



MicroTrans^{II} Summing Signal Processor

Operation & Maintenance Manual

*Engineered for accuracy, applicability,
durability and simplicity in HVAC air systems
and industrial process control loops*

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1. INTRODUCTION

1.1. DESCRIPTION

The MicroTrans^{II} Summing Signal Processor employs current state-of-the-art digital microprocessor technology to produce highly stable and accurate air flow measurements. The MicroTrans^{II} is factory configured and calibrated to the exact specification determined at time of order. The MicroTrans^{II} Summing Signal Processor is capable of receiving an external air flow signal (4-20mA / 0-10 VDC), summing the two air flow values and displaying the MicroTrans^{II} measured air flow and the total air flow. The Microtrans^{II} offers an optional controller that utilizes a proprietary algorithm which results in true three mode control incorporating proportional band, integral (reset) and inverse derivative (P, I, 1/D) controller functionality and tuning. The controller will provide responsive modulation of a control damper or variable speed drive guaranteeing a constant airflow or pressure is maintained. Additional optional features include AutoZero; High/Low Remote Alarms; Temperature Compensation; and LonWorks®, BACnet®-MS/TP Master, and Modbus® Slave communication. Simple field configuration of engineering units, operating range, process noise filtering, alarm set points, etc., are performed via password protected intuitive menus that are accessed through the integral six button touch pad. Device monitoring and configuration can also be performed by a building management system through a LonWorks®, BACnet®-MS/TP Master, or Modbus® Slave communication network.

1.2. BASIC OPERATION

The transducer receives a differential pressure signal from the pressure or flow sensing element. This signal is scaled and linearized before being displayed along with the total air flow value from an external transmitter. The process output (4-20mA, 0-5VDC, or 0-10VDC) signal is selectable between the Microtrans^{II} measured air flow and the total air flow value. The AutoZero option detects and corrects any zero offset caused by large ambient temperature changes. The Temperature Compensation option compensates the flow and velocity signal for density changes caused by variations in the process air temperature; an external temperature transmitter or input signal from the building management system is required.

1.3. PI1/D CONTROL LOOP

The PI1/D controller measures the difference between the process value and the setpoint value to determine the error value. The controller continually attempts to remove this error by varying the control output signal to adjust the variable frequency drive (VFD) or damper. To optimize the control loop response, the control parameters (Proportional Band [PB], Integrator Time [Reset], and Inverse Derivative [1/D]) may need to be adjusted.

1.3.1. PI1/D Parameter Description and Response

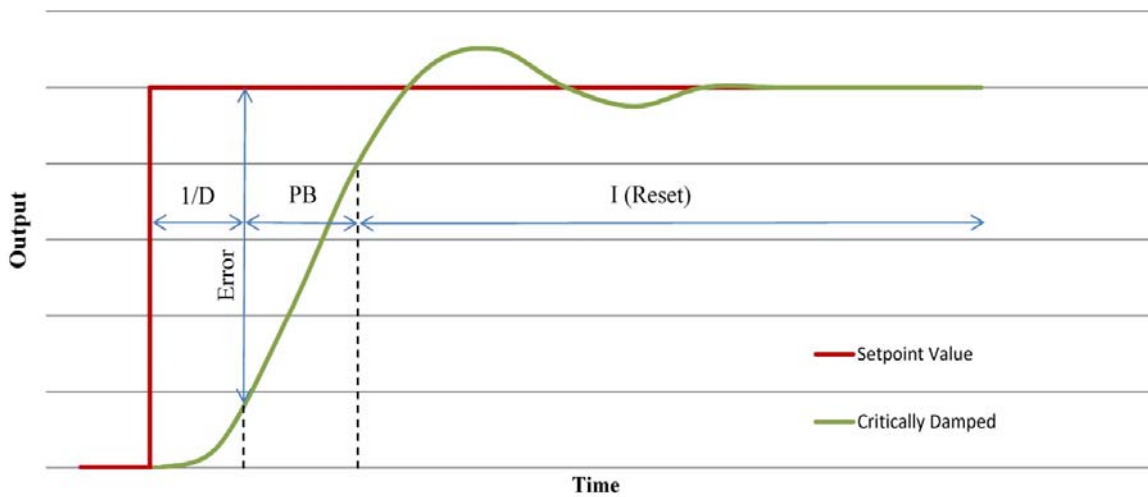
- **Proportional Band (PB):** The function of the PB parameter is to amplify the current error value (process value minus setpoint value) to make a quick control change to a large error change. The PB adjustment range is 1 to 100%. The formula is $\text{Gain} = 100\% / \text{PB}$. For example, a PB setting of 100% is a gain of 1; i.e., it takes a 100% error signal to get a full response of the controller. Conversely, a PB setting of 10% is a gain of 10; i.e., it takes a 10% change of the error signal to get a full response of the controller. Therefore, decreasing the PB value will cause the controller's response to speed up.
- **Integrator Time (Reset):** The function of the Reset is to remove any residual error present after the PB and 1/D functions. The Reset adjustment range is 1 to 300 seconds. Decreasing the Reset value will cause the controller's response to speed up.

- **Inverse Derivative (1/D):** The function of the 1/D parameter is to filter out the noise by delaying the controller response for a specific time period and then give a quick boost to the control output signal. The 1/D function helps improve response and stability of the control loop. The 1/D adjustment range is 1 to 300 seconds. Decreasing the 1/D value will cause the controller's response to speed up.

1.3.2. Correctly Tuned Control Loop

A correctly tuned control loop will respond to an error change quickly and return the process to the setpoint value with minimum overshoot and oscillation, referred to as a critically damped or tuned system (See Figure 1). The three control parameters operate in concert with each other, however each has a specific roll in controller response.

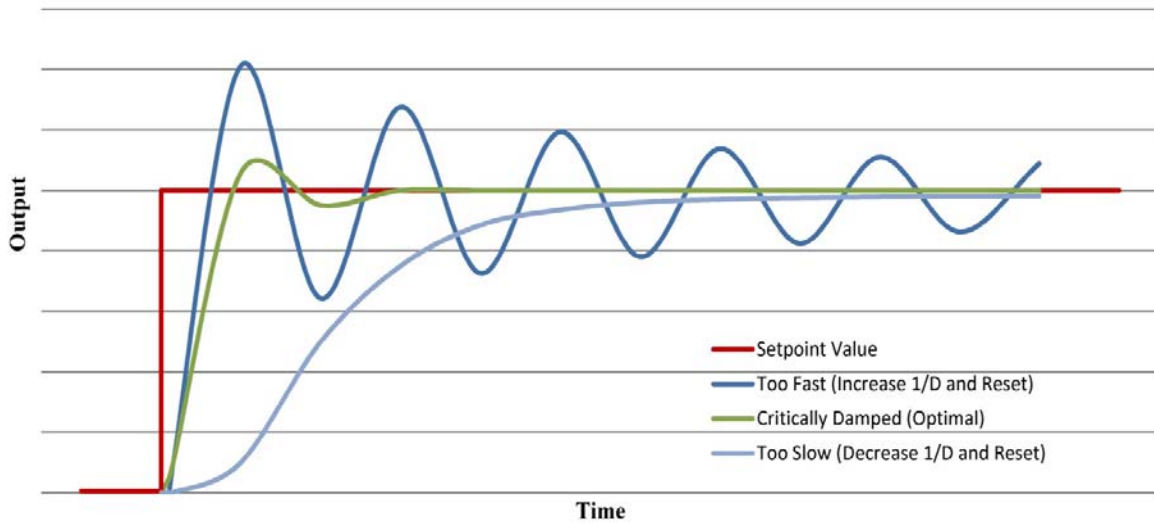
Figure 1 - Critically Damped Control Loop with Control Parameter's Effect on the Output Signal



1.3.2.1. Poorly Tuned Control Loop

A poorly tuned control loop may respond to an error change too quickly and overshoot the setpoint value, respond to slowly and never return to setpoint value or continually oscillate above and below the setpoint value (See Figure 2). For an output that responds too quickly and continues to overshoot, Paragon Controls suggests increasing the 1/D and Reset values in small increments to slow the response. An output that gradually approaches the setpoint but never really gets there is too slow. Paragon Controls suggests decreasing the 1/D and Reset values in small increments to speed up the response.

Figure 2 - Critically Damped Versus Poorly Tuned Control Systems



1.4. SPECIFICATIONS

1.4.1. Power Supply

20 to 28 VAC/DC

1.4.2. Power Consumption

Standard Unit: 192mA at 24VAC

113mA at 24VDC

Full Options: 417mA at 24VAC

229mA at 24VDC

1.4.3. Accuracy

±0.25% full scale (Standard)

±0.10% full scale (Optional)

1.4.4. Temperature Input Options

0-10VDC

4-20mA

1.4.5. External Flow Input Options

0-10VDC

4-20mA

1.4.6. Economizer Override Input Options

0-10VDC

4-20mA

1.4.7. System Start Input

Dry Contact

1.4.8. Process (MT2 Measured / Total) Output Options

0-5VDC

0-10VDC

4-20mA (700Ω maximum load)

1.4.9. Controller Output Options

0-5VDC

0-10VDC

4-20mA (700Ω maximum load)

1.4.10. High/Low Alarm Relay Outputs

Two single (1 form C) dry contacts rated for:

5 amps at 30VAC/dc

10 amps at 120VAC

1.5. SAFETY

1.5.1. Electrical Connections

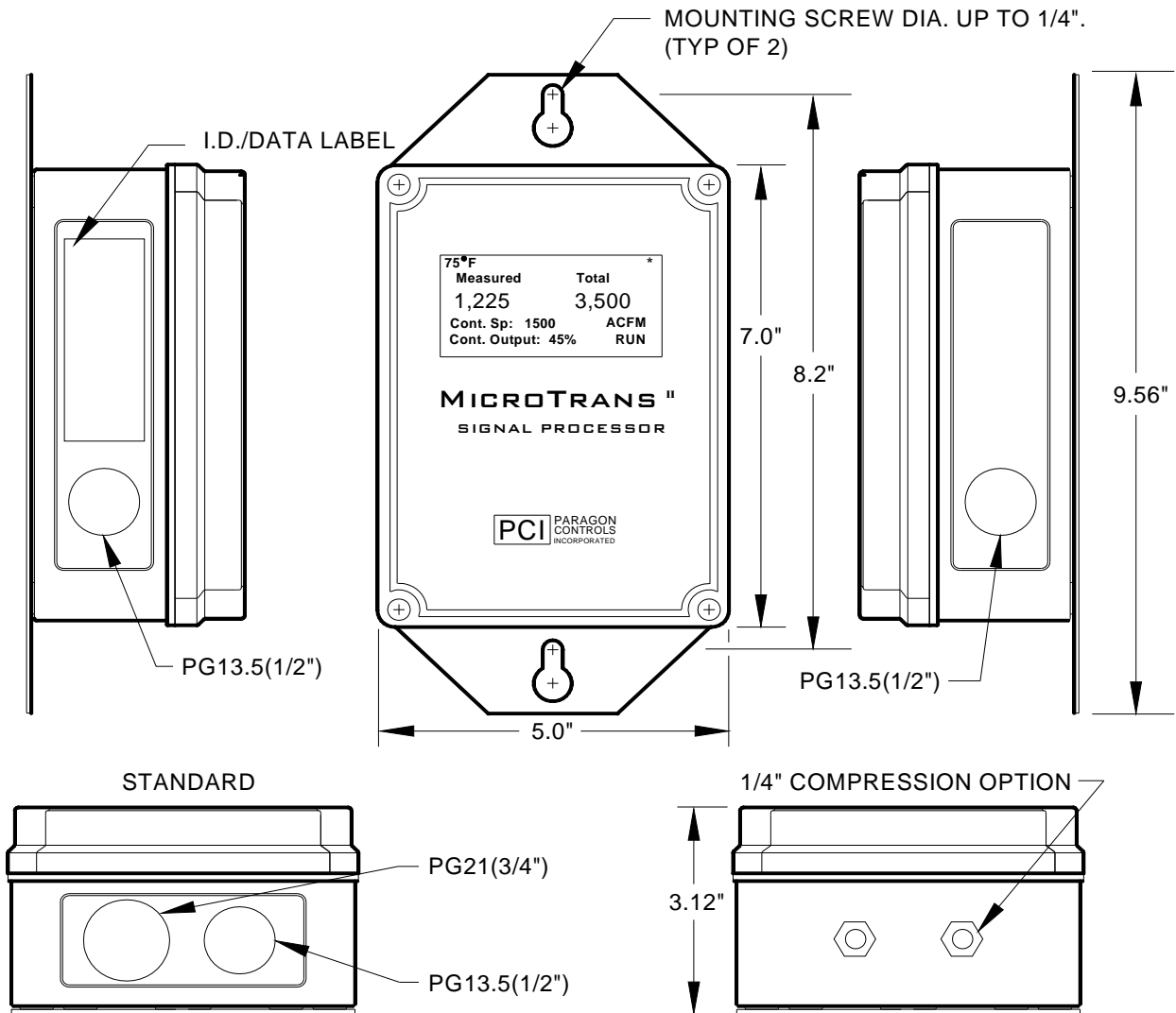
Before any electrical connections are made, ensure the **POWER SWITCH** is in the **OFF** position.

1.5.2. Static Electricity

The circuit board contains components which are susceptible to damage caused by static electrical discharge. Should it be necessary to remove the circuit board from the enclosure, appropriate precautions must first be taken to ensure that the operator and the circuit board are at the same electrical potential.

2. PRODUCT DIMENSIONS

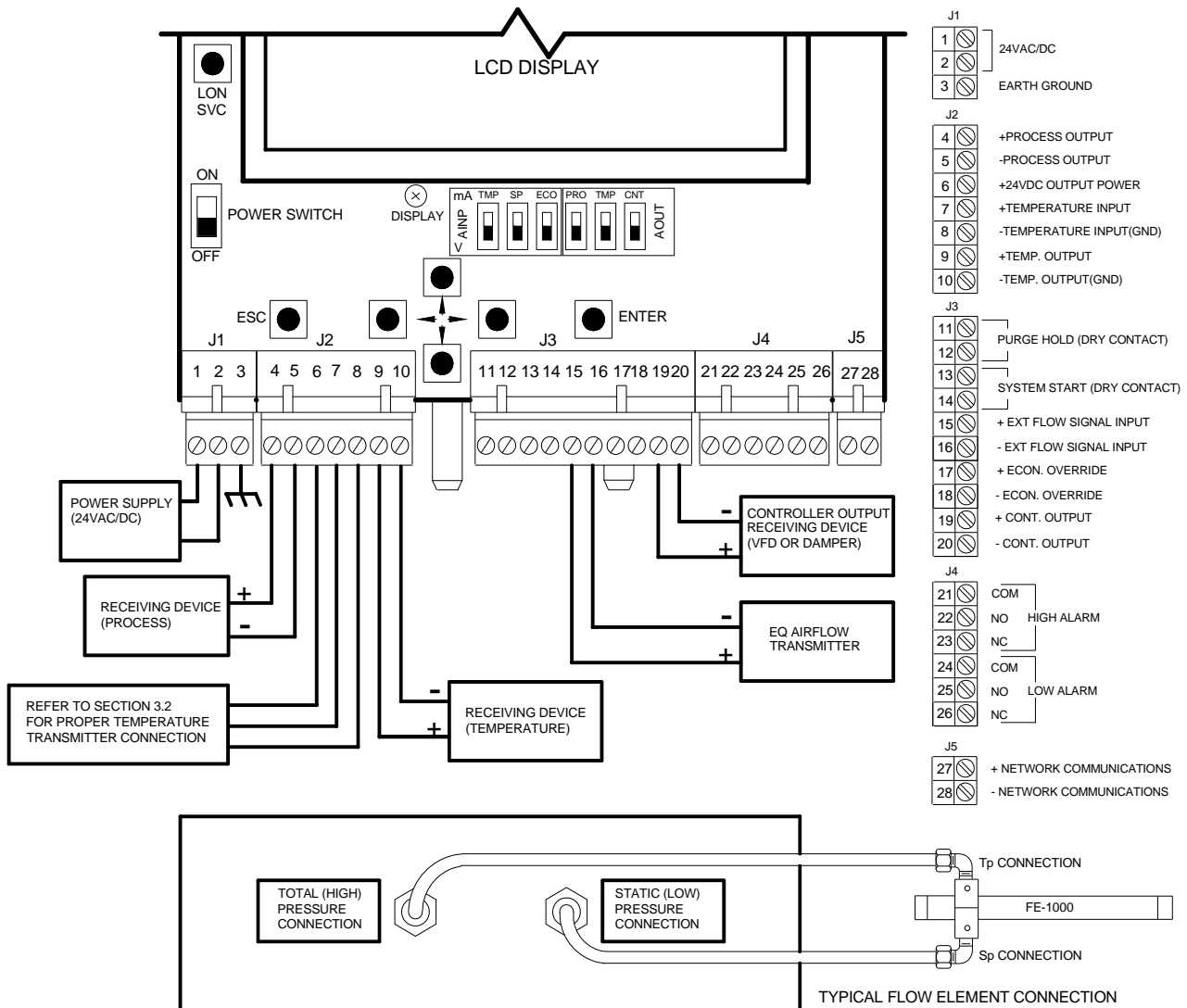
2.1. MECHANICAL DIMENSIONS



3. INSTALLATION

3.1. ELECTRICAL & PNEUMATIC INSTALLATION

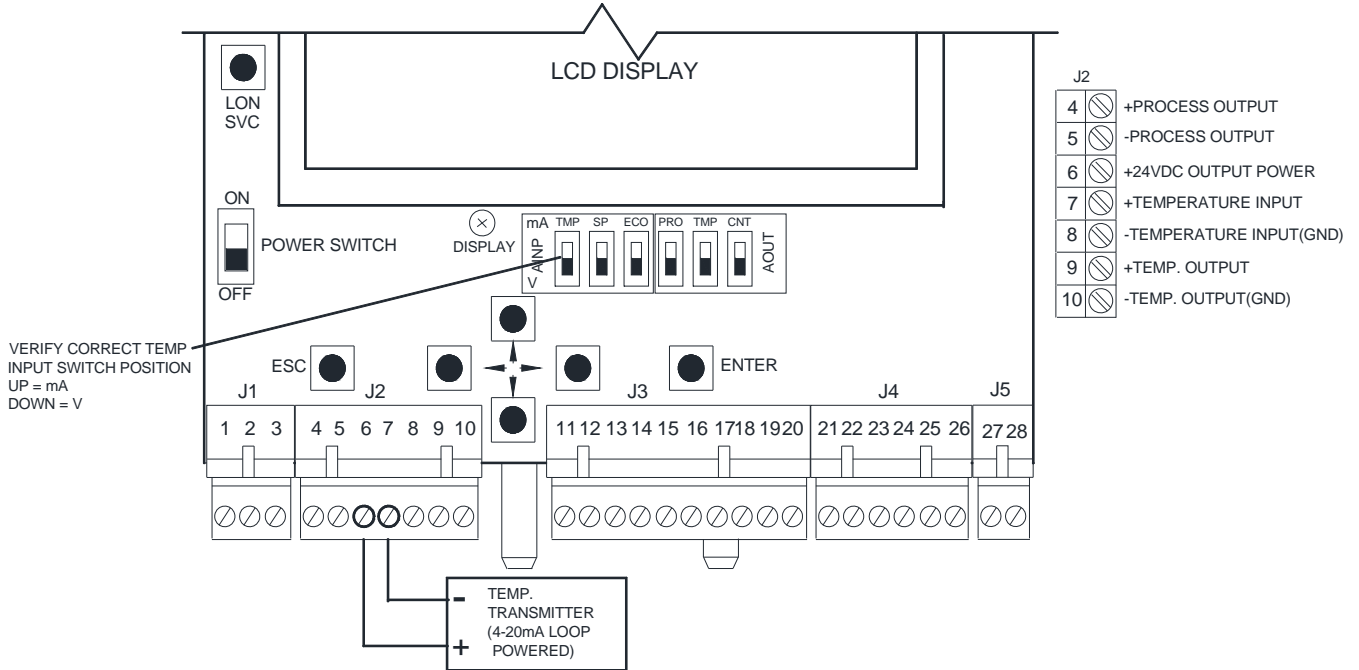
- Remove the cover by turning each corner cover mounting screw counter clockwise.
- The NEMA 4X enclosures incorporate three 1/2 inch conduit connections and one 3/4 inch conduit connection to interface all electrical wiring and pneumatic tubing to the device. Determine which conduit connection will be used and remove the black plug and install the appropriate conduit fitting (By Others).
- The five electrical connectors (J1, J2, J3, J4, and J5) located on the MicroTrans^{II} board have removable terminal blocks for ease of installing the interface wiring. **(Caution - All electrical connections must be made with the MicroTrans^{II} power switch in the OFF position).**



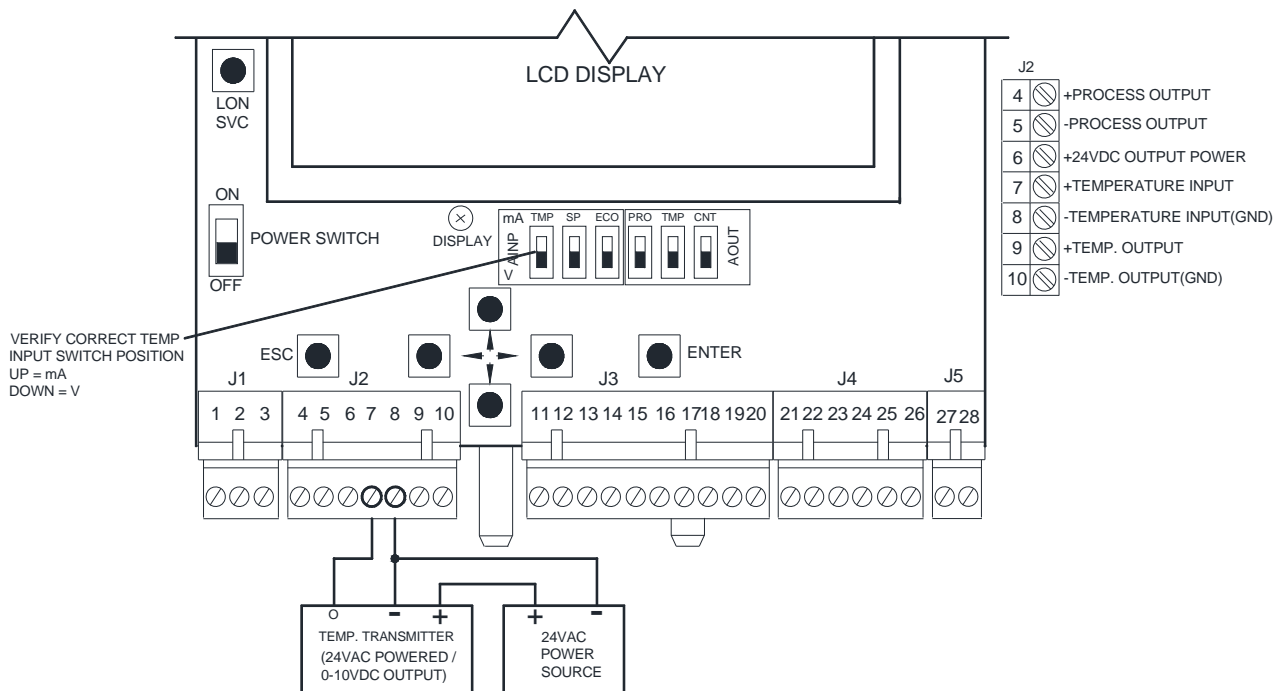
3.2. TEMPERATURE TRANSMITTER CONNECTION

Verify Temperature Input switch (TMP) position matches the input signal type. Shielded cable is recommended for all connections between the MicroTrans^{II} and the Temperature Transmitter.

