inventlab®

# ippcc - inventlab power path controller and charger

## Datasheet

***Observe safety instructions on page 2***


ippcc


ippcc DIN

V2.2

## Features of ippcc

- ► **Module to build high current UPS, load sharing and redundant power supply solutions**
- ► **PC104 PCB or DIN-Rail case version available**
- ► **Integrated 5A Constant-Current-Constant-Voltage (CCCV) charger**
- ► **Up to 80A output current**
- ► Up to 40A input current per power path input
- ► 3.6V to 36V power path voltage input
- ► 12 to 36V charger input
- ► 10 to 24V charge output
- ► -40°C to 85°C operating temperature

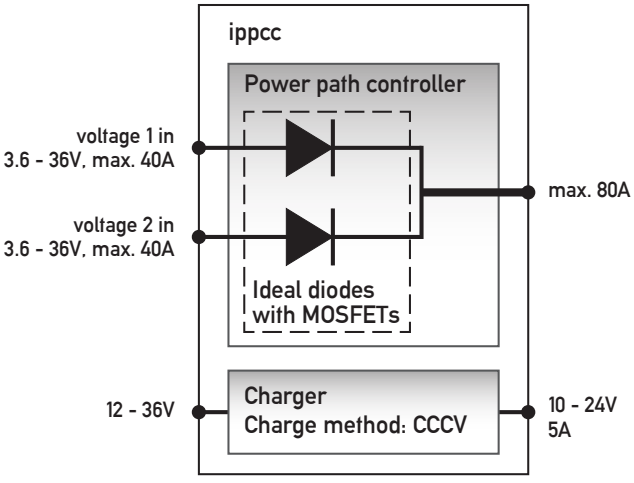
## Applications

- ► Industrial
- ► Security
- ► Defense
- ► Marine
- ► Vehicle
- ► Railway
- ► ...

## Description

ippcc is an integration module to build ups solutions or redundant power supplies. Its integrated Constant-Current-Constant-Voltage (CCCV) allows to charge an ultracapacitor module or a battery, while input voltage is available. When the input voltage fails, the load can be powered from ultracapacitor/battery over the second power path.
If the voltage difference on the both power path inputs is below 100mV, the load is automatically shared by the two voltage sources. If the voltage difference is higher than 100mV, the load draws the full current from the voltage source with the higher voltage.

## Block diagram

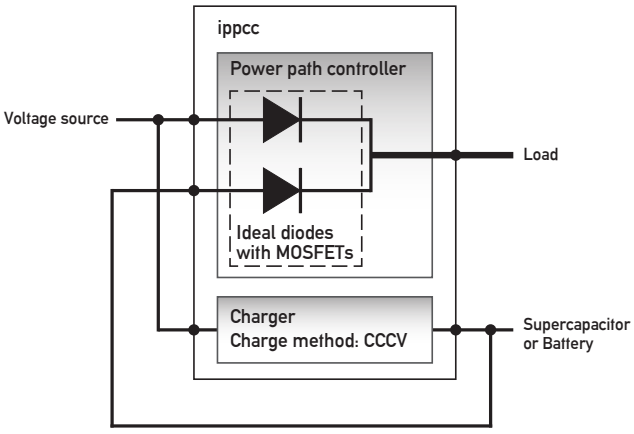



## Safety instructions

**The manufacturer declines any liability for damage to humans and machines. In particular, damage arising from the non-observance of the following safety regulations!**
**All work on the device must be carried out only by qualified and trained personnel!**
Keep conductive parts away from the connectors, risk of short circuit!
If the device has visible defects or it indicates defects, disconnect it and return it to manufacturer for repair.

## Application example

High-current UPS built with ippcc:



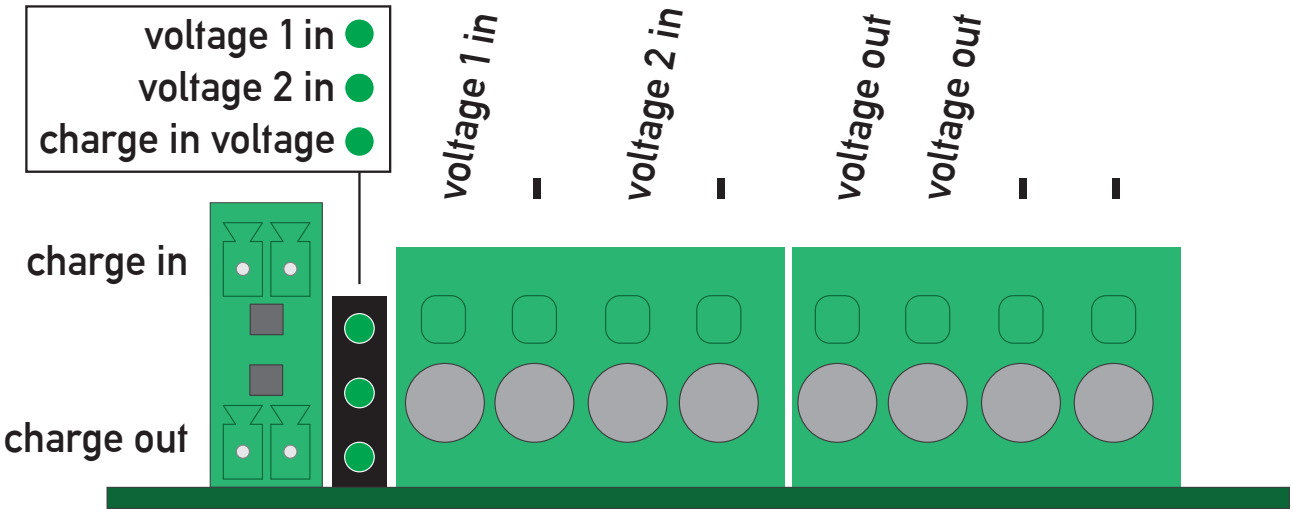

Other ippcc application examples:

- ► Ultracapacitor buffer module to prevent voltage drops, e.g. when a motor on the same voltage rail switches on
- ► Compensation of high load peaks (e.g. to minimize cable diameters for periodically high load currents)
- ► Ultracpacitor/battery-UPS
- ► Redundant power supplies
- ► Load sharing between two voltage sources

## Application informations

- ► Contact inventlab LLC to get design support
- ► Use the calculator software on http://www.inventlab.ch/ultracapacitor_energy_calculator/ to build design ultracapacitor UPS solutions with ippcc
- ► Make sure your ultracapacitor/battery charge and discharge currents are in allowed range according to the ratings of the used ultracapacitor/battery
- ► Make sure your load is cut off at a minimum voltage (undervoltage protection) to prevent disallowed high currents in low voltage ranges and to prevent instable states of your load.

## Connectors and pinout




## Charge in and out cable entry plug, cable cross sections

Solid wire: 26-16 AWG / 0.13-1.5mm²
Stranded wire: 26-16 AWG / 0.13-1.5mm²
Torque: 3.0Lb.In / 0.34Nm
Wire stripe length: 6-7mm

## Voltage 1 and 2 in and voltage out, cable cross sections

Conductor cross section solid min. 0.2 mm²
Conductor cross section solid max. 10 mm²
Conductor cross section flexible min. 0.2 mm²
Conductor cross section flexible max. 6 mm²
Conductor cross section flexible, with ferrule without plastic sleeve min. 0.25 mm²
Conductor cross section flexible, with ferrule without plastic sleeve max. 6 mm²
Conductor cross section flexible, with ferrule with plastic sleeve min. 0.25 mm²
Conductor cross section flexible, with ferrule with plastic sleeve max. 4 mm²
Conductor cross section AWG min. 24
Conductor cross section AWG max. 8
2 conductors with same cross section, stranded, TWIN ferrules with plastic sleeve, min. 0.25 mm²
2 conductors with same cross section, stranded, TWIN ferrules with plastic sleeve, max. 1.5 mm²
Wire Stripe length: 15mm

## Charge voltage set

The charge voltage can be set by the potentiometer on the rear of the ippcc. Remove the rear metal sheet of ippcc DIN to reach the potentiometer:

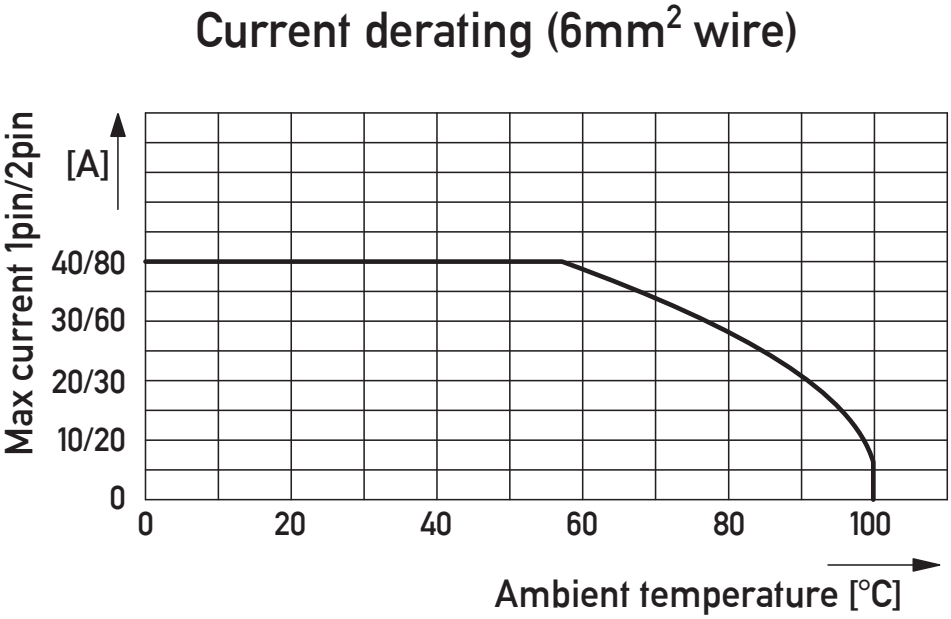

- ► Disconnect the ultracapacitor/battery module, when you have already connected it to the charge out
- ► Connect a voltmeter to the charge out
- ► Power the charge in with a voltage source with at least the voltage you need on charge out + 2V. (e.g. when you need a charge voltage of 10.5V, the voltage on charge in has to be at least 12.5V)
- ► Adjust the voltage down to the minimal voltage
- ► Now adjust the charge voltage to the value you need

