MicroML4/Micro100 Liquid OPERATORS MANUAL
Flow Computer
Liquid Version

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WARRANTY

Dynamic Flow Computers warrants to the owner of the Flow Computer that the product delivered will be free from defects in material and workmanship for one (1) year following the date of purchase.

This warranty does not cover the product if it is damaged in the process of being installed or damaged by abuse, accident, misuse, neglect, alteration, repair, disaster, or improper testing.

If the product is found otherwise defective, Dynamic Flow Computers will replace or repair the product at no charge, provided that you deliver the product along with a return material authorization (RMA) number from Dynamic Flow Computers.

Dynamic Flow Computers will not assume any shipping charge or be responsible for product damage due to improper shipping.

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Date: 9/28/2022

CHAPTER 1: QUICK START

Introduction:

The micro MV Liquid Multi-Meter Flow Computer was designed after careful listening to our customers in all sectors of the oil and gas industry. It was built to address the different needs for refineries, chemical plants, gas processing plants, offshore platforms, pipeline and transmission, remote gas wells, and storage caverns. The focus has been to bring the different needs and requirements of these specialized industries into one hardware platform and therefore reducing the spare parts requirements, the training process, calibration, and overall cost of ownership. We believe the Micro MV Liquid Flow Computer has delivered and met the design intentions.

The Micro MV Liquid Flow Computer combines the following features:

- ♦ **User Friendly**
- ♦ **Flexible**
- ♦ **Easy to understand and configure**
- ♦ **Rugged**
- ♦ **Economical to install and maintain**
- ♦ **Accurate**

We hope that your experience with the Micro MV Liquid Flow Computer will be a simple pleasant experience, not intimidating in any way.

The Micro MV Liquid Flow Computer handles up to four-meter run flow computer for the measurement of liquid products. Using orifice plate, Venturi, turbine/PD meter, or wedge devices, it can meter a wide variety of products, such as crude, refined product, LPG/NGL products. Thirty-five days of previous daily data, eight previous batch data, and thirty-five days previous hourly data are stored in the short format type reports. The previous 80 audit-trail reports and 80 alarm reports are stored. User formatted reports and user formatted ticket reports are available. Eight different product files are user-configurable.

One Rosemount multi-variable digital transducers can be connected to each Micro MV flow computer for temperature, pressure (up to 3626 PSIG), and DP (up to 830 inches H_2O). Other Rosemount multi variable transmitters can be connected to the Micro MV Liquid Flow Computer via RS485 serial interface. Up to four meter runs can be stored and calculated in a single Micro MV Liquid Flow computer. The 2nd RS485 is used as a slave or a master Modbus port for data acquisition and other serial functions.

The Micro MV Liquid Flow Computer has a host of inputs and outputs beyond the built in Rosemount Multi Variable transmitter.

Three high-speed frequency inputs (Sine or Square wave), 70 mV peak to peak or sine wave 6 volts, or lighter on square wave

Four additional analog inputs, or two analog inputs and one three wire RTD inputs

The Micro MV Liquid Flow computer handles up to four-meter runs capabilities. It includes the following

Four additional analog inputs, or two analog inputs and one three wire RTD inputs

One analog output expandable to four, or five additional analog inputs, one RS232, two RS485 with Modbus protocol, and one additional serial printer output.

Three status inputs or digital outputs are user configurable. The fourth digital I/O is optional.

Additionally, each Micro MV Liquid Flow Computer can store up to 35 days of hourly and daily data. Optional expandable memory (Virtual Hard Drive) up to 132 Megs, combined with our customized data storage allows almost any type data logging task to become possible.

Note: Flow equations used are continuously upgraded and new equations are added.

Call factory for current software library.

Quick Start Up

Version 2 - MicroMV Main/Memory Boards (Micro2009 and Later Model)

Main Board
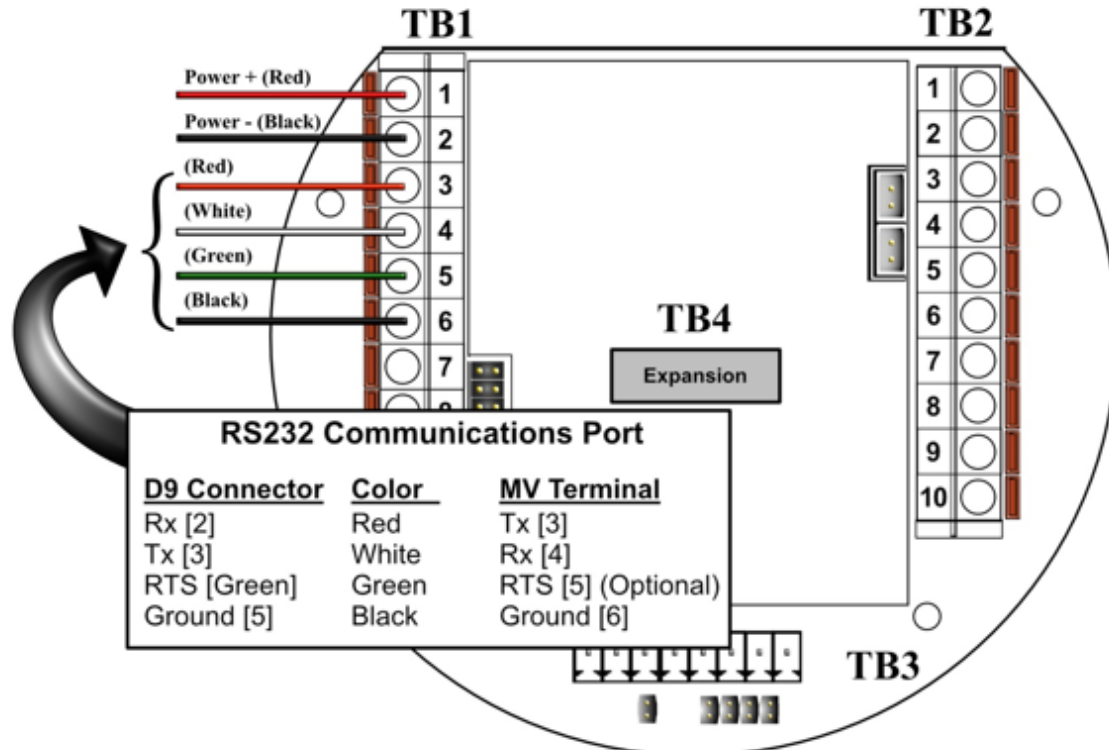
MV Step by Step Startup:

1. Connect power supply cable
2. Connect RS-232 Communications
3. Ensure jumper JP1 is installed on memory board
4. Energize power supply (24 Volts Recommended)
5. Verify display comes on
6. Run DFC Software
7. Configure the Micro MV device

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Version 2 - MicroMV Main/Memory Boards (Micro2009 and Later Model)
Memory/CPU Board

MicroMV CPU/Memory Board

JP1 Jumper Location

Memory Jumper
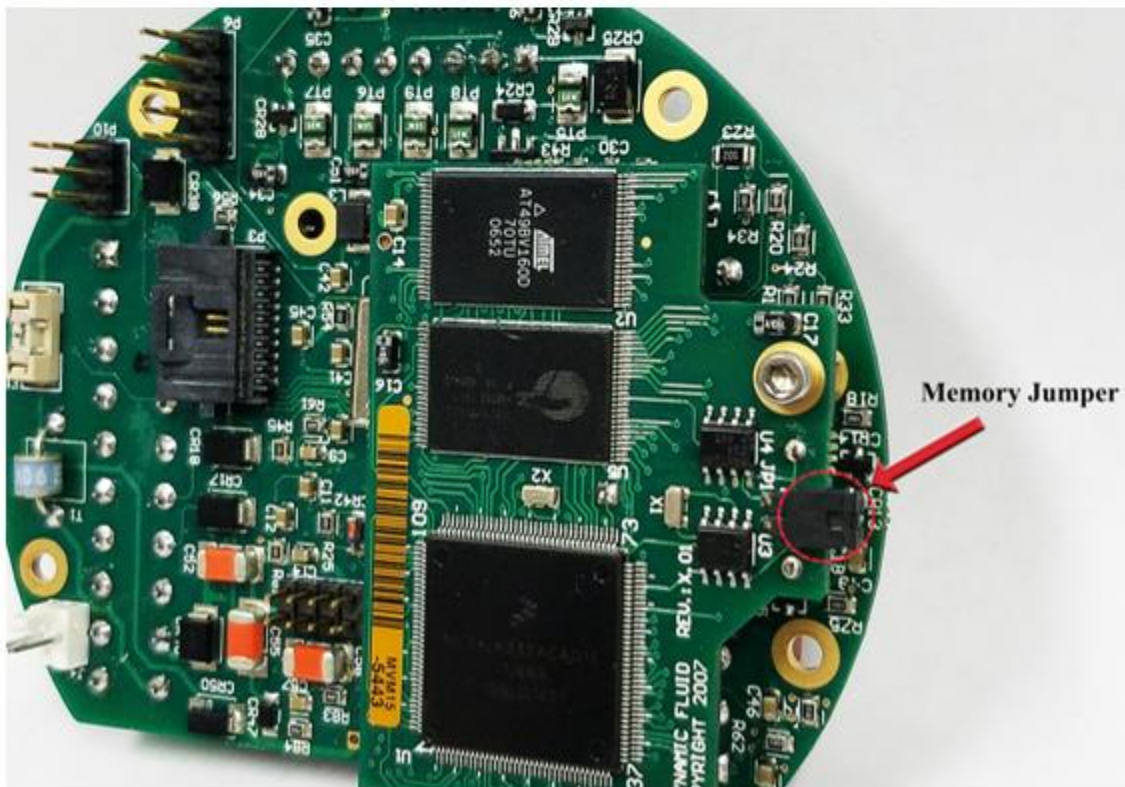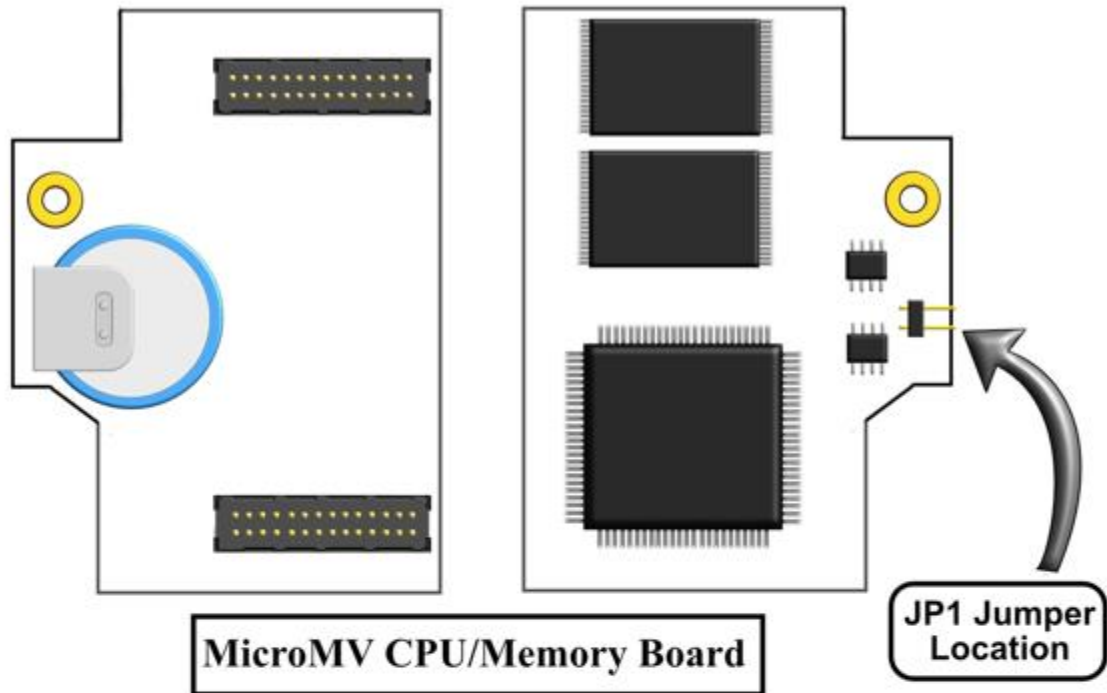
Version 1 - MicroMV Board (Older MicroMV Models)

MicroMV Quick Start
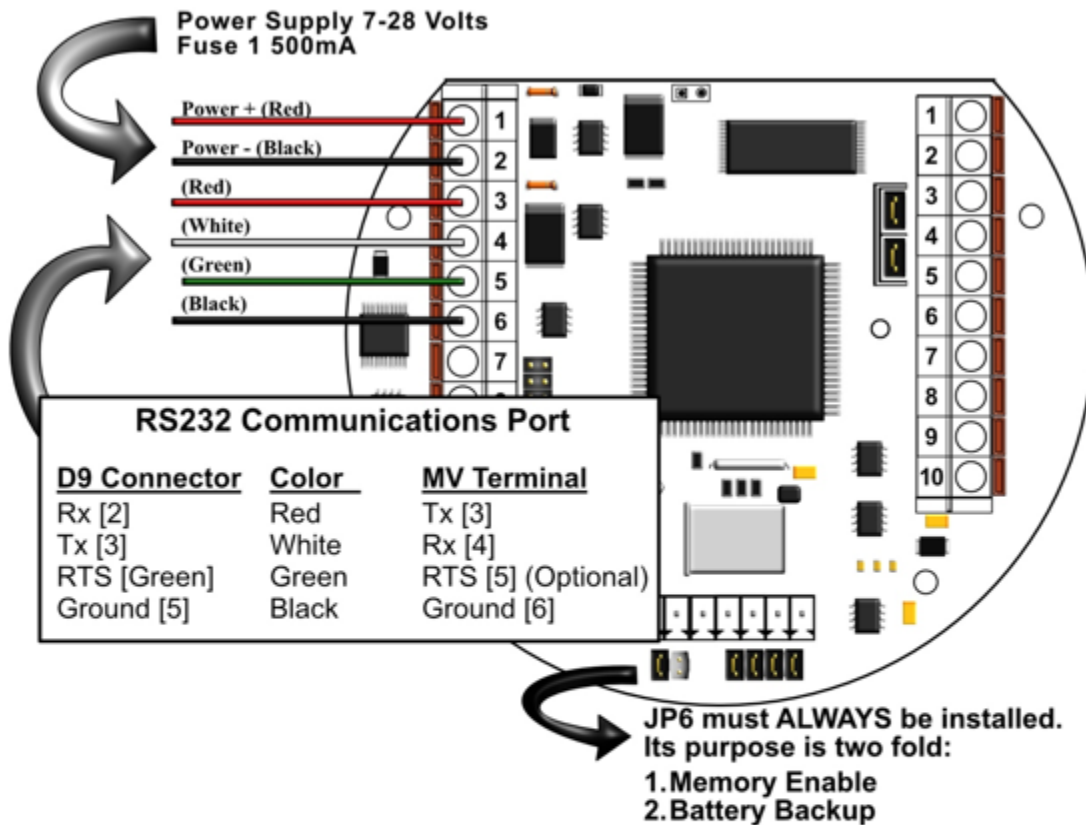
Power Supply 7-28 Volts
Fuse 1 500mA

Power + (Red) — 1
Power - (Black) — 2
(Red) — 3
(White) — 4
(Green) — 5
(Black) — 6
7

1
2
3
4
5
6
7
8
9
10

RS232 Communications Port

D9 Connector	Color	MV Terminal
Rx [2]	Red	Tx [3]
Tx [3]	White	Rx [4]
RTS [Green]	Green	RTS [5] (Optional)
Ground [5]	Black	Ground [6]

JP6 must ALWAYS be installed.
Its purpose is two fold:
1. Memory Enable
2. Battery Backup

MV Step by Step Startup:

1. Connect power supply cable
2. Connect RS-232 Communications
3. Ensure jumper JP6 is installed
4. Energize voltage (24 Volts Recommended)
5. Verify DynacomTM Software
6. Run DynacomTM Software
7. Configure the Micro MV unit
8. Consult the Faultfinding if a problem is incurred

Date: 9/28/2022

Version 1 - MicroMV Board (<u>Older MicroMV Models</u>)

Berg Links and Connections

JP1: Battery Link installed when UPS backup battery installed.

JP4 & JP5: Turbine input type selection.
JP4 - Meter 1
JP5 - Meter 2
Install link for square wave, else input is sign wave input.

P5: Expansion Board Connection

JP7: Must be **Off** and unassigned to ST/SW 4 when using as a serial port

JP6: Must be installed for CPU to run. Memory enable and Battery Backup

JP3: RTD Constant current supply using ADC inputs 3 & 4

JP2: mA or Volts selection. Install link for mAmp input. JP2- Two <u>left</u> jumpers must be **Off** for RTD

P7: Multivariable connection

F1: Fuse 500mA

P9: Future 64 Megabit hard drive.

J4: UPS Battery Connection

P3: Display connector

P10: RS232 Connection

P6: Software and manufacturer debug port

B1: 3 Volt rechargeable battery

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Version 2 - MicroMV Main Board (Micro2009 and Later Model)

Berg Links and Connections

JP1: Battery link installed when UPS backup battery installed.

JP4 &JP5: Turbine Input Type selection.
JP4- Meter 1
JP5- Meter 2
Install link for square wave else input is sign wave input.

P5: Expansion Board Connection

JP3: RTD Constant current supply using ADC inputs 3 & 4

JP2: mA or Volts selection. Install link for mAmp input.
JP2- Two right jumpers must be **Off** for RTD

F1: Fuse 2Amp

P7: Multivariable connection

J4: 2-Day UPS Battery

Memory/CPU Board Connection

F1: Fuse 250mA

P3: Display connector

P10: RS232 Connection

P6: Software and manufacturer debug port

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Version 2 - MicroMV Memory/CPU Board

Berg Links and Connections

JP1: Must be installed
for CPU to run. Memory
enable and Battery Backup.

B1: 3 Volt rechargeable battery

MicroMV Main Board
Connection
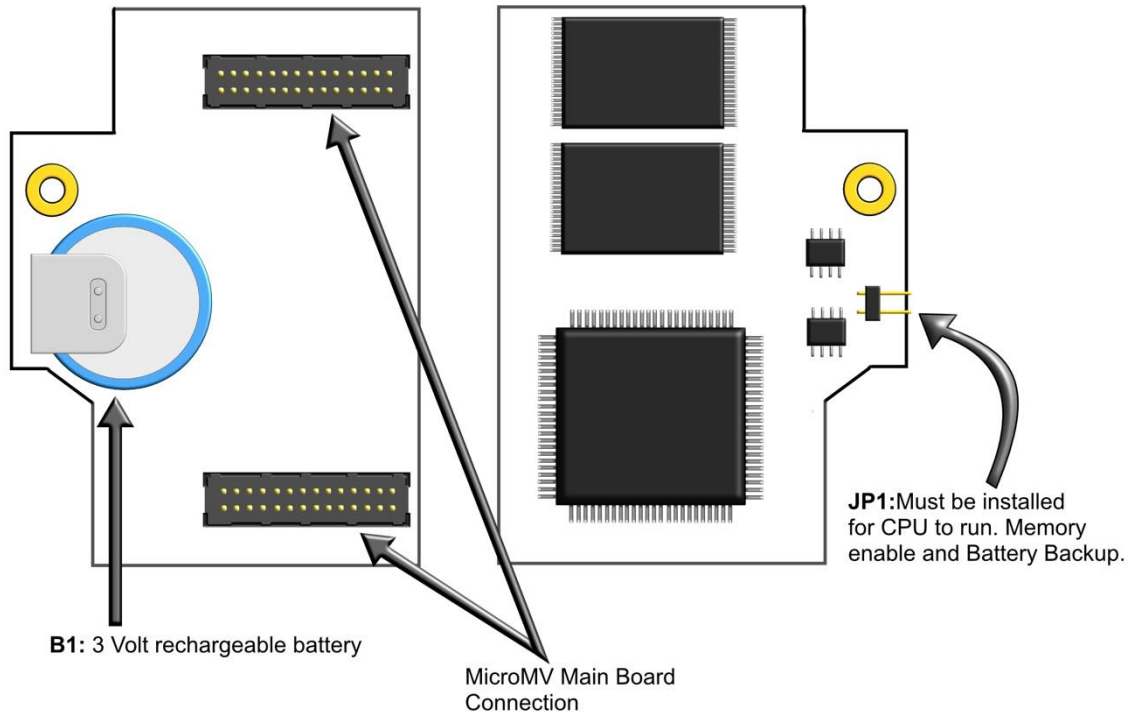
Technical Data

POWER	
VOLTAGE RANGE	7-28 VDC
POWER CONSUMPTION	0.5 WATT
OPERATING CONDITIONS	
TEMPERATURE	- 40 TO 185 °F
HUMIDITY	100%
HOUSING	NEMA 4X CLASS 1 DIV. 1
FEATURES	
DISPLAY	PLASMA 4 LINES 20 CHARACTERS BACKLIT DISPLAY WITH 4 INFRARED REFLECTIVE SENSORS
PROCESSOR	32-BIT MOTOROLA 68332 @ 16.7 MHZ
FLASH ROM	4 MBITS @ 70 NANO SECONDS
RAM	2 MBITS
FREQUENCY INPUT	3 CHANNELS CHANNELS 1 & 2 ARE SINE/SQUARE WAVE CAPABLE CHANNEL 3 IS SQUARE WAVE ONLY SQUARE WAVE RANGE 0 - 6000 HZ SINE WAVE RANGE 0 – 1200 HZ SIGNAL > 40 mV FOR SINE WAVE SIGNAL > 3 VOLTS and < 12 VOLTS FOR SQUARE WAVE (CHANNELS 1 & 2)
ANALOG INPUT	4 INPUTS STANDARD EXPANDABLE UP TO 9 ANALOG INPUTS OR 7 WITH ADDITIONAL 3 WIRE RTD.
MULTIVARIABLE	BUILT-IN ROSEMOUNT MULTIVARIABLE TRANSMITTER WITH DIRECT SPI DIGITAL CONNECTION. MAXIMUM UPDATE SPEED ONCE EVERY 109 MILLISECONDS.
ANALOG OUTPUT	ONE (1) OPTICALLY ISOLATED 16 BITS EXPANDABLE TO FOUR (4)
DIGITAL I/O	4 DIGITAL INPUTS OR OUTPUTS. DIGITAL OUTPUTS HAVE 0.25 AMPS RATING.
SERIAL	2 RS485 @ 9600 BAUDS VARIABLE 1 RS232 @ 9600 BAUDS VARIABLE 1 PRINTER OUTPUT
COMMUNICATION PROTOCOL	MODBUS

Parts List

Spare Parts - Micro MV	
Part #	**Description**
MVC	Micro MV CPU Main Board Only
MVM	Micro MV CPU Memory Board Only
MVD	Micro MV Display Board
MVI	Micro MV Analog In Board
MVO	Micro MV Analog Out Board
MVP	Micro MV Prover Board
MVR	Micro MV Rosemount Board
S6920	Explosion Proof Housing Unit for Micro MV Flow Computer
Adapter A	Adapter for 0205 Rosemount Transmitter (Accommodates Micro MV Flow Computer)
Bracket-MVD	Bracket for Micro MV Display
Bracket-MVC A	Bracket for Micro MV CPU (Without Analog)
Bracket-MVC B	Bracket for Micro MV CPU (With Analog)
MVD Cable	Micro MV Display Ribbon Cable
O-Ring A	O-Ring Gasket for Micro MV Housing
Fuse A	250 mA Fuse
Fuse B	500 mA Fuse
Fuse C	2 Amp Fuse
Battery A	Replacement Battery for Micro MV Flow Computer (Board Mounted)

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Micro MV Flow Computer: Dimensions
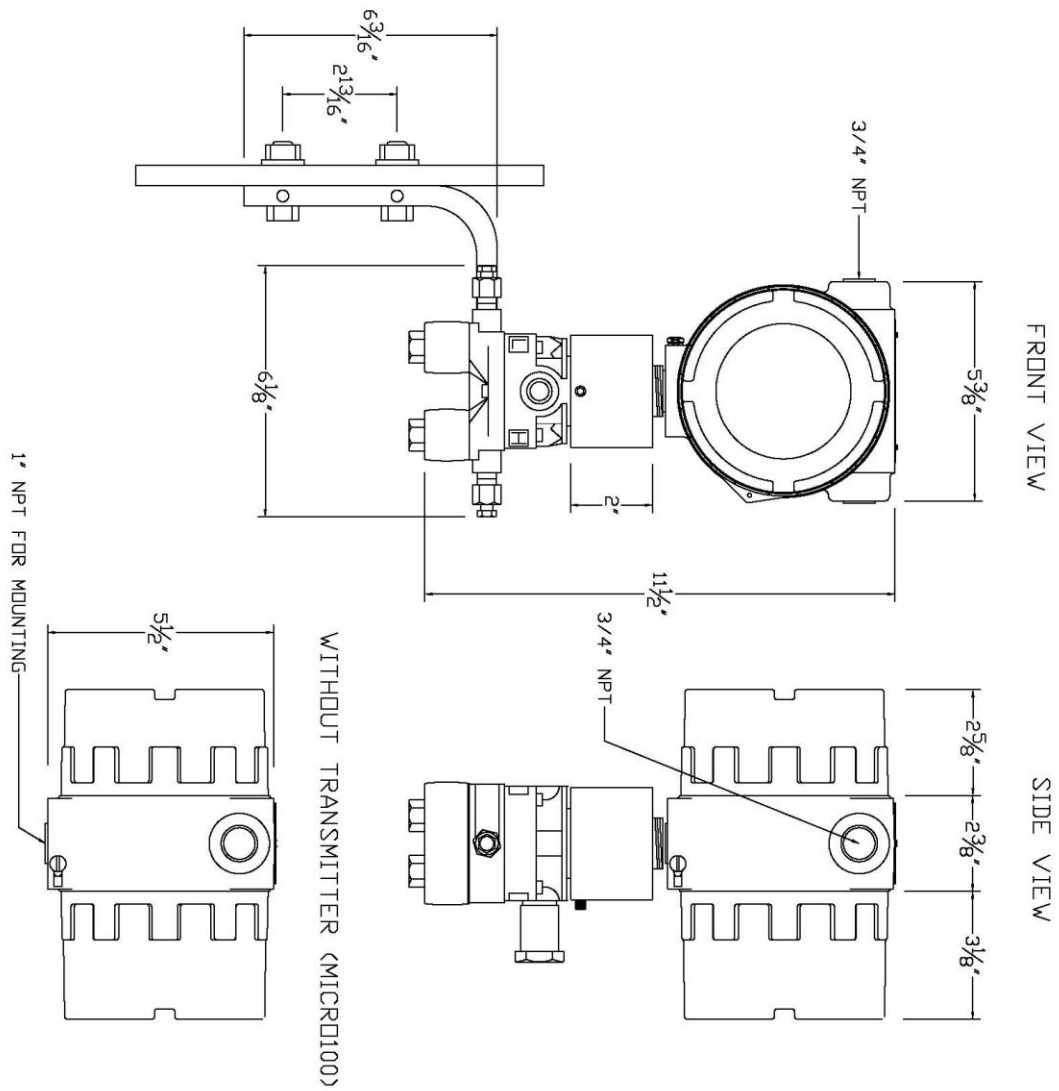
Window Software Minimum Requirements:

Please make sure your computer has the minimum requirements to install Dynamic's Dynacom software.

System Minimum Requirements

In order to install this software product the following requirements must be met:

- Windows Operating System (Win95, Win98, Win98SE, win2000, WinNT, WinXP, Vista, Windows 7, Windows 8, Windows 10)
- For Windows NT, 2000, XP or Vista: Administrator level access to create an ODBC system DNS.
- Minimum disk space available: 16 MB.
- 1 Serial Communication Port

If your computer meets these requirements, you can run the setup file downloaded from our website

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What is a configuration file?

The configuration file is an archive that contains the data used by the flow computer to determine calculation settings (Pipe ID, Flow Equation, Meter ID, etc.) and input/output assignments.

Downloading a configuration file to the flow computer.

- Open the configuration file using the **Configuration File | Open…** option on the main menu or pressing the open button 📂 in the toolbar. Once the file is open the file name will appear on the upper left corner of the window, so you can verify that the desired file was open.

- Connect to the Flow Computer either by using the **Tools | Connect to Device** option on the main menu, the ⌖ Connect to Device button on the vertical toolbar, or by pressing the **[F5]** key on the keyboard. Once you are connected the application it will show an ONLINE status on the lower right corner of the main window. Failure to communicate can occur because of a communication wiring problem, wrong PC port selection, communication parameter mismatch between PC and MicroMV (Modbus type, parity, baud rate, etc.) or lack of power to the MicroMV Flow Computer. To use **"Tools | Com Settings | Auto Detect Settings"** option, the user must insure that **only one MicroMV** computer is connected to the PC. More than one MicroMV Flow Computer in the loop will cause data collisions and unintelligible responses.

- Go to the configure device option either by using the **Tools | Meter Configuration** option, the 📑 Configure Device button on the vertical toolbar, or by pressing the **[F10]** key on the keyboard.

- Because you are connected to a device, a window will appear asking you if you want to read the configuration from the connected meter, Press **NO** since what we want is to write the PC file to the flow computer.

- A configuration window will now appear showing you the information in the configuration file, you can check these values to make sure this is the file you want to send to the flow computer. Once you have checked that the configuration is correct, press the **[Download]** button. A blue bar indicating the progress of the download will appear at the bottom of the application window, after that the information in the configuration file will be in the flow computer.

Note: In case the flow computer is a liquid application, remember to End Batch after the configuration in downloaded for the changes to take effect.

What is an Image File?

An image file is an EPROM code for a certain purpose (liquid, gas, prover, etc.) **The image file is only done when an application upgrade is needed**.

When an image file is downloaded to the flow computer, all the information in the computer is lost (configuration and historical data), so make sure to retrieve all the important information before changing the image file.

How to download an Image File

- Download an image file through **RS232 port** only.

- To Download an Image File to the Flow Computer select the **Tools | Download Program** option form the main menu or press the 🖫⬇ button in the toolbar.

- A small dialog will appear asking for the file name of the image file (Image file have the extension .img). Type it in or use the **Browse** button to locate it.

- Once the file name is in place press **Download**.

- If a retry message of small dialog appears, try to use **"Tools | Com Settings | Auto Detect Settings"** option, the user must insure that **only one MicroMV** computer is connected to the PC. More than one MicroMV Flow Computer in the loop will cause data collisions and unintelligible responses. Failure to communicate can occur because of a communication wiring problem, wrong PC port selection, communication parameter mismatch between PC and MicroMV (Modbus type, parity, baud rate, etc.) or lack of power to the MicroMV Flow Computer. After the device is detected, then you can follow steps described above.

Warning messages will remind you that this action will erase **ALL** the information in the flow computer.

The download task will take about 7 minutes to be completed. Once the image file is in place, the flow computer is ready to be configured (enter calculation parameters and I/O assignments).

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How to force a board into download mode

First, try to recycle the power and reload the image if the error message is displayed while downloading a new image file. Download an image file only through **RS-232 port**. MicroMS4 Windows Software version 2.1 or higher is required. Contact technical support for old boards loaded with downloader v1.
Forcing download mode could be required if a wrong type of application image was loaded or other issues. Call our main office for more information
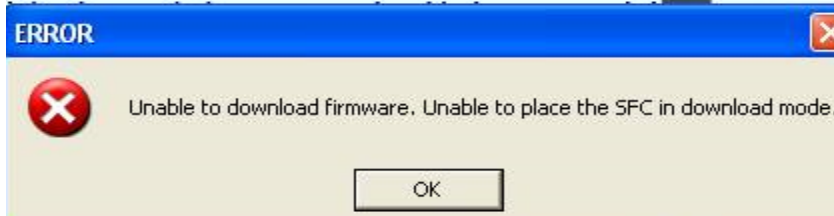
Steps to force the board into download mode.
(1) Remove Power
(2) Put a jumper on P6 as shown below.
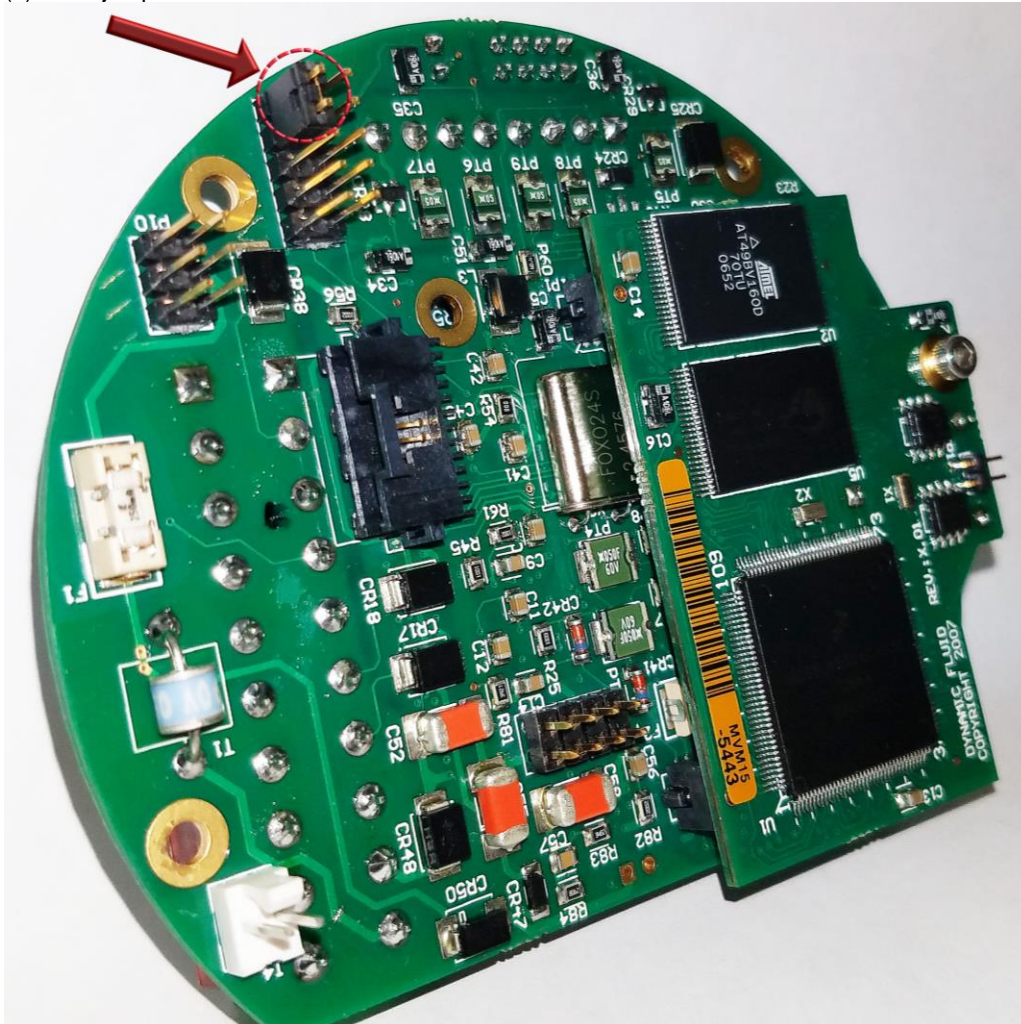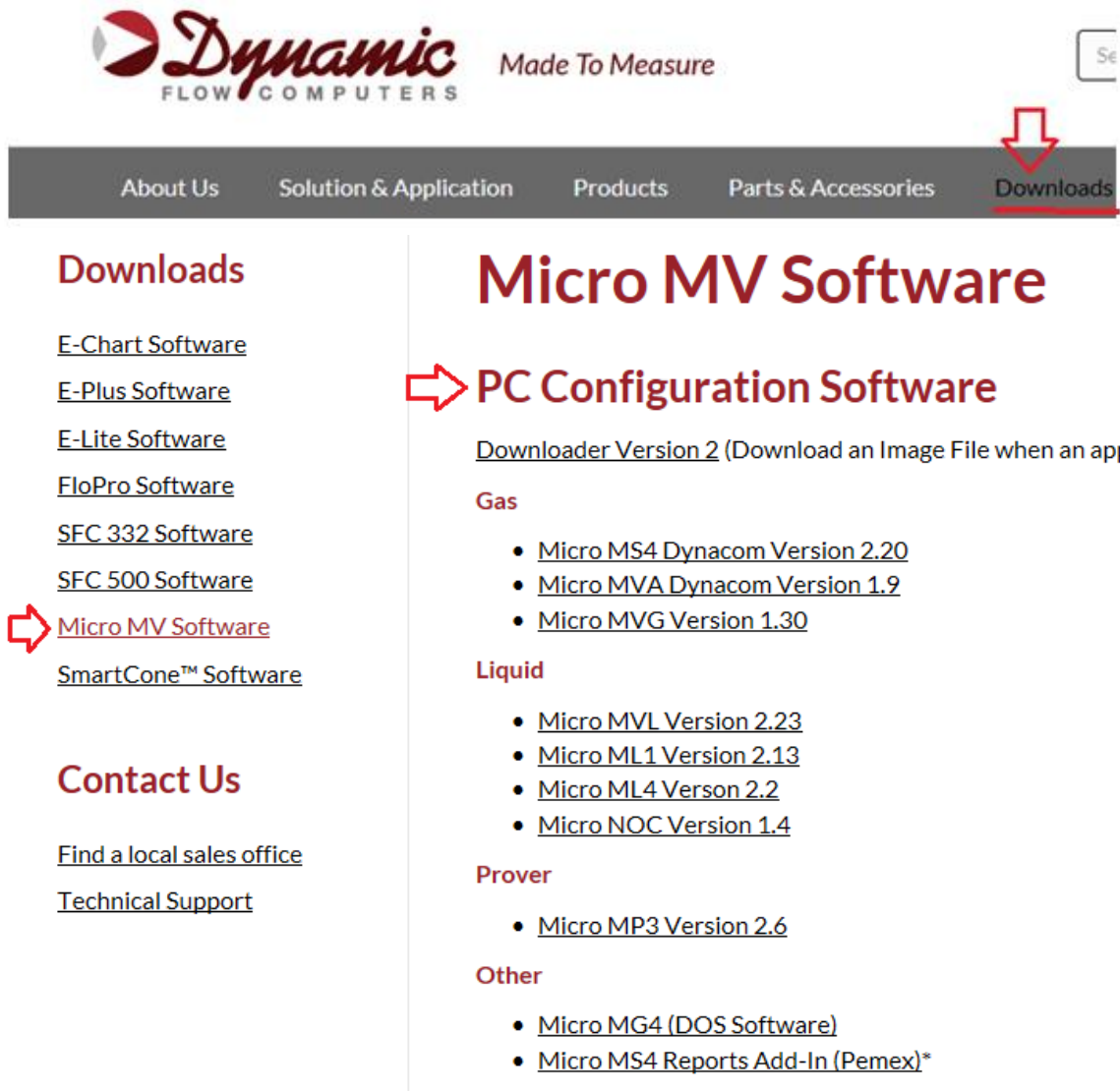
(3) Power up the board
(4) Board is in download mode
(5) Download image
(6) Remove power and jumper on P6 after a new image is loaded
(7) Board is ready

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Website - DFC Configuration Software

Step 1. Go to our website WWW.DYNAMICFLOWCOMPUTERS.COM

Step 2. Click on the "**Downloads**"

Step 3. Select application software based on Step 2.

Step 4. On the new screen presented to you click on the application that you are trying to download. Once you hit the link it will ask you if you want to run or save the file in your computer. Select **SAVE.** (See illustration 1)
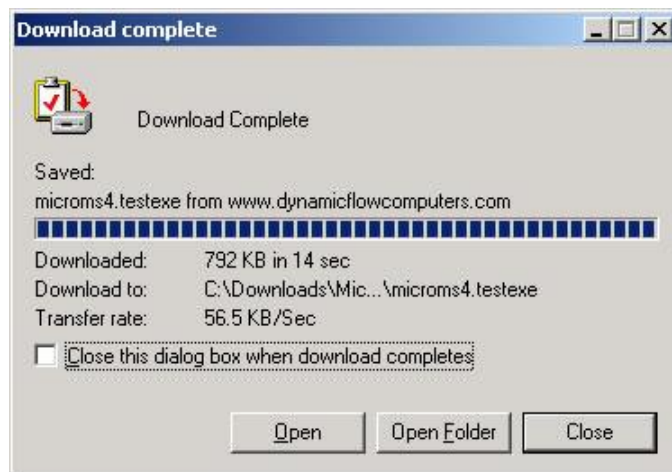
Step 5. The file will start to transfer to your computer. The download time depends on your Internet connection speed and the type of application that being downloaded.

Step 6. When the download if finish. Press the **OPEN** button to start the setup process. (See Illustration)

Step 7. Follow the steps in the application setup.

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Website – Image File (Firmware)

Check the version number of image file. **The image file is only done when an application upgrade is needed**.

Step 1. Go to our website WWW.DYNAMICFLOWCOMPUTERS.COM

Step 2. Click on the "**Downloads**"

Step 3. On the new screen presented to you click on the application firmware that you are trying to download. Once you hit the link it will ask you the location and file name to be saved.

Step 4. The file will start to transfer to your computer. The download time depends on your Internet connection speed and the type of application that being downloaded.

Step 5. After the download is finished, follow the steps in the image downloading setup.

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Getting acquainted with the flow computer wiring:

Back Terminal Wiring

The back terminal wiring indicates the overall positions of the terminal plugs and their functions. Though the back panel's jumpers are also shown, refer to the next drawing, "Back Panel Jumpers", for information on their settings and functions.

The MicroMV receives its power via the .top two pins on Terminal P1, on the left of the board. Also on Terminal P1 from top to bottom are inputs to the four serial connections

To the right (P4), from top to bottom, are two turbine inputs, density frequency input, and switch/status inputs and output.

Terminal P3, at the lower bottom, handles analog inputs/RTD and analog output.

VERSION 2 - MICROMV MAIN/MEMORY BOARDS (MICRO2009 AND LATER MODEL)
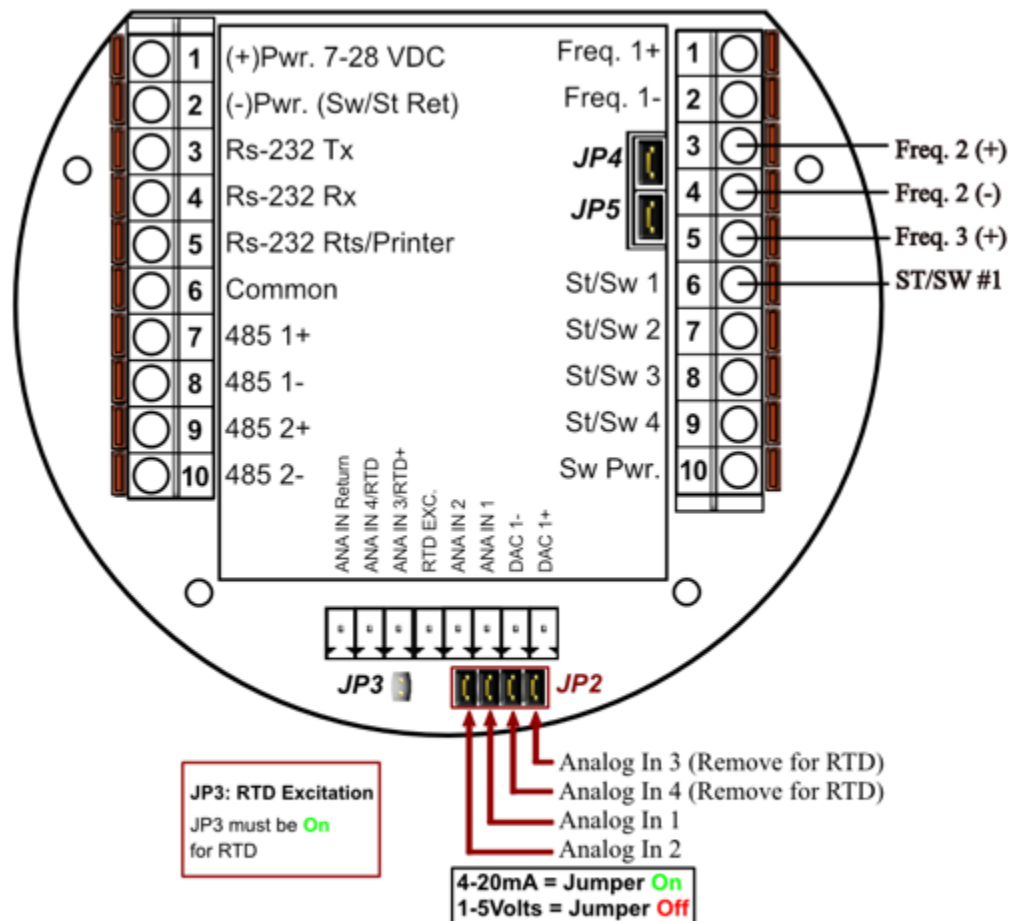
JP4: When ON Meter 1 Uses Square Wave. When OFF Meter 1 Uses Sine Wave
JP5: When ON Meter 2 Uses Square Wave. When OFF Meter 2 Uses Sine Wave

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VERSION 1 - MICROMV BOARD (OLDER MICROMV MODELS)

Back Panel
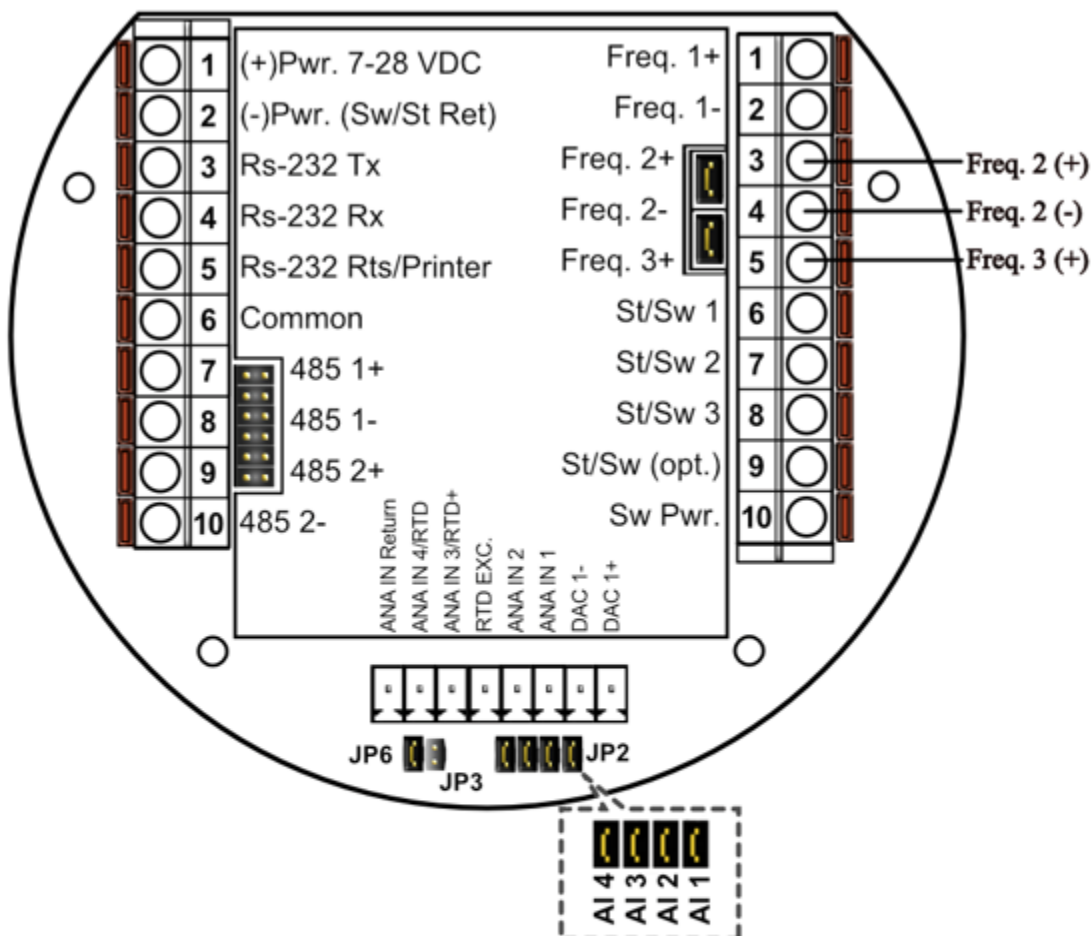
JP2: Must be installed for 4-20mA inputs. When removed, the
analog input is used as 1 to 2.5 Volts Input. JP2 consists of
4 links, each link corresponds to one analog input.

JP3: Is RTD Excitation and should never be installed when Analog 3 & 4
are used as Analog inputs (See RTD Connection for details).

JP4: When ON, Meter 1 Uses Square wave.When OFF, Meter 1 Uses Sine wave

JP5: When ON, Meter 2 Uses Square Wave. When OFF, Meter 2 Uses Sine Wave

JP6: Always installed. It can be removed after power is removed
to clear RAM memory.

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INPUT/OUTPUT: Assigning and Ranging Inputs

Input/Output Assignment

We will now configure your MicroML4/Micro100 Flow Computer's inputs and outputs. The flow computer allows the user to configure the inputs and outputs. (I.e. Analog #1 is pressure for Meter #1). The flow computer does not use unassigned inputs.

How to assign a transmitter to an I/O point:

1   Click "Configure Device", configuration menu is prompted

2   On configuration menu, click "Meter Data | Input Position"

3   Enter assignments for DP, temperature, pressure, density and BS&W inputs.

4   **Assignment (1-***n***).** Assignments 1-4 are analog inputs attached to terminal of the back panel. These inputs accept 4-20mA or 1-5 volts are suitable for temperature, pressure, density, or spare inputs. An assignment 5 is strictly RTD (temperature) input only for the meter, densitometer or spare. Assignment 7 indicates a density frequency input; it is assigned automatically once you choose live density frequency input in the setup menu at density type Assignment 10 (module 1) is for Rosemount multi-variable module only. DP, pressure, and temperature for the meter can be assigned. When a frequency type primary element is hooked to the flow computer, the Multi Variable pressure and temperature can be used and the DP becomes a spare input that could be assigned for strainer differential.

Ranging the Transmitter Inputs:

1. **Enter the range values for analog inputs**: after assigning the analog inputs, click "Inputs/Outputs | Analog Inputs" to scale the 4-20mA. Enter the value at **@4mA** and **@20mA**. Enter both values similar to the way the transmitter is ranged. 1-5 volts are equivalent to 4-20mA. Enter the 1 Volt value at the 4mA, and 5 Volt value at 20mA. When the Multi Variable is used the 4-20 ma scale has no effect on anything and does not need to be configured for that input. The reason is simply that the flow computer gets the data via digital communication from the transmitter in engineering units, and therefore a scale is not needed. Normal **pressure range is 0-3626, temperature –40 to 1200, DP –250 to 250, or -830 to 830 inches of wate**r.

