DC-DC CONVERTER ELECTROMOBILITY OFFER



TECHNICAL CATALOG







DC-DC CONVERTERS

Poclain Hydraulics DC-DC Converter is a wide input voltage range of 32 ~ 96V and single isolated output converter. It can provide 500W / 13,7V regulated DC output voltage.

The DC-DC converter offers input undervoltage lockout, output over current limit, short circuit, output over voltage, over temperature, and input reverse polarity

protections and allows a wide operating temperature range of -40°C to +90°C.

With creative design technology and optimization of component placement, this converter possess outstanding electrical and thermal performance, as well as high reliability under extremely harsh operating conditions. The DC-DC Converter meets IP67 protection (with fully assembled mating connector).



e+h

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SAFETY INSTRUCTIONS

Display of safety instructions

Standardized safety instructions, symbols, terms and abbreviations are used so that you can use this documentation to work quickly and safely with your product. To give you a better understanding they are explained in the sections below.

> SIGNAL WORD Type and source of the hazard! Consequences of not avoiding the hazard.

Indication of how to avoid the hazard.

- **Safety sign:** Draws attention to the hazard.
- Signal word: Identifies the degree of the hazard.
- Type and source of hazard: Identifies the type and source of the hazard.

■ Precautions: States how to avoid the hazard.

Danger classes in accordance with ANSI Z535.6



Symbols

The following symbols mark notes that are not relevant to personal safety, but are intended to make this documentation easier to understand.

Symbol	Meaning
P	Poclain Hydraulics disclaims any liability for damage of any kind if use of the product is not compliant with a recommendation identified with this symbol.
\bigcirc	General information regarding the product or the repair procedure.
C	Information on the model number.
	Weight of component without oil.
Y	Indication of necessary volume of oil.
	Units.
	Indication of necessary tightening torque.
0000	Screws.
Â	Information intended for Poclain-Hydraulics personnel.

AND METHODOLOGY

The views in this document are created using metric standards. The dimensional data is given in mm and in inches (inches are between brackets and italic)

General safety instruction

 WARNING
 Risk of electrical shocks!

 Modification of the Converter can cause severe injuries to operator or damage to the machine due to electric shocks.

 Installation must be done done according to the state of the art with proper connectors.

- Installation must be done done according to the state to Do not use for any different purposes.
- Do not use for any unefert purposes.
 Do not remove cover of the Converter.
- Do not make any modification to the product.
- Refer servicing to qualified service personnel.
- Disconnect the main supply before connecting or disconnecting the links to the wiring.
- Replace Converter in case of any damage.

Intended use

The Poclain Hydraulics DC-DC Converter is specifically designed for "e+h" Electrohydraulic systems to supply electronics and controllers with 12V nominal voltage from high voltage battery.

Refer to Poclain Electromobility system technical catalog B79372X for more details about intended use.



Any use other than that described as Intended use is considered improped and is therefore impermissible. Poclain Hydraulics accepts no liability whatsoever for damage resulting from improper use. The user bears all risks arising from improper use.



INTRODUCTION

Features

- Wide input voltage range, 32 ~ 96V
- 500W output
- Full Load Efficiency up to 89.5% at 48V in and 72V in
- · Box type package with metal base plate
- Operating temperature range 40°C to +90°C
- Input reverse polarity protection
- Input UVLO, Output OCL, Short circuit protection, OVP, OTP
- Enable on/off
- 2250 V DC Isolation
- · IP67 protection (with fully assembled mating connector)
- RoHs compliant
- IEC/EN/UL60950-1, IEC/EN/UL62368-1, CE Mark
- EMC compatible: EN12895-2015, EN55011,
- EN61000-3-2, EN61000-3-3, EN55014-2, CISPR11 ClassA

Examples of available functions

Output Over-Current Limit and Short Protection

The modules include internal output over-current limit (OCL) and short circuit protection (SCP) circuits, the OCL set point is lower than that of the SCP; The response of SCP circuit is much fast than that of the OCL circuit.

The slowly increase of the output current will let module enter OCL protection when the current exceeds the OCL set point, while the fast increase of the output current will let module enter SCP when the current exceeds the SCP set point. When the modules enter OCL protection, the output voltage will decrease while the output current is kept constant, the output voltage will soft start to set point when the overload condition is removed.

The module will enter hiccup mode when it triggers the SCP set point. The module will try to restart after shutdown. If the overload condition still exists, the module will shut down again. This restart trial will continue until the overload condition is removed.

Output Over-Voltage Protection

The power module includes an internal output over-voltage protection (OVP) circuit, which monitors the voltage on the output terminals. If this voltage exceeds the OVP set point, the module will shut down, and then restart after a fixed delay time.

Over-Temperature Protection

The over-temperature protection consists of circuitry that provides protection from thermal damage. If the temperature exceeds the preset temperature threshold the module will shut down, and all components will not exceed their absolute maximum temperature ratings. The module will restart after the temperature is within specification.

