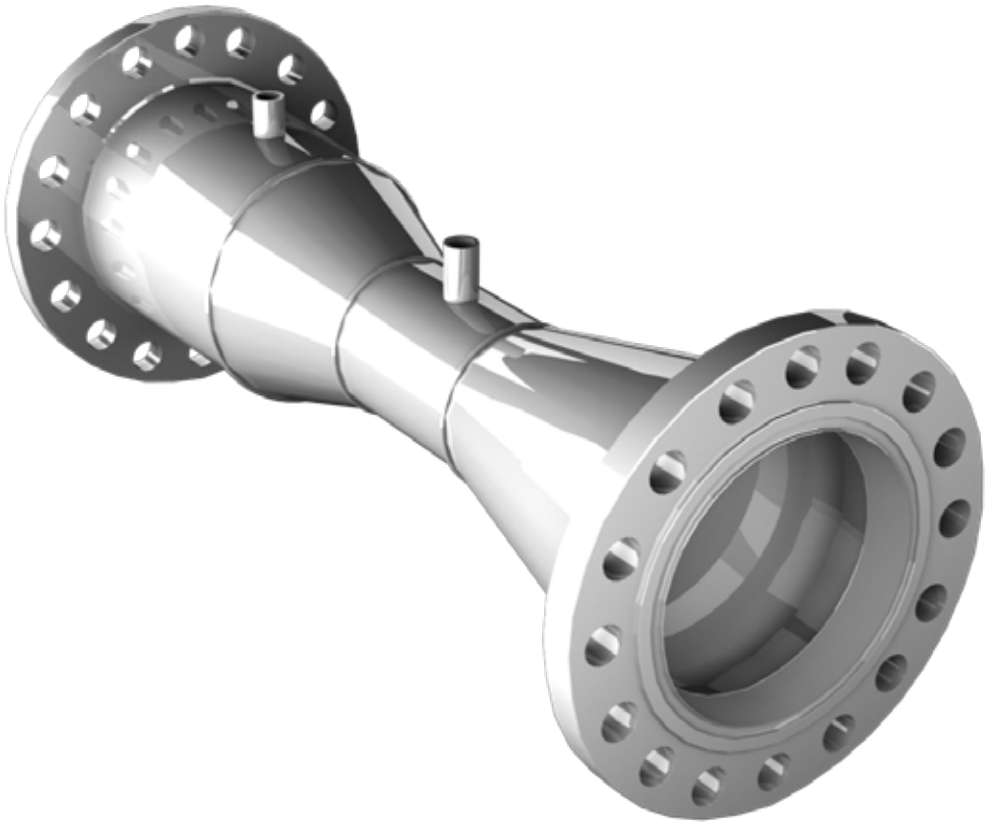
Quick Start Guide

Tek-DP 1640A

Venturi Tube



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Quick Start Guide

1. Before you begin

This guide provides basic guidelines to assist you in quickly getting started.

Installation of the transmitter in an explosive environment must be in accordance with the appropriate local, national, and international Standards, codes, and practices. Review the approvals section of the Tek-DP 1620A reference manual for any restrictions associated with a safe installation.

Do not remove the transmitter covers in explosive environments when the circuit.

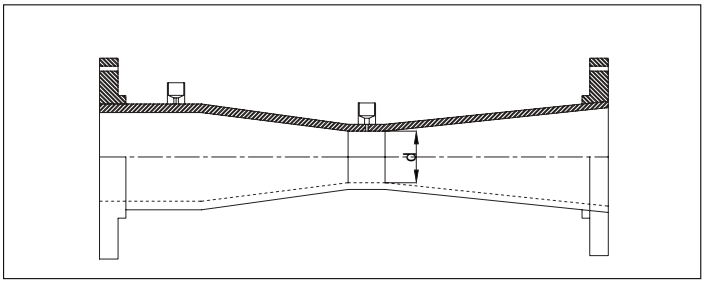
Make sure the transmitter is installed by qualified personnel and in accordance with applicable codes of practice.

