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ACX 240
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 240 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.

It covers 0 to 5 Amps AC, and 0 to 250 Volts AC in 4 major ranges.

The ACX 240 provides 600 Volts AC or 1000 Volts DC isolation from the input to output/power supply.

The following are some outstanding features of this model.

- Field adjustable via a sixteen position rotary switch and jumpers inside the unit.
- Selectable response, true RMS or Average.
- High accuracy, repeatability and ambient effect stability.
- NO INTERACTION of ZERO and SPAN.
- Small size—DIN mounting package 1"w x 3.1"h x 3.6d.
- Options for NEMA housing SNAP TRACK or surface mounting and explosion proof housing.

3.0 INSTALLATION

The instrument is supplied in a non-metallic general purpose DIN rail mount enclosure as standard. NEMA 4, 7 or 12 enclosures are optionally available. Installation area/location must agree with the supplied instruments including operating temperature and ambient conditions. For detailed mounting and installation information refer to page 4 inside.

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).

A six position compression terminal block is provided for the I/O and power connections. A housing ground terminal is not required due to non-metallic housing.

Controls

Instrument controls consist of the following:

- A two position and a four position jumper for input range.
- One 16 position rotary switch for COARSE SPAN.
- One 2 position jumper for Measurement response (TRMS or Average).
- Two External multiturn potentiometers for Fine Zero and Span.

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.

(9/96) 190-A-000066-A

6.0 CONFIGURATION

All ADTECH units are factory calibrated per P.O. instructions. Usually, a complete recalibration is not required unless you want to change input type, output type, or the calibration range of the unit.

SAFETY CAUTION

If the AC transmitter is in service, DO NOT open the input connection. FIRST SHUT OFF the primary current that is being monitored, then disconnect the leads from the input terminals. It is also IMPORTANT NOT to make jumper changes while an input is applied on the input terminals.

6.1 INPUT AND OUTPUT CONFIGURATION

A. If you need to change the input calibration range, carefully open the instrument and remove the cover from unit to gain access to pc boards. The larger pc board is the input pcb and the smaller pcb is the output/power pcb. Jumpers found in the input tables are found on the input pcb. Jumpers found in the output table are found on the output/power pcb.

B. The ACX 240 interfaces to both Current and Voltage AC waveforms. The transmitter offers either True RMS or Average Responding measurements. Table 2 is used to select the type of measurement for your application.

C. For the ACX 240 the Output Zero jumper in Table 3 should always be set to postion A.

6.2 MAJOR RANGE SETTING

A. Follow Table 1 to set the MAJOR RANGE. The range picked should be the smallest value in the table that is still greater than the input Full Scale.

6.3 CALIBRATION

A. If the unit has been altered under *INPUT and OUTPUT CONFIGURATION* then the cover must remain off until calibration is complete. If no alterations have been made to the jumpers, there is no need to remove the cover to fine adjust the ZERO and SPAN of the unit.

B. Make sure the unit I/O wiring is properly connected and that the correct power source per label is also connected. The instrument must be at normal power for a minimum of 2 minutes prior to proceeding.

C. The input source must be adjustable from 0 to 100% in steps of 10% or at least 25%. The source should either be precalibrated or an accurate meter must be used to monitor the input.

D. The output may be monitored as a current or as a voltage across a resistor shunt, i.e. 1-5 Vdc across 250 ohms.

E. Set the input to zero and adjust the potentiometer marked ZERO to achieve 4.00mA output.

F. This step is only required if the unit has been altered (see above text). 1. Turn the potentiometer marked SPAN fully clockwise. 2. Turn the 16 position rotary switch SW1 (inside unit) until the output just drops below 20mA.

G. With input at full scale adjust the SPAN potentiometer until the output reaches 20mA ± 0.01 mA.

H. Repeat steps E and G until the readings are within desired calibration.

I. Check the instrument at 25, 50 and 75% input settings for linearity.

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 made of small size components. 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. Contact the ADTECH factory for information on repair and return at 716-383-8280 or Fax 716-383-8386.

8.0 TABLES

TABLE 1
INPUT MAJOR RANGE

5 amp	J3-A	J2-A
250 mV	J3-A	J2-B
2.5 V	J3-B	J2-B
25 V	J3-C	J2-B
250 V	J3-D	J2-B

Note: All jumpers J1, J2, J3, J4 are located on the input PCB.

