

Manual for charging rectifier type PRX



SAFETY INSTRUCTIONS



You must read this manual **before** installation, use or work on the product.



This product contains dangerous voltage that when touched can cause electric shock, burns or death.

The product must be installed by qualified personnel and according to the installation instructions. Service may only be performed by authorised service personnel. The equipment may only be opened by qualified personnel. Work in addition to replacing the rectifier modules may only be carried out when all power has been cut to the equipment and when the mains breaker has been closed for at least five minutes. The protective covers and contact safety devices inside the equipment may only be removed by authorised service personnel.

The power must always be disconnected in a safe way before starting any service/maintenance.



WARNING! Multiple power sources. Dangerous voltage is possible even with mains power shut off. The panel mains power switch does not give a dead condition.

Dokumentnr: 9-1719-B
Artikelnr: 0001137

Vi förbehåller oss rätten till ändringar av innehållet utan föregående avisering.

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[A DIMENSION DIAGRAM](#)

[B CIRCUIT DIAGRAM PRX](#)

1 PRESENTATION

PRX is a family of charging rectifiers in single phase configuration with integrated monitoring that are designed for wall mounting.

The charging rectifier is constructed using plug-in rectifier modules for simple maintenance and high flexibility and availability. Its compact design allows it to be used even in confined spaces. The clear display and well-arranged system of menus of the monitoring unit make it easy and pleasant to work with.

This description primarily deals with all installation, commissioning, service, maintenance and technical data and is principally aimed at the personnel who are responsible for these areas. An equivalent description of the parts of the equipment that relate to the monitoring unit are detailed in the *Manual for monitoring unit type PCM2*.

Operation is handled primarily via the monitoring unit described in the *Manual for monitoring unit type PCM2*. This is therefore chiefly aimed at the personnel that have the day to day responsibility for the plant, but also to other personnel who have cause to work with the charging rectifier.

For a complete description, this manual is to be used together with the description for the monitoring unit, *Manual for monitoring unit type PCM2*.

The term "charging rectifier" is replaced henceforth with the shorter term "rectifier".

2 SAFETY INSTRUCTIONS



This product contains dangerous voltage that when touched can cause electric shock, burns or death.

For safety reasons the affected personnel are classified according to the following requirements for specific skills.

Authorised service personnel:

- Have electrical training and adequate experience in avoiding the dangers that electricity can cause.
- Are certified to meet authority requirements for the work in question.
- Have linguistic skills that ensure the content in this description cannot be misunderstood.
- Have undergone a product specific training programme for authorised service personnel that are approved by KraftPowercon Sweden AB.

Qualified personnel:

- Have electrical training and adequate experience to avoid the dangers that electricity can cause.
- Are certified to meet authority requirements for the work in question.
- Have linguistic skills that ensure the content in this description cannot be misunderstood.

Installation, service, maintenance and fault tracing may only be carried out by authorised personnel and in accordance with the installation instructions.

The protective covers and contact safety devices inside the equipment may only be removed by authorised service personnel.

3 TECHNICAL DATA

3.1 ELECTRICAL DATA

3.1.1 Range

PRX can be equipped with one or two rectifier modules.

PRX							Likriktarmodul		
Model designation	U _{NOM} (V _{DC})	I _{RATED} (A)	Mains power ^{*1} (VA)	Mains current ^{*1} (A _{RMS})	Mains fuse ^{*2} (A)	Power loss ^{*3} (W)	Number of modules	I _{RATED} (A)	Model designation
PRX 24/36	24	36	1150	6	10	160	1	36	PCS 24/36
PRX 24/2x36		72	2300	12	16	310	2	36	PCS 24/36
PRX 24/70		70	2200	12	16	185	1	70	PCS 24/70
PRX 48/18	48	18	1150	6	10	145	1	18	PCS 48/18
PRX 48/2x18		36	2300	12	16	280	2	18	PCS 48/18
PRX 48/50		50	2900	15	20	220	1	50	PCS 48/50
PRX 110/8	110	8	1150	6	10	145	1	8	PCS 110/8
PRX 110/2x8		16	2300	12	16	280	2	8	PCS 110/8
PRX 110/16		16	2200	12	16	170	1	16	PCS 110/16
PRX 110/2x16		32	4400	23	25	330	2	16	PCS 110/16
PRX 110/22		22	2900	15	20	210	1	22	PCS 110/22
PRX 110/2x22		44	5800	30	35	410	2	22	PCS 110/22
PRX 220/10	220	10	2700	14	16	210	1	10	PCS 220/10
PRX 220/2x10		20	5400	28	35	410	2	10	PCS 220/10

*1: max at 195 V_{AC}

*2: recommended value

*3: type at 230 V_{AC} and full load. Also includes monitoring unit.

3.1.2 Common electrical input data

Rated voltage 120^{*1}/127^{*1}/220/230/240 V_{AC} 1- phase

Frequency 50 – 60 Hz

Power factor > 0.99 at 230 V_{AC}, full load

Connection screw terminal block..... 0.5 – 10 mm²

*1: Power derating below 190 V_{AC}.

