Premium
Powering Your Challenge

CRS-1000

1000W SINGLE OUTPUT DC/DC CONVERTERS

GENERAL FEATURES:

Designed according to EN50155
Fire and smoke: EN45545-2 approved
High input-output isolation
Adjustable output voltage
Remote inhibit
Remote sensing
Input &Output OK LEDs
Output failure alarm
Input reverse polarity protection
ORing FET option
Different cooling options
Efficiency up to 94%

5 YEAR WARRANTY
EN45545 fire & smoke
EN50155
ROHS REACH

	24Vin 14,4V ... 30V	36Vin 21,6V ... 47V	48Vin 28,8V ... 60V	72Vin 43,2V ... 90V	110Vin 66V ... 144V
24Vout	**CRS-1000-6475**	**CRS-1000-6487**	**CRS-1000-6478**	**CRS-1000-6481**	**CRS-1000-6484**
48Vout	**CRS-1000-6476***	**CRS-1000-6488***	**CRS-1000-6479***	**CRS-1000-6482***	**CRS-1000-6485**
72Vout	**CRS-1000-6490**	**CRS-1000-6491**	Available under request*	Available under request*	**CRS-1000-6494**
110Vout	**CRS-1000-6492**	Available under request*	Available under request*	Available under request*	**CRS-1000-6493**

*References subject to special MOQs and lead times

INPUT	
Input voltage range	See table
Input undervoltage shutdown	55% to 60% Vi nom
Maximum allowed input ripple	15% Vin nom (EN50155)
OUTPUT	
Output voltage	See table
Output voltage adjustment	
Vi min = 60% Vi nom	-10% ... +0% Vo nom
Vi min = 70% Vi nom	-10% ... +15% Vo nom
Line regulation (Io = nom)	< 0,2 %
Load regulation (Vin = nom Io: 0…100%))	< 0.2 % by default < 2.5 % for ORing FET option
Ripple	< 50 mVpp
Noise (BW = 20MHz)	< 100 mVpp
Max. overvoltage protection	< 140% Vout nom
Maximum remote sense	0.3V / pole
Hold up time	10ms (Class S2 EN50155) only with option H
ENVIRONMENTAL	
Storage temperature	-40ºC … 85ºC
Operating temperature range Io: 100%	-25ºC ... 55ºC (-40°C … 55ºC, see note-1)
Operating temperature range Io :75%	-25ºC ... 70ºC (-40°C … 70ºC, see note-1)
Cooling	Natural convection
Maximum Relative humidity	95% with no condensation
Shock and vibration	EN61373 Category 1 class B body mounted
MTBF (at 40°C and 75% load)	350.000h acc. to IEC61709 Cooling options R, V, D 250.000h acc. to IEC61709 Cooling option C
Service life (at 40°C and 75% load)	20 years (Option C fan maintenance at 10 years is required)
EMC	
Emission	EN61000-6-4, EN50121-3-2
Immunity	EN61000-6-2, EN50121-3-2
SAFETY	
Safety	EN62368
Dielectric strength Input-Output	3000Vac, 4200Vdc 1min.
Dielectric strength Input-Earth	1500Vac, 2100Vdc 1min.
Dielectric strength Output-Earth	1500Vac, 2100Vdc 1min.
Fire and smoke	EN45545-2:2020
MECHANICAL	
Approximate weight	< 2.5kg, < 5kg for convection cooling version
CONTROL	
Remote inhibit	Unit OFF applying: 15 … 143 Vdc, Impedance > 27kΩ
Alarm contacts	1A @ 24Vdc, 0.3A @ 150Vdc, 1A @ 125Vac
Local: Input OK, Output OK	Green LEDs
PROTECTIONS	
Against overloads and short-circuits	Current limiting
Against output over-voltages	Shutdown (reset by input switch off)
Against over-temperature	Shutdown with self-recovery
Against reverse input voltage.	Input fuse (Active protection with option H)
Against input under-voltage.	Under-voltage lock-out
Against Input over-currents	Input fuse

