Firmware Release Summary: 3410 Series Gas Ultrasonic Flow Meters

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VERSION 1.70

Gas3410_1pt70_Release_Prod_20241227 SHA-2 checksum
d105ae38b11a467d667f643cf3be7b8371ccf1de825add51f67800c2ff3a84c1

New Features:

■ Added support for reading hourly and daily log records over Modbus serial and Modbus TCP interface.

■ Added support to IIC acquisition modules rated for Gas Groups A, B, C, D, and IIC applications.

■ Implemented improvements to SMV report functionality for mitigating failed reports observed in field.

■ Added dependency to block user from setting XdcrType, MeterModel and MeterNominalSize to zero when already set to non-zero value.

Bug Fixes/Additional Minor Enhancements:

■ Improved RTCSecondsSinceEpochSet audit log entry to provide the time delta of how much the meter's clock was changed wherein old value indicates meter's time at which the clock was set, and the new value indicates the meter's time to which the clock was set.

■ Fixed issue where last good flow pressure and temperature values are not maintained through a warm start.

■ Fixed issue where connection to meter may fail or exit abruptly or archived log collection may fail when an internal process exits under high CPU load.

■ Fixed issue of meter generating empty scheduled SMV report with N/C result for previous month having no SMV capable hourly logs. Empty scheduled SMV reports are now no longer generated.

■ Fixed issue of IsWarmStartReq alarm making SMV report status as "Fail" even though it gets activated due to an intentional end user change. Alarm severity is changed from "Fail" to "Warning".

■ Fixed issue of SndVelCompErr marked as N/C in hourly logs if the number of valid samples of AvgSndVel and AGA10SndVel values in the hourly log interval were less than 75%. Now it is calculated even for one valid sample.

■ Fixed issue of unexpected and inconsistent behavior of CFA alarms through a warm start. If active then the alarms are not cleared when meter is warm started, or power cycled.

■ Fixed issue of HCH_Method of "Gross Method 1" generating AGA8BaseCalcStatus as invalid when MoleFracN2 is calculated to be less than equal to zero even though heating value, CO2 value, relative density, P and T are all in the Range 1 limits for the GROSS Equation of State.

■ Fixed issue of AGA8FlowCalcStatus value getting stuck to 27 (Flow-condition calculations not performed due to a base-condition calculation error/not performed) while AGA8BaseCalcValidity was TRUE for HCH_Method "Detail".

■ Fixed issue of IsXdcrMaintenanceRequired Boolean being based on the latched status of IsXdcrMaintenanceRequired<A..H> alarms instead of their present status.

■ Fixed issue of undesirable 15 minutes wait before resuming waveform streaming when previous connection to meter breaks abruptly.

■ Fixed issue where firmware upgrade process incorrectly mentions "Failure" when user attempts program downloads when meter is write-protected. Also added more verbose for the upgrade process.

■ Fixed issue of incorrect responses for HART Command 231 when meter is write-protected and for HART Command 223.

■ Cybersecurity improvements

VERSION 1.61

Gas3410_1pt61_Release_20231221 SHA-2 checksum
b19a150904ebc400fa0e219c504e38dc0c817e1c08402a1b076bf4c4057256bd

New Features:

- Added support for Modbus block of registers defined in the ISO 17089-1:2019(E) Annex F for gas ultrasonic meter.

- Added support to enable a Model 3418 meter and a second 3410 series meter mounted in series to share data as a Dual-Configuration meter.

- Registered ultrasonic gas meters under Rosemount™ brand with FieldComm Group™ for HART interface. Manufacture ID and HART device ID changed to 0x2699 (Gas). FDI package for FDI complaint host and files for AMS Trex Device Communicator are available.

  Note
  HART DD 0701 or later will be required for meter running firmware version 1.61-Release or later.

