ROC Protocol Specifications Manual (for Emerson FB1000 and FB2000 Series Flow Computers)

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Chapter 1: Introduction

This manual provides information required to understand the specifications for the ROC protocol. The intended use is for developing communication drivers to interface with a FB Series flow computer.

The ROC database is broken into individual parameters. Each database parameter is uniquely associated by parameter number and point type. See *Chapter 3, Parameter Lists for Point Types*, for detailed information.

Note
For simplicity, this manual uses the term "FB Series" when referring to the Emerson FB1100, FB1200, FB2100 and FB2200 flow computers. Unless otherwise noted, the descriptions and procedures apply to all FB Series devices using the ROC protocol.

1.1 Manual Organization

This manual is organized into the following chapters:

Table 1-1: Manual Organization

Chapter	Description
Chapter 1: Introduction	Describes this manual and provides a summary of the general protocol message format, summary of each opcode, and how to calculate data offsets.
Chapter 2: Opcodes	Lists each opcode the ROC protocol uses.
Chapter 3: Parameter Lists for Point Types	Describes ROC point types and data types.
Chapter 4: CRC-16 Code and Examples	Provides information concerning the cyclical redundancy check the ROC protocol uses.
Chpter 5: IEEE Floating Point Format	Provides information about the binary representation of floating-point numbers.
Index	Provides an alphabetic listing of items and topics contained in this manual.

1.2 General Protocol Message Format

Tables 1-2 and 1-3 show the various ROC and host protocol message formats. General Message Format - Station "A" Polling Station 'B' for Data/Action:

Table 1-2: General Format – Station "A" Polling Station "B" for Data/Action

Destination (B)		Source (A)		Opcode	Data Length	m Data Bytes							CRC	
unit	group	unit	group		# of bytes	d1	d2	d3	-	-	-	dm	Lsb	msb

Table 1-3: General Format – Station "B" Responding to Station "A"

Destination (B)		Source (A)		Opcode	Data Length	m Data Bytes							CRC	
unit	group	unit	group		# of bytes	d1	d2	d3	-	-	-	dn	Lsb	msb

A message generally contains the following fields, in order from left to right:

Field	Description	
Destination	Specifies the address for the destination device. Destination has two components:	
	Unit	One-byte unit code for the station address. The unit code for a ROC address is user-configurable. For a host, this must be a unique number. **0** represents "broadcast within group" and **240** is the "direct connect address."
	Group	Indicates the group code for the station address. This is user-configurable.
Source	Specifies the address for the source device. Source has two components:	
	Unit	One-byte unit code for the station address. The unit code for a ROC address is user-configurable. For a host, this must be a unique number. **0** represents "broadcast within group" and **240** is the "direct connect address."
	Group	Indicates the group code for the station address. This is user-configurable.
Opcode	Defines the operation code (opcode) action to perform. See *Section 2* for description of supported opcodes.	

# of bytes	Indicates the number of bytes in the data byte field, consisting of the path, desired opcode, number of data bytes for the desired message, and the desired message itself.	
Data Bytes	Contains messages of varying lengths, consisting of the path, desired opcode, number of data bytes for the desired message, and the message itself.	
CRC	Confirms validity of message transmission.	
	lsb	Least significant byte.
	msb	Most significant byte.

Messages are of flexible length. The first six data bytes are used for the header information including: destination, source, opcode, and data length (number of bytes). The length of a message equals the number of data bytes transmitted plus eight overhead bytes (header information and CRC).

The minimum message length is eight bytes if the number of data bytes is zero (no data bytes transmitted). The maximum message length is 248 bytes (240 bytes of data). a byte.

Tables 1-4 and *1-5* provide examples of the messages exchanged if the host requests the current time and date from ROC 13 of Group 5.

Table 1-4: Host Request to ROC

ROC Address		Host Address		Opcode	Data Length	CRC	
unit	group	unit	group	-	# of bytes	Lsb	msb
13	5	1	0	7	0	l	m

Table 1-5: ROC Response to Host

Host Address		ROC Address		Opcode	Data Length	8 Data Bytes								CRC	
unit	group	unit	group	-	# of bytes	d1	d2	d3	-	-	-	-	dn	Lsb	msb
1	0	13	5	7	8	sec	min	hr	day	mo	yr	lyr	dwk	l	m

Note

Addresses **240, 240** and **0,x** are reserved and should not be used.

1.3 Calculating Data Offsets

A data byte offset is the offset (zero-based) from the beginning of a transmit or receive buffer for the data items that comprise the opcode data. The offset of the first data item is always 6 to allow for the header information (bytes 0-5).

Certain data offset values are determined based on the ROC configuration. The data byte offset for each item may be calculated. To calculate the next data offset value, add the previous offset value to the length of the previous data item:

Offset = Previous Offset + Length of Previous Data Item

1.4 Limitations

The following limitations currently exist when FB Series devices use ROC protocol:

- Changes to the meter or history configuration in your FB Series device require you to issue an Opcode 6 to update configuration information before using other Opcodes to read/write data over ROC protocol. Additionally, Opcode 120 must be issued before making any call to retrieve history data.
- New functionality such as Action or Math Blocks parameters cannot be accessed.
- Events for BIN (binary) data types show **only** the new and old value of the changed bit; unchanged bits are not logged as events.
- Events logged for the user mode property associated with a meter other than the first or integral sensor instance (for example, DP_1-**2**, Press_1-**2**, RTD_1-**2**) will all return the same MVS TLP (40,0,3). This may make it difficult for users to determine what specific instance was changed.
- To generate valid EFM data:
  - User Data points cannot be assigned as flow measurement inputs
  - Identical objects cannot be assigned to two different meters
- In cases where value precision is greater in the FB Series device than what was supported by the FloBoss107, the extra digits will be truncated *without* rounding. For example, the “no flow time limit in seconds” for Linear Meters on FB Series devices accepts a floating point number with up to three decimal places (e.g., 5.678) whereas the FloBoss107 supports an integer number. In this case, retrieving the value from the FB Series device over ROC protocol will yield an integer with trailing decimal numbers removed (e.g., 5). See the DNP3 protocol manual for a complete listing of parameter data types used by FB Series devices.

- Meter history collection is limited to Station 1, which resides in group 4. You cannot access the Station 2 history group. Additionally, devices supporting two meter runs must have the second meter history configured in group 4 (station 1).
- Station parameter assignments are primarily configured during a device's initial setup. As previously noted, the FloBoss107's ROC protocol does not have the concept of different stations. As a result, both meters **must** be assigned to Station1/history group 4. For a similar reason, station parameter changes returned via Opcode 122 appear as if they are affecting only meter 1. However, the FlowCal Enterprise software recognizes (via the file's configuration section) that the station parameter change has occurred in meter 2, but since it does not have an associated event, the software highlights the exception. Because there is no associated event to tag precisely when the value changed, it is advisable to make station changes as soon as possible after the SCADA poll (that is, for a 1:00 PM poll, make changes at 1:01PM). To avoid this issue with manually entered gas composition changes, assign each meter to a **separate** Components object.

Chapter 2: Opcodes

This chapter details each ROC protocol opcode.

2.1 Opcode Overview

Table 2-1 briefly describes each opcode. The tables in this section provide detailed descriptions of the various opcodes used. For each opcode, a brief description of the data bytes is provided. In some cases, the number of data bytes returned for an opcode varies.

Certain opcodes only send data and do not receive data back from the FB Series. For example, Opcode 8 requests the FB Series to set the time and date. The host transmits six to nine data bytes defining the new time and date. The FB Series resets the time and date and sends back an acknowledgment in which the opcode is repeated, but no data bytes are transmitted back. All acknowledgments are 8-byte messages that repeat the opcode received, but do not transmit any data bytes.

Opcode 255 is an error message indicator. This is also an 8-byte message with no data bytes included. The opcode is set to 255 to indicate the message received by the FB Series had valid Cyclical Redundancy Check (CRC) but contained invalid parameters. For example, if a request was made for information on Analog Input #11, but the FB Series was configured for only eight analog inputs (0 to 7), the FB Series would respond back with the 8-byte message with the opcode equal to 255 (error).

The number of analog inputs varies from device to device. This variability is indicated by listing the first analog input and indicating the remaining analog inputs by a period (“.”). In the following tables, a period in either the Data byte(s) column or the Description of Data column indicates a repetition of the proceeding item for the necessary number of instances.

Table 2-1: Summary of Codes

Opcode	Description
6	Sends FB Series configuration information.
7	Sends current time and date.
8	Sets new time and date.
17	Sets operator identification.
103	Sends system information such as on/off times, manual/alarm status, firmware version, and current time and date.
120	Sends pointers for alarm, event, and history logs.
121	Sends specified number of alarms starting at specified alarm pointer.
122	Sends specified number of events starting at specified event pointer.

Opcode	Description
130	Sends archived hourly and daily data for specified history point starting at specified history pointer.
136	Requests multiple history points for multiple time periods
165	Sends current history configuration data
166	Sets specified contiguous block of parameters.
167	Sends specified contiguous block of parameters.
180	Sends specified parameters.
181	Sets specified parameters.
255	Transmits error messages by FB Series in response to a request with invalid parameters or format.

2.2 Opcode 6 – FB Series

Opcode 6 returns the current configuration of the FB Series device.

Table 2-2: Opcode 6

Opcode 6						
Communication Opcode	Host Request to ROC			ROC Response to Host		
	Data		Description of Data	Data		Description of Data
	Offset	Length		Offset	Length	
Opcode 6: Send ROC Configuration – (FB Series)			No data bytes.	6	1	Number of Discrete Inputs
				7	1	Number of Analog Inputs
				8	1	Number of Discrete Outputs
				9	1	Number of Analog Outputs
				10	1	Number of Active meter runs
				11	1	Number of PIs
				12	1	Number of Active PIDs
				13	1	Number of Tanks – always 0
				14	1	Number of Standard History Points (0 - 60)
				15	1	Number of Extended History Points (0 – 10)
				16	1	Not Used – always 0
				17	1	Not Used – always 0
				18	1	Not Used – always 0
				19	1	Not Used – always 0
				20	1	Not Used – always 0
				21	1	Not Used – always 0
				22	1	Number of Soft Points
				23	1	Number of Comm Ports
				24	1	Device Type, (4 = FB Series)

Opcode 6						
Communication Opcode	Host Request to ROC			ROC Response to Host		
	Data		Description of Data	Data		Description of Data
	Offset	Length		Offset	Length	
				25	1	Number of Configurable Opcodes = 0
				26	20	Customer Name
				46-63	1	Not Used – always 0
				64	1	Number of MVS - Point Type 40
				65	1	Number of Run Parameter – Point Type 41
				66	1	Number of Extra Run Parameters – Point Type 42
				67	1	Point Type 43 – Not Used – always 0
				68	1	Number of Radio Power Control Parameters – Point Type 44 = 0
				69	1	Number of Meter Calibration and Sampler – Point Type 45
				70	1	Number of Meter Configuration – Point Type 46
				71	1	Number of Meter Flow Values – Point Type 47
				72	1	Number of PID Control – Point Type 48
				73-84	1	Not Used – always 0
				85	1	Communication Port where Opcode 6 Request Received. 0=COM1 1=COM2 2=COM3 4=Ethernet
				86	1	Operating Mode (always 0) 0=Normal 1=Boot
				87-91	4	Not Used – always 0
				92	1	Maximum number of Standard History points
				93	1	Maximum number of User Defined History points
				94-114	1	Not Used – always 0

Opcode 6						
Communication Opcode	Host Request to ROC			ROC Response to Host		
	Data		Description of Data	Data		Description of Data
	Offset	Length		Offset	Length	
				115	1	Number of Ethernet Points – Point Type 80
				116-120	1	Not Used – always 0
				121	1	Number of Extended History Information Points – Point Type 86
				122-234	1	Not Used – always 0

2.3 Opcode 7

Opcode 7 returns the current time and date, the number of years since the last leap year, and the day of week.

Note
Read the time/date by using Opcodes 167 and 180 and specifying Point Type 12.

Table 2-3: Opcode 7

Opcode 7						
Communication Opcode	Host Request to ROC			ROC Response to Host		
	Data		Description of Data	Data		Description of Data
	Offset	Length		Offset	Length	
Opcode 7: Send Current Time and Date			No data bytes.	6	1	Current Second
				7	1	Current Minute
				8	1	Current Hour
				9	1	Current Day
				10	1	Current Month
				11	1	Current Year
				12	1	Leap Year or Not Leap Year 1 = Leap Year 0 = Not Leap Year
				13	1	Current day of week 1=Sunday...7=Saturday

2.4 Opcode 8

Opcode 8 is the only way to set the real-time clock. The leap year counter provides a mechanism to set the leap year.

Table 2-4: Opcode 8

Opcode 8						
Communication Opcode	Host Request to ROC			ROC Response to Host		
	Data		Description of Data	Data		Description of Data
	Offset	Length		Offset	Length	
Opcode 8: Set Current Time and Date	6	1	Current seconds (0-59)			No data bytes.
	7	1	Current minutes (0-59)			Time and date are set and acknowledgment sent back.
	8	1	Current hour (0-23)			
	9	1	Current day (1-31)			
	10	1	Current month (1-12)			
	11	1	Current year (0-99)			

2.5 Opcode 17

Opcode 17 sets an operator identification code for the communications port through which communications are occurring. The operator identification is logged with an event, indicating the operator responsible for creating the event. The FB Series provides a default operator identification for each communications port.

Once you set the operator identification, it remains set until changed by:

- Subsequent Opcode 17 requests.
- Inactivity timeout for login
- FB Series initialized by a cold start.

Table 2-5. Emulated FloBoss 107 Version

Emulated FloBoss 107 Version	FB1000/FB2000 Firmware Introduced	Description
1.00	1.x.x.x	Introduced
1.90	2.14.x.x	Enhanced Security introduced

Table 2-6. Opcode 17

Opcode 17						
Communication Opcode	Host Request to ROC			ROC Response to Host		
	Data		Description of Data	Data		Description of Data
	Offset	Length		Offset	Length	
Opcode 17: Set Operator ID – (Accepted only when security is disabled for comm port)	6	3	Operator ID			No data bytes.
or						
Opcode 17: Set Operator ID – (Accepted when User ID and and Password are valid user in device)	6	3	Operator ID			No data bytes.
	9	2	Password			Acknowledgment sent back.
or						
Opcode 17: Set Operator ID – (Accepted when User ID and Password are	6	3	Operator ID			No data bytes.
	9	2	Password			Acknowledgment sent back.
	11	6	Access Level			

Opcode 17						
Communication Opcode	Host Request to ROC			ROC Response to Host		
	Data		Description of Data	Data		Description of Data
	Offset	Length		Offset	Length	
valid user in device. Access level is ignored as it is based on Role of user configured in device.)						
	6	3	Operator ID			
	9	2	Password			
	11	6	“Logout”			

When you opt into the new security feature, you must use the Enhanced Security Enable Operator ID (30 character alphanumeric) and Long Password (40 character alphanumeric) to log into the device. The opcode length is different compared to the shorter packet structure and the host needs to alter the protocol frame based on the security selection in the device.

Table 2-7. Opcode 17 (Enhanced Security)

Opcode 17 (Enhanced Security)						
Communication Opcode	Host Request to ROC			ROC Response to Host		
	Data		Description of Data	Data		Description of Data
	Offset	Length		Offset	Length	
Opcode 17: Set Operator ID – (version 2.4 or greater)	6	30	Operator ID			No data bytes.
	36	40	Password			Acknowledgment sent back.
or						
Opcode 17: Set Operator ID – (version 2.4 or greater)	6	30	Operator ID			No data bytes.
	36	40	Password			Acknowledgment sent back.
	76	1	Access Level			
	6	30	Operator ID			
	36	40	Password			
	76	6	“Logout”			
or						
Opcode 17: Session Key Request **Note**: Session key string is the ASCII	6	13	Session Key String [AC13]	6	24	Wrapped Session Key [AC24]

Opcode 17 (Enhanced Security)						
Communication Opcode	Host Request to ROC			ROC Response to Host		
	Data		Description of Data	Data		Description of Data
	Offset	Length		Offset	Length	
string "GETSESSIONKEY" in all capital letters and is valid for only 5 seconds.						

2.6 Opcode 103

Opcode 103 determines the current version of firmware residing in the FB Series, as well as other device-specific information. This opcode is useful in determining which FB Series units should be upgraded.

Table 2-8: Opcode 103

Opcode 103						
Communication Opcode	Host Request to ROC			ROC Response to Host		
	Data		Description of Data	Data		Description of Data
	Offset	Length		Offset	Length	
Opcode 103: Send System Information (Power Off/On Times, Manual/ Alarm Status, Firmware Version.)			No data bytes.	6	6	Last power-off time and date – Always 0
				12	6	Last power-on time and date – Always 0
				18	1	Manual Status flag – Always 0
				19	1	Alarm Status flag – Always 0
				20	40	Product Identification
				60	20	Time and date firmware produced
				80	1	Device Address
				81	1	Device Group
				82	20	Station Name
				102	6	Current time and date: Seconds, minutes, hour, day, month, and year

2.7 Opcode 120

Opcode 120 also sends the current hour (periodic) and day pointers for the history groups and maximum number of logs for each group.

Note

The FB Series hourly log archive can store up to 1500 entries. Only the most recent 840 can be retrieved through ROC protocol. The daily log can contain up to 365 entries. Only the most recent 35 can be retrieved through ROC protocol.

Table 2-9: Opcode 120

Opcode 120						
Communication Opcode	Host Request to ROC			ROC Response to Host		
	Data		Description of Data	Data		Description of Data
	Offset	Length		Offset	Length	
Opcode 120: Send Pointer for Alarm, Event, and History Index			No data bytes.	6	2	Current Alarm Log pointer (0-239)
				8	2	Current Event Log pointer (0-239)
				10	2	Index to current History Group 4 (Station 1) Hourly History (0-839)
				12	2	Index to current History Group 1 (User Periodic 1) History (0-9)
				14	2	Number of User Periodic 1 History Logs (0-3999)
				16	2	Not Used – Always 0

Opcode 120						
Communication Opcode	Host Request to ROC			ROC Response to Host		
	Data		Description of Data	Data		Description of Data
	Offset	Length		Offset	Length	
Opcode 120: Send Pointer for Alarm, Event, and History Index ***(Cont'd)***				18	1	Index to current History Group 4 (Station 1) Daily History (0-34)
				19	1	Not Used – Always 0
				20	1	Not Used – Always 0
				21	1	Not Used – Always 0
				22	2	Maximum number of alarms (240)
				24	2	Maximum number of events (240)
				26	1	Number of Day of Archived Daily History logs (0-34)
				27	1	Number of Days of Archived Hourly History logs (0-34)
				28	1	Number of Days of Archived User Periodic 1 History logs (0-?)
				29	1	Not Used – Always 0
				30	1	Not Used – Always 0
				31	1	Not Used – Always 0

2.8 Opcode 121

Opcode 121 requests alarm data from the Alarm Log in the FB Series. The Alarm Log consists of a maximum of 240 alarms.

Note

An Opcode 120 request can be used to retrieve the current alarm index pointer. For calls which start inside the valid alarm index range (0-239) but request data beyond the last index (239), the system wraps back around to the first index (0) and uses those older items to fill the response buffer. Requests which try to reference values outside the valid alarm index range (>239) result in an error.

Table 2-10: Opcode 121

Opcode 121						
Communication Opcode	Host Request to ROC			ROC Response to Host		
	Data		Description of Data	Data		Description of Data
	Offset	Length		Offset	Length	
Opcode 121: Send Specified Number of Alarms Starting with Specified Alarm Pointer	6	1	Number of alarms requested (maximum 10)	6	1	Number of alarms being sent
	7	2	Starting Alarm Log pointer (0-239)	7	2	Starting Alarm Log pointer
				9	2	Current Alarm Log pointer
				11	22	1st Alarm:
						Alarm Type (1 byte – see below)
						Alarm Code (1 byte – see below)
						Time and date (6 bytes):
						SS | MM | HH | DD | MM | YY
						Tag (10 bytes)
						Value (4 bytes)
					-	(above repeated as necessary)

Alarm Type: The byte is broken into two nibbles: high nibble equals bits 4 to 7, and low nibble equals bits 0 to 3. A nibble is a four-bit unit or half a byte.

- High nibble equals 1 for DP Sensor alarms
- High nibble equals 2 for SP Sensor alarms
- High nibble equals 3 for PT Sensor alarms
- High nibble equals 5 for I/O point AIs, DIs, PIs, and AOs
- High nibble equals 6 for meter run alarms
- High nibble equals 7 for User Text alarms
- High nibble equals 8 for User Value alarms
- High nibble equals 9 for Integral Sensor alarms
- Low nibble equals 0 means alarm clear
- Low nibble equals 1 means alarm set.
- Low nibble equal to some other value is possible, but not given here (contact factory).

Alarm Code: For an I/O point (high nibble of the Alarm Type byte is 1, 2, 3, or 5):

- 0 = Low Alarm

- 1 = Lo Lo Alarm
- 2 = High Alarm
- 3 = Hi Hi Alarm
- 4 = Rate Alarm
- 5 = Status Change
- 6 = Point Fail
- 7 = Override Mode

For a meter run alarm (the high nibble of the Alarm Type byte is 6):

- 0 = Low Alarm
- 2 = High Alarm
- 6 = No Flow Alarm
- 7 = Manual Mode

For an Integral Sensor alarm (high nibble of the Alarm Type byte is 9):

- 4 = Input Freeze Mode (Calibration in progress)
- 6 = Sensor Communications Fail Alarm
- 7 = Scanning disabled

All other alarms = Invalid Alarm.

Time and Date: Seconds, minute, hour, day, month, and year.

Tag: Ten ASCII characters.

Value: Represents the value at time of the occurrence of the alarm.

2.9 Opcode 122

Opcode 122 requests up to 10 events from the Event Log in the FB Series. The Event Log consists of a fixed number of events. The maximum number of events in the Event Log is returned in Opcode 120. Each event consists of 22 bytes, organized according to the one of the five formats described in *Tables 2-11* through *2-17*. *Table 2-18* shows the format used by each point type.

Note
An Opcode 120 request can be used to retrieve the current event index pointer. For calls which start inside the valid event index range (0-239) but request data beyond the last

index (239), the system wraps back around to the first index (0) and use those older items to fill the response buffer. Requests which try to reference values outside the valid event index range (>239) result in an error.

Table 2-11: Opcode 122

Opcode 122						
Communication Opcode	Host Request to ROC			ROC Response to Host		
	Data		Description of Data	Data		Description of Data
	Offset	Length		Offset	Length	
Opcode 122: Send Specified Number of Events Starting with the Specified Event Pointer	6	1	Number of events requested (maximum 10)	6	1	Number of events being sent
	7	2	Starting Event Log pointer (0-239)	7	2	Starting Event Log pointer
				9	2	Current Event Log pointer
				11	22	1st Event:
						See *Tables 2-10* through *2-15*, for breakout of these 22 bytes. To determine which format is used by a given point type, see *Table 2-16*.
					-	(above repeated as necessary)

Table 2-12: Event Format 1

Point Type	Parm #	Time and Date Occurrence of Event						Pt #	Operator ID			Event Text									
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
-	-	sec	min	hr	day	mo	yr														

Table 2-13: Event Format 2

Point Type	Parm #	Time and Date Occurrence of Event						Pt #	Operator ID			Old Value				New Value				Not Used or Tag	
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
-	-	sec	min	hr	day	mo	yr														

Notes

- Old values and New values are formatted in the native data type of the parameter changed with the Least Significant Byte (LSB) first. If the length of the parameter is less than 4 bytes, the Old and New values start at bytes 12 and 16, respectively, with unused bytes at the end of both the Old and New value 4-byte reserved area. For example, if the data type of the parameter changed was a TLP type (3 bytes),

the Old value would be entered in bytes 12-14 and the New value would be entered in bytes 16-18, with bytes 15 and 19 unused. Refer to *Section 3.2, ROC Point Type Parameter Definitions*, concerning data types.

- If the length of the parameter is 10 bytes, the New value is entered in both the Old, New, and Tag bytes (12 through 21) and the Old value is not retained. If the length of the parameter is greater than 10 bytes, the first 10 bytes of the New value are entered in the Old, New, and Tag bytes (12 through 21) and the Old value is not retained.

