Smart Sonic
Ultrasonic Transmitters

Instruction Manual

BIN MASTER.®

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BIN MASTER®

Customer Service and <u>Technical Support Personnel</u>

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<u>Customer Service Hotline</u>

Call or fax one of the following numbers if you have installation or application questions.

General Specifications

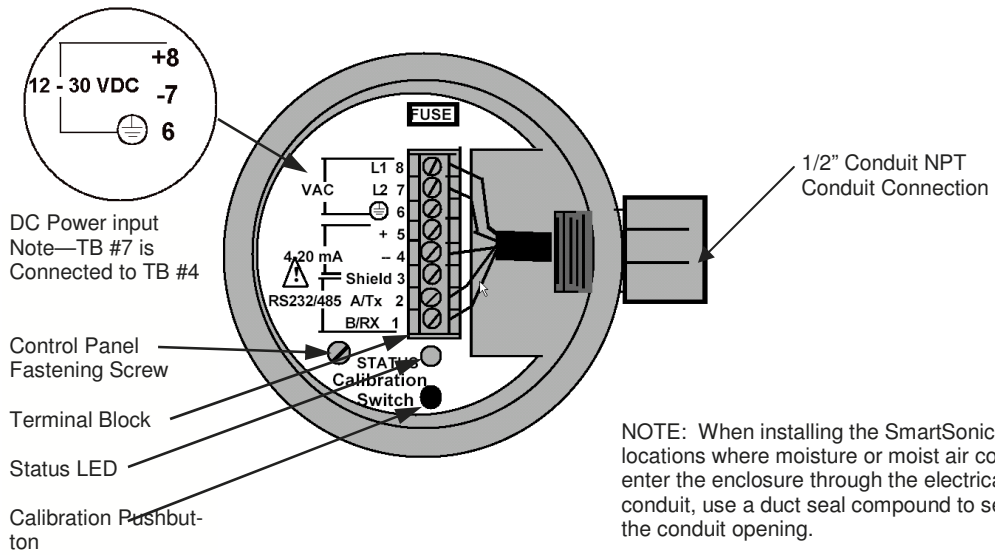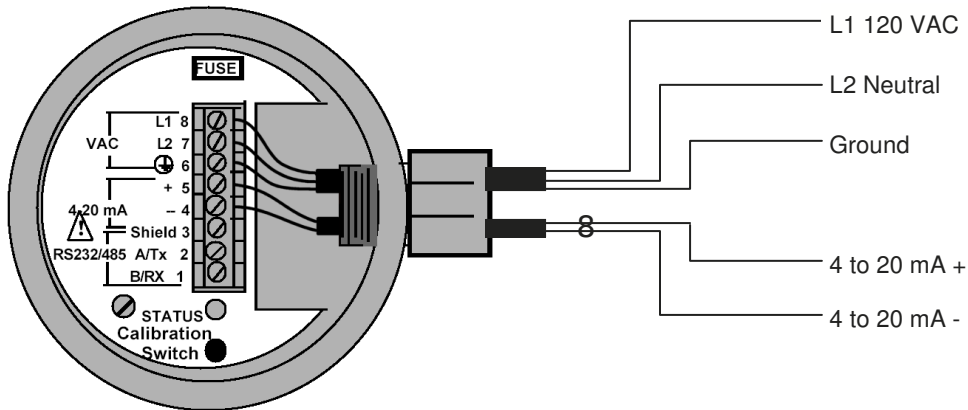|	
Conduit Entry:	1/2" NPT (PVC conduit only)
Enclosure:	PVC-94VO
Enclosure Rating:	NEMA 4X(IP65)
Temperature:	-40 to +140°F (-40 to 60°C)
Pressure:	2 bar
Approvals:	Entela—CSA/UL
Accuracy:	+/- 0.25% of maximum range
Beam Angle:	6°-12° conical at –3dB
Loss of Echo:	Hold 30 seconds, 22 mA
Temperature Compensation:	Continuous in transducer
Temperature Sensor failure:	23 mA
Calibration:	Push-button or programmable via optional communication port
Diagnostics:	Via communication port (echo profile, echo stability, operation errors)
Power AC:	AC units 115 VAC 60Hz or 230 VAC 50Hz, 1.7 VA
Power: DC 3 Wire: **DC 2 Wire Loop Powered:**	DC units 12 to 30 VDC, 0.07 A max @ 24 VDC DC Loop Powered units, 12 to 28 VDC, 0.025 A max @ 24 VDC
Output:	4-20 mA, optional RS-232, RS-485, or Modbus
4 to 20 mA Max. Loop Resistance	110 VAC @ 750 Ohms (isolated) 12 VDC @ 250 Ohms 24 VDC @ 750 Ohms

