tekon
WIRELESS SENSORS TECHNOLOGY

IP67
PROTECTION

WIRELESS TRANSMITTER DUOS CO$_2$

IoT ready

Tekon Wireless Transmitter DUOS CO2 is an accurate solution for measurement and monitoring of CO2 for demanding applications. Taking advantage from all the features of the DUOS product family, it's the perfect solution for air quality monitoring, agriculture, wine cellars and fermentation processes.

This device uses a dual wavelength NDIR CO2 sensor with automatic temperature compensation for ageing effects and high accuracy over the entire temperature operating range. The sensor IP65 enclosure together with transmitter IP67 protection level, ensures operation in harsh, wet and polluted environments.

Product References		
	Black	White
868MHz	PA160411110	PA160411120
915MHz	PA160411130	PA160411140

KEY FEATURES

−40 ºC TO 60ºC
TEMPERATURE SENSOR MEASUREMENT RANGE*

AGRIFOOD INDUSTRY COMPATIBILITY
COMPATIBLE WITH AGRIFOOD INDUSTRY STANDARDS

DUAL PROBE
INTERNAL TEMPERATURE AND EXTERNAL CO2 PROBE

WIRELESS LINK INDICATION (RSSI)
AUTO DISCOVERY OF THE BEST WIRELESS LINK

MULTIPLE CO2 MEASUREMENT RANGES
2.000PPM, 5.000PPM, 10.000PPM, 3% AND 5%

WATER RESISTANT
IP67 PROTECTION (TRANSMITTER)
IP65 PROTECTION (CO2 PROBE)

* The temperature measurement sensor range is related with the external temperature probes.

DS_DUOS_CO2_E02B

TECHNICAL SPECIFICATIONS

RADIO SPECIFICATIONS	868MHZ	915MHZ
Range [1]	Up to 4 Km LoS	
Minimum communication distance	3 m @ 27 dBm (500mW)	
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 [5]
Radio channels	16	50 [6]
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
Maximum hops	13
Communication period	16 to 3600 seconds (configurable)

CO2 MEASUREMENT – EXTERNAL PROBE	
Connector	M8 female socket, 4 poles
Acquisition range [3]	0-2000ppm 0-5000ppm 0-10000ppm 0-3% 0-5%
Precision at 25ºC and 1013 mbar	0 to 2000ppm: +- 50ppm + 2% measured value 0 to 5000ppm +- 50ppm + 3% measured value 0 to 10000ppm +- 100ppm + 5% measured value 0 to 3%: +- 1,5% of the scale + 2% measured value 0 to 5%: +-1,5% of the scale + 2% measured value
Sampling Time	16[4] to 3600 seconds (configurable)
T90 (90% step response)	60 seconds (16 second sampling)
Operating Temperature	-40ºC to 60ºC (0-100%RH non-condensing)

TEMPERATURE MEASUREMENT – INTERNAL PROBE	
Range	-40 to 60 ºC
Resolution	0,1 ºC
Accuracy	Typical: ± 0,25 ºC / Maximum: ± 0,5 ºC
Sensor type	I2C digital sensor
Sampling time	16[3] to 3600 seconds (configurable)

OPERATING ENVIRONMENT	
Probe / Transmitter	–40 ºC to 60 ºC
	95% maximum relative humidity (non-condensing)

POWER SUPPLY *(HARDWARE VERSION <4.2)*	
3x3,6 AA lithium batteries [7]	
External power supply with 12 VDC ± 5%	

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Peak current draw of 250 mA[2]
Supply voltage measurement accuracy ± 1 V DC
Sleep mode current consumption < 8 μA

POWER SUPPLY *(HARDWARE VERSION >= 4.2)*

3x1,5 V AA lithium/alkaline/Ni-MH batteries [3]
3 years of estimated battery life [4]
External power supply with 5 VDC ± 5%
Peak current < 100 mA [2]
Supply voltage measurement accuracy ± 1 V DC
Sleep mode current consumption < 40 μA

BATTERIES LIFETIME (EXAMPLE)	868MHZ	915MHZ
Communication Period (s)	Estimated Battery Lifetime (months)	
15	0,6	0,6
60	2,1	2,1
600	10,2	10,2
3600	15,9	15,9

INTERFACE

2 blue LED (LED 1 and LED 2) for wireless network address identification and general operation status
1 red LED (LED 4) and 1 green LED (LED 3) for wireless network operation status
1 magnetic reed switch for system reboot
1 M8 female socket with 5 poles for device configuration through host computer

CASING

Dimensions	162 x 88.5 x 25 mm
Weight	100 g
Material	ABS UL94HB
Protection Index	IP67

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
Transmitter ID	1	
Communication Period	16 seconds	
Configuration time window at startup	10 seconds	
Reconnection time	30 minutes	
Wireless Network ID	16777217	