3.2.1. 4-20mA Output/2-Wire Loop Powered Temperature Transmitter

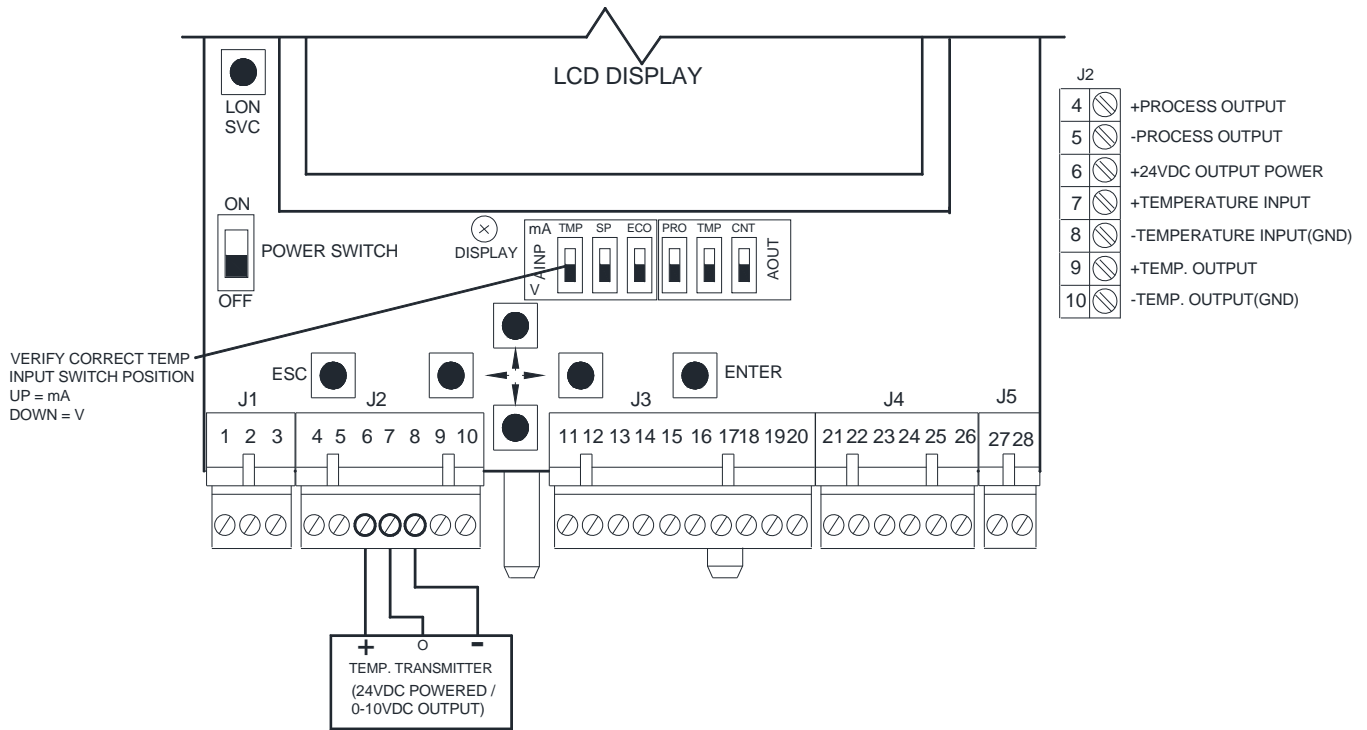


3.2.2. 0-10VDC Output/24VAC Power 3-Wire Temperature Transmitter

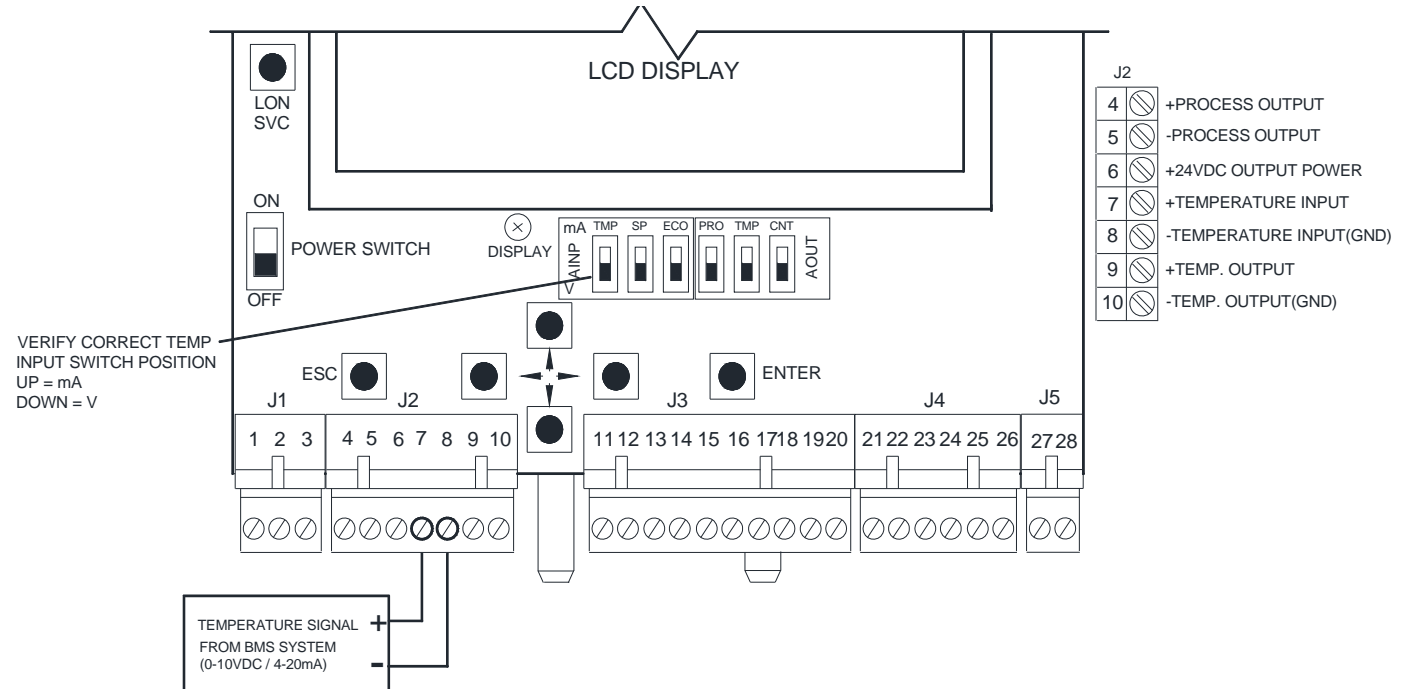


Note: If the MicroTrans^{II} power source is 24VAC, the same power source can be used to power the Temperature Transmitter.

3.2.3. 0-10VDC Output/24VDC Power 3-Wire Temperature Transmitter



3.2.4. 0-10VDC or 4-20mA from a Building Management System (BMS)



4. INPUT/OUTPUT SET-UP

The MicroTrans^{II} has been configured and calibrated at the factory for the specific application. Refer to the MicroTrans^{II} Set-Up label located on the left side of unit to verify correct Input/Output configuration for the application. If input or output configuration changes are required refer to the tables in the sections below and the figure in Section 3.1.

4.1. TEMPERATURE INPUT (OPTION)

To change the input configuration, set the **TMP** switch as follows:

| Temperature Input | AINP (TMP) Selection |
|-------------------|----------------------|
| 4-20mA | mA |
| 0-10VDC | V |

4.2. EXTERNAL AIRFLOW INPUT

To change the input configuration, set the **SP** switch as follows:

| Setpoint Input | AINP (SP) Selection |
|----------------|---------------------|
| 4-20mA | mA |
| 0-10VDC | V |

4.3. ECONOMIZER OVERRIDE INPUT (OPTION)

To change the input configuration, set the **ECO** switch as follows:

| Economizer Override Input | AINP (ECO) Selection |
|---------------------------|----------------------|
| 4-20mA | mA |
| 0-10VDC | V |

4.4. PROCESS OUTPUT

To change the output configuration, set the **PRO** switch as follows:
 (Note: See section 4.7 for voltage level select)

| Process Output | AOUT (PRO) Selection |
|----------------|----------------------|
| 4-20mA | mA |
| 0-10VDC | V |
| 0-5VDC | V |

4.5. TEMPERATURE OUTPUT

To change the output configuration, set the **TMP** switch as follows:
 (Note: See section 4.7 for voltage level select)

| Temperature Output | AOUT (TMP) Selection |
|--------------------|----------------------|
| 4-20mA | mA |
| 0-10VDC | V |
| 0-5VDC | V |

4.6. CONTROLLER OUTPUT

To change the output configuration, set the **CNT** switch as follows:
 (Note: See section 4.7 for voltage level select)

| Process Output | AOUT (CNT) Selection |
|-----------------------|-----------------------------|
| 4-20mA | mA |
| 0-10VDC | V |
| 0-5VDC | V |

4.7. OUTPUT VOLTAGE SELECTION

To change the output configuration (0-10VDC or 0-5VDC), perform the following procedure:

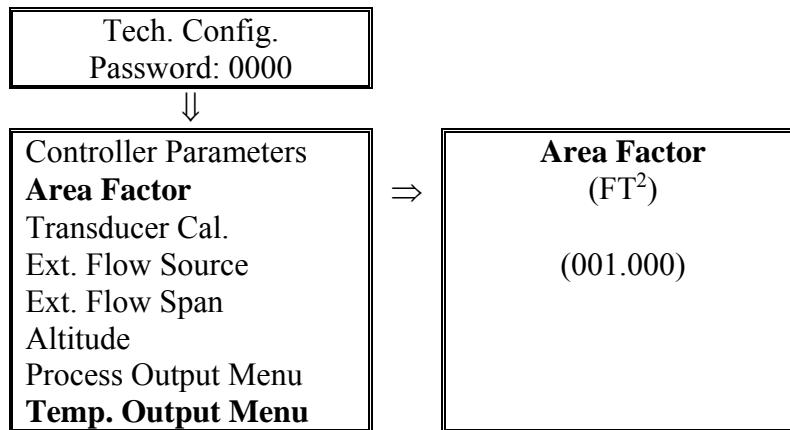
- Step 1. From the active display, enter the Tech. Configuration Menu by pressing the Up/Down buttons simultaneously.
- Step 2. Enter password number 1000 and press the Enter button.
- Step 3. Scroll down to the appropriate menu (Process Output Menu, Temp Output Menu or Cont Output Menu) and press the Enter button.
- Step 4. Select the Output Level menu.
- Step 5. Select either 0-5VDC or 0-10VDC and press the Enter button.
- Step 6. Press the ESC button 3 times to return to the process display.

5. COMMON STARTUP CONFIGURATION CHANGES

5.1. AREA FACTOR

The Area Factor can be entered or modified as follows:

- Step 1. From the active display, enter the Tech. Configuration Menu by pressing the Up/Down buttons simultaneously.
- Step 2. Enter password number 1000 and press the Enter button.
- Step 3. Press the Enter button once to access the Area Factor Menu.
- Step 4. Enter the new Area Factor using the Up/Down/Left/Right buttons.
- Step 5. Press the Enter button once.
- Step 6. Press the ESC button twice.
- Step 7. The active display should now be displayed.



If the new Area Factor causes the existing Operating Range Value to be outside the new calculated Minimum or Maximum Full Scale Value, the below Warning Message will appear and the Operating Range will be reset to the new Maximum Full Scale Value by pressing Enter. The display will automatically jump to the Op Range Menu allowing the user to enter a new Operating Range Value. This can be accomplished by performing the steps under Section 5.2. See Area Factor Example below.

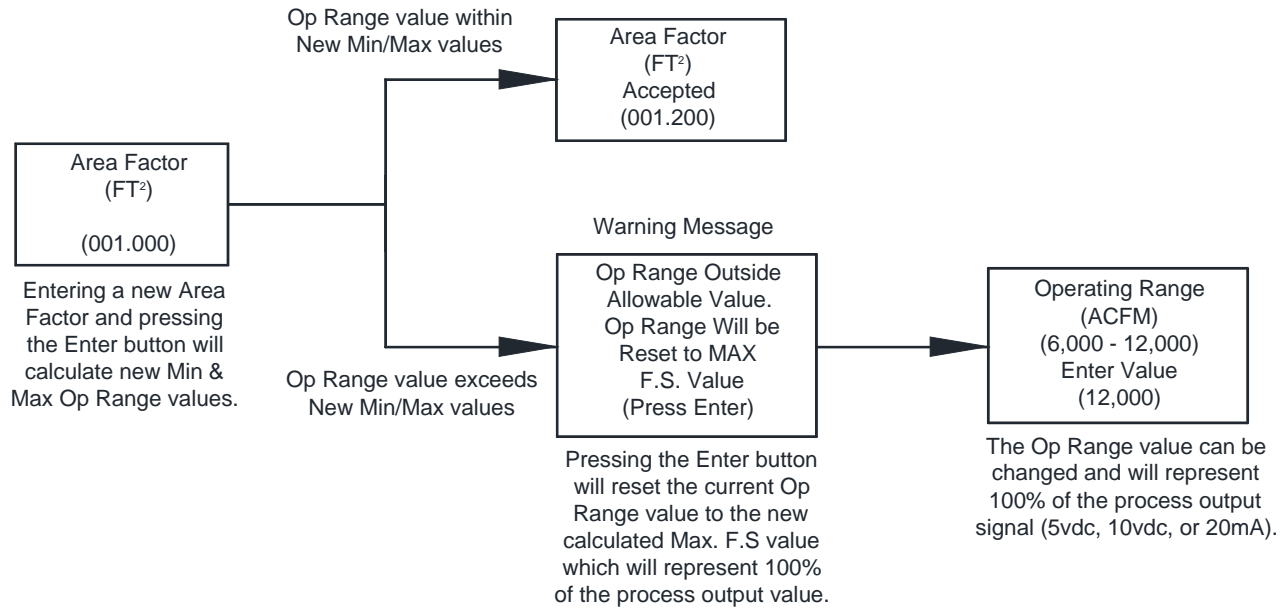
Warning Message:

Op Range Outside Allowable Value

 Op Range will be Reset to the MAX F.S. Value

 (Press Enter)

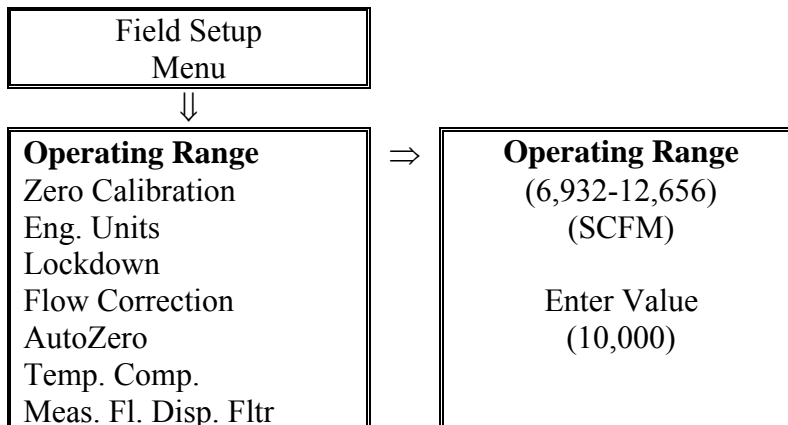
-Area Factor Example-



5.2. OPERATING RANGE

The Operating Range allows the user to enter a value which will represent 100% of the process output signal (5VDC, 10VDC, or 20mA). The menu will display the Maximum Full Scale Value possible for the user to enter as the Operating Range. The Operating Range can be changed using the following steps:

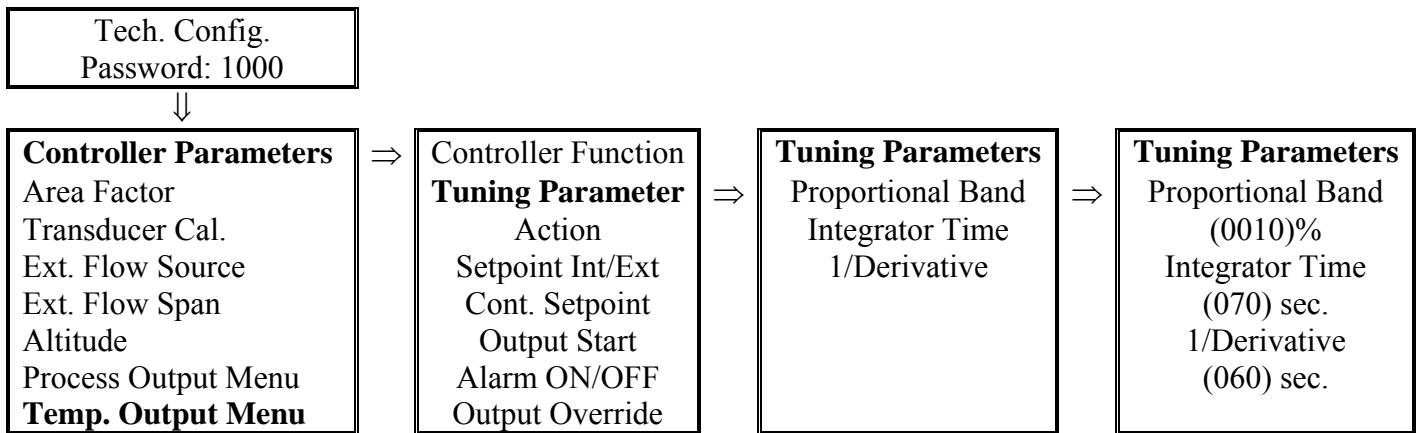
- Step 1. From the active display, enter the Field Menu by pressing and holding the Enter button for 3 seconds.
- Step 2. Press the Enter button once to access the Operating Range Menu.
- Step 3. Enter the new Operating Range using Up/Down/Left/Right buttons.
- Step 4. Press the Enter button once.
- Step 5. Press the ESC button twice.
- Step 6. The active display should now be displayed.
- Step 7. The Process Output is automatically rescaled to the new Operating Range.



5.3. CONTROLLER PARAMETERS

5.3.1. Tuning Parameters

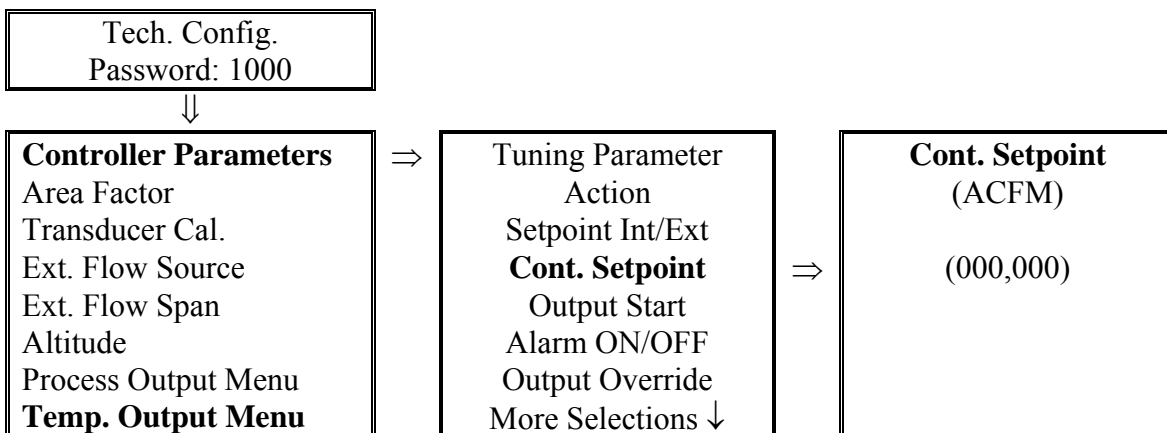
The Tuning Parameters Menu allows the user to tune the controller parameters to match the system dynamics. The Proportional Band value can be entered as a percent value from 1 to 100%. Reset and Inverse Derivative values will range from 0 to 300 seconds. Decreasing any of the three tuning parameter values will cause the controller's response to speed up. Default values will be Proportional Band = 10%, Reset (Integrator Time) = 70 seconds and Inverse Derivative = 60 seconds.



5.3.2. Controller Setpoint (Internal Value)

The Controller Setpoint Menu allows the user to enter an Internal Setpoint Value. The acceptable setpoint range is 0 to the Operating Range Value entered. The Setpoint Value can be changed by performing the following steps:

- Step 1. From the active display, enter the Tech. Configuration Menu by pressing the Up/Down buttons simultaneously.
- Step 2. Enter password number 1000 and press the Enter button
- Step 3. Verify Controller Parameters is highlighted and press the Enter button.
- Step 4. Scroll down until Cont. Setpoint is highlighted and press the Enter button.
- Step 5. Enter the new Setpoint value using the Up/Down/Left/Right buttons.
- Step 6. Press the Enter button once.
- Step 7. Press the ESC button 3 times.
- Step 8. The active display should now be displayed.



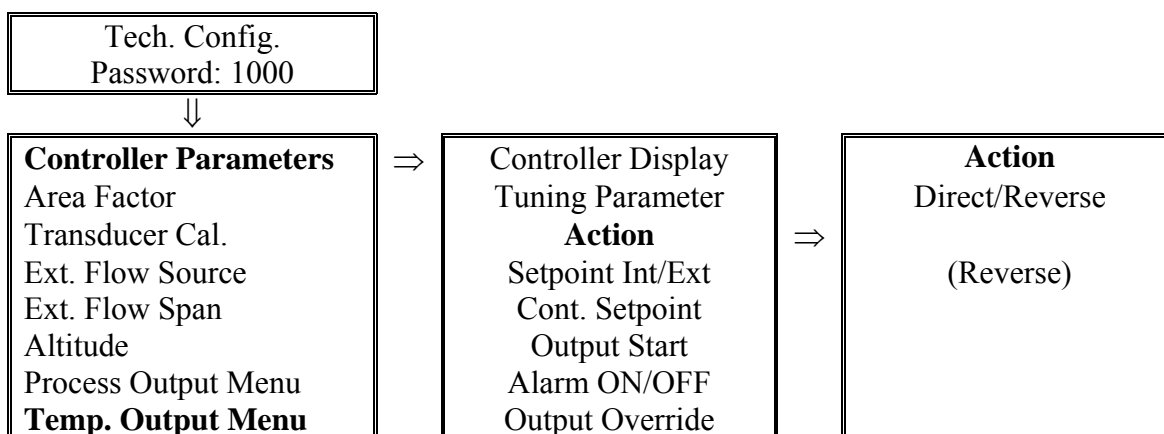
5.3.3. Action

The Action Menu allows the user to select between Direct and Reverse Action. The controller Action for various applications is listed in the below table.

| Process Controlled | Control Variable | Action |
|---------------------------|--------------------------|---------------|
| Flow | Fan Variable Speed Drive | Reverse |
| Flow | Normally Closed Damper | Reverse |
| Flow | Normally Open Damper | Direct |
| Negative Duct Pressure | Fan Variable Speed Drive | Direct |
| Negative Duct Pressure | Normally Closed Damper | Direct |
| Negative Duct Pressure | Normally Open Damper | Reverse |
| Positive Duct Pressure | Fan Variable Speed Drive | Reverse |
| Positive Duct Pressure | Normally Closed Damper | Reverse |
| Positive Duct Pressure | Normally Open Damper | Direct |

The Controller Action can be changed by performing the following steps:

- Step 1. From the active display, enter the Tech. Configuration Menu by pressing the Up/Down buttons simultaneously.
- Step 2. Enter password number 1000 and press the Enter button
- Step 3. Verify Controller Parameters is highlighted and press the Enter button.
- Step 4. Scroll down until Action is highlighted and press the Enter button.
- Step 5. Use the Up/Down buttons to select the correct action.
- Step 6. Press the Enter button once.
- Step 7. Press the ESC button 3 times.
- Step 8. The active display should now be displayed.



5.4. TEMPERATURE COMPENSATION FOR AIR DENSITY

The Temperature Compensation option compensates the flow and velocity signal for density changes caused by variations in the process air temperature. The following menus for configuration of Temperature Compensation are only available if the Temperature Compensation option is purchased. Additionally, an input signal from an external temperature transmitter or the building automation system is required; see Section 3.2 for proper temperature transmitter connection.

