



PHI-CON

# 12 W DC-DC Converter P12C-Series

- 2:1 Wide Input Range
- 1600 V<sub>DC</sub> Isolation
- MTBF >1 Mio. h
- Continuous Short Circuit Protection
- Efficiency up to 91%
- Soft Start
- On/Off remote Control
- Wide Operation Temperature Range -40...85°C



## Model guide

Type	Input voltage		Input current		Output voltage [V <sub>DC</sub> ]	Output current [mA]	Efficiency typ. [%]	Capacitor load [μF] max.
	Nominal [V <sub>DC</sub> ]	Range [V <sub>DC</sub> ]	No load [mA]	Full load [mA]				
<b>Single output</b>								
P12C122R5S	12	9...18	15	890	2.5	0...3500	85	2000
P12C123R3S	12	9...18	15	1145	3.3	0...3500	87	2000
P12C1205S	12	9...18	15	1165	5.0	0...2400	89	2000
P12C1212S	12	9...18	15	1150	12.0	0...1000	90	430
P12C1215S	12	9...18	15	1150	15.0	0...800	90	300
P12C242R5S	24	18...36	15	445	2.5	0...3500	85	2000
P12C243R3S	24	18...36	15	575	3.3	0...3500	87	2000
P12C2405S	24	18...36	15	580	5.0	0...2400	89	2000
P12C2412S	24	18...36	15	575	12.0	0...1000	90	430
P12C2415S	24	18...36	15	575	15.0	0...800	90	300
P12C482R5S	48	36...75	15	225	2.5	0...3500	84	2000
P12C483R3S	48	36...75	15	285	3.3	0...3500	88	2000
P12C4805S	48	36...75	15	290	5.0	0...2400	89	2000
P12C4812S	48	36...75	15	295	12.0	0...1000	88	430
P12C4815S	48	36...75	15	290	15.0	0...800	89	300
<b>Dual output</b>								
P12C1212D	12	9...18	15	1150	±12.0	± 0...500	90	2 x 200
P12C1215D	12	9...18	15	1135	±15.0	± 0...400	91	2 x 120
P12C2412D	24	18...36	15	575	±12.0	± 0...500	90	2 x 200
P12C2415D	24	18...36	15	560	±15.0	± 0...400	91	2 x 120
P12C4812D	48	36...75	15	295	±12.0	± 0...500	88	2 x 200
P12C4815D	48	36...75	15	290	±15.0	± 0...400	89	2 x 120

## Specifications

<b>Input</b>	
Filter	Pi Network
Reflected input current	20 mA <sub>p-p</sub> (see figure 1)
Start up time with R-load	20 ms typ.
Remote CTRL on/off, Pin1 (See figure 4)	On: 3...12 V or open input Off: 0...1.2 V Standby idle current 5 mA typ.
<b>Isolation:</b>	
Rated voltage (for 60 s)	Input to output: 1600 V <sub>DC</sub> Case to input/output: 1600 V <sub>DC</sub>
Resistance	10 <sup>9</sup> Ω
Capacitance	1200 pF, typ.
<b>Output</b>	
Voltage accuracy	± 1.2 %, max.
Line regulation	± 0.5 %, max.
Load regulation 0...100% load	P30CxxxS: ± 0.5 %, max. P30CxxxD: ± 1 %, max.
Cross regulation	± 5 %
Ripple and noise (at 20 MHz BW)	85 mV <sub>p-p</sub> , max. (See figure 2)
Over current limiting	150 % of I <sub>out</sub> , max.
Temperature coefficient	± 0.02 % / °C
Short circuit protection	Indefinite, hiccup, automatic restart
Transient recovery time @ 25 % load change steps	250 μs typ.
Transient response drift @ 25 % load change steps	3 %, max.
<b>Over voltage protection</b>	
P12Cxx2V5S, P12Cxx3R3S	3.9 V Z-diode clamping
P12Cxx05S	6.2 V Z-diode clamping
P12Cxx12x	15 V Z-diode clamping
P12Cxx15x	18 V Z-diode clamping

