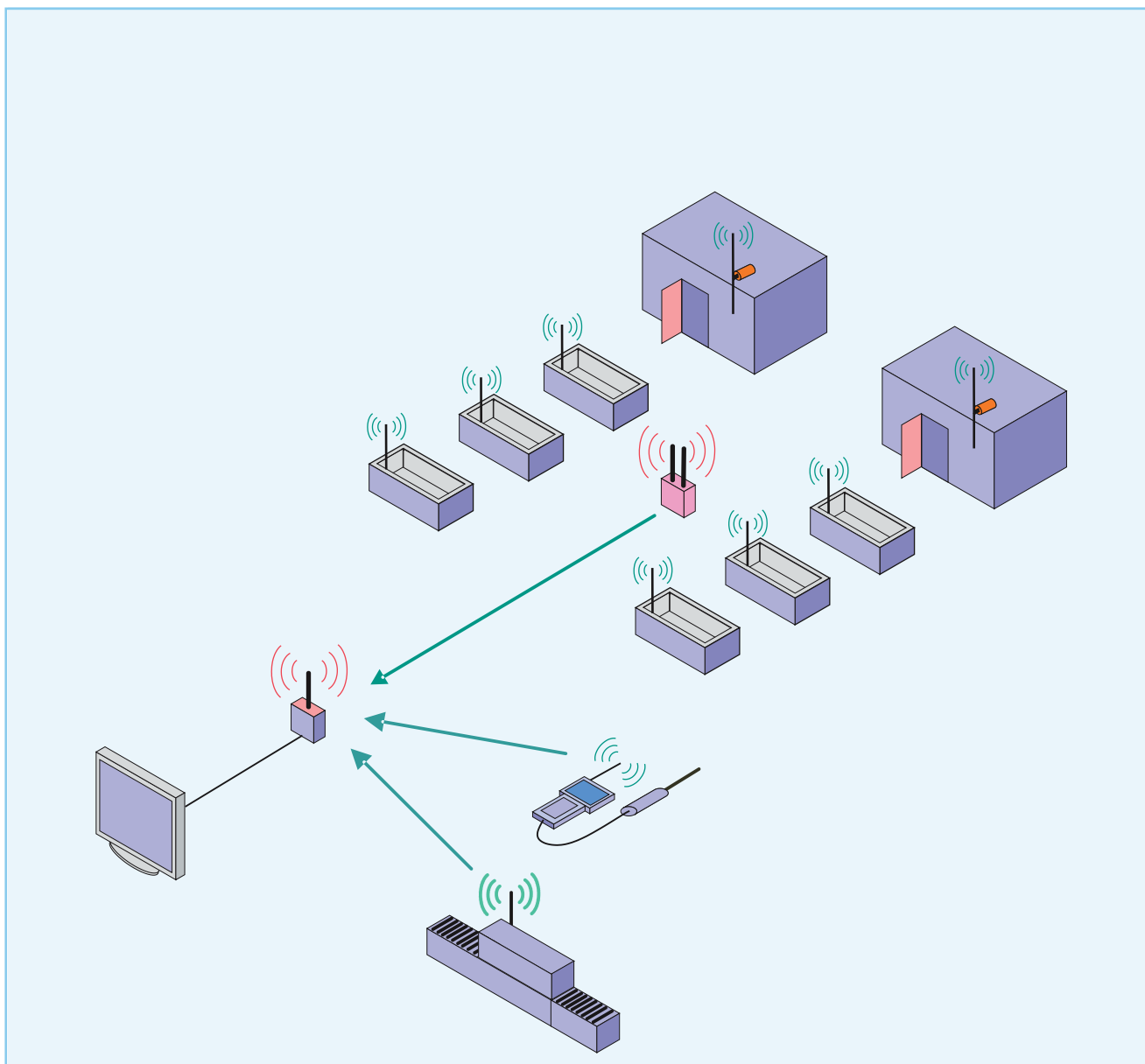


# Nokeval

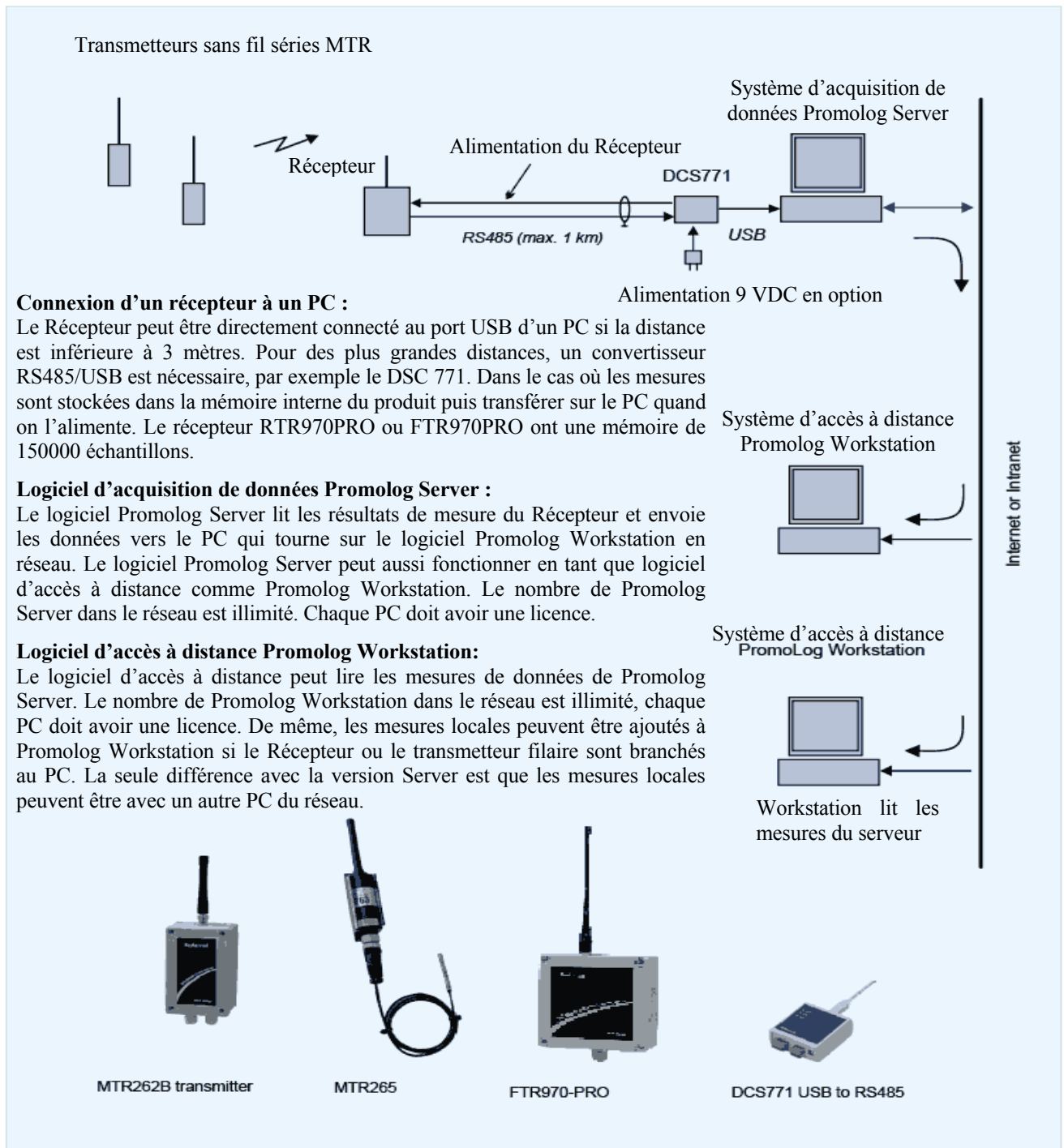


## Transmetteurs sans fils



# APPLICATIONS

## Utilisation du logiciel Promolog Server et Workstation.



|                                       |                     |               |
|---------------------------------------|---------------------|---------------|
| Transmetteurs sans fil des séries MTR | Récepteur RTR970PRO | Convertisseur |
|---------------------------------------|---------------------|---------------|

### DIMELCO NORD

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# Recepteurs sans fils

Receivers

Transmitters

Software

Applications

Temperature sensors



|                                  | Récepteur   | Récepteur avec mémoire   | Répéteur   | Récepteur pour rail DIN   | Récepteur avec mémoire   |
|----------------------------------|---|--|--|---|--|
| <b>Modele</b>                    | <b>FTR970</b>   | <b>FTR970-PRO</b>  | <b>FTR960</b>  | <b>RTR970</b>   | <b>RTR970-PRO</b>  |
| <b>Fabricant</b>                 | Nokeval   | Nokeval  | Nokeval  | Nokeval   | Nokeval  |
| <b>Radio signal</b>              | Frequence 434 MHz   | Frequence 434 MHz  | Frequence 434 MHz  | Frequence 434 MHz   | Frequence 434 MHz  |
| <b>Nombre de voies</b>           | jusqu'à 1000 *  | jusqu'à 1000 *   | jusqu'à 500  | jusqu'à 1000  | jusqu'à 1000 *   |
| <b>Recepteur</b>                 | •   | •  | -  | •   | •  |
| <b>Repeteur</b>                  | -   | -  | •  | -   | -  |
| <b>Mémoire Non volatile</b>      | -   | 150.000 échantillons   | -  | -   | 150.000 échantillons   |
| <b>Récupération Données</b>      | PromoLog (PC)   | Lisible par le client  | -  | PromoLog(PC)  | Lisible par le client  |
| <b>Serial data / Ouput</b>       | RS485, USB  | RS485, RS232, USB  | -  | RS485, USB (Nokeval SCL protocol)   | RS485, RS232, USB (SCL, Modbus protocols)                                  |
| <b>Protocole</b>                 | Nokeval SCL   | SCL et Modbus RTU  | -  | Nokeval SCL   | SCL et Modbus RTU  |
| <b>Temperature d'utilisation</b> | -30..+60°C  | -30..+50°C   | -30..+60°C   | -30..+60°C  | -30..+50°C   |
| <b>Configuration avec</b>        | MekuWin   | MekuWin  | -  | MekuWin   | MekuWin  |
| <b>Alimentation</b>              | 9..30 VDC   | 9..15 VDC  | 9..30 VDC  | 9..30 VDC   | 9..15 VDC  |
| <b>Installation</b>              | Field enclosure   | Field enclosure  | Field enclosure  | DIN rail, 35 mm   | DIN rail, 35 mm  |
| <b>Dimensions</b>                | 130 x 130 x 60 mm WHD   | 130 x 130 x 60 mm WHD  | 180 x 130 x 60 mm WHD  | 70 x 85 x 60 mm WHD   | 70 x 85 x 60 mm WHD  |
| <b>Classe de Protection</b>      | IP65  | IP65   | IP65   | IP20  | IP20   |
| <b>Note</b>                      | Data processing by PromoLog data acquisition software or user's software. | The FTR970-PRO works independently without realtime data processing in PC. | The FTR960 listens to transmitters and retransmits data to a receiver or repeater. | Data processing by PromoLog data acquisition software or user's software. | The RTR970-PRO works independently without realtime data processing in PC. |
|                                  | <b>FTR970</b>   | <b>FTR970-PRO</b>  | <b>FTR960</b>  | <b>RTR970</b>   | <b>RTR970-PRO</b>  |