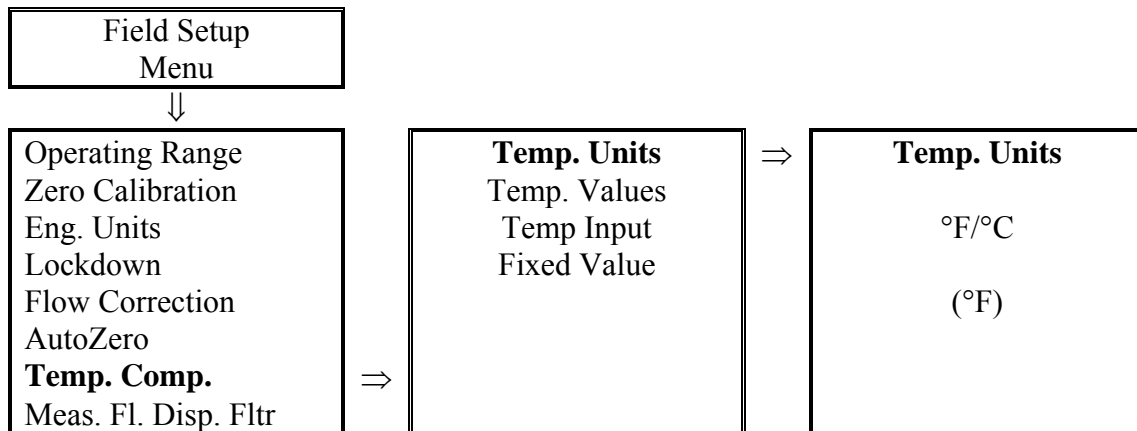
5.4.1. Temperature Input Signal Selection

To change the input configuration, set the **TMP** switch as follows:
 (Refer to Section 3.2 for Switch location on board)

| Temperature Input | AINP (TMP) Selection |
|-------------------|----------------------|
| 4-20mA | mA |
| 0-10VDC | V |

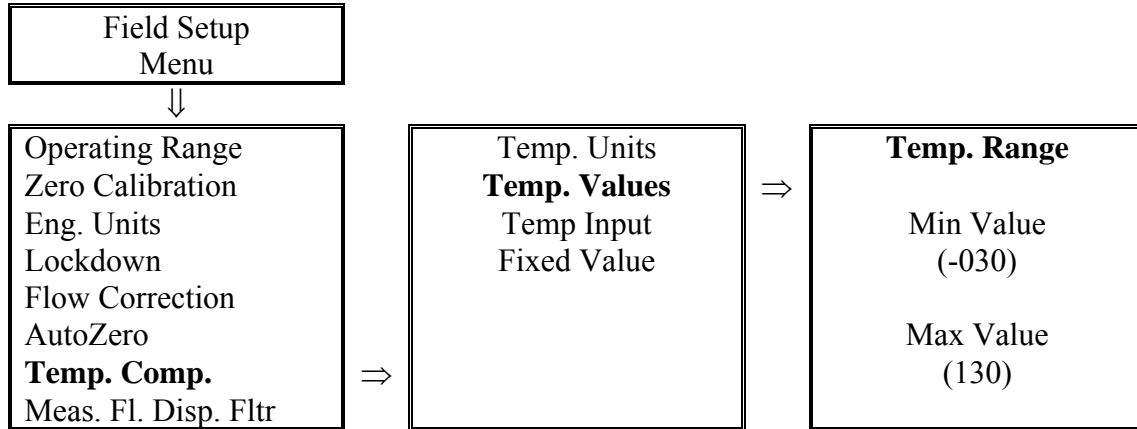
5.4.2. Temperature Units

The Temperature Units Menu allows the user to select the appropriate temperature units for the job.



5.4.3. Temperature Values

The Temperature Values Menu allows the factory or user to set the minimum and maximum temperature range values that represent the input signal from the external temperature transmitter or the building automation system.



If the new temperature values cause the existing Operating Range Value to be outside the new calculated Minimum or Maximum Full Scale Value, the below Warning Message will appear and the Operating Range will be reset to the new Maximum Full Scale Value by pressing Enter. The display will automatically jump to the Op Range Menu allowing the user to enter a new Operating Range Value. This can be accomplished by performing the steps under Section 5.2. See Temperature Range Example below.

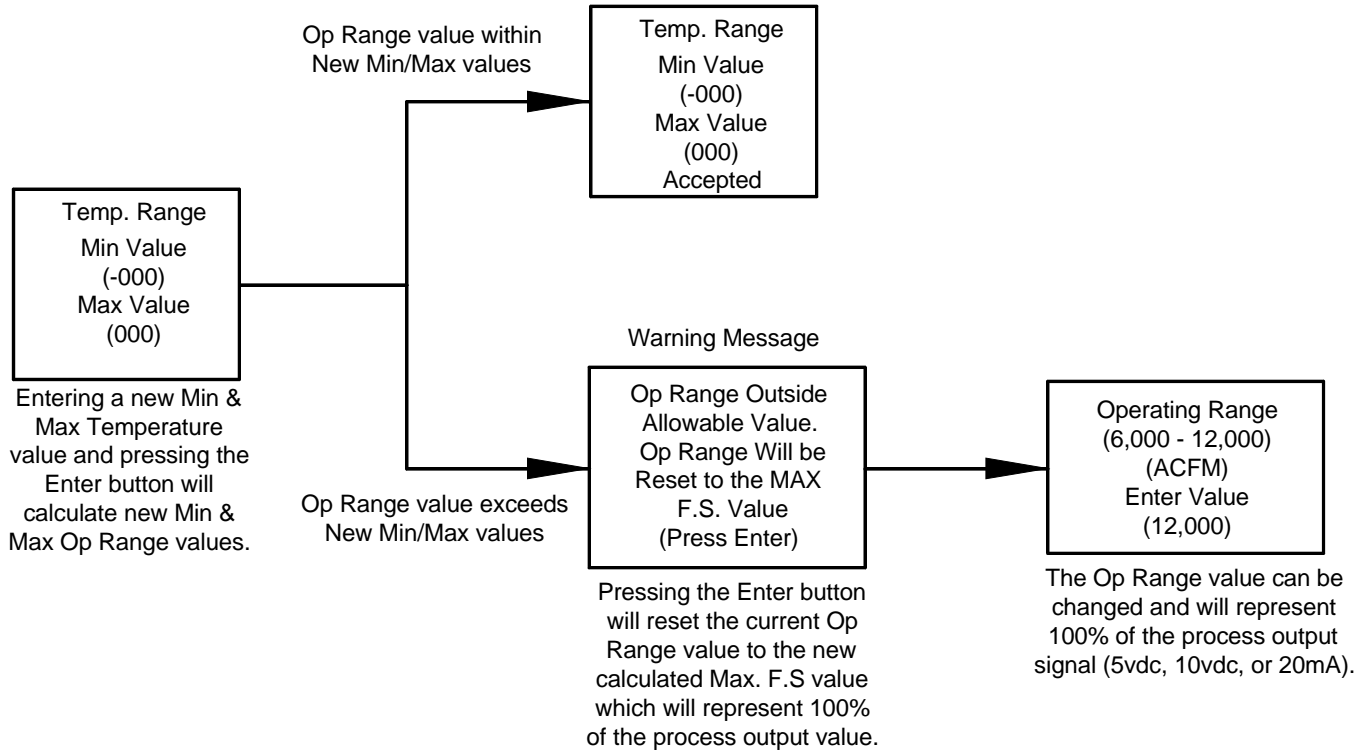
Warning Message:

Op Range Outside Allowable Value

Op Range will be Reset to the MAX F.S. Value

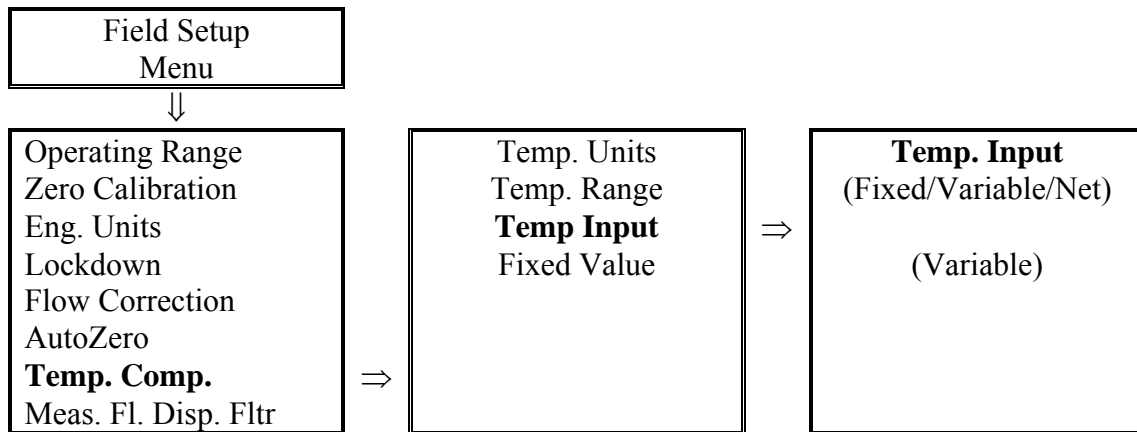
(Press Enter)

-Temperature Range Example-



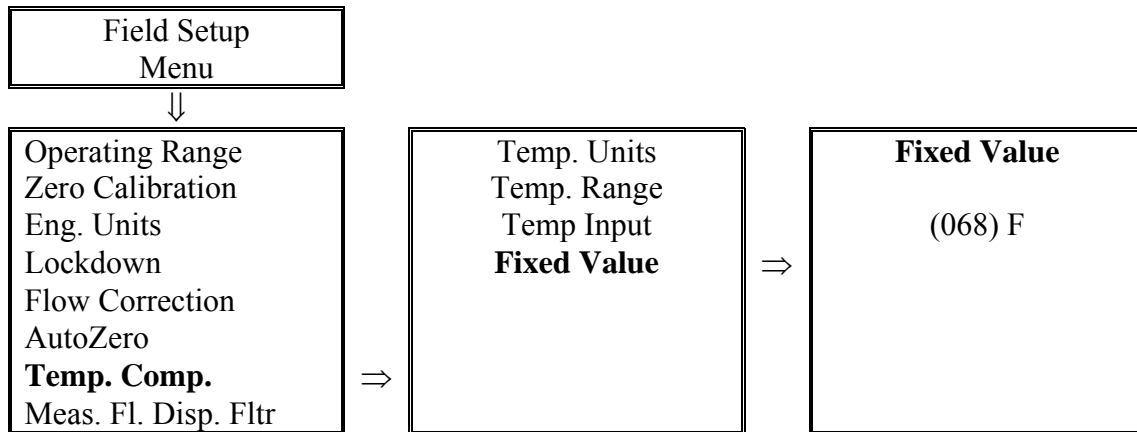
5.4.4. Temperature Input

The Temperature Input Menu allows the user to select between three temperature input options (Fixed, Variable, and Net) for the flow calculations. If Fixed is selected the default temperature value entered in the Fixed Value Menu (see Section 5.4.5) is used. The Standard Fixed Value is 68°F. If Variable is selected an external temperature input signal is required (see Sections 5.4.1 through 5.4.3). If Net is selected, the temperature input signal is obtained through network communications. The Net option is only available if one of the communication options is ordered (see Sections 9.12 through 9.14). The temperature value is only displayed on the LCD screen, if the Temperature Input is set to Variable or Net.



5.4.5. Fixed Value

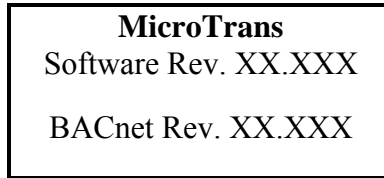
The Fixed Value Menu allows the user to enter a temperature value other than the standard value of 68°F for the flow calculations. This value will not be displayed on the LCD screen.



6. ACTIVE DISPLAYS & KEY FUNCTIONS

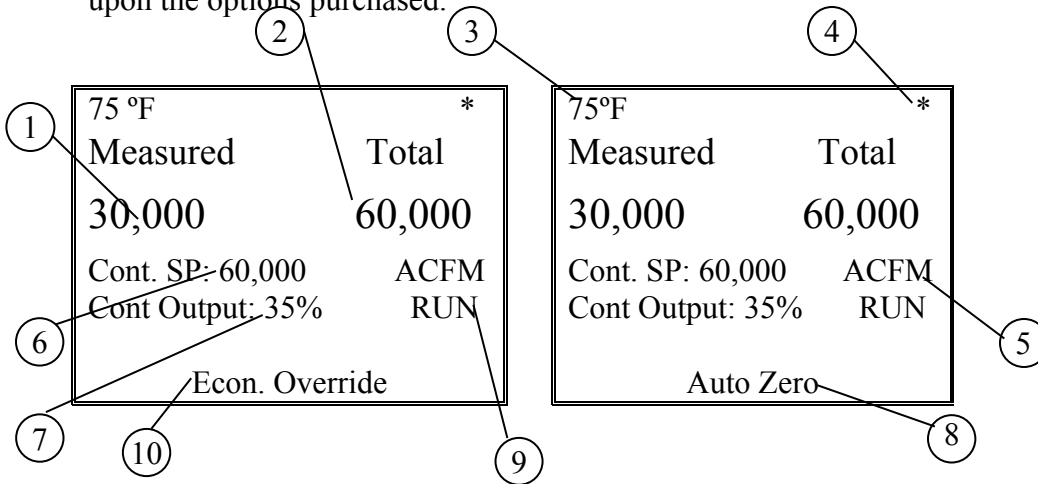
6.1. POWER-UP INITIATION DISPLAY

Upon initial power-up, Software Revision information will be displayed on the graphic display for approximately 5 seconds.



6.2. PROCESS DISPLAY DESCRIPTIONS

After power-up initialization, the following information will appear on the graphic display depending upon the options purchased.



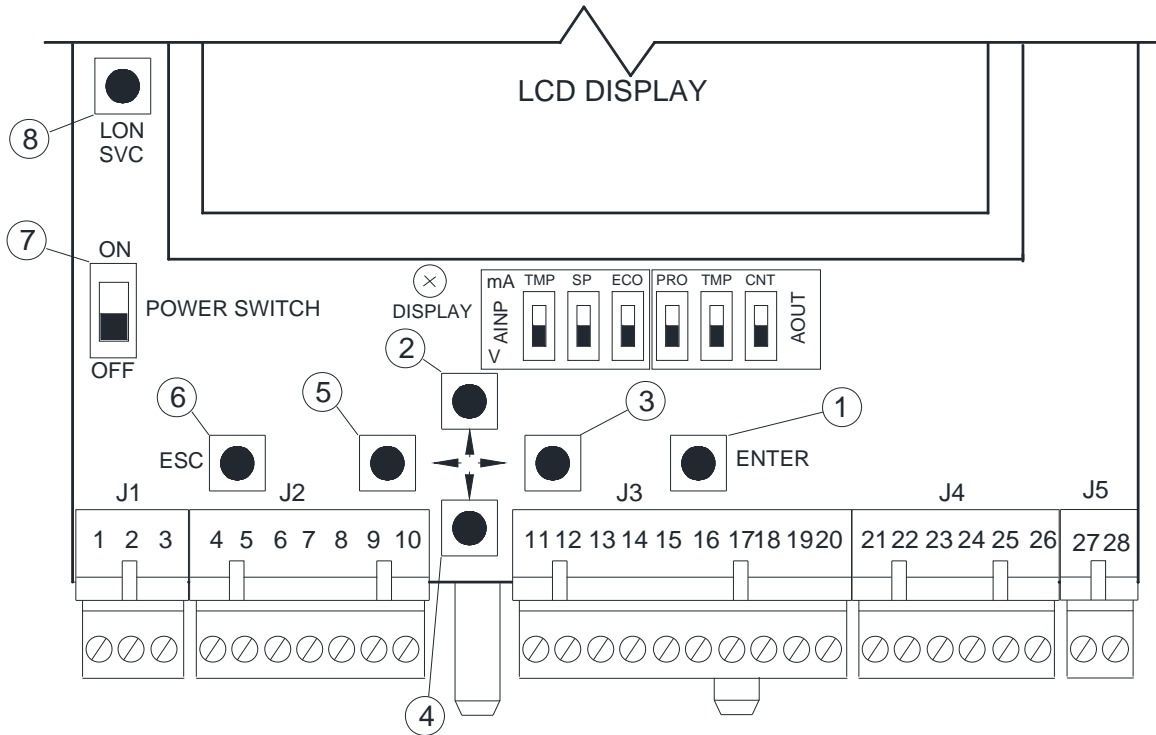
Flow Monitoring with Economizer Override

Flow Monitoring in Auto Zero Cycle

| Number | Description |
|--------|---|
| 1 | Measured Process Value (MT2 only) |
| 2 | Total Airflow Value (MT2 + EQ) |
| 3 | Air Flow Temperature Units in Degree F or C (Temperature Compensation Option) |
| 4 | Flashing Asterisk Indicates the CPU is Functioning |
| 5 | Engineering Units |
| 6 | Controller Setpoint Value (Total) |
| 7 | Controller Output Value |
| 8 | Displayed During an AutoZero Cycle (AutoZero Option) |
| 9 | System Start Status |
| 10 | Indicating System is in Economizer Override (Economizer Override Option) |

6.3. KEY FUNCTIONS

The following figure and description identify the function of each button.



| Number | Description |
|--------|---|
| 1 | Enter Key - Allows a user to enter into the Field Menu, enter into a selected menu item, or store into memory changes made to the program. |
| 2 | Up Key - Allows the user to scroll up in the menu list to a selected item or increase digits when making value changes. |
| 3 | Right Key - When making changes to user values the right key allows the user to scroll to the correct digit for changes. |
| 4 | Down Key - Allows the user to scroll down in the menu list to a selected item or decrease digits when making value changes. |
| 5 | Left Key - When making changes to user values the left key allows the user to scroll to the correct digit for changes. |
| 6 | Escape Key - The Escape key allows the user to back out of the menu to the Active Display. If a user starts to make a change and decides to cancel the change, the Escape key will allow the user to return to the Active Display without making the change. |
| 7 | Power Switch – Allows a user to turn power off to the MicroTrans ^{II} during field wiring or modifications to the device. |
| 8 | Lon Switch – Allows a user to send a unique Neuron device ID when connecting to a LonWorks communication network. |

7. DISPLAY MENUS

7.1. FIELD SETUP & TECH. CONFIGURATION MENUS

The following table shows the Field Setup and Tech. Configuration Menus for devices set to monitor Flow, Velocity, and Pressure. The display will vary depending upon the options purchased.

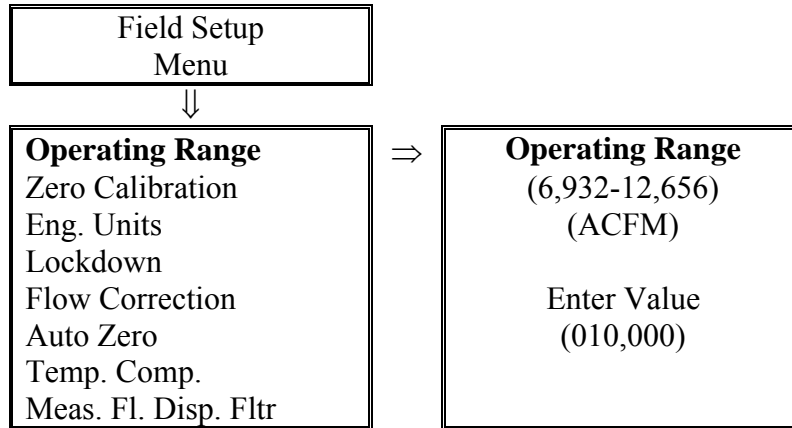
| MicroTrans^{II} Setup for Flow or Velocity | |
|---|---|
| Field Setup Menu (Press ENTER button) | Tech. Configuration Menu (Press UP/DOWN buttons simultaneously) (Enter Password number 1000) (Press ENTER button) |
| Operating Range | Controller Param |
| Zero Calibration | Area Factor |
| Eng. Units | Transducer Cal. |
| Lockdown | Ext. Flow source |
| Flow Correction | Ext. Flow Span |
| AutoZero | Altitude |
| Temp Comp. | Process Output Menu |
| Measured Flow Display Filter | Temp. Output Menu |
| External Flow Filter | Cont. Output Menu |
| Output Filter | Correction Coeff. |
| Alarm | 4PT Flow Corr |
| Factory Defaults | MAC Address |
| | Instance Number |
| | Modbus ID |
| | Baud Rate |
| | |
| | |

8. FIELD SETUP MENUS

(To enter the Field Setup Menu, depress and hold the Enter button for 5 seconds)

8.1. OPERATING RANGE

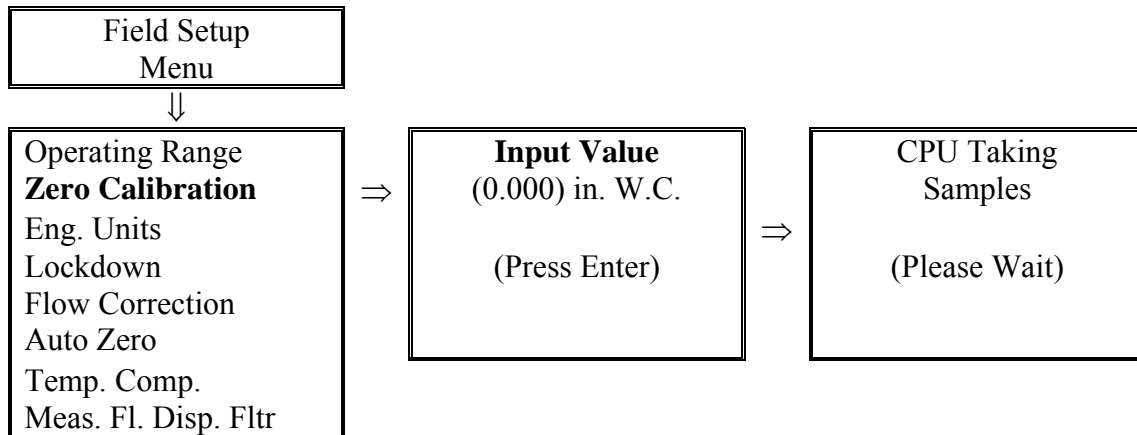
The Operating Range allows the user to enter a value which will represent 100% of the process output signal (5VDC, 10VDC, or 20mA). The menu will display the Maximum Full Scale Value possible for the user to enter as the Operating Range.



8.2. ZERO PRESSURE CALIBRATION

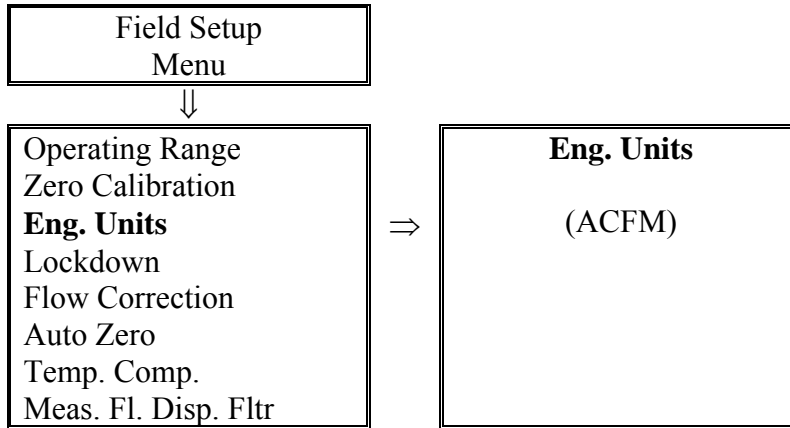
The Zero Calibration Menu allows the user to perform a zero transducer calibration to eliminate any transducer zero shift.

(Caution: Before performing a zero calibration, disconnect the Total (High) and Static (Low) pressure connections, perform a zero calibration and then reconnect the Total and Static pressure connections).



8.3. ENGINEERING UNITS

A list of engineering units are available for the user to select from for display purposes to meet customer requirements. Changing the engineering units will affect the process display and the alarm value menus.



