Operation Manual

ATA-2001

LVDT/RVDT Signal Conditioner

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ATA-2001 LVDT/RVDT Signal Conditioner

1 Introduction

The ATA-2001 is a general purpose, AC line powered, LVDT/RVDT analog signal conditioner with digital setup and calibration. The embedded microprocessor generates a PWM-shaped sine wave (oscillator for transducer excitation) and handles all calibration functions. It also controls the demodulation, filtration and synchronization of the LVDT or RVDT transducer signal. All settings are stored in non-volatile memory for restoration on power-up. Zero, Gain and Phase adjustments are accomplished via the use of splash-proof front panel pushbuttons and digital voltage dividers. Intended for the most demanding industrial applications, the ATA 2001 is CE certified, and has been rigorously tested to the highest industrial standards for EMI, RFI and ESD.

Designed for universal compatibility with transducers having 4, 5 or 6 electrical connections, the ATA-2001 provides a wide range of oscillator frequencies, gains and two excitation voltages, affording maximum interface versatility. The very high drive current of 45mA allows **operation with transducer input impedance as low as 12 Ohms** (with 0.5 VRMS excitation). With high gain capability and low noise, the ATA-2001 provides measurement resolutions beyond most products currently available.

The **unique auto fallback synchronization** feature allows reliable master/slave operation, for prevention of amplifier cross talk, without the worry of sync signal loss. If the internal processor in a slave amplifier detects an unstable or missing sync signal, the internal clock will takeover, continuing at the preselected nominal frequency. Upon restoration of a normal sync pulse, the oscillator will return to the slave mode.

The ATA-2001 is contained within a rugged, one-piece, extruded aluminum housing which provides optimal amplifier performance under the most rigorous EMI and RFI conditions. An integral panel mounting system provides for convenient 1/8 DIN standard, panel installation. A pre-punched 19” rack adapter is also available to accommodate up to eight amplifiers per adapter installation.

2 Product Specifications

For complete specifications and ordering information, please refer to the datasheet at:
http://www.meas-spec.com/product/t_product.aspx?id=2584

Product specifications are also listed on the next page.

ATA-2001 LVDT/RVDT Signal Conditioner

ELECTRICAL SPECIFICATIONS	
Line power requirements	115VAC ±10%, 50-400Hz; 220VAC ±10%, 50-400Hz *(switch selectable)*
Line voltage regulation	±10%, with no change in output
Voltage output	
Unipolar voltage output range	0 to 10VDC, with 10mA maximum current capability
Bipolar voltage output range	±10VDC (using 100% zero suppression), with 10mA maximum current capability
Noise and ripple (voltage output)	3mV RMS maximum @ 2.5KHz excitation frequency
Output impedance (voltage output)	1Ω maximum
Current output	
Current output range	4 to 20mA
Internal loop supply voltage	18VDC
Maximum loop resistance	700Ω with internal loop supply; 1000Ω with 24VDC external supply *(32vdc MAX)*
Noise and ripple (current output)	10µA RMS (max)
Analog outputs frequency response	
Frequency response @ -3db	250Hz @ 2.5kHz ; 500Hz @ 5.0kHz ; 1000Hz @ 10kHz excitation
Amplifier characteristics	
Transducer FSO for 10 VDC output	High gain: 0.04 to 0.9 VRMS; Low gain: 0.5 to 10 VRMS *(switch selectable)*
Input impedance	100kΩ
Zero suppression range	±110% of FSO
Phase shift compensation range	±120 degrees maximum
Non-linearity and hysteresis	±0.05% of FSO, maximum
Stability	±0.05% of FSO, maximum, after 20 minute warm up
Temperature coefficient of output	±0.02% of FSO per °F [±0.036% per °C] over the operating temperature range
Transducer excitation	
Oscillator Drive Voltage	0.5 or 3.5 VRMS, sine wave *(switch selectable)*
Oscillator Drive Current	45mA RMS maximum
Oscillator Frequency	2.5, 5 or 10kHz *(switch selectable)*
Transducer requirements	
Transducer type	LVDT or RVDT with 4, 5 or 6 electrical connections
Input impedance (Primary)	12Ω minimum with 0.5 VRMS excitation; 80Ω minimum with 3.5 VRMS excitation
Full scale output	High gain: 0.04 to 0.9 VRMS; Low gain: 0.5 to 10 VRMS

ENVIRONMENTAL AND MECHANICAL SPECIFICATIONS	
Operating temperature range	-40°F to +185°F [-40°C to 85°C]
Storage temperature range	-40°F to +257°F [-40°C to 125°C]
Weight	2.1lbs [950 grams]
Transducer electrical connections	DB-9S (See our transducer data sheets for jumper cables or connector option)
Output and sync connections	Barrier terminal strip
Mounting	1/8 DIN standard panel mounting *(19" rack adapter for 8-up available)*
IEC 60529 rating	IP61 (Front panel only)

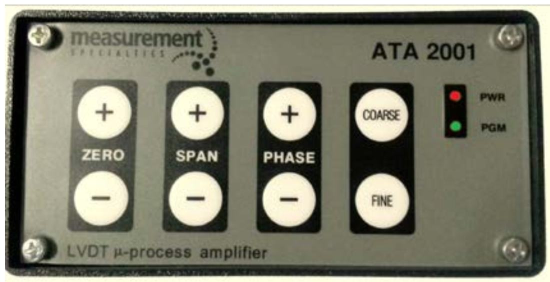
Notes:

- *All values are nominal unless otherwise noted*
- *FSO (Full Scale Output) is the largest absolute value of the outputs measured at the range ends*

3 Controls, Adjustments and Indicators

3.1 Front Panel

The ATA-2001 combined control and indicator panel is manufactured from a polyester membrane assembly with an integral RFI/ESD layer screened onto the rear of the outer surface. All push button controls are provided with tactile feedback for maximum operator interface. The operator is assured verification of control inputs through a system of red and green LED indicator signals.



