Instruction Manual

FPT Series Foundation Fieldbus Sanitary Temperature Transmitter

REVISION 1.1

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1 Introduction

1.1 Overview

This manual is provided to assist the user in installing, operating and maintaining the FPT series Foundation Fieldbus Temperature Transmitter Module. It is assumed that the user has a thorough understanding of operating principals for Foundation Fieldbus protocol, as well as the specific host control system in use. Users should directly contact the host system vendor for configuration questions specific to their individual system.

1.2 Product Description

Replacing the analog output of the previous series is a fully digital communication protocol conforming to the standards of “Foundation” Fieldbus. As a result, this unit may interface with host control systems offered by any manufacturer conforming to Foundation Fieldbus operating standards. As this type of control system platform utilizes a plant wide communication “bus” network, wiring is accomplished by simply hooking up to the network at any point near the process. Customers save installation time by eliminating the need to run long individual cabling back to a central location. The host system can perform all programming functions directly from any user designated access point, eliminating the need to work directly on the transmitter itself.

1.3 Specifications

Input: 3-wire, 100 ohm, DIN standard curve AGENCY APPROVALS
(.00385 ohms/ohm/ºC) Electromagnetic Compatibility (EMC):
CE Compliant tested to IEC 61326: 1997

Communication: Foundation Fieldbus HI
(31.25kb/s) Bus-powered, 2 terminals Hazardous Locations: Meets UL requirements for Class 1, Div. 1&2; Groups A-D for intrinsically safe

RTD Interconnections: 3 screw terminals with #3 screws apparatus when installed with barrier as required in control drawing provided

Accuracy: + 0.1% of URL (module only)+ 0.2% of URL (module and RTD)

Delta V System Certification: Pending

Stability: 0.1ºC per 6 months Ambient Limits: -18 to 50ºC

Maximum Range: -50 to 180ºC Ambient Effects: +0.13ºC per 28ºC temperature change

Power Requirements: 9-32 VDC (19 mA max.) Storage Temperature: -40 to 65ºC

Power Supply Effect: Less than 0.005% of span per Volt °°°°°°°v: 0-100% RH

Fieldbus Display: Optional 4-digit display

Warranty: Two Years

2 Mechanical Installation

The transmitter should be located on the process or equipment such that the housing is protected from physical abuse. Do not select a location where the unit is likely to interfere with daily operations, or be struck by mobile equipment, forklifts, etc. The housing should be located such that the optional digital display is visible to the operator. A horizontal orientation is always preferred in processes having elevated temperatures so that less heat conducts to the inner electronics.

Precautions should be taken to insure that the housing internals are not exposed to water, water vapor or other moisture. Experience has shown that flexible conduits do not necessarily preclude water from entering the housing. Condensation is common within the conduit, and proper measures must be taken to keep this moisture from migrating into the sensor. Note: The installer assumes responsibility for assuring a moisture tight connection has been properly made.

If mounted horizontally, the conduit fitting should point downward. The preferred method for connecting the sensor is to utilize the watertight connector provided to properly seal against the cable. Rigid or flex conduit should be terminated just short of the sensor housing, and sealed as well to prevent water from migrating into the conduit. This method provides protection for the cabling, while isolating the sensor from moisture that may find it's way into the conduit runs.

3 Transmitter Wiring

As the FPT utilizes a high speed digital communication network for data transfer, it is required that proper cable be utilized. Cable has not been supplied from Anderson. It is recommended that the same cable utilized in the remainder of the host network be utilized for consistency. For new applications, cable specifications are as follows:

Belden 3077F 22 AWG ISA/SP-50 Fieldbus Cable or equivalent

NOTE
The seal-tight wiring connector provided has been designed to accept cable having a ¼" Outside Diameter. Be sure to verify cable in use, as smaller O.D. may allow moisture to enter transmitter housing. If utilizing an alternate connector, be sure to apply Teflon thread tape when attaching the new seal-tight connector.

Wiring of the conduit housing sensor is accomplished as follows:

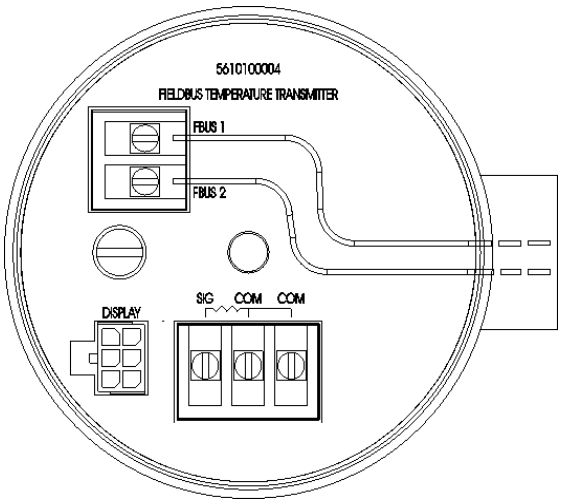
1. Remove the housing cap to expose the wiring terminal block.

