powersystem TECHNOLOGY

Ihr Vertriebspartner:
HY-LINE®
hy-line-group.com

HY-LINE Power Components
Vertriebs GmbH
Inselkammerstr. 10
D-82008 Unterhaching
✆ +49 89/ 614 503 -10
power@hy-line.de

HY-LINE AG
Hochstrasse 355
CH-8200 Schaffhausen
✆ +41 52 647 42 00
info@hy-line.ch

PRELIMINARY DATASHEET

DC-DC VPX Conduction cooled
PST VPX600DC3U

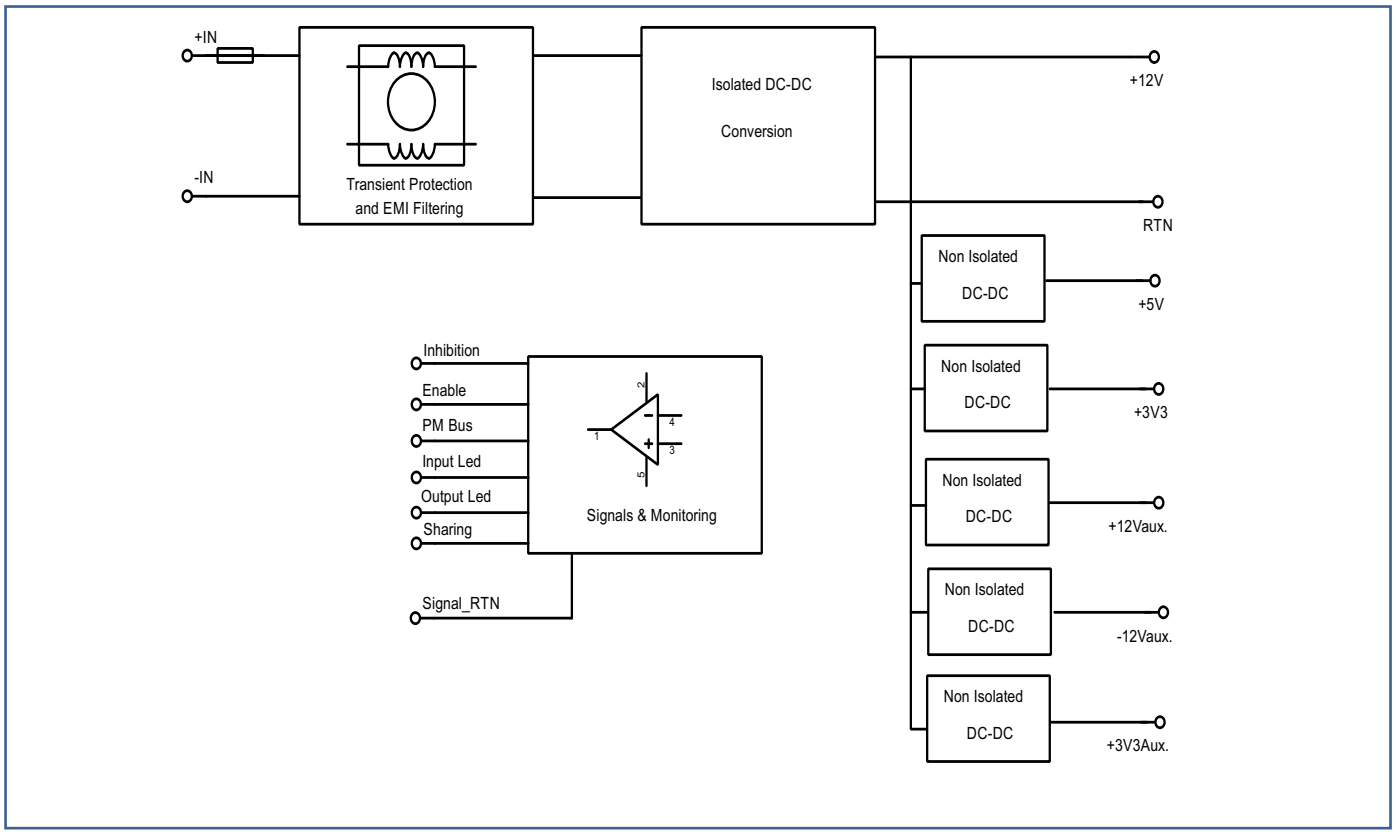
Features

Input ranges: 16-50Vdc
6 outputs 600W max.
3U*5TE*160mm
Automatic reverse polarity, Surge and transient protected
-40°C to 85°C baseplate
MIL-STD-810 and Severe environment

