

PLUS WGW420 WIRELESS GATEWAY



An easy-to-use system that allows wireless reception and transmission of any process variables that could be transformed into an analogue signal.

PLUS wireless system was designed to monitor 4..20 mA / 0..10V signals, providing a secure communication, without cable requirements of a complex wired solution.

Conductivity, PH, vibration, humidity, flow, level, pressure or temperature, are some examples of industrial process variables, possible to be monitored and controlled.

Dimensions: 36 x 90 x 56 mm

Weight: 135 g

Material: PA (UL 94 V-0) / Polycarbonate

Protection Index: IP40

KEY FEATURES

SCALABLE NETWORK

UP TO 55 PLUS TRANSMITTERS AND 12 REPEATERS

UP TO 4 KM COMMUNICATION DISTANCE (LOS)

MULTI-HOP MESH NETWORK

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

MODBUS RTU COMMUNICATION PROTOCOL

8 ANALOG OUTPUTS

4..20 MA CURRENT LOOP

MONITORING THE COMMUNICATION SIGNAL STATUS

SIMPLE AND INTUITIVE USB CONFIGURATION

TEKON CONFIGURATOR SOFTWARE

DS_PLUS_WGW420_E01C

TECHNICAL SPECIFICATIONS

RADIO SPECIFICATIONS	868MHZ	915MHZ
Range ¹	Up to 4Km LoS	
Frequency band ²	868 to 869 MHz	902 to 928 MHz
Number of channels	16	50
Receiver sensitivity ²	-97 to -110 dBm	-97 to -110 dBm
Transmit power ²	25 to 27 dBm	8 to 27 dBm
Transmission rate ²	19 to 76,8kbit/s	
Encryption method	AES 128 (Advanced Encryption Standard)	
Modulation	GFSK	
Antenna	Articulated dipole antenna	
Antenna connector	SMA	
Antenna impedance	50Ω	

WIRELESS NETWORK	
Maximum devices	55
Maximum hops	13

RS-485 COMMUNICATION	
Protocol	MODBUS RTU (Slave)
Baud rate	4,8 to 115,2kbit/s (configurable)
Parity	none/even/odd (configurable)
Stop bits	1 (even/odd parity) or 2 (none)
Addresses	1 to 247
Galvanic Isolation	1kV AC

POWER SUPPLY	
Supply voltage	12 to 24V DC ± 5%
Current consumption (max.)	100mA DC to 24V DC / 200mA DC to 12V DC
Protection	Against reversed polarity

ANALOG OUTPUT - CURRENT	
Output range	4 to 20mA
Maximum resistive load	360Ω @ 12V DC / 1kΩ @ 24V DC
Out of range	[3,2;4,0]mA and [20,0;20,2]mA
Error indication	3,1mA and 20,4mA
Update period	Equal to wireless communication period (transmitters)
Protection	Against reversed polarity

INTERFACE	
Indicators	Frontal Panel LED
Configuration	RS485 (through RS485 USB)

¹ Range depends on the RF propagation environment and Line of Sight (LoS). Always verify your wireless network's range by performing a Site Survey.

² According to the radio channel selection

MECHANICAL INTERFACE					
Maximum wire section	2,5mm ² (0,0984 in ²)				

OPERATING ENVIRONMENT	ENVIRONMENTAL CONDITIONS	STORAGE CONDITIONS
Temperature	0 to 80°C	-20 to 80°C
Relative humidity	N/A	≤ 95% (non- condensing)

CASING	
Dimensions	36 x 90 x 56 mm
Weight	135 g
Material	PA (UL 94 V-0) / Polycarbonate
Protection index	IP40

FACTORY DEFAULT SETTINGS	868MHZ	915MHZ
Frequency	869,525 MHz	904,000 MHz
Radio transmit power	27dBm	
Radio transmission rate	76,8kbit/s	
Wireless channel	13	4
Wireless network ID	Device Serial Number	
RS-485 baud rate	19,2kbit/s	
RS-485 parity	None	
RS-485 stop bits	2	
Modbus address	1	
RS-485 configuration specifications	19,2kbit/s, no parity, 2 stop bits	

CERTIFICATIONS AND APPROVALS	
EN 61326-1 - Class B - Industrial Requirements	
EN 300 220-2 V3.1.1	
EN 301 489-1 V2.2.0	
EN 301 489-3 V2.1.1	

