

# Manual for Inverter system type PCI05



## SAFETY INSTRUCTIONS



This manual must be read **before** installation, use or work on the product.



**This product contains dangerous voltages 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 authorized service personnel. The cubicle may only be opened by authorized personnel. The protective covers and contact safety devices inside the equipment may only be removed by authorized service personnel.

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



**Warning for reverse voltage. Power is supplied from several sources.**

Manual: 9-1705-A  
P/n: 0001130

*We reserve the right to make changes to the content of this manual without prior notification.*

## CONTENTS

|         |                                                 |    |
|---------|-------------------------------------------------|----|
| 1       | PRESENTATION.....                               | 5  |
| 2       | SAFETY INSTRUCTIONS.....                        | 6  |
| 3       | TECHNICAL DATA .....                            | 7  |
| 3.1     | ELECTRICAL DATA .....                           | 7  |
| 3.1.1   | Product line .....                              | 7  |
| 3.1.2   | Common electrical data.....                     | 7  |
| 3.1.3   | Alarm outputs .....                             | 7  |
| 3.1.4   | Electrical data for integrated bypass unit..... | 8  |
| 3.1.5   | Electrical data for manual bypass.....          | 8  |
| 3.2     | ENVIRONMENTAL DATA.....                         | 8  |
| 3.3     | MECHANICAL DATA.....                            | 8  |
| 3.4     | STANDARDS .....                                 | 8  |
| 4       | FUNCTIONAL DESCRIPTION.....                     | 9  |
| 4.1     | GENERAL.....                                    | 9  |
| 4.2     | INVERTER MODULE.....                            | 9  |
| 4.3     | MANUAL BYPASS SWITCH.....                       | 9  |
| 5       | OPERATION .....                                 | 10 |
| 5.1     | GENERAL.....                                    | 10 |
| 5.2     | DC BREAKER .....                                | 10 |
| 5.3     | FUSES .....                                     | 10 |
| 5.3.1   | Fuses for internal protection.....              | 10 |
| 5.3.2   | AC distribution.....                            | 10 |
| 5.4     | MANUAL BYPASS .....                             | 10 |
| 5.5     | BATTERY DIAGRAM.....                            | 12 |
| 6       | INSTALLATION .....                              | 13 |
| 6.1     | SAFETY INSTRUCTIONS.....                        | 13 |
| 6.2     | STORAGE AND PROTECTION .....                    | 13 |
| 6.3     | ERECTION .....                                  | 13 |
| 6.3.1   | General.....                                    | 13 |
| 6.3.2   | Wall model.....                                 | 13 |
| 6.3.3   | Floor model .....                               | 13 |
| 6.4     | ELECTRICAL INSTALLATION.....                    | 14 |
| 6.4.1   | General.....                                    | 14 |
| 6.4.2   | Earthing .....                                  | 14 |
| 6.4.2.1 | Wall model .....                                | 14 |
| 6.4.2.2 | Floor model.....                                | 14 |
| 6.4.3   | Mains supply .....                              | 14 |
| 6.4.3.1 | External fuse rating .....                      | 14 |
| 6.4.3.2 | Connection.....                                 | 14 |
| 6.4.4   | Connection of external load.....                | 14 |
| 6.4.4.1 | Distribution fuses.....                         | 14 |
| 6.4.4.2 | Without integrated AC distribution .....        | 14 |
| 6.4.4.3 | With integrated AC distribution .....           | 14 |
| 6.4.5   | DC supply.....                                  | 15 |
| 6.4.5.1 | External fuse rating .....                      | 15 |
| 6.4.5.2 | Connection.....                                 | 15 |
| 6.4.6   | Signals .....                                   | 15 |
| 6.4.6.1 | Alarm from inverter module .....                | 15 |
| 6.4.6.2 | Mains fault alarm.....                          | 15 |
| 6.4.6.3 | Alarm from AC distribution board .....          | 15 |
| 6.4.7   | Settings for AC distribution board DM199 .....  | 15 |

|       |                                                                  |    |
|-------|------------------------------------------------------------------|----|
| 7     | COMMISSIONING .....                                              | 16 |
| 7.1   | SAFETY INSTRUCTION .....                                         | 16 |
| 7.2   | PREPARATORY INSPECTION .....                                     | 16 |
| 7.2.1 | General.....                                                     | 16 |
| 7.3   | POWERING UP .....                                                | 16 |
| 8     | MAINTENANCE.....                                                 | 17 |
| 8.1   | ANNUAL INSPECTION.....                                           | 17 |
| 8.2   | REPLACEMENT OF INVERTER MODULE DURING OPERATION.....             | 17 |
| 9     | FAULT TRACING .....                                              | 18 |
| 9.1   | POWER FAILURE OR FAULT INDICATION FROM THE INVERTER SYSTEM ..... | 18 |
| 9.2   | LAMP INDICATORS .....                                            | 18 |
| 9.3   | CONTACT INFORMATION, KRAFTPOWERCON SERVICE.....                  | 18 |

## Appendices

- [A LAYOUT AND DIMENSION DRAWING PCI05, FLOOR MODEL](#)
- [B LAYOUT AND DIMENSION DRAWING PCI05, WALL MODEL](#)
- [C CIRCUIT DIAGRAM PCI05](#)
- [D CIRCUIT DIAGRAM AC DISTRIBUTION DM199, MCB](#)
- [E CIRCUIT DIAGRAM AC DISTRIBUTION DM199, DIAZED](#)

## 1 PRESENTATION

The Inverter system type PCI05 is aimed for interconnection with DC systems where uninterruptible mains power is needed, e.g. for computers and process control. The unit consists of an inverter module type INVB with integrated controller for control and monitoring of the system, and a bypass unit for switching to commercial power line in case of a fault. The system also has a manual bypass for safe isolation of the inverter module at service and maintenance.

PCI05 is available for 24/48/110/125/220 V DC, output voltage 115 or 230 V AC, frequency 50 or 60 Hz and output power 500-4000 VA.

The system is mounted in a 19" floor standing or wall hanging enclosure with external connections directly to terminal blocks. It can also be equipped with a nine way AC distribution board.

This manual describes the complete PCI05 Inverter system. To ensure relevant and updated information, please see *Manual for Inverter type INVB* for details regarding the Inverter module itself.

