	R	1 = 1ºC
03.47	PP 9 TEMP	Measured IGBT temperature of inverter module no. 9 [ºC]	R	1 = 1ºC
03.48	PP 10 TEMP	Measured IGBT temperature of inverter module no. 10 [ºC]	R	1 = 1ºC
03.49	PP 11 TEMP	Measured IGBT temperature of inverter module no. 11 [ºC]	R	1 = 1ºC
03.50	PP 12 TEMP	Measured IGBT temperature of inverter module no. 12 [ºC]	R	1 = 1ºC
04 INFORMATION		Program versions, inverter ratings		
04.01	SW PACKAGE VER	Displays the type and version of the firmware package in the inverter. For PVS800 inverter control program revision 7xxx, the designation is ISXR7xxx.	C	-
04.02	DTC VERSION	Inverter control software version. This fixed part of the control program consists of inverter control, operational system, communication control of the DDCS channels, and Modbus software of the control panel.	C	-
04.03	APPLIC NAME	Displays the type and version of the control program.	C	-
04.04	NOM AC VOLTAGE	Nominal AC voltage [V] of the inverter	R	1 = 1 V
04.05	NOM AC CURRENT	Nominal AC current [A] of the inverter	R	1 = 1 A
04.06	NOM AC POWER	Nominal AC power [kW] of the inverter	R	1 = 1 kW
04.09	INVERTER TYPE	Inverter type	R	-
04.10	APBU EPLD VERSION	APBU branching unit logic version.	R	-
04.11	BOARD TYPE	Shows the control board type.	C	-
04.12	PARAMETER CRC16	Checksum of parameter settings in the loading package.	C	-
07 CONTROL WORDS		Control words		
07.01	MAIN CTRL WORD	Main control word of the inverter.	PB	

Bit	Name	Value	Description
0	ON/OFF	0 ⇒1	Start charging (close charging contactor)
		0	Open main contactor (switch power off)
1…2	Reserved		
3	START	1	Start modulation
		0	Stop modulation
4	Q POWER	1	Operate in the reactive power compensation mode.
		0	Do not operate in the reactive power compensation mode.
5…6	Reserved		
7	RESET	0 ⇒1	Reset
8…15	Reserved		

No.	Name/Value	Description	T	FbEq
07.03	AUX CTRL WORD 2	Auxiliary control word for user-specified functions.	PB	
07.04	MPPT CMW	Internal control word for the MPPT mode. **Note:** This word can be used for monitoring only.	PB	

Bit	Value	Description
0	1	Enable the MPPT mode
1	1	Enable DC level difference tracking
2	1	Enable lost energy calculation
3	1	Enable external DC reference for MPPT
4	1	Close the DC switch
5	Reserved	
6	1	Enable the DC contactor use
7	1	Enable trip signal monitoring of the DC breaker
8	1	Enable temperature monitoring of the inverter module
9	1	Enable the Lost energy warning
10	1	Enable the DC reference maximum / minimum warning
11…15	Reserved	

08 STATUS WORDS	Status words		
08.01	MAIN STATUS WORD	Main Status Word.	PB	

Bit	Name	Value	STATE/Description
0	RDY_ON	1	Ready to switch on = no fault
1	RDY_RUN	1	Ready to operate = DC bus charged
2	RDY_REF	1	Operation enabled
		0	Operation inhibited
3	TRIPPED	1	A fault occured in the inverter.
4	HVRT	1	High voltage ride-through function is active
5…6	Reserved		
7	ALARM	1	A warning in the inverter.
8	MODULATING	1	Inverter is modulating
9	REMOTE	1	Control location: REMOTE
		0	Control location: LOCAL
10	NET OK	1	Grid voltage is OK
		0	Grid voltage is lost
11	LEVEL1 DIP	1	Low voltage ride-though function is active.
12	Reserved		
13	CHARGING OR RDY_RUN		Combines bits 14 and 1.
		1	Ready to operate or charging contactor closed
14	CHARGING	1	Charging contactor closed
15	Reserved		

No.	Name/Value	Description	T	FbEq
08.03	LIMIT WORD	Limit word.	PB	

Bit	Name	Value	Description
0	CURRENT PLIM	1	An internal current limit is limiting the active power. The limit depends on the measured ambient temperature.
1	EXTERNAL PLIM	1	An external active power limit in MCP parameter 31.16 POWER LIMITING is limiting the active power.
2	CAP REF LIMIT	1	Capacitive current reference above limit (*24.22 IQ CAP LIMIT*)
3	IND REF LIMIT	1	Inductive current reference above limit (*24.23 IQ IND LIMIT*)
4	DC REF MAX LIM	1	*02.05 DC REF Q-CTRL* is above the maximum DC voltage reference.
5	Q CUR LIM	1	Reactive current is limited because *01.06 LINE CURRENT* has reached the maximum allowed current.
6	GRID POW LIM	1	Instantaneous active power limitation
7	DC POW LIM	1	Active power from the grid is limited.
8	POW FREQ LIM	1	Active power to the grid is limited because of grid over frequency.
9	GRID FILT POW LIM	1	Active power to the grid is limited.
10	HIGH UAC PLIM	1	Maximum active power is limited from grid overvoltage.
11	MPPT PLIM	1	Maximum active power increase rate is limiting the active power.
12	START POW LIM	1	Active power ramp-up after the start is limiting the active power.
13	POWER STOP RAMP	1	Active and/or reactive power is limited during a controlled stop.
14	LVRT RETURN PLIM	1	Return ramp after Low voltage ride-through is limiting the active power.
15	U FREQ PLIM	1	Active power is limited according to the grid underfrequency characteristic curve.

08.04	LIMIT WORD 2	A limit word to indicate active and reactive power limitations.	PB	-

Bit	Value	Description
0	1	Inductive reactive power reference is limited by the Q(P) characteristic curve.
1	1	Capacitive reactive power reference is limited by the Q(P) characteristic curve.

08.05	DI STATUS WORD	Inverter control unit digital input (DI) status word. This parameter shows the status of each digital input on the Inverter control unit and RDIO modules.	PB	-

Bit	Name	Description
0	DI1	Inverter control unit DI1 status, feedback of inverter cabinet fans and LCL fans
1	DI2	Inverter control unit DI2 status
2	DI3	Inverter control unit DI3 status, feedback of AC contactor K1.1
3	DI4	Inverter control unit DI4 status
4	DI5	Inverter control unit DI5 status
5	DI6	Inverter control unit DI6 status
6	DI7 (DIIL)	Inverter control unit DI7 (DIIL) status
7	EXT1_DI1	RDIO module 1, DI1 status, feedback of DC contactor K2.1
8	EXT1_DI2	RDIO module 1, DI2 status, feedback of DC contactor K2.2
9	EXT1_DI3	RDIO module 1, DI3 status, state of optional grid monitoring relay
10	EXT2_DI1	RDIO module 2, DI1 status, feedback of AC contactor K1.2
11	EXT2_DI2	RDIO module 2, DI2 status, feedback of AC contactor K1.3
12	EXT2_DI3	RDIO module 2, DI3 status, feedback of DC contactor K2.3
13…15	Reserved	

No.	Name/Value	Description	T	FbEq
08.06	MPPT STATUS	MPPT status word. See also *08.04 PVA STATES* in the master control program (page *59*).	PB	-

Bit	Name	Value	Description
0	MPPT	1	Inverter running in the MPPT mode. See parameter *39.01 MPPT CONTROL* (page *145*).
1	LOCAL MODE	1	Inverter in the local control mode, MPPT disabled, DC switch open.
2	START MPPT	1	Start command received; DC pre-charge or DC switch closure in progress before entering the MPPT mode.
3	RELAY INIT	0	Inverter unit initializing after power-on. Master control program remains in the STANDBY state.
		1	Inverter unit ready.
4	DC SWITCH STA	1	DC switch is closed.
5	GRIDMON RELAY RESTART	1	Grid monitoring relay has signalled a network failure. Inverter unit parametrized to restart after delay.
6	LOST ENERGY	1	Lost energy calculation active. Power limit set lower than PVS800 nominal power.
7	START ENA	1	Start is enabled by cut-in conditions. See parameters *44.18*…*44.23* (page *159*).
8	DC REF MIN	1	MPPT has reached the minimum DC reference. Check *39.05 MPPT DC REF MIN* (page *145*).
9	DC REF MAX	1	MPPT has reached the maximum DC reference. Check parameter *39.04 MPPT DC REF MAX* (page *145*).
10	DC CTRL LIM	1	External DC reference cannot be maintained because of power limiting.
11	Reserved		
12	VOLTAGE SUPPRESSION	1	Grid voltage rise suppression -function is active.
13	ANTI-ISLAND RESTART	1	Anti-island restart delay is ongoing, the inverter operation is disabled until the delay has passed.
14	Q POW RUN	1	Inverter is running in the Q POWER state.
15	Reserved		

08.07	GRID CODE STATUS	Status word for miscellaneous grid code related information.		

Bit	Name	Value	STATE/Description
0	O FREQ DELAY	1	Delay counting in Active power limitation from grid overfrequency is ongoing.
1	O FREQ RETURN RAMP	1	Active power limit is restoring with a ramp from the grid overfrequency transient.
2	U FREQ DELAY	1	Delay counting in Active power limitation from grid underfrequency is ongoing.
3	U FREQ RETURN RAMP	1	Active power limit is restoring with a ramp from the grid underfrequency transient.
4	U FREQ ACTIVE	1	Grid underfrequency transient is ongoing.
5	O FREQ ACTIVE	1	Grid overfrequency transient is ongoing.

<table>
<tr><th>No.</th><th>Name/Value</th><th>Description</th><th>T</th><th>FbEq</th></tr>
<tr><td>08.08</td><td>ISLAND STATUS</td><td>Anti-island status word.

<table><tr><th>Bit</th><th>Name</th><th>Value</th><th>STATE/Description</th></tr><tr><td>0</td><td>PEAK DETECT ENABLE</td><td>1</td><td>Anti-island peak detection is enabled</td></tr><tr><td>1</td><td>ADAPT DETECT ENABLE</td><td>1</td><td>Anti-island adaptive level detection is enabled</td></tr><tr><td>2</td><td>CONST DETECT ENABLE</td><td>1</td><td>Anti-island constant level detection is enabled</td></tr><tr><td>3...4</td><td colspan="3">Reserved</td></tr><tr><td>5</td><td>PEAK DETECTED</td><td>1</td><td>The last anti-island fault was caused by peak detection</td></tr><tr><td>6</td><td>ADAPT LEVEL DETECTED</td><td>1</td><td>The last anti-island fault was caused by adaptive level detection</td></tr><tr><td>7</td><td>CONST LEVEL DETECTED</td><td>1</td><td>The last anti-island fault was caused by constant level detection</td></tr></table></td><td>PB</td><td>-</td></tr>
<tr><td>08.22</td><td>INT CONFIG WORD</td><td>16-bit data word. Number of inverter units recognized by the control program during PPCC link initialization.
Bit 0 = INT1 = Inverter unit 1 INT board
…
Bit 2 = INT3 = Inverter unit 3 INT board</td><td>PB</td><td></td></tr>
<tr><td>08.31</td><td>AINT TYPE</td><td>Shows the AINT/AGDR configuration data read from the inverter module specified by parameter 16.11 PBU CH AINT CHK.
The control program reads the configuration data from all parallel-connected inverter modules at power-up. All modules must return the same configuration data. In case of a mismatch, a fault is generated.
The configuration data shown by 08.31 AINT TYPE is coded as follows:
<table><tr><th rowspan="2">AINT board type (AINT-…)</th><th colspan="3">Configuration data</th></tr><tr><th>AGDR du/dt configuration</th><th>AINT ID</th><th>AINT ASIC ID</th></tr><tr><td>01(C)</td><td rowspan="5">0 or 7</td><td>1</td><td>215</td></tr><tr><td>02(C)</td><td>1</td><td>231</td></tr><tr><td>11/12/14(C)</td><td>2</td><td>215</td></tr><tr><td>14D</td><td>2</td><td>231</td></tr><tr><td>24</td><td>4</td><td>231</td></tr></table>
For example, if this parameter displays the value 74231, the module selected by 16.11 has an AINT-24 board, and the du/dt configuration of its AGDR board is 7.</td><td>I</td><td></td></tr>
</table>

No.	Name/Value	Description	T	FbEq
09 FAULT WORDS		Fault and alarm words		
09.01	FAULT WORD 1	Fault word 1.	PB	

Bit	Fault
0	*SHORT CIRC (2340)* (page *194*)
1	*OVERCURRENT (2310)* (page *191*)
2	*DC OVERVOLT (3210)* (page *188*)
3	*PVS800 TEMP (4210)* (page *193*)
4	*EARTH FAULT (2330)* (page *189*)
5…6	Reserved
7	*INTERNAL FAULT* (page *190*)
8	*AC UNDERFREQ (3142)* (page *185*)
9	*AC OVERFREQ (3141)* (page *185*)
10	*AC UNDERVOLT (3120)* (page *185*)
11	*AC OVERVOLT (3110)* (page *185*)
12…15	Reserved
Bit value: 1 = fault, 0 = no fault	

09.02	FAULT WORD 2	Fault word 2.	PB	

Bit	Fault
0	*SUPPLY PHASE (3130)* (page *194*)
1	Reserved
2	*DC UNDERVOLT (3220)* (page *188*)
3…5	Reserved
6	*IO FAULT (7000)* (page *190*)
7	*CTRL B TEMP (4110)* (page *187*)
8	Reserved
9	*OVER SWFREQ (FF55)* (page *192*)
10	Reserved
11	*PPCC LINK (5210)* (page *192*)
12	*COMM MODULE (7510)* (page *187*)
13…15	Reserved
Bit value: 1 = fault, 0 = no fault	

09.03	FAULT WORD 3	Fault word 3.	PB	

Bit	Fault
0…7	Reserved
8	*CAB TEMP1 HI (4180)* (page *186*)
9	*CAB TEMP1 LO (4182)* (page *186*)
10	*CAB TEMP2 HI (4184)* (page *187*)
11	*CAB TEMP2 LO (4186)* (page *187*)
12...13	Reserved
14	*MOD BOARD T (FF88)* (page *191*)
15	Reserved
Bit value: 1 = fault, 0 = no fault	

No.	Name/Value	Description	T	FbEq
09.04	ALARM WORD 1	Alarm word 1.	PB	

Bit	Fault
0	*CAB TEMP1 HI (4181)* (page *186*)
1	*CAB TEMP1 LO (4183)* (page *187*)
2…6	Reserved
7	*CAB TEMP2 HI (4185)* (page *187*)
8	*CAB TEMP2 LO (4187)* (page *187*)
9	Reserved
10	*EXT ANALOG IO (7081)* (page *189*)
11...13	Reserved
14	*MOD BOARD T (FF92)* (page *191*)
15	Reserved
Bit value: 1 = alarm, 0 = no alarm	

No.	Name/Value	Description	T	FbEq
09.10	PV FLT ALM WORD	Fault/Alarm word.	PB	

Bit	Fault/Alarm
0	*GRID MON FLT (8189)* (page *190*)
1	Reserved
2	*REVERSE POW (8187)* (page *193*) (peak)
3	*DC SWITCH LEV (818C)* (page *188*)
4	*DC SWITCH POS (818D)* (page *188*)
5	*REVERSE POW (8187)* (page *193*) (level)
6	Reserved
7	*LOST ENERGY (8192)* (page *190*)
8	*GRID MON ALM (8191)* (page *190*)
9	*PVS&PANEL DC (32A8)* (page *192*)
10	Reserved
11	*ANTI-ISLAND (8193)* (page *186*)
12	*DCREF MIN RNG (32AB)* (page *188*)
13	*DCREF MAX RNG (32AC)* (page *188*)
14…15	Reserved
Bit value: 1 = fault/alarm, 0 = no fault/alarm	

No.	Name/Value	Description	T	FbEq
09.11	SUPPLY FAULT WORD	Inverter unit fault word. If the inverter unit consists of parallel connected modules, a fault is indicated by this word if it is present in any module.	PB	

Bit	Fault
0	*CHARGING FLT (3230)* (page *187*)
1	*OVERCURRENT (2310)* (page *191*)
2	*EXT EVENT DI5 (9085)* (page *189*)
3	*PVS800 TEMP (4210)* (page *193*)
4	*EXT EVENT DI4 (9084)* (page *189*)
5	*DI1 (9088)* (page *188*)
6	*MAIN CNT FLT (FF17)* (page *191*)
7	*SHORT CIRC (2340)* (page *194*)
8	*INTERNAL FAULT* (page *190*)
9	*NET VOLT FLT (3100)/(32A2)* (page *191*) or *RT NET LOST (32A1)* (page *193*)
10	*COMM MODULE (7510)* (page *187*)
11	*EXT EVNT DI7 (908E)* (page *190*)
12	*EARTH FAULT (2387)* (page *189*)
13	Reserved
14	*DC UNDERVOLT (3220)* (page *188*)
15	*DC OVERVOLT (3210)* (page *188*)
Bit value: 1 = fault, 0 = no fault	

No.	Name/Value	Description	T	FbEq
09.12	SUPPLY ALARM WORD	Inverter unit alarm word.	PB	

Bit	Fault
0	*COMM MODULE (7510)* (page *187*)
1	*PANEL LOST (5300)* (page *192*)
2	*DI1 (9088)* (page *188*)
3	Reserved
4	*PVS800 TEMP (4294)* (page *193*)
5...7	Reserved
8	*QLIM PVS TMP (44A2)* (page *193*)
9	*RUN DISABLED (FFAC)* (page *193*)
10	*NET LOST (32A3)* (page *191*)
11	*EXT EVNT DI7 (908E)* (page *190*)
12	*RECHARGE ALM (3250)* (page *193*)
13	*EXT EVNT DI4 (908B)* (page *189*)
14	*EXT EVNT DI5 (908C)* (page *190*)
15	Reserved
Bit value: 1 = alarm, 0 = no alarm	

No.	Name/Value	Description	T	FbEq
09.13	CURRENT UNBALANCE	Current unbalance fault word.	PB	

Bit	Fault
0	*CUR UNBAL 1 (23E0)* (page *187*)
1	*CUR UNBAL 2 (23E1)* (page *187*)
2	*CUR UNBAL 3 (23E2)* (page *187*)
3…15	Reserved
Bit value: 1 = fault, 0 = no fault	

No.	Name/Value	Description	T	FbEq
09.14	OVERCURRENT FAULT	Overcurrent fault word.	PB	

Bit	Fault
0	*OVERCURR 1 (23A0)* (page *191*)
1	*OVERCURR 2 (23A1)* (page *191*)
2	*OVERCURR 3 (23A2)* (page *191*)
3…15	Reserved
Bit value: 1 = fault, 0 = no fault	

No.	Name/Value	Description	T	FbEq
09.15	SHORT CIRC FAULT	Short circuit fault word.	PB	

Bit	Fault
0	*SC INV 1 U (23B0)*, *SC INV 1 V (23B1)* or *SC INV 1 W (23B2)* (page *194*)
1	*SC INV 2 U (23B3)*, *SC INV 2 V (23B4)* or *SC INV 2 W (23B5)* (page *194*)
2	*SC INV 3 U (23B6)*, *SC INV 3 V (23B7)* or *SC INV 3 W (23B8)* (page *194*)
3…11	Reserved
12	Short circuit in phase U of the faulted module
13	Short circuit in phase V of the faulted module
14	Short circuit in phase W of the faulted module
15	Reserved
Bit value: 1 = fault, 0 = no fault	

No.	Name/Value	Description	T	FbEq
09.16	OVERTEMP WORD	Overtemperature fault word.	PB	

Bit	Fault
0	*PVS TEMP 1 U (42A0)*, *PVS TEMP 1 V (42A1)* or *PVS TEMP 1 W (42A2)* (page *193*)
1	*PVS TEMP 2 U (42A3)*, *PVS TEMP 2 V (42A4)* or *PVS TEMP 2 W (42A5)* (page *193*)
2	*PVS TEMP 3 U (42A6)*, *PVS TEMP 3 V (42A7)* or *PVS TEMP 3 W (42A8)* (page *193*)
3…11	Reserved
12	Overtemperature in phase U of the faulted module
13	Overtemperature in phase V of the faulted module
14	Overtemperature in phase W of the faulted module
15	Reserved
Bit value: 1 = fault, 0 = no fault	

09.17	TEMP DIF FLT WORD	Temperature difference fault word.	PB	

Bit	Fault
0	*TEMP DIF 1 U (4381)*, *TEMP DIF 1 V (4382)* or *TEMP DIF 1 W (4383)* (page *194*)
1	*TEMP DIF 2 U (4384)*, *TEMP DIF 2 V (4385)* or *TEMP DIF 2 W (4386)* (page *194*)
2	*TEMP DIF 3 U (4387)*, *TEMP DIF 3 V (4388)* or *TEMP DIF 3 W (4389)* (page *194*)
3…11	Reserved
12	Temperature difference fault in phase U of the faulted module
13	Temperature difference fault in phase V of the faulted module
14	Temperature difference fault in phase W of the faulted module
15	Reserved
Bit value: 1 = fault, 0 = no fault	

09.18	TEMP DIF ALM WORD	Temperature difference alarm word.	PB	

Bit	Fault
0	*TEMP DIF 1 U (44B1)*, *TEMP DIF 1 V (44B2)* or *TEMP DIF 1 W (44B3)* (page *194*)
1	*TEMP DIF 2 U (44B4)*, *TEMP DIF 2 V (44B5)* or *TEMP DIF 2 W (44B6)* (page *194*)
2	*TEMP DIF 3 U (44B7)*, *TEMP DIF 3 V (44B8)* or *TEMP DIF 3 W (44B9)* (page *194*)
3…11	Reserved
12	Temperature difference alarm in phase U of the faulted module
13	Temperature difference alarm in phase V of the faulted module
14	Temperature difference alarm in phase W of the faulted module
15	Reserved
Bit value: 1 = alarm, 0 = no alarm	

09.24	PPCC FAULT WORD	PPCC communication fault word.	PB	

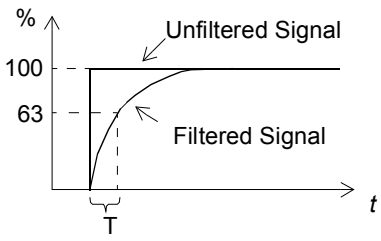
Bit	Description
0	*PPCC LINK (5210)* (page *192*)
1	*PPCC LINK 1 (5280)* (page *192*)
2	*PPCC LINK 2 (5281)* (page *192*)
3…15	Reserved
Bit value: 1 = fault, 0 = no fault	

No.	Name/Value	Description	T	FbEq
09.25	POWERFAIL FAULT	AINT board power failure word.	PB	

Bit	Description
0	*POWERFAIL (3381)* (page *192*)
1	*POWERF INV 1 (3382)* (page *192*)
2	*POWERF INV 2 (3383)* (page *192*)
3…15	Reserved
Bit value: 1 = fault, 0 = no fault	

09.30	FAULT CODE 1 LAST	Fieldbus code of the latest alarm/fault. See chapter *Fault tracing*. The fault buffer can be reset using parameter *16.16 RESET FLT/ALM BUF* (page *134*).	PB	
09.31	FAULT CODE 2 LAST	Fieldbus code of the 2nd latest alarm/fault		
09.32	FAULT CODE 3 LAST	Fieldbus code of the 3rd latest alarm/fault		
09.33	FAULT CODE 4 LAST	Fieldbus code of the 4th latest alarm/fault		
09.34	FAULT CODE 5 LAST	Fieldbus code of the 5th latest alarm/fault		
09.35	FAULT CODE 6 LAST	Fieldbus code of the 6th latest alarm/fault		
09.36	FAULT CODE 7 LAST	Fieldbus code of the 7th latest alarm/fault		
09.37	FAULT CODE 8 LAST	Fieldbus code of the 8th latest alarm/fault		
09.38	FAULT CODE 9 LAST	Fieldbus code of the 9th latest alarm/fault		
09.39	FAULT CODE 10 LAST	Fieldbus code of the 10th latest alarm/fault		

Parameter groups 11…99

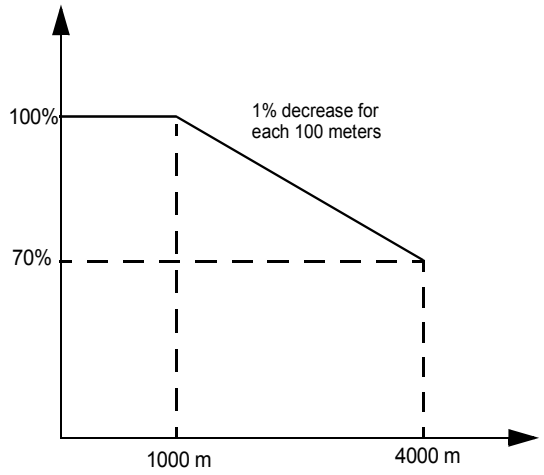
No.	Name/Value	Description	Def.	T	FbEq
13 ANALOGUE INPUTS		Analog input signal processing			
13.03	FILTER AI1	Defines the filter time constant for analog input AI1. The hardware filter time constant (with the RMIO board) is fixed to 20 ms.  $O = I \cdot (1 - e^{-t/T})$ I = filter input (step) O = filter output t = time T = filter time constant	1000 ms	R	
	0…30000 ms	Filter time constant			1 = 1 ms
13.07	FILTER AI2	Defines the filter time constant for analog input AI2. The hardware filter time constant (with the RMIO board) is fixed to 20 ms.	1000 ms	R	
	0…30000 ms	Filter time constant. See parameter *13.03 FILTER AI1*.			1 = 1 ms
13.11	FILTER AI3	Defines the filter time constant for analog input AI3. The hardware filter time constant (with the RMIO board) is 20 ms.	1000 ms	R	
	0…30000 ms	Filter time constant. See parameter *13.03 FILTER AI1*.			1 = 1 ms
14 DIGITAL OUTPUTS		Relay output control			
14.06	EXT1 DO1 SEL	Selects the source for status information indicated through digital output DO1 on I/O extension module 1.	151.04 b4	P	
	-255.255.31 … +255.255.31 / C. -32768 … C. 32767	Parameter index or a constant value: - Parameter pointer: Inversion, group, index and bit fields. The bit number is effective only for blocks handling Boolean inputs. - Constant value: Inversion and constant fields. Inversion field must have value C to enable the constant setting. Example: The state of digital input DI2 is connected to input 1 as follows: - Set the source selection parameter (*57.06*) to +01.15.01. (The adaptive program stores the state of digital input DI2 to bit 1 of actual signal 01.15.) - If you need an inverted value, switch the sign of the pointer value (-01.15.01).			
14.07	EXT1 DO2 SEL	Selects the source for status information indicated through digital output DO2 on I/O extension module 1.	151.04 b4	P	
		See parameter *14.06 EXT1 DO1 SEL*.			
14.09	EXT2 DO2 SEL	Selects the source for status information indicated through digital output DO2 on I/O extension module 2.	151.04 b4	P	
		See parameter *14.06 EXT1 DO1 SEL*.			

