



# Air Monitor

Precision Airflow Measurement  
An ONICON Brand

## ELECTRA-flo 5 Series

### THERMAL AIRFLOW MEASUREMENT SYSTEM

The E-flo 5 Series represents the state-of-the-art in electronic airflow measurement. The 5 Series has the features and performance required by the challenging applications found in today's complex HVAC systems.



## ELECTRA-flo 5 Series

### THERMAL AIRFLOW MEASUREMENT SYSTEM



## DESCRIPTION

Air Monitor's ELECTRA-flo 5 Series Thermal Dispersion Airflow Measurement instruments accurately measure airflow in a wide variety of commercial HVAC applications and installations.

At the heart of each ELECTRA-flo/S5 thermal probe array is pairs of precision matched thermistors installed in aerodynamic apertures. These sensor aperture assemblies are specifically designed to reduce the effects of angular flow distortions found within ducted air distribution systems. The design, construction, and calibration of each thermistor sensor pair ensures the accuracy and long term reliability of the measurement system.

## APPLICATIONS

Permanently installed airflow measurement systems provide the real time, actionable information required for the safe, code compliant and efficient operation of today's high performance buildings.

Building Airflow Distribution Systems - Including supply, return, exhaust, relief and dedicated outdoor air systems (DOAS) applications.

Fan Inlet Airflow Measurement - Single inlet, dual inlet or fan wall installations.

## CALIBRATION

Individual sensors receive a multi-point, NIST\* traceable calibration of air velocity and temperature across the entire operating range.

## FEATURES

### Accommodates (32) Thermal Sensing Points per Array

More sensing points means more accurate measurements in challenging "real world" duct configurations.

### Serial Communication Bus Between Individual Sensors and Transmitter

Allows individual probes to be daisy chained together in the field - Saves time and money by simplifying the installation!

### Ruggedized, Hermetically Sealed Sensors - Precision Thermistors And Heating Circuit Are Fully Encapsulated

Provides a high degree of protection from the environment and allows the sensor assembly to be cleaned without damage.

### Dedicated ELECTRA-flo G5 Transmitter with Display

Each airflow measurement system comes complete with a transmitter that is factory matched and configured, guaranteeing system performance.

### True Dual Channel Version Available

The ELECTRA-flo G5 Dual Transmitter provides two separate airflow measurements in one transmitter. Duct size and sensor allocation is set independently for each channel.



\* National Institute of Standards and Technology

# ELECTRA-flo 5 Series

## THERMAL AIRFLOW MEASUREMENT SYSTEM



### SPECIFICATIONS\*

ELECTRA-flo G5 Transmitter		
PERFORMANCE	SYSTEM CONFIGURATION	Single or dual channel operation Supports up to 32 individual thermal dispersion airflow sensors Provides airflow velocity, flow and temperature Supports multiple airflow measurement system types Provides three (3) field characterization methods
OPERATING CONDITIONS	AMBIENT TEMPERATURE	-20°F to 180°F (Storage), -20°F to 140°F (Operating)
	HUMIDITY	0 to 99% RH, non-condensing
INPUT POWER	24 VAC	20 - 28 VAC, 16 - 90 VA, varies based on # of sensors (# of sensors x 1.1 VA)
	24 VDC	20 - 28 VDC, 16 - 50 W, varies based on # of sensors
I/O SIGNALS	Two (2) analog outputs, selectable based on configuration	
ELECTRONICS ENCLOSURE	AVAILABLE OPTIONS	<ul style="list-style-type: none"> <li>Aluminum, NEMA 1</li> <li>Stainless steel, NEMA 4X without viewing window</li> <li>Aluminum, NEMA 1 with conduit connection box</li> <li>Fiberglass, NEMA 4X with viewing window</li> </ul>
	DISPLAY	2.75" x 2" TFT color LCD
PROGRAMMING	Menu driven user interface via four (4) push buttons	
ELECTRICAL CONNECTIONS	POWER	Removable terminal block for use with 14 to 18 AWG wire
	COMMUNICATIONS	Removable terminal block for use with 14 to 22 AWG wire
	I/O	Removable terminal block for use with 14 to 22 AWG wire
PROCESS CONNECTIONS	AVAILABLE OPTIONS	<ul style="list-style-type: none"> <li>NEMA 1 enclosure, two (2) mini-DIN connectors XMTR to probes and two (2) ½" conduit openings</li> <li>NEMA 4X enclosure, two (2) liquid tight cord grips and two (2) ½" conduit openings</li> </ul>
NETWORK CONNECTIONS	RS485, BACnet MS/TP or MODBUS RTU	
APPROVALS	UL	60730
	BTL	Certified to BACnet standard ISO 16484-5 rev. 1.12
	FCC	Meets part 15 Subpart B, Class A device requirements
ELECTRA-flo/S5 Thermal Dispersion Probe Array		
PERFORMANCE	SENSOR ACCURACY	Individual sensor accuracy: ±2% of reading from 0 - 5000 FPM
	SYSTEM ACCURACY	Complete system accuracy: ±3% of reading over published velocity range
	VELOCITY RANGE	Ducted mounted installations: 0 - 5000 FPM Station mounted probe arrays: 0-5000 FPM (0-4000 FPM with straightening cell) Fan inlet installations: 0-10,000 FPM
SENSOR DESIGN	Precision matched, hermetically sealed thermistors with laser trimmed resistive heating element Dedicated 16 bit A/D processing of each sensor signal Sensor node consists of two (2) thermistors mounted in a dedicated flow conditioning aperture	
	TEMPERATURE ACCURACY	±0.1°F over operating range of -20°F to 140°F
SENSOR CAPACITY	TRANSMITTER	Maximum of 32 sensors per transmitter, shared between both channels
	PROBE	Maximum of 8 sensors per probe

