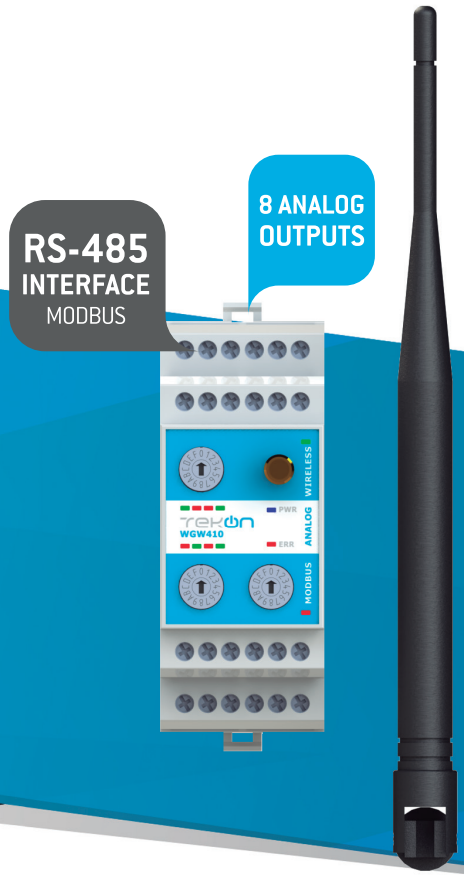
WIRELESS SENSORS TECHNOLOGY

WIRELESS MODBUS GATEWAY WGW410



The Tekon Wireless Modbus Gateway WGW410 is specifically designed to meet the most rigorous requirements of operation in the industrial process environments. Due to their reduced dimensions, they can be easily installed in junction boxes or in the control cabinet.

It receives the information transmitted by the Universal Wireless Temperature Transmitter THW401 and makes it available on the RS485 interface with Modbus protocol. Additionally, the first 8 addressed wireless transmitters can be read through the 4 to 20mA analog outputs.

Dimensions:	98mm x 66,22mm x 35,80mm
Weight:	120g
Material:	PA – UL 94 V0
Protection Index:	IP40

KEY FEATURES

SUPPORTS UP TO 16 THW401
TEMPERATURE TRANSMITTERS

UP TO 3.5 KM LINE OF SIGHT (LoS)
LONG DISTANCE RANGE COMMUNICATION

REAL TIME TRANSMISSION
PROCESS AND AMBIENT TEMPERATURE, RF SIGNAL STRENGTH AND BATTERY LEVEL

1 SECOND NETWORK REFRESH TIME

RS-485 INTERFACE WITH MODBUS PROTOCOL

8 X ANALOG OUTPUTS (4...20MA)

ON SITE BATTERY AND RF SIGNAL STRENGTH VERIFICATION

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TEKON ELECTRONICS | AVEIRO, PORTUGAL
P.: +351 234 303 320 M.: +351 939 992 222 E.: sales@tekonelectronics.com

TECHNICAL SPECIFICATIONS

	POWER SUPPLY
Voltage supply:	12 VDC to 24 VDC +/- 10%
Current consumption:	70 mA @ 12 VDC / 45 mA @ 24 VDC (@ 25 °C)
Power consumption:	0.85 W @ 12 VDC / 1.1 W @ 24 VDC (@ 25 °C)
Power up time:	900 ms

	RF TRANSMISSION
Transmission frequency:	2.4 GHz (worldwide)
Transmission interval:	60 ms per remote node
Maximum output power:	18 dBm
Sensitivity:	-108 dBm
Open air range:	3.5 Km LoS

	RS-485 INTERFACE
Protocol:	Modbus RTU
Baud rate:	[4800; 115200] Kbps
Galvanic isolation:	1KV

