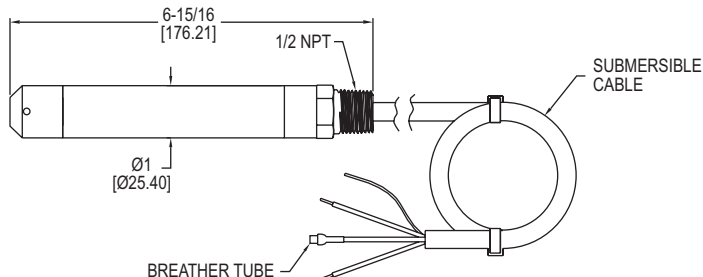




Series SBLTX Submersible Level Transducer

Specifications - Installation and Operating Instructions



The **Series SBLTX Submersible Level Transducer** is manufactured for years of trouble free service. The transducer consists of a piezoresistive sensing element, encased in a 316 SS housing. Bullet nose design protects diaphragm from damage. Comes equipped with a 270-pound tensile strength, shielded, vented cable. Ventilation tube in the cable automatically compensates for changes in atmospheric pressure above the tank.

Intrinsic Safety Approval Classification

The SBLTX is UL listed for use in Hazardous (Classified) Locations. The protection method is by Intrinsic Safety, "ia". It was investigated by UL under UL Standard 913 8th Edition, CAN/CSA C22.2 No. 60079-0:15 and CAN/CSA C22.2 No. 60079-11:14.

Hazardous (Classified) Location Intrinsically Safe For:

Class I Div. 1 Groups A,B,C,D
 Class II Div. 1 Groups E,F,G
 Class III Div. 1
 Class I Zone 0 AEx ia IIC T4 Ga
 Zone 20 AEx ia IIIC T135°C Da
 Ex ia IIC T4 Ga
 Ex ia IIIC T135°C Da

Ta = -20°C to 80°C (ETFE Cable)

Ta = -20°C to 65°C (Polyurethane Cable)

Install in accordance with Control Drawing 001833-43.

See Control Drawing 001833-43 for Entity Parameters.

ATEX: EU Type Certificate NO. DEMKO 18 ATEX 2080

ATEX STANDARDS: EN 60079-0:2012/A11:2013

EN 60079-11:2012

ATEX CLASSIFICATION: **CE** 0518 **Ex** II 1 G Ex ia IIC T4 Ga (-20°C ≤ Tamb ≤ 80°C (ETFE Cable)) (-20°C ≤ Tamb ≤ 65°C (Polyurethane Cable))

CE 0518 **Ex** II 1 D Ex ia IIIC T135°C Da (-20°C ≤ Tamb ≤ 80°C (ETFE Cable)) (-20°C ≤ Tamb ≤ 65°C (Polyurethane Cable))

IECEX Certificate of Conformity: IECEX UL 18.0086

IECEX STANDARDS: IEC 60079-0: 2011 6TH ED.

IEC 60079-11:2011 6TH ED.

IECEX CLASSIFICATION: Ex ia IIC T4 Ga (-20°C ≤ Tamb ≤ 80°C (ETFE Cable)) (-20°C ≤ Tamb ≤ 65°C (Polyurethane Cable))

Ex ia IIIC T135°C Da (-20°C ≤ Tamb ≤ 80°C (ETFE Cable)) (-20°C ≤ Tamb ≤ 65°C (Polyurethane Cable))

Install in accordance with Control drawing 001833-46

SEE CONTROL DRAWING 001833-46 FOR ENTITY PARAMETERS.

SPECIFICATIONS

Service: Compatible liquids.

Wetted Materials: Body: 316 SS, 316L SS; Bullet nose: PVC; Cable: Polyether polyurethane or ETFE; Seals: Fluoroelastomer.

Accuracy: ±0.25% of FS.

Temperature Limit: ETFE cable equipped -4 to 176°F (-20 to 80°C); Polyurethane cable equipped -4 to 149°F (-20 to 65°C).

Compensated Temperature Range: -4 to 176°F (-20 to 80°C).

Thermal Effect: Less than ±0.02% FS/ °F.

Pressure Limit: 2X FS.

Power Requirement: 10-28 VDC.

Output Signal: 4-20 mA DC, 2-wire.

Response Time: 50 ms.

Max. Loop Resistance: 900 Ω.

Electrical Connections: Wire pigtail.

Mounting Orientation: Suspended in tank below level being measured.