## 2 SAFETY INSTRUCTIONS



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

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

**Authorised service 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 that the content of 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 that the content of 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 Product line

| Input voltage<br>V <sub>DC</sub> |         | Output power | Output power | Output current, maximum<br>A <sub>AC</sub> at 230V <sub>AC</sub> | Input current, maximum<br>A <sub>DC</sub> | Recommended fuse AC <sub>IN</sub> | Recommended output fuse, *<br>maximum<br>A |               |               |               |
|----------------------------------|---------|--------------|--------------|------------------------------------------------------------------|-------------------------------------------|-----------------------------------|--------------------------------------------|---------------|---------------|---------------|
| Nominal                          | min-max | VA           | W            |                                                                  |                                           | min-max<br>A                      | DII<br>type gG                             | MCB<br>type B | MCB<br>type Z | MCB<br>type C |
| 24                               | 19-31   | 500          | 400          | 2.1                                                              | 24                                        | 6-10                              |                                            |               | 1             |               |
|                                  |         | 1000         | 800          | 4.3                                                              | 48                                        | 6-20                              |                                            | 1             | 2             |               |
|                                  |         | 2000         | 1600         | 8.7                                                              | 96                                        | 10-20                             | 2                                          | 3             | 4             | 1             |
| 48/60                            | 38-72   | 500          | 400          | 2.1                                                              | 12                                        | 6-10                              |                                            |               | 1             |               |
|                                  |         | 1000         | 800          | 4.3                                                              | 24                                        | 6-20                              |                                            | 1             | 2             |               |
|                                  |         | 2000         | 1600         | 8.7                                                              | 48                                        | 10-20                             | 2                                          | 3             | 4             | 1             |
|                                  |         | 4000         | 3200         | 17.4                                                             | 96                                        | 20-20                             | 4                                          | 6             | 10            | 3             |
| 110                              | 88-132  | 500          | 400          | 2.1                                                              | 5.3                                       | 6-10                              |                                            |               | 1             |               |
|                                  |         | 1000         | 800          | 4.3                                                              | 11                                        | 6-20                              |                                            | 1             | 2             |               |
|                                  |         | 2000         | 1600         | 8.7                                                              | 21                                        | 10-20                             | 2                                          | 3             | 4             | 1             |
|                                  |         | 4000         | 3200         | 17.4                                                             | 42                                        | 20-20                             | 4                                          | 6             | 10            | 3             |
| 125                              | 88-149  | 500          | 400          | 2.1                                                              | 5.3                                       | 6-10                              |                                            |               | 1             |               |
|                                  |         | 1000         | 800          | 4.3                                                              | 11                                        | 6-20                              |                                            | 1             | 2             |               |
|                                  |         | 2000         | 1600         | 8.7                                                              | 21                                        | 10-20                             | 2                                          | 3             | 4             | 1             |
| 220                              | 178-264 | 500          | 400          | 2.1                                                              | 2.6                                       | 6-10                              |                                            |               | 1             |               |
|                                  |         | 1000         | 800          | 4.3                                                              | 5.1                                       | 6-20                              |                                            | 1             | 2             |               |
|                                  |         | 2000         | 1600         | 8.7                                                              | 11                                        | 10-20                             | 2                                          | 3             | 4             | 1             |
|                                  |         | 4000         | 3200         | 17.4                                                             | 21                                        | 20-20                             | 4                                          | 6             | 10            | 3             |

\* See also section 6.4.4.1 Distribution fuses

##### 3.1.2 Common electrical data

|                                           |                                                                                                  |
|-------------------------------------------|--------------------------------------------------------------------------------------------------|
| Output voltage .....                      | 115/230 V ±5 %                                                                                   |
| Frequency .....                           | 50/60 Hz                                                                                         |
| Frequency deviation.....                  | Synchronized with commercial power line within ±3 Hz<br>Unsynchronized operation: 50,58/60,63 Hz |
| Distortion .....                          | < 2 %                                                                                            |
| Power factor.....                         | 0,8                                                                                              |
| Crest factor.....                         | > 2,5                                                                                            |
| Overload capability .....                 | 125 % 12 seconds, 150 % 3 seconds                                                                |
| Short-circuit current (without bypass)... | > 2xI <sub>n</sub> 2,5 seconds                                                                   |
| Efficiency .....                          | > 88 % at nominal load                                                                           |
| Connection DC input.....                  | 0,75-35 mm <sup>2</sup> , screw terminal block                                                   |
| Connection AC output .....                | 1,5-25 mm <sup>2</sup> , screw terminal block                                                    |
| Connection AC distribution.....           | 0,2-6 mm <sup>2</sup> , screw terminal block                                                     |

##### 3.1.3 Alarm outputs

|                            |                                                                                                                                                                                                   |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Inverter module.....       | See <i>Manual for Inverter type INVB</i>                                                                                                                                                          |
| Mains fault .....          | 230 V <sub>AC</sub> , 3 A, inductive<br>24 V <sub>DC</sub> , 2 A, inductive                                                                                                                       |
| AC distribution board..... | Relay, closed circuit working<br>250 V <sub>AC</sub> , 5 A, AC1<br>24/48 V <sub>DC</sub> , 0.3 A, inductive<br>125 V <sub>DC</sub> , 0.15 A, inductive<br>250 V <sub>DC</sub> , 0.12 A, inductive |
| Connection .....           | 0,2-2,5 mm <sup>2</sup> , disconnect screw terminal block                                                                                                                                         |

**3.1.4 Electrical data for integrated bypass unit**

|                      |                                            |
|----------------------|--------------------------------------------|
| Type.....            | Relay (0,5-2 kVA)<br>Static switch (4 kVA) |
| Integrated fuse..... | 10 AT (0,5-2 kVA)<br>20 AF (4 kVA)         |
| Switching time ..... | < 10 ms (0,5-2 kVA)<br>< 4 ms (4 kVA)      |

**3.1.5 Electrical data for manual bypass**

|                        |                                               |
|------------------------|-----------------------------------------------|
| Type.....              | Contactors                                    |
| Switching time .....   | < 20 ms                                       |
| Mains (AC input) ..... | 0,2-10 mm <sup>2</sup> , screw terminal block |

---

**3.2 ENVIRONMENTAL DATA**

|                           |                                                                            |
|---------------------------|----------------------------------------------------------------------------|
| Class of enclosure .....  | IP21 according to EN 60529                                                 |
| Cooling .....             | Speed controlled fans in inverter modules, other items natural air cooling |
| Ambient temperature ..... | -5 to +40°C                                                                |
| Storage temperature ..... | -40 to +70°C                                                               |
| Humidity.....             | < 90 % RH, non-condensing                                                  |
| Altitude (ASL) .....      | < 2000 m                                                                   |
| Sound level .....         | < 60 dBA                                                                   |