	ANALOG OUTPUTS
Output signal:	4 to 20 mA
Max. load:	360 Ω @ 12VDC / 1 KΩ @ 24VDC
Out of range:	[3.2;4.0] mA and [20.0;20.2] mA
Fault signal (e.g. sensor fault):	3.1.mA or 20.4 mA
Sample cycle:	1s to 24h (configurable)
Protection:	Against reversed polarity Surge protection
Power on or reset initial value:	Last written value

	FACTORY SETTINGS
Net ID:	0x01
RS-485:	0x01
Baud rate:	9600 Kbps
Sensor probe type:	2 (Pt100 – 3 wires)
Sensor transmission interval:	10s

	CASING
Material:	PA – UL 94 V0
Color:	RAL 7035
Weight:	120 g
Cross-section of cables:	2.5mm^2
Protection type:	IP40
Antenna connection:	SMA Reverse Polarity

	AMBIENT CONDITIONS
Ambient temperature range:	-20 to 80 °C (-4 to 176 °F)
Storage temperature range:	-20 to 80 °C (-4 to 176 °F)
Relative humidity:	≤ 95 %, without condensation

	CERTIFICATIONS AND APPROVALS
EN 61326	Electrical equipment for measurement, control and laboratory use. EMC requirements.
IEC 61000-4-2	Electrostatic discharge immunity test
IEC 61000-4-3	Radiated, Radio-Frequency, Electromagnetic Field Immunity test
IEC 61000-4-4	Electrical fast transient/brust immunity test
IEC 61000-4-5	Surge Immunity Test
EN 300 228	Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive
EN 300 440	Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices; Radio equipment to be used in the 1 GHz to 40 GHz frequency range; Part 2: Harmonized EN under article 3.2 of the R&TTE Directive

MODBUS HOLDING REGISTER TABLE (FUNCTION 0X03 – READ HOLDING REGISTER; FUNCTION 0X10 – WRITE HOLDING REGISTER) FOR OTA (OVER THE AIR CONFIGURATION) - THW401

Description	Sensor temperature in °C x 100	Transmission interval in seconds	Sensor probe type (see table below)	Node Model (see table below)	Battery Voltage in Volts x 100	RSSI in dBm	Information life time in seconds	Board temperature in °C x 100
Variable type	INT32	UINT32	UINT16	UINT16	UINT16	UINT16	UINT32	INT16
Address	Node Offset [1]	Node Offset + 18	Node Offset + 20	Node Offset +21	Node Offset + 22	Node Offset + 23	Node Offset + 24	Node Offset + 26
Permissions	Read	Read/Write	Read/Write	Read	Read	Read	Read	Read
Range	According to sensor type	[0 to 86400]	[1 to 99]	[1 to 99]	[3.00 to 20.00]	[70 to 180]	[0 to 86400]	[-20.00 to 80.00]
Node 0	0	18	20	21	22	23	24	26
Node 1	27	45	47	48	49	50	51	53
Node n	n*27	(n*27)+18	(n*27)+20	(n*27)+21	(n*27)+22	(n*27)+23	(n*27)+24	(n*27)+26

Sensor probe type	Code
PT100 - 2 Wires	1
PT100 - 3 Wires	2
PT100 - 4 Wires	3
PT500 - 2 Wires	4
PT500 - 3 Wires	5
PT500 - 4 Wires	6
PT1000 - 2 Wires	7
PT1000 - 3 Wires	8
PT1000 - 4 Wires	9

Sensor probe type	Code
Thermocouple K	10
Thermocouple J	11
Thermocouple T	12
Thermocouple S	13
Thermocouple R	14
Thermocouple N	15
Thermocouple B	16
Thermocouple E	17

End node models	Code
THW401	2

[1] Node Offset = [NodeID x 27]

