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Bel Power Solutions for Railway and Industrial

bel POWER SOLUTIONS & PROTECTION
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DC-DC Converters for General Purpose Rail Applications

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RCM Series

The RCM Series (Railway Chassis Mount) DC-DC converters are reliable power supplies for railway and transportation systems. There are two wide input voltage ranges available for 150 W and 300 W models. 500 W and 1000 W models are optimised for 110 V railway batteries. The RCM Series is designed for chassis mount applications, with integrated enclosure, operating in convection cooled environments.

Many options are available, such as an output ORing FET for redundant operation, output voltage adjustment, interruption time of 10 ms (class S2), out-ok signals, and a shutdown input.

Features

- RoHS lead-free-solder product
- Input voltage ranges:
  - 150 W / 300 W models: 24 / 36 V or 72 / 110 V batteries
  - 500 W / 1000 W models: 110 V battery
- Output voltages:
  - 150 W / 300 W models: 12 V and 24 V
  - 500 W / 1000 W models: 24 V
- Integrated enclosure for chassis mounting
- Extremely high efficiency and high power density
- Low inrush current
- 3 connectors: Input, output, auxiliary (option for 150 W / 300 W models)
- Overtemperature, overvoltage, overcurrent, and overload protection
- Compliant to EN 50155 and EN 45545

MODEL	DC INPUT VOLTAGE (cont.)	DC OUTPUT VOLTAGE	OUTPUT CURRENT	EFFICIENCY	OUTPUT POWER
24RCM150-12	24 V (16.8 – 45 V)	12 V	12.5 A	90%	150 W
24RCM150-24		24 V	6.25 A	90%	
110RCM150-12	110 V (50.4 – 137.5 V)	12 V	12.5 A	90%	150 W
110RCM150-24		24 V	6.25 A	90%	
24RCM300-12	24 V (16.8 – 45 V)	12 V	25 A	92%	300 W
24RCM300-24		24 V	12.5 A	92%	
110RCM300-12	110 V (50.4 – 137.5 V)	12 V	25 A	92%	300 W
110RCM300-24		24 V	12.5 A	92%	
110RCM500-24	110 V (77 – 137.5 V)	24 V	21 A	96%	500 W
110RCM1000-24	110 V (77 – 137.5 V)	24 V	42 A	96%	1000 W

Battery Charger

LBC Series

The LBC Series is a ruggedized battery charger consisting of two or three parallel independent AC-DC converter modules employing PFC stage and insulated DC-DC stage to convert the three-phase input voltage 400 / 480 VAC (line to line) to a bus voltage suitable for 110 V battery charging. The system includes a DSP for control and monitoring.

- Input voltage: 3x 400 / 480 VAC (350 - 528 VAC)
- Output power up to 12 kW
- High power density 13 W/in^3 per unit
- 110 VDC output is decoupled with a diode for redundant applications
- Output voltage for 110 V battery (adjustable 85 – 137.5 VDC)
- Operating temperature -25 to 55°C without derating
- CAN bus / Ethernet Interface
- EN 50155, EN 50121-3-2 and EN 45545 compliant for railway applications

Rugged 3U Cassettes for 19inch Rack or Chassis Mount

The rugged MELCHER products offer the industry's premier line of standard products for DC-DC and AC-DC power conversion, including custom design capability for application specific power conversion solutions.

For over 40 years Bel's MELCHER lineup of DC-DC and AC-DC cassette-style power converters with extremely robust electrical and mechanical designs have demonstrated to provide consistent power to a diverse array of railway, signaling, communications, transportation and industrial infrastructure applications.

