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FDX 150

Two-Wire Isolated Frequency Transmitter Instruction Manual

1.0 INTRODUCTION

These instructions refer to the above model. Supplementary sheets are attached if the unit has special options or features. For detailed specifications, see page 4 or refer to the Data Bulletin. All ADTECH instruments are factory calibrated and supplied with a label detailing the calibration. Adjustments are normally not necessary. A simple check should be performed to verify calibration before installation to ensure that it matches the field requirement.

2.0 GENERAL DESCRIPTION

The ADTECH Model FDX 150 Isolated Two-Wire Frequency Transmitter provides high accuracy conversion of frequency or pulse rate inputs to a standard 4-20 ma dc process signal.

The primary features of the FDX 150 are:

- Wide range - 0-30Hz to 0-30KHz - switch selectable.
- Field adjustable via front accessible switches and potentiometers.
- Crystal controlled time base.
- High accuracy, repeatability, and ambient effect stability.
- Universal input configuration; accepts pulse (including TTL), contact or AC waveform from 10mv to 100V RMS.
- Sensitivity and hysteresis adjustments for the most demanding signal.
- Built in adaptive digital filtering for improved contact bounce and signal noise immunity.
- RFI Protection: Standard.
- NO INTERACTION of ZERO and SPAN.
- Small size - universal mounting package provides integral RFI protection and an environmental seal.
- Options for NEMA housings, SNAP TRAK and DIN rail mounting(DIN 46 277 standard).

3.0 INSTALLATION

The instrument is supplied in a sturdy die cast aluminum housing with an epoxy paint finish. The housing is gasketed providing an environmental seal for the internal electronics and controls. NEMA 4, 7 and 12, Snap Track and DIN rail (TS32 and TS35) are optionally available. Installation area / location must agree with the supplied instruments including operating temperature and ambient conditions.

Mounting

Refer to page 3 for outline and mounting dimensions. The standard instrument is surface mounted with integral #6-32 S.S. thumb screws.

Electrical Connections

The wire used to connect the instrument to the control system **Input / Output** should be twisted pair(s) and sized according to normal practice. Shielded cable is not normally necessary (if used, the shield must be grounded at the input of the ADTECH instrument and left floating at the sensor).

Two barrier terminal blocks with #6-32 screws and 0.325" spacing are provided for I / O connections.

Controls

Instrument controls consist of the following:

- A 16 position major range switch.
- Four multiturn potentiometers; ZERO, SPAN, SENSITIVITY and HYSTERESIS controls.

All controls are accessible through the front of the instrument. An integral gasketed cover provides an environmental seal for the controls and internal electronics when the controls are not in use.

4.0 MAINTENANCE

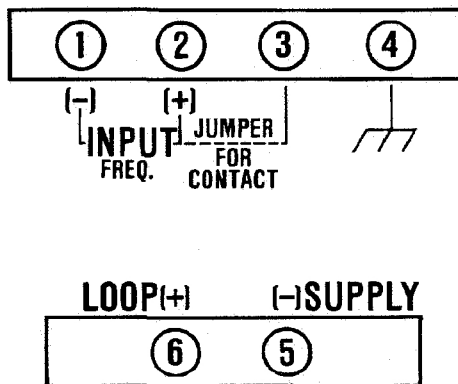
These instruments are electronic and require no maintenance except periodic cleaning and calibration.

If the unit appears to be mis-operating, field wiring and/or associated circuits should be checked. MOST problems are traced to these areas.

If the problem appears to be the instrument, it may be checked as installed or removed for a bench check as detailed in sections 6.0 and 7.0.

5.0 CONNECTIONS

Standard connections are shown below and on the instrument face plate, Data Bulletin or on attached supplementary sheets.



NOTE: For contact input connect a jumper from Terminal #2 to Terminal #3.

6.0 CALIBRATION

All ADTECH instruments are calibrated per your instructions at the factory. A calibration sticker located on the unit identifies the model, calibration, and options present.

To perform a calibration check or re-calibration of the instrument, please follow this procedure.

- A. Make sure the unit I / O wiring is properly connected and that the correct power source per the label is also connected. The instrument must be at normal power for a minimum of 2 minutes before proceeding to B.
- B. The input signal source must be adjustable from 0 to 100% in steps of 10% or at least 25%. The source should be either precalibrated or an accurate meter must be used to monitor the input.
- C. The output may be monitored as a current that can be represented as a voltage across a resistor shunt.
- D. Set the 16 position span switch to the desired full scale range (see section 8.0). Under normal conditions only one input control is required to provide the proper input threshold.
 1. If the minimum input signal level is 1 volt or less, turn the SENSITIVITY control fully clockwise. You will only need adjust the HYSTERESIS for proper operation.
 2. If the minimum input signal level is greater than 1 volt, turn the HYSTERESIS control fully clockwise. Only the SENSITIVITY control is required for proper operation.
- E. Adjust the input signal to the minimum input voltage, and is a frequency about mid-scale. Adjust the HYSTERESIS control if the minimum input signal level is 1 volt or less (SENSITIVITY control if the input signal level is greater than 1 volt) to the point where the unit just starts operating. (The output will be about mid-scale.) Give the adjustment an additional 1/4 to 1/2 turn to allow for input signal variations.
- F. With 0% input (or the input shorted) adjust the ZERO control for 4.00 ma to the desired accuracy.
- G. With a 100% input signal at the operating voltage level, adjust the SPAN control for 20.00 ma to the desired accuracy.
- H. Repeat steps F and G until the readings remain within to desired calibration accuracy.
- I. Check the instrument at the 25-50-75% input settings minimum.