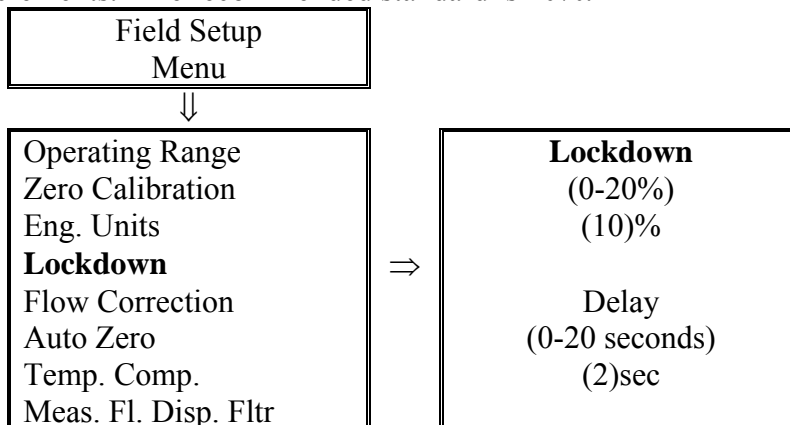
| Standard Flow Units | Actual Flow Units | Standard Velocity Units | Actual Velocity Units | Pressure Units |
|---------------------|---------------------|-------------------------|-----------------------|----------------|
| SCFM | ACFM | SFPM | AFPM | Inch w.c. |
| SCFH | L/S | Sm/s | Am/s | Pa |
| SL/S | Am ³ /S | % | % | KPa |
| Sm ³ /S | Am ³ /M | | | mm w.c. |
| Sm ³ /M | Am ³ /HR | | | % |
| Sm ³ /HR | % | | | |
| % | | | | |

8.4. LOCKDOWN

Due to the high square root gain associated with very low delta p values, the display and process output are locked to a zero value until the input value reaches the specified Lockdown Value that was entered. Above the Lockdown Value the output is linear to air flow. The following menus are only available if the MicroTrans^{II} is configured by Paragon at the time of order for flow or velocity.

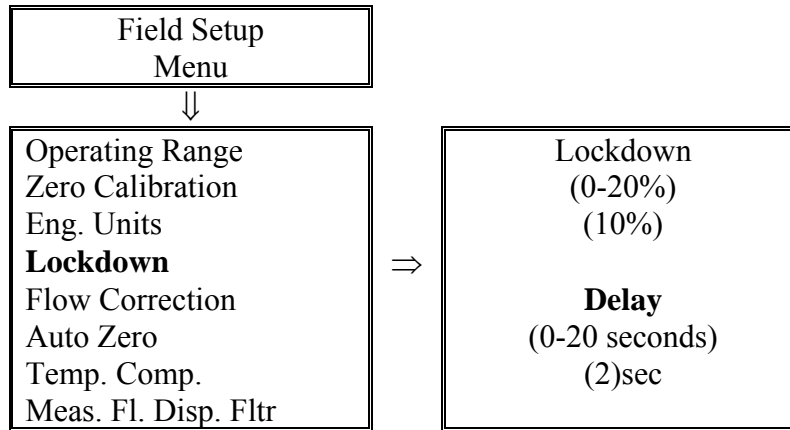
8.4.1. Lockdown Value

The Lockdown Value can be changed from 0 to 20% of Operating Range Value. Lockdown Values can be changed in 1% increments. The recommended standard is 10%.



8.4.2. Lockdown Delay

The Lockdown Delay Menu allows the user to enter a lockdown time delay (0-20 seconds) that will delay the display and output lockdown from occurring until the flow value or output value has remained below the lockdown value for that duration.

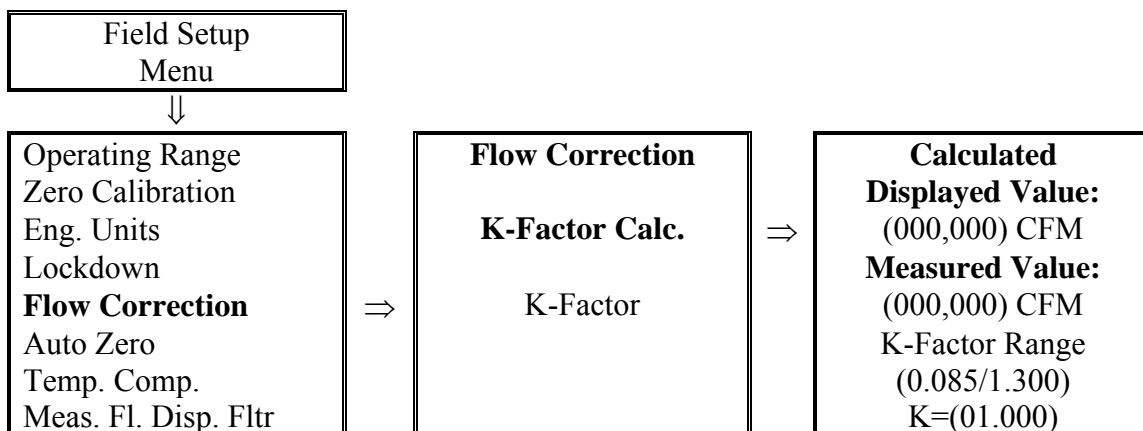


8.5. FLOW CORRECTION

The Flow Correction Menu was incorporated into the MicroTrans^{II} to give the user an easy way to make corrections to the display and output without changing the Op. Range Value entered by the factory or user. The Flow Correction Menu would be used to correct for a constant error from zero to the entered Op Range Value. The following menus are only available if the MicroTrans^{II} is configured by Paragon at the time of order for flow or velocity.

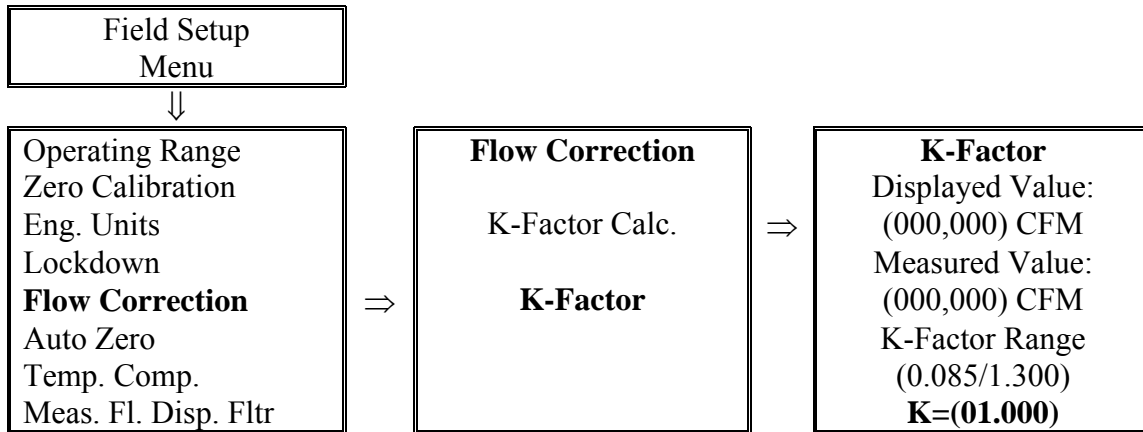
8.5.1. Flow Correction (K-Factor Calculator)

If the new K-factor Value needs to be calculated, select the K-Factor Calc. Menu, enter the MicroTrans^{II} Total Displayed Value and Total Measured Value (value measured by a balancer), press Enter and the % change will be calculated and stored as the new K-Factor Value.



8.5.2. Flow Correction (K-Factor)

If the user knows the % change required to match the balancers reading, select the K-Factor Menu and enter this value for the K-Factor. The minimum and maximum allowable K-Factor Value is displayed in the K-Factor Menu.



-FLOW CORRECTION EXAMPLE-

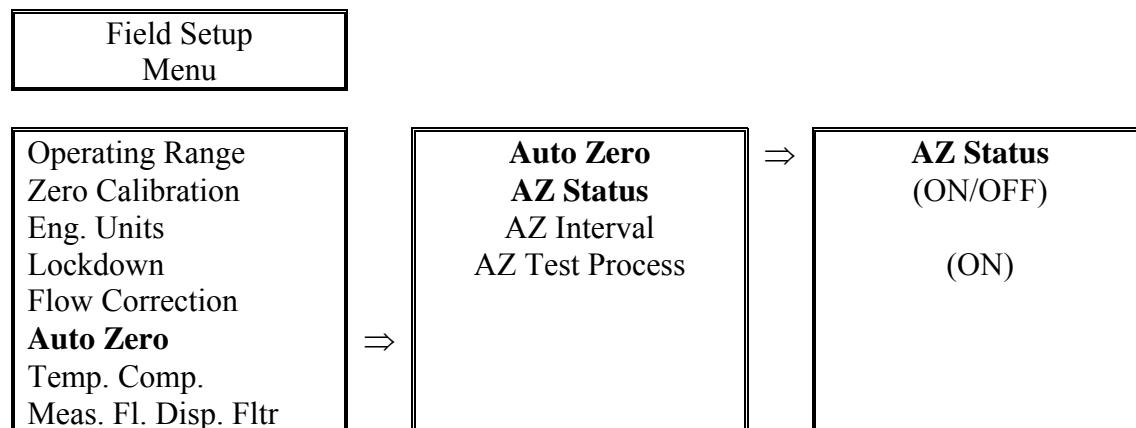
The balancer is consistently measuring a Total value of 9,500 CFM, which is 500 CFM less than the 10,000 CFM value on the MicroTrans^{II} display (Total). The user would then perform the following math function: Total Measured Value / Total Displayed Value = K-Factor so 9,500 CFM / 10,000 CFM = 0.950. The user would enter 0.950 for the K-Factor Flow Correction. If the K-Factor Calculator is used, the K-Factor Flow Correction would automatically update the K Factor.

8.6. AUTOZERO

The AutoZero option detects and corrects any zero offset caused by large ambient temperature changes. The following menus for configuration of AutoZero are only available if the AutoZero option is purchased.

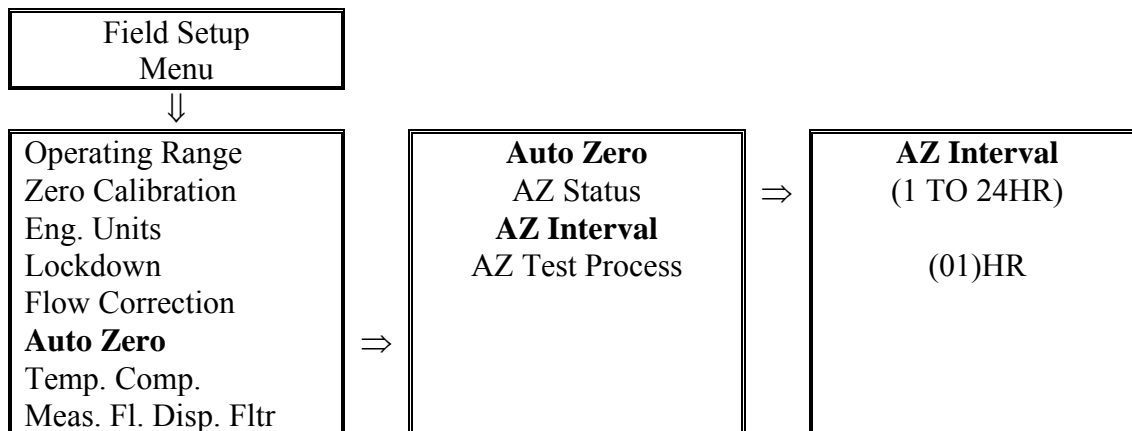
8.6.1. AutoZero Status

The AutoZero Status Menu allows the user to turn the AutoZero function ON or OFF.



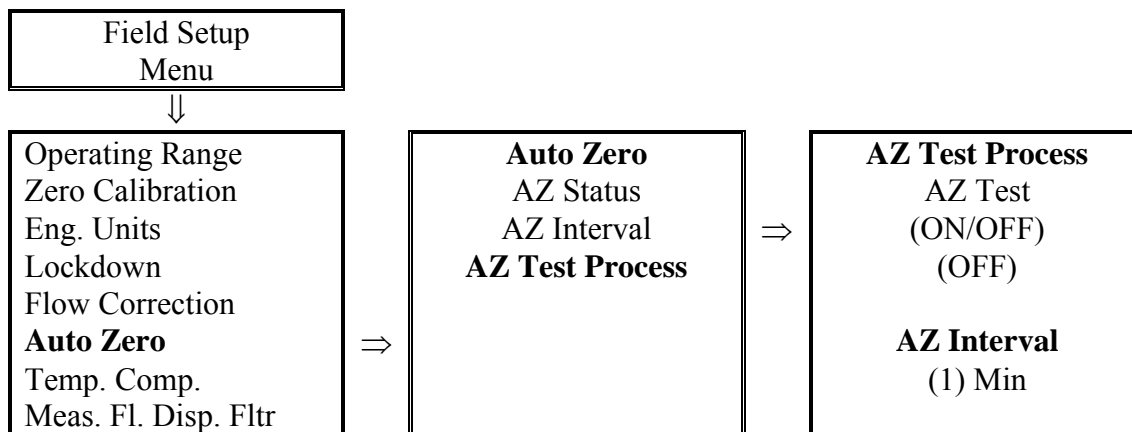
8.6.2. AutoZero Interval

The AutoZero Interval Menu allows the user to select the AutoZero Interval from once an hour to once a day in 1 hour increments. Use the UP/DOWN buttons to select the interval value. Upon device power up, an AutoZero cycle will occur after 20 seconds.



8.6.3. AutoZero Test Process

For troubleshooting or testing the AutoZero function, the AutoZero Test Process Menu allows the user to select an Auto Zero test frequency of once a minute to once every 30 minutes in 1 minute increments. Use the UP/DOWN buttons to select the interval value. If AutoZero Test Process is turned ON for more than 60 minutes, it will automatically default to OFF and the AutoZero Interval (see Section 8.6.2) will be reactivated.

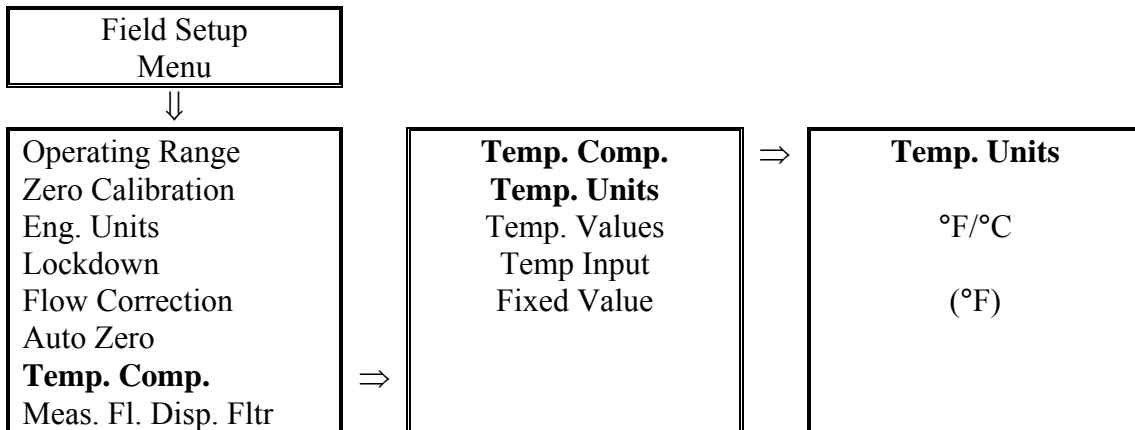


8.7. TEMPERATURE COMPENSATION

The Temperature Compensation option compensates the flow and velocity signal for density changes caused by variations in the process air temperature. The following menus for configuration of Temperature Compensation are only available if the Temperature Compensation option is purchased. Additionally, an input signal from an external temperature transmitter or the building automation system is required; see Section 3.2 for proper temperature transmitter connection and Section 4.1 for temperature input signal configuration.

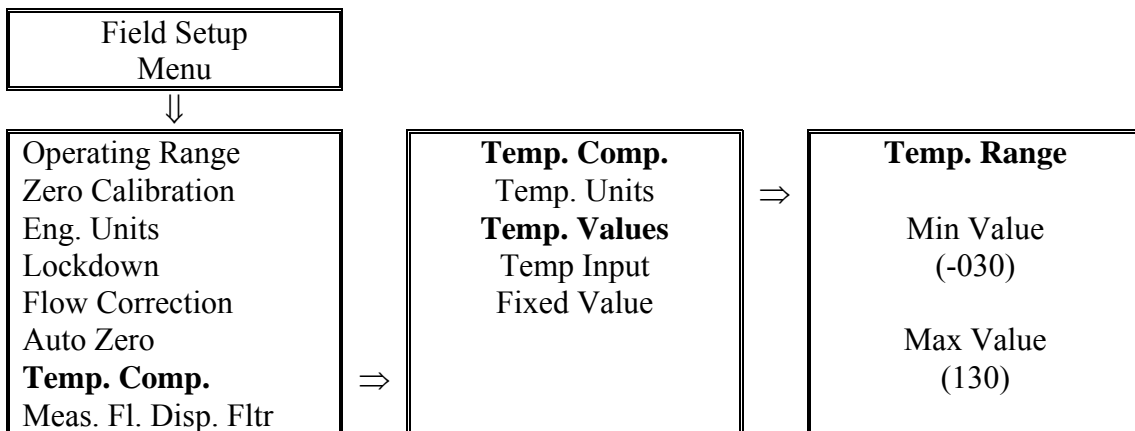
8.7.1. Temperature Units

The Temperature Units Menu allows the user to select the appropriate temperature units for the job.



8.7.2. Temperature Values

The Temperature Values Menu allows the factory or user to set the minimum and maximum temperature range values that represent the input signal from the external temperature transmitter or the building automation system.



If the new temperature values cause the existing Operating Range Value to be outside the new calculated Minimum or Maximum Full Scale Value, the below Warning Message will appear and the Operating Range will be reset to the new Maximum Full Scale Value by pressing Enter. The display will automatically jump to the Op Range Menu allowing the user to enter a new Operating Range Value. See Temperature Range Example below.

Warning Message:

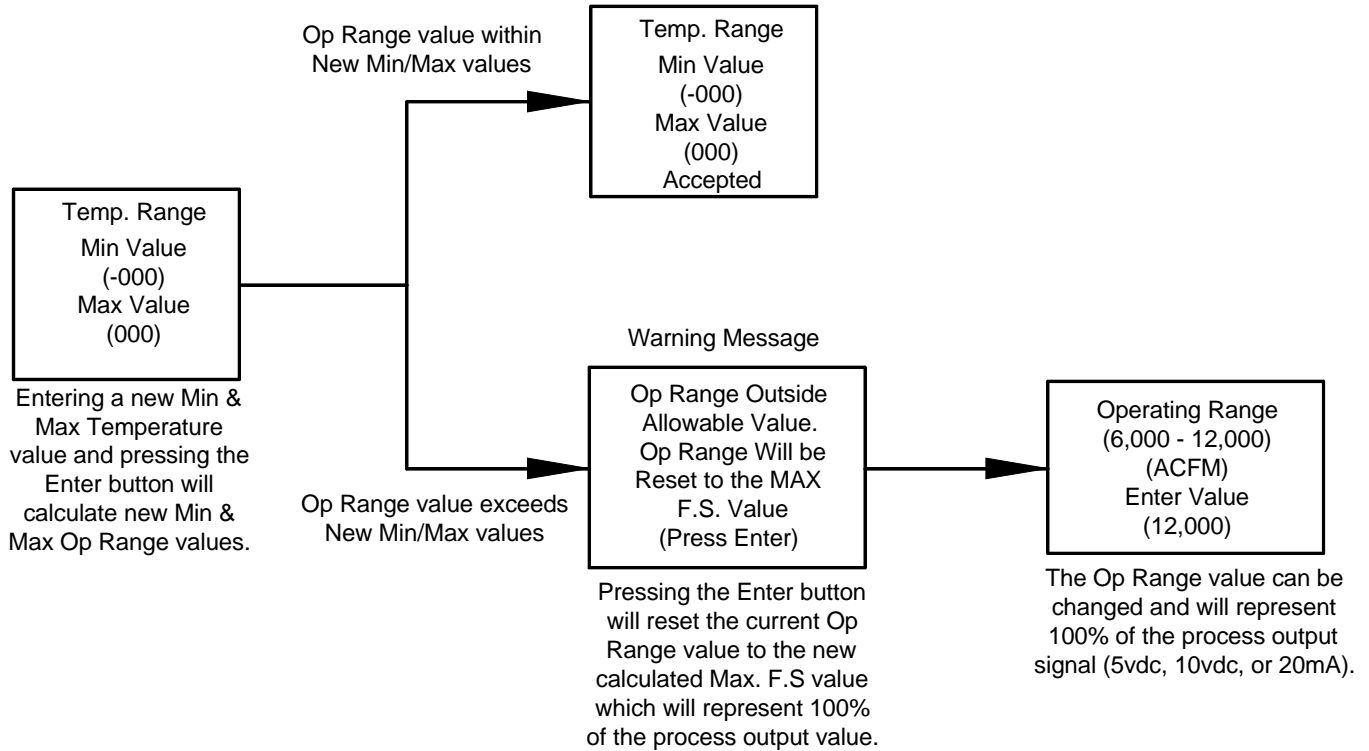
```

    Op Range Outside
    Allowable Value

    Op Range will be
    Reset to the MAX
    F.S. Value

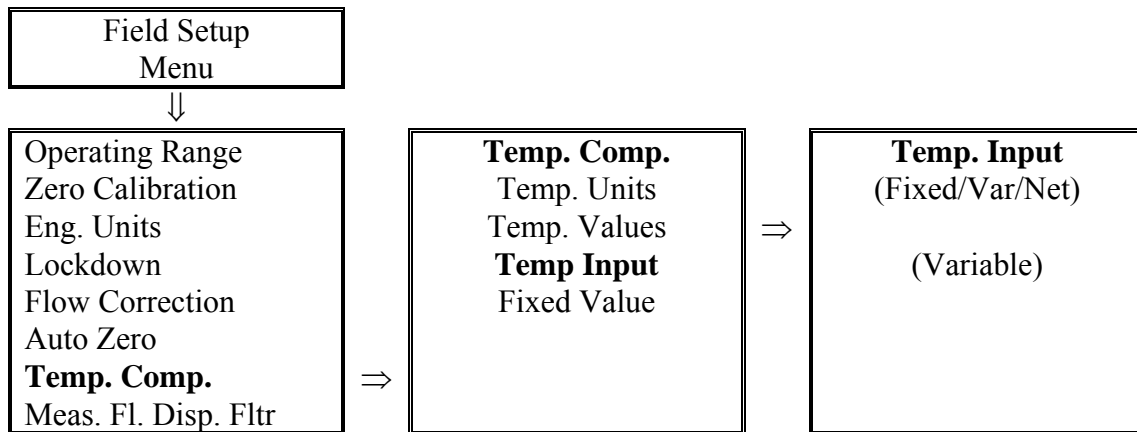
    (Press Enter)
    
```


-Temperature Range Example-



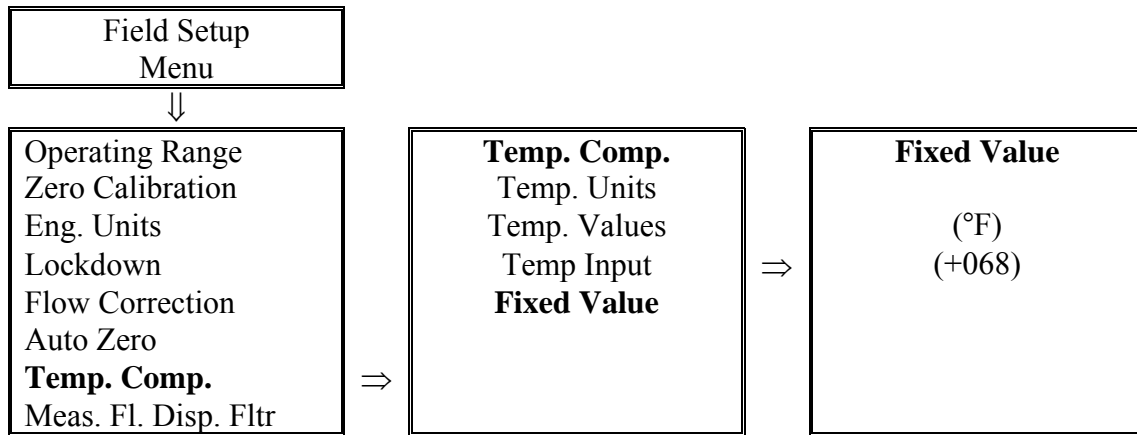
8.7.3. Temperature Input

The Temperature Input Menu allows the user to select between three temperature input options (Fixed, Variable, and Net) for the flow calculations. If Fixed is selected the default temperature value entered in the Fixed Value Menu (see Section 5.4.5) is used. The Standard Fixed Value is 68°F. If Variable is selected an external temperature input signal is required (see Sections 5.4.1 through 5.4.3). If Net is selected, the temperature input signal is obtained through network communications. The Net option is only available if one of the communication options is ordered (see Sections 9.12 through 9.14). The temperature value is only displayed on the LCD screen, if the Temperature Input is set to Variable or Net.