No.	Name/Value	Description	Def.	T	FbEq
15 ANALOGUE OUTPUTS		Output signal processing			
15.01	ANALOGUE OUTPUT 1	Connects a signal to analog output AO1.	15811	I	
	0…30000	Example: Parameter index 109 denotes signal *01.09 POWER*.			1 = 1
15.02	INVERT AO1	Activates analog output AO1 signal inversion.	NO	B	
	NO	Inversion inactive. Minimum signal value corresponds to the minimum output value.			0
	YES	Inversion active. Maximum signal value corresponds to the minimum output value.			1
15.03	MINIMUM AO1	Defines the minimum value for analog output AO1.	0 mA	I	
	0 mA	Zero milliamperes			1
	4 mA	Four milliamperes			2
	10 mA	Ten milliamperes			3
15.04	FILTER AO1	Defines the filter time constant for analog output AO1.	5 s	R	
	0.00…10.00 s	Filter time constant			100 = 1.00 s
15.05	SCALE AO1	Defines the nominal value of the signal connected to analog output AO1. See parameter *15.01 ANALOGUE OUTPUT 1*. The value corresponds to 20 mA at the output. Example: Parameter *01.06 LINE CURRENT* is indicated through analog output AO1. The nominal value of line current is 100 A. This parameter is set to 100 to match the nominal value (100 A) with the analog output signal maximum (20 mA).	100	R	
	0…65536	Real value			1 = 1
15.06	ANALOGUE OUTPUT 2	Connects a measured signal to analog output AO2.	0	I	
	0…30000	Parameter index 109 denotes signal *01.09 POWER*.			1 = 1
15.07	INVERT AO2	Activates analog output AO2 signal inversion.	NO	B	
	NO	Inversion inactive. Minimum signal value corresponds to the minimum output value.			0
	YES	Inversion active. Maximum signal value corresponds to the minimum output value.			1
15.08	MINIMUM AO2	Defines the minimum value for analog output AO2.	0 mA	I	
	0 mA	Zero milliamperes			1
	4 mA	Four milliamperes			2
	10 mA	Ten milliamperes			3
15.09	FILTER AO2	Defines the filter time constant for analog output AO2. See parameter *15.04 FILTER AO1*.	0.1 s	R	
	0.00…10.00 s	Filter time constant			100 = 1.00 s

No.	Name/Value	Description	Def.	T	FbEq
15.10	SCALE AO2	Defines the nominal value of the signal connected to analog output AO2. See parameter *15.06 ANALOGUE OUTPUT 2*. The value corresponds to 20 mA at the output. See parameter *15.05 SCALE AO1*.	100	R	
	0…65536	Real value			1 = 1
15.11	EXT1 AO1	Connects a signal to analog output AO1 on I/O extension module 1. For example, the value 109 denotes parameter 01.09. **Note:** AO1 on extension module 1 is not in use if parameters *30.20 EXT TMP 1 AI1 SEL* and *98.11 AI/O EXT MODULE 1* are activated.	0	I	
	0…30000	Source.			1 = 1
15.16	EXT1 AO2	Connects a signal to analog output AO2 on I/O extension module 1. For example, the value 109 denotes parameter 01.09. **Note:** AO2 on extension module 1 is not in use if parameters *30.26 EXT TMP 2 AI2 SEL* and *98.11 AI/O EXT MODULE 1* are activated.	0	I	
	0…30000	Source.			1 = 1
15.25	EXT2 AO1	Connects a signal to analog output AO1 on I/O extension module 2. For example, the value 109 denotes parameter 01.09. **Note:** AO1 on extension module 2 is not in use if parameters *30.32 EXT TMP 3 AI1 SEL* and *98.15 AI/O EXT MODULE 2* are activated.	0	I	
	0…30000	Source.			1 = 1
15.26	EXT2 AO2	Connects a signal to analog output AO2 on I/O extension module 2. For example, the value 109 denotes parameter 01.09. **Note:** AO2 on extension module 2 is not in use if parameters *30.38 EXT TMP 4 AI2 SEL* and *98.15 AI/O EXT MODULE 2* are activated.	0	I	
	0…30000	Source.			1 = 1
16 SYSTEM CTRL INPUTS		Parameter lock, parameter back-up etc.			
16.01	RUN BIT SEL	Selects the source for commands ON and START in I/O control.	DI2	B	
	DI2	ON command via digital input DI2 START command via digital input DI2			0
	DI7	ON command via digital input DI2 START command via digital input DI7 (DIIL) **Note:** This selection forces the value of parameter *30.13 DI7 EXT EVENT* to *NO*.			1
16.02	PARAMETER LOCK	Selects the state of the parameter lock. The lock prevents parameter changing.	OPEN	B	
	LOCKED	Locked. Parameter values cannot be changed from the control panel. The lock can be opened by entering the valid code to parameter *16.03 PASS CODE*.			1
	OPEN	The lock is open. Parameter values can be changed.			0
16.03	PASS CODE	Selects the pass code for the parameter lock (see parameter *16.02 PARAMETER LOCK*).	0	I	

No.	Name/Value	Description	Def.	T	FbEq
	0…30000	Setting 358 opens the lock. The value reverts automatically back to 0.			
16.04	LOCAL LOCK	Disables entering the local control mode (***LOC/REM*** key on the panel). **WARNING!** Before activating, ensure that the control panel is not needed for stopping the inverter!	FALSE	B	
	FALSE	Local control allowed.			0
	TRUE	Local control disabled.			65535
16.05	USED MODULES	Defines which modules of the inverter are in use. **Note:** This parameter is write-protected when the inverter is running.	-	I	
	GROUP 1	PVS800-57-500kW-A, -630kW-B, -875kW-B and -1000kW-C: The left inverter module is used.			0
	GROUP 2	PVS800-57-500kW-A and -630kW-B: The right inverter module is used. PVS800-57-875kW-B and -1000kW-C: The middle and right inverter modules are used.			1
	GROUPS 1&2	PVS800-57-500kW-A and -630kW-B: The left and right inverter modules are used. PVS800-57-875kW-B and -1000kW-C: The left, middle and right inverter modules are used.			2
16.06	PARAMETER BACKUP	Saves parameters from the RAM memory to the FPROM memory. Saving of parameters is needed only when parameter changes through external control system have to be stored to the FPROM memory. **Note:** Parameter changes by CDP 312R control panel or DriveWindow are immediately saved to the FPROM memory.	DONE	I	
	DONE	Parameter saving is completed.			0
	SAVE	Parameters are saved to the FPROM memory.			1
16.07	CTRL BOARD SUPPLY	Defines the source of the control unit power supply.	EXTERNAL 24V	I	
	INTERNAL 24V	The control unit is supplied from internal power supply from the inverter module. After power fail saving function the control unit is booted.			1
	EXTERNAL 24V	The control unit is powered from an external supply. After power fail saving function the control unit is not automatically booted.			2
16.08	FAN SPD CTRL MODE	Selects the inverter fan speed control. Inverter modules can be equipped with an optional controllable inverter fan.	CONTROLLED	I	
	CONST 50HZ	Fan is running always at constant frequency of 50 Hz when powered.			0
	RUN/STOP	Fan is running at constant speed of 50 Hz when the inverter is running. Fan is running at constant speed of 10 Hz when the inverter is stopped.			1

No.	Name/Value	Description	Def.	T	FbEq
	CONTROLLED	The speed of the fan is determined from the IGBT temperature vs. the fan speed curve when the inverter is running. The speed range is 25…55 Hz. Fan is running at constant speed of 10 Hz when the inverter is stopped.			2
16.09	RESET COUNTER	Resets the selected counter.	NO	I	
	NO	No reset. The value automatically restores to *NO* after a reset.			1
	BREAKER	Main contactor/breaker counter reset (*01.30 BREAKER COUNTER*)			2
	FAN ON TIME	Inverter cooling fan running time counter reset (*01.31 FAN ON-TIME*)			3
	KWH	kWh counter reset (*01.14 KWH SUPPLY*, *01.16 KWH MOTORING* and *01.17 KWH GENERATING*)			4
16.10	INT CONFIG USER	Defines a number of parallel connected inverter modules which the inverter shall operate. **Note**: In caseof reduced run function, a value of this parameter must be changed.	0	R	
	1…3	Number of parallel connected inverter modules			1 = 1
16.11	PBU CH AINT CHK	Selects the inverter module whose AINT/AGDR configuration data is shown by *08.31 AINT TYPE*.	1	I	
	1…12	Inverter module number.			1 = 1
16.12	RESET RUN-TIME	Resets parameters *01.38 RUN-TIME*.	NO	I	
	NO	Reset done or not requested.			0
	YES	Reset *01.38 RUN-TIME*.			65535
16.14	POWER SIGN CHANGE	Changes the sign of the power.	YES	B	
	NO	No power sign change			0
	YES	Power sign changed: Signs of signals *01.08* and *01.09* are inverted.			1
16.15	START MODE	Selects the start mode.	LEVEL	B	
	LEVEL	Starts inverter by level of control command. Control command is selected by parameter *98.01 COMMAND SEL* and *98.02 COMM. MODULE*. **WARNING!** After a fault reset, the inverter will start if the start signal is on.			0
	EDGE	Starts inverter by edge of control command. Control command is selected by parameter *98.01 COMMAND SEL* and *98.02 COMM. MODULE*.			1
16.16	RESET FLT/ALM BUF	Clears parameters *09.30*…*09.39*.	DONE	I	
	DONE	Clearing done or not requested.			0
	RESET	Clears the 10 latest alarm/fault codes.			65535
16.17	RESET DC BRK CNT	Clears master control program parameter *01.31 DC BREAKER COUNTR*.	OFF	I	
	OFF	Clearing done or not requested.			0

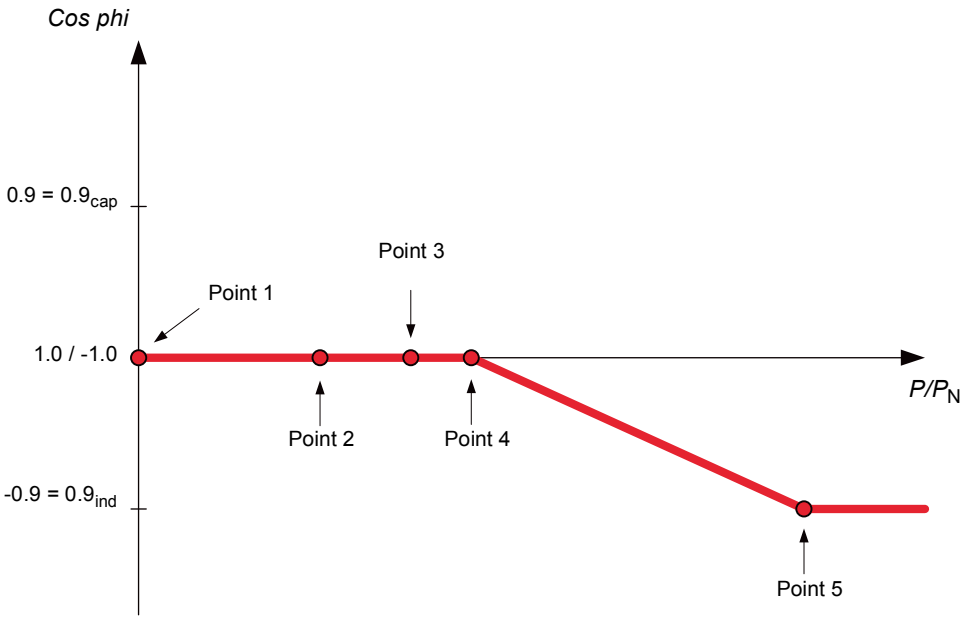
No.	Name/Value	Description	Def.	T	FbEq
	ON	Clears the master control parameter *01.31 DC BREAKER COUNTR*.			-1
16.18	INSUL MEAS SELECT	Selects the insulation measurement device used. This setting defines what is shown in signal *01.29 INSUL RESISTANCE*.	NONE	I	
	NONE	*01.29 INSUL RESISTANCE* = 0. Use this selection if the inverter does not have option +Q954.			1
	BENDER	Measured insulation resistance is shown in *01.29 INSUL RESISTANCE*. This selection is valid only with option +Q954.			2
16.19	ALTITUDE	Defines the installation altitude of the inverter. The current limit of the inverter is decreased according to the installation altitude: If altitude <= 1000 m, current limit is not decreased. If altitude > 1000 m, current limit is decreased by 1% for each hundred meter that exceeds 1000 meters. For example, in 1500 meters the coefficient for current limitation is 0.95.  Installation altitude is used in combination with ambient temperature monitoring to create a current limit for the inverter.	0 m	R	
	0...4000 m	Installation altitude in meters.			1 = 1 m

No.	Name/Value	Description	Def.	T	FbEq
18 LED PANEL CTRL		The Inverter Monitoring Display has a LED bar to show an absolute real type value. 0 50 100 150% The source and the scale of the display signal are defined by this parameter group. **Note:** If the Inverter Monitoring Display and CDP 312R Control Panel are used together, actual signal *01.26 LED PANEL OUTP* must be the first signal in the CDP 312R Actual Signal Display mode. Otherwise the LED bar of the Inverter Monitoring Display display will show an incorrect value. The ISXR73XX panel link ID number must be 1, see *How to select a control unit and change its panel link ID number*.			
18.01	LED PANEL OUTPUT	Selects the signal source for the Inverter Monitoring Display. Example: To show signal *01.09 POWER* on the display, set this parameter to 109.	109	I	
	0…30000	Parameter index 109 denotes signal *01.09 POWER*.			
18.02	SCALE PANEL	Defines the value of the signal selected by parameter *18.01* LED PANEL OUTPUT which corresponds to 100% on the LED bar display. Example: Signal *01.05 FREQUENCY* is shown on the LED display: At 50 Hz the LED display indicates full value (100%) when: Parameter *18.01* is set to 105. Parameter *18.02* is set to 5000 (= 100 · 50 = 5000, where 100 is the integer scale (FbEq) for signal 01.05).	100	R	
	0…65536	Scaling factor			1 = 1
19 DATA STORAGE		Parameters for receiving information from or sending to an external control system. The parameters are unconnected and they can be used for linking, testing and commissioning purposes.			
19.01	DATA 1	Stores data written from a user-defined source.	0	R	
	32768…+32767	Data value			1 = 1
…	…	…	…	…	…
19.08	DATA 8	See parameter *19.01*.	0	R	
	32768…+32767	Data value			1 = 1
23 DC VOLT REF		DC voltage reference			
23.01	DC VOLT REF	Shows the DC voltage reference. By default, the reference is received from the MPPT algorithm; an external reference can be selected using parameter *39.08 ENA EXT DC REF* (see page *145*).	Varies	R	
	V	DC voltage reference. The range is limited by parameters *39.05 MPPT DC REF MIN* and *39.04 MPPT DC REF MAX*. (At start, the maximum DC reference is 875 V.)			1 = 1 V

No.	Name/Value	Description	Def.	T	FbEq
24 REACTIVE POWER		Reactive power settings			
24.01	Q POWER REF	Shows reactive power reference in percent of inverter nominal power.	0%	R	
	-100…+100%	Reactive power reference. • Positive value denotes capacitive load. • Negative value denotes inductive load.			100 = 1%
24.02	Q POWER REF2	MCP *24.02 Q POWER REF* (*72*)	0	I	
24.03	Q POWER REF2 SEL	MCP *24.03 Q POWER REF SEL* (*74*)	kVAr	I	
24.04	Q POWER REF ADD	Defines an additional reactive power reference value, which is added to *24.02 Q POWER REF2*.	0 kVAr	R	
	-120…120%	Additional reactive power reference in percent of *04.06 NOM AC POWER*			1 = 1 kVAr
24.05	Q POWER STOP DLY	Defines a delay for stopping the inverter in the Q POWER state. When the reactive power reference is below the level defined in parameter *24.06 Q POW ZERO MARGIN* for this time delay, the inverter is stopped and the AC contactor opened. The inverter starts again when the reactive power reference reaches the defined level.	60 s	R	
	0…1000000 s	Stop delay			1 = 1 s
24.06	Q POW ZERO MARGIN	Defines a margin for the zero reactive power reference in the Q POWER state. See parameter *24.05 Q POWER STOP DLY*.	1%	R	
	0…100%	Margin for zero reactive power reference			100 = 1%
24.08	COS PHI CAP LIMIT	Defines the minimum allowed cosine phi at the capacitive side. Cosine phi is always greater than or equal to this value.	0.0	R	
	0…1	Cosine phi limit at the capacitive side			100 = 1.0
24.09	COS PHI IND LIMIT	Defines the minimum allowed cosine phi at the inductive side. Cosine phi is always greater than or equal to this value.	0.0	R	
	0…1	Cosine phi limit at the inductive side			100 = 1.0
24.10	LOCK-IN POWER	Defines the lock-in power level for Q(U) control. The active power has to be greater than this level before the Q(U) control starts producing non-zero reactive power reference.	0%	R	
	0…100%	Lock-in value for active power			100 = 1%
24.11	LOCK-OUT POWER	Defines the lock-out power level for Q(U) control. If the active power is below this level, the reactive power reference from the Q(U) control will be zero. **Note:** The lock-out power level has to be smaller than the lock-in power level (*24.10 LOCK-IN POWER*).	0%	R	
	0…100%	Lock-out value for active power			100 = 1%

No.	Name/Value	Description	Def.	T	FbEq
24.15	AC-CTR GAIN	Defines the relative gain of the AC voltage controller. For example, if the gain is set to 1, a 10% change in the error value (reference - actual value) causes the AC voltage controller output to change by 10%.	2	R	
	0…8	AC voltage controller gain			1 = 1
24.16	AC-CTR INTEG TIME	Defines the integration time of the AC voltage controller.	1 s	R	
	0.1…1000 s	AC voltage controller integration time			10 = 1 s
24.17	AC-CTR OFFSET	Defines an offset value that can be used to manipulate the U_{AC} reference input. The offset is added to the reference given by the user. With zero offset, the reference range 9000…10000…11000 corresponds to 90…100…110% of nominal voltage. With an offset of 1000, the reference range 8000…9000…10000 corresponds to 90…100…110% of nominal voltage.	0	I	
	-32768…32767	AC voltage controller offset			1 = 1
24.18	AC-CTR LOW LIMIT	Defines the minimum reactive power reference value at the AC controller output. A negative value denotes inductive reactive power.	-100%	I	
	-120…0%	Minimum reactive power reference value at the AC controller output			100 = 1%
24.19	AC-CTR HIGH LIMIT	Defines the maximum reactive power reference value at the AC controller output. A positive value denotes capacitive reactive power.	100%	I	
	0…120%	Maximum reactive power reference value at the AC controller output			100 = 1%
24.20	Q POWER CAP LIMIT	Defines the maximum capacitive (leading) reactive power that the inverter can feed to the grid.	100%	R	
	0…120%	Limit in percent of *04.06 NOM AC POWER*			100 = 1%
24.21	Q POWER IND LIMIT	Defines the maximum inductive (lagging) reactive power that the inverter can take from the grid.	100%	R	
	0…120%	Limit in percent of *04.06 NOM AC POWER*			100 = 1%
24.22	IQ CAP LIMIT	Capacitive current reference limit. If the capacitive current reference is higher than this limit, bit 2 of *08.03 LIMIT WORD* is set. **Note:** An active reduced run function rescales the limit.	100%	R	
	0…200%	Capacitive current reference limit in percent of *04.05 NOM AC CURRENT*			1 = 1%
24.23	IQ IND LIMIT	Inductive current reference limit. If the inductive current reference is higher than this limit, bit 3 of *08.03 LIMIT WORD* is set. **Note:** An active reduced run function rescales the limit.	100%	R	
	0…200%	Inductive current reference limit in percent of *04.05 NOM AC CURRENT*			1 = 1%

No.	Name/Value	Description	Def.	T	FbEq
24.25	Q(U) SLOPE	Defines the slope for Q(U) control reference calculation. If the grid voltage differs from the nominal value defined by parameter *24.02 Q POWER REF2*, then Q(U) control feeds reactive power. Amount of reactive power can be defined from the formula below: 24.25 Q(U) SLOPE x UAC change If UAC is less than nominal, capacitive power is generated. If UAC is above nominal, inductive power is generated. See also parameters *24.02*, *24.26*...*24.28*.	4.17%/V	R	
	0…20 %/V	Q(U) slope			100 = 1 %/V
24.26	Q(U) DEAD BAND	Defines a dead band for Q(U) control. If the grid voltage stays inside the dead band area, Q(U) control is not active.	0 V	R	
	0…100 V	Voltage hysteresis			100 = 1 V
24.27	Q(U) TIME DELAY	Defines a time delay for Q(U) control. Q(U) control is active when the grid voltage is outside the hysteresis area longer than this time delay.	0 s	R	
	0…3600 s	Time delay			100 = 1 s
24.28	Q(U) RAMP TIME	Defines a ramp time for Q(U) control. Actual grid voltage is ramped before using it in Q(U) control.	62.5 s	R	
	0…3600 s	Ramp time from zero to nominal voltage			100 = 1 s
25 REACTIVE POWER		Additional reactive power settings for the cos phi *f*(P) reference type			
25.01	LOCK-IN VOLTAGE	Defines the lock-in voltage level for cos phi = *f*(P) control. The grid voltage has to be greater than this value before the cos phi = *f*(P) control starts producing non-zero reactive power reference.	105%	R	
	90…150%	Lock-in value for grid voltage. 100% equals the nominal voltage of the inverter.			100 = 1%
25.02	LOCK-OUT VOLTAGE	Defines the lock-out voltage level for cos phi = *f*(P) control. If the grid voltage is below this value, the reactive power reference from the cos phi = *f*(P) control will be zero. **Note:** The lock-out voltage level has to be smaller than the lock-in voltage level (*25.01 LOCK-IN VOLTAGE*).	100%	R	
	90…150%	Lock-out value for grid voltage. 100% equals the nominal voltage of the inverter.			100 = 1%

No.	Name/Value	Description	Def.	T	FbEq
25.03	POINT 1 X	Defines the X coordinate of the first point in the characteristic curve cos phi = *f*(P). The value represents active power at the inverter output terminals.	0%	R	
	0…150%	Active power level at the first point.			100 = 1%
					
25.04	POINT 1 Y	Defines the Y coordinate of the first point in the characteristic curve cos phi = *f*(P). The value represents cos phi at the inverter output terminals. Negative values mean inductive reactive power and positive values mean capacitive reactive power.	-1.0	R	
	-1.0…1.0	Cos phi at the first point			10000 = 1
25.05	POINT 2 X	Defines the X coordinate of the second point in the characteristic curve cos phi = *f*(P). See also parameter *25.03 POINT 1 X*.	25%	R	
	0…150%	Active power level at the second point			100 = 1%
25.06	POINT 2 Y	Defines the Y coordinate of the second point in the characteristic curve cos phi = *f*(P). See also parameter *25.04 POINT 1 Y*.	-1.0	R	
	-1.0…1.0	Cos phi at the second point			10000 = 1
25.07	POINT 3 X	Defines the X coordinate of the third point in the characteristic curve cos phi = *f*(P). See also parameter *25.03 POINT 1 X*.	40%	R	
	0…150%	Active power level at the third point			100 = 1%
25.08	POINT 3 Y	Defines the Y coordinate of the third point in the characteristic curve cos phi = *f*(P). See also parameter *25.04 POINT 1 Y*.	-1.0	R	
	-1.0…1.0	Cos phi at the third point			10000 = 1