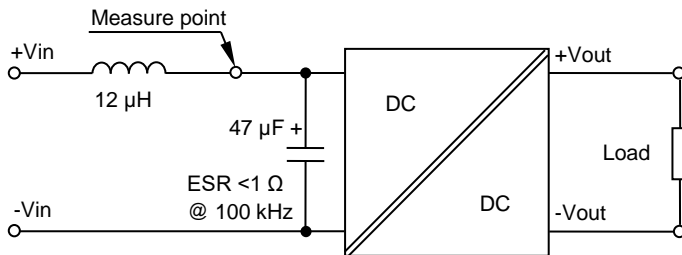
<b>General</b>	
Switching frequency	330 kHz, typ.
Safety Standard	IEC 60950-1
Reliability calculated MTBF (MIL-HDBK-217F)	> 1 Mio. h
<b>EMC Characteristics</b>	
Radiated Emissions (See figure 3)	EN55032 class A
Conducted Emissions (See figure 3)	EN55032 class A
ESD	EN61000-4-2 Crit. B
RS	EN61000-4-3 Crit. A
EFT	EN61000-4-4 Crit. A
Surge (See figure 3)	EN61000-4-5 Crit. A
CS (See figure 3)	EN61000-4-6 Crit. A
PFMF	EN61000-4-8 Crit. A
<b>Environmental</b>	
Operating ambient temperature	-40 ... 85 °C (see derating)
Storage temperature	-40 ... 125 °C
Case temperature	100 °C max.
Derating	see diagram
Storage humidity	Up to 95 %, non condensing
Cooling	Free air convection 16...33 cm/s
<b>Physical</b>	
Dimensions	31.75 x 20.32 x 10.16 mm
Weight	18 g
Case material	Nickel coated copper
Potting material	Epoxy (UL94V-0 rated)
Absolute maximum conditions	
Soldering temperature	< 260 °C for <10 s, > 1.5 mm distance from body
Input surge voltage for < 1 s	P12C12xxx: 36 V <sub>DC</sub> , max. P12C24xxx: 50 V <sub>DC</sub> , max. P12C48xxx: 100 V <sub>DC</sub> , max.

# 12 W DC-DC Converter P12C-Series

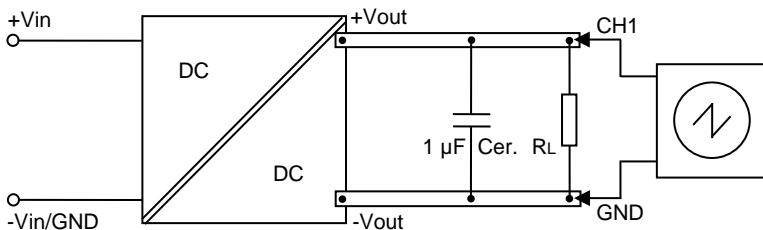
Notes:

1. All parameter are typical specified at 25 °C ambient temperature, nominal input voltage and full load, unless otherwise noted.
2. Capacitive load tested by minimal input voltage and constant resistive load.
3. An external filter is required to meet EFT standard IEC 61000-4-4 and IEC 61000-4-5. (see Figure 3)

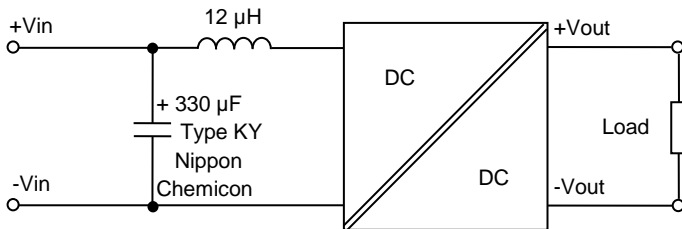
**Figure 1 Measure circuit for reflected input ripple current**



