

FT-3000 SERIES

Inline Electromagnetic Flow Meter
BACnet Supplement



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SECTION 1.0: INTRODUCTION

1.1 PURPOSE OF THIS GUIDE

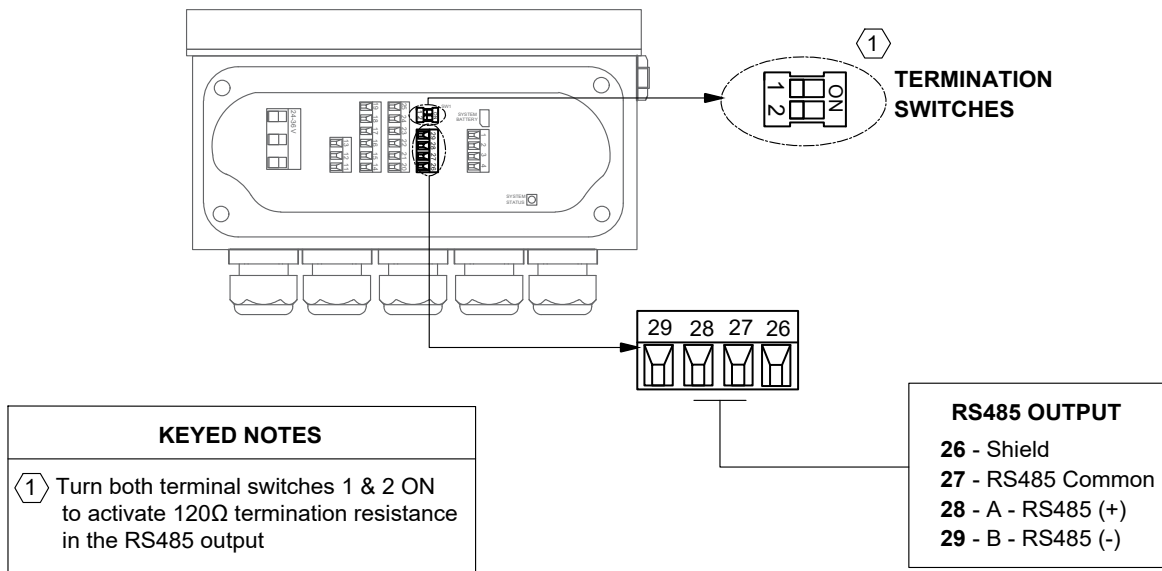
The purpose of this guide is to provide installation and operating instructions for the ONICON FT-3000 Series BACnet MS/TP serial interface.

1.2 SPECIFICATIONS

RS485 (IEA-485)	
Transceiver	3-wire, half-duplex, 1/8 unit load
Max # of devices per segment	32
Device address range	0-127 set the device as a Master, 128-254 set the device as a Slave
Baud rate	9600, 19200, 38400, 57600, 76800
Termination	Field settable 120Ω resistor
Device Instance Range	1-4,194,302 (Default: 4194304 "not initialized", configure the device before us. Once changed this value can't be set back to 4194303)

1.3 NETWORK SIGNAL CONNECTIONS

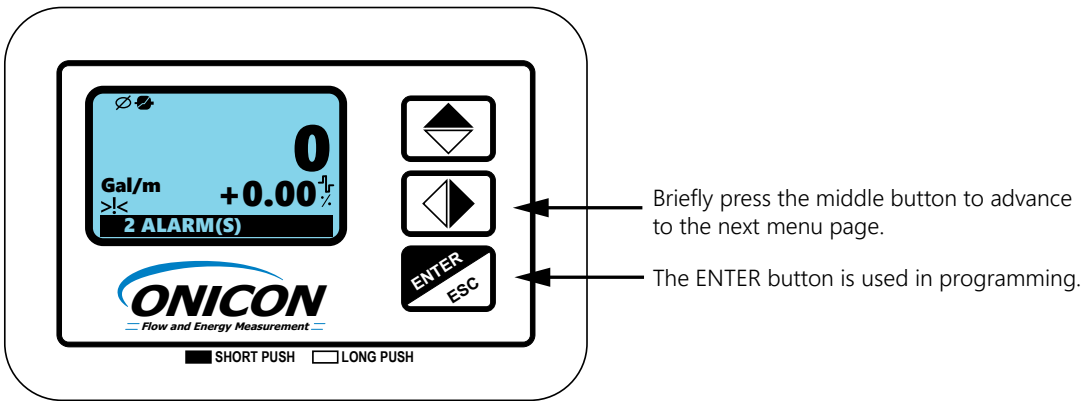
MODBUS RTU network signal connections are shown below. To apply end of line termination, set switches 1 and 2 to the ON position.