---

**3.3 MECHANICAL DATA**

|                                    |                                              |
|------------------------------------|----------------------------------------------|
| Type.....                          | Floor or wall mounted cabinet with 19" frame |
| Erection.....                      | Indoors in dry and clean areas               |
| Weight, floor model .....          | 80 kg                                        |
| Weight, wall model.....            | 40 kg                                        |
| Dimensions, floor model.....       | 1361/600/600 mm (h/b/d)                      |
| Dimensions, wall model .....       | 604/600/500 mm (h/b/d)                       |
| Colour code .....                  | RAL 7035 light grey                          |
| Cable connection, floor model..... | From above and below                         |
| Cable connection, wall model ..... | From below                                   |

---

**3.4 STANDARDS**

|                         |                           |
|-------------------------|---------------------------|
| EN 60529.....           | Degree of protection IP21 |
| EN 60950, VDE 0805..... | Safety                    |
| EN 61000-6-3/4 .....    | EMC (Emission)            |
| EN 61000-6-2 .....      | EMC (Immunity)            |



## 4 FUNCTIONAL DESCRIPTION

---

### 4.1 GENERAL

PCI05 is an inverter system consisting of an inverter module with integrated controller and bypass unit, terminals for external connections and a manual bypass offering the possibility for maintenance with the load still energized. The floor model can also be equipped with a nine way AC distribution board.

### 4.2 INVERTER MODULE

The inverter module converts the incoming DC supply to alternating voltage. In the input stage the input and output are separated galvanically and at the same time the DC voltage is raised and controlled to a level corresponding to the peak output voltage. The DC voltage is converted to AC in an IGBT based bridge. This design offers a robust output with high peak current capability, which ensures low voltage distortion even with nonlinear load

The module measures DC supply voltage, AC output voltage, AC input voltage (mains), frequency and total output power from the inverter. Measured values are used to issue alarms, bypass or switch off parts of the system. Indications on the front panel give information via LED or display depending on model.

The INVB series inverter modules has an integrated bypass unit for switching from normal to backup supply in case of failure of the normal supply.

### 4.3 MANUAL BYPASS SWITCH

The manual bypass switch bypasses the inverter module to make it possible to disconnect the module for maintenance. With this integrated switch the bypass is performed by means of a contactor, which first disconnects the output of the inverter module and then connects the mains input to the load. The changeover gives a short voltage interruption of a couple of ms, which means that the bypass can be done even if the inverter is not synchronized to the mains. However, in order to minimize the risk of disturbances we recommend that the inverter module is switched to mains mode before changeover (see section [5.4.1](#)).

## 5 OPERATION

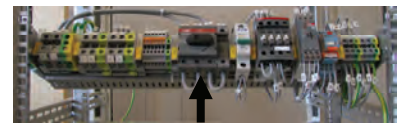
### 5.1 GENERAL

This chapter describes the operation of the inverter system in general. For a more detailed description of the inverter module, please see *Manual for Inverter type INV.B*. Please study the sections that describe the operation of the inverter module before first start of the system.

The system parts beside the inverter module are a breaker for DC input, an MCB, a mains voltage monitoring relay and a manual bypass. The latter makes it possible to switch off the complete system, still keeping the load energized.

### 5.2 DC BREAKER

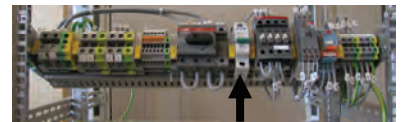
Q1 is a breaker for the input battery power. It is mainly aimed for service purposes of the inverter module.



### 5.3 FUSES

#### 5.3.1 Fuses for internal protection

The MCB F1 is a protection for the control and indication of the manual bypass.



#### 5.3.2 AC distribution

As an option, the PCI05 can be supplied with a nine way AC distribution board of the type DM199. The fuses can be of either fuse links of type Diazed DII or MCB:s.

Each fuse way in the distribution board is equipped with zero voltage monitoring and a LED indicator. A general common alarm is connected to terminal blocks. Individual unused fuse ways can be de-activated, see section INSTALLATION INSTRUCTIONS.



The LED indicators have the following function:

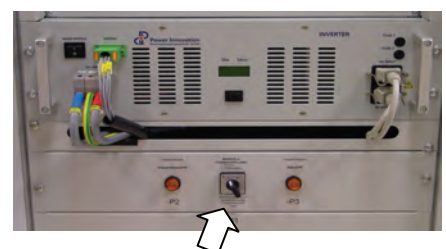
- Green - Fuse way OK
- Red - Fuse fault
- Off - Monitoring de-activated

On the left short side is a folding plastic pocket with fuse list. The list is normally empty by delivery. For a template in Excel format, please contact KraftPowercon Sweden AB.



### 5.4 MANUAL BYPASS

The inverter system is equipped with a manual bypass. The manual bypass switch is used to release the inverter module for maintenance on the system, still keeping the load energized.



Manual bypass is performed as follows:

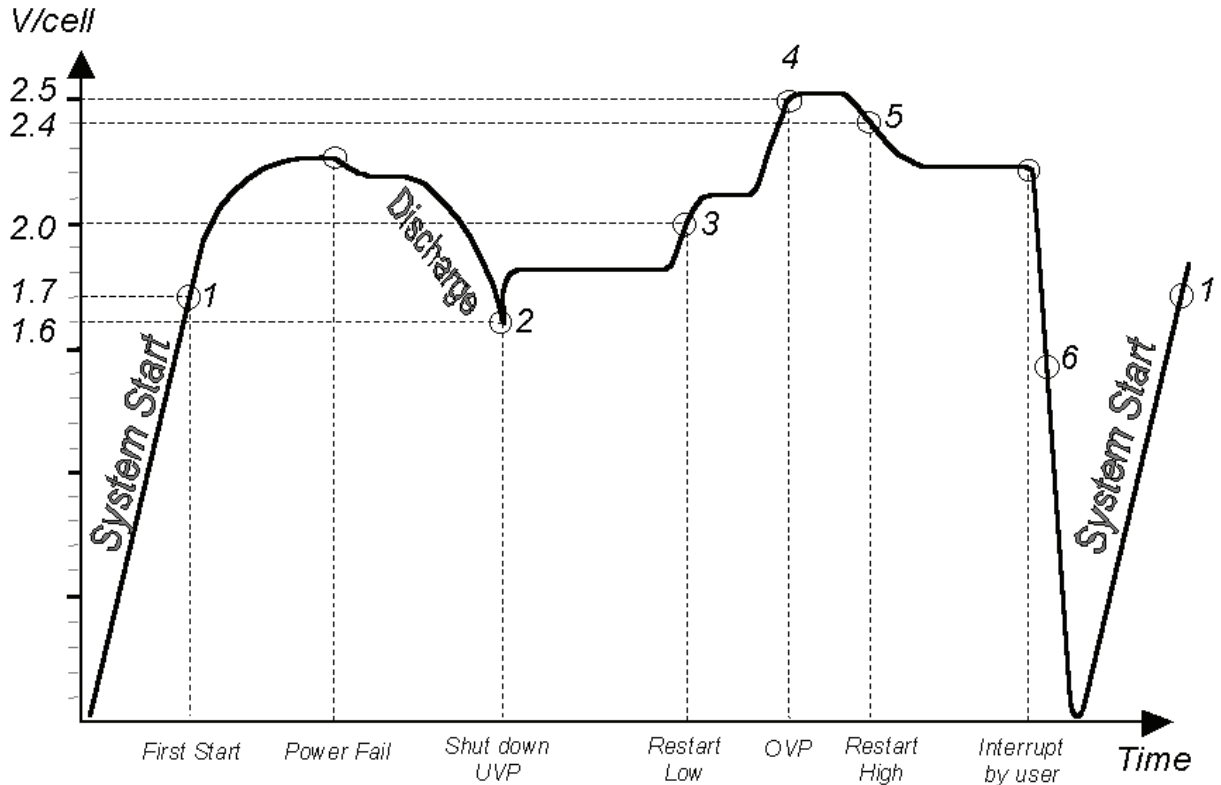
1. Starting position: Bypass switch (at the arrow) is in position 1 (Normal), lamps indicate "Inverter in Inverter mode".  
In case of an inverter fault the lamps should instead indicate " Inverter in Mains mode". In that case, go directly to paragraph 4.
2. Set the inverter module into Mains mode. The procedure is somewhat different between the different inverter models, therefore see *Manual for Inverter type INVB* if needed.
3. Verify that the lamps now indicate "Inverter in Mains mode".
4. Turn the bypass switch in position 2 (Bypassed).
5. The inverter module can now be turned off safely, still keeping the load energized.  
Note: At maintenance or replacement of the inverter module, also turn off the DC breaker before the connections on the front of the inverter module are removed.

Return to inverter mode:

1. Starting position: Bypass switch is in position 2 (Bypassed), the inverter module is turned off.
2. Turn on the DC breaker.
3. Turn on the inverter module. After a short while the inverter should have synchronized with the commercial power line and will then automatically switch over to inverter mode.
4. Verify that the lamps now indicate Inverter in Inverter mode.
5. Turn the bypass switch in position 1 (Normal).

For operation otherwise of the inverter module itself, please see *Manual for Inverter type INVB*.

**5.5 BATTERY DIAGRAM**



**First Start (1)**

To start up the entire system, the "First Start" limit has to be reached and exceeded at the DC input terminals.

**Shut down UVP (2)**

The inverter is shut down when undervoltage protection level "UVP" is reached, in order to avoid deep discharge of the battery cells.

**Reset Low (3)**

After inverter shut down due to "UVP", the DC level has to reach "Restart Low" level before it is switched on again.

**OVP (4)**

At voltage level "OVP", the inverter is shut down (overvoltage protection) as a protection.

**Restart High (5)**

If the inverter has been shut down due to "OVP", it will be switched on again, after DC voltage has decreased to "Restart High".

**Reset (6)**

If the inverter is cut off from the batteries (for example, the user switches off the DC breaker Q1), the terminal voltage drops below "Reset" voltage limit. The limit for a system restart is reset to "First Start" level.

## 6 INSTALLATION

---

### 6.1 SAFETY INSTRUCTIONS



**DANGER!** This product contains dangerous voltages 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 section 2, [SAFETY INSTRUCTIONS](#)).



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

---

### 6.2 STORAGE AND PROTECTION

Storage is to be in a dry area and at a temperature within the -40 to +70 °C range.

---

### 6.3 ERECTION

#### 6.3.1 General

The equipment is intended for placement in a dry, clean environment that is free from conductive dust.

#### 6.3.2 Wall model

The cabinet is intended to be hung on a wall. Suitable wall mounting brackets are enclosed to facilitate mounting. Note that they have to be used in order to ensure sufficient air flow for cooling. Loosen the screw located on the left side of front (see arrow on picture) and open the cabinet. Attach the mounting brackets on the back of the cabinet with two screws for each bracket. Close the cabinet and fix with the screw. The cabinet can then easily be hooked on to suitable fixing screws in the wall.



Cable intake is from below.



**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.

#### 6.3.3 Floor model

The cabinet is intended for placement on floor and is equipped with levelling feet adjustable up to 25 mm in height.

Note that the cabinet has air outlets also on the rear why there must be minimum 50 mm free space to the wall to ensure sufficient air flow.

Cable inlets are by an opening on the bottom of the cabinet or by an FL21 opening on the top.

## 6.4 ELECTRICAL INSTALLATION

### 6.4.1 General

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

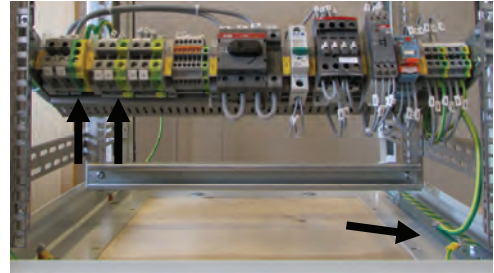
### 6.4.2 Earthing

#### 6.4.2.1 Wall model

Terminals for earth connection are located close to incoming DC and AC. Connection of equipotential bonding can be done via M5 welding studs on the inside of the cabinet.

#### 6.4.2.2 Floor model

Terminals for earth connection are located close to incoming DC and AC. Connection of equipotential bonding can be done via bolt holes on the main earth bar (see picture, right arrow).



### 6.4.3 Mains supply

#### 6.4.3.1 External fuse rating

The rating of the mains fuse depends on several factors. The maximum output current of the system is shown in the table in section 3.1. This gives the maximum fuse rating in the following distribution board that can be blown within the allowed time according to the trigger conditions. The mains fuse is chosen so that discrimination is achieved between mains and distribution fuses, which in practice usually mean a fuse link. The table in section 3.1.1 states a recommended range. Beyond this, the integrated bypass switch of the inverter module has internal fuse links as short-circuit protection.