3.2 Keypad Controls

The COARSE and FINE buttons:

Press **COARSE** and **FINE** simultaneously to unlock the keypad. The red power LED will extinguish and the green LED will illuminate. Once unlocked, the keypad will automatically re-lock after about 1.5 minutes of inactivity (the green LED will extinguish and the red LED will illuminate). *Zero, span and phase settings will be written to non-volatile memory upon keypad re-lock, so you will not lose your settings.*

Press the **FINE** button to establish the fine resolution mode, or **COARSE** to set up the coarse mode.

The + and – buttons:

ZERO buttons: Set the zero position or offset within the full measurement range of the sensor.
SPAN buttons: Set the full scale output of the amplifier to the desired voltage or current.
PHASE buttons: Optimize conditioner demodulation to compensate for cable or LVDT phase shift.

Pressing the **ZERO+** and **ZERO–** buttons simultaneously sets the zero offset to approximately 0.0 volts.

Pressing **SPAN+** and **SPAN–** simultaneously sets the span to mid-scale. Since span is "logarithmic", mid-scale default gain setting is not meaningful in the same sense as the zero default, but is a useful shortcut for returning to the factory default setting.

Pressing the **PHASE+** and **PHASE–** buttons simultaneously sets the phase correction to zero, or in-phase with the oscillator signal (transducer excitation).

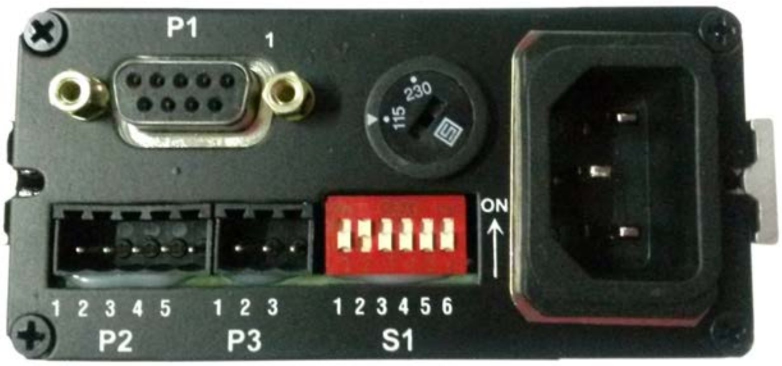
Note: The green LED will blink after each setting, to indicate execution of the command.

Holding down a **ZERO, SPAN** or **PHASE** button enables auto-repeat; the green LED flashes in approximate proportion to the slew rate. When the setting limit is reached, the flashing stops.

Press **COARSE** and **FINE** simultaneously to save all settings without waiting for the keypad to auto-lock.

3.3 Rear Panel

All remaining ATA-2001 controls are found on the rear panel using the DIP switch set labeled S1.



The following table explains the switch positions and functions:

	Function:	Gain	Oscillator frequency			Sync	Not used	Oscillator voltage
	Switch No:	1		2	3	4	5	6
	ON	HIGH				SLAVE		0.5 VRMS
	OFF	LOW				MASTER		3.5 VRMS
			10 kHz	ON	ON			
			5 kHz	OFF	ON			
			2.5 kHz	ON	OFF			

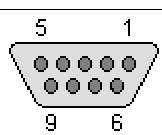
Notes:

- *Default factory settings are noted in BLUE in the table above.*
- *One master can sync up to **four** slaves.*
- *There are no user accessible controls within the ATA-2001 housing. **Do NOT open it** for any reasons as there are high (line) voltages on portions of the circuit board and warranty would become void.*

4 Wiring Instructions

4.1 Transducer Wiring & Schematics

The transducer connects to the ATA-2001 via the **P1** connector on the rear panel, using the supplied mating plug (DE-9P subminiature 9-pin "D"). The pinout of this connector is described in the table below.

 DE-9 pinout when facing the ATA-2001 rear panel	DE-9 pin number	1	2	3	5	9
	LVDT/RVDT winding	Primary	Primary	Secondary	Secondary	
	MEAS LVDT or RVDT wire color	YEL/BLK or YEL	YEL/RED or BRN	BLK	RED	Shield if cable
	MEAS LVDT or RVDT connector pin	C	F	D	A	

See wiring schematics on next page.

