Installation and Operating Manual

FM50 IOM 6-18

HOERBIGER

altronic

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1.0 SAFETY PRECAUTIONS

Continental Controls fuel control and measuring devices are normally used with natural gas. Natural gas is combustible. If natural gas is contained within a confined space, such as an engine enclosure or a building, it can explode when ignited. It is necessary to always use extreme caution when working with fuel systems.

WARNING!

DO NOT ATTEMPT TO REPAIR. THE FM50 MUST BE RETURNED TO CONTINENTAL CONTROLS CORPORATION FOR REPAIR AND SERVICE.

When installing the FM50 in Class I Division 2 Hazardous Locations, installation of all electrical equipment MUST be in compliance with the National Electric Code (NEC). Customer is responsible for termination of pigtail wires out of the cable harness assembly on the FM50.

The FM50 cables MUST be continuously supported and protected against physical damage using mechanical protection such as dedicated struts, angles or channels. The FM50 cables MUST be secured in conduit. After installation all connections should be inspected for leaks. Do not connect or disconnect the FM50 unless power is off.

WARNING!

Be sure to disconnect the FM50 before welding.

WARNING!

Protective Earthing (Protective Grounding): Enclosure to be bonded to earth ground using minimum 14 AWG wire.

2.1 PART NUMBERS

Part Number	Description	Quantity
54700008-X	Flow meter, model; FM50, Configuration; X See the configuration data for the value of X	1
54701507-2-30	Cable, interface, 30 feet, FM50	Select 30 or 60 foot
54701507-2-60	Cable, Interface, 60 feet, FM50	
54709009-1	Kit, Split Flange, 2" Butt Weld Head (the kit contains the parts in the green area below)	1
54709019	Flange, Split, SAE, 4-bolt pattern, 2" pipe	(2)
54709039	Kit, Mounting, 2" pipe SAE split flange	(2)
54709049	Flange Head, Butt Weld, 2" pipe SAE split flange	(2)
54709009-2	Kit, Split Flange, 2" NPTF Head (the kit contains the parts in the gray area below)	1
54709019	Flange, Split, SAE, 4-bolt pattern, 2" pipe	(2)
54709029	Flange Head, NPTF threaded, 2" pipe SAE split flange	(2)
54709039	Kit, Mounting, 2" pipe SAE split flange	(2)

