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ROC Plus Protocol Specifications Manual

Energy and Transportation Solutions

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Chapter 1 – Introduction

This manual provides information required to understand the ROC Plus protocol and its implementation within the ROC800-Series (“ROC800”) controller. It is written for personnel needing to implement a ROC Plus Protocol driver or as a reference to understanding the ROC800 controller. This manual is intended for users experienced in the development of communication drivers. The protocol provides access to database configuration, real-time clock, event and alarm logs, and historically archived data.

The ROC Plus 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.

1.1 Manual Organization

This manual is organized into the following chapters:

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 Plus protocol uses.
Chapter 3 Parameter Lists for Point Types	Describes ROC Plus protocol point types and data types.
Chapter 4 CRC-16 Code	Provides information concerning the cyclical redundancy check the ROC protocol uses.
Chapter 5 IEEE Floating Point Format	Provides information about the binary representation of floating-point numbers.
Chapter 6 Spontaneous Report-by-Exception	Provides information on the ROC800’s Spontaneous Report-by-Exception (RBX or RBX) function.
Chapter 7 ROC to ROC Communications	Provides information detailing store and forward options in the ROC800.
Index	Provides an alphabetic listing of items and topics contained in this manual.

1.2 General Protocol Message Format

Figure 1-1 shows the various ROC and host protocol message formats. The ROC Plus protocol is a request/response protocol, in which you use an opcode to make a request to which the device responds.

General Message 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

General Message Format - Station "B" Responding to Station "A":

Destination (A)		Source (B)		Opcode	Data Length	n Data Bytes								CRC	
unit	group	unit	group		# of bytes	d1	d2	d3	–	–	–	–	dn	LSB	MSB

Figure 1-1. General Message Format

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 and usually set to **2**.
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 and usually set to **2**.
Opcode	Defines the operation code (opcode) action to perform.	
# 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.	

Field	Description	
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 variable length. The first six data bytes provide the header information including: destination, source, opcode, and data length (number of bytes). Data bytes and a 2-byte CRC follow the header. The CRC is calculated using the header information and the data bytes. The total length of a message equals the number of data bytes transmitted plus eight overhead bytes (6-byte header information and 2-byte CRC).

Figure 1-2 provides examples of the messages exchanged if the host requests the current time and date from ROC13 of Group 5.

Host Request to ROC800:

ROC Address		Host Address		Opcode	Data Length	CRC	
unit	group	unit	group	–	# of bytes	LSB	MSB
13	5	1	0	7	0	1	M

ROC800 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	X1	X2

X1 and X2 depend on the date and time value.

Figure 1-2. Request/Response Example

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

Certain opcodes only send or set data and do not receive data back from the ROC800-Series. For example, Opcode 8 requests the ROC to set the time and date. The host transmits data bytes defining the new time and date. The ROC 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.

1.3 Broadcast

ROC800 firmware version 1.10 and higher supports message broadcasting. A broadcast message is an opcode that is sent to a unit of 0. In this case, all ROC800s with the group matching the request accept the opcode and process it (regardless of the unit designation that each ROC800 may have). The ROC800 does not respond to the request.

For example, you may need to synchronize several ROC800s to the same date and time. If the ROC800s were connected to the same radio link and configured for the same group, a host could send an opcode 8 (Set Real-Time Clock) request to Unit 0 that would then set all of the ROC800s configured in this group to the same date and time.

1.4 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 ROC800's configuration, such as for Opcode 0. 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

Chapter 2 – Opcodes

This chapter details each ROC Plus protocol opcode.

2.1 Opcode Overview

Table 2-1 summarizes and briefly describes each opcode. The tables in this section provide detailed descriptions of the various opcodes and their uses. In some cases, the number of data bytes returned for an opcode varies.

Note: In the following opcode tables, a period (".") in either the Data columns or the Description of Data field indicates a repetition of the preceeding item for the necessary number of times.

Table 2-1. Summary of Opcodes

Opcode	Description
6	Sends ROC800 configuration.
7	Sends current time and date.
8	Sets new time and date.
10	Sends data from configurable opcode tables.
11	Sets data in configurable opcode tables.
17	Sets operator identification.
24	Stores and forwards.
50	Requests IO point position array.
100	Reads user-defined point information (Command 11).
105	Sends history point definition, min/max data, and current values for specified history point.
108	Sends tag and current history period for specified history points.
118	Sends specified number of alarms starting at specified alarm index.
119	Sends specified number of events starting at specified event index.
135	Requests history point data.
136	Requests history index data.
137	Requests history index for a day.
138	Requests daily and periodic history for a day.
139	Requests various types of information from history.
166	Sets specified contiguous block of parameters.
167	Sends specified contiguous block of parameters.
180	Sends specified parameters.
181	Sets specified parameters.
203	File transfer to and from ROC800.
205	Sends a passthru message to a device on the RTU Network.
206	Reads transaction history data.
224	Sends Report-by-Exception (SRBX) message to host.
225	Acknowledges Report-by-Exception message from ROC800.
255	Transmits ROC800 error messages in response to a request with invalid parameters or format.

2.2 Opcode 6, System Configuration

Opcode 6 obtains the current configuration of the ROC800. This opcode follows a similar but slightly different format compared to previous products.

Version	Description
1.00	Introduced
1.20	Updated: added offset 103, point type 138
2.00	Updated: defined offset 10, Logical Compatibility Mode
2.02	Updated: added point types, offsets 104-220; defined offset 11, Opcode 6 revision
3.00	Updated: defined offset 12, ROC Sub-type

Table 2-2: Opcode 6, System Configuration

Communi-cation Opcode	Host Request to ROC800			ROC800 Response to Host		
	Data			Data		
	Offset	Length	Description of Data	Offset	Length	Description of Data
Opcode 6: System Configura-tion	6		No data bytes	6	1	The system mode the unit is currently operating in. **0** = Firmware Update Mode – Extremely limited functionality is available. **1** = Run Mode
				7	2	Comm Port or Port Number that this request arrived on. This is not defined if the above value (offset 6) is 0.
				9	1	Security Access Mode for the port the request was received on.
				10	1	Logical Compatibility Status – Version 2.00 See [Point Type 91,Logical 0,Parameter 50]: **0** = 16 points per slot (160 bytes total) – Compatibility Mode is 0 & 9 module slots max **1** = 16 points per slot (240 bytes total) – Compatibility Mode is 0 & 14 module slots max. NOTE: The 15th module slot cannot be used. **2** = 8 points per slot (224 bytes total) – Compatibility Mode is 1 & 27 module slots max. See Opcode 50, Request I/O Point Position and *Table 11, Compability Mode*, for more information.
				11	1	Opcode 6 Revision (Version 2.02) **0** = Original **1** = Extended for Additional Point Types (offset 104 -220)
				12	1	ROC Subtype 1 – Series 1 0 = Series 2

Communi-cation Opcode	Host Request to ROC800			ROC800 Response to Host		
	Data			Data		
	Offset	Length	Description of Data	Offset	Length	Description of Data
				13	11	Reserved for future use [Zeroes returned]
				24	1	Type of ROC: **1** = ROCPAC ROC300-Series **2** = FloBoss 407 **3** = FlashPAC ROC300-Series **4** = FloBoss 503 **5** = FloBoss 504 **6** = ROC800 (809/827) **11** = DL8000 **X** = FB100-Series
				25	1	Contains the number of logical for point type 60
				26	1	Contains the number of logical for point type 61
				27	1	Contains the number of logical for point type 62
				28	1	Contains the number of logical for point type 63
				29	1	Contains the number of logical for point type 64
				30	1	Contains the number of logical for point type 65
				31	1	Contains the number of logical for point type 66
				32	1	Contains the number of logical for point type 67
				33	1	Contains the number of logical for point type 68
				34	1	Contains the number of logical for point type 69
				35	1	Contains the number of logical for point type 70
				36	1	Contains the number of logical for point type 71
				37	1	Contains the number of logical for point type 72
				38	1	Contains the number of logical for point type 73
				39	1	Contains the number of logical for point type 74
				40	1	Contains the number of logical for point type 75
				41	1	Contains the number of logical for point type 76
				42	1	Contains the number of logical for point type 77
				43	1	Contains the number of logical for point type 78
				44	1	Contains the number of logical for point type 79
				45	1	Contains the number of logical for point type 80

Communi-cation Opcode	Host Request to ROC800			ROC800 Response to Host		
	Data			Data		
	Offset	Length	Description of Data	Offset	Length	Description of Data
				46	1	Contains the number of logical for point type 81
				47	1	Contains the number of logical for point type 82
				48	1	Contains the number of logical for point type 83
				49	1	Contains the number of logical for point type 84
				50	1	Contains the number of logical for point type 85
				51	1	Contains the number of logical for point type 86
				52	1	Contains the number of logical for point type 87
				53	1	Contains the number of logical for point type 88
				54	1	Contains the number of logical for point type 89
				55	1	Contains the number of logical for point type 90
				56	1	Contains the number of logical for point type 91
				57	1	Contains the number of logical for point type 92
				58	1	Contains the number of logical for point type 93
				59	1	Contains the number of logical for point type 94
				60	1	Contains the number of logical for point type 95
				61	1	Contains the number of logical for point type 96
				62	1	Contains the number of logical for point type 97
				63	1	Contains the number of logical for point type 98
				64	1	Contains the number of logical for point type 99
				65	1	Contains the number of logical for point type 100
				66	1	Contains the number of logical for point type 101
				67	1	Contains the number of logical for point type 102
				68	1	Contains the number of logical for point type 103
				69	1	Contains the number of logical for point type 104
				70	1	Contains the number of logical for point type 105
				71	1	Contains the number of logical for point type 106
				72	1	Contains the number of logical for point type 107

Communi-cation Opcode	Host Request to ROC800			ROC800 Response to Host		
	Data			Data		
	Offset	Length	Description of Data	Offset	Length	Description of Data
				73	1	Contains the number of logical for point type 108
				74	1	Contains the number of logical for point type 109
				75	1	Contains the number of logical for point type 110
				76	1	Contains the number of logical for point type 111
				77	1	Contains the number of logical for point type 112
				78	1	Contains the number of logical for point type 113
				79	1	Contains the number of logical for point type 114
				80	1	Contains the number of logical for point type 115
				81	1	Contains the number of logical for point type 116
				82	1	Contains the number of logical for point type 117
				83	1	Contains the number of logical for point type 118
				84	1	Contains the number of logical for point type 119
				85	1	Contains the number of logical for point type 120
				86	1	Contains the number of logical for point type 121
				87	1	Contains the number of logical for point type 122
				88	1	Contains the number of logical for point type 123
				89	1	Contains the number of logical for point type 124
				90	1	Contains the number of logical for point type 125
				91	1	Contains the number of logical for point type 126
				92	1	Contains the number of logical for point type 127
				93	1	Contains the number of logical for point type 128
				94	1	Contains the number of logical for point type 129
				95	1	Contains the number of logical for point type 130
				96	1	Contains the number of logical for point type 131
				97	1	Contains the number of logical for point type 132
				98	1	Contains the number of logical for point type 133
				99	1	Contains the number of logical for point type 134

Communi-cation Opcode	Host Request to ROC800			ROC800 Response to Host		
	Data			Data		
	Offset	Length	Description of Data	Offset	Length	Description of Data
				100	1	Contains the number of logical for point type 135
				101	1	Contains the number of logical for point type 136
				102	1	Contains the number of logical for point type 137
				103	1	Contains the number of logical for point type 138
Included if Opcode 6 Revision (offset 11) >= 1 Version 2.02				104	1	Contains the number of logical for point type 139
				105	1	Contains the number of logical for point type 140
				106	1	Contains the number of logical for point type 141
				107	1	Contains the number of logical for point type 142
				108	1	Contains the number of logical for point type 143
				109	1	Contains the number of logical for point type 144
				110	1	Contains the number of logical for point type 145
				111	1	Contains the number of logical for point type 146
				112	1	Contains the number of logical for point type 147
				113	1	Contains the number of logical for point type 148
				114	1	Contains the number of logical for point type 149
				115	1	Contains the number of logical for point type 150
				116	1	Contains the number of logical for point type 151
				117	1	Contains the number of logical for point type 152
				118	1	Contains the number of logical for point type 153
				119	1	Contains the number of logical for point type 154
				120	1	Contains the number of logical for point type 155
				121	1	Contains the number of logical for point type 156
				122	1	Contains the number of logical for point type 157
				123	1	Contains the number of logical for point type 158
				124	1	Contains the number of logical for point type 159

Communi-cation Opcode	Host Request to ROC800			ROC800 Response to Host		
	Data			Data		
	Offset	Length	Description of Data	Offset	Length	Description of Data
				125	1	Contains the number of logical for point type 160
				126	1	Contains the number of logical for point type 161
				127	1	Contains the number of logical for point type 162
				128	1	Contains the number of logical for point type 163
				129	1	Contains the number of logical for point type 164
				130	1	Contains the number of logical for point type 165
				131	1	Contains the number of logical for point type 166
				132	1	Contains the number of logical for point type 167
				133	1	Contains the number of logical for point type 168
				134	1	Contains the number of logical for point type 169
				135	1	Contains the number of logical for point type 170
				136	1	Contains the number of logical for point type 171
				137	1	Contains the number of logical for point type 172
				138	1	Contains the number of logical for point type 173
				139	1	Contains the number of logical for point type 174
				140	1	Contains the number of logical for point type 175
				141	1	Contains the number of logical for point type 176
				142	1	Contains the number of logical for point type 177
				143	1	Contains the number of logical for point type 178
				144	1	Contains the number of logical for point type 179
				145	1	Contains the number of logical for point type 180
				146	1	Contains the number of logical for point type 181
				147	1	Contains the number of logical for point type 182
				148	1	Contains the number of logical for point type 183
				149	1	Contains the number of logical for point type 184

Communi-cation Opcode	Host Request to ROC800			ROC800 Response to Host		
	Data		Description of Data	Data		Description of Data
	Offset	Length		Offset	Length	
				150	1	Contains the number of logical for point type 185
				151	1	Contains the number of logical for point type 186
				152	1	Contains the number of logical for point type 187
				153	1	Contains the number of logical for point type 188
				154	1	Contains the number of logical for point type 189
				155	1	Contains the number of logical for point type 190
				156	1	Contains the number of logical for point type 191
				157	1	Contains the number of logical for point type 192
				158	1	Contains the number of logical for point type 193
				159	1	Contains the number of logical for point type 194
				160	1	Contains the number of logical for point type 195
				161	1	Contains the number of logical for point type 196
				162	1	Contains the number of logical for point type 197
				163	1	Contains the number of logical for point type 198
				164	1	Contains the number of logical for point type 199
				165	1	Contains the number of logical for point type 200
				166	1	Contains the number of logical for point type 201
				167	1	Contains the number of logical for point type 202
				168	1	Contains the number of logical for point type 203
				169	1	Contains the number of logical for point type 204
				170	1	Contains the number of logical for point type 205
				171	1	Contains the number of logical for point type 206
				172	1	Contains the number of logical for point type 207
				173	1	Contains the number of logical for point type 208
				174	1	Contains the number of logical for point type 209

Communi-cation Opcode	Host Request to ROC800			ROC800 Response to Host		
	Data			Data		
	Offset	Length	Description of Data	Offset	Length	Description of Data
				175	1	Contains the number of logical for point type 210
				176	1	Contains the number of logical for point type 211
				177	1	Contains the number of logical for point type 212
				178	1	Contains the number of logical for point type 213
				179	1	Contains the number of logical for point type 214
				180	1	Contains the number of logical for point type 215
				181	1	Contains the number of logical for point type 216
				182	1	Contains the number of logical for point type 217
				183	1	Contains the number of logical for point type 218
				184	1	Contains the number of logical for point type 219
				185	1	Contains the number of logical for point type 220
				186	1	Contains the number of logical for point type 221
				187	1	Contains the number of logical for point type 222
				188	1	Contains the number of logical for point type 223
				189	1	Contains the number of logical for point type 224
				190	1	Contains the number of logical for point type 225
				191	1	Contains the number of logical for point type 226
				192	1	Contains the number of logical for point type 227
				193	1	Contains the number of logical for point type 228
				194	1	Contains the number of logical for point type 229
				195	1	Contains the number of logical for point type 230
				196	1	Contains the number of logical for point type 231
				197	1	Contains the number of logical for point type 232
				198	1	Contains the number of logical for point type 233
				199	1	Contains the number of logical for point type 234

Communication Opcode	Host Request to ROC800			ROC800 Response to Host		
	Data			Data		
	Offset	Length	Description of Data	Offset	Length	Description of Data
				200	1	Contains the number of logical for point type 235
				201	1	Contains the number of logical for point type 236
				202	1	Contains the number of logical for point type 237
				203	1	Contains the number of logical for point type 238
				204	1	Contains the number of logical for point type 239
				205	1	Contains the number of logical for point type 240
				206	1	Contains the number of logical for point type 241
				207	1	Contains the number of logical for point type 242
				208	1	Contains the number of logical for point type 243
				209	1	Contains the number of logical for point type 244
				210	1	Contains the number of logical for point type 245
				211	1	Contains the number of logical for point type 246
				212	1	Contains the number of logical for point type 247
				213	1	Contains the number of logical for point type 248
				214	1	Contains the number of logical for point type 249
				215	1	Contains the number of logical for point type 250
				216	1	Contains the number of logical for point type 251
				217	1	Contains the number of logical for point type 252
				218	1	Contains the number of logical for point type 253
				219	1	Contains the number of logical for point type 254
				220	1	Contains the number of logical for point type 255

2.3 Opcode 7, Read Real-time Clock

Opcode 7 returns the current time, date, and day of the week.

Version	Description
1.00	Introduced

Note: You can also read the time/date by specifying Point Type 136 (ROC Clock) or Opcode 167 (Request Single Point Parameters).

Table 2–3. Opcode 7, Read Real-time Clock

Opcode 7						
Communi-cation Opcode	**Host Request to ROC800**			**ROC800 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 [UINT8]
				7	1	Current minute [UINT8]
				8	1	Current hour [UINT8]
				9	1	Current day [UINT8]
				10	1	Current month [UINT8]
				11	2	Current year [UINT16]
				13	1	Current day of week [UINT8] 1=Sunday → 7=Saturday

2.4 Opcode 8, Set Real-time Clock

Opcode 8 is the only way to set the real-time clock. The ROC800 calculates the current day of the week. When you set the clock, the microseconds in the ROC800 zero out.

Version	Description
1.00	Introduced

Table 2–4. Opcode 8, Set Real-time Clock

Opcode 8						
Communi-cation Opcode	**Host Request to ROC800**			**ROC800 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 [UINT8]			No data bytes.
	7	1	Current minutes [UINT8]			Time and date are set and acknowledgment sent back.
	8	1	Current hour [UINT8]			
	9	1	Current day [UINT8]			
	10	1	Current month [UINT8]			
	11	2	Current year [UINT16]			

2.5 Opcode 10, Read Configurable Opcode Point Data

Opcode 10 reads data defined by Point Type 99 (Configurable Opcode). The value of the starting table location plus the number of table locations must be less than or equal to 44.

Version	Description
1.00	Introduced

Table 2–5. Opcode 10, Read Configurable Opcode Point Data

Opcode 10						
Communication Opcode	Host Request to ROC800			ROC800 Response to Host		
	Data		Description of Data	Data		Description of Data
	Offset	Length		Offset	Length	
Opcode 10: Send data from configurable opcode tables	6	1	Table Number (0-15)	6	1	Table Number (0-15)
	7	1	Starting Table Location (0-43)	7	1	Starting Table Location (0-43)
	8	1	Number of Table Locations (1-44)	8	1	Number of Table Locations (1-44)
				9	4	Table Version Number [float]
				13	x	Data

2.6 Opcode 11, Write Configurable Opcode Point Data

Opcode 11 writes data defined by Point Type 99 (Configurable Opcode). The value of the starting table location plus the number of table locations must be less than or equal to 44.

Version	Description
1.00	Introduced

Table 2–6. Opcode 11, Write Configurable Opcode Point Data

Opcode 11						
Communication Opcode	Host Request to ROC800			ROC800 Response to Host		
	Data		Description of Data	Data		Description of Data
	Offset	Length		Offset	Length	
Opcode 11: Set data in configurable opcode tables	6	1	Table Number (0-15)			No data bytes.
	7	1	Starting Table Location (0-43)			Acknowledgment sent back.
	8	1	Number of Table Locations (1-44)			
	9	x	Data			

2.7 Opcode 17, Login Request

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 ROC800 provides a default operator identification for each communications port.

Version	Description
1.00	Introduced
3.90	Enhanced Security Introduced

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

- Subsequent Opcode 17 requests;
- Initialization of the ROC800 by a warm start or cold start;
- Firmware upgrade; or
- Timeout.

Table 2–7. Opcode 17, Login Request

Opcode 17						
Communi-cation Opcode	**Host Request to ROC800**			**ROC800 Response to Host**		
	Data		**Description of Data**	**Data**		**Description of Data**
	Offset	**Length**		**Offset**	**Length**	
Opcode 17: Set operator ID **Note**: Access Level only sent if Security Mode (95, x, 44) is set to 2 where x = the logical of the port the request is being made on.	6	3	Operator ID [AC3]			Acknowledgment sent back without data.
	9	2	Password [UINT16]			
	11	1	Access Level [UINT8]			
Opcode 17: Logout request **Note**: Logout string is the ASCII string "LOGOUT" in all capital letters.	6	3	Operator ID [AC3]			Acknowledgment sent back without data
	9	2	Password [UINT16]			
	11	6	Logout String [AC6]			
Opcode 17: Session Key Request **Note**: Session Key string is the ASCII string "GETSESSIONKEY" in all capital letters.	6	13	Session Key String [AC13]	6	24	Wrapped Session Key [AC24]
Note: Longer Operator IDs and Passwords are used if Enhanced Security Enable (91,0,81) is set to 1.	6	30	Operator ID [AC30]			Acknowledgment sent back without data
	36	40	Password [AC40]			
	76	1	Access Level [UINT8]			
	6	30	Operator ID [AC30]			Acknowledgment sent back without data
	36	40	Password [AC40]			
	76	6	Logout String [AC6]			

2.8 Opcode 24, Store and Forward

Opcode 24 defines the requested store and forward action through up to three intermediate ROC800s to the final destination ROC800. Refer to *Chapter 7, ROC-to-ROC Communications,* for details on how this opcode works.

Version	Description
1.00	Introduced

Table 2–10. Opcode 24, Store and Forward

Opcode 24						
Communi-cation Opcode	**Host Request to ROC800**			**ROC800 Response to Host**		
	Data		**Description of Data**	**Data**		**Description of Data**
	Offset	**Length**		**Offset**	**Length**	
Opcode 24: Store and Forward	6	1	Host Address			No acknowledgment sent back
	7	1	Host Group			
	8	1	1st Destination Address			
	9	1	1st Destination Group			
	10	1	2nd Destination Address			
	11	1	2nd Destination Group			
	12	1	3rd Destination Address			
	13	1	3rd Destination Group			
	14	1	4th Destination Address			
	15	1	4th Destination Group			
	16	1	Desired opcode			
	17	1	Number of data bytes for the desired opcode			
	18	x	Opcode data			

2.9 Opcode 50, Request I/O Point Position

Opcode 50 requests either the *type* or the *logical number* of all the I/O points in the ROC800, returned in the order of their physical location in the ROC800. The system (diagnostic) inputs are also included.

Version	Description
1.00	Introduced
2.00	Update

In version 2.0, with the addition of the 827 and expanded backplanes, the 255-byte limit was been reached and requests for higher modules slots would not be valid. As a result, the number of points per module changed from 16 to 8. In order to provide a mechanism to retain 16-points-per-module addressing, a backwards compatibility mode was developed and set by default (see Point Type 91, Parameter 50). In backwards compatibility mode, an 809 (or an 827 with one expanded backplane) will be returned the same as version 1.XX (16 points per module). If it is an 827 with 2 expanded backplanes, then it still can be returned with 16 points/module, but the byte length is expanded to allow for all the information to be returned with one request/response pair. If it is set to 8 points/module, regardless of the backplane style or number of expanded backplanes, all the information for 27 slots is returned (even if there aren't modules in these slots and even if the expanded backplanes don't exist).

The following table summarizes the behavior of Opcode 50 based on Point Type 91, Parameter 50 (logical 0) and the backplanes used. Use this table in conjunction with Opcode 6 to determine the byte length for the response of any Opcode 50 request.

Table 2-11. Compatibility Mode

	Compatibility Mode: Point Type 91; Logical 0; Parameter 50; Value = 1 Logical Compability Status: (Opcode 6, Offest 10 Response)	**Enhanced Mode**: Point Type 91; Logical 0; Parameter 50; Value = 1 Logical Compatibility Status: (Opcode 6 Offset 10 Response)
ROC809 Backplane	0	2
ROC827 with 0 expanded backplanes	0	2
ROC827 with 1 expanded backplanes	0	2
ROC827 with 2 expanded backplanes	1	2
ROC827 with 3 expanded backplanes	1	2
ROC827 with 4 expanded backplanes	1	2

Enumeration The "type" indicates the type of I/O point:

Description	Type Number
Undefined	0
HART-2	84
HART	85
Discrete Input	101
Discrete Output	102
Analog Input	103
Analog Output	104
Pulse Input	105
RTD	106
Thermocouple	107
MVS	108
System Analog Input	109
ACIO	140
APM	141

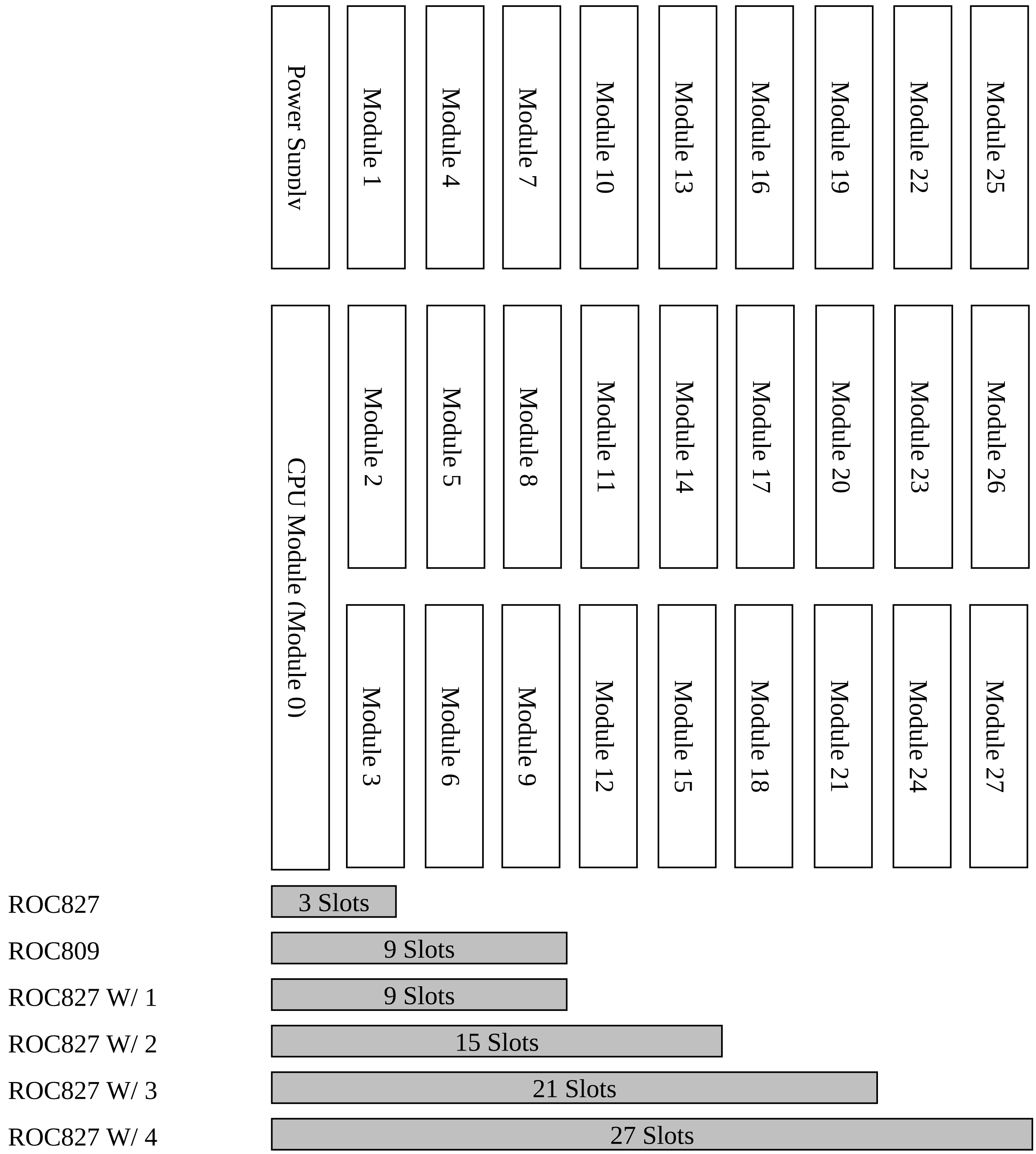
The "logical number" indicates the logical offset of this point within points of the same type. The first I/O point of a given type has a logical number of 0; the second has a logical number of 1, etc.

Note: This logical number is not used as the "Logical/Location" component of the TLP (type, logical/location, parameter) reference. I/O points use the **physical** location.

The CPU module (module 0) is the only module that cannot be removed. The CPU module currently has 5 points associated with it (Point Type 109: System Analog Inputs). The other modules can contain anywhere from 0 to 8 points.

The I/O point type and logical numbers can only be requested using Opcode 50 (Request I/O Point Position). You must perform two requests to retrieve **both** the point types and logical numbers.

The ROC800's layout consists of a power supply and CPU module in the left-most column. Depending on configuration, up to 9 columns of modules can be added. Refer to the following figure.



There are three possible responses to Opcode 50 based on how many expanded backplanes are connected and the logical compatibility mode [Point Type 91, Logical 0, Parameter 50]. These correspond to the Logical Compatibility Status reported in offset 10 of Opcode 6. See the description of Opcode 6 (System Configuration) for more information.

- **Logical Compatibility Status = 0: Compatibility Mode with 809 or 827 with 0 – 1 expanded backplane** [Point Type 91, Logical 0, Parameter 50] = 0 and connected to either an ROC809 or ROC827 with 0 or 1 expanded backplane.

Each module has 16 points allocated to it and the response is the same for versions 1.XX and 2.00. Since there are 10 modules (0 [CPU Module] →9 [Slot 9]) and 16 points per module, the ROC800 provides up to 160 addressable physical position points.

I/O Point

Physical Location	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	…	159
Module - Point	0-1	0-2	0-3	0-4	0-5	0-6	0-7	0-8	0-9	0-10	0-11	0-12	0-13	0-14	0-15	0-16	1-1	…	9-16
Point Type	109	109	109	109	109	0	0	0	0	0	0	0	0	0	0	0	X_{16}	…	X_{159}
Logical Number	0	1	2	3	4	0	0	0	0	0	0	0	0	0	0	0	Y_{16}	…	Y_{159}
Notes:						Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved			

Where: Physical location = (module number X 16) + point number on module -1
X = I/O point types 101 → 109; 0 represents module not present
Y = 0 to → maxium number of logicals for the given I/O point type

- **Logical Compatibility Status = 1: Compatibility Mode with 827 and 2 to 4 expanded backplanes** [Point Type 91, Logical 0, Parameter 50] = 0 and ROC827 with 2 to 4 expanded to either an ROC809 or ROC827 with 0 or 1 expanded backplane.

  Each module has 16 points allocated to it and the response is the same for versions 1.XX and 2.00. Since there are 10 modules (0 [CPU Module] →9 [Slot 9]) and 16 points per module, the ROC800 provides up to 160 addressable physical position points.

I/O Point

Physical Location	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	…	239
Module - Point	0-1	0-2	0-3	0-4	0-5	0-6	0-7	0-8	0-9	0-10	0-11	0-12	0-13	0-14	0-15	0-16	1-1	…	14-16
Point Type	109	109	109	109	109	0	0	0	0	0	0	0	0	0	0	0	X_{16}	…	X_{239}
Logical Number	0	1	2	3	4	0	0	0	0	0	0	0	0	0	0	0	Y_{16}	…	Y_{239}
Notes:						Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved			

Where: Physical location = (module number X 16) + point number on module -1
X = I/O point types 101 → 109; 0 represents module not present
Y = 0 to → maxium number of logicals for the given I/O point type

- **Logical Compatibility Status = 2: Compatibility Mode is set to 2.00 with any ROC800-Series based product (809/827 and any number of expanded backplanes)** [Point Type 91, Logical 0, Parameter 50] = 1 and connect to a ROC809 or ROC827 with 0 to 1expanded backplanes.

In this configuration, each module has 8 points allocated to it. All 28 shots (0 in the CPU module up to 27 in slot 27) are returned using 8 points per modle. As a result, there are 224 physical position points addressable in this configuration.

I/O Point

Physical Location	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	…	223
Module - Point	0-1	0-2	0-3	0-4	0-5	0-6	0-7	0-8	0-9	0-10	0-11	0-12	0-13	0-14	0-15	0-16	1-1	…	27-16
Point Type	109	109	109	109	109	0	0	0	0	0	0	0	0	0	0	0	X_{16}	…	X_{223}
Logical Number	0	1	2	3	4	0	0	0	0	0	0	0	0	0	0	0	Y_{16}	…	Y_{223}
Notes:						Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved			

Where: Physical location = (module number X 8) + point number on module -1
X = I/O point types 101 → 109; 0 represents module not present
Y = 0 to → maxium number of logicals for the given I/O point type

Table 2-12. Opcode 50, Request I/O Point Position

Opcode 50						
Communication Opcode	**Host Request to ROC800**			**ROC800 Response to Host**		
	Data			**Data**		
	Offset	**Length**	**Description of Data**	**Offset**	**Length**	**Description of Data**
Opcode 50: Send I/O point type or logical number associated with the point type.	6	1	Which I/O data to send (0 = I/O Point Type, 1 = I/O Logical Number)	6	160 240 224	I/O Point Types or Logical Numbers See Opcode 6 (offset 10) for length of response

2.10 Opcode 100, Access User-defined Information

Opcode 100 readsuser-defined point type information.

Version	Description
1.20	Introduced (Command 11)

Table 2-13. Opcode 100, Access User-defined Information

Opcode 100							
Communi-cation Opcode	Host Request to ROC800			ROC800 Response to Host			
	Data		Description of Data	Data		Description of Data	
	Offset	Length		Offset	Length		
Get point type information Retrieve information about point types.	6 7 8	1 1 1	Command (11) Start Point # (0 – 255) # Points (0 – 245)	6 7 8 9	1 1 1 1	Command (11) Start Point # (0 – 255) # Points (0 – 245) Type of Point Type 0 – 7 = User Program 253 = User Defined 254 = ROC Point Type 255 = No Point Type (Repeat above as necessary)	

2.11 Opcode 105, Request Today's and Yesterday's Min/Max Values

Opcode 105 retrieves the occurrence of today's and yesterday's minimum and maximum values. The history point is specified by segment and point number.

Version	Description
1.00	Introduced

Enumeration Historical archive method.

128	Archived every hour (Average)
129	Archived every hour (Accumulated)
130	Archived every hour (Current)
134	Archived every hour (Totalize)
67	Timestamp logged with FST-controlled timestamp. Timestamp is a TIME [UINT32] representing the number of seconds elapsed since 12:00AM Jan 1, 1970. Use FST command WTM (Write Current Time to History)
65	Database value logged when directed by FST command WDB (Write Results Register Value to History)
0	Not defined.

Table 2–14. Opcode 105, Request Today's and Yesterday's Min/Max Values

Opcode 105						
Communication Opcode	**Host Request to ROC800**			**ROC800 Response to Host**		
	Data			**Data**		
	Offset	**Length**	**Description of Data**	**Offset**	**Length**	**Description of Data**
Opcode 105:	6	1	History Segment (0 – 10)	6	1	History Segment (0 – 10)
Send history point definition, min and max Data, and current value for specified history point	7	1	History point number	7	1	Historical point number
				8	1	Historical Archival Method Type
				9	1	Point type
				10	1	Point/Logic number
				11	1	Parameter number
				12	4	Current value [float]
				16	4	Minimum value since contract hour [float]
				20	4	Maximum value since contract hour [float]
				24	5	Time of minimum value occurrence **Note**: This is a UINT32 (4 bytes) and contains the number of seconds since 12:00AM Jan 1, 1970. Seconds, minutes, hour, day, and month
				29	5	Time of maximum value occurrence. **Note**: This is a UINT32 (4 bytes) and contains the number of seconds since 12:00AM Jan 1, 1970. Seconds, minutes, hour, day, and month
				34	4	Minimum value yesterday [float]
				38	4	Maximum value yesterday [float]
				42	5	Time of yesterday's min value occurrence. **Note**: This is a UINT32 (4 bytes) and contains the number of seconds since 12:00AM Jan 1, 1970. Seconds, minutes, hour, day and month
				47	5	Time of yesterday's max value occurrence. **Note**: This is a UINT32 (4 bytes) and contains the number of seconds since 12:00AM Jan 1, 1970. Seconds, minutes, hour, day, and month
				52	4	Value during last completed period [float]

2.12 Opcode 108, Request History Tag and Periodic Index

Opcode 108 sends the tag and history period for specified history points, up to a maximum of 20 history points. All points must be within a single segment.

Version	Description
1.00	Introduced

Table 2–15. Opcode 108, Request History Tag and Periodic Index

Opcode 108						
Communi-cation Opcode	**Host Request to ROC800**			**ROC800 Response to Host**		
	Data		**Description of Data**	**Data**		**Description of Data**
	Offset	**Length**		**Offset**	**Length**	
Opcode 108: Send tag and current history period for specified history point(s)	6	1	History Segment (0 – 10)	6	1	History Segment (0 – 10)
	7	1	# of historical points specified	7	1	# of historical points specified
	8	1	Historical point (0 – 199)	8	2	Periodic Index (common among all history points in segment)
		.	(repeat above as necessary 20 maximum)	(repeat as necessary)	1	History point
					10	Tag [AC10]

2.13 Opcode 118, Request Alarm Data

Opcode 118 requests alarm data from the ROC800's Alarm Log.

Version	Description
1.00	Introduced

Table 2–16. Opcode 118, Request Alarm Data

Opcode 118						
Communi-cation Opcode	**Host Request to ROC800**			**ROC800 Response to Host**		
	Data		**Description of Data**	**Data**		**Description of Data**
	Offset	**Length**		**Offset**	**Length**	
Opcode 118: Send specified number of alarms starting with specified alarm index.	6	1	# of alarms requested (max 10) *SEE NOTE BELOW	6	1	Number of alarms being sent
	7	2	Starting Alarm Log index	7	2	Starting Alarm Log index
				9	2	Current Alarm Log index
				11	23	Alarm Data
					.	(repeat above as necessary)

Note If no alarms are requested, the ROC800 does not return alarm data.

Alarm Data The alarm log stores the last 450 alarm entries. Each alarm consists of 23 bytes and has the following general format:

Description	Type	Time				Alarm-specific Data																	
Byte:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22

Alarm Type The alarm type (byte 0) is a packed one-byte field that also includes information identifying if the alarm indicates a set or clear condition, and if the alarm is an SRBX alarm.

Alarm Type Byte Breakdown The alarm type (byte 0) is a packed one-byte field that also includes information identifying if the alarm indicates a set or clear condition, and if the alarm is an SRBX alarm. It has the following format:

Description	SRBX	Condition	Type					
Bit:	7	6	5	4	3	2	1	0

- **SRBX (most significant bit)**: Indicates whether the alarm was an SRBX alarm. An SRBX allows the ROC800 to notify a host about certain alarm conditions. The host may be notified when an alarm is either set or cleared. Refer to *Chapter 6*. Valid values are:

  0 - No SRBX
  1 - SRBX issued

- **Condition (bit 6):** Indicates if the alarm is being set or cleared. Valid values are:

  0 - Cleared
  1 – Set

- **Type (bits 5-0)**: Identifies what type of alarm is stored. See Alarm-specific Data for byte usage (5-22) of each type. Valid values are:

  0 - No Alarm
  1 - Parameter Alarm
  2 - FST Alarm
  3 - User Text Alarm
  4 - User Value Alarm

Time Bytes 1 to 4 provide the timestamp for the alarm, which is the time the alarm was logged. The timestamp is a TIME [UINT32] which represents the number of seconds that have elapsed since 12:00 a.m. Jan. 1, 1970.

Alarm-specific Data For each alarm type, bytes 5 to 22 provide an alarm description and value as appropriate:

Parameter Alarm

This type of alarm is typically generated as a parameter reaches a particular value. The data for this particular alarm has the following format:

Description:	Code	TLP			Alarm Description										Value			
Byte:	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22

- **Code**: Reason why the alarm was logged. Some codes only hav meaning for certain TLPs. Valid values are:

  0 - Low Alarm
  1 - Low Low Alarm
  2 - High Alarm
  3 - High High Alarm
  4 - Rate Alarm
  5 - Status Change
  6 - Point Fail
  7 - Scanning Disabled
  8 - Scanning Manual
  9 - Redundant Total Counts
  10 - Redundant Flow Register
  11 - No Flow Alarm
  12 - Input Freeze Mode
  13 - Sensor Communication Failure
  14 - 485 Communication Failure
  15 - Off Scan Mode
  16 - Manual Flow Inputs.
  17 - Meter Temperature Failure Alarm
  18 - Compressibility Calculation Alarm
  19 - Sequence Out of Order
  20 - Phase Discrepancy
  21 - Pulse Synchronization Failure
  22 - Frequency Discrepancy
  23 - Pulse Input One Failure
  24 - Pulse Input Two Failure
  25 - Pulse Output Buffer Overrun
  26 - Pulse Output Buffer Warning
  27 - Relay Fault
  28 - Relay Failure
  29 - Static Pressure Low Limited
  30 - Temperature Low Limited
  31 - Analog Output Readback Error
  32 - Bad Level A Pulse Stream
  33 - Market Pulse Alarm

- **TLP**: Parameter that caused the alarm. In some situations, only the Type and Logical of the TLP have meaning.
- **Alarm Description**: Short textual description of the alarm.
- **Value**: Value of the specified TLP when alarm was logged. Data is a floating-point value regardless of the type associated with the parameter for specified TLP.

FST Alarm Alarm that was logged from an FST. The data for this particular alarm has the following format:

Description:	FST #	Alarm Description													Value			
Byte:	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22

- **FST #**: Indicates which running FST logged the alarm.
- **Alarm Description**: Short textual description of the alarm
- **Value**: Floating point value associated with alarm.

User Text Alarm Alarm that was logged by a User C++ program. The data for this particular alarm has the following format:

Description:	Alarm Description																	
Byte:	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22

- **Alarm Description**: Short textual description of the alarm

User Value Alarm Alarm that was logged by a User C++ program. The data for this particular alarm has the following format:

Description:	Alarm Description														Value			
Byte:	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22

- **Alarm Description**: Short textual description of the alarm.
- **Value**: Floating point value associated with alarm.

2.14 Opcode 119, Request Event Data

Opcode 119 requests event data from ROC800's Event Log. The Event Log consists of a maximum of 450 events. Each event consists of 22 bytes, organized according to one of the five formats described below.

Version	Description
1.00	Introduced

Table 2–17. Opcode 119, Request Event Data

Opcode 119						
Communication Opcode	Host Request to ROC800			ROC800 Response to Host		
	Data Offset	Data Length	Description of Data	Data Offset	Data Length	Description of Data
Opcode 119: Send specified number of events starting with the specified event Index	6	1	# of events requested (max 10) *SEE NOTE BELOW	6	1	Number of events being sent
	7	2	Starting Event Log index	7	2	Starting Event Log index
				9	2	Current Event Log index
				11	22	Event Data
					.	(repeat above as necessary)

Note: If no events are requested, the ROC800 does not return event data.

Event Data The event log stores the last 450 event entries. Each event consists of 22 bytes and has the following general format:

Description:	Type	Time				Event Specific Data																
Byte:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

Event Type The event type identifies what type of event is stored in the event specific data. Valid values are:

0 - No Event
1 - Parameter Change Event
2 - System Event
3 - FST Event
4 - User Event
5 - Power Lost Event
6 - Clock Set Event
7 - Calibrate Verify Event

Parameter Change Event A Parameter Change event is logged any time a user makes a change to any TLP. The data for the event has the following format:

Description:	Operator ID			TLP			Data Type	New Value				Old Value				Spare	
Byte:	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

- **Operator ID**: Identifies who made the change.
- **TLP**: Identifies what parameter was changed.
- **Data Type**: Identifies the type of data stored in the new value and old value fields. Valid values are:

  0 - BIN
  1 - INT8
  2 - INT16
  3 - INT32
  4 - UINT8
  5 - UINT16
  6 - UINT32
  7 - FL
  8 - TLP
  9 - AC (3 bytes)
  10 - AC (7 bytes)
  11 - AC (10 bytes)
  12 - AC (12 bytes)
  13 - AC (20 bytes)
  14 - AC (30 bytes)
  15 - AC (40 bytes)
  16 - DOUBLE
  17 - TIME

- **New Value**: New value of the changed parameter. New value will extend beyond its four-byte field and into the old value and spare fields if the data size is larger than 4 bytes.

- **Old Value**: Old value of the changed parameter. The old value always starts at byte offset 16. If the data type is too large to store both old value and new value, only the new value will be stored.

System Event A system event logs internally in the ROC800. The data for the event has the following format:

Description:	Code	Description															
Byte:	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

- **Code**: More specifically defines the type of event that occurred. Valid values are:

144 - Initialization Sequence
145 - All Power Removed
146 - Initialize from defaults.
147 - ROM CRC Error
148 - Database Initialization
150 - Program Flash
151 - Reserved for ROC800 only
152 - Reserved for ROC800 only
153 - Reserved for ROC800 only
154 - Smart Module Inserted
155 - Smart Module Removed
200 - Clock Set
248 - Text Message
249 - Download Configuration
250 - Upload Configuration
251 - Calibration Timeout
252 - Calibration Cancel
253 - Calibration Success
254 - MVS Reset to Factory Defaults

- **Description**: Textual description of the alarm.

FST Event An FST event is logged by an FST. The data for the event has the following format:

Description:	FST #	Value				Description										Spare	
Byte:	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

- **FST #**: Identifies which FST logged the event.
- **Value**: Floating point value associated with event.
- **Description**: Textual description of the event.

User Event A User event is logged by the action of a logged in user. The data for the event has the following format:

Description:	Operator Id			Code	Description													
Byte:	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

- **Operator ID**: Identifies who made the change.
- **Code**: More specifically defines the type of event that occurred. The valid values are:

  144 - Initialization Sequence
  145 - All Power Removed
  146 - Initialize from defaults
  147 - ROM CRC Error
  148 - Database Initialization
  150 - Program Flash
  151 - Reserved for ROC800 only
  152 - Reserved for ROC800 only
  153 - Reserved for ROC800 only
  154 - Smart Module Inserted
  155 - Smart Module Removed
  200 - Clock Set
  248 - Text Message
  249 - Download Configuration
  250 - Upload Configuration
  251 - Calibration Timeout
  252 - Calibration Cancel
  253 - Calibration Success
  254 - MVS Reset to Factory Defaults

- **Description**: Textual description of the alarm.

Power Lost Event

A Power Lost event is logged when power to the ROC800 has been lost. The data for the event has the following format:

Description:	Time				Not Used												
Byte:	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

- **Time**: Time that power to the unit was lost.

Clock Set Event

A Clock Set event is logged when the time is set on the ROC800. The data for the event has the following format

Description:	Time				Not Used												
Byte:	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

- **Time**: Identifies the time on the ROC800 was set to.

Calibrate Verify Event

A Calibrate Verify event is logged any time a user tests the calibration of an I/O point.

Description:	Operator ID			TLP			Raw Value				Calibrated Value				Spare		
Byte:	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

- **Operator ID**: Identifies who tested the calibration.
- **TLP**: Identifies what parameter was tested.

- **Raw Value**: Value of input before calibration was applied. Data type is float.
- **Calibrated Value**: Value of input after calibration was applied. Data type is float.

Timestamp The timestamp for the alarm represents the time the alarm was logged. The timestamp is a TIME [UINT32] which represents the number of seconds that have elapsed since 12:00 a.m. Jan. 1, 1970.

2.15 Opcode 135, Request Single History Point Data

Opcode 135 requests a specified number of history data values for a single history point, starting at a specified history index.

Version	Description
1.00	Introduced

The history segment indicates where data is requested, according to the following format:

0 = General History #0
1 = General History #1
2 = General History #2
.
.
.
9 = General History #9
10 = General History #10

The history point can be referenced by point number only as zero (0) – x, where x is the number of history points defined for a History Segment. For each history segment, you can retrieve three types of possible history: Minute (0), Periodic (1), and Daily (2).

You can also retrieve the Periodic (3) and Daily (4) timestamps.

The starting history index specifies the record from which the history values start:

- Minute History: 0 – 60.
- Periodic History: 0 – (#periodic entries in history point – 1) (24 hours per day repeated for a maximum of 35 days).
- Daily History: 0 – (#daily entries in history point – 1).

Opcode 135 returns the history values for the requested history point from the starting history index and continues until it completes the requested number of indexes. To read timestamps, specify the value in "Type of History."

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 column addressing.

Table 2–18. Opcode 135, Request Single History Point Data

Opcode 135						
Communi-Cation Opcode	Host Request to ROC800			ROC800 Response to Host		
	Data			Data		
	Offset	Length	Description of Data	Offset	Length	Description of Data
Opcode 135: Send specified # of history data for specified history point starting at specified history index	6	1	History Segment (0-10)	6	1	History Segment (0-10)
	7	1	Point number (0-(# of history points for history segment – 1))	7	1	Point number (0-(# of history points for history segment – 1))
	8	1	Type of History (Minute – 0, Periodic – 1, or Daily – 2, Periodic Time Stamps – 3; Daily Time Stamps – 4)	8	2	Current history segment index
	9	2	Starting history segment index {Minute 0 – 59, Periodic 0 - (#periodic entries in history point – 1), or Daily 0 - (#daily entries in history point – 1)}	10	1	# of values being sent
	11	1	# of values requested (max 60) *SEE NOTE BELOW	11	4	1st history value
					.	(repeat above as necessary)

Note: If no events are requested, the ROC800 does not return history values.

2.16 Opcode 136, Request Mutiple History Point Data

Opcode 136 requests a specified number of history 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.

Version	Description
1.00	Introduced

The history segment indicates where data is requested. Following are the history segments:

0 = General History #0
1 = General History #1
2 = General History #2
.
.
.
9 = General History #9
10 = General History #10

The history index specifies the record to be used:

- Minute History: 0 – 60.
- Periodic History: 0 – (#periodic entries in history point – 1) (24 hours per day repeated for a maximum of 35 days).

- Daily History: 0 – (#daily entries in history point – 1).

There are three types of history possible to be retrieved from each history segment: Minute (0), Periodic (1), or Daily (2).

The starting history point can be referenced by point number only as 0 – x, where x is the number of history points defined for a History Segment.

Opcode 136 returns the history values for the requested 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. An error is returned if the day is not found.

Table 2–19. Opcode 136, Request Multiple History Point Data

Opcode 136						
Communi-cation Opcode	**Host Request to ROC800**			**ROC800 Response to Host**		
	Data			**Data**		
	Offset	**Length**	**Description of Data**	**Offset**	**Length**	**Description of Data**
Opcode 136: Send specified # of history data for specified history index starting at specified history point	6	1	History Segment (0-10)	6	1	History Segment (0-10)
	7	2	History Segment Index {Minute 0 - 59, Periodic 0 - (#periodic entries in history point – 1), or Daily 0 - (#daily entries in history point – 1)}	7	2	History Segment Index {Minute 0 - 59, Periodic 0 - (#periodic entries in history point – 1), or Daily 0 - (#daily entries in history point – 1)}
	9	1	Type of History (Minute – 0, Periodic – 1, or Daily – 2)	9	2	Current history segment index
	10	1	Starting history point (0-(# of history points for history segment – 1))	11	1	# of data elements being sent ((# history points + 1) * # time periods) Value is 0 if the request is invalid.
	11	1	# of history points	12	4	Time stamp for 1^{st} time period
	12	1	# of time periods	16	4	1^{st} history point value
			*SEE NOTE BELOW ((# history points + 1) * # time periods) must not be greater than 60		.	(repeat for number of history points)
					(above repeated for number of time periods)	

Note: If no time period is requested, the ROC800 does not return history values.

2.17 Opcode 137, Request History Index for a Day

Opcode 137 requests the Periodic and Daily Index for a specific day of a specified history point. If a day is not found, an opcode error is returned.

Version	Description
1.00	Introduced

Table 2–20. Opcode 137, Request History Index for a Day

Opcode 137						
Communi-cation Opcode	Host Request to ROC800			ROC800 Response to Host		
	Data			Data		
	Offset	Length	Description of Data	Offset	Length	Description of Data
Opcode 137: Send history index for specified history point for specified day and month	6	1	History Segment (0 – 10)	6	1	History Segment (0 – 10)
	7	1	Day requested	7	2	Starting Periodic Index for day and month request.
	8	1	Month requested	9	2	# periodic entries for day
				11	2	Daily Index for day and month requested. Not valid if the number of daily entries for requested day is 0.
				13	2	# daily entries per contract day

2.18 Opcode 138, Request Daily and Periodic History for a Day

Opcode 138 requests the periodic and daily history for a given day. If a day is not found, the ROC800 returns an opcode error. An opcode error can also occur if there are more periodic and daily entries than can fit in a reply. Request history point 255 to retrieve timestamps for the specified day.

Version	Description
1.00	Introduced

Table 2–21. Opcode 138, Request Daily and Periodic History for a Day

Opcode 138						
Communi-cation Opcode	**Host Request to ROC800**			**ROC800 Response to Host**		
	Data			**Data**		
	Offset	**Length**	**Description of Data**	**Offset**	**Length**	**Description of Data**
Opcode 138:	6	1	History Segment (0 – 10)	6	1	History Segment (0 – 10)
Send periodic and daily index	7	1	History point (0 – (# of history points for history segment – 1))	7	1	History point (0 – (# of history points for history segment – 1))
for specified history point	8	1	Day requested	8	1	Day requested
for specified day and month	9	1	Month requested	9	1	Month requested
				10	2	# periodic entries
				12	2	# daily entries
				14	4	periodic value
						(repeat above for each periodic value)
					4	daily value
						(repeat above for each daily value)

2.19 Opcode 139, History Information Data

Opcode 139 requests various types of information from history. Depending on the command, you can retrieve the configured points, the data, or the timestamps.

Version	Description
1.00	Introduced

Table 2–22. Opcode 139, History Information Data

Opcode 139						
Communication Opcode	Host Request to ROC800			ROC800 Response to Host		
	Data			Data		
	Offset	Length	Description of Data	Offset	Length	Description of Data
Opcode 139: History	6	1	Command	6	1	Command
Command = 0 Request configured points.	7	1	History Segment	7	1	History Segment
				8	1	Number of configured points
				9	1	First configured point.
					.	(repeat above as necessary)
Command = 1 Request specified point data	7	1	History Segment	7	1	History Segment
If Request Timestamps is 0, Number of points * Number of Time Periods must not be greater than 60.	8	2	History Segment Index {Minute 0 - 59, Periodic 0 - (#periodic entries in history point – 1), or Daily 0 - (#daily entries in history point – 1)}	8	2	Current Index
	10	1	Type of History (Minute – 0, Periodic – 1, or Daily – 2)	10	1	Number of time periods
	11	1	Number of time periods	11	1	Request Timestamps
If Request Timestamps is 1, (Number of points + 1)* Number of Time Periods must not be greater than 60.	12	1	Request Timestamps	12	1	Number of points
				13	4	Timestamp for first index (not returned if Request Timestamps parameter is 0)
	13	1	Number of points	17	4	1st history point value
	14	1	Requested history point	21	.	(repeat for number of history points
		.	(repeat above as necessary)		(Repeat above for number of time periods)	

2.20 Opcode 166, Set Single Point Parameters

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

Version	Description
1.00	Introduced

Table 2–23. Opcode 166, Set Single Point Parameters

Opcode 166						
Communi-cation Opcode	Host Request to ROC800			ROC800 Response to Host		
	Data Offset	Data Length	Description of Data	Data Offset	Data Length	Description of Data
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	1→230	Data (a contiguous block)			

2.21 Opcode 167, Request Single Point Parameters

Opcode 167 either reads the configuration of a single point or reads a contiguous block of parameters for a single point. Opcode 167 can be more efficient than reading the entire point, or even a contiguous portion of the point, using opcode 180.

Version	Description
1.00	Introduced

Table 2–24. Opcode 167, Request Single Point Parameters

Opcode 167						
Communi-cation Opcode	Host Request to ROC800			ROC800 Response to Host		
	Data Offset	Data Length	Description of Data	Data Offset	Data Length	Description of Data
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	1→230	Data (a contiguous block)

2.22 Opcode 180, Request Parameters

Opcode 180 reads several parameters in a single request. The parameters can be from different points and of different point types. The opcode is intended to read any combination of parameters listed in this document.

Version	Description
1.00	Introduced

Errors The opcode responds with an error response if:

- The response is longer than 240 bytes
- If the request is for an invalid parameter, possibly due to a point that is not configured.

Table 2–25. Opcode 180, Request Parameters

Opcode 180						
Communi-cation Opcode	Host Request to ROC800			ROC800 Response to Host		
	Data			Data		
	Offset	Length	Description of Data	Offset	Length	Description of Data
Opcode 180: Send specified parameters	6	1	Number of parameters requested	6	1	Number of parameters requested
	7	1	Point type	7	1	Point type
		1	Point/Logic number		1	Point/Logic number
		1	Parameter number		1	Parameter number
		.	(repeat above as necessary)		x	Data comprising the parameter
					.	(repeat above as necessary)

2.23 Opcode 181, Write Parameters

Opcode 180 writes several parameters with a single request. The parameters can be from different points and of different point types. The opcode is intended to write any combination of parameters listed in this document.

Version	Description
1.00	Introduced

Errors The opcode responds with an error response if:

- The response is longer than 240 bytes.
- The request is for an invalid parameter.
- A parameter's data is out of range.
- A parameter is read-only.

Table 2–26. Opcode 181, Write Parameters

Opcode 181						
Communi-cation Opcode	Host Request to ROC800			ROC800 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	Point type			Acknowledgment sent back.
		1	Point/Logic number			
		1	Parameter number			
		x	Data comprising the parameter			
		.	(repeat above as necessary)			

2.24 Opcode 203, General File Transfer

Opcode 203 transfers files to and from the flash file system.

Version	Description
2.02	Introduced Commands 1 - 5

Paths /flash/userData (recommended for user C applications)

Opcode 255 Error Codes

Invalid file	FILE_DOES_NOT_EXIST	67
Flash file system full	FLASH_FILE_SYSTEM_FULL	69
Invalid path	INVALID_PATH	72
Invalid offset	INVALID_OFFSET	73
Invalid option	INVALID_OPTION	74
More than 10 files open	TOO_MANY_FILES_OPEN	75

Other Limitations/Special Cases

- Maximum of 10 open files.
- Can create only one directory per open command. That is, if /flash/etc does not exist, you cannot open a file in /flash/etc/bin
- You would be able to open a file in /flash/etc, which would create the etc directory.
- You can delete both directories and files with the delete command.

Table 2–27. Opcode 203, General File Transfer

Opcode 203						
	Host Request to ROC800			ROC800 Response to Host		
	Data			Data		
Command	Offset	Length	Description of Data	Offset	Length	Description of Data
Open (An open must be performed first before reading or writing to any file) When creating a new file the path must start with /flash/.	6 7 8 108	1 1 100 25	Command (1) Options 0 = Open file for reading 1 = Open file for writing 2 = Create new file for writing (if doesn't exist) 3 = Open file for update (reading and writing) 4 = Truncate to zero length or create file for writing Path File Name (25-byte filename must include null character)	6 7	1 4	Command (1) File Descriptor
Read (Must use File Descriptor returned by the Open command)	6 7 11	1 4 4	Command (2) File Descriptor Offset	6 7 11 15 19 20	1 4 4 4 1 Num-ber of bytes	Command (2) File Descriptor File Size Offset Number of bytes Data (maximum 230 bytes) (repeat above as necessary)
Write (Must use File Descriptor returned by the Open command)	6 7 11 15 19 20	1 4 4 4 1 Number of bytes	Command (3) File Descriptor File Size Offset Number of bytes Data (maximum 230 bytes) (above repeated as necessary)	6 7 11	1 4 4	Command (3) File Descriptor Offset
Close (Closes opened file and removes descriptor)	6 7	1 4	Command (4) File Descriptor	6	1	Command (4)
Delete	6	1	Command (6)	6	1	Command (5)

Opcode 203						
	Host Request to ROC800			ROC800 Response to Host		
	Data			Data		
Command	**Offset**	**Length**	**Description of Data**	**Offset**	**Length**	**Description of Data**
(Does not require file descriptor) Can delete file or directory within "/flash"	7 107	100 25	Path File Name			
Read Directory Contents (Version 3.05 or prior) Returns all filenames in the "./flash/data" directory including subdirectories	6 7 107	1 100 1	Command (6) Path Total Num File Names Sent	6 7 8 9	1 1 1 Num-ber of bytes	Command (6) Additional filenames to read: 0 = No 1 = Yes Total number of file names sent File Names (each file or directory name is separated with a null character and the entire data section ends with a null character)
Read Directory Contents (Version 3.10 or greater) Returns all filenames in the "./flash/data" directory including subdirectories	6 7 107	1 100 2	Command (6) Path	6 7 8 9	1 1 1 Num-ber of bytes	Command (64) Additional filenames to read: 0 = No 1 = Yes Total number of file names sent File Names (each file or directory name is separated with a null character and the entire data section ends with a null character)

2.25 Opcode 205, Peer-to-Peer Network Messages

Opcode 205 tunnels messages on the peer-to-peer network. the message that is sent to the host to signal an SRBX. Refer to *Chapter 6* for an example of spontaneous report-by-exception.

Version	Description
3.50	Introduced

Errors The opcode responds with an error response if:

- No Network module is installed (Error 3)
- If a tunnel request is pending (Error 76)

- If the installed Network Radio module is not communicating, is in boot mode, or is an access point (Error 78)
- Indicates an SPI timeout from the Network Radio module (Error 71)

Table 2–28. Opcode 205, Peer-to-Peer Network Messages

Opcode 205						
	Host Request to ROC800			ROC800 Response to Host		
	Data			Data		
Command	Offset	Length	Description of Data	Offset	Length	Description of Data
Opcode 205	6	1	Network ID (1-255)	6	1	Network ID (1-255)
	7	1	Commissioned Index One based	7	4	Commissioned Index One baseed
	8	1	Embedded ROC opcode	8	1	Embedded ROC opcode
	9	1	Embedded Request Length	9	1	Embedded Response Length
	10	Variable	Embedded Request Data	10	Variable	Embedded Request Data

Note: The embedded Request and Response do not have trailing CRC bytes.

2.26 Opcode 206, Read Transaction History Data

Opcode 206 requests from a transactional history segment (Command 1) a list of transaction numbers and the date those numbers were created and retrieves data from a particular transaction (Command 2).

Version	Description
3.50	Introduced

Table 2–29. Opcode 206, Read Transaction History Data

Opcode 206						
	Host Request to ROC800			ROC800 Response to Host		
	Data			Data		
Command	Offset	Length	Description of Data	Offset	Length	Description of Data
List Transaction	6	1	Command (1)	6	1	Command (1)
Lists transactions currently stored in system.	7	1	Segment	7	1	Number of transactions in data
	8	2	Transaction offset (starts at the first transaction stored in the segment, which is index 0. After rollover, this is not necessarily the oldest transaction.	8	1	More transactions than those returned in this request (0=No, 1=Yes)
				9	10	Description
				19	2	Payload Size (size of the data portion of these segment transactions). This is the size of all data type

Opcode 206						
	Host Request to ROC800			ROC800 Response to Host		
	Data			Data		
Command	**Offset**	**Length**	**Description of Data**	**Offset**	**Length**	**Description of Data**
						and value pairs returned in Command 2.
				21	2	Transaction number
				23	4	Date created
				(Above 6 bytes repeated for num transactions)		
Read Transaction Reads data for specified transaction	6	1	Command (2)	6	1	Command (2)
	7	1	Segment	7	1	Message Data Size (size of data below this byte)
	8	2	Transaction Number	8	1	More data than included in this response (0=No, 1=Yes)
	10	2	Offset into data (this is a byte index into the data type value pairs	9	1	Data Type (see Note 1 below)
				10	Data size	Value
				(Above TLP, Data Type, Value repeated for num bytes.		

Note: The valid data types and corresponding values returned are:

U8 = 1	STRING7 = 10
S8 = 2	STRING10 = 11
U16 = 3	STRING20 = 12
S16 = 4	STRING30 = 14
U32 = 5	T_STRING40 = 15
S32 = 6	BINARY (1 byte) = 17
FLOAT = 7	TLP (3 bytes) = 18
DOUBLE = 8	TIME (4 bytes) = 20
STRING3 = 9	

2.27 Opcode 224, SRBX Signal

Opcode 224 represents the message that is sent to the host to signal an SRBX. Refer to *Chapter 6* for an example of spontaneous report-by-exception.

Version	Description
1.00	Introduced

Table 2–30. Opcode 224, SRBX Signal

Opcodes 224						
Communi-cation Opcode	Host Request to ROC800			ROC800 Response to Host		
	Data			Data		
	Offset	Length	Description of Data	Offset	Length	Description of Data
Opcode 224: Signal Report- by-Exception			Host could possibly use a variety of different ways to retrieve the alarm index.			No data bytes.

2.28 Opcode 225, Acknowledge SRBX

Opcode 225 acknowledges receipt of an SRBX alarm message. Refer to *Chapter 6* for an example of spontaneous report-by-exception. This opcode was introduced in version 1.00.

Table 2–31. Opcode 225, Acknowledge SRBX

Opcode 225						
Communi-cation Opcode	Host Request to ROC800			ROC800 Response to Host		
	Data			Data		
	Offset	Length	Description of Data	Offset	Length	Description of Data
Opcode 225: Acknowledge Report-by-Exception	6	2	Current Alarm Log index			No data bytes. Acknowledgment sent back. ROC800 clears SRBX status if the ROC800's alarm index equals data received from the host.

2.29 Opcode 255, Error Indicator

Opcode 255 is an error message indicator. If an opcode request is invalid, a request contains invalid data, or a value parmeter is out of range, the response is opcode 255. An error can also be triggered if the value of the parameter is out of range. This special opcode's data consists of an error code byte and an offset byte (see *Table 2-38* for a list of error codes). The offset is the byte offset into the message in which an error was detected. Multiple parameters may cause an error, so there may be multiple error codes in the Opcode 255 response. This enables separation of good data from the bad. A multiple set could have some errors returned as well as some data being set. Refer to *Table 2-40* for all of the error codes and the opcodes that may cause them. .

Version	Description
1.09	Introduced

This special opcode's data consists of an error code byte and an offset byte, as shown below:

Table 2–32. Opcode 255 Error Codes

Error Code	Description	Byte that caused error
1	Invalid Opcode request.	Opcode
2	Invalid parameter number.	Parameter number
3	Invalid logical number.	Logical number
4	Invalid point type.	Point type
5	Received too many data bytes.	Length
6	Received too few data bytes.	Length
12	Obsolete (Reserved, but not used)	
13	Outside valid address range.	Address
14	Invalid history request.	History point number
15	Invalid FST request	FST command number
16	Invalid event entry.	Event code
17	Requested too many alarms.	Number of alarms requested
18	Requested too many events.	Number of events requested
19	Write to read only parameter. Exception for Opcode 166 which can have multiple parameters. Some of these may be RO, and some may not.	Parameter number
20	Security error.	Opcode
21	Invalid security logon.	Login ID or Password
22	Invalid store and forward path.	Any address or group
24	History configuration in progress.	Opcode
25	Invalid parameter range	Parameter
29	Invalid 1 day history index request.	History Segment, point, day or month
30	Invalid history point.	History Point
31	Invalid Min/Max request.	History segment or point number
32	Invalid TLP.	Point type, parameter, or logical number
33	Invalid time.	Seconds, minutes, hours, days, months, or years
34	Illegal Modbus range	Point/Logical number
50	General Error	Any
51	Invalid State for Write	Point type
52	Invalid Configurable Opcode Request	Starting Table Location
61	HART Passthrough Comm Scanner or passthrough disabled on this channel	See Opcode 200
62	HART passthrough not licensed	See Opcode 200
63	Requested Access Level Too High	Access Level
77	Invalid logoff string	Ignored

Table 2–33. Opcode 255, Request Multiple History Point Data

Opcode 255						
Communi-Cation Opcode	Host Request to ROC800			ROC800 Response to Host		
	Data			Data		
	Offset	Length	Description of Data	Offset	Length	Description of Data
Opcode 255: Invalid parameters in request received by ROC800			Reserved for ROC800 use.	⎡6 ⎣7	1 1 .	Error code (see Opcode 200) Offset of the byte that caused the error. (repeat above as necessary). With the exceptions shown in the Note below:

Note: The following are special cases for the value returned in offset 7:

- For opcodes 166 and 167:
  Returns the requested point type's Actual parameter. For example, if you request parameters 5 through 10 and 6 fails, the value of parameter 6 (not 2) is returned in offset 7.
- For opcodes 180 and 181:
  Returns the TLP-Tuple offset. For example, if you request ten TLPs and the 9th TLP has an error, 9 values are returned.

Table 2–34. Valid Error Code for a Given Opcode

This chart shows the ROC Plus Protocol relationship between opcodes and the point types that they reference.

Error Codes

Description	#	6 Request current ROC800 configuration	7 Read data and time	8 Set real time clock	10 Read configurable opcode point data	11 Write configurable opcode point data	17 Set operator id code	24 Set store and forward action	50 Request I/O Point Position	105 Request today and yesterday min and max values	108 Request history tag and periodic index	118 Request alarm data	119 Request event data	135 Request history point data	136 Request history index data	137 Request history index for a day	166 Set single point parameters	167 Request single point parameters	180 Request parameters	181 Write parameters	224 RBX send to host	225 RBX Ack from host	255 Error indicator
Invalid opcode request	**1**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Invalid parameter number	**2**																				NA		NA
Invalid logical number	**3**																**x**	**x**	**x**	**x**	NA		NA
Invalid point type	**4**																				NA		NA
Received too many data bytes	**5**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	NA		NA
Received too few data bytes	**6**			**x**	**x**	**x**	**x**	**x**	**x**		**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	NA	x	NA
Outside valid address range	**13**																				NA		NA
Invalid history request	**14**													**x**	**x**						NA		NA
Invalid FST request	**15**																				NA		NA
Invalid event entry	**16**																				NA		NA
Requested too many alarms	**17**											**x**									NA		NA
Requested too many events	**18**												**x**								NA		NA
Write to read only parameter	**19**																**x***			**x**	NA		NA
Security error	**20**						**x**														NA		NA
Invalid security logon	**21**						**x**														NA		NA
Invalid store and forward path	**22**							**x**													NA		NA
Flash programming error	**23**																				NA		NA
History configuration in progress	**24**									**x**	**x**			**x**	**x**	**x**					NA		NA
Invalid parameter range	**25**			**x**		**x**											**x**			**x**	NA		NA

This chart shows the ROC Plus Protocol relationship between opcodes and the point types that they reference.		Request current ROC800 configuration	Read data and time	Set real time clock	Read configurable opcode point data	Write configurable opcode point data	Set operator id code	Set store and forward action	Request I/O Point Position	Request today and yesterday min and max values	Request history tag and periodic index	Request alarm data	Request event data	Request history point data	Request history index data	Request history index for a day	Set single point parameters	Request single point parameters	Request parameters	Write parameters	RBX send to host	RBX Ack from host	Error indicator
Description	**#**	**6**	**7**	**8**	**10**	**11**	**17**	**24**	**50**	**105**	**108**	**118**	**119**	**135**	**136**	**137**	**166**	**167**	**180**	**181**	**224**	**225**	**255**
Invalid User C++ program number	**26**																				NA		NA
No room for User C++ program	**27**																				NA		NA
Out of sequence User C++ packet number	**28**																				NA		NA
Invalid 1 day history index request	**29**															x					NA		NA
Invalid history point	**30**										x										NA		NA
Invalid Min/Max request	**31**									x											NA		NA
Invalid TLP	**32**																x	x	x	x	NA		NA
Invalid time.	**33**			x																	NA		NA
Illegal Modbus range	**34**																x			x	NA		NA
General Error	**50**								**x**												NA		NA
Invalid State for Write	**51**																**x***			**x**	NA		NA
Invalid Configurable Opcode Request	**52**				**x**	**x**															NA		NA

* = Exception for opcode 166 which can have multiple parameters. Some of these may be RO or Invalid State, and some may not.

