



# RADIO MODULES

Z-LINK1-NM, Z-AIR, RM169, RTURADIO

## Highlights

- Remote plants monitoring
- Cabling costs reduction
- Signals centralization from different points and distances
- Data transmission in climatically severe outdoor environments
- Modules with embedded I/O's
- Low power consumption
- RS232/R485 interfaces
- ModBUS RTU protocol support
- Different serial protocols supported with license free transmission
- External antennas
- Configuration via software

For radio transmission of process and control signals, SENECA radio modules use UHF/VHF technology with GFSK modulation and 169 / 869 MHz operating frequencies.

SENECA radio modules are suitable for indoor and outdoor applications both for remote control and process industry. These modules can cover ranges from hundreds meters up to few kilometers and each device supports different operating modes such as point-to-point, point-to-multipoint, broadcasting and signal repetition.

Z-LINK1 is a 869 MHz radio device designed to use radio communications operating remotely via ModBUS RTU protocol.

Z-AIR is suitable for medium range areas with integrated antenna and IP65 protection suitable for outdoor applications. The module operates on a UHF band 868-870 MHz operating on 6 basic channels, upgradeable up to 20 channeled sub-bands (12,5 kHz or 25 kHz).

RM169 (Radio Modem with 169 MHz operating frequency) is a NBFM system (Narrow Band Frequency Modulation) with RS232/RS485 interface optimized to be powered by primary or secondary batteries in accordance with the standard ERC 70-03 and European decision 2005/928/EC.

RTURADIO-169 uses a radio modem NBFM at 169,4 MHz with output power up to 500 mW. Uses the AES (Advanced Encryption Standard) 128-bit to transfer data with a high level of security. This device has 2 analog inputs, 2 analog outputs, 4 digital inputs, 2 digital outputs, 1 RS485 serial port and a counter input.





## RADIO MODULES

### Z-LINK1-NM, Z-AIR, RM169, RTURADIO

Our experience in interface technology, radio modules and radio modems is one of the key elements of automation and communication systems, especially in signal transmission from a few meters to several tens of kilometers. UHF / VHF equipment and industrial modem allow you to reach wide distances with maximum reliability.

They also grant you to perform remote control and field devices diagnostics via point-to-point multipoint, broadcasting, mesh, signal repetition mode.



## Z-AIR 868 – 870 MHz RADIOMODEM WITH BUILT-IN ANTENNA



LICENSE FREE	IP65	Z-AIR SETUP
LOW CONSUMPTION	BUILT-IN COAXIAL ANTENNA	

**Power Supply:** 8-32 Vdc  
**Operating bandwidth:** 868 - 870 MHz  
**Modulazione:** NBFM / GFSK  
**Transmission Power:** 25 / 150 / 500 mW  
**Built-in I/O**  
**Interfaces:** RS485  
**Operating mode:** Point-to-Point, Point-to-Multipoint, Broadcasting, Digipeater, LBT (Listen Before Talk), Agility

### Glossary

**AGILITY** System that combines the most spread radio communication technologies with safety systems, alarm management, with remote control, web and mobile applications.

#### BROADCASTING

Broadcasting is the distribution of communication content or other messages to a dispersed audience via any electronic mass communications medium, but typically one using the electromagnetic spectrum (radio waves) in a one-to-many model.

#### DIGIPEATER (Digital Repeater)

Digipeater or Digital Repeater" is a repeater for packet data rather than voice. Unlike the standard voice repeater that receives on one frequency and retransmits what it hears simultaneously on another frequency, the usual digipeater is a single frequency device.

#### GFSK (Gaussian Frequency Shift Keying)

GFSK stands for Gaussian Frequency Shift Keying modulation. In GFSK, baseband pulses are first passed through the gaussian filter before modulation. This makes pulses smooth and hence limit the modulated spectrum width. This process is known as pulse shaping.

#### LBT (Listen Before Talk)

Technique used in radiocommunications whereby a radio transmitters first sense its radio environment before it starts a transmission.

#### NBFM (Narrow Band Frequency Modulation)

A narrow band FM is the FM wave with a small bandwidth. The modulation of narrow band FM is small as compared to one radiant. Hence, the spectrum of narrow band FM consists of the carrier and upper sideband and a lower sideband.

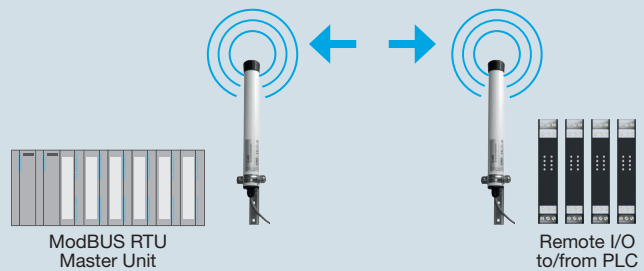
#### POINT-TO-MULTIPOINT

Communication mode which is accomplished via a distinct type of one-to-many connection, providing multiple paths from a single location to multiple locations. Point-to-multipoint is often abbreviated as P2MP, PTMP, or PMP.

