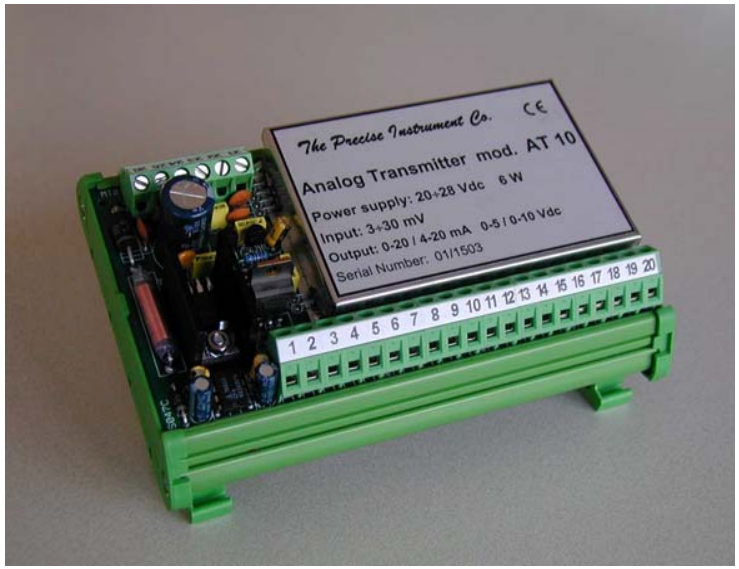
MODEL AT-10
ANALOG TRANSMITTER

INSTALLATION & OPERATING MANUAL



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SECTION I
GENERAL INFORMATION

Introduction

The Model AT-10 Analog Transmitters are electronic devices utilizing solid-state integrated components. They provide the user with a selectable voltage or current output directly proportional to the input signal within a specified linearity.

Description

The transmitters are intended for field mounting close to the vessel site, thereby reducing installation costs. An integral 20-position terminal strip provides connections for up to four transducers, thus eliminating the need for a separate summing junction box.

Two screw type terminal strips provide connections for the supply voltage, transducer wiring, and analog outputs.

The zero and span adjustments for the analog outputs are accomplished with two sets of dip-switches and trim pots.

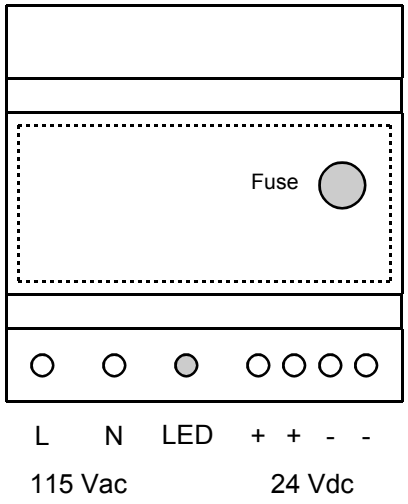
The units also include an adjustable filter which can be used to stabilize the output. Filtering is used to minimize the effects of vibration caused by agitators or other devices.

Each unit is set to customer specifications or factory standards prior to shipment in order to provide a fully tested and working instrument. Should a change be required, or to verify the initial settings, please follow the procedures outlined in Section II of the manual.

The standard packaging is an ABS plastic DIN-Rail mounted enclosure. Optional field-mounted, fiberglass or type 304 stainless steel NEMA-4X enclosures are available.

The transmitters are available with an optional 24 Vdc power supply enabling the unit to be operated with 115 Vac. For additional information, please refer to Section III of the manual.

FIGURE 4
Model 121 Power Supply



Fuse Replacement

- The following procedures require work inside the power supply enclosure and should be performed by qualified service personnel.
- Before opening the unit, disconnect the AC voltage.
- Remove the front cover from the power supply.
- Press down gently on the cover of the fuse holder, and turn counter-clockwise.
- Pull out the cover and fuse as an assembly, replace fuse with a new one.
- Re-install fuse and cover as an assembly, press down gently and turn clockwise.
- Replace the front cover on the power supply.
- Re-apply AC voltage to the unit.