\* SPECIFICATIONS subject to change without notice.



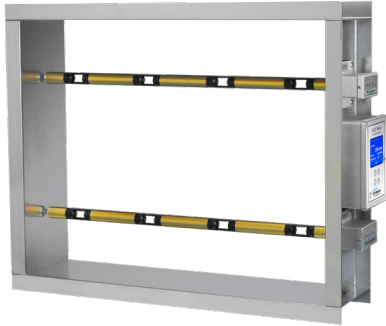
## SPECIFICATIONS CONTINUED\*

<b>ELECTRA-flo/S5 Thermal Dispersion Probe Array (Continued)</b>		
SENSOR DENSITY	DUCT & STATION MOUNTED	Three (3) sensor density levels specifiable based on configuration
	FAN INLET	Single or dual sensor configuration per inlet available
PROBE MATERIALS OF CONSTRUCTION	AVAILABLE OPTIONS	<ul style="list-style-type: none"> <li>• 6063 anodized aluminum, 1½" diameter with NEMA 1 enclosure</li> <li>• 6063 anodized aluminum, 1½" diameter with NEMA 4 enclosure and IP68 liquid tight cord grips</li> <li>• 6063 anodized aluminum, 1½" diameter with NEMA 4 enclosure and ½" conduit connections</li> <li>• 300 series stainless steel, 1½" diameter with NEMA 4X enclosure and ½" conduit connections</li> </ul>
OPERATING CONDITIONS	FLUID TEMPERATURE	-20°F to 140°F
	HUMIDITY	0 to 99% RH, non-condensing
WIRING CONNECTIONS	AVAILABLE OPTIONS	<ul style="list-style-type: none"> <li>• Mini-DIN, NEMA 1 only</li> <li>• Conduit opening with terminal blocks</li> <li>• IP68 liquid tight cord grip</li> </ul>
DUCT MOUNTED PROBE ARRAYS	MOUNTING OPTIONS	<ul style="list-style-type: none"> <li>• Rectangular duct, external or internally mounted</li> <li>• Rectangular duct, standoff mount</li> <li>• Circular duct, external or internally mounted</li> </ul>
STATION MOUNTED PROBE ARRAYS	CONSTRUCTION OPTIONS	<ul style="list-style-type: none"> <li>• 14 ga. galvanized steel with 1½" flange</li> <li>• 18 ga. stainless steel with 1½" flange</li> <li>• Aluminum honeycomb airflow straightening cell</li> </ul>
<b>ELECTRA-flo/FI Thermal Dispersion Fan Inlet Probe Array</b>		
PERFORMANCE	SENSOR ACCURACY	Individual sensor accuracy: ±2% of reading from 0 - 5000 FPM
	SYSTEM ACCURACY	Complete system accuracy: ±3% of reading over published velocity range <sup>1</sup>
	VELOCITY RANGE	Fan inlet installations: 0-10,000 FPM
SENSOR DESIGN	Precision matched, hermetically sealed thermistors with laser trimmed resistive heating element Each sensor node consists of two (2) thermistors mounted in a dedicated flow conditioning aperture Each sensor node is completely sealed and impervious to water	
	TEMPERATURE ACCURACY	±0.1°F over operating range of -20°F to 140°F
SENSOR CAPACITY	TRANSMITTER	Maximum of 32 sensors per transmitter
SENSOR DENSITY	FAN INLET	Single or dual sensor configuration per inlet available
PROBE MATERIALS OF CONSTRUCTION	6063 anodized aluminum, 1½" diameter with remote NEMA 4X poly enclosure	
OPERATING CONDITIONS	FLUID TEMPERATURE	-20°F to 140°F
	HUMIDITY	0 to 100% RH, condensing
WIRING CONNECTIONS	AVAILABLE OPTIONS	<ul style="list-style-type: none"> <li>• Watertight integral plenum rated cable attached to probe</li> <li>• Conduit opening with terminal blocks</li> </ul>
FAN INLET	Stainless steel tube in tube telescoping support struts and stainless steel mounting brackets	

