

TK-UGW-ABS

UNIVERSAL IoT GATEWAY



Universal IoT Gateway connects sensors and other devices to the cloud. This allows you to view applications and devices status in an IoT platform to get real-time insights and notifications.

Accelerate your business digitalization and quick access to data without complexity and high technical expertise. This versatile gateway is your go-to solution to speed up Industrial IoT applications.

Product References

	with GSM	without GSM
868MHz	PA222410102	PA222410100
915MHz	PA222410103	PA222410101

KEY FEATURES

WIRELESS COMMUNICATION

WI-FI AND 3G/4G

INDUSTRIAL COMMUNICATION

MODBUS RS485 AND MODBUS TCP/IP

TEKON WIRELESS SOLUTIONS

NETWORKS WITH DUOS AND PLUS TRANSMITTERS

IOT PLATFORMS

NATIVE INTEGRATION WITH TEKON IOT PLATFORM AND THIRD-PARTY SOLUTIONS

DATA INTEGRATION

MQTT AND NODE-RED

DATA LOGGING

MEMORY FOR DATA STORAGE

REMOTE UPDATE

DS_GATEWAY_UNIVERSAL_IOT_E01B

TECHNICAL SPECIFICATIONS

RADIO SPECIFICATIONS	868MHZ	915MHZ
Range ¹	Up to 4 Km LoS	
Minimum communication distance	3 m @ 27 dBm	3 m @ 27 dBm
Radio transmit power ²	0 to 27 dBm	8 to 27 dBm
Radio receiver sensitivity ²	-97 to -110 dBm	
Frequency band ²	868 to 869 MHz	902 to 928 MHz ³
Radio channels	16	50 ⁴
Radio transmission rate ²	1,2 to 76,8 kbit/s	
Modulation	GFSK	
Encryption method	AES 128 (Advanced Encryption Standard)	

WIRELESS NETWORK

Maximum devices	55 for DUOS family + 55 for PLUS family
Maximum hops	13

ANTENNA

ANTENNA	868MHZ	915MHZ
Range	$\frac{1}{4} \lambda$ dipole with SMA connector, 50 Ohms and +3 dBi gain	

SUPPLY VOLTAGE

External power supply from 12 to 30 V DC
Minimum current draw of 300 mA at 12V / Maximum current draw of 600 mA at 12V ²

INTERFACE

Serial Port	1x 3-input RS485 terminal block
Ethernet Communication	2x RJ45 ports
Display	1x 1.8" TFT LCD 128 x 160 color pixels
Power Supply	1x 2-input terminal block
Wireless Connection	1x WiFi Access Point
Reset button	hold during 3 seconds
Cellular Connection	1x Nano SIM Card for 3G/4G

USER INTERFACE FUNCTIONALITIES

Device configuration
Network settings
Cloud settings
Cellular settings
Modbus (RTU and TCP/IP) settings
Data visualization and analysis
Alarms and notifications
FW and SW updates

SYSTEM

CPU	Arm Quad Core Cortex-A72 64-bit SoC
Memory	16 GB eMMC flash
Mobile	3G/4G cellular Modem (optional)

SERIAL COMMUNICATION (RS-485)

Protocol	Modbus RTU: master (optional) and slave modes
Interface	2-wire RS-485
Baud rates	4,8k to 115,2k
Data format	8 data bits, no parity/even/odd, 1/2 stop bit
Available modbus addresses	1 to 247

ETHERNET PORT 0

Interface	RJ45
Speed	1 Gbps
IP address	Dynamic (provided by network DHCP server)
HTTP/HTTPS Proxy	Configurable
NTP	Configurable
DNS	Configurable

ETHERNET PORT 1

Protocol	Modbus TCP/IP: client (optional) and server modes
Interface	RJ45
Speed	100 Mbps
IP address	Dynamic (provided by network DHCP server)

CELLULAR COMMUNICATION (OPTIONAL)

Nano SIM card port available
APN, username and password configurable in the user interface
3G and 4G available
Worldwide compatible

WI-FI COMMUNICATION

SSID and password configurable in the user interface
AP and client modes available and configurable in the user interface

IOT CONNECTIVITY

Integration with Tekon IoT Platform via REST API
Integration with third-party IoT platforms via MQTT broker and Node-Red (optional)
Data sent by Ethernet, Wi-Fi or GSM