\* dépend de l'intervalle de transmission



**FTR970-PRO**

## Receivers with memory

Receivers FTR970-PRO and RTR970-PRO (DIN rail) have internal memory of 150.000 samples and can also act as dataloggers. If the receiver is powered through UPS battery even power failures or computer malfunctions do not cause loss of measurement data. Data can be automatically read from receiver's memory when the computer is running again.

Measurement data from Receivers FTR970-PRO and RTR970-PRO can be read using PC running PromoLog data



**FTR960**

## Repeaters

FTR960 and RTR960 have separate antennas for receiving and transmitting data. Repeaters do not need any configuration and can be also added afterwards if the installation environment of the wireless measuring system changes. Only 9...30 VDC power supply is required.

The use of repeaters reduces the maximum number of transmitters because repeaters use the same frequency channel as transmitters. The maximum amount of transmitters is determined by the transmission interval.

## Desktop receiver MTR970



**Features:**  
Frequency 434 MHz

**Serial data:**  
RS485, RS232, Nokeval SCL protocol

**Operating temperature:**  
0..+60°C

**Power supply:**  
9...30 VDC

**Dimensions:**  
75 x 120 25 mm WHD

# Wireless Transmitters

Receivers

Transmitters

Software

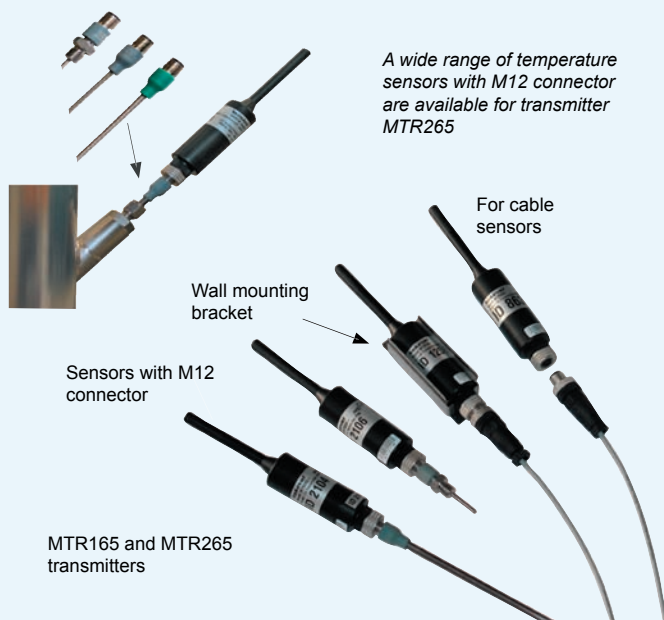
Applications

Temperature sensors

Suitable for closed steel cabinet as freezers and cold rooms



|                                  | Capteur Interne Température  | Multi Entrée transmetteur   | 2 Voies transmetteur   | Transmetteur 4..20 mA, 0..10V   | Transmetteur Capteurs temp.          |
|----------------------------------|--|---|--|---|--------------------------------------|
| <b>Modele</b>                    | <b>MTR260C</b>   | <b>MTR262B</b>  | <b>FTR860</b>  | <b>MTR165</b>   | <b>MTR265</b>                        |
| <b>Fabricant</b>                 | Nokeval  | Nokeval   | Nokeval  | Nokeval   | Nokeval                              |
| <b>Nombre de voies</b>           | 1  | 1   | 2  | 1   | 1                                    |
| <b>Entrée possible</b>           | Capteur Interne Pt100<br>Temps de reponse 10 minutes.                                      | Pt100, thermocouple K, J, T, E, L, N, mV, 0..10 V, 0..100 V, 0/4..20 mA, 0..2000 mV                       | Pt100, thermocouple K, J, T, E, L, N, mV and 0/4..20 mA  | 0..20 mA, 4..20 mA, 0..2000 mV, 0..10V, 0..100 V                                | Pt100, thermocouple K, J, T, E, L, N |
| <b>Radio signal</b>              | Frequence 434 MHz  | Frequence 434 MHz   | Frequence 434 MHz  | Frequence 434 MHz   | Frequence 434 MHz                    |
| <b>Temperature d'utilisation</b> | -30..+60°C   | -30..+60°C  | -30..+60°C   | -20..+60°C  | -20..+60°C                           |
| <b>Maximum</b>                   | 50..300 m  | 50..200 m   | 50..200 m  | 50..200 m   | 50..200 m                            |
| <b>Précision</b>                 | < 0.5°C Pt100capteur   | ±0.2°C Pt100 capteur ±0.75°C or ±1.5°C TC *   | ±0.2°C Pt100 capteur ±0.75°C thermocouple  | ±0.05°C dell'échelle  | ±0.2°C Pt100 ±0.75°C thermocouple    |
| <b>Configuration</b>             | MekuWin or 6790  | MekuWin or 6790   | MekuWin or 6790  | MekuWin or 6790   | MekuWin or 6790                      |
| <b>Transmission: interval</b>    | Typically 80 s (>4 s)  | 4 s..5 min  | 4 s..5 min   | 4 s..5 min  | 4 s..5 min                           |
| <b>connexion capteur en</b>      | Interne  | Borne à vis 1,5 mm <sup>2</sup>   | Borne à vis 1,5 mm <sup>2</sup>  | M12 connecteur  | M12 connecteur                       |
| <b>Alimentation</b>              | 3.6V Lithium batterie, 1/2 AA  | 2 x 1.5 V AA batterie or 24 VDC   | Alimentation Externe 24..240 VDC/VAC   | 3V Lithium batterie CR2032  | 3V Lithium batterie CR2032           |
| <b>Autonomie</b>                 | Type > 5 ans   | Type 3 ans  | -  | Max. 3 ans  | Max. 3 ans                           |
| <b>Dimensions</b>                | 75 x 35 x 35 mm WHD <sup>1)</sup>  | 80 x 130 x 60 mm WHD  | 180 x 130 x 60 mm WHD  | 92 x Ø29 mm + 80 mm   | 92 x Ø29 mm + 80 mm                  |
| <b>Classe de Protection</b>      | IP67 (watertight)  | IP65  | IP65   | IP65  | IP65                                 |
| <b>Note</b>                      | Developed for transmitting from closed steel cabinet.<br><br><sup>1)</sup> without antenna | * Accuracy is given with thermocouple in operating temperature 0..40°C (±0.75°C) and -30..+60°C (±1.5°C). | Suitable only for external power supply.<br><br>Digital inputs: 2 digital inputs, max. 240 VAC | Includes wall mounting bracket<br><br>Input resistance 50 Ω for current inputs. | Includes wall mounting bracket       |
|                                  | <b>MTR260C</b>   | <b>MTR262B</b>  | <b>FTR860</b>  | <b>MTR165</b>   | <b>MTR265</b>                        |



A wide range of temperature sensors with M12 connector are available for transmitter MTR265

For cable sensors

Wall mounting bracket

Sensors with M12 connector

MTR165 and MTR265 transmitters

FTR262B transmitter can be powered using either batteries (2 x standard AA) or external 24 VDC power supply. Transmitter is specially suitable for measurements with short transmission intervals (4..30 s) and has long battery life time.



MTR262B

2 channel transmitter FTR860 is designed for wide supply voltage range 24...240 VAC or VDC.

FTR860 has two digital inputs that can be used, for example, to control when to send measurement data. Transmitter requires always external supply voltage.