MODBUS MAPPING					
HOLDING REGISTERS - TRANSMITTERS DATA					
Description	Address	Number of Words	Data Type	Data	
Serial Number	{Transmitter Modbus Index-1} x 20+0	2	UINT32	Transmitter serial number	
Transmitter Model	{Transmitter Modbus Index-1}x20+2	1	UINT16	868 MHZ - 09 - TWP4AI 24 - TWPH-1UT 37 - TWP4AI/4DI/1UT 915MHZ - 26 - TWP4AI 28 - TWPH-1UT 38 - TWP4AI/4DI/1UT ¹	
RSSI	{Transmitter Modbus Index-1}x20+3	1	UINT16	RSSI in dBm = RSSI / -2	
Communication Period	{Transmitter Modbus Index-1}x20+4	1	UINT16	Communication Period (seconds)	
Elapsed Time	{Transmitter Modbus Index-1}x20+5	1	UINT16	Elapsed Time since last communication (seconds)	
Power Voltage	{Transmitter Modbus Index-1}x20+6	1	UINT16	Volts = Power Voltage / 10	
Data 0	{Transmitter Modbus Index-1}x20+7	2	FLOAT32	Internal temperature [°C] ●▲; External temperature [°C] ■; ²	
Data 1	{Transmitter Modbus Index-1}x20+9	2	FLOAT32	Analog Input value 1 ●■; ³ External temperature [°C] ▲	

Data 2	{Transmitter Modbus Index-1}x20+11	2	FLOAT32	Analog Input value 2 ● ■; ³
Data 3	{Transmitter Modbus Index-1}x20+13	2	FLOAT32	Analog Input value 3 ● ■; ³
Data 4	{Transmitter Modbus Index-1}x20+15	2	FLOAT32	Analog Input value 4 ● ■; ³
FW Version Major Minor	{Transmitter Modbus Index-1}x20+17	1	UINT16	Transmitter Firmware Version ⁴
FW Version Revision	{Transmitter Modbus Index-1}x20+18	1	UINT16	Transmitter Firmware Version ⁴
HW Version Major Minor	{Transmitter Modbus Index-1}x20+19	1	UINT16	Transmitter Hardware Version ⁵

● TWP4AI ▲ TWPH-1UT ■ TWP4AI/4DI/1UT

HOLDING REGISTERS - ANALOG OUTPUTS				
Description	Address	Number of Words	Data Type	Data
Minimum Value	{Analog Output Index-1}x8+1100+0	2	FLOAT32	Minimum Input Value for current conversion 4mA
Maximum Value	{Analog Output Index-1}x8+1100+2	2	FLOAT32	Maximum Input Value for current conversion 20mA
Output Offset	{Analog Output Index-1}x8+1100+4	1	UINT16	Output current offset in uA [-1000 to 1000]
Attempts Number	{Analog Output Index-1}x8+1100+5	1	UINT16	Number of Communication Periods to signalize current output error (transmitter disconnected)
Modbus Address Link	{Analog Output Index-1}x8+1100+6	1	UINT16	Words to convert to current. (Start address of Modbus FLOAT32 (2 words) is considered for conversion)
Actual Current Value	{Analog Output Index-1}x8+1100+7	1	UINT16	Actual output analogue current [mA=Actual Current Value/100]

¹ Each transmitter model is codified with a unique ID number. Consult specified mapping tables for every transmitter model.

² Transmitter internal temperature in degrees Celsius.

³ Current in uA; Voltage in uV.