2. **Enter the high and low limits**: high limits and low limits are simply the alarm points in which you would like the flow computer to flag as an alarm condition. Enter these values with respect to the upper and lower range conditions. Try to avoid creating alarm log when conditions are normal. For example: If the line condition for the pressure is between 0 to 500 PSIG. Then you should program less than zero for low-pressure alarm, and 500 or more for high-pressure alarm.

3. **Set up the fail code: Maintenance** and **Failure Code** values tell the flow computer to use a default value in the event the transmitter fails. The default value is stored in **Maintenance**. There are three outcomes: the transmitter value is always used, no matter what (**Failure Code** = 0); the **Maintenance** value is always used, no matter what (**Failure Code** = 1); and the **Maintenance** value is used only when the transmitter's value indicates that the transmitter has temporarily failed (**Failure Code** = 2).

RTD inputs will skip 4-20 mA assignment because RTD is a raw signal of 50Ω (ohms) to 156Ω. Readings beyond that range require a 4-20 mA signal to the flow computer or using the built in Rosemount Multi Variable transmitter. The Rosemount Multivariable has a range of –40-1200 degrees Fahrenheit. Density coefficients for raw frequency inputs are programmed in this menu. The menu will only show parameters relevant to the live density selected (i.e., Solartron or UGC, etc.).

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WIRING:

Wiring to the flow computer is very straightforward and simple. But still it is very important to get familiar with the wiring diagram.

Wiring of Analog Inputs: Version 2 Board

MicroMV Main/Memory Boards (Micro2009 and Later Model)

Typical wiring for analog inputs 2 and 1 are shown in the drawing. Analog inputs 4 and 3 are to the left of analog 2 and 1 separated by the RTD excitation. Note that the analog input has only one common return that is the -Ve signal of power supply powering the transmitters.

When wiring **1-5 volts**, **make sure to calibrate** the flow computer for the 1-5 volt signal because the flow computer calibration defaults for the 4-20 ma, which is different from the 1-5 volts. JP2 must be removed for 1-5 volt inputs. Signal line impedance provided by our flow computer is 250Ω.

Analog Input Wiring
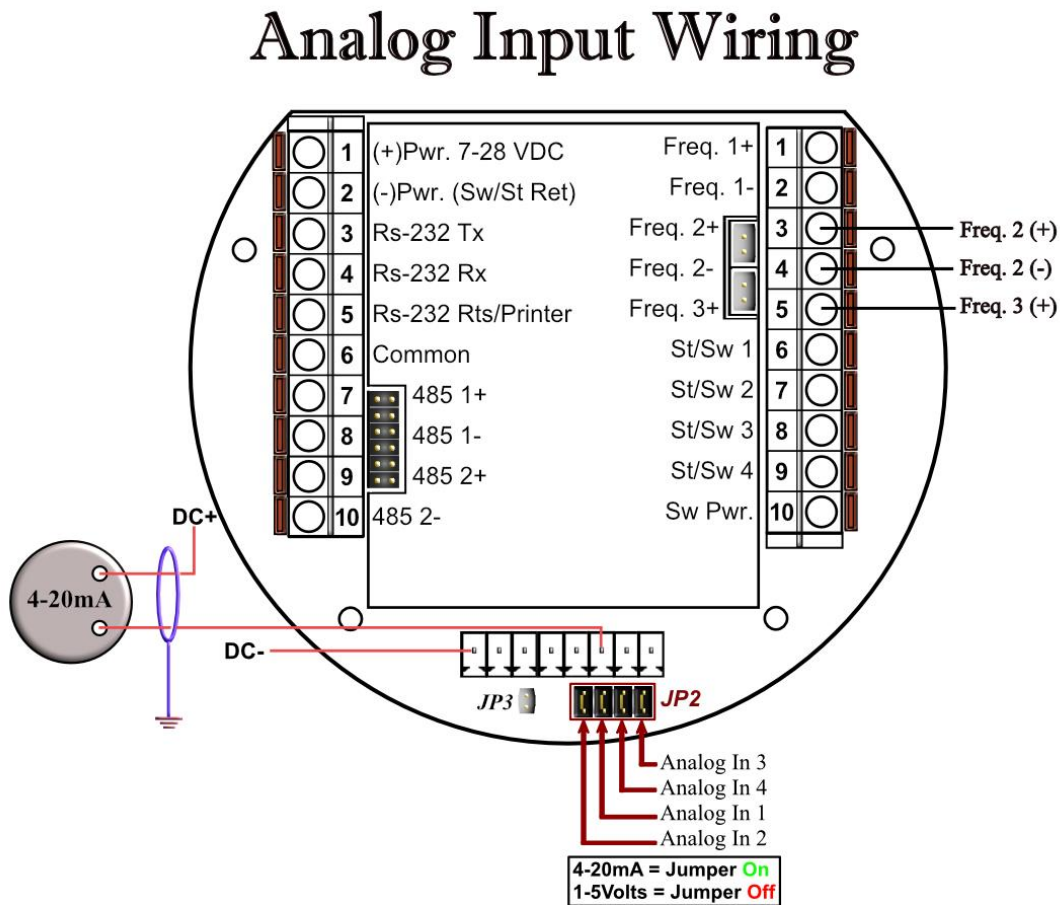
Wiring of Analog Inputs: Version 1 Board

MicroMV Board (Older MicroMV Models)

Typical wiring for analog inputs 1 and 2 are shown in the drawing. Analog inputs 3 and 4 are to the left of analog 1 and 2 separated by the RTD excitation. Note that the analog input has only one common return that is the -Ve signal of power supply powering the transmitters.

When wiring **1-5 volts**, **make sure to calibrate** the flow computer for the 1-5 volt signal because the flow computer calibration defaults for the 4-20 ma, which is different from the 1-5 volts. JP2 must be removed for 1-.5 volt inputs. Signal line impedance provided by our flow computer is 250Ω.

Analog Inputs are loop powered. They require their own power supply. The same CPU power supply can be used if it is filtered.

JP2: Must be installed for 4-20mA Inputs. When removed, the analog input is used as 1 to .5 Volts Input. JP2 consists of 4 links, each link corresponds to one analog input. (See JP2 Detail)

JP3: Is RTD Excitation & should never be installed when Analog 3 & 4 are used as Analog Inputs.

NOTE: The 4-20mA or 1-5 volt DOES NOT source power to the transmitters. You can use the DC power feeding the flow computer to power the 4-20mA loops IF that power supply is FILTERED.

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Wiring of RTD

100Ω platinum **must** be used; a temperature range of -43°F to +300°F can be measured. RTD is to the left of analog in 1&2. The RTD excitation jumper (JP3) has to be installed for the RTD to function. In the figure below, notice that the RTD requires a three wire connections. Internal excitation current source generated is in the micro AMP range.

Wiring RTD Directly Into CPU Board

MicroMV 2009 & Later Model

Older MicroMV Models
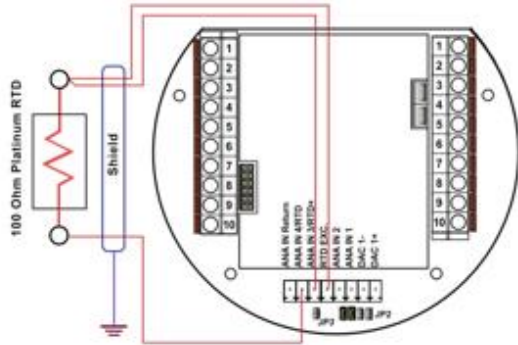
Jumper Settings:
JP3- Must be On
JP2- Two right jumpers must be Off
For 4-wire RTD, tie the two return wires together and wire as 3-wire RTD
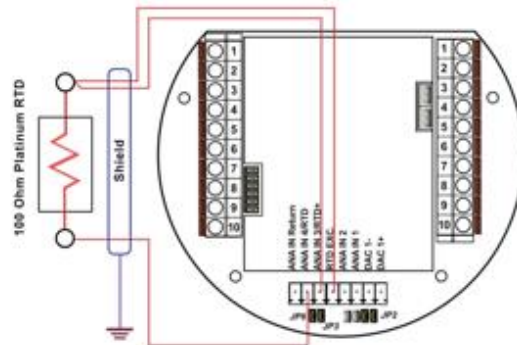
Jumper Settings:
JP3- Must be On
JP2- Two left jumpers must be Off
For 4-wire RTD, tie the two return wires together and wire as 3-wire RTD

Wiring RTD Into Rosemount Multivariable
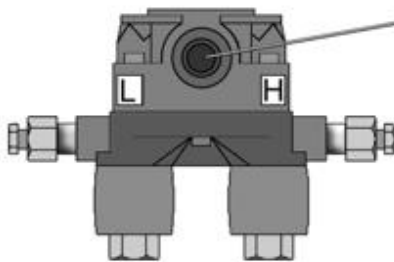
Plug the custom RTD plug into the RTD port located on the front of the multivariable sensor.

To use your own RTD instead of Rosemount's armored assembly, you can order the custom plug with wire ends.

Date: 9/28/2022

Rosemount RTD Connection

RTD Connection Detail

Guide Post
RTD White 1
RTD Red 2
RTD Red 1
RTD White 2
Guide Post

Wiring RTD Into Rosemount Multivariable

Plug the custom RTD plug into the RTD port located on the front of the multivariable sensor.

To use your own RTD instead of Rosemount's armored assembly, you can order the custom plug with wire ends.

Date: 9/28/2022
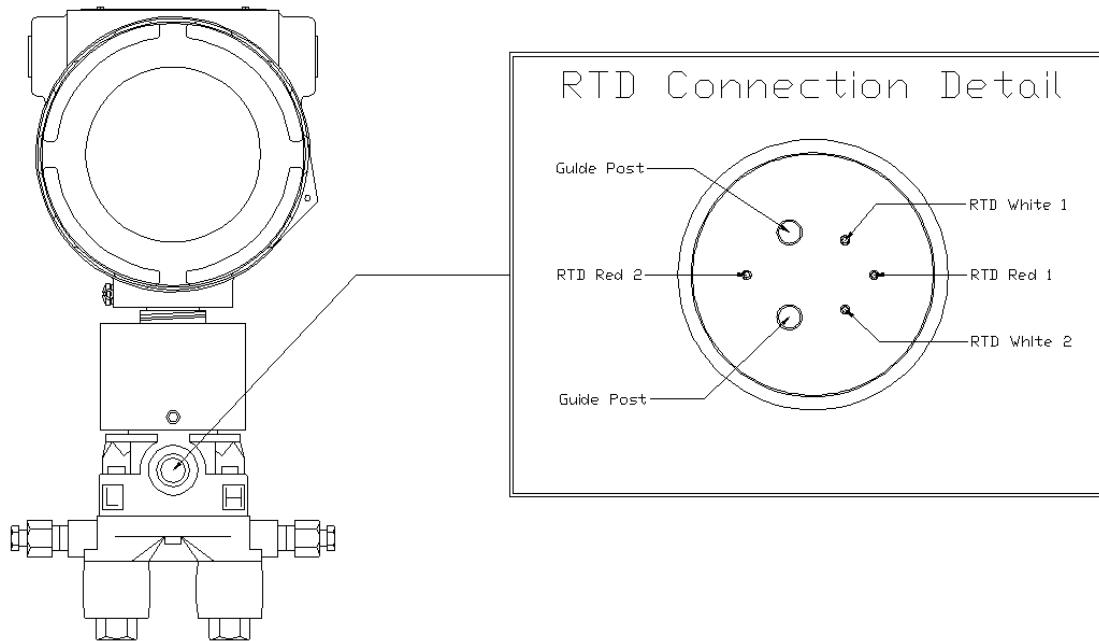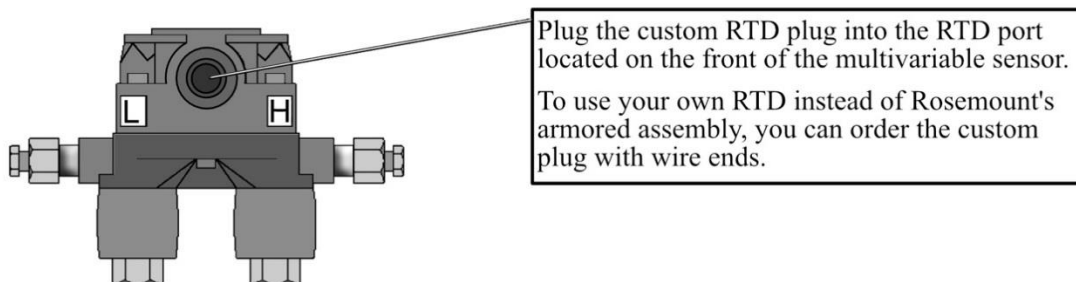
Wiring of Analog Output:

Wiring diagram shows typical Analog output wiring. Notice that analog outputs will regulate 4-20 mA current loops but **DOES NOT** source the power for it. **External power is required**. Expansion board is required for addition three analog outputs.

Analog Output Wiring

1	(+)Pwr. 7-28 VDC	Freq. 1+	1
2	(-)Pwr. (Sw/St Ret)	Freq. 1-	2
3	Rs-232 Tx	Freq. 2+	3
4	Rs-232 Rx	Freq. 2-	4
5	Rs-232 Rts/Printer	Freq. 3+	5
6	Common	St/Sw 1	6
7	485 1+	St/Sw 2	7
8	485 1-	St/Sw 3	8
9	485 2+	St/Sw 4	9
10	485 2-	Sw Pwr.	10

ANA IN Return ANA IN 4/RTD ANA IN 3/RTD+ RTD EXC. ANA IN 2 ANA IN 1 DAC 1- DAC 1+

JP3   JP2

Load

-VE   24 VDC   +VE

Power
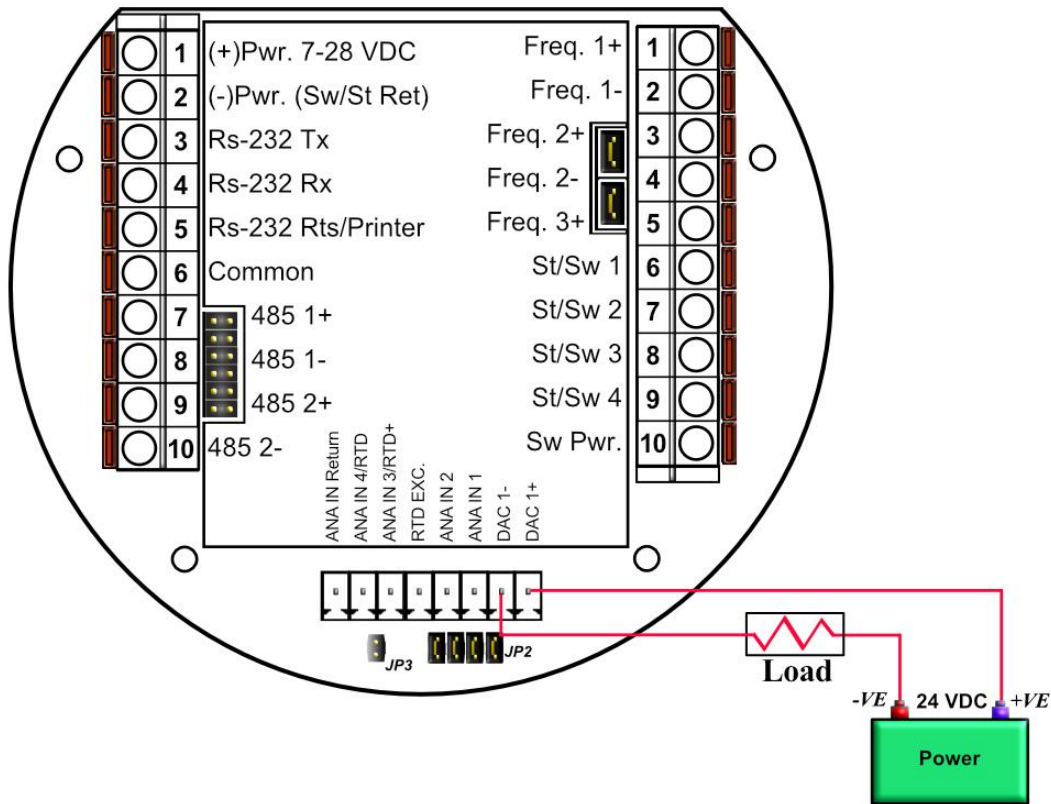
Assigning/Ranging the 4-20mA Analog Outputs:

Go to the **configuration** main menu and click **Analog Output Assignment**. A selection menu is prompted. Select the analog output number, and then enter what the 4 mA output will indicate and the 20 mA. Make sure that the 20 mA assignment value exceeds the upper range limit of what you assigned the Analog output for, otherwise the analog output will not update beyond 20 mA.

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Additional Analog Inputs or Analog Outputs – Board Installation

Connecting Additional Analog Board
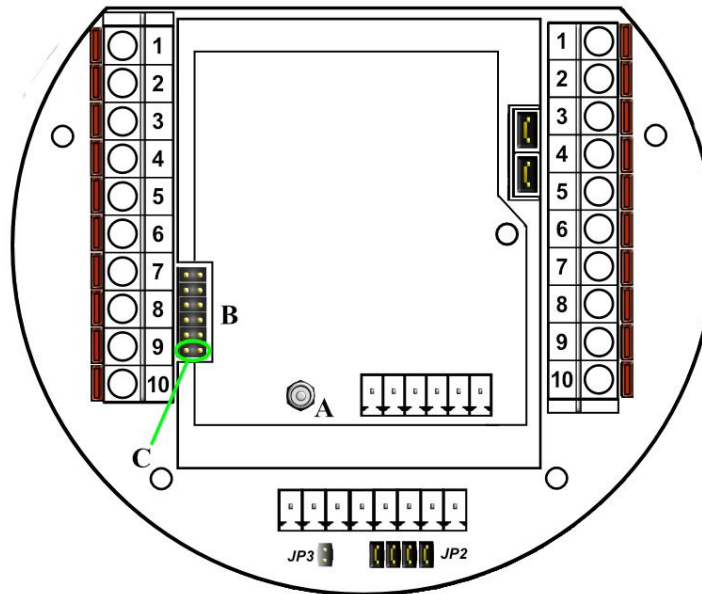
Components Needed:
- Extra Analog Board
- 1/4" Stand-off (**Figure D**)
- 1/4 Nut Screwdriver
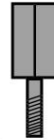
Figure D

Procedure:
1. Remove power from the Main board.
2. Remove nut from the Main Board (See **A**) and Install 1/4" Stand Off in its place.
3. Plug Analog board to the Main Board (Using Connector **B**)
4. Note that the Analog board connector has 10 pins while the Main board connector has 12 pins. The bottom two are <u>NOT</u> connected [See **C**].
5. Place the nut removed on step 2 on the stand-off (**A**) to secure analog board.
6. For wiring of extra Analogs, refer to specific drawing.(Analog Input/Analog Output).

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Additional Analog Outputs

Addition analog output board is required to have additional 3 analog outputs.

Back Panel w/ Extra Analog Out Board

*Additional Analog outputs are loop powered.
*There is no need of jumper setting to use extra I/O.
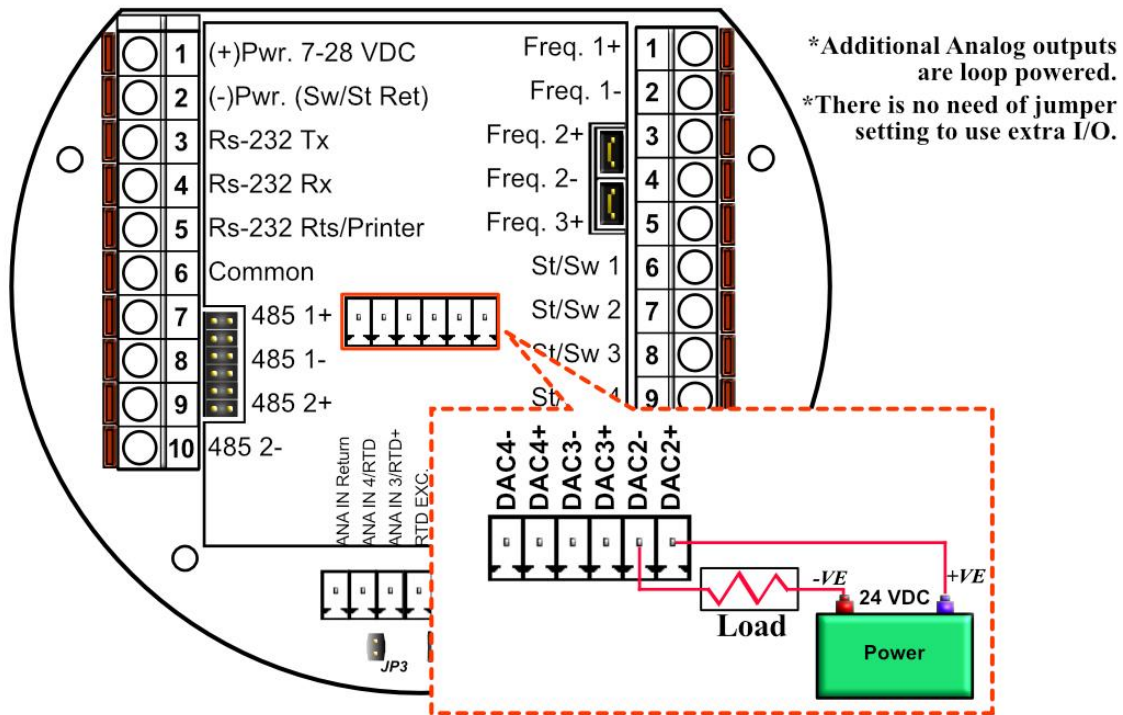
Back Panel - Additional Analog Intputs

Addition analog input board is required to have additional 5 analog inputs.

Back Panel w/ Extra Analog Input Board
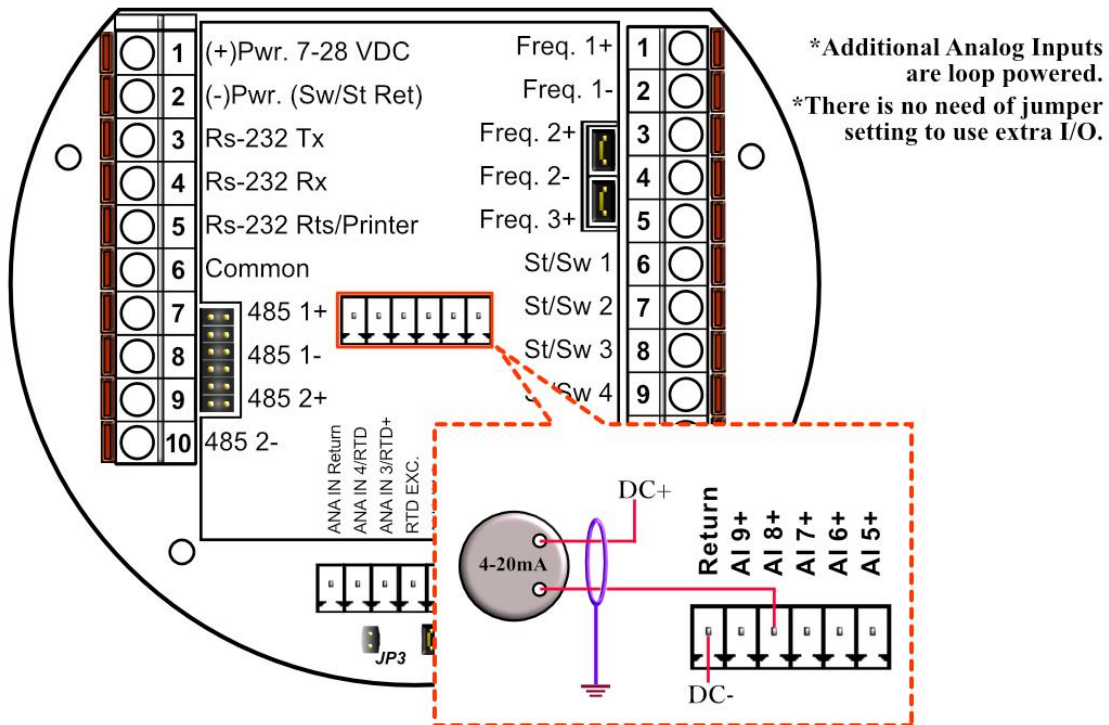
Turbine Input Wiring

Go to **view** main menu, click **turbine** under **Wiring Drawings**. Two drawings above each other will show typical wiring for turbine meter 1 and turbine meter 2. When dual pickups from the same turbine are connected, use the inputs for turbine 1 for pickup 1 and turbine 2 for the second pickup coil. When connecting sine wave directly from the pickup coil make sure the distance from the pickup coil to the flow computer is very short–less than 50 feet with shielded cable. In the event there is presence of noise, the distance must be shortened. When connecting sine wave signal, the JP4 jumper for meter 1 must not be installed and JP5 jumper for meter 2 must not be installed. (*JP4 and JP5 must be off when using sine wave*). On the other hand, when using square wave, the square wave signal can be sinusoidal but has to be above 5 volts peak to peak with less than 0.4 volts offset in order for the flow computer to read it. The JP4 jumper for meter 1 must be installed and JP5 jumper for meter 2 must be installed.
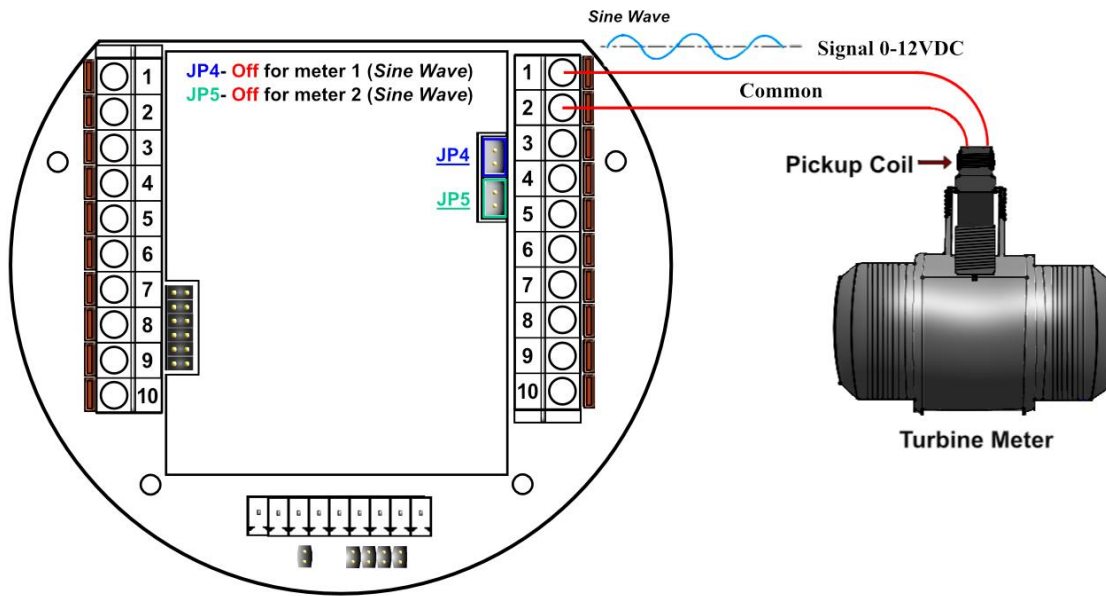
| **Note**: | When connecting square wave input, the JP4 and JP5 connect the turbine return to the flow computer power return. Therefore, signal polarity is very important. Reverse polarity could result in some **damage or power loss**. When sine wave is used the signal polarity is usually of no significance. |

The turbine input is on the top of terminal P3 The third pin down from the top is Turbine/PD input 2 plus and below it is Turbine 2 minus. The third frequency input (fifth pin down) has the positive input and the negative is the power input ground. If a different power supply is used to power the densitometer then the power return for that input needs to be connected to the Micro MV power ground.

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Turbine Input Wiring

For square wave, the voltage is 5 to 12 VDC. Do not exceed 12 VDC
(Terminal 1-Frequency#1 input+ and Terminal 3-Frequency#2 input+).

Using Daniel 1818 Preamp
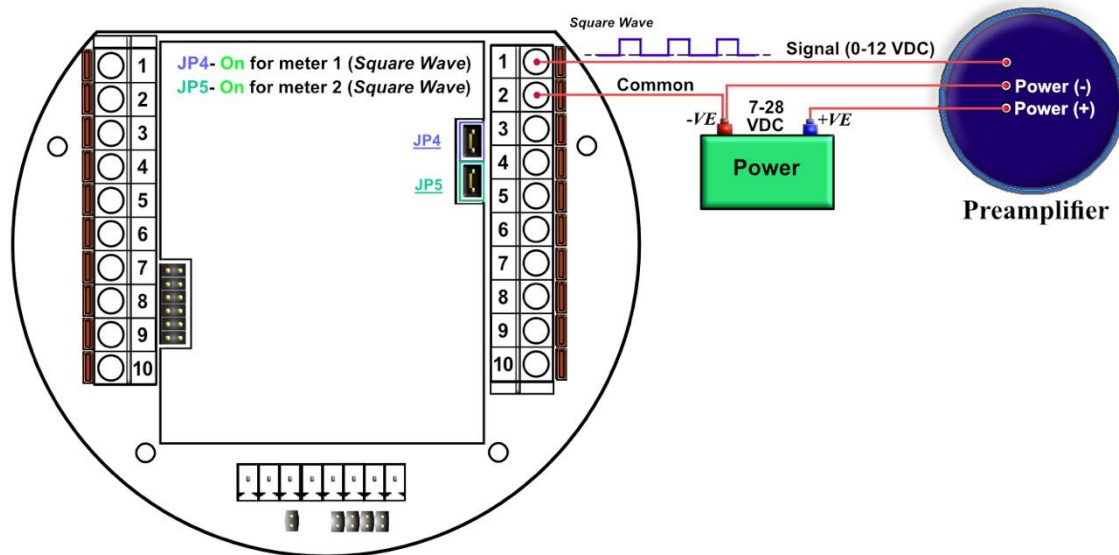
Turbine Input Wiring – Using Daniel 1817 Preamp
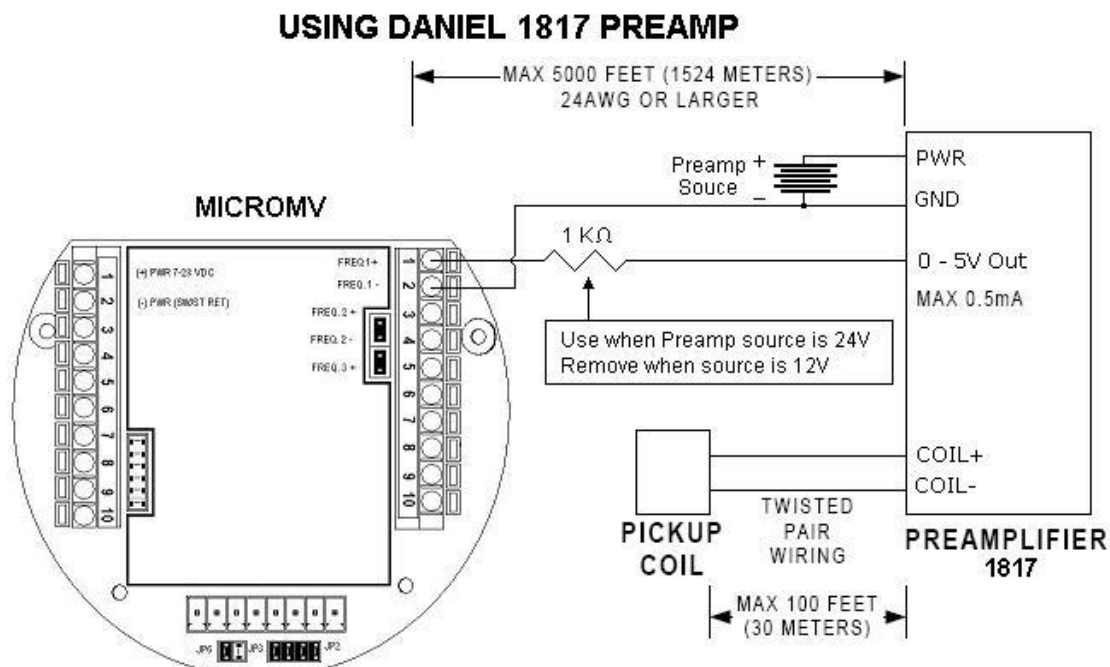
RS-232 Connection:

The RS-232 is located on the left terminal block. The third, fourth, fifth, and sixth pins of the RS232 below the power input.

Note: Twisted shielded cable is required.

RS-232

When Using Modem:
- Jumper
- DTR to DSR
- RTS to CTS
- Disable software handshakes
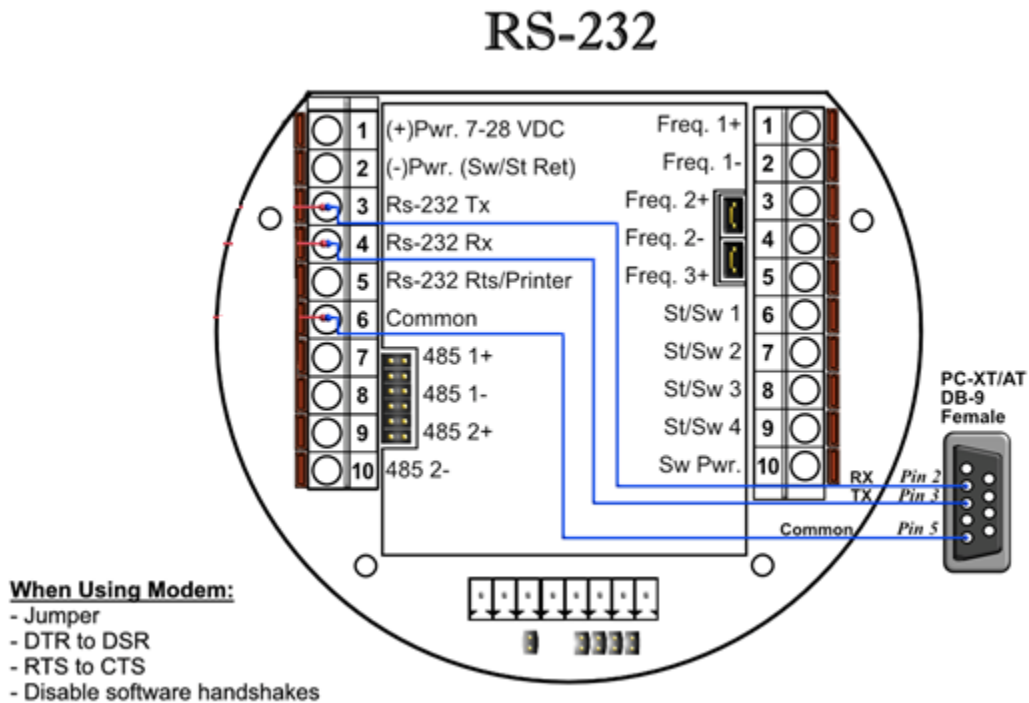
WARNING: When the RS-232 terminal is used with a modem, external protection on the phone line is required. Jumper DTR to DSR, RTS to CTS, and disable software handshake on the modem RS232 connection

RS-485 Connection

RS-485 wiring is shown in the wiring diagram under **RS-485**. Two Rs485 channels are available for Modbus communication. The second 485 channel is also available as a master to other slave devices. I.e. gas G.C., external Modbus slave devices and token passing ring. The maximum distance when 18-gauge wire is used is 4000 feet.

> *Note: Twisted shielded cable is required.*
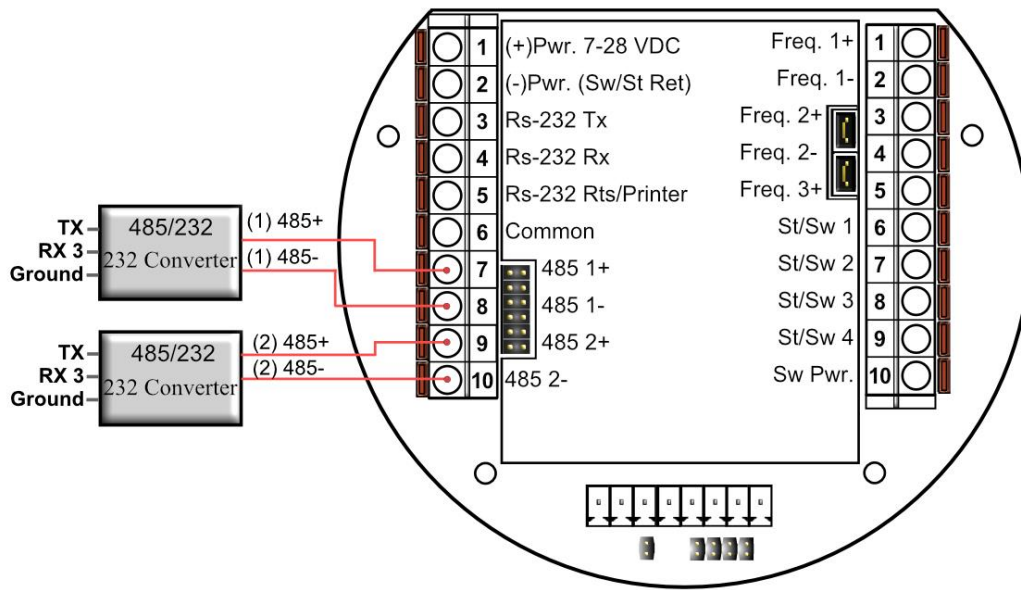
> *WARNING: When the RS-485 terminal is used, external transient protection and optical isolation is required, especially for long distance wiring.*

RS485/232 Adapter

Dynamic recommends B&B Electronics. We generally use Model 485D9TB, which is a port power converter requiring only a 2-Wire connection. The 485D9TB has a terminal block which makes the wiring more convenient and provides the option of external 12V power for low power serial ports. Model 485SD9R can also be used, but it has a DB9 terminal which requires additional cables. With Model 485SD9R the pins that connect to the flow computer are pin 3 on the DB9 to TX on the flow computer and pin 8 on the DB9 goes to RX on the flow computer. For a USB to RS485 converter, we recommend Model USTL4 which is also port powered and supports half and full duplex networks.

*Note

Version 1: MicroMV Board (Older MicroMV Models)

       The second RS485 gets disabled if ST/SW#4 is used. They cannot be used at same time.

       To use ST/SW#4 as a serial port, JP7 must be OFF and no assignment for ST/SW#4, otherwise serial port#3(Second 485 Port) gets burned if voltage is applied.

Version 2: Main/Mem MicroMV Boards (Micro2009 and Later Model)

       ST/SW#4 and the second RS485 can be used be used at same time.

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Wiring of Status Inputs:

There are 4 digital inputs or outputs that are user configurable. The configuration software will configure the input to be a status input or a switch output.. The standard status input has 4 volts of noise hysteresis, with on trigger point of 5 volts and an off point of 1 Volt.
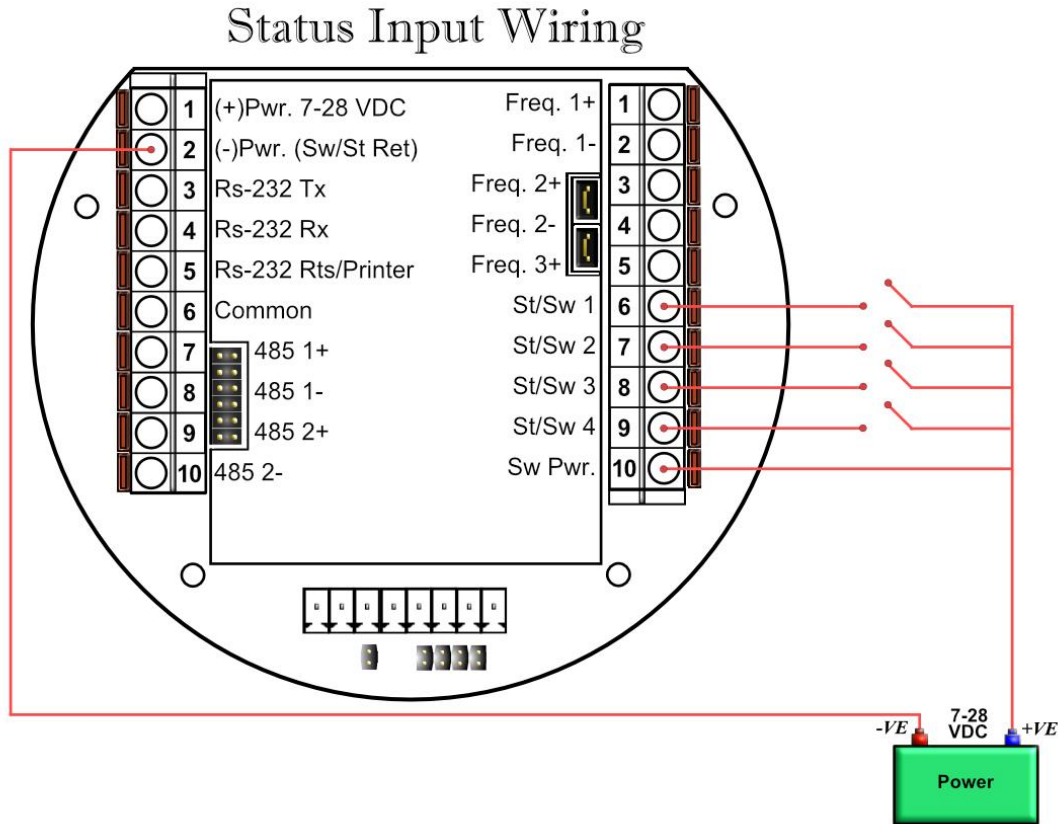
Status Input Wiring

1	(+)Pwr. 7-28 VDC	Freq. 1+ 1
2	(-)Pwr. (Sw/St Ret)	Freq. 1- 2
3	Rs-232 Tx	Freq. 2+ 3
4	Rs-232 Rx	Freq. 2- 4
5	Rs-232 Rts/Printer	Freq. 3+ 5
6	Common	St/Sw 1 6
7	485 1+	St/Sw 2 7
8	485 1-	St/Sw 3 8
9	485 2+	St/Sw 4 9
10	485 2-	Sw Pwr. 10

-VE 7-28 VDC +VE

Power

*Note
Version 1: MicroMV Board (Older MicroMV Models)
       The fourth digital I/O is optional and can only be use if the 2nd RS485 is not used.
       The second RS485 gets disabled if ST/SW#4 is used. They cannot be used at same time.
       To use Status 4 JP7 Must be ON otherwise OFF

Version 2: Main/Mem MicroMV Boards (Micro2009 and Later Model)
       ST/SW#4 and the second RS485 can be used be used at same time.

Date: 9/28/2022

Wiring of Switch/Pulse Outputs:

Switch one and two can be on /off or pulse type output up to 125 pulse per second. Notice that the switch outputs are transistor type outputs (open collector type with maximum DC rating of 350 mA continuous at 24 VDC) connections		
1	Status Input /switch output 1	Switch - Maximum rating: 350mA @24 volts
2	Status Input /switch output 2	Switch Output Range: 7-28 VDC
3	Status Input /switch output 3	Status Input Rating: 7-28 VDC
4	Status input /switch output 4	

Switch Output
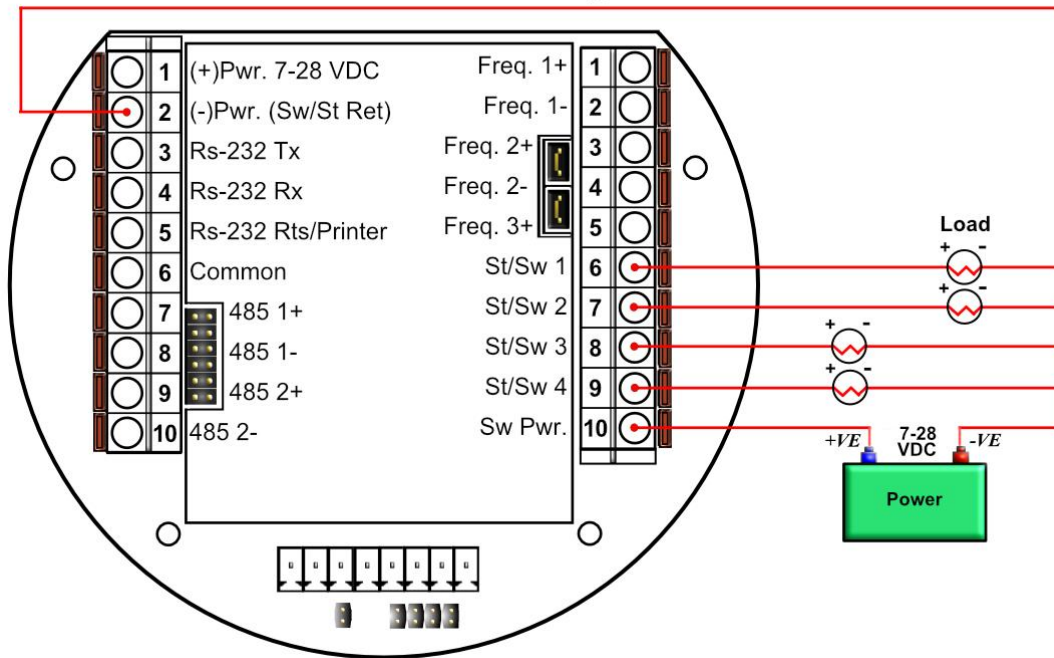
*Note

Version 1: MicroMV Board (Older MicroMV Models)
   The fourth digital I/O is optional and can only be use if the 2nd RS485 is not used.
   When using ST/SW#4, the second RS485 gets disabled. They cannot be used at same time.

Version 2: Main/Mem MicroMV Boards ((Micro2009 and Later Model)
   ST/SW#4 and the second RS485 can be used be used at same time.

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Switch Output to Relay Wiring Diagram

When wiring the Switch Outputs to an inductive load such as a relay, it is better to add transient protection to the flow computer's electronics due to the surge in voltage that inductive loads may create. This protection can be added as shown in the drawing below.
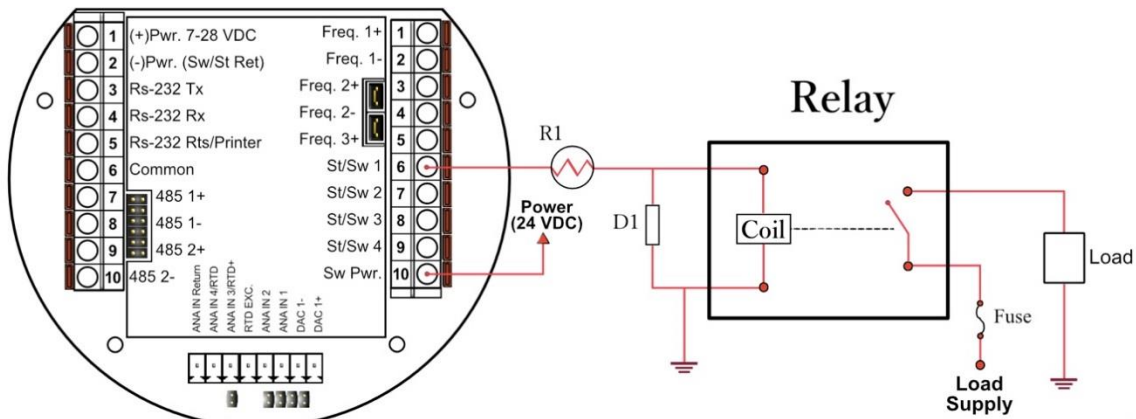
Note:
R1- Current limiting resistor. Current must not exceed 250mA.
D1- Use on relay or any inductive load
   Transient voltage suppressor. Part No. 1.5KE30CA
   It is a bidirectional part, so wiring polarity is indifferent.
   Unidirection part No. 1.5KE30A may also be used. In such case, the stripped
   side is to be connected to the Switch Output side and the other side to ground.

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Density input wiring:

When using a live densitometer input with frequency signal, the signal can be brought into the MicroMV in its raw form. The MicroMV accepts a sine wave or square with or without DC offset.
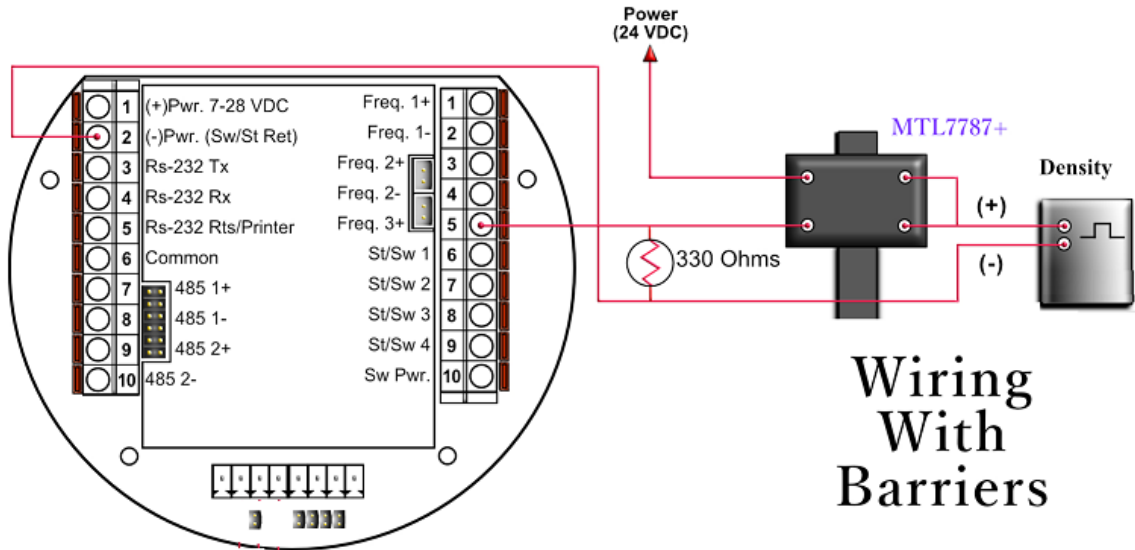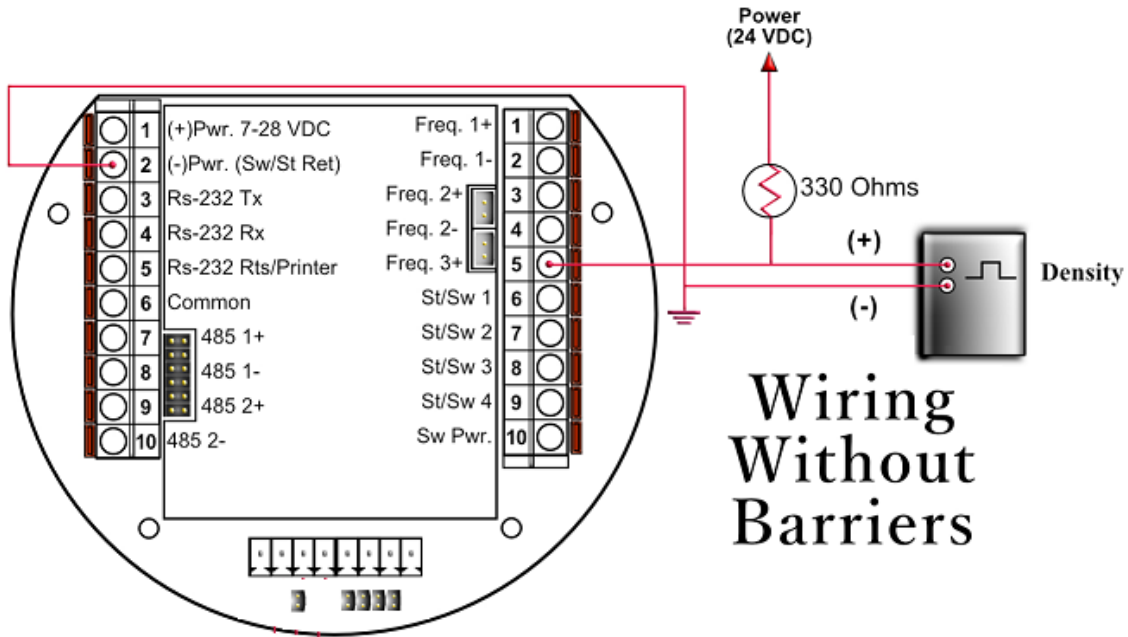
MTL7787+:   Barrier for **switches** or **digital inputs**

Note: When wiring the density input polarity is of significance and reverse polarity could result in some damage or power loss. When Density input is 4-20mA it should be connected as a regular 4-20mA signal to the analog input and not the density frequency input.

