FLUID COMPONENTS INTERNATIONAL LLC

# FOUNDATION™ Fieldbus Manual

## MT100
### Multipoint Flow Meter


FOUNDATION

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# Introduction

## General

This manual describes the MT100 FOUNDATION™ Fieldbus features, its operation and configuration. The MT100 can provide up to three different process variables. It provides Flow, Temperature, and Flow Totalizer as outputs. The flow output can be selected as volumetric, mass or velocity units. The MT100 can support up to eight flow sensors providing the average flow of all sensors in a single output.

FOUNDATION Fieldbus is different from other communication protocols because it is designed to resolve process control applications instead of just transfer data in a digital mode.

This document is applicable to all members of the MT100 product line configured with FOUNDATION Fieldbus digital communication protocol.

FOUNDATION Fieldbus operation is provided through an optional add-on card that plugs into the MT100 SB4 main board.

## Definition

**AI Block**: Analog Input Block. This block receives the MT100 process data variables from the Process Data Transducer Block and makes the process data available for the function blocks.

There are three AI blocks in the MT100. These are the Flow AI Block, Temperature AI Block, and the Totalizer AI Block. Not all Process Variables are available in every member of the MT100 family.

**TB Block**: Transducer Block. This block makes the connection to the MT100 signal processing hardware, presents the process variables and eases instrument setup through FOUNDATION Fieldbus.

**PID Block**: The Proportional, Integral, Derivative, control function block offers a lot of control algorithms that use the Proportional, Integral, and Derivative Terms. The algorithm of the MT100 PID is the non-iterative, ISA version.

**RS Block**: The Resource block contains basic FOUNDATION Fieldbus information about the MT100 and some configuration data.

**FF Configurator**: A software tool used to access data and configure FOUNDATION Fieldbus devices.

**DD Files**: The Device Description Files are used by configuration software, like the NI configurator or handheld configurators like the Emerson 475, or other FOUNDATION Fieldbus hosts. The DD files describe the FOUNDATION Fieldbus device. They also allow for custom manufacturer-specific features to be added to a FOUNDATION Fieldbus device, and provide the means for the host to access the instrument's custom features.

**FCI Configurator**: A Windows-based PC application for accessing MT100 functions and features. The application is typically used for basic instrument setup and configuration, as well as provide access to advanced functions. The FCI configurator/host PC communicates to the instrument through the instrument's USB or Ethernet service port.

## Installation

### General

For details on the general mounting, placement of sensor head, and mounting options refer to the MT100 main manual **06EN003460**.

### Electrical Wiring

Open the enclosure door to access the wiring terminal blocks. Use one of the cable ports at the bottom of the enclosure to route cable to the appropriate wiring connections. FCI recommends the use of FOUNDATION Fieldbus H1 cable compliant with the *H1 Cable Test Specification FF-844*.

The MT100 FOUNDATION Fieldbus connections are located near the bottom edge of the SB4 main board as shown in Figure 1 below. Connect the FOUNDATION Fieldbus cable to the J26 FB_A and FB_B terminals as labeled on board silkscreen. Loosen the J26 cable clamp #2-56 pan head phillips screws and thread the Fieldbus cable end through the clamp towards the connector. After making the wire connections, tighten the cable clamp screws to secure the cable to the board. Refer to the MT100 main manual **06EN003460** for further wiring details.

***Note***: FOUNDATION Fieldbus operation requires that the optional Fieldbus/Profibus add-on card be installed onto the SB4 main board as shown in Figure 1 below. This card is installed at the factory when the MT100 is ordered with the Fieldbus/Profibus option.

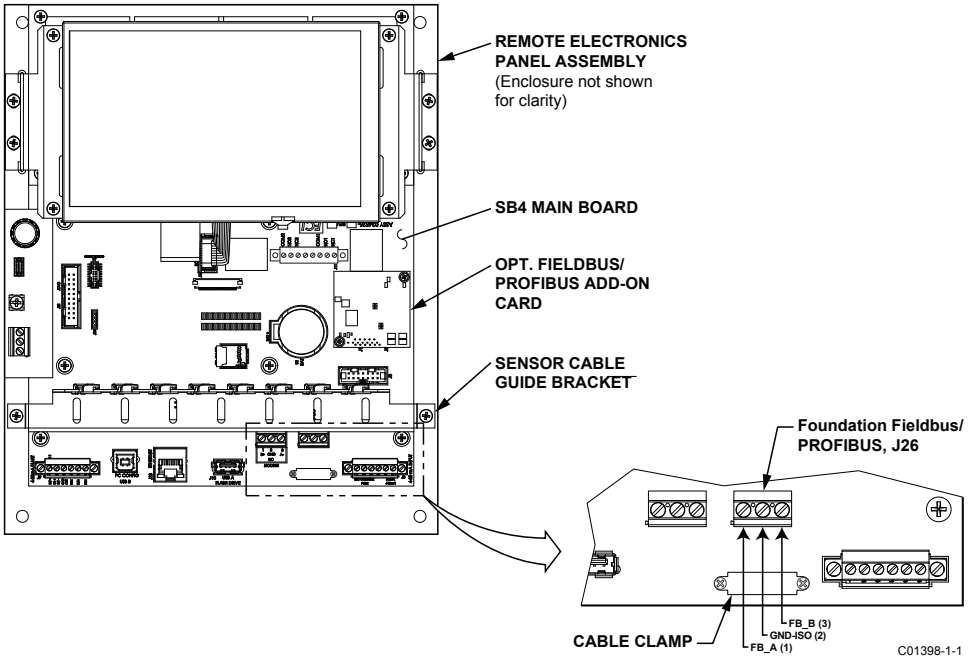


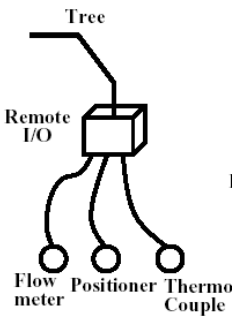

**Figure 1 – MT100 Foundation Fieldbus Connections**

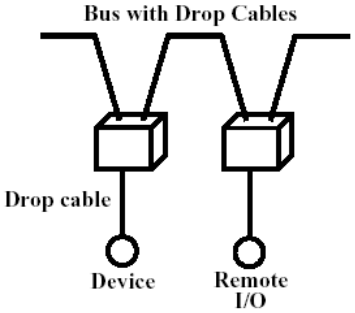
### Topology and Network Configuration

The MT100 supports both Bus topology and Tree topology. Both types have a trunk cable with two terminations. The devices are connected to the trunk via spurs. The spurs may be integrated in the device giving zero spur length. A spur may connect more than one device, depending on the length. Active couplers may be used to extend spur lengths.

Active repeaters may be used to extend the trunk length.

The total cable length, including spurs, between any two devices in the FOUNDATION Fieldbus network must not exceed 1900 m. Limit the connection of couplers to less than 15 per 250 m.




## General Operation

### Functional Description

The MT100 is a flow meter with three flow classifications: volumetric flow, mass flow, and velocity flow. In addition, the MT100 family of instruments offers process temperature and process pressure.

The FOUNDATION Fieldbus functionality is organized into two modes; an Instrument Process Data mode, and an Instrument Setup mode. To support these two modes, two transducer blocks were designed, one for process data and one for basic setup data.

The MT100 supports up to 8 flow sensors, the output is presented as an average of the flow sensors. The MT100 has the capability of viewing the output of each sensor head.

### Function Transducer Blocks

The MT100 provides the following FOUNDATION Fieldbus blocks to present its process data and setup features: Resource Block, Process Data Transducer block, Service Transducer Block, Flow Analog Input Block, Temperature Analog Input, and Totalizer Analog Input Block.

### Data Types Definitions

**DS-64** Data Type

| E | Element Name | Data Type | Size |
|---|---|---|---|
| 1 | Block Tag | VisibleString | 32 |
| 2 | DD MemberId | Unsigned32 | 4 |
| 3 | DD ItemId | Unsigned32 | 4 |
| 4 | DD Revision | Unsigned16 | 2 |
| 5 | Profile | Unsigned16 | 2 |
| 6 | Profile Revision | Unsigned16 | 2 |
| 7 | Execution Time | Unsigned32 | 4 |
| 8 | Period of Execution | Unsigned32 | 4 |
| 9 | Number of Parameters | Unsigned16 | 2 |
| 10 | Next FB to Execute | Unsigned16 | 2 |
| 11 | Starting Index of Views | Unsigned16 | 2 |
| 12 | NumberofVIEW_3 | Unsigned8 | 1 |
| 13 | NumberofVIEW_4 | Unsigned8 | 1 |

**DS-65** Floating Point Value & Status

| E | Element Name | Data Type | Size |
|---|---|---|---|
| 1 | Status | Unsigned8 | 1 |
| 2 | Value | Float | 4 |

**DS-69** Mode Structure

| E | Element Name | Data Type | Size |
|---|---|---|---|
| 1 | Target | Bitstring | 1 |
| 2 | Actual | Bitstring | 1 |
| 3 | Permitted | Bitstring | 1 |
| 4 | Normal | Bitstring | 1 |

**DS-72** Alarm Discrete Structure

| E | Element Name | Data Type | Size |
|---|---|---|---|
| 1 | Unacknowledged | Unsigned8 | 1 |
| 2 | Alarm State | Unsigned8 | 1 |
| 3 | Time Stamp | Time Value | 8 |
| 4 | Subcode | Unsigned16 | 2 |
| 5 | Value | Unsigned8 | 1 |

