

RETIRED



Instructions: Series 1500
Model 150T Resistance Bulb, RTD, Two-wire Transmitters

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IMPORTANT SAFETY CONSIDERATIONS
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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 redundancy, and comprehensive failure analysis to insure a safe and satisfactory overall system design. It is agreed between the Buyer and Acromag, that this is the Buyer's responsibility.

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1-015,3
8500-026-F06H010

INSTRUCTIONS: SERIES 150T TRANSMITTERS
Resistance Bulb, RTD; 100 Ohm Platinum, 10 Ohm Copper, Two-Wire Transmitters

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:
150T-Input-Range Code-Isolation-Output-Calibration
- B. Typical Model Number 150T-RBP-P001-X-20

Series/Type	-Input	Range Code	-Isolation	-Output	-Cal*
150T	-RBP (100 ohm Plat.)	See Note below	-X	-20	(Blank) -C
	-RBC (10 ohm Cu.)	See Table 2			

*Unit can be ordered with or without factory calibration. If unit is factory calibrated to a customer's specification, the model number suffix "-C" will indicate this. The calibration information will be specified on a separate calibration label on the unit.

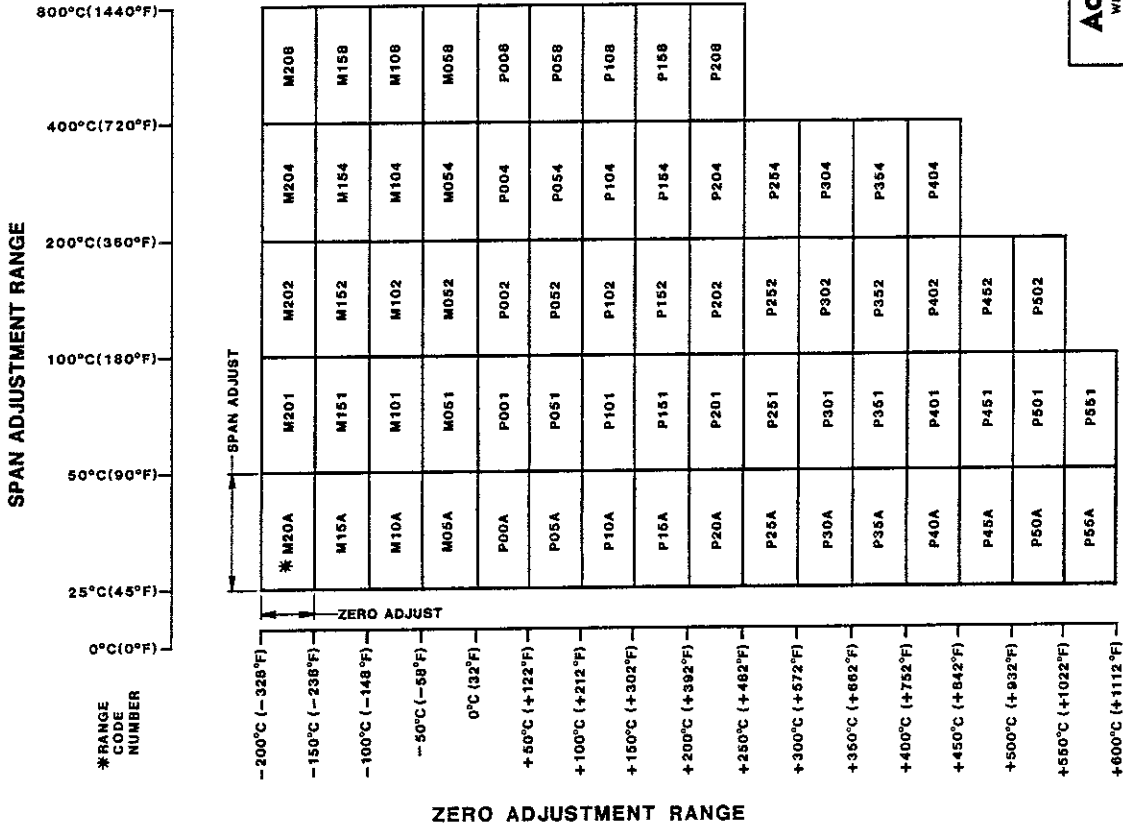
NOTE: Standard Range Codes, for 100 ohm Platinum RTD's, include all range codes specified on Drawing 4500-394. Refer to Drawing 4500-394 for Zero and Span adjustment range of a given Range Code Number.

DESCRIPTION:

The 150T Series RTD is a non-isolated two-wire transmitter which accepts either a 2, 3, or 4 wire 100 ohm Platinum Resistance Temperature Sensor (RTD) or a 2 or 3 wire Copper RTD and converts the signal to a 4-20mA process current output. The unit provides, excitation to the sensor, lead wire compensation, linearization and wide range zero and span adjustment. 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. See Drawing 4500-328 for typical installation.

NOTES:

1. THE CHART BELOW DEFINES THE ZERO AND SPAN ADJUSTMENT RANGE FOR A GIVEN CODE NUMBER.
2. STANDARD RANGE CODES ARE DEFINED FOR A MODEL TYPE IN THE SPECIFICATIONS, ALL OTHER RANGE CODES ARE CONSIDERED NON-STANDARD.
3. RANGE CODES APPLY ONLY WITHIN THE TEMPERATURE CAPABILITY OF THE SENSOR.



RTD RANGE CODE CHART

Actomag® WIXOM, MICH.		5 FEB 85 B 17366 TW	AP
		3 NOV 83 A 15930 TW	P.D.
		15 APR 83 TW	LC
DATE	REV	CO	DR
			ENG CIP
RTD RANGE CODE CHART		SHEET	REV
C		1 OF 1	4500-394 B

Table 2: -RBC, 10 Ohm Copper RTD - Standard Ranges

Range Code	Adjustment Range	
	Zero	Span
M051	-58°F to 32°F (-50°C to 0°C)	90°F to 180°F (50°C to 100°C)
M052	-58°F to 32°F (-50°C to 0°C)	180°F to 360°F (100°C to 200°C)
P001	32°F to 122°F (0°C to 50°C)	90°F to 180°F (50°C to 100°C)
P002	32°F to 122°F (0°C to 50°C)	180°F to 360°F (100°C to 200°C)

SPECIFICATIONS:

Function: This non-isolated two-wire transmitter conditions either a 100 ohm Platinum RTD input or a 10 ohm Copper RTD. The unit provides excitation, lead wire compensation, linearization and converts the signal to a 4-20mA process current output. Wide range zero and span adjustments utilize 22-turn potentiometers which are accessible on top of unit.