No.	Name/Value	Description	Def.	T	FbEq
25.09	POINT 4 X	Defines the X coordinate of the fourth point in the characteristic curve cos phi = *f*(P). See also parameter *25.03 POINT 1 X*.	50%	R	
	0…150%	Active power level at the fourth point			100 = 1%
25.10	POINT 4 Y	Defines the Y coordinate of the fourth point in the characteristic curve cos phi = *f*(P). See also parameter *25.04 POINT 1 Y*.	-1.0	R	
	-1.0…1.0	Cos phi at the fourth point			10000 = 1
25.11	POINT 5 X	Defines the X coordinate of the fifth point in the characteristic curve cos phi = *f*(P). See also parameter *25.03 POINT 1 X*.	100%	R	
	0…150%	Active power level at the fifth point			100 = 1%
25.12	POINT 5 Y	Defines the Y coordinate of the fifth point in the characteristic curve cos phi = *f*(P). See also parameter *25.04 POINT 1 Y*.	-0.9	R	
	-1.0…1.0	Cos phi at the fifth point			10000 = 1
25.15	Q(P) LIMIT P1	Defines an active power level for the first point of Q(P) limitation curve. 100% equals the value in parameter *04.06 NOM AC POWER*. If active power in parameter *01.09 POWER* is less than this value, the reactive power limits defined with parameters *25.20 Q(P) LIMIT Q1 IND* and *25.25 Q(P) LIMIT Q1 CAP* are used.	0 %	R	
	0…120%	Active power level 1.			100 = 1%
25.16	Q(P) LIMIT P2	Defines an active power level for the second point of Q(P) limitation curve. 100% equals the value in parameter *04.06 NOM AC POWER*.	5 %	R	-
	0…120%	Active power level 2.			100 = 1%
25.17	Q(P) LIMIT P3	Defines an active power level for the third point of Q(P) limitation curve. 100% equals the value in parameter *04.06 NOM AC POWER*.	20 %	R	-
	0…120 %	Active power level 3.			100 = 1%
25.18	Q(P) LIMIT P4	Defines an active power level for the fourth point of Q(P) limitation curve. 100% equals the value in parameter *04.06 NOM AC POWER*. If active power in parameter *01.09 POWER* is greater than this value, the reactive power limits defined with parameters *25.23 Q(P) LIMIT Q4 IND* and *25.28 Q(P) LIMIT Q4 CAP* are used.	100 %	R	-
	0…120%	Active power level 4.			100 = 1%
25.20	Q(P) LIMIT Q1 IND	Defines an inductive reactive power level for the first point of Q(P) limitation curve. 100% equals the value in parameter *04.06 NOM AC POWER*.	100 %	R	-
	0…120%	Inductive reactive power level 1.			100 = 1%
25.21	Q(P) LIMIT Q2 IND	Defines an inductive reactive power level for the second point of Q(P) limitation curve. 100% equals the value in parameter *04.06 NOM AC POWER*.	100 %	R	-
	0…120%	Inductive reactive power level 2.			100 = 1%

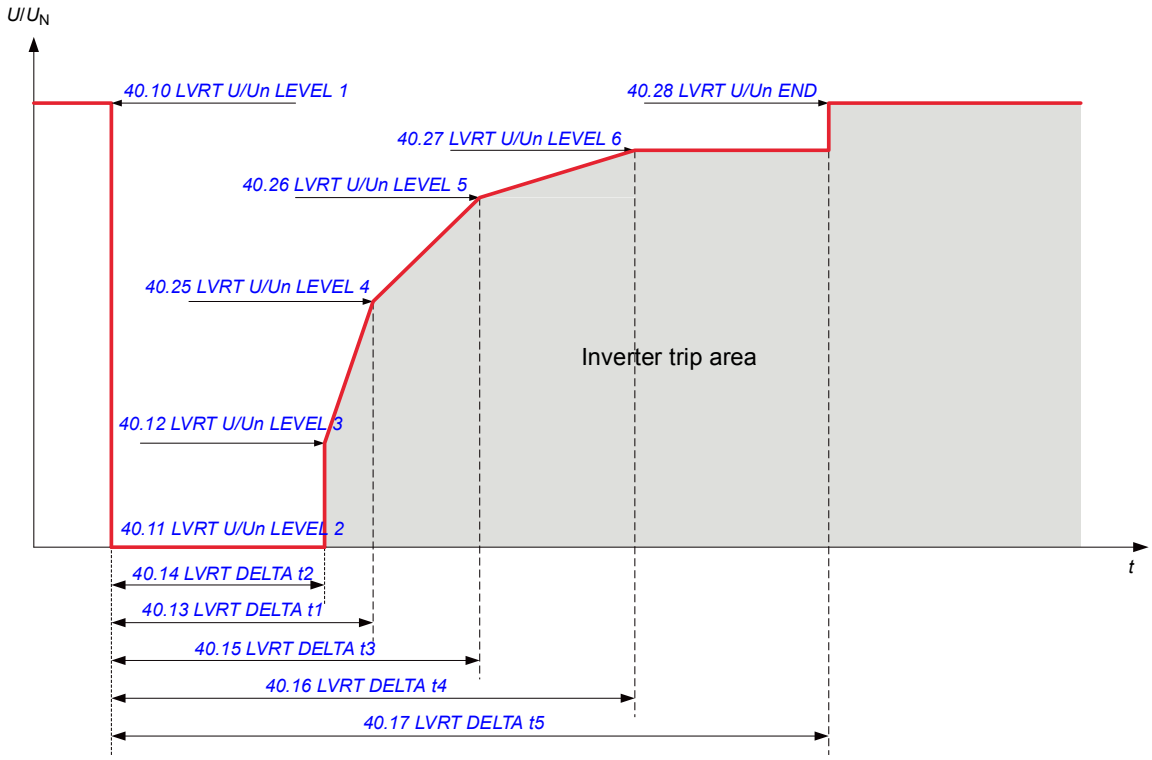
No.	Name/Value	Description	Def.	T	FbEq
25.22	Q(P) LIMIT Q3 IND	Defines an inductive reactive power level for the third point of Q(P) limitation curve. 100% equals the value in parameter *04.06 NOM AC POWER*.	100 %	R	-
	0…120%	Inductive reactive power level 3.			100 = 1%
25.23	Q(P) LIMIT Q4 IND	Defines an inductive reactive power level for the fourth point of Q(P) limitation curve. 100% equals the value in parameter *04.06 NOM AC POWER*.	100 %	R	-
	0…120%	Inductive reactive power level 4.			100 = 1%
25.25	Q(P) LIMIT Q1 CAP	Defines a capacitive reactive power level for the first point of Q(P) limitation curve. 100% equals the value in parameter *04.06 NOM AC POWER*.	100 %	R	-
	0…120%	Capacitive reactive power level 1.			100 = 1%
25.26	Q(P) LIMIT Q2 CAP	Defines a capacitive reactive power level for the second point of Q(P) limitation curve. 100% equals the value in parameter *04.06 NOM AC POWER*.	100 %	R	-
	0…120%	Capacitive reactive power level 2.			100 = 1%
25.27	Q(P) LIMIT Q3 CAP	Defines a capacitive reactive power level for the third point of Q(P) limitation curve. 100% equals the value in parameter *04.06 NOM AC POWER*.	100 %	R	-
	0…120%	Capacitive reactive power level 3.			100 = 1%
25.28	Q(P) LIMIT Q4 CAP	Defines a capacitive reactive power level for the fourth point of Q(P) limitation curve. 100% equals the value in parameter *04.06 NOM AC POWER*.	100 %	R	-
	0…120%	Capacitive reactive power level 4.			100 = 1%
30 FAULT FUNCTIONS		Programmable protection functions			
30.02	EARTH FAULT	Selects the action when a ground (earth) fault or current unbalance is detected. **Note:** With parallel-connected modules, *30.02 EARTH FAULT* is forced to *FAULT* and the fault message is *CUR UNBAL 1 (23E0)*… instead of *EARTH FAULT (2330)*.	FAULT	B	
	WARNING	The inverter generates alarm *EARTH FAULT (2387)*.			0
	FAULT	The inverter trips on fault *EARTH FAULT (2330)* / *CUR UNBAL 1 (23E0)*….			1
30.03	EARTH FAULT LEVEL	Defines the ground (earth) fault level. **Note:** This parameter cannot be changed without a valid pass code. Contact your local ABB representative.	3	R	
	1	1% unbalance in the sum current			1
	2	3% unbalance in the sum current			2
	3	8% unbalance in the sum current			3
	4	13% unbalance in the sum current			4
	5	18% unbalance in the sum current			5
	6	28% unbalance in the sum current			6

No.	Name/Value	Description	Def.	T	FbEq
	7	39% unbalance in the sum current			7
	8	62% unbalance in the sum current			8
30.04	DI4 EXT EVENT	Selects how the inverter reacts to the state of digital input DI4. **Note:** DI4 is reserved for ground/earth fault monitoring.	DI4=1 FAULTS	I	
	NO	Not in use.			1
	DI4=0 FAULTS	If digital input DI4 is OFF (0), the inverter trips on fault *EXT EVENT DI4 (9084)*.			2
	DI4=1 FAULTS	If digital input DI4 is ON (1), the inverter trips on fault *EXT EVENT DI4 (9084)*.			3
	DI4=0 ALARMS	If digital input DI4 is OFF (0), the inverter generates warning *EXT EVNT DI4 (908B)*.			4
	DI4=1 ALARMS	If digital input DI4 is ON (1), the inverter generates warning *EXT EVNT DI4 (908B)*.			5
30.05	DI5 EXT EVENT	Selects how the inverter reacts to the state of digital input DI5.	NO	I	
	NO	Not in use			1
	DI5 = 0 FAULTS	If digital input DI5 is OFF (0), the inverter first generates alarm *EXT EVNT DI5 (908C)* and trips on fault *EXT EVENT DI5 (9085)* after the delay defined by parameter *30.10 DI5 TRIP DELAY* has elapsed.			2
	DI5 = 1 FAULTS	If digital input DI5 is ON (1), the inverter first generates alarm *EXT EVNT DI5 (908C)* and trips on fault *EXT EVENT DI5 (9085)* after the delay defined by parameter *30.10 DI5 TRIP DELAY* has elapsed.			3
	DI5 = 0 ALARMS	If digital input DI5 is OFF (0), the inverter generates alarm *EXT EVNT DI5 (908C)*.			4
	DI5 = 1 ALARMS	If digital input DI5 is ON (1), the inverter generates alarm *EXT EVNT DI5 (908C)*.			5
30.10	DI5 TRIP DELAY	Defines the delay time before the inverter trips on fault *EXT EVENT DI5 (9085)*. Supervision is selected by parameter *30.05 DI5 EXT EVENT*. The default value is 0 s with 100 kW inverters, 60 s with 250 and 500 kW inverters.	0 s	R	
	0…3600 s	Delay time			1 = 1
30.11	DC OVERVOLT TRIP	Defines a tripping limit for DC circuit overvoltage protection. If the value of parameter *01.10 DC VOLTAGE* is higher than or equal to this limit, the inverter trips instantly with *DC OVERVOLT (3210)* fault. There is no delay in this protection.	1000 V	R	
	[*30.12*] … 1000 V	Trip limit			1 = 1 V
30.12	DC UNDERVOLT TRIP	Defines the *DC UNDERVOLT (3220)* (DC circuit undervoltage fault) trip limit. **Note:** This parameter also determines the DC voltage check limit during charging.	Varies	R	
	0…*30.11* V	Trip limit			1 = 1 V

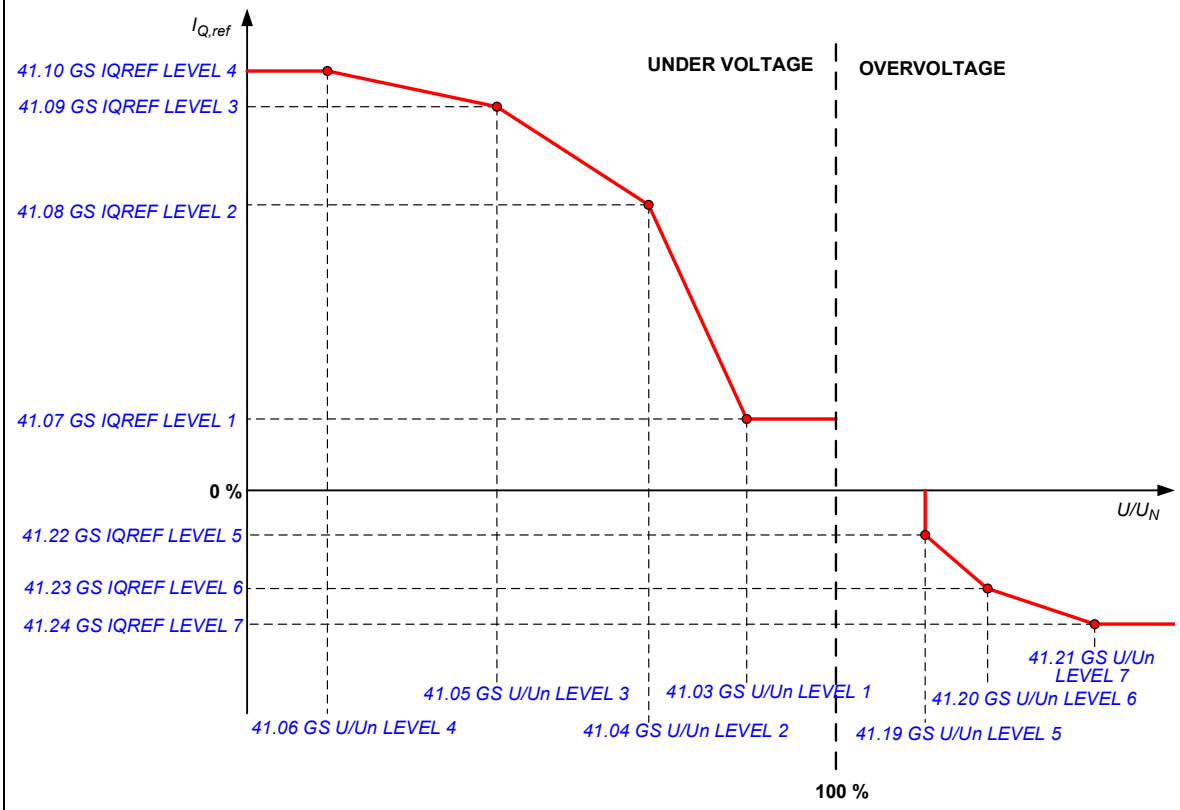
No.	Name/Value	Description	Def.	T	FbEq
30.13	DI7 EXT EVENT	Selects how inverter reacts to the state of digital input DI7 (DIIL). See parameter *16.01 RUN BIT SEL*.	NO	I	
	NO	Not in use			1
	DI7=0 FAULTS	If digital input DI7 is OFF (0), the inverter first generates warning *EXT EVNT DI7 (908E)* and then trips on fault *EXT EVENT DI7 (9087)* after the delay defined by parameter *30.14 DI7 TRIP DELAY* has elapsed.			2
	DI7=1 FAULTS	If digital input DI7 is ON (1), the inverter first generates warning *EXT EVNT DI7 (908E)* and then trips on fault *EXT EVENT DI7 (9087)* after the delay defined by parameter *30.14 DI7 TRIP DELAY* has elapsed.			3
	DI7=0 ALARMS	If digital input DI7 is OFF (0), the inverter generates warning *EXT EVNT DI7 (908E)*.			4
	DI7=1 ALARMS	If digital input DI7 is ON (1), the inverter generates warning *EXT EVNT DI7 (908E)*.			5
30.14	DI7 TRIP DELAY	Defines the delay time before the inverter trips on fault *EXT EVENT DI7 (9087)*. Supervision is selected by parameter *30.13 DI7 EXT EVENT*.	0 s	R	
	0…3600 s	Delay time			1 = 1
30.15	DCREF RANGE ALARM	When MPPT hits the minimum or maximum range of the DC reference, an alarm can be triggered. Otherwise just status bits are updated in parameter *08.06 MPPT STATUS*.	OFF	B	
	OFF	No alarm. If the minimum range is reached, bit 8 is set in parameter *08.06 MPPT STATUS*. If the maximum range is reached, bit 9 is set in parameter *08.06 MPPT STATUS*.			0
	ON	Alarm is triggered if MPPT reaches the minimum or maximum range of the DC reference. If the minimum range is reached, bit 8 in parameter *08.06 MPPT STATUS* and bit 12 in parameter *09.10 PV FLT ALM WORD* are set. Alarm: *DCREF MIN RNG (32AB)*. If the maximum range is reached, bit 9 in parameter *08.06 MPPT STATUS* and bit 13 in parameter *09.10 PV FLT ALM WORD* are set. Alarm: *DCREF MAX RNG (32AC)*.			1
31 AUTOMATIC RESET		**Note:** These parameters are not to be changed as automatic fault resets are configured via the master control program. See parameter group *30 FAULT FUNCTIONS* on page *77*.			
31.01	NUMBER OF TRIALS	Reserved.		I	
31.02	TRIAL TIME	Reserved.		R	
31.03	DELAY TIME	Reserved.		R	
31.04	OVERCURRENT	Reserved.		B	
31.05	OVERVOLTAGE	Reserved.		B	

No.	Name/Value	Description	Def.	T	FbEq
31.06	UNDERVOLTAGE	Reserved.		B	
39 MPPT CONTROL		Maximum power point tracking (MPPT) settings. See also section *Maximum power point tracking (MPPT)* on page *34*.			
39.01	MPPT CONTROL	Enables/disables MPPT.	ON	B	
	OFF	MPPT disabled.			0
	ON	MPPT enabled.			1
39.02	MPPT UDC STEP	Defines the DC voltage steps that is used by the MPPT logic when seeking the maximum power point.	7 V	R	
	0 … 1249 V	DC voltage step.			10 = 1 V
39.04	MPPT DC REF MAX	Maximum DC reference value allowed for MPPT.	Varies	R	
	[*39.05*] … 850 V	Maximum DC reference.			1 = 1 V
39.05	MPPT DC REF MIN	Minimum DC reference value allowed for MPPT.	Varies	R	
	Varies … [*39.04*] V	Minimum DC reference.			1 = 1 V
39.06	GRIDMON SUPV MODE	Determines the action when a grid failure is detected by the grid monitoring relay.	NONE	I	
	NONE	No action taken.			0
	ALARM	An alarm is given.			1
	FAULT	A fault is generated.			2
	RESTART	An alarm is given, the delay specified by parameter *39.07 GRIDMON RESTR DLY* starts. The inverter is restarted after the delay elapses. If the fault still exists, restart is attempted after another delay period. The cycle is repeated until the grid failure is removed.			3
39.07	GRIDMON RESTR DLY	When parameter *39.06 GRIDMON SUPV MODE* is set to *RESTART*, determines the delay before a restart is attempted.	0 ms	R	
	0…8388607 ms	Restart delay			1 = 1 ms
39.08	ENA EXT DC REF	Enables/disables external DC reference. When enabled, the external reference overrides the internal MPPT reference. See master control program parameter *23.01 EXT MPPT DC REF* (page *72*).	OFF	B	
	OFF	External DC reference disabled. Internal MPPT reference used.			0
	ON	External DC reference enabled. The external reference overrides the internal MPPT reference.			1
39.09	EXT MPPT DC REF	Shows the external DC reference. This reference is used when parameter *39.08 ENA EXT DC REF* is set to *ON*.	0 V	B	
	0…1500	External DC reference			1 = 1 V

No.	Name/Value	Description	Def.	T	FbEq
40 LVRT CONTROL		Parameters related to the Low voltage ride-through function. Do not change parameters when the PVS800 is running. **Note:** Group 40 is write-protected. It can be write-enabled by giving a password with parameter *16.03 PASS CODE*.			
40.01	LVRT MODE	Voltage tracking source selection for the Low voltage ride-through function. Selection between phase and main voltages can be set in parameter *40.24 RMS VOLTAGE CALC*. **Note:** Parameter 40.01 LVRT MODE is write-protected when the PVS800 is running. Stop the PVS800 before changing the value. **Note:** Perform the following checks before enabling the LVRT function: • Check that the mains voltage measurement is OK (signal *01.11 MAINS VOLTAGE*). • Check that the RT area parameters are set correctly, see the figure of parameter *40.10 LVRT U/Un LEVEL 1*. • Check the settings for the grid support mode (parameter *41.01 GRID SUPPORT MODE*).	POS SEQ VOLT	I	
	OFF	LVRT function is disabled.			0
	MAX RMS VOLT	Input for the LVRT function is the highest RMS AC voltage, either phase or main.			1
	MIN RMS VOLT	Input for the LVRT function is the lowest RMS AC voltage, either phase or main.			2
	POS SEQ VOLT	Input for the LVRT function is the positive sequence of the AC voltage.			3
40.03	LVRT RETURN RAMP	Defines a ramping time for active power after a voltage dip. When the grid voltage has returned to a normal value after the voltage dip, the active power is restored using this ramp time.	3 s	R	
	0…100 s	Ramp time			10 = 1 s
40.09	RT U/Un MOD STOP	Modulation stops if the value of *01.11 MAINS VOLTAGE* falls below the value of this parameter. Check the RT area parameters. See the figure at parameter *40.10 LVRT U/Un LEVEL 1*.	0%	R	
	0…90%	Modulation stop limit of the RT function			1 = 1%

No.	Name/Value	Description	Def.	T	FbEq
40.10	LVRT U/Un LEVEL 1	Defines the trigger level for the LVRT function. See the figure below for information on defining the allowed LVRT area. After the LVRT function is triggered, bit 11 of *08.01 MAIN STATUS WORD* is set and an alarm (*LVRT RIDETRGH (32A0)*) is generated. If the grid voltage falls to the inverter trip area, the inverter unit will trip on *RT NET LOST (32A1)*.	80%	R	
	[*40.11*]…200%	Level 1			1 = 1%
					
40.11	LVRT U/Un LEVEL 2	LVRT voltage level 2. See the figure in parameter *41.10 LVRT U/Un LEVEL 1*.	0%	R	
	0…[*40.10*]%	Level 2			1 = 1%
40.12	LVRT U/Un LEVEL 3	LVRT voltage level 3. See the figure in parameter *40.10 LVRT U/Un LEVEL 1*.	20%	R	
	[*40.11*]…200%	Level 3			1 = 1%
40.13	LVRT DELTA t1	Defines the time (t1) within which *01.11 MAINS VOLTAGE* should be restored above *40.25 LVRT U/Un LEVEL 4*.	1000 ms	R	
	[*40.14*]…[*40.15*] ms	Time 1			1 = 1 ms
40.14	LVRT DELTA t2	Defines the time (t2) within which *01.11 MAINS VOLTAGE* should be restored above *40.12 LVRT U/Un LEVEL 3*.	600 ms	R	
	0…[*40.13*] ms	Time 2			1 = 1 ms
40.15	LVRT DELTA t3	Defines the time (t3) within which *01.11 MAINS VOLTAGE* should be restored above *40.26 LVRT U/Un LEVEL 5*.	1500 ms	R	
	[*40.13*]…[*40.16*] ms	Time 3			1 = 1 ms

No.	Name/Value	Description	Def.	T	FbEq
40.16	LVRT DELTA t4	Defines the time (t4) within which *01.11 MAINS VOLTAGE* should be restored above *40.27 LVRT U/Un LEVEL 6*.	2000 ms	R	
	[*40.15*]…[*40.17*] ms	Time 4			1 = 1 ms
40.17	LVRT DELTA t5	Defines the time (t5) within which *01.11 MAINS VOLTAGE* must be restored above *40.28 LVRT U/Un END*.	3000 ms	R	
	[*40.16*]… 8388608 ms	Time 5			1 = 1 ms
40.24	RMS VOLTAGE CALC	Enables/disables RMS voltage measuring.	MAIN VOLT	I	
	OFF	RMS voltage measuring is disabled.			0
	PHASE VOLT	RMS phase voltage measuring is enabled.			1
	MAIN VOLT	RMS main voltage measuring is enabled.			2
40.25	LVRT U/Un LEVEL 4	LVRT voltage level 4. See the figure in parameter *40.10 LVRT U/Un LEVEL 1*.	45%	R	
	[*40.12*]…200%	Level 4			1 = 1%
40.26	LVRT U/Un LEVEL 5	LVRT voltage level 5. See the figure in parameter *40.10 LVRT U/Un LEVEL 1*.	60%	R	
	[*40.25*]…200%	Level 5			1 = 1%
40.27	LVRT U/Un LEVEL 6	LVRT voltage level 6. See the figure in parameter *40.10 LVRT U/Un LEVEL 1*.	75%	R	
	[*40.26*]…200%	Level 6			1 = 1%
40.28	LVRT U/Un END	End level for LVRT. See the figure in parameter *40.10 LVRT U/Un LEVEL 1*.	85%	R	
	[*40.10*]…200%	End level			1 = 1%
41 GRID SUPPORT		Parameters related to the Grid support function. **Note:** Group 41 is write-protected. It can be write-enabled by giving a password with parameter *16.03 PASS CODE*. Parameter *41.01 GRID SUPPORT MODE* is write-protected when the PVS800 is running.			
41.01	GRID SUPPORT MODE	Selects the operation mode of the Grid support function. Grid support means feeding of capacitive reactive power to the grid upon voltage dip (ie, when bit 11 of *08.01 MAIN STATUS WORD* is set). The amount of grid support is defined by parameters *41.03*…*41.10*. Selection between phase and main voltages can be set in parameter *40.24 RMS VOLTAGE CALC*.	OFF	I	
	OFF	Grid support function is disabled.			0
	MAX RMS VOLT	Input for the grid support function is the highest RMS AC voltage, either phase or main.			1
	MIN RMS VOLT	Input for the grid support function is the lowest RMS AC voltage, either phase or main.			2
	POS SEQ VOLT	Input for the grid support function is a positive sequence of the AC voltage.			3

