

# PM50/PM80 Installation manual



## Warranty

All Polyamp DC/DC converters are warranted against defective material and workmanship. This warranty is valid for 24 months from the date of delivery. We will repair or replace products, which prove to be defective during the warranty period. The warranty is valid only if the converter is used within specification.

## Manual

This manual is as complete and actual as possible at the time of printing. However, the information may have been updated since then. Polyamp AB reserves the right to make changes in this manual without notice.



The exclamation point within an equilateral triangle is intended to alert the user to presence of important operating and maintenance instructions in the literature accompanying



The lightning flash with arrowhead, within an equilateral triangle, is intended to alert the user to presence of uninsulated "dangerous voltage" within the products enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons

### Caution!

To prevent the risk of electric shock, do not open enclosure. No serviceable parts inside. Refer servicing to qualified service personnel only



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## 1 Before installation

On the front panel label the following is displayed: Converter type name, input voltage range, nominal output voltage, serial number, article number and batch number. The converter type name consists of model name PM50 or PM80 followed by input code and output voltages. Two examples:

- "Type: PM50B15-15" has input code "B" and nominal output voltage 2x(12-16) Vd.c.
- "Type: PM80 110/24-24" has input code "110" and nominal output voltage 2x24Vd.c.

Input, outputs and case are galvanically separated from each other. The two outputs are also galvanically separated from each other. You can thus choose how you want the system connected.

The input is protected against reverse polarity by a parallel diode at the input on models with input code A, B, 24 and 48. This diode, however, is only intended to blow an external input fuse. C, D, 110 and 220 input codes have a series diode.

The input shall be fused with an approved fuse with a slow blow characteristic and high breaking capacity. See *Table 1*.

PM50 input fuses	
Input voltage code	Time delay fuse
A	T 6.3 A H, 250
B	T 4A H, 250
C	T 1.6 A H, 250
D	T 1A H, 250

PM80 input fuses	
Input voltage code	Time delay fuse
24	T 5A H, 250
48	T 3,15 A H, 250
110	T 1.6 A H, 250
220	T 0.63 A H, 250

**Table 1. Recommended input fuses.**

There are two reasons we do not include the fuse.

1. DC-networks should be fused at the distribution point to protect the cable.
2. Different applications require different types of fuses.

If the converter is mounted in an electric vehicle, an external series diode on the input is recommended. Please contact your Polyamp dealer.

If the converter supplies a DC-motor, we recommend an external parallel diode at the motor poles to protect against reverse voltages.

For the disconnection ability, an external disconnection device, which is able to disconnect both polarities, shall be incorporated with the input power supply cord. The disconnection device must be properly labelled and easy accessible

## 2 Installation

The converter is supplied with mounting brackets. With these you can mount the converter in any direction on a wall or on a DIN 35mm rail.

The converter is convection cooled and in order to get sufficient cooling there shall be a minimum of 30 to 50 mm space around the converter. If this is not possible, we recommend the use of an external fan.

Note that the expected life of the converter is dependant on converter temperature. For every 10°C that the temperature is lowered the expected life is approximately doubled. It is therefore crucial to cater for good ventilation and if possible to reduce ambient temperature.

To meet the EMC specifications in the enclosed "declaration of conformity" use twisted-pairs for connecting input and output. Shielded cables are not necessary.

1. Connect protective earth to the connection marked no 17. Use a ring terminal that has been crimped by an appropriate tool.
2. Connect the output. The converter outputs are short-circuit proof by a constant current limit which works unlimited in time.
  - Use the supplied jumpers according to Connecting the outputs for series, parallel or master/slave operation on page 5.
  - If the converter is to be connected in parallel with another unit at the output, please consult Parallel connection of two converters or more on page 5.
3. Connect the input cables. Bundle input cables together at the terminals separated from the output cables. Make the same arrangement on the output side. This is to make sure one cable will not bridge the insulation barrier in case of coming lose.
4. Start the converter with your external input disconnection device.
 

**Beware of hazardous voltages!**
5. The output voltage can be adjusted with the potentiometer marked "V.ADJ" on the front panel. Clockwise turn increases the output voltage. The potentiometer has one (1) turn.

- When the converter is disconnected, switch-off the input voltage with the disconnecting unit. Disconnect the input cables first, then output and last the protective case connection.