2. Insert the cable through the seal tight connector, stripping back approximately 2 inches of sheathing to expose the wires.

3. Two wires will be utilized for connections at the transmitter end of the loop. Trim off all unused wires, including the bare shield wire. Connections will be made to the FBUS1 and FBUS2 terminals.

4. Strip tips of the remaining wires back approximately 3/8 of an inch and twist if stranded wire (tinning is highly recommended).

5. Using the following diagram, make the appropriate connections to the terminal wiring strip (located inside the conduit housing).



4 Liquid Crystal Display

The FPT transmitter is available from the factory, or field upgradeable, with an internal LCD process display. The display is supplied from the factory with corresponding units of Temperature (deg F, deg C etc.) showing on the face. Zero and Span will be automatically selected when the unit is plugged into the FPT transmitter.

Installation of an LCD Process Display into an already existing transmitter is as follows:

1. To prevent possible damage to the transmitter or host receiver, it is recommended that all bus connections be disconnected before proceeding.

2. Remove the conduit cap from the sensor. If upgrading a transmitter in the field, you will be supplied with a new conduit cap (hole in center).

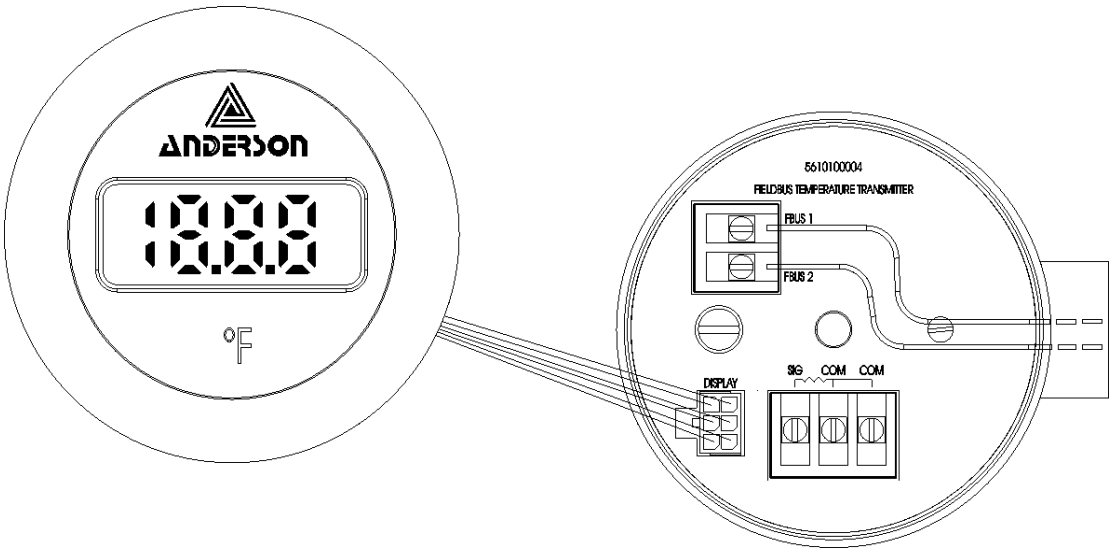
3. Insert the plug from the display into the mating connection located inside the transmitter housing. This plug is keyed to prevent a reverse connection.

4. Slide the LCD display into the end of the conduit housing, orienting for proper position.

5. Secure with the new cap provided.

6. Re-connect the FPT to the communication bus.

7. At this point, the display should be reading the corresponding line Temperature. If not, immediately remove transmitter from bus connection, and check to be sure plug connection is secure.



5 Configuration and Operation

This section provides startup and operating details for the communications portion of the transmitter. Details for all active function blocks have also been included.

5.1 Device Description

A specific "Device Descriptor File" has been generated for this device. Prior to moving ahead with setup and configuration of the unit, you will need to be sure that this file has been loaded into the host control system. This file may be obtained from the following source:

- Via the internet, point browser to the following address: www.fieldbus.org
- Scroll down until the search box entitled "Registered Products" is visible
- Enter "Anderson" in the search text box, and press the search button
- The most recent descriptor file will be available for download. Simply click the link for the proper model transmitter to start download.

Once downloaded and installed, the host system will be capable of properly communicating with the Anderson device. For additional information regarding operation and installation of device descriptor files, directly contact the manufacturer of the host control system.

5.2 Block Descriptions

All Fieldbus devices are arranged in a "block" operating configuration. The Fieldbus Foundation has defined a set of standards that each unit must follow, and as a result, block details remain consistent between products and manufacturers. A specially designated level, the "Manufacturer Specific Parameters," functions just as the name implies. Here, the Fieldbus Foundation allows manufacturers the opportunity to add functions specific to their device. Additional information covering definitions and descriptions can be found at www.fieldbus.org.