Model/Series: 150T-

Input:

- RBP 100 ohm (Ro) Platinum Resistance Temperature Sensor (RTD), 2, 3, or 4 wire connection. Standard calibration is based on the international R vs. T curve having an alpha of 0.00385 ohms/ohm/°C (Pt-385). Unit can also be calibrated for sensors having an alpha of 0.003925 ohms/ohm/°C (Pt-392). Maximum excitation current is 2.0mA DC. The span and zero adjustment is a function of the RTD range code. Note: Linearization is maintained for any calibration within defined range.
- RBC 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 0°C. Maximum excitation is 2.0mA DC. The span and zero adjustment range is a function of the RTD range code. Note: Copper sensor is linear between -50°C and 150°C per manufacturers tables.

Range Code: RTD range code, such as -P001, used to complete model number. See Drawing 4500-394 for Platinum RTD's and Table 2 for Copper RTD's.

Isolation:

- X No input circuit isolation, input sensor must be isolated from ground if the output circuit is grounded.

Output:

-20 4-20mA DC output.

Power: External loop power supply required, minimum 12V DC, maximum 50V DC. Under no circumstances must the DC supply ever exceed 100 volts peak instantaneously. Unit has reverse polarity protection.

Output Limits (approximate): 3.8mA DC to 30mA DC.

Load Resistance Range Equation:

$R\text{-Load (Max.)} = (V \text{ supply} - 12V) / 20mA$

At 24V supply, R-Load = 0-600 ohms

Power Supply Effect:

DC Volts: +0.001% of output span per volt DC.

60/120 Hz Ripple: +0.01% of span per volt peak to peak of power supply ripple.

Linearization: The unit linearizes the Platinum RTD signal to provide an output signal that represents the percent of span value of the measured temperature.

RTD Break Detection: Standard units shipped with upscale detection; jumper J1 out. If unit is ordered with downscale detection, J1 will be installed.

Reference Test Conditions:

-RBP Input: 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.

-RBC Input: 10 ohm, 3-wire Copper (9.035 ohms at 0°C), 0 to 100°C;
output: -20mA into 500 ohm load; 77°F (25°C); 24V DC supply.

Accuracy: Accuracy includes combined effects of transmitter repeatability, hysteresis, terminal point linearity and adjustment resolution. Does not include sensor error.

-RBP +0.1% of calibrated span or +0.1°C whichever is greater for spans up to 720°F (400°C); +0.25% of calibrated span for spans greater than 720°F (400°C).

-RBC +0.25% of calibrated span or +0.25°C whichever is greater.

Lead Wire Compensation:

-RBP 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%.

-RBC 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: -15°F to 185°F (-25°C to 85°C).

Ambient Temperature Effect: (Combined effects of zero and span over temperature).

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

-RBC Less than +0.025% of output span per °F (+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 $\pm 0.05\%$ of maximum output span.

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: Not applicable; non-isolated.

Normal Mode: 26dB at 60 Hz, 100 ohm source; 20dB at 60 Hz, 10 ohm source.

RFI Resistance: Less than $\pm 0.5\%$ of output span with RFI field strengths 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 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:

Case: Self-extinguishing polypropylene UL94 V-0, recognized by CSA, color blue.

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

Size: See mechanical outline Drawing, 4500-328.

Mounting: Designed to mount in enclosures listed under Optional Enclosures below as well as in a standard relay mounting channel (3.00 inches wide) such as Reed Devices Inc., (RDI) Model TK2-6.

Connections: Barrier-type terminal strip using No. 6 screw & clamp plates. Wire range 12 to 26 AWG.

Environmental Protection: Water resistant enclosures, PC Boards are coated with fungus resistant acrylic conformal coating. Gasket material: silicon rubber.

Mounting Position Effect: Position insensitive.

Shipping Weight: 1 pound (0.45 kg.) packed.

OPTIONAL ENCLOSURES AND MOUNTING HARDWARE (Separate Model Number):

Enclosure or mounting rail will be sent as a separate item; transmitter be installed after optional enclosure or mounting rail is installed.

NEMA 4 and 12 Enclosures: Model types listed below. Refer to Drawing 4500-348 for outline and clearance dimensions. Conduit mounting holes and fittings are customer supplied.

Model 150T-N4: NEMA 4 enclosure, water-tight. Enclosure material and finish: 0.075 and 0.060 inch thick steel with gray hammertone enamel finish inside and out. Shipping weight: 5 pounds (2.25 kg.) packed.

Model 150T-N12: NEMA 12 enclosure, oil-tight. Enclosure material and finish: 0.075 and 0.060 inch thick steel with gray hammertone enamel finish inside and out. Shipping weight: 5 pounds (2.25 kg.) packed.

Model 150T-N4-PM: Nema 4 enclosure, same as above, with 2 inch pipe mounting hardware. Shipping weight: 8 pounds (3.6 Kg) packed.

Model 150T-N12-PM: Nema 12 enclosure, same as above, with 2 inch pipe mounting hardware. Shipping weight: 8 pounds (3.6 Kg) packed.

Explosion-Proof Housings: Model types are listed below. Refer to Drawing 4500-635 for outline and clearance dimensions. Enclosure material: Aluminum alloy with Copper content 0.3 max. Housing meets Class I - Group C & D, Class II - Groups E, F & G and NEMA 4 (water-tight) requirements. O-Ring material: Nitrile rubber.

Model 150T-XJSM-WM: Explosion Proof Housing with O-Ring gasket, wall mount, 180° angle conduit openings. Shipping weight: 5 pounds (2.25 kg.) packed.

Model 150T-XJSM-PM: Same housing as above with 2 inch pipe mounting hardware. Shipping weight: 8 pounds (3.6 kg.) packed.

Mounting Rails: Model types listed below. Refer to Drawing 4500-328 for mechanical dimensions. Material: Extruded PVC, non-conductive, meets CSA requirements. Operating temperature range; -15° to 122°F (-25° to 50°C).

Model 150T-SM-24: Mounting rail 24 inches in length (customer may cut to desired length).

Model 150T-SM-3.5: Mounting rail 3.5 inches (for one transmitter).

