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)
Redundant configuration
Railway version EN50155
Fire and smoke: EN45545-2 approved
Up to 10 kW during 40 s
O-ring output diode up to 2000V



		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}

Several references are subjected to special MOQs and lead times. Please consult Premium's Sales Dept. and web site.

Specifications are subject to change without notice. These products are not intended for use as critical components in life support or nuclear systems. **Compliance notice** — This product has been **individually** tested and verified to meet the standards and directives **listed in this datasheet**. When used as part of an equipment or system, **verification of the final equipment compliance lies with the integrator/customer**. In particular, **when operating multiple units in parallel to increase total power**, the integrator/customer **must ensure that all applicable system-level requirements** (e.g., EMC, safety, or any other applicable) **are met, including any additional assessment required**.

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 %
Load regulation Parallel version	< 3 %
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	-25 … 55 °C (EN50155 OT1) -25 … 70 °C (EN50155 OT3)
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 Alarm when Vin is out of input voltage range Closed < 30 Ω. Maximum rating: 0.13 A at 160 V_{dc}
Output alarm	Open when alarm Alarm when Vout is out of ±10% Closed < 30 Ω. Maximum rating: 0.13 A at 160 V_{dc}
Remote OFF input	OFF applying 15…143 V_{dc}, Impedance >24 kΩ (default) Change logic behaviour setting by communication port
Communications	Port RS-232 or CAN BUS

ORDERING CODES

Model	Input				Output					Efficiency
	Voltage		Current		Voltage	Max power		Max current		
	Nom	range	No load	Max	Nom	Average	Peak	RMS	Iopk 40s	
	[V]	[V]	[A]	[A]	[V]	[kW]	[kW]	[A]	[A]	[%]
CBS-10K-6001	24	16.8 - 30	< 1.1	320	500	3.5	5.2	7.0	10.2	> 93
CBS-10K-6003	48	33.6 - 60	< 0.55	310	500	6.0	10	12	20	> 94
CBS-10K-6004	72	50.4 - 90	< 0.34	209	500	6.0	10	12	20	> 95
CBS-10K-6005	110	77 - 138	< 0.22	137	500	6.0	10	12	20	> 95.5

Several references are subjected to special MOQs and lead times. Please consult Premium's Sales Dept. and web site.

Accessories must be ordered in a separate order line.

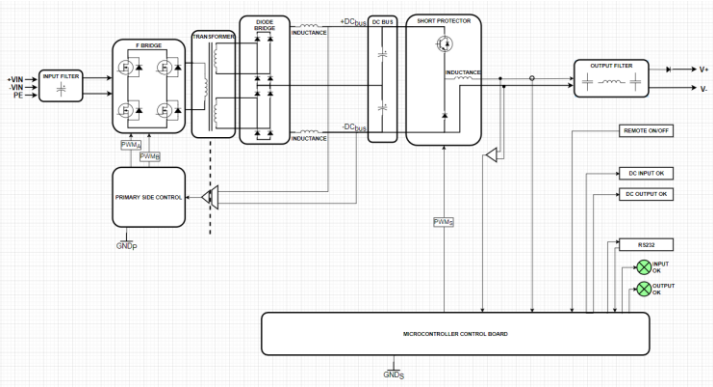
CBS–10K–60_ _–_

P Parallelable

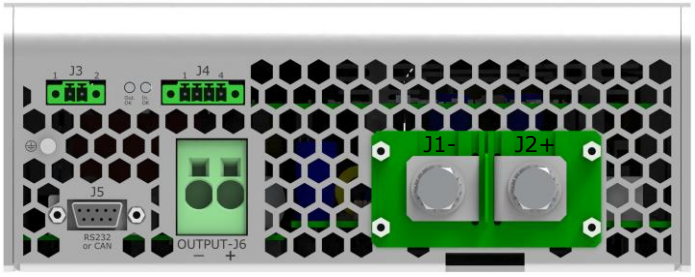
Model number

*For the parallelable model (P) connect a maximum of 3 units.

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 40s (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 external input overcurrent protection (fuse or breaker) 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	209 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 a console application like TERATerm.

