GUIDANT

Electronic Gas Flow Computer System

Smith Meter® microFlow.net™ Gas

Operator Reference Manual

Bulletin MNFG002 Issue/Rev 0.1 (6/11)

Caution

The default or operating values used in this manual and in the program of the Smith Meter® microFlow.net™ Gas are for factory testing only and should not be construed as default or operating values for your metering system. Each metering system is unique and each program parameter must be reviewed and programmed for that specific metering system application.

Disclaimer

Guidant hereby disclaims any and all responsibility for damages, including but not limited to consequential damages, arising out of or related to the inputting of incorrect or improper program or default values entered in connection with the microFlow.net Gas.

Proprietary Notice

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Product Description

The Smith Meter® microFlow.net™ Gas is a microprocessor based single meter, single product electronic flow computer. It is configurable to support a variety of user applications.

Optimum measurement accuracy is attained through continuous linearization of the meter factor with changes in flow rates. Volumetric correction is calculated directly from published AGA/ISO equations providing precise volumetric measurement results. Precise temperature, pressure compensation are options that are available in the instrument.

The dynamic real-time display of the current actual operating conditions of the system provides the operator with valuable system information while the system is operating.

The microFlow.net Gas provides several flow control functions: single or dual pulse input, digital valve control, sampler control support, timed daily reports, continuous totalization, Smith Meter mass meter communications, fraction programmable 6 digit batch totalizers, and 9 digit whole number non-resettable totalizers. Other significant features are as follows:

- Ethernet Connectivity
- Three Multi-drop Serial Communications Ports
- Event Logging / Audit Trail
- User Configurable I/O
- Three Security Levels
- Optional Battery Backed Display per OIML
- Programmable Language/Messages
- MPU Meter Interface

How To Use This Manual

This manual is to be used as a reference guide to the program codes available in the microFlow.net Gas. The directories and subdirectories which contain the program codes are listed above each set of parameters.

The program code explanations frequently list “fatal” or “critical” warnings, or indicate that in some circumstances, the code is “no entry.” A fatal warning is triggered by a selection that the microFlow.net Gas cannot accept and will not allow to be entered. Possible causes include an entry that falls outside an allowable range, or an entry that seriously conflicts with a previous entry. A critical warning signals that a selection is incompatible with a previously configured program code. The microFlow.net Gas will accept the new entry, but the selection will undoubtedly cause a problem in operation and should be changed. “No entry" indicates that a program code is unavailable and will not appear on the menu, because previous selections make it irrelevant. For example, pulse output codes will not appear unless pulse output has been enabled.

The main system directories are as follows:

Configuration Directories
100 – Pulse Outputs
200 – Digital Inputs
300 – Digital Outputs
400 – Analog Inputs

General Purpose Directories
- 10X – Date and Time
- 11X – Units
- 12X – Display
- 13X – Timeouts
- 14X – Control
- 15X – Permissives
- 160 – Security

Meter Directories

Meter Setup Directories

Meter Type
- 30X – Meter
- 33X – Ultrasonic Meter
- 37X – Mass Meter

Flow Control Directories
- 20X – Valve Type
- 22X – Alarm Limits

Volume Accuracy Directories
- 30X…31X – Pulse Input
- 34X…35X – Meter Factors

Temperature/Density Directories
- 40X – Temperature
- 41X – Density

Pressure Directories
- 50X – General Purpose

Product Directories
- 0X – Product
- 1X – Composition
- 4X – Maintenance Values

Alarm Directories
- 601 – Driver Clearable
- 602 – Power-fail Alarm
- 61X…66X – Configure Alarms
  - 61X – System Alarms
  - 62X – Flow Alarms
  - 63X – Sensor Alarms
  - 65X – Meter Alarms
  - 68X – User Alarms
  - 69X – User Alarm Messages

Communications Directories

- 70X…71X – Comm Port Configuration
- 72X – Host Interface
- 73X – Reports
- 76X…77X – Prompts

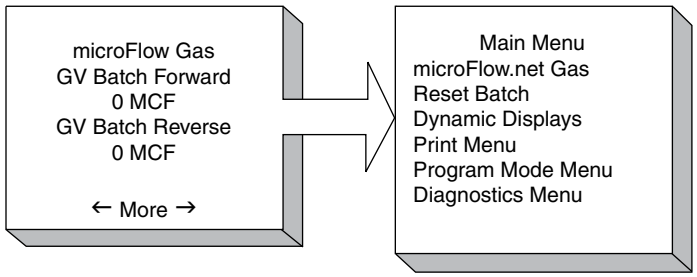
Diagnostic Directories

- Analog Input Test
- Digital Input Test
- Digital Output Test
- Pulse Input Test
- Pulse Output test
- Communications Test
- Keypad Test
- Display Pixel Test
- Boolean Algebraic
- Reset Totals
- Reset Dual Pulse
- Erase Event Log
- Erase Batch Log
- Erase Web Pages
- Mass Meter Menu
- Upgrade Firmware
- Factory Initialize
- Factory Diagnostics

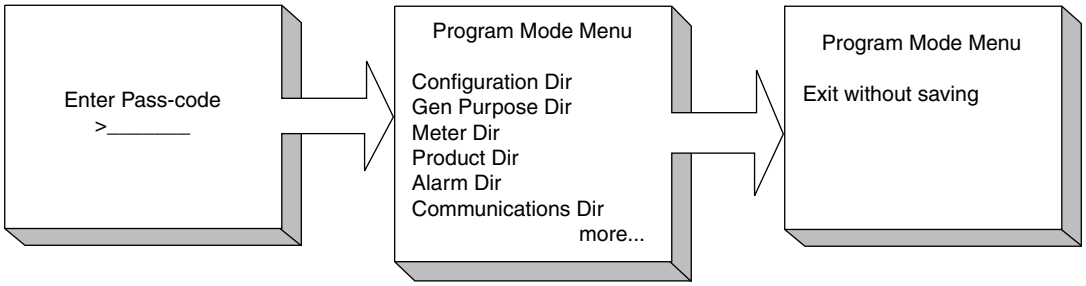
Getting Started

The program codes may be reviewed or altered using both the keypad and display on the face of the microFlow.net Gas or by using Flowmate software through one of the communications ports. The following provides instructions on use of the keypad and display for program code operations.

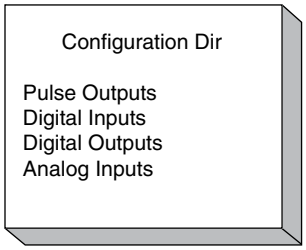
The Program Mode Menu is used for program code manipulation. From the “Run-time” screen the user first goes to the “Main Menu” screen by depressing the ENTER key.



Select “Program Mode Menu” and depress the ENTER key. The microFlow.net Gas will then request the pass-code to allow entry into Program Mode Menu. The default pass-code for a new microFlow.net Gas is “0000”. After entering the proper pass-code the Program Mode Menu screens will be accessible.



There are four (4) Configuration Subdirectories in the microFlow.net Gas:



Pulse Output Subdirectory

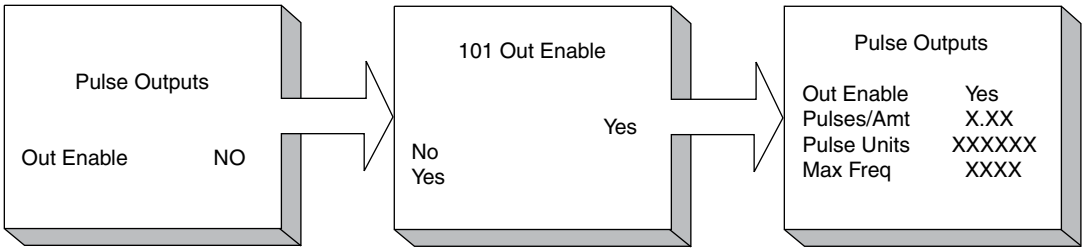
If Pulse Output is not enabled, parameters Configuration 102 thru 104 will not be available for entry.

Configuration 101 – Pulse Output Enable

This program code allows a pulse output to be activated for the microFlow.net Gas. Selections are as follows:
- No
- Yes

Steps to ENABLE Pulse Outputs:

- At first Pulse Output screen press ENTER
- On "101 Out Enable" screen select "Yes"
- Press ENTER
- Pulse Output Directory opens for editing



Configuration 102 – Pulse Output Pulses/Amount

This five-digit parameter defines the pulse output resolution, the number of pulses per unit of volume to be generated (e.g., 0.1 will output 1 pulse for every 10 units of volume). The range of this parameter is 0.00 through 999.99.

Note: *No entry if Pulse Output Enable = No*
Help: "Enter output pulses per unit of volume or mass."

Configuration 103 – Pulse Output Units

This parameter defines the volume type used to pace the pulse output. Selections are as follows:

- IV [Indicated Volume or Raw]
- GV [Gross]
- GSV [Gross at Standard Temperature and Pressure]
- Mass
- Energy

Critical: Selected units not available.

Help: "Select volume type for pulse output to be based on.

Note: *No entry if Pulse Output Enable = No.*

Configuration 104 – Pulse Output Maximum Frequency

This four-digit entry limits the pulse output frequency for Pulse Output #1 to a fixed range (0 to 3500 Hz) to avoid over-speeding the device attached to the pulse output. All of the intended pulses will eventually be transmitted; the total period will be increased if required to ensure the correct number of pulses is output. A 0 entry disables this feature.

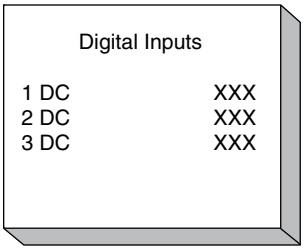
Fatal: Entry is out of specified range.

Help: "Enter frequency that output should be limited to (0 to 3500 Hz)."

Note: *No entry if Pulse Output Enable = No.*

Digital Input Subdirectory

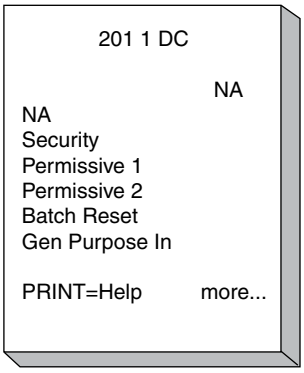
The microFlow.net Gas has provisions for three (3) digital (ON/OFF) inputs.

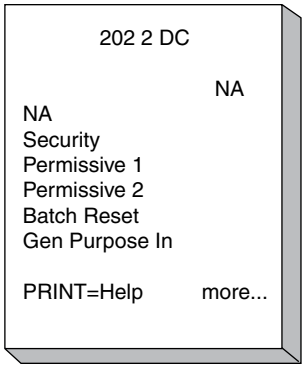


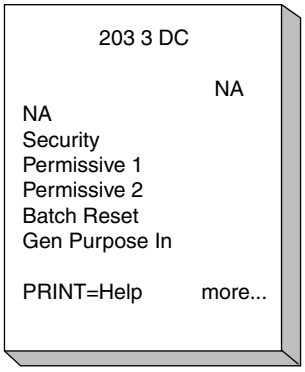
Configuration 201, 202, 203 – Digital Input Functions

These program codes define the function of each digital input. Except for general purpose inputs, duplicate assignments are not allowed. Must be at highest level of security to program or de-program security input. Injector I/O assignment must match Injector type and digital output assigned for the injector. All Digital Inputs are DC type. Selections are as follows:

- NA
- Security Switch
- Permissive #1
- Permissive #2
- Batch Reset
- General Purpose Input

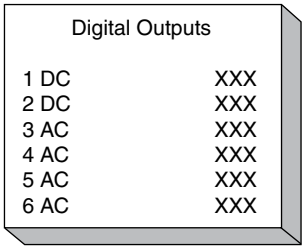






Digital Output Subdirectory

The microFlow.net Gas has provisions for six (6) digital (ON/OFF) outputs. Digital Outputs 1 and 2 are DC type. Digital Outputs 3 through 6 are AC type.



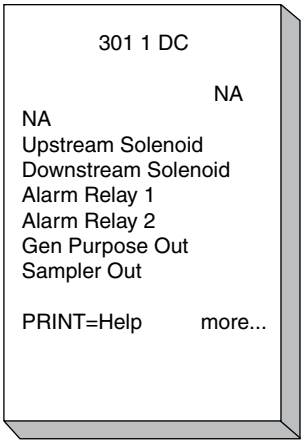
This program code defines the function of a digital output. If a valve is being configured, both upstream and downstream solenoids must be assigned. Except for general purpose outputs, duplicate assignments are not allowed for the same arm (or meter or product).

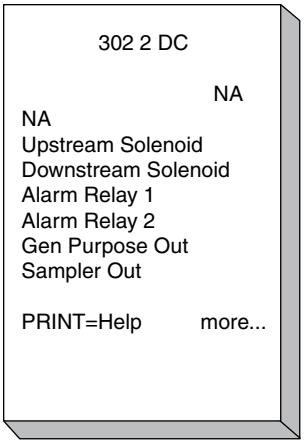
Selections are as follows:

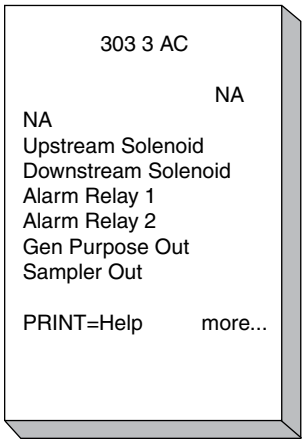
- NA
- Upstream Solenoid
- Downstream Solenoid
- Alarm Relay #1
- Alarm Relay #2
- General Purpose Output
- Sampler Out

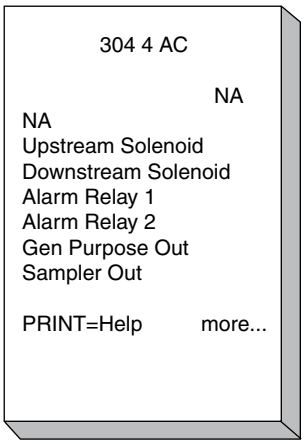
Critical: Output assignments must be unique [except for general purpose function]

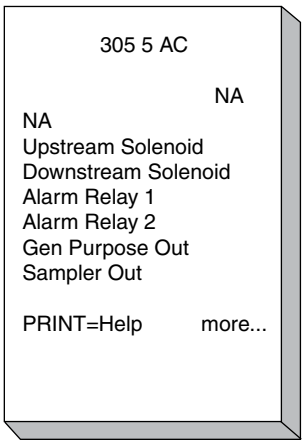
Critical: Both upstream and downstream solenoids required
Critical: Injector I/O assignment does not match type

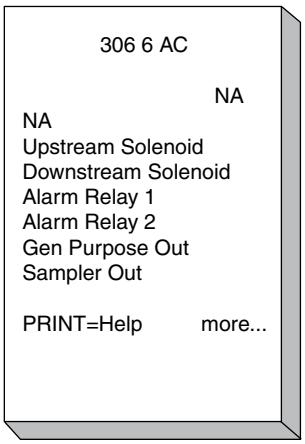






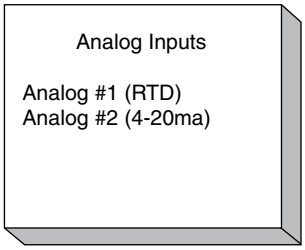






Analog Input Subdirectory

The microFlow.net Gas includes two (2) analog inputs. Analog Input #1 is dedicated to a 100 ohm RTD temperature type sensor. Analog Input #2 is a 4-20ma current loop type. This input may represent temperature, density, or pressure.



Configuration 401 – Analog Input #1 (RTD) Function

These program codes define the function of the Analog Input #1. Selections are as follows:

- NA
- Temperature Input

Critical: RTDs can only be temperature inputs

Help: Select function for this analog input.

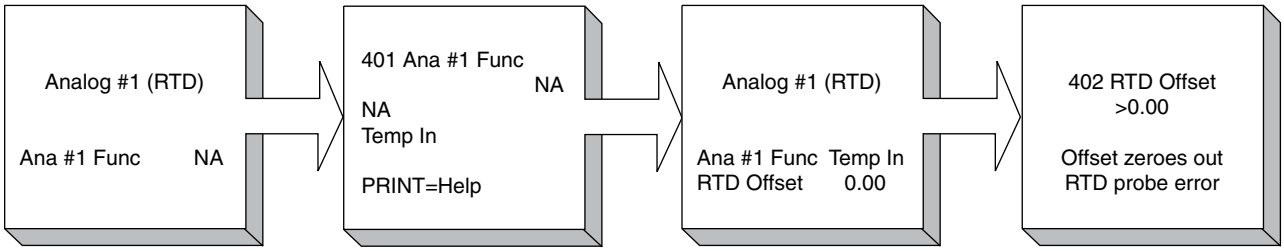
Configuration 402 – RTD Offset

This parameter is used to correct the reading of the RTD input by a fixed amount. The range of this program code is –9.9 to +9.9.

Note: *No-entry if Analog Input #1=NA.*

Steps for enabling RTD input and Offset

- From Analog Inputs subdirectory select “Analog #1 (RTD)”
- Select “Temp In”, press ENTER
- Select “RTD Offset”, press ENTER
- Enter Offset value, press ENTER



Configuration 411 – Analog Input #2 (4-20 mA) Function

These program codes define the function of the Analog Input #2. Selections are as follows:

- NA
- Temperature Input
- Density
- Pressure

Critical: I/O assignments must be unique. Temperature Input cannot be selected if Analog #1 is “Temp In”.

Help: Select function for this analog input.

Configuration 412 – Analog Input #2 Low Value

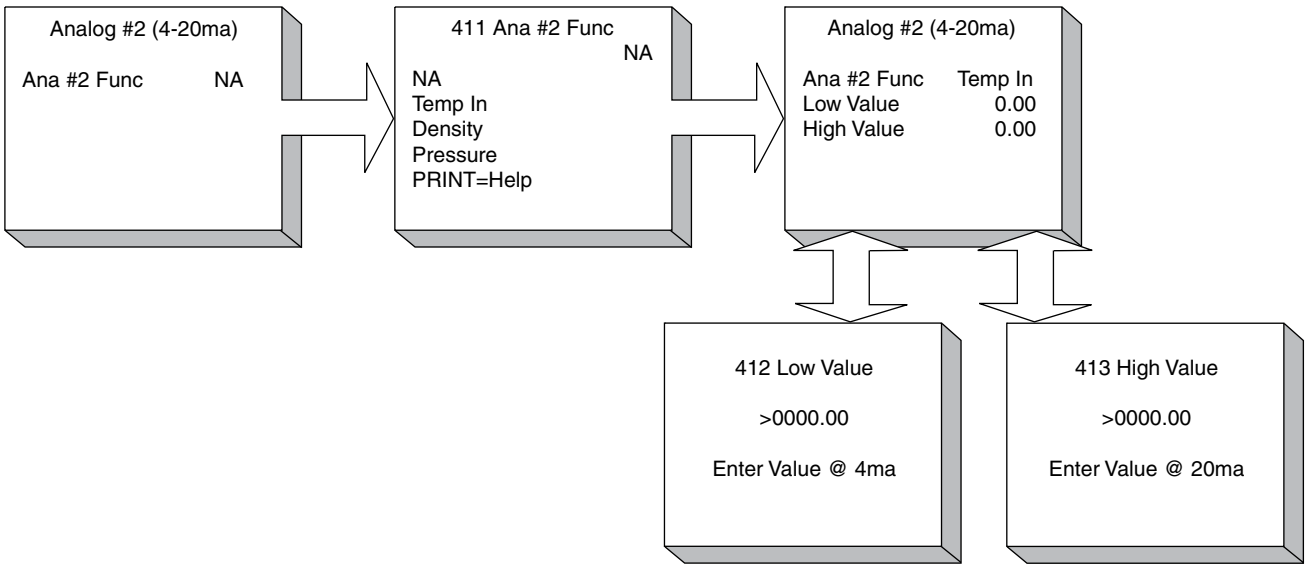
This parameter is used to scale Analog Input #2 by providing the value proportional to 4 mA. The range of this program code is -999.99 to +9999.99.