Date: 9/28/2022

CALIBRATION

Analog Input 4-20mA or 1-5 Volt Signal

Calibrations are performed under **Calibration**. Select inputs to be calibrated, and then select full, single, offset calibration method.

OFFSET CALIBRATION:

For simple offset type calibration simply induce the signal into the analog input and make sure the MicroMV is reading it. After you verify that the MicroMV recognized the analog input, enter the correct mA reading, and then click OK. The offset type calibration is mainly used when a small offset adjustment needs to be changed in the full-scale reading. The offset will apply to the zero and span. Offset is the recommended method for calibrating the temperature input.

FULL CALIBRATION METHOD:

To perform full calibration be prepared to induce zero and span type signal.

1. Induce the low-end signal i.e. 4mA in the analog input.

2. Click inputs to be calibrated under calibration menu, click full calibration, enter the first point - the analog input value i.e. 4mA, and then click OK button.

3. Now be ready to enter the full-scale value. Simply induce the analog signal and then enter the second value i.e. 20mA, and then click OK button

4. *Induce live values to verify the calibration*.

TO USE DEFAULT CALIBRATION

1. Select Analog Input
2. Select Reset calibration method
3. *Now verify the live reading against the flow computer reading*

RTD Calibration:

RTD Calibration is a 2-step process. The first step is a onetime procedure to verify transducer linearity and is done at the time the meter is being setup. The second step is the routine calibration sequence.

Step 1 – Linearity Verification

1- Use a Decade box with 0-150 °F settings.
2- Connect RTD cable to this resistive element for verification of linearity. Verify low and high points. It must be within ½ degree.
3- Connect the actual RTD element and compare with a certified thermometer.
4- If not within ½ degree do a Full Calibration (See Full Calibration below). If problem persists verify other elements such as RTD Probe, connections, shield, conductivity of connectors, etc.

The purpose of the above procedure is to verify zero and span and make sure that the two points fall within the expected tolerance.

Step 2 – Routine Calibration

Once Linearity has been verified through Step 1, the routine calibration procedure is reduced to simply connecting the actual RTD and doing an offset point calibration (see offset calibration below).

Calibration after that will be simple verification for the stability of the transmitter. If it drifts abnormally then you need to verify the other parts involved.

Calibration Procedures through Windows™ Software

At the top menu, go to Calibration and Select RTD Input.

RESET TO DEFAULT CALIBRATION
1. Select Reset calibration method
2. **Now verify the live reading against the flow computer reading**

OFFSET CALIBRATION:
1. Select offset calibration method.
2. Induce a live value and wait for 10 seconds for the reading to stabilize. Then enter the live value. The value entered must be in Ohm only.
3. **Now verify the live reading against the flow computer reading**

FULL SCALE CALIBRATION:
1. Prepare low range resistive input (i.e., 80 Ohm.) and High range resistive input (i.e., 120. Ohm).
2. Go to the calibration menu and select RTD full calibration method. Induce the low end (80 Ohm.) resistive signal and then wait 10 seconds, enter live value in Ohm, and click OK button.
3. Induce the High range signal (120 Ohm.) and wait 10 seconds, then enter 120 Ohm and click OK button.
4. **Now verify the live reading against the flow computer reading**.

Calibration of Analog Output:

To calibrate the analog output against the end device follow the following steps:

1. Go to the calibration menu, select analog output, and then select method. Full calibration will cause the flow computer to output the minimum possible signal 4 mA. Enter the live output value reading in the end device i.e. 4 mA and click OK button. Now the flow computer will output full scale 20 mA. Enter the live output i.e. 20 then click OK button.

2. *Now verify the output against the calibration device*.

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Multi-Variable Transmitters - DP and Pressure

Calibrations are performed under **Calibration**. . Select inputs to be calibrated, and then select full, single, offset calibration method.

OFFSET CALIBRATION

1. Induce live value for pressure or DP.
2. Select Multivariable DP or pressure.
3. Select offset calibration method, enter offset, and click OK button.
4. ***Now read induce live values to verify the calibration.***

FULL SCALE CALIBRATION

1. Induce live value for pressure or DP.
2. Select Multivariable DP or pressure
3. Select full calibration method
4. Induce the low range signal, enter the first point, and then click OK button.
5. Induce the high range signal, enter the second point, and then click OK button.
6. ***Now verify the live reading against the flow computer reading***.

TO USE DEFAULT CALIBRATION

1. Select Multivariable DP or pressure
2. Select Reset calibration method
3. Now verify the live reading against the flow computer reading

While doing calibration before downloading any of the calibrated values, it is a good practice to verify that the Micro MV close reading to the induced value.
The DP reading must be re-calibrated for the zero offset after applying line pressure.

Multi-Variable Transmitters (Model 205) –RTD

RTD Calibration is a 2-step process. The first step is a onetime procedure to verify transducer linearity and is done at the time the meter is being setup. The second step is the routine calibration sequence.

Step 1 – Linearity Verification

1. Use a Decade box with 0-150 °F settings.
2. Connect RTD cable to this resistive element for verification of linearity. Verify low and high points. It must be within ½ degree.
3. Connect the actual RTD element and compare with a certified thermometer.
4. If not within ½ degree do a Full Calibration (See Full Calibration below). If problem persists verify other elements such as RTD Probe, connections, shield, conductivity of connectors, etc.

The purpose of the above procedure is to verify zero and span and make sure that the two points fall within the expected tolerance.

Step 2 – Routine Calibration

Once Linearity has been verified through Step 1, the routine calibration procedure is reduced to simply connecting the actual RTD and doing an offset point calibration (see offset calibration below).

Calibration after that will be simple verification for the stability of the transmitter. If it drifts abnormally then you need to verify the other parts involved.

Calibration Procedures through Windows™ Software

At the top menu, go to Calibration and Select RTD Input.

RESET TO DEFAULT CALIBRATION
1. Select Reset calibration method
2. **Now verify the live reading against the flow computer reading**

OFFSET CALIBRATION:
1. Select offset calibration method.
2. Induce a live value and wait for 10 seconds for the reading to stabilize. Then enter the live value. The value entered must be in Degrees only.
3. **Now verify the live reading against the flow computer reading**

FULL SCALE CALIBRATION:
1. Prepare low range resistive input (i.e., 80 Ohm.) and High range resistive input (i.e., 120. Ohm).
2. Go to the calibration menu and select RTD full calibration method. Induce the low end (80 Ohm.) resistive signal and then wait 10 seconds, enter the equivalent temperature in degrees, and click OK button.
3. Induce the High range signal (120 Ohm.) and wait 10 seconds, then enter the temperature degrees equivalent to 120 Ohm and click OK button.
4. **Now verify the live reading against the flow computer reading**.

Data Verification

Data verification will not affect the calibration, but it will be documented into calibration and verification report.

Verifying Digital Inputs and Outputs

Use the diagnostic menu. to verify all inputs and outputs. A live input and output is displayed. On the top of the screen pulse inputs and density frequency input are shown. Compare the live value against the displayed value on the screen. Failure to read turbine input could be a result of a bad preamplifier or the jumper selection for sine and square wave input are not in the correct position. Refer to wiring diagram **Wiring | Turbine** for proper turbine input wiring. Density input can be sine or square wave with or without DC offset. Minimum accepted signal has to be greater than 1.2 volt peak to peak. Status input is shown below the frequency input to the left of the screen. When the status input is on, the live diagnostic data will show **ON**. Minimum voltage to activate the status is 6 volts with negative threshold of 2 volts. To activate the switch outputs to the on and off position, click on "Enable/Disable Diagnostic" button in the diagnostic menu. After the screen freeze, click on "Toggle ON/OFF" button to toggle the switch on/off . To exit, click on "Enable/Disable Diagnostic" button again. The switch outputs are open collector and require external voltage.

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CHAPTER 2: Data Entry

and Configuration Menus

Introduction to the Micro M.V. Computer Software

The MicroML4/Micro100 software is constructed around a menu-driven organization. Click "MicroML4" icon on the desktop to run the program. It opens with "Diagnostics Data" screen.

Configuration File

We will begin with the DYNACOM PC software menu. Create a new configuration file, and save it.

1. The software opens ready for you with a default configuration file. To choose an existing file go to the **Configuration File** | **Open...** (Left top corner of the screen) and provide the configuration file name. If you want to create a new file, select **Configuration File** | **New.**

2. Now go back to **Configuration File**. Use the down arrow key to move the cursor to **Save** and press ENTER. You have just saved the file you just created. Notice that now the file name will appears in the left top corner of the screen. This indicates the name of the currently active file; if you change parameters and **save** again, the changes will be saved to your file.

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Configuration File Menu

Open a File
Go to the **Configuration File** | **Open...** (Left top corner of the screen)
Use this function to open an existing configuration file. After a file is opened it becomes the currently active file; its contents can be viewed and its parameters can be edited.
When this function is chosen a list of existing configuration files is displayed (files with extension .SFC).
Use the cursor arrow keys to move the cursor to your selection. This function also can be reached pressing
 on the toolbar.

Open a New File
Go to the **Configuration File** | **New...** (Left top corner of the screen)
Create a new file to store all the programmed information for one Micro MV Liquid Flow Computer. You are prompted for the new file's name. If you enter the name of a pre-existing file, the software informs you of this and prompts you if you want to overwrite the old file. After a file is opened it becomes the currently active file; its contents can be viewed and its parameters can be edited. This option can be activated
pressing on the toolbar.

Save As
Go to the **Configuration File** | **Save As...** (Left top corner of the screen)
Use Save As to save the parameters in the currently active file (that is, the parameter values currently being edited) to a new file. You are prompted for the new file's name. If you enter the name of a pre-existing file, the software asks you if you want to overwrite the old file. The original file will remain in memory.

Save
Go to the **Configuration File** | **Save ...** (Left top corner of the screen)
When permanent modifications are performed on a file, user must save the new changes before exiting the program, or proceeding to open a different file. The system will ask you for the name you want for this
file. You can also save pressing on the toolbar.

Exit
Go to the **Configuration File** | **Exit...** (Left top corner of the screen)
Exit the application, if changes were made to the configuration and haven't been saved you will be asked if you want to save them.

Before the Exit option there is a list of the most recently used configuration files so you can select one of them without looking for it in the disk.

Export Configuration File as Text
Go to the **Configuration File** | **Export as Text..** (Left top corner of the screen)
Use "Export as Text" to save configuration file in a text format. Provide a file name and location to save the configuration data report.

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VIEW

View Drawings

To view the wiring drawings for the Flow Computer go to the **View** menu and then select **Wiring.** The drawings available for this device will be listed.

- Back Panel
- Analog Input
- RTD
- Analog Output
- Status Input
- Switch Output
- Turbine
- Densitometer
- RS 232
- RS 485

TOOLS

Communication Port Settings

You can access this window either through the **Tools | Comm Settings** menu option or the Comm button 🖼 on the toolbar. (the fourth icon from the left)

This window let you set the port settings in order to communicate with the Flow Computer. You have the following options available:

SERIAL COMMUNICATION PARAMETERS

Port - Communication Port Number

Enter the PC port used to communicate with the MicroML4/Micro100 Flow Computer.

Baud Rate

> *Note: this parameter must be set the same for both the PC and the MicroML4/Micro100 Flow Computer for communication to occur.*

Baud rate is defined as number of bits per second. The available selections are 1200, 2400, 4800, 9600, or 19200.

Parity

> *Note: this parameter must be set the same for both the PC and the MicroML4/Micro100 Flow Computer for communication to occur.*

    RTU - NONE
    ASCII - EVEN or ODD

Set the parity to match the `Modbus Type`.

Data Bits

Options available: 5, 6, 7, or 8. Generally used: 8 for RTU mode, 7 for ASCII mode. The MicroML4/Micro100 uses 8 data bits in RTU mode and 7 data bits in ASCII mode.

Stop Bits

Options available: 1, 1.5,or28. Generally used: 1. The MicroML4 uses 1 stop bit.

Modbus Type

> *Note: this parameter must be set the same for both the PC and the MicroML4 Flow Computer for communication to occur.*

The Modbus Communication Specification is either Binary RTU or ASCII.

Auto Detect Settings

Click this button and the configuration program will attempt to communicate with a single MicroML4 Flow Computer at different baud rates and formats.
Failure to communicate can occur because of a wiring problem, wrong PC port selection, communication parameter mismatch between PC and MicroML4 Flow Computer (Modbus type, parity, baud rate, etc.) or lack of power to the MicroML4 Flow Computer. To use this feature, the user must insure that only one MicroML4 Flow Computer is connected to the PC. More than one MicroML4 Flow Computer in the loop will cause data collisions and unintelligible responses.

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UNIT ID NUMBER

The Unit ID Number is used strictly for communication purposes; it can take any value from 1 to 247. Only one master can exist in each loop.

> Note: Do not duplicate the Unit ID number in a single communication loop! This situation will lead to response collisions and inhibit communications to units with duplicate ID numbers.

TIME OUT

The amount of time in seconds the program will wait for an answer from the flow computer.

RETRY TIMES

Retry times for the program to communicate with the flow computer in case of timeout.

USE INTERNET PROTOCOL

Check the box if an Ethernet connection is configured instead of a serial connection. To be able to communicate with the flow computer, both IP Address and Port must be configured.

IP Address

Enter IP Address of the target flow computer.
The standard addressing format is xxx.xxx.xxx.xxx

Port

Enter the port number of Modbus/Ethernet Bridges. The default port number is 502.

Protocol

Select a Modbus TCP or TCP/IP Encapsulation protocol to be used through Ethernet connection.

Modbus TCP –

Also known as Modbus Ethernet consists of a Modbus message without CRC wrapped by a TCP/IP message. This protocol is generally used by industrial Modbus to Ethernet converters.

TCP/IP Encapsulation –

Also known as TCP/IP Pass Through Mode consists of a regular Modbus message embedded in a TCP/IP message. This protocol is generally used by a general purpose Ethernet to Serial converters.

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Meter Configuration

A - METER SETTINGS

Meter Set Up

Units System

Selection	Description	Temperature	Pressure	DP
0	US Unit	DEG.F	PSIG	Inches of Water
1	Metric Unit	DEG.C	BAR, KG/CM2, KPA	KPA, m.Bar

Pressure Units – Metric Only

Selection	Description
0	BAR
1	KG/CM2
2	KPA

Flow Units

Selection	Description Gross and Net Flow	Description Mass Flow
0	CF	MLB in US Unit
1	M3	TON in Metric Unit
2	Gallon	
3	Liter	
4	Barrel	

DP Units – Metric Only

Selection	Description
0	m.BAR
1	KPA

K Factor Units – Frequency Device Equation Only

Selection	Description
0	CF
1	Barrel
2	Gallon
3	M3
4	Liter

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General Settings

Company Name

Up to 20 characters. The company name appears in the reports.

Meter Location

Up to 20 characters. This entry appears only in the report and serves no other function.

Day Start Hour (0-23)

Day start hour is used for batch operation. If daily batch is selected, the batch will end at day start hour, all batch totalizers and flow-weighted values are reset.

Disable Alarms

Use Disable Alarms to ignore alarms. When the alarm function is disabled alarms are not logged. Alarms are also not logged if the DP is below the cut-off limit.

Alarm Delay Timer

Enter delay timer in seconds for logging the alarms.

GM/CC Conversion Factor

This factor is used to reference the density to density of water (i.e. 0.999016) to establish specific and API gravity.

$$Specific\ Gravity\ = \frac{Density\ GM/CC}{Density\ of\ Water(gm/cc\ conversion\ factor)}$$

$$API\ Gravity\ = \frac{141.5 * Density\ of\ Water(gm/cc\ conversion\ factor)}{Density\ GM/CC} - 131.5$$

Number of Meters

Enter '1', '2', '3', or '4' meters run configuration per individual flow computer.

Select Flow Rate Display

The flow rate will be based on daily basis, hourly, or minute.

Flow Rate Average Second

The flow rate is averaged for 1-5 seconds to minimize fluctuating flow rate conditions. This number averages the current flow rate by adding it to the previous seconds' flow rate, and then displays an averaged smoothed number. Only a low-resolution pulse meter requires this function.

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Atmospheric Pressure

This pressure is the local pressure or contracted atmospheric pressure to be used. Typical value is 14.696 PSIA for US units.

Base Pressure

The basis reference pressure is used for all corrections. Used, for example, when seller contracts to sell to buyer at an agreed base pressure. Typical values are 14.73 PSIA for US units, 1.01325 bar in Metric units.

Base Temperature

The basis reference temperature is used for all corrections. Used, for example, when seller contracts to sell to buyer at an agreed base temperature. Typically 60.0 Deg.F is used in US units, 15 or 20 Deg.C in Metric units.

Battery Voltage Reading

Enable this feature to read battery voltage. The battery alarm low is activated, when the voltage is below 11.2 volts. Old CPU boards do not have this feature. Uncheck the box to disable battery low alarm.

Common Parameters

This feature allows the Micro MV Liquid Flow Computer to use the transmitters on meter one to substitute and compensate for meter two, three, or four.

Analog Input Expansion #5-#9

Enter '1' to use analog input expansion #5-#9.

Slave Units Configuration

The Micro MV can poll up to 3 other slaves, 4 MicroMS4 Slaves, or 4 E-Chart Slaves.

Slave Type

Selection	Description
0	Others – Communication in Modbus Protocol
1	MicroMS4
2	Foxboro
3	E-Chart
4	MicroMV and E-Chart Combination – Slave Type – 0 - E-Chart, 1 – MicroMVL, 2 – MicroMS4

Slave Unit ID

The Slave Unit ID Number is used strictly for communication purposes; it can take any value from 1 to 247.

VT – Variable Type for Slave Type 0 Only

Variable type describes the position of high, low words of slave device. When 32 bits (two words) register is polled, it is essential to define where the highest significant word.

Code	Description	Sequence in words
0	2 registers of 16 bits integers	High, Low
1	1 register of 32 bits floating	Low, High
2	2 registers of 16 bits floating	Low, High
3	1 register of 32 bits integer	High, Low
4	2 registers of 16 bits integers	Low, High
5	1 register of 32 bits floating	High, Low
6	2 registers of 16 bits floating	High, Low
7	1 register of 32 bits integer	Low, High

DEST - Destination Address for Slave Type 0 Only

Destination defines where the polled variables are used in the flow computer. Variable statements and other pre-defined locations are accepted. Pre-defined locations are temperature, pressure, and density. Variables can be accessed through the display and reports.

0	Floating #1 (7061)	10	Integer #1(5071)	20	M#1 TF	30	M#3 TF
1	Floating #2 (7062)	11	Integer #2(5073)	21	M#1 PF	31	M#3 PF
2	Floating #3 (7063)	12	Integer #3(5075)	22	M#1 DF	32	M#3 DF
3	Floating #4 (7064)	13	Integer #4(5077)	23	M#1 DB*	33	M#3 DB*
4	Floating #5 (7065)	14	Integer #5(5079)	24	M#1 DP	34	M#3 DP
5	Floating #6 (7066)	15	Integer #6(5081)	25	M#2 TF	35	M#4 TF
6	Floating #7 (7067)	16	Integer #7(5083)	26	M#2 PF	36	M#4 PF
7	Floating #8 (7068)	17	Integer #8(5085)	27	M#2 DF	37	M#4 DF
8	Floating #9 (7069)	18	Integer #9(5087)	28	M#2 DB*	38	M#4 DB*
9	Floating 10 (7070)	19	Integer 10(5089)	29	M#2 DP	39	M#4 DP

ADDR - Source Address

Source defines the actual registers being polled from the slave device. Source address is considered to be continuous without zero address in between.

**Example :** Meter #1 density uses micro motion density.

       **Slave ID** = Micro Motion ID   _**VT**_ = 2, _**DEST**_=22, _**ADDR**_=248

*Note: DB – Density at Base Condition.

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Slave Units Configuration - Example

Slave Type 0 – Other Slaves (up to 3 slaves)

Example : Read Meter #1 Density of MicroMS4 from the Micro Motion.
Four entries are required.

Slave ID	**ID**	Micro Motion ID
VT – Variable Type	**2**	2 registers of 16 bits floating (Words Order–Low, High)
DEST - Destination Address	**22**	Meter #1 Density
ADDR – Slave Modbus Address	**248**	Modbus Address of Micro Motion Density

Slave Type 1– MicroMS4 (up to 4 slaves)

Slave **ID**	**ID**	MicoMS4 Unit ID

The MicroMS4 will poll variables are used in the slave. Variables are 4 analog inputs and multi-variables – DP, Pressure, and Temperature. The slave calibrations can be done through the master unit.

Slave Type 2– Foxboro (up to 4 slaves)

Slave **ID**	**ID**	FOXBORO Unit ID

The MicroMS4 will poll variables are used in the slave. Variables are mass flow rate, mass cumulative totals, and density,

Slave Type 3– E-Chart (up to 4 slaves)

Slave **ID**	**ID**	E-Chart Unit ID

The MicroMS4 will poll variables are used in the slave. Variables are multi-variables – DP, Pressure, and Temperature.

Slave Type 4– MicroMS4, E-Chart, or MicroMVL Combination (up to 4 slaves)

Slave **ID**	**ID**	E-Chart Unit ID

The MicroMS4 will poll variables are used in the slave. Variables are multi-variables – DP, Pressure, and Temperature.

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B - METER DATA

Meter ID

Up to 8 characters. This function will serve as meter tag.

Flow Equation Type (0-4)

      0 =   API 14.3 (NEW AGA3)
      1 =   Venturi
      2 =   Frequency Device
      3 =   Wedge
      4 =   FOXBORO (Assume: US unit – Mass in LB/HR, Density LB/CF, Metric Unit- Mass in M3, Density in KG/M3)

Select the desired calculation mode. API 14.3 is the latest orifice calculations introduced in 1994 All new installations are recommended to use API 14.3 for orifice calculations.

On the right hand side of the selection box is a property button that when pressed pops up a window with the flow equation settings.

API 14.3 Data (new AGA3)

Flow Equation Type = 0

Pipe I.D.

Orifice ID

Pipe ID in inches (us unit), or in millimeter (metric unit) is the measured inside pipe diameter at reference conditions. Orifice ID is the measured diameter of the orifice at reference conditions.

DP Cutoff

The Micro MV Flow Computer suspends flow rate calculations whenever the DP, in inches of water column (us unit), in mbar, or in KPA (metric unit), is less than this value. This function is vital for suppressing extraneous data when the DP transmitter drifts around the zero mark under no-flow conditions.

Y Factor (0=None, 1=Upstream, 2=Downstream)

Y factor is the expansion factor through the orifice. The user must enter the position of the pressure and temperature sensors. Select y=1 if the sensors are installed upstream of the orifice plate. Select y=2 if the sensors are downstream of the orifice plate. When multi-variable is used, the pressure sensor is always upstream and set Y to 1.

Isentropic Exponent (Specific Heat)

Ratio of specific heat is a constant associated with each product. Even though it varies slightly with temperature and pressure, in all cases it is assumed as a constant.

Viscosity in Centipoise

Even though viscosity will shift with temperature and pressure changes, the effect on the calculations is negligent. Therefore using a single value is appropriate in most cases. Enter viscosity in centipoise at typical flowing conditions. Natural gas has a typical viscosity of 0.01.

Reference Temperature of Orifice

Reference Temperature of Pipe

These parameters give temperature at which the bore internal diameter was measured on the orifice and pipe respectively. Commonly 68 °F (us unit) or 20 °C (metric unit) is used.

Thermal Expansion Coefficient of Orifice E-6

Thermal Expansion Coefficient of Pipe E-6

These parameters give the linear expansion coefficients of the orifice and pipe materials respectively.

	US Unit	Metric Unit
Type 304 and 316 Stainless	9.25 E 6	16.7 E-6
Monel	7.95 E 6	14.3 E-6
Carbon Steel	6.20 E 6	11.2 E-6

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Venturi

Flow Equation Type = 1

Pipe I.D.

Orifice ID

Pipe ID in inches (us unit), or in millimeter (metric unit) is the measured inside pipe diameter at reference conditions. Orifice ID is the measured diameter of the orifice at reference conditions.

DP Cutoff

The Micro MV Flow Computer suspends flow rate calculations whenever the DP, in inches of water column (us unit), in mbar, or in KPA (metric unit), is less than this value. This function is vital for suppressing extraneous data when the DP transmitter drifts around the zero mark under no-flow conditions.

Y Factor (0=None, 1=Upstream, 2=Downstream)

Y factor is the expansion factor through the orifice. The user must enter the position of the pressure and temperature sensors. Select y=1 if the sensors are installed upstream of the orifice plate. Select y=2 if the sensors are downstream of the orifice plate. When multi-variable is used, the pressure sensor is always upstream and set Y to 1.

Isentropic Exponent (Specific Heat)

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Thermal Expansion Coefficient Of Orifice E-6

Thermal Expansion Coefficient Of Pipe E-6

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	Us Unit	Metric Unit
Type 304 and 316 Stainless	9.25 E-6	16.7 E-6
Monel	7.95 E-6	14.3 E-6
Carbon Steel	6.20 E-6	11.2 E-6

Discharge Coefficient C

This value is the discharge coefficient for Venturi flow equations. The default value is 0.9950.

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Frequency Device

Flow Equation Type = 2

K Factor

K Factor is the number of pulses per unit volume, i.e. 1000 pulses/CF (us unit), M3 (metric unit). The meter's tag would normally indicate the K Factor.

Meter Factor

Meter Factor is a correction to the K Factor for this individual meter, applied multiplicatively to the K factor.

Retroactive Meter Factor

If zero is selected, the meter factor will not apply to the entire batch. It will only apply from the time the new meter factor is entered. Retroactive meter factor, on the other hand, will apply to the entire batch and the entire batch is re-calculated, using the new meter factor.

Flow Cutoff Frequency

The Micro MV Flow Computer will quit totalizing when the turbine frequency (or other frequency input) is below this set limit. This feature is to reduce extraneous noise appearing as volume data when the meter is down for period of time.
This value is entered as pulses per second.

Flow Rate Threshold/Linear Factor

Enter the different correction factors for the meter at different flow rates. The Micro MV Flow Computer will perform linear interpolation each second. Notice that even though using this feature enhances the measurement accuracy and range, performing audit trail on a linearized meter factor is very difficult.

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Wedge
Flow Equation Type = 3

<u>DP Cutoff</u>

The Micro MV Flow Computer suspends all calculations whenever the DP, in inches of water column, is less than this value. This function is vital for suppressing extraneous data when the DP transmitter drifts around the zero mark under no-flow conditions.

<u>Flow Coeff Kd2 and Expansion Factor FA</u>

<u>US unit</u>

Flow Rate (Gallon/Minute) $= (5.668 \times FA \times Kd2) \times SQRT(DP / SG)$

DP = different pressure, inches of water
SG = Liquid specific gravity at flow conditions
FA   = Expansion Coefficient of Wedge
Kd2 = Discharge Coefficient of Wedge

<u>Metric Unit</u>

Flow Rate (Liter/Hour) $= (1.287343 \times Fa \times Kd2) \times SQRT(DP / SG)$

DP = different pressure, m.Bar
SG = Liquid specific gravity at flow conditions
FA = Expansion Coefficient of Wedge
Kd2 = Discharge Coefficient of Wedge

Foxboro
Flow Equation Type = 4

(Assume: US unit – Mass in LB/HR, Density LB/CF, Metric Unit- Mass in M3, Density in KG/M3)

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Net Flow Rate Low/High Limit

The high/low flow rate alarm is activated, when net flow rate exceeds or is below the set limit. The alarm will be documented with time, date, and totalizer.

Input Position

This section allows the user to assign analog inputs to the process variables. The available options are displayed in the selection box. The configuration of the analog inputs is done in the I/O section (explained later on).

Input Position Assignment – Temperature, Pressure, BS&W, DP

1: Analog Input#1
2: Analog Input#2
3: Analog Input#3
4: Analog Input#4
5: RTD Input
7. Frequency Input (Not Selectable)
10. Multi-Variable Module (Master)
11. Multi-Variable Module Slave #1
12. Multi-Variable Module Slave #2
13. Multi-Variable Module Slave #3
21. Analog Input #5
22. Analog Input #6
23. Analog Input #7
24. Analog Input #8
25. Analog Input #9

Use Stack DP

The Micro MV Flow Computer allows the user to select dual DP transmitters on each meter for better accuracy and low range flow. Use in conjunction with the DP Switch High % parameter setting.

DP Switch High %

The Micro MV Flow Computer will begin using the high DP when the low DP reaches the percent limit assigned in this entry. Example: DP low was ranged from 0-25 inches and switch % was set at 95%. When low DP reaches 23.75 in (= 0.95 * 25) the Micro MV Liquid Flow Computer will begin using the high DP provided the high DP did not fail. When the high DP cell drops below 23.75, the Flow Computer will start using the Low DP for measurement.

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Density Type

If live density is connected to the flow computer, user must enter the density type. Raw density frequency or 4-20mA input can be selected. This density will be used to calculate mass flow and net flow.

Density Type	Densitometer	Density 4–20 mA Type*	
Type 0	None		
Type 1	4–20 mA		
		Type 0	Density Signal 4-20mA in LB/FT3 (US unit) or in KG/M3 (Metric unit)
		Type 1	SG Signal 4-20mA
Type 2	UGC		
Type 3	Sarasota		
Type 4	Solartron		

Density 4-20mA Type
Note that this type of input requires the user to choose a subtype.

Density 4–20 mA Type*	
Type 0	Density Signal 4-20mA in LB/FT3(US unit) or in KG/M3 (Metric unit)
Type 1	SG Signal 4-20mA

C – BATCH

Batch Type

If daily batch selected, the batch will end at the day start hour. On demand type will end the batch, when the Micro MV Liquid Flow Computer is requested to end the batch manually.

Batch Ticket Number

This number will increment by one at the end of batch.

Next Batch Product Number

Enter the product number for the next batch.

D - PRODUCTS

End the current batch is required to use the new product data settings.

Product Number

Up to 8 products.

Product Name

Up to 16 characters.

Table Selection

Sel.	Table	Description	Conditions
0	23A/24A Crude SG (API2004)	Crude oil, natural gasoline, drip gasoline Base Temperature@60°F	Live densitometer used
1	24A Crude SG (API2004)	Crude oil, natural gasoline, drip gasoline Base Temperature@60°F	Density is known, Parameter - Specific Gravity @ 60°F is required
2	23B/24B Refined SG (API2004)	Gasoline, naphthalene, jet fuel, aviation fuel, kerosene, diesel, heating oil, furnace oil. Base Temperature@60°F	Live densitometer used
3	24B Refined SG (API2004)	Gasoline, naphthalene, jet fuel, aviation fuel, kerosene, diesel, heating oil, furnace oil. Base Temperature@60°F	Density is known, Parameter - Specific Gravity @ 60°F is required
4	New 23/24	LPG	Live densitometer used
5	New 24	LPG	Density is known, Parameter - Specific Gravity@ 60°F is required
6	24C Special Prod (API 2004)	Benzene, toluene, styrene, *ortho*-xylene, *meta*-xylene, acetone Base Temperature@60°F	Density is known, Parameter - Specific Gravity @ 60°F is required, Alpha T, the number entered will be divided by 10^{-6}.
7	53A/54A Crude (API2004)	Crude oil, natural gasoline, drip gasoline Base Temperature@15°C	Live densitometer used
8	54A Crude (API2004)	Crude oil, natural gasoline, drip gasoline Base Temperature@15°C	Density is known, Parameter - Density@15°C is required
9	53B/54B Refined Prod (API2004)	Gasoline, naphthalene, jet fuel, aviation fuel, kerosene, diesel, heating oil, furnace oil. Base Temperature@15°C	Live densitometer used
10	54B Refined Prod (API2004)	Gasoline, naphthalene, jet fuel, aviation fuel, kerosene, diesel, heating oil, furnace oil. Base Temperature@15°C	Density is known, Parameter - Density@15°C is required
11	OLD 53/54	LPG	Live densitometer used

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12	OLD 54	LPG	Density is known, Parameter - Density@15°C is required
13	54C Special Prod (API 2004)	Benzene, toluene, styrene, *ortho*-xylene, *meta*-xylene, acetone Base Temperature@15°C or @20°C	All conditions
14	59A/60A Crude (API2004)	Crude oil, natural gasoline, drip gasoline Base Temperature@20°C	Live densitometer used
15	60A Crude (API2004)	Crude oil, natural gasoline, drip gasoline Base Temperature@20°C	Density is known, Parameter - Density@20°C is required
16	59B/60B Refined Prod (API2004)	Gasoline, naphthalene, jet fuel, aviation fuel, kerosene, diesel, heating oil, furnace oil. Base Temperature@20°C	Live densitometer used
17	60B Refined Prod (API2004)	Gasoline, naphthalene, jet fuel, aviation fuel, kerosene, diesel, heating oil, furnace oil. Base Temperature@20°C	Density is known, Parameter - Density@20°C is required
18	59D/60D Lubricating Prod	Lub Oil Base Temperature@20°C	Live densitometer used
19	60D Lubricating Prod	Lub Oil Base Temperature@20°C	Density@20°C is known,
20	Water	Water	Density and Base Density are known

Table A is for Crude, the Table B is for refined products, the Table C is for special products - butadiene, toluene. OLD/NEW Tables are used for LPG and NGLs. *6.01.05 or newer firmware version is required for API2004 table*

Crude/Refined/Lubricating Prod/Special Product: use API 2004, D1250-04.
(Refer to API Manual of Petroleum Measurement Standards:
Chapter11-Physical Properties Data/Section 1-Temperature and Pressure Volume Correction "Factors for Generalized Crude Oils, Refined Products, and Lubricating Oils/May2004, and Addendum 1/September 2007)

Temperature, Pressure and Density Limits for Crude Oil, Refined Products, Lubricating Oils

	Crude Oil	**Refined Products**	**Lubricating Oils**
Density, kg/m³@ 60°F	*610.6 to 1163.5*		*800.9 to 1163.5*
Relative Density @ 60°F	0.61120 to 1.16464		0.80168 to 1.1646
API Gravity @ 60°F	100.0 to -10.0		45.0 to -10.0
Kg/m³@ 15°C	611.16 to 1163.79	611.16 to 1163.86	801.25 to 1163.85
Kg/m³@20°C	606.12 to 1161.15	606.12 to 1160.62	798.11 to 1160.71
Temperature, °C	*-50.00 to 150.00*		
°F	-58.0 to 302.0		
Pressure, psig	*0 to 1,500*		
kPa (gauge)	0 to 1.034x10⁴		
Bar (gauge)	0 to 103.4		
α₆₀,per °F	*230.0x10⁻⁶ to 930.0x10⁻⁶*		
per °C	414.0x10⁻⁶ to 1674.0x10⁻⁶		

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SG and Temperature limits for New Table 23/24

SG	.21 to .74
Temperature	-50 °F to 100 °F

SG@60 and Temperature Limits for New Table 24

SG@60	.35 to .688
Temperature	-50 °F to 100 °F

Density and Temperature limits for New Table 53/54

Density	425 to 1200
Temperature	-20 °C to 125 °C

Density@15 and Temperature Limits for New Table 54

Density@15	427 to 1200
Temperature	-20 °C to 125 °C

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E – COMMUNICATION PORTS

Unit ID Number

The Unit ID Number is used strictly for communication purposes; it can take any value from 1 to 247.

> *Note: Do not duplicate the Unit ID number in a single communication loop!*
> *This situation will lead to response collisions and inhibit communications*
> *to units with duplicate ID numbers.*

Only one master can exist in each loop.

Flow Computer Ports

Modbus Type

> *Note: this parameter must be set the same for both the PC and the MicroML4*
> *Flow Computer for communication to occur.*

The Modbus Communication Specification is either Binary RTU or ASCII.

Parity

> *Note: this parameter must be set the same for both the PC and the MicroML4*
> *Flow Computer for communication to occur.*

>   RTU - NONE
>   ASCII - EVEN or ODD

Set the parity to match the **Modbus Type**.

Baud Rate

> *Note: this parameter must be set the same for both the PC and the MicroML4*
> *Flow Computer for communication to occur.*

Baud rate is defined as number of bits per second. The available selections are 1200, 2400, 4800, 9600, or 19200.

RTS Delay

This function allows modem delay time before transmission. The MicroML4 Flow Computer will turn the RTS line high before transmission for the entered time delay period.

>   RTU - NONE
>   ASCII - EVEN or ODD

Select 0=RTS, 1=Printer (N/A)

RTS line has dual function selection: either RTS for driving request to send or transmit to serial printer.
To use serial printer interface for printing reports, i.e. batch, daily, and interval Connect the serial printer to RTS and common return, and select 1 for printer. Serial printer function is not available.

Printer Baud Rate (N/A)

Baud rate is defined as number of bits per second. The available selections are 1200, 2400, 4800, 9600, or 19200.

Printer Number of Nulls (N/A)

This function is used because no hand shaking with the printer is available and data can become garbled as the printer's buffer is filled. The MicroML4 Flow Computer will send nulls at the end of each line to allow time for the carriage to return. Printers with large buffers do not require additional nulls. If data is still being garbled, try reducing the baud rate to 1200.

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INPUTS/OUTPUTS

F – ANALOG/RTD INPUTS

In order for the Flow Computer to use the live input, the input must be properly assigned and properly wired

TAG No

Select the following tag no to use default tag, or select '0' to enter tag id.

11	TubingP1	21	TubingP2	31	TubingP3	41	TubingP4
12	CasingP1	22	CasingP2	32	CasingP3	42	CasingP4
13	OilTank1	23	OilTank2	33	OilTank3	43	OilTank4
14	WatTank1	24	WatTank2	34	WatTank3	44	WatTank4
15	Suction1	25	Suction2	35	Suction3	45	Suction4
16	Dischag1	26	Dischag2	36	Dischag3	46	Dischag4
17	CompreT1	27	CompreT2	37	CompreT3	47	CompreT4

TAG ID

Up to 8 alphanumeric ID number. The transmitters are referred to according to the TAG ID. All alarms are labeled according to TAG ID

4mA – Analog Input

Enter the 4mA value for the transmitter.

20mA – Analog Input

Enter the 20mA value for the transmitter.

Low/High Limit

Enter the low and high limits. When live value exceeds high limit or less than low limit, an alarm log will be generated.

Maintenance Value

The value is to be used when the transmitter fails, or while calibrating. Set fail code to 1 while calibrating.

Fail Code

Fail Code 0: always use the live value even if the transmitter failed.
Fail Code 1: always use the maintenance value
Fail Code 2: use maintenance value if transmitter failed. (i.e. Analog Input - 4-20mA is above 21.75 or below 3.25, RTD Input - OHMs is above 156 or below 50)

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G - ANALOG OUTPUT ASSIGNMENT

4-20mA selection must be proportional and within the range of the selected parameter.

Analog Output Tag ID

Up to 8 alphanumeric ID number. The transmitters are referred to according to the TAG ID. All alarms are labeled according to TAG ID.

Assignments:

	Meter 1	Meter 2	Meter 3	Meter 4
Gross Flow Rate	111	211	311	411
Net Flow Rate	112	212	312	412
Mass Flow Rate	113	213	313	413
DP	121	221	321	421
Temperature	122	222	322	422
Pressure	123	223	323	423
Density	124	224	324	424
Base Density	125	225	325	425
SG	126	226	326	426
Base SG	127	227	327	427
DP Low	128	228	328	428
DP High	129	229	329	429

Station Gross Flow Rate	511
Station Net Flow Rate	512
Station Mass Flow Rate	513

	Assignment		
Analog Input #1	**1**	Spare Auxiliary#1	**11**
Analog Input #2	**2**	Spare Auxiliary#2	**12**
Analog Input #3	**3**	Spare Auxiliary#3	**13**
Analog Input #4	**4**	Spare Auxiliary#4	**14**
RTD Input	**5**	Spare Auxiliary#5	**15**
Remote Control	**6**	Spare Auxiliary#6	**16**
Meter #1 PID	**7**	Spare Auxiliary#7	**17**
Meter #2 PID	**8**	Spare Auxiliary#8	**18**
Meter #3 PID	**9**	Spare Auxiliary#9	**19**
Meter #4 PID	**10**	Spare Auxiliary#10	**20**
		Spare Auxiliary#11	**21**
		Spare Auxiliary#12	**22**
		Densitometer Temp	**23**
		Densitometer Press	**24**

Analog Output 4mA/20mA

4-20mA selection must be proportional and within the range of the selected parameter. The 4-20mA output signal is 12 bits.

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H - DENSITOMETER SETTINGS

Densitometer Tag ID

Up to 8 alphanumeric ID number. The transmitters are referred to according to the TAG ID. All alarms are labeled according to TAG ID.

Densitometer Temperature IO Position

Selection	Description
1	Analog Input #1
2	Analog Input #2
3	Analog Input #3
4	Analog Input #4
5	RTD Input
10.	Multi-Variable Module (Master)
11.	Multi-Variable Module Slave #1
12.	Multi-Variable Module Slave #2
13.	Multi-Variable Module Slave #3
21.	Analog Input #5
22.	Analog Input #6
23.	Analog Input #7
24.	Analog Input #8
25.	Analog Input #9

Densitometer Pressure IO Position

Selection	Description
1.	Analog Input #1
2.	Analog Input #2
3.	Analog Input #3
4.	Analog Input #4
10.	Multi-Variable Module (Master)
11.	Multi-Variable Module Slave #1
12.	Multi-Variable Module Slave #2
13.	Multi-Variable Module Slave #3
21.	Analog Input #5
22.	Analog Input #6
23.	Analog Input #7
24.	Analog Input #8
25.	Analog Input #9

Density Fail Code

Fail Code 0:   always use the live value even if the densitometer failed.
Fail Code 1:   always use the maintenance value
Fail Code 2:   use maintenance value if densitometer failed. (i.e. densitometer period is above density high period or is below densitometer period.)

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Densitometer Settings - Sarasota, UGC, or Solartron

Enter the densitometer constants accordingly with the type selection.

Density Correction Factor

Enter the correction factor for the densitometer

Density Period Low/High Limits

Density Period is the time period in microsecond. The densitometer fails if the density period exceeds the density period low or high limits. If the densitometer fails and density fail code is set to 2, the maintenance value will be used. (Density Period = 1000000/Density Frequency)

Density Maintenance

The value is to be used when the transmitter fails, or while calibrating. Set fail code to 1 while calibrating.

Density Low/High Limits

Enter the low and high limits. When live value exceeds high limit or less than low limit, an alarm log will be generated.

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I - SPARE AUXILIARY I/O

The Flow Computer can be configured to be master unit through the second RS485 (port#3). The master unit can connect up to three "MicroMV Flow Computer" slave units. Each slave unit has four analog inputs. In order to use spare auxiliary inputs, the input must be properly assigned. Enter spare auxiliary 1-4 input data entries are for slave#1, 5-8 input data entries for slave#2, and 9-12 input data entries for slave#3.

TAG No

Select the following tag no to use default tag, or select '0' to enter tag id.

11	TubingP1	21	TubingP2	31	TubingP3	41	TubingP4
12	CasingP1	22	CasingP2	32	CasingP3	42	CasingP4
13	OilTank1	23	OilTank2	33	OilTank3	43	OilTank4
14	WatTank1	24	WatTank2	34	WatTank3	44	WatTank4
15	Suction1	25	Suction2	35	Suction3	45	Suction4
16	Dischag1	26	Dischag2	36	Dischag3	46	Dischag4
17	CompreT1	27	CompreT2	37	CompreT3	47	CompreT4

TAG ID

Up to 8 alphanumeric ID number. The transmitters are referred to according to the TAG ID. All alarms are labeled according to TAG ID

4mA

Enter the 4mA value for the transmitter.

20mA

Enter the 20mA value for the transmitter.

Low/High Limit

Enter the low and high limits. When live value exceeds high limit or less than low limit, an alarm log will be generated.

Maintenance Value

The value is to be used when the transmitter fails, or while calibrating. Set fail code to 1 while calibrating.

Fail Code

       Fail Code 0:   always use the live value even if the transmitter failed.
       Fail Code 1:   always use the maintenance value
       Fail Code 2:   use maintenance value if transmitter failed. (i.e. 4-20mA is above 21.75 or below 3.25)

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J - MULTI.VARIABLE SETTINGS

In order for the Flow Computer to use the live input, the input must be properly assigned and properly wired The Flow Computer can be configured to be master unit through the second RS485 (port#3). The master unit can connect up to three "MicroMV Flow Computer" slave units. Each slave unit has multivariable - DP, pressure, and temperature.

TAG ID

Up to 8 alphanumeric ID number. The multi-variables are referred to according to the TAG ID. All alarms are labeled according to TAG ID.

Low/High Limit

Enter the low and high limits. When live value exceeds high limit or less than low limit, an alarm log will be generated.

Maintenance Value

The value is to be used when the transmitter fails, or while calibrating. Set fail code to 1 while calibrating.

Fail Code

       Fail Code 0:   always use the live value even if the multivariable failed.
       Fail Code 1:   always use the maintenance value
       Fail Code 2:   use maintenance value if multivariable failed

K - *STATUS INPUT /SWITCH OUTPUT ASSIGNMENT*

`I/O|Status Input/Switch Output Assignment`

	Assignment	Comments
1	End Batch	End batch and reset batch totalizer for all the meters
2	Product Bit 0	Before ending the batch, the user can use status input bit to select
3	Product Bit 1	next product. These bits are read once when batch is ended.
4	Product Bit 2	
5	Alarm Acknowledge	Reset the previous occurred alarms output bit
6	Calibration Mode	Calibration mode will set the flow computer to continue totalizing at same rate while all values are still showing live readings.

Switch Output Assignment

User can assign an output to each of the Micro MV Liquid Flow Computer's output switches from this list. The Micro MV Liquid Flow Computer switch outputs are open collector type, requiring external D.C power applied to the SW power.

Outputs in the top list, "Pulse Outputs", require a definition of pulse output per unit volume and "Pulse Output Width". Those data entry are in the other parameter's menu. These outputs are available through switches 1 or 2 only.

Outputs in the bottom list, "Contact Type Outputs", are ON/OFF type outputs. They can be assigned to any of the four switch outputs.

Switches 1 and 2 can be pulse or contact type output; switches 3, 4 are contact-type output only.

Assignments - Pulse Outputs

	Meter 1	Meter 2	Meter 3	Meter 4
Gross	101	104	107	110
Net	102	105	108	111
Mass	103	106	109	112

Station Gross	113
Station Net	114
Station Mass	115

Pulse Output and Pulse Output Width

Pulse Output is used to activate a sampler or external totalizer. The number selected will be pulses per unit volume or per unit mass. If 0.1 pulse is selected, the one pulse will be given every 10 unit volumes has passed through the meter.

Pulse Output Width is the duration, in milliseconds, of one complete pulse cycle (where each cycle is the pulse plus a wait period, in a 50/50 ratio). For example: if POW = 500 msec, the Micro MV Liquid Flow Computer at most can produce one pulse each second regardless of the pulse per unit volume selected (500 msec pulse + 500 msec wait). If POW = 10 msec the Micro MV Liquid Flow Computer can produce up to 50 pulses per second.

The Micro MV Liquid Flow Computer's maximum pulse output is 125 pulses/sec. The Pulse Output in combination with the Pulse Output Width should be set so that this number is not exceeded.

