# CLS-120

## 120W WIDE INPUT RANGE DC/DC CONVERTERS

### GENERAL FEATURES:

Class S2 (hold-up time 10ms)
according to EN50155
Fire and smoke: EN45545-2 approved
High input-output isolation
Optional ORing
Standard size Eurocard 3U available
Adjustable output voltage
Input voltage OK LED
Output voltage presence LED
Remote sensing
Remote inhibit
Power fail


| | 14,4V ... 154V Input |
|---|---|
| 12V output | **CLS-120-6512** |
| 24V output | **CLS-120-6513** |
| 48V output | **CLS-120-6514** |

| | |
|---|---|
| **INPUT** | |
| Input voltage range continuous | 14.4 … 154V |
| Minimum start up input voltage | 16.8V |
| Maximum allowed input ripple | 10% pp of Vin nom (EN50155) |
| Efficiency | See table |
| **OUTPUT** | |
| Output voltage | See table |
| Output voltage adjustment | -10% … +10% Vo nom |
| Line regulation (Io = nom) | < 0,2 % (Io = nom) |
| Load regulation (Vin = nom) | < 0,2 % or < 2 % with ORing (Vin = nom; Io: 0…100%) |
| Ripple | < 50 mVpp |
| Noise (BW = 20MHz) | < 100 mVpp |
| **ENVIRONMENTAL** | |
| Storage temperature | -40ºC … 85ºC |
| Operating temperature range at Io = 100% | -40ºC … 55ºC (See note-1) |
| Operating temperature range at Io = 62.5% | -40ºC … 70ºC (See note-1) |
| Operating temperature range at Io = 25% | -40ºC … 85ºC (See note-1) |
| Maximum Relative humidity | 95% with no condensation |
| Shock and vibration | EN61373 Category 1 class B body mounted |
| MTBF | 300.000h @ 40°C according to IEC61709 |
| **EMC** | |
| Emission | EN50121-4, EN50121-3-2 |
| Immunity | EN50121-4, EN50121-3-2 |
| **SAFETY** | |
| Safety | 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 | < 600g |
| Dimensions | 100 x 160 x 40mm (3U, 8Te) |
| **CONTROL** | |
| Enable -Vin referenced (option Q) | Enable when Ve<1.5V or Open Circuit, Disable when Ve >14.4V |
| Power fail -Vout referenced (option Q) | Open collector when Vo < 0.85…0,90 x Vo nom |
| Remote sense (option Q) | < 0.3V per pole |
| Isolated remote inhibit (option R) | OFF: 14.4V … 154V, ON: <1.5V or Open Circuit |
| Isolated low output voltage alarm (option R) | Isolated solid state relay: Open when Vo <0.85…0.90 Vo nom max. 100mA, 160V |
| **PROTECTIONS** | |
| Against overloads and short-circuits | Current limiting |
| Against reverse input voltage. | Input fuse |
| Against input voltage out of range. | Under/over voltage lock-out |
| Against Input over-currents | Input fuse |

Note-1: Do not handle the connection terminals below -25°C.

## ORDERING CODES

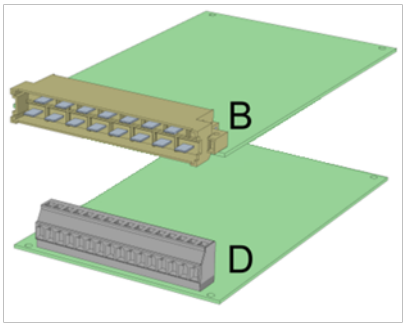
| Part Number | Nominal output Power [W] | Input voltage range [V] | Maximum input current [A] | Nominal Output voltage [V] | Maximum output current [A] | Efficiency [%] |
|---|---|---|---|---|---|---|
| **CLS-120-6512** | 120 | 14.4 – 154 | 9.45 | 12 | 10 | 88 |
| **CLS-120-6513** | 120 | 14.4 – 154 | 9.36 | 24 | 5 | 89 |
| **CLS-120-6514** | 120 | 14.4 – 154 | 9.26 | 48 | 2,5 | 90 |

