tekon
WIRELESS SENSORS TECHNOLOGY

WIRELESS TRANSMITTER DUOS inCO$_2$

Tekon Wireless Transmitter DUOS inCO2 is an accurate solution for measurement and monitoring of temperature, CO2, and barometric pressure 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.

DUOS inCO2 has a built-in sensor and its able to monitor the state of an open/close digital input type.

	Product References
	White
868MHz	PA210310310
915MHz	PA210310320

KEY FEATURES

–40 °C TO 60°C
TEMPERATURE SENSOR MEASUREMENT RANGE

400 TO 5000 PPM
CO2 SENSOR MEASUREMENT RANGE

DIGITAL INPUT

BUILT-IN SENSOR

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

LOW POWER AND LONG BATTERY LIFE
MEASUREMENT AND TRANSMISSION OF BATTERY VOLTAGE

IP65 PROTECTION

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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	2-FSK
Encryption method	AES 128 (Advanced Encryption Standard)	

WIRELESS NETWORK	
Maximum devices	55
Maximum hops	13
Communication period	5 to 43200 seconds (configurable)

TEMPERATURE MEASUREMENT	
Range	-40 to 60 ºC
Resolution	0,1 ºC
Accuracy	Typical: ± 0,25 ºC / Maximum: ± 0,5 ºC
Sensor type	I2C digital sensor
Response time	1 second

CO2 MEASUREMENT *	
Range	0 to 5000 ppm
Accuracy (at 25ºC and 1013 mbar)	0 ... 5000 ppm < ± (50 ppm + 3% of measured value)
Sampling time	5 to 3600 seconds (configurable)
Response time (t_{63})	75 seconds
Temperature dependency	± (1 + C02 concentration [ppm] / 1000) ppm /ºC (-20 to 45 ºC)
Sensor type	I2C digital sensor

* Software versions equal to or lower than 1.1.0 and firmware versions equal to or lower than 1.0.0.

CO2 MEASUREMENT *	
Range	400 to 5000 ppm
Accuracy (at 25ºC and 1013 mbar)	0 - 1000 ppm: ± (50 ppm + 2.5% of reading) 1001 - 2000 ppm: ± (50 ppm + 3% of reading) 2001 - 5000 ppm: ± (40 ppm + 5% of reading) [7]
Sampling time	10 to 3600 seconds (configurable)
Response time (t_{63})	60 seconds
Sensor type	I2C digital sensor

* Software versions equal to or higher than 2.0.0 and firmware versions equal to or higher than 3.0.0.

BAROMETRIC PRESSURE MEASUREMENT *	
Range	700 to 1100 mbar
Accuracy (at 25ºC)	± 2 mbar (20 to 80% RH)
Temperature dependency	± 0,015 mbar/K
Sensor type	I2C digital sensor

* Software versions equal to or lower than 1.1.0 and firmware versions equal to or lower than 1.0.0.

BAROMETRIC PRESSURE MEASUREMENT *	
Range	300 to 1100 mbar
Accuracy (at 25ºC)	± 2 mbar (0 to 65ºC and 20 to 80% RH)
Temperature dependency	± 0,015 mbar/K, equivalent to 12.6 cm/K (25 to 40ºC, 900 mbar) [8]
Sensor type	I2C digital sensor

* Software versions equal to or higher than 2.0.0 and firmware versions equal to or higher than 3.0.0.

DIGITAL INPUT - ELECTRICAL AND TIME FEATURES	
Contact type	Dry contact
Standby state	Open / OFF
Current consumption	DI ON: 28uA / DI OFF: 0uA
Communication time after DI activation	< 1,1 seconds
DI debounce time	60ms
Edge trigger	Open -> Close
DI event buffer	8

POWER SUPPLY
3x1,5 V AA lithium/alkaline/Ni-MH batteries [3]
External power supply with 5 VDC ± 5%
Peak current <100 mA [2]
Supply voltage measurement accuracy ± 100 mV
Sleep mode current consumption < 30 μA

OPERATING ENVIRONMENT *	
Temperature range	-40 ºC to 60º C
Humidity	95% maximum relative humidity (non-condensing)

* Software versions equal to or lower than 1.1.0 and firmware versions equal to or lower than 1.0.0.

OPERATING ENVIRONMENT *	
Temperature range	-10 ºC to 60º C
Humidity	95% maximum relative humidity (non-condensing) [9]

* Software versions equal to or higher than 2.0.0 and firmware versions equal to or higher than 3.0.0.