7.0 FIELD TROUBLE SHOOTING GUIDE

This section offers a simple, first level trouble-shooting aid for an apparent instrument malfunction.

SYMPTOM

CORRECTIVE ACTION

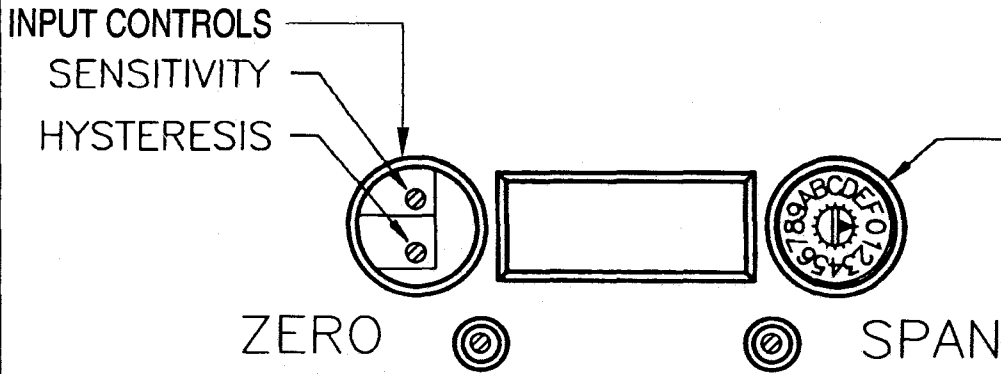
No output

1. Check the input and output connections carefully.
2. Check that the power supply polarity is correct and that the output loop power is present on the indicated terminals.
3. Check that the input source is correct and that it changes magnitude between zero and full scale values when so adjusted.
4. Make sure the output loop is complete and that the correct meter range is selected.

All external checks are complete. Problem seems to be internal.

The instrument is environmentally sealed. Troubleshooting beyond the above may be difficult without special equipment. We do not recommend attempting repair of the unit in the field. ADTECH offers a very responsive repair policy.

8.0 TABLES, OUTLINE / MOUNTING

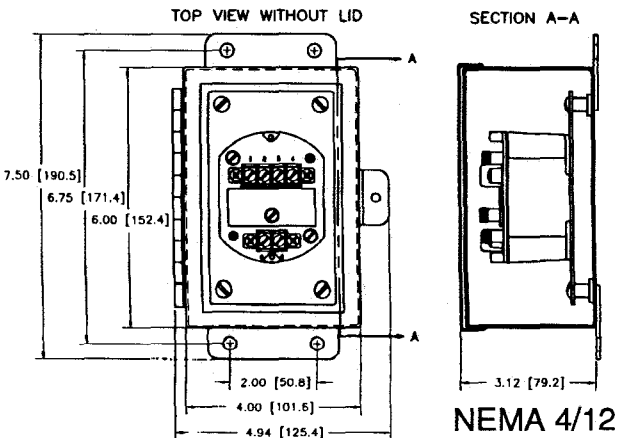
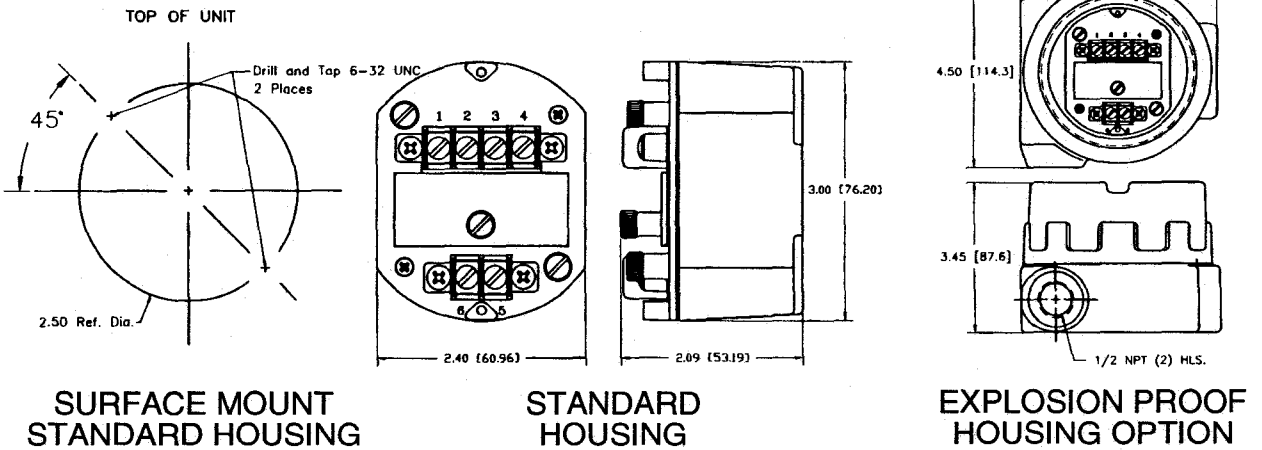