Model FM50 part number 54700008-X

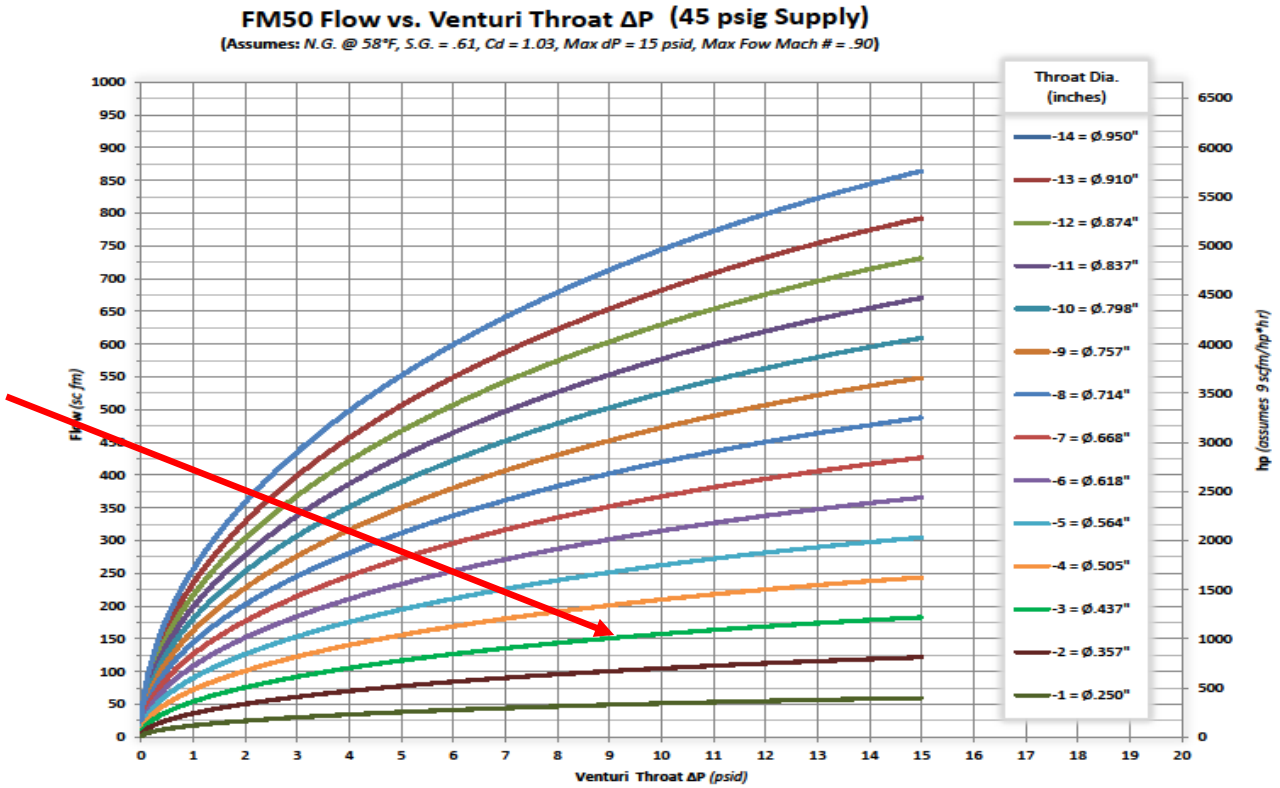
2.2 CONFIGURATIONS

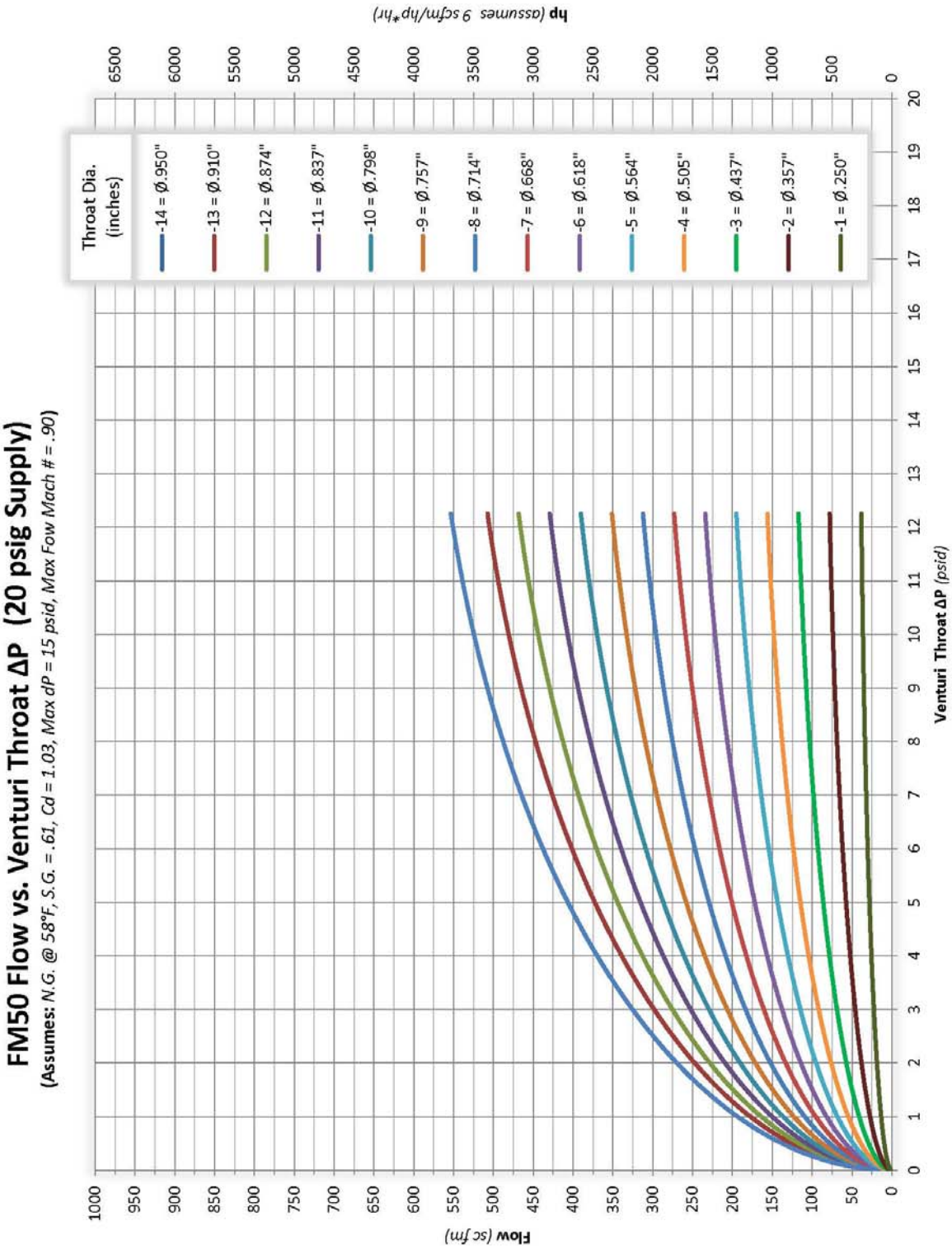
The following tables are provided to determine the configuration or sizing of the FM50 flow meter. To determine the correct dash number, select the proper table based on the gas supply pressure at the point where the meter will be located. The pressure is located at the top of each table. On the left side of each table is the gas flow rate being supplied to the FM50. If the flow rate is unavailable, the engine horsepower can be used to determine the configuration, but the engine horsepower will only provide an approximation. Use the gas flow rate for the application whenever possible.

