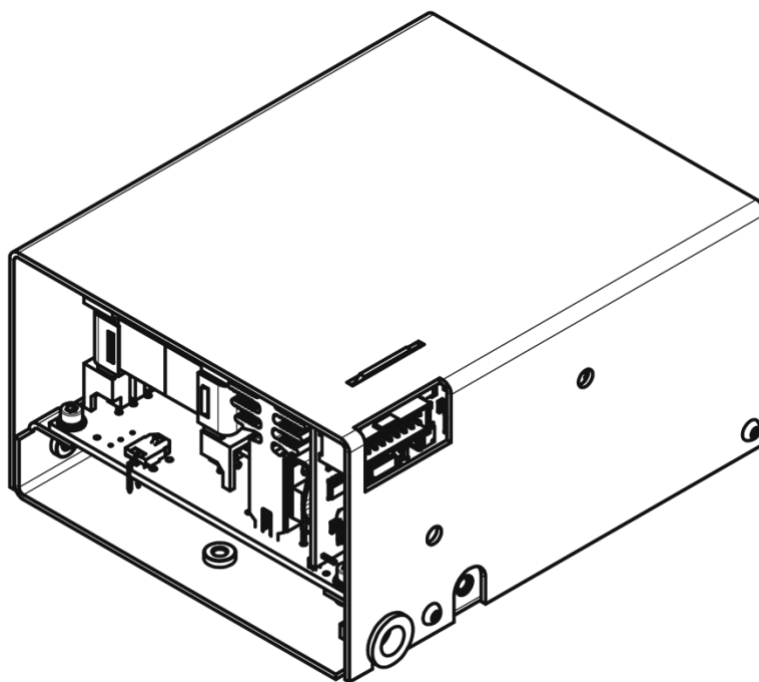


PCP-07 capacitor charging module

User manual



Warning! This equipment might be dangerous.
Please read this user manual before starting any operations.

Important note. Module is sensitive to the reverse polarity applied to the output. If you aren't sure in your application, please contact the factory for the details.

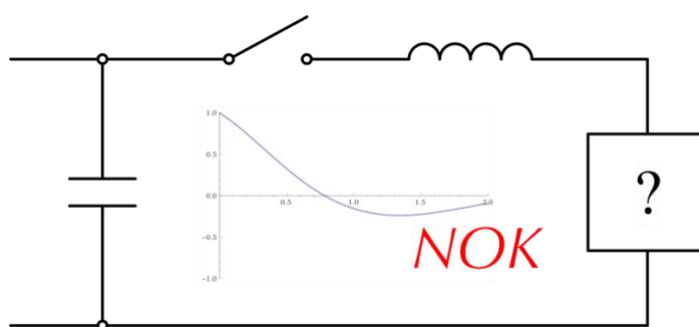
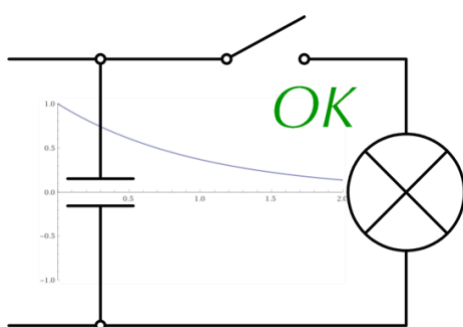


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Overview / Appearance

The PCP-07 capacitor charging module is a high-frequency switch-mode converter, which transforms DC input (rectified mains) to a regulated high voltage DC output to charge capacitors.

Output power is over 700W for modifications with partial discharge (PD) and over 500J/s for modifications with complete discharge (CD). Output voltage is customer defined in the range up to 1500V (2000V on request).

The module is “industrial grade” and is not recommended for use in medical or aesthetic systems.



Cooling

The module does not have an embedded fan. Forced air cooling is required using an external fan.

Contents of delivery

By default, the following items are supplied as standard:

- PCP-07 capacitor charging power supply – 1pc
- Mating INTERFACE cable (0.3m length) – 1pc

Connectors, pins, interface signals

INPUT:

Red thick wire – 300V DC positive

Black thick (**blue** thick) wire – 300V DC negative

HV OUTPUT:

Red thin wire – HV OUTPUT positive

Black thin (**blue** thin) wire – HV OUTPUT negative

GROUND: M4 thread

The module should be grounded using this thread. This should be done before connecting the module to the mains.

Grounding policy

HV OUTPUT negative and INTERFACE return are internally connected to each other, but (important) both aren't connected to the chassis ground. If necessary, you can connect them to the chassis yourself.

Other grounding policies are available on request.

