

30-50W Single Output DC-DC converters, 1/4 Brick

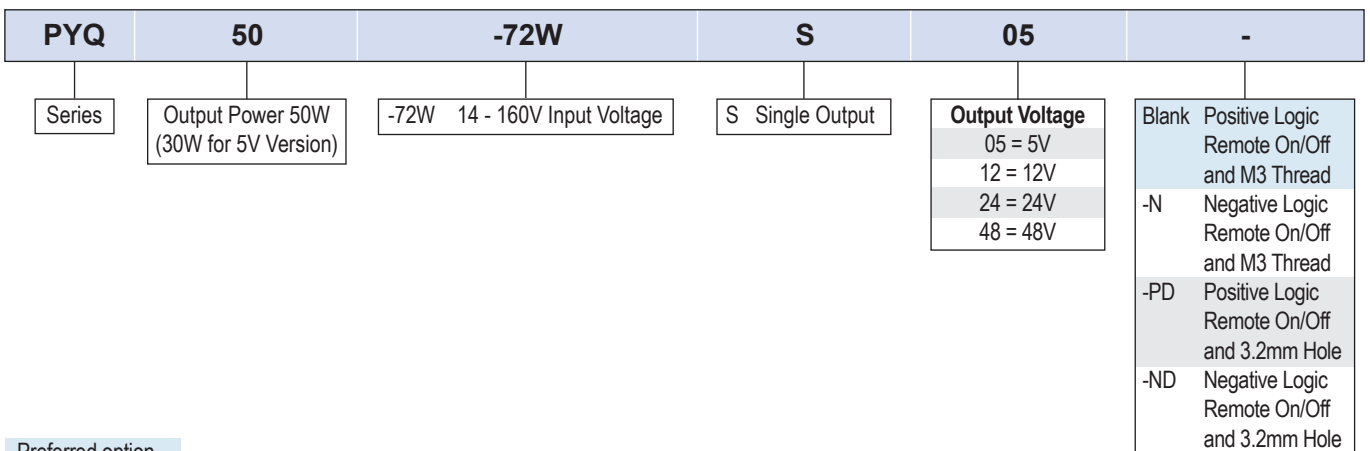
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The 30-50W Quarter-brick footprint PYQ series of isolated DC-DC converters operate from an ultra wide range input of 14 to 160Vdc (12:1) with single output voltages from 5V to 48V. The output voltage can be adjusted between -20% to +10% by using the trim terminal. Sense lines for the output voltage ensure a stable output voltage even with changing loads. The PYQ50 models have efficiencies of up to 89% and can operate in ambient temperature of -40 to 100°C. The input to output isolation is 3,000Vdc and the units are potted to provide a high resistance to shock and vibration. The converters are certified according to the 62368-1 safety standards and with additional circuits, the PYQ50 series is also tested according to the EN 50155 railroad standard for electronic equipment in railroad vehicles.

Features	Benefits
• Quarter-Brick Footprint	• Industry Standard Package Size
• 14 - 160Vdc Wide Input Range (12:1)	• Supports the Majority of Railway DC Input Voltages
• Certified to IEC 62368-1, Tested According to EN 50155	• Easier System Compliance
• Potted Plastic Case	• High Resistance to Shock and Vibration
• 3000Vdc Input to Output Isolation	• Suitable For Railway and Industrial Applications

Model Selector							
Model	Input Voltage (V)	Output Voltage (V)	Maximum Current (A)	Maximum Power (W)	No Load Input Current (mA)	Efficiency (%) at 72 / 110Vdc	Maximum Load Capacitance (uF)
PYQ50-72WS05	14 - 160	5	6	30	5	83 / 81	10000
PYQ50-72WS12	14 - 160	12	4.2	50	5	87 / 86	6800
PYQ50-72WS24	14 - 160	24	2.1	50	5	89 / 87	3300
PYQ50-72WS48	14 - 160	48	1.05	50	8	88 / 85	680