3.1.3 Common electrical output data

Voltage regulation (static) <±0.5% of nominal output voltage

Voltage regulation (dynamic)..... <±1% within 3 seconds, 0-100 / 100-10 % load change

Current regulation..... <±1% of rated current

Setting range, current limit 0 - 100% of rated current

Ripple voltage..... <0.1 %_{RMS}

Ripple current..... <0.1 % of rated current

Efficiency, typical up to 92 % at 230 V_{AC}

Connection screw terminal block..... 1.5 - 35 mm²

3.1.4 Electrical data for rectifier module

Model designation, rectifier module	Output data			Input data			Power loss ²
	U _{NOM} (V _{DC})	Setting range (V _{DC})	I _{RATED} (A)	Voltage range ³ (V _{AC})	Mains power ¹ (VA)	Mains current ¹ (A _{rms})	
PCS 24/36	24	22 – 33	36	90 - 290	1150	6	150
PCS 24/70			70	90 - 290	2200	12	175
PCS 48/18	48	42 – 63	18	90 - 290	1150	6	135
PCS 48/50			50	90 – 290	2900	15	210
PCS 110/8	110	100 – 158	8	90 – 290	1150	6	135
PCS 110/16			16	90 – 290	2200	12	160
PCS 110/22			22	90 – 290	2900	15	200
PCS 220/10	220	187 – 292	10	90 - 290	2700	14	200

¹: max at 195 V_{AC}

²: type at 230 V_{AC} and full load

³: Power derating below 190 V_{AC}.

3.2 Environmental data

Class of enclosure..... IP21 as per EN 60529
 Cooling..... Temperature controlled fans in rectifier modules
 Ambient temperature (specified data applies)..... 0 to +40 °C
 Storage temperature..... -40 to +70 °C
 Humidity <90 % RH, non-condensed
 Altitude above sea..... <2000 m
 Noise level at 1 m, +20 °C, 25 % load..... <50 dBA

3.3 Mechanical data

DesignWall cabinet
 Arrangement.....On a wall indoors in dry, clean room
 Weight.....18 kg, fully equipped
 Dimensions.....400/274/333 mm (h/w/d), see also dimension diagram [Appendix A](#)
 ColourRAL 7035 light grey
 Cable inlets.....From underneath

3.4 Conformity with standards

EN 60529..... Class of enclosure IP21
 EN 50178..... LVD. Electronic equipment, including power electronics in electrical power installations.
 EN 50272-2..... Safety requirements for secondary batteries and battery installations
 EN 61000-6-2 EMC. Immunity for industrial electronics
 EN 61000-6-4 EMC. Emission from industrial electronics

4 FUNCTIONAL DESCRIPTION

4.1 GENERAL

PRX is a complete rectifier with integrated monitoring.

Most functions are handled by the monitoring unit and are described in the *Manual for monitoring unit PCM2*. Only the functions that feature at a general rectifier level are described here.

4.2 FRONT PANEL

The front panel includes the operator panel, mains breaker and voltmeter terminal.

The operator panel is the unit used as the user interface. It is fitted with a display, keypad and indicator lamp for alarm.

The mains breaker handles the mains feed to the rectifier modules.

The voltmeter terminal has short-circuit protection for safe measurement of the battery voltage and is designed for standard 4 mm banana plugs.

4.3 RECTIFIER MODULES

The rectifier modules are of the “plug-in” type and can in principle be replaced during operation. There is room for up to two parallel modules. The rectifier modules are accessible from the front without the need to loosen the cover

There are three indicator lamps on the front of the module:



AC OK	- Green:	Mains OK
	Off:	Mains power failure



WARNING- Yellow (permanent):	Remote shutdown (standby) or high temperature warning
Yellow (flashing):	Communication fault
Off:	Normal operation



ALARM	- Off:	OK
	Red:	Alarm (shutdown after DC overvoltage, over temperature, fan error or internal fault)

4.4 I/O UNIT

The I/O unit contains an adapter for the external connections required for the monitoring unit. It is fitted directly on the back plate together with the terminal blocks for AC input and DC output.

4.5 FUNCTIONS**4.5.1 General**

Only the most important functions are specified here. For more information, see the *Manual for monitoring unit PCM2*.

4.5.2 Float charging

Float charging is the normal operating mode determined by the battery. The voltage level is to be set according to the battery manufacturer instructions.

For more information, see the *Manual for monitoring unit PCM2*.

4.5.3 Equalizing charging

Equalizing charging means charging with raised voltage level over a limited period. It is used partly for the initial charge, and partly for equalizing cell voltages if spread has occurred.

For more information, see the *Manual for monitoring unit PCM2*.



WARNING: Generally, batteries of VR-type (vent regulated) should not be subject to equalizing charging. For some battery types equalizing charging could even be harmful to the batteries. Always follow the instructions stated by the battery manufacturer.

4.5.4 Battery circuit test

A battery circuit test is automatically carried out at optional intervals (normally once a day). The test involves checking that the entire battery circuit, i.e. not only the battery block is in working order.

For more information, see the *Manual for monitoring unit PCM2*.

5 OPERATION

5.1 GENERAL

The bulk of the operation is associated to the monitoring unit. This is described in the *Manual for monitoring unit PCM2*. Other operation is detailed in this section.

5.2 MAINS FEED

The mains breaker handles the mains feed to the rectifier modules.

Note that the breaker only cuts the mains feed to the rectifier modules. The monitoring unit, however, is fed from the battery and thereby continues to work.



WARNING: Note that the breaker for mains feed does not make the equipment dead. For a total dead state, the mains feed must also be cut externally and the equipment's DC output disconnected from the battery.



5.3 OPERATOR PANEL

The operator panel is the link between the equipment and the user. It is made up of a display, a keypad and a LED. Operation is described in the *Manual for monitoring unit PCM2*.