Mounting Brackets:

Model 150T-MSM: Transmitter, metal surface mounting bracket. Material: Aluminum. Refer to Drawing 4500-328 for mounting and clearance dimensions. Shipping weight: 0.5 pound (0.25 kg.) packed.

Model 150T-DRA: Transmitter, DIN Rail Adaptor, can be field installed. Allows transmitter to mount on either the DIN EN-50035 Rail or the DIN EN50022 Rail. Refer to Drawing 4500-802 for mounting and clearance dimensions. Shipping weight: 0.5 pound (0.25 kg.) packed.

INSTALLATION:

The transmitter is packaged in a general purpose type of enclosure. Use an auxiliary enclosure to protect against unfavorable environments and

locations. Maximum operating ambient temperatures should be within -15° to 185°F (-25° to 85°C) for satisfactory performance. If your unit is factory calibrated, it is ready for installation. Connect as shown in connection diagram. If the unit is not factory calibrated, see "CALIBRATION" section.

Mounting:

1. Panel Mounting: First install rail or bracket to mounting surface, then mount the two-wire transmitter. See Drawing 4500-328 for size and clearance dimensions. Complete wiring.
2. DIN Rail Mounting: First install adaptor assembly to the two-wire transmitter. See Drawing 4500-802 for assembly detail, size and clearance dimensions.
3. Explosion-Proof Housings: First mount housing then pull wires into enclosure. See Drawing 4500-635 for size and clearance dimensions. Install two-wire transmitter into enclosure, align with mounting rail, then snap-in. Complete wiring.
4. NEMA 4 and 12 Enclosures: Enclosures ordered from the factory are shipped with the transmitter mounting hardware installed in the enclosure. Conduit mounting holes and fittings are customer supplied. See Drawing 4500-348 for enclosure mounting and clearance dimensions. Install the two-wire transmitter by placing the unit into the mounting rail provided in the enclosure.

Electrical Connections:

The wire size used to connect the unit to the control system is not critical. All terminal strips can accommodate wire from 12-26 AWG. Input wiring may be either a shielded or unshielded twisted wires. Output wires should be twisted pair. It is recommended that 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, see Drawing 4500-330. 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 100 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.

Power supply ripple at 60 Hz and 120 Hz 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.

2. Grounding: The two-wire transmitter housing is plastic thus not requiring an earth ground connection.
3. Input: Connect input per connection diagram, see label for input type. If unit is factory calibrated, calibration label indicates range of input.

CALIBRATION:

The calibration example below is used for reference only. Calibration is essentially the same for units with other inputs.

Connect module as shown in the connection diagrams, Drawing 4500-330. 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 span and zero adjustment potentiometers are accessible from the top of the unit. Remove hole caps for access.

The temperature compensation potentiometer R17 is factory adjusted and sealed. DO NOT ADJUST this potentiometer. If inadvertently adjusted, the unit will require factory alignment.

Adjustment Procedure:

Calibration Example:

Model 150T-RBP-P001-X-20

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

Range Option: P001; zero range, 0 to 50°C; span range, 50 to 100°C.

Linearization is maintained for any calibration within range.

Output: 4-20mA.

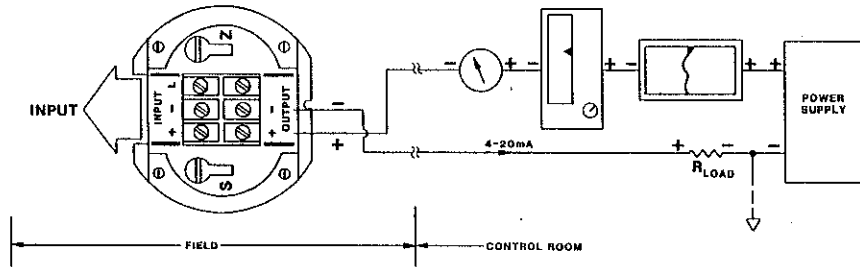
1. Set the input resistance decade to 100.0 ohms. Adjust the Zero (Z) pot. until the output reads 4.000mA DC.
2. Set the input resistance decade to 138.5 ohms. Adjust the Span (S) pot. until the output reads 20.000mA DC.
3. Repeat 1 and 2 above, until readings converge. The instrument is now calibrated.

GENERAL MAINTENANCE:

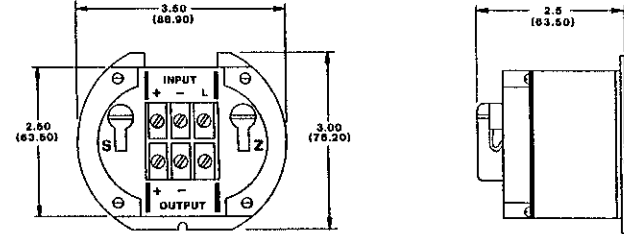
The transmitter contains solid-state components and requires no maintenance except for periodic cleaning and calibration verification. If a transmitter is not operating properly, it should be removed and given a full bench checkout. Past experience indicates that most problems are in the field wiring and associated circuits rather than in the transmitter itself. If the problem is traced to the unit itself, conventional electronic troubleshooting methods may be used.

In the event of a suspected failure exchanging the unit with a known good unit is a convenient method for identifying faulty units. Fault isolation at the component level requires proper test equipment and qualified technicians familiar with solid state analog circuitry. If these facilities are not available, the unit should be returned to the factory for repair and recalibration.

TYPICAL SERIES 150T INSTALLATION

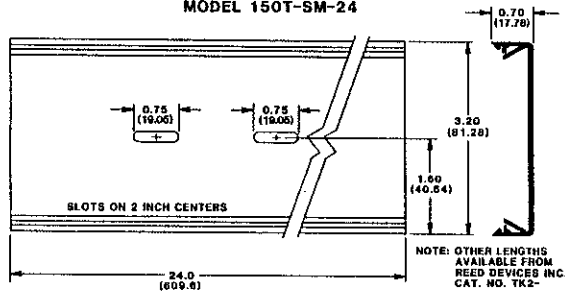


150T HOUSING DIMENSIONS

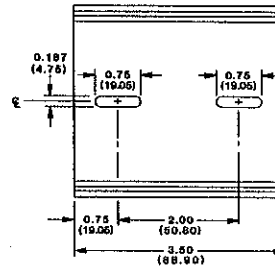


PLASTIC RAIL MOUNTING SYSTEM
RATED TO 122°F (50°C)