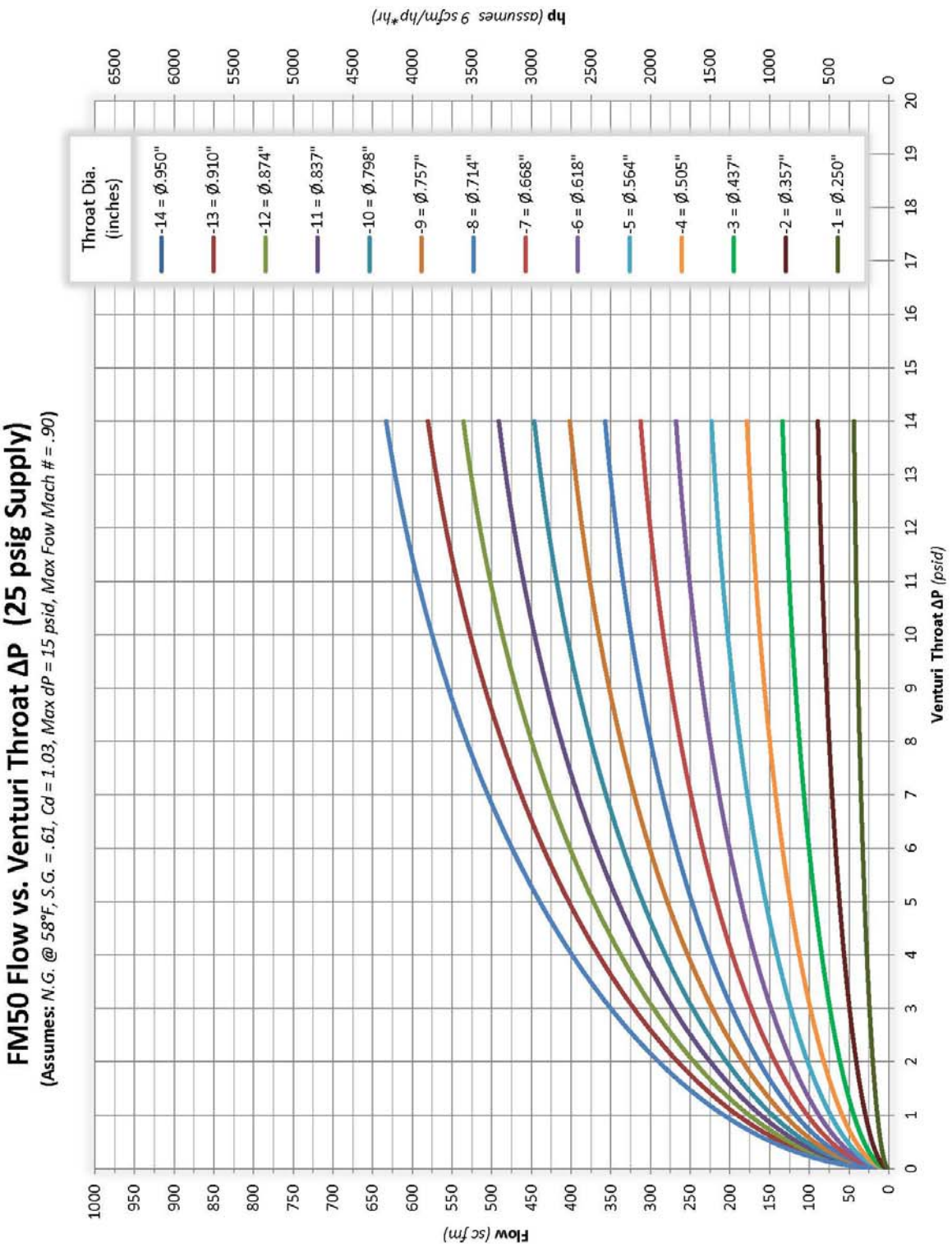
Using the Flow Rate: Locate the proper flow on the left of the appropriate chart, then follow the line to the right until it intersects with a colored, dash-number line on the graph. Use the intersection with the highest venturi throat differential pressure (ΔP) value (farthest to the right). Find the dash number that corresponds with the colored line. This is the configuration (dash number) for this application.

