

**Overview**

EchoMax XPS transducers use ultrasonic technology to measure level in a wide range of liquids and solids.

**Benefits**

- Integral temperature compensation
- Low ringing effect reduces blanking distance
- Optional foam facing for dusty applications
- Self-cleaning and low-maintenance
- Chemically resistant
- Hermetically sealed

**Application**

XPS transducers can be fully immersed, are resistant to steam and corrosive chemicals, and can be installed without flanges.

The XPS series offers versions for various measuring ranges up to 30 m (100 ft) and up to a max. temperature of 95 °C (203 °F).

During operation, the EchoMax transducers emit acoustic pulses in a narrow beam. The level monitor measures the propagation time between pulse emission and its reflection (echo) to calculate the distance.

## Level Measurement

### Continuous level measurement - Ultrasonic transducers

#### EchoMax XPS

#### Technical specifications

Input	XPS-10	XPS-15 (standard and F models)	XPS-30
Measuring range	0.3 ... 10 m (1 ... 33 ft)	Standard: 0.3 ... 15 m (1 ... 50 ft) XPS-15F: 0.45 ... 15 m (1.5 ... 50 ft)	0.6 ... 30 m (2 ... 100 ft)
<b>Output</b>			
Frequency	44 kHz	44 kHz	30 kHz
Beam angle	12°	6°	6°
<b>Environmental</b>			
Location	Indoors/outdoors		
Ambient temperature	-40 ... +95 °C (-40 ... +203 °F)	Standard: -40 ... +95 °C (-40 ... +203 °F) XPS-15F: -20 ... +95 °C (-4 ... +203 °F)	-40 ... +95 °C (-40 ... +203 °F)
Pollution degree	4		
Pressure	8 bar g (120 psi g) Flanged: 0.5 bar g (7.25 psi g)	8 bar g (120 psi g) Flanged: 0.5 bar g (7.25 psi g)	0.5 bar g (7.25 psi g) Flanged: 0.5 bar g (7.25 psi g)
<b>Design</b>			
Weight	0.8 kg (1.8 lb)	1.3 kg (2.8 lb) Flanged: 2 kg (4.4 lb)	4.3 kg (9.5 lb)
Power supply	Operation of transducer only with approved Siemens controllers		
Material	Standard: PVDF Flanged: PVDF with CPVC flange Option: PTFE face with CPVC flange	Standard: PVDF Flanged: PVDF with CPVC flange Option: PTFE face with CPVC flange	Standard: PVDF Flanged: PVDF with CPVC flange Option: PTFE face with CPVC flange
Color	Blue	Standard: Blue XPS-15F: Gray	Blue
Process connection	1" NPT or 1" BSPT	Standard: 1" NPT or 1" BSPT XPS-15F: 1" NPT	1.5" universal thread (NPT or BSPT)
Degree of protection	IP66/68		
Cable	2-wire twisted pair/braided and foil shielded 0.5 mm <sup>2</sup> (20 AWG) PVC jacket		
Separation	Max. 365 m (1 200 ft)		
<b>Certificates and approvals</b>			
	Standard: CE, CSA, FM, ATEX, IECEx	Standard: CE, CSA, FM, ATEX, IECEx XPS-15F: FM Class I, Div. 1, Groups A, B, C, and D, Class II, Div. 1, Groups E, F, and G, Class III	CE, CSA, FM, ATEX, IECEx

<sup>1)</sup> EMC certificate available on request.