FTR860

# Wireless Transmitters

Receivers

Transmitters

Software

Applications

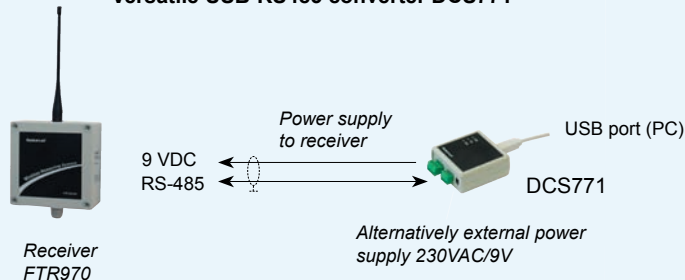
Temperature sensors



Four thermocouples

|                           | Laboratory transmitter   | Laboratory transmitter   | Wireless portable meter  | USB-RS485 Serial Converter  | Field enclosure MTR-IP65  |
|---------------------------|--|--|--|---|---|
| Modele                    | MTR262   | MTR264   | KMR260   | DCS771  |   |
| Fabricant r               | Nokeval  | Nokeval  | Nokeval  | Nokeval   |   |
| Nombre de voies           | 1  | 4  | 1  |   |   |
| Entrées                   | Pt100, thermocouples K, J, T, E, L, N, mV, 0..10 V, 0..100 V, 0/4..20 mA 0..2000 mV              | Thermocouples K, J, T, E, L, N and 0..2000 mV  | Pt100, thermocouple K, J, T, E, L, N and mV  | <b>Features:</b> <ul style="list-style-type: none"> <li>Serial Converter RS485 - USB</li> <li>Power supply to receivers</li> <li>Power supply from USB port</li> <li>Accepts also external transformer 9..24 VDC (230VAC)</li> <li>Screw terminals for (1.5 mm<sup>2</sup>) RS485 cable.</li> <li>Dimensions 66 x 28 x 66 mm</li> </ul> | Field enclosure MTR-IP65 for MTR262 and MTR264 transmitters.<br><br>Protection class IP65.<br><br>Dimensions 70 x 100 x 25 mm (WHD) |
| Signal                    | Frequence 434 MHz  | Frequence 434 MHz  | Frequency 434 MHz  |   |   |
| Temperature d'utilisation | 0..+60°C   | 0..+60°C   | 0..+40°C   |   |   |
| Gamme Maximale            | 20..100 m  | 20..100 m  | 50..200 m  |   |   |
| Précision                 | ±0.2°C Pt100<br>±0.75°C or ±1.5°C TC *   | ±0.75°C or ±1.5°C *  | ±0.2°C Pt100<br>±0.75°C thermocouple   |   |   |
| Configuration             | MekuWin or 6790  | MekuWin or 6790  | PromoLog or keypad   |   |   |
| Transmission par interval | 4 s..5 min   | 4 s..5 min   | -  |   |   |
| Connexion                 | Borne à vis, 1,5 mm <sup>2</sup>   | Borne à vis, 1,5 mm <sup>2</sup>   | connecteur rapide  |   |   |
| Alimentation              | 3V Lithium batterie CR2032   | 3V Lithium batterie CR2032   | LiPo battery, recharging using USB port  |   |   |
| Autonomie                 | Max. 3 an s  | Max. 3 ans   | 10 h en continu  |   |   |
| Dimensions                | 78 x 45 x 18 mm (WHD)  | 78 x 45 x 18 mm (WHD)  |  |   |   |
| Protection class          | IP20   | IP20   | IP64   |   |   |
|                           | Field enclosure IP65 as option.<br><br>* Accuracy in operating temperature 0..40 °C and 0..60°C. | Field enclosure IP65 as option.<br><br>* Accuracy in operating temperature 0..40 °C and 0..60°C. | 128 x 64 pixels graphic display<br><br>Measuring data can be wirelessly sent to PC |   |   |
|                           | MTR262   | MTR264   | KMR260   |   |   |
|                           |  |  | Jun 2007   |   |   |

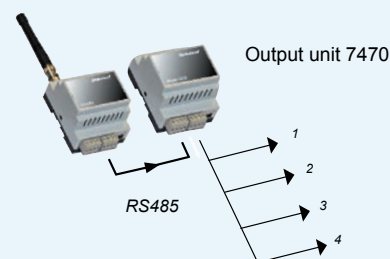
## Versatile USB-RS485 converter DCS771



DCS771 serial converter is powered from USB port and can provide supply voltage to one receiver. More than one receivers can be powered through DCS771 if a 9 VDC external power supply is used.

Computer can be shutdown without losing any measurement data if an external power supply is used with FTR970-PRO or RTR970-PRO receivers. Receivers have a memory of 150.000 samples.

## RTR970-PRO or FTR970-PRO receiver



Four output channels 0/4-20 mA, 0-10 V

Several output units 7470 can be connected to serial bus RS485 (max 16 units =256 channels).

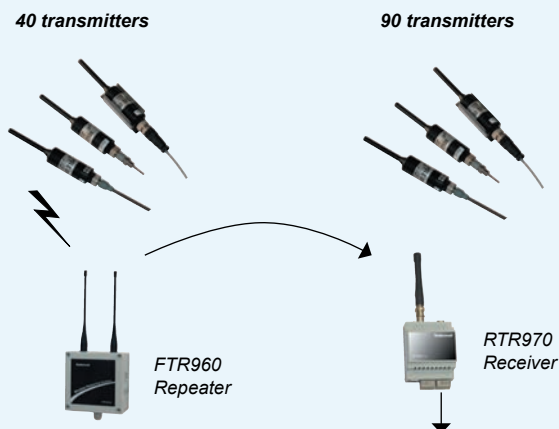
## Number of transmitters

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 table shows the maximum number of allowed radio transmitters in a coverage area.

| Transmission Interval (s) | One Receiver                   | Receiver + 1 repeater | Receiver + 2 repeaters |
|---------------------------|--------------------------------|-----------------------|------------------------|
|                           | FTR970<br>RTR970               | FTR960                | FTR960                 |
|                           | 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                    |

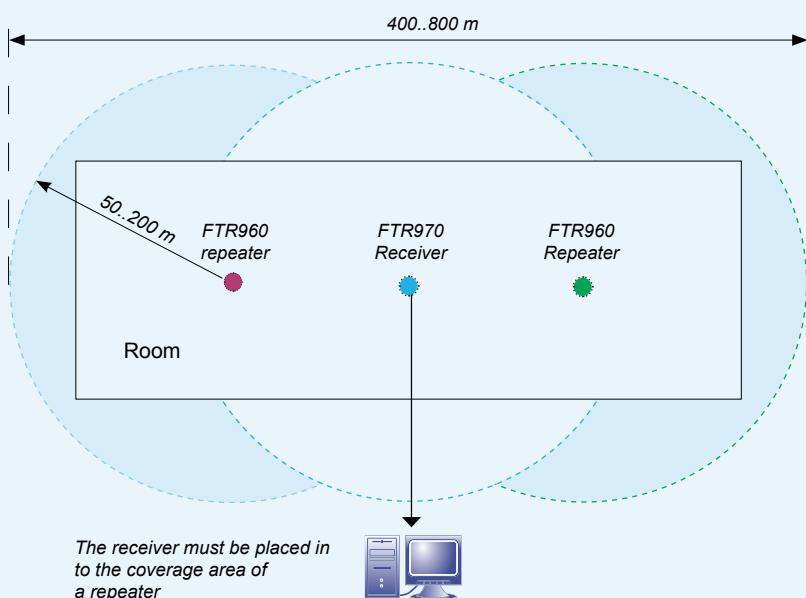
For example, if you have transmission interval of 60 seconds and one repeater and one receiver, the maximum number of transmitters is 130. Without repeaters you can use 261 transmitters. Four channel model MTR264 counts as 4 transmitters.

Example case of overlapping coverage areas with one minute transmission interval.



Both receivers can listen an unlimited number of transmitters, but radio standards limit the number of transmitters to 130 when one minute transmission interval is used. The use of repeaters decreases number of transmitters as it also transmits data.

## How to place receivers and repeaters in large room



The receiver must be placed in to the coverage area of a repeater

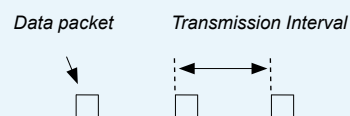
One receiver FTR970 and two FTR960 repeaters can cover a large room, measuring up to 200 m x 800 m.

**Wireless transmitters are the easy way to solve quality control problems in your production.**

### Use wireless transmitters only for non-critical applications

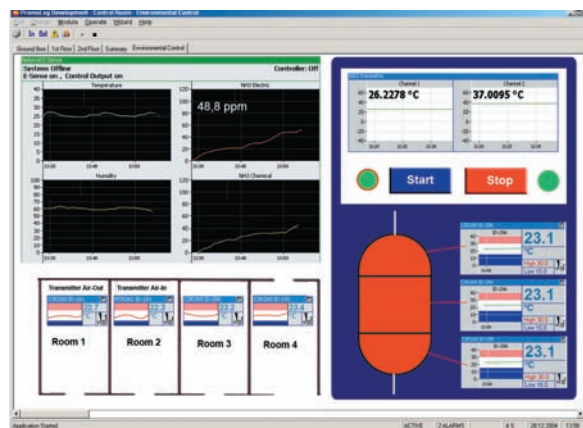
The collision probability of radio data packets increases when the number of transmitters in a coverage area increases or the transmission interval decreases.

For example, if a system with one receiver has a transmission interval of 30 seconds and the number of MTR262 transmitters is 70 the probability of a collision is about 5 %. Therefore, the probability that at least one of two consecutive transmission gets through is over 99.8 % (further details in manual of transmitters).



## PromoLog Data Acquisition system for wireless and wired transmitters

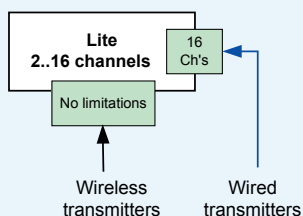
- Unlimited number of wireless channels
- Digital and bar displays
- Single and multi-trend displays
- Several data loggers
- Mathematical functions on channels
- Alarms to remote devices or mobile phones
- Remote access to/from other PromoLog software (Ethernet)
- DDE Server for Excel connectivity
- Nokeval SCL, Modbus RTU and Modbus TCP protocols



Design your user interface easily or select ready made from the library.

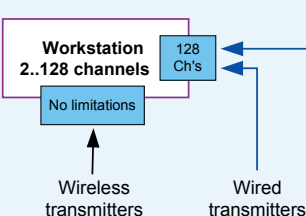
### 1. Lite

Up to 16 wired input channels, no network connections



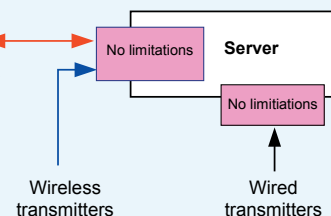
### 2. Workstation

Up to 128 wired input channels and unlimited number of remote channels



### 3. Server

No channel limitations, can access and provide remote channels



## Description of the PromoLog Software

You can create a user interface of your own by picking up modules from the library and dragging them on the screen. You can insert your own ground plan as background, drawing or photo. You can create several window sheets individually and select them quickly by clicking with mouse. Several data loggers can be used at the same time. One of them can save data by transactions and the other one by timing. There are unlimited number of channels.

