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A

ccu-Setter II User's Manual

GAGES Edmunds

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Preface

Manual Revision History

Revision	Change	Date
0	Original Issue	6/3/04
A	Updated I/O cable listed in Advanced Operation section To e #4550200, was #4550203	
	Update section 4.6, Auto Air Shutoff – 25 pin connector to Port “B” only	

Trademark Information

“Accusetter” is a registered trademark of Edmunds Gages

Introduction

1.0 Summary and Features

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

The Accusetter II is a microprocessor based gaging column that combines a 101 discrete tri-color 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 pushbuttons provide all of the operator control functions.

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 for the I/O accessory board. An RS-232C connector allows output of gage results to a data collector. The Accusetter 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 Accusetter II.

The Accusetter II's powerful microprocessor allows the user tremendous flexibility in tailoring the column to match the gaging requirement. Each dimension can be functionally displayed as a deviation from nominal, absolute size, +peak, -peak, TIR or class functions. The automatic mastering provides precise calibration without the usual need of precisely adjusting trim pots and knobs. The user is provided with three distinct application gaging programs to choose from. The single check program simplifies the operation of the Accusetter II to allow only a single check measurement. The multiple check program is Accusetter II's unique "4 in 1" feature that allows the user to configure up to four dimensional checks to be gaged simultaneously in one column. In the multiple fixture program, an enhanced single check measurement is available for up to four separate gages. Whenever power is first turned on to the Accusetter II, the display will scroll the software version and the present application program and the module ID.

1.1 Document Conventions

RUN = Shortcut Programming Key

"INCH" = Alphanumeric Display

1.2 Anti-Static Precautions

When working inside the Accusetter 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

Absolute displays the check size as the actual part size.

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

+APPROACH (or **-APPROACH)** are optional user defined programmable values approaching the max and min part limits.

AVG (Average) is a function that returns the average check reading.

Bypass is a function that displays a live input reading

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

Calibration is a procedure used to automatically set the magnification and zero shift for a check by comparing actual gage readings to known certified sizes of a master or masters.

Deviation displays how much a check size deviates from the nominal size as a variation.

A gaging **Formula** allows the user to add, subtract, multiply, or divide inputs from transducers A, B, C, and D.

A **Function** defines how an input or check will be displayed on the readout. Function options are Bypass, Average, +Peak, -Peak, TIR, and TOL Check.

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.

A **Multiple Check Program** allows the user to program up to four dimensional checks to be gaged simultaneously in one column. All checks must use the same range.

A **Multiple Fixture Program** allows the user to program the Accusetter II with up to four separate gages each consisting of a single check. The gages can use different ranges.

A **Multiplier** is part of the check formula. The input reading is multiplied by the this factor. It is determined by the number of probes used to perform the measurement or to correct any ratio that may be introduced by any contact arms or tooling.

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.

In **Run Mode** the user can perform the actual part measurements.

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

A **Single Check Program** allows the user to program the Accusetter II for one dimensional check.

In **Setup Mode** the user can program the required variables for the par checks and transducers.

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

TOL Check is a check function that displays the average reading measured when the check is within the programmed tolerance limits and displays the +Peak or -Peak readings when the check result is outside the programmed tolerance limits.

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 Accusetter 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.

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

- 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.

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

3) Program Accusetter 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 variables such as range, scale, 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 air inputs.

- Using the masters for the gage tooling and the mag and zero adjustments on the signal conditioning module setup the air input(s).

Note: See "Basic Operation, Input Setup" for additional information, page 3-40

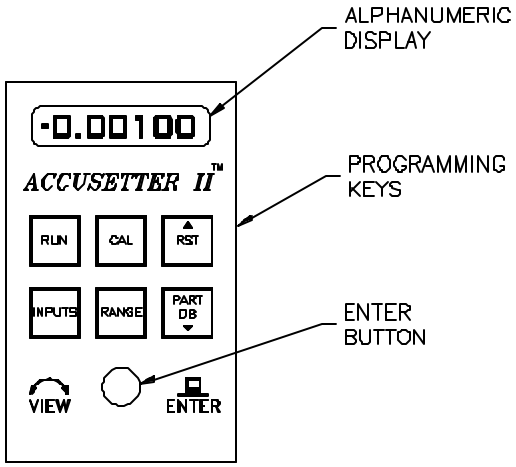
5) Master the gage using Calibration mode.

Note: See "Basic Operation, Calibration" for additional information, page 3-43

6) Select Run mode and the unit is ready for gaging.

Programming Reference Guide

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



RUN — Pressing this button will activate the run mode which is used for normal gaging operation.

CAL — Pressing this button will activate the calibration mode from which the operator can master the gage or view live readings of the inputs.

RST — Pressing this button will reset the currently latched reading. This button can also be used to navigate up one menu level when programming.

INPUTS — This button is a shortcut to the INPUTS menu in the calibration mode. The operator can select a range and view live readings of inputs or checks.

RANGE — This button is a shortcut to the RANGE menu in the setup mode. The operator can select a full scale range.

PART DB — This button is a shortcut to the PART DB menu from which the operator can select a new part program or save the current setup. This button can also be used to navigate down one menu level when programming.

Figure 1.1

Note: RANGE shortcut key is inactive for air applications.

NOTE: If the RANGE is changed the master sizes and part limits must also be reprogrammed.

System Description

2.0 Number References

Component	Edmunds Gages Number
Basic Accusetter II Unit	E9300
(2) Channel LVDT Signal Conditioning Module	E9310
(4) Channel LVDT Signal Conditioning Module	E9320
(1) Channel A/E Signal Conditioning Module	E9330
(2) Channel A/E Signal Conditioning Module	E9340
Power Cable	4550111
Air Filter/Regulator Assembly	5801302
Interface Cable	4550200
Printer Cable	5809060
Power Jumper Cable	4550120
I/O Accessory Board	5911013
Send Data Foot Switch*	5911100
TIR Reset Foot Switch*	5911101
Auto Air Shutoff Kit (Optional)	5913250
Includes: Valve Assembly	5911200
Shutoff Cable*	5911018

*Note: Foot switch and air shutoff cables must be plugged into the "In/Out B" port.

A new Accusetter II will be supplied with an E9310, E9320, E9330, or E9340 signal conditioning module, however the Accusetter II is compatible with the obsolete signal conditioning modules listed below:

Obsolete Signal Conditioning Modules	Edmunds Gages Number
(2) Channel LVDT Signal Conditioning Module	E9010
(4) Channel LVDT Signal Conditioning Module	E9020
(1) Channel A/E Signal Conditioning Module	E9030
(1) Channel A/E Signal Conditioning Module	E9031
(2) Channel A/E Signal Conditioning Module	E9040
(2) Channel A/E Signal Conditioning Module	E9041

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

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 (E9330 or E9340 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 Accusetter 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
E9310 & E9320 LVDT Modules		
2 Position Shunt, .100 Spacing	4570117	1
E9330, (1) Ch. 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
E9340, (2) Ch. A/E Module		
A/E Block	3101510	1
Needle Valve Assembly	3101045	2
O-Ring, Restriction Screw	5900026	2
O-Ring, Body	5900027	2
Bias Restrictor Assembly	3101188-B	1
Filter Disc	3101130-B	2
Bias Restrictor O-Ring	5900026	2
Transducer O-Ring	5900043	4
Air Filter Replacement Element	SMC #KT-AF2000-5B	1
2 Position Shunt, .100 Spacing	4570117	1

2.3 Overall E9300Unit

Figure 2.1 - Accusetter II Basic Unit - E9300

2.4 Front Panel

The Accusetter 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 Accusetter II. When over and under limits are programmed, the bargraph will change colors to visually indicate over or under (red), approaching part limits (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.

Range Options:

Inch	Metric
.0002"	.005mm
.0005"	.01mm
.001"	.02mm
.002"	.05mm
.005"	.10mm
.010"	.20mm
.020"	.50mm
.050"	1.00mm

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 Accusetter II.

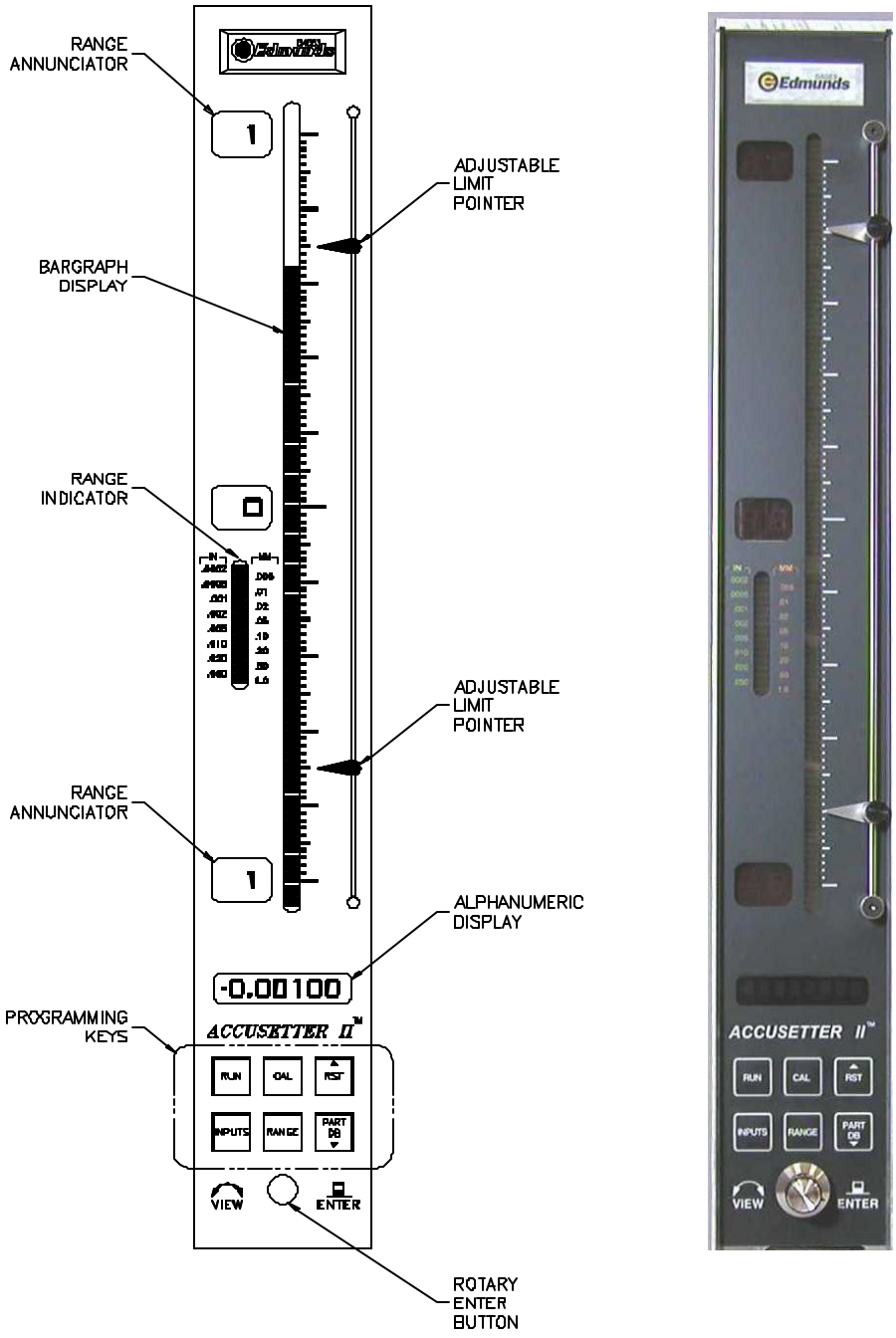


Figure 2.2 - Front Panel

2.5 Rear Panel

The Accusetter 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 Accusetter II contains a universal power supply that will automatically adjust to any line voltage in the above range.

Power Outlet Jumper - In a multiple Accusetter 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 Accusetter 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 Accusetter 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 Accusetter II. An air line is connected to this fitting and to the outlet side of the air filter/regulator assembly.

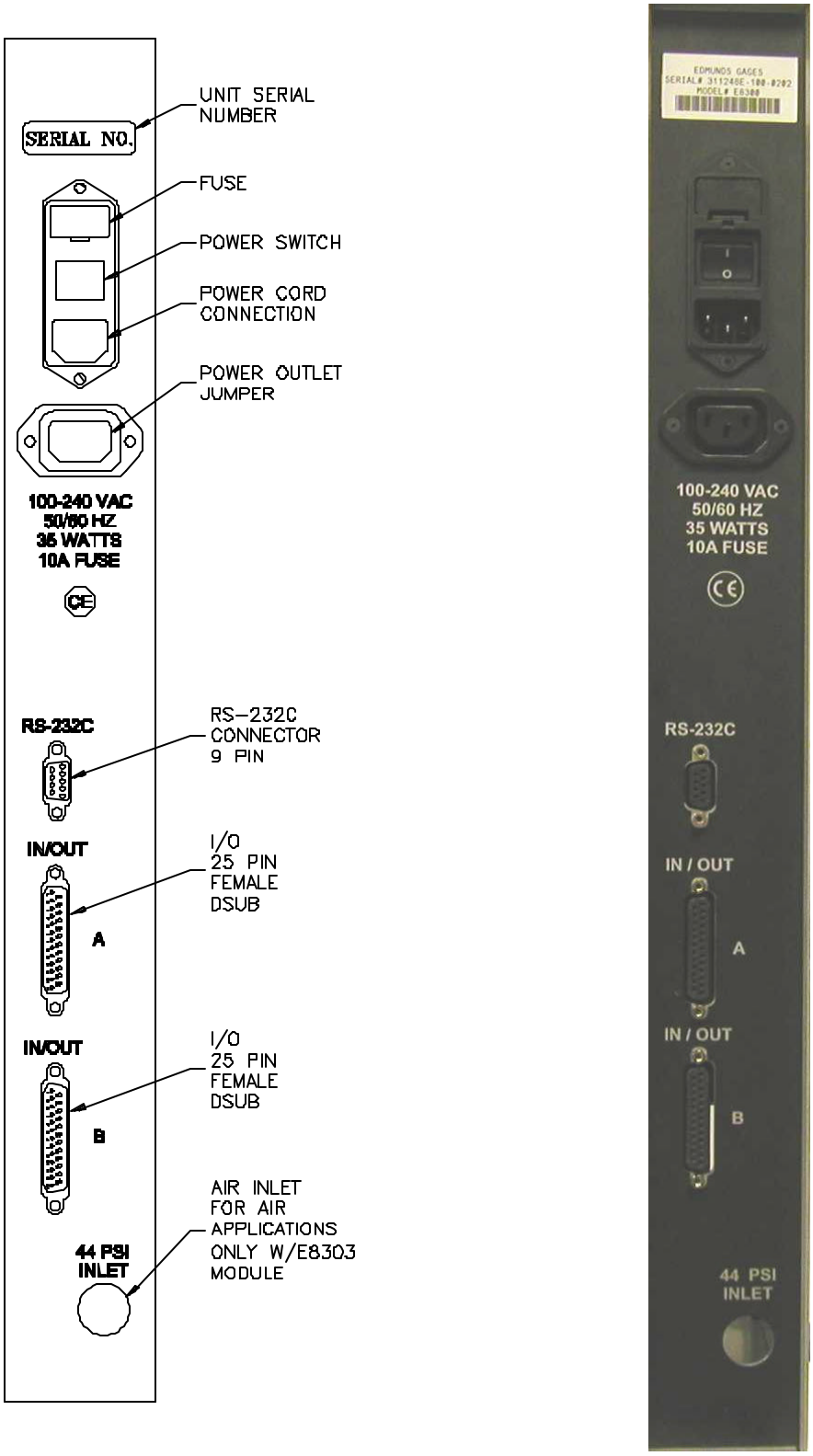


Figure 2.3 - Rear Panel

2.6 Pin Assignments for Rear Panel connectors

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

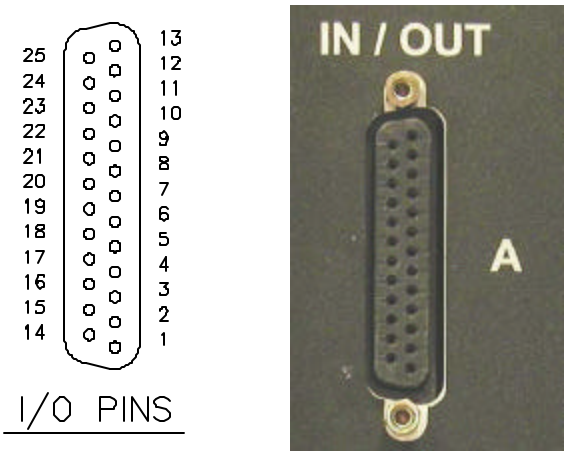


Figure 2.4 - I/O Pins

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/Class Bit 0 (Output)	“
13	Good Relay/Class Bit 1 (Output)	“
14	Under Relay/Class Bit 2 (Output)	“
15	Hold (Input)	“
16	Status/Class Request (Input)	“
17	Footswitch (Send Data/Input)	“
18	NC	+V (External Switch)
19	Relay Output Common	“
20	TIR Reset (Input)	“
21	+Approach/Class Bit 3 (Output)	“
22	-Approach/Class Bit 4 (Output)	“
23	Class Bit 5 (Output)	“
24	Isolated Common	“
25	NC	High Level Analog Out

- NC = Not connected

Typical IO Connections - I/O Board #5911013

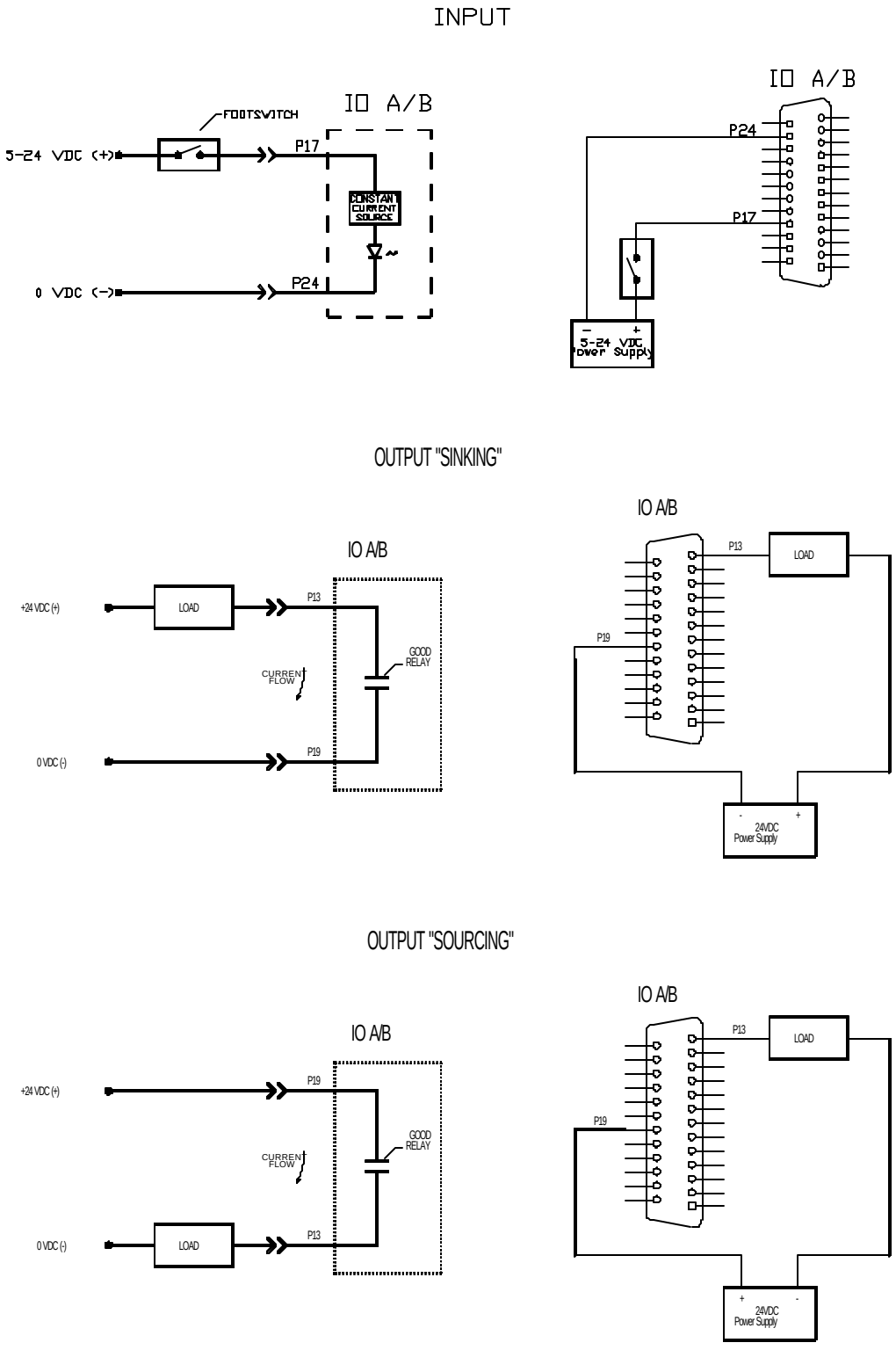


Figure 2.5

RS232C (9 Pin Female DSUB)

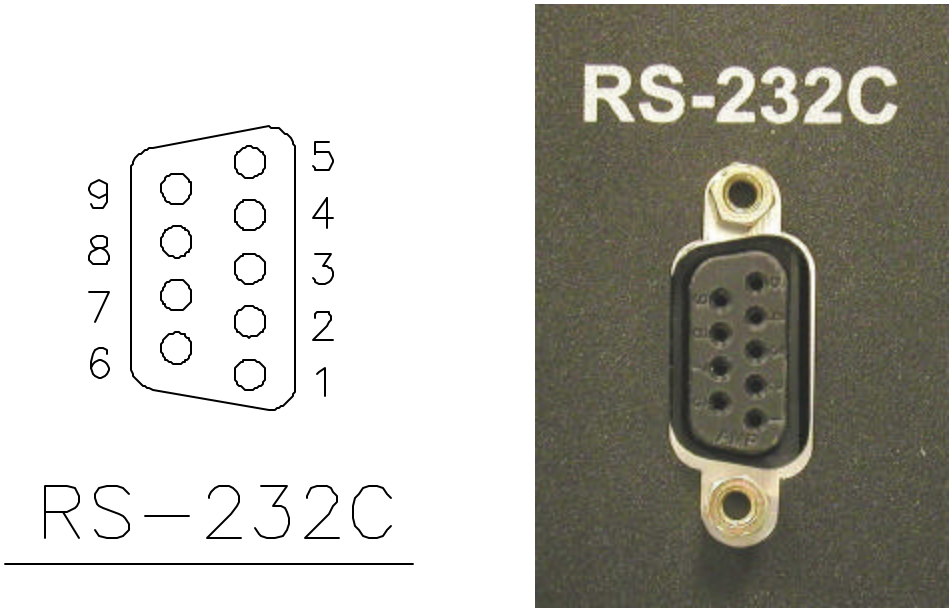


Figure 2.6 - RS-232C Pins

Accusetter 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 E9310 (2) Channel LVDT Signal Conditioning Module

The E9310 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 Accusetter II.

