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Trend-Setter II User's Manual

GAGES
Edmunds

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Preface

Manual Revision History

Revision	Change	Date
0	Original Issue	04/07/03
A	Section 2.0, Number References - Interface Cable was #4550203	10/14/03
	Figure 2.4, I/O Pins, Corrected pin numbers	
B	Section 2.0, Number References - Added Auto Air Shutoff Kit	4/19/04
	Figure 2.4, I/O Pins, Pin numbers for Auto Air Shutoff	
	Added Section 4.5, Auto Air Shutoff	
C	Updated Advanced Operation section for new revision of E8302 board	3/10/05
	Corrected I/O cable listed in Advanced Operation section to be #4550200, was #4550203	
	Update section 4.5, Auto Air Shutoff – 25 pin connector to Port "B" only	

Trademark Information

Introduction

1.0 Summary and Features

The Edmunds Gages Trendsetter II offers many sophisticated features and benefits for durable and robust for shop floor operation.

The Trendsetter II is a microprocessor based gaging column that combines a 101 discrete LED bargraph display for easy visual monitoring of dimensional measurement characteristics, with an eight digit alpha numeric display for precise size readings and operator prompting messages. Illuminated range indicators identify which of the eight inch or eight millimeter ranges have been selected. The tri-color LED bargraph conveys both measurement size and status. A single rotary entry switch and six dedicated mode pushbuttons provide all of the operator control functions required.

The unit is housed in a heavy duty reinforced aluminum case with a module bay for interchangeable plug in modules which will accommodate Edmunds LVDT type gaging probes or Edmunds and nearly all major brands of air tooling. The rear panel of the column contains two female DB25 connectors which provide 6 channels for input/output bussing of analog signals. These connectors also provide various control/status signals when the I/O accessory board is installed, Edmunds #5911013, sold separately. An RS-232C connector allows output of gage results to a data collector. The Trendsetter II will operate at any supply line voltage between 100 VAC to 240 VAC at either 50 or 60 HZ. An additional receptacle is provided for power jumper cord connections for multiple column applications. The serial number with revision letter is identified at the top of the rear panel of the Trendsetter II. The Trendsetter II allows the user tremendous flexibility in tailoring the column to match the gaging requirement.

1.1 Document Conventions

IN/MM = Shortcut Programming Key

"OVER" = Alphanumeric Display

1.2 Anti-Static Precautions

When working inside the Trendsetter II cabinet or handling signal conditioning modules use caution to protect against damage from static electricity. Use of an anti-static wrist band or other grounding procedures are recommended.

Power to the column must be turned off prior to installing or removing a signal conditioning module.

1.3 Glossary of Terms

An **A/E (Air to Electric)** transducer converts changes in pneumatic pressure into an electrical signal.

A part **Check** is an input or combination of inputs expressed with a gaging mode to exhibit a part characteristic.

The **Gain** setting on the A/E signal conditioning module sets the amplification factor of an input signal to a usable value that can be interpreted by the readout device

A **Gage** is a mechanical device used to measure part characteristics.

Gage Readings are the input values obtained during the gage cycle.

A **High Level Signal** is an amplified +/-2.5VDC signal that reflects the number of bars illuminated on the bargraph display.

An **Input** is the assigned name given to a signal that is to be utilized in a gaging formula.

In **LIVE RDG (Live Reading)** mode the input signal is directly displayed on the alphanumeric and bargraph displays in real time.

A **Low Level Signal** is the raw unamplified voltage from an LVDT or A/E transducer.

An **LVDT (Linear Variable Differential Transformer)** is an electromechanical transducer that converts the linear motion of its contact tip to an AC voltage which can be interpreted by a readout device.

Magnification is the enlargement of an input signal to a usable value that can be interpreted by the readout device.

A **Maximum (MAX) Master** is a precision replica of the gaged part manufactured to the upper specification limit of the part features, inspected and certified to size, for use in the calibration of the gage.

A **Minimum (MIN) Master** is a precision replica of the gaged part manufactured to the lower specification limit of the part features, inspected and certified to size, for use in the calibration of the gage.

Mode is the user programmable function controlling how the results are displayed on the readout.

The **Over** limit is the part print upper specification limit for the checked feature.

Polarity is the signed value (+ or -) applied to the magnification of an input to determine the direction of the input value change.

In **+PEAK** (or **-PEAK)** modes the largest (or smallest) size reading since the last reset is displayed.

Range is the full scale value of the bargraph display.

An **R & R** is a statistical study performed on a gage to determine the gages repeatability and reproducibility.

Repeatability is the measurement variation of a gage when used by one operator or under one set of environmental conditions.

Reproducibility is the variation in measurement averages of a gage when used by more than one operator or under varying environmental conditions.

The **Resolution** of a gage is the smallest significant digit of the measurement data that is displayed.

A **Signal Conditioner** is a circuit board that modulates and amplifies the LVDT or A/E signal used by the readout device.

In **TIR** (Total Indicator Reading) mode the difference between the largest and smallest readings measured is displayed.

The **Under** limit is the part print lower specification limit for the checked feature.

A **Zero (or Mean) Master** is a precision replica of the gaged part manufactured to the nominal dimensions of the part features and calibrated to size for use in the calibration of the gage.

A **Zero adjustment** knob allows operator to drive the displayed readout value to a desired setting within a limited range.

1.4 Quick Start Guide

The following steps must be taken to prepare the Trendsetter II® for operation.

1) Unpack and setup the unit.

- Rotate the front foot 90° from its shipping position.
- For air gaging applications, rotate the rear foot 180° from its shipping position and install the filter regulator assembly. Connect 60 psi min supply air to the filter regulator assembly

Note: See "Basic Operations, Unpacking & Setup" for additional information, page 3-1

2) Setup and install the signal conditioning module if it was not installed before shipment and connect the gage tooling.

- Check that the jumpers and switches on the LVDT or A/E signal conditioning board to be used are properly setup for the application to be run.
- Install the signal conditioning module into the lower bay and secure with the two thumb screws on the front panel.
- Plug in the LVDT(s) or airline from the gaging fixture to the signal conditioning module.

Power to the column must be turned off prior to installing or removing a signal conditioning module.

Note: See the "Advanced Operation, Module Setup" section for additional information, page 4-1.

3) Program Trendsetter II® for the application.

- Plug the power cord into the rear of the unit and to a 100 VAC to 240 VAC 50/60 Hz power supply. Turn the unit on using the on/off switch on the rear of the unit.
- Using the programming keys and the enter button program the scale, range, mode, and limits for the application.

Note: See the "Basic Operation, Programming" for additional information, page 3-7

4) Set up magnification and zero for the gage input or inputs.

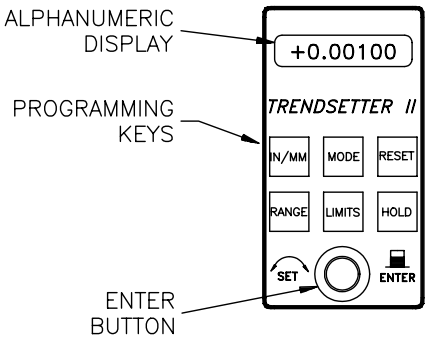
- Using the masters for the gage tooling and the mag and zero adjustments on the signal conditioning modules setup the LVDT(s) or air inputs.

Note: See "Basic Operation, Input Setup" for additional information, page 3-10

5) Select the proper gaging mode using the programming keys, see page 3-17. The unit is ready for gaging.

Programming Reference Guide

The following reference guide briefly outlines the functions of the programming buttons for the Trendsetter II.



MODE — Pressing this button will initially default to displaying the selected mode. Additional presses will scroll and select the next mode option.

RESET — Pressing this button will reset the current latched reading.

IN/MM — Pressing this button will initially default to displaying the last selected scale. Additional presses will scroll and select the next scale option.

RANGE — Pressing this button will initially default to displaying the last selected range. Additional presses will scroll and select the next range option.

HOLD — Pressing this button will latch and hold the current displayed reading until the "RESET" button is pressed.

LIMITS — Pressing this button will toggle the display of the limits options (OVER, UNDER). When desired limit (OVER or UNDER) is selected and display is flashing rotate the Enter button to set limit. Press the Enter button to select.

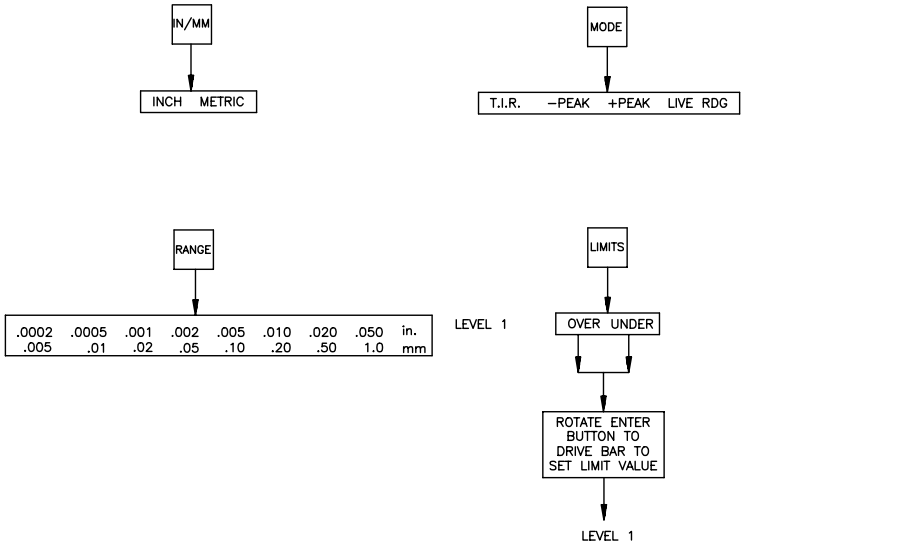


Figure 1.1

System Description

2.0 Number References

Component	Edmunds Gages Number
Basic Trendsetter II® Unit	E8300
(2) Channel LVDT Signal Conditioning Module	E8302
(1) Channel A/E Signal Conditioning Module	E8303
Power Cable	4550111
Air Filter/Regulator Assembly	5801302
Interface Cable	4550200
Printer Cable	5809060
Power Jumper Cable	4550120
I/O Accessory Board (Optional)	5911013
Auto Air Shutoff Kit (Optional)	5912250
Includes: Valve Assembly	5911200
I/O Accessory Board	5911013
Shutoff Cable	5911018

2.1 Specifications

Overall Dimensions	21.25” x 2.50” x 9.00”
Power Requirements	100 VAC to 240 VAC 50/60 Hz
Power Consumption	12 Watts @ 120 VAC, 100 mA
Air Requirements (E8303 Module Only)	
Pressure	60 psi
Flow Rate	1.6 scfm/air tooling nozzle
Environmental Operating Conditions	
Max Temperature	50°C/120°F

2.2 Recommended Spare Parts

Below is a list of recommended spare parts for the Trendsetter II. These items may be ordered separately from Edmunds Gages, they are **not** included with the basic unit.

Part	Edmunds Gages P/N	Qty.
Basic Unit		
10 Amp Fuse	4190135	2
Limit Pointer Assembly	5809508-BM	2
E8302 LVDT Module		
2 Position Shunt, .100 Spacing	4570117	1
E8303 A/E Module		
A/E Block	3101500	1
Needle Valve Assembly	3101045	1
O-Ring, Restriction Screw	5900026	1
O-Ring, Body	5900027	1
Bias Restrictor Assembly	3101188-B	1
Filter Disc	3101130-B	2
Bias Restrictor O-Ring	5900026	2
Transducer O-Ring	5900043	2
Air Filter Replacement Element	SMC #KT-AF2000-5B	1
2 Position Shunt, .100 Spacing	4570117	1

2.3 Overall E8300Unit

Figure 2.1 - Trendsetter II Basic Unit

2.4 Front Panel

The Trendsetter II front panel consists of the following items:

Bargraph display - The 10 inch, 101 point, three color LED bargraph display is the primary readout for the Trendsetter II. When over and under limits are programmed, the bargraph will change colors to visually indicate over (red), under (yellow), or good parts (green).

Range Annunciators - Located next to the bargraph, the half scale indicators display the bargraph values for the various ranges.

Adjustable Limit Pointers - Mechanically positioned limit indicators.

Range Indicator - Displays the currently selected full scale range. Inch ranges are displayed in green. Metric ranges are displayed in amber.

Alphanumeric Display - During gaging operation the alphanumeric display provides a digital readout of the bargraph value. During programming the alphanumeric display shows information on the current programming selections.

Programming Keys - Provide a shortcut to the various programmable options.

Rotary Enter Button - The enter button can be either pressed or rotated and is used during the programming of the Trendsetter II.

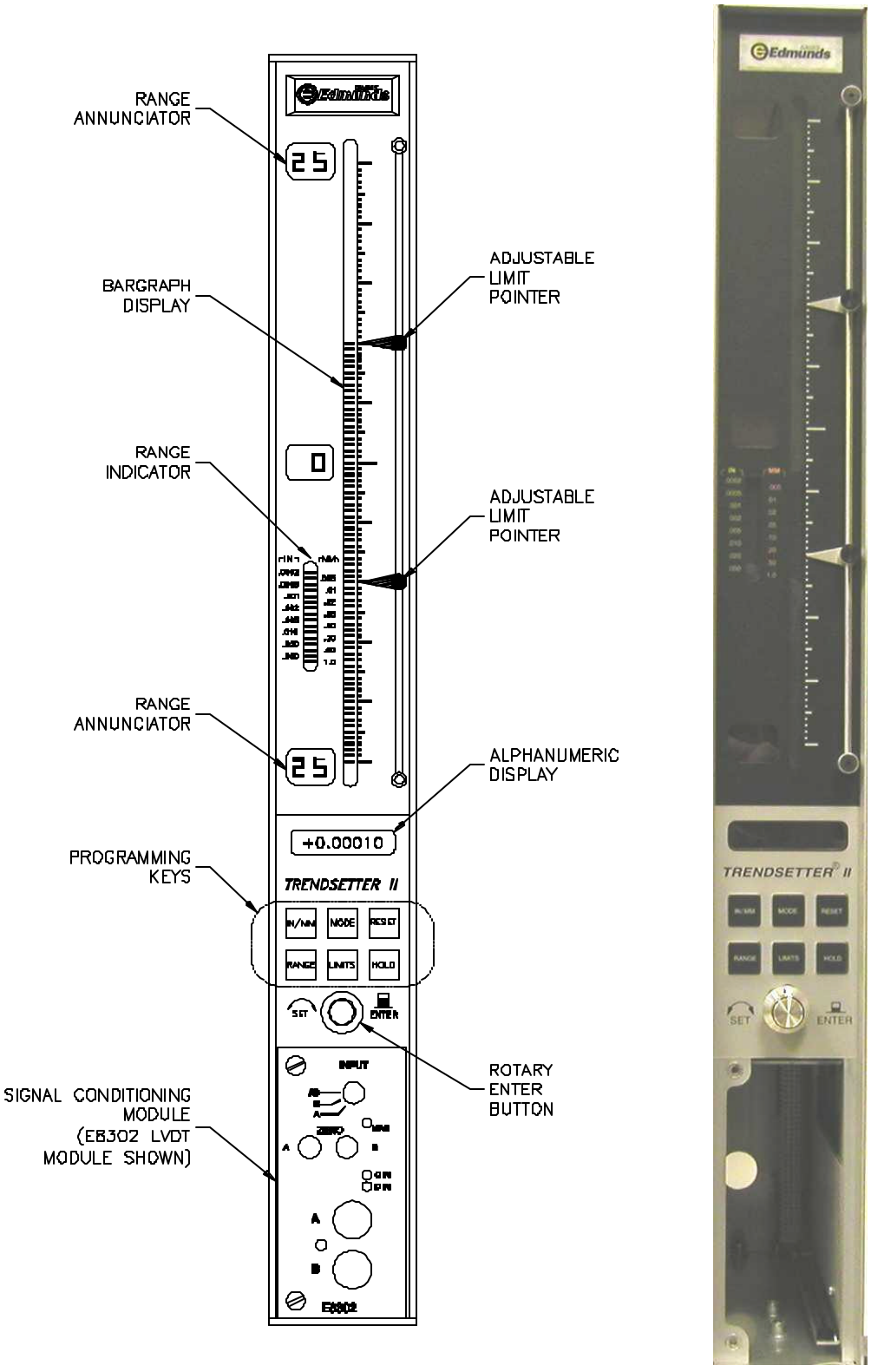


Figure 2.2 - Front Panel

2.5 Rear Panel

The Trendsetter II rear panel contains the following items:

Serial Number - The Edmunds Gages serial number is listed at the top of the rear panel.

Fuse Locator - Contains a 10 Amp fuse.

Power Switch - Use to switch the unit on or off.

Power Connector - Plug the power cable (Edmunds #4550111) into the power connector and connect to input line voltage from 100 to 240 VAC at 50 or 60 Hz. The Trendsetter II contains a universal power supply that will automatically adjust to any line voltage in the above range.

Power Outlet Jumper - In a multiple Trendsetter II setup, plug power jumper cables (Edmunds #4550120) from the power outlet jumper on one unit to the power connector on the next unit.

RS-232C Connector - Use to output gage results to an external data collector.

IN/OUT A (25 Pin) - Use to input/output parallel and analog signals from another Trendsetter II or to an external device using interface cable, Edmunds #4550203. See figure 2-3 for pin assignments.

IN/OUT B (25 Pin) - Use to input/output parallel and analog signals from another Trendsetter II or to an external device using interface cable, Edmunds #4550203. See figure 2-3 for pin assignments.

44 PSI Inlet - When the air to electric module is installed in the lower bay, an air hose fitting will extend out the 44 psi inlet port on the rear of the Trendsetter II. An air line is connected to this fitting and to the outlet side of the air filter/regulator assembly.