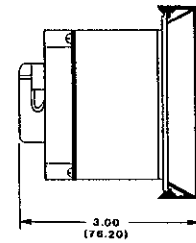
MODEL 150T-SM-24



MODEL 150T-SM-3.5

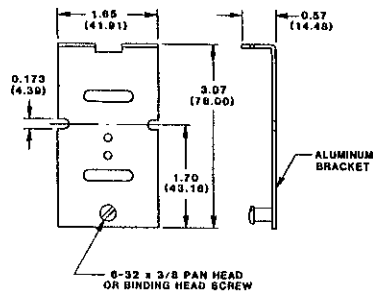


ASSEMBLED DIMENSIONS

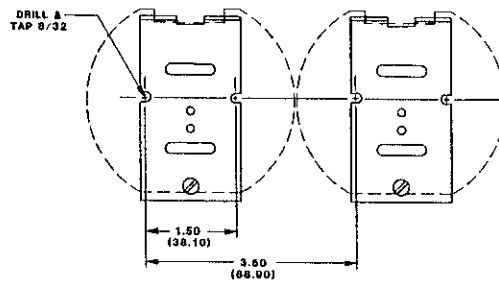


METAL BRACKET MOUNTING SYSTEM

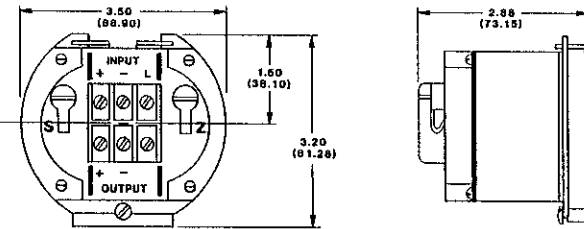
150T-MSM BRACKET DIMENSIONS



PANEL LAYOUT DIMENSIONS



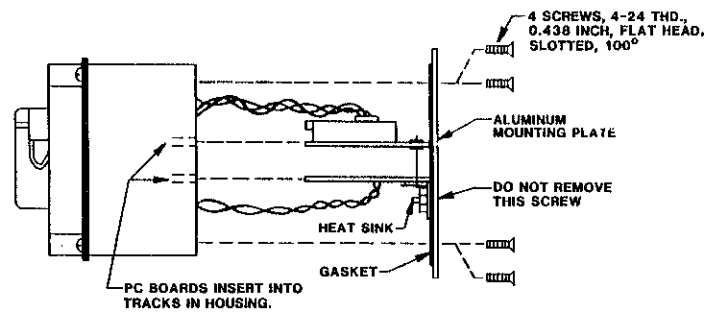
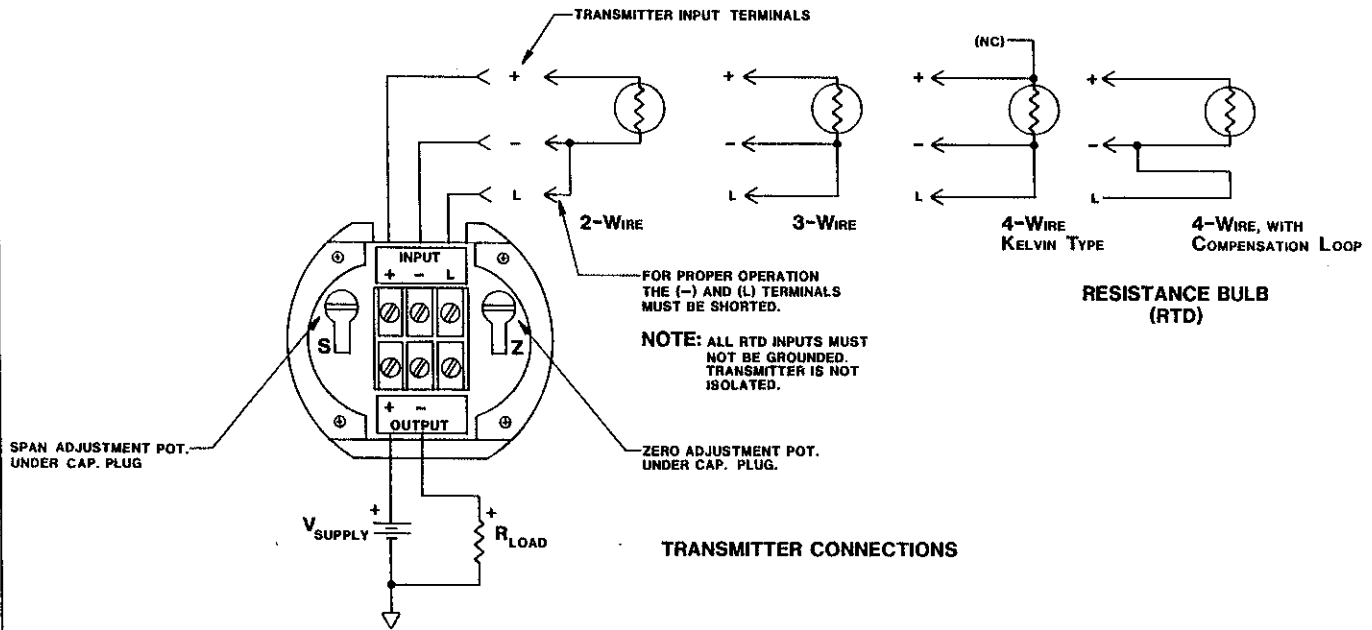
HOUSING AND BRACKET ASSEMBLY DIMENSIONS



ALL DIMENSIONS ARE IN INCHES (MILLIMETERS)*

Acromag®		WIXOM, MICH		4 SEP 88	C	8430	7/22/88	1	C
TITLE		DATE		REV	CO	BY	CHK	CLP	
D		SERIES		SHEET		DRAWING		REV	
150T SERIES		1 of 1		4500-328		C			

DATE	BY	REVISION	RECORD	CLP	ON	FILE
12/83	A	6037		RC	W	W



150T • CIRCUIT BOARD REMOVAL

TOLERANCES	ACROMAG, INC.-WIXOM, MICH.		
UNLESS OTHERWISE SPECIFIED	DECIMAL	FRACTIONAL	TITLE
			150T - RTD CONNECTIONS
C	DATE	DRAWING NUMBER	
	12-3-82	4500-330A	