5.4 LIKRIKTARMODULER

There are three indicator LEDs on the front of the rectifier module with the following functions:



AC OK - Green:
Off:

Mains OK
Mains power failure



WARNING- Yellow (permanent): Remote shutdown (standby) or high temperature warning
Yellow (flashing): Communication fault
Off: Normal operation



ALARM - Off:
Red:

OK
Alarm (shutdown after DC overvoltage, over temperature, fan error or internal fault)



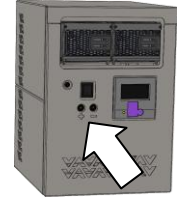
When the module gives an alarm you have the option of finding out in detail the cause of the alarm via the operator panel menus, see the *Manual for monitoring unit PCM2*.

The modules are of the “plug-in” type and can in principle be replaced during operation. For more information, see the [INSTALLATION INSTRUCTIONS](#) section.

5.5 VOLTMETER TERMINALS

When measuring the battery voltage you should avoid measuring directly at the battery terminals due to the risk of arcing in the event of a possible short circuit. Use the short-circuit protected voltmeter terminal on the front panel instead.

The voltmeter terminal fits a standard 4 mm measuring pin. To avoid measurement errors, the voltmeter used should have high ohms, 10 Mohm or better.



6 INSTALLATION INSTRUCTIONS

6.1 SAFETY INSTRUCTIONS



WARNING! *This product contains dangerous voltage that when touched can cause electric shock, burns or death. Protective earth must always be connected in a reliable way to avoid the risk of live parts in the equipment in the event of faults. No live parts are permitted during installation. The product must be installed by qualified personnel (see 2 [SAFETY INSTRUCTIONS](#)) section.*



WARNING! *Check both before and after setting-up that the equipment does not have any mechanical damage. Check that the equipment and individual rectifier modules have the intended rated voltage. Cables for input and output power must be correctly dimensioned to avoid fire hazard.*

6.2 GENERAL

Installation of the parts that belong to the monitoring unit are not dealt with in this manual. For complete installation instructions these instructions should therefore be used in combination with the installation instructions included in the *Manual for monitoring unit PCM2*.

6.3 STORAGE AND PROTECTION

Storage is to be in a dry area and at a temperature that does not exceed the -40 to +70 °C range.

6.4 MOUNTING

The equipment is designed for wall mounting indoors in a room that is dry, clean and free from conductive dust. In order to guarantee free air flow for all ventilation openings, at least 25mm of free space should be left on each side.

The rear plate of the equipment has four mounting holes shaped as keyholes. In order to fit the key hole, the screw should have a diameter of a max of 6 mm and the screw head diameter 9.5 - 13.5 mm. See also dimension diagram [Appendix A](#).



Before mounting, the cover must be removed and the rectifier modules removed temporarily, partly because the two upper mounting holes are only accessible via the opening for the rectifier modules but also by considerably lower weight.

Attention! Loosen the earth wire on the underside of the device before removing the cover. Do not forget to restore the earth wire when the cover put back.



WARNING! *The equipment may cause personal injury or damage to property if dropped. Use secure lifting aids where appropriate. Make sure the mounting screws and their attachments to the wall can easily and safely handle the weight of the equipment.*

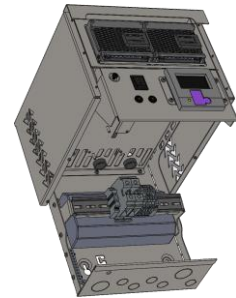
6.5 ELECTRICAL INSTALLATION

6.5.1 General

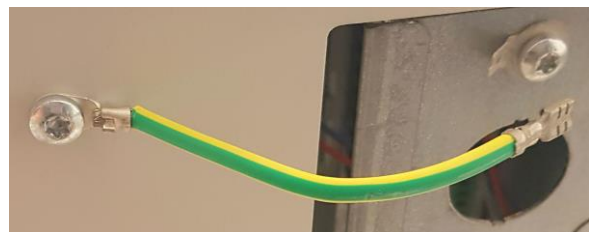
The equipment is designed for permanent installation. Protective earth must be connected before any other installation.

For cable inlets there are six “knock-out” holes of which two has a diameter of 32.5 mm designed for fitting type M32 and five with a diameter of 20.5 mm designed for fitting type M20.

To enable installation, the cover must be removed by first loosening the screw on the front and then pulling the cover straight out.

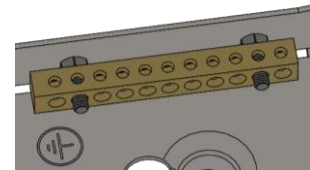


Attention! Loosen the earth wire on the underside of the device before removing the cover. Do not forget to restore the earth wire when the cover put back.



6.5.2 Earthings

For earth and screen connections, use the earth bar available in the connection area, see adjacent figure. There is an additional earth terminal specially designed for the incoming mains cable in direct connection to the mains terminal block.

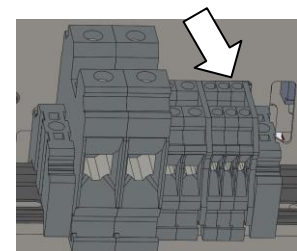


For potential equalization in connection with the cable inlet there is a hole designed for an M8 bolt intended for a ring cable shoe.

6.5.3 Mains voltage

Check that the outer fuse conforms with the recommendations in the [ELECTRICAL DATA](#) section.

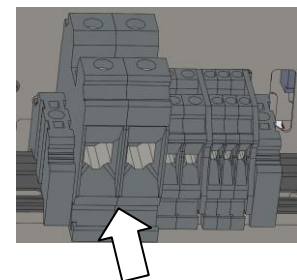
Connect single phase mains voltage to the terminal marked L and N. Connect the earth conductor where possible to the adjacent earth terminal, although this can also be connected to the earth bar.



