User's Manual: Series 450T
Model 450T Frequency Input, AC-Powered Transmitters

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List of Drawings

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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 satisfactory overall system design. It is agreed between the Buyer and Acromag, that this is the Buyer's responsibility.

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INSTRUCTIONS: SERIES 450T

Frequency Input, AC-Powered 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: 450T-Input-Output-Power-Mtg-Certif.-Calibration
B. Typical Model Number: 450T-FQ1-Y-1-DIN-NCR-C

Series	-Input	-Output	-Power	-Mounting	-Cert.	-Cal.*
450T	-FQ1	-Y _VO -V5	-1 -2	-DIN	_NCR -Approval**	(Blank) -C

Notes (Table 1):

* The FQ1 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 information will be included on a separate calibration label on the unit.

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

DESCRIPTION:

The Series 450T is an AC-powered, three-way isolated, DIN-rail mounted transmitter family. This model accepts a periodic or pulse waveform signal, such as those originating from tachometers, magnetic transducers, and turbine flow meters, and converts this signal to a process current or voltage output directly proportional to the signal frequency. Other 450T transmitters are available to condition voltage, current, thermocouple, and RTD inputs. In addition to three-way isolation, this model also provides wide-range zero and span adjustments. Series 450T transmitters are available for 115V, or 230V AC power (for DC power applications, see the Acromag Series 350T transmitter family). The versatile DIN rail mount can accommodate a variety of mounting applications. See Drawing 4501-356 for a simplified schematic.

The input circuit is direct-coupled and can accept signal amplitudes from +/-25mV to 150V RMS. Any one of ten input frequency ranges, from 25Hz to 25600Hz spans, can be selected by changing one jumper (shunt block) on a digital divider network. Additional features of this unit include the following. A quartz crystal time-base design is used for improved temperature performance. Three field-selectable filter network time constants are provided to optimize the output response-time and ripple characteristics. Two field-selectable input threshold circuits are provided; one for bipolar (zero crossing) signals, and one for unipolar (non-zero crossing) signals. In the bipolar mode, the transmitter has a zero volt threshold and fixed hysteresis. If configured in the unipolar mode, the module has a 1.5 volt threshold and fixed hysteresis. In addition, the unipolar mode provides an excitation or pull-up circuit. This excitation allows interfacing to passive frequency inputs, such as with "dry-rated" contact closures and open collector transistor switches.

The Series 450T is another member of the Acromag flat-pack, DIN-rail mounted instrument family. It provides another functional component for a modular solution to varied field applications. The Series 450T complements the Acromag Series 350T DC-powered transmitters, providing the same input conditioning for AC-powered applications. The modular approach of this design and companion Acromag flat-pack modules allows additional transmitters, input modules, isolators, and alarms to be easily integrated, as required.

The 450T transmitter is EMI and RFI protected, operates over a wide temperature range, and features excellent temperature coefficients which minimize the effects from harsh plant environments. In addition, the safe, compact, rugged, and reliable design of this transmitter allow it to be used in control room or field locations.

Input wiring is inserted in the bottom of the unit, while output and power wiring is inserted at 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 AC-powered transmitter accepts a frequency, periodic, or pulse waveform input signal, and converts the input signal to a process current or voltage output. The unit provides three-way isolation between the input, output, and power circuits. Wide-range zero and span adjustments utilize 22-turn potentiometers accessible on front of the unit. Optional 115V AC or 230V AC power may be selected. The transmitter is DIN-rail mounted.

MODEL/SERIES: 450T- (Color coded with a white label)

INPUT: Frequency: direct-coupled input for span ranges from 25Hz to 25600Hz; input impedance is 50K ohms, typical. Input span and zero ranges are adjustable as specified below, except for special ranges which are factory calibrated per customer specifications.

-FQ1: Frequency: Span - 25Hz to 25,600Hz; Zero - 0 to 20% of Span. The input span is continuously adjustable over the preselected input range. The minimum input frequency for any range can be from 0 to 20% of the full- scale frequency.