REV	DESCRIPTION	DATE	BY
5.14 A	5.14 S	-	PL
5.14 B	5.14 S	-	PL
5.14 C	6.040	10/17/57	PL
5.14 D	6.942	10/17/57	PL
5.14 E	05H008	10/17/57	PL
5.14 F	05H008	10/17/57	PL

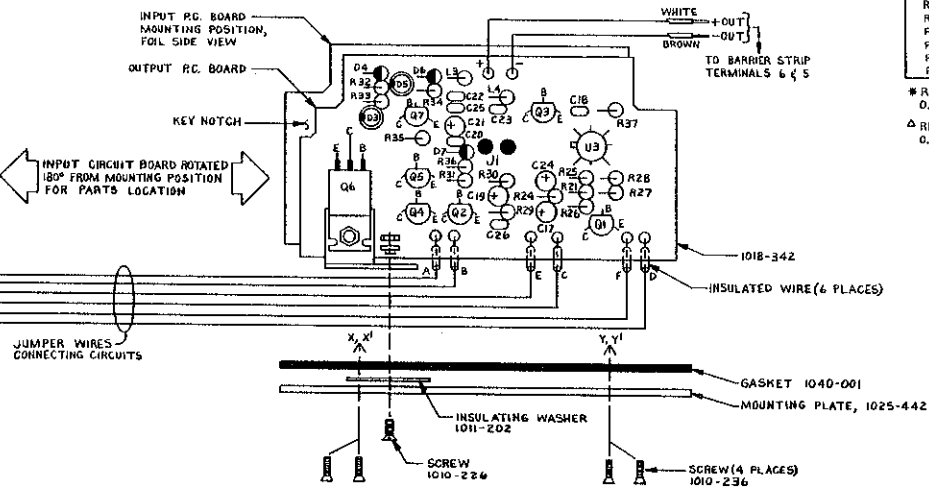
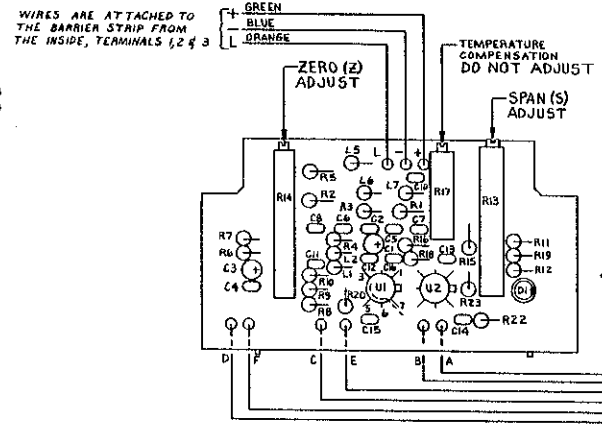
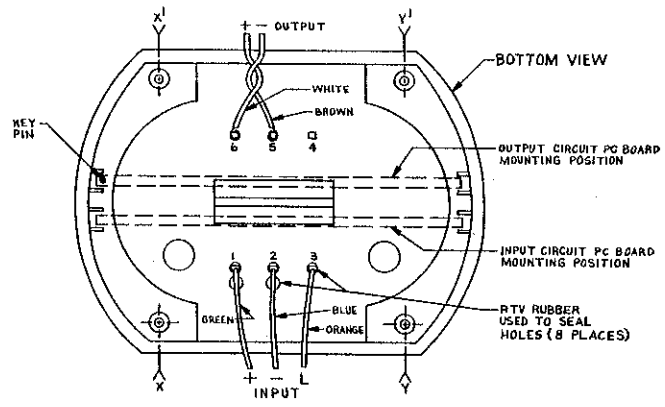
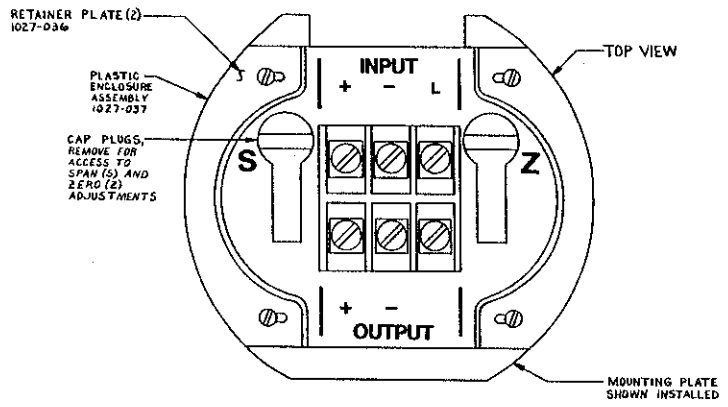


TABLE IA: INPUT RANGE RESISTORS

RANGE CODE	-RB PARTS		-RBC PARTS		-RB & -RBC PARTS
	R1	R2	R5	R2	
M10A	151n	0n	4.64K	-	SEE TABLE IB (XXXA)
M05A	0n	0n	5.36K	-	SEE TABLE IB (XXXA)
P00A	0n	20.5n	5.49K	-	SEE TABLE IB (XXXA)
M10I	23.7n	0n	4.39K	-	SEE TABLE IB (XXXI)
M05I	0n	0n	5.49K	106n	SEE TABLE IB (XXXI)
P00I	0n	16.5n	5.36K	104n	SEE TABLE IB (XXXI)
M10Z	105n	0n	3.83K	-	SEE TABLE IB (XXXZ)
M05Z	84.5n	0n	3.92K	107n	SEE TABLE IB (XXXZ)
P00Z	64.9n	0n	3.83K	105n	SEE TABLE IB (XXXZ)
M104	287n	0n	3.57K	-	SEE TABLE IB (XXX4)
M054	281n	0n	3.48K	-	SEE TABLE IB (XXX4)
P004	293n	0n	3.40K	-	SEE TABLE IB (XXX4)
M108	604n	0n	3.48K	-	SEE TABLE IB (XXX8)
M058	576n	0n	3.48K	-	SEE TABLE IB (XXX8)
P008	549n	0n	3.32K	-	SEE TABLE IB (XXX8)