6.5.4 Battery/Load

Check that the rectifier's rating plate shows the rated voltage that conforms with the battery's nominal voltage.

Connect the DC system to the terminals marked + and -. Select cables that are dimensioned for handling the rectifier's rated current.

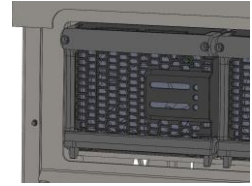


WARNING! *The rectifier's DC output does not have an internal fuse.*

Ensure that there is an external fuse to the battery.

6.5.5 Rectifier modules

The rectifier modules are normally packed separately and are to be put in place during the installation. The rack module slots should be equipped with modules starting from the leftmost position and with spare slots to the right.



A module is installed by gently pushing the module into place and pushing it into the bottom. Then push the handle towards the module and finally secure the handle with the two screws.

The modules can in principle be replaced during operation. However, we recommend disconnection of the mains supply first.

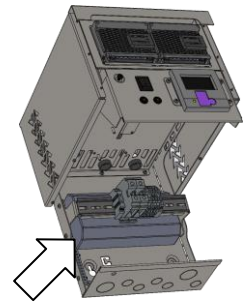
To remove a module, loosen the two screws on the upper handle. It loosens the handle, making it angled downwards. Use the handle and then pull out the module from its place.



WARNING! Check carefully that the rectifier modules have the correct rated voltage.

6.5.6 I/O unit

All the connections to the monitoring units are grouped in a unit called the I/O unit. The connectors are pluggable, i.e. they can be removed for better accessibility when installing. For more information on these connections, see the *Manual for monitoring unit PCM2*.



6.5.7 Battery voltage measurement

To make the installation as simple as possible, the device is prepared for internal measurement of battery voltage. If measurement from an external source is desired, normally the battery control unit, the connection between K1.X7:3 to X1:4 and K1.X7:5 is replaced by X1:3 with a connection directly to K1.X7:3 and K1.X7:5. See also circuit diagram [Appendix B](#).

6.5.8 Mid voltage measurement (option)

For monitoring the mid voltage of the battery, connection to the I/O unit input X7:4 can be made via a special overcurrent protected cable.

Mid voltage measurement is an option and is therefore only installed where applicable. Check that the parameters for the mid voltage measurement are correctly set. See circuit diagram [Appendix B](#) and *Manual for monitoring unit PCM2*.



WARNING: The measurement cord must have current limitation via short circuit protection in direct connection to the connection point on the battery. Use the short-circuit protected cables that are normally supplied.

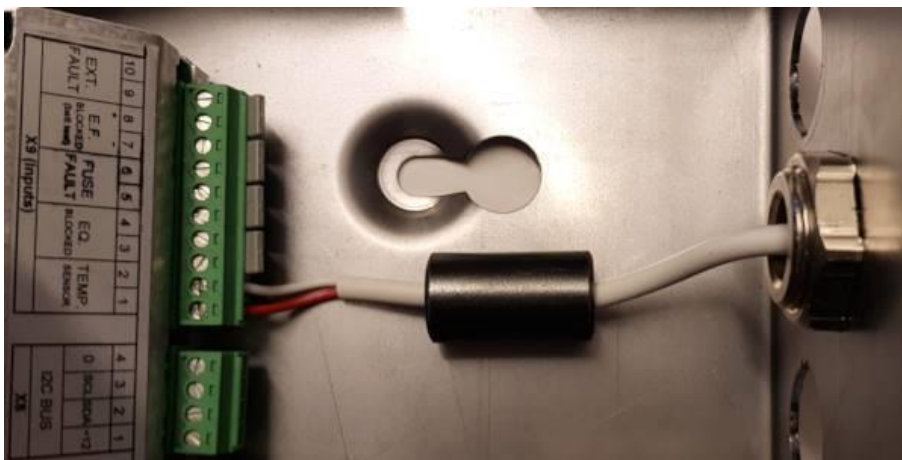
6.5.9 Battery temperature measurement (option)

Measurement of the battery temperature is done via an enclosed Pt-1000 sensor. It is used both to monitor the temperature level and for temperature control of the float charging voltage. As the sensor is a Pt-1000 model, bipolar measurement is sufficient, as opposed to the more common Pt-100 which often needs four-pole measurement to ensure that conductor resistance does not impact negatively on the measurement results.

Place the sensor where it best represents a mean value for the battery temperature.

Connect the sensor to input X9:1-2 "TEMP SENSOR".

To fully comply with the EMC requirements, the sensor cable should be provided with the enclosed ferrite ring, see picture. The ferrite ring is normally attached to the sensor.



If the sensor cable needs extending, there are no special requirements for cables and junction boxes in addition to normal electrical installation directives. The insulation class is determined by the battery voltage.

The temperature sensor is an option and is therefore only installed where applicable. Check that the parameters for temperature measurement are correctly set.

See circuit diagram [Appendix B](#) and *Manual for monitoring unit type PCM2*.

7 COMMISSIONING

7.1 SAFETY INSTRUCTIONS



WARNING! *This product contains dangerous voltage that when touched can cause electric shock, burns or death. All contact safety devices must be fitted during operation.*

7.2 PREPERATORY INSPECTION

Check that the equipment is free from damage, correctly fitted and that all the ventilation openings are free from obstacles.

Check that all cable installations, electrical connections and protective earths are correctly implemented.

Check that the earth wire on the underside of the device is in place.