**DS-73** Event Update Structure

| E | Element Name | Data Type | Size |
|---|---|---|---|
| 1 | Unacknowledged | Unsigned8 | 1 |
| 2 | Update State | Unsigned8 | 1 |
| 3 | Time Stamp | Time Value | 8 |
| 4 | Static Revision | Unsigned16 | 2 |
| 5 | Relative Index | Unsigned16 | 2 |

**DS-74** Alarm Summary Structure

| E | Element Name | Data Type | Size |
|---|---|---|---|
| 1 | Current | Bit String | 2 |
| 2 | Unacknowledged | Bit String | 2 |
| 3 | Unreported | Bit String | 2 |
| 4 | Disabled | Bit String | 2 |

**DS-85** Test Structure

| E | ElementName | DataType | Size |
|---|---|---|---|
| 1 | Value1 | Boolean | 1 |
| 2 | Value2 | Integer8 | 1 |
| 3 | Value3 | Integer16 | 2 |
| 4 | Value4 | Integer32 | 4 |
| 5 | Value5 | Unsigned8 | 1 |
| 6 | Value6 | Unsigned16 | 2 |
| 7 | Value7 | Unsigned32 | 4 |
| 8 | Value8 | FloatingPoint | 4 |
| 9 | Value9 | VisibleString | 32 |
| 10 | Value10 | OctetString | 32 |
| 11 | Value11 | Date | 7 |
| 12 | Value12 | Time of Day | 6 |
| 13 | Value13 | Time Difference | 6 |
| 14 | Value14 | Bitstring | 2 |
| 15 | Value15 | Time Value | 8 |

Other Data Types used in the MT100

- Unsigned 16- and 32-bit integers
- Floating Point (Single Precision)

**Resource Block**

This block contains data that is specific to the MT100 hardware that is associated with the resource. All data is modeled as contained, so there are no links in the Block.

***ITK_VER** parameter*

This parameter provides the ITK version to which the device is certified. The MT100 is certified to Version 5.

***FD_VER** parameter*

This parameter provides the device Field Diagnostic Specification. The MT100 uses Version 1.

***MANUFAC_ID** parameter*

This parameter provides the manufacturer identification number. An interface device to locate the DD file uses the MANUFAC_ID parameter. The manufacturer ID for Fluid Components International is 0x01FC49.

***DEV_TYPE** parameter*

This parameter provides the manufacturer's model number associated with the resource. The Fluid Components model number is FCI MT100.

***DEV_REV** parameter*

This parameter provides the manufacturer's revision number associated with the resource. Fluid Components revision number is 1.

***DD_REV** parameter*

This parameter provides the DD file revision of the associated resource. Fluid Components DD file revision number is 1.

**MT100 Resource Block**

**Table 1 – MT100 Resource Block**

| INDEX | PARAMETER | DATA TYPE (LENGTH) | INITIAL VALUE | DESCRIPTION |
|---|---|---|---|---|
| 0 | BLOCK OBJECT | DS-64 | | |
| 1 | ST_REV | Unsigned16 | 0 | |
| 2 | TAG_DESC | Octet String | spaces | |
| 3 | STRATEGY | Unsigned16 | 0 | |
| 4 | ALERT_KEY | Unsigned8 | 0 | |
| 5 | MODE_BLK | DS-69 | O/S | |
| 6 | BLOCK_ERR | Bit String | | |
| 7 | RS_STATE | Unsigned8 | | |
| 8 | TEST_RW | DS-85 | | |
| 9 | DD_RESOURCE | Visible String | null | |
| 10 | MANUFAC_ID | Unsigned32 | | |
| 11 | DEV_TYPE | Unsigned16 | | |
| 12 | DEV_REV | Unsigned8 | 0x01 | |
| 13 | DD_REV | Unsigned8 | 0x01 | |
| 14 | GRANT_DENY | DS-70 | | |
| 15 | HARD_TYPES | Bit String | 0xC000 | |
| 16 | RESTART | Unsigned8 | | |
| 17 | FEATURES | Bit String | 0111.0100.0010.0000 | |
| 18 | FEATURE_SEL | Bit String | 0111.0100.0000.0000 | |
| 19 | CYCLE_TYPE | Bit String | | |
| 20 | CYCLE_SEL | Bit String | 0 | |
| 21 | MIN_CYCLE_T | Unsigned32 | | |
| 22 | MEMORY_SIZE | Unsigned16 | | |
| 23 | NV_CYCLE_T | Unsigned32 | | |
| 24 | FREE_SPACE | Float | | |
| 25 | FREE_TIME | Float | | |
| 26 | SHED_RCAS | Unsigned32 | 640000 | |
| 27 | SHED_ROUT | Unsigned32 | 640000 | |
| 28 | FAULT_STATE | Unsigned8 | | |
| 29 | SET_FSTATE | Unsigned8 | 1 | |
| 30 | CLR_FSTATE | Unsigned8 | 1 | |
| 31 | MAX_NOTIFY | Unsigned8 | | |
| 32 | LIM_NOTIFY | Unsigned8 | MAX_NOTIFY | |
| 33 | CONFIRM_TIME | Unsigned32 | 640000 | |

**Table 1 – MT100 Resource Block (continued)**

| INDEX | PARAMETER | DATA TYPE (LENGTH) | INITIAL VALUE | DESCRIPTION |
|---|---|---|---|---|
| 34 | WRITE_LOCK | Unsigned8 | 1 | |
| 35 | UPDATE_EVT | DS-73 | | |
| 36 | BLOCK_ALM | DS-72 | | |
| 37 | ALARM_SUM | DS-74 | | |
| 38 | ACK_OPTION | Bit String | 0 | |
| 39 | WRITE_PRI | Unsigned8 | 0 | |
| 40 | WRITE_ALM | DS-72 | | |
| 41 | ITK_VER | Unsigned16 | | |
| 42 | FD_VER | Unsigned16 | 1 | |
| 43 | FD_FAIL_ACTIVE | Bit String | 0 | |
| 44 | FD_OFFSPEC_ACTIVE | Bit String | 0 | |
| 45 | FD_MAINT_ACTIVE | Bit String | 0 | |
| 46 | FD_CHECK_ACTIVE | Bit String | 0 | |
| 47 | FD_FAIL_MAP | Bit String | | |
| 48 | FD_OFFSPEC_MAP | Bit String | | |
| 49 | FD_MAINT_MAP | Bit String | | |
| 50 | FD_CHECK_MAP | Bit String | | |
| 51 | FD_FAIL_MASK | Bit String | | |
| 52 | FD_OFFSPEC_MASK | Bit String | | |
| 53 | FD_MAINT_MASK | Bit String | | |
| 54 | FD_CHECK_MASK | Bit String | | |
| 55 | FD_FAIL_ALM | DS-87 | 0;0;0,0;0;0;0;15;0;0 | |
| 56 | FD_OFFSPEC_ALM | DS-87 | 0;0;0,0;0;0;0;16;0;0 | |
| 57 | FD_MAINT_ALM | DS-87 | 0;0;0,0;0;0;0;17;0;0 | |
| 59 | FD_FAIL_PRI | Unsigned8 | 0 | |
| 60 | FD_OFFSPEC_PRI | Unsigned8 | 0 | |
| 61 | FD_MAINT_PRI | Unsigned8 | 0 | |
| 62 | FD_CHECK_PRI | Unsigned8 | 0 | |
| 63 | FD_SIMULATE | SIMULATE_FD | 0;0;1 | |
| 64 | FD_RECOMMEN_ACT | Unsigned16 | 0 | |

**Process Data Transducer Block**

This block connects the MT100 sensor process variable values and engineering units to the blocks output channels. The MT100 process variables are Flow, Temperature, and Totalizer. Not all of these variables are available in all members of the MT100 family of products.

***PRIMARY_VALUE*** *parameter*

This parameter makes available to the AI block the flow value of the MT100. Flow is organized into three classes; volumetric, mass, and velocity. Each class has its associated valid engineering units. Confirm that units match the flow class.

***SECONDARY_VALUE*** *parameter*

This parameter makes available to the AI block the temperature value of the MT100. There are two valid engineering units associated with this parameter, °C and °F.

***TERTIARY_VALUE*** *parameter*

This parameter makes available to the AI block the Totalizer value of the MT100. This is an optional parameter that can be turned ON or OFF. It is associated with the volumetric flow and the mass flow. The units are set by the flow units selected.

**MT100 Process Data Transducer Block**

The table below summarizes the MT100 Process Data Transducer Block.