Table 2-14: Event Format 3 from EVT Function

Point Type	Parm #	Time and Date Occurrence of Event						Event Text										Floating Point Value			
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
-	-	sec	min	hr	day	mo	yr														

Table 2-15: Event Format 4

Point Type	Parm #	Time and Date Occurrence of Event						Time and Date per Event						Not Used							
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
-	-	sec	min	hr	day	mo	yr	sec	min	hr	day	mo	yr	x	x	x	x	x	x	x	x

Table 2-16: Event Format 5

Point Type	Parm #	Time and Date Occurrence of Event						Not Used													
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
-	-	sec	min	hr	day	mo	yr	x	x	x	x	x	x	x	x	x	x	x	x	x	x

Table 2-17: Event Format 6

Point Type	Parm #	Time and Date Occurrence of Event						Pt #	Operator ID			Old Value				New Value				Cal Info	
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
79	See Note 1	sec	min	hr	day	mo	yr	See Note 2												See Note 3	See Note 4

1. Defines type of calibration performed:

   0 = Set Zero

   1= SetSpan

   2 = Set Mid-point 1

   3 = Set Mid-point 2

4 = Set Mid-point 3

5 = Calibration Verified

10 = Set Zero Shift/Static Pressure Offset/ RTD Bias

29 = Calibration Cancelled

2. Logical number of 4088 or Analog Input being calibrated:

   DP_1-1 : 0 (Point type no : 3)

   SP_1-1 : 1 (Point type no : 3)

   PT_1-1 : 2 (Point type no : 3)

   DP_1-2 : 0 (Point type no : 40)

   SP_1-2 : 0 (Point type no : 40)

   PT_1-2 : 0 (Point type no : 40)

   DP_1-3 : 1 (Point type no : 40)

   SP_1-3 : 1 (Point type no : 40)

   PT_1-3 : 1 (Point type no : 40)

3. Type of point being calibrated (4088=40, AI=3)

4. Defines MVS input being calibrated (only valid when point type is 4088):

   1 = Differential Pressure Input

   2 = Static Pressure Input

   3 = Temperature Input

Table 2-18: Event Format by Point Type

Point Type	Format	Description
1	2	Discrete Input Configuration Variables
2	2	Discrete Output Configuration Variables
3	2	Analog Input Configuration Variables
4	2	Analog Output Configuration Variables
5	2	Pulse Input Configuration Variables
6	2	PID Configuration Variables
7	2	Meter Run Configuration Variables
10	2	Meter Run Flow Rates Parameter
12	2	Clock Configuration Variables
15	2	System Variables
17	2	Soft Points
40	2	Multi-Variable Sensor – (4088B Sensors)
41	2	Meter Run Parameters
42	2	Extra Meter Run Parameters
45	2	Meter Calibration And
46	2	Meter Configuration Parameters
47	2	Meter Flow Values

Point Type	Format	Description
48	2	PID Control Parameters
145	4	All Power Removed
200	1	Clock Change Event

2.10 Opcode 130

Opcode 130 requests a specified number of hourly or daily data values for a specified history point from history group 1 (User periodic 1) or group 4 (Station 1) starting at a specified history pointer.

The current history index for each group can be retrieved by Opcode 120.

The starting history index specifies the beginning record for hourly values or daily values:

- **Daily Values:** 840 + x, where x can be 0 – 34 to indicate the starting history index.
- **Hourly Values:** 0 – 839

Note

For calls which start inside the valid history index range for **hourly** values (0-839) but request data beyond the last index (839), the system wraps back around to the first index for hourly values (0) and uses those older items to fill the response buffer.

For calls which start inside the valid history index range for **daily** values (840-874) but request data beyond the last index (874), the system wraps back around to the first index for daily values (840) and uses those older items to fill the response buffer.

Requests which try to reference values outside the valid history index range (>874) result in an error.

Firmware version 2.14 adds a new parameter ROC_X.ROC_HIST_TIME_STAMP which enables you to select how the system retrieves historical logs. With *X* as the instance number, the parameter has two values: **0**=select records from the start of the period or **1**=select records from the end of period. You define this value on the ROC screen in FBxConnect.

To read time values for a particular history group, specify **254** as the history point number. Following is the format of the hourly and daily timestamp value for group 4 (Station 1):

Minute	Hour	Day	Month

Following is the format of the timestamp for group 1(User Periodic 1): Time in seconds since 12:00 a.m. Jan. 1, 1970.

Table 2-19: Opcode 130

Opcode 130						
Communication Opcode	Host Request to ROC			ROC Response to Host		
	Data		Description of Data	Data		Description of Data
	Offset	Length		Offset	Length	
Opcode 130: Send Specified # of Hourly or Daily Data for Specified History Point Extended History	6	1	Type of History: 0 = Hourly or Daily (Standard) 1 = Extended	6	1	Type of History: 0 = Hourly or Daily (Standard) 1 = Extended
	7	1	History Point Number (0-59, for Timestamp specify 254)	7	1	History Point Number
	8	1	Number of history values requested (maximum 60)	8	1	Number of history values being sent
	9	2	Starting history index (0-839 for hourly, 840-874 for daily)	9	4	1st history value
				13	4	2nd history value
					-	(above repeated as necessary)

2.11 Opcode 136

Opcode 136 requests a specified number of user periodic or station 1 data values for a specified starting history index for a specified number of time periods, starting at a specified history point for a specified number of history points.

Opcode 136 returns the history values for the requested user periodic or station 1 history index from the starting history point and continuing until the requested number of history points is completed. The time stamp for the history index will always be returned.

The timestamp is a TIME [UINT32] representing the number of seconds elapsed since 12:00 a.m. Jan. 1, 1970. This can be thought of as row addressing. An error is returned if the day was not found.

The current history index for each group can be retrieved by Opcode 120.

Note

For calls which start inside the valid history index range for **hourly** values (0-839) but request data beyond the last index (839), the system wraps back around to the first index for hourly values (0) and uses those older items to fill the response buffer.

For calls which start inside the valid history index range for **daily** values (0-34) but request data beyond the last index (34), the system wraps back around to the first index for daily values (0) and uses those older items to fill the response buffer.

Firmware version 2.14 adds a new parameter ROC_X.ROC_HIST_TIME_STAMP which enables you to select how the system retrieves historical logs. With *X* as the instance number, the parameter has two values: **0**=select records from the start of the period or **1**=select records from the end of period. You define this value on the ROC screen in FBxConnect.

Table 2-20: Opcode 136

Opcode 136						
Communication Opcode	Host Request to ROC			ROC Response to Host		
	Data		Description of Data	Data		Description of Data
	Offset	Length		Offset	Length	
Opcode 136: Send specified # of history data for specified history index starting at specified history point	6	1	History Group (Always 0)	6	1	History Group (Always 0)
	7	2	Requested History Index: Hourly: 0 - 839 Daily: 0 – 34 Extended: 0 - 3999 65535 = requests latest history records	7	2	History Index: Hourly: 0 - 839 Daily: 0 – 34 Extended: 0 - 3999 65535 = indicates latest history records
	9	1	Type of History: Hourly = 0 (Standard) Daily = 1 (Standard) Extended = 2	9	2	Current history index
	10	1	Starting history point (0 - 59)	11	1	# of data elements being sent ((# history points + 1) * # time periods) Value is 0 if the request is invalid.

Opcode 136						
Communication Opcode	Host Request to ROC			ROC Response to Host		
	Data		Description of Data	Data		Description of Data
	Offset	Length		Offset	Length	
	11	1	# of history points	12	4	Time stamp for 1st time period
	12	1	# of time periods (see note below) ((# history points + 1) * # time periods) must not be greater than 60	16	[4 -	1st history point value (repeat for number of history points)
					(above repeated for number of time periods)	

Note:

If no time periods are requested, the FB Series device does not return history values.

2.12 Opcode 165

Opcode 165 reads the current configuration for a contiguous group of history points. Opcode 165 reads the configuration of up to 50 history points. When reading the history points, only those points remaining in History Group 4 (Station 1) following the specified starting history point are returned.

Archive Type is defined as:

- **0** – Undefined
- **128** – Average value
- **129** – Integrated value
- **130** – Snapshot, minimum, or maximum value
- **134** – Totalized value

Table 2-21: Opcode 16

Opcode 165						
Communication Opcode	Host Request to ROC			ROC Response to Host		
	Data		Description of Data	Data		Description of Data
	Offset	Length		Offset	Length	
Opcode 165: Reads the current configuration for a contiguous	6	1	Read/Write option (always 0 – Read)	6	1	0
	7	1	History segment (always 0 = History Group 4)	7	2	0

Opcode 165							
Communication Opcode	Host Request to ROC			ROC Response to Host			
	Data		Description of Data	Data			Description of Data
	Offset	Length		Offset	Length		
group of history points	8	1	Starting history point index (0 – 59)	8	3		Number of history points sent (1 – 50).
	9	1	Not used - Always 0	9	4	1	Archive Type
						2	Point Type
						3	Point / Logic Number
						4	Parameter Number
				-			(above repeated as necessary)

2.13 Opcode 166

Opcode 166 configures either a single point or a contiguous block of parameters for a single point. This opcode is more efficient than Opcode 181 when the entire, or even partial, point configuration is required.

Table 2-22: Opcode 166

Opcode 166						
Communication Opcode	Host Request to ROC			ROC Response to Host		
	Data		Description of Data	Data		Description of Data
	Offset	Length		Offset	Length	
Opcode 166: Set Specified Contiguous Block of Parameters	6	1	Point Type			No data bytes.
	7	1	Point / Logic Number			Acknowledgment sent back.
	8	1	Number of Parameters			
	9	1	Starting Parameter Number			
	10	x	Data (a contiguous block)			

2.14 Opcode 167

Opcode 167 reads the configuration of a single point or it can be used to read a contiguous block of parameters for a single point. Opcode 167 is more efficient than Opcode 180 when reading the entire, or even partial, point configuration.

Use Opcode 167 to return the location of I/O installed in the FB Series device by “type” and “position in the I/O database.” Specify 24 for the point type to indicate this I/O position array.

The “type” indicates the type of I/O module installed. The I/O module types are:

- Undefined – 0
- Discrete Input – 1
- Discrete Output – 2
- Analog Input – 3
- Analog Output – 4
- Pulse Input – 5

The order of the point type values in the array indicate the physical location of the point. This location is used as the “L” value in the TLP value to access point information. For example, if the first bytes returned in the array are “03, 03, 03, 03, 03, 04, 04”, This first

analog input point in the database would be accessed with logical of 0, the fifth with logical of 4, and the first analog output point would be accessed with logical of 5.

Table 2-23: Opcode 167

Opcode 167						
Communication Opcode	Host Request to ROC			ROC Response to Host		
	Data		Description of Data	Data		Description of Data
	Offset	Length		Offset	Length	
Opcode 167: Send Specified Contiguous Block of Parameters	6	1	Point Type	6	1	Point Type
	7	1	Point / Logic Number	7	1	Point / Logic Number
	8	1	Number of Parameters	8	1	Number of Parameters
	9	1	Starting Parameter Number	9	1	Starting Parameter Number
				10	x	Data (a contiguous block)
					-	(above repeated as necessary)

2.15 Opcode 180

Opcode 180 reads several parameters in a single request. The parameters can be from different point numbers and of different point types. The opcode is intended to read any combination of parameters listed in the tables of Chapter 3. The opcode responds with an error response if the response is longer than 240 bytes or if the request is for an invalid parameter (possibly due to a point that is not configured).

Table 2-24: Opcode 180

Opcode 180						
Communication Opcode	Host Request to ROC			ROC Response to Host		
	Data		Description of Data	Data		Description of Data
	Offset	Length		Offset	Length	
Opcode 180: Send Specified Parameters	6	1	Number of parameters requested	6	1	Number of parameters requested
	7	3 [1	Type of Point	7	[1	Type of Point
		1	Point / Logical Number (0-based)		1	Point / Logical Number (0-based)
		1]	Parameter Number		1	Parameter Number
		-	(above repeated as necessary)		[x]	Data comprising the parameter
					-	(above repeated as necessary)

2.16 Opcode 181

Opcode 181 sets specific parameters in the FB Series. This opcode is the opposite of Opcode 180 in that it writes values instead of reading them. The FB Series device responds with an acknowledgment. Opcode 181 can be used to configure the operator interface communications ports.

Table 2-25: Opcode 181

Opcode 181						
Communication Opcode	**Host Request to ROC**			**ROC Response to Host**		
	Data		**Description of Data**	**Data**		**Description of Data**
	Offset	**Length**		**Offset**	**Length**	
Opcode 181: Set Specified Parameters	6	1	Number of parameters requested			No data bytes.
	7	1	Type of Point			Acknowledgment sent back.
		1	Point / Logical Number (0-based)			
		1	Parameter Number			
		x	Data comprising the parameter			
		-	(above repeated as necessary)			

2.17 Opcode 255 – Error Indicator

Opcode 255 is an error message indicator. This is an 8-byte message with no data bytes included. The opcode is set to 255 to indicate that the message received by the FB Series device had valid Cyclical Redundancy Check (CRC) but contained invalid parameters. For example, if a request was made for information on Analog Input #11, but the FB Series device was configured for only eight analog inputs (0 – 7), then the FB Series device would respond back with the 8-byte message with the opcode equal to 255.

Table 2-26: Opcode 255

Opcode 255						
Communication Opcode	**Host Request to ROC**			**ROC Response to Host**		
	Data		**Description of Data**	**Data**		**Description of Data**
	Offset	**Length**		**Offset**	**Length**	
Opcode 255: Invalid Parameters in			Error message indicator	6	1	Error code (See *Table 2-25*)
				7	1	Opcode that had the error

Opcode 255						
Communication Opcode	Host Request to ROC			ROC Response to Host		
	Data		Description of Data	Data		Description of Data
	Offset	Length		Offset	Length	
Request Received by FB Series device				8	1	Byte in received message that had the error

Opcode 255 returns the following error codes for FB Series devices:

Table 2-27: Opcode 255 – Error Codes

Error Code	Description
1	Invalid opcode request
2	Invalid parameter number
3	Invalid logical number
4	Invalid point type
5	Received too many data bytes
6	Received too few data bytes
7	Did not receive 1 data byte
8	Did not receive 2 data bytes
9	Did not receive 3 data bytes
10	Did not receive 4 data bytes
11	Did not receive 5 data bytes
12	Did not receive 16 data bytes
13	Outside valid address range
14	Invalid history request
16	Invalid event entry
17	Requested too many alarms
18	Requested too many events
19	Write to read only parameter
20	Security error
21	Invalid security logon
25	Database write failed
63	Access level too high

Chapter 3: Parameter Lists for Point Types

Configuring FB Series devices requires you to be familiar with the structure of the database. The database is broken into individual parameters and each database parameter is uniquely associated by parameter number and point type.

This section details point types and parameters supported by the FB Series devices.

3.1 ROC Point Types and Data Types

Table 3-1 shows point types, *Table 3-2* shows data types for the FB Series devices, and *Table 3-3* defines the data types found in the parameter tables.

Table 3-1: ROC Point Types – FB Series

Point Type	Description	FB Series
0	Configurable Opcode	No
1	Discrete Inputs	Yes
2	Discrete Outputs	Yes
3	Analog Inputs	Yes
4	Analog Outputs	Yes
5	Pulse Inputs	Yes
6	PID Control (see *Point Type 48*)	No
7	AGA Flow Parameters	Yes
8	History Parameters	Yes
10	AGA Flow Values	Yes
12	ROC Clock	Yes
13	System Flags	Yes
14	Communication Ports	No
15	System Variables (ROC Information)	Yes
16	FST Parameters	No

Point Type	Description	FB Series
17	Soft Points	Yes
19	Database Setup	Yes
20	Diagnostics	No
21	Information for User Defined Points	Yes
22-39	User Defined Points	No
40	Multi-Variable Sensor (MVS) Parameters	Yes
41	AGA Run Parameters	Yes
42	Extra Run Parameters	Yes
43	User Lists	No
44	Power Control	No
45	Meter Calibration and Sampler	Yes
46	Meter Configuration Parameters	Yes
47	Meter Flow Values	Yes
48	PID Control Parameters	Yes
52	Battery Parameters	No
53	Modbus Configuration Parameters	No
54	Modbus Function Tables	No
55	Modbus Special Function Table	No
56	AI Calibration	No
57	Keypad / Logon Security Parameters	No
58	Revision Information	No
85	HART Parameters	No
86	Extended History Parameters	Yes

Table 3-2: Data Types

Data Type	Description	Byte Length
AC	ASCII character (groups of 10, 20, or 30 characters)	1 per character
BIN	Binary	1

Data Type	Description	Byte Length
FLP or FL	Floating Point – IEEE Format	4
INT8, 16, 32	Signed Integer – number of bits follows	1, 2 or 4
TLP	Point **T**ype, **L**ogical or Point Number, and **P**arameter Number	3
UINT8, 16, 32	Unsigned Integer – number of bits follows	1, 2 or 4

You reference data in the FB Series device by type, location or logical, and parameter (TLP). Type refers to the number of the point type. The location or logical number is a value based on physical input or output. A parameter is a numeric value assigned to each piece of data contained in a given point type. The tables in this section list the parameters numbers and descriptions for each of the point types.

3.1.1 Type, Location/Logical and Parameter (TLPs)

All supported parameters in the database are referenced via a specific TLP number using Point Type (T), Logical Number (L), and Parameter (P).

Interpret the I/O information (for example, **3**, **2**, **14**) in the following way:

- The first number is point type. In this case **3** indicates Analog Input point type.
- The second number is the logical/physical instance of the point type. In this case **2** indicates the physical location of the analog point to be accessed. For I/O points this value is physical location in the database. For non-I/O point types this value is the logical instance of the point type. See the following section for more details on the physical/logical definition.
- The third number is the parameter number. In this case **14** indicates the Filtered Engineering Units parameter value.

3.1.2 Logical/Point Number Details

Within each point type, individual points are referenced by a point number or a logical number. The point numbers the ROC protocol uses for Point Types 1 to 5 are based on a physical input or output (I/O) as stored in the database.

- **Physical Point Numbers 0 to 69:**

For Point Types 1 through 5, there are Point Numbers for the field I/O and for the diagnostic inputs as follows:

- Point Numbers 0 to 63 are assigned to field I/O (integral sensor inputs, on-board RTD, on-board I/O points, extended I/O module points, and optional I/O module points). The user can access the physical location of all I/O points through opcode 167 reading information for point type 24. See the ROC opcode section for additional details.

  Description of I/O point logicals:

  - AI: Logical #3 - 10 (8 possible points)
  - AO: Logical #11 - 18 (8 possible points)
  - DI: Logical #19 - 28 (10 possible points)
  - DO: Logical #29 - 38 (10 possible points)
  - PI: Logical #39 - 48 (10 possible points)

  A few physical locations for analog input points are predefined:

  - Location 0: Analog input point for integral sensor differential pressure data
  - Location 1: Analog input point for integral sensor static pressure data
  - Location 2: Analog input point for on-board RTD data
  - Location 3 - 10: Optional I/O board analog inputs
  - Location 11 - 18: Optional I/O board analog outputs
  - Location 19 - 28: Optional I/O board digital input
  - Location 29 - 38: Optional I/O board digital output
  - Location 39 - 48: Optional I/O board pulse input
  - Location 49 - 63: Unassigned
- Point Numbers 64 to 69 are assigned to the diagnostic (system) I/O.

Note
The diagnostic points are not supported in the first release of the FB Series Flow Computers.

- **Logical Point Numbers 0 to 127:**

  For all other Point Types, the Logical Point Number is 0 to x, where x is one less than the total number of instances that exist for that Point Type. For example, the eight instances of User Data in the new flow computer would be logical numbers 0 through 7 of the soft point point type for ROC protocol. A more detailed description of logical mapping for each point type is provided in the following sections.

  The FB Series flow computers support up to two meter runs. The meter runs can be a mix of DP meters and linear meters. The logical mapping for meter run point types 7, 10, 41, 42, 45, 46, and 47 is shown below.

  - Two DP meters
    - Logical 0 = DP Meter 1
    - Logical 1 = DP Meter 2
  - Two linear meters
    - Logical 0 = Linear Meter 1
    - Logical 1 = Linear Meter 2
  - One DP and one linear meter
    - Logical 0 = DP Meter 1
    - Logical 1 = Linear Meter 1

Note
All parameters are zero-based for each point type.

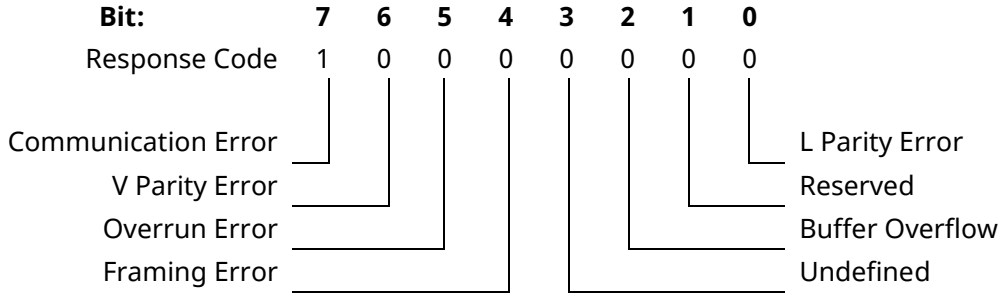
3.1.3 FBx Tag Mapping

A listing of the FBx Tag is mapped to each TLP with designation: Object X or Object X-Y where the object is the name of the database object, X and Y are the instance designators in the FBx database. The instance designators map the ROC logical in most instances as follow:

- Object_N maps to logical N-1: The IO and meter points follow different logical mappings as discussed in *Section 3.1.2*.

3.1.4 Bit Assignments

The bits in each byte are numbered 0 to 7, right to left, with bit 7 shown the furthest to the left. 1 in any bit indicates that bit is active or enabled.



3.2 ROC Point Type Parameter Definitions

Table 3-1 lists all point types. *Table 3-4* through *3-25* details each of the configurable point types. Each point type table is prefaced by a short description, a statement of the number of logical points (or iterations) of the point type, and the storage location for point type information. Point type tables contain the following information:

Field	Description
Parameter #	Defines the specific parameter number associated with that point type.
Description	Provides a brief description of the parameter, its functionality, and its values.
Data Type	Identifies the type of data being stored (see *Table 3-3*)
Access	Indicates if the parameter can be read from and written to (R/W) or if the parameter is read-only (R/O).
Description	Provides specific information on the implementation of the parameter in the new flow computers.

Table 3-3: Details of Data Types

Data Type	Definition	# of Bytes	Default Range
BIN	Binary	1	0 → 1 For each Bit
AC	ASCII character groups	1 per character	0x20 → 0x7E for each character
INT8	Signed Integer – 8 bits	1	-128 → 127
INT16	Signed Integer – 16 bits	2	-32,768 → 32,767
INT32	Signed Integer – 32 bits	4	-2,147,483,648 → 2,147,483,647
UINT8	Unsigned Integer – 8 bits	1	0 → 255
UINT16	Unsigned Integer – 16 bits	2	0→ 65,535
UINT32	Unsigned Integer – 32 bits	4	0 → 4,294,967,296
FL	Single Precision Floating Point – IEEE Format	4	Any valid IEEE single precision float (see *Section 5*)
TLP	Type, Point or Logical Number, Parameter Number	3	0→255, 0→255, 0→255

3.2.1 Point Type 1: Discrete Input

Description: Point Type 1 provides the parameters for the discrete input.

Number of Logical Points: (0-10) Based on I/O hardware installed and I/O point configuration.

Table 3-4: Point Type 1 – Discrete Input Parameters

Point Type 1: Discrete Input Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBx Tag Mapping**	**Description**
0	R/W	AC10	10	DI_X-Y.DESC	Identifies the point tag.
1	R/W	UINT8	1	DI_X-Y.FILTER_TIME	Filter (number of either 1-second or 15-second increments)
2	R/O	UINT8	1	DI_X-Y.SELECTED	Status: **0** = Off **1** = On
3	R/W	BIN	1	DI_X-Y.USER_MODE	DI Mode: **Bit 7** – Manual Mode: 0 = Scanning Enabled 1 = Scanning Disabled
	R/O	BIN	1	Not Mapped	**Bit 6** – Report-by-Exception (RBX) on Set (Not used – always 0) **Bit 5** – RBX on Clear (Not used – always 0)
	R/W	BIN	1	DI_X-Y.ALARM_MODE	**Bit 4** – Alarm Enable: 0 = Disable Alarms 1 = Log Alarms
	R/O	BIN	1	Not Mapped	**Bit 3** – TDI mode enable (Not used – always 0) **Bit 2** – Filter Interval: (Always 0) 0 = 1 second 1 = 15 seconds
	R/W	BIN	1	Bit 1 – DI_X-Y.DI_TYPE Bit 0 – DI_X-Y.INVERT	**Bit 1** – Latch Enable: 0 = Disable

Point Type 1: Discrete Input Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBx Tag Mapping**	**Description**
					1 = Enable **Bit 0** – Invert Enable: 0 = Disabled 1 = Enabled
4	R/O	BIN	1	Bit 7- DI_X-Y.ACTUAL_MODE Bit 6 – DI_X-Y.INPUT_STATUS Bit 0 – 5 – Not Mapped	Alarm Status: **Bit 7** – Manual Mode **Bit 6** – Point Fail **Bit 5** – Not used – always 0 **Bits 4-0** – TDI Alarms (Not used – always 0)
5	R/O	UINT32	4	DI_X-Y.OFF_ON_COUNT	Accumulated Value
6	R/O	UINT32	4	DI_X-Y.ACCUM_ONTIME	On counter (50 millisecond interval)
7	R/O	UINT32	4	DI_X-Y.ACCUM_OFFTIME	Off counter (50 millisecond interval)
8	R/O	INT16	2	Not Mapped	0% pulse width (Not used – always 0)
9	R/O	INT16	2	Not Mapped	100% pulse width (Not used – always 0)
10	R/O	UINT16	2	Not Mapped	Maximum time between pulses (Not used – always 0)
11	R/O	AC10	10	Not Mapped	Units - Not used (Not used – always 0)
12	R/O	UINT16	2	Not Mapped	Scan Period (50 millisecond intervals) (Not used – always 0)
13	R/O	FL	4	Not Mapped	Low Reading (Zero) Engineering Units (EU) (Not used – always 0)
14	R/O	FL	4	Not Mapped	High Reading (Span) EU (Not used – always 0)
15	R/O	FL	4	Not Mapped	Low Alarm EU (Not used – always 0)
16	R/O	FL	4	Not Mapped	High Alarm EU (Not used – always 0)
17	R/O	FL	4	Not Mapped	Low Low Alarm EU (Not used – always 0)
18	R/O	FL	4	Not Mapped	Hi Hi Alarm EU (Not used – always 0)
19	R/O	FL	4	Not Mapped	Rate Alarm EU (Not used – always 0)
20	R/O	FL	4	Not Mapped	Alarm Deadband (Not used – always 0)
21	R/O	FL	4	Not Mapped	EU Value (Not used – always 0)

Point Type 1: Discrete Input Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBx Tag Mapping**	**Description**
22	R/O	UINT16	2	Not Mapped	TDI Count (Not used – always 0)

3.2.2 Point Type 2: Discrete Output

Description: Point Type 2 provides the parameters for the discrete output.