Check that all contact safety devices and breakers are disconnected.

Check that the rated voltage of the equipment corresponds to the rated voltage of the plant.

7.3 ELECTRIFICATION

7.3.1 DC

Start by connecting the battery by connecting a fuse in the battery circuit, for example. Note that a connection current occurs when the rectifier modules' output capacitors are being charged. This could give rise to some spark formation at the point of connection.

After a few seconds, the operator panel display lights up, and after a few more seconds the text appears on the display. All measurement values are initially reset. The measuring begins after around 10 seconds. Any alarms are activated when a total of around 30 seconds has passed.



WARNING! *Connection of the battery with wrong polarity may harm the rectifier. At any uncertainty, do this:*

1. *Pull out the rectifier modules.*
2. *Engage the battery circuit and check the polarity on the rectifier DC output terminals.*
3. *Disengage the battery circuit and restore the rectifier modules.*
4. *The continue according to the instructions above*

7.3.2 AC

Close the mains breaker on the front of the equipment. The rectifier modules will then start up.

The battery now starts to charge, and if it was in a state of deep discharge, the charging starts with rated current until the float charging level is reached. Certain types of battery require an

initial equalizing charge. Always follow the recommendations given by the battery manufacturer.

7.4 CHECK OF CHARGING VOLTAGE

Check the settings of the monitoring units to ensure the voltage level for float charging and equalizing charging conform to the battery manufacturer's specifications, see *Manual for monitoring unit PCM2*.

When the battery is charged to a level where the "High current" alarm is no longer active, you should check that the actual output voltage conforms with the set float charging voltage, see section 0 [Check of charging voltage](#).

7.5 CHECK OF SETTINGS

Each time the monitoring unit has been without voltage, the built-in clock must be set with the current date and time, see the *Manual for monitoring unit PCM2*.

Check that the measurement values presented agree with the actual position. Check that the parameters for charging voltages, alarms and other parameters conform with the intended function, see the *Manual for monitoring unit PCM2*.

7.6 CHECK OF OUTPUTS

The alarm outputs A-D and the output for fan control can be operated manually for simple and smooth control of external circuits, see the *Manual for monitoring unit PCM2*.

8 MAINTENANCE

8.1 ANNUAL INSPECTION

8.1.1 General

In addition to these instructions, you must observe the instructions for maintenance in the *Manual for monitoring unit PCM2* and the battery manufacturer's maintenance instructions.

8.1.2 Check of charging voltage

Connect a measuring instrument to the voltmeter terminal (see section 5.5 [VOLTMETER TERMINAL](#)). Check that the rectifier's output voltage corresponds to the set value.

If the float charging voltage is temperature controlled, it is difficult to determine what the expected output voltage should be. The solution is to temporarily shut down the temperature control. You do this using the menu option *Functions, battery temperature* to specify that the temperature sensor is not installed (see the *Manual for monitoring unit PCM2*, section on *Operation, Functions*). Do not forget to reset the parameter for the installed temperature sensor following a completed measurement!

All control is based on measurement. If charge voltage is found to be in a state of non-conformance it is therefore the voltage measurement that should be calibrated, see the instructions for maintenance in the *Manual for monitoring unit PCM2*.

8.1.3 Check of cooling capacity

Check that the ventilation openings for the equipment and the individual rectifier modules are not clogged with dust or other contamination. Clean where necessary.

9 FAULT TRACING

9.1 SAFETY INSTRUCTIONS



WARNING! *This product contains dangerous voltage that when touched can cause electric shock, burns or death.*

Service/maintenance work that involves working with removed contact protection devices may only be carried out by authorised service personnel (see section 2 [SAFETY INSTRUCTIONS](#)).

Before work can commence on the equipment, it must be guaranteed that the internal capacitors are discharged through the following procedure:

- 1. Disconnect the incoming mains feed.*
- 2. Close the equipment's mains breaker.*
- 3. Wait at least 5 minutes to allow the capacitors to discharge.*



WARNING! *In the event of overvoltage, the electrolytic capacitors and varistors may explode.*

If work must be done when the equipment is powered up and with exposed circuit boards, splinter protection must therefore be used (protective goggles and screens).

Fault tracing in connection with alarm messages is described in the *Manual for monitoring unit PCM2*.

9.2 OTHER FAULT TRACING

The type of faults that can be attributed to the rectifier in general are dealt with here. For faults that relate to the monitoring unit see the *Manual for monitoring unit PCM2*.

The primary fuse trips when the rectifier is turned on

- Cause 1: Incorrect type of mains fuse. Check that the mains fuse observes the specifications in section 3 [ELECTRICAL DATA](#).
- Cause 2: Internal rectifier module fault. Install one module at a time in order to identify the module that is responsible for the problem. Replace the defective module.

The rectifier has no output, green indicator lamp "AC OK" is out

- Cause 1: Mains voltage missing. Check that there is mains voltage to the mains input terminals and that the mains breaker is closed.
- Cause 2: Rectifier modules are not properly inserted.

The rectifier has no output, green indicator lamp "AC OK" is lit, yellow indicator lamp "WARNING" is lit and red indicator lamp "ALARM" is off

- Cause 1: Input "EXT. FAULT" is used as external blocking and is in open state.
- Cause 2: The rectifier module has been switched off due to overtemperature. Check that the rectifier modules' ventilation vents are not clogged with dust or other contaminants. Clean where necessary. Check that the ambient temperature is within permitted limits.