Weight: 2.2 lb (1.0 kg).

Agency Approvals: CE, See Intrinsic Safety Approval Classification.

WARNING Use with approved safety barriers using entity evaluation.

CAUTION

Do not exceed specified supply voltage ratings. Permanent damage not covered by warranty will result. This device is not designed for 120 or 240 volt AC operation. Use only on 10-28 VDC.

MAINTENANCE

After final installation of the pressure transducer and its companion receiver, no routine maintenance is required. A periodic check of system calibration is suggested. The Series SBLTX transducer are not field repairable and should be returned if repair is needed (field repair should not be attempted and may void warranty). Be sure to include a brief description of the problem plus any relevant application notes. Contact customer service to receive a return goods authorization number before shipping.

INSTALLATION

1. Location: Select a location where the temperature of the transducer will be between -4 and 176°F (-20 to 80°C) for ETFE cable or -4 and 149°F (-20 to 65°C) for polyurethane cable. Distance from the receiver is limited only by total loop resistance.

2. Position: The transducer is not position sensitive. However all standard models are originally calibrated with the unit in a position with the pressure connection downward. Although they can be used at other angles, for best accuracy it is recommended that units be installed in the position calibrated at the factory.

3. Mounting: The transducer can be mounted via several methods. It can be suspended from the electrical cable, it can be placed resting on the bottom of the tank in either horizontal or vertical orientation, or it can be attached to a pipe or hang wire by the 1/2" NPT male connection on the top of the housing.

4. Electrical Connections

Wire Length: The maximum length of wire connecting the transducer and receiver is a function of wire size and receiver resistance. Wiring should not contribute more than 10% of the receiver resistance to total loop resistance. For extremely long runs (over 1000 feet), choose receivers with higher resistance to minimize the size and cost of connecting leads. Where wiring length is under 100 feet, wire as small as 22 AWG can be used.

5. Wiring: An external power supply delivering 10-28 VDC with minimum current capability of 40 mA DC (per transducer) is required to power the control loop. See Figure A for connection of the power supply, transducer and receiver. The range of appropriate receiver load resistance (RL) for the DC power supply voltage available is expressed by the formula:

$$RL \text{ Max} = \frac{V_{ps} - 10 \text{ V}}{20 \text{ mA DC}}$$

Shielded cable is recommended for control loop wiring.

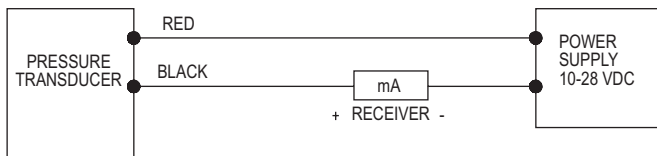


Figure A

Black wire is negative (-) and red wire is positive (+).