Safety IEC/EN 60950-1, RoHS lead-free-solder compliant

RoHS

PST VPX600DC3U is a very high power density 600W DC-DC converter in conduction cooled VPX format incorporating input EMI filtering, input transient protection, output protections, conformal coating, very robust mechanical package and connections. The converter provides high power density thanks to the integration of Vicor Corp. DCM modules, high efficiency, input-to-output isolation, soft start, overtemperature protection, input over/undervoltage lockout. The outputs are short-circuit proof. The 85°C baseplate operation allows operation in high temperature environment. The converter is also protected against transients MIL-STD-704 and MIL-STD-1275, EMI filtered built to meet MIL-STD-461 and ruggedizzed according MIL-STD-810.



Input

Electrical Input Data

Input					Unit
Characteristics	Conditions	min	typ	max	
Operating input voltage		16	28	50	Vdc
Absolute max.rating				65	Vdc
Undervoltage Lockout				15.2	Vdc
Undervoltage Recovery				16	Vdc
Overvoltage Lockout				55	Vdc
Overvoltage Recovery		50			Vdc
Input current	Vin min			40	A
No-load input power			20		W
Inrush current	Peak			25	A
Power interruption			25		µs
Start-up time			20		ms

Input Transient Protection

A transil diode and a common mode filter form an effective protection against input transients in severe environments, MIL-STD-1275 250V/ 100us, MILSTD704. The unit do not incorporate an active protection circuit against high energy transient MIL-STD-1275.

Input Fuse

A fuse mounted inside the converter protects against damages in case of a failure. The fuse is not user-accessible.

Input Reverse Polarity

An active Mosfet circuit placed internally at the input will block the current in case of reversed polarity, no damage to the unit and unit will come back to normal operation when resumed.

Input Inrush Current

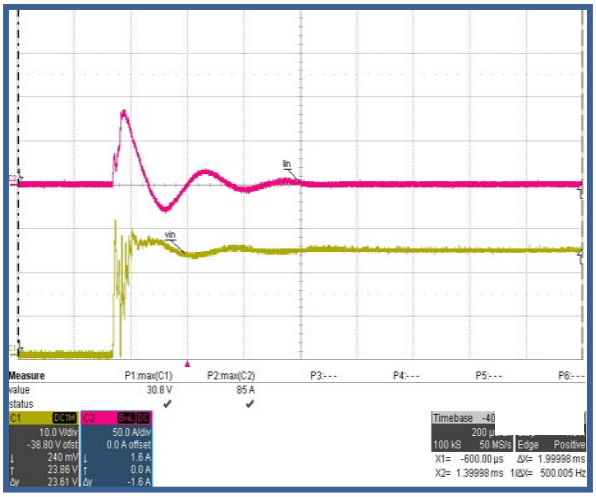
They are no inrush limitation other than input serial choke from EMI filter and those incuded into the Vicor DCM converter as the input capacitors are quite limited.