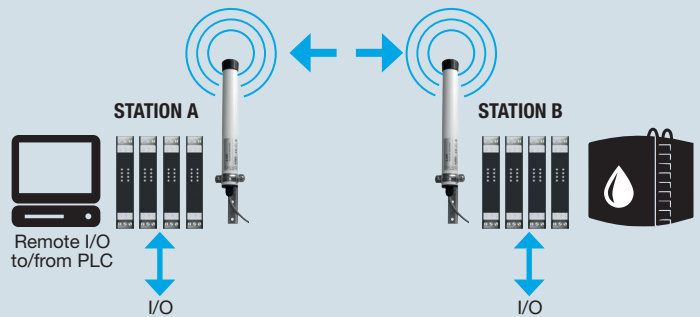
#### POINT-TO-POINT

Point-to-Point Protocol (PPP) is a data link (layer 2) protocol used to establish a direct connection between two nodes. It can provide connection authentication, transmission encryption and compression.

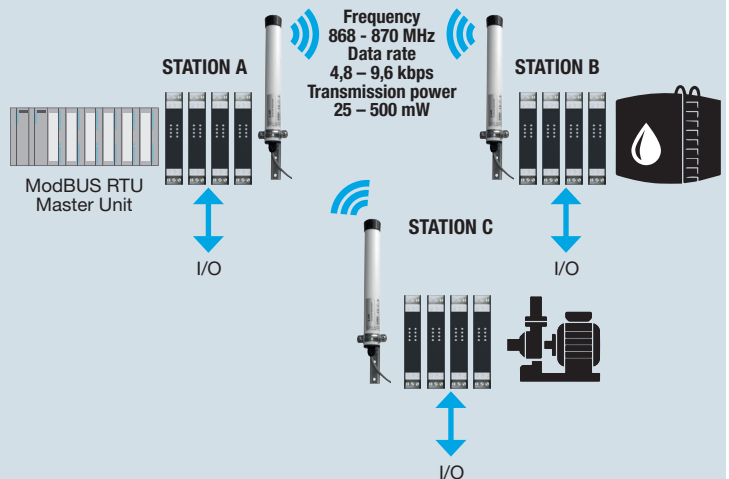
### Data transmission from Master ModBUS Unit







