RADIO MODEM PRODUCTS



Z-AIR-1



RTURADIO-169



RM169-1

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1. Disclaimer

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2. Technical support

Our website www.seneca.it contains many useful information, user guides and configuration software and technical documents always update to the latest version.

If you have technical problems or cannot find the required information in the provided documents, contact our Technical Support by email at support@seneca.it or by phone +39 049 8705359.

3. Restrictions on use

SENECA PRODUCTS HAVE NOT BEEN DESIGNED, INTENDED NOR INSPECTED TO BE USED IN ANY LIFE SUPPORT RELATED DEVICE OR SYSTEM RELATED FUNCTION NOR AS A PART OF ANY OTHER CRITICAL SYSTEM INCLUDED AERONAUTICAL / AEROSPACE APPLICATION.

SENECA PRODUCTS ARE GRANTED NO FUNCTIONAL WARRANTY IF THEY ARE USED IN ANY OF THE APPLICATIONS MENTIONED.

The radio modems have been designed to operate on civil frequency ranges as SRD (Short Range Device), the exact use of which differs from one region and/or country to another. The user of a radio modem must take care that the device is not operated without the permission of the local authorities on frequencies other than those specifically reserved and intended for use without a specific permit.

The radio modems can be used in the following countries with E.R.P. and duty cycle limitation, either on license free channels or on channels where the operation requires a license. More detailed information is available at the local frequency management authority.

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Country allowed [4]
ALB-AND-AUT-BEL-BIH-BLR-BUL-CVA-CYP-CZE-D-DNK-E-EST-F-FIN-G-GRC-HNG-HOL-HRV-I-IRL-ISL-LIE-LTU-LUX-LVA-MCO-MDA-MKD-MLT-MNE-NOR-POL-POR-ROU-RUS-S-SMR-SRB-SUI-SVK-SVN-TUR-UKR

Allowed use according to ERC Recommendation 70-03					
Model	**Frequency (MHz)**	**Annex [1]**	**E.R.P [2]**	**Duty Cycle [3]**	**Country[4] with restriction of use**
RM169-1 RTURADIO	169,400 – 169,475	1	≤ 500 mW	≤ 1 %	BLR-RUS-UKR
	169,400 – 169,475	2	≤ 500 mW	≤10 %	BLR-RUS-UKR
Z-AIR-1	863,000 – 870,000	1	≤ 25 mW	≤ 0.1 %	BLR-GRC-NOR-RUS-S
	868,000 – 868,600	1	≤ 25 mW	≤ 1 %	RUS
	868,700 – 869,200	1	≤ 25 mW	≤ 0.1 %	BLR-UKR
	869,400 – 869,650	1	≤ 500 mW	≤ 10 %	BLR-RUS-UKR
	869,700 – 870,000	1	≤ 5,0 mW	≤ 100 %	RUS-UKR

NOTE:
Before to install the device check always the latest version of ERC Recommendation 70-03 in order to verify any restriction and limitation in terms of E.R.P and Duty Cycle
[1] Annex 1.xxx refer to SRD (Short Range Device), Annex 2 refer to Tracking, Tracing and Data Acquisition.
[2] E.R.P. = Max Effective Radiated Power allowed from radio modem and associated antenna takes into consideration transmitter power output, transmission line attenuation, RF connector insertion losses and antenna gain
[3] Duty Cycle is defined as the ratio, expressed as a percentage, of the maximum transmitter "on" time on one carrier frequency, relative to a one hour period
[4] The CEPT country codes can be seen under http://www.cept-org/cept/cept-country-codes

4. Warranty – Liability of the Product

Supplier represents and warrants that products are manufactured in accordance with the applicable specifications and are free from defects in materials and workmanship. The warranty, valid for a period of 12 months of use, maximum 18 months from the date of delivery, shall not cover defects caused by accident, Buyer's negligence, improper use or maintenance or by any other reason beyond Supplier's control.

Buyer shall have 10 (ten) working days following receipt of products to inspect the products and to notify to Supplier in writing any defects or non-compliance. In the event that any shipment of products is not accepted by Buyer due to any non-conformity with the specifications, or as a result of a cause occurred prior to placement thereof with the carrier, Buyer shall, if so indicated in writing by the Supplier, promptly return some samples or the full shipment that was rejected by Buyer at Buyer's costs.

Supplier, at its own discretion, shall, within a reasonable period, considering the entity of the complaint: (i) send a replacement shipment of products conforming, or (ii) credit Buyer a sum equal to the value of the defective or non-conforming products. This warranty overwrites all legal warranties for defects and compliance and exempts Supplier from any other responsibility for the supplied products; in particular, Buyer shall not be entitled to any requests for compensation or price reductions.

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If one of the products sold by the Supplier to the Buyer is defective, the Buyer will send it, at its own expense, at the headquarters of the Italian Supplier. The product will be repaired or replaced by the Supplier, at no costs to the Buyer.

The Buyer will pay all the shipping costs for the product repaired or replaced and sent back to the Buyer.

The Buyer will bear all costs related to disassembly, assembling and transportation of the product, and any damage caused by the "machinery inactivity".

Supplier shall indemnify Buyer against any liability of the products claims asserted by third parties relating to damages sustained as a result of a defective products. In such case Supplier shall reimburse Buyer exclusively within the limits, terms and conditions of the products liability insurance policy held by Supplier. Buyer shall not make any oral or written representations which vary from the specifications, operating instructions, labels or representations given or made by Supplier with respect to the products. If any liability is incurred because of such varying representations, Buyer holds Supplier harmless with respect to any such representations.

In no event shall Supplier be liable for any indirect, incidental, exemplary or consequential damages, including without limitation any claim for damages based on lost revenues or profits, however caused.

In no event shall the Supplier be liable for any costs or damages arising from any act or omission of Buyer, including, without limitation, relating to the modification, handling, storage and marketing of Products by Buyer or to Buyer's failure to provide its employees, agents and customers or other third parties with adequate instruction as to the proper handling and use of Products.

