PYQ50 Series
Instruction and Application Manual

Content:

For additional information, please visit https://product.tdk.com/en/power/py.

1. PRODUCT DESCRIPTION

The PYQ50 series are board mount 30-50W DC-DC converters in a quarter-brick housing and provide a regulated and galvanically isolated output voltage.

The most outstanding features of this series are the exceptionally wide input voltage range from 14V to 160V (12:1) and the high input/output isolation strength of 3000Vdc.

The wide allowed case temperature range from -40°C to +105°C, the low heat generation, due to the high efficiencies up to 89% and the high shock and vibration resistance thanks to the potted design make this device suitable for nearly every situation.

Another unique feature is the compliance with the standard EN 50155, which is an international standard covering electronic equipment used on rolling stock for railway applications. In combination with the wide input voltage range, there are many application opportunities in this segment. Further applications for this DC-DC converter can be found in Distributed Power Architecture (DPA), telecommunications, battery-powered devices, measurement and laboratory equipment, devices in industrial environments, and many other areas.

2. PRODUCT FEATURES

- Quarter-brick (2.28x1.45”) Industry Standard Footprint
- 3000Vdc Input to Output Isolation
- 14-160V (12:1) Wide-range Input
- EN 50155 Railway Compliant
- IEC 62368-1 (ICT) Approved
- High Shock and Vibration Resistance due to Potted Design
- Efficiency up to 89% and Low No-load Power Consumption
- -40 to +100°C Operating Case Temperature Range
- Remote ON/OFF Input
- Output Voltage Sense Lines

3. INTENDED USE

This device is designed and manufactured as a component part to be mounted on a pc-board and to be installed in electronic devices.

This device is intended for commercial use, such as in industrial control, process control, monitoring and measurement equipment or the like.

Additionally, this device is also designed for equipment that is intended for use in railway rolling stock applications according to EN 50155.

Do not use this device in equipment, where malfunctioning may cause severe personal injury or threaten human life without additional appropriate safety devices, that are suited for the end-application.

If this device is used in a manner outside of its specification, the protection provided by the device may be impaired.

4. INSTALLATION INSTRUCTIONS

Before operating this device, please read this manual thoroughly and retain for future reference! This device may only be installed and put into operation by qualified personnel. If damage or malfunction should occur during operation, immediately turn power off and send device to the factory for inspection. The device does not contain serviceable parts.

⚠ WARNING Risk of electrical shock, fire, personal injury or death.

Turn power off before working on the device. Protect against inadvertent re-powering.

Do not modify or repair the unit.

Do not open the unit as high voltages are present inside.

Use caution to prevent any foreign objects from entering the housing.

Do not use in locations where flammable gas or ignitable substances are present.

Do not use in wet locations or in areas where moisture or condensation can be expected.

Do not use in environment with strong electromagnetic field, corrosive gas or conductive substances or direct sunlight.

Do not touch during power-on, and immediately after power-off. Hot surfaces may cause burns.

Obey the following installation instructions:

This device may only be installed and put into operation by qualified personnel.

This device does not contain serviceable parts. Replace fuses only when explicitly permitted. If damage or malfunction should occur during installation or operation, immediately turn power off and send unit to the factory for inspection.

Install the device in an enclosure providing protection against electrical, mechanical and fire hazards.

The device is designed for pollution degree 2 areas in controlled environments. No condensation or frost is allowed.

The input can be powered from batteries or similar DC sources.

Check for correct input polarity. The device will get damaged when the voltage is reversed.

Ensure sufficient cooling to avoid overloading the device.

The device is designed for altitudes up to 5000m (16400ft).

This device is not internally fused. An external input fuse must always be used. Use a 6A slow-blow fuse.

The maximum operational case temperature is +100°C (+212°F). The case temperature is defined in the middle of the top side of the cover.

The device is designed to operate in areas with a maximum relative humidity of 95%.

Do not apply return voltages from the load to the output terminals.

Do not connect the outputs of multiple devices in parallel for higher output currents.

Do not connect batteries for charging purposes without additional charging circuit to the output of the device.

5. FUNCTIONAL DESCRIPTION

The output is electronically protected against no-load, overload and short circuit. In case of an overload or short circuit, the device will operate intermittently (hiccup mode).

The device can supply resistive and inductive loads.

Avoid loads with large input capacitances. If the capacitive load is higher than the values specified, the device operates in an intermittent mode (hiccup mode).

PYQ50-72WS05: max. 10000µF

PYQ50-72WS12: max. 6800µF

PYQ50-72WS24: max. 3300µF

PYQ50-72WS48: max. 680µF

The output voltage can be adjusted with an external resistor connected between the TRIM-pin and the output voltage.

The device is equipped with sense lines for the output voltage. This feature moves the output voltage regulation point from the output of the device to the point of connection of the remote sense pins.

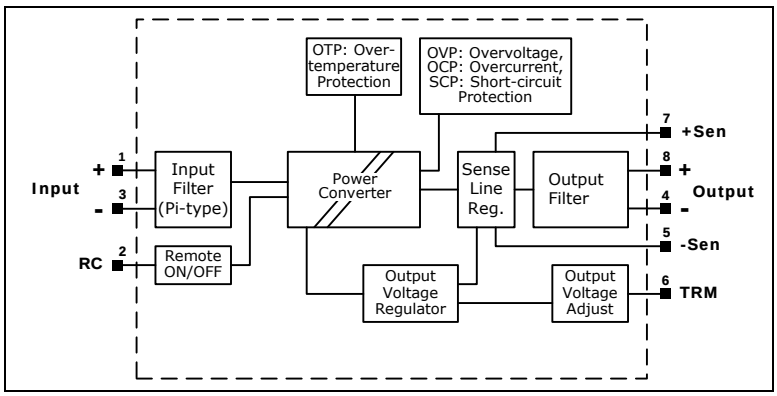
The device is equipped with an over-temperature protection. In case of a high temperature, the output shuts down and starts automatically after cooling off.

