Product Data Sheet
FCDS-20008-EN Rev. 1
November 2023

Bettis XTE3000 with WirelessHART

The Bettis™ XTE3000 WirelessHART® with 775 Wireless THUM or P+F Bullet Adapter allows for basic control of the XTE3000 Multi-Turn Electric Actuator via WirelessHART, by leveraging the ability of the Wireless 1410s Gateway to interact with a Modbus host. The THUM or P+F Bullet Adapter can also be configured to burst extra information to be made available to the Wireless 1410s Gateway, including feedback, alarms and control parameters.

BETTIS™

EMERSON™

This page intentionally left blank.

Table of Contents

This page intentionally left blank.

General Information

The addition of WirelessHART compatibility to the Bettis XTE3000 Electric Actuator allows the user to wirelessly control valve position at a basic level, configure certain actuator parameters and monitor diagnostic data. This is achieved by using the Wireless 1410s Gateway Modbus interface to write to Modbus variables internally linked and configured to HART® variables in the actuator.

New firmware in the XTE3000 and Wireless 1410s Gateway allows for the host to access extra functions in the actuator via Modbus through WirelessHART. The THUM or P+F Bullet can be configured to burst messages configured with desired parameters, which will allow the transfer of extra data used for control and feedback. The Wireless 1410s Gateway will receive these messages and interpret them automatically.

"Basic control" is defined as wireless transmission of OPEN, CLOSE and STOP commands to the actuator. Inching/positioning or modulating control of the actuator is not yet available due to response time limitations of the WirelessHART protocol.

Specifications

Refer to the following document numbers for the relevant Product Data Sheets, from which specifications for each device can be found:

- XTE3000 Electric Actuator: VCPDS-16245-EN
- 775 Wireless THUM Adapter: 00813-0100-4075
- P+F Adapter: Model WHA-BLT-F9D0-N-A0-Z1-1, Class I Div 1
- Wireless 1410s Gateway: 00813-0200-4420

Bettis XTE3000 WirelessHART Hardware

This solution requires the XTE3000 + Wireless THUM or P+F Bullet Adapter, 1410s Wireless Gateway and access from a compatible Modbus Host. The XTE3000 is supplied with the Wireless THUM or P+F Bullet Adapter.

The Wireless THUM or P+F Bullet Adapter portion of the assembly is dependent on the hazardous zone certification required (see Certifications and Approvals).

The Wireless 1410s Gateway is sold separately from the XTE3000 + Wireless THUM or P+F Bullet Adapter.

Bettis XTE3000 WirelessHART Software

The valve may be actuated and monitored via Emerson DCMlink software. Only certain select features (e.g., 2-Speed Timer) within the full actuator configuration menu are currently available across the WirelessHART protocol.

The XTE3000 device configuration must be the same as if it were to be controlled from a standard Wired HART host. The actuator must be set to "POSITIONER" or "ON/OFF" control and must be configured for the HART network type. DCMlink or the XTE3000 local interface menu can be used to configure the actuator. It is worth noting that even if the 4 to 20 mA HART adapter is physically present in the actuator, it must also be set to "ENABLED" in the actuator configuration menu to allow for communication.

Certifications and Approvals

The combined XTE3000 + Wireless THUM Adapter design meets the requirements of IP66/68, NEMA 4, 4X, 6, FM Class I, Div. 1, Groups C, D and FMc (per CSA-C22.2) - Ex db IIB T4 Gb or P+F Bullet Adapter for ATEX, IECEX, INMETRO, KOSHA, ECAS and CCC requirements.

Note that -40 °C / -40 °F is the lowest temperature limit in every case; the Wireless THUM is the limiting factor.

Transmission Timing

For small networks, the estimated time from sending the command from the DCS or PLC until the actuator starts to move is 16 seconds, depending on scan rates. For large networks, the timing could be closer to 30 seconds.

Communications (HART Map)

This map represents a full list of all variables that exist as pertaining to the XTE3000 actuator. Not all variables will be visible at any given time, as their applicability is dependent on relevance to actuator status and operation at that particular moment in time.

Note also that there is a limit to how many variables may be published; generally, attempting to publish more than 16 variables will result in increased transmission time. This is a limitation of the WirelessHART protocol versus the more-established Wired HART version.