In this respect we hereby confirm that our products are not designed for nuclear applications neither for aircraft/aerospace industries. For the above mentioned applications both warranty and insurance coverage do not apply.

5. Warnings and safety instructions

- Read these safety instructions carefully before using the product:
- Warranty will be void, if the product is used in any way that is in contradiction with the instructions given in this manual, or if the radio modem housing has been opened or tampered with.
- The radio modem is only to be operated at frequencies allocated by local authorities, and without exceeding the given maximum allowed output power ratings and duty cycle. SENECA and its distributors are not responsible, if any products manufactured by it are used in unlawful ways.
- The devices is complies with Directive 2014/53/UE (RED) and Directive 2011/65/UE (ROHS)
- The devices mentioned in this manual are to be used only according to the instructions described in this manual. Faultless and safe operation of the devices can be guaranteed only if the transport, storage, operation and handling of the devices is appropriate. This also applies to the maintenance of the products.
- Place the antenna at a height greater than or equal to 2 m above the general public walkway that gives general public access.
- Do not install the equipment close to a heat source or in damp conditions and direct sunlight is also to be avoided.

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- The device must not be exposed to aggressive chemical agents or solvents likely to damage the plastic or corrode the metal parts.
- The device must not be exposed directly to dusty environment.
- Maintenance should only be carried out by qualified persons.
- For your own safety, you must ensure that the equipment is switched off before carrying out any work on it.
- Any electrical connection of the product must be equipped with a protection device against voltage spikes and short-circuits

6. Disposal of waste by users in private households within the European Union



According to Directive 2012/19/EU of the European Union on waste electrical and electronic equipment (WEEE) this product must not be disposed off with your other household waste, it is your responsibility to dispose of your waste by taking it to a collection point designated for the recycling of electrical and electronic appliances.

Separate collection and recycling of your waste at the time of disposal will contribute to conserving natural resources and guarantee recycling that respects the environment and human health.

For further information concerning your nearest recycling center, please contact your nearest local authority/town hall offices.

7. Configuration

To configure the radio modem, download the latest version of the configuration software and the relevant guide from the SENECA website www.seneca.it

The configuration can be carried out via RS485 serial interface, or via RS232 serial interface.

System requirements

Operative system supported: Windows 7, Windows 8, Windows 10
Minimum screen resolution: 1024×768 dpi.

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RM169-1



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1. General description

RM169-1 are radio modems with 1 optically isolated digital inputs and 1 digital relay outputs, an RS-232/485 serial interface, all of which are software configurable. The embedded inputs and outputs allow the RM169-1 radio modem to be used in data acquisition and remote control applications.

RM169-1 has 4 operating modes that are software programmable: radio modem, mirror point to point, Modbus slave, or Modbus master, allowing greater flexibility in the field.

RM169-1 uses routing tables to obtain fewer collisions in complex networks and RM169-1 can also be used as a Modbus hub, allowing 8 Modbus modules (inputs and/or outputs) to be connected through the RS-485 port. (D5 will power these modules).

Data Encryption 128bit AES (Advanced Encryption Standard) ensures transmitted data security.

A power-saving function is built in, to activate inputs only when required, allowing for extended battery life.

Function available for each operating mode.

CHARACTERISTICS AND FUNCTIONALITY AVAILABLE
Yes= you can choose and/or modify the function
No = the function doesn't exist or is not enabled

	Operating mode						
	Radio modem	ModBus Standard		ModBus Low Energy		Mirror	
		Master	Slave	Master	Slave	Master	Slave
Radio							
Channel spacing	Yes	Yes	Yes	Yes	Yes	Yes	Yes
RF channel	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Frequency Agility	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Listen Before Talk	Yes	Yes	Yes	No	No	No	No
RF power	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Serial Port RS485							
Bit Rate	Yes	Yes	Yes	Yes	Yes	No	Yes
Parity bit	Yes	Yes	Yes	Yes	Yes	No	Yes
DTX Time	Yes	Yes	Yes	Yes	Yes	No	Yes

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	Operating mode						
	Radio modem	ModBus Standard		ModBus Low Energy		Mirror	
		Master	Slave	Master	Slave	Master	Slave
Auxiliary							
Safety option	Yes	Yes	Yes	No	No	Yes	Yes
Contact of relè selectable NC/NO	Yes	Yes	Yes	No	No	Yes	Yes
Input & Output							
Digital inputs	Yes (n° 1)	No	Yes (n° 1)	Yes (n° 1)	No	Yes (n° 1)	Yes (n° 1)
Digital outputs	Yes (n° 1)	No	Yes (n° 1)	Yes (n° 1)	No	Yes (n° 1)	Yes (n° 1)
Data							
AES encrytption	Yes	Yes	Yes	Yes	Yes	No	No
Routing Table	Yes, 1 route	Yes, 255 route	No	No	No	Yes, 1 route	Yes, 1 route
Broadcasting	Yes	No	No	No	No	No	No
Address from DTE	Yes	No	No	No	No	No	No
Address to DTE	Yes	No	No	No	No	No	No
Rx address for Tx	Yes	No	No	No	No	No	No
Request of ACK	Yes	No	No	No	No	No	No
Set number of retries	Yes (max. 255)	No	No	No	No	No	No
NAK to DTE	Yes	No	No	No	No	No	No
Other							
Diagnostic	Yes	No	No	No (always active)	No (always active)	No	Yes
Power Save	Yes	Yes	Yes	No	No	No	No
Link Test	Yes	No	No	No	No	No	No