Selection and Ordering data	Article No.	Selection and Ordering data	Order code
<b>EchoMax XPS-10 ultrasonic transducer</b> High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor. Measuring range: min. 0.3 m, max. 10 m ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	<b>7ML115-</b> 	<b>Further designs</b> Please add "-Z" to Article No. and specify Order code(s). Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring point number/ identification (max. 27 characters) specify in plain text	<b>Y15</b>
<b>Mounting thread and facing</b> 1" NPT [(Taper), ANSI/ASME B1.20.1]  0 1" NPT [(Taper), ANSI/ASME B1.20.1] with foam facing <sup>1)</sup> 1 1" NPT [(Taper), ANSI/ASME B1.20.1] with PTFE facing <sup>2)</sup> 2 R 1" [(BSPT), EN 10226]  3 R 1" [(BSPT), EN 10226] with foam facing <sup>1)</sup> 4 R 1" [(BSPT), EN 10226] with PTFE facing <sup>2)</sup> 5		<b>Operating Instructions</b> Quick Start guide, multi-language Applications Guidelines, multi-language Note: The Operating Instructions should be ordered as a separate line item on the order. All literature is available to download for free, in a range of languages, at <a href="http://www.siemens.com/processinstrumentation/documentation">http://www.siemens.com/processinstrumentation/documentation</a> This device is shipped with the Siemens Level and Weighing manual DVD containing the ATEX Quick Start and Operating Instructions library.	Article No. <b>A5E32282889</b> <b>7ML1998-5HV61</b>
<b>Cable length</b> 5 m (16.40 ft)  B 10 m (32.81 ft)  C 30 m (98.43 ft)  E 50 m (164.04 ft) F 100 m (328.08 ft) K		<b>Accessories</b> Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch), one text line for fastening on sensors <b>7ML1930-1BJ</b> Submergence shield kit <b>7ML1830-1BH</b> Easy Aimer 2, aluminum, NPT with ¾" x 1" PVC coupling <b>7ML1830-1AQ</b> Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings <b>7ML1830-1AX</b> Easy Aimer 304, NPT with 1" stainless steel coupling <b>7ML1830-1AU</b> Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 stainless steel couplings <b>7ML1830-1GN</b> Universal box bracket, mounting kit <b>7ML1830-1BK</b> Channel bracket, wall mount <b>7ML1830-1BL</b> Extended channel bracket, wall mount <b>7ML1830-1BM</b> Channel bracket, floor mount <b>7ML1830-1BN</b> Extended channel bracket, floor mount <b>7ML1830-1BP</b> Bridge channel bracket, floor mount (see Mounting Brackets on page 4/190 for more information) <b>7ML1830-1BQ</b> 1" NPT locknut, plastic <b>7ML1830-1DS</b> 1" BSPT locknut, plastic <b>7ML1830-1DR</b>	
<b>Mounting flange</b> None  A 3" ASME, 150 lb, flat faced C 4" ASME, 150 lb, flat faced D 6" ASME, 150 lb, flat faced E 8" ASME, 150 lb, flat faced F DN 80, PN 10/16, Type A, flat faced G DN 100, PN 10/16, Type A, flat faced J DN 150, PN 10/16, Type A, flat faced L JIS10K3B Style M JIS10K4B Style P JIS10K6B Style R (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.)			
<b>Approvals</b> ATEX 2GD Ex mb IIC T4 Gb, Ex tb IIIC T135 °C Db;  3 IECEx SIR 13.0009X Ex mb IIC T4 Gb, Ex tb IIIC T135 °C Db; FM Class I, Div. 2, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III CSA Class I, Div. 1, Groups A, B, C, D, Class II, Div. 1, Groups E, F, G, Class III <sup>3)</sup> 4			

<sup>1)</sup> Not available with flanged versions

<sup>2)</sup> Available with flanged versions only

<sup>3)</sup> Valid with mounting thread and facing options 0 ... 2 only



We can offer shorter delivery times for configurations designated with the Quick Ship Symbol . For details see page 9/5 in the appendix.