2. Unpack

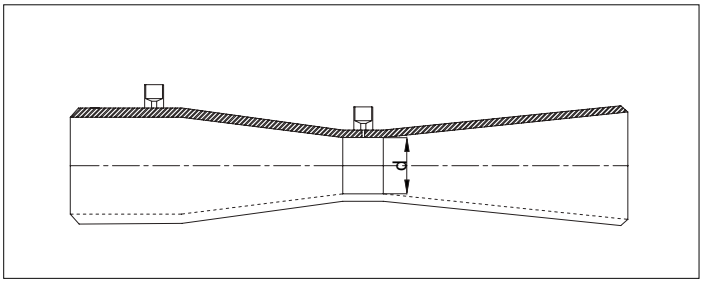
Tek-DP 1640A Venturi Tube

3. Meter Types

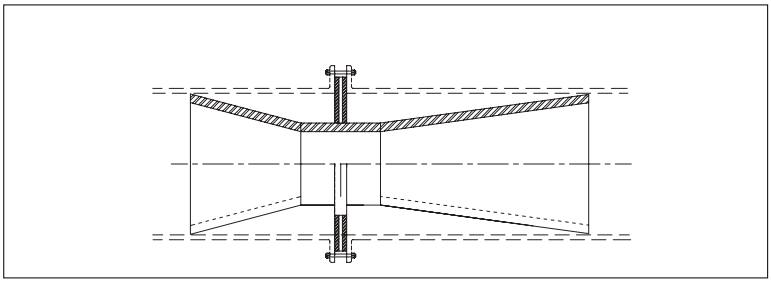
- *Flanged Type*



- *Weld-In Type*



- *Insertion Type*



4. Installation

- ## Mounting Options

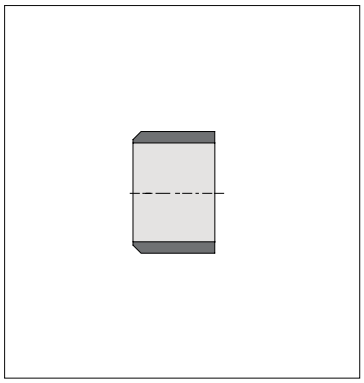


Fig 1: Butt Weld

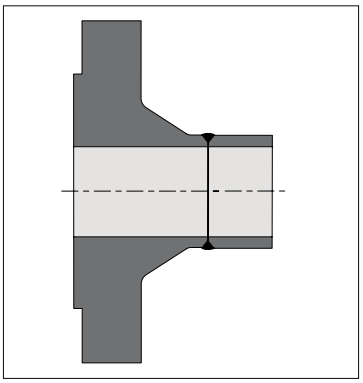


Fig 2: Welding Neck Flange

- ## Sealing Faces for Flanged Version

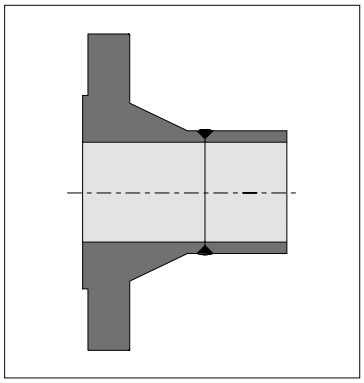


Fig 3: Raised Face (RF)

