50-300W, 43 to 160V Input DC-DC Converters

https://product.tdk.com/en/power/cn-b
www.emea.lambda.tdk.com/cn-b



Industrial Railway

The rugged quarter and half brick 50 to 300W CN-B110 series of isolated DC-DC converters operate from a very wide 43 to 160V input. With an input to baseplate isolation of 2,500Vac and 3,000Vac input to output, the series is designed for use on 72V or 110V nominal input rail power systems. In addition, the baseplate cooled modules meet the rolling stock IEC 61373 Category 1, Class B shock / vibration standards. The series is also designed to meet EN 45545-2 (Fire protection on railway vehicles) and EN 50155[1] (Electronic equipment in railroad vehicles) in certified systems. As standard, the 200 and 300W models features active current share for parallel or redundant operation, remote sense, remote on/off, output voltage adjustment and a power good signal. Also available are optional auxiliary voltages, replacing the power good signal on the 200-300W models and the -sense on the 50-150W models.

Features	Benefits
• Wide Input Range	• Supports 72V and 110V Input Rail Systems
• Quarter and Half Brick Packages	• Less Board Area Needed
• Certified to IEC 62368-1 and IEC 61373 Cat. 1, Class B	• Easier System Compliance
• Designed to Meet EN 45545-2 and EN 50155-2017	• Simplified System Testing
• Current Share Function (CN200B110 and CN300B110 only)	• Can be Paralleled for Higher Power Applications
• Very Minimal Derating at High Ambient Temperatures	• Greater Useable Power

Model Selector

Model	Output Voltage (V)	Output Voltage Adjustment (V)	Output Current (A)	Maximum Power (W)	Load Reg (mV)	Line Reg (mV)	Input Current at 110Vdc input (A)	Efficiency (%) (100% load, nominal input)
CN50B110-5	5	4 - 6	10	50	10	10	0.51	89.5
CN100B110-5	5	4 - 6	20	100	10	10	1.01	91.0
CN150B110-5	5	4 - 6	30	150	10	10	1.52	90.5
CN50B110-12	12	9.6 - 14.4	4.2	50.4	24	24	0.53	88.0
CN100B110-12	12	9.6 - 14.4	8.4	100.8	24	24	1.01	92.0
CN150B110-12	12	9.6 - 14.4	12.5	150	24	24	1.51	91.5
CN200B110-12	12	9.6 - 14.4	16.7	200.4	96	48	2.00	90.0
CN300B110-12	12	9.6 - 14.4	25	300.0	96	48	3.10	89.5
CN200B110-13.8	13.8	9.66 - 14.35	14.5	200.1	96	48	2.00	91.0
CN300B110-13.8	13.8	9.66 - 14.35	21.7	299.5	96	48	3.00	90.5
CN50B110-15	15	12 - 18	3.4	51.0	30	30	0.54	87.5
CN100B110-15	15	12 - 18	6.7	100.5	30	30	1.01	91.5
CN150B110-15	15	12 - 18	10	150.0	30	30	1.51	91.5
CN200B110-15	15	12 - 18	13.4	201.0	120	60	2.10	90.0
CN300B110-15	15	12 - 18	20	300.0	120	60	3.10	90.0
CN50B110-24	24	19.2 - 28.8	2.1	50.4	48	48	0.52	89.0
CN100B110-24	24	19.2 - 28.8	4.2	100.8	48	48	1.02	90.5
CN150B110-24	24	19.2 - 28.8	6.3	151.2	48	48	1.54	90.5
CN200B110-24	24	19.2 - 26.4	8.4	201.6	192	96	2.10	90.0
CN300B110-24	24	19.2 - 26.4	12.5	300.0	192	96	3.10	90.0
CN50B110-48	48	38.4 - 57.6	1.1	52.8	96	96	0.56	87
CN100B110-48	48	38.4 - 57.6	2.1	100.8	96	96	1.02	90.5
CN150B110-48	48	38.4 - 57.6	3.2	153.6	96	96	1.55	91

CN	300B	110	-12	/T
Series Name	Output Power 50B = 50W 100B = 100W 150B = 150W 200B = 200W 300B = 300W	Input Voltage 110 = 43 - 160V	Output Voltage 5 = 5V 12 = 12V 13.8 = 13.8V 15 = 15V 24 = 24V	Options: /AUX = Auxiliary Voltage (See below for details) /T = Non-threaded 3.3mm diameter mounting holes /LC = Latching OVP and OTP (CN200-300B110 models) /CO = Board coating See CN50-150B instruction manual for other options. See link below.