The device is equipped with under-voltage protection on the input side. If the input voltage is too low, the device does not start or switches off.

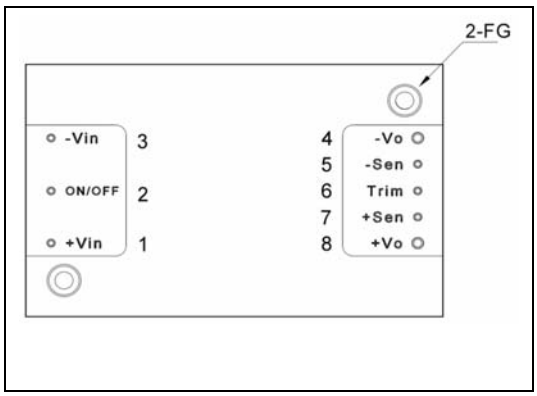
In case of an internal defect, a redundant circuit prevents the output voltage from becoming excessive or dangerous (zener diode type protection).

The device is equipped with a remote ON/OFF function.

6. FUNCTIONAL DIAGRAM



Functional diagram



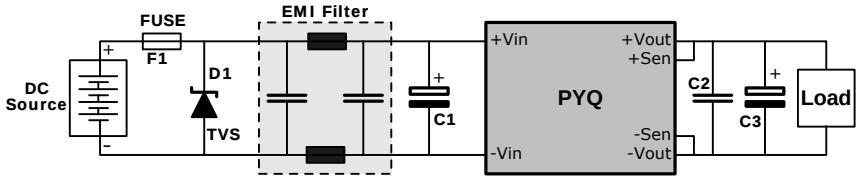
Pin assignment

RC: Remote ON/OFF control pin

TRM: Trim pin for output voltage adjustment

-Sen, +Sen: Sense lines for output voltage

7. Recommended Wiring Scheme



Fuse F1: The DC-DC converter is not internally fused. An external input fuse must always be used. Use a 6A slow-blow fuse.

Diode D1: Transient voltage suppressor diode (TVS) SMDJ180A.

Capacitor C1: 82uF aluminum capacitor

Capacitor C2: 1uF multi layer ceramic capacitor

Capacitor C3: 22µF aluminum or tantalum capacitor.

EMI Filter: This filter reduces the conducted emission to the input. A circuit example can be found in the chapter "EMC Considerations".

8. Product Nomenclature and List of Models

Product Nomenclature:

PY	a	bb	-	ccc	d	ee	-	z
Family Name PY	Size Q = Quarter Brick	Output Power 50 = 50W (30W for 5V Version)		Input Voltage 72W = 14-160V	Output Type S = Single Outputt	Output Voltage 05 = 5V 12 = 12V 24 = 24V 48 = 48V		Options Remote ON/OFF & Mounting: Blank = Positive Logic and M3 Thread N = Negative Logic and M3 Thread PD = Positive Logic and 3.2mm Hole ND = Negative Logic and 3.2mm Hole

Model list:

PYQ50-72WS05	DC-DC converter isolated, 30W, Input: 14-160V, Output: 5V 6A, quarter-brick, pcb-mount
PYQ50-72WS12	DC-DC converter isolated, 50W, Input: 14-160V, Output: 12V 4.2A, quarter-brick, pcb-mount
PYQ50-72WS24	DC-DC converter isolated, 50W, Input: 14-160V, Output: 24V 2.1A, quarter-brick, pcb-mount
PYQ50-72WS48	DC-DC converter isolated, 50W, Input: 14-160V, Output: 48V 1.05A, quarter-brick, pcb-mount

9. SHORT-FORM DATA

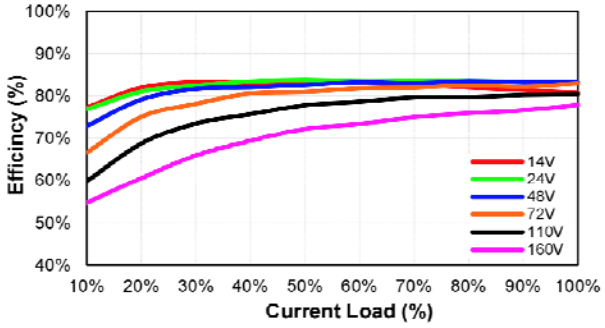
Input voltage range	Min. Nom. Max.	14Vdc 72Vdc 160Vdc	
Input current at no load	Typ. Typ.	8mA 5mA	For 48V model For all models
Input current at remote OFF	Typ. Max.	3mA 5mA	For all models For all models
Output power	Max. Max.	30W 50W	For 5V model For all models
Output current	Nom. Nom. Nom. Nom.	6.0A [1)] 4.2A [1)] 2.1A [1)] 1.05A [1)]	For 5V model For 12V model For 24V model For 48V model
Output voltage adjustment range	Max.	-20%/+10%	For all models
Output voltage remote sense range	Max.	+10%	For all models
Output voltage accuracy range		±1%	Factory setting
Line regulation	Max.	±0.2%	Between 14 and 160Vdc
Load regulation	Max.	±0.2%	For a 0% to 100% to 0% load step
Transient response recovery time	Max.	250µs	For a 75% to 100% load step
Temperature coefficient	Max.	±0.02%/°C	For all models
Start-up time	Typ.	25ms	For resistive load, after applying an input voltage or remote ON signal and reaching 95% of the output voltage
Ripple and noise voltage	Max. Max.	100mVp-p [2)] 40mV rms [2)]	For all models For all models
Efficiency	Typ. Typ. Typ. Typ.	83% / 81% 87% / 86% 89% / 87% 88% / 85%	For 5V model, full load, 72/110Vdc input For 12V model , full load, 72/110Vdc input For 24V model, full load, 72/110Vdc input For 48V model, full load, 72/110Vdc input
Operational temperature range		-40°C to +100°C	See chapter "Thermal Considerations" for derating requirements
Case temperature	Max.	+100°C	
Storage temperature rang		-55°C to +125°C	
Relative humidity	Max.	95% RH	No condensation allowed
Altitude	Max.	5000m / 16 400ft	
Atmospheric pressure range		110-54kPa	
Vibration		20Hz-1kHz:0.04g^2/Hz 1-2kHz: -6dB/octave 60 minutes per axis	According to MIL-STD-810F, random vibration, units are operational
Shock		50 g, 11 ms 18 shocks (3 shocks for each ±axis)	According to MIL-STD-810F, units are operational
Size	Nom.	57.9x 36.8x 12.7mm 2.28 x 1.45 x 0.5"	Length x Width x Height
Weight	Nom.	61.5g / 0.14lb	
MTBF		810 000h 736 000h 795 000h 791 000h	For 5V model For 12V model For 24V model For 48V model Acc. to MIL HDBK 217F at full load, GB25°C

