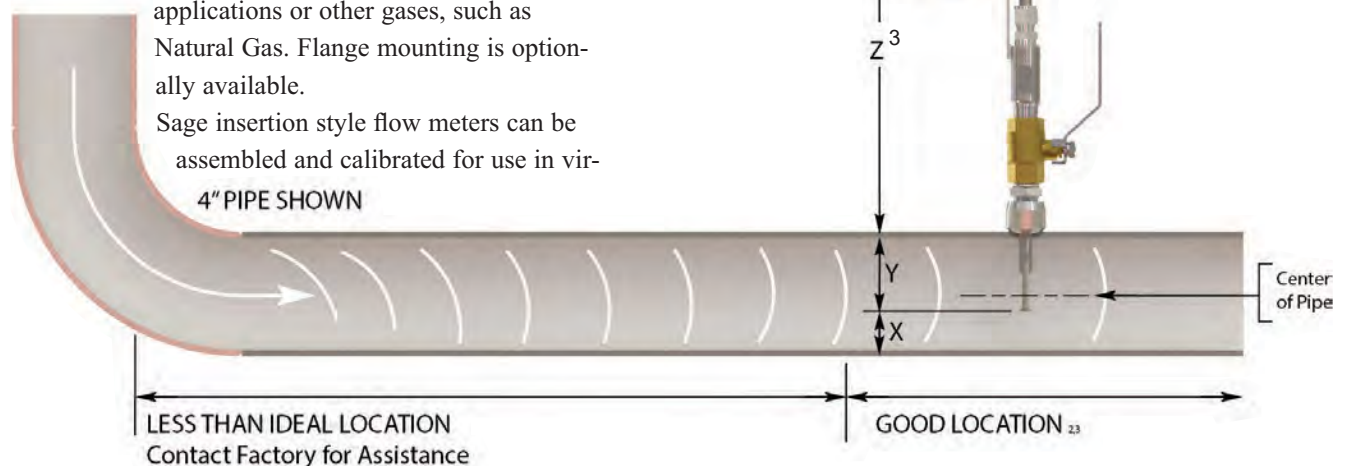


PROBE INSERTION GUIDELINE DRAWING¹

Choose the longest straight-run section of pipe available to allow a uniform, well-developed flow profile. See chart on page 15 for specifications. Note, obstructions such as valves, blowers expanders and PVC and HDPE pipes will require additional straight run (contact factory for assistance). Avoid, if possible, installations immediately downstream of bends, fans, nozzles, heaters and especially valves, or anything else installed in the line that may cause nonuniform flow profiles and swirls. Otherwise signal output errors could result, unless significantly more straight run is provided, or in the absence of sufficient straight run, Flow Conditioners (page 13) are installed (contact Sage for assistance if needed). Refer to page 13 to see the benefits of incorporating Flow Conditioners.

Insertion styles are available through Sage Metering, Inc. with a standard 1/2" OD probe support assembly; 3/4" is also available. Standard probe lengths are 6", 12", 15", 18", 24", 30", 36" and 48". A common method of mounting the probe assembly through a pipe wall or duct (if ambient air) is with a compression fitting (STCF05). A Sage valve assembly (SVA05) is useful and highly recommended for pressurized

applications or other gases, such as Natural Gas. Flange mounting is optionally available. Sage insertion style flow meters can be assembled and calibrated for use in vir-



tually any size pipe or duct (as small as 1"). Sage insertion flow meters include a probe assembly that supports the sensing element (a self-heated flow sensor and a temperature/reference sensor); a sensor drive circuit; microprocessor meter board, and transmitter enclosure. The probe assembly must be inserted into the correct position in the process gas flow conduit to allow the gas to flow through the sensor "window" across the sensor element. The "sensing point" or active part of the sensor (0.5" from the end of the probe) should be positioned as per the drawing below and the Installation Depth Chart on page 15.

Installation Depth²

The center of the pipe (assuming a well developed turbulent flow profile) is fairly flat, and easy to locate. See "Installation Depth Chart" on next page to determine proper insertion depth.

1. SIP Industrial Meter shown in drawing. Note, probe is not bi-directional.
2. Probe should be inserted per Installation Depth Chart (see following page) so sensors are in the center of the pipe.
3. The portion of the probe that remains outside of the pipe, is simply the factory ordered probe length (i.e. "-15" = 15 inches) minus the "Y" dimension.

