



Remote Monitoring by Radio



ELPRO 505U

ISO 9001 Certified

ELPRO 505U Radio Telemetry Module

The 505U radio telemetry module is an economical solution for the remote monitoring of process signals. The 505U can connect to digital, pulse or analogue signals from process transducers, and transmit these signal values by radio. The 505U is suitable for alarm or metering applications, as well as general plant monitoring.

The 505U has an internal radio transmitter which operates on unlicensed radio channels in the UHF band. A radio licence is not required for the 505U in most countries and has an operating range of several kilometres. It is suitable for use in utility industries such as electricity, water and gas; and because of its low price, it is also a cost effective solution for short range applications in factories and plants.

Mode of Operation

The 505U transmits the value of the input signal whenever the signal changes, and after a pre-configured time. Each transmission message includes error-checking to confirm the validity of the message. At each transmission, the 505U may be configured to repeat the transmission several times to ensure that the transmission is received correctly. The input signal is then output either as an identical signal or across a serial data link (RS232 or RS485).

Extremely Low Power Consumption

The power consumption of the 505U is very small as it conserves power by reverting to "sleep" mode between transmissions.

The 505U can be powered from an external 12 VDC supply, or it may be optionally fitted with internal AA batteries which will power the unit for more than four years. The 505U unit provides an internal alarm on low battery voltage - this alarm may be transmitted by radio.

Weatherproof IP65 Enclosure

The 505U is enclosed in a heavy duty painted aluminium enclosure, weather-proofed to IP65. Signal and power connections to the unit are made via a weatherproof connector.



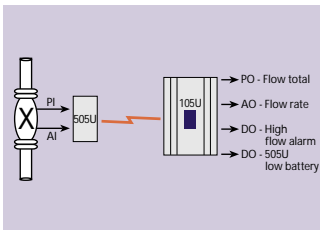
Compatible with 105U

The 505U is compatible with the 105U range of radio telemetry units*; 105U units may be used to output the process signals, or act as a network master unit to connect to an intelligent host such as a PC or PLC. 105U units may also be used as repeaters to extend radio range - up to five intermediate 105U modules may be used as repeaters in any radio path.

More than 10 000 505U units may operate together in a single system.

(*Refer to 105U product literature)

Because of its internal power supply and weatherproof case, the final installed cost of the 505U radio telemetry module is very low, making it a cost effective solution for even simple plant monitoring applications



Wireless process monitoring applications

Inputs

The 505U unit will accept digital, pulse and analogue input signals, and will transmit the value of an input when the value changes. The input value is also transmitted if the signal has not changed within a pre-configured update time (configurable 1 minute to 5 days). Pulse signals use the same input connection as digital inputs.

Alarm and Status Signals

The 505U will connect to digital inputs such as alarm or status signals which are voltage free contacts or 0-5 VDC signals. Whenever the digital signal changes (off to on, or on to off) the 505U will interrupt its sleep mode and immediately transmit the signal value. For digital inputs, there is a separate update time when the digital signal is active (on). For example, an alarm input may update only every day when it is inactive, but update every minute when it is active. This feature allows a large number of 505U units to share the same radio channel. As well as the external digital inputs, there are two internal digital "inputs" - low battery voltage and analogue setpoint status.

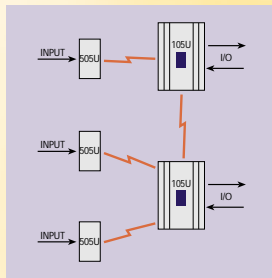
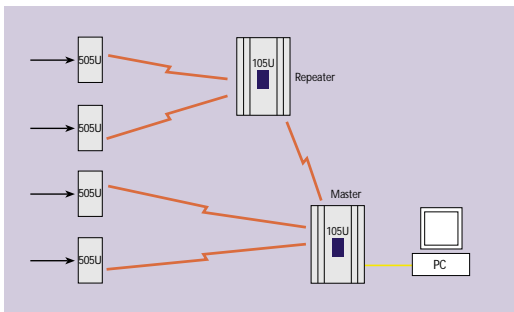
Pulse Signals

The 505U will accept pulse signals up to 100 Hz, suitable for metering applications. Whenever a pulse input is detected, the 505U will interrupt its sleep mode and increase its internal pulse counter. The totalised pulse count is transmitted whenever the count has changed by a pre-configured amount. Transmissions will also occur after the update time.

By transmitting the totalised pulse count, the 505U ensures that individual pulses are not lost. Should a radio transmission not be successful, the pulse count is still held in the 505U, and the totalised value will be updated on the next transmission.

Change transmissions may be disabled if the pulse rate exceeds a pre-configured amount, to prevent the radio channel becoming congested during peak periods.

Low cost, easy to use and easy to configure.



Analogue Signals

The 505U-2 model has one 0-20 mA (0-10 / 4-20 / 0-20 mA) analogue input. The analogue signal may be externally or loop powered - the 505U generates a 12VDC loop supply.