Configuration 413 – Analog Input #2 High Value

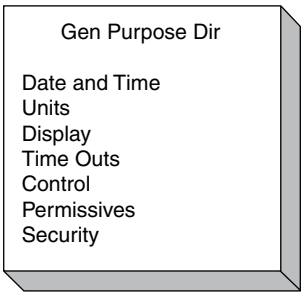
This parameter is used to scale Analog Input #2 by providing the value proportional to 20 mA. The range of this program code is -999.99 to +9999.99.

Critical: Low value must be less than the High Value.

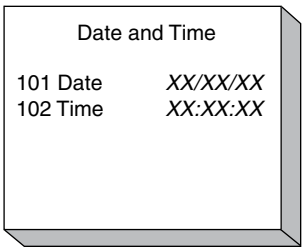
The flowchart below shows the process of enabling and scaling Analog Input #2. This example assumes a 4-20 mA temperature signal as the input.



There are seven (7) General Purpose subdirectories.



Date and Time Subdirectory



General Purpose 101 – Date

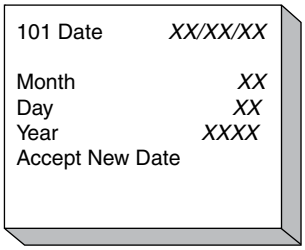
This entry allows the operator to set the date on the microFlow.net Gas. When the month, day, and year have been entered, move to “Accept New Date” and press ENTER. The new date has been accepted.

- Month
- Day
- Year
- Accept New Date

Fatal: Invalid date

Steps to changing microFlow.net Gas Date:

- Select “Month”, press ENTER
- Enter value for month (1-12), press ENTER
- Select “Day”, press ENTER
- Enter value for day of the month (1-31), press ENTER
- Select “Year”, press ENTER
- Enter value for year (4 digit), press ENTER
- Select “Accept New Date”, press ENTER



General Purpose 102 – Time

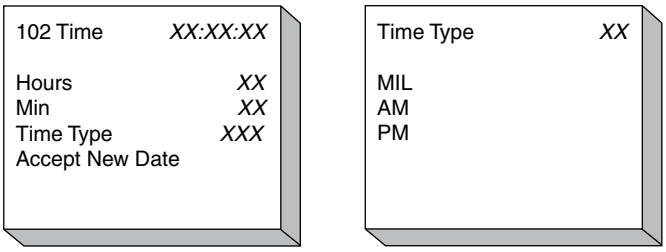
A correction or change to the time can be made through this entry. The Time parameter allows for either an AM/PM format or the military (24 hour) format. To accept the new time, move the cursor to Accept New Time and press "ENTER." The time has been accepted and the screen reverts to the Date and Time display. Selections are as follows:

- Hours
- Min
- Time Type
- Accept New Time

Fatal: Invalid time

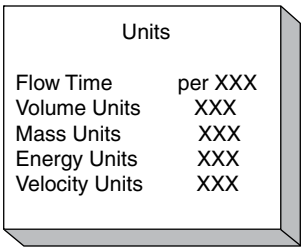
Steps to changing microFlow.net Gas Time:

- Select "Hours", press ENTER
- Enter value for hour (0-24), press ENTER
- Select "Min", press ENTER
- Enter value for minute (0-59), press ENTER
- Select "Time Type", press ENTER
- Select time designation (MIL, AM, PM), press ENTER
- Select "Accept New Time", press ENTER



Units Subdirectory

The parameters in this subdirectory establish the units of measure used by the microFlow.net Gas.



General Purpose 111 – Flow Rate Time

This parameter is used to define the time units used to compute the flow rate. Selections are as follows:

- Per minute
- Per hour
- Per day

Help: "Select the time base for flow rate calculation and display."

General Purpose 112 – Volume Units

This parameter selects the volume units used to measure product delivery. The factory default is "M3." Selections are as follows:

• M3

• MCF

Help: "Select desired volume units (cubic meters or 1000 cubic feet) for values available on displays, reports and via comm.

General Purpose 113 – Mass Units

This parameter defines the mass units used for product measurement. The factory default is "Kilograms." Selections are as follows:

• Kilograms

• Lb

• US Ton

• Metric Ton

• Long Ton

Help: "Select desired mass units to be used for values available on displays, reports and via comm.

General Purpose 114 – Energy Units

This parameter defines the energy units for product measurement.

• MJ

• MMBtu

Help: Select desired energy units (megajoules or megaBtu) for values available on displays, reports and via comm.

General Purpose 115 – Velocity Units

This parameter defines the velocity units for the product being measured.

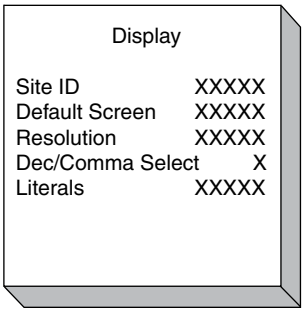
• mtr/sec

• ft/sec

Help: Select the units used for velocity values.

Display Subdirectory

This subdirectory sets the customizable attributes of the microFlow.net Gas display.

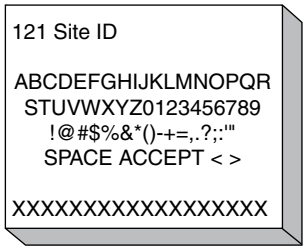


General Purpose 121 – Flow Computer ID

This parameter allows a (21) twenty-one character alphanumeric message to serve as the Flow Computer identifier. The available characters are as follows:

• A B C D E F G H I J K L M N O P Q R S U V W X Y Z # *
• a b c d e f g h i j k l m n o p q r s t u v w x y z & @
• 0 1 2 3 4 5 6 7 8 9 < > ( ) ? ! . , ‘ - “ / + = _ END

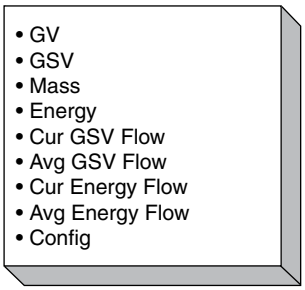
Enter this parameter by selecting characters using the UP/DOWN and LEFT/RIGHT Arrow keys. Press ENTER for each selected character. When all characters have been entered, select “ACCEPT” and press ENTER to complete the process.



Help: Enter a 21-character entry for this flow computer.

General Purpose 122 – Run Display Options

Select batch screen option from the following:



This will be displayed as the default screen.

Help: Select Primary Run Screen (displayed) first in rotation of run screens.

General Purpose 123 – Display Resolution

This parameter selects the resolution for data shown on the Delivery Screen. Selections are as follows:

• Whole Units
• 10th
• 100th

Help: “Select resolution of volume and energy to be displayed.”

General Purpose 124 – Decimal/Comma

This parameter specifies whether a decimal or a comma is to be used to separate the whole and fractional parts of numeric data. The comma is typically used in European locations. The selected delimiter is used in the program mode and on run screens and dynamic displays local to microFlow.net Gas, in host communications, and on delivery reports. Selections are as follows:

• Decimal

• Comma

Help: "Select delimiter between whole and fractional numbers."

General Purpose 125 – Default/Translated Literals

This parameter allows the user to initialize all the displays used in the microFlow.net Gas to either the default (factory literals) or the translated literals. Translated literals are only available if the translation has been completed in the FlowMate and downloaded to the microFlow.net Gas. Selections are as follows:

• Default literals

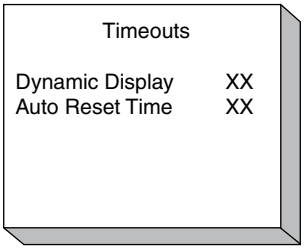
• Translated literals

Note: *If a translation has been entered on FlowMate and downloaded to the microFlow.net Gas, the new translation will not appear on the display until "translated literals" is selected here.*

Help: Select factory-programmed default literals or literals translated via FlowMate.

Timeouts Subdirectory

The Timeouts Subdirectory contains settings which control when the microFlow.net Gas automatically switches back to the Run Screens.



General Purpose 131 – Dynamic Display Timeout

This program code defines the amount of time, in seconds, that Dynamic Displays will remain before the microFlow.net Gas returns to the Run Screen. A "0" entry for this program code disables the Dynamic Displays. A "99" entry for this program code will cause the Dynamic Display to remain indefinitely, until the operator presses CLEAR. The range of this parameter is 0 to 99 seconds.

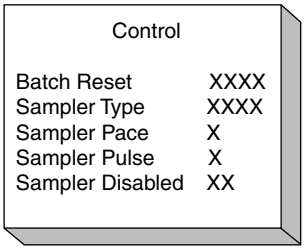
Help: "Time in seconds before exiting displays. "0" disables displays and "99" allows them to remain indefinitely."

General Purpose 132 – Auto Reset Timer

This program code defines the amount of time, in minutes, before microFlow.net Gas will return to the Run Screen in the absence of key input by the operator. The auto reset feature will remove the microFlow.net Gas from the program mode or end batches in progress when this parameter is set to a non-zero value. The clock starts after each keystroke (unless flowing). If another keystroke is not made in the time set in this code, the unit will revert to the Run display. If the operator's load has been completed and he hasn't ended the batch, the microFlow.net Gas will return to the Run mode after the time has expired. The range of this parameter is 0 to 99 minutes. An entry of 0 disables this feature.

Help: Enter time in minutes with no activity before microFlow resets to Ready Mode. Zero disables this feature.

Control Subdirectory



General Purpose 141 – Batch Reset Enable

This parameter allows the user to select whether the batch reset can be done via the keypad OR not allowing the operator to reset the batch via the keypad.

0 - Enable Keypad

1 - Disable Keypad

Help: Enable/Disable batch reset via the keyboard.

General Purpose 142 – Sampler Type

This parameter allows the user to select between disabling the Sampler Type or choosing whether the sampling frequency is set by volume or time. This will allow the MicroFlow to be programmed to take a sample each time a certain volume is accumulated or after a certain time increment is reached. The choices in the directory are shown below:

- Disable
- Volume Pacing
- Time Pacing

Help: "Select volume or time for sampler pacing."

General Purpose 143 – Sampler Pace

This program code allows the user to select the volume or time in seconds between samples. The range of this parameter is from 0 – 250.

Note: *The number selected will correspond to the selection made in parameter 142 (above) to determine whether the pace is set for volume or time.*

Help: Enter the number of seconds or volume units between samples 0-250.

General Purpose 144 – Sampler Pulse

This program code allows the user to set the minimum width of the sampler pulse output via a discrete I/O output signal. The range is between 0 – 50. The sampler pulse output will be incremented in a tenth of a second interval. For example a pulse width of 50 (the highest value able to be entered) will give a 5 second output pulse "on time" until the next sample is taken.

Help: Enter the minimum width of the sampler pulse in 0.1 second increments 0-50.

General Purpose 145 – Sampler Disabled

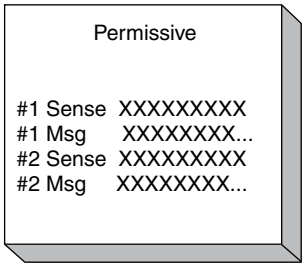
The sampler has the option of being enabled or disabled. This parameter will allow the sampler operation to be disabled. The default setting is set to "No", meaning that the sampler operation will be programmed on a factory default start up.

- No
- Yes

Help: Disables sampler operation.

Permissive Subdirectory

Program codes in the Permissive Subdirectory determine how the microFlow.net Gas responds to the Permissive #1 and #2 assigned to Digital Inputs. **Permissive program codes are only available for those Permissives assigned to Digital Inputs in the Configuration Directory** (Configuration 201, 202, 203).



General Purpose 151 – Permissive #1 Sense

This parameter defines the conditions under which Permissive #1 is expected to be present in order for operations to be allowed. Selections are as follows:

- N/A
- Batch Reset
- Flow
- Reset & Flow

Note: *No entry if digital input not programmed as permissive.*

Help: "Select when permissive is to be required for operation"

General Purpose 152 – Permissive #1 Message

These (21) twenty one-character alphanumeric messages will be displayed if Permissive #1 sense entry is de-fined but not present when expected. The data entry allows the following characters to be selected:

- A B C D E F G H I J K L M N O P Q R S T U V W X Y Z # *
- 0 1 2 3 4 5 6 7 8 9 ! @ # $ % & * ( ) - _ + = , . ? / ; : ' " SPACE ACCEPT < >

Note: *No entry if digital input not programmed as permissive.*

Enter this parameter by selecting characters using the UP/DOWN and LEFT/RIGHT Arrow keys. Press ENTER for each selected character. When all characters have been entered, select "ACCEPT" and press ENTER to complete the process.

Help: Enter message to be displayed in absence of permissive.

General Purpose 153 – Permissive #2 Sense

This parameter defines the conditions under which Permissive #2 is expected to be present in order for operations to be allowed. Selections are as follows:

- N/A
- Batch Reset
- Flow
- Reset & Flow

Note: *No entry if digital input not programmed as permissive.*

Help: "Select when permissive is to be required for operation"

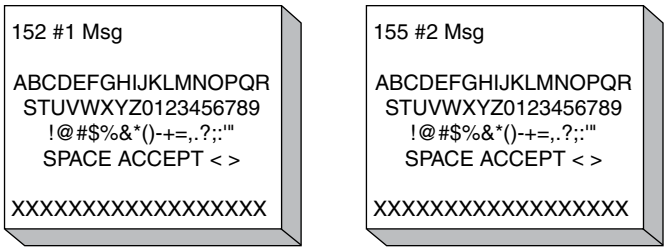
General Purpose 154 – Permissive #2 Message

These (21) twenty one-character alphanumeric messages will be displayed if Permissive #2 sense entry is defined but not present when expected. The data entry allows the following characters to be selected:

- A B C D E F G H I J K L M N O P Q R S T U V W X Y Z # *
- 0 1 2 3 4 5 6 7 8 9 ! @ # $ % & * ( ) - _ + = , . ? / ; : ' " SPACE ACCEPT < >

Note: *No entry if digital input not programmed as permissive.*

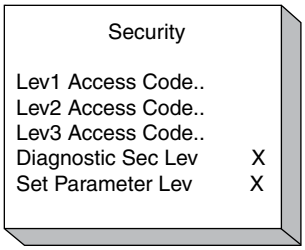
Enter this parameter by selecting characters using the UP/DOWN and LEFT/RIGHT Arrow keys. Press ENTER for each selected character. When all characters have been entered, select "ACCEPT" and press ENTER to complete the process.



Help: Enter message to be displayed in absence of Permissive.

Security Subdirectory

This subdirectory establishes access codes and requirements for microFlow.net Gas secure information. Note: The Security Input Access Level program code is only available if the a Digital Input has been assigned to "Security". See Configuration Directory for Digital Input assignments.



General Purpose 161 – Level 1 Access Code

These four-digit numbers permit entry into the microFlow.net Gas program or Weights and Measures program codes. The access codes must be entered through the microFlow.net Gas keypad after the Program Mode security contact has been closed (if a security contact has been programmed and wired to a switch). If this contact has not been closed, the microFlow.net Gas will not allow entry into the Program Mode. Once the security is set up for the parameters in the unit the operator must enter the program mode at the level assigned to the parameter(s) that are to be changed. The range of these entries is from 0 to 9999.

Critical: Duplicate access codes are not permitted

Critical: Must be at highest level of security

Help: "Enter Access Code for this security level. Level 3 is the highest level."

Note: *These access codes must be programmed in order, beginning with security level one. Intermediate levels cannot be skipped.*
Note: *The operator must enter Program Mode at the highest programmed security level to obtain access to these access codes.*

General Purpose 162 – Level 2 Access Code

These four-digit numbers permit entry into the microFlow.net Gas program or Weights and Measures program codes. The access codes must be entered through the microFlow.net Gas keypad after the Program Mode security contact has been closed (if a security contact has been programmed and wired to a switch). If this contact has not

been closed, the microFlow.net Gas will not allow entry into the Program Mode. Once the security is set up for the parameters in the unit the operator must enter the program mode at the level assigned to the parameter(s) that are to be changed. The range of these entries is from 0 to 9999.

Critical: Duplicate access codes are not permitted

Critical: Must be at highest level of security

Help: "Enter Access Code for this security level. Level 3 is the highest level."

Note: *These access codes must be programmed in order, beginning with security level one. Intermediate levels cannot be skipped.*
Note: *The operator must enter Program Mode at the highest programmed security level to obtain access to these access codes.*

General Purpose 163 – Level 3 Access Code

These four-digit numbers permit entry into the microFlow.net Gas program or Weights and Measures program codes. The access codes must be entered through the microFlow.net Gas keypad after the Program Mode security contact has been closed (if a security contact has been programmed and wired to a switch). If this contact has not been closed, the microFlow.net Gas will not allow entry into the Program Mode. Once the security is set up for the parameters in the unit the operator must enter the program mode at the level assigned to the parameter(s) that are to be changed. The range of these entries is from 0 to 9999.

Critical: Duplicate access codes are not permitted

Critical: Must be at highest level of security

Help: "Enter Access Code for this security level. Level 3 is the highest level."

Note: *These access codes must be programmed in order, beginning with security level one. Intermediate levels cannot be skipped.*
Note: *The operator must enter Program Mode at the highest programmed security level to obtain access to these access codes.*

General Purpose 164 – Level for Security Input

Enter the security level (1-3) to be associated with the security digital input. Valid Range (0-3).

General Purpose 165 – Diagnostics Security Level

This parameter associates a security level with the Program Mode diagnostics. To access these diagnostics, Program Mode must have been accessed with at least the level indicated in this parameter. Selections are as follows:

- Level 1 access
- Level 2 access
- Level 3 access

Critical: Must be at highest level of security

Critical: Access level not valid

Help: “Enter security level (1-3) required to enter Diagnostics Directory.”