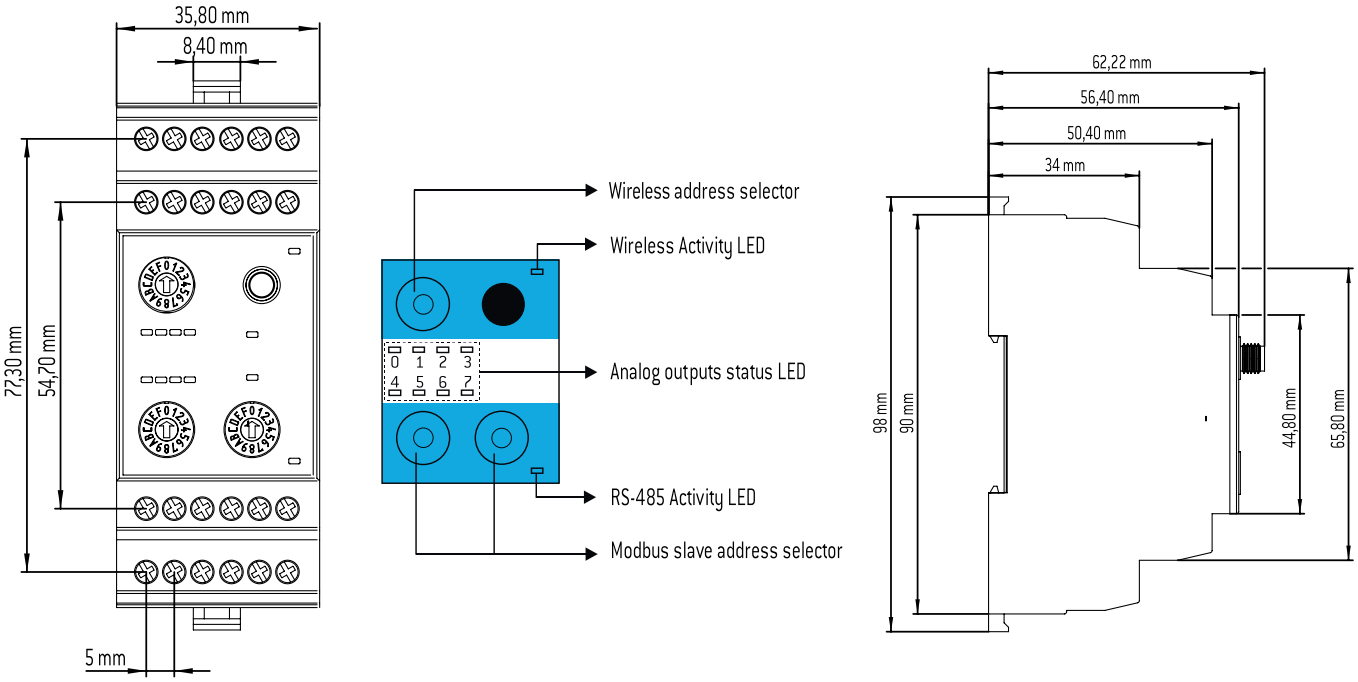
MODBUS HOLDING REGISTER TABLE (FUNCTION 0X03 – READ HOLDING REGISTER; FUNCTION 0X10 – WRITE HOLDING REGISTER) FOR ANALOG OUTPUT CONFIGURATION