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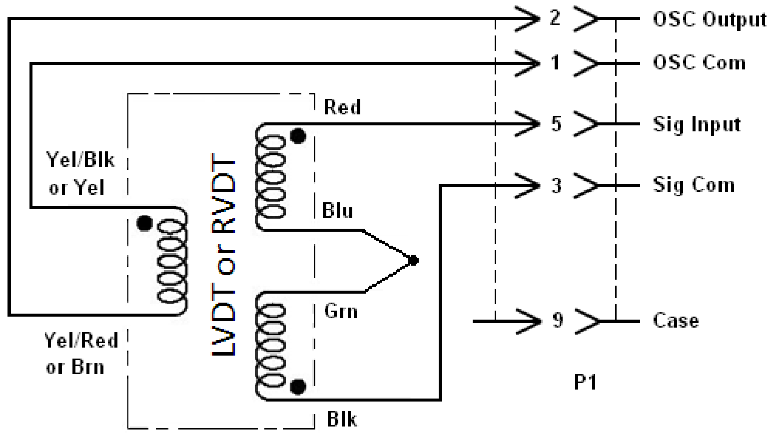
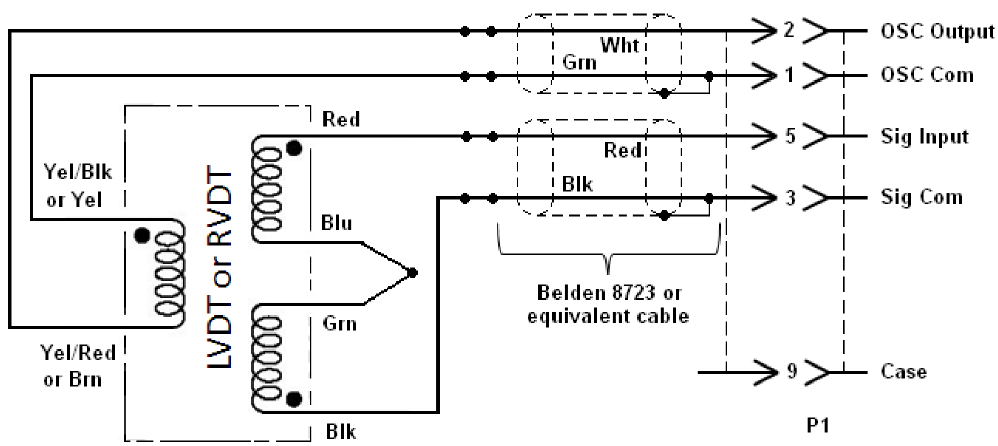
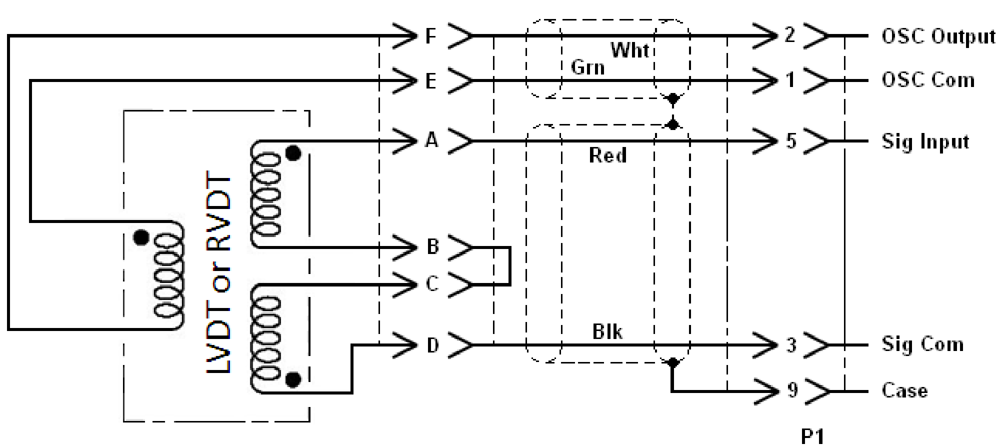


TRANSDUCER WITH LEADS OR CABLE



TRANSDUCER WITH LEADS AND SPLICED CABE



TRANSDUCER WITH CONNECTOR AND JUMPER CABLE

A separate cable with two shielded twisted pairs of wires is recommended for hook-up between the transducer and the P1 plug. Proper low capacitance instrumentation cable should be used to insure best performance and compliance with CE standards for emissions and susceptibility. **Belden™** 8723 or equivalent cable is recommended. The ATA-2001 utilizes a four wire synchronous demodulator and therefore does not require connection to the transducer secondary (output) center tap. Six-wire LVDTs and RVDTs must have external center tap jumpers installed as close to the transducer as possible.

At 2.5 kHz, most LVDT/RVDTs can operate with cable runs of up to 350 feet (over 100 meters). However, depending upon design characteristics, some are less tolerant of cable capacitance, and may exhibit adverse effect on linearity. If you experience difficulty with calibration, consult the factory for additional information about cabling effects on specific models.

Particular attention must be given to proper shield termination to prevent ground loops and EMI interference with the transducer signal. Single shield, multiple twisted pair cable is not recommended for multiple transducer installations (see the Master/Slave Operation section of this manual). Separate cables for each transducer will yield best results. See hook-up diagrams and shielding recommendations below.

Contact our factory for jumper cables sold as accessories for our LVDT and RVDT models.

4.2 Output Wiring & Schematics

The output signals are available at the **P2** connector on the rear panel. This connector is a five-position, "Euro" style, plug-in, screw terminal barrier strip. It was chosen for its ease of use and small footprint. Once all of the connections are made, the amplifier may be removed and reinstalled without disconnecting the individual wires. The wire clamps are designed to accept stripped and tinned wires with no soldering required. The ATA-2001 has several output signal options. They are as follows:

Voltage output

Bipolar Voltage: Most LVDTs may be calibrated for ±10, or ±5VDC output, corresponding to plus and minus full scale displacement of the transducer from its null position.

