



KPW-BTPD

Industrial

IEEE 802.3bt &

Multi-mode PoE Splitter

User's Guide



DOC.200609

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FCC NOTICE

This device complies with Class A Part 15 the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and (2) this device must accept any interference received including the interference that may cause.

CE NOTICE

Marking by the symbol indicates compliance of this equipment to the EMC directive 2014/30/EU of the European Community. Such marking is indicative that this equipment meets or exceeds the following technical standards:

EN 61000-6-4

EN 61000-3-2

EN 61000-3-3

EN 61000-6-2

IEC 61000-4-2

IEC 61000-4-3

IEC 61000-4-4

IEC 61000-4-5

IEC 61000-4-6

IEC 61000-4-8

IEC 61000-4-11

VCCI

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VCCI-A

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Introduction

KTI Network's KPW-BTPD is a high power multi-mode PoE splitter which integrates Power over Ethernet (PoE) technology to PoE incapable network device by just using a single Cat.5/5e/6 cable for both power and data transmission. It is a high power splitter that is capable to receive a power up to 128W in a voltage range of 36 ~ 57V over Ethernet twisted cable from the following PSE devices:

- IEEE 802.3af compliant PoE PSE
- IEEE 802.3at compliant PoE+ PSE
- IEEE 802.3bt compliant PoE++ PSE
- KTI's proprietary PoE++ PSE

The splitter is equipped with DIP SW that allows user to select one from nine different classes for demanding power from a remote PoE switched port or mid-span injector. This feature supports efficient power management at the advanced PSE side.

The splitter is built-in with one DC-DC power converter that converts PoE voltage to a matched voltage and supply power to the local end device. The splitter has options with two output voltages, 12V and 24V and two power levels, 60W and 90W for selection.

With higher power support with PoE++, it enables new markets and widens PoE's scope to existing markets that require higher power in applications such as: Building management (connected LED lighting), Pan-tilt -zoom (PTZ) security cameras, Kiosks, Point of Sale (POS) terminals, Thin clients and Small cells. For industrial applications, the splitter is also equipped with optional brackets for Din-Rail mounting and panel mounting. To enhance application safety, the splitter is featured short-circuit protection, low voltage lock out, inrush current limit and thermal protection.



Features

- Enables PoE incapable network device with PoE capability
- Supports IEEE 802.3bt, 802.3at and 802.3af standards and proprietary PoE++ up to 128W
- Auto-support variety of PSE standards for PD discovery and power classification
- Supports 10BASE-T, 100BASE-TX, and 1000BASE-T
- Supports Alternative A or Alternative B PoE input over Cat.5/6
- Provides power class selection DIP SW for supporting power management at PSE side
- Built-in with an isolated and high-efficient DC-DC power converter
- Protections: short-circuit / over power / over current / over temperature
- High surge immunity up to 4kV

Panels



Specifications

Standard IEEE 802.3 10BASE-T, 100BASE-TX, 1000BASE-T
 PoE In Jack Shielded RJ-45
 10BASE-T, 100BASE-TX, 1000BASE-T support
 Power pins – Pin1/2/3/6 and Pin4/5/7/8 (support both)
 LAN cable - Cat.5 or better

Pin	10/100Base-TX	1000Base-T	PoE
1	RX+	BI_DA+	V _{poe+}
2	RX-	BI_DA-	V _{poe+}
3	TX+	BI_DB+	V _{poe-}
4		BI_DC+	V _{poe+}
5		BI_DC-	V _{poe+}
6	TX-	BI_DB-	V _{poe-}
7		BI_DD+	V _{poe-}
8		BI_DD-	V _{poe-}

PoE Standard IEEE 802.3af Type 1, IEEE 802.3at Type 2,
 IEEE 802.3bt Type 3 & Type 4, Proprietary PoE++ Type 3 & Type 4
 PoE Power Class Type 1 Class 0 ~ Class 3, Type 2 Class 4, Type 3 & 4 Class 5 ~ Class 8
 (DIP SW selectable)
 PoE Input Voltage 36 ~ 57VDC
 DIP SW Selector SW1, SW2: PD class selection for PSE power classification
 LAN Out Jack Shielded RJ-45

10BASE-T, 100BASE-TX, 1000BASE-T support
 LAN cable - Cat.5 or better

Pin	10/100Base-TX	1000Base-T
1	RX+	BI_DA+
2	RX-	BI_DA-
3	TX+	BI_DB+
4		BI_DC+
5		BI_DC-
6	TX-	BI_DB-
7		BI_DD+
8		BI_DD-

DC Power Output 2P flange European Terminal block – DC+/DC-
 Power wires: 12 ~ 22 AWG (1 meter max.)