Input magnification must 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.

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.

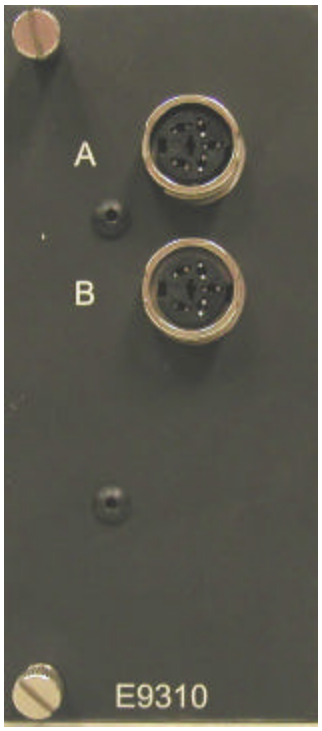


Figure 2.7 - E9310 (2) Channel LVDT Signal Conditioning Module

2.8 E9320 (4) Channel LVDT Signal Conditioning Module

The E9320 module is a four-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 Accusetter II.

Input magnification must 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.

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.

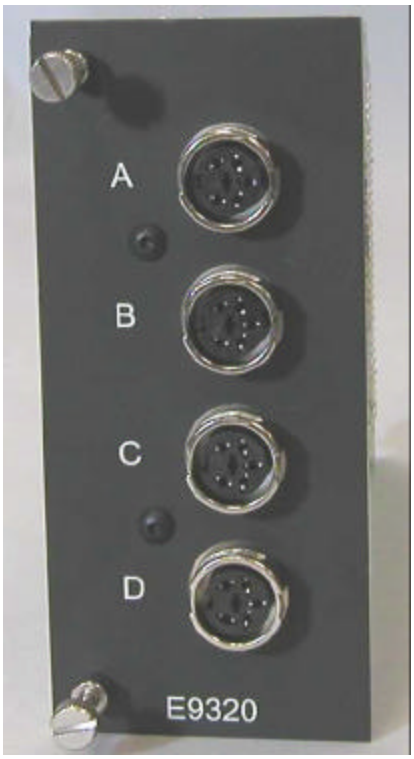


Figure 2.8 - E9320 (4) Channel LVDT Signal Conditioning Module

2.9 E9330 (1) Channel A/E Signal Conditioning Module

The E9330 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 Accusetter II. The module is mounted in the lower bay of the Accusetter 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.

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 2.9 - E9330 (1) Channel AE Signal Conditioning Module

2.10 E9340 (2) Channel A/E Signal Conditioning Module

The E9340 module is a two channel air/electric amplifier which processes pneumatic information from the air tooling and delivers a conditioned signal to the controller board of the Accusetter II. The module is mounted in the lower bay of the Accusetter II

The A/E module also contains a ZERO adjustment knob and a MAG adjustment knob for each input 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.

A jumper strip labeled "A OUT" and "B OUT" provides the option to select a pin, 1 -6, to output a high level (+/-1.84VDC) signal(s) 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 2.10 - E9340 (2) Channel AE Signal Conditioning Module

2.11 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 Accusetter 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 Accusetter II.

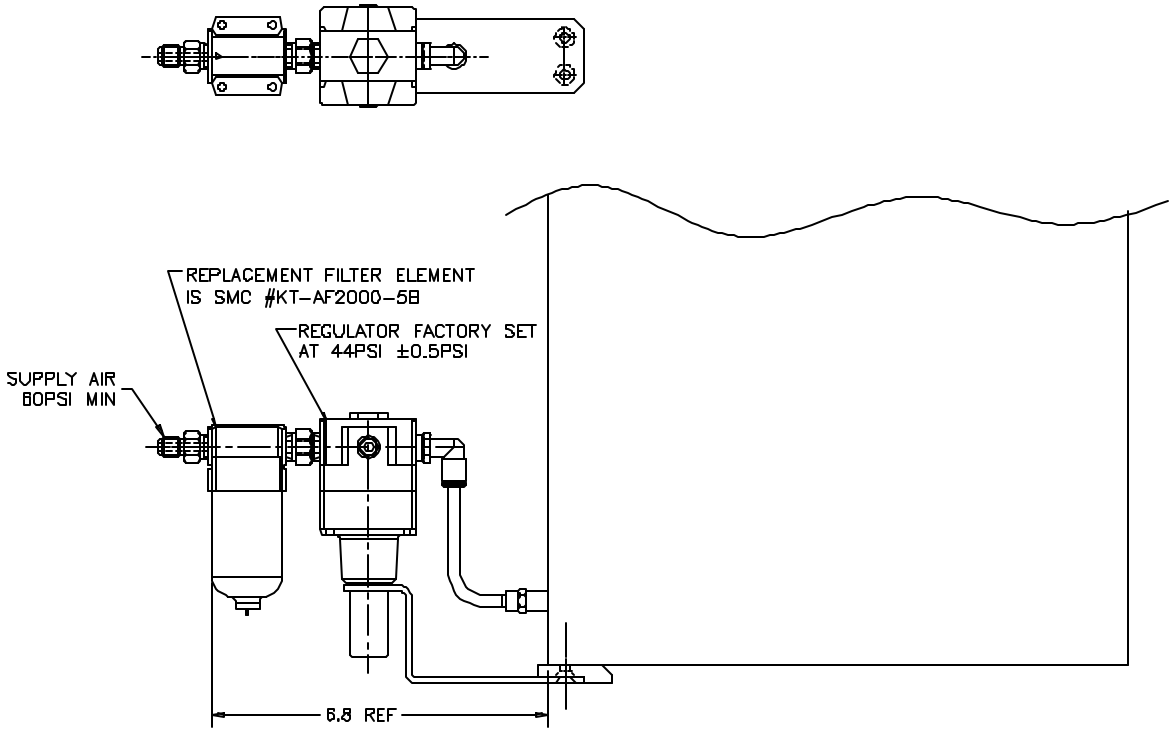


Figure 2.11 - Supply Air Filter/Regulator

Basic Operation

3.0 Set up and Operation Summary

The following steps must be taken to prepare the Accusetter 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 Accusetter II for the application. See the "Programming" section below.

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

5) Calibrate the gage(s). See "Calibration".

6) Select Run mode and unit is ready for gaging. See "Operation".

3.1 Unpacking & Setting Up

Unpacking

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

- Basic Accusetter II unit (E9300)
- Signal Conditioning Module (E9310 or E9320 air module or E9330 or E9340 electronic module)
- Power Cable #4550111
- Filter/Regulator (for air gaging modules E9310 or E9320 only) #5801302
- Hose Assembly (for air gaging modules E9310 or E9320 only) #3101053-B

Setup

The Accusetter II can be used as a stand alone unit or as part of a multiple Accusetter II setup.

Single Accusetter II Setup

1) Turn the Accusetter 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 Accusetter 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 Accusetter II by turning the power switch on the rear of the unit to "ON".

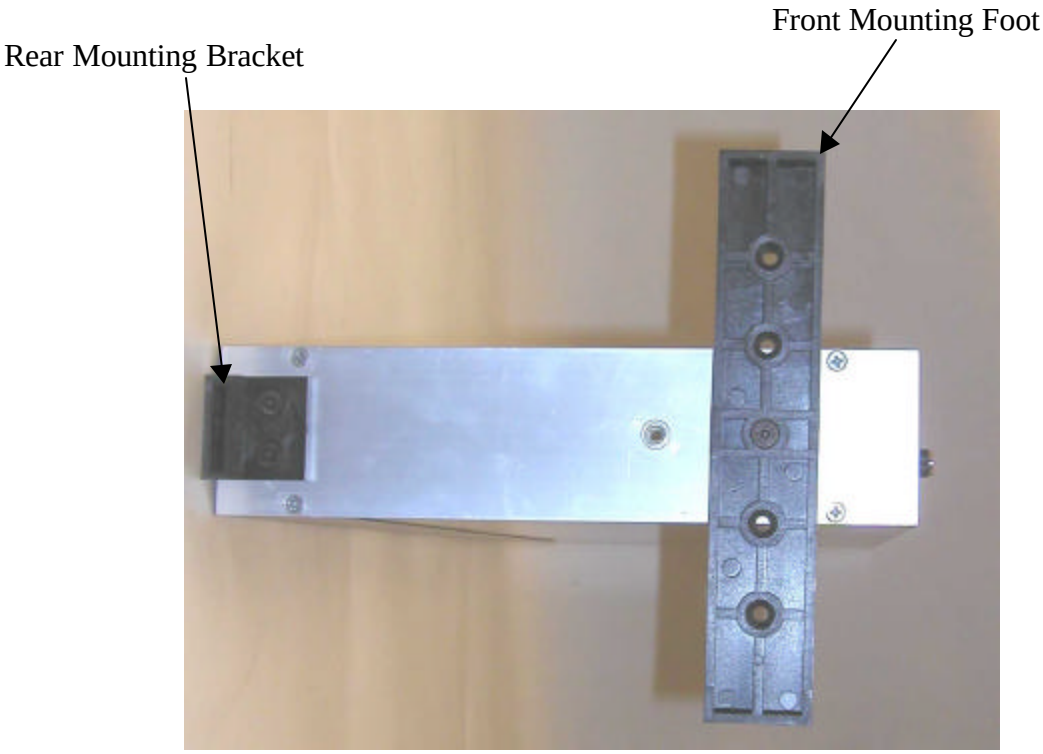


Figure 3.1 - Base Feet

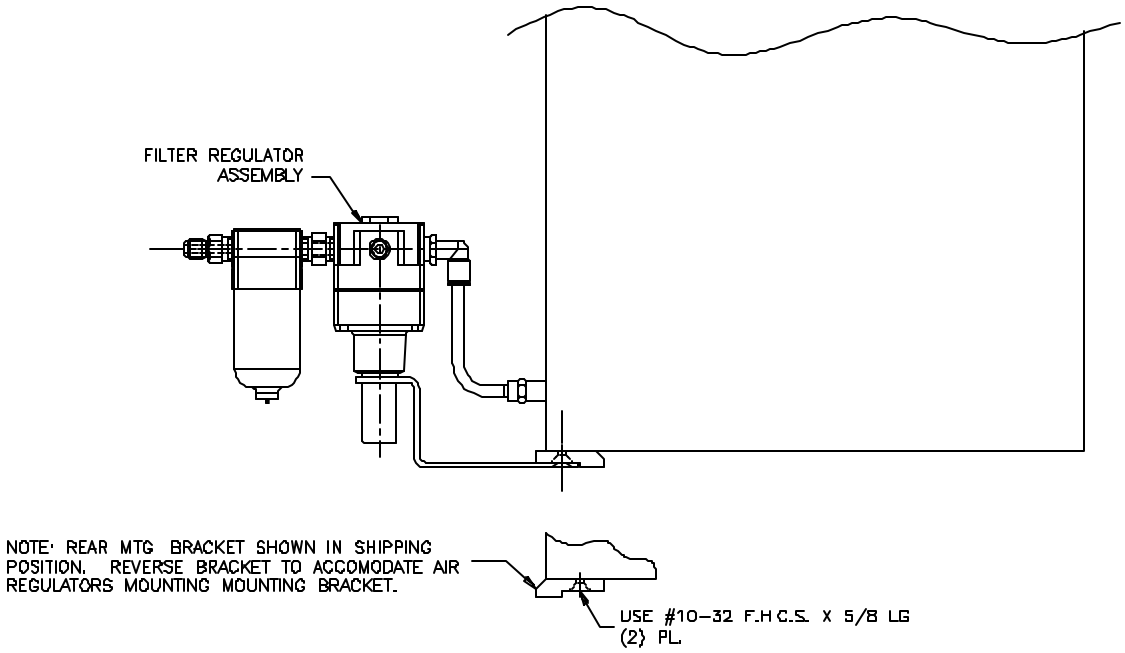


Figure 3.2 - Filter/Regulator Mounting

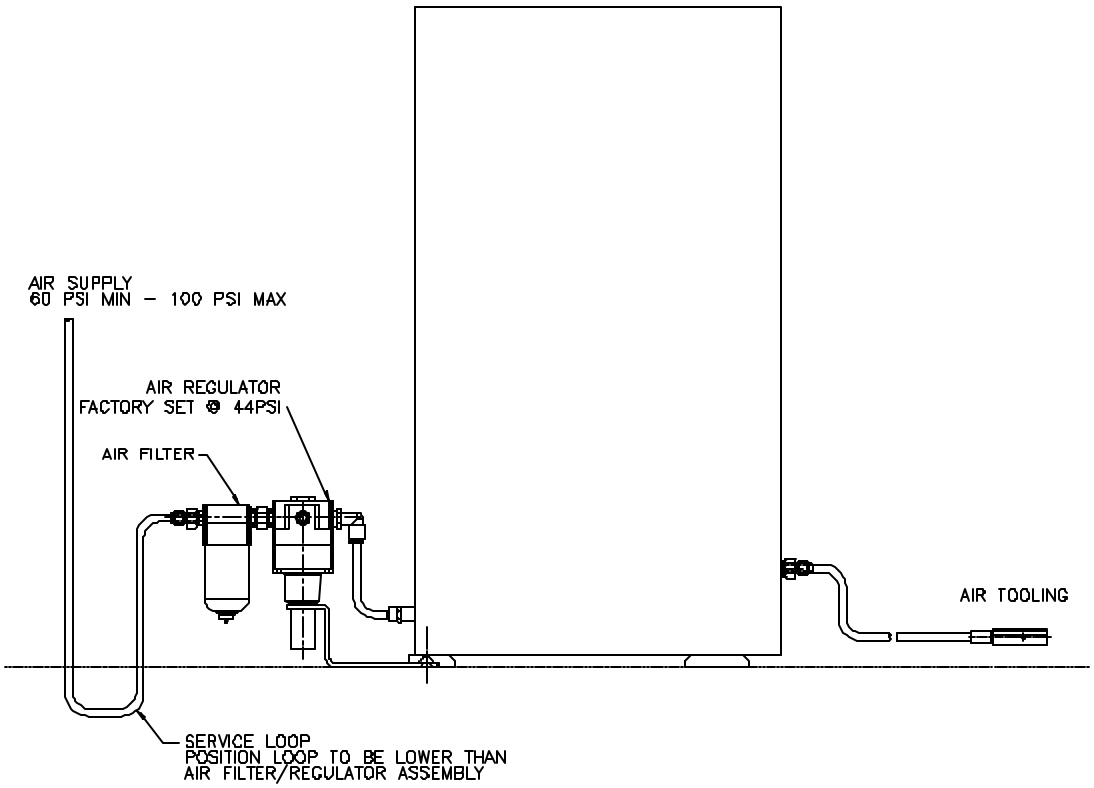


Figure 3.3 - Air Connections
For Air Gaging Application Only

Multiple Accusetter II Setup

1) Turn the Accusetter II units upside down and remove the front foot mounting screws.
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(s) from the air plug, air ring, or air snap to the tooling port(s) on the front of the A/E module. For electronic gaging connect the LVDTs to the inputs on the front of the LVDT module.
12) Turn on the Accusetter II by turning the power switches on the rear of the units to "ON".

3.2 Signal Conditioning Module Setup

For LVDT modules E9310 & E9320 attenuation jumpers must be set to either 1x for standard transducers or 10x for long range transducers. Refer to the "Advanced Operations" section for additional information.

For either an LVDT or A/E signal conditioning module a jumper matrix on the board allows it to accept signals in or send signals out to the analog output connector. Refer to the "Advanced Operations" section of the manual for additional information on setting these jumpers.

Signal Conditioning Module Auto Recognition

When an E9310, E9320, E9330, or E9340 module is installed in the lower bay the Accusetter II will automatically detect the type of signal conditioning module installed and certain setup parameters will be programmed automatically based on the jumper settings on the module. This feature is not available on legacy signal conditioning modules.

For an E9310 or E9320 module the following parameters will be detected:
- Under the "Xducer" menu the Signal Conditioning will be set to "Electric"
- The position of the attenuation jumpers J5-J8 and J10 (1x or 10X) will be detected

For an E9330 or E9340 module the following parameters will be detected:
- Under the "Xducer" menu the Signal Conditioning will be set to "Air"

When the Accusetter II is powered on the module ID code of the currently installed module is displayed in the scroll of start up information. For the LVDT modules E9310 & E9320 the ID code will also identify the status of the "J10" attenuation jumper (1x or 10x).

Module	ID Code
E9010, 20, 30, 40 Legacy Module (no module recognition)	FF
E9310, Jumper J10 = 1x	E1
E9310, Jumper J10 = 10x	E2
E9320, Jumper J10 = 1x	E3
E9320, Jumper J10 = 10x	E4
E9330	E5
E9340	E6

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

3.3 Programming

Choose The Proper Program For Your Application:

1) Single-check — One feature is to be measured.
2) Multiple check — Up to four features are to be measured using one gage or fixture.
3) Multiple fixture — Up to four different gages may be used.

How To Select The Type Program The First Time:

1) Turn power on with toggle power switch in rear of unit, after the power cord has been hooked-up.
2) Press RST button while "ACCUSETTER" is scrolling in the LED display.
3) The display will read "CHG PRG?" (change program).
4) Press the enter button and rotate until desired program is displayed, single check ("SNGL CHK"), multiple check ("MPL CHK"), and multiple fixture ("MPL FXT").
5) Press the ENTER button again to select the program you need.
6) Accusetter will scroll "PERFORM ACCUSETTER SETUP" or the program description.

    a) If a different program type is being selected from that previously stored, "PERFORMING ACCUSETTER SETUP" will Scroll until the ENTER button is pressed. The Accu-Setter will then display "SETUP". Continue with programming.

    b) If the same type program is being selected, the Accu-Setter software S/N version & program description will scroll and go automatically into the run mode after a (10) second delay. If the Accu-Setter displays the type of program you want, but has not been programmed for your application, you may need to change the program for your application. To do that, press enter button. The Accu-Setter will display "SETUP". Continue with programming.