Related Products		
Type	Series	Description
Heatsink kit (User installation)	ACC-PYQB-HC01	HC1 heatsink, thermal pad, screws and washers
Heatsink kit (User installation)	ACC-PYQB-HC05	HC5 heatsink, thermal pad, screws and washers
DC-DC Converter	PYD20	20W, Input 8.5-160V, 2" x 1"
DC-DC Converter	PYQ75	75W, Input 9-75V, quarter brick
DC-DC Converter	PYH200	200W, Input 14-160V, half brick
DC-DC Converter	CN-B	200-300W, Input 60-160V, half brick

Specifications		
Model		PYQ50
Input		
Input Voltage Range	Vdc	14 - 160
Input Surge Voltage	Vdc	200 (100ms maximum)
Input Shutdown Voltage	Vdc	12 Typ.
Start-up Time (typ)	ms	25
No Load Current Consumption	-	See model selector table. Typically 3mA when remote on/off is activated
Efficiency	-	See model selector table
Conducted & Radiated EMI	-	EN55032. See installation manual for external circuitry
Immunity	-	See immunity section
Railway Applications	-	EN50155, EN45545-2, EN61373, EN50121-3-2: See application note for railway use
Safety Certification and Markings	-	IEC/UL/CSA/EN62368-1, CE Mark and UKCA Mark

Immunity				
Test	Standard	Test Level	Criteria	Notes (See installation manuals for external circuitry)
ESD	EN61000-4-2	Air ± 8kV and Contact ± 6kV	A	-
Radiated Susceptibility	EN61000-4-3	20V/m	A	-
Electrical Fast Transient Burst	EN61000-4-4	± 2kV	A	With an input filter of two 82uF capacitors and a 180V suppressor diode (SMDJ180A)
Surge	EN61000-4-5	± 2kV	A	
Conducted Susceptibility	EN61000-4-6	10 Vrms	A	-

Specifications		
Model		PYQ50
Output		
Output Voltage Tolerance	%	±1
Output Voltage Adjustment	%	-20/+10
Switching Frequency	kHz	215-265
Line Regulation	%	±0.2
Load Regulation	%	±0.2
External Load Capacitance	-	See model selector table
Ripple & Noise(1)	mVp-p	100
Temperature Coefficient	%/°C	±0.02
Minimum Load	-	No minimum load required
Transient Loading	-	250us recovery time for a 25% load change
Overcurrent Protection (typ)	%	110-220 (hiccup mode)
Overvoltage Protection (typ)	%	115-140
Overtemperature Protection	°C	110, automatic recovery when temperature falls below 100
Remote Sense	%	±10
Remote On/Off	-	Positive Logic (Blank): ON: Open or 3.5-160V, OFF Short or 0-1.2V Negative Logic (-N): ON: Short or 0-1.2V, OFF: Open or 3.5-160V

Specifications		
Model		PYQ50
Environmental		
Operating Temperature ⁽²⁾	°C	-40 to +100 (see derating section and confirm case temperatures in end system)
Maximum Case Temperature	°C	100
Storage Temperature	°C	-55 to +125
Humidity (non condensing)	%RH	95 (maximum, for operation & storage)
Cooling	-	Convection, conduction or forced air
Altitude	m	5,000 (operating)
Withstand Voltage (For 1 minute)	Vdc/Vac	Input to output 3000Vdc, input to case 2500Vdc, output to case 500Vac
Isolation Capacitance	pF	1000 (input to output), 1500 (input to base plate)
Vibration (Operating)	-	MIL-STD-810F, EN61373
Thermal Shock	-	MIL-STD-810F
Other		
Weight (Typ)	g	61.5
Size (LxWxH)	mm	57.9 x 36.8 x 12.7
Size (LxWxH)	Inches	2.28 x 1.45 x 0.5
Case Material	-	Plastic
Base Plate Material	-	Aluminum
MTBF - MIL-HDBK-217F, Full Load, GB25	Hours	791,000 - 810,000 depending on model
Warranty	yrs	3

