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IMPORTANT SAFETY CONSIDERATIONS

It is very important for the user to consider the possible adverse effects of power, wiring, component, sensor, or software failures in designing any type of control or monitoring system. This is especially important where economic property loss or human life is involved. It is important that the user employ satisfactory overall system design. It is agreed between the Buyer and Acromag, that this is the Buyer's responsibility.

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INTRODUCTION:

These instructions cover the model types listed in Table 1 below. Supplementary sheets are attached for units with special options or features.

Table 1:

- A. Model Number Format:
250T-Input-Mounting/Display-Certification-Calibration
- B. Typical Model Number: 250T-RBP1-XP-NCR-C

Series	-Input	-Mounting/ Display	-Certification	-Calib.
250T	-RBP1	-DIN	-NCR	(Blank)
	-RBP2	-SM	-Approval ²	-C ¹
	-RBP3	-ST		
	-RPxx	-N4		
		-N12		
	-RBC1	-XP		
	-RBC2	-XPD1		
	-RCxx	-XPD2		
		-XPD3		

Notes (Table 1):

1. The RBP1 to RBP3 and RBC1 to RBC2 can be ordered with or without the factory calibration "-C" option. All other input types automatically include calibration to the customer's specification (no "-C" needed). Any customer specified calibration info will be included on a separate calibration label on the unit.

xx Range Code Number: For use with integral display option only, the "xx" represents a standard range code number (01, 05, etc.) for the display. Consult the selection and ordering guide for standard range codes. Unit can be ordered with or without factory calibration; if unit is factory calibrated to a customer's specifications, the model number suffix "-C" will indicate this. Any customer specified calibration information will be included on a separate calibration label on the unit.

Custom range codes are also available--consult the factory.

2. Consult the factory for current information on agency (e.g. Canadian Standards Association, etc.) approvals.

DESCRIPTION:

These two-wire transmitters condition either a 2, 3, or 4 wire, 100 ohm Platinum Resistance Temperature Sensor (RTD), or a 2 or 3 wire Copper RTD input, and convert the signal to a 4 to 20mA process current output. Input circuit isolation is standard. The unit provides excitation to the sensor, lead-wire compensation, linearization, and wide-range zero and span adjustments. The transmitters are RFI-protected, operate over large temperature ranges, and feature excellent temperature coefficients, which minimize the effects from the plant environment.

Following the basic two-wire design, the output and the DC power share the same pair of twisted copper wires. The transmitter, acting similar to a variable resistor in series with the load and the DC supply, provides an output loop current proportional to the input sensor signal.

These field mounted two-wire transmitters are designed to utilize one of a number of customer-specified mounting configurations. The transmitter is available for DIN-rail mounting, surface mounting, and 3-inch SNAPTRACK™ plastic rail mounting, or in various housings. These housings include NEMA 4, NEMA 12, and explosion-proof enclosures. The model number of the unit specifies the mounting/enclosure type.

The transmitter, when mounted in the explosion-proof enclosure, is available with a 3-1/2 digit LCD readout (1/2-inch character height) to provide a visual indication of the transmitter's output. The readout is available in percent-of-span, temperature, or other engineering units, scaled to customer requirements.

Input wiring is inserted in the bottom of the unit, while output wiring is inserted on the top of the unit. Screws to secure the wiring are located on the front panel. Connectors are screw-clamp type and accept wire size up to #14 AWG.

SPECIFICATIONS:

Function: This family of isolated two-wire transmitters condition either a 100 ohm Platinum RTD input or a 10 ohm Copper RTD. The unit converts the input signal to a 4-20mA process current output and provides RTD excitation, lead-wire compensation, linearization, and wide-range zero and span adjustments that utilize 22-turn potentiometers accessible from the front of the unit. The transmitter has various mounting and enclosure options available.

MODEL/SERIES: 250T-

INPUT: Platinum RTD, 100 ohm (-RBPx) - 100 ohm (Ro) Platinum Resistance Temperature Sensor (RTD), 2, 3, or 4 wire connection. Standard calibration is based on the international R versus T curve having an alpha of 0.00385 ohms/ohm⁰C (Pt-385). The unit can also be calibrated for sensors having an alpha of 0.003925 ohms/ohm⁰C (Pt-392). Maximum excitation current is 1.0mA DC (0.5mA for RBP3). The span and zero adjustment is a function of the RTD range. NOTE: linearization is maintained for any calibration within defined range.

For Platinum units, the input range is field selected by means of an internal field configurable jumper. Input span and zero ranges are adjustable as specified below.

NOTE: Accuracy is in percent of Input Temperature Span.

-RBP1: Platinum RTD, 100 ohm. Accuracy
 Range A: Span: 25 - 100⁰C, Zero: -50 to +50⁰C ±0.1%
 Range B: Span: 25 - 100⁰C, Zero: +50 to +150⁰C ±0.1%
 Range C: Span: 25 - 100⁰C, Zero: -150 to -50⁰C ±0.2%

-RBP2: Platinum RTD, 100 ohm.
 Range A: Span: 50 -200⁰C, Zero: -50 to +50⁰C ±0.1%
 Range B: Span: 50 -200⁰C, Zero: +50 to +150⁰C ±0.1%
 Range C: Span: 50 -200⁰C, Zero: -150 to -50⁰C ±0.2%

-RBP3: Platinum RTD, 100 ohm.
 Range A: Span: 200 - 800⁰C, Zero: -50⁰C to +50⁰C
 Accuracy: 200 - 400⁰C Spans ±0.1%
 Accuracy: 400 - 800⁰C Spans ±0.5%
 Range B: Span: 200 - 800⁰C, Zero: + 50 to +150⁰C
 Accuracy: 200 - 400⁰C Spans ±0.2%
 Accuracy: 400 - 800⁰C Spans ±0.7%
 Range C: Span: 200 - 800⁰C, Zero: -150 to - 50⁰C
 Accuracy: 200 - 400⁰C Spans ±0.2%
 Accuracy: 400 - 800⁰C Spans ±0.3%

The following input type is used when the Temperature Display Option (-xxD2) is specified. The temperature range code designated by xx in field) specifies the display range of the Display and the input temperature range of the transmitter. For Example: An "RP05" range code represents a temperature range of 0 to 100⁰C. Consult the selection and ordering guide for standard range codes. Custom range codes are also available--consult the factory. Transmitter performance is per temperature range specified--see specifications for temperature ranges above.

-RPxx: Platinum RTD, 100 ohm, with Display Option. Transmitter and Display configured to a customer specified range code. The span range must be within 50⁰C to 800⁰C, and the zero must be within -150⁰C to +150⁰C.

INPUT: Copper RTD, 10 ohm (-RBCx) -10 ohm (Ro) Copper Resistance Temperature Sensor (RTD), 2 or 3 wire connection. Standard calibration is based on a Copper RTD, 9.035 ohms at 0⁰C. Maximum excitation is 1.5mA DC. The span and zero adjustment range is a function of the RTD range code.

The input span and zero ranges are adjustable as specified below, except for special ranges which are factory calibrated per customer requirements. NOTE: Accuracy The input span and zero ranges are adjustable as specified is in percent of Input Temperature Span.

Accuracy
-RBC1: Span: 50 to 100⁰C, Zero: -50 to +50⁰C ± 0.25%
-RBC2: Span: 100 to 200⁰C, Zero: -50 to +50⁰C ± 0.25%

The following input type is used when the Temperature Display Option (-xxD2) is specified. The temperature range code (xx in field) specifies the display range of the Display and the input temperature range of the transmitter. For Example: A "RC05" range code represents a temperature range of 0 to 100°C. Consult the selection and ordering guide for standard range codes. Custom range codes are also available, consult the factory. Transmitter performance is per temperature range specified--see specifications for temperature ranges above.

-Rcxx: Copper RTD, 10 ohm with Display Option. The Transmitter and Display are configured to a customer specified range code. The span range must be within 50°C to 200°C, and the zero must be within -50°C to +50°C.

Isolation: The input circuit is electrically isolated from output/power circuits, allowing the input to operate at up to 250V AC, or 354V DC off ground, on a continuous basis (will withstand 1500V AC dielectric strength test for one minute without breakdown). Complies with test requirements outlined in ANSI C39.5-1974 for the voltage rating specified.