The rectifier has no output, green indicator lamp "AC OK" is lit, yellow indicator lamp "WARNING" and red indicator lamp "ALARM" are off

Cause 1: Output fuses has tripped. Check that the output fuses are properly dimensioned to handle the rectifier's rated current.

The rectifier module's green indicator lamp "AC OK" and red indicator lamp "ALARM" are lit

Cause 1: The rectifier module has been switched off due to overtemperature. Check that the rectifier modules' ventilation vents are not clogged with dust or other contaminants. Clean where necessary. Check that the ambient temperature is within permitted limits.

Cause 2: The rectifier module has been switched off due to fan error in the module. Replace the fan or the entire rectifier module.

Cause 3: The rectifier module has been tripped by high output voltage, HVSD (High Voltage Shut Down). Reset by removing power to the module, most simply by extracting the module for a few seconds until all lamps are off, and then re-inserting it again. If the fault reoccurs, the module may be faulty. Replace the rectifier module.

Cause 4: Other internal fault in the rectifier module. Replace the rectifier module.

The rectifier module's red indicator lamp "ALARM" is lit

Cause 1: Unless the cause is obvious, e.g. see the alternatives above, you can show the status of the rectifier module in detail via the display on the monitoring unit, see the *Manual for monitoring unit PCM2*.

The rectifier output voltage is too low

Cause 1: The rectifier load is above its capacity (rated current). This is normal in connection with recharging following deep discharge.

Cause 2: Battery circuit test in progress. This is a test that is normally executed automatically once a day.

Cause 3: The requested charging voltage is close to or above the level of the parameter U_{maximum} . The voltage will be limited 1% below this level. If higher voltage is desired, the setting of the parameter U_{maximum} must be increased, see the *Manual for monitoring unit PCM2*.

Cause 4: High temperature in the battery/battery compartment. Only applicable if the rectifier controls the temperature of the float charging voltage. There is no fault with the rectifier in this case. Look for the fault in the high temperature instead. Alternatively the temperature sensor could be defective. Check whether the display is reporting the correct battery temperature.

Cause 5: Incorrectly set float charging voltage level. Adjust the setting.

Cause 6: Incorrectly calibrated voltage measurement. Recalibrate the monitoring unit's measurement of battery voltage, see the *Manual for monitoring unit PCM2*.

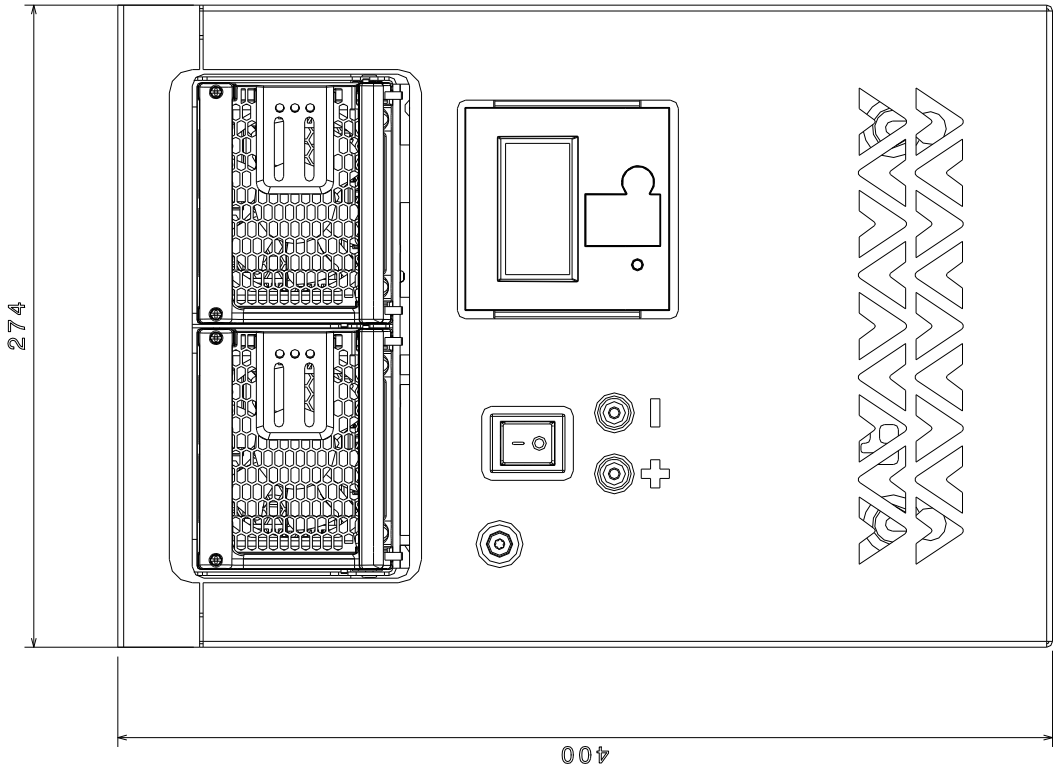
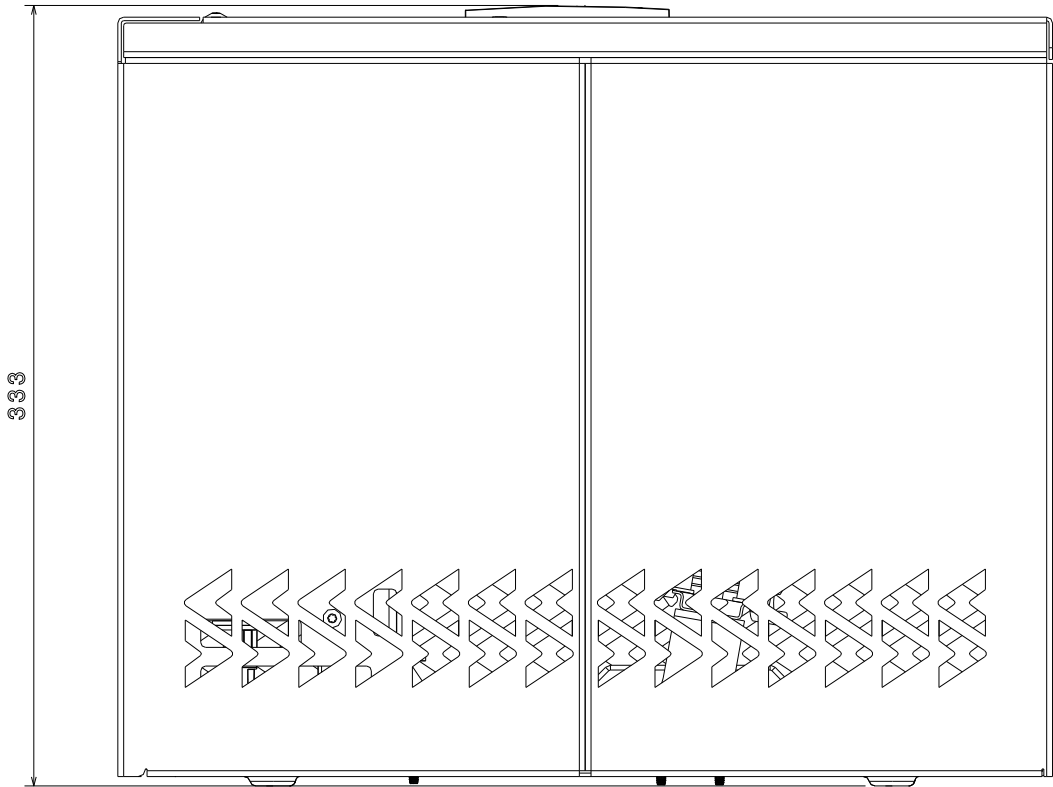
The rectifier output voltage is too high

