

**SSK1000 Series Insertion Air/Gas Flow Sensor**

# SSK1000 Series Insertion Air/Gas Flow Sensor

Thermo's SSK1000 Series Air/Gas Flow Sensor is an insertion style pitot averaging flowmeter designed for industrial process air and gas flow measurement. The SSK1000 can be configured for ducts of various shapes and sizes from 6 inches to over 200 inches.

The SSK1000 Series is ideal for applications where 10 diameters or more of upstream straight run are available. This versatile flowmeter is well suited for a broad range of high temperature and corrosive applications where exotic materials (Hastelloy C, Inconel, etc.) are required. Additionally the SSK1000 is uniquely qualified to measure dirty process gases when used with Thermo's "Continuously Purging" differential pressure transmitters.



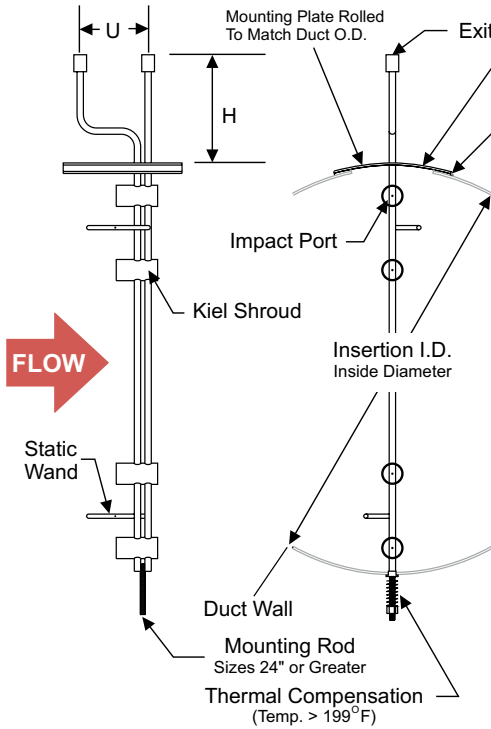
- **Low Cost Installation in Existing Ducts.**
- **Install as a Single Unit, Or In A Multiple Array.**
- **Repeatabilities as low as  $\pm 0.25\%$**
- **Low Pressure Loss of Approximately 5% of Measured D.P.**

