

Multipoint Insertion Flow Meter Series K-BAR 2000B-WGF

The Kurz K-BAR WGF multipoint insertion flow meter for **condensing gas environments** includes the qualities and features found in all Kurz constant temperature thermal flow meters that make them outperform all other currently available thermal mass flow meters, including:

- The first thermal mass flow meter offering accurate and reliable condensing gas flow measurements
- The highest repeatability, accuracy, and reliability available
- The fastest response to temperature and velocity changes in the industry
- Constant temperature thermal technology
- Interchangeable sensor and electronics (single circuit board for each sensor) — no matched sets
- Built-in dry gas flow calculation on all flow units for saturated processes
- Continuous self-monitoring electronics that verify the integrity of sensor wiring and measurements
- Sensors do not overheat at zero flow using a unique constant temperature control method and power limiting design
- Zero velocity as a valid data point
- Completely field configurable using the flow meter user interface or via a computer connection
- User-programmable correction factors to compensate for velocity profiles
- Velocity-temperature mapping for wide ranging velocity and temperature

Kurz Instruments is dedicated to manufacturing and marketing the best thermal mass flow meters available and to support our customers in their efforts to improve their businesses.

Applications

Condensing stacks
Stack & flue gas
Biogas
Emissions monitoring
Mine ventilation
Fan inlets



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SPECIFICATIONS

- **Velocity range**
0 to 6,000 SFPM (28 NMPS)
(Up to 12,000 SFPM (56 NMPS) available
with reduced condensate immunity)
- **Velocity (v) accuracy**
(SFPM at laboratory conditions)
 $\pm (1 + 2000/v) \%$ of reading
- **0.25% reading repeatability**
- **Velocity time constant**
1 second for velocity changes at
6,000 SFPM (constant temperature)
- **Process temperature time constant**
8 seconds for temp changes at
6,000 SFPM (constant velocity)
- **Velocity angle sensitivity**
<2% per degree angle up to $\pm 20^\circ$
- **Velocity-dependent correction factors
for flow rate**
- **Electronics operating temperature**
-40°F to 149°F (-40°C to 65°C)

PROCESS CONDITIONS

- **Process pressure rating**
Up to 150 PSIG (10 BARg)
- **Process temperature rating**
-40°F to 257°F (-40°C to 125°C)
- **Relative humidity**
Up to 100% relative humidity
- **Condensing gas**

APPROVALS

- **IECEX, ATEX, cETLus approvals for
Explosive Atmospheres**
IEC / EN / UL / CSA C22.2 / 60079-0
IEC / EN / UL / CSA C22.2 / 60079-7
II 3 G, Ex ec IIC T4...T1 Gc
Class I, Div. 2, Group A, B, C, and D

T-Class T4 -40°F to 122°F (-40°C to 50°C)
T-Class T3 -40°F to 239°F (-40°C to 115°C)
T-Class T2 -40°F to 419°F (-40°C to 215°C)
T-Class T1 -40°F to 689°F (-40°C to 365°C)
- **EPA mandatory GHG certification**
40 CFR 98.34(c)(1)
- **Alarm output conformity**
NAMUR NE43
- **CE compliance**
EMC, LVD, PED, ROHS, and WEEE

TRANSMITTER FEATURES

- **Two optically-isolated loop powered
4-20 mA outputs**
12-bit resolution and accuracy
Maximum loop resistance is 300Ω at 18 VDC,
550Ω at 24 VDC, 1400Ω at 36 VDC
- **One 4-20mA non-isolated analog input**
- **Input power**
1 Amp per sensor, DC (21.6-26.4V)
- **Two optically isolated solid-state
relays / alarms**
Configurable as alarm outputs, pulsed
totalizer output, or air purge cleaning
- **Two digital inputs dedicated to purge
and zero-mid-span drift check**
- **Enclosure**
Three enclosure options for application and/
or area classification
- **Velocity-dependent correction factors
for flow rate**
- **Built-in zero-mid-span drift check**
- **Built-in flow totalizers and elapsed
time**
- **User-configurable digital filtering
from 0 to 600 seconds**
- **Configuration/data access**
USB, RS-485 Modbus (ASCII or RTU), or HART
- **Meter memory**
200 recent events, top 20 min/max, and
56 hours (10 second samples) of trends
- **3-year warranty**