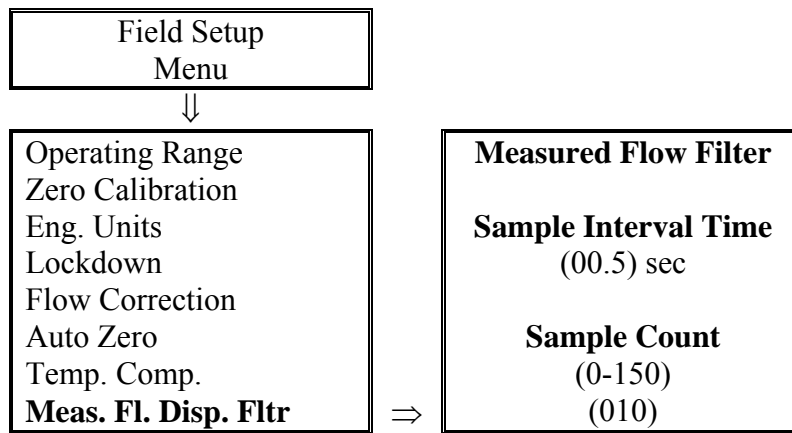
8.7.4. Fixed Value

The Fixed Value Menu allows the user to enter a temperature value other than the standard value of 68°F for the flow calculations. This value will not be displayed on the LCD screen.



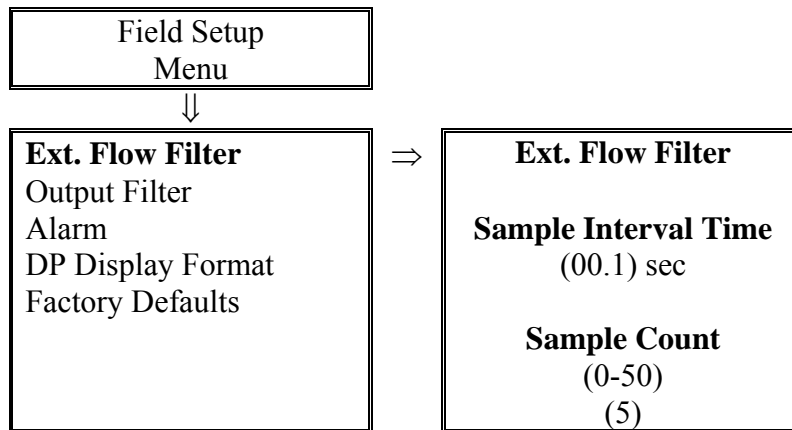
8.8. MEASURED FLOW DISPLAY FILTER

The Measured Flow Display Filter Menu allows the user to vary the Measured Flow Display Filter rolling average Sample Interval Time from 00.1 to 65.5 seconds and the Sample Count from 0 to 150. The Measured Flow Display Filter is independent of the Process Output Filter Value (see Section 8.9).



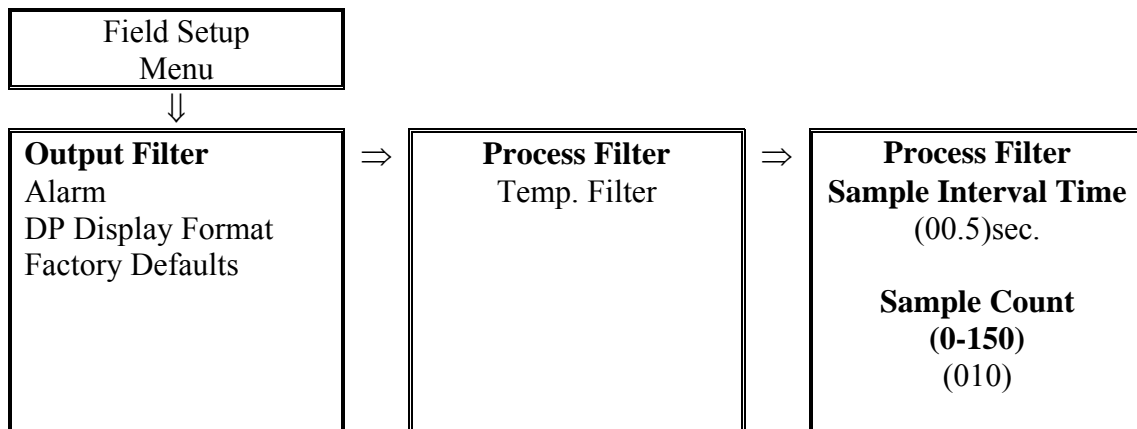
8.9. EXTERNAL FLOW DISPLAY FILTER

The External Flow Display Filter Menu allows the user to vary the External Flow Display Filter rolling average Sample Interval Time from 00.1 to 10 seconds and the Sample Count from 0 to 50.



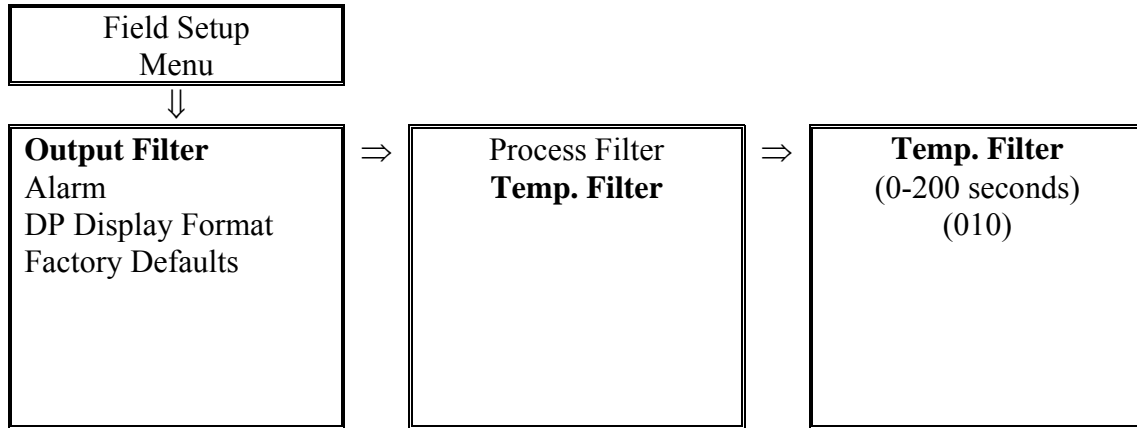
8.10. OUTPUT PROCESS FILTER

The Process Output Filter Menu allows the user to adjust the Process Output Filters rolling average algorithm by setting the Sample Interval Time value in seconds and the number of rolling average Sample Counts. The adjustment range of the Sample Interval Time is 0.10 to 65.5 seconds in 0.10 increments. The Sample Count range is 0 to 150 Sample Counts. The Process Output Filter is independent of the Display Filter.



8.11. OUTPUT TEMPERATURE FILTER

The Temperature Filter Menu allows the user to vary the Temperature Filter rate from 0 to 200 seconds.

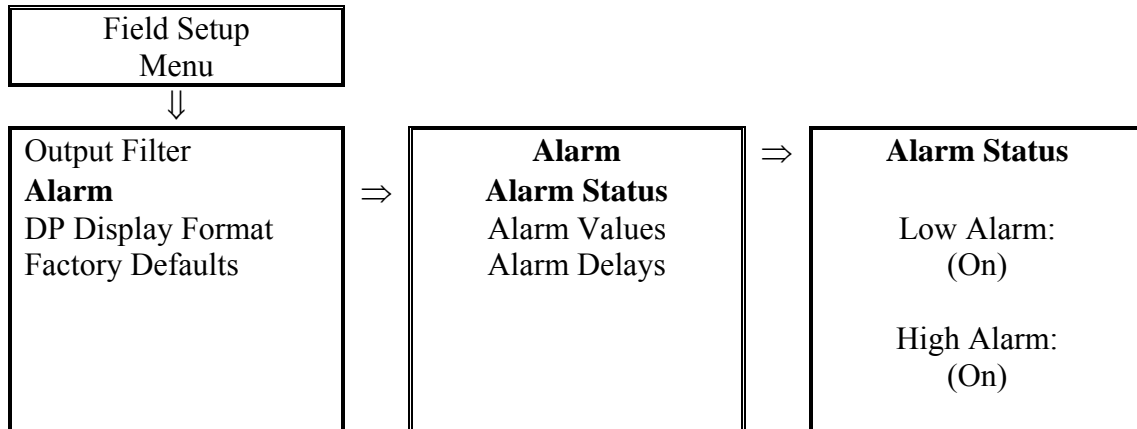


8.12. HIGH/LOW ALARM OPTIONS

The following menus for configuration of High/Low Alarms are only available if the High/Low Alarm option is purchased.

8.12.1. Alarm Status

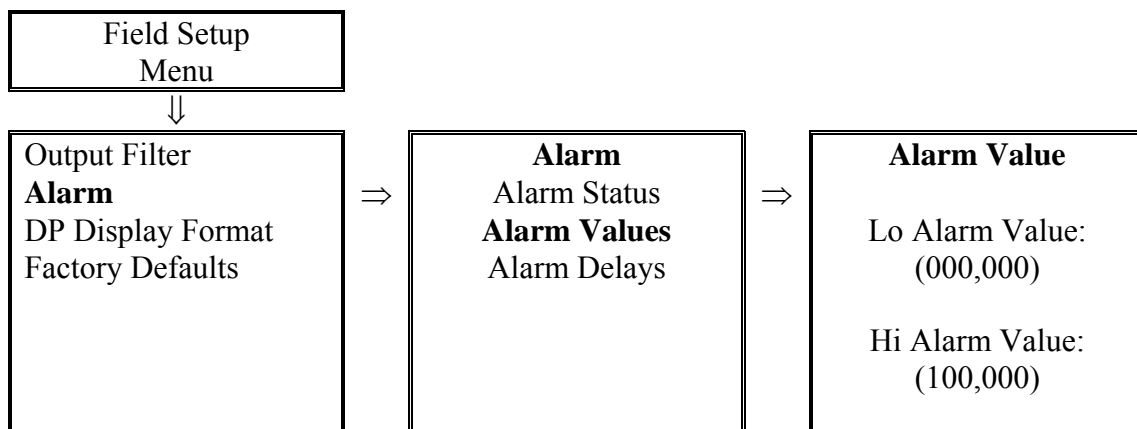
The Alarm Status allows the user to independently turn each alarm ON or OFF.



8.12.2. Alarm Values

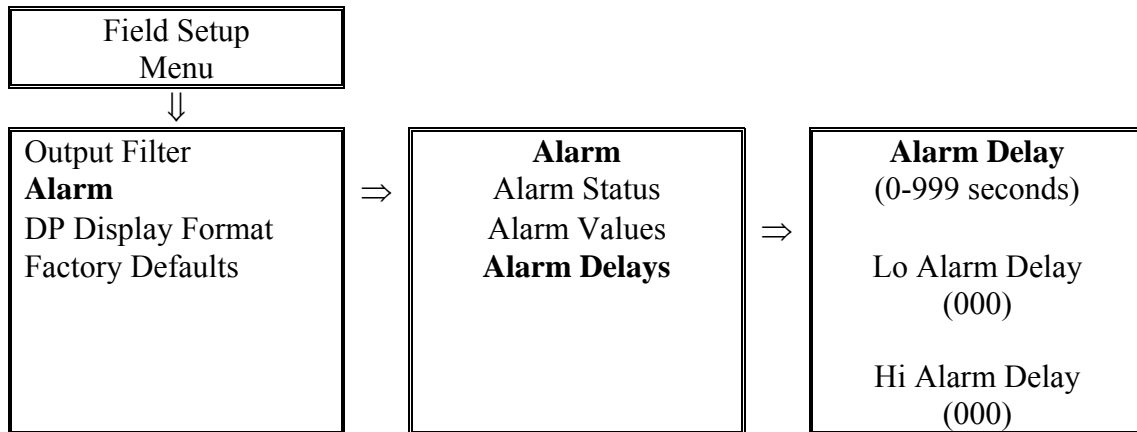
The Alarm Value Menu allows the user to enter the Low or the High flow or pressure alarm value. Alarm values will be displayed in the same engineering units selected in the Eng. Units Menu (see Section 8.3).

- **High Alarm Function:** The High Alarm activates if the flow or pressure exceeds the High Alarm value and resets when the flow or pressure drops below the High Alarm Value.
- **Low Alarm Function:** The Low Alarm activates if the flow or pressure drops below the Low Alarm Value and resets when the flow or pressure exceeds the Low Alarm Value.



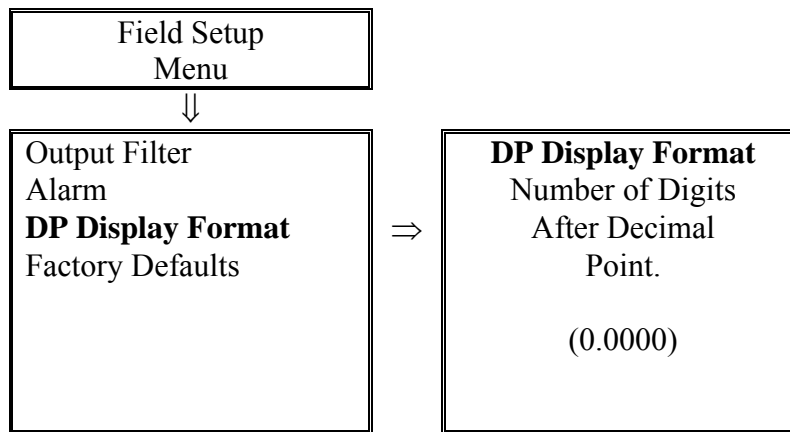
8.12.3. Alarm Delay

The Alarm Delay Menu allows the user to enter an alarm delay of 0 to 999 seconds before an alarm will be activated. The alarm will be reset without a delay.



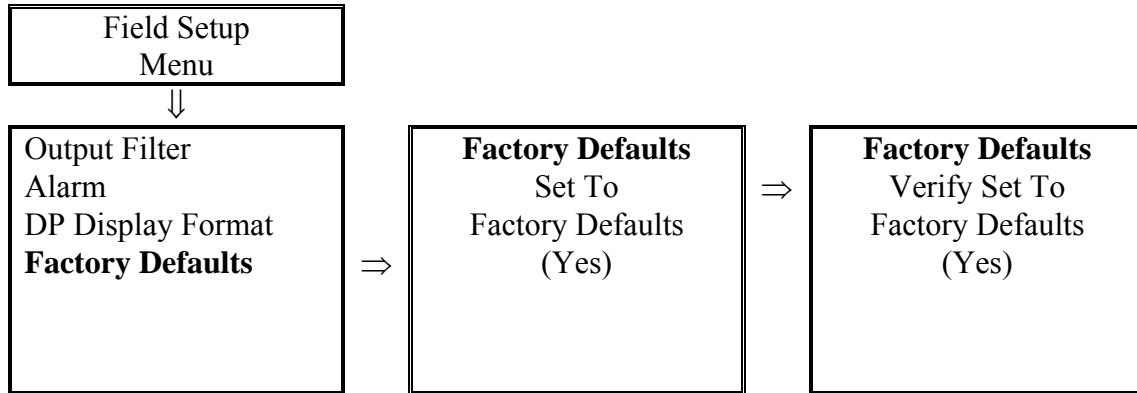
8.13. DP DISPLAY FORMAT

The DP Display Format Menu is only available when the MicroTrans^{II} is configured by Paragon at the time of order for pressure; it allows the user to change the number of digits shown to the right of the decimal point. Selections are 0 to 4 digits. Use the UP/DOWN buttons to move the decimal point to the left or right.



8.14. FACTORY DEFAULTS

If pressure calibration changes have been made incorrectly to the MicroTrans^{II} program, all pressure calibration values and device settings can be restored to the original factory settings by selecting YES and pressing Enter in both the Set To Factory Defaults Menu and the Verify Set To Factory Defaults Menus (See Factory Defaults table below for a list of Saved Settings).



| Item | Factory Saved Setting | Item | Factory Saved Setting |
|------|-------------------------------------|------|---------------------------|
| 1 | All Factory Calibration Points (12) | 16 | Display Filter |
| 2 | All Controller Parameters | 17 | Process Output Filter |
| 3 | Area Factor | 18 | Temperature Output Filter |
| 4 | Operating Range | 19 | DP Display Format |
| 5 | 4 Pt Flow Correction | 20 | Process Output Cal |
| 6 | Altitude | 21 | Temperature Output Cal |
| 7 | K-Factor | 22 | Controller Output Cal |
| 8 | Lockdown & Delay Values | 23 | AutoZero Status |
| 9 | Flow Correction | 24 | AutoZero Interval |
| 10 | Correction Coefficient | 25 | Temp. Units |
| 11 | Min. & Max. Temp Range Values | 26 | Temp. Input |
| 12 | Alarm Status | 27 | Temp. Fixed Value |
| 13 | Alarm Values | 28 | Baud Rate |
| 14 | Alarm Delay | 29 | MAC Address |
| 15 | Engineering Units | 30 | Instance Number |

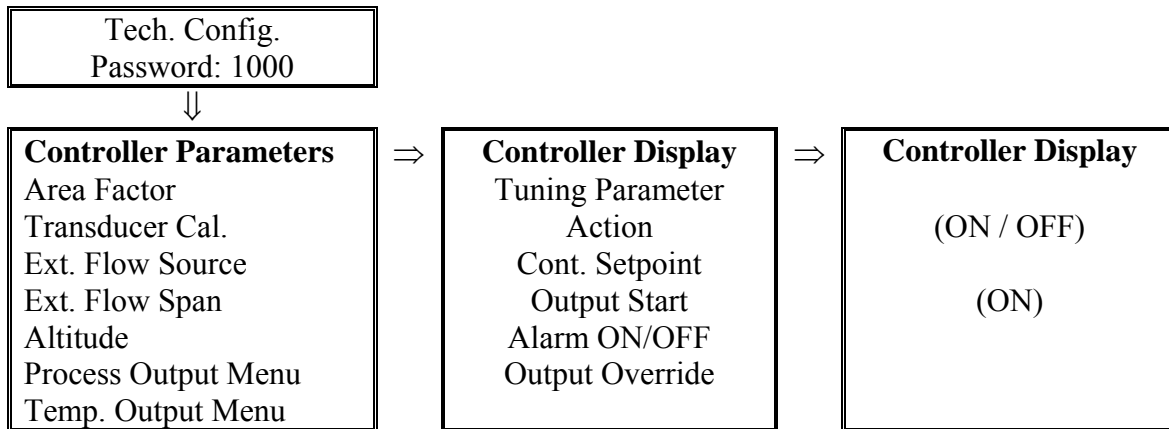
9. TECH CONFIGURATION MENUS

To enter the Tech Configuration Menu, press the UP/DOWN buttons simultaneously, enter password number 1000 and press the Enter button.

9.1. CONTROLLER PARAMETERS

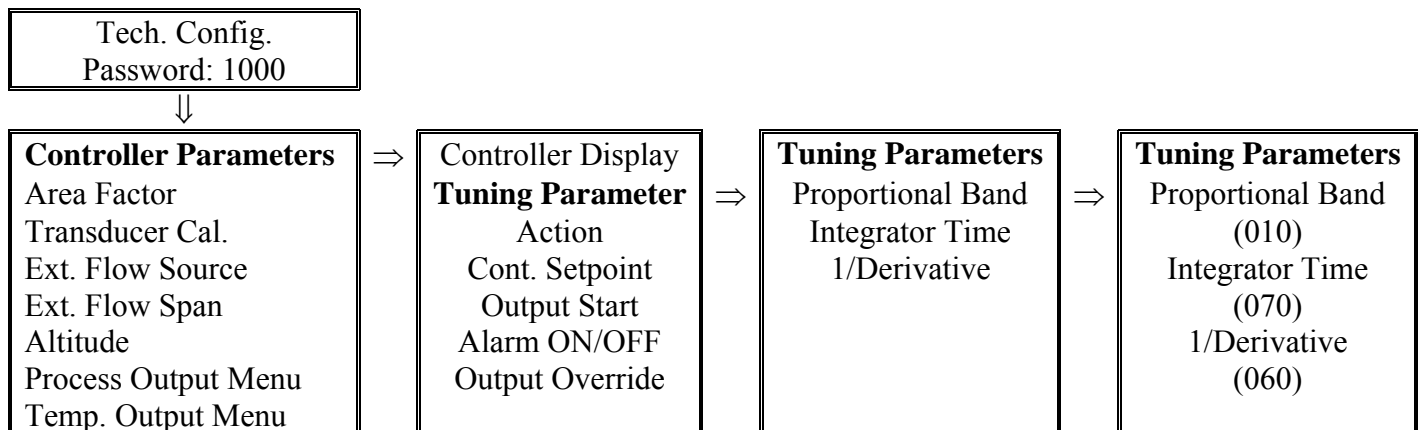
9.1.1. Controller Display

The Controller Display Menu allows the user to turn the controller function and controller display data ON and OFF.



9.1.2. Tuning Parameters

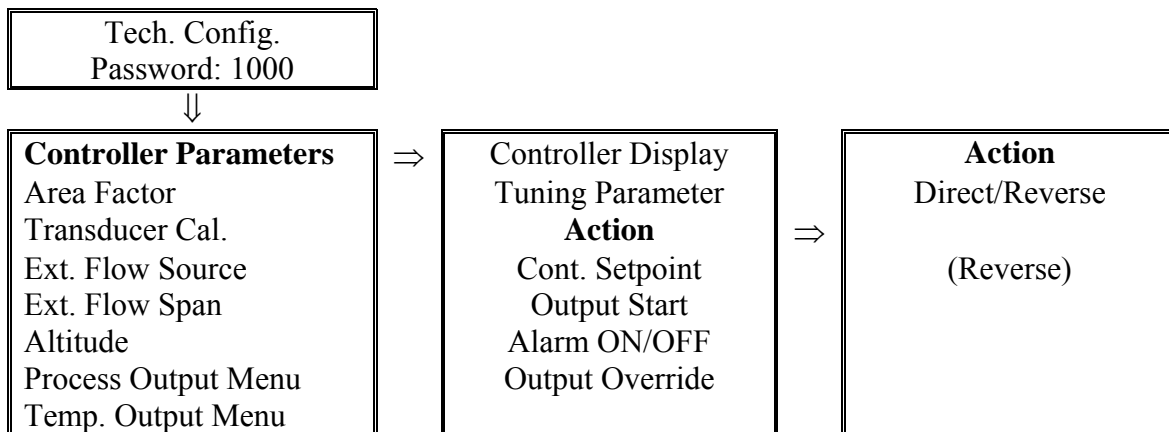
The Tuning Parameters Menu allows the user to tune the controller parameters to match the system dynamics. The Proportional Band value can be entered as a percent value from 1 to 100%. Reset and Inverse Derivative values will range from 0 to 300 seconds. Decreasing any of the three tuning parameter values will cause the controller's response to speed up. Default values will be Proportional Band = 10%, Reset (Integrator Time) = 70 seconds and Inverse Derivative = 60 seconds.