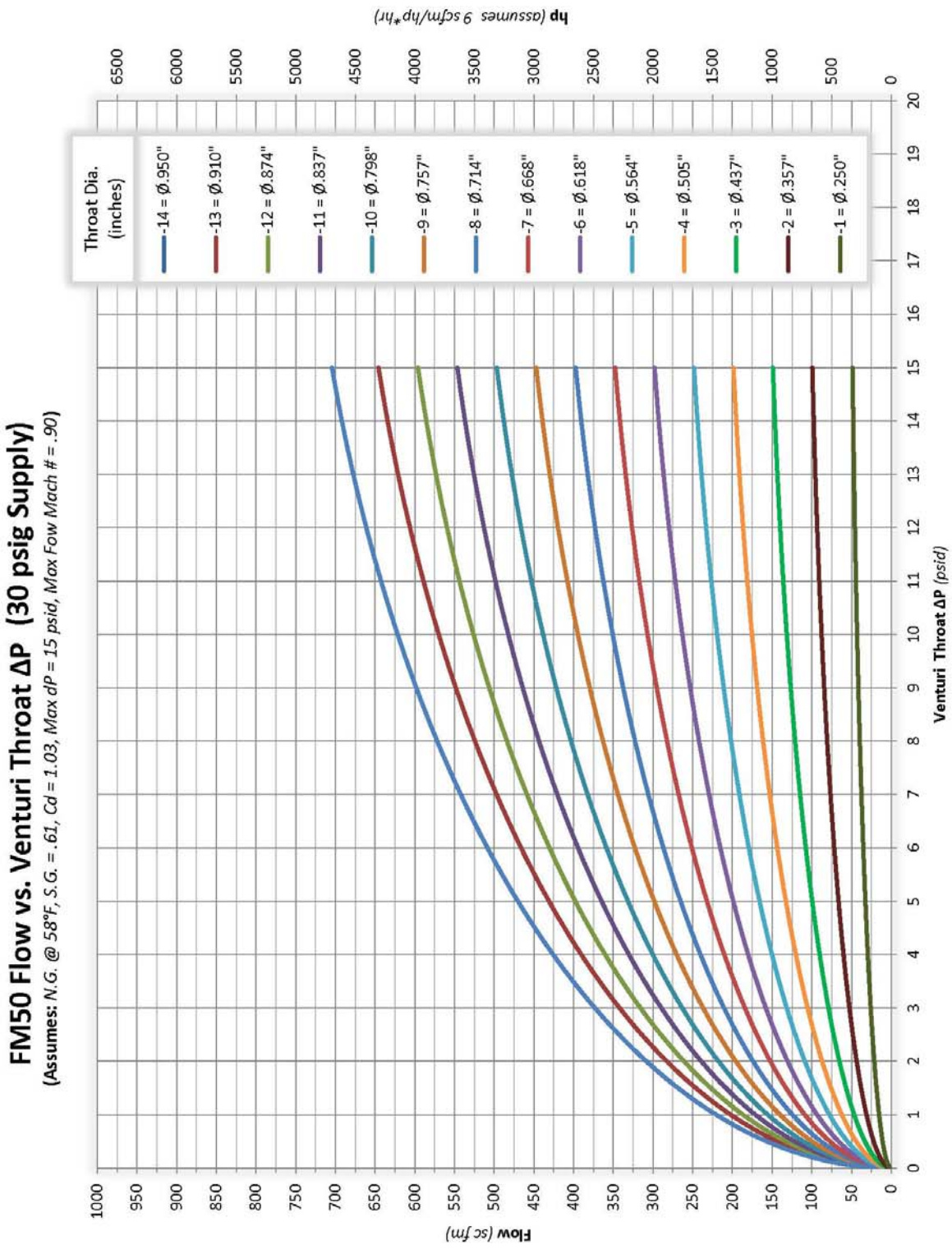
Using Horsepower: Locate the proper horsepower on the right of the appropriate chart, then follow the line to the left until it intersects with a colored, dash-number line on the graph. Use the intersection with the highest venturi throat ΔP value (farthest to the right). Find the dash number that corresponds with the colored line. This is the configuration (dash number) for this application.

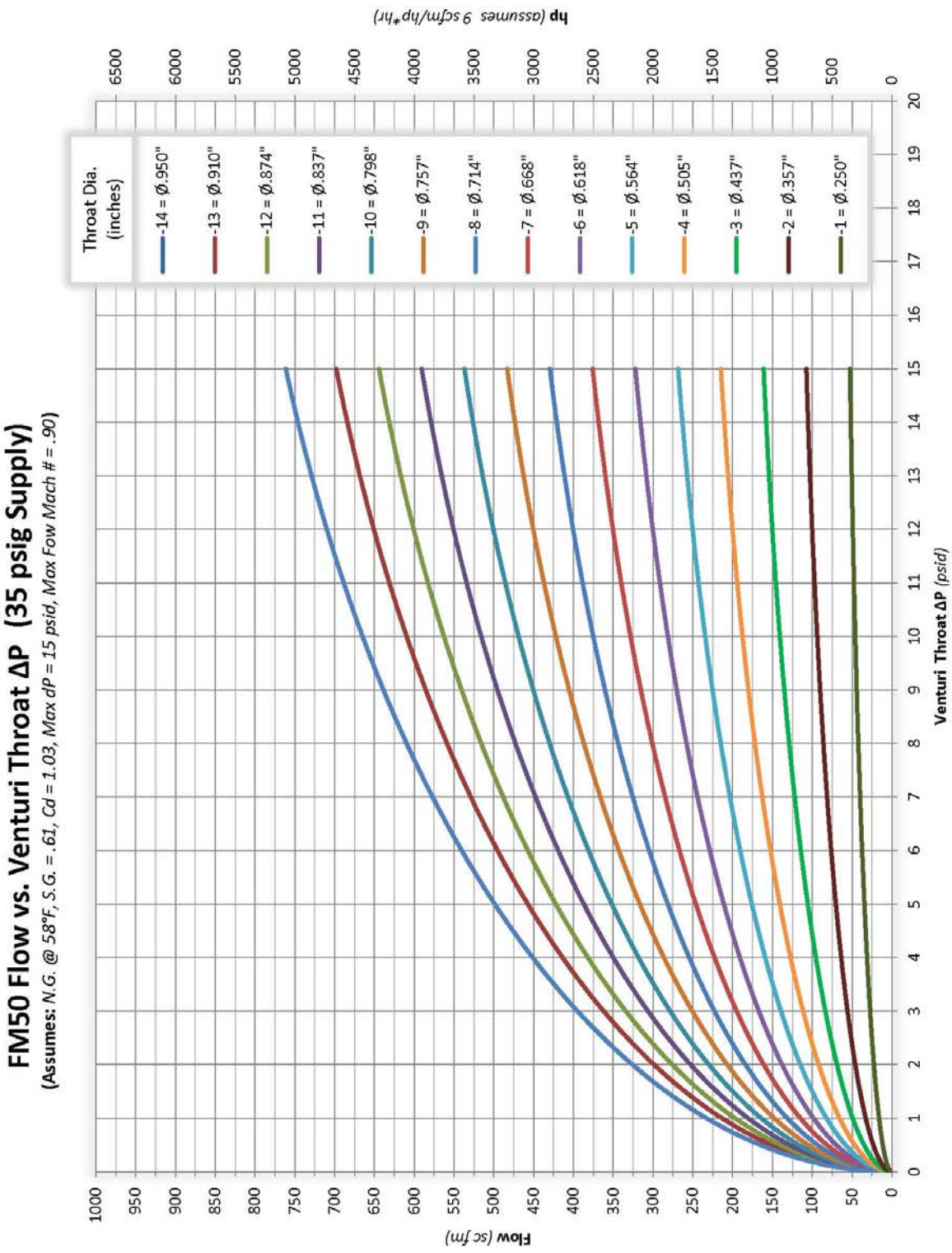
Example: A flow meter running on a supply pressure of 45 psi and a flow of 150 scfm. Use the correct table (based on the supply pressure) and determine the dash number that creates the largest venturi throat ΔP. In this example, the largest possible venturi throat ΔP is 9 psid and the configuration is a Dash-3.