CLS–120–65_ _–_ _

**Q** Remote sensing option
**O** ORing option

**B** DIN41612H15
**D** Spring clamp terminal

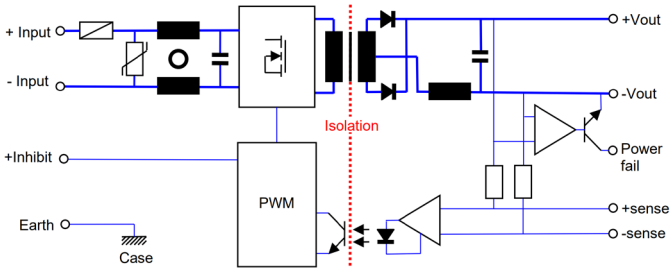
Model number



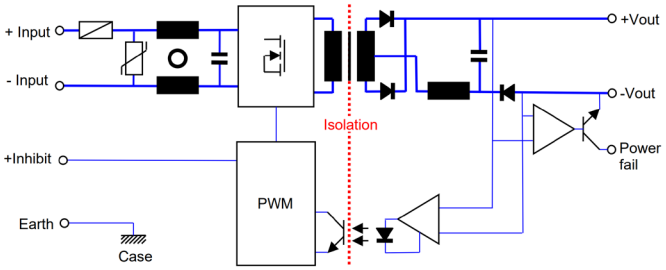

Option ORing only for models CLS-120-6513_O and CLS-120-6514_O (24 and 48V respectively)
Accessories must be ordered in a separated order line

## BLOCKS DIAGRAMS

**Option Q (Remote sensing)**

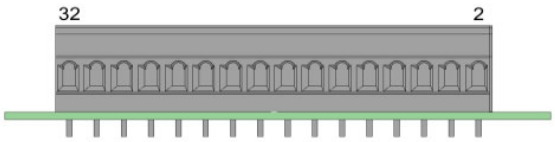



**Option O (ORing)**




**Connector DIN41612H15 (Max. 12A / terminal)**


**Spring clamp terminals (Max. 12A / terminal)**




| Option: Q | | |
|---|---|---|
| Terminal Function | PCB Marking | Terminal No. |
| +Output | +Out | 4, 6 |
| -Output | -Out | 8,10 |
| NC | -I | 12, 14 |
| +Sense | +S | 16 |
| -Sense | -S | 18 |
| P.Fail | PF | 20 |
| Enable | Inh | 22 |
| Earth | ⏚ | 24 |
| + Input | +In | 26, 28 |
| - Input | -In | 30, 32 |

| Option: O | | |
|---|---|---|
| Terminal Function | PCB Marking | Terminal No. |
| +Output | +Out | 4, 6 |
| -Output | -Out | 8,10 |
| NC | -I | 12, 14 |
| NC | +S | 16 |
| NC | -S | 18 |
| P.Fail | PF | 20 |
| Enable | Inh | 22 |
| Earth | ⏚ | 24 |
| + Input | +In | 26, 28 |
| - Input | -In | 30, 32 |

## DESCRIPTION

The CLS-120 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.

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.

## INSTALLATION

There are two connecting options:

- DIN-41612-H15 connector
- Spring clamp terminals

The product can be mounted:

- On a chassis by means of the 4 corner holes.
- In EUROCARD racks. For this application there is a standard 8Te front plate accessory reference **NP-9427**
- With the base reference **NP-9124.** This accessory can be mounted on a chassis or in DIN rail adding the clip accessory **NP-9135**.

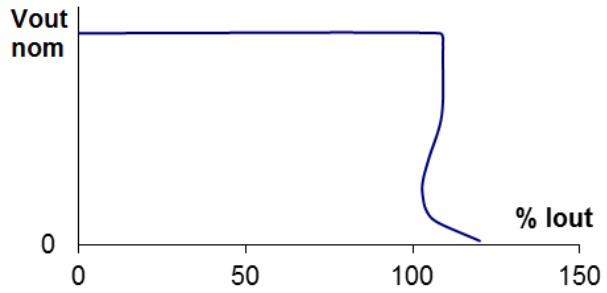
## START-UP

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.