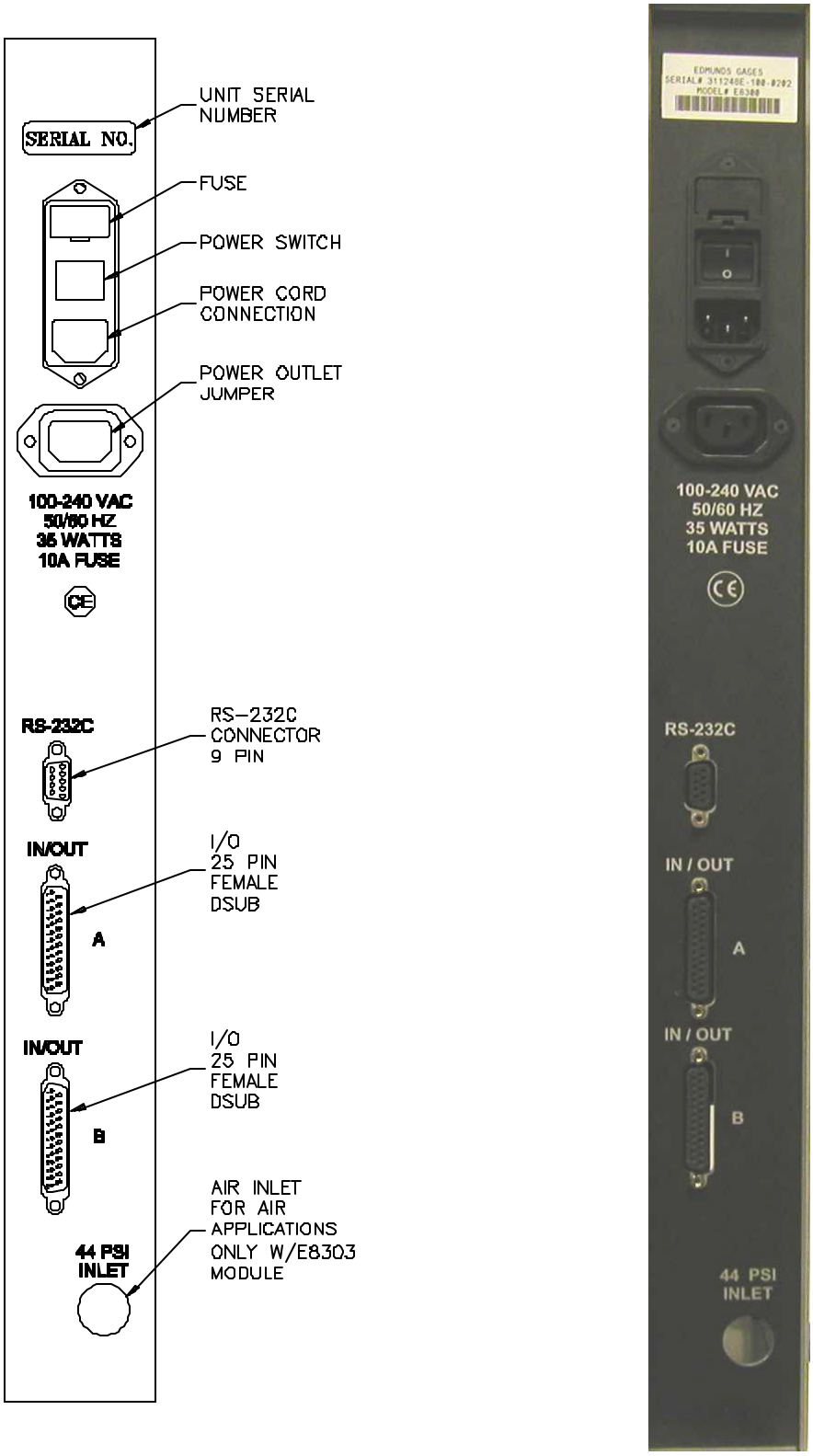
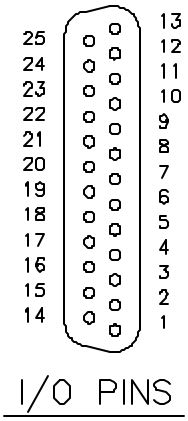


Figure 2.3 - Rear Panel

2.6 Pin Assignments for Rear Panel connectors

In/Out A, In/Out B (25 Pin Female DSUB)



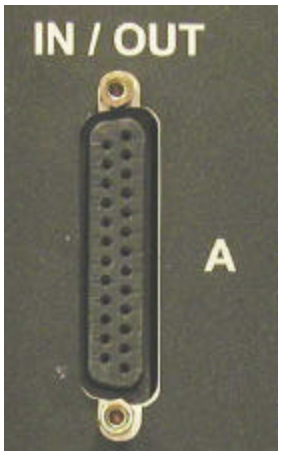


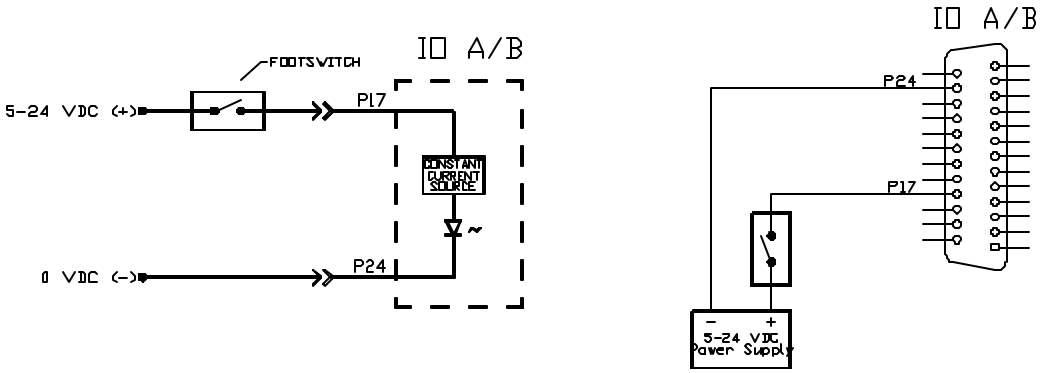
Figure 2.4 - I/O Pins

Pin Number	IN/OUT A Description	IN/OUT B Description
1	Analog Out 1	"
2	Analog Out 2	"
3	Analog Out 3	"
4	Analog Out 4	"
5	Analog Out 5	"
6	Analog Out 6	"
7	Air shut off present (Input)	"
8	**Spare 1 (Input)	"
9	Air off (Output)	"
10	**Spare 2 (Output)	"
11	AGND	"
12	**Over Relay (Output)	"
13	**Good Relay (Output)	"
14	**Under Relay (Output)	"
15	**Write/Disable (Input)	"
16	**Reset (Input)	"
17	**Footswitch (Send Data/Input)	"
18	NC	+V (External Switch)
19	**Relay Output Common	"
20	**TIR Reset (Input)	"
21	**Reserved Output	"
22	**Reserved Output	"
23	**Reserved Output	"
24	**Isolated Common	"
25	NC	High Level Analog Out

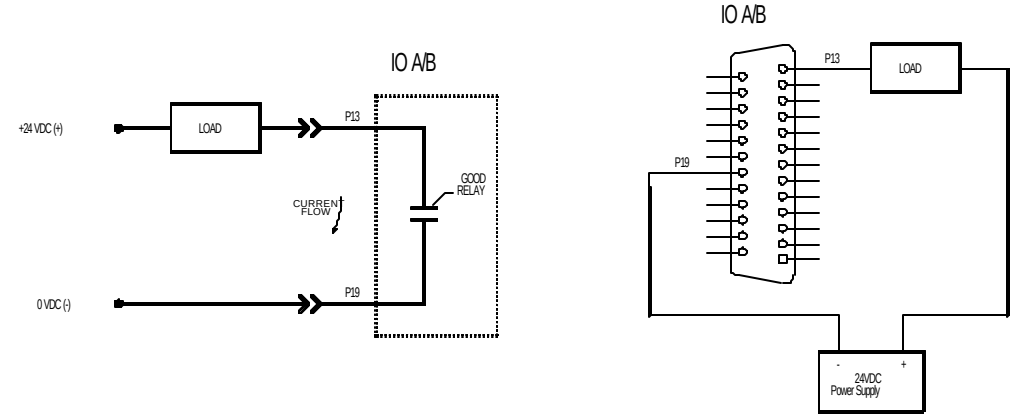
- NC = Not connected
- Reserved pins should be considered "Do Not Connect"
- ** Functions available with optional I/O board #5911013

Typical IO Connections - Optional I/O Board #5911013 Required

INPUT



OUTPUT "SINKING"



OUTPUT "SOURCING"

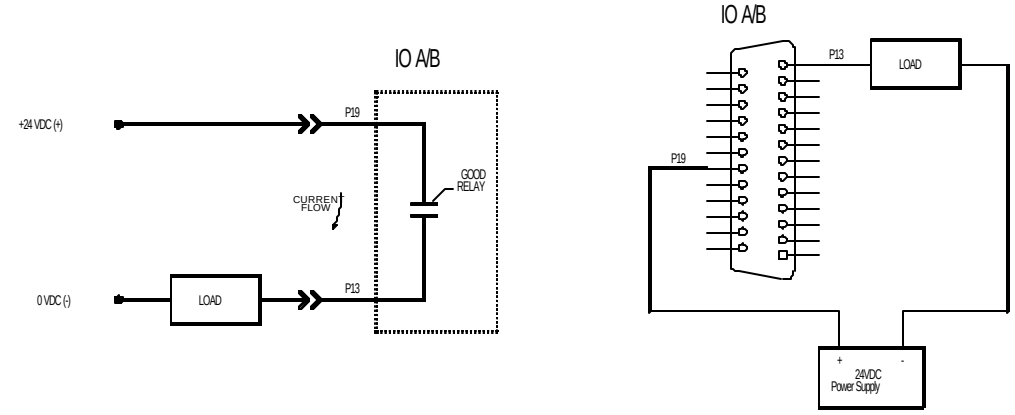


Figure 2.5

RS232C (9 Pin Female DSUB)

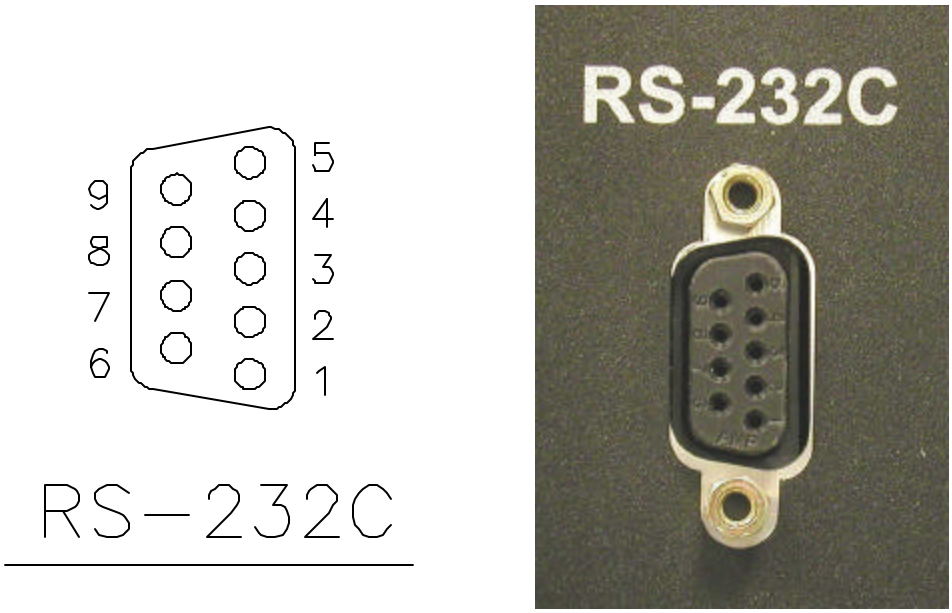


Figure 2.6 - RS-232C Pins

Trendsetter II			Cable	External Device
Pin 1	=	Chassis Ground.	←----------→	Chassis Ground.
Pin 2	=	Receive (RXD)	←----------→	(TXD) Transmit.
Pin 3	=	Transmit (TXD)	←----------→	(RXD) Receive.
Pin 5	=	Signal Ground	←----------→	Signal Ground.

Note: Pin2 and 3 are jumper selectable based upon the application.

2.7 E8302 (2) Channel LVDT Signal Conditioning Module

The E8302 module is a two-channel signal conditioning amplifier for inductive type transducers such as LVDTs that converts the outputs of the transducers into a conditioned signal for the main controller board. The module is mounted in the lower bay of the Trendsetter II®.

The polarity of inputs A and B must be setup using either switches on the original version of the board or jumpers on the current version of the circuit board. The polarity setting determines whether the input reads positive or negative when the LVDT tip is depressed. The input magnification must also be set using jumpers allowing magnification reduction to be set to 10x for long range transducers or 1x for standard transducers.

A jumper matrix on the board allows it to accept signals in or send signals out to the analog output connector. By placing the jumper pin for the desired signal line on one of the six buss lines, the signal can now be sent or received by any other units connected to the buss.

The bussed in signals, C and D, can be added or subtracted using the "SUM/DIFF" jumpers.

The LVDT module contains a INPUT selection knob. The INPUT selection knob can be set to A, B, or AB. When set to A the reading of only input A will be displayed on the bargraph and the alphanumeric display. When set to B the reading of only input B will be displayed on the bargraph and the alphanumeric display. When set to AB the result of input A + input B will be displayed. **Note:** When auxiliary inputs C and/or D utilized, they will be "summed" together with LVDT inputs A and B.

The LVDT signal conditioning module also contains a ZERO adjustment knob for inputs A and B, a MAG adjustment screw for the A and B inputs, and a MAG adjustment screw for inputs C and D bussed in from a separate column or columns.

Power to the column must be turned off prior to installing or removing a signal conditioning module.

Refer to the Advanced Operation, LVDT Module Setup section for additional information on jumper settings and see Basic Operation, Setting LVDT Mag & Zero for additional information on setting Mag and Zero for a particular application.

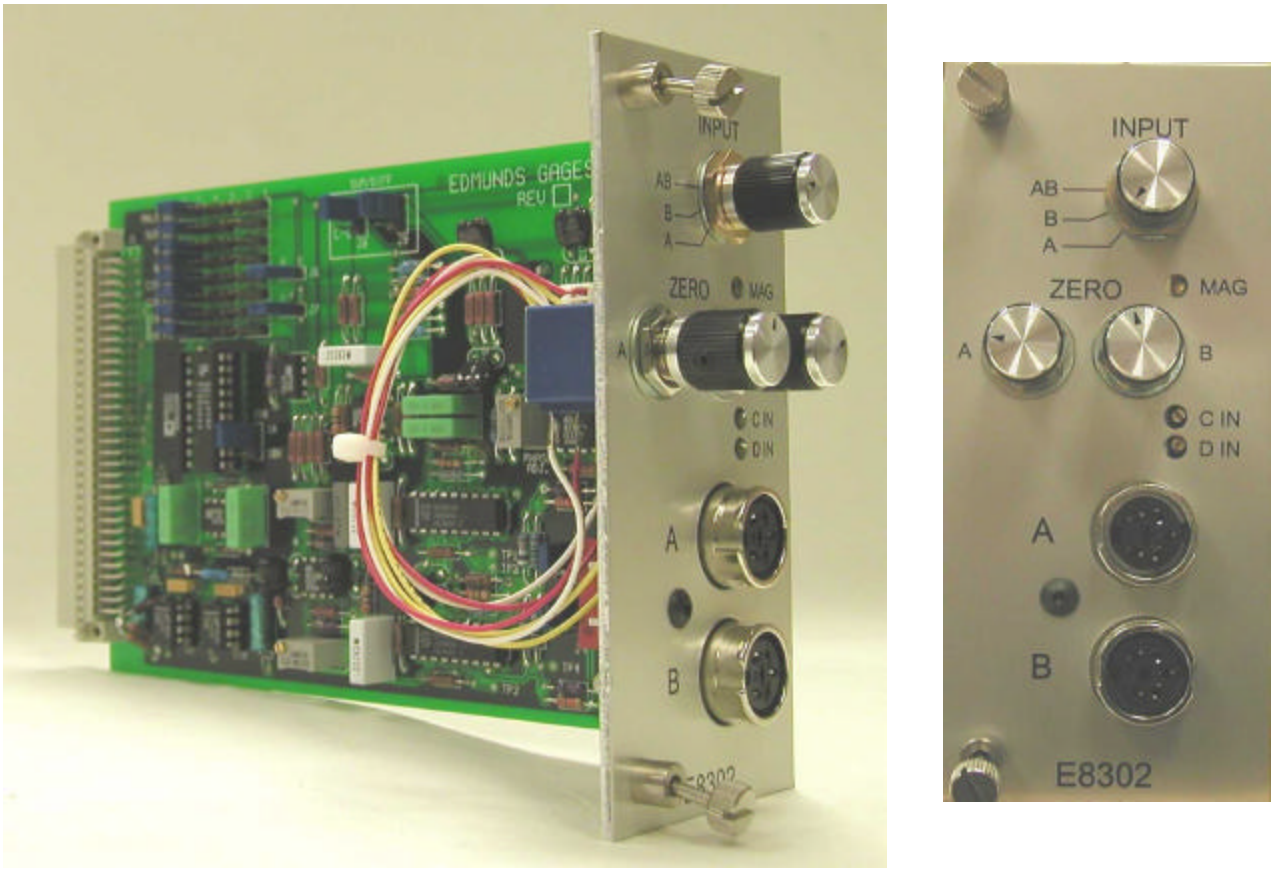


Figure 2.7 - E8302 (2) Channel LVDT Signal Conditioning Module

2.8 E8303 (1) Channel A/E Signal Conditioning Module

The E8303 module is a single channel air/electric amplifier which processes pneumatic information from the air tooling and delivers a conditioned signal to the controller board of the Trendsetter II®. The module is mounted in the lower bay of the Trendsetter II®.

The A/E module also contains a ZERO adjustment knob and a MAG adjustment knob for initial input setup to accommodate the air tooling used..

The air tooling is connected to the air fitting on the front panel of the module. The recommended length of air line from the module to the air tool is no more than six feet.

A minimum of 60 psi air must be supplied to the filter/regulator assembly on the rear of the unit. The regulator is factory set to 44 psi.

The polarity of the input must be setup using jumpers on the circuit board. The polarity setting determines whether the input reads positive or negative when the air nozzles are closed off. The input gain must also be set to low, medium, or high use jumpers supplied on the circuit board. A jumper strip labeled "A OUT" provides the option to select a pin, 1 -6, to output a high level (+/-1.84VDC) signal to the I/O connectors.

Power to the column must be turned off prior to installing or removing a signal conditioning module.

Refer to the Advanced Operation, A/E Module Setup section for additional information on jumper settings and see Basic Operation, Setting A/E Mag & Zero for additional information on setting Mag and Zero for a particular application.