#### 6.4.3.2 Connection

The mains supply is connected to terminals X2:1-2. If the supply is direct grounded (type TN) the neutral shall be connected to X2:2

### 6.4.4 Connection of external load

#### 6.4.4.1 Distribution fuses

Maximum distribution fuse rating (output fuse) is based on a tripping time of maximum 50 mS in order to avoid that objects of other fuse ways will regard an eventual short-circuit as an interruption. See table in section **Fel! Hittar inte referenskälla.** for recommended maximum fuse rating. Note that for fuse links (Diazed type DII), the recommendation is based on brand IFÖ of type Eco gG. For other brands the curve may differ and hence give a different result.

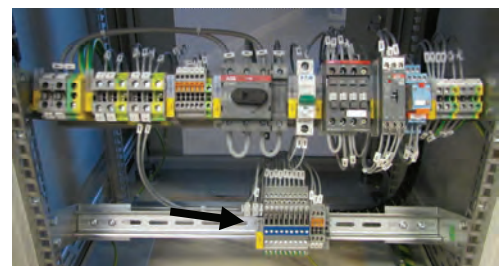
#### 6.4.4.2 Without integrated AC distribution

The load is connected to terminals X2:3 (L) and X2:4 (N).

#### 6.4.4.3 With integrated AC distribution

Terminals X21:1-9 is connections for each output of the AC distribution board of type DM199. Every fuse way has a connection for phase, neutral and protective earth.

Terminals 19-21 are output for a general alarm from the distribution board, see also section 6.4.6.



## 6.4.5 DC supply

### 6.4.5.1 External fuse rating

Normally, the fuse rating should be close above the maximum input current of the system, as shown in the table of section [3.1](#).

### 6.4.5.2 Connection

The DC supply is connected to terminals X1:1 (+) and X1:2 (-). Make sure the polarity is correct!

## 6.4.6 Signals

### 6.4.6.1 Alarm from inverter module

Relay 1 of the inverter module has a floating change-over contact connected to terminal X3:1-3. The function is as follows:

|                                                       |                                                    |
|-------------------------------------------------------|----------------------------------------------------|
| <b>Alarm</b> - X3:2 open<br>Closed between X3:1 and 3 | <b>Ok</b> - X3:3 open<br>Closed between X3:1 and 2 |
|-------------------------------------------------------|----------------------------------------------------|

### 6.4.6.2 Mains fault alarm

The mains power (AC input) is monitored by relay K3 and timer K2. A mains fault generates an alarm after about 2 minutes (default) on terminal X3:4-6.

|                                                       |                                                    |
|-------------------------------------------------------|----------------------------------------------------|
| <b>Alarm</b> - X3:6 open<br>Closed between X3:4 and 5 | <b>Ok</b> - X3:5 open<br>Closed between X3:4 and 6 |
|-------------------------------------------------------|----------------------------------------------------|

### 6.4.6.3 Alarm from AC distribution board

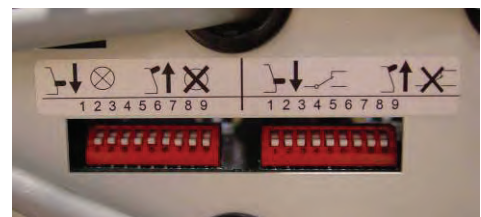
Tripped fuse in the AC distribution board causes a general alarm on terminal X21:19-21.

|                                                            |                                                         |
|------------------------------------------------------------|---------------------------------------------------------|
| <b>Alarm</b> - X21:19 open<br>Closed between X21:21 and 20 | <b>Ok</b> - X21:20 open<br>Closed between X21:21 and 19 |
|------------------------------------------------------------|---------------------------------------------------------|

## 6.4.7 Settings for AC distribution board DM199

Settings available for distribution board DM199 are enable/disable of alarms for each single fuse way. The reason for disabling is to avoid that unused fuse ways causes alarm. The alternative to disabling is to switch on MCB or equip with fuse links for unused fuse ways.

Enabling/disabling of alarm indication and alarm output is done via two DIL switches located on the rear of the distribution board (see picture). They are equipped with nine separate switches, each numbered from 1 to 9 corresponding to fuse way 1 to 9. The left DIL switch (seen from behind according to picture) manages the LED indicators and the right manages the alarm output (alarm relay). Switch lever in downward position means normal position (enabled) while lever in upward position result in unlit LED and blocking of alarm output (disable).



## 7 COMMISSIONING

---

### 7.1 SAFETY INSTRUCTION



**DANGER!** *This product contains dangerous voltages that when touched can cause electric shock, burns or death. All contact safety devices and plates must be fitted when operating.*

---

### 7.2 PREPARATORY INSPECTION

#### 7.2.1 General

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 all protective covers are intact, all breakers are switched off and all fuses are removed or switched off. Ensure that the power switch (battery switch) on the front of the inverter is switched off and that the manual bypass switch is in position "Normal".

---

### 7.3 POWERING UP

Turn on the DC power source (Q1 still switched off) and check polarity in terminal block X1.

Switch on DC breaker Q1.

Turn on mains power.

Switch on the MCB F1.

Switch on the power switch (battery switch) on the front of the inverter module.  
The inverter should now provide power and the lamps indicate "Inverter in Inverter mode".

Switch on or install fuses in the AC distribution board.  
The LED indicators for each fuse way should now change colour from red to green.

---



## 8 MAINTENANCE

---

### 8.1 ANNUAL INSPECTION

Normally, periodic maintenance of the inverter system is not necessary. Although, it is a good habit to check the system in a regular base in order to avoid future operational disruptions. Check that all fans in the inverter module are rotating by sensing the airflow with your hand close to the air intakes. Also check that the air intakes are free from dust and clean if needed. Listen for abnormal sound from the fan bearings. Normally the fans need not to be replaced during the lifetime of the product and are therefore not easily replaced on site. We recommend that the units are sent to KraftPowercon Sweden AB in case of fan failure.

