

ABB solar inverters

User's manual PVS-JB-8-M junction box with monitoring for PVS800 central inverters



List of related manuals

Inverter hardware manuals and guides

Code (English)

PVS800-57 central inverters (100 to 500 kW) hardware manual [3AUA0000053689](#)

Inverter firmware manuals and guides

PVS800 central inverters firmware manual [3AUA0000058422](#)

Option manuals and guides

PVS-JB-8-M junction box with monitoring for PVS800 central inverters user's manual [3AUA0000087106](#)

Manuals and quick guides for I/O extension modules, fieldbus adapter, etc.

All manuals are available in PDF format on the Internet. See [Further information](#) on the inside of the back cover.

User's manual

**PVS-JB-8-M junction box with monitoring
for PVS800 central inverters**

Table of contents



3. Mechanical installation



4. Electrical installation



5. Start-up



Table of contents

List of related manuals	2
-------------------------------	---

1. Introduction to the manual

What this chapter contains	9
Safety instructions	9
Target audience	10
Contents of the manual	10
Related documents	10
Terms and abbreviations	10

2. Operation principle and hardware description

What this chapter contains	13
Operation principle	13
Layout drawing	15
Modbus link	15
Type designation label	16
Type designation key	16



3. Mechanical installation

What this chapter contains	17
Checking the installation site	17
Tools and accessories	18
Checking the delivery	18
Installing the unit	19

4. Electrical installation

What this chapter contains	21
Connecting the power cables	21
Connecting the external power supply cable for the auxiliary circuit	21
Connecting the Modbus link	22

5. Start-up

What this chapter contains	23
Start-up procedure	23
SAFETY	23
PRIMARY CHECKS	23
CHECKS WITH NO LOAD	23
CONFIGURING THE JUNCTION BOX PARAMETERS IN THE INVERTER	24
PERFORMING CURRENT CALIBRATION	25
FINALIZING THE START-UP	25

6. Parameters

What this chapter contains	27
Terms and abbreviations	27
Parameter listing	28
30 FAULT FUNCTIONS	28
32 STRING BOX ADDR	28
33 STRING MON SET	29
34 STRING MON STAT	32
35 ENABLED STRINGS	35
36 SBOX CUR DEV STA	36
40 STRING BOX 1 & 2	37
41 STRING BOX 3 & 4	40
42 STRING BOX 5 & 6	40
43 STRING BOX 7 & 8	40
44 STRING BOX 9 & 10	41
45 STRING BOX 11 & 12	41
46 STRING BOX 13 & 14	41
47 STRING BOX 15 & 16	41
48 STRING BOX 17 & 18	41
49 STRING BOX 19 & 20	41



7. Communication

What this chapter contains	43
Communication settings	43
Writing registers	44

8. Troubleshooting

What this chapter contains	45
LEDs	45
Common problem situations	46

9. Technical data

What this chapter contains	47
Input	47
Output	47
Terminal and lead-through data	48
Auxiliary power connection data	48
Degree of protection	48
Ambient conditions	48
Dimensions and weights	49
Monitoring board	49
I/O interface	49

10. Circuit diagrams

What this chapter contains	51
----------------------------------	----

Further information

Product and service inquiries	55
Product training	55
Providing feedback on ABB Drives manuals	55
Document library on the Internet	55





1

Introduction to the manual

What this chapter contains

This chapter introduces this manual.

Applicability

This manual applies to PVS-JB-8-M junction box with monitoring, software version 103B and later.

Safety instructions



WARNING! Read and follow the complete safety instructions given for the solar generator system and the inverter in *PVS800-57 central inverters (100 to 500 kW) hardware manual (3AUA0000053689 [English])*. Ignoring the instructions can cause physical injury or death, or damage to the equipment.

Only qualified electricians are allowed to install the junction box!

Never work on the junction box or its cabling when the box is connected to the solar modules or inverter, or to the 230 V AC auxiliary power supply. Always disconnect all possible power sources and prevent their accidental reconnection before starting the work.

Target audience

This manual is intended for people who plan the installation, install, commission, use and service the junction box. Read the manual before working on the equipment. You are expected to know the fundamentals of electricity, wiring, electrical components and electrical schematic symbols.

Contents of the manual

The manual consists of the following chapters:

- [Introduction to the manual](#) introduces this manual.
- [Operation principle and hardware description](#) describes the operation principle and construction of the junction box in short.
- [Mechanical installation](#) describes the mechanical installation procedure of the junction box.
- [Electrical installation](#) describes the electrical installation procedure of the junction box.
- [Start-up](#) describes the start-up procedure of the junction box with the inverter.
- [Parameters](#) describes the PVS800 Master control program parameters that are related to the junction box.
- [Communication](#) describes the communication on the Modbus link between the junction box and a PVS800 inverter.
- [Troubleshooting](#) describes the LEDs and common problem situations of the junction box along with corrective actions.
- [Technical data](#) contains the technical data of the junction box.
- [Circuit diagrams](#) contains diagrams showing the electrical connections between the junction box and the inverter.

Related documents

See the inside of the front cover.

Terms and abbreviations

See also the solar generator system example on page [14](#).

Term/abbreviation	Explanation
Inverter	A cabinet-built entity containing all inverter modules together with their control electronics, and I/O and auxiliary components. The inverter module converts the DC voltage to AC voltage. Its operation is controlled by switching the IGBTs.
I/O	Input/Output

Term/abbreviation	Explanation
Photovoltaic cell, generator, module, string, array and array junction box	In this manual, solar power system components based on photovoltaic effect are called solar cell, solar module, solar array, solar string and solar array junction box as defined below.
Solar array	Group of parallel-connected solar strings
(Solar array) junction box	Device that connects outputs of multiple solar source circuits (strings) into a combined output circuit or circuits.
Solar cell	Device that converts light directly into electricity by the photovoltaic effect.
Solar generator	The total of all solar strings of a solar power supply system, which are electrically interconnected.
Solar module	Packaged interconnected assembly of solar cells
Solar string	Circuit of series-connected solar modules
RMBA	Modbus adapter module



Operation principle and hardware description

What this chapter contains

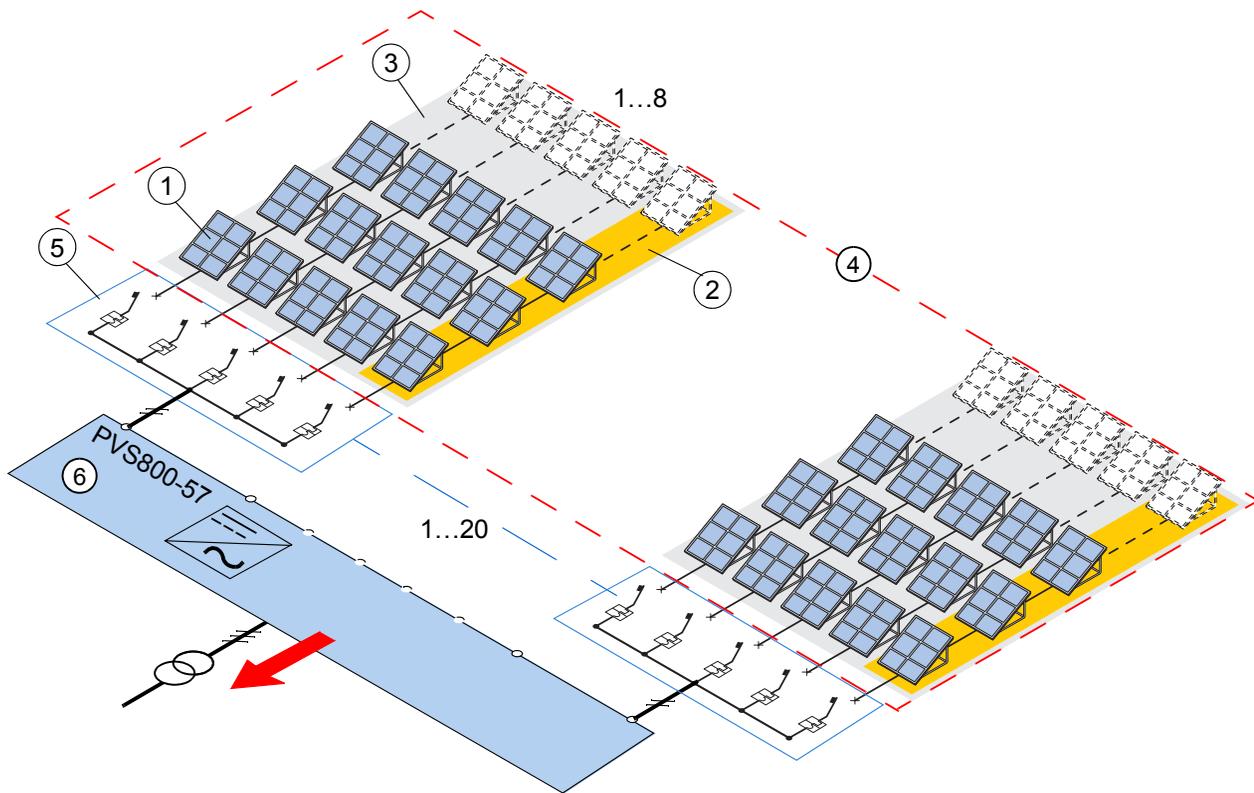
This chapter describes the operation principle and construction of the junction box in short.