General Purpose 166 – Set Parameter Security Level

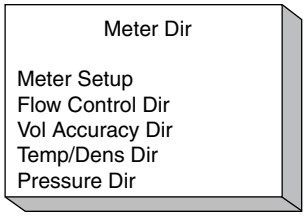
This parameter associates a security level with the Program Mode parameters. To access these parameters, Program Mode must have been accessed with at least the level indicated in this parameter. Selections are as follows:

- Level 1 access
- Level 2 access
- Level 3 access

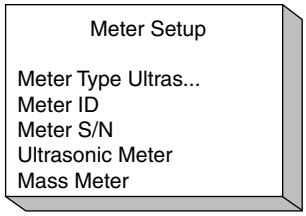
Critical: Must be at highest level of security

Critical: Access level not valid

Help: “Select security level to assign all parameters.”



Meter Setup Directory



Meter Type Directory

Meter 301 – Meter Type

This program code defines the type of meter that will be used for this application.

- Ultrasonic Meter
- Turbine for Positive Displacement Meter
- Mass Meter

Meter 302 – Meter ID

This (21) Twenty-one-character message will be displayed as the meter's ID.

- A B C D E F G H I J K L M N O P Q R S T U V W X Y Z # *
- 0 1 2 3 4 5 6 7 8 9 ! @ # $ % & * ( ) - _ + = , . ? / ; : ’ ” SPACE ACCEPT < >

Meter 303 – Meter Serial Number

This (21) Twenty-one-character message will be displayed as the meter's serial number.

- A B C D E F G H I J K L M N O P Q R S T U V W X Y Z # *
- 0 1 2 3 4 5 6 7 8 9 ! @ # $ % & * ( ) - _ + = , . ? / ; : ’ ” SPACE ACCEPT < >

Ultrasonic Meter Subdirectory

Meter 331 – Ultrasonic Type

This program parameter determines the type of FMC ultrasonic meter used for this application.

- None
- MPU

Meter 332 – Ultrasonic Meter Configuration

This parameter defines the two general modes in which the microFlow.net can operate. The first mode is as a standard flow computer where the meter provides volume at line conditions (IV) to the microFlow and the microFlow performs the correction of quantities to standard conditions. In the Remote Display mode of operation, the microFlow.net must be paired with an MPU meter which performs all of the calculations to correct the volume to standard conditions and the microFlow.net operates as a user interface and totalizer for the meter.

The operator selects the general mode of operation by accessing parameter 332 Ultrasonic Meter Config which can be set to the following values:

Parameter 332 Setting	Operational Mode	Meter Interface
Communications Only	Flow computer (Conversion and indicating Device)	Modbus (MPU Only)
Communications and Pulses	Flow computer (Conversion and indicating Device)	Modbus/Pulse Stream (MPU Only)
Pulses Only	Flow computer (Conversion and indicating Device)	Pulse stream from any meter that produces pulses/volume
Remote Display - Metric	Display (Indicating Device Only)	Modbus (MPU Only)
Remote Display - Imperial	Display (Indicating Device Only)	Modbus (MPU Only)

The following figures illustrate the hardware interface between the microFlow.net Gas and the meter used in each of these operating modes.

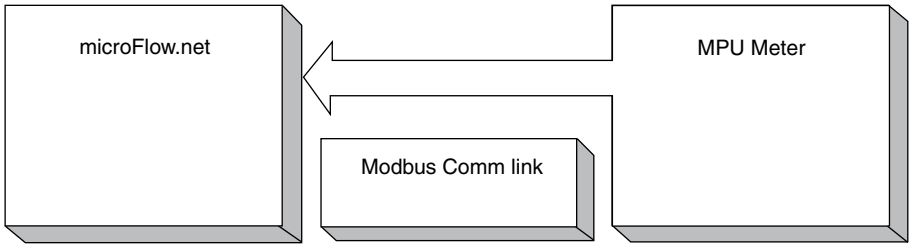


Figure 1 – Communications Only

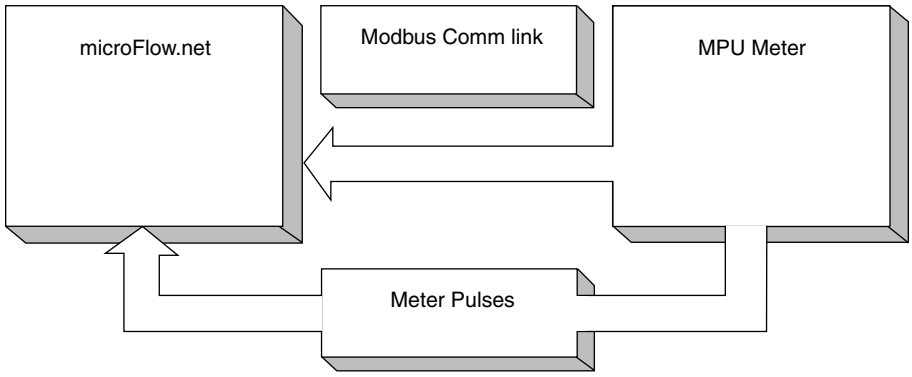


Figure 2 – Communications and Pulses

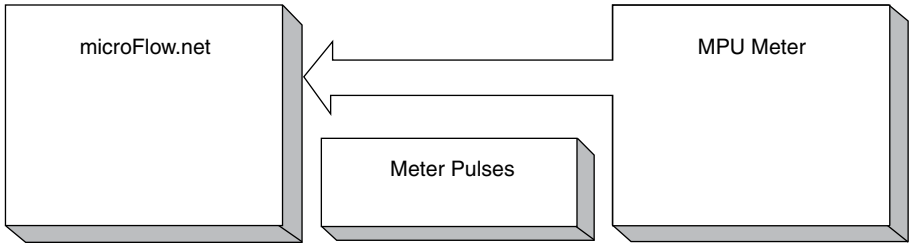


Figure 3 – Pulses Only

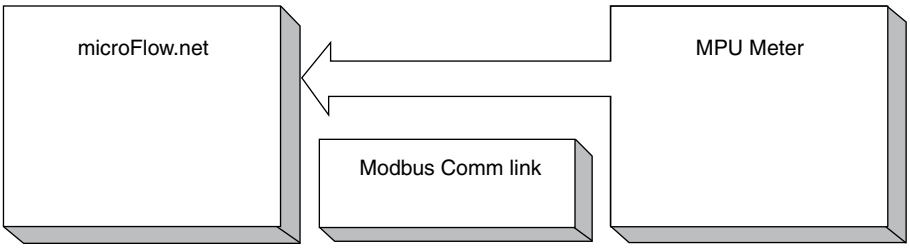


Figure 4 – Remote Display – Metric or Imperial Units

Meter 333 – Share Temperature with Ultrasonic Meter

– No

– Yes

If this parameter is set to "Yes", the temperature currently is use by the microFlow.net Gas will be periodically written via modbus to the Ultra meter. The Ultra meter will use the temperature value to compensate for the effect of temperature on the structure of the meter. This enhances the accuracy of the meter.

Meter 334 – Share Pressure with Ultrasonic Meter

– No

– Yes

If this parameter is set to "Yes", the pressure currently is use by the microFlow.net Gas will be periodically written via modbus to the Ultra meter. The Ultra meter will use the temperature value to compensate for the effect of temperature on the structure of the meter. This enhances the accuracy of the meter.

Meter 335 – Ultrasonic Meter IP Address

XXX.XXX.XXX.XXX

This parameter specifies the IP address of the Ultra meter to be used when communicating with the meter using modbus over TCP/IP. This address must be on the same network as the host IP address in the communications directory. If it is not desired to use modbus over TCP/IP to communicate with an Ultra meter, this parameter should be set to 0.0.0.0

Mass Meter Subdirectory

The mass meter subdirectory contains two program codes, Type and Sequence Number.

Meter 371 – Mass Meter Type

This program codes defines the style of mass meter to be used for the application.

- N/A
- S-Mass
- Apollo

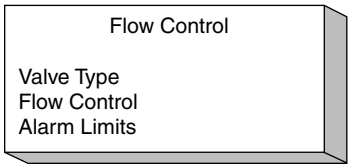
Help: Select the type of mass meter, S-Mass or Apollo.

Meter 372 – Sequence Number

This program code identifies the sequence number of the mass meter being used. Use the last 5 digits of the micro-Pak S/N or the Final Assembly Number for Apollo.

Flow Control Directory

The Flow Control Directory contains program codes which establish the flow characteristics to which the microFlow.net Gas will control.



Valve Type Subdirectory

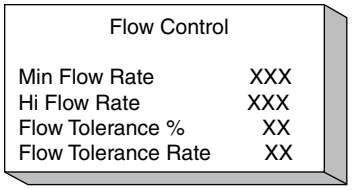
Flow Control 201 – Valve Type

These program codes define the style of flow control valve used. Selections are as follows:

- None
- Digital
- Two-stage

Help: “Select the type of valve used.”

Flow Control Subdirectory



Flow Control 202 – Minimum Flow Rate

This four-digit numeric entry defines the minimum flow rate allowed. This value is used in determining digital valve control aspects. The range of this parameter is 0 to 9999. This value should be set to the minimum flow rate from the meter nameplate. The factory default is 0.

Help: "Enter minimum flow rate for digital valve control operations, mass or vol. based on pulse input type."

Flow Control 203 – High Flow Rate

This five-digit code sets the high flow rate for the system. The range of this entry is 00001 to 99999 flow units.

***Note:** “00000” will not allow the valve to open.*

Help: “Enter the maximum flow rate for digital valve control operation. A zero entry will not allow the valve to open.”

Flow Control 204 – Flow Tolerance Percentage

This single-digit entry designates the percentage of the currently requested flow rate that the flow rate may vary before the microFlow.net Gas initiates a valve correction. The range of this one-digit numeric entry is 0 to 9%.

The microFlow.net Gas will calculate the current flow tolerance using this percentage and the current flow rate. This will be compared with the programmed flow tolerance rate, with the larger of the two tolerances determining when to adjust the valve.

Example:

Current Flow Rate 600 GPM

Flow Tolerance 9%

Flow rate can vary 54 GPM (600 GPM x 9% = 54 GPM) without a valve correction signal from the microFlow.net Gas.

Help: “Enter desired flow rate tolerance as a percentage of the current flow rate”

Flow Control 205 – Flow Tolerance Rate

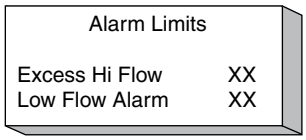
This program code allows for the entry of the minimum flow rate tolerance in units per time. The range of this three-digit numeric entry is from 0 to 999 units per time.

The microFlow.net Gas will calculate the current flow tolerance using the percentage entered in Flow Control 209 and the current flow rate. This will be compared with the programmed flow tolerance rate entered here. The larger of the two tolerances will determine when to adjust the valve.

Help: "Enter a desired flow rate tolerance in units per time (GPM, BPH, etc.), mass or vol. based on pulse type."

Alarm Limits Subdirectory

This subdirectory contains flow related limit set points.



Flow Control 221 – Excess High Flow Rate

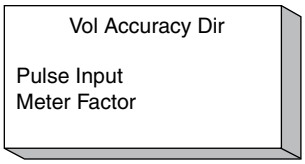
This program code sets the maximum percentage by which the flow rate can exceed the product's high flow rate entry without alarming. This entry must be greater than the Flow Tolerance entry, except when a value of zero is entered to disable excess high flow alarm checking. The excess rate is entered as a percentage of the product high flow rate. The range of this two-digit numeric entry is 00 through 99.

Help: "Enter the highest flow rate allowed in percent above the high flow rate without alarming."

Flow Control 222 – Low Flow Rate Alarm Limit

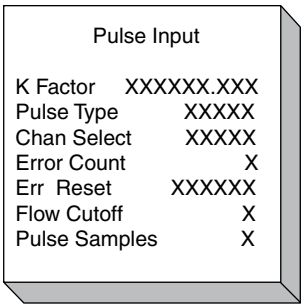
This three-digit entry defines the set point in units per minute for the low flow alarm. The low flow alarm will be triggered whenever a flow rate is equal to or lower than the limit set and is maintained for eight seconds. The low flow alarm is not triggered in cases where there is no flow. The range of this entry is 000 to 999 flow units.

Help: "Enter the minimum flow rate allowed without a low flow alarm, mass or vol based on pulse input type."



Pulse Input Subdirectory

The Pulse Input Subdirectory contains program codes used in characterizing meter pulse inputs to the microFlow.net Gas.



Volume Accuracy 311 – K Factor

This nine-digit numeric entry defines the nominal number of pulses comprising one unit of volume registration. The range of this entry is 000000.001 to 999999.999.

Critical: Security level for parameter must be at top 2 levels.

Fatal: Entry must not be zero

Help: "Enter the number of pulses required for one unit of registration, mass or vol. based on pulse input type."

Warning: Changing this parameter causes batch reset at program mode exit.

Volume Accuracy 312 – Pulse In Type

This parameter allows the selection of mass pulse input rather than the default of pulses representing volume from the meter. The microFlow.net Gas then totalizes directly in mass. A density input is required to back-calculate volume when using a mass meter. Selections are as follows:

- Not Used
- Volume
- Mass

Help: "Specify whether meter pulses input to microFlow.net Gas represent volume or mass."

Volume Accuracy 313 – Pulse Input Channel

This parameter allows the selection of either a single or dual channel pulse transmitter. Selections are as follows:

- Single Channel
- Dual Channel

Critical: Transmitter integrity not available with single channel.

Help: "Select single or dual pulse transmitter. Single or channel A: CN5 1(+), 2(-) or 3(+), 4(-) for turbine; channel B or meter injection 6(+), 7(-) or 8(+), 9(-) for turbine."

*If EPLD is Rev. 0, any pulse frequency input must be single channel when the frequency input is between 3Hz. If ELPD is Rev. 1 or higher, the dual channel input can be selected for all input pulse frequencies (3Hz or higher).

Volume Accuracy 314 – Dual Pulse Error Count

This three-digit numerical entry defines the number of error counts that may be received from a dual pulse comparator without causing a pulse security alarm. The range of this parameter is 0 to 999. The factory default is 0.

Note: *No entry if dual pulse not selected.*

Help: "Enter the number of dual pulse errors allowed before alarm."

Volume Accuracy 315 – Dual Pulse Error Reset

This program code defines the conditions under which the dual pulse error count will be reset. The factory default is "No reset." Selections are as follows:

- No Reset (No dual pulse error reset)
- Batch End (Reset at end of batch)
- Power-Up (Reset on power-up)
- Batch & Power (Reset at end of batch and on power-up)

Note: *No entry if dual pulse not selected.*

Help: "Select how dual pulse error count is reset."

Volume Accuracy 316 – Dual Pulse Flow Rate Cutoff

This parameter defines the flow rate below which dual pulse errors will not be counted. The range of this four-digit numerical entry is 0 to 999. The factory default is 0.

Note: *No entry if dual pulse not selected.*

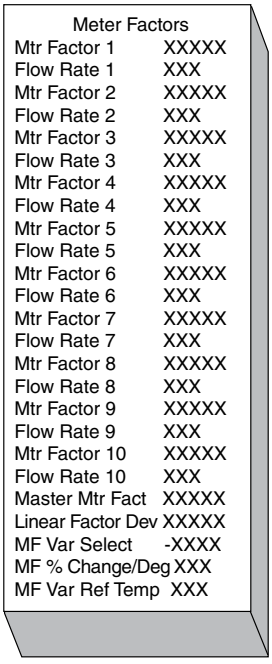
Help: "Enter the flow rate at which dual pulse error counts will be counted, mass or vol based on pulse input type."

Volume Accuracy 317 – Pulse Period Sample Count

This two-digit entry determines the length of time in 0.1 second increments over which the frequency of the meter pulses is averaged to provide flow rate smoothing. This parameter is intended for meters that produce a varying frequency pulse output when the flow is steady. The range of this two digit entry is 0-20.

Help: Enter number of 1/10th second samples over which the pulse input periods are averaged.

Meter Factor Subdirectory



Volume Accuracy 341 – Meter Factor 1
Volume Accuracy 343 – Meter Factor 2
Volume Accuracy 345 – Meter Factor 3
Volume Accuracy 347 – Meter Factor 4
Volume Accuracy 349 – Meter Factor 5
Volume Accuracy 351 – Meter Factor 6

Volume Accuracy 353 – Meter Factor 7

Volume Accuracy 355 – Meter Factor 8

Volume Accuracy 357 – Meter Factor 9

Volume Accuracy 359 – Meter Factor 10

These program codes and the associated flow rates below allow the entry of the meter factor curve. The microFlow.net Gas will perform linearization to calculate meter factors between the entered flow rates.

If only a single meter factor is used, it must be put into program code 341. The flow rate selected in program code 342 or 344 must be set to "0". Under these conditions any other meter factors programmed will be ignored. The range of these six-digit numeric entries is 0 to 9.99999.

It is possible to change the meter factor on the fly (while a batch is in process) the microFlow.net Gas will use the new meter factor from the instant it is entered forward. The historical batch logs will calculate an average meter factor value if multiple meter factors are used. Meter factors entered will not "back calculate" any previous totals.

Note: *A zero entry in meter factor 1 will be considered an invalid entry. Zero entries in the remaining factors will result in that factor and subsequent factors not being used. (e.g., if a zero entry is made for factor 2... factor 10 will not be used.)*

Fatal: Entry must not be zero [341 only]

Critical: Factor varies more than the Linearized Factor Deviation

Critical: Meter factors must be within 2% of the master meter factor

Help: Meter factor = (actual amount x current factor x k factor)/input pulses.

Volume Accuracy 342 – Flow Rate 1

Volume Accuracy 344 – Flow Rate 2

Volume Accuracy 346 – Flow Rate 3

Volume Accuracy 348 – Flow Rate 4

Volume Accuracy 350 – Flow Rate 5

Volume Accuracy 352 – Flow Rate 6

Volume Accuracy 354 – Flow Rate 7

Volume Accuracy 356 – Flow Rate 8

Volume Accuracy 358 – Flow Rate 9

Volume Accuracy 360 – Flow Rate 10

These five-digit entries are the flow rates at which the meter factors are defined beginning with the highest flow rate in program code 342 and descending to the lowest flow rate in program code 360. If only one meter factor is used, program code 342 or 344 must be set at "0". The range of these entries is 0 to 99999 flow units.

Critical: Flow rates must be entered in descending order

Critical: Corresponding meter factor not programmed

Help: "Enter the flow rate corresponding to the meter factor, mass or vol based on pulse input type."