16 POSITION SWITCH

SWITCH POSITION	FREQUENCY* RANGE Hz
F	30,000
E	15,000
D	7,500
C	3,750
B	1,875
A	937.5
9	468.8
8	234.4
7	117.2
6	58.59
5	29.30

*Select the frequency range that is just equal to higher than the desired input full scale.

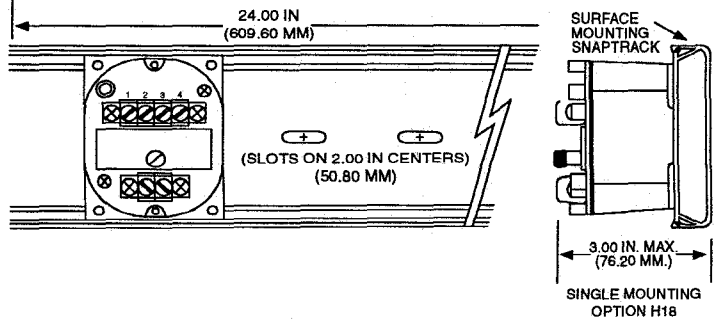
OUTLINE & MOUNTING



NEMA 12 = Option H144; NEMA 4 = H13A

MULTIPLE MOUNTING OPTION H 19 (8 UNITS MAX IN 24 IN. LENGTH)

NOTE: Option H22 must be ordered for Snap Track Utilization



SNAP TRACK

9.0 SPECIFICATIONS

INPUT/OUTPUT

INPUT SIGNALS

- a. Voltage (Amplitude): 10 mv to 100 vrms (0-5 KHz)
50 mv to 50 vrms (5 KHz to 30 KHz)
- b. Contact: Dry, 2 ma @ 24 vac rating
- c. Frequency Range: 0-30 Hz to 0-30 KHz Full Scale
- d. Major Range Switch provides 11 discrete ranges with the ZERO control adjustable $\pm 10\%$ of output and the SPAN control adjustable from 50% to 100% of the major range selected

OUTPUT SIGNALS

- a. 4-20 ma dc

OUTPUT LOOP DRIVE CAPABILITY

$$R(\text{ohm}) = \frac{(V \text{ supply} - V \text{ minimum}) 1000}{I \text{ out max. ma}}$$

V minimum = 8.0 vdc

I out	4 - 20 ma			
V supply	12	24	36	42
R (ohm)	200	800	1400	1700

PERFORMANCE

- a. **Calibrated Accuracy:** $\pm 0.1\%$
- b. **Independent Linearity:** $\pm 0.02\%$ maximum,
 $\pm 0.001\%$ typical
- c. **Repeatability:** $\pm 0.005\%$ maximum; $\pm 0.002\%$ typical
- d. **Zero TC:** $\pm 0.01\%$ of span max/ $^{\circ}\text{C}$
- e. **Span TC:** $\pm 0.01\%$ of span max/ $^{\circ}\text{C}$
- f. **Load Effect:** $\pm 0.005\%$ zero to full load
- g. **Output Ripple:** 10 mv P/P maximum
- h. **Response Time:** 550 milliseconds (10 to 90% step response)
- i. **Bandwidth:** (-3 db): 0.6 Hz
- j. **Temperature Range:** -25 $^{\circ}$ to 185 $^{\circ}$ F (-31 $^{\circ}$ to 85 $^{\circ}$ C) operating
-40 $^{\circ}$ to 200 $^{\circ}$ F (-40 $^{\circ}$ to 93 $^{\circ}$ C) storage
- k. **Power Supply Effect:** $\pm 0.005\%$ over operating range
- l. **Isolation:** Input/output/case: 600 VAC, 1000 VDC

Note: All accuracies are given as a percentage of span

POWER

- a. 8 to 42 vdc—standard

MECHANICAL

- a. Electrical Classification: general purpose, CSA pending
- b. Connection: Barrier terminal strips
(0.325" spacing, No. 6 screws)
- c. Controls: One 16 position rotary switches for range control
Four multiturn potentiometers for ZERO, SPAN,
SENSITIVITY, and HYSTERESIS control
- d. Mounting: Surface, Snap-Track, DIN or NEMA 4, 7 & 12
- e. Weight: Net Unit: 8 oz. (228 grams)
Shipping: Nominal 1 pound (455 grams)

OPTIONS

<u>Option Number</u>	<u>Description</u>
H 13 through H 20	Mounting