Number of Logical Points: (0-10) Based on I/O hardware installed and I/O point configuration.

Table 3-5: Point Type 2 – Discrete Output Parameters

Point Type 2: Discrete Output Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
0	R/W	AC10	10	DO_X-Y.DESC	Identifies the point tag.
1	R/W	UINT16	2	DO_X-Y.TIME_ON	Time On (50 miliseconds intervals)
2	R/O	UINT8	1	Not Mapped	Not used – always 0
3	R/W	UINT8	1	DO_X-Y.SELECTED	Status: **0** = Off **1** = On
4	R/W	BIN	1	DO_X-Y.USER_MODE	DO Mode: **Bit 7** – Manual Mode: 0 = Scanning Enabled 1 = Scanning Disabled
	R/O	BIN	1	Not Mapped	**Bit 6** – Not used – always 0 **Bit 5** – Not used – always 0
	R/W	BIN	1	DO_X-Y.RESET_MODE	**Bit 4** – Clear on Reset: 0 = Disabled – Retain last status 1 = Enabled – Set to fault mode
	R/O	BIN	1	Bits 0,1,3 – DO_X-Y.DO_TYPE: Value = 0 – Bits 0,1,3 OFF Value = 1 – Bit 0 ON, Bits 1,3 OFF Value = 2 – Bit 1 ON, Bits 0,3 OFF Value = 3 – Bits 0,3 ON, Bit 1 OFF Value =4 – Bits 1,3 ON, Bit 0 OFF	**Bit 3** – TDO Enabled: 0 = Disabled 1 = Enabled **Bit 2** – Reserved (Do not set this bit) **Bit 1** – Toggle:

Point Type 2: Discrete Output Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
					0 = Disabled 1 = Enabled **Bit 0** – Momentary: 0 = Disabled 1 = Enabled
5	R/O	BIN	1	Bit 7 – DO_X-Y.USER_MODE Bit 6 – DO_X-Y.OUTPUT_STATUS Bit 0 -5 – Not Mapped	Alarms Code: **Bit 7** – Manual Mode **Bit 6** – Point Fail **Bits 5 through 0** – Not used – always 0
6	R/O	UINT32	4	DO_X-Y.ACCUM	Accumulated Value
7	R/O	AC10	10	Not Mapped	Units
8	R/W	UINT16	2	DO_X-Y.TDO_CYCLE_TIME	Cycle Time
9	R/W	INT16	2	DO_X-Y.TDO_0%_TIME	0% Count
10	R/W	INT16	2	DO_X-Y.TDO_100%_TIME	100% Count
11	R/O	FL	4	DO_X-Y.TDO_LOW_EU	Low reading EU
12	R/O	FL	4	DO_X-Y.TDO_HIGH_EY	High reading EU
13	R/O	FL	4	DO_X-Y.AUTO_EU	EU Value
14	R/O	BIN	1	Bit 0 -7 – Not Mapped	Alarm Mode: **Bit 6** – Report-by-Exception on Set (Not used – always 0) 0 = No RBX on Set 1 = RBX on Set **Bits 7 through 0** – Not used – always 0
15	R/O	BIN	1	Bit 1- 7 – Not Mapped	Scanning Mode: **Bits 7 through 1** – Not used – always 0
	R/W	BIN	1	Bit 0 - DO_X-Y.USER_MODE	**Bit 0** – Scanning Mode: 0 = Automatic 1 = Manual

Point Type 2: Discrete Output Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
16	R/W	UINT8	1	DO_X-Y.OVRD	Manual state: **0** = Off **1** = On
17	R/O	UINT8	1	DO_X_Y.SELECTED	Physical state: **0** = Off **1** = On

3.2.3 Point Type 3: Analog Input

Description	Point Type 3 provides the parameters for the analog input.
Number of Logical Points:	(0-8) Based on I/O hardware installed and I/O point configuration. Logical no. 0 - 2 are fixed for DP1-1 (integral sensor DP input), SP1-1 (integral sensor static pressure input) and PT1-1 (on-board RTD input) resp. Logical no. 3-10 are used for AI. Logical no. 65, 66, and 68 are fixed for Battery Voltage, DC Input Voltage, and CPU Board Temperature.

Table 3-6: Point Type 3 – Analog Input Parameters

Point Type 3: Analog Input Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
0	R/W	AC10	10	Logical 0 – DP_1-1.DESC Logical 1 – Press _1-1.DESC Logical 2 – RTD_1-1.DESC Logical 3- 10 – AI_X_Y.DESC Logical 65 – “Battery” Logical 66 – “Charge In” Logical 68 - ”Brd Temp”	Identifies the point tag.
1	R/O	AC10	10	Logical 0 – DP_1-1.UNITS Logical 1 – Press _1-1.UNITS Logical 2 – RTD_1-1.UNITS Logical 3- 10 – AI_X_Y.UNITS Logical 65 – “Volts” Logical 66 – “Volts” Logical 68 - ”Degrees F”	Units
2	R/O	UINT16	2	No Mapping	Scan period (50 milliseconds intervals) (Always 20)
3	R/W	UINT16	2	Logical 0 – DP_1-1.DAMPING_FACTOR Logical 1 – Press _1-1.DAMPING_FACTOR	Filter (50 milliseconds intervals)

Point Type 3: Analog Input Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
				Logical 2 – RTD_1-1.DAMPING_FACTOR Logical 3- 10 – AI_X_Y.DAMPING_FACTOR Logical 65 – "Volts" Logical 66 – "Volts" Logical 68 - "Degrees F"	
4	R/W	INT16	2	Logical 0 – DP_1-1.AI_RAW_0_PERCENT Logical 1 – Press _1-1.AI_RAW_0_PERCENT Logical 2 – RTD_1-1.AI_RAW_0_PERCENT Logical 3- 10 – AI_X_Y.AI_RAW_0_PERCENT Logical 65 – No Mapping Logical 66 – No Mapping Logical 68 – No Mapping	Adjusted D/A 0%
5	R/W	INT16	2	Logical 0 – DP_1-1.AI_RAW_100_PERCENT Logical 1 – Press _1-1.AI_RAW_100_PERCENT Logical 2 – RTD_1-1.AI_RAW_100_PERCENT Logical 3- 10 – AI_X_Y.AI_RAW_100_PERCENT Logical 65 – No Mapping Logical 66 – No Mapping	Adjusted D/A 100%

Point Type 3: Analog Input Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
				Logical 68 – No Mapping	
6	R/W	FL	4	Logical 0 – DP_1-1.LRL Logical 1 – Press _1-1.LRL Logical 2 – RTD_1-1.LRL Logical 3- 10 – AI_X_Y.LOW_EU Logical 65 – No Mapping Logical 66 – No Mapping Logical 68 – No Mapping	Low Reading (in Engineering Units)
7	R/W	FL	4	Logical 0 – DP_1-1.URL Logical 1 – Press _1-1.URL Logical 2 – RTD_1-1.URL Logical 3- 10 – AI_X_Y.HIGH_EU Logical 65 – No Mapping Logical 66 – No Mapping Logical 68 – No Mapping	High Reading (in Engineering Units)
8	R/W	FL	4	Logical 0 – DP_1-1.ALM_OBJ.LO_LIM Logical 1 – Press _1-1. ALM_OBJ.LO_LIM Logical 2 – RTD_1-1. ALM_OBJ.LO_LIM Logical 3- 10 – AI_X_Y. ALM_OBJ.LO_LIM Logical 65 – System Pwr_1.BATT_ALM.LO_LIM Logical 66 – System Pwr_1. EXT_VOLT_ALM.LO_LIM Logical 68 – No Mapping	Low Alarm (in Engineering Units)
9	R/W	FL	4	Logical 0 – DP_1-1.ALM_OBJ.HI_LIM	High Alarm (in Engineering Units)

Point Type 3: Analog Input Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
				Logical 1 – Press _1-1.ALM_OBJ.HI_LIM Logical 2 – RTD_1-1.ALM_OBJ.HI_LIM Logical 3- 10 – AI_X_Y.ALM_OBJ.HI_LIM Logical 65 – System Pwr_1.BATT_ALM.HI_LIM Logical 66 – System Pwr_1. EXT_VOLT_ALM.HI_LIM Logical 68 – No Mapping	
10	R/W	FL	4	Logical 0 – DP_1-1.ALM_OBJ.LOLO_LIM Logical 1 – Press _1-1.ALM_OBJ.LOLO_LIM Logical 2 – RTD_1-1.ALM_OBJ.LOLO_LIM Logical 3- 10 – AI_X_Y.ALM_OBJ.LOLO_LIM Logical 65 – System Pwr_1.BATT_ALM.LOLO_LIM Logical 66 – System Pwr_1. EXT_VOLT_ALM.LOLO_LIM Logical 68 – No Mapping	Low Low Alarm (in Engineering Units)
11	R/W	FL	4	Logical 0 – DP_1-1.ALM_OBJ.HIHI_LIM Logical 1 – Press _1-1.ALM_OBJ.HIHI_LIM Logical 2 – RTD_1-1.ALM_OBJ.HIHI_LIM	Hi Hi Alarm (in Engineering Units)

Point Type 3: Analog Input Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
				Logical 3- 10 – AI_X_Y.ALM_OBJ.HIHI_LIM Logical 65 – System Pwr_1.BATT_ALM.HIHI_LIM Logical 66 – System Pwr_1. EXT_VOLT_ALM.HIHI_LIM Logical 68 – No Mapping	
12	R/W	FL	4	Logical 0 – Press _1-1.ALM_OBJ.ROC_LIM Logical 1 – Press _1-1.ALM_OBJ.ROC_LIM Logical 2 – RTD_1-1.ALM_OBJ.ROC_LIM Logical 3- 10 – AI_X_Y.ALM_OBJ.ROC_LIM Logical 65 – System Pwr_1.BATT_ALM.ROC_LIM Logical 66 – System Pwr_1. EXT_VOLT_ALM.ROC_LIM Logical 68 – No Mapping	Rate Alarm (in Engineering Units)

Point Type 3: Analog Input Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
13	R/W	FL	4	Logical 0 – DP_1-1.ALM_OBJ.DEADBAND Logical 1 – Press _1-1.ALM_OBJ.DEADBAND Logical 2 – RTD_1-1.ALM_OBJ.DEADBAND Logical 3- 10 – AI_X_Y.ALM_OBJ.DEADBAND Logical 65 – System Pwr_1.BATT_ALM.DEADBAND Logical 66 – System Pwr_1. EXT_VOLT_ALM.DEADBAND Logical 68 – No Mapping	Alarm Deadband
14	R/O	FL	4	Logical 0 – DP_1-1.SELECTED Logical 1 – Press _1-1.SELECTED Logical 2 – RTD_1-1.SELECTED Logical 3- 10 – AI_X_Y.SELECTED Logical 65 – System Pwr_1.BATT_VAL Logical 66 – System Pwr_1. EXT_VOLT_VAL Logical 68 – System_1.CPU_TEMP	Filtered (in Engineering Units)
15	R/W	BIN	1	Logical 0 – DP_1-1.USER_MODE Logical 1 – Press _1-1.USER_MODE Logical 2 – RTD_1-1.USER_MODE Logical 3- 10 – AI_X_Y.USER_MODE Logical 65 – No Mapping Logical 66 – No Mapping Logical 68 – No Mapping	AI Mode: **Bit 7** – Manual Mode: 0 = Scanning Enabled 1 = Scanning Disabled

Point Type 3: Analog Input Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
	R/O	BIN	1	No Mapping	**Bit 6** – RBX on Set (Not used – always 0) 0 = Disabled 1 = Enabled **Bit 5** – RBX on Clear (Not used – always 0) 0 = Disabled 1 = Enabled
	R/W	BIN	1	Logical 0 – DP_1-1.ALM_OBJ.LO_ENB Logical 1 – Press _1-1.ALM_OBJ.LO_ENB Logical 2 – RTD_1-1.ALM_OBJ.LO_ENB Logical 3- 10 – AI_X_Y.ALM_OBJ.LO_ENB Logical 65 – System_1.BATT_ALM.LO_ENB Logical 66 – System Pw3_1.EXT_VOLT_ALM.LO_ENB Logical 68 – No Mapping	**Bit 4** – Alarm Enable: 0 = Disabled 1 = Log Alarm
	R/O	BIN	1	No Mapping	**Bit 3** – Average Enable: (Not used – always 0) 0 = Disabled 1 = Average Enable **Bit 2** – Temp Comp Enable (Not used – always 0)
	R/W	BIN	1	Logical 0 – No Mapping Logical 1 – No Mapping Logical 2 – No Mapping Logical 3- 10 – AI_X_Y.CLIP_MODE Logical 65 – No Mapping Logical 66 – No Mapping Logical 68 – No Mapping	**Bit 1** – Clipping: 0 = Disabled 1 = Clipping Enabled

Point Type 3: Analog Input Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
	R/W	BIN	1	Logical 0 – DP_1-1.FAULT_MODE Logical 1 – Press _1-1.FAULT_MODE Logical 2 – RTD_1-1.FAULT_MODE Logical 3- 10 – AI_X_Y.FAULT_MODE Logical 65 – No Mapping Logical 66 – No Mapping Logical 68 – No Mapping	**Bit 0** – Fault Handling: 0 = Retain Last Value 1 = Set to Fault Value
16	R/O	BIN	1	Bit 7 - Logical 0 – DP_1-1.USER_MODE Logical 1 – Press _1-1.USER_MODE Logical 2 – RTD_1-1.USER_MODE Logical 3- 10 – AI_X_Y.USER_MODE Logical 65 – No Mapping Logical 66 – No Mapping Logical 68 – No Mapping Bit 0-6 Logical 0 – DP_1-1.ALM_OBJ.PROCESS_ALM Logical 1 – Press _1-1.ALM_OBJ.PROCESS_ALM Logical 2 – RTD_1-1.ALM_OBJ.PROCESS_ALM Logical 3- 10 – AI_X_Y.ALM_OBJ.PROCESS_ALM Logical 65 – System_1.BATT_ALM.PROCESS_ALM	Alarm Code: **Bit 7** – Manual Mode **Bit 6** – Point Fail **Bit 5** – Not used – always 0 **Bit 4** – Rate Alarm **Bit 3** – High High Alarm **Bit 2** – High Alarm **Bit 1** – Low Low Alarm **Bit 0** – Low Alarm

Point Type 3: Analog Input Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
				Logical 66 – System Pw3_1.EXT_VOLT_ALM.PROCESS_ALM Logical 68 – No Mapping	
17	R/O	INT16	2	Logical 0 – DP_1-1.RAW Logical 1 – SP_1-1.RAW Logical 2 – RTD_1-1.RAW Logical 3- 10 – AI_X_Y.RAW Logical 65 – System Pwr_1.BATT_VAL Logical 66 – System Pwr_1. EXT_VOLT_VAL Logical 68 – System_1.CPU_TEMP	Raw D/A Input
18	R/O	UINT16	2	No Mapping	Actual Scan Time (50 millisecond intervals) (Always 20)
19	R/W	FL	4	Logical 0 – DP_1-1.FAULT Logical 1 – Press _1-1.FAULT Logical 2 – RTD_1-1.FAULT Logical 3- 10 – AI_X_Y.FAULT Logical 65 – No Mapping Logical 66 – No Mapping Logical 68 – No Mapping	Fault EU Value
20	R/O	INT16	2	Logical 0 – DP_1-1.CAL_OBJ.IDEAL_ZERO_VAL Logical 1 – Press _1-1.CAL_OBJ.IDEAL_ZERO_VAL Logical 2 – RTD_1-1.CAL_OBJ.IDEAL_ZERO_VAL Logical 3- 10 – AI_X_Y.CAL_OBJ.IDEAL_ZERO_VAL Logical 65 – No Mapping	Calibrated Zero Raw – Lowest calibrated raw A/D input

Point Type 3: Analog Input Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
				Logical 66 – No Mapping Logical 68 – No Mapping	
21	R/O	INT16	2	Logical 0 – DP_1-1.CAL_OBJ.IDEAL_MID1_VAL Logical 1 – Press _1-1.CAL_OBJ.IDEAL_MID1_VAL Logical 2 – RTD_1-1.CAL_OBJ.IDEAL_MID1_VAL Logical 3- 10 – AI_X_Y.CAL_OBJ.IDEAL_MID1_VAL Logical 65 – No Mapping Logical 66 – No Mapping Logical 68 – No Mapping	Calibrated Mid-point Raw #1 A/D Value; second-lowest raw A/D input
22	R/O	INT16	2	Logical 0 – DP_1-1.CAL_OBJ.IDEAL_MID2_VAL Logical 1 – Press _1-1.CAL_OBJ.IDEAL_MID2_VAL Logical 2 – RTD_1-1.CAL_OBJ.IDEAL_MID2_VAL Logical 3- 10 – AI_X_Y.CAL_OBJ.IDEAL_MID2_VAL Logical 65 – No Mapping Logical 66 – No Mapping Logical 68 – No Mapping	Calibrated Mid-point Raw #2 A/D Value; third-lowest raw A/D input
23	R/O	INT16	2	Logical 0 – DP_1-1.CAL_OBJ.IDEAL_MID3_VAL Logical 1 – Press _1-1.CAL_OBJ.IDEAL_MID3_VAL	Calibrated Mid-point Raw #3 A/D Value; second-highest calibrated raw A/D input

Point Type 3: Analog Input Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
				Logical 2 – RTD_1-1.CAL_OBJ.IDEAL_MID3_VAL Logical 3- 10 – AI_X_Y.CAL_OBJ.IDEAL_MID3_VAL Logical 65 – No Mapping Logical 66 – No Mapping Logical 68 – No Mapping	
24	R/O	INT16	2	Logical 0 – DP_1-1.CAL_OBJ.IDEAL_SPAN_VAL Logical 1 – Press _1-1.CAL_OBJ.IDEAL_SPAN_VAL Logical 2 – RTD_1-1.CAL_OBJ.IDEAL_SPAN_VAL Logical 3- 10 – AI_X_Y.CAL_OBJ.IDEAL_SPAN_VAL Logical 65 – No Mapping Logical 66 – No Mapping Logical 68 – No Mapping	Calibrated Span Raw; highest calibrated raw A/D input
25	R/O	FL	4	Logical 0 – DP_1-1.CAL_OBJ.USER_ZERO_VAL Logical 1 – Press _1-1.CAL_OBJ.USER_ZERO_VAL Logical 2 – RTD_1-1.CAL_OBJ.USER_ZERO_VAL Logical 3- 10 – AI_X_Y.CAL_OBJ.USER_ZERO_VAL Logical 65 – No Mapping Logical 66 – No Mapping	Calibrated Zero EU Value; lowest calibrated EU value.

Point Type 3: Analog Input Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
				Logical 68 – No Mapping	
26	R/O	FL	4	Logical 0 – DP_1-1.CAL_OBJ.USER_MID1_VAL Logical 1 – Press _1-1.CAL_OBJ.USER_MID1_VAL Logical 2 – RTD_1-1.CAL_OBJ.USER_MID1_VAL Logical 3- 10 – AI_X_Y.CAL_OBJ.USER_MID1_VAL Logical 65 – No Mapping Logical 66 – No Mapping Logical 68 – No Mapping	Calibrated Mid-point EU #1; second-lowest calibrated EU value
27	R/O	FL	4	Logical 0 – DP_1-1.CAL_OBJ.USER_MID2_VAL Logical 1 – Press _1-1.CAL_OBJ.USER_MID2_VAL Logical 2 – RTD_1-1.CAL_OBJ.USER_MID2_VAL Logical 3- 10 – AI_X_Y.CAL_OBJ.USER_MID2_VAL Logical 65 – No Mapping Logical 66 – No Mapping Logical 68 – No Mapping	Calibrated Mid-point 2 EU #2; third-lowest or highest calibrated EU value
28	R/O	FL	4	Logical 0 – DP_1-1.CAL_OBJ.USER_MID3_VAL Logical 1 – Press _1-1.CAL_OBJ.USER_MID3_VAL	Calibrated Mid-point EU #3; second-highest calibrated EU value

Point Type 3: Analog Input Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
				Logical 2 – RTD_1-1.CAL_OBJ.USER_MID3_VAL Logical 3- 10 – AI_X_Y.CAL_OBJ.USER_MID3_VAL Logical 65 – No Mapping Logical 66 – No Mapping Logical 68 – No Mapping	
29	R/O	FL	4	Logical 0 – DP_1-1.CAL_OBJ.USER_SPAN_VAL Logical 1 – Press _1-1.CAL_OBJ.USER_SPAN_VAL Logical 2 – RTD_1-1.CAL_OBJ.USER_SPAN_VAL Logical 3- 10 – AI_X_Y.CAL_OBJ.USER_SPAN_VAL Logical 65 – No Mapping Logical 66 – No Mapping Logical 68 – No Mapping	Calibrated Span EU; highest calibrated EU value
30	R/O	FL	4	Logical 0 – DP_1-1.CAL_OBJ.ZERO_SHIFT Logical 1 – Press _1-1.CAL_OBJ.ZERO_SHIFT Logical 2 – RTD_1-1.CAL_OBJ.ZERO_SHIFT Logical 3- 10 – AI_X_Y.CAL_OBJ.ZERO_SHIFT Logical 65 – No Mapping Logical 66 – No Mapping	Offset (Zero Shift); value to be added to all calculated EU values

Point Type 3: Analog Input Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
				Logical 68 – No Mapping	
31	R/O	FL	4	No Mapping	Calibration Set Value; desired EU value for a calibrated point (Not used – always 0)
32	R/O	FL	4	Logical 0 – DP_1-1.SELECTED Logical 1 – Press _1-1.SELECTED Logical 2 – RTD_1-1.SELECTED Logical 3- 10 – AI_X_Y.SELECTED Logical 65 – No Mapping Logical 66 – No Mapping Logical 68 – No Mapping	Calibrated Manual value; the currently EU value of the AI while performing calibration
33	R/O	UINT16	2	Logical 0 – DP_1-1.CAL_OBJ.TIMEOUT Logical 1 – Press _1-1.CAL_OBJ.TIMEOUT Logical 2 – RTD_1-1.CAL_OBJ.TIMEOUT Logical 3- 10 – AI_X_Y.CAL_OBJ.TIMEOUT Logical 65 – No Mapping Logical 66 – No Mapping Logical 68 – No Mapping	Calibration Timer; indicates the number of seconds until a calibration timeout occurs.
34	R/O	UINT8	1	Logical 0 – DP_1-1.CAL_OBJ.CAL_STATUS Logical 1 – Press _1-1.CAL_OBJ.CAL_STATUS Logical 2 – RTD_1-1.CAL_OBJ.CAL_STATUS Logical 3- 10 – AI_X_Y.CAL_OBJ.CAL_STATUS	Calibration mode: **0** = No cal active **1** = Start cal **2** = Cal input **3** = Restore cal **4** = End cal

Point Type 3: Analog Input Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
				Logical 65 – No Mapping Logical 66 – No Mapping Logical 68 – No Mapping	
35	R/O	UINT8	1	No Mapping	Calibration type: (Not used – always 0) **0** = No cal active **1** = Set zero **2** = Set span **3** = Set mid1 **4** = Set mid2 **5** = Set mid3 **6** = Set Offset

3.2.4 Point Type 4: Analog Output

Description: Point Type 4 provides the parameters for the analog output.

Number of Logical Points: (0-8) Based on I/O hardware installed and I/O point configuration.

Table 3-7: Point Type 4 – Analog Output Parameters

Point Type 4: Analog Output Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
0	R/W	AC10	10	AO_X-Y.DESC	Identifies the point tag.
1	R/O	AC10	10	AO_X-Y.UNITS_TYPE	Units
2	R/W	INT16	2	AO_X-Y.AO_RAW_0_PERCENT	Adjusted D/A 0%
3	R/W	INT16	2	AO_X-Y.AO_RAW_100_PERCENT	Adjusted D/A 100%
4	R/W	FL	4	AO_X-Y.LOW_EU	Low reading EU
5	R/W	FL	4	AO_X-Y.HIGH_EU	High reading EU
6	R/O	FL	4	AO_X-Y.SELECTED	Value in EUs
7	R/W	BIN	1	AO_X-Y.USER_MODE	AO Mode: **Bit 7** – Manual Mode: 0 = Normal 1 = Manual
	R/O	BIN	1	No Mapping	**Bit 6** – RBX on Set (Not used – always 0) 0 = Disabled 1 = Active **Bit 5** – RBX on Clear (Not used – always 0) 0 = Disabled 1 = Active **Bit 4** – ALM Enable (Not used – always 0) 0 = Disabled 1 = Log Alarms
	R/W	BIN	1	AO_X-Y.FAULT_MODE	**Bit 3** – Clear on Reset: 0 = Disabled

Point Type 4: Analog Output Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
					1 = Enabled
	R/O	BIN	1	No Mapping	**Bits 2 through 0** – Not used – always 0
8	R/O	BIN	1	Bit 7 - AO_X-Y.USER_MODE Bit 6 - AO_X-Y.OUTPUT_STATUS Bit 0-5 – No Mapping	Alarm Code: **Bit 7** – Manual Mode **Bit 6** – Point Fail **Bit 5 through 0** – Not used – always 0
9	R/O	INT16	2	AO_X-Y.RAW	Raw D/A Output
10	R/W	BIN	1	AO_X-Y.USER_MODE	Scanning mode: **0** = Automatic **1** = Manual
11	R/W	FL	4	AO_X-Y.OVRD	Manual EU
12	R/O	FL	4	AO_X-Y.SELECTED	Physical EU

3.2.5 Point Type 5: Pulse Input

Description: Point Type 5 provides the parameters for the pulse input.