Chapter 3 – Parameter Lists for Point Types

Configuring the ROC800 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 ROC point types, Data Types, and User Defined Point (UDP) Types.

3.1 Type, Location/Logical, and Parameter (TLPs)

You reference data in the ROC800 by **t**ype, **l**ocation or **l**ogical, and **p**arameter (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.

3.2 Logical/Location Details

Within a point type, you reference individual points by either a location or a logical number (the “L” in the TLP referencing scheme). The ROC Plus protocol uses *location* (which is based on a physical input or output [I/O] “module and point” location) for point types 101 through 109. All other point types use a *logical* number and are simply numbered in sequence.

- **Location (Physical Point Numbers 1 – 240)**: For point types 101 through 109, the “L” in “TLP” represents a number identifying the physical location of the field I/O and the diagnostic inputs. The original release of the ROC809 firmware fixed the number of points per module at 16. ROC800 firmware versions 2.00 and later allow you to select either 8 or 16 points per module (Logical Compatibility Mode, TLP 91,0,50). Depending on the selection of points per module, the location numbers are assigned accordingly:
  - If you select **8** points per module, the ROC800 reserves Location Numbers 0 to 7 for system I/O. If you select **16** points per module, the ROC800 reserves Location Numbers 0 to 15 for system I/O. In either case, the five diagnostic points in a ROC800 are locations 0 through 4.
  - If you select **8** points per module, the ROC800 assigns Location Numbers 8 to 223 to field I/O. For example, an I/O module in slot 1 with 4 points is assigned points 8 through 11. If you select **16** points per module, the ROC800 assigns Location Numbers 16 to 240 to field I/O. An I/O module in slot 1 with 4 points is assigned points 16 through 19.

Note: If you select 16 points per module for a ROC800 with more than one expansion ring, you **cannot** address any I/O modules past slot 14. See the description of Opcode 50 (Request I/O Point Position) in *Chapter 2, Opcodes*.

- Logical (Point Numbers 0 – 127): For all other point types (other than 101 through 109), the logical number is 0 to *x*, where *x* is one less than the total number of points that exist for that point type. For example, the 16 PIDs would be logical numbers 0 through 15.

Table 3-1 details data types.

Table 3–1. Data Type

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 or FLOAT	Single Precision Floating Point – IEEE Format	4	Any valid IEEE double precision float (see Chapter 5)
DBL	Double Precision Floating Point – IEEE Format	8	Any valid IEEE double precision float (see Chapter 5)
TLP	Type, Point or Logical Number, Parameter Number	3	{0 → 255, 0 → 255, 0 →2 55}
TIME	Arithmetic Time: Number of seconds since Jan 1 1970 @ 00:00:00. This is a UINT32.	4	0 → 0 → 4,294,967,296 Jan 1, 1970 00:00:00 → Feb. 7, 2106 06:28:15

3.3 Binary Field (BIN) Example

This section provides an example alarm code from an analog input point type to demonstrate how a binary parameter is returned. A **1** in any bit indicates that bit is active or enabled.

	Scanning Disabled Alarm	Point Fail Alarm	Not Used	Rate Alarm	High High Alarm	High Alarm	Low Low Alarm	Low Alarm
Bit	7	6	5	4	3	2	1	0
Response Code	1	0	0	0	0	0	0	0

3.4 Point Type Table Fields

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
Param#	Defines the specific parameter number associated with that point type.
Name	Provides the name of the parameter.
Access	Indicates if the parameter can be read from and written to (**R/W**) or if the parameter is read-only (**R/O**).
System or User Update	Identifies who has write access to the data.
Data Type	Identifies the type of data being stored. Data types are defined in Chapter 2.
Length	Indicates the number of bytes the parameter uses.
Range	Identifies the range of accepted values for the parameter.
Default	Indicates the initial value of the parameter.
Ver	Identifies the version of program in which the parameter was first introduced.
Description	Provides a brief description of the parameter.

3.4.1 Point Type 82: Virtual Discrete Outputs

Description: Point type 82 provides the Virtual Discrete Outputs parameters for setting up discrete outputs.
Number of Logical Points: 24 logical points for Virtual Discrete Outputs may exist.
Storage Location: Point type 82 is saved to internal configuration memory.

Table 3-2: Point Type 82, Virtual Discrete Outputs

Point Type 82, Virtual Discrete Outputs

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Point Tag ID	R/W	User	AC	10	0x20 → 0x7E for each ASCII character	"DO Default"	3.02	Identification name for specific DO. Values must be printable ASCII characters.
1	Units Tag	R/W	User	AC	10	0x20 → 0x7E for each ASCII character	"Percent "	3.02	Describes the units used by the DO. Values must be printable ASCII characters.
2	Scanning Mode	R/W	User	UINT8	1	0 → 2	1	3.02	Indicates the scanning mode. Valid values are: 0 = Disabled (no changes to output occur) 1 = Automatic (anything changes DO values) 2 = Manual (only user can change DO values)
3	Alarming	R/W	User	UINT8	1	0 → 1	0	3.02	If enabled, alarms may be generated and sent to the Alarm Log. Valid values are 0 (Disabled) and 1 (Enabled).
4	SRBX on Clear	R/W	User	UINT8	1	0 → 1	0	3.02	Indicates a SRBX alarm is desired if an alarm condition clears. Valid values are 0 (SRBX on Clear Disabled) and 1 (SRBX on Clear Enabled).
5	SRBX on Set	R/W	User	UINT8	1	0 → 1	0	3.02	Indicates a SRBX alarm is desired if an alarm condition occurs. Valid values are 0 (SRBX on Set Disabled) and 1 (SRBX on Set Enabled).
6	Alarm Code	R/O	System	BIN	1	0x00 → 0xFF	0x00	3.02	
6.0	Not Used			Bit 0			0		Not Used
6.1	Not Used			Bit 1			0		Not Used
6.2	Not Used			Bit 2			0		Not Used
6.3	Not Used			Bit 3			0		Not Used
6.4	Not Used			Bit 4			0		Not Used

Point Type 82, Virtual Discrete Outputs

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
6.5	Scanning Manual Alarm			Bit 5			0	3.02	If set, the Scanning (parameter #2) has been set to Manual. If clear, the Scanning (parameter #2) has been set to either Disable or Automatic
6.6	Not Used			Bit 6			0		Not Used
6.7	Scanning Disabled Alarm			Bit 7			0	3.02	If set, the Scanning (parameter #2) has been disabled. If clear, the Scanning (parameter #2) has been set to either Automatic or Manual.
7	Failsafe on Reset	R/W	User	UINT8	1	0 → 1	0	3.02	If enabled, the Status (parameter #8) is set to the status indicated in 'Failsafe Status Value' (Parameter #22) on a restart of any kind. If disabled, the last Status before the restart will be used. Valid values are 0 (Output Last Status on Reset) and 1 (Use Failsafe value on Reset).
8	Auto Output	R/W	Both	UINT8	1	0 → 1	0	3.02	Controls the state of the DO when Scanning (parameter #2) is in auto mode. In other words, the physical output gets this status when the mode (parameter # 2) is set to Automatic.
9	Accumulated Value	R/W	Both	UINT32	4	0 → 4,294,967,295	0	3.02	Number of times the Status (parameter #8) goes from OFF to ON.
10	Momentary Mode	R/W	User	UINT8	1	0 → 1	0	3.02	If enabled, the Status (parameter #8) is turned ON for the entered Time On (parameter #14) and then be turned OFF. Valid valules are 0 (Momentary Disabled) and 1 (Momentary Enabled).
11	Momentary Active	R/O	System	UINT8	1	0 → 1	0	3.02	Indicates that the DO currently has the Momentary ability active. Valid values are 0 (Momentary Not Active) and 1 (Momentary Active).
12	Toggle Mode	R/W	User	UINT8	1	0 → 1	0	3.02	If enabled, the Status (parameter #8) is ON for the entered Time On (parameter #14) and then turned OFF for the same Time On. The Status continues to cycle between the ON and OFF states. Vallid values are 0 (Toggle Disabled) and 1 (Toggle Enabled).

Point Type 82, Virtual Discrete Outputs

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
13	Timed Discrete Output (TDO) Mode	R/W	User	UINT8	1	0 → 1	0	3.02	If enabled, the Status (parameter #8) is turned ON for a calculated Time On (parameter #14) based upon the entered EU Value (parameter #20). After the Time On has expired, the Status is turned OFF and remains that way until a new EU Value is entered. Valid values are 0 (TDO Disabled) and 1 (TDO Enabled).
14	Time On	R/W	Both	FL	4	DO: 0.002 → 43,200.0 DOR: 0.05→ 43,200.0	1.0	3.02	Number of seconds the Status (parameter #8) is turned on for if in TDO, Toggle, or Momentary Mode.
15	Cycle Time	R/W	User	FLOAT	4	>0.0 → 43,200.0	15.0	3.02	Number of seconds for when TDO Mode (parameter #13) and Toggle Mode (parameter #12) are selected. The Status (parameter #8) is ON for the calculated Time On (parameter #14) based upon the entered EU Value (parameter #20). The Status is then turned OFF based upon the Cycle Time minus the Time On.
16	Low Reading Time	R/W	User	FLOAT	4	0.0 → 43,200.0	3.0	3.02	Minimum number of seconds the calculated Time On (parameter #14) is when the entered EU Value (parameter #20) is less than or equal to the entered Low Reading EU (parameter #18).
17	High Reading Time	R/W	User	FLOAT	4	0.0 → 43,200.0	12.0	3.02	Maximum number of seconds the calculated Time On (parameter #14) will be when the entered EU Value (parameter #20) is greater than or equal to the entered High Reading EU (parameter #19).
18	Low Reading EU	R/W	User	FLOAT	4	Any valid IEEE 754 float	0.0	3.02	Minimum EU Value (parameter #20) possible.
19	High Reading EU	R/W	User	FLOAT	4	Any valid IEEE 754 float	100.0	3.02	Maximum EU Value (parameter #20) possible.
20	EU Value	R/W	Both	FLOAT	4	Any valid IEEE 754 float	0.0	3.02	Value in Engineering Units.
21	Manual Output	R/W	Both	UINT8	1	0 → 1	0	3.02	Controls the state of the DO when Scanning (parameter #2) is in manual mode. In other words, the physical output gets this status when the mode (parameter # 2) is set to Automatic.
22	Failsafe Output	R/W	User	UINT8	1	0 → 1	1	3.02	The state the output is placed in when the unit is started and the Failsafe on Reset Parameter (Parameter 7) is set to 1, Use Failsafe value on reset.
23	Max Scan Period	R/O	System	FLOAT	4	0.0→Any positive valid IEEE 754 float	2	3.02	How often (in seconds) the DOs are rewritten.

Point Type 82, Virtual Discrete Outputs

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
24	Physical Output	R/O	System	UINT8	1	0 → 1	0	3.02	Indicates the current state of the DO. Valid values are 1 (ON) and 0 (OFF).
25	DO Type	R/O	System	UINT8	1	2	0	3.02	Indicates the DO type. Only current valid vauis is 2 (Virtual DO).
26	Invert Output Mode	R/W	User	UINT8	1	0 → 1	0	1.00	Inverts the output of the DO channel, allowing you to use TDO mode tp keep a channel OFF for a set amount of time and then bringi the channel back ON. Valid values are 0 (Normal) and 1 (Inverted). **Note:** This **always** inverts the output, including the Failsafe Output.

3.4.2 Point Type 84: HART Extended Point Type

Description: Point type 84 provides the HART parameters associated with the HART 2 module.
Number of Logical Points: 4 logicals per installed module imay exist.
Storage Location: Any parameter noted as “persistent” is saved to internal configuration memory.

Table 3-3: Point Type 84, HART Extended Point Type

Point Type 84, HART Extended

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Channel Alarming	R/W	User	UINT8	1	0-1	0	3.10	If enabled, generates channel alarms and sends them to the Alarm Log. Valid values are 0 (Disabled) and 1 (Enabled). **Note**: This parameter is **persistent**.
1	Channel Alarm Code	R/O	System	BIN	1	0x00 → 0xFF	0	3.10	Alarm value for the HART channel. **Note**: This parameter is **persistent**.
1.0	AI Low Alarm			Bit 0			0		If set, the HART AI EU value is less than or equal to the AI Low Alarm EU (parameter #2). If clear, the HART EU value is greater than the AI Low Alarm EU (parameter #2). Only applies when the channel is configured as an AI.
1.2	AI High Alarm			Bit 2			0		If set, the HART AI EU value is greater than or equal to the AI High Alarm EU (parameter #3). If clear, the HART EU value is less than the AI High Alarm EU (parameter #3). Only applies when the channel is configured as an AI.
1.5	AO Readback Alarm			Bit 5			0		If set, the HART module is not detecting a device on the output line. If clear, the analog output is functioning correctly. Only applies when the channel is configured as an AO.
1.6	Point Fail Alarm			Bit 6			0		If set, communicating with the HART module has failed. If clear, the HART’s hardware is operating properly.
2	AI Low Alarm EU	R/W	User	FLOAT	4	Any valid IEEE 754 float	-10.0	3.10	Alarm value for HART AI Low Alarm. **Note**: This parameter is **persistent**.
3	AI High Alarm EU	R/W	User	FLOAT	4	Any valid IEEE 754 float	110.0	3.10	Alarm value for HART AI High Alarm. **Note**: This parameter is **persistent**.

Point Type 84, HART Extended

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
4	Alarm Deadband	R/W	User	FLOAT	4	Any valid IEEE 754 float	2.0	3.10	Provides a range (±) that the HART AI EU Value may move between without causing another alarm. **Note**: This parameter is **persistent**.
5	Device 1 Alarming	R/W	User	UINT8	1	0-1	0	3.10	If enabled, generates device alarms and sends them to the Alarm Log. Valid values are 0 (Disabled) and 1 (Enabled). **Note**: This parameter is **persistent**.
6	Device 1 Alarm Code	R/O	System	BIN	1	0x00 → 0xFF	0	3.10	Alarm code for the device on the HART channel. **Note**: This parameter is **persistent**.
6.0	Device 1 PV Low Alarm			Bit 0			0		If set, the Device PV value is less than or equal to the Device PV Low Alarm Value. If clear, the Device PV value is greater than the Device PV Low Alarm Value.
6.2	Device 1 PV High Alarm			Bit 2			0		If set, the Device PV value is greater than or equal to the Device PV High Alarm Value. If clear, the Device PV value is less than the Device PV High Alarm Value.
6.6	Device 1 Point Fail Alarm			Bit 6			0		If set, communicating with the HART Device has failed. If clear, the HART Device is operating correctly.
7	Device 1 PV Low Alarm Value	R/W	User	FLOAT	4	Any valid IEEE 754 float	-10	3.10	Alarm value for Device PV Low Alarm. **Note**: This parameter is **persistent**.
8	Device 1 PV High Alarm Value	R/W	User	FLOAT	4	Any valid IEEE 754 float	1,000,000	3.10	Alarm value for Device PV High Alarm. **Note**: This parameter is **persistent**.
9	Device 1 Alarm Deadband	R/W	User	FLOAT	4	Any valid IEEE 754 float	0	3.10	Provides a range (±) that the Device PV Value may move between without causing another alarm. **Note**: This parameter is **persistent**.
10	Device 1 Download PV	R/W	USER	FLOAT	4	Any valid IEEE 754 float	0	3.10	When the device Poll Mode is set to Download PV (4), the PV value of the device is set to the Device Download PV value. **Note**: This parameter is **persistent**.
11	Device 1 Live PV Value	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	3.10	The current value of the PV returned from the card or last live value if scan mode is set to Skip this Device or Slot modes. **Note**: This parameter is **persistent**.

Point Type 84, HART Extended

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
12	Device 1 In Use Mode	R/W_ LOG	User	UINT8	1	0-2	0	3.10	Determines what value is used to populate the PV parameter. Valid values are: 0 = live or last live 1 = failsafe value 2 = download value. Overrides failsafe mode except when in live mode. **Note**: This parameter is **persistent**.
13	Device 1 In Use Status	R/O	System	UINT8	1	0-6	0	3.10	Status of what value is being used to populate the PV. Valid values are: 0 = live or last live value without failure 1 = last live/scanning disabled 2 = failed to last live value 3 = failed to download value 4 = failed to failsafe value, 5 = set to download value, 6 = set to failsafe value **Note**: This parameter is **persistent**.
14	Device 2 Alarming	R/W	User	UINT8	1	0-1	0	3.10	If enabled, device alarms may be generated and sent to the Alarm Log. Valid values are 0 (Disabled) and 1 (Enabled). **Note**: This parameter is **persistent**.
15	Device 2 Alarm Code	R/O	System	BIN	1	0x00 → 0xFF	0	3.10	Alarm code for the device on the HART channel. **Note**: This parameter is **persistent**.
15.0	Device 2 PV Low Alarm			Bit 0			0		If set, the Device PV value is less than or equal to the Device PV Low Alarm Value. If clear, the Device PV value is greater than the Device PV Low Alarm Value.
15.2	Device 2 PV High Alarm			Bit 2			0		If set, the Device PV value is greater than or equal to the Device PV High Alarm Value. If clear, the Device PV value is less than the Device PV High Alarm Value.
15.6	Device 2 Point Fail Alarm			Bit 6			0		If set, communicating with the HART Device has failed. If clear, the HART Device is operating correctly.
16	Device 2 PV Low Alarm Value	R/W	User	FLOAT	4	Any valid IEEE 754 float	-10	3.10	Alarm value for Device PV Low Alarm. **Note**: This parameter is **persistent**.
17	Device 2 PV High Alarm Value	R/W	User	FLOAT	4	Any valid IEEE 754 float	1,000,000	3.10	Alarm value for Device PV High Alarm. **Note**: This parameter is **persistent**.
18	Device 2 Alarm Deadband	R/W	User	FLOAT	4	Any valid IEEE 754 float	0	3.10	Provides a range (±) within which the Device PV Value may move between without causing another alarm. **Note**: This parameter is **persistent**.

Point Type 84, HART Extended

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
19	Device 2 Download PV	R/W	USER	FLOAT	4	Any valid IEEE 754 float	0	3.10	When the device Poll Mode is set to Download PV (4), the PV value of the device is set to the Device Download PV value. **Note**: This parameter is **persistent**.
20	Device 2 Live PV Value	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	3.10	The current value of the PV returned from the card or last live value if scan mode is set to Skip this Device or Slot modes. **Note**: This parameter is **persistent**.
21	Device 2 In Use Mode	R/W	User	UINT8	1	0-2	0	3.10	Determines what value populates the PV parameter. Valid values are: 0 = live or last live 1 = failsafe value 2 = download value. Overrides failsafe mode except when in live mode. **Note**: This parameter is **persistent**.
22	Device 2 In Use Status	R/O	System	UINT8	1	0-6	0	3.10	Status of what value is being used to populate the PV. Valid values are: 0 = live or last live value without failure 1 = last live/scanning disabled 2 = failed to last live value 3 = failed to download value, 4 = failed to failsafe value 5 = set to download value 6 = set to failsafe value **Note**: This parameter is **persistent**.
23	Device 3 Alarming	R/W	User	UINT8	1	0-1	0	3.10	If enabled, device alarms may be generated and sent to the Alarm Log. Valid values are 0 (Disabled) and 1 (Enabled). **Note**: This parameter is **persistent**.
24	Device 3 Alarm Code	R/O	System	BIN	1	0x00 → 0xFF	0	3.10	Alarm code for the device on the HART channel. **Note**: This parameter is **persistent**.
24.0	Device 3 PV Low Alarm			Bit 0			0		If set, the Device PV value is less than or equal to the Device PV Low Alarm Value. If clear, the Device PV value is greater than the Device PV Low Alarm Value.
24.2	Device 3 PV High Alarm			Bit 2			0		If set, the Device PV value is greater than or equal to the Device PV High Alarm Value. If clear, the Device PV value is less than the Device PV High Alarm Value.
24.6	Device 3 Point Fail Alarm			Bit 6			0		If set, communicating with the HART Device has failed. If clear, the HART Device is operating correctly.

Point Type 84, HART Extended

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
25	Device 3 PV Low Alarm Value	R/W	User	FLOAT	4	Any valid IEEE 754 float	-10	3.10	Alarm value for Device PV Low Alarm. **Note**: This parameter is **persistent**.
26	Device 3 PV High Alarm Value	R/W	User	FLOAT	4	Any valid IEEE 754 float	1,000,000	3.10	Alarm value for Device PV High Alarm. **Note**: This parameter is **persistent**.
27	Device 3 Alarm Deadband	R/W	User	FLOAT	4	Any valid IEEE 754 float	0	3.10	Provides a range (±) that the Device PV Value may move between without causing another alarm. **Note**: This parameter is **persistent**.
28	Device 3 Download PV	R/W	USER	FLOAT	4	Any valid IEEE 754 float	0	3.10	When the device Poll mode is set to Download PV (4), the PV value of the device is set to the Device Download PV value. **Note**: This parameter is **persistent**.
29	Device 3 Live PV Value	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	3.10	The current value of the PV returned from the card or last live value if Scan mode is set to Skip this Device or Slot modes. **Note**: This parameter is **persistent**.
30	Device 3 In Use Mode	R/W	User	UINT8	1	0-2	0	3.10	Determines what value populates the PV parameter. Valid values are: 0 = live or last live 1 = failsafe value 2 = download value. Overrides failsafe mode except when in live mode. **Note**: This parameter is **persistent**.
31	Device 3 In Use Status	R/O	System	UINT8	1	0-6	0	3.10	Status of what value is being used to populate the PV. Valid values are**:** 0 = live or last live value without failure 1 = last live/scanning disabled 2 = failed to last live value 3 = failed to download value 4 = failed to failsafe value 5 = set to download value 6 = set to failsafe value. **Note**: This parameter is **persistent**.
32	Device 4 Alarming	R/W	User	UINT8	1	0-1	0	3.10	If enabled, device alarms may be generated and sent to the Alarm Log. Valid values are 0 (Disabled) and 1 (Enabled). **Note**: This parameter is **persistent**.
33	Device 4 Alarm Code	R/O	System	BIN	1	0x00 → 0xFF	0	3.10	Alarm code for the device on the HARTchannel. **Note**: This parameter is **persistent**.
33.0	Device 4 PV Low Alarm			Bit 0			0		If set, the Device PV value is less than or equal to the Device PV Low Alarm Value. If clear, the Device PV value is greater than the Device PV Low Alarm Value.

Point Type 84, HART Extended

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
33.2	Device 4 PV High Alarm			Bit 2			0		If set, the Device PV value is greater than or equal to the Device PV High Alarm Value. If clear, the Device PV value is less than the Device PV High Alarm Value.
33.6	Device 4 Point Fail Alarm			Bit 6			0		If set, communicating with the HART Device has failed. If clear, the HART Device is operating correctly.
34	Device 4 PV Low Alarm Value	R/W	User	FLOAT	4	Any valid IEEE 754 float	-10	3.10	Alarm value for Device PV Low Alarm. **Note**: This parameter is **persistent**.
35	Device 4 PV High Alarm Value	R/W	User	FLOAT	4	Any valid IEEE 754 float	1,000,000	3.10	Alarm value for Device PV High Alarm. **Note**: This parameter is **persistent**.
36	Device 4 Alarm Deadband	R/W	User	FLOAT	4	Any valid IEEE 754 float	0	3.10	Provides a range (±) that the Device PV Value may move between without causing another alarm. **Note**: This parameter is **persistent**.
37	Device 4 Download PV	R/W	USER	FLOAT	4	Any valid IEEE 754 float	0	3.10	When the device Poll Mode is set to Download PV (4), the PV value of the device is set to the Device Download PV value. **Note**: This parameter is **persistent**.
38	Device 4 Live PV Value	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	3.10	The current value of the PV returned from the card or last live value if scan mode is set to Skip this Device or Slot modes. **Note**: This parameter is **persistent**.
39	Device 4 In Use Mode	R/W	User	UINT8	1	0-2	0	3.10	Determines what value populates the PV parameter. Valid values are: 0 = live or last live 1 = failsafe value 2 = download value. Overrides failsafe mode except when in live mode. **Note**: This parameter is **persistent**.
40	Device 4 In Use Status	R/O	System	UINT8	1	0-6	0	3.10	Status of what value is being used to populate the PV. Valid values are: 0 = live or last live value without failure 1 = last live/scanning disabled 2 = failed to last live value 3 = failed to download value 4 = failed to failsafe value 5 = set to download value 6 = set to failsafe value **Note**: This parameter is **persistent**.
41	Device 5 Alarming	R/W	User	UINT8	1	0-1	0	3.10	If enabled, device alarms may be generated and sent to the Alarm Log. Valid values are 0 (Disabled) and 1 (Enabled). **Note**: This parameter is **persistent**.

Point Type 84, HART Extended

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
42	Device 5 Alarm Code	R/O	System	BIN	1	0x00 → 0xFF	0	3.10	Alarm code for the device on the HART channel. **Note**: This parameter is **persistent**.
42.0	Device 5 PV Low Alarm			Bit 0			0		If set, the Device PV value is less than or equal to the Device PV Low Alarm Value. If clear, the Device PV value is greater than the Device PV Low Alarm Value.
42.2	Device 5 PV High Alarm			Bit 2			0		If set, the Device PV value is greater than or equal to the Device PV High Alarm Value. If clear, the Device PV value is less than the Device PV High Alarm Value.
42.6	Device 5 Point Fail Alarm			Bit 6			0		If set, communicating with the HART device has failed. If clear, the HART device is operating correctly.
43	Device 5 PV Low Alarm Value	R/W	User	FLOAT	4	Any valid IEEE 754 float	-10	3.10	Alarm value for Device PV Low Alarm. **Note**: This parameter is **persistent**.
44	Device 5 PV High Alarm Value	R/W	User	FLOAT	4	Any valid IEEE 754 float	1,000,000	3.10	Alarm value for Device PV High Alarm. **Note**: This parameter is **persistent**.
45	Device 5 Alarm Deadband	R/W	User	FLOAT	4	Any valid IEEE 754 float	2.0	3.10	Provides a range (±) in which the Device PV Value may move between without causing another alarm. **Note**: This parameter is **persistent**.
46	Device 5 Download PV	R/W	USER	FLOAT	4	Any valid IEEE 754 float	0	3.10	When the device Poll Mode is set to Download PV (4), the PV value of the device is set to the Device Download PV value. **Note**: This parameter is **persistent**.
47	Device 5 Live PV Value	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	3.10	The current value of the PV returned from the card or last live value if scan mode is set to Skip this Device or Slot modes. **Note**: This parameter is **persistent**.
48	Device 5 In Use Mode	R/W	User	UINT8	1	0-2	0	3.10	Determines what value is used to populate the PV parameter. Valid values are: 0 = live or last live 1 = failsafe value 2 = download value. Overrides failsafe mode except when in live mode. **Note**: This parameter is **persistent**.

Point Type 84, HART Extended

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
49	Device 5 In Use Status	R/O	System	UINT8	1	0-6	0	3.10	Status of what value is being used to populate the PV. Valid values are: 0 = live or last live value without failure 1 = last live/scanning disabled 2 = failed to last live value 3 = failed to download value 4 = failed to failsafe value 5 = set to download value 6 = set to failsafe value **Note**: This parameter is **persistent**.
50	Units Tag	R/W	User	AC	10	0x20 → 0x7E for each ASCII character	“ “	3.40	Describes the units the HART AI uses. Values must be primarily ASCII characters. **Note**: This parameter is **persistent**.

3.4.3 Point Type 85: HART Point Type

Description: Point type 85 is a User Defined Point Type to allow storage for user defined data.
Number of Logical Points: 4 logicals per installed module may exist.
Storage Location: Any parameter noted as “persistent” is saved to internal configuration memory.

Table 3-4: Point Type 85, HART Point Type

Point Type 85, HART

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0 (HART 1)	Channel Version	R/O	System	AC	10	0x20 - 0x5F for each byte	" "	1.40	Version number for the firmware in the channel.
0 (HART 2)	RESERVED	R/O	System	AC	10	0x20 - 0x5F for each byte	" "	3.10	Version number for the firmware in the channel.
1 (HART 1)	Channel I/O	R/O	System	UINT8	1	0 – 1	0	1.40	Indicates if a channel is an analog input or output. Valid values are 0 (Input) and 1 (Output). **Note**: This parameter is **persistent.**
1 (HART 2)	Channel II/O	R/W	User	UINT8	1	0 – 1	0	3.10	Indicates if a channel is an analog input or output. Valid values are 0 (Input) and 1 (Output). **Note**: This parameter is **persistent**.
2 (HART 1)	HART Communication Mode	R/W	User	UINT8	1	0 – 2	1	1.40	If disabled, all HART communication stops and no changes occur unless manually entered. Valid values are: 0 = Disabled 1 = Point to Point, 2 = Multidrop **Note**: This parameter is **persistent**.
2 (HART 2)	HART Communication Mode	R/W	User	UINT8	1	Bits 0-6: 0 – 2 Bit7: 0 – 1	1	1.00	If disabled, all HART communication stops and no changes occur unless manually entered. Bits 0-6: 0 = Disabled 1 = Point to Point, 2 = Multidrop Bit 7: 0 = Primary Master 1 = Secondary Master **Note**: This parameter is **persistent**.

Point Type 85, HART

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
3	Number of Devices Connected	R/W	User	UINT8	1	1 – 5	1	1.40	Indicates the number of devices connected in multidrop mode. **Note**: This parameter is **persistent**.
4 (HART 1)	HART COM Status	R/O	System	UINT8	1	0 – 3	1	1.40	0 = Not Scanning 1 = Scanning Normal 2 = Dual Master Detected 3 = Pass thru
4 (HART 2)	HART COM Status	R/O	System	UINT8	1	0 – 4	1	3.10	0 = Not Scanning 1 = Scanning Normal 2 = Dual Master Detected 3 = Pass thru 4 = Device in Burst Mode Detected .
5	Analog Mode	R/W	User	UINT8	1	0– 4	1	1.40	Analog Input: 0 = Disabled 1 = Enabled 3 = Calibration – EU Value not longer updates and freezes at this value. 4 = Cancel Calibration (restore previous calibration) Analog Output: 0 = Disabled 1 = Enabled (Auto) 2 = Manua **Note**: This parameter is **persistent**.
6	ROC Protocol Pass Thru Enable	R/W	User	UINT8	1	0 – 2	1	1.40	Enables ROC protocol pass thru communication. 0 = Disabled, 1 = Enabled 0 = Disable 1 = Strip all bytes, including preambles, before message 2 = Don't alter the message, return all bytes. This parameter is only R/W (to other than 0) if the license is available for this feature. **Note**: This parameter is **persistent**.
7 (HART 1)	ROC Protocol Pass Thru Timeout	R/W	User	UINT32	4	0 - 4,294,967,295	5000	1.40	Timeout in milliseconds to resume polling of HART device after receiving ROC protocol pass thru communication. **Note**: This parameter is **persistent**.
7 (HART 2)	Internal Resistor Control	R/W	User	UINT32	4	0 - 4,294,967,295	5000	3.10	Enables or disables internal resistor. Bits 0-30 are unused. Valid values for Bit 31 are 0 (Enabled) and 1 (Disabled). **Note**: This parameter is **persistent**.

Point Type 85, HART

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
8	EU Value	R/O	Both	FLOAT	4	Any valid IEEE 754 float	0	1.40	EU value of analog input or output. **Note**: This parameter is **persistent**.
9	Failsafe on Reset	R/W	User	UINT8	1	0 – 1	0	1.40	0 = Use last EU Value on reset 1 = Use Failsafe value on Reset If enabled (1), the raw D/A Output will be set to the Failsafe value on a restart of any kind. If disabled, the last EU Value or the last saved EU Value will be used to determine the Raw D/A Output after a restart. **Note**: This parameter is **persistent**.
10	Failsafe Value	R/W	Both	FLOAT	4	Any valid IEEE 754 float	0.0	1.40	The value outputted when the unit is started and the Failsafe on Reset Parameter is set to 1, Use Failsafe value on reset. **Note**: This parameter is **persistent**.
11	Manual Value	R/W	Both	FLOAT	4	Any valid IEEE 754 float	0.0	1.40	Indicates the EU value used as an output when Scanning is in manual mode. **Note**: This parameter is **persistent**.
12	Auto Value	R/W	Both	FLOAT	4	Any valid IEEE 754 float	0.0	1.40	Indicates the EU value used as an output when Scanning is in auto mode. **Note**: This parameter is **persistent**.
13	Physical Value	R/O	System	FLOAT	4	Any valid IEEE 754 float	0.0	1.40	Indicates the current value of the output in Engineering Units. **Note**: This parameter is **persistent**.
14	Physical Raw D/A Output	R/O	System	UINT16	2	0 → 65,535	AI: 0 AO: 5,257	1.40	Calculated Digital-to-Analog value based upon the EU value currently being outputted EU Value.
15	Cabribration Live Value	R/O	Both	FLOAT	4	Any valid IEEE 754 float	0.0	1.40	Live value when calibrating an AI. **Note**: This parameter is **persistent**.
16	EU Calibration Value Zero	R/W	User	FLOAT	4	Any valid IEEE 754 float	0.0	1.40	Indicates the zero EU calibration value. **Note**: This parameter is **persistent**.
17	EU Calibration Value Span	R/W	User	FLOAT	4	Any valid IEEE 754 float	100.0	1.40	Indicates the span EU calibration value. **Note**: This parameter is **persistent**.
18	EU Raw Value	R/O	System	UINT16	2	0 - 65535	0	1.40	Indicates the raw EU value of analog input or output. **Note**: This parameter is **persistent**.
19	EU Raw Calibration Zero	R/W	System	UINT16	2	0 - 65535	AI: 621 AO: 5,257	1.40	Indicates the zero raw EU calibration value. **Note**: This parameter is **persistent**.
20	EU Raw Calibration Span	R/W	System	UINT16	2	0 - 65535	AI:3,103 AO: 26,287	1.40	Indicates the span raw EU calibration value. **Note**: This parameter is **persistent**.

Point Type 85, HART

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
21 (HART 1)	Device 1 Poll Mode	R/W	User	UINT8	1	0-5	0	1.40	Indicates the polling mode for device. Valid values are: 0 = Skip This Device 1 = Primary Variable Only 2 = All Dynamic Variables 3 = All Slot Variables 4 = Full Update **Note**: This parameter is **persistent**.
21 (HART 2)	Device 1 Poll Mode	R/W	User	UINT8	1	Bit 7: 0 – 1 Bits 0-6: 0 –3	0	1.40	Bit 7: Update State: 1=update, 0=no update Bits 0-6: 0 = Skip This Device 1 = Primary Variable Only 2 = All Dynamic Variables 3 = All Slot Variables **Note**: This parameter is **persistent**.
22	Device 1 Polling Address	R/O	Both	UINT8	1	0-15	0	1.40	Polling address for device 1.
23	Device 1 Status	R/O	System	UINT8	1	0-1	0	1.40	0 = No Device Found 1 = Communicating 2 = Comm Error
24	Device 1 Actual Scan Period	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Period at which device 1 is being updated.
25	Device 1 Tag	R/W	Both	AC	10	0x20 - 0x5F for each byte	"."	1.40	Tag that resides in device 1. **Note**: This parameter is **persistent.**
26	Device 1 Response Code/Status	R/O	System	UINT16	2	0 - 65535	0	1.40	Response code and status received from device 1.
27	Device 1 Active Alarms	R/O	System	UINT8	1	0 - 255	0	1.40	Active alarms reported by device 1.
28	Device 1 Current (mA)	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Current in milliamps reported by device 1.
29	Device 1 Percent of Range	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Percent of range reported by device 1.
30 (HART 1)	Device 1 Fail Safe Enable	R/W	User	UINT8	1	0 - 1	0	1.40	Enables the use of fail safe values for the dynamic variables when the unit resets for device 1: **Note**: This parameter is **persistent**.

Point Type 85, HART

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
30 (HART 2)	Device 1 Fail Safe Enable	R/W	User	UINT8	1	0 - 1	0	3.10	Enables the use of fail safe or download values for the dynamic variables when the unit detects an error for device 1. Valid values are: 0 = live or last live 1 = failsafe values 2 = download value for PV, failsafe values for other dynamic variables. **Note**: This parameter is **persistent.**
31	Device 1 PV Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units code for primary variable reported by device 1.
32	Device 1 PV	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of primary variable of device 1. **Note**: This parameter is **persistent**.
33	Device 1 PV Fail Safe Value	R/W	User	FLOAT	4	Any valid IEEE 754 float	0	1.40	Primary fail safe value for device 1. **Note**: This parameter is **persistent**.
34	Device 1 SV Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units code for secondary variable reported by device 1.
35	Device 1 SV	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of secondary variable of device 1. **Note**: This parameter is **persistent**.
36	Device 1 SV Fail Safe Value	R/W	User	FLOAT	4	Any valid IEEE 754 float	0	1.40	Secondary fail safe value for device 1. **Note**: This parameter is **persistent**.
37	Device 1 TV Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units code for tertiary variable reported by device 1.
38	Device 1 TV	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of tertiary variable of device 1. **Note**: This parameter is **persistent**.
39	Device 1 TV Fail Safe on Reset Value	R/W	User	FLOAT	4	Any valid IEEE 754 float	0	1.40	Tertiary fail safe value for device 1. **Note**: This parameter is **persistent**.
40	Device 1 FV Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units code for fourth variable reported by device 1.
41	Device 1 FV	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of fourth variable of device 1. **Note**: This parameter is **persistent**.
42	Device 1 FV Fail Safe on Reset Value	R/W	User	FLOAT	4	Any valid IEEE 754 float	0	1.40	Fourth fail safe value of device 1. **Note**: This parameter is **persistent**.
43	Device 1 Slot 0 Assignment	R/W	User	UINT8	1	0 - 255	0	1.40	Slot 0 variable to request from device 1. **Note**: This parameter is **persistent**.
44	Device 1 Slot 0 Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units of slot 0 variable requested from device 1.
45	Device 1 Slot 0 Variable	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of slot 0 variable requested from device 1.
46	Device 1 Slot 1 Assignment	R/W	User	UINT8	1	0 - 255	0	1.40	Slot 1 variable to request from device 1. **Note**: This parameter is **persistent**.

Point Type 85, HART

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
47	Device 1 Slot 1 Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units of slot 1 variable requested from device 1.
48	Device 1 Slot 1 Variable	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of slot 1 variable requested from device 1.
49	Device 1 Slot 2 Assignment	R/W	User	UINT8	1	0 - 255	0	1.40	Slot 2 variable to request from device 1. **Note**: This parameter is **persistent**.
50	Device 1 Slot 2 Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units of slot 2 variable requested from device 1.
51	Device 1 Slot 2 Variable	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of slot 2 variable requested from device 1.
52	Device 1 Slot 3 Assignment	R/W	User	UINT8	1	0 - 255	0	1.40	Slot 3 variable to request from device 1. **Note**: This parameter is **persistent**.
53	Device 1 Slot 3 Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units of slot 3 variable requested from device 1.
54	Device 1 Slot 3 Variable	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of slot 3 variable requested from device 1.
55	Device 1 Message	R/W	Both	AC	40	0x20 - 0x5F for each byte	" "	1.40	Device 1 message.
56	Device 1 Descriptor	R/W	Both	AC	20	0x20 - 0x5F for each byte	" "	1.40	Device 1 descriptor.
57	Device 1 Manufacture's ID and Device ID	R/O	System	UINT16	2	0 - 65535	0	1.40	Device 1 manufacture's ID and device's ID
58	Device 1 Serial Number	R/O	System	UINT32	4	0 - 4,294,967,295	0	1.40	Device 1 serial number.
59	Device 1 ID Number	R/O	System	UINT32	4	0 - 4,294,967,295	0	1.40	Device 1 ID number.
60	Device 1 Sensor Units	R/O	System	UINT8	1	0 - 255	0	1.40	Device 1 sensor units.
61	Device 1 Upper Sensor Limit	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Device 1 upper sensor limit.
62	Device 1 Lower Sensor Limit	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Device 1 lower sensor limit.
63	Device 1 Minimum Span	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Device 1 minimum sensor span.
64	Device 1 Output Units	R/O	System	UINT8	1	0 - 255	0	1.40	Device 1 Output Units
65	Device 1 Upper Output Limit	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Device 1 upper output limit.
66	Device 1 Lower Output Limit	R/O	System	FLOAT FLOAT	4	Any valid IEEE 754 float	0	1.40	Device 1 lower output limit.
67	Device 1 Damping Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.40	Device 1 damping value.

Point Type 85, HART

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
68 (HART 1)	Device 2 Poll Mode	R/W	User	UINT8	1	0-255	0	1.40	Polling mode for device 2. Valid values are: 0 = Skip This Device 1 = Primary Variable Only 2 = All Dynamic Variables 3 = All Slot Variables 4 = Full Update **Note**: This parameter is **persistent**.
68 (HART 2)	Device 2 Poll Mode	R/W	User	UINT8	1	Bit 7: 0 – 1 Bits 0-6: 0 –3	0	3.10	Polling mode for device 2. Bit 7: Update State: 1=update, 0=no update Bits 0-6: 0 = Skip This Device 1 = Primary Variable Only 2 = All Dynamic Variables 3 = All Slot Variables **Note**: This parameter is **persistent**.
69	Device 2 Polling Address	R/O	Both	UINT8	1	0-15	0	1.40	Polling address for device 2.
70	Device 2 Status	R/O	System	UINT8	1	0-1	0	1.40	0 = No Device Found 1 = Communicating 2 = Comm Error (HART 2)
71	Device 2 Actual Scan Period	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Period at which device 2 is being updated.
72	Device 2 Tag	R/W	Both	AC	10	0x20 - 0x5F for each byte	" "	1.40	Tag that resides in device 2. **Note**: This parameter is **persistent**.
73	Device 2 Response Code/Status	R/O	System	UINT16	2	0 - 65535	0	1.40	Response code and status received from device 2.
74	Device 2 Active Alarms	R/O	System	UINT8	1	0 - 255	0	1.40	Active alarms reported by device 2.
75	Device 2 Current (mA)	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Current in milliamps reported by device 2.
76	Device 2 Percent of Range	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Percent of range reported by device 2.
77 (HART `1)	Device 2 Fail Safe on Reset Enable	R/W	User	UINT8	1	0 - 1	0	1.40	Enables the use of fail values for the dynamic variables when the unit is reset for device 2: **Note**: This parameter is **persistent**.
77 (HART 2)	Device 2 Fail Safe Enable	R/W	User	UINT8	1	0 - 1	0	3.10	Enables the use of fail safe or download values for the dynamic variables when the unit detects an error for device 2. Valid values are: 0 = live or last live 1 = failsafe values 2 = download value for PV, failsafe values for other dynamic variables. **Note**: This parameter is **persistent**.

Point Type 85, HART

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
78	Device 2 PV Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units code for primary variable reported by device 2.
79	Device 2 PV	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of primary variable of device 2. **Note**: This parameter is **persistent**.
80	Device 2 PV Fail Safe on Reset Value	R/W	User	FLOAT	4	Any valid IEEE 754 float	0	1.40	Primary fail safe value for device 2. **Note**: This parameter is **persistent**.
81	Device 2 SV Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units code for secondary variable reported by device 2.
82	Device 2 SV	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of secondary variable of device 2. **Note**: This parameter is **persistent**.
83	Device 2 SV Fail Safe Value	R/W	User	FLOAT	4	Any valid IEEE 754 float	0	1.40	Secondary fail safe value for device 2. **Note**: This parameter is **persistent**.
84	Device 2 TV Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units code for tertiary variable reported by device 2.
85	Device 2 TV	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of tertiary variable of device 2. **Note**: This parameter is **persistent**.
86	Device 2 TV Fail Safe Value	R/W	User	FLOAT	4	Any valid IEEE 754 float	0	1.40	Tertiary fail safe value for device 2. **Note**: This parameter is **persistent**.
87	Device 2 FV Units	R/O	System	UINT8	1	0 - 255	0	1.00	Units code for fourth variable reported by device 2.
88	Device 2 FV	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of fourth variable of device 2. **Note**: This parameter is **persistent**.
89	Device 2 FV Fail Safe Value	R/W	User	FLOAT	4	Any valid IEEE 754 float	0	1.40	Fourth fail safe value of device 2. **Note**: This parameter is **persistent**.
90	Device 2 Slot 0 Assignment	R/W	User	UINT8	1	0 - 255	0	1.40	Slot 0 variable to request from device 2. **Note**: This parameter is **persistent**.
91	Device 2 Slot 0 Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units of slot 0 variable requested from device 2.
92	Device 2 Slot 0 Variable	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of slot 0 variable requested from device 2.
93	Device 2 Slot 1 Assignment	R/W	User	UINT8	1	0 - 255	0	1.40	Slot 1 variable to request from device 2. **Note**: This parameter is **persistent**.
94	Device 2 Slot 1 Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units of slot 1 variable requested from device 2.
95	Device 2 Slot 1 Variable	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of slot 1 variable requested from device 2.
96	Device 2 Slot 2 Assignment	R/W	User	UINT8	1	0 - 255	0	1.40	Slot 2 variable to request from device 2. **Note**: This parameter is **persistent**.
97	Device 2 Slot 2 Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units of slot 2 variable requested from device 2.

Point Type 85, HART

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
98	Device 2 Slot 2 Variable	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of slot 2 variable requested from device 2.
99	Device 2 Slot 3 Assignment	R/W	User	UINT8	1	0 - 255	0	1.40	Slot 3 variable to request from device 2. **Note**: This parameter is **persistent**.
100	Device 2 Slot 3 Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units of slot 3 variable requested from device 2.
101	Device 2 Slot 3 Variable	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of slot 3 variable requested from device 2.
102	Device 2 Message	R/W	Both	AC	40	0x20 - 0x5F for each byte	" "	1.40	Device 2 message.
103	Device 2 Descriptor	R/W	Both	AC	20	0x20 - 0x5F for each byte	" "	1.40	Device 2 descriptor.
104	Device 2 Manufacture's ID and Device ID	R/O	System	UINT16	2	0 - 65535	0	1.40	Device 2 manufacture's ID and device's ID
105	Device 2 Serial Number	R/O	System	UINT32	4	0 - 4,294,967,295	0	1.40	Device 2 serial number.
106	Device 2 ID Number	R/O	System	UINT32	4	0 - 4,294,967,295	0	1.40	Device 2 ID number.
107	Device 2 Sensor Units	R/O	System	UINT8	1	0 - 255	0	1.40	Device 2 sensor units.
108	Device 2 Upper Sensor Limit	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Device 2 upper sensor limit.
109	Device 2 Lower Sensor Limit	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Device 2 lower sensor limit.
110	Device 2 Minimum Span	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Device 2 minimum sensor span.
111	Device 2 Output Units	R/O	System	UINT8	1	0 - 255	0	1.40	Device 2 Output Units
112	Device 2 Upper Output Limit	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Device 2 upper output limit.
113	Device 2 Lower Output Limit	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Device 2 lower output limit.
114	Device 2 Damping Value	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Device 2 damping value.
115 (HART 1)	Device 3 Poll Mode	R/W	User	UINT8	1	0-255	0	1.40	Polling mode for device 3: Valid values are: 0 = Skip This Device 1 = Primary Variable Only 2 = All Dynamic Variables 3 = All Slot Variables 4 = Full Update **Note**: This parameter is **persistent**.

Point Type 85, HART

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
115 (HART 2)	Device 3 Poll Mode	R/W	User	UINT8	1	Bit 7: 0-1 Bits 0-6: 0-3	0	3.10	Bit 7: Update State: 1=update, 0=no update Bits 0-6 0 = Skip This Device 1 = Primary Variable Only 2 = All Dynamic Variables 3 = All Slot Variables **Note**: This parameter is **persistent**.
116	Device 3 Polling Address	R/O	Both	UINT8	1	0-15	0	1.40	Polling address for device 3.
117	Device 3 Status	R/O	System	UINT8	1	0-1	0	1.40	0: No Device Found 1: Communicating 2: Comm Error
118	Device 3 Actual Scan Period	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Period at which device 3 is being updated.
119	Device 3 Tag	R/W	Both	AC	10	0x20 - 0x5F for each byte	" "	1.40	Tag that resides in device 3. **Note**: This parameter is **persistent**.
120	Device 3 Response Code/Status	R/O	System	UINT16	2	0 - 65535	0	1.40	Response code and status received from device 3.
121	Device 3 Active Alarms	R/O	System	UINT8	1	0 - 255	0	1.40	Active alarms reported by device 3.
122	Device 3 Current (mA)	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Current in milliamps reported by device 3.
123	Device 3 Percent of Range	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Percent of range reported by device 3.
124 (HART 1)	Device 3 Fail Safe on Reset Enable	R/W	User	UINT8	1	0 - 1	0	1.40	Enable the use of fail safe values for the dynamic variables when the unit is reset for device 3. **Note**: This parameter is **persistent**.
124 (HART 2)	Device 3 Fail Safe Enable	R/W	User	UINT8	1	0 - 1	0	3.10	Enable the use of fail safe or download values for the dynamic variables when the unit detects an error for device 3. Valid values are: 0 = live or last live 1 = failsafe values 2 = download value for PV, failsafe values for other dynamic variables. **Note**: This parameter is **persistent**.
125	Device 3 PV Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units code for primary variable reported by device 3.
126	Device 3 PV	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of primary variable of device 3. **Note**: This parameter is **persistent**.
127	Device 3 PV Fail Safe Value	R/W	User	FLOAT	4	Any valid IEEE 754 float	0	1.40	Primary fail safe value for device 3. **Note**: This parameter is **persistent**.

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Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
128	Device 3 SV Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units code for secondary variable reported by device 3.
129	Device 3 SV	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of secondary variable of device 3. **Note**: This parameter is **persistent**.
130	Device 3 SV Fail Safe Value	R/W	User	FLOAT	4	Any valid IEEE 754 float	0	1.40	Secondary fail safe value for device 3. **Note**: This parameter is **persistent**.
131	Device 3 TV Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units code for tertiary variable reported by device 3.
132	Device 3 TV	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of tertiary variable of device 3. **Note**: This parameter is **persistent**.
133	Device 3 TV Fail Safe Value	R/W	User	FLOAT	4	Any valid IEEE 754 float	0	1.40	Tertiary fail safe value for device 3. **Note**: This parameter is **persistent**.
134	Device 3 FV Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units code for fourth variable reported by device 3.
135	Device 3 FV	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of fourth variable of device 3. **Note**: This parameter is **persistent**.
136	Device 3 FV Fail Safe Value	R/W	User	FLOAT	4	Any valid IEEE 754 float	0	1.40	Fourth fail safe value of device 3. **Note**: This parameter is **persistent**.
137	Device 3 Slot 0 Assignment	R/W	User	UINT8	1	0 - 255	0	1.40	Slot 0 variable to request from device 3. **Note**: This parameter is **persistent**. .
138	Device 3 Slot 0 Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units of slot 0 variable requested from device 3.
139	Device 3 Slot 0 Variable	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of slot 0 variable requested from device 3.
140	Device 3 Slot 1 Assignment	R/W	User	UINT8	1	0 - 255	0	1.40	Slot 1 variable to request from device 3. **Note**: This parameter is **persistent**.
141	Device 3 Slot 1 Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units of slot 1 variable requested from device 3.
142	Device 3 Slot 1 Variable	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of slot 1 variable requested from device 3.
143	Device 3 Slot 2 Assignment	R/W	User	UINT8	1	0 - 255	0	1.40	Slot 2 variable to request from device 3. **Note**: This parameter is **persistent**.
144	Device 3 Slot 2 Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units of slot 2 variable requested from device 3.
145	Device 3 Slot 2 Variable	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of slot 2 variable requested from device 3.
146	Device 3 Slot 3 Assignment	R/W	User	UINT8	1	0 - 255	0	1.40	Slot 3 variable to request from device 3. **Note**: This parameter is **persistent**.
147	Device 3 Slot 3 Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units of slot 3 variable requested from device 3.

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Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
148	Device 3 Slot 3 Variable	R/O	System	FL	4	Any valid IEEE 754 float	0	1.40	Value of slot 3 variable requested from device 3.
149	Device 3 Message	R/W	Both	AC	40	0x20 - 0x5F for each byte	" "	1.40	Device 3 message.
150	Device 3 Descriptor	R/W	Both	AC	20	0x20 - 0x5F for each byte	" "	1.40	Device 3 descriptor.
151	Device 3 Manufacture's ID and Device ID	R/O	System	UINT16	2	0 - 65535	0	1.40	Device 3 manufacture's ID and device's ID
152	Device 3 Serial Number	R/O	System	UINT32	4	0 - 4,294,967,295	0	1.40	Device 3 serial number.
153	Device 3 ID Number	R/O	System	UINT32	4	0 - 4,294,967,295	0	1.40	Device 3 ID number.
154	Device 3 Sensor Units	R/O	System	UINT8	1	0 - 255	0	1.40	Device 3 sensor units.
155	Device 3 Upper Sensor Limit	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Device 3 upper sensor limit.
156	Device 3 Lower Sensor Limit	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Device 3 lower sensor limit.
157	Device 3 Minimum Span	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Device 3 minimum sensor span.
158	Device 3 Output Units	R/O	System	UINT8	1	0 - 255	0	1.40	Device 3 Output Units
159	Device 3 Upper Output Limit	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Device 3 upper output limit.
160	Device 3 Lower Output Limit	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Device 3 lower output limit.
161	Device 3 Damping Value	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Device 3 damping value.
162 (HART 1)	Device 4 Poll Mode	R/W	User	UINT8	1	0-255	0	1.40	Polling mode for device 4. Valid values are: 0 = Skip This Device 1 = Primary Variable Only 2 = All Dynamic Variables 3 = All Slot Variables 4 = Full Update **Note**: This parameter is **persistent**.
162 (HART 2)	Device 4 Poll Mode	R/W	User	UINT8	1	Bit 7: 0-1 Bits 0-6: 0-3	0	3.10	Bit 7: Update State: 1=update, 0=no update Bits 0-6 0 = Skip This Device 1 = Primary Variable Only 2 = All Dynamic Variables 3 = All Slot Variables **Note**: This parameter is **persistent**.

Point Type 85, HART

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
163	Device 4 Polling Address	R/O	Both	UINT8	1	0-15	0	1.40	Polling address for device 4.
164	Device 4 Status	R/O	System	UINT8	1	0-1	0	1.40	0: No Device Found 1: Communicating 2: Comm Error
165	Device 4 Actual Scan Period	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Period at which device 4 is being updated.
166	Device 4 Tag	R/W	Both	AC	10	0x20 - 0x5F for each byte	" "	1.40	Tag that resides in device 4. **Note**: This parameter is **persistent**.
167	Device 4 Response Code/Status	R/O	System	UINT16	2	0 - 65535	0	1.00	Response code and status received from device 4.
168	Device 4 Active Alarms	R/O	System	UINT8	1	0 - 255	0	1.40	Active alarms reported by device 4.
169	Device 4 Current (mA)	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Current in milliamps reported by device 4.
170	Device 4 Percent of Range	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Percent of range reported by device 4.
171 (HART 1)	Device 4 Fail Safe on Reset Enable	R/W	User	UINT8	1	0 - 1	0	1.40	Enable the use of fail safe values for the dynamic variables when the unit is reset for device 4. **Note**: This parameter is **persistent**.
171 (HART 2)	Device 4 Fail Safe Enable	R/W	User	UINT8	1	0 - 1	0	3.10	Enable the use of fail safe or download values for the dynamic variables when the unit detects an error for device 4: Valid values are: 0 = live or last live 1 = failsafe values 2 = download value for PV, failsafe values for other dynamic variables. **Note**: This parameter is **persistent**.
172	Device 4 PV Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units code for primary variable reported by device 4.
173	Device 4 PV	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of primary variable of device 4. **Note**: This parameter is **persistent**.
174	Device 4 PV Fail Safe Value	R/W	User	FLOAT	4	Any valid IEEE 754 float	0	1.40	Primary fail safe value for device 4. **Note**: This parameter is **persistent**.
175	Device 4 SV Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units code for secondary variable reported by device 4.
176	Device 4 SV	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of secondary variable of device 4. **Note**: This parameter is **persistent**.
177	Device 4 SV Fail Safe Value	R/W	User	FLOAT	4	Any valid IEEE 754 float	0	1.40	Secondary fail safe value for device 4. **Note**: This parameter is **persistent**.

Point Type 85, HART

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
178	Device 4 TV Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units code for tertiary variable reported by device 4.
179	Device 4 TV	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of tertiary variable of device 4. **Note**: This parameter is **persistent**.
180	Device 4 TV Fail Safe on Reset Value	R/W	User	FLOAT	4	Any valid IEEE 754 float	0	1.40	Tertiary fail safe value for device 4. **Note**: This parameter is **persistent**.
181	Device 4 FV Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units code for fourth variable reported by device 4.
182	Device 4 FV	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of fourth variable of device 4. **Note**: This parameter is **persistent**.
183	Device 4 FV Fail Safe Value	R/W	User	FLOAT	4	Any valid IEEE 754 float	0	1.40	Fourth fail safe value of device 4. **Note**: This parameter is **persistent**.
184	Device 4 Slot 0 Assignment	R/W	User	UINT8	1	0 - 255	0	1.40	Slot 0 variable to request from device 4. **Note**: This parameter is **persistent**.
185	Device 4 Slot 0 Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units of slot 0 variable requested from device 4.
186	Device 4 Slot 0 Variable	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of slot 0 variable requested from device 4.
187	Device 4 Slot 1 Assignment	R/W	User	UINT8	1	0 - 255	0	1.40	Slot 1 variable to request from device 4. **Note**: This parameter is **persistent**.
188	Device 4 Slot 1 Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units of slot 1 variable requested from device 4.
189	Device 4 Slot 1 Variable	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of slot 1 variable requested from device 4.
190	Device 4 Slot 2 Assignment	R/W	User	UINT8	1	0 - 255	0	1.40	Slot 2 variable to request from device 4. **Note**: This parameter is **persistent**.
191	Device 4 Slot 2 Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units of slot 2 variable requested from device 4.
192	Device 4 Slot 2 Variable	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of slot 2 variable requested from device 4.
193	Device 4 Slot 3 Assignment	R/W	User	UINT8	1	0 - 255	0	1.40	Slot 3 variable to request from device 4. **Note**: This parameter is **persistent**.
194	Device 4 Slot 3 Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units of slot 3 variable requested from device 4.
195	Device 4 Slot 3 Variable	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of slot 3 variable requested from device 4.
196	Device 4 Message	R/W	Both	AC	40	0x20 - 0x5F for each byte	"."	1.40	Device 4 message.
197	Device 4 Descriptor	R/W	Both	AC	20	0x20 - 0x5F for each byte	".	1.40	Device 4 descriptor.

Point Type 85, HART

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
198	Device 4 Manufacture's ID and Device ID	R/O	System	UINT16	2	0 - 65535	0	1.40	Device 4 manufacture's ID and device's ID
199	Device 4 Serial Number	R/O	System	UINT32	4	0 - 4,294,967,295	0	1.40	Device 4 serial number.
200	Device 4 ID Number	R/O	System	UINT32	4	0 - 4,294,967,295	0	1.40	Device 4 ID number.
201	Device 4 Sensor Units	R/O	System	UINT8	1	0 - 255	0	1.40	Device 4 sensor units.
202	Device 4 Upper Sensor Limit	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Device 4 upper sensor limit.
203	Device 4 Lower Sensor Limit	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Device 4 lower sensor limit.
204	Device 4 Minimum Span	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Device 4 minimum sensor span.
205	Device 4 Output Units	R/O	System	UINT8	1	0 - 255	0	1.40	Device 4 Output Units
206	Device 4 Upper Output Limit	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Device 4 upper output limit.
207	Device 4 Lower Output Limit	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Device 4 lower output limit.
208	Device 4 Damping Value	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Device 4 damping value.
209 (HART 1)	Device 5 Poll Mode	R/W	User	UINT8	1	0-255	0	1.40	Polling mode for device 5. Valid values are: 0 = Skip This Device 1 = Primary Variable Only 2 = All Dynamic Variables 3 = All Slot Variables 4 = Full Update **Note**: This parameter is **persistent**.
209 (HART 2)	Device 5 Poll Mode	R/W	User	UINT8	1	Bit 7: 0 – 1 Bits 0-6: 0-3	0	3.10	Bit 7: Update State: 1=update, 0=no update Bits 0-6 0 = Skip This Device 1 = Primary Variable Only 2 = All Dynamic Variables 3 = All Slot Variables **Note**: This parameter is **persistent**.
210	Device 5 Polling Address	R/O	Both	UINT8	1	0-15	0	1.40	Polling address for device 5.
211	Device 5 Status	R/O	System	UINT8	1	0-1	0	1.40	Valid values are: 0 = No Device Found 1 = Communicating 2 = Comm Error

Point Type 85, HART

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
212	Device 5 Actual Scan Period	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Period at which device 5 is being updated.
213	Device 5 Tag	R/W	Both	AC	10	0x20 - 0x5F for each byte	""	1.40	Tag that resides in device 5. **Note**: This parameter is **persistent**.
214	Device 5 Response Code/Status	R/O	System	UINT16	2	0 - 65535	0	1.40	Response code and status received from device 5.
215	Device 5 Active Alarms	R/O	System	UINT8	1	0 - 255	0	1.40	Active alarms reported by device 5.
216	Device 5 Current (mA)	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Current in milliamps reported by device 5.
217	Device 5 Percent of Range	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Percent of range reported by device 5.
218 (HART 1)	Device 5 Fail Safe on Reset Enable	R/W	User	UINT8	1	0 - 1	0	1.40	Enable the use of fail safe values for the dynamic variables when the unit is reset for device 5. **Note**: This parameter is **persistent**.
218 (HART 2)	Device 5 Fail Safe Enable	R/W	User	UINT8	1	0 - 1	0	3.10	Enable the use of fail safe or download values for the dynamic variables when the unit detects an error for device 5. Valid values are: 0 = live or last live 1 = failsafe values 2 = download value for PV, failsafe values for other dynamic variables. **Note**: This parameter is **persistent**.
219	Device 5 PV Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units code for primary variable reported by device 5.
220	Device 5 PV	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of primary variable of device 5. **Note**: This parameter is **persistent**.
221	Device 5 PV Fail Safe Value	R/W	User	FLOAT	4	Any valid IEEE 754 float	0	1.40	Primary fail safe value for device 5. **Note**: This parameter is **persistent**.
222	Device 5 SV Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units code for secondary variable reported by device 5.
223	Device 5 SV	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of secondary variable of device 5. **Note**: This parameter is **persistent**.
224	Device 5 SV Fail Safe Value	R/W	User	FLOAT	4	Any valid IEEE 754 float	0	1.40	Secondary fail safe value for device 5. **Note**: This parameter is **persistent**.
225	Device 5 TV Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units code for tertiary variable reported by device 5.
226	Device 5 TV	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of tertiary variable of device 5. **Note**: This parameter is **persistent**.

Point Type 85, HART

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
227	Device 5 TV Fail Safe Value	R/W	User	FLOAT	4	Any valid IEEE 754 float	0	1.40	Tertiary fail safe value for device 5. **Note**: This parameter is **persistent**.
228	Device 5 FV Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units code for fourth variable reported by device 5.
229	Device 5 FV	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of fourth variable of device 5. **Note**: This parameter is **persistent**.
230	Device 5 FV Fail Safe Value	R/W	User	FLOAT	4	Any valid IEEE 754 float	0	1.40	Fourth fail safe value of device 5.
231	Device 5 Slot 0 Assignment	R/W	User	UINT8	1	0 - 255	0	1.40	Slot 0 variable to request from device 5. **Note**: This parameter is **persistent**.
232	Device 5 Slot 0 Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units of slot 0 variable requested from device 5.
233	Device 5 Slot 0 Variable	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of slot 0 variable requested from device 5.
234	Device 5 Slot 1 Assignment	R/W	User	UINT8	1	0 - 255	0	1.40	Slot 1 variable to request from device 5. **Note**: This parameter is **persistent**.
235	Device 5 Slot 1 Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units of slot 1 variable requested from device 5.
236	Device 5 Slot 1 Variable	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of slot 1 variable requested from device 5.
237	Device 5 Slot 2 Assignment	R/W	User	UINT8	1	0 - 255	0	1.40	Slot 2 variable to request from device 5. **Note**: This parameter is **persistent**.
238	Device 5 Slot 2 Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units of slot 2 variable requested from device 5.
239	Device 5 Slot 2 Variable	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of slot 2 variable requested from device 5.
240	Device 5 Slot 3 Assignment	R/W	User	UINT8	1	0 - 255	0	1.40	Slot 3 variable to request from device 5. **Note**: This parameter is **persistent**.
241	Device 5 Slot 3 Units	R/O	System	UINT8	1	0 - 255	0	1.40	Units of slot 3 variable requested from device 5.
242	Device 5 Slot 3 Variable	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Value of slot 3 variable requested from device 5.
243	Device 5 Message	R/W	Both	AC	40	0x20 - 0x5F for each byte	" "	1.40	Device 5 message.
244	Device 5 Descriptor	R/W	Both	AC	20	0x20 - 0x5F for each byte	" "	1.40	Device 5 descriptor.
245	Device 5 Manufacture's ID and Device ID	R/O	System	UINT16	2	0 - 65535	0	1.40	Device 5 manufacture's ID and device's ID
246	Device 5 Serial Number	R/O	System	UINT32	4	0 - 4,294,967,295	0	1.40	Device 5 serial number.

Point Type 85, HART

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
247	Device 5 ID Number	R/O	System	UINT32	4	0 - 4,294,967,295	0	1.40	Device 5 ID number.
248	Device 5 Sensor Units	R/O	System	UINT8	1	0 - 255	0	1.40	Device 5 sensor units.
249	Device 5 Upper Sensor Limit	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Device 5 upper sensor limit.
250	Device 5 Lower Sensor Limit	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Device 5 lower sensor limit.
251	Device 5 Minimum Span	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Device 5 minimum sensor span.
252	Device 5 Output Units	R/O	System	UINT8	1	0 - 255	0	1.40	Device 5 Output Units
253	Device 5 Upper Output Limit	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Device 5 upper output limit.
254	Device 5 Lower Output Limit	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Device 5 lower output limit.
255	Device 5 Damping Value	R/O	System	FLOAT	4	Any valid IEEE 754 float	0	1.40	Device 5 damping value.

3.4.4 Point Type 91: System Variables

Description: Point type 91 provides the System Variables parameters for the system configuration.

Number of Logical Points: 1 logic point for System Variables may exist.

Storage Location: Point type 91 is saved to internal configuration memory.

Table 3-5: Point Type 91, System Variables

Point Type 91, System Variables

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	ROC Address	R/W	User	UINT8	1	0 →255	1	1.00	One-byte unit code of the station address. You can configure the unit code for a ROC address. **Note**: 0 is used for broadcast and **should not** be used by the ROC.
1	ROC Group	R/W	User	UINT8	1	0 →255	2	1.00	Group code of the station address.
2	Station Name	R/W	User	AC	20	0x20→0x7E for each byte	'Remote Oprtns Cntrlr'	1.00	A 20-character ASCII field for the station name.
3	Part Number and Version	R/O	System	AC	20	0x20 → 0x7E for each byte	'W68xxx Ver y.yy'	1.00	The software part number and version number string.
4	Time Created	R/O	System	AC	20	0x20 → 0x7E for each byte	'mmm dd, yyyy HH:MM'	1.00	The time and date stamp the firmware was created.
5	Manufacturer ID	R/O	System	AC	20	0x20 → 0x7E for each byte	'Emerson Process Mgmt'	1.00	The manufacturing identification string.
6	Product Description	R/O	System	AC	20	0x20 → 0x7E for each byte	'ROC809'	1.00	The manufacturing description of product.
7	RESERVED	-	-	-	-	-	-	-	Reserved for future use
8	Maximum Events	R/O	System	UINT16	2	450	450	1.00	The maximum number of events that the Event Log may store.
9	Maximum Alarms	R/O	System	UINT16	2	450	450	1.00	The maximum number of alarms that the Alarm Log may store.
10	Maximum PIDs	R/O	System	UINT8	1	0 →16	16	1.00	The maximum number of PID loops that may run on the system

Point Type 91, System Variables

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
11	Maximum Meter Runs	R/O	System	UINT8	1	2 –12	0	1.00	The maximum number of gas meter runs that may run on the system. **Note**: Maximum number depends on licensing.
12	Maximum FSTs	R/O	System	UINT8	1	6	6	1.00	The maximum number of FSTs that may run on the system
13	Event Index	R/O	System	UINT16	2	0 → 449	0	1.00	The current event index for the Event Log.
14	Alarm Index	R/O	System	UINT16	2	0 → 449	0	1.00	The current alarm index in the Alarm Log.
15	Active PIDs	R/W	System	UINT8	1	0 → 16	16	1.00	Number of active PIDs
16	Active Stations	R/W	User	UINT8	1	0 → Maximum # of Meter Runs	1	1.00	Number of active stations
17	Active Orifice Meter Runs	R/W	User	UINT8	1	0 → 12	1	1.00	Number of active orifice meter runs
18	Active Turbine Meter Runs	R/W	User	UINT8	1	0 → 12	1	1.00	Number of active turbine meter runs
19	FST Clear	R/W	User	UINT8	1	0 → 1	0	1.00	Clears all FST code from Flash ROM. Valid values are 0 (Do nothing) and 1 (Clear FST code).
20	Clear configuration memory	R/W	User	UINT8	1	0 → 1	0	1.00	Clears the internal configuration memory stored in flash ROM. Valid values are 0 (Do nothing) and 1 (Enable clearing of Configuration Memory).
21	Write to Configuration Memory	R/W	User	UINT8	1	0 → 1	0	1.00	Commands the ROC to store certain point types (indicated throughout this document) to flash configuration memory. Valid values are 0 (Do nothing) and 1 (Perform Write to Configuration Memory).
22	Configuration Memory Write Complete	R/O	System	UINT8	1	0 → 1	1	1.00	Indicates if the system is in the process of writing the configuration to flash ROM. Valid values are 0 (Currently Performing the Write) and 1 (Completed the Write).
23	MPU Loading	R/O	System	FL	4	0.0 →100.0	0.0	1.00	The current percentage of time the CPU is being loaded, updated every 5 seconds.
24	RESERVED	-	-	-	-	-	-	-	Reserved for future use
25	I/O Scanning	R/W	User	UINT8	1	0 → 1	1	1.50	Turns the LCD on or off. Valid values are 0 (Off, screens cleared, no menus) and 1 (On, screens on, menus visable.) **Note:** Turning off **does not** shut off power.
26	Warm Start	R/W	User	UINT8	1	0 → 1	0	1.00	Used to re-start the system. A warm start is a reboot of the system without performing all the power-on-self tests. Valid values are 0 (Do nothing) and 1 (Perform Warm Start).