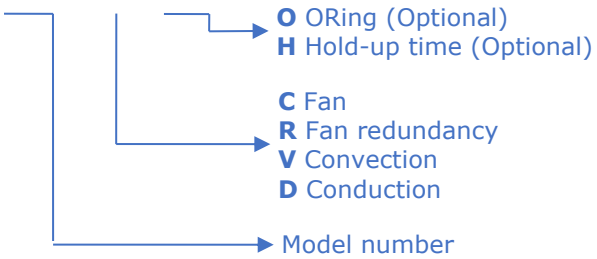
Note-1: The unit can start up and work at an ambient temperature of -40°C with the following restrictions:
1) Do not handle the connection terminals below -25°C.
2) The output ripple can rise up to 150mVpp at -40°C

ORDERING CODES

Part Number	Output Power [W]	Input voltage [V]	Input voltage range [V]	Maximum Input current [A]	Output Voltage [V]	Output current [A]	Efficiency (Typ.) At full load [%]
CRS-1000-6475	1000	24	14,4 - 30	78,9	24	41,6	88
CRS-1000-6476*	1000	24	14,4 - 30	78,0	48	20,8	89
CRS-1000-6490	1000	24	14,4 - 30	77,2	72	13,9	90
CRS-1000-6492	1000	24	14,4 - 30	77,2	110	9,8	90
CRS-1000-6487	1000	36	21,6 - 47	51,4	24	41,6	89
CRS-1000-6488*	1000	36	21,6 - 47	51,4	48	20,8	90
CRS-1000-6491	1000	36	21,6 - 47	50,9	72	13,9	91
CRS-1000-6478	1000	48	28,8 - 60	38,2	24	41,6	91
CRS-1000-6479*	1000	48	28,8 - 60	37,7	48	20,8	92
CRS-1000-6481	1000	72	43,2 - 90	25,4	24	41,6	91
CRS-1000-6482*	1000	72	43,2 - 90	25,2	48	20,8	92
CRS-1000-6484	1000	110	66 - 144	16,5	24	41,6	92
CRS-1000-6485	1000	110	66 - 144	16,3	48	20,8	93
CRS-1000-6494	1000	110	66 - 144	16,1	72	13,9	94
CRS-1000-6493	1000	110	66 - 144	16,1	110	9,8	94

*References subject to special MOQs and lead times

CRS–1000–64_ _–_ _ _



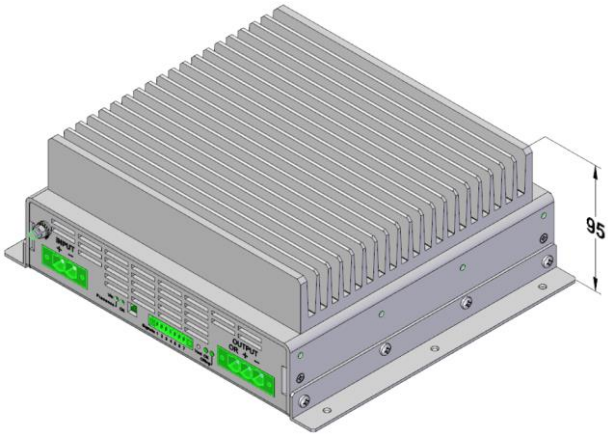
OPTIONS INFORMATION	Letter code
Fan cooling (2 fans with speed control)	**C**
Fan redundancy cooling (4 fans with speed control working at half speed at full load)	**R**
Convection cooling	**V**
Conduction cooling	**D**
Hold up time of 10ms at 1000W. Includes: • Active protection against input reverse polarity • Active inrush current limiter at < 2 · Inmax (Maximum Input current)	**H**
ORing FET for redundancy. Includes a passive current sharing by voltage drop < 2.5%	**O**

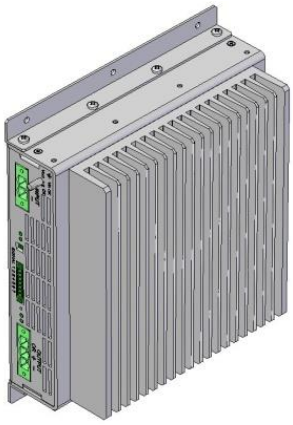
Accessories must be ordered in a separate order line