Bug Fixes/Additional Minor Enhancements:

- Fixed issue where when volume accumulators (<Pos/Neg>VolUncorr, <Pos/Neg>VolFlow, <Pos/Neg>VolBase, TrigPrev<Pos/Neg>VolFlow, TrigPrev<Pos/Neg>VolBase) and mass accumulators (<Pos/Neg>Mass) are read in U.S. Customary volume units (FT3 & LBM) via Modbus, HART and DB API then the read value could be off by 35 FT3 and 2 LBM respectively.

- Fixed issue where repeated signal distortion chordal alarms are observed with T-200 transducers. Changed default Pk1Wdth from 5.6 to 6.4 usecs for T-200 transducers.

- Fixed issue where incorrect log record count is reported after device number is changed while the meter has full logs.

- Fixed issue where a delay of up to 5 seconds is observed in updating in-use flow-condition pressure and temperature values from specified pressure and temperature values when input pressure and temperature source is set to "Fixed".

- Fixed issue where a Dual-Configuration communication error alarm (IsColocMeterCommErr) gets activated since clock synchronization stops working.

- Fixed issue where on a Dual-Configuration meter P and T process may core under high CPU load resulting in meter warm start.

- Fixed issue introduced in version 1.60-Release where a DHCP client may fail to connect to meter on IP address 192.168.135.100 when DHCP switch (CPU Module switch position 2) is ON position .

- Fixed issue introduced in version 1.60-Release where one minute running average calculations are incorrect when BatchUpdatePeriod is changed.

- Fixed issue where the HART master (PDM v9.2 & v9.1) is not able to update device configuration through offline menu.

- Fixed issue where device status on HART master (PDM v9.1) is failed while there is no alert description.

- Fixed issue where device is in multi-drop mode then request to perform AO2 trim using HART master, fails with error response code 11 (device is in multi-drop mode).

- Fixed issue where on DeltaV device shows "More Status Available" on DeltaV diagnostics while device status shows "good" on both AMS and TREX.

VERSION 1.60

Gas3410_1pt60_Release_20230214 SHA-2 checksum
6f918c97bd8cd9ab0a25d201d9e2918928ad234d1b58e80f4219e8ce8ccbe96a

New Features

Support of Meter Authentication

- A valid username and password are required to connect with meter on the DB API, Waveform Streaming, FTP and HTTP protocols. The privileges for the username are determined by the user type. MeterLink™ 1.90 or later is required to connect to meter running 3410 Series firmware version 1.60.

- Support 3 user types for privileges:
  — **Administrator:** Full read and write privileges and privileges to manage users

  — **Engineer:** Full read and write privileges

  — **Operator:** Read only access

- Support of maximum 25 usernames. All usernames can be of same user type or different user types. There will be at least one username with manage user privilege.

- A default user "administrator" with Administrator user type and unique password for the meter will be created when firmware is upgraded to Firmware Version 1.60. To upgrade to 3410 Series Firmware Version 1.60, MeterLink™ 1.90 or later is required. It is highly recommended to change default credentials after firmware upgrade.

- Using DB API client, a user with manage users privilege can:
  — Add user

  — Delete user

  — Read user information (username, user type, and user state)

  — Write user information (username, user type and password)

  — Export encrypted user database (user IDs, usernames, passwords and associated user types)

  — Import encrypted user database (user IDs, usernames, passwords and associated user types)

- Export and import encrypted user database (user IDs, usernames, passwords and associated user types) can be used to setup one meter and then clone the user database to other meters. Import encrypted user database can also be used to reconfigure a meter after cold start. Cloning user database means making a copy of the user database using an imported user database file (file exported from the same meter or from another meter).

- DB API client can perform meter cold start or reset users (in case passwords are lost/forgotten) by putting meter into reset mode. Port A override switch is used to enable meter reset mode.

- Modbus serial can be disabled to prevent unauthorized access. Modbus TCP can be configured as read-only or disabled to prevent unauthorized access.

- HART interfaces can be disabled to prevent unauthorized access.

3410 Series Ultrasonic Flow Meters are rebranded as follows:

- Rosemount™ 3410 Series Ultrasonic Gas Flow Meters

Major Enhancements and Bug Fixes:

- Cybersecurity improvements.