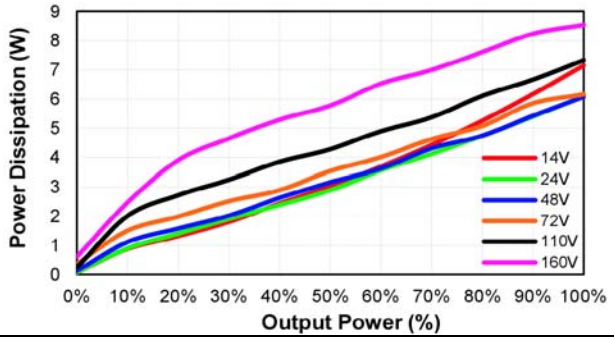
1) This is the nominal current which must not be exceeded even at lower tuned output voltages. At higher output voltages, the current is reduced according to the nominal power.

2) With 22µF Electrolytic/tantalum capacitor and 1µF ceramic multi layer capacitor parallel in measurement path.

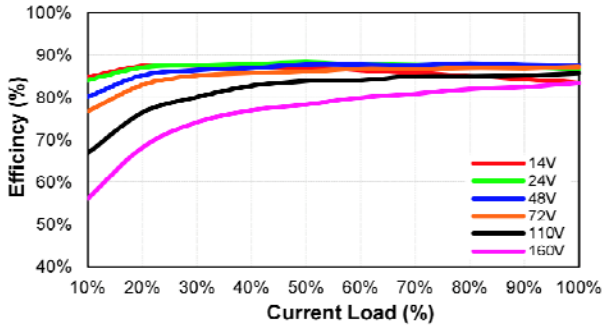
10. EFFICIENCY AND POWER DISSIPATION CURVES

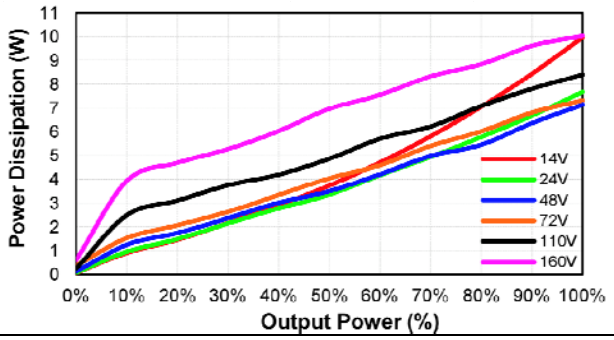
PYQ50-72WS05: Efficiency and power losses vs. output load



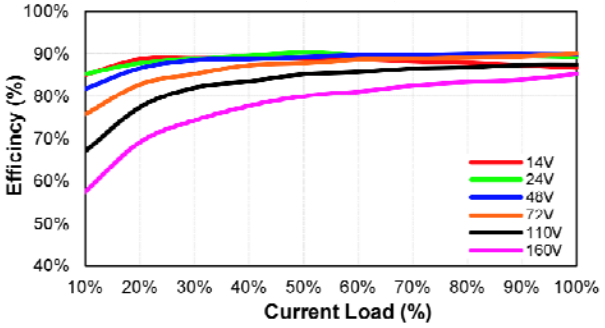


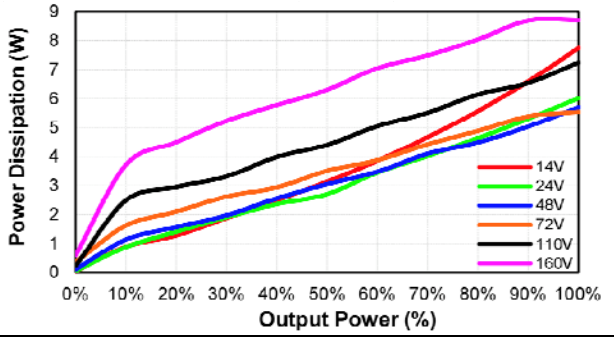
PYQ50-72WS12: Efficiency and power losses vs. output load