### Connections

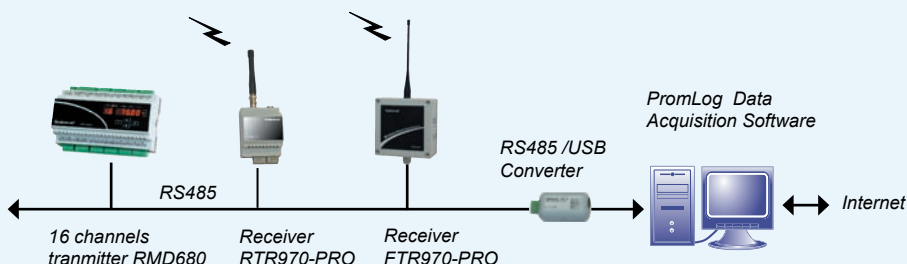
The PromoLog software supports all Nokeval wireless and wired transmitters and indicators with serial output RS-485/232, using Nokeval SCL or Modbus RTU/TCP protocols. Transmitters, indicators and radio receivers are directly connected to the USB/ serial port of the host computer. For remote use, only the IP address and port number of the server need to be entered to access the remote channels. PromoLog saves data in ASCII format which is easy to read into spreadsheet software like Excel.

### Requirements

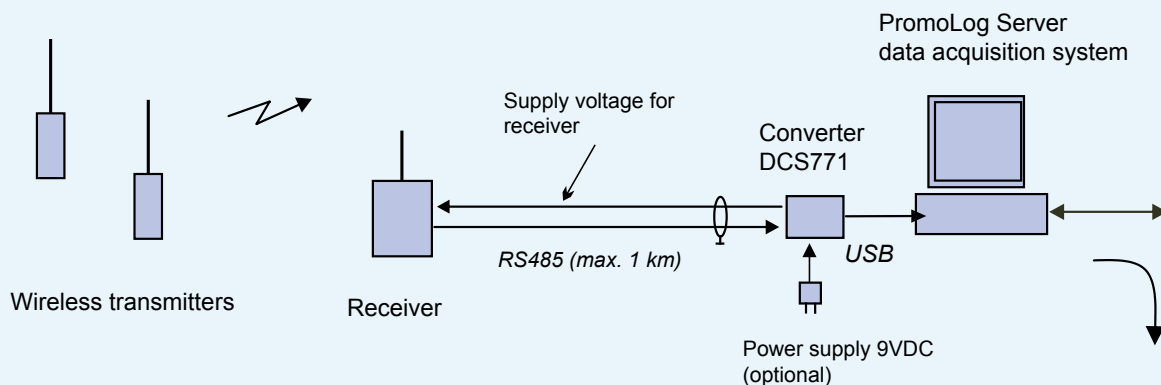
Windows 2000 or XP operating system and speed minimum 500 MHz, serial or USB port.

| PromoLog modules                         |      |             |        |
|--|------|-------------|--------|
| Functions                                | Lite | Workstation | Server |
| <b>Modules</b>                           |      |             |        |
| Wireless transmitters and receivers      | X    | X           | X      |
| Input channels (SCL, Modbus RTU)         | X    | X           | X      |
| Data recording to file                   | X    | X           | X      |
| Digital/Bar/Trend graph display          | X    | X           | X      |
| User interface components                | X    | X           | X      |
| Surveillance reporting and remote alarms |      | X           | X      |
| Multi-trend displays                     |      | X           | X      |
| Digital outputs                          |      | X           | X      |
| Mathematical module                      |      | X           | X      |
| DDE Server                               |      | X           | X      |
| Remote Access Client                     |      | X           | X      |
| Analog outputs                           |      |             | X      |
| Remote Interface Server                  |      |             | X      |
| Remote Access Server                     |      |             | X      |

### Wireless and wired transmitters into the same data acquisition



## Using PromoLog Server and Workstation software



### Connecting a receiver to a computer:

Receiver can be directly connected to a PC's USB port if the distance is less than three meters. For longer distances a USB/RS485 converter, for example DCS771, is needed. The converter is powered from a USB port or from a 9VDC external power supply. When using external power supply the receiver is also powered when the PC is switched off. In this case the measurements are stored in the receiver's internal memory and transferred to PC when it is powered again. RTR970-PRO and FTR970-PRO receivers have a memory of 150.000 samples.

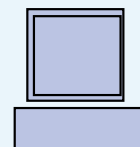
### Data acquisition software PromoLog Server:

PromoLog Server software reads measurement results from the receiver and shares the data to computers running PromoLog Workstation software through network. It also stores the data to a hard drive and displays trends. PromoLog Server software can also act as a remote access software like PromoLog Workstation. The number of PromoLog servers in a network is not limited.

### Remote access software PromoLog Workstation

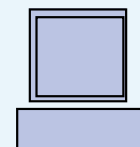
Remote access software can read measurement data from PromoLog Servers. The number of remote PromoLog Workstations in a network is not limited. Also local measurements can be added to PromoLog Workstation if a receiver or wired transmitter is connected to the PC. The only difference to the Server version is that local measurements cannot be shared with other computers in the network.

PromoLog Workstation remote access



Internet or Intranet

PromoLog Workstation remote access



Workstation reads measurements from Servers



MTR262B transmitter with battery and external 24 VDC power supply



MTR265 transmitter



FTR970-PRO Receiver

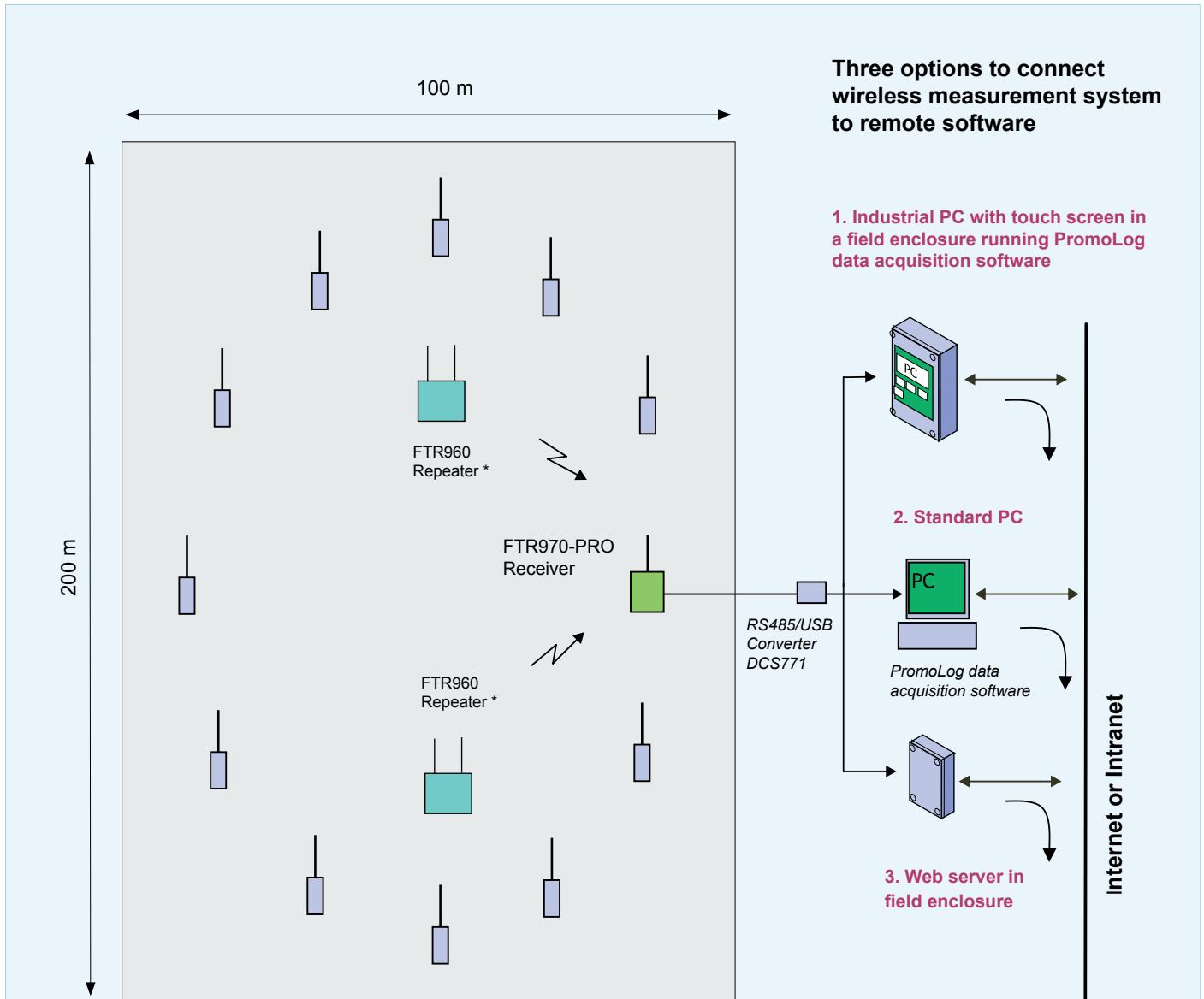


DCS771 USB to RS485 converter

Several different transmitter and receiver models are available .



## Network connection options for wireless transmitters



\* The coverage area can be extended using repeaters when transmitters are placed in targets that attenuate RF signals like e.g. closed steel cabinets. Repeaters do not require any configuration.

### Network connection options

#### 1. Industrial PC ready for use

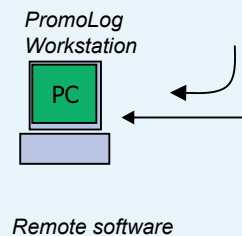
Compact industrial PC with touch screen placed in a field enclosure. PromoLog Server data acquisition software is installed at the factory and is ready for use. Only supply voltage and network connection (Internet/intranet) is required.

