



## Model A-435-A Remote Display Tool

### Specifications - Installation and Operating Instructions



An option for Magnesense® II Differential Pressure Transmitter models that do not have a display is to use a **Model A-435-A Remote Display Tool** which can plug into the connector shown in Figure 1. The remote display tool has two buttons that function identically to the buttons on the PCB.



#### CALIBRATION

##### NOTICE

Once the zero or span calibration button is released, there is a 5 second delay before the change takes effect. This delay is used to prevent stress related offsets on the lower ranges.

##### NOTICE

The security level that is set in the Programming Menu Section of the manual will determine which calibrations, if any, may be adjusted by the user.

#### Zero Calibration

In order to apply the zero calibration, vent both pressure ports to atmosphere or apply equal pressure to both ports then press the zero button for 3 seconds. The display will read **ZEro** and then sequence back to the home display. If the current reading is not close enough to zero ( $\pm 2\%$ ), the operation will fail and **FFIL** will be displayed.

#### SPAN Calibration

The span calibration can only be adjusted after completing the zero calibration. It must be completed within 5 minutes of the last zero calibration. The span calibration button will be ignored until the zero calibration is completed. Apply the maximum full-scale pressure value, indicated by the DIP switch setting, to the positive pressure port (i.e. the pressure value corresponding to 20 mA, 5 V, or 10 V depending on selected output). Press and hold the span button for 3 seconds. The display will read **SPAN** and then sequence back to the home display. If the span calibration is attempted before adjusting the zero calibration, the **FFIL** error message will flash on the display. A failure will also occur if the span operation is performed too closely to the zero point pressure.

#### Display Error Messages

**ouEr** = The applied pressure is greater than the maximum span value causing an Over Range Error.

**UndEr** = The applied pressure is less than the minimum span value causing an Under Range Error.

**FFIL** = When the span or zero buttons are pressed, the pressure value is out of the range to allow a correct setting. This may be due to a sensor failure or incorrect pressure being applied.

**Err1** = The sensor is damaged.

**-rErr** = Negative display value too low to display.

#### PROGRAMMING MENUS

##### Home Menu

During normal operation, the display will be in the Home Menu and will display the current measured pressure and the engineering units.

##### Menu Access Security

While in the Home Menu, press and hold the Zero and Span buttons simultaneously until **SECUr** appears on the display in order to access the other programming menus. Upon releasing the buttons, the display will indicate the current security level.

If the current security level is the security level desired (i.e. Security Level 0), press and hold the span button for three seconds to enter the Pressure, Velocity, or Air Flow Menu.

If the security level is not the desired level, the security level can be changed temporarily to a lower security level or permanently to a higher level of security by pressing the zero button. A security code will be shown on the display and it can be changed to one of the codes listed in the below table. The span button chooses which digit and the zero button increments the value of that digit. Pressing and holding the span button will store the value.

Security Level	Setting	Access			
		View Menu	Edit Menu	Span	Zero
0	000	Yes	Yes	Yes	Yes
1	111	Yes	No	No	Yes
2	222	No	No	No	Yes
3	333	No	No	No	No

The level of access to the programming menus and the calibration is limited based on the security level. The above table details the level of access for each security level.

### Mode Selection / Digital Dampening Menu

From the home display, pressing the span and zero button simultaneously for 3 seconds will access the Menu Security Level. If the level is set to 0 or 1, pressing and holding the span button for 3 seconds a second time will access the Mode Selection Menu. The display will default to Pressure when first powered up. Pressing the zero button will cycle to Velocity and Flow.

Once the desired Mode is displayed, pressing and holding the span button for three seconds will save the selected mode and display the digital dampening or averaging parameter. This parameter stabilizes the output and the display by averaging the readings. There are 2.5 readings taken each second and the user can select the number of seconds that they would like to average up to 240 seconds. The display and the output will continue to update at a rate of 2.5 updates per second, but the moving average is used for these updates.

### PRESSURE MODE

#### Maximum Output Adjustment

If the Pressure Mode was selected, pressing and holding the span after adjusting the digital dampening will enter the Pressure Mode. In this menu, the maximum output pressure (POH) can be adjusted to any pressure between the lowest dip switch range to the highest dip switch range. If the dip switch settings are preferred over manually setting the range, the POH parameter can be set to off.