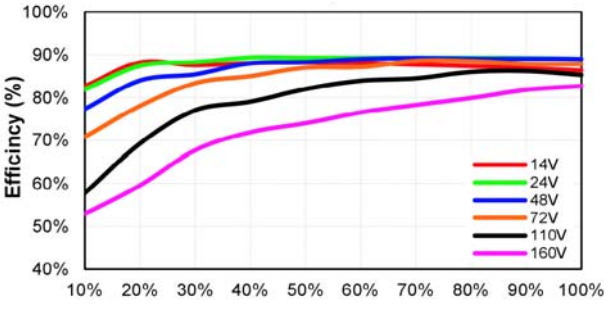


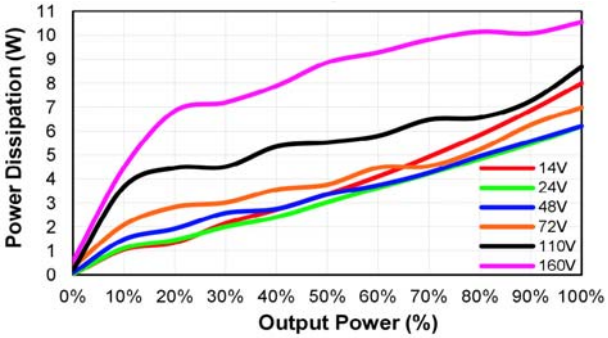
PYQ50-72WS24: Efficiency and power losses vs. output load





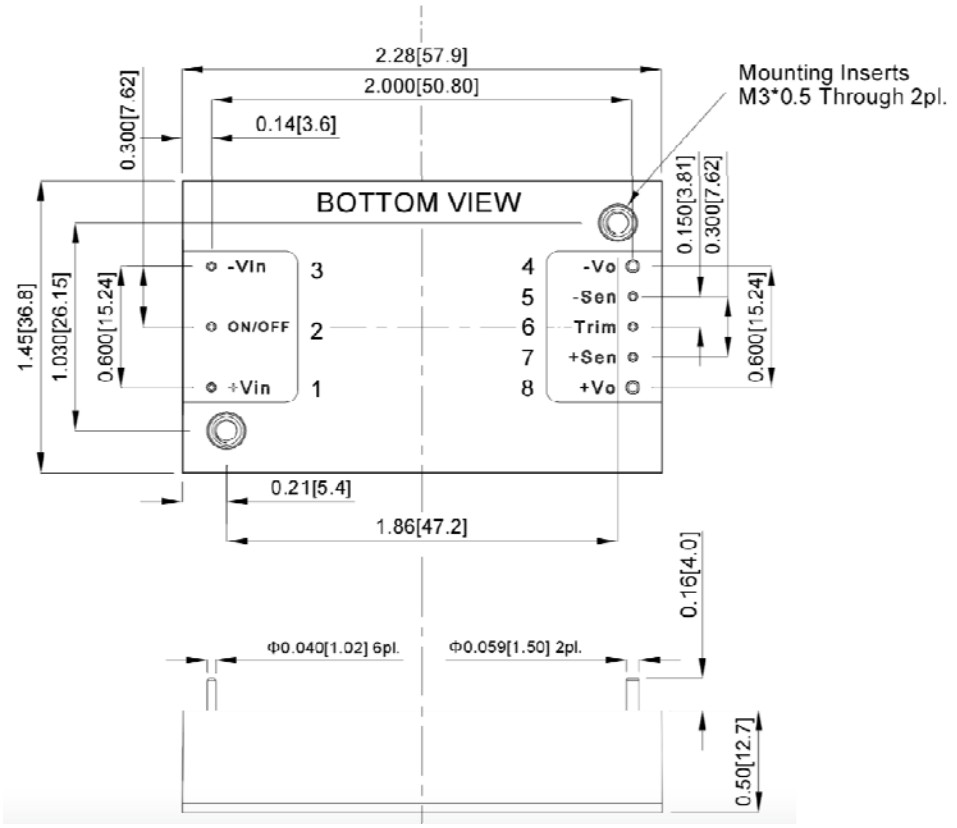
PYQ50-72WS48: Efficiency and power losses vs. output load





11. PHYSICAL DIMENSIONS AND PIN LAYOUT:

Format	Quarter-Brick
Length	57.9mm, 2.28”
Width	36.8mm, 1.45”
Height	12.7mm, 0.5”
Weight	61.5g, 0.14lb
Case material	Plastic
Base plate	Aluminium
Potting Material	Silicone
Pin material	Base: copper Plating: nickel with matte tin



All dimensions in inch [mm]

Pin assignment

Pin	Function
1	+V Input
2	R/C
3	-V Input
4	-V Output
5	- Sense
6	Trim
7	+ Sense
8	+V Output

Inch tolerances:
x.xx±0.02, x.xxx±0.01

Millimeter tolerances:
x.x±0.5, x.xx±0.25

Recommendations for pad design:

Pin 4, 8:
1.8mm plated, through hole
3.3mm pad size

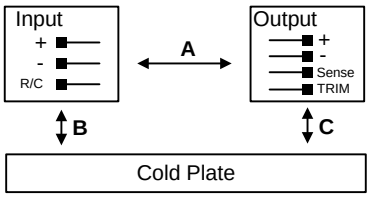
Pin 1, 2, 3, 5, 6, 7:
1.3mm plated, through hole
2.5mm pad size

Converter screws:
3.5mm through hole

12. Isolation and Dielectric Strength

The output voltage is floating and has no ohmic connection to the input or the case.

Hi-pot tests may be repeated by the customer using appropriate test equipment, which applies the voltage with a slow ramp (2s up and 2s down). Connect all input-terminals together as well as all output poles before conducting the test.



