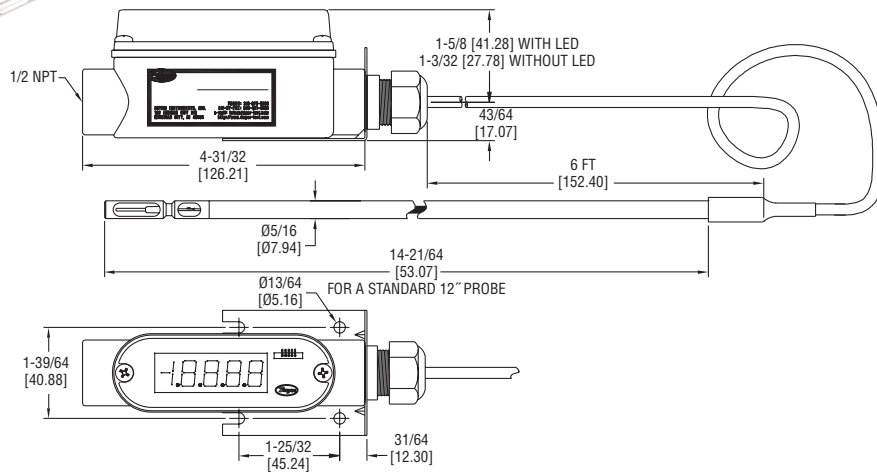
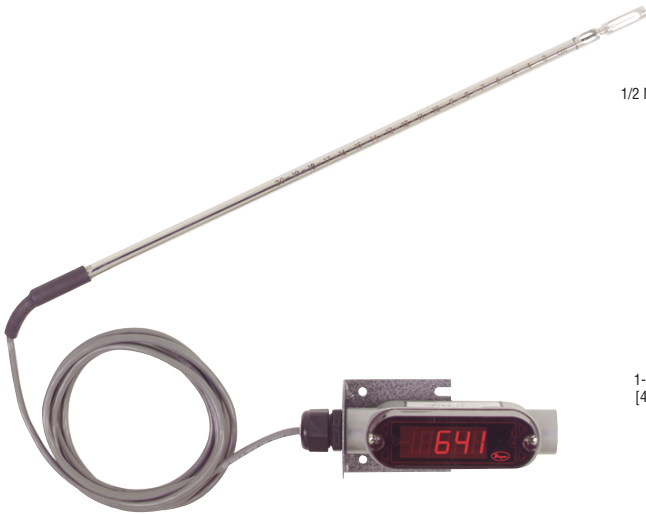




Series 641RM Air Velocity Transmitter

Specifications - Installation and Operating Instructions



The Series 641RM Air Velocity Transmitter uses a heated mass flow sensor technology. It has 8 user selectable ranges from 250 FPM to 15000 FPM with corresponding metric ranges of 1.25 MPS to 75 MPS. The Series 641RM Air Velocity Transmitter provides an isolated 4-20 mA output proportional to the velocity. With the optional 1/2" 4-1/2 digit LED display, the Series 641RM Air Velocity Transmitter will provide a highly visible local readout of the velocity.

INSTALLATION

Location: Select a location where the temperature will be within 32 to 140°F (0 to 60°C) to mount the enclosure. The transmitter may be located any distance from the receiver provided that the total loop resistance does not exceed 600 ohms. The probe should be located where conditions are representative of the overall environment being monitored. Avoid locations where turbulence, stagnation, or rapidly fluctuating velocities or temperatures are present as these conditions may affect the readings. The filter setting may be used to average velocity readings in turbulent conditions.

Position: The transmitter is not position sensitive and may be mounted in any orientation.

Probe Orientation: Dots on the probe indicate the direction of the calibrated airflow. Align these dots toward the source of the process air.

Airflow: The Series 641RM Air Velocity Transmitter is intended for use with clean dry air. Particulates in the air may cause sensor damage. Dust accumulation may impair the velocity measurement and will require probe cleaning.

TO READ DISPLAY UNIT MUST BE MOUNTED HORIZONTALLY AS SHOWN ABOVE. DISPLAY CAN BE TURNED 180° SO CONDUIT OPENING CAN BE POSITIONED TO THE RIGHT OR LEFT.

SPECIFICATIONS

Service: Air and compatible, non-combustible gases.

Accuracy:

3% FS Process gas: 32 to 122°F (0 to 50°C).

4% FS Process gas: -40 to 32°F & 122 to 212°F (-40 to 0°C & 50 to 100°C).

Response Time: Flow: 1.5 seconds to 95% of final value (output filter set to minimum).