<u>Operation</u>

The SmartSonic transmitter features high efficiency, narrow beam design technology using a wide frequency bandwidth to enhance operation in difficult applications. The transmitter performs particularly well in harsh environments where vessel temperatures vary. SmartSonic uses smart signal processing to eliminate unwanted echoes from tank walls, standpipes, and other tank structures that often cause error readings by other ultrasonic devices. The unit's transducer uses a built-in, self-cleaning operation to eliminate buildup or condensation. SmartSonic's sensor probes are designed to adapt to the internal tank conditions, automatically adjusting power and receiver sensitivity to any distance and reflecting surface. This technology ensures the same echo is maintained over the entire operating range which enhances measurement accuracy.

The transmitter can be programmed to simply send a 4-20 mA analog output signal directly to an existing control system or send data by RS-232 or RS-485 to a PC running SmartSonic's calibration/data logging software program.
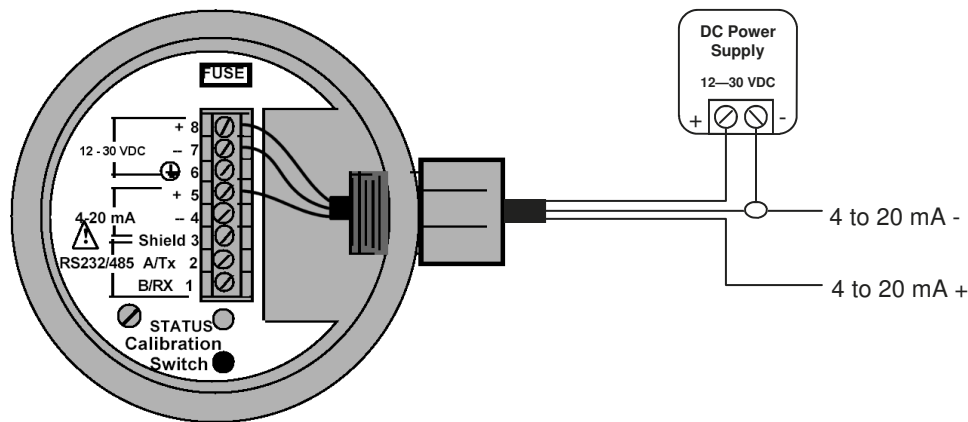
Interconnecting Wire Diagram

12 - 30 VDC
+8
-7
6

DC Power input
Note—TB #7 is
Connected to TB #4

Control Panel
Fastening Screw

Terminal Block

Status LED

Calibration Pushbut-
ton

FUSE

VAC — L1 8
L2 7
6
+ 5
4-20 mA — 4
⚠ — Shield 3
RS232/485 A/Tx 2
B/RX 1

STATUS
Calibration
Switch

1/2" Conduit NPT
Conduit Connection

NOTE: When installing the SmartSonic in
locations where moisture or moist air could
enter the enclosure through the electrical
conduit, use a duct seal compound to seal
the conduit opening.

