



Remote Monitoring by Radio



ELPRO 905U-K

ELPRO 905U-K Wireless I/O

The 905U-K wireless I/O module is an economical solution for the remote monitoring of process signals. The 905U-K connects to discrete, pulse or analog signals from process transducers, and transmits these signal values by radio. The 905U-K is suitable for alarm or metering applications, as well as general plant monitoring.

The 905U-K has an internal 900MHz frequency-hopping radio transmitter which operates on a license-free radio band. The 905U-K has an operating range of more than 20 miles (30km). It is suitable for monitoring in utility industries such as electricity, water and gas; and is also a cost effective solution for short range applications in factories and plants.

Mode of Operation

The 905U-K is compatible with the 905U range of wireless I/O products* - 905U units may be used to output the process signals, or act as a wireless interface connected to a PLC, DCS or PC. The 905U-K transmits the value of its input signals whenever the signal changes, or after a pre-configured update time. Each transmission message includes error-checking to confirm the validity of the message. The 905U-K can be configured to repeat the transmission several times to ensure that the transmission is received correctly. The input signal is output at a 905U unit either as an identical signal or across a serial data link (RS232 or RS485).

905U units may also be used as repeaters to extend the radio range of the 905U-K - up to five intermediate 905U modules may be used as repeaters in any radio path.

More than 10,000 905U-K units may operate together in a single system.

Extremely Low Power Consumption

The power consumption of the 905U-K is very low as it conserves power by reverting to "sleep" mode between measurements of the input signals and transmissions.

The 905U-K can be powered from a 6 - 30 VDC supply. It can also be powered from one or more ELPRO BU-5 battery packs without any other power source. Each battery pack can power the

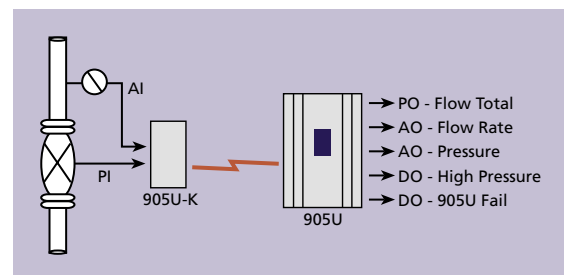


905U-K for over a year, depending on input signal configuration. The 905U-K unit provides an internal alarm on low supply voltage - this alarm can be transmitted by radio.

Weatherproof NEMA 4 Enclosure

The 905U-K is enclosed in a heavy duty painted aluminum enclosure, weather-proofed to NEMA 4. Signal and power connections to the unit are made via a weatherproof connector.

Because of its battery power supply and weatherproof case, the final installed cost of the 905U-K radio telemetry module is very low, making it a cost effective solution for even simple plant monitoring applications.



(*refer to 905U product literature)

Wireless process monitoring applications

Inputs

The 905U-K unit can connect to two discrete or pulse signals and one analog signal, and will transmit the value of an input whenever the signal changes. The input value is also transmitted if the signal has not changed within a user-configured update time (configurable 10 sec to 7 days). Pulse signals use the same input connection as discrete inputs.

Alarm and Status Signals

The 905U-K can connect to two discrete inputs such as alarm or status signals which are voltage free contacts or TTL signals. Whenever the discrete signal changes (off to on, or on to off) the 905U-K will interrupt its sleep mode and transmit the signal value. The 905U-K will also transmit the input values after a pre-configured update time. There are different update times for when the discrete signal is "on" or "off". For example, an alarm input can update once per day when it is inactive, but update every minute when it is active. This feature allows a large number of 905U-K units to share the same radio channel.

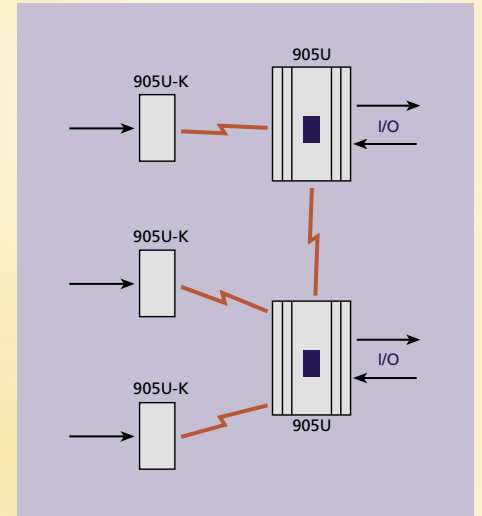
As well as the two external discrete inputs, there are two internal discrete "inputs" - low battery voltage and analog setpoint status.

Pulse Signals

The 905U-K will accept two pulse signals suitable for metering applications. The 905U-K calculates both totalized pulse count and pulse rate. The totalized count is a 32 bit count (2 x 16 bit registers) and is transmitted whenever the count has changed by a pre-configured amount and also after its update time. By transmitting the totalized pulse count, the 905U-K ensures that individual pulses are not lost. Should a radio transmission not be successful, the pulse count is still held in the 905U-K, and totalized value will be updated on the next transmission.

The 905U-K can be configured for use with a quadrature or incremental shaft-encoder, where the two pulse inputs operate on a single up-down counter.