Operation principle

The junction box connects solar strings to the PVS800-57 central inverter, which further connects to the electrical power system. The junction box features eight inputs, each of which is separately monitored through current measurements.

14 Operation principle and hardware description

An example of a solar generator system where solar module string arrays are connected to the electrical power system through junction boxes and an inverter is shown below.



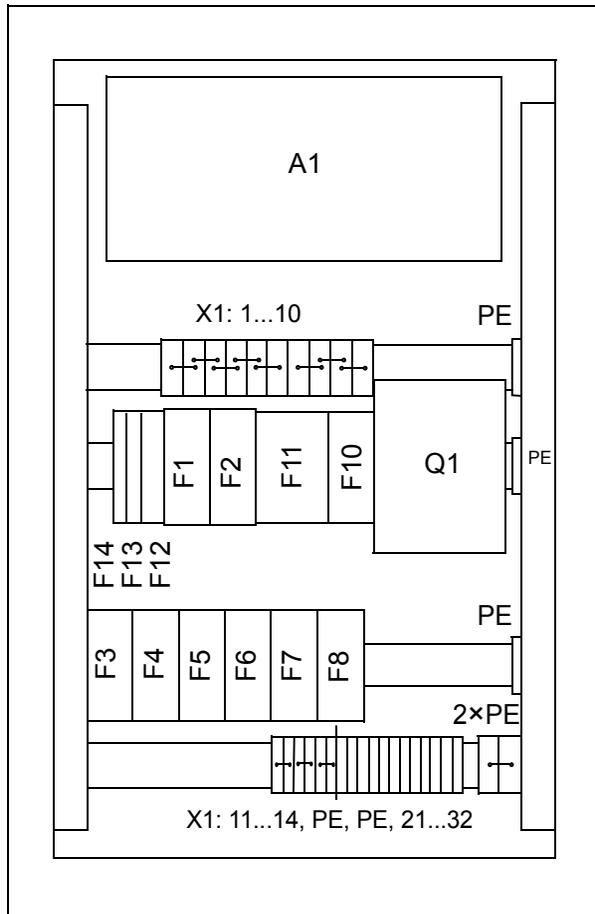
- 1 Solar module (photovoltaic module)
- 2 Solar string
- 3 Solar array
- 4 Solar generator
- 5 Junction box
- 6 Inverter

The junction box provides string fuses as standard to protect both the positive and negative lines. Overvoltage protection and circuit breakers are also included as standard. In addition, the main circuit is equipped with:

- disconnecting devices (one for each string input)
- a surge arrester (for peak overvoltage protection)
- a main circuit breaker (at the output).

Layout drawing

The figure below shows the layout of the junction box. For more detailed information, see chapter [Circuit diagrams](#).



Symbol	Description
A1	String monitoring unit
X1	Terminal block
F1...F8	Fuse switch disconnectors for input strings
F10	Fuse switch disconnecter
Q1	Main circuit breaker
F11	Surge arrester for peak overvoltage protection (main circuit)
F12	Circuit breaker for the auxiliary control voltage input
F13, F14	Surge arresters for peak overvoltage protection (Modbus communication link)

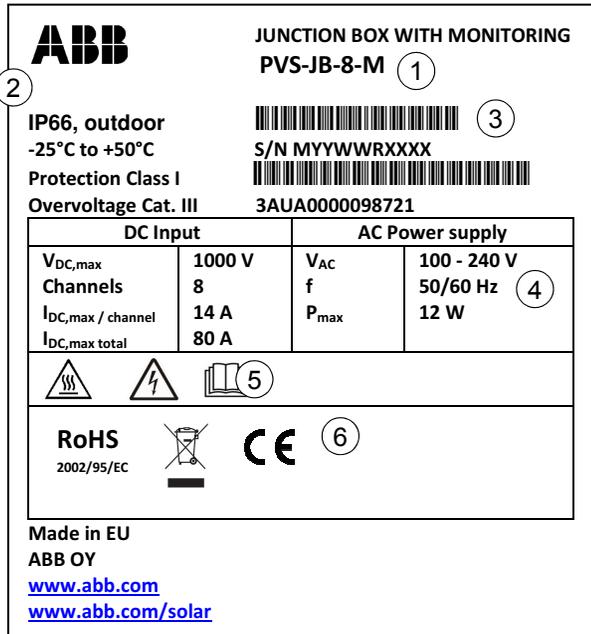
Modbus link

The inverter monitors the junction box via an RS-485 Modbus link. The installer connects the link to the RMBA-01 Modbus adapter module (+K458). For more information, see section [Connecting the Modbus link](#) on page 22.

For information on the communication on the Modbus link, see chapter [Communication](#).

Type designation label

Each junction box is equipped with a type designation label. An example label is shown below.



No.	Description
1	Type designation
2	Degree of protection Operating temperature range Classification of protection against electric shock by IEC 62103 Category of protection against overvoltage of atmospheric origin or due to switching by EN 60664-1
3	Serial number and barcode Material number and barcode
4	Ratings
5	Warnings, other information
6	Compliance, markings

Type designation key

You find the type designation on the type designation label attached to the junction box. The type designation is explained below.

<p style="font-size: 2em; margin: 0;">PVS-JB-8-M</p> <div style="display: flex; justify-content: center; gap: 20px; margin-top: 10px;"> <div style="text-align: center;"> <hr style="width: 50px; margin: 0 auto;"/> <p>1</p> </div> <div style="text-align: center;"> <hr style="width: 50px; margin: 0 auto;"/> <p>2</p> </div> <div style="text-align: center;"> <hr style="width: 50px; margin: 0 auto;"/> <p>3</p> </div> <div style="text-align: center;"> <hr style="width: 50px; margin: 0 auto;"/> <p>4</p> </div> </div>	
1	Product series
2	Product (JB = Junction box)
3	Maximum number of solar strings that can be connected to the junction box
4	M = String monitoring unit

3

Mechanical installation

What this chapter contains

The chapter describes the mechanical installation procedure of the junction box.

Checking the installation site

The junction box must be installed in an upright vertical position, for example, on rails.

The installation site must meet the specification in section [Ambient conditions](#) on page 48.



WARNING! Do not install the junction box in a location where:

- corrosive, explosive or flammable materials are used or stored
 - there is a risk of mechanical impacts
 - there is a lot of dust, or any conductive dust
 - there is a risk of flooding or snow or sand piling
 - junction box will be near to a heat source. Exposure to external heat will shorten the component lifetime.
-
- The installation location must be accessible in emergencies and for maintenance.
 - The installation location must be out of reach of children, pets and pests.
 - Avoid installing the junction box in direct sunlight.
 - Leave enough space for cabling below the box.
-



18 Mechanical installation

- The supporting structure on which the junction box will be mounted must be made of non-flammable material.
- The supporting structure and fastenings must be strong enough to carry the weight of the junction box. See section *Dimensions and weights* on page 49.

Tools and accessories

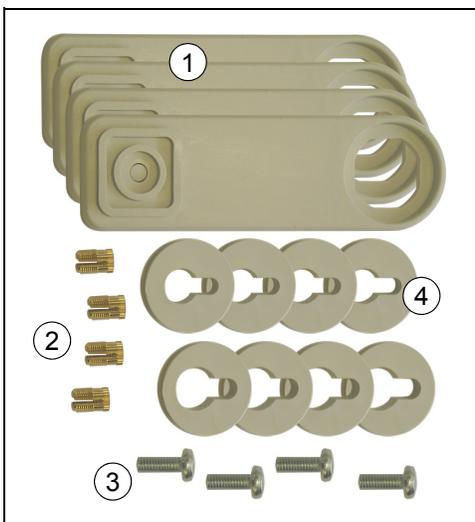
Make sure that you have the following tools and accessories available:

- screwdriver with a set of screw bits
- drill
- pencil or other marker
- spirit level
- mounting screws.