FQ: Range A: Span: 25 to 50 Hz
FQ: Range B: Span: 50 to 100 Hz
FQ: Range C: Span: 100 to 200 Hz
FQ: Range D: Span: 200 to 400 Hz
FQ: Range E: Span: 400 to 800 Hz
FQ: Range F: Span: 800 to 1,600 Hz
FQ: Range G: Span: 1,600 to 3,200 Hz
FQ: Range H: Span: 3,200 to 6,400 Hz
FQ: Range I: Span: 6,400 to 12,800 Hz
FQ: Range J: Span: 12,800 to 25,600 Hz

Isolation: Three-way isolation is provided between input, output and power for common mode voltages 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). This complies with test requirements outlined in ANSI/ISA-S82.01-1988 for the voltage rating specified.

Input Circuit Open Response: Down-scale drive standard.

Bipolar Input Configuration: User configured by internal jumpers (shunt blocks): Threshold: 0.0V DC; Input Amplitude: +/-25mV to 150V RMS; Hysteresis: +/-25mV fixed, nominal; The switching points are -25mV and +25mV (nominal), or 0.0V +/-0.025V.

Unipolar Input Configuration: User configured by internal shunt jumper.

- Threshold: 1.5V DC. Attenuator resistors may be installed on the PC board to further reduce sensitivity by raising the threshold level--consult the factory.

- Hysteresis: +/-25mV fixed, nominal. The switching points are +1.525V and +1.475V (nominal), or +1.5V +/-0.025V.

- Input Amplitude: 0 to 2V to 150V RMS.

- Unipolar Excitation Supply: In the unipolar mode, the (L) terminal provides an excitation supply for contact closure or open collector transistor switching circuits. Nominal excitation/pull-up is 5V DC through 15K ohms (0.333mA, nominal). NOTE: If input leads are long, capacitance developed across the input leads could limit use to lower frequencies.

Minimum Pulse Width: The minimum pulse width required is 10uS.

OUTPUT: Process Current or Voltage output. Voltage outputs are designed to provide true voltage output, with zero volts included, and to be stable with capacitive loads.

-Y : 4 to 20mA DC, R-Load = 0 to 600 ohms
-V0: 0 to 10V DC into 10,000 ohms or greater
-V5: 0 to 5V DC into 5,000 ohms or greater

NOTE: For process current output (-Y units), the loop current may be monitored by placing a DVM between the Output (S) and Output (+) terminal. This connection measures the current drop through a precision 10 ohm resistor placed in series with the Output (+) terminal (+/-0.1%, 25ppm). A DVM measurement of 40mV corresponds to 4mA, and 200mV corresponds to 20mA of loop current. For voltage outputs (-Vx units), the Output (S) terminal is electrically equivalent to the Output (+) terminal.

Output Limiting: Voltage units (-Vx): 120% of full scale output, nominal.
Current unit (-Y): 125% of full-scale output (24mA), nominal.

Output Ripple: Less than +/-0.1% of the maximum output span.

POWER: -1: 115V AC +/-10%, 50 to 60Hz, 0.05A (-Y units), 0.020A (-Vx units).

-2: 230V AC +/-10%, 50 to 60Hz, 0.025A (-Y units), 0.010A (-Vx units).

Power Supply Effect: Less than +/-0.01% of output span for rated supply variations.

Reference Test Conditions: Input: 0-12800Hz, 100 ohm resistive source; Output (-Y units): 4-20mA DC (500 Ohm load); Output (-Vx units): 0-10V DC into 10K ohms or greater; Ambient 77^{o}F (25^{o}C); +115V AC supply.

Accuracy: Better than +/-0.1% of calibrated span. The error includes the combined effects of transmitter repeatability, hysteresis, terminal point linearity and adjustment resolution. Does not include sensor error.

Ambient Temperature Range: -13^{o}F to 185^{o}F (-25^{o}C to 85^{o}C).

Ambient Temperature Effect (Combined effects of zero/span over temperature): Less than +/-0.01 % of output span per ^{o}F (+/-0.018% per ^{o}C) over ambient temperature range for reference test conditions.

Bandwidth: -3dB at 25600 Hz, typical.

Response Time: Shunt block selection of the filter networks on the PC Board will result in different response times. Standard unit is shipped configured for a 0.4 second response filter. To maintain low output ripple for each frequency range, use the recommended filter. For a step change in the input frequency, the nominal response time for a 98% change of the output span is specified below. Install shunt blocks per Table below (refer to Drawing 4501-357).

Table: Frequency Range/Response Time Selection.