SUPPORT & ELEMENT COMPONENTS

- **Sensor material**
C-276 alloy all-welded sensor
construction (standard)
- **Sensor support**
316L stainless steel (standard)
Hastelloy® C-22® alloy (optional)
- **Sensor support diameter**
Segment 1 — 1½" tubing (standard)
Segment 2 — 2½" (Sch.10)
Segment 3 — 4" (Sch 10)
- **Sensor support length**
Maximum length based on supported or
self-supporting design and the number
of sensors
- **Mounting flange**
Raised face Class 150 ANSI B16.5
- **3-year warranty**

OPTIONS

- **Enclosure Options**
Two styles for Hazardous Locations
One style for General Industrial (non-
hazardous location)
- **Communication protocols**
HART (v7 FSK) and PROFIBUS DP
- **Hardware accessories**
Available hardware includes flange
mounting assemblies, ball valves, conduit
seals, cable, and packing glands
- **SIL1 certification**
via TUV Rheinland



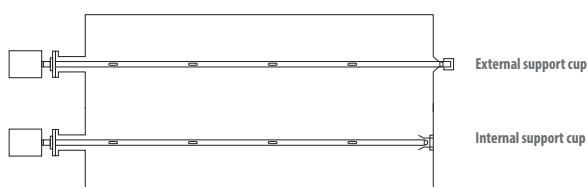


K-BAR DESIGN

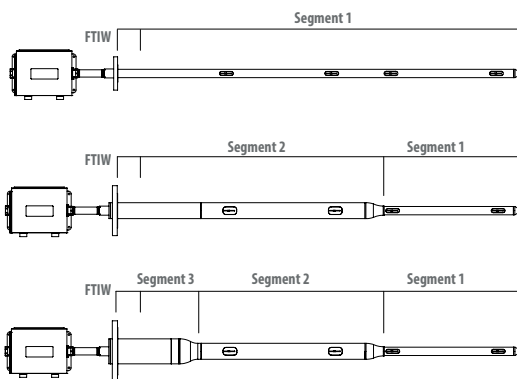
All K-BARs include the flange-to-inside-wall (FTIW) measurement when determining the length of the probe support.

The K-BAR can be a supported or self-supporting structure.

- A supported K-BAR has an external or internal support cup on the wall opposite the mounting flange. A supported K-BAR allows for a smaller flange and a consistent 1.5" probe support across the width of the stack/duct. A supported probe support with 1, 2, 3, or 4 sensors can be up to 173" (including the FTIW distance).



- A self-supporting K-BAR, depending on the length, can have up to three support probe sections that reduce in diameter toward the probe support tip. In addition, the number of sensors is a factor in determining the maximum probe support length.
 - One segment = 1.5", stack/duct up to 302 inches
 - Two segments = 2.875", 1.5", stack/duct up to 488 inches
 - Three segments = 4.5", 2.875", 1.5", stack/duct up to 460 inches