Dielectric strength	Min.	3000Vdc	Input to output (A) for 1 minute
	Min.	2500Vdc	Input to base plate (B) for 1 minute
	Min.	500Vac	Output to base plate (C) for 1 minute
Isolation resistance	Min.	200 MΩ	Input to output (A), measured at 500Vdc
Isolation capacitance	Typ.	1nF	Input to output (A)
	Typ.	1.5nF	Input to case (B)
	Typ.	10nF	Output to base plate (C)

13. Protection Features

Under voltage protection (UVP) Turn-On voltage	Min. Typ. Max.	14.2Vdc 14.6Vdc 15.0Vdc	For all models
Under voltage protection (UVP) Shut-down voltage	Min. Typ. Max.	11.6Vdc 12.0Vdc 12.4Vdc	2.6V lock-out hysteresis voltage
Input surge voltage	Max.	200Vdc	For maximal 100ms
Output over voltage protection (OVP)	Min. Typ. Max.	115% 125% 140%	
Output over-current protection (OCP)	Min. Typ. Max.	110% 180% 220%	Of nominal output current, intermittent operation (hiccup mode)
Output short-circuit protection (SCP)		Included	Continuous, automatic recovery
Over temperature protection (OTP)	Typ.	110°C	Temperature at the centre part of base plate, non-latching, automatic recovery when temperature falls below 100°C
Reverse input polarity protection		Not included	Use external protection diode if required
Degree of pollution		2	According to IEC 60664-1, not conductive

14. Approvals and Regulatory Compliances

CE	EU Declaration of Conformity includes Low-Voltage and RoHS Directive
UKCA	UK Declaration of Conformity includes Electrical Safety and RoHS Directive
EN 62368-1	Safety requirements for audio/video, information and communication technology equipment
UL 62368-1	Recognized component for audio/video, information and communication technology equipment, E-File E133400, Categories QQJQ2 and QQJQ8

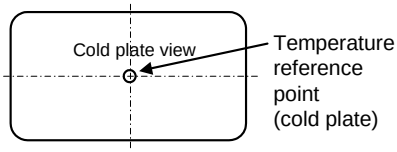
15. Rail Applications

The DC-DC converter with additional circuits is tested according to the following standards and is suitable for railroad applications. For details see application note for railway application

EN 50155	Railway applications - Rolling stock - Electronic equipment
EN 45545-2	Fire protection on railway vehicles - Part 2: Requirements for fire behaviour of materials and components
EN 61373	Railway applications - Rolling stock equipment - Shock and vibration tests
EN 50121-3-2	Railway applications - Electromagnetic compatibility - Part 3-2: Rolling stock - Apparatus

16. Thermal Consideration and Derating

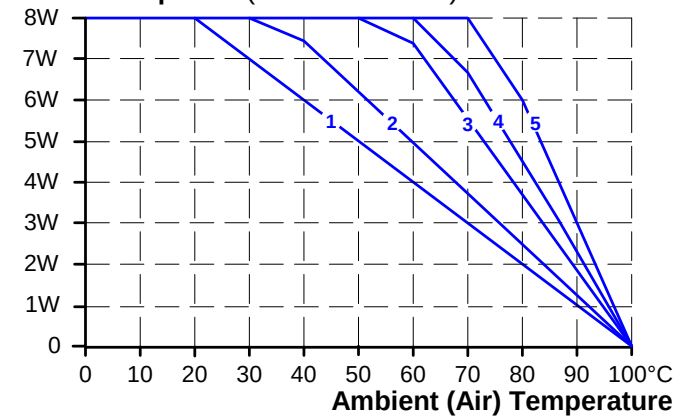
The DC-DC converters operate over a wide temperature range. Even if the heat generated by the DC-DC converters are very low, it must be removed. This can be done either by convection cooling, forced air cooling, radiation or the use of an additional heatsink.



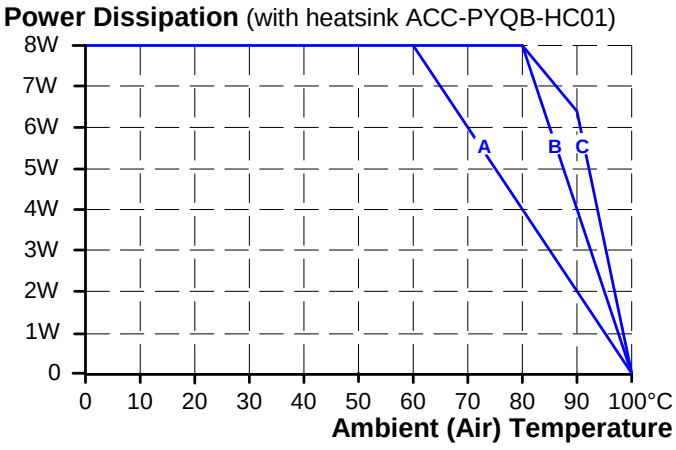
It is important that the enclosure temperature at the indicated temperature reference point does not exceed the maximum enclosure temperature, which is 100°C.

To predict the approximate cooling needed for the DC-DC converter, refer to the following power dissipation curves. These curves are approximations of the ambient temperatures and airflows required to keep the DC-DC converter temperature below its 100°C. After installation in the actual application, the temperature of the module should be re-measured to ensure that the temperatures are not exceeded.

The following curves show the possible power dissipation that the PYQ50 series can thermally dissipate without an additional heatsink and with a typical heatsink. The curves apply in vertical mounting position with natural convection cooling or forced air cooling.



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



A Natural convection 20LFM (0.1m/s, R_{TH} 4.78°C/W)
B Forced air 100LFM (0.5m/s, R_{TH} 2.44°C/W)
C Forced air 400LFM (2.0m/s, R_{TH} 1. 85°C/W)

The power dissipation depends on the operating conditions of the DC-DC converter and can be taken from the curves in chapter "Efficiency and power dissipation curves".

Example:
A PYQ50-72WS12 operates at 48Vdc input voltage and is loaded with 100% of the nominal output current results in a power dissipation of 7W. With these 7W you go into the above curves and determine the required airflow or the heat sink requirement. If the ambient temperature is expected to be below 60°C, the following two options could be considered:
Option 1 without a heatsink: Curve 3 shows that 7W can be dissipated with forced airflow of 200LFM.
Option 2 with heatsink: Curve A shows that 7W can be dissipated up to 65°C without forced airflow.