## Level Measurement

### Continuous level measurement - Ultrasonic transducers

#### EchoMax XPS

Selection and Ordering data	Article No.	Selection and Ordering data	Order code
<b>EchoMax XPS-15 ultrasonic transducer</b> High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor. Measuring range: min. 0.3 m, max. 15 m Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	<b>7ML1118-</b> 0	<b>Further designs</b> Please add "-Z" to Article No. and specify Order code(s). Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: <b>Y15</b> Measuring point number/ identification (max. 27 characters) specify in plain text	
<b>Mounting thread and facing</b> 1" NPT [(Taper), ANSI/ASME B1.20.1] <b>0</b> 1" NPT [(Taper), ANSI/ASME B1.20.1] with foam facing <sup>1)</sup> <b>1</b> 1" NPT [(Taper), ANSI/ASME B1.20.1] with PTFE facing <sup>2)</sup> <b>2</b> R 1" [(BSPT), EN 10226] <b>3</b> R 1" [(BSPT), EN 10226] with foam facing <sup>1)</sup> <b>4</b> R 1" [(BSPT), EN 10226] with PTFE facing <sup>2)</sup> <b>5</b>		<b>Operating Instructions</b> Quick Start guide, multi-language <b>A5E32282889</b> Applications Guidelines, multi-language <b>7ML1998-5HV61</b> Note: The Operating Instructions should be ordered as a separate line item on the order. All literature is available to download for free, in a range of languages, at <a href="http://www.siemens.com/processinstrumentation/documentation">http://www.siemens.com/processinstrumentation/documentation</a> This device is shipped with the Siemens Level and Weighing manual DVD containing the ATEX Quick Start and Operating Instructions library.	Article No. <b>A5E32282889</b> <b>7ML1998-5HV61</b>
<b>Cable length</b> 5 m (16.40 ft) <b>B</b> 10 m (32.81 ft) <b>C</b> 30 m (98.43 ft) <b>E</b> 50 m (164.04 ft) <b>F</b> 100 m (328.08 ft) <b>K</b>		<b>Accessories</b> Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch), one text line for fastening on sensors <b>7ML1930-1BJ</b> Submergence shield kit <b>7ML1830-1BJ</b> Universal box bracket, mounting kit <b>7ML1830-1BK</b> Channel bracket, wall mount <b>7ML1830-1BL</b> Extended channel bracket, wall mount <b>7ML1830-1BM</b> Channel bracket, floor mount <b>7ML1830-1BN</b> Extended channel bracket, floor mount <b>7ML1830-1BP</b> Bridge channel bracket, floor mount (see Mounting Brackets on page 4/190 for more information) <b>7ML1830-1BQ</b>	<b>7ML1930-1BJ</b> <b>7ML1830-1BJ</b> <b>7ML1830-1BK</b> <b>7ML1830-1BL</b> <b>7ML1830-1BM</b> <b>7ML1830-1BN</b> <b>7ML1830-1BP</b> <b>7ML1830-1BQ</b>
<b>Mounting flange</b> None <b>A</b> 6" ASME, 150 lb, flat faced <b>D</b> 8" ASME, 150 lb, flat faced <b>E</b> DN 150, PN 10/16, Type A, flat faced <b>J</b> DN 200, PN 10, Type A, flat faced <b>K</b> JIS10K 6B <b>N</b> JIS10K 8B <b>P</b> (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.)		1" NPT locknut, plastic <b>7ML1830-1DS</b> 1" BSPT locknut, plastic <b>7ML1830-1DR</b> Easy Aimer 2, aluminum, NPT with 3/4" x 1" PVC coupling <b>7ML1830-1AQ</b> Easy Aimer 2, aluminum with M20 adapter and 1" and 1 1/2" BSPT aluminum couplings <b>7ML1830-1AX</b> Easy Aimer 304, NPT with 1" stainless steel coupling <b>7ML1830-1AU</b> Easy Aimer 304, with M20 adapter and 1" and 1 1/2" BSPT 304 stainless steel couplings <b>7ML1830-1GN</b>	<b>7ML1830-1DS</b> <b>7ML1830-1DR</b> <b>7ML1830-1AQ</b> <b>7ML1830-1AX</b> <b>7ML1830-1AU</b> <b>7ML1830-1GN</b>
<b>Approvals</b> ATEX 2GD Ex mb IIC T4 Gb, Ex tb IIIC T135 °C Db; <b>3</b> IECEx SIR 13.0009X Ex mb IIC T4 Gb, Ex tb IIIC T135 °C Db; FM Class I, Div. 2, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III CSA Class I, Div. 1, Groups A, B, C, D, Class II, Div. 1, Groups E, F, G, Class III <sup>3)</sup> <b>4</b>			
<sup>1)</sup> Not available with flanged versions <sup>2)</sup> Available with flanged versions only <sup>3)</sup> Available with mounting options 0 ... 2 only We can offer shorter delivery times for configurations designated with the Quick Ship Symbol <b>◆</b> . For details see page 9/5 in the appendix.		We can offer shorter delivery times for configurations designated with the Quick Ship Symbol <b>◆</b> . For details see page 9/5 in the appendix.	

