

User manual
Firmware version V2.0
8.5.2008

FTR262

Universal wireless transmitter
Pt100, TC, mV, mA and V inputs



Nokeval

DESCRIPTION

FTR262 is a wireless transmitter that has universal input and can be powered using batteries or 24 VDC power supply. It is housed in a field enclosure (IP65) and equipped with detachable screw post connectors for inputs and power supply.

The wireless concept allows easy implementation, installation and expansion of a measuring system even in difficult locations and installation sites. The transmitter is programmable for transmission intervals from 5 seconds to 5 minutes and for the following inputs: Pt100, Ni, Cu, universal thermocouple (mV + cold junction temperature), ohms, millivolts, milliamperes and volts up to 100 VDC.

Measured values are transmitted using license free 433.92 MHz frequency band (ISM) so FTR262 can be freely used, for example, almost in whole Europe.

Manufacturer

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SUPPLY VOLTAGE

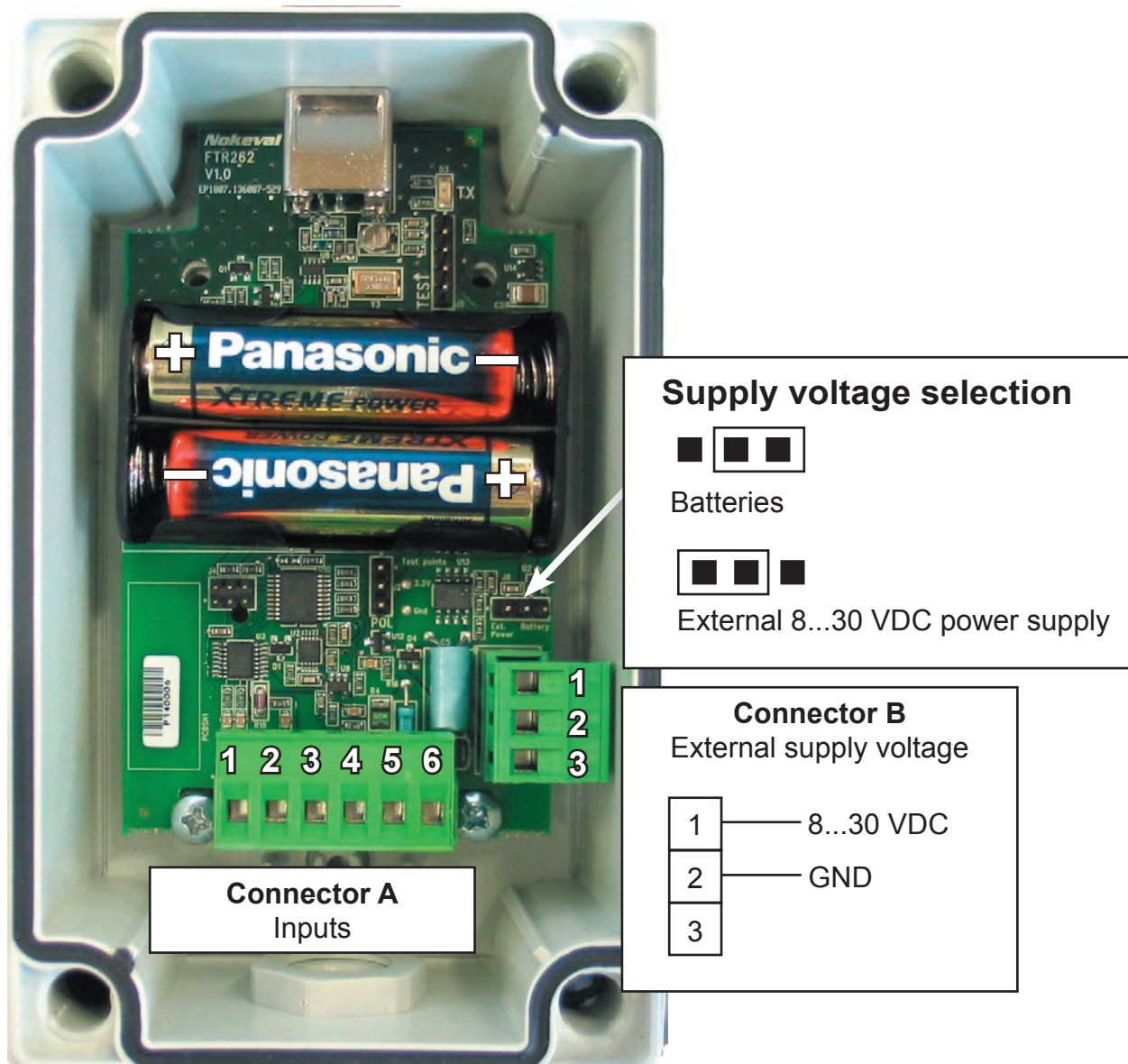
FTR262 can be powered using standard AA batteries or external 24 VDC power supply. Note that the supply voltage selection jumper must be configured accordingly.