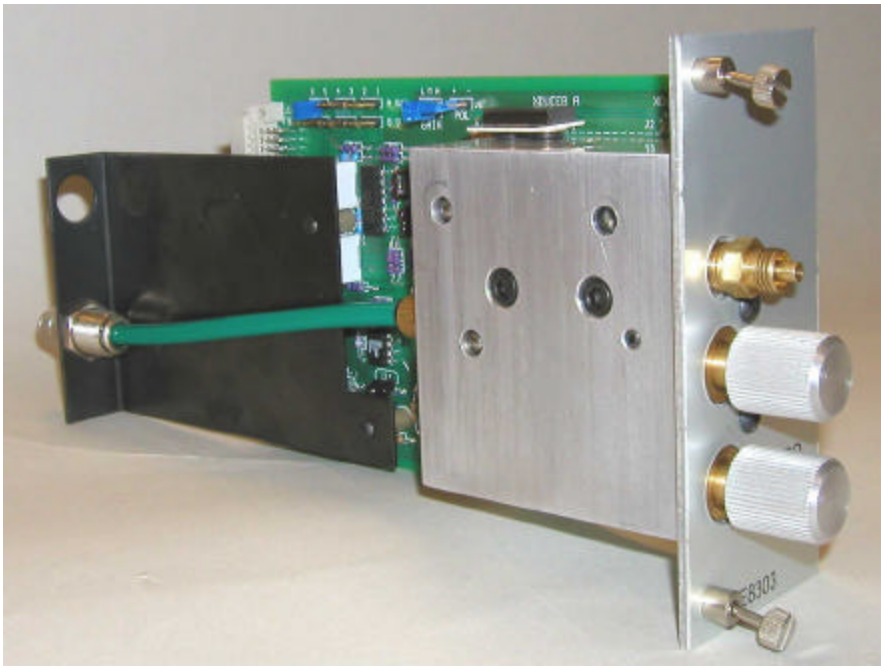


Figure 2.8 - E8303 (1) Channel AE Signal Conditioning Module

2.9 Supply Air Filter/Regulator Assembly

Any unit supplied with an A/E signal conditioning module will also be supplied with a filter/regulator assembly. The assembly is mounted to the rear foot of the Trendsetter II. The regulator is factory preset to 44psi and requires a clean, dry air supply at 60psi min. The regulator output is connected to a fitting on the A/E module that extends out of the 44psi inlet port on the rear panel of the Trendsetter II®.

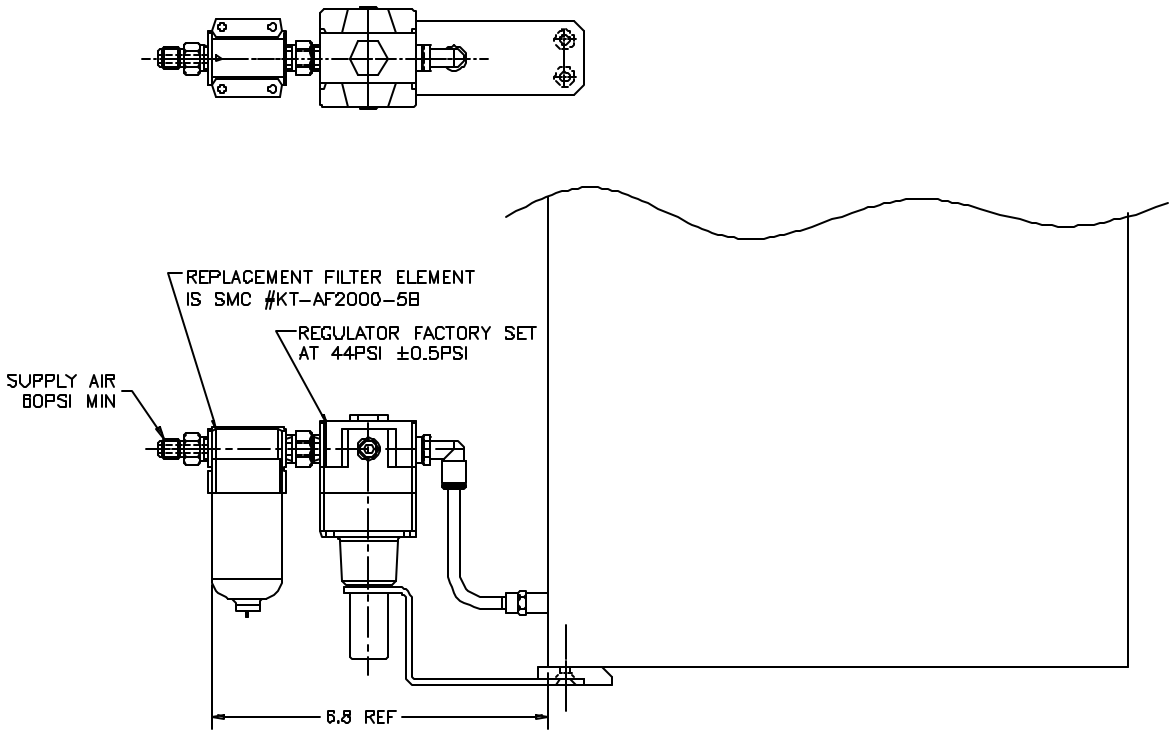


Figure 2.9 - Supply Air Filter/Regulator

Basic Operation

3.0 Set up and Operation Summary

The following steps must be taken to prepare the Trendsetter II® for operation.

1) Unpack and setup the unit. See "Unpacking & Setup" below.

2) Setup signal conditioning module jumpers and install module. See the "Advanced Operation" section.

Power to the column must be turned off prior to installing or removing a signal conditioning module.

3) Program Trendsetter II® for application. See the "Programming" section below.

4) Set up magnification and zero for the gage input or inputs. See "Input Setup" below.

5) Select the proper gaging mode and unit is ready for gaging.

3.1 Unpacking & Setting Up

Unpacking

Ensure that the following items are received when the unit is unpacked:

- Basic Trendsetter II® unit
- Signal Conditioning Module (E8303 air module or E8302 electronic module)
- Power Cable #4550111
- Filter/Regulator (for air gaging module E8303 only) #5801302
- Hose Assembly (for air gaging module E8303 only) #3101053-B

Setup

The Trendsetter II® can be used as a stand alone unit with one A/E check or one or two LVDT checks or as part of a multiple Trendsetter II® setup.

Single Trendsetter II® Setup

1) Turn the Trendsetter II® upside down and remove the front foot mounting screw.
2) Rotate the front foot 90° from its shipping position so that it is perpendicular to the column and remount as shown below.
3) If air gaging is to be used, remove the two mounting screws for the rear mounting bracket and rotate the rear foot 180° from its shipping position so that the air filter/regulator assembly can be mounted as shown in figure 3.1.
4) Turn the unit right side up.
5) For air gaging applications only, attach the air line from the filter/regulator assembly to the fitting extending from the rear of the column.
6) Ensure the power switch on the rear of the column is turned "OFF".
7) Plug the power cord into the male electrical receptacle on the rear of the column.
8) Plug the power cord into a power source between 100VAC and 240VAC at 50 or 60 Hz.
9) For air gaging applications only, connect a source of clean, dry air at 60 psi min to the air filter/regulator inlet. **NOTE:** The Trendsetter II regulator is factory set to 44psi.
10) Connect the gage tooling to be used to the signal conditioning module. For air gaging connect the air hose from the air plug, air ring, or air snap to the tooling port on the front of the A/E module. For electronic gaging connect the one or two LVDTs to inputs A and/or B on the front of the LVDT module.
11) Turn on the Trendsetter II® by turning the power switch on the rear of the unit to "ON".

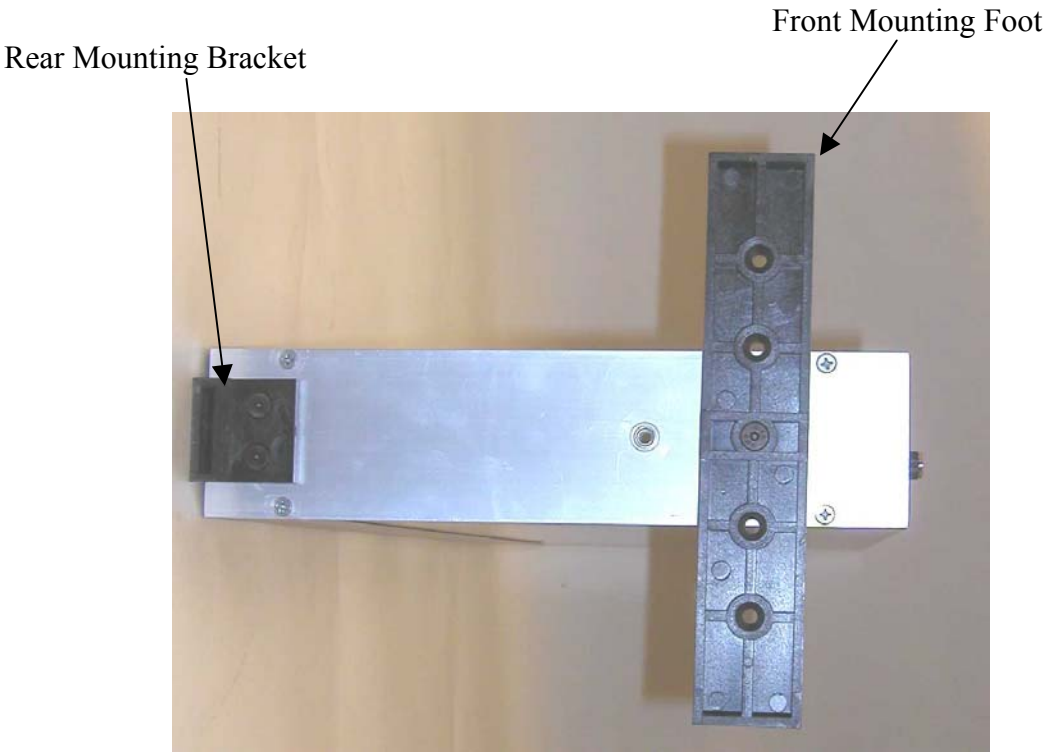


Figure 3.1 - Base Feet

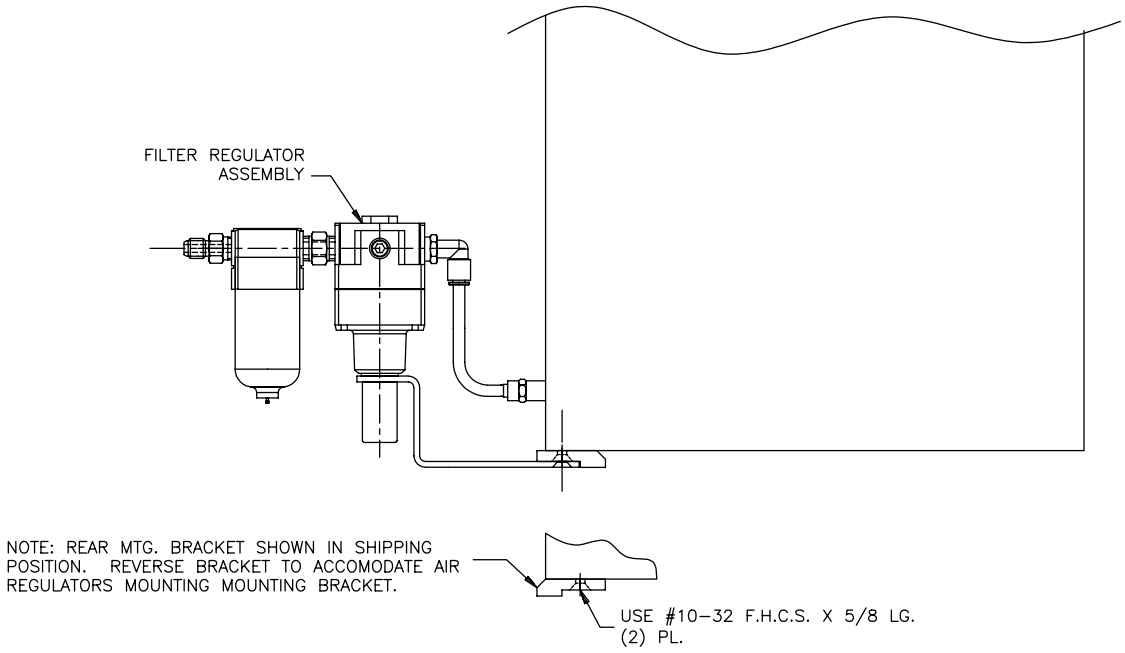


Figure 3.2 - Filter/Regulator Mounting

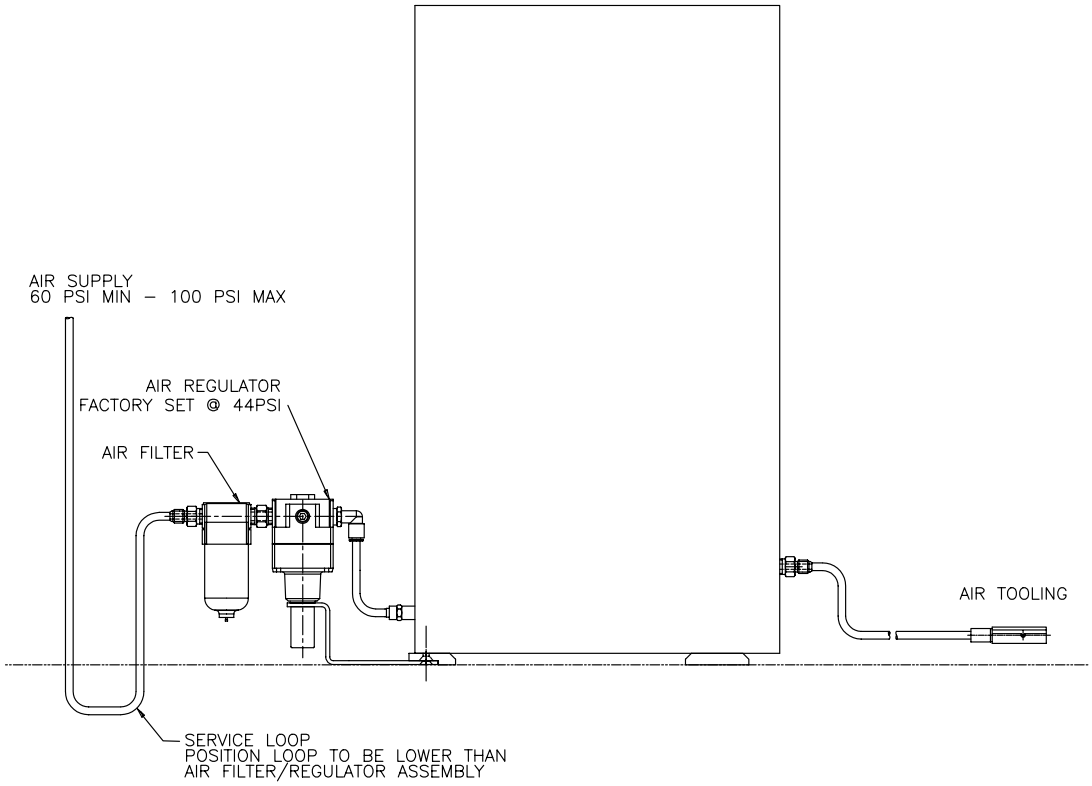


Figure 3.3 - Air Connections
For Air Gaging Application Only

Multiple Trendsetter II® Setup

1) Turn the Trendsetter II® units upside down and remove the front foot mounting screw.
2) Rotate the front foot 90° from its shipping position so that it is perpendicular to the column and remount as shown above. Up to three columns can be mounted on the same front foot.
3) If air gaging is to be used, remove the two mounting screws for the rear foot and rotate the rear foot 180° from its shipping position so that the air filter/regulator assembly can be mounted as shown below. Repeat for all columns using air gaging.
4) Turn the units right side up.
5) For air gaging applications only, attach the air line from the filter/regulator assembly to the fitting extending from the rear of the column.
6) Ensure the power switch on the rear of the column is turned "OFF".
7) Plug the power cord into the male electrical receptacle on the rear of one of the columns.
8) Plug a power jumper cable (#4550120) from the power outlet on the rear of the column with the power cord to the male electrical receptacle on the next column. Repeat until all columns are connected with power jumper cables.
9) Plug the power cord into a power source between 100VAC and 240VAC at 50 or 60 Hz.
10) For air gaging applications only, connect a source of clean, dry air at 60 psi min to all the air filter/regulator inlets.
11) Connect the gage tooling to be used to the signal conditioning module. For air gaging connect the air hose from the air plug, air ring, or air snap to the tooling port on the front of the A/E module. For electronic gaging connect the one or two LVDTs to inputs A and/or B on the front of the LVDT module.
12) Turn on the Trendsetter II® by turning the power switches on the rear of the units to "ON".

3.2 Signal Conditioning Module Setup

A/E Signal Conditioning Module, E8303

The polarity of the input and the air amplification gain must be setup using jumpers on the module circuit board. The polarity of the input determines whether the input reads positive or negative as the air nozzles are closed off. The air amplification gain is set to low, medium, or high depending on the range to be used with the air tooling. See the "Advance Operation" section of the manual for additional information of module setup.

The A/E module contains a MAG and ZERO adjustment knob for input setup. See section the "Input Setup" section below for A/E input set up procedures.

LVDT Module, E8302

The polarity of inputs A and B must be setup using switches on the module circuit board. The polarity setting determines whether the input reads positive or negative when the LVDT tip is depressed. See the "Advance Operation" section of the manual for additional information of module setup.

The LVDT module contains a INPUT selection knob. The INPUT selection knob can be set to A, B, or AB. When set to A the reading of only input A will be displayed on the bargraph and the alphanumeric display. When set to B the reading of only input B will be displayed on the bargraph and the alphanumeric display. When set to AB the result of input A + input B will be displayed.

The LVDT module also contains a ZERO adjustment knob for inputs A and B, a MAG adjustment screw for the A and B inputs, and a MAG adjustment screw for inputs C and D bussed in from a separate column or columns. See section the input setup section below for LVDT input setup procedures.

Power to the column must be turned off prior to installing or removing a signal conditioning module.

3.3 Programming

Trendsetter II® Programming Guide

The Trendsetter II system programming guide provides a convenient table for recording programming information, the switch and jumper settings for the signal conditioning modules, and any optional accessories.

A brief explanation of the program guide follows:

The top section of the programming guide list the scale, range, mode, and limits to be programmed in the Trendsetter II. The type of signal conditioning module to be used in the lower bay is also listed.

The next section indicates if the optional I/O board is to be installed and if a serial cable is included.

The information on jumper and switch settings for the signals conditioning module is listed below the column in which the module is to be installed.

If signals will be bussed between multiple columns the interface cable(s) are listed at the bottom of the form.