Important Note: Please refer to the FT-3000 Series Installation and Operation Manual for additional information.

1.4 DISPLAY AND USER INTERFACE

The FT-3000 Series transmitter is equipped with a lighted graphic display and 3-button user interface as shown below.



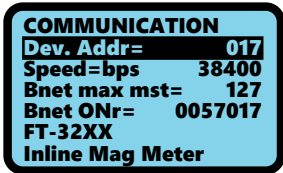
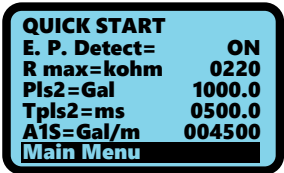
1.5 ACCESSING THE BACNET SETTINGS

In order to change the BACnet settings, you must first enter the programming mode. Access to the programming menus is password protected. The factory default access code is: 4*****. The 3-user interface pushbutton functions change when operating in the program mode. The functions are described below.

Push Button	Short Press (<1 second)	Long Press (>1 second)
	• Moves the cursor to the right on input fields • Advances to the next menu item • Changes the process data display	• Moves the cursor to the left on input fields • Returns to the previous menu item
	• Increments the numeric value or selected parameter • Return to the previous menu item	• Decrements the numeric value • Advances to the next menu item
	• Enters or leaves the selected function • Enters the program mode	• Exits the current menu

The menu can be accessed by briefly pressing the key and entering the access code 4*****.

1. From Quick Start menu, push repeatedly until Main Menu is highlighted.
2. Enter into the Main Menu.
3. From the Main Menu repeatedly press until 8-Communication is highlighted and then press enter.



1.6 MENU 8-COMMUNICATION

Menu Options	Descriptions
Device Address	[Device Communication Address]
Speed	Communication Speed
Bnet max mst	BACnet max master
Bnet ONr	BACnet Object Instance Number
Bnet ObjName	BACnet Device Object Number
Bnet ObjDescr	BACnet Device Object Description
Bnet ObjLoc	BACnet Device Object Location
Bnet pw	BACnet Device Management Password
Bnet W.E.	BACnet Device Object Write Enable

Device Communication Address

Is the BACnet unique "MAC" Address on the MSTP network; 0-127 set the device as a Master, 128-254 set the device as a Slave.

Communication Speed

Is the BACnet MSTP communication speed.

BACnet Max Master

Is the Device-"Max_Master" property; can be set also via BACnet MS/TP.

BACnet Object Instance Number

Is the BACnet unique Device - "Object_Identifier" property on the network; can be set also via BACnet. Device is shipped with this value set to 4194303 (3FFFFFFh) that means "not initialized"; configure the device before use. Once changed this value can't be set back to 4194303.

BACnet Device Object Name¹

Is the Device-"Object_Name" property; can be set also via BACnet²

BACnet Device Object Description¹

Is the Device-"Description" property; can be set also via BACnet²

BACnet Device Object Location¹

Is the Device-"Location" property; can be set also via BACnet²

BACnet Device Mangem. Password:

Is the Device Management Password for "DM-DCC-B" and "DM-RD-B" services; only reduced ASCII character set can be used.

BACnet Device Object Write Enable

Enable writing of Object Identifier, Name, Location and Description also via BACnet

OFF Writing via BACnet disabled.

ALL Writing via BACnet enabled.

DESC. writing of just Name, Location and Description, via BACnet enabled.

BACnet Database Revision Number (MCP ONLY)

¹ Only reduced ASCII character set can be used entering the text via Display or MCP; write it via BACnet for full UTF-8 set.

² Depending on "BACnet Device Object Write Enable" settings.