### VELOCITY MODE

#### K-Factor Adjustment

If the Velocity Mode was selected, pressing and holding the span after adjusting the digital dampening will enter the Velocity Mode and the transmitter will display the engineering unit that has been selected by the dip switch. Pressing and holding the span button for three seconds will enter the K – Factor adjustment. The K – Factor can be adjusted between 0.001 to 9.999. The K-Factor can be adjusted by pressing the span button to select the digit and pressing the zero button to increment the value of the digit. Pressing and holding the span button for three seconds will enter the Maximum Output Adjustment parameter.

#### Maximum Output Adjustment

The maximum output can be equivalent to a velocity or a pressure. After adjusting the K-Factor, the display will indicate if the adjustment is set for pressure or velocity. Pressing the zero button will toggle between the selections. Pressing and holding the span button for three seconds will enter the maximum output adjustment. The maximum output can be adjusted by pressing the span button to select the digit and pressing the zero button to increment the value of the digit. Pressing and holding the span button for three seconds will save this value and go to the Security Update Menu.

### FLOW MODE

#### K-Factor Adjustment

If the Flow Mode was selected, pressing and holding the span after adjusting the digital dampening will enter the Flow Mode and the transmitter will display the engineering unit that has been selected by the dip switch. Pressing and holding the span button for three seconds will enter the K – Factor adjustment. The K – Factor can be adjusted between 0.001 to 9.999. The K-Factor can be adjusted by pressing the span button to select the digit and pressing the zero button to increment the value of the digit. Pressing and holding the span button for three seconds will enter the Area Adjustment parameter.

#### Area Adjustment

For Flow applications, the area is multiplied by the velocity to determine the volumetric air flow. The area will be listed in either feet or meters depending on the dip switch settings. The units will be indicated on the display at the time of adjustment. The area can be adjusted by pressing the span button to select the digit and pressing the zero button to increment the value of the digit. Pressing and holding the span button for three seconds will enter the Maximum Output Adjustment parameter.

#### Maximum Output Adjustment

The maximum output can be equivalent to a flow or a pressure. After adjusting the Area parameter, the display will indicate if the adjustment is set for pressure or flow. Pressing the zero button will toggle between the selections. Pressing and holding the span button for three seconds will enter the maximum output adjustment. The maximum output can be adjusted by pressing the span button to select the digit and pressing the zero button to increment the value of the digit. Pressing and holding the span button for three seconds will save this value and go to the Security Update Menu.

### Security Update / Save Changes Menu

The Security Update Menu allows the security level to be set either higher or lower than the current security level setting. This security level will be displayed the next time the Menus are accessed from the home screen. Pressing the zero button cycles through the security levels. Pressing and holding the span button for three seconds accepts the new security level and gives the option to save all the menu changes. Pressing the zero button will toggle between yes and no. Yes will save the changes made to all menu items and no will discard all the changes made to all menu items. If the display is set to yes, pressing and holding the span will save the menu items and return the display to the Home Position.

### FACTORY DEFAULT PROCEDURE

In order to reset all of the menu settings back to their factory programmed values, press and hold both the span and zero buttons simultaneously for 10 seconds until FCC+ is displayed on the LCD. Upon releasing the buttons, the unit will be factory defaulted. Since resetting the transmitter will wipe out all changes, it is necessary to zero (and possibly span) the transmitter before taking measurements.

### MAINTENANCE/REPAIR

Upon final installation of the A-435-A, no routine maintenance is required. The A-435-A is not field serviceable and it is not possible to repair the unit. Field repair should not be attempted and may void warranty.

### WARRANTY/RETURN

Refer to “Terms and Conditions of Sales” in our catalog and on our website. Contact customer service to receive a Return Goods Authorization number before shipping the product back for repair. Be sure to include a brief description of the problem plus any additional application notes.