5.2.1 Resource Block

The resource block is used to describe characteristics of the individual device. Parameters such as device name, manufacturer and serial number are located here. Each device has one Resource block. There are no linkable parameters located within this block.

5.2.2 Sensor Transducer Block

This block contains configuration data specific to the individual device. Data such as sensor type, calibration date and span trim are located within this block.

5.2.3 Function Block

The function block is made up of a series of sub blocks. It is these sub blocks that provide the basis for system control and operation. Standard sets of Function Blocks have been defined by the Fieldbus Foundation. These blocks are available for input and output communication via the network. The following are in use:

Analog Input Block (AI)
The core duty of this block is to process incoming signals from the sensing element (Temperature in this case), and make the data available for use in other function blocks. This data is formatted in engineering units, as defined by the user.

Arithmetic Block (AR)
The function of this block is to determine the difference between two Temperature elements located on the bus. This block utilizes AI (Analog Input) data from its home device, as well as data available from other devices accessible on the network.

5.3 Common Block Operations

Each of the blocks within the transmitter share a common set of programming modes. By setting a specific operating mode, the user will be able to dictate the output of the transmitter to the network bus.

Description	Function
MODE_BLK.TARGET	Command used to set operating mode
MODE_BLOCK.ACTUAL	Used to read current mode of operation. Allow short update time after making a change using MODE_BLK.TARGET command
MODE_BLOCK.PERMITTED	Using this command, access to specific operating modes may be denied.
AUTO	Normal operating mode. All data input, calculations and data output for the block will function.
Out Of Service (OOS)	Setting operating mode to OOS disables all function executions by the block.

5.4 Specific Commands – Resource Block

The following section outlines commands that are available within the Resource Block.

5.4.1 WRITE_LOCK

The WRITE_LOCK parameter is used to prevent parameter changes from occurring within the device. When enabled, the only accessible command remains WRITE-LOCK so that the parameter may be cleared. When cleared, writes to the device are again enabled. When cleared, an alert is generated by WRITE_ALM to indicate a change was made. The alarm priority corresponds to the WRITE_PRI parameter.

5.4.2 FEATURES_SEL

The FEATURES_SEL command is used to turn on and off additional features supported by the device. At this time, the following are supported:

- REPORTS
- SOFTWLOCK

5.5 Specific Commands – Sensor Transducer Block

The following section outlines some of the important commands that are available within the Sensor Transducer Block.

NOTE: This block does not contain parameters that allow Engineering Units to be modified. Units within the Transducer Block automatically track values programmed by the XD_SCALE parameter.

5.5.1 Zero Trim

Prior to putting a device into service, a ZERO trim adjustment is required. The Operations section of this guide illustrates the complete procedure.

5.5.2 Damping

This parameter may be used to filter out unwanted noise in the measured process value. By setting this parameter to a larger time interval, the device will have a slower response time. By setting this parameter to a lower value, the response time will be faster. Use with caution, as setting response time to slow may cause the system to miss critical process changes that may occur.

It is recommended that any required damping done within this block, using the Damping command. Although the AI block has additional features, forcing damping within that block will

not be carried over to the device on-board display (if provided). The result would be a faster response on the display, and a slower response on AI Block output data.

5.6 Specific Commands – Analog Input (AI) Block

The following section outlines commands that are available within the Analog Input Block.

5.6.1 L_TYPE

This parameter is used to define the relationship between the measured process value (Transducer Block), and the output of the AI block. As Engineering units and calculations are performed within the AI block, it is recommended that this parameter be set to INDIRECT for most applications. Setting to DIRECT will simply pass the Transducer Block information without additional modification.

- Direct: By setting to DIRECT, the AI output will be identical to the Transducer Block.
- INDIRECT: By setting to INDIRECT, the data supplied by the Transducer Block is applied to any range or calculation parameters established within the AI block. Values between the Transducer Block and the AI Block will remain linear.
- INDIRECT SQUARE ROOT: By setting to INDIRECT SQUARE ROOT, an inferred non-linear value may be generated by AI block. This would be common for correlating a differential Temperature measurement to the corresponding flow rate in a line.

5.6.2 XD_SCALE and OUT_SCALE

These parameters are used to set the Engineering Units and Scaling factors associated with the data coming into the AI block, as well as being generated by the AI block. Each of the parameters may be set to 0%, 100% or to associated Engineering Units. These parameters are programmed differently depending on the L_TYPE that is selected.

NOTE: The following is a list of supported Engineering Units. To prevent configuration errors from occurring ONLY select units supported by the device.

