CTS-240

180…280W SINGLE OUTPUT DC/DC CONVERTERS

GENERAL FEATURES:

Designed according to EN50155
Fire and smoke: EN45545-2 approved
High input-output isolation
Standard size Eurocard 3U
Adjustable output voltage
Input voltage OK LED
Output voltage presence LED
Remote inhibit
Option: remote sensing or alarm
Efficiency up to 92%



	24Vin 14,4V ... 30V	36Vin 21,6V ... 47V	48Vin 28,8V ... 60V	72Vin 43,2V ... 90V	110Vin 66V ... 144V	220Vin 132 ... 275V
5Vout	**CTS-240-6655*** 180W	**CTS-240-6672*** 180W	**CTS-240-6659*** 180W	**CTS-240-6663*** 180W	**CTS-240-6667** 180W	Available under request*
12Vout	**CTS-240-6656** 240W	**CTS-240-6673*** 240W	**CTS-240-6660** 240W	**CTS-240-6664** 240W	**CTS-240-6668** 240W	Available under request*
24Vout	**CTS-240-6657** 240W	**CTS-240-6674** 280W	**CTS-240-6661** 280W	**CTS-240-6665** 280W	**CTS-240-6669** 280W	**CTS-240-6678*** 280W
48Vout	**CTS-240-6658** 240W	**CTS-240-6675** 280W	**CTS-240-6662** 280W	**CTS-240-6671** 280W	**CTS-240-6670** 280W	Available under request*

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.

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 % (Io = nom)
Load regulation (Vin = nom)	< 0,2 % (Vin = nom; Io: 0…100%)
Ripple	< 50 mVpp
Noise (BW = 20MHz)	< 100 mVpp
ENVIRONMENTAL	
Storage temperature	-40ºC … 85ºC
Operating temperature range at Io = 100%	-25ºC … 60ºC (-40°C … 60ºC, see note-1)
Operating temperature range at Io = 75%	-25ºC … 70ºC (-40°C … 70ºC, see note-1)
Operating temperature range at Io = 37.5%	-25ºC … 85ºC (-40°C … 85ºC, see note-1)
Maximum Relative humidity	95% with no condensation
Shock and vibration	EN61373 Category 1 class B body mounted
MTBF	400.000h @ 40°C according to IEC61709
EMC	
Emission	EN50121-4, EN50121-3-2
Immunity	EN50121-4, EN50121-3-2
SAFETY	
Safety	EN60950-1, EN62368-1, EN50155
Dielectric strength Input - Output	3000Vac, 4200Vdc 1min.
Dielectric strength Input - Earth	1500Vac, 2100Vdc 1min.
Dielectric strength Output - Earth	1500Vac, 2100Vdc 1min.
Fire and smoke	EN45545-2:2013 +A1:2015
MECHANICAL	
Approximate weight	640g
Dimensions	100 x 220 x 38.5mm
CONTROL	
Remote inhibit range	5V ... 24V
Remote sense (option)	< 0.3V per pole
Low output voltage alarm (option)	Threshold: 0.85…0.90 Vo nom. Open when alarm Isolated solid state relay: max.100mA, 160V
PROTECTIONS	
Against overloads and short-circuits	Current limiting
Against reverse input voltage.	Input fuse
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:

- Do not handle the connection terminals below -25°C
- The output ripple can rise up to 150mVpp at -40°C

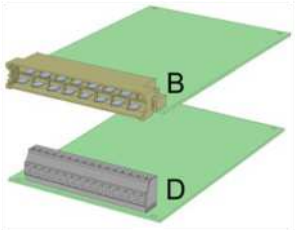
ORDERING CODES

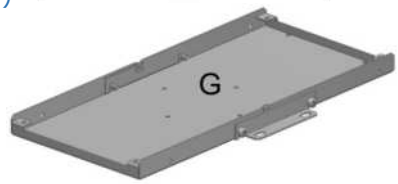
Part Number	INPUT			OUTPUT			
	Nominal voltage [V]	Voltage range [V]	Maximum current [A]	Nominal voltage [V]	Maximum power [W]	Maximum current [A]	Efficiency at full load [%]
CTS-240-6655	24	14,4 - 30	15,6	5	180	36	80
CTS-240-6656	24	14,4 - 30	20,1	12	240	20	83
CTS-240-6657	24	14,4 - 30	19,2	24	240	10	87
CTS-240-6658	24	14,4 - 30	18,9	48	240	5	88
CTS-240-6672	36	21,6 - 47	10,4	5	180	36	80
CTS-240-6673	36	21,6 - 47	13,4	12	240	20	83
CTS-240-6674	36	21,6 - 47	14,9	24	280	11,7	87
CTS-240-6675	36	21,6 - 47	14,7	48	280	5,8	88
CTS-240-6659	48	28,8 - 60	7,81	5	180	36	80
CTS-240-6660	48	28,8 - 60	9,92	12	240	20	84
CTS-240-6661	48	28,8 - 60	11,1	24	280	11,7	88
CTS-240-6662	48	28,8 - 60	10,9	48	280	5,8	89
CTS-240-6663	72	43,2 - 90	5,14	5	180	36	81
CTS-240-6664	72	43,2 - 90	6,31	12	240	20	88
CTS-240-6665	72	43,2 - 90	7,20	24	280	11,7	90
CTS-240-6671	72	43,2 - 90	7,20	48	280	5,8	90
CTS-240-6667	110	66 - 144	3,37	5	180	36	81
CTS-240-6668	110	66 - 144	4,13	12	240	20	88
CTS-240-6669	110	66 - 144	4,66	24	280	11,7	91
CTS-240-6670	110	66 - 144	4,61	48	280	5,8	92
CTS-240-6678	220	132 - 275	2,33	24	280	11,7	91