Notes

See website for detailed specifications, test methods and installation manual

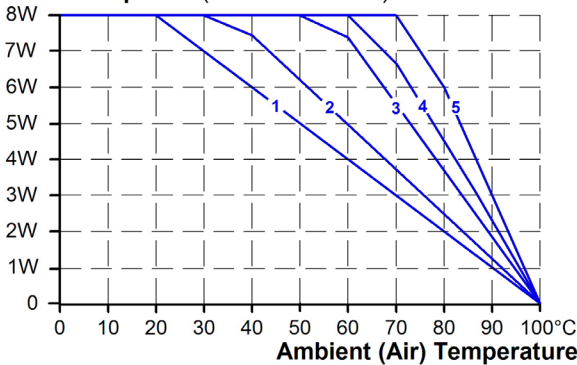
(1): Measured with a 22µF electrolytic/tantalum capacitor and a 1µF ceramic multi-layer capacitor parallel in measurement path.

(2): The case temperature must be confirmed in the end application. The product rating may be affected by airflow direction and physical obstructions near the module.

Derating Curve - Vertical Mount, Natural Convection

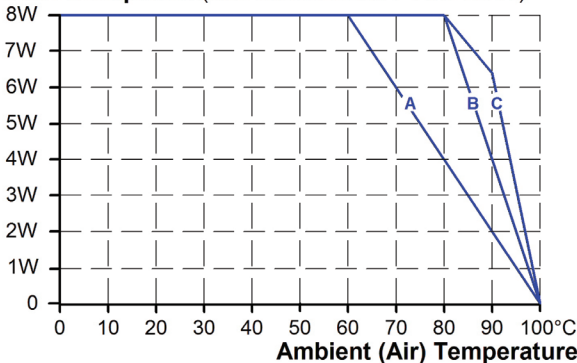
The possible temperature range depends on the power dissipation at the operating point of the DC-DC converter and the cooling method used. See installation manual for details.

Power Dissipation (without heatsink)