Checking the delivery

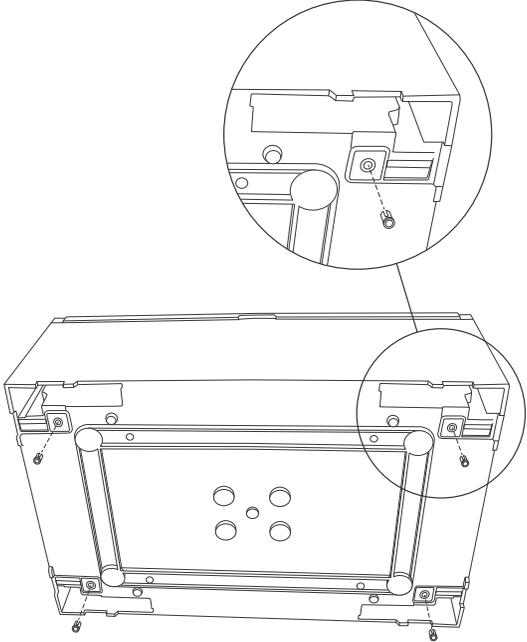
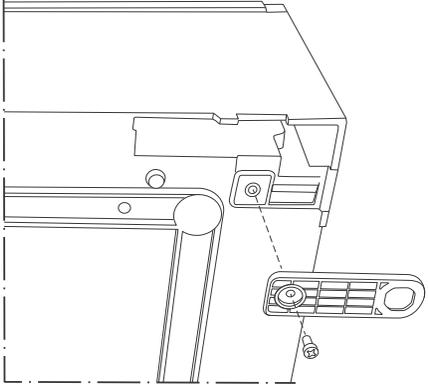
The junction box delivery contains:

- junction box, PVS-JB-8-M
- this manual
- installation accessories for securing the box to the installation surface; see the picture below:



No.	Description
1	Horizontal/vertical fixing brackets
2	Brass sleeves
3	Fixing screws
4	Bolt plates (two sizes)

Installing the unit

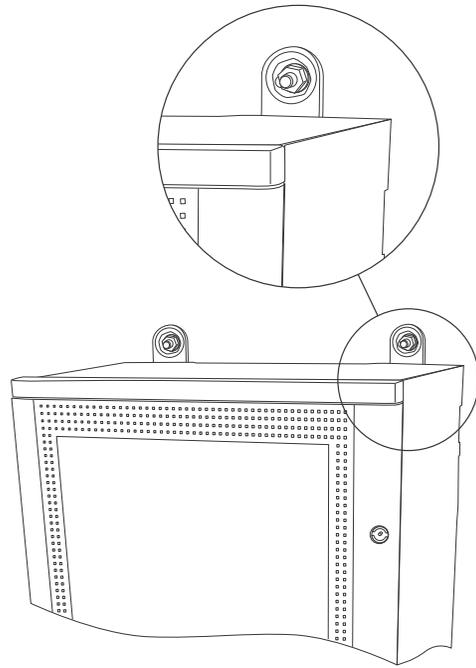
<input type="checkbox"/>	<p>Plug the brass sleeves into the holes provided on the back corners of the unit.</p>	
<input type="checkbox"/>	<p>Fasten each fixing bracket to its hole with the fixing screws. You can choose from two positions, horizontal and vertical.</p> <p>Note: The smooth side of the bracket must be placed against the back of the unit.</p>	<p>Example: Vertical installation</p> 
<input type="checkbox"/>	<p>Measure the distances of the mounting holes, and mark the locations of the mounting screws on the mounting plate/surface. Use a spirit level to ensure upright position.</p>	
<input type="checkbox"/>	<p>Drill the holes for the mounting screws.</p>	
<input type="checkbox"/>	<p>Install the mounting screws into place (leave untightened).</p>	
<input type="checkbox"/>	<p>Fit suitable bolt plates into the fixing brackets (ensure that the head of the mounting screw can enter through the bracket).</p>	





Lift the junction box onto the mounting screws and tighten the screws.

Example: Vertical installation



4

Electrical installation

What this chapter contains

The chapter describes the electrical installation procedure of the junction box.



WARNING! Only qualified electricians are allowed to carry out the work described in this chapter. Follow the [Safety instructions](#) on the first pages of this manual. Ignoring the safety instructions can cause injury or death.

Connecting the power cables

1. Select the power cables as instructed in *PVS800-57 central inverters (100 to 500 kW) hardware manual* (3AUA0000053689 [English]).
2. Connect the cables as displayed in chapter [Circuit diagrams](#).

Connecting the external power supply cable for the auxiliary circuit

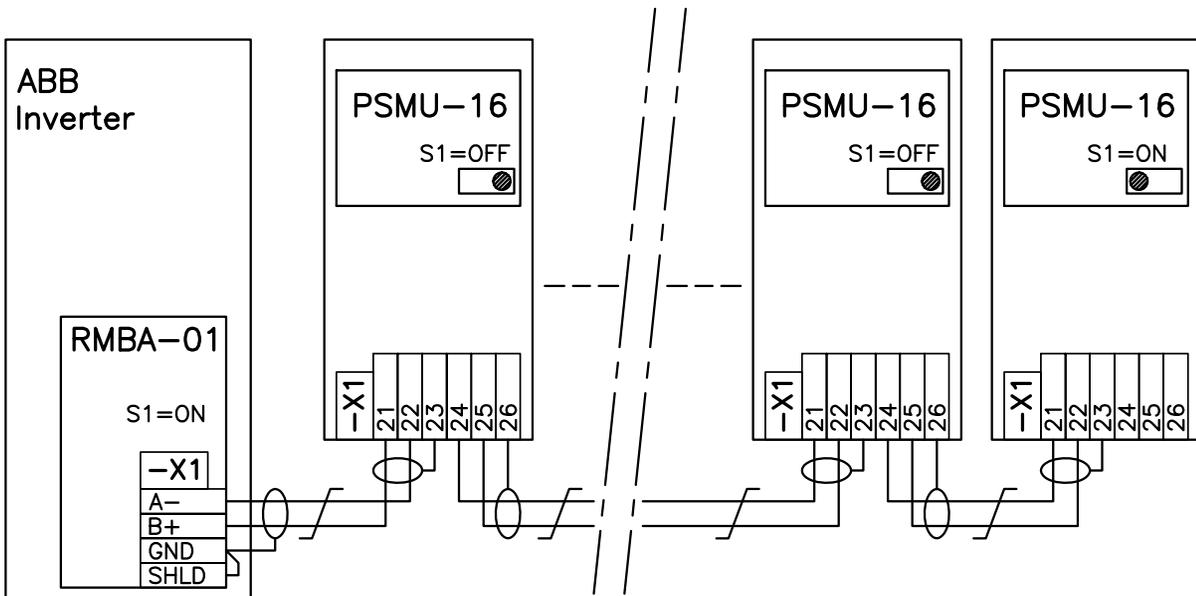
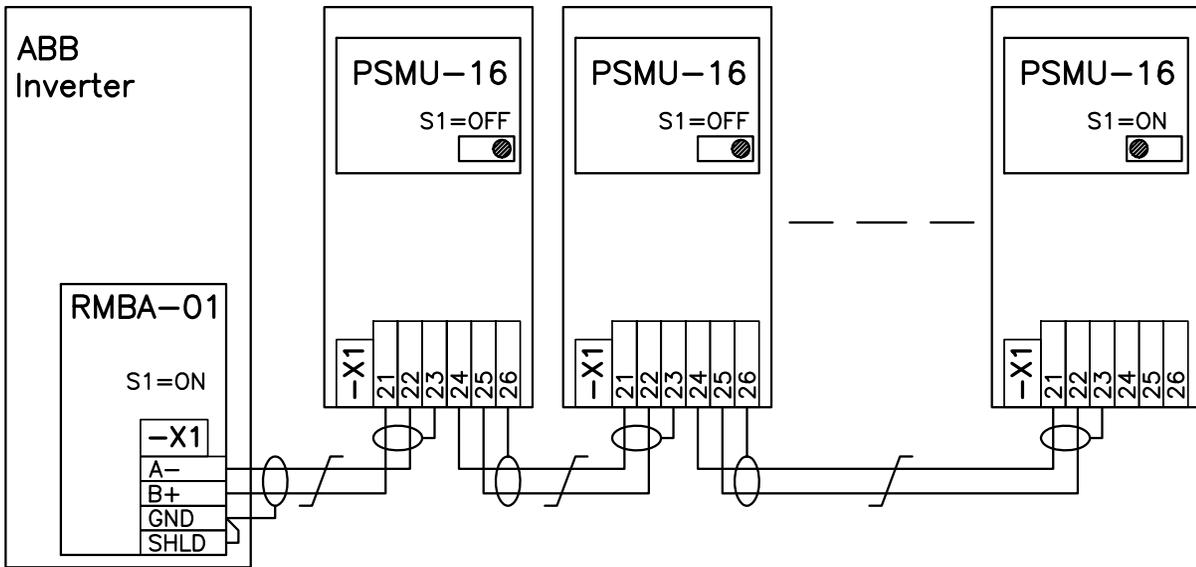
Connect the cables as displayed in chapter [Circuit diagrams](#).



Connecting the Modbus link

Use shielded, twisted pair RS-485 cable.

1. Connect the junction box to the RMBA-01 module as shown in the example connection diagram below. Note that the inverter can also be located in the middle of a chain.
2. Switch on the link termination resistor in the devices located at the end of the link (that is, when the link is not chained forward). In the junction box, the designation of the termination switch is S1.