9.1.3. Action

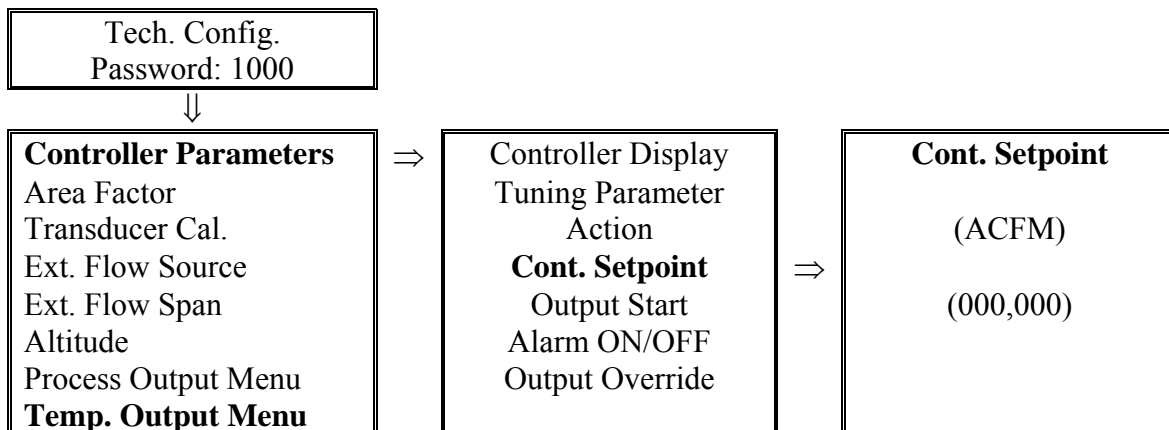
The Action Menu allows the user to select between Direct and Reverse Action. The controller Action for various applications is listed in the below table.

| Process Controlled | Control Variable | Action |
|------------------------|--------------------------|---------|
| Flow | Fan Variable Speed Drive | Reverse |
| Flow | Normally Closed Damper | Reverse |
| Flow | Normally Open Damper | Direct |
| Negative Duct Pressure | Fan Variable Speed Drive | Direct |
| Negative Duct Pressure | Normally Closed Damper | Direct |
| Negative Duct Pressure | Normally Open Damper | Reverse |
| Positive Duct Pressure | Fan Variable Speed Drive | Reverse |
| Positive Duct Pressure | Normally Closed Damper | Reverse |
| Positive Duct Pressure | Normally Open Damper | Direct |



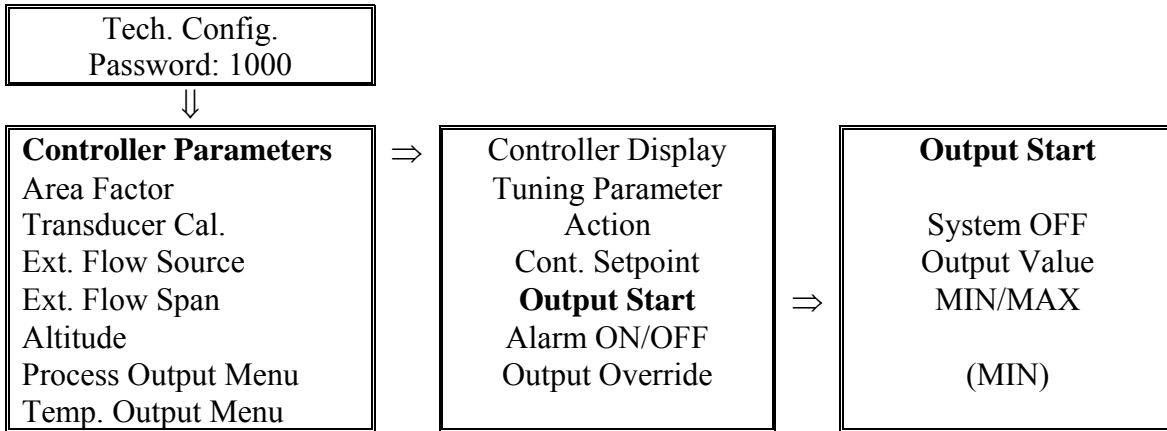
9.1.4. Controller Setpoint (Internal Value)

The Controller Setpoint Menu allows the user to enter an Internal Setpoint Value. The acceptable setpoint range is 0 to the Operating Range Value entered.



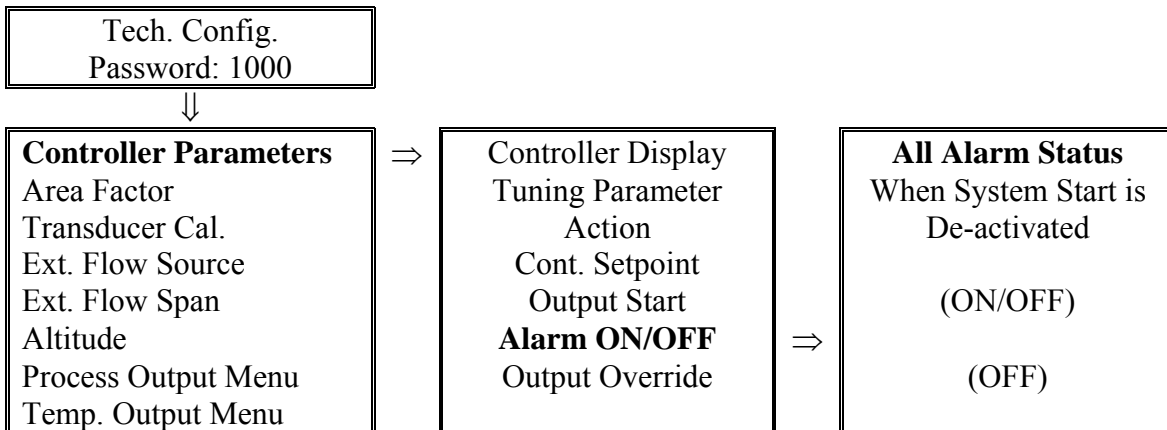
9.1.5. Output Start

The Output Start Menu allows the user to select the output condition when the System Start input is not active. If MIN is selected, the output will start at 0VDC (4mA) and modulate from there. If MAX is selected, the output will start at 10VDC (20mA) and modulate from there.



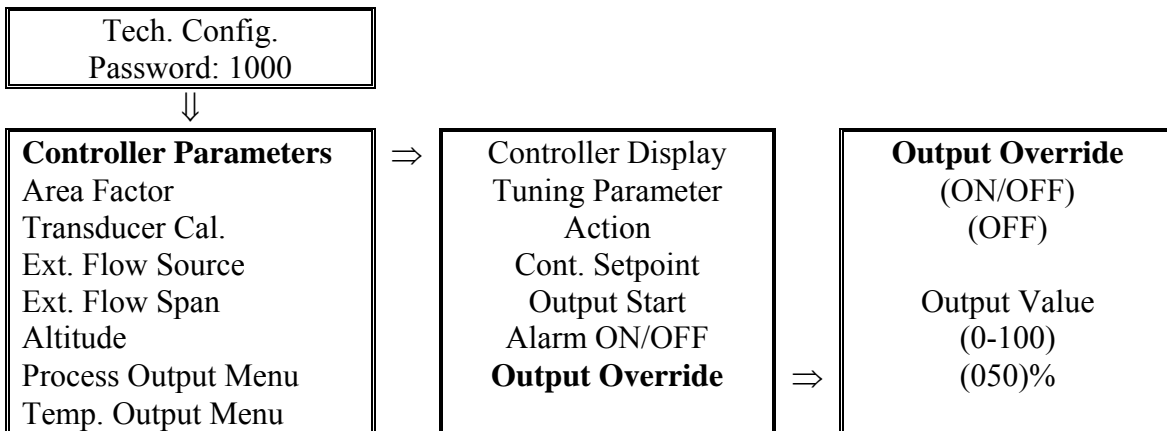
9.1.6. Alarm On/Off

The Alarm ON/OFF menu allows the user to determine if all alarms will be active (ON) or inactive (OFF) when the System Start input is de-activated.



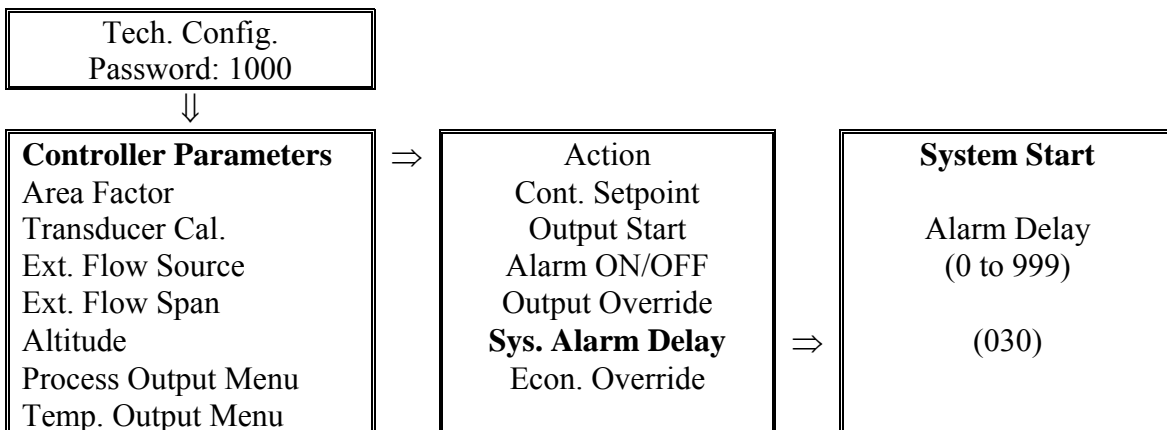
9.1.7. Output Override

The Output Override Menu allows the user to manually set the controller output to a fixed value.



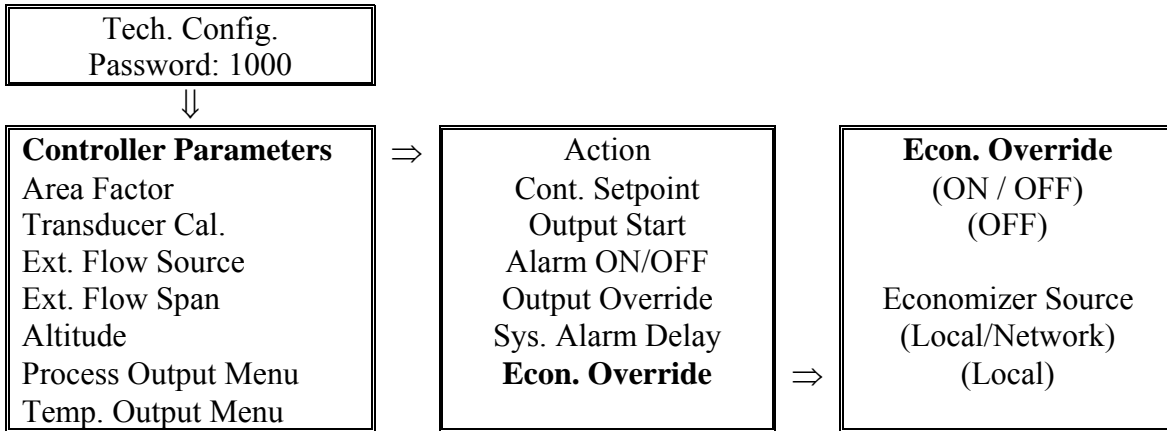
9.1.8. System Alarm Delay

The System Alarm Delay Menu allows the user to enter an alarm delay value in seconds that will start after the System Start Input is activated.



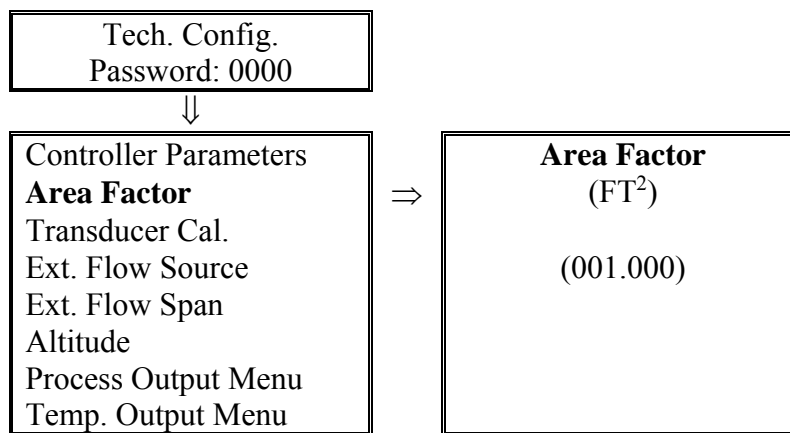
9.1.9. Economizer Override

The Economizer Override Menu allows the user to enable or disable the Economizer Override function. If enabled, the economizer analog input signal (0-10vdc/4-20mA) is compared to the controller output value and the highest value is sent as the controller output value. Enabling the Economizer Override function will cause the text “Econ. Override” to be shown at the bottom of the display. The Economizer Override Menu also allows the user to select between two Economizer input options (Local and Network). If Local is selected, the transmitter receives a 0-10vdc or 4-20mA analog input economizer signal. If Network is selected, the economizer input signal is obtained through network communications. The Network option is only available if one of the communication options is ordered.



9.2. AREA FACTOR

The Area Factor Menu allows the user to enter or modify an existing Area Factor. The Area Factor Menu is only available if the MicroTrans^{II} is configured by Paragon at the time of order for flow or velocity and for input from a non-amplified Pitot-type flow sensor.



If the new Area Factor causes the existing Operating Range Value to be outside the new calculated Minimum or Maximum Full Scale Value, the below Warning Message will appear and the Operating Range will be reset to the new Maximum Full Scale Value by pressing Enter. The display will automatically jump to the Op Range Menu allowing the user to enter a new Operating Range Value. This can be accomplished by performing the steps under Section 5.2. See Area Factor Example below.

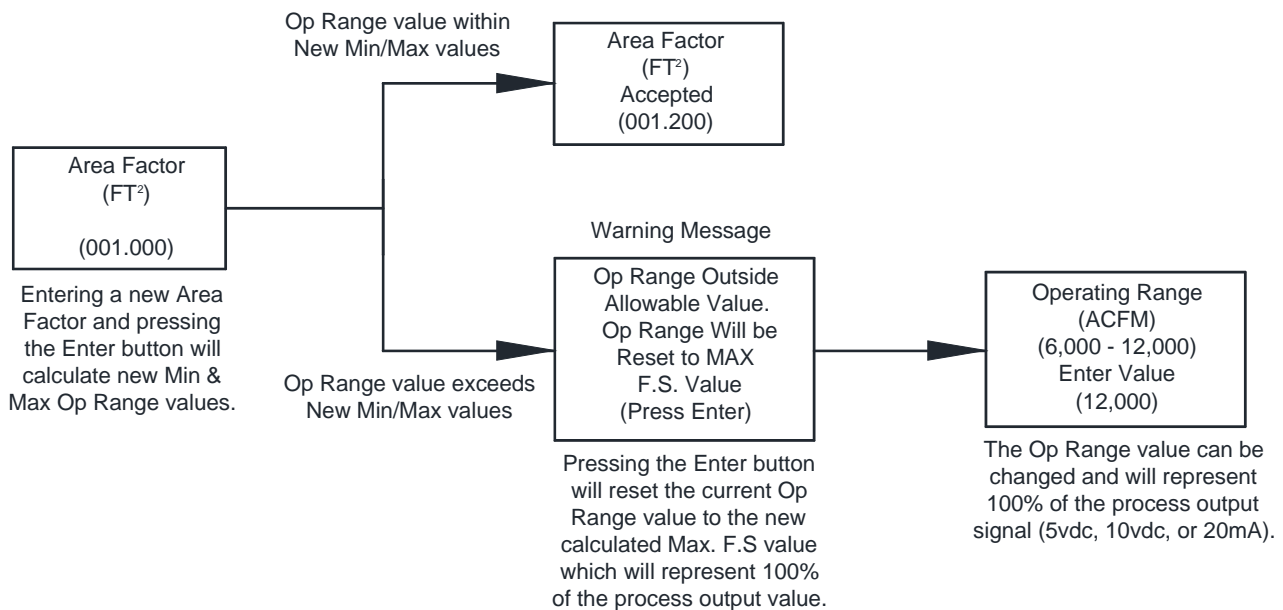
Warning Message:

Op Range Outside Allowable Value

Op Range will be Reset to the MAX F.S. Value

(Press Enter)

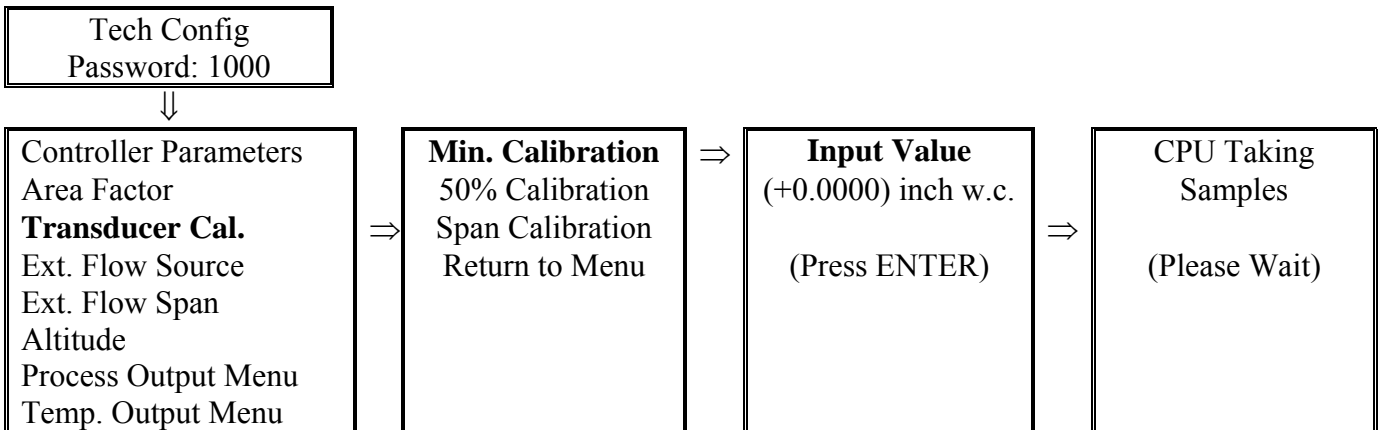
-Area Factor Example-



9.3. TRANSDUCER CALIBRATION

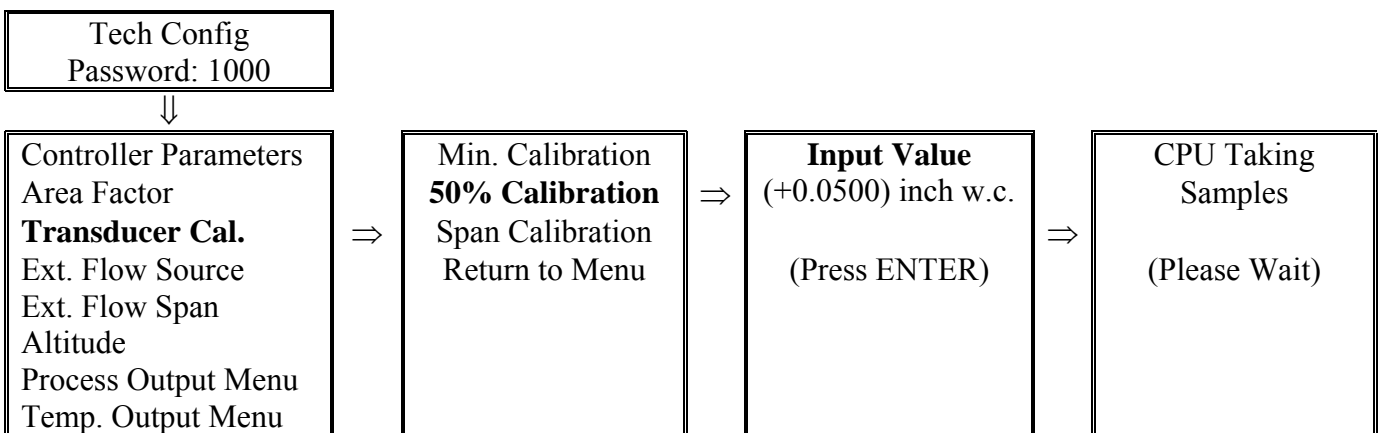
9.3.1. Minimum Calibration

The Minimum Calibration Menu allows a user to perform a minimum transducer calibration. This value will be placed in a different memory location and used until a Return to Factory Defaults is selected (see Section 8.12). **(Caution: Before performing a minimum calibration, disconnect the Total (High) and Static (Low) Pressure connections, perform a minimum calibration and then reconnect the Total and Static Pressure connections).**



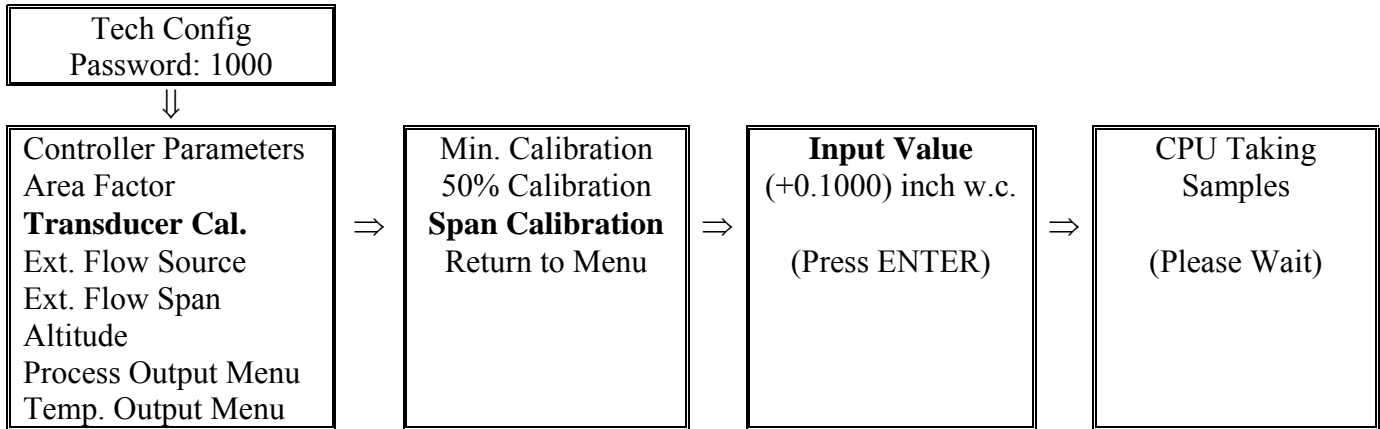
9.3.2. 50% Calibration

The 50% Calibration Menu is only available when the MicroTrans^{II} is configured by Paragon at the time of order for pressure; it allows a user to perform a 50% transducer calibration to eliminate zero drift in a bipolar transducer. This value will be placed in a different memory location and used until a Return to Factory Defaults is selected (see Section 8.12).



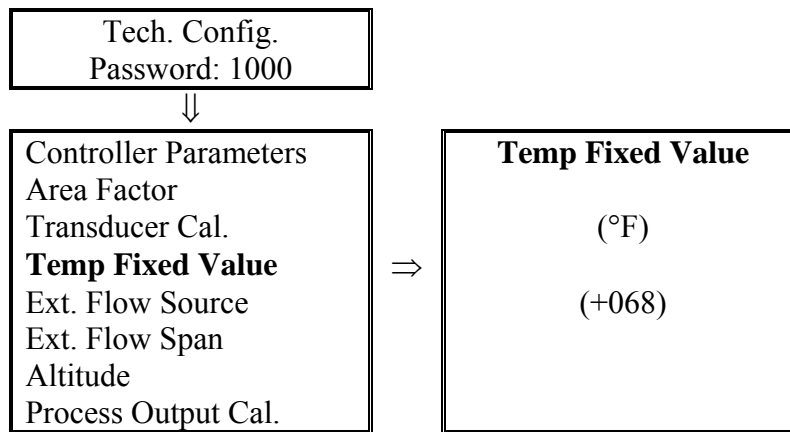
9.3.3. Span Calibration

The Span Calibration Menu allows the user to perform a span transducer calibration to eliminate any possible transducer drift. This value will be placed in a different memory location than the Factory Span memory location and used until a Return to Factory Defaults is selected (see Section 8.12).



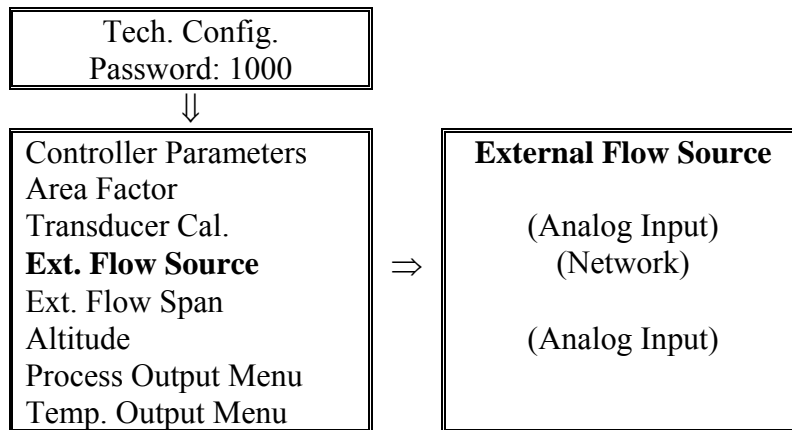
9.4. TEMPERATURE FIXED VALUE (NO TEMP COMP OPTION)

When the Temperature Compensation option (see Section 8.7) is not ordered, the Temperature Fixed Value Menu allows the user to enter a temperature value other than the standard value of 68°F for the density calculations. This value will not be displayed on the LCD screen.



