Premium
Powering Your Challenge

CCS-60

50...70W SINGLE OUTPUT DC/DC CONVERTERS

GENERAL FEATURES:

Railway features according to EN50155
Hold up time 10ms
Remote inhibit
High input-output isolation
Standard size Eurocard 3U
Adjustable output voltage
Remote sensing
Input voltage OK LED
Output voltage presence LED
Efficiency up to 88%

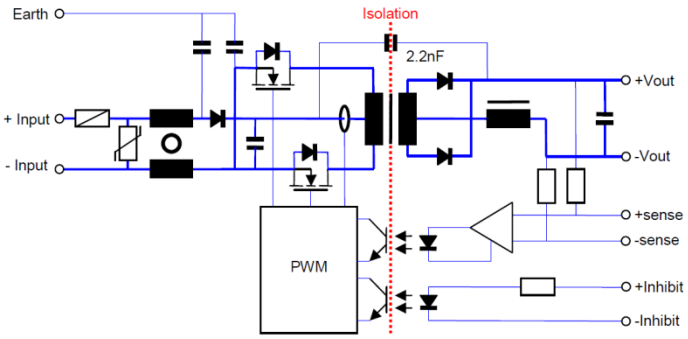
5 YEAR WARRANTY
EN45545 fire & smoke
EN50155
ROHS REACH

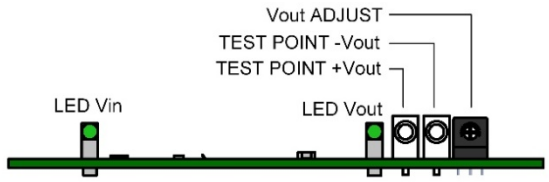
	12 Vin 9.5V ... 15V	24 Vin 14.4V ... 30V	36 Vin 21.6V ... 45V	48 Vin 28.8V ... 60V	72 Vin 43.2V ... 90V	110 Vin 66V ... 144V
5Vout	**CCS-60-6551*** 50W	**CCS-60-6555** 50W	**CCS-60-6571*** 50W	**CCS-60-6559*** 50W	**CCS-60-6563*** 50W	**CCS-60-6567** 50W
12Vout	**CCS-60-6552*** 60W	**CCS-60-6556** 70W	**CCS-60-6572*** 70W	**CCS-60-6560** 70W	**CCS-60-6564*** 70W	**CCS-60-6568** 70W
24Vout	**CCS-60-6553** 60W	**CCS-60-6557** 70W	**CCS-60-6573*** 70W	**CCS-60-6561** 70W	**CCS-60-6565*** 70W	**CCS-60-6569** 70W
48Vout	**CCS-60-6554** 60W	**CCS-60-6558** 70W	**CCS-60-6574*** 70W	**CCS-60-6562** 70W	**CCS-60-6566*** 70W	**CCS-60-6570*** 70W

*References subject to special MOQs and lead times

INPUT	
Input voltage range	See table
Maximum input ripple	15% Vin nom (EN50155)
OUTPUT	
Output voltage	See table
Output voltage adjustment range:	
Vimin>60% Vi nom	-10 % ... +0 % Vo nom
Vimin>70% Vi nom	-10 % ... +15 % Vo nom (Not applicable for 12V input models)
Line regulation (Io = nom)	< 0,2 %
Load regulation (Vin = nom)	< 0,2 %
Ripple	< 50 mVpp
Noise (BW = 20MHz)	< 100 mVpp
Maximum remote sensing	0,3V / pole
Hold up time	10ms (Class S2 EN50155)
ENVIRONMENTAL	
Storage temperature	-40ºC ... 80ºC
Operating temperature at Full load	-25ºC ... 60ºC (-40°C ... 60ºC with ripple <150mV)
Operating temperature at 75% load	-25ºC ... 70ºC (-40°C ... 70ºC with ripple <150mV)
Operating temperature at 37.5% load	-25ºC ... 85ºC (-40°C ... 85ºC with ripple <150mV)
Maximum Relative humidity	95% with no condensation
Shock and vibration	EN61373 Category 1 class B body mounted
MTBF	800.000h @ 40°C according to IEC61709
EMC	
Emission	EN61000-6-4, EN50121-4, EN50121-3-2
Immunity	EN61000-6-2, EN50121-4, EN50121-3-2
SAFETY	
Safety	EN-60950-1, EN68368-1, EN50155
Dielectric strength Input / Output	3000Vac, 4200Vdc 1min
Dielectric strength Input / Earth	1500Vac, 2100Vdc 1min
Dielectric strength Output / Earth	1500Vac, 2100Vdc 1min
MECHANICAL	
Approximate weight	200g
Dimensions	Eurocard 3U 5Te depth 160mm
CONTROL	
Remote inhibit range	5V... 24V
PROTECTIONS	
Against overloads and short-circuits	Current limiting
Against reverse input voltage.	Input diode
Against input under-voltage.	Under-voltage lock-out
Against Input over-currents	Input fuse

