The wireless alternative to expensive cabling...

Wireless Solutions for Process Applications

New Products ... New Solutions

The ELPRO 905U range of telemetry modules provide remote monitoring and control by radio or twisted-pair wire, over short or long distances. Transducer signals connected at one module (input signals) are transmitted to another module where the signals are re-created as output signals, or passed via RS232/485 to a host device such as a PLC or SCADA system.

Easy to Use

The ELPRO 905U range of telemetry modules have been designed to be easy to use and simple to install. The modules include power supply, microprocessor controller, input/output (I/O) circuits, radio transceiver and/or serial transceiver (RS485/232). The 905U modules are completely integrated and ready for use.

They are housed in a strong extruded aluminum case, with plug in terminal strips for ease of wiring connection and maintenance.

905U Wireless I/O Modules

The ELPRO 905U radio telemetry modules are a low cost alternative to cable installations.

The 905U provides a wireless radio link for digital (switch contact), pulse and analog signals. As well as radio communications, the 905U has a port for RS485 multidrop twisted pair cable, enabling communications to 105S serial telemetry modules.

105S Serial I/O Modules

The 105S range of modules provide communications via RS485 multidrop. RS485 is a method of transmitting between many devices using a common twisted pair wire. The maximum length of the wire is typically one mile. This method of communications is particularly suitable for enclosed factory environments, where distances between modules are not very far, however radio paths may be obstructed. 105S modules may be used as a separate multi-drop I/O system, or as I/O expansion for 905U modules.

In factories or building environments, groups of 105S modules, connected by RS485 multidrop, may also transmit information by radio to another remote multidrop group in another building. For example, several buildings on a large site may be connected by radio links, with signals inside the buildings being conveyed by multidrop twisted-pair.

Simple but Reliable

The ELPRO 905U modules use a very reliable transmission protocol designed for secure communications, even with external interference. Because 905U modules have transceivers, modules are able to communicate with each other to control the flow of information.

Transmissions occur when an input signal changes. That is, when a digital (switch contact) input turns off or on, or when the value of an analog input changes by a pre-configured amount. The 905U provides real-time communications, which polling systems cannot achieve.

There are also regular update transmissions to check the value of the input signals and to check the integrity of the communication path. The status of the communications path is available as an alarm output.

The input signals are transmitted in a “data frame” which includes the address of the transmitting module, the address of the destination module, and a CRC error check. The error check is used to ensure that there is no corruption of the data frame during transmission.

Each module will wait until the radio channel is “free” before transmitting a message. When the destination module receives the message, it will check the validity of the message and transmit a return acknowledgment - a “handshake”.

If the original module does not receive this acknowledgment, then it will resend the message another four times. Using this simple but secure communications protocol, the 905U provides reliable operation even in noisy environments.

The wireless alternative to expensive cabling...

Two-way Communications

The 905U internal radio is a transceiver - a transmitter and receiver. Because the 905U can communicate in both directions, each module is capable of both input and output signals. Both monitoring (input) and control (output) functions are provided on every 905U module.

Variety of I/O Configurations

The 905U range of products include the 905-1, 905-2, 905-3 and 905-4 modules with various I/O configurations. All modules in the ELPRO 905U range include the same flexible and reliable operating protocol. Different versions will operate together in the one system. Each module provides different combinations of the following I/O :

- digital inputs for switch devices such as limit switches, level switches, security sensors, motor starters, pushbuttons
- analog inputs (0-10 / 0-20 / 4-20mA) for connecting transducers which measure parameters such as level, flow, pressure, temperature, vibration
- digital output contacts for controlling devices such as motor drives, lights, alarms
- analog outputs (0-10 / 0-20 / 4-20mA) for connection to meters or indicators to display measured parameters.
- pulse inputs and outputs for transmitting pulse signals from flowmeters, energy meters etc.

Networking

Each ELPRO 905U module is configured with a system address and a unit address. Only modules with the same system address will communicate within the same system.

More than one system may operate within radio range without “cross-talk” or malfunction. A system may comprise a simple two unit network, with input signals at one module appearing as outputs at the other.
Or a system may comprise up to 95 905U modules communicating by radio, with each module connected to up to 31 105S modules via RS485. Any input may be configured to be transmitted to an output on any module.