### APPENDIX I

#### Air Velocity / Air Flow Calculations

Velocity is calculated using the below equation:

$$\text{Velocity (fpm)} = \text{K-Factor} \times 4004.4 \times \sqrt{(\text{Diff. Press. (in of w.c.)})}$$

Velocity in m/s is then calculated from the equation:

$$\text{Velocity (m/s)} = \text{Velocity (fpm)} \times 0.00508$$

Flow is calculated using the below equation:

$$\text{Flow (cfm)} = \text{Area (Ft}^2\text{)} \times \text{K-Factor} \times 4004.4 \times \sqrt{(\text{Diff. Press. (in of w.c.)})}$$

$$\text{Flow (m}^3\text{/h)} = \text{Flow (cfm)} \times 1.6992$$






### APPENDIX II

#### Maximum Flow

Range in w.c.	Max Displayed Flow		Max (K Factor x Area)	
	CFM	M <sup>3</sup> /H	CFM Mode	M <sup>3</sup> /H Mode
0.5	5885000	9999000	2037.2	154.5
5	5885000	9999000	644.2	59.9
28	5885000	9999000	272.2	25.3




MENU FLOW CHART

BUTTON PRESS LEGEND





-  = PRESS ZERO BUTTON
-  = PRESS SPAN BUTTON
-  = PRESS AND HOLD ZERO BUTTON
-  = PRESS AND HOLD SPAN BUTTON
-  = PRESS AND HOLD ZERO AND SPAN BUTTONS

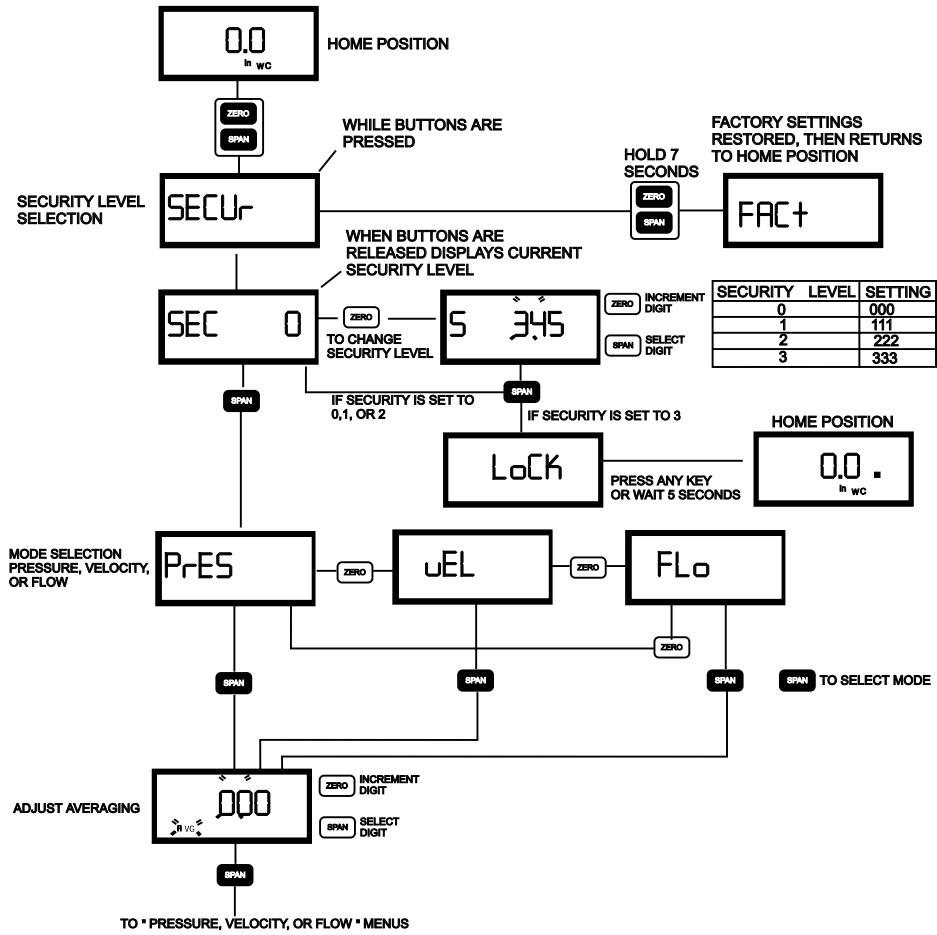
MENU CONVENTIONS

IN HOME POSITION:

-  CALIBRATE UNIT TO ZERO PRESSURE. } DISPLAY IS NOT NECESSARY
-  CALIBRATE UNIT TO SPAN PRESSURE. } DISPLAY IS NOT NECESSARY
-  ENTER MENU DISPLAY

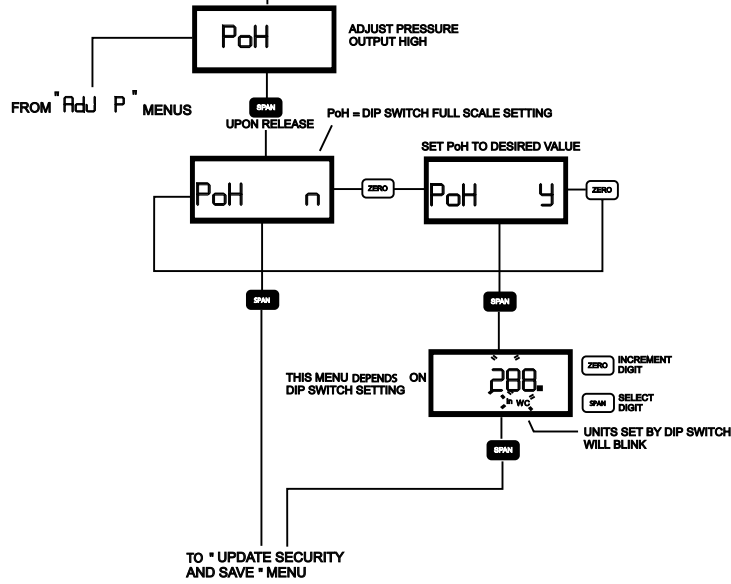
IN MENU DISPLAY:

-  SEQUENCES TO NEXT MAIN MENU ITEM, AND IF A MENU ITEM IS CHANGED TEMPORARILY SAVES THE SELECTION
-  SEQUENCES THROUGH SUB MENU SELECTIONS OR INCREMENTS DIGITS
-  SEQUENCE TO NEXT DIGIT. ACTIVE DIGIT WILL BLINK.  = BLINKING DIGIT



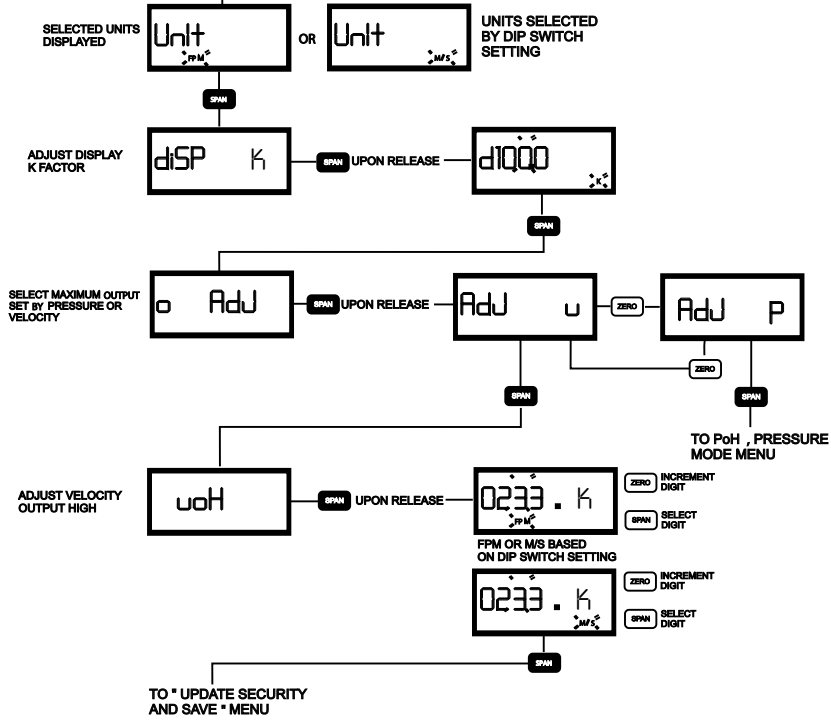
PRESSURE MODE MENU

FROM AVERAGING MENU



VELOCITY MODE MENU

FROM AVERAGING MENU



**FLOW MODE MENU**

FROM AVERAGING MENU

