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ACX 140

Two-Wire Isolated AC Current/Voltage 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 ACX 140 Universal Range Isolated Two-Wire Transmitter provides high accuracy conversion of AC Current or Voltage input signals. Typically 0-5 AMPS or 0-120 VAC to a standard process signal output of 4-20 ma dc.

The ACX 140 offers a low cost Universal Range solution to applications requiring full range capabilities. The unit covers 0 to 5 Amps AC in 7 major ranges, and 0 to 255 Volts AC in 21 major ranges.

The ACX 140 provides 750 Volts AC or 1000 Volts DC isolation from the input to output/power supply.

- Field adjustable via front accessible switch and potentiometers.
- High accuracy, repeatability and ambient effect stability.
- NO INTERACTION of ZERO and SPAN.
- Small size—universal mounting package provides environmental seal.
- Options for NEMA housing SNAP TRACK and DIN rail mounting (DIN 46 277 standard).

3.0 INSTALLATION

The instrument is supplied in a sturdy die cast aluminum housing. 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:

- An 8 position major range switch.
- Two multiturn potentiometer ZERO and SPAN.

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

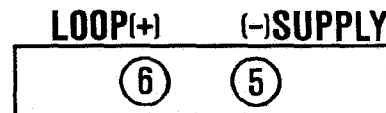
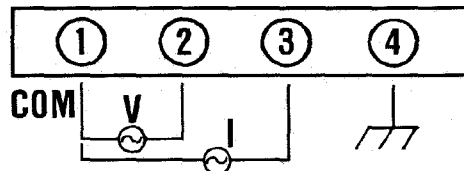
These instruments are electronic and require no maintenance except periodic cleaning and calibration.

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.



CAUTION

When used as a current input, Terminal #1 must be jumpered to Terminal #2.

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.

SAFETY CAUTION

If an AC Current Transmitter is in service. DO NOT open the connections to terminals 1 and 3.

FIRST SHUT OFF the primary current circuit that is being monitored, then disconnect the leads from terminals 1 and 3.

CAUTION

When used as a current input, Terminal #1 must be jumpered to Terminal #2.

- 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 input source to the minimum desired input value. Adjust the ZERO potentiometer fully counter-clockwise (see section 8.0). Set the major range switch (S-1) for a value that just meets or exceeds the maximum input span you are calibrating to. Rotate the ZERO potentiometer clockwise until the output reaches 4.00 ma \pm 0.01 ma.
- E. Set the input source to the maximum desired input value. Adjust the FINE SPAN potentiometer until the output is 20 ma \pm 0.01 ma.
- F. Repeat steps D & E until the readings are within calibration.
- G. 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.

<u>SYMPTOM</u>	<u>CORRECTIVE ACTION</u>
No output	<ol style="list-style-type: none">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.

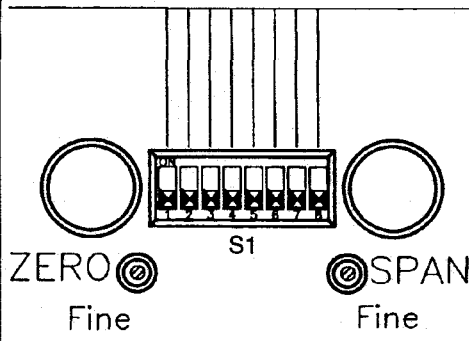
All external checks are complete. Problem seems to be internal.

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

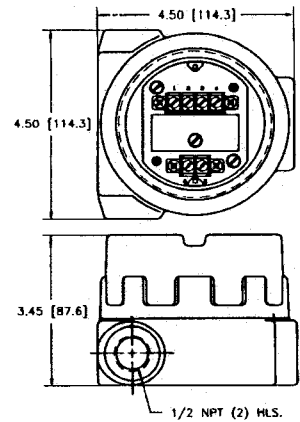
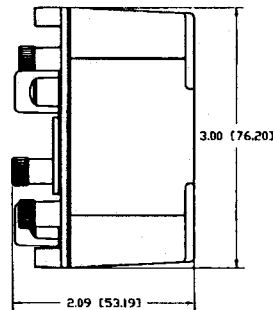
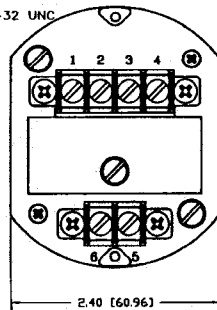
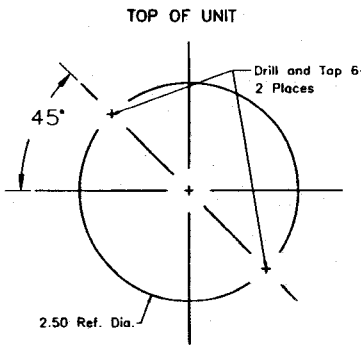
VOLTS INPUT F.S. VOLTS RMS	1	2	3	4	5	6	7	8
255	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
190	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF
140	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF
105	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF
78	ON	OFF	OFF	OFF	OFF	ON	OFF	OFF
58	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF
43	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON
32	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
24	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
18	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF
13	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF
9.8	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF
7.2	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
5.4	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON
4.0	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
3.0	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF
3.2	OFF	ON	OFF	ON	OFF	OFF	OFF	OFF
1.6	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF
1.2	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF
0.9	OFF	ON	OFF	OFF	OFF	OFF	ON	OFF
0.67	OFF	ON	OFF	OFF	OFF	OFF	OFF	ON

