105U-G Wireless Gateway

Data bus interface and conversion

Description

ELPRO wireless gateways provide interface and communication between industrial data bus devices and field devices (for example, Modbus to Profibus to EtherNet/IP or PLC to SCADA/DCS). Connected via RS-232/RS-485/RJ-45, register-allocated data bus values are transmitted and received by radio to and from field and control room devices.

ELPRO 105U-G series products can multi-hop repeat up to four times, support a variety of industrial protocols and be combined with ELPRO 105U/505U-K and 115S series products to create powerful I/O and data bus networks.

Features

- 150/220/400/869 MHz, 5 mW–5W, 3.6–19.2 kbps radio communications to 35 miles (55 km) with multi-hop repeating
- Able to connect to similar and dissimilar industrial protocols and vendor devices: master/slave, slave/slave, master/master networks
- Flexible and secure networking, point to multipoint communications with forward error correction (FEC), data integrity check (CRC) and data encryption
- Eight configurable digital onboard I/O with I/O expansion via the ELPRO 115S series products
- AC/DC/battery power options with UPS battery charger
- Module diagnostics including read/write of register I/O, reporting of received signal strength indication (RSSI), communications logging and internal measurement of low/normal and battery supply voltages

Applications

- Data bus SCADA/DCS to PLC-PLC communications
- Moving machinery PLC-PLC/HMI connection/operation
- Data bus cable replacement
- Smart instrument interface and connection (for example, gas analyzer)
- Multi-I/O data concentrator/repeater for large networks

Specifications

SPECIFICATION	DESCRIPTION
Transmitter and Receiver	
Frequency ①	148–174 MHz
	200–235 MHz
	360–512 MHz
	869.525 MHz
	869.875 MHz
Transmit power ①	148–174 MHz, 0.1–5W
	220–235 MHz, 0.1–5W
	360–512 MHz, 10 mW–5W
	869.525 MHz, 500 mW
	869.875 MHz, 5 mW
Transmission	Frequency modulation (FM)
Modulation	Digital frequency shift key (DFSK)
Receiver sensitivity	148–512 MHz: –114 dBm
	869.525 MHz, 869.875 MHz: –106 dBm
Channel spacing	148–512 MHz: 12.5 kHz
	869.525 MHz, 869.875 MHz: 250 kHz
Data rate	400 MHz: 3.6 kbps
	869.525 MHz, 869.875 MHz: 19.2 kbps, forward-error correction
Range (LoS) ②	150/220/400 MHz: 10 mW EIRP to 1.2 miles (2 km), 500 mW EIRP to 6.2 miles (10 km), 5W EIRP to 34 miles (55 km)
	869.525 MHz: 3.1 miles (5 km) 500 mW
	869.875 MHz: 0.6 miles (1 km) 5 mW
Antenna connector	148–512 MHz: BNC female coaxial
	869.525, 869.875 MHz: SMA female coaxial internal gas discharger arrestor protection
Input/Output	
Discrete I/O ③	8 input voltage-free/NPN, wetting current 0.5 mA; 8 output FET 30 Vdc/500 mA
Ethernet Port	
Ethernet port	10/100Base-T; RJ45 connector (IEEE 802.3)
Link activity	Link, 100Base-T via LED
Serial settings	7/8 data bits; no parity, 1 stop bit
Serial Port	
RS-232	9-pin DB9 female connector
RS-485	2-pin terminal block, non-isolated to 4000' (1200 m)
Data rate (bps)	300, 600, 1200, 2400, 4800, 9600, 14400, 19200, 38400
Serial settings	7/8 data bits; stop/start/parity (configurable)
Protocols and Configuration	
System address	Configurable system address
Protocols supported:	
105U-G-MD1	Modbus RTU (master/slave), DF1 up to 4300 I/O points: analog and/or discrete
	Modbus, RS-232/RS-485, 300–38400 bps DF1 (full duplex), RS-232, 300–38400 bps
105U-G-ET1	EtherNet/IP (Level 2 I/O server)
	Modbus/TCP (Class 0, 1, partially Class 2 slave)
	TCP/IP functions; embedded web system (dynamic HTTP); onboard file system for downloadable web pages via FTP server; email (SMTP) 2048 bytes input/2048 bytes output; up to 4300 DIO or 1024 AI/1024 AO; 10/100 Mbps, RJ-45 connector
105U-G-PR1	Profibus DP slave to EN 50170 standard; 416 I/O bytes (up to 1952 DI/1952 DO or 122 AI/122 AO)
	RS-485 optically isolated with onboard DC/DC converter, automatic baud rate detection: 9600 bps–12 Mbps
105U-G-PR2	Profibus DP master to EN 50170 standard; 2048 bytes input/2048 bytes output (up to 4300 DIO or 1024 AI/1024 AO)
	RS-485 optically isolated with onboard DC/DC converter, automatic baud rate detection: 9600 bps–12 Mbps