SECTION 2.0 BACnet

2.1 BACnet PROTOCOL IMPLEMENTATION CONFORMANCE STATEMENT

Date: 02/23/2025

Vendor Name: ONICON Inc.

Product Name: FT-3200 Product

Model Number: FT-32**-*****-21**

Application Software Version³: 1.06.0000.0004

Firmware Revision⁴: 2.0.0

BACnet Protocol Revision: 1.24

BACnet Standardized Device Profiles Supported (Annex L):

- BACnet Application Specific Controller (B-ASC)

BACnet Interoperability Building Blocks Supported (Annex K):

BIBB	Name	BACnet Service	Init.	Exec.
DS-RP-B	Data Sharing - Read Property-B	ReadProperty		x
DS-RPM-B	Data Sharing - Read Property Multiple-B	ReadPropertyMultiple		x
DS-WP-B	Data Sharing - Write Property-B	WriteProperty		x
DM-DDB-B ⁵	Device Management - Dynamic Device Binding-B	Who-Is		x
		I-Am	x	
DM-DOB-B ³	Device Management - Dynamic Object Binding-B	Who-Has		x
		I-Have	x	
DM-DCC-B	Device Management - Device Communication Control-B	Device Communication Control		x
DM-TS-B	Device Management - Time Synchronization-B	Time Synchronization		x
DM-RD-B	Device Management - UTC Time Synchronization-B	UTCTime Synchronization		x
DM-RD-B	Device Management - Reinitialize Device-B	ReinitializeDevice		x

³ Referred to whole application; will be upgraded also for changes not related to BACnet implementation.

⁴ Referred to BACnet implementation ONLY.

⁵ Available only when configured as a MS/TP Master

Segmentation Capability: NO

STANDARD OBJECT TYPES SUPPORTED

Property Identifier	Property Datatype	R/W	Value
Object_Identifier	BACnetObjectIdentifier	R-W ⁶	OBJECT_DEVICE: XXXXX
Object_Name	CharacterString	R-W ⁶	FT-3200_Name
Object_Type	BACnetObjectType	R	8 : Object Device
System_Status	BACnetDeviceStatus	R	0, operational
Vendor_Name	CharacterString	R	ONICON Inc.
Vendor_Identifier	Unsigned16	R	589
Model_Name	CharacterString	R	FT-3200
Firmware_Revision	CharacterString	R	2.0.0
Application_Software_Version	CharacterString	R	XX.XX.XXXX
Location	CharacterString	R-W ⁶	FT-3200 location
Description	CharacterString	R-W ⁶	FT-3200 description
Protocol_Version	Unsigned	R	1
Protocol_Revision	Unsigned	R	24
Protocol_Services_Supported	BACnetServicesSupported	R	...
Protocol_Object_Types_Supported	BACnetObjectTypesSupported	R	...
Object_List	BACnetARRAY[N]of BACnetObjectIdentifier	R	...
Max_Apdu_Length_Accepted	Unsigned	R	480
Segmentation_Support	BACnetSegmentation	R	3: none
Local_Time	Time	R-W	hh:mm:ss.cc
Local_Date	Date	R-W	dd/mm/yyyy
Utc_Offset	INTEGER	R-W	+/-min("-> E,"-> W)
Daylight_Saving_Status	BOOLEAN	R-W	1,True/0,False
Apdu_Timeout	Unsigned	R	10000
Number_Of_Apdu_Retries	Unsigned	R	3
Max_Master	Unsigned(1..127)	R-W ⁶	1-127
Max_Info_Frames	Unsigned	R	2
Device_Address_Binding	List of BACnetAddressBinding	R	0 :
Database_Revision	Unsigned	R	RRRRR
Last_ReStart_Reason	BACnetRestartReason	R	See list below ...
Time_Of_Device_Restart	BACnetTimeStamp	R	date, time
Serial_Number	CharacterString	R	NNNNNNNN
Property_List	BACnetARRAY[N]of BACnetPropertyIdentifier	R	...