▽ RESISTORS
1%, 1/8W, T9

□ RESISTORS
0.1%, 1/10W, T13

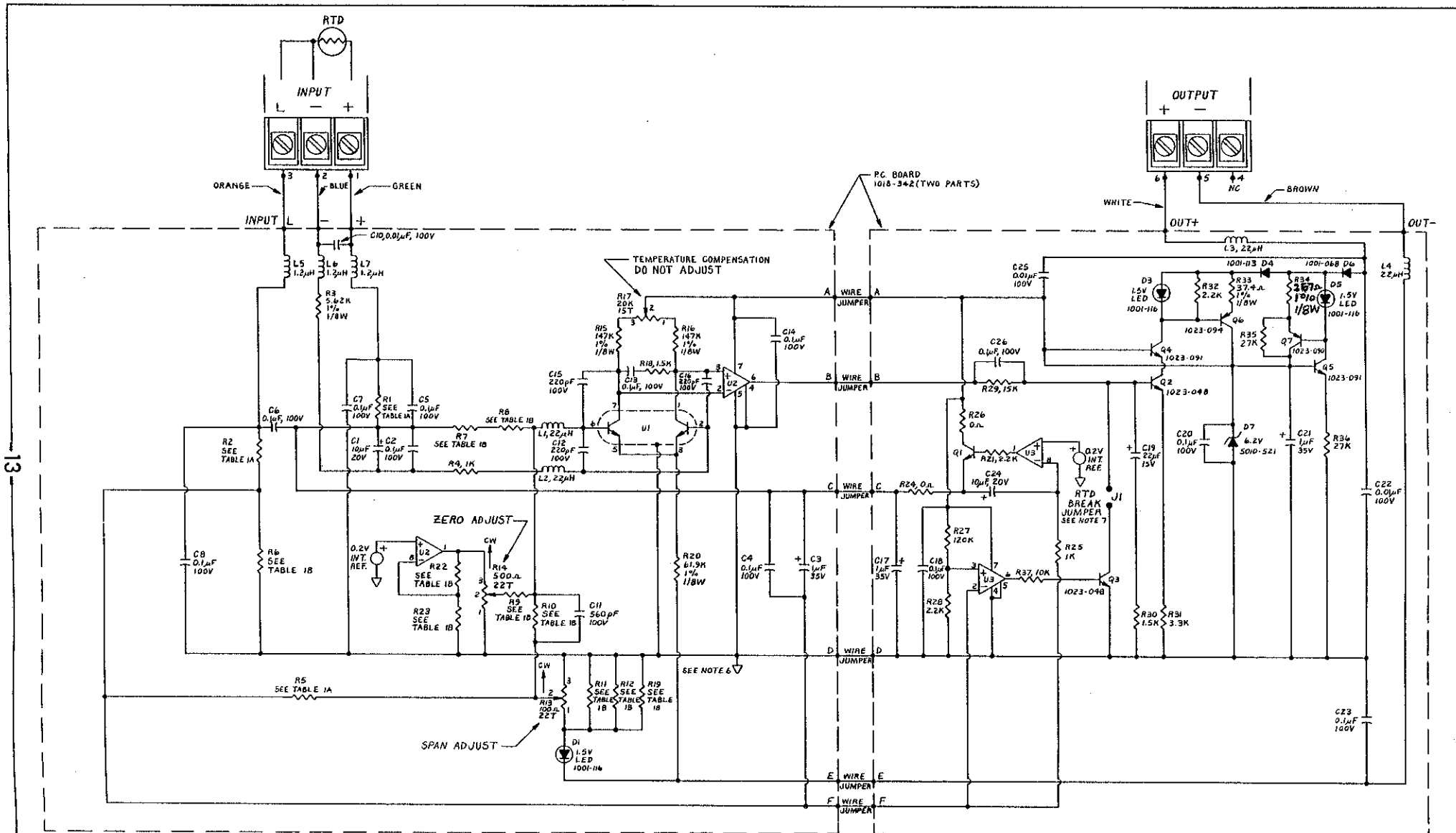
TABLE IB: INPUT RANGE RESISTORS

PART	LAST DIGIT RANGE CODE -RB					-RBC	
	XXXA	XXXI	XXX2	XXX4	XXX8	XXY1	XXY2
R6*	118n	118n	200n	402n	806n	118n	118n
R7*	154K	15.4K	15.4K	15.4K	15.4K	15.4K	15.4K
R8	34.8n	34.8n	33.4n	61.9n	18.2n	15.4n	15.4n
R9*	30.1K	30.1K	49.9K	80.6K	100K	198K	198K
R10*	31.6K	31.6K	22.3K	19.1K	18.2K	16.7K	16.7K
R11	10n	12.7n	11n	10.1n	14.3n	2n	2n
R12	15n	OPEN	OPEN	OPEN	OPEN	2n	10n
R19	OPEN	OPEN	OPEN	OPEN	OPEN	2n	10n
R22	0n	0n	0n	0n	0n	0n	0n
R23	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN

* RESISTORS
0.1%, 1/10W, T13

△ RESISTORS
0.1%, 1/8W, T9

TOLERANCES	ACROMAG, INC.-WIXOM, MICH.		
RESISTORS	SERIES 150T	SCALE	DRAWN BY PL
FRACTIONAL	150T-RBx-XXXX-X-20		
PARTIAL	2-11-83	DESIGN NUMBER	4500-350 F



NOTES:

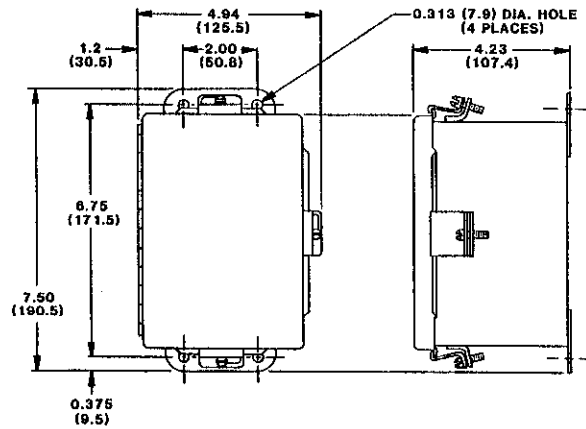
1. ALL RESISTORS ARE 10%, 1/4W UNLESS OTHERWISE SPECIFIED.
2. ALL 1% RESISTORS ARE T2 TYPE EXCEPT AS NOTED.
3. ALL SEVEN DIGIT NUMBERS ARE ACROMAG PART NUMBERS.
4. U1 IS AN ACROMAG 5010-528 (DUAL TRANSISTOR).
5. U2 & U3 ARE AN ACROMAG 1033-315 (OP-AMP).