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2. Technical specification

Operating data			
Label	*Description*		*Value*
$V_{S\ (EXT)}$	Power supply, voltage range		9,0 → 32 Vdc
$P_{S\ (EXT)}$	Max power		max. 5 W
I_{Sleep}	Sleeping current (Power Off)		≤ 150 µA @ 12Vdc
P_{RF}	RF transmission power	Level H	500 mW
		Level M	150 mW
		Level L	25 mW
RX_{SENS}	Receiver sensitivity		≤ -105 ± 3 dBm
RF_{MOD}	Modulation mode		***F1D
CH	Canalization		12,5 – 25 – 50 kHz
BR Radio	Baud Rate on radio channel		4.800 – 9.600 – 19.200 bps
Buffer	Memory buffer		1024 bytes
$Z_{I/O\ ANT}$	Antenna impedance		50Ω
Digital Input	Rating digital input		5 – 24 Vdc 3 – 20 Vac
$Z_{DIGITAL-INP}$	Digital input impedance		2.2KΩ
Digital Output	Digital output rating		Normally Open (NO) 24 Vac @ 0,5 A 32 Vdc @ 1A
$I_{A,B\ LINES}$	Max current out at RS-485 serial port		± 60 mA
BR DTE	Baud Rate serial port		1.200 → 57.600 bps

WARNING

Exceed the maximum operating value below (continuous and/or temporary) can damage the device

Maximum operating data		
Label	*Description*	*Value*
$V_{S(EXT)}$	Max power supply voltage	32 Vdc
$V_{DIG-INP}$	Digital input, max voltage	24 Vdc / 20 Vac
$V_{DIG-OUT}$	Digital output, max voltage	32 Vdc / 28 Vac
$V_{P\ RS}$	Max peak voltage at the ports A/B RS-485 (1)	± 32 Vdc
$I_{A,B\ LINES}$	Max current out at the A/B RS-485	± 200 mA
$T_{OPERATING}$	Operating temperature range	-30°C +60 °C
$T_{STORAGE}$	Storage temperature range	-40°C +85 °C

Note:

(1) Impulse time < 100 millisecond.

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3. Installation

- Mechanical

The device must be installed in a location that is sufficiently ventilated so that there is no risk of internal heating. Place the device against a flat, firm and stable surface. It is not recommendable to install the radio modem on a strongly vibrating surface. Suitable dampening and/or isolation materials should be used in cases where the installation surface will be subjected to vibration.

- Electrical (wiring)

To prevent damage both the radio modem and any terminal devices must always be switched OFF before connecting or disconnecting the serial connection cable. It should be ascertained that different devices used have the same ground potential. Before connecting any power cables the output voltage of the power supply should be checked.

The product has no disconnecting device. An external disconnecting device must be installed. This must be close to the equipment.

Provide an adequate termination resistance on the RS485 serial line.

To by supplied by class II (LPS) certified AC/DC adaptor.

JP4 Connector		
PIN	*Label*	*Description*
1	A RS485	RS-485 (line A)
2	RXD (OUT)	Data output
3	TXD (IN)	Data input
4	DTR	Data Terminal Ready
5	GROUND	Ground (GND)
6	N.C.	Not connected
7	RTS	Request To Send
8	CTS	Clear To Send
9	A RS485	RS-485 (line B)

JP1 Connector		
PIN	*Label*	*Description*
1		Opto-isolated digital input
2		
3		Digital output normally open (NO)
4		
5	⏚	Ground (GND)
6	9-32V 0,6A	Power supply (9 – 32 VDC, 0.6A)

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- Antenna

The device's antenna must be free and at least 10 cm away from any conducting material. When the antenna is installed outside, it is essential to connect the cable screen to the building's earth. We recommend using lightning protection. The protection kit chosen must permit the coaxial cable to be earthed (eg: coaxial lightning arrester with earthing of the cable at different places on the antenna at the base of pylons and at the entry, or just before entering the premises).

- Dimension LxHxW: 120 x 80 x 35 mm

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Z-AIR-1



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1. General description

The Z-AIR-1 Series is an integrated radio modem with RS485 interface and an internal dipole antenna and is software configurable.

The Z-AIR-1 Series uses an internal dipole antenna which results in no signal attenuation, due to a connection between the radio and antenna. This allows installation of the Z-AIR-1 series at a greater distance from the data signal source.

A robust, multi-pair serial data cable connection allows use in outdoor installations.

Robust construction with surface mounted components, ensure highly-stable electronics. Being housed in an IP65 enclosure, allows the Z-AIR-1 series to be located in unfriendly environments.

Z-AIR-1 has 4 operating modes that are software programmable: radio modem, mirror point to point, Modbus slave, or Modbus master, allowing greater flexibility in the field.

Z-AIR-1 uses routing tables to obtain fewer collisions in complex networks and Z-AIR-1 can also be used as a Modbus hub allowing Modbus modules (inputs and/or outputs) to be connected through the RS-485 port.

Data Encryption 128bit AES (Advanced Encryption Standard) ensures transmitted data security.

CHARACTERISTICS AND FUNCTION AVAILABLE
Yes= you can choose and/or modify the function
No = the function doesn't exist or is not enabled

	Operating mode						
	Radio modem	ModBus Standard		ModBus Low Energy		Mirror	
		Master	Slave	Master	Slave	Master	Slave
Radio							
Channel spacing	Yes	Yes	Yes	Yes	Yes	Yes	Yes
RF channel	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Frequency Agility	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Listen Before Talk	Yes	Yes	Yes	No	No	No	No
RF power	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Serial Port RS485							
Bit Rate	Yes	Yes	Yes	Yes	Yes	No	Yes
Parity bit	Yes	Yes	Yes	Yes	Yes	No	Yes
DTX Time	Yes	Yes	Yes	Yes	Yes	No	Yes

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	Operating mode						
	Radio modem	ModBus Standard		ModBus Low Energy		Mirror	
		Master	Slave	Master	Slave	Master	Slave
Data							
AES encryption	Yes	Yes	Yes	Yes	Yes	No	No
Routing Table	Yes, 1 route	Yes, 255 route	No	No	No	Yes, 1 route	Yes, 1 route
Broadcasting	Yes	No	No	No	No	No	No
Address from DTE	Yes	No	No	No	No	No	No
Address to DTE	Yes	No	No	No	No	No	No
Rx address for Tx	Yes	No	No	No	No	No	No
Request of ACK	Yes	No	No	No	No	No	No
Set number of retries	Yes (max. 255)	No	No	No	No	No	No
NAK to DTE	Yes	No	No	No	No	No	No
Other							
Diagnostic	Yes	No	No	No (always active)	No (always active)	No	Yes
Power Save	Yes	Yes	Yes	No	No	No	No
Link Test	Yes	No	No	No	No	No	No