⁶ Depends on local device settings

Standard	BACnetRestartReason
	0, Unknown; 1, cold start; 2, warm start; 3, detected power lost; 4, detected power off; 5, hardware watchdog; 6, software watchdog

Custom	BACnetRestartReason
	65, low power mode 70, software update 80, system exception 85, nv memory fault 90, os error

"POSITIVE INTEGER VALUE" OBJECTS

Property Identifier	Property Datatype	R/W	Value
Object_Identifier	BACnetObjectIdentifier	R	0 ... 3
Object_Name	CharacterString	R	See "Name" Column in the Device Objects Tables
Object_Type	BACnetObjectType	R	Positive-integer-value
Present_Value	Unsigned	R ⁷	
Description	CharacterString	R	See "Function" Column in the Device Object Tables
Status_Flags	BACnetStatusFlag	R	InAlarm = "F" Fault = "T" or "F" Overridden = "F" OutOfService = "F"
Event_State	BACnetEventState	R	0, normal
Reliability	BACnetReliability	R ⁷	0, no-fault-detected 201, no-source ⁹ 2, over-range 9, multi-state-fault 102, simulation ⁹
Out_Of_Service	BOOLEAN	R ⁸	0, False / 1, True
Units	BACnetEngineeringUnit	R	See "Supported Units of Measures" table
Property_List	BACnetARRAY[N]of BACnetPropertyIdentifier	R	

ATTENTION: when OOS is True Present_Value and Reliability do not represent actual object value!

⁷ Writable for testing purposes on NOT MID Devices when OOS is True.

⁸ Writable to "1" for testing purposes on NOT MID Devices

⁹ Custom Value

"ANALOG VALUE" OBJECTS

Property Identifier	Property Datatype	R/W	Value
Object_Identifier	BACnetObjectIdentifier	R	0 ... 3
Object_Name	CharacterString	R	See "Name" Column in the Device Objects Tables
Object_Type	BACnetObjectType	R	analog-value
Present_Value	REAL	R ¹⁰	
Units	BACnetEngineeringUnit	R	See "Supported Units of Measures" table
Description	CharacterString	R	See "Function" Column in the Device Object Tables
Status_Flags	BACnetStatusFlag	R	InAlarm = "F" Fault = "T" or "F" Overridden = "F" OutOfService = "F"
Event_State	BACnetEventState	R	0, normal
Reliability	BACnetReliability	R ¹⁰	0, no-fault-detected 201, no-source ¹¹ 2, over-range 9, multi-state-fault 102, simulation ¹¹
Out_Of_Service	BOOLEAN	R ¹²	0, False / 1, True
Property_List	BACnetARRAY[N]of BACnetPropertyIdentifier	R	...

¹⁰ Writable for testing purposes on NOT MID Devices when OOS is True.

¹¹ Custom Value

¹² Writable to "1" for testing purposes on NOT MID Devices

"ANALOG INPUT" OBJECTS

Property Identifier	Property Datatype	R/W	Value
Object_Identifier	BACnetObjectIdentifier	R	0 ... 4
Object_Name	CharacterString	R	See "Name" Column in the Device Objects Tables
Object_Type	BACnetObjectType	R	analog-input
Present_Value	REAL	R ¹³	
Units	BACnetEngineeringUnit	R	See "Supported Units of Measures" table
Description	CharacterString	R	See "Function" Column in the Device Object Tables
Status_Flags	BACnetStatusFlag	R	InAlarm = "F" Fault = "T" or "F" Overridden = "F" OutOfService = "F"
Event_State	BACnetEventState	R	0, normal
Reliability	BACnetReliability	R ¹³	0, no-fault-detected 1, no-sensor 2, over-range 7, unreliable-other 64, not-installed ¹⁵ 102, simulation ¹⁵ 211, empty-pipe ¹⁵
Out_Of_Service	BOOLEAN	R ¹⁴	0, False / 1, True
Property_List	BACnetARRAY[N]of BACnetPropertyIdentifier	R	...