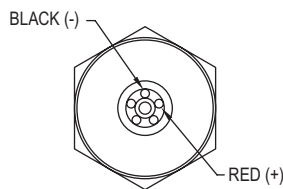


Figure B

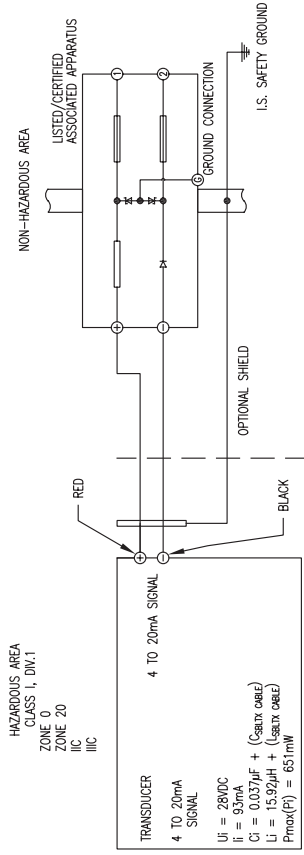
- NOTES:
1. SELECTED ASSOCIATED APPARATUS MUST BE THIRD PARTY LISTED AS PROVIDING INTRINSICALLY SAFE CIRCUITS FOR THE APPLICATION, AND NOT EXCEED THE ENTITY PARAMETERS LISTED IN THIS DRAWING.
 2. ASSOCIATED APPARATUS OUTPUT CURRENT MUST BE LIMITED BY A RESISTOR SUCH THAT THE OUTPUT VOLTAGE-CURRENT PLOT IS A STRAIGHT LINE DRAWN BETWEEN OPEN-CIRCUIT VOLTAGE AND SHORT-CIRCUIT CURRENT.
 3. CAPACITANCE AND INDUCTANCE OF THE FIELD WIRING FROM THE INTRINSICALLY SAFE TRANSDUCER TO THE ASSOCIATED APPARATUS SHALL BE CALCULATED AND MUST INCLUDE THE SYSTEM CALCULATIONS AS SHOWN WITHIN THIS DRAWING. TOTAL CAPACITANCE IS CALCULATED BY ADDING BOTH (C_{sxtx}) AND (C_{cable}) TO C_i , WHERE (C_{sxtx}) IS THE CAPACITANCE OF FACTORY WIRING PROVIDED WITH THE SBLTX AND (C_{cable}) IS CAPACITANCE OF ANY ADDITIONAL END USER CABLE THAT IS WIRED TO THE SBLTX. TOTAL INDUCTANCE IS CALCULATED BY ADDING BOTH (L_{sxtx}) AND (L_{cable}) TO L_i , WHERE (L_{sxtx}) IS THE INDUCTANCE OF FACTORY WIRING PROVIDED WITH THE SBLTX AND (L_{cable}) IS THE INDUCTANCE OF ANY ADDITIONAL END USER CABLE THAT IS WIRED TO THE SBLTX. WHEN PROVIDED WITH POLYURETHANE CABLE, THE CAPACITANCE (C_{sxtx}) IS 96 pF/FT (3154F/M) AND INDUCTANCE (L_{sxtx}) IS 346nH/FT (1.159uF/M). WHEN PROVIDED WITH ETFE CABLE, THE CAPACITANCE (C_{sxtx}) IS 162pF/FT (532 pF/M) AND INDUCTANCE (L_{sxtx}) IS 340 nH/FT (1.16uH/M). WHERE CABLE CAPACITANCE AND INDUCTANCE PER UNIT LENGTH ARE NOT KNOWN, THE CAPACITANCE OF 60pF/FT (2008F/M) AND INDUCTANCE OF 0.2uH/FT (1.0 uH/M) MAY BE USED. PLEASE NOTE THAT THE SBLTX CABLE LENGTH IS SPECIFIED WITHIN THE NOMENCLATURE. SEE ITEM "ccc" FOR LENGTH AND ITEM "d" FOR UNIT OF LENGTH. THIS LENGTH WILL NEED TO BE MULTIPLIED BY THE CORRECT PARAMETER (C_{sxtx}) AND (L_{sxtx}) SPECIFIED ABOVE, BASED ON THE CABLE PROVIDED. SEE NOMENCLATURE ITEM "a" FOR THE DEVICE'S CABLE TYPE.
 4. TRANSDUCERS MUST BE INSTALLED TO THE MANUFACTURER'S CONTROL DRAWING AND ARTICLE 504 OF THE NATIONAL ELECTRICAL CODE (ANSI/NFPA 70) FOR INSTALLATION IN THE UNITED STATES OR SECTION 18 OF THE CANADIAN ELECTRICAL CODE (CSA C22.1) FOR INSTALLATION IN CANADA OR OTHER LOCAL INSTALLATION CODES, AS APPLICABLE.
 5. THE ASSOCIATED APPARATUS MANUFACTURER'S INSTALLATION INSTRUCTIONS MUST BE FOLLOWED WHEN INSTALLING THE EQUIPMENT.
 6. THE CABLE USED IN THIS DEVICE HAS A VENT TUBE. THEREFORE THE CABLE ATTACHED TO THE SBLTX SHALL BE TERMINATED IN THE HAZARDOUS AREA.
 7. NO REVISION TO THIS DRAWING WITHOUT PRIOR APPROVAL BY UL.

STANDARDS:
 AS REFERENCE BY UL 913 - 8th EDITION CAN/CSA C22.2 NO. 60079-015
 UL 60079-0 - 6th EDITION CAN/CSA C22.2 NO. 60079-11:14
 UL 60079-11 - 8th EDITION