How To Select A Stored Program From Part Database Memory

If a program has already been stored in the memory, and you wish to use it:

1) From Run mode, press the ENTER button and then rotate the ENTER button to display "PART DB".
   NOTE: This menu can also be accessed from the PART DB shortcut key
2) Press the ENTER button.
2) "PART #1" will display.
3) Rotate the ENTER button to display desired part program.
4) Press the ENTER button to select and load.
5) "PART DB" will display.
6) Press the RUN button, "CANCEL" will display.
7) Rotate the ENTER button to display "SAVE".
8) Press the ENTER button to save setup.
9) Proceed to Calibration and Operation sections of this manual.

How To Store A New Program In Part Database Memory

NOTE: Prior to storing, a part name must be programmed for each new program or the database will store the default name, Part 1, for every program.

NOTE: This operation can **not** be accessed from the PART DB shortcut key, it must be accessed through the System menu.

1) From Run mode, press the ENTER button and then rotate the ENTER button to display "SYSTEM" and then press ENTER.
2) Rotate the ENTER button to display "PART DB".
3) Press the ENTER button. "PART #1" will display. Rotate the ENTER button to select the desired data base location.
4) Press the ENTER button. "SELECT" will display.
5) Rotate the ENTER button until "SAVE" is displayed and then press the ENTER button.
6) Press the RUN button to return to run mode.

How To Clear a Program In Part Database Memory

NOTE: This operation can **not** be accessed from the PART DB shortcut key, it must be accessed through the System menu.

1) From the Run mode, press the ENTER button and then rotate the ENTER button to display "SYSTEM" and press ENTER.
2) Rotate the ENTER button to display "PART DB".
3) Press the ENTER button. "PART #1" will display. Rotate the ENTER button to select the program to be cleared.
4) Press the ENTER button. "SELECT" will display.
5) Rotate the ENTER button until "CLEAR" is displayed and then press the ENTER button.
6) Press the RUN button "CANCEL" will display.
7) Rotate the ENTER button to display "SAVE" and press the ENTER button to confirm the program deletion.
8) Press the RUN button to return to run mode.

Accusetter II Programming Guide

The Accusetter II system programming guide provides a convenient table for recording programming information.

A brief explanation of the program guide follows:

The top section of the programming guide lists the program type, signal conditioning information, scale, and input magnification and polarity. Any signals bussed in or out are also listed.

The next section list the setup information for each check including check name, function, inputs, and range. The part limits for each check are also listed.

Gaging Formulas

The gaging formula under FUNCTION on the Accusetter II allows the user to add, subtract, multiply, or divide inputs from transducers A, B, C, and D. The Accusetter II requires a gaging formula for all applications programmed in the Multiple Check and Multiple Fixture programs.

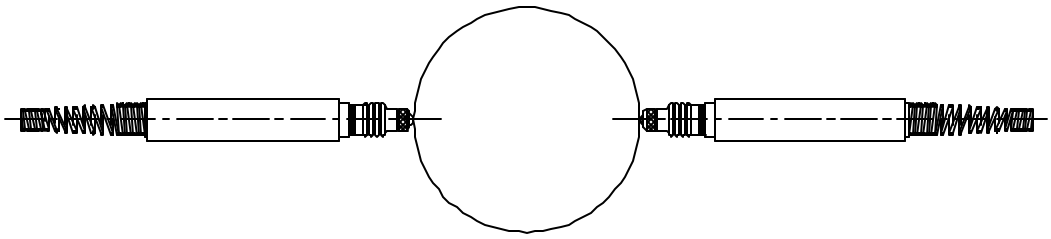
For air gaging applications, the gaging formula will always be 1.000 for Input A or Input B. For electronic gaging applications using LVDTs, the gaging formula will be dependent upon the specific gaging application.

Gaging probes used within any system are strategically mounted to contact the work piece at specified locations to perform measurements. These probes, or their output values, must be combined in an algebraic fashion to provide the measurements desired.

There are four elements required to developing a gaging formula. These include:
1. Input definition.
2. Polarity.
3. Multiplier.
4. Gaging Function.

Input definition is simply identifying the probes or "inputs" to the readout that will be used to measure the part. As an example, let us use two opposing LVDT probes and assume that these are the first inputs connected to the readout. These will be identified as inputs 1A and 1B.

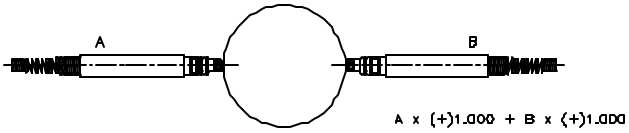
Polarity must be determined for the application at hand. For example, consider a gage with two probes measuring an outer diameter, the probe's normal operation defines the polarity as (+) when the tip is depressed. Thus the polarity programmed in the Accusetter for each of our inputs for this example will be (+) plus. As the diameter grows, the probes are depressed providing positive readings indicating a larger part diameter.



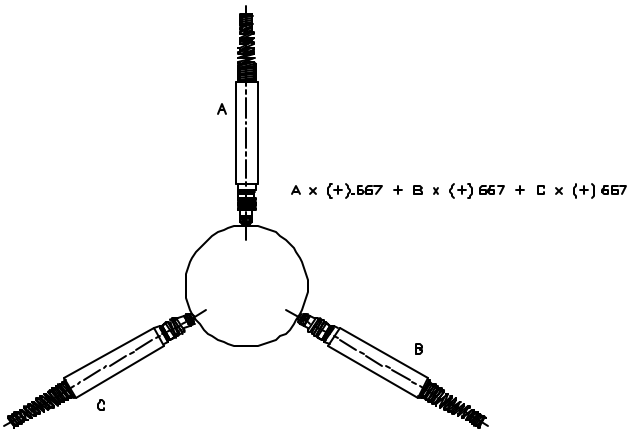
Next, we must apply a multiplier to the probes outputs that is dependant on the application. The multiplier is determined by the number of probes used to perform the measurement or to correct any ratio that may be introduced by any contact arms or tooling.

An example of various multipliers as related to diameter measurement follows:

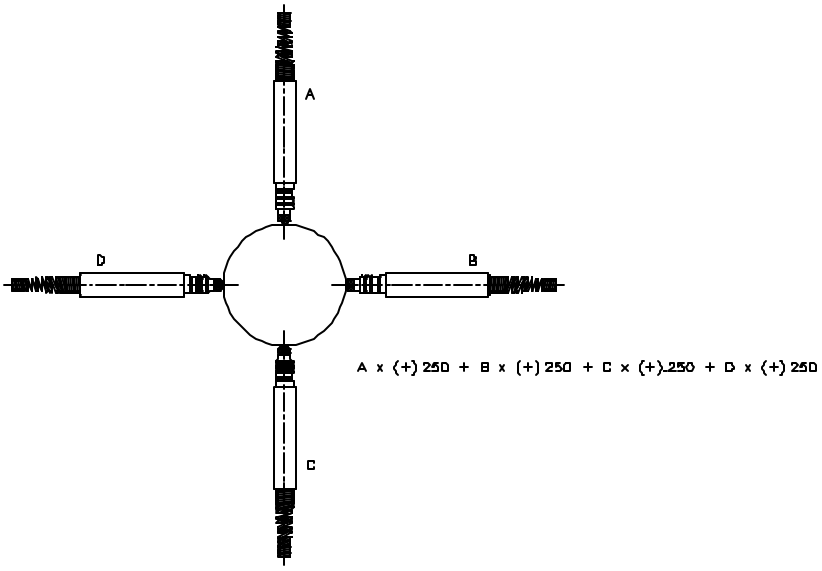
2 PROBE DIAMETER



3 PROBE DIAMETER

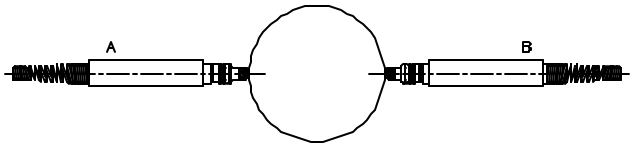


4 PROBE DIAMETER



The last consideration to complete the formula is the gaging function. See examples below:

DIAMETER SIZE CHECK



READOUT DISPLAYS DIAMETER SIZE

FUNCTION = AVERAGE

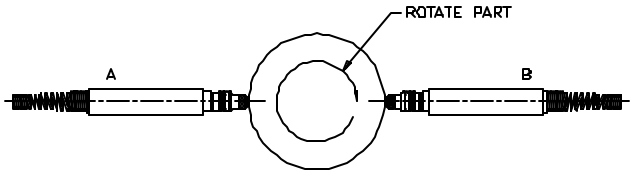
FORMULA = [A] X [(+)] [1.000] + B * (+)1.000

INPUT DEFINITION

POLARITY

MULTIPLIER

MAX (OR MIN) DIAMETER

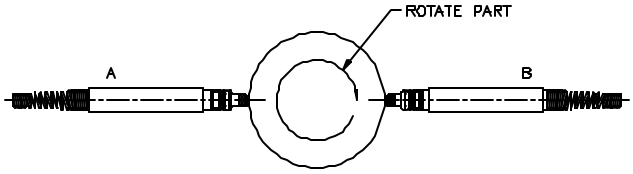


FUNCTION = +PEAK (OR −PEAK)

FORMULA = A X 1.000 + B * 1.000

READOUT DISPLAYS MAX (OR MIN) DIAMETER SIZE

TOTAL INDICATOR READING

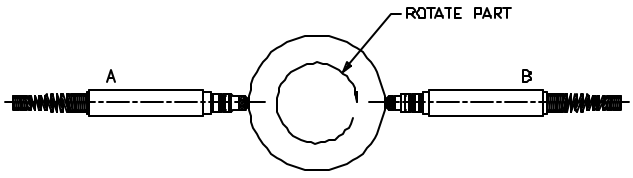


FUNCTION = TIR

FORMULA = A X 1.000 + B * 1.000

READOUT DISPLAYS DIFFERENCE BETWEEN MAX AND MIN DIAMETER SIZE

TOLERANCE CHECK



FUNCTION = TOL CHK

FORMULA = A X 1.000 + B * 1.000

READOUT DISPLAYS ACTUAL PART DIAMETER WHEN SIZE IS WITHIN PROGRAMMED LIMITS AND DISPLAYS MAX OR MIN PART SIZE WHEN OUTSIDE OF PROGRAMMED LIMITS

Multiple Check Formulas

If the Accusetter is programmed for multiple check operation then the results of checks 1, 2, and/or 3 can be combine algebraically. For an example of a multiple check application consider and air plug that measures a part ID at two elevations. The large diameter is measured with input A and displays the large diameter size as check #1. The small diameter is measured with input B and displays the small diameter size as check #2. To display the part taper check #3 can be defined as a multiple check to display the results of check #1 minus check #2.

Check #1, Large Diameter
Function = BYPASS
Formula = A x (+)1.000

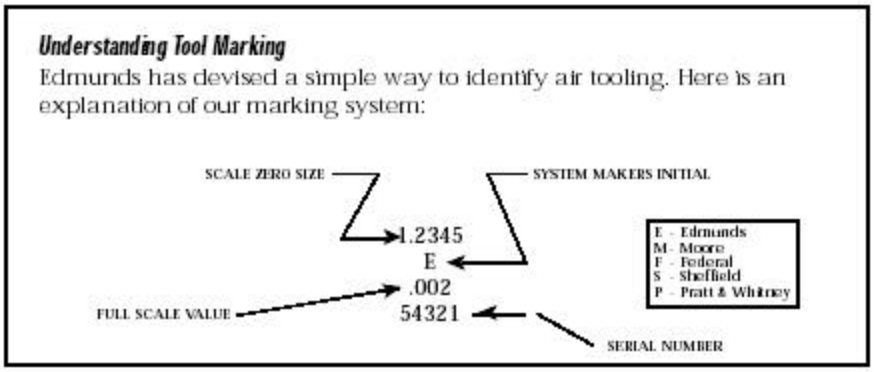
Check #2, Small Diameter
Function = BYPASS
Formula = B x (+)1.000

Check #3, Multiple Check, Taper
Function = BYPASS
Formula = CHK1 x (+)1.000 + CHK2 x (-)1.000

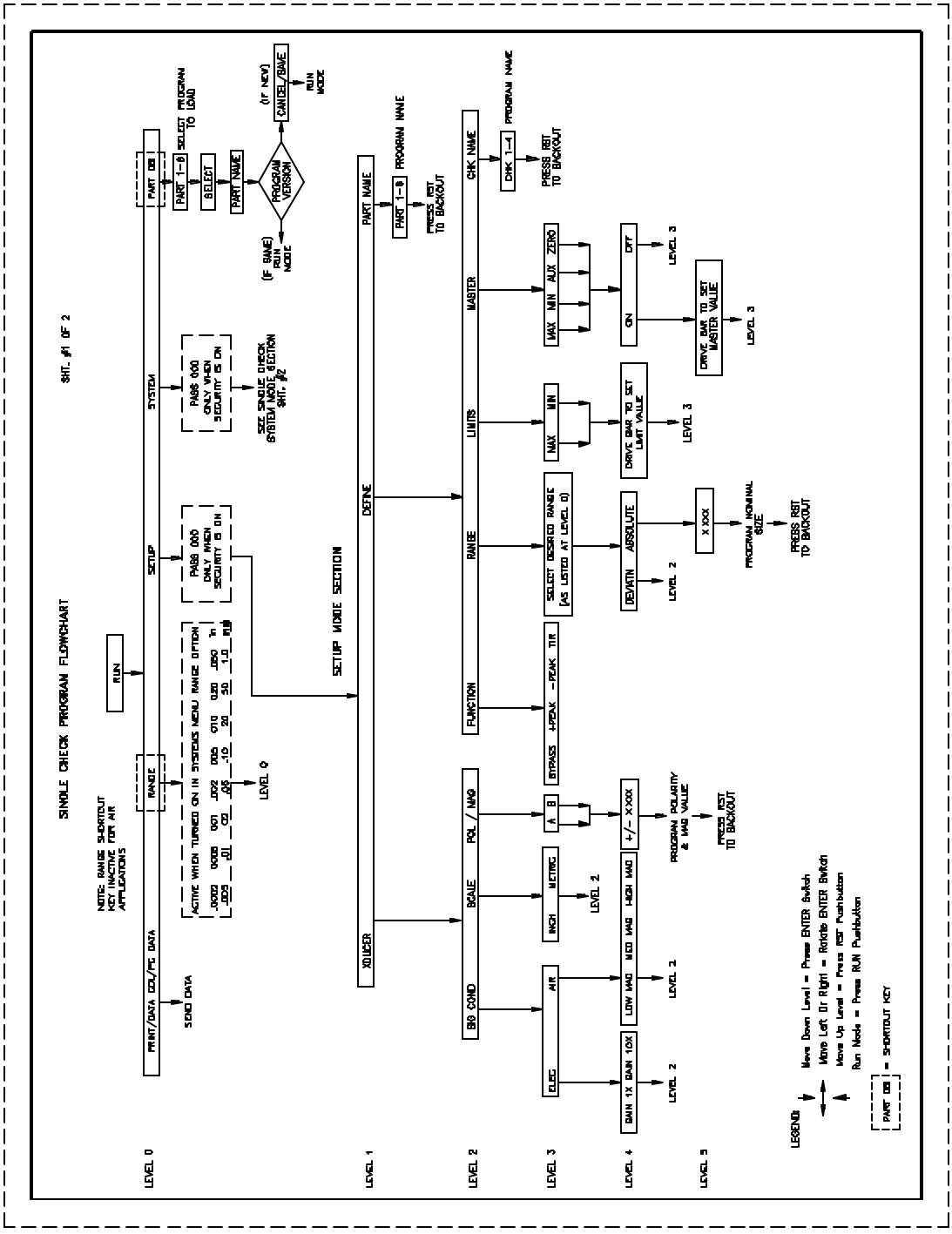
Selecting Full Scale Value

All Edmunds air tooling is marked with the full scale range it was intended to work with. Since overall range of air tooling is limited, our tooling is designed to operate on one scale only. Random switching of ranges may affect the performance and linearity of the tooling. Using tooling manufactured for a type of system other than Edmunds' back-pressure bleed system may require trial and error to determine the optimum air amplification choice for the most stable and linear readings. The following chart may be helpful is selecting the proper magnifications.

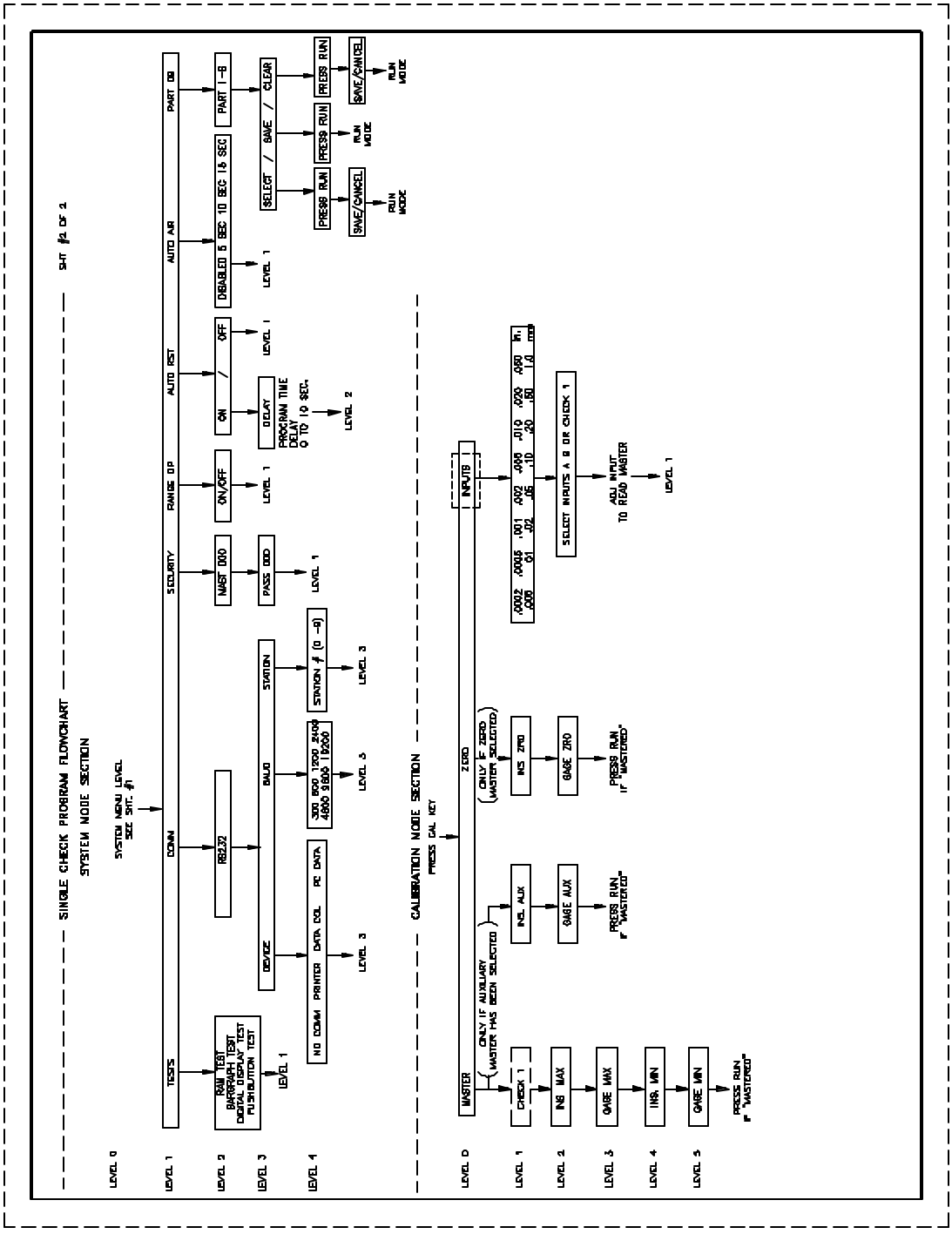
Marked Range	**Air Amplification**
.050" / 1mm	Not for air use
.020" / .5mm	Not for air use
.010" / .2mm	Low
.005" / .1mm	Low
.002" / .05mm	Medium
.001" / .02mm	High
.0005" / .01mm	High
.0002" / .005mm	High



PROGRAMMING - SINGLE CHECK MEASUREMENT



PROGRAMMING - SINGLE CHECK MEASUREMENT



PROGRAMMING - SINGLE CHECK MEASUREMENT

Programming SETUP Options

1) With the column in RUN mode, Press the ENTER button and then rotate the ENTER button until "SETUP" is displayed.
2) Press the ENTER button.
3) Rotate the ENTER button to select "XDUCER", "DEFINE" or "PART NAME" and then press the ENTER button.