Input UVP/ OVP

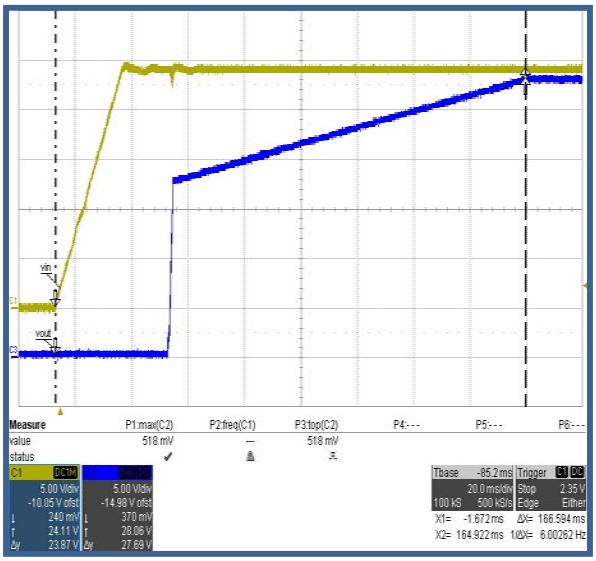
The VPX includes input undervoltage protection (UVP) and overvoltage protection (OVP) which will stop the converter in the event of an under/ overvoltage and restart when input comes back in its normal range. See table above for the value according input range. Do not not exceed absolute maximum rating in any case.

Waveforms

Inrush Current : The below graph illustrate a typical test performance results based on this architecture. No inrush dedicated limiting circuit, peak value and waveform depend on input source impedance.



Start-up time : The below graph illustrate a typical test performance results based on this architecture



Output

Electrical Output Data

Output		+12V	+5V	+3V3	+3V3 Aux.	+12V Aux.	-12V Aux.	Unit
Characteristics	**Conditions**							
Output voltage	At 25°C	12	5	3V3	3V3	12	-12	Vdc
Output power Max.	600W max. total	600	100	82	5	12	12	W
Output nom.current	At 25°C	40	20	20	1.5	1	1	A
Peak Output current	At 25°C	50	20	25	1.5	1	1	A
Output current limitation	At 25°C	55	25	28	2	1.2	1.2	A
Efficiency	Max.	90						%
Output noise	Nominal input, full load, 20MHz Brandwidth	120	75	50	50	120	120	mVpp

Parallel and Series Connection

No serial operation is recommend for this PSU. Parallel operation is possible based on the shared signals, the accuracy of the sharing will be dependant on the output cables connection. Output voltage of each unit should be as close as possible (+-50mV at 50% load) to ensure proper current sharing between the paralleled units.

Redundant Systems Operation

When systems require a very high level of reliability and should work normally in the event of a failure, N+1 redundancy is implemented where N is the number of converter to support power requirement. If one converter fail, the remaining ones still delivers the power to the loads.

Hold-up time

The converter provides very limited hold-up time. If a hold-up time is required, use external input capacitors of adequat size. Please consult factory for proper protection.
Formula for additional external input capacitor : C =2*Pout*th*100/(V^2-Vi^2)/n
whereas :

C = external input capacitance [mF]
P_{out} = output power [W]
n = efficiency [%]
t_h = hold-up time [ms]
V_i = minimum input voltage
V = Input voltage level before interruption

Thermal Considerations

The converter is designed to be mounted on a dissipative area through the wedge lock system, in conduction cooling mode. The max. operating temperature is the temperature of the baseplate which should not exceed 90°C.
When used with heatsink attached to the chassis in conduction cooled or air forced, the thermal impedance Rth (°C/W) of the heatsink should be calculated taking into account max baseplate temp.90°C (Tb max.), max operating ambiant (Ta max.), dissipated power (Pdiss).
Rth = (Tb max. - Ta max.) / Pdiss.

Output OVP

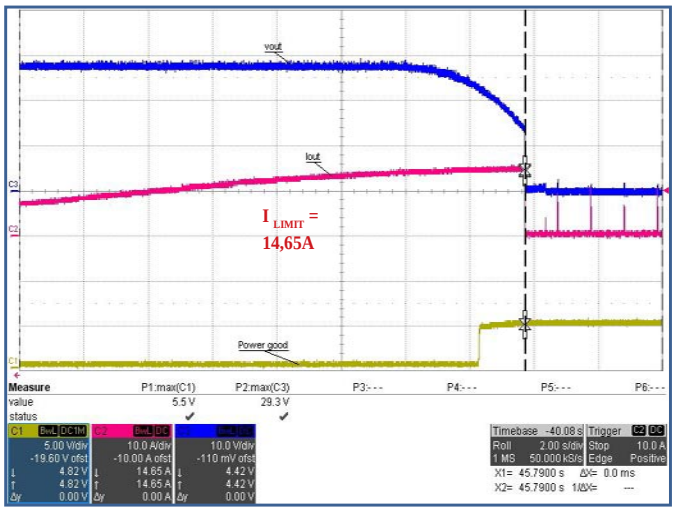
The VPX includes output overvoltage protection (OVP) on the 12V which will stop the converter in the event of an overvoltage and restart when input comes back in its normal range. Nevetheless exceeding these value may damage the converter.