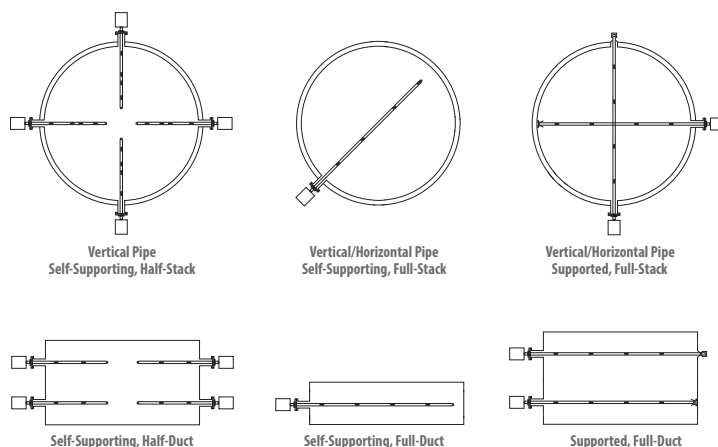


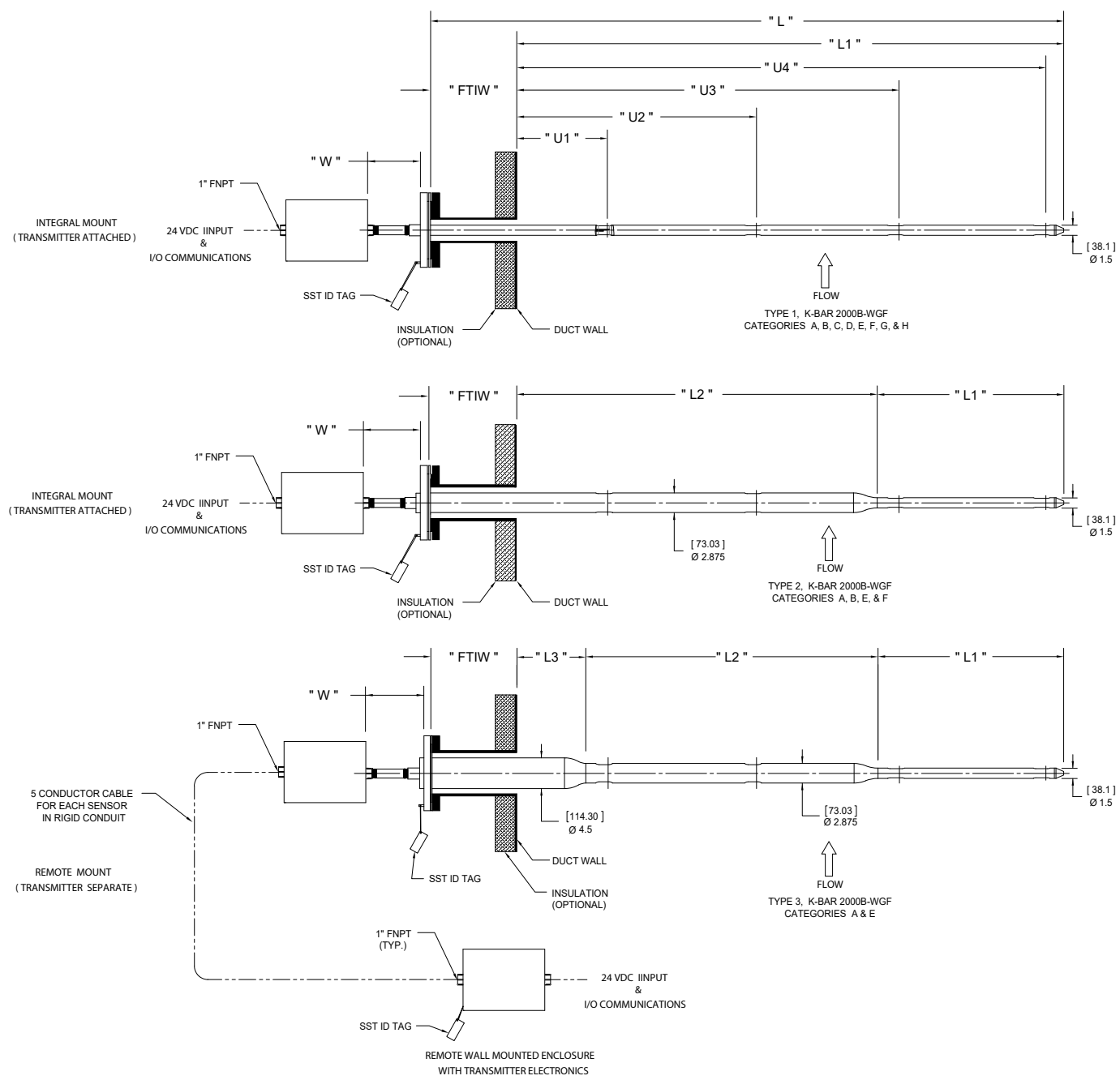
Note: The additional material used to increase the diameter of segments 2 and 3 also slows the effects of corrosion on the probe support.