"BITSTRING VALUE" OBJECTS

Property Identifier	Property Datatype	R/W	Value
Object_Identifier	BACnetObjectIdentifier	R	0 ... 1
Object_Name	CharacterString	R	See "Name" Column in the Device Objects Tables
Object_Type	BACnetObjectType	R	Bit-string-value
Present_Value	BIT STRING	R ¹³	See Below
Bit_Text	BACnetARRAY[N]of CharacterString	R	...
Description	CharacterString	R	See "Function" Column in the Device Object Tables
Status_Flags	BACnetStatusFlag	R	InAlarm = "F" Fault = "T" or "F" Overridden = "F" OutOfService = "F"
Event_State	BACnetEventState	R	0, normal
Out_Of_Service	BOOLEAN	R ¹⁶	0, False / 1, True
Property_List	BACnetARRAY[N]of BACnetPropertyIdentifier	R	...

¹³ Writable for testing purposes on NOT MID Devices when OOS is True.

¹⁴ Writable to "1" for testing purposes on NOT MID Devices. Writable for testing purposes on NOT MID Devices when OOS is True.

¹⁵ Custom Value

¹⁶ Writable to "1" for testing purposes on NOT MID Devices.

"BINARY VALUE" OBJECTS

Property Identifier	Property Datatype	R/W	Value
Object_Identifier	BACnetObjectIdentifier	R	0
Object_Name	CharacterString	R	See "Name" Column in the Device Objects Tables
Object_Type	BACnetObjectType	R	binary-value
Present_Value	BACnetBinaryPV	R-W ¹⁷	
Description	CharacterString	R	See "Function" Column in the Device Object Tables
Status_Flags	BACnetStatusFlag	R	InAlarm = "F" Fault = "T" or "F" Overridden = "T" or "F" OutOfService = "T" or "F"
Event_State	BACnetEventState	R	0, normal
Reliability	BACnetReliability	R-W ¹⁷	0, no-fault-detected
Out_Of_Service	BOOLEAN	R-W ¹⁸	0, False
Inactive_Text	CharacterString	R	No Command
Active_Text	CharacterString	R	Reset Command
Priority_Array	BACnetPriorityArray	R ¹⁷	...
Relinquish_Default	BACnetBinaryPV	R	...
Current_Command_Priority		R ¹⁷	NULL, 1...16
Property_List	BACnetARRAY[N]of BACnetPropertyIdentifier	R	...

ATTENTION: when OOS is True Present_Value and Reliability do not represent actual object value!

OPERATIONS:

- Writing "1, Active" cause reset of selected counters (strobe-like functionality);
- Device automatically remove any entry on Priority Array to allow next reset command without need to set to "0, Inactive"
- Therefore reading Priority Array and Current Command Priority always give "NULL" and reading Present Value always give "0, Inactive".

¹⁷ On NOT MID Devices, when OOS is True, Device do not automatically remove entry from Priority Array, then Present Value, Priority Array, and Current Command Priority can be test as usual

"NETWORK PORT" OBJECT

Property Identifier	Property Datatype	R/W	Value
Object_Identifier	BACnetObjectIdentifier	R	0
Object_Name	CharacterString	R	NP MS/TP
Object_Type	BACnetObjectType	R	Network-port
Description	CharacterString	R	BACnet MS/TP NetworkPort
Status_Flags	BACnetStatusFlag	R	InAlarm = "F" Fault = "T" or "F" Overridden = "T" or "F" OutOfService = "T" or "F"
Reliability	BACnetReliability	R	0, no-fault-detected
Out_Of_Service	BOOLEAN	R	0, False
Network_Type	BACnetNetworkType	R	Mstp
Protocol_Level	BACnetProtocolLevel	R	BACnet Application
Changes_Pending	BOOLEAN	R ¹	0, False / 1, True
Network_Number	Unsigned	R	0, Unknown
Network_Number_Quality	BACnetNetworkNumberQuality	R	0, Unknown
Link_Speed	Real	R	XXXXX BPS
Apdu_Length	Unsigned	R	480
Mac_Address	OctetString	R-W	0...254
Max_Master	Unsigned	R-W	
Max_Info_Frames	Unsigned	R	
Property_List	BACnetARRAY[N]of BACnetPropertyIdentifier	R	

