

# PLUS TWP-4AI4DI1UT WIRELESS TRANSMITTER



The PLUS TWP-4AI4DI1UT Wireless Transmitter System is a complete solution to easily gather the data needed to identify production issues and implement measures to increase efficiency and prevent future disruptions.

PLUS TWP-4AI4DI1UT Wireless Transmitter was designed to monitor 4..20 mA / 0..10V signals, digital inputs, and universal temperature inputs, providing a secure communication, without cable requirements of a complex wired solution. Conductivity, vibration, humidity, flow, level, pressure and temperature are some examples of industrial process variables, possible to be monitored and controlled.

Dimensions: 120 x 90 x 50 mm

Weight: 314 g

Material: ASA+PC-FR (UL 94 V-0) / Polycarbonate

Protection Index: IP65

## KEY FEATURES

**4 CONFIGURABLE ANALOG INPUTS**

**4 CONFIGURABLE DIGITAL INPUTS**

**1 UNIVERSAL TEMPERATURE INPUT**

**1 REMOTE SWITCH OUTPUT**

**MULTI-HOP MESH NETWORK**

WITH SELF-FORMING, SELF-HEALING AND SELF-OPTIMIZING FEATURES

**OPERATING MODE**

AS END DEVICE / AS REPEATER

**SITE SURVEY FEATURE**

**SIMPLE AND INTUITIVE USB CONFIGURATION**

TEKON CONFIGURATOR SOFTWARE

DS\_PLUS\_TWP-4AI4DI1UT\_E01C

**TECHNICAL SPECIFICATIONS**

RADIO SPECIFICATIONS	868MHZ	915MHZ
Range <sup>1</sup>	Up to 4Km LoS	
Frequency Band	868 to 869MHz	902 to 928MHz <sup>4</sup>
Radio channels	16	50 <sup>5</sup>
Radio receiver sensitivity <sup>2</sup>	-97 to -110 dBm	
Power <sup>2</sup>	25 to 27 dBm	8 to 27 dBm
Radio transmission rate <sup>2</sup>	19 to 76,8kbit/s	
Encryption method	AES 128 (Advanced Encryption Standard)	
Modulation	GFSK	
Connection	SMA	
Antenna	Articulated dipole antenna	
Antenna impedance	50Ω	

WIRELESS NETWORK	
Maximum devices	55
Maximum hops	13
Communication period	1 to 43200 seconds (configurable)

INPUT RESISTANCE THERMOMETER (RTD)	
Measured variable	Temperature
Sensor type	PT100
Units	°C
Connection	1 Resistance thermometer (RTD) in 3-wire system
Sensor current	200µA
Open-circuit monitoring	Always active (cannot be disabled)
Short-circuit monitoring	Always active (cannot be disabled)
Measuring range	See "Digital measuring accuracy" table
Cable resistance per wire (max.)	50 Ω

INPUT THERMOCOUPLES (TC)	
Measured variable	Temperature
Sensor type	Thermocouples: J, K, N, R, S, T
Units	°C
Connection	1 Thermocouple
Open-circuit monitoring	Always active (cannot be disabled)
Short-circuit monitoring	Not available
Cold junction compensation (CJC)	Integrated resistance thermometer
Measuring range	See "Digital measuring accuracy" table

MEASUREMENT ACCURACY	
Reference conditions	
Power supply	12V DC ± 1%
Ambient temperature	23°C

Digital measuring errors	See table "Digital measuring accuracy" table
Internal cold junction	
Accuracy	$< \pm 0,50 \text{ }^\circ\text{C}$
Resolution	0,01 $^\circ\text{C}$
Influence of ambient temperature	
on RTD measurement	$< \pm 0,001 \text{ }^\circ\text{C} / \text{ }^\circ\text{C}$
on thermocouple	Thermocouples J, K, N, T: $\leq \pm 0,005 \text{ }^\circ\text{C} / \text{ }^\circ\text{C}$ Thermocouple R: $\leq \pm 0,010 \text{ }^\circ\text{C} / \text{ }^\circ\text{C}$ Thermocouple S: $\leq \pm 0,2 \text{ }^\circ\text{C} / \text{ }^\circ\text{C}$
Isolation voltage (test   operation)	250 V AC   48 V AC

POWER SUPPLY	
Supply voltage	5 to 24V DC $\pm 5\%$ / USB <sup>6</sup>
Maximum current	500mA DC @ 5V DC / 100mA DC @ 24V DC
Protection against reverse polarity	

ANALOG INPUTS	CURRENT	VOLTAGE
Range	0 to 24mA	0 to 12V DC
Resolution	0,96uA (15bit)	0,38mV (15bit)
Accuracy	$< 100\text{uA}$ [ $< 0,5\%$ FS]	$< 5\text{mV}$ [ $< 0,05\%$ FS]
Input impedance	100 $\Omega$	$> 100\text{k}\Omega$