Options:

DC OUT *1	Output Power
12VDC±2%	60W
12VDC±1%	90W
24VDC±2%	60W
24VDC±1%	90W


LED Display PoE input status
 Housing Enclosed metal with no fan
 Dimension 110 x 43.3 x 142 mm (LxWxH, metal body only)
 Mounting Support DIN-Rail, Panel mounting
 Temperature Operating Temperature: -40°C ~ +70°C
 Storage Temperature: -40°C ~ +85°C
 Relative Humidity: 5% ~ 95% non-condensing
 Approval FCC Part 15 Class A, CE Mark Class A,
 VCCI 32-1 Class A, LVD/EN 62368-1 safety

Model Options

Model	PoE Input Voltages	Local Output Voltage	Output Power
KPW-BTPD-12V60W	44 ~ 57V	12V	60W
KPW-BTPD-12V90W	36 ~ 57V	12V	90W
KPW-BTPD-24V60W	44 ~ 57V	24V	60W
KPW-BTPD-24V90W	44 ~ 57V	24V	90W

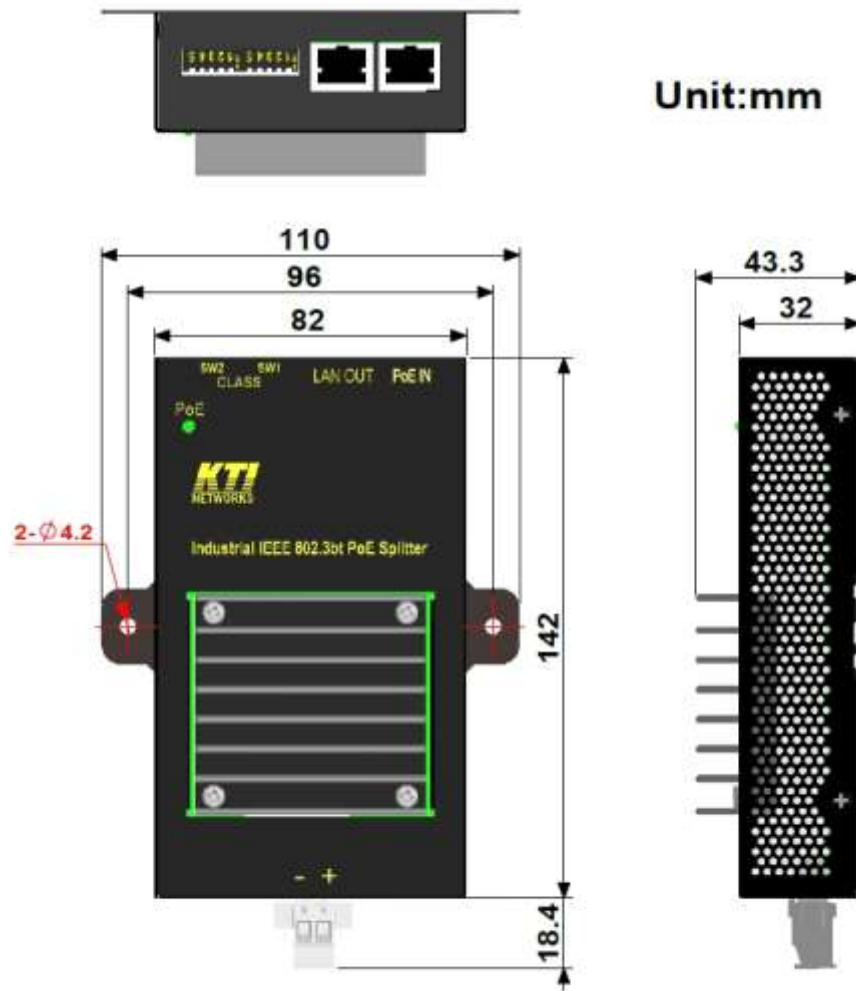
Safety Cautions

To reduce the risk of bodily injury, electrical shock, fire and damage to the product, observe the following precautions.