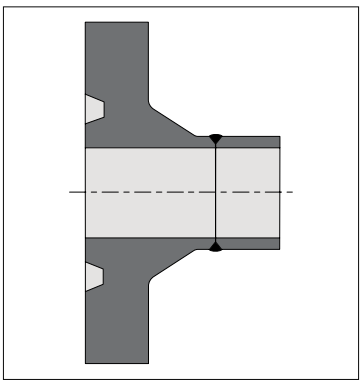


Fig 4: Ring Joint

- ## Pressure Tappings

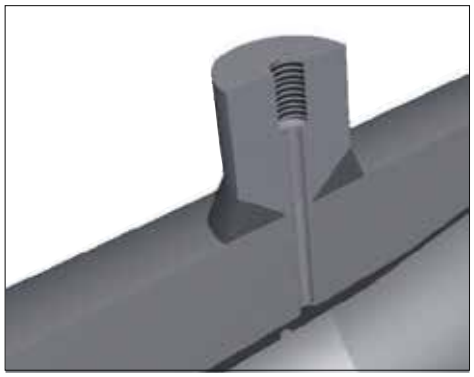


Fig 5: NPT Tap or Weld Stub

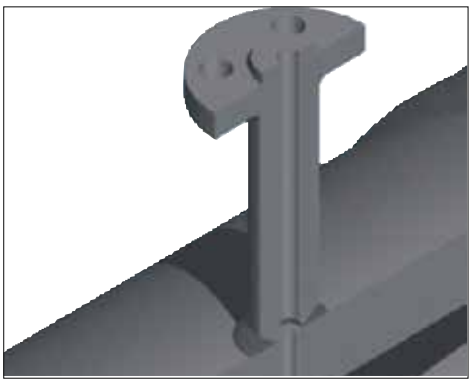


Fig 6: Tap with Flangged Ends

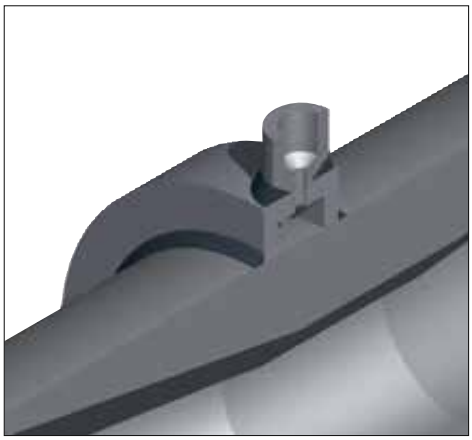


Fig 7: Annular Chamber Tap with Welded Ring

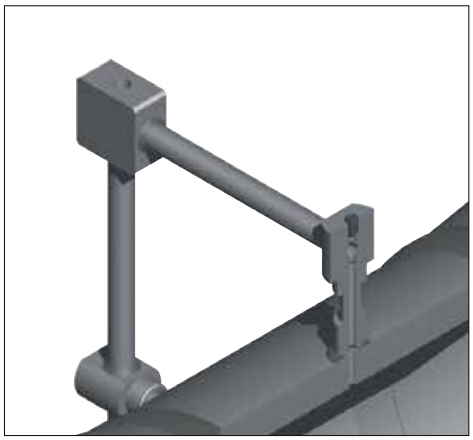


Fig 8: Annular Chamber Tap from Pipes

- ## *Standard Port Location for Horizontal Installations*

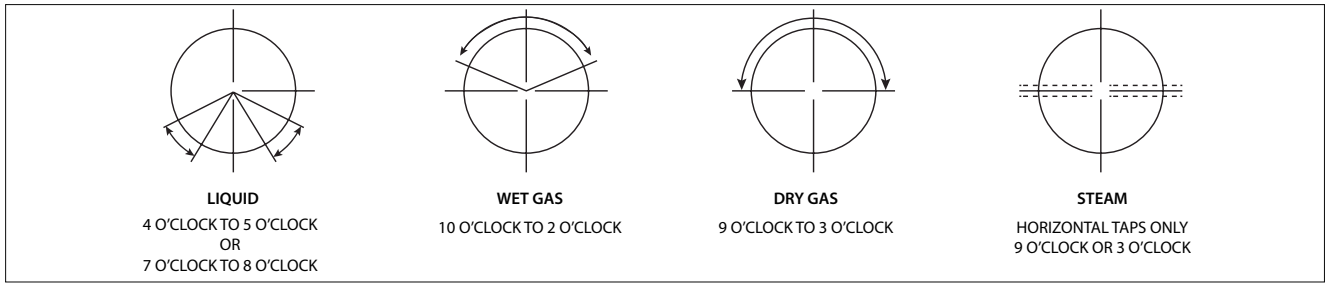


Fig 9: Standard Port Location for Horizontal Installation

- ## *For Liquid*

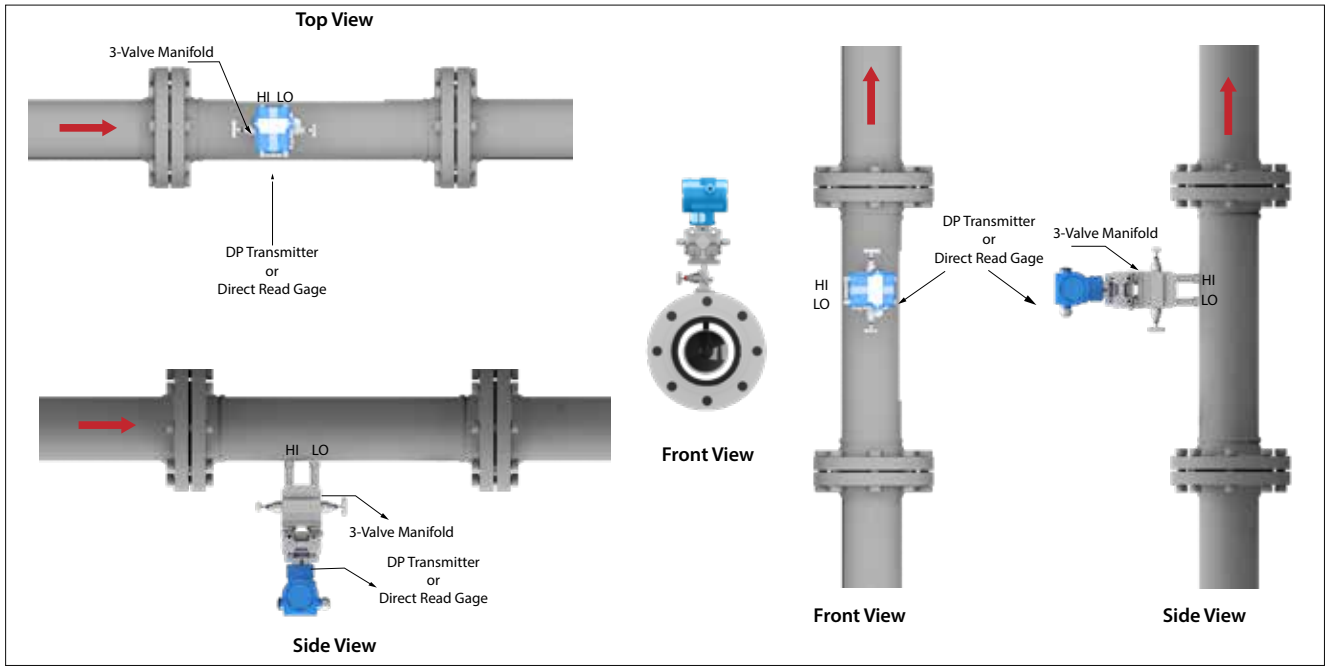


Fig 10: Horizontal Installation for Liquid

