

Electrolab D100 IoT Gateway Controller – Datasheet

Features

Electrolab's D100 IoT Gateway Controller is an industrial wireless controller that facilitates Industrial Internet of Things (IIoT) applications. As a communications gateway, it interfaces local serial ports, local I/O ports, and local ISM radio devices to the internet using either a cellular connection or a wired Ethernet network connection.

- Logic controller with ScriptBasic programming.
- Cellular modem Internet connectivity or wired Ethernet.
- Automation protocols include Modbus TCP, Modbus RTU, and Ethernet/IP™.
- Secure email and text messaging for alarms, alerts, and data log files.
- Data logging with removable SD card.
- Interactive programmable user interface with LCD and LED indicators.
- Universal, on-board I/O with analog and discrete I/O to connect local sensors and control equipment.
- Industry standard RS-485, Ethernet and USB communication ports.
- Battery powered.



WARNING: Not to Be Used for Personnel Protection

Never use this device as a sensing device for personnel protection. Doing so could lead to serious injury or death. This device does not include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A sensor failure or malfunction can cause either an energized or de-energized sensor output condition.



CAUTION: Electrostatic Discharge (ESD)

ESD Sensitive Device.

Use proper handling procedures to prevent ESD damage to these devices. The module does not contain any specific ESD protection beyond the structures contained in its integrated circuits. Proper handling procedures should include leaving devices in their anti-static packaging until ready for use; wearing anti-static wrist straps; and assembling units on a grounded, static-dissipative surface.

Model D100 IoT Gateway Controller

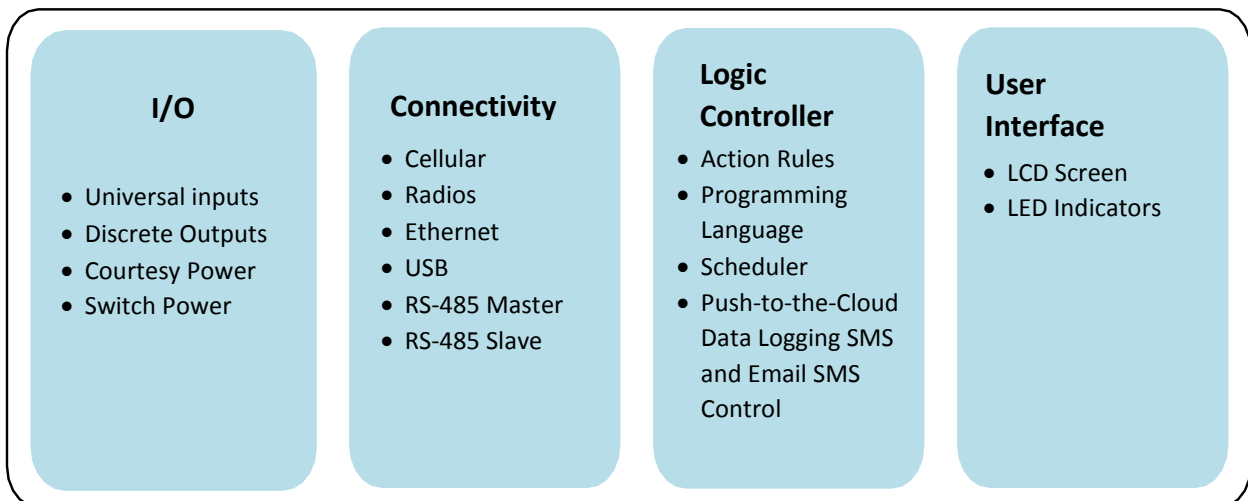
Models	Description
D100 IoT Gateway Controller	D100 IoT Gateway Controller w/ internal 900MHz radio

Cellular Communication—Controllers accept LTE modems only. Cellular modems are ordered separately as accessories under the following part numbers:

- Verizon LTE Cellular Module (Electrolab p/n ELD99-DXM-V-LTE)

D100 IoT Gateway Controller System Overview

Electrolab’s D100 IoT Gateway Controller integrates wireless nodes, cellular connectivity, and local I/O to provide a platform for the Industrial Internet of Things (IIoT).



Inputs/Outputs—On-board universal and programmable I/O ports connect to local sensors, indicators, and control equipment.

- Universal inputs
- Discrete outputs
- Battery back-up

Connectivity—The D100's wired and wireless connectivity options make it easy to share data between local and remote equipment. The cellular modem option eliminates the need for IT infrastructures to connect remote equipment for sensing and control. The integrated radio enables Modbus connectivity to remote sensors, indicators, and control equipment.

Wired Connectivity supports the following:

- Ethernet: Modbus TCP or Ethernet/IP
- Field Bus: Modbus RS-485 Master/Slave or CAN

Wireless Connectivity supports the following:

- Internal radio
- Cellular modem: CDMA (Verizon) or GSM

Logic Rules—Program the D100's logic controller using action rules and/or *ScriptBasic* language, which can execute concurrently. The control functions allow freedom when creating custom sensing and control sequences. The logic controller supports the Modbus protocol standards for data management, ensuring seamless integration with existing automation systems.

See the supported features below.