No.	Name/Value	Description	Def.	T	FbEq
41.03	GS U/Un LEVEL 1	Defines grid support level 1. When the voltage falls below this level, the grid is supported by feeding capacitive current as defined by *41.07 GS IQREF LEVEL 1*.	100%	R	
	[*41.04*]…200%	Grid support voltage level 1			1 = 1%
					
41.04	GS U/Un LEVEL 2	Defines grid support level 2. When the voltage falls below this level, the grid is supported by feeding capacitive current as defined by *41.08 GS IQREF LEVEL 2*.	50%	R	
	[*41.05*]…[*41.03*]%	Grid support voltage level 2			1 = 1%
41.05	GS U/Un LEVEL 3	Defines grid support level 3. When the voltage falls below this level, the grid is supported by feeding capacitive current as defined by *41.09 GS IQREF LEVEL 3*.	25%	R	
	[*41.06*]…[*41.04*]%	Grid support voltage level 3			1 = 1%
41.06	GS U/Un LEVEL 4	Defines grid support level 4. When the voltage falls below this level, the grid is supported by feeding capacitive current as defined by *41.10 GS IQREF LEVEL 4*.	15%	R	
	0…[*41.05*]%	Grid support voltage level 4			1 = 1%
41.07	GS IQREF LEVEL 1	Defines the reactive current reference point for *41.03 GS U/Un LEVEL 1* in percent of *04.05 NOM AC CURRENT*.	0%	R	
	0…100%	Grid support reference level 1			1 = 1%
41.08	GS IQREF LEVEL 2	Defines the reactive current reference point for *41.04 GS U/Un LEVEL 2* in percent of *04.05 04.05 NOM AC CURRENT*.	100%	R	
	0…100%	Grid support reference level 2			1 = 1%

No.	Name/Value	Description	Def.	T	FbEq
41.09	GS IQREF LEVEL 3	Defines the reactive current reference point for *41.05 GS U/Un LEVEL 3* in percent of *04.05 NOM AC CURRENT*.	100%	R	
	0…100%	Grid support reference level 3			1 = 1%
41.10	GS IQREF LEVEL 4	Defines the reactive current reference point for *41.06 GS U/Un LEVEL 4* in percent of *04.05 NOM AC CURRENT*.	100%	R	
	0…100%	Grid support reference level 4			1 = 1%
41.11	RT IQREF	Defines an external reactive current reference during a voltage dip. If the value differs from 0, the reactive current reference defined by parameters *41.03*…*40.10* is bypassed. Value is given as a percentage of parameter *04.05 NOM AC CURRENT*.	0%	R	
	0…100%	Reactive current reference			1 = 1%
41.12	RT IQ RAMP UP	Defines the ramp time from zero to nominal current (*04.05 NOM AC CURRENT*) for the reactive current reference. Ramp time is used if parameter *40.01 LVRT MODE* is activated and the voltage dip is active.	0.04 s	R	
	0…100 s	Ramp time			10 = 1 s
41.14	GS UAC REF SEL	Defines a reference level of the AC voltage for the low voltage grid support calculation.	NOMINAL VOLT		
	NOMINAL VOLT	Parameter *04.04 NOM AC VOLTAGE* is used as reference. Grid support is calculated with the difference between actual voltage and value in parameter *04.04 NOM AC VOLTAGE*. This result is also used as input for grid support curve (parameters *41.03 GS U/Un LEVEL 1*...*41.10 GS IQREF LEVEL 4*).			0
	60 s AVERAGE	Parameter 02.08 *60 s AVERAGE VOLT* is used as reference. Grid support is calculated with the difference between actual voltage and value in parameter 02.08 *60 s AVERAGE VOLT*. This result is also used as input for grid support curve (parameters *41.03 GS U/Un LEVEL 1*...*41.10 GS IQREF LEVEL 4*).			1
41.15	GS TURN OFF TIME	Defines the turn off time for grid support after a voltage dip. The grid support stays on for this delay time after the voltage dip ends.	0 ms		
	0...8388610 ms	Delay time			1 = 1 ms
41.16	GS IQREF BASE SEL	Defines the base value of reactive current reference which is used with the low voltage grid support.	ZERO		
	ZERO	When the low voltage ride-through is active, the existing reactive current reference is ignored. Reactive current reference comes only from the grid support curve (parameters *41.03*…*40.10*).			0
	60 s AVERAGE	Reactive current reference calculated from the grid support curve (parameters *41.03*…*40.10*) is added to parameter *02.04 60 s AVERAGE IQ* during the low voltage ride-through.			1

No.	Name/Value	Description	Def.	T	FbEq
41.17	HV GS IQREF BASE	Defines the base value of reactive current reference which is used with the high voltage grid support.	IQ REF		
	ZERO	When the high voltage ride-through is active, the existing reactive current reference is ignored. Reactive current reference comes only from the grid support curve (parameters *41.19*…*41.24*).			0
	IQ REF	Reactive current reference calculated from the grid support curve (parameters *41.19*…*41.24*) is added to the existing reactive current reference.			1
41.18	HV GS MODE	Defines an input mode for the High voltage ride-through (HVRT) function.	OFF		
	OFF	HVRT is not used.			0
	MAX RMS VOLT	HVRT is based on the maximum value of the calculated RMS voltages.			1
	MIN RMS VOLT	HVRT is based on the minimum value of the calculated RMS voltages.			2
	POS SEQ VOLT	HVRT is based on the positive sequence component of the grid voltage.			3
41.19	GS U/Un LEVEL 5	Defines the voltage at the 5th point of the grid support curve.	110%		
	100% … [*41.20*]				1 = 1%
41.20	GS U/Un LEVEL 6	Defines the voltage at the 6th point of the grid support curve.	120%		
	[*41.19*]…[*41.21*]				1 = 1%
41.21	GS U/Un LEVEL 7	Defines the voltage at the 7th point of the grid support curve.	120%		
	[*41.20*] … 200%				1 = 1%
41.22	GS IQREF LEVEL 5	Defines the active current reference at the 5th point of the grid support curve.	0%		
	-100…0%	Reactive current reference in percent of *04.05 NOM AC CURRENT*.			1 = 1%
41.23	GS IQREF LEVEL 6	Defines the active current reference at the 6th point of the grid support curve.	-30%		
	-100…0%	Reactive current reference in percent of *04.05 NOM AC CURRENT*.			1 = 1%
41.24	GS IQREF LEVEL 7	Defines the active current reference at the 7th point of the grid support curve.	-30%		
	-100…0%	Reactive current reference in percent of *04.05 NOM AC CURRENT*.			1 = 1%
41.25	UNBALANCE LEVEL	Defines a level to detect unbalanced voltage dip. The unbalanced dip is detected when the ratio of negative sequence voltage (parameter *02.10 NEG SEQUENCE VOLT*) to the positive sequence voltage (parameter *01.11 MAINS VOLTAGE*) is greater than the level defined in this parameter. If the unbalanced dip is detected, the reactive current is limited to a value set in the parameter *41.25 UNBALANCE LEVEL*	100%		
	0…100%	Unbalance level			1 = 1%

No.	Name/Value	Description	Def.	T	FbEq
41.26	IQ ASYM DIP LIMIT	Defines the maximum reactive current reference allowed during an unbalanced voltage dip.	100%		
	0…100%	Maximum reactive current reference in percentage of value in parameter *04.05 NOM AC CURRENT*.			1 = 1%
42 GENER POWER LIMIT		Parameters related to generated active power limiting. **Note:** Group 42 is write-protected. It can be write-enabled by giving a password with parameter *16.03 PASS CODE*.			
42.02	GENLIM RAMP UP	Ramp up time for the internal generator side active power limit.	3 s	R	
	0…100 s	Ramp up time			10 = 1 s
42.03	ACTPOW RAMP UP	Defines the ramp-up rate for active power limit defined in the Master control program, parameter *31.16 POWER LIMITING*. If the value in parameter *31.16* is increased, the increase is ramped-up using the ramp rate defined by this parameter. For example, if the value of parameter *31.16 POWER LIMITING* is changed from 50% to 100% and parameter *42.03 ACTPOW RAMP UP* = 10 seconds, it takes 5 seconds before the active power limit is actually increased to 100% of the nominal power.	10 s	R	
	0…1000 s	Active power ramp up time from zero to *04.06 NOM AC POWER*.			10 = 1 s
42.04	ACTPOW RAMP DOWN	Defines the ramp-down rate for active power limit defined in the Master control program parameter *31.16 POWER LIMITING*. If the value in parameter *31.16* is decreased, the decrease is ramped-down using a ramp rate defined by this parameter. For example, if a value of the parameter *31.16 POWER LIMITING* is changed from 80% to 50% and parameter *42.03 ACTPOW RAMP UP* = 10 seconds, it takes 3 seconds before the active power limit is actually decreased to 50% of the nominal power.	10 s	R	
	0…1000 s	Active power ramp down time from *04.06 NOM AC POWER* to zero.			10 = 1 s
42.05	RESTR ACTPOW GRD1	Defines a ramp-up time for active power after the following network faults: RT NET LOST (32A1), GRID MON FLT (8189), AC UNDERFREQ (3142), AC OVERFREQ (3141), AC UNDERVOLT (3120), AC OVERVOLT (3110) If the ramp-up time defined in parameter *42.06 RESTR ACTPOW GRD2* is longer than this ramp-up time, it is used instead of this ramp-up time.	0 s	R	
	0…86400 s	Ramp time from zero to *04.06 NOM AC POWER*			1 = 1 s

No.	Name/Value	Description	Def.	T	FbEq
42.06	RESTR ACTPOW GRD2	Defines a ramp-up time for active power after the start-up. This ramp is used after every start of the inverter. In addition, if this ramp-up time is longer than the ramp-up time in parameter *42.05 RESTR ACTPOW GRD1*, this ramp-up time is used instead of *42.05* after a network fault listed in *42.05* has occurred.	0 s	R	
	0…86400 s	Ramp time from zero to *04.06 NOM AC POWER*			1 = 1 s
42.07	P FREQ LIM ENA	Selects the mode of the Active power limitation from grid overfrequency function. Active power is limited according to the limitation curve defined by parameters *42.08 P LIMITING FREQ 1* … *42.11 P LIMITING FREQ 3*. See section *Active power limitation from grid overfrequency* on page *38*.	OFF	I	
	OFF	Active power limitation from grid overfrequency is not used.			0
	INCREMENTAL	Active power limit decreases according to the limitation curve, but increases only when the grid frequency is below *42.11 P LIMITING FREQ 3* longer than *42.13 P(f) RETURN DELAY*. Increasing the power limit is done with a ramp rate defined by parameter *42.14 P(f) RETURN RAMP*.			1
	FREE RUNNING	Active power limit can move back and forth within the limitation curve defined by parameters *42.08 P LIMITING FREQ 1* … *42.10 P FREQ LIMIT 2*. After the grid frequency is restored below *42.08 P LIMITING FREQ 1*, the power limit is increased with a ramp rate defined by parameter *42.14 P(f) RETURN RAMP*.			2
42.08	P LIMITING FREQ 1	Defines the grid frequency where the active power limitation curve starts.	50.2 Hz	R	
	[*41.11*]…[*41.09*]	Start frequency for active power limitation from grid overfrequency			100 = 1 Hz
42.09	P LIMITING FREQ 2	Defines the grid frequency where the active power limitation curve ends. If the grid frequency exceeds this value, the active power is limited to zero.	51.5 Hz	R	
	[*41.08*]…65 Hz	Stop frequency for active power limitation from grid overfrequency			100 = 1 Hz
42.10	P FREQ LIMIT 2	Defines the active power limitation at the frequency defined by parameter *42.09 P LIMITING FREQ 2*. The value is given as a percentage of the active power level before limitation.	48%	R	
	0…100%	Active power limitation			100 = 1%

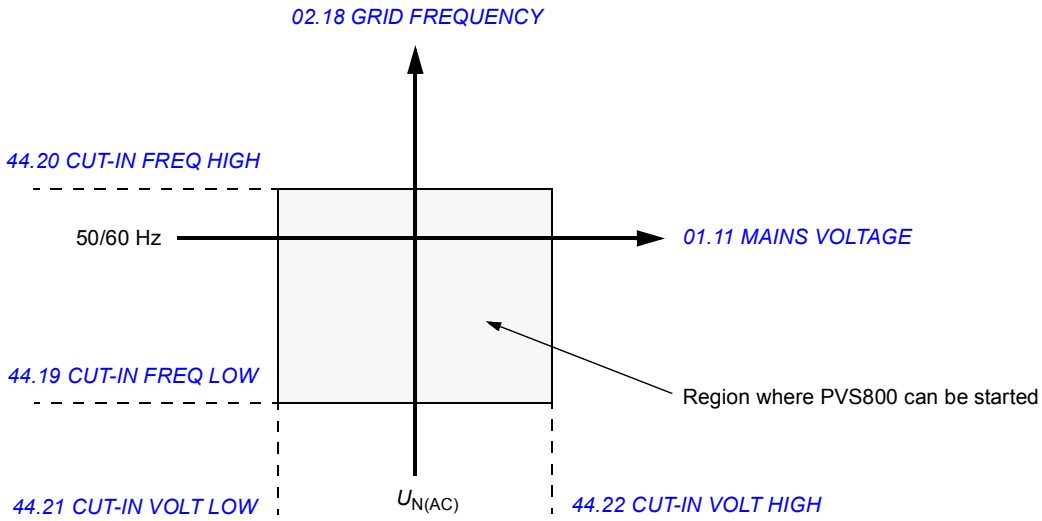
No.	Name/Value	Description	Def.	T	FbEq
42.11	P LIMITING FREQ 3	Defines the frequency where the active power limitation from grid frequency is deactivated. If the frequency-dependent active power limitation is effective (bit 8 in parameter *08.03 LIMIT WORD* is set), it is deactivated only when *02.18 GRID FREQUENCY* falls below 42.11 P LIMITING FREQ 3.	50.05	R	
	45…[*42.09*]	Deactivation frequency for active power limitation from grid overfrequency			100 = 1 Hz
42.12	POWER PRIORITY	Defines the prioritized power type. If the AC current limit of the inverter is reached, the non-prioritized power type is reduced to keep the AC current below the limit.	ACTIVE POW	I	
	REACTIVE POW	Reactive power is prioritized and the active power is limited.			0
	ACTIVE POW	Active power is prioritized and the reactive current reference is limited.			1
42.13	P(f) RETURN DELAY	Defines a return delay for the active power limitation from grid overfrequency in the incremental mode. For the power limitation to end, the actual grid frequency must be less than *42.11 P LIMITING FREQ 3* for a time period longer than this delay. The delay is active only if parameter *42.07 P FREQ LIM ENA* is set to *INCREMENTAL*.	0 s	R	
	0…419430 s	Return delay			20 = 1 s
42.14	P(f) RETURN RAMP	Defines a ramp time for active power recovery after the active power limitation from grid overfrequency has ended. Time means ramping from zero to nominal power. The ramp is used if parameter *42.07 P FREQ LIM ENA* is set to *INCREMENTAL* or *FREE RUNNING*.	300 s	R	
	0…419430 s	Ramp time			20 = 1 s
42.15	P(f) RET RAMP MAX	Defines the maximum ramping time from zero to nominal power when the inverter is returning from the grid overfrequency transient. The ramp selections MEMORY and DELTA in parameter *42.16 P(f) RET RAMP SEL* may lead to very slow return ramps. Parameter *42.15* can be used to set a reasonable maximum ramping time.	1200 s	R	20 = 1 s
	1…1200 s	Maximum ramping time			
42.16	P(f) RET RAMP SEL	Selects which power the return ramp time in parameter *42.14 P(f) RETURN RAMP* refers to.	NOMINAL		
	NOMINAL	Return ramp time in parameter *42.14 P(F) RETURN RAMP* means ramping from zero to nominal power (*04.06 NOM AC POWER*).			0
	MEMORY	Return ramp time in parameter *42.14 P(F) RETURN RAMP* means ramping from zero power to $P_{e\text{-}mem}$, where • $P_{e\text{-}mem}$ = Active power level when the overfrequency transient was started.			1

No.	Name/Value	Description	Def.	T	FbEq
	DELTA	Return ramp time in parameter *42.14 P(F) RETURN RAMP* means ramping from P_{min} to $P_{e\text{-}mem}$, where • P_{min} = Minimum achieved active power level during the overfrequency transient • $P_{e\text{-}mem}$ = Active power level when the overfrequency transient was started.			2
42.17	MPPT P RAMP ENA	Enables or disables Increase rate limitation for active power in the MPPT mode. Increase rate limitation is not used until active power ramp-up after the start is completed.	OFF		
	OFF	The maximum increase rate of active power is not limited.			0
	ON	The maximum increase rate of active power is defined by parameter *42.18 MPPT P RAMP UP*.			1
42.18	MPPT P RAMP UP	Defines the maximum increase rate for active power in the MPPT mode.	6000%/ min	R	
	1…6000%/min	Maximum increase rate for active power in the MPPT mode.			1 = 1%/min
42.19	POWER STOP RAMP	Defines the stopping ramp rate for active and reactive power in a controlled stop. A controlled stop means that the inverter is stopped without a fault. Both active and reactive power are ramped down to zero using this ramp rate before the inverter is totally stopped.	100%/s	R	
	1…1200%/s	Ramp rate. 100%/s equals parameter *04.06 NOMINAL POWER* in one second.			100 = 1%/s
42.20	UAC PLIM MODE SEL	Selects the mode of the Active power limitation from grid overvoltage function. Active power is limited according to the limitation curve defined by parameters *42.24 UAC PLIM VOLT 1* … *42.27 UAC PLIM LEVEL 2*. See section *Active power limitation from grid overvoltage* on page *40*.	OFF	I	
	OFF	Active power limitation from grid overvoltage is not used.			0
	INCREMENTAL	Active power limit decreases according to the limitation curve, but increases only when the voltage is below *42.24 UAC PLIM VOLT 1* longer than *42.22 UAC PLIM RET DLY*. Increasing the power limit is done with a ramp rate defined by parameter *42.23 UAC PLIM RAMP UP*.			1
	FREE RUNNING	Active power limit can move back and forth within the limitation curve. Increasing the power limit is done with a ramp rate defined by parameter *42.23 UAC PLIM RAMP UP*.			2

No.	Name/Value	Description	Def.	T	FbEq
42.21	UAC PLIM INPUT	Selects the input for the active power limitation from grid overvoltage.	POS SEQ VOLT	I	
	POS SEQ VOLT	Active power limitation from the positive sequence of the AC voltage (*01.11 MAINS VOLTAGE*).			0
	10-MIN AVG	Active power limitation from the 10-minute moving average of the AC voltage (*02.09 AVERAGE AC VOLT*).			1
42.22	UAC PLIM RET DLY	Defines a return delay for the active power limitation from grid overvoltage in the incremental mode. Grid voltage must be below *42.24 UAC PLIM VOLT 1* longer than this delay before the active power limit can be increased again. This setting is used only if parameter *42.20 UAC PLIM MODE SEL* is set to INCREMENTAL.	300 s	R	
	0…10000 s	Return delay			20 = 1 s
42.23	UAC PLIM RAMP UP	Defines a ramp rate for the active power limitation from grid overvoltage. The active power limit is always increased with this ramp rate.	20 %/min	R	
	1…6000 %/min	Ramp rate			1 = 1 %/min
42.24	UAC PLIM VOLT 1	Defines a voltage value for the first point in the active power limitation curve.	105%	R	
	100…[*42.26*] V	Voltage in percent of *04.04 NOM AC VOLTAGE*			10 = 1%
42.25	UAC PLIM LEVEL 1	Defines an active power level for the first point in the active power limitation curve.	100%	R	
	[*42.27*]…120 %	Active power level in percent of *04.06 NOM AC POWER*			100 = 1%
42.26	UAC PLIM VOLT 2	Defines a voltage value for the second point in the active power limitation curve.	110%	R	
	[*42.24*]…150 %	Voltage in percent of *04.04 NOM AC VOLTAGE*			10 = 1%
42.27	UAC PLIM LEVEL 2	Defines an active power level for the second point in the active power limitation curve.	0%	R	
	0…[*42.25*] %	Active power level in percent of *04.06 NOM AC POWER*			100 = 1%
44 GRID MONITORING		Parameters related to internal grid monitoring. **Note:** Group 44 is write-protected. It can be write-enabled by giving a password with parameter *16.03 PASS CODE*.			
44.01	NAMU GRIDMON MODE	Defines the usage mode of the internal grid monitoring. Grid monitoring is based on the voltage measurement via the NAMU board.	FAULT	I	
	NONE	Internal grid monitoring is disabled.			0
	ALARM	Internal grid monitoring is enabled. If grid voltage and/or frequency are outside limits that are defined by parameters *44.02*…*44.17*, a corresponding alarm is created and the inverter continues to operate.			1

No.	Name/Value	Description	Def.	T	FbEq
	FAULT	Internal grid monitoring is enabled. If grid voltage and/or frequency are outside limits that are defined by parameters *44.02*…*44.17*, a corresponding fault is created and the inverter stops.			2
44.02	UNDER FREQ 1 LIM	Defines a trip limit for under frequency fault 1. If the grid frequency (signal *02.18 GRID FREQUENCY*) is below this setting longer than the time delay in parameter *44.04 UNDER FREQ 1 TIME*, the inverter will generate an alarm or a fault according to parameter *44.01 NAMU GRIDMON MODE*.	47.5 Hz	R	
	45…65 Hz	Trip limit 1			100 = 1 Hz
44.03	UNDER FREQ 2 LIM	Defines a trip limit for under frequency fault 2. If the grid frequency (signal *02.18 GRID FREQUENCY*) is below this setting longer than the time delay in parameter *44.05 UNDER FREQ 2 TIME*, the inverter will generate an alarm or a fault according to parameter *44.01 NAMU GRIDMON MODE*.	47.5 Hz	R	
	45…65 Hz	Trip limit 2			100 = 1 Hz
44.04	UNDER FREQ 1 TIME	Defines a trip time for under frequency fault 1.	0.1 s	R	
	0…33554.4 s	Trip time 1			100 = 1 s
44.05	UNDER FREQ 2 TIME	Defines a trip time for under frequency fault 2.	0.1 s	R	
	0…33554.4 s	Trip time 2			100 = 1 s
44.06	OVER FREQ 1 LIM	Defines a trip limit for over frequency fault 1. If the grid frequency (signal *02.18 GRID FREQUENCY*) exceeds this setting longer than the time delay in parameter *44.08 OVER FREQ 1 TIME*, the inverter will generate an alarm or a fault according to parameter *44.01 NAMU GRIDMON MODE*.	51.5 Hz	R	
	45…65 Hz	Trip limit 1			100 = 1 Hz
44.07	OVER FREQ 2 LIM	Defines a trip limit for over frequency fault 2. If the grid frequency (signal *02.18 GRID FREQUENCY*) exceeds this setting longer than the time delay in parameter *44.09 OVER FREQ 2 TIME*, the inverter will generate an alarm or a fault according to parameter *44.01 NAMU GRIDMON MODE*.	51.5 Hz	R	
	45…65 Hz	Trip limit 2			100 = 1 Hz
44.08	OVER FREQ 1 TIME	Defines a trip time for over frequency fault 1.	0.1 s	R	
	0…33554.4 s	Trip time 1			100 = 1 s
44.09	OVER FREQ 2 TIME	Defines a trip time for over frequency fault 2.	0.1 s	R	
	0…33554.4 s	Trip time 2			100 = 1 s