### Point-to-point data transmission (i.e. I/O repetition)



### Point-to-Multipoint data transmission

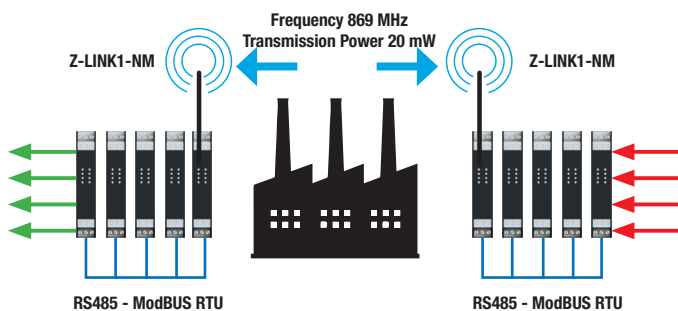


	Z-LINK1-NM	Z-AIR	RM169	RTURADIO
				
	<b>869 Mhz Radiomodem with RS232/RS485 interface</b>	<b>Radiomodem with omnidirectional antenna, outdoor applications, IP65 protection</b>	<b>169MHZ Radiomodem, 1DI,1DO,1RS485</b>	<b>169MHZ 500mW Radiomodem, 4DI, 2 DO, 1 counter, 2 AO, 2 AI, RS485</b>
<b>GENERAL DATA</b>				
Power Supply	10..40 Vdc; 19..28 Vac	8 – 32 Vdc	8 -36 Vdc with limited power source	9-32 Vdc with limited power source; 3,3-4,8 Vdc with battery supply
External device supply	-	-	-	Yes
Consumption	1W @ 12 Vdc	150 mA @12 Vdc	-	-
Status indicators	Power Supply / Error / Rx/Tx Data	ONAIR / On	ONAIR / On / Data	ONAIR / On / Data / I/O
Operating bandwidth	g3, annexed 1 ERC 70-03 (869.4 MHz – 869.650 MHz)	868 – 870 MHz	169.400 – 169.475 Mhz	169.400 - 169.475 MHz
Modulation	GFSK	9K00F1D (@ 12,5 kHz di canalization); 18K00F1D (@ 25 kHz canalization)	9K00F1D o 18K0F1D (NBFM / GFSK)	9K00F1D o 18K0F1D (NBFM / GFSK)
Data rate (radio)	-	4.800 bps (@ 12,5 kHz canalization); 9,6 kbps (@ 25 kHz canalization)	4.800 bps (@ 12,5 kHz canalization); 9,6 kbps (@ 25 kHz canalization)	4,800 bps @ 12.5 kHz – 9,600 bps @ 25 kHz
Frequency stability	-	± 1 ppm/°C	±500 Hz	±500 Hz
Crypting	AES 128 bit	AES 128 bit	AES 128 bit	AES 128 bit
RTC	-	-	Built-in for custom application	Built-in for custom application
Antenna	ANT Mag (standard) SMA maschio , ANT-LINK1-MG (opt)	λ/2 integrated	λ/4 - λ/2 or 3 Yagi elements	Short vertical stilo λ.1/2 / λ.1/4 / 3 Yagi elements
Dimension	17,5 x 100 x 112 mm	Ø 40 x L 320 mm	90 x 100 x 40 mm	140 x 110 x 50 mm
Operating temperature	0..55°C	-30..+70 °C	-30..70°C	-30..70°C
Weight	200 g	750 g	210 g	330 g
Protection degree	IP20	IP65 (outdoor installation)	IP20	IP20
Mounting	DIN rail 35 mm	Mounting bracket and screws in stainless steel	Wall / panel mounting	Wall / panel mounting
Aux Digital Output	-	-	N.O. 28 Vac @ 0,5 A o 60 Vdc @ 1 A	nr. 2 N.O. 28 Vac @ 0,5 A o 60 Vdc @ 1 A
Digital Input	-	-	5-24 Vdc o 3,50-20 Vac. Zinp. 2.2 kΩ (optoisolated)	nr. 4 PNP 0-12 Vdc + 1 counter 10Hz
Built-in I/O	-	-	1 DI , 1 DO	4DI, 2DO (relay), 1 counter, 2AO (4-20 mA), 2 AI (4-20 mA)
Operating Mode / Functions	Point-to-point, Point-multipoint, I/O repeater	Point-to-point, Point-multipoint, Broadcasting, digital repeater	Point-to-point, Point-multipoint, Broadcasting, digital repeater, DTE addressing, ACK, message repetition, ECHO, LBT, AFA, remote programming	Point-to-point, Point-multipoint, broadcasting, Modbus (master/slave), Mesh support (static)
Settings (software)	EASY SETUP	Z-AIR-SETUP	RM169-SETUP	RTURADIO-SETUP
<b>TRANSMITTER</b>				
Output power	20 mW	25/150/500 mW	0.20 WERP (DL169-IN-B); 0.5 WERP (DL169-IN-B-Y3)	500 mWERP
Frequency deviation	-	± 1.8 kHz @ 12,5 kHz - ± 3.6 kHz @ 25 kHz	± 1.8 kHz @ 12,5 kHz - ± 3.6 kHz @ 25 kHz	± 1.8 kHz @ 12,5 kHz - ± 3.6 kHz @ 25 kHz
Output power stability	-	±1.5 dB	±1.5 dB	±1.5 dB
<b>RECEIVER CLASS 1/2 - LBT - AGILITY</b>				
Type	-	CLASS 2 - LBT, AGILITY	CLASS 2 - LBT, AGILITY	CLASS 1 - LBT, AGILITY
Sensitivity	-	BER <10 <sup>-3</sup> @ 9.600 bps < -107 dBm @ 25 kHz	<-110 dBm @ 12,5 kHz - <-107 dBm @ 25 kHz BER 10-2	<-110 dBm @ 9.600 bps
<b>COMMUNICATION</b>				
Interfaces	N°1 RS232, N° 1 RS485	RS485	RS232 / RS485	RS485
Protocols	ModBUS RTU	Protocol transparent (max buffer 448 bytes)		
Data rate	1.200...115.200 bps	1.200...38.400 bps	1.200...38.400 bps	2.400...57.400 bps
Transmission mode	Half Duplex	Simplex / Half Duplex	Simplex / Half Duplex	
<b>STANDARD</b>				
Approvals	CE, ETSI	CE	CE	CE
Norms	ETSI EN 300 220-2 V2.1.2 (2007-06) ETSI EN 301 489-3 V1.4.1 (2002-08) CEI EN 61010 Radio and telecommunications terminal equipment directive 99/5/EC Electromagnetic compatibility directive 2004/108/EC Low Voltage equipment directive 2006/95/EC	EN 301 489 – 1 v 1.9.2 EMC Compatibility general directive EN 301 489 – 3 v 1.4.1 EMC Compatibility specific for Short Range Devices (SRD) EN 60950 – 1 Safety requirements plus Attachment 11 2004 EN 300 220 – 1 v 2.3.1 Short Range Devices specifications EN 61000 – 4 – 4	EN 300 220-1 v2.3.1 , EN 300 220-2 v2.3.1	EN 300 220-1 v2.3.1 , EN 300 220-2 v2.3.1