	Do not service any product except as explained in your system documentation.
	Opening or removing covers may expose you to electrical shock.
	Only a trained service technician should service components inside these compartments.
	If any of the following conditions occur, unplug the product from the electrical outlet and replace the part or contact your trained service provider: <ul style="list-style-type: none">- The power cable, extension cable, or plug is damaged.- An object has fallen into the product.- The product has been exposed to water.- The product has been dropped or damaged.- The product does not operate correctly when you follow the operating instructions.
	Do not push any objects into the openings of your system. Doing so can cause fire or electric shock by shorting out interior components.
	Operate the product only from the type of external power source indicated on the electrical ratings label. If you are not sure of the type of power source required, consult your service provider or local power company.

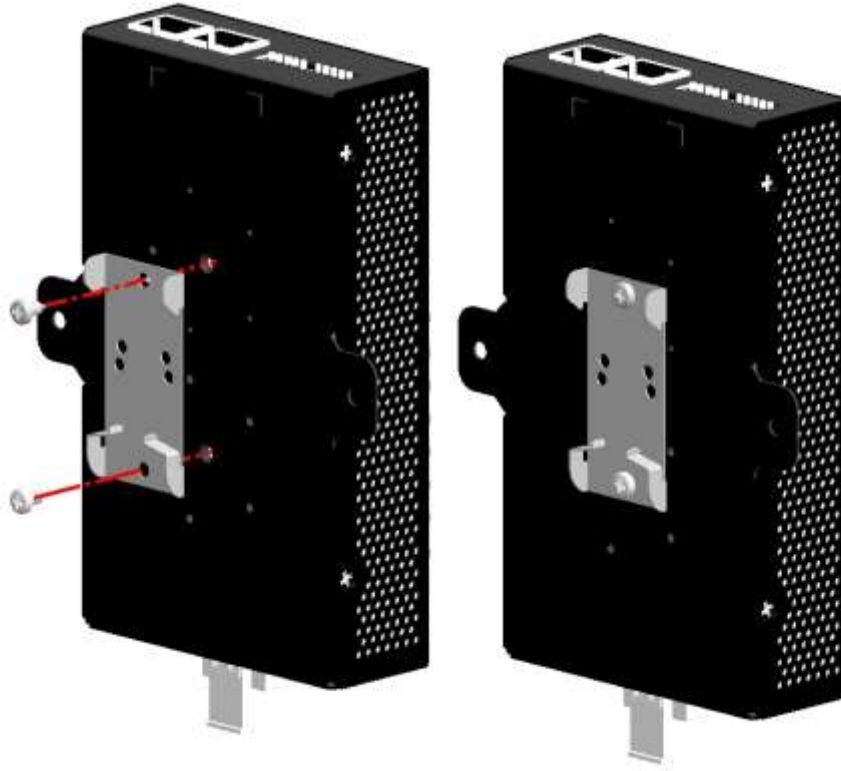
Mounting Support

Panel mount & Dimension

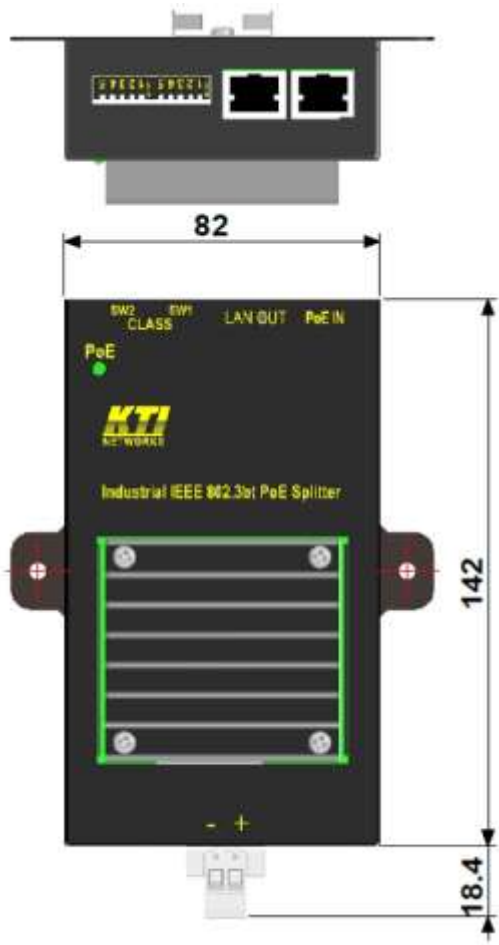


Din-Rail mounting bracket installation

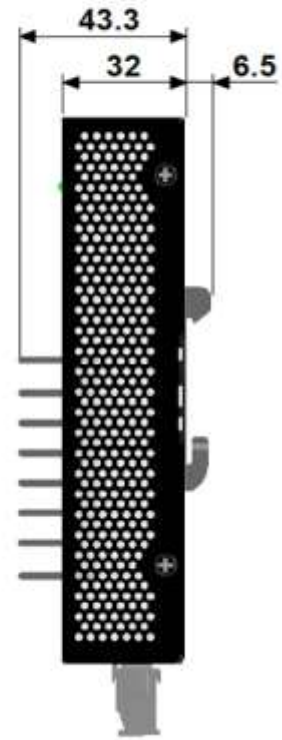
The bracket is supplied in the product package.