Point Type 91, System Variables

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
27	Cold start	R/W	User	UINT8	1	0 → 7	0	1.00	Used to re-start the system. A cold start always includes starting from the boot sector and performing power-on-self tests, plus the following options. Valid values are: 0 = Do nothing 1 = Restore Configuration from Flash 2 = Clear Alarms 3 = Clear Events 4 = Clear FSTs 5 = Clear History Data 6 = Restore Configuration from Flash, Clear Alarms/Events/FSTs/History Data 7 = Restore Configuration from Defaults
28	RESERVED	-	-	-	-	-	-	-	Reserved for future use
29	RESERVED	-	-	-	-	-	-	-	Reserved for future use
30	RESERVED	-	-	-	-	-	-	-	Reserved for future use
31	Baud Rate Generator #0 Rate	R/W	User	UINT32	4	300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200	19200	3.10	The baud rate that baud rate generator #0 is to be set to.
32	Baud Rate Generator #1 Rate	R/W	User	UINT32	4	300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200	9600	3.10	The baud rate that baud rate generator #1 is to be set to.
33	Baud Rate Generator #2 Rate	R/W	User	UINT32	4	300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200	38400	3.10	The baud rate that baud rate generator #2 is to be set to.
34	Baud Rate Generator #3 Rate	R/W	User	UINT32	4	300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200	57600	3.10	The baud rate that baud rate generator #3 is to be set to.
35	CRC Check	R/W	User	UINT8	1	0 → 1	1	1.00	Provides the CRC check flag. If this flag is enabled, a CRC is appended to all messages and a CRC is expected on all received messages. Valid values are 0 (Disabled) and 1 (Enabled). **Note**: Ethernet communications ignore the CRC since TCP/IP protocol already does error checking. The CRC must still be sent over Ethernet communications.
36	LED Enable	R/W	User	UINT8	1	0 → 60	5	1.00	Indicates the number of minutes the LEDs are on before automatically turning themselves off. (The LED button activea the LEDs for the configured time). Valid values are 0 (LEDs always on) and 1 - 60 (Specifying the number of minutes LEDs are on).

Point Type 91, System Variables

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
37	Boot Part Number and Version	R/O	System	AC	20	0x20 → 0x7E for each byte	'W68xxx Ver y.yy'	1.00	Contains the boot software part number and version number string.
38	Boot Firmware Time Created	R/O	System	AC	20	0x20 → 0x7E for each byte	'1'	1.00	Contains the time and date stamp the foot firmware was created.
39	Active Odorizer(s)	R/W	User	UINT8	1	0 → 12	0	1.00	Indicates the number of active odorizers. **Note**: Maximum number depends on licensing.
40	Clear History	R/W	User	UINT8	1	0 → 1	0	1.00	Clears history database and resets configuration back to factory defaults without power cycling the ROC. Valid values are 0 (Don't clear) and 1 (Clear).
41	Flash Disk Space Used	R/O	System	UINT32	4	0 → 0xFFFFFFFF	varies	1.20	The amount of disk space that has been consumed.
42	Flash Disk Space Free	R/O	System	UINT32	4	0 → 0xFFFFFFFF	varies	1.20	The amount of disk space that is available.
43	Number of System Initializations	R/W	Both	UINT16	2	0 → 65535	0	1.20	The number of system initializations. **Note:** This parameter is not reset to defaults due to a cold start; however, it **is** reset on a firmware upgrade.
44	Number of Warm Starts	R/W	Both	UINT16	2	0 → 65535	0	1.20	The number of warm starts. **Note:** This parameter is not reset to defaults due to a cold start; however, it **is** reset on a firmware upgrade.
45	Number of Cold Starts	R/W	Both	UINT16	2	0 → 65535	0	1.20	The number of cold starts. **Note:** This parameter is not reset to defaults due to a cold start; however, it **is** reset on a firmware upgrade.
46	Number of Power Cycles	R/W	Both	UINT16	2	0 → 65535	0	1.20	The number of power cycles. **Note** This parameter is not reset to defaults due to a cold start; however, it **is** reset on a firmware upgrade.
47	Last Power-Down Time	R/O	System	TIME	4	N/A	0	1.30	Contains the last power-down time in the number of seconds elapsed since 12:00 a.m. Jan. 1, 1970.
48	Last Power-Up Time	R/O	System	TIME	4	N/A	0	1.30	Contains the last power-up time in the number of seconds elapsed since 12:00 a.m. Jan. 1, 1970.
49	RESERVED	-	-	-	-	-	-	-	Reserved for future use

Point Type 91, System Variables

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
50 (Series 1)	Logical Compatibility Mode	R/W	User	UINT8	1	0 → 1	0	2.00	Indicates the logical compatibility mode. Valid values are: 0 = 16 points per slot [Opcode 50 information and logical indexing for I/O is used in the same way as with version 1.XX of firmware]. 1 = 8 points per slot [Opcode 50 information and logical indexing for I/O is based on 8 points per module and allows for up to 27 modules to be accessed.] See Opcode 50 for more information.
50 (Series 2)	Logical Compatibility Mode	R/W	User	UINT8	1	0 → 1	1	3.00	Indicates the logical compatibility mode. Valid values are: 0 = 16 points per slot [Opcode 50 information and logical indexing for I/O is used in the same way as with version 1.XX of firmware]. 1 = 8 points per slot [Opcode 50 information and logical indexing for I/O is based on 8 points per module and allows for up to 27 modules to be accessed.] See Opcode 50 for more information.
51	ROC Series	R/O	System	AC20	20	0x20 → 0x7E for each byte	Series 2	3.00	Indicates hardware revision.
52	Num Active Virtual DO	R/W	User	UINT8	1	0 → 24	0	3.02	Indicates the number of active virtual Discrete Outputs.
53	System Rollover for Double Precision Parameters	R/W	User	DBL	8	Any valid IEEE double precsion float → 2,996 * 10^{306}	1,000,000	3.10	Indicates the value at which the double precision accumlators roll over.
54	RESERVED	-	-	-	-	-	-	-	Reserved for future use
55	RESERVED	-	-	-	-	-	-	-	Reserved for future use
56	RESERVED	-	-	-	-	-	-	-	Reserved for future use
57	RESERVED	-	-	-	-	-	-	-	Reserved for future use
58	RESERVED	-	-	-	-	-	-	-	Reserved for future use
59	RESERVED	-	-	-	-	-	-	-	Reserved for future use
60	RESERVED	-	-	-	-	-	-	-	Reserved for future use
61	RESERVED	-	-	-	-	-	-	-	Reserved for future use
62	RESERVED	-	-	-	-	-	-	-	Reserved for future use
63	RESERVED	-	-	-	-	-	-	-	Reserved for future use
64	RESERVED	-	-	-	-	-	-	-	Reserved for future use

Point Type 91, System Variables

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
65	Load Diagnostic 1 Enable	R/W	User	UINT8	1	0 → 1	0	3.82	Turns Load Diagnostic 1 on or off. Valid values are 0 (Disabled) and 1 (Enabled).
66	Load Diagnostic 1 Period	R/W	User	UINT16	2	5 → 180	30	3.82	The period in seconds over which this load diagnostic samples and averages. Changing this value will reset the samples and averages.
67	Load Diagnostic 1 Current Average	R/O	System	FL	4	0.0 → 100.0	0.0	3.82	The average MPU load perecentage for samples taken over the last period.
68	Load Diagnostic 1 Maximum Average	R/O	System	FL	4	0.0 → 100.0	0.0	3.82	The maximum value seen for parameter 67 since inception. Resettable via parameter 72.
69	Load Diagnostic 1 Threshold	R/W	User	FL	4	0.0 → 100.0	0.0	3.82	A percentage of MPU load which can be used to identify the amount of time a ROC is above and below a certain load percentage.
70	Load Diagnostic 1 Over Threshold Percentage	R/O	System	FL	4	0.0 → 100.0	0.0	3.82	The perecentage of time since inception the ROC's loading exceeded the value defined in parameter 69.
71	Load Diagnostic 1 Alarm Enable	R/W	User	UINT8	1	0 → 1	0	3.82	Enables the ROC to write to the alarm log if the current loading average is above the Threshold defined in parameter 69. Valid values are 0 (Disabled) and 1 (Enabled).
72	Load Diagnostic 1 Resets	R/W	User	UINT8	1	0 → 2	0	3.82	Resets certain values associated with this load diagnostic. 0 = Idle 1 = Reset Averages (Parameters 67 and 68) 2 = Reset Over Threshold % (Parameter 70)
73	Load Diagnostic 2 Enable	R/W	User	UINT8	1	0 → 1	0	3.82	Turns Load Diagnostic 2 on or off. Valid values are 0 (Disabled) and 1 (Enabled).
74	Load Diagnostic 2 Period	R/W	User	UINT16	2	5 → 180	30	3.82	The period in seconds over which this load diagnostic samples and averages. Changing this value will reset the samples and averages.
75	Load Diagnostic 2 Current Average	R/O	System	FL	4	0.0 → 100.0	0.0	3.82	The average MPU load perecentage for samples taken over the last period.
76	Load Diagnostic 2 Maximum Average	R/O	System	FL	4	0.0 → 100.0	0.0	3.82	The maximum value seen for parameter 75 since inception. Resettable via parameter 80.

Point Type 91, System Variables

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
77	Load Diagnostic 2 Threshold	R/W	User	FL	4	0.0 → 100.0	0.0	3.82	A percentage of MPU load which can be used to identify the amount of time a ROC is above and below a certain load percentage.
78	Load Diagnostic 2 Over Threshold Percentage	R/O	System	FL	4	0.0 → 100.0	0.0	3.82	The perecentage of time since inception the ROC's loading exceeded the value defined in parameter 77.
79	Load Diagnostic 2 Alarm Enable	R/W	User	UINT8	1	0 → 1	0	3.82	Enables the ROC to write to the alarm log if the current loading average is above the Threshold defined in parameter 77. Valid values are 0 (Disabled) and 1 (Enabled).
80	Load Diagnostic 2 Resets	R/W	User	UINT8	1	0 → 2	0	3.82	Resets certain values associated with this load diagnostic. 0 = Idle 1 = Reset Averages (Parameters 75 and 76) 2 = Reset Over Threshold % (Parameter 78)
81	Enhanced Security Enable	R/W	User	UINT8	1	0 → 1	0	3.90	Changes ROC Security, when enabled, to utilize longer User IDs and Passwords for credential authenitcation. Once enabled (1), this setting cannot be reverted.

3.4.5 Point Type 92: Logon Parameters

Description: Point type 92 provides the parameters for logging onto the ROC800L.

Number of Logical Points: Up to 64 logical points for Logon Parameters may exist.

Storage Location: Point type 92 is saved to internal configuration memory.

Table 3-6: Point Type 92, Logon Parameters

Point Type 92, Logon Parameters

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Operator Identifier	R/W	User	AC	3	0x20 → 0x7E for each byte.	‡	1.00	A three-character ASCII operator identifier (such as LOI).
1	Unused #1	R/O	User	UINT8	1	0	0	1.00	
2	Unused #2	R/O	User	UINT8	1	0	0	1.00	
3	Unused #3	R/O	User	UINT8	1	0	0	1.00	
4	Password	R/W	User	UINT16	2	0000 → 9999	(see note)	1.00	A numerical value that is used as a password for the Operator Identifier (such as 1000). Modified in version 1.20 to Write-Only; reading the value now always returns **0**. **Note**: The first point (logical 0) defaults to the familiar operator ID (LOI) and password (1000). The remaining 15 points default to operator ID " " and password of 0000.
5	Access Level	R/W	User	UINT8	1	0→ 255	0	1.21	A value that is used to limit access to parameters when parameter (95, x, 44) is set to 2 (Security by User Access Level) where x = to the logical of the port that the request is being made on.
6	Group #1	R/W	User	UINT8	1	0→19,255	255	1.50	States the first group the user is a member. The Group is then mapped to PT123 Logical 1, Parameters 0→19.
7	Group #2	R/W	User	UINT8	1	0→19,255	255	1.50	States the first group the user is a member. The Group is then mapped to PT123 Logical 1, Parameters 0→19.
8	Group #3	R/W	User	UINT8	1	0→19,255	255	1.50	States the first group the user is a member. The Group is then mapped to PT123 Logical 1, Parameters 0→19.

Point Type 92, Logon Parameters

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
9	Group #4	R/W	User	UINT8	1	0→19,255	255	1.50	States the first group the user is a member. The Group is then mapped to PT123 Logical 1, Parameters 0→19.
10	Group #5	R/W	User	UINT8	1	0→19,255	255	1.50	States the first group the user is a member. The Group is then mapped to PT123 Logical 1, Parameters 0→19.
11	Group #6	R/W	User	UINT8	1	0→19,255	255	1.50	States the first group the user is a member. The Group is then mapped to PT123 Logical 1, Parameters 0→19.
12	Group #7	R/W	User	UINT8	1	0→19,255	255	1.50	States the first group the user is a member. The Group is then mapped to PT123 Logical 1, Parameters 0→19.
13	Group #8	R/W	User	UINT8	1	0→19,255	255	1.50	States the first group the user is a member. The Group is then mapped to PT123 Logical 1, Parameters 0→19.
14	Group #9	R/W	User	UINT8	1	0→19,255	255	1.50	States the first group the user is a member. The Group is then mapped to PT123 Logical 1, Parameters 0→19.
15	Group #10	R/W	User	UINT8	1	0→19,255	255	1.50	States the first group the user is a member. The Group is then mapped to PT123 Logical 1, Parameters 0→19.
16	Group #11	R/W	User	UINT8	1	0→19,255	255	1.50	States the first group the user is a member. The Group is then mapped to PT123 Logical 1, Parameters 0→19.
17	Group #12	R/W	User	UINT8	1	0→19,255	255	1.50	States the first group the user is a member. The Group is then mapped to PT123 Logical 1, Parameters 0→19.
18	Group #13	R/W	User	UINT8	1	0→19,255	255	1.50	States the first group the user is a member. The Group is then mapped to PT123 Logical 1, Parameters 0→19.
19	Group #14	R/W	User	UINT8	1	0→19,255	255	1.50	States the first group the user is a member. The Group is then mapped to PT123 Logical 1, Parameters 0→19.
20	Group #15	R/W	User	UINT8	1	0→19,255	255	1.50	States the first group the user is a member. The Group is then mapped to PT123 Logical 1, Parameters 0→19.
21	Group #16	R/W	User	UINT8	1	0→19,255	255	1.50	States the first group the user is a member. The Group is then mapped to PT123 Logical 1, Parameters 0→19.
22	Group #17	R/W	User	UINT8	1	0→19,255	255	1.50	States the first group the user is a member. The Group is then mapped to PT123 Logical 1, Parameters 0→19.

Point Type 92, Logon Parameters

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
23	Group #18	R/W	User	UINT8	1	0→19,255	255	1.50	States the first group the user is a member. The Group is then mapped to PT123 Logical 1, Parameters 0→19.
24	Group #19	R/W	User	UINT8	1	0→19,255	255	1.50	States the first group the user is a member. The Group is then mapped to PT123 Logical 1, Parameters 0→19.
25	Group #20	R/W	User	UINT8	1	0→19,255	255	1.50	States the first group the user is a member. The Group is then mapped to PT123 Logical 1, Parameters 0→19.
26	Long User ID	R/W	User	AC	30	0x20 → 0x7E for each byte.	Logical 0: "Username" All Others: Blank	3.90	A 30-character ASCII identifier for authenticating a User
27	Long Password	R/W	User	AC	40	0x20 → 0x7E for each byte.	Logical 0: "Username" All Others: Blank	3.90	A 32-character password associated with the user. Note: The default for logical zero is “Password” padded with ASCII spaces. This should be changed immediately upon longer login activation. Note: Reading this parameter will return a blank string. Passwords are effectively Write Only. Note: The password must be encrypted and cannot be written in clear text.
28	Keypad PIN	R/W	User	UINT32	4	0→99,999,999	0	3.90	An 8-digit integer identification number mapping to a user ID which a Keypad Display can use to login. A value of 0 indicates that this user has no PIN access. Note: Reading this parameter will return a 0 if a user has no PIN, or a 1 if they do. The actual PIN is not returned.

3.4.6 Point Type 95: Communication Ports

Description: Point type 95 defines the communication ports for configuring a communication port. Only the following parameters are valid for logical 1 (Ethernet port):

ROC Plus Protocol Valid Receive Counter
ROC Plus Protocol successful message time
Transmit counter
ROC Plus Protocol Security Status

All other parameters for logical 1 cannot be modified.

Number of Logical Points: 6 logical points for Communication Ports may exist.

Storage Location: Point type 95 is saved to internal configuration memory.

Table 3-7: Point Type 95, Communication Ports

Point Type 95, Communication Ports

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Tag Identification	R/W	User	AC	10	0x20 → 0x7E for each byte	“Local Port”, “Ethernet” “COMM2” → “COMM5”	1.00	The customizable name for this communications port.
1	Baud Rate Generator Used	R/W	User	UINT16	2	0→ 3	0	1.00	The baud rate generator used by this com port. Each port may use a different generator, however, only 4 generators exist. *See Point Type 91, System Variables, Parameters 31-34*.
2	Stop Bits	R/W	User	UINT8	1	1,2	1	1.00	The number of stop bits in a character.
3	Data Bits	R/W	User	UINT8	1	7, 8	8	1.00	The number of data bits in a character.
4	Parity	R/W	User	UINT8	1	0 →2	0	1.00	For parity error checking, the host adds a 1 or 0 bit to the character to make it even or odd. The receiver then decodes this. An error occurs if the sum of the bits is not correct. Valid values are: 0 = None 1 = Odd 2 = Even

Point Type 95, Communication Ports

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
5	Comm Type	R/O	System	UINT8	1	0, 9→13, 15	LOI: 10 COMM1: 15 COMM2: 10 COMM3: 0 COMM4: 0 COMM5: 0	1.00	Indicates the communication module installed. The system updates this parameter wheneer a module is installed or removed. Valid values are : 0 = No Comm Module Installed 9 = MVS 10 = RS-232 11 = RS-485 12 = Modem 13 = HART 15 = Ethernet (Versions prior to 2.00) 19 = Ethernet (Versions 2.00 and later)
6	Store and forward port	R/W	User	UINT8	1	0 → 1	COMM1: 1 All others: 0	1.00	If this is enabled, all store and forward messages are sent out this port. If it is disabled, none are sent. Valid values are 0 (Do not store and forward for this port) and 1 (Store and forward for this port).
7	Key On Delay	R/W	User	FL	4	0.0→Any positive valid IEEE 754 float	LOI: 0.0 Others: 0.01	1.00	The period to wait after turning the RTS signal on before a message can be sent. This value is in seconds.
8	Key Off Delay	R/W	User	FL	4	0.0→Any positive valid IEEE 754 float	LOI: 0.0 Others: 0.01	1.00	The period, in seconds, to delay turning the RTS signal off after a message has been sent.
9	Modem Status	R/O	System	UINT8	1	0→ 255	0	1.00	This is the numeric response from the modem. A non-Hayes compatible modem does not provide this information. 0 = OK.
10	Modem Type	R/W	Both	UINT8	1	0 →2	0	1.00	Indicates the type of modem. The ROC detects and can changesthe internal modem. Valid values are: 0 = None 1 = External 2 = Internal **Note**: The user cannot write 2.
11	Connect Time	R/W	User	FL	4	0.0 → Max positive IEEE 754 float	60.0	1.00	The amount of time in seconds the ROC800-Series waits after initiating a call to receive a connect message before terminating a call. Enter 0 to disable.
12	Configuration Command	R/W	User	AC	40	0x20 → 0x7E for each byte	"AT&F0E0H 0V0X0&K3 S0=1S7=25 5S24=60"	1.00	The commands needed to initialize a modem.
13	Connect Command	R/W	User	AC	40	0x20 → 0x7E for each byte	"ATDT (number)"	1.00	The Hayes compatible modem command needed to dial out for SRBX communications.

Point Type 95, Communication Ports

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
14	Disconnect Time	R/W	User	FL	4	0.0→Any positive valid IEEE 754 float	60.0	1.00	Time in seconds that the ROC800-Series waits before disconnecting if there is no activity. Enter 0 to disable.
15	Inactivity Time	R/W	User	FL	4	0.0→Any positive valid IEEE 754 float	900.0	1.00	Time in seconds that the ROC800-Series waits, without receiving a signal, before it resets the modem. The inactivity timer looks at the valid receive counter to determine if the signal has been received. Enter 0 to disable.
16	Modem disconnect command	R/W	User	AC	40	0x20 → 0x7E for each byte	"ATH0"	1.00	The user can use a different disconnect string for a modem.
17	SRBX Status	R/O	System	UINT8	1	0 → 1	0	1.00	Valid values are 0 (SRBX is currently inactive) and 1 (SRBX is currently active for this port).
18	Enable SRBX	R/W	User	UINT8	1	0 → 1	0	1.00	If this is enabled all SRBX messages will be sent out this port. If is disabled, none will be sent. Valid values are 0 (Disable SRBX for this port) and 1 (Enable SRBX for this port).
19	SRBX Alarm Index	R/O	System	UINT16	2	0 → [PT 91, parameter 10]	0	1.00	The index into the alarm table that corresponds to the alarm that caused an SRBX.
20	SRBX Time Base #1	R/W	User	FL	4	0.0→Any positive valid IEEE 754 float	20.0	1.00	Time in seconds that the ROC800-Series uses as the first SRBX delay.
21	SRBX Attempts #1	R/W	User	UINT8	1	0 → 255	1	1.00	The number of attempts for the first SRBX to use. Valid values are 0 (Disable) and 255 (Continuous).
22	SRBX Time Base #2	R/W	User	FL	4	0.0→Any positive valid IEEE 754 float	30.0	1.00	Time in seconds that the ROC800-Series uses as the second SRBX delay.
23	SRBX Attempts #2	R/W	User	UINT8	1	0 → 255	2	1.00	The number of attempts for the second SRBX to use. Valid values are 0 (Disable) and 255 (Continuous).
24	SRBX Time Base #3	R/W	User	FL	4	0.0→Any positive valid IEEE 754 float	45.0	1.00	Time in seconds that the ROC800-Series uses as the third SRBX delay.
25	SRBX Attempts #3	R/W	User	UINT8	1	0 → 255	3	1.00	The number of attempts for the third SRBX to use. Valid values are 0 (Disable) and 255 (Continuous).
26	SRBX Host Address	R/W	User	UINT8	1	0 → 255	1	1.00	Used to identify the SRBX host – Address portion.
27	SRBX Host Group	R/W	User	UINT8	1	0 → 255	0	1.00	Used to identify the SRBX host – Group portion.
28	Store & Forward Address #1	R/W	User	UINT8	1	0 → 255	0	1.00	Address of the first destination for the store and forward path. SRBX must be enabled for this to function.

Point Type 95, Communication Ports

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
29	Store & Forward Group #1	R/W	User	UINT8	1	0 → 255	0	1.00	Group number of the first destination for the store and forward path. SRBX must be enabled for this to function.
30	Store & Forward Address #2	R/W	User	UINT8	1	0 → 255	0	1.00	Address of the second destination for the store and forward path. SRBX must be enabled for this to function.
31	Store & Forward Group #2	R/W	User	UINT8	1	0 → 255	0	1.00	Group number of the second destination for the store and forward path. SRBX must be enabled for this to function.
32	Store & Forward Address #3	R/W	User	UINT8	1	0 → 255	0	1.00	Address of the third destination for the store and forward path. SRBX must be enabled for this to function.
33	Store & Forward Group #3	R/W	User	UINT8	1	0 → 255	0	1.00	Group number of the third destination for store and forward. SRBX must be enabled for this to function.
34	Unused	R/O	User	UINT8	1	0	0	1.00	Not currently used.
35	Unused	R/O	User	UINT8	1	0	0	1.00	Not currently used.
36	ROC Plus Protocol Valid Receive Counter	R/W	Both	UINT16	2	0 → 65535	0	1.00	The number of valid ROC Plus Protocol messages the ROC received for this port. It can be cleared by the user.
37	ROC Plus Protocol successful message time	R/O	System	TIME	4	0x0→ 0xFFFFFFFF	0x386D97E0	1.00	The time of the last successful Opcode received by the ROC800-Series. Indicated by the number of seconds since midnight Jan 1, 1970.
38	Modbus Valid Receive Counter	R/W	Both	UINT16	2	0 → 65535	0	1.00	The number of valid Modbus messages received the ROC received for this port. It can be cleared by the user.
39	Modbus successful message time	R/O	System	TIME	4	0x0→ 0xFFFFFFFF	0x386D97E0	1.00	The time of the last successful function code received by the ROC800-Series. Indicated by the number of seconds since midnight Jan 1, 1970.
40	Number of invalid message bytes	R/W	Both	UINT16	2	0 → 65535	0	1.00	The number of invalid ROC Plus Protocol or Modbus bytes received. This parameter always returns 0 for logical 1.
41	Invalid message byte time	R/O	System	TIME	4	0x0→ 0xFFFFFFFF	0x386D97E0	1.00	The time of the last unsuccessful message byte was received by the ROC800-Series. Indicated by the number of seconds since midnight Jan 1, 1970. This parameter always returns 0 for logical 1.
42	Transmit counter	R/W	Both	UINT16	2	0 → 65535	0	1.00	Number of messages sent.

Point Type 95, Communication Ports

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
43	Port owner	R/W	Both	UINT8	1	0 → 255	0	1.00	The program that currently owns the port. Messages are routed directly to the owner, bypassing the ROC Plus Protocol. You cannot change the owner if an MVS module is installed on the port. Valid values are: 0 = ROC Plus Protocol / Modbus Slave 1 = Modbus Master (Comm 2 – 5) 2 = DS800 (Not Valid for Comm 1 on ROC809E) 3 = LCD 4 = I/O Module (Read Only) 5 = User C++ Program 1 6 = User C++ Program 2 7 = User C++ Program 3 8 = User C++ Program 4 9 = User C++ Program 5 10 = User C++ Program 6 11 = User C++ Program 7 12 = User C++ Program 8 50 = ROC Plus Protocol Only 51 = Modbus Slave Only 52 = LCD/Roc Plus Protocol 255 = DMMI (RAS use only)
44	ROC Plus Protocol Security Status	R/W	User	UINT8	1	0 → 2	0	 1.00 1.00 1.21	Enables security for the communications port. Valid values are : 0 = Disabled 1 = Security by User ID 2 = Security by User Access Leve
45	RTS Test	R/OR/W	System User	UINT8	1	0 → 255	0	1.00	Tests communications. The RTS line will be toggle on for the number of seconds specified and then be off for the number of seconds specified (above 0).
46	Response Delay	R/OR/W	User	UINT32	4	0 → 0xFFFFFFFF	5000	2.02	Sets the response delay time (in milliseconds) for individual ports.
47	Security Inactivity Timeout	R/W	User	UINT32	4	60 → 86400	3600	3.20	Indicates the number of seconds before the user is logged out because of inactivity.

3.4.7 Point Type 96: FST Parameters

Description: Point type 96 provides the parameters for setting up a FST or used by the FST.

Number of Logical Points: 6 logical points for FST Parameters may exist.

Storage Location: Point type 96 is saved to internal configuration memory.

Table 3-8: Point Type 96, FST Parameters

Point Type 96, FST Parameters

Param	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Point Tag ID	R/W	User	AC	10	0x20 → 0x7E for each byte	"FSTx"	1.00	This field contains a string to describe the FST. "X" in default name is a number that correlates to the FST logical number.
1	Result Register (RR)	R/W	System	FL	4	Any valid IEEE 754 float	0	1.00	Register used to store result of last FST operation.
2	Register 1 (R1)	R/W	Both	FL	4	Any valid IEEE 754 float	0	1.00	Register used as an input to an FST or as a location to store FST data.
3	Register 2 (R2)	R/W	Both	FL	4	Any valid IEEE 754 float	0	1.00	Register used as an input to an FST or as a location to store FST data.
4	Register 3 (R3)	R/W	Both	FL	4	Any valid IEEE 754 float	0	1.00	Register used as an input to an FST or as a location to store FST data.
5	Register 4 (R4)	R/W	Both	FL	4	Any valid IEEE 754 float	0	1.00	Register used as an input to an FST or as a location to store FST data.
6	Register 5 (R5)	R/W	Both	FL	4	Any valid IEEE 754 float	0	1.00	Register used as an input to an FST or as a location to store FST data.
7	Register 6 (R6)	R/W	Both	FL	4	Any valid IEEE 754 float	0	1.00	Register used as an input to an FST or as a location to store FST data.
8	Register 7 (R7)	R/W	Both	FL	4	Any valid IEEE 754 float	0	1.00	Register used as an input to an FST or as a location to store FST data.
9	Register 8 (R8)	R/W	Both	FL	4	Any valid IEEE 754 float	0	1.00	Register used as an input to an FST or as a location to store FST data.
10	Register 9 (R9)	R/W	Both	FL	4	Any valid IEEE 754 float	0	1.00	Register used as an input to an FST or as a location to store FST data.
11	Register 10 (R10)	R/W	Both	FL	4	Any valid IEEE 754 float	0	1.00	Register used as an input to an FST or as a location to store FST data.
12	Timer #1	R/W	Both	UINT32	4	0 → 4294967295	0	1.00	Time left for count down timer. Timer resolution is 100ms.

Point Type 96, FST Parameters

Param	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
13	Timer #2	R/W	Both	UINT32	4	0 → 4294967295	0	1.00	Time left for count down timer. Timer resolution is 100ms.
14	Timer #3	R/W	Both	UINT32	4	0 → 4294967295	0	1.00	Time left for count down timer. Timer resolution is 100ms.
15	Timer #4	R/W	Both	UINT32	4	0 → 4294967295	0	1.00	Time left for count down timer. Timer resolution is 100ms.
16	Message #1	R/W	System	AC	30	0x20 → 0x7E for each byte	“”	1.00	This parameter is updated with the first argument of the “MSG” FST command when the command executes.
17	Message #2	R/W	User	AC	30	0x20 → 0x7E for each byte	“”	1.00	This parameter is updated with the first argument of the “MS2” FST command when the command executes.
18	Message Data #1	R/O	System	AC	10	0x2D, 0x2E, 0x30 → 0x39 for each byte	“0.0”	1.00	This parameter is updated with the second argument of the “MSG” FST command when the command executes.
19	Miscellaneous 1	R/W	Both	UINT8	1	0 → 255	0	1.00	Single byte register that may be used by an FST.
20	Miscellaneous 2	R/W	Both	UINT8	1	0 → 255	0	1.00	Single byte register that may be used by an FST.
21	Miscellaneous 3	R/W	Both	UINT8	1	0 → 255	0	1.00	Single byte register that may be used by an FST.
22	Miscellaneous 4	R/W	Both	UINT8	1	0 → 255	0	1.00	Single byte register that may be used by an FST.
23	Compare Flag (SVD)	R/W	System	UINT8	1	0 → 255	0	1.00	Stores the result of a Boolean expression. Valid values are 0 (FALSE) and 1 (TRUE).
24	Run Status	R/W	Both	UINT8	1	0, 1, 5, 8, 9	0	1.00	This parameter stores the run state of the FST. Valid values are: 0 = FST is not running. 1 = FST is running. 5 = Indicates FST has shut down due to an invalid point reference. 8 = FST Editor initiates the Trace mode. 9 = Indicates that the FST in ROC800 is processing.
25	Code Size	R/O	System	UINT16	2	0 – 3000	0	1.00	Size, in bytes, of the FST code. This size does not include storage needed for register names, description, or version.
26	Instruction Pointer	R/W	System	UINT16	2	0 – 3000	0	1.00	Contains the location of the FST function to be executed next. If an error occurs, the Instruction Pointer will be set to the location of the parameter that caused the error. This parameter may also be called a program counter.
27	Execution Delay	R/W	User	UINT16	2	0 → 65535	0	1.00	Execution delay between FST instructions. Resolution is tenths of a second.

Point Type 96, FST Parameters

Param	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
28	FST Version	R/O	System	AC	10	0x20 → 0x7E for each byte	“”	1.00	Stores information about the version of the FST code. The user sets this before the FST is uploaded to the ROC800.
29	FST Description	R/O	System	AC	40	0x20 → 0x7E for each byte	“”	1.00	Contains a short description about the FST that is running. The user sets this before the FST is uploaded to the ROC800.
30	Message Data #2	R/O	System	AC	10	0x2D, 0x2E, 0x30 → 0x39 for each byte	“0.0”	1.00	This parameter is updated with the second argument of the “MS2” FST command when the command executes.
31	Steps / Task Cycle	R/W	User	UINT8	1	0 → 250	20	1.00	The requested number of steps to be executed each cycle of the FST task for this FST. The FST task nominally runs every 100 ms.
32	Actual Steps / Task Cycle	R/O	System	UINT8	1	0 → 250	20	1.00	The actual number of FST steps that the ROC800 executed for this FST during the most recent cycle of the FST task.
33	FST Cycle Time	R/O	System	FL	4	0 → Any valid positive IEEE 754 float	0.0	1.00	The amount of time in seconds from the beginning of the last execution of the FST (step 1) to the beginning of the current execution (step 1).

3.4.8 Point Type 97: FST Register Tags

Description: Point Type 97 provides the parameters for entering the register tags for the FST data. Each register name corresponds to a register in point type 96. It is only broken apart because of the length of the point type.

Number of Logical Points: 6 logical points for FST Register Tags may exist.

Storage Location: Point type 97 is saved to internal configuration memory.

Table 3-9: Point Type 97, FST Register Tags

Point Type 97, FST Register Tags

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Register Tag 1	R/W	System	AC	10	0x20 → 0x7E for each byte	"Register1"	1.00	Text string used as a label for Register 1 (R1).
1	Register Tag 2	R/W	System	AC	10	0x20 → 0x7E for each byte	"Register2"	1.00	Text string used as a label for Register 2 (R2).
2	Register Tag 3	R/W	System	AC	10	0x20 → 0x7E for each byte	"Register3"	1.00	Text string used as a label for Register 3 (R3).
3	Register Tag 4	R/W	System	AC	10	0x20 → 0x7E for each byte	"Register4"	1.00	Text string used as a label for Register 4 (R4).
4	Register Tag 5	R/W	System	AC	10	0x20 → 0x7E for each byte	"Register5"	1.00	Text string used as a label for Register 5 (R5).
5	Register Tag 6	R/W	System	AC	10	0x20 → 0x7E for each byte	"Register6"	1.00	Text string used as a label for Register 6 (R6).
6	Register Tag 7	R/W	System	AC	10	0x20 → 0x7E for each byte	"Register7"	1.00	Text string used as a label for Register 7 (R7).
7	Register Tag 8	R/W	System	AC	10	0x20 → 0x7E for each byte	"Register8"	1.00	Text string used as a label for Register 8 (R8).
8	Register Tag 9	R/W	System	AC	10	0x20 → 0x7E for each byte	"Register9"	1.00	Text string used as a label for Register 9 (R9).
9	Register Tag 10	R/W	System	AC	10	0x20 → 0x7E for each byte	"Register10"	1.00	Text string used as a label for Register 10 (R10).

3.4.9 Point Type 98: Soft Point Parameters

Description: Point type 98 provides the soft point parameters for global storage that may be used by any part of the system.

Number of Logical Points: 32 logical points for Soft Point Parameters may exist.

Storage Location: Point type 98 is saved to internal configuration memory.

Table 3-10: Point Type 98, Soft Point Parameters

Point Type 98, Soft Point Parameters

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	ASCII Text 1	R/W	User	AC	40	Any printable ASCII text.	“Soft Pt x”	1.00	Text string used to label instance of soft point. The “x” in default is the number of the soft point.
1	Float 1	R/W	User	FL	4	Any valid IEEE 754 float	0	1.00	Miscellaneous storage.
2	Float 2	R/W	User	FL	4	Any valid IEEE 754 float	0	1.00	Miscellaneous storage.
3	Float 3	R/W	User	FL	4	Any valid IEEE 754 float	0	1.00	Miscellaneous storage.
4	Float 4	R/W	User	FL	4	Any valid IEEE 754 float	0	1.00	Miscellaneous storage.
5	Float 5	R/W	User	FL	4	Any valid IEEE 754 float	0	1.00	Miscellaneous storage.
6	Float 6	R/W	User	FL	4	Any valid IEEE 754 float	0	1.00	Miscellaneous storage.
7	Float 7	R/W	User	FL	4	Any valid IEEE 754 float	0	1.00	Miscellaneous storage.
8	Float 8	R/W	User	FL	4	Any valid IEEE 754 float	0	1.00	Miscellaneous storage.
9	Float 9	R/W	User	FL	4	Any valid IEEE 754 float	0	1.00	Miscellaneous storage.
10	Float 10	R/W	User	FL	4	Any valid IEEE 754 float	0	1.00	Miscellaneous storage.
11	Float 11	R/W	User	FL	4	Any valid IEEE 754 float	0	1.00	Miscellaneous storage.
12	Float 12	R/W	User	FL	4	Any valid IEEE 754 float	0	1.00	Miscellaneous storage.
13	Float 13	R/W	User	FL	4	Any valid IEEE 754 float	0	1.00	Miscellaneous storage.
14	Float 14	R/W	User	FL	4	Any valid IEEE 754 float	0	1.00	Miscellaneous storage.
15	Float 15	R/W	User	FL	4	Any valid IEEE 754 float	0	1.00	Miscellaneous storage.
16	Float 16	R/W	User	FL	4	Any valid IEEE 754 float	0	1.00	Miscellaneous storage.
17	Float 17	R/W	User	FL	4	Any valid IEEE 754 float	0	1.00	Miscellaneous storage.
18	Float 18	R/W	User	FL	4	Any valid IEEE 754 float	0	1.00	Miscellaneous storage.
19	Float 19	R/W	User	FL	4	Any valid IEEE 754 float	0	1.00	Miscellaneous storage.
20	Float 20	R/W	User	FL	4	Any valid IEEE 754 float	0	1.00	Miscellaneous storage.

Point Type 98, Soft Point Parameters

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
21	Long 1	R/W	User	UINT32	4	0 → 4294967295	0	1.00	Miscellaneous storage.
22	Long 2	R/W	User	UINT32	4	0 → 4294967295	0	1.00	Miscellaneous storage.
23	Short 1	R/W	User	UINT16	2	0 → 65535	0	1.00	Miscellaneous storage.
24	Short 2	R/W	User	UINT16	2	0 → 65535	0	1.00	Miscellaneous storage.
25	Short 3	R/W	User	UINT16	2	0 → 65535	0	1.00	Miscellaneous storage.
26	Short 4	R/W	User	UINT16	2	0 → 65535	0	1.00	Miscellaneous storage.
27	Short 5	R/W	User	UINT16	2	0 → 65535	0	1.00	Miscellaneous storage.
28	Short 6	R/W	User	UINT16	2	0 → 65535	0	1.00	Miscellaneous storage.
29	Short 7	R/W	User	UINT16	2	0 → 65535	0	1.00	Miscellaneous storage.
30	Short 8	R/W	User	UINT16	2	0 → 65535	0	1.00	Miscellaneous storage.
31	Short 9	R/W	User	UINT16	2	0 → 65535	0	1.00	Miscellaneous storage.
32	Short 10	R/W	User	UINT16	2	0 → 65535	0	1.00	Miscellaneous storage.
33	Byte 1	R/W	User	UINT8	1	0 → 255	0	1.00	Miscellaneous storage.
34	Byte 2	R/W	User	UINT8	1	0 → 255	0	1.00	Miscellaneous storage.
35	Byte 3	R/W	User	UINT8	1	0 → 255	0	1.00	Miscellaneous storage.
36	Byte 4	R/W	User	UINT8	1	0 → 255	0	1.00	Miscellaneous storage.
37	Byte 5	R/W	User	UINT8	1	0 → 255	0	1.00	Miscellaneous storage.
38	Byte 6	R/W	User	UINT8	1	0 → 255	0	1.00	Miscellaneous storage.
39	Byte 7	R/W	User	UINT8	1	0 → 255	0	1.00	Miscellaneous storage.
40	Byte 8	R/W	User	UINT8	1	0 → 255	0	1.00	Miscellaneous storage.
41	Byte 9	R/W	User	UINT8	1	0 → 255	0	1.00	Miscellaneous storage.
42	Byte 10	R/W	User	UINT8	1	0 → 255	0	1.00	Miscellaneous storage.
43	Double 1	R/W	User	DBL	8	Valid IEEE double precision floating point	0	3.10	Miscellaneous storage.
44	Double 2	R/W	User	DBL	8	Valid IEEE double precision floating point	0	3.10	Miscellaneous storage.
45	Double 3	R/W	User	DBL	8	Valid IEEE double precision floating point	0	3.10	Miscellaneous storage.
46	Double 4	R/W	User	DBL	8	Valid IEEE double precision floating point	0	3.10	Miscellaneous storage.
47	Double 5	R/W	User	DBL	8	Valid IEEE double precision floating point	0	3.10	Miscellaneous storage.
48	Double 6	R/W	User	DBL	8	Valid IEEE double precision floating point	0	3.10	Miscellaneous storage.

Point Type 98, Soft Point Parameters

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
49	Double 7	R/W	User	DBL	8	Valid IEEE double precision floating point	0	3.10	Miscellaneous storage.
50	Double 8	R/W	User	DBL	8	Valid IEEE double precision floating point	0	3.10	Miscellaneous storage.
51	Double 9	R/W	User	DBL	8	Valid IEEE double precision floating point	0	3.10	Miscellaneous storage.
52	Double 10	R/W	User	DBL	8	Valid IEEE double precision floating point	0	3.10	Miscellaneous storage.
53	Long 3	R/W	User	UINT32	4	0 → 4294967295	0	3.10	Miscellaneous storage.
54	Long 4	R/W	User	UINT32	4	0 → 4294967295	0	3.10	Miscellaneous storage.
55	Long 5	R/W	User	UINT32	4	0 → 4294967295	0	3.10	Miscellaneous storage.
56	Long 6	R/W	User	UINT32	4	0 → 4294967295	0	3.10	Miscellaneous storage.
57	Long 7	R/W	User	UINT32	4	0 → 4294967295	0	3.10	Miscellaneous storage.
58	Long 8	R/W	User	UINT32	4	0 → 4294967295	0	3.10	Miscellaneous storage.
59	Long 9	R/W	User	UINT32	4	0 → 4294967295	0	3.10	Miscellaneous storage.
60	Long 10	R/W	User	UINT32	4	0 → 4294967295	0	3.10	Miscellaneous storage.
61	Logging Enable	R/W	User	U8	1	0 → 1	1	3.10	Enabled/disables logging of events for changes to the soft point parameters on this logical. Valid values are 0 (Logging Disabled) and 1 (Logging Enabled).

3.4.10 Point Type 99: Configurable Opcode Table

Description: Point type 99 provides the Configurable Opcode table that hosts may use to collect data from a ROC in a specific order.

There are 16 instances (logicals) of the Configurable Opcode table. Each instance of the point type is a grouping of up to 44 different ROC parameter definitions (Point **T**ype, **L**ogical Number, and **P**arameter Number = TLP). Once the parameter(s) have been defined, use Opcodes 10 and 11 to read/write data from/to the TLPs pointed to by the Configurable Opcode Table.

Number of Logical Points: 16 logical points for Configurable Opcodes may exist.

Storage Location: Point type 99 is saved to internal configuration memory.

Table 3-11: Point Type 99, Configurable Opcode

Point Type 99, Configurable Opcode

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Sequence/Revision #	R/W	User	FL	4	Any valid IEEE 754 float	0.0	1.00	Identifies the revision number for this table.
1	Data 1	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
2	Data 2	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
3	Data 3	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
4	Data 4	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
5	Data 5	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
6	Data 6	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
7	Data 7	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
8	Data 8	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
9	Data 9	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
10	Data 10	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
11	Data 11	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
12	Data 12	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
13	Data 13	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
14	Data 14	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
15	Data 15	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
16	Data 16	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
17	Data 17	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
18	Data 18	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
19	Data 19	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable

Point Type 99, Configurable Opcode

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
20	Data 20	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
21	Data 21	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
22	Data 22	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
23	Data 23	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
24	Data 24	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
25	Data 25	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
26	Data 26	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
27	Data 27	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
28	Data 28	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
29	Data 29	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
30	Data 30	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
31	Data 31	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
32	Data 32	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
33	Data 33	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
34	Data 34	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
35	Data 35	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
36	Data 36	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
37	Data 37	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
38	Data 38	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
39	Data 39	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
40	Data 40	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
41	Data 41	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
42	Data 42	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
43	Data 43	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable
44	Data 44	R/W	User	TLP	3	Any valid TLP	0,0,0	1.00	User configurable

Any valid TLP = values represented as TLP {(91→98, 100→135), 0→xx[1],0→xx[2]}.

[1] The logical number corresponds to the last instance of the point type.
[2] The parameter number corresponds to the number of parameters in the specified point type.

3.4.11 Point Type 100: Power Control Parameters

Description: Point type 100 provides parameters for configuring radio power control.

Number of Logical Points: 6 logical points for Power Control Parameters may exist.

Storage Location: Point type 100 is saved to internal configuration memory.

Special Data Type
Name: HOURMINUTE
Length: 2 bytes
Description:
This is supposed to be viewed as a time listed as a decimal-based number, where the first two digits represent the hour and the last two digits represent the minute.
Range: 9999, 0 → 23 for 2 MS Digits; 0 → 59 for 2 LS Digits
Special Meanings: 9999, Disabled

Table 3-12: Point Type 100, Power Control Parameters

Point Type 100, Power Control Parameters

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Point Tag Identification	R/W	User	AC	10	0x20 → 0x7E for each byte	LOI: “PWR_CTRL_0” COMM1: “PWR_CTRL_1” COMM2: “PWR_CTRL_2” COMM3: “PWR_CTRL_3” COMM4: “PWR_CTRL_4” COMM5: “PWR_CTRL_5”	1.00	Specifies a name used to identify this radio power control point.
1	Status	R/O	User	UINT8	1	0,1	0	1.00	Status of power control on this port. Valid values are 0 (Power Disabled) and 1 (Power Enabled).

Point Type 100, Power Control Parameters

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
2	Enable	R/W	User	UINT8	1	0,1	0	1.00	The enabled mode for the power control on this port. Valid values are 0 (Disabled) and 1 (Enabled).
3	Start Time #1	R/W	User	HOURMINUTE	2	See Default Above	9999	1.00	Zone 1 start time.
4	Start Time #2	R/W	User	HOURMINUTE	2	See Default Above	9999	1.00	Zone 2 start time.
5	Start Time #3	R/W	User	HOURMINUTE	2	See Default Above	9999	1.00	Zone 3 start time.
6	On Time #1	R/W	User	UINT32	4	0, 100 → 4294967295	0	1.00	On time for Zone 1. The amount of time for this cycle, the DO associated with this power control is in the on state (in milliseconds).
7	On Time #2	R/W	User	UINT32	4	0, 100 → 4294967295	0	1.00	On time for Zone 2. The amount of time for this cycle, the DO associated with this power control will be in the on state (in milliseconds).
8	On Time #3	R/W	User	UINT32	4	0, 100 → 4294967295	0	1.00	On time for Zone 3. The amount of time for this cycle, the DO associated with this power control is in the on state (in milliseconds).
9	Off Time #1	R/W	User	UINT32	4	0, 100 → 4294967295	0	1.00	Off time for Zone 1. The amount of time (in milliseconds) for this cycle, the DO associated with this power control is in the off state (following the on state)
10	Off Time #2	R/W	User	UINT32	4	0, 100 → 4294967295	0	1.00	Off time for Zone 2. The amount of time (in milliseconds) for this cycle, the DO associated with this power control is in the off state (following the on state).
11	Off Time #3	R/W	User	UINT32	4	0, 100 → 4294967295	0	1.00	On time for Zone 3. The amount of time (in milliseconds) for this cycle, the DO associated with this power control is in the off state (following the on state).
12	Active Time Zone	R/O	System	UINT8	1	1 → 3	1	1.00	This parameter is the current active power zone.
13	Hold Time	R/W	User	UINT32	4	0 → 4294967295	10000	1.00	Time in milliseconds that the output is held on after detection of communications. Not applicable for logical 1 if Ethernet Port.
14	Power Timer	R/O	System	UINT32	4	0 → 4294967295	0	1.00	Counts down the amount of time, in milliseconds, (On Time, Off Time, Hold Time) that the power control is currently using.

Point Type 100, Power Control Parameters

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
15	Discrete Output Number	R/W	User	TLP	3	[0,0,0] or Type: 102. Parameter: 8 Logical is 0→ (number of DO Points – 1).	0,0,0	1.00	The logical discrete output number.
16	Low Battery	R/W	User	FL	4	Any IEEE 754 floating point number.	11.0	1.00	The radio will not be turned on if the voltage drops below this value. In volts.
17	Cumulative On Time	R/W	Both	UINT32	4	0 → 4294967295	0	1.00	The counter shows how many seconds the radio power control has been on.
18	Cumulative Off Time	R/W	Both	UINT32	4	0 → 4294967295	0	1.00	This counter shows how many seconds the radio power control has been off.
19	Low Battery Deadband	R/W	User	FL	4	Any IEEE 754 floating point number.	1.0	1.00	This is a dead-band for the low battery level in power control. This is used to keep from the radio continuously turning on and off.

3.4.12 Point Type 101: Discrete Inputs

Description: Point type 101 provides the parameters for setting up and reading discrete inputs.

Number of Logical Points: 8 logical points for each installed module may exist.

Storage Location: Point type 101 is saved to internal configuration memory.

Table 3-13: Point Type 101, Discrete Inputs

Point Type 101, Discrete Inputs

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Point Tag ID	R/W	User	AC	10	0x20 → 0x7E for each ASCII character	“DI Default”	1.00	Identification name for specific DI. Values must be printable ASCII characters.
1	Scanning	R/W	User	UINT8	1	0 → 1	1	1.00	If disabled, field inputs are ignored and no changes will occur unless manually entered. Valid values are 0 (Disabled) and 1 (Enabled).
2	Filter	R/W	User	FL	4	0.00 → 43,200.0	0.3	1.00	Number of seconds that a DI must remain in the ON state before it is recognized as valid and the Status (parameter #3) is changed.
3	Status	R/W	Both	UINT8	1	0 → 1	0	1.00	Indicates the DI’s current state. Valid values are 0 (OFF) and 1 (ON).
4	Invert Mode	R/W	User	UINT8	1	0 → 1	0	1.00	If enabled, the field input will be inverted in the Status (parameter #3 – ON becomes OFF and vice-versa). Valid values are 0 (Invert Status Disabled) and 1 (Invert Status Enabled).
5	Latch Mode	R/W	User	UINT8	1	0 → 1	0	1.00	If enabled, then, on an active transition of the input, the Status (parameter #3) will change to ON and remain in the ON state until it is cleared manually. Valid values are 0 (Latch Status Disabled) and 1 (Latch Status Enabled).
6	Accumulated Value	R/W	Both	UINT32	4	0 → 16,000,000	0	1.00	Number of times the Status (parameter #3) goes from OFF to ON. Value rolls over once it reaches the maximum range.
7	Cumulative On Time	R/W	Both	FL	4	0.0→ 1,000,000	0.0	1.00	Number of seconds the Status (parameter #3) is in the ON state. Value rolls over once it reaches the maximum range.
8	Cumulative Off Time	R/W	Both	FL	4	0.0→ 1,000,000	0.0	1.00	Number of seconds the Status (parameter #3) is in the OFF state. Value rolls over once it reaches the maximum range.
9	Alarming	R/W	User	UINT8	1	0 → 1	0	1.00	If enabled, alarms may be generated and sent to the Alarm Log. Valid values are 0 (Disabled) and 1 (Enabled).

Point Type 101, Discrete Inputs

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
10	SRBX on Clear	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates a SRBX alarm is desired if an alarm condition clears. Valid values are 0 (SRBX on Clear Disabled) and 1 (SRBX on Clear Enabled).
11	SRBX on Set	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates a SRBX alarm is desired if an alarm condition occurs. Valid values are 0 (SRBX on Set Disabled) and 1 (SRBX on Set Enabled).
12	Alarm Code	R/O	System	BIN	1	0x00 → 0xFF	0x00	1.00	
12.0	Not Used			Bit 0			0		Not Used
12.1	Not Used			Bit 1			0		Not Used
12.2	Not Used			Bit 2			0		Not Used
12.3	Not Used			Bit 3			0		Not Used
12.4	Not Used			Bit 4			0		Not Used
12.5	Status On Alarm			Bit 5			0	1.00	If set, the Status (parameter #3) is ON. If clear, the Status (parameter #3) is OFF.
12.6	Not Used			Bit 6			0		Not Used
12.7	Scanning Disabled Alarm			Bit 7			0	1.00	If set, the Scanning (parameter #1) has been disabled. If clear, the Scanning (parameter #1) has been enabled.
13	Scan Period	R/W	User	FL	4	0.004→43,200.0	0.05	1.00	Scan period in seconds
14	Actual Scan Time	R/O	System	FL	4	0.0 → 43,200.0	0.0	1.00	Actual number of seconds between updates of the DI.
15	Physical Status	R/O	System	UINT8	1	0 → 1	0	1.00	Indicates the hardware’s current state. Valid values are 0 (OFF) and 1 (ON).

3.4.13 Point Type 102: Discrete Outputs

Description: Point type 102 provides the parameters for setting up discrete outputs.

Number of Logical Points: 5 logical points may exist for each installed DO-Relay and DO module. The DO-Relay 6-point may have 6 logical points for each installed module.

Storage Location: Point type 102 is saved to internal configuration memory.

Table 3-14: Point Type 102, Discrete Outputs

Point Type 102, Discrete Outputs

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Point Tag ID	R/W	User	AC	10	0x20 → 0x7E for each ASCII character	"DO Default"	1.00	Identification name for specific DO. Values must be printable ASCII characters.
1	Units Tag	R/W	User	AC	10	0x20 → 0x7E for each ASCII character	"Percent "	1.00	Describes the units used by the DO. Values must be printable ASCII characters.
2	Scanning Mode	R/W	User	UINT8	1	0 → 2	1	1.00	If disabled, no changes to the output will occur. If in Manual, only the user can change the values of the DO. If in Automatic, anything can change the values of the DO. Valid values are: 0 = Disabled 1 = Automatic 2 = Manual
3	Alarming	R/W	User	UINT8	1	0 → 1	0	1.00	If enabled, alarms may be generated and sent to the Alarm Log. Valid values are 0 (Disabled) and 1 (Enabled).
4	SRBX on Clear	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates a SRBX alarm is desired if an alarm condition clears. Valid values are 0 (SRBX on Clear Disabled) and 1 (SRBX on Clear Enabled).
5	SRBX on Set	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates a SRBX alarm is desired if an alarm condition occurs. Valid values are 0 (SRBX on Set Disabled) and 1 (SRBX on Set Enabled).
6	Alarm Code	R/O	System	BIN	1	0x00 → 0xFF	0x00	1.00	
6.0	Not Used			Bit 0			0		Not Used
6.1	Not Used			Bit 1			0		Not Used
6.2	Not Used			Bit 2			0		Not Used
6.3	Not Used			Bit 3			0		Not Used
6.4	Not Used			Bit 4			0		Not Used

Point Type 102, Discrete Outputs

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
6.5	Scanning Manual Alarm			Bit 5			0	1.00	If set, the Scanning (parameter #2) has been set to Manual. If clear, the Scanning (parameter #2) has been set to either Disable or Automatic
6.6	Not Used			Bit 6			0		Not Used
6.7	Scanning Disabled Alarm			Bit 7			0	1.00	If set, the Scanning (parameter #2) has been disabled. If clear, the Scanning (parameter #2) has been set to either Automatic or Manual.
7	Failsafe on Reset	R/W	User	UINT8	1	0 → 1	0	1.00	If enabled, the Status (parameter #8) will be set to the status indicated in 'Failsafe Status Value' (Parameter #22) on a restart of any kind. If disabled, the last Status before the restart will be used. Valid values are 0 (Output Last Status on Reset) and 1 (Use Failsafe value on Reset).
8	Auto Output	R/W	Both	UINT8	1	0 → 1	0	1.00	Controls the state of the DO when Scanning (parameter #2) is in auto mode. In other words, the physical output gets this status when the mode (parameter # 2) is set to Automatic.
9	Accumulated Value	R/W	Both	UINT32	4	0 → 4,294,967,295	0	1.00	Number of times the Status (parameter #8) goes from OFF to ON.
10	Momentary Mode	R/W	User	UINT8	1	0 → 1	0	1.00	If enabled, the Status (parameter #8) will be turned ON for the entered Time On (parameter #14) and then be turned OFF. Valid values are 0 (Momentary Disabled) and 1 (Momentary Enabled).
11	Momentary Active	R/O	System	UINT8	1	0 → 1	0	1.00	Indicates that the DO currently has the Momentary ability active. Valid values are 0 (Momentary Not Active) and 1 (Momentary Active).
12	Toggle Mode	R/W	User	UINT8	1	0 → 1	0	1.00	If enabled, the Status (parameter #8) will be turned ON for the entered Time On (parameter #14) and then turned OFF for the same Time On. The Status will continue to cycle between the ON and OFF states. Valid values are 0 (Toggle Disabled) and 1 (Toggle Enabled).
13	Timed Discrete Output (TDO) Mode	R/W	User	UINT8	1	0 → 1	0	1.00	If enabled, the Status (parameter #8) will be turned ON for a calculated Time On (parameter #14) based upon the entered EU Value (parameter #20). After the Time On has expired, the Status will be turned OFF and remain that way until a new EU Value is entered. Valid values are 0 (TDO Disabled) and 1 (TDO Enabled).
14	Time On	R/W	Both	FL	4	DO: 0.002 → 43,200.0 DOR: 0.05→ 43,200.0	1.0	1.00	Number of seconds the Status (parameter #8) will be turned ON for if in TDO, Toggle, or Momentary Mode.

Point Type 102, Discrete Outputs

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
15	Cycle Time	R/W	User	FL	4	>0.0 → 43,200.0	15.0	1.00	Number of seconds for when TDO Mode (parameter #13) and Toggle Mode (parameter #12) are selected. The Status (parameter #8) will be ON for the calculated Time On (parameter #14) based upon the entered EU Value (parameter #20). The Status will then be turned OFF based upon the Cycle Time minus the Time On.
16	Low Reading Time	R/W	User	FL	4	0.0 → 43,200.0	3.0	1.00	Minimum number of seconds the calculated Time On (parameter #14) will be when the entered EU Value (parameter #20) is less than or equal to the entered Low Reading EU (parameter #18).
17	High Reading Time	R/W	User	FL	4	0.0 → 43,200.0	12.0	1.00	Maximum number of seconds the calculated Time On (parameter #14) will be when the entered EU Value (parameter #20) is greater than or equal to the entered High Reading EU (parameter #19).
18	Low Reading EU	R/W	User	FL	4	Any valid IEEE 754 float	0.0	1.00	Minimum EU Value (parameter #20) possible.
19	High Reading EU	R/W	User	FL	4	Any valid IEEE 754 float	100.0	1.00	Maximum EU Value (parameter #20) possible.
20	EU Value	R/W	Both	FL	4	Any valid IEEE 754 float	0.0	1.00	Value in Engineering Units.
21	Manual Output	R/W	Both	UINT8	1	0 → 1	0	1.00	Controls the state of the DO when Scanning (parameter #2) is in manual mode. In other words, the physical output gets this status when the mode (parameter # 2) is set to Manual.
22	Failsafe Output	R/W	User	UINT8	1	0 → 1	1	1.00	The state the output will be placed in when the unit is started and the Failsafe on Reset Parameter (Parameter 7) is set to 1, Use Failsafe value on reset.
23	Max Scan Period	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	2	1.00	How often (in seconds) the system rewrites to the DOs (in seconds).
24	Physical Output	R/O	System	UINT8	1	0 → 1	0	1.10	Indicates the DO's current state. Valid values are 0 (OFF) and 1 (ON).
25	DO Typer	R/O	System	UINT8	1	0 → 1	0	1.10	Indicates the type of DO (relay or solid state). Valid values are: 0 = DO Relay 1 = DO Solid State 3 = DO Relay 6 Point
26	Invert Output Mode	R/W	User	UINT8	1	0 → 1	0	3.01	Inverts the output of the ACIO channel. This allows you to use TDO mode to keep a channel OFF for a set amount of time and then bring this channel back ON. Valid values are 0 (Normal) and 1 (Inverted). **Note**: This always inverts the output, including the Failsafe Output.

3.4.14 Point Type 103: Analog Inputs

Description: Point type 103 provides the parameters for setting up and reading analog inputs.

Number of Logical Points: 4 logical points per installed module may exist.

Storage Location: Point type 103 is saved to internal configuration memory.

Table 3-15: Point Type 103, Analog Inputs

Point Type 103, Analog Inputs

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Point Tag ID	R/W	User	AC	10	0x20 → 0x7E for each ASCII character	"AI Default"	1.00	Identification name for specific AI. Values must be printable ASCII characters.
1	Units Tag	R/W	User	AC	10	0x20 → 0x7E for each ASCII character	" "	1.00	Describes the units used by the AI. Values must be printable ASCII characters.
2	Scanning	R/W	User	UINT8	1	0 → 1	1	1.00	If disabled, field inputs are ignored and no changes will occur unless manually entered. Valid values are 0 (Disabled) and 1 (Enabled).
3	Scan Period	R/W	User	FL	4	0.05 → 43,200.0	1.0	1.00	Number of seconds between updates of the AI.
4	Actual Scan Time	R/O	System	FL	4	0.0 → 43,200.0	0.0	1.00	Actual number of seconds between updates of the AI.
5	Filter	R/W	User	UINT8	1	0 → 99	3	1.00	Percentage of last raw A/D reading to be weighted with the new raw A/D reading.
6	Averaging	R/W	User	UINT8	1	0 → 1	0	1.00	If enabled, the filtered raw A/D value is averaged over the Scan Period. If disabled, the current filtered raw A/D value is used when the Scan Period is reached. Valid values are 0 (Disabled) and 1 (Enabled).
7	Raw A/D Input	R/O	System	UINT16	2	0 → 65,535	0	1.00	Raw A/D reading used to calculate the EU Value (parameter #21).
8	Zero Raw	R/W	User	UINT16	2	0 → 65,535	AI-12: 819 AI-16: 13,107	1.00	Lowest calibrated raw A/D input.
9	Mid Point Raw #1	R/w	User	UINT16	2	0 → 65,535	AI-12: 4,095 AI-16: 65,535	1.00	Second lowest calibrated raw A/D input.

Point Type 103, Analog Inputs

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
10	Mid Point Raw #2	R/w	User	UINT16	2	0 → 65,535	AI-12: 4,095 AI16: 65,535	1.00	Third lowest or highest calibrated raw A/D input.
11	Mid Point Raw #3	R/w	User	UINT16	2	0 → 65,535	AI-12: 4,095 AI-16: 65,535	1.00	Second highest calibrated raw A/D input.
12	Span Raw	R/W	User	UINT16	2	0 → 65,535	AI-12: 4,095 AI-16: 65,535	1.00	Highest calibrated raw A/D input.
13	Zero EU	R/W	User	FL	4	Any valid IEEE 754 float	0.0	1.00	Lowest calibrated EU value.
14	Mid Point EU #1	R/W	User	FL	4	Any valid IEEE 754 float	100.0	1.00	Second lowest calibrated EU value.
15	Mid Point EU #2	R/W	User	FL	4	Any valid IEEE 754 float	100.0	1.00	Third lowest or highest calibrated EU value.
16	Mid Point EU #3	R/W	User	FL	4	Any valid IEEE 754 float	100.0	1.00	Second highest calibrated EU value.
17	Span EU	R/W	User	FL	4	Any valid IEEE 754 float	100.0	1.00	Highest calibrated EU value. When this parameter changes, parameters 14, 15, and 16 are set equal to this value.
18	Offset (Zero Shift)	R/W	User	FL	4	Any valid IEEE 754 float	0.0	1.00	Value to be added to all calculated EU values.
19	Set Value	R/W	User	FL	4	Any valid IEEE 754 float	0.0	1.00	Desired EU value for a calibration point. **Note**: No event is logged for this parameter. and should possibly labeled as R/O in any external ROC Plus Protocol Specification
20	Manual Value	R/O	System	FL	4	Any valid IEEE 754 float	0.0	1.00	Current EU value of AI while performing calibration.
21	EU Value	R/O	System	FL	4	Any valid IEEE 754 float	0.0	1.00	Value in Engineering Units.
22	Clipping	R/W	User	UINT8	1	0 → 1	0	1.00	If enabled, then the EU Value (parameter #21) cannot be less than the Low Low Alarm EU (parameter #23) or greater than the High High Alarm EU (parameter #26). Valid values are 0 (Disabled, no limiting of the EU value, Parameter 21, occurs) and 1 (Enabled).
23	Low Low Alarm EU	R/W	User	FL	4	Any valid IEEE 754 float	-20.0	1.00	Alarm value for Low Low Alarm and minimum EU Value (parameter #21) if clipping (parameter #22) is enabled.
24	Low Alarm EU	R/W	User	FL	4	Any valid IEEE 754 float	-10.0	1.00	Alarm value for Low Alarm.
25	High Alarm EU	R/W	User	FL	4	Any valid IEEE 754 float	110.0	1.00	Alarm value for High Alarm.
26	High High Alarm EU	R/W	User	FL	4	Any valid IEEE 754 float	120.0	1.00	Alarm value for High High Alarm and maximum EU Value (parameter #21) if clipping (parameter #22) is enabled.

Point Type 103, Analog Inputs

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
27	Rate Alarm EU	R/W	User	FL	4	Any valid IEEE 754 float	5.0	1.00	Alarm value for maximum change of EU Value (parameter #21) between Scan Periods.
28	Alarm Deadband	R/W	User	FL	4	Any valid IEEE 754 float	2.0	1.00	Provides a range (±) that the EU Value (parameter #21) may move between without causing another alarm.
29	Alarming	R/W	User	UINT8	1	0 → 1	0	1.00	If enabled, alarms may be generated and sent to the Alarm Log. Valid values are 0 (Disabled) and 1 (Enabled).
30	SRBX on Clear	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates a SRBX alarm is desired if an alarm condition clears. Valid values are 0 (SRBX on Clear Disabled) and 1 (SRBX on Clear Enabled).
31	SRBX on Set	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates a SRBX alarm is desired if an alarm condition occurs. Valid values are 0 (SRBX on Set Disabled) and 1 (SRBX on Set Enabled).
32	Alarm Code	R/O	System	BIN	1	0x00 → 0xFF	0x00	1.00	
32.0	Low Alarm			Bit 0			0	1.00	If set, the EU Value (parameter #21) is less than or equal to the Low Alarm EU (parameter #24). If clear, the EU Value (parameter #21) is greater than the Low Alarm EU (parameter #24).
32.1	Low Low Alarm			Bit 1			0	1.00	If set, the EU Value (parameter #21) is less than or equal to the Low Low Alarm EU (parameter #23). If clear, the EU Value (parameter #21) is greater than the Low Low Alarm EU (parameter #23).
32.2	High Alarm			Bit 2			0	1.00	If set, the EU Value (parameter #21) is greater than or equal to the High Alarm EU (parameter #25). If clear, the EU Value (parameter #21) is less than the High Alarm EU (parameter #25).
32.3	High High Alarm			Bit 3			0	1.00	If set, the EU Value (parameter #21) is greater than or equal to the High High Alarm EU (parameter #26). If clear, the EU Value (parameter #21) is less than the High High Alarm EU (parameter #26).
32.4	Rate Alarm			Bit 4			0	1.00	If set, the EU Value (parameter #21) change from last Scan Period to the new Scan Period is greater than or equal to the Rate Alarm EU (parameter #27). If clear, the EU Value (parameter #21) change from last Scan Period to the new Scan Period is less than the Rate Alarm EU (parameter #27).
32.5	Not Used			Bit 5			0		Not used
32.6	Point Fail Alarm			Bit 6			0	1.00	If set, the AI's hardware is reporting a malfunction. If clear, the AI's hardware is operating properly.

Point Type 103, Analog Inputs

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
32.7	Scanning Disabled Alarm			Bit 7			0	1.00	If set, the Scanning (parameter #2) has been disabled. If clear, the Scanning (parameter #2) has been enabled.
33	Calibration Timer	R/O	System	FL	4	0.0 → 3,600.0	3,600.0	1.00	Number of seconds until a calibration timeout occurs.
34	Calibration Mode	R/W	Both	UINT8	1	0 → 4	0	1.00	Indicates what the calibration for the AI is doing. Valid values are: 0 = Use Current Calibration 1 = Start Calibration 2 = Calibrate 3 = Restore Previous Calibration 4 = Stop Calibration. **Note**: No event is logged for this parameter. and should possibly labeled as R/O in any external ROC Plus Protocol Specification
35	Calibration Type	R/W	Both	UINT8	1	0 → 6	0	1.00	During calibration, determines what value the Set Value (parameter #19) replaces. Valid values are: 0 = Nothing 1 = Set Zero 2 = Set Span 3 = Set Mid Point #1 4 = Set Mid Point #2 5 = Set Mid Point #3 6 = Set Offset (Zero Shift). **Note**: No event is logged for this parameter. and should possibly labeled as R/O in any external ROC Plus Protocol Specification
36	Failsafe Mode	R/W	User	UINT8	1	0 → 1	0	3.00	Valid values are 0 (Disabled) and 1 (Enabled, the EU Value is set to the Failsafe value in the event of a point fail).
37	Failsafe Value	R/W	User	FL	4	Any valid IEEE 754 float	0	3.00	The AI's EU Value is set to the Failsafe Value if Failsafe Mode is Enabled and the AI is in Point Fail.
38	AI Type	R/O	System	UINT8	1	0 → 1	0	3.00	Indicates the type of AI module (12 or 16 bit). Valid values are 0 (AI 12 Bit) and 1 (AI 16 Bit).
39	Equivalent Milliamp Value	R/O	System	FL	4	4 → 20	0	3.10	Output of module scaled to a 4 to 20 value to be equivalent to milliamps.

3.4.15 Point Type 104: Analog Outputs

Description: Point type 104 provides the parameters for setting up analog outputs.

Number of Logical Points: 4 logical points for each installed module may exist.

Storage Location: Point type 104 is saved to internal configuration memory.