**Figure 2 Measure circuit for output ripple and noise voltage**

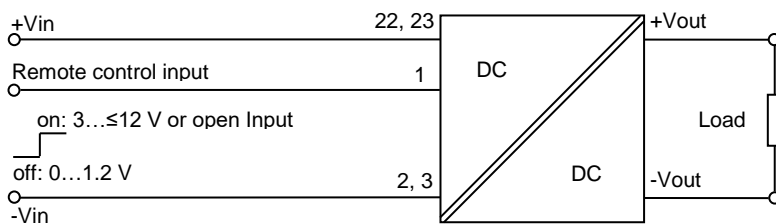


**Figure 3 Input filter circuit to meet the class A specifications**

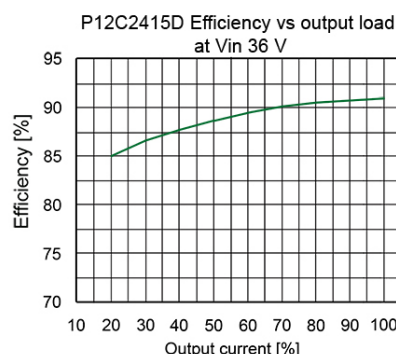
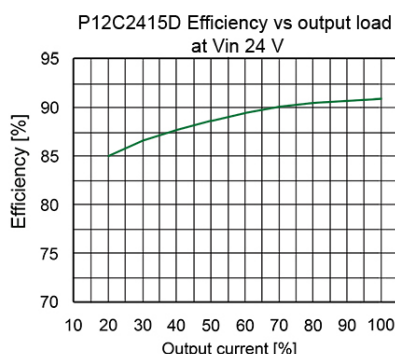
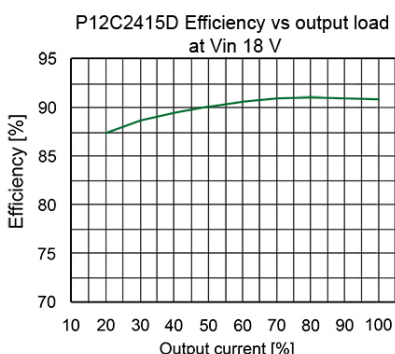
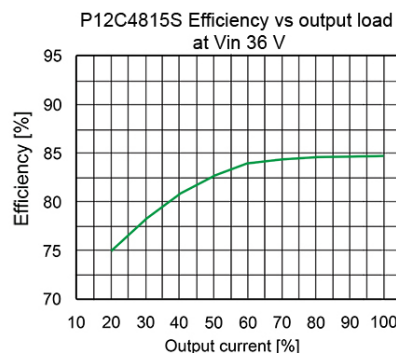
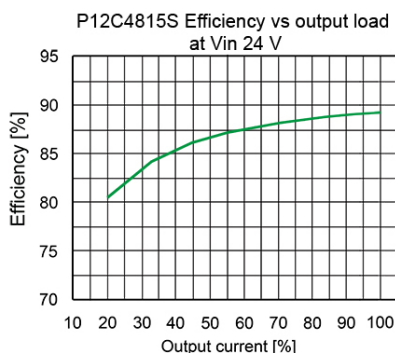
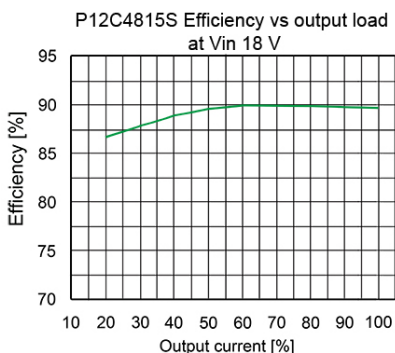
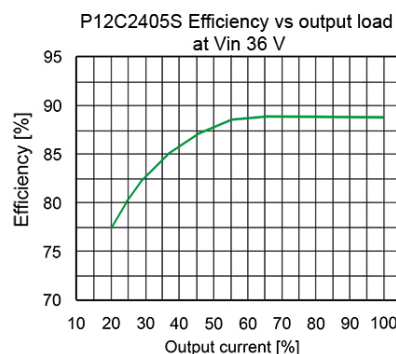
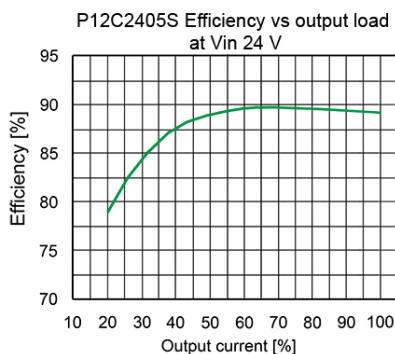
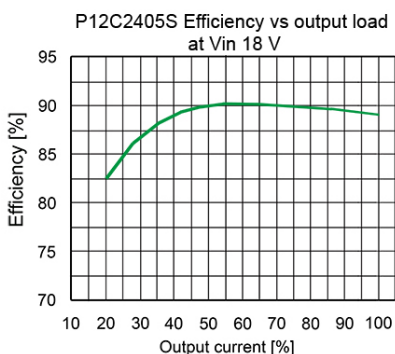
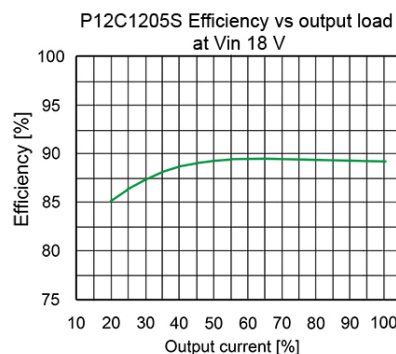
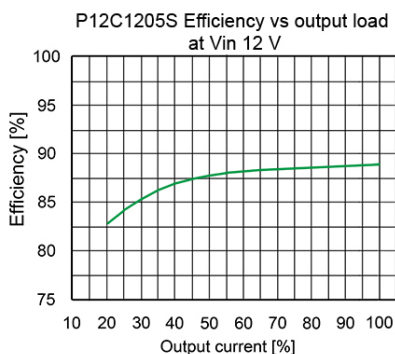
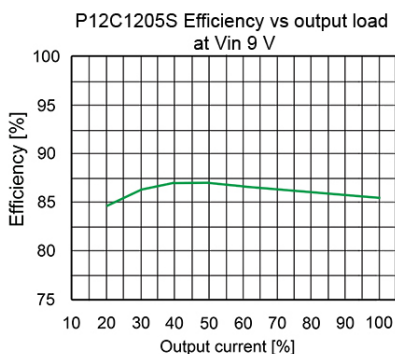