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

CTS–240–66_ _–_ _ _

- **B** DIN41612H15
- **D** Spring clamp terminal
- **H** With alarm (Optional)
- **G** With base NP-9125 (Optional)
- Model number

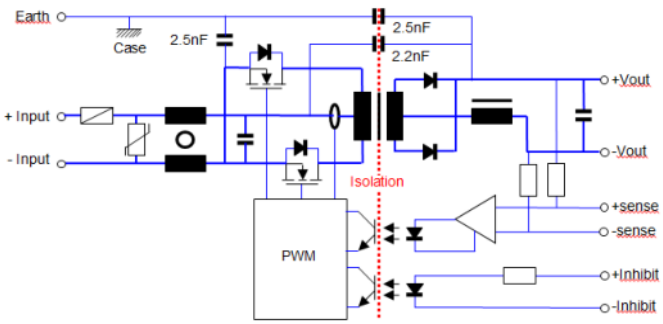




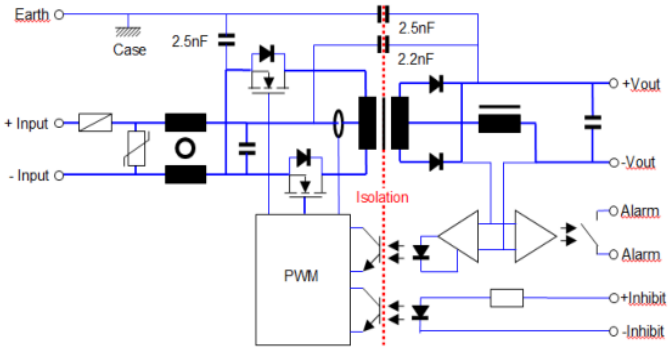
Accessories must be ordered in a separated order line.

BLOCKS DIAGRAM

Option: Remote sensing



Option: Alarm



DESCRIPTION

The CTS-240 series consists of DC-DC converters, with a galvanic isolation between input and output. The converters operate at a fixed switching frequency and use push-pull converter topology.

There are two options to choose:

1 - With remote sensing

2 - With low output voltage alarm

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.

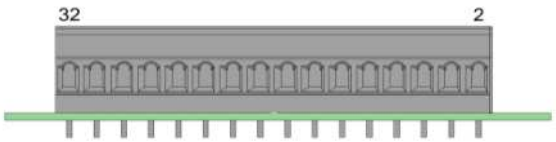
When a converter input undervoltage condition occurs, the converter is disabled, thus preventing the battery from becoming totally discharged. Once the input is within the range the unit restarts automatically. Once the input is within the range the unit restarts automatically.

CONNECTIONS

Connector DIN41612H15 (Max. 12A / terminal)



Spring clamp terminals (Max. 12A / terminal)



Option: R. Sensing		
Terminal Function	PCB Marking	Terminal No.
-Input	-Vin	(2), 4, 6
+Input	+Vin	8,10
-Inhibit	-INH	12
+Inhibit	+INH	14
Earth	⏚	16
-Sense	-S	18
-Output	-OUT	20, 22, 24
+ Output	+OUT	26, 28, 30
+Sense	+S	32

Option: Alarm		
Terminal Function	PCB Marking	Terminal No.
-Input	-VIn	(2), 4, 6
+Input	+VIn	8,10
-Inhibit	-INH	12
+Inhibit	+INH	14
Earth	⏚	16
Alarm	+AL	18
Alarm	-AL	20
-Output	-OUT	22, 24, 26
+Output	+OUT	28, 30, 32

INSTALLATION

There are two connecting options:

- DIN-41612-H15 connector
- Spring clamp terminal

The product can be mounted in several ways:

- On a chassis by means of the 4 corner holes.
- In EUROCARD racks. For this application there is a standard 9Te front plate accessory reference **NP-9155**
- With the base reference **NP-9125.** This accessory can be mounted on a chassis or in DIN rail adding the clip accessory **NP-9135**.

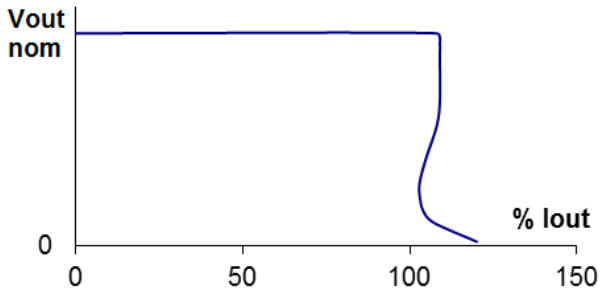
START-UP

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.