Volume Accuracy 361 – Master Meter Factor

This program code allows the operator to set a master meter factor. This six-digit entry will be used to restrict all meter factors to plus or minus 2% of the master factor (i.e., the value entered here). This range restriction applies only to meter factors which are programmed for use (i.e., meter factor one always and, if linearizing, all the factors used). Any attempt to enter a meter factor outside the 2% range, if installed, will cause a Critical Warning.

In addition, a master factor entry that causes the current meter factors installed to be out of range will cause those meter factors which are out of range to prompt a Critical Message. This critical condition must be corrected so that all used meter factors are within the 2% range of the master factor before normal Run Mode operations can occur. The range of this entry is 0 to 9.99999. Note that zero disables the master meter factor.

Critical: Meter factor must be within 2% of the master meter factor

Help: "Restricts programmed meter factors to + or –2% of this master factor."

Volume Accuracy 362 – Linearized Factor Deviation

This code allows the operator to set a maximum deviation between adjacent meter factors. This three-digit entry will be used to restrict deviation between the adjacent meter factors in use to plus or minus the entered percentage (i.e., the value entered here). Any attempt to enter a meter factor outside the entered range will cause a Critical Warning.

A linearized factor deviation entry that results in the current meter factors installed to be out of range will set a program code alarm. The meter factors that are out of range will be indicated by a DA alarm. The meter factors at fault must be corrected so they are within range of the deviation entry before normal Run Mode operations can occur. The value of the linearized factor deviation may range from 0 to 9.99%. Zero disables this feature.

Critical: Meter factor varies more than the Linearized Factor Deviation

Help: "Set the maximum deviation in percent allowed between adjacent meter factors."

Volume Accuracy 363 – Meter Factor Variation Select

This parameter allows the selection of enabling or disabling the meter factor variation entries (calculations). When enabled, the microFlow.net Gas will calculate and use the meter factor based on the current temperature of the product. The factory default is "Disabled". Selections are as follows:

- Disabled
- Enabled

Note: *No entry if temperature unit not assigned.*

Critical: Security level for parameter must be at top 2 levels.

Help: "Enable or disable the use of meter factor variation with temperature."

Volume Accuracy 364 – Meter Factor Percent Change Per Degree Temperature

This four-digit parameter allows the entry of the meter factor variation with temperature. This four-digit entry represents the meter factor percent change per degree of temperature. The range of this parameter is 0.0001 to 0.9999 percent.

Fatal: Entry is out of specified range.

Help: "Enter the meter factor variation in % change per degree temperature."

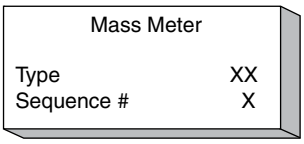
Volume Accuracy 365 – Meter Factor Variation Reference Temperature

This four-digit code allows the entry of the meter factor reference temperature. This entry represents the temperature, in tenths, at which the present meter factor was determined. The range of this entry is 000.1 to 999.9 units.

Fatal: Entry is out of specified range.

Help: "Enter reference temperature for the meter factor % change per degree."

Mass Meter Subdirectory



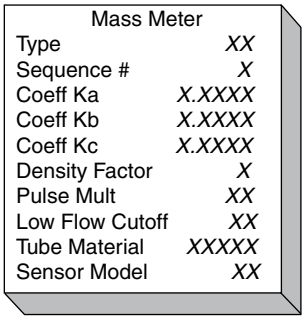
Volume Accuracy 371 – Mass Meter Type

This parameter allows the operator to select the mass meter used by the meter. The factory default is "NA." Selections are as follows:

- S-Mass
- Apollo

Help: "Select the type of mass meter, S-Mass or Apollo."

If an S-Mass meter is selected the Mass Meter Subdirectory is expanded to include mass meter data.



Volume Accuracy 372 – Mass Meter Sequence Number

This entry allows the operator to enter the specific sequence number assigned to a mass meter connected to the microFlow.net Gas. The range of this entry is from 0 to 99999.

Help: "Last five digits of the Micro-Pak serial number or the Final Assembly # for Apollo."

Volume Accuracy 373 – S-Mass Coefficient Ka

This entry allows the operator to enter the Constant Ka from the S-Mass meter. This numeric entry has a range of 0.0000 to 63.99999. This parameter specifies the "Ka" value in the equation KaX2+KbX + Kc = Density. See MN0M008 for more information.

Note: *No entry if not selected as installed densitometer type.*

Help: "Enter the Ka from the S-Mass nameplate."

Volume Accuracy 374 – S-Mass Coefficient Kb

This entry allows the operator to enter the Constant Kb from the S-Mass meter. This numeric entry has a range of -31.9999 to 31.9999. This parameter specifies the "Kb" value in the equation KaX2+KbX + Kc = Density. See MN0M008 for more information.

Note: *No entry if not selected as installed densitometer type.*

Help: "Enter the Kb from the S-Mass nameplate."

Volume Accuracy 375 – S-Mass Coefficient Kc

This entry allows the operator to enter the Constant Kc from the S-Mass meter. This numeric entry has a range of -31.9999 to 31.9999. This parameter specifies the "Kc" value in the equation KaX2+KbX + Kc = Density. See MN0M008 for more information.

Note: *No entry if not selected as installed densitometer type.*

Help: "Enter the Kc from the S-Mass nameplate."

Volume Accuracy 376 – S-Mass Density Factor

This factor is used to adjust the period of the tubes for the minute changes in tube frequency that occurs with change in the flow rate. This factor is typically not changed in the field. The setting depends on the sensor size and materials of construction. Factory settings are as follows:

	Stainless Steel	Hastelloy
S25LF	N/A	030
S25	N/A	030
S50	020	028
S100	016	023
S200	019	027

If the Density Factor for your sensor is different from what is shown, consult your Smith Meter representative.

Note: *No entry if not selected as installed densitometer type.*

Help: "Enter the Density Factor for the S-Mass."

Volume Accuracy 377 – Mass Meter Pulse Multiplier

The mass meter flow rate pulse output is multiplied by this factor to increase the number of pulses per unit of volume resolution. The maximum frequency for the flow rate pulse output is 2500 Hz. Selections are as follows:

- x 1
- x 2
- x 4
- x 8
- x 16
- x .5

Note: *No entry if not selected as installed densitometer type.*
Help: Enter the multiplier for the flow pulse output 1, 2, 4, 8, 16, or .5.

Volume Accuracy 378 – Mass Meter Low Flow Cutoff

This entry allows the operator to specify the low flow cutoff point. The range of this numeric entry is from 0 to 99. This is the Low Flow Cutoff for the S-Mass meter. The range is 0 to 99. A value of 10 approximates 1.0% of full scale flow, 20 approximates 2.0% of full flow etc. This function prevents counting extraneous pulses that may be generated while at no flow condition. Factory default is 20. See MN0M008 for more information.

Note: *No entry if not selected as installed densitometer type.*
Help: "Enter the min. flow to report. 10 = 1% of full scale flow."

Volume Accuracy 379 – Mass Meter Tube Material

This entry allows the operator to specify the type of material from which the mass meter's tubes were constructed. Selections are as follows:

- Stainless
- Hastelloy

Note: *No entry if not selected as installed densitometer type.*
Help: "Select the tube material (stainless or hastelloy) for this meter."

Volume Accuracy 380 – Mass Meter Model

This entry allows the operator to specify the type of sensor contained in the mass meter. Selections are as follows:

- Model 25
- Model 50
- Model 100
- Model 200

Note: *No entry if not selected as installed densitometer type.*
Help: "Select the sensor model of the meter."

GC Interface Subdirectory

Gas Chromatograph Interface

The microFlow.net Gas supports an interface to a Danalyzer 2251 online gas chromatograph using modbus protocol over a serial line or a TCP/IP connection. Because the protocol used is generic modbus, other models/brands of gas chromatographs that can be configured to emulate the Danalyzer 2251 modbus map for composition and status may also be used.

Volume Accuracy 381 – GC Update Timeout

This parameter sets the maximum time in seconds the microFlow.net Gas will wait for the GC to update the measurement data. If more than this amount of time elapses between updates a GC Communications Alarm is posted. The range is 0 to 9999.

Volume Accuracy 382 – GC IP Address

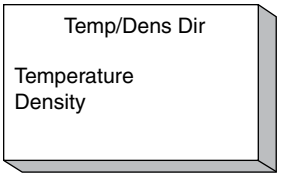
The IP address of the GC is entered here to enable communications with the GC via a TCP/IP network. This address must be in the same network as the main IP address in the communications directory. If there is no modbus over TCP/IP interface to a gas chromatograph, this entry should be set to 0.0.0.0

Volume Accuracy 383 – GC C6 Percent

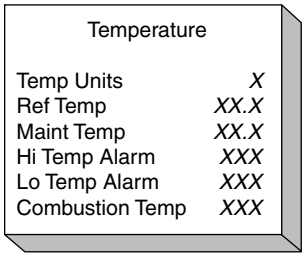
Volume Accuracy 384 – GC C7 Percent

Volume Accuracy 385 – GC C6 Percent

These three parameters are used by the microFlow.net Gas to calculate the amount of the C6+ component that is hexane (383), heptane (384) and octane (385). Each time the microFlow.net Gas reads the C6+ component from the GC, the percentage reported for the GC+ component is multiplied by these three parameters to calculate the individual component amounts.



Temperature Subdirectory



Temperature/Density 401 – Temperature Units

This program code selects the temperature scale used by microFlow.net Gas. The factory default is "NA." Selections are as follows:

- Celsius
- Fahrenheit

Critical: API table conflicts with selected units

Help: "Select temperature units."

Temperature/Density 402 – Reference Temperature

The actual uncompensated volume throughput is temperature compensated to its equivalent volume at this four-digit reference temperature in tenth degrees. The most common reference temperatures are 60.0 Deg. F and 15.0 Deg. C. The range of this entry is 0.0 to 999.9.

Note: *No-entry if Temperature Units = Not Used.*

Help: "Enter the temperature that volume will be corrected to."

Temperature/Density 403 – Maintenance Temperature

This code allows the entry of a maintenance temperature to be used when a temperature probe is not installed or working, but temperature related calculations are desired. The temperature units are dependent on the entry made in the Temperature Units Select code. This four-digit entry has a range of –999.9 to 999.9 temperature units where –999.9 disables the maintenance temperature.

Note: *An entry greater than -999.9 will override the temperature probe or transducer input if installed and will be used in all calculations where temperature is used.*

Note: *No entry if Temperature Units = Not Used*

Help: "Select maintenance temperature if temperature probe is not installed or to override probe"

Temperature/Density 404 – High Temperature Alarm Limit

This code allows the entry of a temperature reading that will cause a high temperature alarm to be generated. The temperature units will be dependent on the entry made in the Temperature Units Select code. This four-digit entry has a range of –999.9 to +999.9 degrees F or C.

Note: *An entry of "+999" will disable the alarm.*

Help: "Enter temperature that will cause an alarm for high temperature."

Temperature/Density 405 – Low Temperature Alarm Limit

This code allows the entry of a temperature reading that will cause a low temperature alarm to be generated. The temperature units will be dependent on the entry made in the Temperature Units Select code. This four-digit entry has a range of –999.9 to +999.9 degrees F or C.

Note: *"-999" will disable the alarm.*

Note: *No entry if Temperature Units = Not Used*

Help: "Enter temperature that will signal an alarm for low temperature."

Temperature/Density 406 – Combustion Temperature

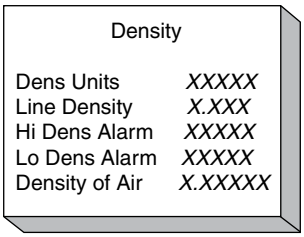
• 0 C

• 15 C

• 25 C

Help: Select combustion temperature to use for ISO 6976

Density Subdirectory



Temperature/Density 411 – Density Units

This selection allows the operator to choose which density scale will be used if there is a densitometer installed. It is used to convert volume to mass. Selections are as follows:

• Kg/M3 (Kilograms/Cubic Feet)

• Lb/Ft3 (Pounds/Cubic Feet)

Note: *When using temperature compensation, a value (Lb/Ft3, or Kg/M3) must be entered in this parameter.*

Help: "Select density units. These are used for a live density input and for mass calculation."

Temperature/Density 412 – Maintenance Line Density

This parameter is used for the entry of a maintenance density to be used when a live density input is not installed or working, but density related calculations are required. The density units are dependent on the entry made in the Density Units select code. Enter "0" to use density value or AGA8/ISO6979 calculated valve.

Temperature/Density 413 – High Density Alarm Limit

This code allows the entry of a density reading that will cause a high-density alarm to be generated. The units will be dependent on the entry made in the Density Units Select code. This four-digit entry will be dependent on the API table selection as follows:

–999.9 to +999.9 API

0 to 9999.0 Reference Density

Note: *No entry if Density Units = Not Used*

Help: "Enter density that will signal an alarm for high product density."

Temperature/Density 414 – Low Density Alarm Limit

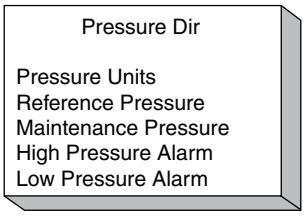
This code allows the entry of a density reading that will cause a low-density alarm to be generated. The units will be dependent on the entry made in the Density Units Select code.

Note: *No entry if Density Units = Not Used.*

Help: "Enter density that will signal an alarm for low product density."

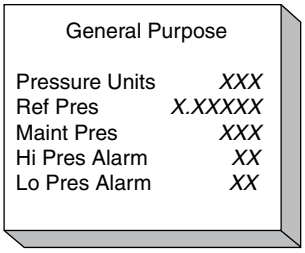
Temperature/Density 415 – Density of Air

This code is used to enter the density of Air. If set to a value of 0, density at standard conditions will be used. (1.225410 Kg/M3)



Pressure Subdirectory

The subdirectory is used to provide general information regarding the setup of the microFlow.net Gas for pressure aspects.



Pressure 501 – Pressure Units

This parameter defines the pressure units used by microFlow.net Gas. The factory default is "NA." Selections are as follows:

- Bar
- PSI
- Kpa (kilopascals)
- Kg/cm2 (Kilograms/square centimeter)

Help: "Select units of pressure."

Pressure 502 – Reference Pressure

This parameter is used to enter the pressure that the gas volume will be corrected to.

Help: Enter Pressure that volume will be corrected to.

Pressure 503 – Maintenance Pressure

This code allows the entry of a maintenance pressure to be used when a pressure transmitter is not installed or is not working, but pressure-related calculations are desired. The pressure units will be dependent on the entry made in the Pressure Units Select code (Pressure 501). This five-digit entry has a range of 0.0 to 9999.9 pressure units. A nonzero value entered here will override an analog pressure input.

Note: *No entry if Pressure Units = NA*

Pressure 504 – High Pressure Alarm Limit

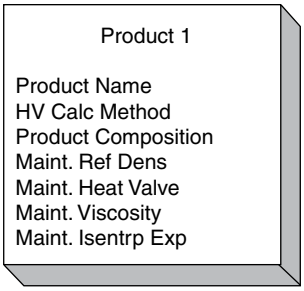
This code allows the entry of a pressure reading that will cause a high pressure alarm to be generated. The pressure units will be dependent on the entry made in the Pressure Units Select code. This four-digit entry has a range of 0.0 to +9999.

Note: *An entry of "+9999" will disable the alarm.*
Note: *No entry if Pressure Units = NA*
Help: "If pressure exceeds this value an alarm will occur."

Pressure 505 – Low Pressure Alarm Limit

This code allows the entry of a pressure reading that will cause a low pressure alarm to be generated. The pressure units will be dependent on the entry made in the Pressure Unit Select code. This four-digit entry has a range of 0.0 to +9999.

Note: *"9999" will disable the alarm.*
Note: *No entry if Pressure Units = NA*
Help: "If pressure drops below this value an alarm will occur."



Product 02 – Product Name

This program code allows an alphanumeric entry of up to fifteen (15) characters. It is used as an identifier of the product on the display and on the receipt ticket.

Help: Enter an alphanumeric message to identify this product.

Enter this parameter by selecting characters using the Up, Down, Left/Right arrow keys. Press ENTER for each selected character. When all characters have been entered, select ACCEPT and press ENTER to complete the process.

Product 03 – Heating Value Calculation Method

This program code allows for the selection of the Heating Value Calculation Method to be used.

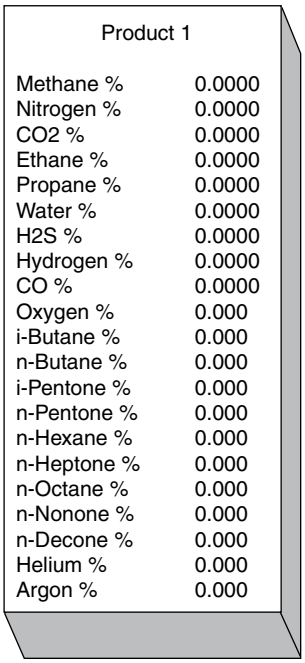
- AGA 5
- ISO6976

Help: Select the method used to calculate the heating value of the gas.

Product Composition Subdirectory

Parameters in this subdirectory establish the Composition of the Product.

When the microFlow.net is configured for flow computer mode, the gas composition is a required input to both the density (AGA 8) and heating value (AGA 5 or ISO 6976) computations. When the microFlow.net is configured for Remote Display mode, the gas composition is required by the MPU as an input to the DECA calculations. In the case where a live gas chromatograph input is not available to provide the current gas composition, the microFlow.net will use the values from the parameters in the product composition subdirectory. These values can be updated using the front panel or via communications link (modbus/Smith protocol). When a gas chromatograph is available the gas composition is read from it and the values in the product directory are only used in the event of a gas chromatograph failure.



Product 11 – Methane %
This program allows the entry of the mole percentage of this component in the Product. Range is from 0.0000% to 100.000%.

Product 12 – Nitrogen %
This program allows the entry of the mole percentage of this component in the Product. Range is from 0.0000% to 100.000%.

Product 13 – CO2 %
This program allows the entry of the mole percentage of this component in the Product. Range is from 0.0000% to 100.000%.

Product 14 – Ethane %
This program allows the entry of the mole percentage of this component in the Product. Range is from 0.0000% to 100.000%.

Product 15 – Propane %
This program allows the entry of the mole percentage of this component in the Product. Range is from 0.0000% to 100.000%.

Product 16 – Water %
This program allows the entry of the mole percentage of this component in the Product. Range is from 0.0000% to 100.000%.

Product 17 – H2S %
This program allows the entry of the mole percentage of this component in the Product. Range is from 0.0000% to 100.000%.

Product 18 – Hydrogen %
This program allows the entry of the mole percentage of this component in the Product. Range is from 0.0000% to 100.000%.

Product 19 – CO %
This program allows the entry of the mole percentage of this component in the Product. Range is from 0.0000% to 100.000%.

Product 20 – Oxygen %
This program allows the entry of the mole percentage of this component in the Product. Range is from 0.0000% to 100.000%.