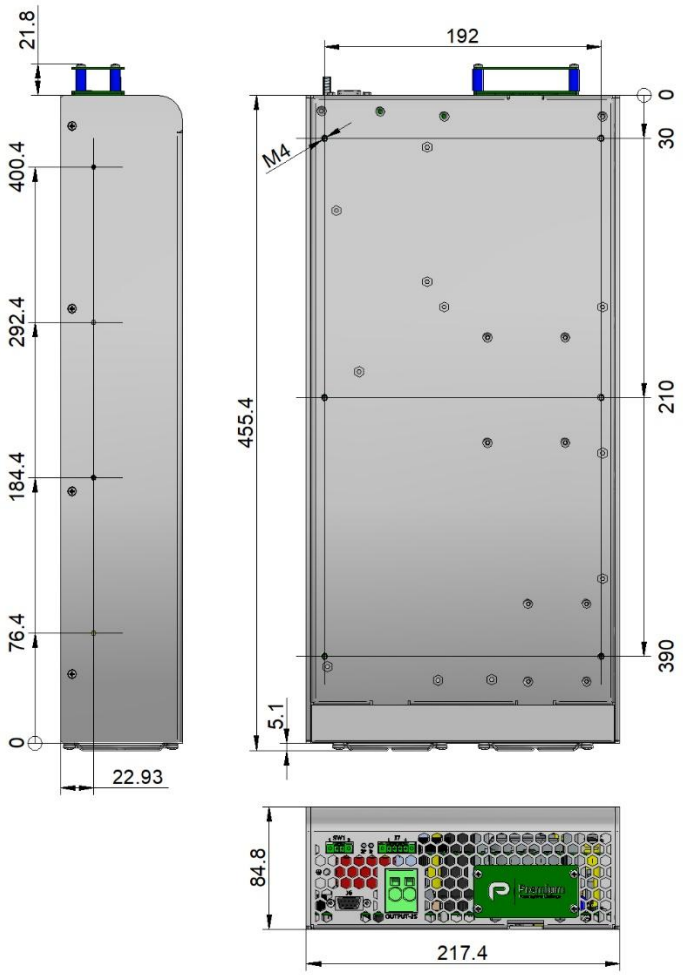
Also, it is possible to control and monitor de unit directly using the protocol showed in table:

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
			B	■■■.■	OK / ERR	Set the logic behaviour of the REMOTE input **111.1** → (default) Output is stopped if Remote input voltage is applied **222.2** → Output is running if Remote input voltage is applied

OTHER PORTS PENDING

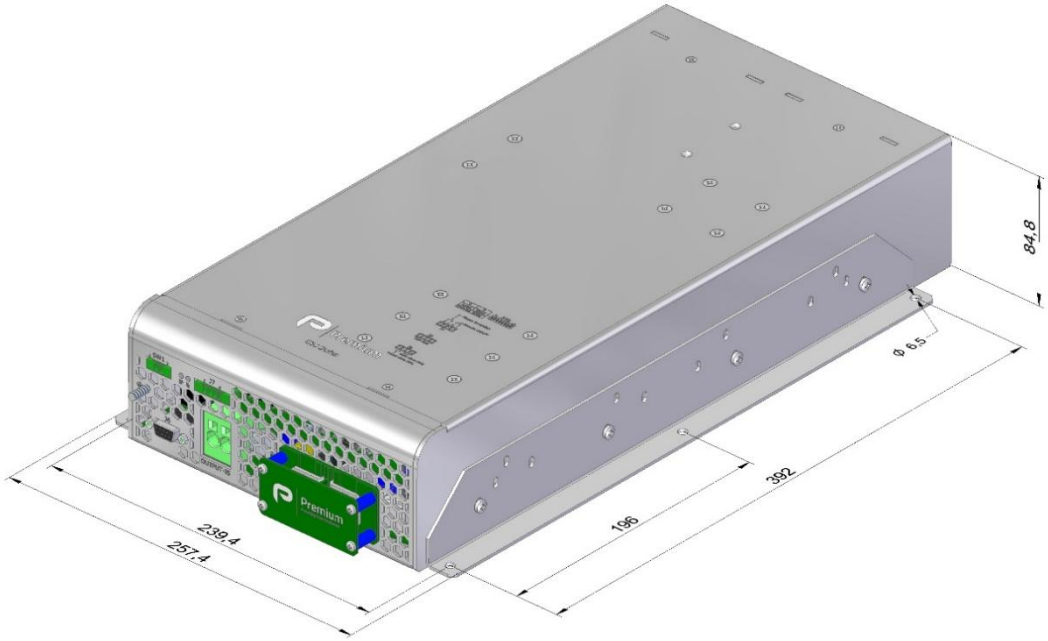
DIMENSIONS



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



ACCESSORY FOR PARALLEL CONFIGURATION

Description	Notes	CODE
Magnetic core	This component must be used when three units are connected in parallel	**59000415**

The magnetic core must be installed in the unit that receives the direct power supply. Since two additional units are connected in parallel to the main unit, the core must be placed at the input of the main unit. The power cables must be looped twice through the core, as shown in the following image.



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 SI 2016 No 1101	Low voltage / The electrical equipment (safety) regulations
2014/30/EU SI 2016 No 1091	EMC / Electromagnetic compatibility regulations
2011/65/EU Annex II and its amendment 2015/863/EU SI 2012 No. 3032	RoHS / Restriction of the use of certain hazardous substances in electrical and electronic equipment