**Note<sup>1</sup>** Field characterization required to achieve ± 3% system accuracy

\* SPECIFICATIONS subject to change without notice.

## ELECTRA-flo 5 Series Thermal Airflow Measuring Stations

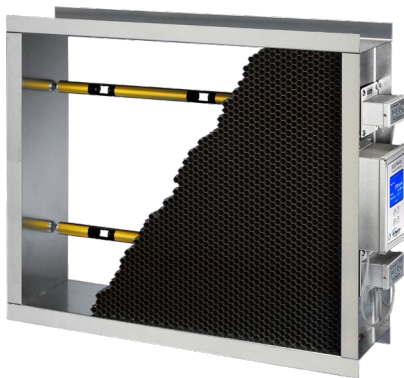


ELECTRA-flo/S5-MM Stations 0-4000 FPM

The **ELECTRA-flo/S5-MM or CM** consist of S5 Series probe arrays mounted in prefabricated stations. Stations guarantee the configuration and level of performance specified is installed. The use of prefabricated stations simplifies the installation process – stations mount directly to ducts via flange connections.

The stations feature S5 probes externally mounted and pre-wired, simplifying the installation process. The G5 transmitter can be mounted directly on the station or located remotely.

The E-flo/S5 stations are manufactured with or without air straightening cells (honeycomb).



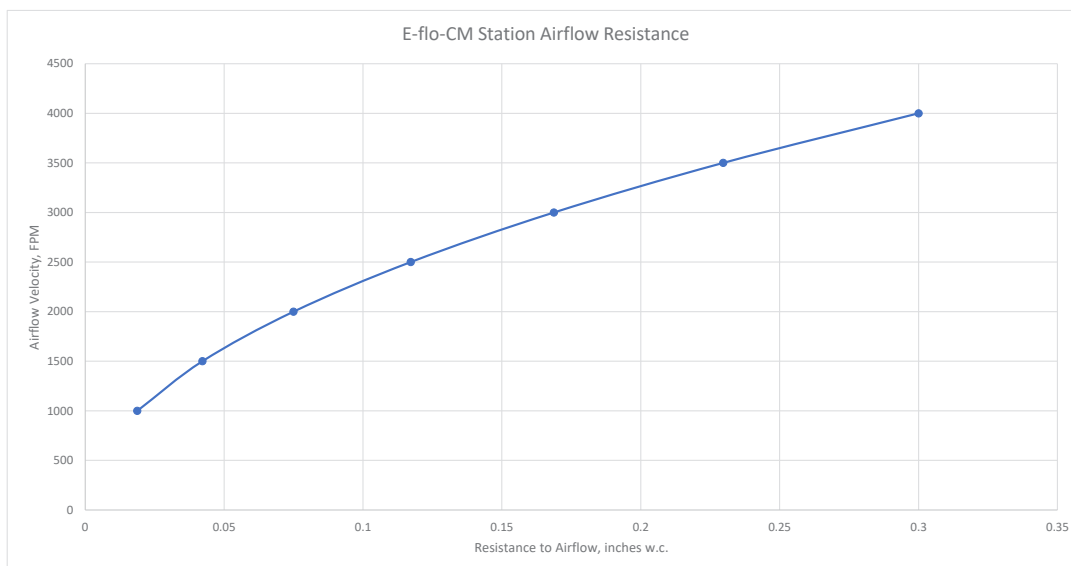
ELECTRA-flo/S5-CM Stations 0-5000 FPM

**ELECTRA-flo/S5-CM** is provided with aluminum Honeycomb cell. The air conditioning cell reduces the amount of straight duct run required in difficult installation locations.