Dimension

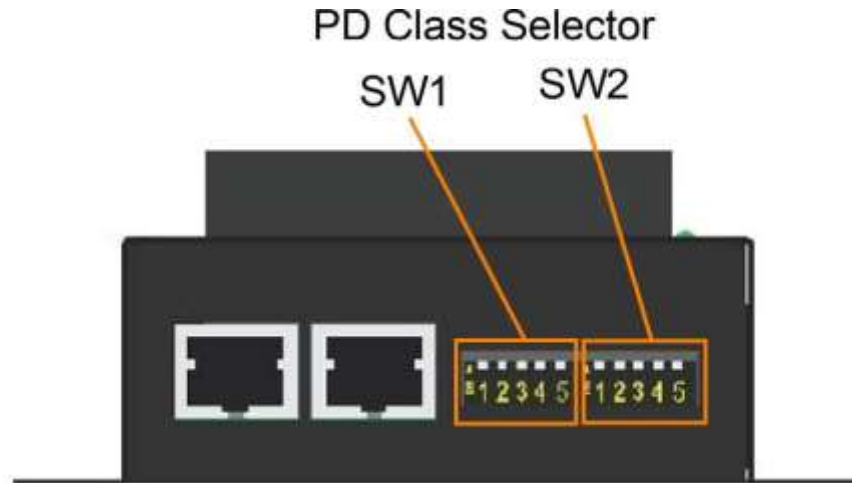


Unit:mm



PD Class Setting

This power class selection makes PD power notification to the remote PSE for PD discovery, power classification operation. It does not cause any power consumption limitation on the splitter itself. Note that some PSE devices may use the class notification for PoE power management and may limit the power delivery according to the received class notification.



Device PD Class Selection (DIP SW1 & SW2)

PD Class		IEEE 802.3af(W)		IEEE 802.3at(W)		IEEE 802.3bt (W)		PoE++ (W) *2		DIP SW	
Type	Class	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	SW1*3	SW2*4
1	0	12.95	15.4	12.95	15.4	12.95	15.4	12.95	15.4	1 ON	5 ON
1	1	3.84	4	3.84	4	3.84	4	3.84	4	2 ON	5 ON
1	2	6.49	7	6.49	7	6.49	7	6.49	7	3 ON	5 ON
1	3	12.95	15.4	12.95	15.4	12.95	15.4	12.95	15.4	4 ON	5 ON
2	4	--	--	25.5	30	25.5	30	25.5	30	5 ON	5 ON
3	5	--	--	--	--	40	45	39	50	1 ON	1 ON
3	6	--	--	--	--	51	60	53	74	2 ON	2 ON
4	7	--	--	--	--	62	75	70	90	3 ON	3 ON
4	8	--	--	--	--	71.3	90	90	128	4 ON	4 ON

Notes:

1. The device supports all PSE standards listed above for PD discovery and classification automatically.
2. In PoE++ standard, the Class 4 ~ Class 8 in PoE++ are proprietary standard and the Class 0 ~ Class 4 comply with IEEE 802.3 standard. The power ranges listed in the table specify the possible power received at the PoE In jack.
3. One switch is set ON and others are set OFF in SW1 group.
4. One switch is set ON and others are set OFF in SW2 group.

Application Notes

DIP SW1 SW2 Factory Default

Model	DC OUT Rating	Output Power	SW1	SW2
KPW-BTPD-12V60W	12VDC	60W	SW1-4 ON	SW2-4 ON
KPW-BTPD-12V90W	12VDC	90W	SW1-4 ON	SW2-4 ON
KPW-BTPD-24V60W	24VDC	60W	SW1-4 ON	SW2-4 ON
KPW-BTPD-24V90W	24VDC	90W	SW1-4 ON	SW2-4 ON