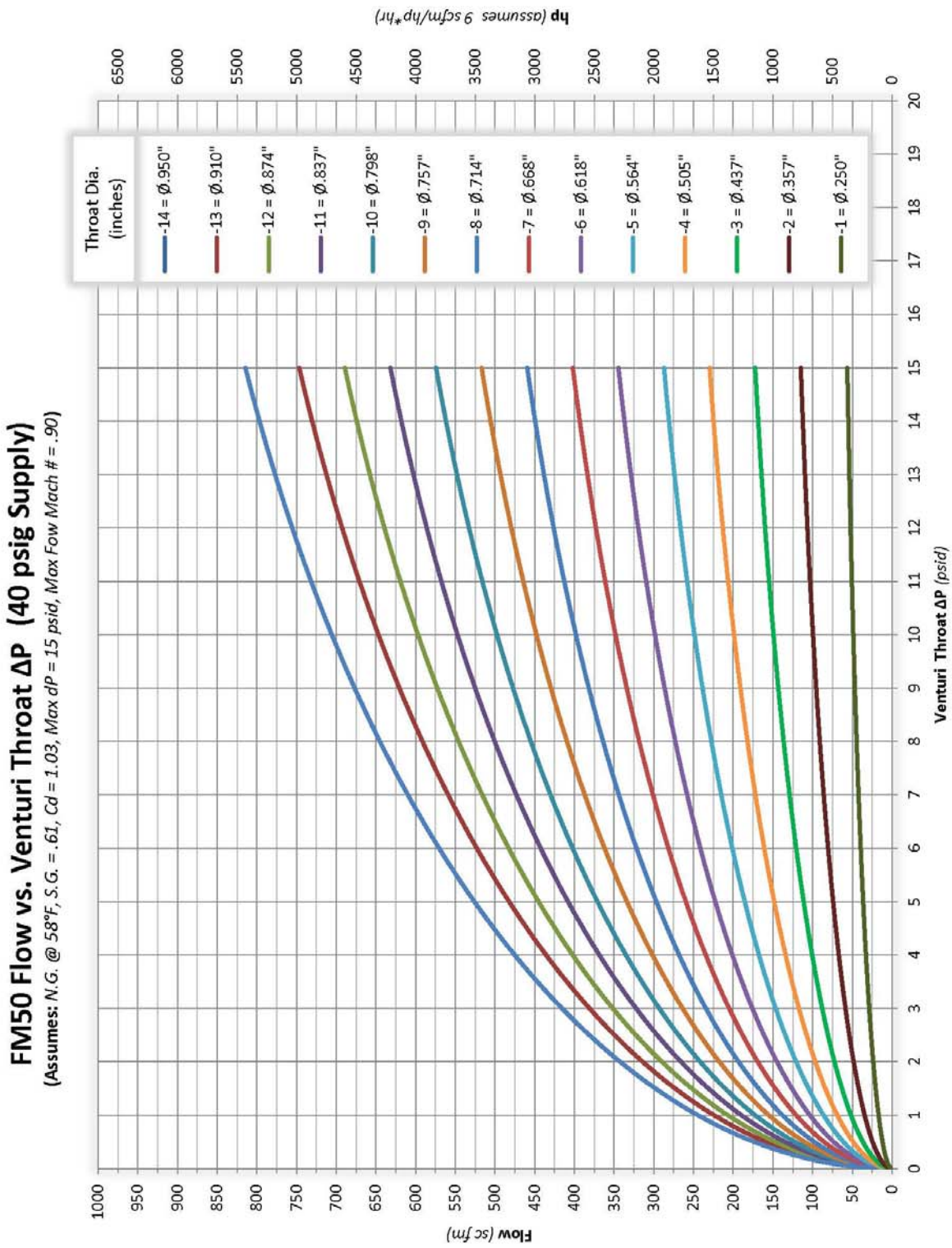


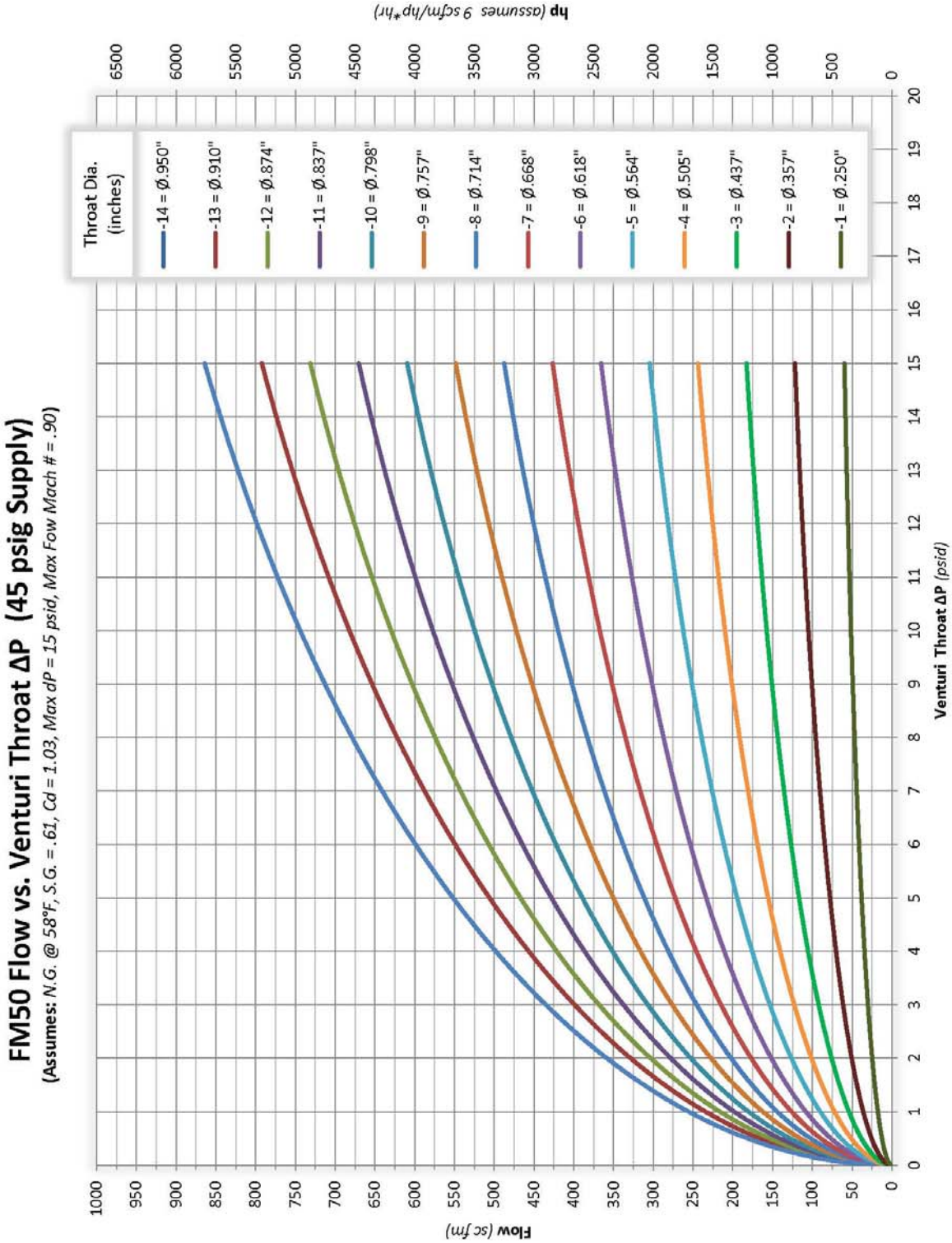


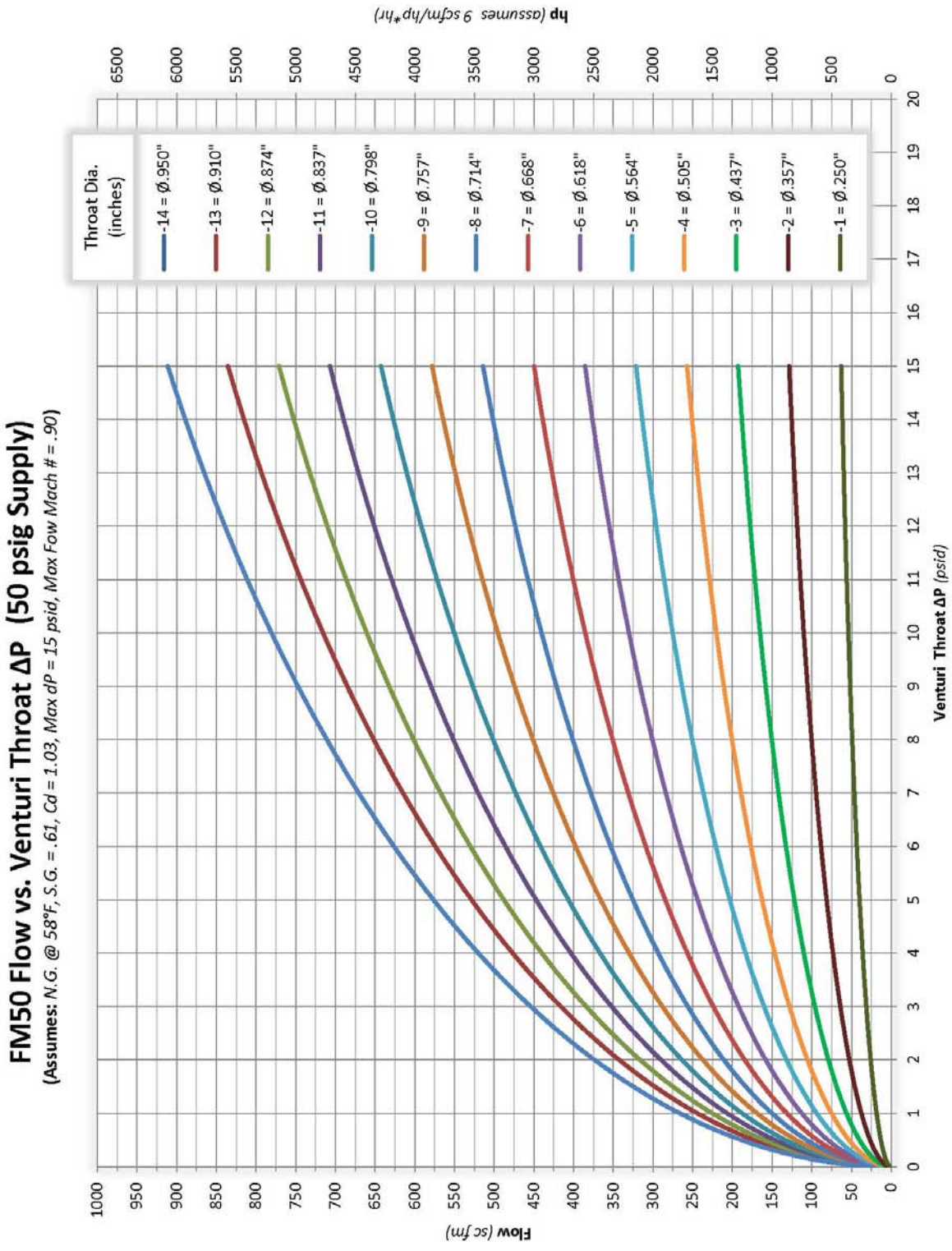










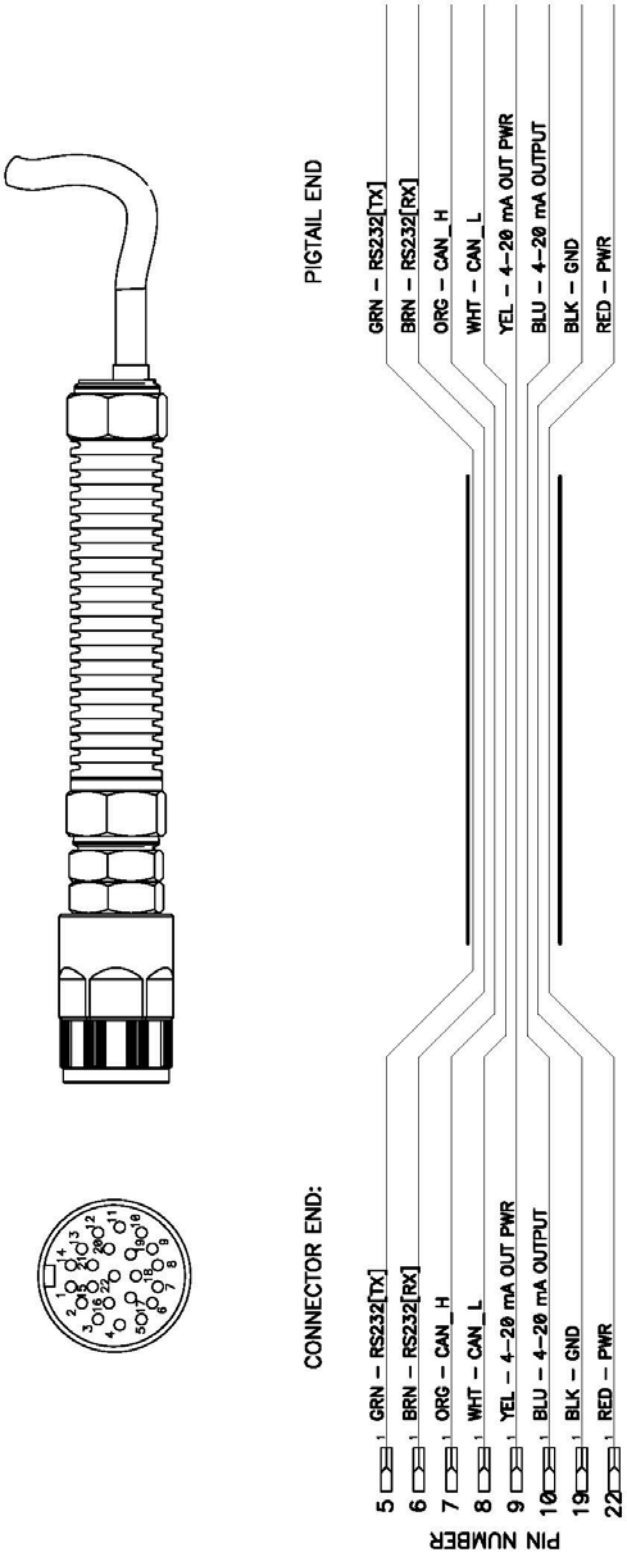


2.3 SPECIFICATIONS

Parameters	Values
Supply Voltage	10-30 Vdc – 25 watts (*see note)
Ambient Temperature Limit	-40°C to +85°C (-40°F to 185°F) (*see note)
Wetted Materials	Anodized aluminum, 6061-T6 Stainless Steel, 300 series Nitrile o-rings
Maximum working pressure (the actual working pressure will be based on the application and is listed on the FM50 cover)	500 psig
Analog output	4-20mA, Loop Powered
Communication	RS232, Modbus RTU
	CanBus J1939
	2.4GHz Radio – Modbus RTU
Hazardous location certifications	CSA Class 1 Division 2 Group D, T4
Flange	ASE 61 series, 4 bolt, 2-inch pipe
Minimum piping requirements	2” schedule 40, 20” upstream, 10” downstream (straight pipe)
Accuracy	The greater of: 2% of reading or 0.5% of full scale.

* Temperatures below 35°F require a supply voltage above 14Vdc.

2.4 CABLES AND WIRING



2.5 INTERFACE, PARAMETERS AND SETUP

2.5.1 FM50 Interface

The FM50 has three buttons on the right side of the display. The three buttons have the following functions;

1) Top button – Cycle through different screens on the display or Increase a value in the setup menu.