DIGITAL INPUTS	INPUT TRIGGER	4 DIGITAL INPUTS
Range	0 to 24V DC	
ON detection level	$> 4,5\text{V}$	$> 12\text{V}$
OFF detection level	$< 2,5\text{V}$	$< 9\text{V}$
Type	Sinking	
Impedance	$> 4\text{k}\Omega$	Compliant to IEC 61131-2; Type 1, 2, 3
Input current	4,5mA @ 12V DC / 6mA @ 24V DC	2,47mA for Type 3
Maximum current protection	10mA	
Galvanic Isolation	No	Yes
Detection type	State change	
Activation detection (if enabled)	Falling Edge / Rising Edge / Both <sup>3</sup>	

DIGITAL OUTPUTS	COMMUNICATION LOSS	REMOTE OUTPUT	EXTERNAL SUPPLY
Range	5 to 24V DC		
Type	Sinking / NPN		
Maximum current protection	90mA		
Start state	ON / OFF / last state <sup>3</sup>		
Communication loss state	ON / OFF / last state <sup>3</sup>		
Event number activation	1 to 10 <sup>3</sup>	N/A	N/A
Activation period before communication	N/A	N/A	0 to 255 seconds <sup>3</sup>

INTERFACE	
Indication	Frontal Panel LED

Switches	External - Site Survey activation Internal - Load Default Factory Settings
Configuration	Internal micro USB connector

**MECHANICAL INTERFACE**

Push-in spring terminal blocks (internal)
Bucins PG-7
1.5mm <sup>2</sup> (0.0591in <sup>2</sup> )
Micro USB internal connector

OPERATING ENVIRONMENT	ENVIRONMENTAL CONDITIONS	STORAGE CONDITIONS
Temperature		-30 to 80°C
Relative humidity	N/A	≤ 95% (non- condensing)

**CASING**

Dimensions	120 x 90 x 50 mm
Weight	314 g
Material	ASA+PC-FR (UL 94 V-0) / Polycarbonate
Protection index	IP65

FACTORY DEFAULT SETTINGS	868MHZ	915MHZ
Frequency	869,525MHz	915,000MHz
Radio transmit power		27dBm
Radio transmission rate		76,8kbit/s
Wireless channel	13	26
Wireless network ID		13042017
Communication period		10 seconds
Reconnection period		30 minutes
Gateway modbus index		1
Analog inputs		OFF
Digital input trigger		Disable
Digital inputs		Disable
Sensor Input		PT100 3W
Digital output - Communication loss		OFF
Digital output - Remote output		OFF
Digital output - External supply		OFF
Operating mode		End Device

**CERTIFICATIONS AND APPROVALS**

EN 61326-1 - Class B - Industrial Requirements
EN 300 220-2 V3.1.1
EN 301 489-1 V2.2.1
EN 301 489-3 V2.1.1
EN 60950-1:2006
EN 61326-1:2013

**DIGITAL MEASURING ACCURACY**

**RESISTANCE THERMOMETER (RTD)**

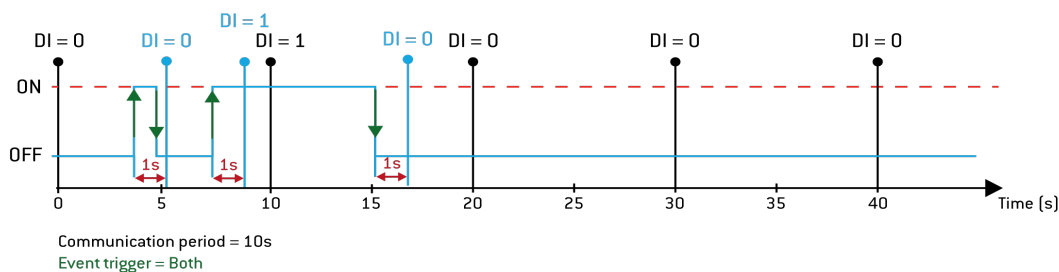
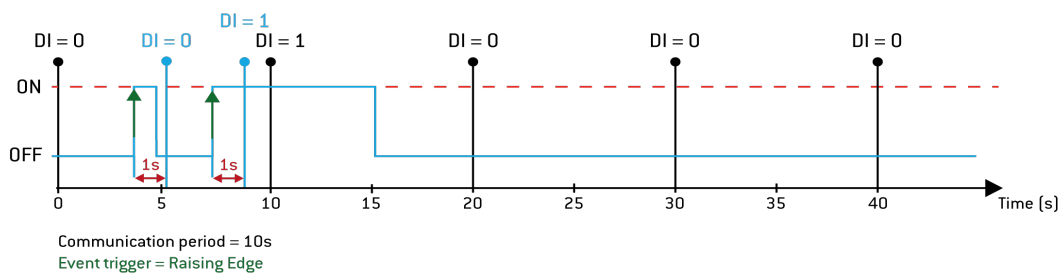
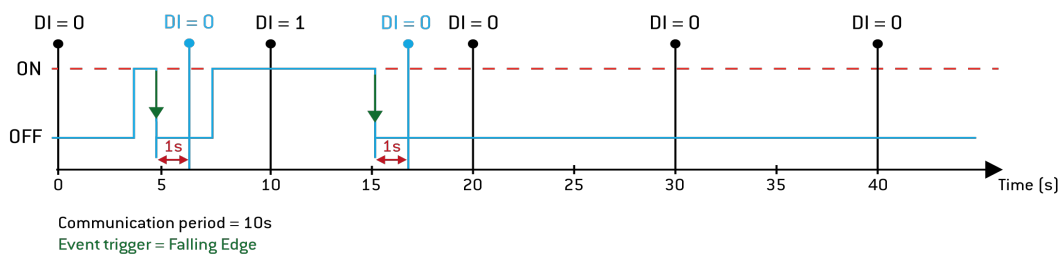
Sensor	Range °C	Accuracy °C	Resolution °C
PT100	-210 to 850	< ± 0,2	0,05