**Table 2 – MT100 Process Data Transducer Block**

| INDEX | PARAMETER | DATA TYPE (LENGTH) | INITIAL VALUE | DESCRIPTION |
|---|---|---|---|---|
| 0 | BLOCK OBJECT | DS-64 | | |
| 1 | ST_REV | Unsigned16 | 0 | |
| 2 | TAG_DESC | Octet String | spaces | |
| 3 | STRATEGY | Unsigned16 | 0 | |
| 4 | ALERT_KEY | Unsigned8 | 0 | |
| 5 | MODE_BLK | DS-69 | 0 | |
| 6 | BLOCK_ERR | Bit String | 0 | |
| 7 | UPDATE_EVT | DS-73 | | |
| 8 | BLOCK_ALM | DS-72 | | |
| 9 | TRANSDUCER_DIRECTORY | Unsigned16 | 0 | |
| 10 | TRANSDUCER_TYPE | Unsigned16 | 65534 | |
| 11 | XD_ERROR | Unsigned8 | 0 | |
| 12 | COLLECTION_DIRECTORY | Unsigned32 | | |
| 13 | PRIMARY_VALUE | DS-65 | 0; 0.0 | MT100 Flow Variable |
| 14 | PRIMARY_VALUE_UNIT | Unsigned16 | 0 | MT100 Flow Units |
| 15 | SECONDARY_VALUE | DS-65 | 0; 0.0 | MT100 Temperature Variable |
| 16 | SECONDARY_VALUE_UNIT | Unsigned16 | 0 | MT100 Temperature Variable |
| 17 | TERTIARY_VALUE | DS-65 | 0; 0.0 | MT100 Totalizer Variable |
| 18 | TERTIARY_VALUE_UNIT | Unsigned16 | 0 | MT100 Totalizer Units |
| 19 | — | | | |
| 20 | — | | | |

### Service Transducer Block

This block is primarily used to setup, configure and diagnose the MT100 from a remote location via a FOUNDATION Fieldbus configurator, or a system monitor. Variables set or changed by this block affect all sensors when rights are authorized. Write access is authorized through the MT100 Configuration Software application (see "Setting the MT100 for FOUNDATION Fieldbus Operation" on page 19).

This block provides access to the MT100 basic setup parameters; some are read and write others are read only. This block can be used to review factory set calibration limits and settings of other process variables, like the plenum size, and to read and write the engineering units of the process variables. In addition, this block can be used to view process data from individual sensor elements in a multipoint system.

This block does not have an output, and it does not make any data available to other blocks.

#### Factory Calibration Limits (Configuration Software Factory/Factory Parameters)

***MAX_CAL_FLOW*** *parameter*

This parameter provides the value of the maximum calibrated flow limit that was set by the factory, for the active flow classification and cal group.

***MIN_CAL_FLOW*** *parameter*

This parameter provides the value of the minimum calibrated flow limit that was set by the factory, for the active flow classification and cal group.

***MAX_CAL_TEMP*** *parameter*

This parameter provides the value of the maximum calibrated temperature limit that was set by the factory during the factory calibration process.

***MIN_CAL_TEMP*** *parameter*

This parameter provides the value of the minimum calibrated temperature limit that was set by the factory during the calibration process.

#### Process Engineering Units (Configuration Software Basic Setup/Units & Basic Setup/Pipe Size)

***FLOW_ENG_UNITS*** *parameter*

This parameter provides the engineering units associated with the process flow variable.

***TOTALIZER_ENG_UNITS*** *parameter*

This parameter provides the engineering units associated with the process Totalizer variable. The Totalizer applies only to flow units that are volumetric or mass, and it is a parameter that can be turned off.

***PLENUM_SIZE_VALUE_DIAMETER*** *parameter*

This parameter provides the engineering units associated with the pipe size diameter parameter, or the width parameter of the duct in which the MT100 flow meter is installed.

***PLENUM_SIZE_VALUE_HEIGHT*** *parameter*

This parameter provides the engineering units associated with the duct in which the MT100 flow meter is installed.

**Factory Restore Command (Configuration Software Basic Setup/Groups)**

***FACTORY_RESTORE*** *parameter*

This parameter is a write only command that restores the instrument calibration to the calibration parameters that were set by the factory, for the presently active calibration group.

**Individual Sensors Data View**

This section of the Service Transducer Block is a read only section. It shows a snapshot of the process data that each individual sensor head is detecting. This section provides information for up to 16 sensors of a multipoint system.

Listed below are typical parameters for a sensor head (Sensor 1 shown).

***FLOW_VALUE_SENSOR_1*** *parameter*

This parameter provides the flow value of flow sensor 1 in SFPS.

***TEMPERATURE_VALUE_SENSOR_1*** *parameter*

This parameter provides the temperature value associated with flow sensor 1 in °F.

**MT100 Service Transducer Block**

The table below summarizes the MT100 Service Transducer Block.

**Table 3 – MT100 Service Transducer Block**

| BLOCK INFO | | | | |
|---|---|---|---|---|
| **INDEX** | **PARAMETER** | **DATA TYPE (LENGTH)** | **INITIAL VALUE** | **DESCRIPTION** |
| 0 | BLOCK OBJECT | DS-64 | | |
| 1 | ST_REV | Unsigned16 | 0 | |
| 2 | TAG_DESC | Octet String | spaces | |
| 3 | STRATEGY | Unsigned16 | 0 | |
| 4 | ALERT_KEY | Unsigned8 | 0 | |
| 5 | MODE_BLK | DS-69 | 0 | |
| 6 | BLOCK_ERR | Bit String | 0 | |
| 7 | UPDATE_EVT | DS-73 | | |
| 8 | BLOCK_ALM | DS-72 | | |
| 9 | TRANSDUCER_DIRECTORY | Unsigned16 | 0 | |
| 10 | TRANSDUCER_TYPE | Unsigned16 | 65534 | |
| 11 | XD_ERROR | Unsigned8 | 0 | |
| 12 | COLLECTION_DIRECTORY | Unsigned32 | | |

**Table 3 – MT100 Service Transducer Block (continued)**

| INDIVIDUAL SENSOR RD | | | | |
|---|---|---|---|---|
| **INDEX** | **PARAMETER** | **DATA TYPE (LENGTH)** | **INITIAL VALUE** | **DESCRIPTION** |
| Fluid Components Specific Service Parameters | | | | |
| 13 | FLOW VALUE SENSOR #1 | Floating Point | 0 | |
| 14 | TEMPERATURE VALUE SENSOR #1 | Floating Point | 0 | |
| 15 | — | | | |
| 16 | FLOW VALUE SENSOR #2 | Floating Point | 0 | |
| 17 | TEMPERATURE VALUE SENSOR #2 | Floating Point | 0 | |
| 18 | — | | | |
| 19 | FLOW VALUE SENSOR #3 | Floating Point | 0 | |
| 20 | TEMPERATURE VALUE SENSOR #3 | Floating Point | 0 | |
| 21 | — | | | |
| 22 | FLOW VALUE SENSOR #4 | Floating Point | 0 | |
| 23 | TEMPERATURE VALUE SENSOR #4 | Floating Point | 0 | |
| 24 | — | | | |
| 25 | FLOW VALUE SENSOR #5 | Floating Point | 0 | |
| 26 | TEMPERATURE VALUE SENSOR #5 | Floating Point | 0 | |
| 27 | — | | | |
| 28 | FLOW VALUE SENSOR #6 | Floating Point | 0 | |
| 29 | TEMPERATURE VALUE SENSOR #6 | Floating Point | 0 | |
| 30 | — | | | |
| 31 | FLOW VALUE SENSOR #7 | Floating Point | 0 | |
| 32 | TEMPERATURE VALUE SENSOR #7 | Floating Point | 0 | |
| 33 | — | | | |
| 34 | FLOW VALUE SENSOR #8 | Floating Point | 0 | |
| 35 | TEMPERATURE VALUE SENSOR #8 | Floating Point | 0 | |
| 36 | — | | | |
| 37 | FLOW VALUE SENSOR #9 | Floating Point | 0 | |
| 38 | TEMPERATURE VALUE SENSOR #9 | Floating Point | 0 | |
| 39 | — | | | |
| 40 | FLOW VALUE SENSOR #10 | Floating Point | 0 | |
| 41 | TEMPERATURE VALUE SENSOR #10 | Floating Point | 0 | |
| 42 | — | | | |
| 43 | FLOW VALUE SENSOR #11 | Floating Point | 0 | |
| 44 | TEMPERATURE VALUE SENSOR #11 | Floating Point | 0 | |
| 45 | — | | | |
| 46 | FLOW VALUE SENSOR #12 | Floating Point | 0 | |
| 47 | TEMPERATURE VALUE SENSOR #12 | Floating Point | 0 | |
| 48 | — | | | |
| 49 | FLOW VALUE SENSOR #13 | Floating Point | 0 | |
| 50 | TEMPERATURE VALUE SENSOR #13 | Floating Point | 0 | |

**Table 3 – MT100 Service Transducer Block (continued)**

| FACTORY SETTINGS | | | | |
|---|---|---|---|---|
| **INDEX** | **PARAMETER** | **DATA TYPE (LENGTH)** | **INITIAL VALUE** | **DESCRIPTION** |
| 51 | — | | | |
| 52 | FLOW VALUE SENSOR #14 | Floating Point | 0 | |
| 53 | TEMPERATURE VALUE SENSOR #14 | Floating Point | 0 | |
| 54 | — | | | |
| 55 | FLOW VALUE SENSOR #15 | Floating Point | 0 | |
| 56 | TEMPERATURE VALUE SENSOR #15 | Floating Point | 0 | |
| 57 | — | | | |
| 58 | FLOW VALUE SENSOR #16 | Floating Point | 0 | |
| 59 | TEMPERATURE VALUE SENSOR #16 | Floating Point | 0 | |
| 60 | — | | | |
| 61 | MAX CAL FLOW | Floating Point | 0 | |
| 62 | MIN CAL FLOW | Floating Point | 0 | |
| 63 | MAX CAL TEMP | Floating Point | 0 | |
| 64 | MIN CAL TEMP | Floating Point | 0 | |
| 65 | — | | | |
| 66 | — | | | |
| 67 | FLOW_ENG_UNITS | Unsigned16 | 0 | |
| 68 | PLENUM_ENG_UNITS | Unsigned16 | 0 | |
| 69 | TEMP_ENG_UNITS | Unsigned16 | 0 | |
| 70 | — | | | |
| 71 | TOTALIZER_ENG_UNITS | Unsigned16 | 0 | |
| 72 | PLENUM_SIZE_VALUE_DIAMETER | Floating Point | 0 | |
| 73 | PLENUM_SIZE_UNITS_HEIGHT | Floating Point | 0 | |
| 74 | FACTORY RESTORE | Unsigned8 | 0 | |

### Flow Analog Input Block

This block takes the input data from the Process Data Transducer Block, selected by the "Flow Average Channel" and makes it available to other function blocks at its output.