Interfacing to Other Systems

A 905U network may also connect via RS232 or RS485 to a host device such as a supervisory computer or PLC. The host device will receive the status of input signals, and may set the value of output signals.
A Modbus interface is available for connecting a 905U network to a PLC, DCS or SCADA system.

Pulse I/O

The 905U modules may be configured to count a pulse input and transmit the accumulated count to a remote module. At the destination module the pulse signal is recreated - the accumulated value is used to ensure that all input pulses are output accurately.The 905U can also transmit the pulse input rate as a separate analog value and the rate signal is provided as an analog output at the destination module.

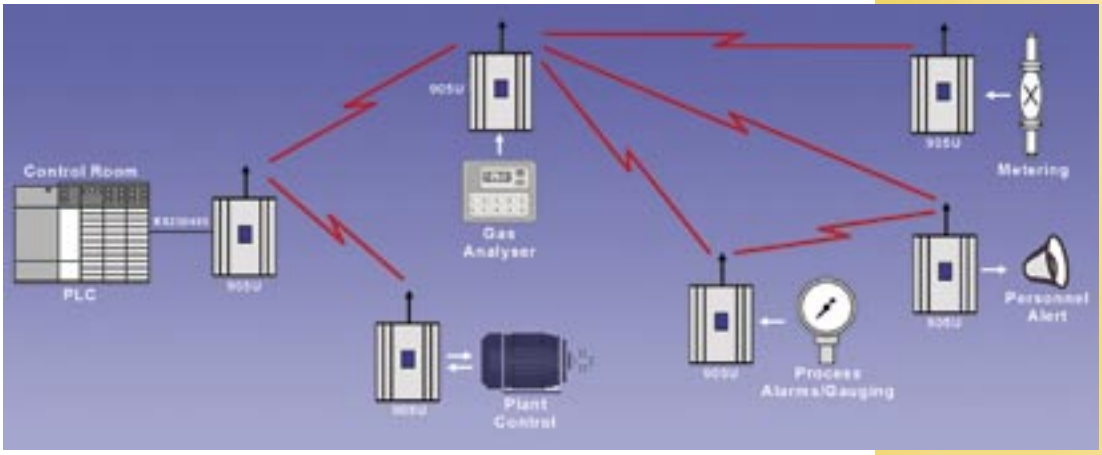
	905U-1	105S-1	905U-2	105S-2	905U-3	105S-3	905U-4	105S-4
Radio Port	✔		✔		✔		✔	
Serial Port	✔	✔	✔	✔	✔	✔	✔	✔
Digital inputs	4		4		0		4 - 16	
Digital outputs	4		1		8		4 - 16	
Analog inputs	2		6		0		0	
Analog outputs	2		0		8		0	
Pulse inputs	1		4		0		4	
Pulse outputs	1		0		4		4	

Pulse and digital I/O are same

The 105-4 has 4 fixed inputs and 4 fixed outputs and 12 which may be either input or output.

...Low cost and easy to use!

Industrial Automation



Analog I/O

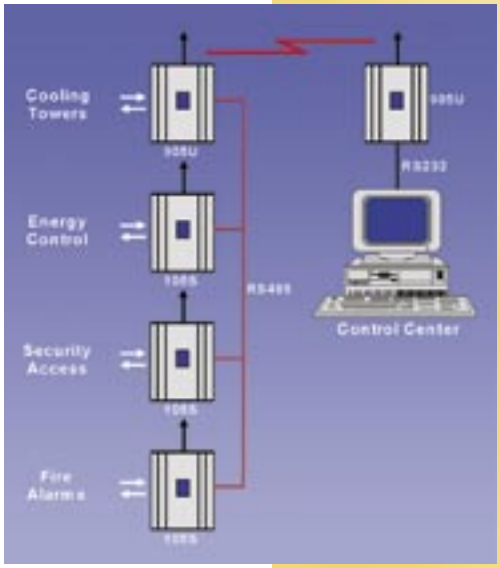
The 905U-1 modules have two inputs which will accept 4–20mA analog signals. One of these inputs has adjustable setpoints for controlling a digital output.