**THERMOCOUPLES (TC)**

Sensor	Range °C	Accuracy °C	Resolution °C
J	-210 to 1200	< ± 1,0	0,077
K	-270 to 1370	< ± 1,0	0,098
N	-270 to 1270	< ± 1,0	0,151
R	-50 to 1760	< ± 1,2	0,189
S	-50 to 1760	< ± 2,0	0,185
T	-270 to 400	< ± 1,0	0,026

**DIGITAL INPUTS**

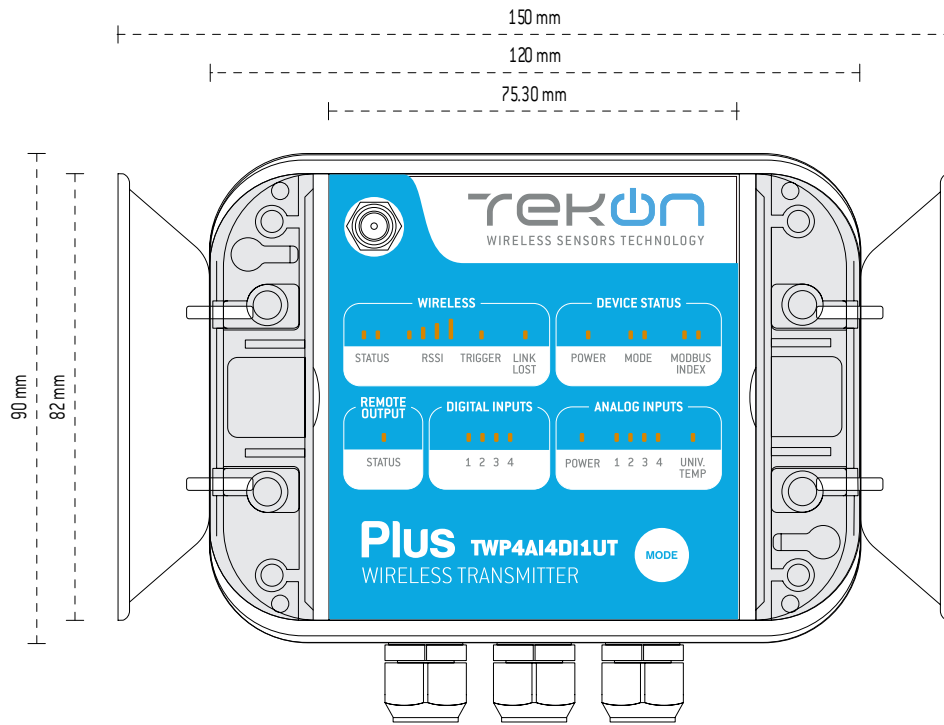
**TRANSMITTER DI OPERATION**



<sup>1</sup> Range depends on the RF propagation environment and Line of Sight (LoS). Always verify your wireless network's range by performing a Site Survey  
<sup>2</sup> Dependent on radio channel selection  
<sup>3</sup> Configurable  
<sup>4</sup> In some countries, the frequency band admitted is not so extended as the default range.  
<sup>5</sup> The radio frequencies admitted in Australia are available from channel 26 to channel 50.  
<sup>6</sup> It is recommended to use a power supply with short-circuit current protection or equipped with a fuse.