2) Center button – the Enter key.
3) Bottom button – Cycle through different screens on the display or Decrease a value in the setup menu.

2.5.2 The parameters available in the Main Menu are as follows:

1. **CURRENT FLOW** – Instantaneous gas flow measurement.
2. **ACCUM FLOW** – The accumulated total flow since last zeroing. [The accumulator can be zeroed by pressing "Enter" (the middle button) while on this screen. This is the only accumulated flow that can be zeroed.]
3. **CURRENT HOUR** – The accumulated flow for current hour.
4. **LAST HOUR** – The accumulated flow for the last hour.
5. **TODAY** – The accumulated flow for the current date.
6. **YESTERDAY** – The accumulated flow for yesterday's date.
7. **MONTH TO DATE** – The accumulated flow for the current month.
8. **LAST MONTH** – The accumulated flow for last month.
9. **YEAR TO DATE** – The accumulated flow for the current year.
10. **LAST YEAR** – The accumulated flow for last year.
11. **PSIA** – Absolute pressure reading.
    [PSIA is the barometric pressure at your location (in Hg) divided by 2.036.]
12. **TEMPERATURE** – Temperature of the gas in the meter.
13. **DIFFERENTIAL** – Differential pressure measurement. This should be zero when no gas is flowing through the meter.
14. **SETUP MENU-ENTER** If you press the "Enter" (middle) button while this is displayed, you will enter the set-up menu (see next page/section).

2.5.3 The Setup Menu

The setup menu is used to set the time, change the password, zero the transducers and make adjustments to the flow calibration. The following items are in the setup menu:

1. **DATE** – Enter the current date (Month/Day/Year format)
2. **TIME** – Enter the current time (HH:MM:SS format)
3. **AUTO ZERO DP** – Turn ON/OFF the auto zero function for the DP transducer
4. **NEW PASSWORD** – Enter/change the password. Default value: 0000
5. **ZERO PRESSURE XDUCER** – Zero supply pressure transducer
6. **ZERO DP XDUCER** – Zero differential pressure transducer
7. **FLOW CONSTANT** – Enter the gas flow constant based on gas properties. Default value (for Natural Gas): 1041
8. **GAS TYPE** – Choose gas type: Natural Gas, Propane, Air, Customer Defined. Default Value: Natural Gas
9. **ORIFICE TYPE** – This value is set by the factory. The orifice type is based on the orifice diameter:
    1. 0.250 inch
    2. 0.357 inch
    3. 0.437 inch
    4. 0.505 inch
    5. 0.564 inch
    6. 0.618 inch
    7. 0.668 inch
    8. 0.714 inch
    9. 0.757 inch