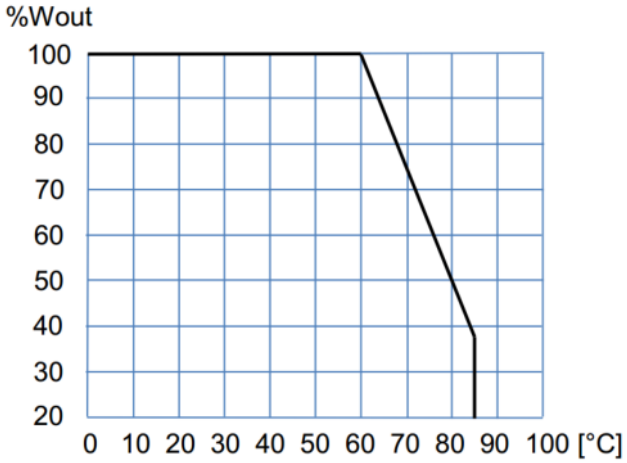
WARNING: If the load is connected to the tabs of remote sensing (+/-S) and the connection from the output to this load is missing the remote sensing function could make unusable due to the acting of the internal fuse of protection.

If power levels close to the maximum output are required,

TYPICAL OUTPUT CHARACTERISTIC



POWER DERATING vs AMBIENT TEMP.



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.

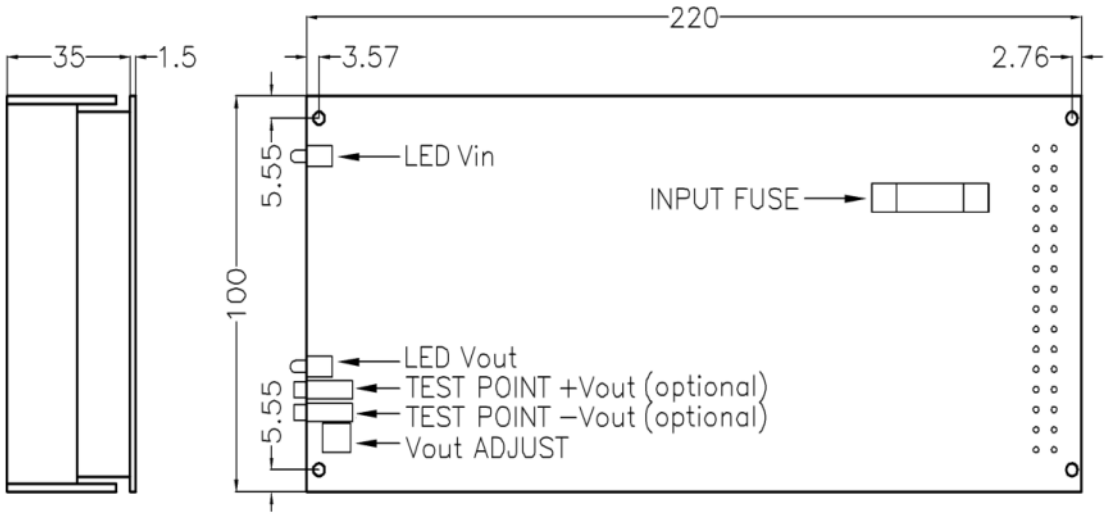
Do not use remote sensing.

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.

DIMENSIONS



ACCESSORIES

ACCESSORIES	CODE
Subrack front panel (3U 9TE)	NP-9155
Mounting base	NP-9125
Din rail clip for mounting base	NP-9135
Redundant connection for two units (ORing diodes + alarms contacts)	ACD-15, ACD-25

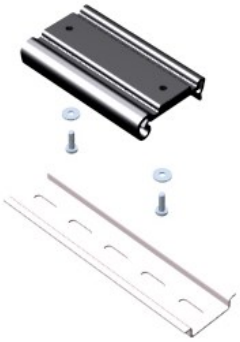
NP-9155



NP-9125



NP-9135



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: **CTS-240-6655 … 6678**

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:

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: **2006**; 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>
<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 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)
Class OT5 (-25 to 85°C): load <37.5%
Class OT6 (-40 to 85°C): load <37.5% (Without Connectors handling and output ripple <150mVpp)</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
EN50121-4:2016</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>Conducted emissions</td><td>IEC55016</td><td>Input</td><td>150kHz…500kHz</td><td>79dB(µV) Qpk, 66dB(µV) Av</td></tr>
<tr><td></td><td></td><td></td><td>500kHz…30MHz</td><td>79dB(µV) Qpk, 60dB(µV) Av</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 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: at 40°C and load 100%</td></tr>
<tr><td>14 Rapid Temperature variation test</td><td>Type</td></tr>
</table>
</td></tr>
</table>