**TECHNICAL DRAWINGS**

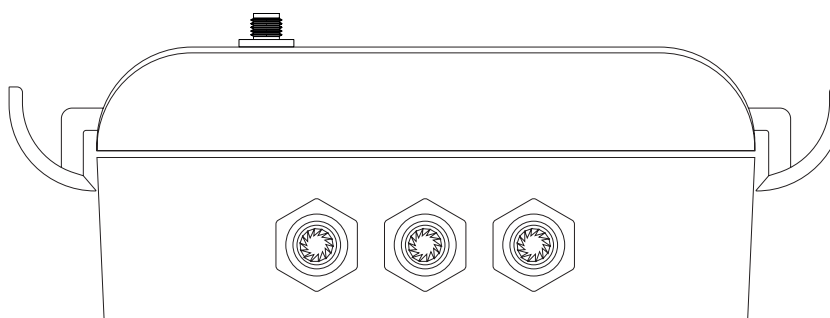
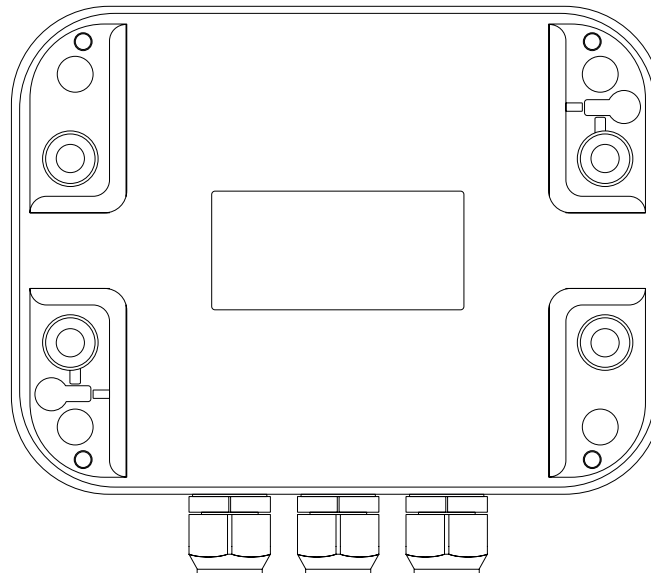
**DIMENSIONAL DRAWINGS AND INTERFACE DESIGN**