Response Time (98%)	Frequency Span Range	Filter Jumpers Jumper Block: J1 (shunt)	
8.0 sec.	A thru J	Pins 1 & 3	Pins 2 & 4
5.0 sec.	C thru J	Pins 3 & 5	Pins 2 & 4
0.4 sec.	D thru J	Pins 3 & 5	Pins 4 & 6

Noise Rejection:

Common Mode: 115dB, 60 Hz, 100 ohm unbalance, typical.
Normal Mode: Not applicable.

RFI Resistance: Less than +/-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 +/-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:

Printed Circuit Boards: Military grade FR-4 epoxy glass circuit board.
Terminals: Compression type, wire size 14 AWG maximum.
Case: Self-extinguishing NYLON Type 6.6 polyamide thermoplastic UL94 V-2, color black.
General Purpose, NEMA Type 1 enclosure.
Printed Circuit Board Coating: Fungus resistant acrylic conformal coat.
Mounting Position: Position insensitive.

MOUNTING:

-DIN: General Purpose Housing, DIN-Rail Mount - "G" & "T" rails. "G" Rail (32mm), Type EN50035; "T" Rail (35mm), Type EN50022. Refer to Drawing 4501-348 for outline and clearance dimensions.
Shipping Weight: 1 pound (0.45 Kg) packed.

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.

INSTALLATION:

The transmitter is packaged in a general purpose enclosure. Use an auxiliary enclosure to protect against unfavorable environments and locations. Maximum operating ambient temperatures should be within -13^{o}F to 185^{o}F (-25^{o}C to 85^{o}C) for satisfactory performance. Factory calibrated units are ready for installation. Connect as shown in the connection diagram of Drawing 4501-356. If the unit is not factory calibrated, refer to the "CALIBRATION" section.

Mounting: Mount transmitter assembly - refer to Drawing 4501-348 for mounting and clearance dimensions.

DIN Rail Mounting: Using suitable fastening hardware, secure the DIN rail to the designated mounting surface. A transmitter 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. Units can be mounted side-by-side on 1.6 inch centers, if required.

"T" Rail (35mm), Type EN50022: To attach a transmitter to this style of DIN rail, angle the top of the unit towards the rail and locate the top groove of the adapter over the upper lip of the rail. Firmly push the unit towards the rail until it snaps solidly into place. To remove a transmitter, insert a screwdriver into the lower arm of the connector and pull downward while applying outward pressure to the bottom of the unit.

"G" Rail (32mm), Type EN50035: To attach a transmitter to this style of DIN rail, angle the unit so that the upper groove of the adapter hooks under the top lip of the rail. Firmly push the unit towards the rail until it snaps solidly into place. To remove a transmitter, pull the lower part of the unit outward until it releases from the rail and lift the unit from the rail.

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. **Power (Refer to Drawing 4501-356 for power connections):** The label on the unit specifies the AC power requirements. Connect AC power as shown in the connection diagram (Drawing 4501-356). Use suitable wire per applicable codes. For 115V AC units, connect the AC HOT power lead to the (L1) terminal and the AC NEUTRAL power lead to the terminal marked (W). For 230V AC units, connect the AC L1 power lead to the (L1) terminal and AC L2 power lead to the terminal marked (L2). Connect the AC GROUND lead to the (G) terminal (The AC Ground (G) terminal is not connected internally).
2. **Grounding:** The transmitter housing is plastic and does not require an earth ground connection. If the alarm is mounted in a metal housing, a ground wire connection is required. Connect the ground terminal of the metal housing (Green Screw) to a suitable earth ground using appropriate wire per applicable codes.
3. **Output:** Connect output per connection diagram, refer to Drawing 4501-356. Load range is a function of the module's output type; refer to "Output" in the preceding "SPECIFICATIONS" section. The output is isolated from the input and power circuits.
4. **Input:** Connect input per connection diagram (refer to Drawing 4501-356). Be sure to observe proper polarity on unipolar inputs, see label for input type. If unit is factory calibrated, the calibration label indicates range of input. Note: The input circuit is electrically isolated from the output and power circuits, allowing the input to operate up to 250V AC or 354V DC off ground on a continuous basis. If your input is from a contact closure or from an open collector transistor, the excitation circuit must be activated by placing a short jumper wire between the input (+) and (L) terminal of the transmitter.

The input circuit of the transmitter accepts most periodic waveforms and will trigger on the positive edge of the input waveform. The input stage of the transmitter has a built-in low-pass filter (R1, C1) to remove any high frequency noise that may be present on the input signal. If a digital 5V pulse is used to drive the input stage, the width of the pulse should be greater than 10 microseconds.