---

### 8.2 REPLACEMENT OF INVERTER MODULE DURING OPERATION

An inverter module can be replaced during operation provided that the system has been switched into mains mode by manual bypass (see section 5.4). Instruction for replacement:

1. Switch over to mains mode (load supplied from commercial power line) according to section 5.4.
2. Turn off the inverter module by the power switch (battery switch) on the front of the module.
3. Switch off DC-breaker Q1. Ensure that the DC power is completely disconnected by measuring on the DC terminals on the front of the inverter module.
4. Disconnect the DC cables from the terminals on the front of the inverter module.
5. Disconnect both of the AC connectors on the front of the inverter module.
6. Unscrew the inverter module and pull it out of the rack.
7. Slide the new inverter module into the rack and fasten it with the mounting screws.
8. Connect the DC supply with cables to the DC input terminal blocks on the front of the inverter module. Mind the polarity.
9. Reconnect both of the AC connectors on the front of the inverter module.
10. Switch on DC-breaker Q1.
11. Turn on the inverter by the power switch (battery switch) on the front of the inverter module.
12. Switch over to inverter mode according to section 5.4.

## 9 FAULT TRACING

---

### 9.1 POWER FAILURE OR FAULT INDICATION FROM THE INVERTER SYSTEM

In case of fault or fault indication of the inverter system, check the following:

- Does the inverter module show any fault message? If yes, see manual for the inverter module for further fault tracing.
- Check that the power switch (battery switch) on the front of inverter module is switched on (1 = on).
- Check that the DC power breaker Q1 is switched on.
- Check that the auxiliary power MCB (-F1) is switched on.
- Check that there is DC voltage present by measuring on the terminals of the inverter module.
- Check input AC voltage and frequency by measuring as close to the connectors on the inverter module as possible.

Should the actions of above not solve the problem, please contact KraftPowercon Service.

---

### 9.2 LAMP INDICATORS

If both the lamps (-P1 and -P2) has gone off, the reason could be one of the following:

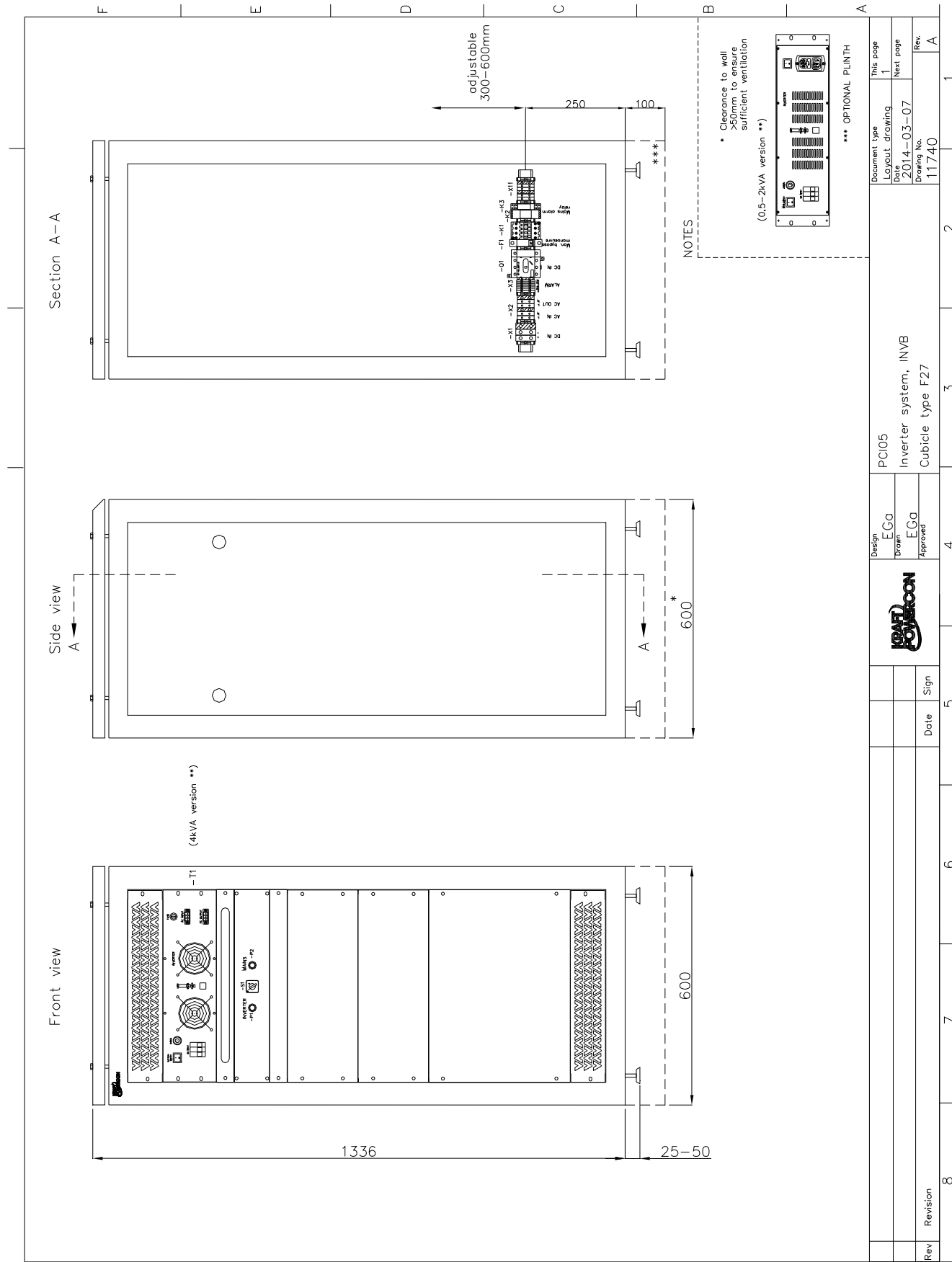
- The system has no proper mains supply.
- A lamp is broken, check the lamps.
- The auxiliary power MCB (-F1) has tripped, search for a fault in the auxiliary power circuit.