Output: 4-20mA DC output.

NOTE: A Test Signal of 40mV to 200mV is available at the output terminals (see Drawing 4501-078), it represents the 4 to 20mA output.

Power: An external loop power supply is required: 12V DC minimum, 50V DC maximum. Under no circumstances must the DC supply ever exceed 75 volts peak instantaneously. Unit has reverse polarity protection.

Output Limits (typical): 3.8mA DC to 26mA DC.

Load Resistance Range Equation: $R\text{-Load (Maximum)} = (V \text{ supply} - 12V) / 0.020A$ At 24V supply, R-Load = 0 to 600 ohms.

Power Supply Effect:

DC Volts: $\pm 0.001\%$ of output span per volt DC. 60/120 Hz ripple: $\pm 0.01\%$ of span per volt peak-to-peak of power supply ripple.

RTD Break Detection: Upscale RTD break detection is standard.

Reference Test Conditions:

- A. 100 ohm, 3-wire Platinum, 0-100°C, (Alpha = 0.00385); output: 4-20mA into 500 ohm load; 77°F (25°C); 24V DC supply.
- B. 10 ohm, 3-wire Copper (9.035 ohms at 0°C), 0 to 100°C; output: 4-20mA into 500 ohm load; 77°F (25°C); 24V DC supply.

Accuracy: A Function of Range--listed adjacent to range selected. Accuracy includes combined effects of transmitter repeatability, hysteresis, terminal point linearity, and adjustment resolution. Does not include sensor error.

Linearization: The unit linearizes the Platinum RTD signal to provide an output signal that represents the percent-of-span value of the measured temperature. The linearization circuit is universal for the model type ordered, it allows freedom to calibrate to any input range and linearization will be functional. Per manufacturers tables, the Copper sensor is linear between -50°C and 150°C.

Lead Wire Compensation:

- A. 100 ohm, Platinum RTD: Zero shift is less than 0.01% per ohm of lead resistance, for up to 10 ohms per leg, with a total maximum shift of 0.1%.
- B. 10 ohm Copper RTD: Zero shift is less than 0.05% per ohm of lead resistance, for up to 10 ohms per leg, with a total maximum shift of 0.5%.

Ambient Temperature Range: -13°F to 185°F (-25°C to 85°C).

Ambient Temperature Effect:

(Combined effects of zero/span over temperature).

-RBP Less than $\pm 0.01\%$ of output span per °F ($\pm 0.018\%$ per °C) over ambient temperature range for reference test conditions.

-RBC Less than $\pm 0.025\%$ of output span per °F ($\pm 0.045\%$ per °C) over ambient temperature range for reference test conditions.

Load Resistance Effect: Less than +0.005% of output span for 100 ohm change.

Output Ripple: Less than $\pm 0.25\%$ of the maximum output span. Can be reduced to less than $\pm 0.1\%$ by adding a 1uF capacitor across the load resistor. Some loads (such as E/P and I/P devices) may require a 0.1uF capacitor inserted across the load.

Bandwidth: -3dB at 3 Hz, typical.

Response Time: For a step input, the output reaches 98% of output span in 350ms, typical.

Noise Rejection:

Common Mode: 120dB @ 60 Hz, 100 ohm unbalance, typical.
Normal Mode: 26dB @ 60 Hz, 100 ohm source; 20dB @ 60Hz, 10 ohm source.

RFI Resistance: Less than $\pm 0.5\%$ of output span with RFI field strengths of up to 10V/meter at frequencies of 27, 151, and 467 MHz.

EMI Resistance: Less than $\pm 0.25\%$ of output span effect with switching solenoids or commutator motors.

Surge Withstand Capability (SWC): Input/Output terminations are rated per ANSI/IEEE C37.90-1978. Unit is tested to a standardized test waveform that is representative of surges (high frequency transient electrical interference), observed in actual installations.

Construction (Basic Transmitter):

Circuit Boards: Military grade FR-4 epoxy glass circuit board.

Circuit Board Coating: Fungus resistant acrylic conformal coat.

Terminals: Compression type, wire size 14 AWG maximum.

Mounting Position: Position insensitive.

CERTIFICATION: Consult the factory for current information on the availability of agency (e.g. Canadian Standards Association, Factory Mutual, etc.) approvals.

-NCR: No Certification Required.

MOUNTING/DISPLAY: A wide variety of mounting options and enclosures are available to meet the needs of the installation. The available models are listed below. The transmitter is shipped as a complete assembly.

General Purpose Housing: Available with various mounting options listed below. Case: Self-extinguishing NYLON Type 6.6 polyamide thermoplastic UL94 V-2, color black.

-DIN: General Purpose Housing, DIN Rail-Mount - "G" & "T" rails. "G" Rail (32mm), Type EN50035; "T" Rail (35mm), Type EN50022. Refer to Drawing No. 4501-080 for outline and clearance dimensions. Shipping Weight: 1 pound (0.45Kg) packed.

-SM: General Purpose Housing, Surface-Mount. Refer to Drawing No. 4501-081 for outline and clearance dimensions. Shipping Weight: 1 pound (0.45Kg) packed.

-ST: General Purpose Housing, SNAPTRACK™. Refer to Drawing No. 4501-081 for outline and clearance dimensions. Shipping Weight: 1 pound (0.45Kg) packed. SNAPTRACK™ is a registered trademark of Reed Devices, Inc.

NEMA 4 and 12 Enclosures: Option types listed below. Refer to Drawing No. 4501-083 for outline and clearance dimensions. Transmitter is mounted within the enclosure at the factory. These enclosures can also accommodate a second Series 250T transmitter with the surface-mount option (-SM option), ordered separately. Conduit mounting holes and fittings are customer supplied.

-N4: Water-Tight Enclosure, NEMA 4. Enclosure material and finish: 0.075 and 0.060 inch thick steel with gray hammertone enamel finish inside and out. Shipping weight: 6 pounds (2.7Kg) packed.

-N12: Oil-Tight Enclosure, NEMA 12. Enclosure material and finish: 0.075 and 0.060 inch thick steel with gray hammertone enamel finish inside and out. Ship. weight: 6 pounds (2.7Kg) packed.

Explosion Proof, Water-Tight Enclosures: Option types listed below. Refer to Drawing No. 4501-084 (no display window) or Drawing No.4501-085 (with display window) for outline and clearance dimensions. Enclosure Materials: Body and cover - Copper-free aluminum (less than 0.4%), Glass lens - Heat tempered glass, Gasket - Neoprene. Finish: Corro-free epoxy powder coat, color gray. Hub size: 0.75 inch (Quantity 2). Housing meets Class I - Groups B, C, & D, Class II - Groups E, F, & G, Class III, and NEMA 4 (water-tight) requirements. Transmitter is mounted within enclosure at factory.

-XP: Explosion Proof, Water-Tight Enclosure (No Window). Shipping weight: 5 pounds (2.3Kg) packed.

-XPD1: Explosion Proof, Water-Tight Enclosure (With Window). Includes the Standard Display Option (D1). Shipping weight: 6 pounds (2.7Kg) packed.

-XPD2: Explosion Proof, Water-Tight Enclosure (With Window). Includes the Temperature Display Option (D2). Shipping weight: 6 pounds (2.7Kg) packed.

-XPD3: Explosion Proof, Water-Tight Enclosure (With Window). Includes the Engineering Units Display Option (D3). Shipping weight: 6 pounds (2.7Kg) packed.

DISPLAY OPTION: The Display is available as an option when specifying the "-XP" Housing. The linear display option assembly includes zero and span trim adjustments. Display Options include:

-xxD1: Standard Display Option (D1): The minimum and maximum input (any calibration) is represented by 00.0 and 100.0% on the display (normalized). It also represents the 4 to 20mA transmitter output, a resolution of 0.1% of span.

-xxD2: Temperature Display Option (D2): Not applicable.

-xxD3: Engineering Units Display Option (D3): The minimum and maximum display readings correspond to the minimum and maximum display readings specified for the unit by the customer.

Display Range: The minimum display reading can be from -1999 to +1999 counts, while the span range can be from 100 to 2000 counts (span counts = maximum counts minus minimum counts--Note: mentally remove the decimal point to determine the display counts). The decimal point is configured as required (such as 00.0 to 100.0%).