Deg F
Deg C

- **L_TYPE = DIRECT**: When the desired output of the AI Block is the same as the measured variable, settings are as follows:

  XD_SCALE = Same as range of process

  OUT_SCALE = Set same as XD_SCALE

  Example:

Process Description	Line sees 0-200 deg F, with deg F as desired output
XD_SCALE	0-200 deg F
OUT_SCALE	0-200 deg F

- **L_TYPE = INDIRECT**: When the desired output of the AI Block is to be inferred, settings are as follows:

  XD_SCALE = Same as range of process

  OUT_SCALE = Set to 0% and 100% points of inferred output scale

  Example:

Process Description	Line sees 0-212 deg F, with deg C as desired output
XD_SCALE	0-212 deg F
OUT_SCALE	0% = 0 deg C, 100% = 100 deg C

- **L_TYPE = INDIRECT SQUARE ROOT**: When the desired output of the AI Block is to be inferred. And non-linear, settings are as follows:

  XD_SCALE = Same as range of process

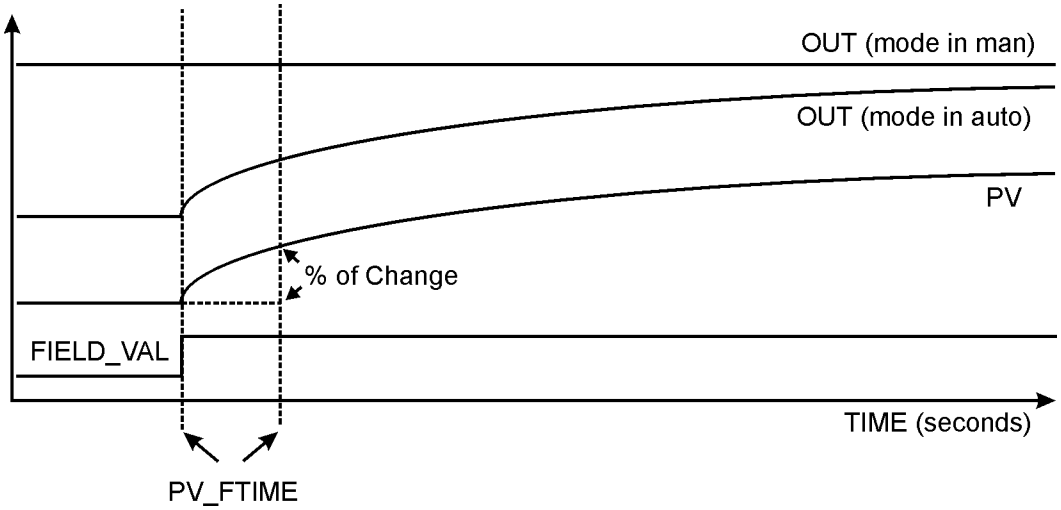
  OUT_SCALE = Set to 0% and 100% points of inferred output scale

  Example:

Process Description	Line sees 0-100 psi, with bar as desired output
XD_SCALE	0-100 psi
OUT_SCALE	0% = 0 bar, 100% = 6.89 bar

5.6.3 PV_FTIME

This parameter is used to apply filtering to the data stream coming into the AI block. It can be used to smooth out otherwise rapid changes seen by the Transducer Block. Units of measure for PV_FTIME are in seconds. Setting the filter time constant to zero will disable it from use.



5.6.4 LOW_CUT

This parameter is used to put a low boundary on the calculated input data stream to the AI block. It can be used to force a zero reading even though the process parameter may be slightly less than zero. This parameter is used in conjunction with IO_OPTS as the enable / disable.

Example:

LOW_CUT set to .3 deg F

IO_OPTS set to TRUE

AI input calculated value is currently .2 deg F

Converted AI value remains at 0 deg F

5.6.5 Process Alarms

The OUT data produced by the AI Block is compared to values programmed into the alarms. If a value has bee reached, the associated alarm is initiated. Available alarms are as follows:

- HI_LIM = High alarm
- HI_HI_LIM = High High alarm
- LO_LIM = Low alarm
- LO_LO_LIM = Low Low alarm

5.6.6 Alarm Hysteresis

A hysteresis may be programmed to prevent false tripping (chatter) when the process fluctuates closely around an alarm point. The value is programmed in % of process variable using the ALARM_HYS parameter.

Example:

Max process variable = 100 deg C

ALARM_HYS set to 1

Hysteresis around each alarm point will be 1 deg C

5.6.7 Alarm Priority

Alarm priority determines what actions are taken as the result of an alarm condition. Priority for each alarm is set using the following parameters:

- HI_PRI = High priority
- HI_HI_PRI = High High priority
- LO_PRI = Low priority
- LO_LO_PRI = Low Low priority

Priority Number	Priority Description
0	The alarm condition is not used
1	Alarm recognized by the Control System, but no operator alerts
2	Alarm is alerted to the operator
3-7	Advisory alarms, with increased priority for each increment
8-15	Critical alarms, with increased priority for each increment

5.6.8 Status Options

With the device in OOS (Out of Service) mode, the STATUS_OPTS parameter may be programmed.