DEVICE STORAGE

Integrated memory for data storage
Data from Tekon DUOS and PLUS wireless systems
Generic data from third-party equipment (via Modbus)

CASING

Dimensions	131 x 51 x 131 mm
Weight	450 g
Material	ABS UL94HB
Protection index	IP40

OPERATING ENVIRONMENT

-10 °C to 50 °C
95% maximum relative humidity (non-condensing)

FACTORY DEFAULT SETTINGS	868MHZ	915MHZ
Frequency	869,525 MHz	915,000 MHz
Radio Transmit Power	27 dBm	
Radio Transmission Rate	76,8 kbit/s	
Wireless Channel	13	26
Wireless Network ID	Device serial number	
Serial Communication	RS-485 / Modbus	
Modbus RTU over RS485 (slave mode)		
PLUS slave address	2	
DUOS slave address	1	
Baudrate(config) Bits Parity Stop	19200 8 None 2	
Modbus TCP/IP (server mode)		
IP address	192.168.100.1	
PLUS port	502	
DUOS port	503	

ETH0

IP Address	DHCP
HTTP/HTTPS proxy	none
NTP server	time3.google.com

WEB INTERFACE ACCESS

Login	admin
Password	tekon

WI-FI ACCESS POINT

IP	192.168.128.1
SSID	TekonGTW_<serialNumber>
DHCP	Enabled

CERTIFICATIONS AND APPROVALS

2014/53/EU (RED Directive)
2011/65/EU (RoHS2 Directive)
2014/30/EU (EMC Directive)
Validation standards:
EN 61000-4-2:2012
EN 61000-4-3:2012
EN 61000-4-4:2012
EN 61000-4-5:2012
EN 61000-4-6:2012

MODBUS REGISTER CONFIGURATION - DUOS WIRELESS SOLUTION

The following table presents the MODBUS register configuration and the presented values can be changed in accordance with the transmitter model in use.

	DESCRIPTION	ADDRESS	NUMBER OF WORDS	DATA TYPE	DATA
TRANSMITTER 0	Transmitter model	0	1	UINT16	868MHz: 03 - DUOS Temp 11 - DUOS Hygrotemp 12 - DUOS DI+Temp 13 - DUOS CO ₂ 868MHz: 59 - DUOS inHygrotemp 60 - DUOS inCO ₂ 61 - DUOS inAir 62 - DUOS inTemp 67 - DUOS uTemp 915MHz: 29 - DUOS Temp 30 - DUOS Hygrotemp 31 - DUOS DI+Temp 32 - DUOS CO ₂ 915MHz: 63 - DUOS inHygrotemp 64 - DUOS inCO ₂ 65 - DUOS inAir 66 - DUOS inTemp 68 - DUOS uTemp
	Probe sensor model	1	1	UINT16	01 - TK9808 02 - TK07 03 - TK939 04 - TK871 255 - UNKNOWN 8 - TK280 9 - TK895 10 - PT100 2W 11 - PT100 3W 12 - PT100 4W 13 - PT500 2W 14 - PT500 3W 15 - PT500 4W 16 - PT1000 2W 17 - PT1000 3W 18 - PT1000 4W 19 - TC J 20 - TC K 21 - TC R 22 - TC S 23 - TC T 24 - TC N 25 - TC C 26 - Ohm 27 - mV 28 - TK8095 29 - TK30 255 - UNKNOWN
	RSSI	2	1	UINT16	RSSI RSSI in dBm = RSSI/-2
	Communication period	3	1	UINT16	Transmitter' communication period in seconds
	Elapsed time	4	1	UINT16	Transmitter' time without communicating (in seconds)
	Power supply voltage	5	1	UINT16	Power supply voltage Volts = Power supply voltage/10
	FW version Major Minor	6	1	UINT8 UINT8	Firmware version Major Minor
	FW Version Revision	7	1	UINT16	Firmware version Revision (LSB)
	HW Version Major Minor	8	1	UINT8 UINT8	MAJOR MINOR
	Data 0	9	2	DOUBLE 32	Internal temperature [°C]
TRANSMITTER 0	Data 1	11	2	DOUBLE 32	DUOS Temp, DUOS Hygrotemp, DUOS DI+Temp - External temperature [°C] DUOS CO ₂ , DUOS inCO ₂ - CO ₂ [ppm] DUOS uTemp - External temperature [°C] (if sensor model ID between 10 and 25); Ohm [Ω] (if sensor model ID = 26); mV [mV] (if sensor model ID = 27) DUOS inHygrotemp, DUOS inAir - Relative humidity [%] DUOS inTemp - Digital Input [0 1 2 3 4 5] Little endian byte swap format
	Data 2	13	2	DOUBLE 32	DUOS Hygrotemp - Relative humidity [%] DUOS DI+Temp, DUOS uTemp, DUOS inHygrotemp - Digital Input [0 1 2 3 4 5] DUOS CO ₂ , DUOS inCO ₂ - Average CO ₂ [ppm] DUOS inAir - CO ₂ [ppm] Little endian byte swap format
	Data 3	15	2	DOUBLE 32	DUOS inCO ₂ - Barometric pressure [mbar] DUOS inAir - Average CO ₂ [ppm]
	Data 4	17	2	DOUBLE 32	DUOS inCO ₂ - Digital Input [0 1 2 3 4 5] DUOS inAir - Barometric pressure [mbar]
	Data 5	19	2	DOUBLE 32	DUOS inAir - Digital Input [0 1 2 3 4 5]