For Gateways to be compatible, they must be running firmware version 4.7.94 or later. Main parameter configuration messages to burst are shown below (this list may be modified as desired):

- COMMANDS
- POSITION_REQUEST
- CLOSE_STATUS
- OPEN_STATUS
- POSITION_FEEDBACK
- MAIN_ACTUATOR_STATUS
- LOCAL_MODE
- OFF_MODE
- REMOTE_MODE
- STALL_ALARM
- DEVICE_ACTIVE_ALARM
- ACTUATOR_READY
- PV
- CURRENT

Four burst messages are available, each of which can transmit up to 8 variables. To transmit necessary THUM Adapter information, 2.5 messages are dedicated as “reserved.” It is strongly recommended that the “reserved” messages not be modified, as doing so will interfere with basic device operation.

	XTE	Type
1	COMMANDS_INT16	16 bit int
2	MAIN_ACTUATOR_STATUS_INT16	16 bit int
3	CHANGE_COUNTER	16 bit unsigned int
4	DEVICE_TYPE	16 bit unsigned int
5	MANUFACTURER	16 bit unsigned int
6	PRIVATE_LABEL_DISTRIBUTER	16 bit unsigned int
7	244	32 bit float
8	245	32 bit float
9	29	32 bit float
10	3	32 bit float
11	30	32 bit float
12	31	32 bit float
13	32	32 bit float
14	33	32 bit float
15	34	32 bit float
16	COMMANDS	32 bit float
17	CURRENT	32 bit float
18	LOCAL_MODE	32 bit float
19	MAIN_ACTUATOR_STATUS	32 bit float
20	OFF_MODE	32 bit float
21	POSITION_FEEDBACK	32 bit float
22	POSITION_REQUEST	32 bit float
23	PV	32 bit float
24	QV	32 bit float
25	REMOTE_MODE	32 bit float
26	STALL_ALARM	32 bit float
27	SV	32 bit float
28	TV	32 bit float
29	DEVICE_ID	32 bit unsigned int
30	0_STATUS	8 bit unsigned int
31	0_UNITS	8 bit unsigned int
32	244_CLASS	8 bit unsigned int
33	244_CODE	8 bit unsigned int
34	244_STATUS	8 bit unsigned int

	XTE	Type
35	244_UNITS	8 bit unsigned int
36	245_CLASS	8 bit unsigned int
37	245_CODE	8 bit unsigned int
38	245_STATUS	8 bit unsigned int
39	245_UNITS	8 bit unsigned int
40	29_CLASS	8 bit unsigned int
41	29_CODE	8 bit unsigned int
42	29_STATUS	8 bit unsigned int
43	29_UNITS	8 bit unsigned int
44	30_CLASS	8 bit unsigned int
45	30_CODE	8 bit unsigned int
46	30_STATUS	8 bit unsigned int
47	30_UNITS	8 bit unsigned int
48	31_CLASS	8 bit unsigned int
49	31_CODE	8 bit unsigned int
50	31_STATUS	8 bit unsigned int
51	31_UNITS	8 bit unsigned int
52	32_CLASS	8 bit unsigned int
53	32_CODE	8 bit unsigned int
54	32_STATUS	8 bit unsigned int
55	32_UNITS	8 bit unsigned int
56	33_CLASS	8 bit unsigned int
57	33_CODE	8 bit unsigned int
58	33_STATUS	8 bit unsigned int
59	33_UNITS	8 bit unsigned int
60	34_CLASS	8 bit unsigned int
61	34_CODE	8 bit unsigned int
62	34_STATUS	8 bit unsigned int
63	34_UNITS	8 bit unsigned int
64	3_CLASS	8 bit unsigned int
65	3_CODE	8 bit unsigned int
66	3_STATUS	8 bit unsigned int
67	3_UNITS	8 bit unsigned int
68	ADDITIONAL_STATUS_0	8 bit unsigned int