## Model Number Description

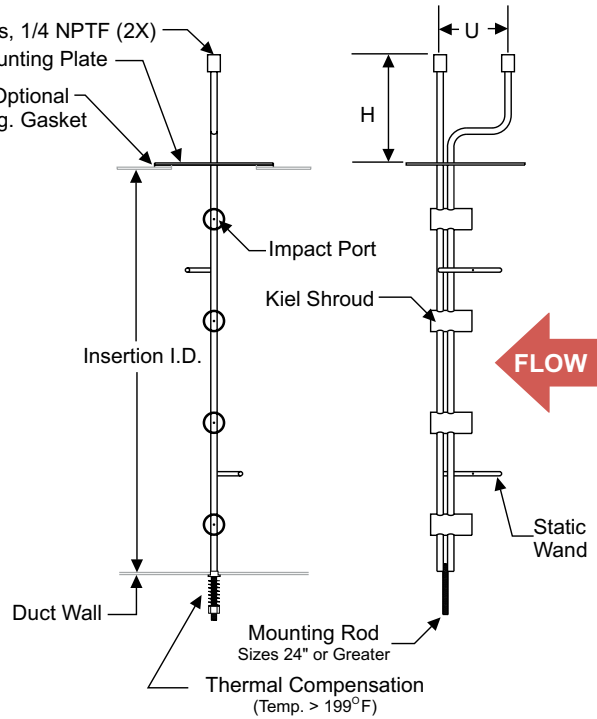
<b>SERIES: SSK1000 INSERTION FLOW SENSOR</b>	
SSK14 = Circular Duct Configuration SSK16 = Rectangular Duct Configuration SSK19 = Fan Inlet Configuration SSK1X = Special Configuration (Consult Factory)	
<b>SENSOR ARRAY MATERIAL</b>	
2 = 304 Stainless Steel all welded construction	X = Special. Consult Factory
5 = 316 Stainless Steel all welded construction	
H = Hastelloy C-276 all welded construction	Other materials possible. Call factory for availability.
<b>SENSOR ARRAY TYPE</b>	
0 = Total & Static, Kiel Shrouded Impact Ports and Hemispherical Static Wand 2 = Static Only, Hemispherical Static Wands X = Special. Consult Factory	
<b>- INSERTION LENGTH</b>	
CIRCULAR DUCT = Supply Inside Dimension and unit of measurement RECTANGULAR DUCT = Inside Dimension (Insertion Side). Supply Other Side I.D. and unit of measurement with order. FAN INLET CONFIGURATION = Inside Dimension, at probe location, and unit of measurement. Minimum of 12 Inches.	
<b>- DUCT OR PIPE WALL THICKNESS OR GAUGE</b>	
Specify Duct or Pipe wall thickness, including insulation or nozzle offset. Supply Unit of Measurement (inches, mm, gauge, etc.). See Note 3 below. For Fan Inlet Probe please supply Fan Shaft O.D..	
<b>- OPTIONS: (Not Available on the SSK1900 Fan Inlet Sensor)</b>	
ZV = Mounted MVA Zeroing Valve. See Thermo MVA Specification Sheet. QS = Seismic Qualified for Nuclear Applications. Specify seismic zone and response spectrum. IF = Insertion Flow Straighteners. Rectangular Ducts only. Separate Cutout required approximately 6" upstream of SSK. Used in retrofit scenarios where installation of a Flow Station is not possible. HP = ANSI 150lb. mounting flange, Nom. 6" Dia. standard for SSK1000 sizes 12" or greater, Nom 4" for SSK1000's less than 12". For units less than 12", supply nozzle offset I.D. For other size options consult factory. TC = Temperature Connection. 1/2" NPTF, 316SS for mounting of Temperature Sensor. RTD = Resistance Temperature Detector, 3 wire device for Temperature Measurements. TC Option Included. ARTD = Averaging RTD sensor, 3 wire device for Temperature Averaging. TC Option Included. MG = Mounting Gasket, 1/8" thick. Specify Material.	
NOTES: 1. Flow Calculations will be based on conditions supplied at time of order. Temperature range, Pressure Range, Flow or Velocity Range, Molecular Weight and Relative Humidity are necessary to insure sensor design will meet application requirements. 2. Specify Tagging If Applicable. 3. SSK1400 & SSK1600 Sensors are designed with the assumption a 1/8" gasket will be used. Do not add this to your duct or pipe wall thickness.	