Product 21 – i-Butane %
This program allows the entry of the mole percentage of this component in the Product. Range is from 0.0000% to 100.000%.

Product 22 – n-Butane %
This program allows the entry of the mole percentage of this component in the Product. Range is from 0.0000% to 100.000%.

Product 23 – i-Pentone %
This program allows the entry of the mole percentage of this component in the Product. Range is from 0.0000% to 100.000%.

Product 24 – n-Pentone %
This program allows the entry of the mole percentage of this component in the Product. Range is from 0.0000% to 100.000%.

Product 25 – n-Hexone %

This program allows the entry of the mole percentage of this component in the Product.
Range is from 0.0000% to 100.000%.

Product 26 – n-Heptone %

This program allows the entry of the mole percentage of this component in the Product.
Range is from 0.0000% to 100.000%.

Product 27 – n-Octone %

This program allows the entry of the mole percentage of this component in the Product.
Range is from 0.0000% to 100.000%.

Product 28 – n-Nonone %

This program allows the entry of the mole percentage of this component in the Product.
Range is from 0.0000% to 100.000%.

Product 29 – n-Decone %

This program allows the entry of the mole percentage of this component in the Product.
Range is from 0.0000% to 100.000%.

Product 30 – Helium %

This program allows the entry of the mole percentage of this component in the Product.
Range is from 0.0000% to 100.000%.

Product 31 – Argon %

This program allows the entry of the mole percentage of this component in the Product.
Range is from 0.0000% to 100.000%.

Product 41 – Maintenance Reference Density

This program code sets the maintenance reference density to be used if a densitometer is not used or is not functioning.
Help: Enter the maintenance reference density of the gas in Kg/Sm3 or LB/SCF (0 disables that maintenance value).

Product 42 – Maintenance Heat Value

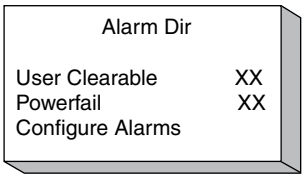
This program code sets the maintenance Heat Value to be used for the system.
Help: Enter maintenance Heat Value used to calculate energy in BTU/SCF or MJ/Sm3 (0 disables maintenance value).

Product 43 – Maintenance Viscosity

This program code sets the maintenance viscosity for the gas.
Help: Enter the maintenance absolute viscosity of the gas at flow conditions in centipoise (0 disables the maintenance value).

Product 44 – Maintenance Isentropic Exponent

This program codes sets the maintenance isentropic exponent for this gas.
Help: Enter the maintenance isentropic exponent for this gas at flowing conditions (negative disables maintenance value).



Alarm 601 – User Clearable Alarms

This parameter sets the number of alarms that can be cleared without a pass code. It is a two-digit entry with a range of 0-20.

Help: "Enter the number of alarms clearable not requiring a pass code."

Fatal: Entry is out of specified range.

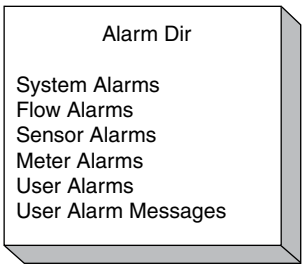
Alarm 602 – Powerfail Alarm

This program code provides the operator with the capability of either enabling or disabling the powerfail alarm. The powerfail alarm is a diagnostic alarm that is not clearable through communications. The factory default for this parameter is "Yes". Selections are as follows:

- Yes
- No

Help: "Select if an alarm indicating loss of power is desired."

Configure Alarms Subdirectory



Alarm 611 to 685 – Alarm Configuration

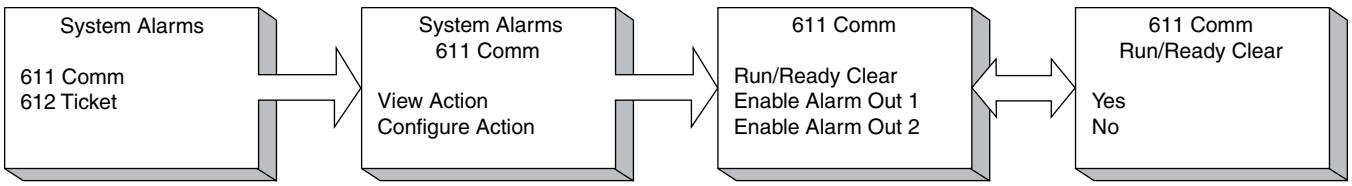
These parameters allow the actions of each alarm to be configured. Multiple options selected from the following list may be configured for each alarm. The microFlow.net Gas treats all alarm configured to an action as being logically "OR"ed. i.e. If any of the alarms assigned to action are energized, the action is energized. Selections are as follows:

- Allow run/ready clearing
- Energize alarm output 1
- Energize alarm output 2

Note: *Through Communications, add to get combination of desired options (i.e., 7 would set up all three options.)*

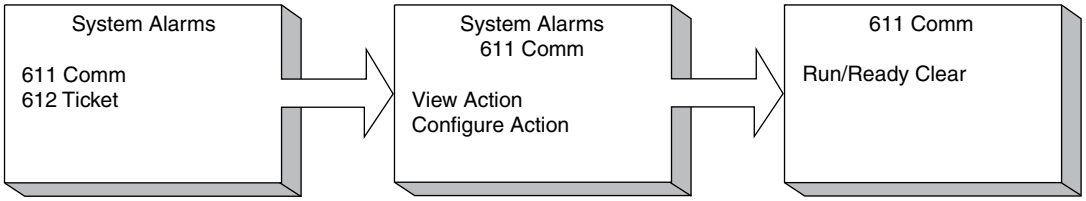
The following examples illustrate the steps required to establish and view the configuration of alarms in a microFlow.net Gas. The Communications Alarm is used for the example, but the steps are typical of any alarm.

Configuring Alarm Actions



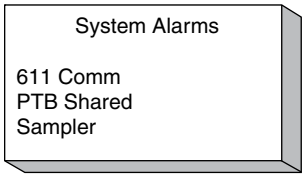
- From the “System Alarms” subdirectory select “611 Comm”, press ENTER
- Select “Configure Action”, press ENTER
- Select desired action, press ENTER (Actions already selected will be marked with an *)
- Select “Yes” to enable the action or “No” to disable the action, press ENTER
- The microFlow.net Gas returns to the previous screen for another selection, repeat or press CLEAR to return to the first screen of the selected alarm subdirectory.

Viewing Alarm Actions



- From the “System Alarms” subdirectory select “611 Comm”, press ENTER
- Select “View Action”, press ENTER
- The microFlow.net Gas displays a list of enabled actions for the alarm. Press CLEAR to return to the first screen of the selected alarm subdirectory.

System Alarms Subdirectory



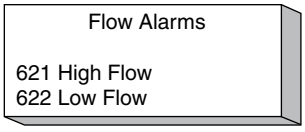
611 CM: Communications Alarm. Indicates a failure on one of the communication channels.

612 PTB Printer: Indicates that the microFlow.net Gas failed to receive the correct response from the PTB printer after the data was sent to be printed. The microFlow.net Gas will continue to resend the data to the printer until the communication port timeout setting expires, the PTB printer alarm will be set at this time.

613 Shared Printer: – Allows one or multiple MicroFlow’s to be connected via 232/485 communications to a host microFlow for printing reports.

614 Sampler Error: Defines an error when the sampler will overspeed. The rate/frequency needs to be adjusted.

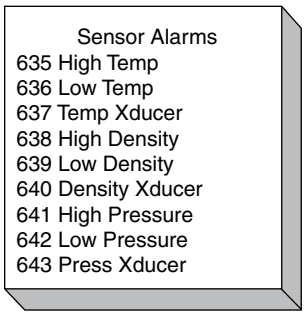
Flow Alarms Subdirectory



621 HF: High Flow Alarm. Indicates that the flow rate has exceeded the flow limit set in the excess high flow program code for more than 4 seconds.

622 LF: Low Flow Alarm. Indicates that the flow rate was at or below the minimum flow rate established by the minimum flow limit program code for longer than eight seconds.

Sensor Alarm Subdirectory



635 HT: High Temperature Alarm. Indicates that the temperature probe or transducer is out of range of the high temperature setting.

636 LT: Low Temperature Alarm. Indicates that the temperature probe or transducer is out of range of the low alarm setting.

637 TP: Temperature Transducer Alarm. Indicates a temperature transducer failure or an out-of-range condition (less than 2 mA/0.5 vdc/52.11 Ω or greater than 23 mA/5.5 vdc/220.88 Ω).

638 HD: High Density Alarm. Indicates the density transducer is out of range of the high alarm setting.

639 LD: Low Density Alarm. Indicates that the density transducer is out of range of the low alarm setting.

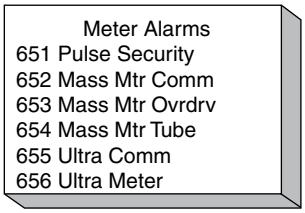
640 DP: Density Transducer Alarm. Indicates a density transducer failure or an out-of-range condition (less than 2 mA/ or greater than 23 mA.

641 HP: High Pressure Alarm. Indicates the pressure transducer is out of range of the high alarm setting.

642 LP: Low Pressure Alarm. Indicates that the pressure transducer is out of range of the low alarm setting.

643 DP: Pressure Transducer Alarm. Indicates a pressure transducer failure or an out-of-range condition (less than 2 mA/ or greater than 23 mA.

Meter Alarms Subdirectory



651 PS: Pulse Security Alarm. Indicates an out of sequence error in the A-B pulse stream.

If this alarm occurs, the transaction must be terminated using one of the methods in Transaction Termination (General Purpose 144). Pressing CLEAR as a run clearable alarm will open the valve, but as soon as pulses start, the PS alarm will reoccur and again shut down the valve.

652 MF: Mass Meter Comm Fail. This alarm is set when any command sent to a mass meter fails both the first and second attempt. The normal polling sequence to each of the mass meters is not interrupted by the occurrence of a mass meter communications alarm. The mass meter in alarm will be skipped in the polling loop until this alarm is cleared.

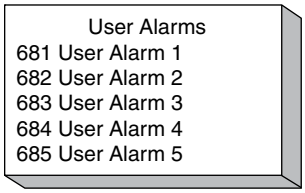
653 MO: Mass Meter Overdrive. This alarm is set when a mass meter reports a status indicating an overdrive condition exists. (This alarm is valid only for S-Mass.)

654 MT: Mass Meter Tube. This alarm is set when a mass meter reports a status indicating a tube imbalance condition exists. (This alarm is valid only for S-Mass.)

655 UC: Ultrasonic Communications Alarm. Indicates communications with the ultrasonic meter has failed.

656 UM: Ultrasonic Meter Fault. Indicates the ultrasonic meter is reporting an alarm condition.

User Alarms Subdirectory



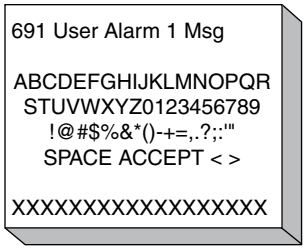
Alarm 681 to 685 – User Alarms

These program codes allow the operator to customize the microFlow.net Gas by defining alarm conditions to a particular system. User alarms may be set through communications or Boolean/algebraic equations, or may be selected from the following:

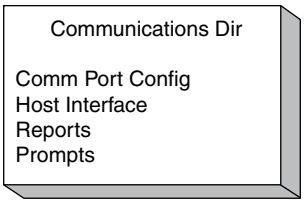
- Allow run/ready mode clearing
- Energize alarm output #1
- Energize alarm output #2

Alarm 691 to 695 – User Alarm Messages

These program codes permit the entry of an 18-character text entry identifying an alarm condition. User alarms can be set through communications or Boolean/algebraic equations. The data entry allows the following characters to be selected:



Enter this parameter by selecting characters using the UP/DOWN and LEFT/RIGHT Arrow keys. Press ENTER for each selected character. When all characters have been entered, select “ACCEPT” and press ENTER to complete the process.

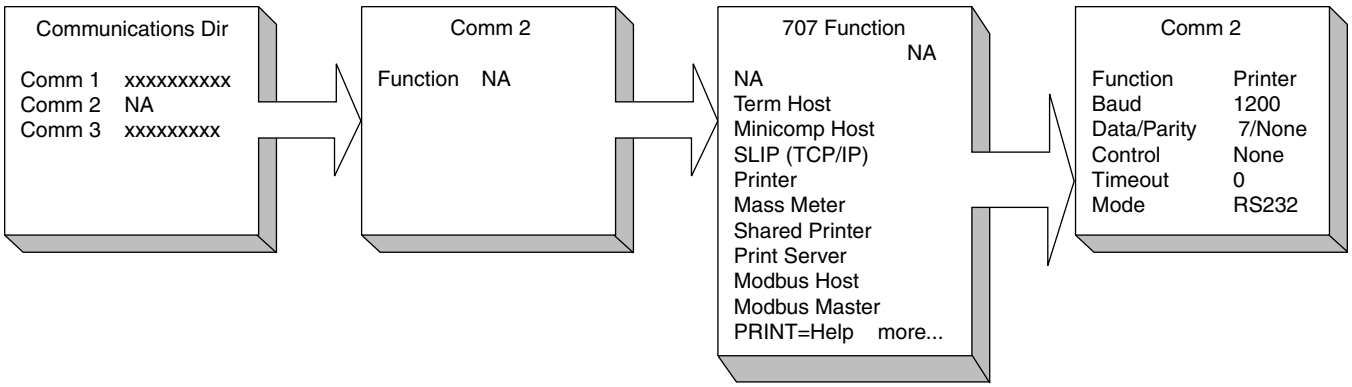


Comm Port Configuration Subdirectory

The Comm Port Configuration subdirectory contains information vital to the operation of the microFlow.net Gas's three (3) serial communications ports. The following example demonstrates the procedure for configuring a previously unassigned Comm Port 2.

- Select “Comm 2” from the Communications Dir menu, press ENTER
- “Function…..NA” will be displayed, press ENTER to configure.

  Note: *if the port had been previously assigned the function would be displayed as well as port settings.*
- Select function from list, press ENTER
- Selected function and default port settings will be displayed.
- If required, adjust port settings by selecting appropriate parameter and pressing ENTER
- Select desired value, press ENTER
- Selected function and port settings will be displayed.
- When required settings complete press CLEAR to return to the port selection menu.



Communications 701, 707, 713 – Comm Port Function

This program code defines the function of the communications port. The factory default is “Minicomp Host” on comm port 1. Selections are as follows:

- **Not used** – This communications port is not selected for use
- **Terminal Host Communications** – This port communicates with a terminal type device using a simplified communications protocol
- **Minicomputer Host Communications** – This port communicates with a minicomputer type device using a sophisticated and secure communications protocol
- **SLIP (TCP/IP)** – Serial Line Internet Protocol emulates ethernet TCP/IP protocol over serial (RS-232, RS-485) communications hardware
- **Printer** – Permits the microFlow.net Gas through this communication port to automatically output an end of a transaction report to a printer connected to the microFlow.net Gas.
- **Mass Meter** – Assigns a communications channel to an S-Mass or Apollo Meter.
- **Shared Printer** – Allows one or multiple microFlows to be connected via 232/485 communications to a host microFlow for printing reports.

- **Print Server** – The microFlow that acts as the host for printing reports. Allows several microFlows to effectively share a printer by communicating with the “Print Server” microFlow which will have the printer connected to it.
- **Modbus Host** – The microFlow.net Gas communicates with other computer systems using the Modbus protocol. (Available in Rev 0.07 and above).
- **Modbus Master Ultrasonic** – This function is used when an ultrasonic meter is configured and serial communications will be used to send temperature and/or pressure values to the meter and to read the meter status.
- **GC** – This function is used when a serial modbus link is wired to a gas chromatograph.

Note: *Only one port may be configured for mass meter communications.*

Critical: An address must not be zero.

Critical: Only two ports may be configured for injector control.

Critical: Only two ports may be configured for host interface.

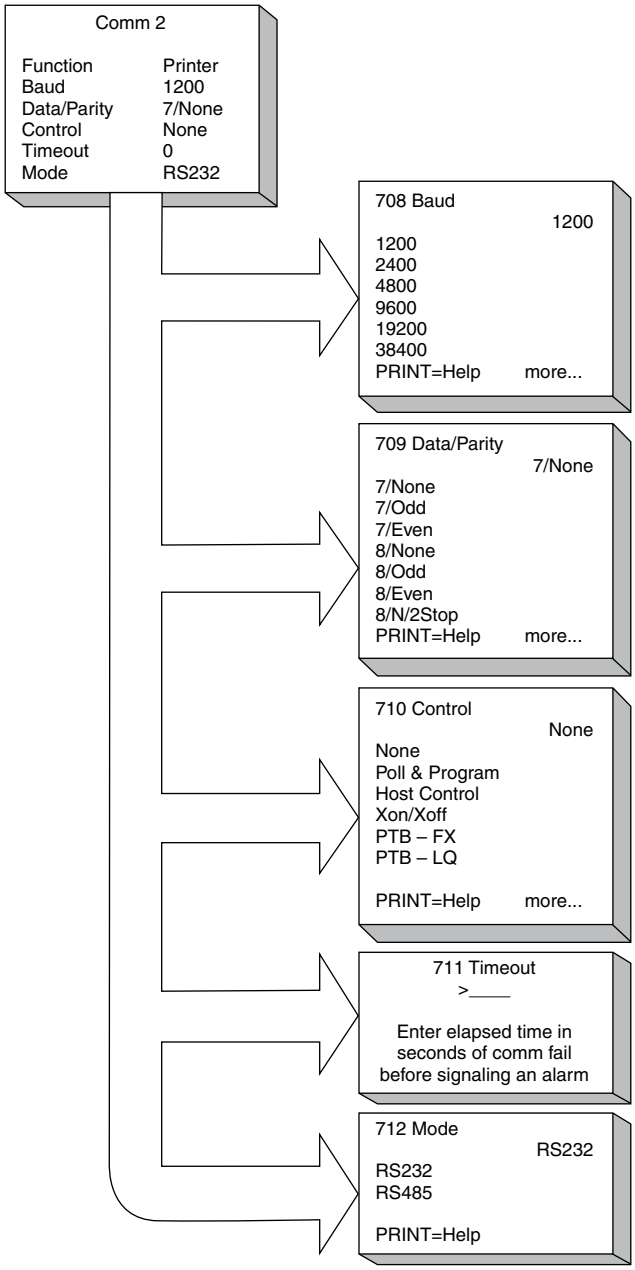
Critical: Only one port may be configured for mass meter.

Critical: Function conflicts with Port Control.

Critical: Only a shared printer or print server can be configured on one microFlow at a time.

Critical: If using printer server, another port has to be configured as a printer.