5

Start-up

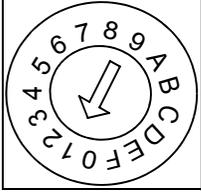
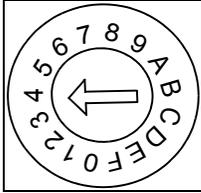
What this chapter contains

The chapter describes the start-up procedure of the junction box with the inverter.

Start-up procedure

SAFETY		
<input type="checkbox"/>	 WARNING! Follow the safety instructions during the start-up procedure. See Safety instructions .	
<input type="checkbox"/>	Only qualified electricians are allowed to start-up the junction box with the inverter.	
PRIMARY CHECKS		
<input type="checkbox"/>	Check that the mechanical installation and electrical installation of the junction box is correct. See chapters Mechanical installation and Electrical installation .	
CHECKS WITH NO LOAD		
<input type="checkbox"/>	 WARNING! Ensure that the main circuit breaker of the junction box is open.	
<input type="checkbox"/>	Stop the inverter and open its main switch disconnecter.	
<input type="checkbox"/>	Check that <ul style="list-style-type: none"> • the fuses have been installed • the fuses are undamaged • the size of the fuses is suitable for solar generator set-up. 	12 A fuses are included in the delivery.



<input type="checkbox"/>	<p>For Modbus communication to work, each connected device needs to have its own node address.</p> <p>Select the node address of the junction box using the multi-position switches S2 and S3 on the string monitoring unit.</p> <p>The switches define the node address in hexadecimal format. For example, a setting of 0x41 corresponds to Modbus address 65.</p>	<p>Example:</p> <p>Switch S2, NODEL</p>  <p>Switch S3, NODEH</p> 
<input type="checkbox"/>	<p>Switch on the auxiliary power of the string monitoring unit.</p>	

CONFIGURING THE JUNCTION BOX PARAMETERS IN THE INVERTER

<input type="checkbox"/>	<p>Set up the DriveWindow tool or CDP panel and download the PVS800 master control program parameter list.</p>	<p>Note: The auxiliary power of the inverter must be switched on.</p>
<input type="checkbox"/>	<p>Define the address for the desired junction box communication channel with parameters 32.03 BOX1 NODE ADDR...32.22 BOX20 NODE ADDR. The address must match with the node address selections on the string monitoring unit.</p>	
<input type="checkbox"/>	<p>Change the RMBA-01 module to the master Modbus mode by setting parameter 33.06 MODBUS MODE to MASTER.</p>	
<input type="checkbox"/>	<p>Enable string monitoring by setting parameter 33.01 ENABLE MONITORING to TRUE. After this the Modbus master will read data from all configured communication channels.</p>	
<input type="checkbox"/>	<p>Verify that the Modbus link is working.</p>	<p>The status of the Modbus link can be read from signals 34.01 LINK STATUS 1-16 and 34.02 LINK STATUS 17-20.</p> <p>A bit value of 1 means that the link is working.</p>
<input type="checkbox"/>	<p>With parameters 35.01 BOX1 STRING ENA ...35.20 BOX20 STRING ENA, define which strings are enabled in the junction box communication channel.</p>	<p>All enabled strings are part of string monitoring. All strings are enabled by default, so you need to disable the ones that you do not wish to use.</p>



<input type="checkbox"/>	If needed, enable current deviation calculation by setting parameter 33.02 CUR DEV CALC ENA to TRUE.	
PERFORMING CURRENT CALIBRATION		
	The string current measurements have been calibrated at the factory, but installation conditions can affect the measurement results. Therefore, it is recommended to perform current measurement calibration once more after the installation.	
<input type="checkbox"/>	 WARNING! Current calibration must be made with zero current. Otherwise, the calibration results will not be correct.	
<input type="checkbox"/>	Using the DriveWindow tool or CDP panel, look up parameter group 33 STRING MON SET .	
<input type="checkbox"/>	Set parameter 33.07 ACYC REQUEST MODE to WRITE VALUE.	
<input type="checkbox"/>	Set parameter 33.08 REQUEST NODE ADDR to the corresponding junction box node address.	
<input type="checkbox"/>	Set parameter 33.10 ACYCLIC DATA to 1.	
<input type="checkbox"/>	Set parameter 33.09 REQUEST REG ADDR to 201. A current calibration command is sent to the string monitoring unit.	During the calibration, the UNIT ST LED on the string monitoring unit will blink with a red color. The calibration is complete when the UNIT ST LED changes from red to green.
<input type="checkbox"/>	Once the calibration is complete, check that the measured currents show zero values.	The calibration results (measurement offsets) can be read from parameter groups 40...49. For example, if junction box 2 is calibrated, the offsets can be read from signals 40.55...40.62 .
<input type="checkbox"/>	If the calibration has to be performed again, write value 0 to register 201, and then write value 1 to the same register.	The calibration will start when the monitoring unit detects the raising edge in the first bit of Modbus register 201.
FINALIZING THE START-UP		
<input type="checkbox"/>	Close the main circuit breaker of the junction box.	
<input type="checkbox"/>	Repeat this start-up procedure for each junction box in your solar generator system.	
<input type="checkbox"/>	Start the inverter.	
<input type="checkbox"/>	If there is sunlight, check in parameter groups 40...49 that the current measurement is working.	







Parameters

What this chapter contains

This chapter describes the PVS800 Master control program parameters that are related to the junction box.

Terms and abbreviations

Term/abbreviation	Explanation
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.
B	Boolean
Def	Default
FbEq	Fieldbus equivalent: The scaling between the value shown on the panel and the integer used in serial communication.
I	Integer
PB	Packed boolean
R	Real
T	Data type (see B, I, PB, R)

Parameter listing

No	Name/Value	FbEq	Description	Def	T
30 FAULT FUNCTIONS			Settings for fault functions		
30.06	CURRENT DEV FUNC		Selects the fault function for a detected current deviation.	NO	I
	NO	0	No specific fault function. The detected current deviation can be seen only in status words.		
	ALARM	1	Inverter generates alarm BX CUR DEV if a current deviation is detected (X means the number of the communication channel). The detected deviation can be also seen in status words.		
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	10 = 1 s	Time delay for the BX CUR DEV alarm		
30.08	SBOX LOST FUNC		Selects the fault function for a Modbus link lost.	NO	I
	NO	0	No specific fault function. The status of the Modbus link can be seen only in status words.		
	ALARM	1	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.		
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	10 = 1 s	Time delay for the SBOX X LINK alarm		
32 STRING BOX ADDR			Addresses for junction box communication channels		
32.01	NR OF BOXES		Shows the number of the junction boxes configured.	0	I
	0...20	1 = 1	Number of the junction boxes configured.		

No	Name/Value	FbEq	Description	Def	T
32.03	BOX1 NODE ADDR		Defines an address for junction box communication channel 1. A zero address means that the communication channel is not configured and, thus, not used.	0	I
	0...247	1 = 1	Address for communication channel 1		
32.04	BOX2 NODE ADDR		Defines an address for junction box communication channel 2. A zero address means that the communication channel is not configured and, thus, not used.	0	I
	0...247	1 = 1	Address for communication channel 2		
...
32.22	BOX20 NODE ADDR		Defines an address for junction box communication channel 20. A zero address means that the communication channel is not configured and, thus, not used.	0	I
	0...247	1 = 1	Address for communication channel 20		
33 STRING MON SET			Settings for string monitoring		
33.01	ENABLE MONITORING		Enables communication for string monitoring. <ul style="list-style-type: none"> • 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	0	String monitoring is disabled.		
	TRUE	1	String monitoring is enabled.		
33.02	CUR DEV CALC ENA		Enables current deviation calculation. String monitoring (see parameter 33.01) must be enabled in order to receive the measured currents from the junction boxes.	FALSE	B
	FALSE	0	Current deviation calculation is disabled.		
	TRUE	1	Current deviation calculation is enabled.		

30 Parameters

No	Name/Value	FbEq	Description	Def	T
33.03	MIN CUR DEVIATION		Defines the minimum current deviation for 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. The average string current is calculated separately in each junction box from all enabled strings.	1 A	R
	0...1000 A	1000 = 1 A	Minimum current deviation for status indication		
33.04	MB MASTER CYCLE		Defines the time between two master requests (polls) in cyclical communication. The 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	100 = 1 s	Modbus master cycle time		
33.05	MB MASTER TIMEOUT		Defines a timeout for Modbus master requests. If the response for the master's request is not received within this time, the communication link is considered broken. The timeout counting is started when the request is sent from the Modbus master to the junction box.	0.3 s	R
	0.2...1000 s	100 = 1 s	Modbus master timeout		
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	B
	SLAVE	0	RMBA-01 is used in the slave mode.		
	MASTER	1	RMBA-01 is used in the master mode.		
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	0	A read request will be sent to the junction box.		