Installing/replacing the batteries

Open the case, match the batteries to the + and - marks inside the battery holder and insert the batteries. Set also the supply voltage selection jumper to batteries position.

External power supply

FTR262 can be powered connecting 8...30 V external power supply to connector B. Open the case and connect the positive wire of the supply voltage to terminal 1 and the ground wire to terminal 2. Set also the supply voltage selection jumper to external power supply position



SETTINGS

Use MekuWin program and programming cable or Nokeval 6790 hand held programmer to configure the device. You can download MekuWin from Nokeval's web site www.nokeval.com for free.

Connection settings

Communication settings for configuration:

- baud rate 9600
- protocol SCL
- address 0

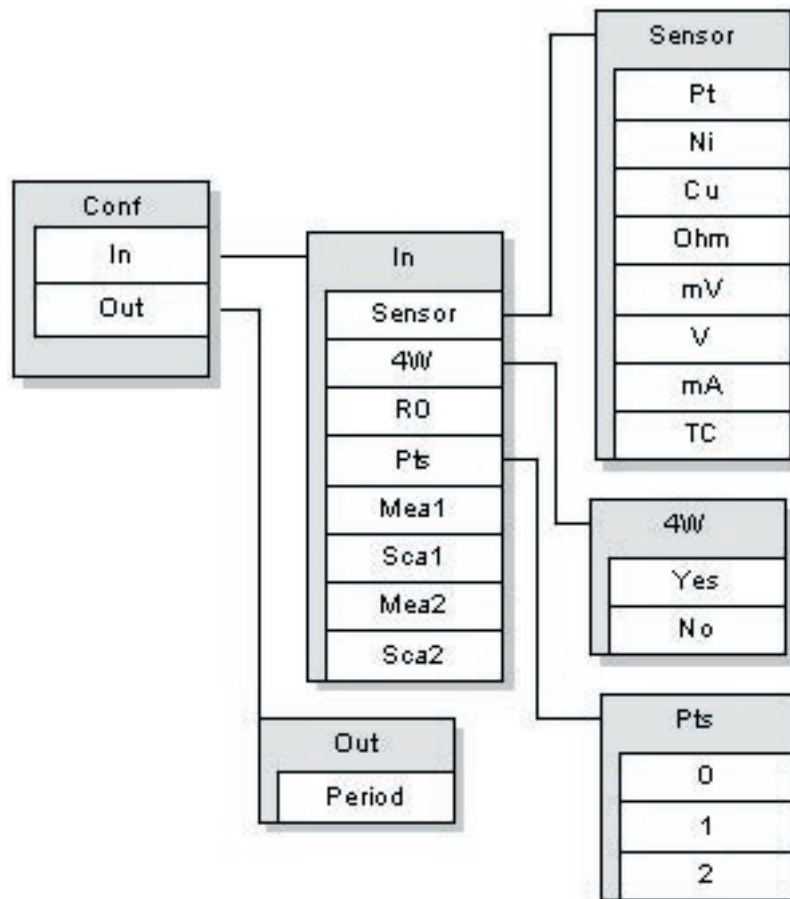
Programming connector

The device has a 3PIN POL programming connector. Use POL-3PIN adaptor to connect a POL-RS232 cable, DCS772 (USB-POL converter) or 6790 to the device. The 3PIN POL programming connector can be connected in both ways.