Table 3-16: Point Type 104, Analog Outputs

Point Type 104, Analog Outputs

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Point Tag ID	R/W	User	AC	10	0x20 → 0x7E for each ASCII character	"AO Default"	1.00	Identification name for specific AO. Values must be printable ASCII characters.
1	Units Tag	R/W	User	AC	10	0x20 → 0x7E for each ASCII character	"Percent "	1.00	Describes the units used by the AO. Values must be printable ASCII characters.
2	Scanning Mode	R/W	User	UINT8	1	0 → 2	1	1.00	If disabled, no changes to the output will occur. If in Manual, only the user can change the values of the AO. If in Automatic, anything can change the values of the AO. Valid values are: 0 = Disabled 1 = Automatic 2 = Manual
3	Alarming	R/W	User	UINT8	1	0 → 1	0	1.00	If enabled, alarms may be generated and sent to the Alarm Log. Valid values are 0 (Disabled) and 1 (Enabled).
4	SRBX on Clear	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates a SRBX alarm is desired if an alarm condition clears. Valid values are 0 (SRBX on Clear Disabled) and 1 (SRBX on Clear Enabled).
5	SRBX on Set	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates a SRBX alarm is desired if an alarm condition occurs. Valid values are 0 (SRBX on Set Disabled) and 1 (SRBX on Set Enabled).
6	Alarm Code	R/O	System	BIN	1	0x00 → 0xFF	0x00	1.00	
6.0	Not Used			Bit 0			0		Not Used
6.1	Not Used			Bit 1			0		Not Used
6.2	Not Used			Bit 2			0		Not Used
6.3	Not Used			Bit 3			0		Not Used
6.4	Not Used			Bit 4			0		Not Used

Point Type 104, Analog Outputs

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
6.5	Scanning Manual Alarm			Bit 5			0	1.00	If set, the Scanning (parameter #2) has been set to Manual. If clear, the Scanning (parameter #2) has been set to either Disable or Automatic
6.6	Point Fail Alarm			Bit 6			0	1.00	If set, the AO's hardware is reporting a malfunction. If clear, the AO's hardware is operating properly.
6.7	Scanning Disabled Alarm			Bit 7			0	1.00	If set, the Scanning (parameter #2) has been disabled. If clear, the Scanning (parameter #2) has been set to Manual or Automatic.
7	Failsafe on Reset	R/W	User	UINT8	1	0 → 1	0	1.00	If enabled, the Raw D/A Output (parameter #13) will be set to the Failsafe value (parameter #22) on a restart of any kind. If disabled, the last EU Value (parameter #13) or the last saved EU Value will be used to determine the Raw D/A Output (parameter #13) after a restart. Valid values are 0 (Use last EU Value on reset) and 1 (Use Failsafe value on reset).
8	Zero Raw	R/W	User	UINT16	2	0 → 65,535	12,584	1.00	Minimum D/A count the calculated Raw D/A Output (parameter #13) will be when the entered EU Value (parameter #12) is less than or equal to the entered Zero EU (parameter #10).
9	Span Raw	R/W	User	UINT16	2	0 → 65,535	62,923	1.00	Maximum D/A count the calculated Raw D/A Output (parameter #13) will be when the entered EU Value (parameter #12) is greater than or equal to the entered Span EU (parameter #11).
10	Zero EU	R/W	User	FL	4	Any valid IEEE 754 float	0.0	1.00	Minimum EU Value (parameter #12) possible.
11	Span EU	R/W	User	FL	4	Any valid IEEE 754 float	100.0	1.00	Maximum EU Value (parameter #12) possible.
12	Auto Value	R/W	Both	FL	4	Any valid IEEE 754 float	0.0	1.00	Controls the output when Scanning (parameter #2) is in auto mode.
13	Raw D/A Output	R/O	System	UINT16	2	0 → 65,535	12,584	1.00	Calculated Digital-to-Analog value based upon EU Value (parameter #12).
14	Manual Value	R/W	Both	FL	4	Any valid IEEE 754 float	0.0	1.00	Controls the output when Scanning (parameter #2) is in manual mode.
15	Failsafe Value	R/W	Both	FL	4	Any valid IEEE 754 float	0.0	1.00	This is the value that will be outputted when the unit is started and the Failsafe on Reset Parameter (Parameter 7) is set to 1, Use Failsafe value on reset.
16	Physical Value	R/O	System	FL	4	Any valid IEEE 754 float	0.0	1.00	Indicates the current value of the output in Engineering Units.

3.4.16 Point Type 105: Pulse Inputs

Description: Point type 105 provides the parameters for setting up and reading pulse inputs.

Number of Logical Points: 4 logical points for each installed module may exist.

Storage Location: Point type 105 is saved to internal configuration memory.

Table 3-17: Point Type 105, Pulse Inputs

Point Type 105, Pulse Inputs

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Point Tag ID	R/W	User	AC	10	0x20 → 0x7E for each ASCII character	“PI Default”	1.00	Identification name for specific PI. Values must be printable ASCII characters.
1	Units Tag	R/W	User	AC	10	0x20 → 0x7E for each ASCII character	“ “	1.00	Describes the units used by the PI. Values must be printable ASCII characters.
2	Scanning	R/W	User	UINT8	1	0 → 1	1	1.00	If disabled, field inputs are ignored and no changes will occur unless manually entered. Valid values are 0 (Disabled) and 1 (Enabled).
3	Scan Period	R/W	User	FL	4	0.05 → 43,200.0	1.0	1.00	Number of seconds between updates of the PI.
4	Accumulated Value	R/W	Both	UINT32	4	0→16,000,000	0	1.00	Total number of pulses that the PI has received.
5	Contract Hour	R/W	User	UINT8	1	0 → 23	0	1.00	Hour, in military time, that represents the end of the day for the PI.
6	Pulses for Day	R/O	Both	UINT32	4	0 → 4,294,967,295	0	1.00	Total number of pulses that the PI has received for the contract day.
7	Current Rate Period	R/W	User	UINT8	1	0 → 3	2	1.00	Used to determine the calculation of the Current Rate (parameter #10): Valid values are: 0 = EU/second 1 = EU/minute 2 = EU/hour 3 = EU/day.
8	Conversion	R/W	User	UINT8	1	0 → 1	1	1.00	Determines if Conversion Value (parameter #9) will be multiplied or divided by the accumulated pulses to determine the units for the Current Rate (parameter #10). Valid values are 0 (EUs/pulse) and 1 (pulses/EU).
9	Conversion Value	R/W	User	FL	4	Any valid IEEE 754 float, except 0.0	1.0	1.00	Used to calculate the units of the Current Rate (parameter #10).
10	Current Rate	R/O	System	FL	4	Any valid IEEE 754 float	0.0	1.00	Calculated rate of the pulses.

Point Type 105, Pulse Inputs

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
11	EU Value Mode	R/W	User	UINT8	1	0 → 2	0	1.00	Used to determine what the EU Value (parameter #13) represents. Valid values are: 0 = Rate 1 = Accumulator with Maximum Rollover 2 = Accumulator with Entered Rollover.
12	Rollover Maximum	R/W	User	FL	4	Any valid IEEE 754 float	1,000.0	1.00	This is the Entered Rollover Maximum for the EU Value Mode (parameter #11) when it is setup for Accumulator with Entered Rollover.
13	EU Value	R/W	Both	FL	4	Any valid IEEE 754 float	0.0	1.00	Value in Engineering Units.
14	Low Low Alarm EU	R/W	User	FL	4	Any valid IEEE 754 float	0.0	1.00	Alarm value for Low Low Alarm when the EU Value Mode (parameter #11) is setup for Rate.
15	Low Alarm EU	R/W	User	FL	4	Any valid IEEE 754 float	10.0	1.00	Alarm value for Low Alarm when the EU Value Mode (parameter #11) is setup for Rate.
16	High Alarm EU	R/W	User	FL	4	Any valid IEEE 754 float	100.0	1.00	Alarm value for High Alarm when the EU Value Mode (parameter #11) is setup for Rate.
17	High High Alarm EU	R/W	User	FL	4	Any valid IEEE 754 float	110.0	1.00	Alarm value for High High Alarm when the EU Value Mode (parameter #11) is setup for Rate.
18	Rate Alarm EU	R/W	User	FL	4	Any valid IEEE 754 float	5.0	1.00	Alarm value for maximum change of EU Value (parameter #13) between Scan Periods when the EU Value Mode (parameter #11) is setup for Rate.
19	Alarm Deadband	R/W	User	FL	4	Any valid IEEE 754 float	2.0	1.00	Provides a range (±) that the EU Value (parameter #13) may move between without causing another alarm when the EU Value Mode (parameter #11) is setup for Rate.
20	Alarming	R/W	User	UINT8	1	0 → 1	0	1.00	If enabled, alarms may be generated and sent to the Alarm Log. Valid values are 0 (Disabled) and 1 (Enabled).
21	SRBX on Clear	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates a SRBX alarm is desired if an alarm condition clears. Valid values are 0 (SRBX on Clear Disabled,) and 1 (SRBX on Clear Enabled).
22	SRBX on Set	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates a SRBX alarm is desired if an alarm condition occurs. Valid values are 0 (SRBX on Set Disabled) and 1 (SRBX on Set Enabled).
23	Alarm Code	R/O	System	BIN	1	0x00 → 0xFF	0x00	1.00	
23.0	Low Alarm			Bit 0			0	1.00	If set, the EU Value (parameter #13) is less than or equal to the Low Alarm EU (parameter #15). If clear, the EU Value (parameter #13) is greater than the Low Alarm EU (parameter #15).

Point Type 105, Pulse Inputs

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
23.1	Low Low Alarm			Bit 1			0	1.00	If set, the EU Value (parameter #13) is less than or equal to the Low Low Alarm EU (parameter #14). If clear, the EU Value (parameter #13) is greater than the Low Low Alarm EU (parameter #14).
23.2	High Alarm			Bit 2			0	1.00	If set, the EU Value (parameter #13) is greater than or equal to the High Alarm EU (parameter #16). If clear, the EU Value (parameter #13) is less than the High Alarm EU (parameter #16).
23.3	High High Alarm			Bit 3			0	1.00	If set, the EU Value (parameter #13) is greater than or equal to the High High Alarm EU (parameter #17). If clear, the EU Value (parameter #13) is less than the High High Alarm EU (parameter #17).
23.4	Rate Alarm			Bit 4			0	1.00	If set, the EU Value (parameter #13) change from last Scan Period to the new Scan Period is greater than or equal to the Rate Alarm EU (parameter #18). If clear, the EU Value (parameter #13) change from last Scan Period to the new Scan Period is less than the Rate Alarm EU (parameter #18).
23.5	Not Used			Bit 5			0		Not Used
23.6	Point Fail Alarm			Bit 6			0	1.00	If set, the PI's hardware is reporting a malfunction. If clear, the PI's hardware is operating properly.
23.7	Scanning Disabled Alarm			Bit 7			0	1.00	If set, the Scanning (parameter #2) has been disabled. If clear, the Scanning (parameter #2) has been enabled.
24	Today's Total	R/O	Both	FL	4	Any valid IEEE 754 float	0.0	1.00	Calculated value of the accumulated pulses for the contract day multiplied by the Conversion Value (parameter #9).
25	Yesterday's Total	R/O	System	FL	4	Any valid IEEE 754 float	0.0	1.00	Previous contract day's total.
26	Corrected Pulse Accumulation	R/O	System	FL	4	Any valid IEEE 754 float	0.0	1.00	Running accumulation of pulses multiplied by **X,** where **X** is either the Conversion Value (when Parameter 8 is set to EU/Pulse) or is set to 1/Conversion Value if Pulses/EU. Rolls over at 1,000,000.0
27	Frequency	R/O	System	FL	4	0 → positive valid IEEE 754 float	0.0	1.00	Frequency of incoming pulses in pulses/second.

3.4.17 Point Type 106: RTD

Description: Point type 106 provides the parameters for setting up and reading a RTD.

Number of Logical Points: 2 logical points for each installed RTD module may exist; 3 logical points for each installed RTD 3-point module may exist.

Storage Location: Point type 106 is saved to internal configuration memory.

Table 3-18: Point Type 106, RTD

Point Type 106, RTD

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Point Tag ID	R/W	User	AC	10	0x20 → 0x7E for each ASCII character	"RTD Deflt "	1.00	Identification name for specific RTD. Values must be printable ASCII characters.
1	Units Tag	R/W	User	AC	10	0x20 → 0x7E for each ASCII character	" "	1.00	Describes the units used by the RTD. Values must be printable ASCII characters.
2	Scanning	R/W_ LOG	User	UINT8	1	0 → 1	1	1.00	If disabled, field inputs are ignored and no changes will occur unless manually entered. Valid values are 0 (Disabled) and 1 (Enabled).
3	Scan Period	R/W_ CNDL	User	FL	4	0.066 → 43,200.0	1.0	1.00	Number of seconds between updates of the RTD.
4	Actual Scan Time	R/O	System	FL	4	0.05 → 43,200.0	0.0	1.00	Actual number of seconds between updates of the RTD.
5	Filter	R/W_ CNDL	User	UINT8	1	0 → 99	3	1.00	Percentage of last raw A/D reading to be weighted with the new raw A/D reading.
6	Averaging	R/W_ CNDL	User	UINT8	1	0 → 1	0	1.00	If enabled, the filtered raw A/D value is averaged over the Scan Period. If disabled, the current filtered raw A/D value is used when the Scan Period is reached. Valid values are 0 (Disabled) and 1 (Enabled).
7	Alpha of RTD	R/W_ LOG	User	UINT8	1	0 → 1	0	1.00	Indicates what the alpha (α) of the RTD. Valid values are 0 (Alpha of 0.00385) and 1 (Alpha of 0.00392).
8	Raw A/D Input	R/O	Both	UINT16	2	0 → 65,535	0	1.00	Raw A/D reading used to calculate the EU Value (parameter #22).
9	Zero Raw	R/O	User	UINT16	2	0 → 65,535	42973	1.00	Lowest calibrated raw A/D input.
10	Mid Point Raw #1	R/O	User	UINT16	2	0 → 65,535	61963	1.00	Second lowest calibrated raw A/D input.
11	Mid Point Raw #2	R/O	User	UINT16	2	0 → 65,535	61963	1.00	Third lowest or highest calibrated raw A/D input.
12	Mid Point Raw #3	R/O	User	UINT16	2	0 → 65,535	61963	1.00	Second highest calibrated raw A/D input.

Point Type 106, RTD

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
13	Span Raw	R/O	User	UINT16	2	0 → 65,535	61963	1.00	Highest calibrated raw A/D input.
14	Zero EU	R/O	User	FL	4	Any valid IEEE 754 float	-50.0	1.00	Lowest calibrated EU value.
15	Mid Point EU #1	R/O	User	FL	4	Any valid IEEE 754 float	350.0	1.00	Second lowest calibrated EU value.
16	Mid Point EU #2	R/O	User	FL	4	Any valid IEEE 754 float	350.0	1.00	Third lowest or highest calibrated EU value.
17	Mid Point EU #3	R/O	User	FL	4	Any valid IEEE 754 float	350.0	1.00	Second highest calibrated EU value.
18	Span EU	R/O	User	FL	4	Any valid IEEE 754 float	350.0	1.00	Highest calibrated EU value.
19	Offset (Zero Shift)	R/W	User	FL	4	Any valid IEEE 754 float	0.0	3.00	Value to be added to all calculated EU values.
20	Set Value	R/W	User	FL	4	Any valid IEEE 754 float	-50→350 °C -58→662 °F 401.67→ 1121.67 R 223.15→ 623.15 K 80.31→ 229.72 Ω (385) 80→ 231.89 Ω (392)	1.00	Desired EU value for a calibration point. **Note**: No event is logged for this parameter and should possibly labeled as R/O in any external ROC Plus Protocol Specification. The range is based upon the unit selected.
21	Manual Value	R/O	System	FL	4	Any valid IEEE 754 float	0.0	1.00	Current EU Value of RTD while performing calibration.
22	EU Value	R/W	Both	FL	4	Any valid IEEE 754 float	0.0	1.00	Value in Engineering Units.
23	Clipping	R/W	User	UINT8	1	0 → 1	0	1.00	If enabled, then the EU Value (parameter #22) cannot be less than the Low Low Alarm EU (parameter #24) or greater than the High High Alarm EU (parameter #27). If disabled, no limiting of the EU Value (parameter #22) takes place. Valid values are 0 (Disabled) and 1 (Enabled).
24	Low Low Alarm EU	R/W	User	FL	4	Any valid IEEE 754 float	-20.0	1.00	Alarm value for Low Low Alarm and minimum EU Value (parameter #22) if clipping (parameter #23) is enabled.
25	Low Alarm EU	R/W	User	FL	4	Any valid IEEE 754 float	-10.0	1.00	Alarm value for Low Alarm.
26	High Alarm EU	R/W	User	FL	4	Any valid IEEE 754 float	110.0	1.00	Alarm value for High Alarm.
27	High High Alarm EU	R/W	User	FL	4	Any valid IEEE 754 float	120.0	1.00	Alarm value for High High Alarm and maximum EU Value (parameter #22) if clipping (parameter #23) is enabled.
28	Rate Alarm EU	R/W	User	FL	4	Any valid IEEE 754 float	5.0	1.00	Alarm value for maximum change of EU Value (parameter #22) between Scan Periods.

Point Type 106, RTD

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
29	Alarm Deadband	R/W	User	FL	4	Any valid IEEE 754 float	2.0	1.00	Provides a range (±) that the EU Value (parameter #22) may move between without causing another alarm.
30	Alarming	R/W	User	UINT8	1	0 → 1	0	1.00	If enabled, alarms may be generated and sent to the Alarm Log. Valid values are 0 (Disabled) and 1 (Enabled).
31	SRBX on Clear	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates a SRBX alarm is desired if an alarm condition clears. Valid values are 0 (SRBX on Clear Disabled) and 1 (SRBX on Clear Enabled).
32	SRBX on Set	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates a SRBX alarm is desired if an alarm condition occurs. Valid values are 0 (SRBX on Set Disabled) and 1 (SRBX on Set Enabled).
33	Alarm Code	R/O	System	BIN	1	0x00 → 0xFF	0x00	1.00	
33.0	Low Alarm			Bit 0			0	1.00	If set, the EU Value (parameter #22) is less than or equal to the Low Alarm EU (parameter #25). If clear, the EU Value (parameter #22) is greater than the Low Alarm EU (parameter #25).
33.1	Low Low Alarm			Bit 1			0	1.00	If set, the EU Value (parameter #22) is less than or equal to the Low Low Alarm EU (parameter #24). If clear, the EU Value (parameter #22) is greater than the Low Low Alarm EU (parameter #24).
33.2	High Alarm			Bit 2			0	1.00	If set, the EU Value (parameter #22) is greater than or equal to the High Alarm EU (parameter #26). If clear, the EU Value (parameter #22) is less than the High Alarm EU (parameter #26).
33.3	High High Alarm			Bit 3			0	1.00	If set, the EU Value (parameter #22) is greater than or equal to the High High Alarm EU (parameter #27). If clear, the EU Value (parameter #22) is less than the High High Alarm EU (parameter #27).
33.4	Rate Alarm			Bit 4			0	1.00	If set, the EU Value (parameter #22) change from last Scan Period to the new Scan Period is greater than or equal to the Rate Alarm EU (parameter #28). If clear, the EU Value (parameter #22) change from last Scan Period to the new Scan Period is less than the Rate Alarm EU (parameter #28).
33.5	Not Used			Bit 5			0		Not Used
33.6	Point Fail Alarm			Bit 6			0	1.00	If set, the RTD's hardware is reporting a malfunction. If clear, the RTD's hardware is operating properly.

Point Type 106, RTD

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
33.7	Scanning Disabled Alarm			Bit 7			0	1.00	If set, the Scanning (parameter #2) has been disabled. If clear, the Scanning (parameter #2) has been disabled.
34	Calibration Timer	R/O	System	FL	4	0.0 → 3,600.0	3,600.0	1.00	Number of seconds until a calibration timeout occurs.
35	Calibration Mode	R/W	Both	UINT8	1	0 → 4	0	1.00	Describes what the calibration for the RTD is doing. Valid values are: 0 = Use Current Calibration 1 = Start Calibration 2 = Calibrate 3 = Restore Previous Calibration 4 = Stop Calibration. **Note**: No event is logged for this parameter.
36	Calibration Type	R/W	Both	UINT8	1	0 → 6	0	1.00	During calibration, determines what the Set Value (parameter #20) is replacing. Valid values are : 0 = Nothing 1 = Set Zero 2 = Set Span 3 = Set Mid Point #1 4 = Set Mid Point #2 5 = Set Mid Point #3 6 = Unused. **Note**: No event is logged for this parameter and should possibly labeled as R/O in any external ROC Plus Protocol Specification
37	Units	R/W	User	UINT8	1	0 → 4	0	1.00	Indicates units for the point. Valid values are: 0 = °F 1 = °C 2 = °K 3 = °R 4 = Ohms **Note**: Version 3.40 changed default from **1** (°C) to **0** (°F).

3.4.18 Point Type 107: Thermocouple

Description: Point type 107 provides the parameters for setting up and reading a thermocouple.

Number of Logical Points: 5 logical points for each installed thermocouple may exist; 4 logical points for each installed TC 4-point module may exist.

Storage Location: Point type 107 is saved to internal configuration memory.

Table 3-19: Point Type 107, Thermocouple

Point Type 107, Thermocouple

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Point Tag ID .	R/W	User	AC	10	0x20 → 0x7E for each ASCII character	"TC Default"	1.00	Identification name for specific TC. Values must be printable ASCII characters.
1	Units Tag	R/W	User	AC	10	0x20 → 0x7E for each ASCII character	" "	1.00	Describes the units used by the TC. Values must be printable ASCII characters.
2	Scanning	R/W	User	UINT8	1	0 → 1	1	1.00	If disabled, field inputs are ignored and no changes will occur unless manually entered. Valid values are 0 (Disabled) and 1 (Enabled).
3	Units	R/W	User	UINT8	1	0 → 3	0	1.00	Indicates the TC units. Valid values are: 0 = °F 1 = °C 2 = °K 3 = °R **Note**: Version 3.40 changed default from **1** (°C) to **0** (°F).
4	Type of Thermocouple	R/W	System	UINT8	1	0 → 6; 8 → 10	0	1.00	Indicates which type of thermocouple is attached. Valid values are: 0 = Type J 1 = Type K 2 = Type B 3 = Type E 4 = Type R 5 = Type S 6 = Type T 8 = Type 10 9 = Type C. 10 = Type N **Note**: Only types J and K are available on the original 5-point TC module.
5	Scan Period	R/W	User	FL	4	0.1 → 43,200.0	1.0	1.00	Number of seconds between updates of the TC.

Point Type 107, Thermocouple

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
6	Actual Scan Time	R/O	System	FL	4	0.00 → 43,200.0	0.0	1.00	Actual number of seconds between updates of the TC.
7	Filter	R/W	User	UINT8	1	0 → 99	0	1.00	Percentage of last raw A/D reading to be weighted with the new raw A/D reading.
8	Averaging	R/W	User	UINT8	1	0 → 1	0	1.00	If enabled, the filtered EU value is averaged over the Scan Period. If disabled, the current filtered EU value is used when the Scan Period is reached. Valid values are 0 (Disabled) and 1 (Enabled).
9	EU Value	R/W	Both	FL	4	Any valid IEEE 754 float	0.0	1.00	Value in Engineering Units.
10	Low Low Alarm EU	R/W	User	FL	4	Any valid IEEE 754 float	-20.0	1.00	Alarm value for Low Low Alarm and minimum EU Value (parameter #22) if Clipping (parameter #23) is enabled.
11	Low Alarm EU	R/W	User	FL	4	Any valid IEEE 754 float	-10.0	1.00	Alarm value for Low Alarm.
12	High Alarm EU	R/W	User	FL	4	Any valid IEEE 754 float	110.0	1.00	Alarm value for High Alarm.
13	High High Alarm EU	R/W	User	FL	4	Any valid IEEE 754 float	120.0	1.00	Alarm value for High High Alarm and maximum EU Value (parameter #22) if Clipping (parameter #23) is enabled.
14	Rate Alarm EU	R/W	User	FL	4	Any valid IEEE 754 float	5.0	1.00	Alarm value for maximum change of EU Value (parameter #22) between Scan Periods.
15	Alarm Deadband	R/W	User	FL	4	Any valid IEEE 754 float	2.0	1.00	Provides a range (±) that the EU Value (parameter #22) may move between without causing another alarm.
16	Alarming	R/W	User	UINT8	1	0 → 1	0	1.00	If enabled, alarms may be generated and sent to the Alarm Log. Valid values are 0 (Disabled) and 1 (Enabled).
17	SRBX on Clear	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates a SRBX alarm is desired if an alarm condition clears. Valid values are 0 (SRBX on Clear Disabled) and 1 (SRBX on Clear Enabled).
18	SRBX on Set	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates a SRBX alarm is desired if an alarm condition occurs. Valid values are 0 (SRBX on Set Disabled) and 1 (SRBX on Set Enabled).
19	Alarm Code	R/O	System	BIN	1	0x00 → 0xFF	0x00	1.00	
19.0	Low Alarm			Bit 0			0	1.00	If set, the EU Value (parameter #22) is less than or equal to the Low Alarm EU (parameter #25). If clear, the EU Value (parameter #22) is greater than the Low Alarm EU (parameter #25).

Point Type 107, Thermocouple

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
19.1	Low Low Alarm			Bit 1			0	1.00	If set, the EU Value (parameter #22) is less than or equal to the Low Low Alarm EU (parameter #24). If clear, the EU Value (parameter #22) is greater than the Low Low Alarm EU (parameter #24).
19.2	High Alarm			Bit 2			0	1.00	If set, the EU Value (parameter #22) is greater than or equal to the High Alarm EU (parameter #26). If clear, the EU Value (parameter #22) is less than the High Alarm EU (parameter #26).
19.3	High High Alarm			Bit 3			0	1.00	If set, the EU Value (parameter #22) is greater than or equal to the High High Alarm EU (parameter #27). If clear, the EU Value (parameter #22) is less than the High High Alarm EU (parameter #27).
19.4	Rate Alarm			Bit 4			0	1.00	If set, the EU Value (parameter #22) change from last Scan Period to the new Scan Period is greater than or equal to the Rate Alarm EU (parameter #28). If clear, the EU Value (parameter #22) change from last Scan Period to the new Scan Period is less than the Rate Alarm EU (parameter #28).
19.5	Not Used			Bit 5			0		Not Used
19.6	Point Fail Alarm			Bit 6			0	1.00	If set, the TC's hardware is reporting a malfunction. If clear, the TC's hardware is operating properly.
19.7	Scanning Disabled Alarm			Bit 7			0	1.00	If set, the Scanning (parameter #2) has been disabled. If clear, the Scanning (parameter #2) has been disabled.
20	EU Offset	R/W	User	FL	4	Any valid IEEE 754 float	0.0	1.00	Value to be added to EU value (parameter #9).
21	Failsafe Mode	R/W	User	UINT8	1	$0 \rightarrow 1$	0	3.50	Valid values are 0 (Disabled) and 1 (Enabled, the EU Value is set to the Failsafe value in the event of a point fail)
22	Failsafe Mode	R/W	User	FL	4	Any valid IEEE 754 float	0	3.50	The TC's EU Value is set to the Failsafe Value if Failsafe Mode is Enabled and the TC is in Point Fail.

3.4.19 Point Type 108: Multi-Variable Sensor

Description: Point type 108 provides the parameters for interfacing with a multi-variable sensor (MVS).

Number of Logical Points: 6 logical points per installed module may exist.

Storage Location: Point type 108 is saved to internal configuration memory.

Table 3-20: Point Type 108, Multi-Variable Sensor

Point Type 108, Multi-Variable Sensor

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Sensor Tag ID	R/W	User	AC	10	0x20 → 0x7E for each ASCII character	"MVS Deflt "	1.00	Identification name for specific MVS. Values must be printable ASCII characters.
1	Sensor Address	R/W	User	UINT8	1	0 → 255	1	1.00	Unique address of MVS to allow for multi-drop communications.
2	Poll Mode	R/W	Both	UINT8	1	0 → 2, 4 → 5	0	1.00	Sets the operation for the MVS module: Valid values are: 0 = Off Scan Mode 1 = Normal Poll Mode 2 = Input Freeze Mode 4 = Configuration Poll Mode 5 = Set Tag and Address Mode.
3	Units	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates the engineering units for the process variables. Valid values are 0 (English Units) and 1 (Metric Units).
4	Inches H_2O	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates the reference temperature for calculating pressure properly. Valid values are 0 (Inches H_2O at 60 °F) and 1 (Inches H_2O at 68 °F).
5	Pressure Tap Location	R/W	User	UINT8	1	0 → 1	1	1.00	Indicates if the static pressure is an upstream or downstream reading. Valid values are 0 (Downstream) and 1 (Upstream).
6	Action on Failure	R/W	User	UINT8	1	0 → 1	1	1.00	Indicates whether the DP Reading, SP Reading, TMP Reading, and DP Reverse Reading should retain last value or be set to the Fault Value parameters when a 485 or Sensor Communication Failure occurs. Valid values are 0 (Retain Last Value) and 1 (Use Fault Value parameters).
7	Software Revision MVS Interface	R/O	System	UINT8	1	0 → 255	0	1.00	Current software revision of the MVS Interface software.
8	Sensor Voltage	R/O	System	FL	4	Any valid IEEE 754 float	0.0	1.00	Current voltage of MVS in volts.

Point Type 108, Multi-Variable Sensor

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
9	Sensor Alarming	R/W	User	UINT8	1	0 → 1	0	1.00	If enabled, alarms may be generated and sent to the Alarm Log. Valid values are 0 (Disabled) and 1 (Enabled). **Note**: If Enabled, this parameter populates Parameter #10.
10	Sensor Alarm Code	R/O	System	BIN	1	0x00 → 0xFF	0x00	1.00	Populated if parameter #9 is Enabled.
10.0	Not Used			Bit 0			0		Not Used
10.1	Not Used			Bit 1			0		Not Used
10.2	Not Used			Bit 2			0		Not Used
10.3	Not Used			Bit 3			0		Not Used
10.4	Input Freeze Mode			Bit 4			0	1.00	Indicates the Poll Mode (parameter #2) is in Input Freeze Mode. Valid values are 0 (Not in Input Freeze Mode) and 1 (Input Freeze Mode).
10.5	Sensor Communication Failure			Bit 5			0	1.00	Indicates the MVS is no longer communicating with the MVS Interface. Valid values are 0 (No Failure) and 1 (Sensor Communication Failure).
10.6	485 Communication Failure			Bit 6			0	1.00	Indicates the MVS Interface is no longer communicating with the ROC800-Series. Valid values are 0 (No Failure) and 1 (485 Communication Failure).
10.7	Off Scan Mode			Bit 7			0	1.00	Indicates the Poll Mode (parameter #2) is in Off Scan Mode. Valid values are 0 (Not in Off Scan Mode) and 1 (Off Scan Mode).
11	Sensor Range Status	R/O	System	BIN	1	0x00 → 0xFF	0x00	1.00	
11.0	DP less than DP Zero			Bit 0			0	1.00	Indicates if the DP Reading (parameter #19) is less than the calibrated DP Zero Calibration Point (parameter #13). Valid values are 0 (DP Reading greater than or equal to DP Zero Calibration Point) and 1 (DP Reading less than DP Zero Calibration Point).
11.1	SP less than SP Zero			Bit 1			0	1.00	Indicates if the SP Reading (parameter #35) is less than the calibrated SP Zero Calibration Point (parameter #29). Valid values are 0 (SP Reading greater than or equal to SP Zero Calibration Point) and 1 (SP Reading less than SP Zero Calibration Point).
11.2	TMP less than TMP Zero			Bit 2			0	1.00	Indicates if the TMP Reading (parameter #50) is less than the calibrated TMP Zero Calibration Point (parameter #44). Valid values are 0 (TMP Reading greater than or equal to TMP Zero Calibration Point) and 1 (TMP Reading less than TMP Zero Calibration Point).

Point Type 108, Multi-Variable Sensor

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
11.3	DP greater than DP Span			Bit 3			0	1.00	Indicates if the DP Reading (parameter #19) is greater than the calibrated DP Span Calibration Point (parameter #17). Valid values are 0 (DP Reading less than or equal to DP Span Calibration Point) and 1 (DP Reading greater than DP Span Calibration Point).
11.4	SP greater than SP Span			Bit 4			0	1.00	Indicates if the SP Reading (parameter #35) is greater than the calibrated SP Span Calibration Point (parameter #33). Valid values are 0 (SP Reading less than or equal to SP Span Calibration Point) and 1 (SP Reading greater than SP Span Calibration Point).
11.5	TMP greater than TMP Span			Bit 5			0	1.00	Indicates if the TMP Reading (parameter #50) is greater than the calibrated TMP Span Calibration Point (parameter #48). Valid values are 0 (TMP Reading less than or equal to TMP Span Calibration Point) and 1 (TMP Reading greater than TMP Span Calibration Point).
11.6	Not Used			Bit 6			0		Not Used
11.7	Not Used			Bit 7			0		Not Used
12	Static Pressure Effect	R/W	Both	FL	4	Any valid IEEE 754 float	0.0	1.00	Calibrated Zero Shift for DP in inches of H_2O or kPa.
13	DP Zero Calibration Point	R/O	Both	FL	4	Any valid IEEE 754 float	0.0	1.00	Lowest calibrated DP Reading value in inches of H_2O or kPa.
14	DP Calibration Mid Point #1	R/O	Both	FL	4	Any valid IEEE 754 float	250.0	1.00	Second lowest calibrated DP Reading value in inches of H_2O or kPa.
15	DP Calibration Mid Point #2	R/O	Both	FL	4	Any valid IEEE 754 float	250.0	1.00	Third lowest or highest calibrated DP Reading value in inches of H_2O or kPa.
16	DP Calibration Mid Point #3	R/O	Both	FL	4	Any valid IEEE 754 float	250.0	1.00	Second highest calibrated DP Reading value in inches of H_2O or kPa.
17	DP Span Calibration Point	R/O	Both	FL	4	Any valid IEEE 754 float	250.0	1.00	Highest calibrated DP Reading value in inches of H_2O or kPa.
18	Manual DP	R/O	System	FL	4	Any valid IEEE 754 float	0.0	1.00	Current DP Reading while performing calibration in inches of H_2O or kPa.
19	DP Reading	R/W	Both	FL	4	Any valid IEEE 754 float	0.0	1.00	Current Differential Pressure in inches of H_2O or kPa.
20	DP Reverse Reading	R/O	Both	FL	4	Any valid IEEE 754 float	0.0	1.00	Current Differential Pressure Reversed in inches of H_2O or kPa.

Point Type 108, Multi-Variable Sensor

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
21	DP Fault Value	R/W	User	FL	4	Any valid IEEE 754 float	0.0	1.00	Value that the DP Reading (parameter #19) will be set to if a 485 Communication Failure or Sensor Communication Failure occurs in inches of H_2O or kPa. The DP Reverse Reading (parameter #20) will be set to the same value of the opposite sign.
22	DP Low Alarm EU	R/W	User	FL	4	Any valid IEEE 754 float	0.0	1.00	DP Alarm value for DP Low Alarm in inches of H_2O or kPa.
23	DP High Alarm EU	R/W	User	FL	4	Any valid IEEE 754 float	250.0	1.00	DP Alarm value for DP High Alarm in inches of H_2O or kPa.
24	DP Alarm Deadband	R/W	User	FL	4	Any valid IEEE 754 float	2.0	1.00	Provides a range (±) that the DP Reading (parameter #19) may move between without causing another alarm in inches of H_2O or kPa.
25	DP Alarming	R/W	User	UINT8	1	0 → 1	0	1.00	If enabled, DP alarms may be generated and sent to the Alarm Log. Valid values are 0 (DP Alarming Disabled) and 1 (DP Alarming Enabled).
26	DP SRBX on Clear	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates a SRBX alarm is desired if an alarm condition clears. Valid values are 0 (SRBX on Clear Disabled) and 1 (SRBX on Clear Enabled).
27	DP SRBX on Set	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates a SRBX alarm is desired if an alarm condition occurs. Valid values are 0 (SRBX on Set Disabled) and 1 (SRBX on Set Enabled).
28	DP Alarm Code	R/O	System	BIN	1	0x00 → 0xFF	0x00	1.00	
28.0	Low Alarm			Bit 0			0	1.00	If set, the DP Reading (parameter #19) is less than or equal to the DP Low Alarm EU (parameter #22). If clear, the DP Reading (parameter #19) is greater than the DP Low Alarm EU (parameter #22).
28.1	Not Used			Bit 1			0		Not Used
28.2	High Alarm			Bit 2			0	1.00	If set, the DP Reading (parameter #19) is greater than or equal to the DP High Alarm EU (parameter #23). If clear, the DP Reading (parameter #19) is less than the DP High Alarm EU (parameter #23).
28.3	Not Used			Bit 3			0		Not Used
28.4	Not Used			Bit 4			0		Not Used
28.5	Not Used			Bit 5			0		Not Used
28.6	Point Fail Alarm			Bit 6			0	1.00	Indicates a failure in the hardware or software of the MVS for Differential Pressure. Valid values are 0 (No Failure) and 1 (DP Failure).
28.7	Not Used			Bit 7			0		Not Used

Point Type 108, Multi-Variable Sensor

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
29	SP Zero Calibration Point	R/O	Both	FL	4	Any valid IEEE 754 float	0.0	1.00	Lowest calibrated SP Reading value in PSI or kPa.
30	SP Calibration Mid Point #1	R/O	Both	FL	4	Any valid IEEE 754 float	800.6447	1.00	Second lowest calibrated SP Reading value in PSI or kPa.
31	SP Calibration Mid Point #2	R/O	Both	FL	4	Any valid IEEE 754 float	800.6447	1.00	Third lowest or highest calibrated SP Reading value in PSI or kPa.
32	SP Calibration Mid Point #3	R/O	Both	FL	4	Any valid IEEE 754 float	800.6447	1.00	Second highest calibrated SP Reading value in PSI or kPa.
33	SP Span Calibration Point	R/O	Both	FL	4	Any valid IEEE 754 float	800.6447	1.00	Highest calibrated SP Reading value in PSI or kPa.
34	Manual SP	R/O	System	FL	4	Any valid IEEE 754 float	0.0	1.00	Current SP Reading while performing calibration in PSI or kPa.
35	SP Reading	R/W	Both	FL	4	Any valid IEEE 754 float	0.0	1.00	Current Static Pressure in PSI or kPa.
36	SP Fault Value	R/W	User	FL	4	Any valid IEEE 754 float	0.0	1.00	Value that the SP Reading (parameter #35) will be set to if a 485 Communication Failure or Sensor Communication Failure occurs in PSI or kPa.
37	SP Low Alarm EU	R/W	User	FL	4	Any valid IEEE 754 float	0.0	1.00	SP Alarm value for SP Low Alarm in PSI or kPa.
38	SP High Alarm EU	R/W	User	FL	4	Any valid IEEE 754 float	800.6447	1.00	SP Alarm value for SP High Alarm in PSI or kPa.
39	SP Alarm Deadband	R/W	User	FL	4	Any valid IEEE 754 float	2.0	1.00	Provides a range (±) that the SP Reading (parameter #35) may move between without causing another alarm in PSI or kPa.
40	SP Alarming	R/W	User	UINT8	1	0 → 1	0	1.00	If enabled, SP alarms may be generated and sent to the Alarm Log. Valid values are 0 (SP Alarming Disabled) and 1 (SP Alarming Enabled).
41	SP SRBX on Clear	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates a SRBX alarm is desired if an alarm condition clears. Valid values are 0 (SRBX on Clear Disabled) and 1 (SRBX on Clear Enabled).
42	SP SRBX on Set	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates a SRBX alarm is desired if an alarm condition occurs. Valid values are 0 (SRBX on Set Disabled) and 1 (SRBX on Set Enabled).
43	SP Alarm Code	R/O	System	BIN	1	0x00 → 0xFF	0x00	1.00	
43.0	Low Alarm			Bit 0			0	1.00	If set, the SP Reading (parameter #35) is less than or equal to the SP Low Alarm EU (parameter #37). If clear, the SP Reading (parameter #35) is greater than the SP Low Alarm EU (parameter #37).
43.1	Not Used			Bit 1			0		Not Used

Point Type 108, Multi-Variable Sensor

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
43.2	High Alarm			Bit 2			0	1.00	If set, the SP Reading (parameter #35) is greater than or equal to the SP High Alarm EU (parameter #38). If clear, the SP Reading (parameter #35) is less than the SP High Alarm EU (parameter #38).
43.3	Not Used			Bit 3			0		Not Used
43.4	Not Used			Bit 4			0		Not Used
43.5	Not Used			Bit 5			0		Not Used
43.6	Point Fail Alarm			Bit 6			0	1.00	Indicates a failure in the hardware or software of the MVS for Static Pressure. Valid values are 0 (No Failure) and 1 (SP Failure).
43.7	Not Used			Bit 7			0		Not Used
44	TMP Zero Calibration Point	R/O	Both	FL	4	Any valid IEEE 754 float	-459.4	1.00	Lowest calibrated TMP Reading value in °F or °C.
45	TMP Calibration Mid Point #1	R/O	Both	FL	4	Any valid IEEE 754 float	800.6	1.00	Second lowest calibrated TMP Reading value in °F or °C.
46	TMP Calibration Mid Point #2	R/O	Both	FL	4	Any valid IEEE 754 float	800.6	1.00	Third lowest (or highest) calibrated TMP Reading value in °F or °C.
47	TMP Calibration Mid Point #3	R/O	Both	FL	4	Any valid IEEE 754 float	800.6	1.00	Second highest calibrated TMP Reading value in °F or °C.
48	TMP Span Calibration Point	R/O	Both	FL	4	Any valid IEEE 754 float	800.6	1.00	Highest calibrated TMP Reading value in °F or °C.
49	Manual TMP	R/O	System	FL	4	Any valid IEEE 754 float	0.0	1.00	Current TMP Reading while performing calibration in °F or °C.
50	TMP Reading	R/W	Both	FL	4	Any valid IEEE 754 float	-459.4	1.00	Current temperature in °F or °C.
51	TMP Fault Value	R/W	User	FL	4	Any valid IEEE 754 float	-459.4	1.00	Value that the TMP Reading (parameter #50) will be set to if a 485 Communication Failure or Sensor Communication Failure occurs in °F or °C.
52	TMP Low Alarm EU	R/W	User	FL	4	Any valid IEEE 754 float	-459.4	1.00	TMP Alarm value for TMP Low Alarm in °F or °C.
53	TMP High Alarm EU	R/W	User	FL	4	Any valid IEEE 754 float	800.6	1.00	TMP Alarm value for TMP High Alarm in °F or °C.
54	TMP Alarm Deadband	R/W	User	FL	4	Any valid IEEE 754 float	2.0	1.00	Provides a range (±) that the TMP Reading (parameter #50) may move between without causing another alarm in °F or °C.
55	TMP Alarming	R/W	User	UINT8	1	$0 \rightarrow 1$	0	1.00	If enabled, TMP alarms may be generated and sent to the Alarm Log. Valid values are 0 (TMP Alarming Disabled) and 1 (TMP Alarming Enabled).

Point Type 108, Multi-Variable Sensor

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
56	TMP SRBX on Clear	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates a SRBX alarm is desired if an alarm condition clears. Valid values are 0 (SRBX on Clear Disabled) and 1 (SRBX on Clear Enabled).
57	TMP SRBX on Set	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates a SRBX alarm is desired if an alarm condition occurs. Valid values are 0 (SRBX on Set Disabled) and 1 (SRBX on Set Enabled).
58	TMP Alarm Code	R/O	System	BIN	1	0x00 → 0xFF	0x00	1.00	
58.0	Low Alarm			Bit 0			0	1.00	If set, the TMP Reading (parameter #50) is less than or equal to the TMP Low Alarm EU (parameter #52). If clear, the TMP Reading (parameter #50) is greater than the TMP Low Alarm EU (parameter #52).
58.1	Not Used			Bit 1			0		Not Used
58.2	High Alarm			Bit 2			0	1.00	If set, the TMP Reading (parameter #50) is greater than or equal to the TMP High Alarm EU (parameter #53). If clear, the TMP Reading (parameter #50) is less than the TMP High Alarm EU (parameter #53).
58.3	Not Used			Bit 3			0		Not Used
58.4	Not Used			Bit 4			0		Not Used
58.5	Not Used			Bit 5			0		Not Used
58.6	Point Fail Alarm			Bit 6			0	1.00	Indicates a failure in the hardware or software of the MVS for Temperature. Valid values are 0 (No Failure) and 1 (TMP Failure).
58.7	Not Used			Bit 7			0		Not Used
59	Calibrate Command	R/W	Both	UINT8	1	0 → 6	0	1.00	Tells the MVS Interface the process variable being calibrated. Valid values are: 0 = No Action 1 = Calibrate DP 2 = Calibrate SP 3 = Calibrate TMP 6 = Save MVS Calibration 7 = Set Defaults.
60	Calibrate Type	R/W	Both	UINT8	1	0 → 7	0	1.00	Indicates the MVS Interface point being calibrated. Valid values are: 0 = None 1 = Set Zero 2 = Set Span 3 = Set Mid Point #1 4 = Set Mid Point #2 5 = Set Mid Point #3 6 = Sensor Setup 7 = Sensor Restore.

Point Type 108, Multi-Variable Sensor

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
61	Calibrate Set Value	R/W	User	FL	4	Any valid IEEE 754 float	0.0	1.00	Desired value for a calibration point.
62	Sensor SRBX on Clear	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates a SRBX alarm is desired if an alarm condition clears. Valid values are 0 (SRBX on Clear Disabled) and 1 (SRBX on Clear Enabled). **Note**: For 485 and Sensor Communication Failures only.
63	Sensor SRBX on Set	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates a SRBX alarm is desired if an alarm condition occurs. Valid values are 0 (SRBX on Set Disabled) and 1 (SRBX on Set Enabled). **Note**: For 485 and Sensor Communication Failures only.
64	SP Zero Shift	R/W	Both	FL	4	Any valid IEEE 754 float	0.0	2.02	Calibrated Zero Shift for SP in inches of H_2O or kPa.
65	MVS Type	R/O	User	FL	4	Any valid IEEE 754 float	0	2.02	Indicates the module/sensor type. Valid values are: 0 = Standard MVS 1 = Smart MVS 2 = 3095
66	Temperature Bias	R/W	User	FL	4	Any valid IEEE 754 float	0	3.20	Indicates the calibrated temperature bias for the MVS temperature reading. Units based on units parameter (#3)
67	MVS Config Change Count	R/O	System	UINT16	2	0 → 65535	0	3.60	Increments when the configuration of a 4088 is changed. The value is stored on the 4088. This parameter is not valid for a 205.
68	MVS Sensor Type	R/O	System	UINT8	1	0→4	0	3.60	Indicates the module/sensor type. Valid values are: 0 = Undefined 1 = 4088 A 2 = 4088 B 3 = 3095 4 = MVS205

3.4.20 Point Type 109: System Analog Inputs

Description: Point type 109 provides the parameters for setting up and reading analog inputs.

Number of Logical Points: 5 logical points for System Analog Inputs may exist.

Storage Location: Point type 109 is saved to internal configuration memory.

Table 3-21: Point Type 109, System Analog Inputs

Point Type 109, System Analog Inputs

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Point Tag ID	R/W	User	AC	10	0x20 → 0x7E for each ASCII character	Logic 0: “Battery ” Logic 1: “Charge In “ Logic 2: “Module “ Logic 3: “AI Default” Logic 4: “OnBoardTmp”	1.00	Identification name for specific System AI. Values must be printable ASCII characters. Note: Point Tag ID on logical 1 is “Voltage In” when a PM-30 power module is installed (Version 3.60).
1	Units Tag	R/W	User	AC	10	0x20 → 0x7E for each ASCII character	Logic 0: “Volts “ Logic 1: “Volts “ Logic 2: “Volts “ Logic 3: “ “ Logic 4: “Degrees C “	1.00	Describes the units used by the System AI. Values must be printable ASCII characters.
2	Scanning	R/W	User	UINT8	1	0 → 1	1	1.00	If disabled, field inputs are ignored and no changes will occur unless manually entered. Valid values are 0 (Disabled) and 1 (Enabled).
3	Scan Period	R/W	User	FL	4	1.0 → 43,200.0	1.0	1.00	Number of seconds between updates of the System AI.
4	Actual Scan Time	R/O	System	FL	4	1.0 → 43,200.0	1.0	1.00	Actual number of seconds between updates of the System AI.
5	Filter	R/W	User	UINT8	1	0 → 99	0	1.00	Percentage of last raw A/D reading to be weighted with the new raw A/D reading.

Point Type 109, System Analog Inputs

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
6	Averaging	R/W	User	UINT8	1	0 → 1	0	1.00	If enabled, the filtered raw A/D value is averaged over the Scan Period. If disabled, the current filtered raw A/D value is used when the Scan Period is reached. Valid values are 0 (Disabled) and 1 (Enabled).
7	Raw A/D Input	R/W	Both	UINT16	2	0 → 65,535	0	1.00	Raw A/D reading used to calculate the EU Value (parameter #21).
8	Zero Raw	R/O	System	UINT16	2	0 → 65,535	Logic 0:0 Logic 1:0 Logic 2:0 Logic 3:819 Logic 4:10	1.00	Lowest raw A/D input.
9	Span Raw	R/O	System	UINT16	2	0 → 65,535	Logic 0:255 Logic 1:255 Logic 2:255 Logic 3: 4095 Logic 4:179	1.00	Highest raw A/D input.
10	Zero EU	R/O	User	FL	4	Any valid IEEE 754 float	Logic 0:0.0 Logic 1:0.0 Logic 2:0.0 Logic 3:0.0 Logic 4 : -40.0	1.00	Lowest EU value.
11	Span EU	R/O	User	FL	4	Any valid IEEE 754 float	Logic 0: 16.225 Logic 1: 19.95 Logic 2: 16.225 Logic 3: 100.0 Logic 4: 125.0	1.00	Highest EU value.
12	EU Value	R/W	Both	FL	4	Any valid IEEE 754 float	Logic 0:12.0 Logic 1:13.5 Logic 2:12.0 Logic 3:0.0 Logic 4:20.0	1.00	Value in Engineering Units.

Point Type 109, System Analog Inputs

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
13	Clipping	R/W	User	UINT8	1	0 → 1	0	1.00	If enabled, then the EU Value (parameter #12) cannot be less than the Low Low Alarm EU (parameter #14) or greater than the High High Alarm EU (parameter #17). If disabled, no limiting of the EU Value (parameter #12) takes place. Valid values are 0 (Disabled) and 1 (Enabled).
14	Low Low Alarm EU	R/W	User	FL	4	Any valid IEEE 754 float EXCEPT +B, then it is >=9.00Volts	Logic 0:10.6 Logic 1:10.0 Logic 2:10.6 Logic 3: -20.0 Logic 4: -25.0	1.00	Alarm value for Low Low Alarm and minimum EU Value (parameter #12) if Clipping (parameter #13) is enabled.
15	Low Alarm EU	R/W	User	FL	4	Any valid IEEE 754 float	Logic 0:11.0 Logic 1:11.0 Logic 2:11.0 Logic 3: -10.0 Logic 4: -15.0	1.00	Alarm value for Low Alarm.
16	High Alarm EU	R/W	User	FL	4	Any valid IEEE 754 float	Logic 0:14.5 Logic 1:17.0 Logic 2:14.5 Logic 3: 110.0 Logic 4: 100.0	1.00	Alarm value for High Alarm.
17	High High Alarm EU	R/W	User	FL	4	Any valid IEEE 754 float	Logic 0:15.0 Logic 1:18.5 Logic 2:15.0 Logic 3: 120.0 Logic 4: 110.0	1.00	Alarm value for High High Alarm and maximum EU Value (parameter #12) if Clipping (parameter #13) is enabled.
18	Rate Alarm EU	R/W	User	FL	4	Any valid IEEE 754 float	Logic 0:3.0 Logic 1:3.0 Logic 2:3.0 Logic 3:5.0 Logic 4:8.0	1.00	Alarm value for maximum change of EU Value (parameter #12) between Scan Periods.
19	Alarm Deadband	R/W	User	FL	4	Any valid IEEE 754 float	Logic 0:0.5 Logic 1:1.0 Logic 2:0.5 Logic 3:2.0 Logic 4:5.0	1.00	Provides a range (±) that the EU Value (parameter #12) may move between without causing another alarm.

Point Type 109, System Analog Inputs

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
20	Alarming	R/W	User	UINT8	1	0 → 1	0	1.00	If enabled, alarms may be generated and sent to the Alarm Log. Valid values are 0 (Disabled) and 1 (Enabled).
21	SRBX on Clear	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates a SRBX alarm is desired if an alarm condition clears. Valid values are 0 (SRBX on Clear Disabled) and 1 (SRBX on Clear Enabled).
22	SRBX on Set	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates a SRBX alarm is desired if an alarm condition occurs. Valid values are 0 (SRBX on Set Disabled) and 1 (SRBX on Set Enabled).
23	Alarm Code	R/O	System	BIN	1	0x00 → 0xFF	0x00	1.00	
23.0	Low Alarm			Bit 0			0	1.00	If set, the EU Value (parameter #12) is less than or equal to the Low Alarm EU (parameter #15). If clear, the EU Value (parameter #12) is greater than the Low Alarm EU (parameter #15).
23.1	Low Low Alarm			Bit 1			0	1.00	If set, the EU Value (parameter #12) is less than or equal to the Low Low Alarm EU (parameter #14). If clear, the EU Value (parameter #12) is greater than the Low Low Alarm EU (parameter #14).
23.2	High Alarm			Bit 2			0	1.00	If set, the EU Value (parameter #12) is greater than or equal to the High Alarm EU (parameter #16). If clear, the EU Value (parameter #12) is less than the High Alarm EU (parameter #16).
23.3	High High Alarm			Bit 3			0	1.00	If set, the EU Value (parameter #12) is greater than or equal to the High High Alarm EU (parameter #17). If clear, the EU Value (parameter #12) is less than the High High Alarm EU (parameter #17).
23.4	Rate Alarm			Bit 4			0	1.00	If set, the EU Value (parameter #12) change from last Scan Period to the new Scan Period is greater than or equal to the Rate Alarm EU (parameter #18). If clear, the EU Value (parameter #12) change from last Scan Period to the new Scan Period is less than the Rate Alarm EU (parameter #18).
23.5	Not Used			Bit 5			0		Not Used
23.6	Point Fail Alarm			Bit 6			0	1.00	If set, the System AI's hardware is reporting a malfunction. If clear, the System AI's hardware is operating properly.
23.7	Scanning Disabled Alarm			Bit 7			0	1.00	If set, the Scanning (parameter #2) has been disabled. If clear, the Scanning (parameter #2) has been enabled.

Point Type 109, System Analog Inputs

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
24	Units	R/W	User	UINT8	1	Logic 0 → 3: 0 → 1 Logic 4: 0 → 3	Logic 0 → 3: 0 Logic 4: 1	1.10	Indicates the EUP value units: Valid values are For Logic 0 → 3, 0 (Volts) and 1 (milliVolts) For Logic 4: 0 = °F 1 = °C 2 = °K 3 = °R.

3.4.21 Point Type 110: PID Control Parameters

Description: Point type 110 provides the control parameters for configuring PID loops.

Number of Logical Points: 16 logical points for PID Control Parameters may exist. The number depends upon the number of active PIDs.

Storage Location: Point type 110 is saved to internal configuration memory.

Table 3-22: Point Type 110. PID Control Parameters

Point Type 110, PID Control Parameters

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Point Tag ID	R/W	User	AC	10	0x20 → 0x7E for each ASCII character	"PID X" where X is the PID number	1.00	Identification name for specific PID. Values must be printable ASCII characters.
1	PID Mode	R/W	User	UINT8	1	0 → 3	0	1.00	Indicates whether the PID mode. Valid values are: 0 = PID Disabled 1 = Manual 2 = Automatic 3 = Remote Setpoint
2	Loop Period	R/W	User	FL	4	0.05 → Any positive valid IEEE 754 float	1.5	1.00	Desired frequency of execution of the PID algorithm in seconds.
3	Actual Loop Period	R/O	System	FL	4	0.05 → Any positive valid IEEE 754 float	0	1.00	Actual frequency of execution of the PID algorithm in seconds.
4	Action on Process Variable Failure (Reserved)	R/O	User	UINT8	1	0 → 1	0	1.00	Indicates what action to take if the process variable has questionable data. Valid values are 0 (No action) and 1 (Switch mode to manual).
5	Discrete Output Type	R/W	User	UINT8	1	0 → 2	0	1.00	Indicates what type of outputs is written to the control device. Valid values are: 0 = Analog 1 = Discrete (Open/Close outputs to a motor operated valve) 2 = Digital Valve **Note**: Option 2 is available only in firmward version 3.02 or greater.
6	Reset Mode	R/W	User	UINT8	1	0 → 1	1	1.00	Indicates whether the PID is disabled on a restart of any kind or retain its last mode. Valid values are 0 (Retain last mode) and 1 (Disable after Reset).

Point Type 110, PID Control Parameters

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
7	Manual Tracking	R/W	User	UINT8	1	0 → 1	0	1.00	If in Manual Mode, the Primary Setpoint is set equal to the current Primary Process Variable. If disabled, nothing occurs. Valid values are 0 (Disable Manual Tracking) and 1 (Enable Manual Tracking).
8	Primary Input Point	R/W	User	TLP	3	TLP 0,0,0 and TLP 60→77, 0→255, 0→255 (must be float) and TLP 103,5→148,21 and TLP 105,5→148,10 or 13 and TLP 96,0→5,2→11and TLP 98,0→31,1→20 and TLP 108,0→11,19→20 or 35 or 50 and TLP 106,5→148,22 and TLP 107,5→148,9 and TLP 112,0→11,53→54 and TLP 113,0→11,26 or 28 or 30 and 114,0→11,0→3 and TLP 115,0→11,14 or 16 or 18 and TLP 116,0→11,0→3	0,0,0	1.00	The parameter assigned to read the Primary Process Variable (parameter #9) from.
9	Primary Process Variable	R/W	Both	FL	4	Any valid IEEE 754 float	0.0	1.00	Input value for the Primary Loop.
10	Primary Setpoint Point	R/W	User	TLP	3	TLP 0,0,0 and TLP 60→77, 0→255, 0→255 (must be float) and TLP 103,5→148,21 and TLP 105,5→148,10 or 13 and TLP 96,0→5,2→11and TLP 98,0→31,1→20 and TLP 108,0→11,19→20 or 35 or 50 and TLP 106,5→148,22 and TLP 107,5→148,14 and TLP 112,0→11,53→54 and TLP 114,0→11,0→3 and TLP 116,0→11,0→3	0,0,0	1.00	The parameter assigned to read the primary setpoint (parameter #11) from.
11	Primary Setpoint	R/W	Both	FL	4	Any valid IEEE 754 float	0.0	1.00	Desired value of the Primary Process Variable (parameter #9).
12	Primary Setpoint Low Limit	R/W	User	FL	4	Any valid IEEE 754 float	0.0	1.00	Lowest allowed value for the primary setpoint (parameter #11).

Point Type 110, PID Control Parameters

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
13	Primary Setpoint High Limit	R/W	User	FL	4	Any valid IEEE 754 float	1000000.0	1.00	Highest allowed value for the primary setpoint (parameter #11).
14	Primary Setpoint Maximum Change Rate	R/W	User	FL	4	Any positive valid IEEE 754 float	0.0	1.00	Maximum rate of change allowed for the actual setpoint used by the Primary Loop in engineering units per minute (EU/minute). A value of 0 disables this option.
15	Primary Proportional Gain	R/W	User	FL	4	Any positive valid IEEE 754 float	0.0	1.00	Proportional gain (K_P) of the Primary Loop.
16	Primary Integral Gain	R/W	User	FL	4	Any positive valid IEEE 754 float	0.5	1.00	Integral gain (K_I) of the Primary Loop.
17	Primary Derivative Gain	R/W	User	FL	4	Any positive valid IEEE 754 float	0.0	1.00	Derivative gain (K_D) of the Primary Loop.
18	Primary Scale Factor	R/W	User	FL	4	Any valid IEEE 754 float	-0.004	1.00	Scale factor (F_S) of the Primary Loop.
19	Primary Integral Deadband	R/W	User	FL	4	Any valid IEEE 754 float	0.0	1.00	Range (±) that the error at time t (e_t) must be greater than or equal to for the Primary Loop to include the K_I term for the change in output calculation.
20	Primary Change in Output	R/O	System	FL	4	Any valid IEEE 754 float	0.0	1.00	Calculated change in output from the Primary Loop.
21	Override Loop Mode	R/W	User	UINT8	1	0 → 2	0	1.00	Indicates which loops have been enabled for control. Valid values are: 0 = Primary Loop Only 1 = Primary and Override Loop 2 = Override Loop Only.
22	Loop Switch Select	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates when to switch to the Override Loop based upon whether the Primary change in output is less than or greater than the Override change in output. Valid values are 0 (Low Override) and 1 (High Override).

Point Type 110, PID Control Parameters

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
23	Override Input Point	R/W	User	TLP	3	TLP 0,0,0 and TLP 60→77, 0→255, 0→255 (must be float) and TLP 103,5→148,21 and TLP 105,5→148,10 or 13 and TLP 96,0→5,2→11and TLP 98,0→31,1→20 and TLP 108,0→11,19→20 or 35 or 50 and TLP 106,5→148,22 and TLP 107,5→148,9 and TLP 112,0→11,53→54 and TLP 113,0→11,26 or 28 or 30 and 114,0→11,0→3 and TLP 115,0→11,14 or 16 or 18 and TLP 116,0→11,0→3	0,0,0	1.00	The parameter assigned to read the Override Process Variable (parameter #24) from.
24	Override Process Variable	R/W	Both	FL	4	Any valid IEEE 754 float	0.0	1.00	Input value for the Override Loop.
25	Override Setpoint Point	R/W	User	TLP	3	TLP 0,0,0 and TLP 60→77, 0→255, 0→255 (must be float) and TLP 103,5→148,21 and TLP 105,5→148,10 or 13 and TLP 96,0→5,2→11and TLP 98,0→31,1→20 and TLP 108,0→11,19→20 or 35 or 50 and TLP 106,5→148,22 and TLP 107,5→148,14 and TLP 112,0→11,53→54 and TLP 114,0→11,0→3 and TLP 116,0→11,0→3	0,0,0	1.00	The parameter assigned to read the override setpoint (parameter #26) from.
26	Override Setpoint	R/W	User	FL	4	Any valid IEEE 754 float	0.0	1.00	Desired value of the Override Process Variable (parameter #24).
27	Override Setpoint Low Limit	R/W	User	FL	4	Any valid IEEE 754 float	0.0	1.00	Lowest allowed value for the override setpoint (parameter #26).
28	Override Setpoint High Limit	R/W	User	FL	4	Any valid IEEE 754 float	1000000.0	1.00	Highest allowed value for the override setpoint (parameter #26).

Point Type 110, PID Control Parameters

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
29	Override Setpoint Maximum Change Rate	R/W	User	FL	4	Any positive valid IEEE 754 float	0.0	1.00	Maximum rate of change allowed for the actual setpoint used by the Override Loop in engineering units per minute (EU/minute).
30	Override Proportional Gain	R/W	User	FL	4	Any positive valid IEEE 754 float	0.0	1.00	Proportional gain (K_P) of the Override Loop.
31	Override Integral Gain	R/W	User	FL	4	Any positive valid IEEE 754 float	0.5	1.00	Integral gain (K_I) of the Override Loop.
32	Override Derivative Gain	R/W	User	FL	4	Any positive valid IEEE 754 float	0.0	1.00	Derivative gain (K_D) of the Override Loop.
33	Override Scale Factor	R/W	User	FL	4	Any valid IEEE 754 float	-0.004	1.00	Scale factor (F_S) of the Override Loop.
34	Override Integral Deadband	R/W	User	FL	4	Any valid IEEE 754 float	0.0	1.00	Range (±) that the error at time t (e_t) must be greater than or equal to for the Override Loop to include the K_I term for the change in output calculation.
35	Override Change in Output	R/O	System	FL	4	Any valid IEEE 754 float	0.0	1.00	Calculated change in output from the Override Loop.
36	Switch Status	R/O	System	UINT8	1	0 → 2	0	1.00	Indicates what loop is currently being used to control the process variable. Valid values are: 0 = Neither 1 = Primary Loop 2 = Override Loop.
37	Current Output of PID	R/W	Both	FL	4	Any valid IEEE 754 float	0.0	1.00	Value that is sent to current output.
38	Output of PID point	R/W	User	TLP	3	TLP 0,0,0 and {if DO Control Off TLP 104,5→148,12 and TLP 96,0→5,2→11 and TLP 98,0→31,1→20 and TLP 60→77, 0→255, 0→255 (must be float)}	0,0,0	1.00	The parameter assigned to write the analog control output of the PID loop to. **Note**: Used **only** if DO Control (parameter #5) is Off.
39	Discrete Open PID output	R/W	User	TLP	3	TLP 0,0,0 and {if DO Control On TLP 102,5→148,20 and TLP 96,0→5,2→11 and TLP 98,0→31,1→20 and TLP 60→77, 0→255, 0→255 (must be float) }	0,0,0	1.00	The parameter assigned to write the increase/open output to. **Note**: Used **only** if DO Control (parameter #5) is On.

Point Type 110, PID Control Parameters

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
40	Discrete Close PID output	R/W	User	TLP	3	TLP 0,0,0 and {if DO Control On TLP 102,5→148,20 and TLP 96,0→5,2→11 and TLP 98,0→31,1→20 and TLP 60→77, 0→255, 0→255 (must be float) }	0,0,0	1.00	The parameter assigned to write the decrease/closed output to. **Note**: Used **only** if DO Control (parameter #5) is On.
41	Output Low Limit	R/W	User	FL	4	Any valid IEEE 754 float	-4.0	1.00	Minimum allowable PID output. If the change in output calculated by the loop would cause the current value of the output to go below this value, the output is set to this value.
42	Output High Limit	R/W	User	FL	4	Any valid IEEE 754 float	4.0	1.00	Maximum allowable PID output. If the change in output calculated by the loop would cause the current value of the output to go above this value, the output is set to this value.
43	Output Low Limit Status	R/O	System	UINT8	1	0 → 1	0	1.00	Indication that the output of the PID loop has been clipped by the low output limit. Vaid values are 0 (Not limited) and 1 (Low output limited).
44	Output High Limit Status	R/O	System	UINT8	1	0 → 1	0	1.00	Indication that the output of the PID loop has been clipped by the high output limit. Valid values are 0 (Not limited) and 1 (High output limited).
45	Primary Process Variable Status	R/O	System	UINT8	1	0 → 2	0	1.00	Indication of the status of the primary process variable. Valid values are: 0 = No error 1 = Questionable data 2 = Invalid TLP.
46	Primary Setpoint Low Limit Status	R/O	System	UINT8	1	0 → 1	0	1.00	Indication that the primary setpoint has been clipped by the low setpoint limit. Valid values are 0 (Not limited) and 1 (Low setpoint limited).
47	Primary Setpoint High Limit Status	R/O	System	UINT8	1	0 → 1	0	1.00	Indication that the primary setpoint has been clipped by the high setpoint limit. Valid values are 0 (Not limited) and 1 (High setpoint limited).
48	Primary Setpoint Rate Limited	R/O	System	UINT8	1	0 → 1	0	1.00	Indication that the primary setpoint currently being used by the PID calculation is currently being limited by the maximum setpoint change rate (parameter #14).
49	Override Process Variable Status	R/O	System	UINT8	1	0 → 2	0	1.00	Indication of the status of the override process variable. Valid values are: 0 = No error 1 = Questionable data 2 = Invalid TLP.

Point Type 110, PID Control Parameters

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
50	Override Setpoint Low Limit Status	R/O	System	UINT8	1	$0 \rightarrow 1$	0	1.00	Indication that the override setpoint has been clipped by the low setpoint limit. Valid values are 0 (Not limited) and 1 (Low setpoint limited).
51	Override Setpoint High Limit Status	R/O	System	UINT8	1	$0 \rightarrow 1$	0	1.00	Indication that the override setpoint has been clipped by the high setpoint limit. Valid values are 0 (Not limited) and 1 (High setpoint limited).
52	Override Setpoint Rate Limited	R/O	System	UINT8	1	$0 \rightarrow 1$	0	1.00	Indication that the override setpoint currently being used by the PID calculation is currently being limited by the maximum setpoint change rate (parameter #29).
53	Override Threshold Value	R/W	User	FL	4	Any positive valid IEEE 754 float	0.0	2.02	The override function takes control **only** if the override process variable is within the threshold value of the override setpoint.
54	Action Wait Time	R/W	User	FL	4	Any positive valid IEEE 754 float	1.0	3.01	When taking an action, this amount of time, in seconds, is added to make sure the process returns to a steady state before a new action is taken. **Note**: Used **only** if Brooks Control (parameter #5) is selected.
55	Upstream Output Point	R/W	User	TLP	3	TLP 0,0,0 TLP 140, X, 37 TLP 102, X, 20	0,0,0	3.01	The parameter assigned to the upstream output. Only valid outputs are AC I/O, EU TLP, and DO EU TLP. **Note**: Used **only** if Brooks Control (parameter #5) is selected.
56	Downstream Output Point	R/W	User	TLP	3	TLP 0,0,0 TLP 140, X, 37 TLP 102, X, 20	0,0,0	3.01	The parameter assigned to write the downstream output to. Only valid outputs are AC I/O EU TLP and DO EU TLP. **Note**: Used **only** if Brooks Control (parameter #5) is selected.
57	Valve Dead Time	R/W	User	FL	4	Any positive valid IEEE 754 float	0.0	3.01	The amount of time, in seconds, added to every TDO EU value passed to the AC I/O to account for extra time to break valve seal. **Note**: Used **only** if Brooks Control (parameter #5) is selected.

3.4.22 Point Type 111: Sampler/Odorizer Parameters

Description: Point type 111 provides the parameters for configurating a sampler or odorizer for a meter run or station.

Number of Logical Points: 10 logical points for sampler/odorizer parameters may exist.

Storage Location: Point type 111 is saved to internal configuration memory.

Table 3-23: Point Type 111. Sampler/Odorizer Parameters

Point Type 111, Sampler/Odorizer Parameters

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Mode	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates whether a sampler or odorizer is being used. Valid values are 0 (Disabled) and 1 (Enabled).
1	Input Rate TLP	R/W	User	TLP	3	TLP 0,0,0 and TLP 60→77, 0→255, 0→255 (must be float) and TLP 112,0→11,53→54 and TLP 114,0→11,0→3 and TLP 116,0→11,0→3 and TLP 98,0→31,1→20 and TLP 96,0→5,2→11 and TLP 103,5→148,21 and TLP 105,5→148,10 or 13	0,0,0	1.00	Rate input being used for sampler or odorizer.
2	Input Rate Value	R/O	User	FL	4	Any valid IEEE 754 float	0.0	1.00	Rate input value.
3	Time Basis for Rate	R/W	User	UINT8	1	0 → 3	3	1.00	States the rate for the input value. Valid values are: 0 = Per Second 1 = Per Minute 2 = Per Hour 3 = Per Day.
4	Unit Accumulation	R/W	User	FL	4	>0.0 → Any positive valid IEEE 754 float	1000.0	1.00	Amount of units allowed past before activating sampler or odorizer.
5	Duration	R/W	User	FL	4	>0.0 → 43,200.0	1.0	1.00	Amount of time, in seconds, for sampler to collect gas or odorizer to inject odor.
6	Output TLP	R/W	User	TLP	3	TLP 0,0,0 and TLP 102,5→148,10	0,0,0	1.00	Indicates what DO is being used to control a sampler or odorizer.

3.4.23 Point Type 112: Station Parameters

Description: Point type 112 provides the parameters for configurating a station of meter runs.

Number of Logical Points: 12 logical points for station parameters may exist. The number depends on the number of active stations.

Storage Location: Point type 112 is saved to internal configuration memory.

Table 3-24: Point Type 112. Station Parameters

Point Type 112, Station Parameters

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Point Tag ID	R/W	User	AC	10	0x20 → 0x7E for each ASCII character	"Station X" where X is the station number	1.00	Identification name for specific station. Values must be printable ASCII characters.
1 (Series 1)	Calculation Standard	R/W	User	UINT8	1	0 → 2	0	1.00	Indicates what calculation standard is used to calculate the station's meter runs. Valid values are: 0 = AGA3/AGA7 (Gas) 1 = ISO5167/ISO9951(Gas) 2 = ISO5167/API Chapter 12 (Liquid).
1 (Series 2)	Calculation Standard	R/W	User	UINT8	1	0 → 3 0 → 4 (Ver 3.60)	0	1.00	Indicates what calculation standard is used to calculate the station's meter runs. Valid values are: 0 = AGA3/AGA7 (Gas) 1 = ISO5167-98/ISO9951(Gas) 2 = ISO5167-98/API Chapter 12 (Liquid) 3 = ISO5167-2003/ISO9951(Gas) 4 = AGA3/AGA7 2012 (Gas) (Ver 3.60)
2	Edition of Calculations	R/O	System	UINT8	1	0 → 1 (Ver 3.60)	0	1.00	Indicates what edition of the meter run calculations the program uses. Valid values are: 0 = 1992 Edition 1 = 2012 Edition (Ver. 3.60) **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992).[1]

Point Type 112, Station Parameters

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
3	Compressibility Calculation	R/W	User	UINT8	1	0 → 3	0	1.00	Indicates what method to use to calculate the compressibility of natural gas and other related hydrocarbons. Value values are: 0 = AGA Report #8 Detail Method 1 = AGA Report #8 Gross Method #1, 2 = AGA Report #8 Gross Method #2 3 = User Method (compressibility and density values will be R/W).
4	Units	R/W	User	UINT8	1	0 → 2	0	1.00	Indicates the engineering units used for the process variables, inputs, and calculations. Valid values are: 0 = English Units 1 = Metric Units with kPa 2 = Metric Units with DP in mbar and pressure in bar.
5	Alarming	R/W	User	UINT8	1	0 → 2	0	1.00	If enabled, alarms may be generated and sent to the Alarm Log. Valid values are: 0 = Disabled, 1 = Alarm on Corrected Volume / Day, 2 = Alarm on Mass / Day. Option 2 was added in firmware version 1.52.
6	SRBX on Clear	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates a SRBX alarm is desired if an alarm condition clears. Valid values are 0 (SRBX on Clear Disabled) and 1 (SRBX on Clear Enabled).
7	SRBX on Set	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates a SRBX alarm is desired if an alarm condition occurs. Valid values are 0 (SRBX on Set Disabled) and 1 (SRBX on Set Enabled).
8	Alarm Code	R/O	System	BIN	1	0x00 → 0xFF	0x00	1.00	
8.0	Low Alarm			Bit 0			0		This alarm is set if the Flow Rate per Day (parameter #53) is less than or equal to the Low Alarm Flow (parameter #9). This alarm is cleared if the Flow Rate per Day (parameter #53) is greater than the Low Alarm Flow (parameter #9) plus the alarm deadband (parameter #11).
8.1	Not Used			Bit 1			0		Not Used
8.2	High Alarm			Bit 2			0	1.00	This alarm is set if the Flow Rate per Day (parameter #53) is greater than or equal to the High Alarm Flow (parameter #10). This alarm clears if the Flow Rate per Day (parameter #53) is less than the High Alarm Flow (parameter #10) minus the alarm deadband (parameter #11).