6. COMPONENT SIDE FOIL ON BOTH BOARDS IS USED AS CIRCUIT COMMON.
7. RTD BURNOUT DETECTION
 J1 OUT (STANDARD): UPSCALE
 J1 IN : DOWNSCALE

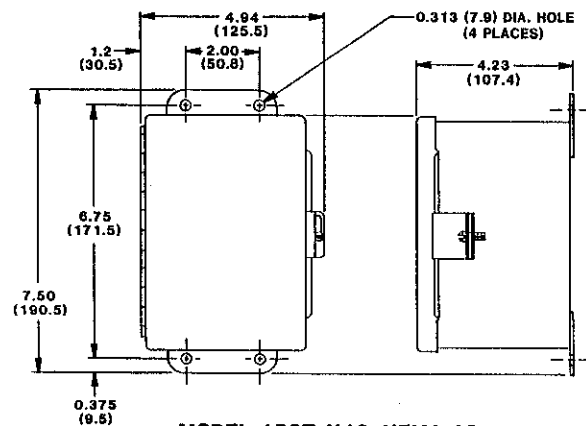
ACROMAG		WIKOM, MICH.	
4 OCT 81	D	8203	2V 12V
22 DEC 81	E	1642	2V 12V
29 AUG 81	B	5316	2V 12V
27 MAY 83	A	5345	2V 12V
11 FEB 83	-	-	2V 12V
DATE	REV	CD	DR SHG CIP

18 OCT 86	F	06H51N	NIK	EC
16 AUG 85	E	05H00B	TD	ROX
TITLE: 150T-RBx-XXXX-X-20				
SHEET: 2 OF 2				
DRAWING: 4500-350				

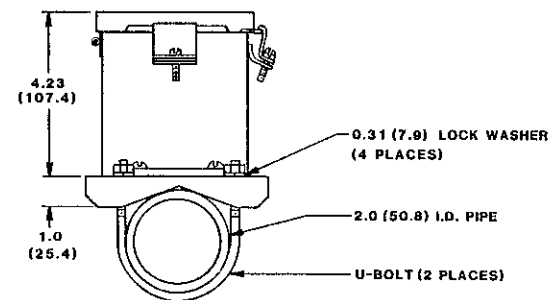
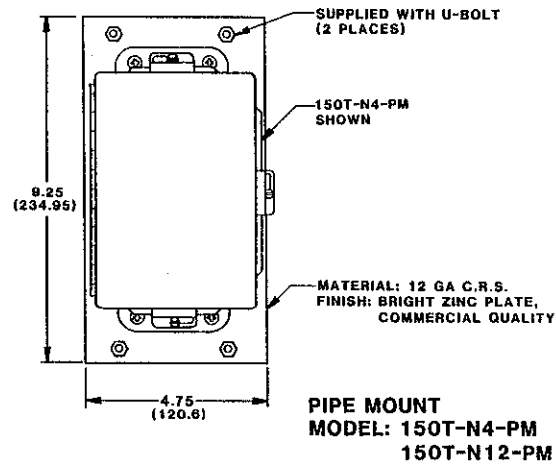
DATE	BY	REVISION	RECORD	ELP	DR	CR
3/8	A	6451				



MODEL: 150T-N4; NEMA 4

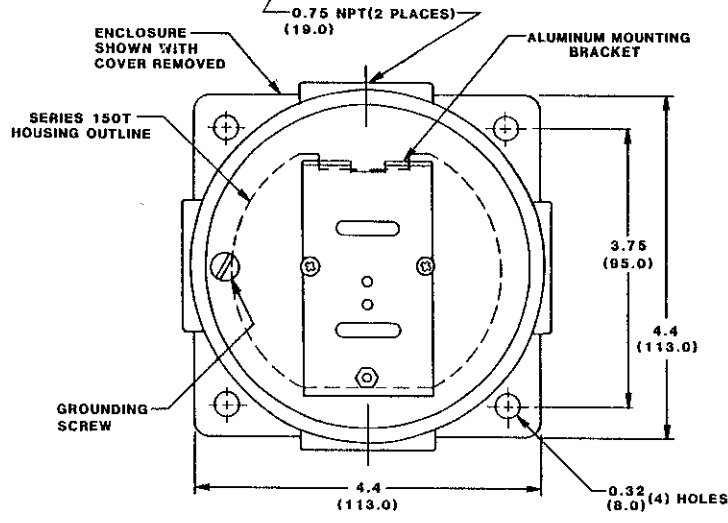
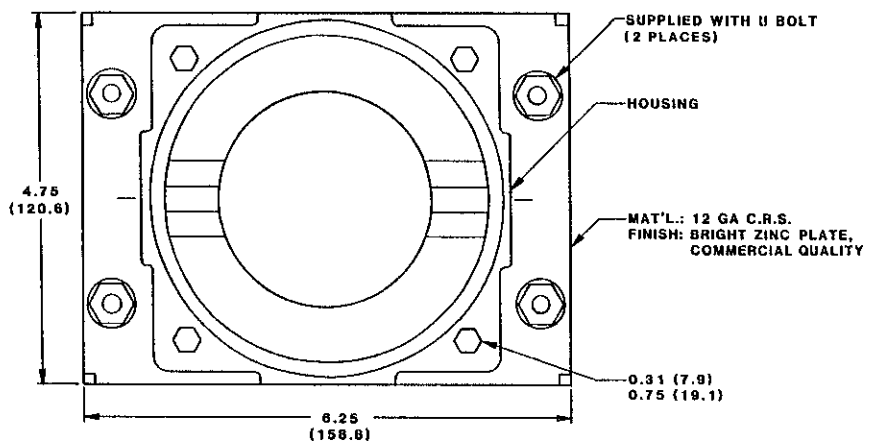
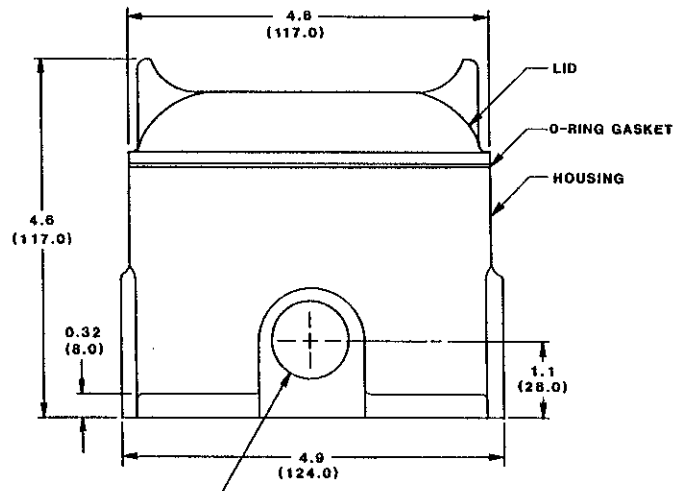