Selection and Ordering data	Article No.	Selection and Ordering data	Article No.
<b>EchoMax XPS-15F ultrasonic transducer</b> High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor. Measuring range: min. 0.3 m, max. 15 m <a href="#">Click on the Article No. for the online configuration in the PIA Life Cycle Portal.</a>	<b>7ML1171-</b> 	<b>EchoMax XPS-30 ultrasonic transducer</b> High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor. 1½" universal thread compatible with 1½" NPT and R 1½" [(BSPT), EN 10226] Measuring range: min. 0.6 m (1.97 ft), max. 30 m (98.43 ft) <a href="#">Click on the Article No. for the online configuration in the PIA Life Cycle Portal.</a>	<b>7ML1123-</b> 
<b>Mounting thread and facing</b> 1" NPT [(Taper), ANSI/ASME B1.20.1]	1	<b>Mounting thread and facing</b> 1½" universal thread 1½" universal thread, foam facing <sup>1)</sup> 1½" universal thread, PTFE facing <sup>2)</sup>	0 1 2
<b>Cable length</b> 5 m (16.40 ft) 10 m (32.81 ft) 30 m (98.43 ft) 50 m (164.04 ft) 100 m (328.08 ft)	B C D E F	<b>Cable length</b> 5 m (16.40 ft) 10 m (32.81 ft) 30 m (98.43 ft) 50 m (164.04 ft) 100 m (328.08 ft)	B C E F K
<b>Mounting flange, flush mount</b> None 6" ASME, 150 lb, flat faced 8" ASME, 150 lb, flat faced (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1, or JIS B 2220 standard.)	A B C	<b>Mounting flange</b> None 6" ASME, 150 lb, flat faced 8" ASME, 150 lb, flat faced DN 150, PN 10/16, Type A, flat faced DN 200, PN 10, Type A, flat faced JIS10K 6B JIS10K 8B (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.)	A D E J K N P
<b>Approvals</b> FM Class I, Div. 1, Groups A, B, C, and D, Class II Div. 1, Groups E, F, and G, Class III	1	<b>Approvals</b> ATEX 2G 1D Ex mb IIC T4 Gb, Ex ta IIIC T135 °C Da; IECEx SIR 13.0009X Ex mb IIC T4 Gb, Ex ta IIIC T135 °C Da <sup>1)</sup> Not available with flanged versions <sup>2)</sup> Available with flanged versions only	5
<b>Selection and Ordering data</b> <b>Further designs</b> Please add "-Z" to Article No. and specify Order code(s). Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring point number/ identification (max. 27 characters) specify in plain text	Order code		
<b>Operating Instructions</b> English Applications Guidelines, multi-language Note: The Operating Instructions should be ordered as a separate line item on the order. All literature is available to download for free, in a range of languages, at <a href="http://www.siemens.com/processinstrumentation/documentation">http://www.siemens.com/processinstrumentation/documentation</a> This device is shipped with the Siemens Level and Weighing manual DVD containing the ATEX Quick Start and Operating Instructions library.	Article No. <b>A5E32725813</b> <b>7ML1998-5HV61</b>		
<b>Accessories</b> Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch), one text line for fastening on sensors Submergence shield kit Universal box bracket, mounting kit Channel bracket, wall mount Extended channel bracket, wall mount Channel bracket, floor mount Extended channel bracket, floor mount Bridge channel bracket, floor mount (see Mounting Brackets on page 4/190 for more information) 1" NPT locknut, plastic Easy Aimer 2, aluminum, NPT with ¾" x 1" PVC coupling Easy Aimer 304, NPT with 1" stainless steel coupling	<b>7ML1930-1BJ</b>  <b>7ML1830-1BJ</b> <b>7ML1830-1BK</b> <b>7ML1830-1BL</b> <b>7ML1830-1BM</b> <b>7ML1830-1BN</b> <b>7ML1830-1BP</b> <b>7ML1830-1BQ</b>  <b>7ML1830-1DS</b> <b>7ML1830-1AQ</b>  <b>7ML1830-1AU</b>		