Unipolar Voltage: Single ended calibration options are, 0 to 10, or 0 to 5VDC for minus to plus full displacement of the transducer. Half the calibrated full scale DC voltage is at transducer null. For example, 0 to 10VDC calibration would have an output of 5VDC at the transducer null position.

Current output

The 4 to 20mA current output is most beneficial in applications with long signal runs. The signal maintains a constant current in the control loop for a given sensor position. Changes in loop resistance or voltage, within operating parameters, will not affect the position signal. Current loops also have greater resistance to electromagnetic and radio frequency interference. A shielded, twisted, wire pair is recommended for best immunity.

4 to 20mA internal loop power: Used when no external loop power supply is available. The internal power supply of the ATA-2001 provides the voltage (18VDC) necessary for the current loop. This feature should not be used with current receivers configured to supply loop power.

4 to 20mA external loop power: This option allows operation of the ATA-2001 with powered receivers. Using an external 24 to 28 VDC power supply increases the allowable loop resistance.

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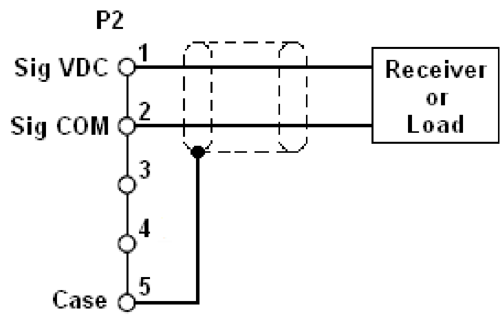
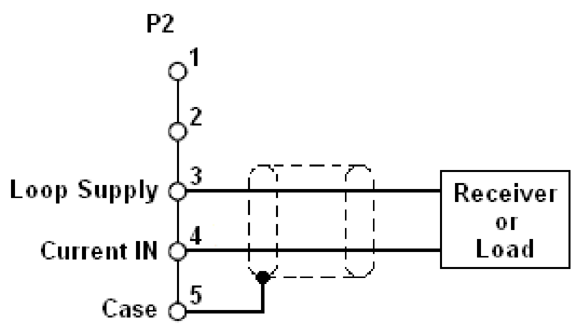
Wiring details:

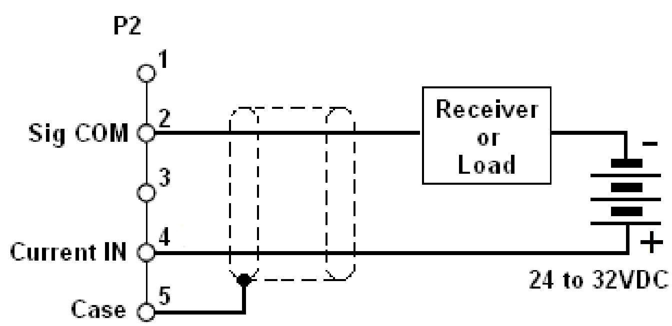
	**P2 pin no.**	**1**	**2**	**3**	**4**	**5**
	Function	DC Voltage Signal	DC Voltage Common	Current Loop Supply	Current Loop Return	Case Ground for Shielding



VOLTAGE OUTPUT



4-20mA OUTPUT USING THE INTERNAL LOOP SUPPLY



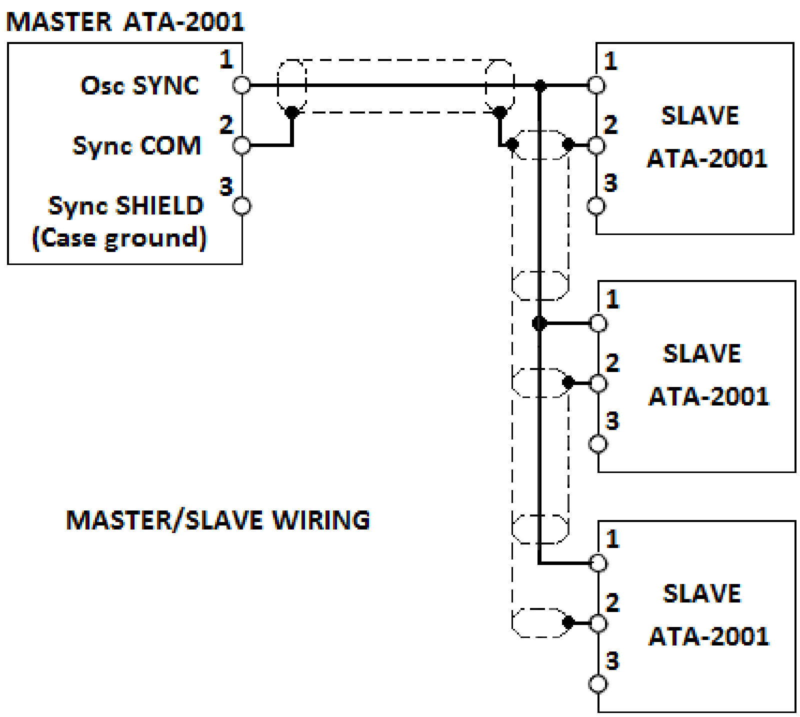
4-20mA OUTPUT USING AN EXTERNAL LOOP SUPPLY