The 3003 series aluminum cell features honeycomb construction, providing a robust, corrosion resistant air flow straightening system - allowing unsurpassed performance in difficult installation configurations.

The honeycomb design provides extremely low airflow resistance while maximizing its' flow conditioning ability in difficult installation locations.

To add more flexibility, the Dual Channel version of the G5 transmitter allows different styles of probe arrays, such as prefabricated stations, fan inlets or field inserted probe arrays, to be connected to a single transmitter – reducing installation time and cost.



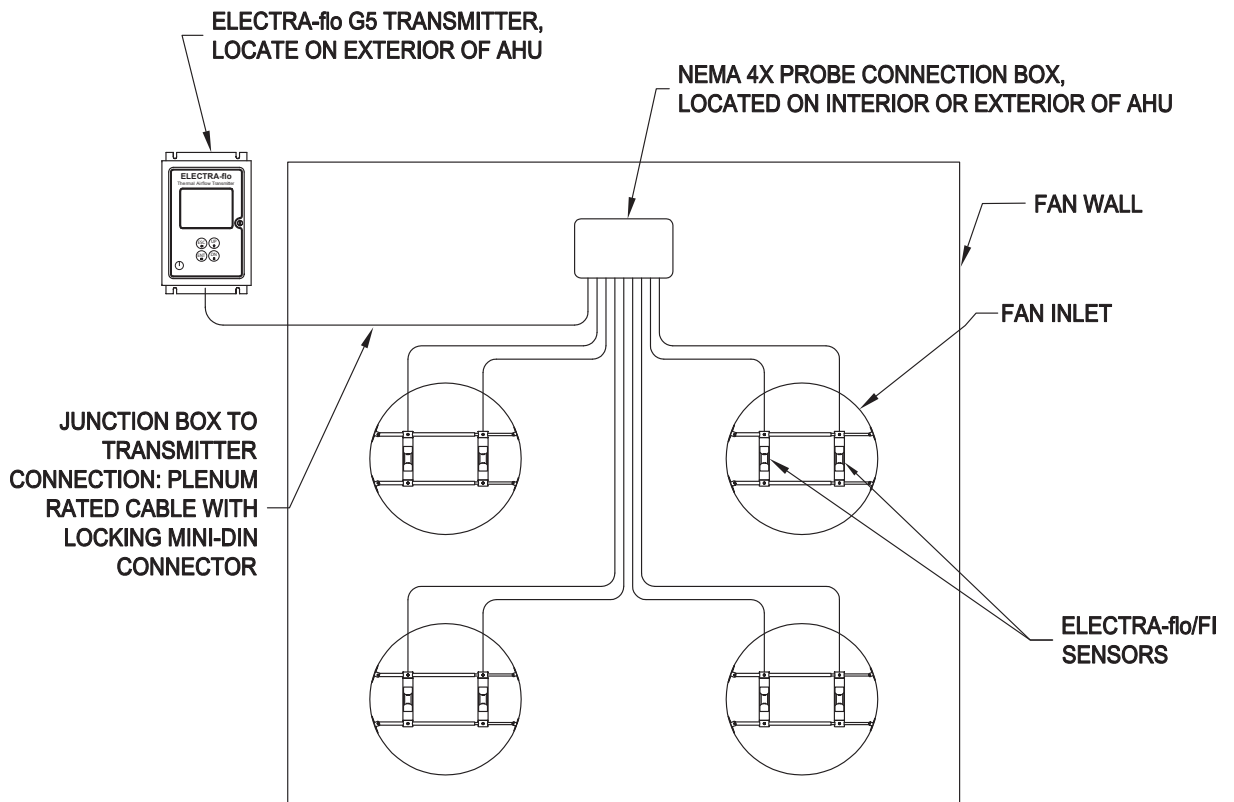
## ELECTRA-flo/FI Probe Array for Fan Inlet Installations

The ELECTRA-flo 5 Series family also includes the ELECTRA-flo/FI, a system of thermal probes and the associated hardware specifically designed for use in both single and dual inlet fan applications. The adjustable mounting brackets allow for easy installation of the sensors, and the transmitter interface provides a simple field characterization routine, allowing quick system set up in the field.