## Level Measurement

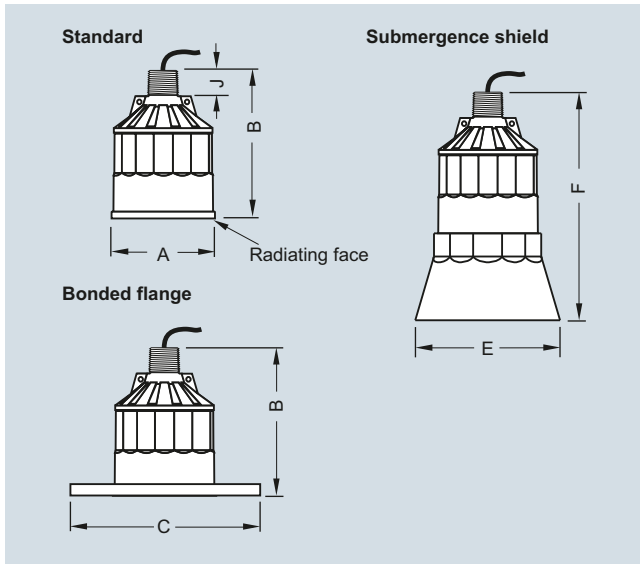
### Continuous level measurement - Ultrasonic transducers

#### EchoMax XPS

Selection and Ordering data	Order code	Selection and Ordering data	Article No.
<p><b>Further designs</b></p> <p>Please add "-Z" to Article No. and specify Order code(s).</p>		<p><b>EchoMax XPS-30C ultrasonic transducer</b></p> <p>High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor.</p> <p>1½" universal thread compatible with 1½" NPT and R 1½" [(BSPT), EN 10226]</p> <p>Measuring range: min. 0.6 m (1.97 ft), max. 30 m (98.43 ft)</p> <p>➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.</p>	<p><b>7ML1155-</b></p> <p>1</p>
<p>Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: measuring-point number/identification (max. 27 characters) specify in plain text</p>	<b>Y15</b>	<p><b>Mounting thread and facing</b></p> <p>1½" universal thread</p> <p>1½" universal thread, foam facing<sup>1)</sup></p> <p>1½" universal thread, PTFE facing<sup>2)</sup></p>	<p>0</p> <p>1</p> <p>2</p>
<p><b>Operating Instructions</b></p> <p>Quick Start guide, multi-language</p> <p>Applications Guidelines, multi-language</p> <p>Note: The Operating Instructions should be ordered as a separate line item on the order.</p> <p>All literature is available to download for free, in a range of languages, at <a href="http://www.siemens.com/processinstrumentation/documentation">http://www.siemens.com/processinstrumentation/documentation</a></p> <p>This device is shipped with the Siemens Level and Weighing manual DVD containing the ATEX Quick Start and Operating Instructions library.</p>	<p>Article No.</p> <p><b>A5E32282889</b></p> <p><b>7ML1998-5HV61</b></p>	<p><b>Cable length</b></p> <p>5 m (16.40 ft)</p> <p>10 m (32.81 ft)</p> <p>30 m (98.43 ft)</p> <p>50 m (164.04 ft)</p> <p>100 m (328.08 ft)</p>	<p>B</p> <p>C</p> <p>E</p> <p>F</p> <p>K</p>
<p><b>Accessories</b></p> <p>Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch), one text line for fastening on sensors</p> <p>1½" BSPT locknut, plastic</p> <p>Easy Aimer 2, aluminum, NPT with 1½" galvanized coupling</p> <p>Easy Aimer 304, NPT with 1½" stainless steel coupling</p> <p>Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings</p> <p>Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 stainless steel couplings</p>	<p><b>7ML1930-1BJ</b></p> <p><b>7ML1830-1DP</b></p> <p><b>7ML1830-1AN</b></p> <p><b>7ML1830-1AT</b></p> <p><b>7ML1830-1AX</b></p> <p><b>7ML1830-1GN</b></p>	<p><b>Mounting flange</b></p> <p>None</p> <p>6" ASME, 150 lb, flat faced</p> <p>8" ASME, 150 lb, flat faced</p> <p>DN 150, PN 10/16, Type A, flat faced</p> <p>DN 200, PN 10, Type A, flat faced</p> <p>JIS10K 6B</p> <p>JIS10K 8B</p> <p>(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.)</p>	<p>A</p> <p>D</p> <p>E</p> <p>J</p> <p>K</p> <p>N</p> <p>P</p>
		<p><b>Approvals</b></p> <p>CSA, Class I, Div. 2, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III</p>	<p>4</p>
		<p><b>Selection and Ordering data</b></p> <p><b>Further designs</b></p> <p>Please add "-Z" to Article No. and specify Order code(s).</p> <p>Stainless steel tag [69 mm x 50 mm (2.71 x 1.97 inch)]: Measuring-point number / identification (max. 27 characters) specify in plain text</p>	
		<p><b>Operating Instructions</b></p> <p>Quick Start guide, multi-language</p> <p>Applications Guidelines, multi-language</p> <p>Note: The Operating Instructions should be ordered as a separate line item on the order.</p> <p>All literature is available to download for free, in a range of languages, at <a href="http://www.siemens.com/processinstrumentation/documentation">http://www.siemens.com/processinstrumentation/documentation</a></p> <p>This device is shipped with the Siemens Level and Weighing manual DVD containing the ATEX Quick Start and Operating Instructions library.</p>	
		<p><b>Accessories</b></p> <p>Easy Aimer 2, aluminum, NPT with 1½" galvanized coupling</p> <p>Easy Aimer 304, NPT with 1½" stainless steel coupling</p> <p>1½" BSPT locknut, plastic</p>	<p><b>Y15</b></p> <p>Article No.</p> <p><b>A5E32282889</b></p> <p><b>7ML1998-5HV61</b></p> <p><b>7ML1830-1AN</b></p> <p><b>7ML1830-1AT</b></p> <p><b>7ML1830-1DP</b></p>