When the programming connector is connected the device sends measurement data about three times per second. When the configuration connection is open no measurement data is sent.

Menu

FTR262 menu structure



INPUTS

Settings

The configuration menu is divided in several submenus. The input settings are in a submenu called In.

In submenu

Sensor

Input range and sensor selection.

- **Pt, Ni and Cu:** Resistance thermometers (RTD's). The nominal resistance is set in R0 (see below). The reading is in Celsius.
- **Ohm:** Resistance input. The resistor is connected in two-wire, three-wire or four-wire connection. The reading is in ohms.
- **mV:** Voltage input -30...2000 mV.
- **V:** Voltage input -600 mV...100 V.
- **mA:** Current input 0...25 mA.
- **TC:** Thermocouples.

Note! FTR262 doesn't do linearization. If TC is selected, the result is sent in millivolts. In addition, the device measures and sends the cold junction temperature. The result is linearized in the receiving system (for example, PromoLog or FTR/RTR970-PRO)

4W

- No: Three-wire RTD connection.
 - Yes: Two-wire or Four-wire RTD connection.
- See the connections chapter for details.

R0

The nominal resistance of a resistive temperature sensor. With Pt and Ni sensors, this is the resistance at 0°C, e.g. with Pt100 set R0=100. With Cu the nominal resistance is given at 25°C.

If the real resistance of the sensor at the nominal temperature is known, it can be fed here, in order to cancel the sensor error.

Pts

Number of scaling points. The scaling means converting the reading to represent some other (engineering) reading. The scaled value is used on the display, serial output, analog outputs, and alarms.

- **0:** No scaling.
- **1:** One point offset correction. The reading corresponding to Mea1 is scaled to be Sca1 when displayed, using appropriate offset value.
- **2:** Two point scaling. Readings from Mea1 to Mea2 are scaled to be Sca1 to Sca2 on the display and other outputs. Any values can be used, these do not have to be the end points.

Mea1, Sca1, Mea2, Sca2

Scaling points. Visibility of these settings depend on the Pts setting. Unscaled reading Mea1 is converted to Sca1, and Mea2 to Sca2. These scaling points can be conveniently used to calibrate a sensor-transmitter pair in a thermal bath. First set the scaling off by setting Pts=0. Apply one or two known temperatures to the sensor and write down the displayed and the real temperatures. Then set Pts to 1 or 2 depending on the number of calibration points, and write the first reading in Mea1 and the real temperature in Sca1. And the same with Mea2 and Sca2 if two points are calibrated.

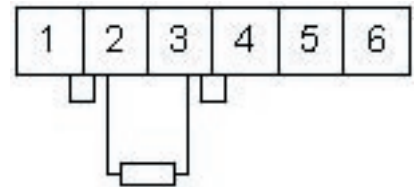
Connections

When using external power supply note that the inputs are not galvanically isolated from supply voltage.

Resistance input

Two-wire connection

Connect the sensor to terminals two and three. Terminal two is the measurement current source. Note that terminals one and two must be connected, as do terminals three and four.

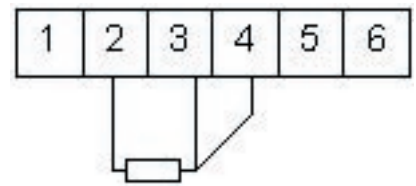


Two-wire measurement is not recommended to be used with long wires, because the resistance of wires affects to the result.

