POLYAMP

- A secure part of your system

DC/DC Converters
PC2000 series
1000 to 2000 W

INPUT / OUTPUT

- Optimized input voltage ranges
- Input ranges from 20 to 300 Vd.c.
- Single outputs from 24 to 48 Vd.c.
- Inrush current limit
- Reverse input voltage protection

FEATURES

- Current sharing
- External output voltage sense
- Overvoltage protection OVP
- Alarm circuit with relay
- Inhibit input / Power down
- Output voltage adjustable on front panel

OPERATION

- Operating temperature range -25 to +55 °C
- High efficiency > 89%
- Convection cooled 1000 W
- Fan cooled up to 1400 to 2000 W

EMC

- EN IEC 61000-6-3, Emission.
- EN IEC 61000-6-2, Immunity.
- EN IEC 61000-4-3, 20 V/m
- EN IEC 61000-4-4, 4 kV.
- EN IEC 61000-4-5 level 2 & 3.
- EN 50121-3-2 train

INPUT			
Nominal inputs	**Input range**	**Stop level**	**Code**
24 Vd.c.	20 - 32 V	<16.8 V	24
48 Vd.c.	43 - 60 V	< 33.6 V	48
110 Vd.c.	93 - 150V	< 77 V	110
220 Vd.c.	187 - 300 V	< 154 V	220

Other input ranges can be made on demand.
Input range, is the range we guarantee full output performance, Uout +10%, Iout +5%.
The converter works down to the stop levels.
The output voltage might decrease to approx. -10% of nominal output at the stop level.

OUTPUT		
Voltage	**Current**	**Power**
24 V	42 - 58 A	1000 - 1400 W
28 V	36 - 50 A	1000 - 1400 W
36 V*	28 - 39 A	1000 - 1400 W
48 V	21 - 42 A	1000 - 2000 W
53.3 V	19 - 37 A	1000 - 2000 W

** NRE might be changed*

OUTPUT RATING & TYPE CODE

DC OUTPUT			DC INPUT				
Voltage	Current	Power	20 - 32 V	43 - 60 V	93 - 150 V	187 - 300 V	Cooling
24 V	42 A	1000 W	PC1000 24/24	PC1000 48/24	PC1000 110/24	PC1000 220/24	Convection
24 V	58 A	1400 W		PC1400 48/24	PC1400 110/24	PC1400 220/24	Fan
28 V	36 A	1000 W	PC1000 24/28	PC1000 48/28	PC1000 110/28	PC1000 220/28	Convection
28 V	50 A	1400 W		PC1400 48/28	PC1400 110/28	PC1400 220/28	Fan
36 V*	28 A	1000 W	PC1000 24/36	PC1000 48/36	PC1000 110/36	PC1000 220/24	Convection
36 V*	39 A	1400 W		PC1400 48/36	PC1400 110/36	PC1400 220/36	Fan
48 V	21 A	1000 W	PC1000 24/48	PC1000 48/48	PC1000 110/48	PC1000 220/48	Convection
48 V	42 A	2000 W		PC2000 48/48	PC2000 110/48	PC2000 220/48	Fan
53 V	19 A	1000 W	PC1000 24/48	PC1000 48/53	PC1000 110/53	PC1000 220/53	Convection
53 V	37 A	2000 W		PC2000 48/53	PC2000 110/53	PC2000 220/53	Fan

** NRE might be changed*

How to read our product code:
Example PC1000 110/48
PC1000 = Family code and power
110 = Input voltage code 110
48 = Output voltage 48 V

FEATURES

Current Sharing

Current sharing is used to balance the load between up to 10 units working in parallel.

External output voltage sense

External sense is used when the voltage regulation at the load is critical. See output data page 3. The sense can compensate voltage drops up to 5% of the nominal voltage.

Alarm circuit

The alarm relay switches to “ALARM” state if:

- The output voltage is not within -10 to +15% of nominal output voltage.
- The converter is overheated

Over voltage protection OVP

A second regulation circuit takes over in case the main regulation fails. The output voltage is limited to approximately +15% over nominal output voltage.

Inhibit input / Power down

The converter will shutdown if the inhibit input is short circuit by a relay or electrical switch. The current through the short-circuit is 20mA. Note that there is no electrical isolation between the inhibit and the output.

Inrush current limit and reverse voltage protection

All models have an inrush current limit circuit. In case the input is connected in reverse voltage the converter will not start. The reverse voltage do not damage the input of the converter.

Electrical Safety Installation Class

The PC2000 series can be installed in different networks, see page 4.

OPTIONAL FEATURES

Series diode on output

Specify series diode output when the output is connected in parallel with other power supplies to achieve redundancy.
The output is derated 10% on 24V and 5% on 48V.