<sup>1)</sup> Not available with flanged version  
<sup>2)</sup> Available for flanged versions only

## Dimensional drawings

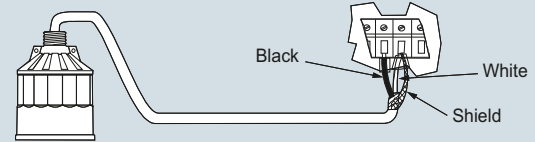


XPS ultrasonic transducer

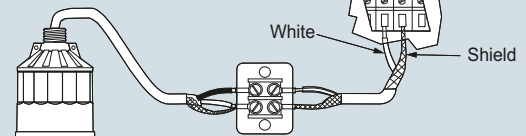
Version			
Dimension	XPS-10	XPS-15	XPS-30
A	88 mm (3.464 inch)	121 mm (4.764 inch)	175 mm (6.890 inch)
B	122 mm (4.803 inch)	132 mm (5.197 inch)	198 mm (7.795 inch)
C	According to ASME, DIN, and JIS		
E	124 mm (4.882 inch)	158 mm (6.220 inch)	n/a
F	152 mm (5.984 inch)	198 mm (7.795 inch)	n/a
J	28 mm (1.1 inch)	28 mm (1.1 inch)	28 mm (1.1 inch)

## Schematics

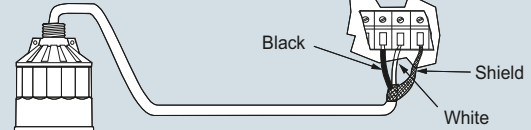
## Direct connection



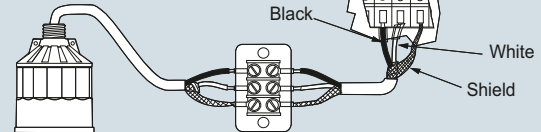
## Coaxial connection



## 3 terminal direct\*



## 3 terminal extension\*



\* For SITRANS LUT400, MultiRanger 100/200, HydroRanger 200

## Mounting

Make particularly sure that the radiating face of the transducer is protected from damage. Mount the transducer so that it is above the maximum material level by at least the blanking value. On liquid applications, the transducer must be mounted so that the axis of transmission is perpendicular to the liquid surface. On solids applications, an Easy Aimer should be used to facilitate aiming the transducer. Consider the optional temperature sensor when mounting the transducer.

## Interconnection

Do not route cable openly or near high voltage or current runs, contactors and SCR control drives. For optimum isolation against electrical noise, run cable separately in a grounded metal conduit. Seal all thread connections to prevent ingress of moisture.

XPS ultrasonic transducer connections