Output Current Limitation

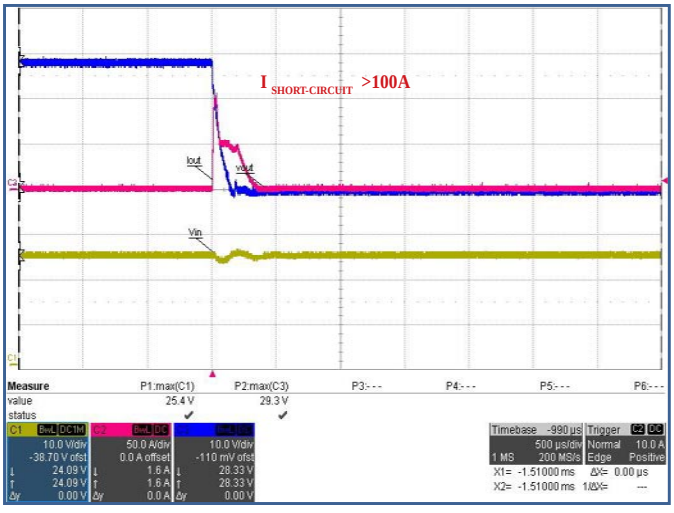
See Electrical output data for current limitation value for each output
The converter output is continously protected against short-circuit or current limitation on the 12V by disabling the power train when ouput current goes above the value from the table attached. When the default disappear, the converter will go back to normal operation after initialization.

Waveforms

Current Limitation The below graph illustrate a typical test performance results based on this architecture



Short Circuit limitation The below graph illustrate a typical test performance results based on this architecture



Auxiliary Functions

Inhibit (Remote On/Off)

As stated in Vita 62, active low, turn off all outputs execpt 3V3 Aux, referenced to signal_RTN.

Enable

As stated in VITA 62, active high, turn off all output voltages, refrenced to signal_RTN.

Fail

Signal active low if one of the output voltage disappear

SysReset

Signal active high when all output are within normal ranges.

PMBus

A power management bus (PMBus) is used for monitoring signals. Through this serial two wires communication (SCL, SDA), temperature and default are reported.

Sense Lines

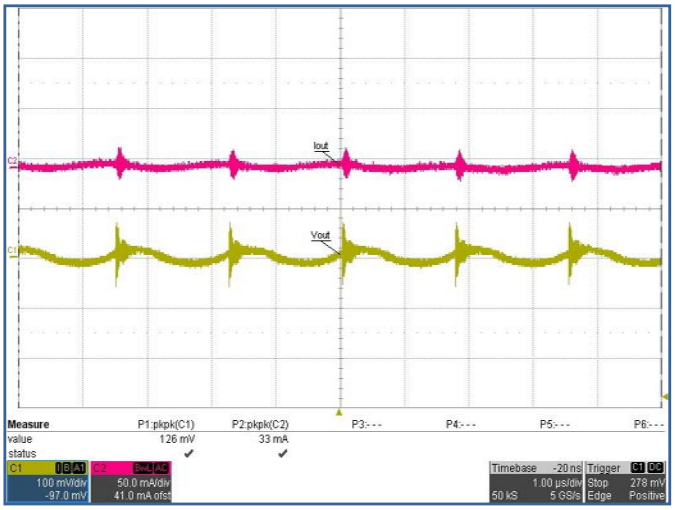
This feature enables compensation of voltage drop accross the connector contacts and the load lines by connecting +S and -S at the load location. The overall voltage compensation in the + and - power lines should not exceed +10% of the nominal output voltage as it may .