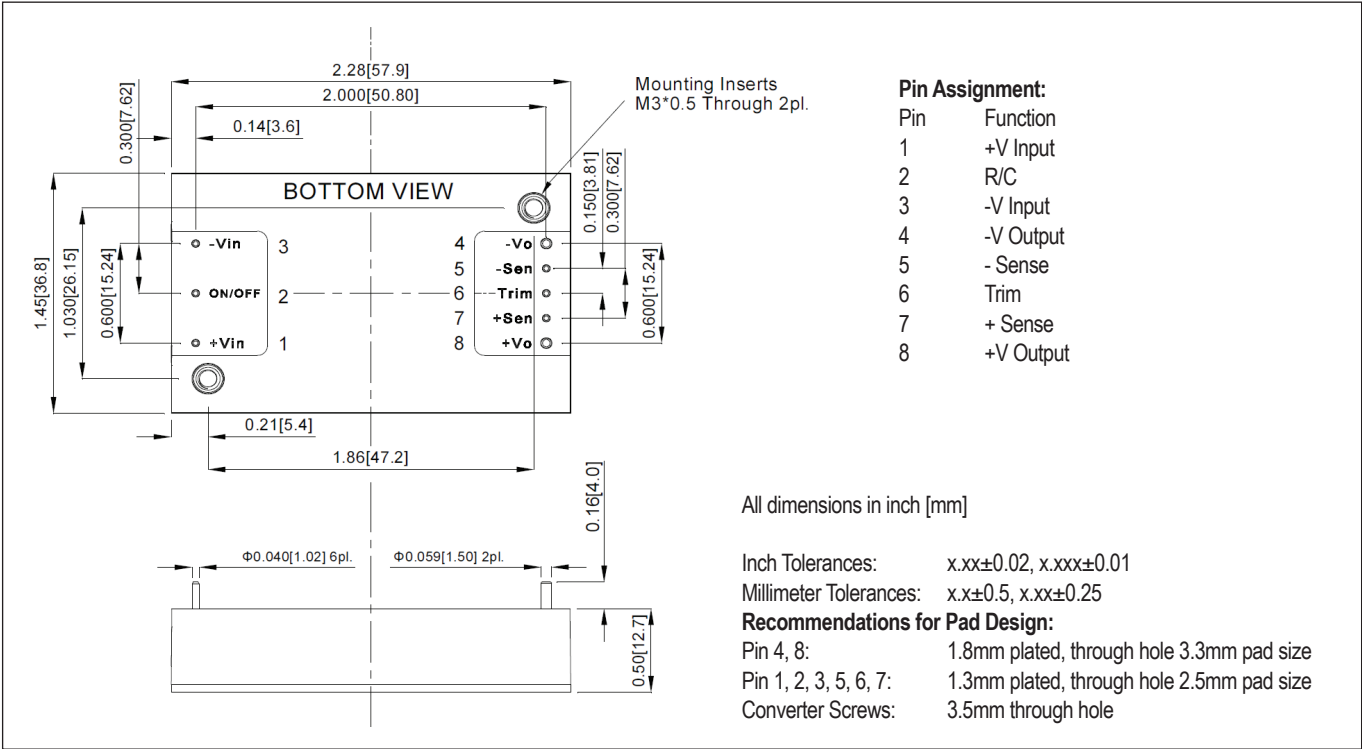
- 1. Natural convection 20LFM (0.1m/s, RTH 10.1°C/W)
- 2. Forced air 100LFM (0.5m/s, RTH 8.0°C/W)
- 3. Forced air 200LFM (1.0m/s, RTH 5.4°C/W)
- 4. Forced air 300LFM (1.5m/s, RTH 4.4°C/W)
- 5. Forced air 400LFM (2.0m/s, RTH 3.4°C/W)

Power Dissipation (with heatsink ACC-PYQB-HC01)