MODBUS ADDRESSING CONVENTION - DUOS WIRELESS SOLUTION

MEASUREMENTS	FORMULA
Transmitter model	$(\text{Transmitter Device ID} - 1) \times 21$
Probe sensor model	$(\text{Transmitter Device ID} - 1) \times 21 + 1$
RSSI	$(\text{Transmitter Device ID} - 1) \times 21 + 2$
Communication period	$(\text{Transmitter Device ID} - 1) \times 21 + 3$
Elapsed time	$(\text{Transmitter Device ID} - 1) \times 21 + 4$
Supply voltage	$(\text{Transmitter Device ID} - 1) \times 21 + 5$
Firmware Major Minor	$(\text{Transmitter Device ID} - 1) \times 21 + 6$
Firmware Revision	$(\text{Transmitter Device ID} - 1) \times 21 + 7$
Hardware version Major Minor	$(\text{Transmitter Device ID} - 1) \times 21 + 8$
Data 0	$(\text{Transmitter Device ID} - 1) \times 21 + 9$
Data 1	$(\text{Transmitter Device ID} - 1) \times 21 + 11$
Data 2	$(\text{Transmitter Device ID} - 1) \times 21 + 13$
Data 3	$(\text{Transmitter Device ID} - 1) \times 21 + 15$
Data 4	$(\text{Transmitter Device ID} - 1) \times 21 + 17$
Data 5	$(\text{Transmitter Device ID} - 1) \times 21 + 19$

* Transmitter Device ID [1-55]

MODBUS REGISTER CONFIGURATION - PLUS WIRELESS SOLUTION

HOLDING REGISTERS - TWP4AI TRANSMITTER DATA					
DESCRIPTION	ADDRESS $(\text{Transmitter Modbus Index} - 1) \times 20 + x$	NUMBER OF WORDS	DATA TYPE	DATA	
Serial Number	0	2	UINT32 ⁵	Transmitter serial number	
Transmitter Model	2	1	UINT16	868 MHZ - 09 - TWP4AI ⁶ 915 MHZ - 26 - TWP4AI ⁶	
RSSI	3	1	UINT16	RSSI in dBm = RSSI / -2	
Communication Period	4	1	UINT16	Communication Period (seconds)	
Elapsed Time	5	1	UINT16	Elapsed Time since last communication (seconds)	
Power Voltage	6	1	UINT16	Volts = Power Voltage / 10	
Data 0	7	2	FLOAT32 ⁵	Internal temperature [°C] ⁷	
Data 1	9	2	FLOAT32 ⁵	Analog Input value 1 ⁸	
Data 2	11	2	FLOAT32 ⁵	Analog Input value 2 ⁸	
Data 3	13	2	FLOAT32 ⁵	Analog Input value 3 ⁸	
Data 4	15	2	FLOAT32 ⁵	Analog Input value 4 ⁸	
FW Version Major Minor	17	1	UINT16	Transmitter Firmware Version ⁹	
FW Version Revision	18	1	UINT16	Transmitter Firmware Version ⁹	
HW Version Major Minor	19	1	UINT16	Transmitter Hardware Version ¹⁰	

HOLDING REGISTERS - TWP-1AI TWP-2AI TRANSMITTERS DATA					
DESCRIPTION	ADDRESS $(\text{Transmitter Modbus Index} - 1) \times 20 + x$	NUMBER OF WORDS	DATA TYPE	DATA	
Serial Number	0	2	UINT32 ¹	Transmitter serial number	