Display Characteristics: The 7-segment reflective Liquid Crystal Display (LCD) contains 3-1/2 digits (1999) with 1/2 inch character height. Also includes a factory programmed 3 position decimal point. Optimal view angle is 60 degrees.

No Output Burden: Provides a visual indication of the transmitter output without reducing the output compliance (the allowable load resistance range).

Display Ambient Temperature Range: Operating: 0 °C to +50°C (+32 to +122°F); Storage: -20 °C to +70°C (-4°F to +158°F).

Over-range: The three lower order digits blank for >1999 counts.

Display Accuracy: ± (0.1% of reading + 2 counts).

Display Ambient Temperature Effect: ± 0.02% per °C (± 0.012% per °F), typical.

Conversion Rate: 2.5 per second.

INSTALLATION:

The transmitter is available in a general purpose plastic housing or within a variety of protective enclosures. The transmitter should be located in an area that is protected from dust, moisture, and corrosive atmospheres. The enclosure type determines the protection afforded in a particular environment and location, make sure that this is not compromised. Maximum operating ambient temperatures should be within -13 °F to 185°F (-25 °C to 85°C) for satisfactory performance. If the unit is factory calibrated, it is ready for installation. Connect as shown in connection diagram (Drawing 4501-078). If the unit is not factory calibrated, refer to the "CALIBRATION" section.

Mounting: Mount transmitter assembly - refer to appropriate outline drawing for mounting and clearance dimensions. Determine which configuration is utilized and consult the proper mounting instructions listed below.

1. **DIN Rail Mounting:** Using suitable fastening hardware, secure the DIN rail to the designated mounting surface. A transmitter, ordered with the DIN Rail mounting option (-DIN), can be mounted to either the "T" or "G" Rail. Installation of the transmitter to the rail depends on the type of DIN rail used (see Drawing 4501-080). Units can be mounted side-by-side on 1.0-inch centers, if required.
2. **Surface Mounting:** Secure the transmitter to the designated mounting surface using two 6-32 screws. Note that the mounting bracket has screw slots to facilitate mounting. Units can be mounted side-by-side on 1.0-inch centers, if required.
3. **SNAPTRACK™ Mounting:** Secure the SNAPTRACK™ mounting channel to the designated mounting surface using suitable fastening hardware. To install the unit in the mounting channel, place the bottom end of the mounting bracket between the rails and press the top (notched end) firmly until the bracket "snaps" into place. To remove the transmitter, insert a screwdriver into the upper arm of the connector and twist to release the unit from the track and tip the unit out. Units can be mounted side-by-side on 1.0-inch centers, if required.

4. **NEMA 4 & 12 Enclosure Mounting:** Secure the enclosure assembly to the designated mounting surface using appropriate hardware. The transmitter is secured within this enclosure using two screws.

Note: It is recommended that the transmitter be removed from the enclosure during the process of drilling holes, installing fittings, and mounting the enclosure.

5. **Explosion-Proof Mounting:** Secure the enclosure assembly to the designated mounting position using appropriate hardware.

Note: It is recommended that the transmitter be removed from the enclosure during the process of mounting the enclosure. To remove the unit from the enclosure, remove two screws securing it to the bottom of the enclosure. After the enclosure is installed, install the transmitter into the enclosure. Position the unit at an angle that permits all wiring to be routed unobstructed through both ports. If the transmitter has the display option, make sure the orientation of the display allows for easy reading once installed. Secure the transmitter assembly to the enclosure using two screws.

Electrical Connections:

Regardless of the mounting configuration employed, the electrical connections are basically identical. The wire size used to connect the unit to the control system is not critical. All terminal strips can accommodate wire from 14-26 AWG. Strip back the insulation 1/4-inch on each lead before installing it into the terminal block. Input wiring may be either a shielded or unshielded twisted pair. Output wires should be twisted pair. Since common mode voltages can exist on signal wiring, adequate wire insulation should be used and proper wiring practices followed. It is recommended that output/power wiring be separated from signal wiring for safety, as well as for low noise pickup.

1. **Output/Power:** Connect DC power supply and load per connection diagram, refer to Drawing 4501-078. These transmitters operate from DC power supplies only. Power supply voltage is not critical and normally should be from 12-50V DC. The supply voltage must not exceed 75 volts even instantaneously. The power supply voltage must be adequate to furnish full-scale current to the load(s), plus transmission line drop, plus 12V DC terminal voltage to the transmitter. Variations in power supply voltage or load resistance have negligible effect on transmitter accuracy.

Ripple and Noise: Power supply ripple at 60Hz/120Hz is reduced at the load by the transmitter. The ripple at the load will be 0.01% of span per volt peak to peak of power supply ripple. The unit may have up to 0.25 percent of internally generated ripple; connect an external luf capacitor across the load to reduce this ripple to less than 0.1% if desired.

2. **Grounding:** The two-wire transmitter in the General Purpose Housing is plastic and does not require an earth ground connection. If the two-wire transmitter is mounted in a metal housing, a ground wire connection is required. Connect the ground terminal (green screw) to a suitable earth ground using suitable wire per applicable codes.

3. **Input:** Connect input per connection diagram. If unit is factory calibrated, calibration label indicates range of input.
 Note: The input circuit is electrically isolated from the output/power circuit allowing the input to operate up to 250V AC, or 354V DC, off ground on a continuous basis.

CALIBRATION:

A. TRANSMITTER:

This section provides information for unit configuration and calibration. If the unit was factory calibrated, jumpers have been placed in their proper positions and verification of the calibration can be made per the Adjustment Procedure. If the calibration of the unit is to be changed, first go to the "Shunt Block Configuration Procedure" (Platinum units only, not required for Copper units) before going to the Transmitter Adjustment Procedure.

1. Transmitter - Shunt Block Configuration Procedure (Platinum Units Only):

The Platinum RTD transmitter is quite universal in that it can be configured for any of three adjustment ranges with a single jumper. Before proceeding with the adjustment procedure, this jumper must be configured for the requirements of the application (refer to Drawing 4501-088 for details). To gain access to the Configuration Jumper, first remove the transmitter from the installation. Second, remove the circuit boards from the plastic enclosure as described in the Disassembly Procedure below. Third, configure the jumper (shunt block) as described in the Jumper Configuration procedure below. Note: calibration per the Adjustment Procedure should be performed before the circuit boards are reassembled within the plastic enclosure.

Disassembly Procedure for the 250T Plastic Housing:

The plastic housing has no screws, it "snaps" together. A flat-head screwdriver (Acromag 5021-216 or equivalent) is needed to pry the housing apart as described in the following steps.

CAUTION: Do not push the screwdriver blade into the housing more than approximately 0.1 inches while prying it apart. Handling of the printed circuit boards should only be done at a static-free workstation, otherwise, damage to the electronics could result.

1. To begin disassembly (refer to Drawing 4501-088) place the screwdriver at point A (left side of the transmitter). While pressing the blade into the seam, use a twisting motion to separate the sides slightly. Repeat this operation at point B.
2. Now that the two pieces have been partially separated, use the screw-driver blade to work the left side of the package loose by working around the transmitter and carefully prying the sides further part. Repeat this action until it is easy to remove the left side from the plastic pins holding the pieces together.
3. Repeat this operation for right side starting at points C and D.

CAUTION: If the two pc boards become separated while taking the package apart, re-align the boards making sure that the two headers (pins) and sockets at locations E and F are properly aligned and carefully push the boards back together.

Jumper Configuration (Shunt Block):

A shunt block is provided to accommodate in-field configuration changes for the Platinum unit. In case of misplacement, additional shunt blocks may be ordered from the factory. When ordering additional shunt blocks, refer to Acromag Part Number 1004-332.

1. **Zero Range:** Determine the Zero Range that is required by your application, refer to the table on Drawing 4501-088 for proper jumper (Shunt) position. Jumper positions are marked A, B, and C on the circuit board corresponding to sub-range A, B, and C.
2. **Important:** Mark the Transmitter's Configuration on the calibration label located on the enclosure.
 Example: IN: RBP1, Range B, 0-100°C

Jumper Configuration Example:

The following is the configuration for the example below, configure your module as required by your application:

Configure internal jumper as follows:

- A. RBP1 sub-range A: Zero: -50 to 50°C (Span: 25 to 100°C).
- B. Mark label with range selected.