In the event of a malfunction, please contact the nearest distributor for assistance. Any attempt to modify or repair the power supply will void the manufacturers warranty.

SECTION III
OPTIONS

Precise Model 121
24 Volt Power Supply

Specifications

Power

Input Voltage	115 Vac, 50/60Hz
Output Voltage	24 Vdc (norminal)
Power Consumption	10 VA maximum
Fuse	200 mA
Isolation	Class II

Environmental

Operating Temp. Range	+14 to +104ºF (-10 to +40°C)
Storage Temp. Range	-4 to +122ºF (-20 to +50°C)
Relative Humidity	85% non-condensing

Enclosure

Dimensions (L x H x D)	2.75" x 3.50" x 2.25"
Mounting	DIN-Rail mount
Material	ABS Plastic
Weight	12.5 Ounces

Installation

- Make sure the installation complies with local regulations and electrical codes.
- Connect AC voltage to the terminals marked “L” and “N”.
- The DC voltage is available on the terminals marked “+” and “-”. The second set of terminals are used when powering two transmitters from a single power supply.
- A red LED is illuminated when the power supply is “ON”.

Refer to Figure 4 on the following page for terminal locations.

Specifications

Power

Power Supply	24 Vdc ± 15%
Load Cell Excitation	10 Vdc
Load Current	200 mA (4 load cells x 350Ω)
Power Consumption	6 VA

Amplifier

Input Signal	Selectable, 10mV, 20mV, 30mV
Output Signals	Selectable (Internal jumper J1)
Voltage	0-10 Vdc (2KΩ min load)
Current	4/20 mA (500Ω load max)
Maximum Gain	≈ 4000
Coarse Zero	4-position dip-switch
Fine Zero	20-turn trim-pot
Coarse Span Control	4-position-dip switch
Fine Span Control	20-turn trim-pot
Linearity	± 0.02% FS
Analog Filter	Adjustable, 270° turn trim-pot

Environmental

Operating Temp. Range	+14 to +104ºF (-10 to +40°C)
Storage Temp. Range	-4 to +122ºF (-20 to +50°C)
Thermal Stability	20 ppm/°C
Relative Humidity	85% non-condensing

Enclosure

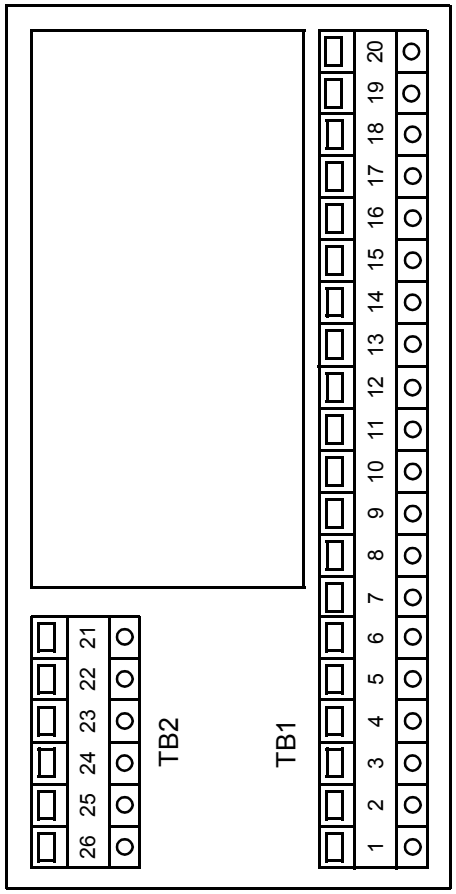
Dimensions (L x H x D)	5.0" x 3.5" x 2.5"
Mounting	DIN-Rail mount
Material	ABS Plastic
Weight	7.5 Ounces
Wiring connections	Terminal blocks, pitch 0.196

Options

115 Vac power supply	DIN-Rail mounted, (See pg. 10)
NEMA 4X Enclosure	Wall mounted, 10” x 8” x 4”

NOTE: All specifications are subject to change.