Point Type 112, Station Parameters

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
8.3	Not Used			Bit 3			0		Not Used
8.4	Not Used			Bit 4			0		Not Used
8.5	Zb Calc Alarm			Bit 5			0	1.00	This alarm is set if the base temperature, base pressure, and composition values do not allow a valid base compressibility calculation. If condition occurs, the value of Zb is set to 1.0.
8.6	No Flow Alarm			Bit 6			0	1.00	If set, then no flow conditions are present and the Flow Rate per Day (parameter #53) is zero. If clear, then flowing conditions exist and the Flow Rate per Day (parameter #53) is not zero.
8.7	Not Used			Bit 7			0		Not Used
9	Low Alarm Flow	R/W	User	FL	4	Any valid IEEE 754 float	1,000.0	1.00	Alarm value for Low Alarm in mft^3/day or km^3/day.
10	High Alarm Flow	R/W	User	FL	4	Any valid IEEE 754 float	10,000.0	1.00	Alarm value for High Alarm in mft^3/day or km^3/day.
11	Alarm Deadband	R/W	User	FL	4	Any valid IEEE 754 float	100.0	1.00	The value that the Flow Rate Per Day (parameter #53) must be above the low alarm value (parameter #9) or below the high alarm value (parameter #10) before the associated alarm will clear.
12	History Segment	R/W	User	UINT8	1	0 → 10	0	1.00	The history segment that the station uses for storing history. Valid values are 0 (No history stored) and values 1 → 10 (Use indicated history segment).
13	Base or Contract Pressure	R/W	User	FL	4	> 0.0 → 40,000 PSI (275,790.3 kPa)	14.73	1.00	Used to correct the standard volume flow rate to the base volume flow rate. Entered in PSI (lb/in^2), kPa, or bar. **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992).
14	Base or Contract Temperature	R/W	User	FL	4	>= -200 Deg F (-128.9 Deg C) → 760 Deg F (404.4 Deg C)	60.0	1.00	Used to correct the standard volume flow rate to the base volume flow rate. Entered in °F or °C. **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992).
15	Atmospheric Pressure Option	R/W	User	UINT8	1	0 → 1	1	1.00	Indicates whether to calculate the atmospheric pressure or use the entered value. Valid values are 0 (Calculate Atmospheric Pressure) and 1 (Use Entered Atmospheric Pressure).

Point Type 112, Station Parameters

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
16	Atmospheric Pressure	R/W	Both	FL	4	> 0 → 40,000 PSI (275,790.3 kPa)	14.45	1.00	Amount of pressure in PSI (lb/in^2), kPa, or bar that is added to the static pressure to calculate an absolute pressure from a gauge pressure. **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992).
17	Gravity Option	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates whether to calculate the gravity or use the entered value. Valid values are 0 (Calculate Gravity) and 1 (Use Entered Gravity).
18	Local Gravitational Acceleration	R/W	Both	FL	4	Any valid IEEE 754 float	32.14398	1.00	Local value of gravity at the station in ft/sec^2 or m/sec^2. **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992).
19	Elevation	R/W	User	FL	4	>= -2000 ft (-609.6 m) → 29200 ft (8,900.2 m)	500.0	1.00	Distance from sea level in feet or meters for the station. **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992).
20	Latitude	R/W	User	FL	4	0.0 → 90.0	35.0	1.00	Latitude of station in degrees. **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992).
21	Heating Value Type	R/W	User	UINT8	1	0 → 2	0	1.00	Indicates the type of entered heating value. Valid values are: 0 = Dry 1 = Wet 2 = As Delivered.
22	Heating Value	R/W	Both	FL	4	Any valid IEEE 754 float	1027.189	1.00	Gas property indicating how much energy it takes to heat the gas based upon a per-unit volume basis. For English units, Btu/ft^3 are used and for Metric units, MJ/m^3 are used. **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992).
23	Specific Gravity (Gr)	R/W	Both	FL	4	>0.0 → Any positive valid IEEE 754 float	0.573538	1.00	Real gas relative density. **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992).
24	Gas Quality	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates if the gas quality for the station is live or constant. Valid values are 0 (Constant Gas Quality) and 1 (Live Gas Quality).
25	Normalization Type	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates if the gas composition is adjusted to 100% by modifying the methane or using normalization. Valid values are 0 (Methane Adjust) and 1(Normalize Gas).
26	N2 Nitrogen	R/W	User	FL	4	0.0 → 100.0	1.0	1.00	Percent of gas present.

Point Type 112, Station Parameters

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
27	CO2 Carbon Dioxide	R/W	User	FL	4	0.0 →100.0	0.0	1.00	Percent of gas present.
28	CH4 Methane	R/W	Both	FL	4	0.0 → 100.0	96.0	1.00	Percent of gas present.
29	C2H6 Ethane	R/W	User	FL	4	0.0 → 100.0	3.0	1.00	Percent of gas present.
30	C3H8 Propane	R/W	User	FL	4	0.0 → 100.0	0.0	1.00	Percent of gas present.
31	C4H10 n-Butane	R/W	User	FL	4	0.0 → 100.0	0.0	1.00	Percent of gas present.
32	C4H10 i-Butane	R/W	User	FL	4	0.0 → 100.0	0.0	1.00	Percent of gas present.
33	C5H12 n-Pentane	R/W	User	FL	4	0.0 → 100.0	0.0	1.00	Percent of gas present.
34	C5H12 i-Pentane	R/W	User	FL	4	0.0 → 100.0	0.0	1.00	Percent of gas present.
35	C6H14 n-Hexane	R/W	Both	FL	4	0.0 → 100.0	0.0	1.00	Percent of gas present. When the Heavy Gas Option (parameter #46) is selected, this value will be determined by the ROC based on the Heavy Gas Percent (parameter #47) and the Heavy Gas Percent Hexane (parameter #48).
36	C7H16 n-Heptane	R/W	Both	FL	4	0.0 → 100.0	0.0	1.00	Percent of gas present. When the Heavy Gas Option (parameter #46) is selected, this value will be determined by the ROC based on the Heavy Gas Percent (parameter #47) and the Heavy Gas Percent Heptane (parameter #49).
37	C8H18 n-Octane	R/W	Both	FL	4	0.0 → 100.0	0.0	1.00	Percent of gas present. When the Heavy Gas Option (parameter #46) is selected, this value will be determined by the ROC based on the Heavy Gas Percent (parameter #47) and the Heavy Gas Percent Octane (parameter #50).
38	C9H20 n-Nonane	R/W	Both	FL	4	0.0 → 100.0	0.0	1.00	Percent of gas present. When the Heavy Gas Option (parameter #46) is selected, this value will be determined by the ROC based on the Heavy Gas Percent (parameter #47) and the Heavy Gas Percent Nonane (parameter #51).
39	C10H22 n-Decane	R/W	Both	FL	4	0.0 → 100.0	0.0	1.00	Percent of gas present. When the Heavy Gas Option (parameter #46) is selected, this value will be determined by the ROC based on the Heavy Gas Percent (parameter #47) and the Heavy Gas Percent Decane (parameter #52).
40	H2S Hydrogen Sulfide	R/W	User	FL	4	0.0 → 100.0	0.0	1.00	Percent of gas present.
41	H2O Water	R/W	User	FL	4	0.0 → 100.0	0.0	1.00	Percent of gas present.
42	He Helium	R/W	User	FL	4	0.0 → 100.0	0.0	1.00	Percent of gas present.
43	O2 Oxygen	R/W	User	FL	4	0.0 → 100.0	0.0	1.00	Percent of gas present.

Point Type 112, Station Parameters

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
44	CO Carbon Monoxide	R/W	User	FL	4	0.0 → 100.0	0.0	1.00	Percent of gas present.
45	H2 Hydrogen	R/W	User	FL	4	0.0 → 100.0	0.0	1.00	Percent of gas present.
46	Heavy Gas Option	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates whether to separate Heavy Gas Percent (C6+) (parameter #47) into individual components in the percentages configured in parameters #48-52 and write to gas components hexane and heavier (parameters #35-39). 0 = C6+ not used, 1 = C6+ used.
47	Heavy Gas Percent (C6+)	R/W	User	FL	4	0.0 → 100.0	0.0	1.00	Percent of gas that is a composite of hydrocarbons hexane and heavier. Values for C6+ should be written to this parameter.
48	Heavy Gas % C6H14 n-Hexane	R/W	User	FL	4	0.0 → 100.0	100.0	1.00	Percent of hexane believed to be present in the composite heavy gas.
49	Heavy Gas % C7H16 n-Heptane	R/W	User	FL	4	0.0 → 100.0	0.0	1.00	Percent of heptane believed to be present in the composite heavy gas.
50	Heavy Gas % C8H18 n-Octane	R/W	User	FL	4	0.0 → 100.0	0.0	1.00	Percent of octane believed to be present in the composite heavy gas.
51	Heavy Gas % C9H20 n-Nonane	R/W	User	FL	4	0.0 → 100.0	0.0	1.00	Percent of nonane believed to be present in the composite heavy gas.
52	Heavy Gas % C10H22 n-Decane	R/W	User	FL	4	0.0 → 100.0	0.0	1.00	Percent of decane believed to be present in the composite heavy gas.
53	Flow Rate per Day	R/O	System	FL	4	Any valid IEEE 754 float	0.0	1.00	Volume flow rate at base condition in mft^3/day or km^3/day.
54	Energy Rate per Day	R/O	System	FL	4	Any valid IEEE 754 float	0.0	1.00	Energy rate at base conditions in mmBtu/day or GJ/day.
55	Flow Today	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.00	Total accumulation of flow for the current contract day in mft^3 or km^3.
56	Flow Yesterday	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.00	Total accumulation of flow for the previous contract day in mft^3 or km^3.
57	Energy Today	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.00	Total accumulation of energy for the current contract day in mmBtu or GJ.
58	Energy Yesterday	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.00	Total accumulation of energy for the previous contract day in mmBtu or GJ.
59	Zs	R/W	Both	FL	4	> 0.0→Any positive valid IEEE 754 float	0.9979234	1.00	Represents the compressibility at standard conditions. **Note**: Refer to API Chapter 14.2 (AGA Report No. 8 1992 2nd printing 1994).

Point Type 112, Station Parameters

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
60	Zb	R/W	Both	FL	4	> 0.0→Any positive valid IEEE 754 float	0.9979234	1.00	Represents the compressibility at base conditions. **Note**: Refer to API Chapter 14.2 (AGA Report No. 8 1992 2nd printing 1994).
61	Base Density	R/W	Both	FL	4	> 0.0→Any positive valid IEEE 754 float	0.043892	1.00	Represents the density of a fluid at base conditions in lbm/ft^3 or kg/m^3. **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992).
62	Ar Argon	R/W	User	FL	4	0.0 → 100.0	0.0	1.00	Percent of gas present.
63	Mass Rate Per Day	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.00	Mass flow rate in mlb/day or tonnes/day.
64	Mass Today	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.00	Total accumulation of mass since the last contract hour in mlb or tonnes.
65	Mass Yesterday	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.00	Total accumulation of mass for the previous contract day in mlb or tonnes.
66	Maintenance Lock	R/O	User	UINT8	1	0 → 1	0	1.20	Allows the station's meter runs to be set to maintenance mode. Valid values are 0 (Locked, do not allow the station's meter runs to be set to maintenance mode) and 1 (Unlocked).
67	Base Density Option	R/O	User	UINT8	1	0 → 1	0	1.20	Selection to calculate base density by entering specific gravity (relative density) or molecular weight. Valid values are 0 (Enter Specific Gravity [Relative Density]) and 1 (Enter Molecular Weight).
68	Molecular Weight	R/O	Both	FL	4	>0.0→Any positive valid IEEE 754 float	16.5834	1.20	Molecular weight of the gas

3.4.24 Point Type 113: Orifice Meter Run Configuration

Description: Point type 113 provides the parameters for configurating an orifice meter run.

Number of Logical Points: 12 logical points for orifice meter run configuration may exist. The number depends on licensing and the number of active orifice meter runs.

Storage Location: Point type 113 is saved to internal configuration memory.

Table 3-25: Point Type 113. Orifice Meter Run Configuration

Point Type 113, Orifice Meter Run

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Point Tag ID	R/W	User	AC	10	0x20 → 0x7E for each ASCII character	"Orifice X" where X is the Orifice number	1.00	Identification name for specific Orifice Meter Run. Values must be printable ASCII characters.
1	Point Description	R/W	User	AC	30	0x20 → 0x7E for each ASCII character	" "	1.00	Description for specific meter run. Values must be printable ASCII characters.
2	Static Pressure Units	R/W	User	UINT8	1	0 → 1	1	1.00	Indicates whether the static pressure is in gauge or absolute pressure units. Valid values are 0 (Gauge) and 1 (Absolute).
3	Static Pressure Tap	R/W	User	UINT8	1	0 → 1	1	1.00	Indicates if the static pressure is an upstream or downstream reading. Valid valuesare 0 (Downstream) and 1 (Upstream).
4	Alarming	R/W	User	UINT8	1	0 → 4	0	1.00	If enabled, alarms may be generated and sent to the Alarm Log. Valid values are: 0 = Disabled 1 = Alarm on Corrected Volume / Day 2 = Alarm on Mass / Day 3 = Alarm on Corrected Volume / Hour 4 = Alarm on Mass / Hour. **Note**: Options 2, 3, and 4 were added in firmware version 1.52.
5	SRBX on Clear	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates a SRBX alarm is desired if an alarm condition clears. Valid values are 0 (SRBX on Clear Disabled) and 1(SRBX on Clear Enabled).
6	SRBX on Set	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates a SRBX alarm is desired if an alarm condition occurs. Valid values are 0 (SRBX on Set Disabled) and 1 (SRBX on Set Enabled).
7	Alarm Code	R/O	System	BIN	1	0x00 → 0xFF	0x00	1.00	

Point Type 113, Orifice Meter Run

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
7.0	Low Alarm			Bit 0			0	1.00	This alarm is set if the Flow Rate per Day (point type 114, parameter #0) is less than or equal to the Low Alarm Flow (parameter #8). This alarm clears if the Flow Rate per Day (point type 114, parameter #0) is greater than the Low Alarm Flow (parameter #8) plus the alarm deadband (parameter #10).
7.1	Not Used			Bit 1			0		Not Used
7.2	High Alarm			Bit 2			0	1.00	This alarm is set if the Flow Rate per Day (point type 114, parameter #0) is greater than or equal to the High Alarm Flow (parameter #9). This alarm clears if the Flow Rate per Day (point type 114, parameter #0) is less than the High Alarm Flow (parameter #9) minus the alarm deadband (parameter #10).
7.3	Not Used			Bit 3			0		Not Used
7.4	Temp Fail Alarm			Bit 4			0	2.00	This alarm is set if the meter temperature input value falls below –200 Deg F (–128.89 Deg C) or goes above 400 Deg F (204.44 Deg C). If this condition occurs, the flow rates are set to 0.0.
7.5	Zf1 Calc Alarm			Bit 5			0	2.00	This alarm is set if the meter temperature, pressure, and composition values do not allow a valid flowing compressibility calculation. If condition occurs, the value of Zf1 is set to 1.0.
7.6	No Flow Alarm			Bit 6			0	1.00	If set, then no flow conditions are present and the Flow Rate per Day (point type 114, parameter #0) is zero. If clear, then flowing conditions exist and the Flow Rate per Day (point type 114, parameter #0) is not zero.
7.7	Manual Inputs Alarm			Bit 7			0	1.00	If set, then one of the DP TLP (parameter #25), SP TLP (parameter #27), TMP TLP (parameter #29), or Low DP TLP (parameter #24), if Stacked DP is enabled, is set to Manual (0,0,0). If clear, then the DP TLP (parameter #25), SP TLP (parameter #27), TMP TLP (parameter #29), and Low DP TLP (parameter #24), if Stacked DP is enabled, are not set to Manual.
8	Low Alarm Flow	R/W	User	FL	4	Any valid IEEE 754 float	1,000.0	1.00	Alarm value for Low Alarm in mft^3/day or km^3/day.
9	High Alarm Flow	R/W	User	FL	4	Any valid IEEE 754 float	10,000.0	1.00	Alarm value for High Alarm in mft^3/day or km^3/day.
10	Alarm Deadband	R/W	User	FL	4	Any valid IEEE 754 float	100.0	1.00	The value that the Flow Rate Per Day (Point Type 114, parameter #0) must be above the low alarm value (parameter #8) or below the high alarm value (parameter #9) before the associated alarm will clear.

Point Type 113, Orifice Meter Run

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
11	Station number	R/W	User	UINT8	1	0 → 11	0	1.00	Indicates the station associated with the meter run.
12	Pipe Diameter	R/W	User	FL	4	>0.0 → Any positive valid IEEE 754 float	8.071	1.00	Meter tube internal diameter in inches or millimeters. Must be greater than 0.0. **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992).
13	Pipe Reference Temp	R/W	User	FL	4	Any valid IEEE 754 float	68.0	1.00	Reference temperature of the meter tube inside diameter in °F or °C. **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992).
14	Pipe Material	R/W	User	UINT8	1	0 → 2 0 → 5 (Ver. 3.60)	2	1.00	Indicates the material for the meter tube, used in determining the linear coefficient of thermal expansion for the meter tube. Valid values are: 0 = Type 304 or 316 Stainless Steel 1 = Monel 2 = Carbon Steel. 3 = Stainless Steel 304 (added in Ver 3.60) 4 = Stainless Steel 316 (added in Ver. 3.60) 5 = Monel 400 (added in Ver. 3.60) **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992).
15	Orifice Diameter	R/W	User	FL	4	>0.0 → Any positive valid IEEE 754 float	4.0	1.00	Orifice plate bore diameter in inches or millimeters. Must be greater than 0.0 and less than Pipe Diameter (parameter #12). See note 1.
16	Orifice Reference Temp	R/W	User	FL	4	Any valid IEEE 754 float	68.0	1.00	Reference temperature of the orifice plate bore diameter in °F or °C. **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992).
17	Orifice Material	R/W	User	UINT8	1	0 → 2 0 → 5 (Ver. 3.60)	0	1.00	Indicates the material for the orifice plate, used in determining the linear coefficient of thermal expansion for the orifice plate. See note 1. Valid values are: 0 = Type 304 or 316 Stainless Steel 1 = Monel 2 = Carbon Steel 3 = Stainless Steel 304 (added in Ver. 3.60) 4 = Stainless Steel 316 (added in Ver. 3.60) 5 = Monel 400 (added in Ver. 3.60)
18	Viscosity	R/W	User	FL	4	>0.0→Any positive valid IEEE 754 float	0.00000 69	1.00	Absolute viscosity of flowing fluid in Lbm/Ft-Sec or centipoise. **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992).

Point Type 113, Orifice Meter Run

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
19	Specific Heat Ratio	R/W	User	FL	4	>0.0→Any positive valid IEEE 754 float	1.3	1.00	Isentropic exponent for natural gas. Must be greater than 0.0. **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992).
20	Low DP Cutoff	R/W	User	FL	4	0.0 → Any positive valid IEEE 754 float	0.0	1.00	Indicates the cutoff point for the differential pressure, in inches of H_2O, kPa, or mbar to determine whether the meter run is flowing or not. **Note**: Refer to API Chapter 21.1 (September 1993).
21	Stacked DP	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates a stacked differential pressure for the meter run is being used. Valid values are 0 (Disabled) and 1 (Enabled).
22	High DP Setpoint	R/W	User	FL	4	Any valid IEEE 754 float	0.0	1.00	If a stacked differential pressure is enabled, this is the differential pressure value, in inches of H_2O or kPa, which indicates to start reading from the DP TLP (parameter #25).
23	Low DP Setpoint	R/W	User	FL	4	Any valid IEEE 754 float	0.0	1.00	If a stacked differential pressure is enabled, this is the differential pressure value, in inches of H_2O or kPa, which indicates to start reading from the Low DP TLP (parameter #24).
24	Low DP TLP	R/W	User	TLP	3	TLP 0,0,0 and TLP 60→77, 0→255, 0→255 (must be float) and TLP 103,5→148,21 and TLP 96,0→5,2→11and TLP 98,0→31,1→20 and TLP 108,16→63,19→20	0,0,0	1.00	Indicates what is being used to get the DP (parameter #26) if the stacked differential pressure says to use the lower DP.
25	DP TLP	R/W	User	TLP	3	TLP 0,0,0 and TLP 60→77, 0→255, 0→255 (must be float) and TLP 103,5→148,21 and TLP 96,0→5,2→11and TLP 98,0→31,1→20 and TLP 108, 16→63,19→20	0,0,0	1.00	Indicates what is being used to get the DP (parameter #26).
26	DP (Differential Pressure, hw)	R/W	Both	FL	4	> 0.0 → Any positive valid IEEE 754 float	0.0	1.00	Indicates the differential pressure in inches of H_2O or kPa. **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992) and API Chapter 21.1 (September 1993)

Point Type 113, Orifice Meter Run

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
27	SP TLP	R/W	User	TLP	3	TLP 0,0,0 and TLP 60→77, 0→255, 0→255 (must be float) and TLP 103,5→148,21 and TLP 96,0→5,2→11and TLP 98,0→31,1→20 and TLP 108, 16→63,35	0,0,0	1.00	Indicates what is being used to get the SP (parameter #28).
28	SP (Static Pressure, P_f)	R/W	Both	FL	4	> 0.0 → 40,000 PSI (275,790.3 kPa)	0.0	1.00	Static pressure in PSI (lb/in^2) or kPa. **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992) and API Chapter 21.1 (September 1993)
29	TMP TLP	R/W	User	TLP	3	TLP 0,0,0 and TLP 60→77, 0→255, 0→255 (must be float) and TLP 103,5→148,21 and TLP 96,0→5,2→11and TLP 98,0→31,1→20 and TLP 108, 16→63,50 and TLP 106,5→148,22 and TLP 107,5→148, 9	0,0,0	1.00	Indicates what is being used to get the TMP (parameter #30).
30	TMP (Temperature, T_f)	R/W	Both	FL	4	>= -200 Deg F (-128.9 Deg C) → 760 Deg F (404.4 Deg C)	0.0	1.00	Temperature in °F or °C. **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992) and API Chapter 21.1 (September 1993)
31	Static Pressure Deadweight Calibrator	R/W	User	UINT8	1	0 → 1	0	1.00	Expand the volume flow equation to include the local gravitational correction for the deadweight calibrator on Static Pressure ($F_{pwl(static)}$). Valid values are 0 (Do Not Use) and 1 (Use). **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992), Appendix 3-A.
32	Differential Pressure Deadweight Calibrator	R/W	User	UINT8	1	0 → 1	0	1.00	Expand the volume flow equation to include the local gravitational correction for the deadweight calibrator on Differential Pressure ($F_{pwl(differential}$ Valid values are 0 (Do Not Use) and 1 (Use). **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992), Appendix 3-A.
33	Calibration Weights Gravitational Acceleration	R/W	User	FL	4	>0.0→Any positive valid IEEE 754 float	32.1740	1.00	Used to calculate F_{pwl}. Entered in ft/sec^2 or m/sec^2. **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992), Appendix 3-A.
34	User Correction Factor	R/W	User	FL	4	Any valid IEEE 754 float	1.0	1.00	Variable multiplied through the volume flow equation to allow the user to modify the flow.

Point Type 113, Orifice Meter Run

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
35	Differential Meter Type	R/W	User	UINT8	1	0 → 1	0	1.22	Indicates the type of primary differential metering device. Valid values are 0 (Flange tapped orifice) and 1 (User defined device).
36	Temperature Tap Location	R/W_ CNDL	User	UINT8	1	0 → 1	0	3.10	Indicates the location for the temperature measurement. Valid values are 0 (Downstream) and 1 (Upstream).
37	Joule-Thomson Option	R/W_ CNDL	User	UINT8	1	0 → 1	0	3.10	Calculates an upstream temperature using the Joule-Thomson coefficient. Valid values are 0 (Disabled) and 1 (Enabled).
38	Joule-Thomson Coefficient Option	R/W_ LOG	User	UINT8	1	0 → 1	0	3.10	Indicates whether to calculate or enter the Joule-Thomson coefficient. Valid values are 0 (Calculate) and 1 (Enter).
39	Pressure Loss Option	R/W_ LOG	User	UINT8	1	0 → 1	0	3.10	Indicates whether to calculate or enter the value for the permanent pressure loss across the differential meter. Valid values are 0 (Calculate) and 1 (Enter).
40	Flow Calculations Alarming	R/W	User	UINT8	1	0 → 4	0	3.10	Enables the system to generate flow calculation alarms (parameter #41) and send them to the alarm log. Valid values are 0 (Disable) and 1 (Enable).
41	Flow Calculations Alarm Code	R/O	System	BIN	1	0x00 → 0xFF	0x00	3.10	
41.0	Orifice Diameter Range Alarm			Bit 0			0	3.10	Bit sets if the orifice diameter (parameter #15) is outside the range specified by ISO5167 or AGA 3 based on the calculation standard used for the station (point type #121 parameter #1)
41.1	Pipe Diameter Range Alarm			Bit 1			0	3.10	Bit sets if the pipe diameter (parameter #12) is outside the the range specified by ISO5167 or AGA 3 based on the calculation standard used for the station (point type #121 parameter #1)
41.2	Beta Range Alarm			Bit 2			0	3.10	Bit sets if the beta value (point type #114 parameter #14) is outside the the range specified by ISO5167 or AGA 3 based on the calculation standard used for the station (point type #121 parameter #1)
41.3	Reynolds Number Range Alarm			Bit 3			0	3.10o	Bit sets if the Reynolds number (point type #114 parameter #16) is outside the the range specified by ISO5167 or AGA 3 based on the calculation standard used for the station (point type #121 parameter #1)
41.4	Coefficient of Discharge Non-convergence Alarm			Bit 4			0	3.10	Bit sets if the coefficient of discharge (point type #114 parameter #5) did not converge to a value within tolerance during calcuation.
41.5	Not used			Bit 5			0		Not used

Point Type 113, Orifice Meter Run

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
41.6	Not used			Bit 6			0		Not used
41.7	Not used			Bit 7			0		Not used

3.4.25 Point Type 114: Orifice Meter Run Values

Description: Point type 114 provides the parameters for displaying the orifice meter run calculations.

Number of Logical Points: 12 logical points for Orifice Meter Run Values may exist. The number depends on licensing and the number of active orifice meter runs.

Storage Location: Point type 114 is **not saved** to internal configuration memory.

Table 3-26: Point Type 114. Orifice Meter Run Values

Point Type 114, Orifice Meter Run Values

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Flow Rate per Day	R/O	System	FL	4	Any valid IEEE 754 float	0.0	1.00	Volume flow rate at base condition in mft^3/day or km^3/day.
1	Energy Rate per Day	R/O	System	FL	4	Any valid IEEE 754 float	0.0	1.00	Energy rate at base conditions in mmBtu/day or GJ/day.
2	Flow Rate per Hour	R/W	Both	FL	4	Any valid IEEE 754 float	0.0	1.00	Volume flow rate at base conditions in ft^3/hour or m^3/hour. **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992).
3	Energy Rate per Hour	R/O	System	FL	4	Any valid IEEE 754 float	0.0	1.00	Energy rate at base conditions in Btu/hour or MJ/hour.
4	Pressure Extension (hwPf)	R/W	Both	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.00	Represents the square root of Differential Pressure times Static Pressure √(hw * Pf). **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992) and API Chapter 21.1 (September 1993).
5	CdFT	R/W	Both	FL	4	>0.0→Any positive valid IEEE 754 float	0.6	1.00	Represents the Coefficient of discharge at a specified pipe Reynolds number for flange-tapped orifice meter. **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992).
6	Velocity of Approach (Ev)	R/W	Both	FL	4	>0.0→Any positive valid IEEE 754 float	1.031575	1.00	Represents the velocity of approach factor. See note 1. **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992).
7	Expansion Factor (Y_1)	R/W	Both	FL	4	0.0→Any positive valid IEEE 754 float	1.0	1.00	Represents the Expansion factor based on upstream absolute static pressure. **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992) and API Chapter 21.1 (September 1993).

Point Type 114, Orifice Meter Run Values

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
8	Orifice Plate Bore Diameter (d)	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	3.997484	1.00	Orifice plate bore diameter calculated at the average flowing temperature over the imp in inches. **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992).
9	Zf1	R/W	Both	FL	4	>0.0→Any positive valid IEEE 754 float	1.0	1.00	Represents the compressibility at upstream flowing conditions. **Note**: Refer to API Chapter 14.2 (AGA Report No. 8 1992 2nd printing 1994).
10	Fpb	R/O	System	FL	4	Any valid IEEE 754 float	1.0	1.00	Represents the base pressure factor. **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992) and API Chapter 21.1 (September 1993).
11	Ftb	R/O	System	FL	4	Any valid IEEE 754 float	1.0	1.00	Represents the base temperature factor. **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992) and API Chapter 21.1 (September 1993)..
12	Multiplier Value	R/W	Both	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.00	Represents the value multiplied by the square root of the product of differential and static pressure to calculate instantaneous flow rate. **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992).
13	Meter Tube Internal Diameter (D)	R/O	System	FL	4	>0.0→Any positive valid IEEE 754 float	8.067597	1.00	Meter tube internal diameter calculated at the average flowing temperature over the imp in inches. **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992).
14	Diameter Ratio (Beta)	R/W	Both	FL	4	>0.0→Any positive valid IEEE 754 float	0.495498 7	1.00	Ratio of orifice plate bore diameter to meter tube internal diameter calculated at the average flowing temperature over the imp. **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992).
15	Density	R/W	Both	FL	4	>0.0→Any positive valid IEEE 754 float	0.0	1.00	Represents the density of a fluid at flowing conditions in lbm/ft^3 or kg/m^3. See note 1. **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992).
16	Reynolds Number	R/W	Both	FL	4	>0.0→Any positive valid IEEE 754 float	0.0	1.00	Represents the pipe Reynolds number. See note 1. **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992).
17	Upstream Static Pressure	R/O	System	FL	4	Any valid IEEE 754 float	0.0	1.00	Represents the instantaneous upstream static pressure in psia or kPa.

Point Type 114, Orifice Meter Run Values

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
18	SP Fpwl	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	1.0	1.00	Represents the local gravitational correction for the deadweight tester. **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992), Appendix 3-A.
19	Flow Today	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.00	Total accumulation of flow for the current contract day in mft^3 or km^3.
20	Flow Yesterday	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.00	Total accumulation of flow for the previous contract day in mft^3 or km^3.
21	Flow Month	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.00	Total accumulation of flow for the current month in mft^3 or km^3.
22	Flow Previous Month	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.00	Total accumulation of flow for the previous month in mft^3 or km^3.
23	Flow Accumulated	R/O	System	FL	4	0.0→1,000,000.0	0.0	1.00	Total accumulation of flow for the meter run in mft^3 or km^3. The 1,000,000.0 rollover point ensures that flow accuracy is not lost due to the significant digits of a float data type.
24	Minutes Today	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.00	Total accumulation of flowing minutes for the current contract day.
25	Minutes Yesterday	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.00	Total accumulation of flowing minutes for the previous contract day.
26	Minutes Month	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.00	Total accumulation of flowing minutes for the current month.
27	Minutes Previous Month	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.00	Total accumulation of flowing minutes for the previous month.
28	Minutes Accumulated	R/O	System	FL	4	0.0→1,000,000.0	0.0	1.00	Total accumulation of flowing minutes for the meter run. The 1,000,000.0 rollover point ensures that flow minutes accuracy is not lost due to the significant digits of a float data type.
29	Energy Today	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.00	Total accumulation of energy for the current contract day in mmBtu or GJ.
30	Energy Yesterday	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.00	Total accumulation of energy for the previous contract day in mmBtu or GJ.
31	Energy Month	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.00	Total accumulation of energy for the current month in mmBtu or GJ.
32	Energy Previous Month	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.00	Total accumulation of energy for the previous month in mmBtu or GJ.
33	Energy Accumulated	R/O	System	FL	4	0.0→1,000,000.0	0.0	1.00	Total accumulation of energy for the meter run in mmBtu or GJ. The 1,000,000.0 rollover point ensures that energy accuracy is not lost due to the significant digits of a float data type.

Point Type 114, Orifice Meter Run Values

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
34	Mass Rate Per Day	R/O	System	FL	4	Any valid IEEE 754 float	0.0	1.20	Mass flow rate in mlb/day or tonnes/day.
35	Mass Rate Per Hour	R/O	System	FL	4	Any valid IEEE 754 float	0.0	1.20	Mass flow rate in lb/hr or kg/hr.
36	Mass Today	R/O	System	FL	4	Any valid IEEE 754 float	0.0	1.20	Total accumulation of mass since the last contract hour in mlb or tonnes.
37	Mass Yesterday	R/O	System	FL	4	Any valid IEEE 754 float	0.0	1.20	Total accumulation of mass for the previous contract day in mlb or tonnes.
38	Mass Month	R/O	System	FL	4	Any valid IEEE 754 float	0.0	1.20	Total accumulation of mass for the current month in mlb or tonnes.
39	Mass Previous Month	R/O	System	FL	4	Any valid IEEE 754 float	0.0	1.20	Total accumulation of mass for the previous month in mlb or tonnes.
40	Mass Accumulated	R/O	System	FL	4	Any valid IEEE 754 float	0.0	1.20	Total accumulation of mass for the meter run in mlb or tonnes. The 1,000,000.0 rollover point ensures that accuracy is not lost due to the significant digits of a float data type.
41	DP Fpwl	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	1.0	3.04	Represents the local gravitational correction for the deadweight tester. **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992), Appendix 3-A.
42	Flow Accumulated Double Precision	R/O	System	DBL	8	Any valid IEEE double precision float	0.0	3.10	Total accumulation of flow for the meter run in mft^3 or km^3. Rollover is based upon the user defined rollover.
43	Minutes Accumulated Double Precision	R/O	System	DBL	8	Any valid IEEE double precision float	0.0	3.10	Total accumulation of flowing minutes for the meter run. Rollover is based upon the user defined rollover.
44	Energy Accumulated Double Precision	R/O	System	DBL	8	Any valid IEEE double precision float	0.0	3.10	Total accumulation of energy for the previous month in mmBtu or GJ. Rollover is based upon the user defined rollover.
45	Mass Accumulated Double Precision	R/O	System	DBL	8	Any valid IEEE double precision float	0.0	3.10	Total accumulation of mass for the meter run in mlb or tonnes. Rollover is based upon the user defined rollover.
46	Upstream Temperature	R/O	System	FL	4	Any valid IEEE 754 float	0.0	3.10	Value of meter temperature in Deg F or Deg C, upstream of the differential meter.
47	Joule-Thomson Coefficient	R/W	Both	FL	4	Any valid IEEE 754 float	0.0	3.10	Calculated or entered value of Joule-Thomson coefficient in Deg F/psi, Deg C/kPa or Deg C/bar.
48	Pressure Loss	R/W	Both	FL	4	Any valid IEEE 754 float	0.0	3.10	Calculated or entered value of permanent pressure loss across the differential meter in % of DP.

3.4.26 Point Type 115: Turbine Meter Run Configuration

Description: Point type 115 provides the parameters for configuring a turbine meter run.

Number of Logical Points: 12 logical points for Turbine Meter Run Configuration may exist. The number depends on licensing and the number of active turbine meter runs.

Storage Location: Point type 115 is saved to internal configuration memory.

Table 3-27: Point Type 115. Turbine Meter Run Configuration

Point Type 115, Turbine Meter Run

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Point Tag ID	R/W	User	AC	10	0x20 → 0x7E for each ASCII character	"Turbine X" where X is the Turbine number	1.00	Identification name for specific turbine meter run. Values must be printable ASCII characters.
1	Point Description	R/W	User	AC	30	0x20 → 0x7E for each ASCII character	" "	1.00	Description for specific meter run. Values must be printable ASCII characters.
2	Static Pressure Units	R/W	User	UINT8	1	0 → 1	1	1.00	Indicates whether the static pressure is in gauge or absolute pressure units. Valid values are 0 (Gauge) and 1 (Absolute).
3	Alarming	R/W	User	UINT8	1	0 → 4	0	1.00	If enabled, alarms may be generated and sent to the Alarm Log. Valid values are: 0 = Disabled 1 = Alarm on Corrected Volume / Day 2 = Alarm on Mass / Day 3 = Alarm on Corrected Volume / Hour 4 = Alarm on Mass / Hour **Note**: Options 2, 3, and 4 were added in firmware version 1.52
4	SRBX on Clear	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates a SRBX alarm is desired if an alarm condition clears. Valid values are 0 (SRBX on Clear Disabled) and 1 (SRBX on Clear Enabled).
5	SRBX on Set	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates a SRBX alarm is desired if an alarm condition occurs. Valid values are 0 (SRBX on Set Disabled) and 1 (SRBX on Set Enabled).
6	Alarm Code	R/O	System	BIN	1	0x00 → 0xFF	0x00	1.00	

Point Type 115, Turbine Meter Run

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
6.0	Low Alarm			Bit 0			0	1.00	This alarm sets if the Flow Rate per Day (point type 116, parameter #0) is less than or equal to the Low Alarm Flow (parameter #7). This alarm is cleared if the Flow Rate per Day (point type 116, parameter #0) is greater than the Low Alarm Flow (parameter #7) plus the alarm deadband (parameter #9).
6.1	Not Used			Bit 1			0		Not Used
6.2	High Alarm			Bit 2			0	1.00	This alarm sets if the Flow Rate per Day (point type 116, parameter #0) is greater than or equal to the High Alarm Flow (parameter #8). This alarm is cleared if the Flow Rate per Day (point type 116, parameter #0) is less than the High Alarm Flow (parameter #8) minus the alarm deadband (parameter #9).
6.3	Not Used			Bit 3			0		Not Used
6.4	Not Used			Bit 4			0		Not Used
6.5	Not Used			Bit 5			0		Not Used
6.4	Temp Fail Alarm			Bit 4			0	2.00	This alarm sets if the meter temperature input value falls below –200 Deg F (–128.89 Deg C) or goes above 400 Deg F (204.44 Deg C). If this condition occurs, the flow rates are set to 0.0.
6.5	Zf Calc Alarm			Bit 5			0	2.00	This alarm sets if the meter temperature, pressure, and composition values do not allow a valid flowing compressibility calculation. If condition occurs, the value of Zf is set to 1.0.
6.6	No Flow Alarm			Bit 6			0	1.00	If set, then no flow conditions are present and the Flow Rate per Day (point type 116, parameter #0) is zero. If clear, then flowing conditions exist and the Flow Rate per Day (point type 116, parameter #0) is not zero.
6.7	Manual Inputs Alarm			Bit 7			0	1.00	If set, then one of the Uncorrected Flow Rate TLP (parameter #13), SP TLP (parameter #15), or TMP TLP (parameter #17) is set to Manual (0,0,0). If clear, then the Uncorrected Flow Rate TLP (parameter #13), SP TLP (parameter #15), and TMP TLP (parameter #17) are not set to Manual.
7	Low Alarm Flow	R/W	User	FL	4	Any valid IEEE 754 float	1,000.0	1.00	Alarm value for Low Alarm in mft^3/day or km^3/day.
8	High Alarm Flow	R/W	User	FL	4	Any valid IEEE 754 float	10,000.0	1.00	Alarm value for High Alarm in mft^3/day or km^3/day.

Point Type 115, Turbine Meter Run

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
9	Alarm Deadband	R/W	User	FL	4	Any valid IEEE 754 float	100.0	1.00	The value that the Flow Rate Per Day (Point Type 116, parameter #0) must be above the low alarm value (parameter #7) or below the high alarm value (parameter #8) before the associated alarm will clear.
10	Station number	R/W	User	UINT8	1	0 → 11	0	1.00	Indicates the station associated with this meter run.
11	K-factor	R/W	User	FL	4	Any positive, non-zero, valid IEEE 754 float	1.0	1.00	Indicates the linear meter constant (K-Factor) in pulses/ft^3 or pulses/m^3. f a K-Factor curve is being used (parameter #24), this represents the K-Factor currently in use and becomes a read-only parameter. **Note**: Refer to API Chapter 21.1 (September 1993).
12	No Flow Time	R/W	User	UINT32	4	1 → 86,400	5	1.00	Amount of time in seconds without a pulse before the meter is considered not to have flow.
13	Uncorrected Flow Rate/Mass TLP	R/W	User	TLP	3	TLP 0,0,0 and TLP 60→77, 0→255, 0→255 (must be float) and TLP 105,5→148,10 or 13 and TLP 103,5→148,21 and TLP 96,0→5,2→11and TLP 98,0→31,1→20	0,0,0	1.00	Indicates what is being used to get the pulses from the turbine and the Uncorrected Flow Rate or Mass (parameter #14).
14	Uncorrected Flow/Mass Rate	R/W	Both	FL	4	Any positive valid IEEE 754 float	0.0	1.00	Indicates the uncorrected flow rate in mft^3/day or km^3/day for volume measurement and Lb/hour or Kg/hour for mass measurement. **Note**: Refer to API Chapter 21.1 (September 1993) and to AGA Report No. 7 (1996).
15	SP TLP	R/W	User	TLP	3	TLP 0,0,0 and TLP 60→77, 0→255, 0→255 (must be float) and TLP 103,5→148,21 and TLP 96,0→5,2→11and TLP 98,0→31,1→20 and TLP 108, 16→63,35	0,0,0	1.00	Indicates what is being used to get the SP (parameter #16).
16	SP (Static Pressure, P_f)	R/W	Both	FL	4	> 0.0 → 40,000 PSI (275,790.3 kPa)	0.0	1.00	Static pressure in PSI (lb/in^2) or kPa. **Note**: Refer to API Chapter 21.1 (September 1993) and to AGA Report No. 7 (1996).

Point Type 115, Turbine Meter Run

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
17	TMP TLP	R/W	User	TLP	3	TLP 0,0,0 and TLP 60→77, 0→255, 0→255 (must be float) and TLP 103,5→148,21 and TLP 96,0→5,2→11and TLP 98,0→31,1→20 and TLP 108, 16→63,50 and TLP 106,5→148,22 and TLP 107,5→148, 9	0,0,0	1.00	Indicates what is being used to get the TMP (parameter #18).
18	TMP (Temperature, T_f)	R/W	Both	FL	4	>= -200 Deg F (-128.9 Deg C) → 760 Deg F (404.4 Deg C)	0.0	1.00	Temperature in °F or °C. **Note**: Refer to API Chapter 21.1 (September 1993) and to AGA Report No. 7 (1996).
19	Static Pressure Deadweight Calibrator	R/W	User	UINT8	1	0 → 1	0	1.00	Expand the volume flow equation to include the local gravitational correction for the deadweight calibrator on Static Pressure ($F_{pwl(static)}$). Valid values are 0 (Do Not Use) and 1 (Use). **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992), Appendix 3-A.
20	Calibration Weights Gravitational Acceleration	R/W	User	FL	4	Any positive valid IEEE 754 float	32.1740	1.00	Used to calculate $F_{pwl(static)}$. Entered in ft/sec^2 or m/sec^2. **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992), Appendix 3-A.
21	User Correction Factor	R/W	User	FL	4	Any valid IEEE 754 float	1.0	1.00	Variable multiplied through the volume flow equation to allow the user to modify the flow (F_{uc}).
22	Low Flow Cutoff	R/W	User	FL	4	0.0 → any valid IEEE 754 float	0.0	1.00	Indicates the cutoff point for the uncorrected flow rate if it is not obtained from a pulse input. If the uncorrected flow rate input is equal to or below this value, the uncorrected flow rate value (parameter #14) will be set to zero. If the uncorrected flow rate is obtained from a pulse input, all pulses are considered flow and this value is meaningless.
23	Speed Of Sound Option	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates the status of the speed of sound calculation. Valid vaues are 0 (Disabled) and 1 (Enabled). If enabled, the calculated value of the speed of sound is stored in point type116, parameter 33.
24	K-Factor Option	R/W	User	UINT8	1	0 → 1	0	1.20	Indicates whether a single K-factor is used or the K-factor table with interpolation between points.Valid values are 0 (Use Single K-factor,) and 1 (Use K-Factor table).

Point Type 115, Turbine Meter Run

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
25	K-Factor 1	R/W	User	FL	4	>0.0 → any valid IEEE 754 float	1.0	1.30	This is the linear meter constant (K-Factor) in pulses/ft^3 or pulses/m^3 for the associated frequency in Hz (parameter #26).
26	K-Factor 1 Frequency	R/W	User	FL	4	0.0 → any valid IEEE 754 float	0.0	1.30	Frequency in Hz that corresponds with K-Factor 1 (parameter #25).
27	K-Factor 2	R/W	User	FL	4	>0.0 → any valid IEEE 754 float	1.0	1.30	This is the linear meter constant (K-Factor) in pulses/ft^3 or pulses/m^3 for the associated frequency in Hz (parameter #28).
28	K-Factor 2 Frequency	R/W	User	FL	4	0.0 → any valid IEEE 754 float	0.0	1.30	Frequency in Hz that corresponds with K-Factor 2 (parameter #27).
29	K-Factor 3	R/W	User	FL	4	>0.0 → any valid IEEE 754 float	1.0	1.30	This is the linear meter constant (K-Factor) in pulses/ft^3 or pulses/m^3 for the associated frequency in Hz (parameter #30).
30	K-Factor 3 Frequency	R/W	User	FL	4	0.0 → any valid IEEE 754 float	0.0	1.30	Frequency in Hz that corresponds with K-Factor 3 (parameter #29).
31	K-Factor 4	R/W	User	FL	4	>0.0 → any valid IEEE 754 float	1.0	1.30	This is the linear meter constant (K-Factor) in pulses/ft^3 or pulses/m^3 for the associated frequency in Hz (parameter #32).
32	K-Factor 4 Frequency	R/W	User	FL	4	0.0 → any valid IEEE 754 float	0.0	1.30	Frequency in Hz that corresponds with K-Factor 4 (parameter #31).
33	K-Factor 5	R/W	User	FL	4	>0.0 → any valid IEEE 754 float	1.0	1.30	This is the linear meter constant (K-Factor) in pulses/ft^3 or pulses/m^3 for the associated frequency in Hz (parameter #34).
34	K-Factor 5 Frequency	R/W	User	FL	4	0.0 → any valid IEEE 754 float	0.0	1.30	Frequency in Hz that corresponds with K-Factor 5 (parameter #33).
35	K-Factor 6	R/W	User	FL	4	>0.0 → any valid IEEE 754 float	1.0	1.30	This is the linear meter constant (K-Factor) in pulses/ft^3 or pulses/m^3 for the associated frequency in Hz (parameter #36).
36	K-Factor 6 Frequency	R/W	User	FL	4	0.0 → any valid IEEE 754 float	0.0	1.30	Frequency in Hz that corresponds with K-Factor 6 (parameter #35).
37	K-Factor 7	R/W	User	FL	4	>0.0 → any valid IEEE 754 float	1.0	1.30	This is the linear meter constant (K-Factor) in pulses/ft^3 or pulses/m^3 for the associated frequency in Hz (parameter #38).
38	K-Factor 7 Frequency	R/W	User	FL	4	0.0 → any valid IEEE 754 float	0.0	1.30	Frequency in Hz that corresponds with K-Factor 7 (parameter #37).
39	K-Factor 8	R/W	User	FL	4	>0.0 → any valid IEEE 754 float	1.0	1.30	This is the linear meter constant (K-Factor) in pulses/ft^3 or pulses/m^3 for the associated frequency in Hz (parameter #40).
40	K-Factor 8 Frequency	R/W	User	FL	4	0.0 → any valid IEEE 754 float	0.0	1.30	Frequency in Hz that corresponds with K-Factor 8 (parameter #39).

Point Type 115, Turbine Meter Run

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
41	K-Factor 9	R/W	User	FL	4	>0.0 → any valid IEEE 754 float	1.0	1.30	This is the linear meter constant (K-Factor) in pulses/ft^3 or pulses/m^3 for the associated frequency in Hz (parameter #42).
42	K-Factor 9 Frequency	R/W	User	FL	4	0.0 → any valid IEEE 754 float	0.0	1.30	Frequency in Hz that corresponds with K-Factor 9 (parameter #41).
43	K-Factor 10	R/W	User	FL	4	>0.0 → any valid IEEE 754 float	1.0	1.30	This is the linear meter constant (K-Factor) in pulses/ft^3 or pulses/m^3 for the associated frequency in Hz (parameter #44).
44	K-Factor 10 Frequency	R/W	User	FL	4	0.0 → any valid IEEE 754 float	0.0	1.30	Frequency in Hz that corresponds with K-Factor 10 (parameter #43).
45	K-Factor 11	R/W	User	FL	4	>0.0 → any valid IEEE 754 float	1.0	1.30	This is the linear meter constant (K-Factor) in pulses/ft^3 or pulses/m^3 for the associated frequency in Hz (parameter #46).
46	K-Factor 11 Frequency	R/W	User	FL	4	0.0 → any valid IEEE 754 float	0.0	1.30	Frequency in Hz that corresponds with K-Factor 11 (parameter #45).
47	K-Factor 12	R/W	User	FL	4	>0.0 → any valid IEEE 754 float	1.0	1.30	This is the linear meter constant (K-Factor) in pulses/ft^3 or pulses/m^3 for the associated frequency in Hz (parameter #48).
48	K-Factor 12 Frequency	R/W	User	FL	4	0.0 → any valid IEEE 754 float	0.0	1.30	Frequency in Hz that corresponds with K-Factor 12 (parameter #47).
49	Meter Input Type	R/W	User	UINT8	1	0 → 1	0	1.50	Indicates whether the meter input is an actual volume or a mass reading. Valid values are 0 (Volume) and 1 (Mass).
50	Mass Pressure Compensation Option	R/W	User	UINT8	1	0 → 1	0	1.50	Indicates whether the mass input requires compensation for pressure effect on the Coriolis tube. Valid values are 0 (Mass pressure compensation disabled) and 1 (Mass pressure compensation enabled). **Note**: This parameter is applicable **only** when mass has been selected for the Meter Input Type (parameter #49)
51	Calibration Pressure	R/W	User	Float	4	0.0→Any positive valid IEEE 754 float	0.0	2.13	Pressure mass meter was calibrated at in PSIG. **Note**: his parameter is applicable **only** when mass has been selected for the Meter Input Type (parameter #49) and the Mass Pressure Compensation Option (parameter #50).
52	Pressure Effect Mass Compensation Coefficient	R/W	User	Float	4	Any negative valid IEEE 754 float → 0.0	-0.0002	3.00	Pressure correction coefficient for mass in percent per psi. This value is supplied by the manufacturer for the given model mass meter. This parameter is only applicable when mass has been selected for the Meter Input Type (parameter #49) and the Mass Pressure Compensation Option (parameter #50) has been enabled.

Point Type 115, Turbine Meter Run

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
53	RESERVED	R/O	System	UINT8	1	0	0	3.70	Reserved for future use.
54	Meter Signal	R/W	User	UINT8	1	0 → 1	0	3.70	Sets the meter signal type. Valid values are 0 (Pulse/Analog) and 1 (Accumulator). When Accumulator is selected, the user is also prompted to enter the accumulator input point and the accumulator rollover value.
55	Accumulator Rollover Value	R/W	User	Float	4	0.0→Any positive valid IEEE 754 float	1000000.0	3.70	Sets the accumulator rollover value. This field indicates the rollover value for the accumulator input value and applies only when the selected meter signal type is “accumulator”.
56	Accumulator TLP	R/W	User	TLP	3	TLP 0,0,0 and TLP 60→77, 0→255, 0→255 (must be float) and TLP 196→238 , 0→255, 0→255 (must be float) and TLP 239 → 254 0→255, 0→255 (must be float) and TLP 103,5→148,21 and TLP 96,0→5,2→11and TLP 98,0→31,1→20	0,0,0	3.70	Indicates what is being used to get the accumulator input (parameter #57).
57	Accumulator Value	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0.0	3.70	Accumulator input. Note: This value can either represent the mass accumulation or the volume accumulation depending on the meter input type selection (param #49). Note: If meter input type is “mass”, valid units are Lb for U.S units and Kg for Metric units. If meter input type is “volume”, valid units are MCF for U.S units and KM3 for metric units.

3.4.27 Point Type 116: Turbine Meter Run Values

Description: Point type 116 provides the parameters for displaying calculations of the turbine meter run.

Number of Logical Points: 12 logical points for Turbine Meter Run Values may exist. The number depends on licensing and the number of active turbine meter runs.

Storage Location: Point type 116 is **not saved** to internal configuration memory.

Table 3-28: Point Type 116. Turbine Meter Run Values

Point Type 116, Turbine Meter Run Values

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Flow Rate per Day	R/O	System	FL	4	Any valid IEEE 754 float	0.0	1.00	Volume flow rate at base condition in mft^3/day or km^3/day.
1	Energy Rate per Day	R/O	System	FL	4	Any valid IEEE 754 float	0.0	1.00	Energy rate at base conditions in mmBtu/day or GJ/day.
2	Flow Rate per Hour	R/O	System	FL	4	Any valid IEEE 754 float	0.0	1.00	Volume flow rate at base conditions in ft^3/hour or m^3/hour. **Note**: Refer to AGA Report No. 7 (1996).
3	Energy Rate per Hour	R/O	System	FL	4	Any valid IEEE 754 float	0.0	1.00	Energy rate at base conditions in Btu/hour or MJ/hour.
4	Pressure Multiplier	R/W	Both	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.00	Represents the AGA 7 pressure factor (R/O) if station calculation method (pt type 112, parameter #1) has been configured for AGA3/7 (Gas) or ISO5167/ISO9951 (Gas). Represents CPL (R/W) if station calculation method (pt type 112, parameter #1) has been configured for ISO5167/API Ch.12 (Liquid). **Note**: Refer to API Chapter 21.1 (September 1993) and to AGA Report No. 7 (1996).
5	Temperature Multiplier	R/W	Both	FL	4	0.0→Any positive valid IEEE 754 float	1.130528	1.00	Represents the AGA 7 temperature factor (R/O) if station calculation method (pt type 112, parameter #1) has been configured for AGA3/7 (Gas) or ISO5167/9951 (Gas). Represents CTL (R/W) if station calculation method (pt type 112, parameter #1) has been configured for ISO5167/API Ch.12 (Liquid). **Note**: Refer to API Chapter 21.1 (September 1993) and to AGA Report No. 7 (1996).
6	Compressibility Multiplier	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0.997923 4	1.00	Represents the compressibility factor. **Note**: Refer to API Chapter 21.1 (September 1993) and to AGA Report No. 7 (1996).

Point Type 116, Turbine Meter Run Values

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
7	Zf1	R/W	Both	FL	4	> 0.0→Any positive valid IEEE 754 float	1.0	1.00	Represents the compressibility at upstream flowing conditions. **Note**: Refer to API Chater 14.2 (AGA Report No. 8 1992 2nd Printing 1994).
8	Multiplier Value	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0	1.00	Represents the product of the pressure multiplier, the temperature multiplier and the compressibility multiplier.
9	Pulses Accumulated	R/O	System	UINT32	4	0 → 4,294,967,295	0	1.00	Ongoing accumulation of the number of pulses input to this meter run. Not used if uncorrected flow rate is not configured for a pulse input point.
10	Density	R/W	Both	FL	4	> 0.0→Any positive valid IEEE 754 float	0.0	1.00	Represents the density of a fluid at flowing conditions in lbm/ft^3 or kg/m^3. **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992).
11	Fpwl	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	1.0	1.00	Represents the local gravitational correction for the deadweight tester static pressure standard. **Note**: Refer to ANSI/API 2530-92 (AGA Report No. 3 1992), Appendix 3-A.
12	Flow Today	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.00	Total accumulation of flow for the current contract day in mft^3 or km^3.
13	Flow Yesterday	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.00	Total accumulation of flow for the previous contract day in mft^3 or km^3.
14	Flow Month	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.00	Total accumulation of flow for the current month in mft^3 or km^3.
15	Flow Previous Month	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.00	Total accumulation of flow for the previous month in mft^3 or km^3.
16	Flow Accumulated	R/O	System	FL	4	0.0→1,000,000.0	0.0	1.00	Total accumulation of flow for the meter run in mft^3 or km^3. The 1,000,000.0 rollover point ensures that flow accuracy is not lost due to the significant digits of a float data type.
17	Minutes Today	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.00	Total accumulation of flowing minutes for the current contract day.
18	Minutes Yesterday	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.00	Total accumulation of flowing minutes for the previous contract day.
19	Minutes Month	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.00	Total accumulation of flowing minutes for the current month.
20	Minutes Previous Month	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.00	Total accumulation of flowing minutes for the previous month.

Point Type 116, Turbine Meter Run Values

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
21	Minutes Accumulated	R/O	System	FL	4	0.0→1,000,000.0	0.0	1.00	Total accumulation of flowing minutes for the meter run. The 1,000,000.0 rollover is to ensure that flow minutes accuracy is not lost due to the significant digits of a float data type.
22	Energy Today	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.00	Total accumulation of energy for the current contract day in mmBtu or GJ.
23	Energy Yesterday	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.00	Total accumulation of energy for the previous contract day in mmBtu or GJ.
24	Energy Month	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.00	Total accumulation of energy for the current month in mmBtu or GJ.
25	Energy Previous Month	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.00	Total accumulation of energy for the previous month in mmBtu or GJ.
26	Energy Accumulated	R/O	System	FL	4	0.0→1,000,000.0	0.0	1.00	Total accumulation of energy for the meter run in mmBtu or GJ. The 1,000,000.0 rollover is to ensure that energy accuracy is not lost due to the significant digits of a float data type.
27	Uncorrected Today	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.00	Total accumulation of uncorrected flow for the current contract day in mft^3 or km^3.
28	Uncorrected Yesterday	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.00	Total accumulation of uncorrected flow for the previous contract day in mft^3 or km^3.
29	Uncorrected Month	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.00	Total accumulation of uncorrected flow for the current month in mft^3 or km^3.
30	Uncorrected Previous Month	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.00	Total accumulation of uncorrected flow for the previous month in mft^3 or km^3.
31	Uncorrected Accumulated	R/O	System	FL	4	0.0→1,000,000.0	0.0	1.00	Total accumulation of uncorrected flow for the meter run in mft^3 or km^3. The 1,000,000.0 rollover is to ensure that uncorrected flow accuracy is not lost due to the significant digits of a float data type.
32	Measured Speed Of Sound	R/W	User	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.20	Speed of Sound measured by the ultrasonic flowmeter in feet/second or meters/second. This parameter is intended to store the value retrieved from the ultrasonic meter via Modbus protocol.
33	Calculated Speed Of Sound	R/O	System	FL	4	0.0→Any positive valid IEEE 754 float	0.0	1.20	Speed of Sound calculated per AGA10 in feet/second or meters/second. **Note**: The system writes this value **only** if you **enable** the speed of sound calculation (point type 115, parameter 23).
34	Mass Rate Per Day	R/O	System	FL	4	Any valid IEEE 754 float	0.0	1.20	Mass flow rate in mlb/day or tonnes/day.
35	Mass Rate Per Hour	R/O	System	FL	4	Any valid IEEE 754 float	0.0	1.20	Mass flow rate in lb/hr or kg/hr.

Point Type 116, Turbine Meter Run Values

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
36	Mass Today	R/O	System	FL	4	Any valid IEEE 754 float	0.0	1.20	Total accumulation of mass since the last contract hour in mlb or tonnes.
37	Mass Yesterday	R/O	System	FL	4	Any valid IEEE 754 float	0.0	1.20	Total accumulation of mass for the previous contract day in mlb or tonnes.
38	Mass Month	R/O	System	FL	4	Any valid IEEE 754 float	0.0	1.20	Total accumulation of mass for the current month in mlb or tonnes.
39	Mass Previous Month	R/O	System	FL	4	Any valid IEEE 754 float	0.0	1.20	Total accumulation of mass for the previous month in mlb or tonnes.
40	Mass Accumulated	R/O	System	FL	4	Any valid IEEE 754 float	0.0	1.20	Total accumulation of mass for the meter run in mlb or tonnes. The 1,000,000 rollover point ensures that accuracy is not lost due to the significant digits of a float data type.
41	Flow Accumulated Double Precision	R/O	System	DBL	8	Any valid IEEE double precision float	0.0	3.10	Total accumulation of flow for the meter run in mft^3 or km^3. Rollover is based upon the user defined rollover.
42	Minutes Accumulated Double Precision	R/O	System	DBL	8	Any valid IEEE double precision float	0.0	3.10	Total accumulation of flowing minutes for the meter run. Rollover is based upon the user defined rollover.
43	Energy Accumulated Double Precision	R/O	System	DBL	8	Any valid IEEE double precision float	0.0	3.10	Total accumulation of energy for the previous month in mmBtu or GJ. Rollover is based upon the user defined rollover.
44	Uncorrected Flow Accumulated Double Precision	R/O	System	DBL	8	Any valid IEEE double precision float	0.0	3.10	Total accumulation of uncorrected flow for the meter run in mft^3 or km^3. Rollover is based upon the user defined rollover.
45	Mass Accumulated Double Precision	R/O	System	DBL	8	Any valid IEEE double precision float	0.0	3.10	Total accumulation of mass for the meter run in mlb or tonnes. Rollover is based upon the user defined rollover.

3.4.28 Point Type 117: Modbus Configuration Parameters

Description: Point type 117 provides the parameters for setting up the Modbus protocol.

Number of Logical Points: 6 logical points for Modbus Configuration Parameters may exist corresponding to LOI through Comm 5.

Storage Location: Point type 117 is saved to internal configuration memory.

Table 3-29: Point Type 117, Modbus Configuration Parameters

Point Type 117, Modbus Configuration Parameters

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Transmission Mode	R/W	User	UINT8	1	0 → 1	0	1.00	Controls the type of transmission mode desired. Valid values are 0 (RTU Mode) and 1 (ASCII Mode).
1	Byte Order	R/W	User	UINT8	1	0 → 1	0	1.00	Controls which byte is sent out first for floats, short integers, and long integers. Valid values are 0 (LSB first , associated with little-endian processors) and 1 (MSB first, aAssociated with big-endian processors).
2	Event Log Enable	R/W	User	UINT8	1	0 → 1	1	1.00	Controls if changes to Modbus registers are logged to the event log or not (Slave mode only). Valid values are 0 (No Logging) and 1 (Log to Event Log).
3	Slave Exception Status	R/O	System	UINT8	1	0 → 3	0	1.00	Contains the error code for the last Modbus message received (Slave mode only). Valid values are: 0 = No Error 1 = Illegal Function 2 = Illegal Data Address 3 = Illegal Data Value
4	Master Poll Request Trigger	R/W	Both	UINT8	1	0 → 1	0	1.00	Controls the initiation of a Modbus master polling sequence (Master mode only). Valid values are 0 (No polling) and 1 (Begin polling with the entry in the Modbus master table indicated by the master starting request number [parameter #5] and continue through the table for the number of master requests [parameter #6]). The system resets this parameter when the polling sequence completes.
5	Master Starting Request Number	R/W	User	UINT16	2	1 - 75	1	1.00	Contains the request number in the Modbus master table to begin with when the Modbus master poll request trigger (parameter #4) is set (Master mode only).

Point Type 117, Modbus Configuration Parameters

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
6	Master Number of Requests	R/W	User	UINT16	2	0 → 75	0	1.00	Contains the total number of Modbus requests to be made when the Modbus master poll request trigger (parameter #4) is set (Master mode only).
7	Master Continuous Polling Enable	R/W	User	UINT8	1	0 → 1	0	1.00	Controls whether the Modbus master poll request sequence specified is executed on a continuous basis (Master mode only). Valid values are 0 (Continuous polling disabled) and 1 (Continuous polling enabled).
8	Master Poll Request Delay	R/W	User	FL	4	1 → 86400 (24 hrs)	1	1.00	Contains the delay time in seconds between continuous master poll requests (Continuous poll mode only). **Note**: Default and minimum changed in Ver. 3.60
9	RESERVED	R/O	System	UINT8	1	0	0	1.00	Reserved for future use.
10	Low Integer Scale	R/W	User	INT16	2	–32768 → 32767	0	1.00	Contains the lower limit value when scaling floating-point data.
11	High Integer Scale	R/W	User	INT16	2	–32768 → 32767	4095	1.00	Contains the upper limit value when scaling floating-point data.
12	Low Float Scale 1	R/W	User	FL	4	Any IEEE 754 floating point number	0.0	1.00	Contains the lower limit in float range 1 when converting integers to floats and vice-versa.
13	High Float Scale 1	R/W	User	FL	4	Any IEEE 754 floating point number	0.0	1.00	Contains the upper limit in float range 1 when converting integers to floats and vice-versa.
14	Low Float Scale 2	R/W	User	FL	4	Any IEEE 754 floating point number	0.0	1.00	Contains the lower limit in float range 2 when converting integers to floats and vice-versa.
15	High Float Scale 2	R/W	User	FL	4	Any IEEE 754 floating point number	0.0	1.00	Contains the upper limit in float range 2 when converting integers to floats and vice-versa.
16	Low Float Scale 3	R/W	User	FL	4	Any IEEE 754 floating point number	0.0	1.00	Contains the lower limit in float range 3 when converting integers to floats and vice-versa.
17	High Float Scale 3	R/W	User	FL	4	Any IEEE 754 floating point number	0.0	1.00	Contains the upper limit in float range 3 when converting integers to floats and vice-versa.
18	Low Float Scale 4	R/W	User	FL	4	Any IEEE 754 floating point number	0.0	1.00	Contains the lower limit in float range 4 when converting integers to floats and vice-versa.
19	High Float Scale 4	R/W	User	FL	4	Any IEEE 754 floating point number	0.0	1.00	Contains the upper limit in float range 4 when converting integers to floats and vice-versa.

Point Type 117, Modbus Configuration Parameters

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
20	Low Float Scale 5	R/W	User	FL	4	Any IEEE 754 floating point number	0.0	1.00	Contains the lower limit in float range 5 when converting integers to floats and vice-versa.
21	High Float Scale 5	R/W	User	FL	4	Any IEEE 754 floating point number	0.0	1.00	Contains the upper limit in float range 5 when converting integers to floats and vice-versa.
22	Low Float Scale 6	R/W	User	FL	4	Any IEEE 754 floating point number	0.0	1.00	Contains the lower limit in float range 6 when converting integers to floats and vice-versa.
23	High Float Scale 6	R/W	User	FL	4	Any IEEE 754 floating point number	0.0	1.00	Contains the upper limit in float range 6 when converting integers to floats and vice-versa.
24	Low Float Scale 7	R/W	User	FL	4	Any IEEE 754 floating point number	0.0	1.00	Contains the lower limit in float range 7 when converting integers to floats and vice-versa.
25	High Float Scale 7	R/W	User	FL	4	Any IEEE 754 floating point number	0.0	1.00	Contains the upper limit in float range 7 when converting integers to floats and vice-versa.
26	Low Float Scale 8	R/W	User	FL	4	Any IEEE 754 floating point number	0.0	1.00	Contains the lower limit in float range 8 when converting integers to floats and vice-versa.
27	High Float Scale 8	R/W	User	FL	4	Any IEEE 754 floating point number	0.0	1.00	Contains the upper limit in float range 8 when converting integers to floats and vice-versa.
28	Master Poll Timeout	R/W	User	UINT8	1	1 → 255	30	1.00	Amount of time in seconds Modbus master will wait for a slave response. (Master mode only).
29	Master Poll Number of Retries	R/W	User	UINT8	1	0 → 255	2	1.00	Number of retries Modbus Master will attempt on a particular request number in the Master Poll Table before giving-up and going to the next request number. (Master mode only).

3.4.29 Point Type 118: Modbus Register to TLP Mapping

Description: Point type 118 provides the Modbus Register to TLP Mapping parameters for mapping ROC Plus Protocol TLPs to Modbus Protocol Registers.

Number of Logical Points: 24 logical points for Modbus Register to TLP Mapping may exist.

Storage Location: Point type 118 is saved to internal configuration memory.

Table 3-30: Point Type 118, Modbus Register to TLP Mapping

Point Type 118, Modbus Register to TLP Mapping

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Tag ID	R/W	User	AC	10	0x20 → 0x7E for each byte	'Reg Map #'	1.00	String that describes the instance of the mapping table.
1	Start Register #1	R/W	User	UINT16	2	0 → 65535	0	1.00	The starting register number for the first range of Modbus registers that map to ROC Plus Protocol TLP(s).
2	End Register #1	R/W	User	UINT16	2	0 → 65535	0	1.00	The ending register number for the first range of Modbus registers that map to ROC Plus Protocol TLP(s).
3	ROC Parameter(s) (Reg Range 1)	R/W	User	TLP	3	Any TLP is valid except for the Program Flash Parameters (PT 90)	0, 0, 0	1.00	The starting ROC Plus Protocol TLP that maps to the first range of Modbus registers.
4	Indexing (Reg Range 1)	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates whether multiple registers access consecutive logical numbers or consecutive parameters from the starting TLP. Valid values are 0 (Logical indexing) and 1 (Parameter indexing).
5 (Series 1)	Conversion Code (Reg Range 1)	R/W	User	UINT8	1	0 → 8, 25 →29, 65 → 72	0	1.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
5 (Series 2)	Conversion Code (Reg Range 1)	R/W	User	UINT8	1	0 → 29, 37, 41 → 81	0	3.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.

Point Type 118, Modbus Register to TLP Mapping

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
6	Comm Port (Reg Range 1)	R/W	User	UINT8	1	0 → 5, 255	255	1.00	Communication port to which the first range of registers map. Vallid values are: 0 = LOI 1 = Comm Port 1 2 = Comm Port 2 3 = Comm Port 3 4 = Comm Port 4 5 = Comm Port 5 255 = All Comm Ports
7	Start Register #2	R/W	User	UINT16	2	0 → 65535	0	1.00	The starting register number for the second range of Modbus registers that map to ROC Plus Protocol TLP(s).
8	End Register #2	R/W	User	UINT16	2	0 → 65535	0	1.00	The ending register number for the second range of Modbus registers that map to ROC Plus Protocol TLP(s).
9	ROC Parameter(s) (Reg Range 2)	R/W	User	TLP	3	Any TLP is valid except for the Program Flash Parameters (PT 90)	0, 0, 0	1.00	The starting ROC Plus Protocol TLP that maps to the second range of Modbus registers.
10	Indexing (Reg Range 2)	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates whether multiple registers access consecutive logical numbers or consecutive parameters from the starting TLP. 0 = Logical indexing, 1 = Parameter indexing.
11 (Series 1)	Conversion Code (Reg Range 2)	R/W	User	UINT8	1	0 → 8, 25 → 29, 65 → 72	0	1.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
11 (Series 2)	Conversion Code (Reg Range 2)	R/W	User	UINT8	1	0 → 29, 37, 41 → 81	0	3.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
12	Comm Port (Reg Range 2)	R/W	User	UINT8	1	0 → 5, 255	255	1.00	Communication port to which the second range of registers map: Valid values are: 0 = LOI 1 = Comm Port 1 2 = Comm Port 2 3 = Comm Port 3 4 = Comm Port 4 5 = Comm Port 5 255 = All Comm Ports
13	Start Register #3	R/W	User	UINT16	2	0 → 65535	0	1.00	The starting register number for the third range of Modbus registers that map to ROC Plus Protocol TLP(s).