Transmitter Model	2	1	UINT16	868 MHZ - 47 - TWP-1AI 48 - TWP-2AI ⁶ 915 MHZ - 53 - TWP-1AI 54 - TWP-2AI ⁶
RSSI	3	1	UINT16	RSSI in dBm = RSSI / -2
Communication Period	4	1	UINT16	Communication Period (seconds)
Elapsed Time	5	1	UINT16	Elapsed Time since last communication (seconds)
Power Voltage	6	1	UINT16	Volts = Power Voltage / 10
Data 0	7	2	FLOAT32 ⁵	Internal temperature [°C] ⁷
Data 1	9	2	FLOAT32 ⁵	Analog Input value 1 ⁸
Data 2	11	2	FLOAT32 ⁵	Analog Input value 2 (*) ⁸
Data 3	13	2	FLOAT32 ⁵	-
Data 4	15	2	FLOAT32 ⁵	-
FW Version Major Minor	17	1	UINT16	Transmitter Firmware Version ⁹
FW Version Revision	18	1	UINT16	Transmitter Firmware Version ⁹
HW Version Major Minor	19	1	UINT16	Transmitter Hardware Version ¹⁰

(*) Only available on TWP-2AI

HOLDING REGISTERS - TWP-4AI4DI1UT TRANSMITTER DATA				
DESCRIPTION	ADDRESS (Transmitter Modbus Index-1) x 20+x	NUMBER OF WORDS	DATA TYPE	DATA
Serial Number	0	2	UINT32 ⁵	Transmitter serial number
Transmitter Model	2	1	UINT16	868 MHZ - 37 - TWP4AI/4DI/1UT ⁶ 915 MHZ - 38 - TWP4AI/4DI/1UT ⁶
RSSI	3	1	UINT16	RSSI in dBm = RSSI / -2
Communication Period	4	1	UINT16	Communication Period (seconds)
Elapsed Time	5	1	UINT16	Elapsed Time since last communication (seconds)
Power Voltage	6	1	UINT16	Volts = Power Voltage / 10
Data 0	7	2	FLOAT32 ⁵	External temperature [°C]
Data 1	9	2	FLOAT32 ⁵	Analog Input value 1 ⁸
Data 2	11	2	FLOAT32 ⁵	Analog Input value 2 ⁸
Data 3	13	2	FLOAT32 ⁵	Analog Input value 3 ⁸
Data 4	15	2	FLOAT32 ⁵	Analog Input value 4 ⁸
FW Version Major Minor	17	1	UINT16	Transmitter Firmware Version ⁹
FW Version Revision	18	1	UINT16	Transmitter Firmware Version ⁹
HW Version Major Minor	19	1	UINT16	Transmitter Hardware Version ¹⁰

HOLDING REGISTERS - TWP-1DI TWP-2DI TRANSMITTERS DATA				
DESCRIPTION	ADDRESS (Transmitter Modbus Index-1) x 20+x	NUMBER OF WORDS	DATA TYPE	DATA
Serial Number	0	2	UINT32 ⁵	Transmitter serial number
Transmitter Model	2	1	UINT16	868 MHZ - 49 - TWP-1DI 50 - TWP-2DI ⁶ 915 MHZ - 55 - TWP-1DI 56 - TWP-2DI ⁶
RSSI	3	1	UINT16	RSSI in dBm = RSSI / -2
Communication Period	4	1	UINT16	Communication Period (seconds)
Elapsed Time	5	1	UINT16	Elapsed Time since last communication (seconds)
Power Voltage	6	1	UINT16	Volts = Power Voltage / 10
Data 0	7	2	FLOAT32 ⁵	Internal temperature [°C] ⁷
Data 1	9	2	FLOAT32 ⁵	Pulse counter 1

Data 2	11	2	FLOAT32 ⁵	Pulse counter 2 (*)
Data 3	13	2	FLOAT32 ⁵	-
Data 4	15	2	FLOAT32 ⁵	-
FW Version Major Minor	17	1	UINT16	Transmitter Firmware Version ⁹
FW Version Revision	18	1	UINT16	Transmitter Firmware Version ⁹
HW Version Major Minor	19	1	UINT16	Transmitter Hardware Version ¹⁰