⁴ Firmware version: Major.Minor.Revision = 8 MSB.8 LSB.8 LSB

⁵ Hardware version: Major.Minor = 8 MSB.8 LSB

COILS REGISTERS

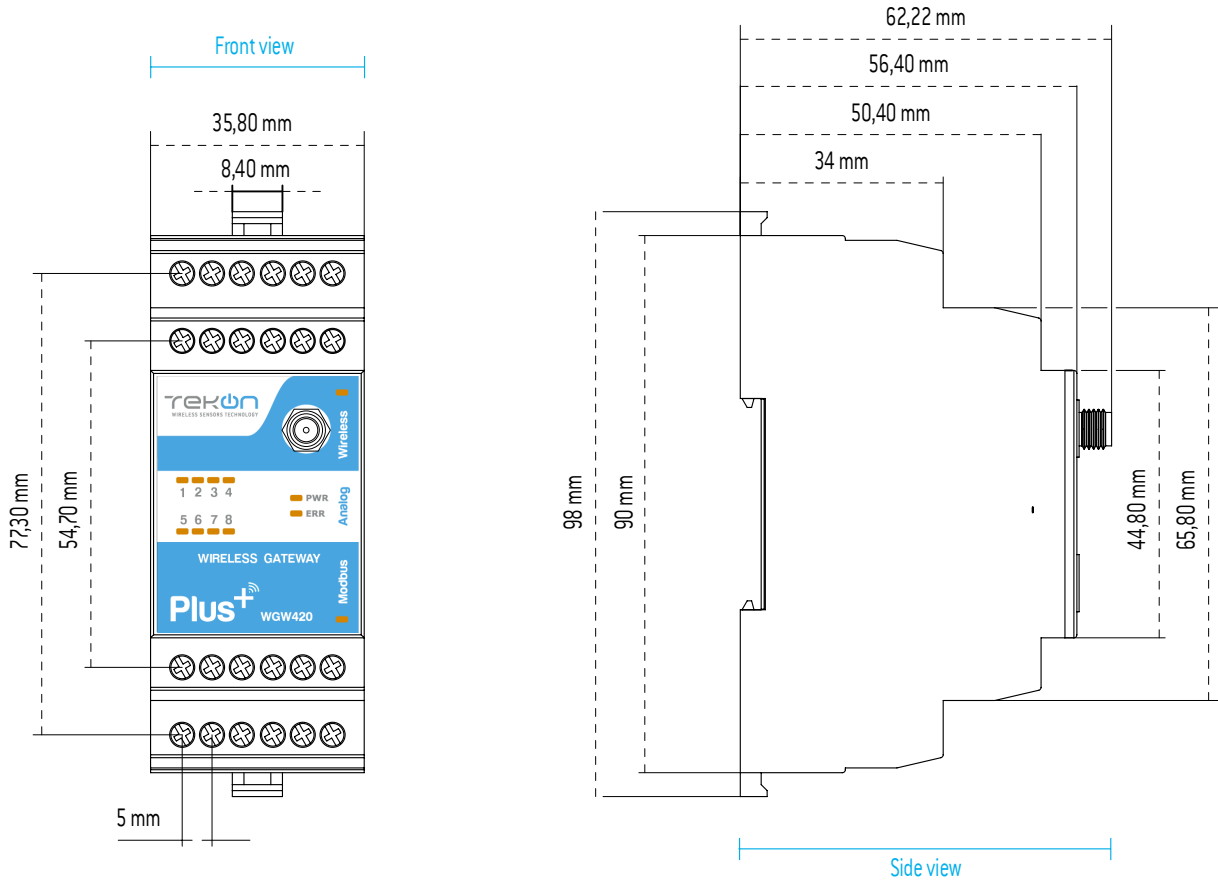
Description	Address	Data
Coil 0	{(Modbus Transmitter Index-1)x16}+0	Transmitter Remote control output controlled through Gateway ■
Coil 1	{(Modbus Transmitter Index-1)x16}+1	State of External Power Activation output to enable power-on of external devices ■
Coil 2	{(Modbus Transmitter Index-1)x16}+2	State of Trigger Input ■
Coil 3	{(Modbus Transmitter Index-1)x16}+3	Digital Input 1 state ■
Coil 4	{(Modbus Transmitter Index-1)x16}+4	Digital Input 2 state ■
Coil 5	{(Modbus Transmitter Index-1)x16}+5	Digital Input 3 state ■
Coil 6	{(Modbus Transmitter Index-1)x16}+6	Digital Input 4 state ■
Coil 7	{(Modbus Transmitter Index-1)x16}+7	-
Coil 8	{(Modbus Transmitter Index-1)x16}+8	-
Coil 9	{(Modbus Transmitter Index-1)x16}+9	-
Coil 10	{(Modbus Transmitter Index-1)x16}+10	-