NOTE: If the input signal amplitude is not adequate to meet the threshold/hysteresis requirements, the output will go to a value that represents 0 Hertz.

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" before going to the Transmitter Adjustment Procedure.

1. Transmitter - Shunt Block Configuration Procedure:

The frequency transmitter is quite universal in that it can be configured for Unipolar or Bipolar input signals, a large number of frequency ranges, and ripple/response filtering. Before the adjustment procedure can proceed, the jumpers have to be configured to the requirements of the application (refer to Drawing 4501-357 for details). To gain access to the Configuration Jumpers, first remove the transmitter from the installation. Second, remove the circuit boards from the plastic enclosure as described in the Jumper Configuration procedure below. Third, configure the jumpers (shunt blocks) as described in the Jumper Configuration procedure below (refer to Drawing 4501-357).

NOTE: Calibration per the Adjustment Procedure should be performed before the circuit boards are reassembled within the plastic enclosure.

Disassembly Procedure for the 450T 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 board should only be done at a static-free workstation, otherwise damage to the electronics could result.

1. To begin disassembly (refer to Drawing 4501-357) place the screw-driver at point A (left side of the alarm). 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 alarm and carefully prying the sides further apart. 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 the 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 both interconnection headers are aligned with their mating sockets and carefully push the boards back together.

Jumper Configuration (Shunt Blocks):

Shunt blocks are provided to accommodate in-field configuration changes. 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. INPUT CONDITIONING SELECTION: Determine whether the input signal is a zero crossing or a non-zero crossing signal. The sinusoidal output from a passive magnetic pickup is a typical "zero-crossing" signal. A typical TTL output is a non-zero crossing signal type. Refer to Drawing 4501-357 for proper jumper (shunt) position.
2. INPUT FREQUENCY RANGE: Select the desired frequency range for the input signal and place the shunt block in the required range position (A through J). Refer to Drawing 4501-357 for proper jumper (shunt block) position. NOTE: for best results, select the smallest frequency range that will cover the frequency span being monitored.
3. OUTPUT RIPPLE/RESPONSE TIME: Select the filter for desired results. Refer to table 1 on Drawing 4501-357 for proper jumper (shunt) position. Refer to "Response Time" in the preceding "SPECIFICATIONS" section, which describes the frequency/response-time combinations that can be achieved while maintaining less than +/-0.1% output ripple from 10 to 100% of full-scale. Faster response-times may be used when output ripple is not critical. Units which have not been factory calibrated have a response time of 0.4 seconds.
4. IMPORTANT: Mark the transmitter's configuration on the calibration label located on the enclosure. For example: IN: Bipolar, Range "I"; 0 to 12,800Hz, Filter - 3; 0.4 seconds.

Jumper Configuration Example:

The following is the configuration for the example given below, make adjustments to the configuration as required for your application. For our example, configure the internal jumpers as follows:

A. Unipolar/Bipolar: Bipolar (Shunt Block J1, pins 9 & 10).

B. Frequency Range: Range I, 0 to 12800Hz (Shunt Block J2, position I).

C. Ripple/Response: 0.4 Seconds (Shunt Block J1, pins 3 to 5 & 4 to 6).

Transmitter - Adjustment Procedure:

Connect transmitter as shown in the connection diagram (refer to Drawing 4501-356). The input signal source must be adjustable over the entire frequency range (0-25600 Hz) of the transmitter. In addition, the frequency source must be adjustable and stable to any specific frequency with an accuracy of 0.1% or better. Signal amplitude should be set at a level representative of the actual input signal. It is recommended that a frequency counter be used to measure input frequency, as most dial markings are not accurate enough. The output voltage must be measured to 0.1% accuracy or better for proper results.

The Zero and Span adjustments are accessible at the front panel of the transmitter, see Drawing 4501-356 for their location. The screwdriver blade, used to adjust the potentiometers should not be more than 0.1 inch (2.54mm) wide.