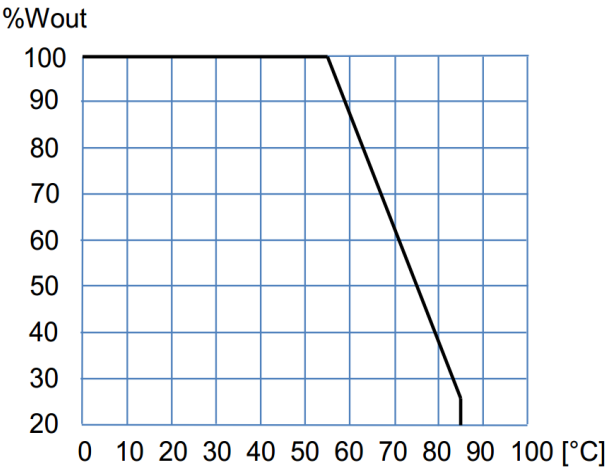
WARNING: If the load is connected to the tabs of remote sensing (+/-S) and the connection from the output to this load is missing the remote sensing function could make unusable due to the acting of the internal fuse of protection. If power levels close to the maximum output are required, make sure the assembly enhances cooling by natural convection and the card is placed in vertical position.

## OUTPUT VOLTAGE ADJUSTMENT


## TYPICAL OUTPUT CHARACTERISTIC




## POWER DERATINGvsAMBIENT TEMP.




**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. To adjust the output voltage use a small screwdriver to move a potentiometer (position indicated in the image). **Attention: use a plastic screwdriver to adjust the potentiometer to avoid accidental short circuits that could damage permanently the board.**

Join the load outputs by using cables with a cross-section no greater than the one required and of equal length.

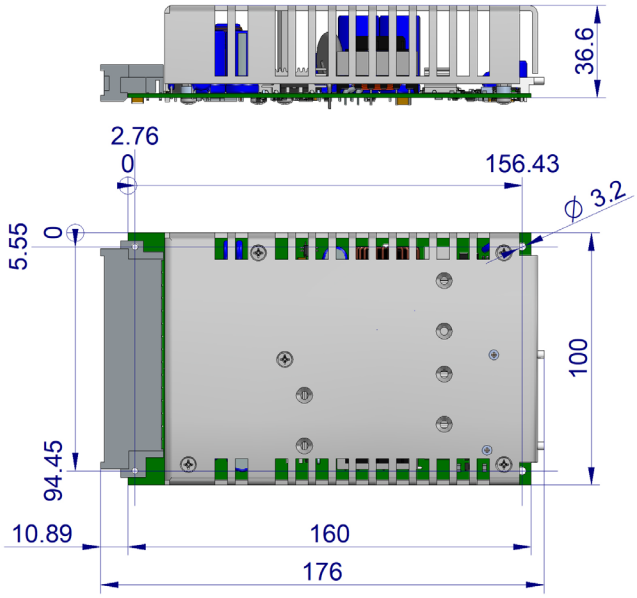
**For safety reasons, the following requirements must be complied with:**

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.

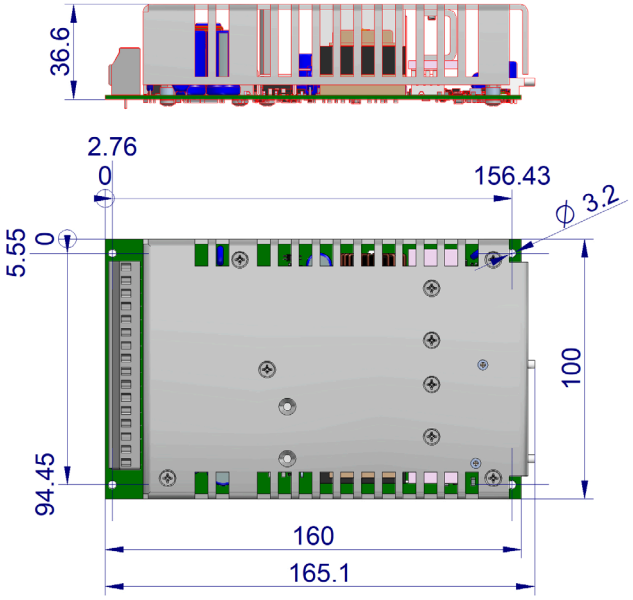
Only replace the fuse with another fuse of the same rating and type, and only after disconnecting the converter from DC power.