No.	Name/Value	Description	Def.	T	FbEq
44.10	UNDER VOLT 1 LIM	Defines a trip limit for under voltage fault 1. If the grid voltage (signal *01.11 MAINS VOLTAGE*) is below this setting longer than the time delay in parameter *44.12 UNDER VOLT 1 TIME*, the inverter will generate an alarm or a fault according to parameter *44.01 NAMU GRIDMON MODE*.	80%	R	
	0…200%	Trip limit 1			1 = 1%
44.11	UNDER VOLT 2 LIM	Defines a trip limit for under voltage fault 2. If the grid voltage (signal *01.11 MAINS VOLTAGE*) is below this setting longer than the time delay in parameter *44.13 UNDER VOLT 2 TIME*, the inverter will generate an alarm or a fault according to parameter *44.01 NAMU GRIDMON MODE*.	80%	R	
	0…200%	Trip limit 2			1 = 1%
44.12	UNDER VOLT 1 TIME	Defines a trip time for under voltage fault 1.	1.5 s	R	
	0…33554.4 s	Trip time 1			100 = 1 s
44.13	UNDER VOLT 2 TIME	Defines a trip time for under voltage fault 2.	1.5 s	R	
	0…33554.4 s	Trip time 2			100 = 1 s
44.14	OVER VOLT 1 LIM	Defines a trip limit for over voltage fault 1. If the grid voltage (signal *01.11 MAINS VOLTAGE*) exceeds this setting longer than the time delay in parameter *44.16 OVER VOLT 1 TIME*, the inverter will generate an alarm or a fault according to parameter *44.01 NAMU GRIDMON MODE*.	120%	R	
	0…200%	Trip limit 1			1 = 1%
44.15	OVER VOLT 2 LIM	Defines a trip limit for over voltage fault 2. If the grid voltage (signal *01.11 MAINS VOLTAGE*) exceeds this setting longer than the time delay in parameter *44.17 OVER VOLT 2 TIME*, the inverter will generate an alarm or a fault according to parameter *44.01 NAMU GRIDMON MODE*.	120%	R	
	0…200%	Trip limit 2			1 = 1%
44.16	OVER VOLT 1 TIME	Defines a trip time for over voltage fault 1.	0.1 s	R	
	0…33554.4 s	Trip time 1			100 = 1 s
44.17	OVER VOLT 2 TIME	Defines a trip time for over voltage fault 2.	0.1 s	R	
	0…33554.4 s	Trip time 2			100 = 1 s

No.	Name/Value	Description	Def.	T	FbEq
44.18	CUT-IN CHECK ENA	Enables or disables the checking of cut-in conditions (start conditions). Cut-in condition checking is based on measurements from the NAMU board. The limits for cut-in conditions are defined by parameters *44.19 CUT-IN FREQ LOW* … *44.22 CUT-IN VOLT HIGH*. See the figure below for more information.	ON	B	
	OFF	Checking of cut-in conditions is disabled.			0
	ON	Checking of cut-in conditions is enabled.			1
					
44.19	CUT-IN FREQ LOW	Defines the low limit for the frequency cut-in condition.	47.5 Hz	R	
	45…65 Hz	Low limit for the grid frequency			100 = 1 Hz
44.20	CUT-IN FREQ HIGH	Defines the high limit for the frequency cut-in condition.	50.05 Hz	R	
	45…65 Hz	High limit for the grid frequency			100 = 1 Hz
44.21	CUT-IN VOLT LOW	Defines the low limit for the voltage cut-in condition.	90%	R	
	90…110%	Low limit for the grid voltage			1 = 1%
44.22	CUT-IN VOLT HIGH	Defines the high limit for the voltage cut-in condition.	110%	R	
	90…110%	High limit for the grid voltage			1 = 1%
44.23	CUT-IN DELAY	Defines the delay for the checking of cut-in conditions. Grid frequency and grid voltage have to be within the limits defined by parameters *44.19 CUT-IN FREQ LOW* … *44.22 CUT-IN VOLT HIGH* longer than this delay before the inverter can be started.	0 s	R	
	0… 419430 s	Time delay for the checking of cut-in conditions			20 = 1 s
44.24	GRIDMON INPUT SEL	Selects the input for grid voltage monitoring.	POS SEQ VOLT		
	POS SEQ VOLT	Grid monitoring for undervoltage and overvoltage is based on the positive sequence component of the grid voltage.			0

No.	Name/Value	Description	Def.	T	FbEq
	RMS VOLT	Undervoltage detection is based on the minimum RMS value and overvoltage detection on the maximum RMS value of the grid voltage. The selection between phase-to-neutral and phase-to-phase voltages is done with parameter *40.24 RMS VOLTAGE CALC*.			1
45 ANTI-ISLANDING		Parameters related to island detection. **Note:** Group 45 is write-protected. It can be write-enabled by giving a password with parameter *16.03 PASS CODE*.			
45.01	ISLAND DETECTION	Selects the operation mode of the island detection.	NONE	I	
	NONE	Island detection is disabled.			0
	FAULT	Island detection is enabled. When an island is detected, the inverter trips on a fault.			1
	RESTART	Island detection is enabled. When an island is detected, the inverter is stopped and an alarm generated. The inverter starts again after the delay defined by parameter *45.06 ANTI-ISLAND DELAY*. **Note:** If the delay is short (less than 30 seconds), the Low voltage ride-through (LVRT) function is needed for a fast start.			2
45.02	ANTI-ISLAND MODE	Defines the method of the Anti-islanding function.	PASSIVE	I	
	PASSIVE	Passive anti-islanding. The inverter does not do any action for island detection.			1
	RPV	Active anti-islanding (reactive power variation). The reactive power variation makes a cyclic reactive power excitation to detect the island.			2
	FREQ SHIFT	Active anti-islanding (by frequency shift). The grid frequency is shifted out of its normal range by utilizing positive feedback from the grid frequency.			3
45.03	RPV CYCLE TIME	Defines the cycle time of the additional reactive power reference in the reactive power variation (RPV) method.	1 s	R	
	0…8388.61 s	RPV cycle time			1000 = 1 s
45.04	RPV AMPLITUDE	Amplitude of the reactive power reference in the RPV method. Amplitude is defined in percentage of the parameter *04.06 NOM AC POWER* when the inverter is running with full active power. Actual used amplitude of the used reactive power reference is scaled according to the present active power level.	1%	R	
	0…100%	Amplitude of the reactive power reference in percent of *04.06 NOM AC POWER*.			100 = 1%
45.05	ROCOF PEAK TRIP	Defines a trip level for the grid frequency change rate (ROCOF, rate of change of frequency).	4 Hz/s	R	
	0…390.625 Hz/s	Trip level for the grid frequency change rate			100 = 1 Hz/s

No.	Name/Value	Description	Def.	T	FbEq
45.06	ANTI-ISLAND DELAY	Defines a delay for the anti-islanding restart mode. When an island is detected, the inverter is disconnected from the grid and alarm *ANTI-ISLAND (81A0)* is generated. The inverter starts again after the delay, provided that there are no faults active. **Note:** If the delay is short (less than 30 seconds), the Low voltage ride-through (LVRT) function is needed for a fast start.	5 s	R	
	0…8388.61 s	Time delay for the anti-islanding restart mode			1000 = 1 s
45.07	ROCOF CONST LEVEL	Defines a constant ROCOF level for the island detection. The island is detected when the grid frequency change rate (ROCOF) is beyond this level for the time delay defined in parameter *45.08 ROCOF CONST DELAY*. The constant ROCOF level detection is enabled only when parameter *45.11 CONST DETECTION* = ON. The island detected by the constant level detection is indicated with bit 7, in parameter *08.08 ISLAND STATUS*.	2 Hz/s		
	0…390.625 Hz/s	Detection level.			100 = 1 Hz/s
45.08	ROCOF CONST DELAY	Defines the time delay for constant level island detection. The island is detected when grid frequency change rate (ROCOF) is beyond the level defined in parameter *45.07 ROCOF CONST LEVEL* for the delay defined in this parameter.	0.2 s		
	0…8388.61 s	Detection delay.			1000 = 1 s
45.09	PEAK DETECTION	Activates island detection from peak ROCOF value.	ON		
	OFF	Peak detection is disabled			0
	ON	Peak detection is enabled			1
45.10	ADAPT DETECTION	Activates island detection from adaptive ROCOF value.	ON		
	OFF	Adapt detection is disabled			0
	ON	Adapt detection is enabled			1
45.11	CONST DETECTION	Activates island detection from constant ROCOF value with delay.	ON		
	OFF	Constant detection is disabled			0
	ON	Constant detection is enabled			1
45.12	FREQ SHIFT GAIN	Defines gain for frequency shift algorithm. Gain affects the strength of positive feedback. A too large gain can cause instability in the system.	100%/Hz		
	10...200%/Hz	Frequency shift gain			1 = 1%/HZ

No.	Name/Value	Description	Def.	T	FbEq
46 POWER LIMITATION		Parameters for active power limitation during a grid underfrequency situation.			
46.01	UF PLIM MODE SEL	Enables or disables active power limitation during a grid underfrequency situation.	OFF		
	OFF	Active power limitation during a grid underfrequency situation is disabled.			0
	INCREMENTAL	Active power limit increases according to the grid underfrequency characteristic curve, but decreases only when the grid frequency is greater than *46.04 UF PLIM RET FREQ* for longer than *46.02 UF PLIM RET DELAY*. Decreasing the active power limit is done with a ramp rate defined by parameter *46.03 UF PLIM RET RAMP*.			1
46.02	UF PLIM RET DELAY	Defines the return delay for a grid underfrequency situation. The grid frequency has to be greater than *46.04 UF PLIM RET FREQ* for the duration of this delay before return ramping can be started.	300 s	R	
	0…3600 s	Return delay			20 = 1 s
46.03	UF PLIM RET RAMP	Defines the ramp rate for decreasing the active power limit after a grid underfrequency situation.	300 s	R	
	0…3600 s	Ramping time from zero to *04.06 NOM AC POWER*			20 = 1 s
46.04	UF PLIM RET FREQ	Defines the return frequency for a grid underfrequency situation.	50.0 Hz	R	
	[*46.05*] … 65 Hz	Return frequency			100 = 1 Hz
46.05	UF PLIM FREQ 1	Defines the frequency at the first point of the grid underfrequency characteristic curve.	49.7 Hz	R	
	[*46.07*] … [*46.04*]	Frequency			100 = 1 Hz
46.06	UF PLIM LEVEL 1	Defines the active power limit value at the first point of the grid underfrequency characteristic curve.	100%	R	
	80% … [*46.08*]	Active power limit in percent *of 04.06 NOM AC POWER*			1 = 1%
46.07	UF PLIM FREQ 2	Defines the frequency at the second point of the grid underfrequency characteristic curve.	49.3 Hz	R	
	45 Hz … [*46.05*]	Frequency			100 = 1 Hz
46.08	UF PLIM LEVEL 2	Defines the active power limit value at the second point of the grid underfrequency characteristic curve.	120%	R	
	[*46.06*]…120%	Active power limit in percent of *04.06 NOM AC POWER*			1 = 1%

No.	Name/Value	Description	Def.	T	FbEq
51 MASTER ADAPTER		These parameters are visible, and need to be adjusted, only when a fieldbus adapter module (optional) is installed and activated by parameter *98.02 COMM. MODULE*. For details on the parameters, refer to the manual of the fieldbus module and chapter *Fieldbus control*. **Note:** Any changes in these parameters take effect only after the next power-up of the adapter module.			
51.01	MODULE TYPE	Module type and software version			
51.02 … 51.26	FIELDBUS PAR2…26	(According to module type)			
51.27	FBA PAR REFRESH	Validates any changed adapter module configuration parameter settings. After refreshing, the value reverts automatically to *DONE*.			
	DONE	Refreshing done.			
	REFRESH	Refreshing.			
51.28	FILE CPI FW REV	Displays the required CPI firmware revision of the fieldbus adapter as defined in the configuration file stored in the control unit memory. The CPI firmware version of the fieldbus adapter (refer to par. *51.32*) must contain the same or a later CPI version to be compatible. The format is **xyz**, where **x** = major revision, **y** = minor revision, **z** = correction number.			
51.29	FILE CONFIG ID	Displays the fieldbus adapter module configuration file identification stored in the control unit memory. This information is control program dependent.			
51.30	FILE CONFIG REV	Displays the fieldbus adapter module configuration file revision stored in the control unit memory. The format is **xyz**, where **x** = major revision, **y** = minor revision, **z** = correction number.			
51.31	FBA STATUS	Displays the status of the adapter module.			
	IDLE	Adapter not configured.			
	EXEC. INIT	Adapter initializing.			
	TIME OUT	Time-out has occurred in the communication between the adapter and the control unit.			
	CONFIG ERROR	Adapter configuration error. The major or minor revision code of the CPI program revision on the control unit is not the revision required by the module (see parameter *51.32*), or configuration file upload has failed more than five times.			
	OFF-LINE	Adapter is off-line.			
	ON-LINE	Adapter is on-line.			
	RESET	Adapter is performing a hardware reset.			

<table>
<tr><th>No.</th><th>Name/Value</th><th>Description</th><th>Def.</th><th>T</th><th>FbEq</th></tr>
<tr><td>51.32</td><td>FBA CPI FW REV</td><td>Displays the CPI program revision of the module inserted in slot 1 of the control unit.
The format is xyz, where x = major revision, y = minor revision, z = correction number.</td><td></td><td></td><td></td></tr>
<tr><td>51.33</td><td>FBA APPL FW REV</td><td>Displays the program revision of the module inserted in slot 1 of the control unit.
The format is xyz, where x = major revision, y = minor revision, z = correction number.</td><td></td><td></td><td></td></tr>
<tr><td colspan="2">53 USER PARAMETERS</td><td>Adaptive program settings.</td><td></td><td></td><td></td></tr>
<tr><td>53.01</td><td>NUMERIC 1</td><td>Defines a numeric parameter for adaptive programming</td><td>0</td><td>PB</td><td></td></tr>
<tr><td></td><td>-8388608…8388607</td><td>Numeric value</td><td></td><td></td><td></td></tr>
<tr><td>53.02</td><td>NUMERIC 2</td><td>Defines a numeric parameter for adaptive programming</td><td>0</td><td>PB</td><td></td></tr>
<tr><td></td><td>-8388608…8388607</td><td>Numeric value</td><td></td><td></td><td></td></tr>
<tr><td>…</td><td>…</td><td>…</td><td></td><td></td><td></td></tr>
<tr><td>53.10</td><td>NUMERIC 10</td><td>Defines a numeric parameter for adaptive programming</td><td>0</td><td>PB</td><td></td></tr>
<tr><td></td><td>-8388608…8388607</td><td>Numeric value</td><td></td><td></td><td></td></tr>
<tr><td>53.11</td><td>STRING 1</td><td>Defines an alarm or fault text indication for the EVENT block</td><td></td><td>C</td><td></td></tr>
<tr><td></td><td>0…9 characters</td><td>ASCII string type</td><td></td><td></td><td></td></tr>
<tr><td>53.12</td><td>STRING 2</td><td>Defines an alarm or fault text indication for the EVENT block</td><td></td><td>C</td><td></td></tr>
<tr><td></td><td>0…9 characters</td><td>ASCII string type</td><td></td><td></td><td></td></tr>
<tr><td>…</td><td>…</td><td>…</td><td></td><td></td><td></td></tr>
<tr><td>53.17</td><td>STRING 7</td><td>Defines an alarm or fault text indication for the EVENT block</td><td></td><td>C</td><td></td></tr>
<tr><td></td><td>0…9 characters</td><td>ASCII string type</td><td></td><td></td><td></td></tr>
<tr><td colspan="2">57 ADAPTIVE PROG2</td><td>Adaptive program task 2 settings:
• selections of the function blocks and their input connections
• diagnostics.</td><td></td><td></td><td></td></tr>
<tr><td>57.01</td><td>STATUS</td><td>Shows the value of adaptive program task 2 status word.</td><td>0</td><td>I</td><td></td></tr>
<tr><td></td><td>0…15</td><td>The table below shows the alternative bit states and the corresponding values on the control panel display.
If all the bits are FALSE (ie, 0), the state is STOPPED.
<table><tr><th>Bit</th><th>Display</th><th>Meaning</th></tr><tr><td>0</td><td>1</td><td>Running</td></tr><tr><td>1</td><td>2</td><td>Editing</td></tr><tr><td>2</td><td>4</td><td>Checking</td></tr><tr><td>3</td><td>8</td><td>Faulted</td></tr></table></td><td></td><td></td><td></td></tr>
<tr><td>57.02</td><td>FAULTED PAR</td><td>Points out the faulted parameter in adaptive program task 2.</td><td>0</td><td>P</td><td></td></tr>
</table>

No.	Name/Value	Description	Def.	T	FbEq
	0…32768	Value			
57.05	BLOCK1	Selects the function block type for block 1 in adaptive program task 2.	NO	I	
	0…32768	Function block type			
57.06	INPUT1	Selects the source for input 1 of block 1.	0	P	
	-255.255.31 … +255.255.31 / C. -32768 … C. 32768	Parameter pointer or a constant value: • Parameter pointer: Inversion, group, index and bit fields. The bit number is effective only for blocks handling Boolean inputs. • Constant value: Inversion and constant fields. Inversion field must have value C to enable the constant setting. **Example:** The state of digital input DI2 is connected to input 1 as follows: • Set the source selection parameter (57.06) to +01.15.01. (The adaptive program stores the state of digital input DI2 to bit 1 of actual signal 01.15.) • If you need an inverted value, switch the sign of the pointer value (-01.15.01).			
57.07	INPUT2	Selects the source for input 2 of block 1.	0	P	
		See parameter *57.06 INPUT1*.			
57.08	INPUT3	Selects the source for input 3 of block 1.	0	P	
		See parameter *57.06 INPUT1*.			
57.09	OUTPUT	Stores and displays the output of block 1.	0	I	
	0…32768	No user-setting possible			
57.10	BLOCK2	Selects the function block type for block 2 in adaptive program task 2.	NO	I	
	0…32768	Function block type			
57.11	INPUT1	Selects the source for input 1 of block 2.	0	P	
		See parameter *57.06 INPUT1*.			
57.12	INPUT2	Selects the source for input 2 of block 2.	0	P	
		See parameter *57.06 INPUT1*.			
57.13	INPUT	Selects the source for input 3 of block 2.	0	P	
		See parameter *57.06 INPUT1*.			
57.14	OUTPUT	Stores and displays the output of block 2.	0	I	
	0…32768	No user setting possible			
57.15	BLOCK3	Selects the function block type for block 3 in adaptive program task 2.	NO	I	
	0…32768	Function block type			
…	…				
57.104	OUTPUT	Stores and displays the output of block 20.	0	I	
	0…32768	No user setting possible			
58 ADAPT PROG2 CNTRL		Adaptive program task 2 control. The update time of task 2 control is 500 ms. See parameter group *57 ADAPTIVE PROG2*.			
58.01	ADAPT PROG CMD	Selects the operation mode for adaptive program task 2.	EDIT	I	
	STOP	Stopped. The program can be edited.			1

No.	Name/Value	Description	Def.	T	FbEq
	START	Running. The program cannot be edited.			2
	EDIT	Stops to edit the mode. The program can be edited.			3
58.02	EDIT CMD	Selects the command for the block placed in the location defined by parameter *58.03 EDIT BLOCK*. The program must be in editing mode (see parameter *58.01 ADAPT PROG CMD*).	NO	I	
	NO	Home value. The value automatically reverts to *NO* after an editing command is executed.			1
	PUSH	Shifts the block in the location defined by parameter *58.03 EDIT BLOCK* and the subsequent blocks one location up. A new block can be placed in the emptied location.			2
	DELETE	Selects the block in the location defined by parameter *58.03 EDIT BLOCK* and shifts the subsequent blocks one step down.			3
	PROTECT	Activation of the task protection: Read-protects the input connections of the blocks. Activate as follows: • Ensure the task operation mode is set to *START* or *STOP* (parameter *58.01 ADAPT PROG CMD*). • Set the passcode by parameter *58.05 PASSCODE*. • Set parameter *58.02* to *PROTECT*. When protection is activated: • All parameters in group *57 ADAPTIVE PROG2* excluding the block output parameters are hidden (read-protected). • It is not possible to switch the task operating mode (parameter *58.01 ADAPT PROG CMD*) to the editing mode. • Parameter *58.05 PASSCODE* value is set to 0.			4
	UNPROTECT	Deactivation of the task protection: no read protection of the input connection of the blocks. Deactivate as follows: • Ensure the adaptive task operation mode is set to *START* or *STOP* (parameter *58.01 ADAPT PROG CMD*). • Set the passcode by parameter *58.05 PASSCODE*. • Set parameter *58.02* to *UNPROTECT*.			5
58.03	EDIT BLOCK	Defines the block location number for the command selected by parameter *58.02 EDIT CMD*.	0	I	
	1…15	Block location number			
58.04	TIMELEV_SEL	Indicates the fixed execution cycle time of 100 ms for adaptive program task 2.	500ms	I	
58.05	PASSCODE	Defines the passcode, which activates/deactivates the protection of the input connections of the blocks. See parameter *58.02 EDIT CMD*.	0	I	

No.	Name/Value	Description	Def.	T	FbEq
	0h…FFFFFFh	Passcode. The setting restores to 0 after the protection is activated/deactivated. **Note:** When you activate the protection, write down the passcode and store it for later use.			
70 DDCS CONTROL		Settings for the fibre optic channels CH0, CH1 and CH3			
70.01	CH0 NODE ADDR	Defines the node address for DDCS channel CH0. No two nodes online may have the same address.	1	R	
	1…254	Node address			1 = 1
70.02	CH0 LINK CONTROL	Defines the light intensity of the transmission LEDs. LEDs act as light sources for option fibres which are connected to DDCS channel CH0. With the maximum length of optic fibre cable, use value 15.	10	R	
	1…15	Light intensity			1 = 1
70.03	CH0 BAUD RATE	Selects the communication speed of DDCS channel CH0. If FCI (Fieldbus Communication Interface) and fieldbus communication modules are used, parameter has to be set to 4 Mbit/s. Otherwise, the external control system sets the communication speed automatically.	4 Mbit/s	I	
	8 Mbit/s	8 Mbit/s (not in use)			0
	4 Mbit/s	4 Mbit/s			1
	2 Mbit/s	2 Mbit/s (not in use)			2
	1 Mbit/s	1 Mbit/s			3
70.04	CH0 TIMEOUT	Defines the time delay before channel CH0 or type Rxxx fieldbus adapter interface communication break alarm/fault (COMM MODULE) is activated. Time count starts when the link fails to update the communication message. The action taken by the inverter on a communication break is defined by parameter *70.05 CH0 COM LOSS CTRL*. When parameter is set to zero, time is not monitored and *COMM MODULE (7510)* fault not generated regardless of the value of parameter *70.05 CH0 COM LOSS CTRL*.	2000 ms	R	
	0…60000 ms	Time			1 = 1 ms
70.05	CH0 COM LOSS CTRL	Selects how the inverter reacts when communication error on DDCS channel CH0 or on type Rxxx fieldbus adapter interface is detected. Time delay for the communication break alarm/fault activation is defined by parameter *70.04 CH0 TIMEOUT*. **Note**: This parameter is in use when parameter *98.01 COMMAND SEL* is set to *MCW* and external serial communication is activated by parameter *98.02 COMM. MODULE*.	FAULT	I	
	NO FAULT	Inverter unit generates warning *COMM MODULE (7510)*.			1

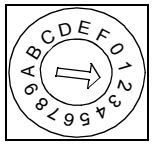
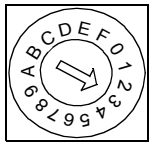
No.	Name/Value	Description	Def.	T	FbEq
	FAULT	Inverter unit trips on fault *COMM MODULE (7510)*.			2
70.06	CH1 LINK CONTROL	Defines the light intensity of the transmission LEDs. LEDs act as light sources for option fibres which are connected to DDCS channel CH1. With the maximum length of optic fibre cable, use value 15.	10	R	
	1…15	Light intensity			1 = 1
70.15	CH3 NODE ADDR	Defines the node address for DDCS channel CH3. No two nodes online may have the same address. Typically the setting needs to be changed when the inverter unit is connected in a ring configuration with other units and a PC with a DriveWindow PC tool. **Note:** The new node address becomes valid only after the next power-up of the control unit.	2	R	
	1…254	Node address			1 = 1
70.16	CH3 LINK CONTROL	Defines the light intensity of the transmission LEDs. LEDs act as light sources for option fibres which are connected to DDCS channel CH3. With the maximum length of optic fibre cable, use value 15.	15	R	
	1…15	Light intensity			1 = 1
70.19	CH0 HW CONNECTION	Selects the topology of the DDCS channel CH0 link. **Note:** This parameter is not in use in the DriveBus mode.	STAR	B	
	RING	Devices are connected in a ring.			0
	STAR	Devices are connected in a star.			1
70.20	CH3 HW CONNECTION	Selects the topology of the DDCS channel CH3 link.	RING	B	
	RING	Devices are connected in a ring.			0
	STAR	Devices are connected in a star.			1
71 DRIVEBUS COMM		DDCS channel CH0 DriveBus settings			
71.01	CH0 DRIVEBUS MODE	Selects the communication mode for the DDCS channel CH0. The new mode becomes valid only after the next power-up of the PVS800. Data is exchanged 4 times faster in the DriveBus mode than in the DDCS mode.	NO	B	
	NO	DDCS mode			0
	YES	DriveBus mode			1
90 D SET REC ADDR		Addresses into which the received data sets are written. These parameters should not be changed.			
90.01	D SET 10 VAL 1	Selects the address into which data word 1 of data set 10 is written. Update time is 2 ms.	701	I	
	0…20000	Parameter index			
90.02	D SET 10 VAL 2	Selects the address into which data word 2 of data set 10 is written. Update time is 2 ms.	15133	I	
	0…20000	Parameter index			