**SSK16 2 0 - 36" - 0.125" - ZV**

**Typical Model Number**

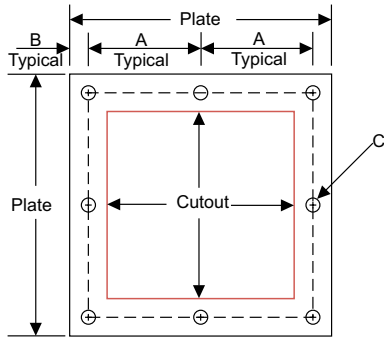


**SSK1400**  
Circular Insertion Sensor  
Standard 2 Tube Design

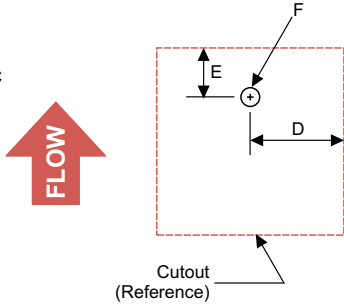


**SSK1600**  
Rectangular Insertion Sensor  
Standard 2 Tube Design

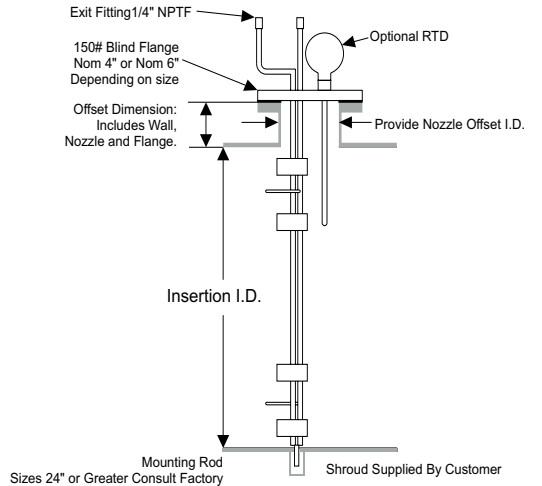
● **Maximum Turndown of 25:1**



**Mounting Plate & Cutout**



**Location Farside Mounting Hole**



**SSK1000 2 Tube With HP Option**

Duct I.D.	Mounting Plate	Cutout	A	B	C	D	E	F	H	R	U
8 to 11.9" <sup>1</sup>	4" x 4" x 1/16"	3" X 3"	1.75"	0.25"	0.25"				4.0"		2.5"
12 to 23.9"	7" x 7" x 1/8"	5" x 5"	3.0"	0.50"	0.313"				5.5"		4.0"
24 to 27.9"	7" x 7" x 1/8"	5" x 5"	3.0"	0.50"	0.313"	2.5"	1.313"	0.438"	5.5"	3.0"	4.0"
28 to 39.4"	7" x 7" x 1/8"	5" x 5"	3.0"	0.50"	0.313"	2.5"	1.625"	0.563"	6.0"	3.0"	5.5"
39.5" to 72"	7" x 7" x 1/8"	5" x 5"	3.0"	0.50"	0.313"	2.5"	1.75"	0.563"	8.0"	4.5"	6.0"
72.1 to 96" <sup>2</sup>	7" x 7" x 1/8"	5" x 5"	3.0"	0.50"	0.313"	2.5"	1.75"	0.563"	8.0"	6.0"	6.0"

1. Smaller Sizes Possible. Consult Factory

2. Vertical Installation Only

# SSK1000 Series Insertion Air/Gas Flow Sensor

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## Kiel Shrouded Impact Port

- Improves Signal Quality.
- Increases Accuracy While Minimizing Effects Of Turbulent Flow.
- Eliminates Problems Associated With “Yawing” (Angular Position).
- Thermo Patented Design.