### 3 Connecting the outputs for series, parallel or master/slave operation

You can choose how the two (2) outputs of the converter shall be connected with the jumpers that are supplied with the converter. Connect the jumper(s) as drawn in *8* to configure the outputs in series, parallel or a master/slave configuration with or without isolation between the two outputs. "15-15" output are adjusted to 12.0Vd.c. at delivery.

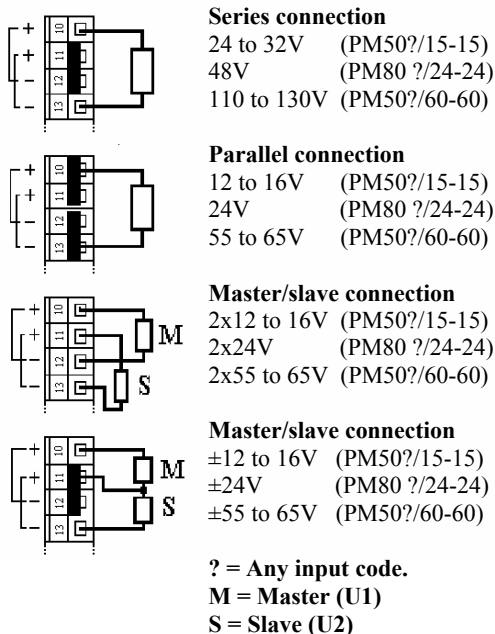


Figure 1. Output connections

If you have connected the outputs master/slave, the master should be the output with the heaviest load, as this is the regulated output.

### 4 Parallel connection of two converters or more

If the converter is to be connected in parallel at the output with another unit we recommend the use of an external series diode. A series diode is necessary if the output is connected in parallel with another power supply or if you require redundant operation. If a converter breaks down with an internal short-

circuit on the output and other converters are connected in parallel on the output, the broken unit will short-circuit the others if the series diode is not used. This might cause excessive heat or even fire in the faulty unit.

### 5 Isolation voltage test

Each converter has been isolation tested in factory before delivery. The isolation voltage depends on nominal inputs and outputs, see *table 2*.

**Warning! An isolation test shall only be performed by personnel aware of the dangers and hazards of the test.**

Input code	Isolation In/out, In/case	Isolation out/case	Isolation out1/out2
24, 48, A, B	2.0kVd.c.	1.0kVd.c.	500Vd.c.
110, 220, C, D	2.5kVa.c.	1.0kVd.c.	500Vd.c.

Table 2. Isolation voltages on different converters.

#### 5.1 DC isolation test output to case

- Disconnect all cables from the converter.
- Connect the input terminals of the converter to case.
- Connect the output terminals together.
- Connect your isolation tester between output and case. See *7*. Raise the voltage of the isolation tester from 0 to 1000Vd.c. Check that the leakage current does not exceed 5µA. The voltage should not be applied for more than a few seconds or the Y-capacitors might be damaged.
- Turn off the isolation tester and discharge the test voltage with a 10 MΩ resistor between output and case.

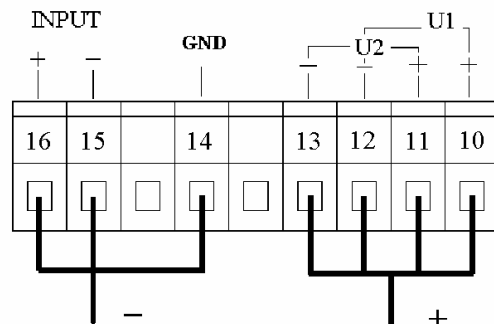


Figure 2. Output to case isolation voltage test

### 5.2 DC isolation test input to output and input to case

1. Disconnect all cables from the converter.
2. Connect the output terminals of the converter to case.
3. Connect the input terminals together.
4. Connect your isolation tester between input and case. See 7. Raise the voltage of the isolation tester from 0 to 2000Vd.c. Check that the leakage current does not exceed 5µA. The voltage should not be applied for more than a few seconds or the Y-capacitors might be damaged.
5. Turn off the isolation tester and discharge the test voltage with a 10 MΩ resistor between input and case.