#### 2. Standard PC

Standard computer with PromoLog Server data acquisition software installed. PromoLog reads measurement data from receiver and shares the data to remote PromoLogs over network.

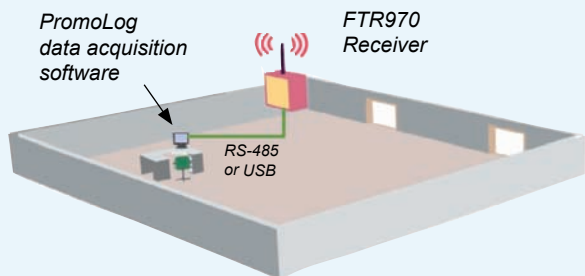
#### 3. Web server

Web server enables remote reading of FTR970-PRO receiver from any computer connected to the same network using Modbus TCP. Web server has an IP address that allows connection to other systems without installing a PC to customer's premises.



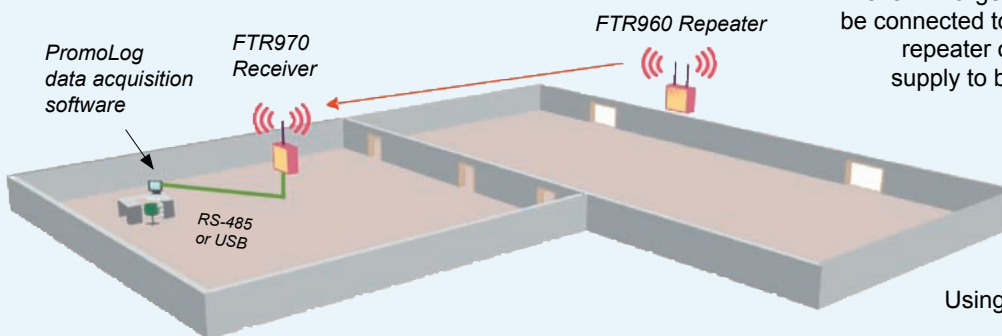
## Installing Wireless Receivers

### 1. Using single receiver



A receiver covers approximately 50...200 m radius circular area around it. If the receiver is close to a computer it can be connected and powered using USB bus. A longer distance from a computer can be achieved using RS-485 bus, for example, if the receiver needs to be installed to the center of a building. The length of a RS-485 bus can be up to 1 km.

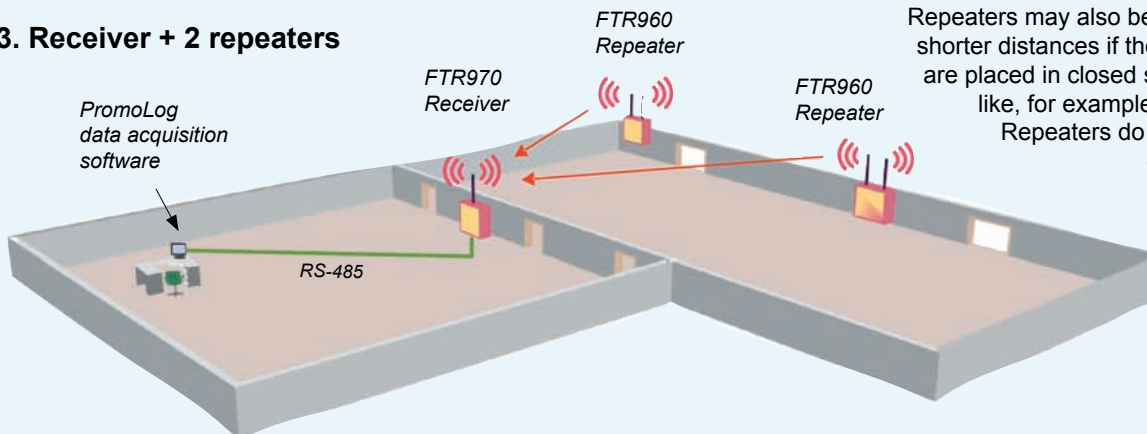
### 2. Expanding coverage area using repeaters



Repeaters eliminate the need for cabling even in large buildings. The receiver can be connected to a pc using USB bus and a repeater only needs a 9...24 V power supply to be connected. Repeaters do not need any configuration.

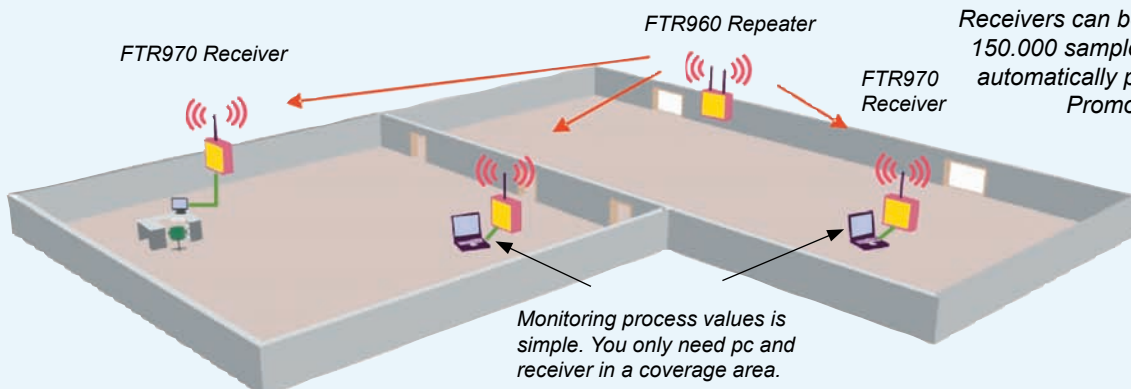
Using two repeaters expands the coverage area even more.

### 3. Receiver + 2 repeaters



Repeaters may also be needed with shorter distances if the transmitters are placed in closed steel cabinets like, for example, cold rooms. Repeaters do not need any configuration.

### 4. Temporary measurements using multiple receivers



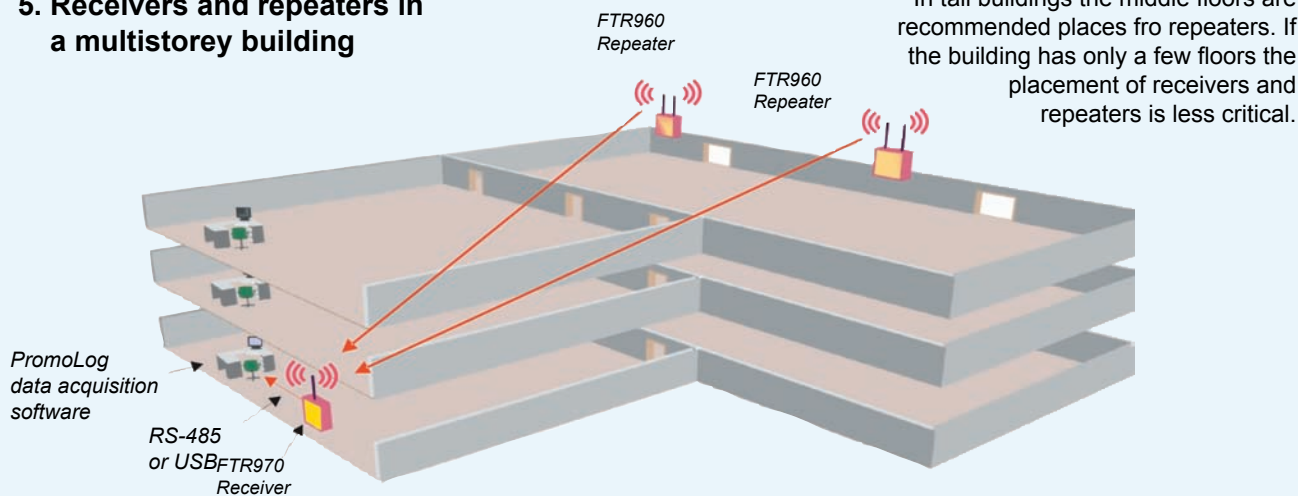
Multiple receivers can be used to listen transmitters and repeaters in the same coverage area. The number of the receivers is not limited. Receivers can be powered using USB bus or external power supply.

Receivers can be equipped with 150.000 sample memory that is automatically processed when PromoLog application is started.

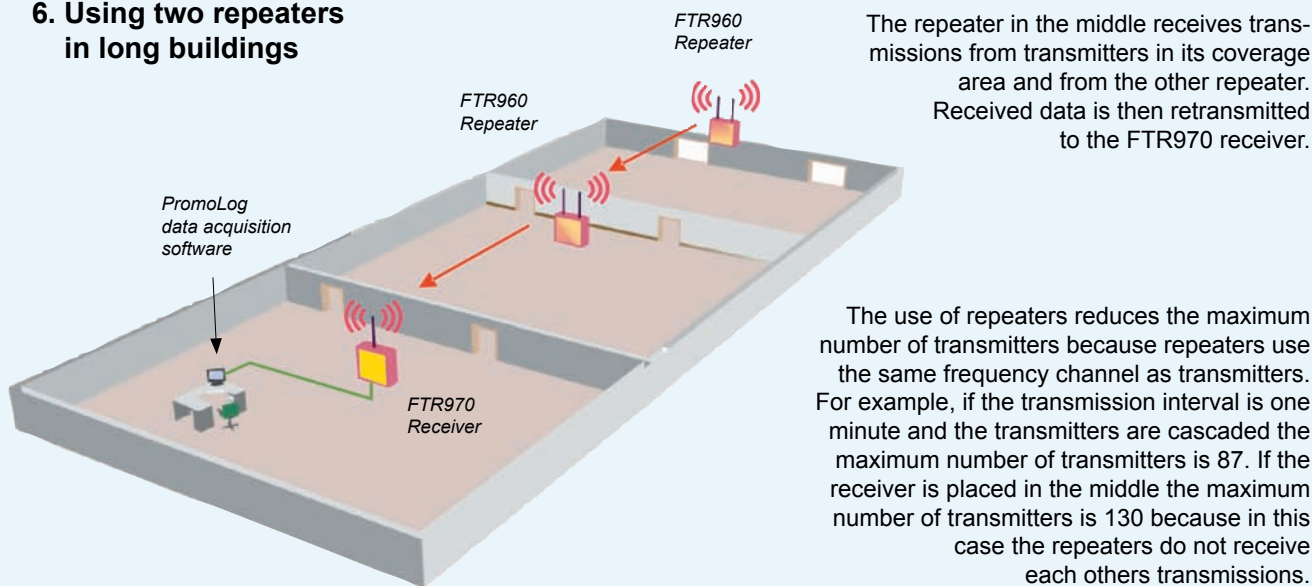
Monitoring process values is simple. You only need pc and receiver in a coverage area.