HALF SPAN AND FULL SPAN

Using a supported or self-supporting K-BAR is determined by several factors:

- The dimensions of the stack or duct
- The accessibility of an installation location
- The flow profile of the stack or duct
- Excessive vibration

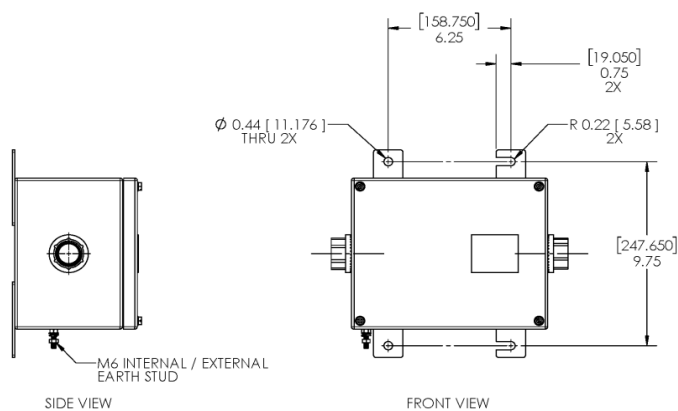




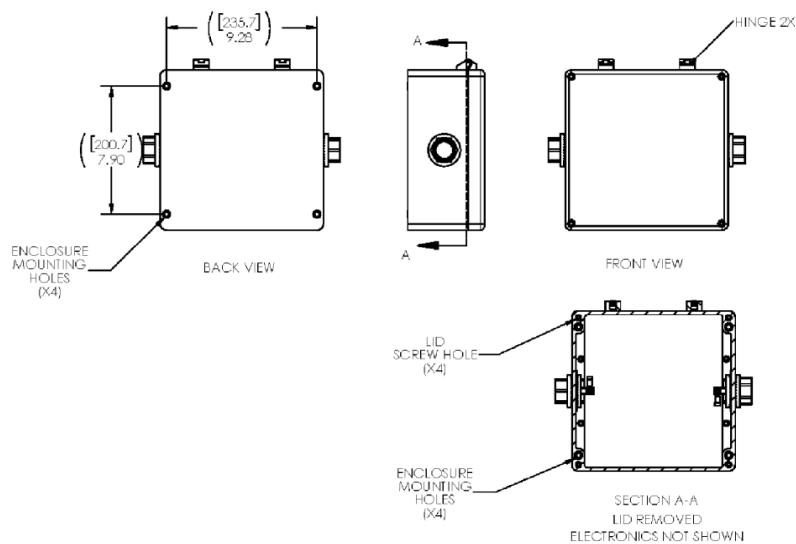
Identifier	Description	Identifier	Description
D	The round stack/duct diameter or rectangular stack/duct flow inside dimension (inches).	L ₁	Length of segment #1 (inches).
FTIW	The flange-to-inside wall measurement for determining the overall length of the probe support includes gaskets, flanges, and stack/duct wall thickness.	L ₂	Length of segment #2 (inches).
Integral Mount	The electronics are in an enclosure mounted on the probe.	L ₃	Length of segment #3 (inches).
Remote Mount	The electronics are in an enclosure mounted separately from the probe.	L	Total length (inches) of K-BAR probe support (L ₁ + L ₂ + L ₃ + FTIW).
Dimensions	All dimensions are in inches with millimeters in brackets.	U ₁	Location of first sensor from inside wall of stack/duct.
	For enclosure dimensions and ratings see Page 5.	U ₂	Location of second sensor from inside wall of stack/duct.
		U ₃	Location of third sensor from inside wall of stack/duct.
		U ₄	Location of fourth sensor from inside wall of stack/duct.
		W	HT=7.5"; HHT=13.5"