"MULTI STATE VALUE" OBJECTS

Property Identifier	Property Datatype	R/W	Value
Object_Identifier	BACnetObjectIdentifier	R	0
Object_Name	CharacterString	R	See "Name" on Table 3
Object_Type	BACnetObjectType	R	multi-state-value
Present_Value	Unsigned	R-W ¹⁹	See Below
Description	CharacterString	R	See "Description" on Table 3
Status_Flags	BACnetStatusFlag	R	InAlarm = "F" Fault = "T" or "F" Overridden = "F" OutOfService = "T" or "F"
Event_State	BACnetEventState	R	0, normal
Reliability	BACnetReliability	R-W ¹⁹	0, no-fault-detected 64, not-installed
Out_Of_Service	BOOLEAN	R-W ²⁰	0, False / 1, True
Number_Of_States	Unsigned	R	See Below
State_Text	BACnetARRAY[N]of CharacterString	R	...
Property_List	BACnetARRAY[N]of BACnetPropertyIdentifier	R	...

¹⁹ Writable for testing purposes on NOT MID Devices when OOS is True.²⁰ Writable to "1" for testing purposes on NOT MID Devices.

LIST OF PROPRIETARY - CUSTOM - PROPERTIES:

Value	Name	Type	Description

LIST OF PROPRIETARY - CUSTOM - RELIABILITIES:

Value	Name	Description
64	NOT_INSTALLED	Not Installed Feature
100	MAYOR_FAULT	HP Alarm Fault
201	NO_SOURCE	No Source Data Connected for this Value
211	EMPTY_PIPE	No Data for this Value due to Empty Pipe

Data Link Layer Options:

☒ MS/TP master (Clause 9), baud rate(s): 9600, 19200, 38400, 57600, 76800

☒ MS/TP slave (Clause 9), baud rate(s): 9600, 19200, 38400, 57600, 76800

Device Address Binding: NO

Networking Options: None

Data Link Layer Options:

☒ ANSI X3.4 - ISO 10646 (UTF-8)

Gateway Options: Not a gateway

Network Security Options: None

2.2 BACnet DEVICE OBJECT

ANALOG INPUT(S)

Object Identifier	Name	Function	Units
Analog Input 0	FLOW_RATE	Flow Rate [5]	[5] (R)
Analog Input 1	FLOW_RATE_(PC)	Flow Rate percentage [%]	(98) percent
Analog Input 2	BRD_T1_TEMP	Board Temperature T1 [3]	[3] (R)
Analog Input 3	BRD_T2_TEMP	Board Temperatuer T2 [3]	[3] (R)
Analog Input 4	BATT CHARGE	Battery Charge [%]	(98) percent

ANALOG & BINARY VALUE(S)

Object Identifier	Name	Function	Units
Analog Value 0	TOT_VOL_POS_V	Total Volume Positive [4]	[4] (R)
Analog Value 1	PAR_VOL_POS_V	Partial Volume Positive [4]	[4] (R)
Analog Value 2	TOT_VOL_NEG_V	Total Volume Negative [4]	[4] (R)
Analog Value 3	PAR_VOL_NEG_V	Partial Volume Negative [4]	[4] (R)
Binary Value 0	RST_SEL_CNT	Reset Selected Counters (Active=Reset)	-

BITSTRING VALUE(S)

Object Identifier	Name	Function	Bit & Explanation
BitString Value 0	MEA_ERROR	Measure Errors	0. Overflow Alarm 1. Pulse 1 overflow alarm 2. Pulse 2 overflow alarm 3. Flow MIN alarm 4. Flow MAX alarm 5. Signal error alarm 6. Excitation error alarm 7. Pipe empty alarm
BitString Value 1	SYS_ERROR	System Errors	0. Battery fault alarm 1. Low battery alarm 2. Over temperature alarm 3. Power fail alarm

POSITIVE INTEGER VALUE(S)

Object Identifier	Name	Function	Units
Positive Integer Value 0	TOT_VOL_POS_C	Total Volume Positive [4]	[4] (R)
Positive Integer Value 1	PAR_VOL_POS_C	Partial Volume Positive [4]	[4] (R)
Positive Integer Value 2	TOT_VOL_NEG_C	Total Volume Negative [4]	[4] (R)
Positive Integer Value 3	PAR_VOL_NEG_C	Partial Volume Negative [4]	[4] (R)