## Installing Wireless Receivers

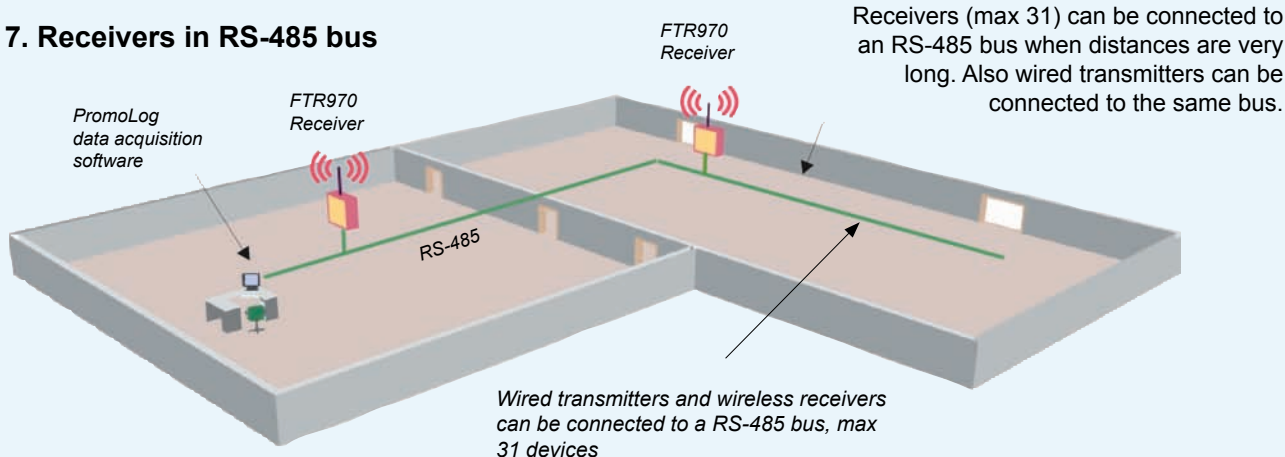
### 5. Receivers and repeaters in a multistorey building



### 6. Using two repeaters in long buildings



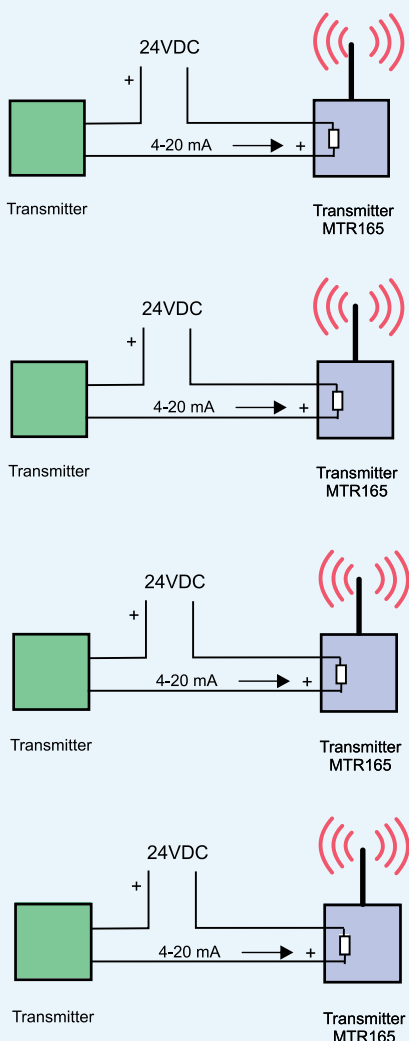
### 7. Receivers in RS-485 bus



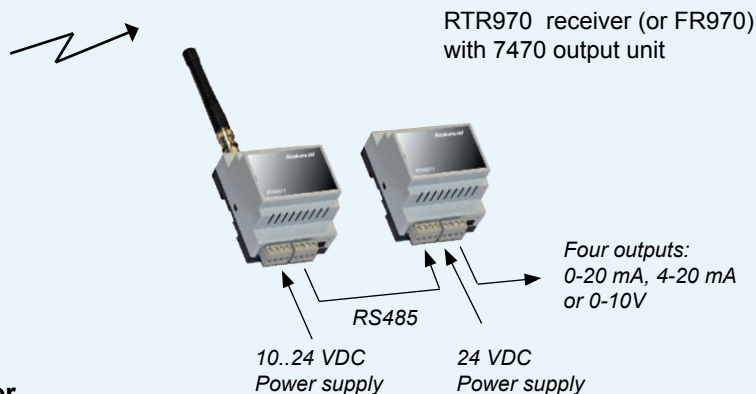
## Adding analog outputs for wireless transmitters



**Two wire transmitters 4-20 mA for wireless transmitters**

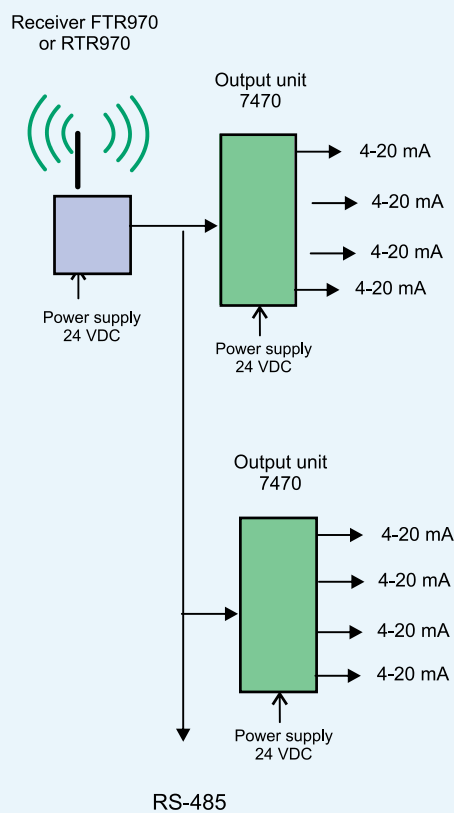


Distance between transmitters and the receiver can be up to 50..100 m in typical factory buildings. MTR165 transmitter is battery powered device. The life time of the battery depends on the transmitting interval that should be more than 30 seconds for one year battery life.



Distance between the RTR970 (or FTR970) receiver and the 7470 output unit can be up to 1 km.

### Four 4-20 mA output signals per unit

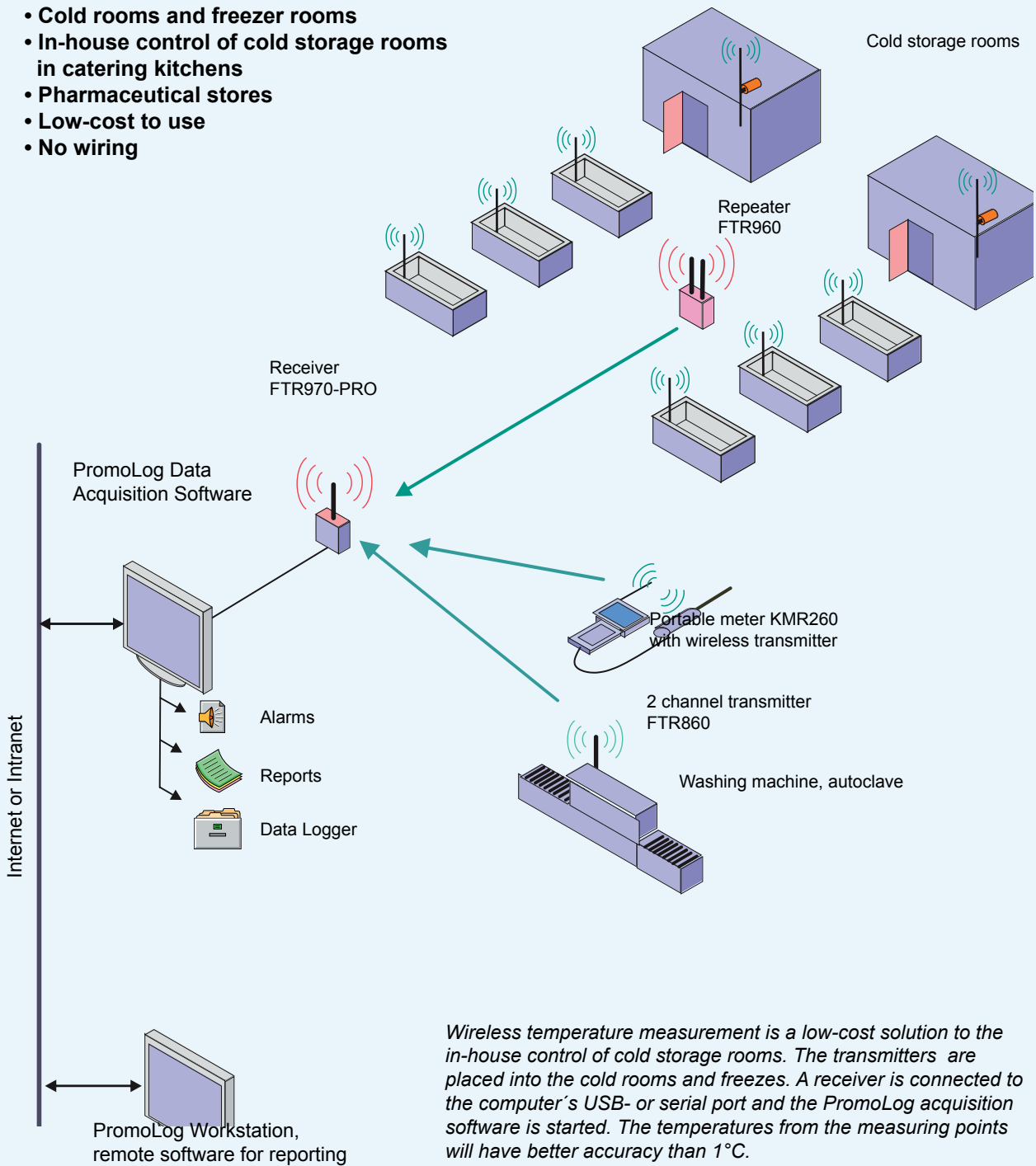


**Several output units 7470 can be connected to serial bus RS-485 (max 16 units =256 channels).**

## Temperature control of cold storage rooms in foodstuffs and pharmaceutical industry

### Centralized temperature control

- Cold rooms and freezer rooms
- In-house control of cold storage rooms in catering kitchens
- Pharmaceutical stores
- Low-cost to use
- No wiring