Conformally coating

For use in weather protected area with high ambient humidity or large temperature gradients producing condensation.

Train input

Input voltage range according to train standard EN50155 and IEC60571. See T-inputs below.

T-INPUT RANGES FOR MOBILE APPLICATIONS

INPUT			
Input	Uin range S1	Uin 0.1s S2	Code
24 V	16.8 - 32 V	14.4 - 33.6 V	24T
36 V	25.2 - 45 V	21.6 - 50.4 V	36T
48 V	33 - 60 V	28.8 - 69 V	48T
72 V	50.4 - 90 V	43 - 101 V	72T
110 V	77 - 138 V	66 - 154 V	110T

GENERAL DATA | INPUT DATA

LABEL	VALUE
Design topology	Push-Pull
Switching frequency	60 kHz
Emission / Immunity	See page 4
Safety EN IEC 60950-1:2001	See page 4
Humidity	5 - 85% non condensing
Ingression Protection IP PC1000 PC1400, PC2000	 IP30 IP20
Max. accepted input ripple[1] 50 - 400 Hz	2 % of nominal voltage
Input power at no load: Input code 24 Input code 48, 110 Input code 220	 < 8 W <17 W <21 W
Reverse input voltage protection	In start-up sequence[2]
Inrush current limit	Iin < 10 x Inom
Dimensions (D x W x H)	285 x 420 x 87 mm
Weight	8.5 kg

1. Higher ripple affects the input, contact factory
2. The converter do not start at reverse voltage
3. The output ripple might increase to 0.5% RMS of Vout, when IEC 61000-4-3, 20 V/m test is applied
4. Relay is also rated 300 Vdc 20 mA, switch current depends on voltage
5. Lowest efficiency measured within the whole input voltage range at 100% load
6. Contact factory for derating as depends on model. The alarm relay can not be used at +70 °C

OUTPUT DATA

LABEL	VALUE
Source regulation	0.1%
Load regulation (0 to 100% load) with sense connected	0.2%
Load regulation (0-100% load)	0.5%
Transient recovery time for 10 to 90% load step to within 3% of nominal output voltage.	<3 ms
Output ripple (120 kHz) Vp-p[3]	Typ. 30 mV
Input ripple attenuation to output 50 to 400 Hz	150:1
Emission / Immunity	See page 4
Temperature coefficient	0.02%/°C
Min output adjustment range adjustable with a 15 turn potentiometer	95 - 110%
Current limit, rectangular	105%
Remote sense	Yes
Softs start	Yes
Alarm relay rating (a.c. & d.c.)	30 V 300 mA[4]
Start up time	< 3 s
Hold up time, contact factory	2 - 25 ms
Efficiency[5]	89 - 93%
Operating temperature range at 100% load. (Convection cooling) with derating[6]	-25 to +55°C -25 to +70°C
Storage temperature range	-40 to + 85°C

PC1000/2000 19"-rack mounted 2U using standard brackets L89-3
Convection cooled case

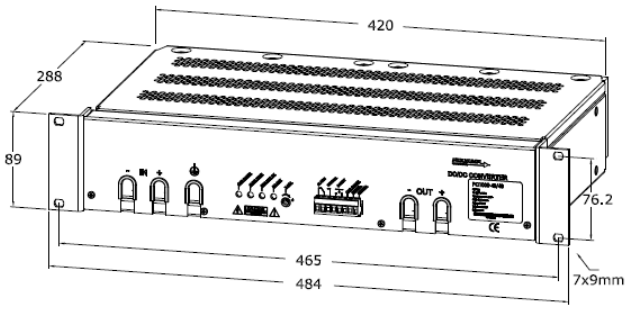
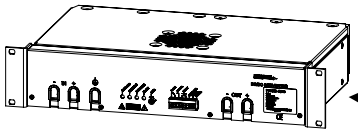
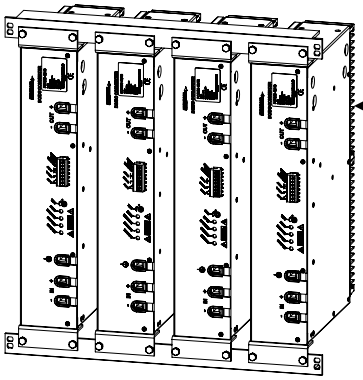


Figure 1. Main dimensions [mm] and weight 8.5 kg



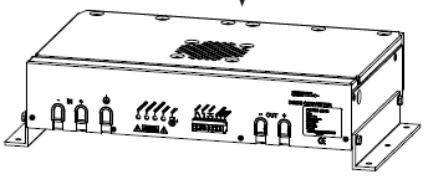
Single unit PC1400/2000 mounted as one 19" unit using standard brackets L89-3
Fan cooling case