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Assignments - Contact Type Outputs

	Meter 1	Meter 2	Meter 3	Meter 4
Batch Ended	116	121	126	131
Temperature Out Range	117	122	127	132
Gravity Out of Range	118	123	128	133
Flow Rate High	119	124	129	134
Flow Rate Low	120	125	130	135
Meter Down	138	225	226	227

Day Ended	136	**Analog Input #7 Low**	167	**Slave#1 DP LO**	198
Month Ended	137	**Analog Input #8 High**	168	**Slave#1 P HI**	199
Analog Input #1 High	139	**Analog Input #8 Low**	169	**Slave#1 P LO**	200
Analog Input #1 Low	140	**Analog Input #9 High**	170	**Slave#1 T HI**	201
Analog Input #2 High	141	**Analog Input #9 Low**	171	**Slave#1 T LO**	202
Analog Input #2 Low	142	**Spare Auxiliary I/O#1 Hi**	172	**Slave#2 DP HI**	203
Analog Input #3 High	143	**Spare Auxiliary I/O#1 LO**	173	**Slave#2 DP LO**	204
Analog Input #3 Low	144	**Spare Auxiliary I/O#2 Hi**	174	**Slave#2 P HI**	205
Analog Input #4 High	145	**Spare Auxiliary I/O#2 LO**	175	**Slave#2 P LO**	206
Analog Input #4 Low	146	**Spare Auxiliary I/O#3 Hi**	176	**Slave#2 T HI**	207
RTD Input High	147	**Spare Auxiliary I/O#3 LO**	177	**Slave#2 T LO**	208
RTD Input Low	148	**Spare Auxiliary I/O#4 Hi**	178	**Slave#3 DP HI**	209
Densitometer Failed	149	**Spare Auxiliary I/O#4 LO**	179	**Slave#3 DP LO**	210
Density High	150	**Spare Auxiliary I/O#5 HI**	180	**Slave#3 P HI**	211
Density Low	151	**Spare Auxiliary I/O#5 LO**	181	**Slave#3 P LO**	212
Multi-Variable DP HI	152	**Spare Auxiliary I/O#6 HI**	182	**Slave#3 T HI**	213
Multi-Variable DP LO	153	**Spare Auxiliary I/O#6 LO**	183	**Slave#3 T LO**	214
Multi-Variable PF HI	154	**Spare Auxiliary I/O#7 HI**	184	**Analog#1 Fail**	215
Multi-Variable PF Low	155	**Spare Auxiliary I/O#7 LO**	185	**Analog#2 Fail**	216
Multi-Variable TF HI	156	**Spare Auxiliary I/O#8 HI**	186	**Analog#3 Fail**	217
Multi-Variable TF Low	157	**Spare Auxiliary I/O#8 LO**	187	**Analog#4 Fail**	218
Active Alarms	158	**Spare Auxiliary I/O#9 HI**	188	**RTD Fail**	219
Occurred Alarms	159	**Spare Auxiliary I/O#9 LO**	189	**Analog#5 Fail**	220
Watchdog	160	**Spare Auxiliary I/O#10 HI**	190	**Analog#6 Fail**	221
Remote Control	161	**Spare Auxiliary I/O10 LO**	191	**Analog#7 Fail**	222
Analog Input #5 High	162	**Spare Auxiliary I/O#11 HI**	192	**Analog#8 Fail**	223
Analog Input #5 Low	163	**Spare Auxiliary I/O11 LO**	193	**Analog#9 Fail**	224
Analog Input #6 High	164	**Spare Auxiliary I/O#12 HI**	194		
Analog Input #6 Low	165	**Spare Auxiliary I/O12 LO**	195		
Analog Input #7 High	166	**Slave#1 DP HI**	197		

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L - FLOW COMPUTER DISPLAY ASSIGNMENT

Display assignment selections are up to **12** assignments. Each screen has **two selections**. The Micro MV Liquid Flow Computer will scroll through them at the assigned delay time.

Assignment

	Meter 1	Meter 2	Meter 3	Meter 4
Gross Flow Rate	101	201	301	401
Net Flow Rate	102	202	302	402
Mass Flow Rate	103	203	303	403
Gross Batch Total	104	204	304	404
Net Batch Total	105	205	305	405
Mass Batch Total	106	206	306	406
Gross Daily Total	107	207	307	407
Net Daily Total	108	208	308	408
Mass Daily Total	109	209	309	409
Gross Month Total	110	210	310	410
Net Month Total	111	211	311	411
Mass Month Total	112	212	312	412
Gross Cumulative Total	113	213	313	413
Net Cumulative Total	114	214	314	414
Mass Cumulative Total	115	215	315	415
Previous Gross Batch Total	116	216	316	416
Previous Net Batch Total	117	217	317	417
Previous Mass Batch Total	118	218	318	418
Previous Gross Daily Total	119	219	319	419
Previous Net Daily Total	120	220	320	420
Previous Mass Daily Total	121	221	321	421

Station Gross Flow Rate	501
Station Net Flow Rate	502
Station Mass Flow Rate	503

	Meter 1	Meter 2	Meter 3	Meter 4
Temperature	122	222	322	422
Pressure	123	223	323	423
Density	124	224	324	424
DP	125	225	325	425
DP Low	126	226	326	426
DP High	127	227	327	427
Alarms	128	228	328	428
Orifice ID	129	229	329	429
Pipe ID	130	230	330	430
PID – Flow	131	231	331	431
PID – Pressure	132	232	332	432
PID – Output	133	233	333	433
Base Density	134	234	334	434
SG	135	235	335	435
Base SG	136	236	336	436
FWA DP	137	237	337	437
FWA Temperature	138	238	338	438
FWA Pressure	139	239	339	439
FWA Density	140	240	340	440
FWA Base Density	141	241	341	441
FWA SG	142	242	342	442
FWA Base SG	143	243	343	443
Last Batch FWA Temperature	144	244	344	444
Last Batch FWA Pressure	145	245	345	445
Last Batch FWA Density	146	246	346	446
Densitometer Period	147	247	347	447
Un-Corrected Density	148	248	348	448

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Selection	Description
701	Date/Time
702	Battery Voltage/Spare Variabe#1
703	Spare Variable #2/#3
704	Spare Variable #4/#5
705	Spare Variable #6/#7
706	Spare Variable #8/#9
707	Spare Auxiliary Variable#1/#2
708	Spare Auxiliary Variable#3/#4

Selection	Description
709	Spare Auxiliary Var.#5/#6
710	Spare Auxiliary Var.#7/#8
711	Spare Auxiliary Var.#9 /#10
712	Spare Auxiliary Var.#11 /#12
713	Program Variable #1/#2
714	Program Variable #3/#4
715	Program Variable #5/#6
716	Program Variable #7/#8

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M - MODBUS SHIFT- 2 OR 4 BYTES

Reassigns Modbus address registers on the Micro MV Liquid Flow Computer to predefined Modbus registers for easy polling and convenience. Use Modbus Shift to collect values in scattered Modbus registers into a consecutive order. The Micro MV Liquid Flow Computer will repeat the assigned variables into the selected locations.

Note: some Modbus registers are 2 byte/16 bit, and some are 4 byte/32 bit. Register size incompatibility could cause rejection to certain address assignments. Refer to the Modbus Address Table Registers in Chapter 5.

Example: you want to read the current status of switches #1 and #2 (addresses 2751 and 2752) and the Daily Gross Total for Meter #1 (address 3131). Make assignments such as:

       3082=2751   (2 bytes)
       3083=2752   (2 bytes)
       3819=3131   (4 bytes)

N - MODBUS SHIFT – FLOATING POINT

Use Modbus Shift to collect values in scattered Modbus floating point registers into a consecutive order. The Micro MV Liquid Flow Computer will repeat the assigned variables (Refer to the Modbus Address Table Registers in Chapter 5) into the selected locations (7501-7600)

*Note: Modbus shift registers are READ ONLY registers.

O - BOOLEAN STATEMENTS

From the MicroMV Flow Computer Configuration Software, Point cursor to **'I/O',** scroll down to **'Boolean Statements'** and a window will pop up allowing you to enter the statements.

Boolean Points – 4 digits (0001-0800, 7831-7899)

Enter the Boolean statements (**no space allowed**, up to 30 statements). Each statement contains up to two Boolean variables (optionally preceded by '/') and one of the Boolean function (&, +, *). **_4 digits are required_** for referencing programmable variables or Boolean points. (Example: 0001)
Example:
The statement is true if either temperature or pressure override is in use.

0070=0112+0113

BOOLEAN Statements and Functions

Each programmable Boolean statement consists of two Boolean variables optionally preceded a Boolean 'NOT' function (/) and separated by one of the Boolean functions (**&, +, ***). Each statement is evaluated every 100 milliseconds. Boolean variables have only two states 0 (False, OFF) or 1 (True, ON). Any variable (integer or floating point) can be used in the Boolean statements. The value of Integer or floating point can be either positive (TRUE) or negative (FALSE).

Boolean Functions	Symbol
NOT	**/**
AND	**&**
OR	**+**
EXCLUSIVE OR	*****

Boolean points are numbered as follows:
0001 through 0050   Digital I/O Points 1 through 50
       0001 – Status Input/Digital Output #1
       0002 – Status Input/Digital Output #2
       0003 – Status Input/Digital Output #3
       0004 – Status Input/Digital Output #4
       0005 – 0050 **-** Spare

0070 through 0099   Programmable Boolean Points

Boolean Points
0100 through 0199   Meter #1 Boolean Points
0200 through 0299   Meter #2 Boolean Points
0300 through 0399   Meter #3 Boolean Points
0400 through 0499   Meter #4 Boolean Points

1st digit–always 0, 2nd digit–meter number, 3rd and 4th digit-Selection
0n01   Spare
0n02   Spare
0n03   Spare
0n04   Spare
0n05   Meter Active
0n06   Spare
0n07   Any Active Alarms
0n08-0n10   Spare
0n11   DP Override in Use
0n12   Temperature Override in Use
0n13   Pressure Override in Use
0n14   Density Override in Use
0n15   BS&W Override in Use
0n17-0n20   Spare
0n21   Gravity Out of Range
0n22   Flow Rate High Alarm
0n23   Flow Rate Low Alarm
0n24   Table Temperature Out of Range
0n25   Alpha T Out of Range
0n26
0n27

0601 through 0800
0601   Analog Input #1 High
0602   Analog Input #1 Low
0603   Analog Input #2 High
0604   Analog Input #2 Low
0605   Analog Input #3 High
0606   Analog Input #3 Low
0607   Analog Input #4 High
0608   Analog Input #4 Low

0609   RTD Input High
0610   RTD Input Low
0611   Calibration Mode
0612   Battery Alarm
0613   Analog Output #1 Out of Range
0614   Analog Output #2 Out of Range
0615   Analog Output #3 Out of Range
0616   Analog Output #4 Out of Range

0617	Analog Input #1 Failed
0618	Analog Input #2 Failed
0619	Analog Input #3 Failed
0620	Analog Input #4 Failed
0621	RTD Input Failed
0622	Densitometer Failed
0623	Densitometer High Alarm
0624	Densitometer Low Alarm
0625	Multi-Variable DP High
0626	Multi-Variable DP Low
0627	Multi-Variable Pressure High
0628	Multi-Variable Pressure Low
0629	Multi-Variable Temperature High
0630	Multi-Variable Temperature Low
0631	Spare
0632	Spare
0633	Analog Input#1 Override in Use
0634	Analog Input#2 Override in Use
0635	Analog Input#3 Override in Use
0636	Analog Input#4 Override in Use
0637	RTD Input Override in Use
0638	Density Override in Use
0639	Densitometer Temperature Override in Use
0640	Densitometer Pressure Override in Use
0641	Multi-Variable DP Override in Use
0642	Multi-Variable Pressure Override in Use
0643	Multi-Variable Temperature Override in Use
0644	Spare
0645	Spare#1 Input Override in Use
0646	Spare#2 Input Override in Use
0647	Spare#3 Input Override in Use
0648	Spare#4 Input Override in Use
0649	G.C. Communication Failed
0650	Slave ID #1 Communication Failed
0651	Slave ID #2 Communication Failed
0652	Slave ID #3 Communication Failed
0653	MPU1200 Alarm
0654	Spare
0655	Spare
0656	Spare

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0657	Analog Input #5 High
0658	Analog Input #5 Low
0659	Analog Input #6 High
0660	Analog Input #6 Low
0661	Analog Input #7 High
0662	Analog Input #7 Low
0663	Analog Input #8 High
0664	Analog Input #8 Low
0665	Analog Input #9 High
0666	Analog Input #9 Low
0667	Spare
0668	Spare Input #5 Override in Use
0669	Spare Input #6 Override in Use
0670	Spare Input #7 Override in Use
0671	Spare Input #8 Override in Use
0672	Spare Input #9 Override in Use
0673	Analog Input #5 Override in Use
0674	Analog Input #6 Override in Use
0675	Analog Input #7 Override in Use
0676	Analog Input #8 Override in Use
0677	Analog Input #9 Override in Use
0678	Spare
0679	Spare
0680	Spare
0681	Auxiliary Variable #1 High
0682	Auxiliary Variable #1 Low
0683	Auxiliary Variable #2 High
0684	Auxiliary Variable #2 Low
0685	Auxiliary Variable #3 High
0686	Auxiliary Variable #3 Low
0687	Auxiliary Variable #4 High
0688	Auxiliary Variable #4 Low
0689	Auxiliary Variable #5 High
0690	Auxiliary Variable #5 Low
0691	Auxiliary Variable #6 High
0692	Auxiliary Variable #6 Low
0693	Auxiliary Variable #7 High
0694	Auxiliary Variable #7 Low
0695	Auxiliary Variable #8 High
0696	Auxiliary Variable #8 Low
0697	Auxiliary Variable #9 High
0698	Auxiliary Variable #9 Low
0699	Auxiliary Variable #10 High
0700	Auxiliary Variable #10 Low
0701	Auxiliary Variable #11 High
0702	Auxiliary Variable #11 Low
0703	Auxiliary Variable #12 High
0704	Auxiliary Variable #12 Low

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0705	Day Ended Flag (Last 5 Seconds)
0706	Month Ended Flag (Last 5 Seconds)
0707	Spare
0708	Spare
0709	Spare
0710	Spare
0711	Run Switch
0712	Spare
0713	Slave#1 DP High Alarm
0714	Slave#1 DP Low Alarm
0715	Slave#1 Pressure High Alarm
0716	Slave#1 Pressure Low Alarm
0717	Slave#1 Temperature High Alarm
0718	Slave#1 Temperature Low Alarm
0719	Spare
0720	Spare
0721	Slave#2 DP High Alarm
0722	Slave#2 DP Low Alarm
0723	Slave#2 Pressure High Alarm
0724	Slave#2 Pressure Low Alarm
0725	Slave#2 Temperature High Alarm
0726	Slave#2 Temperature Low Alarm
0727	Spare
0728	Spare
0729	Slave#3 DP High Alarm
0730	Slave#3 DP Low Alarm
0731	Slave#3 Pressure High Alarm
0732	Slave#3 Pressure Low Alarm
0733	Slave#3 Temperature High Alarm
0734	Slave#3 Temperature Low Alarm
0735	Spare
0736	Spare
0737	Slave#1 DP Override in Use
0738	Slave#1 Pressure Override in Use
0739	Slave#1 Temperature Override in Use
0740	Slave#2 DP Override in Use
0741	Slave#2 Pressure Override in Use
0742	Slave#2 Temperature Override in Use
0743	Slave#3 DP Override in Use
0744	Slave#3 Pressure Override in Use
0745	Slave#3 Temperature Override in Use

0801 through 0899   Command Boolean Points
0801	Alarm Acknowledge

P - PROGRAM VARIABLE STATEMENTS

From the MicroMV Flow Computer Configuration Software, Point cursor to **'I/O',** scroll down to **'Program Variable Statements'** and a window will pop up allowing you to enter the statements.

Enter the user programmable statements (**no space allowed**, up to 69 statements). Each statement contains up to three variables and separated by one of the mathematical functions. _**4 digits are required**_ for referencing programmable variables or Boolean points. (Example: 0001+7801)

Example:
7832 is equal to total of variable#1(Modbus addr.7801) and variable#2 (Modbus addr.7802)
32=7801+7802

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Variable Statements and Mathematical Functions

Each statement can contain up to 3 variables or constants.

Function	Symbol	
ADD	**+**	Add the two variables or constant
SUBTRACT	**-**	Subtract the variable or constant
MULTIPLY	*****	Multiply the two variables or constant
DIVIDE	**/**	Divide the two variables or constants
CONSTANT	**#**	The number following is interpreted as a constant
POWER	**&**	1st variable to the power of 2nd variable
ABSOLUTE	**$**	unsigned value of variable
EQUAL	**=**	Move result to another variable Variable within the range of 7801-7899 (floating points) Variable within the range of 5031-5069 (long integer)

IF STATEMENT   )   Compares the variable to another
Example: 7801)T7835 (if variable is greater to or is equal to 1 then go to 7835)
            7801)7802=#0 (if variable is greater to or is equal to 1 then set variable 7802 to 0)
GOTO STATEMENT   T   Go to a different statement (**forward only**)
Example: 7801%#60T7836 (if variable is equal to 60 then go to statement 7836)
COMPARE   %   Compare a value (**EQUAL TO**)
GREATER/EQUAL   >   Compare a value (**GREATER OR EQUAL TO)**
Example: 7801>7802T7836
(If variable 1 is greater to or equal to variable 2 then go to 7836)
Natural Log   L   Natural Log of variable

Order of precedence – absolute, power, multiply, divide, add and subtract.
Same precedence – left to right

Variables stored on the hourly report – 7071- 7075 will be **reset** at the end of hour.
Variables stored on the daily report   – 7076 - 7080 will be **reset** at the end of day.
Variables stored on the month report – 7081- 7085 will be **reset** at the end of month.

Scratch Pad Variables – Floating Point - 7801-7830 (Read or Write)
                                - Long Integer – 5031 – 5069 (Read or Write)

7262-7266 – Last Hour Program Variables (Read Only)
7434-7438 – Yesterday Program Variables (Read Only)
7466-7470 – Last Month Program Variables (Read Only)

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Q – VARIABLE STATEMENT TAGS

These tags are provided to add a meaningful description for the program variables.

R - SPARE ASSIGNMENT

Spare inputs are not used in the calculation and just for indication, display and alarm purpose only.

S - PID CONTROL

PID Configuration

(PID) Proportional Integral Derivative control– We call this function PID, however the flow computer performs Proportional Integral control. And does not apply the Derivative. The Derivative is not normally used in flow and pressure control operations and complicates the tuning operation

Use Flow Loop

(Valid entries are 0 or 1)
Enter 1 if the computer performs flow control.
Enter 0 if the flow computer does not perform flow control.

Flow Loop Maximum Flow rate

Enter the maximum flow rate for this meter. This rate will be basis for maximum flow rate to control at.

Flow Set Point

Enter the set point. The set point is the flow rate that the flow computer will try to control at.

Flow Acting – forward or reverse

Enter 0 if the control is direct acting, Enter 1 if the control is reverse acting.
Direct acting is when the output of the controller causes the flow rate to follow in the same direction. The output goes up and the flow rate increases. A fail Close valve located in line with the meter will typically be direct acting. If the Controller output signal increases, the control valve will open more causing the flow rate to increase.
Reverse acting is when the output of the controller causes the opposite action in the flow rate. A fail open valve in line with the meter will typically be reverse acting. If the Controller output increases the control valve will close some causing the flow rate to decrease.
Care must be taken to study where the valves are located in relation to the meter and whether the valves are fail open or fail close to understand if the controller should be direct or reverse acting. Some control valves can be fail in position (especially Electrically actuated control valves). This valve should be studied to understand if the actuators themselves are direct or reverse acting.

PID Flow Base

PID flow rate base can be gross, net, or mass flow rate.

Use Pressure Loop

(Valid entries are 0 or 1)
Enter 1 if the computer performs pressure control.
Enter 0 if the flow computer does not perform pressure control.

Pressure Maximum

Enter the Maximum pressure for this meter. This pressure will be basis for Maximum pressure to control at.

Pressure Set Point

Enter the set point. The set point is the pressure that the flow computer will try to control at.

Pressure Acting – forward or reverse

Enter 0 if the control is direct acting, Enter 1 if the control is reverse acting.
Direct acting is when the output of the controller causes the pressure to follow in the same direction. The output goes up and the pressure increases. A fail open valve located in the line downstream of the meter will typically be direct acting to maintain the pressure at the meter. An Increase in the output from the controller will cause the control valve to close thus causing the pressure to increase.
Reverse acting is when the output of the controller causes the opposite action in the flow rate. A fail close valve in the line downstream of the meter will typically be reverse acting to maintain the pressure at the meter. An increase in the output signal will cause the valve to open, which will cause the pressure to be released thus causing the pressure to decrease.
Care must be taken to study where the valves are located in relation to the meter and whether the valves are fail open or fail close to understand if the controller should be direct or reverse acting. Some control valves can be fail in position (especially Electrically actuated control valves). These valves should be studied to understand if the actuators themselves are direct or reverse acting.

PID Pressure Base

PID pressure base can be meter pressure or spare#1-#9.

System Data Minimum Output

Enter the minimum output percent (default to 0)

System Data Maximum Output

Enter the maximum output percent (default to 100.0)

Signal Selection

If flow and pressure loops are both configured in the PID control loop, select high or low signal to be the output.

Date: 9/28/2022

PID Tuning

Flow Controller Gain

(Allowable Entries 0.0 – 9.99)

The gain is effectively 1/Proportional Band.

The basis of theory for proportional band is the relationship of the percentage of the output of the controller to the percentage of the change of the process. In this case, if the control output changes 5% the flow rate should change 5%, the proportional band would be 1.0 and the gain would be 1.0.

If the percentage of the output is 5% and the flow rate would change by 10%, the proportional band would be 2 and the Gain would be 0.5

However since you do not know until you are flowing the effect of the output on the flow rate, you have to start somewhere. A good starting point is to use a proportional band of 0.5 if the valve is properly sized.

Flow Controller Reset

(Allowable Range 0.0 – 9.99)

Reset is the number of minutes per repeat is the time interval controller adjusts the output to the final control element. If the reset is set at 2, the flow computer will adjust the signal to the flow control valve every 2 minutes. If the Reset is set at 0.3, the output signal will be adjusted approximately every 20 seconds, until the process and set point are the same.

The rule of thumb is the reset per minute should be set slightly slower that the amount of time it takes for the control valve and the flow rate to react to the flow computer output signal changing.

This can only be determined when there is actual flow under normal conditions. It is best to start the reset at 0.3 or reset the signal every 3 minutes, if the control valve is properly sized.

Pressure Controller Gain

(Allowable Entries 0.0 – 9.99)

The gain is effectively 1/Proportional Band.

The basis of theory for proportional band is the relationship of the percentage of the output of the controller to the percentage of the change of the process. In this case, if the control output changes 5% the pressure should change 5%, the proportional band would be 1.0 and the gain would be 1.0.

If the percentage change of the output is 5% and the pressure would change by 10%, the proportional band would be 2 and the Gain would be 0.5.

However since you do not know until you are flowing the effect of the output on the pressure, you have to start somewhere. A good starting point is to use a proportional band of 0.5 if the control element is properly sized.

Pressure Controller Reset

(Allowable Range 0.0 – 9.99)

Reset is the number of times per minute the controller adjusts the output to the control valve. If the reset is set at 2, the flow computer will adjust the signal to the final control element every 2 minutes. If the Reset is set at 0.3, the output signal will be adjusted approximately every 20 seconds, until the process and the set point are the same.

The rule of thumb is the reset per minute should be set slightly slower that the amount of time it takes for the control valve and the pressure to react to the flow computer changing the output.

This can only be determined when there is actually flow under normal conditions. It is best to start the reset at 0.3 or reset the signal every 3 minutes, if the control element is properly sized.

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Download Firmare/Image File

To Download an Image File to the Flow Computer select the Tools option form the menu, and then Download Program.

A small dialog will appear asking for the file name of the image file. Type it in or use the Browse option to locate it. Once the file name is in place press Download. This task will take about 5 minutes to be completed.

Security Codes

The desktop application provides 5 security areas to prevent users from entering data into certain areas. The 5 areas are:

Master Access: Once the master access is granted, the user can access to all four areas.

Configuration: Allow user to modify device configuration settings.

Override: Allow user to change values directly on the device.

Calibration: Let the user to calibrate the device inputs.

Image File Download: Let user download an image file to the device. This procedure will erase all the information and configuration stored in the device.

Use the **Tools|Security Codes** option to modify the access code; a form will appear showing the five different security areas and the actual access status (at bottom of the form). To put a new access code log in to the desired security area and press Change security Code, type in the code and retype it on the confirm space to avoid mistyped codes. Then click [OK].

The system will update the security access every time the application connects to the device and every time data is written to the device it will check for security access before writing.

NOTE: In case the access code is forgotten contact our offices for a reset code.

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Connect to Device

Click [Connect to Device icon] to establish the communication. If the communication is failed, check information in the "Communication Port Settings".

Go Offline

Click [Go Offline icon]   to disconnect the communication.

Modbus Driver

DFM provides this tool to read and write Modbus registers from and to the MicroMV flow computers. It will display transmitting and receiving message in HEX format. It should be used for testing purpose only.

Settings

Each report has its own default template. The user can edit, modify and save as a new personal report. Specify the new location if you want to use the formatted report.

PID OPERATING

Click PID Loops icon to display PID output percentage, flow, and pressure data. To change setup, select entries under PID menu.

Flow Loop Set Point

Enter the set point. The set point is the flow rate that the flow computer will try to control at.

Flow Loop In Service OR Out of Service

The device can perform either flow control or pressure control, or both flow and pressure control. Check if the flow loop is in service or not.

Pressure Loop Set Point

Enter the set point. The set point is the pressure that the flow computer will try to control at.

Pressure Loop In Service OR Out of Service

The device can perform either flow control or pressure control, or both flow and pressure control. Check if the flow loop is in service or not.

Set Output Percentage

If PID output mode is in automatic mode, then enter the output percentage to control PID loop.

Auto/Manual Mode

PID mode can be configured as manual or automatic mode.

Reset PID

Reset PID data if PID configuration parameters are changed.

CALIBRATION

Calibrations are performed under **Calibration**. . Select inputs to be calibrated, and then select full, single, offset calibration method.

View Diagnostic Data

Diagnostic data will show live data changing real time. To control the switch outputs manually, check "Enable Switch Output Diagnostic Mode".

Calibrate Mode

To calibrate Flow Computer, totalizers will continue at same rate where live parameters will show actual value, i.e. flow rate, DP, pressure etc. Enter '1' to enable this feature.

SET CALIBRATION METER

Set the meter to be calibrated.

SET TIME (1-9 HOUR)

This entry is the duration for the calibrate mode. After time expires, the Micro MV Flow Computer will resume its normal operation.

CALIBRATION

See details in chapter 1.
.

Calibration - Slave Unit

This feature is only available if master and slave units are configured. (Slave type = 1) See detailed information in the "Slave Units Configuration" section.

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Calibration - Display

Display backlight mode

Display Backlight Mode	Description
0	60 seconds ON after a touch screen sensor is activated
1	Activate based on backlight timer Turn ON Hour and Backlight ON Timer in Hours
2	Backlight always OFF

Data Verification

Data verification will not affect the calibration, but will be documented into data verification report.

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Parameter Overrides:

Temperature Override

This value is entered when no live temperature is available, or when a different value from the live value should be used.

Pressure Override

Pressure override can be used when no live pressure transmitter is connected to the MicroML4 Flow Computer.

Venturi C Override

The value is the discharge coefficient for Venturi flow equations. The default value is .9950

Wedge Kd2 Override

The value is the discharge coefficient for Wedge flow equations.

BS&W Override

BS&W override can be used when no live BS&W input is connected to the MicroML4 Flow Computer.

Equilibrium Pressure Override

Enter equilibrium pressure override to the current batch.

Alpha T E-6 Override

Enter Alpha T Override to the batch. It will not affect the Alpha T value in the product file. Alpha T is the thermal expansion coefficient for the selected product. The flow computer divides by 1000000.
>   Example: 0.000355 = 355 / 1000000 (value entered is *335* for an Alpha T of 0.000355)

Orifice ID Override

Orifice ID in inches is the measured diameter of the orifice at reference conditions.

Pipe ID Override

Pipe ID in inches is the measured diameter of the pipe at reference conditions.

Multi-variables Input Override

The value can be used when the transmitter fails.

SG/Density Override

Enter Gravity Override to replace current gravity. The gravity override is a non-retroactive gravity and will not override the product file gravity. It only applies to the current running batch.

Analog Input Override

The value can be used when the transmitter fails, or while calibrating.

RTD Input Override

The value can be used when the transmitter fails, or while calibrating.

SYSTEM

DATE AND TIME

Change the date and time for the flow computer.

END BATCH ON ALL METERS

The batch will end if requested through this menu. The current batch totalizer and flow weighted data will reset to zero. Non-resettable totalizers are not affected by the batch resetting.

RESET CUMULATIVE TOTALIZER

Enter reset code to reset cumulative totalizer.

Non-resettable accumulated volume will roll over at 999999999.

CLEAR SYSTEM

Enter reset system code to reset all data.

NOTE: Contact our offices for a reset code.
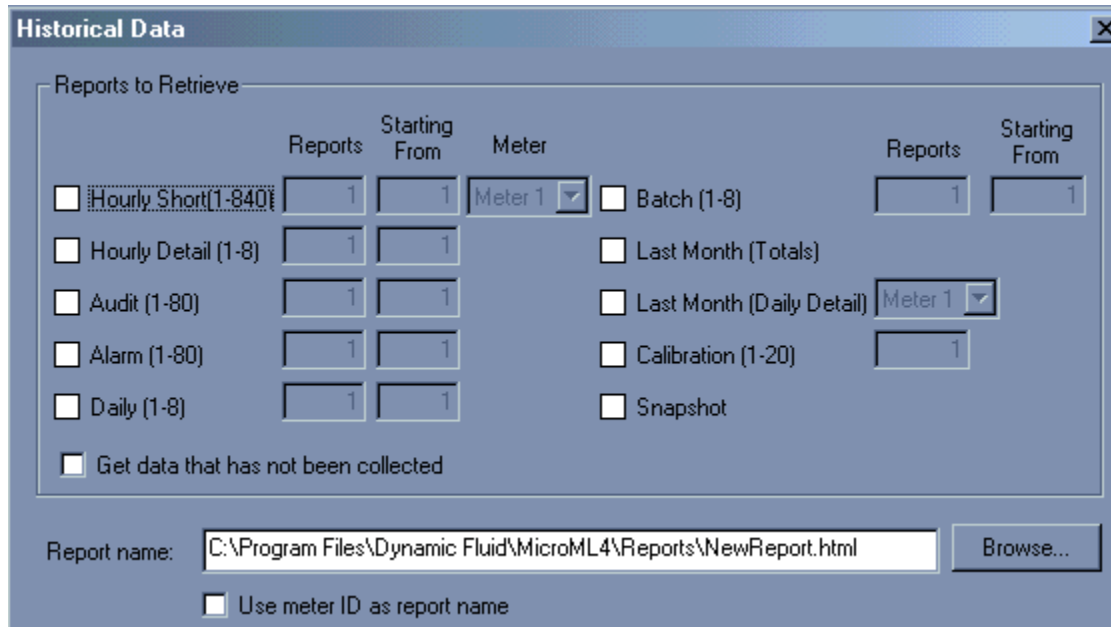
HISTORICAL DATA

CAPTURE REPORT

To retrieve historical data, go to **Historical Data** menu. It retrieves the information, shows it on the screen and stores in one report. Use the different names to save new reports. The data will be overwritten by the same file name. Select reports, enter the file name, click [Get Report] button to save all data in one report.

Templates are created for each report. The user can edit, modify the report template, and save as a new formatted report. Go to **"Tools | Settings…",** then click [...] button to specify the location or directory for the new report, and the location of the reports to be saved. Check "DFM File" box to generate the additional binary format of reports.

The available types of reports are:

PREVIOUS HOURLY DATA
Up to 840 previous hourly data are stored in the Flow Computer. Enter starting (1=Latest, 840=Oldest) report and the Flow Computer will go backward from that selected report. Current hour can not be retrieved.

PREVIOUS DETAIL HOURLY DATA
Up to 8 previous details hourly data are stored in the Flow Computer. Enter starting (1=Latest, 8=Oldest) report and the Flow Computer will go backward from that selected report. Current hour can not be retrieved.

AUDIT REPORT
The audit trail report shows configuration parameters that have changed which could influence the calculated numbers. The Flow Computer provides up to 80 event logs. One purpose for audit trail is to back track calculation errors that result from mistakes by the operator of the flow computer operator.

ALARM REPORT
Up to 80 previous alarm data can be retrieved. The data are starting from the most recent to the oldest.

PREVIOUS DAILY DATA
Up to 8 previous daily reports can be retrieved.

PREVIOUS BATCH DATA
Up to 8 previous batch reports can be retrieved.

LAST MONTH DATA
One month of detail data is stored in the Flow Computer. Select meter number to display, print, or capture.
Current month data cannot be retrieved.

LAST MONTH DATA – DAY BY DAY
Month of daily data is stored in the Flow Computer. Select meter number to display, print, or capture.
Current month data cannot be retrieved.

SCHEDULED AUTO POLLING

Automatic Data Polling

Use the **Historical Data|Scheduled Auto Polling** to retrieve report information from devices in a periodic basis automatically.

These are the following settings:

Enable Automatic Data Retrieval: Check this option to enable the automatic polling. If the automatic polling function is enabled an "AUTOPOLL" message will appear on the application's status bar (bottom-right corner of the application window).

Reports to Retrieve: check the reports you want to get from the devices, you can select as many as you want, just make sure the polling interval is long enough to allow the PC to retrieve the archive. For example, if the computer is programmed to poll 100 reports every 10 seconds, there will not be enough time to get the report before the next poll starts and data will be overlapped.

Report Name: provide a name to the reports captured so they will be available for viewing, printing and exporting.

Starting Day: Type the date where the poll is going to start. Select "Every Day" is the date doesn't matter.

Polling Time: select the time you want the automatic polling to start, then select "Poll One Time" if you want to execute these poll only once or select "Poll Every…" and type the polling interval for periodic polls. For example, to poll every hour and a half select "Poll Every…" and type 90 in the Minutes field. **IMPORTANT:** Do not use straight hours as starting time (i.e. 7:00, 8:00). The flow computer calculates and updates its information at the beginning of the hour so if data is retrieved at this time it might be erroneous. Allow about 5 minutes for the flow computer to update the data.

Polling List: Add all the units you want to get data from on every poll. You can add up to 100 units. To add a unit just click "Add" and then type the unit's **Modbus** ID number.

NOTE: The file C:\AutoPoll.log will contain all the logs for the automatic poll, it will tell if there was a problem or if the data was retrieved successfully.

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Viewing previously captured reports

Once a report is saved using the **Historical Data | Open Saved Report** option to view the report.
When the option is selected, a dialog will appear asking for the name and location of the report you want to
see.   The browse button can be used to specify the location or directory of the reports.

Printing Reports

Go to **Configuration File | Print Report** or click [icon] button to print reports.

- The **Print** Button (shown o the picture) lets you print the report to any printer installed in your
  computer. The printed version will look just like it is shown on the screen.

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Custom Report

Go to **Historical Data | Custom Report** to view the user report. Dynacom software allows the user to make personal report. The user can build its own formatted report and monitor the report on line. (real time data).

CUSTOM REPORT

Report Template

Current Template:

CustomTmp.custrpt

Location:

C:\Program Files\Dynamic Fluid\MicroML4\Templates\CustomTmp.custrpt

Load Template   Edit Template   New Template   Set as Default Template

Save Report   Help   Note: System must be online to see real time values on the report.

Click [Load Template] button to open a saved user report.

Click [Edit Template] button to modify a formatted report.

Click [New Template] button build a new report.

Any text can be used. Modbus register must follow the "^" sign in order for the program to retrieve the address location. Modbus Registers are listed in the Chapter 5.

Click [Set as Default Template] button to overwrite a default template report.

Click [Save Report] button to save a formatted report.

CHAPTER 3: Data Entry

Through Front Panel Display

The Data entry is a menu driven type construction.

Four Keys – **ESC/Mode, Enter/Select, Down Arrow/Right Arrow key**
These keys can be operated with a reflective object. The reflective object must be placed in front of the key to get a response.

Function

ESC/Mode Key
This key serves dual functions. In order to access the data entry, the mode key has to be activated. The mode key is on/off type key. This key will get the security code prompt, and then using select, enter key with the arrow keys to access the program. Place the reflective object on and then off for each step. Once the data menu function access is completed, exit by using the escape key.

Select/Enter Key

It is used to stop screen from scrolling, to select data entry, and accept the data configurations. It is on/off type key. Place the reflective object in front of key, and then move away before the next step.

Down Arrow Key, Right Arrow Key

Scrolling keys, the **Right Arrow Key** function is to scroll **Right** way for selecting the number to be changed, and then changing the number by using **Down Arrow Key**

MAIN MENU

It consists primarily of series of topics. Your valid choices are the two Arrow Keys (**Down**, **Right**) and select/enter key. Use the Down or Right Arrow keys to make your selection and then use the select/enter key. Use Esc/Mode key to go back to previous mode.

Security Code

> Enter Security Code   00000

Enter the right security code to be able to change data.

Calibrate /1=M.Var

Enter 0 to calibrate analog input 1-4, RTD, analog output 1-4, or enter '1' to calibrate multi-variable

> Calibrate/1=M.Var
>
> Override Meter No.
>
> Date Time
> Configuration

You must first select this menu and the number will begin to blink. Use arrow key to change between 0 and 1, then use select key.

```
Enable Calib. Mode
Analog Input (1-9)
RTD Input
Analog Output (1-4)
```

Enable Calibrate Mode

Enter '1' to enable calibrate mode. Calibration mode will set the flow computer to continue totalizing at same rate while all values are still showing live readings.

Calibrate Analog Input, RTD

0=**Offset** is a single point calibration that will offset zero and span.
1=**Full** – zero and span must be calibrated.
2=**Reset** to factory calibration.

```
0=Offset,1=Full
2=Reset
```

OFFSET (SINGLE POINT)

Induce the signal into the analog input, wait for 10 seconds for the reading to stabilize, then enter the offset.

```
Enter Correct Value        8.000


Current Value
              7.9000
```

FULL (ZERO AND SPAN CALIBRATION)

1. Calibrate Low Point (4mA or 75 Ω,), induce the known live value for the low set point, and wait for 10 seconds for the reading to stabilize. Now enter in that value.

```
First Point              0.000


Current Value
          0.900
```

2. Calibrate High Point (20mA or 120 Ω), induces the known live value for the high set point, and then wait for 10 seconds for the reading to stabilize. Now enter in that value.

```
Second Point             20.000


Current Value
          19.900
```

RESET (USE DEFAULT)

Enter '2' to use manufacture default.

Calibrate Analog Output

0=Offset is a single point calibration that will offset zero and span.
1=Full – zero and span must be calibrated.
2=Reset to factory calibration.

```
0=Offset,1=Full

2=Reset
```

FULL (ZERO AND SPAN CALIBRATION)

1.The screen will show the minimum possible signal 4mA. Enter the live output value reading in the end device i.e. 4mA.

```
Enter 4mA                4.000


Reading mA
          4.000
```

2. Now the flow computer will output full scale 20mA. Enter the live output i.e. 20mA

```
Enter 20mA               20.000


Reading mA
          20.000
```

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RESET (USE DEFAULT)

Enter '2' to use manufacture default.

Calibrate Multivariable

Select DP, Pressure, or Temperature to be calibrated.

Calibrate Muli.Var.

DP
Pressure
Temperature

Enter the calibrate method (0=Offset, 1=Full, 2=Reset).

0=Offset,1=Full

2=Reset

OFFSET (SINGLE POINT)
Induce the live value, and then enter the offset.

> Enter Offset   10.0000
>
>
> Current Value
>   10.9000

FULL (ZERO AND SPAN CALIBRATION)
1.Calibrate Low Point - induce the low range signal, and enter in that value.

> First Point   0.0000
>
>
> Current Value
>   0.9000

2. Calibrate High Point - induces the high range signal, and enters in that value.

> Second Point   250.0000
>
>
> Current Value
>   250.0000

RESET (USE DEFAULT)
Enter '2' to use manufacture default.

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Override Meter No.

Enter the meter number 1 or 2 to change meter override value

> TF/PF/MF
>
> BS&W/Venturi C/Equilibrium/Alpha T
>
> SG/Density/DCF
> Orifice/Pipe ID

TF/PF/MF

TF - Temperature

This value is entered when no live temperature is available, or when a different value from the live value should be used.

PF – Pressure

This value is entered when no live temperature is available, or when a different value from the live value should be used.

MF – Meter Factor

Enter the value to change current meter factor (Frequency Device Method)

BS&W/VENTURI C/EQUILIBRIUM PRESSURE/ALPHA T

BS&W Override: used to enter a value to override the BS&W factor.
Venturi C Override: used to enter a value to override the flow coefficient C factor.
Equilibrium Pressure Override: used to enter a value to override the equilibrium pressure.
Alpha T Override: used to enter a value to override the Alpha T value.

SG /DCF/DENSITY

SG Override is used to override the specific gravity.
DCF- Density Correction Factor
Density Override is used to override the density.

ORIFICE/PIPE ID

Orifice ID in inches is the measured inside pipe diameter to 5 decimals at reference conditions

Pipe ID in inches is the measured diameter of the orifice at reference conditions.

Date/Time

> Change Date
>
> Change Time

CHANGE DATE

> Month   09
>
> Day   08
>
> Year   00
> Change Date 1=Yes

Enter Month (1-12), Day (1-31), Year (0-99) and then enter '1' to change date.

CHANGE TIME

> Hour   09
>
> Minute   08
>
> Second   00
> Change Time 1=Yes

Enter Hour (0-23), Minute (0-59), Second (0-59) and then enter '1' to change time.

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Configuration

> Configuration

> Configure Meter No   1
>
> Configure I/O
> Pulse Output
> Others

Configue Meter

> Flow Equation 0-4   1
>
> 0=New AGA3,1=Venturi
> 2=Freq,3=Wedge,4=Foxboro

Flow Equation Type

0 = API 14.3 (NEW AGA3, 1992 Orifice Equations)
1 = Venturi
2 = Frequency Device
3 = Wedge
4 = FOXBORO (Assume: US unit – Mass in LB/HR, Density LB/CF, Metric Unit- Mass in M3, Density in KG/M3)

NEW AGA3

```
Orifice ID              10.00000

Pipe ID,                5.00000

DP Cut Off              1.0000
Viscosity               .024500
```

Pipe I.D.

Orifice ID

Pipe ID is the measured inside pipe diameter to 5 decimals at reference conditions. Orifice ID is the measured diameter of the orifice at reference conditions.

DP Cutoff

The Micro MV Liquid Flow Computer suspends all calculations whenever the DP, in inches of water column, is less than this value. This function is vital for suppressing extraneous data when the DP transmitter drifts around the zero mark under no-flow conditions.

Viscosity in Centipoise

Even though viscosity will shift with temperature and pressure changes, the effect on the calculations is negligent. Therefore using a single value is appropriate in most cases. Enter viscosity in centipoise.

VENTURI

```
Orifice ID              10.00000

Throat ID               5.00000

DP Cut Off              1.0000

C Coefficient           .024500
```

Pipe I.D.

Throat ID

Pipe ID is the measured inside pipe diameter to 5 decimals at reference conditions. Throat ID is the measured diameter of the orifice at reference conditions.

DP Cutoff

The Micro MV Liquid Flow Computer suspends all calculations whenever the DP is less than this value. This function is vital for suppressing extraneous data when the DP transmitter drifts around the zero mark under no-flow conditions.

Discharge Coefficient C

This value is the discharge coefficient for Venturi flow equations. The default value is 0.9950.

FREQUENCY DEVICE

K Factor	1000.000
Meter Factor	1.00000
Flow Cut Off Freq.	1

K Factor

K Factor is the number of pulses per unit volume, i.e. 1000 pulses/unit. The tag on the meter would normally indicate the K Factor.

Meter Factor

Meter Factor is a correction to the K Factor for this individual meter, applied multiply to the K factor.

Flow Cutoff Frequency

The Flow Computer will quit totalizing, when frequency is below the set limit. This feature is to reduce noise effect when the meter is down for period of time. The totalizer will stop totalizing when the frequency is below the cut off limit.

Configure I/O

Analog Output
Meter I/O
Status/Switch
Flow Computer Display

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Analog Output

Ana.Out#1 Assign	1
Ana.Out#2 Assign	0
Ana.Out#3 Assign	0
Ana.Out#4 Assign	0

Assignments: 3 Digits

	Meter 1	Meter 2	Meter 3	Meter 4
Gross Flow Rate	111	211	311	411
Net Flow Rate	112	212	312	412
Mass Flow Rate	113	213	313	413
DP	121	221	321	421
Temperature	122	222	322	422
Pressure	123	223	323	423
Density	124	224	324	424
Base Density	125	225	325	425
SG	126	226	326	426
Base SG	127	227	327	427
DP Low	128	228	328	428
DP High	129	229	329	429

Station Gross Flow Rate	511
Station Net Flow Rate	512
Station Mass Flow Rate	513

	Assignment		
Analog Input #1	1	Spare Auxiliary#1	11
Analog Input #2	2	Spare Auxiliary#2	12
Analog Input #3	3	Spare Auxiliary#3	13
Analog Input #4	4	Spare Auxiliary#4	14
RTD Input	5	Spare Auxiliary#5	15
Remote Control	6	Spare Auxiliary#6	16
Meter #1 PID	7	Spare Auxiliary#7	17
Meter #2 PID	8	Spare Auxiliary#8	18
Meter #3 PID	9	Spare Auxiliary#9	19
Meter #4 PID	10	Spare Auxiliary#10	20
		Spare Auxiliary#11	21
		Spare Auxiliary#12	22
		Densitometer Temp	23
		Densitometer Press	24

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Meter I/O

Temperature

Pressure

DP

Densitometer

ASSIGNMENTS

0=	Not Used
1=	Analog Input#1
2=	Analog Input#2
3=	Analog Input#3

4=	Analog Input#4
5=	RTD
21=	Analog Input#5
22=	Analog Input#6

7 =	Dens.Freq (Not Selectable)
10 =	Multi. Variable Module
23=	Analog Input#7
24=	Analog Input#8
25=	Analog Input#9

4MA

Enter the 4mA value for the transducer.

20MA

Enter the 20mA value for the transducer.

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Status Input Assignment

Status/Switch#1	000
Status/Switch#2	001
Status/Switch#3	000
Status/Switch#4	000

	Assignment	Comments
1	End Batch	End batch and reset batch totalizer for all the meters
2	Product Bit 0	Before ending the batch, the user can use status input bit to select
3	Product Bit 1	next product. These bits are read once when batch is ended.
4	Product Bit 2	
5	Alarm Acknowledge	Reset the previous occurred alarms output bit
6	Calibration Mode	Calibration mode will set the flow computer to continue totalizing at same rate while all values are still showing live readings.

Switch Output Assignment

User can assign an output to each of the Micro MV Liquid Flow Computer's output switches from this list. The Micro MV Liquid Flow Computer switch outputs are sourcing through switch power input power. Outputs in the top list, "Pulse Outputs", require a definition of pulse output per unit volume. Therefore a Pulse Output Width must be defined when one of these switch types are chosen. These outputs are available through switch 1 or 2 only.

Outputs in the bottom list, "Contact Type Outputs", are ON/OFF type outputs. They can be assigned to any of the four switch outputs.

Switches 1 and 2 can be pulse or contact type output; switches 3, 4 are contact-type output only.

ASSIGNMENTS - PULSE OUTPUTS

	Meter 1	Meter 2	Meter 3	Meter 4
Gross	101	104	107	110
Net	102	105	108	111
Mass	103	106	109	112

Station Gross	113
Station Net	114
Station Mass	115

ASSIGNMENTS - CONTACT TYPE OUTPUTS

	Meter 1	Meter 2	Meter 3	Meter 4
Batch Ended	116	121	126	131
Temperature Out Range	117	122	127	132
Gravity Out of Range	118	123	128	133
Flow Rate High	119	124	129	134
Flow Rate Low	120	125	130	135
Meter Down	138	225	226	227

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Flow Computer Display Assignment

FC.Display#1	000
FC.Display#2	001
FC.Display#3	000
FC.Display#4	000

Display assignment can be selected up to 16 assignments. The Micro MV Liquid Flow Computer will scroll through them at the assigned delay time.

Assignment

	Meter 1	Meter 2	Meter 3	Meter 4
Gross Flow Rate	101	201	301	401
Net Flow Rate	102	202	302	402
Mass Flow Rate	103	203	303	403
Gross Batch Total	104	204	304	404
Net Batch Total	105	205	305	405
Mass Batch Total	106	206	306	406
Gross Daily Total	107	207	307	407
Net Daily Total	108	208	308	408
Mass Daily Total	109	209	309	409
Gross Month Total	110	210	310	410
Net Month Total	111	211	311	411
Mass Month Total	112	212	312	412
Gross Cumulative Total	113	213	313	413
Net Cumulative Total	114	214	314	414
Mass Cumulative Total	115	215	315	415
Previous Gross Batch Total	116	216	316	416
Previous Net Batch Total	117	217	317	417
Previous Mass Batch Total	118	218	318	418
Previous Gross Daily Total	119	219	319	419
Previous Net Daily Total	120	220	320	420
Previous Mass Daily Total	121	221	321	421

Station Gross Flow Rate	501
Station Net Flow Rate	502
Station Mass Flow Rate	503

	Meter 1	Meter 2	Meter 3	Meter 4
Temperature	122	222	322	422
Pressure	123	223	323	423
Density	124	224	324	424
DP	125	225	325	425
DP Low	126	226	326	426
DP High	127	227	327	427
Alarms	128	228	328	428
Orifice ID	129	229	329	429
Pipe ID	130	230	330	430
PID – Flow	131	231	331	431
PID – Pressure	132	232	332	432
PID – Output	133	233	333	433
Base Density	134	234	334	434
SG	135	235	335	435
Base SG	136	236	336	436
FWA DP	137	237	337	437
FWA Temperature	138	238	338	438
FWA Pressure	139	239	339	439
FWA Density	140	240	340	440
FWA Base Density	141	241	341	441
FWA SG	142	242	342	442

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FWA Base SG	143	243	343	443
Last Batch FWA Temperature	144	244	344	444
Last Batch FWA Pressure	145	245	345	445
Last Batch FWA Density	146	246	346	446
Density Period	147	247	347	447
Un-Corrected Density	148	248	348	448

Selection	Description		Selection	Description
701	Date/Time		**709**	Spare Auxiliary Var.#5/#6
702	Battery Voltage/Spare Variable #1		**710**	Spare Auxiliary Var.#7/#8
703	Spare Variable #2/#3		**711**	Spare Auxiliary Var.#9/#10
704	Spare Variable #4/#5		**712**	Spare Auxiliary Var.#11/#12
705	Spare Variable #6/#7		**713**	Program Variable #1/#2
706	Spare Variable #8/#9		**714**	Program Variable #3/#4
707	Spare Auxiliary Variable#1/#2		**715**	Program Variable #5/#6
708	Spare Auxiliary Variable#3/#4		**716**	Program Variable #7/#8

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Pulse Output

```
Pulse Output

#1 P/Unit#1              1.000
#2 P/Unit#2              1.000
Pulse Width              50
```

PULSE OUTPUT AND PULSE OUTPUT WIDTH

Pulse Output is used to activate a sampler or external totalizer. The number selected will be pulses per unit volume or per unit mass. If 0.1 pulse is selected, the one pulse will be given every 10 unit volumes has passed through the meter.