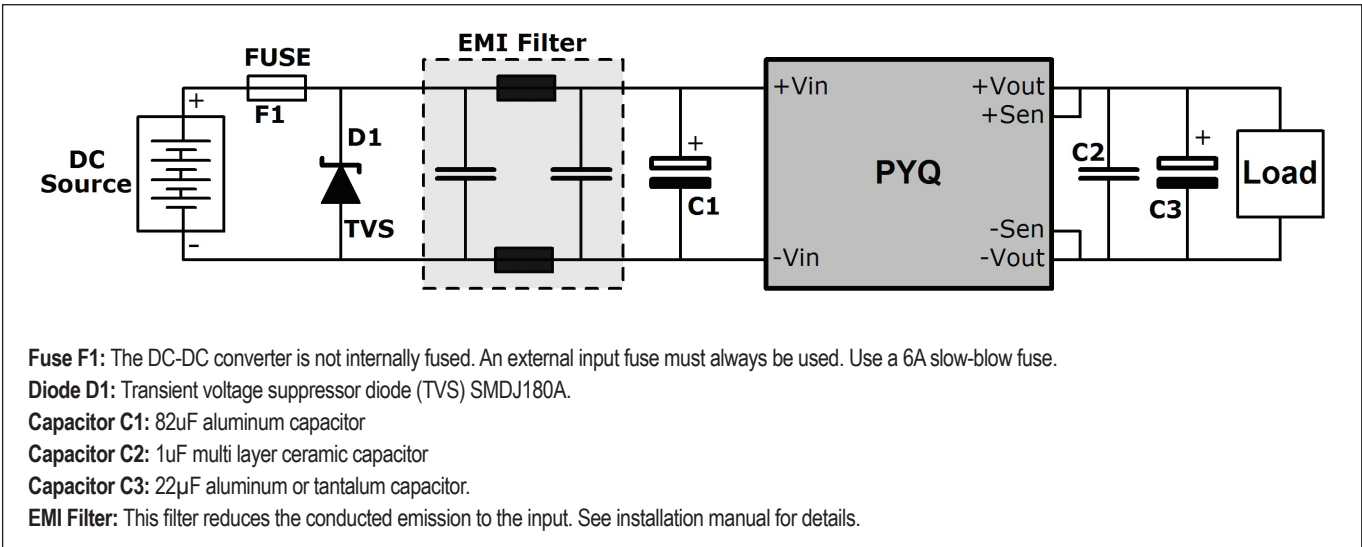


- A. Natural convection 20LFM (0.1m/s, RTH 4.78°C/W)
- B. Forced air 100LFM (0.5m/s, RTH 2.44°C/W)
- C. Forced air 400LFM (2.0m/s, RTH 1.58°C/W)

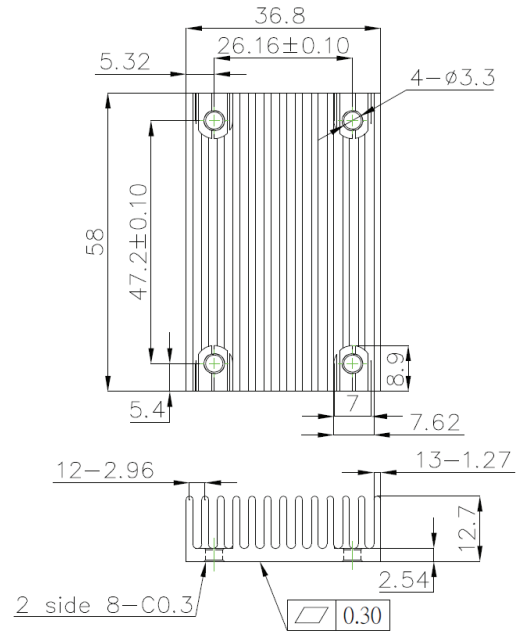
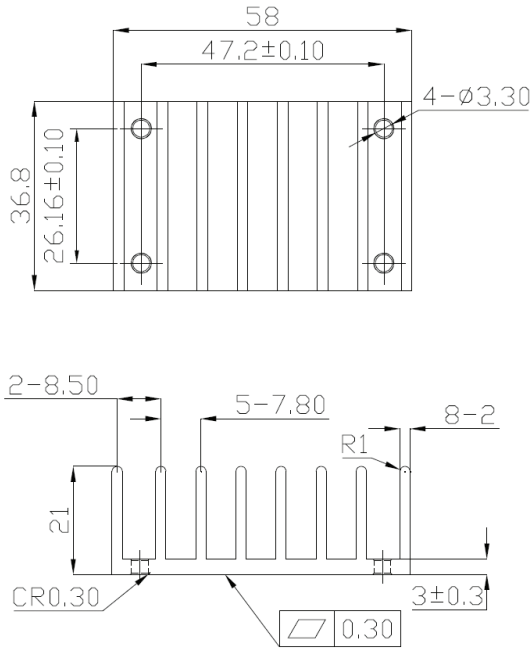
Outline Drawing and Pinout



Recommended Wiring Scheme



Heatsinks



Fin Style	ACC-PYQB-HC01
	Transverse
Size (L x W x H)	58 x 36.8 x 21mm
Thermal Impedance	4.78°C/W nat. convection
	2.44°C/W with 100LFM
	2.06°C/W with 200LFM
	1.76°C/W with 300LFM
	1.58°C/W with 400LFM

Fin Style	ACC-PYQB-HC05
	Longitudinal
Size (L x W x H)	36.8 x 58 x 12.7mm
Thermal Impedance	5.61°C/W nat. convection
	4.01°C/W with 100LFM
	3.39°C/W with 200LFM
	2.86°C/W with 300LFM
	2.49°C/W with 400LFM



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