Specifications

Model		CN-B110
Input		
Input Voltage Range	Vdc	43 - 160
Efficiency	-	See model selector table
Conducted & Radiated EMI	-	EN55011-A, EN55032-A with external components. See evaluation data on website.
Immunity	-	See model immunity table below
Safety Certifications and Markings	-	IEC/UL/CSA/EN62368-1, CE Mark and UKCA Mark. Designed to meet EN45545-2 and EN50155[1]

Related Products

Type	Part Numbers	Description
Heatsink	HAQ-10T	Quarter brick 25mm transverse fins
Heatsink	HAH-10L	Half brick 25mm longitudinal fins
Heatsink	HAH-10T	Half brick 25mm transverse fins
Heatsink	HAH-15L	Half brick 38.1mm longitudinal fins

Immunity

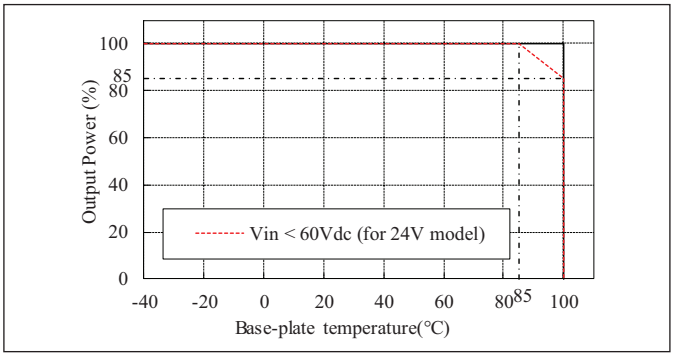
Test	Standard	Test Level	Criteria	Notes: See IEC61000 immunity test report on website for external filtering circuitry
ESD	EN61000-4-2	Air and contact ± 8kV	A	
Radiated Susceptibility	EN61000-4-3	80M -1GHz: 20V/m 1.4 - 2.0GHz: 10V/m 2.0 - 2.7GHz: 5V/m 2.7 - 6.0GHz: 3V/m	A	
Electrical Fast Transient Burst	EN61000-4-4	± 4kV	A	Signal pins: ± 2kV
Surge	EN61000-4-5	± 2kV and ± 4kV	A	Common mode: 4kV with surge absorbers Common mode: 2kV without surge arrestors Normal mode: : 2kV without surge arrestors
Conducted Susceptibility	EN61000-4-6	10Vrms	A	
Magnetic Fields	EN61000-4-8	100A/m	A	