Number of Logical Points: (0-10) Based on I/O hardware installed and I/O point configuration.

Table 3-8: Point Type 5 – Pulse Input Parameters

Point Type 5: Pulse Input Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
0	R/W	AC10	10	PI_X-Y.DESC	Identifies the point tag.
1	R/O	AC10	10	PI_X-Y.UNITS_TYPE	Units
2	R/O	UINT8	1	No Mapping	Rate Flag: (Not used – always 0) **0** = Rate **1** = Accumulate **2** = Accum using user entered rollover
3	R/W	UINT8	1	PI_X-Y.RATE_PERIOD	Rate Period: **0** = Minutes **1** = Hours **2** = Days
4	R/O	UINT8	1	No Mapping	Filter Time: (Not used – always 0) **0** = None **1** = 255 in 22 millisecond increments
5	R/W	UINT16	2	PI_X-Y.SCAN_PERIOD	Scan Period (50 millisecond intervals)
6	R/W	FL	4	PI_X-Y.CONV_FACTOR	Conversion factor
7	R/W	FL	4	PI_X-Y.FEQ_ALM_OBJ.LO_LIM	Low Alarm EU
8	R/W	FL	4	PI_X-Y.FEQ_ALM_OBJ.HI_LIM	High Alarm EU
9	R/W	FL	4	PI_X-Y.FEQ_ALM_OBJ.LOLO_LIM	Low Low Alarm EU
10	R/W	FL	4	PI_X-Y.FEQ_ALM_OBJ.HIHI_LIM	Hi Hi Alarm EU
11	R/W	FL	4	PI_X-Y.FEQ_ALM_OBJ.ROC_LIM	Rate Alarm EU
12	R/W	FL	4	PI_X-Y.FEQ_ALM_OBJ.DEADBAND	Alarm Deadband / Rollover Maximum
13	R/W	FL	4	PI_X-Y.RATE	Value in EUs

Point Type 5: Pulse Input Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
14	R/W	BIN	1	PI_X-Y.USER_MODE	PI Mode **Bit 7** – Manual Mode: 0 = Normal Scan 1 = Off Scan
	R/O	BIN	1	No Mapping	**Bit 6** – RBX on Set (Not used – always 0) 0 = Disabled 1 = Active **Bit 5** – RBX on Clear (Not used – always 0) 0 = Disabled 1 = Active
	R/W	BIN	1	PI_X-Y.FREQ_ALM_OBJ.LO_ENB	**Bit 4** – ALM Enable: 0 = Disabled 1 = Log Alarms
	R/O	BIN	1	No Mapping	**Bit 3** – Conversion: 1 = Pulses/EU **Bits 2 through 0** – Not used – always 0
15	R/O	BIN	1	Bit 7 - PI_X-Y.USER_MODE Bit 6 - PI_X-Y.INPUT_STATUS Bit 5 – No Mapping Bit 0-4 - PI_X-Y.FREQ_ALM_OBJ.PROCESS_ALM	Alarm Code: **Bit 7** – Manual Mode **Bit 6** – Point Fail **Bit 5** – Not used – always 0 **Bit 4** – Rate Alarm **Bit 3** – High High Alarm **Bit 2** – High Alarm **Bit 1** – Low Low Alarm **Bit 0** – Low Alarm
16	R/O	UINT32	4	PI_X-Y.PULSE_ACCUM	Accumulated Pulse Total
17	R/O	FL	4	PI_X-Y.RATE	Current Rate
18	R/O	FL	4	PI_X-Y.TODAYS_TOTAL	Today's Total

Point Type 5: Pulse Input Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
19	R/O	FL	4	PI_X-Y.TESTERDAYS_TOTAL	Yesterday's Total
20	R/O	UINT32	4	PI_X-Y.PULSE_DAY_ACCUM_32	Pulses for Day
21	R/O	FL	4	PI_X-Y.LIVE_FREQ	Frequency in Hertz

3.2.6 Point Type 7: AGA Flow

Description: Point Type 7 provides the parameters for the AGA flow. A 15-second timer starts from the last write when writing the composition parameters. Once the timer expires, the components will be applied to the device and reflected to the subsequent reads.

Number of Logical Points: (0-2) Based on product type and meter setup. These map to either a DP Mtr or Linear Mtr object in the FBx device.

Table 3-9: Point Type 7 – AGA Flow Parameters

Point Type 7: AGA Flow Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
0	R/W	AC10	10	Dp Mtr_X.DESC Linear Mtr_X.DESC	Identifies the point tag.
1	R/W	FP	4	Dp Mtr_X.STATION_OBJ.LATITUDE Linear Mtr_X.STATION_OBJ.LATITUDE	Latitude
2	R/W	FP	4	Dp Mtr_X.STATION_OBJ.ELEVATION Linear Mtr_X.STATION_OBJ.ELEVATION	Elevation
3	R/O	BIN	1	Bit 7 - Dp Mtr_X.MTR_TYPE Linear Mtr_X – No Mapping - Always 0 Bit 5-6 – No Mapping	Calculation Method: **Bit 7** – Differential Flow Calculation Standard: 0 = AGA3 1 = ISO5167 **Bit 6** – RBX on Set (Not used – always 0) 0 = Disabled 1 = Active **Bit 5** – RBX on Clear (Not used – always 0) 0 = Disabled 1 = Active
	R/W	BIN	1	Dp Mtr_X.FLW_ALM_OBJ.LO_ENB Linear Mtr_X.FLW_ALM_OBJ.LO_ENB	**Bit 4** – ALM Enable: 0 = Disabled 1 = Log Alarms
	R/O	BIN	1	Bit 3 - Dp Mtr_X.TEMP_UNITS	**Bit 3** – US or Metric Units:

Point Type 7: AGA Flow Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
				Linear Mtr_X.TEMP_UNITS Bit 2 – No Mapping Bit – 1 - Dp Mtr_X.MTR_TYPE Linear Mtr_X.MTR_TYPE Bit 0 - No Mapping	0 = US 1 = Metric **Bit 2** – Limit Meter Run Events: (Not used – always 0) 0 = Event not limited 1 = Events limited **Bit 1** – Flow Calculation Method: 0 = Differential 1 = Linear **Bit 0** – Not used – always 0
4	R/O	BIN	1	No Mapping	AGA Configuration Options: **Bit 7** – Log Methane Adjustment: (Not used – always 0) 0 = Log 1 = Do not log normalization

Point Type 7: AGA Flow Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
	R/W	BIN	1	**Bit 6 -** Dp Mtr_X.STATION_OBJ.HV_MEAS_BASIS Linear Mtr_X.STATION_OBJ.HV_MEAS_BASIS **Bit 5 -** Dp Mtr_X.STATION_OBJ.GRAV_UMODE Linear Mtr_X.STATION_OBJ.GRAV_UMODE **Bit 4 -** Dp Mtr_X.STATION_OBJ.HV_REAL_UMODE Linear Mtr_X.STATION_OBJ.HV_REAL_UMODE **Bit 3 -** Dp Mtr_X.PRESS_TYPE Linear Mtr_X.PRESS_TYPE **Bit 2 – Dp Mtr_x.PRESS_LOC** **Linear Mtr – No Mapping** **Bit 1 -** Dp Mtr_X.STATION_OBJ.HV_REAL_MODE Linear Mtr_X.STATION_OBJ.HV_REAL_MODE **Bit 0 – No Mapping**	**Bit 6** – Mass/Volume Units (applies to calculation outputs, alarm limits, sampler accumulation, and heating value): 0 = Mass 1 = Volumetric **Bit 5** – Gravitational Acceleration Source: 0 = Calculate 1 = Enter **Bit 4** – Heating Value Source: 0 = Calculate 1 = Enter **Bit 3** – Static Pressure Value: 0 = Gauge 1 = Absolute **Bit 2** – Static Pressure Tap Location: 0 = Downstream 1 = Upstream **Bit 1** – Specific Gravity Source: 0 = Calculate 1 = Enter **Bit 0** – Not used – always 0
5	R/W	FL	4	Dp Mtr_X.FLUID_PROP_OBJ.RD_REAL Linear Mtr_X.FLUID_PROP_OBJ.RD_REAL	Specific gravity
6	R/W	FL	4	Dp Mtr_X.FLUID_PROP_OBJ.HV_REAL Linear Mtr_X.FLUID_PROP_OBJ.HV_REAL	Heating value
7	R/W	FL	4	Dp Mtr_X.STATION_OBJ.GRAV Linear Mtr_X.STATION_OBJ.GRAV	Local Gravitational Acceleration
8	R/O	UINT16	2	No Mapping	Scan Period (50 ms intervals) (Always 20)

Point Type 7: AGA Flow Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
9	R/W	FP	4	Dp Mtr_X.PIPE_DIAM Linear Mtr_X.PIPE_DIAM	Pipe diameter
10	R/W	FP	4	Dp Mtr_X.MTR_DIAM Linear Mtr_X.MTR_DIAM	Orifice diameter
11	R/W	FP	4	Dp Mtr_X.MTR_DIAM_REF Linear Mtr_X.MTR_DIAM_REF	Orifice measured (reference) temperature
12	R/O	UINT8	1	Dp Mtr_X.MTR_MAT_OPT Linear Mtr_X.MTR_MAT_OPT	Orifice material: **0** = SS **1** = Monel **2** = CS **3** = 304SS **4** = 316SS **5** = Monel400
13	R/W	AC30	30	Dp Mtr_X.DESC Linear Mtr_X.DESC	Meter run point description **Note:** The description truncates to 20 characters.
14	R/O	BIN	1	Bit 3-7 – No Mapping Bit 2 - Dp Mtr_X.FLW_ALM_OBJ.PROCESS_ALM Linear Mtr_X.FLW_ALM_OBJ.PROCESS_ALM Bit 1 – No Mapping Bit 0 - Dp Mtr_X.FLW_ALM_OBJ.PROCESS_ALM Linear Mtr_X.FLW_ALM_OBJ.PROCESS_ALM	Alarm Code: **Bit 7** – Manual Mode (Not used – always 0) **Bit 6** – No Flow (Not used – always 0) **Bit 5** – Not used – always 0 **Bit 4** – Not used – always 0 **Bit 3** – Not used – always 0 **Bit 2** – High Alarm **Bit 1** – Not used – always 0 **Bit 0** – Low Alarm
15	R/W	FP	4	Dp Mtr_X.FLW_ALM_OBJ.LO_LIM Linear Mtr_X.FLW_ALM_OBJ.LO_LIM	Low Alarm EU – Flow
16	R/W	FP	4	Dp Mtr_X.FLW_ALM_OBJ.HI_LIM Linear Mtr_X.FLW_ALM_OBJ.HI_LIM	High Alarm EU – Flow

Point Type 7: AGA Flow Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
17	R/W	FP	4	Dp Mtr_X.FLUID_PROP_OBJ.DYN_VISC_OVRD Linear Mtr_X.FLUID_PROP_OBJ.DYN_VISC_OVRD	Viscosity
18	R/W	FL	4	Dp Mtr_X.FLUID_PROP_OBJ.ISENTR_SEL Linear Mtr_X.FLUID_PROP_OBJ.ISENTR_SEL	Specific Heat Ratio
19	R/W	FP	4	Dp Mtr_X.STATION_OBJ.PB_SEL Linear Mtr_X.STATION_OBJ.PB_SEL	Contact or Base Pressure
20	R/W	FL	4	Dp Mtr_X.STATION_OBJ.TB_SEL Linear Mtr_X.STATION_OBJ.TB_SEL	Base or contract temperature
21	R/W	FP	4	Dp Mtr_X.NO_FLOW_LIM Linear Mtr_X.NO_FLOW_LIM	Low Differential Pressure (hw) Cutoff – Orifice
22	R/W	FP	4	Dp Mtr_X.USER_CORR_FACTOR Linear Mtr_X.USER_CORR_FACTOR	User Correction Factor
23	R/W	FP	4	Dp Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.N2_SEL Linear Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.N2_SEL	N_2 – Nitrogen
24	R/W	FP	4	Dp Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.CO2_SEL Linear Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.CO2_SEL	CO_2 – Carbon Dioxide
25	R/W	FP	4	Dp Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.H2S_SEL Linear Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.H2S_SEL	H_2S – Hydrogen Sulfide
26	R/W	FP	4	Dp Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.H2O_SEL Linear Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.H2O_SEL	H_2O – Water

Point Type 7: AGA Flow Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
27	R/W	FP	4	Dp Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.HE_SEL Linear Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.HE_SEL	He – Helium
28	R/W	FP	4	Dp Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.C1_SEL Linear Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.C1_SEL	CH_4 – Methane
29	R/W	FP	4	Dp Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.C2_SEL Linear Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.C2_SEL	C_2H_6 – Ethane
30	R/W	FP	4	Dp Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.C3_SEL Linear Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.C3_SEL	C_3H_8 – Propane
31	R/W	FP	4	Dp Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.NC4_SEL Linear Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.NC4_SEL	C_4H_{10} – n-Butane
32	R/W	FP	4	Dp Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.IC4_SEL Linear Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.IC4_SEL	C_4H_{10} – i-Butane
33	R/W	FP	4	Dp Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.NC5_SEL Linear Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.NC5_SEL	C_5H_{12} – n-Pentane

Point Type 7: AGA Flow Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
34	R/W	FP	4	Dp Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.IC5_SEL Linear Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.IC5_SEL	C_5H_{12} – i-Pentane
35	R/W	FP	4	Dp Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.C6_SEL Linear Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.C6_SEL	C_6H_{14} – n-Hexane
36	R/W	FP	4	Dp Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.C7_SEL Linear Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.C7_SEL	C_7H_{16} – n-Heptane
37	R/W	FP	4	Dp Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.C8_SEL Linear Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.C8_SEL	C_8H_{18} – n-Octane
38	R/W	FP	4	Dp Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.C9_SEL Linear Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.C9_SEL	C_9H_{20} – n-Nonane
39	R/W	FP	4	Dp Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.C10_SEL Linear Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.C10_SEL	$C_{10}H_{22}$ – n-Decane
40	R/W	FP	4	Dp Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.O2_SEL Linear Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.O2_SEL	O_2 – Oxygen

Point Type 7: AGA Flow Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
41	R/W	FP	4	Dp Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.CO_SEL Linear Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.CO_SEL	CO – Carbon Monoxide
42	R/W	FP	4	Dp Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.H2_SEL Linear Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.H2_SEL	H_2 – Hydrogen
43	R/O	UINT8	1	No Mapping	Not used – always 0
44	R/O	UINT8	1	No Mapping	Enable Stacked Differential Pressure (hw) (Not used – always 0)
45	R/O	TLP	3	No Mapping	Not used – always 0
46	R/O	TLP	3	Dp Mtr_X – No Mapping Linear Mtr_X.FLOW_OBJ	hw Input Definition (Differential Meter) (Not used – always 0) Uncorrected Flow Rate Input Definition (Linear Meter)
47	R/O	TLP	3	Dp Mtr_X.PF_OBJ Linear Mtr_X.PF_OBJ	Static Pressure (Pf) Input Definition
48	R/O	TLP	3	Dp Mtr_X.TF_OBJ Linear Mtr_X.TF_OBJ	Flowing Temperature (Tf) Input Definition
49	R/O	FP	4	No Mapping	Low Differential Pressure (hw) Setpoint (Not used – always 0.0)
50	R/O	FP	4	No Mapping	High Differential Pressure (hw) Setpoint (Not used – always 0.0)
51	R/W	FL	4	Dp Mtr_X.DP_OBJ.SELECTED Linear Mtr_X.FLOW_OBJ.SELECTED_FREQ	Current Differential Pressure (Differential Meter) Uncorrected Flow Rate (Linear Meter)
52	R/W	FL	4	Dp Mtr_X.PF_OBJ.SELECTED Linear Mtr_X.PF_OBJ.SELECTED	Current Pf – Flowing Pressure

Point Type 7: AGA Flow Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
53	R/W	FL	4	Dp Mtr_X.TF_OBJ.SELECTED Linear Mtr_X.TF_OBJ.SELECTED	Current Tf – Flowing Temperature

3.2.7 Point Type 8: Standard History

Description: Point Type 8 provides the parameters for the standard history.

Number of Logical Points:
Logical 0 = Points 1-15 (FB Series station 1 history points 1-15).
Logical 1 = Points 16-30 (FB Series station 1 history points 16-30)
Logical 2 = Points 31-45 (FB Series station 1 history points 31-45)
Logical 3 = Points 46-60 (FB Series station 1 history points 46-60)
Logical 4 = Points 61-75 (Unused – Always 0)
Logical 5 = Points 76-90 (Unused – Always 0)
Logical 6 = Points 91-100 (Unused – Always 0)

Table 3-10: Point Type 8 – Standard History Parameters

Point Type 8: Standard History Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
0	R/O	TLP	3	No Mapping	TLP for tag for history point 1, 16, 31, 46, 61, 76, or 91 (Not used – always 0,0,0)
1	R/O	TLP	3	Hist_X-Y.HIST_PARAM	TLP for value for history point 1, 16, 31, 46, 61, 76, or 91
2	R/O	UINT8	1	Hist_X-Y.HIST_TYPE	History type for history point 1, 16, 31, 46, 61, 76, or 91. **128** = Average **129** = Accumulate **130** = Current Value **134** = Totalize
3	R/O	UINT8	1	Hist_X-Y.HIST_TYPE	Detail of history type for history point 1, 16, 31, 46, 61, 76, or 91. **0** = Snapshot **1** = Minimum **2** = Maximum
4	R/O	TLP	3	No Mapping	TLP for tag for history point 2, 17, 32, 47, 62, 77, or 92. (Not used – always 0,0,0)
5	R/O	TLP	3	Hist_X-Y.HIST_PARAM	TLP value for history point 2, 17, 32, 47, 62, 77, or 92.
6	R/O	UINT8	1	Hist_X-Y.HIST_TYPE	History type for history point 2, 17, 32, 47, 62, 77, or 92.
7	R/O	UINT8	1	Hist_X-Y.HIST_TYPE	Detail of history type for history point 2, 17, 32, 47, 62, 77, or 92.

Point Type 8: Standard History Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
8	R/O	TLP	3	No Mapping	TLP for tag for history point 3, 18, 33, 48, 63, 78, or 93.
9	R/O	TLP	3	Hist_X-Y.HIST_PARAM	TLP for value of history point 3, 18, 33, 48, 63, 78, or 93.
10	R/O	UINT8	1	Hist_X-Y.HIST_TYPE	History type for history point 3, 18, 33, 48, 63, 78, or 93.
11	R/O	UINT8	1	Hist_X-Y.HIST_TYPE	Detail of history type for history point 3, 18, 33, 48, 63, 78, or 93.
12	R/O	TLP	3	No Mapping	TLP for tag for history point 4, 19, 34, 49, 64, 79, or 94.
13	R/O	TLP	3	Hist_X-Y.HIST_PARAM	TLP for value of history point 4, 19, 34, 49, 64, 79, or 94.
14	R/O	UINT8	1	Hist_X-Y.HIST_TYPE	History type for history point 4, 19, 34, 49, 64, 79, or 94.
15	R/O	UINT8	1	Hist_X-Y.HIST_TYPE	Detail of history type for history point 4, 19, 34, 49, 64, 79, or 94.
16	R/O	TLP	3	No Mapping	TLP for value of history point 5, 20, 35, 50, 65, 80, or 95.
17	R/O	TLP	3	Hist_X-Y.HIST_PARAM	TLP for value of history point 5, 20, 35, 50, 65, 80, or 95.
18	R/O	UINT8	1	Hist_X-Y.HIST_TYPE	History type for history point 5, 20, 35, 50, 65, 80, or 95.
19	R/O	UINT8	1	Hist_X-Y.HIST_TYPE	Detail of history type for history point 5, 20, 35, 50, 65, 80, or 95.
20	R/O	TLP	3	No Mapping	TLP for tag of history point 6, 21, 36, 51, 66, 81, or 96.
21	R/O	TLP	3	Hist_X-Y.HIST_PARAM	TLP for value of history point 6, 21, 36, 51, 66, 81, or 96.
22	R/O	UINT8	1	Hist_X-Y.HIST_TYPE	History type for history point 6, 21, 36, 51, 66, 81, or 96.
23	R/O	UINT8	1	Hist_X-Y.HIST_TYPE	Detail of history type for history point 6, 21, 36, 51, 66, 81, or 96.
24	R/O	TLP	3	No Mapping	TLP for tag of history point 7, 22, 37, 52, 67, 82, or 97.
25	R/O	TLP	3	Hist_X-Y.HIST_PARAM	TLP for value of history point 7, 22, 37, 52, 67, 82, or 97.
26	R/O	UINT8	1	Hist_X-Y.HIST_TYPE	History type for history point 7, 22, 37, 52, 67, 82, or 97.
27	R/O	UINT8	1	Hist_X-Y.HIST_TYPE	Detail of history type for history point 7, 22, 37, 52, 67, 82, or 97.
28	R/O	TLP	3	No Mapping	TLP for tag of history point 8, 23, 38, 53, 68, 83, or 98.
29	R/O	TLP	3	Hist_X-Y.HIST_PARAM	TLP for value of history point 8, 23, 38, 53, 68, 83, or 98.
30	R/O	UINT8	1	Hist_X-Y.HIST_TYPE	History type for history point 8, 23, 38, 53, 68, 83, or 98.
31	R/O	UINT8	1	Hist_X-Y.HIST_TYPE	Detail of history type for history point 8, 23, 38, 53, 68, 83, or 98.
32	R/O	TLP	3	No Mapping	TLP for tag for history point 9, 24, 39, 54, 69, 84, or 99.
33	R/O	TLP	3	Hist_X-Y.HIST_PARAM	TLP for value for history point 9, 24, 39, 54, 69, 84, or 99.
34	R/O	UINT8	1	Hist_X-Y.HIST_TYPE	History type for history point 9, 24, 39, 54, 69, 84, or 99.

Point Type 8: Standard History Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
35	R/O	UINT8	1	Hist_X-Y.HIST_TYPE	Detail of history type for history point 9, 24, 39, 54, 69, 84, or 99.
36	R/O	TLP	3	No Mapping	TLP for tag for history point 10, 25, 40, 55, 70, 85, or 100.
37	R/O	TLP	3	Hist_X-Y.HIST_PARAM	TLP for value for history point 10, 25, 40, 55, 70, 85, or 100.
38	R/O	UINT8	1	Hist_X-Y.HIST_TYPE	History type for history point 10, 25, 40, 55, 70, 85, or 100.
39	R/O	UINT8	1	Hist_X-Y.HIST_TYPE	Detail of history type for history point 10, 25, 40, 55, 70, 85, or 100.
40	R/O	TLP	3	No Mapping	TLP for tag for history point 11, 26, 41, 56, 71, or 86.
41	R/O	TLP	3	Hist_X-Y.HIST_PARAM	TLP for value for history point 11, 26, 41, 56, 71, or 86.
42	R/O	UINT8	1	Hist_X-Y.HIST_TYPE	History type for history point 11, 26, 41, 56, 71, or 86.
43	R/O	UINT8	1	Hist_X-Y.HIST_TYPE	Detail of history type for history point 11, 26, 41, 56, 71, or 86.
44	R/O	TLP	3	No Mapping	TLP for tag for history point 12, 27, 42, 57, 72, or 87.
45	R/O	TLP	3	Hist_X-Y.HIST_PARAM	TLP for value for history point 13, 28, 43, 58, 73, or 88.
46	R/O	UINT8	1	Hist_X-Y.HIST_TYPE	History type for history point 13, 28, 43, 58, 73, or 88.
47	R/O	UINT8	1	Hist_X-Y.HIST_TYPE	Detail of history type for history point 13, 28, 43, 58, 73, or 88.
48	R/O	TLP	3	No Mapping	TLP for tag for history point 13, 28, 43, 58, 73, or 88.
49	R/O	TLP	3	Hist_X-Y.HIST_PARAM	TLP for value for history point 13, 28, 43, 58, 73, or 88.
50	R/O	UINT8	1	Hist_X-Y.HIST_TYPE	History type for history point 13, 28, 43, 58, 73, or 88.
51	R/O	UINT8	1	Hist_X-Y.HIST_TYPE	Detail of history type for history point 13, 28, 43, 58, 73, or 88.
52	R/O	TLP	3	No Mapping	TLP for tag for history point 14, 29, 44, 59, 74, or 89.
53	R/O	TLP	3	Hist_X-Y.HIST_PARAM	TLP for value for history point 14, 29, 44, 59, 74, or 89.
54	R/O	UINT8	1	Hist_X-Y.HIST_TYPE	History type for history point 14, 29, 44, 59, 74, or 89.
55	R/O	UINT8	1	Hist_X-Y.HIST_TYPE	Detail of history type for history point 14, 29, 44, 59, 74, or 89.
56	R/O	TLP	3	No Mapping	TLP for tag for history point 15, 30, 45, 60, 75, or 90.
57	R/O	TLP	3	Hist_X-Y.HIST_PARAM	TLP for value for history point 15, 30, 45, 60, 75, or 90.
58	R/O	UINT8	1	Hist_X-Y.HIST_TYPE	History type for history point 15, 30, 45, 60, 75, or 90.
59	R/O	UINT8	1	Hist_X-Y.HIST_TYPE	Detail of history type for history point 15, 30, 45, 60, 75, or 90.