MODEL#	AC INPUT VOLTAGE	DC INPUT VOLTAGE	OUTPUT VOLTAGES	# OF OUTPUTS	OUTPUT POWER
M Series (8 TE)	85 – 264 VAC*	8 – 385 VDC (6 ranges)	5 – 60; ±12, ±15; 5/±12, 5/±15 V	1, 2 or 3	50 W
S Series (12 TE)	85 – 264 VAC* (PFC)	8 – 385 VDC (6 ranges)	5, 12, 15, 24, 48; ±12, ±15, ±24 V	1 or 2	100 W
K Series (16 TE)	85 – 264 VAC* (PFC)	8 – 385 VDC (6 ranges)	5, 12, 15, 24, 48; ±12, ±15, ±24 V	1 or 2	150 W
LKP Series (16 TE)	187 – 255 VAC (PFC)	N/A	12, 24, 48; ±12, ±24 V	1 or 2	250 W
T Series (28 TE)	70 – 140; 85 – 255 VAC (PFC)	N/A	24 – 54.5 V	1	500 W
Q Series (4 TE)	N/A	14.4 – 154 VDC (5 ranges)	3.3 – 48; ±5, ±12, ±15, ±24 V	1 or 2	82 – 132 W
P Series (4 TE)	N/A	14.4 – 154 VDC (5 ranges)	3.3 – 96 V	1, 2, 3 or 4	100 – 192 W
HP Series (4 TE)	N/A	12.5 – 154 VDC (1 range)	5 – 96 V	1, 2, 3 or 4	120 – 192 W
HR Series (12, 16 TE)	N/A	12 – 168 VDC (1 range)	±12, ±15, ±48 V	1 or 2	144 – 288 W
ER Series (12, 16 TE)	N/A	66 – 168 VDC (1 range)	±12, ±15, ±48 V	1 or 2	144 – 288 W
LR Series (12, 16 TE)	90 – 264 VAC (PFC)	N/A	±12, ±15, ±48 V	1 or 2	210 – 300 W

* 47 – 440 Hz

1 TE = 0.2"

HP Series Rugged DC-DC Cassettes

- For railway and mobility applications
- Ultra wide input range 12.5 to 154 VDC
- 1 to 4 outputs, total power up to 192 W
- EN 50155 and EN 45545 compliant
- 10 ms interruption time
- High reliability: "fit and forget"
- Compatible to former P Series
- Accessories optionally available

LR Series Rugged AC-DC Cassettes with PFC

- For use in advanced electronic systems
- Universal input voltage range 90 – 264 VAC
- Inrush current limitation
- Two isolated adjustable outputs (12 V or 15 V or 48 V)
- Output power up to 300 W
- EN50155 and AREMA compliant
- Parallel operation with active current sharing
- Hold-up time 20 ms

Features

- DC-DC converters with extremely wide input covering battery applications from 12 V to 220 V nominal
- Universal AC input with identical form factors
- Inrush current limitation
- Reverse polarity protection
- Up to 300 W output power
- High efficiency, up to 94.5% including input filter
- Ultra-wide output voltage adjustment
- Remote on/off control input
- Current share, redundancy
- Rugged aluminum extruded case, conformally coated assemblies
- Self-cooling, no derating over the specified temperature range
- Compliance with EN 50155, EN 50121-3-2, UL/EN 60950 and National deviations (AREMA, RIA, NFF-F 16)
- Input / output overvoltage protection
- All products are fully transient protected
- No-load, overload and short-circuit protection
- Thermal protection

AREMA Compliant Power Systems

- High current sub-rack, 5 – 40 A systems, fully redundant
- 1 – 4 MELCHER 150 W AC-DC converters per rack
- Universal fully redundant input 110 / 230 VAC
- Fully redundant outputs of 12-15 VDC or 24 – 30 VDC
- 5 – 40 A of output current
- Test votage 3000 VAC
- Relay contacts for alarm signals

Isolated PC-Board Mount DC-DC Converters

Bel Power Solutions offers a wide range of PCB-mount DC-DC converters that are especially designed and manufactured for the railway and transportation markets.

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MODEL	INPUT VOLTAGE	OUTPUT VOLTAGES	# OF OUTPUTS	OUTPUT POWER	SIZE
IMX4	4.4 – 121 VDC (4 ranges)	3.3, 5, 12, 15 or ±5, ±12, ±15, ±24	1 or 2	4 W	DIP24, 8.5 mm
IMX7	8.4 – 150 VDC (4 ranges)	3.3, 5 or ±5, ±12, ±15, ±24	1 or 2	7 W	1" x 2" 10.5 mm
IMX15 / IMY15	8.4 – 150 VDC (3 ranges)	3.3, 5 or ±5, ±12, ±15, ±24	1 or 2	15 W	1.6" x 2" 10.5 mm
IMX35	9 –150 VDC (4 ranges)	4x 5, 4x 12, 4x15; 5/±12, 5/±15	4	35 W	2" x 3" 10.5 mm
IMX70 / IMY70	12 –154 VDC (2 ranges)	5, 12, 15, ±24	1 or 2	70 – 90 W	2" x 3" 10.5 mm
0RQB-15Y05x	14 –154 VDC	5 V @ 3 A	1	15 W	1/8 brick modified
0RQB-C5W54L	43 – 154 VDC	54 V @ 3 A	1	162 W	1/4 brick standard
0RQB-C5U54H	16 – 67 VDC	54 V @ 3 A	1	162 W	1/4 brick standard
0RQB-C2Q12x	9 – 36 VDC	12 V @ 13 A	1	156 W	1/4 brick standard
0RQB-D0W12L	66 – 154 VDC	12 V @ 16.7 A	1	200 W	1/4 brick standard
Non-Isolated Boost DC-DC Converter					
IBX15 Series	12 – 154 VDC	49 – 80 V	1	63 – 110 W	2" x 2" x 0.45" / 54 x 54 x 11.5 mm