CURRENT INPUT F.S. AMPS RMS	1	2	3	4	5	6	7	8
5.0	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
3.7	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF
2.8	OFF	ON	OFF	ON	OFF	OFF	OFF	OFF
2.0	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF
1.5	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF
1.1	OFF	ON	OFF	OFF	OFF	OFF	ON	OFF
0.8	OFF	ON	OFF	OFF	OFF	OFF	OFF	ON



SPAN ADJUSTMENT: ± 25%
ZERO ADJUSTMENT: ± 10%

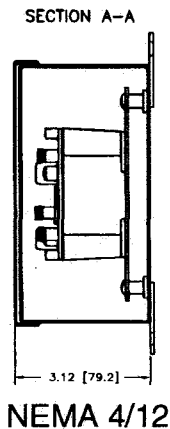
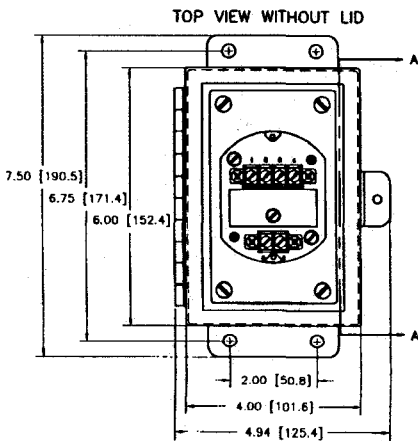
OUTLINE & MOUNTING



**SURFACE MOUNT
STANDARD HOUSING**

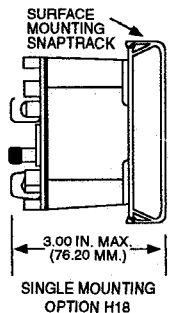
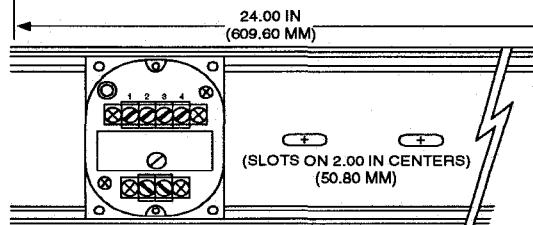
**STANDARD
HOUSING**

**EXPLOSION PROOF
HOUSING OPTION**



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

NOTE: Option H22 must be ordered for Snap Track Utilization



NEMA 12 = Option H144; NEMA 4 = H13A

SNAP TRACK

9.0 SPECIFICATIONS

INPUT/OUTPUT

INPUT SIGNALS

- a. AC Current—any 0-0.8 to 0-5 amps ac, burden less than 0.5 va (7 major ranges)
- b. AC Voltage—any 0-0.67 to 0-255 vac rms signal, burden less than 0.5 va (21 major ranges)
- c. Zero Adjustment: $\pm 10\%$
- d. Span Adjustment: $\pm 25\%$

Input Frequency Range: 25-1,000 Hz

Input Overload Capability:

- a. AC Current—15 amps continuous; 200 amps for 1 second
- b. AC Voltage—200% of input specified, continuous. Suppression to 20% of range

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:** $\pm 0.1\%$ maximum, $\pm 0.04\%$ 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:** Current + 0.02%, $\pm 0.015\%$ of span max/ $^{\circ}\text{C}$
Voltage - 0.015%, $\pm 0.01\%$ 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:** 350 milliseconds (10 to 90% step response)
- i. **Bandwidth:** (-3 db): 1 Hz
- j. **Temperature Range:** -25° to 185°F (-31° to 85°C) operating
-40° to 200°F (-40° to 93°C) storage
- k. **Power Supply Effect:** $\pm 0.005\%$ over operating range
- j. **Common Mode Rejection:** 140 db @ 60 Hz
- k. **Isolation:** Input/output/case: 750 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 8 position dip switch for major range
Two multiturn potentiometers for FINE ZERO and SPAN 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