***L_TYPE*** *parameter*

This parameter determines how the values passed by the Process Transducer Block will be used in the block. There are two options; direct or indirect.

*Direct:* The Process Data Transducer flow value is passed directly to the PV of this AI block, and the XD_SCALE information is not used.

*Indirect:* The Process Data Transducer flow value is converted to the OUT_SCALE and the information of XD_SCALE is applied.

***CHANNEL*** *parameter*

This parameter selects the process variable to be used. The CHANNEL parameter, in the MT100 Flow Analog Input Block, MUST be set to "Flow Average."

***XD_SCALE*** *parameter*

This parameter sets the high and low scale values, the units index, and the number of digits after the decimal point for display purposes.

### MT100 Flow Analog Input Block

The table below summarizes the MT100 Flow Analog Input Block.

**Table 4 – MT100 Flow Analog Input Block**

| INDEX | PARAMETER | DATA TYPE (LENGTH) | INITIAL VALUE | DESCRIPTION |
|---|---|---|---|---|
| 1 | ST_REV | Unsigned 16 | 0 | |
| 2 | TAG_DESC | OctString(32) | Spaces | |
| 3 | STRATEGY | Unsigned 16 | 0 | |
| 4 | ALERT_KEY | Unsigned 8 | 0 | |
| 5 | MODE_BLK | DS-69 | O/S | |
| 6 | BLOCK_ERR | Bitstring(2) | | |
| 7 | PV | DS-65 | | MT100 FLOW value from the transducer block |
| 8 | OUT | DS-65 | | MT100 FLOW value available to other function blocks |
| 9 | SIMULATE | DS-82 | Disable | |
| 10 | XD_SCALE | DS-68 | 0 - 100% | |
| 11 | OUT_SCALE | DS-68 | 0 - 100% | |
| 12 | GRANT_DENY | DS-70 | 0 | |
| 13 | IO_OPTS | Bitstring(2) | 0 | |
| 15 | CHANNEL | Unsigned16 | 0 | Set this channel to "Flow Average." |
| 16 | L_TYPE | Unsigned 8 | 0 | |
| 17 | LOW_CUT | Float | 0 | |
| 18 | PV_FTIME | Float | 0 | |
| 19 | FIELD_VAL | DS-65 | | |
| 20 | UPDATE_EVT | DS-73 | | |
| 21 | BLOCK_ALM | DS-72 | | |
| 22 | ALARM_SUM | DS-74 | | |
| 23 | ACK_OPTION | Bitstring(2) | | |
| 24 | ALARM_HYS | Float | | |
| 25 | HI_HI_PRI | Unsigned 8 | | |
| 26 | H_HI_LIM | Float | | |
| 27 | HI_PRI | Unsigned 8 | | |
| 28 | HI_LIM | Float | | |
| 29 | LO_PRI | Unsigned 8 | | |
| 30 | LO_LIM | Float | | |
| 31 | LO_LO_PRI | Unsigned 8 | | |
| 32 | LO_LO_LIM | Float | | |
| 33 | HI_HI_ALM | DS-71 | | |
| 34 | HI_ALM | DS-71 | | |
| 35 | LO_ALM | DS-71 | | |
| 36 | LO_LO_ALM | DS-71 | | |

**Temperature Analog Input Block**

This block takes the input data from the Process Data Transducer Block, selected by the "Temperature Average Channel" and makes it available to other function blocks at its output.

***L_TYPE*** *parameter*

This parameter determines how the values passed by the Process Transducer Block are used in the block. There are two options; direct or indirect.

*Direct:* The Process Data Transducer temperature value is passed directly to the PV of this AI block, and the XD_SCALE information is not used.

*Indirect:* The Process Data Transducer flow value is converted to the OUT_SCALE and the information of XD_SCALE is applied.

***CHANNEL*** *parameter*

This parameter selects the process variable to be used. The CHANNEL parameter, in the MT100 Temperature Analog Input Block, MUST be set to "Temperature Average."

***XD_SCALE*** *parameter*

This parameter sets the high and low scale values, the units index, and the number of digits after the decimal point for display purposes.

**MT100 Temperature Analog Input Block**

The table below summarizes the MT100 Temperature Analog Input Block.

**Table 5 – MT100 Temperature Analog Input Block**

| INDEX | PARAMETER | DATA TYPE (LENGTH) | INITIAL VALUE | DESCRIPTION |
|---|---|---|---|---|
| 1 | ST_REV | Unsigned 16 | 0 | |
| 2 | TAG_DESC | OctString(32) | Spaces | |
| 3 | STRATEGY | Unsigned 16 | 0 | |
| 4 | ALERT_KEY | Unsigned 8 | 0 | |
| 5 | MODE_BLK | DS-69 | O/S | |
| 6 | BLOCK_ERR | Bitstring(2) | | |
| 7 | PV | DS-65 | | MT100 TEMPERATURE value from the transducer block |
| 8 | OUT | DS-65 | | MT100 TEMPERATURE value available to other function blocks |
| 9 | SIMULATE | DS-82 | Disable | |
| 10 | XD_SCALE | DS-68 | 0 - 100% | |
| 11 | OUT_SCALE | DS-68 | 0 - 100% | |
| 12 | GRANT_DENY | DS-70 | 0 | |
| 13 | IO_OPTS | Bitstring(2) | 0 | |
| 15 | CHANNEL | Unsigned16 | 0 | Set this channel to "Temperature Average." |
| 16 | L_TYPE | Unsigned 8 | 0 | |
| 17 | LOW_CUT | Float | 0 | |
| 18 | PV_FTIME | Float | 0 | |
| 19 | FIELD_VAL | DS-65 | | |
| 20 | UPDATE_EVT | DS-73 | | |
| 21 | BLOCK_ALM | DS-72 | | |
| 22 | ALARM_SUM | DS-74 | | |

**Table 5 – MT100 Temperature Analog Input Block (continued)**

| INDEX | PARAMETER | DATA TYPE (LENGTH) | INITIAL VALUE | DESCRIPTION |
|---|---|---|---|---|
| 23 | ACK_OPTION | Bitstring(2) | | |
| 24 | ALARM_HYS | Float | | |
| 25 | HI_HI_PRI | Unsigned 8 | | |
| 26 | H_HI_LIM | Float | | |
| 27 | HI_PRI | Unsigned 8 | | |
| 28 | HI_LIM | Float | | |
| 29 | LO_PRI | Unsigned 8 | | |
| 30 | LO_LIM | Float | | |
| 31 | LO_LO_PRI | Unsigned 8 | | |
| 32 | LO_LO_LIM | Float | | |
| 33 | HI_HI_ALM | DS-71 | | |
| 34 | HI_ALM | DS-71 | | |
| 35 | LO_ALM | DS-71 | | |
| 36 | LO_LO_ALM | DS-71 | | |

**Totalizer Analog Input Block**

This block takes the input data from the Process Data Transducer Block, selected by the "Totalizer Average Channel" and makes it available to other function blocks at its output.

***L_TYPE*** *parameter*

This parameter determines how the values passed by the Process Transducer Block are used in the block. There are two options; direct or indirect.

*Direct* The Process Data Transducer Totalizer value is passed directly to the PV of this AI block, and the XD_SCALE information is not used.

*Indirect* The Process Data Transducer Totalizer value is converted to the OUT_SCALE and the information of XD_SCALE is applied.

***CHANNEL*** *parameter*

This parameter selects the process variable to be used. The CHANNEL parameter, in the MT100 Totalizer Analog Input Block, MUST be set to "Totalizer Average."

***XD_SCALE*** *parameter*

This parameter sets the high and low scale values, the units index, and the number of digits after the decimal point for display purposes.

**MT100 Totalizer Analog Inupt Block**

The table below summarizes the MT100 Totalizer Analog Input Block.