SPECIFICATION	DESCRIPTION
105U-G-DE1	DeviceNet slave
	512 bytes input/512 bytes output (up to 4300 DIO or 256 AI/256 AO)
	16-bit register size; up to 500 remote addresses
	RS-422 optically isolated (selectable 125/250/500 kbps baud rate)
105U-G-M+1	Modbus plus slave
	Global database transactions: routing up to six networks
	2048 bytes input/2048 bytes output; up to 4300 DIO or 1024 AI/1024 AO
	RS-485 optically isolated; standard baud rate of 1 Mbps
User configuration	E-Series configuration utility
Configurable parameters	Individual I/O mappings, update time, databus mappings, protocol settings
Security	64-bit encryption on radio and serial
LED Indicators and Diagnostics	
LED indication	Active, OK, serial TX and RX, radio TX and RX, I/O LED status Refer to product manual for more information.
Reported diagnostics	RSSI, communications logging, I/O status, battery voltage
Power Supply	
Nominal supply	12–24 Vac/15–30 Vdc: over-voltage/reverse power protected
Average current draw	105U-G-MD1: 150 mA @ 12V; 90 mA @ 24V; add 5 mA per I/O 105U-G-ET1/PR1/PR2/DE1/M+1: 270 mA @ 12V; 170 mA @ 24V; add 5 mA per I/O
Transmit current draw	450 mA @ 13.8 Vdc (0.5W) 600 mA @ 13.8 Vdc (1W) 800 mA @ 13.8 Vdc (2W) 1.25A @ 13.8 Vdc (5W)
Battery supply	11.5–15.0 Vdc (battery supply volts, internal I/O value)
Battery charging circuit	Suitable for 12 Vdc sealed lead acid batteries, max. charge current 2.0A (5W), 0.9A (500 mW)
Compliance	
EMC	CE, FCC Part 15, AS3548, EN 301 489
RF (radio)	EN 300 220, EN 300 113, FCC Part 90, RSS-119, AS4295, AS4768.1
Hazardous area	UL Class I, Division 2
Safety	EN 60950
General	
Size	5.1" x 7.3" x 2.4" (130 mm x 185 mm x 60 mm)
Housing	Extruded aluminum
Mounting	DIN rail
Terminal blocks	Removable; max conductor 14 AWG (2.5 mm^2)
Temperature rating	105U-G-MD1, 150/220/400 MHz: –22 to +140°F (–30 to +60°C) 105U-G-MD1, 869 MHz: –40 to +140°F (–40 to +60°C) 105U-G-ET1/PR1/PR2/DE1/M+1: –32 to +140°F (0 to +60°C)
Humidity rating	105U-G-MD1: RH noncondensing 0–99% 105U-G-ET1/PR1/PR2/DE1/M+1: RH noncondensing 0–95%
Weight	1 kg (2.2 lbs)

Note: Specifications are subject to change.

① Specify RF power and frequency at time of order.

② Typical maximum LoS sight range (single hop, repeaters will extend)