FIGURE 1
Wiring Connections

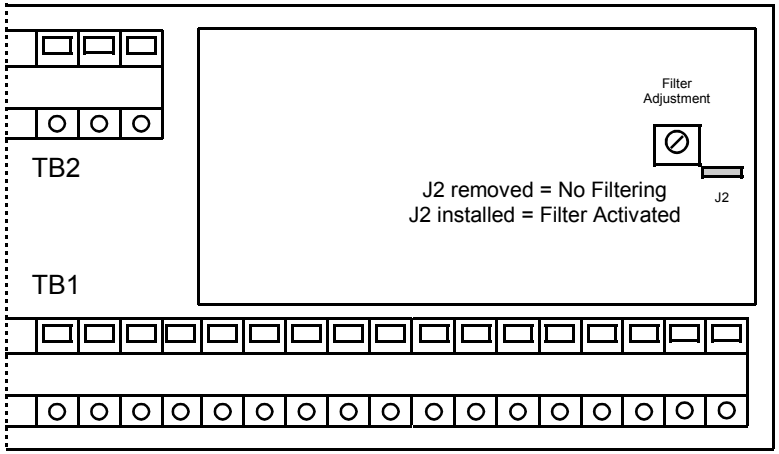


Mount the transmitter horizontally on a section of DIN-Rail with Terminal Block TB1 positioned on the bottom. If an optional 115 Vac to 24 Vdc power supply is used, the cable between the two devices must not exceed 3 feet.

TABLE 2
Span Adjustment Dip-switches

1	2	3	4	mV min	mV max
OFF	OFF	OFF	OFF	2.6	2.8
ON	OFF	OFF	OFF	2.8	3.0
OFF	ON	OFF	OFF	3.0	3.2
ON	ON	OFF	OFF	3.2	3.5
OFF	OFF	ON	OFF	3.4	3.7
ON	OFF	ON	OFF	3.7	4.0
OFF	ON	ON	OFF	4.0	4.4
ON	ON	ON	OFF	4.3	4.9
OFF	OFF	OFF	ON	4.8	5.4
ON	OFF	OFF	ON	5.3	6.1
OFF	ON	OFF	ON	5.9	7.0
ON	ON	OFF	ON	6.8	8.2
OFF	OFF	ON	ON	7.8	9.7
ON	OFF	ON	ON	9.3	12.2
OFF	ON	ON	ON	11.6	16.5
ON	ON	ON	ON	15.2	24.7

FIGURE 3
Analog Filter Adjustment



Calibration Procedure (cont'd)

Apply a known weight and adjust the fine span trim pot for the correct output. Turning the trim pot clockwise increases the output while turning it counter clockwise decreases the output.

Re-check "zero" and "span" calibration and re-adjust if required.

Replace the metal cover after calibration has been completed.

Analog Filter Adjustment

If the output is unstable under normal operating conditions, slowly turn the filter adjustment clockwise until the output stabilizes. See Figure 3 for location of the filter adjustment.

TABLE 1
Zero Adjustment Dip-switches

1	2	3	4	mV min	mV max
OFF	OFF	OFF	OFF	-0.8	1.6
ON	OFF	OFF	OFF	1.2	3.7
OFF	ON	OFF	OFF	3.0	5.5
ON	ON	OFF	OFF	4.6	7.1
OFF	OFF	ON	OFF	5.9	8.4
ON	OFF	ON	OFF	7.2	9.7
OFF	ON	ON	OFF	8.3	10.8
ON	ON	ON	OFF	9.3	11.8
OFF	OFF	OFF	ON	10.2	12.8
ON	OFF	OFF	ON	11.0	13.6
OFF	ON	OFF	ON	11.8	14.3
ON	ON	OFF	ON	12.5	15.0
OFF	OFF	ON	ON	13.1	15.7
ON	OFF	ON	ON	13.7	16.2
OFF	ON	ON	ON	14.3	16.8
ON	ON	ON	ON	14.8	17.3

The Model AT-10 is designed to be installed in the field close to the vessel. Terminal strip TB1 provides connections for up to four transducers, thereby eliminating the need for a separate summing junction box.