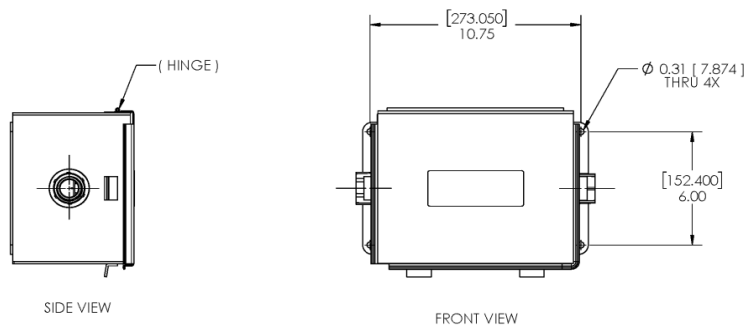
K-BAR Enclosure Options



316L Stainless Steel NEMA 4X, IP66, for Hazardous Locations



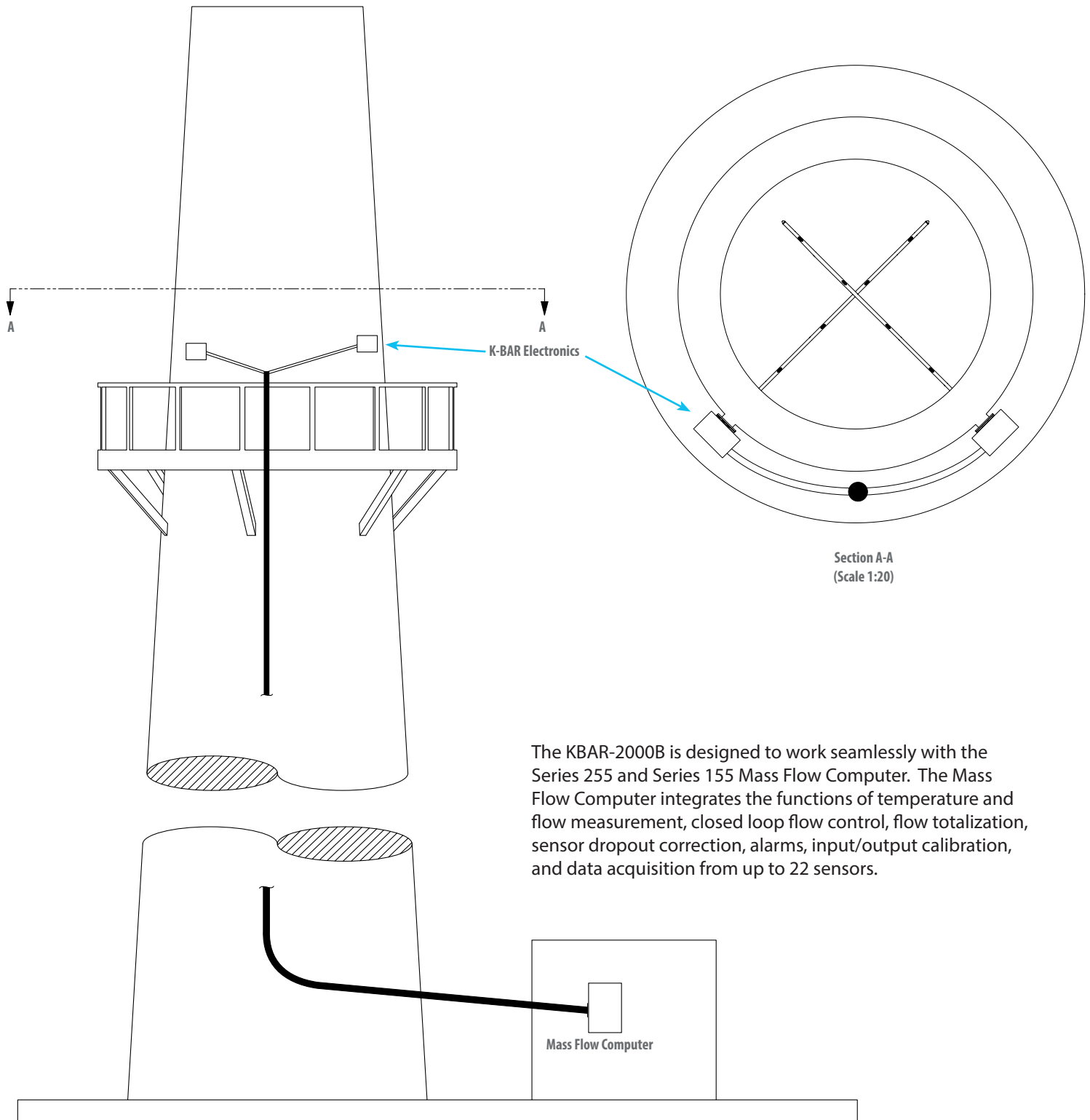
Polyester NEMA 4X, IP66, for Hazardous Locations