Fig 11: Vertical Installation for Liquid

- ## For Gases

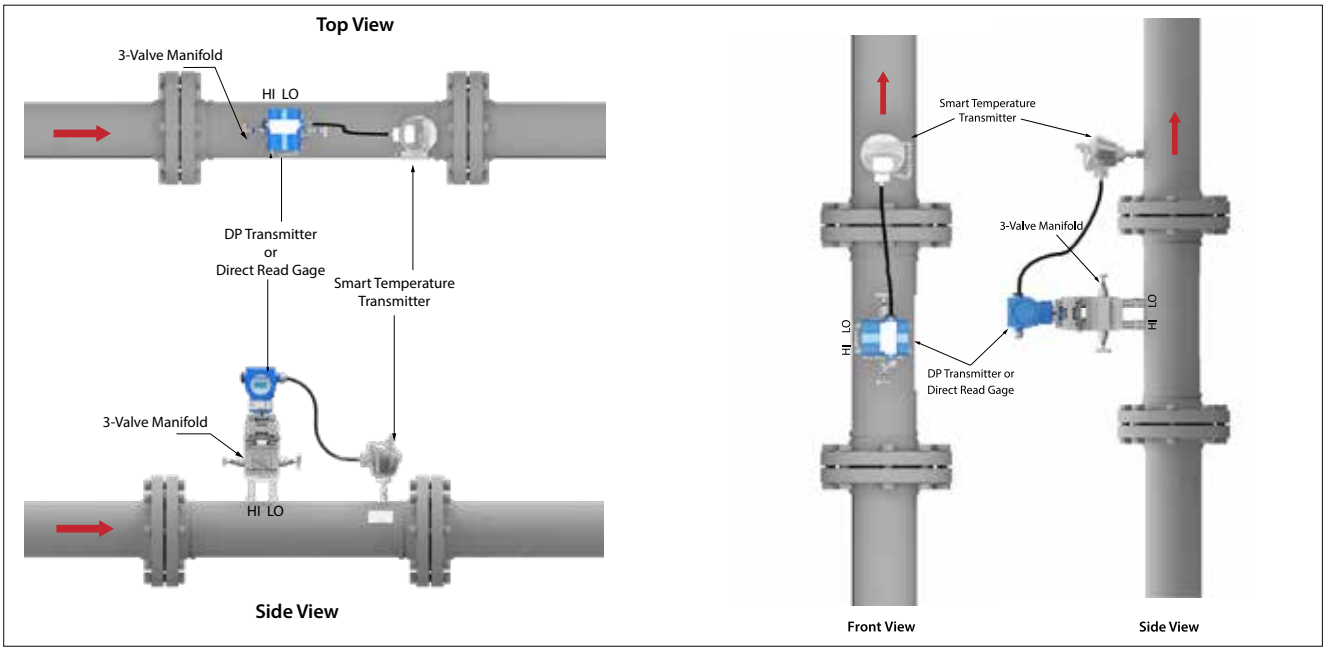


Fig 12: Horizontal Installation for Gases

Fig 13: Vertical Installation for Gases

- ## For Steam

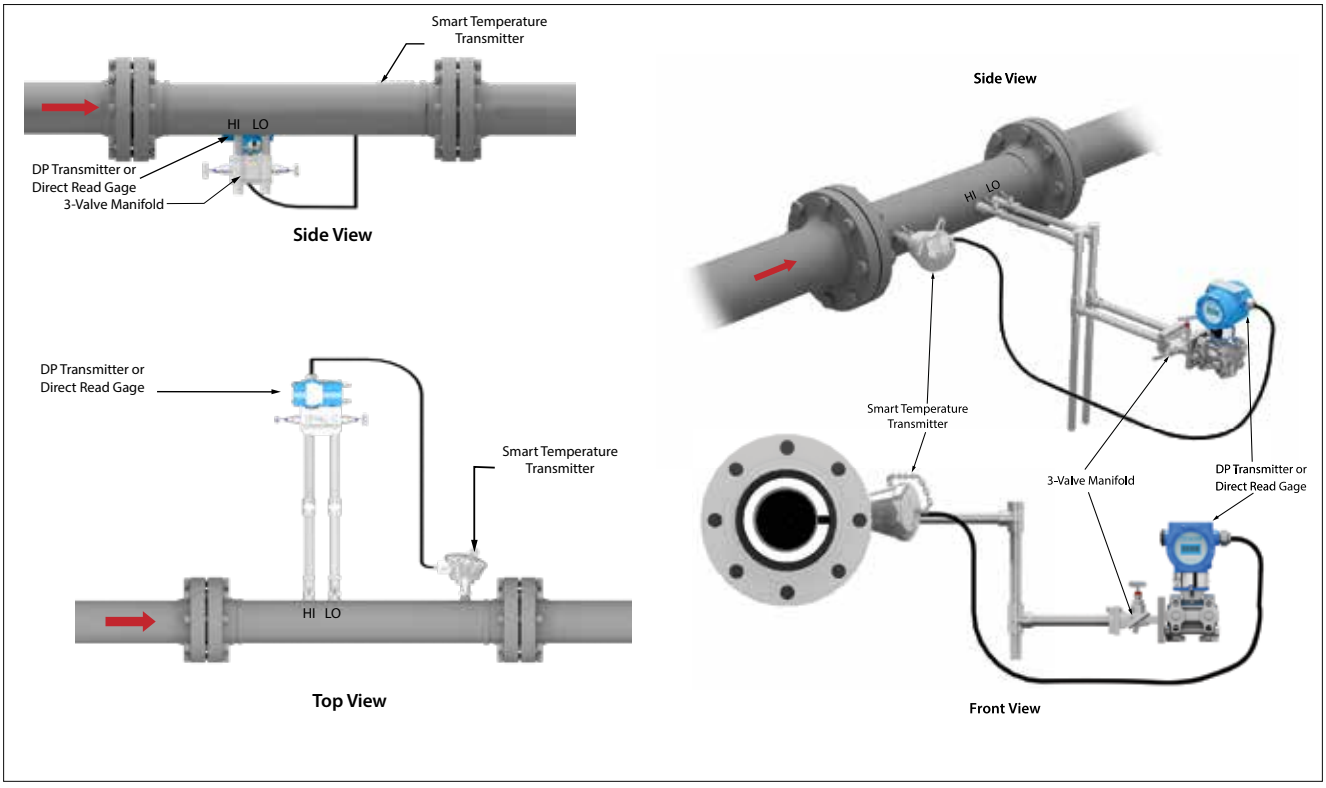


Fig 14: Horizontal Installation for Steam

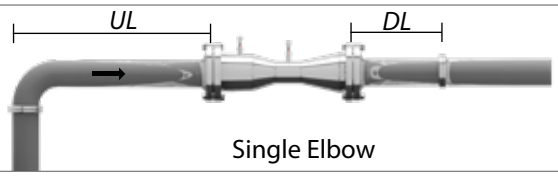
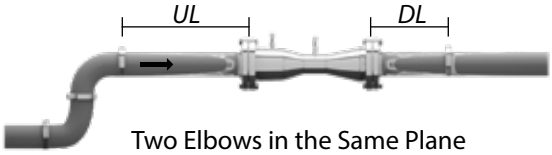
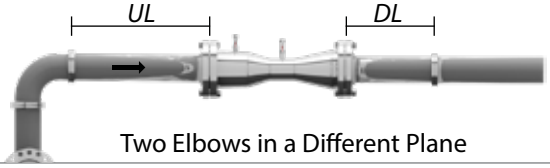
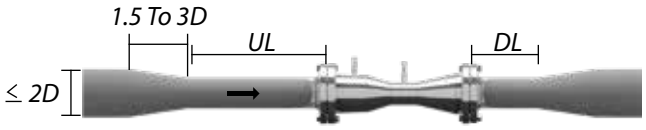
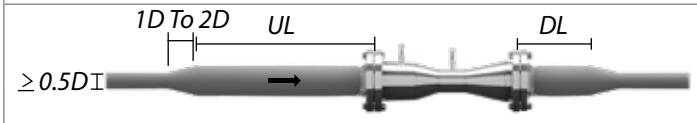
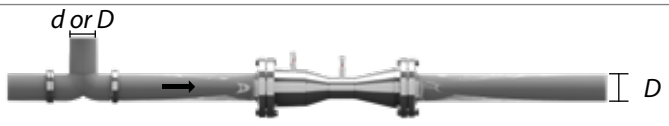
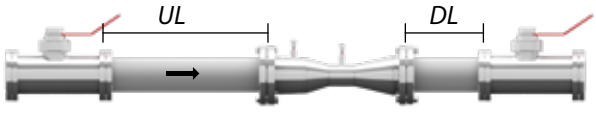
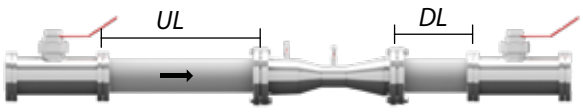
Fig 15: Vertical Installation for Steam