NETWORK PORT & MULTI-STATE VALUE

Object Identifier	Name	Function
Network Port 0	NP MS/TP	BACnet MS/TP NetworkPort

MULTI-STATE VALUE

Object Identifier	Name	Function	Present Value & Explanation
Multi-State Value 0	BATT_STATE	Battery Status	1. Battery OK (if enabled) 2. Battery Low 3. Battery Empty 4. Battery Fault

2.3 SUPPORTED UNITS

NOTE	Unit of Measure	Text	ASHRAE Unit
[3] Temperature	Degrees Celsius	°C	(62) degrees-Celsius
	Degrees Fahrenheit	°F	(64) degrees-Fahrenheit

NOTE	Unit of Measure	Text	ASHRAE Unit
[4] "Volume" Metric	MilliLiter	ml	(197) milliliters
	Cubic Centimeter	Cm ³	(4096) cubic-centimeters
	Liter	l	(82) liters
	Cubic Decimeter	dm ³	(4097) cubic-decimeters
	DecaLitre	dal	(4098) decaliters
	DecaLitre	hl	(4099) hectoliters
	Cubic Meter	m ³	(80) cubic-meters
	MegaLitre	MI	(4100) megaliters

NOTE	Unit of Measure	Text	ASHRAE Unit
[4] "Volume" Imperial / USC	Cubic Inch	in ³	(4352) cubic-inch
	US Gallon	Gal	(83) us-gallons
	UK Gallon	IGL	(81) imperial-gallons
	Cubic Foot	ft ³	(79) cubic-feet
	Standard Barrel	bbl	(4353) standard-barrels
	Oil Barrel	BBL	(4354) oil-barrels
	Hundred Cubic Feet	hf ³	(4355) hundred-cubic-feet
	Kilo US Gallon	KGL	(4356) us-kilo-gallons
	Kilo UK Gallon	IKG	(4357) imperial-kilo-gallons
	Kilo Cubic Feet	kf ³	(4358) kilo-cubic-feet
	Ten Thousand Gallon	ttG	(4359) ten-thousand-gallons
	Acre Foot	Aft	(4360) acre-feet
	Mega US Gallon	MGL	(47912) us-mega-gallons
	Mega UK Gallon	IMG	(47913) imperial-mega-gallons

NOTE	Unit of Measure	Text	ASHRAE Unit
[5] "Flow" Metric	[4] \ SECOND	[4] \ S	(198) milliliters-per-second
			(4614) ⁶ cubic-centimeter-per-second
			(87) liters-per-second
			(4619) ⁶ cubic-decimeter-per-second
			(4623) ⁶ decaliters-per-seconds
			(4627) ⁶ hectoliters-per-seconds
			(85) cubic-meters-per-second
			(4631) ⁶ megaliters-per-seconds
	[4] \ MINUTE	[4] \ m	(47914) milliliters-per-minute
			(4613) ⁶ cubic-centimeter-per-minute
			(88) liters-per-minute
			(4618) ⁶ cubic-decimeter-per-minute
			(4622) ⁶ decaliters-per-minute
			(4626) ⁶ hectoliters-per-minute
			(165) cubic-meters-per-minute
			(4630) ⁶ megaliters-per-minute
	[4] \ HOUR	[4] \ h	(4609) ⁶ milliliters-per-hour
			(4612) ⁶ cubic-centimeter-per-hour
			(136) liters-per-hour
			(4617) ⁶ cubic-decimeter-per-hour
			(4621) ⁶ decaliters-per-hour
			(4625) ⁶ hectoliters-per-hour
			(135) cubic-meters-per-hour
			(4629) ⁶ megaliters-per-hour
	[4] \ DAY	[4] \ d	(4608) ⁶ milliliters-per-day
			(4611) ⁶ cubic-centimeter-per-day
			(4615) ⁶ liters-per-day
			(4616) ⁶ cubic-decimeter-per-day
			(4620) ⁶ decaliters-per-day
			(4624) ⁶ hectoliters-per-day
			(249) cubic-meters-per-day
			(4628) ⁶ megaliters-per-day