Wireless temperature measurement is a low-cost solution to the in-house control of cold storage rooms. The transmitters are placed into the cold rooms and freezers. A receiver is connected to the computer's USB- or serial port and the PromoLog acquisition software is started. The temperatures from the measuring points will have better accuracy than 1°C.

If the workstation is connected into network, for example all the kitchens of large cities and hotel chains can be controlled centralized from one workstation.

# Temperature Sensors

Receivers

Transmitters

Software

Applications

Temperature sensors



| TRE Series for Pt100   | PT100 sensor  | Length   | Ø                  | Type Code  | Ø  | Type Code     |
|--|---|--|--------------------|--|----|---------------|
|  |   | L=mm   | mm                 |  | mm |               |
| <p>M12S-KO Connector</p> <p>M12K-KO Connector</p> <p>TWCP</p> <p>L</p> | <b>Pt100 sensor with M12 male connector can be connected directly to transmitter MTR265 or using cable to MTR165 and MTR262</b> | 100  | 3                  | TRE-100-3.0-A  | 6  | TRE-100-6.0-A |
|  |   | 150  | 3                  | TRE-150-3.0-A  | 6  | TRE-150-6.0-A |
|  |   | 250  | 3                  | TRE-250-3.0-A  | 6  | TRE-250-6.0-A |
|  |   | 350  | 3                  | TRE-350-3.0-A  | 6  | TRE-350-6.0-A |
|  |   | 500  | 3                  | TRE-500-3.0-A  | 6  | TRE-500-6.0-A |
|  |   | 750  | 3                  | TRE-750-3.0-A  | 6  | TRE-750-6.0-A |
|  | <b>Removable M12 connector (optional)</b>   | Female connectors  | M12K-NA<br>M12S-NA | Angle type with screw terminals, 4 pole, IP67<br>Straight type screw terminals, 4 pole, IP67 |    |               |
|  | <b>Sensor element</b>   | Pt100, Class A $\pm 0,15^{\circ}\text{C}$ , optional Class B $\pm 0,3^{\circ}\text{C}$ , IEC 751 |                    |  |    |               |
|  | <b>Temperature range</b>  | Class A $-30..+350^{\circ}\text{C}$ , optional Class B $-50..+500^{\circ}\text{C}$               |                    |  |    |               |
|  | <b>Sensor material</b>  | AISI 316   |                    |  |    |               |

| TCSM Thermocouple Sensors        | Sensor   | Length mm   | Ø mm   | Type Code         | Ø mm | Type Code  |  |
|----------------------------------|--|---|--|-------------------|------|--|--|
| <p>M12S-NA connector</p>         | <b>K thermocouple max. 1150°C</b><br><br><b>Sensor material Inconel, M12 connector</b> | 250   | 3.0  | TCSM12-K-250-3.0  | 6.0  | TCSM12-K-250-6.0   |  |
|                                  |  | 500   | 3.0  | TCSM12-K-500-3.0  | 6.0  | TCSM12-K-500-6.0   |  |
|                                  |  | 1000  | 3.0  | TCSM12-K-1000-3.0 | 6.0  | TCSM12-K-1000-6.0  |  |
|                                  |  | 1500  | 3.0  | TCSM12-K-1500-3.0 | 6.0  | TCSM12-K-1500-6.0  |  |
|                                  |  | <b>M12 Connectors for sensors and transmitters (MTR165/265)</b> |  |                   |      |  |  |
|                                  | <b>M12 Connectors with screw terminals</b>   | M12K-NA   | Angle type with screw terminals, 4 pole female, IP67 |                   |      |  |  |
|                                  | M12S-NA  | Straight type with screw terminals, 4 pole female, IP67         |  |                   |      |  |  |
|                                  | M12K-KO  | Straight type with screw terminals, 4 pole male, IP67           |  |                   |      |  |  |
| <b>Extension Cables with M12</b> | <b>Extension cables with moulded M12 connector at the other end of cable</b>           |   |  |                   |      |  |  |
|                                  | M12TC-K-5m   | Extension cable, length 5 m, type K with moulded M12 connector  |  |                   |      |  |  |
|                                  | M12S-NA M12K-KO  |   |  |                   |      | <p>TCSM-K K type extension Cable, length 5 m</p> <p><b>K type extension cable have to use between sensors and transmitters</b></p> |  |
|                                  | Connectors for extension cables  |   |  |                   |      |  |  |

| TWCP Protection tubes               | Length | Ø                | Type Code        | Ø   | Type Code        |
|-------------------------------------|--------|------------------|------------------|---|------------------|
| <p>Compression fitting</p> <p>L</p> | mm     | mm               | <b>G1/4"</b>     | mm  | <b>G1/2"</b>     |
|                                     | 50     | 3                | TWCP-50-3-G1/4"  | 3   | TWCP-50-3-G1/2"  |
|                                     | 100    | 3                | TWCP-100-3-G1/4" | 3   | TWCP-100-3-G1/2" |
|                                     | 150    | 3                | TWCP-150-3-G1/4" | 3   | TWCP-150-3-G1/2" |
|                                     | 200    | 3                | TWCP-200-3-G1/4" | 3   | TWCP-200-3-G1/2" |
|                                     | 300    | 3                | TWCP-300-3-G1/4" | 3   | TWCP-300-3-G1/2" |
| 400                                 | 3      | TWCP-400-3-G1/4" | 3                | TWCP-400-3-G1/2"  |                  |
|                                     | mm     | Ø mm             | <b>G1/2"</b>     | Process connection G1/4" or G1/2".<br>Material AISI 316. Max. pressure 100 bar (350°C).<br><br><b>Thermowells will be delivered without sensors</b> |                  |
| 50                                  | 6      | TWCP-50-6-G1/2"  |                  |   |                  |
| 100                                 | 6      | TWCP-100-6-G1/2" |                  |   |                  |
| 150                                 | 6      | TWCP-150-6-G1/2" |                  |   |                  |
| 200                                 | 6      | TWCP-200-6-G1/2" |                  |   |                  |
| 300                                 | 6      | TWCP-300-6-G1/2" |                  |   |                  |
| 400                                 | 6      | TWCP-400-6-G1/2" |                  |   |                  |

# Temperature Sensors


Receivers


Transmitters


Software


Applications


Temperature sensors

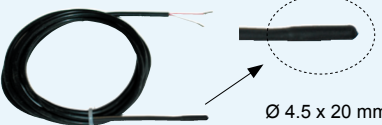
| TCR Thermocouple with Silicone Cable   | Sensor                      | Length mm                        | Ø mm | Type Code      | Ø mm           | Type Code      |                |
|--|-----------------------------|----------------------------------|------|----------------|----------------|----------------|----------------|
|  <p>Round Silicone Cable, length 2 m</p> <p>Bending angle 3 x sensor diameter</p> | Thermocouple K, max. 1100°C | 50                               | 1.0  | TCR-K-50-1.0   | 1.5            | TCR-K-50-1.5   |                |
|  |                             | 100                              | 1.0  | TCR-K-100-1.0  | 1.5            | TCR-K-100-1.5  |                |
|  |                             | 150                              | 1.0  | TCR-K-150-1.0  | 1.5            | TCR-K-150-1.5  |                |
|  |                             | 250                              | 1.0  | TCR-K-250-1.0  | 1.5            | TCR-K-250-1.5  |                |
|  |                             | 500                              | 1.0  | TCR-K-500-1.0  | 1.5            | TCR-K-500-1.5  |                |
|  |                             | 1000                             | 1.0  | TCR-K-1000-1.0 | 1.5            | TCR-K-1000-1.5 |                |
|  | Material Inconel 600        | Round Silicone cable, max. 180°C | 50   | 3.0            | TCR-K-50-3.0   | 6.0            | TCR-K-50-6.0   |
|  |                             |                                  | 100  | 3.0            | TCR-K-100-3.0  | 6.0            | TCR-K-100-6.0  |
|  |                             |                                  | 150  | 3.0            | TCR-K-150-3.0  | 6.0            | TCR-K-150-6.0  |
|  |                             |                                  | 250  | 3.0            | TCR-K-250-3.0  | 6.0            | TCR-K-250-6.0  |
|  |                             |                                  | 500  | 3.0            | TCR-K-500-3.0  | 6.0            | TCR-K-500-6.0  |
|  |                             |                                  | 1000 | 3.0            | TCR-K-1000-3.0 | 6.0            | TCR-K-1000-6.0 |