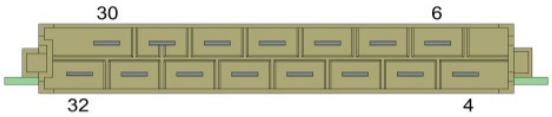
BLOCKS DIAGRAM





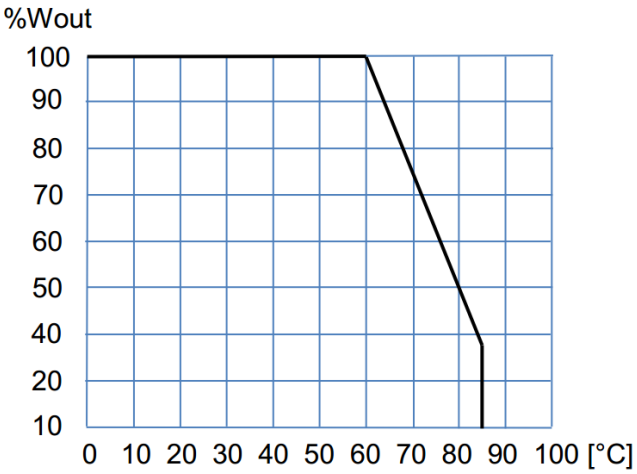
CONNECTIONS

Connector DIN41612H15 (Max. 12A / terminal)



CONNECTION	Terminal
+Vin	8,10
-Vin	(2),4,6
GND	16
+Vout	26,28,30
-Vout	20,22,24
+Sense	32
-Sense	18
+Inhibit	14
-Inhibit	12

POWER DERATING vs AMBIENT TEMP.



DESCRIPTION

The CCS-60 series consists of PWM DC-DC converters, with a galvanic isolation between input and output. The converters operate at a fixed switching frequency.

Voltage feedback is performed by transferring the error signal from the output to the primary side through an opto-coupler, where the PWM circuit changes the pulse width as required to keep the voltage output stable.

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 overload 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.

INSTALLATION

Connection: DIN-41612-H15 connector

The product can be mounted in several ways:

- On a chassis by means of the 4 holes.
- In EUROCARD racks. For this application there is a standard 5Te front plate accessory reference NP-9213.
- In the standard case IP30 code NP-9297

START-UP

Perform connection as per the table. Use of remote sensing is not absolutely necessary, 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 make unusable due to the acting of the internal fuse of protection.

If power levels close to the maximum output are required, make sure the assembly enhances cooling by natural convection and the card is placed in vertical position.

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 some kind of 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.