- Propagate Fault Forward: This option is used to send a fault condition downstream without taking immediate action within the AI block.
- Uncertain if Limited: This option is used to set the AI output status to uncertain if the measured or calculated value is limited
- BAD if Limited: This option is used to set the AI output status to BAD if high or low limits are being violated by the sensor.
- Uncertain if Man Mode: This option is used to set the AI output status to uncertain if the AI block is currently set in manual mode.

5.7 Master Reset – Resource Block

In order to perform a master reset, you must manually configure the Resource Block parameters as follows:

Set the RESTART to one of the following:

- RUN – Set to NOMINAL STATE when not restarting; this is default parameter
- RESOURCE – Not used by device
- DEFAULTS – Sets all device parameters to Foundation Fieldbus standard defaults
- PROCESSOR – Processor does a software reset of the CPU

5.8 Sensor Upper and Lower Trim – Sensor Transducer Block

In order to perform upper and lower sensor trim, you must manually configure the Transducer Block parameters as follows:

1. Set MODE_BLK_TARGET to OOS

2. Set CAL_UNIT to one of the supported engineering units found in the Transducer Block

3. Using appropriate test rig, apply Temperature equal to the lower calibration point – allow sufficient time for reading to stabilize, watching for leakage conditions. Be sure Temperature applied is with the range defined by PRIMARY_VALUE_RANGE.

4. CAL_POINT_LO can now be set to correspond with low value being applied via test rig.

5. Raise test rig Temperature to match upper calibration point.

6. CAL_POINT_HI can now be set to correspond with high value being applied via test rig.
Again, be sure Temperature applied is with the range defined by PRIMARY_VALUE_RANGE.

7. Set SENSOR_CAL_DATE to the current date.

8. Set SENSOR_CAL_WHO to the name of the individual performing the calibration.

9. Set SENSOR_CAL_LOC reflect any location data that corresponds to this calibration.

10. Set SENSOR_CAL_METHOD to USER TRIM.

11 Set MODE_BLK.TARGET to AUTO.

5.9 Sensor Zero Trim Method – Transducer Block

In order to perform sensor zero trim, you must manually configure the Transducer Block parameters as follows:

1. Set MODE_BLK.TARGET to OOS.

2. Using appropriate test rig, apply ZERO Temperature – allow sufficient time for reading to stabilize, watching for leakage conditions.

3. CAL_POINT_LO can now be set to 0.

4. Set SENSOR_CAL_DATE to the current date.

5. Set SENSOR_CAL_WHO to the name of the individual performing the calibration.

6. Set SENSOR_CAL_LOC reflect any location data that corresponds to this calibration.

7. Set SENSOR_CAL_METHOD to USER TRIM.

8. Set MODE_BLK.TARGET to AUTO.

5.10 Factory Trim Recall Method – Transducer Block

In order to perform sensor factory trim recall method, you must manually configure the Transducer Block parameters as follows:

1. Set MODE_BLK.TARGET to OOS.

2. Set FACTORY_CAL_RECALL to RECALL

3. Set SENSOR_CAL_DATE to the current date.

4. Set SENSOR_CAL_WHO to the name of the individual performing the calibration.

5. Set SENSOR_CAL_LOC reflect any location data that corresponds to this calibration.

6. Set SENSOR_CAL_METHOD to USER TRIM.

7. Set MODE_BLK.TARGET to AUTO.

5.11 Status Data – Analog Input (AI) Block

In normal operation, either actual or calculated values are passed from the Sensor Transducer Block to the Analog Input (AI) Block for further processing. Along with that data, a STATUS condition is also sent. Potential conditions are as follows:

- STATUS = GOOD, no problems with hardware or data
- STATUS = BAD, problems found with either hardware, or data passed from Transducer Block
- STATUS = UNCERTAIN, potential problems found with data or hardware

Be sure that programming of the system in areas that utilize the data generated by the Analog Input Block also monitor the STATUS condition. Appropriate action should be taken in cases where BAD or UNCERTAIN conditions appear to prevent further problems down stream.

5.12 Simulate Mode – Analog Input (AI) Block

For testing purposes, it is possible to force data out of the Analog Input Block. This procedure could be used to test a control function, or to test the operation of the down stream device that was the receiver of the data. Two methods exist for data output:

Manual Mode – This method forces the output data from the Analog Input (AI) Block to the desired value, but does not change the status of the STATUS parameter.

1. Place the TARGET MODE of the Analog Input (AI) Block to MANUAL.
2. OUT_VALUE can now be modified to reflect the desired output value.

Simulate Mode – This method forces the output data from the Analog Input (AI) Block to a desired value, and in addition, changes the STATUS parameter to the corresponding value.