XDUCER Menu

Signal Conditioning

(Note: These parameters will be automatically set by module recognition for E9310, E9320, E9330, or E9340 modules)

1) Rotate the ENTER button until "SIG COND" is displayed and then press the ENTER button.
2) Rotate the ENTER button to select "AIR" or "ELEC" and then press the ENTER button.
   a) If "ELEC" was selected then rotate the ENTER button to select "GAIN 1X" or "GAIN 10X" and then press the ENTER button to return to the Xducer menu.
   b) If "AIR" was selected then rotate the ENTER button to select LOW MAG, MED MAG, or HIGH MAG and then press ENTER to return to the Xducer menu.

Scale

1) Rotate the ENTER button until "SCALE" is displayed and then press the ENTER button.
2) Rotate the ENTER button to select "INCH" or "METRIC".
3) Press the ENTER button and the Accusetter will return to the Xducer menu and display "SCALE".

Pol/Mag

1) Rotate the ENTER button until "POL/MAG" is displayed and then press the ENTER button.
2) Rotate the ENTER button to select "INPUT A" or "INPUT B" and then press the ENTER button. A numerical value with a polarity (+ or -)sign will be displayed.
3) Enter the correct polarity and magnification. Refer to the Accusetter program guide supplied with your gage.
4) After setting the polarity and mag for one input press RST and then rotate the ENTER button to select the next input to be set up. Repeat steps 2 - 4.
5) After programming all required inputs press RST until "XDUCER" is displayed. All Xducer options are now programmed.

How To Enter Numerical Values and polarities
Enter the correct numeral or polarity by pressing the enter button to move from one decimal place to another. To change numbers or polarity signs rotate the ENTER button left or right until desired number or sign is displayed.

DEFINE Menu

1) From Run mode press the ENTER button.
2) Rotate the ENTER button to display "SETUP" and then press ENTER.
3) Rotate the ENTER button to display "DEFINE" and then press ENTER.

Function

1) Rotate the ENTER button until "FUNCTION" is displayed and then press ENTER.
2) Rotate the ENTER button to select from "BYPASS", "+PEAK", "-PEAK", or "TIR". Refer to the Accusetter program guide for the correct function for a given application.
3) Press the ENTER button and the Accusetter will return to the DEFINE menu and display "FUNCTION".

Range

1) Rotate the ENTER button until "RANGE" is displayed and then press ENTER.
2) Rotate the ENTER button until the desired full scale value is displayed and then press enter. Refer to the Accusetter program guide for the correct range for a given application. **NOTE:** If the scale option of the Xducer menu is set to INCH then only inch range options will be listed and if the scale option of the Xducer menu is set to METRIC only metric ranges will be listed.

Note: .020”/.500mm or .050”/1.00mm ranges should be used for electronic applications only.

3) After the desired range is displayed press the ENTER button.
4) Rotate the ENTER button to select "DEVIATION" or "ABSOLUTE" and then press the ENTER button.
5) If deviation was selected then the Accusetter will return to the define menu and display "RANGE". If Absolute was selected then use the ENTER button to program the nominal part size. After programming the nominal size press the RST button until "RANGE" is displayed.

NOTE: If the RANGE is changed the master sizes and part limits must also be reprogrammed.

Limits

1) Rotate the ENTER button until "LIMITS" is displayed and then press the ENTER button.
2) Rotate the ENTER button until "MAX" is displayed and then press the ENTER button.
3) Rotate the ENTER button to drive the bargraph until the max limit is displayed and press the ENTER button.
4) Rotate the ENTER button until "MIN" is displayed and then press the ENTER button.
5) Rotate the ENTER button to drive the bargraph until the min limit is displayed and then press the RST button to display "LIMITS".

Master

This menu allows the operator to select which masters will be used to calibrate the gage and to program the correct master values. For example a two master system uses a MAX and MIN master while a single master system would use only the ZERO master. The auxiliary (AUX) master is used to calibrate a TIR check mastered with a single master. Refer to the Accusetter setup guide to determine what master or masters will be used to calibrate the gage and refer to the master calibration reports for the actual master values.

1) Rotate the ENTER button until "MASTER" is displayed and then press the ENTER button.
2) Rotate the ENTER button until "MAX", "MIN", "AUX", or "ZERO" is displayed and then press enter.
3) Rotate the ENTER button to select "ON" or "OFF" and then press ENTER.

NOTE: If the auxiliary master ("AUX") is turned "ON" then "MAX" and "MIN" are automatically turned "OFF" and if "MAX" or "MIN" is turned "ON" then "AUX" is automatically turned "OFF".

4) If ON was selected then rotate the ENTER button to drive the bargraph to the master value listed on the master certification report and then press ENTER and return to step 2. If OFF was selected then return to step 2.
5) After all required masters are programmed press RST to display "MASTER".

Check Name

1) Rotate the ENTER button to display "CHK NAME" and then press ENTER.
2) "PART 1" will display. Press the ENTER button.
3) The first character will flash. Rotate the ENTER button to change the character and then press ENTER to move to the next character. Press RST when done. The programmed name will display. Press RST again to return to the define menu.

Part Names

Note:The part name of the program can be renamed if desired to store in memory.

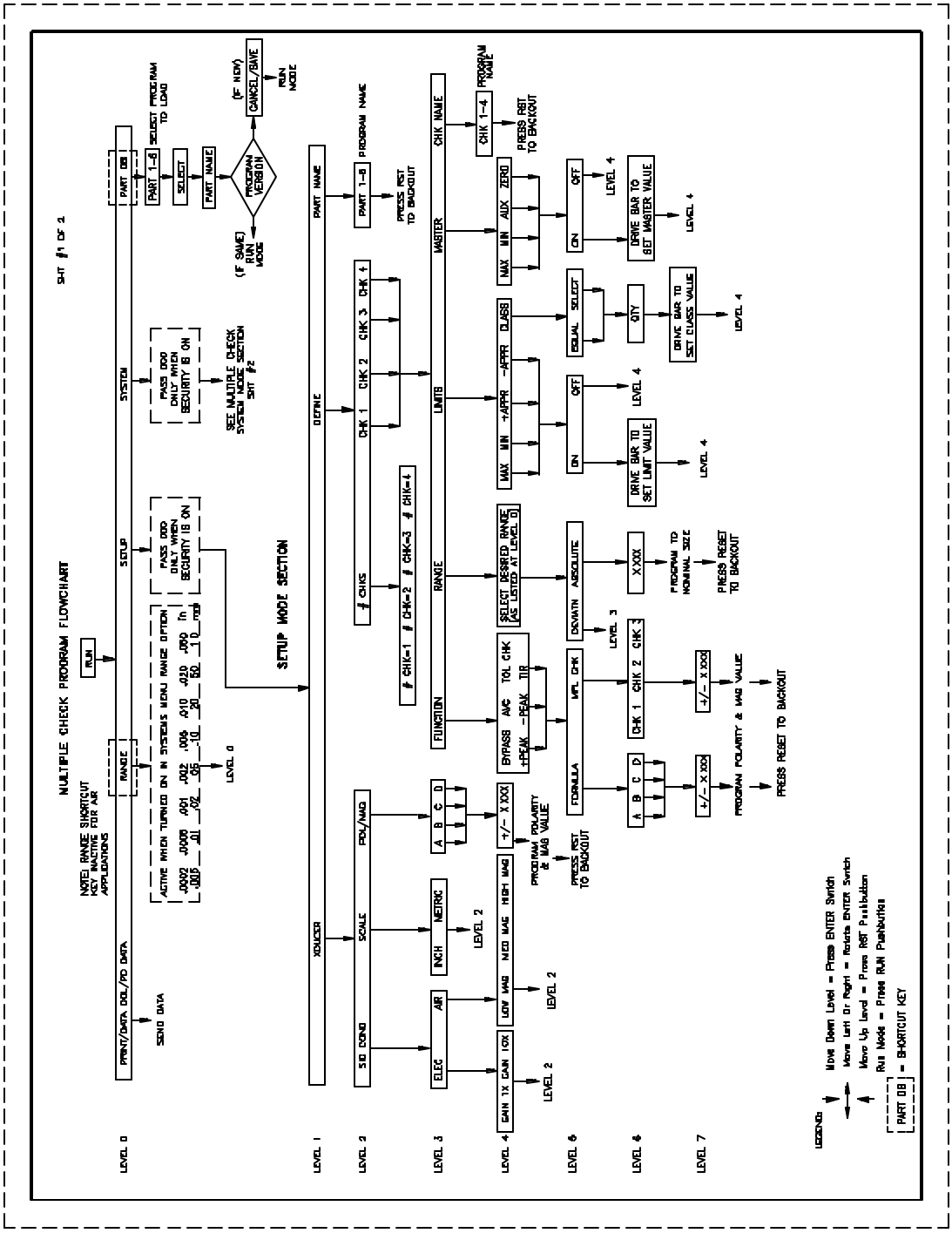
1) From the Setup menu, rotate the ENTER button to display "PART NAME".
2) Press the ENTER button. "PART 1" will display.
3) Press the ENTER button. The first character will flash. To change, rotate the ENTER button left or right until desired character is displayed.
4) Press the ENTER button to move to next character.
5) Press the RST button once, when done. The programmed name will display.
6) Press the RST button once.

PROGRAMMING - SINGLE CHECK MEASUREMENT

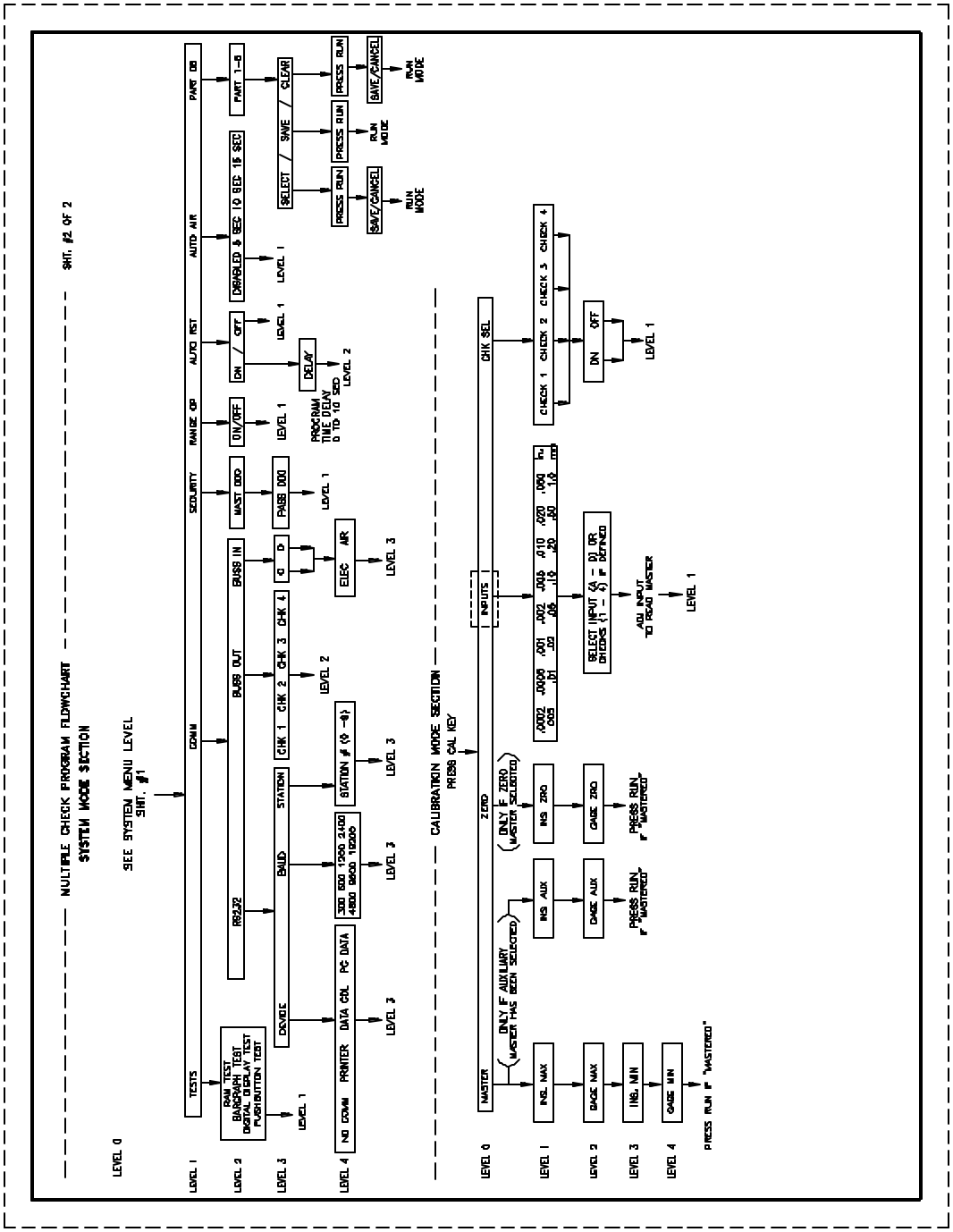
Saving the Program

1) Press the RUN button. "CANCEL" will display.
2) Rotate the ENTER button to display "SAVE" and then press the ENTER button to save the setup.

PROGRAMMING - MULTIPLE CHECK MEASUREMENT



PROGRAMMING - MULTIPLE CHECK MEASUREMENT



PROGRAMMING - MULTIPLE CHECK MEASUREMENT

Multiple Check Programming

Programming SETUP Options

1) With the column in RUN mode, Press the ENTER button and then rotate the ENTER button until "SETUP" is displayed.
2) Press the ENTER button.
3) Rotate the ENTER button to select "XDUCER", "DEFINE" or "PART NAME" and then press the ENTER button.

XDUCER Menu

Signal Conditioning

(Note: These parameters will be automatically set by module recognition for E9310, E9320, E9330, or E9340 modules)

1) Rotate the ENTER button until SIG COND is displayed and then press the ENTER button.
2) Rotate the ENTER button to select "AIR" or "ELEC" and then press the ENTER button.
   a) If "ELEC" was selected then rotate the ENTER button to select "GAIN 1X" or "GAIN 10X" and then press the ENTER button to return to the Xducer menu.
   b) If "AIR" was selected then rotate the ENTER button to select LOW MAG, MED MAG, or HIGH MAG and then press ENTER to return to the Xducer menu.

Scale

1) Rotate the ENTER button until SCALE is displayed and then press the ENTER button.
2) Rotate the ENTER button to select "INCH" or "METRIC".
3) Press the ENTER button and the Accusetter will return to the Xducer menu and display "SCALE".

Pol/Mag

1) Rotate the ENTER button until "POL/MAG" is displayed and then press the ENTER button.
2) Rotate the ENTER button to select "INPUT A", "INPUT B", "INPUT C", or "INPUT D" and then press the ENTER button. A numerical value with a polarity (+ or -) sign will be displayed.
3) Enter the correct polarity and magnification. Refer to the Accusetter program guide for the correct value and polarity.
4) After setting the polarity and mag for one input press RST and then rotate the ENTER button to select the next input to be set up. Repeat steps 2 - 4.
5) After programming all required inputs press RST until XDUCER is displayed. All Xducer options are now programmed.

How To Enter Numerical Values and polarities

Enter the correct numeral or polarity by pressing the enter button to move from one decimal place to another. To change numbers or polarity signs rotate the ENTER button left or right until desired number or sign is displayed.

DEFINE Menu

CHKS

Use this menu to define the total number of checks to be programmed from 1 to 4.

1) Rotate the ENTER button until "#CHKS" is displayed and then press ENTER.
2) Rotate the ENTER button to select "#CHK=1", "#CHK=2", "#CHK=3", or "#CHK=4" and then press ENTER to return to the define menu.

CHK 1, CHK 2, CHK 3, CHK 4

Select the check that is to be set up by:

1) Rotate the ENTER button until the desired check number is displayed and then press ENTER.
2) For each check in the gage setup the FUNCTION, RANGE, LIMITS, MASTERS, and CHECK NAME per the following instructions.

Function

1) Rotate the ENTER button until "FUNCTION" is displayed and then press ENTER.
2) Rotate the ENTER button to select from BYPASS, AVG, +PEAK, -PEAK, TOL CHK, or TIR. Refer to the Accusetter program guide for the correct function for a given application and then press ENTER.
3) Rotate the ENTER button to select FORMULA or MPL CHK and then press ENTER.
   NOTE: Refer to the Accusetter setup guide for the gage formula or multiple check formula to be programmed for this check.
   Use the FORMULA menu if the check is a result of one or more gage inputs and use the MPL CHK formula if this check a combination of the results from two or more other checks.

Formula

1) Rotate the ENTER button to select input A, B, C, or D and then press ENTER.
2) A numerical value with a polarity sign (+ or -) will display. Enter the correct magnification numeral. If this input is not being used, change number to 0. Enter the correct polarity by pressing the enter button to move to the + or - position and rotate enter button to select your choice.
3) Press the RST button to return to the formula menu and rotate the ENTER button to select the next input, if any, used on the current check and repeat steps 1 - 2. When all inputs for the current check have been setup press the RST button until "FUNCTION" is displayed.

MPL CHK

1) Rotate the ENTER button to select "CHK 1", "CHK 2", or "CHK 3" and then press ENTER.
2) A numerical value with a polarity sign (+ or -) will display. Enter the correct magnification numeral. If this check is not being used, change number to 0. Enter the correct polarity by pressing the enter button to move to the + or - position and rotate enter button to select your choice.
3) Press the RST button to return to "CHK X" and rotate the ENTER button to select the next check, if any, used on the current check and repeat steps 1 - 2. When all check for the current multiple check have been setup press the RST button until FUNCTION is displayed.

Range

1) Rotate the ENTER button until "RANGE" is displayed and then press ENTER.
2) Rotate the ENTER button until the desired full scale value is displayed and then press enter. Refer to the Accusetter program guide for the correct range for a given application. **NOTE:** If the scale option of the Xducer menu is set to INCH then only inch range options will be listed and if the scale option of the Xducer menu is set to METRIC only metric ranges will be listed.

Note: .020”/.500mm or .050”/1.00mm ranges should be used for electronic applications only.

3) After the desired range is displayed press the ENTER button.
4) Rotate the ENTER button to select "DEVIATN" or "ABSOLUTE" and then press the ENTER button.
5) If "Deviation" was selected then the Accusetter will return to the define menu and display "RANGE". If "Absolute" was selected then use the ENTER button to program the nominal part size. After programming the nominal size press the RST button until RANGE is displayed.

NOTE: If the RANGE is changed the master sizes and part limits must also be reprogrammed.

PROGRAMMING - MULTIPLE CHECK MEASUREMENT

Limits

MAX, MIN, +APPR, -APPR

1) Rotate the ENTER button until "LIMITS" is displayed and then press the ENTER button.
2) Rotate the ENTER button until "MAX", "MIN", "+APPR", or" -APPR" is displayed and then press the ENTER button.
3) Rotate the ENTER button to select whether the limit will be "ON" or "OFF" and then press ENTER.
4) Rotate the ENTER button to drive the bargraph until the limit value is displayed and press the ENTER button.
5) Repeat steps 2 - 4 for any limits that are required.

CLASS

1) Rotate the ENTER button until "LIMITS" is displayed and then press the ENTER button.
2) Rotate the ENTER button until "CLASS" is displayed and then press ENTER.
3) Rotate the ENTER button to select "EQUAL" or "SELECT" and then press ENTER.
   Note: If you chose "EQUAL", the Accu-Setter will automatically program the classes after the first class size is programmed. If you chose SELECT, the operator can program each class size independently.
4) "QTY" with a numerical value will display. Rotate ENTER button until desired number of classes is displayed, 39 maximum, and press the ENTER button.
5) "STRT. PT." will display. Rotate the ENTER button to set the starting point of first class and then press the ENTER button.
6) "CLASS" with a numerical value will display. Rotate the ENTER button to set the ending point of the first class and then press the ENTER button.
7) "CLASS 02" will display if more than one class has been selected. If EQUAL was selected in step 3 then the Accusetter will automatically program the remaining classes. If SELECT was chosen in step 3 then rotate the ENTER button to set the ending point of the next class, press ENTER and repeat until all classes have been programmed.
8) Press the RST button until "LIMITS" is displayed to return to the define, checks menu.

Master

This menu allows the operator to select which masters will be used to calibrate the gage and to program the correct master values. For example a two master system uses a MAX and MIN master while a single master system would use only the ZERO master. The auxiliary (AUX) master is used to calibrate a TIR check mastered with a single master. Refer to the Accusetter setup guide to determine what master or masters will be used to calibrate the gage and refer to the master calibration reports for the actual master values.