- Fixed issue where SOS Mach number correction was not properly correcting chordal SOS values at high velocities.

- Fixed issue where temporary files created during on-demand SMV report generation are not deleted if connection with meter is interrupted while report generation is in progress. Temporary files will cause meter memory to fill up and can cause failure to collect archive logs or generate on-demand SMV report.

- Fixed issue where it is possible to create on-demand SMV reports while connected with meter via a read-only serial port.

- Fixed issue where scheduled SMV report generation will fail if SMV period has only one SMV-capable hourly log for the report period.

- Fixed issue where client will fail to connect to meter on FTP after updating FTPServerControlPort or HTTPServerPort data point value.

- Fixed issue where SwirlAngleLmt data point is not audit logged.

- Added latched data point for the AreGasPropertiesInvalidInUse alarm.

- Fixed issue where FLOW_GATED and FLOW_ANALYSIS_GATED data points in the hourly & daily logs will be incorrectly averaged when meter goes into acquisition mode during the log period.

- Fixed issue where IsXdcrMaintenanceReq boolean is set to TRUE while IsXdcrMaintenanceRequired<Chord> booleans all are FALSE.

- Changed DHCP lease time from 10 days to 8 hours.

- Fixed issue where DB API serial connection with meter on Port A will disconnect when Port A is in override mode and BaudPortA is changed.

- Fixed issue where Modbus read and write operation will fail for LONG & INT types when data point native type is UINT16 or UINT32 and the value is above signed integer limit.

- Improvement in Real-Time Clock (RTC) and system clock to handle incorrect time in the meter.
  — Increased the trickle charge rate of the super cap in u-boot for the RTC.

  — Detect if the century bit in the RTC chip is set and if not set (indicating RTC value corruption), the RTC is set to 01 Jan 2000 00:00:00 (Y2K) prior to initializing the system clock.

  — Detect if the system clock value less than Y2K or greater than 9th Jan, 2038 00:00:00 (near end of epoch) and set the system and RTC to Y2K.

  > **Note**
  > Y2K is always less than the firmware release date, so it forces an invalid clock alarm and associated log entry.

  — Detect on meter start-up if the RTC oscillator was stopped and raise IsClkInvalid alarm. When RTC oscillator is stopped, it is an indication that the clock is invalid. The RTC oscillator can stop when the voltage present on Vcc is insufficient to support oscillation.

VERSION 1.50

Gas3410_1pt50_Release_Prod_20210810 SHA-2 checksum
99f3fa8f89be2056a32a34743f55c6e3817dc44e4bfcc2b8f6b9ec2a241558cb

- Added Smart Meter Verification support for models 3414, 3415 (4-path only), 3416 (4-path only), 3417 and 3418.
  — Scheduled SMV report at midnight of the 1st day of the month for the previous month.

  — On-Demand SMV report for user entered start and end dates.

  — Daily SMV results on Modbus.

  — SMV result value (Pass, Warning or Fail) in daily and hourly logs.

- Added HTTP support for file transfer (database configuration file, program download, meter archive logs, SMV reports) as an alternative for FTP.

- Removed feature key (Continuous Flow Analysis Key, AGA10 Key and GC Key) requirement, effectively unlocking all advanced diagnostic features such as process alerts, reading gas properties from a Gas Chromatograph and AGA 10 SOS calculations.

- Added support for validation of gas properties when gas properties source is set to "Fixed". The validation checks are like those applied when gas properties source is set to "Live".

- Added support to disable FTP server for additional security on the meter.

- Updated alarm severity of multiple alarms to help determine the root cause(s) for alarms.

- Additional improvements:
  — Fixed issue where the error between AGA10 SOS and meter calculate SOS is not calculated when SOS comparison feature is disabled.

  — Fixed issue where the AGA10 SOS and meter calculated SOS comparison alarm (IsSndVelCompErr) is generated when the error (SndVelCompErr) is equal to the error limit (SndVelCompErrLimit).

  — Fixed issue where GC alarm present (IsGCAlarmPresent) error is generated while GC data error (IsGCDataErr) should be generated.