2. Transmitter - Adjustment Procedure:

The calibration example below is used for reference only. Calibration is essentially the same for units with other inputs. Connect the transmitter as shown in the Calibration connection diagram (Drawing 4501-078). The high precision resistance decade must be adjustable over the entire input range of the unit and settable to an accuracy of 0.1% or better. The power supply voltage must be adequate to furnish full-scale current to the load, plus wire drop, plus 12V DC terminal voltage to the transmitter. The output current must be measured to 0.1% accuracy or better for proper results.

The Zero and Span adjustments are accessible on the front panel of the transmitter, see Drawing 4501-078 for their location. The screwdriver blade used to adjust the potentiometers should not be more than 0.1 inch (2.54mm) wide.

The resistance representing the temperatures at Zero and at Full-Scale are set on the resistance source to obtain the two calibration points. Use Table 2 to convert each temperature to its equivalent resistance for the RTD type used.

Table 2: Temperature vs. Resistance

Note: Pt385 (Platinum): Alpha = 0.00385 Ohms/ohm/°C.
Pt392 (Platinum): Alpha = 0.00392 Ohms/ohm/°C.

Temperature in Ohms			
Temperature °C	100 Ohm Platinum		10 Ohm Copper
	Pt385	PT392	9.035 oHMS @ 0 °C
-150	39.71	38.68	---
-100	60.25	59.57	---
-50	80.31	79.96	7.104
0	100.00	100.00	9.035
+50	119.40	119.73	10.966
+100	138.50	139.16	12.897
+150	157.31	158.29	14.828
+200	175.84	177.13	16.776
+250	194.07	195.67	18.726
+300	212.02	213.93	---
+350	229.67	231.89	---
+400	247.04	249.56	---
+450	264.11	266.94	---
+500	280.90	284.02	---
+550	297.39	300.80	---
+600	313.59	317.28	---
+650	329.51	---	---
+700	345.13	---	---
+750	360.47	---	---
+800	375.51	---	---
+850	390.26	---	---

Transmitter - Calibration Example:

MODEL :250T-RBP1-DIN-NCR

Input :0 to 100°C (100.0 to 138.5 ohms), Platinum RTD, PT-385.
Output : 4 to 20mA.

1. Set the input resistance decade to 100.0 ohms (0.0°C). Adjust the Zero (Z) pot until the output reads 4.000mA DC.
2. Set the input resistance decade to 138.5 ohms (100°C). Adjust the Span (S) pot until the output reads 20.000mA DC.
3. Repeat steps 1 and 2 above until the readings converge. The instrument is now calibrated. Several mid-point values should be checked to verify proper operation of the transmitter.
4. After the above calibration procedure is complete, install the transmitter PC Board assembly back into its case as described in the assembly procedure below.

NOTE: If the transmitter has the Display Option, install it at this time.

Assembly Procedure for the 250T Plastic Housing:

NOTE: The Model/Serial Number label is attached to the left side.

1. Refer to drawing 4501-088 and line up the left plastic side with the board and terminal assembly. Carefully but firmly press the pieces together.
2. Before installing the right side, place the mounting bracket unique to the mounting type you have) around the pins at the back the housing.
3. Line up the right side of the housing with the assembly and carefully but firmly press the pieces together.

B. DISPLAY

Display - Adjustment Procedure:

If the unit you are calibrating has a display, it is calibrated separately from the transmitter. The calibration of the transmitter must be verified FIRST (see above procedure), before verifying the calibration of the display module. Refer to Drawing 4501-078 for location of Transmitter's Zero and Span adjustments and the location of the Display's Zero and Span adjustments. NOTE: The display option is factory configured for a particular customer specified range--the Zero (DZ) and Span (DS) adjustments are trim adjustments only.

Display - Calibration Example:

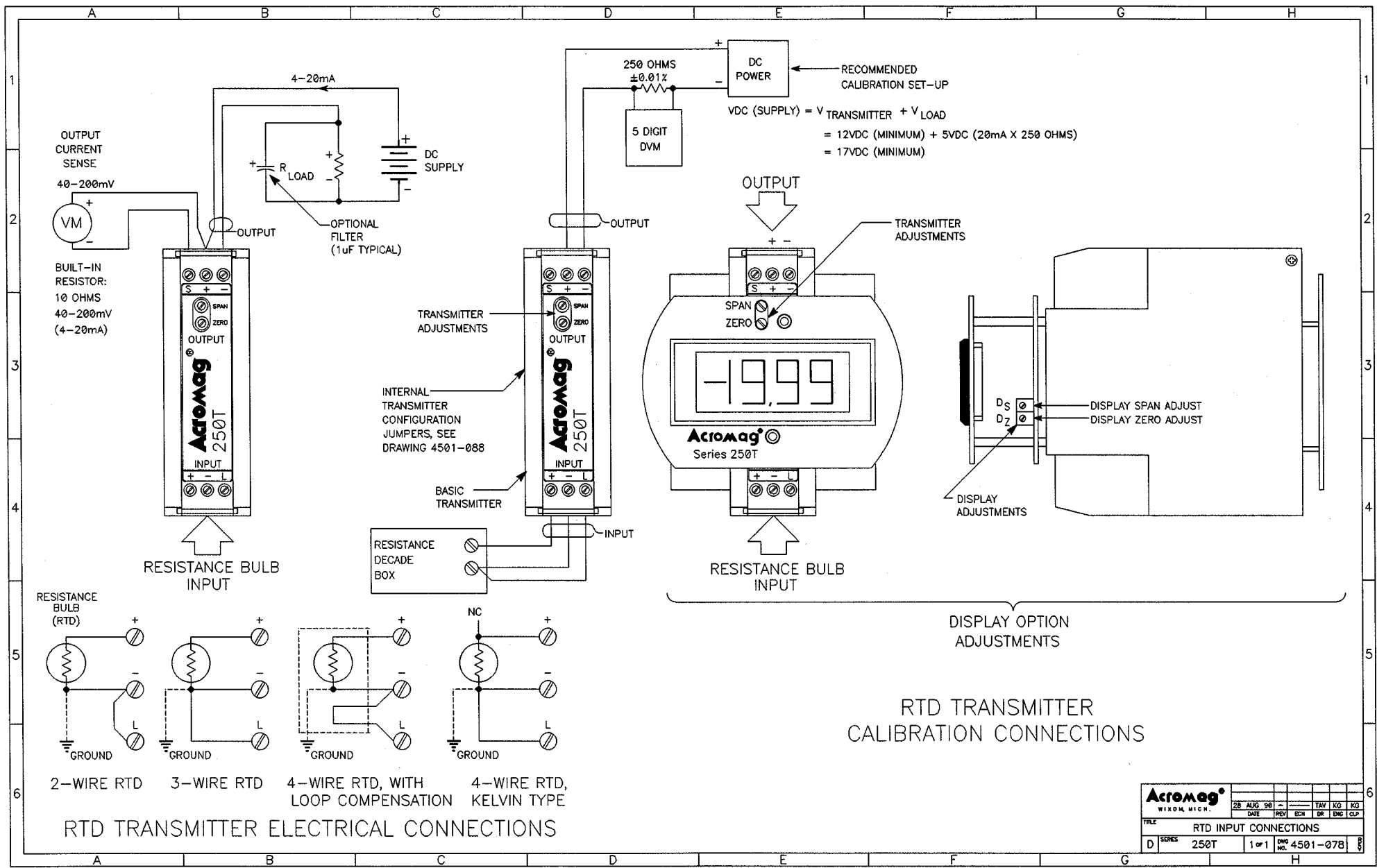
MODEL : 250T-RBP1-XPD1-NCR

Input : 0 to 100°C (100.0 to 138.5 ohms), Platinum RTD, Pt-385.
Display : 0 to 100.0°C

1. Set the input resistance decade to 100.0 ohms (Zero point of the transmitter's span). Adjust the Zero (DZ) pot of the Display module for the zero of the display range (0°C in this example).
2. Set the input resistance decade to 138.5 ohms (the full-scale point of the transmitter's span). Adjust the Span (DS) pot on the Display module for the correct full-scale display reading, 100°C in this example.
3. Repeat steps 1 and 2 above until the readings converge. The display is now calibrated.