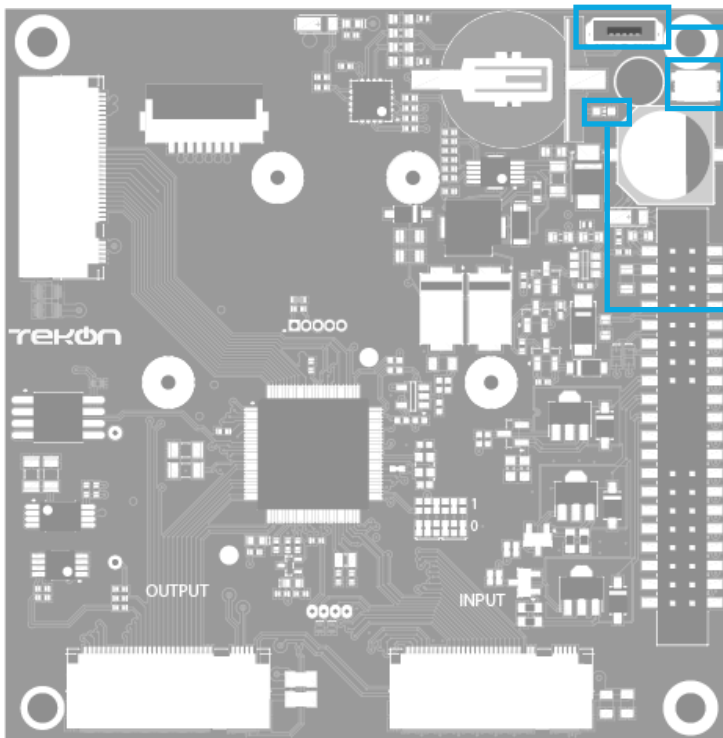
Front view



Rear view

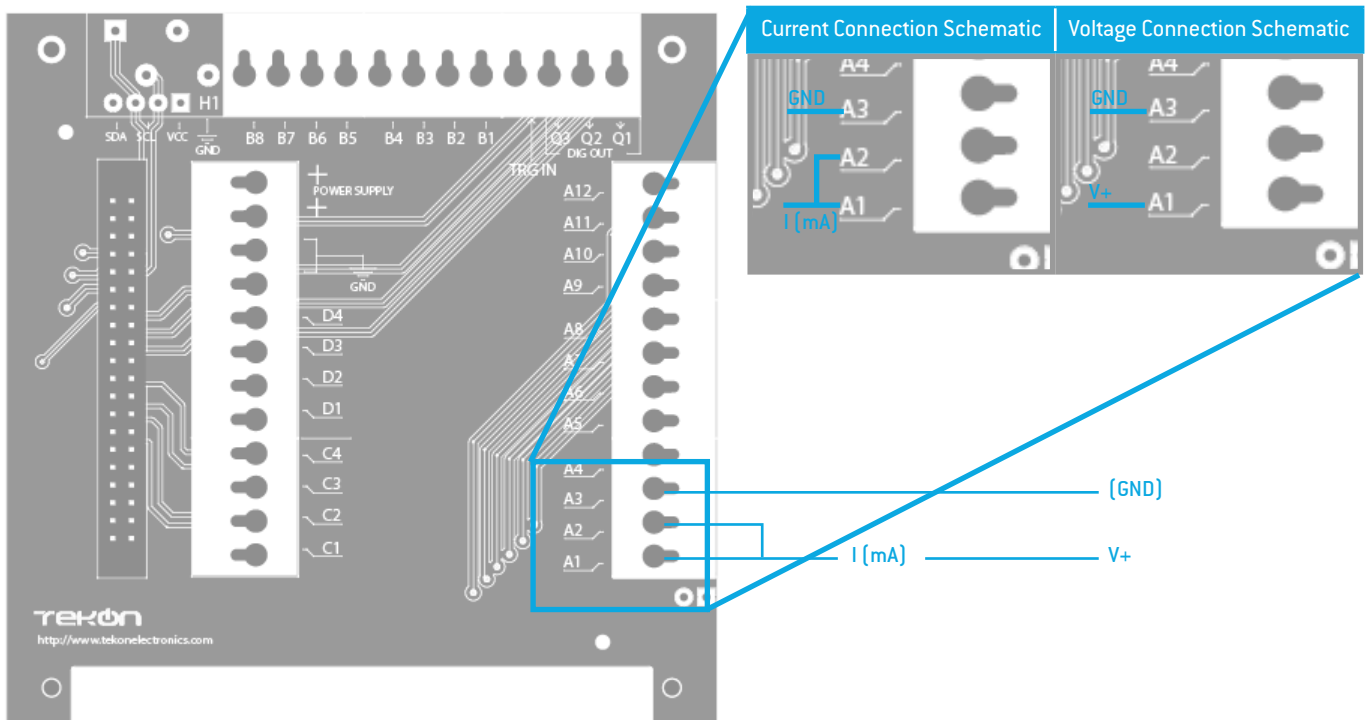


WIRING DIAGRAM

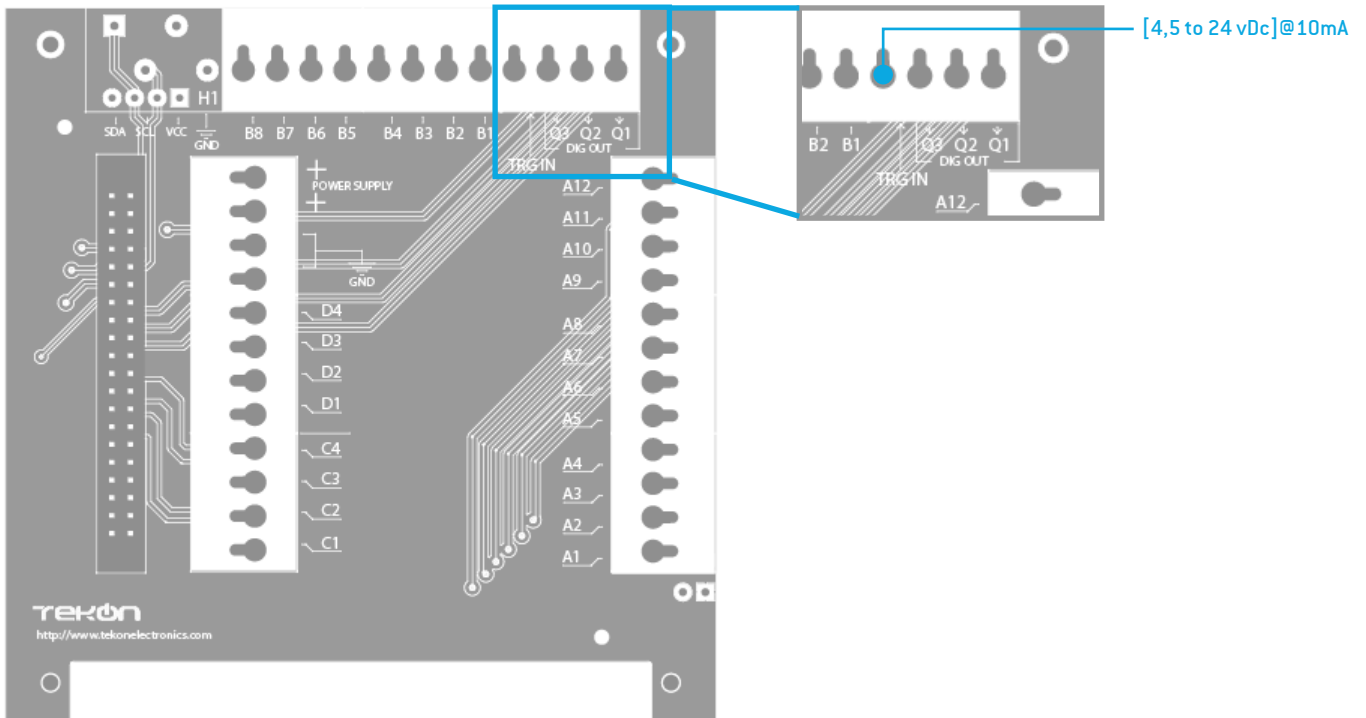


- USB Configuration Port**  
Allows Tekon device Configuration
- Load factory setting button (2 methods)**
  - Pressing this button during 3 seconds forces the factory settings load and reboot.
  - Power ON the device with the button pressed during 3 seconds forces the factory settings load and reboot
- Internal LED**