**Table 6 – MT100 Totalizer Analog Input Block**

| INDEX | PARAMETER | DATA TYPE (LENGTH) | INITIAL VALUE | DESCRIPTION |
|---|---|---|---|---|
| 1 | ST_REV | Unsigned 16 | 0 | |
| 2 | TAG_DESC | OctString(32) | Spaces | |
| 3 | STRATEGY | Unsigned 16 | 0 | |
| 4 | ALERT_KEY | Unsigned 8 | 0 | |
| 5 | MODE_BLK | DS-69 | O/S | |
| 6 | BLOCK_ERR | Bitstring(2) | | |
| 7 | PV | DS-65 | | MT100 Totalizer value from the transducer block |

**Table 6 – MT100 Totalizer Analog Input Block (continued)**

| | | | | |
|---|---|---|---|---|
| 8 | OUT | DS-65 | | MT100 Totalizer value available to other function blocks |
| 9 | SIMULATE | DS-82 | Disable | |
| 10 | XD_SCALE | DS-68 | 0 - 100% | |
| 11 | OUT_SCALE | DS-68 | 0 - 100% | |
| 12 | GRANT_DENY | DS-70 | 0 | |
| 13 | IO_OPTS | Bitstring(2) | 0 | |
| 15 | CHANNEL | Unsigned16 | 0 | Set this channel to "Totalizer Average." |
| 16 | L_TYPE | Unsigned 8 | 0 | |
| 17 | LOW_CUT | Float | 0 | |
| 18 | PV_FTIME | Float | 0 | |
| 19 | FIELD_VAL | DS-65 | | |
| 20 | UPDATE_EVT | DS-73 | | |
| 21 | BLOCK_ALM | DS-72 | | |
| 22 | ALARM_SUM | DS-74 | | |
| 23 | ACK_OPTION | Bitstring(2) | | |
| 24 | ALARM_HYS | Float | | |
| 25 | HI_HI_PRI | Unsigned 8 | | |
| 26 | H_HI_LIM | Float | | |
| 27 | HI_PRI | Unsigned 8 | | |
| 28 | HI_LIM | Float | | |
| 29 | LO_PRI | Unsigned 8 | | |
| 30 | LO_LIM | Float | | |
| 31 | LO_LO_PRI | Unsigned 8 | | |
| 32 | LO_LO_LIM | Float | | |
| 33 | HI_HI_ALM | DS-71 | | |
| 34 | HI_ALM | DS-71 | | |
| 35 | LO_ALM | DS-71 | | |
| 36 | LO_LO_ALM | DS-71 | | |

### PID Block

This block offers control algorithms that use the Proportional, Integral and Derivative terms. The algorithm is non-iterative or ISA. In this algorithm the GAIN is applied to all terms of the PID, and the proportional and the integral actuate over the error, and the derivative actuates over the PV value.

### MT100 PID Block

The table below summarizes the MT100 PID Block.

**Table 7 – MT100 PID Block**

| INDEX | PARAMETER | DATA TYPE (LENGTH) | INITIAL VALUE | DESCRIPTION |
|---|---|---|---|---|
| 1 | ST_REV | Unsigned16 | 0 | |
| 2 | TAG_DESC | OctString(32) | Blanks | |
| 3 | STRATEGY | Unsigned16 | 0 | |
| 4 | ALERT_KEY | Unsigned8 | 0 | |
| 5 | MODE_BLK | DS-69 | OOS | |
| 6 | BLOCK_ERR | Bitstring(2) | | |
| 7 | PV | DS-65 | Bad ns 0 | ns = non specific |
| 8 | SP | DS-65 | G C/0 | G C/0 = GOOD_CAS/0 |
| 9 | OUT | DS-65 | BOS | BOS = BAD_Out of service 0 |
| 10 | PV_SCALE | DS-68 | 0-100% | |
| 11 | OUT_SCALE | DS-68 | 0-100% | |
| 12 | GRANT_DENY | DS-70 | 0,0 | |
| 13 | CONTROL_OPTS | Bitstring(2) | 0 | |
| 14 | STATUS_OPTS | Bitstring(2) | 0 | |
| 15 | IN | DS-65 | BNc | BNc= Bad-Not connected 0 |
| 16 | PV_FTIME | Float | 0 | |
| 17 | BYPASS | Unsigned8 | Unititialized | |
| 18 | CAS_IN | DS-65 | BNc | BNc= Bad-Not connected 0 |
| 19 | SP_RATE_DN | Float | +INF | |
| 20 | SP_RATE_UP | Float | +INF | |
| 21 | SP_HI_LIM | Float | 100 | |
| 22 | SP_LO_LIM | Float | 0 | |
| 23 | GAIN | Float | 0 | |
| 24 | RESET | Float | +INF | |
| 25 | BAL_TIME | Float | 0 | |
| 26 | RATE | Float | 0 | |
| 27 | BKCAL_IN | DS-65 | BNc | BNc = Bad_Not connected /0 |
| 28 | OUT_HI_LIM | Float | 100 | |
| 29 | OUT_LO_LIM | Float | 0 | |
| 30 | BKCAL_HYS | Float | 0.5% | |
| 31 | BKCAL_OUT | DS-65 | BNs0 | BNs0 = Bad-Non Specific 0 |
| 32 | RCAS_IN | DS-65 | Bos0 | Bos0=Bad-Out of Service/0 |
| 33 | ROUT_IN | DS-65 | Bos0 | Bos0=Bad-Out of Service/0 |
| 34 | SHED_OPT | Unsigned8 | Uninitialized | |
| 35 | RCAS_OUT | DS-65 | BNs0 | BNs0 = Bad-Non Specific 0 |
| 36 | ROUT_OUT | DS-65 | BNs0 | BNs0 = Bad-Non Specific 0 |

**Table 7 – MT100 PID Block (continued)**

| INDEX | PARAMETER | DATA TYPE (LENGTH) | INITIAL VALUE | DESCRIPTION |
|---|---|---|---|---|
| 37 | TRK_SCALE | DS-68 | 0-100% | |
| 38 | TRK_IN_D | DS-66 | BNcO | BncO=Bad-Not connected/ off |
| 39 | TRK_VAL | DS-65 | BNc | BNc = Bad_Not connected /0.0 |
| 40 | FF_VAL | DS-65 | BNc | BNc = Bad_Not connected /0.0 |
| 41 | FF_SCALE | DS-68 | 0-100% | |
| 42 | FF_GAIN | Float | 0.0 | |
| 43 | UPDATE_EVT | DS-73 | | |
| 44 | BLOCK_ALM | DS-72 | | |
| 45 | ALARM_SUM | DS-74 | All alarms enabled | |
| 46 | ACK_OPTION | Bitstring(2) | Auto ACK disabled | |
| 47 | ALARM_HYS | Float | 0.5% | |
| 48 | HI_HI_PRI | Unsigned8 | 0 | |
| 49 | HI_HI_LIM | Float | +INF | |
| 50 | HI_PRI | Unsigned8 | 0 | |
| 51 | HI_LIM | Float | +INF | |
| 52 | LO_PRI | Unsigned8 | 0 | |
| 53 | LO_LIM | Float | -INF | |
| 54 | LO_LO_PRI | Unsigned8 | 0 | |
| 55 | LO_LO_LIM | Float | -INF | |
| 56 | DV_HI_PRI | Unsigned8 | 0 | |
| 57 | DV_HI_LIM | Float | +INF | |
| 58 | DV_LO_PRI | Unsigned8 | 0 | |
| 59 | DV_LO_LIM | Float | -INF | |
| 60 | HI_HI_ALM | DS-71 | | |
| 61 | HI_ALM | DS-71 | | |
| 62 | LO_ALM | DS-71 | | |
| 63 | LO_LO_ALM | DS-71 | | |
| 64 | DV_HI_ALM | DS-71 | | |
| 65 | DV_LO_ALM | DS-71 | | |

## Link Master Function

The MT100 with FOUNDATION Fieldbus protocol supports the Link Master function with Link Active Scheduler (LAS) capability.

A Link Master (LM) is a device that can function as a Link Active Scheduler (LAS) for controlling communications on an H1 Fieldbus link. Only one LM device can serve as LAS. The LM LAS assignment is determined during a bidding process that starts on link startup or LAS failure.

A Link Active Scheduler (LAS) is essentially a bus arbiter that performs housekeeping (adding new devices/removing non-responsive devices), polls devices for process loop data, and distributes Data Link (DL) and Link Scheduling (LS) time to synchronize devices on the network.

### Operation

The Link Active Scheduler (LAS) has a list of transmit times for all data buffers in all devices that need to be cyclically transmitted.

When it is time for a device to send a buffer, the LAS issues a Compel Data (CD) message to the device.

Upon receipt of the CD, the device broadcasts or "publishes" the data in the buffer to all devices on the Fieldbus. Any device configured to receive the data is called a "subscriber".

Scheduled data transfers are typically used for the regular, cyclic transfer of control loop data between devices on the Fieldbus.

## Configuring FOUNDATION Fieldbus

For details on the general mounting, placement of sensor head, and mounting options see the MT100 main manual document number **06EN003460**.

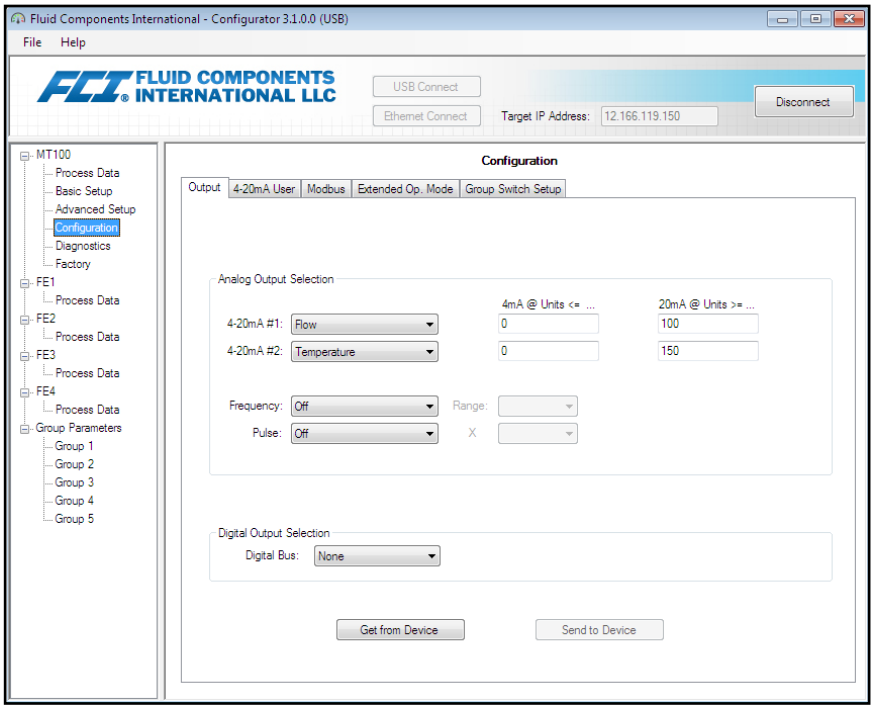
### Setting the MT100 for FOUNDATION Fieldbus Operation

***Note***: If the MT100 was ordered from the factory as a FOUNDATION Fieldbus device, the factory will have configured the instrument accordingly with no further instrument configuration required.