TABLE 2
RESPONSE TYPE

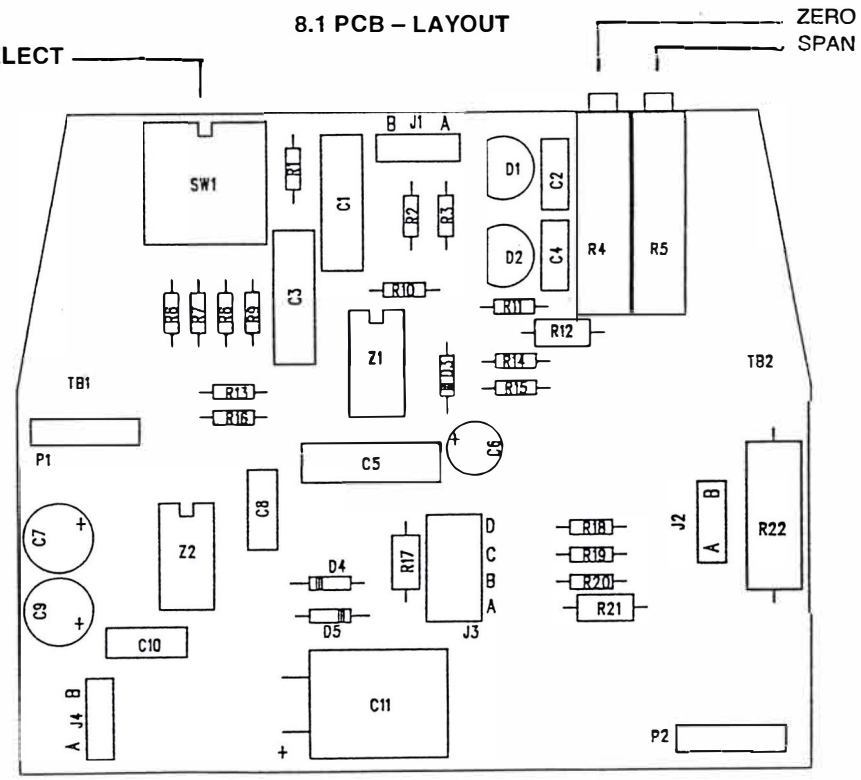
TRMS	J4-A
Average	J4-B

TABLE 3
OUTPUT ZERO TYPE

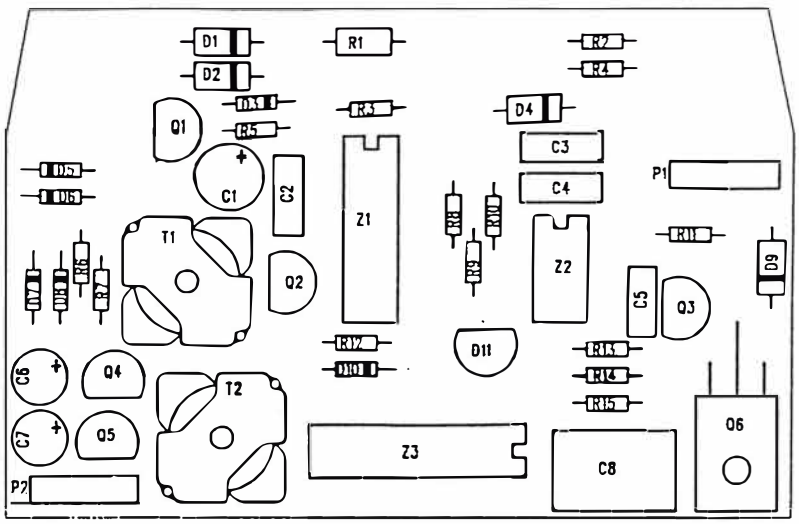
Elevated 20%	J1-A
Zero Based	N/A

8.1 PCB – LAYOUT

INPUT PCB



OUTPUT PCB



NOTE: All components shown may not be required by this model.