4.3 Master/Slave Operation and Wiring

Multiple transducer setups (multiple ATA-2001 conditioners), with LVDTs and/or RVDTs in close proximity to each other or with long common cable runs, should have their excitations (oscillators) synchronized to a single frequency. Failure to do this may result in low-frequency beat (heterodyning) of the ATA-2001 output signals due to crosstalk. Select one ATA-2001 as the master (S1 switch 4 in the OFF position) and the remaining as slaves (S1 switch 4 in ON position). Check the “Rear Panel” section in this manual for switch settings. The **P3** connector is used for synchronization wiring. This is a three position “Euro” style connector similar to P2. Proper foil shielded, twisted pair cable with lengths kept as short as possible, should be used.

Wiring details:

	**P3 pin no.**	**1**	**2**	**3**
	Function	Oscillator SYNC	Sync COM	Shield



Notes:

- *Only one ATA-2001 may be setup as the master and all others must be configured as slaves.*
- *All units must have the same oscillator frequency setting (refer to the “Rear Panel” section in this manual).*
- *One master can sync up to **four** slaves.*
- *A single, foil shielded conductor is best for sync wiring, as depicted in the above schematic. A foil shielded, twisted pair (for Sync and Com connections), may be also be used, in which case the shield can be connected to Pin 3 on each ATA-2001. Always use the shortest cable possible.*

5 Setup and Calibration

5.1 Preliminary Setup

While the factory default settings will work for many transducers, you must verify that these settings are acceptable for your particular transducer by reviewing its specifications (input impedance and maximum allowable excitation voltage or current, at the selected excitation frequency).

Transducers with very low input impedance or high phase shift at lower oscillator frequencies often require different settings. All MHR series LVDTs work best at 10 kHz. The higher excitation frequency increases the input impedance and output sensitivity. This higher impedance results in lower oscillator current draw, allowing higher oscillator drive voltages with less heating effect on the coil. An additional benefit of the higher excitation voltage is the reduction in gain required for calibration, which improves overall signal immunity to external noise or interference. XS-B series LVDTs **must be operated at 0.5Vrms and 10 kHz**, due to extremely low primary impedance. Any attempt to operate the XS-B at 3.5Vrrns may cause permanent damage to the LVDT. The ATA-2001 itself is protected against overload and would not be harmed by this attempt. Consult the transducer datasheet for specific transducer frequency recommendations.

Verify all settings of DIP switch set S1 (Refer to the “Rear Panel” section of this manual). The ATA-2001 will calibrate for ±10 VDC output, using the default factory gain with transducers having Full Scale Outputs (FSO) ranging from 0.5 VRMS and up. If your calculated full scale output is less than 0.5 VRMS, use the High gain setting (S1 switch 1 in the ON position).

5.2 Getting Started

Do not connect the transducer to the ATA-2001 with power applied until you have completely read this section. Here are some basic formulas for the oscillator and gain settings (S1, switches 1, 2, 3, and 6).

Calculating drive current for a given oscillator voltage and transducer input impedance:

$$\text{Drive Current} = \frac{\text{Excitation Voltage}}{\text{Input Impedance}}$$

Example 1: 3.5 VRMS / 500 Ohms = 0.007 Amp or 7mA (this will work)
Example 2: 3.5 VRMS / 50 Ohms = 0.070 Amp or 70mA (this will not work)

Question: Why won't Example 2 work?
Answer: In the specification table at the beginning of this manual, it is stated that the maximum oscillator drive current available is 45mA. Example 2 exceeds this specification, due to the low input impedance.

Question: Will the ATA-2001 still work with the low impedance transducer in Example 2?
Answer: Yes, there are two options. Reducing the drive voltage to 0.5Vrms (0.5V/50Ω=10mA), or increasing the oscillator frequency (preferred method) to 5 or even 10 kHz. If the input impedance of your transducer at the higher excitation frequency is at least 78 Ohms, you may still operate the ATA-2001 at 3.5 VRMS (3.5/78=45mA); **however, 45mA may still be too high a current for your transducer** (Check with the transducer manufacturer first).

Unless otherwise specified, MEAS recommends using **25mA** as a maximum, to avoid causing permanent damage to the transducer or voiding its warranty. MEAS application note “LVDT Selection Handling and Installation Guidelines” contains a detailed discussion on this subject.

Calculating the transducer Full Scale Output (FSO) for a known sensitivity and excitation voltage:

FSO = Oscillator Voltage x Transducer Sensitivity x Full Scale Displacement

Notes:

- *The transducer sensitivity (like its input impedance), will change function of the excitation frequency*
- *The transducer sensitivity is specified in VRMS/VRMS/mm or /inch*
- *The Full Scale Displacement (inch or mm for LVDT, degree for RVDT) is the maximum transducer displacement from the mid-stroke null position. For example, if the transducer is an LVDT with ±5 inch stroke, the Full Scale Displacement is 5 inches.*

Examples with MHR series LVDT operated at 10 kHz:

Example 1: MHR 100 (±0.1 in), FSO=3.5 VRMS x 2.8 V/V/in x 0.1 in=0.98 VRMS (will work in Low gain)
Example 2: MHR 010 (±0.01 in), FSO=3.5 VRMS x 6.05 V/V/in x 0.01=0.212 VRMS (must use High gain)

Question: How do I know if I need High or Low Gain?
Answer: Refer to the specification page at the beginning of this manual, under “Amplifier characteristics”. It is stated that Low gain requires a transducer with minimum FSO of O.5 VRMS to obtain a 10 VDC output from the ATA-2001. In Example 1, the FSO is 0.98 VMS which meets the Low gain requirement. In Example 2, the FSO is only 0.212 VRMS, therefore High gain is required.