  — Fixed issue where bore buildup will not be detected on 3418 when the swirl angle is high.

VERSION 1.45

For model 3416, corrected speed of sound calculation for diagnostic chord on check meter electronics which caused it to deviate from meter speed of sound at high velocity.

VERSION 1.44

Minor enhancement for model 3418 that addresses Modbus previously not reporting both halves of 64 bit accumulators.

VERSION 1.42

- Before upgrading, please note the following:
  - During the upgrade process to Version 1.42 Firmware, the logs will be copied to the extended storage space in the meter; therefore, an additional two minutes of start-up delay may be observed.
  - Once the meter is upgraded to Version 1.42 Firmware or later, downgrading to lower versions of firmware will erase all archive logs.
- New features:
  - Support for Extended Timed Logs. Hourly log size increased from 100 days to 180 days. Daily log size is increased from 1 year to 5 years.
  - Speed improvements to archive log collection.
  - T-200 transducer support added to the firmware.
  - Username and Port identifier is recorded when a configuration change is recorded in the audit log. MeterLink 1.60 or later must be used to make full use of this functionality.
- Additional improvements:
  - Tracking parameters have been improved in cases of blockages or other aberrations in the flow. This improvement prevents conditions that cause a permanent cycle skip in certain applications.
  - Addressed possible false alarms on chord length mismatch.
  - Hourly and daily archive logs now log the same data points. Diagnostic datapoint in logs are now all logged as a flow analysis gated average.
  - Added datapoints to hourly/daily logs:
    - EnergyRate
    - MassRate
    - AGA10SndVel
    - ExpCorrPressure
    - ExpCorrTemperature
    - CorrectionFactor

VERSION 1.41

- Added support for 3418 8-path gas ultrasonic meters.
- Additional enhancements include:

— Fixed issue where user is not able to collect archive logs from the meter when audit log records have unprintable characters.

— Fixed issue where one or more chords are failed when chord is running at minimum gain level. Issue was caused by signals being discarded due to clipped waveforms.

VERSION 1.35

■ Added support of read-only serial port. All available serial ports on USM meter can be configured in Read-only or Read-write mode.

■ USM Gas firmware supports GERG-2008 (AGA8 Part 2, 2017) calculation for gas thermodynamic properties and speed of sound.

■ Transducer performance alarms are suppressed until chord performance drops below a configured limit.

■ Continuous flow analysis alarms (Bore Buildup Detection, Blockage Detection, Liquid Detection, Abnormal Profile Detection and Alarm for error between AGA speed of sound and meter calculated speed of sound) can be configured as Digital Output.

■ On Dual-Configuration meters:
— Uncorrected flow rate range validity alarm can be configured as Digital Output.

— Transmitter Head 2 can be configured to read gas properties, flow-condition pressure, and flow-condition temperature values from Transmitter Head 1.

— Uncorrected flow rate and speed of sound deviation percentage are logged in hourly and daily logs to view trend of Transmitter Head 2 speed of sound and uncorrected flow rate percentage difference with Transmitter Head 1.

■ Additional enhancements include:
— Fixed issue where turbulence for diagnostic chord will not be calculated when Chord A fails in batch.

— Fixed issue where meter will get locked when only one component is downloaded after unzipping firmware release file. Now meter will not allow downloading individual components after unzipping firmware release file.

— Fixed issue where IsMeasSndSpdRange<Chord> alarm is logged excessively causing alarm logs to get full.

— Fixed issue where HART Communication will intermittently drop when archive logs are pulled from the meter.

— Fixed issue where HART Communication will drop when archive logs are pulled from meter simultaneously by two clients.

— Fixed issue where measurement data is discarded on all chords when a chord is marked inactive.

— Fixed issue where meter will fail to discard distorted waveforms from measurement due to incorrect positive or negative span as bad.

— Fixed issue where standard deviation of CrossFlow, Symmetry, and ProfileFactor, which are used for detection of Liquids in meter, are calculated incorrectly.