The MT100 Configuration Software application is used to select the instrument's digital communication protocol.

Connect the MT100 USB port to a USB port on the PC on which the MT100 configurator software is installed using the supplied USB cable.

Launch the MT100 Configurator (with the PC already running and connected to the MT100). Select *Configuration* branch from the menu tree on the window's left side, Observe that the **Output** tab is selected. In the window's *Digital Output Selection* field, click the *Digital Bus* pull-down menu and select **FF/Profibus**. Then click **Send to Device** to program the MT100 (enter "2772" user password). Refer to the MT100 Configuration Software manual **06EN003461** for details on digital bus configuration and general operation information.




### Configuring the MT100 FOUNDATION Fieldbus AI Blocks

All activities described below are done with the use of the National Instruments Windows-based NI-FBUS Configurator utility program. These steps represent the minimum steps to put an AI block into AUTO mode.

***Note***: The utility program's Windows title bar shows "ST100" when connected to an MT100 system. This is normal as the Fieldbus firmware runs on both ST100 and MT100 FCI products.

### MT100 Flow Analog Input Block (AI)

If the DD files are not yet loaded use the NI-FBUS Configurator utility to import the DD files.

Start up the NI configurator and allow it find the MT100 Instrument in the FF segment.

Open up the "Function Block Application" in the NI configurator, and drag the desired AI block into it, in this case the Flow AI block. If there are other AI blocks to be loaded drag those in the Function Block Application area.

In the NI configurator under the "Configure" pull down menu select "Download Configuration". Then in the "Download Configuration" pop-up screen check the "Clear Device" check box, and then click "Download".

### Configuring the Flow AI Block

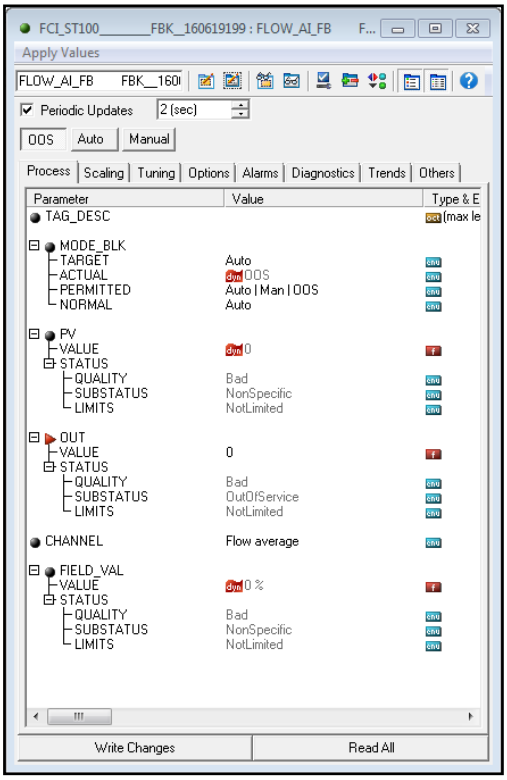
Double click on the "Flow" AI block.

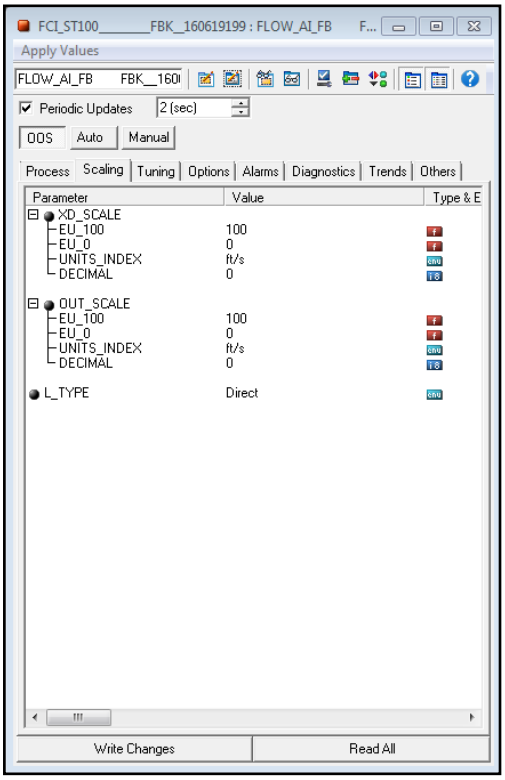
If the MODE_BLK.TARGET of the AI block is not set to 'OOS', set it to 'OOS'.

***Note***: Some parameters can be written only if the MODE_BLK.ACTUAL is set to 'OOS'.

- Set the CHANNEL parameter to "Flow average".
- Set the UNITS_INDEX parameter to the desired flow units i.e. "L/s".
- Set the L_TYPE parameter to "Indirect" It can also be "Direct" if XD_SCALE and OUT_SCALE parameters have the same values.

Confirm that the BLOCK_ERR parameter shows "Out of Service". Once all of the above have been confirmed, set the block Mode into AUTO, and confirm that the bock is providing updated flow process data in the OUT parameter. If all conditions are met then the MODE_BLK.ACTUAL parameter of AI block goes into 'Auto'.

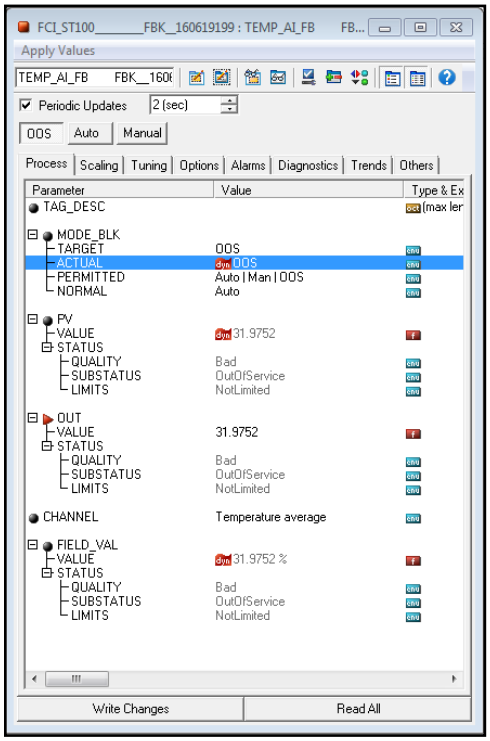


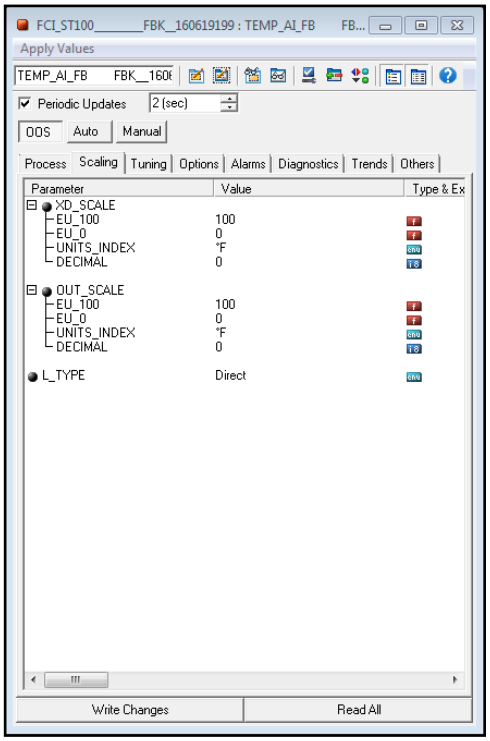



### Configuring the Temperature AI Block

The configuration process is similar to the Flow AI block except for the parameter settings below.

- Set the CHANNEL parameter to “Temperature average”.
- Set the UNITS_INDEX parameter to the desired temperature units; e.g., “°F”.