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2. Technical specification

Operating data			
Label	*Description*		*Value*
$V_{S\ (EXT)}$	Power supply, voltage range		9,0 → 32 Vdc
$P_{S\ (EXT)}$	Max power		max. 5 W
I_{Sleep}	Sleeping current (Power Off)		≤ 150 µA @ 12VDC
P_{RF}	RF transmission power	Level H	500 mW
		Level M	150 mW
		Level L	25 mW
RX_{SENS}	Receiver sensitivity		≤ -105 ± 3 dBm
RF_{MOD}	Modulation mode		***F1D
CH	Canalization		25 – 50 kHz
BR Radio	Baud Rate on radio channel		9.600 – 19.200 bps
Buffer	Memory buffer		1024 bytes
$I_{A,B\ LINES}$	Max current out at RS-485 serial port		± 60 mA
BR DTE	Baud Rate RS-485 serial port		1.200 → 57.600 bps
IP	IP rating		IP65

NOTE:
(1) with 10 mt cable length, consult SENECA for cable length more then 10 mt

WARNING
Exceed the maximum operating value below (continuous and/or temporary) can damage the device

Maximum operating data		
Label	*Description*	*Value*
$V_{S(EXT)}$	Max power supply voltage	32 Vdc
$V_{P\ RS-485}$	Max peak voltage at the ports A/B RS-485 (1)	± 32 Vdc
$I_{A,B\ LINES}$	Max current out at the A/B RS-485	± 200 mA
$T_{OPERATING}$	Operating temperature range	-30°C +60 °C
$T_{STORAGE}$	Storage temperature range	-40°C +85 °C

NOTE:
(1) Impulse time < 100 millisecond.

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3. Installation

- Mechanical

The device can be installed in an indoor or outdoor location (IP65). Place the device against a stable surface. It is not recommendable to install the radio modem on a strongly vibrating surface. Suitable dampening and/or isolation materials should be used in cases where the installation surface will be subjected to vibration.

- Electrical (wiring)

To prevent damage both the radio modem and any terminal devices must always be switched OFF before connecting or disconnecting the serial connection cable. It should be ascertained that different devices used have the same ground potential. Before connecting any power cables the output voltage of the power supply should be checked.

The product has no disconnecting device. An external disconnecting device must be installed. This must be close to the equipment.

Provide an adequate termination resistance on the RS485 serial line.

To by supplied by class II (LPS) certified AC/DC adaptor.

Cable	
Label	*Colour*
VCC +	Orange
VCC -	White - Orange
RTX Enable [(1)]	White – Green
RS-485 (line A)	Brown
RS-485 (line B)	White – Brown
Ground (GND)	Green
ON AIR Led	White – Blue
PWR ON Led	Blue

The cable shield is factory connect to GND's device, in order to avoid "Ground Loop" we suggest not to connect the shield to ground.

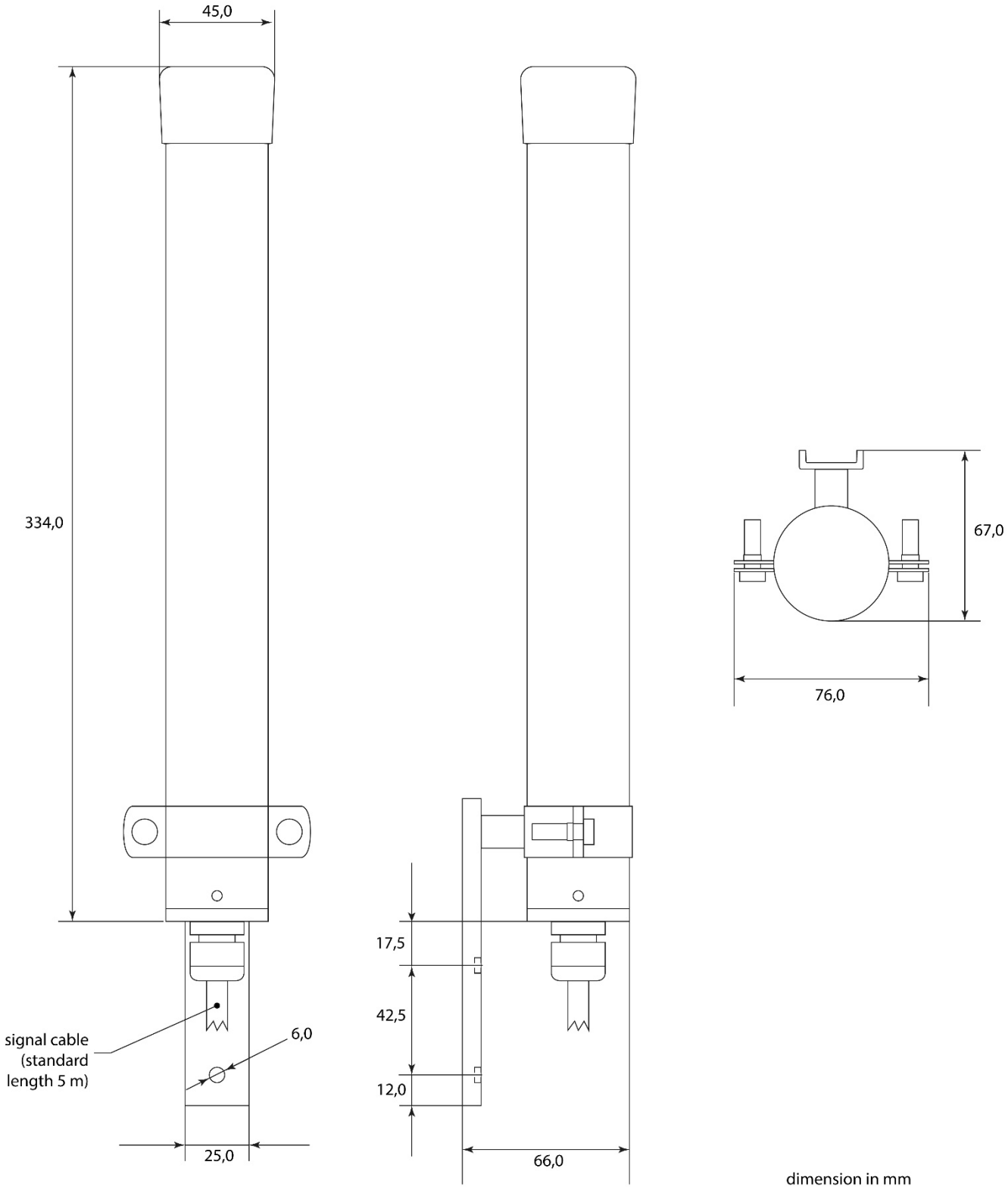
[(1)] If the RTX Enable is not used, it must be connected to positive supply voltage (max +32 VDC), connecting it to GND, allows the switching off of the radio modem.