4 units PC1000/2000 mounted vertically in 19" rack using standard brackets L89-3 and L480-2 (Optional)

Figure 2. 19"-rack, horizontal or vertical mounting

PC1000/2000 wall mounted. using mounting brackets L216-1 (Optional),
Fan cooling case



PC1000/2000 wall mounted. Using mounting brackets L100-1 (Optional)

PC1000 wall mounted.
Convection cooling case

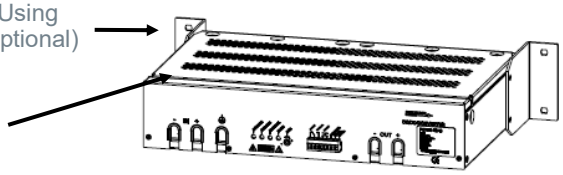


Figure 3. Wall mounting

CE MARK

PC2000-series meets the requirements defined by CE mark as an apparatus.

This means they meet requirements stated by EMC directive and low voltage directive (LVD) as well as 2015/863 (RoHS 3) directive.

PC2000-series is in respect to EMC, as stand alone unit. Can also be installed in any other environment by a professional installer.

Please note that product standards can demand different levels or other basic standard tests. We test according to levels below. For higher levels or other tests, contact factory.

PC2000-series use the electric safety standard EN IEC 61204-7:2018. On EMC it meets the requirements of EN IEC 61204-3:2018, and the generic EMC standards:

EN IEC 61000-6-2 (Immunity)
EN IEC 61000-6-3 (Emission)

SAFETY STANDARD

NETWORK	INSTALLATION	INPUT CODE
Primary circuit	Class II (1)	110, 220
Primary circuit	Class I (2)	110, 220
Secondary circuit	Class I (2)	all
SELV circuit	Class I (2)	24, 48

1. Pollution degree 2 2. Pollution degree 3

ISOLATION TESTABLE LEVELS		TEST VOLTAGE
Input/Output	Input code 24, 48, 72 Input code 110, 220	2.5 kVd.c. 3 kVa.c.| 4.3 kVd.c.
Input/Alarm	Input code 24, 48, 72 Input code 110, 220	2.5 kVd.c. 3 kVa.c.| 4.3 kVd.c.
Input/Case	Input code 24, 48, 72 Input code 110, 220	2.5 kVd.c. 3 kVa.c.| 4.3 kVd.c.
Alarm/Case	Input code 24, 48, 72 Input code 110, 220	2.5 kVd.c. 3 kVa.c.| 4.3 kVd.c.
Output/Case	On <75 Vd.c. output	2.5 kVd.c.
Output/Alarm		2.5 kVd.c.

EMC

EMC STANDARDS	TEST VOLTAGE		NOTES
Emission standards	**EN IEC 61000-6-3**		**Commercial and light-industrial environments**
	Input	**Output**	
EN 55016 CISPR16 (0.15 - 30 MHz)	OK	OK	Optional EN 55022 level B
EN 55016 CISPR16 (30 - 1000 MHz)	OK		Enclosure test
Immunity standards	**EN IEC 61000-6-2**		**Industrial environments**
EN IEC 61000-4-2	8 kV | 15 kV		Connectors | Air, Enclosure test
EN IEC 61000-4-3, see note 3	20 V/m AM-modulated		Output ripple can increase to 0.5% of Vout. Enclosure test
EN IEC 61000-4-4	±4 kV	±4 kV	
EN IEC 61000-4-5 Input code 24,48, 72 Input code 110, 220	±0.5 kV | ±1 kV ±1 kV | ±2 kV	±0.5 kV | ±1 kV ±0.5 kV | ±1 kV	Line-line 2 Ω | Line-case 12 Ω See note 4
EN 50121-3-2 train	±1 kV | ±2 kV	±0.5 kV | ±1 kV	Line-line 42 Ω | Line-case 42 Ω
EN IEC 61000-4-6	10 V_{RMS}	10 V_{RMS}	AM-modulated
EN IEC 61000-4-8	20 A/m		Enclosure test
EN IEC 61000-4-10	Not sensitive		Enclosure test

3. 10 V/m do not show any influence.
4. Higher level 2 kV / 4 kV with external filters, contact factory.
We use the EMC product standard "Low voltage power supplies DC output" EN 61204-3 as base for measurement principles. The Immunity EMC levels are elevated in order to comply to EN 50121-3-2 (IEC 62236-3-2) Railway application: Rolling stock – Apparatus, and EN 50121-4 (IEC 62236-4) , Railway application: Signaling and telecommunication apparatus. Also to meet relevant parts of IEC 61000-6-5 Generic Standards – Immunity for power stations and substation environments.

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