No	Name/Value	FbEq	Description	Def	T
	WRITE VALUE	1	A write request will be sent to the junction box.		
33.08	REQUEST NODE ADDR		Defines the station address where the acyclical request is sent.	0	I
	0...247	1 = 1	Station address in the request. Address of 0 means a broadcast message; it should be used only in the write mode.		
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	1 = 1	Register address		
33.10	ACYCLIC DATA		<p>Defines or shows the data in acyclical communication.</p> <p>This parameter has three purposes:</p> <ul style="list-style-type: none"> • 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	I
	-32768...32767	1 = 1	Data in acyclical communication		

32 Parameters

No	Name/Value	FbEq	Description	Def	T								
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								
			<table border="1"> <thead> <tr> <th>Bit</th> <th>Value</th> <th>Information</th> </tr> </thead> <tbody> <tr> <td rowspan="2">0...15</td> <td>1</td> <td>Link is OK; Modbus master is communicating with the junction box.</td> </tr> <tr> <td>0</td> <td>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.</td> </tr> </tbody> </table> <p>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.</p>	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	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.											
	0...65535	1 = 1											
34.02	LINK STATUS 17-20		Shows the Modbus link status for communication channels 17...20.	0	PB								
			<table border="1"> <thead> <tr> <th>Bit</th> <th>Value</th> <th>Information</th> </tr> </thead> <tbody> <tr> <td rowspan="2">0...3</td> <td>1</td> <td>Link is OK; Modbus master is communicating with the junction box.</td> </tr> <tr> <td>0</td> <td>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.</td> </tr> </tbody> </table> <p>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.</p>	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	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.											
	0...15	1 = 1											

No	Name/Value	FbEq	Description	Def	T																							
34.03	MONITORING STATUS		Status word for string monitoring	0	PB																							
			<table border="1"> <thead> <tr> <th>Bit</th> <th>Value</th> <th>Information</th> </tr> </thead> <tbody> <tr> <td rowspan="2">0</td> <td>1</td> <td>String monitoring is enabled.</td> </tr> <tr> <td>0</td> <td>String monitoring is disabled.</td> </tr> <tr> <td rowspan="2">1</td> <td>1</td> <td>Current deviation calculation is enabled.</td> </tr> <tr> <td>0</td> <td>Current deviation calculation is disabled.</td> </tr> <tr> <td rowspan="2">2</td> <td>1</td> <td>RMBA-01 is in the master mode.</td> </tr> <tr> <td>0</td> <td>RMBA-01 is in the slave mode.</td> </tr> <tr> <td rowspan="2">3</td> <td>1</td> <td>Write mode is selected for acyclical communication.</td> </tr> <tr> <td>0</td> <td>Read mode is selected for acyclical communication.</td> </tr> </tbody> </table>	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.		
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																										
34.04	ACYC REQUEST		<p>Status word for acyclical communication.</p> <p>Status word during a successful acyclical request: 0x0001 (request sending is triggered) -> 0x0002 (request is sent) -> 0x0000 (a successful response).</p> <p>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.</p>	0	PB																							

34 Parameters

No	Name/Value	FbEq	Description	Def	T																												
			<table border="1"> <thead> <tr> <th>Bit</th> <th>Value</th> <th>Information</th> </tr> </thead> <tbody> <tr> <td rowspan="2">0</td> <td>1</td> <td>Request sending is triggered; the request will be sent when the communication bus is idle.</td> </tr> <tr> <td>0</td> <td>No messages are waiting for to be sent.</td> </tr> <tr> <td rowspan="2">1</td> <td>1</td> <td>A request is sent; the master is waiting for a response.</td> </tr> <tr> <td>0</td> <td>Request processing is not active.</td> </tr> <tr> <td rowspan="2">2</td> <td>1</td> <td>Timeout counter has expired (no response from the junction box).</td> </tr> <tr> <td>0</td> <td>Timeout counter has not expired.</td> </tr> <tr> <td rowspan="2">3</td> <td>1</td> <td>There was an exception code in the response from a junction box. The code is shown in parameter 33.10.</td> </tr> <tr> <td>0</td> <td>The response message from a junction box was successful (no exception code).</td> </tr> <tr> <td rowspan="2">4</td> <td>1</td> <td>Input data in parameter 33.08 or 33.09 is invalid. The acyclical request is not sent.</td> </tr> <tr> <td>0</td> <td>Input data in parameters 33.08 and 33.09 was valid when the message sending process was triggered.</td> </tr> </tbody> </table>	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	A request is sent; the master is waiting for a response.	0	Request processing is not active.	2	1	Timeout counter has expired (no response from the junction box).	0	Timeout counter has not expired.	3	1	There was an exception code in the response from a junction box. The code is shown in parameter 33.10 .	0	The response message from a junction box was successful (no exception code).	4	1	Input data in parameter 33.08 or 33.09 is invalid. The acyclical request is not sent.	0	Input data in parameters 33.08 and 33.09 was valid when the message sending process was triggered.		
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	A request is sent; the master is waiting for a response.																															
	0	Request processing is not active.																															
2	1	Timeout counter has expired (no response from the junction box).																															
	0	Timeout counter has not expired.																															
3	1	There was an exception code in the response from a junction box. The code is shown in parameter 33.10 .																															
	0	The response message from a junction box was successful (no exception code).																															
4	1	Input data in parameter 33.08 or 33.09 is invalid. The 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 timeout since the last power-up.	0	PB																												
	0...65535	1 = 1																															

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

No	Name/Value	FbEq	Description	Def	T								
35.02	BOX2 STRING ENA		Defines which strings are enabled in junction box 2. One bit corresponds to one string in junction box channel 2.	65535 = 0xFFFF	PB								
			<table border="1"> <thead> <tr> <th>Bit</th> <th>Value</th> <th>Information</th> </tr> </thead> <tbody> <tr> <td rowspan="2">0...7</td> <td>1</td> <td>String channel is enabled in string monitoring and current deviation calculation.</td> </tr> <tr> <td>0</td> <td>String channel is disabled in string monitoring and current deviation calculation.</td> </tr> </tbody> </table> <p>Bit 0 is for the 1st string, bit 1 is for the 2nd string...and bit 7 is for the 8th string.</p>	Bit	Value	Information	0...7	1	String channel is enabled in string monitoring and current deviation calculation.	0	String channel is disabled in string monitoring and current deviation calculation.		
Bit	Value	Information											
0...7	1	String channel is enabled in string monitoring and current deviation calculation.											
	0	String channel is disabled in string monitoring and current deviation calculation.											
	0...255	1 = 1	Enabled strings in decimal format										
...								
35.20	BOX20 STRING ENA		Defines which strings are enabled in junction box 20. One bit corresponds to one string in junction box channel 20.	65535 = 0xFFFF	PB								
			<table border="1"> <thead> <tr> <th>Bit</th> <th>Value</th> <th>Information</th> </tr> </thead> <tbody> <tr> <td rowspan="2">0...7</td> <td>1</td> <td>String channel is enabled in string monitoring and current deviation calculation.</td> </tr> <tr> <td>0</td> <td>String channel is disabled in string monitoring and current deviation calculation.</td> </tr> </tbody> </table> <p>Bit 0 is for the 1st string, bit 1 is for the 2nd string...and bit 7 is for the 8th string.</p>	Bit	Value	Information	0...7	1	String channel is enabled in string monitoring and current deviation calculation.	0	String channel is disabled in string monitoring and current deviation calculation.		
Bit	Value	Information											
0...7	1	String channel is enabled in string monitoring and current deviation calculation.											
	0	String channel is disabled in string monitoring and current deviation calculation.											
	0...255	1 = 1	Enabled strings in decimal format										
36 SBOX CUR DEV STA			Status word for the current deviations detected										
36.01	BOX1 CUR DEV STA		Shows the status of string current deviations in junction box communication channel 1.	0	PB								
			<table border="1"> <thead> <tr> <th>Bit</th> <th>Value</th> <th>Information</th> </tr> </thead> <tbody> <tr> <td rowspan="2">0...7</td> <td>1</td> <td>Current deviation is detected.</td> </tr> <tr> <td>0</td> <td>Current deviation is not detected.</td> </tr> </tbody> </table> <p>Bit 0 is for the 1st string, bit 1 is for the 2nd string...and bit 7 is for the 8th string.</p>	Bit	Value	Information	0...7	1	Current deviation is detected.	0	Current deviation is not detected.		
Bit	Value	Information											
0...7	1	Current deviation is detected.											
	0	Current deviation is not detected.											
	0...255	1 = 1											