3.2.8 Point Type 10: AGA Flow Calculation

Description: Point Type 10 provides the parameters for the AGA flow calculation.

Number of Logical Points: (0-2) Based on product type and meter setup.

Table 3-11: Point Type 10 – AGA Flow Calculation Parameters

Point Type 10: AGA Flow Calculation Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
0	R/O	FL	4	Dp Mtr_X.DP_OBJ.SELECTED Linear Mtr_X.IQ_RATE	**Differential Pressure (DP) Meter:** hw – Meter Differential Pressure Value (Inches H_2O or kPa) **Linear Meter:** Uncorrected Flow (MCF or km3)
1	R/O	FL	4	Dp Mtr_X.PF_OBJ.SELECTED Linear Mtr_X.PF_OBJ.SELECTED	Pf – Static Flowing Pressure Value (psi or kPa)
2	R/O	FL	4	Dp Mtr_X.TF_OBJ.SELECTED Linear Mtr_X.TF_OBJ.SELECTED	Tf – Flowing Temperature Value (°F or °C)
3	R/O	FL	4	Dp Mtr_X.SVOL_RATE Linear Mtr_X.SVOL_RATE	Instantaneous Flow (Flow rate per Day) – MCF/Day or km3/Day
4	R/O	FL	4	Dp Mtr_X.ENERGY_RATE Linear Mtr_X.ENERGY_RATE	Instantaneous Energy (Energy rate per Day) – MMBTU/Day or GJ/Day
5	R/O	FL	4	Dp Mtr_X.SVOL_TOT_OBJ.CUR_DAY Linear Mtr_X.SVOL_TOT_OBJ.CUR_DAY	Flow Today – MCF or km3
6	R/O	FL	4	Dp Mtr_X.ENERGY_TOT_OBJ.CUR_DAY Linear Mtr_X.ENERGY_TOT_OBJ.CUR_DAY	Energy Today – MMBTU or GJ
7	R/O	FL	4	Dp Mtr_X.SVOL_TOT_OBJ.PREV_DAY Linear Mtr_X.SVOL_TOT_OBJ.PREV_DAY	Flow Yesterday – MCF or km3
8	R/O	FL	4	Dp Mtr_X.ENERGY_TOT_OBJ.PREV_DAY Linear Mtr_X.ENERGY_TOT_OBJ.PREV_DAY	Energy Yesterday – MMBTU or GJ

Point Type 10: AGA Flow Calculation Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
9	R/O	FL	4	Dp Mtr_X.DP_OBJ.IV_SEL Linear Mtr_X.UVOL_RATE	**Differential Pressure (DP) Meter:** Pressure Extension – hwPf (AGA3) - sqrt(hw) (ISO 5167) **Linear Meter:** Uncorrected Flow Rate
10	R/O	FL	4	Dp Mtr_X.IMV_SEL Linear Mtr_X.IMV_SEL	**Differential Pressure (DP) Meter:** IMV (Integral Multiplier Value) **Linear Meter:** BMV (Base Multiplier Value)
11	R/O	FL	4	No Mapping	Sample Time (Not used – always 0.0)
12	R/O	FL	4	Dp Mtr_X.DP_OBJ.Y1_SEL Linear Mtr_X.PRESS_MULT	**Differential Pressure (DP) Meter:** Expansion Factor (Y) **Linear Meter:** Fpm
13	R/O	FL	4	Dp Mtr_X.RE_SEL Linear Mtr – No Mapping	**Differential Pressure (DP) Meter:** Reynolds Number (ReD) **Linear Meter:** Not used – always 0
14	R/O	FL	4	No Mapping	**Differential Pressure (DP) Meter:** Ftf (Not used – always 0.0) **Linear Meter:** Not used – always 0
15	R/O	FL	4	No Mapping	Fpv – Compressibility (Not used – always 0.0) **Linear Meter:** Not used – always 0
16	R/O	FL	4	No Mapping	Not used – always 0
17	R/O	FL	4	Dp Mtr_X.CD_SEL Linear Mtr_X.TEMP_MULT	**Differential Pressure (DP) Meter:** AGA 1992 – Cd (Coefficient of discharge) **Linear Meter:** Ftm
18	R/O	FL	4	No Mapping	Fpb (Not used – always 0.0)
19	R/O	FL	4	No Mapping	Ftb (Not used – always 0.0)
20	R/O	FL	4	No Mapping	**Differential Pressure (DP) Meter:** Ev-AGA 1992 (Not used – always 0.0) **Linear Meter:** Not used – always 0
21	R/O	FL	4	No Mapping	Flow Minutes - Not used – always 0

3.2.9 Point Type 12: ROC Clock

Description: Point Type 12 provides the parameters for the ROC clock.

Number of Logical Points: 0 is the only valid logical number.

Table 3-12: Point Type 12 – ROC Clock Parameters

Point Type 12: ROC Clock Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
0	R/O	UINT8	1	Clock_1.SECOND	Seconds
1	R/O	UINT8	1	Clock_1.MINUTE	Minutes
2	R/O	UINT8	1	Clock_1.HOUR	Hours
3	R/O	UINT8	1	Clock_1.DAY	Day
4	R/O	UINT8	1	Clock_1.MONTH	Month
5	R/O	UINT8	1	Clock_1.YEAR	Year
6	R/O	UINT8	1	No Mapping	Leap Year (Not used – always 0)
7	R/O	UINT8	1	Clock_1.WEEK_DY	Day of Week
8	R/O	UINT8 (6)	1	Clock_1.TIME	Time: Seconds, Minutes, Hours, Day, Month, and Year
9	R/O	UINT8	1	No Mapping	Century (Not used – always 0)
10	R/O	UINT8	1	Clock_1.DST_MODE	Enables Daylight Savings Time. Valid values are: **0** = Disable **1** = Enable
11	R/O	UINT8	1	Clock_1.DST_ST_HR	Daylight Saving Time Start Hour
12	R/O	UINT8	1	Clock_1.DST_ST_DW	Daylight Saving Time Start Day of Week
13	R/O	UINT8	1	Clock_1.DST_ST_OCR	Daylight Saving Time Start Week of Month
14	R/O	UINT8	1	Clock_1.DST_ST_MTH	Daylight Saving Time Start Month
15	R/O	UINT32	4	Clock_1.DST_ST_TM	Daylight Saving Time start date and time in binary format (seconds since 1970)
16	R/O	UINT8	1	Clock_1.DST_EN_HR	Daylight Saving Time End Hour
17	R/O	UINT8	1	Clock_1.DST_EN_DW	Daylight Saving Time End Day of Week
18	R/O	UINT8	1	Clock_1.DST_EN_OCR	Daylight Saving Time End Week of Month

Point Type 12: ROC Clock Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
19	R/O	UINT8	1	Clock_1.DST_EN_MTH	Daylight Saving Time End Month
20	R/O	UINT32	4	Clock_1.DST_EN_TM	Daylight Saving Time end date and time in binary format (seconds since 1970)

3.2.10 Point Type 13: System Flag

Description: Point Type 13 provides the parameters for the system flag.

Number of Logical Points: 0 is the only valid logical number.

Table 3-13: Point Type 13 – System Flag Parameters

Point Type 13: System Flag Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
0	R/O	UINT8	1	No Mapping	Indicates the CRC check. Valid values are: (Not used – always 1) **0** = Disabled **1** = Enabled
1	R/O	UINT8	1	No Mapping	Not used – always 0
2	R/O	UINT8	1	No Mapping	Not used – always 0
3	R/O	UINT8	1	No Mapping	Not used – always 0
4	R/O	UINT8	1	No Mapping	Not used – always 0
5	R/O	UINT8	1	No Mapping	Not used – always 0
6	R/O	UINT8	1	No Mapping	Not used – always 0
7	R/O	UINT8	1	No Mapping	Not used – always 0
8	R/O	UINT8	1	No Mapping	RTS test on LOI port (Not used – always 0)
9	R/O	UINT8	1	No Mapping	RTS test on Comm 1 port (Not used – always 0)
10	R/O	UINT8	1	No Mapping	RTS test on Comm 2 port (Not used – always 0)
11	R/O	UINT8	1	No Mapping	Not used – always 0
12	R/O	UINT8	1	No Mapping	Enables I/O scan (Not used – always 0)
13	R/O	UINT8	1	No Mapping	Not used – always 0
14	R/O	UINT8	1	No Mapping	Not used – always 0
15	R/O	UINT8	1	No Mapping	Cold start options (Not used – always 0)
16	R/O	UINT8	1	No Mapping	Warm start (Not used – always 0)
17	R/O	UINT8	1	No Mapping	Read I/O (Not used – always 0)
18	R/O	UINT8	1	No Mapping	Write to config memory (Not used – always 0)
19	R/O	UINT8	1	No Mapping	Config memory write complete (Not used – always 0)

Point Type 13: System Flag Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
20	R/O	UINT8	1	No Mapping	Enables the event log (Not used – always 0)
21	R/O	UINT8	1	ROC_1.ROC_SECURITY_EN	LOI Security: **0** = Disabled **1** = Enabled, managed by password
22	R/O	UINT8	1	ROC_2.ROC_SECURITY_EN	Comm 1 Security: **0** = Disabled **1** = Enabled, managed by password)
23	R/O	UINT8	1	ROC_3.ROC_SECURITY_EN	Comm 2 Security: **0** = Disabled **1** = Enabled, managed by password)
24	R/O	UINT8	1	No Mapping	Not used – always 0
25	R/O	UINT8	1	No Mapping	Pass through mode (Not used – always 0)
26	R/O	UINT8	1	No Mapping	Not used – always 0
27	R/O	UINT8	1	ROC_5.ROC_SECURITY_EN	Comm 3 Security: **0** = Disabled **1** = Enabled, managed by password)
28	R/O	UINT8	1	No Mapping	RTS test on Comm 3 port (Not used – always 0)
29	R/O	UINT8	1	No Mapping	Configured number of daily history logs (Not used – always 0)
30	R/O	UINT8	1	No Mapping	History time stamp log: (Not used – always 0) **0** = End of period **1** = Beginning of period
31	R/O	UINT8	1	No Mapping	Archive hourly and daily history on meter setup changes: (Not used – always 0) **0** = Hourly and daily **1** = Hourly only **2** = Neither

3.2.11 Point Type 15: System Variables (ROC Information)

Description: Point Type 15 provides the parameters for the ROC system variables.

Number of Logical Points: 0 is the only valid logical number.

Table 3-14: Point Type 15 – System Variables (ROC Information) Parameters

Point Type 15: System Variables (ROC Information) Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
0	R/W	UINT8	1	ROC_X.ROC_ADDR	Indicates the ROC address.
1	R/W	UINT8	1	ROC_X.ROC_GROUP	Indicates the ROC group.
2	R/O	AC20	20	System_1.SITE_NAME	Indicates the Station Name.
3	R/O	UINT8	1	System_1.MAX_PID	Indicates the active PIDs.
4	R/O	UINT8	1	Mtr Setup_1.MAX_MTRS	Indicates the active AGA meter runs.
5	R/O	UINT8	1	No Mapping	Indicates the number of FST instructions per FST execution cycle. (Not used – always 0)
6	R/O	UINT8	1	Hist Grp_4.NUM_PTS	Indicates the number of standard history points.
7	R/O	UINT8	1	Hist Grp_1.NUM_PTS	Indicates the number of extended history points.
8	R/O	UINT8	1	No Mapping	Indicates the number of RAM2/History3 database points. (Not used – always 0)
9	R/O	UINT8	1	No Mapping	Forces End of Day (Not used – always 0)
10	R/W	UINT8	1	Hist Grp_4.CONTRACT_HR	Indicates the contract hour.
11	R/O	AC20	20	No Mapping	Indicates the version name (part number).
12	R/O	AC20	20	System_1.MFG_ID	Provides manufacturing identification.
13	R/O	AC20	20	No Mapping	Indicates the time created.
14	R/O	AC12	12	System_1.DEV_SER_NUM	Provides the unit serial number.
15	R/O	AC20	20	System_1.SITE_NAME	Indicates the customer name.
16	R/O	UINT8	1	System_1.MAX_PID	Indicates the maximum number of PIDs.
17	R/O	UINT8	1	Mtr Setup_1.MAX_MTRS	Indicates the maximum number of AGA meter runs.
18	R/O	UINT8	1	No Mapping	Indicates the maximum number of tanks. (Not used – always 0)
19	R/O	UINT8	1	No Mapping	Indicates the number of FSTs possible. (Not used – always 0)

Point Type 15: System Variables (ROC Information) Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
20	R/O	BIN	1	No Mapping	Indicates the RAM installed. (Not used – always 0)
21	R/O	BIN	1	No Mapping	Indicates the ROM installed. (Not used – always 0)
22	R/O	FL	4	System_1.MPU_LOAD	Indicates MPU loading.
23	R/O	BIN	1	No Mapping	Indicates Utilities (Not used – always 0)
24	R/O	UINT16	2	No Mapping	Indicates the type of ROC or FloBoss (107 = FloBoss 107 or FB Series device).
25	R/O	UINT8	1	Station_1.DENS_UNITS	Indicates the Units flag. Valid values are: **0** = English **1** = Metric (kPa) **2** = Metric (bar)
26	R/O	UINT32	4	No Mapping	Encryption Key 1 (Not used – always 0)
27	R/O	UINT32	4	No Mapping	Encryption Key 2 (Not used – always 0)
28	R/O	UINT32	4	No Mapping	Encryption Key 3 (Not used – always 0)
29	R/O	UINT32	4	No Mapping	Encryption Key 4 (Not used – always 0)
30	R/O	UINT32	4	No Mapping	Encryption Key 5 (Not used – always 0)
31	R/O	UINT32	4	No Mapping	Encryption Key 6 (Not used – always 0)
32	R/O	UINT32	4	No Mapping	Encryption Key 7 (Not used – always 0)
33	R/O	UINT32	4	No Mapping	Encryption Key 8 (Not used – always 0)

3.2.12 Point Type 17: Soft Point

Description: Point Type 17 provides the parameters for soft point data storage.

Number of Logical Points: 8 logicals exist.

Table 3-15: Point Type 17 – Soft Point Parameters

Point Type 17: Soft Point Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
0	R/W	AC10	10	User Data_X.DESC	Identifies the point tag.
1	R/W	UINT16	2	User Data_X.SHORT_1	Integer flag
2	R/W	FLP	4	User Data_X.FLOAT_1	Data #1
3	R/W	FLP	4	User Data_X.FLOAT_2	Data #2
4	R/W	FLP	4	User Data_X.FLOAT_3	Data #3
5	R/W	FLP	4	User Data_X.FLOAT_4	Data #4
6	R/W	FLP	4	User Data_X.FLOAT_5	Data #5
7	R/W	FLP	4	User Data_X.FLOAT_6	Data #6
8	R/W	FLP	4	User Data_X.FLOAT_7	Data #7
9	R/W	FLP	4	User Data_X.FLOAT_8	Data #8
10	R/W	FLP	4	User Data_X.FLOAT_9	Data #9
11	R/W	FLP	4	User Data_X.FLOAT_10	Data #10
12	R/W	FLP	4	User Data_X.FLOAT_11	Data #11
13	R/W	FLP	4	User Data_X.FLOAT_12	Data #12
14	R/W	FLP	4	User Data_X.FLOAT_13	Data #13
15	R/W	FLP	4	User Data_X.FLOAT_14	Data #14
16	R/W	FLP	4	User Data_X.FLOAT_15	Data #15
17	R/W	FLP	4	User Data_X.FLOAT_16	Data #16
18	R/W	FLP	4	User Data_X.FLOAT_17	Data #17
19	R/W	FLP	4	User Data_X.FLOAT_18	Data #18
20	R/W	FLP	4	User Data_X.FLOAT_19	Data #19
21	R/W	FLP	4	User Data_X.FLOAT_20	Data #20

Point Type 17: Soft Point Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
22	R/W	UINT8	1	User Data_X.EVENT_LOG_OPT	Event logging: **0** = Log events **1** = Do not log events)

3.2.13 Point Type 19: Database

Description: Point Type 19 provides the parameters for the database.

Number of Logical Points: Logicals 1-60 are mapped to FB Series Station 1, History Points 1-60. Logicals 61-100 are unmapped and return all zero values.

Table 3-16: Point Type 19 – Database Parameters

Point Type 19: Database Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
0	R/O	FL	4	No Mapping	Identifies the point tag (Not used – always 0,0,0)
1	R/O	UINT8	1	Hist_X-Y.HIST_TYPE	Archive Type: **128** = Average **129** = Accumulate **130** = Current Value **134** = Totalize
2	R/O	UINT8	1	Hist_X-Y.HIST_PARAM	Point Type
3	R/O	UINT8	1	Hist_X-Y.HIST_PARAM	Logical Number
4	R/O	UINT8	1	Hist_X-Y.HIST_PARAM	Parameter Number
5	R/O	FL	4	No Mapping	Last Daily Value (Not used – always 0.0)
6	R/O	FL	4	No Mapping	Last Hour's Total (Not used – always 0.0)
7	R/O	AC10	10	Hist_X-Y.DESC	User-specified text typically used for history value units.

3.2.14 Point Type 21: User Defined Point

Description: Point Type 20 provides the parameters for the user defined point.

Number of Logical Points: 20 logicals can be accessed. FB Series devices do not support user programs. All parameters will return zero values when read.

Table 3-17: Point Type 21 – User Defined Point Parameters

Point Type 21: User Defined Point Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
0	R/O	AC20	20	No Mapping	Point Type Description (Not used – always 0)
1	R/O	UINT32	4	No Mapping	Template Pointer (Not used – always 0)
2	R/O	UINT8	1	No Mapping	Number of Parameters (Not used – always 0)
3	R/O	UINT8	1	No Mapping	Display Number (Not used – always 0)

3.2.15 Point Type 40: Multi-Variable Sensor

Description: Point Type 40 provides the parameters for the multi-variable sensor.

Number of Logical Points: (0-2) Based on product type and licensing.

Table 3-18: Point Type 40 – Multi-Variable Sensor Parameters

Point Type 40: Multi-Variable Sensor Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
0	R/W	AC10	10	4088_X-Y.4088_TAG	Provides point tag ID.
1	R/W	UINT8	1	4088_X-Y.4088_ADDR	Sensor address
2	R/O	BIN	1	No Mapping	Sensor Configuration: **Bit 7** – Sensor Type: (Not used – always 0) 0 = MVS205 1 = 3095FB/4088B
	R/W	BIN	1	Bit 4-6 – No Mapping Bit 3 – 4088_X-Y.SENSOR_OBJ.DP.FAULT_MODE	**Bits 6 through 4** – Not used – always 0 **Bit 3** – Failure Mode: 0 = Set to fault value 1 = Hold last good value
	R/O	BIN	1	Bit 1 -2 – No Mapping Bit 0 – 4088_X-Y.SENSOR_OBJ.DP.UNITS	**Bit 2** – Pressure Tap Location (Not used – always 0) 0 = Upstream 1 = Downstream **Bit 1** – Calibration Temp: (Not used – always 0) 0 = H_2O at 15.4°C (60°F) 1 = H_2O at 19.8°C (68°F) **Bit 0** = Units of Measure: 0 = US 1 = Metric
3	R/W	UINT8	1	4088_X-Y.SCAN_ENABLE 4088_X-Y.4088_CAL_STAT	Poll Mode: **0** = Off Scan **1** = Normal Poll

Point Type 40: Multi-Variable Sensor Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
				When SCAN_ENABLE is DISABLED the output value is always 0. When SCAN_ENABLE is ENABLED and 4088_CAL_STATUS is No Measurement in calibration then the output value is 1. For all other cases the output value is 2	**2** = Input Freeze **4** = Conf Poll **5** = Set Tag & Addr **6** = Calibrate
4	R/O	UINT8	1	4088_X-Y.FIRM_VER	Interface revision
5	R/O	BIN	1	Bit 7 – 4088_X-Y.INPUT_STATUS Bit 6 – 4088_X-Y.COMM_STATUS Bit 5 – 4088_X-Y.INPUT_STATUS Bit 4 – 4088_X-Y.4088_CAL_STAT Bit 3 – No Mapping Bit 2 – 4088_X-Y.PT_VAR_STATUS Bit 1 – 4088_X-Y.SP_VAR_STATUS Bit 0 – 4088_X-Y.DP_VAR_STATUS	Sensor Status: **Bit 7** - Off Scan Flag: 0 = On Scan 1 = Off Scan **Bit 6** – 485 Comm Status: 0 = Good 1 = Failed **Bit 5** – Sensor Comm Status: 0 = Good 1 = Failed **Bit 4** – Input Freeze Flag: 0 = Normal 1 = Frozen **Bit 3** – Not used – always 0 **Bit 2** – Process Temp Status: 0 = Good 1 = Failure **Bit 1** – Static Press Status: 0 = Good 1 = Failure **Bit 0** – Diff Press Status:

Point Type 40: Multi-Variable Sensor Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
					0 = Good 1 = Failure
6	R/O	BIN	1	Bit 6-7 – No Mapping Bit 5 – 4088_X-Y.SENSOR_OBJ.PT.ALM_OBJ.PROCESS_ALM Bit 4 – 4088_X-Y.SENSOR_OBJ.SP.ALM_OBJ.PROCESS_ALM Bit 3 – 4088_X-Y.SENSOR_OBJ.DP.ALM_OBJ.PROCESS_ALM Bit 2 – 4088_X-Y.SENSOR_OBJ.PT.ALM_OBJ.PROCESS_ALM Bit 1 – 4088_X-Y.SENSOR_OBJ.SP.ALM_OBJ.PROCESS_ALM Bit 0 – 4088_X-Y.SENSOR_OBJ.DP.ALM_OBJ.PROCESS_ALM	Sensor Alarms: **Bit 7** – Not used – always 0 **Bit 6** – Not used – always 0 **Bit 5** – PT High Alarm **Bit 4** – AP High Alarm **Bit 3** – DP High Alarm **Bit 2** – PT Low Alarm **Bit 1** – AP Low Alarm **Bit 0** – DP Low Alarm
7	R/O	FL	4	No Mapping	Sensor Voltage (Not used – always 0.0)
8	R/W	FL	4	4088_X-Y.Sensor_OBJ.DP.SELECTED	Differential Pressure (DP) Reading
9	R/W	FL	4	4088_X-Y.Sensor_OBJ.SP.SELECTED	Static Pressure (AP) Reading
10	R/W	FL	4	4088_X-Y.Sensor_OBJ.PT.SELECTED	Temperature (PT) Reading
11	R/O	FL	4	4088_X-Y.Sensor_OBJ.DP.REV_DP	DP Reverse Flow
12	R/O	FL	4	4088_X-Y.Sensor_OBJ.DP.CAL_OBJ.ZERO_SHIFT	DP Static Pressure Effect (Zero Shift)
13	R/O	FL	4	4088_X-Y.Sensor_OBJ.DP.CAL_OBJ.USER_ZERO_VAL	DP Minimum Calibration Point Value
14	R/O	FL	4	4088_X-Y.Sensor_OBJ.DP.CAL_OBJ.USER_MID1_VAL	DP Mid Point 1 Calibration Value
15	R/O	FL	4	4088_X-Y.Sensor_OBJ.DP.CAL_OBJ.USER_MiD2_VAL	DP Mid Point 2 Calibration Value

Point Type 40: Multi-Variable Sensor Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
16	R/O	FL	4	4088_X-Y.Sensor_OBJ.DP.CAL_OBJ.USER_MID3_VAL	DP Mid Point 3 Calibration Value
17	R/O	FL	4	4088_X-Y.Sensor_OBJ.DP.CAL_OBJ.USER_SPAN_VAL	DP Maximum Calibration Point Value
18	R/O	FL	4	4088_X-Y.Sensor_OBJ.SP.CAL_OBJ.USER_ZERO_VAL	AP Minimum Calibration Point Value
19	R/O	FL	4	4088_X-Y.Sensor_OBJ.SP.CAL_OBJ.USER_MID1_VAL	AP Mid Point 1 Calibration Value
20	R/O	FL	4	4088_X-Y.Sensor_OBJ.SP.CAL_OBJ.USER_MiD2_VAL	AP Mid Point 2 Calibration Value
21	R/O	FL	4	4088_X-Y.Sensor_OBJ.SP.CAL_OBJ.USER_MID3_VAL	AP Mid Point 3 Calibration Value
22	R/O	FL	4	4088_X-Y.Sensor_OBJ.SP.CAL_OBJ.USER_SPAN_VAL	AP Maximum Calibration Point Value
23	R/O	FL	4	4088_X-Y.Sensor_OBJ.PT.CAL_OBJ.USER_ZERO_VAL	PT Minimum Calibration Point Value
24	R/O	FL	4	4088_X-Y.Sensor_OBJ.PT.CAL_OBJ.USER_MID1_VAL	PT Mid Point 1 Calibration Value
25	R/O	FL	4	4088_X-Y.Sensor_OBJ.PT.CAL_OBJ.USER_MiD2_VAL	PT Mid Point 2 Calibration Value
26	R/O	FL	4	4088_X-Y.Sensor_OBJ.PT.CAL_OBJ.USER_MID3_VAL	PT Mid Point 3 Calibration Value
27	R/O	FL	4	4088_X-Y.Sensor_OBJ.PT.CAL_OBJ.USER_SPAN_VAL	PT Maximum Calibration Point Value
28	R/O	UINT8	1	No Mapping	Calibration Command (Not used – always 0)
29	R/O	UINT8	1	No Mapping	Calibration Type (Not used – always 0)
30	R/O	FL	4	No Mapping	Calibrate Set Value (Not used – always 0.0)
31	R/O	FL	4	4088_X-Y.SENSOR_OBJ.DP_LIVE	Manual DP Value (used in calibration only)