Remote On/Off

DC-DC Converter has Enable control function. This Enable PIN is designed on the primary side of converter, the converter will turn on when the Enable PIN connected to VIN + or floating, and turn off when the Enable PIN connected to VIN -.



Input Reverse Voltage Protection

The input reverse voltage protection is provided by a diode on the input line, the standoff voltage for the reverse protection shall be no less than - 96V.

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Safety instructions and Methodology

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DC-DC Converter characteristics

Comercial name	SD-DCC-48-12-500			
Part number	B68397T			
Isolation voltage	Input to Output, Input to Case Max. 2250 V DC			
	Output to Case	0 V DC		
Isolation resistance, Input to output	Min. 10 mΩ			
Isolation capacitance, Input to output	5000 pF			
Switching life	175 kHz			
	15 years (Baseplate @ 40°C, include Aluminum capacitor)			
Mass	16 years (72Vin, Baseplate @ 80°C)			
Mass		1,0 kg [2		
Environmental performances	0	NAL-1	Truckerst	NA i
Storago tomporaturo rango	Conditions	Minimum	Турісаї	
Operating temperature range	Basenlate	-40 °C		+90 °C
Over temperature protection	NTC temperature	-40 0	118 °C	
Humidity (non condensing)				95% RH
Thermal shock test	Temperature range: -40 to $+125^{\circ}$ C [-40 to 52° E]			
	Thermal rate: 20° C / min [6.7 °E /min]	-		
		-	ISO 16750-	4
		-		
Submoroion toot	Iotal cycle: 300 cycles			
Submersion test	Total cycles: 10	-		
	Dwell Time at Tmax: 1h	-		
	Transition duration: < 20s ISO 16750-4		4	
	Test fluid: De-ionized water, 5% NaCl	e-ionized water, 5% NaCl		
	Water temperature: <4°C			
	Immersion Time: 5 min			
Water protection level	With fully assembled mating connector	IP67		
Vibration	Sine wave	_		
	1. Frequency (Hz) amplitude accelaration 5 - 9Hz +/-15mm 15 - 200Hz, 10G IEC 60068-2-5: Sine wave vit		vibration, test Fc	
	2. Sweep rate 1 Oct / min	-		
	3. Duration 50 cycles	-		
Mechanical shock	50G/11ms, 3 shocks for each direction	IEC 60068-2-27: Shock, ł		alf sine, test Ea
Bump	40G/6ms, 1000 shocks for each direction	IEC 60068-2-29, Bump, test Eb		
Salt spray test	Operating / No load			
	1. Salt spray concentration: 5%	-		
	2. Test temperature: 35°C [95°F]	-		
	3. Volume of spray: 1-2ml/h/80cm ²	-		Fest Ka
	4. PH: 6,5 - 7,2			
	5. Test time: 95h	-		
	6. Tolerance: Salt spray concentration (+/-1%) Test temperature: +/- 2°C			
Emission	30 - 1000Hz, 34-45 dBuV/m	EN12895-2015		
Immunity	20V/m/27-1000MHz AM; 3V/m/1-2GHz AM; 1V/m/2-2,7Ghz AM EN12895-2015		EN61000-4-	3
ESD	Direct: +/-8kV, Air: +/- 15kV EN12895-2015		EN61000-4-	2

Specifications typical at Ta=+25 $^{\circ}$ C, nominal input voltage and rated full load output current unless otherwise noted. Specifications are subject to change without notice.



Input characteristics

input onula otoriotico				
	Conditions	Minimum	Typical	Maximum
Continuous input voltage		36 V DC	48 V DC	96 V DC
Input under-voltage lockout Turn-on voltage threshold		29 V DC	30 V DC	31 V DC
Input under-voltage lockout Turn-off voltage threshold		27 V DC	28 V DC	29 V DC
Lockout hysteresis voltage		1 V DC	2 V DC	3 V DC
Maximum input current	Vin=32V, 100% load		18 A	19 A
No lood input ourrant	Vin=48V		80 mA	
	Vin=72V, 80V		40 mA	
Off converter input current	Vin=48V, enable off		6 mA	
Reflected input ripple current	Vin=48V, peak to peak			0,2 A
Max reverse polarity input voltage				96 V DC
Max inrush current				10 A
Internal input fuse		500 V / 30 A Fast-acting fuse		