Transmitter - Calibration Example:

Model : 450T-FQ1-Y-1-DIN-NCR
Input : 0-12800Hz, Bipolar input, Filter: 0.4 second step response.
Output: 4-20mA DC
Power : 115V AC

1. The calibration signal amplitude requirements are a function of the "Input Conditioning Type" selected.
   A. Unipolar (Threshold: 1.5V DC Nominal), use a 0-2.0V signal or greater.
   B. Bipolar (Threshold: 0.0V DC Nominal), use a +/-0.2V signal or greater.
2. Set the input frequency to 0 Hz. Adjust the Zero (Z) pot until the output reads 4.000mA. If the output cannot be reduced to 4.000mA, turn the "Span" pot counter clockwise until the output is reduced to the desired value. NOTE: If the minimum input is 0 Hz, it can be simulated by temporarily disconnecting the signal generator and shorting the input terminals of the transmitter. Before going to Step 3, remove the short circuit and connect the signal generator to the input terminals.
3. Set the input frequency to 12,800 Hz. Adjust the Span (S) pot until the output reads 20.000mA.
4. Repeat Steps 2 and 3 above until the readings converge. The instrument is now calibrated. Several mid-point values should also be checked to verify proper operation of the transmitter.
5. After the above calibration procedure is complete, install the transmitter PC Board assembly back into its case as described in the assembly procedure below.

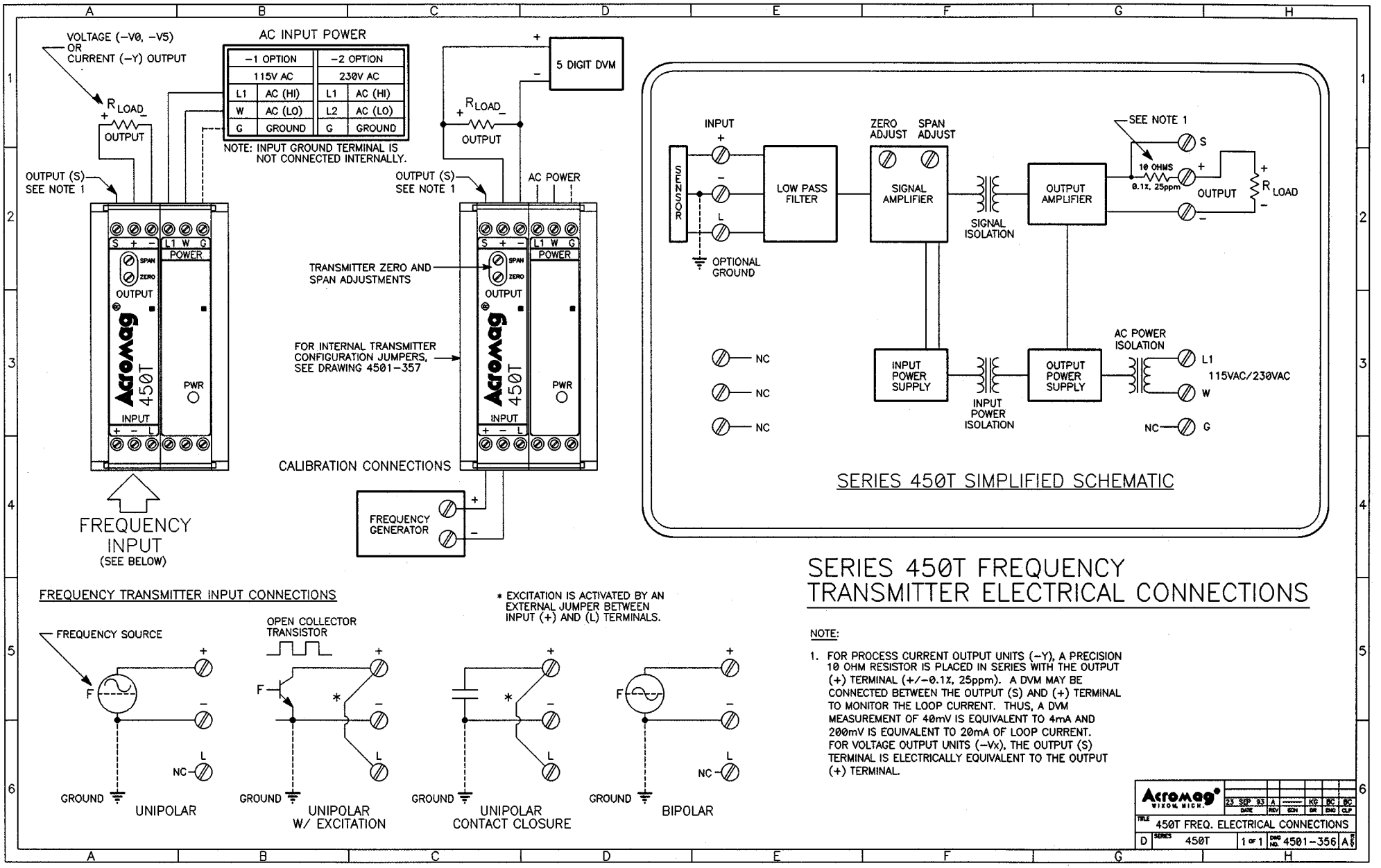
Assembly Procedure for the 450T Plastic Housing:

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

1. Refer to drawing 4501-357 and line up the left plastic side with the board and terminal assembly. Carefully but firmly press the pieces together.
2. Align the pins of the center section with the side and press the pieces together.
3. Now line up the right side of the housing with the left side and center assembly and carefully but firmly press the pieces together.

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 makes use of 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.



FREQUENCY TRANSMITTER INPUT CONNECTIONS

SERIES 450T FREQUENCY TRANSMITTER ELECTRICAL CONNECTIONS

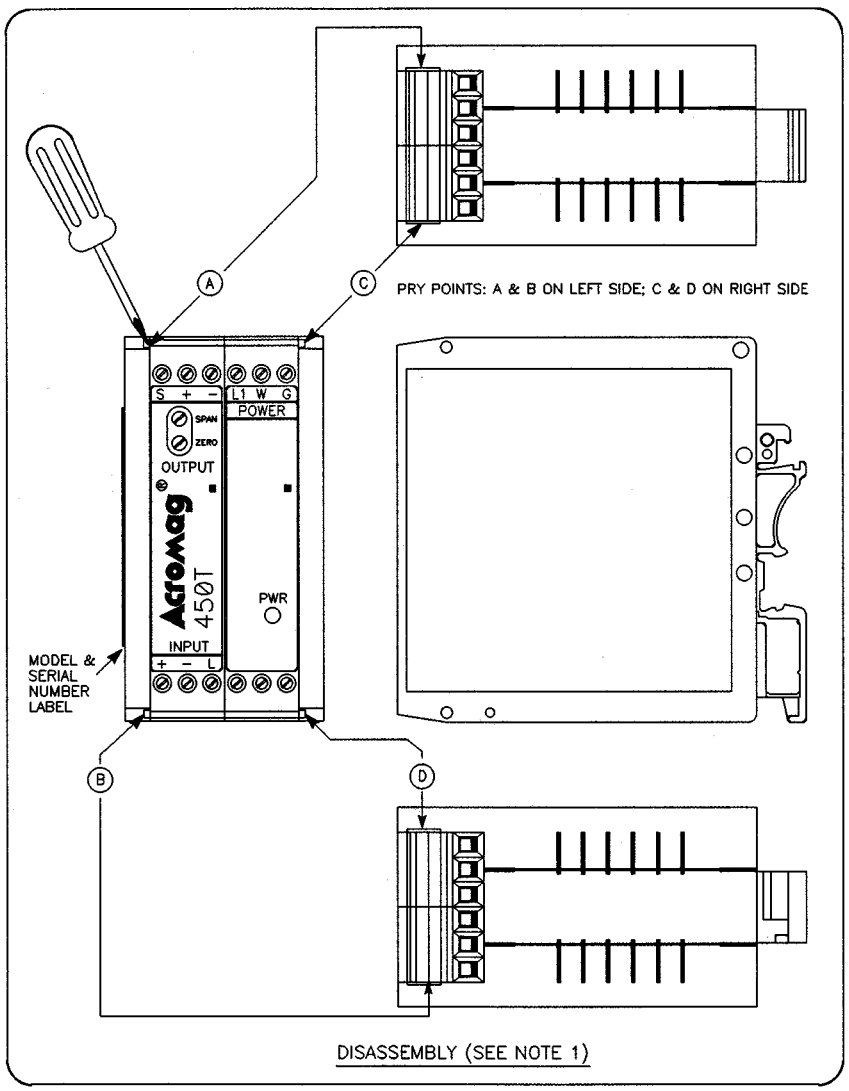
NOTE:

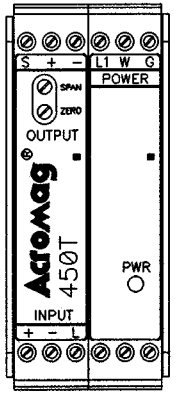
1. FOR PROCESS CURRENT OUTPUT UNITS (–Y), A PRECISION 10 OHM RESISTOR IS PLACED IN SERIES WITH THE OUTPUT (+) TERMINAL (+/–0.1%, 25ppm). A DVM MAY BE CONNECTED BETWEEN THE OUTPUT (S) AND (+) TERMINAL TO MONITOR THE LOOP CURRENT. THUS, A DVM MEASUREMENT OF 40mV IS EQUIVALENT TO 4mA AND 200mV IS EQUIVALENT TO 20mA OF LOOP CURRENT. FOR VOLTAGE OUTPUT UNITS (–Vx), THE OUTPUT (S) TERMINAL IS ELECTRICALLY EQUIVALENT TO THE OUTPUT (+) TERMINAL.

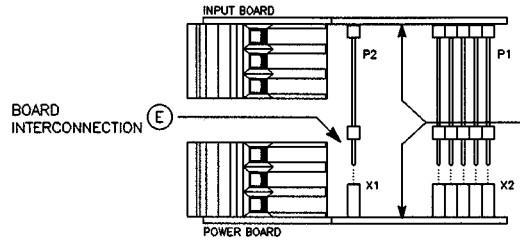
Acromag WIXOM, MICH.	23 SEP 93	A		KG	BC	BC
	DATE	REV	ECN	DR	ENG	CLP

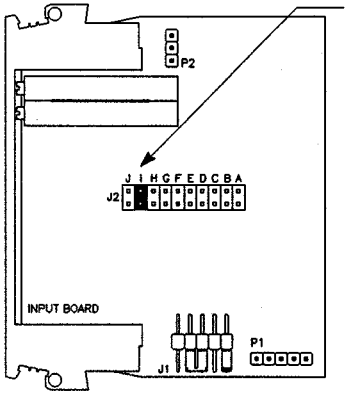
TITLE: 450T FREQ. ELECTRICAL CONNECTIONS

D	SERIES 450T	1 OF 1	DWG NO. 4501–356	A REV



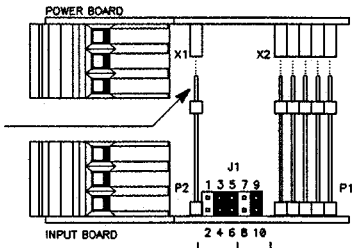






	J I H G F E D C B A
RANGE A: 25 TO 50 Hz	
RANGE B: 50 TO 100 Hz	
RANGE C: 100 TO 200 Hz	
RANGE D: 200 TO 400 Hz	
RANGE E: 400 TO 800 Hz	
RANGE F: 800 TO 1600 Hz	
RANGE G: 1600 TO 3200 Hz	
RANGE H: 3200 TO 6400 Hz	
* RANGE I: 6400 TO 12800 Hz	
RANGE J: 12800 TO 25600 Hz	

* Example Configuration – Range I, 0 TO 12,800 Hz



FREQUENCY RANGE/ RESPONSE TIME SELECTION (TO 98%)

1 3 5 / 2 4 6 — FILTER 1 – 8.0 SECOND RESPONSE FREQUENCY RANGES A THROUGH J PIN 1 TO 3 AND PIN 2 TO 4

1 3 5 / 2 4 6 — FILTER 2 – 5.0 SECOND RESPONSE FREQUENCY RANGES C THROUGH J PIN 1 TO 3 AND PIN 4 TO 6

* 1 3 5 / 2 4 6 — FILTER 3 – 0.4 SECOND RESPONSE FREQUENCY RANGES D THROUGH J PIN 3 TO 5 AND PIN 4 TO 6

INPUT CONDITIONING

7 9 / 8 10 — UNIPOLAR W/ 1.5V DC THRESHOLD

* 7 9 / 8 10 — BIPOLAR (ZERO CROSSING) W/ 0V DC THRESHOLD

* Example Configuration: Filter 3, 0.4 Second Response; Bipolar Input.

NOTE: 1. REFER TO THE CALIBRATION SECTION OF THE MANUAL FOR DETAILED INSTRUCTIONS.

