

505U Radio Telemetry Module

505U-2 400MHz

505U-K 869MHz

Remote Monitoring by Radio



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

Easy to use

The 505U has an internal low power radio transmitter which operates on unlicensed radio channels in the UHF band. A radio licence is not required for the 505U in most countries. The 505U has an operating range of several kilometres. It is suitable for monitoring 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 low as it conserves power by reverting to "sleep" mode between measurements of the input signals and transmissions.

The 505U-K can be powered from an external supply, or it can be powered from one or more ELPRO BU-5 battery packs without any other power source. Each battery pack can power the 505U for over a year, depending on input signal configuration. The 505U unit provides an internal alarm on low supply voltage - this alarm can be transmitted by radio.

Weatherproof IP65 Enclosure

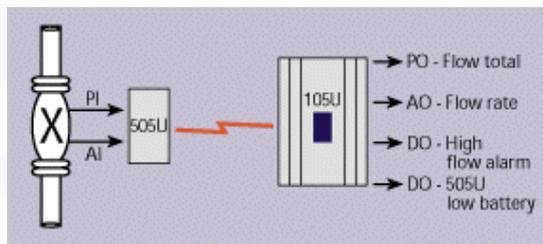
The 505U is enclosed in a heavy duty painted aluminium enclosure, weather-proofed to IP66. Signal and power connections to the unit are made via a weatherproof connector.

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.

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Inputs

The 505U-K unit can connect to two discrete or pulse signals and one analogue signal, 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 user-configured update time. Pulse signals use the same input connection as discrete inputs.

Alarm and Status Signals

The 505U will connect to digital inputs such as alarm or status signals which are voltage free contacts or TTL 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 10 KHz, 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.

Analogue Signals

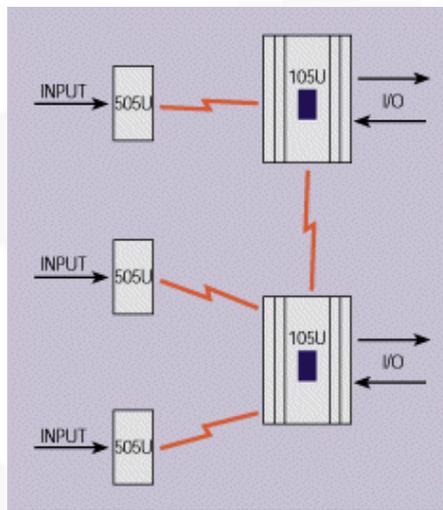
The 505U has one 0-20 mA (0-10 / 4-20 / 0-20 mA) or 0-10VDC input. The analogue signal may be externally or loop powered - the 505U generates a loop supply voltage. During sleep mode, the loop supply is switched off. After a pre-configured sleep period, the analogue loop supply is activated, and the 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 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.

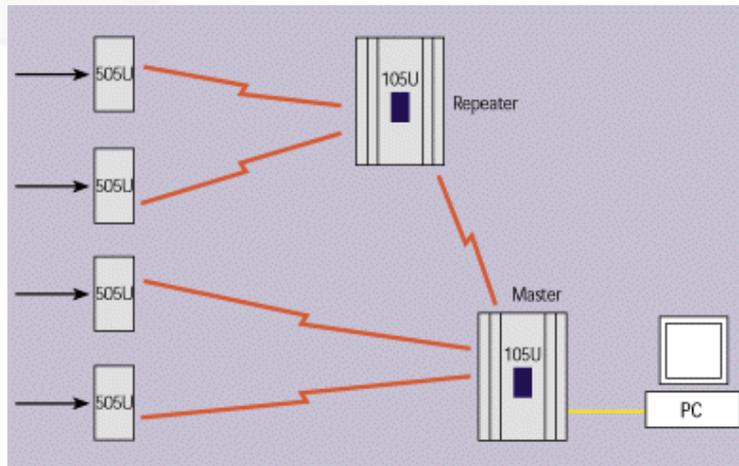
Configuration and Diagnostics

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.

Low cost, easy to use and easy to configure



3 x 505U modules sending I/O directly to hard outputs no computer required.



4 x 505U modules repeating through 105U modules to soft outputs at the computer.

Specifications 505U-2 405-490MHz

**Go to 505U-K 869MHz
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

505U-2-E

- 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
- Analogue loop supply internally generated 12VDC, 50mA
- Power consumption increases for pulse inputs > 1Hz.

505U-2-B

- Suitable for use with BU-5 battery pack or any 3.5 - 5VDC battery pack.
- Life of BU-5 is up to 1.4 years depending on input configuration
- Internal monitoring of battery low voltage status - may be transmitted to remote modules as an "input".
- Analogue loop supply internally generated 10VDC, 50mA
- Power consumption increases for pulse inputs > 1Hz.

Input Types

I/O	Power Supply	Value
Digital	External	Status
Pulse	External	Count
Analogue	External	Analogue
Setpoint	Internal	Status
Battery low Volts	Internal	Status

Digital/Pulse Input

Digital Inputs

- two inputs, suitable for voltage free contacts / NPN or TTL 0-1.5 VDC on / 3.5-13VDC off
- transmitted as digital status on change of input signal and on time elapsed since last transmission - update time period 1 min - 5.3 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 - The two pulse inputs may be configured to a single count, to suit quadrature or incremental shaft encoder transducers.

Analogue Input

- 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 (factory set) -
 - 500mW with 3dB aerial
 - 100mW / 10mW 0dB aerial
- 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-2-E
- Battery Pack supply (3.5 - 5VDC) - 505U-2-B

Specifications 505U-2 869MHz

General

- Environmental -40 to 60° C, 0 - 99% RH
- EMC compliant EN 300 683
- Housing IP66 painted aluminum enclosure, 170 x 64 x 36 mm, 0.5 kg
- 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) < 140m A
- operating mode (@12VDC) < 10mA + analogue loop*2,
- during radio transmission (35 msec) 300mA @ 12VDC
- Analogue 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 "analogue input".

Input Types

Inputs	External/Internal	Type
Discrete	External	Status
Pulse total	External	Count
Pulse rate	Internal	Analogue
Analogue	External	Analogue
Setpoint	Internal	Status
Supply voltage	Internal	Analogue
Supply low voltage	Internal	Status

Digital/Pulse Input

Digital Inputs

- 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 analogue input - range 0 - 1000Hz configurable scaling

Analogue 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

- 869.4 - 869.65MHz, fixed channel
- Transmitter power 500mW
- Conforms to EN 300 220
- Line of sight range 5km
- Range may be extended by up to five 905U repeaters.
- Each transmission may be configured to be sent 1 to 5 times.

Configuration & Diagnostics

- External 12VDC supply only - 505U-2-E
- Battery Pack supply (3.5 - 5VDC) - 505U-2-B