Point Type 40: Multi-Variable Sensor Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
32	R/O	FL	4	4088_X-Y.SENSOR_OBJ.SP_LIVE	Manual AP Value (used in calibration only)
33	R/O	FL	4	4088_X-Y.SENSOR_OBJ.PT_LIVE	Manual PT Value (used in calibration only)
34	R/O	BIN	1	No Mapping	DP Mode: **Bit 7** – Not used – always 0 **Bit 6** – SRBX on Set: (Not used – always 0) 0 = Disable 1 = Enable **Bit 5** – SRBX on Clear: (Not used – always 0) 0 = Disable 1 = Enable
	R/W	BIN	1	4088_X-Y.SENSOR_OBJ.DP.ALM_OBJ.LO_ENB	**Bit 4** – DP Alarm Enable: 0 = Disable 1 = Enable
	R/O	BIN	1	No Mapping	**Bits 3 through 1** – Not used – always 0 **Bit 0** – Sensor Alarm Enable (All inputs) (Not used – always 0) 0 = Disabled 1 = Enabled
35	R/O	BIN	1	Bit 7 – No Mapping Bit 6 – 4088_X-Y.SENSOR_OBJ.DP.ALM_OBJ.PROCESS_ALM Bit 3-5 – No Mapping Bit 2 – 4088_X-Y.SENSOR_OBJ.DP.ALM_OBJ.PROCESS_ALM Bit 1 – 4088_X-Y.SENSOR_OBJ.DP.ALM_OBJ.PROCESS_ALM Bit 0 – No Mapping	DP Alarm Code: **Bit 7** – Not used – always 0 **Bit 6** – Point Fail **Bit 5** – Not used – always 0 **Bit 4** – Not used – always 0 **Bit 3** – Not used – always 0 **Bit 2** – High Alarm **Bit 1** – Not used – always 0 **Bit 0** – Low Alarm

Point Type 40: Multi-Variable Sensor Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
36	R/W	FL	4	4088_X-Y.SENSOR_OBJ.DP.ALM_OBJ.LO_LIM	DP Low Alarm
37	R/W	FL	4	4088_X-Y.SENSOR_OBJ.DP.ALM_OBJ.HI_LIM	DP High Alarm
38	R/W	FL	4	4088_X-Y.SENSOR_OBJ.DP.ALM_OBJ.DEADBAND	DP Deadband
39	R/W	FL	4	4088_X-Y.SENSOR_OBJ.DP.FAULT	DP Alarm Fault Value
40	R/O	BIN	1	No Mapping	AP Mode: Bits 7,6,5 – Not used
	R/W	BIN	1	4088_X-Y.SENSOR_OBJ.AP.ALM_OBJ.LO_ENB	**Bit 4** – Alarm Enabled: 0 = Disabled 1 = Enabled
	R/O	BIN	1	No Mapping	**Bits 3, 2, 1 and 0** – Not used
41	R/O	BIN	1	Bit 7 – No Mapping Bit 6 – 4088_X-Y.SENSOR_OBJ.SP.ALM_OBJ.PROCESS_ALM Bit 3-5 – No Mapping Bit 2 – 4088_X-Y.SENSOR_OBJ.SP.ALM_OBJ.PROCESS_ALM Bit 1 – 4088_X-Y.SENSOR_OBJ.SP.ALM_OBJ.PROCESS_ALM Bit 0 – No Mapping	AP Alarm Code: **Bit 7** – Not used **Bit 6** – Point Fail **Bit 5** – Not used **Bit 4** – Not used **Bit 3** – Not used **Bit 2** – High Alarm **Bit 1** – Not used **Bit 0** – Low Alarm
42	R/W	FL	4	4088_X-Y.SENSOR_OBJ.SP.ALM_OBJ.LO_LIM	AP Low Alarm
43	R/W	FL	4	4088_X-Y.SENSOR_OBJ.SP.ALM_OBJ.HI_LIM	AP High Alarm
44	R/W	FL	4	4088_X-Y.SENSOR_OBJ.SP.ALM_OBJ.DEADBAND	AP Deadband
45	R/W	FL	4	4088_X-Y.SENSOR_OBJ.SP.FAULT	AP Alarm Fault Value

Point Type 40: Multi-Variable Sensor Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
46	R/O	BIN	4	No Mapping	PT Mode: Bts 7, 6, 5 –Not used
	R/W	BIN	1	4088_X-Y.SENSOR_OBJ.PT.ALM_OBJ.LO_ENB	**Bit 4** – Alarm Enabled: 0 = Disabled 1 = Enabled
47	R/O	BIN	1	Bit 7 – No Mapping Bit 6 – 4088_X-Y.SENSOR_OBJ.PT.ALM_OBJ.PROCESS_ALM Bit 3-5 – No Mapping Bit 2 – 4088_X-Y.SENSOR_OBJ.PT.ALM_OBJ.PROCESS_ALM Bit 1 – 4088_X-Y.SENSOR_OBJ.PT.ALM_OBJ.PROCESS_ALM Bit 0 – No Mapping	PT Alarm Code: **Bit 7** – Not used **Bit 6** – Point Fail **Bit 5** – Not used **Bit 4** – Not used **Bit 3** – Not used **Bit 2** – High Alarm **Bit 1** – Not used **Bit 0** – Low Alarm
48	R/W	FL	4	4088_X-Y.SENSOR_OBJ.PT.ALM_OBJ.LO_LIM	PT Low Alarm
49	R/W	FL	4	4088_X-Y.SENSOR_OBJ.PT.ALM_OBJ.HI_LIM	PT High Alarm
50	R/W	FL	4	4088_X-Y.SENSOR_OBJ.PT.ALM_OBJ.DEADBAND	PT Deadband
51	R/W	FL	4	4088_X-Y.SENSOR_OBJ.PT.FAULT	PT Fault Value
52	R/O	FL	4	4088_X-Y.SENSOR_OBJ.PT.CAL_OBJ.ZERO_SHIFT	PT Bias
53	R/O	FL	4	4088_X-Y.SENSOR_OBJ.SP.CAL_OBJ.ZERO_SHIFT	Static Pressure Offset
54	R/O	UINT16	2	4088_X-Y.CONFIG_CHANGE_CNT	Configuration Change Counter
55	R/O	UINT8	1	No Mapping	Sensor Type: (Not used – always 0) **0** = Unknown **1** = 4088A

Point Type 40: Multi-Variable Sensor Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
					2 = 4088B **3** = 3095FB **4** = MVS205

3.2.16 Point Type 41: Run

Description: Point Type 41 provides the run parameters.

Number of Logical Points: (0-2) Based on product type and meter setup

Table 3-19: Point Type 41 – Run Parameters

Point Type 41: Run Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
0	R/W	AC10	10	DP Mtr_X.DESC Linear Mtr_X.DESC	Identifies point tag.
1	R/W	FL	4	DP Mtr_X.STATION_OBJ.ATMPR_SEL Linear Mtr_X.STATION_OBJ.ATMPR_SEL	Atmospheric pressure
2	R/W	BIN	1	DP Meter – No Mapping Linear Mtr_X.FACTOR_CURVE_OPT	Calculation Method: **Bit 7** – K Factor Calculation: 0 = Single 1 = Multiple
	R/O	BIN	1	No Mapping	**Bits 6** – Not used – always 0
	R/W	BIN	1	DP Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.USER_MODE Linear Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.USER_MODE	**Bit 5** – Gas Quality Input Mode: 0 = Constant 1 = Live
	R/O	BIN	1	DP Mtr_X.STATION_OBJ.H2O_CONTENT_BASIS Linear Mtr_X.STATION_OBJ.H2O_CONTENT_BASIS	**Bit 4** – BTU Dry: (Always 0) 0 = See Bit 3 1 = As Delivered
	R/W	BIN	1	DP Mtr_X.STATION_OBJ.H2O_CONTENT_BASIS Linear Mtr_X.STATION_OBJ.H2O_CONTENT_BASIS	**Bit 3** – BTU Basis: 0 = Dry 1 = Wet
	R/O	BIN	1	DP Mtr_X.STATION_OBJ.ATMPR_UMODE Linear Mtr_X.STATION_OBJ.ATMPR_UMODE	**Bit 2** – Atmospheric Pressure: 0 = Calculated 1 = Entered

Point Type 41: Run Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
	R/O	BIN	1	DP Mtr_X.STATION_OBJ.ZF_METHOD	**Bit 1** – AGA8 Gross Characterization Method: 0 = Gross 2 1 = Gross 1
	R/O	BIN	1	DP Mtr_X.STATION_OBJ.ZF_METHOD Linear Mtr_X.STATION_OBJ.ZF_METHOD	**Bit 0** = AGA8 Characterization Method: 0 = Detailed 1 = Gross
3	R/O	TLP	3	No Mapping	Not used
4	R/W	FL	4	DP Mtr_X.PIPE_DIAM_REF Linear Meter – No Mapping	Pipe reference temperature
5	R/W	UINT8	1	DP Mtr_X.PIPE_MAT_OPT Linear Meter – No Mapping	Pipe Material: **0** = SS **1** = Not used – always 0 **2 =** CS **3** = 304SS **4** = 316SS **5** = Monel400
6	R/O	UINT8	1	No Mapping	Not used
7	R/O	FL	4	DP Mtr_X.CD_SEL Linear Mtr_X.TEMP_MULTI	**Orifice:** Cd – AGA 1992 **Turbine:** Ftm
8	R/O	FL	4	DP Mtr_X.RE_SEL Linear Meter – No Mapping	Reynolds Number
9	R/O	FL	4	DP Mtr_X.Y1_SEL Linear Mtr_X.PRESS_MULTI	**Orifice:** Expansion Factor (Y) **Turbine:** Fpm
10	R/O	FL	4	No Mapping	Fpb Factor (Not used – always 0.0)
11	R/O	FL	4	No Mapping	Ftb Factor (Not used – always 0.0)
12	R/O	FL	4	No Mapping	Ftf Factor (Not used – always 0.0)
13	R/O	FL	4	No Mapping	Fgr Factor (Not used – always 0.0)
14	R/O	FL	4	DP Meter – No Mapping	Fpv (Compressibility) Factor

Point Type 41: Run Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
				Linear Mtr_X.COMP_MULTI	
15	R/O	UINT8	1	No Mapping	Hist Pt Num 1 – Not used – always 0
16	R/O	UINT8	1	No Mapping	Hist Rollup 1 – Not used - always 0
17	R/O	TLP	3	No Mapping	Hist Param 1 – Not used - always 0,0,0
18	R/O	FL	4	No Mapping	Hist Conversion 1 – Not used - always 0
19	R/O	UINT8	1	No Mapping	Hist Pt Num 2 – Not used – always 0
20	R/O	UINT8	1	No Mapping	Hist Rollup 2 – Not used - always 0
21	R/O	TLP	3	No Mapping	Hist Param 2 – Not used - always 0,0,0
22	R/O	FL	4	No Mapping	Hist Conversion 2 – Not used - always 0
23	R/O	UINT8	1	No Mapping	Hist Pt Num 3 – Not used – always 0
24	R/O	UINT8	1	No Mapping	Hist Rollup 3 – Not used - always 0
25	R/O	TLP	3	No Mapping	Hist Param 3 – Not used - always 0,0,0
26	R/O	FL	4	No Mapping	Hist Conversion 3 – Not used - always 0
27	R/O	UINT8	1	No Mapping	Hist Pt Num 4 – Not used – always 0
28	R/O	UINT8	1	No Mapping	Hist Rollup 4 – Not used - always 0
29	R/O	TLP	3	No Mapping	Hist Param 4 – Not used - always 0,0,0
30	R/O	FL	4	No Mapping	Hist Conversion 4 – Not used - always 0
31	R/O	UINT8	1	No Mapping	Hist Pt Num 5 – Not used – always 0
32	R/O	UINT8	1	No Mapping	Hist Rollup 5 – Not used - always 0
33	R/O	TLP	3	No Mapping	Hist Param 5 – Not used - always 0,0,0
34	R/O	FL	4	No Mapping	Hist Conversion 5 – Not used - always 0
35	R/O	UINT8	1	No Mapping	Hist Pt Num 6 – Not used – always 0
36	R/O	UINT8	1	No Mapping	Hist Rollup 6 – Not used - always 0
37	R/O	TLP	3	No Mapping	Hist Param 6 – Not used - always 0,0,0
38	R/O	FL	4	No Mapping	Hist Conversion 6 – Not used - always 0
39	R/O	UINT8	1	No Mapping	Hist Pt Num 7 – Not used – always 0
40	R/O	UINT8	1	No Mapping	Hist Rollup 7 – Not used - always 0

Point Type 41: Run Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
41	R/O	TLP	3	No Mapping	Hist Param 7 – Not used - always 0,0,0
42	R/O	FL	4	No Mapping	Hist Conversion 7 – Not used - always 0
43	R/O	UINT8	1	No Mapping	Hist Pt Num 8 – Not used – always 0
44	R/O	UINT8	1	No Mapping	Hist Rollup 8 – Not used - always 0
45	R/O	TLP	3	No Mapping	Hist Param 8 – Not used - always 0,0,0
46	R/O	FL	4	No Mapping	Hist Conversion 8 – Not used - always 0
47	R/O	UINT8	1	No Mapping	Hist Pt Num 9 – Not used – always 0
48	R/O	UINT8	1	No Mapping	Hist Rollup 9 – Not used - always 0
49	R/O	TLP	3	No Mapping	Hist Param 9 – Not used - always 0,0,0
50	R/O	FL	4	No Mapping	Hist Conversion 9 – Not used - always 0
51	R/O	UINT8	1	No Mapping	Hist Pt Num 10 – Not used – always 0
52	R/O	UINT8	1	No Mapping	Hist Rollup 10 – Not used - always 0
53	R/O	TLP	3	No Mapping	Hist Param 10 – Not used - always 0,0,0
54	R/O	FL	4	No Mapping	Hist Conversion 10 – Not used - always 0
55	R/O	UINT8	1	No Mapping	Hist Pt Num 11 – Not used – always 0
56	R/O	UINT8	1	No Mapping	Hist Rollup 11 – Not used - always 0
57	R/O	TLP	3	No Mapping	Hist Param 11 – Not used - always 0,0,0
58	R/O	FL	4	No Mapping	Hist Conversion 11 – Not used - always 0
59	R/O	UINT8	1	No Mapping	Hist Pt Num 12 – Not used – always 0
60	R/O	UINT8	1	No Mapping	Hist Rollup 12 – Not used - always 0
61	R/O	TLP	3	No Mapping	Hist Param 12 – Not used - always 0,0,0
62	R/O	FL	4	No Mapping	Hist Conversion 12 – Not used - always 0
63	R/O	UINT8	1	No Mapping	Hist Pt Num 13 – Not used – always 0
64	R/O	UINT8	1	No Mapping	Hist Rollup 13 – Not used - always 0
65	R/O	TLP	3	No Mapping	Hist Param 13 – Not used - always 0,0,0
66	R/O	FL	4	No Mapping	Hist Conversion 13 – Not used - always 0
67	R/O	UINT8	1	No Mapping	Hist Pt Num 14 – Not used – always 0

Point Type 41: Run Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
68	R/O	UINT8	1	No Mapping	Hist Rollup 14 – Not used - always 0
69	R/O	TLP	3	No Mapping	Hist Param 14 – Not used - always 0,0,0
70	R/O	FL	4	No Mapping	Hist Conversion 14 – Not used - always 0
71	R/O	UINT8	1	No Mapping	Hist Pt Num 15 – Not used – always 0
72	R/O	UINT8	1	No Mapping	Hist Rollup 15 – Not used - always 0
73	R/O	TLP	3	No Mapping	Hist Param 15 – Not used - always 0,0,0
74	R/O	FL	4	No Mapping	Hist Conversion 15 – Not used - always 0
75	R/O	UINT8	1	No Mapping	Hist Pt Num 16 – Not used – always 0
76	R/O	UINT8	1	No Mapping	Hist Rollup 16 – Not used - always 0
77	R/O	TLP	3	No Mapping	Hist Param1 6 – Not used - always 0,0,0
78	R/O	FLP	4	No Mapping	Hist Conversion 16 – Not used - always 0

3.2.17 Point Type 42: Extra AGA Run

Description: Point Type 42 provides the extra AGA run parameters.

Number of Logical Points: (0-2) Based on product type and meter setup

Table 3-20: Point Type 42 – Extra AGA Run Parameters

Point Type 42: Extra AGA Run Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
0	R/W	AC10	10	DP Mtr_X.DESC Linear Mtr_X.DESC	Identifies point tag.
1	R/O	FLP	4	DP Mtr_X.SVOL_TOT_OBJ.CUR_DAY Linear Mtr_X.SVOL_TOT_OBJ.CUR_DAY	Flow Today – MCF (km3)
2	R/O	FLP	4	DP Mtr_X.SVOL_TOT_OBJ.PREV_DAY Linear Mtr_X.SVOL_TOT_OBJ.PREV_DAY	Flow Yesterday – MCF (km3)
3	R/O	FLP	4	DP Mtr_X.SVOL_TOT_OBJ.CUR_MNTH Linear Mtr_X.SVOL_TOT_OBJ.CUR_MNTH	Flow Month – MCF (km3)
4	R/O	FLP	4	DP Mtr_X.SVOL_TOT_OBJ.PREV_MNTH Linear Mtr_X.SVOL_TOT_OBJ.PREV_MNTH	Flow Previous Month – MCF (km3)
5	R/O	FLP	4	DP Mtr_X.SVOL_TOT_OBJ.CURRENT Linear Mtr_X.SVOL_TOT_OBJ.CURRENT	Flow Accumulated (rollover at 1,000,000)
6	R/O	FLP	4	DP Mtr_X.FLWTM_TOT_OBJ.CUR_DAY Linear Mtr_X.FLWTM_TOT_OBJ.CUR_DAY	Minutes Today
7	R/O	FLP	4	DP Mtr_X.FLWTM _TOT_OBJ.PREV_DAY Linear Mtr_X.FLWTM_TOT_OBJ.PREV_DAY	Minutes Yesterday
8	R/O	FLP	4	DP Mtr_X.FLWTM_TOT_OBJ.CUR_MNTH Linear Mtr_X.FLWTM_TOT_OBJ.CUR_MNTH	Minutes Month
9	R/O	FLP	4	DP Mtr_X.FLWTM_TOT_OBJ.PREV_MNTH Linear Mtr_X.FLWTM_TOT_OBJ.PREV_MNTH	Minutes Previous Month
10	R/O	FLP	4	DP Mtr_X.FLWTM_TOT_OBJ.CURRENT Linear Mtr_X.FLWTM_TOT_OBJ.CURRENT	Minutes Accumulated (rollover at 1,000,000) – MCF (km3)

Point Type 42: Extra AGA Run Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
11	R/O	FLP	4	DP Mtr_X.ENERGY_TOT_OBJ.CUR_DAY Linear Mtr_X.ENERGY_TOT_OBJ.CUR_DAY	Energy Today – MMBTU (GJ)
12	R/O	FLP	4	DP Mtr_X.ENERGY_TOT_OBJ.PREV_DAY Linear Mtr_X.ENERGY_TOT_OBJ.PREV_DAY	Energy Yesterday – MMBTU (GJ)
13	R/O	FLP	4	DP Mtr_X.ENERGY_TOT_OBJ.CUR_MNTH Linear Mtr_X.ENERGY_TOT_OBJ.CUR_MNTH	Energy Month – MMBTU (GJ)
14	R/O	FLP	4	DP Mtr_X.ENERGY_TOT_OBJ.PREV_MNTH Linear Mtr_X.ENERGY_TOT_OBJ.PREV_MNTH	Energy Previous Month – MMBTU (GJ)
15	R/O	FLP	4	DP Mtr_X.ENERGY_TOT_OBJ.CURRENT Linear Mtr_X.ENERGY_TOT_OBJ.CURRENT	Energy Accumulated (rollover at 1,000,000) – MCF (km3)
16	R/O	FLP	4	DP Mtr_X.UVOL_TOT_OBJ.CUR_DAY Linear Mtr_X.UVOL_TOT_OBJ.CUR_DAY	Uncorrected Today – MCF (km3)
17	R/O	FLP	4	DP Mtr_X.UVOL_TOT_OBJ.PREV_DAY Linear Mtr_X.UVOL_TOT_OBJ.PREV_DAY	Uncorrected Yesterday – MCF (km3)
18	R/O	FLP	4	DP Mtr_X.UVOL_TOT_OBJ.CUR_MNTH Linear Mtr_X.UVOL_TOT_OBJ.CUR_MNTH	Uncorrected Month – MCF (km3)
19	R/O	FLP	4	DP Mtr_X.UVOL_TOT_OBJ.PREV_MNTH Linear Mtr_X.UVOL_TOT_OBJ.PREV_MNTH	Uncorrected Previous Month – MCF (km3)
20	R/O	FLP	4	DP Mtr_X.UVOL_TOT_OBJ.CURRENT Linear Mtr_X.UVOL_TOT_OBJ.CURRENT	Uncorrected Accumulation (rollover at 1,000,000) – MCF (km3)
21	R/O	FLP	4	DP Mtr_X.MTR_DIAM_SEL Linear Meter – no Mapping	Orifice Plate Bore Diameter at flowing temperature – d
22	R/O	FLP	4	DP Mtr_X.PIPE_DIAM_SEL Linear Meter – no Mapping	Meter Tube (pipe) Internal Diameter at flowing temperature – D
23	R/O	FLP	4	DP Mtr_X.DETA_SEL Linear Meter – no Mapping	Beta – Diameter Ratio
24	R/O	FLP	4	DP Mtr_X.EV_SEL Linear Meter – no Mapping	Ev (Velocity of Approach) – AGA 1992

Point Type 42: Extra AGA Run Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
25	R/O	FLP	4	DP Mtr_X.CD_SEL Linear Meter – no Mapping	Cd (Coefficient of discharge) – AGA 1992
26	R/O	FLP	4	DP Mtr_X.RE_SEL Linear Meter – no Mapping	Reynolds Number
27	R/O	FLP	4	DP Mtr_X.PF_INUSE Linear Mtr_X.PF_INUSE	Upstream Absolute Static Pressure
28	R/O	FLP	4	DP Mtr_X.FLUID_PROP_OBJ.MOLAR_MASS Linear Mtr_X.FLUID_PROP_OBJ.MOLAR_MASS	Molecular Weight

3.2.18 Point Type 45: Meter Calibration and Sampler

Description: Point Type 45 provides the meter calibration and sampler parameters.

Number of Logical Points: (0-2) Based on product type and meter setup

Table 3-21: Point Type 45 – Meter Calibration and Sampler Parameters

Point Type 45: Meter Calibration and Sampler Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
0		BIN	1	No Mapping	Calibration Options: **Bit 7** – Not used – always 0 **Bit 6** – Not used – always 0 **Bit 5** – Not used – always 0 **Bit 4** – Not used – always 0 **Bit 3** – Not used – always 0 **Bit 2** – Differential Pressure Deadweight Calibrator (Not used – always 0) **Bit 1** – Static Pressure Deadweight Calibrator (Not used – always 0) **Bit 0** – Not used – always 0
1	R/O	FL	4	No Mapping	Not used – always 0
2	R/O	FL	4	No Mapping	Not used – always 0
3	R/O	FL	4	No Mapping	Calibrated Weights Gravitational Acceleration (Not used – always 0.0)
4	R/O	FL	4	No Mapping	Not used – always 0
5	R/O	FL	4	No Mapping	Not used – always 0
6	R/W	FL	4	DP Mtr_X.USER_CORR_FACTOR Linear Mtr_X.USER_CORR_FACTOR	User Correction Factor
7	R/O	UINT8	1	No Mapping	Sampler Enable. Valid values are: (Not used – always 0) **0** = Disabled **1** = Enabled

Point Type 45: Meter Calibration and Sampler Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
8	R/O	FL	4	No Mapping	Sampler Accumulation Trigger (Not used – always 0)
9	R/O	FL	4	No Mapping	Sampler Duration (in seconds) (Not used – always 0)
10	R/O	BIN	1	No Mapping	Not used – always 0
11	R/O	UINT16	2	No Mapping	Not used – always 0
12	R/O	BIN	1	No Mapping	Not used – always 0
13	R/O	UINT8	1	No Mapping	Not used – always 0
14	R/O	TLP	3	No Mapping	TLP for sampler. Must be discrete output configured in momentary mode. (Not used – always 0,0,0)

3.2.19 Point Type 46: Meter Configuration

Description: Point Type 46 provides the meter configuration parameters.