5.3 Time to Power Up

CAUTION!
Be sure to verify the position of the AC line voltage selector switch, before applying power. Failure to do so may cause permanent damage to the ATA-2001.
Do NOT operate with 230VAC, unless the switch is in the proper position.

Plug the line plug into an AC outlet to apply power. Allow for a **15 to 20 minute warm-up**, prior to the initial calibration. When power is first applied, the red LED on the front panel should illuminate. If the LED is flashing off and on, verify that S1 (rear panel) switch 4 is in the OFF (master) position. A flashing red LED when in the slave mode, indicates a loss of the master sync signal. If switch no. 4 of DIP switch set S1 is already in the OFF position, there may be a “checksum” error. Pressing the **COARSE** and **FINE** programming buttons simultaneously will stop the flashing and correct the condition.

5.4 Calibration

LVDT or RVDT calibration with the ATA-2001 requires a minimum amount of equipment. A good quality digital voltmeter, and some type of displacement standard such as a barrel micrometer, gage blocks or protractor for RVDTs. Cabling capacitance affects the scale factor, therefore calibration must be done with the required cable in place between the transducer and the amplifier. To perform a traceable calibration, NIST traceable equipment must be used, (meter and gage blocks). For the purpose of calibration, it is assumed that you have the LVDT, RVDT, or gage head (spring or air actuated LVDT) mounted in some sort of fixture, a dial indicator stand, or a piece of equipment onto which you intend to install the transducer. If you have a fixture gaging application, you may use zero and set masters or zero masters and gage blocks.

Note: If an RVDT is used instead of an LVDT, the following procedures are the same except that you would be rotating the shaft instead of moving a core or a plunger, and you would be using a different positioning fixture (angular instead of linear).

Calibrating for bipolar voltage output (±10VDC at transducer full scale):

1. Disconnect the LVDT from the ATA-2001. After proper warm up, connect a digital volt meter to the **P2** connector, between Pins 1 and 2. Pin 1 is DC voltage signal out (+), and Pin 2 is signal common (–).
2. Unlock the keypad by depressing the **FINE** and **COARSE** buttons at the same time.
3. Simultaneously depress the **ZERO+** and **ZERO–** buttons. This should cancel out any zero offset. If there is still a residual output, press the **FINE** button, then use the **ZERO +/–** buttons to get as close to 0 VDC as practically possible (a small offset at this point will not adversely affect your calibration).
4. Connect the LVDT to the **P1** connector.
5. Move the LVDT core, the core connecting rod, or the plunger in and out, around the approximate mid-stroke, in order to find the position that is as close to zero-volt DC output as possible. If the core connecting rod is fixed, you may slide the LVDT body back and forth in its mounting instead. When done, secure the connecting rod or the LVDT body.
6. Move the core of the LVDT, to roughly half the positive VDC calibration scale (towards the lead wire or connector side for MEAS LVDTs). You do not have to be precise for this part of the calibration. If the keypad has timed out, unlock it again using the **FINE** and **COARSE** buttons. If the output exceeds 5 VDC, use the **SPAN–** button to reduce it.
7. Depress the **PHASE+ or PHASE–** button, (whichever increases the output). The output voltage will climb until it reaches a maximum and then start to decline. Stop when the maximum level is found. If at any point during this operation, the output voltage exceeds 10 VDC, reduce the span again using the **SPAN–** button, and then continue the operation.
8. Return the core to the original zero position; the output should still be 0 VDC. If it is not, make a small adjustment with the **ZERO+** or **ZERO–** button.
9. Move the core exactly to the positive VDC full scale, using your micrometer or gage blocks. This position should be the maximum positive range over which you intend to perform the calibration.
10. Using the **SPAN+** or **SPAN–** button as necessary, adjust for +10 VDC output. Use the **FINE** or **COARSE** buttons as required, to make the setting easier.
11. Recheck the zero position for 0 VDC, and then displace the core to the negative full scale position, to check for -10 VDC and for symmetry. You may make small adjustments with the **ZERO +/–** buttons.
12. Depress **FINE** and **COARSE** simultaneously to save your settings, or wait for the keypad to time-out (auto-lock) and automatically save your calibration parameters.

Calibrating for unipolar voltage output with zero suppression (0/+10VDC at transducer full scale):

1. Follow the instructions on the previous page through Step 9. Then, using the **SPAN +/–** buttons, adjust for +5 VDC output. Use the **FINE** or **COARSE** buttons as required, to make the setting easier.
2. Recheck the zero, and then displace the core to the negative full scale position to check for -5 VDC and for symmetry. You may make small adjustments with the **ZERO** +/– buttons, as needed.
3. Using the **ZERO+** button with the core still at the negative full scale position, change the output to 0 VDC (from the original -5 VDC).
4. Move back to your original zero position; the output should now be +5 VDC instead of 0 VDC.
5. Move to your original positive full scale position, it should now be +10 VDC instead of +5 VDC.
6. Depress **FINE** and **COARSE** simultaneously to save your settings, or wait for the keypad to time-out (auto-lock) and automatically save your calibration parameters.