The derating is never hardware controlled. The user has to take this into consideration to stay below the de-rated current limits in order not to overload the unit.

17. EMC CONSIDERATIONS

In terms of EMC, this DC-DC converter module is considered a component for installation in an end device by a device manufacturer. In order to meet all the requirements of the end device, additional components may have to be deployed and final EMC measurements must be carried out in the end application.

The following tests and measurements were performed according to EN 55032 and EN 50121-3-2 (emission) and EN 55024 and EN 50121-3-2 (immunity).

All tests and measurements were carried out with standardized test set-ups.

EMC Immunity

Electrostatic discharge	EN 61000-4-2	Air discharge Contact discharge	±8kV ±6kV	Criterion A Criterion A
Electromagnetic RF field	EN 61000-4-3	80MHz-1GHz	20V/m	Criterion A
Fast transients (Burst)	EN 61000-4-4	Input, with additional components see note 1)	±2kV	Criterion A
Surge voltage	EN 61000-4-5	Input, with additional components see note 1)	±2kV	Criterion A
Conducted disturbance	EN 61000-4-6	0.15-80MHz	10V	Criterion A

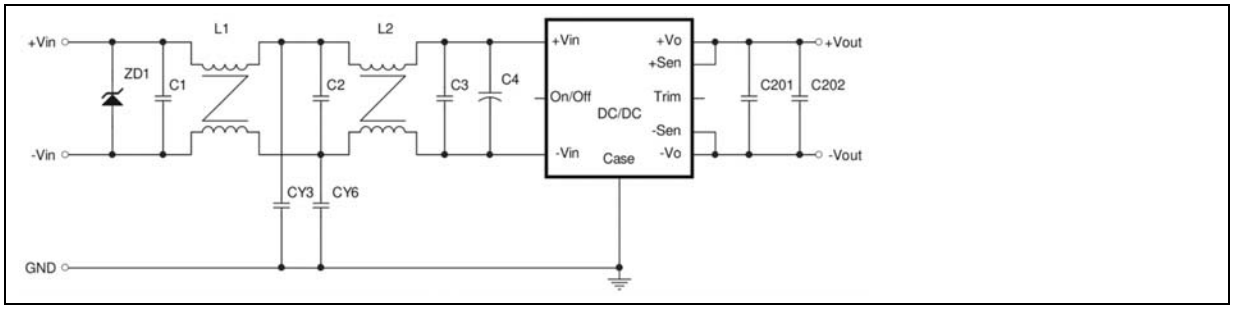
Performance criterion A: The device shows normal operation behavior within the defined limits.

Note 1) Burst and surge tests were performed with an additional 82µF capacitor and 180V suppressor diode SMDJ180A.

EMC Emission

Recommended external EMI filter for EN 55011, EN 55032 Class A and EN 50121-3-2

The placement of components and the routing of traces on the pc-board must be carried out according to EMC aspects. If help is needed, please contact our technical support team.



BOM	For all models
C1, C2, C3	1uF/250V, 1812 MLCC, X7R ceramic
C4	82uF/250V, Aluminum Capacitor Nippon Chemi-Con KXJ series
C201	2.2uF/100V, 1210 MLCC, X7R ceramic
C202	4.7uF/100V, 1210 MLCC, X7R ceramic
CY3, CY6	2200pF/Y1, TDK Y1 capacitors or equivalent
ZD1	SMDJ180A, Secos
L1, L2	URT24-05055H, BULL WILL (G91C7221622) or equivalent.

Switching Frequency

Main converter	Min.	215kHz	Fixed frequency
	Typ.	240kHz	
	Max.	265kHz	

18. REMOTE ON/OFF FUNCTION

The device is equipped with a remote ON/OFF function to turn the output ON or OFF.

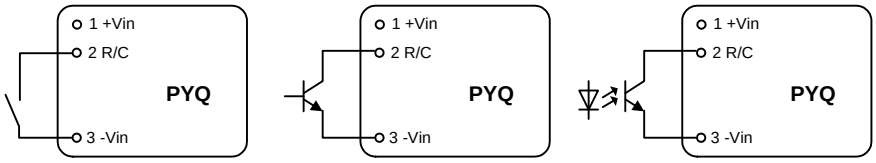
Two logics are possible. With the positive logic (standard version), the output switches OFF as soon as pin 2 (R/C) and pin 3 (-Vin) are linked or the voltage is less than 1V.

The optionally available negative logic (option –N) is exactly the vice versa. Here the output switches ON as soon as pin 2 (R/C) and pin 3 (-Vin) are linked or the voltage is less than 1V.

The RC-input is a sink input, which requires a maximal current of 1mA (typically 0.4mA) to be activated. The maximal allowed voltage (open circuit voltage) for this pin is 160Vdc.

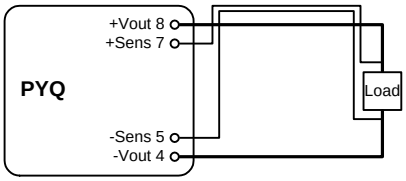
Positive logic (standard)
Converter ON: open or 3.5-160V
Converter FF: closed or 0-1.2V

Negative logic (option -N)
Converter ON: closed or 0-1.2V
Converter FF: open or 3.5-160V



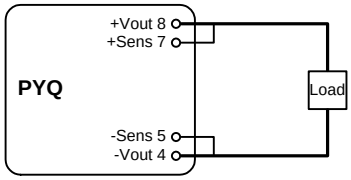
19. OUTPUT REMOTE SENSING

The PYQ75 series has the feature to remotely sense both lines of its output. This feature moves the output voltage regulation point from the output of the unit to the point of connection of the remote sense pins. This feature automatically adjusts the real output voltage of the PYQ75 series in order to compensate for voltage drops in distribution and maintain a regulated voltage at the point of load.