NOTE: If a check is programmed as a "Multiple Check" then master values do not need to be programmed and "MASTER" will not appear as a choice on the check setup menu.

1) Rotate the ENTER button until "MASTER" is displayed and then press the ENTER button.
2) Rotate the ENTER button until "MAX", "MIN", "AUX", or "ZERO" is displayed and then press enter.
3) Rotate the ENTER button to select "ON" or "OFF" and then press ENTER.

NOTE: If the auxiliary master ("AUX") is turned "ON" then "MAX" and "MIN" are automatically turned "OFF" and if "MAX" or "MIN" is turned "ON" then "AUX" is automatically turned "OFF".

4) If "ON" was selected then rotate the ENTER button to drive the bargraph to the master value listed on the master certification report and then press ENTER and return to step 2. If "OFF" was selected then return to step 2.
5) After all required masters are programmed press RST to return to the define menu.

Check Name

1) Rotate the ENTER button to display "CHK NAME" and then press ENTER.
2) "PART 1" will display. Press the ENTER button.
3) The first character will flash. Rotate the ENTER button to change the character and then press ENTER to move to the next character. Press RST when done. The programmed name will display. Press RST again to return to the define menu.

Part Names

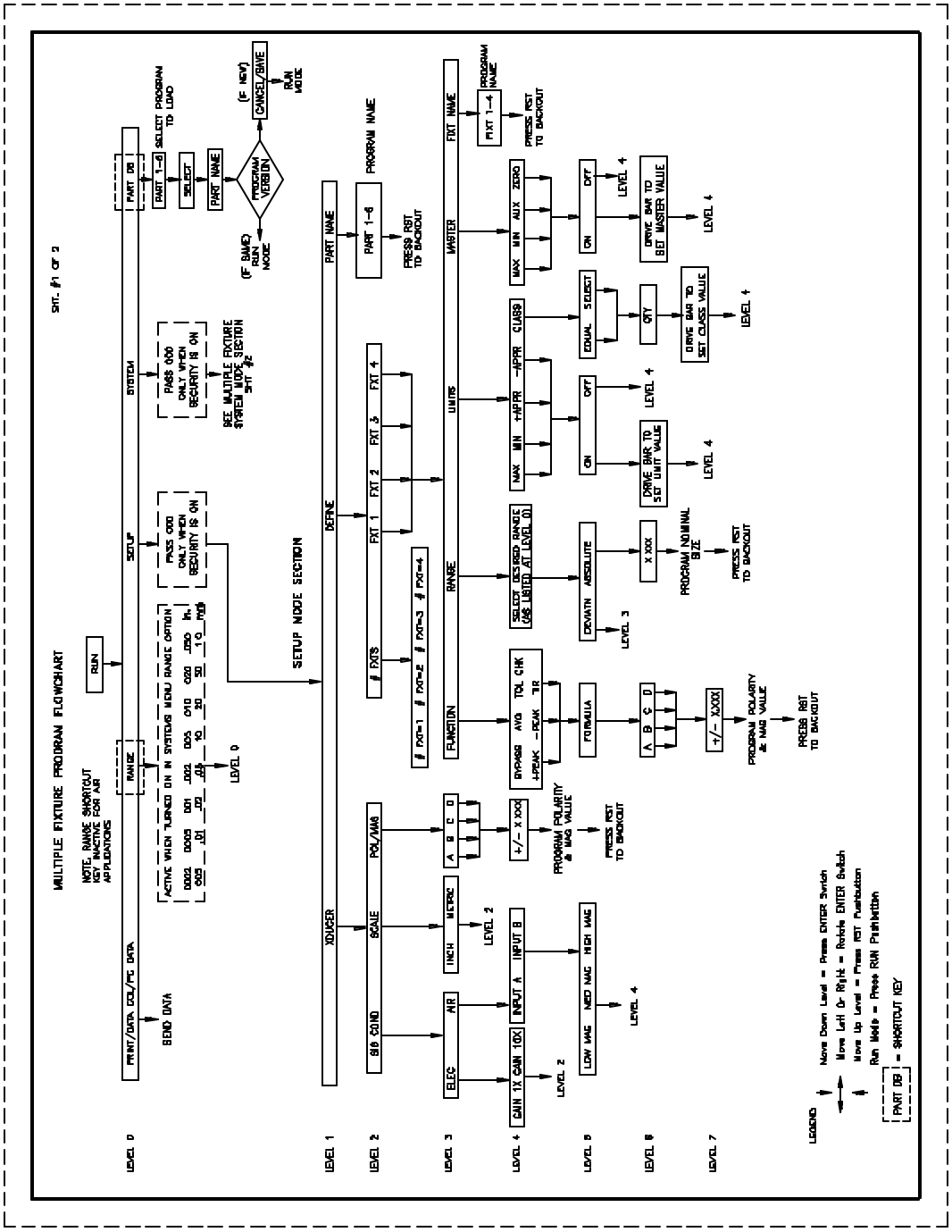
Note:The part name of the program can be renamed if desired to store in memory.

1) From the Setup menu, rotate the ENTER button to display "PART NAME".
2) Press the ENTER button. "PART 1" will display.
3) Press the ENTER button. The first character will flash. To change, rotate the ENTER button left or right until desired character is displayed.
4) Press the ENTER button to move to next character.
5) Press the RST button once, when done. The programmed name will display.
6) Press the RST button once.

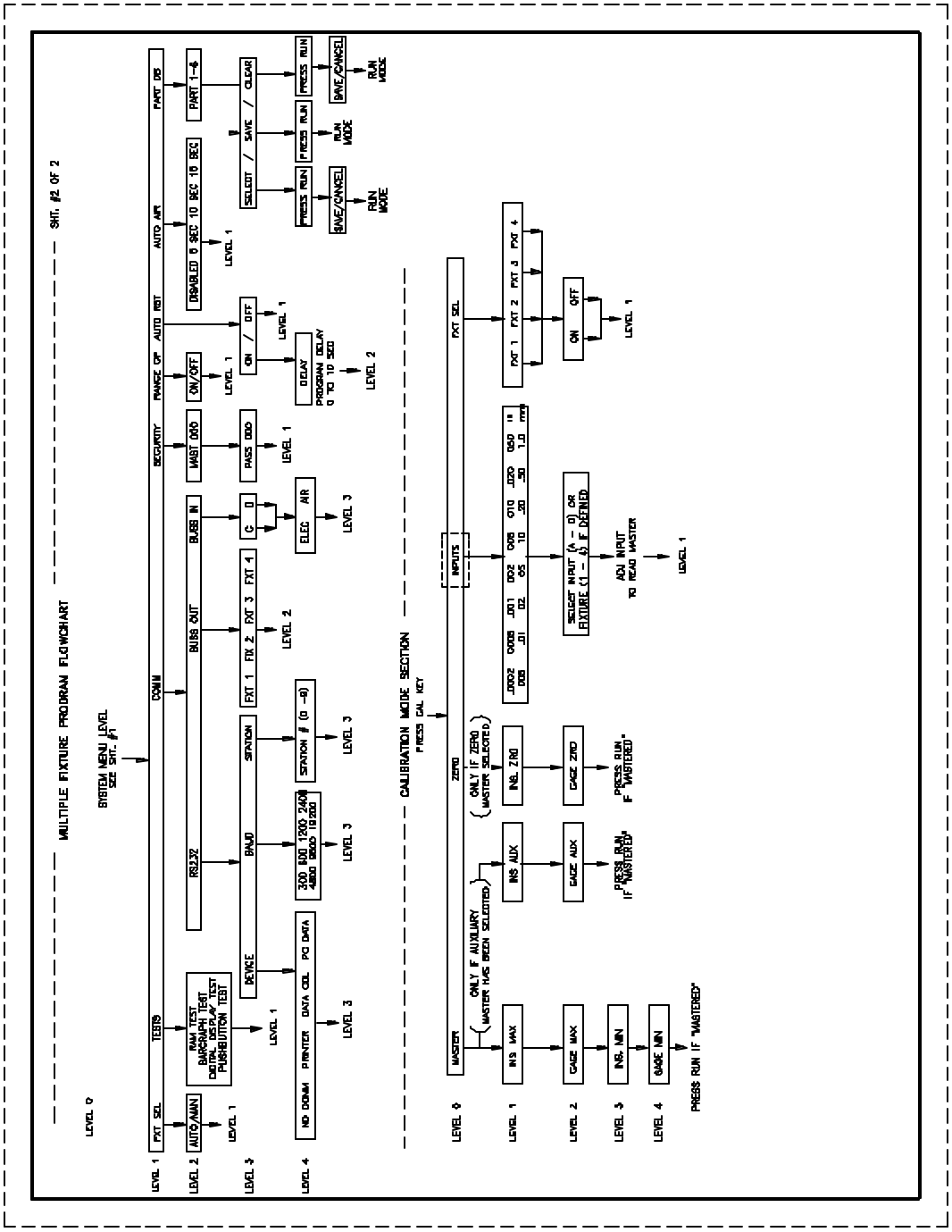
Saving the Program

1) Press the RUN button. "CANCEL" will display.
2) Rotate the ENTER button to display "SAVE" and then press the ENTER button to save the setup.

PROGRAMMING - MULTIPLE FIXTURE MEASUREMENT



PROGRAMMING - MULTIPLE FIXTURE MEASUREMENT



Multiple Fixture Programming

Programming SETUP Options

1) With the column in RUN mode, Press the ENTER button and then rotate the ENTER button until "SETUP" is displayed.
2) Press the ENTER button.
3) Rotate the ENTER button to select "XDUCER", "DEFINE" or "PART NAME" and then press the ENTER button.

XDUCER Menu

Signal Conditioning

(Note: These parameters will be automatically set by module recognition for E9310, E9320, E9330, or E9340 modules)

1) Rotate the ENTER button until "SIG COND" is displayed and then press the ENTER button.
2) Rotate the ENTER button to select "AIR" or "ELEC" and then press the ENTER button.
   a) If "ELEC" was selected then rotate the ENTER button to select "GAIN 1X" or "GAIN 10X" and then press the ENTER button to return to the Xducer menu.
   b) If "AIR" was selected then rotate the ENTER button to select LOW MAG, MED MAG, or HIGH MAG and then press ENTER to return to the Xducer menu.

Scale

1) Rotate the ENTER button until "SCALE" is displayed and then press the ENTER button.
2) Rotate the ENTER button to select "INCH" or "METRIC".
3) Press the ENTER button and the Accusetter will return to the Xducer menu and display "SCALE".

Pol/Mag

1) Rotate the ENTER button until "POL/MAG" is displayed and then press the ENTER button.
2) Rotate the ENTER button to select INPUT A, INPUT B, INPUT C, or INPUT D and then press the ENTER button. A numerical value with a polarity (+ or -)sign will be displayed.
3) Enter the correct polarity and magnification. Refer to the Accusetter program guide for the correct value and polarity.
4) After setting the polarity and mag for one input press RST and then rotate the ENTER button to select the next input to be set up. Repeat steps 2 - 4.
5) After programming all required inputs press RST until XDUCER is displayed. All Xducer options are now programmed.

How To Enter Numerical Values and polarities

Enter the correct numeral or polarity by pressing the enter button to move from one decimal place to another. To change numbers or polarity signs rotate the ENTER button left or right until desired number or sign is displayed.

DEFINE

1) Rotate the ENTER button to display "DEFINE".
2) Press the ENTER button. "# FXTS" will display.
3) Press the ENTER button.
5) Rotate the ENTER button to display the number of fixtures in your application.
6) Press the ENTER button to select the correct number of checks. "#FXTS" will display.

Defining Fixture 1

1) Rotate the ENTER button to display "FXT 1".

Select Function

1) Press the ENTER button to display "FUNCTION".
2) Press the ENTER button.
3) Either "BYPASS", "+PEAK", "-PEAK", "TIR", "AVG", or "TOL CHK" will display. Rotate the ENTER button to display the proper function for your application.
4) Press the ENTER button to select.

Program Formula

1) "FORMULA" will display.
2) Press the ENTER button. "INPUT A" will display.
3) Rotate the ENTER button to display the INPUT to be programmed for FIXTURE #1. You will have a choice of A, B, C, or D.
4) Press the ENTER button. A numerical value with a polarity sign (+ or -) will display.
5) Enter the correct magnification numeral. (As standard, 1 is the correct number. If this input is not being used, change number to 0).

6) Enter the correct polarity by pressing the enter button to move to the + or - position and rotate ENTER button to select your choice. (As standard, it should be + polarity).
7) Press RST button to display "INPUT A".
8) If not using any other inputs, set numerical values for those not in use to 0 by using the same procedure described in steps 4. - 9.
9) If other inputs need to be programmed, follow the same procedure described in steps 4. - 9.
10) Press the RST button three times to display "FUNCTION".

Select Range

1) Rotate the ENTER button to display "RANGE".
2) Press the enter button. Either one of 8 full scale ranges will display:
   a) .0002” / .005mm
   b) .0005” / .010mm
   c) .001” / .020mm
   d) .002” / .050mm
   e) .005” / .100mm
   f) .010” / .200mm
   g) .020” / .500mm
   h) .050” / 1.000mm

Note: .020”/.500mm and .050”/1.00mm ranges should be used for electronic applications only.

3) Rotate the enter button to display the range you need and then press the ENTER button to select.
4) Either "DEVIATN" or "ABSOLUTE" will display.
5) Rotate the ENTER button to display your choice and then press the ENTER button.
   a) If you choose DEVIATN, RANGE will display
   b) If you choose ABSOLUTE, enter the actual nominal size of the measurement.
6) Press RST button three times to display "RANGE".

NOTE: If the RANGE is changed the master sizes and part limits must also be reprogrammed.

PROGRAMMING - MULTIPLE FIXTURE MEASUREMENT

Select Limits

1) Rotate the ENTER button to display LIMITS.
2) Press the ENTER button.

MAX/MIN

1) "MAX" will display.
2) Press the ENTER button. "ON" or "OFF" will display.
3) Rotate the ENTER button to display ON and then press the ENTER button.
4) Rotate the ENTER button until the maximum size or deviation is displayed.
5) Position the upper mechanical pointer at that location on the bargraph display. To move the pointer, loosen the thumbscrew.
6) Press the ENTER button. "MAX" will display.
7) Rotate the ENTER button to display "MIN".
8) Press the ENTER button. "ON" or "OFF" will display.
9) Rotate the ENTER button to display "ON" and then press the ENTER button.
10) Rotate the ENTER button until the minimum size or deviation is displayed.
11) Position the lower mechanical pointer at that location on the bargraph display.
12) Press the ENTER button.
13) "MIN" will display.

Approach (Optional)

1) Rotate the ENTER button to display "+APPRCH".
2) Press the ENTER button. "ON" or "OFF" will display.
3) Rotate the ENTER button to display your choice. (Select ON if using this limit function. Select OFF if not using this limit function).
4) Press the ENTER button.
5) If ON, rotate the enter button until the +APPRCH size or deviation is displayed and then press the ENTER button.. "+ APPRCH" will display.
6) Rotate the ENTER button to display "-APPRCH". Press the ENTER button "ON" or "OFF" will display.
7) Rotate the ENTER button to display your choice. (Select ON if using this limit function. Select OFF if not using this limit function). Press the enter button to select.
8) If ON, rotate the enter button to display the "-APPRCH" numerical value.
9) Press the ENTER button. "- APPRCH" will display.

Class (Optional)

1) Rotate the ENTER button to display "CLASS" and press the ENTER button. "EQUAL" or "SELECT" will display.
2) Rotate the ENTER button to display your choice and press the ENTER button to select. "QTY" with a numerical value will display.
3) Rotate the ENTER button left or right until desired number of classes is displayed. (39 maximum).
4) Press the ENTER button. "STRT PT" will display.
5) Rotate the ENTER button left or right to set the starting point of the first class.
6) Press the ENTER button. "CLASS" with a numerical value will display.
7) Rotate the ENTER button to set the ending point of the first class.
8) Press the ENTER button to select. "CLASS 02" will display if more than one class has been selected. Note: If you chose EQUAL, the Accu-Setter will automatically program the remaining classes. If you chose SELECT, rotate the ENTER button to set the ending point of the next class. Press the enter button to select. The next class number will display. Repeat procedure until all classes are programmed.
9) Either "SELECT" or "EQUAL" will display.
10) Press the RST button twice until "LIMITS" is displayed.

Master

This menu allows the operator to select which masters will be used to calibrate the gage and to program the correct master values. For example a two master system uses a MAX and MIN master while a single master system would use only the ZERO master. The auxiliary (AUX) master is used to calibrate a TIR check mastered with a single master. Refer to the Accusetter setup guide to determine what master or masters will be used to calibrate the gage and refer to the master calibration reports for the actual master values.

1) Rotate the ENTER button until "MASTER" is displayed and then press the ENTER button.
2) Rotate the ENTER button until "MAX", "MIN", "AUX", or "ZERO" is displayed and then press enter.
3) Rotate the ENTER button to select "ON" or "OFF" and then press ENTER.
4) NOTE: If the auxiliary master ("AUX") is turned "ON" then "MAX" and "MIN" are automatically turned "OFF" and if "MAX" or "MIN" is turned "ON" then "AUX" is automatically turned "OFF".
5) If "ON" was selected then rotate the ENTER button to drive the bargraph to the master value listed on the master certification report and then press ENTER and return to step 2. If "OFF" was selected then return to step 2.
6) After all required masters are programmed press RST to return to the define menu.

PROGRAMMING - MULTIPLE FIXTURE MEASUREMENT

Fixture Names

1) Rotate the ENTER button to display check name.
2) Press ENTER button. "FXT 1" will display.
3) Press enter button. The first character will flash. To change, rotate ENTER button left or right until desired character displays.
4) Press ENTER button to move to next character.
5) Press the RST button twice when done. Fixture name will display.
6) Press the RST button twice to display "FXT 1".

Defining Fixture 2, 3, or 4

1) Rotate the ENTER button to display FXT 2, 3, or 4 and follow the same programming procedure beginning with “Defining Fixture 1” section until all fixtures are programmed.

Part Names

Note:The part name of the program can be renamed if desired to store in memory.

7) Press RST button three times to display "DEFINE".
8) Rotate the ENTER button to display "PART NAME".
9) Press the ENTER button. "PART 1" will display.
10) Press the ENTER button. The first character will flash. To change, rotate the ENTER button left or right until desired character is displayed.
11) Press the ENTER button to move to next character.
12) Press the RST button once, when done. The programmed name will display.
13) Press the RST button once. "NAMES" will display.

Save Program

1) Press the RUN button. "CANCEL" will display.
2) Rotate the ENTER button to display "SAVE".
3) Press the ENTER button to save setup.
4) Proceed to the Programming — System section of this manual.

Programming SYSTEM Options

This area of programming allows you to conduct Accu-Setter system tests, program information downloading (communication), passwords, check names, the auto reset timer, and part databases. If you will not be using any of these features, proceed to the Calibration section of this manual.

To access the system menu use the following procedure:

1) From Run mode, press the ENTER button and then rotate the ENTER button until "SYSTEM" is displayed.
2) Press the ENTER button. If a password is required the Accusetter will prompt the operator to enter the password to access the system menu. If no password is programmed the Accusetter will proceed to the system menu.

TESTS Menu

Note: This is a hardware check. The alphanumeric display will prompt you through various tests.

1) Rotate the ENTER button until "TESTS" is display and then press ENTER.
2) The Accu-Setter version number will scroll across the alphanumeric display. Press the ENTER button.
3) "RAM TESTS" will display. Cycle 1 - 9 will process automatically, the range LEDs will light up one at a time, the bargraph will cycle thru three colors, (red, green, yellow), and the alphanumeric display will cycle for light intensity and numerical values. After the automatic tests are completed "KEY TEST" will be displayed. Proceed with the key test as described below. If the key test is not performed the automatic test will repeat.
4) Press any key, RUN, CAL, RST, INPUTS, RANGE, or PAR DB. IF the key is working properly then the key name will appear in the alphanumeric display.
5) Press the RUN key. "CANCEL" will display. Press the ENTER button to exit the test sequence.

COMM Menu

The communications menu allows the operator to program the Accusetter to download data to, or receive communications from, an external device and ,with multiple check or multiple fixture programs, to setup signals to buss to other columns. **NOTE: See section 4.4, Communication in the Advanced Operation section of the manual for additional technical specification.**

External Device Setup

1) Rotate the enter button to display "COMM" and then press ENTER.
2) RS-232 will display. Press the ENTER button.
3) Rotate the ENTER button to select "DEVICE" and then press ENTER.
4) Rotate the ENTER button to select "NO COMM", "PRINTER", or "DATA COL" and then press ENTER.
5) "DEVICE" will display. Rotate the ENTER button to display "BAUD" and then press ENTER.
6) Rotate the ENTER button to select 600, 1200, 2400, 4800, 9600, or 19,200 and then press ENTER. **NOTE: The default baud rate is 600.**
7) "BAUD" will display. Rotate the enter button to display "STATION" and then press ENTER.