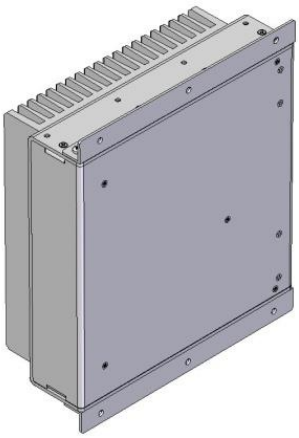
Option C: Fan cooling

Option R: Fan redundancy cooling

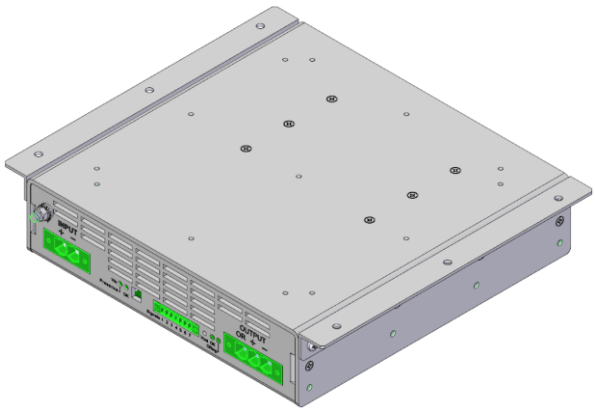
Option V: Convection cooling

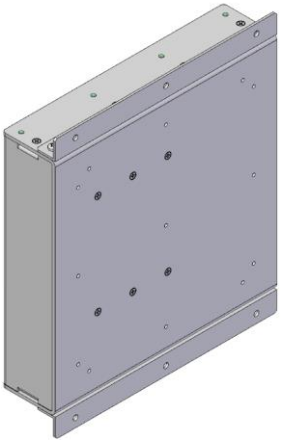




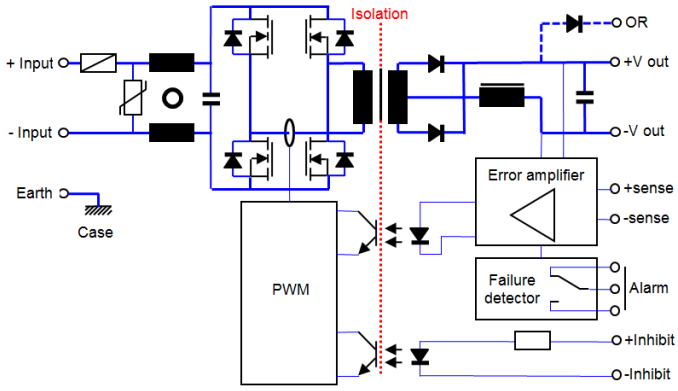


Option D: Conduction cooling

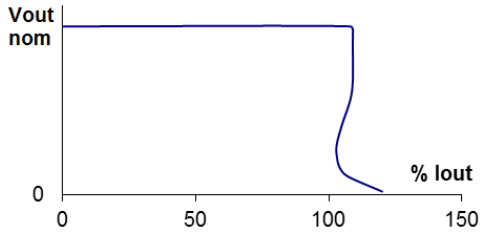




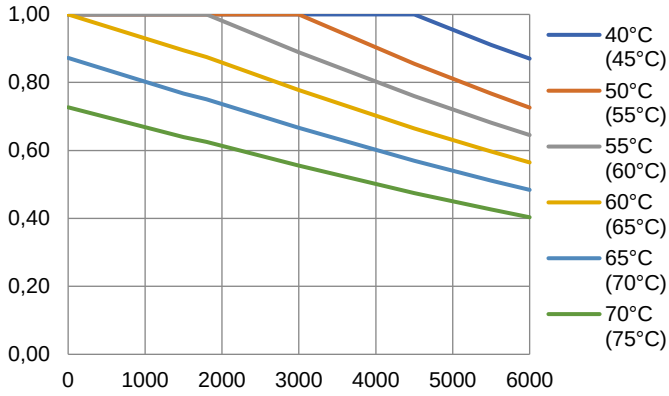
BLOCKS DIAGRAM



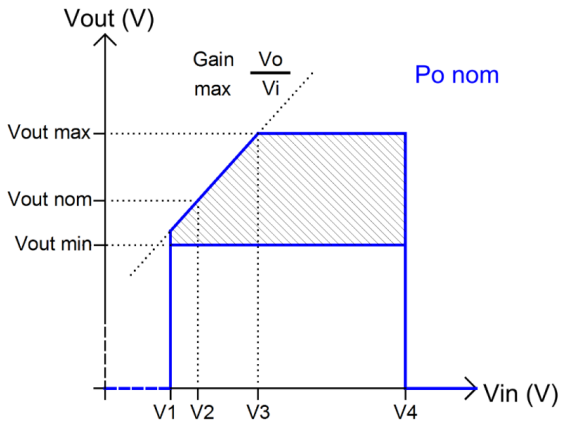
Typical output characteristic



Power derating vs ambient temperature & altitude[m]



Output/Input working area



MODELS	V1	V2	V3	V4
24V input	<14.4 V	15.4 V	16.8 V	>30 V
Rest	< 0.6·Vin nom	0.6·Vin nom	0.7·Vin nom	>1.25·Vin nom

DESCRIPTION

The CRS-1000 series consists of DC-DC converters with a galvanic isolation input-output and fixed switching frequency.