Share

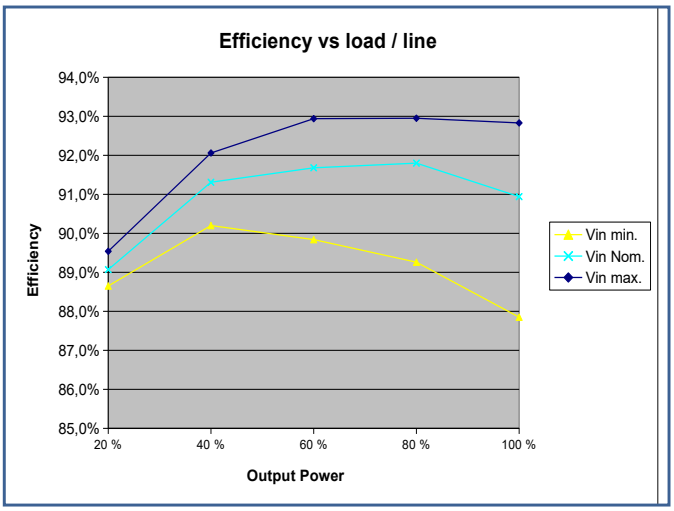
The sharing signals are used to interconnect each units to be mounted in parallel in order to share the power.

Waveforms

Output Noise The below graph illustrate a typical test performance results based on this architecture



Efficiency The below graph illustrate a typical test performance results based on this architecture



Isolation

- Dielectric withstand Input/chassis: 2120Vdc
- Dielectric withstand Input/Output : 2120Vdc
- Dielectric withstand Output/chassis: 700Vdc

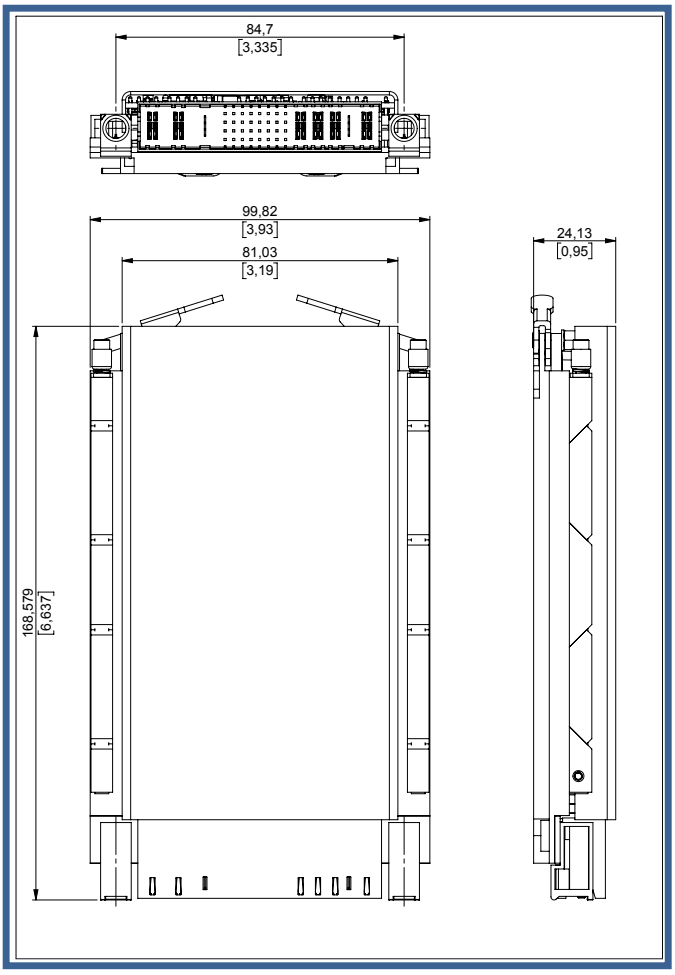
Approvals & Environment

Built to meet standards - No laboratory certification **EMI :** MIL-STD-461F CE102
Temperature :
Storage : -40 +100°C
Operating : -40 +85°C, conduction cooled