Point Type 118, Modbus Register to TLP Mapping

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
14	End Register #3	R/W	User	UINT16	2	0 → 65535	0	1.00	The ending register number for the third range of Modbus registers that map to ROC Plus Protocol TLP(s).
15	ROC Parameter(s) (Reg Range 3)	R/W	User	TLP	3	Any TLP is valid except for the Program Flash Parameters (PT 90)	0, 0, 0	1.00	The starting ROC Plus Protocol TLP that maps to the third range of Modbus registers.
16	Indexing (Reg Range 3)	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates whether multiple registers access consecutive logical numbers or consecutive parameters from the starting TLP. 0 = Logical indexing, 1 = Parameter indexing.
17 (Series 1)	Conversion Code (Reg Range 3)	R/W	User	UINT8	1	0 → 8, 25 → 29, 65 → 72	0	1.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
17 (Series 2)	Conversion Code (Reg Range 3)	R/W	User	UINT8	1	0 → 29, 37, 41 → 81	0	3.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
18	Comm Port (Reg Range 3)	R/W	User	UINT8	1	0 → 5, 255	255	1.00	Communication port to which the third range of registers map. Valid values are: 0 = LOI 1 = Comm Port 1 2 = Comm Port 2 3 = Comm Port 3 4 = Comm Port 4 5 = Comm Port 5 255 = All Comm Ports
19	Start Register #4	R/W	User	UINT16	2	0 → 65535	0	1.00	The starting register number for the fourth range of Modbus registers that map to ROC Plus Protocol TLP(s).
20	End Register #4	R/W	User	UINT16	2	0 → 65535	0	1.00	The ending register number for the fourth range of Modbus registers that map to ROC Plus Protocol TLP(s).
21	ROC Parameter(s) (Reg Range 4)	R/W	User	TLP	3	Any TLP is valid except for the Program Flash Parameters (PT 90)	0, 0, 0	1.00	The starting ROC Plus Protocol TLP that maps to the fourth range of Modbus registers.
22	Indexing (Reg Range 4)	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates whether multiple registers access consecutive logical numbers or consecutive parameters from the starting TLP. Valid values are 0 (Logical indexing) and 1 (Parameter indexing).

Point Type 118, Modbus Register to TLP Mapping

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
23 (Series 1)	Conversion Code (Reg Range 4)	R/W	User	UINT8	1	0 → 8, 25 → 29, 65 → 72	0	1.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
23 (Series 2)	Conversion Code (Reg Range 4)	R/W	User	UINT8	1	0 → 29, 37, 41 → 81	0	3.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
24	Comm Port (Reg Range 4)	R/W	User	UINT8	1	0 → 5, 255	255	1.00	Communication port to which the fourth range of registers map. Valid values are: 0 = LOI 1 = Comm Port 1 2 = Comm Port 2 3 = Comm Port 3 4 = Comm Port 4 5 = Comm Port 5 255 = All Comm Ports
25	Start Register #5	R/W	User	UINT16	2	0 → 65535	0	1.00	The starting register number for the fifth range of Modbus registers that map to ROC Plus Protocol TLP(s).
26	End Register #5	R/W	User	UINT16	2	0 → 65535	0	1.00	The ending register number for the fifth range of Modbus registers that map to ROC Plus Protocol TLP(s).
27	ROC Parameter(s) (Reg Range 5)	R/W	User	TLP	3	Any TLP is valid except for the Program Flash Parameters (PT 90)	0, 0, 0	1.00	The starting ROC Plus Protocol TLP that maps to the fifth range of Modbus registers.
28	Indexing (Reg Range 5)	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates whether multiple registers access consecutive logical numbers or consecutive parameters from the starting TLP. Valid values are 0 (Logical indexing) and 1 (Parameter indexing).
29 (Series 1)	Conversion Code (Reg Range 5)	R/W	User	UINT8	1	0 → 8, 25 → 29, 65 → 72	0	1.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
29 (Series 2)	Conversion Code (Reg Range 5)	R/W	User	UINT8	1	0 → 29, 37, 41 → 81	0	3.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.

Point Type 118, Modbus Register to TLP Mapping

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
30	Comm Port (Reg Range 5)	R/W	User	UINT8	1	0 → 5, 255	255	1.00	Communication port to which the fifth range of registers map. Valid values are: 0 = LOI 1 = Comm Port 1 2 = Comm Port 2 3 = Comm Port 3 4 = Comm Port 4 5 = Comm Port 5 255 = All Comm Ports
31	Start Register #6	R/W	User	UINT16	2	0 – 65535	0	1.00	The starting register number for the sixth range of Modbus registers that map to ROC Plus Protocol TLP(s).
32	End Register #6	R/W	User	UINT16	2	0 – 65535	0	1.00	The ending register number for the sixth range of Modbus registers that map to ROC Plus Protocol TLP(s).
33	ROC Parameter(s) (Reg Range 6)	R/W	User	TLP	3	Any TLP is valid except for the Program Flash Parameters (PT 90)	0, 0, 0	1.00	The starting ROC Plus Protocol TLP that maps to the sixth range of Modbus registers.
34	Indexing (Reg Range 6)	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates whether multiple registers access consecutive logical numbers or consecutive parameters from the starting TLP. 0 = Logical indexing, 1 = Parameter indexing.
35 (Series 1)	Conversion Code (Reg Range 6)	R/W	User	UINT8	1	0 → 8, 25 → 29, 65 → 72	0	1.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
35 (Series 2)	Conversion Code (Reg Range 6)	R/W	User	UINT8	1	0 → 29, 37, 41 → 81	0	3.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
36	Comm Port (Reg Range 6)	R/W	User	UINT8	1	0 → 5, 255	255	1.00	Communication port to which the sixth range of registers map. Valid values are: 0 = LOI 1 = Comm Port 1 2 = Comm Port 2 3 = Comm Port 3 4 = Comm Port 4 5 = Comm Port 5 255 = All Comm Ports
37	Start Register #7	R/W	User	UINT16	2	0 → 65535	0	1.00	The starting register number for the seventh range of Modbus registers that map to ROC Plus Protocol TLP(s).

Point Type 118, Modbus Register to TLP Mapping

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
38	End Register #7	R/W	User	UINT16	2	0 → 65535	0	1.00	The ending register number for the seventh range of Modbus registers that map to ROC Plus Protocol TLP(s).
39	ROC Parameter(s) (Reg Range 7)	R/W	User	TLP	3	Any TLP is valid except for the Program Flash Parameters (PT 90)	0, 0, 0	1.00	The starting ROC Plus Protocol TLP that maps to the seventh range of Modbus registers.
40	Indexing (Reg Range 7)	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates whether multiple registers access consecutive logical numbers or consecutive parameters from the starting TLP. Valid values are 0 (Logical indexing) and 1 (Parameter indexing).
41 (Series 1)	Conversion Code (Reg Range 7)	R/W	User	UINT8	1	0 → 8, 25 → 29, 65 → 72	0	1.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
41 (Series 2)	Conversion Code (Reg Range 7)	R/W	User	UINT8	1	0 → 29, 37, 41 → 81	0	3.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
42	Comm Port (Reg Range 7)	R/W	User	UINT8	1	0 → 5, 255	255	1.00	Communication port to which the seventh range of registers map. Valid values are: 0 = LOI 1 = Comm Port 1 2 = Comm Port 2 3 = Comm Port 3 4 = Comm Port 4 5 = Comm Port 5 255 = All Comm Ports
43	Start Register #8	R/W	User	UINT16	2	0 → 65535	0	1.00	The starting register number for the eighth range of Modbus registers that map to ROC Plus Protocol TLP(s).
44	End Register #8	R/W	User	UINT16	2	0 → 65535	0	1.00	The ending register number for the eighth range of Modbus registers that map to ROC Plus Protocol TLP(s).
45	ROC Parameter(s) (Reg Range 8)	R/W	User	TLP	3	Any TLP is valid except for the Program Flash Parameters (PT 90)	0, 0, 0	1.00	The starting ROC Plus Protocol TLP that maps to the eighth range of Modbus registers.
46	Indexing (Reg Range 8)	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates whether multiple registers access consecutive logical numbers or consecutive parameters from the starting TLP. Valid values are 0 (Logical indexing) and 1 (Parameter indexing).

Point Type 118, Modbus Register to TLP Mapping

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
47 (Series 1)	Conversion Code (Reg Range 8)	R/W	User	UINT8	1	0 → 8, 25 → 29, 65 → 72	0	1.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
47 (Series 2)	Conversion Code (Reg Range 8)	R/W	User	UINT8	1	0 → 29, 37, 41 → 81	0	3.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
48	Comm Port (Reg Range 8)	R/W	User	UINT8	1	0 → 5, 255	255	1.00	Communication port to which the eighth range of registers map. Valid values are: 0 = LOI 1 = Comm Port 1 2 = Comm Port 2 3 = Comm Port 3 4 = Comm Port 4 5 = Comm Port 5 255 = All Comm Ports
49	Start Register #9	R/W	User	UINT16	2	0 → 65535	0	1.00	The starting register number for the ninth range of Modbus registers that map to ROC Plus Protocol TLP(s).
50	End Register #9	R/W	User	UINT16	2	0 → 65535	0	1.00	The ending register number for the ninth range of Modbus registers that map to ROC Plus Protocol TLP(s).
51	ROC Parameter(s) (Reg Range 9)	R/W	User	TLP	3	Any TLP is valid except for the Program Flash Parameters (PT 90)	0, 0, 0	1.00	The starting ROC Plus Protocol TLP that maps to the ninth range of Modbus registers.
52	Indexing (Reg Range 9)	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates whether multiple registers access consecutive logical numbers or consecutive parameters from the starting TLP. 0 = Logical indexing, 1 = Parameter indexing.
53 (Series 1)	Conversion Code (Reg Range 9)	R/W	User	UINT8	1	0 → 8, 25 → 29, 65 → 72	0	1.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
53 (Series 2)	Conversion Code (Reg Range 9)	R/W	User	UINT8	1	0 → 29, 37, 41 → 81	0	3.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.

Point Type 118, Modbus Register to TLP Mapping

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
54	Comm Port (Reg Range 9)	R/W	User	UINT8	1	0 → 5, 255	255	1.00	Communication port to which the ninth range of registers map. Valid values are: 0 = LOI 1 = Comm Port 1 2 = Comm Port 2 3 = Comm Port 3 4 = Comm Port 4 5 = Comm Port 5 255 = All Comm Ports
55	Start Register #10	R/W	User	UINT16	2	0 → 65535	0	1.00	The starting register number for the tenth range of Modbus registers that map to ROC Plus Protocol TLP(s).
56	End Register #10	R/W	User	UINT16	2	0 → 65535	0	1.00	The ending register number for the tenth range of Modbus registers that map to ROC Plus Protocol TLP(s).
57	ROC Parameter(s) (Reg Range 10)	R/W	User	TLP	3	Any TLP is valid except for the Program Flash Parameters (PT 90)	0, 0, 0	1.00	The starting ROC Plus Protocol TLP that maps to the tenth range of Modbus registers.
58	Indexing (Reg Range 10)	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates whether multiple registers access consecutive logical numbers or consecutive parameters from the starting TLP. Valid values are 0 (Logical indexing) and 1 (Parameter indexing).
59 (Series 1)	Conversion Code (Reg Range 10)	R/W	User	UINT8	1	0 → 8, 25 → 29, 65 → 72	0	1.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
59 (Series 2)	Conversion Code (Reg Range 10)	R/W	User	UINT8	1	0 → 29, 37, 41 → 81	0	3.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
60	Comm Port (Reg Range 10)	R/W	User	UINT8	1	0 → 5, 255	255	1.00	Communication port to which the tenth range of registers map. Valid values are: 0 = LOI 1 = Comm Port 1 2 = Comm Port 2 3 = Comm Port 3 4 = Comm Port 4 5 = Comm Port 5 255 = All Comm Ports
61	Start Register #11	R/W	User	UINT16	2	0 → 65535	0	1.00	The starting register number for the 11th range of Modbus registers that map to ROC Plus Protocol TLP(s).

Point Type 118, Modbus Register to TLP Mapping

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
62	End Register #11	R/W	User	UINT16	2	0 → 65535	0	1.00	The ending register number for the 11th range of Modbus registers that map to ROC Plus Protocol TLP(s).
63	ROC Parameter(s) (Reg Range 11)	R/W	User	TLP	3	Any TLP is valid except for the Program Flash Parameters (PT 90)	0, 0, 0	1.00	The starting ROC Plus Protocol TLP that maps to the 11th range of Modbus registers.
64	Indexing (Reg Range 11)	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates whether multiple registers access consecutive logical numbers or consecutive parameters from the starting TLP. Valid values are 0 (Logical indexing) and 1 (Parameter indexing).
65 (Series 1)	Conversion Code (Reg Range 11)	R/W	User	UINT8	1	0 → 8, 25 → 29, 65 → 72	0	1.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
65 (Series 2)	Conversion Code (Reg Range 11)	R/W	User	UINT8	1	0 → 29, 37, 41 → 81	0	3.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
66	Comm Port (Reg Range 11)	R/W	User	UINT8	1	0 → 5, 255	255	1.00	Communication port to which the 11th range of registers map. Valid values are: 0 = LOI 1 = Comm Port 1 2 = Comm Port 2 3 = Comm Port 3 4 = Comm Port 4 5 = Comm Port 5 255 = All Comm Ports
67	Start Register #12	R/W	User	UINT16	2	0 → 65535	0	1.00	The starting register number for the 12th range of Modbus registers that map to ROC Plus Protocol TLP(s).
68	End Register #12	R/W	User	UINT16	2	0 → 65535	0	1.00	The ending register number for the 12th range of Modbus registers that map to ROC Plus Protocol TLP(s).
69	ROC Parameter(s) (Reg Range 12)	R/W	User	TLP	3	Any TLP is valid except for the Program Flash Parameters (PT 90)	0, 0, 0	1.00	The starting ROC Plus Protocol TLP that maps to the 12th range of Modbus registers.
70	Indexing (Reg Range 12)	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates whether multiple registers access consecutive logical numbers or consecutive parameters from the starting TLP. Valid values are 0 (Logical indexing) and 1 (Parameter indexing).

Point Type 118, Modbus Register to TLP Mapping

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
71 (Series 1)	Conversion Code (Reg Range 12)	R/W	User	UINT8	1	0 → 8, 25 → 29, 65 → 72	0	1.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
71 (Series 2)	Conversion Code (Reg Range 12)	R/W	User	UINT8	1	0 → 29, 37, 41 → 81	0	3.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
72	Comm Port (Reg Range 12)	R/W	User	UINT8	1	0 → 5, 255	255	1.00	Communication port to which the 12th range of registers map. Valid values are: 0 = LOI 1 = Comm Port 1 2 = Comm Port 2 3 = Comm Port 3 4 = Comm Port 4 5 = Comm Port 5 255 = All Comm Ports
73	Start Register #13	R/W	User	UINT16	2	0 → 65535	0	1.00	The starting register number for the 13th range of Modbus registers that map to ROC Plus Protocol TLP(s).
74	End Register #13	R/W	User	UINT16	2	0 → 65535	0	1.00	The ending register number for the 13th range of Modbus registers that map to ROC Plus Protocol TLP(s).
75	ROC Parameter(s) (Reg Range 13)	R/W	User	TLP	3	Any TLP is valid except for the Program Flash Parameters (PT 90)	0, 0, 0	1.00	The starting ROC Plus Protocol TLP that maps to the 13th range of Modbus registers.
76	Indexing (Reg Range 13)	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates whether multiple registers access consecutive logical numbers or consecutive parameters from the starting TLP. 0 = Logical indexing, 1 = Parameter indexing.
77 (Series 1)	Conversion Code (Reg Range 13)	R/W	User	UINT8	1	0 → 8, 25 → 29, 65 → 72	0	1.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
77 (Series 2)	Conversion Code (Reg Range 13)	R/W	User	UINT8	1	0 → 29, 37, 41 → 81	0	3.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.

Point Type 118, Modbus Register to TLP Mapping

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
78	Comm Port (Reg Range 13)	R/W	User	UINT8	1	0 → 5, 255	255	1.00	Communication port to which the 13th range of registers map. Valid values are: 0 = LOI 1 = Comm Port 1 2 = Comm Port 2 3 = Comm Port 3 4 = Comm Port 4 5 = Comm Port 5 255 = All Comm Ports
79	Start Register #14	R/W	User	UINT16	2	0 → 65535	0	1.00	The starting register number for the 14th range of Modbus registers that map to ROC Plus Protocol TLP(s).
80	End Register #14	R/W	User	UINT16	2	0 → 65535	0	1.00	The ending register number for the 14th range of Modbus registers that map to ROC Plus Protocol TLP(s).
81	ROC Parameter(s) (Reg Range 14)	R/W	User	TLP	3	Any TLP is valid except for the Program Flash Parameters (PT 90)	0, 0, 0	1.00	The starting ROC Plus Protocol TLP that maps to the 14th range of Modbus registers.
82	Indexing (Reg Range 14)	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates whether multiple registers access consecutive logical numbers or consecutive parameters from the starting TLP. Valid values are 0 (Logical indexing) and 1 (Parameter indexing).
83 (Series 1)	Conversion Code (Reg Range 14)	R/W	User	UINT8	1	0 → 8, 25 → 29, 65 → 72	0	1.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
83 (Series 2)	Conversion Code (Reg Range 14)	R/W	User	UINT8	1	0 → 29, 37, 41 → 81	0	3.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
84	Comm Port (Reg Range 14)	R/W	User	UINT8	1	0 → 5, 255	255	1.00	Communication port to which the 14th range of registers map. Valid values are: 0 = LOI 1 = Comm Port 1 2 = Comm Port 2 3 = Comm Port 3 4 = Comm Port 4 5 = Comm Port 5 255 = All Comm Ports
85	Start Register #15	R/W	User	UINT16	2	0 → 65535	0	1.00	The starting register number for the 15th range of Modbus registers that map to ROC Plus Protocol TLP(s).

Point Type 118, Modbus Register to TLP Mapping

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
86	End Register #15	R/W	User	UINT16	2	0 → 65535	0	1.00	The ending register number for the 15th range of Modbus registers that map to ROC Plus Protocol TLP(s).
87	ROC Parameter(s) (Reg Range 15)	R/W	User	TLP	3	Any TLP is valid except for the Program Flash Parameters (PT 90)	0, 0, 0	1.00	The starting ROC Plus Protocol TLP that maps to the 15th range of Modbus registers.
88	Indexing (Reg Range 15)	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates whether multiple registers access consecutive logical numbers or consecutive parameters from the starting TLP. Valid values are 0 (Logical indexing) and 1 (Parameter indexing).
89 (Series 1)	Conversion Code (Reg Range 15)	R/W	User	UINT8	1	0 → 8, 25 → 29, 65 → 72	0	1.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
89 (Series 2)	Conversion Code (Reg Range 15)	R/W	User	UINT8	1	0 → 29, 37, 41 → 81	0	3.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
90	Comm Port (Reg Range 15)	R/W	User	UINT8	1	0 → 5, 255	255	1.00	Communication port to which the 15th range of registers map. Valkid values are: 0 = LOI 1 = Comm Port 1 2 = Comm Port 2 3 = Comm Port 3 4 = Comm Port 4 5 = Comm Port 5 255 = All Comm Ports

Conversion Codes are:

0	= No Conversion
1	= Float to Signed Integer, Float Scale 1
2	= Float to Signed Integer, Float Scale 2
3	= Float to Signed Integer, Float Scale 3
4	= Float to Signed Integer, Float Scale 4
5	= Float to Signed Integer, Float Scale 5
6	= Float to Signed Integer, Float Scale 6
7	= Float to Signed Integer, Float Scale 7
8	= Float to Signed Integer, Float Scale 8
9	= Convert anything to Signed Long with 1 implied decimal place
10	= Convert anything to Signed Long with 2 implied decimal places
11	= Convert anything to Signed Long with 3 implied decimal places
12	= Convert anything to Signed Long with 4 implied decimal places
13	= Convert anything to Signed Long with 5 implied decimal places
14	= Convert anything to Signed Long with 6 implied decimal places

15 = Convert anything to Signed Long with 7 implied decimal places
16 = Convert anything to Signed Long with 8 implied decimal places
17 = Convert anything to Unsigned Long with 1 implied decimal place
18 = Convert anything to Unsigned Long with 2 implied decimal places
19 = Convert anything to Unsigned Long with 3 implied decimal places
20 = Convert anything to Unsigned Long with 4 implied decimal places
21 = Convert anything to Unsigned Long with 5 implied decimal places
22 = Convert anything to Unsigned Long with 6 implied decimal places
23 = Convert anything to Unsigned Long with 7 implied decimal places
24 = Convert anything to Unsigned Long with 8 implied decimal places
25 = Convert Anything to Float, No Scaling
26 = Convert Anything to a Signed Short Integer
27 = Convert Anything to a Signed Long Integer
28 = Convert Anything to an Unsigned Short Integer
29 = Convert Anything to an Unsigned Long Integer
37 = Convert Unsigned Byte to Packed Bit
41 = Convert anything to Signed Short with 1 implied decimal place
42 = Convert anything to Signed Short with 2 implied decimal places
43 = Convert anything to Signed Short with 3 implied decimal places
44 = Convert anything to Signed Short with 4 implied decimal places
45 = Convert anything to Signed Short with 5 implied decimal places
46 = Convert anything to Signed Short with 6 implied decimal places
47 = Convert anything to Signed Short with 7 implied decimal places
48 = Convert anything to Signed Short with 8 implied decimal places
49 = Convert anything to Unsigned Short with 1 implied decimal place
50 = Convert anything to Unsigned Short with 2 implied decimal place
51 = Convert anything to Unsigned Short with 3 implied decimal place
52 = Convert anything to Unsigned Short with 4 implied decimal place
53 = Convert anything to Unsigned Short with 5 implied decimal place
54 = Convert anything to Unsigned Short with 6 implied decimal place
55 = Convert anything to Unsigned Short with 7 implied decimal place
56 = Convert anything to Unsigned Short with 8 implied decimal place
57 = Convert anything to Signed Long 0, 1, 2, 3
58 = Convert anything to Unsigned Long 0, 1, 2, 3
59 = Convert anything to Signed Long 1, 0, 3, 2
60 = Convert anything to Unsigned Long 1, 0, 3, 2
61 = Convert anything to Signed Long 2, 3, 0, 1
62 = Convert anything to Unsigned Long 2, 3, 0, 1
63 = Convert anything to Signed Long 3, 2, 1, 0
64 = Convert anything to Unsigned Long 3, 2, 1, 0
65 = IEEE Floating Point Number 0, 1, 2, 3
66 = IEEE Floating Point Number 0, 1, 2, 3, Disregard MSB flag
67 = IEEE Floating Point Number 1, 0, 3, 2
68 = IEEE Floating Point Number 1, 0, 3, 2, Disregard MSB flag
69 = IEEE Floating Point Number 2, 3, 0, 1
70 = IEEE Floating Point Number 2, 3, 0, 1, Disregard MSB flag
71 = IEEE Floating Point Number 3, 2, 1, 0
72 = IEEE Floating Point Number 3, 2, 1, 0, Disregard MSB flag

73	= Double 01, 23, 45, 67, Disregard MSB flat (Series 2 only)
74	= Double 23, 21, 67, 45, Disregard MSB flag (Series 2 only)
75	= Double 45, 67, 01, 23, Disregard MSB flag (Series 2 only)
76	= Double 67, 45, 32, 01, Disregard MSB flag (Series 2 only)
77	= Double 10, 32, 54, 76, Disregard MSB flag (Series 2 only)
78	= Double 32, 10, 76, 54, Disregard MSB flag (Series 2 only)
79	= Double 54, 76, 10, 32, Disregard MSB flag (Series 2 only)
80	= Double 76, 54, 32, 10, Disregard MSB flag (Series 2 only)
81	= ASCII, Two characters per 16 bit register (Series 2 only)

3.4.30 Point Type 119: Modbus Event, Alarm, and History Table

Description: Point type 119 provides the Modbus Event, Alarm, and History Table parameters for allowing Modbus to bring back the event log, the alarm log, and history archives.

Number of Logical Points: 1 logical point for Modbus Event, Alarm, and History Table may exist.

Storage Location: Point type 119 is saved to internal configuration memory.

Table 3-31: Point Type 119, Modbus Event, Alarm, and History Table

Point Type 119, Modbus Event, Alarm, and History Table

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Event/Alarm Register	R/W	User	UINT16	2	0 → 65535	32	1.00	Contains a unique register number that indicates the request is for Events and Alarm records.
1	Current Date Register	R/W	User	UINT16	2	0 → 65535	7046	1.00	Contains a unique register that allows a Modbus read/write command to access the current date in MMDDYY format
2	Current Time Register	R/W	User	UINT16	2	0 → 65535	7047	1.00	Contains a unique register that allows a Modbus read/write command to access the current time in HHMMSS format
3	Periodic History Register #1	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for periodic values for the first range of history points.
4	Daily History Register #1	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for daily values for the first range of history points.
5	History Segment	R/W	User	UINT8	1	0→10	0	1.00	Contains the history segment for range 1.
6	Start History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the starting history point number for range 1.
7	End History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the ending history point number for range 1.
8	Conversion Code	R/W	User	UINT8	1	0, 65 → 72	0	1.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
9	Periodic History Register #2	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for periodic values for the second range of history points.

Point Type 119, Modbus Event, Alarm, and History Table

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
10	Daily History Register #2	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for daily values for the second range of history points.
11	History Segment	R/W	User	UINT8	1	0→10	0	1.00	Contains the history segment for range 2.
12	Start History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the starting history point number for range 2.
13	End History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the ending history point number for range 2.
14	Conversion Code	R/W	User	UINT8	1	0, 65 → 72	0	1.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
15	Periodic History Register #3	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for periodic values for the third range of history points.
16	Daily History Register #3	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for daily values for the third range of history points.
17	History Segment	R/W	User	UINT8	1	0→10	0	1.00	Contains the history segment for range 3.
18	Start History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the starting history point number for range 3.
19	End History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the ending history point number for range 3.
20	Conversion Code	R/W	User	UINT8	1	0, 65 → 72	0	1.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
21	Periodic History Register #4	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for periodic values for the fourth range of history points.
22	Daily History Register #4	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for daily values for the fourth range of history points.
23	History Segment	R/W	User	UINT8	1	0→10	0	1.00	Contains the history segment for range 4.
24	Start History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the starting history point number for range 4.
25	End History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the ending history point number for range 4.

Point Type 119, Modbus Event, Alarm, and History Table

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
26	Conversion Code	R/W	User	UINT8	1	0, 65 → 72	0	1.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
27	Periodic History Register #5	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for periodic values for the fifth range of history points.
28	Daily History Register #5	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for daily values for the fifth range of history points.
29	History Segment	R/W	User	UINT8	1	0→10	0	1.00	Contains the history segment for range 5.
30	Start History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the starting history point number for range 5.
31	End History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the ending history point number for range 5.
32	Conversion Code	R/W	User	UINT8	1	0, 65 → 72	0	1.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
33	Periodic History Register #6	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for periodic values for the sixth range of history points.
34	Daily History Register #6	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for daily values for the sixth range of history points.
35	History Segment	R/W	User	UINT8	1	0→10	0	1.00	Contains the history segment for range 6.
36	Start History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the starting history point number for range 6.
37	End History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the ending history point number for range 6.
38	Conversion Code	R/W	User	UINT8	1	0, 65 → 72	0	1.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
39	Periodic History Register #7	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for periodic values for the seventh range of history points.
40	Daily History Register #7	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for daily values for the seventh range of history points.
41	History Segment	R/W	User	UINT8	1	0→10	0	1.00	Contains the history segment for range 7.

Point Type 119, Modbus Event, Alarm, and History Table

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
42	Start History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the starting history point number for range 7.
43	End History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the ending history point number for range 7.
44	Conversion Code	R/W	User	UINT8	1	0, 65 → 72	0	1.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
45	Periodic History Register #8	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for periodic values for the eighth range of history points.
46	Daily History Register #8	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for daily values for the eighth range of history points.
47	History Segment	R/W	User	UINT8	1	0→10	0	1.00	Contains the history segment for range 8.
48	Start History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the starting history point number for range 8.
49	End History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the ending history point number for range 8.
50	Conversion Code	R/W	User	UINT8	1	0, 65 → 72	0	1.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
51	Periodic History Register #9	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for periodic values for the ninth range of history points.
52	Daily History Register #9	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for daily values for the ninth range of history points.
53	History Segment	R/W	User	UINT8	1	0→10	0	1.00	Contains the history segment for range 9.
54	Start History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the starting history point number for range 9.
55	End History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the ending history point number for range 9.
56	Conversion Code	R/W	User	UINT8	1	0 → 8, 25 → 29, 65 → 72	0	1.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
57	Periodic History Register #10	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for periodic values for the tenth range of history points.

Point Type 119, Modbus Event, Alarm, and History Table

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
58	Daily History Register #10	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for daily values for the tenth range of history points.
59	History Segment	R/W	User	UINT8	1	0→10	0	1.00	Contains the history segment for range 10.
60	Start History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the starting history point number for range 10.
61	End History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the ending history point number for range 10.
62	Conversion Code	R/W	User	UINT8	1	0, 65 → 72	0	1.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
63	Periodic History Register #11	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for periodic values for the eleventh range of history points.
64	Daily History Register #11	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for daily values for the eleventh range of history points.
65	History Segment	R/W	User	UINT8	1	0→10	0	1.00	Contains the history segment for range 11.
66	Start History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the starting history point number for range 11.
67	End History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the ending history point number for range 11.
68	Conversion Code	R/W	User	UINT8	1	0, 65 → 72	0	1.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
69	Periodic History Register #12	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for periodic values for the twelfth range of history points.
70	Daily History Register #12	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for daily values for the twelfth range of history points.
71	History Segment	R/W	User	UINT8	1	0→10	0	1.00	Contains the history segment for range 12.
72	Start History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the starting history point number for range 12.
73	End History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the ending history point number for range 12.

Point Type 119, Modbus Event, Alarm, and History Table

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
74	Conversion Code	R/W	User	UINT8	1	0, 65 → 72	0	1.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
75	Periodic History Register #13	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for periodic values for the thirteenth range of history points.
76	Daily History Register #13	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for daily values for the thirteenth range of history points.
77	History Segment	R/W	User	UINT8	1	0→10	0	1.00	Contains the history segment for range 13.
78	Start History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the starting history point number for range 13.
79	End History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the ending history point number for range 13.
80	Conversion Code	R/W	User	UINT8	1	0, 65 → 72	0	1.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
81	Periodic History Register #14	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for periodic values for the fourteenth range of history points.
82	Daily History Register #14	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for daily values for the fourteenth range of history points.
83	History Segment	R/W	User	UINT8	1	0→10	0	1.00	Contains the history segment for range 14.
84	Start History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the starting history point number for range 14.
85	End History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the ending history point number for range 14.
86	Conversion Code	R/W	User	UINT8	1	0, 65 → 72	0	1.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
87	Periodic History Register #15	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for periodic values for the fifteenth range of history points.
88	Daily History Register #15	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for daily values for the fifteenth range of history points.
89	History Segment	R/W	User	UINT8	1	0→10	0	1.00	Contains the history segment for range 15.

Point Type 119, Modbus Event, Alarm, and History Table

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
90	Start History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the starting history point number for range 15.
91	End History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the ending history point number for range 15.
92	Conversion Code	R/W	User	UINT8	1	0, 65 → 72	0	1.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
93	Periodic History Register #16	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for periodic values for the sixteenth range of history points.
94	Daily History Register #16	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for daily values for the sixteenth range of history points.
95	History Segment	R/W	User	UINT8	1	0→10	0	1.00	Contains the history segment for range 16.
96	Start History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the starting history point number for range 16.
97	End History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the ending history point number for range 16.
98	Conversion Code	R/W	User	UINT8	1	0, 65 → 72	0	1.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
99	Periodic History Register #17	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for periodic values for the seventeenth range of history points.
100	Daily History Register #17	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for daily values for the seventeenth range of history points.
101	History Segment	R/W	User	UINT8	1	0→10	0	1.00	Contains the history segment for range 17.
102	Start History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the starting history point number for range 17.
103	End History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the ending history point number for range 17.
104	Conversion Code	R/W	User	UINT8	1	0, 65 → 72	0	1.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
105	Periodic History Register #18	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for periodic values for the eighteenth range of history points.

Point Type 119, Modbus Event, Alarm, and History Table

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
106	Daily History Register #18	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for daily values for the eighteenth range of history points.
107	History Segment	R/W	User	UINT8	1	0→10	0	1.00	Contains the history segment for range 18.
108	Start History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the starting history point number for range 18.
109	End History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the ending history point number for range 18.
110	Conversion Code	R/W	User	UINT8	1	0, 65 → 72	0	1.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
111	Periodic History Register #19	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for periodic values for the nineteenth range of history points.
112	Daily History Register #19	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for daily values for the nineteenth range of history points.
113	History Segment	R/W	User	UINT8	1	0→10	0	1.00	Contains the history segment for range 19.
114	Start History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the starting history point number for range 19.
115	End History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the ending history point number for range 19.
116	Conversion Code	R/W	User	UINT8	1	0, 65 → 72	0	1.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
117	Periodic History Register #20	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for periodic values for the twentieth range of history points.
118	Daily History Register #20	R/W	User	UINT16	2	0 → 65535	0	1.00	Contains a unique register number that indicates the request is for daily values for the twentieth range of history points.
119	History Segment	R/W	User	UINT8	1	0→10	0	1.00	Contains the history segment for range 20.
120	Start History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the starting history point number for range 20.
121	End History Point	R/W	User	UINT16	2	0→199	0	1.00	Contains the ending history point number for range 20.

Point Type 119, Modbus Event, Alarm, and History Table

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
122	Conversion Code	R/W	User	UINT8	1	0, 65 → 72	0	1.00	Contains the conversion code to convert the ROC800-Series data into a format that is compatible to a Modbus device. **Note**: See Conversion Codes at end of table.
123	History Index Mode	R/W	User	UINT8	1	0 →	0	1.00	Indicates the history indexing mode. Valid values are: 0 = EFM Extensions Mode: History Indexes (mapped to TLP[124,X,5] and [124,X,6]) will be returned as one less - accounting for roll-over - corresponding to last entry location. History data will be returned for the index requested. 1 = Override mode 1: History Indexes (mapped to TLP[124,X,5] and [124,X,6]) will be returned unmodified (index is to the next record to be written). History data will be returned for the index requested. 2 = Override mode 2: History Indexes (mapped to TLP[124,X,5] and [124,X,6]) will be returned unmodified (index is to the next record to be written). History data will be returned at an index one less than the index requested, accounting for rollover. If a request for history data at an index beyond the number of valid indices is received, the ROC will respond with history data at the last valid index (For example, if there are 35 daily entries, valid indices are 0-34. Requests for index 35, 36, 37, etc. will all return history for index 34). Override mode 2 was implemented in firmware version 2.02.

Conversion codes are:

0 = No Conversion
65 = IEEE Floating Point Number 0, 1, 2, 3
66 = IEEE Floating Point Number 0, 1, 2, 3, Disregard MSB flag
67 = IEEE Floating Point Number 1, 0, 3, 2
68 = IEEE Floating Point Number 1, 0, 3, 2, Disregard MSB flag
69 = IEEE Floating Point Number 2, 3, 0, 1
70 = IEEE Floating Point Number 2, 3, 0, 1, Disregard MSB flag
71 = IEEE Floating Point Number 3, 2, 1, 0
72 = IEEE Floating Point Number 3, 2, 1, 0, Disregard MSB flag

3.4.31 Point Type 120: Modbus Master Modem Configuration

Description: Point type 120 provides the configuration parameters for configuring Modbus Protocol master modem communication.

Number of Logical Points: 5 logical points for Modbus Master Modem Configuration may exist corresponding to Comm1 through Comm 5.

Storage Location: Point type 120 is saved to internal configuration memory.

Table 3-32: Point Type 120, Modbus Master Modem Configuration

Point Type 120, Modbus Master Modem Configuration

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Tag ID	R/W	User	AC	10	0x20 → 0x7E for each byte	'Modem #'	1.10	String that describes the instance of the Master modem table.
1	First RTU Address	R/W	User	UINT8	1	0 → 255	0	1.10	Associates an RTU address to the Connect Command.
2	First Connect Command	R/W	User	AC	30	0x20 → 0x7E for each byte	'ATDT'	1.10	A 40-character modem command typically used to represent the telephone number of the slave RTU.
3	Second RTU Address	R/W	User	UINT8	1	0 → 255	0	1.10	Associates an RTU address to the Connect Command.
4	Second Connect Command	R/W	User	AC	30	0x20 → 0x7E for each byte	'ATDT'	1.10	A 40-character modem command typically used to represent the telephone number of the slave RTU.
5	Third RTU Address	R/W	User	UINT8	1	0 → 255	0	1.10	Associates an RTU address to the Connect Command.
6	Third Connect Command	R/W	User	AC	30	0x20 → 0x7E for each byte	'ATDT'	1.10	A 40-character modem command typically used to represent the telephone number of the slave RTU.
7	Fourth RTU Address	R/W	User	UINT8	1	0 → 255	0	1.10	Associates an RTU address to the Connect Command.
8	Fourth Connect Command	R/W	User	AC	30	0x20 → 0x7E for each byte	'ATDT'	1.10	A 40-character modem command typically used to represent the telephone number of the slave RTU.
9	Fifth RTU Address	R/W	User	UINT8	1	0 → 255	0	1.10	Associates an RTU address to the Connect Command.
10	Fifth Connect Command	R/W	User	AC	30	0x20 → 0x7E for each byte	'ATDT'	1.10	A 40-character modem command typically used to represent the telephone number of the slave RTU.
11	Sixth RTU Address	R/W	User	UINT8	1	0 → 255	0	1.10	Associates an RTU address to the Connect Command.

Point Type 120, Modbus Master Modem Configuration

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
12	Sixth Connect Command	R/W	User	AC	30	0x20 → 0x7E for each byte	'ATDT'	1.10	A 40-character modem command typically used to represent the telephone number of the slave RTU.

3.4.32 Point Type 121: Modbus Master Table

Description: Point type 121 provides the Modbus Master Table parameters for configuring Modbus Protocol master communication.

Number of Logical Points: 15 logical points for Modbus Master Table may exist (3 tables per communication port).

Storage Location: Point type 121 is saved to internal configuration memory.

Table 3-33: Point Type 121, Modbus Master Table

Point Type 121, Modbus Master Table

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Tag ID	R/W	User	AC	10	0x20 → 0x7E for each byte	'MastTbl #'	1.10	String that describes the instance of the Master table.
1	RTU 1 Address	R/W	User	UINT8	1	0 →255	0	1.10	Contains RTU 1 Address the Modbus Query is destined for
2	Function Code Number	R/W	User	UINT8	1	0 → 6, 15, 16	0	1.10	Specifies the Modbus Function Code to be sent to the slave device on RTU 1. **Note**: See Modbus Function Codes list at end of table.
3	Slave Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the slave device for the query on RTU 1.
4	Master Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the Master device (ROC800-Series) where the data will either be stored for a read, or provided for a write.
5	Number of registers	R/W	User	UINT8	1	1 → 120	1	1.10	Indicates the number of registers for the master to either read or write.
6	Communication Status	R/W	System	UINT8	1	0 → 8, 128 → 131, 144, 145	0	1.10	Displays the status of the master query. **Note**: See Communications Status Codes list at end of table.
7	RTU 2 Address	R/W	User	UINT8	1	0 → 255	0	1.10	Contains RTU 2 Address the Modbus Query is destined for
8	Function Code Number	R/W	User	UINT8	1	0 → 6, 15, 16	0	1.10	Specifies the Modbus Function Code to be sent to the slave device on RTU 2. **Note**: See Modbus Function Codes list at end of table.
9	Slave Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the slave device for the query on RTU 2.
10	Master Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the Master device (ROC800-Series) where the data will either be stored for a read, or provided for a write.

Point Type 121, Modbus Master Table

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
11	Number of registers	R/W	User	UINT8	1	1 → 120	1	1.10	Indicates the number of registers for the master to either read or write.
12	Communication Status	R/W	System	UINT8	1	0 → 8, 128 → 131, 144, 145	0	1.10	Displays the status of the master query. **Note**: See Communications Status Codes list at end of table.
13	RTU 3 Address	R/W	User	UINT8	1	0 → 255	0	1.10	Contains RTU 3 Address the Modbus Query is destined for.
14	Function Code Number	R/W	User	UINT8	1	0 → 6, 15, 16	0	1.10	Specifies the Modbus Function Code to be sent to the slave device on RTU 3. **Note**: See Modbus Function Codes list at end of table.
15	Slave Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the slave device for the query on RTU 3.
16	Master Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the Master device (ROC800-Series) where the data will either be stored for a read, or provided for a write.
17	Number of registers	R/W	User	UINT8	1	1 → 120	1	1.10	Indicates the number of registers for the master to either read or write.
18	Communication Status	R/W	System	UINT8	1	0 → 8, 128 → 131, 144, 145	0	1.10	Displays the status of the master query. **Note**: See Communications Status Codes list at end of table.
19	RTU 4 Address	R/W	User	UINT8	1	0 → 255	0	1.10	Contains RTU 4 Address the Modbus Query is destined for
20	Function Code Number	R/W	User	UINT8	1	0 → 6, 15, 16	0	1.10	Specifies the Modbus Function Code to be sent to the slave device on RTU 4. **Note**: See Modbus Function Codes list at end of table.
21	Slave Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the slave device for the query on RTU 4.
22	Master Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the Master device (ROC800-Series9) where the data will either be stored for a read, or provided for a write.
23	Number of registers	R/W	User	UINT8	1	1 → 120	1	1.10	Indicates the number of registers for the master to either read or write.
24	Communication Status	R/W	System	UINT8	1	0 → 8, 128 → 131, 144, 145	0	1.10	Displays the status of the master query. **Note**: See Communications Status Codes list at end of table.
25	RTU 5 Address	R/W	User	UINT8	1	0 → 255	0	1.10	Contains RTU 5 Address the Modbus Query is destined for

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Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
26	Function Code Number	R/W	User	UINT8	1	0 → 6, 15, 16	0	1.10	Specifies the Modbus Function Code to be sent to the slave device on RTU 5. **Note**: See Modbus Function Codes list at end of table.
27	Slave Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the slave device for the query on RTU 5.
28	Master Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the Master device (ROC800-Series) where the data will either be stored for a read or provided for a write.
29	Number of registers	R/W	User	UINT8	1	1 → 120	1	1.10	Indicates the number of registers for the master to either read or write.
30	Communication Status	R/W	System	UINT8	1	0 → 8, 128 → 131, 144, 145	0	1.10	Displays the status of the master query. **Note**: See Communications Status Codes list at end of table.
31	RTU 6 Address	R/W	User	UINT8	1	0 → 255	0	1.10	Contains RTU 6 Address the Modbus Query is destined for
32	Function Code Number	R/W	User	UINT8	1	0 → 6, 15, 16	0	1.10	Specifies the Modbus Function Code to be sent to the slave device on RTU 6. **Note**: See Modbus Function Codes list at end of table.
33	Slave Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the slave device for the query on RTU 6.
34	Master Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the Master device (ROC800-Series) where the data will either be stored for a read or provided for a write.
35	Number of registers	R/W	User	UINT8	1	1 → 120	1	1.10	Indicates the number of registers for the master to either read or write.
36	Communication Status	R/W	System	UINT8	1	0 → 8, 128 → 131, 144, 145	0	1.10	Displays the status of the master query. **Note**: See Communications Status Codes list at end of table.
37	RTU 7 Address	R/W	User	UINT8	1	0 → 255	0	1.10	Contains RTU 7 Address the Modbus Query is destined for
38	Function Code Number	R/W	User	UINT8	1	0 → 6, 15, 16	0	1.10	Specifies the Modbus Function Code to be sent to the slave device on RTU 7. **Note**: See Modbus Function Codes list at end of table.
39	Slave Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the slave device for the query on RTU 7.
40	Master Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the Master device (ROC800-Series) where the data will either be stored for a read, or provided for a write.

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Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
41	Number of registers	R/W	User	UINT8	1	1 → 120	1	1.10	Indicates the number of registers for the master to either read or write.
42	Communication Status	R/W	System	UINT8	1	0 → 8, 128 → 131, 144, 145	0	1.10	Displays the status of the master query. **Note**: See Communications Status Codes list at end of table.
43	RTU 8 Address	R/W	User	UINT8	1	0 → 255	0	1.10	Contains RTU 8 Address the Modbus Query is destined for
44	Function Code Number	R/W	User	UINT8	1	0 → 6, 15, 16	0	1.10	Specifies the Modbus Function Code to be sent to the slave device on RTU 8. **Note**: See Modbus Function Codes list at end of table.
45	Slave Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the slave device for the query on RTU 8.
46	Master Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the Master device (ROC800-Series) where the data will either be stored for a read, or provided for a write.
47	Number of registers	R/W	User	UINT8	1	1 → 120	1	1.10	Indicates the number of registers for the master to either read or write.
48	Communication Status	R/W	System	UINT8	1	0 → 8, 128 → 131, 144, 145	0	1.10	Displays the status of the master query. **Note**: See Communications Status Codes list at end of table.
49	RTU 9 Address	R/W	User	UINT8	1	0 → 255	0	1.10	Contains RTU 9 Address the Modbus Query is destined for
50	Function Code Number	R/W	User	UINT8	1	0 → 6, 15, 16	0	1.10	Specifies the Modbus Function Code to be sent to the slave device on RTU 9. **Note**: See Modbus Function Codes list at end of table.
51	Slave Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the slave device for the query on RTU 9.
52	Master Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the Master device (ROC800-Series) where the data will either be stored for a read, or provided for a write.
53	Number of registers	R/W	User	UINT8	1	1 → 120	1	1.10	Indicates the number of registers for the master to either read or write.
54	Communication Status	R/W	System	UINT8	1	0 → 8, 128 → 131, 144, 145	0	1.10	Displays the status of the master query. **Note**: See Communications Status Codes list at end of table.
55	RTU 10 Address	R/W	User	UINT8	1	0 → 255	0	1.10	Contains RTU 10 Address the Modbus Query is destined for

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Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
56	Function Code Number	R/W	User	UINT8	1	0 → 6, 15, 16	0	1.10	Specifies the Modbus Function Code to be sent to the slave device on RTU 10. **Note**: See Modbus Function Codes list at end of table.
57	Slave Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the slave device for the query on RTU 10.
58	Master Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the Master device (ROC800-Series) where the data will either be stored for a read, or provided for a write.
59	Number of registers	R/W	User	UINT8	1	1 → 120	1	1.10	Indicates the number of registers for the master to either read or write.
60	Communication Status	R/W	System	UINT8	1	0 → 8, 128 → 131, 144, 145	0	1.10	Displays the status of the master query. **Note**: See Communications Status Codes list at end of table.
61	RTU 11 Address	R/W	User	UINT8	1	0 → 255	0	1.10	Contains RTU 11 Address the Modbus Query is destined for
62	Function Code Number	R/W	User	UINT8	1	0 → 6, 15, 16	0	1.10	Specifies the Modbus Function Code to be sent to the slave device on RTU 11. **Note**: See Modbus Function Codes list at end of table.
63	Slave Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the slave device for the query on RTU 11.
64	Master Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the Master device (ROC800-Series) where the data will either be stored for a read, or provided for a write.
65	Number of registers	R/W	User	UINT8	1	1 → 120	1	1.10	Indicates the number of registers for the master to either read or write.
66	Communication Status	R/W	System	UINT8	1	0 → 8, 128 → 131, 144, 145	0	1.10	Displays the status of the master query. **Note**: See Communications Status Codes list at end of table.
67	RTU 12 Address	R/W	User	UINT8	1	0 → 255	0	1.10	Contains RTU 12 Address the Modbus Query is destined for
68	Function Code Number	R/W	User	UINT8	1	0 → 6, 15, 16	0	1.10	Specifies the Modbus Function Code to be sent to the slave device on RTU 12. **Note**: See Modbus Function Codes list at end of table.
69	Slave Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the slave device for the query on RTU 12.
70	Master Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the Master device (ROC800-Series) where the data is either stored for a read or provided for a write.

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Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
71	Number of registers	R/W	User	UINT8	1	1 → 120	1	1.10	Indicates the number of registers for the master to either read or write.
72	Communication Status	R/W	System	UINT8	1	0 → 8, 128 → 131, 144, 145	0	1.10	Displays the status of the master query. **Note**: See Communications Status Codes list at end of table.
73	RTU 13 Address	R/W	User	UINT8	1	0 → 255	0	1.10	Contains RTU 13 Address the Modbus Query is destined for
74	Function Code Number	R/W	User	UINT8	1	0 → 6, 15, 16	0	1.10	Specifies the Modbus Function Code to be sent to the slave device on RTU 13. **Note**: See Modbus Function Codes list at end of table.
75	Slave Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the slave device for the query on RTU 13.
76	Master Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the Master device (ROC800-Series) where the data will either be stored for a read, or provided for a write.
77	Number of registers	R/W	User	UINT8	1	1 → 120	1	1.10	Indicates the number of registers for the master to either read or write.
78	Communication Status	R/W	System	UINT8	1	0 → 8, 128 → 131, 144, 145	0	1.10	Displays the status of the master query. **Note**: See Communications Status Codes list at end of table.
79	RTU 14 Address	R/W	User	UINT8	1	0 → 255	0	1.10	Contains RTU 14 Address the Modbus Query is destined for
80	Function Code Number	R/W	User	UINT8	1	0 → 6, 15, 16	0	1.10	Specifies the Modbus Function Code to be sent to the slave device on RTU 14. **Note**: See Modbus Function Codes list at end of table.
81	Slave Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the slave device for the query on RTU 14.
82	Master Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the Master device (ROC800-Series) where the data will either be stored for a read, or provided for a write.
83	Number of registers	R/W	User	UINT8	1	1 → 120	1	1.10	Indicates the number of registers for the master to either read or write.
84	Communication Status	R/W	System	UINT8	1	0 → 8, 128 → 131, 144, 145	0	1.10	Displays the status of the master query. **Note**: See Communications Status Codes list at end of table.
85	RTU 15 Address	R/W	User	UINT8	1	0 → 255	0	1.10	Contains RTU 15 Address the Modbus Query is destined for

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Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
86	Function Code Number	R/W	User	UINT8	1	0 → 6, 15, 16	0	1.10	Specifies the Modbus Function Code to be sent to the slave device on RTU 15. **Note**: See Modbus Function Codes list at end of table.
87	Slave Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the slave device for the query on RTU 15.
88	Master Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the Master device (ROC800-Series) where the data will either be stored for a read, or provided for a write.
89	Number of registers	R/W	User	UINT8	1	1 → 120	1	1.10	Indicates the number of registers for the master to either read or write.
90	Communication Status	R/W	System	UINT8	1	0 → 8, 128 → 131, 144, 145	0	1.10	Displays the status of the master query. **Note**: See Communications Status Codes list at end of table.
91	RTU 16 Address	R/W	User	UINT8	1	0 → 255	0	1.10	Contains RTU 16 Address the Modbus Query is destined for
92	Function Code Number	R/W	User	UINT8	1	0 → 6, 15, 16	0	1.10	Specifies the Modbus Function Code to be sent to the slave device on RTU 16. **Note**: See Modbus Function Codes list at end of table.
93	Slave Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the slave device for the query on RTU 16.
94	Master Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the Master device (ROC800-Series) where the data will either be stored for a read, or provided for a write.
95	Number of registers	R/W	User	UINT8	1	1 → 120	1	1.10	Indicates the number of registers for the master to either read or write.
96	Communication Status	R/W	System	UINT8	1	0 → 8, 128 → 131, 144, 145	0	1.10	Displays the status of the master query. **Note**: See Communications Status Codes list at end of table.
97	RTU 17 Address	R/W	User	UINT8	1	0 → 255	0	1.10	Contains RTU 17 Address the Modbus Query is destined for
98	Function Code Number	R/W	User	UINT8	1	0 → 6, 15, 16	0	1.10	Specifies the Modbus Function Code to be sent to the slave device on RTU 17. **Note**: See Modbus Function Codes list at end of table.
99	Slave Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the slave device for the query on RTU 17.
100	Master Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the Master device (ROC800-Series) where the data will either be stored for a read, or provided for a write.

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Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
101	Number of registers	R/W	User	UINT8	1	1 → 120	1	1.10	Indicates the number of registers for the master to either read or write.
102	Communication Status	R/W	System	UINT8	1	0 → 8, 128 → 131, 144, 145	0	1.10	Displays the status of the master query. **Note**: See Communications Status Codes list at end of table.
103	RTU 18 Address	R/W	User	UINT8	1	0 – 255	0	1.10	Contains RTU 18 Address the Modbus Query is destined for
104	Function Code Number	R/W	User	UINT8	1	0 → 6, 15, 16	0	1.10	Specifies the Modbus Function Code to be sent to the slave device on RTU 18. **Note**: See Modbus Function Codes list at end of table. .
105	Slave Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the slave device for the query on RTU 18.
106	Master Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the Master device (ROC800-Series) where the data will either be stored for a read, or provided for a write.
107	Number of registers	R/W	User	UINT8	1	1 → 120	1	1.10	Indicates the number of registers for the master to either read or write.
108	Communication Status	R/W	System	UINT8	1	0 → 8, 128 → 131, 144, 145	0	1.10	Displays the status of the master query. **Note**: See Communications Status Codes list at end of table.
109	RTU 19 Address	R/W	User	UINT8	1	0 → 255	0	1.10	Contains RTU 19 Address the Modbus Query is destined for
110	Function Code Number	R/W	User	UINT8	1	0 → 6, 15, 16	0	1.10	Specifies the Modbus Function Code to be sent to the slave device on RTU 19. **Note**: See Modbus Function Codes list at end of table.
111	Slave Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the slave device for the query on RTU 19.
112	Master Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the Master device (ROC800-Series) where the data will either be stored for a read, or provided for a write.
113	Number of registers	R/W	User	UINT8	1	1 → 120	1	1.10	Indicates the number of registers for the master to either read or write.
114	Communication Status	R/W	System	UINT8	1	0 → 8, 128 → 131, 144, 145	0	1.10	Displays the status of the master query. **Note**: See Communications Status Codes list at end of table.
115	RTU 20 Address	R/W	User	UINT8	1	0 → 255	0	1.10	Contains RTU 20 Address the Modbus Query is destined for

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Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
116	Function Code Number	R/W	User	UINT8	1	0 →15, 16	0	1.10	Specifies the Modbus Function Code to be sent to the slave device on RTU 20. **Note**: See Modbus Function Codes list at end of table.
117	Slave Register Number	R/W	User	UINT16	2	0 →535	0	1.10	The starting Modbus register number on the slave device for the query on RTU 20.
118	Master Register Number	R/W	User	UINT16	2	0 →535	0	1.10	The starting Modbus register number on the Master device (ROC800-Series) where the data will either be stored for a read, or provided for a write.
119	Number of registers	R/W	User	UINT8	1	1 → 120	1	1.10	Indicates the number of registers for the master to either read or write.
120	Communication Status	R/W	System	UINT8	1	0 → 8, 128 → 131, 144, 145	0	1.10	Displays the status of the master query. **Note**: See Communications Status Codes list at end of table.
121	RTU 21 Address	R/W	User	UINT8	1	0 → 255	0	1.10	Contains RTU 21 Address the Modbus Query is destined for
122	Function Code Number	R/W	User	UINT8	1	0 → 6, 15, 16	0	1.10	Specifies the Modbus Function Code to be sent to the slave device on RTU 21. **Note**: See Modbus Function Codes list at end of table.
123	Slave Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the slave device for the query on RTU 21.
124	Master Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the Master device (ROC800-Series) where the data will either be stored for a read, or provided for a write.
125	Number of registers	R/W	User	UINT8	1	1 → 120	1	1.10	Indicates the number of registers for the master to either read or write.
126	Communication Status	R/W	System	UINT8	1	0 → 8, 128 → 131, 144, 145	0	1.10	Displays the status of the master query. **Note**: See Communications Status Codes list at end of table.
127	RTU 22 Address	R/W	User	UINT8	1	0 → 255	0	1.10	Contains RTU 22 Address the Modbus Query is destined for
128	Function Code Number	R/W	User	UINT8	1	0 → 6, 15, 16	0	1.10	Specifies the Modbus Function Code to be sent to the slave device on RTU 22. **Note**: See Modbus Function Codes list at end of table.
129	Slave Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the slave device for the query on RTU 22.
130	Master Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the Master device (ROC800-Series) where the data will either be stored for a read, or provided for a write.

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Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
131	Number of registers	R/W	User	UINT8	1	1 → 120	1	1.10	Indicates the number of registers for the master to either read or write.
132	Communication Status	R/W	System	UINT8	1	0 → 8, 128 → 131, 144, 145	0	1.10	Displays the status of the master query. **Note**: See Communications Status Codes list at end of table.
133	RTU 23 Address	R/W	User	UINT8	1	0 → 255	0	1.10	Contains RTU 23 Address the Modbus Query is destined for
134	Function Code Number	R/W	User	UINT8	1	0 → 6, 15, 16	0	1.10	Specifies the Modbus Function Code to be sent to the slave device on RTU 23. **Note**: See Modbus Function Codes list at end of table. .
135	Slave Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the slave device for the query on RTU 23.
136	Master Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the Master device (ROC800-Series) where the data will either be stored for a read, or provided for a write.
137	Number of registers	R/W	User	UINT8	1	1 → 120	1	1.10	Indicates the number of registers for the master to either read or write.
138	Communication Status	R/W	System	UINT8	1	0 → 8, 128 → 131, 144, 145	0	1.10	Displays the status of the master query. **Note**: See Communications Status Codes list at end of table.
139	RTU 24 Address	R/W	User	UINT8	1	0 → 255	0	1.10	Contains RTU 24 Address the Modbus Query is destined for
140	Function Code Number	R/W	User	UINT8	1	0 → 6, 15, 16	0	1.10	Specifies the Modbus Function Code to be sent to the slave device on RTU 24. **Note**: See Modbus Function Codes list at end of table.
141	Slave Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the slave device for the query on RTU 24.
142	Master Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the Master device (ROC800-Series) where the data will either be stored for a read, or provided for a write.
143	Number of registers	R/W	User	UINT8	1	1 → 120	1	1.10	Indicates the number of registers for the master to either read or write.
144	Communication Status	R/W	System	UINT8	1	0 → 8, 128 → 131, 144, 145	0	1.10	Displays the status of the master query. **Note**: See Communications Status Codes list at end of table.
145	RTU 25 Address	R/W	User	UINT8	1	0 → 255	0	1.10	Contains RTU 25 Address the Modbus Query is destined for

Point Type 121, Modbus Master Table

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
146	Function Code Number	R/W	User	UINT8	1	0 → 6, 15, 16	0	1.10	Specifies the Modbus Function Code to be sent to the slave device on RTU 25. **Note**: See Modbus Function Codes list at end of table.
147	Slave Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the slave device for the query on RTU 25.
148	Master Register Number	R/W	User	UINT16	2	0 → 65535	0	1.10	The starting Modbus register number on the Master device (ROC800-Series) where the data will either be stored for a read, or provided for a write.
149	Number of registers	R/W	User	UINT8	1	1 → 120	1	1.10	Indicates the number of registers for the master to either read or write.
150	Communication Status	R/O	System	UINT8	1	0 → 8, 128 → 131, 144, 145	0	1.10	Displays the status of the master query. **Note**: See Communications Status Codes list at end of table.

Modbus Function Codes are:

- 0 = Disables the query.
- 1 = Send register contents to master (Read Coil Status)
- 2 = Send register contents to master (Read Input Status)
- 3 = Send register contents to master (Read Holding Registers)
- 4 = Send register contents to master (Read Input Registers)
- 5 = Set a single register value on slave (Force Single Coil)
- 6 = Set a single register value on slave (Preset Single Register)
- 8 = Return data sent to slave back to master (Loopback)
- 15 = Set multiple register values on a slave (Force Multiple Coils)
- 16 = Set multiple register values on a slave (Preset Multiple Registers)

Communication Status codes are:

- 0 = Inactive or start of transmission
- 1 = Received timeout error
- 2 = Received address check
- 3 = Received Function Code check
- 4 = Number of expected bytes check
- 8 = Valid slave response
- 128 = Write ROC data error
- 129 = Access ROC data error
- 130 = Master Table error
- 131 = Master TCP error

Status values 0 and 3 through 8 are active on the master transmission. These values appear for a very short time and step to the next value if the process is without error. If an error occurs in the step, then the value is present until the next transmission is requested. A transmission without error has a status value of 8, “Valid Slave Response.”

3.4.33 Point Type 122: DS800 Configuration

Description: This point type provides parameters used to configure DS800.

Number of Logical Points: 1 logical point for DS800 Configuration may exist.

Storage Location: Point type 122 is saved to internal configuration memory.

Table 3-34. Point Type 122, DS800 Configuration

Point Type 122, DS800 Configuration

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Power Switch	R/W	User	UINT8	1	0,1	1	1.00	Turns DS800 on and off. Valid values are 0 (OFF) and 1 (ON).
1	RSI Enable	R/W	User	UINT8	1	0,1	1	1.00	Enables/Disables the DS800 serial task. Valid values are 0 (Disable) and 1 (Enable). Changes to this parameter take affect when DS800 is stopped and started again.
2	ETCP Enable	R/W	User	UINT8	1	0,1	1	1.00	Enables/Disables the DS800 TCP/IP task. Valid values are 0 (Disable) and 1 (Enable). Changes to this parameter take affect when DS800 is stopped and started again.
3	IXD Enable	R/W	User	UINT8	1	0,1	1	1.00	Enables/Disables the DS800 IXD task. Valid values are 0 (Disabale) and 1 (Enable). Changes to this parameter take affect when DS800 is stopped and started again.
4	RSI Running	R/O	System	UINT8	1	0,1	1	1.00	Indicates whether the DS800 serial task is currently running. Valid values are 0 (Not running) and 1 (Running).
5	ETCP Running	R/O	System	UINT8	1	0,1	1	1.00	Indicates whether the DS800 TCP/IP task is currently running. Valid values are 0 (Not running) and 1 (Running).
6	IXD Running	R/O	System	UINT8	1	0,1	1	1.00	Indicates whether or not the DS800 IXD task is currently running. Valid values are 0 (Not running) and 1 (Running).
7	Clean Stored Resources	R/W	User	UINT8	1	0,1	0	1.00	Setting this parameter to **1** removes all stored resources from file system. This does **not** stop resources that may be running, but running resources will not be reloaded when you toggle the power switch.
8	Resource 1 Name	R/O	System	AC	20	0x02 → 0x7E for each bite	" "	2.10	Indicates the name for the specified resource.

Point Type 122, DS800 Configuration

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
9	Resource 1 Status	R/O	System	INT8	1	1 → 120	0	2.10	Indicates the resource's status code. Valild values are: -1 = Fatal Error 0 = No resource available 1 = Stored resource available 2 = Ready to run 3 = Run in real time 4 = Run in cycle by cycle 5 = Run with breakpoint encountered (not currentl supported)
10	Resroiuce 1 Programmed Cycle Time	R/O	System	UINT32	4	0 — 4,294,967,295	0	2.10	Indicates, in milliseconds, the defined cycle time for the specified resource.
11	Resource 1 Current Cycle Time	R/O	System	UINT32	4	0 — 4,294,967,295	0	2.10	Indicates, in milliseconds, the current cycle time for the specified resource.
12	Resource 2 Name	R/O	System	AC	20	0x02 → 0x7E for each bite	" "	2.10	Indicates the name for the specified resource.
13	Resource 2 Status	R/O	System	INT8	1	1 → 120	0	2.10	Indicates the resource's status code. Valild values are: -1 = Fatal Error 0 = No resource available 1 = Stored resource available 2 = Ready to run 3 = Run in real time 4 = Run in cycle by cycle 5 = Run with breakpoint encountered (not currentl supported)
14	Resroiuce 2 Programmed Cycle Time	R/O	System	UINT32	4	0 — 4,294,967,295	0	2.10	Indicates, in milliseconds, the defined cycle time for the specified resource.
15	Resource 2Current Cycle Time	R/O	System	UINT32	4	0 — 4,294,967,295	0	2.10	Indicates, in milliseconds, the current cycle time for the specified resource.
16	Resource 3 Name	R/O	System	AC	20	0x02 → 0x7E for each bite	" "	2.10	Indicates the name for the specified resource.
17	Resource 3Status	R/O	System	INT8	1	1 → 120	0	2.10	Indicates the resource's status code. Valild values are: -1 = Fatal Error 0 = No resource available 1 = Stored resource available 2 = Ready to run 3 = Run in real time 4 = Run in cycle by cycle 5 = Run with breakpoint encountered (not currentl supported)
18	Resroiuce 3 Programmed Cycle Time	R/O	System	UINT32	4	0 — 4,294,967,295	0	2.10	Indicates, in milliseconds, the defined cycle time for the specified resource.

Point Type 122, DS800 Configuration

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
19	Resource 3 Current Cycle Time	R/O	System	UINT32	4	0 — 4,294,967,295	0	2.10	Indicates, in milliseconds, the current cycle time for the specified resource.
20	Resource 4 Name	R/O	System	AC	20	0x02 → 0x7E for each bite	" "	2.10	Indicates the name for the specified resource.
21	Resource 4 Status	R/O	System	INT8	1	1 → 120	0	2.10	Indicates the resource's status code. Valild values are: -1 = Fatal Error 0 = No resource available 1 = Stored resource available 2 = Ready to run 3 = Run in real time 4 = Run in cycle by cycle 5 = Run with breakpoint encountered (not currentl supported)
22	Resroiuce 4 Programmed Cycle Time	R/O	System	UINT32	4	0 — 4,294,967,295	0	2.10	Indicates, in milliseconds, the defined cycle time for the specified resource.
23	Resource 4 Current Cycle Time	R/O	System	UINT32	4	0 — 4,294,967,295	0	2.10	Indicates, in milliseconds, the current cycle time for the specified resource.

3.4.34 Point Type 123: Security – Group Configuration

Description: Point type 123 provides the Group Configuration parameters used in conjunction with point type 92 to define which users are a member of which group.

Number of Logical Points: 1 logical point for this point type may exist.

Storage Location: Point type 123 is saved to internal configuration memory.

Table 3-35. Point Type 123, Security – Group Configuration

Point Type 123, Security – Group Configuration

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Group #1	R/W	User	AC	20	0x20 → 0x7E for each byte	" "	1.50	Group identifier
1	Group #2	R/W	User	AC	20	0x20 → 0x7E for each byte	" "	1.50	Group identifier
2	Group #3	R/W	User	AC	20	0x20 → 0x7E for each byte	" "	1.50	Group identifier
3	Group #4	R/W	User	AC	20	0x20 → 0x7E for each byte	" "	1.50	Group identifier
4	Group #5	R/W	User	AC	20	0x20 → 0x7E for each byte	" "	1.50	Group identifier
5	Group #6	R/W	User	AC	20	0x20 → 0x7E for each byte	" "	1.50	Group identifier
6	Group #7	R/W	User	AC	20	0x20 → 0x7E for each byte	" "	1.50	Group identifier
7	Group #8	R/W	User	AC	20	0x20 → 0x7E for each byte	" "	1.50	Group identifier
8	Group #9	R/W	User	AC	20	0x20 → 0x7E for each byte	" "	1.50	Group identifier
9	Group #10	R/W	User	AC	20	0x20 → 0x7E for each byte	" "	1.50	Group identifier
10	Group #11	R/W	User	AC	20	0x20 → 0x7E for each byte	" "	1.50	Group identifier
11	Group #12	R/W	User	AC	20	0x20 → 0x7E for each byte	" "	1.50	Group identifier
12	Group #13	R/W	User	AC	20	0x20 → 0x7E for each byte	" "	1.50	Group identifier

Point Type 123, Security – Group Configuration

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
13	Group #14	R/W	User	AC	20	0x20 → 0x7E for each byte	“ ”	1.50	Group identifier
14	Group #15	R/W	User	AC	20	0x20 → 0x7E for each byte	“ ”	1.50	Group identifier
15	Group #16	R/W	User	AC	20	0x20 → 0x7E for each byte	“ ”	1.50	Group identifier
16	Group #17	R/W	User	AC	20	0x20 → 0x7E for each byte	“ ”	1.50	Group identifier
17	Group #18	R/W	User	AC	20	0x20 → 0x7E for each byte	“ ”	1.50	Group identifier
18	Group #19	R/W	User	AC	20	0x20 → 0x7E for each byte	“ ”	1.50	Group identifier
19	Group #20	R/W	User	AC	20	0x20 → 0x7E for each byte	“ ”	1.50	Group identifier

3.4.35 Point Type 124: History Segment Configuration

Description: Point Type 124 is used to configure the number of history points that exist in a history segment, as well as specifying the sizes of the history points in that segment. This point type also controls the sampling rate for periodic entries, and allows the user to turn off archiving for history points in a given segment.

Number of Logical Points: 13 logical units of this point type may exist

Storage Location: Point type 124 is saved to configuration memory.

Table 3-36: Point Type 124, History Segment Configuration

Point Type 124, History Segment Configuration

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Segment Description	R/W	User	AC	10	0x20 → 0x7E for each byte	Logic 0: “General 00” Logic 1 – 12: Segment XX”	3.00	Identifies what the segment of history is used for. For logical points 1 – 12, “XX” is the ordered number of the history type.
1	Segment Size	Logic 0: R/O Logic 1 - 10: R/W	User	UINT16	2	0 – 240	Logic 0: 240 Logic 1 – 12: 0	3.00	Specifies how many history points are in the history segment. For Logic 0, this parameter is R/O. **Note**: You cannot modify this parameter from an FST, nor can you set this value to less than the value of parameter 12 (Number of Configured Points).
2	Maximum Segment Size	R/O	System	UINT16	2	240	240	3.00	Specifies the maximum number of history points that may be configured for the history segment.
3	Periodic Entries	R/W	User	UINT16	2	0 - 65535	840	1.00	Number of periodic entries per history point in the history segment. Actual upper range is limited by available free space.
4	Daily Entries	R/W	User	UINT16	2	0 - 65535	35	1.00	Number of daily entries per history point in the history segment.
5	Periodic Index	R/O	System	UINT16	2	0 – (#Periodic Entries – 1)	0	1.00	Location in each history point for the segment where the next periodic entry will be saved.
6	Daily Index	R/O	System	UINT16	2	0 – (#Daily Entries – 1)	0	1.00	Location in each history point for the segment where the next daily entry will be saved.