1. Place a shunt in the simulate (SIM) pins of the device. These pins would be located behind the screw off end cap of the device. If the jumper is already in the ON position, it must be removed and replaced to properly enter the simulate mode.
2. Setting the TARGET MODE to AUTO will change both the OUT_VALUE and OUT_STATUS.
3. Set SIMULATE_ENABLE_DISABLE parameter to ACTIVE state.
4. Entering the desired value into the SIMULATE_VALUE parameter will force the output of the OUT_VALUE parameter, along with setting the OUT_STATUS to the correct value.

It may be necessary to reset the SIMULATE jumper if any errors occur while performing the above. Doing so will clear error conditions, allowing device to resume operation.

6 Appendix A – Resource Block Parameters

Index	Parameter Mnemonic	Description
1	ST_REV	Revision level of the static data
2	TAG_DESC	
3	STRATEGY	Can be used to identify grouping of blocks
4	ALERT_KEY	ID# of plant unit
5	MODE_BLK	Contains the modes available to the block
6	BLOCK_ERR	Contains error status
7	RS_STATE	State of the function block
8	TEST_RW	Used only for conformance testing
9	DD_RESOURCE	String identifying the tag of the resource
10	MANUFAC_ID	Manufacturer ID# calc = 0x00000A1C
11	DEV_TYPE	Used to locate the DD file
12	DEV_REV	MFG rev #
13	DD_REV	Rev # of the DD
14	GRANT_DENY	Options for controlling access to Hast
15	HARD_TYPES	The types of hardware available as Chan #
16	RESTART	Allows restart to be initiated
17	FEATURES	Shows supported resource block options
18	FEATURE_SEL	Selects resource block options
19	CYCLE_TYPE	ID's block execution methods available
20	CYCLE_SEL	Selects execution method for this resource
21	MIN_CYCLE_T	Time duration of shortest cycle interval
22	MEMORY_SIZE	Available config memory in the empty resource
23	NV_CYCLE_T	Interval between writing non-volatile memory
24	FREE_SPACE	Free memory – (AIC = 0%)
25	FREE_TIME	Free processing time (AIC = 0%)
26	SHED_RCAS	Time duration at which to give up writing to RCAS locations
27	SHED_ROUT	Time duration at which to give up writing to ROUT location
28	FAULT_STATE	Set by loss of communication to output block
29	SET_FSTATE	Allows fault state to be manually set
30	CLR_FSTAT	Clear fault state
31	MAX_NOTIFY	Max # of unconfirmed alert notify messages
32	LIM_NOTIFY	Set MAX_NOTIFY
33	CONFIRM_TIME	Min time between retries of alert reports
34	WRITE_LOCK	Disable write capability
35	UPDATE_EVT	Alert generated by any change to static data
36	BLOCK_ALM	System failure information
37	ALARM_SUM	Alert status
38	ACK_OPTION	Select which alarms will be automatically ack.
39	WRITE_PRI	Priority of alarm generated by clearing the write lock
40	WRITE_ALM	Alert generated if write lock is cleared
41	ITK_VER	Major rev of interoperability test case

7 Appendix B – Sensor Transducer Block Parameters

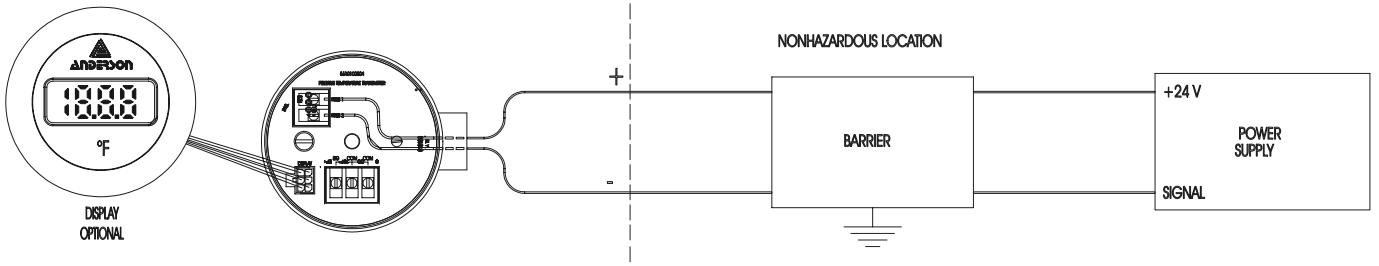
Index	Parameter Mnemonic	Description
1	ST_REV	The revision level of the static data associated with this block.
2	TAG_DESC	User description of the block.
3	STRATEGY	User information
4	ALERT_KEY	User identification number
5	MODE_BLK	Block mode control and status
6	BLOCK_ERR	Error Status of block
7	UPDATE_EVT	This is generated when the static data in the block is changed.
8	BLOCK_ALM	Identifies that a problem exists in the system
9	TRANSDUCER_DIRECTORY	Specifies the number and starting indices in the transducer block.
10	TRANSDUCER_TYPE	Transducer identification
11	XD_ERROR	Additional error codes
12	COLLECTION_DIRECTORY	Specifies the number, starting indices, and DD item identifications.
13	PRIMARY_VALUE_TYPE	104 - Process Temperature
14	PRIMARY_VALUE	The measured value
15	PRIMARY_VALUE_RANGE	The high and low range limit values
16	CAL_POINT_HI	The highest point calibration
17	CAL_POINT_LO	The lowest point calibration
18	CAL_MIN_SPAN	The minimum span allowed
19	CAL_UNIT	The engineering units used
20	SENSOR_TYPE	Type of sensor
21	SENSOR_RANGE	Sensor limits
22	SENSOR_SN	The sensor serial number
23	SENSOR_CAL_METHOD	Method of last sensor calibration
24	SENSOR_CAL_LOC	Sensor location
25	SENSOR_CAL_DATE	Date of calibration
26	SENSOR_CAL_WHO	Who calibrated sensor
27	SENSOR_CONNECTION	Number of wires = 3
28	SECONDARY_VALUE	Not implemented
29	SECONDARY VALUE_UNIT	Not implemented
30	PRIMARY_VALUE_DAMPING	Time constant of filter in seconds