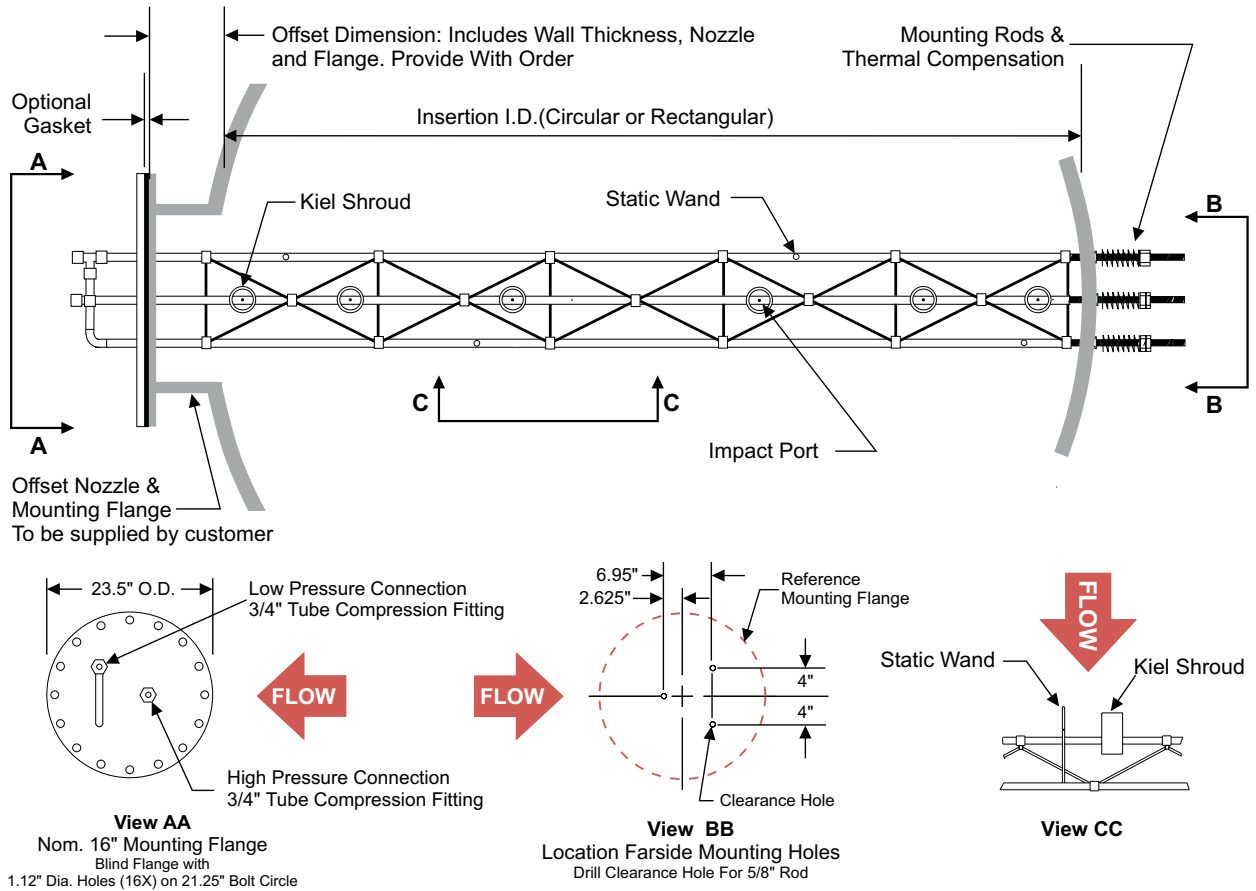
## True Static Measurement

- Hemispherical Static Wand Design.
- Measures Actual Static Pressure, No Correction Factors Required.
- Wands Positioned 90° To The Direction Of Flow, Eliminating Velocity Effect Errors.

## SSK1000 Series Proven Applications

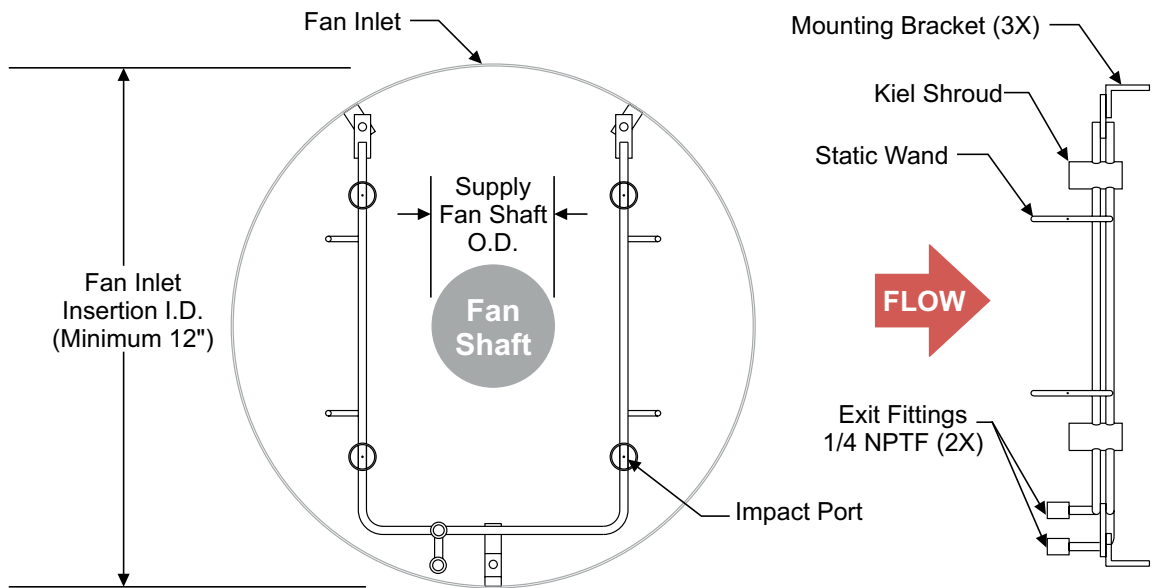
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- Aeration Basin Air Flow
- Air Distribution Flow To Scrubbers
- Compressed Air Flow
- Natural Gas Flow
- Stack Gas Flow (CEM)
- SO<sub>x</sub> / NO<sub>x</sub> Removal Systems
- Tail Gas Flow
- Thermal Oxidizer Flow
- Solvent Recovery Systems



## SSK1000 - 3 Tube Truss Design

View From Flow Direction



## SSK1900 - Fan Inlet Probe

# SSK1000 Series Insertion Air/Gas Flow Sensor

## PERFORMANCE SPECIFICATIONS

	SSK1400/1600	SSK1900
<b>Accuracy:</b>	Sizes 16" or Greater with 10 upstream & 3 downstream duct diameters. Single Sensors: Typically $\pm 3\%$ . Multiple Sensors: Typically $\pm 2\%$ . Sizes 16" or Greater with 5 upstream & 2 downstream duct diameters. Single Sensors: Typically $\pm 7.5\%$ . Multiple Sensors: $\pm 5\%$ . <i>For sizes less than 16" Consult Factory. See MULTIPLE SSK1000 INSTALLATION this page. Accuracies for SINGLE SSK1000 installations are where sensor is mounted in plane with the last upstream bend.</i>	Typically $\pm 5\%$ .
<b>Repeatability:</b>	Single Sensors $\pm 0.50\%$ . Multiple Sensors $\pm 0.25\%$	Typically $\pm 0.50\%$
<b>Flow Range:</b>	25:1 Turndown	25:1 Turndown