You must enable four-wire (4W) measurement in settings.

Three-wire connection

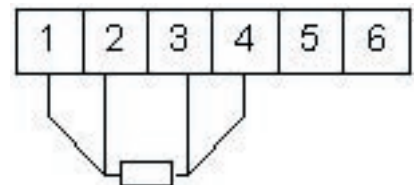
Connect the sensor to terminals two, three and four. Terminal two is the measurement current source. Note that all conductors should be equal in length and have equal cross-sectional area.



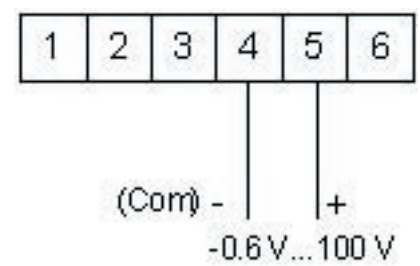
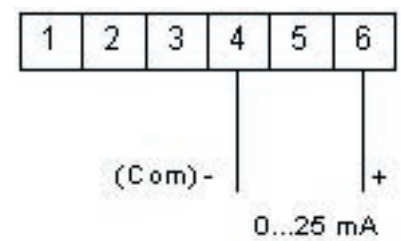
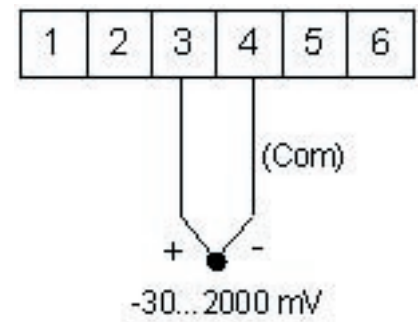
You must disable four-wire (4W) measurement in settings.

Four-wire connection

Connect the sensor to terminals one, two, three and four. Terminal two is the measurement current source. Four-wire measurement is the most accurate way to measure sensor's resistance because the resistance differences in conductors have no effect.



You must enable four-wire (4W) measurement in settings.



RADIO TRANSMITTER

The device sends the measurement data using license free 433.92 MHz frequency range.

Settings

Radio transmitter configuration is done in Out submenu.

Out submenu

Period

Number of periods between consecutive transmissions. The minimum value for this setting is two and maximum value is 127. One period is approximately 2.7 seconds (25 °C). The duration of a period depends on temperature and varies from 1.5 to 3 seconds. When using batteries, it is not recommended to set the period value smaller than necessary because it has a quite significant effect on battery life.

