

P R B X

POWERBOX Railway Line ENAR40W Series 40W 4:1 Single and Dual Output DC/DC Converter

Features

No minimum load required
1600VDC input to output isolation for 24Vin and 48Vin
3000VDC input to output isolation for 110Vin
Application of chassis-mount DC/DC converter
Screw terminals for input and output connections
Internal input fuse protection
Internal output LED indicator
Meet EN55022 Class B
Safety meets UL60950-1, EN60950-1 and IEC60950-1
Compliance to EN50155 and EN45545-2 railway standard
CE marked
Compliant to RoHS II and REACH

Input

Voltage range	24Vin(nom)	9.5~36VDC
	48Vin(nom)	18~75VDC
	110Vin(nom)	43~160VDC
Input fuse (slow blow)	24Vin(nom)	8A typ
	48Vin(nom)	4A typ
	110Vin(nom)	2A typ
Inrush current	15A typ.	
Start-up voltage	24Vin(nom)	9.5VDC max
	48Vin(nom)	18VDC max
	110Vin(nom)	43VDC max
Shutdown voltage	24Vin(nom)	8VDC typ
	48Vin(nom)	16VDC typ
	110Vin(nom)	40VDC typ
Start up time	Power up	100ms typ
	Remote On/Off	60ms typ
	Constant resistive load.	
Input surge voltage	24Vin(nom)	50VDC, 1s max
	48Vin(nom)	100VDC, 1s max
	110Vin(nom)	170VDC, 1s max
Remote ON/OFF (option)	Referred to -Vin pin	
	Positive logic (standard)	
	DC-DC ON Open or 3~12V	
	DC-DC OFF Short or 0~1.2V	
	Negative logic (option)	
	DC-DC ON Short or 0~1.2V	
	DC-DC OFF Open or 3~12V	
Input current of Ctrl pin ± 0.5 -1mA.		
Remote off input current 5mA typ.		

Output

Voltage accuracy	3.3Vout	$\pm 1.5\%$
	Others	$\pm 1.0\%$
Line regulation	LL to HL at full load	$\pm 0.5\%$
Load regulation	3.3Vout	$\pm 1.5\%$
	Others	$\pm 1.0\%$
Cross regulation	Dual	$\pm 5.0\%$
	Assymetrical load 25%/100% FL.	
Voltage adjustability	Single output	
	3.3Vout, 5Vout	$\pm 10\%$
	15Vout, 24Vout	-10% to +20%



Ripple and noise	3.3Vout, 5Vout, 12Vout	75mV p-p typ
20MHz bandwidth	12Vout, 15Vout	100mV p-p typ
	24Vout	150mV p-p typ
Temperature coefficient	$\pm 0.02\%/^{\circ}\text{C}$.	
Transient response	250 μs typ, 25% load step change.	
Over voltage protection	3.3Vout	3.9VDC typ
	5Vout	6.2VDC typ
	12Vout	15VDC typ
	15Vout	20VDC typ
	24Vout	30VDC typ
	Zener diode clamp.	
Output indicator	Green LED.	
Overload protection	150% of lout rated.	
Short circuit protection	Continuous, automatic recovery.	

Environmental

Operating ambient temp.	-40 $^{\circ}\text{C}$ ~ +63 $^{\circ}\text{C}$ without derating.
	+63 $^{\circ}\text{C}$ ~ +96 $^{\circ}\text{C}$ with derating.
Over temp. protection	+115 $^{\circ}\text{C}$, case of DC/DC module.
Storage temperature	-40 $^{\circ}\text{C}$ to +105 $^{\circ}\text{C}$.
Thermal shock	MIL-STD-810F.
Shock & vibration	EN61373, MIL-STD-810F.
Relative humidity	5-95% RH.

General

Isolation voltage	110Vin(nom):	
	Input to output	3000VDC
	Input (output) to case	1600VDC
Others:	Input to output	1600VDC
	Input (output) to case	1600VDC
	Isolation resistance	500VDC
Isolation capacitance	4000pF, max.	
Switching frequency	250KHz typ.	
Chassis material	Aluminum.	
Weight	110g.	
MTBF	MIL-STD-217F, full load	1.944 x 10 ⁶ hrs

Standards

Safety approvals	UL60950-1, EN60950-1, IEC60950-1.	
EMI	EN55022 Class B.	
ESD	EN61000-4-2, air $\pm 8\text{KV}$, contact $\pm 6\text{KV}$, Criteria A.	
Radiated immunity	EN61000-4-3, 20V/m, Criteria A.	
Fast transient	EN61000-4-4, $\pm 2\text{KV}$, Criteria A.	
Surge	EN61000-4-5, $\pm 1\text{KV}$, Criteria A.	
Conducted immunity	EN61000-4-6, 10 Vr.m.s., Criteria A.	
Power frequency	EN61000-4-8, 100A/m continuous;	
magnetic field	1000A/m 1 second, Criteria A.	