## FUNCTIONAL SPECIFICATIONS

	SSK1400/1600	SSK1900
<b>Temperature Range:</b>	-200 to 750°F (-128 to 400°C) for 304 or 316 Stainless Steel -200 to 1200°F (982°C) for Hastelloy C-276 <i>Higher Temperatures are possible. Consult factory.</i>	
<b>Maximum Static Pressure:</b>	Assembly has an ANSI 150 (ND16) rating <i>Final pressure rating (mounted) dependent on joint efficiency and gasket. For High Pressure Mounting See HP option.</i>	
<b>Unrecovered Pressure Loss:</b>	Less than 5% of measured D.P.	

## PHYSICAL SPECIFICATIONS

	SSK1400/1600	SSK1900
<b>Available Sizes</b>	Vertical/Horizontal Installation: 6 to 72 inch	12 to 72 Inch Dia.
<b>2 Tube Design:</b>	Vertical Installation Only: 72.1 to 96 inch	
<b>3 Tube Truss Design:</b>	72.1" and longer <i>Note: Mounting hardware not supplied. Gasket Optional.</i>	
<b>Sensors:</b>	304SS standard w/argon welded joints	
<b>Process Connections:</b>	1/4" NPTF, 316 Stainless Steel. <i>Other materials possible. Consult factory.</i>	
<b>Seismic Qualifications:</b>	May be qualified by testing, analysis or similarity. Specify seismic zone and response spectrum. Consult Factory.	

## INSTALLATION GUIDELINES

Configuration	WORST CASE CONDITIONS		RECOMMENDED INSTALLATION	
	Acc.%	Rep.%	Upstream	Downstream
Fan Outlet	4-6%	0.3-0.7%	10 Dia.	2 Dia.
Compressor Outlet	4-6%	0.3-0.7%	10 Dia.	2 Dia.
Elbow or Tee	6-8%	0.5-1.0%	10 Dia.	2 Dia.
2 Elbows same plane	8-10%	0.5-1.0%	10 Dia.	2 Dia.
2 Elbows Different Planes	8-10%	0.5-1.0%	10 Dia.	2 Dia.

WORST CASE CONDITIONS = No Upstream Or Downstream Straight Run  
RECOMMENDED INSTALLATION = Number Of Upstream And Downstream Straight Run Necessary For Optimum Performance.

Above accuracies based on circular ducts using 2 SSK1400's 90° apart. Not Applicable for SSK1900. For Installation Configurations Not Shown, Consult Factory.

## MULTIPLE SSK1000 INSTALLATION

The SSK1000's are best used in multiples where the sensors are externally manifolded. Multiple SSK1000's should be used when duct sizes are greater than 20" (500mm). See Accuracy Specifications this page.

**Circular Ducts:** Two SSK1400's mounted 90° apart. They will not be located in the same plane.

**Rectangular Ducts:** Quantity of sensors is equal to the longest side divided by the shortest side, plus one additional sensor for each side greater than 24" insertion length. They will be located in the same plane. Example: For an 80" x 40" duct size, use a quantity of 6 SSK1600-40". Consult Factory for assistance.

## SPECIFYING THE SSK1000

Flow Sensor shall be pitot averaging type. All components shall be constructed from 304 or 316 Stainless Steel. Impact ports shall be shrouded with kiels to reduce noise and improve velocity profile at point of measurement. Static pressure shall be measured by hemispherical tipped static wands aligned parallel with the direction of flow. All process connections shall be 1/4" NPTF. Accuracy / Repeatability shall be  $\pm 2.0\%$  /  $\pm 0.25\%$  of reading when multiple probes are used. Flow turn-down shall be 25:1.

## Thermo Electron

For over 20 years, Thermo has been the recognized leader in the measurement of air/gas flow and very low differential pressure in industrial applications. Thermo offers a complete line of pitot/static probes and arrays, D.P. Transmitters, the unique Nozzle-Pitot flow sensor and a complete family of Current to Pressure (I/P) and Pressure to Current (P/I) Transducers. Contact Thermo or Thermo's Representative, for further information, specifications and application assistance.



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