When remote sense is in use, the sense should be connected by twisted-pair wire or shield wire. Output voltage might become unstable because of impedance of wiring and load condition when length of wire is exceeding 400mm.

If the remote sense feature is not to be used, the sense pins should be connected locally. The +Sense pin should be connected to the +Vout pin at the module and the -Sense pin should be connected to the -Vout pin at the module. Wire between +Sense and +Vout and between -Sense and -Vout as short as possible. Loop wiring should be avoided. The converter might become unstable by noise coming from poor wiring.



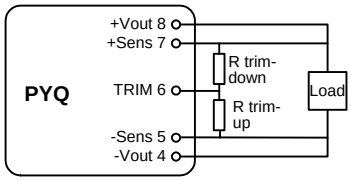
Please note: Although the output voltage can be varied (increased or decreased) by both remote sense and TRIM, the maximum variation for the output voltage is the larger of the two values not the sum of the values. The output power delivered by the module is defined as the voltage at the output terminals multiplied by the output current. Using remote sense and TRIM can cause the output voltage to increase and consequently increase the power output of the module if output current remains unchanged. Always ensure that the output power of the module remains at or below the maximum rated power.

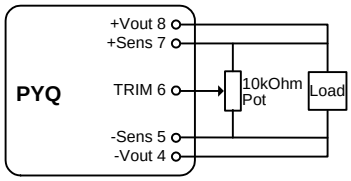
20. OUTPUT VOLTAGE ADJUSTMENT

The output voltage can be adjusted in the range of -20%/+10%.

To increase the output voltage, connect an external resistor between the TRIM-Pin and the negative output voltage (-Vout) and to decrease the voltage, connect the resistor between the TRIM-Pin and the positive output voltage (+Vout).

Alternatively a 10kΩ potentiometer can be used to adjust the output voltage continuously within its limits.





Resistor values for adjusting the 5V output model

Output (V)	4.0	4.2	4.4	4.6	4.8	**5V**	5.1	5.2	5.3	5.4	5.5
	-20%	-16%	-12%	-8%	-4%		+2%	+4%	+6%	+8%	+10%
R-up (Ω)	-	-	-	-	-	-	24340	11280	6930	4750	3450
R-down (Ω)	1480	4300	9000	18400	46600	-	-	-	-	-	-

Resistor values for adjusting the 12V output model

Output (V)	9.6	10.08	10.56	11.04	11.52	**12V**	12.24	12.48	12.72	12.96	13.20
	-20%	-16%	-12%	-8%	-4%		+2%	+4%	+6%	+8%	+10%
R-up (Ω)	-	-	-	-	-	-	74950	35370	22170	15580	11620
R-down (Ω)	2921	11920	26930	56950	147000	-	-	-	-	-	-

Resistor values for adjusting the 24V output model

Output (V)	19.2	20.16	21.12	22.08	23.04	**24V**	24.48	24.96	25.44	25.92	26.4
	-20%	-16%	-12%	-8%	-4%		+2%	+4%	+6%	+8%	+10%
R-up (Ω)	-	-	-	-	-	-	78640	35940	21710	14590	10320
R-down (Ω)	1583	23970	61300	135900	359900	-	-	-	-	-	-

Resistor values for adjusting the 48V output model

Output (V)	38.4	40.32	42.24	44.16	46.08	**48V**	48.96	49.92	50.88	51.84	52.8
	-20%	-16%	-12%	-8%	-4%		+2%	+4%	+6%	+8%	+10%
R-up (Ω)	-	-	-	-	-	-	71290	33240	20560	14220	10410
R-down (Ω)	52620	95280	166300	308500	735100	-	-	-	-	-	-

21. HOLD-UP TIME CIRCUITRY

The hold time is defined as the time period during which the DC-DC converter output remains active after a loss of input power. The DC-DC converter itself is not capable of providing a hold time. For this, an external circuit with a large hold-up (storage capacitor) is required. The lower the operating voltage of the system, the larger this hold-up capacitor must be.

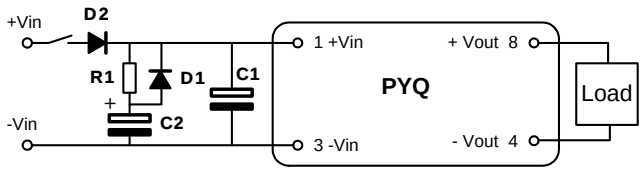
D1, D2: 200V/10A

D2: To prevent the stored energy from flowing in the wrong direction and not being available for the DC-DC converter. Use only if needed.

R1: 100Ω, 10W

C1: 82uF/250V ESR<0.07Ω

C2: see table below, voltage must be larger than the supply voltage



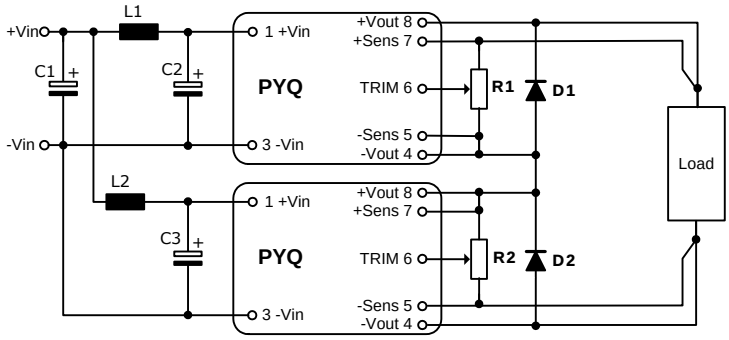
Sizing the hold-up capacitor

Input Voltage	**24Vdc**	**36Vdc**	**48Vdc**	**72Vdc**	**96Vdc**	**110Vdc**
Hold-up capacitor (C2) for 10ms	3300µF	1100µF	600µF	250µF	150µF	120µF
Hold-up capacitor (C2) for 30ms	9400µF	3300µF	1700µF	730µF	410µF	330µF