No	Name/Value	FbEq	Description	Def	T								
36.02	BOX2 CUR DEV STA		Shows the status of string current deviations in junction box communication channel 2.	0	PB								
			<table border="1"> <thead> <tr> <th>Bit</th> <th>Value</th> <th>Information</th> </tr> </thead> <tbody> <tr> <td rowspan="2">0...7</td> <td>1</td> <td>Current deviation is detected.</td> </tr> <tr> <td>0</td> <td>Current deviation is not detected.</td> </tr> </tbody> </table> <p>Bit 0 is for the 1st string, bit 1 is for the 2nd string...and bit 7 is for the 8th string.</p>	Bit	Value	Information	0...7	1	Current deviation is detected.	0	Current deviation is not detected.		
Bit	Value	Information											
0...7	1	Current deviation is detected.											
	0	Current deviation is not detected.											
	0...255	1 = 1											
...								
36.20	BOX20 CUR DEV STA		Shows the status of string current deviations in junction box communication channel 20.	0	PB								
			<table border="1"> <thead> <tr> <th>Bit</th> <th>Value</th> <th>Information</th> </tr> </thead> <tbody> <tr> <td rowspan="2">0...7</td> <td>1</td> <td>Current deviation is detected.</td> </tr> <tr> <td>0</td> <td>Current deviation is not detected.</td> </tr> </tbody> </table> <p>Bit 0 is for the 1st string, bit 1 is for the 2nd string...and bit 7 is for the 8th string.</p>	Bit	Value	Information	0...7	1	Current deviation is detected.	0	Current deviation is not detected.		
Bit	Value	Information											
0...7	1	Current deviation is detected.											
	0	Current deviation is not detected.											
	0...255	1 = 1											
40 STRING BOX 1 & 2			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.										
40.01	BOX1 TYPE	1 = 1	Shows the junction box type (example: 0x040B).		PB								
40.02	BOX1 SW VERSION	1 = 1	Shows the software version (example: 0x102A).		PB								
40.03	BOX1 HW VERSION	1 = 1	Shows the hardware version (example: 0x0102).		PB								
40.04	BOX1 NR OF CHAN	1 = 1	Shows the number of the current measurement channels.		I								

38 Parameters

No	Name/Value	FbEq	Description	Def	T														
40.05	BOX1 RESERVED D5	1 = 1	Shows the status of the string monitoring unit.		I														
			<table border="1"> <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>	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.		
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.																		
40.06	BOX1 RESERVED D6	1 = 1	Reserved		I														
40.07	BOX1 OK MSG CNT	1 = 1	Shows the number of OK messages.		PB														
40.08	BOX1 ER MSG CNT	1 = 1	Shows the number of error messages.		PB														
40.09	BOX1 BOARD TEMP	10 = 1°C	Shows the temperature of the string monitoring unit.		R														
40.10	ANALOG INPUT 1	50 = 1 mA or 100 = 1 V	Shows the measured current/voltage in analog input 1.		I														
40.11	ANALOG INPUT 2	2 = 1 mV	Shows the measured current/voltage in analog input 2.		I														
40.12	PT100 TEMP A	10 = 1°C	Shows the measured temperature in Pt100 channel A.		I														
40.13	PT100 TEMP B	10 = 1°C	Shows the measured temperature in Pt100 channel B.		I														
40.14	RESERVED D14		Reserved																
40.15	DI STATUS WORD	1 = 1	Shows the status of the digital inputs.		PB														
			<table border="1"> <tr> <td>Bit 0</td> <td>Status of digital input 1</td> </tr> <tr> <td>Bit 1</td> <td>Status of digital input 2</td> </tr> <tr> <td>Bit 2</td> <td>Status of digital input 3</td> </tr> </table>	Bit 0	Status of digital input 1	Bit 1	Status of digital input 2	Bit 2	Status of digital input 3										
Bit 0	Status of digital input 1																		
Bit 1	Status of digital input 2																		
Bit 2	Status of digital input 3																		
40.16	RESERVED D16		Reserved																
40.17	RESERVED D17		Reserved																
40.18	RESERVED D18		Reserved																
40.19	RESERVED D19		Reserved																

No	Name/Value	FbEq	Description	Def	T														
40.20	STRING1 AVG CUR	1000 = 1 A	Shows the average current of string 1.		R														
40.21	STRING2 AVG CUR	1000 = 1 A	Shows the average current of string 2.		R														
...														
40.27	STRING8 AVG CUR	1000 = 1 A	Shows the average current of string 8.		R														
40.36	BOX2 TYPE	1 = 1	Shows the junction box type (example: 0x040B).		PB														
40.37	BOX2 SW VERSION	1 = 1	Shows the software version (example: 0x102A).		PB														
40.38	BOX2 HW TYPE	1 = 1	Shows the hardware version (example: 0x0102).		PB														
40.39	BOX2 NR OF CHAN	1 = 1	Shows the number of the current measurement channels.		I														
40.40	BOX2 RESERVED D5	1 = 1	Shows the status of the string monitoring unit.		I														
			<table border="1"> <tbody> <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> </tbody> </table>	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.		
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.																		
40.41	BOX2 RESERVED D6		Reserved																
40.42	BOX2 OK MSG CNT	1 = 1	Shows the number of OK messages.		PB														
40.43	BOX2 ER MSG CNT	1 = 1	Shows the number of error messages.		PB														
40.44	BOX2 BOARD TEMP	10 = 1°C	Shows the temperature of the string monitoring unit.		R														
40.45	ANALOG INPUT 1	50 = 1 mA or 100 = 1 V	Shows the measured current/voltage in analog input 1.		I														
40.46	ANALOG INPUT 2	2 = 1 mV	Shows the measured current/voltage in analog input 2.		I														

40 Parameters

No	Name/Value	FbEq	Description	Def	T						
40.47	PT100 TEMP A	10 = 1°C	Shows the measured temperature in Pt100 channel A.		I						
40.48	PT100 TEMP B	10 = 1°C	Shows the measured temperature in Pt100 channel B.		I						
40.49	RESERVED D14		Reserved								
40.50	DI STATUS WORD	1 = 1	Shows the status of the digital inputs.		PB						
			<table border="1"> <tr> <td>Bit 0</td> <td>Status of digital input 1</td> </tr> <tr> <td>Bit 1</td> <td>Status of digital input 2</td> </tr> <tr> <td>Bit 2</td> <td>Status of digital input 3</td> </tr> </table>	Bit 0	Status of digital input 1	Bit 1	Status of digital input 2	Bit 2	Status of digital input 3		
Bit 0	Status of digital input 1										
Bit 1	Status of digital input 2										
Bit 2	Status of digital input 3										
40.51	RESERVED D16		Reserved								
40.52	RESERVED D17		Reserved								
40.53	RESERVED D18		Reserved								
40.54	RESERVED D19		Reserved								
40.55	STRING1 AVG CUR	1000 = 1 A	Shows the average current of string 1.		R						
40.56	STRING2 AVG CUR	1000 = 1 A	Shows the average current of string 2.		R						
...						
40.62	STRING8 AVG CUR	1000 = 1 A	Shows the average current of string 8.		R						
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.								
			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.								
			See group 40 STRING BOX 1 & 2 for the signal descriptions.								
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.								
			See group 40 STRING BOX 1 & 2 for the signal descriptions.								

No	Name/Value	FbEq	Description	Def	T
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.		
			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.		
			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.		
			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.		
			See group 40 STRING BOX 1 & 2 for the signal descriptions.		
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.		
			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.		
			See group 40 STRING BOX 1 & 2 for the signal descriptions.		



Communication

What this chapter contains

This chapter describes the communication on the Modbus link between the junction box and a PVS800 inverter.

Communication settings

The communication between the junction box and a PVS800 inverter uses the settings shown in the table below. The inverter must be configured to use these settings.

Speed	9600 bps
Parity	None
Stop bits	1

Writing registers

The table below lists the 16-bit data words which the inverter can write to the junction box.

Address	Description	Integer scaling				
201	Start command for current measurement calibration. Calibration will start with a rising edge of bit 0. Note: Before starting the calibration, make sure that the actual string currents are zero. If they are not, the calibration results will not be correct.	1 = 1				
202	Control word for the two relay outputs <table border="1" data-bbox="296 689 1020 954"> <tbody> <tr> <td>Bit 0</td> <td> Control of relay output 1 0 == de-energize 1 == energize </td> </tr> <tr> <td>Bit 1</td> <td> Control of relay output 2 0 == de-energize 1 == energize </td> </tr> </tbody> </table>	Bit 0	Control of relay output 1 0 == de-energize 1 == energize	Bit 1	Control of relay output 2 0 == de-energize 1 == energize	1 = 1
Bit 0	Control of relay output 1 0 == de-energize 1 == energize					
Bit 1	Control of relay output 2 0 == de-energize 1 == energize					

8

Troubleshooting

What this chapter contains

This chapter describes the LEDs and common problem situations of the junction box along with corrective actions.

LEDs

The LEDs of the junction box are listed below.

Name	Color	When the LED is lit
COMM	Flashing green	Communication on the Modbus link is working.
	Off	No communication on the Modbus link
STRING ST	Flashing green	String status is OK.
	Red	Internal failure
UNIT ST	Green	Unit is OK.
PWR OK	Green	Auxiliary power is connected to the string monitoring unit.