Calibrating for current (4 to 20mA) using the internal loop power supply:

1. Disconnect the LVDT from the ATA-2001. After proper warm up, connect a digital current meter or receiver to the **P2** connector, Pins 3 and 4. Pin 3 is the current loop output (loop supply) and Pin 4 is the current loop return.
2. Unlock the keypad by depress the **FINE** and **COARSE** buttons at the same time.
3. Simultaneously, depress the **ZERO+** and **ZERO–** buttons. This should cancel out any zero offset in the ATA-2001. Read the current meter; it should display 12mA DC. Press the **FINE** button, then use the **ZERO +/–** buttons to get as close to 12rnA as practically possible.
4. Connect the LVDT to **P1** connector.
5. Move the core, the core connecting rod, or the plunger in and out, around the approximate mid-stroke, in order to find the position that is as close to 12mA DC output as possible. If the core connecting rod is fixed, you may slide the LVDT body back and forth in its mounting instead. When done, secure the connecting rod or the LVDT body.
6. Move the core to roughly half of the positive calibration scale (toward the lead wire or connector side for MEAS LVDTs). You do not have to be precise for this part of the calibration. If the keypad has timed out, unlock it again using the **FINE** and **COARSE** buttons. If the output exceeds 16mA, use the **SPAN–** button to reduce it.
7. Depress the **PHASE+ or PHASE–** button, (whichever increases the output). The output current will climb until it reaches a maximum and then start to decline. Stop when the maximum level is found. If at any point during this operation, the output exceeds 20mA, reduce the span again using the **SPAN–** button, and then continue the operation.
8. Return the core rod to the original mid-stroke position; the output should still be 12mA. If it is not, make a small adjustment with the **ZERO+** or **ZERO–** button.
9. Move the core exactly to the positive full scale, using your micrometer or gage blocks. This position should be the maximum positive range over which you intend to perform the calibration.
10. Using the **SPAN+** or **SPAN–** button as necessary, adjust for 20mA output. Use the **FINE** or **COARSE** buttons as required, to make the setting easier.
11. Recheck your mid-stroke position for 12mA DC, and then displace the core to the negative full scale position, to check for 4mA and for symmetry. You may make small adjustments with the **ZERO** +/– buttons to balance the endpoints.
12. Depress **FINE** and **COARSE** simultaneously to save your settings, or wait for the keypad to time-out (auto-lock) and automatically save your calibration parameters.

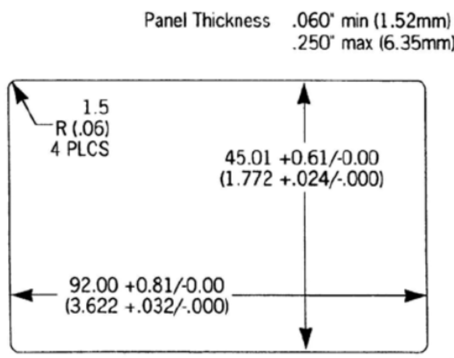
Calibrating for Current (4 to 20mA) using an external loop power supply:

1. Disconnect the LVDT from the ATA-2001. After proper warm up, connect the positive side of an external power supply to Pin 4 of the **P2** connector. Connect the negative side of the external power supply to the negative input of a digital current meter or receiver. Connect the positive input of the meter or receiver to Pin 2 of the **P2** connector.
2. Follow Steps 2 through 12 in the previous section (calibrating for current using the internal loop supply).

6 Mounting Instructions

6.1 Cutout

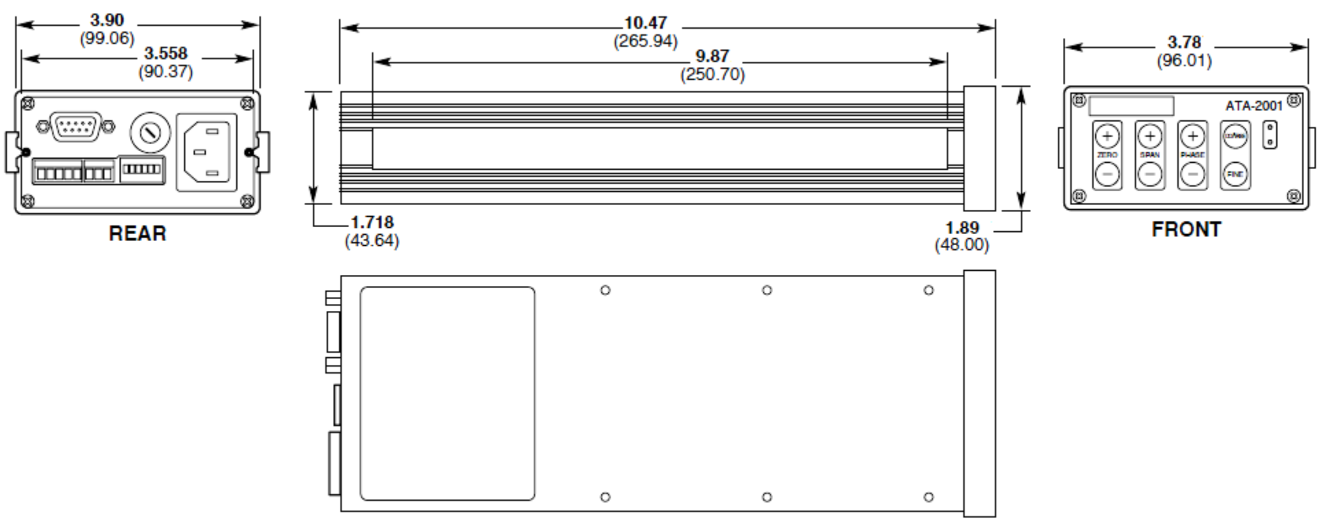
The ATA 2001 is designed to be mounted in a 1/8th DIN standard panel cutout. The dimensions for the installation opening are: 3.622 +0.032/-0.000 inch (92 +0.81/-0.00mm) wide, by 1.772 +0.024/-0.000 inch (45.01 +0.61/-0.00mm) high. This is the same mounting standard used by most common digital panel meters. The minimum recommended panel thickness is 0.060 inch (1.52mm); the maximum is 0.250 inch (6.35mm). All the necessary hardware for panel installation is provided.