Number of Logical Points: (0-2) Based on product type and meter setup

Table 3-22: Point Type 46 – Meter Configuration Parameters

Point Type 46: Meter Configuration Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
0	R/W	AC10	10	DP Mtr_X.OBJ_NAME Linear Mr_X.OBJ_NAME	Identifies point tag.
1	R/W	AC30	30	DP Mtr_X.DESC Linear Mr_X.DESC	Describes point **Note:** The description truncates to 20 characters.
2	R/W	BIN	1	DP Mtr_X.MTR_TYPE	Calculation Method: **Bit 7** – Differential Flow Calculation Standard: 0 = AGA3 1 = ISO5167 **Linear Meter:** Not Used
				No Mapping	**Bit 6** – RBX on Set: (Not used – always 0) 0 = No RBX 1 = Enable RBX **Bit 5** – RBX on Clear: (Not used – always 0) 0 = No RBX 1 = Enable RBX **Bit 4** – Meter Run Alarming: (Not used – always 0) 0 = Disabled 1 = Enabled
	R/O	BIN	1	DP Mtr_X.STATION_OBJ.TEMP_UNITS Linear Mtr_X.STATION_OBJ.TEMP_UNITS	**Bit 3** — Units of Measurement 0 = English

Point Type 46: Meter Configuration Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
					1 = Metric
	R/O	BIN	1	No Mapping	**Bit 2** — Log Meter Run Lim 0 = Log Events 1 = Do not log
	R/O	BIN	1	No Tag mapping based on Meter object in use	**Bit 1** — Flow Calculation M 0 = Differential 1 = Linear
	R/O	BIN	1	No Mapping	**Bit 0** — Not Used
3	R/W	BIN	1	Linear Mtr_X.FACTOR_CURCE_OPT	Indicates Calculation Method II: **Bit 7** – K-factor Calculation: **Differential Meter:** Not used 0 = Single 1 = Multiple

Point Type 46: Meter Configuration Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
	R/O	BIN	1	No Mapping	**Bit 6** – Not used
	R/W	BIN	1	DP Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.USER_MODE Linear Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.USER_MODE	**Bit 5** – Gas Quality Input Mode: 0 = Constant 1 = Live
	R/O	BIN	1	No Mapping	**Bit 4** – Heating Value Delivered Basis: (Not used – always 0) 0 = Ignored 1 = As Delivered
	R/W	BIN	1	DP Mtr_X.STATION_OBJ.H20_CONTENT_BASIS Linear Mtr_X.STATION_OBJ.H20_CONTENT_BASIS	**Bit 3** – Heating value Dry or Wet Basis: 0 = Dry 1 = Wet
	R/W	BIN	1	DP Mtr_X.STATION_OBJ.ATMPR_UMODE Linear Mtr_X.STATION_OBJ.ATMPR_UMODE	**Bit 2** – Atmospheric Pressure Source: 0 = Calculated 1 = Entered
	R/O	BIN	1	DP Mtr_X.STATION_OBJ.ZF_METHOD Linear Mtr_X.STATION_OBJ.ZF_METHOD	**Bit 1** – AGA8 Gross Characterization Method: 0 = Gross 2 1 = Gross 1 **Bit 0** – AGA8 Characterization Method: 0 = Detailed 1 = Gross
4	R/O	BIN	1	No Mapping	Options: **Bit 7** – Log Methane Assignment: (Not used – always 0) 0 = Log 1 = Do not log
	R/W	BIN	1	DP Mtr_X.STATION_OBJ.HV_MEAS_BASIS Linear Mtr_X.STATION_OBJ.HV_MEAS_BASIS	**Bit 6** – Units for HV, alarm limits, and sample accum:

Point Type 46: Meter Configuration Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
					0 = Mass 1 = Volume
	R/W	BIN	1	DP Mtr_X.STATION_OBJ.GRAV_UMODE Linear Mtr_X.STATION_OBJ.GRAV_UMODE	**Bit 5** – Gravitational Acceleration Source: 0 = Calculate 1 = Entered
	R/W	BIN	1	DP Mtr_X.FLUID_PROP_OBJ.HV_REAL_MODE Linear Mtr_X.FLUID_PROP_OBJ.HV_REAL_MODE	**Bit 4** – Heating Value Source: 0 = Calculate 1 = Entered
	R/W	BIN	1	DP Mtr_X.PRESS_TYPE Linear Mtr_X.PRESS_TYPE	**Bit 3** – Static Pressure Value: 0 = Gauge 1 = Absolute
	R/W	BIN	1	DP Mtr_X.PRESS_LOC	**Bit 2** – Static Pressure Tap Location: **Differential Meter:** 0 = Downstream 1 = Upstream **Linear Meter**: Not used
	R/W	BIN	1	DP Mtr_X.FLUID_PROP_OBJ.RD_REAL_MODE Linear Mtr_X.FLUID_PROP_OBJ.RD_REAL_MODE	**Bit 1** – Specific Gravity Source: 0 = Calculate 1 = Entered
	R/W	BIN	1	DP Mtr_X.MTR_TYPE	**Bit 0** – Type of pressure tap: 0 = Flange 1 = Pipe **Linear Meter:** Not used
5	R/O	UINT8	1	No Mapping	Contract Hour (Not used – always 0)
6	R/O	FL	4	No Mapping	**Integral Multiplier Period** – Orifice (minutes) (Not used – always 0) **Base Multiplier Period** – Turbine (minutes) (Not used – always 0)

Point Type 46: Meter Configuration Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
7	R/W	FL	4	DP Mtr_X.PIPE_DIAM Linear Mr_X.PIPE_DIAM	Pipe Diameter (inches or mm)
8	R/W	FL	4	DP Mtr_X.PIPE_DIAM_REF Linear Mr_X.PIPE_DIAM_REF	Pipe Reference Temperature (degrees F or C)
9	R/W	UINT8	1	DP Mtr_X.PIPE_MAT_OPT Linear Mr_X.PIPE_MAT_OPT	Pipe Material: **0** = SS **1** = Monel **2 =** CS **3** = 304SS **4** = 316SS **5** = Monel400
10	R/W	FL	4	DP Mtr_X.MTR_DIAM Linear Mr_X.MTR_DIAM	Orifice plate diameter (inches or millimeters)
11	R/W	FL	4	DP Mtr_X.MTR_DIAM_REF Linear Mr_X.MTR_DIAM_REF	Orifice plate reference temperature (degrees F or C)
12	R/W	UINT8	1	DP Mtr_X.MTR_MAT_OPT Linear Mr_X.MTR_MAT_OPT	Orifice Material: **0** = SS **1** = Not used – always 0 **2 =** CS **3** = 304SS **4** = 316SS **5** = Monel400
13	R/W	FL	4	DP Mtr_X.STATION_OBJ.PB_SEL Linear Mr_X. STATION_OBJ.PB_SEL	Base or contract pressure (psia or kPa)
14	R/W	FL	4	DP Mtr_X.STATION_OBJ.TB_SEL Linear Mr_X. STATION_OBJ.TB_SEL	Base or contract temperature
15	R/W	FL	4	DP Mtr_X.STATION_OBJ.ATMPR_SEL Linear Mr_X. STATION_OBJ.ATMPR_SEL	Atmospheric pressure

Point Type 46: Meter Configuration Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
16	R/W	FL	4	DP Mtr_X.FLUID_PROP_OBJ.RD_REAL_SEL Linear Mr_X. FLUID_PROP_OBJ.RD_REAL_SEL	Specific gravity
17	R/W	FL	4	DP Mtr_X.FLUID_PROP_OBJ.HV_REAL_SEL Linear Mr_X. FLUID_PROP_OBJ.HV_REAL_SEL	Heating value
18	R/W	FL	4	DP Mtr_X.FLUID_PROP_OBJ.DYN_VISC_OVRD Linear Mr_X. FLUID_PROP_OBJ. DYN_VISC_OVRD	Viscosity
19	R/W	FL	4	DP Mtr_X.FLUID_PROP_OBJ.ISENTR_SEL Linear Mr_X. FLUID_PROP_OBJ. ISENTR_SEL	Specific Heat Ratio
20	R/W	FL	4	DP Mtr_X.STATION_OBJ.ELEVATION Linear Mr_X. STATION_OBJ.ELEVATION	Elevation (ft or m)
21	R/W	FL	4	DP Mtr_X.STATION_OBJ.LATITUDE Linear Mr_X. STATION_OBJ.LATITUDE	Latitude (degrees)
22	R/W	FL	4	DP Mtr_X.STATION_OBJ.GRAV Linear Mr_X. STATION_OBJ.GRAV	Local Gravitational Acceleration (Read) Local Gravitational Acceleration (Write)
23	R/W	FL	4	DP Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.N2_SEL Linear Mr_X. FLUID_PROP_OBJ. COMPONENTS_OBJ.N2_SEL	Nitrogen (N_2) composition, in mole %
24	R/W	FL	4	DP Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.CO2_SEL Linear Mr_X. FLUID_PROP_OBJ. COMPONENTS_OBJ.CO2_SEL	Carbon Dioxide (CO_2) composition, in mole %
25	R/W	FL	4	DP Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.H2S_SEL Linear Mr_X. FLUID_PROP_OBJ. COMPONENTS_OBJ.H2S_SEL	Hydrogen Sulfide (H_2S) composition, in mole %
26	R/W	FL	4	DP Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.H2O_SEL Linear Mr_X. FLUID_PROP_OBJ. COMPONENTS_OBJ.H2O_SEL	Water (H_2O) composition, in mole %
27	R/W	FL	4	DP Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.HE_SEL	He Helium

Point Type 46: Meter Configuration Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
				Linear Mr_X. FLUID_PROP_OBJ. COMPONENTS_OBJ.HE_SEL	
28	R/W	FL	4	DP Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.C1_SEL Linear Mr_X. FLUID_PROP_OBJ. COMPONENTS_OBJ.C1_SEL	Methane (CH_4) composition, in mole %
29	R/W	FL	4	DP Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.C2_SEL Linear Mr_X. FLUID_PROP_OBJ. COMPONENTS_OBJ.C2_SEL	Ethane (C_2H_6) composition, in mole %
30	R/W	FL	4	DP Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.C3_SEL Linear Mr_X. FLUID_PROP_OBJ. COMPONENTS_OBJ.C3_SEL	Propane (C_3H_8) composition, in mole %
31	R/W	FL	4	DP Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.NC4_SEL Linear Mr_X. FLUID_PROP_OBJ. COMPONENTS_OBJ.NC4_SEL	n-Butane (C_4H_{10}) composition, in mole %
32	R/W	FL	4	DP Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.IC4_SEL Linear Mr_X. FLUID_PROP_OBJ. COMPONENTS_OBJ.IC4_SEL	i-Butane (C_4H_{10}) composition, in mole %
33	R/W	FL	4	DP Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.NC5_SEL Linear Mr_X. FLUID_PROP_OBJ. COMPONENTS_OBJ.NC5_SEL	n-Pentane (C_5H_{12}) composition, in mole %
34	R/W	FL	4	DP Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.IC5_SEL Linear Mr_X. FLUID_PROP_OBJ. COMPONENTS_OBJ.IC5_SEL	i-Pentane (C_5H_{12}) composition, in mole %
35	R/W	FL	4	DP Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.C6_SEL Linear Mr_X. FLUID_PROP_OBJ. COMPONENTS_OBJ.C6_SEL	n-Hexane (C_6H_{14}) composition, in mole %
36	R/W	FL	4	DP Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.C7_SEL	n-Heptane (C_7H_{16}) composition, in mole %

Point Type 46: Meter Configuration Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
				Linear Mr_X. FLUID_PROP_OBJ. COMPONENTS_OBJ.C7_SEL	
37	R/W	FL	4	DP Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.C8_SEL Linear Mr_X. FLUID_PROP_OBJ. COMPONENTS_OBJ.C8_SEL	n-Octane (C_8H_{18}) composition, in mole %
38	R/W	FL	4	DP Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.C9_SEL Linear Mr_X. FLUID_PROP_OBJ. COMPONENTS_OBJ.C9_SEL	n-Nonane (C_9H_{20}) composition, in mole %
39	R/W	FL	4	DP Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.C10_SEL Linear Mr_X. FLUID_PROP_OBJ. COMPONENTS_OBJ.C10_SEL	n-Decane ($C_{10}H_{22}$) composition, in mole %
40	R/W	FL	4	DP Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.O2_SEL Linear Mr_X. FLUID_PROP_OBJ. COMPONENTS_OBJ.O2_SEL	Oxygen (O_2) composition, in mole %
41	R/W	FL	4	DP Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.CO_SEL Linear Mr_X. FLUID_PROP_OBJ. COMPONENTS_OBJ.CO_SEL	Carbon Monoxide (CO) composition, in mole %
42	R/W	FL	4	DP Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.H2_SEL Linear Mr_X. FLUID_PROP_OBJ. COMPONENTS_OBJ.H2_SEL	Hydrogen (H_2) composition, in mole %
43	R/W	FL	4	DP Mtr_X.NO_FLOW_LIM Linear Mtr_X.KF_SEL	**Differential Meter**: Low hw Cutoff **Linear Meter**: K-factor
44	R/O	FL	4	No Mapping	**Differential Meter**: Stacked DP High Switch Point (Not used – always 0)
	R/W	FL	4	Linear Mtr_X.NO_FLOW_LIM	**Linear Meter**: Low Flowrate Cutoff
45	R/O	FL	4	No Mapping	**Differential Meter**: Stacked DP Low Switch Point (Not used – always 0) **Linear Meter:** Not used – always 0

Point Type 46: Meter Configuration Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
46	R/O	UINT8	1	No Mapping	**Differential Meter**: Stacked DP (Not used – always 0) 0 = Disabled 1 = Enabled **Linear Meter:** Not used – always 0
47	R/O	TLP	3	No Mapping	**Differential Meter**: Stacked DP Input Definition (Not used – always 0) **Linear Meter:** Not Used
48	R/O	TLP	3	DP Mtr_X.DP_OBJ Linear Mtr_X.FLOW_OBJ	**Differential Meter**: hw Input Definition **Linear Meter:** Uncorrected Flow Rate Input Definition
49	R/O	TLP	3	DP Mtr_X.PF_OBJ Linear Mtr_X.PF_OBJ	Static Pressure (Pf) Input Definition
50	R/O	TLP	3	DP Mtr_X.TF_OBJ Linear Mtr_X.TF_OBJ	Flowing Temperature (Tf) Input Definition
51	R/W	FL	4	DP Mtr_X.DP_OBJ.SELECTED Linear Mtr_X.FLOW_OBJ.SELECTED_FREQ	**Differential Meter**: Current Differential Pressure **Linear Meter:** Uncorrected Flow Rate
52	R/W	FL	4	DP Mtr_X.PF_OBJ.SELECTED Linear Mtr_X.PF_OBJ.SELECTED	Current Pf – Flowing Pressure
53	R/W	FL	4	DP Mtr_X.TF_OBJ.SELECTED Linear Mtr_X.TF_OBJ.SELECTED	Current Tf – Flowing Temperature
54	R/O	BIN	1	No Mapping	Alarm Code: **Bit 7** – Manual Mode: (Not used – always 0) 0 = No alarm 1 = In alarm **Bit 6** – No Flow: (Not used – always 0) 0 = No alarm

Point Type 46: Meter Configuration Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
					1 = In alarm **Bit 5** – Flow Rate Register Discrepancy (Not used – always 0) **Bit 4** – Total Counts Register Discrepancy (Not Used – always 0) **Bit 3** – Not used – always 0
	R/O	BIN	1	DP Mtr_X.FLW_ALM_OBJ.PROCESS_ALM Linear Mtr_X. FLW_ALM_OBJ.PROCESS_ALM	**Bit 2** – High Alarm 0 = No alarm 1 = In alarm
	R/O	BIN	1	No Mapping	**Bit 1** – Not used – always 0
	R/O	BIN	1	DP Mtr_X.FLW_ALM_OBJ.PROCESS_ALM Linear Mtr_X. FLW_ALM_OBJ.PROCESS_ALM	**Bit 0** – Low Alarm 0 = No alarm 1 = In alarm
55	R/W	FL	4	DP Mtr_X.FLW_ALM_OBJ.LO_LIM Linear Mtr_X. FLW_ALM_OBJ.LO_LIM	Low Alarm Flow Limit
56	R/W	FL	4	DP Mtr_X.FLW_ALM_OBJ.HI_LIM Linear Mtr_X. FLW_ALM_OBJ.HI_LIM	High Alarm Flow Limit
57	R/W	UINT8	1	Mtr Setup_1.AVG_METHOD	History Averaging Technique: **1** = Flow-dependent time-weighted linear averaging **2** = Flow-dependent time-weighted formulaic averaging **3** = Flow-weighted linear averaging **4** = Flow-weighted formulaic averaging **5** = Linear averaging
58	R/O	UINT8	1	No Mapping	Full Recalculation Flag: (Not used – always 0) **0** = No recalc active **1** = Force full recalc)

Point Type 46: Meter Configuration Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
59	R/O	TLP	3	Linear Mtr_X.FLOW_OBJ	**Differential Meter:** Not used – always 0 **Linear Meter:** Input definition for multiple K-factor calculation
60	R/O	FL	4	No Mapping	**Differential Meter:** Not used – always 0 **Linear Meter:** Deadband for multiple K-factor calculation (Not used – always 0)
61	R/W	FL	4	Linear Mtr_X.FACTOR_1	**Differential Meter:** Not used – always 0 **Linear Meter:** Lowest K-factor
62	R/W	FL	4	Linear Mtr_X.FACTOR_2	**Differential Meter:** Not used – always 0 **Linear Meter:** 2nd K-factor
63	R/W	FL	4	Linear Mtr_X.FACTOR_3	**Differential Meter:** Not used – always 0 **Linear Meter:** 3rd K-factor
64	R/W	FL	4	Linear Mtr_X.FACTOR_4	**Differential Meter:** Not used – always 0 **Linear Meter:** 4th K-factor
65	R/W	FL	4	Linear Mtr_X.FACTOR_5	**Differential Meter:** Not used – always 0 **Linear Meter:** 5th K-factor
66	R/W	FL	4	Linear Mtr_X.FACTOR_1_FLOW	**Differential Meter:** Not used – always 0 **Linear Meter:** Lowest K-factor EU
67	R/W	FL	4	Linear Mtr_X.FACTOR_2_FLOW	**Differential Meter:** Not used – always 0 **Linear Meter:** 2nd K-factor EU
68	R/W	FL	4	Linear Mtr_X.FACTOR_3_FLOW	**Differential Meter:** Not used – always 0 **Linear Meter:** 3rd K-factor EU
69	R/W	FL	4	Linear Mtr_X.FACTOR_4_FLOW	**Differential Meter:** Not used – always 0 **Linear Meter:** 4th K-factor EU
70	R/W	FL	4	Linear Mtr_X.FACTOR_5_FLOW	**Differential Meter:** Not used – always 0 **Linear Meter:** 5th K-factor EU
71	R/W	FL	4	Linear Mtr_X.FACTOR_6	**Differential Meter:** Not used – always 0 **Linear Meter:** 6th K-factor

Point Type 46: Meter Configuration Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
72	R/W	FL	4	Linear Mtr_X.FACTOR_7	**Differential Meter:** Not used – always 0 **Linear Meter:** 7th K-factor
73	R/W	FL	4	Linear Mtr_X.FACTOR_8	**Differential Meter:** Not used – always 0 **Linear Meter:** 8th K-factor
74	R/W	FL	4	Linear Mtr_X.FACTOR_9	**Differential Meter:** Not used – always 0 **Linear Meter:** 9th K-factor
75	R/W	FL	4	Linear Mtr_X.FACTOR_10	**Differential Meter:** Not used – always 0 **Linear Meter:** 10th K-factor
76	R/W	FL	4	Linear Mtr_X.FACTOR_11	**Differential Meter:** Not used – always 0 **Linear Meter:** 11th K-factor
77	R/W	FL	4	Linear Mtr_X.FACTOR_12	**Differential Meter:** Not used – always 0 **Linear Meter:** Highest K-factor
78	R/W	FL	4	Linear Mtr_X.FACTOR_6_FLOW	**Differential Meter:** Not used – always 0 **Linear Meter:** 6th K-factor EU
79	R/W	FL	4	Linear Mtr_X.FACTOR_7_FLOW	**Differential Meter:** Not used – always 0 **Linear Meter:** 7th K-factor EU
80	R/W	FL	4	Linear Mtr_X.FACTOR_8_FLOW	**Differential Meter:** Not used – always 0 **Linear Meter:** 8th K-factor EU
81	R/W	FL	4	Linear Mtr_X.FACTOR_9_FLOW	**Differential Meter:** Not used – always 0 **Linear Meter:** 9th K-factor EU
82	R/W	FL	4	Linear Mtr_X.FACTOR_10_FLOW	**Differential Meter:** Not used – always 0 **Linear Meter:** 10th K-factor EU
83	R/W	FL	4	Linear Mtr_X.FACTOR_11_FLOW	**Differential Meter:** Not used – always 0 **Linear Meter:** 11th K-factor EU
84	R/W	FL	4	Linear Mtr_X.FACTOR_12_FLOW	**Differential Meter:** Not used – always 0 **Linear Meter:** Highest K-factor EU
85	R/W	FL	4	DP Mtr_X.FLUID_PROP_OBJ.COMPONENTS_OBJ.AR_SEL	Argon (Ar) composition; units are mole percentage

Point Type 46: Meter Configuration Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
				Linear Mr_X. FLUID_PROP_OBJ. COMPONENTS_OBJ.AR_SEL	
86	R/O	BIN	1	No Mapping	Configuration status, byte 4: **Bit 7** – Not used – always 0 **Bit 6** – Not used – always 0 **Bit 5** – Not used – always 0
	R/W	BIN	1	Bit 4: DP Mtr_X.FLUID_PROP_OBJ.JT_UMODE Linear Mr_X. FLUID_PROP_OBJ. JT_UMODE Bit 3: DP Mtr_X.TEMP_CORR_METHOD Linear Meter: Not Used	**Bit 4** – Source of the Joule-Thomson coefficient: 0 = Calculate 1 = Entered **Bit 3** – Calculation of the upstream temperature: 0 = Disabled 1 = Enabled
	R/O	BIN	1	No Mapping	**Bit 2 –** Temperature tap location: (Not used – always 0) 0 = Downstream 1 = Upstream **Bit 1** – Flow rate time basis for alarming: (Not used – always 0) 0 = Daily rate 1 = Hourly rate **Bit 0** – Source of the pressure loss in % (Not used – always 0) 0 = Calculate 1 = Entered
87	R/W	UINT32	4	Linear Mtr_X.NO_FLOW_TIME	**Differential Meter:** Not used – always 0 **Linear Meter:** No flow time limit in seconds

Point Type 46: Meter Configuration Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
88	R/W	UINT8	1	DP Mtr_X.MTR_TYPE	**Differential Meter:** ISO 5167 Meter Type. Valid values are: 0 = Orifice Flange 1 = Orifice Corner Tap 2 = Orifice D and D/2 Taps 10 = Venturi Tube **Linear Meter:** Not used – always 0
89	R/W	FL	4	DP_Mtr_X.CD_SEL	**Differential Meter:** User Venturi Coefficient of Discharge **Linear Meter:** Not used
90	R/W	FL	4	DP Mtr_X.FLW_ALM_OBJ.DEADBAND Linear Mtr_X. FLW_ALM_OBJ.DEADBAND	Alarm Deadband
91	R/O	FL	4	DP Mtr_X.PLOSS_SEL	**Differential Meter:** ISO5167 Pressure Loss **Linear Meter:** Not used
92	R/W	FL	4	DP Mtr_X.FLUID_PROP_OBJ.JT_SEL Linear Mr_X. FLUID_PROP_OBJ. JT_SE:	ISO5167 Joule-Thompson coefficient
93	R/W	BIN	1	DP Mtr_X.AGA3_METHOD	**Differential Meter**: API Options: **Bit 7** – Not used – always 0 **Bit 6** – Not used – always 0 **Bit 5** – Not used – always 0 **Bit 4** – Not used – always 0 **Bit 3** – Not used – always 0 **Bit 2** – Not used – always 0 **Bit 1** – Expansion Factory Calculation: 0 = AGA3 1992 1 = AGA3 2011

Point Type 46: Meter Configuration Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
					Bit 0 – API 21.1 Averaging Technique: (Not used – always 0) 0 = Before 2011 1 = 2011 **Linear Meter:** Not used

3.2.20 Point Type 47: Meter Flow

Description: Point Type 47 provides the meter flow parameters.