Description	Input Minimum Value	Input Maximum Value	Number of failed messages to alarm	Modbus Output Address Link	Alarms	Damaged Sensor current signal	Communication failure current signal	Device Status	Temperature *100	Output current
Variable type	INT16	INT16	UINT16	UINT16	UINT16	UINT16	UINT16	UINT16	INT32	UINT16
Address	Analog Offset [2]	Analog Offset + 1	Analog Offset + 2	Analog Offset +3	Analog Offset +4	Analog Offset + 5	Analog Offset + 6	Analog Offset + 7	Analog Offset + 8	Analog Offset + 10
Permissions	Read/Write	Read/Write	Read/Write	Read only	Read only	Read only	Read only	Read only	Read only	Read only
Range	Temperature that defines 4mA	Temperature that defines 20mA	2...10	N/A	0 ... 3	204 (20.4mA)	310 (3.10mA)	1 ... 4	N/A	N/A
Info	Min. temperature read (°C)	Max. temperature read (°C)	Time refresh cycles to alarm	Additional Modbus Address to read temperature	0: All Off 1: Sensor On +Com. Fail Off 2: Sensor Off + Com Fail On 3: Sensor On + Com Fail On	Output current when sensor is damaged (mA) x 100	Output current when communication alarm condition is reached (mA) x 100	Device status code: 1 – Normal Operation; 2 – Sensor Damaged 3 – Sensor OK but temperature out of range 4 - Com. error	Sensor read temperature (converted to °C x 100)	Output current equivalent to given temperature (mA) x 100
Default Values	0	100	3		3	204	310	N/A	N/A	N/A
Output 0	432	433	434	435	436	437	438	439	440	442
Output 1	443	444	445	446	447	448	449	450	451	453
Output 2	454	455	456	457	458	459	460	461	462	464
Output 3	465	466	467	468	469	470	471	472	473	475
Output 4	476	477	478	479	480	481	482	483	484	486
Output 5	487	488	489	490	491	492	493	494	495	497
Output 6	498	499	500	501	502	503	504	505	506	508
Output 7	509	510	511	512	513	514	515	516	517	519

[2] Analog Offset = [432 + Analog IDx11]

TECHNICAL DRAWINGS

DIMENSIONAL DRAWINGS AND INTERFACE DESIGN

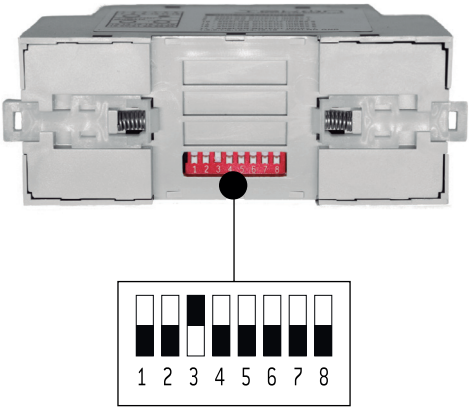


MODBUS CONFIGURATION

BAUDRATE (BPS)	Pin 1	Pin 2	Pin 3
4800	OFF	OFF	OFF
9600	OFF	OFF	ON
14400	OFF	ON	OFF
19200	OFF	ON	ON
38400	ON	OFF	OFF
56000	ON	OFF	ON
57600	ON	ON	OFF
115200	ON	ON	ON

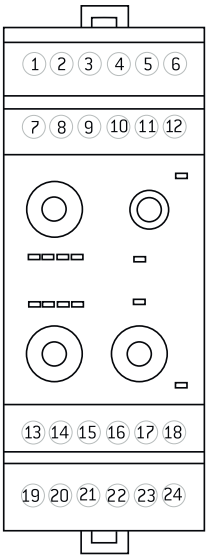
PARITY	Pin 4	Pin 5
None	OFF	OFF
Even	OFF	ON
Odd	ON	OFF
None	ON	ON

STOP BITS	Pin 6
One	ON
Two	OFF



Note:
1. Pin 7 is reserved for future use.
2. Pin 8 at ON state connects an internal 120Ω resistance for line adaptation.

ELECTRICAL CONNECTIONS



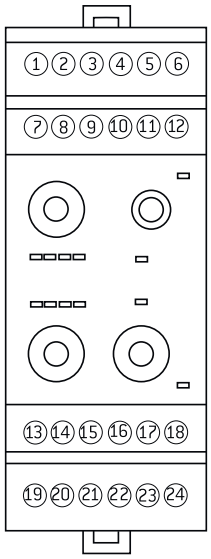
POWER

19	20	21
-	⏚	+

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 rage temperature configured and measured is OK.

TEKON ELECTRONICS

Tekon Electronics is an European brand, specialized in the manufacture and development of innovative wireless sensors technology.

It is a business unit of Bresimar Automação, S.A., with over 30 years of experience in automation, industrial control solutions and engineering.