Point Type 124, History Segment Configuration

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
7	Periodic Sample Rate	R/W	User	UINT8	1	1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60	60	1.00	The number of minute intervals that pass before an entry is made in the periodic history. **Note**: For meter run history, you can set the periodic sample rate only to the same value as the integral multiplier period for the meter run, or 60.
8	Contract Hour	R/W	User	UINT8	1	0 – 23	0	1.00	Hour that indicates the beginning of a new day.
9	ON/OFF Switch	R/W	User	UINT8	1	0 – 1	1	1.00	Switch that controls history logging for the history segment. Logging is suspended while the switch is off. Valid values are 0 (Off) and 1 (On).
10	Free Space	R/O	System	UINT32	4	0 - 224400	224400	3.00	Specifies the number of history entries that are unaccounted for and may be added to history points in various segments. This value applies to all history segments.
11	Force End of Day	R/W	User	UINT8	1	0 – 1	0	1.00	Allows the user to force an end of day for the history segment. Valid values are 0 (No Force) and 1 (Force End of Day).
12	Number of Configured Points	R/O	System	UINT16	2	0-240	0	3.00	Number of history points that are configured in the segment.
13	User Weighting TLP	R/W	User	TLP	3	See note in description	0,0,0	3.60	The parameter of the value to use as the weight when using averaging type 6, User Weighted Averaging. **Note**: TLP used as the weight must be a number.

3.4.36 Point Type 125: History Segment 0 Point Configuration

Description: Point Type 125 provides the history configuration parameters for History Segment 0.

Number of Logical Points: Number of logical points varies depending on the segment size parameter for History Segment 0.

Storage Location: Point type 125 is saved to internal configuration memory.

Table 3-37: Point Type 125, History Segment 0 Point Configuration

Point Type 125, History Segment 0 Point

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Point Tag ID	R/O	System	AC	10	0x20 → 0x7E for each byte	“”	1.00	Same value as the Point Tag of the Point Type the History Log Point resides in.
1	Parameter Description	R/W	User	AC	10	0x20 → 0x7E for each byte	“”	1.00	User supplied text string used to identify the parameter being logged in the history point.
2	History Log Point	R/W	User	TLP	3	See note 3	{0,0,0}	1.00	TLP points to a value to be archived by history.
3	Archive Type	R/W	User	UINT8	1	See note 1	0	1.00	See note 1
4	Averaging/Rate Type	R/W	User	UINT8	1	See note 2	0	1.00	See note 2
5	Current Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.00	Current value of parameter being logged.
6	Last Daily Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.00	Value logged to the daily archive at the last contract hour.
7	Today Minimum Time	R/O	System	TIME	4	0→4294967296	0	1.00	Time the minimum value was reached today.
8	Today Minimum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.00	Minimum value of logged parameter observed today.
9	Today Maximum Time	R/O	System	TIME	4	0→4294967296	0	1.00	Time the maximum value was reached today.
10	Today Maximum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.00	Maximum value of logged parameter observed today.
11	Yesterday Minimum Time	R/O	System	TIME	4	0→4294967296	0	1.00	Time the minimum value was reached yesterday.
12	Yesterday Minimum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.00	Minimum value of logged parameter observed yesterday.
13	Yesterday Maximum Time	R/O	System	TIME	4	0→4294967296	0	1.00	Time the maximum value was reached yesterday.
14	Yesterday Maximum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.00	Maximum value of logged parameter observed yesterday.

1 This parameter defines how the system archives a data point to history.

0 = None (History point not defined)
1 = User C/C++ Data
2 = User C/C++ Time
65 = FST Data History
67 = FST Time
128 = Average
129 = Accumulate
130 = Current Value
134 = Totalize

2 This parameter is used in conjunction with the Archive Type parameter to further define how history data is archived. This parameter defines the rate of accumulation of the averaging technique.

Accumulation Rate (Archive Type = 129):
10 = Per Second
11 = Per Minute
12 = Per Hour
13 = Per Day

Averaging Type (Archive Type = 128):
0 = None (History point not defined)
1 = Flow Dependent Time Weighted Linear
2 = Flow Dependent Time Weighted Formulaic
3 = Flow Weighted Linear
4 = Flow Weighted Formulaic
5 = Linear Averaging
6 = User Weighted Averaging (Version 3.60)

3.4.37 Point Type 126: History Segment 1 Point Configuration

Description: Point Type 126 provides the history configuration parameters for History Segment 1.

Number of Logical Points: Number of logical points varies depending on the segment size parameter for History Segment 1.

Storage Location: Point type 126 is saved to internal configuration memory.

Table 3-38: Point Type 126, History Segment 1 Point Configuration

Point Type 126, History Segment 1 Point

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Point Tag ID	R/O	System	AC	10	0x20 → 0x7E for each byte	“”	1.00	Same value as the Point Tag of the Point Type the History Log Point resides in.
1	Parameter Description	R/W	User	AC	10	0x20 → 0x7E for each byte	“”	1.00	User supplied text string used to identify the parameter being logged in the history point.
2	History Log Point	R/W	User	TLP	3	Any parameter may be logged except parameters of Data Type TLP or AC	{0,0,0}	1.00	TLP points to a value to be archived by history.
3	Archive Type	R/W	User	UINT8	1	See note 1	0	1.00	See note 1
4	Averaging/Rate Type	R/W	User	UINT8	1	See note 2	0	1.00	See note 2
5	Current Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.00	Current value of parameter being logged.
6	Last Daily Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.00	Value logged to the daily archive at the last contract hour.
7	Today Minimum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the minimum value was reached today.
8	Today Minimum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Minimum value of logged parameter observed today.
9	Today Maximum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the maximum value was reached today.
10	Today Maximum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Maximum value of logged parameter observed today.
11	Yesterday Minimum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the minimum value was reached yesterday.
12	Yesterday Minimum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Minimum value of logged parameter observed yesterday.
13	Yesterday Maximum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the maximum value was reached yesterday.
14	Yesterday Maximum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Maximum value of logged parameter observed yesterday.

1 This parameter defines how the system archives a data point to history.

0 = None (History point not defined)
1 = User C/C++ Data (Ver. 1.20)
2 = User C/C++ Time (Ver. 1.20)
65 = FST Data History
67 = FST Time
128 = Average
129 = Accumulate
130 = Current Value
134 = Totalize

2 This parameter is used in conjunction with the Archive Type parameter to further define how history data is archived. This parameter defines the rate of accumulation of the averaging technique.

Accumulation Rate (Archive Type = 129):
10 = Per Second
11 = Per Minute
12 = Per Hour
13 = Per Day

Averaging Type (Archive Type = 128):
0 = None (History point not defined)
1 = Flow Dependant Time Weighted Linear
2 = Flow Dependant Time Weighted Formulaic
3 = Flow Weighted Linear
4 = Flow Weighted Formulaic
5 = Linear Averaging
6 = User Weighted Averaging (Version 3.60)

3.4.38 Point Type 127: History Segment 2 Point Configuration

Description: Point Type 127 provides the history configuration parameters for History Segment 2

Number of Logical Points: Number of logical points varies depending on the segment size parameter for History Segment 2.

Storage Location: Point type 127 is saved to internal configuration memory.

Table 3-39: Point Type 127, History Segment 2 Point Configuration

Point Type 127, History Segment 2 Point

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Point Tag ID	R/O	System	AC	10	0x20 → 0x7E for each byte	“”	1.00	Same value as the Point Tag of the Point Type the History Log Point resides in.
1	Parameter Description	R/W	User	AC	10	0x20 → 0x7E for each byte	“”	1.00	User supplied text string used to identify the parameter being logged in the history point.
2	History Log Point	R/W	User	TLP	3	Any parameter may be logged except parameters of Data Type TLP or AC	{0,0,0}	1.00	TLP points to a value to be archived by history.
3	Archive Type	R/W	User	UINT8	1	See note 1	0	1.00	See note 1
4	Averaging/Rate Type	R/W	User	UINT8	1	See note 2	0	1.00	See note 2
5	Current Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.00	Current value of parameter being logged.
6	Last Daily Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.00	Value logged to the daily archive at the last contract hour.
7	Today Minimum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the minimum value was reached today.
8	Today Minimum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Minimum value of logged parameter observed today.
9	Today Maximum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the maximum value was reached today.
10	Today Maximum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Maximum value of logged parameter observed today.
11	Yesterday Minimum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the minimum value was reached yesterday.
12	Yesterday Minimum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Minimum value of logged parameter observed yesterday.
13	Yesterday Maximum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the maximum value was reached yesterday.
14	Yesterday Maximum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Maximum value of logged parameter observed yesterday.

1 This parameter defines how the system archives a data point to history.

0 = None (History point not defined)
1 = User C/C++ Data (Ver. 1.20)
2 = User C/C++ Time (Ver. 1.20)
65 = FST Data History
67 = FST Time
128 = Average
129 = Accumulate
130 = Current Value
134 = Totalize

2 This parameter is used in conjunction with the Archive Type parameter to further define how history data is archived. This parameter defines the rate of accumulation of the averaging technique.

Accumulation Rate (Archive Type = 129):
10 = Per Second
11 = Per Minute
12 = Per Hour
13 = Per Day
Averaging Type (Archive Type = 128):
0 = None (History point not defined)
1 = Flow Dependant Time Weighted Linear
2 = Flow Dependant Time Weighted Formulaic
3 = Flow Weighted Linear
4 = Flow Weighted Formulaic
5 = Linear Averaging
6 = User Weighted Averaging (Version 3.60)

3.4.39 Point Type 128: History Segment 3 Point Configuration

Description: Point Type 128 provides the history configuration parameters for History Segment 3.

Number of Logical Points: Number of logical points varies depending on the segment size parameter for History Segment 3.

Storage Location: Point type 128 is saved to internal configuration memory.

Table 3-40: Point Type 128, History Segment 3 Point Configuration

Point Type 128, History Segment 3 Point

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Point Tag ID	R/O	System	AC	10	0x20 → 0x7E for each byte	“”	1.00	Same value as the Point Tag of the Point Type the History Log Point resides in.
1	Parameter Description	R/W	User	AC	10	0x20 → 0x7E for each byte	“”	1.00	User supplied text string used to identify the parameter being logged in the history point.
2	History Log Point	R/W	User	TLP	3	Any parameter may be logged except parameters of Data Type TLP or AC	{0,0,0}	1.00	TLP points to a value to be archived by history.
3	Archive Type	R/W	User	UINT8	1	See note 1	0	1.00	See note 1
4	Averaging/Rate Type	R/W	User	UINT8	1	See note 2	0	1.00	See note 2
5	Current Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.00	Current value of parameter being logged.
6	Last Daily Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.00	Value logged to the daily archive at the last contract hour.
7	Today Minimum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the minimum value was reached today.
8	Today Minimum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Minimum value of logged parameter observed today.
9	Today Maximum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the maximum value was reached today.
10	Today Maximum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Maximum value of logged parameter observed today.
11	Yesterday Minimum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the minimum value was reached yesterday.
12	Yesterday Minimum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Minimum value of logged parameter observed yesterday.
13	Yesterday Maximum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the maximum value was reached yesterday.
14	Yesterday Maximum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Maximum value of logged parameter observed yesterday.

1 This parameter defines how a data point is archived to history.
- 0 = None (History point not defined)
- 1 = User C/C++ Data (Ver. 1.20)
- 2 = User C/C++ Time (Ver. 1.20)
- 65 = FST Data History
- 67 = FST Time
- 128 = Average
- 129 = Accumulate
- 130 = Current Value
- 134 = Totalize

2 This field is used in conjunction with the Archive Type parameter to further define how history data is archived. This parameter defines the rate of accumulation of the averaging technique.

Accumulation Rate (Archive Type = 129):
- 10 = Per Second
- 11 = Per Minute
- 12= Per Hour
- 13 = Per Day

Averaging Type (Archive Type = 128):
- 0 = None (History point not defined)
- 1 = Flow Dependant Time Weighted Linear
- 2 = Flow Dependant Time Weighted Formulaic
- 3 = Flow Weighted Linear
- 4 = Flow Weighted Formulaic
- 5 = Linear Averaging
- 6 = User Weighted Averaging (Version 3.60)

3.4.40 Point Type 129: History Segment 4 Point Configuration

Description: Point Type 129 provides the history configuration parameters for History Segment 4.

Number of Logical Points: Number of logical points varies depending on the segment size parameter for History Segment 4.

Storage Location: Point type 129 is saved to internal configuration memory.

Table 3-41: Point Type 129, History Segment 4 Point Configuration

Point Type 129, History Segment 4 Point

Param #	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Point Tag ID	R/O	System	AC	10	0x20 → 0x7E for each byte	“”	1.00	Same value as the Point Tag of the Point Type the History Log Point resides in.
1	Parameter Description	R/W	User	AC	10	0x20 → 0x7E for each byte	“”	1.00	User supplied text string used to identify the parameter being logged in the history point.
2	History Log Point	R/W	User	TLP	3	Any parameter may be logged except parameters of Data Type TLP or AC	{0,0,0}	1.00	TLP points to a value to be archived by history.
3	Archive Type	R/W	User	UINT8	1	See note 1	0	1.00	See note 1
4	Averaging/Rate Type	R/W	User	UINT8	1	See note 2	0	1.00	See note 2
5	Current Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.00	Current value of parameter being logged.
6	Last Daily Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.00	Value logged to the daily archive at the last contract hour.
7	Today Minimum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the minimum value was reached today.
8	Today Minimum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Minimum value of logged parameter observed today.
9	Today Maximum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the maximum value was reached today.
10	Today Maximum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Maximum value of logged parameter observed today.
11	Yesterday Minimum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the minimum value was reached yesterday.
12	Yesterday Minimum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Minimum value of logged parameter observed yesterday.
13	Yesterday Maximum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the maximum value was reached yesterday.
14	Yesterday Maximum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Maximum value of logged parameter observed yesterday.

1 This parameter defines how the system archives a data point to history.

0 = None (History point not defined)
1 = User C/C++ Data (Ver. 1.20)
2 = User C/C++ Time (Ver. 1.20)
65 = FST Data History
67 = FST Time
128 = Average
129 = Accumulate
130 = Current Value
134 = Totalize

2 This field is used in conjunction with the Archive Type parameter to further define how history data is archived. This parameter defines the rate of accumulation of the averaging technique.

Accumulation Rate (Archive Type = 129):
10 = Per Second
11 = Per Minute
12 = Per Hour
13 = Per Day

Averaging Type (Archive Type = 128):
0 = None (History point not defined)
1 = Flow Dependant Time Weighted Linear
2 = Flow Dependant Time Weighted Formulaic
3 = Flow Weighted Linear
4 = Flow Weighted Formulaic
5 = Linear Averaging
6 = User Weighted Averaging (Version 3.60)

3.4.41 Point Type 130: History Segment 5 Point Configuration

Description: Point Type 130 provides the history configuration parameters for History Segment 5.

Number of Logical Points: Number of logical points varies depending on the segment size parameter for History Segment 5.

Storage Location: Point type 130 is saved to internal configuration memory.

Table 3-42: Point Type 130, History Segment 5 Point Configuration

Point Type 130, History Segment 5 Point

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Point Tag ID	R/O	System	AC	10	0x20 → 0x7E for each byte	“”	1.00	Same value as the Point Tag of the Point Type the History Log Point resides in.
1	Parameter Description	R/W	User	AC	10	0x20 → 0x7E for each byte	“”	1.00	User supplied text string used to identify the parameter being logged in the history point.
2	History Log Point	R/W	User	TLP	3	Any parameter may be logged except parameters of Data Type TLP or AC	{0,0,0}	1.00	TLP points to a value to be archived by history.
3	Archive Type	R/W	User	UINT8	1	See note 1	0	1.00	See note 1
4	Averaging/Rate Type	R/W	User	UINT8	1	See note 2	0	1.00	See note 2
5	Current Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.00	Current value of parameter being logged.
6	Last Daily Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.00	Value logged to the daily archive at the last contract hour.
7	Today Minimum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the minimum value was reached today.
8	Today Minimum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Minimum value of logged parameter observed today.
9	Today Maximum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the maximum value was reached today.
10	Today Maximum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Maximum value of logged parameter observed today.
11	Yesterday Minimum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the minimum value was reached yesterday.
12	Yesterday Minimum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Minimum value of logged parameter observed yesterday.
13	Yesterday Maximum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the maximum value was reached yesterday.
14	Yesterday Maximum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Maximum value of logged parameter observed yesterday.

1 This parameter defines how the system archives a data point to history.

0 = None (History point not defined)
1 = User C/C++ Data (Ver. 1.20)
2 = User C/C++ Time (Ver. 1.20)
65 = FST Data History
67 = FST Time
128 = Average
129 = Accumulate
130 = Current Value
134 = Totalize

2 This field is used in conjunction with the Archive Type parameter to further define how history data is archived. This parameter defines the rate of accumulation of the averaging technique.

Accumulation Rate (Archive Type = 129):
10 = Per Second
11 = Per Minute
12 = Per Hour
13 = Per Day
Averaging Type (Archive Type = 128):
0 = None (History point not defined)
1 = Flow Dependant Time Weighted Linear
2 = Flow Dependant Time Weighted Formulaic
3 = Flow Weighted Linear
4 = Flow Weighted Formulaic
5 = Linear Averaging
6 = User Weighted Averaging (Version 3.60)

3.4.42 Point Type 131: History Segment 6 Point Configuration

Description: Point Type 131 provides the history configuration parameters for History Segment 6.

Number of Logical Points: Number of logical points varies depending on the segment size parameter for History Segment 6.

Storage Location: Point type 131 is saved to internal configuration memory.

Table 3-43: Point Type 131, History Segment 6 Point Configuration

Point Type 131, History Segment 6 Point

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Point Tag ID	R/O	System	AC	10	0x20 → 0x7E for each byte	“”	1.00	Same value as the Point Tag of the Point Type the History Log Point resides in.
1	Parameter Description	R/W	User	AC	10	0x20 → 0x7E for each byte	“”	1.00	User supplied text string used to identify the parameter being logged in the history point.
2	History Log Point	R/W	User	TLP	3	Any parameter may be logged except parameters of Data Type TLP or AC	{0,0,0}	1.00	TLP points to a value to be archived by history.
3	Archive Type	R/W	User	UINT8	1	See note 1	0	1.00	See note 1
4	Averaging/Rate Type	R/W	User	UINT8	1	See note 2	0	1.00	See note 2
5	Current Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.00	Current value of parameter being logged.
6	Last Daily Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.00	Value logged to the daily archive at the last contract hour.
7	Today Minimum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the minimum value was reached today.
8	Today Minimum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Minimum value of logged parameter observed today.
9	Today Maximum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the maximum value was reached today.
10	Today Maximum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Maximum value of logged parameter observed today.
11	Yesterday Minimum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the minimum value was reached yesterday.
12	Yesterday Minimum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Minimum value of logged parameter observed yesterday.
13	Yesterday Maximum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the maximum value was reached yesterday.
14	Yesterday Maximum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Maximum value of logged parameter observed yesterday.

1 This parameter defines how the system archives a data point to history.

0 =None (History point not defined)
1 = User C/C++ Data (Ver. 1.20)
2 = User C/C++ Time (Ver. 1.20)
65 = FST Data History
67 = FST Time
128 = Average
129 = Accumulate
130 = Current Value
134 = Totalize

2 This field is used in conjunction with the Archive Type parameter to further define how history data is archived. This parameter defines the rate of accumulation of the averaging technique.

Accumulation Rate (Archive Type = 129):
10 = Per Second
11 = Per Minute
12 = Per Hour
13 = Per Day
Averaging Type (Archive Type = 128):
0 = None (History point not defined)
1 = Flow Dependant Time Weighted Linear
2 = Flow Dependant Time Weighted Formulaic
3 = Flow Weighted Linear
4 = Flow Weighted Formulaic
5 = Linear Averaging
6 = User Weighted Averaging (Version 3.60)

3.4.43 Point Type 132: History Segment 7 Point Configuration

Description: Point Type 132 provides the history configuration parameters for History Segment 7.

Number of Logical Points: Number of logical points varies depending on the segment size parameter for History Segment 7.

Storage Location: Point type 132 is saved to internal configuration memory.

Table 3-44: Point Type 132, History Segment 7 Point Configuration

Point Type 132, History Segment 7 Point

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Point Tag ID	R/O	System	AC	10	0x20 → 0x7E for each byte	“”	1.00	Same value as the Point Tag of the Point Type the History Log Point resides in.
1	Parameter Description	R/W	User	AC	10	0x20 → 0x7E for each byte	“”	1.00	User supplied text string used to identify the parameter being logged in the history point.
2	History Log Point	R/W	User	TLP	3	Any parameter may be logged except parameters of Data Type TLP or AC	{0,0,0}	1.00	TLP points to a value to be archived by history.
3	Archive Type	R/W	User	UINT8	1	See note 1	0	1.00	See note 1
4	Averaging/Rate Type	R/W	User	UINT8	1	See note 2	0	1.00	See noter 2
5	Current Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.00	Current value of parameter being logged.
6	Last Daily Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.00	Value logged to the daily archive at the last contract hour.
7	Today Minimum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the minimum value was reached today.
8	Today Minimum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Minimum value of logged parameter observed today.
9	Today Maximum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the maximum value was reached today.
10	Today Maximum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Maximum value of logged parameter observed today.
11	Yesterday Minimum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the minimum value was reached yesterday.
12	Yesterday Minimum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Minimum value of logged parameter observed yesterday.
13	Yesterday Maximum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the maximum value was reached yesterday.
14	Yesterday Maximum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Maximum value of logged parameter observed yesterday.

1 This parameter defines how the system archives a data point to history.

0 = None (History point not defined)
1 = User C/C++ Data (Ver. 1.20)
2 = User C/C++ Time (Ver. 1.20)
65 = FST Data History
67 = FST Time
128 = Average
129 = Accumulate
130 = Current Value
134 = Totalize

2 This field is used in conjunction with the Archive Type parameter to further define how history data is archived. This parameter defines the rate of accumulation of the averaging technique.

Accumulation Rate (Archive Type = 129):
10 = Per Second
11 = Per Minute
12 = Per Hour
13 = Per Day
Averaging Type (Archive Type = 128):
0 = None (History point not defined)
1 = Flow Dependant Time Weighted Linear
2 = Flow Dependant Time Weighted Formulaic
3 = Flow Weighted Linear
4 = Flow Weighted Formulaic
5 = Linear Averaging
6 = User Weighted Averaging (Version 3.60)

3.4.44 Point Type 133: History Segment 8 Point Configuration

Description: Point Type 133 provides the history configuration parameters for History Segment 8.

Number of Logical Points: Number of logical points varies depending on the segment size parameter for History Segment 8.

Storage Location: Point type 133 is saved to internal configuration memory.

Table 3-45: Point Type 133, History Segment 8 Point Configuration

Point Type 133, History Segment 8 Point

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Point Tag ID	R/O	System	AC	10	0x20 → 0x7E for each byte	“”	1.00	Same value as the Point Tag of the Point Type the History Log Point resides in.
1	Parameter Description	R/W	User	AC	10	0x20 → 0x7E for each byte	“”	1.00	User supplied text string used to identify the parameter being logged in the history point.
2	History Log Point	R/W	User	TLP	3	Any parameter may be logged except parameters of Data Type TLP or AC	{0,0,0}	1.00	TLP points to a value to be archived by history.
3	Archive Type	R/W	User	UINT8	1	See note 1	0	1.00	See note 1
4	Averaging/Rate Type	R/W	User	UINT8	1	See note 2	0	1.00	See note 2
5	Current Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.00	Current value of parameter being logged.
6	Last Daily Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.00	Value logged to the daily archive at the last contract hour.
7	Today Minimum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the minimum value was reached today.
8	Today Minimum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Minimum value of logged parameter observed today.
9	Today Maximum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the maximum value was reached today.
10	Today Maximum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Maximum value of logged parameter observed today.
11	Yesterday Minimum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the minimum value was reached yesterday.
12	Yesterday Minimum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Minimum value of logged parameter observed yesterday.
13	Yesterday Maximum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the maximum value was reached yesterday.
14	Yesterday Maximum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Maximum value of logged parameter observed yesterday.

1 This parameter defines how the system archives a data point to history.

0 = None (History point not defined)
1 = User C/C++ Data (Ver. 1.20)
2 = User C/C++ Time (Ver. 1.20)
65 = FST Data History
67 = FST Time
128 = Average
129 = Accumulate
130 = Current Value
134 = Totalize

2 This field is used in conjunction with the Archive Type parameter to further define how history data is archived. This parameter defines the rate of accumulation of the averaging technique.

Accumulation Rate (Archive Type = 129):
10 = Per Second
11 = Per Minute
12 = Per Hour
13 = Per Day
Averaging Type (Archive Type = 128):
0 = None (History point not defined)
1 = Flow Dependant Time Weighted Linear
2 = Flow Dependant Time Weighted Formulaic
3 = Flow Weighted Linear
4 = Flow Weighted Formulaic
5 = Linear Averaging
6 = User Weighted Averaging (Version 3.60)

3.4.45 Point Type 134: History Segment 9 Point Configuration

Description: Point Type 134 provides the history configuration parameters for History Segment 9.

Number of Logical Points: Number of logical points varies depending on the segment size parameter for History Segment 9.

Storage Location: Point type 134 is saved to internal configuration memory.

Table 3-46: Point Type 134, History Segment 9 Point Configuration

Point Type 134, History Segment 9 Point

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Point Tag ID	R/O	System	AC	10	0x20 → 0x7E for each byte	“”	1.00	Same value as the Point Tag of the Point Type the History Log Point resides in.
1	Parameter Description	R/W	User	AC	10	0x20 → 0x7E for each byte	“”	1.00	User supplied text string used to identify the parameter being logged in the history point.
2	History Log Point	R/W	User	TLP	3	Any parameter may be logged except parameters of Data Type TLP or AC	{0,0,0}	1.00	TLP points to a value to be archived by history.
3	Archive Type	R/W	User	UINT8	1	See note 1	0	1.00	See note 1
4	Averaging/Rate Type	R/W	User	UINT8	1	See note 2	0	1.00	See note 2
5	Current Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.00	Current value of parameter being logged.
6	Last Daily Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.00	Value logged to the daily archive at the last contract hour.
7	Today Minimum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the minimum value was reached today.
8	Today Minimum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Minimum value of logged parameter observed today.
9	Today Maximum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the maximum value was reached today.
10	Today Maximum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Maximum value of logged parameter observed today.
11	Yesterday Minimum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the minimum value was reached yesterday.
12	Yesterday Minimum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Minimum value of logged parameter observed yesterday.
13	Yesterday Maximum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the maximum value was reached yesterday.
14	Yesterday Maximum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Maximum value of logged parameter observed yesterday.

1 This parameter defines how the system archives a data point to history.

0 = None (History point not defined)
1 = User C/C++ Data (Ver. 1.20)
2 = User C/C++ Time (Ver. 1.20)
65 = FST Data History
67 = FST Time
128 = Average
129 = Accumulate
130 = Current Value
134 = Totalize

2 This field is used in conjunction with the Archive Type parameter to further define how history data is archived. This parameter defines the rate of accumulation of the averaging technique.

Accumulation Rate (Archive Type = 129):
10 = Per Second
11 = Per Minute
12 = Per Hour
13 = Per Day
Averaging Type (Archive Type = 128):
0 = None (History point not defined)
1 = Flow Dependant Time Weighted Linear
2 = Flow Dependant Time Weighted Formulaic
3 = Flow Weighted Linear
4 = Flow Weighted Formulaic
5 = Linear Averaging
6 = User Weighted Averaging (Version 3.60)

3.4.46 Point Type 135: History Segment 10 Point Configuration

Description: Point Type 135 provides the history configuration parameters for History Segment 10.

Number of Logical Points: Number of logical points varies depending on the segment size parameter for History Segment 10.

Storage Location: Point type 135 is saved to internal configuration memory.

Table 3-47: Point Type 135, History Segment 10 Point Configuration

Point Type 135, History Segment 10 Point

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Point Tag ID	R/O	System	AC	10	0x20 → 0x7E for each byte	“”	1.00	Same value as the Point Tag of the Point Type the History Log Point resides in.
1	Parameter Description	R/W	User	AC	10	0x20 → 0x7E for each byte	“”	1.00	User supplied text string used to identify the parameter being logged in the history point.
2	History Log Point	R/W	User	TLP	3	Any parameter may be logged except parameters of Data Type TLP or AC	{0,0,0}	1.00	TLP points to a value to be archived by history.
3	Archive Type	R/W	User	UINT8	1	See note 1	0	1.00	See note 1
4	Averaging/Rate Type	R/W	User	UINT8	1	See note 2	0	1.00	See note 2
5	Current Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.00	Current value of parameter being logged.
6	Last Daily Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.00	Value logged to the daily archive at the last contract hour.
7	Today Minimum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the minimum value was reached today.
8	Today Minimum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Minimum value of logged parameter observed today.
9	Today Maximum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the maximum value was reached today.
10	Today Maximum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Maximum value of logged parameter observed today.
11	Yesterday Minimum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the minimum value was reached yesterday.
12	Yesterday Minimum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Minimum value of logged parameter observed yesterday.
13	Yesterday Maximum Time	R/O	System	TIME	4	0→4294967296	0	1.20	Time the maximum value was reached yesterday.
14	Yesterday Maximum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	1.20	Maximum value of logged parameter observed yesterday.

1 This parameter defines how the system archivesa data point to history.

0 = None (History point not defined)
1 = User C/C++ Data (Ver. 1.20)
2 = User C/C++ Time (Ver. 1.20)
65 = FST Data History
67 = FST Time
128 = Average
129 = Accumulate
130 = Current Value
134 = Totalize

2 This field is used in conjunction with the Archive Type parameter to further define how history data is archived. This parameter defines the rate of accumulation of the averaging technique.

Accumulation Rate (Archive Type = 129):
10 = Per Second
11 = Per Minute
12 = Per Hour
13 = Per Day

Averaging Type (Archive Type = 128):
0 = None (History point not defined)
1 = Flow Dependant Time Weighted Linear
2 = Flow Dependant Time Weighted Formulaic
3 = Flow Weighted Linear
4 = Flow Weighted Formulaic
5 = Linear Averaging
6 = User Weighted Averaging (Version 3.60)

3.4.47 Point Type 136: ROC Clock

Description: Point type 136 provides the parameters for configuring the ROC real-time clock time and date.

Number of Logical Points: One logical point for ROC Clock may exist.

Storage Location: Point type 136 is **not saved** to internal configuration memory.

Table 3-48: Point Type 136, ROC Clock

Point Type 136, ROC Clock

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Seconds	R/O	System	UINT8	1	0 – 59	0	1.00	The seconds.
1	Minutes	R/O	System	UINT8	1	0 – 59	0	1.00	The minutes.
2	Hours	R/O	System	UINT8	1	0 – 23	0	1.00	The hours.
3	Day	R/O	System	UINT8	1	1 – 31	1	1.00	The day.
4	Month	R/O	System	UINT8	1	1 – 12	1	1.00	The month.
5	Year	R/O	System	UINT16	2	2000 – 2104	2000	1.00	The year.
6	Day of Week	R/O	System	UINT8	1	1 – 7	7	1.00	The day of the week. Valid values are: 1 = Sunday 2 = Monday 3 = Tuesday 4 = Wednesday 5 = Thursday 6 = Friday 7 = Saturday
7	Time	R/O	System	TIME	4	N/A	0	1.00	Number of seconds elapsed since 12:00 a.m. Jan. 1, 1970.
8	Daylight Savings Time Enable	R/W	User	UINT8	1	0 → 1	0	1.00	Indicates if daylight savings time is enabled. Valid values are 0 (Disabled) and 1 (Enabled).
9	Microseconds	R/O	System	UINT32	4	0 - 999999	0	1.20	The microseconds.
10	DST Start Hour	R/W	User	UINT8	1	0-23	2	3.40	Hour at which daylight saving time begins.
11	DST Start Day of Week	R/W	User	UINT8	1	1-7 (corresponds to Sunday through Saturday)	1	3.40	Day of the week on which daylight saving time begins.
12	DST Start Week of Month	R/W	User	UINT8	1	1-6 (if set to 6, will be the last week of the month)	2	3.40	Week fo the month in which daylight saving time begins. Weeks are counted if the Sunday falls in the month.

Point Type 136, ROC Clock

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
13	DST Start Month	R/W	User	UINT8	1	1-12	3	3.40	Month in which daylight saving time begins.
14	DST Start Date and Time	R/O	User	Time	4	N/A	(based on above)	3.40	Time and date on which daylight saving time begins. Calculated based on settings above.
15	DST End Hour	R/W	User	UINT8	1	0-23	2	3.40	Hour at which daylight saving time ends.
16	DST End Day of Week	R/W	User	UINT8	1	1-7 (corresponds to Sunday through Saturday)	1	3.40	Day of the week in which daylight saving time ends.
17	DST End Week of Month	R/W	User	UINT8	1	1-56 (if set to 56, will be the last week of month)	1	3.40	Week of the month in which daylight saving time ends. Weeks are counted if the Sunday falls in the month.
18	DST End Month	R/W	User	UINT8	1	1-12	11	3.40	Month at which daylight saving time ends.
19	DST End Date and Time	R/O	User	Time	4	N/A	(based on above)	3.40	The time and date that daylight saving time ends. Calculated based on settings above.

If the clock is manually changed past the start or end time, time does not adjust. If power is not applied during the start or end time, time does not adjust on power up.

3.4.48 Point Type 137: Internet Configuration Parameters

Description: Point type 137 provides configuration parameters for internet communications.

Number of Logical Points: One logical point for Internet Configuration Parameters may exist.

Storage Location: Point type 137 is saved to internal configuration memory.

Table 3-49: Point Type 137, Internet Configuration Parameters

Point Type 137, Internet Configuration Parameters

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	MAC Address	R/O	System	AC12	12	N/A	Varies	1.00	Unique MAC address set by the factory.
1	IP Address	R/W	User	AC20	20	See note in description	10.0.0.2	1.00	IP address for the ROC800. **Note**: These values must be in the format XXX.XXX.XXX.XXX (such as 10.0.0.1). The value 255.255.255.255 is invalid.
2	Subnet Mask	R/W	User	AC20	20	See note in description	255.255.255.0	1.00	Subnet mask for the ROC800. **Note**: These values must be in the format XXX.XXX.XXX.XXX (such as 10.0.0.1). The value 255.255.255.255 is invalid
3	Gateway Address	R/W	User	AC20	20	See note in description	10.0.0.1	1.00	Gateway used by the ROC800. **Note**: These values must be in the format XXX.XXX.XXX.XXX (such as 10.0.0.1). The value 255.255.255.255 is invalid
4	ROC Plus Protocol IP Port Number	R/W	User	UINT16	2	0 → 65535	4000	1.10	The IP port number to which the ROC listens ROC Plus Protocol connections.
5	Current ROC Plus Protocol Connections	R/O	System	UINT8	1	0 → 255	0	1.10	This parameter shows the number of active ROC Plus Protocol TCP/IP connections.
6	ROC Plus Protocol Inactivity Time	R/W	User	FL	4	0.0→Any positive valid IEEE 754 float	3600.0	1.10	Time, in seconds, that the ROC800 waits, without receiving a valid message, before it closes the connection. Occurs in the Application Layer. Enter **0** to disable this feature.
7	Reset ROC Plus Protocol Connections	R/W	User	UINT8	1	0→1	0	1.10	Write **1** to this parameter to close all ROC Plus Protocol TCP/IP connections.
8	ROC Plus Protocol Keep-Alive Time	R/W	User	UINT32	4	0,64 → 86400	324	1.10	Specifies the amount of idle time (in seconds) before the first keep alive message is sent. Nine more keep-alive messages will be sent at an interval of 64 seconds before a connection is considered broken. Occurs in the Transport Layer. Enter **0** to disable this feature.

Point Type 137, Internet Configuration Parameters

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
9	Modbus IP Port Number	R/W	User	UINT16	2	0 → 65535	502	1.30	The IP port number to which the ROC800 listens for Modbus connections.
10	Current Modbus Connections	R/O	System	UINT16	2	0 → 65535	0	1.30	Shows the number of active modbus TCP/IP connections.
11	Modbus Inactivity Time	R/W	User	FL	4	0.0→Any positive valid IEEE 754 float	3600.0	1.30	Time, in seconds, that the ROC800 waits, without receiving a valid modbus message, before it closes the connection. Occurs in the Application Layer. Enter **0** to disable this feature.
12	Reset Modbus Connections	R/W	User	UINT8	1	0→1	0	1.30	Write **1** to this parameter to close all Modbus TCP/IP connections.
13	Modbus Keep-Alive Time	R/W	User	UINT32	4	0,64 → 86400	324	1.30	Specifies the amount of idle time (in seconds) before the first keep-alive message is sent for the modbus connection. Nine more keep-alive messages will be sent at an interval of 64 seconds before a connection is considered broken. Occurs in the Transport Layer. Enter **0** to disable this feature.
14	Modbus over TCP Address To Use	R/W	User	U8	1	0 → 2	2	1.30	Selects which address (ROC or Modbus over IP slave) modbus-over-IP should use. Valid values are: 0 = ROC Address (TLP: 91,0,0) 1 = Modbus over IP Slave Address (TLP: 138,0,15) 2 = Either ROC Address or Modbus TCP Address
15	Modbus over TCP Slave Address	R/W	User	U8	1	0 → 255	0	1.00	Specifies the Slave Address for Modbus over IP.
16	ARP Protection Enable	R/W	User	UINT8	1	0 → 1	0	2.15 3.04	Enables APR storm protection. Valid values are 0 (Disable) and 1 (Enable).
17	APR Packet Queue Limit	R/W	User	UINT32	4	0 → 65535	500	2.15 3.04	Specifies the required number of ARP packets to be queued in order for the ROC to shut down the Ethernet device due to an ARP storm.
18	Modbus Master TCP Option	R/W	User	UINT8	1	0 → 1	0	3.10	Specifies the Modbus master TCP option for Master Table I. Valid values are 0 (TCP Modbus format) and 1 (Modbus wrapped in TCP).
19	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 1, Server 1
20	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 1, Server 1
21	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 1, Server 2
22	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 1, Server 2

Point Type 137, Internet Configuration Parameters

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
23	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 1, Server 3
24	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 1, Server 3
25	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 1, Server 4
26	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 1, Server 4
27	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 1, Server 5
28	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 1, Server 5
29	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 1, Server 6
30	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 1, Server 6
31	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 1, Server 7
32	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 1, Server 7
33	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 1, Server 8
34	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 1, Server 8
35	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 1, Server 9
36	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 1, Server 9
37	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 1, Server 10
38	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 1, Server 10
39	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 1, Server 11
40	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 1, Server 11
41	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 1, Server 12
42	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 1, Server 12
43	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 1, Server 13
44	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 1, Server 13
45	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 1, Server 14
46	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 1, Server 14
47	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 1, Server 15
48	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 1, Server 15
49	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 1, Server 16
50	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 1, Server 16
51	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 1, Server 17
52	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 1, Server 17
53	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 1, Server 18
54	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 1, Server 18
55	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 1, Server 19
56	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 1, Server 19

Point Type 137, Internet Configuration Parameters

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
57	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 1, Server 20
58	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 1, Server 20
59	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 1, Server 21
60	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 1, Server 21
61	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 1, Server 22
62	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 1, Server 22
63	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 1, Server 23
64	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 1, Server 23
65	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 1, Server 24
66	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 1, Server 24
67	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 1, Server 25
68	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 1, Server 25
69	Modbus Master TCP Option	R/W	User	UINT8	1	0 → 1	0	3.10	Specifies the Modbus master TCP option for Master Table 2. Valid values are 0 (TCP Modbus format) and 1 (Modbus wrapped in TCP).
70	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 2, Server 1
71	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 2, Server 1
72	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 2, Server 2
73	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 2, Server 2
74	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 2, Server 3
75	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 2, Server 3
76	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 2, Server 4
77	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 2, Server 4
78	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 2, Server 5
79	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 2, Server 5
80	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 2, Server 6
81	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 2, Server 6
82	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 2, Server 7
83	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 2, Server 7
84	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 2, Server 8
85	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 2, Server 8
86	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 2, Server 9
87	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 2, Server 9
88	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 2, Server 10

Point Type 137, Internet Configuration Parameters

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
89	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 2, Server 10
90	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 2, Server 11
91	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 2, Server 11
92	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 2, Server 12
93	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 2, Server 12
94	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 2, Server 13
95	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 2, Server 13
96	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 2, Server 14
97	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 2, Server 14
98	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 2, Server 15
99	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 2, Server 15
100	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 2, Server 16
101	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 2, Server 16
102	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 2, Server 17
103	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 2, Server 17
104	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 2, Server 18
105	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 2, Server 18
106	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 2, Server 19
107	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 2, Server 19
108	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 2, Server 20
109	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 2, Server 20
110	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 2, Server 21
111	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 2, Server 21
112	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 2, Server 22
113	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 2, Server 22
114	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 2, Server 23
115	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 2, Server 23
116	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 2, Server 24
117	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 2, Server 24
118	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 2, Server 25
119	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 2, Server 25
120	Modbus Master TCP Option	R/W	User	UINT8	1	0 → 1	0	3.10	Specifies the Modbus master TCP option for Master Table 3. Valid values are 0 (TCP Modbus format) and 1 (Modbus wrapped in TCP).

Point Type 137, Internet Configuration Parameters

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
121	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 3, Server 1
122	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 3, Server 1
123	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 3, Server 2
124	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 3, Server 2
125	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 3, Server 3
126	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 3, Server 3
127	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 3, Server 4
128	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 3, Server 4
129	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 3, Server 5
130	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 3, Server 5
131	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 3, Server 6
132	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 3, Server 6
133	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 3, Server 7
134	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 3, Server 7
135	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 3, Server 8
136	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 3, Server 8
137	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 3, Server 9
138	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 3, Server 9
139	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 3, Server 10
140	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 3, Server 10
141	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 3, Server 11
142	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 3, Server 11
143	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 3, Server 12
144	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 3, Server 12
145	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 3, Server 13
146	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 3, Server 13
147	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 3, Server 14
148	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 3, Server 14
149	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 3, Server 15
150	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 3, Server 15
151	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 3, Server 16
152	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 3, Server 16
153	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 3, Server 17
154	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 3, Server 17

Point Type 137, Internet Configuration Parameters

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
155	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 3, Server 18
156	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 3, Server 18
157	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 3, Server 19
158	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 3, Server 19
159	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 3, Server 20
160	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 3, Server 20
161	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 3, Server 21
162	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 3, Server 21
163	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 3, Server 22
164	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 3, Server 22
165	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 3, Server 23
166	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 3, Server 23
167	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 3, Server 24
168	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 3, Server 24
169	IP Address	R/W	User	UINT32	4	N/A	0	3.10	IP address for Table 3, Server 25
170	IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	IP port number for Table 3, Server 25
171	Modbus Master TCP Connection Timeout	R/W	User	UINT8	1	0 → 255	0	3.10	Specifices the number of seconds to wait for a successful connection.
172	Test IP Address	R/W	User	UINT32	4	NA	0	3.10	Indicates the IP address to use when testing a connection.
173	Test IP Port	R/W	User	UINT16	2	0 → 65535	0	3.10	Indicates the IP port to use when testing a connection.
174	Test IP Start	R/W	User	UINT8	1	0 → 1	0	3.10	Indicates when to test the IP connection. Valid values are 0 (Test connection complete/nothing) and 1 (Start connection test).
175	Test IP Status	R/O	System	UINT8	1	0 → 3	0	3.10	Indicates the status of the test connection. Valid values are: 0 = Success 1 = In Progress 2 = Failed 3 = Busy

3.4.49 Point Type 138: User C++ Host Parameters

Description: Point type 138 provides parameters about the ROC with respect to hosting User C++ applications.

Number of Logical Points: One logical point for User C++ Host Parameters may exist.

Storage Location: Point type 138 is **not saved** to internal configuration memory.

Table 3-50: Point Type 138, User C++ Host Parameters

Point Type 138, User C++ Host Parameters

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Host Library Version	R/O	System	AC	12	0x20 → 0x7E for each byte	varies	1.20	The library version supported by the ROC.
1	Host SRAM Used	R/O	System	UINT32	4	0 → 0xFFFFFFFF	varies	1.20	The amount of SRAM consumed by User Defined Points.
2	Host SRAM Free	R/O	System	UINT32	4	0 → 0xFFFFFFFF	varies	1.20	The amount of SRAM available for User Defined Points.
3	Host DRAM Used	R/O	System	UINT32	4	0 → 0xFFFFFFFF	varies	1.20	The amount of DRAM consumed by User C++ Programs.
4	Host DRAM Free	R/O	System	UINT32	4	0 → 0xFFFFFFFF	varies	1.20	The amount of DRAM available for User C++ Programs.

3.4.50 Point Type 139: Smart I/O Module Information

Description: Point type 139 provides parameters for smart I/O modules.

Number of Logical Points: One logical for each I/O slot may exist, for a maximum of 27 logicals (0→26).

Storage Location: Point type 139 is **not saved** to internal configuration memory.

Table 3-51: Point Type 139, Smart I/O Module Information

Point Type 139, Smart I/O Module Information

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Module Type	R/O	System	UINT8	1	0 → 3, 26, 28, 30, 33, 34, 50	0	2.02	Indicates module type. Valid values are: 0 = No Module 1 = AC I/O 2 = PI 4-Point 3 = : APM 26 = Smart MVS 28 = RTD 3-point 30 = DO Relay 6-point 33 = HART 2 Module 34 = Thermocouple 4-point 36 = IEC 62591 Module 50 = Unknown Aux I/O module
1	System Mode	R/O	System	UINT8	1	0 → 1	0	2.02	States the run mode of the module. Valid values are: 0 = Run Mode 1 = Boot Mode (extremely limited functionality is available) 2 = Module Failure **Note**: If in Boot Mode then only parameters 0 – 4, 8, and 9 are valid.
2	Board Health	R/O	System	UINT8	1	0 → 2	1	2.02	Indicates the health of the module. Valid values are: 0 = OK 1 = Module not Installed 2 = Communications lost
3	Boot Version	R/O	System	AC	10	0x20 → 0x7E for each byte	'y.yy'	2.02	Software version of boot Image
4	Boot Part Number	R/O	System	AC	20	0x20 → 0x7E for each byte	'W68xxx'	2.02	Part number of boot firmware
5	Boot Build Date	R/O	System	AC	20	0x20 → 0x7E for each byte	'mmm dd, yyyy HH:MM'	2.02	The time and date stamp the boot firmware was created.

Point Type 139, Smart I/O Module Information

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
6	Flash Version	R/O	System	AC	10	0x20 → 0x7E for each byte	'y.yy'	2.02	Software version of flash image
7	Flash Part Number	R/O	System	AC	20	0x20 → 0x7E for each byte	'W68xxx'	2.02	Part number of flash firmware
8	Flash Build Date	R/O	System	AC	20	0x20 → 0x7E for each byte	'mmm dd, yyyy HH:MM'	2.02	The time and date stamp the flash firmware was created.
9	Module Specific Data	R/O	System	AC	20	0x20 → 0x7E for each byte	' '	2.02	General data that is specific for each module type.
10	Serial Number	R/O	System	AC	30	0x20 → 0x7E for each byte	' '	2.02	Serial Number
11	Flash Description	R/O	System	AC	20	0x20 → 0x7E for each byte	' '	2.02	Description that is specific for each module type
12	Module Specific Parameter #1	R/W	User	UINT32	4	0 → 4.294,967,296	SAM:0 IEC 62591: 36863	3.30	Indicates, for Smart Application modules, the module's subtype.Valid values are: 0=No subtype 10=Modbus Master subtype For IEC 62591 Network ID (V3.40): Bits 0-15: Network ID Bits 16-31: Unused For NRM (v3.50): Bits 16-31: Reserved Bits 8-15: Frequency Hop Key (valid range 1-15) Bits 0-7: Network ID (valid range is 0-255)

Point Type 139, Smart I/O Module Information

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
13	Module Specific Parameter #2	R/W	User	UINT32	4	0 → 4.294,967,296	SAM:0 IEC 62591: 0x44555354	3.30	Indicates, for Smart Application modules, a module conflict substate, and sets when the board health is Module Conflict. (v3.30) 0=No Conflict 1=Too many application modules (maximum of 3) 2=Duplicate application module installed (only one of each application module subtype allowed) 3=Display Conflict (a user display or User C display is already loaded into a display slot used by a Smart Application module) For IEC 62591: Join Key (bytes 0-> 3 (v3.40) For Network Radio Module (v3.50): Network Access Point selection 0 = Slave Device 1 = Access Point 3 = Access Point tye System Time Sync enabled The Network Radio module value is preserved through cold starts and factory defaults but reverts to defaults on module slot change..
14	Module Specific Parameter #3	R/W	User	UINT32	4	0 → 4.294,967,296	0x4E455457	3.40	IEC 62591 Join Key (Bytes 4->7)(v3.40) Network Radio module (v3.50) (see **Note 1**) Network Module 0 = 1-12 devices 1 = 1-24 devices The Network Radio module value is preserved through cold starts and factory defaults but reverts to defaults on module slot change. **Note**: This parameter is writable only when the NRM is the access point. The slave devices report back to the parameter the currently access point.
15	Module Specific Parameter #4	R/W	User	UINT32	4	0 → 4.294,967,296	0x4F524B53	3.40	IEC 62591 Join Key (Bytes 8->11)(v3.40) Network Radio module (v3.50) (see **Note 1**) Bits 8-31=reserved; set to 0 Bits 0-7=Radio Transmit Power in dBm. The Network Radio module value is preserved through cold starts and factory defaults but reverts to defaults on module slot change. Minimum value is 10 and maximum value is either 20 or 27, depending on parameter 15, Maximum Radio Power.

Point Type 139, Smart I/O Module Information

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
16	Module Specific Parameter #5	R/W	User	UINT32	4	0 → 4.294,967,296	0x524F434B	3.40	IEC 62591 Join Key (Bytes 12->15)(v3.40) Network Radio module (v3.50) Network Configuration Revision 0-65535 Set by host and is sent via Network Live Llist Updates
17	Module Specific Parameter #6	R/W	System	UINT32	4	0 → 4.294,967,296	0	3.40	IEC 62591 Status (v3.40) Status Bit 7: 1= Radio Failure Bit 6: 1=Server Failure State Bits 0-5: 0=Initialized 1=Detecting Radio 2=Setting Network Configuration 3=Waiting to Join Network 4=Online Bits 8-31: Unused It is R/O. A write does not return an error but is ignored. Network Radio Module (v3.50) Noise Level 0-30 = Good 31-40 = Marginal 41-127= Poor
18	Module Specific Parameter #7	R/W	System	UINT32	4	0 → 4.294,967,296	0	3.40	IEC 62591 Interface ID (v3.40) Bits 0-31: Inteface ID It is R/O. A write does not return an error but is ignored. Network Radio Module (v3.50) Signal Strength 0-127: Higher is better
19	Module Specific Parameter #8	R/W	System	UINT32	4	0 → 4.294,967,296	0	3.40	IEC 62591 Interface Type (v3.40) Bits 0-15: Interface Type Bits 16-31: Unused It is R/O. A write does not return an error but is ignored. Network Radio Module (v3.50) Percent Good Packets

Point Type 139, Smart I/O Module Information

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
20	Module Specific Parameter #9	R/W	System	UINT32	4	0 → 4.294,967,296	0	3.40	Network Radio Module (v3.50) Start Auto Discovery Sequence: 0=Idle 1= Start 2=Stop **Note**: The ROC800 automatically clears this parameter after the Auto Discovery Sequence completes.
21	Module Specific Parameter #10	R/W	User	UINT32	4	0 → 4.294,967,296	15	1.65/ 3.85	The time in seconds the system allows for the IEC module to re-initialize in case of a time sync or warm start. If the IEC module remains in an "initializing" state after the elapsed time, the system declares all commissioned devices in Comm fail.
22	Module Specific Parameter #11	R/W	User	UINT32	4	0 → 4.294,967,296 (1)	0	3.50	Network Radio Module (v3.50) Initialize Network Import and Export Lists 0=Idle 1=Initialize ROC800 automatically clears parameter
23	Module Specific Parameter #12	R/W	System	UINT32	4	0 → 4.294,967,296 (Not user-writeable)	0	3.50	Network Radio Module (v3.50) Network Status: 0 = Initializing 1 = Not Joined to Network 2 = Joined to Network – not commissioned 3 = Joined to Network and commissioned 128 = Radio Failure 129 = Invalid Network Configuration
24	Module Specific Parameter #13	R/W	User	UINT32	4	0 → 4.294,967,296 (1)	0	3.50	Network Radio Module (v3.50) Force Time Synchronization: 0 = Idle 1= Force Tim e Sync
25	Module Specific Parameter #14	R/W	System	UINT32	4	0 → 4.294,967,296 (1)		3.50	Network Radio Module (v3.50) Radio Address of the NRM
26	Module Specific Parameter #15	R/W	User	UINT32	4	0 → 4.294,967,296 (1)	0	3.50	Network Radio Module (v3.50) Passthru Lock Address Bits 16-31: Reserved Bits 8-15: Address Bits 0-7: Group
27	Module Specific Parameter #16	R/W	User	UINT32	4	0->4,294,967,296	0	3.61	Network Radio Module (v3.61) Stale Data Timeout in seconds (valid range is 10-3600)

Point Type 139, Smart I/O Module Information

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
28	Module Specific Parameter #17	R/W	User	UINT32	4	0->4,294,967,296	0	3.70	Network Radio Module (v3.70) Encryption Key 1
29	Module Specific Parameter #18	R/W	User	UINT32	4	0->4,294,967,296	0	3.70	Network Radio Module (v3.70) Encryption Key 2
30	Module Specific Parameter #19	R/W	User	UINT32	4	0->4,294,967,296	0	3.70	Network Radio Module (v3.70) Encryption Key 3
31	Module Specific Parameter #20	R/W	User	UINT32	4	0->4,294,967,296	0	3.70	Network Radio Module (v3.70) Encryption Key 4
32	Module Specific Parameter #21	R/W	User	UINT32	4	0->4,294,967,296	0	3.70	Network Radio Module (v3.70) Encryption Key 5
33	Module Specific Parameter #22	R/W	User	UINT32	4	0->4,294,967,296	0	3.70	Network Radio Module (v3.70) Encryption Key 6
34	Module Specific Parameter #23	R/W	User	UINT32	4	0->4,294,967,296	0	3.70	Network Radio Module (v3.70) Encryption Key 7
35	Module Specific Parameter #24	R/W	User	UINT32	4	0->4,294,967,296	0	3.70	Network Radio Module (v3.70) Encryption Key 8

3.4.51 Point Type 140: Alternating Current Input / Output

Description: Point type 140 is the point type for controlling and accessing an AC Input / Output.

Number of Logical Points: 6 logicals per module.

Storage Location: Point type 140 is saved to internal configuration memory.

Table 3-52: Point Type 140, Alternating Current Input / Output

Point Type 140, AC I/O Point Type

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Point Tag ID	R/W	User	AC	10	0x20→0x7E for each ASCII character	"ACIO"	2.10	A 10-character description of the channel
1	Power In	R/O	System	UINT8	1	0→1	0	2.10	Module power indicator – same for every channel. Valid values are 0 (AC power off) and 1 (AC power detected).
2	Channel Mode	R/O	System	UINT8	1	0→1	0	2.10	Channel mode is set via hardware DIP switch. Valid values are 0 (channel set as input) and 1 (channel set as output).
3	Scanning Input	R/W	User	UINT8	1	0 → 1	1	2.10	Valid values are 0 (Disabled) and 1 (Enabled). If disabled, system ignores field inputs and no changes occur unless manually entered. **Note**: This parameter functions the same as "Scanning" in Point type 101 (parameter 1).
4	Filter	R/W	User	FL	4	0.00 → 43,200.0	0.3	2.10	Number of seconds that a DI must remain in the ON state before it is recognized as valid and the Status (parameter #5) is changed. **Note**: This parameter functions the same as "Filter" in Point type 101 (parameter 2).
5	Status Input	R/W	System	UINT8	1	0→1	0	2.10	Indicates the current state of the DI. Valid values are 0 (inactive) and 1 (input signal). **Note**: This parameter functions the same as Status" in Point type 101 (parameter 3).
6	Physical Input	R/O	System	UINT8	1	0 → 1	0	2.10	Indicates the current state of the hardware. Valid values are 1 (On) and 0 (Off). **Note**: This parameter functions the same as "Physical Status" in Point type 101 (parameter 15).

Point Type 140, AC I/O Point Type

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
7	Scan Period	R/W	User	FL	4	0.02→43,200.0 (Slots 1-3 827 & 809) 0.05→43,200.0 (Slots 4-27 827)	0.05	2.10	Indicates scan period in seconds. Due to limitations on the ROC 827, slots 4-27 have a lower limit of 50mS. All other slots (1-3, 809) have a minimum limit of 20mS.
8	Actual Scan Time	R/O	System	FL	4	0.0 → 43,200.0	0.0	2.10	Actual number of seconds between updates of the DI. **Note**: This parameter functions the same as “Actual Scan Time” in Point type 101 (parameter 14).
9	Input Invert Mode	R/W	User	UINT8	1	0 → 1	0	2.10	If enabled, the field input will be inverted in the Status (parameter #5 – ON becomes OFF and vice-versa). Valid values are 0 (Invert Status Disabled) and 1 (Invert Status Enabled). **Note**: This parameter functions the same as “Invert Mode” in Point type 101 (parameter 4).
10	Latch Mode	R/W	User	UINT8	1	0 → 1	0	2.10	If enabled, then, on an active transition of the input, the Status (parameter #5) will change to ON and remain in the ON state until it is cleared manually. 0 = Latch Status Disabled, 1 = Latch Status Enabled. **Note**: This parameter functions the same as “Latch Mode” in Point type 101 (parameter 5).
11	Input Accumulated Value	R/W	Both	UINT32	4	0 → 4,294,967,295	0	2.10	Indicates the number of times the Status (parameter 5) goes from OFF to ON. **Note**: This parameter functions the same as “Accumulated Value” in Point type 101 (parameter 6).
12	Cumulative On Time	R/W	Both	FL	4	0.0→Any positive valid IEEE 754 float	0.0	2.10	Number of seconds when the Status (parameter #5) is in the ON state. **Note**: This parameter functions the same as “Cumulative On Time” in Point type 101 (parameter 7).
13	Cumulative Off Time	R/W	Both	FL	4	0.0→Any positive valid IEEE 754 float	0.0	2.10	Indicates the number of seconds when the Status (parameter #5) is in the OFF state. **Note**: This parameter functions the same as “Cumulative Off Time” in Point type 101 (parameter 8).

Point Type 140, AC I/O Point Type

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
14	Input Alarming	R/W	User	UINT8	1	0 → 1	0	2.10	If enabled, alarms may be generated and sent to the Alarm Log. Valid values are 0 (Disabled) and 1 (Enabled). **Note**: This parameter functions the same as "Alarming" in Point type 101 (parameter 9).
15	Input Alarm Code	R/O	System	BIN	1	0x00 → 0xFF	0x00	2.10	
15.0	Not Used			Bit 0			0		Not Used
15.1	Not Used			Bit 1			0		Not Used
15.2	Not Used			Bit 2			0		Not Used
15.3	Not Used			Bit 3			0		Not Used
15.4	Not Used			Bit 4			0		Not Used
15.5	Status On Alarm			Bit 5			0		If set, the Status (parameter #5 is ON. If clear, the Status (parameter #5) is OFF. **Note**: This parameter functions the same as "Status On Alarm" in Point type 101.
15.6	Not Used			Bit 6			0		Not Used
15.7	Input Scanning Disabled Alarm			Bit 7			0		If set, the Scanning (parameter #3) has been disabled. If clear, the Scanning (parameter #3) has been set to Enable. **Note**: This parameter functions the same as "Scanning Disabled Alarm" in Point type 101.
16	Input SRBX on Clear	R/W	User	UINT8	1	0 → 1	0	2.10	Indicates a SRBX alarm is desired if an alarm condition clears. Valid values are 0 (SRBX on Clear Disabled) and 1 (SRBX on Clear Enabled). **Note**: This parameter functions the same as "SRBX on Clear" in Point type 101.
17	Input SRBX on Set	R/W	User	UINT8	1	0 → 1	0	2.10	Indicates a SRBX alarm is desired if an alarm condition occurs. 0 = SRBX on Set Disabled, 1 = SRBX on Set Enabled. **Note**: This parameter functions the same as "SRBX on Clear" in Point type 101.
18	Scanning Output	R/W	User	UINT8	1	0 → 2	1	2.10	Indicates what may change the DO values. Valid values are: 0 = Disabled (no changes to the output can occur) 1 = Automatic (anything can change the DO values) 2 = Manual (only the user can change the DO values) **Note**: This parameter functions the same as "Scanning Mode" in Point type 102).

Point Type 140, AC I/O Point Type

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
19	Auto Output	R/W	Both	UINT8	1	0 → 1	0	2.10	Controls the state of the DO when Scanning (parameter #5) is in auto mode. In other words, the physical output gets this status when Scanning (parameter # 18) is set to Automatic. (Parameter functions the same as “Auto Output” in Point type 102). 0 = Off, 1 = On
20	Manual Output	R/W	Both	UINT8	1	0 → 1	0	2.10	Controls the state of the DO when Scanning (parameter #18) is in manual mode. In other words, the physical output gets this status when Scanning (parameter # 18) is set to Manual. 0 = Off, 1 = On (Parameter functions the same as “Manual Output” in Point type 102)
21	Failsafe Output	R/W	User	UINT8	1	0 → 1	0	2.10	The state the output is placed in when the unit is started and the Failsafe on Reset Parameter (Parameter #24) = 1 (Use Failsafe value on reset). Valid values are 0 (Off) and 1 (On). **Note**: This paarameter functions the same as “Failsafe Output” in Point type 102)
22	Physical Output	R/O	System	UINT8	1	0 → 1	0	2.10	Indicates the DO’s current state. Valid values are 0 (Off) and 1 (On). **Note**: This parameter functions the same as “Physical Output” in Point type 102)
23	Output Accumulated Value	R/W	Both	UINT32	4	0 → 4,294,967,295	0	2.10	Number of times the Physical Output (parameter #22) goes from OFF to ON. **Note**: this parameter functions the same as “Accumulated Value” in Point type 102)
24	Failsafe on Reset Mode	R/W	User	UINT8	1	0 → 1	0	2.10	Indicates the status on reset mode. Valid values are 0 (Output Last Status on Reset) and 1 (Use Failsafe value on Reset). If enabled, the Status (parameter #19) is set to the status indicated in “Failsafe Output” (Parameter #21) on a restart of any kind. If disabled, the last Status before the restart is used. **Note**: This parameter functions the same as “Failsafe on Reset” in Point type 102 (parameter 7).

Point Type 140, AC I/O Point Type

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
25	Momentary Mode	R/W	User	UINT8	1	0 → 1	0	2.10	Valid values are 0 (Momentary Disabled) and 1 (Momentary Enabled). If enabled, the Status (parameter #19) is turned ON for the entered Time On (parameter #30) and then be turned OFF. **Note**: This parameters functions the same as "Momentary Mode" in Point type 102 (parameter 10).
26	Momentary Active	R/O	System	UINT8	1	0 → 1	0	2.10	Indicates whether the DO currently has the Momentary ability active. Valid values are 0 (Momentary Not Active) and 1 (Momentary Active). **Note**: This parameter functions the same as "Momentary Active" in Point Type 102 (parameter 11).
27	Toggle Mode	R/W	User	UINT8	1	0 → 1	0	2.10	Valid values are 0 (Toggle Disabled) and 1 (Toggle Enabled). If enabled, the Status (parameter #19) is be turned ON for the entered Time On (parameter #30) and then turned OFF for the same Time On. The Status continues to cycle between the ON and OFF states. **Note**: This parameter functions the same as "Toggle Mode" in Point type 102 (parameter 12).
28	Timed Discrete Output (TDO) Mode	R/W	User	UINT8	1	0 → 1	0	2.10	Valid values are 0 (TDO Disabled) and 1 (TDO Enabled). If enabled, the Status (parameter #19) is turned ON for a calculated Time On (parameter #30) based upon the entered EU Value (parameter #37). After the Time On has expired, the Status turns OFF and remains that way until a new EU Value is entered.
29	Invert Output Mode	R/W	User	UINT8	1	0 → 1	0	2.10	Inverts the output of the ACIO channel. Valid values are 0 (Normal) and 1 (Inverted). This allows you to use TDO mode to keep a channel OFF for a set amount of time and then bringing the channel back ON. **Note**: This always inverts the output; including the Failsafe Output.

Point Type 140, AC I/O Point Type

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
30	Time On	R/W	Both	FL	4	0.02→ 43,200.0	1.0	2.10	Indicates the number of seconds for which the Status (parameter #19) is ON if in Toggle or Momentary Mode. **Note**: This parameter functions the same as “Time On” in Point type 102 (parameter 14).
31	Cycle Time	R/W	User	FL	4	>0.0 → 43,200.0	15.0	2.10	Number of seconds for when Toggle Mode (parameter #27) is selected. The Status (parameter #19) will be ON for the calculated Time On and off for an equal amount of time. **Note**: Ths parameter functions the same as “Cycle Time” in Point type 102 (parameter 15).
32	Units Tag	R/W	User	AC	10	0x20 → 0x7E for each ASCII character	“Percent“	2.10	Describes the units used by the output parameters. Values must be printable ASCII characters. **Note**: This parameter functions the same as “Units Tag” in Point type 102 (parameter 1)
33	Low Reading Time	R/W	User	FL	4	0.0 → 43,200.0	3.0	2.10	Minimum number of seconds the calculated Time On (parameter #30) will be when the entered EU Value (parameter #37) is less than or equal to the entered Low Reading EU (parameter #35). **Note**: This parameter functions the same as “Low Reading TIme” in Point type 102 (parameter 16).
34	High Reading Time	R/W	User	FL	4	0.0 → 43,200.0	12.0	2.10	Maximum number of seconds the calculated Time On (parameter #30) will be when the entered EU Value (parameter #37) is greater than or equal to the entered High Reading EU (parameter #36). **Note**: This parameter functions the same as “High Reading Time” in Point type 102 (parameter 17).
35	Low Reading EU	R/W	User	FL	4	Any valid IEEE 754 float	0.0	2.10	Minimum EU Value (parameter #37) possible. **Note**: This parameter functions the same as “Low Reading EU” in Point type 102) (parameter 18).
36	High Reading EU	R/W	User	FL	4	Any valid IEEE 754 float	100.0	2.10	Maximum EU Value (parameter #37) possible. **Note**: This parameter functions the same as “High Reading EU” in Point type 102 (paramneter 19).

Point Type 140, AC I/O Point Type

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
37	EU Value	R/W	Both	FL	4	Any valid IEEE 754 float	0.0	2.10	Value in Engineering Units. **Note**: This parameter functions the same as “EU Value” in Point type 102 (parameter 20).
38	Inrush Time	R/W	User	FL	4	0.02 → 0.5	0.05	2.10	Number of seconds that the initial inrush current is allowed to exceed the hardware limiting circuit before de-energizing the circuit. If this time is exceeded, the Fault Reset (parameter #40) is set to 1, scanning is disabled for the channel and if alarming is set, the correct alarm bit will be set.
39	Holding Current	R/O	System	FL	4	0.0 → 43,200.0	0	2.10	Detected current present in the channel in mA.
40	Fault Reset	R/W	Both	UINT8	1	0 → 1	0	2.10	This value is set to 1 when Holding Current (parameter #39) is above 1500 mA for Inrush Time (parameter #38) seconds. This value is set to 2 when a relay failure has been detected. The module will need to be serviced by the manufacturer to reset this value. When not set to 0 the Scanning output (parameter #18) will be disabled, an alarm (parameter #42.4) will be raised, and the channel relay will be de-energized. **Note**: User action is required to reset this field to 0. The firmware continually disables scanning as long as this field has a value of 1. Valid values are: 0 = Reset 1 = Fault 2 = Failure
41	Output Alarming	R/W	User	UINT8	1	0 → 1	0	2.10	If enabled, alarms may be generated and sent to the Alarm Log. Valid values are 0 (Disabled) and 1 (Enabled). **Note**: This parameter functions the same as “Alarming” in Point type 102 (parameter 3).
42	Output Alarm Code	R/O	System	BIN	1	0x00 → 0xFF	0x00	2.10	
42.0	Not Used			Bit 0			0		Not Used
42.1	Not Used			Bit 1			0		Not Used
42.2	Not Used			Bit 2			0		Not Used

Point Type 140, AC I/O Point Type

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
42.3	Relay Failure Alarm			Bit 3			0		If set, a relay failure has been detected. This is a hardware failure and cannot be reset by software. This alarm cannot be disabled.
42.4	Fault Current Alarm			Bit 4			0		If set, the Fault Reset (parameter #33) has been set to Fault. If clear, the Fault Reset (parameter #33) has been set to Reset. This alarm cannot be disabled.
42.5	Scanning Manual Alarm			Bit 5			0		If set, the Scanning (parameter #5) has been set to Manual. If clear, the Scanning (parameter #5) has been set to either Disable or Automatic. **Note**: This parameter functions the same as “Scanning Manual Alarm” in Point type 102 (parameter 6.5).
42.6	Point Fail			Bit 6			0		If set, the ACIO is reporting a malfunction. If clear, the ACIO is operating properly.
42.7	Output Scanning Disabled Alarm			Bit 7			0		If set, the Scanning (parameter #18) has been disabled. If clear, the Scanning (parameter #18) has been set to either Automatic or Manual. **Note**: This parameter functions the same as “Scanning Disabled Alarm” in Point type 102 (parameter 6.7).)
43	Output SRBX on Clear	R/W	User	UINT8	1	$0 \rightarrow 1$	0	1.00	Indicates a SRBX alarm is desired if an alarm condition clears. Valid values are 0 (SRBX on Clear Disabled) and 1 (SRBX on Clear Enabled). **Note**: This parameter functions the same as “SRBX on Clear” in Point type 102 (parameter 4).
44	Output SRBX on Set	R/W	User	UINT8	1	$0 \rightarrow 1$	0	2.10	Indicates a SRBX alarm is desired if an alarm condition occurs. Valid values are 0 (SRBX on Set Disabled) and 1 (SRBX on Set Enabled). **Note**: This parameter functions the same as “SRBX on Set“ in Point type 102) (parameter 5).
45	AC Frequency	R/W	User	FL	4	$47 \rightarrow 63$	60	2.10	The frequency of the AC input. This parameter must be correct for fault detection to function properly.

Point Type 140, AC I/O Point Type

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
46	Failure Action	R/W	User	UINT8	1	0 → 2	0	2.10	Indicates the action to be taken when a failure condition is detected. Valid values are: 0 = Channel Shutdown, alarm logged 1 = No action taken, alarm logged 2 = No action taken, alarm not logged In all cases the Relay Failure Alarm bit (parameter #42.3) is set. **WARNING:** Changing this parameter can cause relay protection to be disabled.

3.4.52 Point Type 141: Advance Pulse Module

Description: Point type 141 provides the parameters for the Advance Pulse Module.

Number of Logical Points: 1 logical point per installed module may exist.

Storage Location: Point type 141 is saved to internal configuration memory.