NOTE: If multiple columns are daisy chained by the RS-232C connector then communication to a specific column requires the identification of the column by station number. Use the following procedure to program the column "Station" number.

8) "STAT" with a numerical value will display. Rotate the enter button to display desired station number, 0 to 9, to identify the column and then press ENTER.
9) "STATION" will display. Press the RST button to return to the system menu, "COMM" will be displayed.

Buss In/Buss Out Setup

Note: For multiple check and multiple fixture programs BUSS IN and BUSS OUT options are available, for column to column communications. These signal are used with the I/O "A" and "B" 25 pin connections.

1) From the COMM menu rotate the enter button to display "BUS OUT" and then press ENTER.
2) Rotate the ENTER button to select the name of the check or fixture to be bussed out and then press ENTER.
3) "BUS OUT" will display. Rotate the enter button to display "BUS IN" and press the ENTER button.
4) Rotate the ENTER button to select "INPUT C" or "INPUT D" and press the ENTER button.
5) Rotate the ENTER button to select "AIR" if the signal to be bussed in is from an air gage or "ELEC" if the signal to be bussed in is from an electronic gage.
6) Press the ENTER button.
7) Press the RST button. If a second bussed in signal is to be set up repeat steps 4 - 6.
8) When all inputs have been setup press the RUN button.
9) Rotate the ENTER button to display "SAVE" and then press ENTER to save the current setup.

SECURITY Menu

1) Rotate the enter button to display "SECURITY" and then press the ENTER button.
2) "MAST" with a numerical value will display. **Note: Master password must be entered now to allow programming your own password. Contact Edmunds Gages if master password is unknown.**
3) Press the ENTER button after entering the master password.
4) "PASS" with a numerical value will display. Enter your password number. **Note: if no password is required, program 000.**
5) Press the ENTER button to return to the system menu, "SECURITY" will display.

How To Enter Numerical Values

Enter the correct numeral by pressing the enter button to move from one decimal place to another. To change numbers rotate enter button left or right until desired number is displayed.

AUTO RST Menu

If the gaging application uses a +PEAK, -PEAK, or TIR function the display will normally stay latched on the peak reading until the RST button is pressed. The auto reset option allows the operator to program a timer to automatically reset the display without hitting the RST button. To program the auto reset feature from the system menu:

1) Rotate the enter button to display "AUTO RST" and then press ENTER.
2) Rotate the enter button to select "ON" or "OFF" and then press the ENTER button.
3) If OFF was selected then the Accusetter will return to the system menu and display "AUTO RST". If ON was selected then "DELAY" with a numeric value will be displayed.
4) Rotate the ENTER button to display your choice of 0 - 10 seconds time delay.
5) Press the ENTER button and ON will be displayed.
6) Press the RST button to return to the system menu and "AUTO RST" will be displayed.

AUTO AIR Menu (Optional)

If the optional automatic air shutoff is installed then this menu is available to program the time delay before air shutoff or to disable the auto air shutoff. See the Auto Air Shutoff in the Advanced Operation section 4.6 for more information.

PART DB

The part database menu allows the operator to select an existing program to load or save the current setup for future use

1) Rotate the ENTER button to display "PART DB" or press the PART DB shortcut button.
2) Press the ENTER button.
3) "PART" and a number will be displayed.
4) Rotate the ENTER button to display the desired setup number.
5) Press the ENTER button.
6) "SELECT" will display.
7) Rotate the ENTER button to choose from "SAVE", "CLEAR", or "SELECT".
8) Press the ENTER button.
9) "PART" and a number will be displayed.
10) Press the RST button once. "PART DB" will be displayed.

RANGE

If Range is "ON" then the range menu is accessible from the level 0 menu.

1) From the System menu, rotate the ENTER button to select "RANGE OP" and then press ENTER.
2) Rotate the ENTER button to select "ON" or "OFF" and then press ENTER.
3) Press the RUN button.
4) Rotate the ENTER button to select "SAVE" and then press ENTER.

3.4 Input Setup

Setting A/E Mag and Zero for Air Gage

NOTE: Inputs MUST be setup from the Calibration, Inputs menu not in RUN mode. In Run mode the master corrections are applied. In Calibration mode the raw input readings are displayed.

If the gage tooling is an airplug or air ring using an (1) channel or (2) channel A/E module use the following procedure to set zero and magnification for each input(s) using a set of max and min masters.

1) Press the CAL button.
2) Rotate the ENTER button until "INPUTS" is displayed and then press the ENTER button.
3) Rotate the ENTER button to select the full scale value to be displayed on the bargraph and then press the ENTER button.
4) Rotate the ENTER button to select an input, check, or fixture to display as a live reading on the bargraph. **Note: The live input, check, or fixture readings are always displayed as deviations from nominal.**
5) Load the MAX master into gage position.
6) Refer to the master calibration report to determine the master value of the MAX master.
7) Adjust the ZERO knob on the signal conditioning module until the digital display reads the master value of the MAX master for the check being setup from the calibration report.
8) Remove the MAX master and load the MIN master into gage position.
9) Calculate the difference between the reading with the MIN master loaded and the reading with the MAX master from step 7.
   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!

(Cont)

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.

10) 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.
11) Remove the MIN master and load the MAX master onto the gage.
12) Repeat steps 5 through 12 until the displayed readings for the each master corresponds to the max and min master deviation values on the calibration sheet for the check being setup.

Setting up LVDT Inputs

Prior to calibrating the gage the LVDT inputs must be properly positioned in the tooling. Use the following procedure to setup each LVDT input.

1) Press the CAL button.
2) Rotate the ENTER button until "INPUTS" is displayed and then press ENTER.
3) Rotate the ENTER button to select the desired full scale value to use for input setup and then press ENTER.
4) Rotate the ENTER button until the input to be setup is displayed. The bargraph and alphanumeric display will show a live reading of the selected input.
5) If the gage uses two masters for calibration load the MAX master into gage position. If the gage uses a single zero master for calibration load the ZERO master into gage position.
6) Determine the target size that the LVDT will be set to using the known calibrated size of the master from the master certification report and the total number of probes used to measure the specific feature. **Use the following chart as a guide, however, individual gage tooling varies depending on many factors and the actual target size may be different depending on the tooling configuration. Refer to documentation supplied with the gage tooling for additional information.**

Number of Probes	**Target Setup Size**
1	100% of master value
2	50% of master value
3	33% of master value
4	25% of master value

7) Loosen the clamping screw holding the LVDT in position and, while observing the bargraph display, reposition the LVDT until a value as close to the target setup size as possible is displayed.
8) Tighten the clamp screw to secure the LVDT. **NOTE: Do not over tighten the clamp screw.**

3.5 Calibration

NOTE: Prior to performing the automatic calibration procedure, the Air to Electric or LVDT inputs need to be properly setup, see Input Setup.

Single Check Application

Two Master System

1) Press the CAL button.
2) Rotate the ENTER button until "MASTER" is displayed and then press ENTER. The check name will be displayed.
3) Press the ENTER button. "INS MAX" will be displayed.
4) Place the MAX master into gage position and press ENTER. "GAGE MAX" will be displayed.
5) Press the ENTER button. The MAX master will be gaged and then the display will update to "INS MIN".
6) Remove the MAX master, place the MIN master into gage position and press ENTER. "GAGE MIN" will be displayed.
7) Press the ENTER button. The MIN master will be gaged and then the display will update to "MASTERED" if the calibration was successful. If the calibration was successful the gage is ready to measure parts, see Operation. Remove the MIN master and press RUN. If the calibration was not completed successfully then see the Troubleshooting section of this manual.

Zero Master Systems

1) Press the CAL button.
2) Rotate the ENTER button until "MASTER" is displayed and then press ENTER. The check name will be displayed.
3) Press the ENTER button. "INS ZERO" will be displayed.
4) Place the ZERO master into gage position and press ENTER. "GAGE ZERO" will be displayed.
5) Press the ENTER button. The ZERO master will be gaged and then the display will update to "MASTERED" if the calibration was successful. If the calibration was successful the gage is ready to measure parts, see Operation. Remove the ZERO master and press RUN. If the calibration was not completed successfully then see the Troubleshooting section of this manual.

Auxiliary Master Systems

1) Press the CAL button.
2) Rotate the ENTER button until "MASTER" is displayed and then press ENTER. The check name will be displayed.
3) Press the ENTER button. "INS AUX" will be displayed.
4) Place the Auxiliary master into gage position and press ENTER. "GAGE AUX" will be displayed.
5) Press the ENTER button and rotate the auxiliary master as required. The Auxiliary master will be gaged and then the display will update to "MASTERED" if the calibration was successful. If the calibration was successful the gage is ready to measure parts, see Operation. Remove the ZERO master and press RUN. If the calibration was not completed successfully then see the Troubleshooting section of this manual.

Multiple Check Applications

In a multiple check program the Accusetter II will automatically turn mastering "ON" for all checks with masters programmed when calibration mode is activated. During the calibration procedure the Accusetter will automatically detect which checks are returning valid results, that is the inputs are not off scale and a different max and min reading is detected, and will record the calibration results for those checks. If all of the checks are not calibrated then the Accusetter II will prompt the operator to continue the calibration procedure until all checks have been mastered or the operator presses the RUN button. If all checks have not been successfully mastered "NOT MAST" will display when the RUN button is pressed.

Use the following procedure to perform the gage calibration:

1) Press the CAL button.
2) Rotate the ENTER button until "MASTER" is displayed and then press ENTER. "INS MAX" will be displayed.
3) Place the MAX master(s) into gage position and press ENTER. "GAGE MAX" will be displayed.
4) Press the ENTER button. The MAX master(s) will be gaged and then the display will update to "INS MIN".
5) Remove the MAX master(s), place the MIN master(s) into gage position and press ENTER. "GAGE MIN" will be displayed.
6) Press the ENTER button. The MIN master(s) will be gaged. If only some of the checks programmed with Max/Min masters were mastered then the Accusetter II will prompt the operator to "INS MAX" to continue the calibration sequence by mastering the remaining checks with Max/Min masters. Repeat steps 3 - 6 until all checks have been mastered. NOTE: By rotating the ENTER button when the Accusetter II prompts the operator to "INS MAX" the check numbers that still need to be calibrated will be displayed.
7) If any checks are programmed with auxiliary masters, then "INS AUX" will be displayed. Load the auxiliary master into gage position.
8) Press the ENTER button and "GAGE AUX" will be displayed.
9) Rotate the auxiliary master as required and then press ENTER.
10) The display will update to "MASTERED" if the calibration of all checks was completed successfully.
    a) If there are no ZERO masters programmed then the gage is ready to measure parts. Press RUN and see Operation. If there are ZERO masters programmed see Zero master calibration below.

Zero Master Calibration

1) From RUN mode, press the CAL button.
2) Rotate the ENTER button until "ZERO" is displayed and then press ENTER. "INS ZERO" will be displayed.

NOTE: All checks that are programmed with a ZERO master will be turned "ON" by default and will therefore be gaged at the same time. If the ZERO masters are to be gaged separately then the checks must be turned "OFF" manually from the "CHK SEL" menu.

3) Place the ZERO master into gage position and press ENTER. "GAGE ZERO" will be displayed.
4) Press the ENTER button. The ZERO master will be gaged and then the display will update to "MASTERED" if the calibration was successful. If the calibration was successful the gage is ready to measure parts, see Operation. Remove the ZERO master and press RUN. If the calibration was not completed successfully then see the Troubleshooting section of this manual.

Multiple Fixture Application

In a multiple fixture program the Accusetter II will automatically turn mastering "ON" for all checks with masters programmed when calibration mode is activated. During the calibration procedure the Accusetter will automatically detect which checks are returning valid results, that is the inputs are not off scale and a different max and min reading is detected, and will record the calibration results for those checks. If all of the checks are not calibrated then the Accusetter II will prompt the operator to continue the calibration procedure until all checks have been mastered or the operator presses the RUN button. If all checks have not been successfully mastered "NOT MAST" will display when the RUN button is pressed.

Use the following procedure to perform the gage calibration:

1) Press the CAL button.
2) Rotate the ENTER button until "MASTER" is displayed and then press ENTER. "INS MAX" will be displayed.
3) Place the MAX master(s) into gage position and press ENTER. "GAGE MAX" will be displayed.
4) Press the ENTER button. The MAX master(s) will be gaged and then the display will update to "INS MIN".
5) Remove the MAX master(s), place the MIN master(s) into gage position and press ENTER. "GAGE MIN" will be displayed.
6) Press the ENTER button. The MIN master(s) will be gaged. If only some of the checks programmed with Max/Min masters were mastered then the Accusetter II will prompt the operator to "INS MAX" to continue the calibration sequence by mastering the remaining checks with Max/Min masters. Repeat steps 3 - 6 until all checks have been mastered. NOTE: By rotating the ENTER button when the Accusetter II prompts the operator to "INS MAX" the check numbers that still need to be calibrated will be displayed.
7) If any checks are programmed with auxiliary masters, then "INS AUX" will be displayed. Load the auxiliary master into gage position.
8) Press the ENTER button and "GAGE AUX" will be displayed.
9) Rotate the auxiliary master as required and then press ENTER.
10) The display will update to "MASTERED" if the calibration of all checks was completed successfully.
    b) If there are no ZERO masters programmed then the gage is ready to measure parts. Press RUN and see Operation. If there are ZERO masters programmed see Zero master calibration below.

Zero Master Calibration

1) From RUN mode, press the CAL button.
2) Rotate the ENTER button until "ZERO" is displayed and then press ENTER. "INS ZERO" will be displayed.

NOTE: All checks that are programmed with a ZERO master will be turned "ON" by default and will therefore be gaged at the same time. If the ZERO masters are to be gaged separately then the checks must be turned "OFF" manually from the "FIX SEL" menu.

3) Place the ZERO master into gage position and press ENTER. "GAGE ZERO" will be displayed.
4) Press the ENTER button. The ZERO master will be gaged and then the display will update to "MASTERED" if the calibration was successful. If the calibration was successful the gage is ready to measure parts, see Operation. Remove the ZERO master and press RUN. If the calibration was not completed successfully then see the Troubleshooting section of this manual.

3.6 Operation

Single Check Operation

To place the Accusetter in Run mode for normal gaging operation press the RUN button.

The operation of the Accusetter in Run mode is dependant on the function that is selected in the define, function menu. For a single check measurement the function options are Bypass, +Peak, -Peak, or TIR.

If max and min limits are programmed then the bargraph display will change colors to indicate the part status. If the check result is within the programmed sizes then the bargraph will be green, if the check results is over the max limit or under the min limit the bargraph will be red. If approach limits are programmed the bargraph will be amber when check results are within the programmed approach limits.

Bypass

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

+PEAK

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

2) Press RST.

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 RST button was pressed.

For example to check the maximum diameter of a shaft:

1) Place the part in an air ring connected to the Accusetter II .
2) Press RST.
3) Rotate the part through at least one revolution.
4) Read the +PEAK value from the alphanumeric display or the bargraph.

NOTE: The Accusetter can be programmed to automatically reset the display using AUTO RST menu. See System Programming Auto Reset.

-PEAK

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

2) Press RST.

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 RST button was pressed.

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

NOTE: The Accusetter can be programmed to automatically reset the display using AUTO RST menu. See System Programming Auto Reset.

TIR

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

2) Press RST.

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 RST button was pressed.

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

NOTE: The Accusetter can be programmed to automatically reset the display using AUTO RST menu. See System Programming Auto Reset.

Multiple Check or Multiple Fixture Operations

To place the Accusetter in Run mode for normal gaging operation press the RUN button.

The operation of the Accusetter in Run mode is dependant on the function that is selected in the define, function menu. For a multiple check or multiple fixture measurement the function options are Bypass, Avg, +Peak, -Peak, TOL Check, or TIR.

If two or more checks or fixtures are programmed in the Accusetter the operator can view the results of the various checks one at a time by rotating the ENTER button to select what check results to display on the bargraph and alphanumeric display.

Bypass

1) Place the part to be checked in gage position. The alphanumeric display and bargraph will display the actual live reading of the check results. **NOTE:** The part or gage can be repositioned to explore the part.
2) Rotate the ENTER button to display the other checks or fixtures.

Tolerance Check (TOL CHK)

If the Accusetter is programmed for a TOL Check function the average reading measured will be displayed when within the programmed tolerance limits and +peak and -peak readings will be displayed when outside of the programmed tolerance limits.

+PEAK

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

2) Press RST.

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 RST button was pressed.

For example to check the maximum diameter of a shaft:

1) Place the part in an air ring connected to the Accusetter II .
2) Press RST.
3) Rotate the part through at least one revolution.
4) Read the +PEAK value from the alphanumeric display or the bargraph.

NOTE: The Accusetter can be programmed to automatically reset the display using AUTO RST menu. See System Programming, Auto Reset.

-PEAK

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

2) Press RST.

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 RST button was pressed.

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

NOTE: The Accusetter can be programmed to automatically reset the display using AUTO RST menu. See System Programming, Auto Reset.

TIR

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

2) Press RST.

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 RST button was pressed.

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

NOTE: The Accusetter can be programmed to automatically reset the display using AUTO RST menu. See System Programming Auto Reset.

Offloading Gage Results

You may opt to offload the readings to a data collector, personal computer, or printer.

NOTE: Prior to offloading data, the external device variables under the Communication section of the system programming menu must be setup. See System Programming, External Device.

If a printer is connected to the Accusetter:

1) From the Run mode, press the ENTER button to display PRINT.
2) Press the ENTER button again to send the results to the printer. The values of all defined checks will begin printing if using single check or multiple check program. If multiple fixture, only the displayed reading will be printed. Checks other than those being displayed, can be viewed or offloaded by rotating the enter button

If a data collector or PC is connected to the Accusetter:

1) From the Run mode, press the ENTER button to display "DATA COL" or "PC DATA".
2) Press the ENTER button again to send the results to the data collector or PC.

For data offloading the ENTER button function can also be performed remotely using the optional footswitch.

The offloaded data consist of the check name, check results, scale, check status, and class (if applicable).

Advanced Operation

4.0 A/E Signal Conditioning Module Setup

The E9330 (1) channel and E9340 (2) channel Air/Electronic modules convert pneumatic pressure from air gage tooling into a calibrated electrical signal. The module contains an air/electronic transducer assembly for each input and an output pin selection jumper.

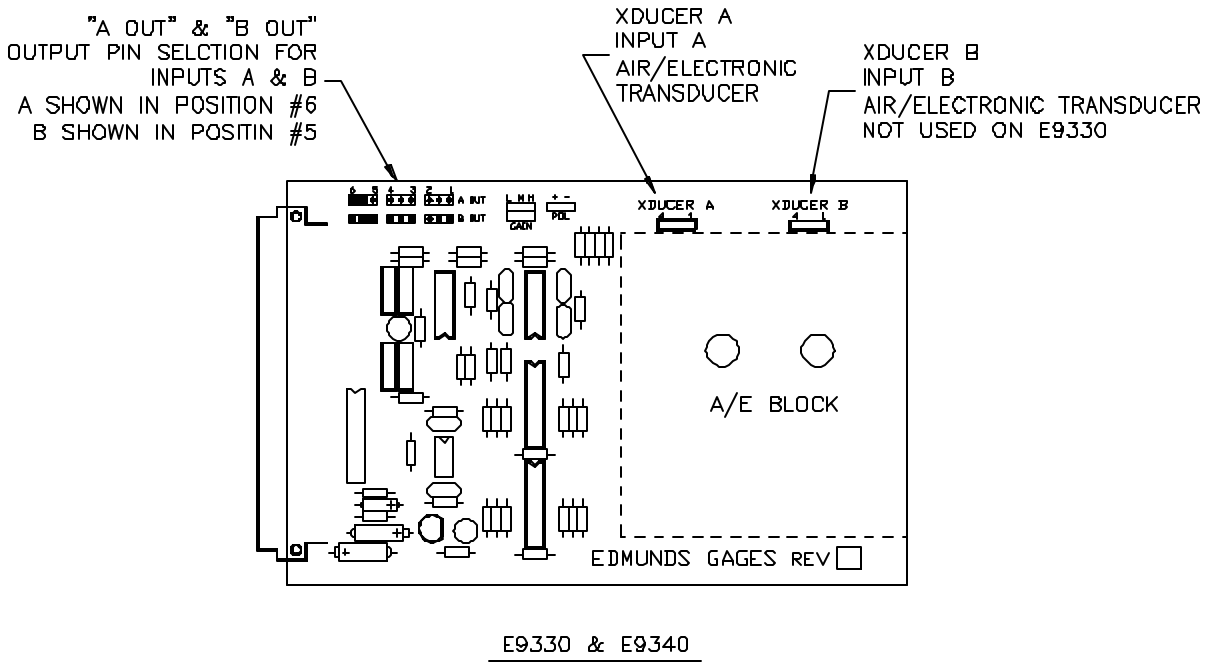


Figure 4.1 - A/E Module E9330 or E9340

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

Output Pin Selection Jumper

The electronic signal from the A/E transducer may be output to another Accusetter 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 E9330 module.