8 Appendix C – Analog Input (AI) Block Parameters

Index	Parameter Mnemonic	Description
1	ST_REV	Same as previous page
2	TAG_DES	Same as previous page
3	STRATEGY	Same as previous page
4	ALERT_KEY	Same as previous page
5	MODE_BLK	Same as previous page
6	BLOCK_ERR	Same as previous page
7	PV	Primary analog value
8	OUT	Primary analog value calculated
9	SIMULATE	Allows for manual input of I/O values
10	XD_SCALE	The scale and unit values from the transducer Blk
11	OUT_SCALE	The scale and unit of this block
12	GRANT_DENY	See resource block
13	IO_OPTS	Option which the user may select to alter I/O block processing
14	STATUS_OPTS	Option which the user may select in the block proc. of status
15	CHANNEL	The logical hardware channel connected to the I/O block
16	L_TYPE	Determines how parameters
17	LOW_CUT	Limit used in sq rt processing
18	PV_FTIME	Time constant of a single exponential filter for the PV
19	FIELD_VAL	Raw value of the field device in % of range
20	UPDATE_EVT	This alert is generated by any change to the static data
21	BLOCK_ALM	Same as previous page
22	ALARM_SUM	See resource block #37
23	ACK_OPTION	See resource block #38
24	ALARM_HYS	Alarm hysteresis in %
25	HI_HI_PRI	Priority of HH alarm
26	HI_HI_LIM	Setting of HH alarm
27	HI_PRI	Priority of H alarm
28	HI_LIM	Setting of H alarm
29	LO_PRI	Priority of L alarm
30	LO_LIM	Setting of L alarm
31	LO_LO_PRI	Priority of LL alarm
32	LO_LO_L IM	Setting of LL alarm
33	HI_HI_ALM	Status of HH alarm
34	HI_ALM	Status of H alarm
35	LO_ALM	Status of L alarm
36	LO_LO_ALM	Status of LL alarm

REVISIONS				44506P0001
REV.	CHANGE NO.	DESCRIPTION	BY	DATE
A		RELEASED	TJG	2/12/03

HAZARDOUS AREA
CLASS I
GROUPS A, B, C, D



UMODEL NUMBERSU

F - P - T - 1 - 0 - 000 - F - 00 - 0 - 1 - 00
7 C 03 1 05
04 2 10
05 15
20

UTRANSMITTER ENTITY PARAMETERSU

V max = 30 VDC
I max = 300 mA
P max = 1.2 W
Ci = 0 uf
Li = 0 uh

UNOTES:U

1. SEE OPERATING INSTRUCTIONS.
2. ASSOCIATED APPARATUS MUST NOT BE CONNECTED IN PARALLEL. UNLESS PERMITTED BY THE ASSOCIATED APPARATUS APPOVAL.
3. WARNING - SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.