GENERAL MAINTENANCE:

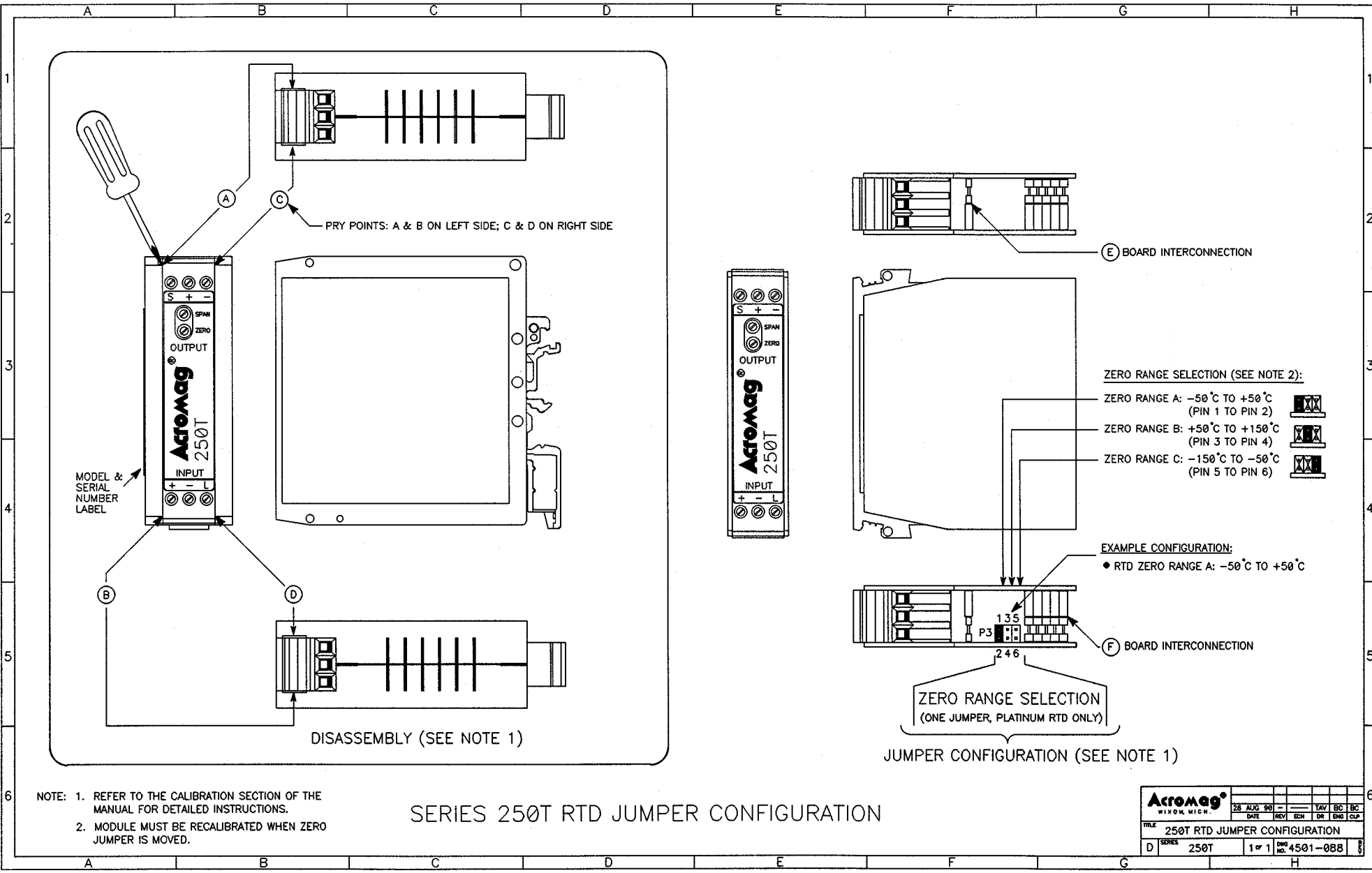
The transmitter contains solid-state components and requires no maintenance except for periodic cleaning and calibration verification. When a failure is suspected, a convenient method for identifying a faulty transmitter is to exchange it with a known good unit. It is highly recommended that a non-functioning transmitter be returned to Acromag for repair, since Acromag used tested and burned-in parts, and in some cases, parts that have been selected for characteristics beyond that specified by the manufacturer. Further, Acromag has automated test equipment that thoroughly checks the performance of each transmitter.