Pulse Output Width is the duration, in milliseconds, of one complete pulse cycle (where each cycle is the pulse plus a wait period, in a 50/50 ratio). For example: if POW = 500 msec, the Micro MV Liquid Flow Computer at most can produce one pulse each second regardless of the pulse per unit volume selected (500 msec pulse + 500 msec wait). If POW = 10 msec the Micro MV Liquid Flow Computer can produce up to 50 pulses per second.

The Micro MV Liquid Flow Computer's maximum pulse output is 125 pulses/sec. The Pulse Output in combination with the Pulse Output Width should be set appropriately.

Others

```
Day Start Hour            7

0=Hour,1=Day,2=Min        0
Disable Alarms            0
```

DAY START HOUR (0-23)

Day start hour is used for daily totalizer reset operation.

FLOW RATE SELECTION

The flow rate will be based on hourly basis, daily, or minute.

DISABLE ALARMS

Use Disable Alarms to ignore alarms. When the alarm function is disabled alarms are not logged. Alarms are also not logged if the DP is below the cut-off limit.

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CHAPTER 4: FLOW EQUATIONS

Common Terms

The following terms are used throughout this chapter.

Term	Definition	US Units	Metric Unit	Examples
q	Flow rate: volume or mass displaced per unit time	See equations	See equations	q_{mass} , q_{energy}
T	Temperature	°F unless noted	°C unless noted	
DP	Differential Pressure across measuring device	Inches H_2O	m.Bar	
d	Orifice Diameter	Inches	Millimeter	d , d_r , d_m
D	Pipe Diameter	Inches	Millimeter	D , D_r , D_m
β	$= \dfrac{d}{D} = \dfrac{Orifice\ diameter}{Pipe\ diameter}$			β , β_r
ρ	Density (usually of the fluid)	Lb/ft^3	Kg/M^3	$\rho_{flowing}$, ρ_m
μ	Viscosity	centipoise	centipoise	
HN	Heating Value	BTU/ ft^3	MJ/ M^3	
Y	Expansion factor			

Subscripts: Conventions Used

This Subscript	Means	Examples
r	At reference conditions	$T_{r,p}$ = reference temperature of the pipe
O (letter o)	Refers to the orifice	$T_{r,O}$ = reference temperature of the orifice
P	Refers to the pipe	
flowing	At flow conditions	$\rho_{flowing}$ = density at flow conditions
cal	Calibration conditions	T_{cal} , P_{cal}
m	At measured conditions	D_m = pipe diameter at measured temp.

API 14.3

For more information, please see *Orifice Metering of Natural Gas*, 3rd edition.

Mass Flow Rate $= \dfrac{\pi}{4} \times N_c \times C_d \times E_v \times d^2 \times Y \times \sqrt{2DP \times Density} \times .001$

Net Flow Rate $= \dfrac{Mass\ Flow}{Base\ Density}$

Gross Flow Rate $= \dfrac{Mass\ Flow}{Flowing\ Density}$

Where:
N_c = Units Conversion Constant
C_d = Orifice Plate Coefficient of Discharge
$E_v = \dfrac{1}{\sqrt{1-\beta^4}}$ = Velocity of Approach Factor
d = Orifice plate bore diameter
Y = Expansion Factor
DP = Orifice Differential Pressure

	US unit	Metric Unit
N_c	323.279	.036
Density	lb/ft^3	kg/m^3
Gross Flow Rate/HR	MCF	KM3
Net Flow Rate/HR	MSCF	KSM3
Mass Flow Rate/HR	MLB	TON

Venturi

$$Mass\ Flow\ Rate = \frac{N \times 3.6 \times C \times Y \times Fa \times d^2\sqrt{Density \times DP}}{\sqrt{1 - Beta^4}}$$

$$Net\ Flow\ Rate = \frac{Mass\ Flow\ Rate}{Reference\ Density}$$

$$Gross\ Flow\ Rate = \frac{Mass\ Flow\ Rate}{Flowing\ Density}$$

Where
> **DP =** Differential Pressure
> **C =** Discharge Coefficient C (Manual Entry)
> **Y =** Expansion Factor
> **Fa =** Manual Entry
> **d =** Venturi Bore Diameter at Reference

(Refer to **Miller Measurement Engineering Handbook**)

Frequency Device

Please see ***Common Terms*** at the beginning of this chapter.

$$Gross\ Flow\ Per\ Hour = \frac{Pulse}{K\ Factor} \times 3600$$

$$Net\ Standard\ Flow\ Per\ Hour = Gross\ Flow \times \frac{Flowing\ Density}{Base\ Density} \times (1 - BSW)\% \times LMF \times 3600$$

$$Mass\ Flow\ Per\ Hour = Gross\ Flow \times Flowing\ Density \times 3600$$

Mass Pulse

$$Mass\ Flow\ Per\ Hour = \frac{Mass\ Pulse}{K\ Factor} \times 3600$$

$$Net\ Standard\ Flow\ Per\ Hour = \frac{Mass\ Flow}{Density\ at\ Base} \times (1 - BSW)\% \times LMF \times 3600$$

$$Gross\ Flow\ Per\ Hour = \frac{Mass\ Flow}{Flowing\ Density} \times 3600$$

Wedge

US unit

Flow Rate (Gallon/Minute) $= 5.668 \times Fa \times Kd^2 \times \sqrt{\dfrac{DP}{SG}}$

Where:

DP = different pressure, inches of water
SG = Liquid specific gravity at flow conditions
Fa   = Expansion Coefficient of Wedge
Kd2 = Discharge Coefficient of Wedge

Metric Unit

Flow Rate (Liter/Hour) $= 1.287343 \times Fa \times Kd^2 \times \sqrt{\dfrac{DP}{SG}}$

Where:

DP = different pressure
SG = Liquid specific gravity at flow conditions
Fa   = Expansion Coefficient of Wedge
Kd2 = Discharge Coefficient of Wedge

DENSITY EQUATIONS

Sarasota Density(GM/CC-US Unit, KG/M3-Metric Unit)

Sarasota density is calculated using the frequency signal produced by a Sarasota densitometer, and applying temperature and pressure corrections as shown below.

$$\text{Corrected Density} = DCF \times \frac{2D_0(t\text{-}T_{0p})}{T_{0p} \times \dfrac{1+K(t\text{-}T_{0p})}{2T_{0p}}}$$

$Where:$

$$T_{0p} = T_{coef} \times (T - T_{cal}) + P_{coef} \times (P - P_{cal}) + T_0$$

$DCF = Density\ Correction\ Factor$

$D_0 = Calibration\ constant,\ mass/volume,\ gm/cm^3$

$t = Densitometer\ oscillation\ period\ in\ microseconds.$

$t_0 = A\ calibration\ constant\ in\ microseconds$

$T_{coef} = Temperature\ coefficient\ in\ microseconds/°F(USUnit)or°C(MetricUnit)$

$P = Flowing\ pressure\ in\ PSIG(USUnit),\ BAR,\ orKG/CM(MetricUnit)$

$P_{coef} = Pressure\ coefficient\ in\ microseconds/PSIG(US\ Unit),\ BAR,\ or\ KG/CM(Metric\ Unit)$

$P_{cal} = Calibration\ pressure\ in\ PSIG(USUnit),\ BAR,\ orKG/CM(MetricUnit)$

UGC Density(GM/CC-US Unit, KG/M3-Metric Unit)

UGC density is calculated using the frequency signal produced by a UGC densitometer, and applying temperature and pressure corrections as shown below

$$\text{Corrected Density} = DCF \times P_{flowing}\{[K(P_{off}+d)\times 10^{-6}]+[K_T(T_{flowing}-T_{cal})] + d\}$$

$$Where:$$

$$d = K_0 + K_1 t + K_2 t^2$$

$$K_0, K_1, K_2 = Calibration\ Constants$$

$$t = Densitometer\ oscillation\ period\ in\ microseconds$$

$$DCF = Density\ Correction\ Factor$$

$$K = Pressure\ Constant$$

$$P_{off} = Pressure\ Offset$$

$$K_T = Temperature\ Coefficient$$

$$T_{cal} = Temperature\ coefficient\ in\ microseconds/°F(USUnit), or°C(MetricUnit)$$

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Solartron Density (GM/CC-US Unit)

Solartron density is calculated using the frequency signal produced by a Solartron densitometer, and applying temperature and pressure corrections as shown below.

Density at 68°F and 0 PSIG

$$D = K_0 \; + \; K_1 t \; + \; K_2 \; t^2$$

$$Where \quad t \; = \; Densitometer \; Oscillation \; Period \; in \; microseconds$$

$$K_0, K_1, K_2 \; = Calibration \; Constants \; Supplied \; by \; Solartron$$

Temperature Corrected Density

$$DT \; = \; D[1 + K_{18}(T\text{-}68)] \; + \; K_{19}(T\text{-}68)$$

$$Where \; T \; = \; Temperature \; in \; °F$$

Temperature and Pressure Corrected Density

$$DP \; = \; DL(1 + K_{20}P) \; + \; K_{21}P$$

$$Where:$$

$$P = \; Pressure \, in \, PSIG$$

$$K_{20} = K_{20A} \; + K_{20B}P$$

$$K_{21} = K_{21A} + K_{21B}P$$

$$K_{20A}, K_{20B}, K_{21A}, K_{21B} = \; Calibration \; Constants \; Supplied \; by \; Solarton$$

Additional Equation for Velocity of Sound Effects

The following equation can provide more accurate measurement for LPG products in the density range of $0.300 \leq D \leq 0.550$ (D is in gm/cc). ***Contact Solarton to get information about KR and KJ constants.***

$$D_{vos} \; = DP + K_r (DP - K_j)^3$$

$$Let \; K_r = 0.0 \, outside \, this \, range.$$

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Solartron Density (KG/M3-Metric Unit)

Density at 20°C and 0 KPA

$$D = K_0 \; + \; K_1 t \; + \; K_2 \, t^2$$

$$Where \quad t \; = \; Densitometer \; Oscillation \; Period \; in \; microseconds$$

$$K_0, K_1, K_2 \; = Calibration \; Constants \; Supplied \; by \; Solartron$$

Temperature Corrected Density

$$DT \; = \; D[1 + K_{18}(T\text{-}20\,)] \; + \; K_{19}(T\text{-}20\,)$$

$$Where \; T \; = \; Temperature \; in \; °C$$

Temperature and Pressure Corrected Density

$$DP \; = \; DL(1 + K_{20}P) \; + \; K_{21}P$$

$$Where:$$

$$P = \; Pressure \, in \; KPA$$

$$K_{20} = K_{20A} \; + K_{20B}P$$

$$K_{21} = K_{21A} + K_{21B}P$$

$$K_{20A}, K_{20B}, \; K_{21A}, K_{21B} \; = \; Calibration \; Constants \; Supplied \; by \; Solarton$$

Additional Equation for Velocity of Sound Effects

The following equation can provide more accurate measurement for LPG products in the density range of
$0.300 \le D \le 0.550$ (D is in kg/m3).

$$D_{vos} \; = DP + K_r(DP - K_j)^3$$

$$Let \; K_r = 0.0 \, outside \; this \; range.$$

CHAPTER 5: MODBUS DATA

MODBUS PROTOCOL

TRANSMISSION MODE

	ASCII	RTU
DATA BITS	7	8
START BITS	1	1
PARITY	EVEN, ODD	NONE
STOP BITS	1	1
ERROR CHECKING	LRC	CRC
BAUD RATE	1200-9600	1200-9600

ASCII FRAMING

Framing is accomplished by using colon (:) character indicating the beginning of frame and carriage (CR), line feed (LF) for the end of frame

ASCII MESSAGE FORMAT

	ADDRESS	FUNCTION	DATA	ERR\CHECK		
:	2 CHAR	2 CHAR	Nx2 CHAR	2 CHAR	CR	LF
8 BITS	16 BITS	16 BITS	Nx16 BITS	16 BITS	8 BITS	8 BITS

RTU FRAMING

Frame synchronization is done by time basis only. The Flow Computer allows 3.5 characters time without new characters coming in before proceeding to process the message and resetting the buffer.

RTU MESSAGE FORMAT

ADDRESS	FUNCTION	DATA	CRC
8 BITS	8 BITS	Nx8 BITS	16 BITS

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FUNCTION CODE

To inform the slave device of what function to perform

FUNCTION CODE	ACTION
01	
03	Read Strings or Multiple 16 Bits
16	Write Strings or Multiple 16 Bits

ERROR CHECK

LRC MODE

The LRC check is transmitted as two ASCII hexadecimal characters. First, the message has to be stripped of the: LF, CR, and then converted the HEX ASCII to Binary. Add the Binary bits and then two's complement the result.

CRC MODE

The entire message is considered in the CRC mode. Most significant bit is transmitted first. The message is pre-multiplied by 16. The integer quotient digits are ignored and the 16-bit remainder is appended to the message as the two CRC check bytes. The resulting message including the CRC, when divided by the same polynomial $(X16+X15+X2+1)$ at the receiver, which will give zero remainder if no error, has occurred.

EXCEPTION RESPONSE

Exception response comes from the slave if it finds errors in communication. The slave responds to the master echoing the slave address, function code (with high bit set), exception code and error check. To indicate that the response is notification of an error, the high order bit of the function code is set to 1.

EXCEPTION CODE	DESCRIPTION
01	Illegal Function
02	Illegal Data Address
03	Illegal Data Value

BROADCAST COMMAND

All units listen to Unit ID Zero, and no one will respond when the write function is broadcasted.

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MODBUS EXAMPLES

FUNCTION CODE 03 (Read Single or Multiple Register Points)

Each Modbus System has a different Modbus address range. For example, 40000 or 90000 is the high level message generated through the host Modbus system. The set up and offset are different for each host Modbus system.

READ A SHORT (SINGLE) WORD NUMERIC VARIABLE

The short word numeric variable is a 16-bit integer
Data: 16 bits (short word: two 8-bit bytes- high byte, low byte),
Short Integer Variable Modbus Address: from 1801 to 3030

RTU MODE

Read Address 3001

ADDR	FUNC CODE	STARTING POINT		# OF POINTS		CRC CHECK	
		HI	LO	HI	LO		
01	03	0B	B9	00	01	57	CB

Response - **Data** - **02 63 (Hex), 611 (Decimal)**

ADDR	FUNC CODE	BYTE COUNTS	DATA		CRC CHECK	
			HI	**LO**		
01	03	02	**02**	**63**	F9	0D

ASCII MODE - Read Address 3076

	ADDR		FUNC CODE		STARTING POINT				# OF POINTS				LRC CHECK			
					HI		LO		HI		LO					
:	30	31	30	33	30	43	30	43	30	30	30	31	45	42	CR	LF

Response

	ADDR		FUNC CODE		BYTE COUNT		DATA				LRC CHECK			
							HI		LO					
:	30	31	30	33	30	32	30	30	30	31	46	39	CR	LF

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READ A LONG WORD NUMERIC VARIABLE

The long word numeric variable is a *two 16-bit integers* with decimal inferred
Data: two 16-bit (32 bits, two words: high word, low word).
Sign bit - first bit of high word (0:positive, 1:negative)
Long Integer Variable Modbus Address: from 3131 to 9645

Read Address 3131

ADDR	FUNC CODE	STARTING Address		# OF Registers		CRC CHECK	
		HI	LO	HI	LO		
01	03	0C	3B	00	**02**	B6	96

Response - Data - **4 Bytes - 00 05 6A 29 (Hex), 611 (Decimal)**

ADDR	FUNC CODE	BYTE COUNTS	DATA				CRC CHECK	
			HI Word		**LO Word**			
01	03	04	**00**	**05**	**6A**	**29**	05	4C

Data Bytes - 00 05 6A 29 (Hex) = 354857 (decimal)
Data with 2 decimal places inferred = 3548.57

For Example:
Honeywell Modbus system - read address **93131**
Delta-V Modbus system - read address **43131**
Data Calculation
Value = High Word x 65536 + Low Word

       High Word = 00 05 (Hex), 5 (Decimal)
       Low Word = 6A 29 (Hex), 27177 (Decimal)
       = 5 x 65536 + 27177
       = 354857
       Two decimal places inferred
       = 3548.57

READ A FLOATING POINT VARIABLE

The floating point variable is a single precision floating point value
One register with 4 data bytes (high word and low word)

IEEE Floating Point Format

Sign	Exponent	Mantissa
1 bit	8 bits	23 bits

Byte 3	Byte 2	Byte 1	Byte 0
SEEEEEEE	EMMMMMMM	MMMMMMMM	MMMMMMMM

Modbus Address: From 7001 to 7999

Sample Floating Point Value

Read Register 7047

ADDR	FUNC CODE	STARTING Address		# OF Registers		CRC CHECK	
		HI	LO	HI	LO		
01	03	1B	87	00	**01**	32	C7

Response - Four Data Bytes - **47 6C 4A 00 (HEX) = 60490.0**

ADDR	FUNC CODE	BYTE COUNTS	DATA				CRC CHECK	
			HI Word		**LO Word**			
01	03	04	**47**	**6C**	**4A**	**00**	19	FA

Modbus Address Table – 16 Bits Integer

ADDRESS	DESCRIPTION	DECIMAL	READ/WRITE
1801-1848	Spare		
1849	Reserved		
1850	Slave#4 Unit ID	0 Inferred	Read/Write
1851	Slave#1 Unit ID	0 Inferred	Read/Write
1852	Slave#1 Variable#1 Type	0 Inferred	Read/Write
1853	Slave#1 Variable#2 Type	0 Inferred	Read/Write
1854	Slave#1 Variable#3 Type	0 Inferred	Read/Write
1855	Slave#1 Variable#4 Type	0 Inferred	Read/Write
1856	Slave#1 Variable#5 Type	0 Inferred	Read/Write
1857	Slave#1 Variable#1 Desitination	0 Inferred	Read/Write
1858	Slave#1 Variable#2 Desitination	0 Inferred	Read/Write
1859	Slave#1 Variable#3 Desitination	0 Inferred	Read/Write
1860	Slave#1 Variable#4 Desitination	0 Inferred	Read/Write
1861	Slave#1 Variable#5 Desitination	0 Inferred	Read/Write
1862	Slave#1 Variable#1 Source Address	0 Inferred	Read/Write
1863	Slave#1 Variable#2 Source Address	0 Inferred	Read/Write
1864	Slave#1 Variable#3 Source Address	0 Inferred	Read/Write
1865	Slave#1 Variable#4 Source Address	0 Inferred	Read/Write
1866	Slave#1 Variable#5 Source Address	0 Inferred	Read/Write
1867	Slave#2 Unit ID	0 Inferred	Read/Write
1868	Slave#2 Variable#1 Type	0 Inferred	Read/Write
1869	Slave#2 Variable#2 Type	0 Inferred	Read/Write
1870	Slave#2 Variable#3 Type	0 Inferred	Read/Write
1871	Slave#2 Variable#4 Type	0 Inferred	Read/Write
1872	Slave#2 Variable#5 Type	0 Inferred	Read/Write
1873	Slave#2 Variable#1 Desitination	0 Inferred	Read/Write
1874	Slave#2 Variable#2 Desitination	0 Inferred	Read/Write
1875	Slave#2 Variable#3 Desitination	0 Inferred	Read/Write
1876	Slave#2 Variable#4 Desitination	0 Inferred	Read/Write
1877	Slave#2 Variable#5 Desitination	0 Inferred	Read/Write
1878	Slave#2 Variable#1 Source Address	0 Inferred	Read/Write
1879	Slave#2 Variable#2 Source Address	0 Inferred	Read/Write
1880	Slave#2 Variable#3 Source Address	0 Inferred	Read/Write
1881	Slave#2 Variable#4 Source Address	0 Inferred	Read/Write
1882	Slave#2 Variable#5 Source Address	0 Inferred	Read/Write
1883	Slave#3 Unit ID	0 Inferred	Read/Write
1884	Slave#3 Variable#1 Type	0 Inferred	Read/Write
1885	Slave#3 Variable#2 Type	0 Inferred	Read/Write
1886	Slave#3 Variable#3 Type	0 Inferred	Read/Write
1887	Slave#3 Variable#4 Type	0 Inferred	Read/Write
1888	Slave#3 Variable#5 Type	0 Inferred	Read/Write
1889	Slave#3 Variable#1 Desitination	0 Inferred	Read/Write
1890	Slave#3 Variable#2 Desitination	0 Inferred	Read/Write
1891	Slave#3 Variable#3 Desitination	0 Inferred	Read/Write
1892	Slave#3 Variable#4 Desitination	0 Inferred	Read/Write
1893	Slave#3 Variable#5 Desitination	0 Inferred	Read/Write
1894	Slave#3 Variable#1 Source Address	0 Inferred	Read/Write

Modbus Address Table – 16 Bits Integer

ADDRESS	DESCRIPTION	DECIMAL	READ/WRITE
1895	Slave#3 Variable#2 Source Address	0 Inferred	Read/Write
1896	Slave#3 Variable#3 Source Address	0 Inferred	Read/Write
1897	Slave#3 Variable#4 Source Address	0 Inferred	Read/Write
1898	Slave#3 Variable#5 Source Address	0 Inferred	Read/Write
1899	Slave Unit Update Flag (1=Slave,2=G.C,3=MPU)	0 Inferred	Read/Write
1900	Slave#1 Type	0 Inferred	Read/Write
1901	Slave#2 Type	0 Inferred	Read/Write
1902	Slave#3 Type	0 Inferred	Read/Write
1903	Slave#4 Type	0 Inferred	Read/Write
1904-1920	Spare		
1921	DFM Display Screen#9 Assignment #1	0 Inferred	Read/Write
1922	DFM Display Screen#9 Assignment #2	0 Inferred	Read/Write
1923	DFM Display Screen#10 Assignment #1	0 Inferred	Read/Write
1924	DFM Display Screen#10 Assignment #2	0 Inferred	Read/Write
1925	DFM Display Screen#11 Assignment #1	0 Inferred	Read/Write
1926	DFM Display Screen#11 Assignment #2	0 Inferred	Read/Write
1927	DFM Display Screen#12 Assignment #1	0 Inferred	Read/Write
1928	DFM Display Screen#12 Assignment #2	0 Inferred	Read/Write
1929	Analog Input#1 Tag Number	0 Inferred	Read/Write
1930	Analog Input#2 Tag Number	0 Inferred	Read/Write
1931	Analog Input#3 Tag Number	0 Inferred	Read/Write
1932	Analog Input#4 Tag Number	0 Inferred	Read/Write
1933	Analog Input#5 Tag Number	0 Inferred	Read/Write
1934	Analog Input#6 Tag Number	0 Inferred	Read/Write
1935	Analog Input#7 Tag Number	0 Inferred	Read/Write
1936	Analog Input#8 Tag Number	0 Inferred	Read/Write
1937	Analog Input#9 Tag Number	0 Inferred	Read/Write
1938	Auxiliary I/O #1 Tag Number	0 Inferred	Read/Write
1939	Auxiliary I/O #2 Tag Number	0 Inferred	Read/Write
1940	Auxiliary I/O #3 Tag Number	0 Inferred	Read/Write
1941	Auxiliary I/O #4 Tag Number	0 Inferred	Read/Write
1942	Auxiliary I/O #5 Tag Number	0 Inferred	Read/Write
1943	Auxiliary I/O #6 Tag Number	0 Inferred	Read/Write
1944	Auxiliary I/O #7 Tag Number	0 Inferred	Read/Write
1945	Auxiliary I/O #8 Tag Number	0 Inferred	Read/Write
1946	Auxiliary I/O #9 Tag Number	0 Inferred	Read/Write
1947	Auxiliary I/O #10 Tag Number	0 Inferred	Read/Write
1948	Auxiliary I/O #11 Tag Number	0 Inferred	Read/Write
1949	Auxiliary I/O #12 Tag Number	0 Inferred	Read/Write
1950	Slave#1 DP Calib. Index	0 Inferred	Read/Write
1951	Slave#1 Pressure Calib. Index	0 Inferred	Read/Write
1952	Slave#1 Temperature Calib. Index	0 Inferred	Read/Write
1953	Spare Auxiliary I/O#1 Calib. Index	0 Inferred	Read/Write
1954	Spare Auxiliary I/O#2 Calib. Index	0 Inferred	Read/Write
1955	Spare Auxiliary I/O#3 Calib. Index	0 Inferred	Read/Write
1956	Spare Auxiliary I/O#4 Calib. Index	0 Inferred	Read/Write
1957	Slave#2 DP Calib. Index	0 Inferred	Read/Write
1958	Slave#2 Pressure Calib. Index	0 Inferred	Read/Write
1959	Slave#2 Temperature Calib. Index	0 Inferred	Read/Write
1960	Spare Auxiliary I/O#5 Calib. Index	0 Inferred	Read/Write
1961	Spare Auxiliary I/O#6 Calib. Index	0 Inferred	Read/Write
1962	Spare Auxiliary I/O#7 Calib. Index	0 Inferred	Read/Write

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Modbus Address Table – 16 Bits Integer

ADDRESS	DESCRIPTION	DECIMAL	READ/WRITE
1963	Spare Auxiliary I/O#8 Calib. Index	0 Inferred	Read/Write
1964	Slave#3 DP Calib. Index	0 Inferred	Read/Write
1965	Slave#3 Pressure Calib. Index	0 Inferred	Read/Write
1966	Slave#3 Temperature Calib. Index	0 Inferred	Read/Write
1967	Spare Auxiliary I/O#9 Calib. Index	0 Inferred	Read/Write
1968	Spare Auxiliary I/O#10 Calib. Index	0 Inferred	Read/Write
1969	Spare Auxiliary I/O#11 Calib. Index	0 Inferred	Read/Write
1970	Spare Auxiliary I/O#12 Calib. Index	0 Inferred	Read/Write
1971	Analog Input #5 Calib. Index	0 Inferred	Read/Write
1972	Analog Input #6 Calib. Index	0 Inferred	Read/Write
1973	Analog Input #7 Calib. Index	0 Inferred	Read/Write
1974	Analog Input #8 Calib. Index	0 Inferred	Read/Write
1975	Analog Input #9 Calib. Index	0 Inferred	Read/Write
1976	Spare Auxiliary I/O #1 Decimal Places	0 Inferred	Read
1977	Spare Auxiliary I/O #2 Decimal Places	0 Inferred	Read
1978	Spare Auxiliary I/O #3 Decimal Places	0 Inferred	Read
1979	Spare Auxiliary I/O #4 Decimal Places	0 Inferred	Read
1980	Spare Auxiliary I/O #5 Decimal Places	0 Inferred	Read
1981	Spare Auxiliary I/O #6 Decimal Places	0 Inferred	Read
1982	Spare Auxiliary I/O #7 Decimal Places	0 Inferred	Read
1983	Spare Auxiliary I/O #8 Decimal Places	0 Inferred	Read
1984	Spare Auxiliary I/O #9 Decimal Places	0 Inferred	Read
1985	Spare Auxiliary I/O #10 Decimal Places	0 Inferred	Read
1986	Spare Auxiliary I/O #11 Decimal Places	0 Inferred	Read
1987	Spare Auxiliary I/O #12 Decimal Places	0 Inferred	Read
1988-1999	Spare		

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Modbus Address Table – 16 Bits Integer

ADDRESS	DESCRIPTION	DECIMAL	READ/WRITE
2142	Display Sensitive Factor	0 Inferred	Read/Write
2143	Spare		
2144	Diagnostic Mode	0 Inferred	Read/Write
2145	Modbus Shift Update	0 Inferred	Read/Write
2146-2350	Reserved		
2351	Port 3 (2nd 485) Modbus Type (0=RTU,1=ASCII)	0 Inferred	Read/Write
2352	Port 3 (2nd 485) Parity(0=None,1=Odd,2=Even)	0 Inferred	Read/Write
2353	Port 3 (2nd 485) Baud Rate(0=1200,1=2400,3=4800,4=9600)		
2354	reserved		
2355	Port 3 (2nd 485) RTS Delay in Milliseconds	0 Inferred	Read/Write
2356-2367	Reserved		
2368	IEEE Floating Point Modbus 0=one 32 bit data ,1=two 16 bit data		
2369	IEEE Floating Point Modbus 0=HI,LO,1=LO,HI Byte	0 Inferred	Read/Write
2370-2398	Reserved		
2399	Program Variable Statement Update	0 Inferred	Read/Write
2400	Boolean Statement Update	0 Inferred	Read/Write
2401-2530	Reserved		
2531	Floating Variable Modbus Shift Update	0 Inferred	Read/Write
2532-2533	Spare		
2534	Flow Copmputer Display Delay	0 Inferred	Read/Write
2535	DFM Display Screen#1 Assignment #1	0 Inferred	Read/Write
2536	DFM Display Screen#1 Assignment #2	0 Inferred	Read/Write
2537	DFM Display Screen#2 Assignment #1	0 Inferred	Read/Write
2538	DFM Display Screen#2 Assignment #2	0 Inferred	Read/Write
2539	DFM Display Screen#3 Assignment #1	0 Inferred	Read/Write
2540	DFM Display Screen#3 Assignment #2	0 Inferred	Read/Write
2541	DFM Display Screen#4 Assignment #1	0 Inferred	Read/Write
2542	DFM Display Screen#4 Assignment #2	0 Inferred	Read/Write
2543	DFM Display Screen#5 Assignment #1	0 Inferred	Read/Write
2544	DFM Display Screen#5 Assignment #2	0 Inferred	Read/Write
2545	DFM Display Screen#6 Assignment #1	0 Inferred	Read/Write
2546	DFM Display Screen#6 Assignment #2	0 Inferred	Read/Write
2547	DFM Display Screen#7 Assignment #1	0 Inferred	Read/Write
2548	DFM Display Screen#7 Assignment #2	0 Inferred	Read/Write
2549	DFM Display Screen#8 Assignment #1	0 Inferred	Read/Write
2550	DFM Display Screen#8 Assignment #2	0 Inferred	Read/Write
2551	Flow Copmputer ID or Unit ID	0 Inferred	Read/Write
2552	reserved		
2553	Port 1 (1st 485) Modbus Type (0=RTU,1=ASCII)	0 Inferred	Read/Write
2554	Port 1 (1st 485) Parity(0=None,1=Odd,2=Even)	0 Inferred	Read/Write
2555	Port 1 (1st 485) Baud Rate(0=1200,1=2400,3=4800,4=9600)		
2556	reserved		
2557	Port 1 (1st 485) RTS Delay in Milliseconds	0 Inferred	Read/Write
2558-2559	reserved		
2560	Port 2 (RS232) Select 0=RTS,1=Printer	0 Inferred	Read/Write
2561	Port 2 (RS232) Modbus Type (0=RTU,1=ASCII)	0 Inferred	Read/Write
2562	Port 2 (RS232) Parity(0=None,1=Odd,2=Even)	0 Inferred	Read/Write
2563	Port 2 (RS232) Baud Rate(0=1200,1=2400,3=4800,4=9600)		
2564	Reserved		
2565	Port 2 (RS232) RTS Delay in Milliseconds	0 Inferred	Read/Write
2566	Printer- Number of Nulls	0 Inferred	Read/Write
2567	Reserved		

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Modbus Address Table – 16 Bits Integer

ADDRESS   DESCRIPTION   DECIMAL READ/WRITE

ADDRESS	DESCRIPTION	DECIMAL	READ/WRITE
2568	No. of Meters	0 Inferred	Read/Write
2569	Select 0=US, 1=Metric Unit	0 Inferred	Read/Write
2570	Metric Pressure Units? 0=Bar,1=KG/CM2,2=KPA	0 Inferred	Read/Write
2571	Flow Units? 0=CF,1=M3,2=Gallon,3=Liter,4=BBL	0 Inferred	Read/Write
2572	Common Temperature 1=Yes	0 Inferred	Read/Write
2573	Common Pressure 1=Yes	0 Inferred	Read/Write
2574	Common Density 1=Yes	0 Inferred	Read/Write
2575	Use Station Total	0 Inferred	Read/Write
2576	Spare #1 Assignment	0 Inferred	Read/Write
2577	Spare #2 Assignment	0 Inferred	Read/Write
2578	Spare #3 Assignment	0 Inferred	Read/Write
2579	Spare #4 Assignment	0 Inferred	Read/Write
2580	DP Unit (0=m.Bar, 1=KPA) – Metric Unit	0 Inferred	Read/Write
2581	Flow Rate Display 0=Hour,1=Day,2=Minute	0 Inferred	Read/Write
2582	Flowrate Averaged Seconds (1-5)	0 Inferred	Read/Write
2583	Day Start Hour (0-23)	0 Inferred	Read/Write
2584	Disable Alarms ? (0=No, 1=Yes)	0 Inferred	Read/Write
2585	New Alarm Delay Timer	0 Inferred	Read/Write
2586	Disable Cry-Out Alarm Message	0 Inferred	Read/Write
2587	Pulse Width	0 Inferred	Read/Write
2588	Cry-Out Alarm Delay Timer	0 Inferred	Read/Write
2589	Reserved		
2590	Analog Output Expnasion	0 Inferred	Read/Write
2591	Spare #5 Assignment	0 Inferred	Read/Write
2592	Spare #6 Assignment	0 Inferred	Read/Write
2593	Spare #7 Assignment	0 Inferred	Read/Write
2594	Spare #8 Assignment	0 Inferred	Read/Write
2595	Spare #9 Assignment	0 Inferred	Read/Write
2596	Status Input/Switch Output #1 Assign	0 Inferred	Read/Write
2597	Status Input/Switch Output #2 Assign	0 Inferred	Read/Write
2598	Status Input/Switch Output #3 Assign	0 Inferred	Read/Write
2599	Status Input/Switch Output #4 Assign	0 Inferred	Read/Write
2600	Analog Output #1 Assign	0 Inferred	Read/Write
2601	Analog Output #2 Assign	0 Inferred	Read/Write
2602	Analog Output #3 Assign	0 Inferred	Read/Write
2603	Analog Output #4 Assign	0 Inferred	Read/Write
2604	Analog Input #5 Fail Code	0 Inferred	Read/Write
2605	Analog Input #6 Fail Code	0 Inferred	Read/Write
2606	Analog Input #7 Fail Code	0 Inferred	Read/Write
2607	Analog Input #8 Fail Code	0 Inferred	Read/Write
2608	Analog Input #9 Fail Code	0 Inferred	Read/Write
2609	Freq KF.Unit 0=CF,1=BBL,2=Gal.,3=Liter,4=BBL	0 Inferred	Read/Write
2610	Enable Battery Alarm (1=Yes)	0 Inferred	Read/Write
2611-2620	Company Name	20 Chars	Read/Write
2621-2630	Meter Location	20 Chars.	Read/Write
2631-2634	Meter #1 ID	8 Chars	Read/Write
2635-2638	Meter #2 ID	8 Chars	Read/Write
2639-2642	Meter #3 ID	8 Chars	Read/Write
2643-2646	Meter #4 ID	8 Chars	Read/Write
2647-2655	Reserved		
2656	Meter #1 Use Stack DP	0 Inferred	Read/Write

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Modbus Address Table – 16 Bits Integer

ADDRESS	DESCRIPTION	DECIMAL	READ/WRITE
2657	Meter #1 Density Type	0 Inferred	Read/Write
2658	Meter #1 Density Unit	0 Inferred	Read/Write
2659	Meter #1 Flow Cut Off	0 Inferred	Read/Write
2660	Meter #1 Flow Equation	0 Inferred	Read/Write
2661	Meter #1 Y Factor Select	0 Inferred	Read/Write
2662	Meter #1 BS&W Assignment	0 Inferred	Read/Write
2663	Meter #1 Retroactive Meter Factor (1=Yes)	0 Inferred	Read/Write
2664	Meter #1 DP.Low Assignment	0 Inferred	Read/Write
2665	Meter #1 Temperature Assignment	0 Inferred	Read/Write
2666	Meter #1 Pressure Assignment	0 Inferred	Read/Write
2667	Meter #1 Density Assignment	0 Inferred	Read/Write
2668	Meter #1 DP.High Assignment	0 Inferred	Read/Write
2669	Meter #1 Mass Pulse	0 Inferred	Read/Write
2670-2675	Spare		
2676	Meter #2 Use Stack DP	0 Inferred	Read/Write
2677	Meter #2 Density Type	0 Inferred	Read/Write
2678	Meter #2 Density Unit	0 Inferred	Read/Write
2679	Meter #2 Flow Cut Off	0 Inferred	Read/Write
2680	Meter #2 Flow Equation	0 Inferred	Read/Write
2681	Meter #2 Y Factor Select	0 Inferred	Read/Write
2682	Meter #2 BS&W Assignment	0 Inferred	Read/Write
2683	Meter #2 Retroactive Meter Factor (1=Yes)	0 Inferred	Read/Write
2684	Meter #2 DP.Low Assignment	0 Inferred	Read/Write
2685	Meter #2 Temperature Assignment	0 Inferred	Read/Write
2686	Meter #2 Pressure Assignment	0 Inferred	Read/Write
2687	Meter #2 Density Assignment	0 Inferred	Read/Write
2688	Meter #2 DP.High Assignment	0 Inferred	Read/Write
2689	Meter #1 Mass Pulse	0 Inferred	Read/Write
2690-2695	Spare		
2696	Meter #3 Use Stack DP	0 Inferred	Read/Write
2697	Meter #3 Density Type	0 Inferred	Read/Write
2698	Meter #3 Density Unit	0 Inferred	Read/Write
2699	Meter #3 Flow Cut Off	0 Inferred	Read/Write
2700	Meter #3 Flow Equation	0 Inferred	Read/Write
2701	Meter #3 Y Factor Select	0 Inferred	Read/Write
2702	Meter #3 BS&W Assignment	0 Inferred	Read/Write
2703	Meter #3 Retroactive Meter Factor (1=Yes)	0 Inferred	Read/Write
2704	Meter #3 DP.Low Assignment	0 Inferred	Read/Write
2705	Meter #3 Temperature Assignment	0 Inferred	Read/Write
2706	Meter #3 Pressure Assignment	0 Inferred	Read/Write
2707	Meter #3 Density Assignment	0 Inferred	Read/Write
2708	Meter #3 DP.High Assignment	0 Inferred	Read/Write
2709	Meter #3 Mass Pulse	0 Inferred	Read/Write
2710-2715	Spare		
2716	Meter #4 Use Stack DP	0 Inferred	Read/Write
2717	Meter #4 Density Type	0 Inferred	Read/Write
2718	Meter #4 Density Unit	0 Inferred	Read/Write
2719	Meter #4 Flow Cut Off	0 Inferred	Read/Write
2720	Meter #4 Flow Equation	0 Inferred	Read/Write
2721	Meter #4 Y Factor Select	0 Inferred	Read/Write
2722	Meter #4 BS&W Assignment	0 Inferred	Read/Write
2723	Meter #4 Retroactive Meter Factor	0 Inferred	Read/Write
2724	Meter #4 DP.Low Assignment	0 Inferred	Read/Write

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Modbus Address Table – 16 Bits Integer

ADDRESS   DESCRIPTION   DECIMAL READ/WRITE

ADDRESS	DESCRIPTION	DECIMAL	READ/WRITE
2725	Meter #4 Temperature Assignment	0 Inferred	Read/Write
2726	Meter #4 Pressure Assignment	0 Inferred	Read/Write
2727	Meter #4 Density Assignment	0 Inferred	Read/Write
2728	Meter #4 DP High Assignment	0 Inferred	Read/Write
2729	Meter #1 Mass Pulse	0 Inferred	Read/Write
2730-2735			
2736	Analog Input #1 Fail Code	0 Inferred	Read/Write
2737	Analog Input #2 Fail Code	0 Inferred	Read/Write
2738	Analog Input #3 Fail Code	0 Inferred	Read/Write
2739	Analog Input #4 Fail Code	0 Inferred	Read/Write
2740	RTD Input Fail Code	0 Inferred	Read/Write
2741	Muti.Var.DP Fail Code	0 Inferred	Read/Write
2742	Muti.Var.Pressure Fail Code	0 Inferred	Read/Write
2743	Muti.Var.Temperature Fail Code	0 Inferred	Read/Write
2744	Densitometer Fail Code	0 Inferred	Read/Write
2745	Densitometer Temperature Assignment	0 Inferred	Read/Write
2746	Densitometer Pressure Assignment	0 Inferred	Read/Write
2747	Activiate Backlight Start Hour (0-23)	0 Inferred	Read/Write
2748	Backlight On Timer in Hours	0 Inferred	Read/Write
2749	Backlignt Mode	0 Inferred	Read/Write
2750	Spare		
2751	Status Input/Switch Output #1 (0=OFF,1=ON)	0 Inferred	Read/Write
2752	Status Input/Switch Output #2 (0=OFF,1=ON)	0 Inferred	Read/Write
2753	Status Input/Switch Output #3 (0=OFF,1=ON)	0 Inferred	Read/Write
2754	Status Input/Switch Output #4 (0=OFF,1=ON)	0 Inferred	Read/Write
2755-2860	Reserved		
2861-2864	Analog Input #5 Tag Name	8 Chars	Read/Write
2865-2868	Analog Input #6 Tag Name	8 Chars	Read/Write
2869-2872	Analog Input #7 Tag Name	8 Chars	Read/Write
2873-2876	Analog Input #8 Tag Name	8 Chars	Read/Write
2877-2880	Analog Input #9 Tag Name	8 Chars	Read/Write
2881	Multivar.DP Calibration Index	0 Inferred	Read/Write
2882	Multivar.Pressure Calibration Index	0 Inferred	Read/Write
2883	Multivar.Temperature Calibration Index	0 Inferred	Read/Write
2884-2887	Spare		
2888	Reset Multivar. Calibration	0 Inferred	Read/Write
2889-2990	Spare		
2891-2894	Analog Input #1 Tag Name	8 Chars	Read/Write
2895-2898	Analog Input #2 Tag Name	8 Chars	Read/Write
2899-2902	Analog Input #3 Tag Name	8 Chars	Read/Write
2903-2906	Analog Input #4 Tag Name	8 Chars	Read/Write
2907-2910	RTD Input Tag Name	8 Chars	Read/Write
2911-2914	Density Input Tag Name	8 Chars	Read/Write
2915-2918	Analog Output #1 Tag Name	8 Chars	Read/Write
2919-2922	Analog Output #2 Tag Name	8 Chars	Read/Write
2923-2926	Analog Output #3 Tag Name	8 Chars	Read/Write
2927-2930	Analog Output #4 Tag Name	8 Chars	Read/Write
2931-2934	Multi.Var DP Tag	8 Chars.	Read/Write
2935-2938	Multi.Var.Pressure Tag	8 Chars.	Read/Write
2939-2942	Multi.Var Temperature Tag	8 Chars.	Read/Write
2943	Meter#1 PID Auto/Manual	0 Inferred	Read/Write
2944	Meter#1 PID Flow Loop Used (1=Yes)	0 Inferred	Read/Write

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Modbus Address Table – 16 Bits Integer

ADDRESS	DESCRIPTION	DECIMAL	READ/WRITE
2945	Meter#1 PID Flow Direct/Reverse Act	0 Inferred	Read/Write
2946	Meter#1 PID Pressure Loop Used (1=Yes)	0 Inferred	Read/Write
2947	Meter#1 PID Pressure Direct/Reverse Act	0 Inferred	Read/Write
2948	Meter#1 PID Flow Loop in Service	0 Inferred	Read/Write
2949	Meter#1 PID Pressure Loop in Service	0 Inferred	Read/Write
2950	Meter#1 PID 0=Low,1=High Signal	0 Inferred	Read/Write
2951	Meter#1 PID Flow Base 0=Gross,1=Net,2=Mass	0 Inferred	Read/Write
2952	Meter#2 PID Auto/Manual	0 Inferred	Read/Write
2953	Meter#2 PID Flow Loop Used (1=Yes)	0 Inferred	Read/Write
2954	Meter#2 PID Flow Direct/Reverse Act	0 Inferred	Read/Write
2955	Meter#2 PID Pressure Loop Used (1=Yes)	0 Inferred	Read/Write
2956	Meter#2 PID Pressure Direct/Reverse Act	0 Inferred	Read/Write
2957	Meter#2 PID Flow Loop in Service	0 Inferred	Read/Write
2958	Meter#2 PID Pressure Loop in Service	0 Inferred	Read/Write
2959	Meter#2 PID 0=Low,1=High Signal	0 Inferred	Read/Write
2960	Meter#2 PID Flow Base 0=Gross,1=Net,2=Mass	0 Inferred	Read/Write
2961	Meter#3 PID Auto/Manual	0 Inferred	Read/Write
2962	Meter#3 PID Flow Loop Used (1=Yes)	0 Inferred	Read/Write
2963	Meter#3 PID Flow Direct/Reverse Act	0 Inferred	Read/Write
2964	Meter#3 PID Pressure Loop Used (1=Yes)	0 Inferred	Read/Write
2965	Meter#3 PID Pressure Direct/Reverse Act	0 Inferred	Read/Write
2966	Meter#3 PID Flow Loop in Service	0 Inferred	Read/Write
2967	Meter#3 PID Pressure Loop in Service	0 Inferred	Read/Write
2968	Meter#3 PID 0=Low,1=High Signal	0 Inferred	Read/Write
2969	Meter#3 PID Flow Base 0=Gross,1=Net,2=Mass	0 Inferred	Read/Write
2970	Meter#4 PID Auto/Manual	0 Inferred	Read/Write
2971	Meter#4 PID Flow Loop Used (1=Yes)	0 Inferred	Read/Write
2972	Meter#4 PID Flow Direct/Reverse Act	0 Inferred	Read/Write
2973	Meter#4 PID Pressure Loop Used (1=Yes)	0 Inferred	Read/Write
2974	Meter#4 PID Pressure Direct/Reverse Act	0 Inferred	Read/Write
2975	Meter#4 PID Flow Loop in Service	0 Inferred	Read/Write
2976	Meter#4 PID Pressure Loop in Service	0 Inferred	Read/Write
2977	Meter#4 PID 0=Low,1=High Signal	0 Inferred	Read/Write
2978	Meter#4 PID Flow Base 0=Gross,1=Net,2=Mass	0 Inferred	Read/Write
2979	Meter#1 PID Pressure Base	0 Inferred	Read/Write
2980	Meter#2 PID Pressure Base	0 Inferred	Read/Write
2981	Meter#3 PID Pressure Base	0 Inferred	Read/Write
2982	Meter#4 PID Pressure Base	0 Inferred	Read/Write
2983-2984	Spare		
2985	Analog Output#1 –Remote Control (0-100)	0 Inferred	Read/Write
2986	Analog Output#2 –Remote Control (0-100)	0 Inferred	Read/Write
2987	Analog Output#3 –Remote Control (0-100)	0 Inferred	Read/Write
2988	Analog Output#4 –Remote Control (0-100)	0 Inferred	Read/Write
2989	Reset PID		
2990	Slave #1 DP Fail Code	0 Inferred	Read/Write
2991	Slave #1 Pressure Fail Code	0 Inferred	Read/Write
2992	Slave #1 Temperature Fail Code	0 Inferred	Read/Write
2993	Slave #2 DP Fail Code	0 Inferred	Read/Write
2994	Slave #2 Pressure Fail Code	0 Inferred	Read/Write
2995	Slave #2 Temperature Fail Code	0 Inferred	Read/Write
2996	Slave #3 DP Fail Code	0 Inferred	Read/Write
2997	Slave #3 Pressure Fail Code	0 Inferred	Read/Write
2998	Slave #3 Temperature Fail Code	0 Inferred	Read/Write

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Modbus Address Table – 16 Bits Integer

ADDRESS   DESCRIPTION   DECIMAL READ/WRITE

ADDRESS	DESCRIPTION	DECIMAL	READ/WRITE
2999	Spare		
3001	Version Number	2 Inferred	Read
3002-3006	Reserved		
3007	Product Used	0 Inferred	Read
3008-3011	Meter #1 ID	8 Chars	Read
3012	Report Format (0=Standard, 1=Prog.Variable)	0 Inferred	Read/Write
3013	End Batch	0 Inferred	Read/Write
3014-3017	Meter #2 ID	8 Chars	Read
3018	Flow Computer Unit Number	0 Inferred	Read
3019	Disable Alarms (1=Yes)	0 Inferred	Read/Write
3020	Spare	0 Inferred	Read/Write
3021	Spare	0 Inferred	Read/Write
3022	Calibrate Meter	0 Inferred	Read
3023	Application Tag	0 Inferred	Read
3024	Enable Calibration Mode (1=Yes)	0 Inferred	Read
3025	Calibration – Set Time (1-9 Hours)	0 Inferred	Read
3026	Spare		
3027	Last Batch Report Request (1-8)	0 Inferred	Write
3028	Reserved		
3029	Last Hourly Report Request (1-8 Long Report)	0 Inferred	Write
3030	Last Alarm Report Request (1-80)	0 Inferred	Write
3031	Last Audit Report Request (1-80)	0 Inferred	Write
3032	Last Daily Report Request (1-8 Long Report)	0 Inferred	Write
3033	Last Month Report Request	0 Inferred	Write
3034-3040	Spare		
3041	Product #1 Table Selection	0 Inferred	Read/Write
3042	Product #2 Table Selection	0 Inferred	Read/Write
3043	Product #3 Table Selection	0 Inferred	Read/Write
3044	Product #4 Table Selection	0 Inferred	Read/Write
3045	Product #5 Table Selection	0 Inferred	Read/Write
3046	Product #6 Table Selection	0 Inferred	Read/Write
3047	Product #7 Table Selection	0 Inferred	Read/Write
3048	Product #8 Table Selection	0 Inferred	Read/Write
3049	Next Batch Product Number	0 Inferred	Read/Write
3050	Spring Forward Month	0 Inferred	Read/Write
3051	Spring Forward Day	0 Inferred	Read/Write
3052	Fall Back Month	0 Inferred	Read/Write
3053	Fall Back Day	0 Inferred	Read/Write
3054	Enable Daylight Time Saving	0 Inferred	Read/Write
3055-3121	Reserved		
3122	Data Verification Number	0 Inferred	Read/Write
3123-3128	Spare		
3129	Last Calib./Verification Rpt Req.(1=Latest,20=Oldest)	0 Inferred	**Write**

Modbus 16-bit Address Table End

Modbus Address Table – 2x16 Bits Integer

ADDRESS   DESCRIPTION   DECIMAL READ/WRITE

*Non-resettable accumulated volume will roll over at 999999999.