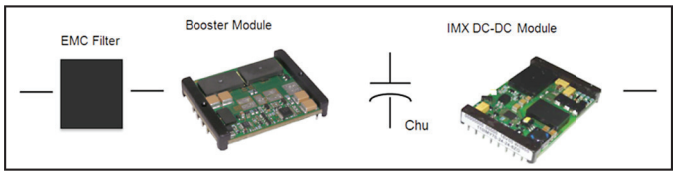
Features

- Various wide DC input voltage ranges with or without isolation from 7 – 154 VDC, including platforms with 10:1 ratio
- Output voltages from 3.3 – 54 V with trim ranges as wide as 0 – 110% Vout nominal
- Wide operating temperature ranges with startup at -40 °C or below and no derating to 70 °C
- Dip-varnished circuits without potting material for maximum reliability
- Isolated converters with magnetic feedback and I/O test voltages up to 3000 VAC
- Low output ripple and excellent dynamic response
- Maximum flexibility for modular type platforms instead of custom designs
- High shock and vibration resistance
- Input overvoltage and under voltage lockout protection
- Current limit and short-circuit protection
- Thermal protection
- Output overvoltage protection (OVP)
- Input transient protection

Modular Building Blocks for max flexibility and 10:1 Input (15 VDC - 154 VDC)

The new IBX15 and IMY70 / IMY15 Series combined offer a 10:1 ratio input platform for battery voltages from nominal 24 V to 110 V, with a multitude of isolated DC output options. The IMY range of DC-DC converters combines single or multiple output voltages between 3.3 V – 48 V with up to 90 W of power.
In order to explore the unique benefits of the IBX/IMY power solutions, a bare PCB demo board is available for free on request.
For further information please contact our Field Application Engineering team.

The IBX/IMY Concept practically replaces full custom solutions:



DIN Rail Products

The Melcher LX / LW Series of Industrial / Transportation DIN Rail power supply units have been designed for rugged and harsh environments, where reliability is critical, featuring single or dual outputs and battery charging options.

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MODEL	INPUT VOLTAGE	OUTPUT VOLTAGES	OUTPUT CURRENT	OUTPUT POWER	EFFICIENCY
LW-Series, single	85 – 264 VAC, 90 – 350 VDC	12, 24, 36, 48 VDC	2.5 to 14 A	125 W	83, 87, 88%
LW-Series, dual	85 – 264 VAC, 90 – 350 VDC	2x 12, 2x 24, 2x 36, 2x 48 VDC	5 to 2x 7 A	250 W	83, 87, 89%
LX-Series, triple	85 – 264 VAC, 90 – 350 VDC	24, 36, 48 VDC	7.5 to 20 A	375 W	87 – 88%
LX-Series, quad	85 – 264 VAC, 90 – 350 VDC	2x 24, 2x 36, 2x 48 VDC	10 to 2x 10 A	500 W	87 – 88%
EW- Series, single / dual	66 – 150 VDC	24 or 2x 24 VDC	5, or 2x 5 A	120, 240 W	87%

Non-Isolated Buck DC-DC Converters

Bel Power Solutions offers a wide range of positive switching regulators designed as power supplies for electronic systems, where no input-to-output isolation is required. Their major advantages include a high level of efficiency, high reliability, low output ripple, and excellent dynamic response.