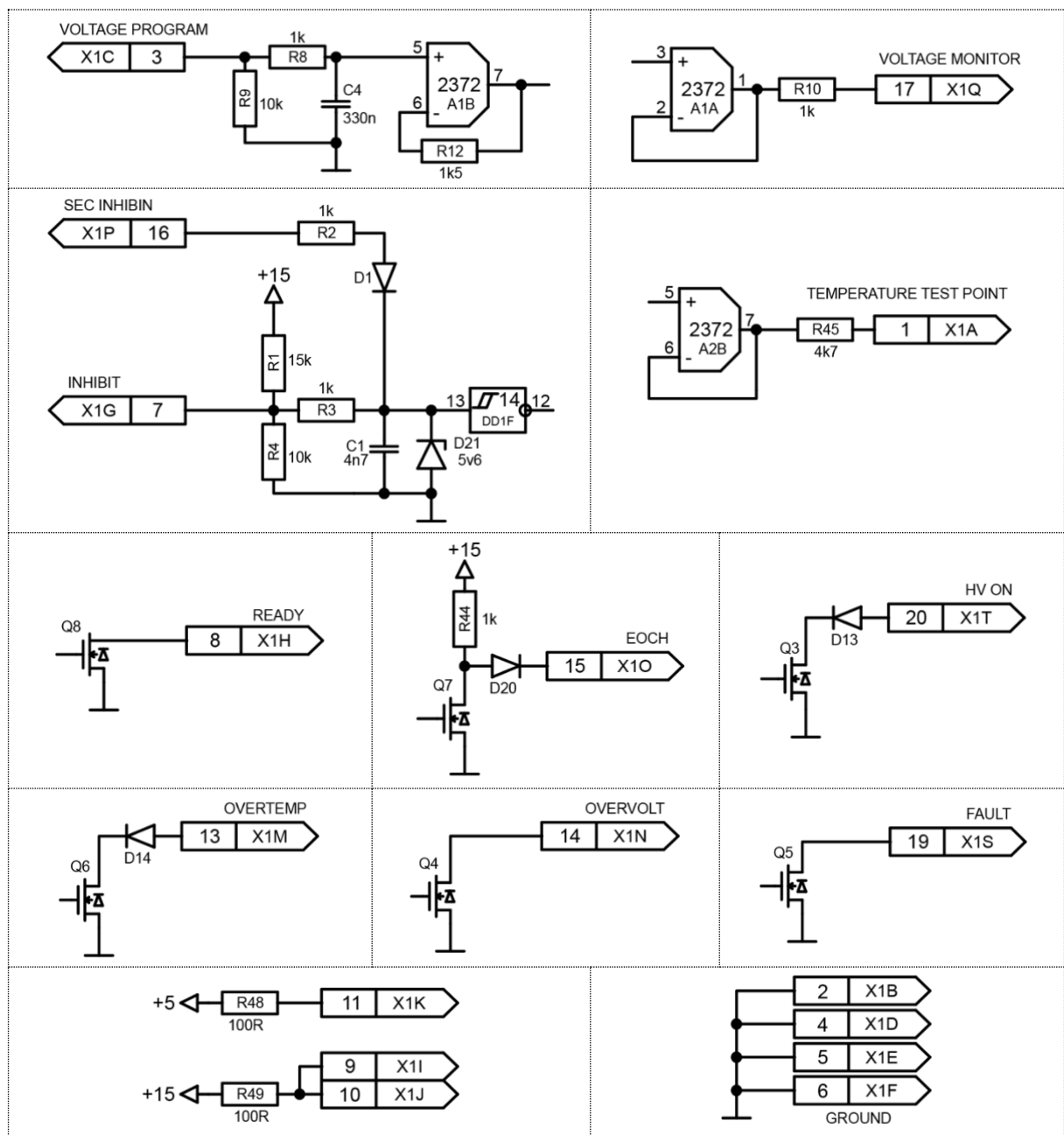
INTERFACE: MOLEX 0901301120

19	17	15	13	11	9	7	5	3	1
20	18	16	14	12	10	8	6	4	2

PIN (color)	DESIGNATION	DESCRIPTION
1 (-)	TEMP Test point	Test point for the module internal temperature. N/A by default but can be supplied on request.
2,4,5,6 (black)	Ground	PINS 2,4,5,6 are connected to the circuit ground of all internal circuits. The return signal connection for all interface signals should be made to one of these pins.
3 (yellow)	Voltage Program	A positive DC voltage applied to this pin controls the output voltage set point. 0-10V corresponds to 0-V _{MAX}
7 (blue)	INHIBIT	The high voltage output is inhibited or enabled by this pin. 0V – enabled; 5V or free-standing – inhibited.
8 (green)	Ready Indicator	This pin is pulled to ground, when the output voltage is equal to the program voltage (or higher than the program voltage).
9, 10 (red)	+15 V	These pins provide +15V DC that may be used for status LEDs etc. Maximum output current 50mA.
11 (orange)	+5 V	This pin provides +5V DC that may be used for status LEDs etc. Maximum output current 50mA.
12, 18	N/C	-
13 (white; black mark)	Over TEMP	This pin is pulled to ground if the module overheats (70-90 °C in dependence on exact model).
14 (white; blue mark)	Over Voltage Status	This pin is pulled to ground when overvoltage occurs. The high voltage output is also disabled when this occurs.
15 (green / yellow)	End of Charge Indicator	PIN15 is pulled to ground when the output voltage below the program voltage. Elsewhere PIN15 is pulled to +15V.
16 (blue / white)	Secondary Inhibit	The HV OUTPUT is inhibited (when +15V are applied) or enabled (when 0V are applied or the pin is free standing). This pin only should be used to control parallel operation of two or more power modules.
17 (violet)	Voltage Monitor	The voltage at this pin is a buffered signal proportional to the instantaneous output. 0-10V corresponds to 0-V _{MAX} Current capability 1,5mA; R _{out} = 1kOhm.