ADDRESS	DESCRIPTION	DECIMAL	READ/WRITE
3131	Meter #1 Daily Gross Total	1 inferred	Read
3133	Meter #1 Daily Net Total	1 inferred	Read
3135	Meter #1 Daily Mass Total	1 inferred	Read
3137	Meter #1 Hourly Gross Total	1 Inferred	Read
3139	Meter #1 Hourly Net Total	1 Inferred	Read
3141	Meter #1 Hourly Mass Total	1 Inferred	Read
3143	Meter #1 Batch Gross Total	1 Inferred	Read
3145	Meter #1 Batch Net Total	1 Inferred	Read
3147	Meter #1 Batch Mass Total	1 Inferred	Read
3149	Meter #1 Monthly Gross Total	0 Inferred	Read
3151	Meter #1 Monthly Net Total	0 Inferred	Read
3153	Meter #1 Monthly Mass Total	0 Inferred	Read
3155	Meter #1 Cumulative Gross Total*	0 Inferred	Read
3157	Meter #1 Cumulative Net Total*	0 Inferred	Read
3159	Meter #1 Cumulative Mass Total*	0 Inferred	Read
3161	Spare		
3163	Meter #1 Meter Factor	6 Inferred	Read
3165	Meter #1 Linear Factor	6 Inferred	Read
3167-3169	Spare		
3171	Meter #2 Daily Gross Total	1 inferred	Read
3173	Meter #2 Daily Net Total	1 inferred	Read
3175	Meter #2 Daily Mass Total	1 inferred	Read
3177	Meter #2 Hourly Gross Total	1 Inferred	Read
3179	Meter #2 Hourly Net Total	1 Inferred	Read
3181	Meter #2 Hourly Mass Total	1 Inferred	Read
3183	Meter #2 Batch Gross Total	1 inferred	Read
3185	Meter #2 Batch Net Total	1 Inferred	Read
3187	Meter #2 Batch Mass Total	0 Inferred	Read
3189	Meter #2 Monthly Gross Total	0 Inferred	Read
3191	Meter #2 Monthly Net Total	0 Inferred	Read
3193	Meter #2 Monthly Mass Total	0 Inferred	Read
3195	Meter #2 Cumulative Gross Total*	0 Inferred	Read
3197	Meter #2 Cumulative Net Total*	0 Inferred	Read
3199	Meter #2 Cumulative Mass Total*	0 Inferred	Read
3201	Spare	0 Inferred	Read
3203	Meter #2 Meter Factor	6 Inferred	Read
3205	Meter #2 Linear Factor	6 Inferred	Read
3207-3209	Spare		
3211	Meter #3 Daily Gross Total	1 inferred	Read
3213	Meter #3 Daily Net Total	1 inferred	Read
3215	Meter #3 Daily Mass Total	1 inferred	Read
3217	Meter #3 Hourly Gross Total	1 Inferred	Read
3219	Meter #3 Hourly Net Total	1 Inferred	Read
3221	Meter #3 Hourly Mass Total	1 Inferred	Read
3223	Meter #3 Batch Gross Total	1 inferred	Read
3225	Meter #3 Batch Net Total	1 inferred	Read
3227	Meter #3 Batch Mass Total	1 inferred	Read
3229	Meter #3 Monthly Gross Total	0 Inferred	Read
3231	Meter #3 Monthly Net Total	0 Inferred	Read
3233	Meter #3 Monthly Mass Total	0 Inferred	Read
3235	Meter #3 Cumulative Gross Total*	0 Inferred	Read

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MODBUS Address Table – 2x16 Bits Integer

ADDRESS	DESCRIPTION	DECIMAL	READ/WRITE
3237	Meter #3 Cumulative Net Total*	0 Inferred	Read
3239	Meter #3 Cumulative Mass Total*	0 Inferred	Read
3241	Spare		
3243	Meter #3 Meter Factor	6 Inferred	Read
3245	Meter #3 Linear Factor	6 Inferred	Read
3247-3249	Spare		
3251	Meter #4 Daily Gross Total	1 inferred	Read
3253	Meter #4 Daily Net Total	1 inferred	Read
3255	Meter #4 Daily Mass Total	1 inferred	Read
3257	Meter #4 Hourly Gross Total	1 Inferred	Read
3259	Meter #4 Hourly Net Total	1 Inferred	Read
3261	Meter #4 Hourly Mass Total	1 Inferred	Read
3263	Meter #4 Daily Gross Total	1 inferred	Read
3265	Meter #4 Daily Net Total	1 inferred	Read
3267	Meter #4 Daily Mass Total	1 inferred	Read
3269	Meter #4 Monthly Gross Total	0 Inferred	Read
3271	Meter #4 Monthly Net Total	0 Inferred	Read
3273	Meter #4 Monthly Mass Total	0 Inferred	Read
3275	Meter #4 Cumulative Gross Total*	0 Inferred	Read
3277	Meter #4 Cumulative Net Total*	0 Inferred	Read
3279	Meter #4 Cumulative Mass Total*	0 Inferred	Read
3281	Spare		
3283	Meter #4 Meter Factor	6 Inferred	Read
3285	Meter #4 Linear Factor	6 Inferred	Read
3287	Battery Voltage	2 Inferred	Read
3289-3289	Spare		
3291-3323	Spare		
3325	Report by Exception Alarms	0 Inferred	Read

```
    00000001 Slave#3 Multi.Var DP Alarm
    00000002 Slave#3 Multi.Var PF Alarm
    00000004 Slave#3 Multi.Var TF Alarm
    00000008 Spare Auxiliary#9 Alarm
    00000010 Spare Auxiliary#10 Alarm
    00000020 Spare Auxiliary#11 Alarm
    00000040 Spare Auxiliary#12 Alarm
```

| 3327 | Reserved | 0 Inferred | Read |

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MODBUS Address Table – 2x16 Bits Integer

ADDRESS	DESCRIPTION	DECIMAL	READ/WRITE
3329	Report by Exception Alarms	0 Inferred	Read

```
00000001 Analog Input #1 Alarm
00000002 Analog Input #2 Alarm
00000004 Analog Input #3 Alarm
00000008 Analog Input #4 Alarm
00000010 Analog Input #5 Alarm
00000020 Analog Input #6 Alarm
00000040 Analog Input #7 Alarm
00000080 Analog Input #8 Alarm

00000100 Analog Input #9 Alarm
00000200 Multi.Var DP Alarm
00000400 Multi.Var Pressure Alarm
00000800 Multi.Var Temperature Alarm
00001000 Battery Alarm
00002000 Slave Comm. Failed
00004000
00008000

00010000 Slave#1 Multi.Var DP Alarm
00020000 Slave#1 Multi.Var Pressure Alarm
00040000 Slave#1 Multi.Var Temperature Alarm
00080000 Spare Auxiliary#1 Alarm
00100000 Spare Auxiliary#2 Alarm
00200000 Spare Auxiliary#3 Alarm
00400000 Spare Auxiliary#4 Alarm

01000000 Slave#2 Multi.Var DP Alarm
02000000 Slave#2 Multi.Var Pressure Alarm
04000000 Slave#2 Multi.Var Temperature Alarm
08000000 Spare Auxiliary#5 Alarm
10000000 Spare Auxiliary#6 Alarm
20000000 Spare Auxiliary#7 Alarm
40000000 Spare Auxiliary#8 Alarm
```

ADDRESS	DESCRIPTION	DECIMAL	READ/WRITE
3331-3339	Reserved	0 Inferred	Read
3341	Analog Input #5 mA Value	3 Inferred	Read
3343	Analog Input #6 mA Value	3 Inferred	Read
3345	Analog Input #7 mA Value	3 Inferred	Read
3347	Analog Input #8 mA Value	3 Inferred	Read
3349	Analog Input #9 mA Value	3 Inferred	Read
3351	Spare		
3353	Analog Input #1 mA Value	3 Inferred	Read
3355	Analog Input #2 mA Value	3 Inferred	Read
3357	Analog Input #3 mA Value	3 Inferred	Read
3359	Analog Input #4 mA Value	3 Inferred	Read
3361	RTD Input Ohm Value	3 Inferred	Read
3363	Analog Output #1 mA Value	3 Inferred	Read
3365	Analog Output #2 mA Value	3 Inferred	Read
3367	Analog Output #3 mA Value	3 Inferred	Read
3369	Analog Output #4 mA Value	3 Inferred	Read
3371	Display Contrast	0 Inferred	Read
3373	Display Sensitive Factor	0 Inferred	Read
3375-3381	Spare		

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MODBUS Address Table – 2x16 Bits Integer

ADDRESS	DESCRIPTION	DECIMAL	READ/WRITE
3383	Analog Output #1 Output %	2 Inferred	Read
3385	Analog Output #2 Output %	2 Inferred	Read
3387	Analog Output #3 Output %	2 Inferred	Read
3389	Analog Output #4 Output %	2 Inferred	Read
3391	Uncorrected Density	6 Inferred	Read
3393-3421	Reserved		
3423	Meter#1 Yesterday's FWA Temperature	2 Inferred	Read
3425	Meter#1 Yesterday's FWA Pressure	2 Inferred	Read
3427	Meter#1 Yesterday's Gross Total	1 Inferred	Read
3429	Meter#1 Yesterday's Net Total	1 Inferred	Read
3431	Meter#1 Yesterday's Mass Total	1 Inferred	Read
3433	Meter#2 Yesterday's FWA Temperature	2 Inferred	Read
3435	Meter#2 Yesterday's FWA Pressure	2 Inferred	Read
3437	Meter#2 Yesterday's Gross Total	1 Inferred	Read
3439	Meter#2 Yesterday's Net Total	1 Inferred	Read
3441	Meter#1 Yesterday's Mass Total	1 Inferred	Read
3443	Meter#3 Yesterday's FWA Temperature	2 Inferred	Read
3445	Meter#3 Yesterday's FWA Pressure	2 Inferred	Read
3447	Meter#3 Yesterday's Gross Total	1 Inferred	Read
3449	Meter#3 Yesterday's Net Total	1 Inferred	Read
3451	Meter#1 Yesterday's Mass Total	1 Inferred	Read
3453	Meter#4 Yesterday's FWA Temperature	2 Inferred	Read
3455	Meter#4 Yesterday's FWA Pressure	2 Inferred	Read
3457	Meter#4 Yesterday's Gross Total	1 Inferred	Read
3459	Meter#4 Yesterday's Net Total	1 Inferred	Read
3461	Meter#4 Yesterday's Mass Total	1 Inferred	Read
3463	Meter#1 Last Hour Flowing Time	2 Inferred	Read
3465	Meter#1 Last Hour Gross Total	1 Inferred	Read
3467	Meter#1 Last Hour Net Total	1 Inferred	Read
3469	Meter#1 Last Hour Mass Total	1 Inferred	Read
3471	Meter#1 Last Hour FWA Temperature	2 Inferred	Read
3473	Meter#1 Last Hour FWA Pressure	2 Inferred	Read
3475	Meter#1 Last Hour FWA DP	4 Inferred	Read
3477	Meter#1 Last Hour FWA DP/EXT	4 Inferred	Read
3479	Meter#2 Last Hour Flowing Time	2 Inferred	Read
3481	Meter#2 Last Hour Gross Total	1 Inferred	Read
3483	Meter#2 Last Hour Net Total	1 Inferred	Read
3485	Meter#1 Last Hour Mass Total	1 Inferred	Read
3487	Meter#2 Last Hour FWA Temperature	2 Inferred	Read
3489	Meter#2 Last Hour FWA Pressure	2 Inferred	Read
3491	Meter#2 Last Hour FWA DP	4 Inferred	Read
3493	Meter#2 Last Hour FWA DP/EXT	4 Inferred	Read
3495	Meter#3 Last Hour Flowing Time	2 Inferred	Read
3497	Meter#3 Last Hour Gross Total	1 Inferred	Read
3499	Meter#3 Last Hour Net Total	1 Inferred	Read
3501	Meter#3 Last Hour Mass Total	1 Inferred	Read

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MODBUS Address Table – 2x16 Bits Integer

ADDRESS	DESCRIPTION	DECIMAL	READ/WRITE
3503	Meter#3 Last Hour FWA Temperature	2 Inferred	Read
3505	Meter#3 Last Hour FWA Pressure	2 Inferred	Read
3507	Meter#3 Last Hour FWA DP	4 Inferred	Read
3509	Meter#3 Last Hour FWA DP/EXT	4 Inferred	Read
3511	Meter#4 Last Hour Flowing Time	2 Inferred	Read
3513	Meter#4 Last Hour Gross Total	1 Inferred	Read
3515	Meter#4 Last Hour Net Total	1 Inferred	Read
3517	Meter#4 Last Hour Mass Total	1 Inferred	Read
3519	Meter#4 Last Hour FWA Temperature	2 Inferred	Read
3521	Meter#4 Last Hour FWA Pressure	2 Inferred	Read
3523	Meter#4 Last Hour FWA DP	4 Inferred	Read
3525	Meter#4 Last Hour FWA DP/EXT	4 Inferred	Read
3527	Meter #1 Last Batch Gross Total	1 Inferred	Read
3529	Meter #1 Last Batch Net Total	1 Inferred	Read
3531	Meter #1 Last Batch Mass Total	1 Inferred	Read
3533	Meter #1 Last Batch FWA Temperature	2 Inferred	Read
3535	Meter #1 Last Batch FWA Pressure	2 Inferred	Read
3537	Meter #1 Last Batch FWA DP	4 Inferred	Read
3539	Meter #1 Last Batch FWA Density	3 Inferred	Read
3541	Meter #2 Last Batch Gross Total	1 Inferred	Read
3543	Meter #2 Last Batch Net Total	1 Inferred	Read
3545	Meter #2 Last Batch Mass Total	1 Inferred	Read
3547	Meter #2 Last Batch FWA Temperature	2 Inferred	Read
3549	Meter #2 Last Batch FWA Pressure	2 Inferred	Read
3551	Meter #2 Last Batch FWA DP	4 Inferred	Read
3553	Meter #2 Last Batch FWA Density	3 Inferred	Read
3555	Meter #3 Last Batch Gross Total	1 Inferred	Read
3557	Meter #3 Last Batch Net Total	1 Inferred	Read
3559	Meter #2 Last Batch Mass Total	1 Inferred	Read
3561	Meter #3 Last Batch FWA Temperature	2 Inferred	Read
3563	Meter #3 Last Batch FWA Pressure	2 Inferred	Read
3565	Meter #3 Last Batch FWA DP	4 Inferred	Read
3567	Meter #3 Last Batch FWA Density	3 Inferred	Read
3569	Meter #4 Last Batch Gross Total	1 Inferred	Read
3571	Meter #4 Last Batch Net Total	1 Inferred	Read
3573	Meter #4 Last Batch Mass Total	1 Inferred	Read
3575	Meter #4 Last Batch FWA Temperature	2 Inferred	Read
3577	Meter #4 Last Batch FWA Pressure	2 Inferred	Read
3579	Meter #4 Last Batch FWA DP	4 Inferred	Read
3581	Meter #4 Last Batch FWA Density	3 Inferred	Read
3583	Spare		
3585	Spare#1 Data	1 Inferred	Read
3587	Spare#2 Data	1 Inferred	Read
3589	Spare#3 Data	1 Inferred	Read
3591	Spare#4 Data	1 Inferred	Read
3593	Spare#5 Data	1 Inferred	Read
3595	Spare#6 Data	1 Inferred	Read
3597	Spare#7 Data	1 Inferred	Read
3599	Spare#8 Data	1 Inferred	Read
3601	Spare#9 Data	1 Inferred	Read
3603-3649	Reserved		

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MODBUS Address Table – 2x16 Bits Integer

ADDRESS	DESCRIPTION	DECIMAL	READ/WRITE
3651	Slave#1 Spare Auxiliary I/O #1 mA Value	3 Inferred	Read
3653	Slave#1 Spare Auxiliary I/O #2 mA Value	3 Inferred	Read
3655	Slave#1 Spare Auxiliary I/O #3 mA Value	3 Inferred	Read
3657	Slave#1 Spare Auxiliary I/O #4 mA Value	3 Inferred	Read
3659	Slave#1 DP	4 Inferred	Read
3661	Slave#1 Pressure	2 Inferred	Read
3663	Slave#1 Temperature	2 Inferred	Read
3665	Slave#1 Multi.Var.Unit Flag	0 Inferred	Read
3667	Slave#2 Spare Auxiliary I/O #1 mA Value	3 Inferred	Read
3669	Slave#2 Spare Auxiliary I/O #2 mA Value	3 Inferred	Read
3671	Slave#2 Spare Auxiliary I/O #3 mA Value	3 Inferred	Read
3673	Slave#2 Spare Auxiliary I/O #4 mA Value	3 Inferred	Read
3675	Slave#2 DP	4 Inferred	Read
3677	Slave#2 Pressure	2 Inferred	Read
3679	Slave#2 Temperature	2 Inferred	Read
3681	Slave#2 Multi.Var.Unit Flag	0 Inferred	Read
3683	Slave#3 Spare Auxiliary I/O #1 mA Value	3 Inferred	Read
3685	Slave#3 Spare Auxiliary I/O #2 mA Value	3 Inferred	Read
3687	Slave#3 Spare Auxiliary I/O #3 mA Value	3 Inferred	Read
3689	Slave#3 Spare Auxiliary I/O #4 mA Value	3 Inferred	Read
3691	Slave#3 DP	4 Inferred	Read
3693	Slave#3 Pressure	2 Inferred	Read
3695	Slave#3 Temperature	2 Inferred	Read
3697	Slave#3 Multi.Var.Unit Flag	0 Inferred	Read
3699	Slave Connection Status	0 Inferred	Read
3701-3999	Spare		
4001-4089	Reserved		
4091-4109	Spare		

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MODBUS Address Table – 2x16 Bits Integer

ADDRESS	DESCRIPTION	DECIMAL	READ/WRITE
4111	Meter #1 PID – Pressure	2 Inferred	Read
4113	Meter #1 PID – Flow	2 Inferred	Read
4115	Meter #1 PID – Output %	2 Inferred	Read
4117	Meter #1 PID – Flow Output %	2 Inferred	Read
4119	Meter #1 PID – Pressure Output %	2 Inferred	Read
4121	Meter #2 PID – Pressure	2 Inferred	Read
4123	Meter #2 PID – Flow	2 Inferred	Read
4125	Meter #2 PID – Output %	2 Inferred	Read
4127	Meter #2 PID – Flow Output %	2 Inferred	Read
4129	Meter #2 PID – Pressure Output %	2 Inferred	Read
4131	Meter #3 PID – Pressure	2 Inferred	Read
4133	Meter #3 PID – Flow	2 Inferred	Read
4135	Meter #3 PID – Output %	2 Inferred	Read
4137	Meter #3 PID – Flow Output %	2 Inferred	Read
4139	Meter #3 PID – Pressure Output %	2 Inferred	Read
4141	Meter #4 PID – Pressure	2 Inferred	Read
4143	Meter #4 PID – Flow	2 Inferred	Read
4145	Meter #4 PID – Output %	2 Inferred	Read
4147	Meter #4 PID – Flow Output %	2 Inferred	Read
4149	Meter #4 PID – Pressure Output %	2 Inferred	Read
4151	Densitometer Period	3 Inferred	Read
4153-4199	Spare		

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MODBUS Address Table – 2x16 Bits Integer

ADDRESS	DESCRIPTION	DECIMAL	READ/WRITE
4201	Date (MMDDYY)	0 Inferred	Read/Write
4203	Time (HHMMSS)	0 Inferred	Read/Write
4205-4211	Product #1 Name	16 Chars.	Read/Write
4213-4219	Product #2 Name	16 Chars.	Read/Write
4221-4227	Product #3 Name	16 Chars.	Read/Write
4229-4235	Product #4 Name	16 Chars.	Read/Write
4237-4243	Product #5 Name	16 Chars.	Read/Write
4245-4251	Product #6 Name	16 Chars.	Read/Write
4253-4259	Product #7 Name	16 Chars.	Read/Write
4261-4267	Product #8 Name	16 Chars.	Read/Write
4269	Product #1 SG Override	4 Inferred	Read/Write
4271	Product #1 Density Override	1,4 Inferred	Read/Write
4273	Product #1 Alpha-T Override	1,3 Inferred*	Read/Write
4275	Product #2 SG Override	4 Inferred	Read/Write
4277	Product #2 Density Override	1,4 Inferred	Read/Write
4279	Product #2 Alpha-T Override	1,3 Inferred*	Read/Write
4281	Product #3 SG Override	4 Inferred	Read/Write
4283	Product #3 Density Override	1,4 Inferred	Read/Write
4285	Product #3 Alpha-T Override	1,3 Inferred*	Read/Write
4287	Product #4 SG Override	4 Inferred	Read/Write
4289	Product #4 Density Override	1,4 Inferred	Read/Write
4291	Product #4 Alpha-T Override	1,3 Inferred*	Read/Write
4293	Product #5 SG Override	4 Inferred	Read/Write
4295	Product #5 Density Override	1,4 Inferred	Read/Write
4297	Product #5 Alpha-T Override	1,3 Inferred*	Read/Write
4299	Product #6 SG Override	4 Inferred	Read/Write
4301	Product #6 Density Override	1,4 Inferred	Read/Write
4303	Product #6 Alpha-T Override	1,3 Inferred*	Read/Write
4305	Product #7 SG Override	4 Inferred	Read/Write
4307	Product #7 Density Override	1,4 Inferred	Read/Write
4309	Product #7 Alpha-T Override	1,3 Inferred*	Read/Write
4311	Product #8 SG Override	4 Inferred	Read/Write
4313	Product #8 Density Override	1,4 Inferred	Read/Write
4315	Product #8 Alpha-T Override	1,3 Inferred*	Read/Write
4317	Batch or Ticket Number	0 Inferred	Read/Write
4319-4373	Spare		
4375	Spare		
4377	Spare		

*note:
Alpha-T 3 decimal inferred for firmware version 6.01.06 or newer, 1 decimal inferred for version before 6.01.06.

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MODBUS Address Table – 2x16 Bits Integer

ADDRESS	DESCRIPTION	DECIMAL	READ/WRITE
4379	Meter #1 Ratio of Heat	4 Inferred	Read/Wirte
4381	Meter #1 Viscosity	6 Inferred	Read/Write
4383	Meter #1 Pipe Thermal E-6	2 Inferred	Read/Write
4385	Meter #1 Orifice Thermal E-6	2 Inferred	Read/Write
4387	Meter #1 Reference Temperature of Pipe	2 Inferred	Read/Write
4389	Meter #1 Reference Temperature of Orifice	2 Inferred	Read/Write
4391	Meter #1 Spare	2 Inferred	Read/Write
4393	Meter #1 Spare	2 Inferred	Read/Write
4395	Meter #1 DP Cut Off	4 Inferred	Read/Write
4397	Meter #1 DP Switch High %	2 Inferred	Read/Write
4399	Meter #1 Meter Factor	6 Inferred	Read/Write
4401	Meter #1 Flow Threshold #1	2 Inferred	Read/Write
4403	Meter #1 Flow Threshold #2	2 Inferred	Read/Write
4405	Meter #1 Flow Threshold #3	2 Inferred	Read/Write
4407	Meter #1 Flow Threshold #4	2 Inferred	Read/Write
4409	Meter #1 Linear Factor #1	6 Inferred	Read/Write
4411	Meter #1 Linear Factor #2	6 Inferred	Read/Write
4413	Meter #1 Linear Factor #3	6 Inferred	Read/Write
4415	Meter #1 Linear Factor #4	6 Inferred	Read/Write
4417	Spare		
4419	Spare		
4421	Meter #2 Ratio of Heat	4 Inferred	Read/Wirte
4423	Meter #2 Viscosity	6 Inferred	Read/Write
4425	Meter #2 Pipe Thermal E-6	2 Inferred	Read/Write
4427	Meter #2 Orifice Thermal E-6	2 Inferred	Read/Write
4429	Meter #2 Reference Temperature of Pipe	2 Inferred	Read/Write
4431	Meter #2 Reference Temperature of Orifice	2 Inferred	Read/Write
4433	Spare		
4435	Spare		
4437	Meter #2 DP Cut Off	4 Inferred	Read/Write
4439	Meter #2 DP Switch High %	2 Inferred	Read/Write
4441	Meter #2 Meter Factor	6 Inferred	Read/Write
4443	Meter #2 Flow Threshold #1	2 Inferred	Read/Write
4445	Meter #2 Flow Threshold #2	2 Inferred	Read/Write
4447	Meter #2 Flow Threshold #3	2 Inferred	Read/Write
4449	Meter #2 Flow Threshold #4	2 Inferred	Read/Write
4451	Meter #2 Linear Factor #1	6 Inferred	Read/Write
4453	Meter #2 Linear Factor #2	6 Inferred	Read/Write
4455	Meter #2 Linear Factor #3	6 Inferred	Read/Write
4457	Meter #2 Linear Factor #4	6 Inferred	Read/Write
4459	Spare		
4461	Spare		
4463	Meter #3 Ratio of Heat	4 Inferred	Read/Wirte
4465	Meter #3 Viscosity	6 Inferred	Read/Write
4467	Meter #3 Pipe Thermal E-6	2 Inferred	Read/Write
4469	Meter #3 Orifice Thermal E-6	2 Inferred	Read/Write
4471	Meter #3 Reference Temperature of Pipe	2 Inferred	Read/Write
4473	Meter #3 Reference Temperature of Orifice	2 Inferred	Read/Write
4475	Spare		
4477	Spare		
4479	Meter #3 DP Cut Off	4 Inferred	Read/Write
4481	Meter #3 DP Switch High %	2 Inferred	Read/Write

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MODBUS Address Table – 2x16 Bits Integer

ADDRESS	DESCRIPTION	DECIMAL	READ/WRITE
4483	Meter #3 Meter Factor	6 Inferred	Read/Write
4485	Meter #3 Flow Threshold #1	2 Inferred	Read/Write
4487	Meter #3 Flow Threshold #2	2 Inferred	Read/Write
4489	Meter #3 Flow Threshold #3	2 Inferred	Read/Write
4491	Meter #3 Flow Threshold #4	2 Inferred	Read/Write
4493	Meter #3 Linear Factor #1	6 Inferred	Read/Write
4495	Meter #3 Linear Factor #2	6 Inferred	Read/Write
4497	Meter #3 Linear Factor #3	6 Inferred	Read/Write
4499	Meter #3 Linear Factor #4	6 Inferred	Read/Write
4501	Spare		
4503	Spare		
4505	Meter #4 Ratio of Heat	4 Inferred	Read/Wirte
4507	Meter #4 Viscosity	6 Inferred	Read/Write
4509	Meter #4 Pipe Thermal E-6	2 Inferred	Read/Write
4511	Meter #4 Orifice Thermal E-6	2 Inferred	Read/Write
4513	Meter #4 Reference Temperature of Pipe	2 Inferred	Read/Write
4515	Meter #4 Reference Temperature of Orifice	2 Inferred	Read/Write
4517	Spare		
4519	Spare		
4521	Meter #4 DP Cut Off	4 Inferred	Read/Write
4523	Meter #4 DP Switch High %	2 Inferred	Read/Write
4525	Meter #4 Meter Factor	6 Inferred	Read/Write
4527	Meter #4 Flow Threshold #1	2 Inferred	Read/Write
4529	Meter #4 Flow Threshold #2	2 Inferred	Read/Write
4531	Meter #4 Flow Threshold #3	2 Inferred	Read/Write
4533	Meter #4 Flow Threshold #4	2 Inferred	Read/Write
4535	Meter #4 Linear Factor #1	6 Inferred	Read/Write
4537	Meter #4 Linear Factor #2	6 Inferred	Read/Write
4539	Meter #4 Linear Factor #3	6 Inferred	Read/Write
4541	Meter #4 Linear Factor #4	6 Inferred	Read/Write
4543	Density Correction Factor	5 Inferred	Read/Write
4545	Densitometer Period Low Limit	3 Inferred	Read/Write
4547	Densitometer Period High Limit	3 Inferred	Read/Write
4549	Multi.Var. DP Low Limit	4 Inferred	Read/Write
4551	Multi.Var. DP High Limit	4 Inferred	Read/Write
4553	Multi.Var. DP Maintenance	4 Inferred	Read/Write
4555	Multi.Var. Pressure Low Limit	2 Inferred	Read/Write
4557	Multi.Var. Pressure High Limit	2 Inferred	Read/Write
4559	Multi.Var. Pressure Maintenance	2 Inferred	Read/Write
4561	Multi.Var. Temperature Low Limit	2 Inferred	Read/Write
4563	Multi.Var. Temperature High Limit	2 Inferred	Read/Write
4565	Multi.Var. Temperature Maintenance	2 Inferred	Read/Write
4567	Multi.Var DP Override	4 Inferred	Read/Write
4569	Multi.Var Pressure Override	2 Inferred	Read/Write
4571	Multi.Var Temperature Override	2 Inferred	Read/Write
4573	Spare		
4575	Analog Output #1 Percentage	2 Inferred	Read/Write
4577	Analog Output #2 Percentage	2 Inferred	Read/Write
4579	Analog Output #3 Percentage	2 Inferred	Read/Write
4581	Analog Output #4 Percentage	2 Inferred	Read/Write
4581-4615	Spare		
4617	Muti.Var DP Calibration Data Entry	4 Inferred	Read/Write

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MODBUS Address Table – 2x16 Bits Integer

ADDRESS	DESCRIPTION	DECIMAL	READ/WRITE
4619	Muti.Var Pressure Calibration Data Entry	2 Inferred	Read/Write
4621	Muti.Var Temperature Calibration Data Entry	2 Inferred	Read/Write
4623-4627	Spare		
4629	Meter #1 Equilibrium Pressure Override	3 Inferred	Read/Write
4631	Meter #2 Equilibrium Pressure Override	3 Inferred	Read/Write
4633	Meter #3 Equilibrium Pressure Override	3 Inferred	Read/Write
4635	Meter #4 Equilibrium Pressure Override	3 Inferred	Read/Write
4637-4655	Reserved		
4657	Meter #1 Wedge Fa Override	6 Inferred	Read/Write
4659	Meter #2 Wedge Fa Override	6 Inferred	Read/Write
4661	Meter #3 Wedge Fa Override	6 Inferred	Read/Write
4663	Meter #4 Wedge Fa Override	6 Inferred	Read/Write
4665	Meter #1 BS&W Override	3 Inferred	Read/Write
4667	Meter #2 BS&W Override	3 Inferred	Read/Write
4669	Meter #3 BS&W Override	3 Inferred	Read/Write
4671	Meter #4 BS&W Override	3 Inferred	Read/Write
4673	Meter #1 Temperature Override	2 Inferred	Read/Write
4675	Meter #2 Temperature Override	2 Inferred	Read/Write
4677	Meter #3 Temperature Override	2 Inferred	Read/Write
4679	Meter #4 Temperature Override	2 Inferred	Read/Write
4681	Meter #1 Pressure Override	2 Inferred	Read/Write
4683	Meter #2 Pressure Override	2 Inferred	Read/Write
4685	Meter #3 Pressure Override	2 Inferred	Read/Write
4687	Meter #4 Pressure Override	2 Inferred	Read/Write
4689	Meter #1 Venturi C Override/Wedge Kd2	6 Inferred	Read/Write
4691	Meter #2 Venturi C Override/Wedge Kd2	6 Inferred	Read/Write
4693	Meter #3 Venturi C Override/Wedge Kd2	6 Inferred	Read/Write
4695	Meter #4 Venturi C Override/Wedge Kd2	6 Inferred	Read/Write
4697-4699	Spare		
4701-4703	Spare Auxiliary I/O #1 TAG	8 Chars	Read/Write
4705-4707	Spare Auxiliary I/O #2 TAG	8 Chars	Read/Write
4709-4711	Spare Auxiliary I/O #3 TAG	8 Chars	Read/Write
4713-4715	Spare Auxiliary I/O #4 TAG	8 Chars	Read/Write
4717-4719	Spare Auxiliary I/O #5 TAG	8 Chars	Read/Write
4721-4723	Spare Auxiliary I/O #6 TAG	8 Chars	Read/Write
4725-4727	Spare Auxiliary I/O #7 TAG	8 Chars	Read/Write
4729-4731	Spare Auxiliary I/O #8 TAG	8 Chars	Read/Write
4733-4735	Spare Auxiliary I/O #9 TAG	8 Chars	Read/Write
4737-4739	Spare Auxiliary I/O #10 TAG	8 Chars	Read/Write
4741-4743	Spare Auxiliary I/O #11 TAG	8 Chars	Read/Write
4745-4747	Spare Auxiliary I/O #12 TAG	8 Chars	Read/Write
4749-4759	Spare		
4761-4763	Slave #1 DP Tag	8 Chars	Read/Write
4765-4767	Slave #1 Pressure Tag	8 Chars	Read/Write
4769-4771	Slave #1 Temperature Tag	8 Chars	Read/Write
4773-4775	Slave #2 DP Tag	8 Chars	Read/Write
4777-4779	Slave #2 Pressure Tag	8 Chars	Read/Write
4781-4783	Slave #2 Temperature Tag	8 Chars	Read/Write
4785-4787	Slave #3 DP Tag	8 Chars	Read/Write
4789-4791	Slave #3 Pressure Tag	8 Chars	Read/Write
4793-4795	Slave #3 Temperature Tag	8 Chars	Read/Write
4797-4821	Spare		
4827	Pulse Output Volume #1 Pulses/Unit	3 Inferred	Read/Write
4829	Pulse Output Volume #2 Pulses/Unit	3 Inferred	Read/Write

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MODBUS Address Table – 2x16 Bits Integer

ADDRESS	DESCRIPTION	DECIMAL	READ/WRITE
4831	Meter #1 PID Output %	2 nferred	Read/Write
4833	Meter #1 PID Flow	2 Inferred	Read/Write
4835	Meter #1 PID Flow Set Point	2 Inferred	Read/Write
4837	Meter #1 PID Flow Controller Gain	2 Inferred	Read/Write
4839	Meter #1 PID Flow Controller Reset	2 Inferred	Read/Write
4841	Meter #1 PID Pressure Maximum	2 Inferred	Read/Write
4843	Meter #1 PID Pressure Set Point	2 Inferred	Read/Write
4845	Meter #1 PID Pressure Controller Gain	2 Inferred	Read/Write
4847	Meter #1 PID Pressure Controller Reset	2 Inferred	Read/Write
4849	Meter #1 PID Mininun Output %	2 Inferred	Read/Write
4851	Meter #1 PID Maxinun Output %	2 Inferred	Read/Write
4853	Meter #2 PID Output %	2 nferred	Read/Write
4855	Meter #2 PID Flow	2 Inferred	Read/Write
4857	Meter #2 PID Flow Set Point	2 Inferred	Read/Write
4859	Meter #2 PID Flow Controller Gain	2 Inferred	Read/Write
4861	Meter #2 PID Flow Controller Reset	2 Inferred	Read/Write
4863	Meter #2 PID Pressure Maximum	2 Inferred	Read/Write
4865	Meter #2 PID Pressure Set Point	2 Inferred	Read/Write
4867	Meter #2 PID Flow Controller Gain	2 Inferred	Read/Write
4869	Meter #2 PID Flow Controller Reset	2 Inferred	Read/Write
4871	Meter #2 PID Mininun Output %	2 Inferred	Read/Write
4873	Meter #2 PID Maxinun Output %	2 Inferred	Read/Write
4875	Meter #3 PID Output %	2 nferred	Read/Write
4877	Meter #3 PID Flow	2 Inferred	Read/Write
4879	Meter #3 PID Flow Set Point	2 Inferred	Read/Write
4881	Meter #3 PID Flow Controller Gain	2 Inferred	Read/Write
4883	Meter #3 PID Flow Controller Reset	2 Inferred	Read/Write
4885	Meter #3 PID Pressure Maximum	2 Inferred	Read/Write
4887	Meter #3 PID Pressure Set Point	2 Inferred	Read/Write
4889	Meter #3 PID Pressure Controller Gain	2 Inferred	Read/Write
4891	Meter #3 PID Pressure Controller Reset	2 Inferred	Read/Write
4893	Meter #3 PID Mininun Output %	2 Inferred	Read/Write
4895	Meter #3 PID Maxinun Output %	2 Inferred	Read/Write
4897	Meter #4 PID Output %	2 nferred	Read/Write
4899	Meter #4 PID Flow	2 Inferred	Read/Write
4901	Meter #4 PID Flow Set Point	2 Inferred	Read/Write
4903	Meter #4 PID Flow Controller Gain	2 Inferred	Read/Write
4905	Meter #4 PID Flow Controller Reset	2 Inferred	Read/Write
4907	Meter #4 PID Pressure Maximum	2 Inferred	Read/Write
4909	Meter #4 PID Pressure Set Point	2 Inferred	Read/Write
4911	Meter #4 PID Pressure Controller Gain	2 Inferred	Read/Write
4913	Meter #4 PID Pressure Controller Reset	2 Inferred	Read/Write
4915	Meter #4 PID Mininun Output %	2 Inferred	Read/Write
4917	Meter #4 PID Maxinun Output %	2 Inferred	Read/Write
4919-4975	Spare		
4977	Multivar.DP	4 Inferred	Read/Write
4979	Multivar.Pressure	2 Inferred	Read/Write
4981	Multivar.Temperature	2 Inferred	Read/Write
4991-5093	Resserved		

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MODBUS Address Table – 2x16 Bits Integer

<u>ADDRESS   DESCRIPTION   DECIMAL READ/WRITE</u>

<u>Last Batch/Hourly/Daily/Month DATA AREA</u>

Last Batch Report
3027 (16 bits Ingeter, Wirte only) =Last Batch Request
Set last batch report request to 1=Latest, 8=Oldest

Last Hourly Report
3029 (16 bits Ingeter, Wirte only) = Last Hour Request
Set last hour report request to 1=Latest, 8=Oldest

Last Daily Report
3032 (16 bits Ingeter, Wirte only) = Last Daily Request
Set last daily report request to 1=Latest, 8=Oldest

Last Month Report
3033 (16 bits Ingeter, Wirte only) = Last Month Request
Set last month report request to 1

Address	Description	Decimal	Read/Write
6161	Meter#1 CTPL	5 Inferred	Read
6163	Meter#1 Batch/Hourly/Daily/Month FWA CTPL	5 Inferred	Read
6165	Meter#1 Meter Density	3 Inferred	Read
6167	M1 Batch/Hourly/Daily/Month FWA Meter Density	3 Inferred	Read
6169	Meter#2 CTPL	5 Inferred	Read
6171	Meter#2 Batch/Hourly/Daily/Month FWA CTPL	5 Inferred	Read
6173	Meter#2 Meter Density	3 Inferred	Read
6175	M2 Batch/Hourly/Daily/Month FWA Meter Density	3 Inferred	Read
6177	Meter#3 CTPL	5 Inferred	Read
6179	Meter#3 Batch/Hourly/Daily/Month FWA CTPL	5 Inferred	Read
6181	Meter#3 Meter Density	3 Inferred	Read
6183	M3 Batch/Hourly/Daily/Month FWA Meter Density	3 Inferred	Read
6185	Meter#4 CTPL	5 Inferred	Read
6187	Meter#4 Batch/Hourly/Daily/Month FWA CTPL	5 Inferred	Read
6189	Meter#4 Meter Density	3 Inferred	Read
6191	M4 Batch/Hourly/Daily/Month FWA Meter Density	3 Inferred	Read
6193-6203	Reserved		
6205	Product/Table/Number	0 Inferred	Read
6207	Batch Number	0 inferred	Read
6209	Batch Start Date	0 inferred	Read
6211	Batch Start Time	0 inferred	Read
6213	Date(mmddyy)	0 Inferred	Read
6215	Time (hhmmss)	0 Inferred	Read
6217-6223	Product Name	16 Chars.	Read
6225-6229	Spare		
6231-6233	Meter#1 ID	8 Chars.	Read
6235	Meter #1 Alarm Status	0 Inferred	Read
6237	Meter #1 Daily Gross Total	1 Inferred	Read
6239	Meter #1 Daily Net Total	1 Inferred	Read
6241	Meter #1 Daily Mass Total	1 Inferred	Read

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MODBUS Address Table – 2x16 Bits Integer

ADDRESS	DESCRIPTION	DECIMAL	READ/WRITE
6243	Meter #1 Cumulative Gross Total	0 Inferred	Read
6245	Meter #1 Cumulative Net Total	0 Inferred	Read
6247	Meter #1 Cumulative Mass Total	0 Inferred	Read
6249	Meter #1 Batch/Hourly/Daily/Monthly Gross Total	1 Inferred	Read
6251	Meter #1 Batch/Hourly/Daily/Monthly Net Total	1 Inferred	Read
6253	Meter #1 Batch/Hourly/Daily/Monthly Mass Total	1 Inferred	Read
6255	Meter #1 Gross Flowrate	2 Inferred	Read
6257	Meter #1 Net Flowrate	2 Inferred	Read
6259	Meter #1 Mass Flowrate	2 Inferred	Read
6261	M#1 Batch/Hourly/Daily/Monthly FW Average DP	4 Inferred	Read
6263	M#1 Batch/Hourly/Daily/Monthly FWA Temperature	2 Inferred	Read
6265	M#1 Batch/Hourly/Daily/Monthly FWA Pressure	2 Inferred	Read
6267	M1 Batch/Hourly/Daily/Monthly FWA Observed Den	3 Inferred	Read
6269	M1 Batch/Hourly/Daily/Monthly FWA Base Density	3 Inferred	Read
6271	M#1 Batch/Hourly/Daily/Monthly FWA SG	4 Inferred	Read
6273	M1 Batch/Hourly/Daily/Monthly FWA Base SG	4 Inferred	Read
6275	M#1 Batch/Hourly/Daily/Monthly FWA. K/CD/LMF	6 Inferred	Read
6277	M#1 Batch/Hourly/Daily/Monthly FWA. CTL	5 Inferred	Read
6279	M#1 Batch/Hourly/Daily/Monthly FWA. CPL	5 Inferred	Read
6281	M#1 Batch/Hourly/Daily/Monthly FWA. DP EXT	4 Inferred	Read
6283	M#1 Batch/Hourly/Daily/Monthly FWA. BS&W	2 Inferred	Read
6285	Meter#1 DP	4 Inferred	Read
6287	Meter#1 Temperature	2 Inferred	Read
6289	Meter#1 Pressure	2 Inferred	Read
6291	Meter#1 Observed Density	3 Inferred	Read
6293	Meter#1 Base Density	3 Inferred	Read
6295	Meter#1 SG	4 Inferred	Read
6297	Meter#1 Base SG	4 Inferred	Read
6299	Meter#1 K/CD/LMF	6 Inferred	Read
6301	Meter#1 CTL	5 Inferred	Read
6303	Meter#1 CPL	5 Inferred	Read
6305	Meter#1 DP EXT	4 Inferred	Read
6307	Meter#1 BS&W	2 Inferred	Read
6309	Meter #1 Y Factor	6 Inferred	Read
6311	Meter#1 Densitometer Temperature	2 Inferred	Read
6313	Meter#1 Densitometer Pressure	2 Inferred	Read
6315	Meter#1 Equilibrium Pressure	3 Inferred	Read
6317	Meter #1 Pipe ID	5 Inferred	Read
6319	Meter #1 Orifice ID	5 Inferred	Read
6321	Meter #1 Density Correction Factor	5 Inferred	Read
6323	Meter #1 K Factor	3 Inferred	Read
6325	Meter #1 Batch Opening Cum. Gross	0 Inferred	Read
6327	Meter #1 Batch Opening Cum. Net	0 Inferred	Read
6329	Meter #1 Batch Opening Cum. Mass	0 Inferred	Read
6331-6333	Meter#2 ID	8 Chars.	Read
6335	Meter #2 Alarm Status	0 Inferred	Read
6337	Meter #2 Daily Gross Total	1 Inferred	Read
6339	Meter #2 Daily Net Total	1 Inferred	Read

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MODBUS Address Table – 2x16 Bits Integer

ADDRESS	DESCRIPTION	DECIMAL	READ/WRITE
6341	Meter #2 Daily Mass Total	1 Inferred	Read
6343	Meter #2 Cumulative Gross Total	0 Inferred	Read
6345	Meter #2 Cumulative Net Total	0 Inferred	Read
6347	Meter #2 Cumulative Mass Total	0 Inferred	Read
6349	Meter #2 Batch/Hourly/Daily/Monthly Gross Total	1 Inferred	Read
6351	Meter #2 Batch/Hourly/Daily/Monthly Net Total	1 Inferred	Read
6353	Meter #2 Batch/Hourly/Daily/Monthly Mass Total	1 Inferred	Read
6355	Meter #2 Gross Flowrate	2 Inferred	Read
6357	Meter #2 Net Flowrate	2 Inferred	Read
6359	Meter #2 Mass Flowrate	2 Inferred	Read
6361	M#2 Batch/Hourly/Daily/Monthly F.W. Average DP	4 Inferred	Read
6363	M#2 Batch/Hourly/Daily/Monthly FWA Temperature	2 Inferred	Read
6365	M#2 Batch/Hourly/Daily/Monthly FWA Pressure	2 Inferred	Read
6367	M2 Batch/Hourly/Daily/Monthly FWA Observed Den	3 Inferred	Read
6369	M2 Batch/Hourly/Daily/Monthly FWA Base Density	3 Inferred	Read
6371	M#2 Batch/Hourly/Daily/Monthly FW. Average SG	4 Inferred	Read
6373	M2 Batch/Hourly/Daily/Monthly FWA Base SG	4 Inferred	Read
6375	M#2 Batch/Hourly/Daily/Monthly FWA K/CD/LMF	6 Inferred	Read
6377	M#2 Batch/Hourly/Daily/Monthly FWA CTL	5 Inferred	Read
6379	M#2 Batch/Hourly/Daily/Monthly FWA CPL	5 Inferred	Read
6381	M#2 Batch/Hourly/Daily/Monthly FWA DP EXT	4 Inferred	Read
6383	M#2 Batch/Hourly/Daily/Monthly FWA BS&W	2 Inferred	Read
6385	Meter#2 DP	4 Inferred	Read
6387	Meter#2 Temperature	2 Inferred	Read
6389	Meter#2 Pressure	2 Inferred	Read
6391	Meter#2 Observed Density	3 Inferred	Read
6393	Meter#2 Base Density	3 Inferred	Read
6395	Meter#2 SG	4 Inferred	Read
6397	Meter#2 Base SG	4 Inferred	Read
6399	Meter#2 K/CD/LMF	6 Inferred	Read
6401	Meter#2 CTL	5 Inferred	Read
6403	Meter#2 CPL	5 Inferred	Read
6405	Meter#2 DP EXT	4 Inferred	Read
6407	Meter#2 BS&W	2 Inferred	Read
6409	Meter #2 Y Factor	6 Inferred	Read
6411	Meter#2 Densitometer Temperature	2 Inferred	Read
6413	Meter#2 Densitometer Pressure	2 Inferred	Read
6415	Meter#2 Equilibrium Pressure	3 Inferred	Read
6417	Meter #2 Pipe ID	5 Inferred	Read
6419	Meter #2 Orifice ID	5 Inferred	Read
6421	Meter #2 Density Correction Factor	5 Inferred	Read
6423	Meter #2 K Factor	3 Inferred	Read
6425	Meter #2 Batch Opening Cum. Gross	0 Inferred	Read
6427	Meter #2 Batch Opening Cum. Net	0 Inferred	Read
6429	Meter #2 Batch Opening Cum. Mass	0 Inferred	Read
6431-6433	Meter#3 ID	8 Chars.	Read
6435	Meter #3 Alarm Status	0 Inferred	Read
6437	Meter #3 Daily Gross Total	1 Inferred	Read

Date: 9/28/2022

MODBUS Address Table – 2x16 Bits Integer

ADDRESS	DESCRIPTION	DECIMAL	READ/WRITE
6439	Meter #3 Daily Net Total	1 Inferred	Read
6441	Meter #3 Daily Mass Total	1 Inferred	Read
6443	Meter #3 Cumulative Gross Total	0 Inferred	Read
6445	Meter #3 Cumulative Net Total	0 Inferred	Read
6447	Meter #3 Cumulative Mass Total	0 Inferred	Read
6449	Meter #3 Batch/Hourly/Daily Gross Total	1 Inferred	Read
6451	Meter #3 Batch/Hourly/Daily Net Total	1 Inferred	Read
6453	Meter #3 Batch/Hourly/Daily Mass Total	1 Inferred	Read
6455	Meter #3 Gross Flowrate	2 Inferred	Read
6457	Meter #3 Net Flowrate	2 Inferred	Read
6459	Meter #3 Mass Flowrate	2 Inferred	Read
6461	M#3 Batch/Hourly/Daily/Monthly FW. Average DP	4 Inferred	Read
6463	M#3 Batch/Hourly/Daily/Monthly FWA Temperature	2 Inferred	Read
6465	M#3 Batch/Hourly/Daily/Monthly FWA Pressure	2 Inferred	Read
6467	M3 Batch/Hourly/Daily/Monthly FWA Observed Den	3 Inferred	Read
6469	M3 Batch/Hourly/Daily/Monthly FWA Base Density	3 Inferred	Read
6471	M#3 Batch/Hourly/Daily/Monthly FWA SG	4 Inferred	Read
6473	M3 Batch/Hourly/Daily/Monthly FWA Base SG	4 Inferred	Read
6475	M#3 Batch/Hourly/Daily/Monthly FWA K/CD/LMF	6 Inferred	Read
6477	M#3 Batch/Hourly/Daily/Monthly FWA CTL	5 Inferred	Read
6479	M#3 Batch/Hourly/Daily/Monthly FWA CPL	5 Inferred	Read
6481	M#3 Batch/Hourly/Daily/Monthly FWA DP EXT	4 Inferred	Read
6483	M#3 Batch/Hourly/Daily/Monthly FWA BS&W	2 Inferred	Read
6485	Meter#3 DP	4 Inferred	Read
6487	Meter#3 Temperature	2 Inferred	Read
6489	Meter#3 Pressure	2 Inferred	Read
6491	Meter#3 Observed Density	3 Inferred	Read
6493	Meter#3 Base Density	3 Inferred	Read
6495	Meter#3 SG	4 Inferred	Read
6497	Meter#3 Base SG	4 Inferred	Read
6499	Meter#3 K/CD/LMF	6 Inferred	Read
6501	Meter#3 CTL	5 Inferred	Read
6503	Meter#3 CPL	5 Inferred	Read
6505	Meter#3 DP EXT	4 Inferred	Read
6507	Meter#3 BS&W	2 Inferred	Read
6509	Meter #3 Y Factor	6 Inferred	Read
6511	Meter#3 Densitometer Temperature	2 Inferred	Read
6513	Meter#3 Densitometer Pressure	2 Inferred	Read
6515	Meter#3 Equilibrium Pressure	3 Inferred	Read
6517	Meter #3 Pipe ID	5 Inferred	Read
6519	Meter #3 Orifice ID	5 Inferred	Read
6521	Meter #3 Density Correction Factor	5 Inferred	Read
6523	Meter #3 K Factor	3 Inferred	Read
6525	Meter #3 Batch Opening Cum. Gross	0 Inferred	Read
6527	Meter #3 Batch Opening Cum. Net	0 Inferred	Read
6529	Meter #3 Batch Opening Cum. Mass	0 Inferred	Read
6531-6533	Meter#4 ID	8 Chars.	Read
6535	Meter #4 Alarm Status	0 Inferred	Read

Date: 9/28/2022

MODBUS Address Table – 2x16 Bits Integer

ADDRESS	DESCRIPTION	DECIMAL	READ/WRITE
6537	Meter #4 Daily Gross Total	1 Inferred	Read
6539	Meter #4 Daily Net Total	1 Inferred	Read
6541	Meter #4 Daily Mass Total	1 Inferred	Read
6543	Meter #4 Cumulative Gross Total	0 Inferred	Read
6545	Meter #4 Cumulative Net Total	0 Inferred	Read
6547	Meter #4 Cumulative Mass Total	0 Inferred	Read
6549	Meter #4 Batch/Hourly/Daily/Monthly Gross Total	1 Inferred	Read
6551	Meter #4 Batch/Hourly/Daily/Monthly Net Total	1 Inferred	Read
6553	Meter #4 Batch/Hourly/Daily/Monthly Mass Total	1 Inferred	Read
6555	Meter #4 Gross Flowrate	2 Inferred	Read
6557	Meter #4 Net Flowrate	2 Inferred	Read
6559	Meter #4 Mass Flowrate	2 Inferred	Read
6561	M#4 Batch/Hourly/Daily/Monthly FW. Average DP	4 Inferred	Read
6563	M#4 Batch/Hourly/Daily/Monthly FWA Temperature	2 Inferred	Read
6565	M#4 Batch/Hourly/Daily/Monthly FWA Pressure	2 Inferred	Read
6567	M4 Batch/Hourly/Daily/Monthly FWA Observed Den	3 Inferred	Read
6569	M4 Batch/Hourly/Daily/Monthly FWA Base Density	3 Inferred	Read
6571	M#4 Batch/Hourly/Daily/Monthly FWA SG	4 Inferred	Read
6573	M4 Batch/Hourly/Daily/Monthly FWA Base SG	4 Inferred	Read
6575	M#4 Batch/Hourly/Daily/Monthly FWA K/CD/LMF	6 Inferred	Read
6577	M#4 Batch/Hourly/Daily/Monthly FWA CTL	5 Inferred	Read
6579	M#4 Batch/Hourly/Daily/Monthly FWA CPL	5 Inferred	Read
6581	M#4 Batch/Hourly/Daily/Monthly FWA DP EXT	4 Inferred	Read
6583	M#4 Batch/Hourly/Daily/Monthly FWA BS&W	2 Inferred	Read
6585	Meter#4 DP	4 Inferred	Read
6587	Meter#4 Temperature	2 Inferred	Read
6589	Meter#4 Pressure	2 Inferred	Read
6591	Meter#4 Observed Density	3 Inferred	Read
6593	Meter#4 Base Density	3 Inferred	Read
6595	Meter#4 SG	4 Inferred	Read
6597	Meter#4 Base SG	4 Inferred	Read
6599	Meter#4 K/CD/LMF	6 Inferred	Read
6601	Meter#4 CTL	5 Inferred	Read
6603	Meter#4 CPL	5 Inferred	Read
6605	Meter#4 DP EXT	4 Inferred	Read
6607	Meter#4 BS&W	2 Inferred	Read
6609	Meter #4 Y Factor	6 Inferred	Read
6611	Meter#4 Densitometer Temperature	2 Inferred	Read
6613	Meter#4 Densitometer Pressure	2 Inferred	Read
6615	Meter#4 Equilibrium Pressure	3 Inferred	Read
6617	Meter #4 Pipe ID	5 Inferred	Read
6619	Meter #4 Orifice ID	5 Inferred	Read
6621	Meter #4 Density Correction Factor	5 Inferred	Read
6623	Meter #4 K Factor	3 Inferred	Read
6625	Meter #4 Batch Opening Cum. Gross	0 Inferred	Read
6627	Meter #4 Batch Opening Cum. Net	0 Inferred	Read
6629	Meter #4 Batch Opening Cum. Mass	0 Inferred	Read

Date: 9/28/2022

MODBUS Address Table – 2x16 Bits Integer

ADDRESS   DESCRIPTION   DECIMAL READ/WRITE

Non-resettable accumulated volume will roll over at 999999999.

