

ROC809 Remote Operations Controller

The ROC809 Remote Operations Controller is a microprocessor-based controller that provides the functions required for a variety of field automation applications. The ROC809 is used primarily where there is a need to monitor, measure, and control equipment in a remote environment. The ROC809 controller is ideal for any applications requiring flow computation; Proportional, Integral, and Derivative (PID) control loops; and logic sequencing control on up to 12 meter runs.

The ROC809 controller is highly innovative and versatile. It has a backplane to which the Central Processing Unit (CPU), power input module, Input/Output (I/O) modules, and communication modules connect. The ROC809 unit has nine slots for modules: the first three slots are for communication or I/O modules, and the remaining six slots are for I/O modules.

The ROC809 has the following features:

- ◆ Rugged, reduced-maintenance hardware.
- ◆ Abundant and versatile I/O.
- ◆ Versatile communications.
- ◆ Easily installed modules.
- ◆ Economical power usage.
- ◆ Built-in memory protection.



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- ◆ Metering station support.
- ◆ Large, configurable history storage.
- ◆ Login security.
- ◆ License keys.
- ◆ Various gas calculation methods.

The ROC809 controller has eliminated the need for fuses on the I/O and communications modules through the extensive use of the latest technology in short-circuit protection. This results in less maintenance for remote location operation.

The Acrylonitrile Butadiene Styrene (ABS) plastic housing has removable wire channel covers to protect the wiring terminals. DIN rail mounting allows the ROC809 to be mounted on an enclosure backplane. The rugged housing is suitable for use over the complete extended temperature range.

The ROC809 unit is designed to economize its power consumption for normal operation through the use of internal 3.3 Volt electronics.

The ROC809 uses a Power Input Module to convert external input power to the voltage levels required by the ROC809 unit's electronics and to monitor voltage levels to ensure proper operation. The 12 Volts dc power input module provides regulated 12 Volts dc power to the backplane.

The ROC809 unit allows up to six communication ports. Three communication ports are built into the base system:

- ◆ Local Operator Interface – LOI.
- ◆ Ethernet – Comm1.
- ◆ EIA-232 (RS-232) – Comm2.

I/O and communication modules can easily be installed or removed from the module slots at any time by removing the two captive screws accessible from the front of the unit. Modules are hot-swappable, meaning the module can be removed and another module of the same kind can be installed under power. The modules are hot-pluggable, meaning they may be installed directly into unused module slots under power. The modules are also self-identifying, meaning ROCLINK™ 800 Configuration Software will recognize the module.

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Up to 3 additional communication modules can be installed to provide ports for communicating with a host computer or other devices (maximum of 6 ports). Three modules of the following types, in any combination, can be accommodated:

- ◆ EIA-232 (RS-232) for point-to-point asynchronous serial communications, including Data Terminal Ready (DTR) support, Ready to Send (RTS) support, and radio power control.
- ◆ EIA-422/EIA-485 (RS-422/RS-485) for asynchronous serial communications, EIA-422 for point-to-point, EIA-485 for multiple-point, 2 and 4-wire.
- ◆ Multi-Variable Sensor (MVS) interface (support for six sensors per interface module and up to 2 modules per ROC unit).
- ◆ Dial-up modem for communications over a telephone network (14.4K V.42 bis providing throughput up to 57.6 K bps).

The ROC809 allows the use of a variety of communication protocols: ROC Plus, Modbus, and Modbus with EFM extensions. Ethernet communications can be used with the DS800 Development Suite 800 software and ROC Plus protocol.

The optically isolated I/O modules can be added as needed to satisfy a wide variety of field I/O requirements (maximum of nine modules). The available modules include:

- ◆ Analog Inputs (AI).
- ◆ Analog Outputs (AO).
- ◆ Discrete Inputs (DI).
- ◆ Discrete Outputs (DO).
- ◆ Digital Relay Outputs (DOR).
- ◆ Pulse Inputs (PI) – High / Low Speed.
- ◆ RTD Inputs (RTD).
- ◆ J and K Type Thermocouple (T/C) Inputs.