Input voltage spikes : MIL-STD704, MILSTD461 CS101, 114, 115,116
MIL-STD-1275D/E +-250 V 100us
Shock & Acceleration : MIL-STD-810G
Operational shock : MIL-STD-810G, 40g/11ms, Method 516.6, proc1.
Crash safety shock (Impulse) : MIL-STD-810G
Vibrations : MIL-STD-810E, Sine 10g pk 5-2000Hz, 10min/axis, Random Method 514.4, proc.1 cat8.

Mechanical Data

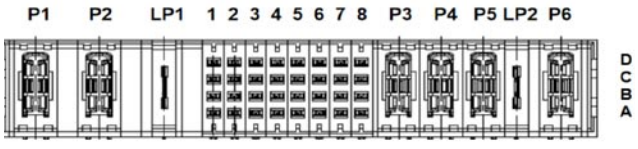
Dimension: 100 x 168.5 x 24.13mm
Weight : 750g.



Connector Pin Allocation

AMP 6450849-7

PIN	signal name	PIN	signal name
P1	-IN	A5	Address
P2	+IN	B5	Address
LP1	Earth	C5	SCL – PMBus Clock
A1	NC	D5	SDA - PMBus Data
B1	NC	A6	
C1	NC	B6	
D1	NC	C6	-12V Aux.
A2	NC	D6	Sysreset
B2	Fail	A7	+12V Share
C2	Inhibit	B7	+3V3 Share
D2	Enable	C7	+5V Share
A3		D7	Signal _RTN
B3	12V Aux.	A8	+12V S+
C3	NC	B8	+3V3 S+
D3	NC	C8	+5V S+
A4	+3V3 Aux.	D8	S-
B4		P3	+5V
C4		P4	RTN
D4		P5	RTN
		LP2	+3V3
		P6	+12V



Safety & Installation

Installations Instructions

These converters are components, intended exclusively for integration into other equipment by an industrial assembly process or by a professionnaly competent person. Installation must strictly follow the safety regulations in respect of the enclosure, mounting, creepage and clearance distances, markings of the end-use application.
Connection to the system shall be made via appropriate connection. The +Vin is internally fused. This fuse is designed to protect the converter against overcurrent caused by a failure, but may not be able to satisfy all requirements. External fuses in the wiring circuit to one or both input pins may be necessary to ensure compliance with local requirements.
Do not open the converters, or the warranty will be invalidated. Make sure that there is sufficient heat dissipation available for conduction cooling. This should be verified by measuring the case of temperature at the specified measuring point, when the converter is operated in the end-use application.

Standards and Approvals

The converters are built to meet the safety standards IEC 62368-1, EN 62368-1.
'Built to meet' mentionned in the different paragraphs of the datasheet means that Power System Technology has designed the product to meet the standard but did not certify it in a laboratory.

Cleaning Agents and Process

The converters are not hermetically sealed. In order to avoid possible damage, any penetration of liquids shall be avoided.

Railway Application

The converters have been designed observing the railway standards EN 50155 and EN 50121. All boards can be protected by a conformal coating as an option (-V).

Isolation

The electric strength test is performed in the factory in accordance with IEC/EN 62368.

Reliability

MIL-HDBK-217F, notice 2	Model	Heatsink Temp.	GB	GF
MTBF (Hours) Est.	VPX600DC3U	40°C	1370200	685100
		70°C	835822	417911
		100°C	509851	254926

Ihr Vertriebspartner:
HY-LINE®
hy-line-group.com

HY-LINE Power Components
Vertriebs GmbH
Inselkammerstr. 10
D-82008 Unterhaching
✆ +49 89/ 614 503 -10
power@hy-line.de

HY-LINE AG
Hochstrasse 355
CH-8200 Schaffhausen
✆ +41 52 647 42 00
info@hy-line.ch