The 905U-2 modules have six inputs which will accept 0–20mA analog signals. Because of the inputs' high resolution, they may be used for 4–20mA signals or 0–10mA signals. Each analog input has adjustable setpoints for controlling digital outputs. The 905U-3 modules provide eight analog outputs with a range of 0-20mA. These outputs will reflect the same value as the analog input signal.

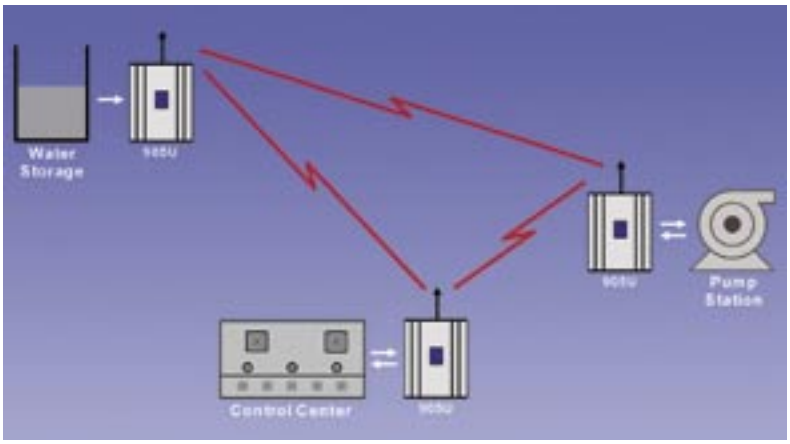
Analog Setpoints

High and low setpoints may be configured for the analog inputs to control a remote digital output contact. The digital output will set ("on") when the analog input value drops below the low setpoint and will reset ("off") when the analog value exceeds the high setpoint.

Building Management



Water Supply Utilities



ELPRO 905U Wireless I/O

Radio Communications

The ELPRO 905U uses frequency-hopping spread spectrum and operates on the license-free 900MHz band. These products can be used without a radio license.

Radio Range

The operating radio range of the 905U depends on obstructions in the radio path, the height above ground of the antennas, and the type of antennas used. Typical line-of-site ranges are:

- 20+ miles in USA/Canada
- 20 km in Australia/NZ

Longer distances may be achieved depending on local conditions.

The 905U provides a measurement of both radio channel noise and radio signal strength to assist with installation and testing. Each 905U also provides a repeater function.
A module may be configured to retransmit a message on to a remote module which does not have a reliable radio path

The repeater acts as an intermediate module between the two ends of the radio link. Messages may be repeated up to five time by intermediate repeater units, allowing very long radio paths to be achieved. Repeaters can also have their own I/O.

Power Supply

The ELPRO 905U modules include a switch-mode power supply which will accept a variety of voltage sources. The 905U will operate from a DC supply of 11 to 30 volts or an AC supply of 15 to 24 volts. The power supply includes a battery charger for backup batteries, and a solar regulator for direct connection of solar panels. The 905U power supply is intelligent and will automatically alarm on loss of power, loss of solar charging or low battery voltage. These alarm signals may also be transmitted to remote modules as digital output signals.

Each 905U module generates a regulated 24VDC supply for analog loops.

Configuration

The 905U modules are easy to configure, by connecting a PC to the module serial port and downloading a configuration file. Configuration software is provided with the modules. Configuration files may be uploaded from the modules for modification or archiving.

Diagnostics, Testing

The 905U modules provide diagnostic and test functions by connecting a PC terminal to the module. I/O and communication functions may be tested. The 905U module includes a radio strength measurement, which provides an indication of background noise and received radio strength.
This feature allows radio paths to be tested without any additional test equipment.

WHAT IS RADIO TELEMETRY?

Radio Telemetry is a method of transmitting information by radio. Signals such as switch status or analog signals may be transmitted to a remote location, and the signals “re-created”.