Quick Start Guide

• *Installation for Upstream and Downstream*

In most of the flow elements, the proper operation and performance depend on unrestricted upstream and downstream piping length requirements. The fully developed symmetrical flow profile is achieved with relatively short upstream and downstream lengths, which need minimal upstream and downstream straight pipe runs.

Note: *UL= Upstream* *DL = Downstream* *0 = NR*

		0.4	0.5	0.6	0.7
 Single Elbow	UL	4	4	4	5
	DL	2	2	2	2
 Two Elbows in the Same Plane	UL	8	8	9	10
	DL	3	3	3	3
 Two Elbows in a Different Plane	UL	15	15	15	20
	DL	4	4	4	4
 Reducer	UL	6	6	6	7
	DL	2	2	2	2
 Expander	UL	8	8	8	10
	DL	3	3	3	3
 Tee Connection with Different Diameters	UL	8	8	8	10
	DL	3	3	3	3
 Globe or Gate Valve Fully Opened	UL	6	6	6	6
	DL	3	3	3	3
 Globe or Gate Valve Partially Opened	UL	12	12	14	18
	DL	3	3	3	3

5. Maintenance

Periodic maintenance or re-calibration is unnecessary if the meter is installed correctly. In extreme process conditions, periodically inspect the Tek-DP 1640A Venturi Tube for any significant physical damage. Calibrate and maintain secondary and tertiary instruments according to the manufacturer's instructions.

6. Troubleshooting

This section provides troubleshooting techniques for most common operating problems shown in table 1.