Trendsetter II Setup Guide

Customer: XYZ Company S.O.# 123456 SKG-12345

	1	2	3	4
Scale	□ Inch □ mm	□ Inch □ mm	□ Inch □ mm	□ Inch □ mm
Range (See note 1)				
Mode (See note 2)				
Limits - Over				
Under				
Signal Conditioning	□ E8302 □ E8303	□ E8302 □ E8303	□ E8302 □ E8303	□ E8302 □ E8303

Accessories

I/O Board (4110943-BM)	□ yes □ no	□ yes □ no	□ yes □ no	□ yes □ no
Printer Cable (5809060)	□ yes □ no	□ yes □ no	□ yes □ no	□ yes □ no

E8302 LVDT Modules

Polarity - A	□ (+) □ (-)	□ (+) □ (-)	□ (+) □ (-)	□ (+) □ (-)
B	□ (+) □ (-)	□ (+) □ (-)	□ (+) □ (-)	□ (+) □ (-)
Mag J3, J4, J10	□ 1X □ 10X	□ 1X □ 10X	□ 1X □ 10X	□ 1X □ 10X
Output Jumpers				
Analog Out (1-6)				
Sum Out (1-6)				
A Out (1-6)				
B Out (1-6)				
Input Jumpers				
C In Var (1-6)				
C In Fix (1-6)				
D In Var (1-6)				
D In Fix (1-6)				
Input Type Jumpers (See notes 3 &4)				
J6 (C In Var)	□ A □ E	□ A □ E	□ A □ E	□ A □ E
J7 (D In Var)	□ A □ E	□ A □ E	□ A □ E	□ A □ E
Sum/Diff Jumpers				
J8	□ C+D □ C-D	□ C+D □ C-D	□ C+D □ C-D	□ C+D □ C-D
J9	□ (+) □ (-)	□ (+) □ (-)	□ (+) □ (-)	□ (+) □ (-)

E8303 A/E Modules

Polarity, J5	□ (+) □ (-)	□ (+) □ (-)	□ (+) □ (-)	□ (+) □ (-)
Gain, J4	□ L □ M □ H	□ L □ M □ H	□ L □ M □ H	□ L □ M □ H
Output Jumpers				
A Out (1-6)				

Interface Cables (4550200):

□ yes □ no	□ yes □ no	□ yes □ no

Notes:

1) Range Options: (Inch) .0002, .0005, .001, .002, .005, .010, .020, .050; (mm) .005, .01, .02, .05, .10, .20, .50 1.00

2) Mode Options: LIVE RDG, +PEAK, -PEAK, TIR

3) If a signal is bussed in to C IN VAR then input type, jumper J6, must be set to "A" for air input or "E" for electronic input.

4) If a signal is bussed in to D IN VAR then input type, jumper J7, must be set to "A" for air input or "E" for electronic input.

5) Connect interface cable from I/O "A" on first column to I/O "B" on second column.

Setting Scale, Range, Mode, and Limits

Use the following procedure to program the Trendsetter II® for a specific application:

1) Press IN/MM. The currently selected scale, “INCH” or “METRIC” will be displayed in the alphanumeric display.

2) Press IN/MM again while the display is flashing to select a different scale.

3) Press RANGE. The currently selected range will be displayed in the alphanumeric display.

4) Press RANGE again to select the next range. Continue to press RANGE until the desired range is displayed in the alphanumeric display. The current range is also displayed on the range indicator to the left of the bargraph. **NOTE:** The range selected should be two to three times the total check tolerance to allow for out of tolerance parts. For example if the check tolerance is +/-.001” for a total tolerance of .002” a scale of .005” would be appropriate.

5) Press MODE. The currently selected mode, “TIR”, “-PEAK”, “+PEAK”, “LIVE RDG”, will be displayed in the alphanumeric display. See "Mode Descriptions" on page 3-9 for a description of the various mode options.

6) Press MODE again while the display is flashing to select the next mode. Continue to press MODE until the desired mode is selected.

7) Press LIMITS. The alphanumeric display will read “OVER” or “UNDER”. Pressing LIMITS again will toggle between “OVER” and “UNDER”.

8) Select “OVER” by pressing the LIMITS button until "OVER" is displayed in the alphanumeric display. The alphanumeric display will switch from “OVER” to display the currently set upper specification limit and the bargraph will also display the currently set limit.

9) When the alphanumeric display is flashing, rotate the Enter button until the display and the bargraph display the upper specification limit. **NOTE:** To turn off the upper limit rotate the Enter button until the bargraph display is off scale high. The alphanumeric display will read "OVER OFF" indicating that the over limit has been turned off. Loosen the thumb screw and reposition the upper adjustable limits pointer so that it is at the upper specification limit.

10) Press LIMITS. The alphanumeric display will read “UNDER” and then switch to display the currently selected lower specification limit. The bargraph will also display the current lower specification limit.

(Cont)

11) When the alphanumeric display is flashing, rotate the Enter button until the display and the bargraph display the lower specification limit. **NOTE:** To turn off the lower limit rotate the Enter button until the bargraph display is off scale low. The alphanumeric display will read "UNDR OFF", indicating that the under limit has been turned off. Loosen the thumb screw and reposition the lower adjustable limits pointer so that it is at the lower specification limit.

12) Press the Enter button to exit the limits setting mode.

13) The Trendsetter II® is now programmed. See "Input Setup & Mastering" to continue preparing for operation of the unit.

Mode Descriptions

The Trendsetter II® can be set to operate in one of four modes, "LIVE RDG", "TIR", "+PEAK", or "-PEAK". A description of each mode follows:

LIVE RDG - The input signal is directly displayed on the alphanumeric and bargraph displays in real time.

TIR - The difference between the maximum and minimum reading since the RESET button was pressed is displayed. This mode is used with a dynamic gaging application.

+PEAK - The maximum reading since the RESET button was pressed is displayed. This mode is used with a dynamic gage.

-PEAK - The minimum reading since the RESET button was pressed is displayed. This mode is used with a dynamic gage.

3.4 Input Setup

Setting A/E Mag and Zero for Air Gage

If the gage tooling is an airplug or air ring using an A/E module use the following procedure to set zero and magnification using a set of max and min masters.

1) Press MODE until "LIVE RDG" mode is selected.
2) Load the MAX master into gage position.
3) Refer to the master calibration report to determine the master value of the MAX master.
4) Adjust the ZERO knob on the E8303 module until the digital display reads the master value of the MAX master from the calibration report.
5) Remove the MAX master and load the MIN master into gage position.
6) Calculate the difference between the reading with the MIN master loaded and the reading with the MAX master from step 4.
   a) If the calculated difference is **less** than the actual difference between the MAX and MIN master values from the calibration sheet for the check being setup, the magnification needs to be increased. This is done by **turning the mag knob clockwise**.
   b) If the calculated difference is **greater** than the actual difference between the MAX and MIN master values from the calibration sheet for the check being setup, the magnification needs to be decreased. This is done by **turning the mag knob counter clockwise**.

   NOTE: Use a factor of 3X for adjusting the display readings. **For example:** If the displayed reading is +.0005 and the calibrated value is +.0001 the difference is .0004 greater. Therefore, you turn the **"MAG"** knob counter clockwise so that the reading changes by .0012.

   IMPORTANT: THE DIRECTION YOU TURN THE MAG KNOB DETERMINES WHETHER YOU ARE INCREASING OR DECREASING THE MAGNIFICATION. YOU SHOULD BE CONCERNED WITH HOW MUCH THE DISPLAY CHANGES, NOT THE DIRECTION THE NUMBERS CHANGE!

   For example, for the above example after turning the mag knob the displayed reading may be (+.0005) + (.0012) = +.0017 or it could read (+.0005) - (.0012) = -.0007. This depends on the polarity of the check.

7) After adjusting the mag knob, turn the zero knob in the same direction as the mag knob to adjust the displayed reading to equal the deviation of the MIN master value on the calibration sheet.
8) Remove the MIN master and load the MAX master onto the gage.
9) Repeat steps 3 through 8 until the displayed readings for the each master corresponds to the max and min master values on the calibration sheet for the check being setup.

Setting LVDT Mag and Zero

Single Probe Setup

If the gaging fixture uses only one LVDT probe use the following procedures to set the probe zero and magnification using a mean master or a set of max and min masters.

Single Probe Setup Using a Mean Master

1) Turn the INPUT knob to the input that is to be setup , "A" or "B".
2) The ZERO knob adjustment is a ten turn potentiometer. Prior to setting zero turn the zero knob for the input to be setup (A or B) to approximately the middle position, about five turns from the end stops.
3) Press MODE until "LIVE RDG" mode is selected.
4) Place the mean master in gage position.
5) Manually reposition the LVDT in the gage fixture until the bargraph reads close to the master value from the master certification report. It is not necessary to position the LVDT to read the exact master value as the ZERO knob will be used for fine adjustment.
6) Turn the ZERO knob for the input being setup (A or B) until the bargraph and alphanumeric display read the master value of the mean master from the master certification report.
7) Remove the mean master.
8) If running the gage in a mode other than "LIVE RDG", press MODE until the desired mode of operation is displayed.
9) The gage is now ready for operation.

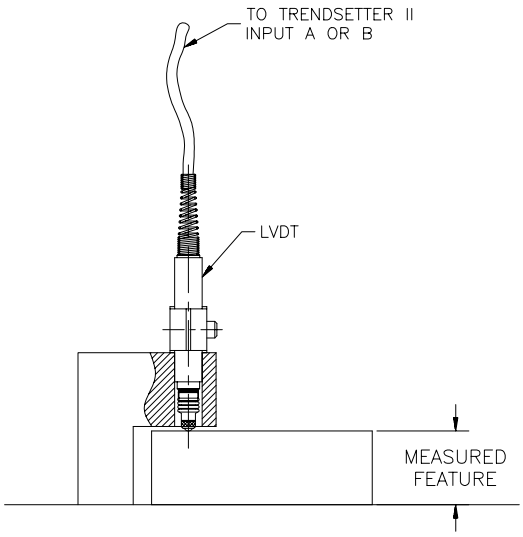


Figure 3.4 - Single Probe Application

Single Probe Setup Using a Max and Min Master

1) Turn the input knob to the input that is to be setup , “A” or “B”.
2) The zero knob adjustment is a ten turn potentiometer. Prior to setting zero turn the zero knob for the input to be setup (A or B) to approximately the middle position, about five turns from the end stops.
3) Press MODE until “LIVE RDG” mode is selected.
4) Place the MAX master in gage position.
5) Manually reposition the LVDT in the gage fixture until the bargraph reads close to the max master value from the master certification report. It is not necessary to position the LVDT to read the exact master value as the zero knob will be used for fine adjustment.
6) Turn the ZERO knob for the input being setup (A or B) until the bargraph and alphanumeric display read the master value of the max master from the master certification report.
7) Remove the max master.
8) Place the MIN master in gage position.
9) If the display reads the master value of the min master from the master certification report then continue to step 10. If the display does not read the master value of the min master then adjust the MAG screw on the front of the LVDT module with a small screw driver until the display reads the min master value. If the difference between the displayed readings of the max and min masters is too small turn the MAG screw clockwise, if the difference is to large turn the MAG screw counterclockwise. Remove the min master and place the max master in gage position. If necessary adjust the MAG screw again so the display reads the max master value. Continue alternating between the max and min masters and adjusting the MAG screw until the max and min master values are read on the display.
10) If running the gage in a mode other than “LIVE RDG”, press MODE until the desired mode of operation is displayed. The gage is now ready for operation.

Two Probe Setup

If the gaging fixture uses two LVDT probes in the A+B mode, for instance to measure an O.D., use the following procedures to set the probe zero and magnification using a mean master or a set of max and min masters.

Two Probes Setup Using a Mean Master

1) The ZERO knob adjustments are ten turn potentiometers. Prior to setting zero turn the zero knobs for inputs A and B to approximately the middle position, about five turns from the end stops.
2) Press MODE until "LIVE RDG" mode is selected.
3) Place the mean master in gage position.
4) Rotate the INPUT knob on the front of the LVDT module to the "A" position. The bargraph will now display the live reading of input A only.
5) Manually reposition LVDT A in the gage fixture until the bargraph reads close to 1/2 the master value from the master certification report. It is not necessary to position the LVDT to read the exact master value as the zero knob will be used for fine adjustment.
6) Rotate the INPUT knob on the front of the LVDT module to the "B" position. The bargraph will now display the live reading of input B only.
7) Manually reposition LVDT B in the gage fixture until the bargraph reads close to 1/2 the master value from the master certification report. It is not necessary to position the LVDT to read the exact master value as the zero knob will be used for fine adjustment.
8) Rotate the INPUT knob on the front of the LVDT module to the "AB" position.
9) Turn the zero knob for input A or B until the bargraph and alphanumeric display read the master value of the mean master from the master certification report.
10) Remove the mean master.
11) If running the gage in a mode other than "LIVE RDG", press MODE until the desired mode of operation is displayed.
12) The gage is now ready for operation.

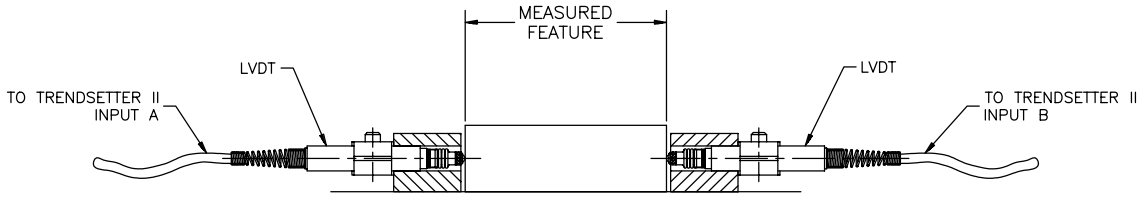


Figure 3.5 - Two Probes Application

Two Probes Setup Using a Max and Min Master

1) The ZERO knob adjustments are ten turn potentiometers. Prior to setting zero turn the zero knobs for inputs A and B to approximately the middle position, about five turns from the end stops.
2) Press MODE until "LIVE RDG" mode is selected.
3) Place the MAX master in gage position.
4) Rotate the INPUT knob on the front of the LVDT module to the "A" position. The bargraph will now display the live reading of input A only.
5) Manually reposition the LVDT A in the gage fixture until the bargraph reads close to ½ the max master value from the master certification report. It is not necessary to position the LVDT to read the exactly ½ the master value as the ZERO knobs will be used for fine adjustment.
6) Rotate the INPUT knob on the front of the LVDT module to the "B" position. The bargraph will now display the live reading of input B only.
7) Manually reposition LVDT B in the gage fixture until the bargraph reads close to ½ the max master value from the master certification report. It is not necessary to position the LVDT to read the exactly ½ the master value as the zero knobs will be used for fine adjustment.
8) Rotate the INPUT knob to the "AB" position. The bargraph will now display the live reading of input A + input B.
9) The bargraph reading should be close to the total max master value. Use either the A or B ZERO knobs to drive the bargraph to the exact max master value.
10) Remove the max master and load the MIN master into gage position. The bargraph should display the min master value from the master inspection report. If the min master value is displayed continue to step 11. If the display does not read the min master value rotate the MAG screw on the front of the LVDT module using a small screw driver until the display does read the min master value. If the difference between the displayed readings of the max and min masters is too small turn the MAG screw clockwise, if the difference is to large turn the MAG screw counterclockwise. Remove the min master and place the max master back in gage position. If necessary adjust the MAG screw again so the display reads the max master value. Continue alternating between the max and min masters and adjusting the MAG screw until the max and min master values are read on the display.
11) If running the gage in a mode other than "LIVE RDG", press MODE until the desired mode of operation is displayed.
12) The gage is now ready for operation.

Two Probes Balance

One final word on calibration is the concept of balance. Balance is the final “trimming out” of all system magnification errors. It should be noted that balance only concerns differential measurements; when both probes are measuring a diameter for example. Gaging systems supplied by Edmunds Gages are factory set to a properly balanced condition.

Lack of balance is one of the chief causes of poor system repeatability. If a problem with repeatability is suspected then the balance should be checked. Balance is easily observed by the use of a simple mechanical balancing fixture or using the gage and masters. The fixture clamps the A and B probes in opposing positions, and with the use of a micrometer, moves the probes in exactly equal, but opposite directions. Such a fixture is available through Edmunds Gages as #29412.

To check balance with balance fixture:

1) Complete the input setup as described in the previous sections.
2) Mount the A and B probes in the balancing fixture.
3) Adjust each probe to its mechanical zero as observed on the Trendsetter II® bargraph display. Then with the range switch set to desired application range, and the input switch set to A+B mode, rotate the micrometer head some convenient distance. This distance should not exceed 2x the selected range.
4) Observe the bargraph, it should remain fixed at zero under these conditions. If, for example, the Trendsetter II® is set to the 0.005 inch range and the micrometer head is rotated thru 0.010 inch, the bargraph should remain exactly at its zero position. Any movement observed on the scale indicates the system is out of balance.
5) To achieve balance, a magnification adjustment is required to one channel only. First, reset the system back to its zero starting point. Next, offset the micrometer head and adjust the B channel mag using the "CAL B" potentiometer on the E8302 board, see page 4-6. The initial amount of adjustment should be small, say no more than 1/4 turn on the B mag pot, see page 4-15.
6) Observe the bargraph, did the error get greater or smaller? If greater, turn the mag in the opposite direction. If smaller, adjust the mag in the same direction until the bargraph remains on zero with the micrometer rotated thru its range. To achieve a greater degree of balance, increase the systems sensitivity via the range switch. With a little practice and patience, balances in the order of 25microinches or less are easily obtained.
7) When no further balance can be obtained from the system, remount and setup the LVDTs in the gage fixture. Using masters, recheck the systems mag and zero. If magnification requires adjusting, use the front panel mag pot only, as any adjustment to the "CAL" potentiometers on the E8302 board will nullify the balance procedure.

To check balance with master:

Balance may also be obtained in a gage fixture. The procedure is similar to the proceeding section except the master with the most side shake and the gage fixture are used in place of the balancing fixture. For a gage measuring an I.D. the master with the most side shake is the max master and for an O.D. application the min master is used.

1) Place the master in the gage fixture.
2) Adjust the Trendsetter II® display to zero.
3) Push the master in a direction which is parallel to the plane that the gage probes are mounted in. The Trendsetter II® readout should remain fixed at zero. If any movement is observed, adjust one of the "CAL" potentiometer on the E8302 board as described in the preceding section.
4) Repeat the procedure several times until no movement is observed on the Trendsetter II® display. Restore the system to its original settings, and recheck calibration with max/min masters. Remember to use the front panel mag only, as any further adjustment of the board mounted potentiometers will nullify the balance procedure.

3.5 Operation

The Trendsetter II® can be operated in any one of the following modes.

LIVE RDG Mode

1) Place the part to be checked in gage position. The alphanumeric display and bargraph will display the actual reading from the gage input. **NOTE:** The part or gage can be repositioned to explore the part.

TIR Mode

1) Place the part to be checked in gage position.

2) Press RESET.

3) Rotate the part or reposition the gage depending on the particular application. The bargraph and alphanumeric displays will show the difference between the maximum and minimum reading since the RESET button was pressed. **NOTE:** To lock the display after the TIR check is complete press HOLD.

For example to check roundness of a hole:
1) Place the part on an air plug connected to the Trendsetter II® .
2) Press RESET.
3) Rotate the part through at least one revolution.
4) Read the TIR value from the alphanumeric display or the bargraph.