Coil 11	$[(\text{Modbus Transmitter Index}-1) \times 16] + 11$	-
Coil 12	$[(\text{Modbus Transmitter Index}-1) \times 16] + 12$	-
Coil 13	$[(\text{Modbus Transmitter Index}-1) \times 16] + 13$	-
Coil 14	$[(\text{Modbus Transmitter Index}-1) \times 16] + 14$	-
Coil 15	$[(\text{Modbus Transmitter Index}-1) \times 16] + 15$	-

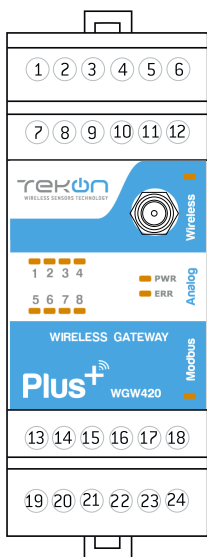
● TWP4AI ▲ TWP4AI/4DI/1UT ■ TWP4AI/4DI/1UT

TECHNICAL DRAWINGS

DIMENSIONAL DRAWINGS AND INTERFACE DESIGN



ELECTRICAL CONNECTIONS



POWER

19 20 21
- m +

RS-485

22 23 24
A GND B

POWER - [12;24] VDC

ANALOG OUTPUTS

- 4 - ANALOG OUTPUT INDEX 0
- 5 - ANALOG OUTPUT INDEX 1
- 6 - ANALOG OUTPUT INDEX 2
- 10 - ANALOG OUTPUT INDEX 3
- 11 - ANALOG OUTPUT INDEX 4
- 12 - ANALOG OUTPUT INDEX 5
- 16 - ANALOG OUTPUT INDEX 6
- 17 - ANALOG OUTPUT INDEX 7

1,2,3,7,8,13,14,15,18 - ANALOG GND

ANALOG OUTPUT LED CODING

LED state	Color	Meaning
Fixed	RED	Analog current loop is open
Blinking	GREEN	The output is in error. Could be out of range temperature, sensor damaged or communication lost. Please see the device status values over the Modbus.
Fixed	GREEN	Correct operation. Current loop is closed, communication between node and gateway OK and temperature range configured and measured is OK.

RELATED PRODUCTS



PLUS TWP4AI WIRELESS TRANSMITTER 868MHZ / 915MHZ

REF.: PA164510110 / PA164510120

- 4 configurable analog inputs (0..20 mA or 0..10 V) providing cable replacement features;
- 3 configurable digital outputs: generic, RF link lost indication and external power control;
- Configurable communication period and/or event trigger via digital input;
- Up to 4Km communication distance (LoS) with 868 MHz / 915 MHz and 128-bit AES encryption;
- Internal temperature, battery voltage and wireless link quality (RSSI) monitoring;
- Simple and intuitive USB configuration via Tekon Configurator (free software).



PLUS WRP001 WIRELESS REPEATER 868 MHZ / 915MHZ

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).



PLUS TWPH-1UT TEMPERATURE WIRELESS TRANSMITTER 868 MHZ / 915MHZ

REF.: PA164510510 / PA164510520

- Universal sensor input (RTD PT100; Thermocouples J, K,N, R, S, T);
- 6 status LED;
- Ultra low power mode;
- 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).

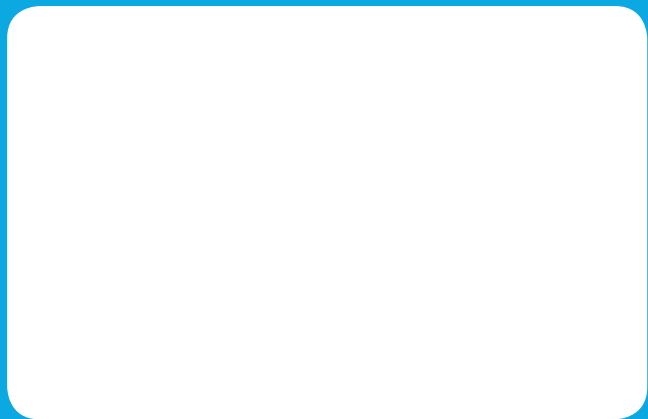
REVISION HISTORY

VERSION	
E01B	Addition of 915MHz frequency information in “Radio Specifications” and “Factory Default Settings” tables; Reform “Operating Environment” table; Revision of “Certifications and approvals” table; Remove “Led Indication” table to the installation guide;
E01C	Modbus addresses and coil registers update;

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