Acromag WIXOM, MICH.		28	AUG	90	---	TAV	KG	KG
TITLE		DATE	REV	ECN	OR	ENG	CLP	
D	SERIES	250T	1	of	1	ENG	NO.	4501-07B

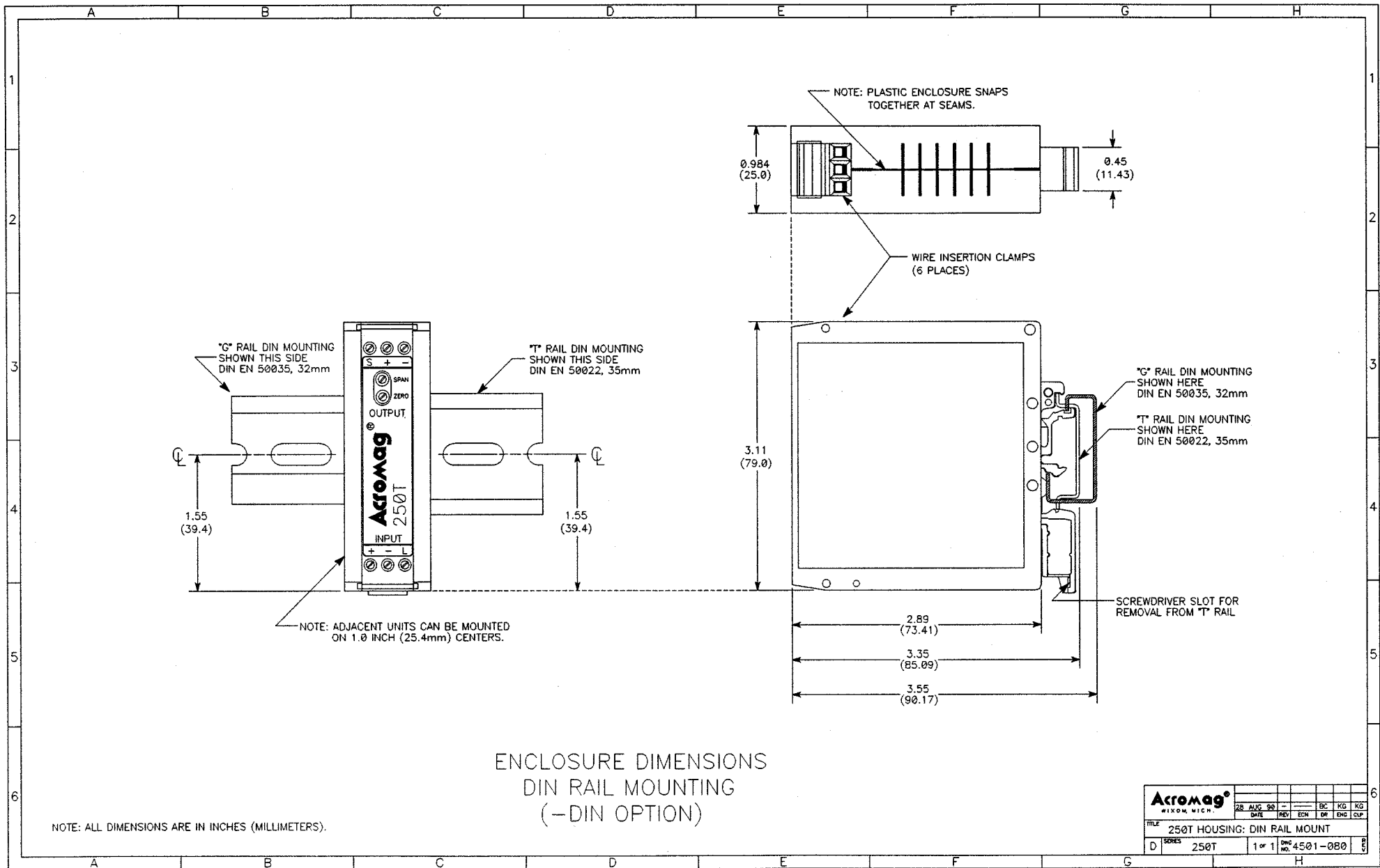
RTD TRANSMITTER ELECTRICAL CONNECTIONS

RTD TRANSMITTER CALIBRATION CONNECTIONS



SERIES 250T RTD JUMPER CONFIGURATION

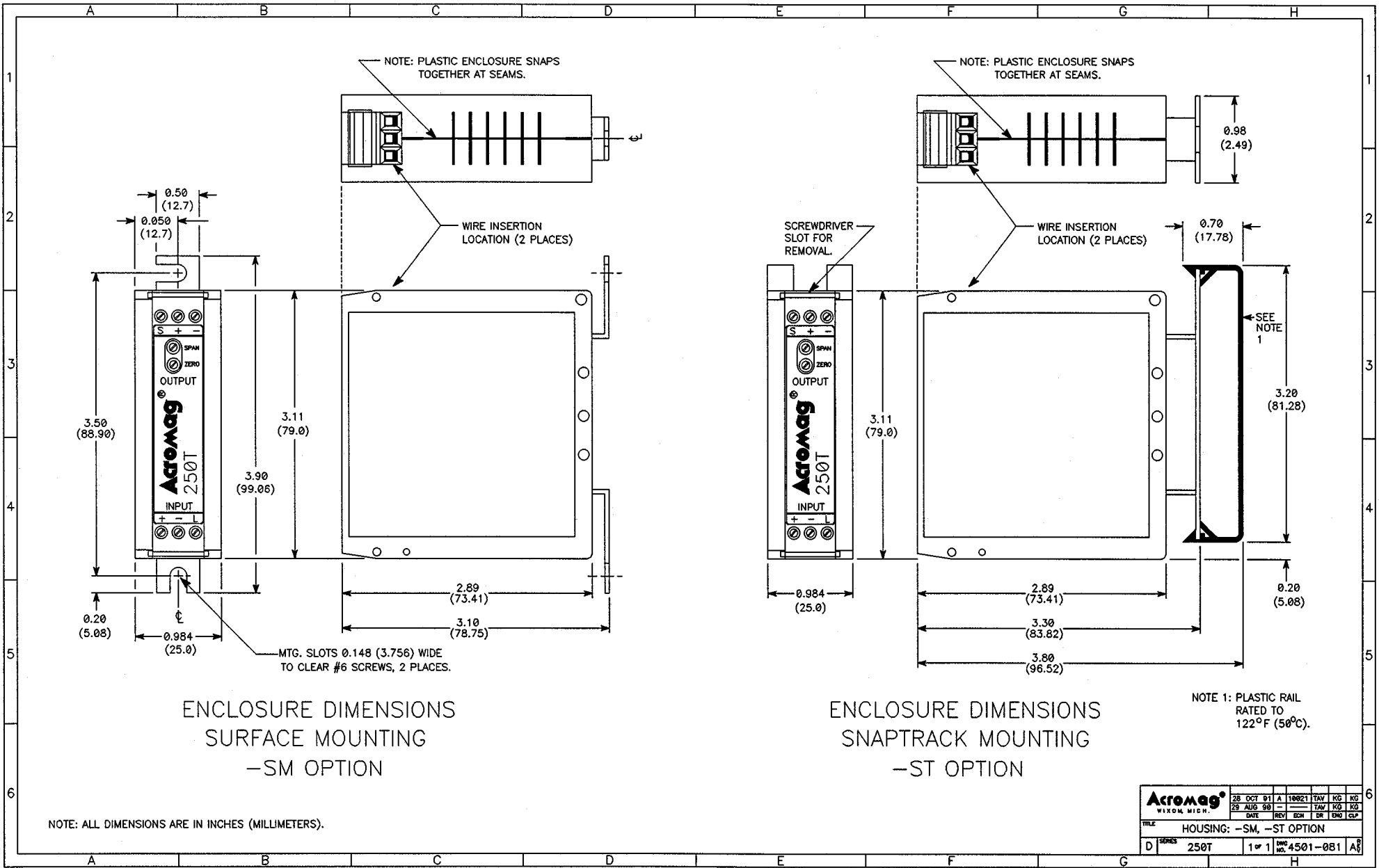
Acromag									
WINON, MICH.		28	AUG	98	-	TAV	BC	BC	
TITLE		DATE	REV	ECN	DR	ENR	CLP		
250T RTD JUMPER CONFIGURATION									
D	SERIES	250T	1	OF	1	DWG	NO.	4501-088	8



ENCLOSURE DIMENSIONS
DIN RAIL MOUNTING
(-DIN OPTION)

NOTE: ALL DIMENSIONS ARE IN INCHES (MILLIMETERS).

Acromag WIXOM, MICH.		28	AUG	93											
TITLE	DATE	REV	ECN	DR	ENG	CLP									
250T HOUSING: DIN RAIL MOUNT															
D	SERIES	250T	1	OF	1	DOC	NO.	4501-080							

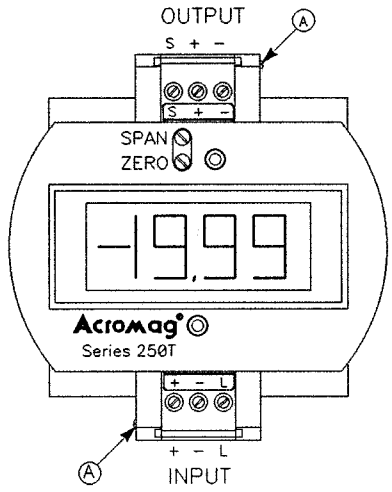
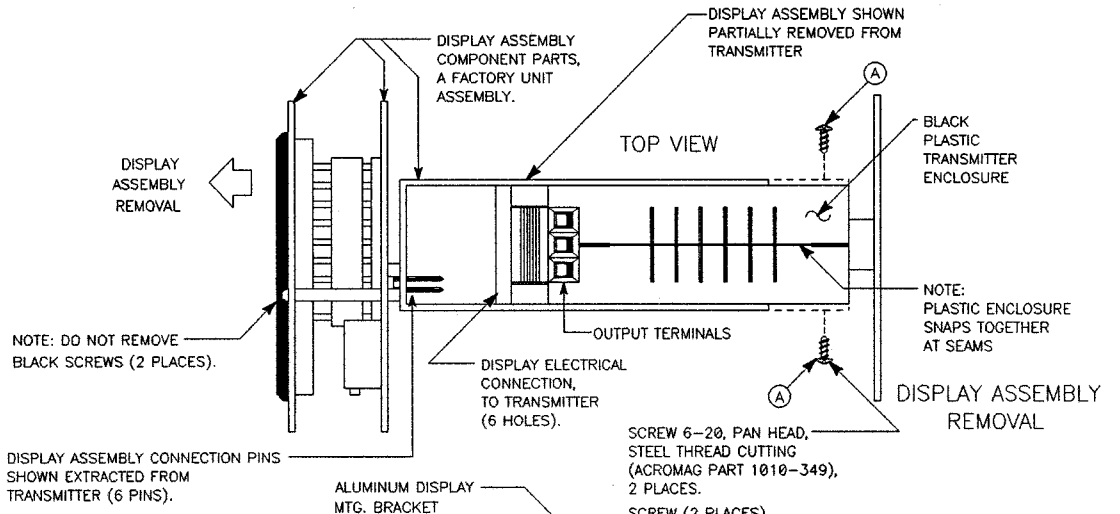


Acromag® WIXOM, MICH.		28 OCT 91	A	18021	TAV	KC	KD
TITLE		29 AUG 98			TAV	KC	KD
HOUSING: -SM, -ST OPTION		DATE	REV	EDN	DR	ENR	CLP
D	SERIES 250T	1 of 1	REV	NO. 4501-081	A8		

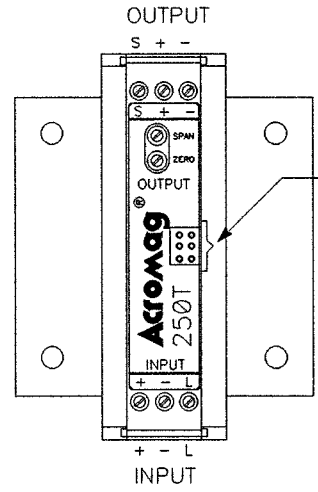
**250T TRANSMITTER ASSEMBLY
FOR -XPDx ENCLOSURES**

NOTE: TO REMOVE TRANSMITTER FROM DISPLAY ASSEMBLY PROCEED AS FOLLOWS.