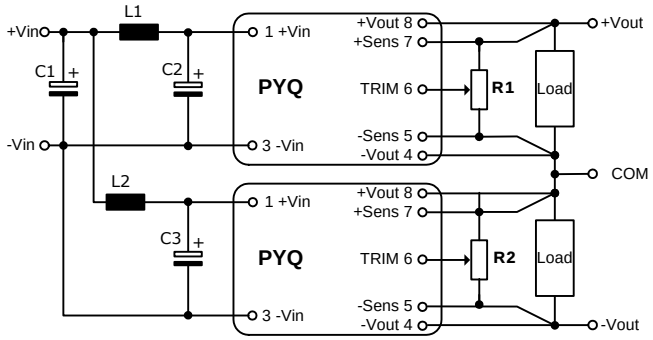
22. SERIES OPERATION OF OUTPUTS

Series operation is possible by connecting the outputs of two or more identical devices. The connection is shown in the following drawing.

Series operation for higher output voltages:



Series operation for + / - output voltages:



L1, L2: 1.0uH
C1, C2, C3: 82uF (ESR<0.07Ω)
R1, R2: 10kΩ potentiometer

D1, D2: 10A

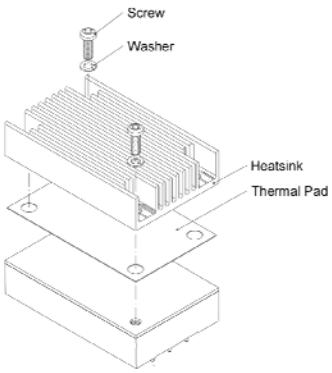
Notes:

- Use larger C1, C2, C3 or capacitors in parallel if the impedance of input line is high or unknown.
- Use larger C1, C2, C3 or capacitors in parallel when ambient temperature becomes lower than -20 °C.
- Use a Schottky diode (D1, D2) across the output of each device, so that if one converter shuts-down for any reason, the output converter does not get damaged.

23. PARALLEL OPERATION OF OUTPUTS

Parallel operation of outputs for higher output currents is not possible.

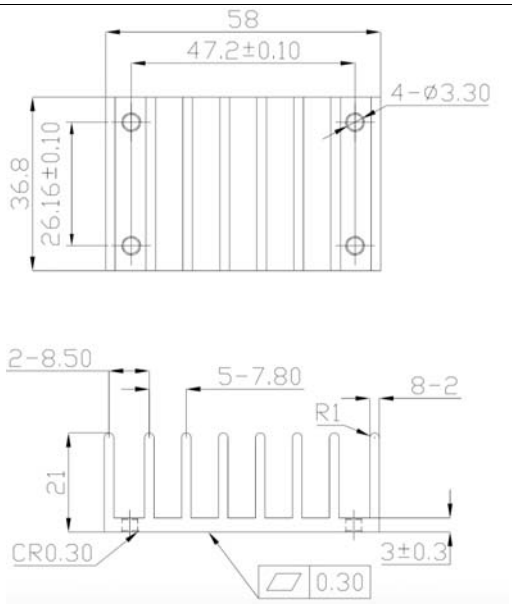
24. ACCESSORY – HEATSINK KITS

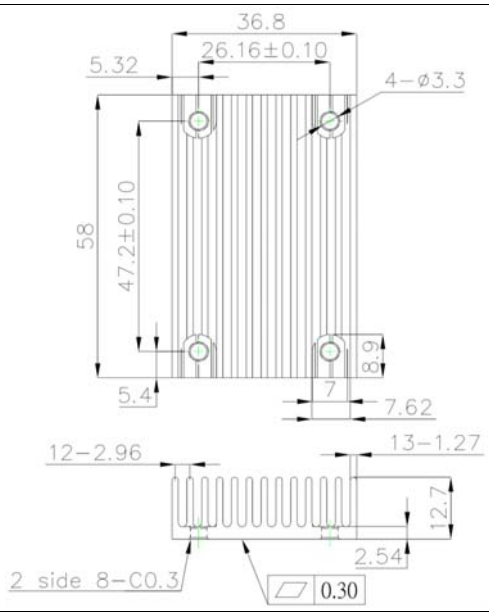


Heatsink kits can be ordered separately and mounted on the converter by means of two screws, two washers and a thermal pad.

The heatsink kit includes one heatsink, one thermal pad, screws and washers.

Order number	ACC-PYQB-HC01	ACC-PYQB-HC05
Fin Style	Transverse	Longitudinal
Size (L x W x H)	58 x 36.8 x 21mm	36.8 x 58 x 12.7mm
Material	Aluminium	Aluminium
Weight	T.B.D.	T.B.D.
Recommended Tightening Torque	3Kgf-cm	3Kgf-cm
Screw	M3 x 8mm (4x)	M3 x 8mm (4x)
Washer	3.2mm (4x)	3.2mm (4x)
Thermal Pad	35.8 x 56.9 x 0.25mm	35.8 x 56.9 x 0.25mm
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	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





25. CLEANING PROCESS AND SOLDERING PROFILE

Cleaning process

Clean the soldered side of the module with a brush, prevent liquid from getting into the module. Do not clean by soaking the module into liquid. Do not allow solvent to come in contact with product labels or resin case as this may changed the color of the resin case or cause deletion of the letters printed on the product label. After cleaning, dry the modules well.

Hand soldering

The suggested soldering iron is 420±10°C for up to 4~15seconds (less than 90W).

Lead free wave soldering