Table 1: Troubleshooting Technique

Symptoms	Area	Possible Problem or Solution
No Signal (0mA)	Transmitter	• No Power to transmitter. • Transmitter not wired correctly. • Check continuity on wiring or loose connection.
Negative Signal (<0mA)	Transmitter	• Transmitter wires are reversed.
Low signal (<4mA)	Tek-DP 1640A	• Venturi Tube is installed backwards, with gauge lines attached as marked. • In this case, the high pressure tap would be sensing a lower pressure than the low pressure tap. • This negative DP would force the signal below 4mA.
	Gauge Line	• Gauge lines are reversed. Transmitter shows more pressure on lower side than higher side. • Check "H" and "L" marks on DP Cone Meter.
	Transmitter	• Some transmitters will send a specified mA signal when a malfunction occurs. • This can be set to low values, such as 3.8mA, or high values, such as 20.1mA.
Zero Signal (4mA)	Tek-DP 1640A	• Meter has been damaged. • Remove and visually inspect meter. • No flow in pipeline. • Check other system locations to verify flow through the meter. • The meter could be under pressure but still have no flow.
	Manifold	• Manifold / gauge lines closed or blocked. • Ensure valves and lines are open. • If fluid is safe, open vent valves on transmitter to verify pressure in the gauge lines.
	Transmitter	• Transmitter is in check mode. • Some transmitters allow for system checks by forcing the signal to 4 or 20mA. • Vent low side of transmitter to ensure the signal responds to pressure changes.

Wrong Signal High or Low	Tek-DP 1640A	• Process conditions do not match actual conditions. • Contact Tek-Trol or your sales representative to recalculate using the correct process conditions. • Wrong meter. • Verify serial numbers on meters to ensure correct specifications. • Sometimes two meters are interchanged. Remember each Venturi Tube has a unique flow coefficient.
	Gauge Lines	• Foreign material trapped in gauge lines. Dirt and sediment can settle into the gauge lines. If the fluid is safe, vent the gauge lines and inspect for spurts of solids, gasses, or liquids (whichever should not be there). • If the fluid is not safe, open the center manifold valve for several minutes under high DP. Close the valve and compare the signal level to before readings. • In a horizontal, liquid application, install the meter with the taps on the sides of the pipe (3 or 9 o'clock). For a horizontal, gas application, install at top or sides of the pipe (12, 3, or 9 o'clock).
	Flow Computer	• Flow calculations have an error. • Use loop calibrator and apply 4, 12, and 20mA to computer / system. • Each of these points should be correlate with the DP Cone Meter sizing information. • Current output signal is read incorrectly. • Apply a known current to the loop and read the raw signal in the computer. • Most computers allow the user to see the mA signal directly.
Unsteady Signal	Tek-DP 1640A	• Partially full pipe occurring (liquids only). • Periods with a partially full pipe will cause wrong readings. See above for details.
	Transmitter	• Insufficient Power supply to generate signal. • Check power specifications for transmitter.
Slow response time	Transmitter	• Dampening.
Sudden change in readings	Tek-DP 1640A	• Foreign object lodged in meter. • This will increase the restriction of the meter and raise the DP. • Remove the meter for visual inspection.
	Gauge Lines	• Possibility of leakage within the line.
Signal Very High	Tek-DP 1640A	• Meter body, near the pressure taps. • If any arrow is not visible and the meter is large than 2", the flow direction can be determined by the location of the pressure taps. • The pressure taps will be closer to the upstream side. • On meters less than 2", the gauge lines will need to be removed. Look at the base of both pressure taps. One tap will be smooth at the base, the other will be mostly weld material. • The smooth tap is on the upstream side. • Flow is going in the opposite direction from what was expected. The assumption of flow direction is sometimes wrong. • Verify with other system readings. • With a meter measuring backward flow, the DP signal will be approximately 30% high. • Partially full pipe (liquids only). A partially full pipe will cause the meter to read very high value. This can happen even in pressurized

Signal Very High	Tek-DP 1640A	• systems.
		  o On horizontal pipes: If the fluid is safe, open a pressure tap on the top of the pipe. Air release will indicate partially full pipe.
		  o On vertical pipes: Up flow will guarantee a full pipe. Down flow is difficult to diagnose if the pipe is full.
		• Foreign object lodged in meter. This will increase the restriction of the meter and raise the DP. Remove the meter and visually inspect.