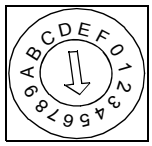
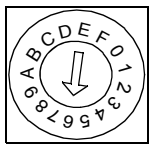
No.	Name/Value	Description	Def.	T	FbEq
90.03	D SET 10 VAL 3	Selects the address into which data word 3 of data set 10 is written. Update time is 2 ms.	0	I	
	0…20000	Parameter index			
90.04	D SET 12 VAL 1	Selects the address into which data word 1 of data set 12 is written. Update time is 4 ms.	15110	I	
	0…20000	Parameter index			
90.05	D SET 12 VAL 2	Selects the address into which data word 2 of data set 12 is written. Update time is 4 ms.	2402	I	
	0…20000	Parameter index			
90.06	D SET 12 VAL 3	Selects the address into which data word 3 of data set 12 is written. Update time is 4 ms.	2403	I	
	0…20000	Parameter index			
90.07	D SET 14 VAL 1	Selects the address into which data word 1 of data set 14 is written. Update time is 100 ms.	0	I	
	0…30000	Parameter index			
90.08	D SET 14 VAL 2	Selects the address into which data word 2 of data set 14 is written. Update time is 100 ms.	3909	I	
	0…30000	Parameter index			
90.09	D SET 14 VAL 3	Selects the address into which data word 3 of data set 14 is written. Update time is 100 ms.	15131	I	
	0…30000	Parameter index			
90.10	D SET 16 VAL 1	Selects the address into which data word 1 of data set 16 is written. Update time is 100 ms.	0	I	
	0…30000	Parameter index			
90.11	D SET 16 VAL 2	Selects the address into which data word 2 of data set 16 is written. Update time is 100 ms.	0	I	
	0…30000	Parameter index			
90.12	D SET 16 VAL 3	Selects the address into which data word 3 of data set 16 is written. Update time is 100 ms.	0	I	
	0…30000	Parameter index			
90.13	D SET 18 VAL 1	Selects the address into which data word 1 of data set 18 is written. Update time is 500 ms.	0	I	
	0…30000	Parameter index			
90.14	D SET 18 VAL 2	Selects the address into which data word 2 of data set 18 is written. Update time is 500 ms.	0	I	
	0…30000	Parameter index			
90.15	D SET 18 VAL 3	Selects the address into which data word 3 of data set 18 is written. Update time is 500 ms.	0	I	
	0…30000	Parameter index			
90.16	D SET 20 VAL 1	Selects the address into which data word 1 of data set 20 is written. Update time is 500 ms.	0	I	
	0…30000	Parameter index			
90.17	D SET 20 VAL 2	Selects the address into which data word 2 of data set 20 is written. Update time is 500 ms.	0	I	
	0…30000	Parameter index			
90.18	D SET 20 VAL 3	Selects the address into which data word 3 of data set 20 is written. Update time is 500 ms.	0	I	
	0…30000	Parameter index			

No.	Name/Value	Description	Def.	T	FbEq
91 D SET REC ADDR		See *90 D SET REC ADDR*.			
91.01	D SET 22 VAL 1	Selects the address into which data word 1 of data set 22 is written. Update time is 500 ms.	0	I	
	0…30000	Parameter index			
…	…	…	…		…
91.06	D SET 24 VAL 3	Selects the address into which data word 3 of data set 24 is written. Update time is 500 ms.	0	I	
	0…30000	Parameter index			
92 D SET TR ADDR		Datasets which the inverter units sends to the master station. These parameters should not be changed.			
92.01	D SET 11 VAL 1	Selects the address from which data word 1 of data set 11 is read. Update time is 2 ms.	801	I	
	0…20000	Parameter index			
92.02	D SET 11 VAL 2	Selects the address from which data word 2 of data set 11 is read. Update time is 2 ms.	15205	I	
	0…20000	Parameter index			
92.03	D SET 11 VAL 3	Selects the address from which data word 3 of data set 11 is read. Update time is 2 ms.	15204	I	
	0…20000	Parameter index			
92.04	D SET 13 VAL 1	Selects the address from which data word 1 of data set 13 is read. Update time is 4 ms.	15109	I	
	0…20000	Parameter index			
92.05	D SET 13 VAL 2	Selects the address from which data word 2 of data set 13 is read. Update time is 4 ms.	218	I	
	0…20000	Parameter index			
92.06	D SET 13 VAL 3	Selects the address from which data word 3 of data set 13 is read. Update time is 4 ms.	201	I	
	0…20000	Parameter index			
92.07	D SET 15 VAL 1	Selects the address from which data word 1 of data set 15 is read. Update time is 100 ms.	930	I	
	0…30000	Parameter index			
92.08	D SET 15 VAL 2	Selects the address from which data word 2 of data set 15 is read. Update time is 100 ms.	130	I	
	0…30000	Parameter index			
92.09	D SET 15 VAL 3	Selects the address from which data word 3 of data set 15 is read. Update time is 100 ms.	112	I	
	0…30000	Parameter index			
92.10	D SET 17 VAL 1	Selects the address from which data word 1 of data set 17 is read. Update time is 100 ms.	911	I	
	0…30000	Parameter index			
92.11	D SET 17 VAL 2	Selects the address from which data word 2 of data set 17 is read. Update time is 100 ms.	912	I	
	0…30000	Parameter index			
92.12	D SET 17 VAL 3	Selects the address from which data word 3 of data set 17 is read. Update time is 100 ms.	117	I	
	0…30000	Parameter index			
92.13	D SET 19 VAL 1	Selects the address from which data word 1 of data set 19 is read. Update time is 500 ms.	806	I	
	0…30000	Parameter index			

No.	Name/Value	Description	Def.	T	FbEq
92.14	D SET 19 VAL 2	Selects the address from which data word 2 of data set 19 is read. Update time is 500 ms.	109	I	
	0…30000	Parameter index			
92.15	D SET 19 VAL 3	Selects the address from which data word 3 of data set 19 is read. Update time is 500 ms.	113	I	
	0…30000	Parameter index			
92.16	D SET 21 VAL 1	Selects the address from which data word 1 of data set 21 is read. Update time is 500 ms.	15201	I	
	0…30000	Parameter index			
92.17	D SET 21 VAL 2	Selects the address from which data word 2 of data set 21 is read. Update time is 500 ms.	15202	I	
	0…30000	Parameter index			
92.18	D SET 21 VAL 3	Selects the address from which data word 3 of data set 21 is read. Update time is 500 ms.	15203	I	
	0…30000	Parameter index			
93 D SET TR ADDR		Datasets which the inverter units sends to the master station. Datasets 25 and 35 can be freely used to transmit arbitrary parameter values from the Inverter control program to the Master control program.			
93.01	D SET 23 VAL 1	Selects the address from which data word 1 of data set 23 is read. Update time is 500 ms.	910	I	
	0…30000	Parameter index			
93.02	D SET 23 VAL 2	Selects the address from which data word 2 of data set 23 is read. Update time is 500 ms.	406	I	
	0…30000	Parameter index			
93.03	D SET 23 VAL 3	Selects the address from which data word 3 of data set 23 is read. Update time is 500 ms.	15119	I	
	0…30000	Parameter index			
93.04	D SET 25 VAL 1	Selects the address from which data word 1 of data set 25 is read. Update time is 500 ms.	0	I	
	0…30000	Parameter index			
93.05	D SET 25 VAL 2	Selects the address from which data word 2 of data set 25 is read. Update time is 500 ms.	0	I	
	0…30000	Parameter index			
93.06	D SET 25 VAL 3	Selects the address from which data word 3 of data set 25 is read. Update time is 500 ms.	0	I	
	0…30000	Parameter index			
93.07	D SET 27 VAL 1	Selects the address from which data word 1 of data set 27 is read. Update time is 500 ms.	214	I	
93.08	D SET 27 VAL 2	Selects the address from which data word 2 of data set 27 is read. Update time is 500 ms.	215	I	
93.09	D SET 27 VAL 3	Selects the address from which data word 3 of data set 27 is read. Update time is 500 ms.	216	I	
93.10	D SET 29 VAL 1	Selects the address from which data word 1 of data set 29 is read. Update time is 500 ms.	127	I	
93.11	D SET 29 VAL 2	Selects the address from which data word 2 of data set 29 is read. Update time is 500 ms.	803	I	
93.12	D SET 29 VAL 3	Selects the address from which data word 3 of data set 29 is read. Update time is 500 ms.	111	I	

No.	Name/Value	Description	Def.	T	FbEq
93.13	D SET 31 VAL 1	Selects the address from which data word 1 of data set 31 is read. Update time is 500 ms.	202	I	
93.14	D SET 31 VAL 2	Selects the address from which data word 2 of data set 31 is read. Update time is 500 ms.	203	I	
93.15	D SET 31 VAL 3	Selects the address from which data word 3 of data set 31 is read. Update time is 500 ms.	129	I	
93.16	D SET 35 VAL 1	Selects the address from which data word 1 of data set 33 is read. Update time is 500 ms.	13501	I	
93.17	D SET 35 VAL 2	Selects the address from which data word 2 of data set 33 is read. Update time is 500 ms.	0	I	
93.18	D SET 35 VAL 3	Selects the address from which data word 3 of data set 33 is read. Update time is 500 ms.	0	I	
98 OPTION MODULES		Activation of external serial communication. See chapter *Fieldbus control*.			
98.01	COMMAND SEL	Selects the control command interface(s). See parameter *98.02 COMM. MODULE*.	MCW	B	
	MCW	Via a serial link and through digital input terminals			0
	I/O	Through digital input terminals			1
98.02	COMM. MODULE	Activates the external serial communication and selects the interface. This parameter should not be changed.	PVA	I	
	NO	Reserved			1
	FIELDBUS	Reserved			2
	ADVANT/N-FB	Reserved			3
	STD MODBUS	Reserved			4
	PVA	Inverter unit is controlled by the master control unit.			5
98.09	DI/O EXT MODULE 1	Activates the communication to optional digital I/O extension module 1 and defines the type and connection interface of the module. See signal *08.05 DI STATUS WORD*. **Note:** With PVS800, an RDIO module is installed as standard into slot 1. The usage of the module is described in the hardware manual. Faster DC input signal detection can be achieved by disabling the hardware filter of the digital input with the configuration DIP switch on the circuit board of the module. DIP switch S2 (RDIO) Hardware filtering Enabled / Disabled  **Note:** Always enable the hardware filtering with an AC input signal. For more information, see RDIO-01 Digital I/O Extension User's Manual [3AFE64485733 (English)].	RDIO-SLOT2	I	
	NOT IN USE	Inactive			2

No.	Name/Value	Description	Def.	T	FbEq
	RDIO-SLOT1	Communication active. Module type: RDIO. Connection interface: Inverter control unit slot 1.			3
	RDIO-SLOT2	Communication active. Module type: RDIO. Connection interface: Inverter control unit slot 2.			4
	RDIO-DDCS	Communication active. Module type: RDIO. Connection interface: Optional I/O module adapter (AIMA) that communicates with the inverter control unit through fiber optic link CH1. Switch S1  **Note:** Module node number must be set to 2 with switch S1.			5
98.10	DI/O EXT MODULE 2	Activates the communication to optional digital I/O extension module 2 and defines the type and connection interface of the module. See signals *08.05 DI STATUS WORD*. **Note:** With 500kW PVS800 units, an RDIO module is installed as standard into slot 2. The usage of the module is described in the hardware manual. Faster DC input signal detection can be achieved by disabling the hardware filter of the digital input with the configuration DIP switch on the circuit board of the module. DIP switch S2 (RDIO) Hardware filtering Enabled / Disabled  **Note:** Always enable the hardware filtering with an AC input signal. The default value is 2 (*NOT IN USE*) with 100 and 250 kW inverters, 3 (*RDIO-SLOT1*) with 500 kW inverters. For more information, see RDIO-01 Digital I/O Extension User's Manual [3AFE64485733 (English)].	NOT IN USE	I	
	NOT IN USE	Inactive			2
	RDIO-SLOT1	Communication active. Module type: RDIO. Connection interface: Inverter control unit slot 1.			3
	RDIO-SLOT2	Communication active. Module type: RDIO. Connection interface: Inverter control unit slot 2.			4
	RDIO-DDCS	Communication active. Module type: RDIO. Connection interface: Optional I/O module adapter (AIMA) that communicates with the inverter control unit through fiber optic link CH1. Switch S1  **Note:** Module node number must be set to 3 with switch S1.			5

No.	Name/Value	Description	Def.	T	FbEq
98.11	AI/O EXT MODULE 1	Activates the communication to the optional analog I/O extension module 1.	NOT IN USE	I	
	NOT IN USE	Inactive.			2
	RAIO-SLOT1	Communication active. Module type: RAIO.			3
	RAIO-SLOT2	Communication active. Module type: RAIO.			4
	RAIO-DDCS	Communication active. Module type: RAIO. Connection interface: Optional I/O module adapter (AIMA) that communicates with the inverter control unit through fiber optic link CH1. Switch S1  **Note:** Module node number must be set to 5 with switch S1.			5
98.15	AI/O EXT MODULE 2	Activates the communication to the optional analog I/O extension module 2.	NOT IN USE	I	
	NOT IN USE	Inactive			2
	RAIO-SLOT1	Communication active. Module type: RAIO.			3
	RAIO-SLOT2	Communication active. Module type: RAIO.			4
	RAIO-DDCS	Communication active. Module type: RAIO. Connection interface: Optional I/O module adapter (AIMA) that communicates with the inverter control unit through fiber optic link CH1. Switch S1  **Note:** Module node number must be set to 6 with switch S1.			5
99 START-UP DATA		Language, identification run selection etc.			
99.01	LANGUAGE	Selects the display language.	ENGLISH	I	
	ENGLISH	English			0
	DEUTSCH	German			2
99.02	DEVICE NAME	Defines the name for the inverter unit. The name is visible on the control panel display in the Control Unit Selection mode or on the DriveWindow main menu. **Note:** The name can be typed only by using a PC tool.		C	
		Name			
99.06	FAST SYNC	Activates the fast synchronization of the inverter unit at start.	YES	B	
	NO	Inactive: synchronisation with phase order check			0
	YES	Active: synchronisation without phase order check			1
99.07	LINE SIDE ID RUN	Enables/disables manual grid identification. See section *Grid identification* on page *35*.	YES	B	
	NO	Disabled			0
	YES	Enabled. The identification starts when the inverter unit receives a start command. (Identification takes about 4 seconds. It is not allowed to load the inverter unit during the identification.)			1

No.	Name/Value	Description	Def.	T	FbEq
99.08	AUTO LINE ID RUN	Enables/disables automatic grid identification. See section *Grid identification* on page *35*. **Note:** Automatic identification can be disabled after a successful ID run unless the phase order has changed afterwards.	YES	B	
	NO	Disabled			0
	YES	Enabled. The identification is requested automatically after control unit power-up. The identification starts automatically when the inverter receives the start command. The parameter actually forces parameter *99.07 LINE SIDE ID RUN* to *YES*. Identification takes about 4 seconds. It is not allowed to load the inverter during the identification procedure.			1
99.09	APPLIC RESTORE	Restores the original parameter settings.	NO	B	
	NO	No			0
	YES	Yes			1
99.10	SUPPLY ID NUMBER	This parameter can be used by an external control system to check the right connections of the optical cables to the inverter unit. This parameter requires support from the external control system to verify the correct connection.	0	I	
	0…32767				

7

Fault tracing

What this chapter contains

This chapter lists all alarm and fault messages including the possible causes and corrective actions.

Safety

WARNING! Only qualified electricians are allowed to service the PVS800. Read the safety instructions in the appropriate hardware manual before working on the PVS800.

Alarm and fault indications

An alarm or a fault message indicates abnormal PVS800 status. Most alarm and fault causes can be identified and corrected using this information. If not, an ABB representative should be contacted.

The four digit code number in brackets after the message is for fieldbus communication. See chapter *Fieldbus control.*

How to reset

The PVS800 (master and inverter control units) can be reset either from DriveWindow, by pressing the keypad ***RESET*** key, by fieldbus, or switching the power off for a while. When the fault is removed, the inverter can be restarted.

Fault history

When a fault is detected, it is stored in the fault history. The latest faults and alarms are stored together with the time stamp at which the event was detected.

The fault logger collects 64 of the latest faults. When the control unit power is switched off, 16 of the latest faults are stored.

The Fault History can be viewed using DriveWindow or by pressing the control panel double arrow keys ( or ) in the Actual Signal Display mode. The fault history can then be scrolled with arrow keys ( and ). To exit the fault history press an arrow key ( or ). The fault history can be cleared by pressing the ***RESET*** key.

Alarm and fault messages generated by the master control program

The parameter numbers and names in the table refer to the master control program unless otherwise indicated.

Note: When viewing the fault history of the master control program, fault and alarm messages originating in the inverter control program are preceded by a “>” sign.

Message	Alarm	Fault	Cause	What to do
>ANTI-ISLAND (819F) *09.14 PVA FAULT WORD* bit 12		●	Island operation is detected in the grid.	Check the grid condition. Check group *45 ANTI-ISLANDING*.
ALM (xx) *08.01 MAIN STATUS WORD* bit 7	●		Internal alarm.	Write down the code in brackets. Contact an ABB service representative.
ANALOG IO (5441) *09.10 IO FAULT WORD* bit 13	●	●	Analog input error detected on the control unit.	Replace the control unit.
APPLIC 1 FLT (FFD6) *09.15 PVA ALARM WORD* bit 13	●		Adaptive program task alarm	Download adaptive program 1 using DriveAP 2.x or set block parameters by control panel or DriveWindow
APPLIC 2 FLT (FFD7) *09.15 PVA ALARM WORD* bit 14	●		Adaptive program task alarm	Download adaptive program 2 using DriveAP 2.x or set block parameters by control panel or DriveWindow
APP OVERLOAD (FFD9) *09.15 PVA ALARM WORD* bit 12	●		Application software overload. There is not enough processor capacity to execute blocks.	Reduce application software load, for example, • move some blocks to slower time level • disable point to point communication • disable some extension modules.
AUTORESET A (6081) *09.15 PVA ALARM WORD* bit 3	●		A sequence of automatic fault resets is in progress.	See parameter *30.05 NUMBER OF TRIALS* (page *78*). Check the fault log.
AUTORESET F (6080) *09.14 PVA FAULT WORD* bit 8		●	The end of a sequence of automatic fault resets is reached.	See parameter *30.05 NUMBER OF TRIALS* (page *78*). Check the fault log.
>BACKPOW LEV (818E) *09.14 PVA FAULT WORD* bit 7		●	See *REVERSE POW (8187)* (page *193*)	
BACKUP ERROR (FFA2)		●	Failure in restoring PC-stored backup of parameters.	Retry. Check connections. Check that the parameters are compatible with the control program.
BACKUP USED (FFA3)	●		PC-stored backup of parameters is downloaded into the control unit.	Wait until download is completed.
>CHARGING F (3284) *09.11 SUPPLY FAULT WORD* bit 0		●	See *CHARGING FLT (3230)* (page *187*)	

Message	Alarm	Fault	Cause	What to do
CH2 COM LOSS (7520) *09.14 PVA FAULT WORD* bit 1		●	Communication error in CH2 between master and inverter control units.	Check that CH0 address in the inverter control program is correct. Check fibre optic cables between master and inverter control units. Check that the inverter control unit is powered. Replace fibre optic cables.
COMM MODULE (7510) *09.14 PVA FAULT WORD* bit 0 Programmable fault: Parameter *70.05*	●	●	Cyclical communication between the master control unit and an external control unit (for example, a PLC) is lost. External communication was activated with parameter	Check fieldbus communication status. See chapter *Fieldbus control*, or appropriate fieldbus adapter manual. Check group *51 MASTER ADAPTER* (fieldbus adapter) parameter settings. Check that the bus master is communicating and correctly configured. Check cable connections and groundings.
>COMM MODULE (7581) *09.11 SUPPLY FAULT WORD* bit 10		●	See *COMM MODULE (7510)* (page *187*)	
>COMM MODULE (758A)	●			
CTRL B TEMP (4110)		●	Control unit temperature exceeds 88 °C.	Check air flow and fan operation.
>DC BRK LEV (818C) *09.14 PVA FAULT WORD* bit 5		●	See *DC SWITCH LEV (818C)* (page *188*)	
>DC BRK POS (818D) *09.14 PVA FAULT WORD* bit 6		●	See *DC SWITCH POS (818D)* (page *188*)	
>DC BRK TRP (8188) *09.14 PVA FAULT WORD* bit 3		●	See *DC SWITCH TRP (8188)* (page *188*)	
DC INPUT DEV (2185) *09.15 PVA ALARM WORD* bit 4 Programmable fault: Parameter *26.06*	●		A current deviation occurred in one or more of the DC inputs.	Identify the deviating DC inputs in parameter *26.04 DC INPUT STATUS*. Then, check the wiring of the deviating DC inputs.
DC OVERVOLT (32AF) *09.11 SUPPLY FAULT WORD* bit 15		●	DC overvoltage measured by the inverter module. Limit is 1000 V.	Check the level of the DC voltage.
>DC UNDERVLT (3282) *09.11 SUPPLY FAULT WORD* bit 14		●	See *DC UNDERVOLT (3220)* (page *188*).	
DIGITAL IO (5442) *09.10 IO FAULT WORD* bit 5		●	Digital I/O fault in the control unit.	Replace the control unit.
>EARTH FAULT (2383) *09.11 SUPPLY FAULT WORD* bit 12		●	See *EARTH FAULT (2387)* (page *189*), *CUR UNBAL (2330)* (page *187*), *CUR UNBAL 1 (23E0)* (page *187*), *CUR UNBAL 2 (23E1)* (page *187*) or *CUR UNBAL 3 (23E2)* (page *187*).	
EM STOP (F081) Programmable fault: Parameter *30.10*	●		Emergency stop circuit is open.	Check the emergency stop circuit. Check the connection to digital input 6 (DI6).
EM STOP (F083) *09.14 PVA FAULT WORD* bit 13 Programmable fault: Parameter *30.10*		●		

Message	Alarm	Fault	Cause	What to do
EXT AIO (7081) *09.10 IO FAULT WORD* bit 14	●		Analog I/O error on RAIO I/O Extension module.	Check cabinet temperature. If RAIO is installed on the AIMA board, check the optical wires between the control unit and AIMA. Check the rotary address switch of the RAIO. If alarm persists, replace the RAIO module.
EXT DIO (7082) *09.10 IO FAULT WORD* bit 6	●		Digital input error on RDIO I/O Extension module.	Check cabinet temperature. Replace RDIO module if alarm persists.
>EXT DI1 (1082) *09.11 SUPPLY FAULT WORD* bit 5		●	See *DI1 (9088)* (page *188*).	
>EXT DI1 ALM (1089)	●		See *DI1 (9081)* (page *188*).	
>EXT DI4 (1080) *09.11 SUPPLY FAULT WORD* bit 4		●	See *EXT EVENT DI4 (9084)* (page *189*).	
>EXT DI4 ALM (108A)	●		See *EXT EVNT DI4 (908B)* (page *189*).	
>EXT DI5 (1081) *09.11 SUPPLY FAULT WORD* bit 2		●	See *EXT EVENT DI5 (9085)* (page *189*).	
>EXT DI5 ALM (108B)	●		See *EXT EVNT DI5 (908C)* (page *190*).	
>EXT DI7 (FF96) *09.11 SUPPLY FAULT WORD* bit 11		●	See *EXT EVENT DI7 (9087)* (page *189*).	
>EXT DI7 ALM (108C)	●		See *EXT EVNT DI7 (908E)* (page *190*).	
EXT EVNT DI3 (9083) *09.15 PVA ALARM WORD* bit 7	●		State of digital input DI3 changed to 0. By default, this message indicates the triggering of hardware overvoltage protection.	Check state of digital input DI3. Check setting of parameter *30.01 DI3 EXT EVENT*. Check and replace overvoltage protection devices.
EXT EVNT DI3 (9083) *09.14 PVA FAULT WORD* bit 9		●		
EXT EVNT DI4 (9084) *09.15 PVA ALARM WORD* bit 8	●		State of digital input DI4 changed to 0. By default, this message indicates the blown-out DC fuse (if option +G420 is installed).	Check state of digital input DI4. Check setting of parameter *30.02 DI4 EXT EVENT*.
EXT EVNT DI4 (9084) *09.14 PVA FAULT WORD* bit 10		●		
EXT EVNT DI5 (9085) *09.15 PVA ALARM WORD* bit 9	●		State of digital input DI5 changed to 0. By default, this digital input is not used.	Check state of digital input DI5. Check setting of parameter *30.03 DI5 EXT EVENT*.
EXT EVNT DI5 (9085) *09.14 PVA FAULT WORD* bit 11		●		
FACTORY FILE (FFA7)		●	Factory macro parameter error.	Replace RMIO board or RDCU control unit.
FLT (xx) *08.01 MAIN STATUS WORD* bit 3		●	Internal fault.	Write down the fault code in brackets. Contact ABB service.
GND CLOSE ER (8196)		●	Grounding disconnector was not properly closed. This may be caused by: • Wrong DC to the ground voltage status • Too high continuous leakage current	Check that the selected grounding resistance is suitable with the solar modules in use.