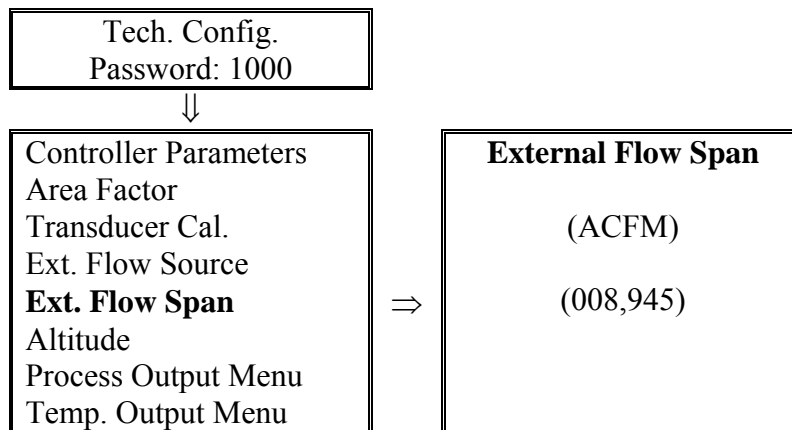
9.5. **EXTERNAL FLOW SOURCE**

The External Flow Source menu allows the user to select between an external airflow source (4-20mA / 0-10 VDC input) or receive an external airflow value from the network.



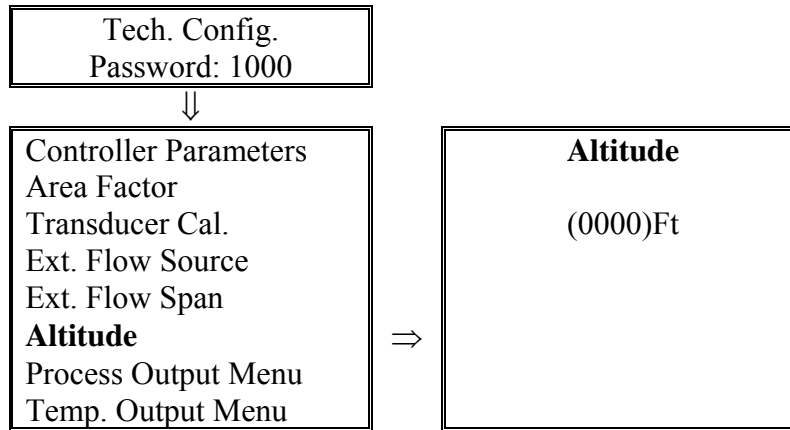
9.6. **EXTERNAL FLOW SPAN**

The External Flow Span menu allows the user to enter a flow span value which corresponds with the maximum external flow input (20mA / 10 VDC).



9.7. ALTITUDE

The Altitude Menu allows user to enter the specific altitude for the job other than the standard value of 0 feet above mean sea level for the density calculations.



If the new Altitude causes the existing Operating Range Value to be outside the new calculated Minimum or Maximum Full Scale Value, the below Warning Message will appear and the Operating Range will be reset to the new Maximum Full Scale Value by pressing Enter. The display will automatically jump to the Op Range Menu allowing the user to enter a new Operating Range Value. This can be accomplished by performing the steps under Section 5.2. See Altitude Example below.

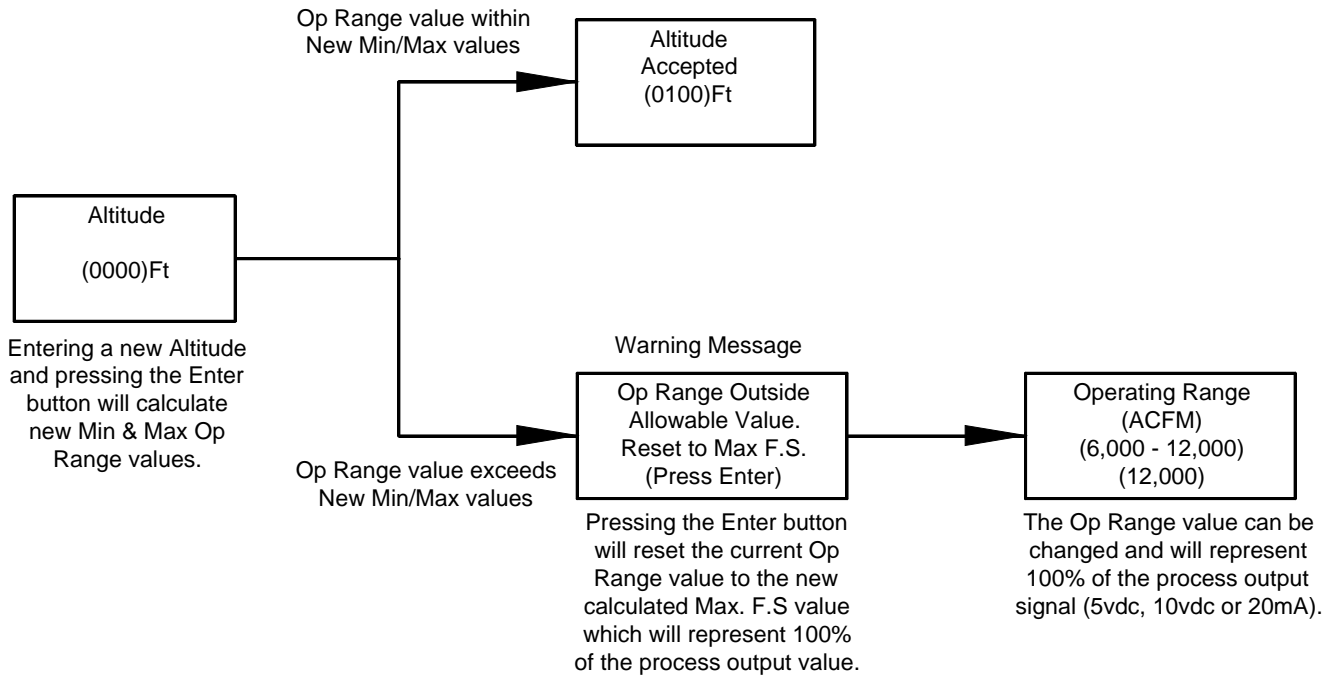
Warning Message:

Op Range Outside
Allowable Value

Op Range will be
Reset to the MAX
F.S. Value

(Press Enter)

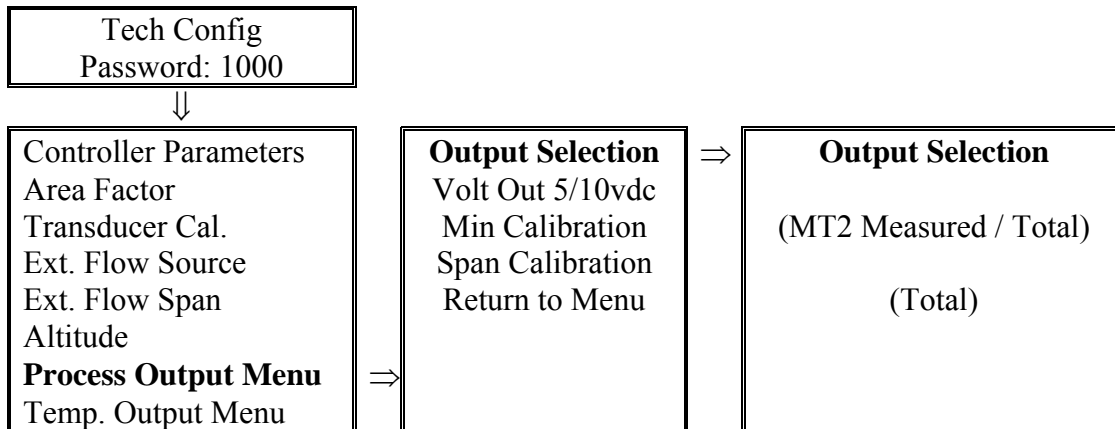
-Altitude Example-



9.8. PROCESS OUTPUT MENU

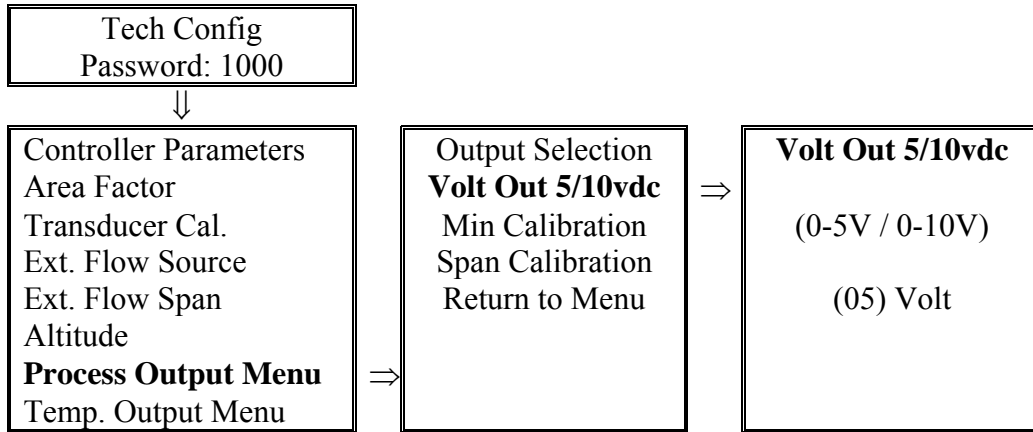
9.8.1. Output Selection

The Output Selection Menu allows the user to select either the MT2 Measured signal or the Total summed signal to be available at the Process Output (see section 3.1, J2 pins 4 & 5).



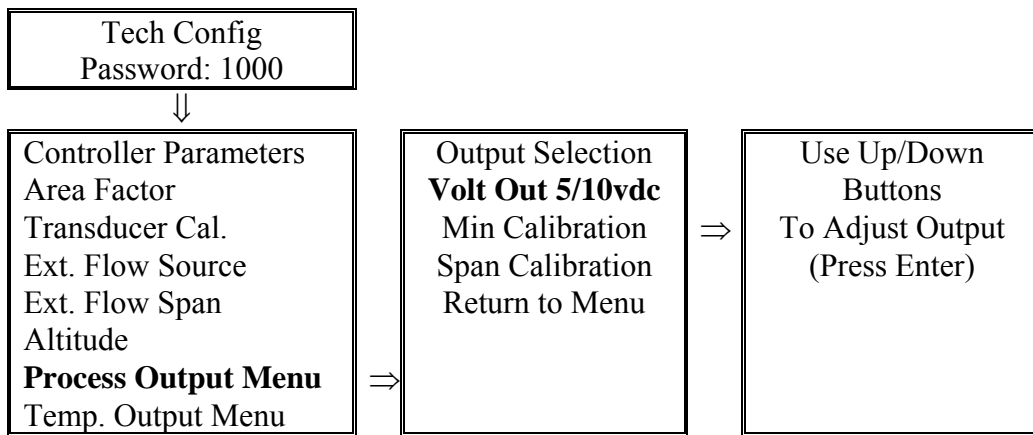
9.8.2. Voltage Output Level Select

The Voltage Output Level Selection Menu allows the user to select either 0-5VDC or 0-10VDC for the Process Output voltage signal. See Section 4.4 for switch selection.



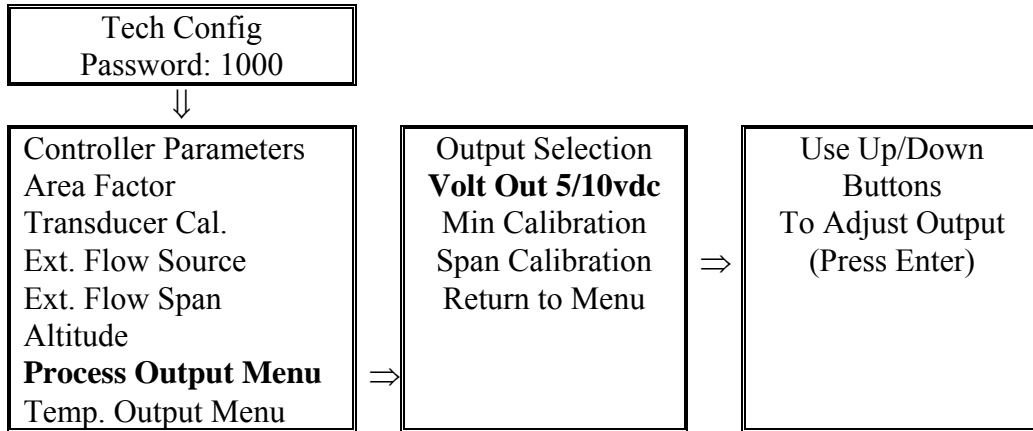
9.8.3. Minimum Calibration

The Minimum Calibration Menu allows the user to make output zero adjustments. Monitor the output and with each Up or Down button depression, the output will increase or decrease by 0.01VDC or 0.01mA depending on output selection.



9.8.4. Span Calibration

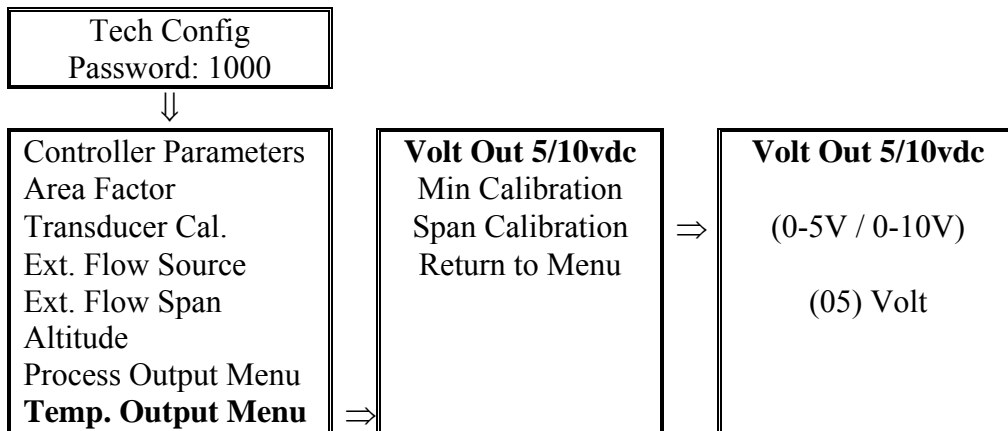
The Span Calibration Menu allows the user to make output span adjustments. Span adjustments require a low pressure air source adjusted to the Full Scale Value shown on the side label. Monitor the output and with each Up or Down button depression, the output will increase or decrease by 0.01VDC or 0.01mA depending on output selection.



9.9. TEMPERATURE OUTPUT MENU

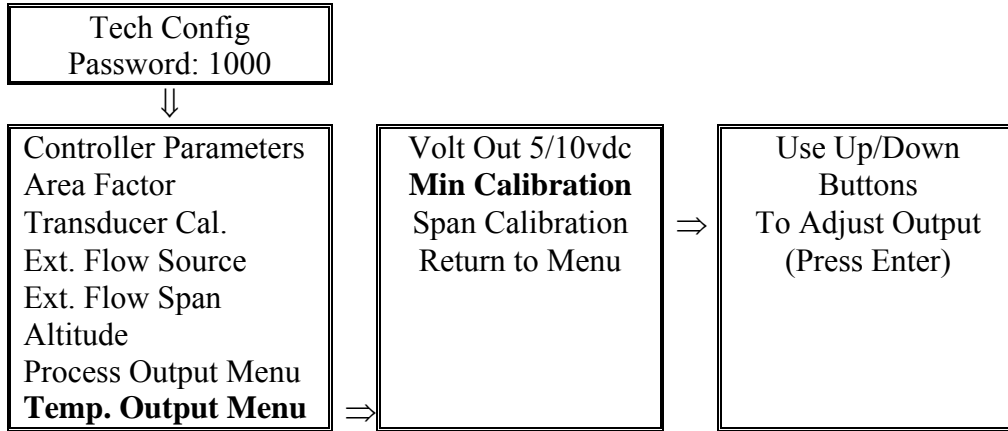
9.9.1. Voltage Output Level Selection

The Voltage Output Level Selection Menu allows the user to select either 0-5VDC or 0-10VDC for the Temperature Output voltage signal. See Section 4.5 for switch selection.



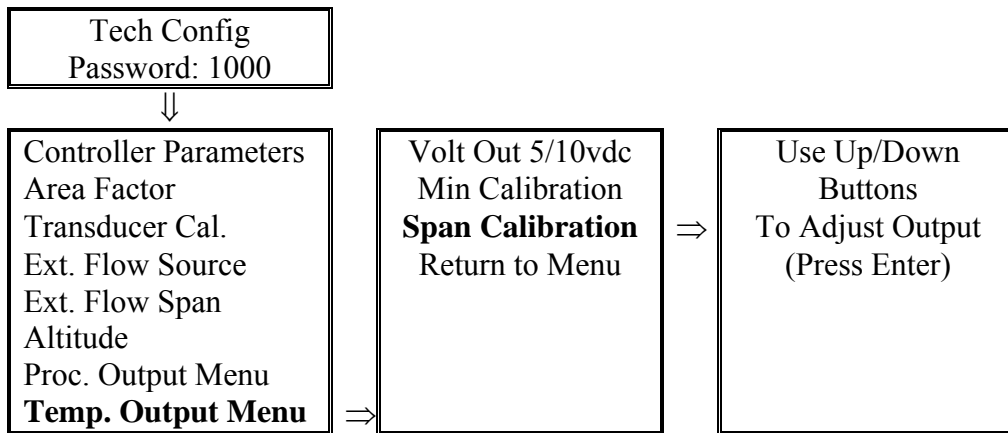
9.9.2. Minimum Calibration

The Minimum Calibration Menu allows the user to make output zero adjustments. Monitor the output and with each Up or Down button depression, the output will increase or decrease by 0.01VDC or 0.01mA depending on output selection.



9.9.3. Span Calibration

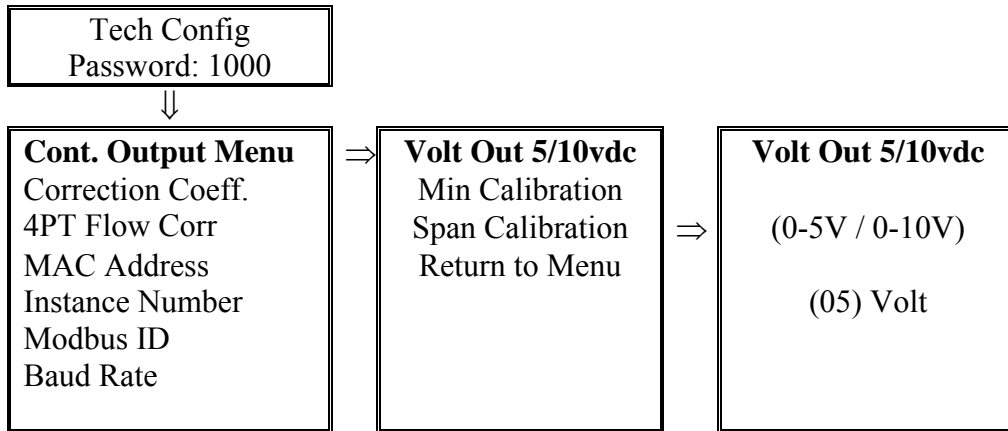
The Span Calibration Menu allows the user to make output span adjustments. Span adjustments require a voltage or current source to generate the minimum and maximum input signal. Monitor the output and with each Up or Down button depression, the output will increase or decrease by 0.01VDC or 0.01mA depending on output selection.



9.10. CONTROLLER OUTPUT MENU

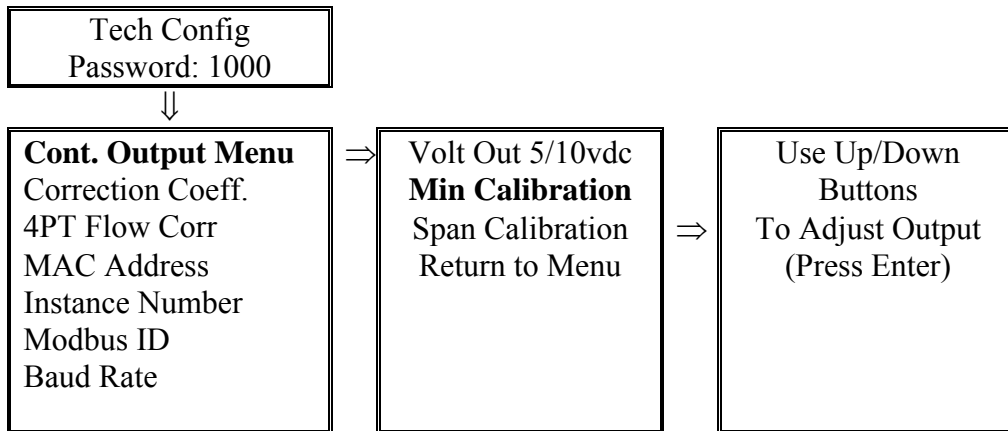
9.10.1. Voltage Output Level Selection

The Voltage Output Level Selection Menu allows the user to select either 0-5VDC or 0-10VDC for the Temperature Output voltage signal. See Section 4.6 for switch selection.



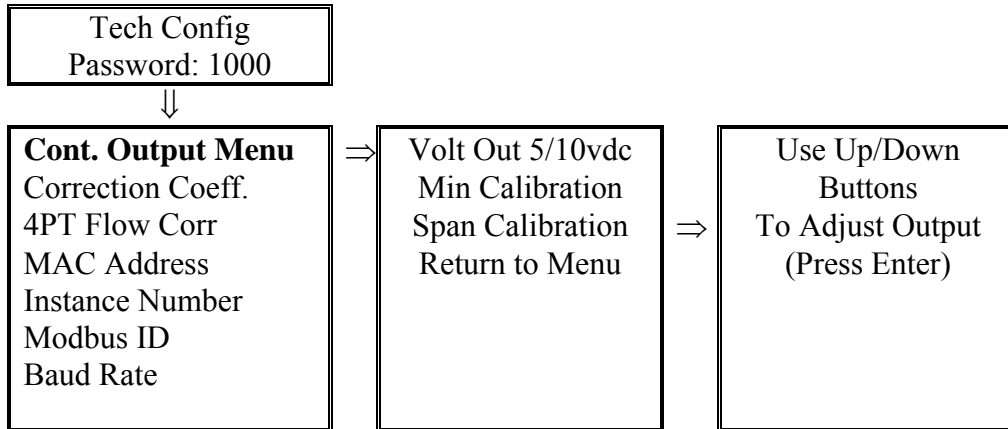
9.10.2. Minimum Calibration

The Minimum Calibration Menu allows the user to make output zero adjustments. Monitor the output and with each Up or Down button depression, the output will increase or decrease by 0.01VDC or 0.01mA depending on output selection.



9.10.3. Span Calibration

The Span Calibration Menu allows the user to make output span adjustments. Span adjustments require a low pressure air source adjusted to the Full Scale Value shown on the side label. Monitor the output and with each Up or Down button depression, the output will increase or decrease by 0.01VDC or 0.01mA depending on output selection.

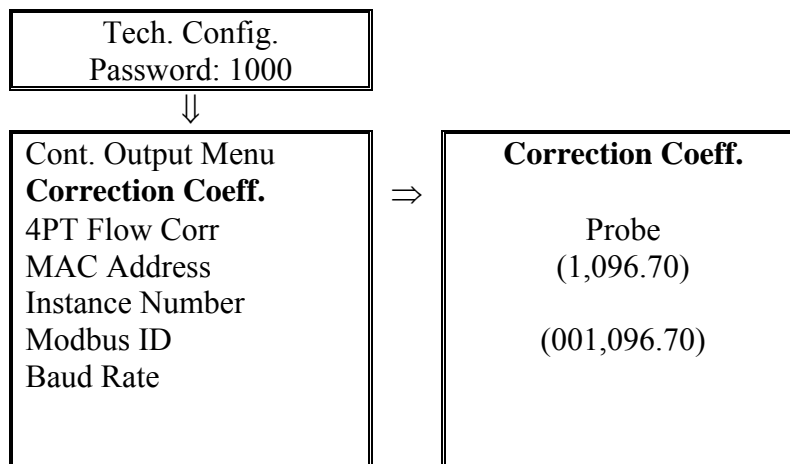


9.11. CORRECTION COEFFICIENT

The Correction Coefficient Menu is only available if the MicroTrans^{II} is configured by Paragon at the time of order for flow or velocity. If the MicroTrans^{II} is configured for input from a non-amplified Pitot-type flow sensor (such as those manufactured by Paragon) the menu in Section 9.8.1 will be displayed. If the MicroTrans^{II} is configured for input from a piezometer ring or amplified differential pressure flow sensor (manufactured by others) the menu in Section 9.8.2 will be displayed.