## ELECTRA-flo/FA Fan Wall (Array) for Multiple Fan Inlet Installations

The ELECTRA-flo/FA is designed to be installed in the environment found within the AHU itself, allowing for an easy and clean installation in fan wall (array) applications. Due to the ELECTRA-flo/FA's sensor architecture, up to 32 individual fans can be measured by simply daisy chaining all of the fan inlet sensors back to a single transmitter. Utilizing the native BACnet serial communication capability found in the ELECTRA-flo G5 Transmitter, individual fan performance information can be brought back to the BMS.



**Additional Products in the  
ELECTRA-flo Family**



ELECTRA-flo/SD Thermal Airflow Probe  
and Transmitter

**ELECTRA-flo/SD**

Thermal Dispersion airflow measurement for use in small duct applications, from 4" to 16". Ideal for direct VAV control in critical space applications.



VOLU-trol/E Thermal Measurement  
and Control Station

**VOLU-trol/E Thermal Measurement and Control Station**

Utilizes ELECTRA-flo 5 Series Thermal Dispersion sensing technology with an integrated damper to continuously measure and control ducted airflow. The VOLU-trol/E features aluminum dampers with blade seals certified to Class 1A leakage rates as defined by AMCA. The VOLU-trol/E is well suited for many VAV applications.

## MODEL SELECTION GUIDE

### Model Number Coding = E-flo G5-AB-CDEF (-SPC)

#### Electra-flo G5 Transmitter

##### A= Feature Set

- 1 = Thermal dispersion airflow transmitter with backlit graphical LCD, two (2) programmable analog outputs and RS485 serial communication.
- 2 = Dual channel thermal dispersion airflow transmitter with backlit graphical LCD, two (2) programmable analog outputs and RS485 serial communication.

##### B= Enclosure

- 1 = NEMA 1 enclosure
- 2 = NEMA 4X SS enclosure without viewing window
- 3 = NEMA 4X fiberglass enclosure with viewing window
- 4 = NEMA 1 enclosure with conduit connection box

##### C= Outputs

- 0 = None
- 2 = Two (2) analog outputs and one (1) alarm output

##### D = Communications

- 0 = None
- 1 = RS485, BACnet MS/TP or MODBUS RTU

##### E = Input Power

- 1 = 24 V AC/DC

##### F=Wiring Connection

- 1 = Mini-DIN, XMTR to probe, 10ft
- 2 = Mini-DIN, XMTR to probe, 25ft
- 3 = Mini-DIN, XMTR to probe, 50ft
- 4 = Mini-DIN, XMTR to probe, 100ft

##### SPC=Special Config

- 000 = None
- 101 = SS Tags

### Model Number Coding = E-flo/S5-AA-BBCC-DEF (-SPC)

#### E-flo/S5 Thermal Dispersion Airflow Measurement System, Probe Array Only

##### AA = Probe Mounting Style

- R1 = External mount, rectangular
- R2 = Internal mount, rectangular
- R3 = Internal stand-off mount, rectangular
- C1 = External mount, circular
- C2 = Internal mount, circular

##### BB = Number of Sensors

- 01 = One (1) sensor in array
- nn = Number of sensors in array, up to 32 max

##### CC = Number of Probes

- 01 = One (1) probe in array
- nn = Number of probes in array, up to 8 max

##### D = Material of Construction Probes

- 1 = 6063 Anodized Al., 1 $\frac{1}{8}$ " dia. with NEMA 1 cast aluminum enclosure
- 2 = 6063 Anodized Al., 1 $\frac{1}{8}$ " dia. with NEMA 4 cast aluminum enclosure, IP68 liquid tight cord grips
- 3 = 6063 Anodized Al., 1 $\frac{1}{8}$ " dia. with NEMA 4 cast aluminum enclosure,  $\frac{1}{2}$ " conduit connections
- 4 = 300 Series SS, 1 $\frac{1}{8}$ " dia. with NEMA 4X SS enclosure,  $\frac{1}{2}$ " conduit connections

##### E = Max Probe Length Dimension (Diameter) Inline with Probe (inches)

- A = 8 to 12
- B = 13 to 18
- C = 19 to 24
- D = 25 to 30
- E = 31 to 36
- F = 37 to 42
- G = 43 to 48
- H = 49 to 54
- I = 55 to 60
- J = 61 to 66
- K = 67 to 72
- L = 73 to 84
- M = 85 to 96
- N = 97 to 108
- O = 109 to 120

##### F= Wiring Connections Probe to Probe

- 1 = Mini-DIN, NEMA 1 (where D = 1 only)
- 3 = Conduit w/ terminal blocks (where D = 1, 3, 4)
- 4 = IP68 liquid tight cord grips (where D = 2 only)