+PEAK Mode

1) Place the part to be checked in gage position.

2) Press RESET.

3) Rotate the part or reposition the gage depending on the particular application. The bargraph and alphanumeric displays will show the maximum reading since the RESET button was pressed. **NOTE:** To lock the display after the check is complete press HOLD.

For example to check the maximum diameter of a shaft:
1) Place the part in an air ring connected to the Trendsetter II® .
2) Press RESET.
3) Rotate the part through at least one revolution.
4) Read the +PEAK value from the alphanumeric display or the bargraph.

-PEAK Mode

1) Place the part to be checked in gage position.

2) Press RESET.

3) Rotate the part or reposition the gage depending on the particular application. The bargraph and alphanumeric displays will show the minimum reading since the RESET button was pressed. **NOTE:** To lock the display after the check is complete press HOLD.

For example to check the maximum diameter of a hole:
1) Place the part in an air plug connected to the Trendsetter II® .
2) Press RESET.
3) Rotate the part through at least one revolution.
4) Read the -PEAK value from the alphanumeric display or the bargraph.

HOLD and RESET

In any mode of operation the HOLD and RESET buttons function as described below:

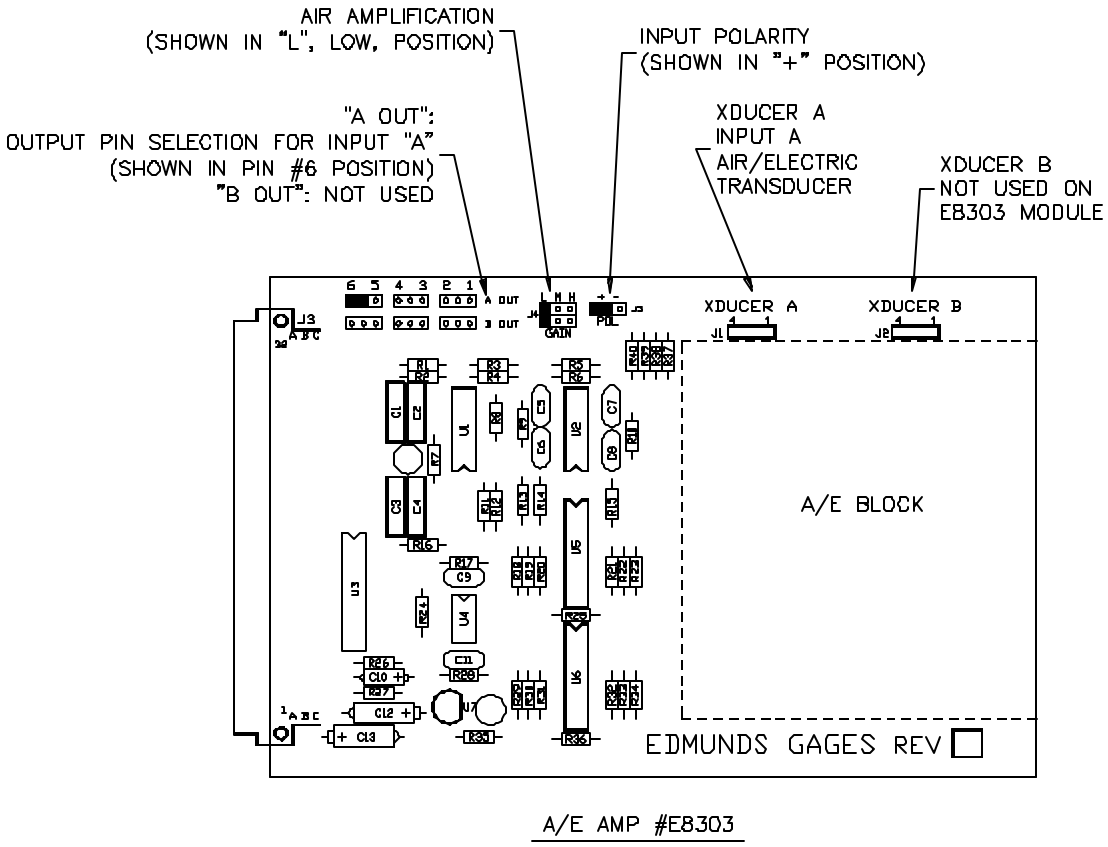
HOLD - Pressing HOLD will latch the currently displayed reading in the bargraph and alphanumeric display and all signal inputs will be ignored. The displays will not change until the RESET button is pressed.

RESET - Pressing RESET will unlock the bargraph and alphanumeric display.

Advanced Operation

4.0 A/E Signal Conditioning Module Setup

The E8303 Air/Electronic module converts pneumatic pressure from air gage tooling into a calibrated electrical signal. The module contains an air/electronic transducer assembly, three selectable fixed gains, a polarity reversal jumper, and an output pin selection jumper.



A/E AMP #E8303

Figure 4.1 - A/E Module E-8303

Power to the column must be turned off prior to installing or removing a signal conditioning module.

A/E Jumper Settings

Air Amplification (Gain) Jumper

Range	**Air Amplification**
.010”/.2mm	Low
.005”/.1mm	Low
.002”/.05mm	Medium
.001”/.02mm	Medium/High
.0005”/.01mm	High
.0002”/.005mm	High

The gain jumper provides the following three fixed stages of amplification:

Low - 1 x
Medium - 3 x
High - 9 x

The low and medium positions of the gain pin header will allow calibration of most air tooling. As a rule of thumb, attempt to calibrate the air tooling in the low position. If you are unable to set the magnification or if the dynamic response of the air signal is too slow, use the medium position to obtain the desired characteristics. The high position is reserved for special high mag applications and should be used with caution, as it may be impossible to calibrate standard applications. See chart above for normal suggested air amplification settings)

Set the air amplification by positioning jumper "J4", Gain, to "L" (low), "M" (Medium) or "H" (High).

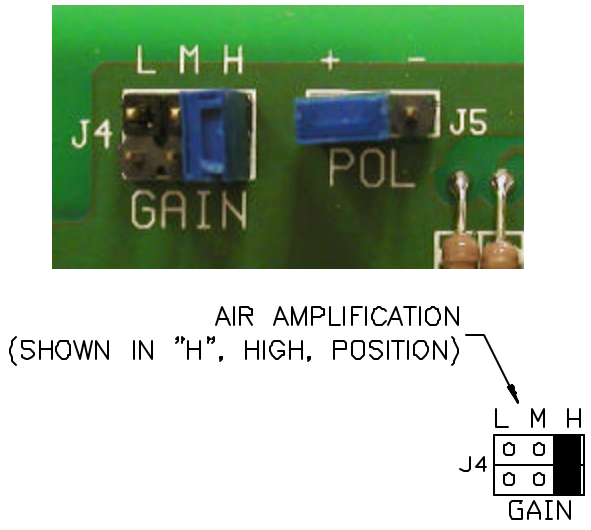


Figure 4.2 - Gain Jumper

Polarity Jumper

Increasing air pressure at the tooling will cause the readout to move upwards when the polarity jumper is in the (“+”) position. The opposite occurs with the jumper in the (“-”) position. This switch is used for setup changes between inside and outside diameter applications. For example, if an air plug is used to measure the inner diameter of a part then the polarity should be set to ("-") so that a larger part inside diameter, which causes a decrease in pressure, causes the readout to increase. If an air ring is used to measure the outside diameter of a part then the polarity should be set to ("+") so that a larger inside diameter, which causes a decrease in pressure, causes the readout to increase.

To set the input polarity position jumper "J5", POL, to the ("+") or ("-") position.

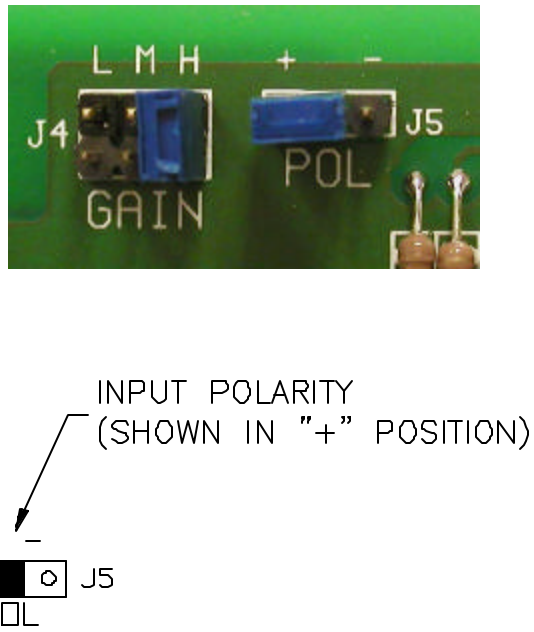


Figure 4.3 - Polarity Jumper

Output Pin Selection Jumper

The electronic signal from the A/E transducer may be output to another Trendsetter II or to an external device connected to the analog buss. The pin on which the signal is output, from 1 to 6, can be selected using the "A OUT" jumper. The "B OUT" jumper is not used on the E8303 module.

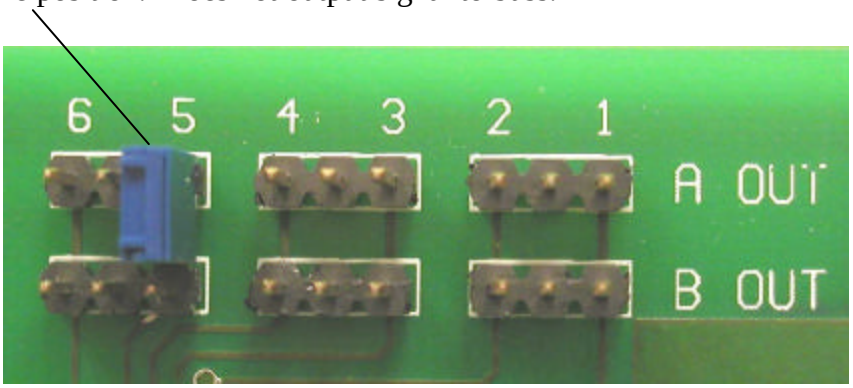
To select an output pin position the "A OUT" jumper so that it is on the desired number pin and the center pin in the three pin group. For example, to output the signal on pin 5 place the jumper on the pin below marked "5" and the center pin between the "5" and "6". Any device connected to the analog buss can now access the signal from pin number 5.

The "A OUT" jumper only has to be set if the signal is to be bussed to another column. If the signal is not to be output the jumper should be place on one pin only.

NOTE: To buss a signal from one Trendsetter II to another connect an interface cable, Edmunds #4550200, from the "Output" connector on the rear of one column to the "Input" connector on the rear of the next column. Multiple columns can be connected in this way.

See LVDT Module E8302, Input Jumper Setup below for information on inputting signals from other columns.

Shown in idle position. Does not output signal to buss.



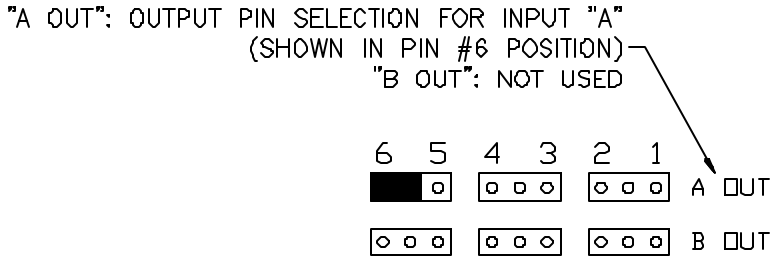


Figure 4.4 - Output Pin Jumper

A/E Module Installation

1) Turn off the main power switch on the rear of the Trendsetter II and unplug the power cord.

Power to the column must be turned off prior to installing or removing a signal conditioning module.

2) Ensure all jumpers are properly set for the application to be run. The polarity and gain jumpers must be set for every application. The A Out jumper only needs to be set if the signal is to be used on another column or external device.
3) Slide the A/E module into the lower bay and secure it in position with the two thumb screws on the front panel. **Note:** Ensure the card is fully inserted into the bay and that the connector on the rear of module is properly seated in the mating plug in the Trendsetter II.
4) Install the filter/regulator assembly, #5801302, to the Trendsetter II if it is not already installed. See Basic Operation, Unpacking and Setup.
5) The air fitting on the rear of the A/E module should be extending from the hole on the back of the Trendsetter II labeled "44 PSI". Connect the output from the filter/regulator assembly to the air fitting using a short length of tubing.
6) Connect the air gaging tool to the fitting on the front of the A/E module using a length of tubing not to exceed 6 feet in length. **Note:** Longer lengths of tubing will affect the response time of the column. The shortest length of tubing that is practical should be used.
7) Connect 60 psi supply air to the filter/regulator assembly.
8) Plug in the Trendsetter II power cord.
9) Turn on the power switch on the rear of the Trendsetter II.
10) If necessary reprogram the scale, range, mode, etc. for the new application. See the Basic Operation, Programming section of the manual.
11) Perform the air gage mag and zero setup procedure. See the Basic Operation, Input Setup section of the manual.
12) The unit is now ready for operation.

4.1 Air/Electronic Maintenance

Maintenance of the A/E transducer may be required if there is extreme difficulty in setup or erratic readings on the Trendsetter II.

Mag & Zero Needle Valves

If oil is present, it is helpful to clean out each needle valve. With the gage set on a master, unscrew the mag knob and remove. Allow the air to blow freely. Inspect the "O" ring on the needle valve body: replace if necessary. Reinsert the mag needle valve and screw down until the point on the Trendsetter II scale comes back to the master point. Repeat the procedure on the zero knob. By only cleaning one needle at a time, the gage setting is not lost. Re-check the mastering points before gaging.

Bias Restriction

Remove bias bleed screw and metallic filter. Insert #1/4-28 screw into dropping resistor and pull out restrictor assembly. Remove bottom metallic filter. Wash out in cleaning spirits. The dropping resistor holes may be cleaned out (very carefully) with a toothpick if necessary. Inspect and replace the two o-rings if required. Blow dry from central hole in restrictor assembly, and reinsert components in reverse order.

Needle Valve Assembly

When an extremely dirty air condition is encountered, it may be necessary to remove the needle valve assembly and clean it. Unscrew the set screw holding the valve assembly. Pull out the complete valve assembly. Unscrew the needle body, clean and inspect the "O" ring. Check the "O" ring on the outer valve body and also at the bottom of the bore in the aluminum restriction block. If they have deteriorated, replace.

Re-assemble the needle to the body. If the threads appear to be loose, carefully spring the split threads open. This is best done using the wedge effect of the screwdriver tip. Pick one so that the spread is only slightly larger than the existing slot and do not over bend.

With the valve assembled and all "O" rings in position, reinsert the valve, taking care to go slowly so as not to nick the top "O ring, as it passes the set screw hole. If pressure is felt to build up and suddenly release during insertion, the "O" ring may possibly be cut. Pull out, inspect and replace if necessary. Push assembly down hard to seat the bottom "O ring, tighten the set screw to retain.

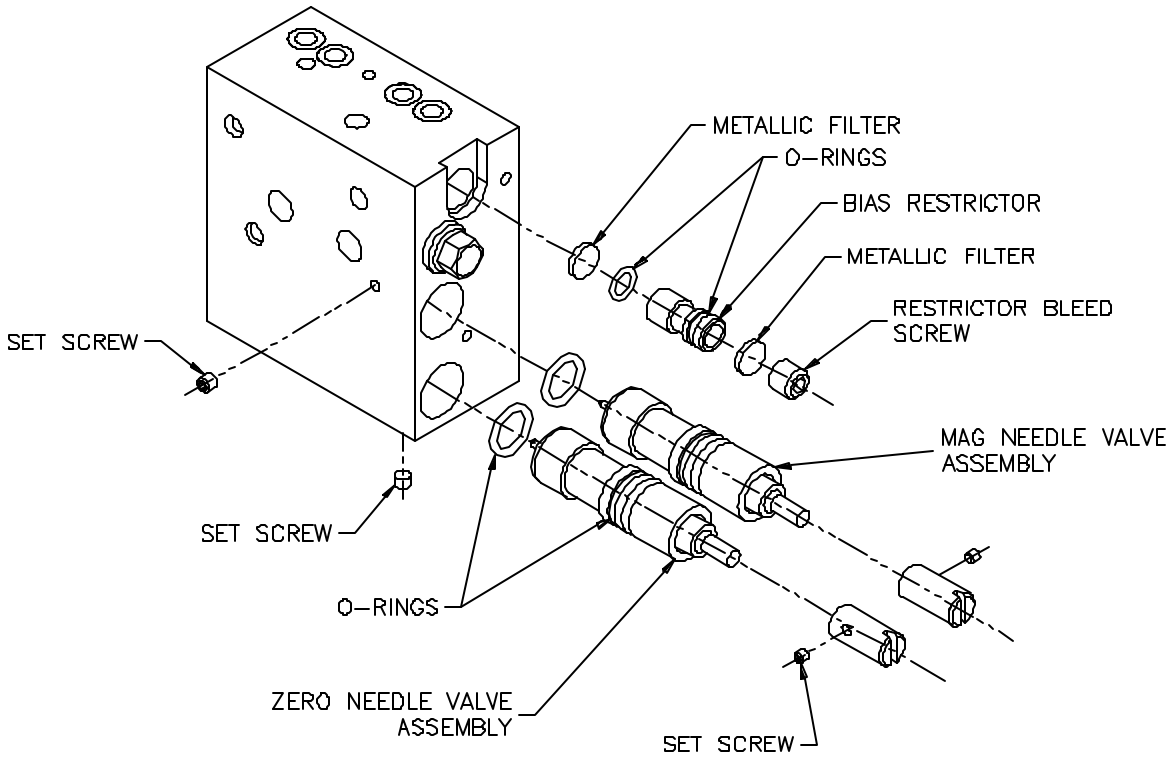


Figure 4.5 - A/E Block

4.2 LVDT Signal Conditioning Module Setup

The E8302 LVDT signal conditioning module is a two channel signal conditioning amplifier. The module plugs into the lower bay of the Trendsetter II and converts the outputs of the transducers into a useable format for the main controller board.
The module has two switches for selecting the polarity of inputs A and B, input and output pin selection jumpers, auxiliary inputs C and D sum and difference jumpers, and jumpers allowing magnification reduction to be set to 10x for long range transducers or 1x for standard transducers. See figure 4.6 or 4.6a for board layout. Figure 4.6a shows the current revision of the signal conditioning module and figure 4.6 shows the original version of the module.

Power to the column must be turned off prior to installing or removing a signal conditioning module.