POWERBOX **Railway Line**
 ENAR40W Series
 40W 4:1 Single and Dual Output
 DC/DC Converter

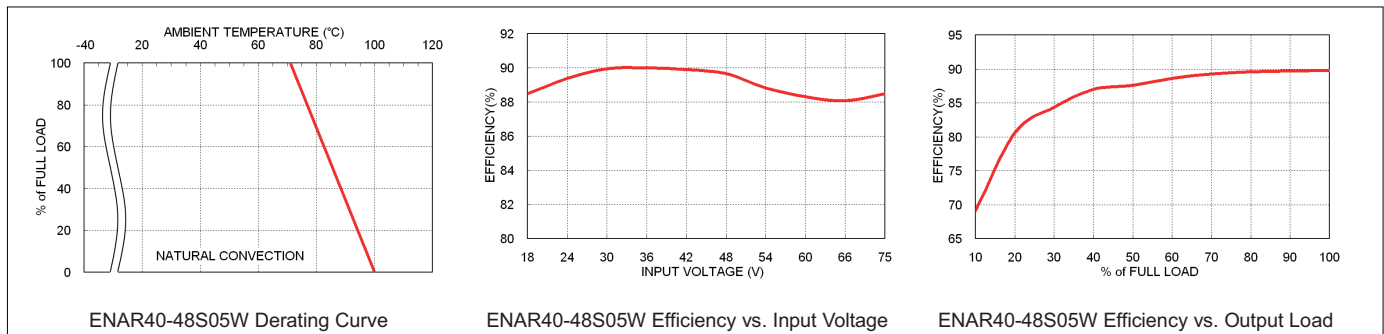
Model Number	Input Range	Output Voltage	Output Current @Full Load	Input Current @No Load	Efficiency	Max Capacitor Load ¹⁾
ENAR40-24S3P3W	9.5 ~ 36 VDC	3.3 VDC	10000 mA	19 mA	89 %	26600 µF
ENAR40-24S05W	9.5 ~ 36 VDC	5 VDC	8000 mA	19 mA	90 %	20000 µF
ENAR40-24S12W	9.5 ~ 36 VDC	12 VDC	3333 mA	19 mA	91 %	3900 µF
ENAR40-24S15W	9.5 ~ 36 VDC	15 VDC	2666 mA	19 mA	91 %	2600 µF
ENAR40-24S24W	9.5 ~ 36 VDC	24 VDC	1666 mA	19 mA	90 %	1300 µF
ENAR40-24D12W	9.5 ~ 36 VDC	±12 VDC	±1666 mA	19 mA	89 %	±2600 µF
ENAR40-24D15W	9.5 ~ 36 VDC	±15 VDC	±1333 mA	19 mA	89 %	±1600 µF
ENAR40-24D24W	9.5 ~ 36 VDC	±24 VDC	±833 mA	19 mA	90 %	±650 µF
ENAR40-48S3P3W	18 ~ 75 VDC	3.3 VDC	10000 mA	14 mA	89 %	26600 µF
ENAR40-48S05W	18 ~ 75 VDC	5 VDC	8000 mA	14 mA	90 %	20000 µF
ENAR40-48S12W	18 ~ 75 VDC	12 VDC	3333 mA	14 mA	91 %	3900 µF
ENAR40-48S15W	18 ~ 75 VDC	15 VDC	2666 mA	14 mA	91 %	2600 µF
ENAR40-48S24W	18 ~ 75 VDC	24 VDC	1666 mA	14 mA	90 %	1300 µF
ENAR40-48D12W	18 ~ 75 VDC	±12 VDC	±1666 mA	14 mA	89 %	±2600 µF
ENAR40-48D15W	18 ~ 75 VDC	±15 VDC	±1333 mA	14 mA	89 %	±1600 µF
ENAR40-48D24W	18 ~ 75 VDC	±24 VDC	±833 mA	14 mA	90 %	±650 µF
ENAR40-110S3P3W	43 ~ 160 VDC	3.3 VDC	10000 mA	10 mA	87 %	26600 µF
ENAR40-110S05W	43 ~ 160 VDC	5 VDC	8000 mA	10 mA	88 %	20000 µF
ENAR40-110S12W	43 ~ 160 VDC	12 VDC	3333 mA	10 mA	89.5 %	3900 µF
ENAR40-110S15W	43 ~ 160 VDC	15 VDC	2666 mA	10 mA	90 %	2600 µF
ENAR40-110S24W	43 ~ 160 VDC	24 VDC	1666 mA	10 mA	89 %	1300 µF
ENAR40-110D12W	43 ~ 160 VDC	±12 VDC	±1666 mA	10 mA	88 %	±2600 µF
ENAR40-110D15W	43 ~ 160 VDC	±15 VDC	±1333 mA	10 mA	88 %	±1600 µF
ENAR40-110D24W	43 ~ 160 VDC	±24 VDC	±833 mA	10 mA	90 %	±650 µF

Note: 1. Test by minimum input and constant resistive load.