- Antenna

The device is complete with lambda/2 (dipole) embedded antenna, it can be fixed on a pole by means of the mounting kit that is supplied. The device must be free and at least 10 cm away from any other conducting material.

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- Dimension (mm)



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RTURADIO-169



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1. General description

Rturadio-169 radio modems with RTU function, feature 4 digital inputs, 2 digital relay outputs, 2 analog inputs, 2 analog outputs, an Rturadio-169 serial interface, and a counter input; all of which are software configurable. The embedded inputs and outputs allow the Rturadio-169 radio modem to be used in data acquisition and remote control applications.

Rturadio-169 has 4 operating modes that are software programmable: radio modem, mirror point to point, Modbus slave, or Modbus master, allowing greater flexibility in the field.

Rturadio-169 uses routing tables to obtain fewer collisions in complex networks and Rturadio-169 can also be used as a Modbus hub, allowing 8 Modbus modules (inputs and/or outputs) to be connected through the RS-485 port. (Rturadio-169 will power these modules).

Data Encryption 128bit AES (Advanced Encryption Standard) ensures transmitted data security.

A power-saving function is built in, to activate inputs only when required, allowing for extended battery life.

Function available for each operating mode.

CHARACTERISTICS AND FUNCTIONALITY AVAILABLE
Yes= you can choose and/or modify the function
No = the function doesn't exist or is not enabled

	Operating mode						
	Radio modem	ModBus Standard		ModBus Low Energy		Mirror	
		Master	Slave	Master	Slave	Master	Slave
Radio							
Channel spacing	Yes	Yes	Yes	Yes	Yes	Yes	Yes
RF channel	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Frequency Agility	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Listen Before Talk	Yes	Yes	Yes	No	No	No	No
RF power	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Serial Port RS485							
Bit Rate	Yes	Yes	Yes	Yes	Yes	No	Yes
Parity bit	Yes	Yes	Yes	Yes	Yes	No	Yes
DTX Time	Yes	Yes	Yes	Yes	Yes	No	Yes

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	Operating mode						
	Radio modem	ModBus Standard		ModBus Low Energy		Mirror	
		Master	Slave	Master	Slave	Master	Slave
Auxiliary							
LED I/O	Yes	Yes	Yes	Yes	Yes	Yes	Yes
+18 Vdc ON/OFF	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Safety option	Yes	Yes	Yes	No	No	Yes	Yes
Contact of relè selectable NC/NO	Yes	Yes	Yes	No	No	Yes	Yes
Input & Output							
Digital inputs	Yes (n° 2)	No	Yes (n° 4)	Yes (n° 4)	No	Yes (n° 2)	Yes (n° 2)
Digital outputs	Yes (n° 2)	No	Yes (n° 2)	Yes (n° 2)	No	Yes (n° 2)	Yes (n° 2)
Counter input	No	Yes	Yes	No	No	No	No
Analog inputs (passive)	No	Yes (n° 2)	Yes (n° 2)	Yes (n° 2)	No	Yes (n° 2)	Yes (n° 2)
Analog outputs (passive)	No	Yes (n° 2)	Yes (n° 2)	No	No	Yes (n° 2)	Yes (n° 2)
Data							
AES encrytption	Yes	Yes	Yes	Yes	Yes	No	No
Routing Table	Yes, 1 route	Yes, 255 route	No	No	No	Yes, 1 route	Yes, 1 route
Broadcasting	Yes	No	No	No	No	No	No
Address from DTE	Yes	No	No	No	No	No	No
Address to DTE	Yes	No	No	No	No	No	No
Rx address for Tx	Yes	No	No	No	No	No	No
Request of ACK	Yes	No	No	No	No	No	No
Set number of retries	Yes (max. 255)	No	No	No	No	No	No
NAK to DTE	Yes	No	No	No	No	No	No
Other							
Diagnostic	Yes	No	No	No (always	No (always	No	Yes

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				active)	active)		
Power Save	Yes	Yes	Yes	No	No	No	No
Link Test	Yes	No	No	No	No	No	No