	XTE	Type
69	ADDITIONAL_STATUS_1	8 bit unsigned int
70	ADDITIONAL_STATUS_10	8 bit unsigned int
71	ADDITIONAL_STATUS_11	8 bit unsigned int
72	ADDITIONAL_STATUS_12	8 bit unsigned int
73	ADDITIONAL_STATUS_13	8 bit unsigned int
74	ADDITIONAL_STATUS_14	8 bit unsigned int
75	ADDITIONAL_STATUS_2	8 bit unsigned int
76	ADDITIONAL_STATUS_3	8 bit unsigned int
77	ADDITIONAL_STATUS_4	8 bit unsigned int
78	ADDITIONAL_STATUS_5	8 bit unsigned int
79	ADDITIONAL_STATUS_6	8 bit unsigned int
80	ADDITIONAL_STATUS_7	8 bit unsigned int
81	ADDITIONAL_STATUS_8	8 bit unsigned int
82	ADDITIONAL_STATUS_9	8 bit unsigned int
83	BURST_48_RESPONSE_CODE	8 bit unsigned int
84	BURST_9_RESPONSE_CODE	8 bit unsigned int
85	COMMANDS_CLASS	8 bit unsigned int
86	COMMANDS_CODE	8 bit unsigned int
87	COMMANDS_STATUS	8 bit unsigned int
88	COMMANDS_UNITS	8 bit unsigned int
89	CURRENT_CLASS	8 bit unsigned int
90	CURRENT_CODE	8 bit unsigned int
91	CURRENT_STATUS	8 bit unsigned int
92	CURRENT_UNITS	8 bit unsigned int
93	DEVICE_PROFILE	8 bit unsigned int
94	DEVICE_REVISION	8 bit unsigned int
95	DISCOVERY_STATUS	8 bit unsigned int
96	EXTENDED_STATUS	8 bit unsigned int
97	FLAGS	8 bit unsigned int
98	HARDWARE_REVISION	8 bit unsigned int
99	LOCAL_MODE_CLASS	8 bit unsigned int
100	LOCAL_MODE_CODE	8 bit unsigned int
101	LOCAL_MODE_STATUS	8 bit unsigned int
102	LOCAL_MODE_UNITS	8 bit unsigned int

	XTE	Type
103	MAIN_ACTUATOR_STATUS_CLASS	8 bit unsigned int
104	MAIN_ACTUATOR_STATUS_CODE	8 bit unsigned int
105	MAIN_ACTUATOR_STATUS_STATUS	8 bit unsigned int
106	MAIN_ACTUATOR_STATUS_UNITS	8 bit unsigned int
107	MONITOR_STATUS	8 bit unsigned int
108	NODE_STATE	8 bit unsigned int
109	OFF_MODE_CLASS	8 bit unsigned int
110	OFF_MODE_CODE	8 bit unsigned int
111	OFF_MODE_STATUS	8 bit unsigned int
112	OFF_MODE_UNITS	8 bit unsigned int
113	OPERATING_MODE	8 bit unsigned int
114	POSITION_FEEDBACK_CLASS	8 bit unsigned int
115	POSITION_FEEDBACK_CODE	8 bit unsigned int
116	POSITION_FEEDBACK_STATUS	8 bit unsigned int
117	POSITION_FEEDBACK_UNITS	8 bit unsigned int
118	POSITION_REQUEST_CLASS	8 bit unsigned int
119	POSITION_REQUEST_CODE	8 bit unsigned int
120	POSITION_REQUEST_STATUS	8 bit unsigned int
121	POSITION_REQUEST_UNITS	8 bit unsigned int
122	PV_CLASS	8 bit unsigned int
123	PV_CODE	8 bit unsigned int
124	PV_STATUS	8 bit unsigned int
125	PV_UNITS	8 bit unsigned int
126	QV_CLASS	8 bit unsigned int
127	QV_CODE	8 bit unsigned int
128	QV_STATUS	8 bit unsigned int
129	QV_UNITS	8 bit unsigned int
130	REMOTE_MODE_CLASS	8 bit unsigned int
131	REMOTE_MODE_CODE	8 bit unsigned int
132	REMOTE_MODE_STATUS	8 bit unsigned int
133	REMOTE_MODE_UNITS	8 bit unsigned int
134	REQUEST_PREAMBLES	8 bit unsigned int
135	RESPONSE_PREAMBLES	8 bit unsigned int
136	SIGNALING_CODE	8 bit unsigned int