Part Number Structure

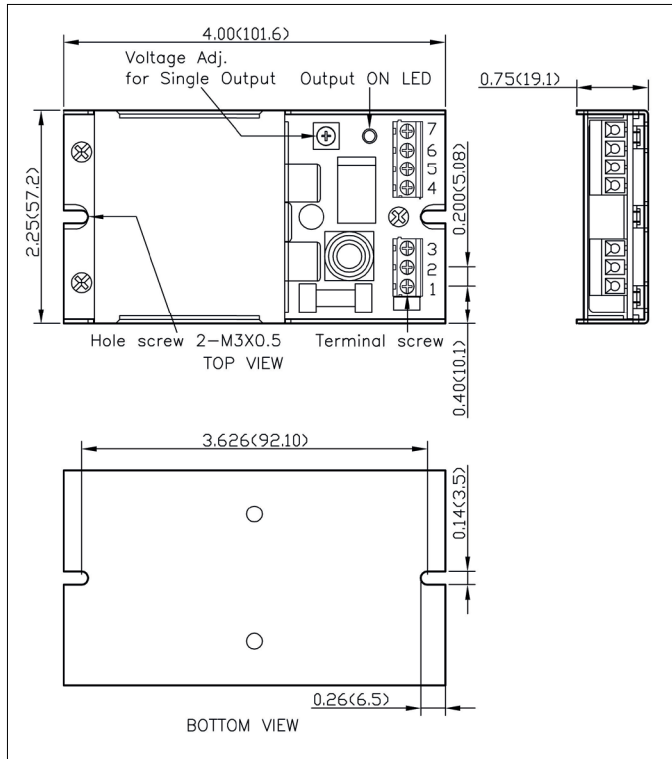
ENAR40	-	48	S	05	W	-	N	EC
Series Name	Input Voltage	Output Quantity	Output Voltage	Input Range	Remote Control Option	Assembly Option		
	24: 9.5-36VDC	S: Single	3P3: 3.3VDC	4:1	<input type="checkbox"/> : Positive logic	<input type="checkbox"/> : None		
	48: 18-75VDC		05: 5VDC		N: Negative logic	EC: Enclosed Mounting Type		
	110: 43-160VDC		12: 12VDC			DR: Din Rail Mounting Type		
			15: 15VDC			ED: Enclosed & Din Rail Mounting Type		
			24: 24VDC					
		D: Dual	12: ±12VDC					
			15: ±15VDC					
			24: ±24VDC					

Characteristic Curve



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Mechanical Chassis Mounting Type



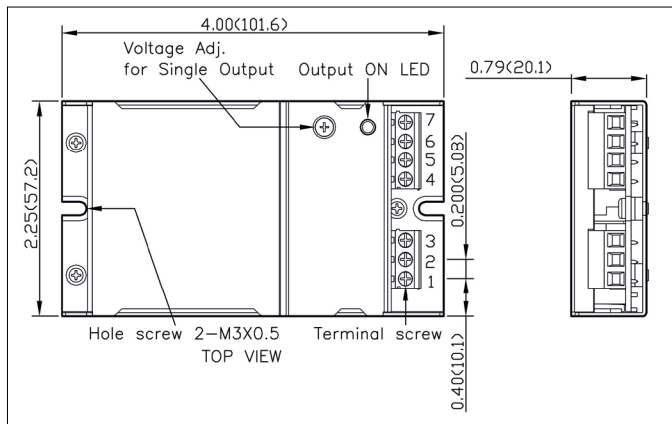
Pin Connection

Pin	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
3	Ctrl	Ctrl
4	NC	NC
5	-Vout	-Vout
6	+Vout	Common
7	NC	+Vout

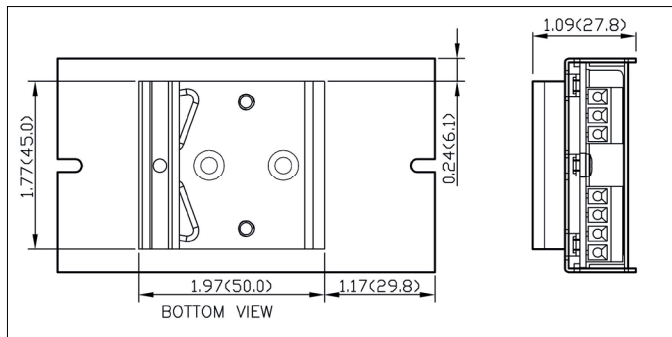
* NC: No Connection

* Screw terminals – wire range from 14 to 18 AWG

Mechanical Enclosed Mounting Type



Mechanical Din Rail Mounting Type



1. All dimensions in Inch (mm)
2. Tolerance : X.XX±0.02 (X.X±0.5)
4. Tolerance : X.XXX±0.01 (X.XX±0.25)
3. Hole screw locked torque: MAX 5.0kgf – cm (0.49N – m)
4. Terminal screw locked torque: MAX 2.5kgf – cm (0.25N – m)

Specifications are subject to change without notice.