Current Data Area

Address	Description	Decimal	Read/Write
9001	Spare	0 Inferred	Read
9003	Spare	0 Inferred	Read
9005	Product/Table/Number	0 Inferred	Read
9007	Batch Number	0 inferred	Read
9009	Batch Start Date	0 inferred	Read
9011	Batch Start Time	0 inferred	Read
9013	Date(mmddyy)	0 Inferred	Read
9015	Time (hhmmss)	0 Inferred	Read
9017-9023	Product Name	16 Chars.	Read
9025-9029	Spare		
9031-9033	Meter#1 ID	8 Chars.	Read
9035	Meter #1 Alarm Status	0 Inferred	Read
9037	Meter #1 Daily Gross Total	1 Inferred	Read
9039	Meter #1 Daily Net Total	1 Inferred	Read
9041	Meter #1 Daily Mass Total	1 Inferred	Read
9043	Meter #1 Cumulative Gross Total*	0 Inferred	Read
9045	Meter #1 Cumulative Net Total*	0 Inferred	Read
9047	Meter #1 Cumulative Mass Total*	0 Inferred	Read
9049	Meter #1 Batch Gross Total	1 Inferred	Read
9051	Meter #1 Batch Net Total	1 Inferred	Read
9053	Meter #1 Batch Mass Total	1 Inferred	Read
9055	Meter #1 Gross Flowrate	2 Inferred	Read
9057	Meter #1 Net Flowrate	2 Inferred	Read
9059	Meter #1 Mass Flowrate	2 Inferred	Read
9061	Meter#1 Batch Flow Weighted Average- DP	4 Inferred	Read
9063	Meter#1 Batch F.W. Average- Temperature	2 Inferred	Read
9065	Meter#1 Batch F.W. Average- Pressure	2 Inferred	Read
9067	Meter#1 Batch F.W. Average- Observed Density	3 Inferred	Read
9069	Meter#1 Batch F.W. Average- Base Density	3 Inferred	Read
9071	Meter#1 Batch F.W. Average- - SG	4 Inferred	Read
9073	Meter#1 Batch F.W. Average- Base SG	4 Inferred	Read
9075	Meter#1 Batch F.W. Average- K/CD/LMF	6 Inferred	Read
9077	Meter#1 Batch F.W. Average- CTL	5 Inferred	Read
9079	Meter#1 Batch F.W. Average- CPL	5 Inferred	Read
9081	Meter#1 Batch F.W. Average- DP EXT	4 Inferred	Read
9083	Meter#1 Batch F.W. Average- BS&W	2 Inferred	Read
9085	Meter#1 DP	4 Inferred	Read
9087	Meter#1 Temperature	2 Inferred	Read
9089	Meter#1 Pressure	2 Inferred	Read
9091	Meter#1 Observed Density	3 Inferred	Read
9093	Meter#1 Base Density	3 Inferred	Read
9095	Meter#1 SG	4 Inferred	Read
9097	Meter#1 Base SG	4 Inferred	Read
9099	Meter#1 K/CD/LMF	6 Inferred	Read
9101	Meter#1 CTL	5 Inferred	Read
9103	Meter#1 CPL	5 Inferred	Read
9105	Meter#1 DP EXT	4 Inferred	Read

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MODBUS Address Table – 2x16 Bits Integer

ADDRESS	DESCRIPTION	DECIMAL	READ/WRITE
9107	Meter#1 BS&W	2 Inferred	Read
9109	Meter #1 Y Factor	6 Inferred	Read
9111	Meter#1 Densitometer Temperature	2 Inferred	Read
9113	Meter#1 Densitometer Pressure	2 Inferred	Read
9115	Meter#1 Equilibrium Pressure	3 Inferred	Read
9117	Meter #1 Pipe ID	5 Inferred	Read
9119	Meter #1 Orifice ID	5 Inferred	Read
9121	Meter #1 Density Correction Factor	5 Inferred	Read
9123	Meter #1 K Factor	3 Inferred	Read
9125	Meter #1 Batch Opening Cum. Gross	0 Inferred	Read
9127	Meter #1 Batch Opening Cum. Net	0 Inferred	Read
9129	Meter #1 Batch Opening Cum. Mass	0 Inferred	Read
9131-9133	Meter#2 ID	8 Chars.	Read
9135	Meter #2 Alarm Status	0 Inferred	Read
9137	Meter #2 Daily Gross Total	1 Inferred	Read
9139	Meter #2 Daily Net Total	1 Inferred	Read
9141	Meter #2 Daily Mass Total	1 Inferred	Read
9143	Meter #2 Cumulative Gross Total*	0 Inferred	Read
9145	Meter #2 Cumulative Net Total*	0 Inferred	Read
9147	Meter #2 Cumulative Mass Total*	0 Inferred	Read
9149	Meter #2 Batch Gross Total	1 Inferred	Read
9151	Meter #2 Batch Net Total	1 Inferred	Read
9153	Meter #2 Batch Mass Total	1 Inferred	Read
9155	Meter #2 Gross Flowrate	2 Inferred	Read
9157	Meter #2 Net Flowrate	2 Inferred	Read
9159	Meter #2 Mass Flowrate	2 Inferred	Read
9161	Meter#2 Batch Flow Weighted Average- DP	4 Inferred	Read
9163	Meter#2 Batch F.W. Average- Temperature	2 Inferred	Read
9165	Meter#2 Batch F.W. Average- Pressure	2 Inferred	Read
9167	Meter#2 Batch F.W. Average- Observed Density	3 Inferred	Read
9169	Meter#2 Batch F.W. Average- Base Density	3 Inferred	Read
9171	Meter#2 Batch F.W. Average- - SG	4 Inferred	Read
9173	Meter#2 Batch F.W. Average- Base SG	4 Inferred	Read
9175	Meter#2 Batch F.W. Average- K/CD/LMF	6 Inferred	Read
9177	Meter#2 Batch F.W. Average- CTL	5 Inferred	Read
9179	Meter#2 Batch F.W. Average- CPL	5 Inferred	Read
9181	Meter#2 Batch F.W. Average- DP EXT	4 Inferred	Read
9183	Meter#2 Batch F.W. Average- BS&W	2 Inferred	Read
9185	Meter#2 DP	4 Inferred	Read
9187	Meter#2 Temperature	2 Inferred	Read
9189	Meter#2 Pressure	2 Inferred	Read
9191	Meter#2 Observed Density	3 Inferred	Read
9193	Meter#2 Base Density	3 Inferred	Read
9195	Meter#2 SG	4 Inferred	Read
9197	Meter#2 Base SG	4 Inferred	Read
9199	Meter#2 K/CD/LMF	6 Inferred	Read
9201	Meter#2 CTL	5 Inferred	Read
9203	Meter#2 CPL	5 Inferred	Read

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ADDRESS	DESCRIPTION	DECIMAL	READ/WRITE
9205	Meter#2 DP EXT	4 Inferred	Read
9207	Meter#2 BS&W	2 Inferred	Read
9209	Meter #2 Y Factor	6 Inferred	Read
9211	Meter#2 Densitometer Temperature	2 Inferred	Read
9213	Meter#2 Densitometer Pressure	2 Inferred	Read
9215	Meter#2 Equilibrium Pressure	3 Inferred	Read
9217	Meter #2 Pipe ID	5 Inferred	Read
9219	Meter #2 Orifice ID	5 Inferred	Read
9221	Meter #2 Density Correction Factor	5 Inferred	Read
9223	Meter #2 K Factor	3 Inferred	Read
9225	Meter #2 Batch Opening Cum. Gross	0 Inferred	Read
9227	Meter #2 Batch Opening Cum. Net	0 Inferred	Read
9229	Meter #2 Batch Opening Cum. Mass	0 Inferred	Read
9231-9233	Meter#3 ID	8 Chars.	Read
9235	Meter #3 Alarm Status	0 Inferred	Read
9237	Meter #3 Daily Gross Total	1 Inferred	Read
9239	Meter #3 Daily Net Total	1 Inferred	Read
9241	Meter #3 Daily Mass Total	1 Inferred	Read
9243	Meter #3 Cumulative Gross Total*	0 Inferred	Read
9245	Meter #3 Cumulative Net Total*	0 Inferred	Read
9247	Meter #3 Cumulative Mass Total*	0 Inferred	Read
9249	Meter #3 Batch Gross Total	1 Inferred	Read
9251	Meter #3 Batch Net Total	1 Inferred	Read
9253	Meter #3 Batch Mass Total	1 Inferred	Read
9255	Meter #3 Gross Flowrate	2 Inferred	Read
9257	Meter #3 Net Flowrate	2 Inferred	Read
9259	Meter #3 Mass Flowrate	2 Inferred	Read
9261	Meter#3 Batch Flow Weighted Average- DP	4 Inferred	Read
9263	Meter#3 Batch F.W. Average- Temperature	2 Inferred	Read
9265	Meter#3 Batch F.W. Average- Pressure	2 Inferred	Read
9267	Meter#3 Batch F.W. Average- Observed Density	3 Inferred	Read
9269	Meter#3 Batch F.W. Average- Base Density	3 Inferred	Read
9271	Meter#3 Batch F.W. Average- - SG	4 Inferred	Read
9273	Meter#3 Batch F.W. Average- Base SG	4 Inferred	Read
9275	Meter#3 Batch F.W. Average- K/CD/LMF	6 Inferred	Read
9277	Meter#3 Batch F.W. Average- CTL	5 Inferred	Read
9279	Meter#3 Batch F.W. Average- CPL	5 Inferred	Read
9281	Meter#3 Batch F.W. Average- DP EXT	4 Inferred	Read
9283	Meter#3 Batch F.W. Average- BS&W	2 Inferred	Read
9285	Meter#3 DP	4 Inferred	Read
9287	Meter#3 Temperature	2 Inferred	Read
9289	Meter#3 Pressure	2 Inferred	Read
9291	Meter#3 Observed Density	3 Inferred	Read
9293	Meter#3 Base Density	3 Inferred	Read
9295	Meter#3 SG	4 Inferred	Read
9297	Meter#3 Base SG	4 Inferred	Read
9299	Meter#3 K/CD/LMF	6 Inferred	Read
9301	Meter#3 CTL	5 Inferred	Read

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ADDRESS	DESCRIPTION	DECIMAL	READ/WRITE
9303	Meter#3 CPL	5 Inferred	Read
9305	Meter#3 DP EXT	4 Inferred	Read
9307	Meter#3 BS&W	2 Inferred	Read
9309	Meter #3 Y Factor	6 Inferred	Read
9311	Meter#3 Densitometer Temperature	2 Inferred	Read
9313	Meter#3 Densitometer Pressure	2 Inferred	Read
9315	Meter#3 Equilibrium Pressure	3 Inferred	Read
9317	Meter #3 Pipe ID	5 Inferred	Read
9319	Meter #3 Orifice ID	5 Inferred	Read
9321	Meter #3 Density Correction Factor	5 Inferred	Read
9323	Meter #3 K Factor	3 Inferred	Read
9325	Meter #3 Batch Opening Cum. Gross	0 Inferred	Read
9327	Meter #3 Batch Opening Cum. Net	0 Inferred	Read
9329	Meter #3 Batch Opening Cum. Mass	0 Inferred	Read
9331-9333	Meter#4 ID	8 Chars.	Read
9335	Meter #4 Alarm Status	0 Inferred	Read
9337	Meter #4 Daily Gross Total	1 Inferred	Read
9339	Meter #4 Daily Net Total	1 Inferred	Read
9341	Meter #4 Daily Mass Total	1 Inferred	Read
9343	Meter #4 Cumulative Gross Total*	0 Inferred	Read
9345	Meter #4 Cumulative Net Total*	0 Inferred	Read
9347	Meter #4 Cumulative Mass Total*	0 Inferred	Read
9349	Meter #4 Batch Gross Total	1 Inferred	Read
9351	Meter #4 Batch Net Total	1 Inferred	Read
9353	Meter #4 Batch Mass Total	1 Inferred	Read
9355	Meter #4 Gross Flowrate	2 Inferred	Read
9357	Meter #4 Net Flowrate	2 Inferred	Read
9359	Meter #4 Mass Flowrate	2 Inferred	Read
9361	Meter#4 Batch Flow Weighted Average- DP	4 Inferred	Read
9363	Meter#4 Batch F.W. Average- Temperature	2 Inferred	Read
9365	Meter#4 Batch F.W. Average- Pressure	2 Inferred	Read
9367	Meter#4 Batch F.W. Average- Observed Density	3 Inferred	Read
9369	Meter#4 Batch F.W. Average- Base Density	3 Inferred	Read
9371	Meter#4 Batch F.W. Average- - SG	4 Inferred	Read
9373	Meter#4 Batch F.W. Average- Base SG	4 Inferred	Read
9375	Meter#4 Batch F.W. Average- K/CD/LMF	6 Inferred	Read
9377	Meter#4 Batch F.W. Average- CTL	5 Inferred	Read
9379	Meter#4 Batch F.W. Average- CPL	5 Inferred	Read
9381	Meter#4 Batch F.W. Average- DP EXT	4 Inferred	Read
9383	Meter#4 Batch F.W. Average- BS&W	2 Inferred	Read
9385	Meter#4 DP	4 Inferred	Read
9387	Meter#4 Temperature	2 Inferred	Read
9389	Meter#4 Pressure	2 Inferred	Read
9391	Meter#4 Observed Density	3 Inferred	Read
9393	Meter#4 Base Density	3 Inferred	Read
9395	Meter#4 SG	4 Inferred	Read
9397	Meter#4 Base SG	4 Inferred	Read
9399	Meter#4 K/CD/LMF	6 Inferred	Read

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MODBUS Address Table – 2x16 Bits Integer

ADDRESS	DESCRIPTION	DECIMAL	READ/WRITE
9401	Meter#4 CTL	5 Inferred	Read
9403	Meter#4 CPL	5 Inferred	Read
9405	Meter#4 DP EXT	4 Inferred	Read
9407	Meter#4 BS&W	2 Inferred	Read
9409	Meter #4 Y Factor	6 Inferred	Read
9411	Meter#4 Densitometer Temperature	2 Inferred	Read
9413	Meter#4 Densitometer Pressure	2 Inferred	Read
9415	Meter#4 Equilibrium Pressure	3 Inferred	Read
9417	Meter #4 Pipe ID	5 Inferred	Read
9419	Meter #4 Orifice ID	5 Inferred	Read
9421	Meter #4 Density Correction Factor	5 Inferred	Read
9423	Meter #4 K Factor	3 Inferred	Read
9425	Meter #4 Batch Opening Cum. Gross	0 Inferred	Read
9427	Meter #4 Batch Opening Cum. Net	0 Inferred	Read
9429	Meter #4 Batch Opening Cum. Mass	0 Inferred	Read
9453	Meter#1 GM/CC (Live Densitometer)	4 Inferred	Read
9457	Meter#2 GM/CC (Live Densitometer)	4 Inferred	Read
9461	Meter#1 GM/CC (Live Densitometer)	4 Inferred	Read
9465	Meter#2 GM/CC (Live Densitometer)	4 Inferred	Read
9469	Meter#1 CTPL	5 Inferred	Read
9471	Meter#1 Batch F.W. Average CTPL	5 Inferred	Read
9473	Meter#1 Meter Density	3 Inferred	Read
9471	Meter#1 Batch F.W. Average Meter Density	3 Inferred	Read
9473	Meter#2 CTPL	5 Inferred	Read
9475	Meter#2 Batch F.W. Average CTPL	5 Inferred	Read
9477	Meter#2 Meter Density	3 Inferred	Read
9479	Meter#2 Batch F.W. Average Meter Density	3 Inferred	Read
9481	Meter#3 CTPL	5 Inferred	Read
9483	Meter#3 Batch F.W. Average CTPL	5 Inferred	Read
9485	Meter#3 Meter Density	3 Inferred	Read
9487	Meter#3 Batch F.W. Average Meter Density	3 Inferred	Read
9489	Meter#4 CTPL	5 Inferred	Read
9491	Meter#4 Batch F.W. Average CTPL	5 Inferred	Read
9493	Meter#4 Meter Density	3 Inferred	Read
9495	Meter#4 Batch F.W. Average Meter Density	3 Inferred	Read

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Modbus Address Table – Float Point

ADDRESS	DESCRIPTION	READ/WRITE
7001	Sarasota Constant D0	Read/Write
7002	Sarasota Constant T0	Read/Write
7003	Sarasota Constant K	Read/Write
7004	Sarasota Constant Temperature Coeff.	Read/Write
7005	Sarasota Constant Temperature Cal.	Read/Write
7006	Sarasota Constant Pressure Coeff.	Read/Write
7007	Sarasota Constant Pressure Cal.	Read/Write
7008	UGC Constant K0	Read/Write
7009	UGC Constant K1	Read/Write
7010	UGC Constant K2	Read/Write
7011	UGC Constant KT	Read/Write
7012	UGC Constant Temperature Cal	Read/Write
7013	UGC Constant K	Read/Write
7014	UGC Constant P0	Read/Write
7015	Solartron Constant K0	Read/Write
7016	Solartron Constant K1	Read/Write
7017	Solartron Constant K2	Read/Write
7018	Solartron Constant K18	Read/Write
7019	Solartron Constant K19	Read/Write
7020	Solartron Constant K3	Read/Write
7021	Solartron Constant K4	Read/Write
7022	Calibration Data Entry	Read/Write
7023	Spare	Read/Write
7024	Verification Data Entry	Read/Write
7025	Spare	Read/Write
7026	Meter#1 Orifice ID	Read/Write
7027	Meter#1 Pipe ID	Read/Write
7028	Meter#1 K Factor	Read/Write
7029	Meter#1 Low Limit	Read/Write
7030	Meter#1 High Limit	Read/Write
7031	Meter#2 Orifice ID	Read/Write
7032	Meter#2 Pipe ID	Read/Write
7033	Meter#2 K Factor	Read/Write
7034	Meter#2 Low Limit	Read/Write
7035	Meter#2 High Limit	Read/Write
7036	Meter#3 Orifice ID	Read/Write
7037	Meter#3 Pipe ID	Read/Write
7038	Meter#3 K Factor	Read/Write
7039	Meter#3 Low Limit	Read/Write
7040	Meter#3 High Limit	Read/Write
7041	Meter#4 Orifice ID	Read/Write
7042	Meter#4 Pipe ID	Read/Write
7043	Meter#4 K Factor	Read/Write
7044	Meter#4 Low Limit	Read/Write
7045	Meter#4 High Limit	Read/Write
7046	Base Temperature	Read/Write
7047	Base Pressure	Read/Write
7048	Atmospheric Pressure	Read/Write
7049	Densitometer Low Limit	Read/Write
7050	Densitometer High Limit	Read/Write
7051	Densitometer Maintenance	Read/Write

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Modbus Address Table – Float Point

ADDRESS   DESCRIPTION   READ/WRITE

7052	Calibration Data Entry	Read/Write
7053	Verification Data Entry	Read/Write
7054	GMCC Conversion Factor	Read/Write
7055-7060	Spare	

7061-7070	Reserved	
7071-7085	Reserved	
7086	Meter#1Density Override (Water–Dens and Base Dens Override)	Read/Write
7087	Meter#1 SG Override	Read/Write
7088	Meter#1 Alpha-T E-6 Override	Read/Write
7089	Meter#2 Density Override (Water–Dens and Base Dens Override)	Read/Write
7090	Meter#2 SG Override	Read/Write
7091	Meter#2 Alpha-T E-6 Override	Read/Write
7092	Meter#3 Density Override (Water–Dens and Base Dens Override)	Read/Write
7093	Meter#3 SG Override	Read/Write
7094	Meter#3 Alpha-T E-6 Override	Read/Write
7095	Meter#4 Density Override (Water–Dens and Base Dens Override)	Read/Write
7096	Meter#4 SG Override	Read/Write
7097	Meter#4 Alpha-T E-6 Override	Read/Write
7098-7102	Spare	

7103	Meter#1 FWA CTPL	Read
7104	Meter#1 Daily Gross Total	Read
7105	Meter#1 Daily Net Total	Read
7106	Meter#1 Daily Mass Total	Read
7107	Meter#1 CTPL	Read
7108	Meter#1 Density	Read
7109	Meter#1 FWA Density	Read
7110	Meter#1 Batch Gross Total	Read
7111	Meter#1 Batch Net Total	Read
7112	Meter#1 Batch Mass Total	Read
7113	Meter#1 Gross Flow Rate	Read
7114	Meter#1 Net Flow Rate	Read
7115	Meter#1 Mass Flow Rate	Read

7116	Meter #1 FWA DP	Read
7117	Meter #1 FWA Temperature	Read
7118	Meter #1 FWA Pressure	Read
7119	Meter #1 FWA Observed Density	Read
7120	Meter #1 FWA Baes Density	Read
7121	Meter #1 FWA SG	Read
7122	Meter #1 FWA Base SG	Read
7123	Meter #1 FWA K/CD/LMF	Read
7124	Meter #1 FWA CTL	Read
7125	Meter #1 FWA CPL	Read
7126	Meter #1 FWA DP_EXT	Read
7127	Meter #1 FWA BS&W	Read

7128	Meter #1 DP	Read
7129	Meter #1 Temperature	Read
7130	Meter #1 Pressure	Read
7131	Meter #1 Observed Density	Read
7132	Meter #1 Base Density	Read

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Modbus Address Table – Float Point

ADDRESS	DESCRIPTION	READ/WRITE
7133	Meter #1 SG	Read
7134	Meter #1 Base SG	Read
7135	Meter #1 K/CD/LMF	Read
7136	Meter #1 CTL	Read
7137	Meter #1 CPL	Read
7138	Meter #1 DP_EXT	Read
7139	Meter #1 BS&W	Read
7140	Meter #1 Y	Read
7141	Meter #1 Densitometer Temperature	Read
7142	Meter #1 Densitometer Pressure	Read
7143	Meter #1 Equilibrium Pressure	Read
7144	Meter #1 Pipe ID	Read
7145	Meter #1 Orifice ID	Read
7146	Meter #1 Density Correction Factor	Read
7147	Meter #1 K Factor	Read
7148	Meter #1 Day Flow Time	Read
7149	Meter #1 Hour Flow Time	Read
7150	Meter #3 Day Flow Time	Read
7151	Meter #3 Hour Flow Time	Read
7152	Spare	Read
7153	Spare	Read
7154	Meter#3 FWA CTPL	Read
7155	Meter#3 Daily Gross Total	Read
7156	Meter#3 Daily Net Total	Read
7157	Meter#3 Daily Mass Total	Read
7158	Meter#3 CTPL	Read
7159	Meter#3 Density	Read
7160	Meter#3 FWA Density	Read
7161	Meter#3 Batch Gross Total	Read
7162	Meter#3 Batch Net Total	Read
7163	Meter#3 Batch Mass Total	Read
7164	Meter#3 Gross Flow Rate	Read
7165	Meter#3 Net Flow Rate	Read
7166	Meter#3 Mass Flow Rate	Read
7167	Meter #3 FWA DP	Read
7168	Meter #3 FWA Temperature	Read
7169	Meter #3 FWA Pressure	Read
7170	Meter #3 FWA Observed Density	Read
7171	Meter #3 FWA Base Density	Read
7172	Meter #3 FWA SG	Read
7173	Meter #3 FWA Base SG	Read
7174	Meter #3 FWA K/CD/LMF	Read
7175	Meter #3 FWA CTL	Read
7176	Meter #3 FWA CPL	Read
7177	Meter #3 FWA DP_EXT	Read
7178	Meter #3 FWA BS&W	Read
7179	Meter #3 DP	Read
7180	Meter #3 Temperature	Read
7181	Meter #3 Pressure	Read
7182	Meter #3 Observed Density	Read
7183	Meter #3 Base Density	Read
7184	Meter #3 SG	Read

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Modbus Address Table – Float Point

ADDRESS	DESCRIPTION	READ/WRITE
7185	Meter #3 Base SG	Read
7186	Meter #3 K/CD/LMF	Read
7187	Meter #3 CTL	Read
7188	Meter #3 CPL	Read
7189	Meter #3 DP_EXT	Read
7190	Meter #3 BS&W	Read
7191	Meter #3 Y	Read
7192	Meter #3 Densitometer Temperature	Read
7193	Meter #3 Densitometer Pressure	Read
7194	Meter #3 Equilibrium Pressure	Read
7195	Meter #3 Pipe ID	Read
7196	Meter #3 Orifice ID	Read
7197	Meter #3 Density Correction Factor	Read
7198	Meter #3 K Factor	Read
7199	Spare	
7201	Date – Floating	Read
7202	Time – Floating	Read
7203	Meter #3 Last Month Flow Time	Read
7204	Meter #3 Last Month Gross Total	Read
7205	Meter #3 Last Month Net Total	Read
7206	Meter #3 Last Month Mass Total	Read
7207	Spare	
7208	Meter #4 Last Month Flow Time	Read
7209	Meter #4 Last Month Gross Total	Read
7210	Meter #4 Last Month Net Total	Read
7211	Meter #4 Last Month Mass Total	Read
7212	Spare	
7213	Meter #3 Yesterday Flowing Time	Read
7214	Meter #3 Average DP	Read
7215	Meter #3 Average Temperature	Read
7216	Meter #3 Average Pressure	Read
7217	Meter #3 Average DP_EXT	Read
7218	Meter #3 Yesterday Gross	Read
7219	Meter #3 Yesterday Net	Read
7220	Meter #3 Yesterday Mass	Read
7221	Spare	
7222	Meter #4 Yesterday Flowing Time	Read
7223	Meter #4 Average DP	Read
7224	Meter #4 Average Temperature	Read
7225	Meter #4 Average Pressure	Read
7226	Meter #4 DP_EXT	Read
7227	Meter #4 Yesterday Gross	Read
7228	Meter #4 Yesterday Net	Read
7229	Meter #4 Yesterday Mass	Read
7230	Spare	
7231	Spare #1 Data	Read
7232	Spare #2 Data	Read
7233	Spare #3 Data	Read
7234	Spare #4 Data	Read
7235	Spare #5 Data	Read
7236	Spare #6 Data	Read

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Modbus Address Table – Float Point

ADDRESS	DESCRIPTION	READ/WRITE
7237	Spare #7 Data	Read
7238	Spare #8 Data	Read
7239	Spare #9 Data	Read
7240	Battery Voltage	Read
7241	Meter #1 Last Hour Flow Time	Read
7242	Meter #1 Last Hour Gross Total	Read
7243	Meter #1 Last Hour Net Total	Read
7244	Meter #1 Last Hour Average Temperature	Read
7245	Meter #1 Last Hour Average Pressure	Read
7246	Meter #1 Last Hour Average DP	Read
7247	Meter #1 Last Hour Average DP/EXT	Read
7248	Meter #2 Last Hour Flow Time	Read
7249	Meter #2 Last Hour Gross Total	Read
7250	Meter #2 Last Hour Net Total	Read
7251	Meter #2 Last Hour Average Temperature	Read
7252	Meter #2 Last Hour Average Pressure	Read
7253	Meter #2 Last Hour Average DP	Read
7254	Meter #2 Last Hour Average DP/EXT	Read
7255-7256	Spare	
7257	Meter #1 Last Month Flow Time	Read
7258	Meter #1 Last Month Gross Total	Read
7259	Meter #1 Last Month Net Total	Read
7260	Meter #1 Last Month Mass Total	Read
7261	Spare	
7262	Last Hour Program Variable #1	Read
7263	Last Hour Program Variable #2	Read
7264	Last Hour Program Variable #3	Read
7265	Last Hour Program Variable #4	Read
7266	Last Hour Program Variable #5	Read
7267-7270	Reserved	
7271	Meter #1 Yesterday Flow Time	Read
7272	Meter #1 Yesterday Average DP	Read
7273	Meter #1 Yesterday Average Temperature	Read
7274	Meter #1 Yesterday Average Pressure	Read
7275	Meter #1 Yesterday Average DP/EXT	Read
7276	Meter #1 Yesterday Gross Total	Read
7277	Meter #1 Yesterday Net Total	Read
7278	Meter #1 Yesterday Mass Total	Read
7279	Spare	
7280	Spare	
7281	Spare	

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Modbus Address Table – Float Point

ADDRESS	DESCRIPTION	READ/WRITE
7301	Spare	Read
7302	Spare	Read
7303	Meter#2 FWACTPL	Read
7304	Meter#2 Daily Gross Total	Read
7305	Meter#2 Daily Net Total	Read
7306	Meter#2 Daily Mass Total	Read
7307	Meter#2 CTPL	Read
7308	Meter#2 Density	Read
7309	Meter#2 FWA Density	Read
7310	Meter#2 Batch Gross Total	Read
7311	Meter#2 Batch Net Total	Read
7312	Meter#2 Batch Mass Total	Read
7313	Meter#2 Gross Flow Rate	Read
7314	Meter#2 Net Flow Rate	Read
7315	Meter#2 Mass Flow Rate	Read
7316	Meter #2 FWA DP	Read
7317	Meter #2 FWA Temperature	Read
7318	Meter #2 FWA Pressure	Read
7319	Meter #2 FWA Observed Density	Read
7320	Meter #2 FWA Base Density	Read
7321	Meter #2 FWA SG	Read
7322	Meter #2 FWA Base SG	Read
7323	Meter #2 FWA K/CD/LMF	Read
7324	Meter #2 FWA CTL	Read
7325	Meter #2 FWA CPL	Read
7326	Meter #2 FWA DP_EXT	Read
7327	Meter #2 FWA BS&W	Read
7328	Meter #2 DP	Read
7329	Meter #2 Temperature	Read
7330	Meter #2 Pressure	Read
7331	Meter #2 Observed Density	Read
7332	Meter #2 Base Density	Read
7333	Meter #2 SG	Read
7334	Meter #2 Base SG	Read
7335	Meter #2 K/CD/LMF	Read
7336	Meter #2 CTL	Read
7337	Meter #2 CPL	Read
7338	Meter #2 DP_EXT	Read
7339	Meter #2 BS&W	Read
7340	Meter #2 Y	Read
7341	Meter #2 Densitometer Temperature	Read
7342	Meter #2 Densitometer Pressure	Read
7343	Meter #2 Equilibrium Pressure	Read
7344	Meter #2 Pipe ID	Read
7345	Meter #2 Orifice ID	Read
7346	Meter #2 Density Correction Factor	Read
7347	Meter #2 K Factor	Read
7348	Meter #2 Day Flow Time	Read
7349	Meter #2 Hour Flow Time	Read

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Modbus Address Table – Float Point

ADDRESS	DESCRIPTION	READ/WRITE
7350	Meter #4 Day Flow Time	Read
7351	Meter #4 Hour Flow Time	Read
7352	Spare	Read
7353	Spare	Read
7354	Meter#4 FWA CTPL	Read
7355	Meter#4 Daily Gross Total	Read
7356	Meter#4 Daily Net Total	Read
7357	Meter#4 Daily Mass Total	Read
7358	Meter#4 CTPL	Read
7359	Meter#4 Density	Read
7360	Meter#4 FWA Density	Read
7361	Meter#4 Batch Gross Total	Read
7362	Meter#4 Batch Net Total	Read
7363	Meter#4 Batch Mass Total	Read
7364	Meter#4 Gross Flow Rate	Read
7365	Meter#4 Net Flow Rate	Read
7366	Meter#4 Mass Flow Rate	Read
7367	Meter #4 FWA DP	Read
7368	Meter #4 FWA Temperature	Read
7369	Meter #4 FWA Pressure	Read
7370	Meter #4 FWA Observed Density	Read
7371	Meter #4 FWA Base Density	Read
7372	Meter #4 FWA SG	Read
7373	Meter #4 FWA Base SG	Read
7374	Meter #4 FWA K/CD/LMF	Read
7375	Meter #4 FWA CTL	Read
7376	Meter #4 FWA CPL	Read
7377	Meter #4 FWA DP_EXT	Read
7378	Meter #4 FWA BS&W	Read
7379	Meter #1 DP	Read
7380	Meter #1 Temperature	Read
7381	Meter #1 Pressure	Read
7382	Meter #1 Observed Density	Read
7383	Meter #1 Base Density	Read
7384	Meter #1 SG	Read
7385	Meter #1 Base SG	Read
7386	Meter #1 K/CD/LMF	Read
7387	Meter #1 CTL	Read
7388	Meter #1 CPL	Read
7389	Meter #1 DP_EXT	Read
7390	Meter #1 BS&W	Read
7391	Meter #1 Y	Read
7392	Meter #1 Densitometer Temperature	Read
7393	Meter #1 Densitometer Pressure	Read
7394	Meter #1 Equilibrium Pressure	Read
7395	Meter #1 Pipe ID	Read
7396	Meter #1 Orifice ID	Read
7397	Meter #1 Density Correction Factor	Read
7398	Meter #1 K Factor	Read
7399	Spare	

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Modbus Address Table – Float Point

ADDRESS	DESCRIPTION	READ/WRITE
7401	Multi.Var DP	Read
7402	Multi.Var Pressure	Read
7403	Multi.Var Temperature	Read
7404	Analog Input #1 mA Value	Read
7405	Analog Input #2 mA Value	Read
7406	Analog Input #3 mA Value	Read
7407	Analog Input #4 mA Value	Read
7408	Multi.Var. Flag	Read
7409	Slave#1 DP	Read
7410	Slave#1 Pressure	Read
7411	Slave#1 Temperature	Read
7412	Slave#1 Spare Auxiliary I/O #1	Read
7413	Slave#1 Spare Auxiliary I/O #2	Read
7414	Slave#1 Spare Auxiliary I/O #3	Read
7415	Slave#1 Spare Auxiliary I/O #4	Read
7416	Slave#1 Multi.Var.Flag	Read
7417-7425	Reserved	
7426-7433	Spare	
7434	Yesterday Program Variable #1	Read
7435	Yesterday Program Variable #2	Read
7436	Yesterday Program Variable #3	Read
7437	Yesterday Program Variable #4	Read
7438	Yesterday Program Variable #5	Read
7439	Reserved	
7440	Reserved	
7441	Meter #3 Last Hour Flow Time	Read
7442	Meter #3 Last Hour Gross Total	Read
7443	Meter #3 Last Hour Net Total	Read
7444	Meter #3 Last Hour Average Temperature	Read
7445	Meter #3 Last Hour Average Pressure	Read
7446	Meter #3 Last Hour Average DP	Read
7447	Meter #3 Last Hour Average DP/EXT	Read
7448	Meter #4 Last Hour Flow Time	Read
7449	Meter #4 Last Hour Gross Total	Read
7450	Meter #4 Last Hour Net Total	Read
7451	Meter #4 Last Hour Average Temperature	Read
7452	Meter #4 Last Hour Average Pressure	Read
7453	Meter #4 Last Hour Average DP	Read
7454	Meter #4 Last Hour Average DP/EXT	Read
7455	Spare	
7456	Spare	
7457	Meter#2 Last Month Flow Time	Read
7458	Meter#2 Last Month Gross Total	Read
7459	Meter#2 Last Month Net Total	Read
7460	Meter#2 Last Month Mass Total	Read
7461	Spare	
7462-7465	Spare	

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Modbus Address Table – Float Point

ADDRESS	DESCRIPTION	READ/WRITE
7466	Last Month Program Variable #1	Read
7467	Last Month Program Variable #2	Read
7468	Last Month Program Variable #3	Read
7469	Last Month Program Variable #4	Read
7470	Last Month Program Variable #5	Read
7471	Meter #2 Yesterday Flow Time	Read
7472	Meter #2 Yesterday Average DP	Read
7473	Meter #2 Yesterday Average Temperature	Read
7474	Meter #2 Yesterday Average Pressure	Read
7475	Meter #2 Yesterday Average DP/EXT	Read
7476	Meter #2 Yesterday Gross Total	Read
7477	Meter #2 Yesterday Net Total	Read
7478	Meter #2 Yesterday Mass Total	Read
7479	Meter #1 Last Batch Gross Total	Read
7480	Meter #1 Last Batch Net Total	Read
7481	Meter #1 Last Batch Mass Total	Read
7482	Meter #2 Last Batch Gross Total	Read
7483	Meter #2 Last Batch Net Total	Read
7484	Meter #2 Last Batch Mass Total	Read
7483	Meter #3 Last Batch Gross Total	Read
7484	Meter #3 Last Batch Net Total	Read
7485	Meter #3 Last Batch Mass Total	Read
7486	Meter #4 Last Batch Gross Total	Read
7487	Meter #4 Last Batch Net Total	Read
7488	Meter #4 Last Batch Mass Total	Read

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Modbus Address Table – Float Point

ADDRESS	DESCRIPTION	READ/WRITE
7601	Analog Input #5 @4mA	Read/Write
7602	Analog Input #5 @20mA	Read/Write
7603	Analog Input #5 Low Limit	Read/Write
7604	Analog Input #5 High Limit	Read/Write
7605	Analog Input #5 Maintenance	Read/Write
7606	Analog Input #6 @4mA	Read/Write
7607	Analog Input #6 @20mA	Read/Write
7608	Analog Input #6 Low Limit	Read/Write
7609	Analog Input #6 High Limit	Read/Write
7610	Analog Input #6 Maintenance	Read/Write
7611	Analog Input #7 @4mA	Read/Write
7612	Analog Input #7 @20mA	Read/Write
7613	Analog Input #7 Low Limit	Read/Write
7614	Analog Input #7 High Limit	Read/Write
7615	Analog Input #7 Maintenance	Read/Write
7616	Analog Input #8 @4mA	Read/Write
7617	Analog Input #8 @20mA	Read/Write
7618	Analog Input #8 Low Limit	Read/Write
7619	Analog Input #8 High Limit	Read/Write
7620	Analog Input #8 Maintenance	Read/Write
7621	Analog Input #9 @4mA	Read/Write
7622	Analog Input #9 @20mA	Read/Write
7623	Analog Input #9 Low Limit	Read/Write
7624	Analog Input #9 High Limit	Read/Write
7625	Analog Input #9 Maintenance	Read/Write
7626	Analog Input #5 Override	Read/Write
7627	Analog Input #6 Override	Read/Write
7628	Analog Input #7 Override	Read/Write
7629	Analog Input #8 Override	Read/Write
7630	Analog Input #9 Override	Read/Write
7631	Spare Auxiliary I/O #1 @4mA	Read/Write
7632	Spare Auxiliary I/O #1 @20mA	Read/Write
7633	Spare Auxiliary I/O #1 Low Limit	Read/Write
7634	Spare Auxiliary I/O #1 High Limit	Read/Write
7635	Spare Auxiliary I/O #2 @4mA	Read/Write
7636	Spare Auxiliary I/O #2 @20mA	Read/Write
7637	Spare Auxiliary I/O #2 Low Limit	Read/Write
7638	Spare Auxiliary I/O #2 High Limit	Read/Write
7639	Spare Auxiliary I/O #3 @4mA	Read/Write
7640	Spare Auxiliary I/O #3 @20mA	Read/Write
7641	Spare Auxiliary I/O #3 Low Limit	Read/Write
7642	Spare Auxiliary I/O #3 High Limit	Read/Write
7643	Spare Auxiliary I/O #4 @4mA	Read/Write
7644	Spare Auxiliary I/O #4 @20mA	Read/Write
7645	Spare Auxiliary I/O #4 Low Limit	Read/Write
7646	Spare Auxiliary I/O #4 High Limit	Read/Write
7647	Spare Auxiliary I/O #5 @4mA	Read/Write

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Modbus Address Table – Float Point

ADDRESS	DESCRIPTION	READ/WRITE
7648	Spare Auxiliary I/O #5 @20mA	Read/Write
7649	Spare Auxiliary I/O #5 Low Limit	Read/Write
7650	Spare Auxiliary I/O #5 High Limit	Read/Write
7651	Spare Auxiliary I/O #6 @4mA	Read/Write
7652	Spare Auxiliary I/O #6 @20mA	Read/Write
7653	Spare Auxiliary I/O #6 Low Limit	Read/Write
7654	Spare Auxiliary I/O #6 High Limit	Read/Write
7655	Spare Auxiliary I/O #7 @4mA	Read/Write
7656	Spare Auxiliary I/O #7 @20mA	Read/Write
7657	Spare Auxiliary I/O #7 Low Limit	Read/Write
7658	Spare Auxiliary I/O #7 High Limit	Read/Write
7659	Spare Auxiliary I/O #8 @4mA	Read/Write
7660	Spare Auxiliary I/O #8 @20mA	Read/Write
7661	Spare Auxiliary I/O #8 Low Limit	Read/Write
7662	Spare Auxiliary I/O #8 High Limit	Read/Write
7663	Spare Auxiliary I/O #9 @4mA	Read/Write
7664	Spare Auxiliary I/O #9 @20mA	Read/Write
7665	Spare Auxiliary I/O #9 Low Limit	Read/Write
7666	Spare Auxiliary I/O #9 High Limit	Read/Write
7667	Spare Auxiliary I/O #10 @4mA	Read/Write
7668	Spare Auxiliary I/O #10 @20mA	Read/Write
7669	Spare Auxiliary I/O #10 Low Limit	Read/Write
7670	Spare Auxiliary I/O #10 High Limit	Read/Write
7671	Spare Auxiliary I/O #11 @4mA	Read/Write
7672	Spare Auxiliary I/O #11 @20mA	Read/Write
7673	Spare Auxiliary I/O #11 Low Limit	Read/Write
7674	Spare Auxiliary I/O #11 High Limit	Read/Write
7675	Spare Auxiliary I/O #12 @4mA	Read/Write
7676	Spare Auxiliary I/O #12 @20mA	Read/Write
7677	Spare Auxiliary I/O #12 Low Limit	Read/Write
7678	Spare Auxiliary I/O #12 High Limit	Read/Write
7679-7690	Spare	Read/Write
7691	Slave#1 DP Override	Read/Write
7692	Slave#1 Pressure Override	Read/Write
7693	Slave#1 Temperature Override	Read/Write
7694	Slave#2 DP Override	Read/Write
7695	Slave#2 Pressure Override	Read/Write
7696	Slave#2 Temperature Override	Read/Write
7697	Slave#3 DP Override	Read/Write
7698	Slave#3 Pressure Override	Read/Write
7699	Slave#3 Temperature Override	Read/Write
7700	Spare	

Modbus Address Table – Float Point

ADDRESS	DESCRIPTION	READ/WRITE
7701	Slave #1 DP Low Limit	Read/Write
7702	Slave #1 DP High Limit	Read/Write
7703	Slave #1 DP Maintenance	Read/Write
7704	Slave #1 Pressure Low Limit	Read/Write
7705	Slave #1 Pressure High Limit	Read/Write
7706	Slave #1 Pressure Maintenance	Read/Write
7707	Slave #1 Temperature Low Limit	Read/Write
7708	Slave #1 Temperature High Limit	Read/Write
7709	Slave #1 Temperature Maintenance	Read/Write
7710	Slave #2 DP Low Limit	Read/Write
7711	Slave #2 DP High Limit	Read/Write
7712	Slave #2 DP Maintenance	Read/Write
7713	Slave #2 Pressure Low Limit	Read/Write
7714	Slave #2 Pressure High Limit	Read/Write
7715	Slave #2 Pressure Maintenance	Read/Write
7716	Slave #2 Temperature Low Limit	Read/Write
7717	Slave #2 Temperature High Limit	Read/Write
7718	Slave #2 Temperature Maintenance	Read/Write
7719	Slave #3 DP Low Limit	Read/Write
7720	Slave #3 DP High Limit	Read/Write
7721	Slave #3 DP Maintenance	Read/Write
7722	Slave #3 Pressure Low Limit	Read/Write
7723	Slave #3 Pressure High Limit	Read/Write
7724	Slave #3 Pressure Maintenance	Read/Write
7725	Slave #3 Temperature Low Limit	Read/Write
7726	Slave #3 Temperature High Limit	Read/Write
7727	Slave #3 Temperature Maintenance	Read/Write

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Modbus Address Table – Float Point

ADDRESS	DESCRIPTION	READ/WRITE
7901	Analog Input #1 @4mA	Read/Write
7902	Analog Input #2 @20mA	Read/Write
7903	Analog Input #1 Low Limit	Read/Write
7904	Analog Input #1 High Limit	Read/Write
7905	Analog Input #1 Maintenance	Read/Write
7906	Analog Input #2 @4mA	Read/Write
7907	Analog Input #2 @20mA	Read/Write
7908	Analog Input #2 Low Limit	Read/Write
7909	Analog Input #2 High Limit	Read/Write
7910	Analog Input #2 Maintenance	Read/Write
7911	Analog Input #3 @4mA	Read/Write
7912	Analog Input #3 @20mA	Read/Write
7913	Analog Input #3 Low Limit	Read/Write
7914	Analog Input #3 High Limit	Read/Write
7915	Analog Input #3 Maintenance	Read/Write
7916	Analog Input #4 @4mA	Read/Write
7917	Analog Input #4 @20mA	Read/Write
7918	Analog Input #4 Low Limit	Read/Write
7919	Analog Input #4 High Limit	Read/Write
7920	Analog Input #4 Maintenance	Read/Write
7921	Spare	Read/Write
7922	Spare	Read/Write
7923	RTD Input Low Limit	Read/Write
7924	RTD Input High Limit	Read/Write
7925	RTD Input Maintenance	Read/Write
7926	Analog Input#1 Override	Read/Write
7927	Analog Input#2 Override	Read/Write
7928	Analog Input#3 Override	Read/Write
7929	Analog Input#4 Override	Read/Write
7930	RTD Input Override	Read/Write
7931	Analog Output #1 @4mA	Read/Write
7932	Analog Output #1 @20mA	Read/Write
7933	Analog Output #2 @4mA	Read/Write
7934	Analog Output #2 @20mA	Read/Write
7935	Analog Output #3 @4mA	Read/Write
7936	Analog Output #3 @20mA	Read/Write
7937	Analog Output #4 @4mA	Read/Write
7938	Analog Output #4 @20mA	Read/Write
7938-7951	Spare	

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Modbus Address Table – Float Point

ADDRESS	DESCRIPTION	READ/WRITE
7952	Analog Input #1 Live Value (for checking alarms only)	Read
7953	Analog Input #2 Live Value (for checking alarms only)	Read
7954	Analog Input #3 Live Value (for checking alarms only)	Read
7955	Analog Input #4 Live Value (for checking alarms only)	Read
7956	RTD Live Value (for checking alarms only)	Read
7957	Analog Input #1 Value (used in the calculation)	Read
7958	Analog Input #2 Value (used in the calculation)	Read
7959	Analog Input #3 Value (used in the calculation)	Read
7960	Analog Input #4 Value (used in the calculation)	Read
7961	RTD Value (used in the calculation)	Read
7962	Analog Output #1 Value	Read
7963	Analog Output #2 Value	Read
7964	Analog Output #3 Value	Read
7965	Analog Output #4 Value	Read
7966	Analog Input #5 Live Value (checking alarms only)	Read
7967	Analog Input #6 Live Value (checking alarms only)	Read
7968	Analog Input #7 Live Value (checking alarms only)	Read
7969	Analog Input #8 Live Value (checking alarms only)	Read
7970	Analog Input #9 Live Value (checking alarms only)	Read
7971	Analog Input #5 Value (used in the calculation)	Read
7972	Analog Input #6 Value (used in the calculation)	Read
7973	Analog Input #7 Value (used in the calculation)	Read
7974	Analog Input #8 Value (used in the calculation)	Read
7975	Analog Input #9 Value (used in the calculation)	Read
7976	Spare #1 Data	Read
7977	Spare #2 Data	Read
7978	Spare #3 Data	Read
7979	Spare #4 Data	Read
7980	Spare #5 Data	Read
7981	Spare #6 Data	Read
7982	Spare #7 Data	Read
7983	Spare #8 Data	Read
7984	Spare #9 Data	Read
7985	Spare Auxiliary I/O #1 Data	Read
7986	Spare Auxiliary I/O #2 Data	Read
7987	Spare Auxiliary I/O #3 Data	Read
7988	Spare Auxiliary I/O #4 Data	Read
7989	Spare Auxiliary I/O #5 Data	Read
7990	Spare Auxiliary I/O #6 Data	Read
7991	Spare Auxiliary I/O #7 Data	Read
7992	Spare Auxiliary I/O #8 Data	Read
7993	Spare Auxiliary I/O #9 Data	Read
7994	Spare Auxiliary I/O #10 Data	Read
7995	Spare Auxiliary I/O #11 Data	Read
7996	Spare Auxiliary I/O #12 Data	Read

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Alarm, Audit Trail, and Calibration Data

Previous Data Alarm Area

Set last alarm status request (3030, 16 bits Integer, Write only) to 1.