Temperature Limits: Process: -40 to 212°F (-40 to 100°C). Ambient: 32 to 140°F (0 to 60°C).

Pressure Limit: 100 psi (6.89 bar) maximum.

Humidity Limit: Non-Condensing.

Power Requirements: 12-35 VDC, 10-16 VAC.

Output Signal: 4-20 mA, isolated 24V source, 3 or 4-wire connection.

Output Filter: Selectable 0.5 -15 (seconds).

Loop Resistance: 600 ohms max.

Current Consumption: 300 mA max.

Electrical Connections: Screw terminal.

Mounting Orientation: Unit not position sensitive. Probe must be aligned with airflow.

Weight: 13.2 oz (374.26 g).

Cable Length: 6 ft (1.82 m).

Probe Length: 12" (30.48 cm) standard.

Probe Diameter: 5/16" (0.79 cm).

OPTIONAL DISPLAY VERSION:

Display: 4-1/2 digit 1/2" Red LED.

Resolution: 1 FPM, 0.01 MPS
(10 FPM @ 10,000 and 15,000 FPM ranges).

Weight: 13.9 oz (394.16 g).

Agency Approvals: CE

The following standards were used for CE approval:

IEC 61000-4-2: 2001

IEC 61000-4-3: 2002

IEC 61000-4-4: 1995

IEC 61000-4-5: 2001

IEC 61000-4-6: 2003

IEC 55011: 1998

IEC 61326: 2002

89/336/EEC EMC Directive

Two buttons and a potentiometer control the setup process.

The SELECT button is used to scroll between the setup parameters.

The ENTER button allows access to each parameter for adjustment.

The ADJUST potentiometer is used to change the value of the parameters.

Holding the ENTER button for 2.5 seconds saves the new parameter value.

Making Adjustments

The adjustment process has three steps: select the parameter, adjust the parameter, save the new value. These are described in the following steps.

1. Select the parameter: Each time the SELECT button is pressed the LED indicator will advance to the next parameter. When the last parameter, SPAN, is selected, the next time the SELECT is pressed the unit will return to RUN mode. Press the SELECT button until the LED indicator illuminates the desired parameter. Press ENTER. The selected indicator will begin to blink, showing the parameter may now be adjusted. If the unit is left in the setup mode, after several minutes it will reset to the operate mode.

2. Adjust the parameter: Turn the ADJUST potentiometer until the desired setting is made. This may be adjusted using a small screwdriver or similar tool. Be careful not to force the control past its stops or damage will result.

3. Save the parameter: To save the new parameter press and hold the ENTER button. The LED indicator will begin to flash at a faster rate. After about 2.5 seconds all of the LED indicators will flash when the parameter is saved. If you do not want to save the parameter press the SELECT button without entering the parameter. The adjusted value will be discarded and next LED indicator will be illuminated.

Adjusting the Output Filter

The output filter may be adjusted to smooth the readings when measuring turbulent flow. The time constant may be adjusted from 0.5 seconds to 15 seconds. To adjust the filter time constant, select the FILTER indicator. Press ENTER to enable adjustment. Turn the ADJUST until the desired amount of damping is achieved. To save the value press and hold the ENTER button until the LED indicators all flash, indicating the value was saved. To discard the adjustment press SELECT before pressing the ENTER button.

OUTPUT FILTER RESPONSE (values in seconds)

% of Full Velocity	Filter Setting on Adjust Dial		
	Min.	Mid.	Max.
63%	0.5	7.5	15
90%	1.1	17.3	34.5
95%	1.5	22.5	44.9
99%	2.3	34.5	69.0

Range Selection

The range selection allows you to select one of eight ranges in either feet per minute (FPM) or meters per second (MPS).

Ranges:

FPM: 250, 500, 1000, 2000, 3000, 5000, 10000, 15000

MPS: 1.25, 2.5, 5, 10, 15, 25, 50, 75

Select the RANGE indicator by pressing ENTER when the RANGE LED indicator is illuminated. The A,B,C LED indicators will display which range setting is currently active. Press ENTER to enable adjustment. Turn the ADJUST until the desired range indication is achieved. If you want to discard the adjustment press SELECT. If you want to save the range press and hold ENTER. The RANGE LED will blink at a faster rate for about 2.5 seconds then all of the LEDs will flash indicating the value was saved.