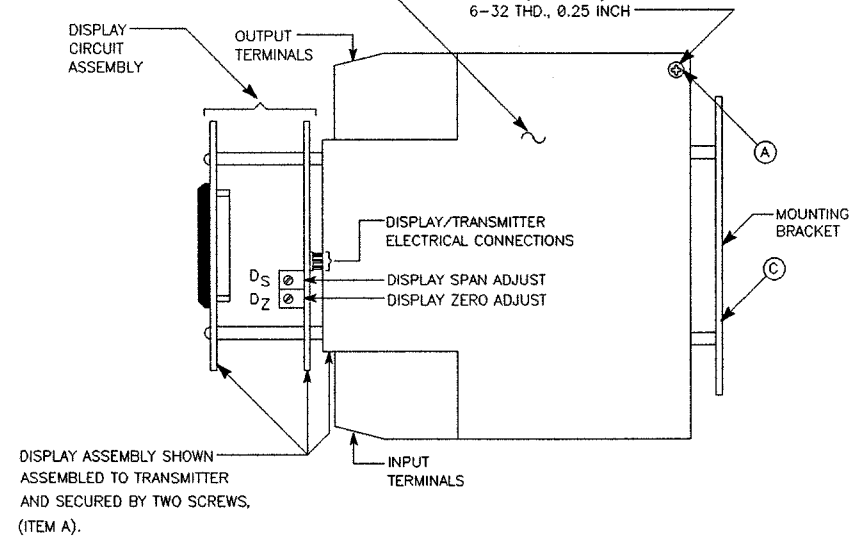
- A. REMOVE SCREWS, ITEM A, (2 PLACES).
- B. PULL DISPLAY ASSEMBLY AND DISPLAY MTG. BRACKET (B) FROM TRANSMITTER, A SIX PIN CONNECTOR WILL DISCONNECT FROM TRANSMITTER.
- C. FOR ACCESS TO INTERNAL CONFIGURATION JUMPERS TAKE PLASTIC ENCLOSURE APART AT SEAMS USING A FLAT BLADE SCREWDRIVER.
- D. MOUNTING BRACKET, ITEM C, IS HELD IN PLACE BY THE TWO HALVES OF THE PLASTIC ENCLOSURE.



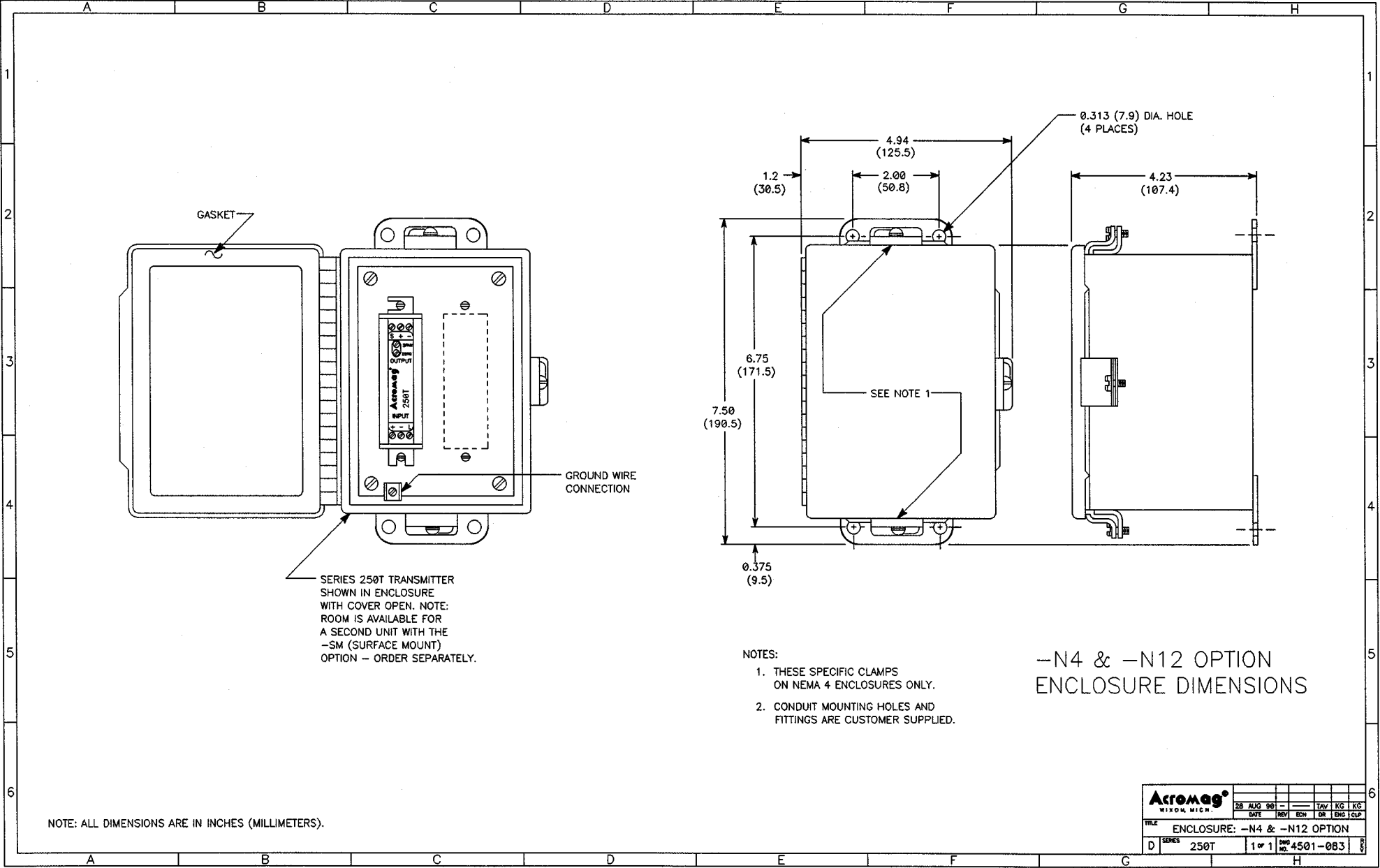
TRANSMITTER ASSEMBLY WITH DISPLAY ASSEMBLY MOUNTED



TRANSMITTER ASSEMBLY WITH DISPLAY ASSEMBLY REMOVED



Acromag WILKON MICH.		14 APR 94	A	P40607	TAV	BC	EC
		28 AUG 90			TAV	KG	KG
TITLE		DATE	REV	ECN	DR	ENC	CLP
D		SERIES	250T	1 of 1	DOC NO.	4501-082	A