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 reset
1 M8 female socket with 5 poles for device configuration through host computer

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	10 seconds	
Configuration time window at startup	10 seconds	
Wireless network ID	16777217	

CASING	
Dimensions	162 x 88,5 x 25 mm
Weight	100 g
Material	ABS UL94HB
Protection index	IP65

CERTIFICATIONS AND APPROVALS
EN 301 489-1 V2.2.1

[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] Batteries not included.
[4] Considering a communication period of 10 minutes, and maximum transmit power (27dBm) at 25 ºC.
[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] Exposure to C02 concentrations smaller than 400 ppm can affect the accuracy of the sensor.
[8] When changing temperature from 25 to 40ºC at constant pressure/altitude, the measured pressure/altitude will change by (15 x 0.015 mbar/K).
[9] Accuracy can be reduced at relative humidity levels lower than 20% and higher than 80%.

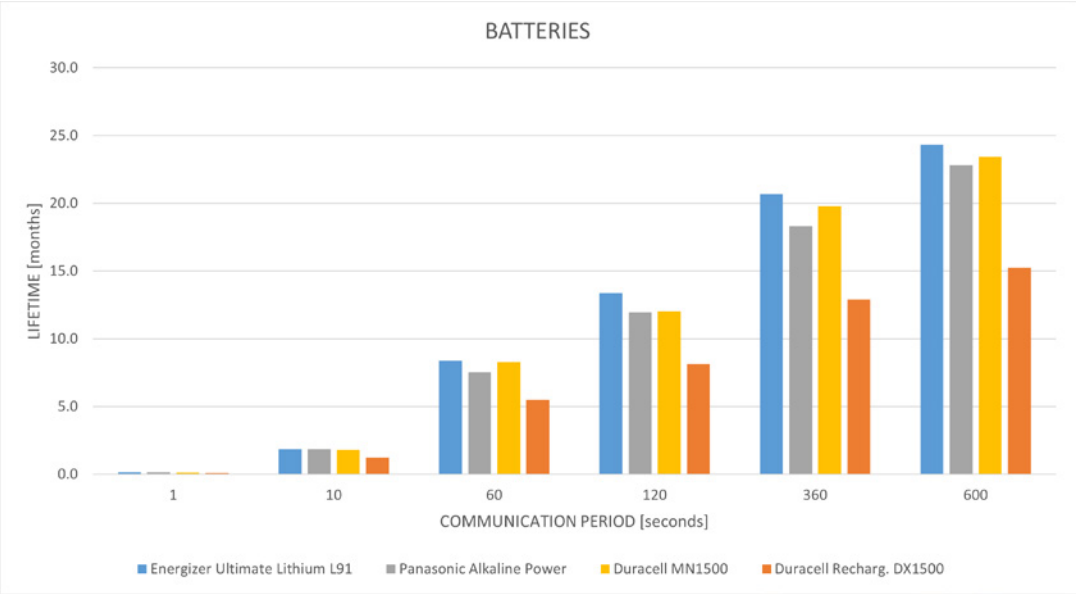
BATTERIES

RECOMMENDED BATTERIES

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

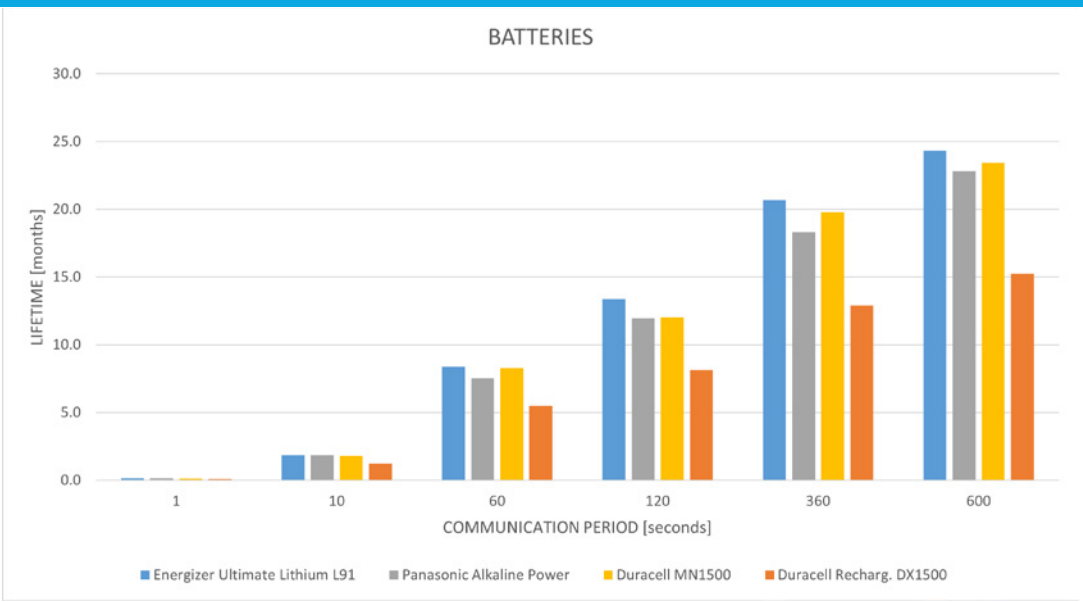
VOLTAGE THRESHOLD (VDC)	INTERNAL TEMP. ≥ -10º	INTERNAL TEMP. < -10º
Critical battery	3 V	2,5 V