4001-4005 (2x16 bits Integers, Read only)
4001   last alarm date mmddyy
4003   last alarm time hhmmss
4005   last alarm flag - IDx1000000 + CODE x10000 +ACODEx100 +STATUS

Last Alarm Flag

ID	CODE	Not used	STATUS

ID

0	Analog Input #1		41	Analog Input #5
1	Analog Input #2		42	Analog Input #6
2	Analog Input #3		43	Analog Input #7
3	Analog Input #4		44	Analog Input #8
4	RTD Input		45	Analog Input #9
5	Analog Output #1			
6	Analog Output #2		51	Spare Auxiliary I/O #1
7	Analog Output #3		52	Spare Auxiliary I/O #2
8	Analog Output #4		53	Spare Auxiliary I/O #3
9	Density		54	Spare Auxiliary I/O #4
10	Density		55	Spare Auxiliary I/O #5
11	Meter #1		56	Spare Auxiliary I/O #6
12	Meter #2		57	Spare Auxiliary I/O #7
13	Meter #3		58	Spare Auxiliary I/O #8
14	Meter #4		59	Spare Auxiliary I/O #9
17	Event Status		60	Spare Auxiliary I/O #10
18	Calibration Mode		61	Spare Auxiliary I/O #11
			62	Spare Auxiliary I/O #12
20	Multi.Var. DP		71	Slave#1 DP
21	Multi.Var. Pressurer		72	Slave#2 DP
22	Multi.Var. Temperature		73	Slave#3 DP
			74	Slave#1 Pressure
30	MPU1200 Alarm		75	Slave#2 Pressure
31			76	Slave#3 Pressure
32	Slave#1 Communication		77	Slave#1 Temperature
33	Slave#2 Communication		78	Slave#2 Temperature
34	Slave#3 Communication		79	Slave#3 Temperature
			80	Battery Alarm

CODE (Only For ID=Meter#1,2,3,4)

1	Flow Rate		7	Down
2	Table Gravity Out of Range		8	Start
3	Table Temperature Out of Range			
4	Table Alpha T Out of Range			

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STATUS

0	ID = 10:	FAILED OK
	ID = 5 –8:	OVERRANGE OK
	ID=17,18	OFF
	ID=Others	OK
Others	Not Used	

1	ID=17,18,30	ON
	ID=Others	HI
	ID=31,32,33,34	FAIL
2	LO	
4	FAILED	
5	OVERRANGE	
6	FAIL OK	
7	FAIL	

Example: Last Alarm Flag – (Hex:A8EA33, Decimal:11070003)
ID= 11, CODE=7,ACODE=0,STATUS=3 -> METER #1 DOWN

Previous Alarm Data Area Ends

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Previous Audit Data Area

Set last audit data request (3031,16 bits Integer, Write only) to 1.
8101-8109 (2x16 bits Integers, Read only)
8101   Last Audit Date mmddyy
8103   Last Audit Time hhmmss
8105   Old Value (Decimal Inferred in the 4th byte of 8109)
8107   New Vaule(Decimal Inferred in the 4th byte of 8109)
8109   Code Flag-Given in four hexadecimal bytes (no,audit code,dec)

Code Flag

	No.	Audit Code	Old/New Value Decimal Inferred

NO.

Value 0: this field is not used.

1	Meter #1 ID		221	Spare Aux.I/O#1 TAG
2	Meter #2 ID		222	Spare Aux.I/O#2 TAG
3	Meter #3 ID		223	Spare Aux.I/O#3 TAG
4	Meter #4 ID		224	Spare Aux.I/O#4 TAG
			225	Spare Aux.I/O#5 TAG
191	Analog Input #5 TAG		226	Spare Aux.I/O#6 TAG
192	Analog Input #6 TAG		227	Spare Aux.I/O#7 TAG
193	Analog Input #7 TAG		228	Spare Aux.I/O#8 TAG
194	Analog Input #8 TAG		229	Spare Aux.I/O#9 TAG
195	Analog Input #9 TAG		230	Spare Aux.I/O#10 TAG
201	Analog Input #1 TAG		231	Spare Aux.I/O#11 TAG
202	Analog Input #2 TAG		232	Spare Aux.I/O#12 TAG
203	Analog Input #3 TAG			
204	Analog Input #4 TAG		236	Slave#1 DP TAG
205	RTD TAG		237	Slave#1 Pressure TAG
			238	Slave#1 Temperature TAG
211	Multi.Var.DP TAG		239	Slave#2 DP TAG
212	Multi.Var.Pressure TAG		240	Slave#2 Pressure TAG
213	Multi.Var.Temperature TAG		241	Slave#2 Temperature TAG
			242	Slave#3 DP TAG
			243	Slave#3 Pressure TAG
			244	Slave#3 TemperatureTAG

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Audit Codes

1	DP Cut Off		60	Base Temperature
2	DP High Switch Percentage		61	Base Pressure
3	DP Low Assignment		62	Atmospheric Pressure
4	DP High Assignment		63	Pulse Output #1 Volume
5	BS&W Assignment		64	Pulse Output #2 Volume
6	Pipe ID		65	Density Correction Factor
7	Orifice ID		66	Number of Meters
8	Temperature Override		67	Pressure Unit
9	Pressure Override		68	Flow Unit
10	BS&W Override		69	Common Temperature
11	Equilibrium Pressure Override		70	Common Pressure
12	Ratio of Heat		71	Common Density
13	Viscosity		72	Flow Rate Display
14	Pipe Thermal Expansion E-6		73	Day Start Hour
15	Orifice Thermal Expansion E-6		74	Disable Alarms
16	Reference Temperature of Pipe		75	Frequency Device K Factor Unit
17	Reference Temperature of Orifice			
18	Kd2 Override		76	@4mA/1-5V
19	FA Override		77	@20mA/1-5V
20	Meter Factor		78	Maintenance
21	K Factor		79	Override
22	Flow Cut Off Hertz		80	Fail Code
23	Use Stack DP 0=No, 1=Yes		81	DP Unit
24	Densitometer Type		82	Product #1 Table
25	Density Unit		83	Product #2 Table
26	Calculation Type		84	Product #3 Table
27	Y Factor Select		85	Product #4 Table
28	Temperature Assignment		86	Product #5 Table
29	Pressure Assignment		87	Product #6 Table
30	Densitometer Assignment		88	Product #7 Table
31	Flow Rate Threshold #1		89	Product #8 Table
32	Flow Rate Threshold #2		90	Mass Pulse Selection
33	Flow Rate Threshold #3			
34	Flow Rate Threshold #4			
35	Linearization Factor #1			
36	Linearization Factor #2			
37	Linearization Factor #3			
38	Linearization Factor #4			
39	Venturi C Factor Override			
40	SG Override			
41	Density Override		**180**	***SEE NOTE (next page)

8101   **Last Audit Date mmddyy**
00 00 C8 C8 (Hex), 051400 (Digit) – May 14, 2000
8103   **Last Audit Time hhmmss**
00 03 0d 40 (Hex), 200000(Digit) – 8 PM
8105   **Old Value (Decimal Inferred in the 4th byte of 8109)**
00 01 86 a0 (Hex) 100000 (Digit)
4th byte of 8113 = 5 (Decimal Places)
result = 1.00000

8107   **New Vaule(Decimal Inferred in the 4th byte of 8109)**
00 01 ad b0 (Hex) 110000 (Digit)
4th byte of 8113 = 5 (Decimal Places)
Rsult = 1.10000

8109   **Code Flag**

00 00 41 05 in Hex
1st Byte
2nd Byte – 0,
3rd Byte – Audit Code – 41(Hex) 65 (Digit) – Density Correction Factor
4th Byte – Decimal Places – 05(Hex) – 5 Decimal Places

NOTE:

When Audit Code = 180, then the following Modbus Addresses store the parameters indicated.

8501   System Start Date

8503   System Start Time

8505   System Failed Date

8507   System Failed Time

8509   Not Used

Previous Audit Data Area Ends

Previous Calibration/Verification Data Area

3129 (16 bits Integer, Write only) **Last Calib./Verification Rpt Req.(1=Latest,20=Oldest)**

8101-8109 (2x16 bits Integers, Read only)

8101	Last Calibration/Verification Date mmddyy
8103	Last Calibration/Verification Time hhmmss
8105	As Found / Verification Point (Decimal Inferred in the 4th byte of 8109)
8107	As Left (Decimal Inferred in the 4th byte of 8109)
8109	Code Flag-Given in four hexadecimal bytes (ID,Code,Decimal Inferreed)

Code Flag

	ID	Code	Value Decimal Inferred

Calibration ID

	Master	Slave #1	Slave#2	Slave#3
DP	1	21	31	41
Pressure	2	22	32	42
Temperature	3	23	33	43
Analog Input#1	4	24	34	44
Analog Input#2	5	25	35	45
Analog Input#3	6	26	36	46
Analog Input#4	7	27	37	47
Analog Input#5	8			
Analog Input#6	9			
Analog Input#7	10			
Analog Input#8	11			
Analog Input#9	12			
RTD	13			

Code

0	Calibration
1	Verification

Decimal Inferred

4	4 Decimal Inferred
3	3 Decimal Inferred
2	2 Decimal Inferred

Date: 9/28/2022

Current Alarm Status

4 Bytes in Hex - FF FF FF FF

METER#1: MODBUS ADDRESS 9533

METER#2: MODBUS ADDRESS 9535

METER#3: MODBUS ADDRESS 9537

METER#4: MODBUS ADDRESS 9539

The Current Alarm Status is a 4-byte string that resides at **Modbus address 9533 for Meter #1, 9535 for Meter #2, 9537 for Meter#3, and 9539 for Meter#4**. The alarm status codes are the same for all meters.

1st byte	2nd byte	3rd byte	4th byte	
01	00	00	00	Meter Down
02	00	00	00	Table Gravity Out of Range
04	00	00	00	Net Flow Rate High
08	00	00	00	Net Flow Rate Low
10	00	00	00	Table Temperature Out of Range
20	00	00	00	Table Alpha-T Out of Range

Date: 9/28/2022

OTHER ALARMS (MODBUS ADDRESS 9517)

4 Bytes in Hex - FF FF FF FF

01	00	00	00	Slave#1 DP High
02	00	00	00	Slave#1 DP Low
04	00	00	00	Slave#1 Pressure High
08	00	00	00	Slave#1 Pressure Low
10	00	00	00	Slave#1 Temperature High
20	00	00	00	Slave#1 Temperature Low
00	01	00	00	Slave#2 DP High
00	02	00	00	Slave#2 DP Low
00	04	00	00	Slave#2 Pressure High
00	08	00	00	Slave#2 Pressure Low
00	10	00	00	Slave#2 Temperature High
00	20	00	00	Slave#2 Temperature Low
00	00	01	00	Slave#3 DP High
00	00	02	00	Slave#3 DP Low
00	00	04	00	Slave#3 Pressure High
00	00	08	00	Slave#3 Pressure Low
00	00	10	00	Slave#3 Temperature High
00	00	20	00	Slave#3 Temperature Low

Date: 9/28/2022

OTHER ALARMS (MODBUS ADDRESS 9527)

4 Bytes in Hex - FF FF FF FF

01	00	00	00	Spare Auxiliary I/O#1 High
02	00	00	00	Spare Auxiliary I/O#1 Low
04	00	00	00	Spare Auxiliary I/O#2 High
08	00	00	00	Spare Auxiliary I/O#2 Low
10	00	00	00	Spare Auxiliary I/O#3 High
20	00	00	00	Spare Auxiliary I/O#3 Low
40	00	00	00	Spare Auxiliary I/O#4 High
80	00	00	00	Spare Auxiliary I/O#4 Low
00	01	00	00	Spare Auxiliary I/O#5 High
00	02	00	00	Spare Auxiliary I/O#5 Low
00	04	00	00	Spare Auxiliary I/O#6 High
00	08	00	00	Spare Auxiliary I/O#6 Low
00	10	00	00	Spare Auxiliary I/O#7 High
00	20	00	00	Spare Auxiliary I/O#7 Low
00	40	00	00	Spare Auxiliary I/O#8 High
00	80	00	00	Spare Auxiliary I/O#8 Low
00	00	01	00	Spare Auxiliary I/O#9 High
00	00	02	00	Spare Auxiliary I/O#9 Low
00	00	04	00	Spare Auxiliary I/O#10 High
00	00	08	00	Spare Auxiliary I/O#10 Low
00	00	10	00	Spare Auxiliary I/O#11 High
00	00	20	00	Spare Auxiliary I/O#11 Low
00	00	40	00	Spare Auxiliary I/O#12 High
00	00	80	00	Spare Auxiliary I/O#12 Low
00	00	00	01	Analog Input #5 Failed
00	00	00	02	Analog Input #6 Failed
00	00	00	04	Analog Input #7 Failed
00	00	00	08	Analog Input #8 Failed
00	00	00	10	Analog Input #9 Failed

Date: 9/28/2022

OTHER ALARMS (MODBUS ADDRESS 9529)

4 Bytes in Hex - FF FF FF FF

01	00	00	00	
02	00	00	00	Slave#1 Communcation Failed
04	00	00	00	Slave#2 Communcation Failed
08	00	00	00	Slave#3 Communcation Failed
10	00	00	00	MPU –1200 Alarm
00	01	00	00	Analog Input#5 High
00	02	00	00	Analog Input#5 Low
00	04	00	00	Analog Input#6 High
00	08	00	00	Analog Input#6 Low
00	10	00	00	Analog Input#7 High
00	20	00	00	Analog Input#7 Low
00	40	00	00	Analog Input#8 High
00	80	00	00	Analog Input#8 Low
00	00	01	00	Analog Input#9 High
00	00	02	00	Analog Input#9 Low

OTHER ALARMS (MODBUS ADDRESS 9531)

4 Bytes in Hex - FF FF FF FF

01	00	00	00	Analog Input #1 High
02	00	00	00	Analog Input #1 Low
04	00	00	00	Analog Input #2 High
08	00	00	00	Analog Input #2 Low
10	00	00	00	Analog Input #3 High
20	00	00	00	Analog Input #3 Low
40	00	00	00	Analog Input #4 High
80	00	00	00	Analog Input #4 Low
00	01	00	00	RTD Input High
00	02	00	00	RTD Input Low
00	04	00	00	Calibration Mode ON
00	08	00	00	Battery Low
00	10	00	00	Analog Output #1 Overrange
00	20	00	00	Analog Output #2 Overrange
00	40	00	00	Analog Output #3 Overrange
00	80	00	00	Analog Output #4 Overrange
00	00	01	00	Analog Input #1 Failed
00	00	02	00	Analog Input #2 Failed
00	00	04	00	Analog Input #3 Failed
00	00	08	00	Analog Input #4 Failed
00	00	10	00	RTD Input Failed
00	00	20	00	Densitometer Failed
00	00	40	00	Densitometer High
00	00	80	00	Densitometer Low
00	00	00	01	Multi.Var.DP High
00	00	00	02	Multi.Var.DP Low
00	00	00	04	Multi.Var.Pressure High
00	00	00	08	Multi.Var.Pressure Low
00	00	00	10	Multi.Var.Temperature High
00	00	00	20	Multi.Var.Temperature Low

Current Alarms Status Section Ends

Date: 9/28/2022

INPUT ASSIGNMENTS

1 – Analog Input #1
2 – Analog Input #2
3 – Analog Input #3
4 – Analog Input #4
5 – RTD
10 – Multi.Variable
21 – Analog Input #5
22 – Analog Input #6
23 – Analog Input #7
24 – Analog Input #8
25 – Analog Input #9

ADDRESS   DESCRIPTION

Assignment	Meter#1	Meter#2	Meter#3	Meter#4
DP	2664	2684	2704	2724
Temperature	2665	2685	2705	2725
Pressure	2666	2686	2706	2726
Density	2667	2687	2707	2727
DP High	2668	2688	2708	2728

2861-2864	Analog Input #5 TAG ID	8 Chars.
2865-2868	Analog Input #6 TAG ID	8 Chars
2869-2872	Analog Input #7 TAG ID	8 Chars
2873-2876	Analog Input #8 TAG ID	8 Chars
2877-2880	Analog Input #9 TAG ID	8 Chars
2891-2894	Analog Input #1 TAG ID	8 Chars.
2895-2898	Analog Input #2 TAG ID	8 Chars.
2899-2902	Analog Input #3 TAG ID	8 Chars.
2903-2906	Analog Input #4 TAG ID	8 Chars.
2907-2910	RTD TAG ID	8 Chars.
2911-2914	Densitometer TAG ID	8 Chars.
2915-2918	Analog Output #1 TAG ID	8 Chars.
2919-2922	Analog Output #2 TAG ID	8 Chars.
2923-2926	Analog Output #3 TAG ID	8 Chars.
2927-2930	Analog Output #4 TAG ID	8 Chars.
2931-2934	Multi.Var DP TAG	8 Chars.
2935-2938	Multi.Var Pressure TAG	8 Chars.
2939-2942	Multi.Var Temperature TAG	8 Chars.
4701-4703	Spare Auxiliary I/O #1	8 Chars.
4705-4707	Spare Auxiliary I/O #2	8 Chars.
4709-4711	Spare Auxiliary I/O #3	8 Chars.
4713-4715	Spare Auxiliary I/O #4	8 Chars.
4717-4719	Spare Auxiliary I/O #5	8 Chars.
4721-4723	Spare Auxiliary I/O #6	8 Chars.
4725-4727	Spare Auxiliary I/O #7	8 Chars.
4729-4731	Spare Auxiliary I/O #8	8 Chars.
4733-4735	Spare Auxiliary I/O #9	8 Chars.
4737-4739	Spare Auxiliary I/O #10	8 Chars.
4741-4743	Spare Auxiliary I/O #11	8 Chars.
4745-4747	Spare Auxiliary I/O #12	8 Chars.

Date: 9/28/2022

Data Packet

Previous Hourly Data Packet (101-184)

Set Meter Number to 1, 2, 3, or 4 (Address 3028)

Hourly archive flow data 101, 102, .. 184 are fixed length arrays. The data field is used to address a 10 hours individual group record.(101=Latest, 184=Oldest)

RTU MODE –

ADDR	FUNC CODE	STARTING POINT		# OF POINTS		CRC CHECK	
		HI	LO	HI	LO		
01	03	00	65	00	01	94	15

Response

ADDR	FUNC CODE	BYTE COUNTS	DATA ...(Repeat n Times)		CRC CHECK	
			HI	LO		
01	03	F0	00	01..		

Data Packet

RESPONSE DATA MESSAGE - STANDARD

DESCRIPTION (Standard)	Decimal	HOUR
Date (3 bytes)/Hour (one byte)	0 Inferred	First Hour
Flowing Time (4 bytes)	2 Inferred	First Hour
Gross Total (4 bytes)	1 Inferred	First Hour
Net Total (4 bytes)	1 Inferred	First Hour
Pressure (2 bytes)/ Temperature (2 bytes)	0 Inferred	First Hour
DP EXT (2 bytes)/DP (2 bytes)	1 Inferred	First Hour
Date (3 bytes)/Hour (one byte)	0 Inferred	Second Hour
Flowing Time (4 bytes)	2 Inferred	Second Hour
Gross Total (4 bytes)	1 Inferred	Second Hour
Net Total (4 bytes)	1 Inferred	Second Hour
Pressure (2 bytes)/ Temperature (2 bytes)	0 Inferred	Second Hour
DP EXT (2 bytes)/DP (2 bytes)	1 Inferred	Second Hour
…	…	…
…	…	…
…	…	…
Date (3 bytes)/Hour (one byte)	0 Inferred	Ninth Hour
Flowing Time (4 bytes)	2 Inferred	Ninth Hour
Gross Total (4 bytes)	1 Inferred	Ninth Hour
Net Total (4 bytes)	1 Inferred	Ninth Hour
Pressure (2 bytes)/ Temperature (2 bytes)	0 Inferred	Ninth Hour
DP EXT (2 bytes)/DP (2 bytes)	1 Inferred	Ninth Hour
Date (3 bytes)/Hour (one byte)	0 Inferred	Tenth Hour
Flowing Time (4 bytes)	2 Inferred	Tenth Hour
Gross Total (4 bytes)	1 Inferred	Tenth Hour
Net Total (4 bytes)	1 Inferred	Tenth Hour
Pressure (2 bytes)/ Temperature (2 bytes)	0 Inferred	Tenth Hour
DP EXT (2 bytes)/DP (2 bytes)	1 Inferred	Tenth Hour

Date: 9/28/2022

Data Packet

RESPONSE DATA MESSAGE – PROGRAM VARIABLE

DESCRIPTION	DATA TYPE	HOUR
Date (3 bytes)/Hour (one byte)	Integer	First Hour
Variable #1	Float	First Hour
Variable #2	Float	First Hour
Variable #3	Float	First Hour
Variable #4	Float	First Hour
Variable #5	Float	First Hour
Date (3 bytes)/Hour (one byte)	Float	Second Hour
Variable #1	Float	Second Hour
Variable #2	Float	Second Hour
Variable #3	Float	Second Hour
Variable #4	Float	Second Hour
Variable #5	Float	Second Hour
…	…	…
…	…	…
…	…	…
Date (3 bytes)/Hour (one byte)	Float	Ninth Hour
Variable #1	Float	Ninth Hour
Variable #2	Float	Ninth Hour
Variable #3	Float	Ninth Hour
Variable #4	Float	Ninth Hour
Variable #5	Float	Ninth Hour
Date (3 bytes)/Hour (one byte)	Float	Tenth Hour
Variable #1	Float	Tenth Hour
Variable #2	Float	Tenth Hour
Variable #3	Float	Tenth Hour
Variable #4	Float	Tenth Hour
Variable #5	Float	Tenth Hour

Date: 9/28/2022

Data Packet

Previous Hourly Data Packet

Number	Hour		Number	Hour		Number	Hour
101	1-10		131	301-310		161	601-610
102	11-20		132	311-320		162	611-620
103	21-30		133	321-330		163	621-630
104	31-40		134	331-340		164	631-640
105	41-50		135	341-350		165	641-650
106	51-60		136	351-360		166	651-660
107	61-70		137	361-370		167	661-670
108	71-80		138	371-380		168	671-680
109	81-90		139	381-390		169	681-690
110	91-100		140	391-400		170	691-700
111	101-110		141	401-410		171	701-710
112	111-120		142	411-420		172	711-720
113	121-130		143	421-430		173	721-730
114	131-140		144	431-440		174	731-740
115	141-150		145	441-450		175	741-750
116	151-160		146	451-460		176	751-760
117	161-170		147	461-470		177	761-770
118	171-180		148	471-480		178	771-780
119	181-190		149	481-490		179	781-790
120	191-200		150	491-500		180	791-800
121	201-210		151	501-510		181	801-810
122	211-220		152	511-520		182	811-820
123	221-230		153	521-530		183	821-830
124	231-240		154	531-540		184	831-840
125	241-250		155	541-550			
126	251-260		156	551-560			
127	261-270		157	561-570			
128	271-280		158	571-580			
129	281-290		159	581-590			
130	291-300		160	591-600			

Date: 9/28/2022

Data Packet

Previous Daily Data Packet

Set Meter Number to 1, 2, 3, or 4 (Address 3028)

Daily archive flow data 431,432, 433,434 (240 bytes) are fixed length arrays. The data field is used to address a 10 days individual group record.431=Latest, 434=Oldest)

Set Meter Number to 1, 2, 3, or 4 (Address 3028)

RTU MODE –

ADDR	FUNC CODE	STARTING POINT		# OF POINTS		CRC CHECK	
		HI	LO	HI	LO		
01	03	01	AF	00	01		

Response

ADDR	FUNC CODE	BYTE COUNTS	DATA …(Repeat n Times)		CRC CHECK	
			HI	LO		
01	03	F0	00	01..		

Date: 9/28/2022

Data Packet

RESPONSE DATA MESSAGE - STANDARD

DESCRIPTION	DECIMAL	DAY
Day Start Hour (1 byte) /Date (3 byte)	0 Inferred	First Day
Flowing Time (4 bytes)	2 Inferred	First Day
Gross Total (4 bytes)	1 Inferred	First Day
Net Total (4 bytes)	1 Inferred	First Day
Pressure (2 bytes)/Temperature (2 bytes)	0 Inferred	First Day
DP EXT (2 bytes)/DP (2 bytes)	1 Inferred	First Day
…	…	…
…	…	…
…	…	…
Day Start Hour (1 byte) /Date (3 byte)	0 Inferred	Ninth Day
Flowing Time	2 Inferred	Ninth Day
Gross Total	1 Inferred	Ninth Day
Net Total	1 Inferred	Ninth Day
Pressure (2 bytes)/Temperature (2 bytes)	0 Inferred	Ninth Day
DP EXT (2 bytes)/DP (2 bytes)	2 Inferred	Ninth Day
Day Start Hour (1 byte) /Date (3 byte)	0 Inferred	Tenth Day
Flowing Time	2 Inferred	Tenth Day
Gross Total	1 Inferred	Tenth Day
Net Total	1 Inferred	Tenth Day
Pressure (2 bytes)/Temperature (2 bytes)	0 Inferred	Tenth Day
DP EXT (2 bytes)/DP (2 bytes)	1 Inferred	Tenth Day

Previous Daily Data Packet

Number	Day
431	1-10
432	11-20
433	21-30
434	31-35

Date: 9/28/2022

Data Packet

RESPONSE DATA MESSAGE – PROGRAM VARIABLE

DESCRIPTION	DATA TYPE	DAY
Day Start Hour (1 byte) /Date (3 byte)	Long Integer	First Day
Variable #1	Float	First Day
Variable #2	Float	First Day
Variable #3	Float	First Day
Variable #4	Float	First Day
Variable #5	Float	First Day
…	…	…
…	…	…
…	…	…
Day Start Hour (1 byte) /Date (3 byte)	Long Integer	Ninth Day
Variable #1	Float	Ninth Day
Variable #2	Float	Ninth Day
Variable #3	Float	Ninth Day
Variable #4	Float	Ninth Day
Variable #5	Float	Ninth Day
Day Start Hour (1 byte) /Date (3 byte)	Long Integer	Tenth Day
Variable #1	Float	Tenth Day
Variable #2	Float	Tenth Day
Variable #3	Float	Tenth Day
Variable #4	Float	Tenth Day
Variable #5	Float	Tenth Day

Previous Daily Data Packet

Number	Day
431	1-10
432	11-20
433	21-30
434	31-35

Date: 9/28/2022

Data Packet

Previous Month Data Packet (411)
Set Meter Number to 1, 2, 3, or 4 (Address 3028)
Monthly archive flow data 411 (72 bytes) is a fixed length array. The data field is used to address month configuration and month totals record.

RTU MODE -

ADDR	FUNC CODE	STARTING POINT		# OF POINTS		CRC CHECK	
		HI	LO	HI	LO		
01	03	01	9b	00	01		

Response

ADDR	FUNC CODE	BYTE COUNTS	DATA …(Repeat n Times)		CRC CHECK	
			HI	LO		
01	03	9C	00	01..		

RESPONSE DATA MESSAGE - STANDARD

DESCRIPTION	DECIMAL
Base Temperature	2 Inferred
Base Pressure	4 Inferred
Atmospheric Pressure	4 Inferred
Base SG	6 Inferred
Heating Value	3 Inferred
Pipe ID	5 Inferred
Orifice ID	5 Inferred
DP Cut Off	4 Inferred
Flowing Hour	2 Inferred
Month Total – Net	0 Inferred
Month Total – Energy	0 Inferred
Month Averaged Pressure (2 bytes)/ Month Averaged Temperature (2 bytes)	0 Inferred
Month Averaged DP EXT (2 bytes)/ Month Averaged DP (2 bytes)	1 Inferred
Spare	0 Inferred
Total Day	0 Inferred
Month	0 Inferred
Year	0 Inferred
Spare	0 Inferred

RESPONSE DATA MESSAGE – PROGRAM VARIABLE

DESCRIPTION	DECIMAL
Base Temperature	2 Inferred
Base Pressure	4 Inferred
Atmospheric Pressure	4 Inferred
Base SG	6 Inferred
Heating Value	3 Inferred
Pipe ID	5 Inferred
Orifice ID	5 Inferred
DP Cut Off	4 Inferred
Variable #1	Float
Variable #2	Float
Variable #3	Float
Variable #4	Float
Variable #5	Float
Spare	0 Inferred
Total Day	0 Inferred
Month	0 Inferred
Year	0 Inferred
Spare	0 Inferred

Date: 9/28/2022

Data Packet

Previous Month Data Packet (412-414)

Monthly archive flow data 412-414 (240 bytes) are fixed length arrays. The data field is used to address an 10 days individual group record

RTU MODE -

ADDR	FUNC CODE	STARTING POINT		# OF POINTS		CRC CHECK	
		HI	LO	HI	LO		
01	03	01	9f	00	01		

Response

ADDR	FUNC CODE	BYTE COUNTS	DATA …(Repeat n Times)		CRC CHECK	
			HI	LO		
01	03	F0	00	01..		

Number	Day
412	1-10
413	11-20
414	21-30

DESCRIPTION	DECIMAL	Days
Day Start Hour (1 byte) /Date (3 byte)	0 Inferred	First Day
Flowing Time	2 Inferred	First Day
Daily Total – Gross Total	1 Inferred	First Day
Daily Total – Net Total	1 Inferred	First Day
Pressure (2 bytes)/Temperature (2 bytes)	0 Inferred	First Day
DP EXT (2 bytes)/DP (2 bytes)	1 Inferred	First Day
…	…	…
…	…	…
Day Start Hour (1 byte) /Date (3 byte)	0 Inferred	10th Day
Flowing Time	2 Inferred	10th Day
Daily Total – Gross Total	1 Inferred	10th Day
Daily Total – Net Total	1 Inferred	10th Day
Pressure (2 bytes)/Temperature (2 bytes)	0 Inferred	10th Day
DP EXT (2 bytes)/DP (2 bytes)	0 Inferred	10th Day

Date: 9/28/2022

Data Packet

Previous Month Data Packet (415)
Monthly archive flow data 415 (48 bytes) is a fixed length array. The data field is used to address a 2 days individual group record.

Number	Day
415	31-32

RTU MODE -

ADDR	FUNC CODE	STARTING POINT		# OF POINTS		CRC CHECK
		HI	LO	HI	LO	
01	03	01	A0	00	01	

Response

ADDR	FUNC CODE	BYTE COUNTS	DATA …(Repeat n Times)		CRC CHECK
			HI	LO	
01	03	30	00	01..	

Date: 9/28/2022

Data Packet

Report by Exception:

When a new alarm is occurred, the MicroML4 will send out an alarm message through RS232.

Unit ID	Function Code	CRC	
1	99 (63 Hex)	XX	XX

32 bits Integer - 3329
```
00000001 Analog Input #1 Alarm
00000002 Analog Input #2 Alarm
00000004 Analog Input #3 Alarm
00000008 Analog Input #4 Alarm
00000010 Analog Input #5 Alarm
00000020 Analog Input #6 Alarm
00000040 Analog Input #7 Alarm
00000080 Analog Input #8 Alarm

00000100 Analog Input #9 Alarm
00000200 Multi.Var DP Alarm
00000400 Multi.Var Pressure Alarm
00000800 Multi.Var Temperature Alarm
00001000 Battery Alarm
00002000 Slave Comm. Failed
00004000
00008000

00010000 Slave#1 Multi.Var DP Alarm
00020000 Slave#1 Multi.Var Pressure Alarm
00040000 Slave#1 Multi.Var Temperature Alarm
00080000 Spare Auxiliary#1 Alarm
00100000 Spare Auxiliary#2 Alarm
00200000 Spare Auxiliary#3 Alarm
00400000 Spare Auxiliary#4 Alarm

01000000 Slave#2 Multi.Var DP Alarm
02000000 Slave#2 Multi.Var Pressure Alarm
04000000 Slave#2 Multi.Var Temperature Alarm
08000000 Spare Auxiliary#5 Alarm
10000000 Spare Auxiliary#6 Alarm
20000000 Spare Auxiliary#7 Alarm
40000000 Spare Auxiliary#8 Alarm
```

32 bits Integer - 3325
```
00000001 Slave#3 Multi.Var DP Alarm
00000002 Slave#3 Multi.Var PF Alarm
00000004 Slave#3 Multi.Var TF Alarm
00000008 Spare Auxiliary#9 Alarm
00000010 Spare Auxiliary#10 Alarm
00000020 Spare Auxiliary#11 Alarm
00000040 Spare Auxiliary#12 Alarm
```

Date: 9/28/2022

Data Packet

Number of active meters/Spare I/O 1-4 Assignments

Spare I/Os are built in master unit- modbus address 3331,3332

Spare I/O	**#2**	**#1**		Active Aux.Spare	Active Spare	Active Meter
Bits	8	8	4	4	4	4
Assignment				1-12	1-9	1-4

Spare I/O Assignments 3-6: Modbus address 3333,3334

Spare I/O	**#6**	**#5**	**#4**	**#3**
Bits	8	8	8	8
Assignment				

Spare I/O Assignments 7,8: Modbus address 3327,3328

Spare I/O	**#8**	**#7**
Bits	8	8
Assignment		

Spare Auxiliary I/O Assignments 1-4: Modbus address 3335,3336

Spare Auxiliary I/O	**#4**	**#3**	**#2**	**#1**
Bits	8	8	8	8
Assignment				

Spare Auxiliary I/O Assignments 5-8: Modbus address 3337,3338

Spare Auxiliary I/O	**#8**	**#7**	**#6**	**#5**
Bits	8	8	8	8
Assignment				

Spare Auxiliary I/O Assignments 9-12: Modbus address 3339,3340

Spare Auxiliary I/O	**#12**	**#11**	**#10**	**#9**
Bits	8	8	8	8
Assignment				

Assignments: (2 digits – 1st digit: Meter Number, 2nd digit: Selection)
Selection
0. Not Used
1. Tubing Pressure
2. Casing Pressure
3. Oil Tank
4. Water Tank
5. Compressor – Suction
6. Compressor – Discharge
7. Compressor – Temperature
Others - Spare

Data Packet

Default Tag Number

11	TubingP1	21	TubingP2	31	TubingP3	41	TubingP4
12	CasingP1	22	CasingP2	32	CasingP3	42	CasingP4
13	OilTank1	23	OilTank2	33	OilTank3	43	OilTank4
14	WatTank1	24	WatTank2	34	WatTank3	44	WatTank4
15	Suction1	25	Suction2	35	Suction3	45	Suction4
16	Dischag1	26	Dischag2	36	Dischag3	46	Dischag4
17	CompreT1	27	CompreT2	37	CompreT3	47	CompreT4

Data Packet

Hourly Data (Last Day - 24 Hours)

Address 601:meter#1, 602:meter#2, 603:meter#3, 604:meter#4

ADDR	FUNC CODE	STARTING POINT		# OF POINTS		CRC CHECK	
		HI	LO	HI	LO		
01	03	02	59	00	01		

Response

ADDR	FUNC CODE	BYTE COUNTS		DATA		CRC CHECK	
		HI	LO	HI	LO		
01	03	00	F0	00	01		

Hourly Data (Last Day - 24 hours and 240 Bytes/Meter)

Variables	Bits	Hour	Range	Decimal
Flow Time (Hour)	8	1st	0-1.00	2 Decimals
Hourly Net Total	16	1st.	0-6553.4	1 Decimal
DP	12	1st.	0-409.5	1 Decimal
Temperature	12	1st.	0-409.5	1 Decimal
Pressure	12	1st.	0-4095	None
DP/EXT	20	1st.	0-10485.76	2 Decimals
	Total – 80 Bits (10 Bytes)			

Flow Time (Hour)	8	2nd.	0-1.00	2 Decimals
Hourly Net Total	16	2nd.	0-6553.4	1 Decimal
DP	12	2nd.	0-409.5	1 Decimal
Temperature	12	2nd.	0-409.5	1 Decimal
Pressure	12	2nd.	0-4095	None
DP/EXT	20	2nd.	0-10485.76	2 Decimals
…				
Flow Time (Hour)	8	24th	0-1.00	2 Decimals
Hourly Net Total	16	24th	0-6553.4	1 Decimal
DP	12	24th	0-409.5	1 Decimal
Temperature	12	24th	0-409.5	1 Decimal
Pressure	12	24th	0-4095	None
DP/EXT	20	24th	0-10485.76	2 Decimals

Date: 9/28/2022

Data Packet

Snapshot Report

Address 605: Spare Auxiliary I/O
Address 606: Spare I/O Data
Address 607: Meter#1
Address 608: Meter#2
Address 609: Meter#3
Address 610: Meter#4

ADDR	FUNC CODE	STARTING POINT		# OF POINTS		CRC CHECK	
		HI	LO	HI	LO		
01	03	02	5d	00	01		

Response

ADDR	FUNC CODE	BYTE COUNTS		DATA		CRC CHECK	
		HI	LO	HI	LO		
01	03	00	F0	00	01		

Snapshot Meter Data

Variables	Bits	Range	Decimal
Yesterday Net Volume	24	0-167721.5	1 Decimal
Month Net Volume	24	0-1677215	None
Daily Net Volume	24	0-167721.5	1 Decimal
Net Flow Rate	20	0-65535	None
Line Temperature	12	0-409.5	1 Decimal
Line Pressure	12	0-4095	None
Line DP	12	0-409.5	1 Decimal

Spare I/Os are built in master unit
Spare Data

Variables	Bits	Decimal
Spare #1 Data	16	*Note
Spare #2 Data	16	*Note
Spare #3 Data	16	*Note
Spare #4 Data	16	*Note
Spare #5 Data	16	*Note
Spare #6 Data	16	*Note
Spare #7 Data	16	*Note
Spare #8 Data	16	*Note
Spare #9 Data	16	*Note

*Note:

11	TubingP1	21	TubingP2	31	TubingP3	41	TubingP4
12	CasingP1	22	CasingP2	32	CasingP3	42	CasingP4
13	OilTank1	23	OilTank2	33	OilTank3	43	OilTank4
14	WatTank1	24	WatTank2	34	WatTank3	44	WatTank4
15	Suction1	25	Suction2	35	Suction3	45	Suction4
16	Dischag1	26	Dischag2	36	Dischag3	46	Dischag4
17	CompreT1	27	CompreT2	37	CompreT3	47	CompreT4

Date: 9/28/2022

Data Packet

Spare auxiliary I/Os are utilized from the slave microml4 unit.

Spare Auxiliary Data

Variables	Bits	Decimal
Spare Auxiliary#1 Data	**16**	***Note**
Spare Auxiliary #2 Data	**16**	***Note**
Spare Auxiliary #3 Data	**16**	***Note**
Spare Auxiliary #4 Data	**16**	***Note**
Spare Auxiliary #5 Data	**16**	***Note**
Spare Auxiliary #6 Data	**16**	***Note**
Spare Auxiliary #7 Data	**16**	***Note**
Spare Auxiliary #8 Data	**16**	***Note**
Spare Auxiliary #9 Data	**16**	***Note**
Spare Auxiliary #10 Data	**16**	***Note**
Spare Auxiliary #11 Data	**16**	***Note**
Spare Auxiliary #12 Data	**16**	***Note**

*Note:

11	TubingP1	21	TubingP2	31	TubingP3	41	TubingP4
12	CasingP1	**22**	CasingP2	**32**	CasingP3	**42**	CasingP4
13	OilTank1	**23**	OilTank2	**33**	OilTank3	**43**	OilTank4
14	WatTank1	**24**	WatTank2	**34**	WatTank3	**44**	WatTank4
15	Suction1	**25**	Suction2	**35**	Suction3	**45**	Suction4
16	Dischag1	**26**	Dischag2	**36**	Dischag3	**46**	Dischag4
17	CompreT1	**27**	CompreT2	**37**	CompreT3	**47**	CompreT4

CHAPTER 6: Installation Drawings

Explosion-Proof Installation Drawings

		REVISIONS			
	REV	DESCRIPTION	CHG. NO.	APP'D	DATE
	AA				

⚠12 INSTALLATION TO BE IN ACCORDANCE WITH
NATIONAL ELECTRICAL CODE.

⚠9 NON-INCENDIVE FIELD WIRING METHODS MAY BE USED FOR CONNECTING
THE TEMPERATURE SENSING ASSEMBLY. WHEN USING NON-INCENDIVE FIELD
WIRING, THE CONNECTION HEAD AND TEMPERATURE SENSOR ASSEMBLY NEED
NOT BE EXPLOSION PROOF, BUT ALL COMPONENTS CONNECTED TO THE
TEMP SENSOR CONNECTOR MUST BE CLASSIFIED "SIMPLE APPARATUS". SIMPLE
APPARATUS ARE DEVICES WHICH ARE INCAPABLE OF GENERATING OR STORING
MORE THAN 1.2V, 0.1A, 25MW, OR 20uJ (RTD'S QUALIFY AS SIMPLE APPARATUS).

⚠8 DIVISION 2 WIRING METHOD.

6. CLASS II INSTALLATIONS MUST USE A CSA APPROVED
   DUST-INGITIONPROOF SENSOR.

5. IN AMBIENTS GREATER THAN 40°C, SPRING LOADED TEMPERATURE SENSORS
   USED WITHOUT AN EXPLOSION PROOF THERMOWELL MUST BE RATED FOR AT
   LEAST 85°C.

4. COMPONENTS REQUIRED TO BE APPROVED MUST BE FOR GAS GROUP
   APPROPIATE TO AREA CLASSIFICATION.

3. ALL CONDUITS THREADS TO BE ASSEMBLED WITH FIVE FULL THREADS MINIMUM.

⚠2 TRANSMITTER MUST NOT BE CONNECTED TO EQUIPMENT GENERATING
MORE THAN 250VAC.

⚠1 WIRING METHOD SUITABLE FOR CLASS I, DIV 1, ANY LENGTH.

UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES (mm). REMOVE ALL BURRS AND SHARP EDGES. MACHINE SURFACE FINISH 125	CONTRACT NO.	DYNAMIC FLUID MEASUREMENT, INC.	12603 SOUTHWEST FWY, SUITE 320 STAFFORD, TX 77477
-TOLERANCE- .X = .1 [2.5] .XX = .02 [0.5] .XXX = .010[0.25]	DR. C. SIADO	TITLE MODEL MICROMV AND ECHART EXPLOSIONPROOF INSTALLATION DRAWING, FACTORY MUTUAL	
	CHK'D		
	APP'D. S. HALILAH		
FRACTIONS ANGLES ± 1/32 ± 2°	APP'D. GOVT.	SIZE A	FSCM NO	DWG NO. CONN-DRW-12
DO NOT SCALE PRINT		SCALE	WT. ————	SHEET 1 OF 3

REVISIONS				
REV	DESCRIPTION	CHG. NO.	APP'D	DATE
AA				

FLOW COMPUTER

FM EXPLOSIONPROOF ENCLOSURE

FM EXPLOSIONPROOF APPROVED TEMPERATURE SENSOR WITH LEADWIRE EXTENSION KIT

DIVISION 1
HAZARDOUS AREA

FLOW COMPUTER

FM EXPLOSIONPROOF ENCLOSURE

FM EXPLOSIONPROOF APPROVED TEMPERATURE SENSORS WITH ASSEMBLIES & ACCESSORY HARDWARE

FLOW COMPUTER

FM EXPLOSIONPROOF ENCLOSURE

FM EXPLOSIONPROOF APPROVED TEMPERATURE SENSOR ASSEMBLY

12603 SOUTHWEST FWY, SUITE 320 STAFFORD, TX 77477		DYNAMIC FLUID MEASUREMENT, INC.		
DR. C. SIADO	SIZE A	FSCM NO	DWG NO.	CONN-DRW-12
ISSUED	SCALE N/A	WT. ————	SHEET 2 OF 3	

Date: 9/28/2022

Manifold Installation Drawings

Date: 9/28/2022

METER #

LOCATION

14.52"
REF.

8.00"
REF.

2" PIPE

RTD CONNECTION

18.19
REF.

M-675SDT-VSHWAXV
316SS 5-VALVE MANIFOLD
SS MOUNTING BRACKET
M-675CDT-VCHWAXV
CARBON STEEL 5-VALVE MANIFOLD
CS MOUNTING BRACKET

DYNAMIC
FLOW
COMPUTER

7.54 MAX OPEN

PGI RESERVES THE RIGHT TO CHANGE
THE DESIGN, DIMENSIONS OR MATERIAL
CONTENT OF OUR PRODUCTS WITHOUT
PRIOR NOTIFICATION.

PGI International

16101 VALLEN DRIVE   (713)466-0056 or 1-800-231-0233
HOUSTON, TX. 77041   FAX: (713) 744-9892

SCALE
NTS

CAD NO.

DRAWING NO.
DYNAMIC FLUID2

Dynamic Fluid Measurments #2
REMOTE MOUNT SMALL BORE

REVISION DATE
1-28-08

REVISION
LEVEL
2

GENERAL SYSTEM DESCRIPTION

PGI EXTERNAL DOCUMENT

Date: 9/28/2022

METER #

LOCATION

M3-775SLT-WAW9
316SS 5-VALVE MANIFOLD
M3-775CLT-WAW9
CARBON STEEL 5-VALVE MANIFOLD

(OPTIONAL)
M3-685SLT-W9
316SS 5-VALVE MANIFOLD
M3-685CLT-W9
CARBON STEEL 2-VALVE BLOCK MANIFOLD

AK-024-COMNW9
STABILIZED CONNECTOR
FLANGES (2) 316SS ONLY
WITH DIELECTRIC OPTION
REQUIRED TORQUE FOR
STABILIZER HEX NUT
(80-100 ft.-lbs. OR ONE HAND
HARD PULL USING 18" CRESCENT.)
(PATENTED)

DYNAMIC
FLOW
COMPUTER

22.91"

11.95"
(MAX. OPEN)

PGI International

16101 VALLEN DRIVE
HOUSTON, TX. 77041

(713)466-0056 or 1-800-231-0233
FAX: (713) 744-9892

REVISION DATE
1-29-08

REVISION
LEVEL
2

SCALE
FULL

CAD NO.

DRAWING NO.
DFM-1

Dynamic Fluid Measurement #1
DIRECT-MOUNT™ LARGE BORE VERTICAL

GENERAL SYSTEM DESCRIPTION

PGI EXTERNAL DOCUMENT

PGI RESERVES THE RIGHT TO CHANGE
THE DESIGN, DIMENSIONS OR MATERIAL
CONTENT OF OUR PRODUCTS WITHOUT
PRIOR NOTIFICATION.

METER #

LOCATION

13.68"

11.80"
(MAX. OPEN)

WORKING
LOAD CAPACITY
150 FT/LBS

DYNAMIC
FLOW
COMPUTER

12.22"

M3-875SLT-WAW9
316SS 90 DEGREE 5-VALVE MANIFOLD
M3-875CLT-WAW9
CARBON STEEL 90 DEGREE 5-VALVE MANIFOLD

(OPTIONAL)
M3-685SLT-W9
316SS 5-VALVE MANIFOLD
M3-685CLT-W9
CARBON STEEL 2 VALVE BLOCK MANIFOLD

AK-024-C0MNW9
STABILIZED CONNECTOR
FLANGES (2) 316SS ONLY
WITH DIELECTRIC OPTION
REQUIRED TORQUE FOR
STABILIZER HEX NUT
(80-100 ft.-lbs. OR ONE HAND
HARD PULL USING 18" CRESCENT.)

3.62"

1.31"

12" 600 # / ASA
SENIOR TYPE
FITTING

PGI RESERVES THE RIGHT TO CHANGE
THE DESIGN, DIMENSIONS OR MATERIAL
CONTENT OF OUR PRODUCTS WITH-OUT
PRIOR NOTIFICATION.

PGI International

16101 VALLEN DRIVE   (713)466-0056 or 1-800-231-0233
HOUSTON, TX. 77041   FAX: (713) 744-9892

CAD NO.   SCALE   FULL
DRAWING NO.   DFM-2

Dynamic Fluid Measurement #2
DIRECT-MOUNT™ LARGE BORE
HORIZONTAL TO VERTICAL

REVISION DATE   1-28-08
REVISION LEVEL   2

GENERAL SYSTEM DESCRIPTION

PGI EXTERNAL DOCUMENT

Date: 9/28/2022