Number of Logical Points: (0-2) Based on product type and meter setup

Table 3-23: Point Type 47 – Meter Flow Parameters

Point Type 47: Meter Flow Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
0	R/O	FL	4	DP Mtr_X.SVOL_RATE Linear Mtr_X.SVOL_RATE	Flow rate per day (MCF/Day or km3/Day)
1	R/O	FL	4	DP Mtr_X.ENERGY_RATE Linear Mtr_X.ENERGY_RATE	Energy rate per day (MMBTU/Day or GJoules/Day)
2	R/O	FL	4	DP Mtr_X.SVOL_RATE Linear Mtr_X.SVOL_RATE	Flow rate per hour (CF/Hr or m3/Hr)
3	R/O	FL	4	DP Mtr_X.ENERGY_RATE Linear Mtr_X.ENERGY_RATE	Energy rate per hour (BTU/Hr or MJoules/Hr)
4	R/O	FL	4	DP Mtr_X.IV_SEL Linear Mtr_X.IQ_RATE	**Differential Meter:** Pressure Extension **Linear Meter:** Uncorrected Flow
5	R/O	FL	4	DP Mtr_X.Y1_SEL Linear Mtr_X.PRESS_MULTI	**Differential Meter:** Expansion Factor **Linear Meter:** Fpm
6	R/O	FL	4	DP Mtr_X.CD_SEL	**Differential Meter:** CdFT **Linear Meter:** Not used – always 0
7	R/O	FL	4	Linear Mtr_X.TEMP_MULTI	**Orifice:** Fm (Not used – always 0.0) **Turbine:** Ftm
8	R/O	FL	4	No Mapping	Base pressure factor (Fpb) (Not used – always 0.0)
9	R/O	FL	4	No Mapping	Base temperature factor (Ftb) (Not used – always 0.0)
10	R/O	FL	4	No Mapping	Flowing temperature factor (Ftf) (Not used – always 0.0)
11	R/O	FL	4	No Mapping	Real gas relative density factor (Fgr) (Not used – always 0.0)
12	R/O	FL	4	No Mapping	Supercompressibility factor (Fpv) (Not used – always 0.0)

Point Type 47: Meter Flow Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
13	R/O	FL	4	DP Mtr_X.FLUID_PROP_OBJ.ZS_SEL Linear Mtr_X.FLUID_PROP_OBJ.ZS_SEL	Compressibility at standard conditions (Zs)
14	R/O	FL	4	DP Mtr_X.FLUID_PROP_OBJ.ZB_SEL Linear Mtr_X.FLUID_PROP_OBJ.ZB_SEL	Compressibility at base conditions (Zb)
15	R/O	FL	4	DP Mtr_X.FLUID_PROP_OBJ.ZF_SEL Linear Mtr_X.FLUID_PROP_OBJ.ZF_SEL	Compressibility at flowing conditions (Zf1)
16	R/O	FL	4	DP Mtr_X.IMV_SEL Linear Mtr_X.IMV_SEL	**Orifice:** Integral Multiplier Value (IMV) **Turbine:** Base Multiplier Value (BMv)
17	R/O	FL	4	DP Mtr_X.DIAM_SEL	**Differential Meter:** Orifice Plate Bore Diameter at flowing conditions (D) **Linear Meter:** Not used – always 0
18	R/O	FL	4	DP Mtr_X.PIPE_DIAM_SEL	**Differential Meter:** Meter Tube Internal Diameter at flowing conditions (D) **Linear Meter:** Not used – always 0
19	R/O	FL	4	DP Mtr_X.BETA_SEL	**Differential Meter:** Diameter Ratio (Beta) **Linear Meter:** Not used – always 0
20	R/O	FL	4	DP Mtr_X.EV_SEL	**Differential Meter:** Velocity of Approach (Ev) **Linear Meter:** Not used – always 0
21	R/O	FL	4	DP Mtr_X.DP_INUSE Linear Mtr_X.PULSE_RAW_TOT	**Differential Meter:** Average hw **Linear Meter:** Total counts during last BMP (if pulse input)
22	R/O	FL	4	DP Mtr_X.PF_INUSE Linear Mtr_X.PF_INUSE	Average flowing pressure (Pf)
23	R/O	FL	4	DP Mtr_X.TF_INUSE Linear Mtr_X.TF_INUSE	Average flowing temperature (Tf)
24	R/O	FL	4	DP Mtr_X.FLUID_PROP_OBJ.DENSF_SEL Linear Mtr_X. FLUID_PROP_OBJ.DENSF_SEL	Flowing Density
25	R/O	FL	4	DP Mtr_X.FLUID_PROP_OBJ.DENSB_SEL	Base Density

Point Type 47: Meter Flow Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
				Linear Mtr_X. FLUID_PROP_OBJ.DENSB_SEL	
26	R/O	FL	4	DP Mtr_X.RE_SEL	**Differential Meter:** Reynolds Number **Linear Meter:** Not used – always 0
27	R/O	FL	4	DP Mtr_X.PF_INUSE	**Differential Meter:** Upstream Static Pressure **Linear Meter:** Not used – always 0
28	R/O	FL	4	DP Mtr_X.FLUID_PROP_OBJ.MOLAR_MASS Linear Mtr_X. FLUID_PROP_OBJ.MOLAR_MASS	Molecular weight
29	R/O	FL	4	No Mapping	Fam - Not used – always 0
30	R/O	FL	4	No Mapping	Fwt - Not used – always 0
31	R/O	FL	4	No Mapping	Fwl - Not used – always 0
32	R/O	FL	4	No Mapping	Local gravitation correction for deadweight tester static pressure (F_{pwl}) (Not used – always 0)
33	R/O	FL	4	No Mapping	Local gravitation correction for deadweight tester diff pressure (F_{pwl}) (Not used – always 0)
34	R/O	FL	4	No Mapping	Fhgm - Not used – always 0
35	R/O	FL	4	No Mapping	Fhgt - Not used – always 0
36	R/O	FL	4	DP Mtr_X.SVOL_TOT_OBJ.CUR_DAY Linear Mtr_X.SVOL_TOT_OBJ.CUR_DAY	Volumetric flow today (MCF or km3)
37	R/O	FL	4	DP Mtr_X.SVOL_TOT_OBJ.PREV_DAY Linear Mtr_X.SVOL_TOT_OBJ.PREV_DAY	Volumetric flow yesterday (MCF or km3)
38	R/O	FL	4	DP Mtr_X.SVOL_TOT_OBJ.CUR_MNTH Linear Mtr_X.SVOL_TOT_OBJ.CUR_MNTH	Volumetric flow this month (MCF or km3)
39	R/O	FL	4	DP Mtr_X.SVOL_TOT_OBJ.PREV_MNTH Linear Mtr_X.SVOL_TOT_OBJ.PREV_MNTH	Volumetric flow for previous month (MCF or km3)

Point Type 47: Meter Flow Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
40	R/O	FL	4	DP Mtr_X.SVOL_RAW_TOT Linear Mtr_X.SVOL_RAW_TOT	Volumetric accumulated flow since the last reset (MCF or km3)
41	R/O	FL	4	DP Mtr_X.FLWTM_TOT_OBJ.CUR_DAY Linear Mtr_X.FLWTM_TOT_OBJ.CUR_DAY	Minutes of flow today
42	R/O	FL	4	DP Mtr_X.FLWTM_TOT_OBJ.PREV_DAY Linear Mtr_X.FLWTM_TOT_OBJ.PREV_DAY	Minutes of flow yesterday
43	R/O	FL	4	DP Mtr_X.FLWTM_TOT_OBJ.CUR_MNTH Linear Mtr_X.FLWTM_TOT_OBJ.CUR_MNTH	Minutes of flow this month
44	R/O	FL	4	DP Mtr_X.FLWTM_TOT_OBJ.PREV_MNTH Linear Mtr_X.FLWTM_TOT_OBJ.PREV_MNTH	Minutes of flow for the previous month
45	R/O	FL	4	DP Mtr_X.FLWTM_RAW_TOT Linear Mtr_X.FLWTM_RAW_TOT	Accumulated minutes of flow since the last reset
46	R/O	FL	4	DP Mtr_X.ENERGY_TOT_OBJ.CUR_DAY Linear Mtr_X.ENERGY_TOT_OBJ.CUR_DAY	Energy Today (MMBTU or GJoules)
47	R/O	FL	4	DP Mtr_X.ENERGY_TOT_OBJ.PREV_DAY Linear Mtr_X.ENERGY_TOT_OBJ.PREV_DAY	Energy Yesterday (MMBTU or GJoules)
48	R/O	FL	4	DP Mtr_X.ENERGY_TOT_OBJ.CUR_MNTH Linear Mtr_X.ENERGY_TOT_OBJ.CUR_MNTH	Energy this Month (MMBTU or GJoules)
49	R/O	FL	4	DP Mtr_X.ENERGY_TOT_OBJ.PREV_MNTH Linear Mtr_X.ENERGY_TOT_OBJ.PREV_MNTH	Energy for the Previous Month (MMBTU or GJoules)

Point Type 47: Meter Flow Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
50	R/O	FL	4	DP Mtr_X.ENERGY_RAW_TOT Linear Mtr_X.ENERGY_RAW_TOT	Energy accumulated since the last reset (MMBTU or GJoules)
51	R/O	FL	4	DP Mtr_X.UVOL_TOT_OBJ.CUR_DAY Linear Mtr_X.UVOL_TOT_OBJ.CUR_DAY	Uncorrected Today (MCF or km3)
52	R/O	FL	4	DP Mtr_X.UVOL_TOT_OBJ.PREV_DAY Linear Mtr_X.UVOL_TOT_OBJ.PREV_DAY	Uncorrected Yesterday (MCF or km3)
53	R/O	FL	4	DP Mtr_X.UVOL_TOT_OBJ.CUR_MNTH Linear Mtr_X.UVOL_TOT_OBJ.CUR_MNTH	Uncorrected Month (MCF or km3)
54	R/O	FL	4	DP Mtr_X.UVOL_TOT_OBJ.PREV_MNTH Linear Mtr_X.UVOL_TOT_OBJ.PREV_MNTH	Uncorrected Previous Month (MCF or km3)
55	R/O	FL	4	DP Mtr_X.UVOL_RAW_TOT Linear Mtr_X.UVOL_RAW_TOT	Uncorrected Accumulation (MCF or km3)
56	R/O	UINT8	1	No Mapping	Partial Recalculation Flag: (Not used – always 0) **0** = No recalc **1** = Partial recalc **2** = Full recalc)
57	R/O	UINT8	1	No Mapping	Redundant Flow Rate per Day – Not used – always 0
58	R/O	UINT8	1	No Mapping	Redundant Total Counts – Not used – always 0
59	R/O	UINT32	4	Linear Mtr_X.PULSE_TOT_OBJ.CURRENT	**Differential Meter:** Not used – always 0 **Linear Meter:** Accumulated Pulses
60	R/O	UINT8	1	No Mapping	Current Flow Status: (Not used – always 0) **0** = Not flowing **1** = Flowing)
61	R/O	FL	4	DP Mtr_X.MASS_RATE Linear Mtr_X.MASS_RATE	Daily Mass Flow Rate (Mlb/Day or Tonnes/Day)
62	R/O	FL	4	DP Mtr_X.MASS_RATE Linear Mtr_X.MASS_RATE	Hourly Mass Flow Rate (lb/Hr or kg/Hr)

Point Type 47: Meter Flow Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
63	R/O	FL	4	DP Mtr_X.MASS_TOT_OBJ.CUR_DAY Linear Mtr_X.MASS_TOT_OBJ.CUR_DAY	Mass Flow Today (Mlb or Tonnes)
64	R/O	FL	4	DP Mtr_X.MASS_TOT_OBJ.PREV_DAY Linear Mtr_X.MASS_TOT_OBJ.PREV_DAY	Mass Flow Yesterday (Mlb or Tonnes)
65	R/O	FL	4	DP Mtr_X.MASS_TOT_OBJ.CUR_MNTH Linear Mtr_X.MASS_TOT_OBJ.CUR_MNTH	Mass Flow Current Month (Mlb or Tonnes)
66	R/O	FL	4	DP Mtr_X.MASS_TOT_OBJ.PREV_MNTH Linear Mtr_X.MASS_TOT_OBJ.PREV_MNTH	Mass Flow Previous Month (Mlb or Tonnes)
67	R/O	FL	4	DP Mtr_X.MASS_RAW_TOT Linear Mtr_X.MASS_RAW_TOT	Mass Flow Accumulated since last reset (Mlb or Tonnes)
68	R/O	BIN	1	Bit 3: DP Mtr_X.STATION_OBJ.FLD_TYPE Linear Mtr_X.STATION_OBJ.FLD_TYPE	Flow calculation configuration:

Point Type 47: Meter Flow Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
					Bit 7 – Not used – always 0 **Bit 6** – Not used – always 0 **Bit 5** – Not used – always 0 **Bit 4** – Not used – always 0 **Bit 3** – Phase of Fluid: 0 = Gas 1 = Liquid **Bit 2** – Flow Calculation Basis: (Not used – always 0) 0 = Volumetric 1 = Mass **Bit 1** – Source of Properties Calculation: (Not used – always 0) 0 = Firmware 1 = User Program **Bit 0** – Source of Flow Calculation: (Not used – always 0) 0 = Firmware 1 = User Program
69	R/O	FL	4	Linear Mtr_X.PRESS_MULTI	**Differential Meter:** Not used – always 0 **Linear Meter:** AGA7: Pressure multiplier (Pf / Pb)
70	R/O	FL	4	Linear Mtr_X.TEMP_MULTI	**Differential Meter:** Not used – always 0 **Linear Meter:** AGA7: Temperature multiplier (Tb / Tf)
71	R/O	FL	4	Linear Mtr_X.COMP_MULTI	**Differential Meter:** Not used – always 0 **Linear Meter:** AGA7: Compressibility multiplier (Zb / Zf)
72	R/O	AC20	20	No Mapping	Description of the standard used to calculate the flow rates of the fluid (Not used – always blank)
73	R/O	AC20	20	No Mapping	Description of the standard used to calculate the properties of the fluid (Not used – always blank)
74	R/O	FL	4	No Mapping	Returns 0

Point Type 47: Meter Flow Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
75	R/O	UINT8	1	No Mapping	Heating value table in use: (Not used – always 0) **0** = GPA2145-09 **1** = ISO6976@15°C 2 = ISO6976@20°C

3.2.21 Point Type 48: PID Control

Description: Point Type 48 provides the PID control parameters.

Number of Logical Points: (0-3) Based on product type and licensing.

Table 3-24: Point Type 48 – PID Control Parameters

Point Type 48: PID Control Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
0	R/W	AC10	10	PID_X.DESC	Identifies the point tag.
1	R/W	BIN	1	PID_X.PID_ENABLE	Control Type: **Bit 7** – PID Scanning Status: 0 = Enabled 1 = Disabled
	R/W	BIN	1	PID_X.P_SETPOINT_TRACK_EN	**Bit 6** – Setpoint Tracks PV in Manual: 0 = Enabled 1 = Disabled
	R/O	BIN	1	No Mapping	**Bit 5** – Not used
	R/W	BIN	1	PID_X.RESUME_ON_RESET	**Bit 4 –** Scanning Status After Restart: 0 = Enable scanning 1 = Disable scanning
	R/W	BIN	1	PID_X.SWITCH_SELECT	**Bit 3 –** Primary/Override Selection: 0 = Low select 1 = High select
	R/W	BIN	1	PID_X.OUTPUT_TYPE	**Bit 2** – Output Type: 0 = Analog 1 = High Discrete
	R/W	BIN	1	PID_X.PID_LOOP_TYPE	**Bit 1** – Primary/Override: 0 = Primary only 1 = Primary and override
	R/W	BIN	1	PID_X.OUTPUT_MODE	**Bit 0** – Source of Flow Calculation:

Point Type 48: PID Control Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
					0 = Manual 1 = Automatic
2	R/O	UINT8	1	PID_X.SELECTED_LOOP	Active Loop Status: **0** = Inactive **1** = Primary controlling **2** = Override controlling)
3	R/W	FL	4	PID_X.LOOP_PERIOD	Loop Period (in seconds)
4	R/O	FL	4	PID_X.LOOP_PERIOD	Actual Loop Period (in seconds)
5	R/W	TLP	3	PID_X.P_PV_POINT	Primary PV Input Point TLP
6	R/W	FL	4	PID_X.P_SETPOINT	Setpoint of primary loop
7	R/W	FL	4	PID_X.P_SETPOINT_RAMP	Maximum setpoint change rate of the primary loop
8	R/W	FL	4	PID_X.P_PROPORTIONAL_G	Primary Proportional Gain
9	R/W	FL	4	PID_X.P_INTEGRAL_GAIN	Primary Reset (Integral) Gain
10	R/W	FL	4	PID_X.P_DERIVATIVE_GAIN	Primary Rate (Derivative) Gain
11	R/O	FL	4	No Mapping	Primary Scale Factor (Not used – always 0)
12	R/O	FL	4	No Mapping	Primary Integral Deadband (Not used – always 0)
13	R/W	FL	4	PID_X.P_PROCESS_VARIABLE	Primary loop process variable (PV)
14	R/O	FL	4	PID_X.ANALOG_OUT_POINT Or PID_X.DIGITAL_OUT_POINT1 Or PID_X.DIGITAL_OUT_POINT2	Change in output calculated by the primary loop
15	R/W	TLP	3	PID_X.O_PV_POINT	TLP for the process variable fo the override loop.
16	R/W	FL	4	PID_X.O_SETPOINT	Setpoint of the override loop
17	R/W	FL	4	PID_X.O_SETPOINT_RAMP	Maximum setpoint change rate of the override loop
18	R/W	FL	4	PID_X.O_PROPORTIONAL_G	Proportional gain of the override loop
19	R/W	FL	4	PID_X.O_INTEGRAL_GAIN	Override Reset (Integral) Gain
20	R/W	FL	4	PID_X.O_DERIVATIVE_GAIN	Derivative gain of the override loop; units are minutes.

Point Type 48: PID Control Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
21	R/O	FL	4	No Mapping	Override scale factor
22	R/O	FL	4	No Mapping	Integral deadband of the override loop (Not used – always 0)
23	R/W	FL	4	PID_X.O_PROCESS_VARIABLE	Process variable (PV) of the override loop
24	R/O	FL	4	PID_X.ANALOG_OUT_POINT Or PID_X.DIGITAL_OUT_POINT1 Or PID_X.DIGITAL_OUT_POINT2	Change in output calculated by the override loop
25	R/O	FL	4	PID_X.OUTPUT_VALUE	Current Output of PID
26	R/W	TLP	3	PID_X.ANALOG_OUT_POINT or PID_X.DIGITAL_OUT_POINT1	PID Output Point (AO or Open DO)
27	R/W	TLP	3	PID_X.DIGITAL_OUT_POINT2	Second Output of PID (Close DO)
28	R/W	FL	4	PID_X.CLAMP_LOW_LIMIT	Low limit of the value written to the AO or to the DO for decreases
29	R/W	FL	4	PID_X.CLAMP_HIGH_LIMIT	High limit of the value written to the AO or to the DO for increases
30	R/O	UINT8	1	No Mapping	Control Loop Selection: (Not used – always 0) **0** = Accept change from either loop **1** = Accept change from primary only **2** = Accept change from override only)
31	R/O	FL	4	No Mapping	Returns 0
32	R/O	AC10	10	No Mapping	Primary Loop PV and Setpoint Units (Not used – always 0)
33	R/O	AC10	10	No Mapping	Override PV Look and Setpoint Units (Not used – always 0)
34	R/O	AC10	10	No Mapping	PID Output Units (Not used – always 0)
35	R/O	FL	4	No Mapping	Low EU value for the primary loop's and setpoint for LCD bar graph. (Not used – always 0.0)

Point Type 48: PID Control Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
36	R/O	FL	4	No Mapping	High EU value for the primary loop's PV and setpoint for LCD bar graph. (Not used – always 0)
37	R/O	FL	4	No Mapping	Low EU value for the override loop's PV and setpoint for LCD bar graph. (Not used – always 0)
38	R/O	FL	4	No Mapping	High EU value for the override loop's PV and setpoint for LCD bar graph. (Not used – always 0)

3.2.22 Point Type 86: Extended History

Description: Point Type 86 provides the extended history parameters.

Number of Logical Points: 1 logical for up to 50 extended history points.

Parameters 2-41 are mapped to FB Series User Periodic Group 1 history points 1-10.

Parameters 42-201 are unmapped and return zero values for all parameters.

Table 3-25: Point Type 86 – Extended History Parameters

Point Type 86: Extended History Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
0	R/O	UINT8	1	Hist Grp_1.NUM_PTS	Maximum number of extended history points
1	R/O	UINT8	1	Hist Grp_1.USER_PERIOD	Log Interval (in minutes) (1-60)
2	R/O	TLP	3	No Mapping	Tag TLP for history point 1 (Not used – always 0)
3	R/O	TLP	3	Hist_1-1.HIST_PARAM	Value TLP for history point 1
4	R/O	UINT8	1	Hist_1-1.HIST_TYPE	Archive type for history point 1: **128** = Average **129** = Accumulate **130** = Snapshot **134** = Totalize
5	R/O	UINT8	1	Hist_1-1.HIST_TYPE	Average/Rate Type for history point 1: **0** = No Detail **1** = Minimum Value **2** = Maximum Value **5** = Linear Average **10** = 1 Second Accumulation Period
6	R/O	TLP	3	No Mapping	Tag TLP for history point 2 (Not used – always 0,0,0)
7	R/O	TLP	3	Hist_1-2.HIST_PARAM	Value TLP for history point 2
8	R/O	UINT8	1	Hist_1-2.HIST_TYPE	Archive type for history point 2

Point Type 86: Extended History Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
9	R/O	UINT8	1	Hist_1-2.HIST_TYPE	Average/Rate Type for history point 2
10	R/O	TLP	3	No Mapping	Tag TLP for history point 3 (Not used – always 0,0,0)
11	R/O	TLP	3	Hist_1-3.HIST_PARAM	Value TLP for history point 3
12	R/O	UINT8	1	Hist_1-3.HIST_TYPE	Archive type for history point 3
13	R/O	UINT8	1	Hist_1-3.HIST_TYPE	Average/Rate Type for history point 3
14	R/O	TLP	3	No Mapping	Tag TLP for history point 4 (Not used – always 0,0,0)
15	R/O	TLP	3	Hist_1-4.HIST_PARAM	Value TLP for history point 4
16	R/O	UINT8	1	Hist_1-4.HIST_TYPE	Archive type for history point 4
17	R/O	UINT8	1	Hist_1-4.HIST_TYPE	Average/Rate Type for history point 4
18	R/O	TLP	3	No Mapping	Tag TLP for history point 5 (Not used – always 0,0,0)
19	R/O	TLP	3	Hist_1-5.HIST_PARAM	Value TLP for history point 5
20	R/O	UINT8	1	Hist_1-5.HIST_TYPE	Archive type for history point 5
21	R/O	UINT8	1	Hist_1-5.HIST_TYPE	Average/Rate Type for history point 5
22	R/O	TLP	3	No Mapping	Tag TLP for history point 6 (Not used – always 0,0,0)
23	R/O	TLP	3	Hist_1-6.HIST_PARAM	Value TLP for history point 6
24	R/O	UINT8	1	Hist_1-6.HIST_TYPE	Archive type for history point 6
25	R/O	UINT8	1	Hist_1-6.HIST_TYPE	Average/Rate Type for history point 6
26	R/O	TLP	3	No Mapping	Tag TLP for history point 7 (Not used – always 0,0,0)
27	R/O	TLP	3	Hist_1-7.HIST_PARAM	Value TLP for history point 7
28	R/O	UINT8	1	Hist_1-7.HIST_TYPE	Archive type for history point 7
29	R/O	UINT8	1	Hist_1-7.HIST_TYPE	Average/Rate Type for history point 7

Point Type 86: Extended History Parameters					
Parameter #	**Access**	**Data Type**	**Length**	**FBX Tag Mapping**	**Description**
30	R/O	TLP	3	No Mapping	Tag TLP for history point 8 (Not used – always 0,0,0)
31	R/O	TLP	3	Hist_1-8.HIST_PARAM	Value TLP for history point 8
32	R/O	UINT8	1	Hist_1-8.HIST_TYPE	Archive type for history point 8
33	R/O	UINT8	1	Hist_1-8.HIST_TYPE	Average/Rate Type for history point 8
34	R/O	TLP	3	No Mapping	Tag TLP for history point 9 (Not used – always 0,0,0)
35	R/O	TLP	3	Hist_1-9.HIST_PARAM	Value TLP for history point 9
36	R/O	UINT8	1	Hist_1-9.HIST_TYPE	Archive type for history point 9
37	R/O	UINT8	1	Hist_1-9.HIST_TYPE	Average/Rate Type for history point 9
38	R/O	TLP	3	No Mapping	Tag TLP for history point 10 (Not used – always 0,0,0)
39	R/O	TLP	3	Hist_1-10.HIST_PARAM	Value TLP for history point 10
40	R/O	UINT8	1	Hist_1-10.HIST_TYPE	Archive type for history point 10
41	R/O	UINT8	1	Hist_1-10.HIST_TYPE	Average/Rate Type for history point 10
42-198	R/O	TLP	3	No Mapping	Tag TLP for history point 11-25 (Not used – always 0,0,0)
43-199	R/O	TLP	3	No Mapping	Value TLP for history point 11-25 (Not used – always 0,0,0)
44-200	R/O	UINT8	1	No Mapping	Archive type for history point 11-25 (Not used – always 0)
45-201	R/O	UINT8	1	No Mapping	Average/Rate Type for history point 11-25 (Not used – always 0)

Chapter 4: CRC-16 Code and Example

The ROC protocol applies a cyclical redundancy check (CRC) to the message string to produce a 16-bit remainder. This remainder is referred to as the CRC-16 code. The CRC-16 code is appended to the end of the message string.

The ROC uses the 16-bit polynomial CRC-16:

X16 + X15 + X2 + 1

The ROC uses the standard GPLIB CRC routine, and calculates CRC by table lookup, with the initial condition of 0000 (zeros).

For example, the activity of a host computer setting an operator identification in a ROC364 is logged in the events for subsequent configuration changes by the host computer.

ROC Address		Host Address		Opcode	Data Length	8 Data Bytes			CRC	
unit	group	Unit	group	-	# of bytes	d1	d2	d3	lsb	msb
1	2	1	0	17	3	‘M’	‘O’	‘C’	133	24

Chapter 5: IEEE Floating Point Format

In general, the FB Series devices uses IEEE format for binary representation of floating-point numbers (see ANSI/IEEE standard 754-1985 for further details).

The single-precision (4-byte) floating-point format consists of a 1-bit sign (s), an 8-bit biased exponent (e), and a 23-bit mantissa (m):

MSB			LSB
seeeeeee	emmmmmmm	mmmmmmmm	mmmmmmmm
31 – 24	23 – 16	15 – 18	7 – 0

where:

MSB = most significant byte

LSB = least significant byte

However, in the ROC protocol, the bytes of each floating-point number are returned in the following order:

Floating-Point format:	LSB		LSB+1		MSB-1		MSB	
	7	0	15	8	23	16	31	24

Likewise for integers:

Integer format:	LSB		MSB	
	7	0	15	8

Long Integer format:	LSB		LSB+1		MSB+1		MSB	
	7	0	15	8	23	16	31	24

Note
For signed integers, the MSB contains the sign in its highest numbered bit.

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