1/2" PROBE DIAMETER INSTALLATION CHART

Methods for Probe Insertion to Pipe Center

METHOD 1

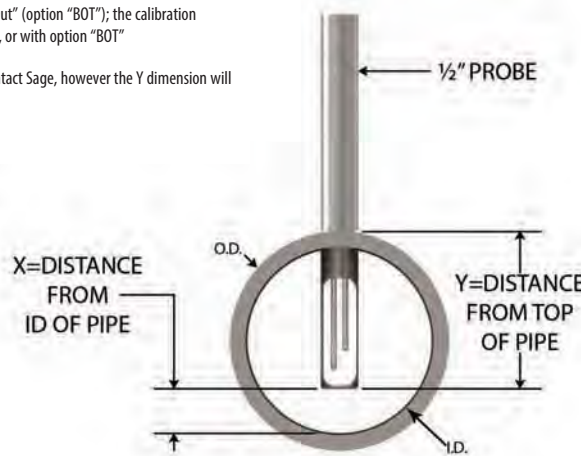
Using charts below, select pipe size (column 1), determine X. Insert probe until the end touches the bottom of the pipe (ID), mark probe as it exits top of fitting. Lift probe distance "X" and tighten compression fitting.

METHOD 2

Using charts below¹, select pipe size (column 1), determine Y. Subtract Y from the factory supplied probe length. That difference Z (see drawing on page 14) should be outside of the pipe, and is measured from the bottom of the enclosure of the probe weld to pipe OD.

¹ The 1" Pipe size needs to have Probe "bottomed Out" (option "BOT"); the calibration method for the 1/2" Pipe is either as shown below, or with option "BOT"

² For other Pipe schedules, such as Schedule 10, contact Sage, however the Y dimension will be the same for any Schedule Pipe.



SCHEDULE 40 PIPE ²					
PIPE SIZE	OD	ID	X	Y	PIPE AREA
1" ¹	C O N S U L T F A C T O R Y				
1.5"	1.900	1.610	.20"	1.56"	0.0141
2"	2.375	2.067	.40"	1.82"	0.0233
2.5"	2.875	2.469	.60"	2.07"	0.0332
3"	3.500	3.068	.90"	2.38"	0.0513
4"	4.500	4.026	1.40"	2.86"	0.0884
6"	6.625	6.065	2.40"	3.95"	0.2006
8"	8.625	7.981	3.40"	4.90"	0.3474
10"	10.750	10.020	4.40"	6.00"	0.5476
12"	12.750	11.938	5.50"	7.00"	0.7773
14"	14.000	13.124	6.00"	7.50"	0.9394
16"	16.000	15.000	7.00"	8.60"	1.2272
18"	18.000	16.876	8.00"	9.60"	1.5533
24"	24.000	22.625	10.75"	12.60"	2.7919

SCHEDULE 80 PIPE ²					
PIPE SIZE	OD	ID	X	Y	PIPE AREA
1" ¹	C O N S U L T F A C T O R Y				
1.5"	1.900	1.500	.15"	1.56"	0.0123
2"	2.375	1.939	.35"	1.82"	0.0205
2.5"	2.875	2.323	.55"	2.07"	0.0294
3"	3.500	2.900	.80"	2.38"	0.0459
4"	4.500	3.826	1.30"	2.86"	0.0798
6"	6.625	5.761	2.25"	3.95"	0.1810
8"	8.625	7.625	3.25"	4.90"	0.3171
10"	10.750	9.750	4.25"	6.00"	0.5185
12"	12.750	11.374	5.13"	7.00"	0.7056
14"	14.000	12.500	5.70"	7.50"	0.8522
16"	16.000	14.312	6.60"	8.60"	1.1172
18"	18.000	16.124	7.50"	9.60"	1.4180
24"	24.000	21.562	10.25"	12.60"	2.5357