Period	Nominal Interval
2	5 s
11	30 s
22	1 min
67	3 min
127	5 min 40 s

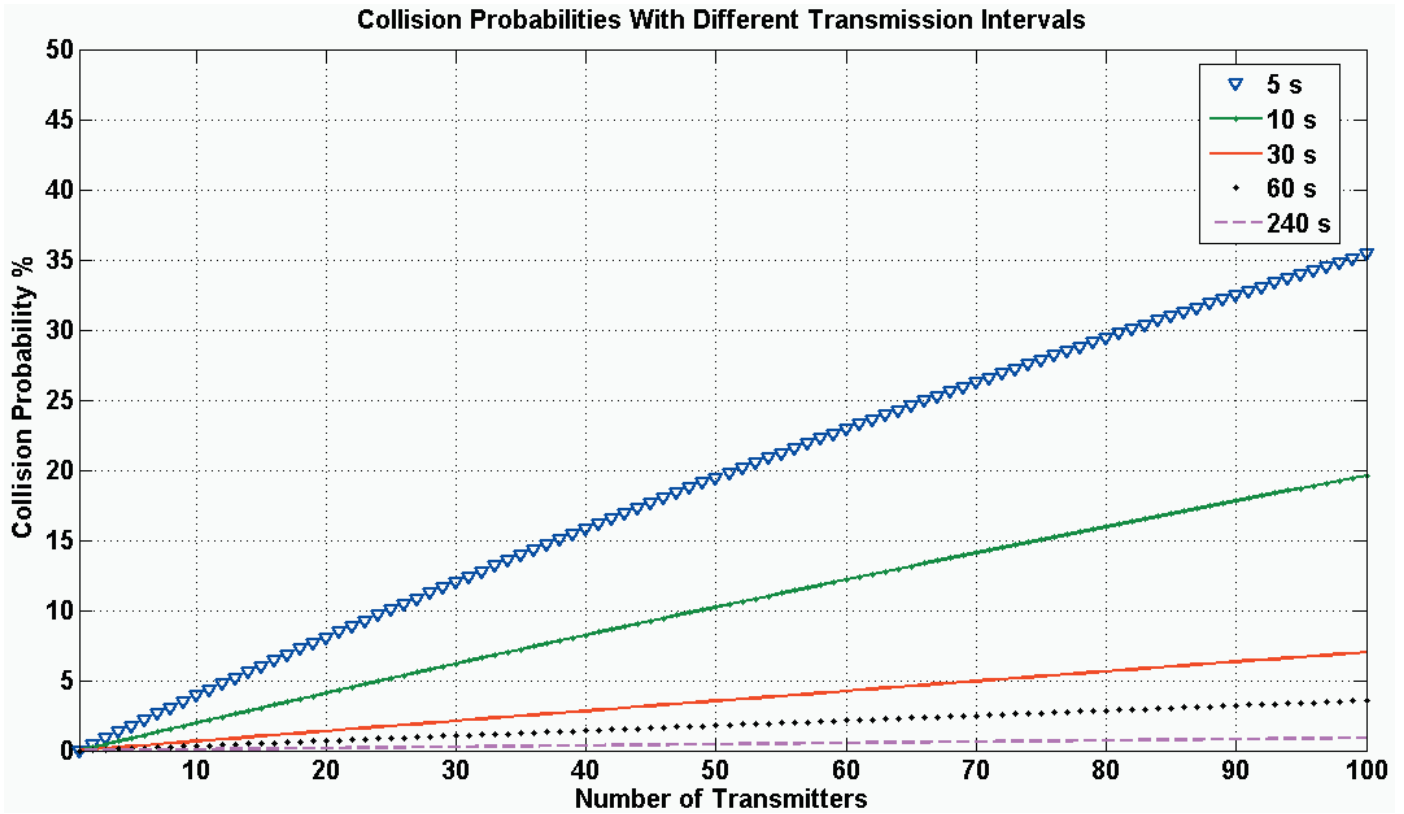
Maximum number of transmitters

The maximum number of radio transmitters in a coverage area is limited by radio standards. The use of repeaters reduces the maximum number of transmitters because repeaters use the same frequency channel as transmitters. The following example table shows the allowed maximum number of FTR262 transmitters in a coverage area.

Transmission Interval (s)	Receiver	Receiver and 1 repeater	Receiver and 2 repeaters
	Maximum number of transmitters		
5	22	11	7
10	43	22	14
20	87	43*	29
30	130	65	43
40	174	87	58
50	217	109	72
60	261	130	87
70	304	152	101
80	348	174	116
90	391	196	130
120	522	261	174
240	1043	522	348

For example, if you have transmission interval of 20 seconds and one repeater, the maximum number of transmitters is 43*.

The collision probability of radio data packets increases when the number of transmitters in a coverage area increases or the transmission interval decreases. The following picture shows how the collision probability raises as the number of transmitters increases.