AC Wire Diagram

FUSE

VAC — L1 8
L2 7
6
+ 5
4-20 mA — 4
⚠ — Shield 3
RS232/485 A/Tx 2
B/RX 1

STATUS
Calibration
Switch

L1 120 VAC

L2 Neutral

Ground

4 to 20 mA +

4 to 20 mA -

DC 3 Wire Diagram

FUSE

+ 8
12 - 30 VDC — 7
6
+ 5
4-20 mA — 4
⚠ — Shield 3
RS232/485 A/Tx 2
B/RX 1

STATUS
Calibration
Switch

**DC Power
Supply**

12—30 VDC

+ ⊘⊘ -

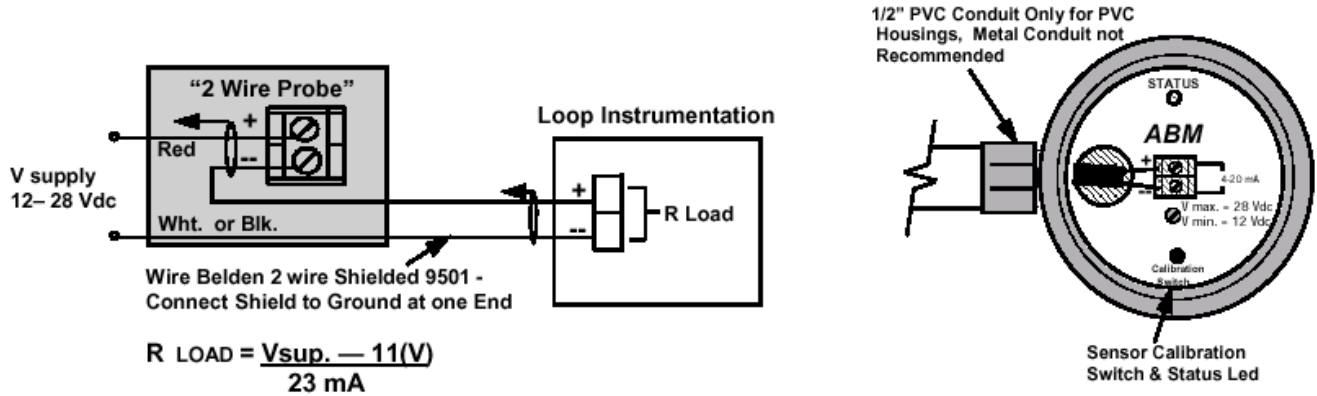4 to 20 mA -

4 to 20 mA +

Wire/Cable for AC Units
115/230 VAC…………..3 wire unshielded, 22AWG (7X30), 300V
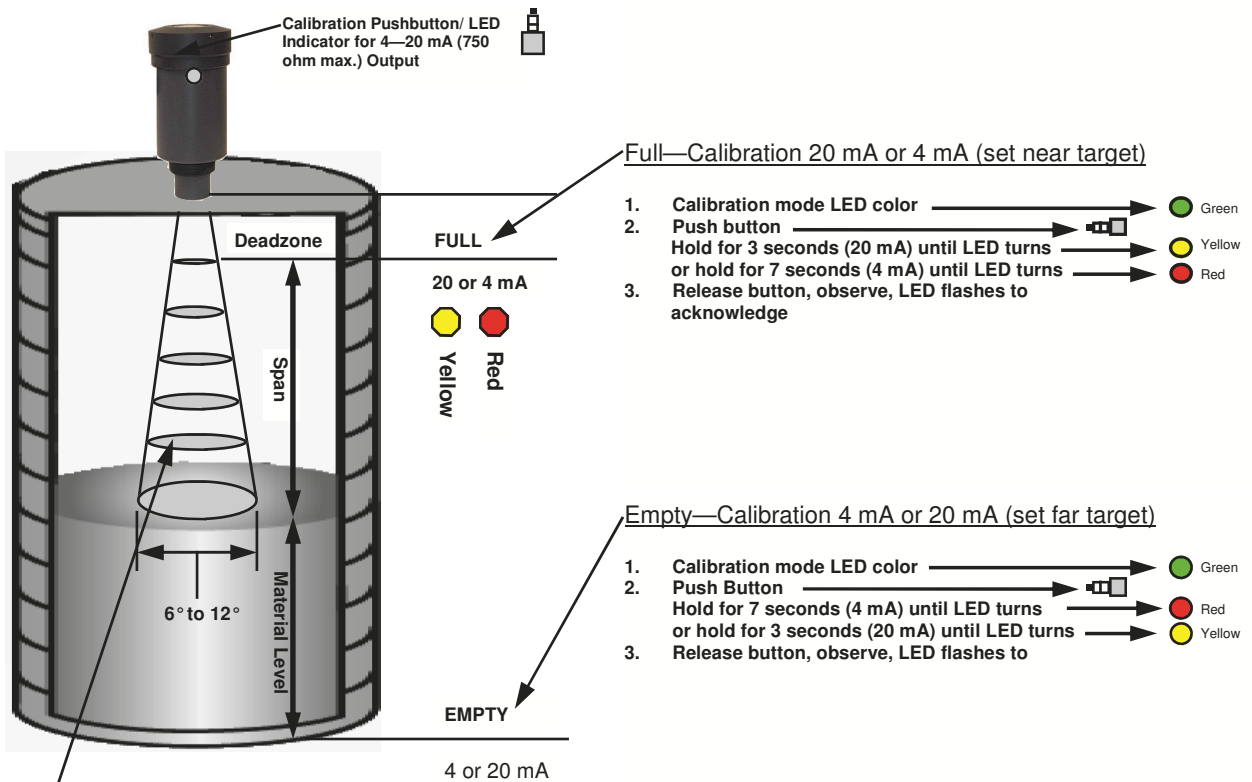4-20 mA………………..1 pair shielded, 24AWG (7X32), 300V