Message	Alarm	Fault	Cause	What to do
GND HIGH CUR (8198)		●	High continuous GND leakage current is detected.	Check that the selected grounding resistance is suitable with the solar modules in use.
GND HIGH VOLT (8199)		●	DC to ground voltage is high when the grounding disconnector is closed.	Check that the selected grounding resistance is suitable with the solar modules in use.
GND LEAK CUR (8197)		●	Sudden change is detected in the GND leakage current.	Check if there is something abnormal connected to the DC busbars.
>GRID MONALM (8191)	●		See *GRID MON ALM (8191)* (page *190*).	
>GRID MONFLT (8189) *09.14 PVA FAULT WORD* bit 4		●	See *GRID MON FLT (8189)* (page *190*).	
ID N CHANGED (FF68)	●		This alarm message is generated by the control panel. Panel ID number of the master control unit is changed from 1 via the control panel (the change is not shown on the display).	To change the panel ID number back to 1, go to the Control Unit Selection mode by pressing ***DRIVE***. Press ***ENTER***. Set the ID number to 1. Press ***ENTER***.
ILLEGAL INST (FF5F)		●	Operating system error.	Replace RMIO board or RDCU control unit.
INSUL RESIST (819A)	●		Insulation resistance is too low. DC grounding contactor cannot be switched on.	Check the insulation measuring device and its settings.
>INTERNAL F (1083) *09.11 SUPPLY FAULT WORD* bit 8		●	See *INTERNAL FAULT* (page *190*).	
I/O FAULT (7000) *09.10 IO FAULT WORD*		●	I/O communication fault or error detected on channel CH1 of the RDCO module or on some I/O device. This can be caused by a fault in the RDCO module, in the RMIO control unit or in an I/O extension module, or by a faulty/loose fibre optic cable connection.	Check the connections between the RMIO board and RDCO module. Test with new fibre optic cables. Replace the RDCO module / RMIO board. Check the alarm messages: if any I/O extension alarms are indicated. Replace the I/O extension module.
IO START ENA (61AA) *09.15 PVA ALARM WORD* bit 15	●		I/O control is enabled and a start command is active. The PVS800 is starting automatically.	Informative alarm.
ISU FAULT (8185) *08.01 MAIN STATUS WORD* bit 3 *09.14 PVA FAULT WORD* bit 14		●	Inverter control unit tripped on a fault which is not shown in the master control unit.	Check the reason for fault in the inverter control unit fault log.
ISU WARNING (8186) *08.01 MAIN STATUS WORD* bit 7 *09.17 PVA ALARM WORD 2* bit 3	●		Inverter control unit has an alarm which is not shown in the master control unit.	Check the reason for alarm from the inverter control unit fault log.
LOAD FACTORY (FF69)	●		Factory parameter settings are restored.	Wait until restoring is completed.
>LOST ENERGY (8190) *09.15 PVA ALARM WORD* bit 5	●		See *LOST ENERGY (8192)* (page *190*)	
>MAIN CNT F (2384) *09.11 SUPPLY FAULT WORD* bit 6		●	See *MAIN CNT FLT (FF17)* (page *191*)	

Message	Alarm	Fault	Cause	What to do
>MPPT MAX REF (32AE) *09.17 PVA ALARM WORD 2* bit 1	●		DC voltage reference is at the MPPT high limit. This may be caused by incorrect sizing of the solar array or by power limitation.	Check the external DC voltage reference in parameter *32.01 EXT MPPT DC REF*. Check the sizing of the solar array. Check the power limitation in parameter *31.16 POWER LIMITING*.
>MPPT MIN REF (32AD) *09.17 PVA ALARM WORD 2* bit 0	●		DC voltage reference is at the MPPT low limit.	Check the external DC voltage reference in parameter *23.01 EXT MPPT DC REF*.
>NET LOST (32A6)	●		See *NET LOST (32A3)* (page *191*)	
>NET VOLT (3285) *09.11 SUPPLY FAULT WORD* bit 9		●	See *NET VOLT FLT (3100)/(32A2)* (page *191*)	
NO COMMUNICATION	●		This alarm message is generated by the CDP312R control panel. Detected problem in cable or hardware malfunction on the CDP312R control panel link. If (×) = 4, control panel type is not compatible with the master control program version.	Check the CDP312R control panel link connections. Press RESET key. Reset may take up to half a minute. Please wait. Check control panel type and version of the master control program (see parameter group *04 INFORMATION*). The panel type is printed on the panel housing.
>OVERCURR (2380) *09.11 SUPPLY FAULT WORD* bit 1		●	See *OVERCURRENT (2310)* (page *191*)	
PANEL LOST (5300) *09.12 SUPPLY ALARM WORD* bit 1	●		Local control device (CDP312R control panel or DriveWindow PC tool) selected as active control location has stopped communicating. **Note:** PVS800 shifts to remote control mode automatically.	Check the CDP312R control panel and PC connections. Check the CDP312R control panel connector. See the hardware manual. Replace control panel.
>PANEL LOST (5382)	●		See *PANEL LOST (5300)* (page *192*)	
PARAM CRC (6320)		●	CRC (Cyclic Redundancy Check) error.	Switch control unit power off and on again. Reload firmware onto control unit. Replace control unit.
>PLIM EXT TMP (44AB)	●		Active power is limited due to high ambient temperature.	Check the cooling of the inverter.
POWFAIL FILE (FFA0)			Error in restoring powerfail.ddf file	If the alarm persists, replace RMIO board or RDCU control unit.
PVA RUN ENA (FF54) *09.15 PVA ALARM WORD* bit 2	●		A start command was given while stand by was forced with parameter *31.01 ENABLE MPPT* or while bit 3 in parameter *08.05 PVA STATUS WORD* is 0.	Check the setting of parameter *31.01 ENABLE MPPT*.
>PVS&PANEL DC (32A9) *09.15 PVA ALARM WORD* bit 1	●		See *PVS&PANEL DC (32A8)* (page *192*)	
>PVS800 TEMP (4291) *09.11 SUPPLY FAULT WORD* bit 3		●	See *PVS800 TEMP (4294)* (page *193*)	
>PVS800 TEMP (4292)	●			

Message	Alarm	Fault	Cause	What to do
>QLIM PVS TMP (818F)	●		Reactive power is limited due to high inverter temperature.	Check the cooling of the inverter. Check air flow and fan operation. Check heatsink fins for dust pick-up. Check line current against inverter nominal current.
>QLIM EXT TMP (44AC)	●		Reactive power is limited due to high ambient temperature.	Check the cooling of the inverter.
>RECHARGE ALM (32AA)	●		See *RECHARGE ALM (3250)* (page *193*)	
>REVERSE POW (8187) *09.14 PVA FAULT WORD* bit 2		●	See *REVERSE POW (8187)* (page *193*)	
RMBA LOST (61A9) *09.15 PVA ALARM WORD* bit 11	●		String monitoring is activated but no RMBA module is installed to RDCU slot 2.	Install and activate RMBA.
>RUN DISABLE (8194)	●		Hardware run enable signal is missing from the inverter control unit DI2. Cut-in conditions are not fulfilled.	Check emergency stop circuit. Check the cut-in settings with parameters *44.18*…*44.23*. Check that the hand-operated DC switch Q2 is switched on. Check actual values of voltage and frequency with parameters *01.11 MAINS VOLTAGE* and *02.18 GRID FREQUENCY*.
>SHORT CIRC (2381) *09.11 SUPPLY FAULT WORD* bit 7		●	See *SHORT CIRC (2340)* (page *194*)	
SBOX 1 LINK (6195) SBOX 2 LINK (6196) SBOX 3 LINK (6197) … SBOX 20 LINK (61A8)	●		Communication with string box channel x (1…20) lost.	Check the wiring of the affected channel. Check also the line termination and node addresses.
>SYNCHRO FLT (8180) *09.11 SUPPLY FAULT WORD* bit 13		●	See *SYNCHRO FLT (8180)* (page *194*)	
SYSTEM START (1087)	●		Control program is started (control unit is powered).	If this message appears during normal operation, check the 24 V supply to the control unit. Check the wiring for breakages and short circuits.
UDC HIGH LIM (32A7) *09.15 PVA ALARM WORD* bit 6	●		Measured DC voltage exceeds high limit.	See *DC overvoltage monitoring* (page *35*).

Alarm and fault messages generated by the inverter control program

The parameter numbers and names in the table refer to the inverter control program unless otherwise indicated.

Message	Alarm	Fault	Cause	What to do
AC OVERFREQ (3141) *09.01 FAULT WORD 1* bit 9		●	AC overfrequency in the grid.	Check group *44 GRID MONITORING*. Check the grid condition.
AC OVERFREQ (31A2)	●		AC overfrequency in the grid.	Check group *44 GRID MONITORING*. Check the grid condition.
AC OVERVOLT (3110) *09.01 FAULT WORD 1* bit 11		●	AC overvoltage in the grid.	Check group *44 GRID MONITORING*. Check the grid condition.
AC OVERVOLT (31A0)	●		AC overvoltage in the grid.	Check group *44 GRID MONITORING*. Check the grid condition.
AC UNDERFREQ (3142) *09.01 FAULT WORD 1* bit 8		●	AC underfrequency in the grid.	Check group *44 GRID MONITORING*. Check the grid condition.
AC UNDERFREQ (31A3)	●		AC underfrequency in the grid.	Check group *44 GRID MONITORING*. Check the grid condition.
AC UNDERVOLT (3120) *09.01 FAULT WORD 1* bit 10		●	AC undervoltage in the grid.	Check group *44 GRID MONITORING*. Check the grid condition.
AC UNDERVOLT (31A1)	●		AC undervoltage in the grid.	Check group *44 GRID MONITORING*. Check the grid condition.
HIGH UAC PEAK (32A4) *09.01 FAULT WORD 1* bit 6		●	Measured instantaneous grid voltage value has exceeded a tripping limit.	Check the grid condition.
AIR TEMP 1 (4484)		●	Measured temperature of the incoming air in the first R8i module is over fault level 70 °C.	Check the air flow and fan operation of the first R8i module. Check the ambient conditions.
AIR TEMP 1 (4484)	●		Measured temperature of the incoming air in the first R8i module is over alarm level 65 °C.	Check the air flow and fan operation of the first R8i module. Check the ambient conditions.
AIR TEMP 2 (4485)		●	Measured temperature of the incoming air in the second R8i module is over fault level 70 °C.	Check the air flow and fan operation of the second R8i module. Check the ambient conditions.
AIR TEMP 2 (4485)	●		Measured temperature of the incoming air in the second R8i module is over alarm level 65 °C.	Check the air flow and fan operation of the second R8i module. Check the ambient conditions.
AIR TEMP 3 (4486)		●	Measured temperature of the incoming air in the third R8i module is over fault level 70 °C.	Check the air flow and fan operation of the third R8i module. Check the ambient conditions.
AIR TEMP 3 (4486)	●		Measured temperature of the incoming air in the third R8i module is over alarm level 65 °C.	Check the air flow and fan operation of the third R8i module. Check the ambient conditions.

Message	Alarm	Fault	Cause	What to do
ALM (xx) *08.01 MAIN STATUS WORD* bit 7	●		Inverter internal alarm	Check the connections of the inverter unit. Write down alarm code (in brackets). Contact an ABB service representative.
ANTI-ISLAND (81A0) *08.06 MPPT STATUS* bit 13	●		Grid in island state. The inverter will restart after a delay defined by parameter *45.06 ANTI-ISLAND DELAY*.	Check the grid condition. Check group *45 ANTI-ISLANDING*.
ANTI-ISLAND (8193) *09.10 PV FLT ALM WORD* bit 11		●	Grid in island state	Check group *45 ANTI-ISLANDING*.
BATT FAILURE (5581)	●		(Only with parallel-connected inverter modules.) APBU branching unit memory backup battery error caused by • incorrect APBU switch S3 setting • too low battery voltage. • poor connection between metal connector strip and plus side of battery.	Enable backup battery by setting actuator 6 of switch S3 to ON. Replace backup battery in APBU. **Notes:** • Actuator 6 of switch S3 is normally activated (ON) during commissioning. • Set actuator 6 of switch S3 to OFF when APBU is stored as spare part. • Replace battery carefully so that the metal connector strip is well connected to the plus side of battery.
CAB TEMP DIF (4188) *09.04 ALARM WORD 1* bit 9	●		The difference of the two measured cabinet temperatures is more than the alarm level of 15 °C.	Check the value of *01.36 CABINET TEMP 1* and *01.37 CABINET TEMP 2*. Check the ambient conditions. Check the air flow and fan operation. Check the line current against the inverter nominal current. Check group *24 REACTIVE POWER*.
CAB TEMP1 HI (4180) *09.03 FAULT WORD 3* bit 8		●	Measured cabinet temperature has reached alarm level 65 °C.	See *CAB TEMP1 HI (4181)*.
CAB TEMP1 HI (4181) *09.04 ALARM WORD 1* bit 0	●		Measured cabinet temperature has reached alarm level 60 °C.	Check the value of *01.36 CABINET TEMP 1* and *01.37 CABINET TEMP 2*. Check the ambient conditions. Check the air flow and fan operation. Check the line current against the inverter nominal current. Check group *24 REACTIVE POWER*.
CAB TEMP1 LO (4182) *09.03 FAULT WORD 3* bit 9		●	Measured cabinet temperature has reached alarm level -22 °C.	Check the physical connection of PT100. Check the value of *01.36 CABINET TEMP 1* and *01.37 CABINET TEMP 2*. Check the ambient conditions.

Message	Alarm	Fault	Cause	What to do
CAB TEMP1 LO (4183) *09.04 ALARM WORD 1* bit 1	●		Measured cabinet temperature has reached alarm level -17 °C.	Check the value of *01.36 CABINET TEMP 1* and *01.37 CABINET TEMP 2*. Check the ambient conditions.
CAB TEMP2 HI (4184) *09.03 FAULT WORD 3* bit 10		●	Measured cabinet temperature has reached alarm level 65 °C.	See *CAB TEMP1 HI (4181)*.
CAB TEMP2 HI (4185) *09.04 ALARM WORD 1* bit 7	●		Measured cabinet temperature has reached alarm level 60 °C.	See *CAB TEMP1 HI (4181)*.
CAB TEMP2 LO (4186) *09.03 FAULT WORD 3* bit 11		●	Measured cabinet temperature has reached alarm level -22 °C.	Check the physical connection of PT100. Check the value of *01.36 CABINET TEMP 1* and *01.37 CABINET TEMP 2*. Check the ambient conditions.
CAB TEMP2 LO (4187) *09.04 ALARM WORD 1* bit 8	●		Measured cabinet temperature has reached alarm level -17 °C.	See *CAB TEMP1 LO (4183)*.
CHARGING FLT (3230) *09.11 SUPPLY FAULT WORD* bit 0		●	DC link voltage is not high enough after charging. DC link voltage has not exceeded minimum limit or current is not below preset limit. The ready signal from 24 V buffers is missing from DI6. Faulty PPCC link (DC voltage measurement is zero)	Check charging circuit fuses. Check charging circuit. Check possible DC short circuit. Check undervoltage trip limit (parameter *30.12 DC UNDERVOLT TRIP*). Check 24 V buffers. Check PPCC link. See *PPCC LINK (5210)* on page *192*.
CH2 COM LOST (7520)		●	A communication error occurred between the RDCU control unit A41 and the NAMU auxiliary measuring unit.	Check fiber optic cables between the inverter control unit CH2 and NAMU. Check that NAMU is powered.
COMM MODULE (7510) *09.02 FAULT WORD 2* bit 12 *09.11 SUPPLY FAULT WORD* bit 10 *09.12 SUPPLY ALARM WORD* bit 0	●	●	Cyclical communication between master control unit channel CH2 and inverter control unit channel CH0 is lost.	Check that the master control unit is communicating and correctly configured. Check fiber optic cables between master control unit CH2 and inverter control unit CH0. Replace fiber optic cables.
CTRL B TEMP (4110) *09.02 FAULT WORD 2* bit 7		●	RMIO control unit temperature exceeds 88 °C.	Check air flow and fan operation.
CUR UNBAL (2330) *09.13 CURRENT UNBALANCE*		●	Excessive current unbalance in inverter module currents in several of parallel-connected inverter modules at the same time.	Resolve the root cause and do not reset the fault before APBU Last and First logger data are uploaded from APBU to PC. Check power cables. Check busbar connections. Check inverter fuses. Check R8i inverter module(s). Check LCL filter. Check the balance of grid voltages.
CUR UNBAL 1 (23E0) CUR UNBAL 2 (23E1) CUR UNBAL 3 (23E2) *09.13 CURRENT UNBALANCE*		●	Excessive current unbalance in inverter module currents in one of parallel-connected inverter modules. The name of the message indicates the number of the inverter module.	

Message	Alarm	Fault	Cause	What to do
DC OVERVOLT (3210) *09.01 FAULT WORD 1* bit 2 *09.11 SUPPLY FAULT WORD* bit 15		●	Excessive DC voltage. This can be caused by • grid static or transient overvoltages, or • excessive network voltage during synchronisation. The default trip limit is 1000 V.	Check level of network voltage, DC voltage and inverter nominal voltage. Check DC overvoltage trip limit (inverter control program parameter *30.11 DC OVERVOLT TRIP*).
DC UNDERVOLT (3220) *09.02 FAULT WORD 2* bit 2 *09.11 SUPPLY FAULT WORD* bit 14		●	DC voltage is not sufficient due to missing network phase, blown fuse or internal inverter fault.	Check main and inverter fuses. Check network voltage. Check DC undervoltage trip limit (inverter control program parameter *30.12 DC UNDERVOLT TRIP*).
DCREF MAX RNG (32AC) *08.06 MPPT STATUS* bit 9	●		MPPT has reached the DC reference maximum range.	Check the settings of parameters *30.05 MPPT DC REF MIN* and *30.15 DCREF RANGE ALARM*.
DCREF MIN RNG (32AB) *08.06 MPPT STATUS* bit 8	●		MPPT has reached the DC reference minimum range.	Check the settings of parameters *30.05 MPPT DC REF MIN* and *30.15 DCREF RANGE ALARM*.
DC SWITCH LEV (818C) Master control program *09.14 PVA FAULT WORD* bit 5 *09.10 PV FLT ALM WORD* bit 3		●	Voltage difference detected over a closed DC contactor.	Check DC fuses. Check the DC voltages on both sides of the DC contactor.
DC SWITCH POS (818D) Master control program *09.14 PVA FAULT WORD* bit 6 *09.10 PV FLT ALM WORD* bit 4		●	DC contactor status signal does not follow an open/close command	Check DC contactor acknowledgement status is correct in inverter control program parameter *08.05 DI STATUS WORD*. Bit2 = K1.1, Bit10 = K1.2, But11 = K1.3, Bit7 = K2.1, Bit8 = K2.2, and Bit12 = K2.3. Check that the DC contactor follows command signals in inverter control program parameter *01.22 RELAY OUTPUT*. Bit2 = K1.1, Bit5 = K1.2, But1 = K1.3, Bit3 = K2.1, Bit4 = K2.2, and Bit6 = K2.3.
DC SWITCH TRP (8188) Master control program *09.14 PVA FAULT WORD* bit 3 *09.10 PV FLT ALM WORD* bit 1		●	Tmax type DC breaker has tripped.	Check auxiliary power for DC breaker. Check that DC breaker DIP breaker is in “AUTO” position. Check DC breaker trip status. If trip signal is not active, try reclosing the breaker.
DI1 (9081)	●		Fan is not rotating or fan contactor connection is loose. This supervision is valid only when inverter is in RDY_RUN state (ie, parameter *08.01 MAIN STATUS WORD* bit 1 = 1).	Check acknowledge circuit connected to digital input DI1 of the inverter control unit. Check fan. Replace if necessary. Check +24 V DC circuit connected to digital input DI1 of the inverter control unit. See the circuit diagrams delivered with the inverter.
DI1 (9088) *09.11 SUPPLY FAULT WORD* bit 5 *09.12 SUPPLY ALARM WORD* bit 2		●		

Message	Alarm	Fault	Cause	What to do
EARTH FAULT (2387) *09.12 SUPPLY ALARM WORD* bit 13 Programmable fault: Parameter	●		Ground/Earth fault in grounded/earthed network. Sum of line currents measured with internal current transducers is too high. Ground/Earth fault in LCL filter, DC circuit, inverter(s), or current imbalance in parallel-connected inverter modules. Occurs when APBU-branching unit is not installed to the inverter. Earth (ground) fault level too sensitive.	Check main fuses (in case of parallel-connected inverter modules). Check for earth leakages. Check power cabling. Check R8i inverter module(s). Check busbars. Check LCL modules. Check setting of parameter *30.02* / *30.03 EARTH FAULT LEVEL*.
EARTH FAULT (2330) Master control program *09.11 SUPPLY FAULT WORD* bit 12 *09.01 FAULT WORD 1* bit 4 *09.11 SUPPLY FAULT WORD* bit 12 Programmable fault: Parameter *30.02*		●	Ground/Earth fault in grounded/earthed network. Sum of line currents measured with internal current transducers is too high. Ground/Earth fault in LCL filter, DC circuit, inverter(s), or current imbalance in parallel-connected inverter modules. Occurs when APBU-branching unit is not installed to the inverter. Earth (ground) fault level too sensitive.	Check main fuses (in case of parallel- connected inverter modules). Check for earth leakages. Check power cabling. Check R8i inverter module(s). Check busbars. Check LCL modules. Check setting of parameter *30.03 EARTH FAULT LEVEL*.
EXT ANALOG IO (7081) *09.04 ALARM WORD 1* bit 10	●		Analog I/O error on RAIO I/O Extension module.	Check cabinet temperature. Replace RAIO module if alarm is continuously active.
EXT DIO (7082)	●		Error in the RDIO module or module configuration	Contact an ABB service representative.
EXT EVENT DI4 (9084) *09.11 SUPPLY FAULT WORD* bit 4 Programmable fault: Parameter *30.04*		●	Digital input DI4 fault **Note**: DI4 is reserved for ground/earth fault monitoring.	Check digital input DI4. Check setting of parameter *30.04 DI4 EXT EVENT*.
EXT EVENT DI5 (9085) *09.11 SUPPLY FAULT WORD* bit 2 Programmable fault: Parameters *30.05* and *30.10*		●	Digital input DI5 fault	Check digital input DI5. Check settings of parameters *30.05 DI5 EXT EVENT* and *30.10 DI5 TRIP DELAY*.
EXT EVENT DI7 (9087) *09.11 SUPPLY FAULT WORD* bit 11 Programmable fault: Parameters *30.13* and *30.14*		●	Digital input DI7 (DIIL) fault	Check digital input DI7 (DIIL). Check settings of parameters *30.13 DI7 EXT EVENT* and *30.14 DI7 TRIP DELAY*.
EXT EVNT DI4 (908B) *09.12 SUPPLY ALARM WORD* bit 13 Programmable fault: Parameter *30.04*	●		Digital input DI4 alarm **Note**: DI4 is reserved for ground/earth fault monitoring.	Check digital input DI4. Check setting of parameter *30.04 DI4 EXT EVENT*.