2. Technical specification

Operating data			
Label	*Description*		*Value*
$V_{S\ (EXT)}$	Power supply, voltage range		9,0 → 32 Vdc
$P_{S\ (EXT)}$	Max power		max. 20 W
V_{BATT}	Battery voltage		3,3 → 4,8 Vdc
I_{BATT}	Max current from battery		max. 3,3 Adc
I_{Sleep}	Sleeping current (Power Off)		≤ 8 µA
I_{OSW}	Max current available at pin 2 of JP1		≤ 1,80 Adc
$V_{SHDN\ LOW}$	Low level Shutdown input		≤ 0,20 Vdc
$V_{SHDN\ HIGH}$	High level Shutdown input		≥ 2,50 Vdc
t_{SHDN} ↑/↓	Max time on/off using Shutdown input (Soft start/stop)		≤ 60 / 30 msec
$I_{SHDN\ LOW}$	Low level Shutdown input current		≤ - V_S / 220 (µA)
P_{RF}	RF transmission power	Level H	500 mW
		Level M	150 mW
		Level L	25 mW
RX_{SENS}	Receiver sensitivity		≤ -105 ± 3 dBm
RF_{MOD}	Modulation mode		***F1D
CH	Canalization		12,5 – 25 – 50 kHz
BR Radio	Baud Rate on radio channel		4.800 – 9.600 – 19.200 bps
Buffer	Memory buffer		1024 bytes
$Z_{I/O\ ANT}$	Antenna impedance		50Ω
$V_{RST\ LOW}$	Low level Reset input		≤ 0,90 Vdc
$V_{RST\ HIGH}$	High level Reset input		≥ 2,10 Vdc
$I_{RST\ LOW}$	Low level Reset input current		≤ - 115 µA (1)
$t_{RST\ LOW}$	Minimum time to hold down for Reset input		≥ 1 msec
$V_{CONFIG\ LOW}$	Low level Config input		≤ 0,60 Vdc
$V_{CONFIG\ HIGH}$	High level Config input		≥ 2,40 Vdc
$I_{CONFIG\ LOW}$	Low level Config input current		≤ - 115 µA (1)
$t_{CONFIG\ LOW}$	Minimum time to hold down the Config input		≥ 5 secondi
$V_{DIG\text{-}INP\ LOW}$	Low level digital inputs		≤ 0,60 Vdc
$V_{DIG\text{-}INP\ HIGH}$	High level digital inputs		≥ 2,40 Vdc
$I_{DIG\text{-}INP\ LOW}$	Low level digital inputs current		≤ - 2,8 µA (1)
$t_{DIG\text{-}INP}$ ↓/↑	Minimum time to hold low/high the digital inputs		≥ 85 / 750 msec
$V_{CNT\text{-}I\ LOW}$	Low level counter input		≤ 0,90 Vdc
$V_{CNT\text{-}I\ HIGH}$	High level counter input		≥ 2,10 Vdc
$I_{CNT\text{-}I\ LOW}$	Low level counter input current		≤ -2,50 µA (1)
$T_{CNT\text{-}I}$ ↓/↑	Minimum time to hold low/high for counter input		≥ 20 / 47 msec
$F_{MAX\ CNT\text{-}I}$	Max frequency on counter input		≤ 10 Hz

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$I_{A,B\ LINES}$	Max current out at RS-485 serial port	± 60 mA
BR DTE	Baud Rate RS-485 serial port	1.200 → 57.600 bps
V_{AN-OUT}	Min/max voltage on analog outputs	8,5 → 32,0 Vdc
$I_{O\ AN-OUT}$	Range of current on analog outputs	0 → 20 mA
V_{AN-INP}	Voltage range at the analog inputs	0 → 3,50 Vdc
$Z_{I\ AN-INP}$	Analog input resistence	173,5 ± 1,5Ω
$V_{+18V-OUT}$	Voltage +18 Vdc output	18,0 ± 0,1 Vdc
$I_{+18V-OUT}$	Max current at +18 Vdc output	200 mAdc

NOTE:

(1) Pull-up current

WARNING

Exceed the maximum operating value below (continuos and/or temporary) can damage the device

Maximum operating data		
Label	*Description*	*Value*
$V_{S(EXT)}$	Max power supply voltage	32 Vdc
V_{BATT}	Max battery voltage	5 Vdc
$V_{DIG-INP}$	Digital inputs max DC voltage on	± 12 Vdc
$V_{P\ DIG-INP}$	Digital inputs max peak voltage	± 32 Vdc
V_{SHDN}	Shutdown input max DC voltage	32 Vdc
$V_{P\ SHDN}$	Shutdown input max peak voltage	32 Vdc
V_{CONFIG}	CONFIG and RESET inputs max DC voltage	± 12 Vdc
$V_{P\ CONFIG}$	CONFIG and RESET inputs max peak voltage	± 32 Vdc
$V_{DIG-OUT}$	Digital outputs, max voltage	32 Vdc / 32 Vac
$V_{INS\ DIG-OUT}$	Digital outputs, max voltage referred to ground	32 Vdc / 32 Vac
V_{AN-OUT}	Analog outputs, max voltage	32 Vdc
$V_{INS\ AN-OUT}$	Analog outputs, max voltage referred to ground	32 Vdc / 32 Vac
V_{AN-INP}	Analog inputs, max voltage	± 5 Vdc
$V_{P\ AN-INP}$	Analog inputs, max peak voltage (1)	± 10 Vdc
$V_{P\ RS-485}$	Max peak voltage at the ports A/B RS-485 (1)	± 32 Vdc
I_{OSW}	Max output current available the pin 2 of JP1 (2)	2,6 A
$I_{O\ +18V}$	Max current available at +18V aux outputs (overall)	260 mA
$I_{O\ AN-OUT}$	Analog outputs, max current	32 mA
$I_{O\ DIG-OUT}$	Digital outputs, max current	1 Adc / 700 mAac
$I_{A,B\ LINES}$	Max current out at the A/B RS-485	± 200 mA
$T_{OPERATING}$	Operating temperature range	-30°C +60 °C
$T_{STORAGE}$	Storage temperature range	-40°C +85 °C

NOTE:

(1) Impulse time < 100 millisecond.

(2) With the equipment in sleep mode

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3. Installation

- Mechanical

The device must be installed in a location that is sufficiently ventilated so that there is no risk of internal heating. Place the device against a flat, firm and stable surface. It is not recommendable to install the radio modem on a strongly vibrating surface. Suitable dampening and/or isolation materials should be used in cases where the installation surface will be subjected to vibration.