APPLICATIONS

- Factories
- Warehouses
- Farming
- Mining
- Irrigation
- Security
- Agriculture
- Overhead cranes
- Manufacturing plants
- Marine
- Water and Sewage
- Tank farms
- Building management
- Lighting control
- PLC interconnection
- Mobile vehicles
- Rotating machines

Specifications

General

Temperature –40 to 140 degF (–40 to 60 degC)
Typical performance –40 to 70 degC
Humidity 0-99%RH
EMC FCC Part 19, AS3548
Housing - extruded aluminum case 5.1" x 7.3" x 2.4" (130 x 185 x 60mm) with DIN rail mounting
Removable terminals up to 12 gauge (2.5 sqmm) wires
LED indication for power supply, WDT, digital I/O

Inputs and Outputs

- **Digital Inputs**
  opto-isolated (5000V) inputs suitable for voltage free contacts or NPN transistor, contact wetting current 5mA
  905-1 four inputs 905-2 four inputs
  905-4 up to 16 inputs (4 inputs + 12 selectable I/O)
  The 12 selectable inputs are surge protected but not isolated.
- **Digital Outputs**
  905-1 four relay contacts, Form A
  AC 50V 5A/ DC 30V 2A
  905-2 one FET output 30VDC 500mA
  905-3 eight FET output 30VDC 500mA
  905-4 up to 16 FET output (4 inputs + 12 selectable I/O)
- **Analog Inputs**
  "floating" differential inputs, common mode voltage 27V, 24VDC for powering external loops provided, digital filtering 1 sec.
  905-1 two 4-20mA resolution 15 bit, accuracy 0.1%
  905-2 six 0-20mA resolution 12 bit, accuracy 0.1%
- **Analog Outputs**
  current sink to common, max loop voltage 27V, max loop resistance 1000 ohms
  905-1 two 4-20 mA resolution 15 bit, accuracy 0.1%
  905-3 eight 0-20 mA resolution 12 bit, accuracy 0.1%
- **Pulse Inputs**
  Specifications as per digital inputs
  Max pulse rate 100Hz, pulse width min 5ms
  905-1 one input (DI1)
  905-2 four input(DI1-4) - first pulse input (DI1) max 1000Hz, pulse width min 0.5ms
  905-4 four input(DI1-4) - first pulse input (DI1) max 1000Hz, pulse width min 0.5ms
- **Pulse Outputs**
  FET 30VDC 500mA max 100Hz
  905-1 one
  905-3 four (DO1-4)
  905-4 four (DO1-4)

Power Supply

Battery supply 11.5-15.0 VDC
Normal supply 12-24 VAC or 15-30 VDC, overvoltage and reverse power protected
Battery charging circuit included for 1.2-12 AHr sealed battery
Solar regulator for direct connection of solar panel (up to 30W) and solar battery (100AHr)
Internal monitoring of power fail, solar charge status, and battery voltage. These values may be transmitted to remote modules for monitoring.
An internal DC/DC converter provides 24VDC 150mA for analog loop supply.

Radio Transceiver

Frequency hopping spread spectrum
USA/Canada 902-908 MHz
Australia 915-928 MHz
New Zealand 921-928 MHz
Transmit power 1W
Approved to FCC Part 15.247, RS210
Maximum line-of-sight range
USA/Canada, 4W ERP, 20+ miles
Australia/NZ, 1W ERP, 20+ km
depending on local conditions.
Range may be extended by using up to five intermediate 905U modules as repeater units.
Antenna connector is SMA coaxial.

Serial Port

RS232/RS485 serial port 9600 baud, 8 bits, no parity, 1 stop bit
RS232 9pin DB9 female connector
RS485 max cable distance 2000 m terminal connections

Data Transmission

Data transmission on "change-of-state" of inputs as well as integrity update transmissions.
The period for update transmissions is configurable. Data transmitted as bit stream data frame using a synchronous protocol with 16 bit CRC error checking. Automatic acknowledgment of error-free transmissions with up to 5 retries before communications fail is set.
Communications failure status may be configured as a digital output. Resetting of outputs on communications failure is configurable.
Transmission rates Radio 19200 bd Serial 9600 bd
Typical radio message transmission time 50msec

Area Approval

USA/Canada
CSA Class 1 Div 2 Groups A, B, C, D. Temp Code T6

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