(*) Only available on TWP-2DI

HOLDING REGISTERS - TWP-1UT TRANSMITTER DATA				
DESCRIPTION	ADDRESS (Transmitter Modbus Index-1) x 20+x	NUMBER OF WORDS	DATA TYPE	DATA
Serial Number	0	2	UINT32 ⁵	Transmitter serial number
Transmitter Model	2	1	UINT16	868 MHZ - 24 - TWP-1UT ⁶ 915 MHZ - 28 - TWP-1UT ⁶
RSSI	3	1	UINT16	RSSI in dBm = RSSI / -2
Communication Period	4	1	UINT16	Communication Period (seconds)
Elapsed Time	5	1	UINT16	Elapsed Time since last communication (seconds)
Power Voltage	6	1	UINT16	Volts = Power Voltage / 10
Data 0	7	2	FLOAT32 ⁵	Internal temperature [°C] ⁷
Data 1	9	2	FLOAT32 ⁵	External temperature 1 [°C]
Data 2	11	2	FLOAT32 ⁵	-
Data 3	13	2	FLOAT32 ⁵	-
Data 4	15	2	FLOAT32 ⁵	-
FW Version Major Minor	17	1	UINT16	Transmitter Firmware Version ⁹
FW Version Revision	18	1	UINT16	Transmitter Firmware Version ⁹
HW Version Major Minor	19	1	UINT16	Transmitter Hardware Version ¹⁰

HOLDING REGISTERS - TWP-1UT TWP-2UT TRANSMITTERS DATA				
DESCRIPTION	ADDRESS (Transmitter Modbus Index-1) x 20+x	NUMBER OF WORDS	DATA TYPE	DATA
Serial Number	0	2	UINT32 ⁵	Transmitter serial number
Transmitter Model	2	1	UINT16	868 MHZ - 45 - TWP-1UT 46 - TWP-2UT ⁶ 915 MHZ - 51 - TWP-1UT 52 - TWP-2UT ⁶
RSSI	3	1	UINT16	RSSI in dBm = RSSI / -2
Communication Period	4	1	UINT16	Communication Period (seconds)
Elapsed Time	5	1	UINT16	Elapsed Time since last communication (seconds)
Power Voltage	6	1	UINT16	Volts = Power Voltage / 10
Data 0	7	2	FLOAT32 ⁵	Internal temperature [°C] ⁷
Data 1	9	2	FLOAT32 ⁵	External temperature 1 [°C]
Data 2	11	2	FLOAT32 ⁵	External temperature 2 [°C] (*)
Data 3	13	2	FLOAT32 ⁵	-
Data 4	15	2	FLOAT32 ⁵	-
FW Version Major Minor	17	1	UINT16	Transmitter Firmware Version ⁹
FW Version Revision	18	1	UINT16	Transmitter Firmware Version ⁹
HW Version Major Minor	19	1	UINT16	Transmitter Hardware Version ¹⁰

(*) Only available on TWP-2UT

COILS REGISTERS - PLUS WIRELESS SOLUTIONS

TWP4AI

DESCRIPTION	ADDRESS (Transmitter Modbus Index-1) x 16+x	DATA
Coil 0	0	Transmitter Remote control output controlled through Gateway
Coil 1	1	State of External Power Activation output to enable power-on of external devices
Coil 2	2	State of Trigger Input
Coil 3	3	-
Coil 4	4	-
Coil 5	5	-
Coil 6	6	-
Coil 7	7	-
Coil 8	8	-
Coil 9	9	-
Coil 10	10	-
Coil 11	11	-
Coil 12	12	-
Coil 13	13	-
Coil 14	14	-
Coil 15	15	-

TWP-1AI | TWP-2AI

DESCRIPTION	ADDRESS (Transmitter Modbus Index-1) x 16+x	DATA
Coil 0	0	Transmitter Remote control output controlled through Gateway
Coil 1	1	-
Coil 2	2	-
Coil 3	3	-
Coil 4	4	-
Coil 5	5	-
Coil 6	6	-
Coil 7	7	-
Coil 8	8	-
Coil 9	9	-
Coil 10	10	-
Coil 11	11	-
Coil 12	12	-
Coil 13	13	-
Coil 14	14	-
Coil 15	15	-

TWP-4AI/4DI/1UT

DESCRIPTION	ADDRESS (Transmitter Modbus Index-1) x 16+x	DATA
Coil 0	0	Transmitter Remote control output controlled through Gateway