Specifications

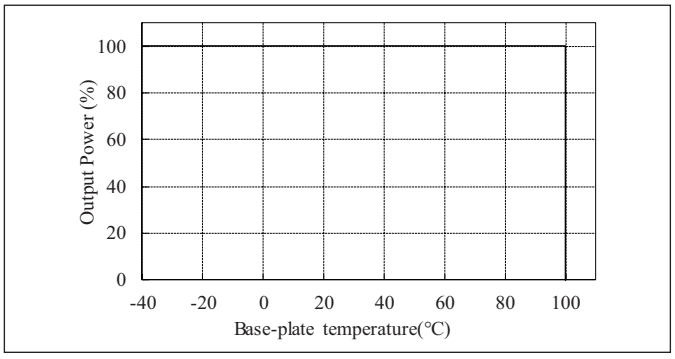
Model		CN-B110
Output		
Output Voltage Tolerance	%	±1
Output Voltage Adjustment	%	See model selector
Switching Frequency	kHz	300 (fixed)
External Load Capacitance (Maximum)	uF	CN50B: 10,000, CN100B: 20,000, CN150B-CN300B: 30000
Ripple & Noise	mV	5V: 100, 12 to 15V: 150, 24V: 240, 48V: 480
Temperature Coefficient	%/°C	0.02
Minimum Load	-	No minimum load required
Overcurrent Protection	%	CN50B: 102 - 170, CN100B-300B: 102 - 150. Constant current mode. When the converter output drops below 40%, the unit will enter hiccup mode until the overload is removed. With the /LC option, the module will enter hiccup mode for several cycles and then maintain a constant current.
Overvoltage Protection	%	CN50-150B: 125-145, CN200-300B: 12V, 15V: 125-145, 13.8V: 109-126, 24V: 115-135. Auto recovery or latching (/LC option)
Overtemperature Protection	°C	Operates at 105-120 baseplate. Auto recovery or latching (/LC option)
Remote Sense		Yes
Remote On/Off	-	Negative Logic ON: Short (<0.8V), OFF: Open or 4 to 30V
DC Good Signal (IOG)	-	CN200-300B Open collector: Low = Output good
Auxiliary Voltage	-	Specify /AUX option 10 to 14V, 0.01A, replaces the DC good signal on the CN200/300B and 7 to 11V, 0.01A replaces the -sense terminal on the CN50-150B)
Parallel Operation	-	CN200-300B: Up to 11 modules. 2 to 5 units, derate to 95% of rated current, 6 to 11 units, derate to 90% of rated current. Parallel not possible on the CN50-150B
Environmental		
Operating Temperature	°C	-40 to +100 (Baseplate), -40 to +85 (ambient) full power except CN300B110-24 when input voltage is less than 60V. See derating curves in the technical files (link below)
Storage Temperature	°C	-40 to +100
Humidity (non condensing)	%RH	5 - 95 (Operating & Storage)
Cooling	-	Conduction
Altitude	m	5,000
Withstand Voltage (For 1 minute)	Vac	Input to baseplate 2,500, input to output 3,000, output to baseplate 500 for 1 minute
Vibration (Non operating)	-	10-55Hz (Sweep for 1min.) Amplitude 0.825mm Constant (Maximum 49.0m/s^2) X,Y,Z 1 hour each. IEC61373 Category 1, Grade B
Shock (Non operating)	-	196.1m/s^2. IEC61373 Category 1 Grade B
Other		
Weight (Typ)	g	CN50-150B: 60, CN200-300B: 100
Size (LxWxH)	mm	CN50-150B: 58.3 x 37.2 x 12.7 x CN200-300B: 61 x 57.9 x 12.7
Size (LxWxH)	Inches	CN50-150B: 2.3 x 1.46 x 0.5 x CN200-300B: 2.4 x 2.28 x 0.5
MTBF - Telcordia SR-332 issue 5*	Hours	50W model: 737,219, 300W model: 609,764
Warranty	yrs	5

Notes
See website for detailed specifications, test methods and installation manual
*Full load, 24V model, 100°C baseplate temperature. See reliability data on website for other temperatures.
(1) See EN50155 application note CN50-150B110 Instruction manual CN-B110 technical files

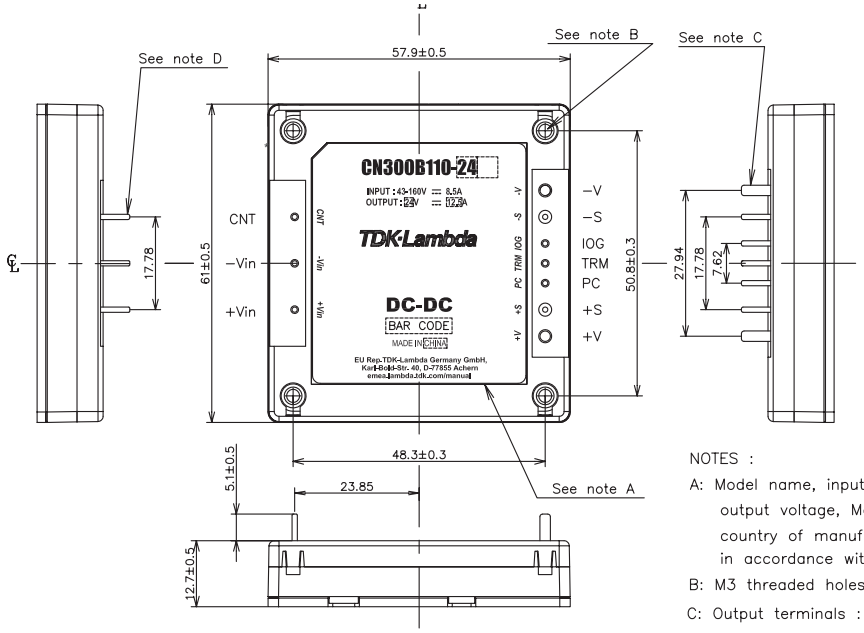
Derating Curves CN300B110



Derating Curves CN50-200B110



Outline Drawing CN200B110, CN300B110 (Standard Models)