Table 3-53: Point Type 141, Advance Pulse Module

Point Type 141, Advanced Pulse Module

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Point Tag ID	R/W	User	AC	10	0x20 → 0x7E for each ASCII character	"APM Deflt"	2.10	A 10 character identification name for a specific APM. Values must be printable ASCII characters.
1	API Level Check Pair 1	R/W	User	UINT8	1	0 → 4	4	2.10	Selects the API level to perform for the first check pair. . Valid values are: 0 = Level A 1 = Level B 2 = Level C 3 = Level D 4 = Level E 5 = Marker Pulse The output of the API Chapter 5.5 level checks will always be written to the API Pulse Counts Pair 1 (parameter #17)
2	API Level Check Pair 2	R/W	User	UINT8	1	0 → 4	4	2.10	Selects the API level to perform for the second check pair. Valid values are: 1 = Level B 2 = Level C 3 = Level D 4 = Level E 5 = Marker Pulse The output of the API Chapter 5.5 level checks is always written to the API Pulse Counts Pair 2 (parameter #19)
3	Meter Input on Prove	R/W	User	UINT8	1	0 → 3	0	2.10	Indicates which pulse to use for the Meter Prove. Valid values are: 0 - Pulse Input 1 1 - Pulse Input 2 2 - Pulse Input 3 3 - Pulse Input 4

Point Type 141, Advanced Pulse Module

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
4	Master Meter Input on Prove	R/W	User	UINT8	1	0 → 3	2	2.10	Indicates which pulse to use for the Master Meter Prove. Valid values are: 0 - Pulse Input 1 1 - Pulse Input 2 2 - Pulse Input 3 3 - Pulse Input 4 **Note**: This function activates **only** if you enable Software Detector Switch (parameter #42).
5	Raw Pulse Count PI One	R/O	System	UINT32	4	0 → 16,000,000	0	2.10	The raw accumulated number of pulses for PI One
6	Frequency PI One	R/O	System	FL	4	0 → Any positive IEEE 754 float	0.0	2.10	Frequency of incoming pulses on PI One in pulses/second.
7	Scan Period PI One	R/W	User	FL	4	0.05 → 60.0	1.0	2.10	Time period in seconds in which the parameters associated with the pulse input are evaluated.
8	Raw Pulse Count PI Two	R/O	System	UINT32	4	0 → 16,000,000	0	2.10	The raw accumulated number of pulses for PI Two
9	Frequency PI Two	R/O	System	FL	4	0 → Any positive IEEE 754 float	0.0	2.10	Frequency of incoming pulses on PI Two in pulses/second.
10	Scan Period PI Two	R/W	User	FL	4	0.05 → 60.0	1.0	2.10	Time period in seconds in which the parameters associated with the pulse input are evaluated.
11	Raw Pulse Count PI Three	R/O	System	UINT32	4	0 → 16,000,000	0	2.10	The raw accumulated number of pulses for PI Three
12	Frequency PI Three	R/O	System	FL	4	0 → Any positive IEEE 754 float	0.0	2.10	Frequency of incoming pulses on PI Three in pulses/second.
13	Scan Period PI Three	R/W	User	FL	4	0.05 → 60.0	1.0	2.10	Time period in seconds in which the parameters associated with the pulse input are evaluated.
14	Raw Pulse Count PI Four	R/O	System	UINT32	4	0 → 16,000,000	0	2.10	The raw accumulated number of pulses for PI Four
15	Frequency PI Four	R/O	System	FL	4	0 → Any positive IEEE 754 float	0.0	2.10	Frequency of incoming pulses on PI Four in pulses/second.
16	Scan Period PI Four	R/W_CNDL	User	FL	4	0.05 → 60.0	1.0	2.10	Time period in seconds in which the parameters associated with the pulse input are evaluated.
17	API Pulse Counts Pair 1	R/O	System	UINT32	4	0 → 16,000,000	0	2.10	The accumulated number of pulses through the API level checks for pulse pair 1. This updates only when you set the API Level Check Pair 1 (parameter #1) to Level A, B, C, or Marker Pulse.

Point Type 141, Advanced Pulse Module

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
18	Frequency Pair 1	R/O	System	FL	4	0 → Any positive IEEE 754 float	0.0	2.10	Frequency of incoming pulses on Pair One in pulses/second.
19	API Pulse Counts Pair 2	R/O	System	UINT32	4	0 → 16,000,000	0	2.10	The accumulated number of pulses through the API level checks for pulse pair 2. This updates only when you set the API Level Check Pair 2 (parameter #2) is set to Level A, B, C, or Marker Pulse.
20	Frequency Pair 2	R/O	System	FL	4	0 → Any positive IEEE 754 float	0.0	2.10	Frequency of incoming pulses on Pair Two in pulses/second.
21	Meter Whole Pulse Count	R/O	System	UINT32	4	0 → 16,000,000	0	2.10	Actual number of whole pulses accumulated between detector switches for a Meter Input (parameter #3). **Note**: Detector Reset clears this value.
22	Master Meter Whole Pulse Count	R/O	System	UINT32	4	0 → 16,000,000	0	2.10	Actual number of whole pulses accumulated between detector switches for a Master Meter Input (parameter #4). **Note**: This activates **only** if you enable the Software Detector Switch Enabled (parameter #42). Detector Reset clears this value.
23	Meter Interpolated Pulse Count	R/O	System	FL	4	0 → Any positive IEEE 754 float	0.0	2.10	Actual number of interpolated pulses accumulated between detector switches for a given meter pulse input.
24	Master Meter Interpolated Pulse Count	R/O	System	FL	4	0 → Any positive IEEE 754 float	0.0	2.10	Actual number of interpolated pulses accumulated between software detector switches for a given master meter pulse input.
25	PI Alarming	R/W	User	UINT8	1	0 → 1	0	2.10	Displays whether alarms may be generated and sent to the alarm log for a pulse input. Valid values are 0 (Alarming Disabled) and 1 (Alarming Enabled).
26	PI SRBX on Clear	R/W	User	UINT8	1	0 → 1	0	2.10	Indicates an SRBX alarm is desired if an alarm condition clears for a pulse input. Valid values are 0 (SRBX on Clear Disabled) and 1 (SRBX on Clear Enabled).
27	PI SRBX on Set	R/W	User	UINT8	1	0 → 1	0	2.10	Indicates an SRBX alarm is desired if an alarm condition occurs for a pulse input. Valid values are 0 (SRBX on Set Disabled) and 1 (SRBX on Set Enabled).
28	API Pair 1 Alarm Status	R/O	System	BIN	1	0 → 255	0	2.10	API Level Alarm Status (Pair 1). **Note**: These values update in real time.

Point Type 141, Advanced Pulse Module

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
28.0	Sequence Out of Order Error			Bit 0			0		This alarm is present if the sequence of the pulses within the pair become out of order. Valid values are 0 (No Alarm Present) and 1 (Alarm Present).
28.1	Phase Discrepancy Detected			Bit 1			0		This alarm occurs if the phase of the pulses within the pair becomes skewed. Valid values are 0 (No Alarm Present) and 1 (Alarm Present).
28.2	Pulse Synchronization Error			Bit 2			0		This alarm occurs if the synchronization of the pulses fails. Valid values are 0 (No Alarm Present) and 1 (Alarm Present).
28.3	Frequency Discrepancy Detected			Bit 3			0		This alarm occurs if the frequencies of the two pulses are not equal. Valid values are 0 (No Alarm Present) and 1 (Alarm Present).
28.4	PI 1 Failure			Bit 4			0		This alarm occurs if PI 1 has failures (see bits 0-3). Valid values are 0 (No Alarm Present) and 1 (Alarm Present).
28.5	PI 2 Failure			Bit 5			0		This alarm occurs if PI 2 has failures (see bits 0-3). Valid values are 0 (No Alarm Present) and 1 (Alarm Present).
28.6	Level A Bad Pulse Stream			Bit 6			0	3.10	This alarm occurs if the number of bad pulses exceeds the bad pulse threshold in Level A. A bad pulse is either a missing pulse or a duplicate pulse. Valid values are 0 (No Alarm Present) and 1 (Alarm Present).
28.7	Marker Pulse Alarm			Bit 7			0	3.10	This alarm occurs if the flow pulses drift from the expected number of pulses by more than the marker puilse deadband for Pair 1. Valid values are 0 (No Alarm Present) and 1 (Alarm Present).
29	API Pair 2 Alarm Status	R/O	System	BIN	1	0 → 255	0	2.10	API Level Alarm Status (Pair 2). **Note**: These values update in real time.
29.0	Sequence Out of Order Error			Bit 0			0		This alarm occurs if the sequence of the pulses within the pair becomes out of order. Valid values are 0 (No Alarm Present) and 1 (Alarm Present).
29.1	Phase Discrepancy Detected			Bit 1			0		This alarm occurs if the phase of the pulses within the pair becomes skewed. Valid values are 0 (No Alarm Present) and 1 (Alarm Present).
29.2	Pulse Synchronization Error			Bit 2			0		This alarm occurs if the synchronization of the pulses fails. Valid values are 0 (No Alarm Present) and 1 (Alarm Present).

Point Type 141, Advanced Pulse Module

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
29.3	Frequency Discrepancy Detected			Bit 3			0		This alarm occurs if the frequencies of the two pulses are not equal. Valid values are 0 (No Alarm Present) and 1 (Alarm Present).
29.4	PI 3 Failure			Bit 4			0		This alarm occurs if PI 3 has failures (see bits 0-3). Valid values are 0 (No Alarm Present) and 1 (Alarm Present).
29.5	PI 4 Failure			Bit 5			0		This alarm occurs if PI 4 has failures (see bits 0-3). Valid values are 0 (No Alarm Present) and 1 (Alarm Present).
29.6	Not Used			Bit 6			0		Not Used
29.7	Marker Pulse Alarm			Bit 7			0	3.10	This alarm occurs if the flow pulses drift from the expected number of pulses by more than the marker puilse deadband for Pair 1. Valid values are 0 (No Alarm Present) and 1 (Alarm Present).
30	API Phase Alarm Count Pair 1	R/O	System	UINT16	2	0 → 65535	0	2.10	Indicates the total number of phase alarms
31	API Same Channel Alarm Count Pair 1	R/O	System	UINT16	2	0 → 65535	0	2.10	Indicates the total number of same channel alarms
32	API Phase Alarm Count Pair 2	R/O	System	UINT16	2	0 → 65535	0	2.10	Indicates the total number of phase alarms
33	API Same Channel Alarm Count Pair 2	R/O	System	UINT16	2	0 → 65535	0	2.10	Indicates the total number of same channel alarms
34	Detector Reset	R/W	User	UINT8	1	0 → 1	0	2.10	This essentially notifies the APM of the start of a prove. All accumulated pulses clear and all alarms clear. Pulse accumulation starts at the transition of the first detector switch and stops at the transition of the second detector switch. Valid values are 0 (Idle) and 1 (Reset).
35	Detector Switch 1 Status	R/O	System	UINT8	1	0 → 1	0	2.10	Indicates the status of the physical detector switch. Valid values are 0 (Closed) and 1 (Open).
36	Detector Switch 2 Status	R/O	System	UINT8	1	0 → 1	0	2.10	Indicates the status of the physical detector switch. Valid values are 0 (Closed) and 1 (Open).

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Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
37	Detector Switch State	R/O	System	UINT8	1	0 → 3	3	2.10	Indicates the state of the detector switches. Valid values are: 0 = Reset; a reset has been received and the APM is expecting a detector switch transition. 1 = Counting; a detector switch transition has occurred and the APM is currently counting whole pulses. 2 = Complete; another detector switch transition has occurred, the Prove run is complete, and all values are stored until the next reset. 3 = Invalid, the accumulator does not contain good values. (This can be either at a power up or if communications are lost during a prove and the accumulators have reset to zero.)
38	Flow Direction Pair 1	R/O	System	UINT8	1	0 → 1	0	2.10	Identifies the direction of flow, based on 180 degrees out of phase for first pair of pulses. Level B API check must be used (parameter #1). Valid values are 0 (Forward [< 180 degrees]} and 1 (Reverse [> 180 degrees]). **Note**: Forward/Reverse designators assume 90 degrees out of phase
39	Flow Direction Pair 2	R/O	System	UINT8	1	0 → 1	0	2.10	Identified the direction of flow, based on 180 degrees out of phase for the second pair of pulses. Level B API check must be used (parameter #2). Valid values are 0 (Forward [< 180 degrees]) and 1 (Reverse [> 180 degrees]). **Note**: Forward/Reverse designators assume 90 degrees out of phase
40	Software Detector Switch	R/W	User	UINT8	1	0 → 1	0	2.10	A 1 “triggers” the start/stop of counting pulses for a master meter or tank prove. Once the APM receives a trigger, it will set this back to Idle. Valid values are 0 (Idle) and 1 (Detector Switch Triggered). **Note**: This is valid **only** if you enable Software Detector Switch (parameter #42) is enabled.
41	Detector Switch Filter Time	R/W	User	UINT16	2	0 → 1500	300	2.10	Indicates, in milliseconds, the time allotted after a detector switch is triggered and before the next trigger is to occur. This provides a de-bounce filter for the detector switches.
42	Software Detector Switch Enabled	R/W	User	UINT8	1	0 → 1	0	2.10	Displays whether a master meter or tank prover is to be proved. Valid values are 0 (Disabled) and 1 (Enabled).

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Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
43	PI4/PO Configuration	R/O	System	UINT8	1	0 → 1	1	2.10	Gives the configuration of the PI4/PO terminal of the APM. Use a hardware switch to configure this. Valid values are 0 (Configured for a Pulse Input) and 1 (Configured for a Pulse Output).
44	PO Scan Period	R/W	User	FL	4	0, 0.500 → 43,200.0	1.0	2.10	Time period in seconds in which the parameters associated with the pulse output are evaluated. Valid values are 0 (Disabled). All other output pulses are at a 50% duty cycle
45	Input TLP	R/W	User	TLP	3		0,0,0	2.10	Input to be used in calculating output pulses
46	PO Input Mode	R/W	User	UINT8	1	0 → 1	0	2.10	Gives the interpretation of the Input TLP (parameter #45). Valid values are 0 (Input TLP is a rate) and 1 (Input TLP is an accumulation).
47	PO Accumulator	R/O	System	UINT32	4	0 → 16,000,000	0	2.10	Indicates the accumulated number of pulses sent out.
48	Output Scaling Value	R/W	User	FL	4	Any positive IEEE 754 float, except 0.0	1.0	2.10	Specifies the value that is applied to the accumulated pulse value.
49	Buffer Warning Alarm Set Point	R/W	User	UINT16	2	0 → 65535	500	2.10	Indicates the maximum allowable number of buffered pulses before triggering the buffer warning alarm. **Note**: This value must be **less** than the maximum number of allowed buffered pulses (see parameter 50). .
50	Maximum Buffered Pulses	R/W	User	UINT16	2	0 → 65535	1000	2.10	Indicates the maximum number of allowed buffered pulses.
51	Maximum Pulse Output Frequency	R/W	User	UINT16	2	0 → 12000	12000	2.10	The maximum number of pulses per second which can be output by the PO (in Hz). If the calculated number of pulses exceeds this value then those pulses shall be placed in the buffer.
52	PO Alarming	R/W	User	UINT8	1	0 → 1	0	2.10	Displays whether alarms may be generated and sent to the alarm log for a pulse output. Valid values are 0 (Alarming Disabled) and 1 (Alarming Enabled).
53	PO Alarm Code	R/O	System	BIN	1	0 → 255	0	2.10	Defines the alarms for a pulse output
53.0	Not Used			Bit 0					Not Used
53.1	Buffer Overrun Alarm			Bit 1					Occurs when the number of buffered pulses has exceeded the max limit (parameter #50). Pulses are now being lost. Valid values are 0 (No Alarm Present) and 1 (Alarm Present).

Point Type 141, Advanced Pulse Module

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
53.2	Buffer Warning Alarm			Bit 2					Occurs when the number of buffered pulses reaches the set point (parameter #49). Adjust the scaling factor so that pulses are not lost. Valid values are 0 (No Alarm Present) and 1 (Alarm Present).
53.3	Not Used			Bit 3					Not Used
53.4	Not Used			Bit 4					Not Used
53.5	Not Used			Bit 5					Not Used
53.6	Not Used			Bit 6					Not Used
53.7	Not Used			Bit 7					Not Used
54	PO SRBX on Clear	R/W	User	UINT8	1	0 → 1	0	2.10	Indicates whether an SRBX alarm occurs if an alarm condition clears for a pulse output. Valid values are 0 (Disable SRBX on Clear) and 1 (Enable SRBX on Clear).
55	PO SRBX on Set	R/W	User	UINT8	1	0 → 1	0	2.10	Indicates whether an SRBX alarm occurs if an alarm condition occurs for a pulse output. Valid values are 0 (Disable SRBX on Set) and 1 (Enable SRBX on Set).
56	Alarming	R/W	User	UINT8	1	0 → 1	0	2.10	If enabled, alarms may be generated and sent to the Alarm Log. Valid values are 0 (Disabled) and 1 (Enabled).
57	Alarm Code	R/O	System	BIN	1	0 → 255	0	2.10	Defines the alarms for the APM.
57.0	Not Used			Bit 0					Not Used
57.1	Not Used			Bit 1					Not Used
57.2	Not Used			Bit 2					Not Used
57.3	Not Used			Bit 3					Not Used
57.4	Not Used			Bit 4					Not Used
57.5	Not Used			Bit 5					Not Used
57.6	Point Fail Alarm			Bit 6					If set, the APM is reporting a malfunction. If cleared, the APM is operating properly
57.7	Not Used			Bit 7					Not Used
58	SRBX on Set	R/W	User	UINT8	1	0 → 1	0	2.10	Indicates an SRBX alarm is desired if an alarm condition occurs. Valid values are 0 (Disable SRBX on Set) and 1 (SRBX on Set Enabled).
59	SRBX on Clear	R/W	User	UINT8	1	0 → 1	0	2.10	Indicates an SRBX alarm is desired if an alarm condition clears. Valid values are 0 (SRBX on Clear Disabled) and 1 (Enable SRBX on Clear).

Point Type 141, Advanced Pulse Module

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
60 (Series 2)	API Reverse Pulse Counts Pair 1	R/O	System	UINT32	4	0 → 16,000,000	0	3.00	Indicates the accumulated number of reverse pulses through the API level checks for pulse pair 1. The system updates this value only when the API Level Check Pair 1 (parameter #1) is set to either Level B or C.
61 (Series 2)	API Reverse Pulse Counts Pair 2	R/O	System	UINT32	4	0 → 16,000,000	0	3.00	Indicates the accumulated number of reverse pulses through the API level checks for pulse pair 2. The system updates this value only when the API Level Check Pair 2 (parameter #2) is set to either Level B or C.
62 (Series 2)	Pulse Input 1 Tag	R/W	User	AC	20	0x20 → 0x7E for each ASCII character	"APM Default PI 1Tag"	3.00	A 20 character identification name for a specific APM Pulse Input. Values must be printable ASCII characters.
63 (Series 2)	Pulse Input 2 Tag	R/W	User	AC	20	0x20 → 0x7E for each ASCII character	"APM Default PI 2Tag"	3.00	A 20 character identification name for a specific APM Pulse Input. Values must be printable ASCII characters.
64 (Series 2)	Pulse Input 3 Tag	R/W	User	AC	20	0x20 → 0x7E for each ASCII character	"APM Default PI 3Tag"	3.00	A 20 character identification name for a specific APM Pulse Input. Values must be printable ASCII characters.
65 (Series 2)	Pulse Input 4 Tag	R/W	User	AC	20	0x20 → 0x7E for each ASCII character	"APM Default PI 4Tag"	3.00	A 20 character identification name for a specific APM Pulse Input. Values must be printable ASCII characters.
66 (Series 2)	Meter Interpolation Timer T1	R/O	System	FL	4	0 → Any positive IEEE 754 float	0.0	3.00	Indicates the time interval, in seconds, over which the whole flowmeter pulses were accumulated.
67 (Series 2)	Meter Interpolation Timer T2	R/O	System	FL	4	0 → Any positive IEEE 754 float	0.0	3.00	Indicates the time interval, in seconds, between the first and second detector switch being triggered.
68 (Series 2)	Master Meter Interpolation Timer T1	R/O	System	FL	4	0 → Any positive IEEE 754 float	0.0	3.00	Indicates the time interval, in seconds, over which the whole flowmeter pulses were accumulated on the master meter..
69 (Series 2)	Master Meter Interpolation Timer T2	R/O	System	FL	4	0 → Any positive IEEE 754 float	0.0	3.00	Indicates the time interval, in seconds, between the first and second detector switch being triggered for the master meter.
70 (Series 2)	API Forward Pulse Counts Pair 1	R/O	System	UINT32	4	0 → 16,000,000	0	3.00	Indicates the accumulated number of forward pulses through the API level checks for pulse pair 1. The system updates this value only when the API Level Check Pair 1 (parameter #1) is set to either Level B or C.

Point Type 141, Advanced Pulse Module

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
71 (Series 2)	API Forward Pulse Counts Pair 2	R/O	System	UINT32	4	0 → 16,000,000	0	3.00	Indicates the accumulated number of forward pulses through the API level checks for pulse pair 2. The system updates this value only when the API Level Check Pair 2 (parameter #2) is set to either Level B or C.
72 (Series 2)	API Total Alarm Count Pair 1	R/O	System	UINT32	4	0 → 4,294,967,295	0	3.10	Indicates the total number of alarms on pair 1.
73 (Series 2)	API Bad Pulse Threshold Pair 1	R/W	User	UINT32	4	0 → 4,294,967,295	1	3.10	Indicates the number of bad pulse pairs received before setting the API Pair 1 alarm status whe using API Level A.
74 (Series 2)	API Good Pulse Threshold Pair 1	R/W	User	UINT32	4	0 → 4,294,967,295	1	3.10	Indicates the number of good pulse pairs received before clearing the API Pair 1 alarm status when using API Level A.
75 (Series 2)	API Low Frequency Cutoff Pair 1	R/W	User	FLT	4	Any positive IEEE 754 float.	0	3.10	Sets the frequency below which the Pair 1 alarm status no longer sets. Existing alarms clear if the Pair 1 bad pulse reset mode is set to 1 (Clear) or the number of good pulse pairs received below the threshold is greater than the API good pulse threshold for Pair 1. **Note**: Applies only when using API Level A.
76 (Series 2)	API Bad Pulse Reset Mode Pair 1	R/W	User	UINT8	1	0 → 1	0	3.10	Determines whether the system clears the number of bad pulse pairs (contributing towards the Pair 1 bad pulse threshold and the existing alarm bits) when the frequency falls below the low frequency cutoff for Pair 1. Valid values are 0 (Retain) and 1 (Clear). **Note**: Applies only when using API Level A.
77 (Series 2)	Marker Pulse Alarm Deadband Pair 1	R/W	User	UINT16	2	0 → 65535	10	3.10	Indicates the allowed deviation of flow pulses from expected pulses at a marker pulse before setting the Marker Pulse Alarm bit. **Note**: Applies only when using Marker Pulse level checking.
78 (Series 2)	Flow Pulses per Marker Pulse Pair 1	R/W	User	UINT16	2	0 → 65535	1000	3.10	Indicates the number of flow pulses expected between each marker pulse. **Note**: Applies only when using Marker Pulse level checking.
79 (Series 2)	Flow Pulse Accumulation at Marker Pulse Pair 1	R/O	System	UINT32	4	0 → 16,000,000	0	3.10	Indicates the accumulation of flow pulses, updated when a marker pulse is received. **Note**: Applies only when using Marker Pulse level checking.

Point Type 141, Advanced Pulse Module

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
80 (Series 2)	Flow Pulse Drift from Expected Pair 1	R/O	System	INT32	4	-2,147,483,648 → 2,147,483,647	0	3.10	Indicates the drift from expected flow pulse value, updated when a marker pulse is received. **Note**: Applies only when using Marker Pulse level checking.
81 (Series 2)	Marker Pulse Reset Pair 1	R/W	Both	UINT8	1	0 → 1	0	3.10	Resets the flow pulse accumulation and flow pulse drift for Pair 1. Valid values are 0 (Idle) and 1 (Reset). **Note**: Applies only when using Marker Pulse level checking.
82 (Series 2)	Marker Pulse Alarm Deadband Pair 2	R/W	User	UINT16	2	0 → 65535	10	3.10	Indicates the allowed deviation of flow pulses from expected pulses at a marker pulse before setting the Marker Pulse Alarm bit. **Note**: Applies only when using Marker Pulse level checking.
83 (Series 2)	Flow Pulses per Marker Pulse Pair 2	R/W	User	UINT16	2	0 → 65535	1000	3.10	Indicates the number of flow pulses expected between each marker pulse. **Note**: Applies only when using Marker Pulse level checking.
84 (Series 2)	Flow Pulse Accumulation at Marker Pulse Pair 2	R/O	System	UINT32	4	0 → 16,000,000	0	3.10	Indicates the accumulation of flow pulses, updated when a marker pulse is received. **Note**: Applies only when using Marker Pulse level checking.
85 (Series 2)	Flow Pulse Drift from Expected Pair 2	R/O	System	INT32	4	-2,147,483,648 → 2,147,483,647	0	3.10	Indicates the drift from expected flow pulse value, updated when a marker pulse is received. **Note**: Applies only when using Marker Pulse level checking.
86 (Series 2)	Marker Pulse Reset Pair 2	R/W	Both	UINT8	1	0 → 1	0	3.10	Resets the flow pulse accumulation and flow pulse drift for Pair 1. Valid values are 0 (Idle) and 1 (Reset). **Note**: Applies only when using Marker Pulse level checking.
87	Contract Hour	R/W	User	AC	10	0x20 → 0x7E for each ASCII character	"………"	3.50	Hour, in 24-hour format, that represents the end of the day for the APM PIs.
88	Current Rate Period	R/W	Use	UINT8	1	0 ➔ 3	2	3.50	Determines the calculation of the Current Rate (parameters 105-108). Valid values are: 0 = EU/second 1 = EU/minute 2= EU/hour 3 = EU/day
89	Pulse Input 1 Units Tag	R/W	User	AC	20	0x20 ➔ 0x7E for each ASCII character	"………"	3.50	Defines the units P1 uses. Values must be printable ASCII characters.

Point Type 141, Advanced Pulse Module

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
90	Pulse Input 2Units Tag	R/W	User	AC	20	0x20 → 0x7E for each ASCII character	"………"	3.50	Defines the units P2 uses. Values must be printable ASCII characters.
91	Pulse Input 3 Units Tag	R/W	User	AC	20	0x20 → 0x7E for each ASCII character	"………"	3.50	Defines the units P3 uses. Values must be printable ASCII characters.
92	Pulse Input 4Units Tag	R/W	User	AC	20	0x20 → 0x7E for each ASCII character	"………"	3.50	Defines the units P4 uses. Values must be printable ASCII characters.
93	Pulse Input 1 Pulses for Day	R/O	Both	UINT32	4	0 → 4,294,967,295	0	3.50	Total number of pulses P1 has received for the contract day.
94	Pulse Input 2 Pulses for Day	R/O	Both	UINT32	4	0 → 4,294,967,295	0	3.50	Total number of pulses P2 has received for the contract day.
95	Pulse Input 3 Pulses for Day	R/O	Both	UINT32	4	0 → 4,294,967,295	0	3.50	Total number of pulses P3 has received for the contract day.
96	Pulse Input 4 Pulses for Day	R/O	Both	UINT32	4	0 → 4,294,967,295	0	3.50	Total number of pulses P4 has received for the contract day.
97	Pulse Input 1 EU Today	R/W	Both	FLOAT	4	Any valid IEEE 754 float	0.0	3.50	Accumulated value foir Pulse 1 in Engineering Units for this contract hou. Calculated using the conversion value for this PI and based on Pulses/EU
98	Pulse Input 2 EU Today	R/W	Both	FLOAT	4	Any valid IEEE 754 float	0.0	3.50	Accumulated value foir Pulse 2 in Engineering Units for this contract hou. Calculated using the conversion value for this PI and based on Pulses/EU
99	Pulse Input 3 EU Today	R/W	Both	FLOAT	4	Any valid IEEE 754 float	0.0	3.50	Accumulated value foir Pulse 3 in Engineering Units for this contract hou. Calculated using the conversion value for this PI and based on Pulses/EU
100	Pulse Input 4 EU Today	R/W	Both	FLOAT	4	Any valid IEEE 754 float	0.0	3.50	Accumulated value foir Pulse 4 in Engineering Units for this contract hou. Calculated using the conversion value for this PI and based on Pulses/EU
101	Pulse Input 1 EU Yesterday	R/O	System	FLOAT	4	Any valid IEEE 754 float	0.0	3.50	Previous contract day's EU total for PI1.
102	Pulse Input 2 EU Yesterday	R/O	System	FLOAT	4	Any valid IEEE 754 float	0.0	3.50	Previous contract day's EU total for PI2.
103	Pulse Input 3 EU Yesterday	R/O	System	FLOAT	4	Any valid IEEE 754 float	0.0	3.50	Previous contract day's EU total for PI3.
104	Pulse Input 4 EU Yesterday	R/O	System	FLOAT	4	Any valid IEEE 754 float	0.0	3.50	Previous contract day's EU total for PI4.
105	Pulse Input 1 EU Rate	R/O	System	FLOAT	4	Any valid IEEE 754 float	0.0	3.50	Calculated rate of the pulses for PI1. Based on the EUP value and the Rate Pieor for the module (parameter 88).

Point Type 141, Advanced Pulse Module

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
106	Pulse Input 2 EU Rate	R/O	System	FLOAT	4	Any valid IEEE 754 float	0.0	3.50	Calculated rate of the pulses for PI2. Based on the EUP value and the Rate Pieor for the module (parameter 88).
107	Pulse Input 3 EU Rate	R/O	System	FLOAT	4	Any valid IEEE 754 float	0.0	3.50	Calculated rate of the pulses for PI3. Based on the EUP value and the Rate Pieor for the module (parameter 88).
108	Pulse Input 4 EU Rate	R/O	System	FLOAT	4	Any valid IEEE 754 float	0.0	3.50	Calculated rate of the pulses for PI4. Based on the EUP value and the Rate Pieor for the module (parameter 88).
109	Pulse Input 1 Conversion Value	R/W	User	FLOAT	4	Any valid IEEE 754 float except 0.0	1.0	3.50	Used to calculate the units of the EU values for PI1.
110	Pulse Input 2 Conversion Value	R/W	User	FLOAT	4	Any valid IEEE 754 float except 0.0	1.0	3.50	Used to calculate the units of the EU values for PI2.
111	Pulse Input 3 Conversion Value	R/W	User	FLOAT	4	Any valid IEEE 754 float except 0.0	1.0	3.50	Used to calculate the units of the EU values for PI3.
112	Pulse Input 4 Conversion Value	R/W	User	FLOAT	4	Any valid IEEE 754 float except 0.0	1.0	3.50	Used to calculate the units of the EU values for PI4.

3.4.53 Point Type 142: History Segment 11 Point Configuration

Description: Point type 142 provides the parameters for configuring History Segment 11.

Number of Logical Points: The number of logical points varies depending on the segment size parameter for History Segment 11.

Storage Location: Point type 142 is saved to internal configuration memory.

Table 3-54: Point Type 142, History Segment 11

Point Type 142, History Segment 11

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Point Tag ID	R/O	System	AC	10	0x20 → 0x7E for each byte	" "	3.00	Same value as the Point Tag of the Point Type in which the history log resides.
1	Parameter Description	R/W	User	AC	10	0x20 → 0x7E for each byte	" "	3.00	User-supplied text string used to identify the parameter being logged in the history point.
2	History Pont Log	R/W	User	TLP	3	Any parameter may be logged except parameters of Data Type TLP or AC	(0,0,0)	3.00	TLP points to a value to be archived by history.
3	Archive Type	R/W	User	UINT8	1	See note 1	0	3.00	See note 1
4	Averaging/Rate Type	R/W	User	UINT8	1	See note 2	0	3.00	See note 2
5	Current Value	R/O	System	FL	4	Any valid IEEE 754 float	0	3.00	Current value of parameter being logged.
6	Last Daily Value	R/)	System	FL	4	Any valid IEEE 754 float	0	3.00	Value logged to the daily archive at the last contract hour.
7	Today Minimum Time	R/O	System	TIME	4	0 → 4294967296	0	3.00	Time at which the minimum value was reached today.
8	Today Minimium Value	R/O	System	FL	4	Any valid IEEE 754 float	0	3.00	Minimum value of logged parameter observed today.
9	Today Maximum Time	R/O	System	TIME	4	0 → 4294967296	0	3.00	Time at which the maximum value was reached today.
10	Today Maximum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	3.00	Maximum value of logged parameter observed today.
11	Yesterday Minimum Time	R/O	System	TIME	4	0 → 4294967296	0	3.00	Time at which the minimum value was reached yesterday.
12	Yesterday Minimum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	3.00	Minimum value of logged parameter observed yesterday.
13	Yesterday Maximum Time	R/O	System	TIME	4	0 → 4294967296	0	3.00	Time at which the maximum value was reached yesterday.

Point Type 142, History Segment 11

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
14	Yesterday Maximumn Value	R/O	System	FL	4	Any valid IEEE 754 float	0	3.00	Maximum value of logged parameter observed yesterday.

1 This parameter defines how a data point is archived to history.
- 0 = None (History point not defined)
- 1 = User C/C++ Data (Ver. 1.20)
- 2 = User C/C++ Time (Ver. 1.20)
- 65 = FST Data History
- 67 = FST Time
- 128 = Average
- 129 = Accumulate
- 130 = Current Value
- 134 = Totalize

2 This field is used in conjunction with the Archive Type parameter to further define how history data is archived. This parameter defines the rate of accumulation of the averaging technique.

Accumulation Rate (Archive Type = 129):
- 10 = Per Second
- 11 = Per Minute
- 12 = Per Hour
- 13 = Per Day

Averaging Type (Archive Type = 128):
- 0 = None (History point not defined)
- 1 = Flow Dependent Time Weighted Linear
- 2 = Flow Dependent Time Weighted Formulaic
- 3 = Flow Weighted Linear
- 4 = Flow Weighted Formulaic
- 5 = Linear Averaging
- 6 = User Weighted Averaging (Version 3.60)

3.4.54 Point Type 143: History Segment 12 Point Configuration

Description: Point type 143 provides the parameters for History Segment 12.

Number of Logical Points: The number of logical points varies depending on the segment size parameter for History Segment 12.

Storage Location: Point type 143 is saved to internal configuration memory.

Table 3-55: Point Type 143, History Segment 12

Point Type 143, History Segment 12

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Point Tag ID	R/O	System	AC	10	0x20 → 0x7E for each byte	“ “	3.00	Same value as the Point Tag of the Point Type in which the history log resides.
1	Parameter Description	R/W	User	AC	10	0x20 → 0x7E for each byte	“ “	3.00	User-supplied text string used to identify the parameter being logged in the history point.
2	History Pont Log	R/W	User	TLP	3	Any parameter may be logged except parameters of Data Type TLP or AC	(0,0,0)	3.00	TLP points to a value to be archived by history.
3	Archive Type	R/W	User	UINT8	1	See note 1	0	3.00	This parameter defines how a data point is archived to history. Valid values are: 0 = None (History point not defined) 1 = User C/C++ Data (Ver. 1.20) 2 = User C/C++ Time (Ver. 1.20) 65 = FST Data History 67 = FST Time 128 = Average 129 = Accumulate 130 = Current Value 134 = Totalize

Point Type 143, History Segment 12

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
4	Averaging/Rate Type	R/W	User	UINT8	1	See note 2	0	3.00	This field is used in conjunction with the Archive Type parameter to further define how history data is archived. This parameter defines the rate of accumulation of the averaging technique. Accumulation Rate (Archive Type = 129): 10 = Per Second 11 = Per Minute 12 = Per Hour 13 = Per Day Averaging Type (Archive Type = 128): 0 = None (History point not defined) 1 = Flow Dependent Time Weighted Linear 2 = Flow Dependent Time Weighted Formulaic 3 = Flow Weighted Linear 4 = Flow Weighted Formulaic 5 = Linear Averaging 6 = User Weighted Averaging (Version 3.60)
5	Current Value	R/O	System	FL	4	Any valid IEEE 754 float	0	3.00	Current value of parameter being logged.
6	Last Daily Value	R/)	System	FL	4	Any valid IEEE 754 float	0	3.00	Value logged to the daily archive at the last contract hour.
7	Today Minimum Time	R/O	System	TIME	4	0 → 4294967296	0	3.00	Time at which the minimum value was reached today.
8	Today Minimium Value	R/O	System	FL	4	Any valid IEEE 754 float	0	3.00	Minimum value of logged parameter observed today.
9	Today Maximum Time	R/O	System	TIME	4	0 → 4294967296	0	3.00	Time at which the maximum value was reached today.
10	Today Maximum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	3.00	Maximum value of logged parameter observed today.
11	Yesterday Minimum Time	R/O	System	TIME	4	0 → 4294967296	0	3.00	Time at which the minimum value was reached yesterday.
12	Yesterday Minimum Value	R/O	System	FL	4	Any valid IEEE 754 float	0	3.00	Minimum value of logged parameter observed yesterday.
13	Yesterday Maximum Time	R/O	System	TIME	4	0 → 4294967296	0	3.00	Time at which the maximum value was reached yesterday.
14	Yesterday Maximumn Value	R/O	System	FL	4	Any valid IEEE 754 float	0	3.00	Maximum value of logged parameter observed yesterday.

3.4.55 Point Type 144: Transactional History Configuration Point Type

Description: Point type 144 provides information for configuring transactional history.

Number of Logical Points: 10 logical points (0 → 9) of point type 144 may exist.

Storage Location: Point type 144 is saved to internal configuration memory.

Table 3-56: Point Type 144, Transactional History Configuration

Point Type 144, Transactional History Configuration

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Num Transactions Allocated	R/W	User	UINT16	2	0→[max based on memory usage]	“No Tag”	3.60	The tag for the remote RTU
1	Num Transactions Stored	R/O	System	UINT16	2	0 → 4,294,967,296	0	3.60	Unique ID for the remote RTU
2	Space Reserved	R/O	System	UINT32	4	0-12 or 0-24 (based upon the network model, parm 139,x,15)	0	3.60	Logical number of the commissioned list poilnt type assigned to this remote RTU
3	Total Space Remaining	R/O	System	INT32	4	-2,147,483,6480 → 105,480	105,480	3.60	Indicates the space remaining for all transactions. This value can be negative if more data is allocated than space available. However, logical cannot be locked when this value is negative.
4	Overwrite Setting	R/W	User	UINT8	1	0 → 1	0	3.60	Indicates how the system acts when the transaction limit is reached.
5	Reset Switch	R/W	User	UINT8	1	0 → 1	0	3.60	Clears all transactions for this logical.
6	Lock Settings	R/W	User	UINT8	1	0 → 1	0	3.60	Indicates the lock setting for the logical. All transactions are cleared for this logical on unlock. Valid values are **0** (Unlocked) and **1** (Locked).
7	Last Transaction Logged	R/O	System	UINT16	2	0 → 65535	0	3.60	Last transaction number logged
8	Status	R/O	System	UINT8	1	0 → 3	0	3.60	Indicates the status of the last action on this logical. Valid values are: 0 = No Error 1 = Invalid CRC when retrieving data 2 = Error getting transaction data to log 3 = Segment full

3.4.56 Point Type 145: Transactional History Point Configuration Point Type

Description: Point type 145 configures the data to be stored for a transaction.

Number of Logical Points: 10 logical points (0 → 9) of point type 145 may exist.

Storage Location: Point type 145 is saved to internal configuration memory.

Table 3-57: Point Type 145, Transactional History Point Configuration

Point Type 144, Transaction History Point Configuration

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Write Trigger	R/W	User	UINT8	1	0 → 1	“No Tag”	3.60	Indicates the write trigger for a transaction. Valid values are 0 (Idle) and 1 (write transaction).
1	Transaction Description	R/W	User	AC	10	0x20→ 0x7E for each byte	“ “	3.60	Transaction description (can be changed without changing transactional history)
2	Point Description	R/W	User	AC	10	0x20→ 0x7E for each byte	“ “	3.60	Point description (can be changed without changing transactional history)
3	Point to Log	R/W	User	TLP	3	Any valid TLP value	0,0,0	3.60	Point to log
4…201									Parameters 2 and 3 repeats as a pair 100 times.

3.4.57 Point Type 172: RTU Network Discovery List Point Type

Description: Point type 172 provides information for the RTU Network discovery list.

Number of Logical Points: 32 logical points (0 → 31) of point type 172 may exist.

Storage Location: Point type 172 is **not** saved to internal configuration memory.

Table 3-58: Point Type 172, RTU Network Discovery List

Point Type 172, RTU Network Discovery List

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Tag	R/W	User	AC	20	0x20→ 0x7E for each byte	“No Tag”	3.50	Tag for the Remote RTU
1	ROC Device IC	R/W	User	UINT32	4	0 → 4,294,967,296	0	3.50	Unique ID for the Remote RTU
2	Commission List Index	R/W	User	UINT8	1	0-12 or 0-24	0	3.50	Logical number of the commissioned list point type assigned to this Remote RTU, based upon the network modle (parameter 139,x,15)
3	Commission Flag	R/W	User	UINT8	1	0, 1, 255	0	3.50	When reading, this parameter indicates if this live list slot is occupied with a live non-commissioned device. Vaid values are 0 (Empty) and 1 (Occupied). When writing, this parameter commissions this device to the specified Commissioned List Index. Valid value is 255 (Commission Device)

3.4.58 Point Type 173: Network Commissioned List Point Type

Description: Point type 173 provides information for the Network Commissioned list.

Number of Logical Points: A maximum of 25 logical points (0 → 24) of point type 173 may exist.

Storage Location: Point type 173 is saved to internal configuration memory.

Table 3-59: Point Type 173, Network Commissioned List

Point Type 173, Network Commissioned List

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Tag	R/O R/W	System	AC	20	0x20→ 0x7E for each byte	"No Tag"	3.50	Device tag
1	ROC Device ID	R/O R/W	System	UINT32	4	0 → 4,294,967,296	0	3.50	Unique ID of the commissioned device
2	Network ID	R/O R/W	System	UINT8	1	0 → 255	0	3.50	Network ID
3	ROC Group Address	R/O R/W	System	UINT8	1	0 → 255	0	3.50	ROC Group Address
4	ROC Unit Address	R/O R/W	System	UINT8	1	0 → 255	0	3.50	ROC Unit Address
5	ROC Type	R/O R/W	System	UINT8	1	0 → 65535	0	3.50	ROC type
6	RTU Backplance Type and Slot usage	R/O R/W	System	UINT32	4	0 → 4,294,967,296	0	3.50	RTU backplane type and slot usage. For bits 0-2: For the FloBoss 107: 0 = 4-slot 1 = 8-slot For the ROC800-Series: 0 = 3-slot 1 = 9-slot 2 = 15-slot 3 = 21-slot 4 = 27-slot For bits 3-31: Slot in use for slots 0-27
7	Device Status	R/O	System	UINT8	1	0 → 255	0	3.50	Integrity summary. Valid values are: 0 = Good Bit 1 :1 = I/O Integrity fault Bit 2: 1 = I/O Alarm fault Bit 3: 1 = State data on device Bit 7: 1 = Identifier **Note**: Device status for ROC800s reports only the Device Status Good bit, the Stale Data on Device bit, and the identifying bit.

Point Type 173, Network Commissioned List

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
8	Comm Status	R./O	System	UINT8	1	0 → 255	0	3.50	Indicates the communication status. Valid values are **0** (Good) and **1** (Comm Failure).
9	Battery Voltage	R/O	System	FLOAT	4	Any valid IEEE 754 float	0.0	3.50	ROC battery voltage.
10	Signal Strength	R/O	System	UINT8	1	0 → 127	0.0	3.50	Radio signal strength. Units in FreeWave J, from 0 to 127.
11	Noise Level	R/O	System	UINT8	1	0 → 127	0	3.50	Noise Level. Units in FreeWave J, from 0 to 127.
12	Percent Packets Good from Master	R/O	System	UINT8	1	0 → 127	0	3.50	Percentage of packets received good from master radio.
13	Network Configuration Revision	R/O	System	UINT16	2	0 → 65535	0	3.50	Revision of the Network Configurator
14	Decommission Flag	R/W	User	UNIT8	1	0,1, 255	0	3.50	Indicates the commissioned status of the device. When reading, valid values are **0** (Not Commissioned) and **1** (Commissioned). When writing, valid values are **0** (Not Commissioned) and **1** (Commissioned). Writing a value of **255** to the device decommissions it.
15	Reflected Power from Radio	R/O	System	FLOAT	4	Any valid IEEE 754 float	0.0	3.50	Reflected power from radio in dBm.
16	Passthru Enabled	R/W	User	UINT8	1	0 → 1	0	3.50	Enables passthru to the remote node. Valid values are **0** (disable passthru) and **1** (enable passthru).
17	Passthru Outgoing Message Count	R/W	User/System	UNIT32	4	0 → 4,294,967,296	0	3.50	Count of outgoing passthru messages. The parameter resets to 0 after any type of restart.

3.4.59 Point Type 174: Network Export Data Point Type

Description: Point type 174 provides information on network export data.

Number of Logical Points: 30 logical points (0 → 29) of point type 174 may exist.

Storage Location: Point type 174 is saved to internal configuration memory.

Table 3-60: Point Type 174, Network Export Data

Point Type 174, Network Export Data

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Tag	R/W	User	AC	10	0x20→ 0x7E for each byte	"No Tag"	3.50	Tag of the selected export TLP
1	Export TLP	R/W	User	TLP	3	Any valid TLP	0,0,0	3.50	TLP of the parameter to be exported
2	Network ID	R/W	User	UINT8	1	0 → 127	0	3.50	Network ID
3	Data ID	R/W	User	UINT16	2	0 → 65535	0	3.50	Unique ID associated with this TLP used to map the value on the import side. Note: Zero indicates the logical is empty
4	Value	R/O	System	FLOAT	4	Any valid IEEE 754 float	0.0	3.50	Current value of the export TLP. The program updates this parameter at the time of the export.

3.4.60 Point Type 175: Network Import Data Point Type

Description: Point type 175 provide information for the network import data.

Number of Logical Points: 128 logical points (0 → 127) of point type 175 may exist.

Storage Location: Point type 175 is saved to internal configuration memory.

Table 3-61: Point Type 175, Network Import Data

Point Type 175, Network Import Data

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Tag	R/W	User	AC	10	0x20→ 0x7E for each byte	“No Tag”	3.50	Tag of the selected imported value
1	Network ID	R/W	User	UINT8	1	0 → 255	0	3.50	Network ID
2	Data ID	R/W	User	UINT16	2	0 → 65535	0	3.50	Unique ID associated with this TLP used to map the value on the export side
3	Value	R/O	System	FLOAT	4	Any valid IEEE 754 float	0.0	3.50	Current value of import.
4	Health Status	R/O	System	UINT8	1	0 → 255	0	3.50	Health status of the importe value. Valid values are: 0 = Good 1 = Data not updated (Stale) 2 = Remote Point Fail 3 = Point in Alarm
5	Fault Value	R/W	User	FLOAT	4	Any valid IEEE 754 float	0.0	3.50	Value the program sets as the imported value if a fault condition occurs. “Fault condition” is defined as a status other than”Good” in the Health Status parameter (175,x,4)
6	Fault Enable	R/W	User	UINT8	1	0 → 1		3.50	Enables the fault value. Valid values are **0** (Disabled) and **1** (Enabled)
7	RESERVED								Reserved for future use
8	Source (R) RTU	R/W	User	UINT8	1	0 → 255	0	3.50	Indicates the Network ID of the remote RTU that is the source of the imported TLP
9	Forward TLP	R/W	User	TLP	3	Any valid TLP	0,0,0	3.50	Indicates the TLP to which to program writes the imported data

3.4.61 Point Type 176: IEC62591 Live List Point Type

Description: Point type 176 provides information for the IEC62591 Live List.

Number of Logical Points: 60 logical points (0 → 59) of point type 176 may exist.

Storage Location: Point type 176 is **not** saved to internal configuration memory.

Table 3-62: Point Type 176, IEC62591 Live List

Point Type 176, IEC62591 Live List

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Device Tag	R/O	System	AC	40	0x20→ 0x7E for each byte	"No Tag"	3.40	Device Tag
1	Device ID	R/O	System	UINT32	4	0 → 65535	0	3.40	Device ID
2	Manufacturing ID	R/O	System	UINT16	2	0 → 65535	0	3.40	Manufacturing ID
3	Device Type	R/O	System	UINT16	2	0 → 65535	0	3.40	Device Type
4	Commissioned List Index	R/W	System	UINT8	1	0 → 59	0	3.40	Logical number of the commissioned list point type assigned to this wireless device
5	Commission Flat	R/W	System	UINT8	1	0,1,254,255	0	3.40	Indicates: When reading, indicates if this live list slot is occupied with a live non-commissioned device. Valid values are **0** (Empty) and **1** (Occupied). When writing, this parameter commissions this device to the specified Commissioned List index. Valid values are **254** (Commission as a new device) and **255** (Commission as a replacement device)
6	Adapter ID	R/O	System	UINT32	4	0 → 4,294,967,295	0	3.83	Adapter ID
7	Adapter Type	R/O	System	UINT16	2	0 → 65535	0	3.83	Adapter Type

3.4.62 Point Type 177: IEC62591 Commissioned List Point Type

Description: Point type 177 provides information for the IEC62591 Commissioned List. .

Number of Logical Points: 60 logical points (0 → 59) of point type 177 may exist.

Storage Location: Point type 177 is saved to internal configuration memory.

Table 3-63: Point Type 177, IEC62591 Commissioned List

Point Type 177, IEC62591 Commissioned List

Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
0	Device Tag	R/W		AC	40	0x20→ 0x7E for each byte	"No Tag"	3.40	Tag that resides in device.
1	Device Message	R/W		AC	40	0x20→ 0x7E for each byte	"No Message"	3.40	Device message.
2	Device Descriptor	R/W		AC	20	0x20→ 0x7E for each byte	"No Descriptor"	3.40	Device descriptor
3	Transducer Serial Number	R/O		UINT32	4	0 → 4,294,967,296	0	3.40	Device serial number
4	Device ID	R/O		UINT32	4	0 → 4,294,967,296	0	3.40	Device ID
5	Manufacturer ID	R/O		UINT16	2	0 → 65535	0	3.40	Manufacturer ID
6	Device Type	R/O		UINT16	2	0 → 65535	0	3.40	Device Type
7	Adapter ID	R/O		UINT32	4	0 → 4,294,967,296	0	3.40	Adapter ID
8	Adapter Type	R/O		UINT16	2	0 → 65535	0	3.40	Adapter Type
9	De-commission Flag	R/W		UINT8	1	0,1,233	0	3.40	Either indicates the commissioned status (READ) or decommissions a device (WRITE). If Read, valid values are **0** (Not commissioned) or **1** (commissioned). If Write, **255** decommissions a device.
10	Battery Life	R/O		UINT16	2	0 → 65535	0	3.40	Indicates the battery life remaining in days. Of the device does not have a battery or another emergy storage component, then the device may return 0xFFFF
11	Response Code/Status	R/O		UINT8	1	0 → 255		3.40	Response Code/Status
12	Poll Mode	R/W		UINT8	1	0 → 1		3.40	Indicates the device's poll mode. Valid values are **0** (normal polling of dynamic and slot variables) and **1** (update all static and dynamic device parameters. After the update completes, the WirelessHART device automatically sets this parameter back to 0).

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Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
13	Burst Rate	R/W		UINT16	2	0 → 6553	10	3.40	Indicates the burst rate (in seconds) used for polling process variables.
14	Communication Status	R/O		UINT8	1	0 → 1	0	3.40	Indicates the device's communication status. Valid values are **0** (OK) and **1** (Communications failure).
15	Loop Current	R/O		FLOAT	4	Any valid IEEE 754 float	0.0	3.40	Indicates the loop current of the device in mA.
16	Primary Variable Value	R/W		FLOAT	4	Any valid IEEE 754 float	0	3.40	Value of primary variable.
17	Primary Variable Units	R/O		UINT8	1	0 → 255	0	3.40	Units code of primary variable.
18	Secondary Variable Value	R/W		FLOAT	4	Any valid IEEE 754 float	0.0	3.40	Value of secondary variable
19	Secondary Variable Units	R/O		UINT8	1	0 → 255	0	3.40	Units code of secondary variable.
20	Tertiary Variable Value	R/W		FLOAT	4	Any valid IEEE 754 float	0.00	3.40	Value of tertiary variable
21	Tertiary Variable Unit	R/O		UINT8	1	0 → 255	0	3.40	Units code of tertiary variable
22	Quaternary Variable Value	R/O		FLOAT	4	Any valid IEEE 754 float	0.0	3.40	Value of quaternary variable
23	Quaternary Variable Units	R/O		UINT8	1	0 → 255	0	3.40	Units code of quaternary variable
24	Device Commision Status	R/O		UINT8	1	0 → 8	0	3.40	Device Commission Status 0 = Idle 1 = Configuring Burst Message 2 = Configuring Burst Variables 3 = Configuring Burst Rate 4 = Enabling Bursting 5 = Bursting 6 = Values Stale 7 = Communication Failure 8 = Disabling Bursting 9 = Bursting: Delayed Response 10=Comminssion Failure
25	Slot 0 Variable Assignment	R/W		UINT8	1	0 → 255	250	3.40	Slot 0 variable to request
26	Slot 0 Units	R/O		UINT8	1	0 → 255	0	3.40	Units of slot 0 variable
27	Slot 0 Value	R/W		FLOAT	4	Any valid IEEE 754 float	0.0	3.40	Value of slot 0 variable
28	Slot1 Variable Assignment	R/W		UINT8	1	0 → 255	250	3.40	Slot 1 variable to request
29	Slot1 Units	R/O		UINT8	1	0 → 255	0	3.40	Units of slot 1 variable
30	Slot1 Value	R/W		FLOAT	4	Any valid IEEE 754 float	0.0	3.40	Value of slot 1 variable
31	Slot 2 Variable Assignment	R/W		UINT8	1	0 → 255	250	3.40	Slot 2 variable to request
32	Slot 2 Units	R/O		UINT8	1	0 → 255	0	3.40	Units of slot 2 variable
33	Slot 2 Value	R/W		FLOAT	4	Any valid IEEE 754 float	0.0	3.40	Value of slot 2 variable
34	Slot 3 Variable Assignment	R/W		UINT8	1	0 → 255	250	3.40	Slot 3 variable to request
35	Slot 3 Units	R/O		UINT8	1	0 → 255	0	3.40	Units of slot 3 variable
36	Slot 3 Value	R/W		FLOAT	4	Any valid IEEE 754 float	0.0	3.40	Value of slot 3 variable

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Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
37	Number Discrete Channels	R/O	System	UINT8	1	0 → 4	0	3.60	Number of Discrete Channels
38	Discrete Chan 1 Set Class	R/O	System	UINT16	2	0 → 65535	0	3.60	Discrete Channel 1 classification for the setpoint.
39	Discrete Chan 1 Live Class	R/O	System	UINT16	2	0 → 65535	0	3.60	Discrete channel 1 classification of the device for the live value
40	Discrete Chan 1 Set Point	R/W	Both	UINT16	2	0 → 65535	0	3.60	Discrete channel 1 setpoint
41	Discrete Chan 1 Live Value	R/O	System	UINT16	2	0 → 65535	0	3.60	Discrete channel 1 live value
42	Discrete Chan 2 Set Class	R/O	System	UINT16	2	0 → 65535	0	3.60	Discrete Channel 2 classification for the setpoint.
43	Discrete Chan 2 Live Class	R/O	System	UINT16	2	0 → 65535	0	3.60	Discrete channel 2 classification of the device for the live value
44	Discrete Chan 2 Set Point	R/W	Both	UINT16	2	0 → 65535	0	3.60	Discrete channel 2 setpoint
45	Discrete Chan 2 Live Value	R/O	System	UINT16	2	0 → 65535	0	3.60	Discrete channel 2 live value
46	Discrete Chan 3 Set Class	R/O	System	UINT16	2	0 → 65535	0	3.60	Discrete Channel 3 classification for the setpoint.
47	Discrete Chan 3 Live Class	R/O	System	UINT16	2	0 → 65535	0	3.60	Discrete channel 3 classfication for the live value
48	Discrete Chan 3 Set Point	R/W	Both	UINT16	2	0 → 65535	0	3.60	Discrete channel 3 setpoint
49	Discrete Chan 3 Live Value	R/O	System	UINT16	2	0 → 65535	0	3.60	Discrete channel 3 live value
50	Discrete Chan 4 Set Class	R/O	System	UINT16	2	0 → 65535	0	3.60	Discrete Channel 4 classification for the setpoint.
51	Discrete Chan 4 Live Class	R/O	System	UINT16	2	0 → 65535	0	3.60	Discrete channel 4 classification for the live value
52	Discrete Chan 4 Set Point	R/W	Both	UINT16	2	0 → 65535	0	3.60	Discrete channel 4 setpoint
53	Discrete Chan 4 Live Value	R/O	System	UINT16	2	0 → 65535	0	3.60	Discrete channel 4 live value
54	Device Failsafe Mode	R/W	User	UINT8	1	0 → 1	0	3.60	Indicates the failsafe mode. Valid values are **0** (Hold Last) and **1** (Use Failsafe).
55	PV Fault Value	R/W	User	FL	4	Any valid IEEE 754 float	0	3.60	Value set for PV if the Comm Status indicates Comm Failure, the NaN flag for the PV is set, or the Field Device Status indicates the PV is out of range.
56	SV Fault Value	R/W	User	FL	4	Any valid IEEE 754 float	0	3.60	Value set for SV if the Comm Status indicates Comm Failure, the NaN flag for the SV is set, or the Field Device Status indicates the SV is out of range.
57	TV Fault Value	R/W	User	FL	4	Any valid IEEE 754 float	0	3.60	Value set for TV if the Comm Status indicates Comm Failure, the NaN flag for the TV is set, or the Field Device Status indicates the TV is out of range.
58	QV Fault Value	R/W	User	FL	4	Any valid IEEE 754 float	0	3.60	Value set for QV if the Comm Status indicates Comm Failure, the NaN flag for the QV is set, or the Field Device Status indicates the QV is out of range.
59	NaN Flag	R/O	System	BIN	1	0 → 15	0	3.60	

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Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
59.0	PV NaN Flag			Bit 0					Indicates the PV value is NaN at the device.
59.1	SV NaN Flag			Bit 1					Indicates the SV value is NaN at the device.
59.2	TV NaN Flag			Bit 2					Indicates the TV value is NaN at the device.
59.3	QV NaN Flag			Bi 3					Indicates the QV value is NaN at the device.
59.4	Slot 1 NaN Flag			Bit 4					Indicates the Slot 1 value is NaN at the device.
59.5	Slot 2 NaN Flag			Bit 5					Indicates the Slot 2 value is NaN at the device.
59.6	Slot 3 NaN Flag			Bit 6					Indicates the Slot 3 value is NaN at the device.
59.7	Slot 4 NaN Flag			Bit 7					Indicates the Slot 4 value is NaN at the device.
60	PV Device Variable Status	R/O	System	BIN	1	0 → 255	0	3.60	PV Device Variable Status byte, which indicates for the primary variable: Bit 0-2 - Device Family Specific Status Bit 3 - More Device Variable Status Available Bits 4-5 - Limit Status 00 = Not Limited 01 = Low Limited 10 = High Limited 11 = Constant Bits 6-7 – Process Data Status 00 = Bad 01 = Poor Accuracy 10 = Manual / Fixed 11 = Good

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Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
61	SV Device Variable Status	R/O	System	BIN	1	0 → 255	0	3.60	SV Device Variable Status byte, which indicates for the secondary variable: Bit 0-2 - Device Family Specific Status Bit 3 - More Device Variable Status Available Bits 4-5 - Limit Status 00 = Not Limited 01 = Low Limited 10 = High Limited 11 = Constant Bits 6-7 – Process Data Status 00 = Bad 01 = Poor Accuracy 10 = Manual / Fixed 11 = Good
62	TV Device Variable Status	R/O	System	BIN	1	0 → 255	0	3.60	TV Device Variable Status byte, which indicates for the tertiary variable: Bit 0-2 - Device Family Specific Status Bit 3 - More Device Variable Status Available Bits 4-5 - Limit Status 00 = Not Limited 01 = Low Limited 10 = High Limited 11 = Constant Bits 6-7 – Process Data Status 00 = Bad 01 = Poor Accuracy 10 = Manual / Fixed 11 = Good

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Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
63	QV Device Variable Status	R/O	System	BIN	1	0 → 255	0	3.60	QV Device Variable Status byte, which indicates for the quaternary variable: Bit 0-2 - Device Family Specific Status Bit 3 - More Device Variable Status Available Bits 4-5 - Limit Status 00 = Not Limited 01 = Low Limited 10 = High Limited 11 = Constant Bits 6-7 – Process Data Status 00 = Bad 01 = Poor Accuracy 10 = Manual / Fixed 11 = Good
64	Discrete Variable Status 1	R/O	System	BIN	1	0 →3	0	3.60	Bitwise field indicating statuses of the discrete variables. Bit 0 – Discrete variable in Simulation or Local Override Bit 1 – Discrete variable in Fault Mode Bit 2-7 – Reserved
65	Discrete Variable Status 2	R/O	System	BIN	1	0 →3	0	3.60	Bitwise field indicating statuses of the discrete variables. Bit 0 – Discrete variable in Simulation or Local Override Bit 1 – Discrete variable in Fault Mode Bit 2-7 – Reserved
66	Discrete Variable Status 3	R/O	System	BIN	1	0 →3	0	3.60	Bitwise field indicating statuses of the discrete variables. Bit 0 – Discrete variable in Simulation or Local Override Bit 1 – Discrete variable in Fault Mode Bit 2-7 – Reserved

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Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
67	Discrete Variable Status 4	R/O	System	BIN	1	0 → 3	0	3.60	Bitwise field indicating statuses of the discrete variables. Bit 0 – Discrete variable in Simulation or Local Override Bit 1 – Discrete variable in Fault Mode Bit 2-7 – Reserved
68	RESERVED	-	-	-	-	-	-	-	Reserved for future use
69	Burst Trigger Mode Message 0	R/W	Both	UINT8	1	0 → 4	0	3.83	Trigger setting for burst mode. 0 = Continuous – Bursts continually at the configured Burst Rate 1 = Windowed – Burst is triggered when source deviates more than the trigger value 2 = Rising – Burst is triggered when source rises above specified value 3 = Falling – Burst is triggered when source falls below specified value 4 = On-Change – Burst is triggered when any value changes
70	Burst Trigger Level Message 0	R/W	Both	FL	4	Any valid IEEE 754 float	0.0	3.83	Trigger Mode supplementary data for Window, Rising, or Falling selections. See parameter 69.
71	Device Variable Classification Message 0	R/O	System	UINT8	1	0 → 255	0	3.83	The device variable classification code that is read at the time of device discovery (See HCF Spec 183 table 21 for list of codes)
72	Unit Code Message 0	R/O	System	UINT8	1	0 → 255	0	3.83	The device engineering unit code that is read at the time of device discovery (HCF Spec 183 table 2 for list of codes)
73	Update Period Message 0	R/W	Both	UINT16	2	1 → 3600	10	3.83	The time interval (in seconds) at which the device communicates. Determined by the Physical Layer and Data Link Layer requirements as well as the process and application requirements.
74	Event Notification Retry Time	R/W	Both	UINT16	2	1 → 3600	4	3.83	The time interval (in seconds) at which a device will publish its events. Must be less than or equal to Maximum Update Time (parameter 75).
75	Event Maximum Update Time	R/W	Both	UINT16	2	1 → 3600	4	3.83	When the Burst Trigger Mode (parameter 69) is anything other than Continuous, this value specifies the longest (in seconds) a device is allowed to remain silent without bursting.
76	Event De-bounce Interval	R/O	System	UINT16	2	1 → 3600	4	3.83	The amount of time in seconds that an event must persist before the event notification is sent.
77	Update Period Message 1	R/W	Both	UINT16	2	1 → 3600	10	3.83	Same as parameter 73 for hybrid transmitters which may send multiple messages.

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Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
78	Burst Rate Max Message 1	R/W	Both	UINT16	2	1 →3600	10	3.83	Same as parameter 13 for hybrid transmitters which may send multiple messages. The device must burst at this frequency even if its configured trigger does not occur.
79	Burst Trigger Mode Message 1	R/W	Both	UINT8	1	0 →4	0	3.83	Same as parameter 69 for hybrid transmitters which may send multiple messages.
80	Burst Trigger Level Message 1	R/W	Both	FL	4	Any valid IEEE 754 float	0.0	3.83	Same as parameter 70 for hybrid transmitters which may send multiple messages.
81	Device Variable Classification Message 1	R/O	System	UINT8	1	0 →255	0	3.83	Same as parameter 71 for hybrid transmitters which may send multiple messages.
82	Unit Code Message 1	R/O	System	UINT8	1	0 →255	0	3.83	Same as parameter 72 for hybrid transmitters which may send multiple messages
83	Event Notification Time	R/O	System	UINT32	4	0 →4294967295	0	3.83	Time of the current event. Number of 1/32 millisecond intervals that have passed since the start of the day.
84	Event Summary	R/O	System	UINT8	1	0 →120	0	3.83	Indicates the Event Notification Control Code as well as the status of any pending events Bit 0-3 – Event Notification Control Code 0 = Off 1 = Enable on Token-Passing Data Link Layer 2 = Enable on TDMA Data Link Layer 3 = Enable on both TDMA and Token DLLs Bit 4 – Configuration Changed Event Pending Bit 5 – Device Status Event Pending Bit 6 – More Status Available Event Pending Bit 7 – Reserved
85	Reset Events	R/W	Both	UINT8	1	0 →1	0	3.83	Writing a 1 to this parameter causes the acknowledgement of all device events.
86	Config Change Counter	R/O	System	UINT16	2	0 →65535	0	3.83	The configuration change counter as read from the device.

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Param#	Name	Access	System or User Update	Data Type	Length	Range	Default	Ver	Description of functionality and meaning of values
87	Execution Command Status	R/O	System	UINT16	2	0 → 65535	0	3.83	In the event a HART command issued from the module to a sensor is not successful, this bitwise parameter indicates which command failed. Bit 0 – Command 103 Message 0 Bit 1 – Command 103 Message 1 Bit 2/3 – Command 104 Message 0/1 Bit 4/5 – Command 107 Message 0/1 Bit 6/7 – Command 108 Message 0/1 Bit 8/9 – Command 109 Message 0/1 Bit 10 – Command 117 Bit 11 – Command 118 Bits 12-15 – RESERVED **Note:** This field shows the status of important commands for Bursting and Events. ▪ Bursting ○ Command 103 Write Burst Period– Writes Min and Max burst update periods ○ Command 104 Write Burst Triggers– Sets burst trigger mode ○ Command 107 Write Burst Device Variables - Burst device variables returned by device on command 9 or 33 in burst mode ○ Command 108 Write Burst mode command number ○ Command 109 Burst Mode Control – Sets bursting ON/OFF ▪ **Event Notification** ○ Command 117 Write Event notification timing – Sets Event notification retry time, Maximum update time, Event De-bounce interval ○ Command 118 Event notification control - Enable/ Disable event notification
88	Formatted Event Notification Time	R/O	System	AC	10	0x20→0x7E for each byte	“00:00:00”	3.83	Parameter 83 converted to HH:MM:SS format

Chapter 4 – CRC-16 Code

The ROC Plus 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 ROC800 uses the 16-bit polynomial CRC-16:

X16 + X15 + X2 + 1

The ROC800 uses the standard GPLIB CRC routine, and calculates CRC by table lookup, with the initial condition (seed) of 0000 (zeros).

ROC800L 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

Note: Ethernet communication ignores the CRC, since TCP/IP protocol already does error checking. However, the CRC still needs to be sent over Ethernet communications.

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Chapter 5 – IEEE Floating Point Format

In general, the ROC Plus protocol uses IEEE format for binary representation of floating-point numbers.

The single-precision format consists of a sign bit, an 8-bit biased exponent, and a 23-bit mantissa. The sign bit is either **0** for positive or **1** for negative.

Sign-m	Exponent		Mantissa	
1 bit	8 bits		23 bits	
31	30	23	22	0

The double-precision format consists of a sign bit, an 11-bit biased exponent, and a 52-bit mantissa. The sign bit is either **0** for positive or **1** for negative.

Sign-m	Exponent		Mantissa	
1 bit	11 bits		52 bits	
63	62	52	51	0

Integers have the following binary representations:

Integer format:

LSB	MSB

Long Integer format:

LSB	LSB +1	MSB – 1	MSB

Single Precision Floating Point format:

LSB	LSB +1	MSB – 1	MSB

Double Precision Floating Point format:

LSB	LSB + 1	LSB+2	LSB+3	MSB - 3	MSB - 2	MSB – 1	MSB

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Chapter 6 – Spontaneous Report-By-Exception

This chapter details the sequence of events describing the Spontaneous-Report-by-Exception (SRBX or RBX).

1. An alarm occurs, which enables the spontaneous report by exception.
2. The ROC800 sends a request to the host computer at the next available chance. The request from the ROC800 appears as:

ROC800-Series Request to Host Computer

Host Address		ROC800L Address		Opcode	Data Length	CRC	
unit	group	unit	group	–	# of bytes	LSB	MSB
1	0	1	2	224	0	232	45

3. The host computer receives the report-by-exception request from the ROC800 and begins a general update of any existing alarms.
4. Once the host computer finishes polling the ROC800, the host computer acknowledges the ROC800's Spontaneous-Report-by-Exception request by sending a pointer to the last alarm received and appears as follows:

Host Computer Response to ROC800-Series

ROC800L Address		Host Address		Opcode	Data Length	8 Data Bytes		CRC	
unit	group	unit	group	–	# of bytes	d1	d2	LSB	MSB
1	2	1	0	225	2	7	0	118	17

Note: The alarm index is 7.

5. The ROC800 compares the index, determines if the host computer has polled for all outstanding alarms, and then clears the report-by-exception status.

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Chapter 7 – Device-To-Device Communications

Store and forward messages can be received on any ROC800 communications port. Those messages are then transmitted out any port that has enabled the store and forward port feature.

Opcode 24 defines the requested store and forward action (refer to *Table 7-1*). This opcode follows the general protocol message format used for ROC800-Series communications, with the exception that there is an embedded message within the message.

Note: Each message can be a maximum of 255 bytes.

Table 7-1. Opcode 24

Opcode 24						
Communi-cation Opcode	**Host Request to ROC800**			**ROC800 Response to Host**		
	Data		**Description of Data**	**Data**		**Description of Data**
	Offset	**Length**		**Offset**	**Length**	
Opcode 24: Store and Forward	6	1	Host Address			No acknowledgment sent back.
	7	1	Host Group			
	8	1	1st Destination Address			
	9	1	1st Destination Group			
	10	1	2nd Destination Address			
	11	1	2nd Destination Group			
	12	1	3rd Destination Address			
	13	1	3rd Destination Group			
	14	1	4th Destination Address			
	15	1	4th Destination Group			
	16	1	Desired Opcode			
	17	1	Number of data bytes for the desired Opcode			
	18	x	Opcode data			

Specify the address and group as **(0,0)** for the destinations that are not used.

The following example reads the clock, where the message is forwarded through one ROC800 to the last ROC800. For this example, the desired path of communication is Host (1,0), ROC1 (1,2), ROC2 (2,2).

Host Request to ROC1:

Destination Address		Source Address			
Unit	Group	Unit	Group	Opcode	Number Bytes
1	2	1	0	24	12

Communication Path									
Unit	Group	Unit	Group	Unit	Group	Unit	Group	Unit	Group
1	0	1	2	2	2	0	0	0	0

Opcode	Number Bytes	CRC	
		LSB	MSB
7	0	X	X

ROC1 Request to ROC2 (final destination):

Destination Address		Source Address			
Unit	Group	Unit	Group	Opcode	Number Bytes
2	2	1	2	24	12

Communication Path									
Unit	Group	Unit	Group	Unit	Group	Unit	Group	Unit	Group
1	0	1	2	2	2	0	0	0	0

Opcode	Number Bytes	CRC	
		LSB	MSB
7	0	X	X

ROC2 Response Back to ROC1:

Destination Address		Source Address			
Unit	Group	Unit	Group	Opcode	Number Bytes
1	2	2	2	24	20

Communication Path									
Unit	Group	Unit	Group	Unit	Group	Unit	Group	Unit	Group
1	0	1	2	2	2	0	0	0	0

Op-code	# of Bytes	d1	d2	d3	d4	d5	d6	d7	d8	CRC LSB	CRC MSB
7	8	Sec	Min	Hour	Day	Month	Year	Leap Year	Day of Week	–	–

ROC1 Request to Host:

Host Address		ROC Address			
Unit	Group	Unit	Group	Opcode	Number Bytes
1	0	1	2	24	20

Communication Path									
Unit	Group	Unit	Group	Unit	Group	Unit	Group	Unit	Group
1	0	1	2	2	2	0	0	0	0

Op-code	**# of Bytes**	**d1**	**d2**	**d3**	**d4**	**d5**	**d6**	**d7**	**d8**	**CRC LSB**	**CRC MSB**
7	8	Sec	Min	Hour	Day	Month	Year	Leap Year	Day of Week	–	–

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