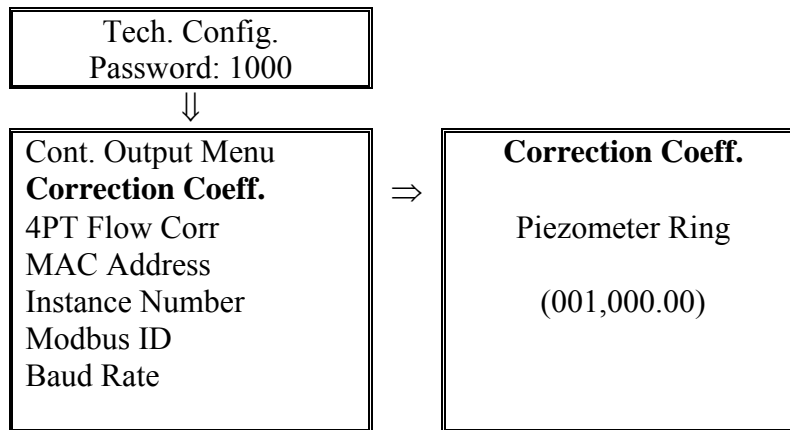
9.11.1. Probe Coefficient

The Probe Coefficient Menu allows the user to modify the formula constant of 1096.70 for a non-amplified Pitot-type flow sensor.



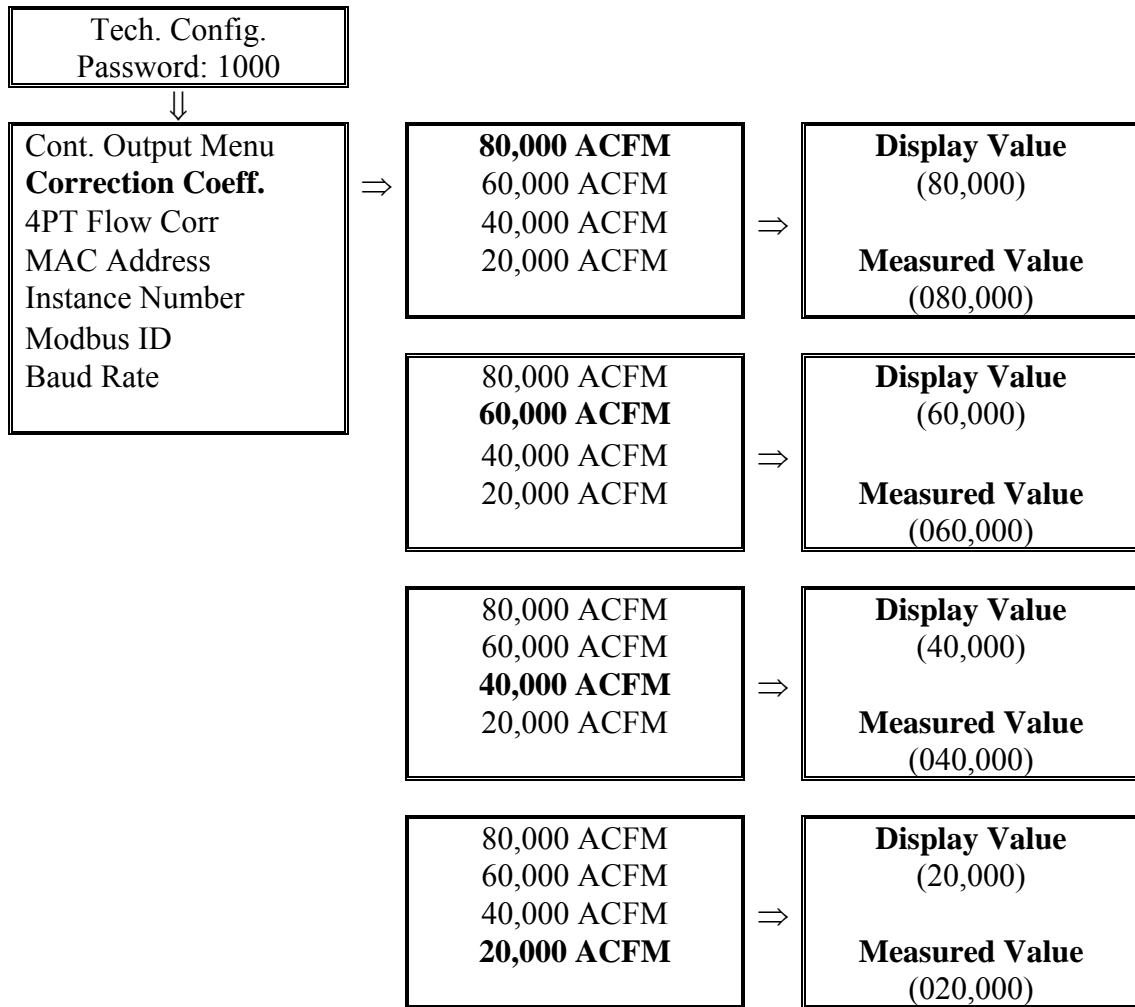
9.11.2. Piezometer Ring Coefficient

The Piezometer Ring Coefficient Menu allows a user to enter the correction constant associated with the piezometer ring or amplified differential pressure flow sensor. Correction constants should be obtained from the sensor manufacturer.



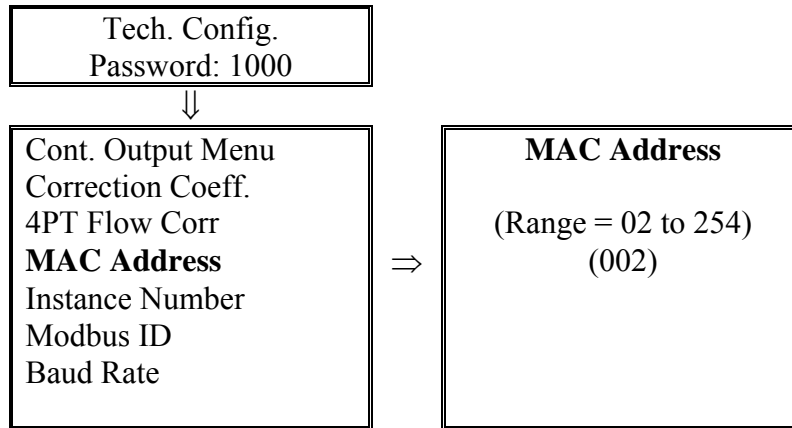
9.12. FOUR POINT FLOW CORRECTION

The Four Point Flow Correction Menu allows the user to make corrections to the display and output signal at 20% increments between 20% and 80% of Operating Range Value entered. The Displayed Value is a fixed value determined by the percentage of Operating Range. The Measured Value is the value determined by an independent balancer's reading. The Four Point Flow Correction Menu is only available if the MicroTrans^{II} is configured by Paragon at the time of order for flow or velocity.



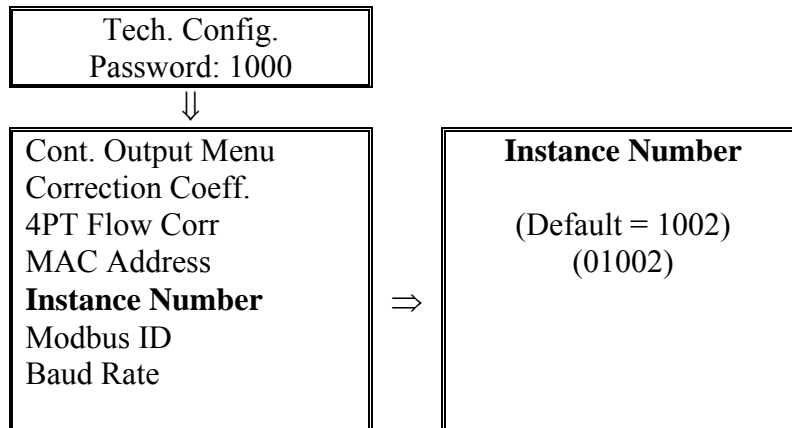
9.13. MAC ADDRESS (BACNET COMMUNICATION OPTION)

When the BACnet Communication option is ordered, the MAC Address Menu allows the user to set a unique device address when connecting to a BACnet network. The MAC Address identifies each device on a branch of the network and can range from 2 to 127. The MAC Address must be unique within a particular branch of a network however, MAC Addresses can repeat if on another branch (Instance Number) of the network. The default is 02. For additional information refer to the Communication O&M.



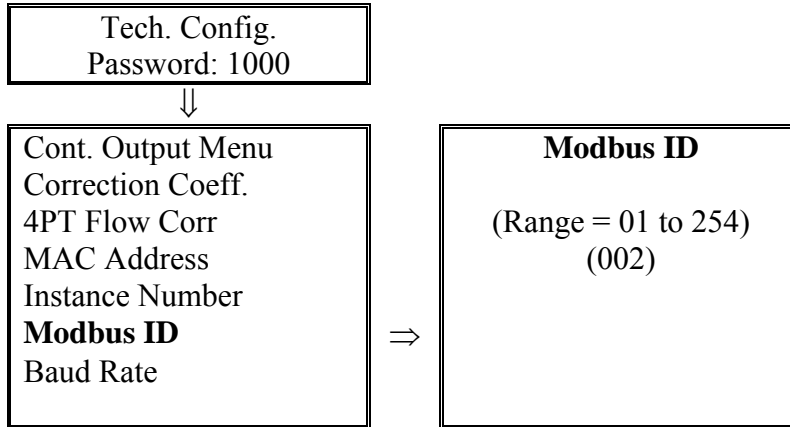
9.14. INSTANCE NUMBER (BACNET COMMUNICATION OPTION)

When the BACnet Communication option is ordered, the Instance Number Menu allows the user to set a unique device address when connecting to a BACnet network. Instance Numbers cannot repeat within any part of a network. The Instance Numbers for the MicroTrans^{II} can range from a value of 1,002 to 4,194,302. The default is 1002. For additional information refer to the Communication O&M.



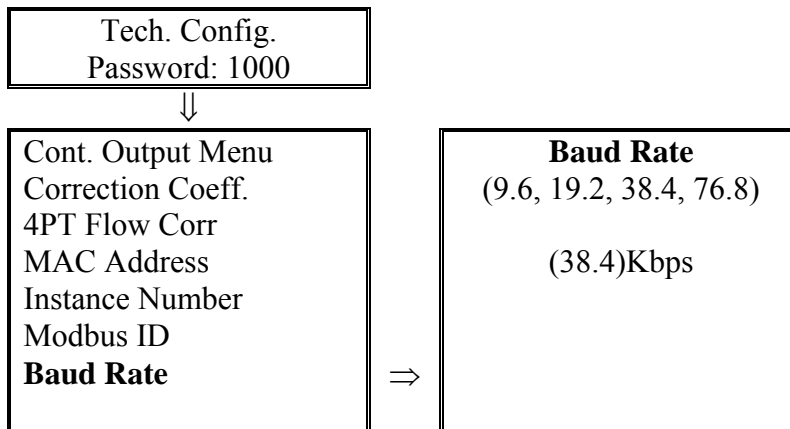
9.15. MODBUS ID (MODBUS COMMUNICATION OPTION)

When the Modbus Communication option is ordered, the Modbus ID Menu allows the user to set a unique device address when connecting to a Modbus network. The default is 02. For additional information refer to the Communication O&M.



9.16. BAUD RATE (BACNET & MODBUS COMMUNICATION OPTIONS)

The Baud Rate Menu allows the user to set a unique network baud rate. The current BACnet protocol supports 9.6, 19.2, 38.4, and 76.8 Kbps baud rate. Modbus communications supports 9.6, 19.2, 38.4, 57.6, and 115.2 Kbps baud rate. The default is 38.4 Kbps. For additional information refer to the Communication O&M.



10. WARNING MESSAGES

10.1. INPUT PRESSURE OVERRANGE MESSAGE

If the input pressure exceeds the entered Operating Range Value, the following message will appear on the display. It will alternate between the process display and the error message until the input falls below the Operating Range Value.

- Caution -
Input Beyond
Operating Range
Selected

10.2. TRANSDUCER CALIBRATION MESSAGE

If during a transducer zero or span calibration process, the transducer output pressure value measured exceeds $\pm 20\%$ of the expected value, the following message will appear on the display. Once the Enter button is pressed, the display returns to the previous calibration menu.

Value entered is
Outside Factory
set limits
(Press Enter)

10.3. OPERATING RANGE MESSAGE

If the new values entered for Temperature Compensation, Area Factor, or Altitude (see Sections 8.7, 9.2, and 9.5) causes the Operating Range Value to exceed the new calculated Maximum Full Scale Value, the following message will appear on the display.

Op Range Outside
Allowable Value.

Op Range will be
Reset to the MAX
F.S. value

(Press Enter)

10.4. NEW OPERATING RANGE MESSAGE

If a user enters a new Operating Range Value, the following message will appear on the display notifying the user that if any 4 PT Flow Correction Values (see Section 9.10) were previously entered, they will be reset. The message allows the user to confirm that the Operating Range change should be made. To complete the Operating Range change, the user must use the UP/Down buttons to change the NO to a YES and press the ENTER button.

Value will
Reset 4PT
Flow Correction
Values
Make the Change
(NO)

(Press Enter)

11. PICS (Protocol Implementation Conformance Statement)

MT2 Summing BACnet PICS

BACnet Standardized Device Profile (Annex L):
 BACnet Application Specific Controller (B-ASC)

BACnet Interoperability Building Blocks Supported (Annex K):
 DS-RP-B
 DS-RPM-B
 DS-WP-B
 DS-WPM-B
 DM-RD-B
 DM-DDB-B
 DM-DOB-B
 DM-DCC-B

Segmentation Capability:
 NONE

Standard Object Types Supported: (See Table 1 for details)
 Analog Input
 Analog Value
 Multistate Value

Data Link Layer Options:
 MS/TP master (Clause 9), baud rate(s): 9600, 19200, 38400, 76800

Device Address Binding:
 NO

Networking Options:
 NONE

Character Sets Supported:
 ANSI 3.4

Supported Services:

| | |
|----------------------------|-------------------|
| ReadProperty | Execute |
| ReadPropertyMultiple | Execute |
| WriteProperty | Execute |
| WritePropertyMultiple | Execute |
| DeviceCommunicationControl | Execute |
| Who-Is | Initiate, Execute |
| Who-Has | Execute |
| I-Am | Initiate, Execute |
| I-Have | Execute |

Gateway:
 This product does not support gateway functionality for any types of non-BACnet equipment/network(s).

TABLE 1 - Standard Object Types Supported – MT2 Summing Device

| Object | Create Object Service | Delete Object Service | Optional Properties Supported | Writeable Properties | Property Data Type | Data Value Description (State_Text) |
|--|-----------------------|-----------------------|--|---|--------------------|-------------------------------------|
| Device | No | No | <ul style="list-style-type: none"> Object Name Description Location Object Identifier APDU Timeout Max Info Frames Max Master | <ul style="list-style-type: none"> Description Location | | |
| Analog Input 1 – Pressure | No | No | <ul style="list-style-type: none"> Description Eng Units | Read Only | REAL | |
| Analog Input 2 – Flow Measured Prc Value | No | No | <ul style="list-style-type: none"> Description Eng Units | Read Only | REAL | |
| Analog Input 3 – Flow Total Prc Value | No | No | <ul style="list-style-type: none"> Description Eng Units | Read Only | REAL | |
| Analog Input 4 – Temperature | No | No | <ul style="list-style-type: none"> Description Eng Units | Present Value | REAL | |
| Analog Output 1 – Controller Output | No | No | <ul style="list-style-type: none"> Description Eng Units | Read Only | REAL | |
| Analog Value 1 – Pressure Operating Range | No | No | Description | Present Value | REAL | |
| Analog Value 2 – Pressure Hi Alarm | No | No | Description | Present Value | REAL | |
| Analog Value 3 – Pressure Lo Alarm | No | No | Description | Present Value | REAL | |
| Analog Value 4 – Flow Operating Range | No | No | Description | Present Value | REAL | |
| Analog Value 5 – Flow Hi Alarm | No | No | Description | Present Value | REAL | |
| Analog Value 6 – Flow Lo Alarm | No | No | Description | Present Value | REAL | |
| Analog Value 7 – Pressure Controller Setpoint | No | No | Description | Present Value | REAL | |
| Analog Value 8 – Flow Controller Setpoint | No | No | Description | Present Value | REAL | |
| Analog Value 9 – Controller Prop Band | No | No | Description | Present Value | REAL | |
| Analog Value 10 – Controller Integrator Time | No | No | Description | Present Value | REAL | |
| Analog Value 11 – Cnt. Inverse Derivative Time | No | No | Description | Present Value | REAL | |
| Analog Value 12 – Economizer Value | No | No | Description | Present Value | REAL | |
| Analog Value 13 – Hi Alarm Delay | No | No | Description | Present Value | Unsigned Integer | |
| Analog Value 14 – Lo Alarm Delay | No | No | Description | Present Value | Unsigned Integer | |
| Binary Input 1 – Sys Start In Status | No | No | Description | Read Only | BACnetBinaryPV | 0 = Off 1 = Run |
| Binary Input 2 – Sys Hold Out Status | No | No | Description | Read Only | BACnetBinaryPV | 0 = Off 1 = On |

| | | | | | | |
|---|----|----|-------------|---------------|------------------|---|
| Multistate Value 1 – Hi Alarm Enable | No | No | Description | Present Value | Unsigned Integer | 1 = Disable 2 = Enable |
| Multistate Value 2 – Hi Alarm Status | No | No | Description | Read Only | Unsigned Integer | 1 = No Alarm 2 = Alarm |
| Multistate Value 3 – Lo Alarm Enable | No | No | Description | Present Value | Unsigned Integer | 1 = Disable 2 = Enable |
| Multistate Value 4 – Lo Alarm Status | No | No | Description | Read Only | Unsigned Integer | 1 = No Alarm 2 = Alarm |
| Multistate Value 5 – Controller Action | No | No | Description | Read Only | Unsigned Integer | 1 = Direct 2 = Reverse |
| Multistate Value 6 – Engineering Units | No | No | Description | Present Value | Unsigned Integer | See Table 2 |
| Multistate Value 7 – Temperature Units | No | No | Description | Present Value | Unsigned Integer | 1 = Fahrenheit 2 = Celsius |
| Multistate Value 8 – Temperature Source | No | No | Description | Present Value | Unsigned Integer | 1 = Temp. Input 2 = Fixed Temp. Value 3 = Network |
| Multistate Value 9 – Process Type | No | No | Description | Read Only | Unsigned Integer | 1 = Flow 2 = Pressure |
| Multistate Value 10 – Process Unit | No | No | Description | Read Only | Unsigned Integer | 1 = Flow 2 = Velocity |
| Multistate Value 11 – Flow Type | No | No | Description | Read Only | Unsigned Integer | 1 = Actual 2 = Standard |

Note: All BACnet required properties are supported. The table above lists optional & writable properties supported.

TABLE 2 – MSV6 Engineering Units State_Text List

MSV9 = 1 – Flow, MSV10 = 1 - Flow

- 1: CFM
- 2: L/S
- 3: m³/S
- 4: m³/M
- 5: m³/HR
- 6: % (Flow %)

MSV9 = 1 - Flow, MSV10 = 2 - Velocity

- 1: FPM
- 2: m/s
- 3: % (Velocity %)

MSV9 = 2 - Pressure

- 1: In.W.C.
- 2: Pa
- 3: KPa
- 4: mm.W.C.
- 5: % (Pressure %)

12. TROUBLESHOOTING GUIDE

| TROUBLESHOOTING TABLE | |
|--|---|
| SYMPTOM | SOLUTION |
| 1. No Display or Back Light | 1. Verify ON/OFF switch is in ON position |
| | 2. Verify correct input power and connection at 3 pin connector J1 |
| | 3. Contact Factory |
| 2. Display background is too dark or characters are too light. | 1. Adjust DISPLAY potentiometer (See Section 3.1) |
| 3. Display does not respond to input pressure changes and Key pad functions. | 1. Reset the unit by turning the ON/OFF switch OFF and back ON. |
| | 2. Contact Factory |
| 4. Display does not respond to input pressure changes but does respond to Key pad functions. | 1. Verify pneumatic input lines are not reversed at the MicroTrans ^{II} ports or the sensing element. |
| | 2. Use a pneumatic gauge to measure the pneumatic signal input to the MicroTrans ^{II} . Verify the signals are within the Op. Range Value shown on the label located on the side of the enclosure. |
| | 3. Contact Factory |
| 5. Display does not respond to Key Pad functions | 1. Reset the unit by turning the ON/OFF switch to OFF and then ON. |
| | 2. Contact Factory |
| 6. CAUTION INPUT OVERRANGE message on Display | 1. Verify data on ID Label located on side of MicroTrans ^{II} is correct for the application. |
| | 2. Remove pneumatic signal lines. If display returns to 0 reading, use a pneumatic gauge to measure the pneumatic signal. Verify input signal is equal to or less then the Op. Range D.P. Value on the ID Label. If the display does not return to 0, a pneumatic tube may be plugged by moisture underneath the PC board. Consult the factory. |
| | 3. Verify menu selections are set correctly: Operating Range, Flow Correction, Temperature Compensation, Area Factor, and Altitude |

| TROUBLESHOOTING TABLE | |
|--|--|
| SYMPTOM | SOLUTION |
| 6. Continued | 4. If the Temperature Compensation Option is installed, verify correct temperature input signal. Verify that the temperature input is connected correctly. |
| | 5. Contact Factory |
| 7. Incorrect Temperature Reading | 1. Verify Temperature Transmitter specifications match with MicroTrans ^{II} ID Label (Current/Voltage, Temperature Range) |
| | 2. Verify Temperature Transmitter is connected correctly to the MicroTrans ^{II} (see Section 3.2). |
| | 3. Verify Temperature Transmitter signal at the MicroTrans ^{II} connector J2 is correct. |
| | 4. Contact Factory |
| 8. No Output signal or Incorrect Output signal. Display is reading correct value. | 1. Verify Process Output PRO switch is in the correct position for the application (see Section 4.4 and the figure in Section 3.1. |
| | 2. Disconnect Output signal wires and verify output signal at MicroTrans ^{II} connector J2 is correct. |
| | 3. Verify correct Operating Range - Section 5.2 |
| | 4. Perform Output Calibration (see Sections 9.6 through 9.8) |
| | 5. Contact Factory |
| 9. Incorrect Process Output Values after changing Area Factor, Altitude, or Temperature Value. Display readings are correct. | 1. Re-Enter Operating Range Value in Field Menu (see Section 5.2) |
| | 2. Contact Factory |
| 10. Unstable Display and Process Output at very low flow. | 1. Increase Display and Process Filter (See Sections 8.8 and 8.9) |
| | 2. Decrease Lockdown Value (see Section 8.4.1) |
| | 3. Increase Lockdown Delay Value (see Section 8.4.2) |
| | 4. Contact Factory |

| TROUBLESHOOTING TABLE | |
|---|---|
| SYMPTOM | SOLUTION |
| 11. "AZ Error" text on display | 1. Turn Power Switch Off and On to reset the AutoZero valve |
| | 2. Check for a pinched tube beneath the main board. (Caution: Remove power before removing board) |
| | 3. Contact Factory |
| 11. Controller Output stays at minimum value. | 1. Verify System Start contacts are closed (see Section 3.1/J3 pins 13 and 14) |
| | 2. Verify Control Action is correct (see Section 9.1.3) |
| | 3. Verify Controller Setpoint Value is correct (see Section 9.1.4) |
| | 4. Contact Factory |