Steel NEMA 4, IP65, for General Industrial



Typical Installation Setup



The KBAR-2000B is designed to work seamlessly with the Series 255 and Series 155 Mass Flow Computer. The Mass Flow Computer integrates the functions of temperature and flow measurement, closed loop flow control, flow totalization, sensor dropout correction, alarms, input/output calibration, and data acquisition from up to 22 sensors.



753 4 1 0

Parent number

F1

F2

F3

F4

F5

F6

F7

F8

F9

F10

F11

F12

Parent Number	Model
753410	K-BAR 2000B-WGF

F1	Option	K-BAR Installation Configuration Category
	A	Category A, round stack/duct, half span, single-end support, type 1, 2, 3
	B	Category B, round stack/duct, full span, single-end support, type 1, 2
	C	Category C, round stack/duct, full span, external end support, type 1
	D	Category D, round stack/duct, full span, internal end support, type 1
	E	Category E, rectangular stack/duct, half span, single-end support, type 1, 2, 3
	F	Category F, rectangular stack/duct, full span, single-end support, type 1, 2
	G	Category G, rectangular stack/duct, full span, external end support, type 1
	H	Category H, rectangular stack/duct, full span, internal end support, type 1

F2	Option	Stack/Duct Flow Dimensions (D)
	----	For round stacks/ducts, enter the inside diameter to the nearest tenth inch. For rectangular stacks/ducts, enter the inside diameter measured along the axis where the K-BAR will be installed to the nearest tenth inch. Enter 4 digits. For example, a round stack with 336 inch inside diameter is written as 3360.

F3	Electronics Enclosure Material, Rating & Area Approval	
	Option	Electronics Enclosure Configuration (1st digit)
	A	Directly attached electronics enclosure.
	B	Remotely attached electronics enclosure
	Option	Probe Support Enclosure Material & Area Approval (2nd digit)
	A	Steel powder-coated, General Industrial Safety, NEMA 4, IP65
	B	Polyester, Ex ec IIC T4 Gc, ATEX II 3 G, Class I Zone 2, Class I Div 2, Groups A, B, C, D, NEMA 4X, IP66, IK08
	C	Stainless Steel, Ex ec IIC T4 Gc, ATEX II 3 G, Class I Zone 2, Class I Div 2, Groups A, B, C, D, NEMA 4X, IP66, IK09
	Option	Remote Electronics Enclosure Material & Area Approval (3rd digit)
	X	Not applicable for directly attached electronics enclosure
	A	Steel powder-coated, General Industrial Safety, NEMA 4, IP65
	B	Polyester, Ex ec IIC T4 Gc, ATEX II 3 G, Class I Zone 2, Class I Div 2, Groups A, B, C, D, NEMA 4X, IP66, IK08
	C	Stainless Steel, Ex ec IIC T4 Gc, ATEX II 3 G, Class I Zone 2, Class I Div 2, Groups A, B, C, D, NEMA 4X, IP66, IK09

Notes: All enclosure options have 1" FNPT conduit hubs for field wiring.
IK Rating indicates degree of protection against external mechanical impacts according to IEC 62262 and IEC 60068.
Purge not available with hazardous location certification

F4	Option	K-BAR Construction Type
	1	One segment K-BAR and FTIW segment. All categories.
	2	Two segment K-BAR and FTIW segment. Category A, B, E, F.
	3	Three segment K-BAR and FTIW segment. Category A, E.