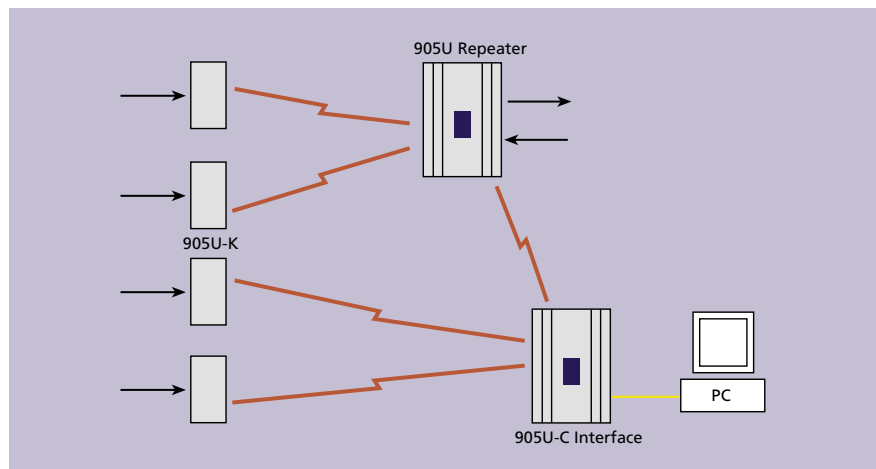
The pulse rate is treated as an internal analog input, and transmitted when the rate changes and after its configured update time. The 905U-K can accept a pulse signal up to 10 KHz.



Analog Signals

The 905U-K model has one analog input (selectable 4-20 mA or 0-10V). The analog signal may be externally or loop powered; the 905U-K generates a 24VDC loop supply. During sleep mode, the loop supply is switched off. After a user-configured sample period, the analog loop supply is activated, and the analog measurement is taken. A warm-up time may be configured before the measurement is taken. If the sample period is set to zero, then the 905U-K does not revert to sleep mode, and it will continually measure the analog signal (note that this is not suitable when used with the BU-5 battery pack). The analog measurement has 12 bit resolution. After the analog measurement is taken, the 905U-K will transmit its value if it has changed since the last measurement. A sensitivity value is configured to determine the minimum change to cause a transmission. The analog value is also transmitted on the update time.

Configurable setpoint values may be used to generate an internal alarm status which can also be transmitted. The setpoint status is treated as another discrete input. Both the analog value and the setpoint status may be transmitted.



Specifications

General

Environmental -40 to 140°F (-40 to 60°C), 0 - 99% RH
 EMC compliant FCC Part 15, AS3548, EN 300 683
 Housing – NEMA 4 / IP66 painted aluminum enclosure
 6.7" x 2.5" x 1.4" (170 x 64 x 36 mm), 1lb (0.5kg)
 Weatherproof connector for external connections.
 SMA connector for antenna or coaxial cable connection.
 LED indicators - Radio TX, Operation OK

Power Supply 6 - 30 VDC

Power consumption - quiescent (sleep mode) <140µA
 operating mode (@12VDC) <10mA + analog loop*2,
 during radio transmission (35 msec) 300mA @ 12VDC
 Analog loop supply internally generated, 24VDC 50mA
 Internal monitoring of supply low voltage status - can be
 transmitted to remote modules as a "discrete input".
 Internal monitoring of supply voltage - can be transmitted
 to remote module as an "analog input".

Inputs	External/Internal	Type
Discrete	external	Status
Pulse total	external	Count
Pulse rate	internal	Analog
Analog	external	Analog
Setpoint	internal	Status
Supply voltage	internal	Analog
Supply low voltage	internal	Status

Discrete/Pulse Input

two inputs, voltage free contacts / NPN, or TTL voltage input
 0-1.5 VDC on / 3.5-13VDC off

Pulse inputs

max rate volt free contacts 300 Hz TTL 10 KHz
 50 KHz possible on PI2 using a configurable divider

Up/Down Pulse count

suitable for quadrature or incremental shaft encoders

Pulse Rate

calculated as an internal analog input – range 0 – 1000Hz
 configurable scaling

Analog Input

selectable 0-24mA (4-20mA, 0-10mA)
 or 0-10V (0-5V, 0-10V)
 input range can be user calibrated
 "floating" differential input common mode
 voltage 27V, resolution 12 bit accuracy
 < 0.1 % of full range

Setpoint Status

status sets (on) when analog value < low SP
 and resets (off) when analog value > high SP
 status transmitted as per discrete input

Serial Port

RS232 DB9 female DCE, used for configuration
 and diagnostics.

Radio Transmitter

Spread spectrum, frequency hopping,
 902-928MHz, 100 channels

Frequency range

USA/Canada 902 - 928 MHz
 Australia 915 - 928 MHz
 New Zealand 921 - 928MHz

Transmitter power 1W

Conforms to FCC Part 15.247, RSS-210,
 RFS29 (NZ), Australia Class Lic. SS.

Line of sight range, dependant on local conditions

USA/Canada 20 miles (4W ERP)
 Australia/NZ 15 km (1W ERP)

Range may be extended by up to five 905U repeaters.
 Each transmission may be configured to be sent
 1 to 5 times.

Configuration and Diagnostics

Windows configuration package

BU-5 Battery Pack

6 x AA alkaline batteries 9V, up to 1.4 year
 service life depending on input configuration
 Enclosure, specifications as per 905U-K enclosure.
 Temperature - dependant on battery type used.

Area Approvals

CSA US & CSA Canada - Electrical safety
 Class 1 Div 2 – pending



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