Coil 1	1	State of External Power Activation output to enable power-on of external devices
Coil 2	2	State of Trigger Input
Coil 3	3	Digital Input 1 state
Coil 4	4	Digital Input 2 state
Coil 5	5	Digital Input 3 state
Coil 6	6	Digital Input 4 state
Coil 7	7	-
Coil 8	8	-
Coil 9	9	-
Coil 10	10	-
Coil 11	11	-
Coil 12	12	-
Coil 13	13	-
Coil 14	14	-
Coil 15	15	-

TWP-1DI | TWP-2DI

DESCRIPTION	ADDRESS (Transmitter Modbus Index-1) x 16+x	DATA
Coil 0	0	Transmitter Remote control output controlled through Gateway
Coil 1	1	Reset Pulse Counter 1
Coil 2	2	Reset Pulse Counter 2
Coil 3	3	Digital Input 1 state
Coil 4	4	Digital Input 2 state
Coil 5	5	-
Coil 6	6	-
Coil 7	7	-
Coil 8	8	-
Coil 9	9	-
Coil 10	10	-
Coil 11	11	-
Coil 12	12	-
Coil 13	13	-
Coil 14	14	-
Coil 15	15	-

TWP-1UT | TWP-2UT

DESCRIPTION	ADDRESS (Transmitter Modbus Index-1) x 16+x	DATA
Coil 0	0	Transmitter Remote control output controlled through Gateway
Coil 1	1	-
Coil 2	2	-
Coil 3	3	-
Coil 4	4	-
Coil 5	5	-
Coil 6	6	-

Coil 7	7	-
Coil 8	8	-
Coil 9	9	-
Coil 10	10	-
Coil 11	11	-
Coil 12	12	-
Coil 13	13	-
Coil 14	14	-
Coil 15	15	-

¹ Range depends on the RF propagation environment by performing a Site Survey.

² According to the radio channel selection

³ In some countries, the frequency band admitted is not so extended as the default range.

⁴ The radio frequencies admitted in Australia are available from channel 26 to channel 50.

⁵ The data types UNIT32 and FLOAT32 have the Mid-Little Endian (C/DAB) format.

⁶ Each transmitter model is codified with a unique ID number. Consult specified mapping tables for every transmitter model.

⁷ Transmitter internal temperature in degrees Celsius.

⁸ Current in μA ; Voltage in mV.