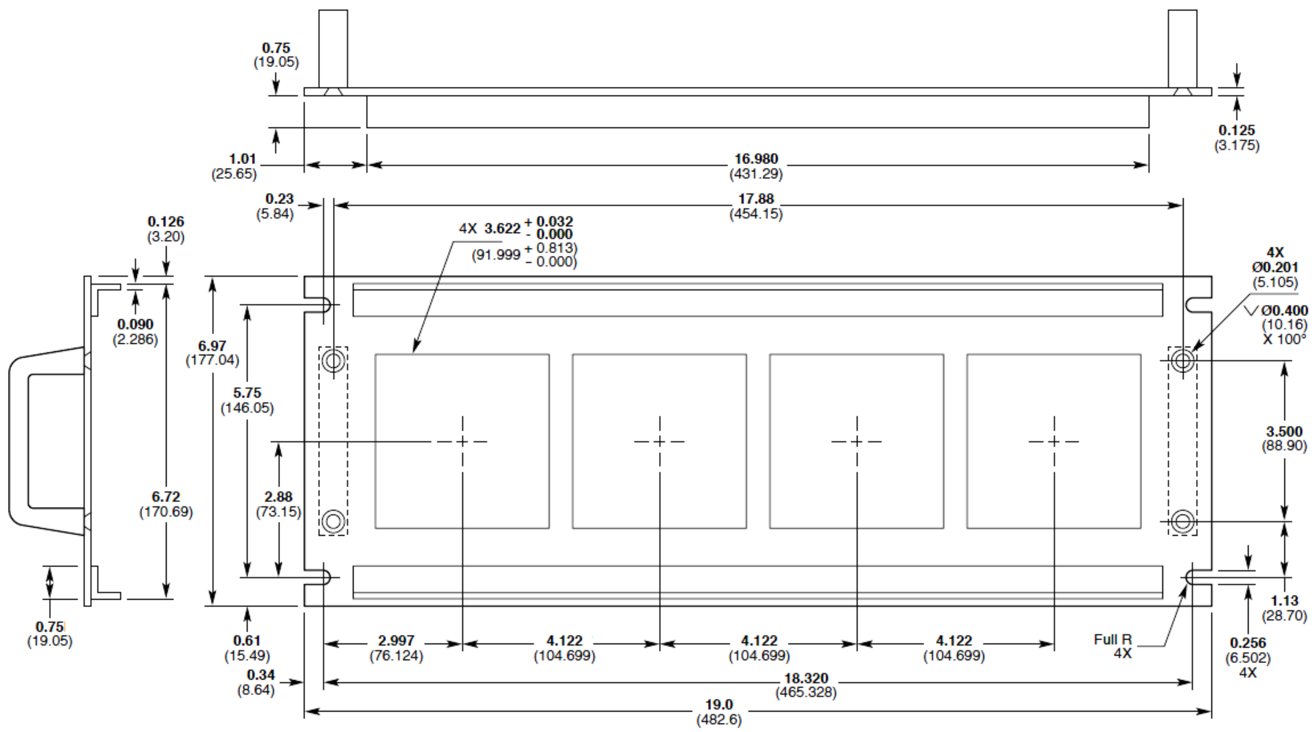
6.2 Installation

Remove the recessed socket head set screws from the center holes at the sides of the rear panel. Slide the panel jacks to the rear, out of their slots. Install the ATA 2001 from the front of the mounting hole. Slide the panel jacks back into their slots, pushing them up against the rear of the panel. Be careful not to over tighten, and then reinstall the socket head jack screws.

7 Dimensions



8 Dimensions, Rack Adapter *(Sold Separately)*



Accommodates up to eight ATA-2001 Amplifiers
Dimensions are in inch (mm)

9 Additional Information

Measurement Specialties, Inc. (MEAS) offers many other types of sensors and signal conditioners. Data sheets can be downloaded from our web site at: http://www.meas-spec.com/datasheets.aspx

*MEAS acquired Schaevitz Sensors and the **Schaevitz**TM trademark in 2000.*

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