PERFORMANCE TESTS *



* Software versions equal to or lower than 1.1.0 and firmware versions equal to or lower than 1.0.0.

PERFORMANCE TESTS *



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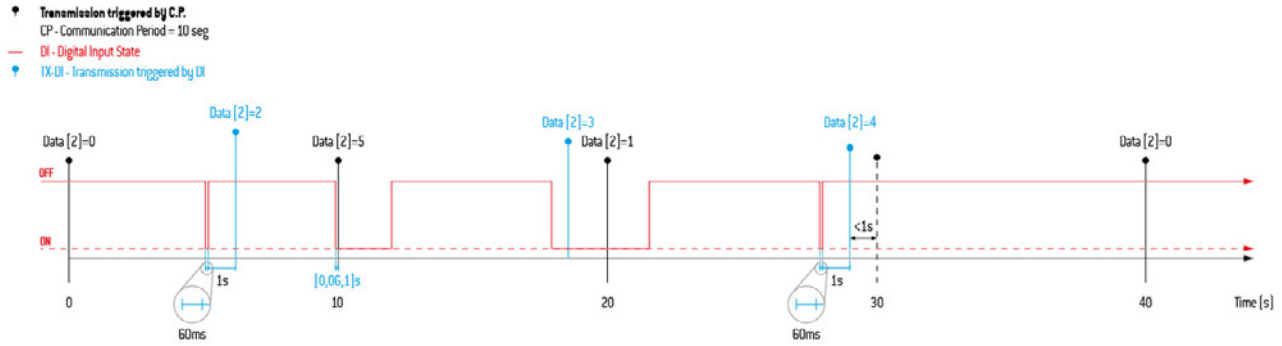
DIGITAL INPUT

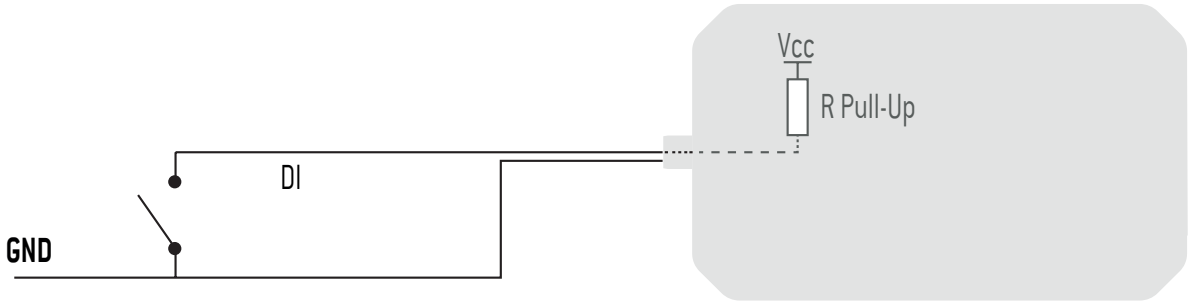
TRANSMITTER DI OPERATION



DI STATE / AWAKENED BY	Time	DI	DI+Time
OFF	0	2	4
ON	1	3	5

Note: If Communication Period is equal to 1 second, possible values are: 0, 1, 4 and 5.