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

N 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

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

EN50121-3-2:2016</td><td>
<table>
<tr><th>Test</th><th>Norm</th><th>Port</th><th>Frequency</th><th>Limits</th></tr>
<tr><td rowspan="4">Radiated emissions</td><td rowspan="4">IEC55016</td><td rowspan="4">Case</td><td>30MHz…230MHz</td><td>40dB(µV/m) Qpk at 10m</td></tr>
<tr><td>230MHz…1GHz</td><td>47dB(µV/m) Qpk at 10m</td></tr>
<tr><td>1…3GHz</td><td rowspan="2">Do not apply
Internal freq. < 108MHz</td></tr>
<tr><td>3…6GHz</td></tr>
<tr><td rowspan="2">Conducted emissions</td><td rowspan="2">IEC55016</td><td rowspan="2">Input</td><td>150kHz…500kHz</td><td>99dB(µV) Qpk</td></tr>
<tr><td>500kHz…30MHz</td><td>93dB(µV) Qpk</td></tr>
</table>
<table>
<tr><th>Test</th><th>Norm</th><th>Port</th><th>Severity</th><th>Conditions</th><th>P</th></tr>
<tr><td rowspan="2">Electrostatic discharge</td><td rowspan="2">IEC61000-4-2</td><td rowspan="2">Case</td><td>±8kV</td><td>Air (isolated parts)</td><td rowspan="2">B</td></tr>
<tr><td>±8kV</td><td>Contact (conductive parts)</td></tr>
<tr><td rowspan="4">Radiated high-frequency</td><td rowspan="4">IEC61000-4-3</td><td rowspan="4">X/Y/Z Axis</td><td>20V/m</td><td>0.08…1.0GHz M. 80% 1kHz</td><td rowspan="4">A</td></tr>
<tr><td>10V/m</td><td>1.4…2.1GHz M. 80% 1kHz</td></tr>
<tr><td>5V/m</td><td>2.1…2.5GHz M. 80% 1kHz</td></tr>
<tr><td>3V/m</td><td>5.1…6Ghz M. 80% 1kHz</td></tr>
<tr><td rowspan="4">Fast transients</td><td rowspan="4">IEC61000-4-4</td><td>Input</td><td>±2kV</td><td rowspan="4">Tr/Th: 5/50 ns</td><td rowspan="4">A</td></tr>
<tr><td>Output</td><td>±2kV</td></tr>
<tr><td>Signal</td><td>±2kV</td></tr>
<tr><td>PE</td><td>±1kV</td></tr>
<tr><td rowspan="2">Surge</td><td rowspan="2">IEC61000-4-5</td><td>Input L to L</td><td>±1kV</td><td rowspan="2">Tr/Th: 1.2/50µs</td><td rowspan="2">B</td></tr>
<tr><td>Input L to PE</td><td>±2kV</td></tr>
<tr><td rowspan="4">Conducted RF</td><td rowspan="4">IEC61000-4-6</td><td>Input</td><td>10V</td><td rowspan="4">0.15...80MHz M. 80% 1kHz</td><td rowspan="4">A</td></tr>
<tr><td>Output</td><td>10V</td></tr>
<tr><td>Signal</td><td>10V</td></tr>
<tr><td>PE</td><td>10V</td></tr>
<tr><td>Magnetic field</td><td>IEC61000-4-8</td><td>X/Y/Z Axis</td><td>300A/m</td><td>0Hz, 16.7Hz, 50/60Hz</td><td>A</td></tr>
</table>
P= Performance criteria, L= Line, PE= Protective Earth
</td></tr>
<tr><td>4.3.7</td><td>Relative humidity</td><td>Up to 95%</td></tr>
<tr><td>5.1.1.2</td><td>DC power supply range</td><td>From 0.70 to 1.25 Un continuous</td></tr>
<tr><td>5.1.1.3</td><td>Temporary DC power supply fluctuation</td><td>From 0.60 to 1.40 Un 0.1s
From 1.25 to 1.40 Un 1s without damage</td></tr>
<tr><td>5.1.1.4</td><td>Interruptions of voltage supply</td><td>Class S1 (without interruptions)</td></tr>
<tr><td>5.1.1.6</td><td>Input ripple factor</td><td>10% peak to peak with a DC Ripple Factor of 5 %</td></tr>
<tr><td>5.1.3</td><td>Supply change-over</td><td>0.6 Un duration 100 ms (without interruptions). Performance criterion A</td></tr>
<tr><td>7.2.7</td><td>Input reverse polarity protection</td><td>By external fuse</td></tr>
<tr><td>10.7</td><td>Protective coating for PCB assemblies</td><td>Class PC2</td></tr>
<tr><td>13.3</td><td>Tests list</td><td>
<table>
<tr><td>1 Visual Inspection</td><td>Routine</td></tr>
<tr><td>2 Performance test</td><td>Routine</td></tr>
<tr><td>3 Power supply test</td><td>Routine</td></tr>
<tr><td>4 Insulation test</td><td>Routine</td></tr>
<tr><td>5 Low temperature storage test</td><td>-</td></tr>
<tr><td>6 Low temperature start-up test</td><td>Type</td></tr>
<tr><td>7 Dry heat test</td><td>Type</td></tr>
<tr><td>8 Cyclic damp heat test</td><td>Type</td></tr>
<tr><td>9 Salt mist test</td><td>-</td></tr>
<tr><td>10 Enclosure protection test (IP code)</td><td>-</td></tr>
<tr><td>11 EMC test</td><td>Type</td></tr>
<tr><td>12 Shocks and vibrations test</td><td>Type</td></tr>
<tr><td>13 Equipment stress screening test</td><td>Routine: 24h at 40°C and load 100%</td></tr>
<tr><td>14 Rapid Temperature variation test</td><td>Type</td></tr>
</table>
</td></tr>
</table>