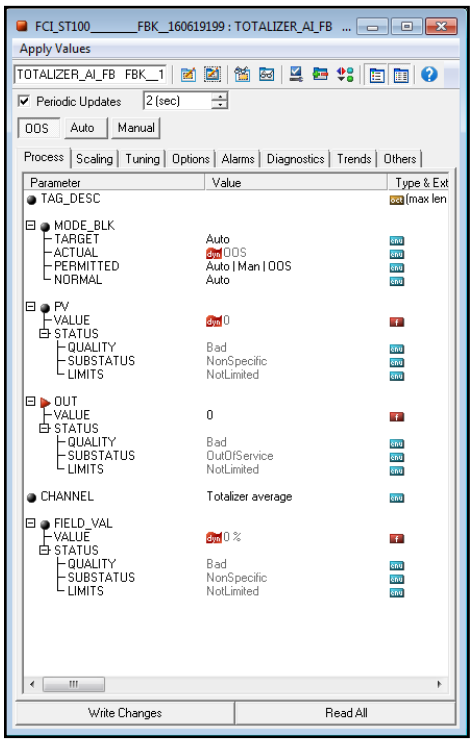


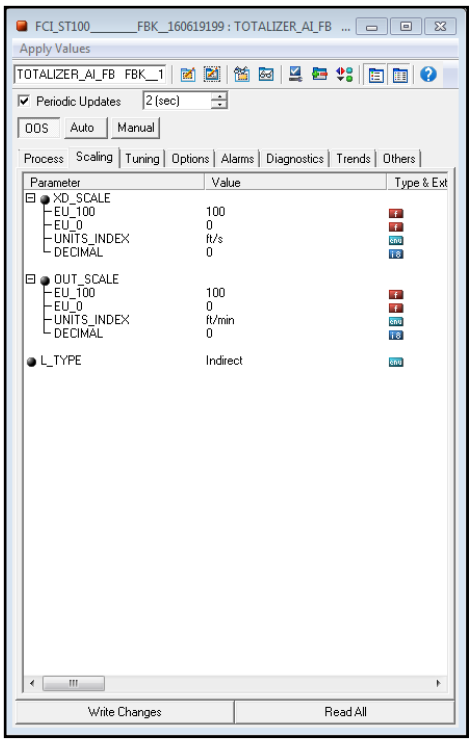




### Configuring the Totalizer AI Block

The configuration process is similar to the Flow AI block except for the parameter settings below.

- Set the CHANNEL parameter to “Totalizer average”.
- Set the UNITS_INDEX parameter to the Totalizer units that match the flow units. If the flow units are ‘ft/s’ then the Totalizer units must be ‘ft’.



## Using the MT100 FOUNDATION Fieldbus Service Transducer Block

### Service Transducer Block, Introduction

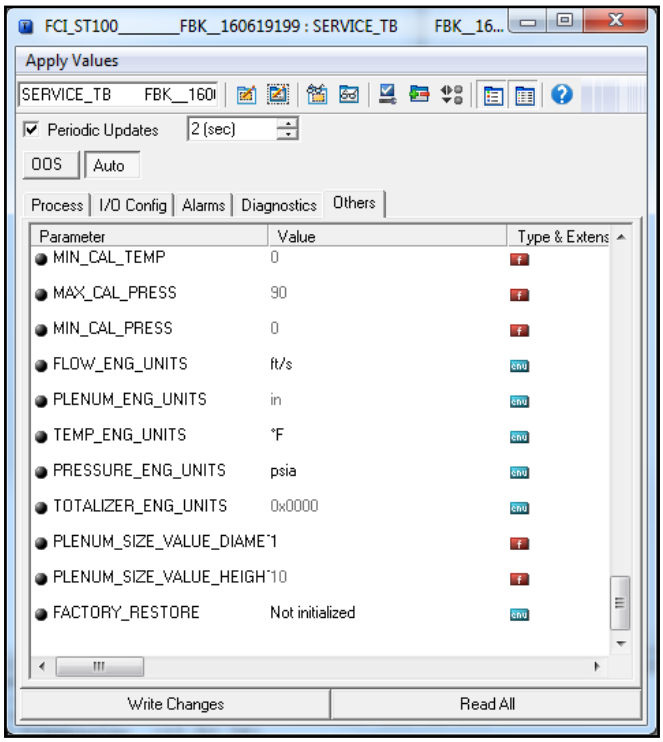
The MT100 Service Transducer Block provides read/write access to a number of instrument parameters via the FOUNDATION Fieldbus Configurator tool.

This section is organized into three parts, 1) Basic instrument setup functions, 2) Instrument min/max settings for process variables, and 3) Advanced instrument functions that present individual process parameters in a multipoint system.

***Note***: Ignore any pressure data shown in the example configurator utility screens. Pressure data applies to ST100 applications only.

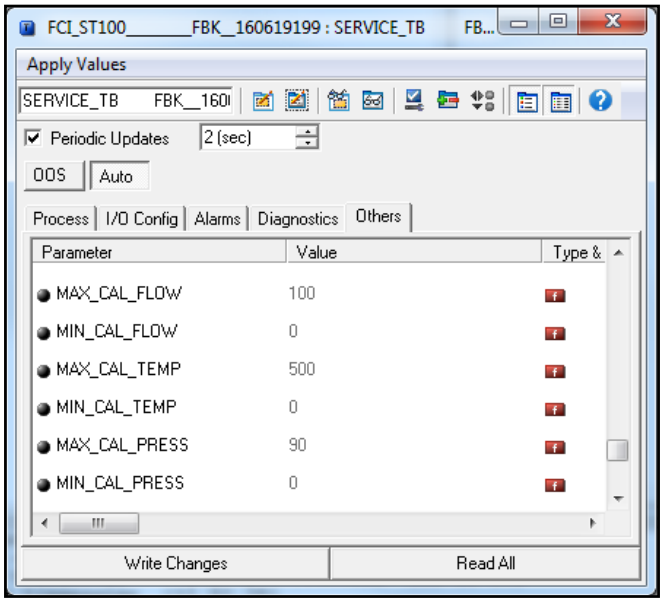
*Basic Instrument Setup Functions*

The basic setup functions include read/write of engineering units for the process variable and the plenum, read/write of the plenum dimensions, and restoration of factory calibration and setup values for the current Calibration Group.



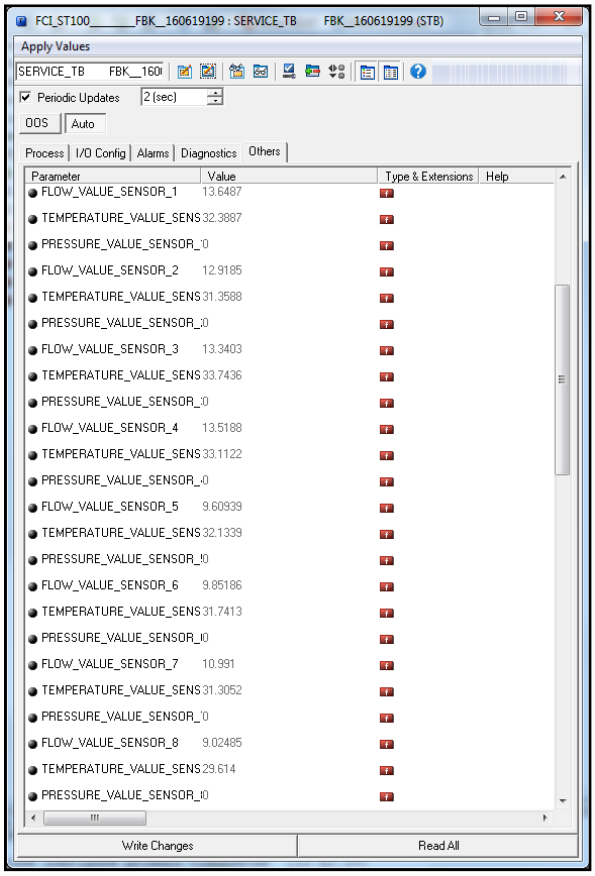

*Instrument Min/Max Settings*

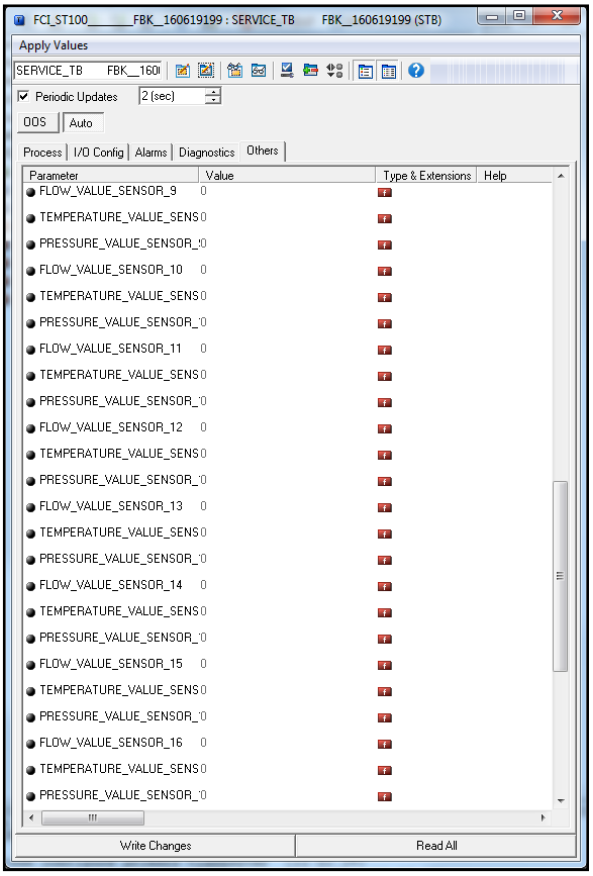
The Min/Max settings lets you read the instrument's Flow Calibration maximum and minimum limits, and the instrument's Temperature Calibration maximum and minimum limits.