- Electrical (wiring)

To prevent damage both the radio modem and any terminal devices must always be switched OFF before connecting or disconnecting the serial connection cable. It should be ascertained that different devices used have the same ground potential. Before connecting any power cables the output voltage of the power supply should be checked.

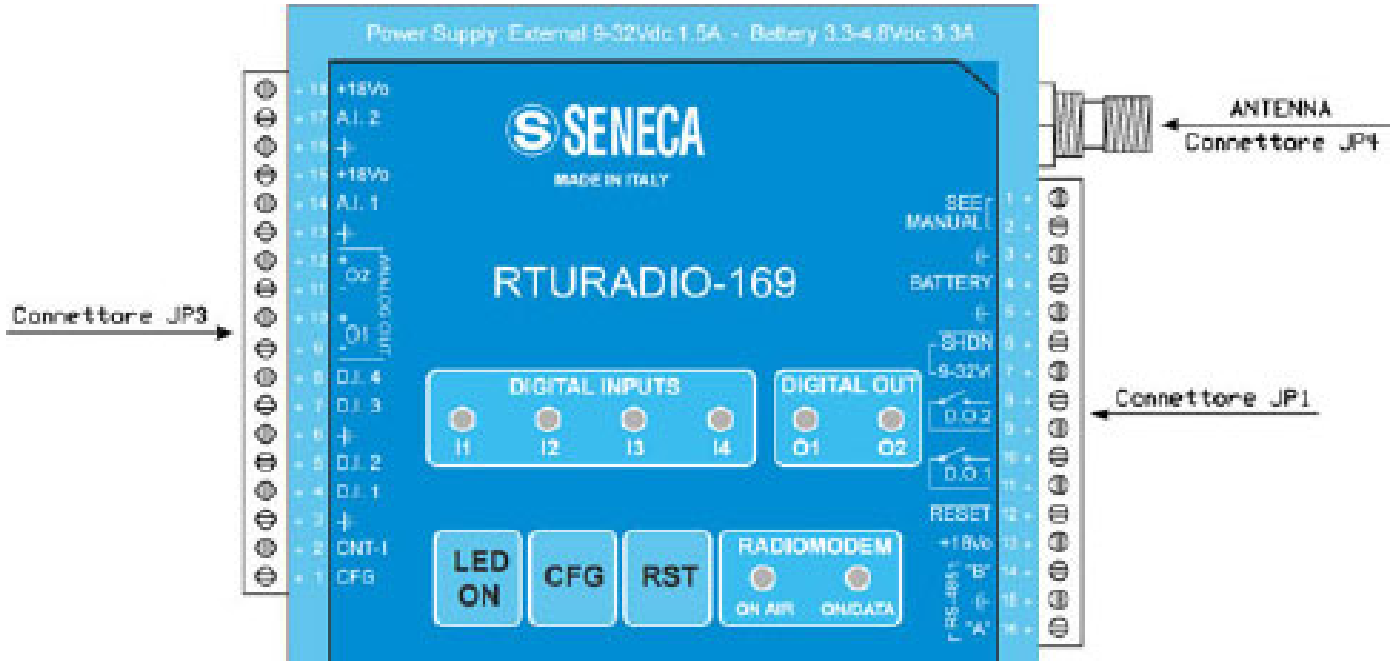
The product has no disconnecting device. An external disconnecting device must be installed. This must be close to the equipment.

Provide an adequate termination resistance on the RS485 serial line.

To by supplied by class II (LPS) certified AC/DC adapter.

In case of external power supply 9-32VDC do not connect any battery.

In case of battery operated must be careful to not invert the power polarity (not protected input)



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JP1 Connector		
PIN	*Label*	*Description*
1	See Manual	To connect to PIN 2 only in case of 9-32 VDC power supply (PIN 7-5)
2	See Manual	To connect to PIN 1 only in case of 9-32 VDC power supply (PIN 7-5)
3	⏚	Ground (GND)
4	3.3-4.8 Vb	Battery power supply (3.3 – 4.8 VDC) (1)
5	⏚	Ground (GND)
6	SHDN	Shutdown input (active low)
7	9-32 Vi	External power supply (9 - 32 VDC) (1)
8	D.O. 2	Digital Output n° 2 normally open (NO)
9	D.O. 2	Digital Output n° 2 normally open (NO)
10	D.O. 1	Digital Output n° 1 normally open (NO)
11	D.O. 1	Digital Output n° 1 normally open (NO)
12	Reset	Reset
13	+18Vo	18 VDC output (2)
14	“B”	RS-485 (line B)
15	⏚	Ground (GND)
16	“A”	RS-485 (line A)

NOTE:

(1) In case of external power supply 9-32VDC not connect any battery to PIN 4 – 3, In case of battery operated must not be inverted power polarity (not protect input)

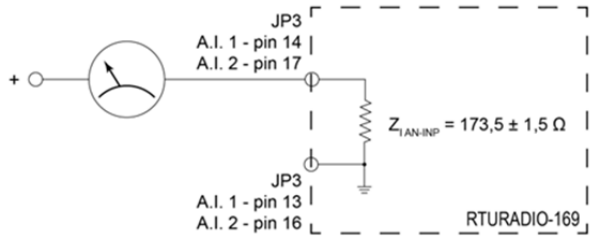
(2) Enabled by configuration software

JP3 Connector		
PIN	*Label*	*Description*
1	CONFIG	Configuration input (active low) (1)
2	Counter Inp.	Counter input (max frequency 10 Hz)
3	⏚	Ground (GND)
4	DIG. INP. 1	Digital Input n° 1 (active low)
5	DIG. INP. 2	Digital Input n° 2 (active low)
6	⏚	Ground (GND)
7	DIG. INP. 3	Digital Input n° 3 (active low)
8	DIG. INP. 4	Digital Input n° 4 (active low)
9	AN-OUT 1 -	Analog Output n° 1 (negative) (2)
10	AN-OUT 1 +	Analog Output n° 1 (positive) (2)
11	AN-OUT 2 -	Analog Output n° 2 (negative) (2)
12	AN-OUT 2 +	Analog Output n° 2 (positive) (2)
13	⏚	Ground (GND)
14	AN-INP. 1	Analog Input n° 1
15	+18Vdc Out	18 VDC output (3)
16	⏚	Ground (GND)
17	AN-INP. 2	Analog Input n° 2
18	+18Vdc Out	18 VDC output (3)