## DIMENSIONS

### B CONNECTOR

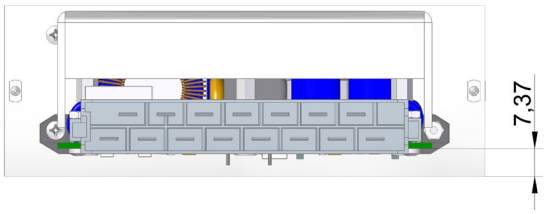



### D CONNECTOR

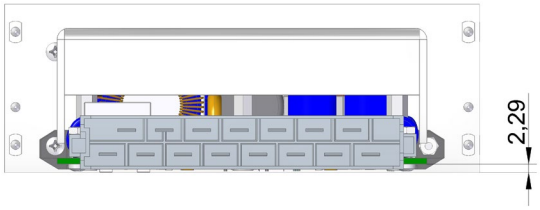



## FRONTAL DIMENSIONS

### TYPE 1 (NP-9427)




### TYPE 2 (NP-9464)

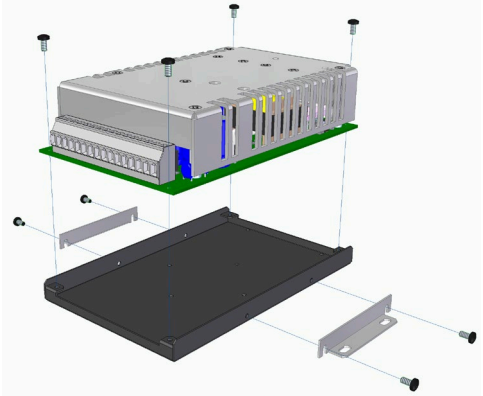



## ACCESSORIES

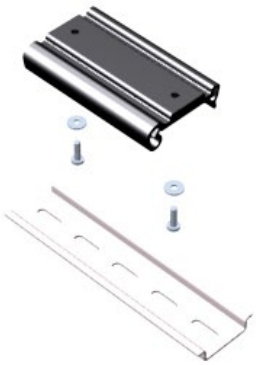
| ACCESSORIES | CODE |
|---|---|
| Mounting base | NP-9124 |
| Rack 19'' frontal panel type 1 (3U 8TE) | NP-9427 |
| Rack 19'' frontal panel type 2 (3U 8TE) | NP-9464 |
| Solder side plastic cover with screws | NP-9465 |
| Din rail clip for mounting base | NP-9135 |
| Redundant connection for two units (ORing diodes + alarms contacts) | ACD-15, ACD-25 |

**NP-9427**


**NP-9124**



**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: **CLS-120-6512 ... 6514**

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

| | |
|---|---|
| 2014/35/EU<br>SI 2016 No 1101 | Low voltage / The electrical equipment (safety) regulations |
| 2014/30/EU<br>SI 2016 No 1091 | EMC / Electromagnetic compatibility regulations |
| 2015/863/EU<br>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: **2020**; 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

Miguel Angel Fernandez
Chief Research & Development Officer

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

# ANNEX

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<tr><td rowspan="3">Radiated emissions</td><td rowspan="3">IEC55016</td><td rowspan="3">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>
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<tr><td>Signal</td><td>±2kV</td></tr>
<tr><td>PE</td><td>±1kV</td></tr>
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<tr><td>Signal</td><td>10V</td></tr>
<tr><td>PE</td><td>10V</td></tr>
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