## Electrical Specifications / Absolute Maximum Ratings

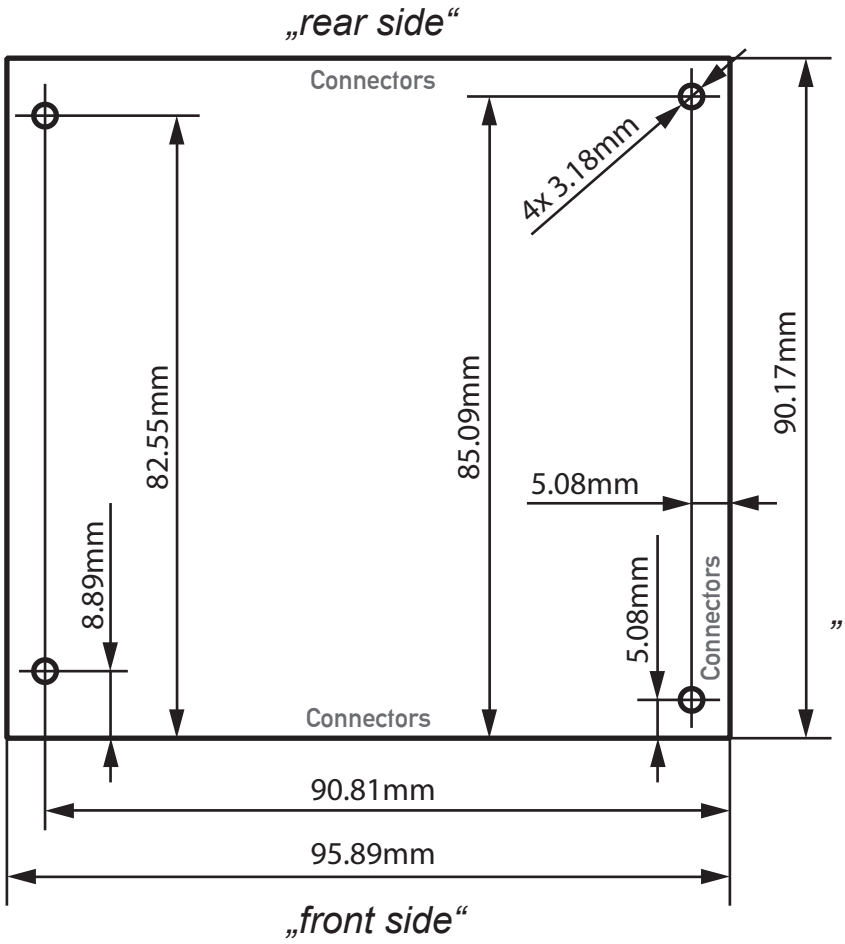
| Symbol | Parameter | Condition | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| $V_{PWRPATH}$ | Power path input voltage | Power path input voltage, each path | 0[1] | 3.6 - 36 | 40 | V |
| $I_{PWRPATHIN}$ | Power path input current | Power path input current, each path | 0 | | 40[2] | A |
| $V_{CHARGEIN}$ | Charger input voltage | Charger input voltage range | 0 | 12 - 36[3] | 40 | V |
| $V_{CHARGEOUT}$ | Charge output voltage | Adjustable charge voltage range | 9 | 10 - 24 | 25 | V |
| $I_{CHARGEOUT}$ | Charge output current | | | 5[4] | | A |
| $T_A$ | Temperature range | Storage | -40 | 20 | 85 | °C |
| $T_O$ | Temperature range | Operating | -40 | 20 | 85 | °C |

[1] Power path input voltages below 3.6V results in higher power dissipation in ippcc. The load should be switched off/disconnected on an at least 3.6V power path input voltage.
[2] See power path controller current derating curve.
[3] Input voltage has to be higher or equal than charge-voltage + 2V.
[4] Make sure your power source is able to deliver enoug input current. The charge input current is highest when the charge-output voltage is near the target charge-voltage.

## Power path controller current derating



Mechanical dimensions ippcc (PC104 variant)




ippcc is a PC104 form factor module. All connectors and LEDs are on the *„front side“*. On the *„rear side“* is only the voltage set potentiometer placed. On the *„right side“* are no connectors.

Mechanical dimensions ippcc DIN (case variant)

48.5 x 105.5 x 92.4 mm

## Manufacturer

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## Product website / Where to buy

http://shop.inventlab.ch/en/12-integration-modules

or for German:

http://shop.inventlab.ch/de/12-integration-module

## Your specific requirements

Please contact inventlab LLC if your project has special requirements. Our engineers look forward to hearing from you.

## Disclaimer