| TCT Thermocouple with TFT cable  | Sensor                      | Length mm                     | Ø mm | Type Code      | Ø mm           | Type Code      |                |
|--|-----------------------------|-------------------------------|------|----------------|----------------|----------------|----------------|
|  <p>Flat Teflon Cable, length 2 m</p> <p>Bending angle 3 x sensor diameter</p> | Thermocouple K, max. 1100°C | 50                            | 1.0  | TCT-K-50-1.0   | 1.5            | TCT-K-50-1.5   |                |
|  |                             | 100                           | 1.0  | TCT-K-100-1.0  | 1.5            | TCT-K-100-1.5  |                |
|  |                             | 150                           | 1.0  | TCT-K-150-1.0  | 1.5            | TCT-K-150-1.5  |                |
|  |                             | 250                           | 1.0  | TCT-K-250-1.0  | 1.5            | TCT-K-250-1.5  |                |
|  |                             | 500                           | 1.0  | TCT-K-500-1.0  | 1.5            | TCT-K-500-1.5  |                |
|  |                             | 1000                          | 1.0  | TCT-K-1000-1.0 | 1.5            | TCT-K-1000-1.5 |                |
|  | Material Inconel 600        | Flat Teflon cable, max. 250°C | 50   | 3.0            | TCT-K-50-3.0   | 6.0            | TCT-K-50-6.0   |
|  |                             |                               | 100  | 3.0            | TCT-K-100-3.0  | 6.0            | TCT-K-100-6.0  |
|  |                             |                               | 150  | 3.0            | TCT-K-150-3.0  | 6.0            | TCT-K-150-6.0  |
|  |                             |                               | 250  | 3.0            | TCT-K-250-3.0  | 6.0            | TCT-K-250-6.0  |
|  |                             |                               | 500  | 3.0            | TCT-K-500-3.0  | 6.0            | TCT-K-500-6.0  |
|  |                             |                               | 1000 | 3.0            | TCT-K-1000-3.0 | 6.0            | TCT-K-1000-6.0 |

| TREP Pt100 sensor (Ø 3 mm)   | Type Code                                       | Length | Ø mm |
|--|---|--------|------|
|  <p>Pt100 sensor with 2 wire cable</p> <p>Bending angle 3 x sensor diameter</p> | TREP-100-3.0-3m                                 | 100 mm | 3.0  |
|  | TREP-150-3.0-3m                                 | 150 mm | 3.0  |
|  | TREP-250-3.0-3m                                 | 250 mm | 3.0  |
| Sensor   | Pt100, Class B ±0.3°C, sensor material AISI 316 |        |      |
| Temperature range  | -50..+500°C                                     |        |      |
| Cable  | Silicone, 2 wire cable, max. temperature 120 °C |        |      |

| TLC Pt100 sensor (Ø 6 mm)  | Type Code                                       | Sensor                                   | Length | Ø mm |  |
|--|---|--|--------|------|--|
|  <p>Pt100 sensor -50..+180°C (2 wire connector)</p> | TLC-100-50-6.0-2m                               | Pt100                                    | 50 mm  | 6.0  |  |
|  | TLC-1000-50-6.0-2m                              | Pt1000                                   |        |      |  |
|  | Sensor  | Pt100, Class B ±0.3°C, material AISI 316 |        |      |  |
|  | Temperature range                               | -50..+180°C                              |        |      |  |
| Cable  | Silicone, 2 wire cable, max. temperature +180°C |  |        |      |  |

| IKES Pt100 sensor (Ø 6 mm)  | Type Code                               | Length | Ø mm | Cable               |
|---|---|--------|------|---------------------|
|  <p>Pt100 with double isolation, rubber isolation + thin steel protection tube</p> | IKES-50-6.0-2m/2                        | 50 mm  | 6.0  | Length 2 m, 2 wire  |
|   | IKES-50-6.0-2m/4                        |        |      | Length 2 m, 4 wire  |
|   | IKES-50-6.0-5m/4                        |        |      | Length 5 m, 4 wire. |
|   | IKES-100-6.0-2m/2                       | 100 mm | 6.0  | Length 2 m, 2 wire  |
|   | IKES-100-6.0-5m/4                       |        |      | Length 5 m, 4 wire  |
| Sensor  | Pt100, Class B ±0.3°C, optional Class A |        |      |                     |
| Temperature range   | -50..+105°C                             |        |      |                     |
| Protection tube   | AISI 316, Ø 6 mm, thin protection tube  |        |      |                     |

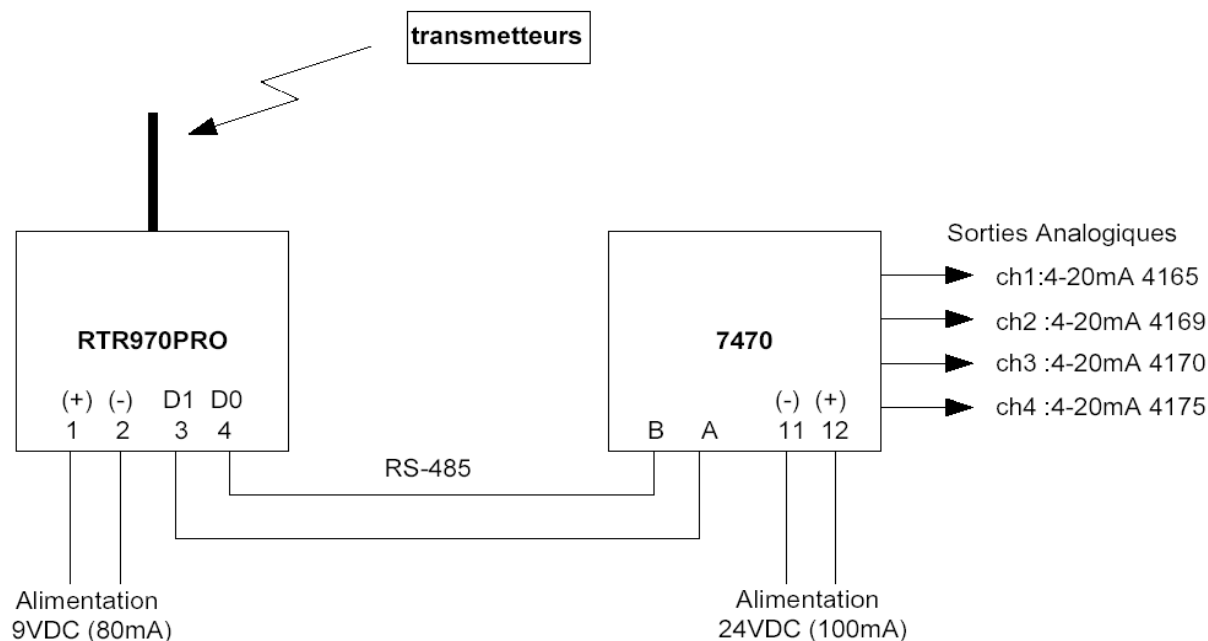
| IKE Pt100 rubber sensor  | Type Code   | Cable /wires        |
|--|---|---------------------|
|  <p>Ø 4.5 x 20 mm</p> | IKE-20-2m/2   | Length 2 m, 2 wire  |
|  | IKE-20-2m/4   | Length 2 m, 4 wire  |
|  | IKE-20-5m/4   | Length 5 m, 4 wire. |
|  | Pt100, Class B ±0.3°C, protection IP68<br>-50..+105°C (sensor + cable), tip size Ø 4.5 x 20 mm<br>Suitable for applications in where metal surface may be a problem |                     |

# APPLICATIONS

## RTR970PRO et appareil à sortie 7470

Le récepteur RTR970PRO peut être utilisé en parallèle avec un 7470. Ces appareils sont connectés au même bus RS-485 et configurés en utilisant Mekuwin ou le 6790 l'aide de programmeur.

ATTENTION : il faut positionner les cavaliers des 2 appareils pour une communication RS485



Le RTR970-PRO (comme le FTR970-PRO) possède 90 voies qui sont configurables avec les récepteurs des séries MTR (tous les types d'entrées thermocouple/Pt100/volt/mA peuvent être lus avec ce type d'application). Le module 7470 a une fonction de maître du bus master qui interroge le RTR970PRO et les transmet en signaux analogiques. Seules 4 voies peuvent être converties avec le 7470.

Remarque : on peut utiliser les versions « non PRO » pour les applications ne nécessitant pas de mémoire et de capteurs de type thermocouple. Le FTR970 est également limité à un maximum de 4 canaux et il ne supporte pas les modèles MTR260 avec le 7470.

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Panel meter series 2000



301/311 field displays



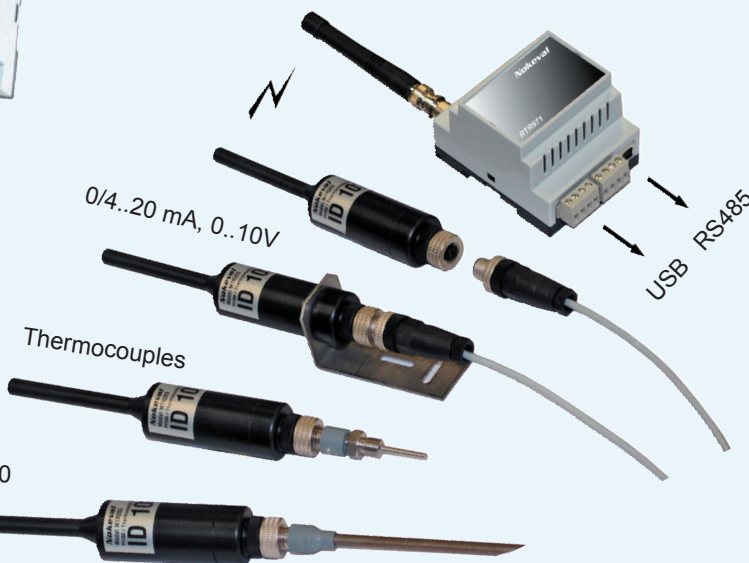
RMD680 8/16 channel transmitters



6821 2 channel transmitters



HTB230 Pt100 2 wire transmitters



*Quality control of processes is easy with wireless transmitters*