19 (white; red mark)	Fault Indicator *	This pin is pulled to ground when a fault is detected. The high voltage output is disabled when this occurs. Failures: • output short-circuit • overtemperature • overvoltage • output open circuit • charge timeout
20 (transparent)	HV ON Indicator	This pin is pulled to ground when the module is supplying power to the load.

* see also **Faults** section



Safety

Warning! This equipment produces high voltages that can be very dangerous.
Be careful in a high-voltage appliances area.

- During operations all the protective covers must be securely in place and all the electrical connections must be properly attached.
- The PCP-07 is designed to be installed inside a properly grounded metal case. It is the customer's responsibility to ensure that personnel are prevented from accidental contacting of the PCP-07 capacitor charger and its high voltage cables. **Casual contact could be fatal!**
- Do not handle the capacitance load until it has been discharged. Use an appropriate meter to check for complete discharge.
- Disconnect the module from the mains before making or changing any electrical or mechanical connections.

Operations

1. *Inhibit* the high voltage output (*PIN7* of *INTERFACE*).
2. Set the desired output voltage by applying a DC voltage to the *Voltage Program* (*PIN3* of *INTERFACE*).
3. Apply power to the module.
4. *Enable* the high voltage output (*PIN7* of *INTERFACE*).
5. Operate, then *Disable* the high voltage output, then disconnect the module from the mains.

Faults

Module sets *Fault* state in the following cases:

- *overheating* (the module temperature exceeds the maximum allowed level)
- *overvoltage* (the voltage on the load exceeds 110% of V_{MAX} level)
- *short-circuit* at module's output (the triggering threshold is about 0.8-1.0s)
- *open-circuit* at module's output
- *charging timeout* (default value is about 5s, other timeouts can be set on request)

For most faults, once the Fault has occurred, eliminate the cause and "reboot" the module (this means to *DISABLE* module and *ENABLE* it again).

Exceptions:

- for *open-circuit* failure one should remove the power from the module and apply it again
- for *overheating* failure, the module can start operating again if the temperature drops rapidly (i.e. faster than in 5-10s) to the low level of the hysteresis loop

Specifications

ELECTRICAL

Input:	
Voltage	300VDC (rectified 230VAC)
Output:	
Maximum output voltage (V_{MAX})	User selectable in 300-1500V range (up to 2000V on request)
Maximum output power	>700W (can be achieved in regime 70-100% V_{MAX} , 230VAC input, 25 °C, partial discharge modifications) >500J/s (can be achieved in regime 0-100% V_{MAX} , 230VAC input, 25 °C, complete discharge modifications)
Stability	0.5% of V_{MAX}
Pulse to pulse	0.5% of V_{MAX}
Efficiency	More than 85%
PFC coefficient	~ 0.90
Protections:	From open-circuit From short-circuit From over-temperature From over-voltage Shut down on charging timeout
Cooling	Forced-air (external fan required)
Environment:	
Operation temperature	+10... +40 °C
Storage temperature	-20 ... +60 °C

Humidity	<90%, non-condensing
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MECHANICAL

Dimensions	Approx. 145x123x72mm (see also the dimensional drawing below)
Weight	Approx. 1.0kg

Dimensions

[illegible]

How to order?

PCP-07-XXXX-YY, where

XXXX means V_{MAX} voltage (user selectable in 300V-1500V range, up to 2000V on special request)

YY means either CD (complete discharge modification) or PD (partial discharge modification); if YY is missed PD modification will be supplied

Examples (the most popular modifications):

PCP-07-300V-PD	300V, partial discharge
PCP-07-500V-PD	500V, partial discharge
PCP-07-700V-PD	700V, partial discharge
PCP-07-1000V-PD	1000V, partial discharge
PCP-07-1000V-CD	1000V, complete discharge
PCP-07-1500V-CD	1500V, complete discharge

Other modifications are available on request.