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

BATTERIES

RECOMMENDED BATTERIES *(HARDWARE VERSION < 4.2)*

BRAND	SAFT	EVE
Model	LS14500	ER14505
Classification	Lithium-thionyl	Lithium-thionyl
Chemical System	Li-SOCl$_2$	Li-SOCl$_2$
Nominal Voltage	3,6 V	3,6 V
Type	AA	AA
Operating Temperature	-60ºC to 85ºC	-55ºC to 85ºC

RECOMMENDED BATTERIES *(HARDWARE VERSION >= 4.2)*

BRAND	ENERGIZER	PANASONIC	DURACELL	DURACELL
Model	Ultimate Lithium L91	Alkaline Power	MN1500	DX1500H
TME Part Number	BAT-FR6/EGL-B4	BAT-LR06/P-B4	BAT-LR6/DR-B12	ACCU-R6/2500/DR
Classification	Lithium	Alkaline	Alkaline	Rechargeable
Chemical System	Li/FeS$_2$	Zn/MnO$_2$	Zn/MnO$_2$	Ni-MH
Nominal Voltage	1,5 V	1,5 V	1,5 V	1,2 V
Type	AA	AA	AA	AA
Operating Temperature	-40ºC to 60ºC	-20ºC to 54ºC	-20ºC to 54ºC	-10ºC to 50ºC

[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] Dependent on radio channel selection.
[3] CO2 acquisition range available upon probe selection. Probe sold separately.
[4] Factory setting.
[5] In some countries, the frequency band admitted is not so extended as the default range.
[6] The radio frequencies admitted in Australia are available from channel 26 to channel 50.
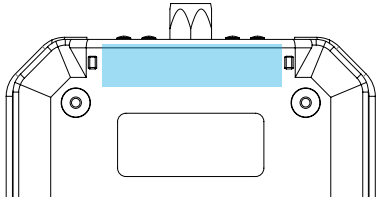[7] Batteries not included.

CALIBRATION SETTINGS

Linear Calibration (y=mx+b)*	m	b
CO$_2$	1 (default)	0 (default)
Internal Temperature	1 (default)	0 (default)

* Software configurable values

RSSI LEVELS

SIGNAL (DBM)	QUALITY
0 to -50	Excellent
-51 to -60	Good
-61 to -70	Acceptable
-71 to -100	Poor

MAGNETIC SWITCH

The DUOS Wireless Transmitters have a magnetic switch that allows to reset the devices.
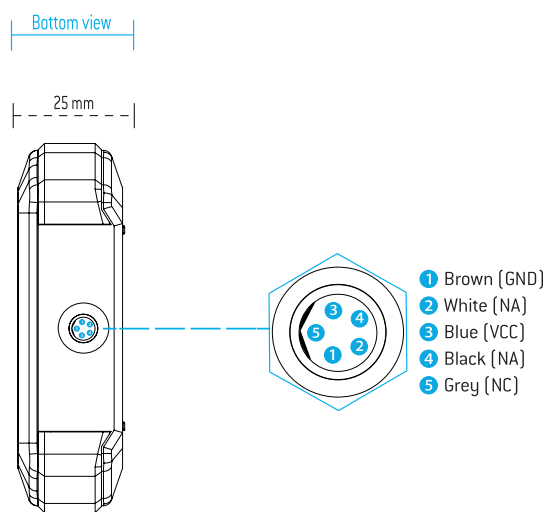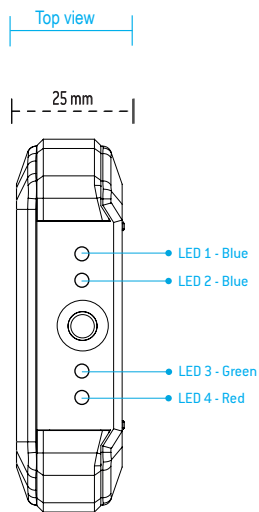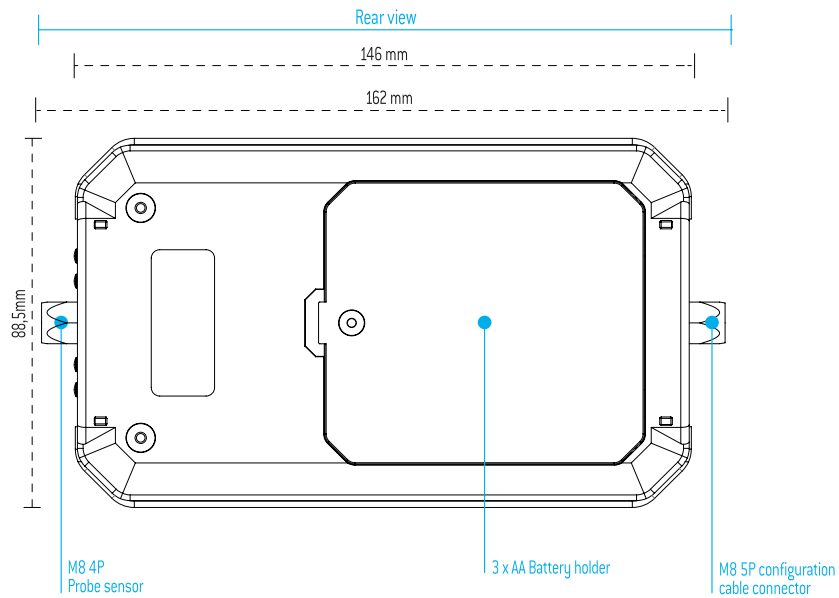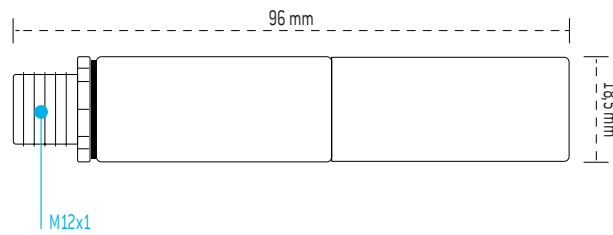
Operation Mode:
Slide a magnet in the area marked in the image. All LED's will be active and the transmitter will be restarted.