③ Configurable as inputs/outputs

Ordering

PRODUCT CODE	DESCRIPTION	FREQUENCY	RF POWER
Industrial Protocol–DeviceNet Slave			
105U-G-DE1-150–5W	Gateway, DeviceNet slave	148–174 MHz ②	0.1–5W
105U-G-DE1-220–5W	Gateway, DeviceNet slave	220–235 MHz ②	0.1–5W
105U-G-DE1-xxx–5W ①	Gateway, DeviceNet slave	360–512 MHz ②	0.5–5W
105U-G-DE1-xxx–500M ①	Gateway, DeviceNet slave	360-512 MHz ②	10–500 mW
105U-G-DE1-868–500M	Gateway, DeviceNet slave	869.525 MHz	500 mW
105U-G-DE1-868–5M	Gateway, DeviceNet slave	869.875 MHz	5 mW
Industrial Protocol–Ethernet/IP, Modbus TCP			
105U-G-ET1-150–5W	Gateway, Ethernet/IP	148-174 MHz ②	0.1–5W
105U-G-ET1-220–5W	Gateway, Ethernet/IP	220-235 MHz ②	0.1–5W
105U-G-ET1-xxx–5W ①	Gateway, Ethernet/IP	360-512 MHz ②	0.5–5W
105U-G-ET1-xxx–500M ①	Gateway, Ethernet/IP	360-512 MHz ②	10–500 mW
105U-G-ET1-868–500M	Gateway, Ethernet/IP	869.525 MHz	500 mW
105U-G-ET1-868–5M	Gateway, Ethernet/IP	869.875 MHz	5 mW
Industrial Protocol–Modbus plus Slave			
105U-G-M+1-150–5W	Gateway, Modbus plus slave	148-174 MHz ②	0.1–5W
105U-G-M+1-220–5W	Gateway, Modbus plus slave	220-235 MHz ②	0.1–5W
105U-G-M+1-xxx–5W ①	Gateway, Modbus plus slave	360-512 MHz ②	0.5–5W
105U-G-M+1-xxx–500M ①	Gateway, Modbus plus slave	360-512 MHz ②	10–500 mW
105U-G-M+1-868–500M	Gateway, Modbus plus slave	869.525 MHz	500 mW
105U-G-M+1-868–5M	Gateway, Modbus plus slave	869.875 MHz	5 mW
Industrial Protocol–Modbus RTU/DF1			
105U-G-MD1-150–5W	Gateway, Modbus RTU/DF1	148-174 MHz ②	0.1–5W
105U-G-MD1-220–5W	Gateway, Modbus RTU/DF1	220-235 MHz ②	0.1–5W
105U-G-MD1-xxx–5W ①	Gateway, Modbus RTU/DF1	360-512 MHz ②	0.5–5W
105U-G-MD1-xxx-500M ①	Gateway, Modbus RTU/DF1	360-512 MHz ②	10–500 mW
105U-G-MD1-868–500M	Gateway, Modbus RTU/DF1	869.525 MHz	500 mW
105U-G-MD1-868–5M	Gateway, Modbus RTU/DF1	869.875 MHz	5 mW
Industrial Protocol–Profibus Master/Slave			
105U-G-PRx-150–5W ③	Gateway, Profibus	148-174 MHz ②	0.1–5W
105U-G-PRx-220–5W ③	Gateway, Profibus	220-235 MHz ②	0.1–5W
105U-G-PRx-xxx–5W ① ③	Gateway, Profibus	360-512 MHz ②	0.5–5W
105U-G-PRx-xxx–500M ① ③	Gateway, Profibus	360-512 MHz ②	10–500 mW
105U-G-PRx-868–500M ③	Gateway, Profibus	869.525 MHz	500 mW
105U-G-PRx-868–5M ③	Gateway, Profibus	869.875 MHz	5 mW

Note: Available RF power and frequency may vary depending on country of application.

① xxx represents frequency band (370, 390, 410, 430, 440, 460, 480, 500)

② Typically licensed. Specify TX/RX frequencies.

③ x is 1 for Profibus slave or 2 for Profibus master

Accessories

PRODUCT CODE	DESCRIPTION
Antennas 148–174 MHz	
UDP150-5	Dipole antenna, BNC male, 0 dBi gain, 5m (16') coaxial cable
Antennas 220–235 MHz	
UDP200-C	Dipole antenna, N-type female, 0 dBi gain
Antennas 360–512 MHz	
UDP400-C	Dipole antenna, BNC male, 0 dBi gain, 3m (9') coaxial cable
UDP400-3	Dipole antenna, N-type female, 0 dBi gain, 3m (9') coaxial cable
YU3-400	Yagi antenna, 3-element, N-type, 10 dBi gain
YU6-400	Yagi antenna, 6-element, N-type, 9 dBi gain
YU16-400	Yagi antenna, 16-element, N-type female, 15 dBi gain
BU3-400	400 MHZ colinear antenna, N-type female, 5 dBi gain
BU6-400	400 MHZ colinear antenna, N-type female, 8 dBi gain
Antennas 869 MHz	
CFD890EL	Dipole antenna, SMA, 2 dBi, 5m (16') RG-58, bracket
SG900EL	Colinear antenna, N-type female, 5 dBi gain
SG900-6	Colinear antenna, N-type female, 8 dBi gai
DG800-5	Whip antenna, SMA male, –2 dBi gain, 5m (16') RG-174, bracket
YU6-870	Yagi antenna, 6-element, N-type, 9 dBi gain
Cables	
CC3/10/20-SMA/BNC	Coaxial cable kit, 9.8' (3m)/32' (10m)/65' (20m), N-type to N-type/SMA male/BNC male
CCTAIL-SMA-F/M	Coaxial cable tail, 24" (600 mm), SMA to N-type female or male
CCTAIL-BNC-F/M	Coaxial cable tail, 24" (600 mm), SMA to N-type female or male
SER-DB9	Serial RS-232 cable, DB9 male to DB9 female, straight through
Surge Diverters	
CSD-SMA-2500	SMA surge diverter for use with CC10/CC20–SMA
CSD-N-6000	Coaxial surge diverter, bulkhead N-type female to N-type female
MA15/D/1/S1	Power supply surge diverter, 110 Vac/15A
IOP32D	Signal surge diverter, 2 x 2-wire/1 x 4-wire
Power Supplies	
PS-DINAC-12DC-OK	DIN rail power supply, 100–250 Vac, 12 Vdc/2.5A
PSG60	DIN rail power supply, 85–264 Vac, 24 Vdc/2.5A
Power Supplies	
BR-YAGI-KIT	Mounting bracket kit for Yagi antenna
BR-COL-KIT	Mounting bracket kit for colinear antenna

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