Specification Sheet

ROC306/312 Operating System Firmware (Measurement Canada)

The ROC306/312 Operating System Firmware (Industry or Measurement Canada) provides a complete operating system for the Canadian Custody Transfer version of a ROC306 or ROC312 Remote Operations Controller (ROC). The firmware supports:

- Task execution.
- Real-time clock.
- Input/Output database.
- Historical database.
- Audit, event, and alarm log databases.
- User interface.
- Communications.
- Applications software.
- Self-tests.
- ROC displays.

The operating system firmware is contained in a FlashPAC memory module. The firmware makes extensive use of configuration parameters, which are stored in battery-backed RAM and programmable ROM. Configuration of these parameters is performed by using ROCLINK™ for Windows Configuration Software.

Task Execution – The operating system is structured around eight tasks (I/O scanning, Proportional, Integral, and Derivative (PID) control, American Gas Association (AGA) calculations, communications, database updates, Function Sequence Tables (FSTs), user programs, and system tasks) that execute on a 100-millisecond cycle. Task execution is prioritized, with the most important tasks executing first. The communications task and user program task can each run up to four user programs.

Real-Time Clock – The real-time clock is user-settable for year, month, hour, minute, and second. The clock firmware provides time-stamping for database values and tracks the day of the week and corrects for leap year.

Input/Output Database – The number of input or output points the operating system firmware supports includes any built-in inputs and I/O modules. The firmware automatically determines the type and location of each installed I/O module. Each input and output is assigned a point in the database. This point includes configuration parameters for assigning values, statuses, or identifiers as appropriate.

The firmware scans each input, placing the values in to the respective database point. These values are available for display and historical archiving.

Historical Database – The historical database provides archiving of measured and calculated values for on-demand viewing or saving to a file. Each point in the historical database (up to 87 points) can be configured to archive values under various schemes (such as averaging or accumulating), as appropriate for the type of database point. The firmware maintains four types of historical databases: Min/Max, Minute, Hourly, and Daily (based on a configurable contract day start).

Audit, Event, and Alarm Log Databases – The Audit Log records the last 240 parameter changes affecting the audit trail of AGA flow calculations. When the Audit Log is full, further changes are prevented until the log is saved. The Event Log records the last 240 parameter changes and power on/off cycles. The Alarm Log records the last 240 occurrences of alarms (set or clear). Each log can be viewed, saved, or printed.

User Interface – Dedicated support is provided for the optional ROC300-Series Local Display Panel, which mounts in the ROC enclosure door. The display panel can be used to view database values the operating system gathers; with the FlashPAC firmware, values can also be modified.

Communications – The operating system uses its own specialized protocol to support serial communications and radio or telephone communications to local or remote devices such as a host computer. The ROC also supports other communications protocols such as the Modbus protocol. This allows the ROC to be integrated into systems.

Self-Tests – The operating system firmware supports diagnostic tests on the ROC hardware, such as RAM, integrity, real-time clock operation, input power voltage, board temperature, watchdog timer, and analog input A/D conversion accuracy.

Calibration Support – The operating system firmware supports calibration of analog inputs by means of a prompted procedure in the configuration software.

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Process Management

Applications Software – The operating system firmware supports application-specific software (most or all of which is firmware) loaded into the ROC memory. Applications software (described in other specifications sheets) includes:

- AGA Flow (includes 1992 calculation).
- PID Control.
- Function Sequence Tables (FSTs).
- Enhanced Communications and LDP Functions.
- Radio Power Control.

ROC Displays – The operating system firmware supports ROC displays, which are created and accessed using the ROCLINK for Windows Configuration Software (Version 1.20 or greater).

Two displays can be stored in ROC memory. ROC displays can be used to view or edit parameters and database values. Access is controlled by security features.

ROC306/312 Operating System Firmware (Measurement Canada) Specifications

SYSTEM VARIABLES (DEVICE INFORMATION)

Configurable: Contract hour, ROC group, ROC address, station name, active PIDs, active AGAs.

Monitor-only: Firmware version, time created, serial number, RAM installed, MPU loading.

ANALOG INPUT PARAMETERS

Configurable: Point tag, units name, scan period, filter value, A/D converter 0%, A/D converter 100%, low-reading EU, high-reading EU, alarm limits (low, high, low-low, high-high, rate), alarm deadband, filtered EUs, mode (manual, report-by-exception, averaging enable, clipping enable).

Monitor-only: Point number, alarm state, raw A/D input value.

ANALOG OUTPUT PARAMETERS

Configurable: Point tag, units, adjusted D/A 0% and 100% values, low-reading EU, high-reading EU, value in EUs, mode (manual, report-by-exception, clear-on-reset).

Monitor-only: Point number, alarm state, raw D/A output value.

DISCRETE INPUT PARAMETERS

Configurable: Point tag, input filtering, input status, modes (manual, report-by-exception, time duration, input, latched input, inversion), TDI alarm limits, accumulated value, on/off counter, 0% and 100% count.

Monitor-only: Point number, alarm state, TDI count.

DISCRETE OUTPUT PARAMETERS

Configurable: Point tag, time on, output status, modes (manual, toggle, momentary, or TDO), accumulated value, units name, cycle time, 0% count, 100% count, low-reading EU, high-reading EU, EU value.

Monitor-only: Point number, alarm state.

PULSE INPUT PARAMETERS

Configurable: Point tag, units name, rate or accumulation, rate period, scan period, conversion, alarm limits, alarm deadband, value in EUs, mode (manual, report-by-exception, conversion), accumulated value, today's total.

Monitor-only: Point number, alarm state, current rate, yesterday's total.

HISTORICAL DATABASE

Min/Max Database: Archives min/max values of selected variables for the current and previous day.

Minute Database: Archives minute values for the past 60 minutes.

Hourly Database: Archives hourly values for up to 35 days.

Daily Database: Archives daily averages or accumulations (on contract day basis) for up to 35 days.

COMMUNICATIONS PARAMETERS

Configurable: Point tag, baud rate, stop bits, data bits, parity, mode, key-on relay, key-off relay, retry count, retry time.

Monitor-only: Status, retry counter.

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