The ROC809 optionally supports up to 12 meter runs with station support. Similarly configured meter runs can be grouped into stations. The largest benefit of using stations is in configuring and reporting. Many parameters are set once for the entire station, thereby reducing the work to configure the meter runs. Reports are provided for each meter run. As a result, redundant meter run data within a station is eliminated and the need to download and upload is reduced, resulting in a more efficient reporting process.

The 12 meter runs can be grouped among the 12 stations (maximum) in any combination. Meter runs may be placed in the same station if they have common parameters, such as the same contract hour and gas data. Contract hours can be set differently for each station.

The firmware that resides in flash memory contains the operating system and application specific software. The CPU module provides battery-backed RAM (Random Access Memory) for saving the configuration, events, alarms, and historical logs.

The Local Operator Interface (LOI) port's EIA-232 (RS-232D) standard RJ-45 connector provides a direct link between the ROC809 and a personal computer. ROCLINK 800 Configuration Software can configure the ROC809, extract data, and monitor its operation. Refer to Specification Sheet 4:RL800.

The firmware has a database for events, alarms, and history that stores the last 450 events, the last 450 alarms, and 35 days of hourly records per API Chapter 21.1. The history database holds up to 200 points in 11 segments, providing over 197,000 unique entries. Each segment can be configured to archive at different time intervals and with different contract hours.

The ROC809 unit has four types of memory:

- ◆ **Boot Flash** – System initialization and diagnostics.
- ◆ **Flash** – Firmware image.
- ◆ **SRAM** (Static Random Access Memory) – Data Logs and configuration.
- ◆ **SDRAM** (Synchronous Dynamic Random Access Memory) – Firmware execution and execution memory.

The 32-bit microprocessor, based on the Motorola MPC862 Quad Integrated Communications Controller (PowerQUICC™) PowerPC processor, and the Real-Time Operating System (RTOS) provide both hardware and software memory protection.

The firmware allows the following optional gas and liquid calculation methods:

- ◆ **AGA and API** Chapter 21 compliant (AGA linear and differential meter types).
- ◆ **AGA 3** – Orifice Plates. [gas]
- ◆ **AGA 7** – Turbine Meters (ISO 9951). [gas]
- ◆ **AGA 8** – Compressibility. Detailed (ISO 12213-2), Gross I (ISO 12213-3), and Gross II. [gas]
- ◆ **ISO 5167** – Orifice Plates. [gas & liquid]

For more information, refer to Specification Sheet 6.1:FW1.

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ROC809 Remote Operations Controller Specifications

PROCESSOR

32-bit microprocessor based on the Motorola MPC862 Quad Integrated Communications Controller (PowerQUICC™) PowerPC processor running at 50 MHz.

PROCESSOR MEMORY

Boot Flash: 256 KB for system initialization and diagnostics.

Flash: 4 MB for firmware image.

SRAM: 1 MB for Historical Data Logs and configuration.

Synchronous DRAM: 8 MB for firmware execution and execution memory.

I/O MODULES

Analog Input-12: 4 channels. 12 bits of resolution.

Analog Output: 4 channels.

Discrete Input: 8 channels.

Discrete Output: 5 channels.

Digital Relay Output: 5 channels.

Pulse Input: 2 channels – high speed or low speed is user-selectable per channel.

RTD Input: 2 channels.

J & K Type Thermocouple Input: 5 channels – type is software configurable per channel.

Refer to Specification Sheets 6.3:IOM1, 6.3:IOM2, 6.3:IOM3, and 6.3:IOM4.

EIA-232 (RS-232) PORT ON CPU

Type: Single. 57.6 K bps Maximum Data Rate.

Refer to Specification Sheet 6.3:COM.

ETHERNET PORT ON CPU

Type: 10BASE-T twisted pair. IEEE multi-segment 10 MB/second baseband Ethernet.

LED Indicators: RX (Receive), TX (Transmit), COL (Ethernet Packet Collision), and LNK (Ethernet Link).

Maximum Segment: 100 m (330 ft).

LOI PORT ON CPU

Type: EIA-232D (RS-232D) Standard. 57.6 K bps Maximum Data Rate.

Refer to Specification Sheet 6.3:COM.

POWER REQUIREMENTS

At 12 Volts dc, base system draws 70 mA typical (power module, backplane, and CPU).