Power Derating

Model	DC OUT *1	Output Power	Conversion Efficiency*2	Power Derating *3
KPW-BTPD-12V60W	12VDC±2%	60W	87%	100%(50°C), 75%(60°C), 55%(70°C)
KPW-BTPD-12V90W	12VDC±1%	90W	86%	100%(50°C), 80%(60°C), 60%(68°C)
KPW-BTPD-24V60W	24VDC±2%	60W	88%	100%(40°C), 80%(50°C), 50%(70°C)
KPW-BTPD-24V90W	24VDC±1%	90W	83%	100%(50°C), 80%(60°C), 60%(68°C)

Note:

1. Measured at the connector end.
Power wire may cause voltage drop at the other end under high current load due to cable and connection resistance.
2. Efficiency = (DC OUT local output power) / (PoE input power) measured with full load @ Vpoe_in 48V
3. Measured under air flow 1m/s

Reference

The protection information

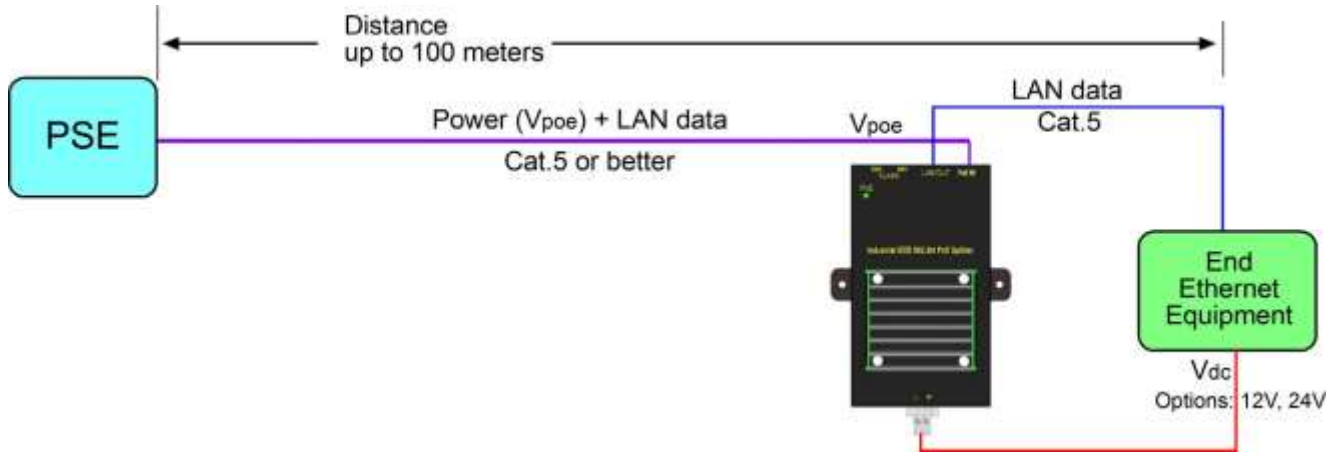
Model	12V60W	12V90W	24V60W	24V90W
Short Circuit	Yes	Yes	Yes	Yes
Over Current	—	110% ~ 140%	—	110% ~ 140%
Over Power	145% ~ 252%	—	150% ~ 256%	—
Over Voltage	118% ~ 132%	115% ~ 140%	118% ~ 132%	115% ~ 140%
Over Temperature	100°C max.	95°C ~ 105°C	100°C max.	95°C ~ 105°C

Note:

1. Auto-recovery for short circuit, OCP, OPP, OTP and zener diode clamp for OVP.
2. OTP by internal power module case temperature thermal shutdown.

Application Diagram

Typical connection of a PoE application:



Compatible PSE devices:

- IEEE 802.3af Mid-span injector
- IEEE 802.3af compliant Ethernet switch port
- IEEE 802.3at Mid-span injector
- IEEE 802.3at compliant Ethernet switch port
- IEEE 802.3bt Mid-span injector
- IEEE 802.3bt compliant Ethernet switch port
- KTI PoE++ Mid-span injector

Notes:

1. The V_{poe} measured at the splitter end could be different from that measured at the PSE end. The voltage drop is caused by Cat.5 line resistance. The V_{poe} measured at the splitter end may be in the range of 36 ~ 57VDC.
2. Reference data for voltage drop over standard Cat.5 (Wire: 24AWG, Length: 100m):

Current	Cable pairs	Voltage drop
2A	4	2V
2A	2	8.3V
1A	4	1V
1A	2	4.1V

3. The splitter supports receiving PoE with all 4 pairs. (Some PSE devices use 2 pairs only for power delivery.)