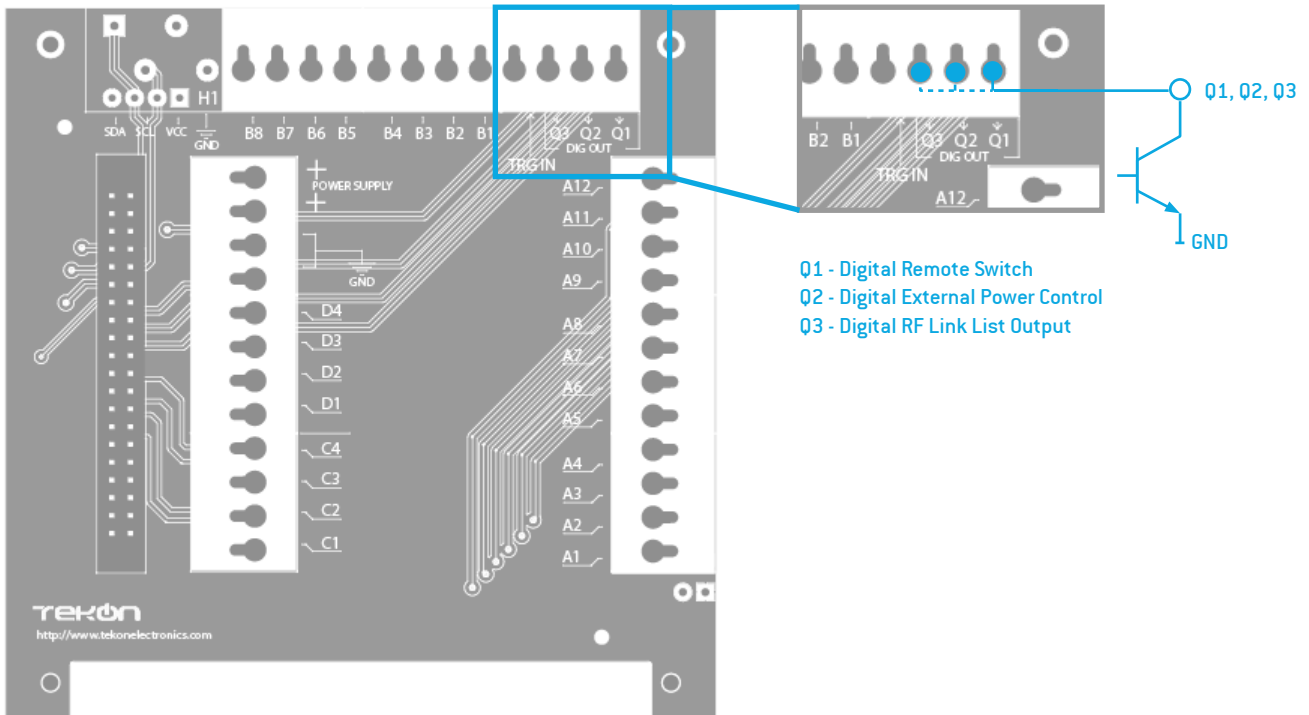
Analog Inputs



Digital Input Trigger - NPN - SINKING

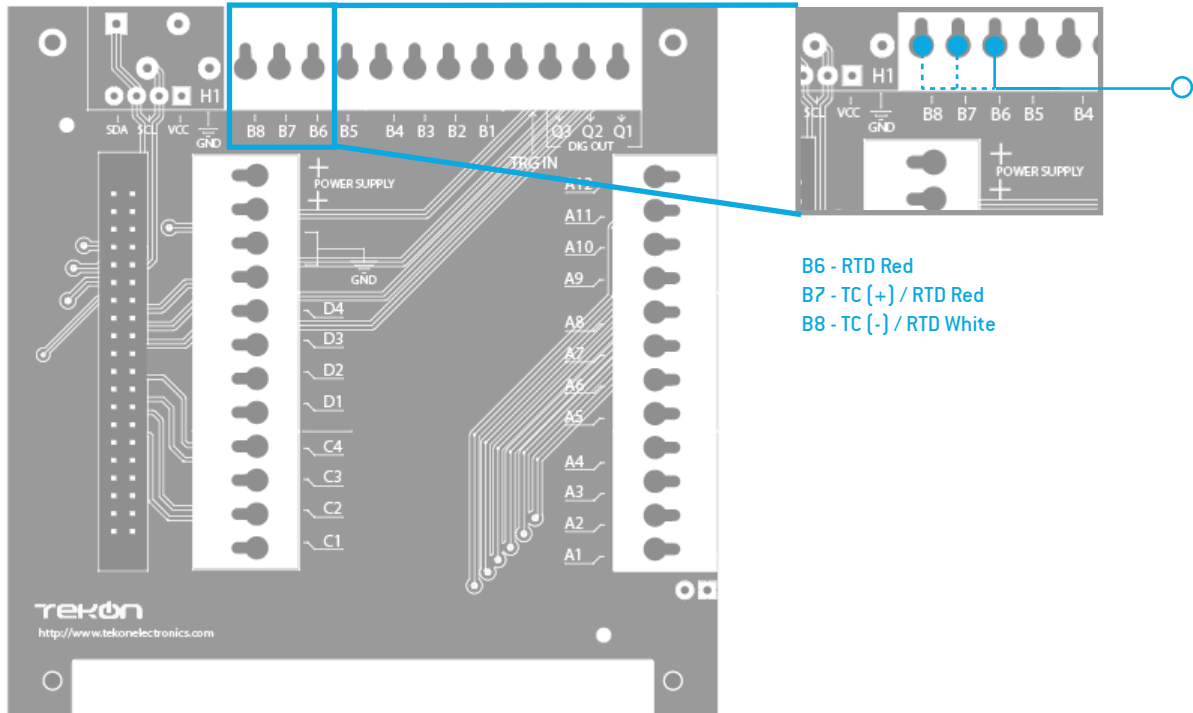


Digital Output - SINKING - NPN





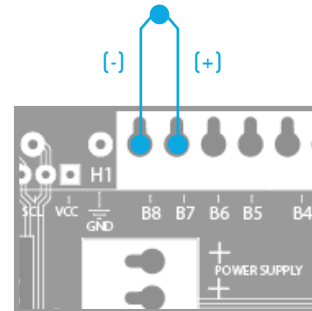
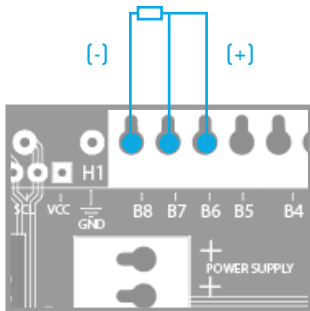
Universal Temperature Input