---

### 9.3 CONTACT INFORMATION, KRAFTPOWERCON SERVICE

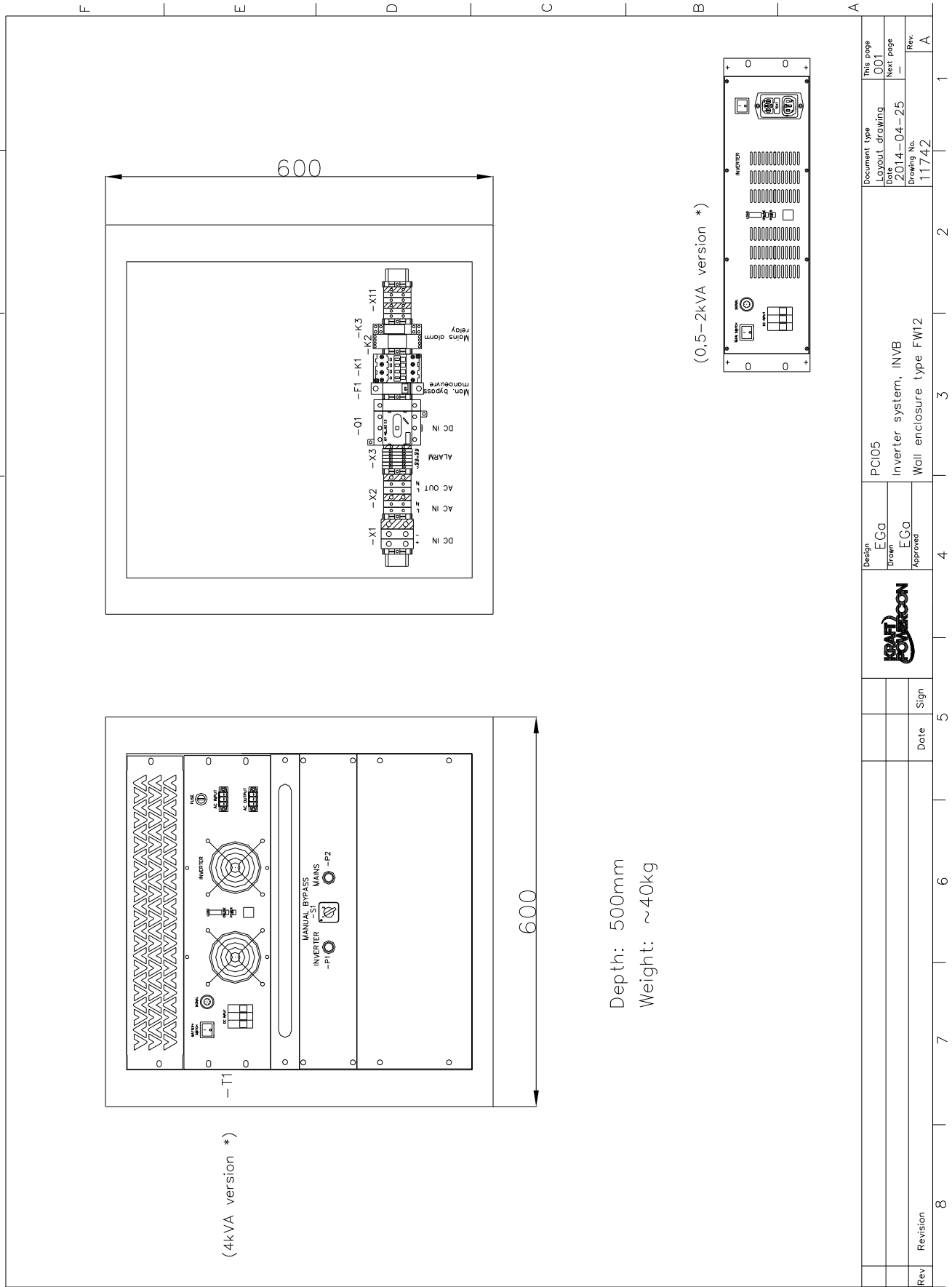
KraftPowercon UPS Service  
[service.vaxjo@kraftpowercon.com](mailto:service.vaxjo@kraftpowercon.com)  
Tel: +46 470-70 52 20

# Appendix A LAYOUT AND DIMENSION DRAWING PCI05, FLOOR MODEL



We reserve all rights in this document and the information contained therein. Reproduction, use or disclosure to third parties without express authority is strictly forbidden.  
© KraftPowercon Sweden AB

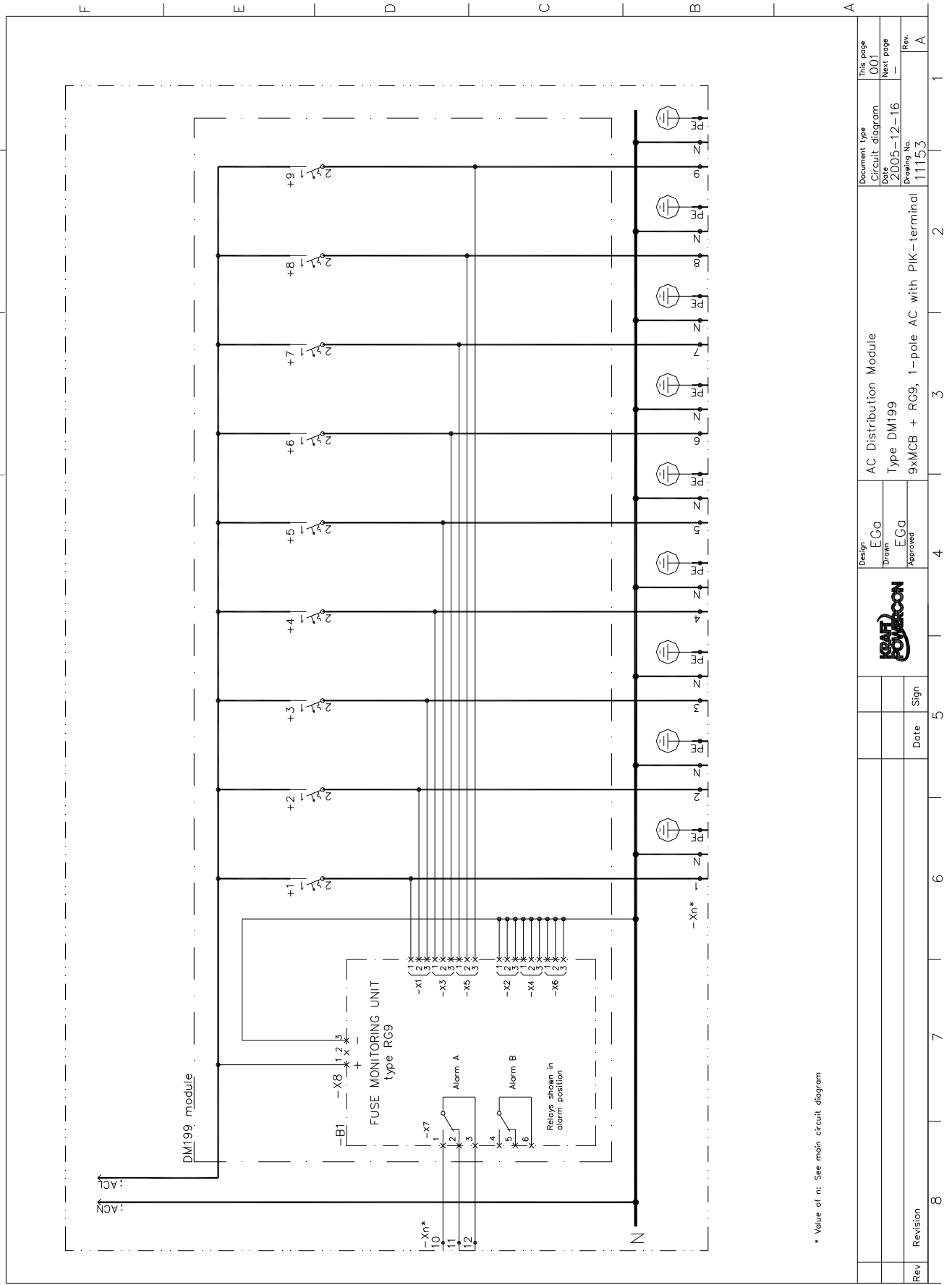
# Appendix B LAYOUT AND DIMENSION DRAWING PCI05, WALL MODEL