MODEL: 150T-N12; NEMA 12

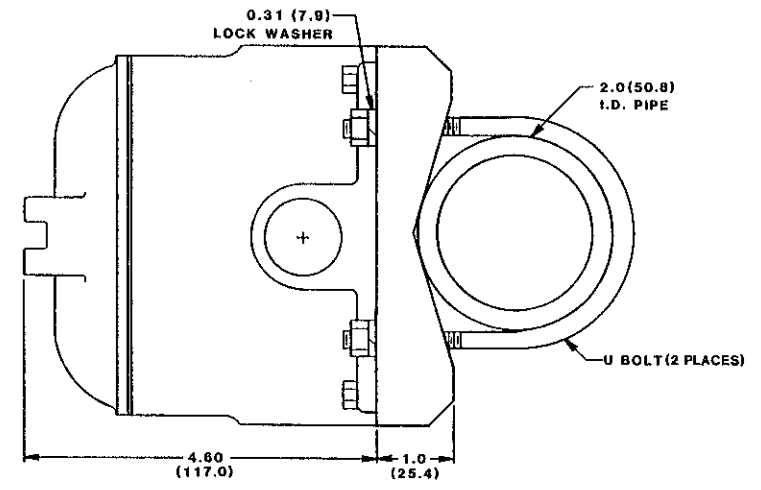


DIMENSIONS ARE IN INCHES (MILLIMETERS).

TOLERANCES (EXCEPT AS NOTED):	ACROMAG, INC.-WIXOM, MICH.		
DECIMAL	SCALE	DRAWN BY	PA
FRACTIONAL	TITLE	APPROVED BY	[Signature]
ANGULAR	DATE	DRAWING NUMBER	4500-348A
C	2-16-84		



MODEL: 150T-XJSM-WM
EXPLOSION PROOF HOUSING
WALL MOUNT



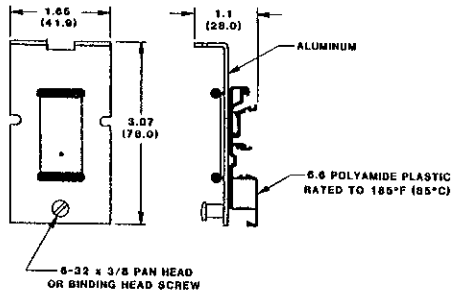
MODEL: 150T-XJSM-PM
EXPLOSION PROOF HOUSING
PIPE MOUNT

DIMENSIONS ARE IN INCHES (MILLIMETERS).

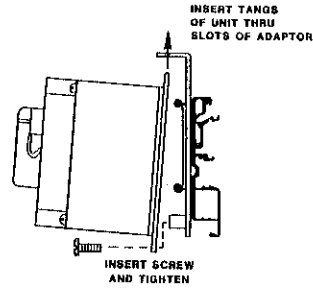
Acromag WIXOM, MICH.		5 SEP 86	B	8433	DMH	14	1.0
		15 MAR 84	A	6452	TW	15	1.0
		1 FEB 84					
		DATE	REV	CD	DR	ENG	CLP
TITLE 150T-XJS ENCLOSURE ASSEMBLIES							
SHEET C	SERIES DWS	SHEET 1 of 1		DRAWING 4500-635		REV B	

3400-025

150T-DRA ADAPTOR DIMENSIONS



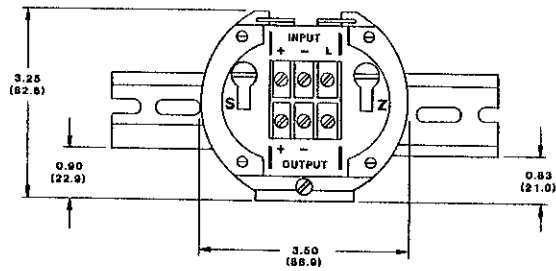
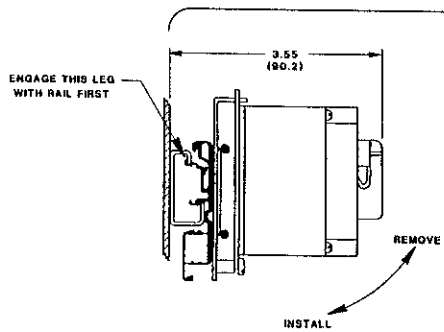
ASSEMBLY



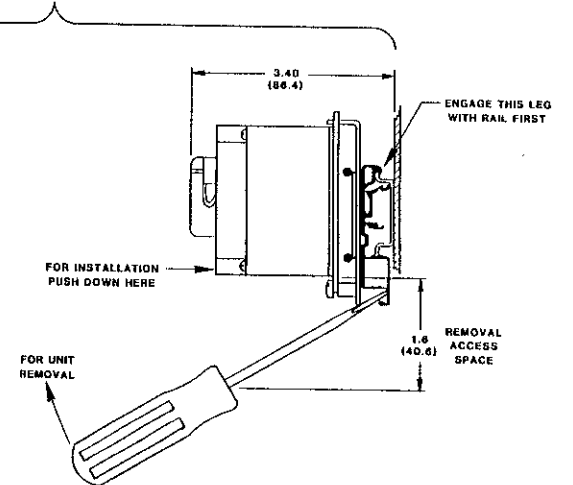
ALL DIMENSIONS ARE IN INCHES (MILLIMETERS)*

D.I.N. RAIL MOUNTS

DIN EN 50035 RAIL MOUNTING



DIN EN 50022 RAIL MOUNTING



Acromag [®]							
WINDOM, MICH		25 AUG 88	---	---	---	---	---
FILE	DATE	REV	CO	DR	ENG	CLIP	REV
MODEL 150T-DRA, D.I.N. RAIL ADAPTOR		SHEET		DRAWING		REV	
REV	REASON	150T SERIES		1 of 1		4500-802	