Wire/Cable Recommendation for 3—Wire DC Units
24 VDC + 4-20 mA…….3 wire shielded, 24AWG (7X32), 300V

2 Wire DC 4/20 mA Loop Powered

"2 Wire Probe"

Red

+

--

Wht. or Blk.

V supply
12– 28 Vdc

Loop Instrumentation

+

--

R Load

Wire Belden 2 wire Shielded 9501 -
Connect Shield to Ground at one End

$$R_{LOAD} = \frac{Vsup. - 11(V)}{23\ mA}$$

1/2" PVC Conduit Only for PVC
Housings, Metal Conduit not
Recommended

STATUS

ABM

+

4-20 mA

V max. = 28 Vdc
V min. = 12 Vdc

Calibration
Switch

Sensor Calibration
Switch & Status Led

Calibration—4-20 or 20-4 mA Output

Calibration Pushbutton/ LED
Indicator for 4—20 mA (750
ohm max.) Output

Deadzone

FULL

FULL

20 or 4 mA

Yellow   Red

Span

6° to 12°

Material Level

EMPTY

EMPTY

4 or 20 mA

Full—Calibration 20 mA or 4 mA (set near target)

1. Calibration mode LED color — Green
2. Push button —
   Hold for 3 seconds (20 mA) until LED turns — Yellow
   or hold for 7 seconds (4 mA) until LED turns — Red
3. Release button, observe, LED flashes to
   acknowledge

Empty—Calibration 4 mA or 20 mA (set far target)

1. Calibration mode LED color — Green
2. Push Button —
   Hold for 7 seconds (4 mA) until LED turns — Red
   or hold for 3 seconds (20 mA) until LED turns — Yellow
3. Release button, observe, LED flashes to