We reserve all rights in this document and in the information contained therein. Reproduction, use or disclosure to third parties without express authority is strictly forbidden.  
© KraftPowercon Sweden AB

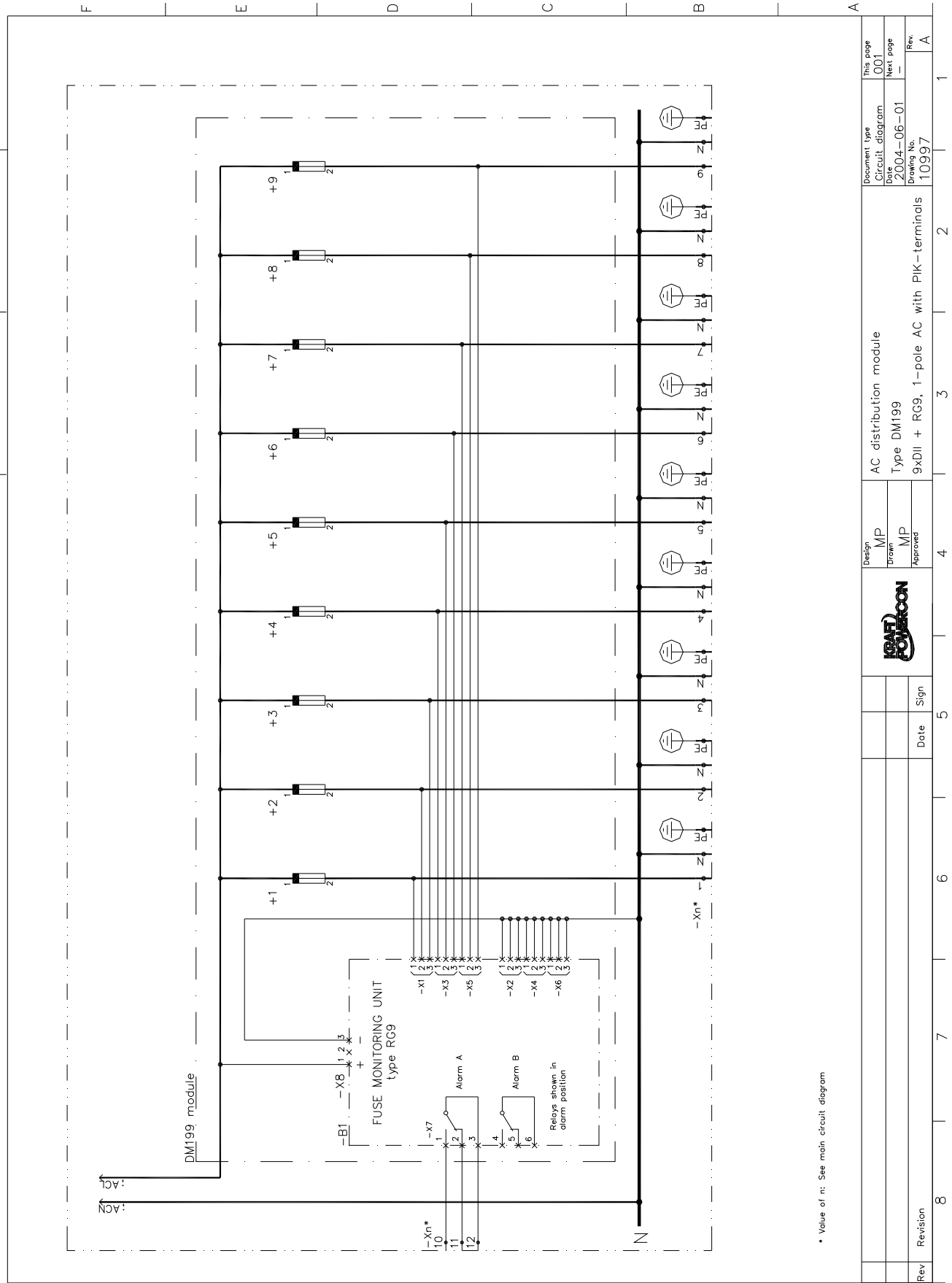


# Appendix D CIRCUIT DIAGRAM AC DISTRIBUTION DM199, MCB



We reserve all rights in this document and in the information contained herein. Reproduction, use or disclosure to third parties without express authority is strictly forbidden.  
© KraftPowercon Sweden AB

# Appendix E CIRCUIT DIAGRAM AC DISTRIBUTION DM199, DIAZED



\* Value of n: See main circuit diagram

We reserve all rights in this document and the information contained therein. Reproduction, use or disclosure to third parties without express authority is strictly forbidden.  
© KraftPowercon Sweden AB

|     |          |      |      |        |       |          |                                                                                   |                                  |                  |
|-----|----------|------|------|--------|-------|----------|-----------------------------------------------------------------------------------|----------------------------------|------------------|
| Rev | Revision | Date | Sign | Design | Drawn | Approved | AC distribution module<br>Type DM199<br>9XDII + RG9, 1-pole AC with PIK-terminals | Document type<br>Circuit diagram | This page<br>001 |
|     |          |      |      | MP     | MP    | MP       |                                                                                   | Date<br>2004-06-01               | Next page<br>-   |
|     |          |      |      |        |       |          |                                                                                   | Drawing No.<br>10997             | Rev.<br>A        |