9.0 SPECIFICATIONS

INPUT/OUTPUT

INPUT SIGNALS

a. AC Current—any 0-1 to 0-5 amps ac, burden less than 0.5 va
b. AC Voltage—any 0-0.25V to 0-250 vac rms signal, burden less than 0.5 va (4 major ranges)
c. Zero Adjustment: ± 5% of span
d. Coarse Span Adjustment: 100% of major range (voltage only)
e. Fine Span Adjust: ±5% of major range (±1 amp for current inputs)

Input Frequency Range: 25-1,000 Hz
Input Overload Capability: 200 % of input continuous

OUTPUT SIGNAL

4-20 ma dc

OUTPUT LOOP DRIVE CAPABILITY

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

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:** ± 0.25%
b. **Independent Linearity:** ± 0.15% maximum, ± 0.06% typical
c. **Repeatability:** ± 0.005% maximum; ± 0.002% typical
d. **Zero TC:** ± 0.01% of span max/°C
e. **Span TC:** ± 0.02% of span max/°C
f. **Load Effect:** ± 0.005% zero to full load
g. **Output Ripple:** 10 mv P/P maximum
h. **Response Time:** Average responding 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:** ± 0.005% of span max.
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

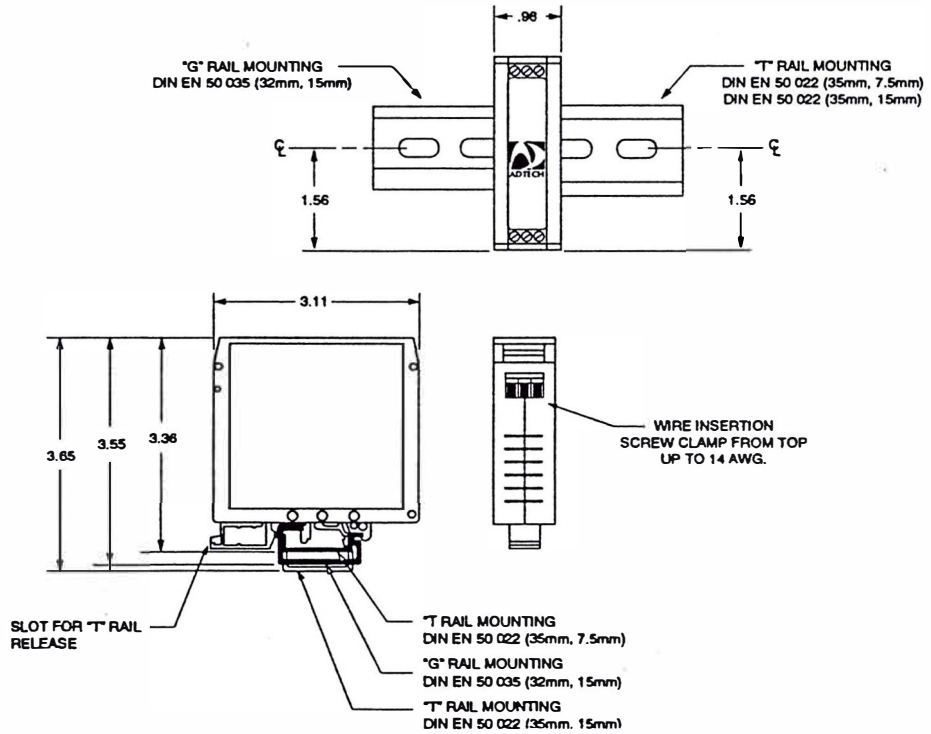
MECHANICAL

a. **Electrical Classification:** General purpose
b. **Connection:** Screw, compression type, accepts up to 14 AWG
c. **Controls:** Two front access multiturn potentiometers for fine zero and span control,
: One 16 position rotary switch for major range selection.
: Jumpers for input range and type of response.
d. **Mounting:** DIN, Surface, Snap-Track, or NEMA 4, 7 or 12
e. **Weight:** Net Unit: 4 oz. (115 grams)
Shipping: Nominal 7 oz. (200 grams)

OPTIONS

Option Number	Description
H 15D through H 30	Mounting
LPI 40D	Loop Indicator

10.0 OUTLINE & MOUNTING



OPTIONAL MOUNTINGS – see seperate drawings provided or request from the factory

Option	H-15	D Explosion Proof, Class 1, Group B, C &D
Option	H-25	Snap Track Mounting N/C (Specify)
Option	H-26	Surface Mounting N/C (Specify)
Option	H-27	NEMA 4 Enclosure
Option	H-29	T35 DIN T rail 2 Ft. Long
Opthin	H-30	T32 DIN G rail 2 Ft. Long