Recommended Voltage Range: 11.5 to 14.5 Volts dc.

Maximum Voltage Range: 11.25 to 16 Volts dc.

BATTERY BACKUP

User-replaceable.

Type: Sanyo 3 V CR2430 lithium.

Normal use life: 10 years while power is applied to unit.

Backup life: 1 year minimum while jumper is disengaged and no power is applied to unit.

Shelf life: 10 years.

BOARD TEMPERATURE ACCURACY

1% typical, 2% maximum.

VOLTAGE MONITOR ACCURACY

0.75% typical, 1% maximum.

TIME FUNCTIONS

Clock Type: 32 KHz crystal oscillator with regulated supply, battery-backed. Year/Month/Day and Hour/Minute/Second, with Daylight Savings Time control.

Clock Accuracy: 0.01%.

Watchdog Timer: Hardware monitor expires after 3 seconds and resets the processor.

MATERIALS

Case: Acrylonitrile Butadiene Styrene (ABS) Plastic.

Wire Channel Covers: Polypropylene Plastic.

Modules: Thermoplastic Polyester, solvent-resistant.

ROC809 Remote Operations Controller Specifications (Continued)

WIRING

12 AWG maximum size for terminal blocks.

DIN RAILS

Size: 35.

DIMENSIONS

241 mm H by 244 mm W by 174 mm D (9.5 in. H by 9.6 in. W by 6.85 in. D), allow an additional 19 mm (.75 in) for cables.

WEIGHT

1.65 kg (3.65 lb) for housing, backplane and CPU.

I/O Modules: Vary from 49-60 g (1.76-2.1 oz).

Modem Module: 113.4 g (4 oz).

EIA-232 (RS-232) Module: 47.6 g (1.68 oz).

EIA-422/485 (RS-422/485) Module: 49.9 g (1.76 oz).

MVS Module: 61.2 g (2.16 oz).

Power Input Module: 97.5 g (3.44 oz).

ENVIRONMENTAL

Operating Temp.: -40 to 75°C (-40 to 167°F).

Storage Temp.: -40 to 85°C (-40 to 185°F).

Relative Humidity: IEC68-2-3; 5-95% non-condensing.

ENVIRONMENTAL (CONTINUED)

Vibration: IEC68-2-6; 0.15 mm/sec² @10-150 Hz.

Mechanical Shock: IEC68-2-27; 11 ms, sinusoidal 50 Gs non-operating, 15 Gs operating.

Thermal Shock: IEC68-2-14; Air to air from -20 to 85°C (-4 to 185°F).

APPROVALS

Complies with the following European Standards:

- EN55011 (Emissions).
- EN61000-4-2 (Electrostatic Discharge Immunity).
- EN61000-4-4 (Electrical Fast Transients Immunity).
- EN61000-4-6 (Conducted Immunity).
- EN61000-4-8 (Power Frequency Magnetic Field Immunity).
- EN61000-6-2 (Radiated RF Immunity).

Evaluated per the following North American Standards:

- CSA C22.2 No. 213.
- CAN/CSA E79-0-95.
- CAN/CSA E79-15-95.
- UL 1604. 3rd Edition.
- UL 2279.

Product Markings for Hazardous Locations:

- Class I, Division 2, Groups A, B, C, and D, T4A.
- Class I, Zone 2, Group IIC, T4A.
- AEx nA IIC, T4A.

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The software provides security for controlling access to functions in ROCLINK 800 Configuration Software for the ROC800-Series. Passwords restrict log-on to both ROCLINK 800 and the ROC809 controller. Refer to Specification Sheet 4:RL800.

Options

- **I/O** - The ROC809 unit supports a wide variety of I/O modules to suit many applications.
- **Communications** - The ROC809 unit supports a variety of communication modules to suit many applications.

- **MVS Sensor Interface** - The ROC809 can handle up to two MVS interface modules, each of which can communicate with 6 MVS Sensors.
- **AGA Calculations** - AGA calculations are optional functions and are ordered in blocks of six meter runs.
- **Development Suite 800 (IEC 61131-3)** - DS800 is an orderable option, which allows the user to program the ROC programs in Flow Chart and all five of the IEC 61131-3 languages. Refer to Specification Sheet 4.1:DS800.

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