### Advanced Instrument Functions

Use the Advanced Instrument functions to review the process variable data of each sensor element channel in a multi-point instrument. The data is not a continuous read but a one-shot read when the block is open. Click **Read Select** button or **Read All** button to update the value(s) of selected or all parameters, respectively. Although the Fieldbus utility can show data for up to 16 sensor elements, the MT100 is physically limited to a maximum of eight sensor elements.




## Device Description Files

### General DD FILES

The DD files are device support files that include two device description files, and one capability file. DDs are platform and operating system independent.

The DD provides an extended description of each object in the Virtual Field Device (VFD).

The DD provides information needed for a control system or host to understand the meaning of the data in the VFD including the human interface for functions such as calibration and diagnostics. Thus, the DD can be thought of as a “driver” for the device.

The MT100 DD files are found under a file folder labeled “01FC49”, and subfolder 0001:

- 0101.ffo
- 0101.sym
- 010101.cff

### Emerson 475 Field Communicator

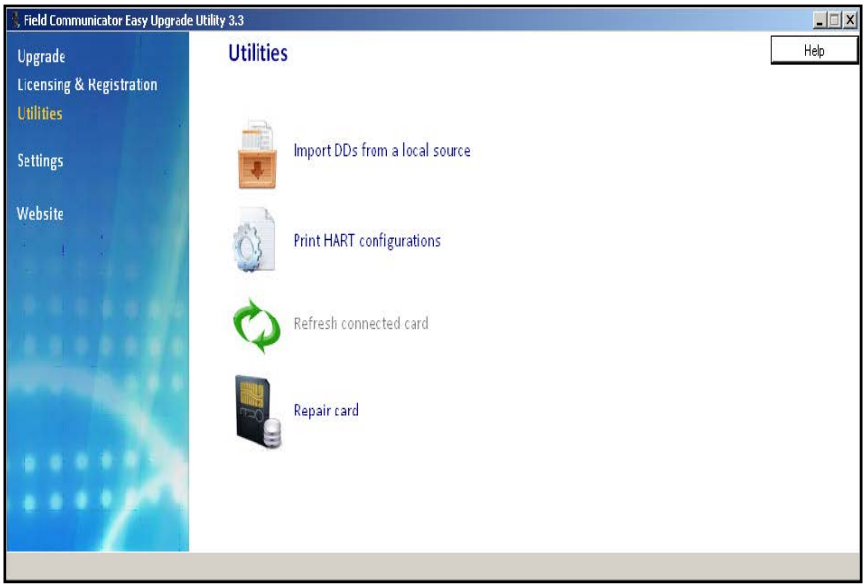
The Emerson Communicator uses the FOUNDATION Fieldbus DDP files to interface with the FOUNDATION Fieldbus device. These files must be loaded into the Emerson Fieldbus Communicator.

The MT100 FOUNDATION Fieldbus DDP files are found under a file folder labeled **EMERSON_475_FILES**, and subfolder 01FC49\0001:

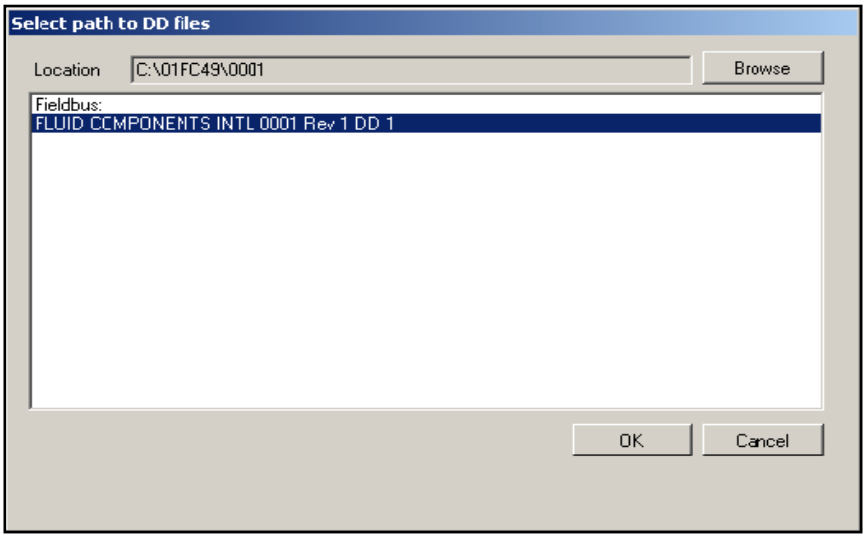
- 01FC49000101.fdd
- 01FFC9000101.fhd
- 0101.ffo
- 0101.sym
- 010101.cff

Load these files in the C:\01FC49\0001 directory.

To load the DDPs into the Field Communicator use the *Easy Upgrade Utility* from Emerson. First import the DDs by selecting "Utilities" and "Import DDs from a local source".




Select the FCI files and click **OK**.



## Technical Characteristics

| | |
|---|---|
| Manufacturer ID: | 01FC49 |
| Output Signal: | H1 compliant to IEC 61158-2, bus powered.<br>Integral reverse polarity protection. |
| Data transmission rate: | 31.25 kBit/s, voltage mode |
| Signal coding: | Manchester II |
| LAS function: | LAS function supported |
| Supported communication: | Publisher, Subscriber |
| H1 Profile Class: | 31PS, 32L |
| H1 Device Class: | Link Master |
| Function Blocks: | Process Data TB<br>Service Data TB<br>Flow AI<br>Temperature AI<br>Totalizer AI<br>PID |
| Certification: | Register Instrument (Test Campaign # IT071900) |
| Register Features: | Alarms and Events<br>Function Blocks (1-RB2(e), 4-AI(s), 1-PID(s), 2-TB(s))<br>Linking<br>Trending<br>Muti-bit Alert<br>Reporting<br>Field Diagnostics |

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## Customer Service/Technical Support

FCI provides full in-house technical support. Additional technical representation is also provided by FCI field representatives. Before contacting a field or in-house representative, please perform the troubleshooting techniques outlined in this document.

### *By Mail*

Fluid Components International LLC

1755 La Costa Meadows Dr.

San Marcos, CA 92078-5115 USA

Attn: Customer Service Department

### *By Phone*

Contact the area FCI regional representative. If a field representative is unable to be contacted or if a situation is unable to be resolved, contact the FCI Customer Service Department toll free at 1 (800) 854-1993.

### *By Fax*

To describe problems in a graphical or pictorial manner, send a fax including a phone or fax number to the regional representative. Again, FCI is available by facsimile if all possibilities have been exhausted with the authorized factory representative. Our fax number is 1 (760) 736-6250; it is available 7 days a week, 24 hours a day.

### *By Email*

FCI Customer Service can be contacted by email at: techsupport@fluidcomponents.com.

Describe the problem in detail making sure a telephone number and best time to be contacted is stated in the email.

### *International Support*

For product information or product support outside the contiguous United States, Alaska, or Hawaii, contact your country's FCI International Representative or the one nearest to you.

### *After Hours Support*

For product information visit FCI at www.fluidcomponents.com. For product support call 1 (800) 854-1993 and follow the prerecorded instructions.

### *Point of Contact*

The point of contact for service, or return of equipment to FCI is your authorized FCI sales/service office. To locate the office nearest you, visit the FCI website at www.fluidcomponents.com.

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## Appendix A – MT100 FOUNDATION Fieldbus Engineering Units/Codes

| Unit | | CLI | FOUNDATION Fieldbus |
|---|---|---|---|
| **Temperature** | | | |
| Fahrenheit | | 70 | 1002 |
| Celsius | | 67 | 1001 |
| **Flow** | | | |
| Standard Feet (vel) | SFPS | 70 | 1067 |
| | SFPM | 83 | 1070 |
| | SFPH | 84 | 1073 |
| | SFPD | 85 | 32768 |
| Normal Meters (vel) | NMPS | 86 | 1061 |
| | NMPM | 87 | 32769 |
| | NMPH | 88 | 1063 |
| | NMPD | 89 | 32770 |
| Standard Cubic Feet (vol) | SCFS | 90 | 32771 |
| | SCFM | 67 | 1360 |
| | SCFH | 72 | 1361 |
| | SCFD | 91 | 32772 |
| Pounds (mass) | LBPS | 80 | 1330 |
| | LBPM | 65 | 1331 |
| | LBPH | 76 | 1332 |
| | LBPD | 92 | 1333 |
| Kilograms (mass) | KGPS | 73 | 1322 |
| | KGPM | 74 | 1323 |
| | KGPH | 75 | 1324 |
| | KGPD | 93 | 1325 |
| Normal Cubic Meters (vol) | NCMS | 94 | 1522 |
| | NCMM | 79 | 1523 |
| | NCMH | 78 | 1524 |
| | NCMD | 95 | 1525 |
| Normal Liters (vol) | NLPS | 68 | 1351 |
| | NLPM | 96 | 1352 |
| | NLPH | 97 | 1353 |
| | NLPD | 98 | 1354 |
| Tonnes (mass) | TNPS | 99 | 1326 |
| | TNPM | 100 | 1327 |
| | TNPH | 101 | 1328 |
| | TNPD | 102 | 1329 |
| **Totalizer** | | | |
| Standard Cubic Feet | | 90 | 1053 |
| Pounds | | 80 | 1094 |
| Kilograms | | 73 | 1088 |
| Normal Cubic meters | | 94 | 1521 |
| Normal Liters | | 68 | 1038 |
| Tonnes | | 99 | 1092 |
| **Plenum** | | | |
| inches | | 0 | 1019 |
| millimeters | | 1 | 1013 |

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