For maximum regulation, the remote sensing terminals can be connected to the load. This will allow a power cable voltage drop of up to 0.3 V on each cable to be offset.

The device is protected against overloads and short-circuits by means of a current limiting circuit.

The device is also protected against reverse polarity input voltage, and the input fuse blows if an improper connection is made.

When a converter input under-voltage condition occurs, the converter is disabled, thus preventing the battery from becoming totally discharged. Once the input is within the range the unit restarts automatically.

INSTALLATION

The product has been designed to be installed on a chassis by means of the included mounting brackets.

With the option of natural convection, the heatsink fins must be mounted in vertical position. With the other cooling options there is no preferred mounting position.

With forced air options, the inlet and outlet air must be free of elements that cause an airflow reduction (the minimum recommended distance to other objects is 50mm).

It is necessary to take into account the environmental conditions of maximum temperature and altitude, since they can limit the maximum output power. See the figure "Power derating vs ambient temperature & altitude". If you have the option "R" (4 fans), the temperature values in brackets can be used. In this case the redundancy of ventilation is lost.

START-UP

Perform connection according to the figure. Use of remote sensing is not mandatory, but if this is required, use of a co-axial or a twisted-pair cable is recommended.

WARNING: If the load is connected to the tabs of remote sensing (+/-S) and the connection from the output to this load is missing the remote sensing function could be lost due to the acting of the internal fuse of protection.

CONNECTIONS

Power connections (input and output)
Input & Output: Connectors for cables up to 16mm2
Earth M5 threaded stud

Signals connector	
1	+ Inhibit
2	- Inhibit
3	- Remote sense
4	+ Remote sense
5	Alarm relay NC (closed when alarm)
6	Alarm relay Common
7	Alarm relay NO (open when alarm)

If several converters need to be connected in parallel, do the following:

- Set the output voltage for all converters featuring a mutual difference as small as possible.
- Join the load outputs by using cables with a cross-section no greater than the one required and of equal length.
- Do not use remote sensing.

For safety reasons, the following requirements must be complied with:

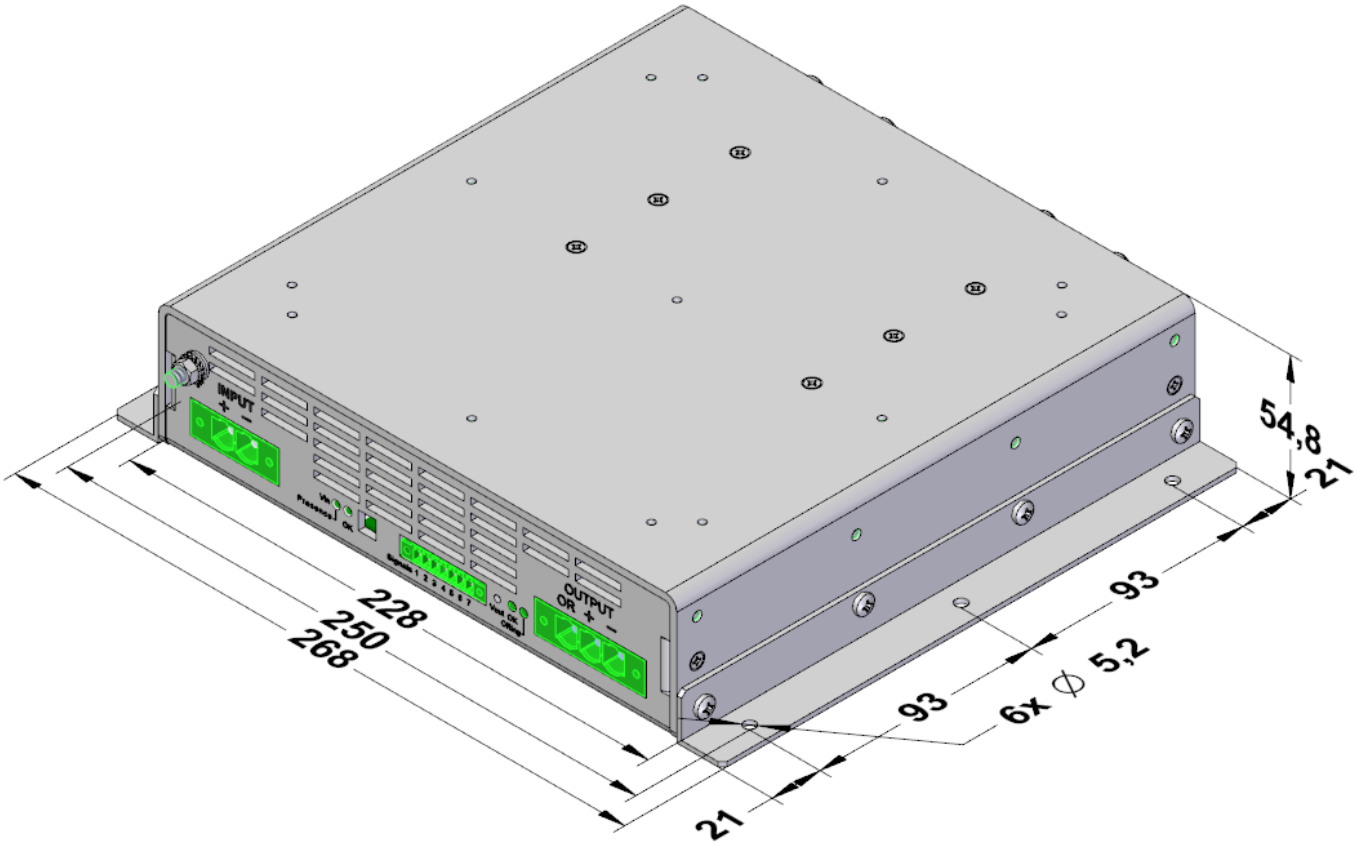
- Provide the equipment with a protective enclosure that complies with the electrical safety directives in effect within the country where the equipment is installed.
- Only replace the fuse with another fuse of the same rating and type, and only after disconnecting the converter from DC power.
- In case of installing input breaker, we recommend one with a current rating higher than the maximum input current curve C. See ORDERING CODES table.
- In case of installing input fuse, we recommend one with a current rating higher than the maximum input current type T (time lag). See ORDERING CODES table.

ALARM

The alarm can be activated by the following reasons:

- When de output voltage is lower than 80…88% of Vout nom.
- When there is a defective fan. In this case the LED Vin OK blinks.
- When the internal temperature reaches about 98°C; just a few degrees below the overtemperature protection shutdown. In this case the LED Vin OK also blinks.

DIMENSIONS

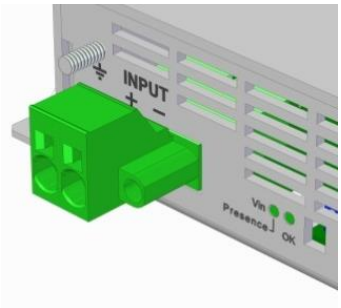


ACCESSORIES

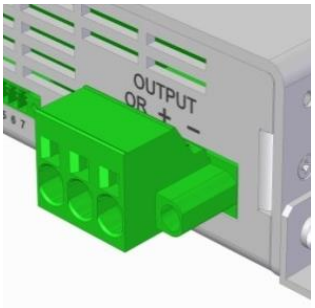
Description	Notes	CODE
Signals mating connector	Phoenix Contact FK-MCP 1,5/ 7-STF-3,81	2601-395
Power mating connector (input)	Phoenix Contact SPC 16/ 2-STF-10,16	2601-606
Power mating connector (output)	Phoenix Contact SPC 16/ 3-STF-10,16	2601-607
Guiding plates for 6U subrack mounting	Screws included	NP-9222
Brackets for 6U subrack mounting	Screws included	NP-9352
2U 19" rackmount tray kit	Screws included	NP-9354