F5	Option	Communications and Inputs/Outputs	
	C	Full	Two 4-20mA isolated outputs, two relays, two digital inputs, one non-isolated 4-20mA input
	E	HART-1	One 4-20mA isolated output, two relays, two digital inputs, one non-isolated 4-20mA input
	H	HART-2	Two 4-20mA isolated outputs, two relays, two digital inputs, one non-isolated 4-20mA input
	K	Profibus DP	Two 4-20mA isolated outputs, two relays, two digital inputs, one non-isolated 4-20mA input

F6	Option	Flange-to-Inside Wall Length (FTIW)
	----	Enter the length from the mating surface of the K-BAR mounting flange to the inside wall of the stack/duct to the nearest tenth inch. This measurement includes the gasket thickness and stack/duct wall thickness. Enter 3 digits. For example, the distance between the stack mounting flange and inside wall of the stack/duct (including gasket and wall thickness) is 56.25 inches and written as 563.

F7	Option	Process Temperature Compensation
	A	Standard temperature compensation (STC) over process temperature range from -40°C to 125°C. Accuracy: $\pm (1\% \text{ Reading} + 20 \text{ SFPM}) \pm 25^\circ\text{C}$.

F8	Sensors & Sensor Material	
	Choose one option from each category.	
	Option	Number of Sensors (first digit)
	1	One
	2	Two
	3	Three
	4	Four
	Option	Sensor Material (second digit)
	3	C-276 alloy
	7	C-276 alloy with abrasion-resistant aluminum titanium nitride (AlTiN) coating

F9	Option	Mounting Flange Size (CL150) & Thickness		
	H	1.5"	(Type 1)	0.69"
	J	2"	(Type 1)	0.75"
	L	2.5"	(Type 1, 2)	0.88"
	N	3"	(Type 1, 2)	0.94"
	Q	3.5"	(Type 1, 2)	0.94"
	S	4"	(Type 1, 2)	0.94"
	U	6"	(Type 1, 2, 3)	1.0"

more on next page



F10	Option	Mounting Flange Material
	2	316L stainless steel
	3	C-276 alloy

F11	Option	Laboratory Air Velocity Calibration
	A	300 SFPM (1.4 NMPS)
	C	600 SFPM (2.8 NMPS)
	E	1,000 SFPM (4.7 NMPS)
	G	2,000 SFPM (9.3 NMPS)
	I	3,000 SFPM (14 NMPS)
	K	4,000 SFPM (18.6 NMPS)
	M	6,000 SFPM (28 NMPS)

F12	Segment Material
Choose one option from each category.	
Option	Segment #1 Material (first digit)
2	316L SS tube / 316L SS windows (Type 1, 2, 3)
3	C-22 alloy tube / C-276 alloy windows (Type 1)
6	C-22 alloy tube / 316L SS windows (Type 1)
Option	Segment #2 Material (second digit)
0	No segment 2 (Type 1)
2	316L SS pipe / 316L SS windows (Type 2, 3)
Option	Segment #3 Material (third digit)
0	No segment 3 (Type 1, 2)
2	316L SS pipe (Type 3)
Option	FTIW Segment Material (fourth digit)
2	316L SS pipe (Type 1, 2, 3)
3	C-22 alloy tube (Type 1) C-276 alloy pipe (Type 2, 3)
Notes: Available configurations are 2002, 3003, 6003, 2202, 2203, 2222, and 2223. Add the letter "S" to the end of Feature 12 to include SIL1 certification via TUV Rheinland.	