Cause 1: Equalizing charging in progress. This has either been initiated manually or automatically following a power failure.

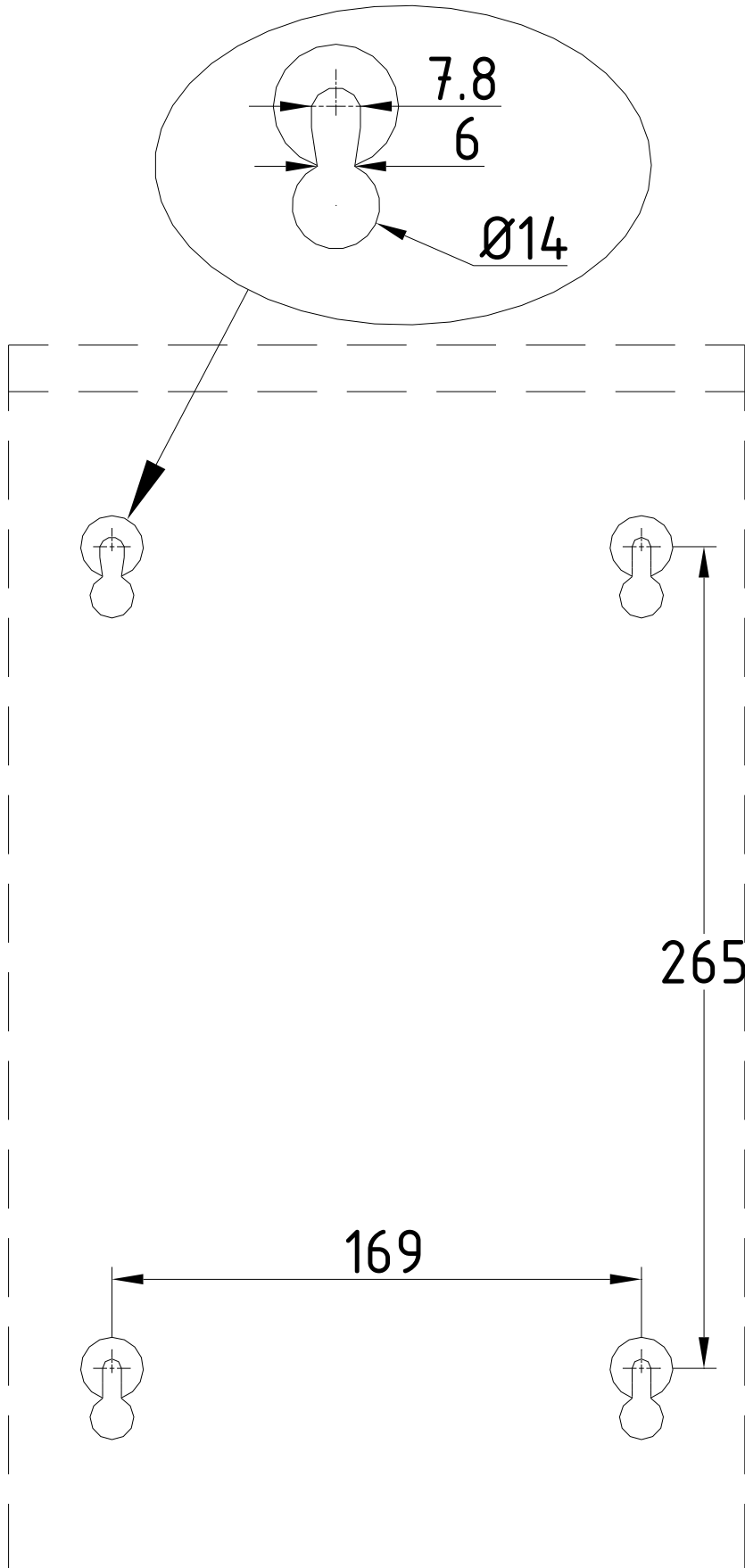
Cause 2: Low temperature in the battery/battery compartment. Only applicable if the rectifier controls the temperature of the float charging voltage. There is no fault with the rectifier in this case. Look for the fault in the low temperature instead. Alternatively the temperature sensor could be defective. Check whether the display is reporting the correct battery temperature.

