CBS-10K

10 kW PEAK SINGLE OUTPUT DC/DC CONVERTER

GENERAL FEATURES:

High input-output isolation 5000 V_{rms}
Remote off opto-coupled
Alarm by isolated relay contacts
Remote control via RS232
CAN BUS (optional)
Parallelable output
Railway version EN50155
Fire and smoke: EN45545-2 approved
Up to 10 kW during 40 s

		Input			
		24 V_{dc} 16.8 ... 30 V	48 V_{dc} 33.6 ... 60 V	72 V_{dc} 50.4 ... 90 V	110 V_{dc} 77 ... 138 V
Output	500 V_{dc}	**CBS-10K-6001** 5200 W_{pk}	**CBS-10K-6003** 10000 W_{pk}	**CBS-10K-6004** 10000 W_{pk}	**CBS-10K-6005** 10000 W_{pk}

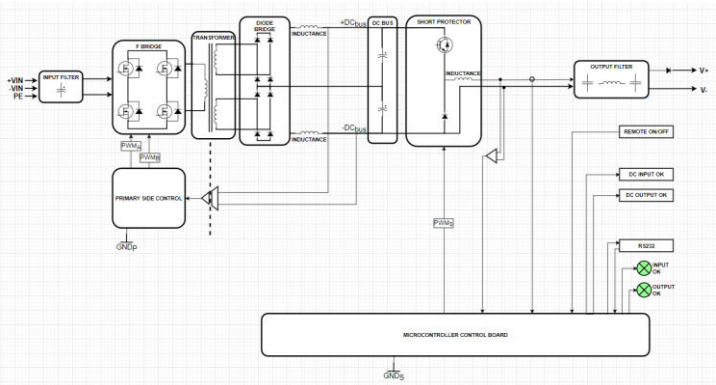
INPUT	
Input voltage range	-30, +25 % Vin nom
Maximum input ripple	5 % Vin nom (V_{rms}, 100 Hz)
OUTPUT	
Nominal output voltage (Von)	See table
Output voltage range	< 1%
Load regulation	< 1 %
Line regulation	< 0.2 %
Maximum Iopk time	40 s
Maximum continuous power	6 kW
Peak power	10 kW
Ripple	< 1 V_{pp}
Ripple + noise (BW 20 MHz)	< 5 V_{pp}
ENVIRONMENTAL	
Storage temperature	-40 … 80 °C
Operating temperature: Full load Operating temperature: 62.5 % load Operating temperature: 25 % load	-25 … 55 °C (EN50155 OT1) -25 … 70 °C (EN50155 OT3) -25 … 85 °C (EN50155 OT5)
Relative humidity without condensation	5 … 95 %
Cooling	Internal controlled fan
Maximum altitude	2000m at full load, 2500m at 90% of load
MTBF (According to IEC61709, SN29500 @40°C)	200.000 h
EMC	
Immunity according	EN61000-6-2:2005, EN50121-3-2:2016
Emissions according	EN61000-6-4:2007, EN50121-3-2:2016
SAFETY	
Dielectric strength: Input /output	5000 V_{rms} / 50 Hz / 1 min
Dielectric strength: Output / Earth	5000 V_{rms} / 50 Hz / 1 min
Dielectric strength: Input / Earth	1500 V_{rms} / 50 Hz / 1 min
Safety according to	EN62368-1:2014
Fire and smoke	EN45545-2:2013
MECHANICAL	
Weight	< 7 kg
Shock and Vibrations according to	EN61373:2011 Category 1 Class B
Protection degree	IP20
PROTECTIONS	
Against overloads	Current and I^2t limited with auto-recovery
Against over-temperature	Shutdown with auto-recovery
CONTROL	
Output OK LED	Red
Input OK LED	Green
Input alarm	Open when alarm Closed < 30 Ω. Maximum rating: 0.13 A at 160 V_{dc}
Output alarm	Open when alarm Closed < 30 Ω. Maximum rating: 0.13 A at 160 V_{dc}
Remote OFF input	Off applying 15…143 V_{dc}, Impedance >24 kΩ

ORDERING CODES

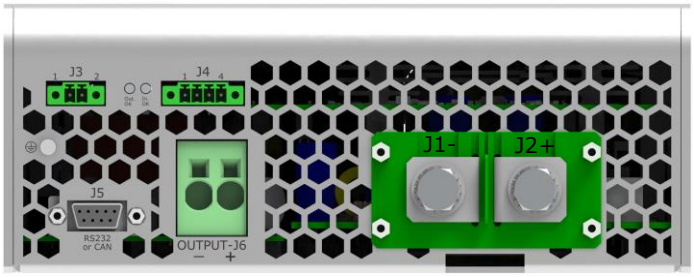
Model	Input voltage DC [V]	Input voltage range [V]	Max. Input current [A]	Output voltage DC [V]	Output current [A]	Average output power [W]	Peak output power [W]	Output peak current (Io_{pk}) 40 s [A]	Efficiency [%]	No load input current [A]
CBS-10K-6001	24	16.8 - 30	320	500	7	3500	5200	10.2	> 93	< 1.1
CBS-10K-6003	48	33.6 - 60	310	500	12	6000	10000	20	> 94	< 0.55
CBS-10K-6004	72	50.4 - 90	209	500	12	6000	10000	20	> 95	< 0.34
CBS-10K-6005	110	77 - 138	137	500	12	6000	10000	20	> 95.5	< 0.22

*Accessories must be ordered in a separate order line.