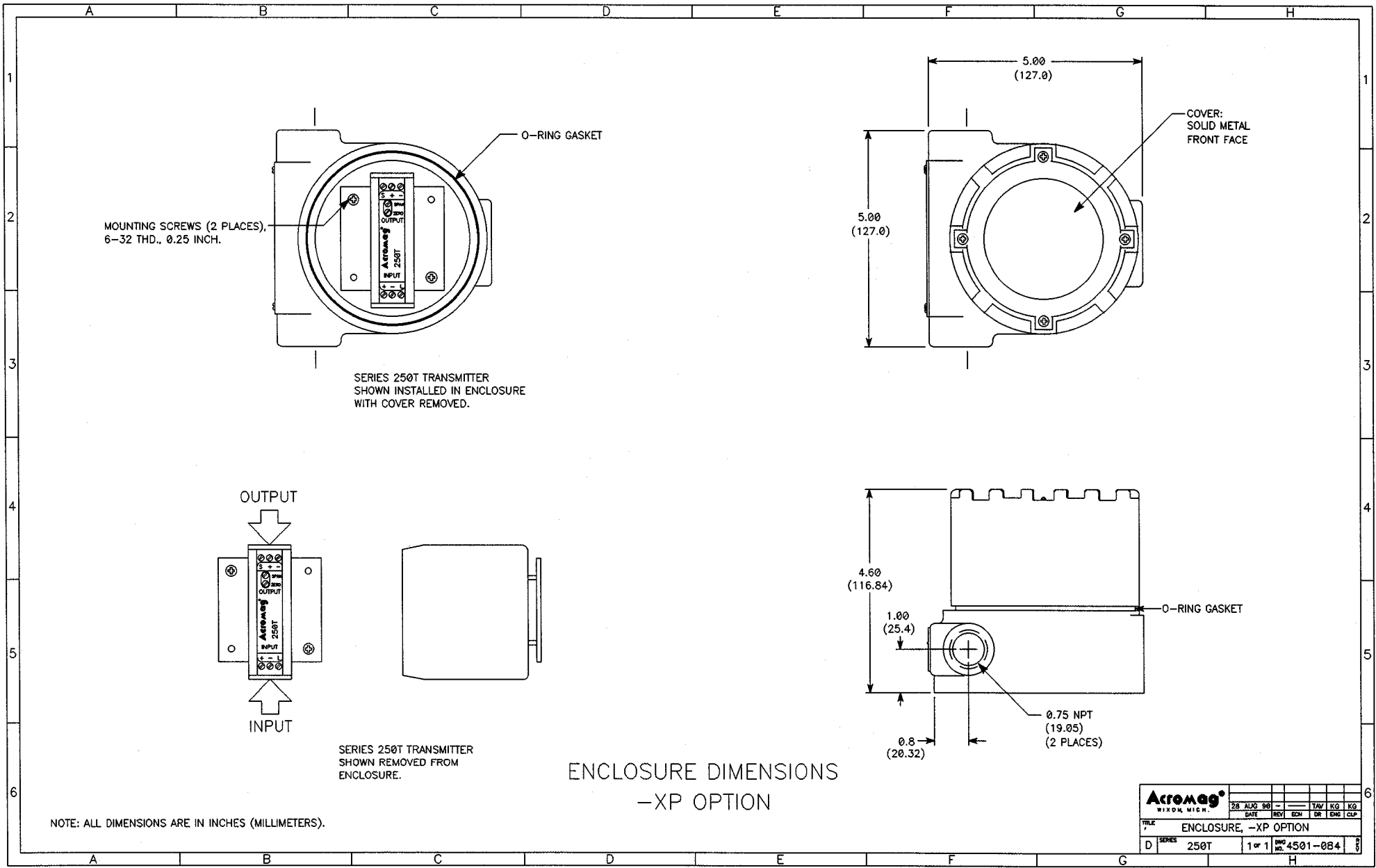
SERIES 250T TRANSMITTER SHOWN IN ENCLOSURE WITH COVER OPEN. NOTE: ROOM IS AVAILABLE FOR A SECOND UNIT WITH THE -SM (SURFACE MOUNT) OPTION - ORDER SEPARATELY.

- NOTES:
1. THESE SPECIFIC CLAMPS ON NEMA 4 ENCLOSURES ONLY.
 2. CONDUIT MOUNTING HOLES AND FITTINGS ARE CUSTOMER SUPPLIED.

-N4 & -N12 OPTION ENCLOSURE DIMENSIONS

NOTE: ALL DIMENSIONS ARE IN INCHES (MILLIMETERS).

Acromag WILSON, MICH.		28	AUG	98	-	-	TAV	KG	KG
TITLE		DATE	REV	EDN	OR	ENG	CLP		
ENCLOSURE: -N4 & -N12 OPTION									
D	SERIES	250T	1	OF	1	DWG	NO.	4501-083	8



MOUNTING SCREWS (2 PLACES),
6-32 THD., 0.25 INCH.

SERIES 250T TRANSMITTER
SHOWN INSTALLED IN ENCLOSURE
WITH COVER REMOVED.

COVER:
SOLID METAL
FRONT FACE

OUTPUT

INPUT

SERIES 250T TRANSMITTER
SHOWN REMOVED FROM
ENCLOSURE.

ENCLOSURE DIMENSIONS
-XP OPTION

4.60
(116.84)

1.00
(25.4)

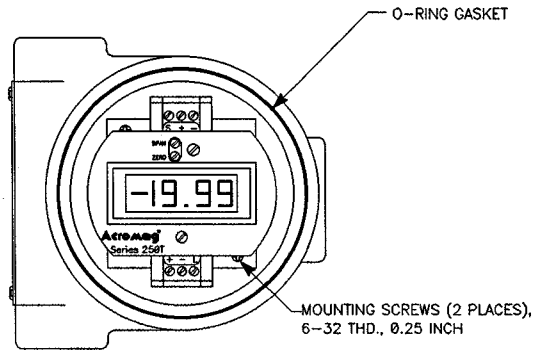
0.8
(20.32)

0.75 NPT
(19.05)
(2 PLACES)

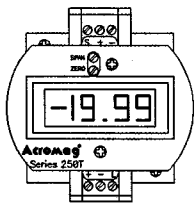
O-RING GASKET

NOTE: ALL DIMENSIONS ARE IN INCHES (MILLIMETERS).

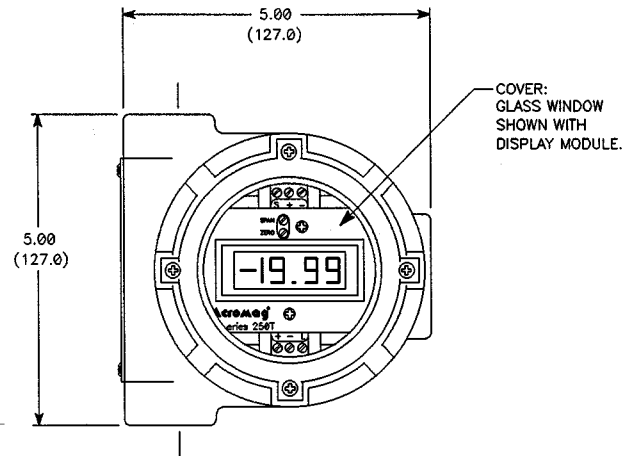
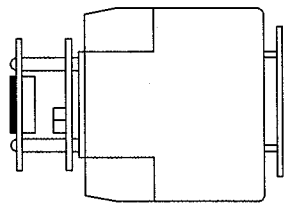
Acromag WIXOM, MICH.		28	AUG	90	-	-	TAV	KG	KG
TITLE		DATE	REV	ECN	DR	ENC	CLP		
ENCLOSURE, -XP OPTION									
D	SERIES	250T	1	of	1	ENC	NO.	4501-084	8



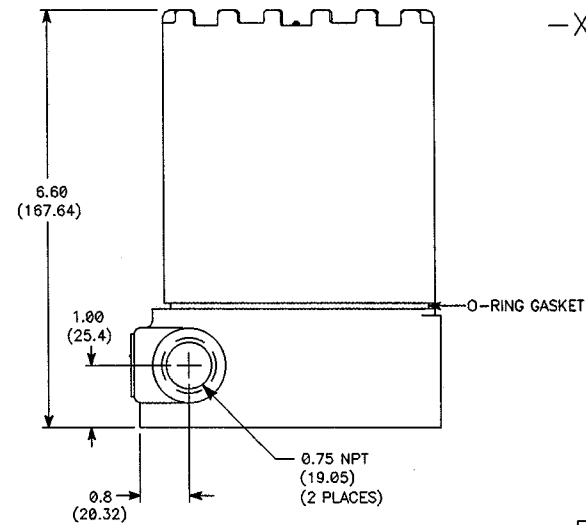
SERIES 250T TRANSMITTER WITH DISPLAY OPTION SHOWN IN ENCLOSURE WITH COVER REMOVED.



SERIES 250T TRANSMITTER WITH DISPLAY OPTION SHOWN REMOVED FROM ENCLOSURE.



ENCLOSURE DIMENSIONS -XPDx OPTION



NOTE: ALL DIMENSIONS ARE IN INCHES (MILLIMETERS).

Acromag WIXOM, MICH.		28	AUG	90	-	TAV	KG	KG
DATE	REV	ECN	DR	ENG	CLP			
TITLE ENCLOSURE, -XPDx OPTION								
D	SERIES	250T	1	OF	1	DWG NO. 4501-085		8