Output characteristics

	Conditions	Minimum	Typical	Maximum
Operating output current range		0 A 0		36,5 A
Output veltage est point	lo=0 V lo=36,5 V		40 7 1/	
Output voltage set point			13,7 V	
	Vin=48V, lo=100%, peak to peak, 20MHz bandwidth, Co=1µF ceramic, 10µF tantalum		120 mV	240 mV
Output voltage ripple and noise	Vin=72V, 80V, Io=100%, peak to peak, 20MHz bandwidth, Co=1μF ceramic, 10μF tantalum		35 mV	70 mV
	Vin=72V, 80V, lo=100%,RMS, 20MHz bandwidth, Co=1µF ceramic, 10µF tantalum		140 mV	280 mV
Output current limit		39 A	45 A	51 A
Start-up time (start _up time by Vin)	Vin=48V,full load, from Vin=Turn-on Threshold to 10%Vo		650 ms	800 ms
Start-up time (start _up time by Enable)	Vin=48V,full load, from Enable=ON to 10%Vo		250 ms	400 ms
Rise time	From 10%Vo to 90%Vo		160 ms	300 ms
Output voltage protection			17 V	19 V
	Positive voltage step, 75% to 50% load dynamic, 0.1A/us slew rate		250 m\/	500 mV
Output voltage current transient	Negative voltage step, 50% to 75% load dynamic, 0.1A/us slew rate	250 mV		
Maximum output capacitance				10 000 µF
Output overshoot				3%
Efficiency @ 100% load Vin=48V			80.5%	
Efficiency @ 100% load	Vin=72V			
Efficiency @ 60% load	Vin=48V		90%	
Efficiency @ 60% load	Vin=72V		89,5%	



Pin description

Number each wire using numbered plastic rings. Each cable must be securely fixed to the machine with clips placed every 200 mm [7.87 in]. Sections are given (for information only) in mm² for a 10 meter [39.37 in] length at an operating temperature of < 85 °C [185 °F].



Function	Wire section mm ²
Enable	
Input +	
Input +	
Output -	
Output -	
Output -	$15 - 2 \text{ mm}^2$
N/A	1,5 - 2 1111
Input -	
Input -	
Output +	
Output +	
Output +	
	Function Enable Input + Input + Output - Output - Output - N/A Input - Input - Output + Output + Output +

Auxiliaries

Characteristics				
Function	SD-DCC counter-part connector			
Compatibility				
Component		Molex reference		
Female connector		19418-0027	x1	
Sockets	لمقتد	19420-0001	x11	
Plug *	and a	19417-0119	x1	

* Pin 7 must be filled with plug.



Overall dimensions of DC-DC Converter





The part number must be given for all replacement part orders.





INSTALLATION

Fitting the DC-DC Converter

The outline and mounting hole dimensions are shown below.

Mount the controller to a flat surface devoid of protrusions, ridges, or a curvature that can cause damage or distortion to its heatsink (the base plate).

Secure the DC-DC Converter using 4x6 mm bolts evenly torqued to the vehicle's mounting surface. These controller's heatsink (bottom surface) have a typical roughness grade of N8 (ISO 1302), with a flatness tolerance of < 5 mm (0.13 per 25 mm).

Poclain DC-DC Converter meets the IP67 requirements for environmental protection against dust and water.

Nevertheless, in order to prevent external corrosion and leakage paths from developing, the mounting location should be carefully chosen to keep the controller as clean and dry as possible.

A thermal joint compound is recommended to improve heat conduction from the controller heatsink to the vehicle's mounting surface. Typically, when properly mounted to a larger metal surface, additional heat-sinking or fan-cooling is not necessary to meet the application's peak and continuous current ratings.



Recomendations for use of DC-DC Converter

Machine wiring recommendations



shocks.

Avoid mechanical stresses in the cables.

WARNING

CAUTION

WARNING

- Do not place the cables or sleevings close to moving or vibrating parts.
- Do not lay the sleevings along sharp angles and protect them at each bend.
- Avoid laying the sleevings too close to high heat sources.
- Use wires with arasion resistant sleevings.
 Avoid laving the sleevings too close to high host source
- Avoid laying the sleevings too close to high heat sources.

Risk of electrical shocks!

Risk of electrical shocks!

Mechanical damage of the cables can cause severe injuries to operator or damage to the machine due to electric

Thermal damage of the cables can cause severe injuries to operator or damage to the machine due to electric shocks.

- Use cables that resist temperatures between 85°C [185°F] and 105°C [221°F] close to heat sources.
- Use cables that resist temperature of -40°C [-40°F].

Risk of damage to the wiring and machine.

Electromagnetic radiation can cause damage to the wiring and machine.

■ Pass the cables inside the machine, ensuring as much contact as possible with metal surfaces (steel).

NOTICE

Risk of damage to the product or environment.

Extreme temperatures can damage the component or machine wiring.

Do not put the converter in a storage environment below -40°C [-40 °F] and above +90°C [194 °F].
 Do not place the converter operating in an environment below -40°C [-40 °F] and above 90°C [194 °F].

NOTICE

Risk of damage to the product or environment.

Risk of damage if environmental seal is damaged.

Do not open the component packaging during storage.

NOTICE

Risk of damage to the product or environment.

Mechanical damage can cause product malfunction.

Avoid any mechanical shock.

Safety instructions and Methodology





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