2601-395

2601-606

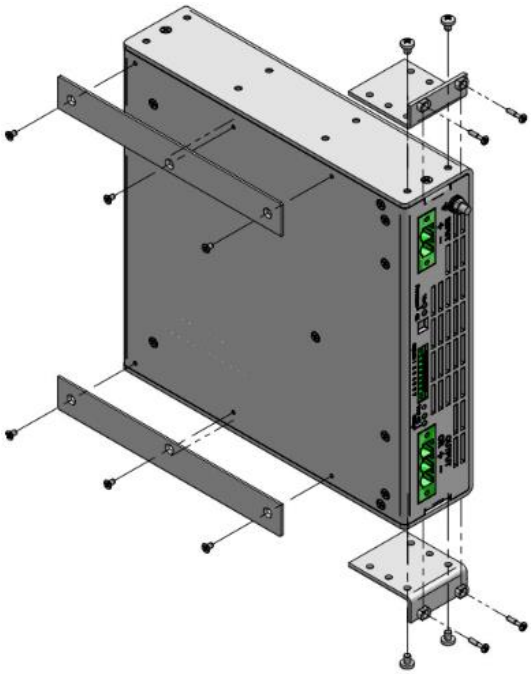


2601-607

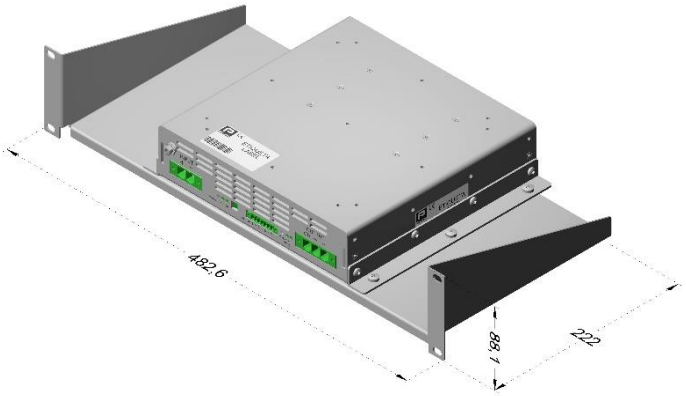


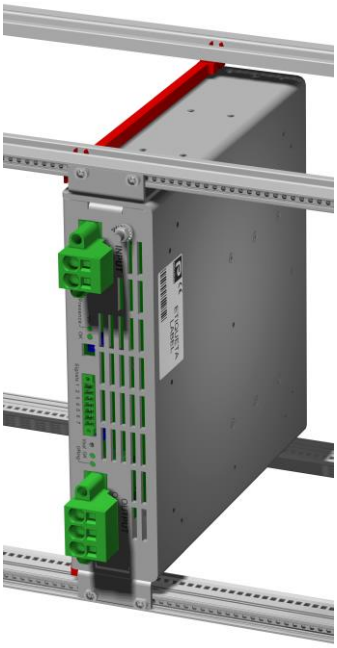
3

NP-9222+NP-9352



NP-9354





EU, UKCA 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: **CRS-1000-6475 … 6493**

is in conformity with the provisions of the following EU directives and UK legislation:

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:

EN 62368-1: 2020	Safety. Audio/video information and communication technology equipment
EN 61000-6-4: 2019	Generic emission standard
EN 61000-6-2: 2019	Generic immunity standard
EN 50155: 2021*	Railway applications. Electronic equipment used on rolling stock material
EN 50121-3-2: 2019* IEC 62236-3-2: 2018*	Railway applications. EMC Rolling stock equipment
EN 50121-4: 2019* IEC 62236-4: 2018*	Railway applications. EMC of the signalling and telecommunications apparatus

* See annexe

CE marking year: **2018**; UKCA marking year: **2021**

Notes:

For the fulfillment 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, 08-09-2023

Albert Sole
Technical Director

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

ANNEXE

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Class OT2 (-40 to 55°C): load < 100% (Without connectors handling and output ripple <150mVpp)
Class OT3 (-25 to 70°C): load <75%
Class OT4 (-40 to 70°C): load <75% (Without Connectors handling and output ripple <150mVpp)</td></tr>
<tr><td>4.4.3</td><td>Switch-on extended operating temp.</td><td>ST1</td></tr>
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<tr><td>4.4.6</td><td>EMC Electromagnetic Compatibility

EN 50121-3-2: 2019
IEC 62236-3-2: 2018
EN 50121-4: 2019
IEC 62236-4: 2018</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>
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</table>
<table>
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<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>
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<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>
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<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>
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From 1.25 to 1.40 Un 1s without damage</td></tr>
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</table>
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