- Cause 3: Incorrectly set float charging voltage level. Adjust the setting.
- Cause 4: Incorrectly calibrated voltage measurement. Recalibrate the monitoring unit's measurement of battery voltage, see the *Manual for monitoring unit PCM2*.

Appendix A
DIMENSION DIAGRAM

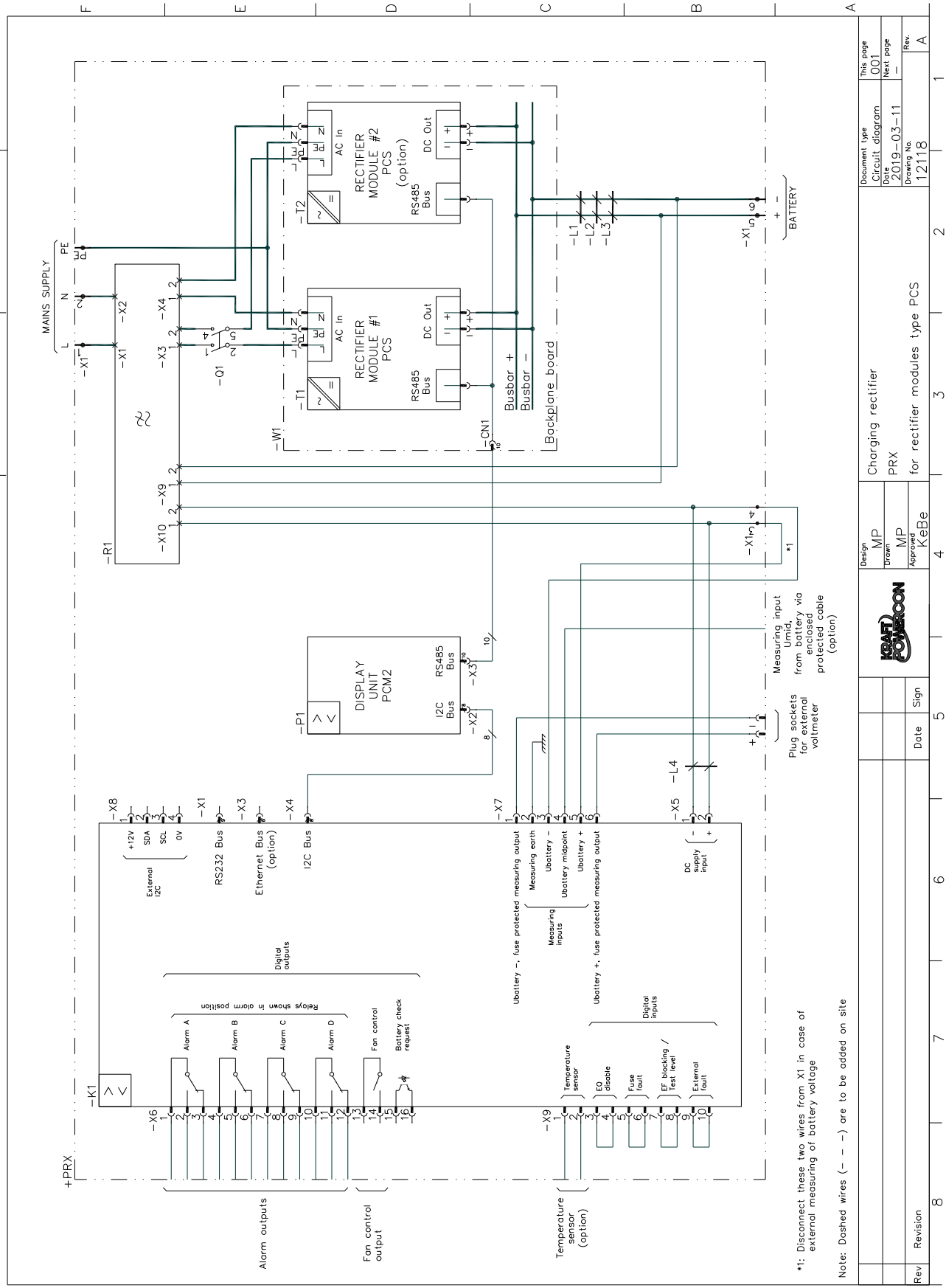


Dimension diagram, external dimensions, PRX



Dimension diagram, mounting holes, PRX

Appendix B CIRCUIT DIAGRAM PRX



*1: Disconnect these two wires from X1 in case of external measuring of battery voltage
 Note: Dashed wires (---) are to be added on site

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Rev	Revision	Date	Sign		Design MP Drawn MP Approved KeBe	Charging rectifier PRX for rectifier modules type PCS	Document type	This page
							Circuit diagram	001
							Date	2019-03-11
							Next page	
							Drawing No.	12118
							Rev.	A