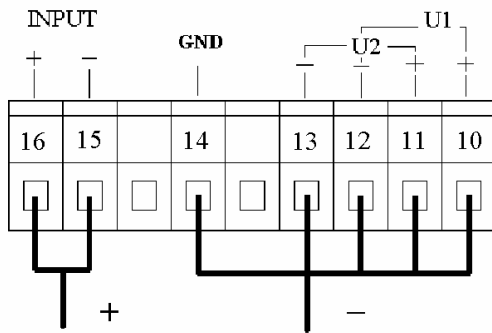


Figure 3. Input to output and input to case isolation voltage test

### 5.3 AC isolation test input to output and input to case

You can also test 2500Va.c. for one (1) minute between input to output and case on units with input codes 110, 220, C and D.

**Beware of the rather high capacitive earth currents (about 50mA) that will occur during this test.**

If your isolation test equipment cannot supply this current, you can perform a DC isolation test with 4000Vd.c (2500V x  $\sqrt{2}$  x 1.1  $\approx$  4000Vd.c where 1.1 = safety factor). Follow the instructions in 5.2 DC isolation test input to output and input to case above but test with 4000Vd.c. instead of 2000Vd.c. The leakage current should not exceed 5µA.

AC isolation test:

1. Disconnect all cables from the converter.
2. Connect the output terminals of the converter to case. See 7.
3. Connect the input terminals together.
4. Connect your isolation tester between input and case. See 7. Raise the voltage of the isolation tester from 0 to 2500Va.c. The voltage should

not be applied for more than one (1) minute or the Y-capacitors might be damaged.

5. Turn off the isolation tester and discharge the test voltage with a 10 MΩ resistor between input and case.

### 5.4 DC isolation test output1 to output2

1. Disconnect all cables from the converter.
2. Connect the input terminals of the converter to case.
3. Connect the output "U2" terminals to case.
4. Connect the output "U1" terminals together.
5. Connect your isolation tester between output "U1" and case. See 7. Raise the voltage of the isolation tester from 0 to 500Vd.c. Check that the leakage current does not exceed 5µA. The voltage should not be applied for more than a few seconds or the Y-capacitors might be damaged.
6. Turn off the isolation tester and discharge the test voltage with a 10 MΩ resistor between output "U1" and case.

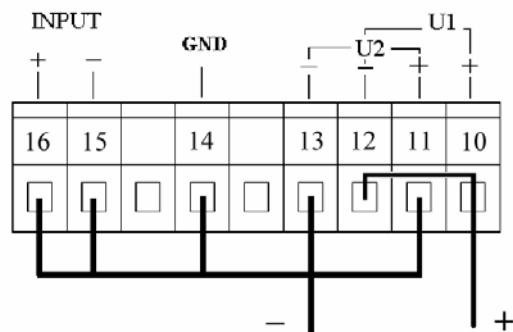


Figure 4. Output "U1" to output "U2" isolation test

## 6 Trouble shooting

### 6.1 There is no output voltage

1. Check that the input fuse is not broken.
2. Check that the input voltage polarity is correct.
3. Check that the input voltage is within the specified limits, see front label.
4. The converter may be in current limit due to excessive output current or an external short-circuit on the output.
  - Disconnect the input.
  - Disconnect the load.
  - Connect the input again and measure the output voltage.

If the converter now starts the load was too heavy or there was a short-circuit.

- If there is an external short-circuit, remove it.
- If the load is too large, decrease the load or consult your Polyamp dealer.

5. The unit is broken. Contact your Polyamp dealer.

### **6.2 The input fuse blows when the input is connected**

1. Check that the input voltage polarity is correct.
2. Check that the input fuse is of time delay type and with correct current rating. See *Table 1*.
3. The unit is broken. Contact your Polyamp dealer.

### **6.3 The converter starts and stops repeatedly**

1. The converter may be in current limit due to excessive output current, a too capacitive load or an external short-circuit on the output.
  - Disconnect the input.
  - Disconnect the load.
  - Connect the input again and measure the output voltage.

If the converter now starts the load was too heavy or too capacitive or there was a short-circuit.

- If there is an external short-circuit, remove it.
- If the load is too large, decrease the load or consult your Polyamp dealer.
- If the load is too capacitive (approximately  $>1000\mu\text{F}$ ), consult your Polyamp dealer.

### **6.4 Fault report**

We suggest that you return a faulty converter to:

POLYAMP AB  
Box 229 / Bäckgatan 10  
S-597 25 ÅTVIDABERG  
SWEDEN

Tel: +46 120 85400

Fax: +46 120 85405

Or to your local Polyamp distributor.

To help us locate the fault, please describe the fault and how and when it occurred.