##### SPC = Special Configuration

- 000 = None
- 101 = SS Tags

#### Notes

1. Maximum number of sensors (nodes) / probe is 8
2. Internal stand off mount in circular ducts is NOT allowed



## MODEL SELECTION GUIDE CONTINUED

**Model Number Coding = E-flo/S5-AA-BBCC-DEF (-GHIJK)(-SPC)**

### **E-flo/S5 Thermal Dispersion Airflow Measurement System, Station Mounted Probe Array**

#### **AA = Probe Mounting Style**

- MM = External mount in casing only, no straightening cell
- CM = External mount in casing with straightening cell

#### **BB = Number of Sensors**

- 01 = One (1) sensor in array
- nn = Number of sensors in array, up to 32 max

#### **CC = Number of Probes**

- 01 = One (1) probe in array
- nn = Number of probes in array, up to 8 max

#### **D = Material of Construction Probes**

- 1 = 6063 Anodized Al., 1 $\frac{1}{8}$ " dia. with NEMA 1 cast aluminum enclosure
- 2 = 6063 Anodized Al., 1 $\frac{1}{8}$ " dia. with NEMA 4 cast aluminum enclosure, IP68 liquid tight cord grips
- 3 = 6063 Anodized Al., 1 $\frac{1}{8}$ " dia. with NEMA 4 cast aluminum enclosure,  $\frac{1}{2}$ " conduit connections
- 4 = 300 Series SS, 1 $\frac{1}{8}$ " dia. with NEMA 4X SS enclosure,  $\frac{1}{2}$ " conduit connections

#### **E = Max Probe Length Dimension (Diameter) Inline with Probe (inches)**

- A = 8 to 12
- B = 13 to 18
- C = 19 to 24
- D = 25 to 30
- E = 31 to 36
- F = 37 to 42
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- H = 49 to 54
- I = 55 to 60
- J = 61 to 66
- K = 67 to 72
- L = 73 to 84
- M = 85 to 96
- N = 97 to 108
- O = 109 to 120

#### **F = Wiring Connections Probe to Probe**

- 1 = Mini-DIN, NEMA 1 (**where D = 1 only**)
- 3 = Conduit w/terminal blocks (**where D = 1, 3, 4**)
- 4 = IP68 liquid tight cord grips (**where D = 2 only**)

#### **G = Station Configuration**

- R = Rectangular
- C = Circular

#### **H = Short Opening Dimension (inches)**

- A = 8 to 12
- B = 13 to 18
- C = 19 to 24
- D = 25 to 30
- E = 31 to 36
- F = 37 to 42
- G = 43 to 48
- H = 49 to 54
- I = 55 to 60
- J = 61 to 66
- K = 67 to 72
- L = 73 to 84
- M = 85 to 96
- N = 97 to 108
- O = 109 to 120
- 9 = Indicates Circular Duct, See Diameter "E"

#### **I = Flange Connection**

- 1 = 1 $\frac{1}{2}$ " flange, 90 deg. formed, integral to casing (**where G = R, all sizes**)
- 2 = 1" flange, 90 deg. welded to casing, 14 ga. (**where G = C,  $\leq 24$ "**)
- 3 = 1 $\frac{1}{2}$ " flange, 90 deg. welded to casing, 14 ga. (**where G = C,  $> 24$ " to  $\leq 44$ "**)
- 4 = 2" flange, 90 deg. welded to casing,  $\frac{3}{16}$ " barstock (**where G = C,  $> 44$ "**)
- 5 = Beaded edge, with 18 ga. casing only (**where G = C,  $\geq 8$ " to  $\leq 24$ "**)

#### **J = Material of Construction Casing**

- 1 = 14 ga. galvanized steel (**where G = R**)
- 2 = 18 ga. galvanized steel (**where G = C**)
- 3 = 14 ga. stainless steel, Type 316 (**where G = R**)
- 4 = 18 ga. stainless steel, Type 316 (**where G = C**)

#### **K = Casing Width (depth) Dimension**

- 1 = 8"
- 2 = 10"
- 3 = 12"
- 4 = 14"
- 5 = 20"

#### **SPC = Special Configuration**

- 000 = None
- 101 = SS Tags

#### **Notes**

1. **Maximum number of sensors (nodes) / probe is 8**
2. **Internal stand off mount in circular ducts is NOT allowed**