Port Settings



Communications 702, 708, 714 – Baud Rate

This parameter sets the speed of the associated communications port. The factory default is "38400." Selections are as follows:

- 1200 baud
- 2400 baud
- 4800 baud
- 9600 baud
- 19200 baud
- 38400 baud

Note: *No entry if corresponding function = Not Used.*
Help: "Select the baud rate for this communications port"

Communications 703, 709, 715 – Data/Parity

This parameter defines the number of data bits and parity used by the associated communications port. Unless indicated otherwise, one stop bit is used. The factory default is "8/None." Selections are as follows:

- 7 bits No Parity
- 7 bits Odd Parity
- 7 bits Even Parity
- 8 bits No Parity
- 8 bits Odd Parity
- 8 bits Even Parity
- 8 bits No Parity, 2 Stop bits

Note: *No entry if corresponding function = Not Used.*
Help: "Select the data format: number of bits per character and type of parity"

Communications 704, 710, 716 – Control

This program code defines the level of control the associated communications port commands. Poll and Program, and Host Control are valid with host communications options. XON/XOFF is valid with printer options. Only one port can have transaction control. The factory default is "Poll & Program." Selections are as follows:

- **None** – No communications on this port.
- **Poll & Program** – For use with demonstration/FlowMate ports. Allows full program access but does not affect transaction control (acts like a standalone unit).
- **Host Control** – Full programming and prompting control. Transaction control (also requiring authorization from host) Allows use of SB – Set Batch to enter the preset remotely and EB to end the batch remotely. This is designed for pre-dispatch operations where the driver has limited input during the load process and the preset is host-controlled.
- **Xon/Xoff** – For printer ports only. Xon/Xoff flow control.
- **PTB-FX** – Security level designed to support PTB Weights and Measures
- **PTB-LQ** – Agency Approved printer interface

Critical: Comm port not configured for host communications

Critical: Comm port not configured for printer

Note: *No entry if corresponding function = Not Used.*
Help: Select the degree of control for this communications port

Communications 705, 711, 717 – Timeout

These three-digit codes allow the operator to specify the amount of time, in seconds, before aborting a communications transfer that has halted. The communications alarm will then be set. This entry is also used to abort a printout if waiting for a shared printer on an XON from a printer. If the timer expires while waiting for a shared printer, the shared printer alarm will be set. The range of this entry is from 0 to 999 seconds.

If the port is configured for host communication, zero disables the communications timeout and the accompanying alarm. If the port is configured for a printer, the timeout cannot be disabled.

Note: *No entry if corresponding function = Not Used.*
Note: *If using shared printing, the timeout may want to be set higher than normal in case two (+) MicroFlows are trying to print at the same time.*
Help: "Enter elapsed time in seconds of comm fail before signaling an alarm."

Communications 706, 712, 718 – Mode

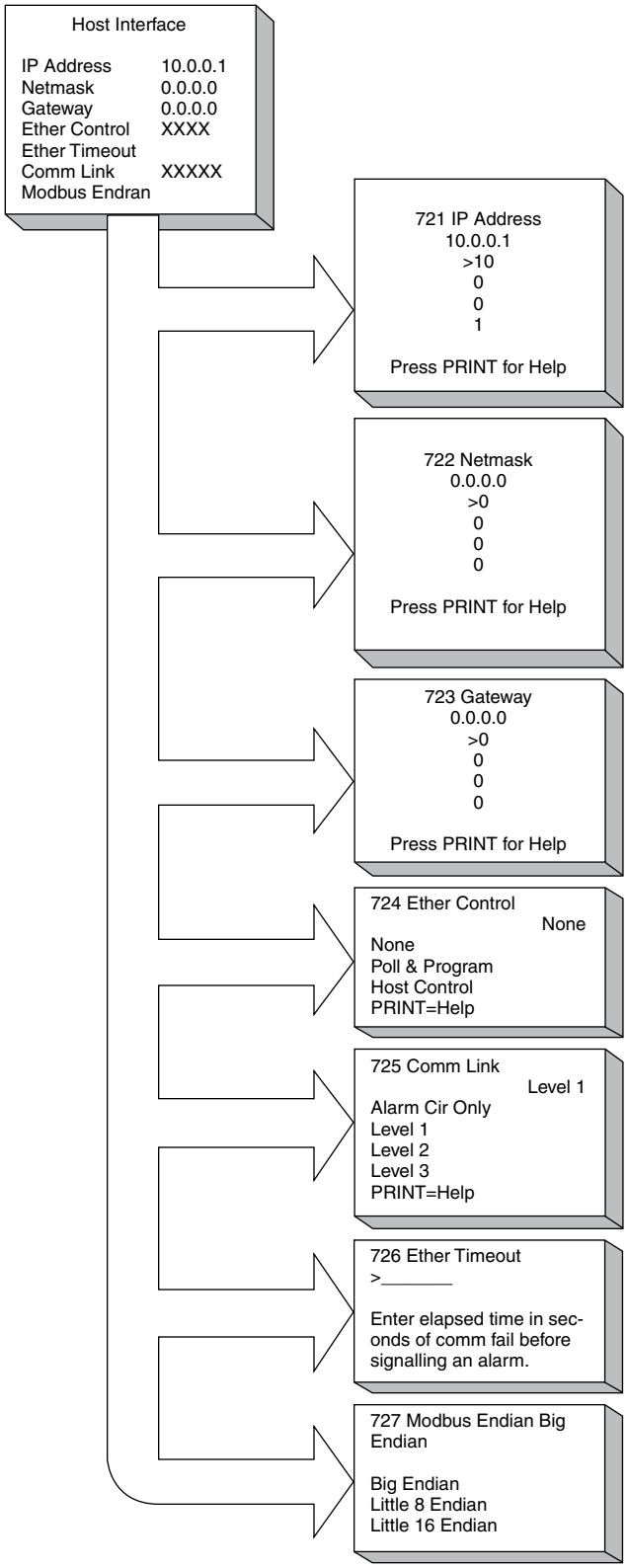
This program code defines the type of serial communications interface assigned to this port. Selections are as follows:

- RS232
- RS485

Note: *No entry if corresponding function = Not Used.*
Help: "Select if comm. Interface is RS232 or RS485."

Host Interface Subdirectory

The Host Interface Subdirectory establishes the Ethernet settings required by the microFlow.net Gas.



The IP, Netmask and Gateway Adresses are in the form of four numbers separated by ".". The range of each number (also known as "octet"), is 0-255. The microFlow.net Gas screen for entering these values lists the present octet values vertically.

Communications 721 – IP Address

This code provides a unique Internet Protocol address for each microFlow.net Gas unit. The IP Address code consists of a set of four octets. The range of each octet is 0-255.

If the Ethernet port is used for Mini Host or Term Host, Smith Meters proprietary type communication only the final two digits of the last octet are used to provide a unique address. The range in this case is 0-99.

Help: "Enter the IP address for this device to connect to the internet. The last octet is used for Smith Comms address."

Communications 722 – Netmask Address (Subnet Mask)

This code provides a unique Internet Protocol subnet address for each microFlow.net Gas unit. The IP Subnet Mask Address code consists of a set of four octets. The range of each octet is 0-2 0.

Help: "Enter the IP subnet mask for this IP address."

Communications 723 – Gateway Address

This code provides a unique Gateway address for each microFlow.net Gas unit which allows access to other IP networks. The Gateway Address code consists of a set of four octets. The range of each octet is 0-255.

Help: "Enter the address that allows access to other IP networks."

Communications 724 – Ethernet Control

This program code defines the level of control the associated Ethernet communications port commands. Poll and Program, and Host Control are valid with host communications options. Only one port can have transaction control. Selections are as follows:

- **None** – No communications on this port.
- **Poll & Program** – For use with demonstration/MicroMate ports. Allows full program access but does not affect transaction control (acts like a standalone unit).
- **Host Control** – Full programming and prompting control. Transaction control (also requiring authorization from host) Allows use of SB – Set Batch to enter the preset remotely and EB to end the batch remotely. This is designed for pre-dispatch operations where the driver has limited input during the load process and the preset is host-controlled.

Critical: Comm port not configured for host communications

Note: *No entry if corresponding function = Not Used.*

Help: "Enter the level of control from the Ethernet port."

Communications 725 – Comm Link Programming

This program code defines which program code parameters can be modified through communications by the access level assigned to those parameters. The factory default is "Level 1 Access." Selections are as follows:

- **Alarm Clearing Only** – This selection allows only the alarms to be reset (cleared) through communications.
- **Level 1 Access Parameters** – This selection allows only the parameters that are assigned level 1 access to be changed through communications.
- **Level 2 Access Parameters** – This selection allows only the parameters that are assigned levels 1 and 2 access to be changed through communications.
- **Level 3 Access Parameters** – This selection allows only the parameters that are assigned levels 1 through 3 access to be changed through communications.

Help: "Select program mode groups modifiable via communications."

Communications 726 – Ethernet Timeout

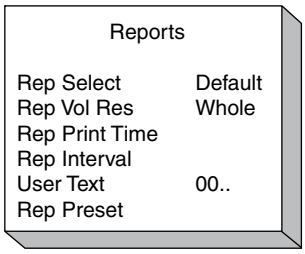
This program code defines the amount of time elapsed that the MicroFlow tries to communicate without getting a response. This can be set from in seconds from 0 to 999.

Communications 727 – Modbus Endian

When retrieving information with floating point numbers, the order of bytes is programmable. The selections of this parameter are as follows:

- Big Endian
- Little 8 Endian
- Little 16 Endian

Reports Subdirectory



Communications 731 – Report Selection

This program code defines which delivery report will be printed at the completion of a transaction if a printer function is assigned to one or more communications ports. The factory default is "Default." Selections are as follows:

- Default
- User Configured Report

Note: *The user-configured reports are designed on the microMate and downloaded to the microFlow.net Gas.*
Note: *Even if a user-configured report has been downloaded from the microMate to the microFlow.net Gas, it will not be printed unless it is selected here. If a user-configured report is selected but none has been downloaded, no report will print.*
Help: "Select the report type to be printed."

Communications 732 – Report Volume Resolution

This entry selects the volume resolution to print on default reports. The factory default is "Whole units." Selections are as follows:

- Whole units
- Tenths
- Hundredths

Note: *No entry if no printer configured on any comm port*
Help: "Select the volume resolution to print on default reports."

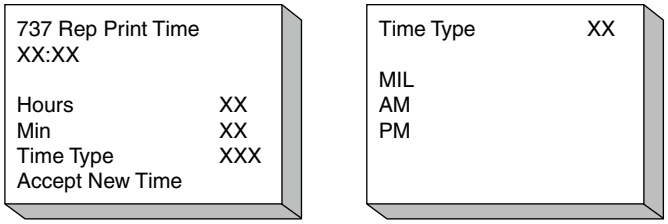
Communications 733 – Report Print Time

This entry sets the initial print time of the report. Enter the hours, minutes, and time type (AM, PM, or military) the report is to be printed. The report includes a line per batch for all transactions run during the time interval specified.

Note: *No entry if no printer configured on any comm. port*
Fatal: Invalid time entry

Steps to changing microFlow.net Gas Report Print Time:

- Select "Hours", press ENTER
- Enter value for hour (0-24), press ENTER
- Select "Min", press ENTER
- Enter value for min (0-59), press ENTER
- Select "Time Type", press ENTER
- Select time designation (MIL, AM, PM), press ENTER
- Select "Accept New Time", press ENTER

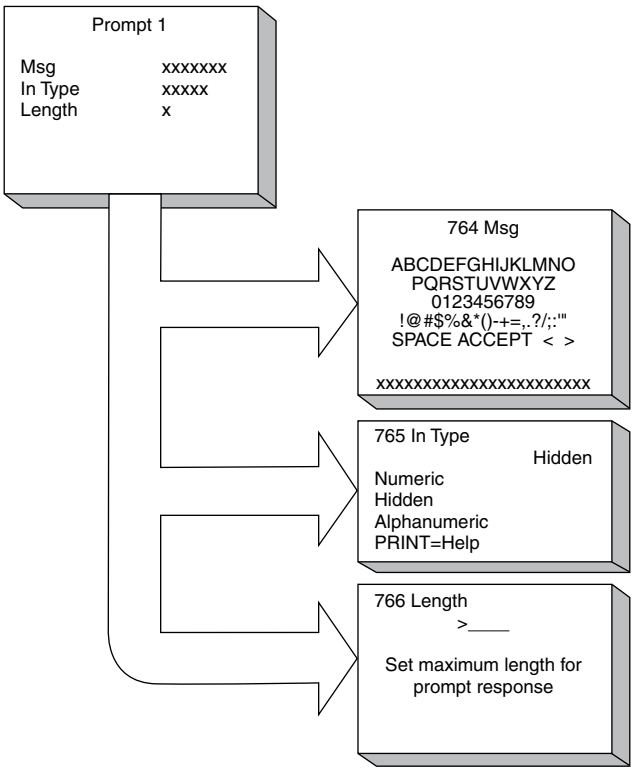


Communications 734 – Report Interval

This parameter sets the interval at which the report will be printed. Once the time of the report has been set using this parameter, the report would print based on that initial time and the interval programmed. The interval is entered in hours with three digits in whole hours. The range of this entry is from 0 to 999.

Note: *No entry if no parameter configured on any comm. port*

Help: "Enter time interval in hours between printed reports. Zero entry disables this feature."



Communications 735 – User Text

This program code determines if the user text set up for reports will be saved with the batch or not saved.

- Not Save
- Save

Help: Select if user text strings are saved in the batch record (selecting save reduces the number of batch records stored.)

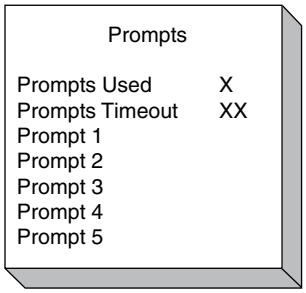
Communications 736 – Report Reset

This program code determines if the batch will be reset when the auto report prints.

- No
- Yes

Help: Reset Batch when auto report prints?

Prompts Subdirectory



Communications 761 – Prompts Used

This program code defines the number of local prompts configured at microFlow.net Gas. These prompts are presented to the operator prior to the preset prompt. The data entered by the operator is stored by microFlow.net Gas and can be printed on a Bill of Lading and retrieved through communications. The range of this program code is 0 to 5.

Help: Zero entry disables this feature

Communications 762 – Prompt Timeout

This two-digit code defines the amount of time, in seconds, that a local prompt will remain displayed at microFlow.net Gas before the prompting sequence is aborted and microFlow.net Gas returns to the ready screen. The range of this parameter is 0 to 99 seconds. If set to zero, microFlow.net Gas will wait indefinitely for data entry in response to a prompt. The factory default is “0”.

Note: *No entry if prompts used = 0.*

Help: Enter time, in seconds, for display of prompt messages

Communications 763, 766, 769, 772, 775 – Prompt #1, #2, #3, #4, #5 Message

This program code defines the 21-character text entry displayed to the operator as one of the five local prompts. It is important to not leave this message as all blanks, as a blank screen will be presented to the operator if this prompt is activated. The data entry allows the following characters to be selected as part of the display unit prompt:

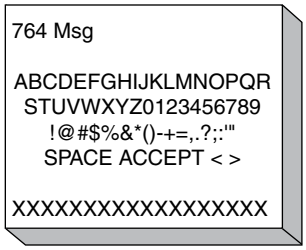
• A B C D E F G H I J K L M N O P Q R S T U V W X Y Z # *

• 0 1 2 3 4 5 6 7 8 9 ! @ # $ % & * ( ) - _ + = , . ? / ; : ’ ” SPACE ACCEPT < >

Note: *No entry if prompts used = 0.*

Help: “Enter prompt message to be displayed at start of transaction.”

Enter this parameter by selecting characters using the UP/DOWN and LEFT/RIGHT Arrow keys. Press ENTER for each selected character. When all characters have been entered, select “ACCEPT” and press ENTER to complete the process.



Communications 764, 767, 770, 773, 776 – Prompt Input #1, #2, #3, #4, #5 Type

This parameter defines whether numeric or alphanumeric data entered in response to a local prompt will echo to the screen or display Xs in place of digits as a security feature. The factory default is “Numeric.” Selections are as follows:

• Numeric

• Hidden

• Alphanumeric

Note: *No entry if prompts used = 0.*
Help: “Select type of prompt response desired.”
Note: *See Application Bulletin AB06062 for details on entering an alphanumeric response to a prompt.*

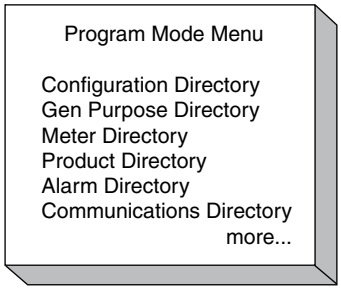
Communications 765, 768, 771, 774, 777 – Prompt #1, #2, #3, #4, #5 Length

This program code defines the maximum length of a response to a local prompt. The single digit code has a range of 0 to 9.

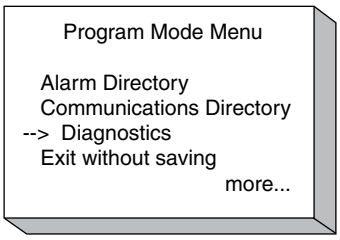
Note: *Codes 765, 768, 771, 774, and 777 are associated with codes 764, 767, 770, 773, and 776 respectively.*
Note: *No-entry if prompts used = 0*
Help: “Set maximum length for prompt response.”

Program Mode Diagnostics

The Program Mode Diagnostics are used to troubleshoot or to determine the current status of the microFlow. Program Mode Diagnostics is selected by moving the cursor to “Diagnostics” on the Program Mode menu and pressing “ENTER”. This will display the Diagnostics menu. Note that Program Mode Diagnostics are only available if Program Mode was entered at a security level at or greater than the level entered in General Purpose Parameter 165.



To access the Diagnostics directory arrow up or down until the arrow is beside the Diagnostics Menu.

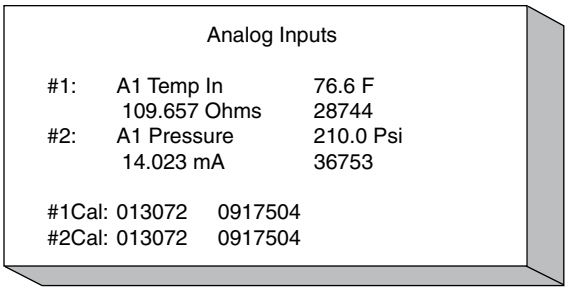


Pressing ENTER with the arrow in front of Diagnostics will display six items of the Diagnostics Menu. Pressing the up and or down arrows will step through the Diagnostics Menu. The available diagnostics in the order that they appear on the menu are as follows:

- Analog Input Test
- Digital Input Test
- Digital Output Test
- Pulse Input Test
- Pulse Output Test
- Communications Test
- Keypad Test
- Display Pixel Test
- Boolean/Algebraic
- Reset Totals
- Reset Dual Pulse Errors
- Erase Event Log
- Erase Batch Log
- Erase Web Pages
- Mass Meter Menu
- Upgrade Firmware
- Factory Initialize
- Factory Diagnostics
    - Watchdog Reset Test
    - Power-up Diagnostics
    - Flow Simulator
    - Field Test Initialize

Analog Input Test

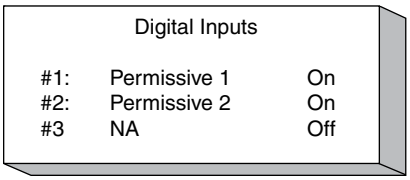
Selecting Analog Input Test and pressing ENTER will display the status of the analog input points in the microFlow.