CONNECTION DIAGRAM



CALIBRATION SETTINGS

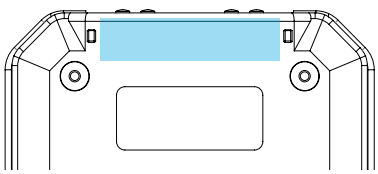
Linear Calibration (y=mx+b)*	m	b
CO_2	1 (default)	0 (default)
Temperature	1 (default)	0 (default)
Barometric Pressure	1 (default)	0 (default)

* 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

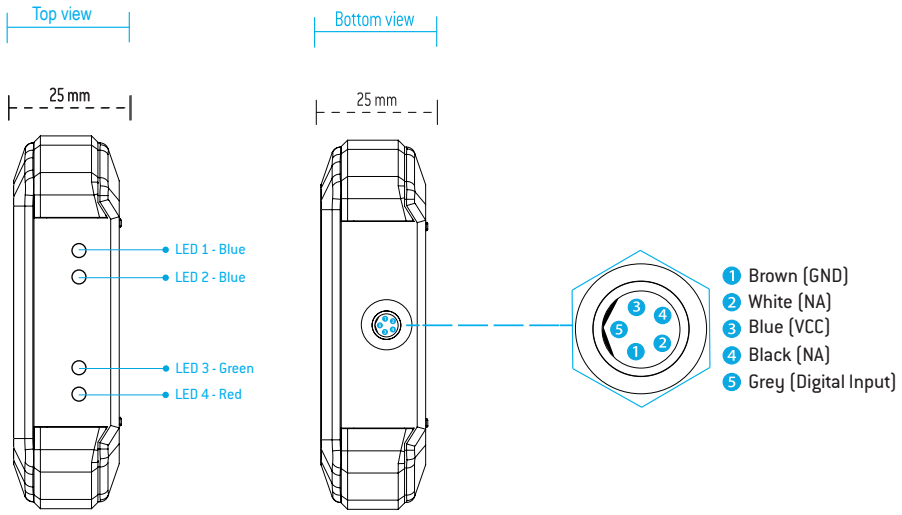


The DUOS Wireless Transmitters have a magnetic switch that allows to reset the devices.

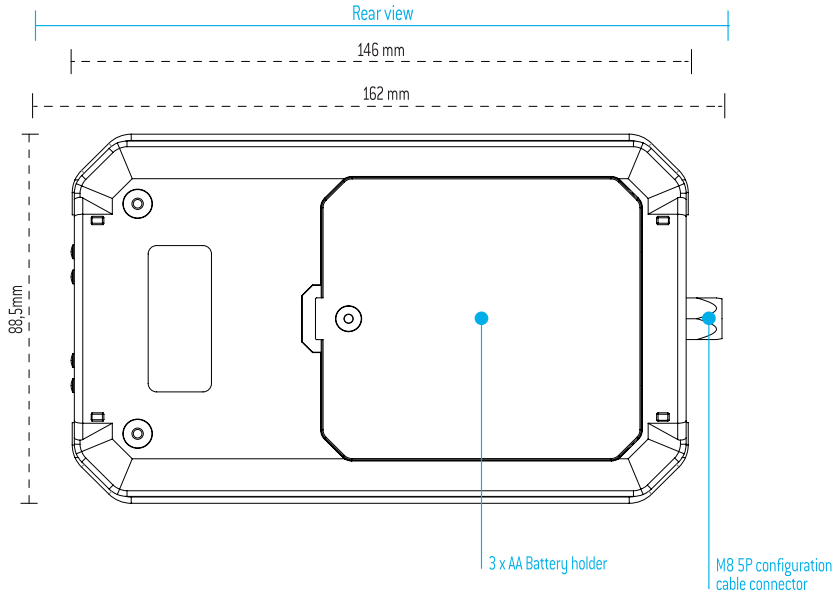
Operation Mode:
Slide a magnet in the area marked in the image. All LED's will be active and the transmitter will be restarted.

TECHNICAL DRAWINGS

DIMENSIONAL DRAWINGS AND INTERFACE DESIGN



POWER SUPPLY AND COMMUNICATIONS CONNECTOR



ACCESSORIES

DUOS EXTERNAL POWER CABLE

REF.: PA160410008

DUOS Transmitter external power supply cable.

DUOS DI+TEMP EXTERNAL CABLE

REF.: PA160410009

DUOS DI+TEMP Digital Input cable.

DUOS TRANSMITTER SARC

REF.: PA160410005

Cable used to configure DUOS Transmitter using Tekon Configuration software.

DUOS POWER SUPPLY 230V AC / 5V DC

REF.: PA160413610

230V/50Hz Power supply cable to be used with the wireless gateway and repeater DUOS.

REVISION HISTORY

VERSION	
E02A	Inclusion of Reconnection Period on “Factory Default Settings Table”; Addition of new “C02 Measurement” table; Addition of new “Barometric Pressure Measurement” table; Addition of new “Operating Environment” table; Changing of the “Performance Tests” table graphic.

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