NOTES ON BARRIERS

1. MAY BE IN A DIVISION 2 LOCATION IF SO APPROVED.
2. OUTPUT CURRENT MUST BE LIMITED BY A RESISTOR SUCH THAT THE OUTPUT VOLTAGE-CURRENT PLOT IS A STRAIGHT LINE DRAWN BETWEEN OPEN CIRCUIT VOLTAGE AND SHORT CIRCUIT CURRENT.
3. CABLE CAPACITANCE PLUS INTRINSICALLY SAFE EQUIPMENT CAPACITANCE MUST BE LESS THAN THE MARKED CAPACITANCE (Ca) SHOWN ON ANY BARRIER USED. THE SAME APPLIES FOR INDUCTANCE. CAPACITANCE AND INDUCTANCE OF FIELD WIRING FROM THE TRANSMITTER TO THE BARRIER SHOULD BE CALCULATED AS (Cc = 60pf/FT AND Lc = 0.2uh/FT) AND SHOULD BE INCLUDED IN THE SYSTEM CALCULATIONS.
4. SELECTED BARRIERS MUST BE THIRD PARTY APPROVED AS INTRINSICALLY SAFE FOR THE APPLICATION AND HAVE Vac OR Vt NOT EXCEEDING Vmax AND Isc OR It NOT EXCEEDING Imax AND THE Pmax OF THE BARRIER MUST BE LESS THAN OR EQUAL TO THE Pmax OF THE TRANSMITTER AS SHOWN FOR EACH TYPE OF BARRIER IN TABLE 1.
5. BARRIERS MUST BE INSTALLED IN ACCORDANCE WITH BARRIER MANUFACTURERS CONTROL DRAWING AND ARTICLE 504 OF NATIONAL ELECTRICAL CODE ANSI/NFPA 70.

NOTES ON CONTROL EQUIPMENT

1. MAINS POWER MUST NOT EXCEED 250 VOLTS WITH RESPECT TO EARTH.

TABLE 1

Equipment		Barrier
V max	≥	Voc
I max	≥	Isc
P max	≥	P max
Ci+Cc	≤	Ca
Li+Lc	≤	La

IF Pmax OF BARRIER IS NOT KNOWN IT MAY BE CALCULATED USING THE FORMULA Voc X Isc = P1

NEXT ASSY: -N/A-
SCALE:NONE | DRAWN BY TJG 2/11/03 | CHECKED BY
MATERIAL: -N/A-
FINISH: -N/A-
*** UNLESS OTHERWISE SPECIFIED ***
ALL DIMS. ARE IN INCHES BREAK CORNERS .015 MAX.
ALL SURFACES 63 REMOVE ALL BURRS
Tolerances on:
3 PLC. DEC. ±.004 FRACTIONS ±1/64
2 PLC. DEC. ±.010 ANGLES ±1°

THIS DRAWING IS THE PROPERTY OF
Anderson Instrument Co., Inc.
156 Auriesville Rd., Fultonville, New York 12072 USA

TITLE
CONTROL DRAWING
FOUNDATION FIELDBUS
TEMPERATURE TRANSMITTER

Sheet No. 1 OF 1 | DWG. NO. 44506P0001 | REV. A
R & D DWG NO. | REV.

10 Warranty

Warranty and Return Statement
These products are sold by The Anderson Instrument Company (Anderson) under the warranties set forth in the following paragraphs. Such warranties are extended only with respect to a purchase of these products, as new merchandise, directly from Anderson or from an Anderson distributor, representative or reseller, and are extended only to the first buyer thereof who purchases them other than for the purpose of resale.

Warranty
These products are warranted to be free from functional defects in materials and workmanship at the time the products leave the Anderson factory and to conform at that time to the specifications set forth in the relevant Anderson instruction manual or manuals, sheet or sheets, for such products for a period of one year.

THERE ARE NO EXPRESSED OR IMPLIED WARRANTIES WHICH EXTEND BEYOND THE WARRANTIES HEREIN AND ABOVE SET FORTH. ANDERSON MAKES NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE PRODUCTS.

Limitations
Anderson shall not be liable for any incidental damages, consequential damages, special damages, or any other damages, costs or expenses excepting only the cost or expense of repairs ore replacement as described above.

Products must be installed and maintained in accordance with Anderson instructions. Users are responsible for the suitability of the products to their application. There is no warranty against damage resulting from corrosion, misapplication, improper specifications or other operating condition beyond our control. Claims against carriers for damage in transit must be filed by the buyer.

This warranty is void if the purchaser uses non-factory approved replacement parts and supplies or if the purchaser attempts to repair the product themselves or through a third party without Anderson authorization.

Returns
Anderson's sole and exclusive obligation and buyer's sole and exclusive remedy under the above warranty is limited to repairing or replacing (at Anderson's option), free of charge, the products which are reported in writing to Anderson at its main office indicated below.

Anderson is to be advised of return requests during normal business hours and such returns are to include a statement of the observed deficiency. The buyer shall pre-pay shipping charges for products returned and Anderson or its representative shall pay for the return of the products to the buyer.

An RMA (Return Merchandise Authorization) must be obtained from Anderson Customer Service before returning merchandise.

Approved returns should be sent to:

Anderson Instrument Co., Inc.
156 Auriesville Rd.
Fultonville, NY 12072

ATTN: Repairs
Write RMA number on outside of package