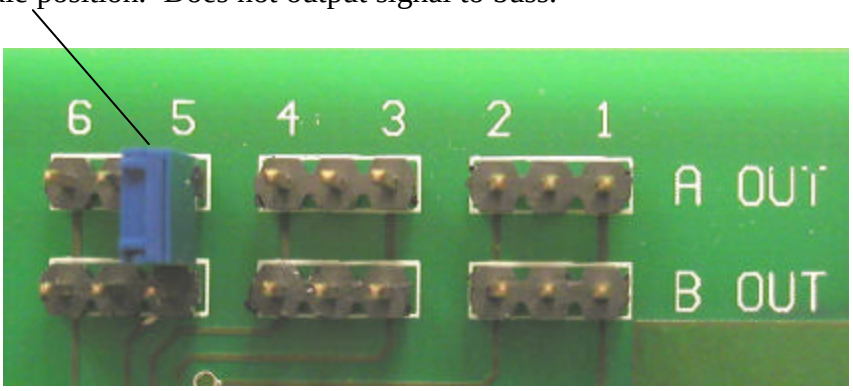
To select an output pin position the "A OUT" jumper so that it is on the desired number pin and the center pin in the three pin group. For example, to output the signal on pin 5 place the jumper on the pin below marked "5" and the center pin between the "5" and "6". Any device connected to the analog 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 Accusetter 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, Input Jumper Setup below for information on inputting signals from other columns.

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



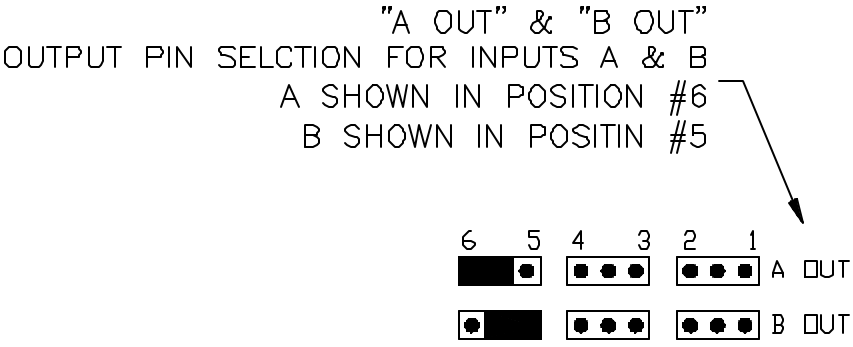


Figure 4.2 - Output Pin Jumper

A/E Module Installation

1) Turn off the main power switch on the rear of the Accusetter 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 A & B 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 Accusetter II.
4) Install the filter/regulator assembly, #5801302, to the Accusetter 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 Accusetter 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 Accusetter II power cord.
9) Turn on the power switch on the rear of the Accusetter 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 for each input used. See the Basic Operation, Input Setup section of the manual.
12) Perform the gage calibration procedure. See the Basic Operation, Calibration section 3.5 of the manual.
13) 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 Accusetter II.

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

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 Accusetter 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 restrictor bleed screw with a 1/4" allen wrench and the metallic filter, see figure 4.3. Insert #1/4-28 screw into bias restrictor and pull out restrictor assembly. Remove bottom metallic filter. Wash out in cleaning spirits. The bias restrictor 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.

Note: See section 2.2, Spare Parts.

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.

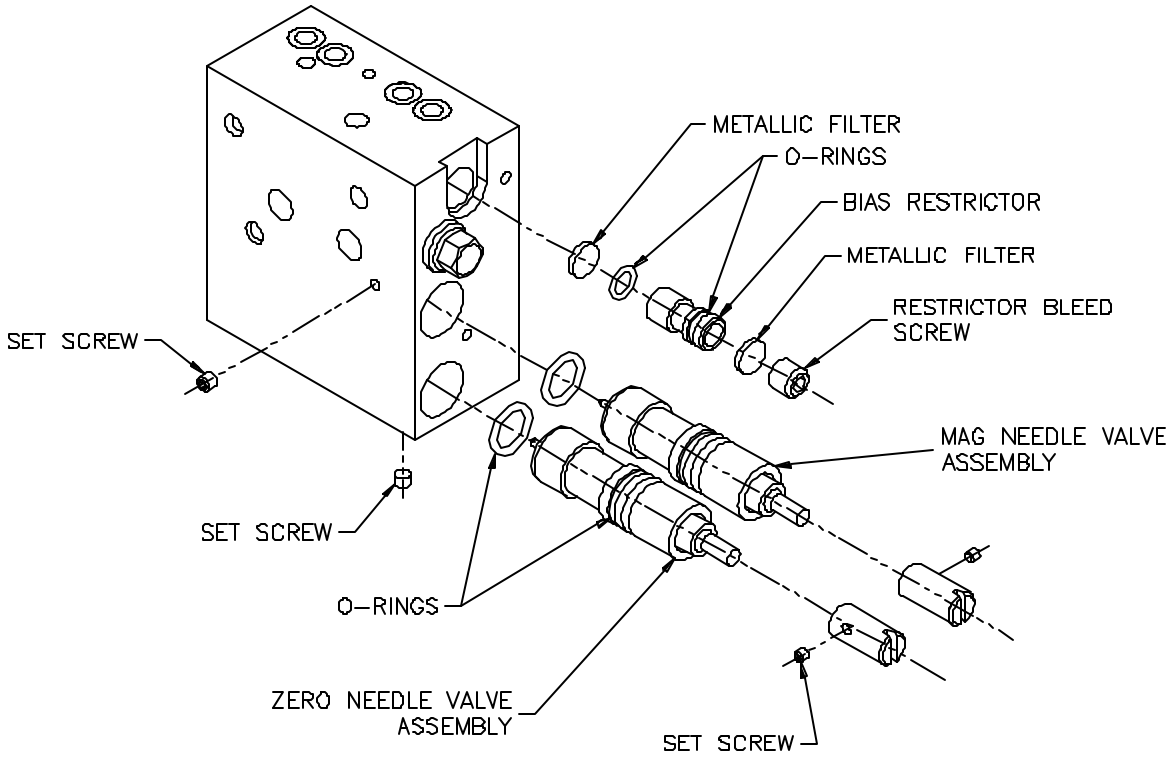


Figure 4.3 - A/E Block

4.2 LVDT Signal Conditioning Module Setup

The E9310 (2) channel and E9320 (4) channel LVDT signal conditioning modules are signal conditioning amplifiers. The module plugs into the lower bay of the Accusetter II and converts the outputs of the transducers into a useable format for the main controller board.
The modules have jumpers allowing magnification reduction to be set to 10x for long range transducers or 1x for standard transducers, see figure 4.4. Jumpers are also available to buss signals in or out to another Accusetter II or an external device.
When an E9310 or E9320 module is used on an Accusetter II the column will automatically recognize the setting of the 1X/10X jumper and program the column accordingly.

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

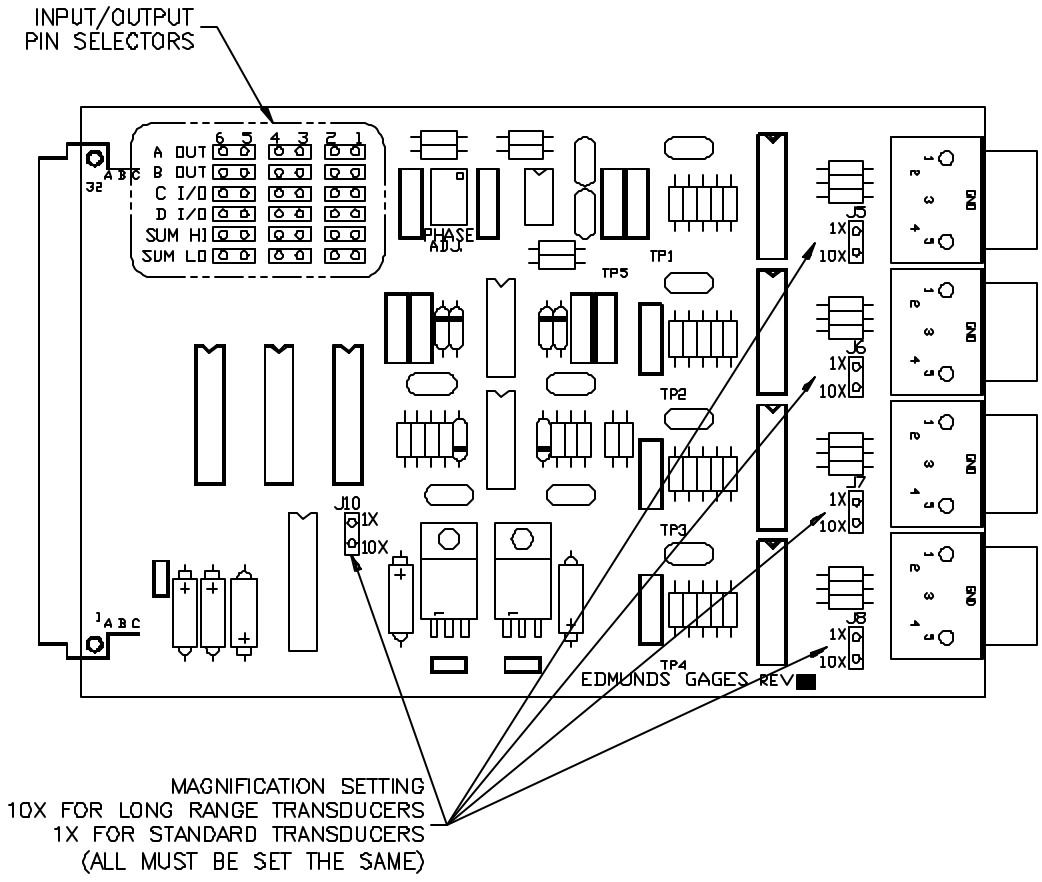


Figure 4.4 - LVDT Module E9310 or E9320

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.

Input/Output Jumpers

To buss a signal from one Accusetter 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 Accusetter 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. See figure 4.5.

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.

C I/O - Use this jumper to assign a pin number, 1 through 6, to buss out the signal from input C to another Accusetter or external device or to buss in a signal from another Accusetter to input C. This is a low level signal.

D I/O - Use this jumper to assign a pin number, 1 through 6, to buss out the signal from input D to another Accusetter or external device or to buss in a signal from another Accusetter to input D. This is a low level signal.

SUM HI - Use this jumper to assign a pin number, 1 through 6, to buss out the sum of all inputs included in the check designated as being "Buss Out" on the System, Comm menu. This is a high level signal (+/-2.5V).

SUM LO - Use this jumper to assign a pin number, 1 through 6, to buss out the sum of all inputs included in the check designated as being "Buss Out" on the System, Comm menu. 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 .

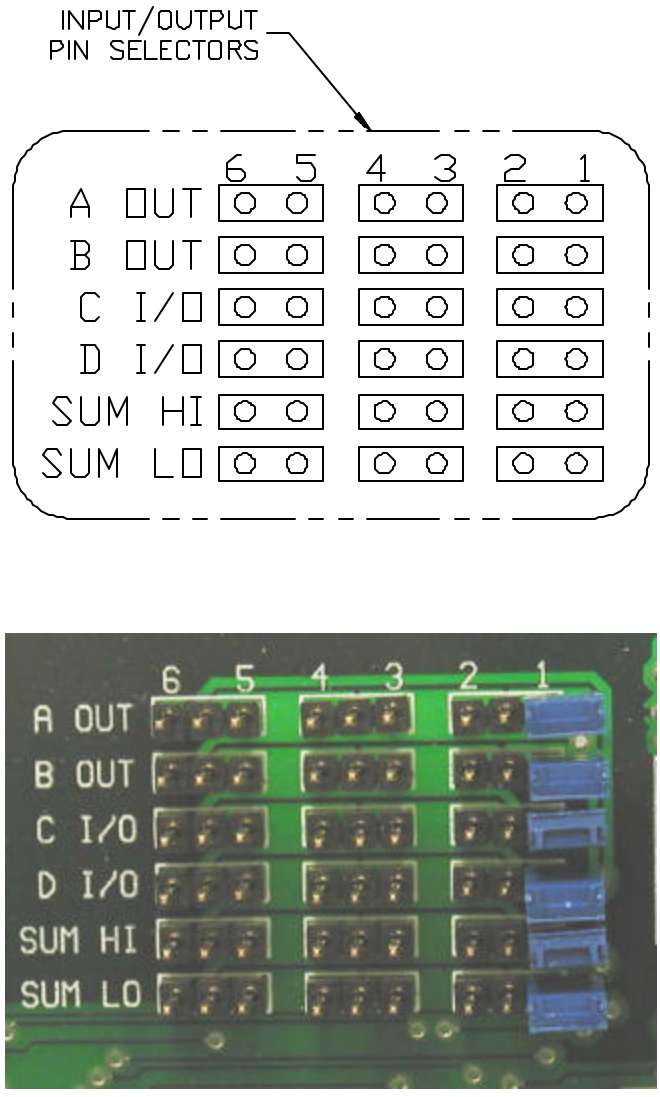


Figure 4.5 - Input/Output Jumpers

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 used the jumpers should be set to 10x.

When an E9310 or E9320 module is used on an Accusetter II the column will automatically recognize the setting of the 1X/10X jumper and program the column accordingly. See figure 4.6.

NOTE: Jumpers J5, J6, J7, J8, and J10 must all be set to the same value.

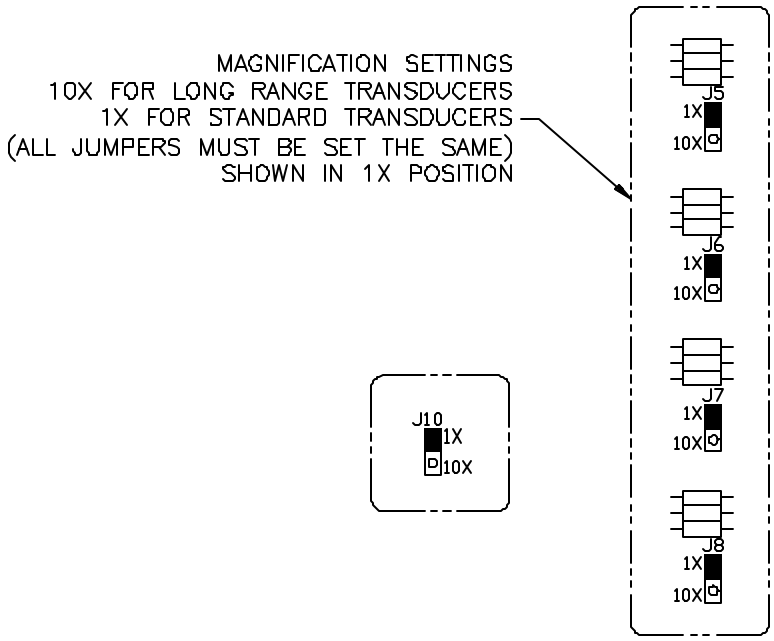


Figure 4.6 - Attenuation Jumpers

LVDT Module Installation

1) Turn off the main power switch on the rear of the Accusetter 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 Accusetter II.
4) Connect from one to four LVDTs to the A, B, C, and/or D plugs on the front of the module.
5) Plug in the Accusetter II power cord.
6) Turn on the power switch on the rear of the Accusetter II.
7) If necessary reprogram the scale, range, mode, etc. for the new application. See the "Basic Operation, Programming" section 3.3 of the manual.
8) Perform the gage calibration procedure. See the Basic Operation, Calibration section 3.5 of the manual.
9) The unit is now ready for operation.

4.3 Obsolete Signal Conditioning Modules

A new Accusetter II will be supplied with an E9310, E9320, E9330, or E9340 signal conditioning module, however the Accusetter II is compatible with the obsolete signal conditioning modules listed below:

Obsolete Signal Conditioning Modules	Edmunds Gages Number
(2) Channel LVDT Signal Conditioning Module	E9010
(4) Channel LVDT Signal Conditioning Module	E9020
(1) Channel A/E Signal Conditioning Module	E9030
(1) Channel A/E Signal Conditioning Module	E9031
(2) Channel A/E Signal Conditioning Module	E9040
(2) Channel A/E Signal Conditioning Module	E9041

Notes Regarding the use of obsolete modules:

1) Obsolete signal conditioning modules do not support the module recognition feature. In the start up message the Accusetter will display "Module ID = FF" for obsolete module with out module recognition.

2) For LVDT modules if the magnification jumpers are set to 10x then the operator must also program the Accusetter using menu Setup, Xducer, Signal Conditioning, Electric.

3) Obsolete modules may have I/O jumpers numbered 1-10. Do not use I/O jumpers 7-10 when used in an Accusetter II.

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

4.4 Communications

RS232 Communications

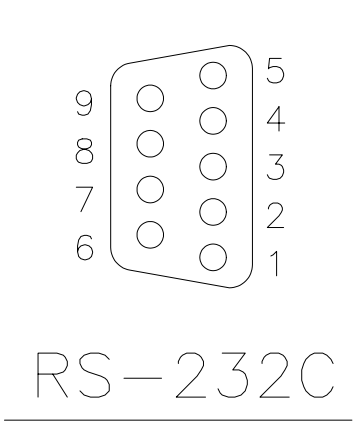


Figure 4.7- RS-232C

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

Accusetter 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	600 (Default), Programmable 600-900
Bits/Character	8
Stop Bits	1
Start Bits	1
Parity	None

Note: Baud rate is programmable from the menu "System", "Comm", "RS232", "Baud".

Offloading Data

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

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

1. The operator can initiate offload by pressing the "ENTER" push-button on the Accusetter 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 Accusetter 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 the I/O Board. The 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 I/O Board section).

Data Packet

The offloaded data packet will contain five 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 - Check Name
Field 2 - Measured Numeric Value, 4-8 ASCII Characters.
Field 3 - Scale Type, 2 ASCII Characters (in, mm).
Field 4 - Status, 0 – 5 ASCII Characters (GOOD, UNDER, OVER).
Field 5 - Class

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

RS-232 Data Collector Offloading

The operator can initiate the data offload to a Data Collector, or data can be solicited by a data collector automatically. This is performed by *pressing the enter button twice while the Accu-Setter is in the RUN mode. For the data collector to automatically solicit data, an “EEH” code or “44H” 00 to 09 code for multiple column applications needs to be sent. The offloaded data packet will contain five fields for each feature being measured. Each field will be separated by a semicolon (;) delimiter. If there is no data for a particular field, the delimiter will still be included in the response. The following five fields are allocated for each measured feature:

Field 1 — Check Name, 8 ASCII Characters
Field 2 — Check Value, 5 - 8 ASCII Characters
Field 3 — Scale Type, 2 ASCII Characters (in. or mm)
Field 4 — Check Status, 0 - 7 ASCII Characters
Field 5 — Check Class, 0 - 8 ASCII Characters

The data packet can vary in length depending on the number of features programmed in the Accu-Setter. Each data packet will end with a <carriage return> and <line feed> character. (HEXcode<ODH> and <OAH>

Example:

NAME	VALVE	SCALE	STATUS	CLASS
<check 1>;	<-1.00>;	<inches>;	<good>;	<1>

HEX Code version:
(c) (h) (e) (c) (k) (;)
43H 48H 45H 4BH 3BH
(-) (1) (.) (0) (0) (;) (i) (n) (c) (h) (e) (s) (;)
2DH 31H 2EH 3OH 3OH 3BH 69H 6EH 63H 69H 65H 73H 3BH
(g) (0) (0) (d) (;) (1) (cr) (lf)
47H 4FH 4FH 44H 3BH 31H ODH OAH

*This function can be performed remotes by using the optional footswitch, which connects to the 25 pin “I/O B” connector on the back of the column.