TB1		TB2	
1. - Excitation (cell # 1)	11. - Excitation (cell # 3)	21. + 4/20 mA	
2. + Excitation (cell # 1)	12. + Excitation (cell # 3)	22. + 0-5 / 0-10 Vdc	
3. - Signal (cell # 1)	13. - Signal (cell # 3)	23. - Analog Output	
4. + Signal (cell # 1)	14. + Signal (cell # 3)	24. - 24 Vdc (supply)	
5. Shield	15. Shield	25. + 24 Vdc (supply)	
6. - Excitation (cell # 2)	16. - Excitation (cell # 4)	26. Ground	
7. + Excitation (cell # 2)	17. + Excitation (cell # 4)		
8. - Signal (cell # 2)	18. - Signal (cell # 4)		
9. + Signal (cell # 2)	19. + Signal (cell # 4)		
10. Shield	20. Shield		

NOTE: Some transducer manufacturers utilize a 6-conductor cable (+/- Sense leads). When using these type of transducers, the + Sense lead must be connected to the + Excitation terminal and the - Sense lead must be connected to the - Excitation terminal.

SECTION II
CALIBRATION

Prior to calibrating the instrument perform the following calculations. This will enable you to determine where the dip-switches should be positioned for zero and span. Obtain the capacity and full scale output of the transducer/s from the calibration certificates. If required, convert them into the engineering units being used in the system.

Use the above values in the following formulas to determine the zero and span mV values.

Multiply the full scale mV/V output of the transducer/s by the excitation voltage to obtain mV.

Example: 3.0 mV/V x 10 Vdc = 30 mV.

Zero (mV) = Z x O / C

Z = Tare weight (vessel, agitator, etc)
O = Full scale output in mV
C = Total capacity of the transducers.

Set the zero adjustment dip-switches so the calculated value is within the minimum and maximum mV ranges given in Table 1.

Span (mV) = S x O / C

S = Net weight (live or product weight)
O = Full scale output in mV
C = Total capacity of the transducers.

Set the span dip-switches so the calculated value is within the minimum and maximum mV ranges given in Table 2.

Sample calculation:

Three 1000 lb. load cells, output = 3.0 mV/V
Tare weight = 500 Lbs.
Net weight = 2000 Lbs.
3.0 mV/V x 10 Vdc = 30 mV
Zero (mV) 500 Lbs. x 30 mV / 3,000 Lbs. = 5 mV
Table 1 dip-switch setting = Off, On, Off, Off (3.0 to 5.5 mV)
Span (mV) 2000 Lbs. x 30 mV / 3,000 Lbs. = 20 mV
Table 2 dip-switch setting = On, On, On, On (15.2 to 24.7 mV)

Calibration Procedure

Remove the metal cover to expose the dip-switches, jumpers and trim pots as shown in Figure 2 below.

Set the zero and span dip-switches so the calculated values are within the minimum and maximum mV ranges given in Tables 1 and 2.

Position jumper J1 for current or voltage output. See Figure 2.

Connect a digital multi-meter to terminal strip TB2 terminals 21 and 23 for current output or to terminals 22 and 23 for voltage output.

Apply power to the unit and allow a couple of minutes for the transmitter to warm up before making any adjustments.

Remove any weight from the system and adjust the fine zero trim pot for a reading 0 Vdc or 4 mA. Turn the trim pot clockwise to increase the output, or counter-clockwise to decrease the output.

FIGURE 2
Zero & Span Adjustments