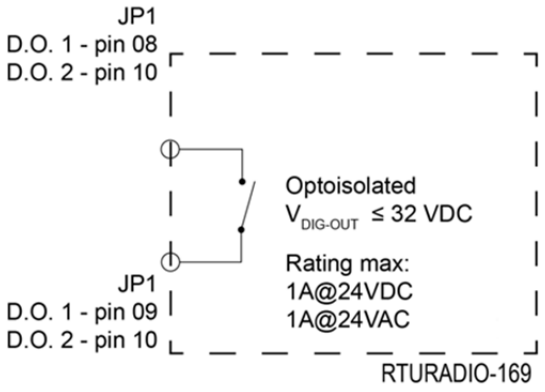
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NOTE:
(1) When the configuration input is connect to ground the device is ready for setting by configuration software through serial port
(2) Ground insulated
(3) Enabled by configuration software

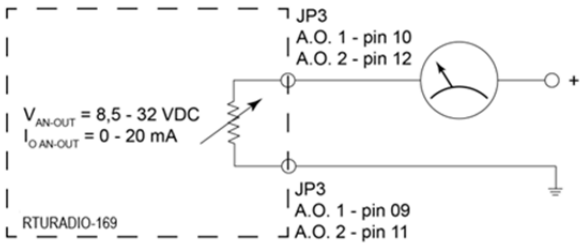
Analog Input



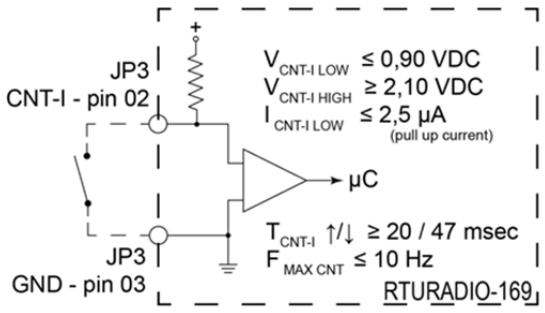
Digital Output



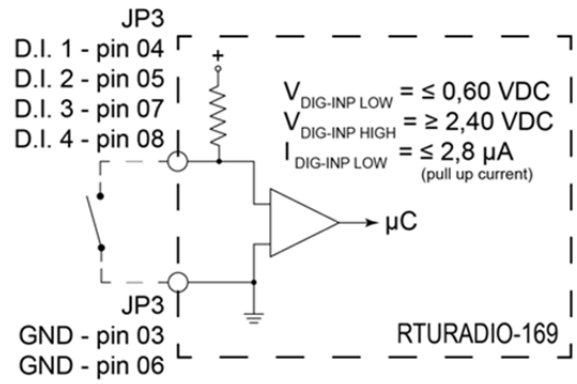
Analog Output



Counter Input



Digital Input



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- Antenna

The device's antenna must be free and at least 10 cm away from any conducting material. When the antenna is installed outside, it is essential to connect the cable screen to the building's earth. We recommend using lightning protection. The protection kit chosen must permit the coaxial cable to be earthed (eg: coaxial lightning arrester with earthing of the cable at different places on the antenna at the base of pylons and at the entry, or just before entering the premises).

- Dimensioni LxHxW: 130 x 100 x 45 mm

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EU Declaration of Conformity (DoC)

We: **SENECA s.r.l.**
via Austria 26 , 35127 Padova – ITALIA
Tel: 049.870.53.59; email: info@seneca.it

declare under our sole responsibility that the products:

Trademark: **SENECA**
Model: **RTURADIO-169, RM169-1**
Description: **Radiomodem for radio data transmission**

to which this declaration relates complies with the relevant EU harmonization directives:

- **2014/53/EU Radio and Telecommunication Terminal Equipment Directive (RED Directive)**
- **2011/65/EU Restriction of the use of certain hazardous substances Directive (RoHS Directive)**

The following harmonised standards and/or technical specifications have been applied:

Safety:	EN60950-1 :2006 + A1 :2010 + A2 :2013 +A11 :2009 +A12 :2011 + AC :2011
EMC & RTTE	EN 301 220-4 V1.1.1
	EN 301 489-1 V1.9.2
	EN 301 489-3 V1.6.1

PADOVA , 25.03.2019

P.I. Alessandro Barbett8

REV1:		
REV0:	**25/03/19**	DC002360

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EU Declaration of Conformity (DoC)

We: **SENECA s.r.l.**
via Austria 26 , 35127 Padova – ITALIA
Tel: 049.870.53.59; email: info@seneca.it

declare under our sole responsibility that the products:

Trademark: **SENECA**
Model: **Z-AIR-1**
Serial number: Axxxxx/nn (xxxxx = batch; nn = serial)
Description: **Radiomodem for radio data transmission**

to which this declaration relates complies with the relevant EU harmonization directives:

- **2014/53/EU Radio and Telecommunication Terminal Equipment Directive (RED Directive)**
- **2011/65/EU Restriction of the use of certain hazardous substances Directive (RoHS Directive)**

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Safety:	EN60950-1 :2006 + A1 :2010 + A2 :2013 +A11 :2009 +A12 :2011 + AC :2011
EMC & RTTE	EN 301 220-2 V3.1.1
	EN 301 489-1 V1.9.2
	EN 301 489-3 V1.6.1

PADOVA , 25.03.2019

P.I. Alessandro Barbett8

REV1:		
REV0:	**25/03/19**	DC002370

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