3/4" PROBE DIAMETER INSTALLATION CHART

Methods for Probe Insertion to Pipe Center

METHOD 1

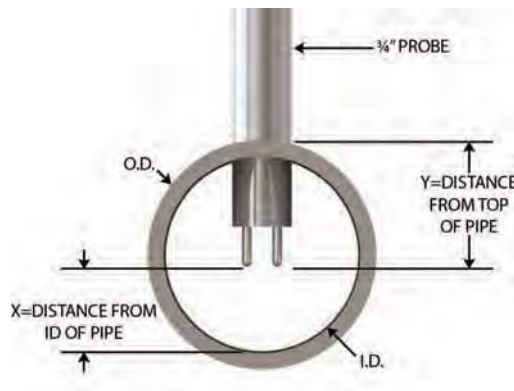
Using charts below, select pipe size (column 1), determine X. Carefully insert probe until the end touches the bottom of the pipe (ID), mark probe as it exits top of fitting. Lift probe distance "X" and tighten compression fitting.

METHOD 2

Using charts below¹, select pipe size (column 1), determine Y. Subtract Y from the factory supplied probe length. That difference Z (see drawing on page 14) should be outside of the pipe, and is measured from the bottom of the enclosure of the probe weld to pipe OD.

¹ For other Pipe Schedules, such as Schedule 10, contact Sage, however the Y dimension will be the same for any Schedule Pipe

² The 1" Pipe Size needs to have the Probe "Bottomed Out" (option "BOT"); the calibration method for the 1½" Pipe is either as shown below, or with option "BOT"



SCHEDULE 40 PIPE ²					
PIPE SIZE	OD	ID	X	Y	PIPE AREA
1" ¹	C O N S U L T F A C T O R Y				
1.5"	1.900	1.610	.63"	1.10"	0.0141
2"	2.375	2.067	.86"	1.34"	0.0233
2.5"	2.875	2.469	1.07"	1.59"	0.0332
3"	3.500	3.068	1.37"	1.90"	0.0513
4"	4.500	4.026	1.85"	2.40"	0.0884
6"	6.625	6.065	2.87"	3.47"	0.2006
8"	8.625	7.981	3.83"	4.47"	0.3474
10"	10.750	10.020	4.85"	5.53"	0.5476
12"	12.750	11.938	5.81"	6.53"	0.7773
14"	14.000	13.124	6.41"	7.15"	0.9394
16"	16.000	15.000	7.35"	8.15"	1.2272
18"	18.000	16.876	8.28"	9.15"	1.5533
24"	24.000	22.625	11.16"	12.15"	2.7919

SCHEDULE 80 PIPE ²					
PIPE SIZE	OD	ID	X	Y	PIPE AREA
1" ¹	C O N S U L T F A C T O R Y				
1.5"	1.900	1.500	.57"	1.10"	0.0123
2"	2.375	1.939	.80"	1.34"	0.0205
2.5"	2.875	2.323	.99"	1.59"	0.0294
3"	3.500	2.900	1.28"	1.90"	0.0459
4"	4.500	3.826	1.75"	2.40"	0.0798
6"	6.625	5.761	2.72"	3.47"	0.1810
8"	8.625	7.625	3.66"	4.47"	0.3171
10"	10.750	9.750	4.72"	5.53"	0.5185
12"	12.750	11.374	5.53"	6.53"	0.7056
14"	14.000	12.500	6.09"	7.15"	0.8522
16"	16.000	14.312	7.00"	8.15"	1.1172
18"	18.000	16.124	7.91"	9.15"	1.4180
24"	24.000	21.562	10.63"	12.15"	2.5357

RECOMMENDED PROBE LENGTHS DATA SHEET:

SAGE - Revised May 2018	1/2" PROBE (- 05)	1/2" PROBE (- 05)	1/2" PROBE (- 05)	3/4" PROBE (- 07X)
	STCF05 height 2.5	SVA05LP height 7.5	SVA05 height 11.0	SVA07 height 13.0
Pipe size	Recommended probe length	Recommended probe length	Recommended probe length	Recommended probe length
1	6	12	15	15
1 1/2	6	12	15	18
2	6	12	15	18
2 1/2	6	12	15	18
3	6	12	15	18
3 1/2	6	15	15	18
4	6	15	15	18
6	12	15	18	18
8	12	15	18	24
10	12	18	18	24
12	12	18	24	24
14	12	18	24	24
16	12	20	24	24
18	15	20	24	24
20	15	22	24	30
24	18	24	30	30
36	24	30	36	36