— Fixed issue with Dual-Configuration meter where IsColocMeterQFlowRangeErr alarm is activated when there is sudden change in flow rate.

VERSION 1.31

■ Dual-Configuration meters sync clocks so time logs and alarms are synchronized providing meaningful time stamp data – released for 3415, 3416, and 3417 meters.

■ Added diagnostic chord status indications.

- Greatly simplified transducer swap-out and replacement with MeterLink. Users no longer need to provide information about the replaced transducer(s).

- Additional enhancements include:
  — Raised gas chromatograph communication alarm in a timelier manner

  — Decreased time to get DHCP address

  — Decreased log file generation time

  — Fixed frequency output errors when meter measurement mode:
    • Is changed from standard batch to rapid batch

    • Test mode to enabled/disabled

    • Or frequency output is reconfigured

  — Fixed Modbus RTU framing errors at high baud rates.

  — Fixed flow profile correction factor error on 3411 and 3412 meters when AGA8 calculations are invalid.

  — Fixed issue with Modbus TCP/IP where Modbus communication will fail when Modbus TCP/IP port is configured with a reserved port number.

  — Fixed issue with transducer maintenance alarm where the alarms fail to clear when meter measurement mode is rapid batch.

  — Fixed issue with signal acquisition where meter fails to go into measurement mode when firing sequence is changed from default value.

  — Fixed issue with event and archive logs where a log full alarm is not cleared on enabling log overwrite feature.

VERSION 1.27

- Enhanced meter connectivity via Ethernet, enabling the meter to communicate with a Gas Chromatograph (GC) to read gas compositions using Modbus TCP/IP over Ethernet. (MeterLink v1.31 or newer must be installed).

- Updated HART® commands to Revision 6 to support configuration of:
  — Additional frequency outputs and digital outputs (FODOs) on the Type 4 CPU Board [1]

  — GC Modbus TCP/IP

  — Dual-Configuration Gas Ultrasonic Flow Meters (Models 3415, 3416 and 3417)

- Additional minor enhancements include:
  — Fixed issue where measurement was affected during waveform collection when the meter was in rapid batch mode.

  — Fixed issue where firmware intermittently read incorrect pressure and temperature input values when the meter was running under high stress.

  — Fixed issue where the meter generated an empty log file during creation of an event or timed log if the meter's clock was backdated.

  — Fixed issue where the meter did not generate an alarm during firing synchronization (lsXdcrFiringSyncActive) resets.

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(1) Type 4 CPU Module releasing for sale in December 2016.

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VERSION 1.24

- Added support for the new Type 4 CPU Board that includes six Frequency/Digital Outputs and removes Analog Output 2.

- Added support for new T-41 transducers.[2]

- Minor enhancements include:
  — Fixed GHOST network vulnerability discovered within Linux libraries.

  — Fixed issue with frequency output in test mode dropping when meter goes from measurement into acquisition mode.

  — Fixed issues with AGA10 sound velocity and SOS compare difference algorithm where AGA10SndVelStatus and SOSComparePctDiff were incorrectly computed by firmware.

VERSION 1.23

- Added support for new dual-configuration Models 3415 and 3416 meters.

- Added support of diagnostic chord alarms in the dual-configuration Model 3416 meter to detect speed of sound error.

- Added support for configurable GC gas component indices, allowing the meter to communicate with all Rosemount gas chromatographs as well as third party gas chromatographs that support SIM 2251.

- Enhanced 'Transducer Health Monitoring' to avoid transducer maintenance alarms when there is no flow in the meter (i.e. meter is below LowFlowLmt) or when the meter is in acquisition mode.

- Added support to display volume for a minimum of 8000 hours of operation at Qmax without the display rolling back to zero, ensuring the meter is in compliance with the European MID directive and OIML R137.

- Additional minor enhancements include:
  — Fixed issue with Modbus server to prevent locking of the TCP/IP port when client rapidly connects and then disconnects this server from the meter.

  — Fixed issue with hourly and daily logs where any entry with a zero value is not averaged.