During sleep mode, the loop supply is switched off. After a pre-configured sleep period, the analogue loop supply is activated, and the analogue measurement is taken. A warm-up time may be configured to allow the analogue loop to stabilise before the measurement is taken. If the sleep period is set to zero, then the 505U does not revert to sleep mode, and it will continually measure the analogue signal - note that this is only suitable where the 505U is powered from an external supply. Once the analogue measurement is taken, the 505U will transmit its value if it has changed since the last measurement. A sensitivity value is configured (0.8 - 50%) to determine the minimum change to cause a transmission. In addition, the analogue value will be transmitted if the update time has been exceeded.

Configurable setpoint values may be used to generate an internal alarm status which may also be transmitted.

Configuration and Diagnostics

Configuration is easily performed by connecting a PC to an RS232 port on the 505U module. The configuration software, which is provided with the unit, also includes diagnostic functions.

Specifications

General

Environmental -20 to 60degC 0 - 99% RH
 EMC compliant 89/336 EEC, AS3548
 Housing - IP65 painted aluminium enclosure 160 x 64 x 36 mm
 Weatherproof connector for external connections.
 BNC connector for aerial or coaxial cable connection.
 LED indicators - Radio TX, Operation OK

Power Supply

External supply 11.5-15.0 VDC overvoltage/reverse power protected.

Power consumption (12VDC) -
 quiescent (sleep mode) 120µA
 operating mode 10mA + analogue loop
 during radio transmission (100 msec) 170mA @ 250mW
 100mA @ 100mW 50mA @ 10mW

Internal battery supply (505U-x-B only)

3 x AA lithium 3.5V	6 amp-hour nominal	4.1 year service life
2 x AA lithium 3.5V	4 amp-hour nominal	2.7 year service life
3 x AA alkaline 1.5V	2 amp-hour nominal	1.4 year service life

Power consumption (internal battery supply)

quiescent (sleep mode) 2.9mA-hour per day
 analogue sample (5 sec warmup, 20mA) 120µA-hour
 during radio transmission 22µA-hour @ 250mW
 15µA-hour @ 100mW 10µA-hour @ 10mW

Analogue loop supply internally generated 10 - 12VDC, 50mA

Internal monitoring of battery low voltage status - may be transmitted to remote modules as an "input".

Power consumption increases for pulse inputs > 1Hz.

Inputs

Digital	external	status
Pulse	external	count
Analogue	external	analogue
Setpoint	internal	status
Battery low voltage	internal	status

Digital/Pulse Input

505U-1 one input 505U-2 two inputs

suitable for voltage free contacts / NPN,

Digital Inputs

transmitted as digital status, debounce time 0.5 secs.

status transmission on change of input signal and on time elapsed since last transmission - update time period 1 min - 5 days, a separate update time may be configured for faster updates when the digital input is "on".

Pulse Input

max rate 100 Hz (5 msec on time), transmitted as pulse count transmissions occur when count change exceeds configured amount, or on time elapsed since last transmission - update time 1 min - 5 days - change transmissions may be suspended if pulse rate exceeds a configured value to reduce radio traffic.

Up/Down Pulse Input (505U-2 only)

The two pulse inputs may be configured to a single count, to suit quadrature or incremental shaft encoder transducers.

Analogue Input (505U-2 only)

0 to 20 mA (4 - 20mA, 0 - 10mA), "floating" differential input, common mode voltage 15V, resolution 12 bit, accuracy < 0.1%, analogue measurement continuous or sampled, sample time configurable 1 min - 5 days, transducer warm-up time configurable 1 - 59 sec analogue value transmitted on change of input signal or time elapsed since last transmission - change sensitivity configurable from 0.8 to 50%, update time configurable from 1 min - 5 days

Setpoint Status

high and low setpoints generate internal digital status - setpoint status sets (on) when analogue value < low setpoint and resets (off) when analogue value > high setpoint status transmitted as per digital input

Serial Port

RS232 DB9 female DCE, used for configuration and diagnostics

Radio Transmitter

Synthesised transmitter

Frequency range 405 - 490 MHz.

Channel spacing 12.5KHz

Frequency configurable range 10MHz

Transmitter power 500mW with 30dB aerial

100mW/10mW with 0dB aerial (factory set)

For 2 x AA battery supply, max power is 100mW.

Conforms to EN 300 220, MPT1329, AS4268.2,

NZ RFS29

Line of sight range 10km (6 mls) @ 500mW,

5km @ 100mW, 2km @ 10mW

Each transmission may be configured to be sent 1 to 5 times.

Product Types

External 12VDC supply only

505U-1-E one digital/pulse input

505U-2-E two digital/pulse inputs plus

one analogue input

Internal battery supply only (batteries not included)

505U-1-B one digital/pulse input

505U-2-B two digital/pulse inputs plus

one analogue input

 **ELPRO**
 Technologies Pty Ltd A.C.N. 010 627 835

9/12 Billabong St, Stafford, Qld 4053 Australia
 Telephone: +61 7 3352 4533
 Facsimile: +61 7 3352 4577
 Email: sales@elpro.com.au
 Internet: http://www.elpro.com.au

Available from: