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MPF 350 Smart Touch™ 3-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 must be performed to verify calibration before installation to ensure that it matches the field requirement.

2.0 GENERAL DESCRIPTION

The ADTECH MODEL MPF 350 3-Wire Frequency to DC Transmitter accepts a periodic waveform and computes ABSOLUTE FREQUENCY. The transmitter accepts inputs from a wide variety of primary sensors such as turbine meters for flow and magnetic pick ups for speed. Calibration is extremely easy with Adtech's **Smart Touch™** technology. Simply input your full scale value, touch a button, and the unit is calibrated for ABSOLUTE FREQUENCY. Input your minimum frequency value, touch another button, and your unit is calibrated for FREQUENCY DEVIATION.

The Input waveform may be sinusoidal, triangular or any pulse shape that is periodic. The magnitude of the input signal may be between 50 mv to 100 v peak to peak, or the input may be a dry contact rated at 2 ma, 24 v dc. For a contact input, a jumper is installed between terminals 2 & 3.

This instrument is powered by a 15-42 VDC supply. The negative of the power and the output share a common connection. This is the reason it is called a three wire transmitter.

The input is electrically isolated from the output and power by 600 volts AC or 1000 vdc peak.

The output is a true current source and is selected to provide 4-20 mA DC, 0-20 mA DC, 0-10 mA DC, 0-1 mA DC, 1-5 VDC, 0-5 VDC, or 0-10 VDC.

3.0 INSTALLATION

Electrical Connections

The wire used to connect the instrument to the control system I/O should be a 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 negative of the ADTECH instrument and left floating at the sensor).

Six position compression terminal blocks are provided for I/O and power connection. A housing ground terminal is not required due to non-metallic housing.

Controls

Instrument controls consist of the following:

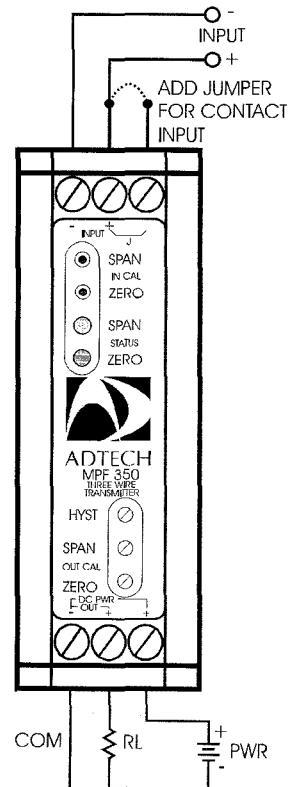
- Input SPAN and ZERO push buttons (Adtech **Smart Touch™**).
- Input Hysteresis potentiometer.
- Output SPAN and ZERO potentiometers.

4.0 MAINTENANCE

These instruments are electronic and require no maintenance except periodic cleaning and calibration verification. If the unit appears to be mis-operating it should be checked per sections 6.0 and 7.0. MOST problems are traced to field wiring and / or associated circuits. If the problem appears to be with the instrument, proceed to 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 - install jumper from terminals 2 to 3.

6.0 CONFIGURATION

All ADTECH units are factory calibrated per P.O. instructions. Usually, a complete re-calibration is not required unless you want to change input type, output type, or the range of the unit. A calibration sticker located on the unit identifies the model, calibration and options present.

NOTE: For re-calibration of the existing range proceed to section 6.1; for new input or output range proceed as follows.

- A. Open the case to gain access to the pc boards. The larger pc board is the input pcb and the smaller pc board is the output / power pcb.
- B. The MPF 350 is capable of both zero based and 20% elevated (i.e. 4-20ma or 1-5V) output zero values. Follow the output configuration jumpers per Table 1 in section 8.0.
- C. Set switch 3 position 1 to the on position and adjust the output ZERO potentiometer for the proper output.
- D. Set switch 3 position 1 to the off position and position 2 to on. Adjust the output SPAN potentiometer for full scale output. Repeat steps C and D until you reach the desired accuracy. (Note: you can check the mid-scale value by setting both switch 3 positions 1 and 2 to the on position simultaneously.)
- E. Return both switch 3 positions 1 and 2 to the off position, reassemble the case, and proceed with section 6.1 below to finish the calibration.

6.1 CALIBRATION

- A. Adjust the hysteresis control for stable operation at the minimum input amplitude. If the hysteresis is set too high, the unit will stop responding.
- B. Apply the FULL SCALE input value at the input terminals of the unit. Depress and hold the SPAN input calibration push button until the SPAN status led flashes. You have just set the input FULL SCALE value, and the output should be at your full scale value after a short time delay. At this point, if you are calibrating the unit for ABSOLUTE FREQUENCY, calibration is complete, and ZERO frequency is assumed to be the transmitter ZERO output. Proceed to step D below. If you are calibrating for FREQUENCY DEVIATION, proceed to step C below.
- C. Apply the lower frequency of your FREQUENCY DEVIATION span to the transmitter input. Depress and hold the ZERO input calibration push button switch until the ZERO status led flashes. You have just finished calibrating the unit for FREQUENCY DEVIATION, and the output should be at your zero value after a short delay. Proceed to the next step to check your calibration.
- D. Calibration is complete. Check the calibration with various input values and verify the corresponding output values.

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 | <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(s) 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.5. Make sure the hysteresis potentiometer setting is not too high. The unit will stop responding to the input signal, if its amplitude is less than the hysteresis setting. |
|-----------|--|

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

The instrument is made of small components. Troubleshooting beyond the above steps may be difficult with out 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 585-869-6330 or 585-869-1835 (FAX).

8.0 TABLES

Output Configuration Jumpers

Output	Output PCB (Small Board)		Input PCB (Large Board)
	J1	J2	J1
4-20mA	A	A	B
0-20mA	A	A	A
0-10mA	A	B	A
0-1mA	A	C	A
1-5V	B	A	B
0-5V	B	A	A
0-10V	C	A	A

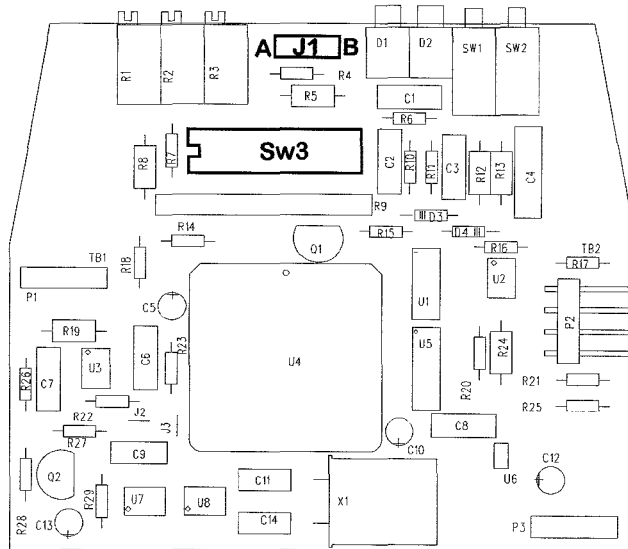
Table 1

Configuration Switch 3

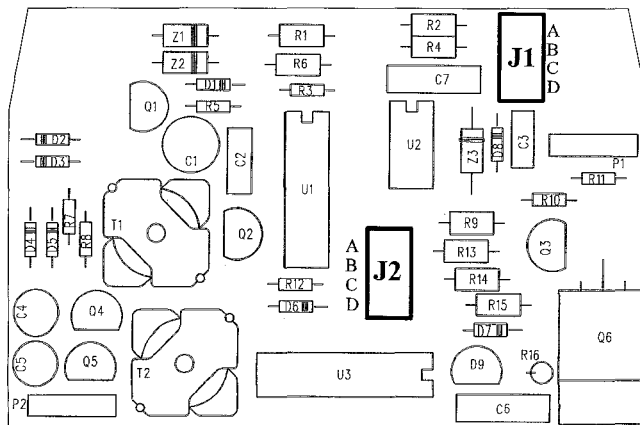
Switch Position	Function	
	1	Off
On		Output the ZERO value
2	Off	Normal Operation
	On	Output the SPAN value
1 and 2	Off	Normal Operation
	On	Output the MID scale value
3,4,5,6,7,8	not used	

Table 2

8.1 PCB LAYOUT



Input PCB



Output PCB

9.0 SPECIFICATIONS

INPUT/OUTPUT

INPUT SIGNALS

- A. **Voltage (Amplitude):** 50mv rms minimum, 100V rms maximum Sine wave(1 to 38 KHz); 50mv P-P pulse minimum, 100V P-P pulse maximum (0 to 38 KHz)
- B. **Contact:** Dry, 2ma @ 24 vac rating
- C. **Frequency range:** 0 - 0.031 Hz to 0 - 38KHz Full Scale.
- D. **Time Base:** 3 MHz sample clock.

OUTPUT SIGNALS

4-20 mA DC, 0-20 mA DC, 0-10 mA DC, 0-1 mA DC, 0-5 V DC, 1-5 V DC, 0-10 V DC

OUTPUT LOOP DRIVE CAPABILITY

$$R(\text{ohm}) = \frac{(V_{\text{supply}} - 5)1000}{I_{\text{out max. mA}}}$$

I out	0-20 mA or 4-20 mA			
V supply	15	24	36	42
R (ohm)	500	950	1550	1850

PERFORMANCE

- A. **Calibrated Accuracy:** ±0.1 %
- B. **Independent Linearity:** ±0.025 % maximum
- C. **Repeatability:** ± 0.025% maximum
- D. **Zero TC:** ± 0.005% of span max/°C
- E. **Span TC:** ± 0.005% of span max/°C
- F. **Load Effect:** ± 0.005% zero to full load
- G. **Output Ripple:** 10 mV (p-p) maximum
- H. **Response Time:** 3 milliseconds (10 to 90% step response)

- I. **Bandwidth (-3 db):** 120 Hz (Output response)
 - 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% over operating range
 - L. **Isolation:** Input/output/case: 600 VAC, 1000 VDC
- Note: All accuracies are given as a percentage of span

POWER

- A. 15 to 42 VDC - standard, 28 mA typical, 33 mA max

MECHANICAL

Electrical Classification: general purpose

- A. **Connection:** Screw, compression type, accepts up to 14 AWG
- B. **Controls:** Input SPAN and ZERO push buttons (Adtech Smart Touch™), Input Hysteresis potentiometer, Output SPAN and ZERO potentiometers.
- C. **Mounting:** DIN Surface, Snap-Track, or NEMA 4,7
- D. **Weight:** Net Unit: 4 oz (115 grams)
Shipping: 7 oz (200 grams)

OPTIONS

Option Number	Description
H-15D	Explosion Proof, Class1, Group B, C & D
H-25	Snap Track Mounting (N/C specify)
H-26	Surface Mounting (N/C specify)
H-27	NEMA 4 Enclosure
H-28	T35 DIN T rail 2 ft. long
H-28	T32 DIN G rail 2 ft. long

10.0 OUTLINE MOUNTING