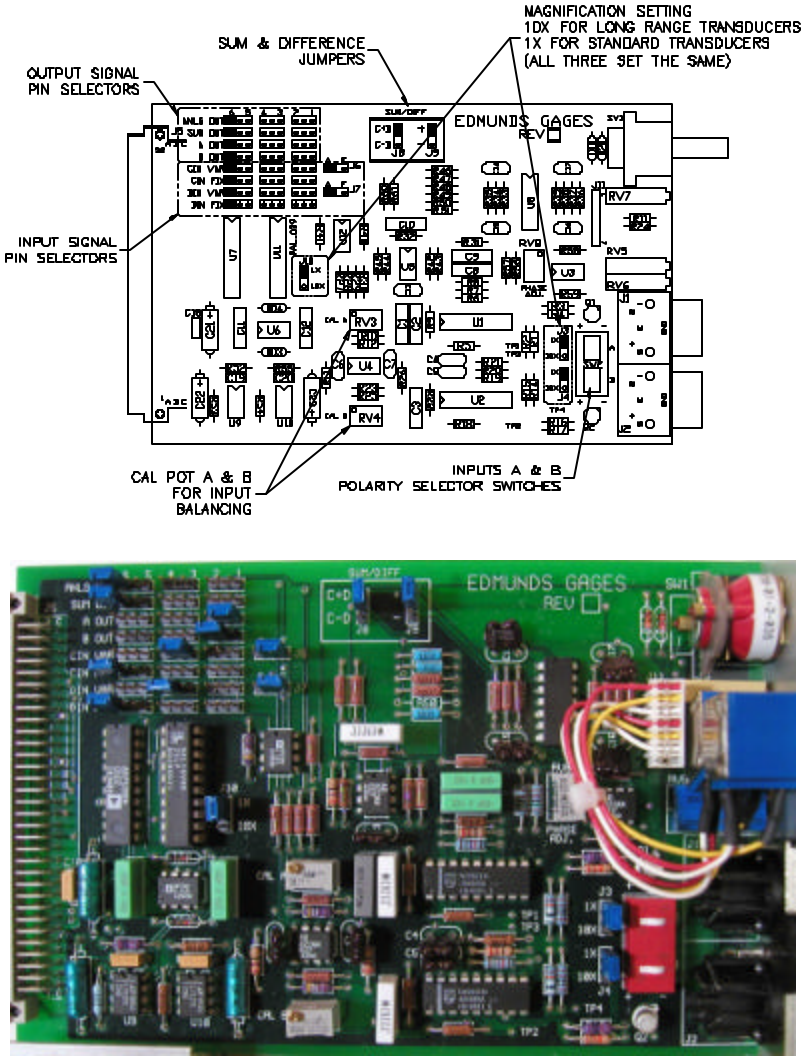
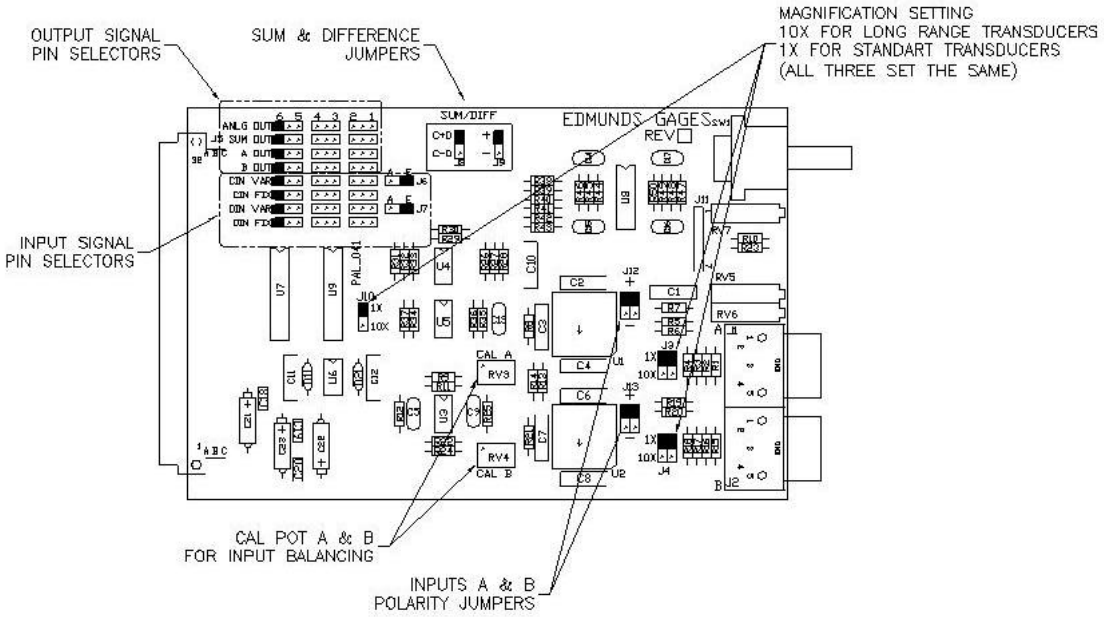


Figure 4.6 - LVDT Module E8302, original version



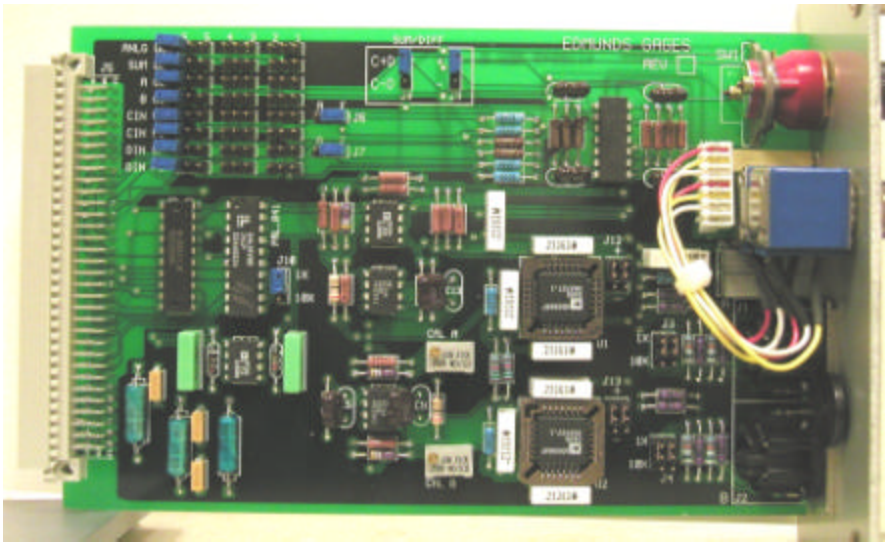


Figure 4.6a - LVDT Module E8302, current version

Polarity

The polarity of the input determines whether the input reads positive or negative as the probe tip is depressed. The bargraph will rise when the tip of the probe is pressed toward the body of the probe in the (+) setting. The polarity of input A and input B can be set independently. For example, if a gaging fixture uses two LVDTs to measure an outside diameter, then the polarity of both probes should be set to ("+") so that for larger part outside diameters the readout would show a larger size.

To set input polarity position the input polarity switches on the circuit board to ("+") or ("-") as shown in figure 4.7 or set jumpers J12 and J13 as shown in figure 4.7a. Figure 4.7a shows the current version of the jumper settings, while figure 4.7 shows the obsolete original version.

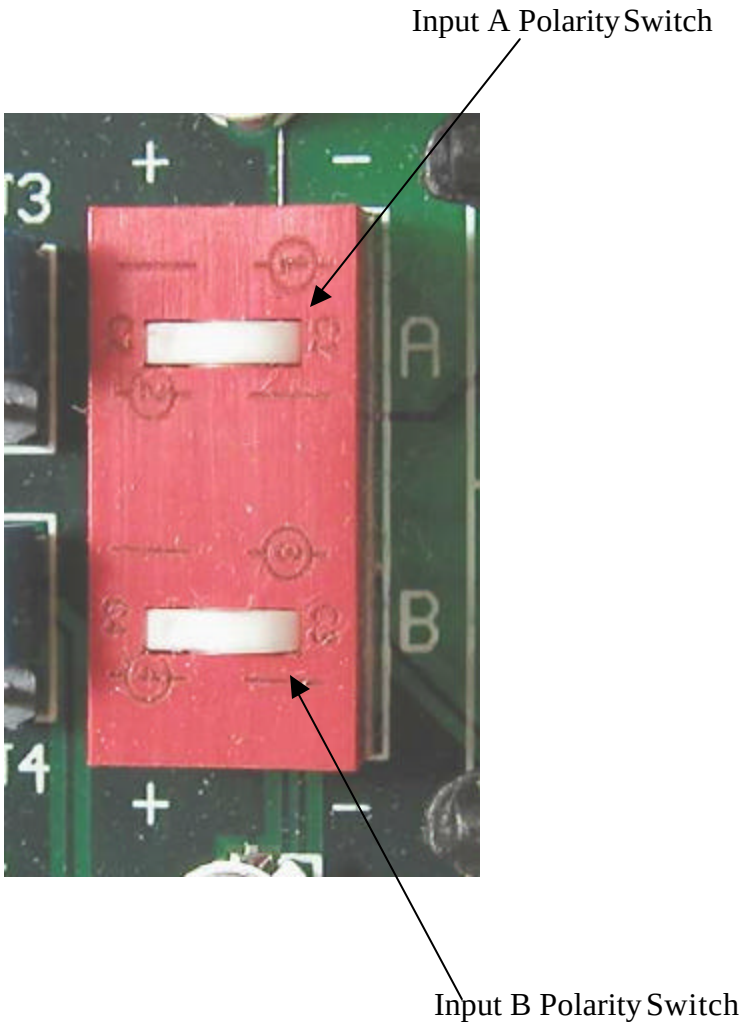


Figure 4.7 - Polarity Switch, original version

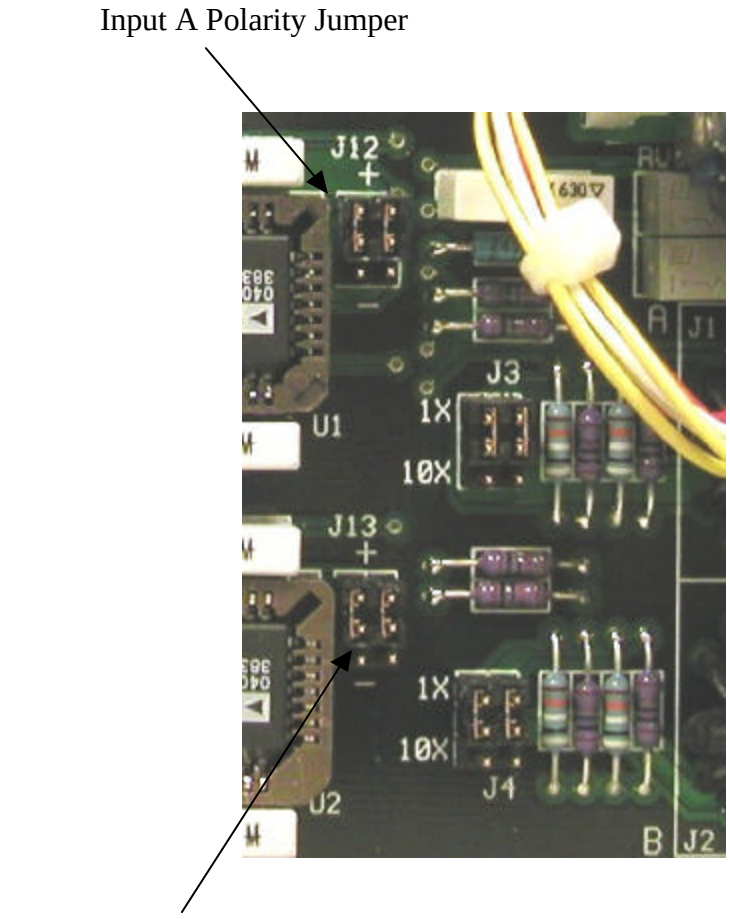


Figure 4.7a – Polarity Jumpers, current version

LVDT Jumper Settings

The following may be set on the signal conditioning module by means of jumpers: Buss out pin assignments, buss in pin assignments, bussed in signal sum and difference, and input amplification.

Output Jumpers

To buss a signal from one Trendsetter II to another connect an interface cable, Edmunds #4550200, from the Input/Output "A" connector on the rear of one column to the Input/Output "B" connector on the rear of the next column. Multiple columns may be connected in this way.

If a signal is to be bussed out to another Trendsetter II or external device the pin assignment, from 1 to 6, must be set using the jumpers as follows. **Note:** To avoid buss contention, assign one pin per signal.

ANLG OUT (Analog Output) - Is a high level output, +/-2.5VDC, of all signals after they have been amplified. This output can be assigned to any pin number 1 through 6.

SUM OUT - Use this jumper to assign a pin number, 1 through 6, to buss out the sum of all inputs including any auxiliary inputs. For example, if input A and input B are connected to LVDTs in a gage fixture and inputs C and D are bussed in from another Trendsetter II then the SUM OUT signal will be equal to A + B + C + D. This is a low level signal.

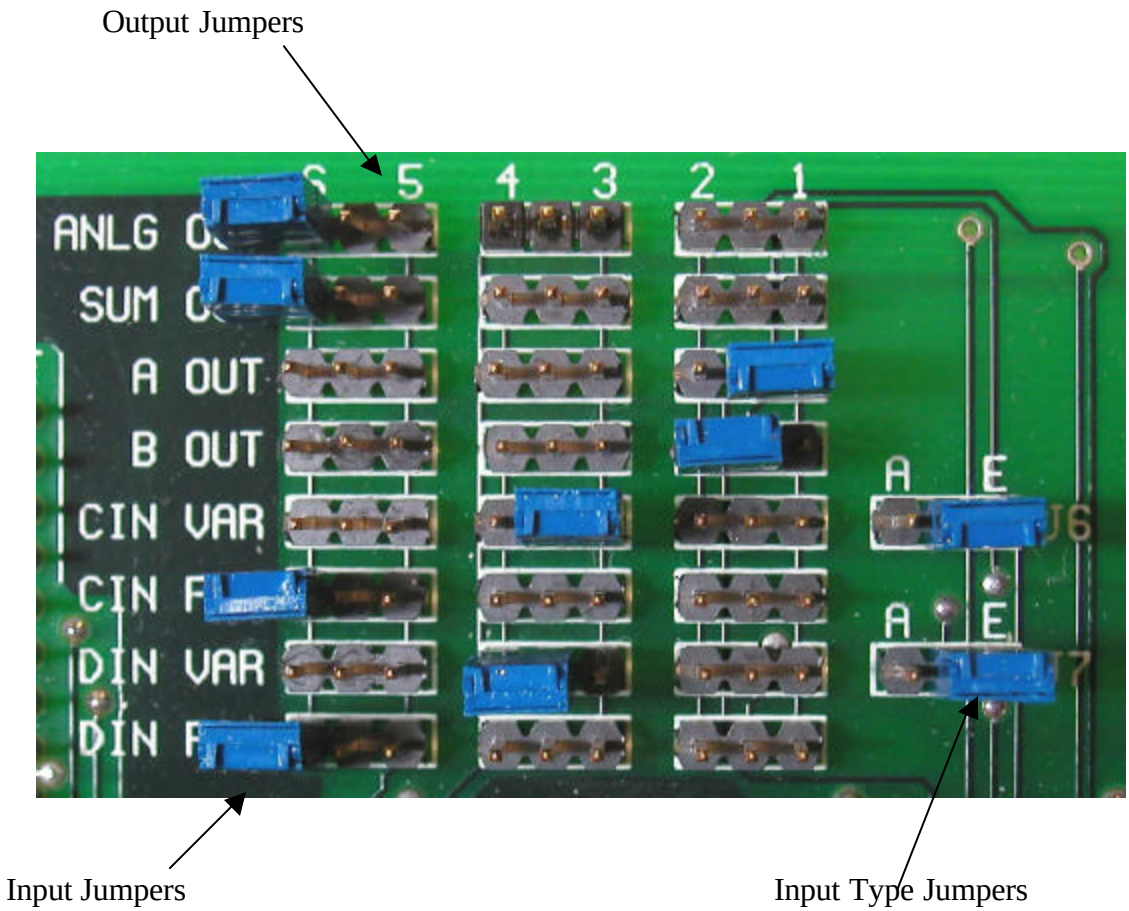
A OUT - Use this jumper to assign a pin number, 1 through 6, to buss out the signal from input A. This is a low level signal.

B OUT - Use this jumper to assign a pin number, 1 through 6, to buss out the signal from input B. This is a low level signal.

NOTE: Each pin can have only one input or output assigned. For example, if A OUT is assigned to pin number 6 then no other input or output can be assigned to pin number 6.

NOTE: If an output is not used place the jumper on only one pin .

For an example of the use of the output jumpers consider a gage fixture with two LVDT probes measuring a part's outside diameter. The two LVDTs are inputs A and B on the first Trendsetter II column. Jumper "A OUT" is set to pin number 1 and jumper "B OUT" is set to pin number 2. An interface cable, Edmunds #4550200, is connected to the Input/Output "A" plug on the rear of the Trendsetter II and to the Input/Output "B" plug on a second Trendsetter II with an E8302 module. A second cable is connected from Input/Output "A" of the second column to the Input/Output "B" plug of a third column. The input A signal from the first column can be bussed in to either or both of the other columns from pin number 1 by setting the appropriate input jumpers for input C or D on the E8302 modules of the second and/or third columns or the input B signal may be used from pin number 2.



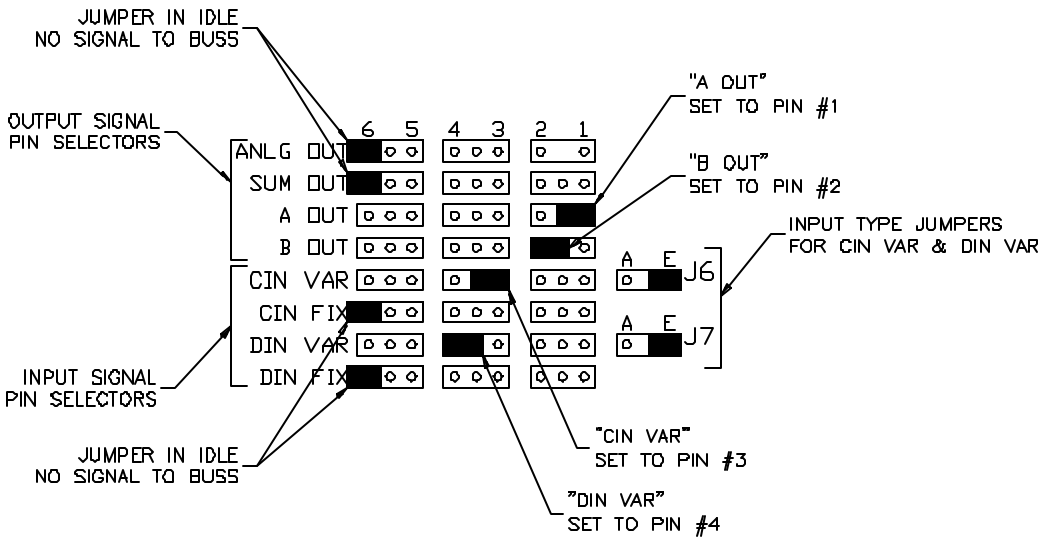


Figure 4.8 - Input/Output Jumpers

Input Pin Selection Jumpers

If an auxiliary signal is to be bussed in from another Trendsetter II or external device the input pin assignment, from 1 to 6, must be set using jumpers CIN VAR, CIN FIX, DIN VAR, or DIN FIX.