NOTES :

A: Model name, input voltage range, Nominal output voltage, Maximum output current, country of manufacture are shown here in accordance with the specifications.

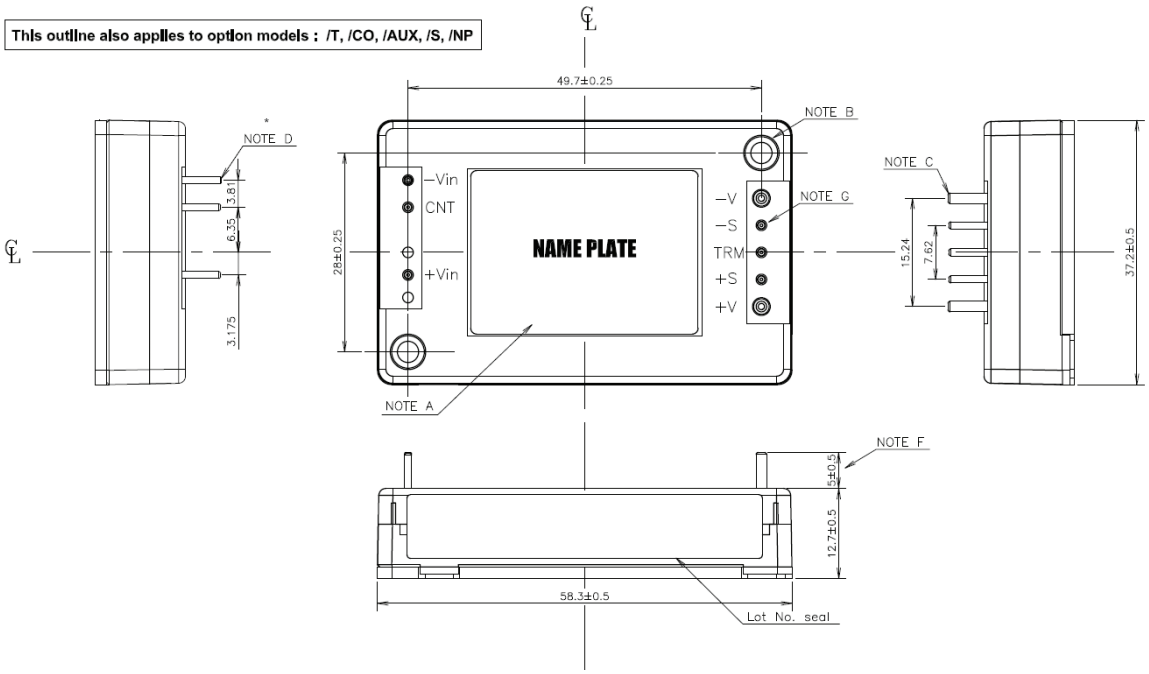
B: M3 threaded holes 4 for customer chassis mounting (FG).

C: Output terminals : 2−ø2

D: Input and signal terminals : 8−ø1

E: Unless otherwise specified dimensional tolerance : ±0.25

Outline Drawing CN50B to CN150B110 (Standard Models)



NOTES :

A: Model name, input voltage range, Nominal output voltage, Maximum output current, country of manufacture and safety marking (for only approved products) are shown on the name plate in accordance with the specifications.

B: Variable hole:
/T models: ø3.3 holes 2 for customer chassis mounting (FG).
The other models: M3 threaded holes 2 for customer chassis mounting (FG).

C: Output pin : 2−ø1.5

D: Input and Signal pin : 6−ø1.0

E: Unless otherwise specified dimensional tolerance : ±0.25mm

F: Variable value:
/S models: 3±0.5
The other models: 5±0.5

G: Variable function:
/AUX models: AUX
The other models: −S



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