MODEL	INPUT VOLTAGE	OUTPUT VOLTAGES	OUTPUT CURRENT	MOUNT	SIZE (in / mm)
PSR Series	7 – 40, 8 – 80 VDC	0 – 36 VDC	2 – 4 A	PCB, Chassis	2 x 2.8 x 1 / 50 x 70 x 25
PSA Series	7 – 35, 18 – 156 VDC	0 – 48 VDC	1 – 5 A	PCB, Chassis	2 x 2.8 x 1 / 50 x 70 x 25
PSB Series	7 – 40, 8 – 80, 15 – 156 VDC	0 – 48 VDC	4 – 8 A	PCB, Chassis	2.7 x 4.2 x 1.3 / 60 x 106 x 32
PSC Series	7 – 40, 8 – 80, 18 – 156 VDC	0 – 48 VDC	6 – 12 A	PCB, Chassis	3.5 x 5.9 x 1.3 / 88 x 151 x 32
PSL Series	7 – 40, 8 – 80, 18 – 156 VDC	0 – 48 VDC	6 – 12 A	Cassette 3 U / 8 TE	19” Rack 1.5 x 6.6 x 4.2 / 37 x 168 x 107
PSS Series	8 – 40, 8 – 80, 18 – 156 VDC	0 – 48 VDC	9 – 18 A	Cassette 3 U / 12 TE	19” Rack 2.4 x 6.6 x 4.4 / 60 x 168 x 111
PSK Series	8 – 40, 8 – 80, 18 – 156 VDC	0 – 48 VDC	12 – 25 A	Cassette 3 U / 16 TE	19” Rack 3.2 x 6.6 x 4.4 / 80 x 168 x 111

Compact PCI Cassette Converters

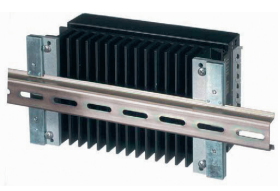
The CPA and CPD Series are highly reliable power supplies for CompactPCI® systems, which are increasingly used in communications, industrial, military, aerospace, and other applications. These power supplies offer high power density in plug-in modules that meet the requirements of the PICMG® power interface specification for CompactPCI® systems.

MODEL	INPUT VOLTAGE	OUTPUT VOLTAGES	OUTPUT CURRENT	OUTPUT POWER	EFFICIENCY	SIZE
CPA250-4530G	90 – 264 VAC	5, 3.3, ±12 VDC	40, 40, 5, 2 A	250 W	82.5%	3 U x 8 TE
CPA500-4530G	90 – 264 VAC	5, 3.3, ±12 VDC	50, 60, 12, 4 A	500 W	84.5%	6 U x 8 TE
CPD250-4530G	36 – 75 VDC	5, 3.3, ±12 VDC	40, 40, 5, 2 A	250 W	82%	3 U x 8 TE
CPD500-4530G	36 – 75 VDC	5, 3.3, ±12 VDC	50, 60, 12, 4 A	500 W	84.5%	6 U x 8 TE

Accessories for Railway Converters

Platform Products

- 19” Racks and backplanes
- Base plates or heat sinks for chassis mounting
- Mating female connectors for solder, cage clamp or faston connections
- Connector retention devices
- Front panels for 19” rack mount
- Chassis and DIN Rail mounting kits
- Temperature sensors for optimal battery charging



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Railway Converters by Bel Power Solutions

Bel Power Solutions is one of the largest power supply manufacturers in the world and has a long history of providing leading edge, innovative power solutions.

Under the MELCHER brand, Bel provides the leading manufacturers in the railway and transportation industry worldwide with high performance, rugged DC-DC and AC-DC converters. With over 40 years of design and manufacturing experience MELCHER products are designed to meet the highest national and international standards for harsh environments, safety and EMC/EMI and undergo rigorous and extensive EVT/DVT and HALT/HASS test. Our strict engineering guidelines ensure low component stress, thermal profiling and high phase margins for stability and dynamic response – all part of our highly reliable converter designs.

Features

- Compliance with International and National standards (EN, UL, AREMA, RIA, NFF) in particular, EN 50155, EN 50121
- Fire safety according to EN 45545 for hazard levels HL1 to HL3
- Ultra-wide DC input voltage, up to 10:1 ratio, suitable for all common battery input voltages worldwide
- Extremely high efficiencies
- Fully featured, full fault protection: Transient, overtemperature, over/undervoltage, overcurrent,
- 3.3 to 96 V output voltages with wide trim range
- Series and parallel or fully redundant configurations
- On/off control, current share and other options
- Extended ambient operating temperature to -40 °C or lower on request
- Convection and conduction cooling with no derating up to 70 °C
- All PC boards dip-varnished for high mechanical durability and humidity withstand, without use of potting material
- Shock and vibration resistance
- Basic or reinforced insulation, test voltages up to 3000 VAC
- Multi-platform approach for highest flexibility
- All products are fully RoHS compliant

bel POWER SOLUTIONS & PROTECTION
a bel group

2390 Walsh Avenue
Santa Clara, CA 95051, USA

For more information please contact us:

North America
+1 408 785 5200

Asia-Pacific
+86 755 29885888

Europe, Middle East
+353 61 225 977

belpowersolutions.com

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