TECHNICAL DRAWINGS

DIMENSIONAL DRAWINGS AND INTERFACE DESIGN | POWER SUPPLY AND COMMUNICATIONS CONNECTOR

Rear view

146 mm

162 mm

88,5 mm

M8 4P
Probe sensor

3 x AA Battery holder

M8 5P configuration
cable connector

Top view

Bottom view

25 mm

25 mm

LED 1 - Blue
LED 2 - Blue

LED 3 - Green
LED 4 - Red

1. Brown (GND)
2. White (NA)
3. Blue (VCC)
4. Black (NA)
5. Grey (NC)

96 mm

18.5 mm

M12x1

ACCESSORIES

DUOS CO2 PROBE TK871-HR5000J2 (A) WITH 2 METER CABLE (B)
REF.: PA160410010 (A) / PA160410011 (B)
5000 ppm CO2 probe for Wireless Transmitter DUOS CO2 868 MHz

DUOS TRANSMITTER SARC
REF.: PA160410005
Cable used to configure DUOS Transmitter using Tekon Configuration software.

DUOS POWER SUPPLY 230VAC/ 5V DC
REF.: PA160413610
230V/50Hz Power supply cable to be used with DUOS wireless transmitters with the new hardware version

DUOS POWER SUPPLY 230VAC/ 12V DC
REF.: PA160410006
230V/50Hz Power supply cable.

DUOS EXTERNAL POWER CABLE
REF.: PA160410008
DUOS transmitter power supply cable.

RELATED PRODUCTS

DUOS WIRELESS GATEWAY
REF.: PA160410210 / PA160411910
- Scalable network up to 55 transmitters;
- Supports up to 12 repeaters in series;
- Up to 4Km communication distance (LoS);
- Automatic Mesh Network Management;
- Multiple networks simultaneously;
- AES KEY Data encryption 128bits;
- Modbus RTU communication for process;
- Simple, intuitive and free configuration software.

DUOS WIRELESS REPEATER

REF.: PA160410310 / PA160412010

- Up to 4Km communication distance (LoS);
- Auto discovery of the best wireless link;
- Automatic forwarding of communication;
- Simple, intuitive and free configuration software.

DUOS WIRELESS GATEWAY IOT

REF.: PA160410240 / PA160411920

- Ethernet TCP/IP communication;
- Integration with Tekon IoT Platform;
- Scalable network up to 55 transmitters;
- Multiple networks simultaneously;
- Automatic Mesh Network Management;
- Up to 4Km communication distance (LoS);
- AES KEY Data encryption 128bits;
- Simple, intuitive and free configuration software.

REVISION HISTORY	
VERSION	
E01B	Inclusion of 915MHz frequency information in "Radio Specifications", "Temperature Measurement Internal Probe", "Operating Environment" and "Factory Default Settings" tables; Revision of "Peak current" topic in "Power Supply" table; Reform of "Voltage Threshold" table; Identification of led number in "Interface" table; Reform of "Certifications and approvals" table; Led layout in "Technical Drawings"; Inclusion of "DUOS Wireless Gateway IoT" in "Related Products" table;
E01C	Inclusion of information about the frequency range used in Australia. Changing the default configuration of radio channel on 915 MHz models.
E01D	Inclusion of "RSSI Levels" and "Magnetic Switch" tables
E01E	Removal of 2,4 GHz frequency
E01F	Removal of "Voltage Threshold" table Inclusion of "Recommended batteries" table
E02A	Inclusion of "Power Supply" information for hardware version >=4.2.0 Reorganization of "Recommended batteries" table Inclusion of information about industrial property. Inclusion of new external power supply on "Accessories" table.
E02B	Inclusion of Reconnection Period on "Factory Default Settings" Table

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