BLOCKS DIAGRAM



CONNECTIONS



J1	-Vin	Terminal M8 (Rec. torque 5 Nm)
J2	+Vin	
J3 - 1	+ Remote	Phoenix Contact MC1.5/2-GF-3.81 Recommended female: Phoenix Contact MC1.5/2-STF-3.81
J3 - 2	- Remote	
J4 - 1	Status output	Phoenix Contact MC1.5/4-GF-3.81 Recommended female: Phoenix Contac MC1.5/4-STF-3.81
J4 - 2	Status output	
J4 - 3	Status input	
J4 - 4	Status input	
J5 - 2	RS232 RX	Female D-Sub DB9
J5 - 3	RS232 TX	
J5 - 5	RS232 GND	
J5 - 2	CAN L (option Can bus)	
J5 - 7	CAN H (option Can bus)	
J5 - 3	CAN GND (option Can bus)	
J6 - 1	- Vout	Cables 2.5 … 4 mm^2
J6 - 2	+Vout	

DESCRIPTION

The CBS-10K series consists of DC/DC converters, with a galvanic isolation between input and output, operating at fixed switching frequency.

The unit can deliver up to 6 kW average and up to 10 kW during 40 s (see data table) being protected against overload and short-circuits.

The unit includes an ORing diode at the output to decouple it from lines up to 2 kV

START-UP

- The unit has 6 threaded M4 holes for the fixation on a mounting surface (maximum deep 5 mm)
- The unit has internal fans. For an appropriate cooling, the air input and output should be free of elements that cause an air flow reduction (minimum recommended distance to other objects 90mm).

- **For safety reasons, the following requirements must be met:**
- Provide the equipment with some kind of protective enclosure that complies with the electrical safety directives in effect within the country where the equipment is installed.
- Include an input fuse with a rating immediately higher than the maximum input current.

- Use cables of adequate cross-section to connect inputs and outputs. The following table lists the maximum currents and the minimum cross-sections for the cables used for each power connection.

	Input 24 V	Input 48 V	Input 72 V	Input 110 V	Output 500 V
Maximum current	320 A	310 A	208 A	137 A	10 A
Cable cross-section	**95 mm^2**	**95 mm^2**	**50 mm^2**	**25 mm^2**	**2.5 - 4 mm^2**

RS232 communication port

It is possible to control and monitor de unit via RS232 by means of an application tool named PAM. This application is free and can be downloaded from the Premium website.

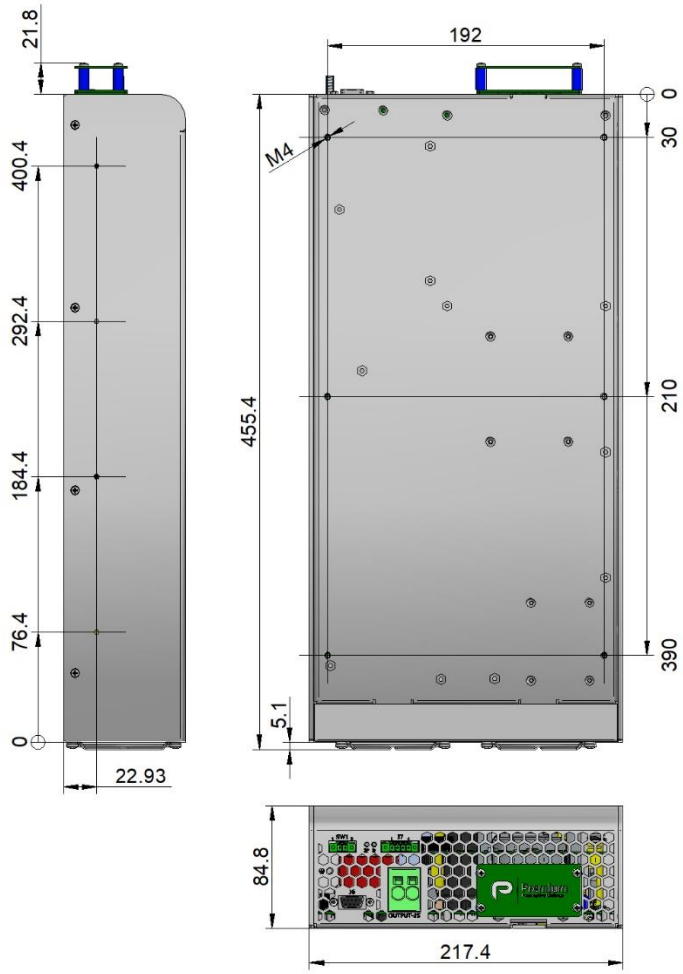
Also it is possible to control and monitor de unit directly using the protocol showed in table:

Protocol configuration: ASCII code, 9600 bauds, parity none, 8 bits, 1bit stop

Header		Function	Parameter		Returns	Explanation
P	R	L	**V**		**PTV■■■.■**	Input voltage in Volts
			v		**PTv■■■.■**	Input voltage ripple in Volts
			U		**PTU■■■■**	Output voltage in Volts
			I		**PTI■■.■■**	Output current in Amps
			T		**PTT■■■.■**	Internal temperature 1 in K
			t		**PTt■■■.■**	Internal temperature 2 in K
			S		**PTS■■■.■**	Inverter state **999.9** → Enabled **000.0** → Disabled **222.2** → Blocked by overload **111.1** → Blocked by overload or shortcircuit
			M		**PTM■■■■**	Model number
			R		**PTR■■■■**	Firmware version
			Other		**PTE**	Command not supported
		G	**1**	**■■■.■**	**OK / ERR**	Set the low input voltage timed shutdown in V
			2	**■■■.■**	**OK / ERR**	Set the minimum alarm input voltage in V
			3	**■■■.■**	**OK / ERR**	Change the status bit **999.9** → Converter enabled **000.0** → Converter disabled
			5	**■■■.■**	**OK / ERR**	Set the maximum output current in Arms 20% I_{nom} ≤ **■■■.■** ≤ 100% I_{nom}
			7	**■■■.■**	**OK / ERR**	Set the alarm maximum output current 0 < **■■■.■** ≤ 100% $I_{max\_warning}$
			8	**■■■.■**	**OK / ERR**	**111.1** → Reset the converter

OTHER PORTS PENDING

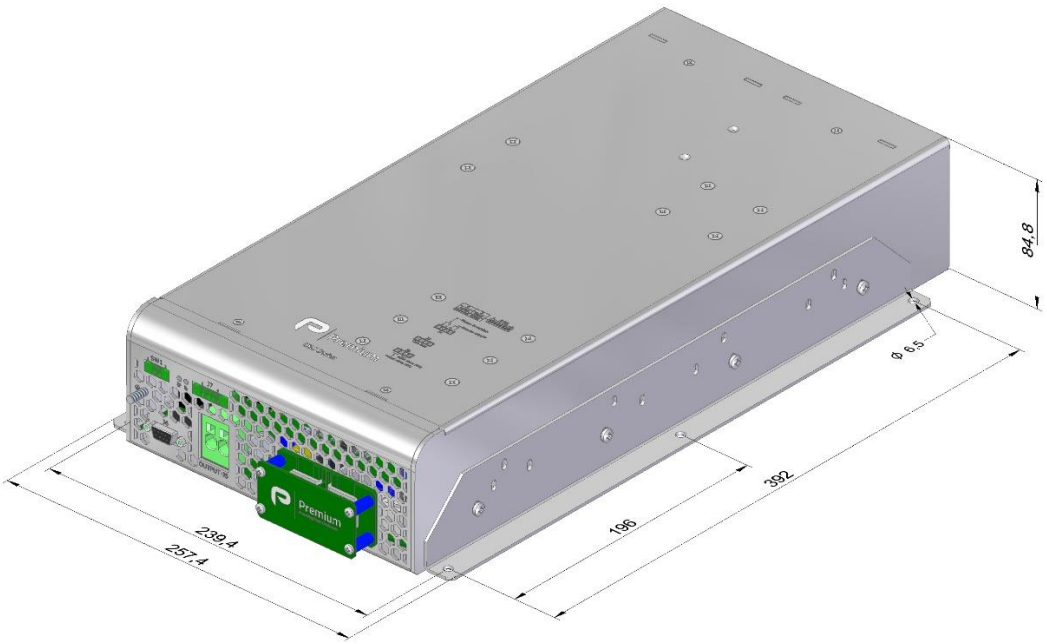
DIMENSIONS



NOTE: All the fixing holes are M4. Maximum screw length inside the converter 5mm

ACCESSORIES

Description	Notes	CODE
Mounting brackets kit	Contains two brackets and screws	NP-9282



EU DECLARATION OF CONFORMITY

The undersigned, representing the following:

Manufacturer: PREMIUM, S. A.,
Address: C/ Dolors Aleu 19-21, 08908 L'Hospitalet de Llobregat, SPAIN

herewith declares that the product:

Type: DC/DC converter
Models: **CBS-10K-6001 … 6005**

is in conformity with the provisions of the following EU directive(s):

2014/35/EU	Low voltage
2014/30/EU	Electromagnetic compatibility
2011/65/EU	Restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)

and that standards and/or technical specifications referenced below have been applied:

EN 62368-1: 2014	Safety. Audio/video, information and communication technology equipment
EN 61000-6-3: 2007	Generic emission standard
EN 61000-6-2: 2005	Generic immunity standard
EN 50155: 2017*	Railway applications. Electronic equipment used on rolling stock material
EN 50121-3-2: 2016*	Railway applications. EMC Rolling stock equipment

* Optional, See annexe

CE marking year: **2021**

Notes:

For the fulfilment of this declaration the product must be used only for the aim that has been conceived, considering the limitations established in the instructions manual or datasheet.

L'Hospitalet de Llobregat, 19-04-2021

Albert Solé
Technical director

PREMIUM S.A. is an ISO9001and ISO14001 certified company by **Bureau Veritas**

ANNEXE

Applicable values for the different sections of the norm EN50155: 2017		
4.3.1	Working altitude	Up to 2000m
4.3.2	Ambient temperature	Class OT1 (-25 to 55°C): load < 100% Class OT3 (-25 to 70°C): load <62.5% Class OT5 (-25 to 85°C): load <25%
4.3.3	Switch-on extended operating temp.	ST1
4.3.4	Rapid temperature variations	H1
4.3.5	Shocks and vibrations	According EN61373:2010 Category 1 class B
4.3.6	EMC Electromagnetic Compatibility EN50121-3-2:2016	

Test	Norm	Port	Frequency	Limits
Radiated emissions	IEC55016	Case	30MHz...230MHz	40dB(µV/m) Qpk at 10m
			230MHz...1GHz	47dB(µV/m) Qpk at 10m
			1...3GHz	Do not apply
			3...6GHz	Internal freq. < 108MHz
Conducted emissions	IEC55016	Input	150kHz...500kHz	99dB(µV) Qpk
			500kHz...30MHz	93dB(µV) Qpk

Test	Norm	Port	Severity	Conditions	*P*
Electrostatic discharge	IEC61000-4-2	Case	±8kV	Air (isolated parts)	B
			±8kV	Contact (conductive parts)	
Radiated high-frequency	IEC61000-4-3	X/Y/Z Axis	20V/m	0.08...1.0GHz M. 80% 1kHz	A
			10V/m	1.4...2.1GHz M. 80% 1kHz	
			5V/m	2.1...2.5GHz M. 80% 1kHz	
			3V/m	5.1...6Ghz M. 80% 1kHz	
Fast transients	IEC61000-4-4	Input	±2kV	Tr/Th: 5/50 ns	A
		Output	±2kV		
		Signal	±2kV		
		PE	±1kV		
Surge	IEC61000-4-5	Input L to L	±1kV	Tr/Th: 1.2/50µs	B
		Input L to PE	±2kV		
Conducted RF	IEC61000-4-6	Input	10V	0.15...80MHz M. 80% 1kHz	A
		Output	10V		
		Signal	10V		
		PE	10V		
Magnetic field	IEC61000-4-8	X/Y/Z Axis	300A/m	0Hz, 16.7Hz, 50/60Hz	A

P= Performance criteria, L= Line, PE= Protective Earth

4.3.7	Relative humidity	Up to 95%	
5.1.1.2	DC power supply range	From 0.70 to 1.25 Un continuous	
5.1.1.3	Temporary DC power supply fluctuation	From 0.60 to 1.40 Un 0.1s From 1.25 to 1.40 Un 1s without damage	
5.1.1.4	Interruptions of voltage supply	Class S1 (without interruptions)	
5.1.1.6	Input ripple factor	10% peak to peak with a DC Ripple Factor of 5 %	
5.1.3	Supply change-over	0.6 Un duration 100 ms (without interruptions). Performance criterion A	
7.2.7	Input reverse polarity protection	By external fuse	
10.7	Protective coating for PCB assemblies	Class PC2	
13.3	Tests list	1 Visual Inspection 2 Performance test 3 Power supply test 4 Insulation test 5 Low temperature storage test 6 Low temperature start-up test 7 Dry heat test 8 Cyclic damp heat test 9 Salt mist test 10 Enclosure protection test (IP code) 11 EMC test 12 Shocks and vibrations test 13 Equipment stress screening test 14 Rapid Temperature variation test	Routine Routine Routine Routine - Type Type Type - - Type Type Routine: 24h at 40°C and load 100% Type