The filter components should be mounted as near as possible and with shortest connections to the DC/DC-Converter.

**Figure 4 Remote control circuit for control voltage  $\leq 12 V_{DC}$**

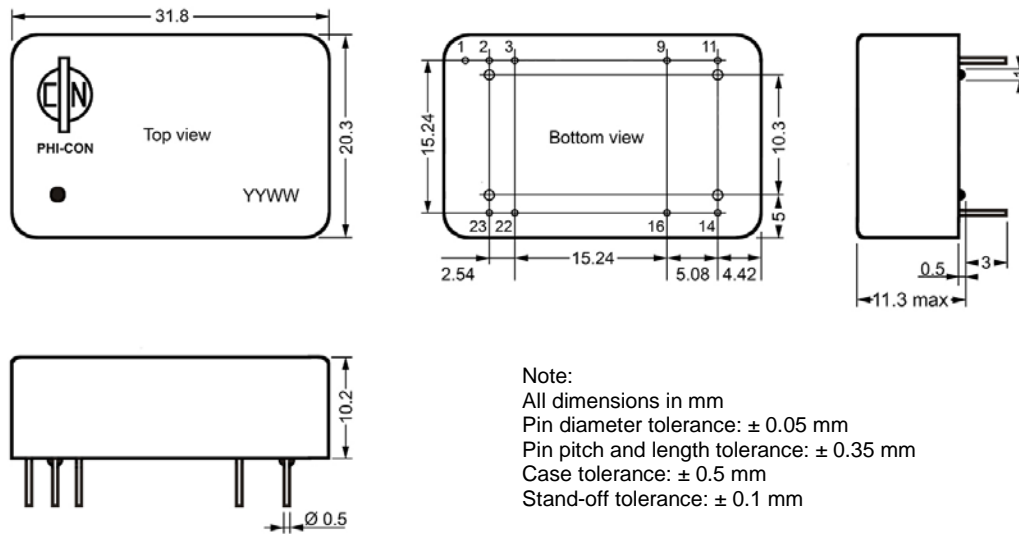


# 12 W DC-DC Converter P12C-Series



# 12 W DC-DC Converter P12C-Series

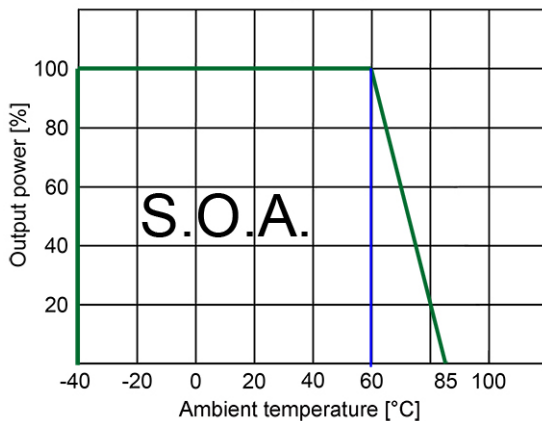
## Dimensions



### Note:

All dimensions in mm  
 Pin diameter tolerance:  $\pm 0.05$  mm  
 Pin pitch and length tolerance:  $\pm 0.35$  mm  
 Case tolerance:  $\pm 0.5$  mm  
 Stand-off tolerance:  $\pm 0.1$  mm

## Derating diagram



Pin assignment		
Pin	Single output	Dual output
1	Remote contr.	Remote contr.
2	-V Input	-V Input
3	-V Input	-V Input
9	Omitted	Common
11	N.C.	-V Output
14	+V Output	+V Output
16	-V Output	Common
22	+V Input	+V Input
23	+V Input	+V Input

PHI-CON is a trademark of HY-LINE Holding GmbH.

Only for professional use by professionals! Not for resale or distribution to the general public in any way! Read the instructions carefully before using!

**Life Support Policy:** HY-LINE does not authorize the use of any of its products for use in life support devices or systems without the express written approval of an officer of the Company. Life support systems are devices which support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user. Rev: 20180611 f