    10. 0.798 inch
    11. 0.837 inch
    12. 0.874 inch
    13. 0.910 inch
    14. 0.950 inch
10. **PSIA** – Enter absolute pressure expressed in psia. Default value: 14.7 psia. Pressure conversion formula: [(Barometric Pressure (inch Hg)) ÷ 2.036 = psia]
11. **MODBUS ADDRESS** – Set Modbus Address. Default value: 25
12. **SAVE** – Save current settings to FLASH memory
13. **MAIN MENU** – Exit from SETUP MENU to MAIN MENU.

2.6 RECOMMENDED INITIAL SETUP

1. Install the FM50. Pipe should be clean and free of debris
2. Verify there is no pressure on the flow meter
3. Verify power is OFF,
   a. Connect ground (the black wire, pin 19) on the connector to the return/ground on the power supply or battery. See the Cables and Wiring section of this manual
   b. Connect the power (red, pin 22) and the 4-20mA (yellow, pin 9) to the power supply
   c. Connect the analog out (blue, pin 10) to PLC or SCADA system.

NOTE:

The power ground must have continuity to the analog ground of the reading device.

4. Turn the power ON
5. Enter the time and date
6. Enter the password
7. Enter the PSIA value
8. Zero the PSIA transducer
9. Zero the DP transducer
10. Confirm auto-zero is ON
11. Turn the gas ON
12. Check for leaks

2.7 DIMENSIONAL DRAWING