⁹ Firmware version: Major.Minor.Revision = 8 MSB.8 LSB.8 LSB

¹⁰ Hardware version: Major.Minor = 8 MSB.8 LSB

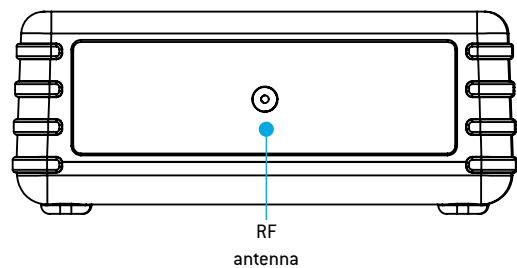
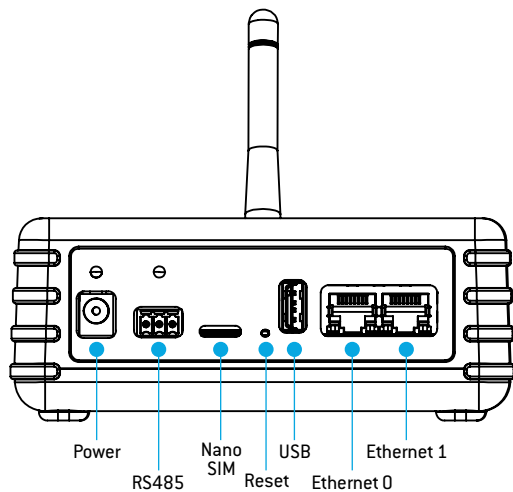
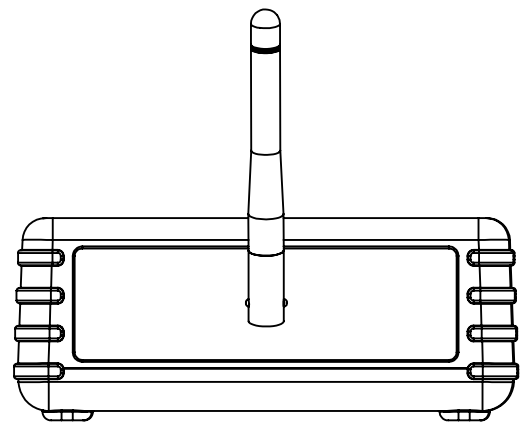
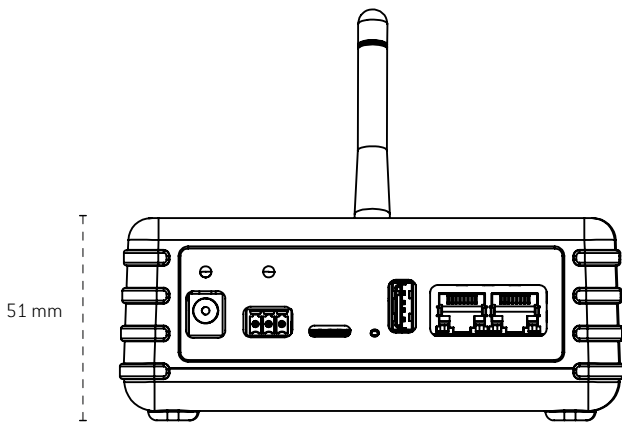
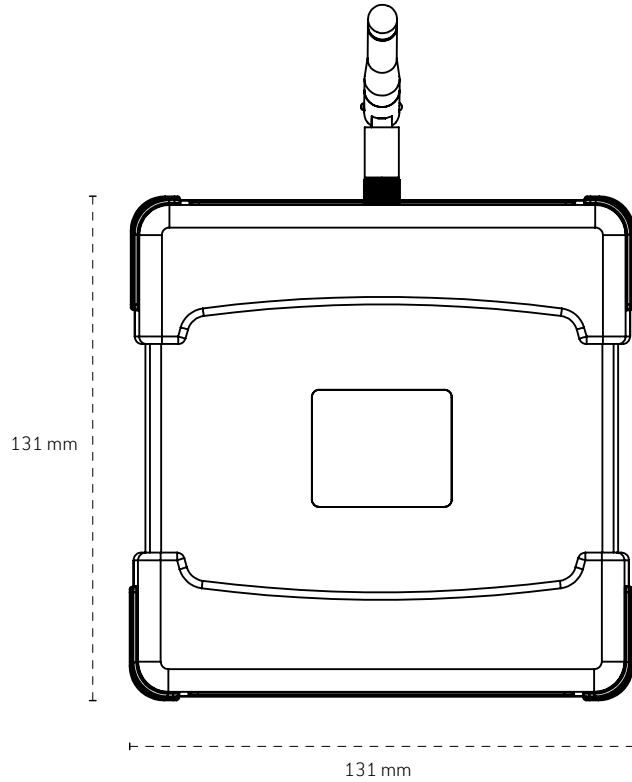
SOFTWARE PACKAGES

FEATURE	REFERENCE
TK-UGW SW PACK MODBUS MASTER/CLIENT	SW222410100
TK-UGW SW PACK ALARMS AND NOTIFICATIONS	SW222410200
TK-UGW SW PACK NODE-RED	SW222410300
TK-UGW SW PACK DASHBOARDS	SW222410400

TECHNICAL DRAWINGS

DIMENSIONAL DRAWINGS, INTERFACE DESIGN

POWER SUPPLY AND COMMUNICATIONS CONNECTOR



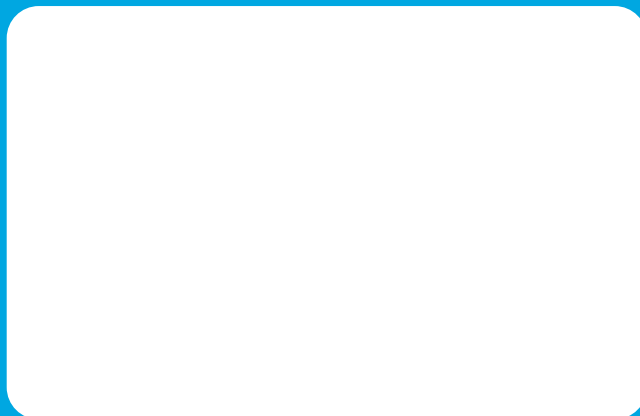
REVISION HISTORY

VERSION	DATE (MM.YY)	CHANGES
E01B	02.25	Addition of software packages table, including the new "Dashboards" additional feature.

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