Operation—An acoustic pulse is transmitted from the SmartSonics sensor face. The pulse travels to the surface being moni-
tored and is reflected off this surface back to the sensor face. The time of flight is divided by 2 and converted to an output
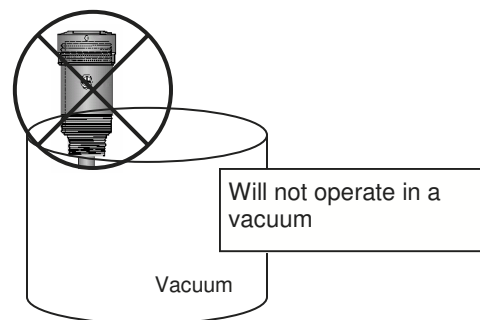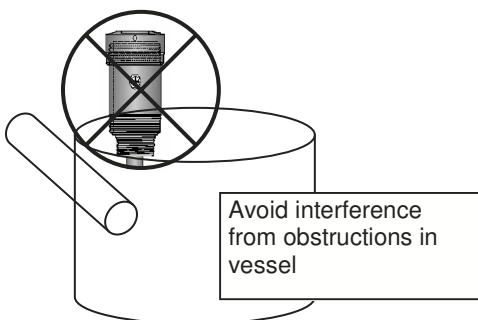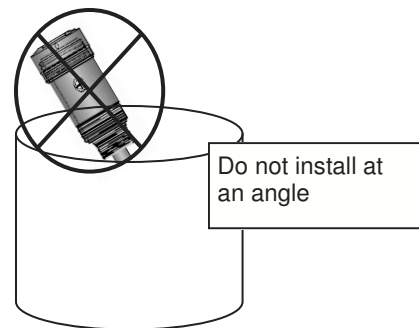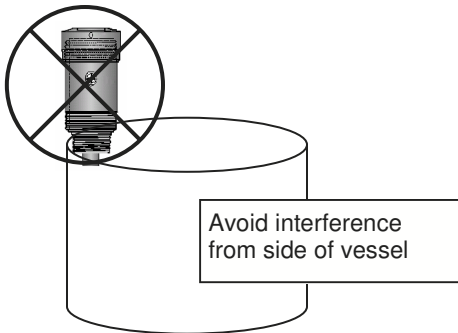signal directly proportional to the material level.
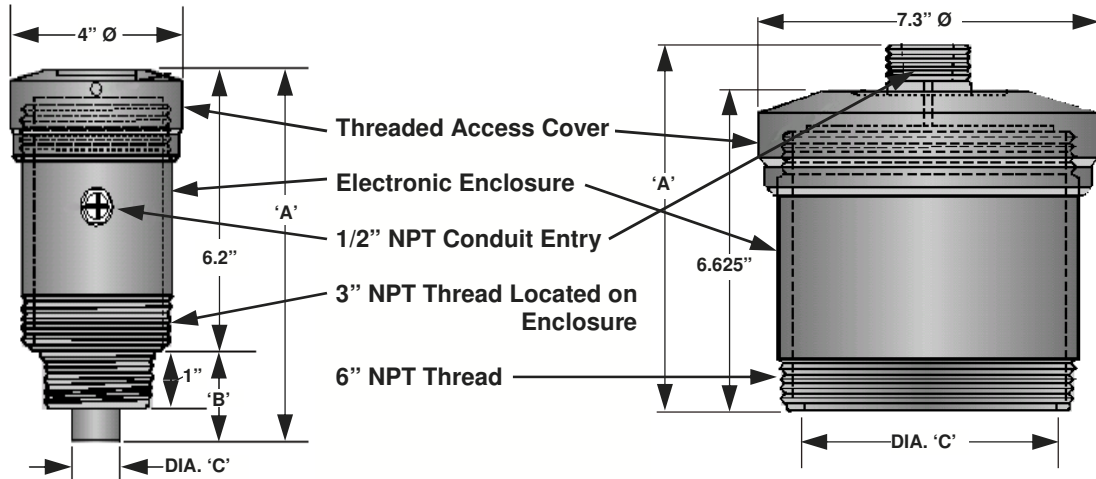
Mounting
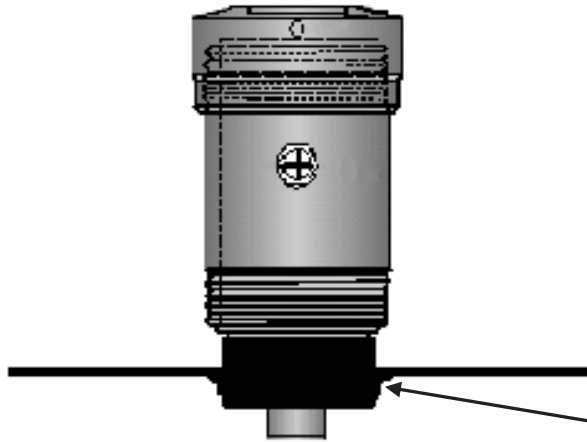
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Mounting:

Mounting the SmartSonic Transmitter is critical to the proper operation of the unit. The unit can be directly mounted by simply threading the sensor directly into a metal or plastic mounting flange. If an extended standpipe is used for mounting, please consult the factory for assistance. The thread size of the unit is dependent upon the specific model (see specifications).

Threaded Mounting Flange (1", 1 1/2", 2", or 3" NPT)

Positioning

Avoid interference from side of vessel

Do not install at an angle

Avoid interference from obstructions in vessel

Will not operate in a vacuum

Vacuum

Technical Specifications

Threaded Access Cover
Electronic Enclosure
1/2" NPT Conduit Entry
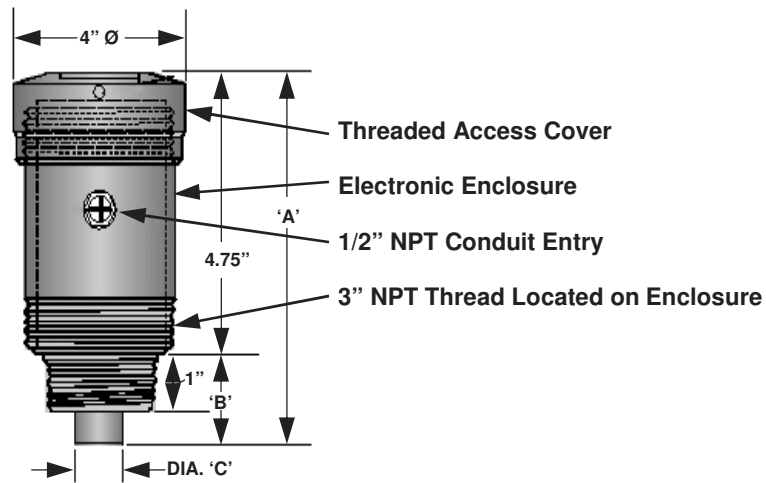3" NPT Thread Located on Enclosure
6" NPT Thread