This screen is used to view the current status of the inputs. The operator can view the function; the current value of the input; the reading of the input in ohms, milliamps, or volts; and the raw analog input value.

Digital Input Test

Selecting Digital Input Test and pressing ENTER will display the status of the digital input points in the microFlow.



This screen shows the Input number, the function that is programmed in the unit for the input and the status of the input point (i.e., if it is on (closed) or off (open). Check the inputs by changing the status of the input, then referring to the diagnostic screen to see if the microFlow.net Gas recognizes the change of state.

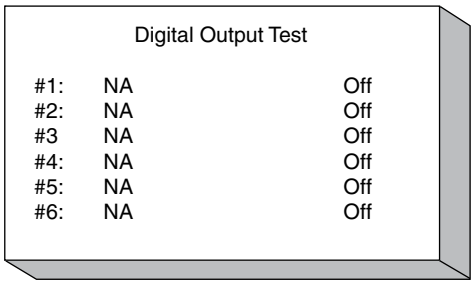
Digital Output Test

Select “Digital Output Test” and press ENTER to display the status of the digital output points in the microFlow. After pressing ENTER the question "Measurement Validity may be affected. Do you want to continue?"

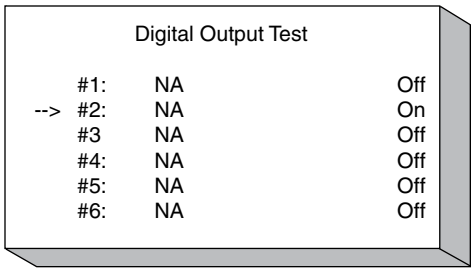
--> No

Yes

Selecting "Yes" will continue to the Digital Output Test.



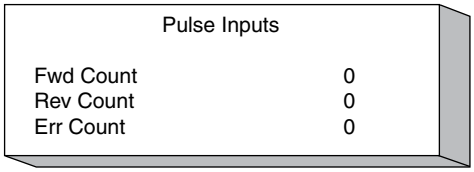
Moving the arrow to the output that is to be tested and pressing ENTER will change the state of the output. An example would be moving the arrow to output #2 Pump and pressing ENTER.



Pulse Input Test

Selecting Pulse Input Test and pressing ENTER will display a screen that indicates the number of pulses received by the respective pulse input. Pressing ENTER clears the pulse count value. This diagnostic should not be used to verify the actual meter pulses received for any batch or transaction. It is intended as a method of verifying pulse input wiring to the respective pulse input on the microFlow. Applying pulse to the respective input will cause the respective counter to increment.

Note: *If Dual Pulse is enabled, "Reset Dual Pulse Errors" will appear as a menu option on the screen. Also if a metered injector is used, it will appear in the screen, just as seen below.*



Pressing CLEAR will return the display to the Diagnostic Menu.

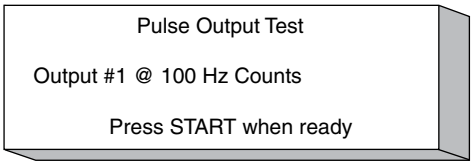
Pulse Output Test

Selecting the Pulse Output Test and pressing ENTER will display a screen that shows the pulse output test and the counts that are output from the microFlow to the pulse receiving device. The output sends out pulses at 100 Hz. The output will send out 2000 pulses. After pressing ENTER the question "Measurement Validity may be affected. Do you want to continue?"

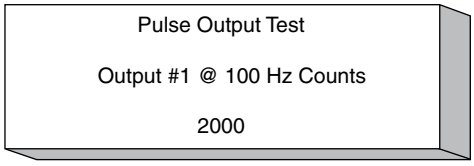
--> No

Yes

Selecting "Yes" will continue to the Digital Output Test.



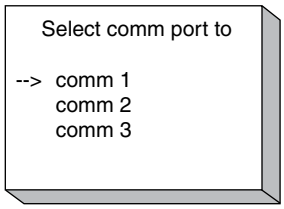
When the test is complete, the receiving device counts should be compared to the diagnostic screen. To start the test when the diagnostic screen is displayed, press the START key.



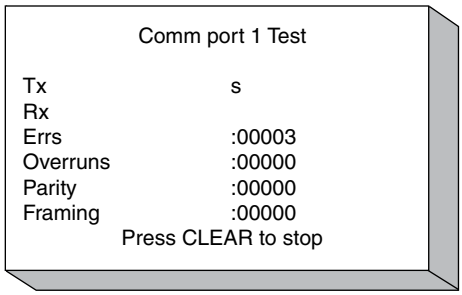
Pressing CLEAR will return the display to the Diagnostic Menu.

Communications Test

Selecting “Communications Test” from the menu allows the operator to run a diagnostic on any of the communication ports on the microFlow. Pressing ENTER with the cursor in front of selection one will activate a popup screen where the operator can select the communications port to be tested.



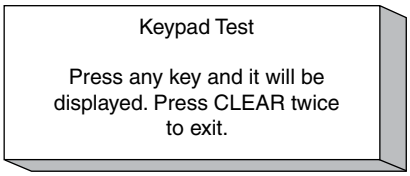
For this test to be completed, the transmit and receive terminals on the comm port must be connected. Once the comm port has been selected for testing by moving the arrow to the required port, pressing ENTER will start the communications test.



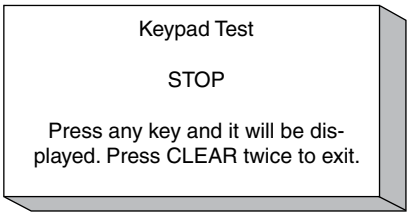
The test will display the characters that are being transmitted on the transmit line. It will also display the characters as they are received back into the instrument. Also displayed are the errors that have occurred during the test, the overruns, the parity, and the framing errors. Pressing CLEAR will end the test and return the unit to the Communications Test menu. The test is identical for the three ports. The only difference in the display will be the communications port number and the channel designation.

Keypad Test

Select “Keypad Test” from the menu to run a diagnostic test on the keypad of the microFlow. Pressing ENTER will display the keypad test screen.



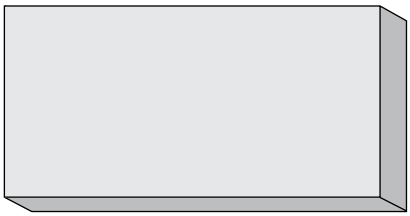
With this screen displayed, any key that is pressed will appear on the screen as the key that was pressed.



To end the test, the CLEAR key must be pressed twice. The first time, CLEAR will appear on the test screen. The second time, the unit will return to the Diagnostic Test menu.

Display Pixel Test

Selecting “Display Pixel Test” and pressing ENTER will initiate the pixel test on the display. All the pixels will be lit, allowing the operator to determine if any of the pixels on the display are not functioning. Pressing CLEAR will terminate the test and return the unit to the Diagnostic menu.



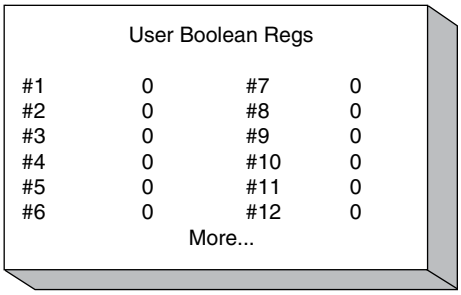
Boolean/Algebraic Processing

Selecting “Boolean/Algebraic Processing” and pressing ENTER will display the following list of Boolean/Algebraic-related diagnostic displays that can be viewed by the operator.

- User Boolean Registers
- User Algebraic Registers
- Equation Line State
- General Purpose Timers

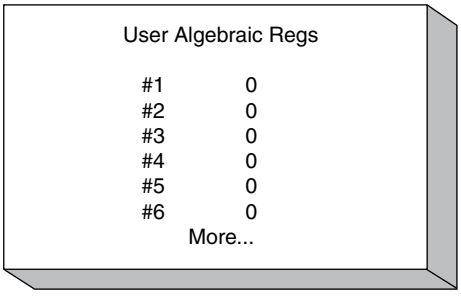
User Boolean Registers

Selecting “User Boolean Registers” and pressing ENTER will display the first twelve user Boolean registers. There are a total of 50 user Boolean registers. The range of these registers is 0 to 255. These registers are set aside for the user. They can be written to by Boolean/Algebraic equations or via communications. The values can be printed on user-defined reports.



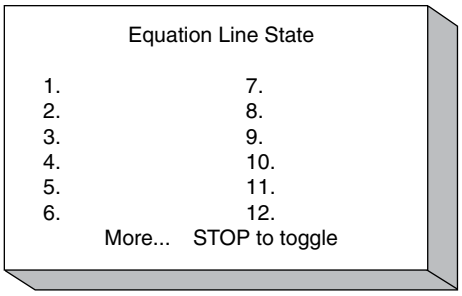
User Algebraic Registers

Selecting “User Boolean Registers” and pressing ENTER will display the first six user algebraic registers.

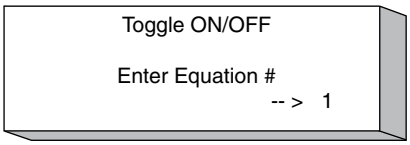


Equation Line State

The Equation Line Status displays the current status of the equations, where “D” indicates that the equation is disabled, “T” is True, and “F” is False. All equations without an “IF” statement will have a “True” status. Those with an “IF” will indicate the result of the “IF” expression: either “True” or “False.”

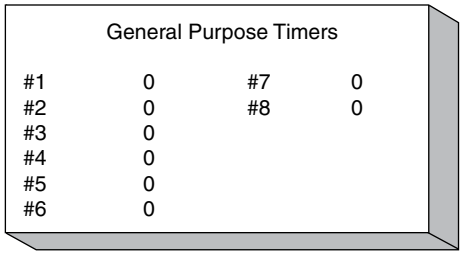


Entering the equation number that is to be disabled and pressing ENTER will change the status on the screen from either T (True) or F (False) to D (Disabled). The equation from that point until enabled will not be active. To enable an equation the same process is followed, except that the screen will indicate that the equation is D (Disabled). Entering the equation number will enable that equation.



General Purpose Timers

Selecting “General Purpose Timers” and pressing ENTER will display nine of the sixteen general purpose timers that can be activated and used through the Boolean and/or algebraic equations.



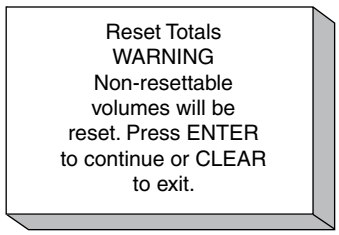
The timers are incremented at these intervals:

Timer Numbers	Resolution	Range
1 - 2	0.1 second	109 minutes
3 - 4	1.0 second	18.2 hours
5 - 6	1.0 minute	45.5 days
7 - 8	1 hour	7.5 years

The operator can clear the times by writing a zero to the database location of the desired timer. Like the user Boolean and user algebraic registers, these timers are reserved strictly for the user. They may be started via Boolean/Algebraic equations or via communications. Timers are very useful in the design of equations as they allow setting a user alarm or taking some other action after an event has persisted for a period of time.

Reset Totals

This diagnostic is used for resetting the non-resettable totals. Pressing ENTER will display the following screen.

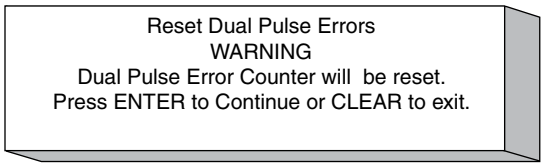


Pressing CLEAR will return the unit to the Diagnostics Menu screen. Pressing ENTER on the screen will reset the non-resettable totals (both product and additive) and return the unit to the Diagnostics Menu screen.

Reset Dual Pulse

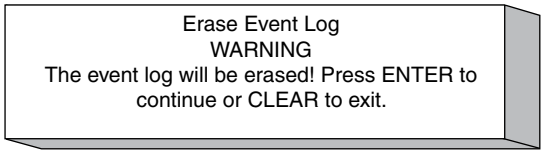
This diagnostic is used for resetting the dual pulse errors if they occur outside of the options programmed in meter code 315 “Dual Pulse Error Reset”. For instance if code 315 is programmed for no automatic reset of the errors this diagnostic would have to be used for resetting the errors if they exceeded the count programmed in meter code 314 “Dual Pulse Error Count”.

To reset the errors, scroll through the menu until the cursor is in front of “Reset Dual Pulse Errors” and press “ENTER”, the following screen will appear.



Erase Event Log

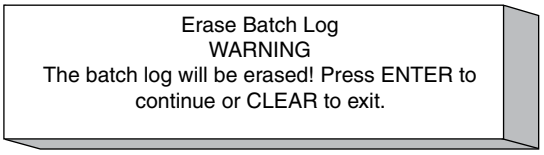
This diagnostic is used for erasing the event log. Pressing ENTER will display the following screen.



Pressing CLEAR will return the unit to the Diagnostics Menu screen without erasing the event log. Pressing ENTER will erase the event log and return the unit to the Diagnostics Menu screen.

Erase Batch Log

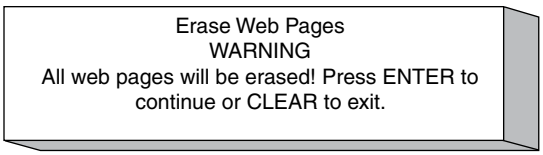
This diagnostic is used to erase the batch log. Pressing ENTER with the arrow in front of “Erase Batch Log” will display the following screen.



Pressing CLEAR will return the unit to the Diagnostics Menu screen without erasing the transaction log. Pressing ENTER will erase the transaction log and return the unit to the Diagnostics Menu. Not only will the log be erased, but historic transactions currently archived will no longer be available via communications.

Erase Web Pages

This diagnostic is used to erase the web pages. Pressing ENTER with the arrow in front of “Erase Transaction Log” will display the following screen.

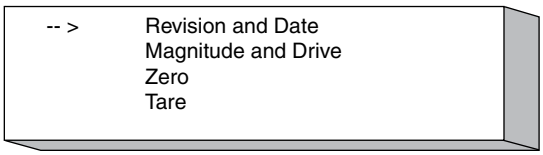


Pressing CLEAR will return the unit to the Diagnostics Menu screen without erasing the web pages. Pressing ENTER will erase the web pages and return the unit to the Diagnostics Menu.

Mass Meter Menu

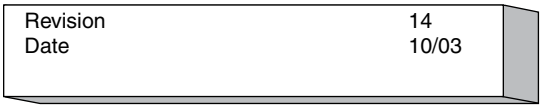
Selecting “Mass Meter Menu” from Program Mode Diagnostics displays the opening mass meter diagnostics screen. Mass meter diagnostics display mass meter information and allow the operator to perform certain maintenance tasks. These diagnostics are only available when a mass meter has been configured for use.

Press ENTER and the following display will then appear.



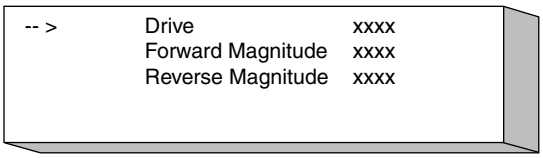
Revision and Date

Selecting “Revision and Date” from the Mass Meter Diagnostics menu displays a screen similar to that shown below. This option indicates the software version and date associated with the mass meter.



Magnitude and Drive

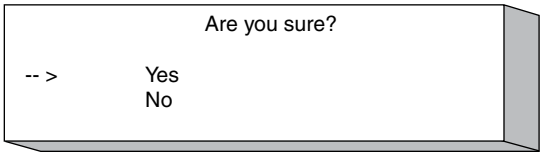
Selecting “Magnitude and Drive” from the Mass Meter Diagnostics menu displays a screen similar to that shown below.



This screen displays the current valves and is dynamically updated. Press CLEAR to return to the Mass Meter Diagnostics menu.

Zero

Selecting “Zero” from the Mass Meter Diagnostics menu displays a screen similar to that shown below.



Position the cursor beside “Yes” and press ENTER to set the meter to zero. The screen will then display “Zeroing in Progress” until the process is complete. Once the meter has been set back to zero, the message will change to “Zeroing Complete – Press Clear to Exit.” Note that there can be no flow in progress when “Zero” is initiated.

Position the cursor beside “No” and press ENTER to abort the zero function and return the display to the Mass Meter Diagnostics menu.

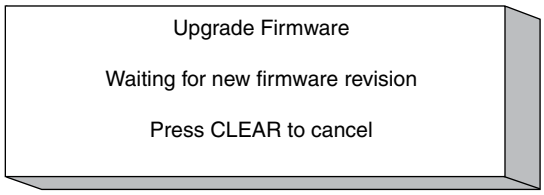
Tare

Selecting “Tare” from the Mass Meter Diagnostics menu displays a screen similar to that shown below.

This screen allows the operator to specify a new tare value for a mass meter. Use the keypad to indicate the new tare value and then press ENTER. The display will return to the Mass Meter Diagnostics menu.

Upgrade Firmware

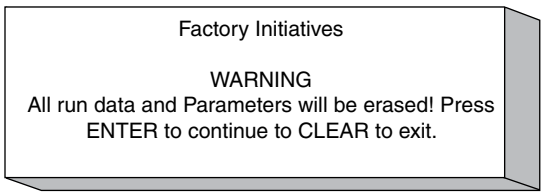
This diagnostic tool will allow a new software revision to be downloaded into the microFlow. In order for a new software revision to be downloaded the Comlink Level must be set to the highest level, unless, the microFlow is in the diagnostic screen shown below, which will override the Comlink Level setting.



Factory Initialize

Selecting “Factory Initialize” and pressing ENTER will display a screen that tells the operator that if ENTER is pressed, all the parameters in the unit will be reset to the default values as they were shipped from the factory.

Caution: Running this diagnostic will change all parameters that have been programmed previously. The only data saved will be that which is stored in the audit trail for Weights and Measures Approvals.



Factory Diagnostics

The Watchdog Reset Test, Powerup Diagnostics, Flow Simulator, and Field Test Init are for factory use only.