To buss a signal from one Trendsetter II to another connect an interface cable, Edmunds #4550200, from the Input/Output "A" connector on the rear of one column to the Input/Output "B" connector on the rear of the next column and set the output jumpers to define which pin numbers the signal are bussed out on.

CIN VAR (Input C, Variable Magnification) - Use this jumper to assign a pin number, 1 thought 6, to be input C. Variable magnification indicates that the "C IN" potentiometer on the front of the module can be used to adjust the magnification of the input. Jumper J6 must also be set to the correct position "A" or "E" depending on the type of input signal. See Input type jumpers below.

CIN FIX (Input C, Fixed Magnification) - Use this jumper to assign a pin number, 1 thought 6, to be input C. Fixed magnification indicates that the "C IN" potentiometer on the front of the module will **NOT** adjust the magnification of the input.

DIN VAR (Input D, Variable Magnification) - Use this jumper to assign a pin number, 1 thought 6, to be input D. Variable magnification indicates that the "D IN" potentiometer on the front of the module can be used to adjust the magnification of the input. Jumper, J7, must also be set to the correct position "A" or "E" depending on the type of input signal. See Input type jumpers below.

DIN FIX (Input D, Fixed Magnification) - Use this jumper to assign a pin number, 1 thought 6, to be input D. Fixed magnification indicates that the "D IN" potentiometer on the front of the module will **NOT** adjust the magnification of the input.

NOTE: Only one C input and one D input can be defined per module. For example, if CIN VAR is set to pin number 1 then CIN FIX can not be used as an input.

NOTE: Each pin can have only one input or output assigned. For example, if DIN VAR is assigned to pin number 6 then no other input or output can be assigned to pin 6.

Input Type Jumpers(J6, J7)

If a signal from an air to electric module is to be bussed in as input C, variable magnification, jumper J6 must be set to "A". Set jumper J7 to "A" if the air to electric signal is bussed in as input D, variable magnification. If a signal from an electronic gage is to be bussed in as input C, variable magnification, jumper J6 must be set to "E". Set jumper J7 to "E" if the signal is bussed in as input D, variable magnification.

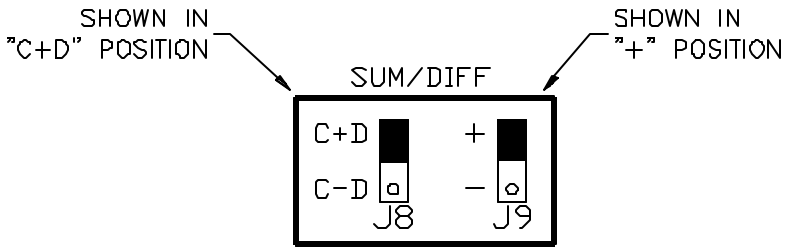
Gain Ratios

Jumper Setting	**Gain Ratio**
E	2x - .025x
A	2x - .002x

Sum/Difference Jumpers For C & D

When external signals are bussed in jumper J8 can be set so that auxiliary inputs C and D are added (C+D) or subtracted (C-D). Jumper J9 can be set to reverse the polarity of inputs C and D. When used together jumpers J8 and J9 can yield the following results:

J8	J9	Results
C+D	(+)	C+D
C+D	(-)	-C-D
C-D	(+)	C-D
C-D	(-)	-C+D



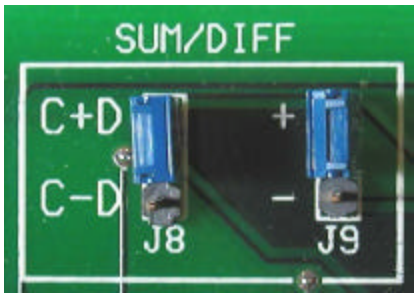


Figure 4.9 - Sum/Difference Jumpers

When an external signal is bussed in to a column the "INPUT" knob on the E8302 module will control the display results as summarized in the table below where the results of C & D are dependant on the settings of jumper J8 and J9.

"INPUT" Setting	Display
A	A + (Results C & D)
B	B + (Results C & D)
AB	A + B + (Results C & D)

For example, consider a Trendsetter II with an E8302 module, two LVDT inputs connected to the A and B inputs and two external signal bussed in as C and D. If jumper J8 is set to "C+D" and J9 is set to "-" then the result of C and D is (C-D). If the "INPUT"

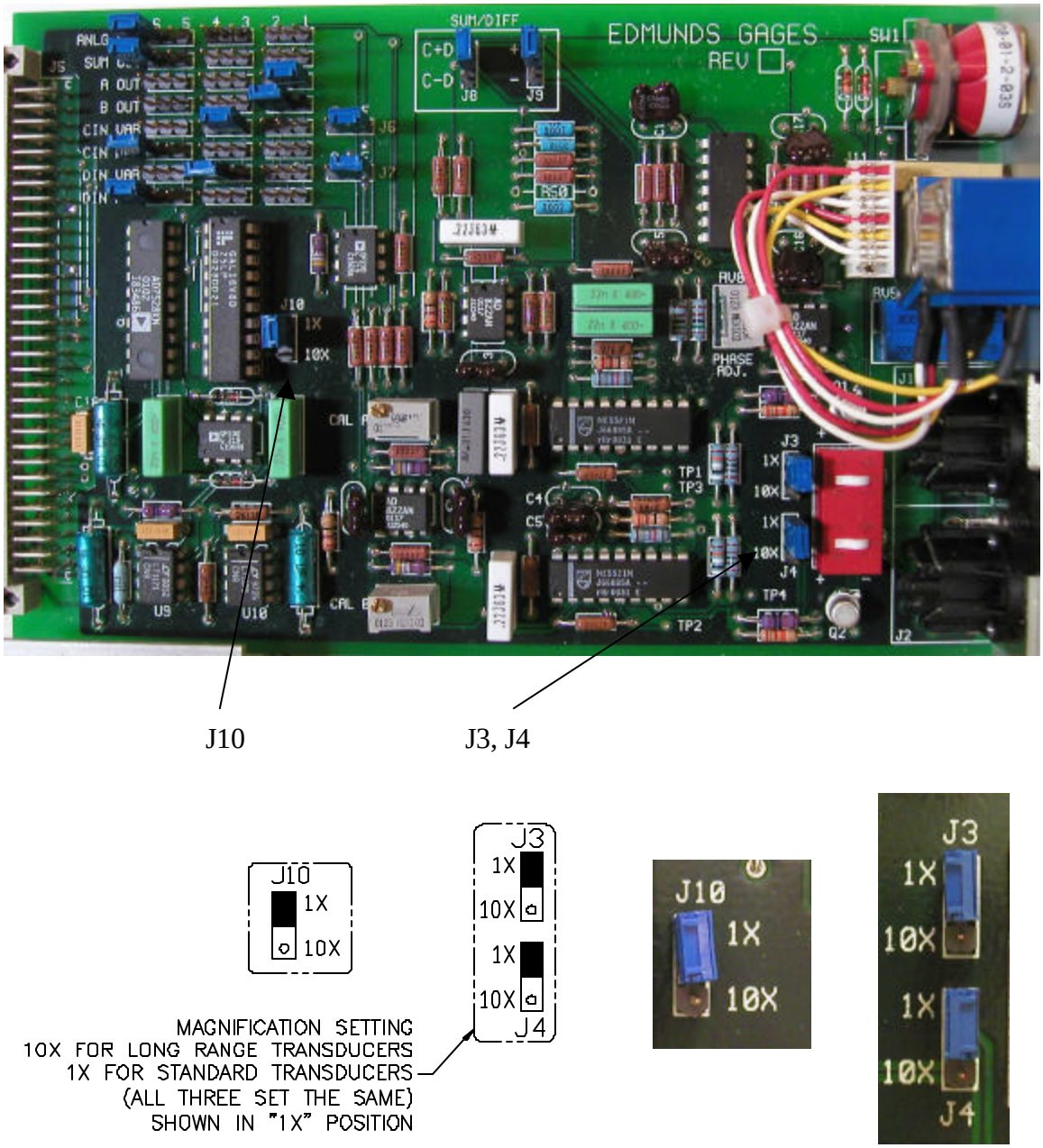
knob on the E8302 module is turned to "A" then the display will show the value of input A + (C - D). If the "INPUT" knob on the E8302 module is turned to "B" then the display will show the value of input B + (C - D). If the "INPUT" knob on the E8302 module is turned to "AB" then the display will show the value of input A + B + (C - D).

As an other example consider a Trendsetter II with LVDTs A and B used to measure the diameter of a part with the "INPUT" selection knob set to AB to display the results of A + B. The A and B outputs are bussed out on pin 1 and 2 respectively by setting the "A OUT" and "B OUT" jumpers. An interface cable, Edmunds #4550200, is connected from the Input/Output "A" plug on the rear of the Trendsetter II to the Input/Output "B" plug of a second Trendsetter II with an E8302 module. The E8302 module in the second Trendsetter II is setup to buss in the signal from the first column with jumper "CIN VAR" set to "1", "DIN VAR" set to "2" and J6 and J7 set to "E". Additionally jumper J8 set to "C-D" and J9 is set to "+" so that the result of C and D is (C-D). If the second Trendsetter II also has an LVDT input connected to input A then value displayed can be controlled with the "INPUT" selection knob. If the "INPUT" knob is set to "A" then the display will show the value of A + (C-D). If the "INPUT" knob is set to "B" then the display will show the value of B + (C-D), however since no B input is connected the display will show the value of C-D. If the "INPUT" knob is set to "AB" then the display will show the value A + B + (C-D), however since no B input is connected the display will show the value A + (C-D).

Attenuation Jumpers

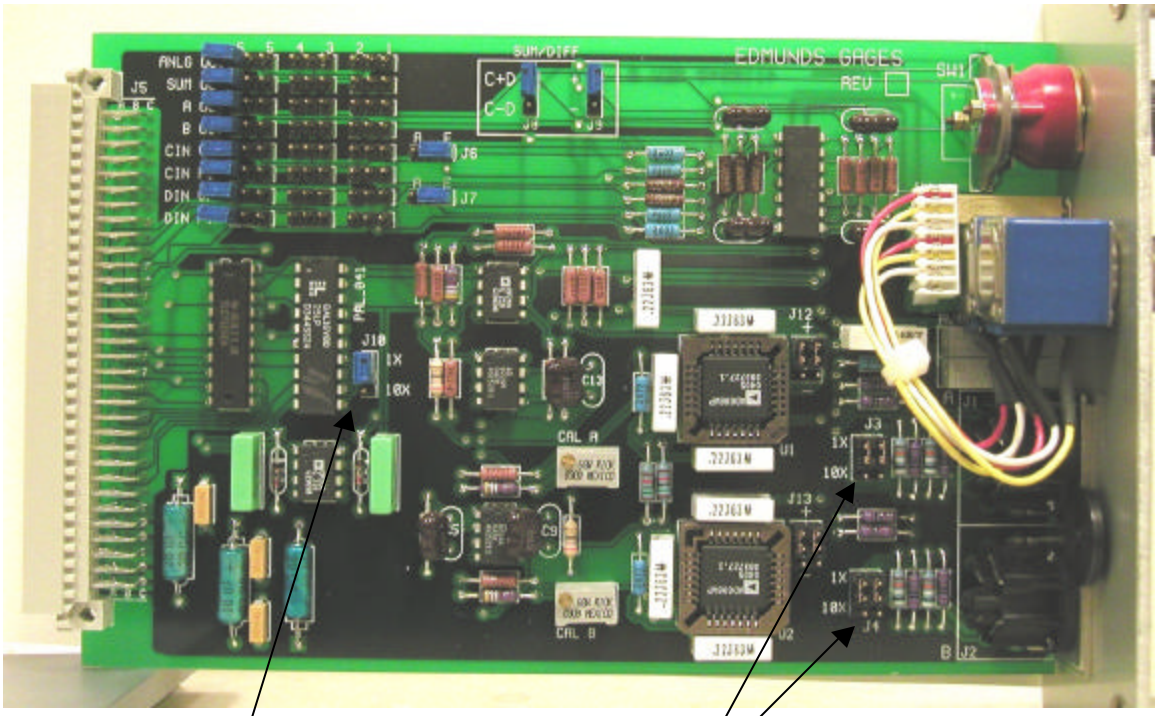
Jumpers J3, J4, and J10 allow the input attenuation to be set to 10x or 1x. For standard transducers the jumpers should be set to 1x. If long range transducers are to be use the jumpers should be set to 10x. See figure 4.10, obsolete board, or figure 4.10a, current revision of board, for jumper settings.

NOTE: Jumpers J3, J4, and J10 must all be set to the same value.



J10 J3, J4

Figure 4.10 - Attenuation Jumpers, obsolete version



J10 J3, J4

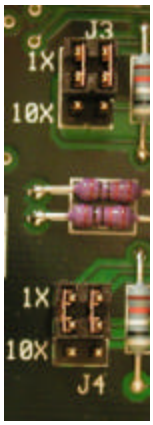


Figure 4.10a - Attenuation Jumpers, current revision

Cal A and Cal B Potentiometers

These (20) turn pots set the primary magnification of the “A” or “B” amplifier. The pots affect the LVDT in the respective channel, and the respective channel output signal to the matrix switch. The gain range it .5x to 1.5x. These potentiometers are factory pre-set and do not normally require adjustment. Refer to the "Basic Operation, Two Probe Balance" section on page 3-15 for additional information.

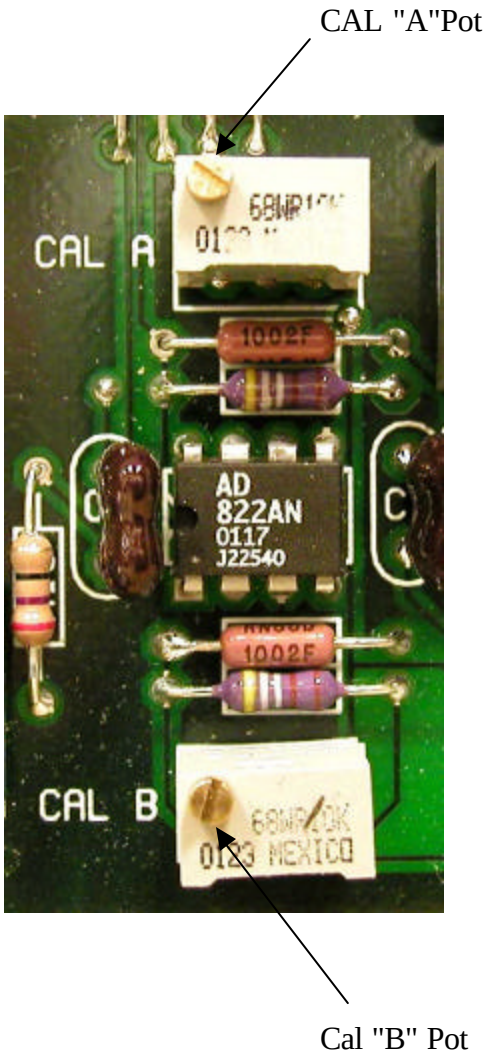


Figure 4.11 - Cal "A" and "B" Potentiometers

LVDT Module Installation

1) Turn off the main power switch on the rear of the Trendsetter II and unplug the power cord.

Power to the column must be turned off prior to installing or removing a signal conditioning module.

2) Ensure all jumpers and switches are properly set for the application to be run.
3) Slide the LVDT module into the lower bay and secure it in position with the two thumb screws on the front panel. **Note:** Ensure the card is fully inserted into the lower bay and that the connector on the rear of module is properly seated in the mating plug in the Trendsetter II.
4) Connect one or two LVDTs to the A and/or B plugs on the front of the module.
5) Plug in the Trendsetter II power cord.
6) Turn on the power switch on the rear of the Trendsetter II.
7) If necessary reprogram the scale, range, mode, etc. for the new application. See the "Basic Operation, Programming" section of the manual.
8) Perform the LVDT mag and zero setup procedure. See the "Basic Operation, Input Setup" section of the manual.
9) The unit is now ready for operation.

4.3 Communications

RS232 Communications

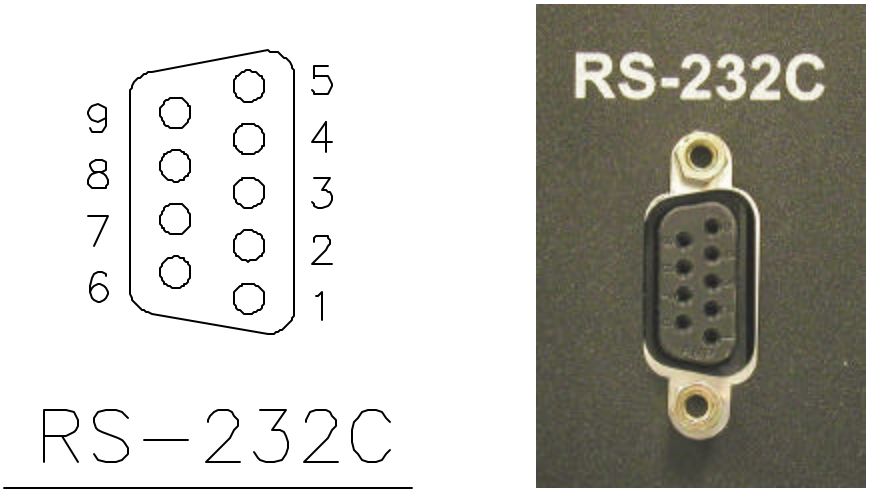


Figure 4.12- RS-232C

The Trendsetter II RS232C serial port provides a path to communicate to external devices such as a Data Collector or Personal Computer (PC). The RS232C connector is a standard 9-pin "D" style and is located on the back of the Trendsetter II. The following pins on the connector are utilized for communications:

Trendsetter II			Cable	External Device
Pin 1	=	Chassis Ground.	←----------→	Chassis Ground.
Pin 2	=	Receive (RXD)	←----------→	(TXD) Transmit.
Pin 3	=	Transmit (TXD)	←----------→	(RXD) Receive.
Pin 5	=	Signal Ground	←----------→	Signal Ground.

Note: Pin2 and 3 are jumper selectable based upon the application.