Common problem situations

Indication/symptom	Possible causes	What to do
Current deviation is detected in a junction box.	<ul style="list-style-type: none"> • Partial shading of solar modules • Irradiance fluctuations caused by clouds • Damaged solar modules • Loose cable connections of solar strings • Dust on solar modules • String fuse has blown. 	<p>Check the installation conditions of the solar modules.</p> <p>Check the cabling.</p> <p>Check the fuses.</p>
Modbus communication is not working.	<ul style="list-style-type: none"> • Faulty Modbus communication settings • Loose cable connections • Surge arresters for peak overvoltage protection have gone off. • Termination resistors are set to incorrect positions. • Auxiliary power of the string monitoring unit is not connected. 	<p>Check that the Modbus settings are as stated in chapter <i>Start-up</i>.</p> <p>Check the node addresses of the junction boxes in switches S2 and S3 and in parameter group <i>32 STRING BOX ADDR</i>.</p> <p>Check the cabling.</p> <p>Check the surge arresters, termination resistors and the auxiliary power connection.</p>



Technical data

What this chapter contains

This chapter contains the technical data of the junction box.

Input

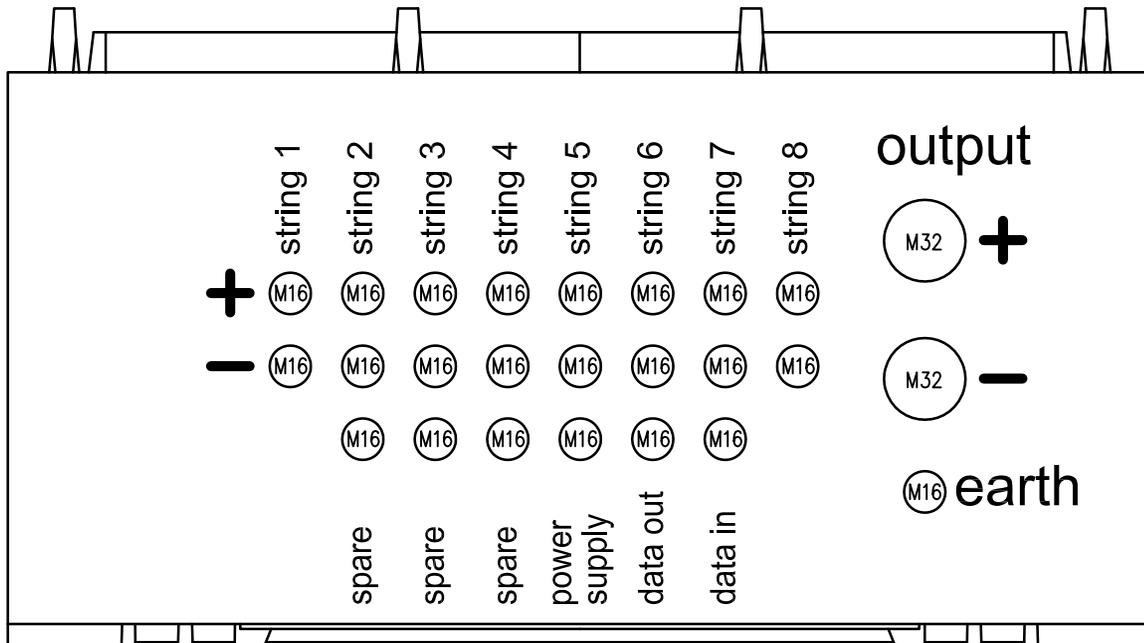
Maximum DC voltage	1000 V
Maximum DC current per input	14 A
Maximum DC current total	80 A
Number of strings	8
Fuses	Bussmann PV-12A10F, 10 × 38 mm, 4 A, 6 A, 8 A, 10 A, 12 A ¹⁾ , 14 A
Fuse disconnecter type	E92/32 PV (ABB)
Fuse holders	ABB openable holder for each + and -

Output

Main switch disconnecter	ABB T_{max} , T1 D 160 PV
Overvoltage protection	ABB OVR

¹⁾ 12 A fuse included

Terminal and lead-through data



3AXD10000022420 Rev A

Terminal	Glands	Cable diameter (mm)	Max. conductor size (mm ²)
Strings	16 × M16	5...10	4...16
Output	2 × M32	13...21	35...70
Ground (PE)	1 × M16	5...10	10...25
Auxiliary power supply	1 × M16	5...10	
Modbus	2 × M16	5...10	
Spare	3 × M16	5...10	

Auxiliary power connection data

Voltage / current 230 V AC / 2 A

Degree of protection

Degree of protection IP66
 All connection cable glands IP68 cable glands at bottom

Ambient conditions

Allowed ambient temperature -25...+50 °C
 Relative humidity level (non-condensing) 0...95%

Dimensions and weights

Width / Height / Depth	460 / 700 / 260 mm
Weight	20 kg

Monitoring board

External power supply	110...230 V AC, 50/60 Hz
Power consumption	< 12 W
Data cable maximum length	1200 m
Overvoltage protection status detection	Yes

I/O interface

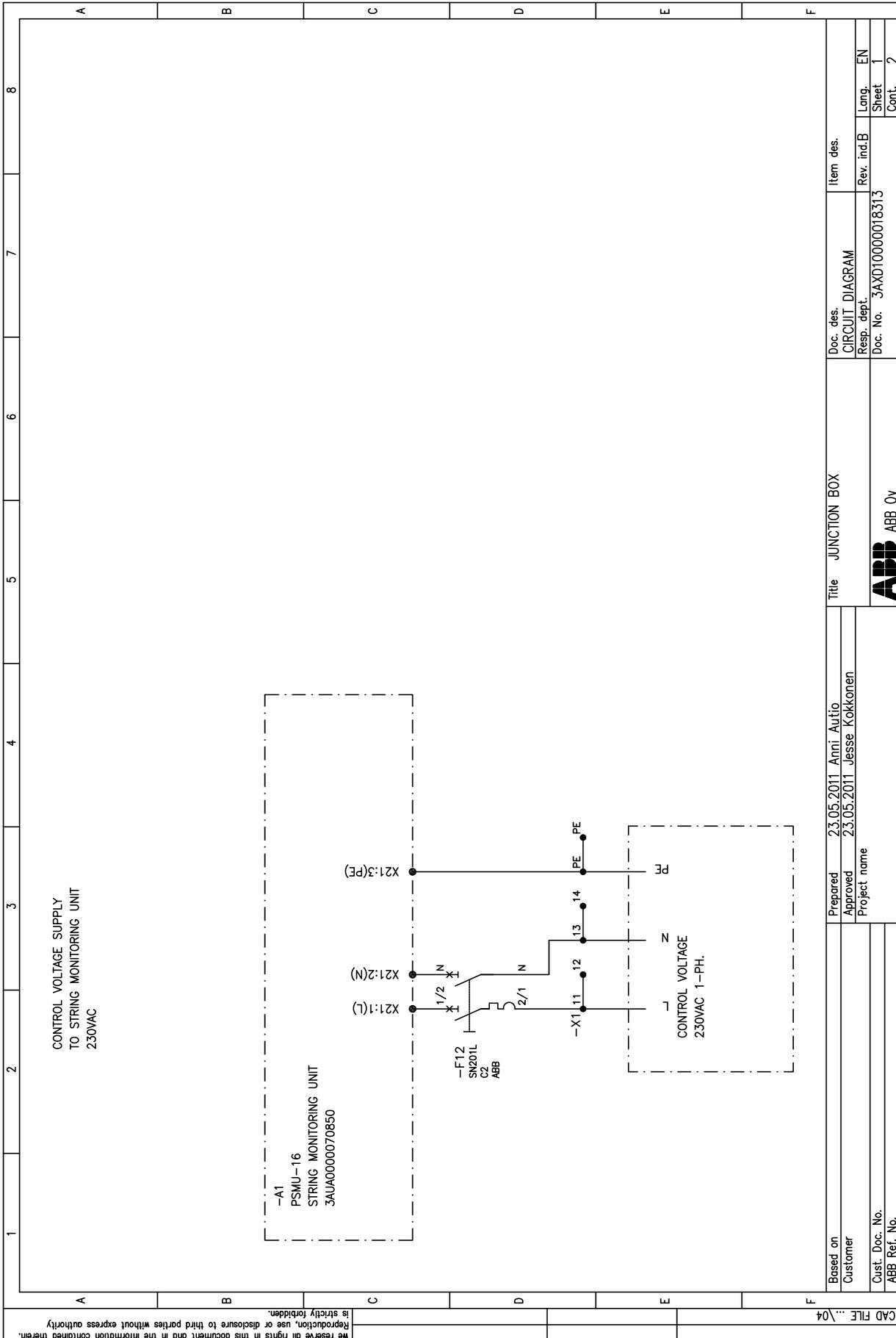
Internal temperature measurement	Yes
External temperature measurement	2 × Pt100
Reference PV cell	0...500 mV
Analog inputs	0...10 V / 0...20 mA
Digital inputs	3
Relay outputs	2