## APPLICATION EXAMPLES

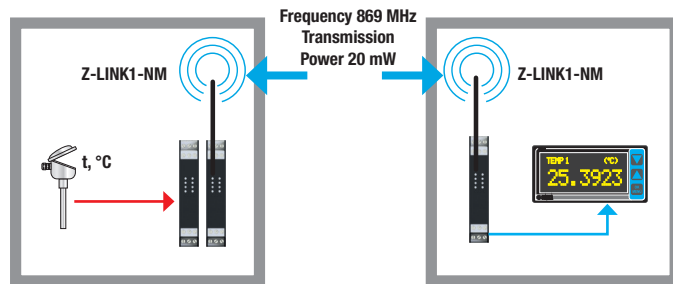
### Z-LINK1-NM

#### ANALOG SIGNAL CONVERSION AND RE-TRANSMISSION



### Z-LINK1-NM

#### «SHORT RANGE» SIGNAL REPETITION



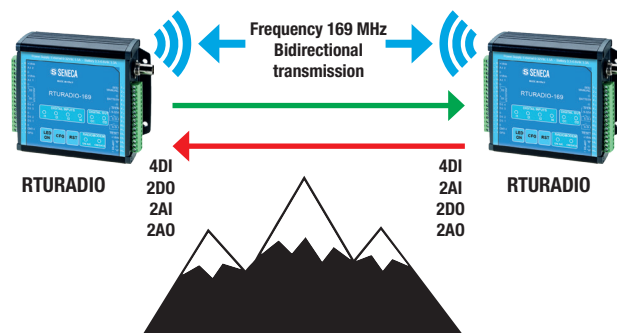
### RM169

#### POINT-TO-POINT / POINT-TO-MULTIPOINT TRANSMISSION



### RTURADIO

#### I/O MIRRORING – REMOTE SIGNAL TRANSMISSION



## ORDER CODES

Code	Description
<b>Z-LINK1-NM</b>	
Z-LINK1-NM	869 MHz Radiomodem with RS232/RS485 interface
CS-RJ10-DB9F	RS232 (RJ10 / DB9F) serial cable
Z-PC-DIN2-17.5	Power supply / data bus support for DIN rail, 2 slots, step 17.5 mm
Z-PC-DINAL2-17.5	Power supply / data bus support for DIN rail, head terminal + 2 slots, step 17.5mm
A-DIR-10-869	Directive external antenna, 10 elements, 824-960 MHz
A-DIR-6-869	Directive external antenna, 6 elements, 824-960 MHz
ANT-LINK1-MG	Dual Band external magnetic antenna
EASY SETUP	Programming software
<b>Z-AIR</b>	
Z-AIR	Radiomodem with integrated antenna, outdoor applications, IP65 protection
S107USB	RS485/USB Asynchronous Serial converter, handheld version
Z-AIR-SETUP	Z-AIR software configurator
<b>RM169</b>	
RM169	169MHZ Radiomodem, 1DI,1DO,1RS485, BNC-F connector
RM169-169DV12	169MHZ Radiomodem, 1DI,1DO,1RS485, vertical dipole antenna
RM169-169YAGI	169MHZ Radiomodem, 1DI,1DO,1RS485, 3 elements Yagi antenna
RM169-169DV14	169MHZ Radiomodem, 1DI,1DO,1RS485, vertical stilo antenna
A-169DV12	169MHz vert.Dip. lambda/2 ant, BNC M, 5mt, low loss cable
A-169DV14	169MHz vert.Dip. lambda/2 ant, BNC M, 5mt
A-169YAGI	169MHz 3 elem. Yagi Ant., BNC M, 10 mt, low loss cable
RM169-SETUP	RM169 radiomodem software configuration
<b>RTURADIO</b>	
RTURADIO-169	RTU RADIO VHF 169MHZ 500mW, 4DI, 2 DO, 1 counter, 2 AO, 2 AI, RS485 port, BNC-F connector
RTURADIO-169DV14	RTU RADIO VHF 169MHZ 500mW, 4DI, 2 DO, 1 counter, 2 AO, 2 AI, RS485 port, BNC-F connector + short vertical antenna ¼
RTURADIO-169DV12	RTU RADIO VHF 169MHZ 500mW, 4DI, 2 DO, 1 counter, 2 AO, 2 AI, RS485 port, BNC-F connector + dipole antenna ½
RTURADIO-169YAGI	RTU RADIO VHF 169MHZ 500mW, 4DI, 2 DO, 1 counter, 2 AO, 2 AI, RS485 port, BNC-F connector + 3 elements Yagy antenna
S117P1	RS232/USB, TTL/USB, RS485/USB asynchronous serial converter
RTURADIO-SETUP	RTURADIO radiomodem software configuration