Action Rules:

- Simple logic support; arithmetic and thresholding
- Low complexity solutions
- SMS text message notifications
- E-mail notifications
- Push data on conditions

Text Programming Language:

- *ScriptBasic*
- Medium complexity solutions

Scheduler:

- Time/calendar-based events
- Astronomical clock

Data logging:

- Cyclic data/event logging
- E-mail log files

SMS Commanding:

- Read/write local registers
- Force a push to the cloud
- Reboot controller

User Interface—The simple user interface consists of an LCD screen and four LED indicators. Use the LCD to access system status and set-up, to view user selectable events or data, and to bind and perform site surveys for Electrolab nodes. Configure the user programmable LEDs to indicate the status of the D100, processes, or equipment.

See the supported features below.

User Programmable LCD:

- Bind nodes
- Site survey
- Sensor information viewing
- System status

User Defined LED Indicators:

- N/A

Applications Overview

The D100 IoT Gateway Controller is ideal for the following applications:

- Productivity Solutions
 - Call for service, or maintenance
 - Tank level monitoring
- Predictive Maintenance and Continuous Monitoring
 - Vibration and temperature monitoring
 - Non-contact temperature monitoring

- Environmental Monitoring and Control
 - Temperature and humidity monitoring

The D100 IoT Gateway Controller can provide visual indication using indicator lights, send text or email alerts, collect data, and interface with automation systems.

Specifications

Radio Range

- 900 MHz, 1 Watt: Up to 9.6 km (6 miles)
- 2.4 GHz, 65 mW: Up to 3.2 km (2 miles)

Antenna Minimum Separation Distance

- 900 MHz, 1 Watt: 4.57 m (15 ft)
- 2.4 GHz, 65 mW: 0.3 m (1 ft)

Radio Transmit Power

- 900 MHz, 1 Watt: 30 dBm (1 W) conducted (up to 36 dBm EIRP)
- 2.4 GHz, 65 mW: 18 dBm (65 mW) conducted, less than or equal to 20dBm (100 mW) EIRP

Spread Spectrum Technology

- FHSS (Frequency Hopping Spread Spectrum)

900 MHz Compliance (1 Watt)

- FCC ID UE3RM1809: This device complies with FCC Part 15, Subpart C, 15.247
- IC: 7044A-RM1809

Antenna Connection

- Ext. Reverse Polarity SMA, 50 Ohms
- Max Tightening Torque: 0.45 N·m (4 lbf·in)

Supply Voltage

- 12 to 30 V dc (use only with a suitable Class 2 power supply (UL) or a SELV (CE) power supply) or
- 12 V dc solar panel and 12 V sealed lead acid battery

Courtesy Power Out

- One output at 5 Volts, 500 mA maximum No short circuit protection

Power Consumption

- 35 mA average at 12 Volts

Construction

- Polycarbonate; DIN rail mount option

Communication Protocols

- Modbus RTU Master/Slave, Modbus/TCP, and Ethernet/IP

Counters, Synchronous 32-bits unsigned

- 10 ms clock rate minimum

Universal Inputs

- Sinking/Sourcing discrete, 4–20 mA analog, 0–10 V analog, counter, and temperature 10 kOhm thermistor

Switched Power Out

- Two selectable 5 V or 16 V outputs 5 V: 400 mA maximum
- 16 V: 125 mA maximum

Security Protocols

- VPN, SSL, and HTTPS

Logging

- 8 GB maximum; removable Micro SD card format

Analog Outputs (DAC)

- 0 to 20 mA or 0 to 10 V dc output Accuracy: 0.1% of full scale +0.01% per °C Resolution: 12-bit

Discrete Output Rating (NMOS)

- Less than 1 A max current at 30 V dc
- ON-State Saturation: Less than 0.7 V at 20 mA ON Condition: Less than 0.7 V
- OFF Condition: Open

Operating Conditions

- 40 °C to +85 °C (–40 °F to +185 °F) (Electronics); –20 °C to +80 °C (–4 °F to

+176 °F) (LCD)

Micro CD Card (if applicable): -25 °C to +85 °C (-13 °F to +185 °F) 95% maximum relative humidity (non-condensing) Radiated

Immunity: 10 V/m (EN 61000-4-3)

Shock and Vibration

IEC 68-2-6 and IEC 68-2-27

Shock: 30g, 11 millisecond half sine wave, 18 shocks Vibration: 0.5 mm p-p, 10 to 60 Hz

Environmental Rating

IEC IP20

Certifications

(CE approval only applies to 2.4 GHz models)



Warnings

Install and properly ground a qualified surge suppressor when installing a remote antenna system. Remote antenna configurations installed without surge suppressors invalidate the manufacturer's warranty. Keep the ground wire as short as possible and make all ground connections to a single-point ground system to ensure no ground loops are created. No surge suppressor can absorb all lightning strikes; do not touch the Electrolab Wireless Communications Network or any equipment connected to the network during a thunderstorm.

Exporting Electrolab Wireless Communications Network Devices. It is our intent to fully comply with all national and regional regulations regarding radio frequency emissions. **Customers who want to re-export this product to a country other than that to which it was sold must ensure the device is approved in the destination country.** A list of approved countries appears in the *Radio Certifications* section of the product manual. Electrolab Wireless Communications Network products are certified for use in these countries using the antenna that ships with the product. When using other antennas, verify you are not exceeding the transmit power levels allowed by local governing agencies. Consult with Electrolab, Inc. if the destination country is not on this list.

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