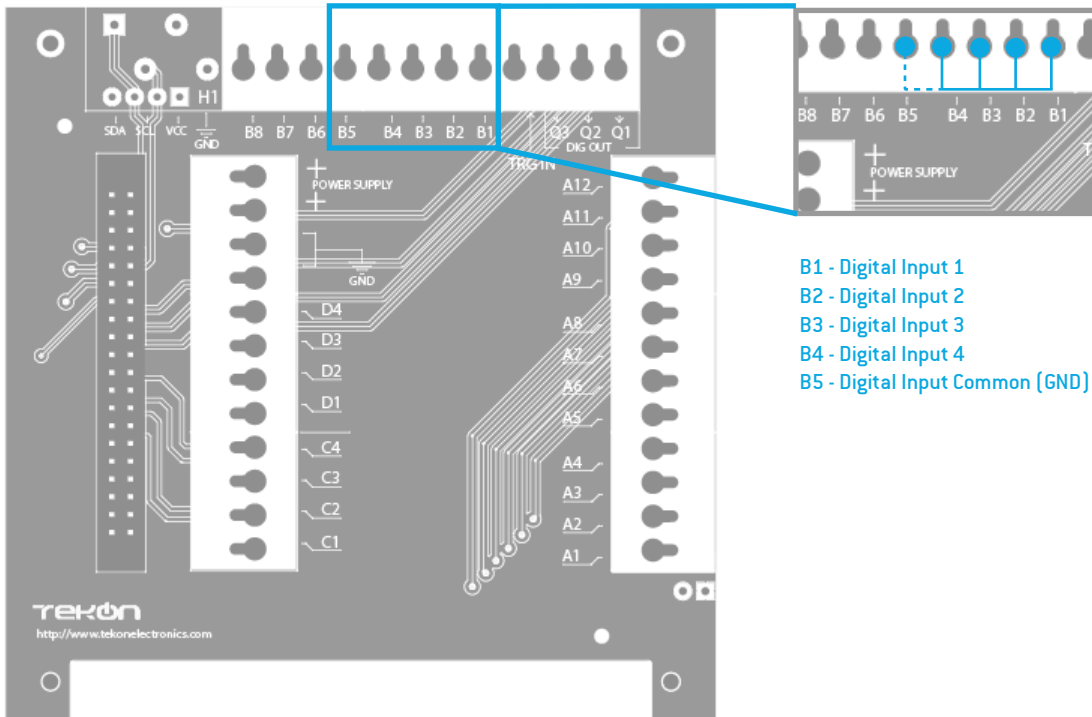
Universal Temperature Input - Physical connections

PT100 3 wire

Thermocouples



Digital Input - SINKING - PNP



Transmitter			
PIN		Functionality	
		Current Mode	Voltage Mode
A1	Analog Input 1	I (mA)	V+
A2		I (mA)	NC
A3		GND	GND
A4	Analog Input 2	I (mA)	V+
A5		I (mA)	NC
A6		GND	GND
A7	Analog Input 3	I (mA)	V+
A8		I (mA)	NC
A9		GND	GND
A10	Analog Input 4	I (mA)	V+
A11		I (mA)	NC
A12		GND	GND
B1	Digital Input 1		
B2	Digital Input 2		
B3	Digital Input 3		
B4	Digital Input 4		
B5	Digital Input Commons (GND)		
B6	Universal Temperature Input		
B7			
B8			

C1	Not used
C2	Not used
C3	Not used
C4	Not used
D1	Not used
D2	Not used
D3	Not used
D4	Not used
TRIG IN	Digital Trigger Input
Q1	Digital Remote Switch Output
Q2	Digital External Power Control Output
Q3	Digital RF Link Lost Output

**RELATED PRODUCTS**



**PLUS WGW420 WIRELESS GATEWAY 868 MHZ / 915 MHZ**

REF.: PA164510210 / PA164510220

- Scalable network up to 55 PLUS transmitters;
- Up to 4 Km communication distance (LoS) with 868 MHz/915 MHz and 128-bit AES encryption;
- Multiple networks with extra gateways and extra long range with several repeaters;
- Multi-hop mesh network with self-forming, self-healing and self-optimizing features;
- Modbus RTU communication protocol via RS-485 interface;
- 8 analog outputs (4..20 mA current loop);
- Simple and intuitive USB configuration via Tekon Configurator (free software);
- DIN rail mounting.



**PLUS WRP001 WIRELESS REPEATER 868 MHZ / 915 MHZ**

REF.: PA164510310 / PA164510320

- Up to 12 repeaters in series for extra-long range;
- Extra repeaters for network redundancy and robustness;
- Up to 4 Km communication distance (LoS) with 868 MHz/915 MHz and 128-bit AES encryption;
- Multi-hop mesh network with self-forming, self-healing and self-optimizing features;
- Simple and intuitive USB configuration via Tekon Configurator (free software).

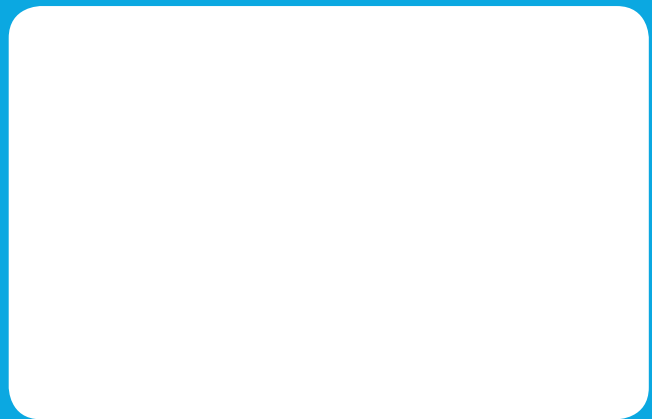
**REVISION HISTORY**

VERSION	
E01B	Revision of "Certifications and Approvals" table.
E01C	Inclusion of Reconnection Period on "Factory Default Settings Table"

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