RS-232 Personal Computer

The PC Data protocol allows someone with knowledge of RS-232 communications to write a software program to communicate to the Accu-Setter. The PC Data protocol consists of two main categories:

1. Uploading measurement data
2. Downloading command codes

The PC is considered the Master in the system. This means that the PC must send or request data to or from the Accu-Setter. The PC can communicate with up to ten Accu-Setters. This is accomplished by implementing a daisy chain configuration on the Accu-Setter's RS-232 port. In a daisy chain configuration, each Accu-Setter must be preprogrammed to have its own unique station number to prevent data collisions. The PC request packet must specify the station number for the Accu-Setter that contains the desired data.

The Accu-Setter must be in the RUN mode to communicate to any external device.

When the Master PC wants to transmit a block of data to one of several AccuSetters, it first sends a command byte followed by a station number which identifies the target Accu-Setter. The command byte and the station number must be transmitted using Mark parity. The block of data that follows must be transmitted using Space parity.

The PC can determine if an Accu-Setter is online by transmitting a 2 byte packet:

EXAMPLE	HEX CODE	RANGE	
PC -> Accusetter	41H	30H-39H	(Mark Parity)

BYTE	HEX CODE	CHAR	DESCRIPTION
1st	41H	A	Online Request
2nd	30H-39H	0 - 9	Station Number

If the Accu-Setter is online it will respond with a 1-byte packet:

PC <- Accu-Setter 06H

(RS-232 Personal Computer, continued)

The PC can request two types of numeric measurement data from the AccuSetter:

1. Current Data — Current measurement readings being displayed on the Accu-Setter.
2. Saved Data — Measurement readings stored in the Accu-Setter's memory. The Accu-Setter can store the active reading. The storage function is initiated by the operator.

To request current measurement data, a 2-byte request packet must be transmitted to the Accu-Setter:

PC -> Accu-Setter <44H><30H - 39H> (Mark Parity)

BYTE	HEXCODE	CHAR	DESCRIPTION
1	44H	D	Current Measurement Data
2	30H - 39H	0 - 9	Station Number

To request saved measurement data, a 2-byte request packet must be transmitted to the Accu-Setter:

PC -> Accu-Setter <4EH><30H-39H> (Mark Parity)

BYTE	HEXCODE	CHAR	DESCRIPTION
1	4EH	N	Saved Measurement Data
2	30H - 39H	0 - 9	Station Number

The transmission packet received in response to the data measurement request packet is a function of the number of measurement features programmed in the Accu-Setter and also the selected program mode. The Accu-Setter can be programmed to measure up to 4 features on a part. The response packet will contain data for all of the programmed features.

(RS-232 Personal Computer, continued)

If the Accu-Setter is executing the MPF FXT program, then the response packet will just contain the displayed fixture. The response packet will contain five fields for each feature being measured. Each field will be separated by a semicolon (;) delimiter. If their is no data for a particular field, the delimiter will still be included in the response packet. The following five fields are allocated for each measured feature.

Field 1 — Check Name, 8 ASCII Characters
Field 2 — Check Value, 5 - 8 ASCII Characters (+0.12345)
Field 3 — Scale, 2 ASCII Characters (in. or mm)
Field 4 — Check Status, 0 - 7 ASCII Characters (over, +apprch, good, -apprch, under)
Field 5 — Check Class, 0 - 8 ASCII Characters (class xx)

The response packet can vary in length depending on the number of features programmed in the Accu-Setter. the end of each response packet will contain the following five bytes:

Example:

1	2	3	4	5
<cr>	<lf>	<ext>	<bcc>	<eot>
<0dh>	<0ah>	<03h>	<??h>	<04h>

The BCC is calculated by XOR all bytes in the response packet up to and including the <ext> character. The response packet will be transmitted using Marked parity.

Example of an offloaded data packet for a 3-feature application:
Check 1; +.0010; In; Good; 0
Check 2; +.0005; In; Good; 0
Check 3; +.0005; In; Good; 10

(RS-232 Personal Computer, continued)

The PC can also simulate the push-button panel on the Accu-Setter through command codes. Command codes consist of a single byte which is not station dependent. The Accu-Setter does not transmit a response packet on receipt of a command code. Command codes transmitted from the PC will affect all of the Accu-Setters connected to the daisy chain serial link. This feature is useful in automatic applications where a bank of Accu-Setters can be controlled from a single source. The command codes are transmitted using Mark parity. There are five command codes available to the PC:

HEX CODE	CHAR	DESCRIPTION
52H	R	Simulates RST key
43H	C	Simulates CAL key
45H	E	Simulates ENTER key
47H	G	Simulates RUN key
48H	H	Holds the current measurements. Xducer input scanning is disabled.

RS-232 Personal Computer Upload/Download

The PC can Upload and Download all of the programmable setup parameters stored in the Accu-Setter. For this upload/download to occur, the Accu-Setter will need the E-prom with the special software version for this ability. Also, the special software will be needed to be loaded onto the personal computer that will be used with the Accu-Setter.

Note: Only the active part program in the Accu-Setter will be offloaded to the personal computer. If a stored program needs to be offloaded, this program will have to be loaded into the active memory of the Accu-Setter prior to offloading. Also the program loaded from the personal computer will go into the active memory of the Accu-Setter.

To complete a successful upload or download, four parameter packets of 192 bytes each in length must be transferred. The PC Upload/Download is station dependent, therefore a station number must be specified in the parameter packet for both the Upload and Download. The setup parameters are transferred serially in a binary format.

The format for a parameter upload request consists of three bytes:
<U> <STATION#> <PACKET#> (Mark Parity)

RS-232 Upload/Download

The format for a parameter upload response will consist of 192 bytes plus the bcc and eot characters:

<192 bytes><bcc><eot> (Mark Parity)

The bcc is calculated by performing the XOR function on the 192 bytes of packet data.

A complete parameter upload will consist of the PC requesting four parameter packets (30h - 33h) from the Accu-Setter. The PC must wait for the parameter response packet before requesting the next parameter packet.

Example of a complete parameter upload for station #0:

Successful Upload for Parameter Packet 0
PC -> Accu-Setter <75h><30h><30h>
PC <- Accu-Setter <192 bytes><bcc><04h>

Successful Upload for Parameter Packet 1
PC -> Accu-Setter <75h><30h><31h>
PC <- Accu-Setter <192 bytes><bcc><04h>

Successful Upload for Parameter Packet 2
PC -> Accu-Setter <75h><30h><32h>
PC <- Accu-Setter <192 bytes><bcc><04h>

Successful Upload for Parameter Packet 3
PC -> Accu-Setter <75h><30h><33h>
PC <- Accu-Setter <192 bytes><bcc><04h>

A complete parameter download will consist of the PC transmitting four parameter packets (30h - 33h) to the Accu-Setter. The PC must wait for the response packet before transmitting the next parameter packet. The parameter packets must also be transferred in sequential order. The response packet for a parameter download will consist of a single byte:

<ack> - 06h successful packet download
<nak> - 15h unsuccessful packet download — retransmit parameter packet

The format for a parameter download packet will consist of 192 bytes including the bcc and the eot characters:

<d><station#<packet#> (Mark Parity)
<192 bytes><bcc><eot> (Space Parity)

The bcc is calculated by performing the XOR function on the 192 bytes of packet data.

The format for a parameter download response packet will consist of a single byte: <ack> or <nak>

Example of a complete parameter download for Station #0

Successful Download for Parameter Packet 0
PC -> Accu-Setter <64h><30h><30h><192 bytes><bcc><04h>
PC <- Accu-Setter <06h>

Successful Download for Parameter Packet 1
PC -> Accu-Setter <64h><30h><31h><192 bytes><bcc><04h>
PC <- Accu-Setter <06h>

Successful Download for Parameter Packet 2
PC -> Accu-Setter <64h><30h><32h><192 bytes><bcc><04h>
PC <- Accu-Setter <06h>

Successful Download for Parameter Packet 3
PC -> Accu-Setter <64h><30h><33h><192 bytes><bcc><04h>
PC <- Accu-Setter <06h>

Note: If the response for the downloaded packet is a “nak”, then retry the download.

Printer Offloading

The operator must initiate printing for the print protocol. This is performed by pressing the enter key twice while the Accu-Setter is in the RUN mode. The print format can contain from three to five fields for each feature being measured. The following five fields are allocated for each measures feature:

Field 1 — Check Name, 8 ASCII Characters
Field 2 — Check Value, 5 - 8 ASCII Characters (+0.12345)
Field 3 — Scale, 2 ASCII Characters (in. or mm)
Field 4 — Check Status, 0 - 7 ASCII Characters
Field 5 — Check Class, 0 - 8 ASCII Characters

The print data can vary in length depending on the number of features programmed in the Accu- Setter. The Accu-Setter will communicate to any generic serial printer by transmitting an "ACSII" data string.

Print Format:

- at the top of each new page:

EDMUNDS GAGES <cr><lf>
ACCU-SETTER II<cr><lf>

- for each initiated PRINT:

<cr><lf>
<check 1 name> <check value> mm GOOD CLASS 01 <cr><lf>
<check 2 name> <check value> mm +APPRCH
<cr><lf>
<check 3 name> <check value> mm
CLASS 79 <cr><lf>

4.5 Input/Output Board

Accusetter I/O Board (P/N 5911013) Functions

The Accusetter I/O board provide the user with various I/O functions. All I/O functions are optically isolated from the rest of the Accusetter electronics and are available at the rear panel I/O A and B connectors.

Summary of I/O signals

Inputs

- **Air Shutoff Present**: Control line to detect connection of automatic air shutoff assembly #5913250.
- **Footswitch**: Control line to externally send data via the RS232C port.
- **TIR/PEAK Reset**: Control line to externally reset TIR or PEAK detectors.
- **Status/Class Request:** Control line to select output of over, good, under relay or class bit 0, 1, or 2. See Outputs below.

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

- **Air Off**: Shuts off air flow to tooling using automatic air shutoff assembly #5913250.
- **Over Relay/Class Bit 0**: Normally open Over relay or classification bit 0
- **Good Relay/Class Bit 1**: Normally open Good relay or classification bit 1
- **Under Relay/Class Bit 2**: Normally open Under relay or classification bit2
- **Class Bit 3:** Classification bit 3
- **Class Bit 4:** Classification bit 4

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.

Typical IO Connections - I/O Board #5911013

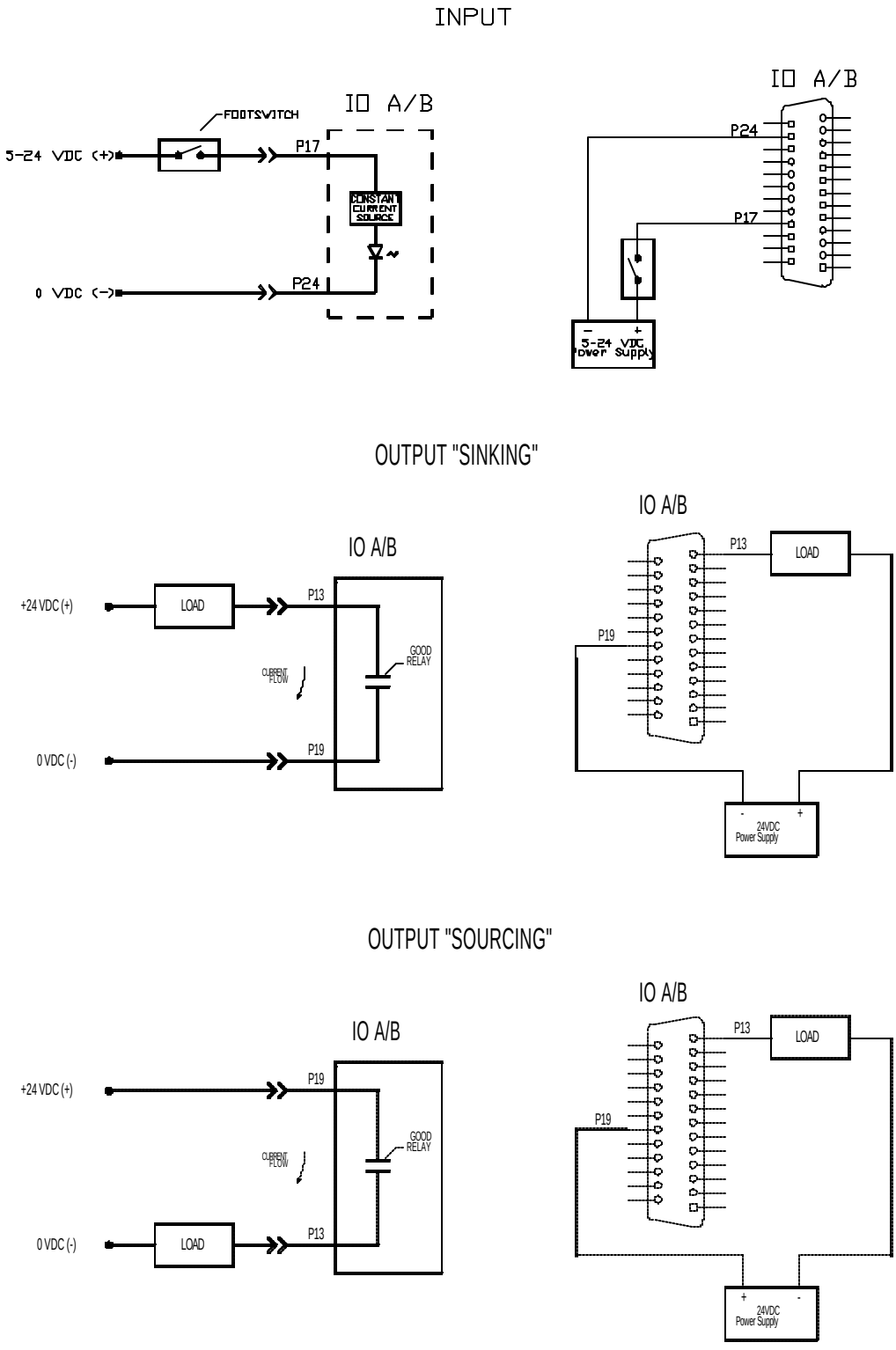
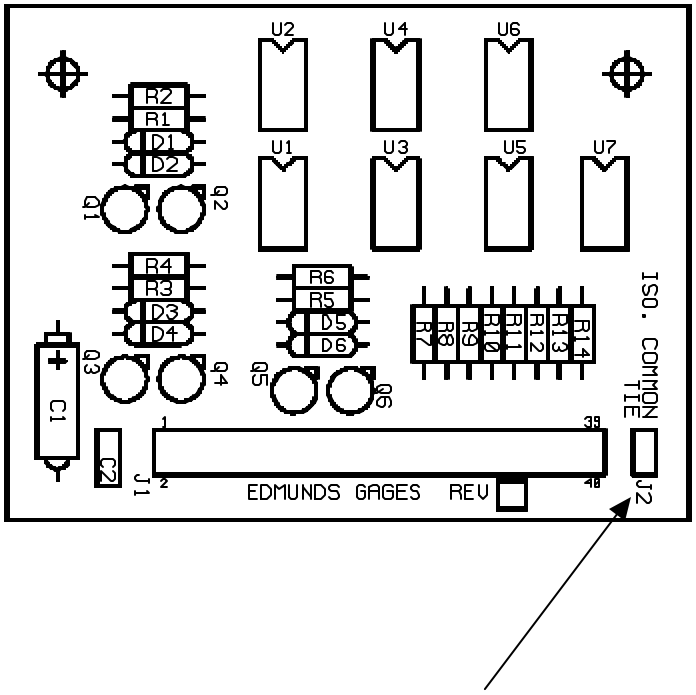


Figure 4.8

E8204 Connections

The Accusetter 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

4.6 Automatic Air Shutoff (Optional)

The optional automatic air shutoff can be used with any air gaging application. The automatic air shutoff will shut the air flow to the tooling to a minimal level when the tooling is not being used to measure a part and return the air flow to the normal operating level when the tooling is place in gage position in a part.

NOTE: The auto air shutoff only operates in the RUN mode. In calibration mode the auto air shutoff is disabled so air inputs can be set up.

Required Hardware:

- Auto Air Shutoff Assembly #5913250

Installation

1) Turn off the power to the Accusetter II.
2) Plug 25 pin connector on the shutoff cable, Edmunds #5911018, into I/O port "B" on the rear of the Accusetter II and connect the other end to the solenoid valve. **NOTE: The 25 pin connector must be connected to post "B" only.**
3) Remove the existing filter/regulator assembly from the back of the Accusetter II and install the filter/regulator assembly with the shutoff valve, Edmunds #5911200.
4) Turn on the power to the Accusetter II.
5) Proceed to the Setup section below.

Auto Air Setup

NOTE: The air check(s) mag and zero must be properly setup and the gage calibrated before setting up the auto air shutoff.

1) From Run mode press the ENTER button and then rotate the ENTER button until "SYSTEM" is displayed and then press ENTER.
2) Rotate the ENTER button until "AUTO AIR" is displayed and then press ENTER.
3) Rotate the ENTER button until "5", "10", or "15" seconds is displayed and press ENTER to select the time delay before auto air shutoff.
4) Press "RUN" to return to run mode.
5) After the programmed 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.**
6) Close the flow control on the air shutoff valve so that a minimal amount of air is allowed to flow to the air tooling.
7) 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.
8) 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.
9) Remove the air tool from the LMC master. After the programmed 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.**
10) 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.
11) Repeat steps 9 and 10 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.

Selecting Time Delay for Auto Air Shutoff

1) With the column in RUN mode press the ENTER button.
2) Rotate the ENTER button until the display reads "SYSTEM" and then press the ENTER button.
3) Rotate the ENTER button until the display reads "AUTO AIR" and then press the ENTER button.
4) Rotate the ENTER button to select a "5 SEC", "10 SEC", or "15 SEC" second delay before air shutoff and then press the ENTER button.
5) Press the "RUN" button to return to run mode.

Disabling Auto Air Shutoff

1) With the column in RUN mode press the ENTER button.
2) Rotate the ENTER button until the display reads "SYSTEM" and then press the ENTER button.
3) Rotate the ENTER button until the display reads "AUTO AIR" and then press the ENTER button.
4) Rotate the ENTER button to select "DISABLED" and then press the ENTER button.
5) Press the "RUN" button to return to run mode.

Operation

1) Place the air tooling in gage position in a part. The air flow will automatically increase to the normal operating level.
2) Gage the part.
3) Remove the air tooling from the part. After the programmed time (5, 10, or 15 seconds) expires the air flow will be reduced to a minimal flow.

4.7 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 Accusetter II regulator set to 44 psi. Air Leak / Check air lines and connections from air tooling to air module. Xducer Mag Set Incorrectly/ Check the mag setting under the Xducer menu. Polarity Set Incorrectly/ Check for proper setting of polarity under the Xducer menu.
LVDT input not responding	Improper connection to signal conditioning module/ Ensure LVDT cable is securely plugged into signal conditioning port. 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. Input setup incorrectly programmed/ Check that "POL/MAG" under Xducer menu is not programmed to 0.000 for the input & "Formula" under define is not 0.000.

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 correct 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. Input setup incorrectly programmed/ Check that "POL/MAG" under Xducer menu is not programmed to 0.000 for the input & "Formula" under define is not 0.000.
Gage reads opposite of expect value	Input polarity set incorrectly/ Check polarity settings under Xducer menu.
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

Gage Calibration Errors

Error	Cause/ Solution
SAT HEAD	**Cause:** Reading from gage is too far beyond full scale display of column. This can occur either during adjustment or calibration. **Solution:** Readjust air inputs or position of LVDT gage head.
MAX = MIN	**Cause:** The gaged value of MAX equaled the gaged value of the MIN during the mastering routine. A MIN or MAX master could have been gaged twice or an AUX master was gaged without repositioning. **Solution:** Re-master confirming proper sequence of masters.
NOT MAST	**Cause:** Indicates that the check(s) have not been mastered under the present setup. If this message appears while attempting to master, a MASTER, CHK# or FXT# may not have been turned on or master values were defined under PROGRAM. **Solution:** Re-master before attempting to operate in run mode.
MAG ERR	**Cause:** The MAG value calculated by the Accu-Setter to correct the input data to the entered master sizes was greater than 15% for AIR inputs or greater than 25% for ELEC inputs. Input not adjusted close enough to calibrated value. **Solution:** Readjust air inputs or LVDT positions. Confirm calibrated master sizes.
ZERO ERR	**Cause:** The zero value calculated by the Accu-Setter to correct the input data was greater than the allowed difference between the MAX and MIN, or zero master values entered. Input not adjusted close enough to calibrated value. **Solution:** Readjust air inputs or LVDT positions. Confirm calibrated master sizes.
POLS <>	**Cause:** The polarities of the gaged MAX and MIN masters are reversed. The masters were possibly gaged in the wrong sequence. **Solution:** Confirm correct polarity valve for inputs in program and re-master using proper sequence of masters.

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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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