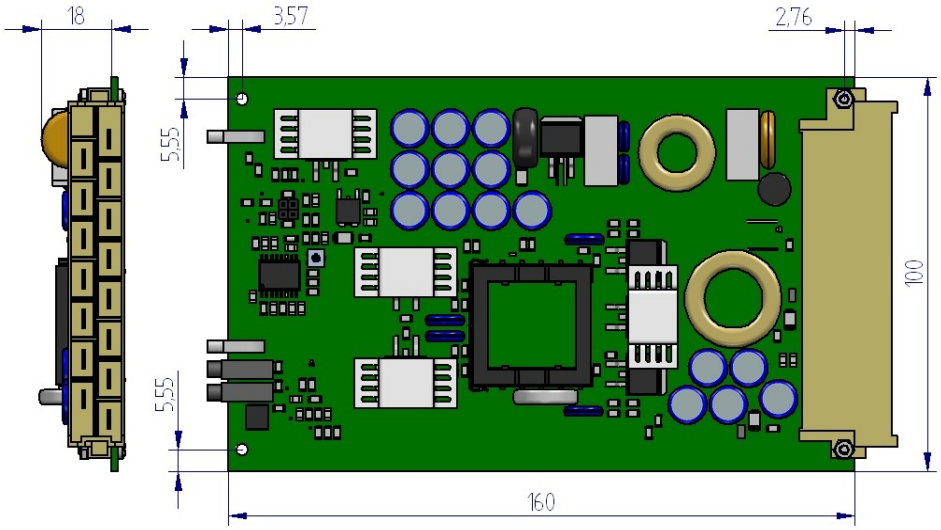
ORDERING CODES

Part Number	Power [W]	Input [V]	Input V range [V]	Output [V]	Output current [A]	Efficiency [%]
CCS-60-6551	50	12	9,5 - 15	5	10	81
CCS-60-6552	60	12	9,5 - 15	12	5	85
CCS-60-6553	60	12	9,5 - 15	24	2,5	86
CCS-60-6554	60	12	9,5 - 15	48	1,3	85
CCS-60-6555	50	24	14,4 - 30	5	10	82
CCS-60-6556	70	24	14,4 - 30	12	5,8	86
CCS-60-6557	70	24	14,4 - 30	24	2,9	87
CCS-60-6558	70	24	14,4 - 30	48	1,5	86
CCS-60-6571*	50	36	21,6 - 45	5	10	83
CCS-60-6572*	70	36	21,6 - 45	12	5,8	87
CCS-60-6573*	70	36	21,6 - 45	24	2,9	87
CCS-60-6574*	70	36	21,6 - 45	48	1,5	87
CCS-60-6559*	50	48	28,8 - 60	5	10	83
CCS-60-6560	70	48	28,8 - 60	12	5,8	87
CCS-60-6561	70	48	28,8 - 60	24	2,9	88
CCS-60-6562	70	48	28,8 - 60	48	1,5	88
CCS-60-6563*	50	72	43,2 - 90	5	10	83
CCS-60-6564*	70	72	43,2 - 90	12	5,8	87
CCS-60-6565*	70	72	43,2 - 90	24	2,9	88
CCS-60-6566*	70	72	43,2 - 90	48	1,5	88
CCS-60-6567	50	110	66 - 144	5	10	83
CCS-60-6568	70	110	66 - 144	12	5,8	87
CCS-60-6569	70	110	66 - 144	24	2,9	88
CCS-60-6570*	70	110	66 - 144	48	1,5	88

*References subject to special MOQs and lead times

Accessories must be ordered in a separated order line

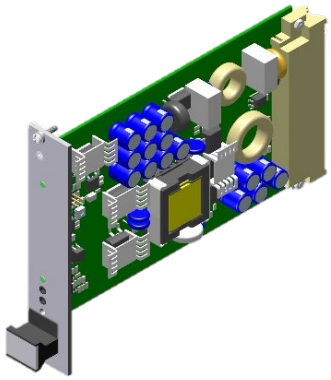
DIMENSIONS



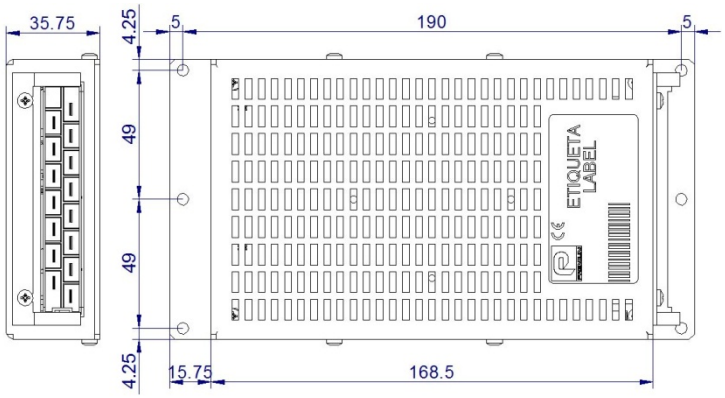
ACCESSORIES

ACCESSORIES	CODE
Front plate 3U 5HP (25.4mm). It Includes Vout test points and LED light guides	NP-9213
Case IP30	NP-9297
Connector DIN 41612 H15 female for IP30 case	2601-379

Front plate NP-9213



Case NP-9297



2601-379

Connector DIN 41612 H15 female

Cage Clamp terminal for cables up to 1.5mm²

Model Harting09 06 015 2813

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: **CCS-60-6555 ... 6574**

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 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 60950-1: 2005	Safety. Information technology equipment
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
EN 50121-4: 2016*	Railway applications. EMC of the signalling and telecommunications apparatus

* See annexe

CE marking year: **2009**; 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, 31-05-2021

Albert Sole
Technical Director

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

ANNEXE

<table>
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<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 OT2 (-40 to 55°C): load < 100% (Output ripple <150mVpp)
Class OT3 (-25 to 70°C): load <75%
Class OT4 (-40 to 70°C): load <75% (Output ripple <150mVpp)
Class OT5 (-25 to 85°C): load <37.5%
Class OT6 (-40 to 85°C): load <37.5% (Output ripple <150mVpp)</td></tr>
<tr><td>4.3.3</td><td>Switch-on extended operating temp.</td><td>ST1</td></tr>
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<tr><td>4.3.6</td><td>EMC Electromagnetic Compatibility

EN50121-3-2:2016
EN50121-4:2016</td><td>
<table>
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<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>79dB(µV) Qpk, 66dB(µV) Av</td></tr>
<tr><td>500kHz...30MHz</td><td>79dB(µV) Qpk, 60dB(µV) Av</td></tr>
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<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
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From 1.25 to 1.40 Un 1s without damage</td></tr>
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<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>
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