Appendix I – Selecting the Source of the Line Temperature

The source used by the microFlow.net Gas for the line temperature can be controlled/configured as follows:

Maintenance Value

If the operator sets a value in the maintenance temperature (parameter 403) the microFlow.net will use this static value as the current line temperature. The maintenance setting overrides any live values available. This parameter is intended to be used during maintenance or calibration to provide a temporary static value to be used while a probe is not in service.

Parameter	Value/Selection
403 Maintenance Temperature	Set to any value other than -999.99

RTD Direct Wired to Analog Input

The microFlow.net can be configured to accept a live line temperature input from an RTD when the RTD is wired to the microFlow.net Gas as shown in the installation manual (MNFG001). In addition the following parameters must be configured:

Parameter	Value/Selection
401 RTD Function	Temperature
402 Analog I/O 1 RTD Offset	Value to be added to the temperature indicated by the temperature probe. From calibration
403 Maintenance Temperature	Set to -999.99 to disable

Reading Temperature from MPU

When a communications link is wired between the microFlow.net and the MPU meter, and the MPU is connected to an analog temperature sensor the microFlow can be configured to read the current line temperature from the MPU via modbus. The parameter settings to configure this mode of operation are listed below:

Parameter	Value/Selection
401 RTD Function	None
403 Maintenance Temperature	Set to -999.99 to disable
403 Maintenance Temperature	Set to -999.99 to disable
331 Ultrasonic Meter Type	MPU
332 Ultrasonic Meter Config	Comm Only or Comm & Pulse
333 Share Temperature w/Meter	Read
335 Ultrasonic IP Address	IP address of the MPU meter

Appendix II – Selecting the Source of the Line Pressure

The source used by the microFlow.net Gas for the line pressure can be controlled/configured as follows:

Maintenance Value

If the operator sets a value in the maintenance pressure (parameter 503) the microFlow.net will use this static value as the current line pressure. The maintenance setting overrides any live values available. This parameter is intended to be used during maintenance or calibration to provide a temporary static value to be used while the probe is not in service.

Parameter	Value/Selection
503 Maintenance Pressure	Set to any value other than 0.0

4-20 mA Sensor Direct Wired to Analog Input

The microFlow.net can be configured to accept a live line pressure input from a 4-20 mA analog sensor when wired to the microFlow.net Gas as shown in the installation manual (MNFG001). In addition the following parameters must be configured:

Parameter	Value/Selection
411 4-20 mA Function	Pressure
412 Analog I/O 2 Low Value	Pressure indicated by 4.0 mA from sensor
413 Analog I/O 2 High Value	Pressure indicated by 20 mA from sensor
503 Maintenance Pressure	Set to 0.0 to disable

Reading Temperature from MPU

When a communications link is wired between the microFlow.net and the MPU meter, and the MPU is connected to an analog pressure sensor the microFlow can be configured to read the current line pressure from the MPU via modbus. The parameter settings to configure this mode of operation are listed below:

Parameter	Value/Selection
411 4-20 mA Function	None
503 Maintenance Pressure	Set to 0.0 to disable
331 Ultrasonic Meter Type	MPU
332 Ultrasonic Meter Config	Comm Only or Comm & Pulse
334 Share Temperature w/Meter	Read
335 Ultrasonic IP Address	IP address of the MPU meter
333 Share Temperature w/Meter	Read

Appendix III – Example: How to Program the microFlow.net Gas Only as an Indicating Device

The following table lists the configuration parameters that must be set correctly when the microFlow.net is configured for Remote Display Mode.

Parameter	Setting Required	Explanation
Analog Inputs Directory		
401 RTD Function	Temperature	If RTD is wired direct to microFlow.net and the temperature is to be written to the MPU
402 Analog I/O 1 RTD Offset	Value from calibration	If RTD is wired direct to microFlow.net and the temperature is to be written to the MPU
411 4-20 ma Function	Pressure	If pressure sensor is wired direct to microFlow.net and the pressure is to be written to the MPU
412 Analog I/O 2 (4-20ma) Low Value	Pressure at 4 mA	If pressure sensor is wired direct to microFlow.net and the pressure is to be written to the MPU
413 Analog I/O 2 (4-20ma) High Value	Pressure at 20 mA	If pressure sensor is wired direct to microFlow.net and the pressure is to be written to the MPU
Volume Accuracy Directory		
301 Meter Type	Ultrasonic Meter	
331 Ultrasonic Meter Type	MPU	
332 Ultrasonic Meter Config	Remote Display – Metric or Remote Display - Imperial	Based on units desired
333 Share Temp. w/Meter	Write if required by installation	If temperature sensor is wired to the microFlow.net this param should be set to “Write” (microFlow.net writes temp. to MPU).
334 Share Press. w/Meter	Write if required by installation	If temperature sensor is wired to the microFlow.net this param should be set to “Write” (microFlow.net writes temp. to MPU).
335 Ultrasonic IP Address	Set to match TCP/IP address of the MPU	If using TCP/IP interface to MPU
381 GC Update Timeout	Maximum time for new analysis data	Only If GC is connected
382 GC IP Address		Only If GC is connected
383 GC C6 Percent	According to common practice for the location	Only If GC is connected
384 GC C7 Percent	According to common practice for the location	Only If GC is connected
385 GC C8 Percent	According to common practice for the location	Only If GC is connected

Parameter	Setting Required	Explanation
Temperature/Density Directory		
401 Temperature Units	Celsius or Fahrenheit	Set automatically when either “Remote Display – Metric” or “Remote Display – Imperial” is selected for param #332
404 High Temperature Alarm	Application dependent	
405 Low Temperature Alarm	Application dependent	
411 Density Units	Kg/M3 or lb/ft3	Set automatically when either “Remote Display – Metric” or “Remote Display – Imperial” is selected for param #332
413 High Density Alarm	Application dependent	
414 Low Density Alarm	Application dependent	
Pressure Directory		
501 Pressure Units	Bar or psi	Set automatically when either “Remote Display – Metric” or “Remote Display – Imperial” is selected for param #332
504 High Pressure Alarm Limit	Application dependent	
505 Low Pressure Alarm Limit	Application dependent	
Alarms Directory	**No configuration required**	No
Communications Directory	**Optional**	**If using serial or TCP/IP link to the MPU meter, the proper port will need to be configured.**
Product 1 Directory		**If no online gas chromatograph data is available, the values in the product directory will be used. The values entered here will be written to the MPU meter as input to the energy/density calculations.**
011 Mole % Methane (C1)	Nominal value	
012 Mole % Nitrogen (N2)	Nominal value	
013 Mole % Carbon Dioxide (CO2)	Nominal value	
014 Mole % Ethane (C2)	Nominal value	
015 Mole % Propane (C3)	Nominal value	
016 Mole % Water (H2O)	Nominal value	
017 Mole % Hydrogen Sulfide (H2S)	Nominal value	
018 Mole % Hydrogen (H2)	Nominal value	
019 Mole % Carbon Monoxide (CO)	Nominal value	
020 Mole % Oxygen (O2)	Nominal value	
021 Mole % i-Butane (iC4)	Nominal value	

Parameter	Setting Required	Explanation
022 Mole % n-Butane (nC4)	Nominal value	
023 Mole % i-Pentane (iC5)	Nominal value	
024 Mole % n-Pentane (nC5)	Nominal value	
025 Mole % n-Hexane (nC6)	Nominal value	
026 Mole % n-Heptane (nC7)	Nominal value	
027 Mole % n-Octane (nC8)	Nominal value	
028 Mole % n-Nonane (nC9)	Nominal value	
029 Mole % n-Decane (nC10)	Nominal value	
030 Mole % Helium (He)	Nominal value	
031 Mole % Argon (Ar)	Nominal value	

Appendix IV – Example: How to Program the microFlow.net Gas as a Conversion Device and as a Indicating Device

The following table lists the configuration parameters that must be set correctly when the microFlow.net is configured for Flow Computer Mode.

Parameter	Setting Required	Explanation
Pulse Outputs Directory - All	**Optional**	**Only required if using the pulse output function**
Digital Inputs Directory	**Optional**	**Only required if using one of the Digital Input functions**
Digital Outputs Directory	**Optional**	**Only required if using one of the Digital Output functions**
Analog Inputs Directory		
401 RTD Function	Temperature	Must be set to allow proper calculation of standard volumes etc. - If RTD is wired direct to microFlow.net
402 Analog I/O 1 RTD Offset	Value from calibration	Must be set to allow proper calculation of standard volumes etc. - If RTD is wired direct to microFlow.net
411 4-20 ma Function	Pressure	Must be set to allow proper calculation of standard volumes etc. - – If pressure sensor is wired to microFlow.net
412 Analog I/O 2 (4-20ma) Low Value	Pressure at 4 mA	Must be set to allow proper calculation of standard volumes etc. - – If pressure sensor is wired to microFlow.net
413 Analog I/O 2 (4-20ma) High Value	Pressure at 20 mA	Must be set to allow proper calculation of standard volumes etc. - – If pressure sensor is wired to microFlow.net
General Purpose Directory	**As required for installation environment**	
Flow Control Directory	**Optional**	**Only required if flow control valve is controlled by microFlow.net or if high/low flow alarms are desired**
Volume Accuracy Directory		
301 Meter Type	According to meter installed – Ultrasonic Meter – Turbine Meter – Mass Meter	
311 K Factor	Taken from meter	Required if the microFlow.net receives pulses from the meter
312 Pulse In Type	Based on meter type	Whether the meter pulses represent volume or mass
313 Channel Select	Based on meter type and wiring	Whether the meter has dual channel pulse output or single channel pulse output
314 Dual Pulse Error Count	Optional	
315 Dual Pulse Error Reset	Optional	
316 Dual Pulse Flow Rate Cutoff	Optional	
331 Ultrasonic Meter Type		If #301 is set to Ultrasonic

Parameter	Setting Required	Explanation
332 Ultrasonic Meter Config		If #301 is set to Ultrasonic
333 Share Temp. w/Meter		If #301 is set to Ultrasonic
334 Share Press. w/Meter		If #301 is set to Ultrasonic
335 Ultrasonic IP Address		Yes – If #301 is set to Ultrasonic and using TCP/IP
341 Meter Factor 1	From calibration	The meter factor curve is developed during calibration. Note: Any meter factors after the first zero meter factor in the list are not used by the calculations
342 Flow Rate 1	From calibration	
343 Meter Factor 2	From calibration	
344 Flow Rate 2	From calibration	
345 Meter Factor 3	From calibration	
346 Flow Rate 3	From calibration	
347 Meter Factor 4	From calibration	
348 Flow Rate 4	From calibration	
349 Meter Factor 5	From calibration	
350 Flow Rate 5	From calibration	
351 Meter Factor 6	From calibration	
352 Flow Rate 6	From calibration	
353 Meter Factor 7	From calibration	
354 Flow Rate 7	From calibration	
355 Meter Factor 8	From calibration	
356 Flow Rate 8	From calibration	
357 Meter Factor 9	From calibration	
358 Flow Rate 9	From calibration	
359 Meter Factor 10	From calibration	
360 Flow Rate 10	From calibration	
371 Mass Meter Type	Based on meter type	Only If using an SMass or Apollo meter
372 Mass Meter Sequence Number	From meter	Only If using an SMass or Apollo meter
373 SMASS Coefficient Ka	From meter	Only If using an SMass or Apollo meter
374 SMASS Coefficient Kb	From meter	Only If using an SMass or Apollo meter
375 SMASS Coefficient Kc	From meter	Only If using an SMass or Apollo meter
376 SMASS Density Factor	From meter	Only If using an SMass or Apollo meter
377 Mass Meter Pulse Multiplier	Based on meter configuration	Only If using an SMass or Apollo meter
378 Mass Meter Low Flow Cutoff	Based on meter configuration	Only If using an SMass or Apollo meter
379 Mass Meter Tube Material	From meter	Only If using an SMass or Apollo meter
380 Mass Meter Model	From meter	Only If using an SMass or Apollo meter
381 GC Update Timeout	Maximum time for new analysis data	Only If GC is connected
382 GC IP Address		Only If GC is connected
383 GC C6 Percent	According to common practice for the location	Only If GC is connected

Parameter	Setting Required	Explanation
384 GC C7 Percent	According to common practice for the location	Only If GC is connected
385 GC C8 Percent	According to common practice for the location	Only If GC is connected
Temperature/Density Directory		
401 Temperature Units	Celsius or Fahrenheit	
402 Reference Temperature	Usually 15 C or 60 F	
403 Maintenance Temperature	-999.99	If set to any other value, this value will override the live temperature
404 High Temperature Alarm	Application dependent	
405 Low Temperature Alarm	Application dependent	
406 Combustion Temperature	Selected based on convention	Only used if param #003 is set to ISO- 6976
411 Density Units	Kg/M3 or lb/ft3	
412 Maintenance Line Density	0.0	If set to any other value, this value will override the live/calculated density
413 High Density Alarm		Application dependent
414 Low Density Alarm		Application dependent
415 Density of Air	1.225410 for kg/m3 (@1.01325 bar/15C) and 0.076487 for lb/ft3 (@14.73 psia/60F)	
Pressure Directory		
501 Pressure Units	bar	
502 Reference Pressure	1.01325 bar	
503 Maintenance Pressure	0.0	If set to any other value, this value will override the live temperature
504 High Pressure Alarm Limit	Application dependent	
505 Low Pressure Alarm Limit	Application dependent	
Alarms Directory	**No configuration required**	No
Communications Directory	**Optional**	**If using serial or TCP/IP link to meter, the proper port will need to be configured. Also, if a gas chromatograph is connected, the proper port is needed for communications**
Product 1 Directory		**If no online gas chromatograph data is available, the values in the product directory will be used. The values entered here will be used for standard calculations in the event that no other composition data is available so these values should represent a nominal composition.**
002 Product Name	Optional	
003 Heat Value Calculation Method	Based on convention, either AGA5 or ISO 6976	Required to calculate the heating value of the gas
011 Mole % Methane (C1)	Nominal value	

Parameter	Setting Required	Explanation
012 Mole % Nitrogen (N2)	Nominal value	
013 Mole % Carbon Dioxide (CO2)	Nominal value	
014 Mole % Ethane (C2)	Nominal value	
015 Mole % Propane (C3)	Nominal value	
016 Mole % Water (H2O)	Nominal value	
017 Mole % Hydrogen Sulfide (H2S)	Nominal value	
018 Mole % Hydrogen (H2)	Nominal value	
019 Mole % Carbon Monoxide (CO)	Nominal value	
020 Mole % Oxygen (O2)	Nominal value	
021 Mole % i-Butane (iC4)	Nominal value	
022 Mole % n-Butane (nC4)	Nominal value	
023 Mole % i-Pentane (iC5)	Nominal value	
024 Mole % n-Pentane (nC5)	Nominal value	
025 Mole % n-Hexane (nC6)	Nominal value	
026 Mole % n-Heptane (nC7)	Nominal value	
027 Mole % n-Octane (nC8)	Nominal value	
028 Mole % n-Nonane (nC9)	Nominal value	
029 Mole % n-Decane (nC10)	Nominal value	
030 Mole % Helium (He)	Nominal value	
031 Mole % Argon (Ar)	Nominal value	
041 Maintenance Reference Density	0.0	If non-zero, this value overrides the live/calculated value
042 Maintenance Heat Value	0.0	If non-zero, this value overrides the live/calculated value
043 Maintenance Viscosity	0.0	If non-zero, this value overrides the live/calculated value
044 Maintenance Isentropic Exponent	0.0	If non-zero, this value overrides the live/calculated value

Appendix V – Report Format

The microFlow.net Gas supports an interface to a serial printer and reports can be configured to print automatically or the operator can use the keypad to manually request a report. There are two types of reports available a batch report which contains totals from a single batch and a daily report which contains totals from all batches which occurred during a day long interval. These reports may be for the current batch or day or for any batch or day for which data is stored in the non-volatile batch record log. The formats of both reports are identical except for the title as shown below:

```
                                    (Reprint)
BATCH REPORT - BATCH # 0001                Printed On:  23/03/09  12:06:13
Site ID:  microFlow Gas Demo                            DD/MM/YY  HH:MM:SS
                                     Start Date/Time: 23/03/09  11:26:15
                                     End Date/Time:   23/03/09  11:30:10

Start Gross Forward:       204266 m3    Start Gross Reverse:            0 m3
End Gross Forward:         204331 m3    End Gross Reverse:              0 m3

------------------------------  Meter Data  ------------------------------
ID:    FC-101                          Type:     Ultrasonic
S/N:   11234                           K Factor:    150.000  Pulses/m3
------------------------------  Product Data  -----------------------------
Name:  Amarillo Gas                    Ref. Temperature: 15.00 C
Type:  Natural Gas                     Ref. Pressure:   101.32500 kPa
----------------------  Flow Weighted Average Data  ----------------------
Obs. Temperature:     0.00 C           Ref. Density:       0.7902 kg/Sm3
Obs. Pressure:     4136.85 kPa         Obs. Density:       37.9528 kg/m3
Relative Density:   0.6449             Heating Value:       33.16 MJ/Sm3
--------------------  Flow Weighted Average Composition  ------------------
Methane     (C1)     81.4410%          n-Hexane         (nC6)     0.0000%
Ethane      (C2)      3.3000%          n-Heptane        (nC7)     0.0000%
Propane     (C3)      0.6050%          n-Octane         (nC8)     0.0000%
n-Butane    (nC4)     0.1040%          Nitrogen         (N2)     13.4650%
i-Butane    (iC4)     0.1000%          Hydrogen Sulfide (H2S)     0.0000%
n-Pentane   (nC5)     0.0000%          Carbon Dioxide   (CO2)     0.9850%
i-Pentane   (iC5)     0.0000%          Water            (H2O)     0.0000%
------------------------------  Batch Totals  ------------------------------
                     Forward                    Reverse
Pulses:                 9750                          0
Gross Vol.:               65 m3                       0 m3
Standard Vol.:          3113 Sm3                      0 Sm3
Energy:               101908 MJ                       0 MJ
Mass:                   2460 kg                       0 kg
--------------------------------  Alarms  --------------------------------
DA DA DA



Signature                                  Date
```

Section XIV – Related Publications

Revisions included in MNFG002 Issue/Rev. 0.1 (6/11):
- Page 20: Ultrasonic Meter Subdirectory revised - information added.
- Page 30: GC Interface Subdirectory revised - information added.
- Page 35: Text added to Product Composition Subdirectory.
- Appendices I-V added to publication.

Technical Support

Contact Information:
Field Service Response Center
24/7 Technical Support/Schedule a Technician: 1-844-203-4014
System Installation Supervision, Start-Up, Training, and Commissioning Services Available

USA Operation
1602 Wagner Avenue
Erie, Pennsylvania 16510 USA
P:+1 814.898.5000

Germany Operation
Smith Meter GmbH
Regentstrasse 1
25474 Ellerbek, Germany
P:+49 4101 304.0