Serial Port Settings

The Serial Port Parameters on the external device need to be configured as follows:

Baud	9600
Bits/Character	8
Stop Bits	1
Start Bits	1
Parity	None

External Commands

There are several commands that can be issued to the Trendsetter II through the RS232C serial connection. These commands consist of a single byte which are called command codes. The command codes simulate the "RESET", "HOLD" and "ENTER" push-buttons on the Trendsetter panel. On receipt of a command code the Trendsetter will respond as if the corresponding push-button had be pressed. The command codes are as follows:

HEX CODE	CHAR	DESCRIPTION
52H	R	Simulates RST key
48H	H	Simulates HOLD key
45H	E	Simulates ENTER key (SEND Data)

Offloading Data

Current measurement results can be offload through the RS232C connection. The offloaded data consist of the measured numeric value, scale (inch or metric) and status (good, over or under).

There are three ways of initiating data offload from the Trendsetter II. They are as follows:

1. The operator can initiate offload by pressing the "ENTER" push-button on the Trendsetter II.
2. An external device (PC or Data Collector) can automatically solicit the data offload by sending an ASCII 'E' character (HEX code <45H>) to the Trendsetter II through the RS232C connection. This will simulate the "ENTER" push-button as explained in the EXTERNAL COMMAND section.
3. The offload can be initiated though an optional Relay I/O Board "add-on" (P/N 5911013). The Relay I/O Board contains a Footswitch control line input that when activated initiates the data offload. This input can be toggled with a footswitch or other external device (see Relay I/O Board section).

Note: When data is offloaded, the Trendsetter will display "SEND" momentarily on the Trendsetter display.

Data Packet

The offloaded data packet will contain three fields. Each field will be separated by a semicolon (;) delimiter. A semicolon delimiter will also be included after the last field along with a <carriage return > and < line feed>. (HEX code<0DH> and <0AH>).

Field 1 - Measured Numeric Value, 4-8 ASCII Characters.
Field 2 - Scale Type, 2 ASCII Characters (in, mm).
Field 3 - Status, 0 – 5 ASCII Characters (GOOD, UNDER, OVER).

Note: If the programmable limits are turned off, the status field will be blank but the delimiter will still be included.

Examples

VALUE SCALE STATUS

<+0.012>;<mm>;<GOOD>;<cr-lf>

<-.000012>;<in>;<UNDER>;<cr-lf>

<+0.012>;<mm>;;<cr-lf>

cr-lf = *(carriage return, line feed)*

ASCII version

+0.012;mm;GOOD;

HEX Code version

(+)(0)(.)(0)(1)(2)(;)(m)(m)(;)(G)(O)(O)(D)(;)(cr)(lf)
2B 30 2E 30 31 32 3B 6D 6D 3B 47 4F 4F 44 3B 0D 0A

4.4 Input/Output Board (Optional)

Trendsetter Relay I/O Board (P/N 5911013) Functions

The Trendsetter relay interface I/O board is an "add-on" option that provides the user with various I/O functions. All I/O functions are optically isolated from the rest of the Trendsetter electronics and are available at the rear panel I/O A and B connectors.

Summary of I/O signals

Inputs

- **Write/Disable** (limits): Control line used in setting one of the "Special Operating Modes". See special operating modes section for a description of these modes.
- **Reset** (limits): Control line used in setting one of the "Special Operating Modes". See special operating modes section for a description of these modes.
- **Footswitch**: Control line to externally send data via the RS232C port.
- **TIR/PEAK Reset**: Control line to externally reset TIR or PEAK detectors.

Inputs are activated by applying a 5-24 VDC signal to the appropriate input line. These signals must be positive in respect to the Isolated Common P24. See "Typical Connections" section for examples.

Outputs

- **Over Relay**: Normally open Over relay
- **Good Relay**: Normally open Good relay
- **Under Relay**: Normally open Under relay

Outputs are normally open Solid State Relays (SSR) and can sink or source current up to 250ma (AC, DC). Maximum load voltage is 120V. Typical "on resistance" (Ron) is 5 ohms. All outputs are referenced to the Relay Output Common P19. See "Typical Connections" section for examples.

Special Operating Modes

- **Follow**: Limit lights and relay outputs follow the signal input.
- **Latch and follow**: Limit lights and relay outputs follow signal input and latch any over or under excursions. Latches are cleared by returning to either reset or follow mode.
- **Hold**: Limit lights, bargraph and relay outputs are locked into their present status and ignore all signal input. Returning to reset or follow mode clears this condition.
- **Reset**: Limit lights and relays outputs off.

Special Operating Modes are set using the Write/Disable and Reset control lines in accordance with the Truth table listed below.

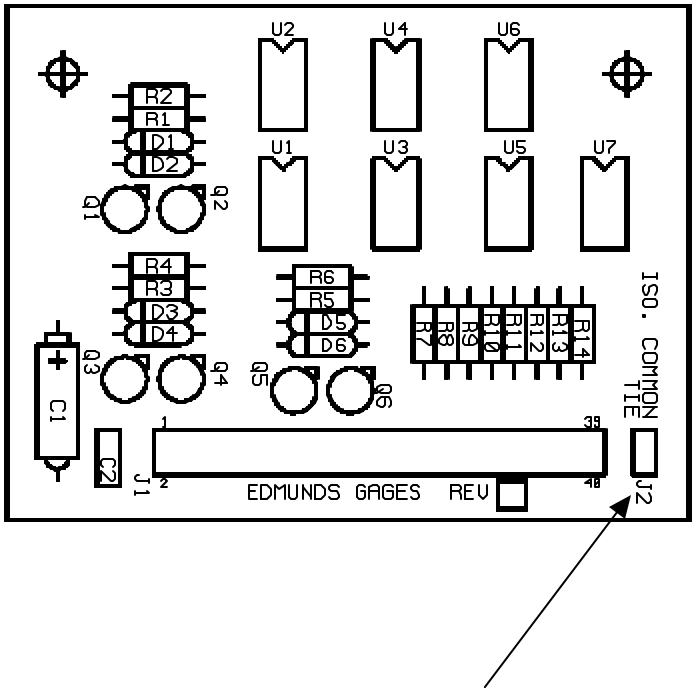
Truth Table – Special Operating Modes

Write/Disable	Reset	Function
0	0	Follow
0	1	Latch and follow
1	1	Hold
1	0	Reset

0 = Input inactivated
1 = Input activated

E8204 Connections

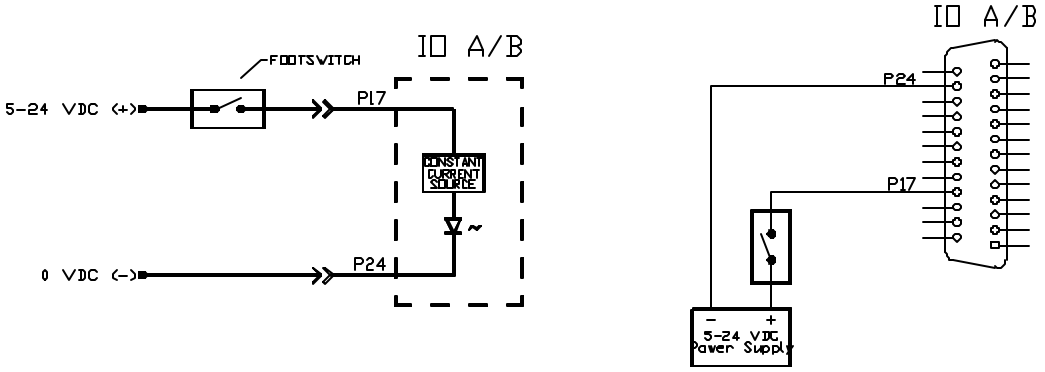
The Trendsetter Relay Interface board (5911013) board contains a programmable jumper (J2) that connects the Relay Output Common P19 to the Isolated Common P24. This option allows the relay interface board (5911013) to connect to legacy relay interface boxes (E8204, etc.). This jumper should be placed in the idle position during all other times.



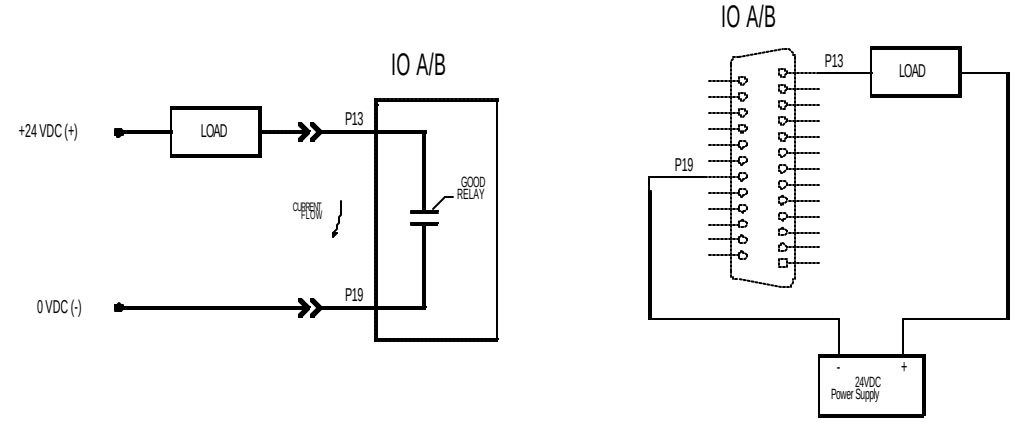
Relay Output Common P19 to Isolated Common P24 jumper

Typical IO Connections - Optional I/O Board #5911013 Required

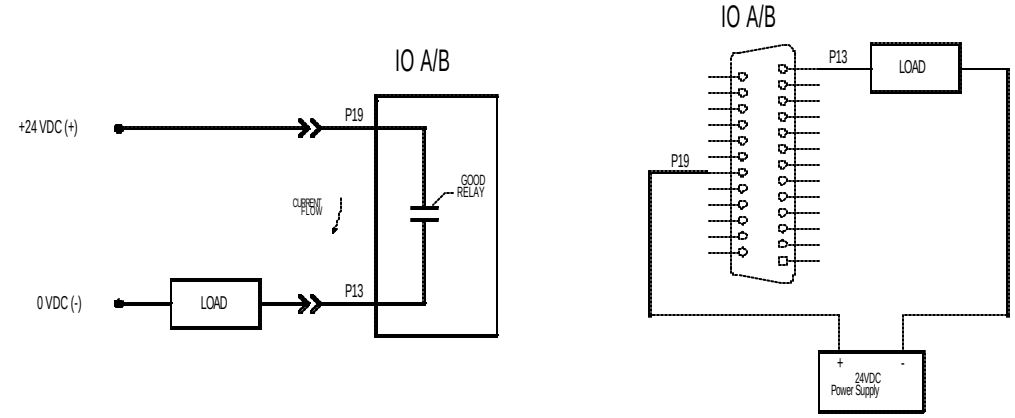
INPUT



OUTPUT "SINKING"



OUTPUT "SOURCING"



I/O Board Installation

NOTE: When working inside the Trendsetter II cabinet unplug the main power cord and use caution to protect against damage from static electricity. Use of an anti-static wrist band or other grounding procedure is recommended.

1) Power down the Trendsetter II column gage.

Power to the column must be turned off prior to installing or removing the I/O Board.

2) Remove the top cover and slide the left side panel out of the Trendsetter II column gage.

3) Locate the expansion connector J5 on the Trendsetter II motherboard.

4) Carefully line up the male pins of the relay interface board to the female connector and press firmly into place snapping the board onto the plastic mounting posts.

5) Replace the top cover and side panel that were removed in step 2.

6) Power up the Trendsetter II column gage.

4.5 Auto Air Shutoff (Optional)

Overview

The optional auto air shutoff allows the user to program the Trendsetter to automatically shut the air flow to the gage tooling to a minimal level when not actively gaging a part. To use the auto air shutoff feature the Trendsetter must have software version 1.3 or later installed and the auto air shutoff kit, Edmunds #5912250, must be installed. The time between removing the gage tooling from the part and the shutoff of the air is programmable to 5, 10, or 15 seconds.

Installing Auto Air Kit #5912250

NOTE: The Trendsetter II must have software version 1.3 or later installed to use the auto air shutoff option.

1) Turn off the power to the Trendsetter II.
2) If the optional Relay I/O board, Edmunds #5911013, is not installed, then install the board per the instruction in section 4.4, I/O Board Installation.
3) Plug the shutoff cable, Edmunds #5911018, into I/O port "B" on the rear of the Trendsetter II. **Note: The cable must be plug into port "B" only.**
4) Remove the existing filter/regulator assembly from the back of the Trendsetter II and install the filter/regulator assembly with the shutoff valve, Edmunds #5911200.
5) Turn on the power to the Trendsetter II. If the shutoff cable is installed in the I/O port then the Trendsetter II will automatically detect the air shutoff and the user will have access to the air shut off menus. **NOTE: The air shutoff menus are not available if the shutoff cable is not plugged in.** At power up, after the Trendsetter II scrolls the opening version message, the "Auto Air" menu option is displayed for about 5 seconds. Pressing the ENTER button when this menu is shown will allow the operator to change the auto air shut off setting between 5, 10, 15 seconds, or disabled.
6) Proceed to the Setup section below.

Setup

1) Setup Mag & Zero for the air check.
2) Remove the air tool from the master so that the nozzles bleed unobstructed to atmosphere and place the column in Run mode. After a 3 second delay the air will shutoff and the display on the column will flash "WAIT" for several seconds and then display "AIR OFF". **NOTE: During the time that the display is flashing "WAIT" DO NOT reinsert the air tool into the part.**
3) Close the flow control on the air shutoff valve so that a minimal amount of air is allowed to flow to the air tooling.
4) Place the air tooling in the least material condition master. For an air plug the LMC master is the max master and for an air ring the LMC master is the min master.
5) If the column readout detects two light bars of deviation when the air tool is loaded in the master it will automatically turn on the full air flow to the gage and a measurement can be made. If the column readout does not detect two light bars of

deviation when the air tool is loaded in the master then slowly open the flow control valve on the air shutoff valve until a two bar deviation is detected and the air turns on.

6) Remove the air tool from the LMC master. After a 3 second delay the air will shutoff and the display on the column will flash "WAIT" for several seconds and then display "AIR OFF". **NOTE: During the time that the display is flashing "WAIT" DO NOT reinsert the air tool into the part.**
7) Load the air tool back in the LMC to ensure the air turns on. If it does not turn on open the flow control until the air turns on.
8) Repeat steps 6 and 7 until the air turns on and off correctly. **NOTE:** If the gage is used to measure parts with greater clearance than the LMC master it may be necessary to open the flow control valve more to ensure that the column detects a two light bar deviation when the air tool is loaded.

Operation

1) Place the air tool in gage position. The air will turn on to full flow automatically as soon as a two light bar deviation is observed.
2) When the air tool is removed from the part the air will shutoff after the programmed delay time. After the air shuts off the display on the column will flash "WAIT" for several seconds and then display "AIR OFF". **NOTE: When the display is flashing "WAIT" DO NOT reinsert the air tool into the part.**

4.6 Troubleshooting

Error	Cause/ Corrective Action
Unit will not turn on	Incorrect or no input line voltage/ Check that the power cable is connected to connector on the rear panel and to the correct line voltage, 100-240 V, 50-60 Hz. Blown fuse/ Check the fuse in the rear panel above the power connector. Fault in power switch/ Check operation of power switch.
Can not set mag & zero for air tooling	Dirty A/E block/ Perform A/E maintenance procedures Damaged air tooling/ Inspect air tooling for damage or wear on nozzles. If repair required contact Edmunds Gages. Incorrect Air Supply Pressure/ Check air supply to filter/regulator assembly is 60 psi min. Check Trendsetter II regulator set to 44 psi. Air Leak / Check air lines and connections from air tooling to air module. Gain Jumper Set Incorrectly/ Check the setting of the gain jumper, J4, on the signal conditioning module. Polarity Jumper Set Incorrectly/ Check for proper setting of polarity jumper, J5, on the signal conditioning module.
LVDT input not responding	Improper connection to signal conditioning module/ Ensure LVDT cable is securely plugged into signal conditioning port. Input channel selector not set properly/ Check "INPUT" selector switch set to appropriate input, “A”, “B”, or "AB" Signal conditioning card not properly installed/ Check that signal conditioning card is properly seated in lower bay.

	Faulty LVDT/ Check function of LVDT on another readout device.
A/E input not responding	Signal conditioning card not properly installed/ Check that signal conditioning card is properly seated in lower bay. Incorrect air supply pressure/ Ensure the air supply to the filter/regulator assembly is at least 60 psi. Damaged air tooling/ Check the air tooling for damaged or plug nozzles. If repair is required contact Edmunds Gages. Improper connection to signal conditioning module/ Ensure the air line from the tooling is securely connected to the signal conditioning port and that there are no air leaks in the line. Mag and Zero not properly setup for the application./ Perform air check mag and zero setup procedure.
Gage reads opposite of expect value	Input polarity set incorrectly/ Check polarity settings on signal conditioning module.
Bargraph reading off scale high or low	Range set incorrectly/ Reset range to larger full scale value. Part is out of tolerance/ If the part being gaged is out of tolerance by a large enough amount the bargraph will read off scale high or low
Bargraph indicates out of tolerance condition for good part	Over/Under LIMITS not set properly/ Reprogram over and under limits. Incorrect gage setup or damaged gage tooling/ Ensure the column is programmed correctly and that there is no physical damage to the gage.
Bargraph not responding in real time	Incorrect mode selected/ If the unit is programmed for TIR, +PEAK, or -PEAK the display may not respond in real time until the RESET button is pressed. If the unit is programmed for LIVE RDG it will always display the results in real time.

Input/Output signal not reading properly	Interface cable not connected properly/ Ensure the interface cable is securely connected form the "Output" plug on the first column to the "Input" plug of the second column. Incorrect Input/Output jumper settings/ Ensure the Input and Output jumpers on the signal conditioning modules are set properly Input Type Jumpers set incorrectly/ Ensure the input type jumpers J6 and J7 on the signal conditioning module are properly set to "A" or "E" Incorrect SUM/DIFF jumper setting/ Check the setting of the sum and difference jumpers on the signal conditioning board. "INPUT" knob not set correctly/ The setting of the "INPUT" knob on the column to which the signals are bussed in will control the displayed results.

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Warranty Information

A one year warranty covering materials and workmanship when used under the intended use of the product. Repairs of air gage modules and columns due to contaminated air supplies are not considered warranty items. We will, at our option, repair or replace any part(s) found defective, provided said part(s) are returned to us transportation prepaid. In no event shall Edmunds be liable for special, incidental, or consequential damages, including but not limited to loss of profits or revenues, loss of use of the products of other equipment, down time costs, or claims of buyers customers for such damages, including non-contractual liabilities for personal injuries or property damage.

Service & Support Information

If service or support is required contact:

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