Message	Alarm	Fault	Cause	What to do
EXT EVNT DI5 (908C) *09.12 SUPPLY ALARM WORD* bit 14 Programmable fault: Parameter *30.05*	●		Digital input DI5 alarm	Check digital input DI5. Check setting of parameter *30.05 DI5 EXT EVENT*.
EXT EVNT DI7 (908E) *09.12 SUPPLY ALARM WORD* bit 11 Programmable fault: Parameter *30.13*	●		Digital input DI7 (DIIL) alarm	Check digital input DI7 (DIIL). Check setting of parameter *30.13 DI7 EXT EVENT*.
FLT (xx) *08.01 MAIN STATUS WORD* bit 3		●	Internal fault	Check connections inside inverter cabinet. Write down the fault code (in brackets). Contact an ABB service representative.
GRID MON ALM (8191) *09.10 PV FLT ALM WORD* bit 8	●		Fault indicated by grid monitoring relay	Check grid condition. Check grid monitoring relay settings. Check setting of parameter *39.06 GRIDMON SUPV MODE.*
GRID MON FLT (8189) Master control program *09.14 PVA FAULT WORD* bit 4 *09.10 PV FLT ALM WORD* bit 0		●		
ID N CHANGED (FF68)	●		Inverter ID number has changed from 2 (change is not displayed on control panel).	To change ID number back to 2, go to the Control Unit Selection mode by pressing ***DRIVE***. Press ***ENTER***. Set ID number to 2. Press ***ENTER***.
INT CONFIG (5410)		●	Inverter cannot find all of the configured inverter modules. Parameters and do not match. Parameter shows the inverter modules found by the RDCU. Parameter determines the amount of inverter modules RDCU should find.	Contact an ABB service representative. Check the charging circuit AINT, APOW, APBU, and RDCU.
INTERNAL FAULT *09.01 FAULT WORD 1* bit 7 *09.11 SUPPLY FAULT WORD* bit 8		●	Internal fault in the inverter unit.	Quote exact message from fault log and contact ABB service.
IO FAULT (7000) *09.02 FAULT WORD 2* bit 6		●	I/O communication fault or error detected on channel CH1 of RDCO module. This can be caused by fault in RDCO module or RMIO control unit or faulty/loose fibre optic cable connection.	Check connections between control unit and RDCO module. Test with new fibre optic cables. Replace RDCO module / RMIO board.
LOAD FACTORY (FF69)	●		Factory parameter settings are restored.	Wait until restore is completed.
LOST ENERGY (8192) Master control program *09.15 PVA ALARM WORD* bit 5 *09.10 PV FLT ALM WORD* bit 7	●		Energy limiting is active (master control program parameter *31.16 POWER LIMITING* is set to a value below 100%)	Informative alarm.
LVRT RIDETRGH (32A0)	●		Detected voltage dip in the AC gird. AC voltage is lower than *40.10 LVRT U/Un LEVEL 1*.	Alarm is cleared when the AC voltage is greater than *40.10 LVRT U/Un LEVEL 1* + 5%. Check the parameter settings in group *40 LVRT CONTROL*.

Message	Alarm	Fault	Cause	What to do
MAIN CNT FLT (FF17) *09.11 SUPPLY FAULT WORD* bit 6		●	Main contactor is not functioning properly, or connection is loose. The control and feedback signals of the AC contactor do not correspond to each other.	Check AC contactor control circuit wiring. Check AC contactor operating voltage level. Check control signals from parameter *01.22 RELAY OUTPUT* and corresponding feedback signals from *08.05 DI STATUS WORD*. *08.05 DI STATUS WORD* : Bit2 = K1.1, Bit10 = K1.2, Bit11 = K1.3, Bit7 = K2.1, Bit8 = K2.2, and Bit12 = K2.3. *01.22 RELAY OUTPUT* : Bit2 = K1.1, Bit5 = K1.2, Bit1 = K1.3, Bit3 = K2.1, Bit4 = K2.2, and Bit6 = K2.3.
MOD BOARD T (FF88) *09.03 FAULT WORD 3* bit 14		●	Overtemperature in AINT board of inverter module.	Check inverter module fan. Check ambient temperature. Check AINT board.
MOD BOARD T (FF92) *09.04 ALARM WORD 1* bit 14	●			
NET LOST (32A3) *09.12 SUPPLY ALARM WORD* bit 10	●		Network voltage is lost during modulation. Line current is below supervision limit or line frequency differs more than 5 Hz from initial value of 50 or 60 Hz.	Check network conditions (power breaks, voltage transients). Check network connections. Check main fuses.
NET VOLT FLT (3100)/(32A2) *09.11 SUPPLY FAULT WORD* bit 9		●	Network voltage is out of acceptable range during grid identification.	Check network voltage. Restart unit.
NO COMMUNICATION (x)	●		This alarm message is generated by control panel. - Cabling problem or hardware malfunction detected on panel link. - If (x) = (4), panel type is not compatible with the inverter program version.	Check panel link connections. Press ***RESET*** key. Reset may take up to half a minute, please wait. Check panel type and version of the inverter application program (see parameter group *04 INFORMATION*). Panel type is printed on panel cover.
OVERCURRENT (2310) *09.01 FAULT WORD 1* bit 1 *09.11 SUPPLY FAULT WORD* bit 1 *09.14 OVERCURRENT FAULT*		●	Excessive inverter module current in several of parallel-connected inverter modules at the same time.	Resolve the root cause and do not reset the fault before APBU Last and First logger data are uploaded from APBU to PC. Check network voltage. Check inverter power semiconductors (IGBTs) and current transducers. Check and analyze data from APBU data logger in case of parallel-connected inverter modules.
OVERCURR 1 (23A0) OVERCURR 2 (23A1) OVERCURR 3 (23A2) *09.14 OVERCURRENT FAULT*		●	Excessive inverter module current in one of parallel-connected inverter modules. The name of the message indicates the number of the inverter module.	

Message	Alarm	Fault	Cause	What to do
OVER SWFREQ (FF55) *09.02 FAULT WORD 2* bit 9		●	Switching overfrequency fault. This may be due to hardware fault in circuit boards.	Replace RMIO board or RDCU control unit. Replace AINT board. With parallel connected inverter modules, replace APBU branching unit.
PANEL LOST (5300) Master control program *09.12 SUPPLY ALARM WORD* bit 1 *09.12 SUPPLY ALARM WORD* bit 1	●		Local control device (control panel or DriveWindow PC tool) selected as active control location has ceased communicating. **Note:** Inverter unit shifts to the remote control mode automatically.	Check control panel and PC connections. Check control panel connector. See the hardware manual. Replace control panel.
POWERFAIL (3381) *09.25 POWERFAIL FAULT* bit 0		●	AINT board power loss in the inverter unit (or one of parallel-connected inverter modules).	Check that AINT board power cable is connected. Check that APOW board is working correctly. Replace AINT board.
POWERF INV 1 (3382) POWERF INV 2 (3383) POWERF INV 3 (3384) *09.25 POWERFAIL FAULT*		●	The name of the message indicates the number of the inverter module.	
PPCC LINK (528C)	●		Occasional runtime communication errors (CRC and 4/5B coding errors) in the link between RDCU control unit and inverter module(s).	Check the fiber optic cables between the RDCU control unit and the inverter module(s) if the alarm is continuously active.
PPCC LINK (5210) *09.02 FAULT WORD 2* bit 11 *09.24 PPCC FAULT WORD* bit 0		●	AINT board current measurement fault, or communication fault between control unit and AINT board in the inverter unit (or one of parallel-connected inverter modules). The fault is activated when charging is completed and the DC voltage is high, but not when DC voltage is disconnected and the control unit has an external power supply. Faulty power stage.	If the control unit is powered from external supply, ensure that the supply is on. Check fiber optic cable connection between RDCU control unit and inverter modules. If the fault persists, replace APBU branching unit, RDCU control unit and inverter AINT board (in this order) until fault disappears. Check the output power semiconductors of the affected inverter module.
PPCC LINK 1 (5280) PPCC LINK 2 (5281) PPCC LINK 3 (5282) *09.24 PPCC FAULT WORD*		●	The name of the message indicates the number of the inverter module.	
PVS&PANEL DC (32A8) Master control program *09.15 PVA ALARM WORD* bit 1 *09.10 PV FLT ALM WORD* bit 9	●		The inverter DC voltage cannot be controlled to a level close enough to solar panel DC voltage. The DC switch cannot be closed.	At start, check the solar panel and inverter DC voltages (*01.01 PV CELL DC* and *01.10 DC VOLTAGE* respectively). Compare inverter DC reference range to panel open loop DC voltage (max. 1000 V DC at start).

Message	Alarm	Fault	Cause	What to do
PVS800 TEMP (4294) Master control program *09.12 SUPPLY ALARM WORD* bit 4 *09.12 SUPPLY ALARM WORD* bit 4	●		Inverter IGBT temperature is excessive.	Check ambient conditions. Check air flow and fan operation. Check heatsink fins for dust pick-up. Check line current against inverter current. Check the main circuit for loose connections.
PVS800 TEMP (4210) *09.01 FAULT WORD 1* bit 3 *09.11 SUPPLY FAULT WORD* bit 0 *09.16 OVERTEMP WORD*		●	Inverter module IGBT temperature is excessive.	
PVS TEMP 1 U (42A0) PVS TEMP 1 V (42A1) PVS TEMP 1 W (42A2) PVS TEMP 2 U (42A3) PVS TEMP 2 V (42A4) PVS TEMP 2 W (42A5) PVS TEMP 3 U (42A6) PVS TEMP 3 V (42A7) PVS TEMP 3 W (42A8) *09.16 OVERTEMP WORD*		●	The name of the message indicates the number of the inverter module and phase.	
QLIM PVS TMP (44A2) *09.12 SUPPLY ALARM WORD* bit 8	●		Inverter temperature is limiting reactive power.	Check ambient conditions. Check air flow and fan operation. Check heatsink fins for dust pick-up. Check line current against inverter nominal current.
RECHARGE ALM (3250) *09.12 SUPPLY ALARM WORD* bit 12	●		DC circuit charging attempted twice within one minute. The charging is delayed to allow the charging resistors to cool down.	Informative alarm.
REPLACE FAN (4280)	●		Running time of inverter module cooling fan has exceeded its estimated life time.	Change fan. Reset fan run time counter. See parameter *01.31 FAN ON-TIME*.
REVERSE POW (8187) Master control program *09.14 PVA FAULT WORD* bit 2 (peak) Master control program *09.14 PVA FAULT WORD* bit 7 (level) *09.10 PV FLT ALM WORD* bit 0 (peak) *09.10 PV FLT ALM WORD* bit 5 (level)		●	Power flow is from the network towards the solar panels.	Check power flow. If an external DC voltage reference is used, set it to a value lower than the solar generator voltage. Restart unit.
RT NET LOST (32A1) *09.11 SUPPLY FAULT WORD* bit 9		●	Supply voltage out of RT-area. Missing phase(s) or frequency out of allowed range for 20 seconds during synchronization.	Check RT area parameters *40.10*…*40.15*. Check network conditions. Check that the initialized base frequency signal *03.03* or *03.04* is correct.
RUN DISABLED (FFAC) *08.06 MPPT STATUS* bit 7 (bit=1 start enable) *09.12 SUPPLY ALARM WORD* bit 9	●		Cut-in conditions are not fulfilled. 24 V missing from DI2 in the inverter control program.	Check the settings of parameters *44.18*…*44.23*.

Message	Alarm	Fault	Cause	What to do
SHORT CIRC (2340) *09.01 FAULT WORD 1* bit 0 *09.11 SUPPLY FAULT WORD* bit 7 *09.15 SHORT CIRC FAULT*		●	Short circuit in several parallel-connected inverter modules at the same time.	Resolve the root cause and do not reset the fault before APBU Last and First logger data are uploaded from APBU to PC. Measure resistances of inverter power semiconductors (IGBTs). If faulty IGBTs are found, replace all three IGBT/AGDR packages, AINT and APOW boards and flat cables of the faulted R8i inverter module. Check main circuit.
SC INV 1 U (23B0) SC INV 1 V (23B1) SC INV 1 W (23B2) SC INV 2 U (23B3) SC INV 2 V (23B4) SC INV 2 W (23B5) SC INV 3 U (23B6) SC INV 3 V (23B7) SC INV 3 W (23B8) *09.15 SHORT CIRC FAULT*		●	Short circuit in one of the parallel-connected inverter modules. The name of the message indicates the number of the inverter module and phase.	
SUPPLY PHASE (3130) *09.02 FAULT WORD 2* bit 0		●	Missing phase during synchronization.	Check main fuses. Check grid for imbalance.
SYNCHRO FLT (8180)		●	Synchronization to network has failed. Network frequency has changed considerably since identification routine.	Perform network identification routine again. See parameter *99.07 LINE SIDE ID RUN*.
SYSTEM START (1087)	●		Control program is started (control unit is powered).	If this message appears during normal operation, check the 24 V supply to the control unit. Check the wiring for breakages and short circuits.
TEMP DIFF (4380) *09.17 TEMP DIF FLT WORD* *09.18 TEMP DIF ALM WORD*	●	●	Excessive temperature difference between parallel-connected inverter modules. Excessive temperature can be caused, for example, by unequal current sharing between parallel-connected inverter modules.	Save the User logger from APBU branching unit when the inverter is running. Check the fans. Check the air filters. Check the temperature parameters in group 3. Check that there are no loose connections.
TEMP DIF 1 U (44B1) TEMP DIF 1 V (44B2) TEMP DIF 1 W (44B3) TEMP DIF 2 U (44B4) TEMP DIF 2 V (44B5) TEMP DIF 2 W (44B6) TEMP DIF 3 U (44B7) TEMP DIF 3 V (44B8) TEMP DIF 3 W (44B9) *09.18 TEMP DIF ALM WORD*	●		Excessive temperature difference between parallel-connected inverter modules. The name of the message indicates the number of the inverter module and phase. Excessive temperature can be caused, for example, by unequal current sharing between parallel connected inverter modules.	
TEMP DIF 1 U (4381) TEMP DIF 1 V (4382) TEMP DIF 1 W (4383) TEMP DIF 2 U (4384) TEMP DIF 2 V (4385) TEMP DIF 2 W (4386) TEMP DIF 3 U (4387) TEMP DIF 3 V (4388) TEMP DIF 3 W (4389) *09.17 TEMP DIF FLT WORD*		●		
USER MACRO (FFA1)		●	No User Macro saved or file is defective.	Create User Macro again.

List of alarm and fault indications by code

8

Fieldbus control

What this chapter contains

This chapter describes how the PVS800 central inverter can be controlled by external devices over a communication network.

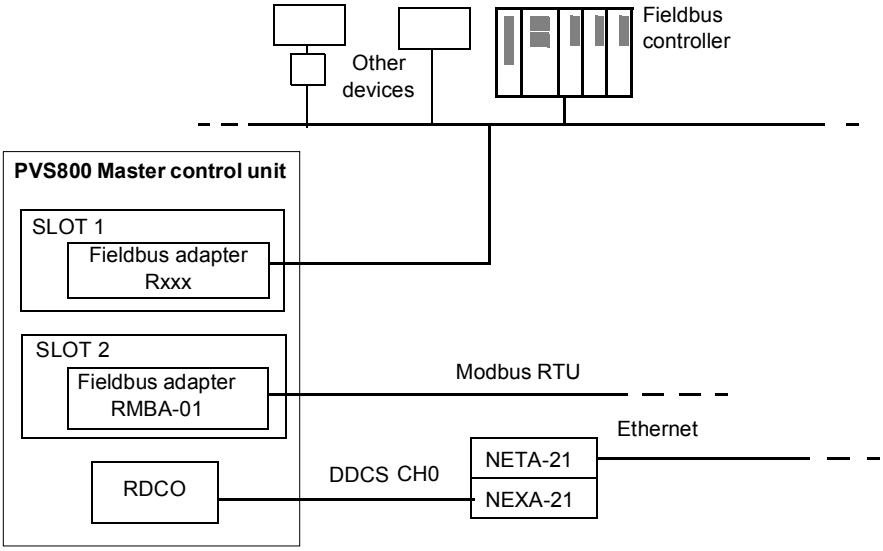
System overview

The central inverter can be connected to an external control and monitoring system using any of these two methods:

- through a communication adapter module connected to the master control unit

  or
- through NETA-21 connected to channel CH0 and RDCO (DDCS communication option) module.

The following diagram shows the control interfaces of the master control unit.



Typically one fieldbus adapter is used at a time. This adapter is installed to SLOT 1 of the RDCU master control unit. The master control unit supports maximum two pieces of R-series fieldbus adapters. If two adapters are used, only RMBA-01 Modbus adapter can be installed to SLOT 2. All other adapters must be installed to SLOT 1.

Commissioning and supporting tools

DriveWindow and other PC tools can be connected to DDCS channel CH3, either in a ring or a star configuration using branching units. Before starting the communication, a unique node address must be set for each connected control unit. See parameter *70.15 CH3 NODE ADDR*. The new node address becomes valid on the next power-up of the control unit.

Setting up communication for Modbus RTU

The Modbus RTU can be connected through RMBA-01 Modbus adapter. The RMBA-01 Modbus adapter module is typically installed in SLOT 1 of the master control unit. RMBA-01 can also be installed in SLOT 2 if SLOT 1 is used by any other adapters.

Before configuring the master control program for Modbus RTU control, check that the mechanical and electrical installation of the RMBA-01 Modbus adapter module is according to the instructions in the hardware manual and the adapter module manual.

Set up the Modbus RTU communication by configuring the parameters according to the following list.

Parameter	Setting	Function / information
52.01 STATION NUMBER	According to system setup	Defines a node address of the control unit. All devices on the same bus must have unique addresses.
52.02 BAUDRATE	According to system setup	1 = 600 bit/s 2 = 1200 bit/s 3 = 2400 bit/s 4 = 4800 bit/s 5 = 9600 bit/s 6 = 19200 bit/s
52.03 PARITY	According to system setup	1 = No parity bit, one stop bit 2 = No parity bit, two stop bits 3 = Odd parity indication bit, one stop bit 4 = Even parity indication bit, one stop bit

Note: If the Modbus RTU interface is used only for direct access to actual signals and parameters (no datasets used), set parameter *98.02 COMM. MODULE* to NO.

Setting up communication for Modbus/TCP

The Modbus/TCP can be connected to the drive through RETA-01 Ethernet adapter module or RETA-02 Ethernet adapter module. The RETA-0x adapter is always installed in SLOT 1 of the master control unit.

Before configuring the master control program for Modbus/TCP connection, check that the mechanical and electrical installation of the adapter module is according to the instructions in the hardware manual and the adapter module manual.

Set up the Modbus/TCP communication by configuring the parameters according to the following list.

Parameter	Setting	Function / information
51.03 DHCP Enable	According to system setup	0 = DHCP disabled 1 = DHCP enabled
51.04 IP address 1	According to system setup	First number of the IP address
51.05 IP address 2	According to system setup	Second number of the IP address
51.06 IP address 3	According to system setup	Third number of the IP address
51.07 IP address 4	According to system setup	Fourth number of the IP address
51.08 Subnet mask 1	According to system setup	First number of the subnet mask
51.09 Subnet mask 2	According to system setup	Second number of the subnet mask
51.10 Subnet mask 3	According to system setup	Third number of the subnet mask
51.11 Subnet mask 4	According to system setup	Fourth number of the subnet mask
51.12 GW address 1	According to system setup	First number of the gateway address
51.13 GW address 2	According to system setup	Second number of the gateway address
51.14 GW address 3	According to system setup	Third number of the gateway address
51.15 GW address 4	According to system setup	Fourth number of the gateway address
51.16 Protocol	Modbus/TCP (0)	0 = Modbus/TCP

If communication settings are changed, reboot the adapter module to apply the changes. You can reboot the adapter module by either setting parameter *51.27 FBA PAR REFRESH* to REFRESH or by switching Off/On the auxiliary power of the control unit.

Note: If the Modbus/TCP interface is used only for direct access to actual signals and parameters (no datasets used), set parameter *98.02 COMM. MODULE* to NO.

Setting up DDCS communication with NETA-01/-21

The inverter can communicate with control and monitoring system using NETA-01/-21 adapters. NETA is connected to master control unit with DDCS fiber optics communication.

To set up communication with NETA-21, define the following parameters. Check also the communication speed for each devices.

Parameter	Setting	Function / information
70.01 CH0 NODE ADDR	Individual address for each control unit connected to NETA-21 starting from 1.	Each device must have a unique node address.
70.03 CH0 BAUD RATE	1 Mb/s	Same communication speed must be used in all devices.
70.19 CH0 HW CONNECTION	According to the connection topology	0 = Ring connection 1 = Star connection

Cyclical communication with upper control and monitoring system using datasets

Inverter parameters can be accessed by reading/writing directly to parameters or by reading/writing parameters through datasets. Datasets provide a way to map different inverter parameters to consecutive addresses and makes communication faster. Each dataset can carry three freely adjustable parameters. If communication timeout monitoring is required, set the parameters in group 70 accordingly.

Set up cyclical communication by defining the following parameters:

Parameter	Setting	Function / information
98.02 COMM MODULE	ADVANT/N-FB	1 = NO 2 = FIELDBUS 3 = ADVANT/N-FB 4 = STD MODBUS
70.05 CH0 COM LOSS CTRL	According to system setup	1 = NO FAULT 2 = FAULT
70.04 CH0 TIMEOUT	According to system setup	This timeout applies to controllers connected to CH0 and R-type fieldbus adapters connected to SLOT1 or SLOT2. The timeout must be longer than the typical cycle time of the communication.

Example: Dataset configuration

The parameters used to read and write from or to the inverter through datasets must be defined before using them. See the below example of a dataset configuration.

If parameters *01.10 AC POWER*, *01.14 REACTIVE POWER* and *01.34 PV MODULE DC MEAS* are monitored and parameters *31.16 POWER LIMITING* and *24.02 Q POWER REF* are used as commands to the inverter, the following dataset configuration can be used:

Parameter	Value	Description
92.01 D SET 11 VAL 1	110	Maps parameter *01.10 AC POWER* into dataset 11, data word 1
92.02 D SET 11 VAL 2	114	Maps parameter *01.14 REACTIVE POWER* into dataset 11, data word 2
92.03 D SET 11 VAL 3	134	Maps parameter *01.34 PV MODULE DC MEAS* into dataset 11, data word 3
90.01 D SET 10 VAL 1	3116	Maps parameter *31.16 POWER LIMITING* into dataset 10, data word 1
90.02 D SET 10 VAL 2	2402	Maps parameter *24.02 Q POWER REF* into dataset 10, data word 2

With this configuration, the following registers can be used from upper control system:

Inverter register	Function
31	Reads AC POWER value from inverter
32	Reads REACTIVE POWER value from inverter
33	Reads PV MODULE DC MEAS value from inverter
28	Writes POWER LIMITING value to inverter
29	Writes Q POWER REF value to inverter

Modbus register addresses

The master control program parameters, data words, references and actual values are mapped into the holding register area. These holding registers can be accessed directly from an external system. There are not setup parameters for mapping the data into the holding register area. The mapping is pre-defined and corresponds directly to the master control program parameter grouping.

The table below shows the parameters and signals of the master control program that can be mapped into the register area:

Register area	Description
1 … 99	Datasets
101…999	Actual signals 01.01…09.99
1001…9999	Parameters 10.01…99.99

Dataset mapping

Writing data to the inverter parameters

The table below shows the dataset register addresses used for writing data to the inverter parameters. These registers can be used for writing control, limitation, and reference values to the inverter.

Register address	description	Configuration parameter
28	dataset 10 data word 1	90.01
29	dataset 10 data word 2	90.02
30	dataset 10 data word 3	90.03
34	dataset 12 data word 1	90.04
35	dataset 12 data word 2	90.05
36	dataset 12 data word 3	90.06
40	dataset 14 data word 1	90.07
41	dataset 14 data word 2	90.08
42	dataset 14 data word 3	90.09
46	dataset 16 data word 1	90.10
47	dataset 16 data word 2	90.11
48	dataset 16 data word 3	90.12
52	dataset 18 data word 1	90.13
53	dataset 18 data word 2	90.14
54	dataset 18 data word 3	90.15
58	Dataset 20 data word 1	90.16
59	Dataset 20 data word 2	90.17
60	Dataset 20 data word 3	90.18
64	dataset 22 data word 1	91.01
65	dataset 22 data word 2	91.02
66	dataset 22 data word 3	91.03
70	Dataset 24 data word 1	91.04
71	Dataset 24 data word 2	91.05
72	Dataset 24 data word 3	91.06

Reading data from inverter parameters

The table below shows the dataset register addresses used for reading data from inverter parameters.

Register address	description	Configuration parameter
31	dataset 11 data word 1	92.01
32	dataset 11 data word 2	92.02
33	dataset 11 data word 3	92.03
37	dataset 13 data word 1	92.04
38	dataset 13 data word 2	92.05
39	dataset 13 data word 3	92.06
43	dataset 15 data word 1	92.07
44	dataset 15 data word 2	92.08
45	dataset 15 data word 3	92.09
49	dataset 17 data word 1	92.10
50	dataset 17 data word 2	92.11
51	dataset 17 data word 3	92.12
55	dataset 19 data word 1	92.13
56	dataset 19 data word 2	92.14
57	dataset 19 data word 3	92.15
61	dataset 21 data word 1	92.16
62	dataset 21 data word 2	92.17
63	dataset 21 data word 3	92.18
67	dataset 23 data word 1	93.01
68	dataset 23 data word 2	93.02
69	dataset 23 data word 3	93.03
73	Dataset 25 data word 1	93.04
74	Dataset 25 data word 2	93.05
75	Dataset 25 data word 3	93.06

Actual signal and parameter mapping

Actual signals and parameters are mapped in this order:

- thousands and hundreds correspond to group number
- tens and ones correspond to the parameter number within a group.

For example, Register = 100 * Group + index

Register address	Description
104	Parameter 01.04
3116	Parameter 31.16

Further information

More information about ABB products for solar applications on the Internet:
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3AUA0000058422 Rev D (EN) 2016-09-23