SERIES 450T FREQUENCY JUMPER CONFIGURATION

Acromag WIXOM, MICH.				KG	BC	BC
	23 SEP 93	A		KG	BC	BC
	DATE	REV.	ECN	DR	ENG	CLP
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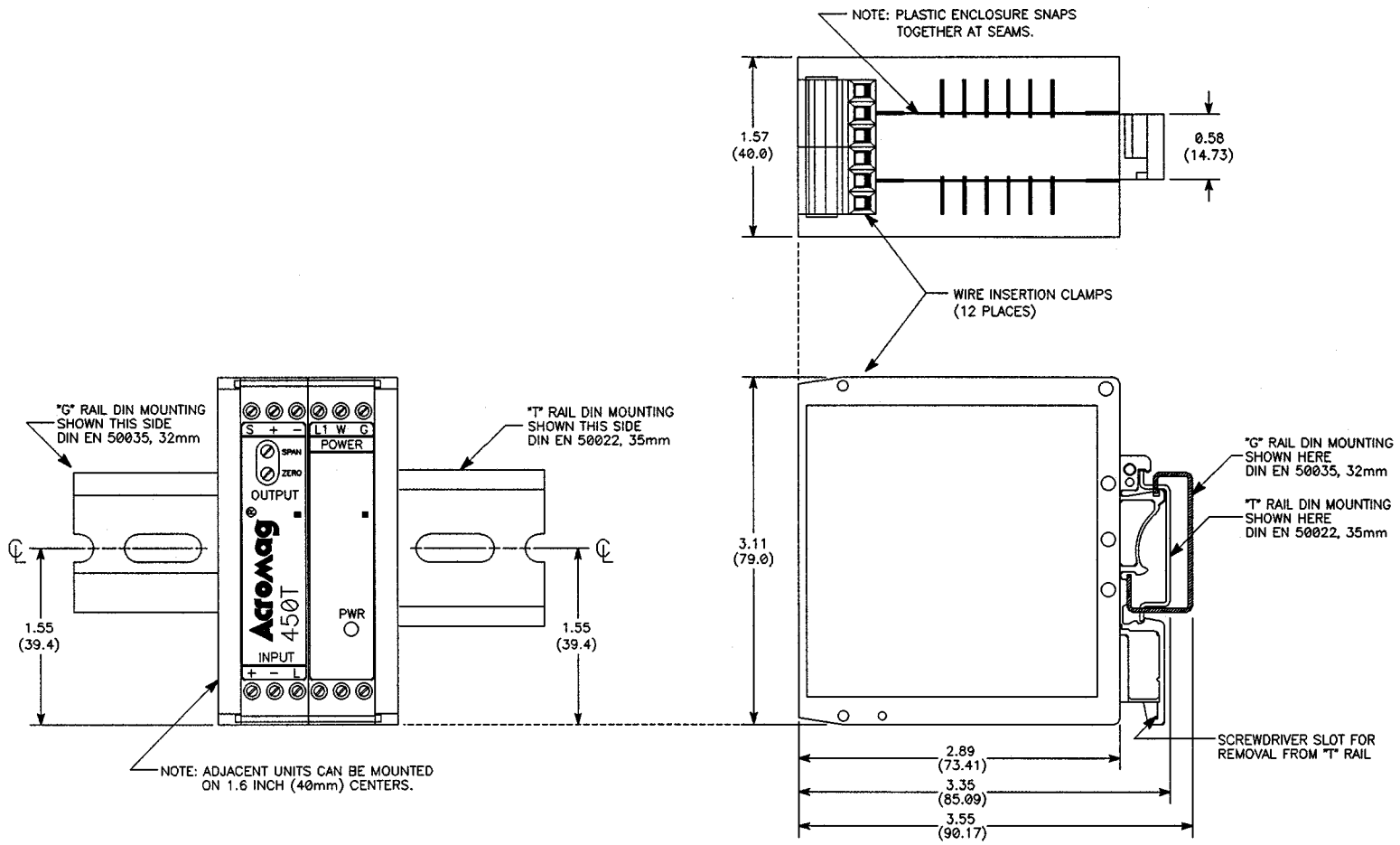

ENCLOSURE DIMENSIONS FOR DIN RAIL MOUNTING

NOTE: ALL DIMENSIONS ARE IN INCHES (MILLIMETERS).

Acromag WIXOM, MICH.		23 SEP 93	A	—	KG	BC	BC
		DATE	REV	ECN	DR	ENG	CLP
TITLE: SERIES 450T HOUSING: DIN RAIL MOUNT							
D	SERIES 450T	1 OF 1	DWG NO. 4501-348	A	REV		