	XTE	Type
137	SOFTWARE_REVISION	8 bit unsigned int
138	STALL_ALARM_CLASS	8 bit unsigned int
139	STALL_ALARM_CODE	8 bit unsigned int
140	STALL_ALARM_STATUS	8 bit unsigned int
141	STALL_ALARM_UNITS	8 bit unsigned int
142	STANDARDIZED_STATUS_0	8 bit unsigned int
143	STANDARDIZED_STATUS_1	8 bit unsigned int
144	STANDARDIZED_STATUS_2	8 bit unsigned int
145	STANDARDIZED_STATUS_3	8 bit unsigned int
146	STATUS_CODE	8 bit unsigned int
147	SV_CLASS	8 bit unsigned int
148	SV_CODE	8 bit unsigned int
149	SV_STATUS	8 bit unsigned int
150	SV_UNITS	8 bit unsigned int
151	TV_CLASS	8 bit unsigned int
152	TV_CODE	8 bit unsigned int
153	TV_STATUS	8 bit unsigned int
154	TV_UNITS	8 bit unsigned int
155	UNIVERSAL_REVISION	8 bit unsigned int
156	VARIABLES	8 bit unsigned int
157	0_HEALTHY	Boolean
158	244_HEALTHY	Boolean
159	245_HEALTHY	Boolean
160	29_HEALTHY	Boolean
161	30_HEALTHY	Boolean
162	31_HEALTHY	Boolean
163	32_HEALTHY	Boolean
164	33_HEALTHY	Boolean
165	34_HEALTHY	Boolean
166	3_HEALTHY	Boolean
167	BANDWIDTH_ALLOCATION_PENDING	Boolean
168	BLOCK_TRANSFER_PENDING	Boolean
169	CAPACITY_DENIED	Boolean
170	COLD_START	Boolean

	XTE	Type
171	COMMANDS_HEALTHY	Boolean
172	CONFIGURATION_CHANGED	Boolean
173	CRITICAL_POWER_FAILURE	Boolean
174	CURRENT_HEALTHY	Boolean
175	DEVICE_CONFIGURATION_LOCKED	Boolean
176	DEVICE_MALFUNCTION	Boolean
177	DEVICE_VARIABLE_ALERT	Boolean
178	DEVICE_VARIABLE_SIMULATION_ACTIVE	Boolean
179	DISCRETE_VARIABLE_SIMULATION_ACTIVE	Boolean
180	DUPLICATE_MASTER_DETECTED	Boolean
181	ELECTRONIC_DEFECT	Boolean
182	ENVIRONMENTAL_CONDITIONS_OUT_OF_RANGE	Boolean
183	EVENT_NOTIFICATION_OVERFLOW	Boolean
184	FAILURE	Boolean
185	FUNCTION_CHECK	Boolean
186	LOCAL_MODE_BOOL	Boolean
187	LOCAL_MODE_HEALTHY	Boolean
188	LOOP_CURRENT_FIXED	Boolean
189	LOOP_CURRENT_SATURATED	Boolean
190	MAINTENANCE_REQUIRED	Boolean
191	MAIN_ACTUATOR_STATUS_HEALTHY	Boolean
192	MORE_STATUS_AVAILABLE	Boolean
193	NONPRIMARY_VALUE_OUT_OF_LIMITS	Boolean
194	NONVOLATILE_MEMORY_DEFECT	Boolean
195	OFF_MODE_BOOL	Boolean
196	OFF_MODE_HEALTHY	Boolean
197	ONLINE	Boolean
198	OUT_OF_SPECIFICATION	Boolean
199	POSITION_FEEDBACK_HEALTHY	Boolean
200	POSITION_REQUEST_HEALTHY	Boolean
201	POWER_SUPPLY_CONDITIONS_OUT_OF_RANGE	Boolean
202	PRIMARY_VALUE_OUT_OF_LIMITS	Boolean
203	PV_HEALTHY	Boolean
204	QV_HEALTHY	Boolean

	XTE	Type
205	RADIO_FAILURE	Boolean
206	REMOTE_MODE_BOOL	Boolean
207	REMOTE_MODE_HEALTHY	Boolean
208	RESERVED	Boolean
209	STALE_DATA_NOTICE	Boolean
210	STALL_ALARM_BOOL	Boolean
211	STALL_ALARM_HEALTHY	Boolean
212	STATUS_SIMULATION_ACTIVE	Boolean
213	SUBDEVICES_WITH_DUPLICATE_IDS_FOUND	Boolean
214	SUBDEVICE_LIST_CHANGED	Boolean
215	SUBDEVICE_MISMATCH	Boolean
216	SV_HEALTHY	Boolean
217	TV_HEALTHY	Boolean
218	VOLATILE_MEMORY_DEFECT	Boolean
219	WATCHDOG_RESET_EXECUTED	Boolean

www.emerson.com/bettis

BETTIS™

EMERSON™