Circuit diagrams

What this chapter contains

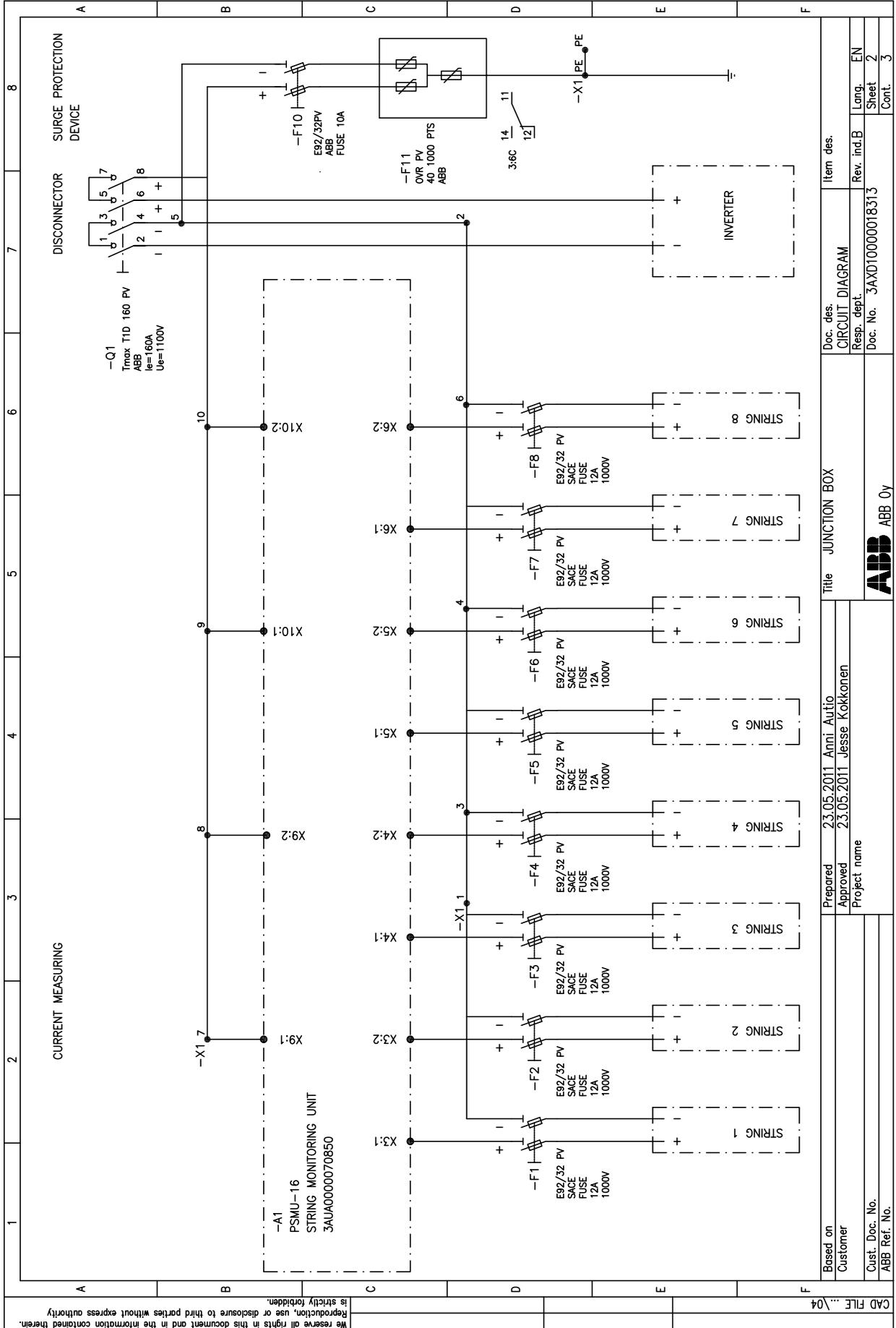
This chapter contains diagrams showing the electrical connections of the junction box.



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Based on	Prepared	23.05.2011	Anni Autio	Title				JUNCTION BOX	Doc. des.	CIRCUIT DIAGRAM	Item des.	
Customer	Approved	23.05.2011	Jesse Kokkonen	Project name					Resp. dept.		Rev. ind.B	
Cust. Doc. No.	ABB Ref. No.			ABB ABB Oy					Doc. No.	3AXD10000018313	Sheet	1
											Cont.	2



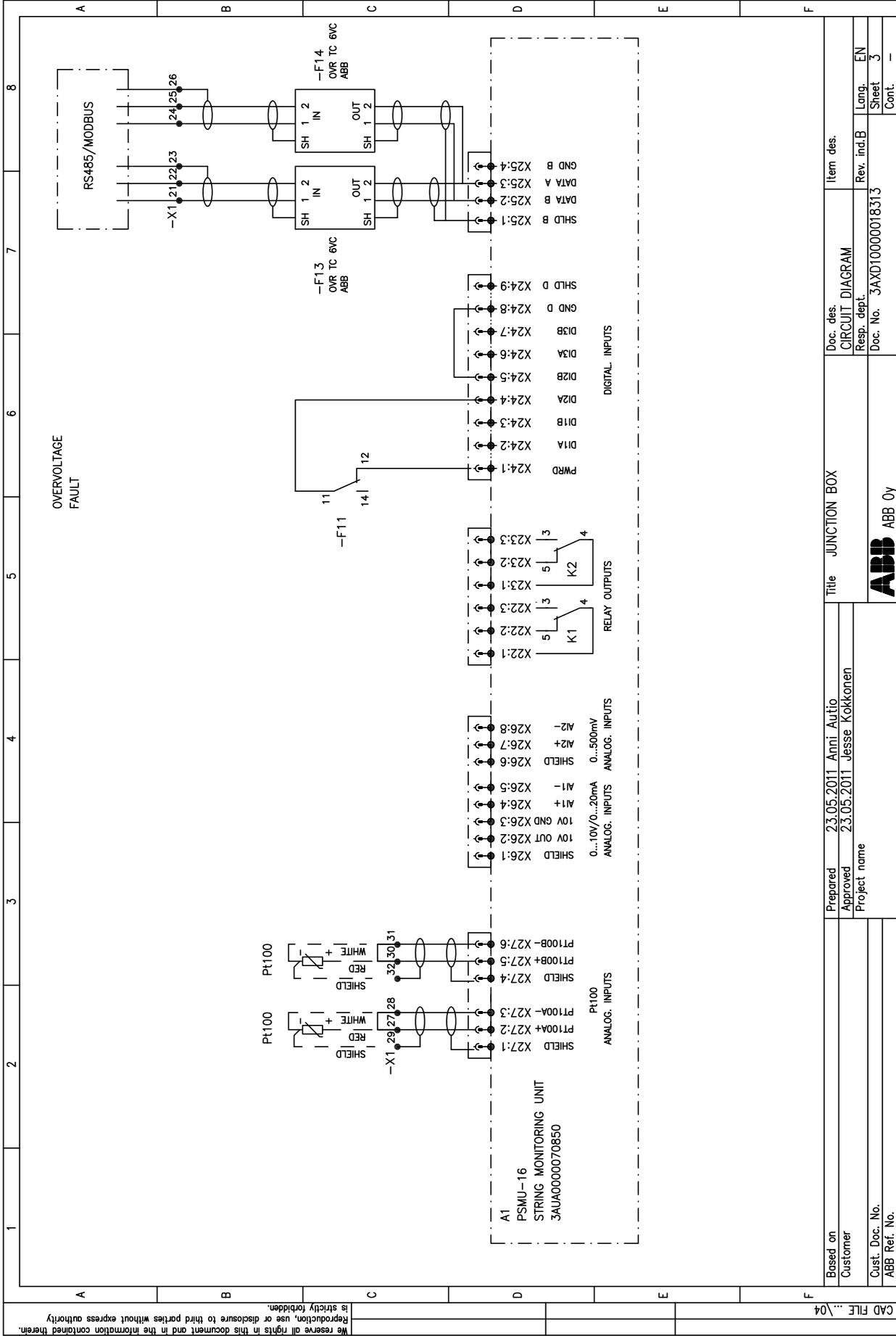
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Based on	Customer	Prepared	23.05.2011 Anni Autio	Doc. des.	Item des.
		Approved	23.05.2011 Jesse Kokkonen	CIRCUIT DIAGRAM	CIRCUIT DIAGRAM
Cust. Doc. No.	ABB Ref. No.	Project name		Rev. ind. B	Lang. EN
				Doc. No. 3AXD10000018313	Sheet 2
					Cont. 3



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Cust. Doc. No.	ABB Ref. No.	Resp. dept.	Lang.
Prepared	23.05.2011 Anni Autio	Doc. No.	3AXD10000018313
Approved	23.05.2011 Jukka Kokkonen	Rev. ind.B	Rev. ind.B
Project name	ABB Oyj	Rev. ind.B	Lang. EN
		Rev. ind.B	Sheet 3
		Rev. ind.B	Cont. —

Further information

Product and service inquiries

Address any inquiries about the product to your local ABB representative, quoting the type designation and serial number of the unit in question. A listing of ABB sales, support and service contacts can be found by navigating to www.abb.com/solar and selecting *Sales, Support and Service network*.

Product training

For information on ABB product training, navigate to www.abb.com/solar and select *Training courses*.

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