	Gauge Lines	• Leak on low pressure gauge line. • Perform a leak check from the meter to the transmitter.
	Transmitter	• Leak on low pressure vent valve. Perform a leak check on valve. • Zero point has shifted positively. This will cause errors more pronounced at the low end of the transmitter range. • Verify by closing the manifold side valves and opening the center valve. The reading should go to zero (4mA). • Recalibrate if necessary. DP span is set very low. • Use pressure calibrator or handheld communicator to verify span point.
	Transmitter/Flow Computer	• Both the transmitter and flow computer are set to take the square root of the signal. • The signal will be correct at 20mA. The positive error will increase dramatically as the signal decreases from 20mA. • Use a loop calibrator to check 12mA point.
	Flow Computer	• 4mA set to minimum flow. • Our calculations assume that 4mA will be equal to zero flow. Sometimes 4mA is set to equal the minimum flow on the sizing page. • This error will be zero at maximum flow and increase as the flow decreases. • The amount of error will depend on the zero offset.
Signal Very Low	Manifold	• Manifold is cross-vented. The center valve must be closed. • To test, close the two side valves and watch the transmitter signal. • If the signal goes to zero (4mA), the center valve is not closed completely.
	Gauge lines	• Leak on high pressure gauge line. • Perform a leak check from the meter to the transmitter.
	Transmitter	• Perform a leak check on valve to identify leak on high pressure vent valve. • Zero point when shifted negatively will cause errors more pronounced at the low end of the transmitter range. Verify by closing the manifold side valves and open the center valve. The reading should go to zero (4mA). Recalibrate if necessary. • Transmitter DP span is set too high hence use pressure calibrator or handheld communicator to verify span point.
	Transmitter or Flow Computer	• Neither the transmitter nor flow computer is set to take the square root of the signal. The signal will be correct at 20mA. • The negative error will increase dramatically as the signal decreases from 20mA. • Use a loop calibrator to check 12mA point.

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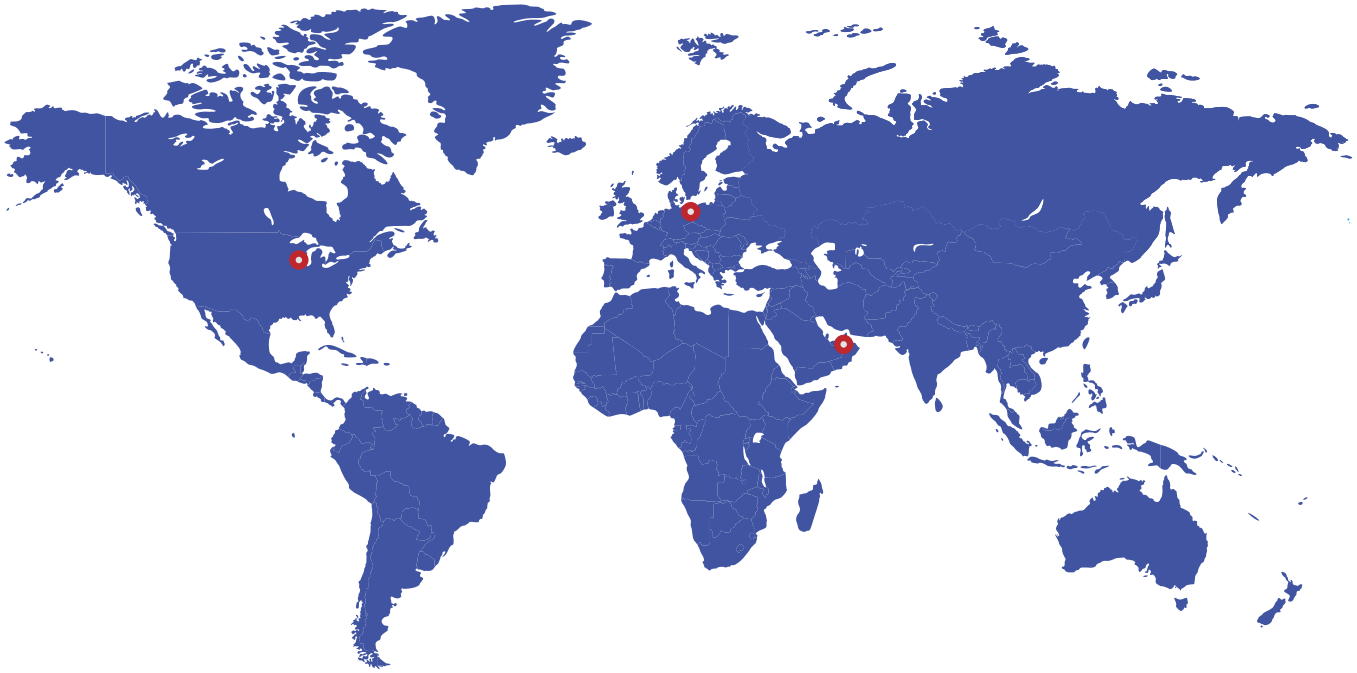
Technology Solutions



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