SPECIFICATIONS

Inputs

Pt100

Range -200...700 °C
 Accuracy 0.05% rdg + 0.25°C
 Thermal Drift 0.02°C/°C

Ni100

Range -60...180 °C
 Accuracy 0.05% rdg + 0.25°C
 Thermal Drift 0.02°C/°C

Cu10

Range -200...260 °C
 Accuracy 0.05% rdg + 0.25°C
 Thermal Drift 0.02°C/°C

Thermocouples

Accuracy Cold junction
 0...40 °C ±0.75 °C
 -30...60 °C ±1.5 °C

Thermocouple: See mV

mV

Range -30...2000 mV
 Accuracy 0.05 % rdg + 0.01 mV
 Thermal Drift 50 ppm/°C
 Load >1 MΩ

V

Range -600 mV...100 V
 Accuracy 0.05 % rdg + 0.01 V
 Thermal Drift 50 ppm/°C
 Load >1 MΩ

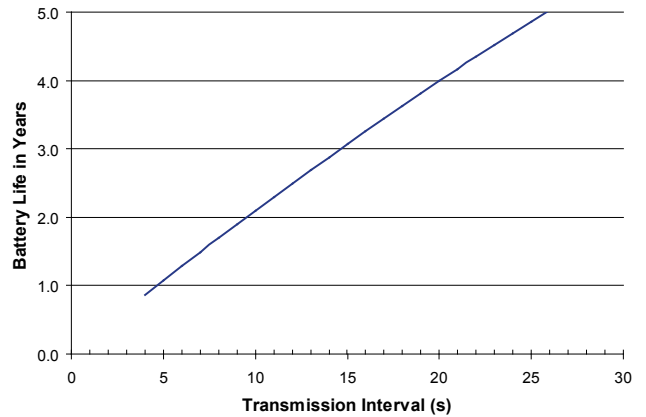
mA

Range 0...25 mA
 Accuracy 0.008 mA
 Thermal Drift 50 ppm/°C
 Load 50...80 Ω

Supply voltage

2 x 1.5 V alkaline AA batteries or external 8...30 VDC power supply

Estimated Battery Life Time (25 °C)



The use of "heavy duty" or "long life" batteries is recommended. Replace both batteries at the same time and with the same type.

Because alkaline batteries are prone to leak over time it is recommended to change the batteries after few years.

Environment

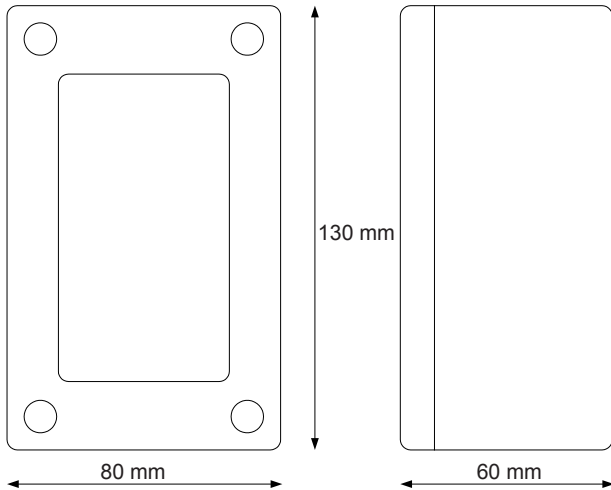
Oper. temperature -30...+60 °C
Protection class IP65

Compatible radio devices

Nokeval MTR, RTR and FTR series radio devices.

Dimensions

Case: 80 mm x 130 mm x 60 mm (WxHxD)



Antenna: 178 mm, \varnothing 8...16 mm

Radio transmitter

Antenna connector: 50 Ω female BNC connector

Standard antenna: Quarter-wave whip antenna (BNC connector)

Frequency range: License free 433.92 MHz subband f according to ERC/REC/70-03

Coverage area:

- Open space: up to 500 m
- Indoors: typically 50...100 m

Configuration

Connector: 3PIN POL programming connector

Protocol: Nokeval SCL protocol

Configuration: PC with Mekuwin for Windows 98...XP or 6970 hand held programmer

Regulations

EMC directive

- EMC immunity EN 61326
- EMC emissions EN 61326, class B

R&TTE directive

- EN 300 220 class 3,
Transmitter power class 8 (10 mW)
- EN 301 489
- EN 300 339