Models SS300/400-45U,52U,70U,80U,81U,and 148U

Model SS300/400-25U Only

	MODEL	RANGE	RESOLUTION	OPERATING FREQUENCY	MOUNTING	DIMENSION 'A'	DIMENSION 'B'	DIMENSION 'C'
110/230 VAC—4 Wire	SS400-25U	1.4-90 ft 0.40-27.4 m	0.41" 10 mm	25 KHz	6.0"/1.0" NPT	7.625"	N/A	5.75"
	SS400-45U	1.0—60 ft 0.30—18.2 m	0.19" 5 mm	45 KHz	3.0" NPT	8.9"	3.0"	3.0"
	SS400-52U	0.9—50 ft 0.27—15.2 m	0.16" 4 mm	52 KHz	3.0" or 2.0" NPT	9.3"	3.05"	2.2"
	SS400-70U	0.8—30 ft 0.24—9.1 m	0.12" 3 mm	70 KHz	3.0" or 2.0" NPT	8.5"	2.25"	1.8"
	SS400-80U	0.7—20 ft 0.21—6.1 m	0.08" 2 mm	80 KHz	3.0" or 2.0" NPT	8.5"	2.25"	1.8"
	SS400-81U	0.6—16 ft 0.18—4.9 m	0.08" 2 mm	81 KHz	3.0" or 1.5" NPT	8.4"	2.1"	1.5"
	SS400-148U	0.4—9 ft 0.12—2.7 m	0.04" 1 mm	148 KHz	3.0" or 1.0" NPT	8.25"	2.0"	1.1"
12 to 30 VDC—3 Wire	SS300-25U	1.4-90 ft 0.40-27.4 m	0.41" 10 mm	25 KHz	6.0"/1.0" NPT	7.625"	N/A	5.75"
	SS300-45U	1.0—60 ft 0.30—18.2 m	0.19" 5 mm	45 KHz	3.0" NPT	8.9"	3.0"	3.0"
	SS300-52U	0.9—50 ft 0.27—15.2 m	0.19" 5 mm	52 KHZ	3.0" NPT	9.3"	3.05"	2.2"
	SS300-70U	0.8—30 ft 0.24—9.1 m	0.12" 3 mm	70 KHZ	3.0" or 2.0" NPT	8.5"	2.25"	1.8"
	SS300-80U	0.7—20 ft 0.21—6.1 m	0.08" 2 mm	80 KHz	3.0" or 2.0" NPT	8.5"	2.25"	1.8"
	SS300-81U	0.6—16 ft 0.18—4.9 m	0.08" 2 mm	81 KHz	3.0" or 1.5" NPT	8.4"	2.1"	1.5"
	SS300-148U	0.4—9 ft 0.12—2.7 m	0.04" 1 mm	148 KHz	3.0" or 1.0" NPT	8.25"	2.0"	1.1"

2 Wire - 4/20mA Loop Powered

Threaded Access Cover

Electronic Enclosure

1/2" NPT Conduit Entry

3" NPT Thread Located on Enclosure

4" Ø

4.75"

'A'

1"

'B'

DIA. 'C'

Models SS200-70U,80U,81U,and 148U

MODEL	RANGE	RESOLUTION	OPERATING FREQUENCY	MOUNTING	DIMENSION 'A'	DIMENSION 'B'	DIMENSION 'C'
SS200-70U	0.8—30 ft 0.24—9.1 m	0.12" 3 mm	70 KHz	3.0" or 2.0" NPT	7.05"	2.25"	1.8"
SS200-80U	0.7—20 ft 0.21—6.1 m	0.08" 2 mm	80 KHz	3.0" or 2.0" NPT	7.05"	2.25"	1.8"
SS200-81U	0.6—16 ft 0.18—4.9 m	0.08" 2 mm	81 KHz	3.0" or 1.5" NPT	6.95"	2.1"	1.5"
SS200-148U	0.4—9 ft 0.12—2.7 m	0.04" 1 mm	148 KHz	3.0" or 1.0" NPT	6.8"	2.0"	1.1"