  — Fixed issue with local display where the displayed value remains in overflow state and does not refresh.

  — Fixed issue with communications between the CPU and the acquisition module that caused fast configuration waveforms' packets to reset in the acquisition module.

  — Fixed issue where all chords can be set to inactive on 3410 Series JuniorSonic meters.

  — Fixed issue to prevent writing zero to 'LA..LD & PipeDiam' which can cause the meter to reset.

  — Fixed issue with PPP communication where communication drops if UnitsSystem is changed.

  — Fixed issue with local display where value of 9999998 is rounded to 1.000E07.

  — Fixed issue with archive logs causing the meter to not create a new record when DoOverwriteUnreadAlarmLog is set to 'FALSE' and the log is full.

  — Fixed issue where system logs are generated for inactivated chords when the meter is in acquisition mode.

  — Fixed issue with archive logs where alarms associated with "archive log is full" are not cleared when logs are marked as read until a new archive log is generated.

  — Fixed issue where meter does not acquire back when min hold time

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(2) Rosemount T-41 transducers releasing for sale in January 2017.

— (MinHoldTm) is written back with a valid value. Fixed issue where transducer firing synchronization (XdcrFiringSyncActive) resets after inactivating chords.

— Fixed issue with system logs where the system log XML file is not well formed due to a corrupt message.

— Fixed issue with hourly and daily logs where time slips by one second.

VERSION 1.18

- Added support for 3-slot retrofit enclosure.

- Added support for a Port C serial port.

- Added support for RS-485 on Port B and Port C.

- Enhanced Transducer Health Monitoring to avoid unnecessary alarms and prematurely discarding waveforms.

- Additional minor enhancements include:
  — Prevented issues with reoccurring live pressure and temperature errors in System logs.

  — Fixed issue where Port A RS-485 full duplex did not work at 1200 or 2400 BPS.

  — Fixed issue where units would be forced to 'U.S. Customary' and time base to 'per hour' for Port A when Port A override switch was toggled.

  — Fixed issue that could cause Acquisition Module communication errors while streaming waveform files.

  — Fixed issue where CurrDayFlowTime and CurrHourFlowTime always report zero.

  — Fixed issue where a chord remained in failure mode after activating an inactive chord.

VERSION 1.16

Enhanced chord substitution feature to improve the accuracy of the calculated measurement in the event of a chord failure.

VERSION 1.13

Added display of CRC-32 checksum on local display if installed for compliance to OIML R137.

VERSION 1.11

Fixed an issue that caused meters with larger path lengths (i.e. 24″ JuniorSonic meter, etc.) to experience chord failure when the flow rate increased above a certain velocity. Chord recovery occurred during 'no flow' conditions.

VERSION 1.09

- Fixed an issue introduced in V1.07 firmware. If the system clock was set to a date prior to 1 January 2003, as is often the case during installation, the externally visible meter time (i.e. RTCSecondsSinceEpochRead, RTCSecond) will not be properly updated.

- Enhanced 'Transducer Type' command (i.e. SetXdcrType) to default to different tracking parameters if running a JuniorSonic or SeniorSonic 3410 Series Meter. Previously, the meter did not distinguish between these two meter types when setting the tracking parameters.

VERSION 1.06

- Added support for T-32 low pressure transducers.
- Additional minor enhancements include:
  — Fixed issue in which activating Write Protect while Output Test is underway led to meter rebooting.

  — Prevented selection of Live GC inputs if GCSerialPort is disabled.

  — Fixed issue to prevent proper chord weightings from being applied when DeviceNumber is changed.

  — Fixed issue in the local display that could cause task to fail when the local display configuration is changed.

  — Corrected errors in logging of temperature alarms.

VERSION 1.04

- Added support for HART 7.
- Added support for Local Display.
- Added support for GC Master functionality on serial Port A.

VERSION 1.03

Required to achieve accurate analog output values for IOBdType 2 and later. Analog output error was ≤0.38%. IOBdType can be found in MeterLink™ Software in the 'Meter Information' section.

For more information: **Emerson.com/global**

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