The range setting is displayed with the LED indicators. The function of these indicators is summarized on the control label inside the unit. The following table summarizes the indicator status for each range setting

Range/Units	Run	Filter	Range	Span	4 mA	20 mA
				A	B	C
250 FPM	1	0	1	0	0	0
500 FPM	1	0	1	0	0	1
1000 FPM	1	0	1	0	1	0
2000 FPM	1	0	1	0	1	1
3000 FPM	1	0	1	1	0	0
5000 FPM	1	0	1	1	0	1
10000 FPM	1	0	1	1	1	0
15000 FPM	1	0	1	1	1	1
1.25 MPS	0	1	1	0	0	0
2.5 MPS	0	1	1	0	0	1
5 MPS	0	1	1	0	1	0
10 MPS	0	1	1	0	1	1
15 MPS	0	1	1	1	0	0
25 MPS	0	1	1	1	0	1
50 MPS	0	1	1	1	1	0
75 MPS	0	1	1	1	1	1

1: Indicator on
0: Indicator off

Span Setting

The Series 641RM Air Velocity Transmitter has been calibrated for standard sea level conditions. As a mass flow device it will always read the air velocity for standard conditions. Density changes due to barometric or absolute pressure are not corrected automatically. The span setting allows correction for altitude or other static pressure conditions that affect the density of the process air. This parameter allows for a $\pm 50\%$ adjustment in the span value.

To make the span adjustment you will need to know either the absolute static pressure or the corrected velocity of the process air. Set the air velocity to a known value, ideally about 3/4 of the full-scale range value. Press SELECT until the SPAN LED indicator is illuminated then press ENTER. The SPAN LED will begin to blink. Adjust the control for the desired velocity then press and hold the ENTER button until all of the LED's flash, indicating the new value was saved. If you know the absolute static pressure you can compute the corrected velocity using the following equation:

$$V_{cor} = \frac{P_o}{P_A} V_{rdg}$$

Where:

P_o is the standard pressure of 29.9 in. Hg. or 760 mm Hg

P_A is the absolute pressure reading

V_{rdg} is the indicated velocity

V_{cor} is the corrected velocity

4 mA Setting

To make this setting you will need a milliammeter connected in the current loop. It is not required to use a known air flow velocity to make this calibration setting. The calibration settings of the velocity and mA outputs are independent of each other. Press SELECT until the 4 mA LED indicator is illuminated then press ENTER. The milliammeter will now read approximately 4.0 mA. Adjust the control for a 4.0 mA reading on the milliammeter. Press and hold ENTER to save the new setting. Pressing SELECT before pressing ENTER will restore the previous calibration value.

20 mA Setting

It is not required to use a known air flow velocity to make this calibration setting. The calibration settings of the velocity and mA outputs are independent of each other. With the milliammeter connected in the current loop, press SELECT until the 20 mA LED indicator is illuminated. Press ENTER to begin adjustment of the 20 mA set point. The 20 mA LED will now be blinking. Adjust the control until the milliammeter reads 20.0 mA. Press and hold ENTER to save the new setting. Pressing SELECT before pressing ENTER will restore the previous calibration value.

Restoring Factory Default Settings

The 4 mA, 20 mA, and Range settings override factory default values. To restore these to the factory default settings, start with the unit in the RUN mode. Press and hold the ENTER button. The RUN LED indicator will begin to blink. After about 2.5 seconds all LED indicators will flash indicating the factory settings have been restored. Range and Filter settings are not affected by this operation. If you are unsure whether any have been altered, press the SELECT button six times to sequence through all settings. When you return to the RUN mode, the RUN LED indicator will blink several times if either the 4 mA, 20 mA, or span settings have been changed. The RUN LED will otherwise remain on.

MAINTENANCE

In general the Series 641RM Air Velocity Transmitter should require very little maintenance. In some installations dust may accumulate on the sensor over time. This can be removed by carefully brushing the probe with a small camel hairbrush. If too much force is applied during cleaning, the sensor of the Series 641RM Air Velocity Transmitter may be damaged. Therefore, a trained technician should perform the cleaning operation. A jet of air may also dislodge the accumulated buildup. However, the sensor is delicate and this operation should be done carefully with clean regulated air. Using a shop air supply may exert enough force to damage the sensor. Most air supplies of this sort will also contain water or oil that could damage the sensor. Technical grade denatured or isopropyl alcohol may be used where the dust accumulation does not respond to brushing. Do not use water. Always disconnect the power when performing a cleaning operation.

Aside from field calibrations for span, 4 mA and 20 mA setting as described above, the Series 641RM Air Velocity Transmitter cannot be fully factory calibrated in the field. Because of specialized computer instrumentation required, these units must be returned to Dwyer Instruments for factory calibration. Contact customer service to receive a return goods authorization number before shipping.