⁶ Custom Value

NOTE	Unit of Measure	Text	ASHRAE Unit
[5] "Flow" Imperial / USC	[4] \ SECOND	[4] \ S	(4867) ⁷ cubic-inch-per-second
			(47879) us-gallons-per-second
			(47875) imperial-gallons-per-second
			(142) cubic-feet-per-second
			(4876) ⁷ standard-barrels-per-second
			(4880) ⁷ oil-barrels-per-second
			(4884) ⁷ hundred-cubic-feet-per-second
			(4888) ⁷ us-kilo-gallons-per-second
			(4892) ⁷ imperial-kilo-gallons-per-second
			(4896) ⁷ kilo-cubic-feet-per-second
			(4900) ⁷ ten-thousand-gallons-per-second
			(4904) ⁷ acre-feet-per-second
			(4908) ⁷ us-mega-gallons-per-second
			(4912) ⁷ imperial-mega-gallons-per-second
	[4] \ MINUTE	[4] \ m	(4866) ⁷ cubic-inch-per-minute
			(89) us-gallons-per-minute
			(86) imperial-gallons-per-minute
			(84) cubic-feet-per-minute
			(4875) ⁷ standard-barrels-per-minute
			(4879) ⁷ oil-barrels-per-minute
			(4883) ⁷ hundred-cubic-feet-per-minute
			(4887) ⁷ us-kilo-gallons-per-minute
			(4891) ⁷ imperial-kilo-gallons-per-minute
			(4895) ⁷ kilo-cubic-feet-per-minute
			(4899) ⁷ ten-thousand-gallons-per-minute
			(4903) ⁷ acre-feet-per-minute
			(4907) ⁷ us-mega-gallons-per-minute
			(4911) ⁷ imperial-mega-gallons-per-minute
	[4] \ HOUR	[4] \ h	(4865) ⁷ cubic-inch-per-hour
			(192) us-gallons-per-hour
			(47876) imperial-gallons-per-hour
			(191) cubic-feet-per-hour
			(4874) ⁷ standard-barrels-per-hour
			(4878) ⁷ oil-barrels-per-hour
			(4882) ⁷ hundred-cubic-feet-per-hour
			(4886) ⁷ us-kilo-gallons-per-hour
			(4890) ⁷ imperial-kilo-gallons-per-hour
			(4894) ⁷ kilo-cubic-feet-per-hour
			(4898) ⁷ ten-thousand-gallons-per-hour
			(4902) ⁷ acre-feet-per-hour
			(4906) ⁷ us-mega-gallons-per-hour
			(4910) ⁷ imperial-mega-gallons-per-hour

⁷ Custom Value

SECTION 3.0 NETWORK TROUBLESHOOTING TIPS

3.1 TROUBLESHOOTING

REPORTED PROBLEM	POSSIBLE SOLUTIONS
Device will not communicate with the network controller	• A unique address is required for each device on the network. Duplicate addresses will cause some or all of the devices on the network to quit working. • The RS485 network cable connections are polarity sensitive and must be connected the same way on every device (i.e. + to + and - to -). • The Baud rate setting must match the network Baud rate. • Shield drain connections should be daisy chained in the same manner as the signal cables for RS485. The shield drain wire should be left unterminated at the end of the cable and connected to earth only at the network master controller. Shield wires must not be connected to the FT-3000 Series. • The maximum number of devices allowed on a RS485 network segment without a repeater is 32. Adding more than 32 devices to a single segment may reduce the transceiver output voltage to a level that is too low to be distinguished from background noise on the cable. • RS485 cable impedance should be matched to a termination resistor at the end of the cable. This resistor should only be used if the meter is the last device on the network cable.
Network communications are disrupted when the device is connected	• The RS485 network cable connections are polarity sensitive and must be connected the same way on every device (i.e. + to + and - to -). • A unique address is required for each device on the network. Duplicate addresses will cause some or all of the devices on the network to quit working. • Shield drain connections should be daisy chained in the same manner as the signal cables for RS485. The shield drain wire should be left unterminated at the end of the cable and connected to earth only at the network master controller. Shield wires must not be connected to the FT-3000 Series.