- SBLTX-ccca-cab-ccc-g-f
- 1. BLANK(STANDARD) OR 2YR(2 YEAR WARRANTY) WARRANTY TYPE, AND OR P1(1/4 MNPT), OR P2(1/4 FNPT), OR P3(1/4 MBSPT), P4(1/4BSPT) FITTING
 - 2. BLANK(POLYURETHANE CABLE) OR ETFE(ETFE CABLE) CABLE TYPE
 - 3. BLANK(FEET) OR (METERS) CABLE UNITS
 - 4. ONE TO THREE DIGIT NUMERIC CHARACTER
 - 5. 1 TO 470(FEET) OR 1 TO 143(METERS) FOR POLYURETHANE CABLE
 - 6. 1 TO 275(FEET) OR 1 TO 84(METERS) FOR ETFE CABLE LENGTH
 - 7. BLANK(PSI) OR (METERS) RANGE UNITS
 - 8. ONE TO FIVE DIGIT NUMERIC CHARACTER,
 - 9. 3 TO 400 PSI OR
 - 10. 2.2 TO 280 METERS OF WC SENSOR RANGE

HAZARDOUS (CLASSIFIED) LOCATION INTRINSICALLY SAFE FOR:

CLASS I DIV.1 GROUPS A,B,C,D
 CLASS II DIV.1 GROUPS E,F,G
 CLASS III DIV.1
 CLASS I ZONE 0 AEx ia IIC T4 Gc
 CLASS I ZONE 1 AEx ia IIC T4 Gc
 CLASS I ZONE 2 AEx ia IIC T4 Gc
 Ex ia IIC T4 Gc
 Ex ia IIC T4 Gc
 Ta= -20°C TO 65°C(POLYURETHANE CABLE)
 -20°C TO 80°C(ETFE CABLE)



HAZARDOUS AREA
 CLASS I, DIV.1
 ZONE 0
 IIC

NON-HAZARDOUS AREA
 LISTED/CERTIFIED
 ASSOCIATED APPARATUS

OPTIONAL SHIELD

I.S. SAFETY GROUND

RED

BLACK

4 TO 20mA SIGNAL

4 TO 20mA SIGNAL

GROUND CONNECTION

TRANSUCER
 4 TO 20mA SIGNAL
 UI = 28VDC
 Ii = 93mA
 Ci = 0.037uF + (Csxtx cable)
 Li = 15.92uH + (Lsxtx cable)
 Pmax(Pi) = 651mW

ASSOCIATED APPARATUS

Voc (Vo) ≤ 28V
 Isc (Io) ≤ 93mA
 Po (Po) ≤ 0.651W
 Ca (Co) ≥ 0.037uF + (Csxtx cable) + (Ccable)
 La (Lo) ≥ 15.92uH + (Lsxtx cable) + (Lcable)

③ = CRITICAL DIMENSION
 DIMENSIONS UNLESS NOTED:
 ALL DIMENSIONS ± .005
 ALL ANGLES ± 1°

MATERIAL		DATE		NAME	
FINISH		02-12-18		SBLTX	
		DWN BY		I.S. CONTROL DRAWING	
		AMS			
		RBS			
		6-19-18			
		AMS			
		02-28-18			
		CHKD			
		DGH			
		APFD			
		BY/DATE		LR	
		CHANGES		LR	
		NO.		AC02002	
				3	

ZONE AND DIVISION ENTITY PARAMETERS ARE SHOWN AS: DIVISION (ZONE)

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DWYER INSTRUMENTS, INC.
 MICHIGAN CITY, INDIANA 46360 U.S.A.
 FR. NO. 001833-43

NOTES:

1. SELECTED ASSOCIATED APPARATUS MUST BE THIRD PARTY LISTED AS PROVIDING INTRINSICALLY SAFE CIRCUITS FOR THE APPLICATION, AND EXCEED THE DISTANCE LISTED IN THIS DRAWING. THE INTRINSICALLY SAFE TRANSUCER TO THE ASSOCIATED APPARATUS SHOULD BE CALCULATED AND MUST INCLUDE THE SYSTEM CALCULATIONS AS SHOWN WITHIN THIS DRAWING. TOTAL CAPACITANCE IS CALCULATED BY ADDING BOTH (C_{cabl}) AND (C_{cabl}) TO C_i, WHERE (C_{cabl}) IS THE CAPACITANCE OF FACTORY WIRING PROVIDED WITH THE SBLTX AND (C_{cabl}) IS CAPACITANCE OF ANY ADDITIONAL END USER CABLE THAT IS WIRED TO THE SBLTX. INDUCTION IS CALCULATED BY ADDING BOTH (L_{cabl}) AND (L_{cabl}) TO L_i, WHERE (L_{cabl}) IS THE INDUCTANCE OF FACTORY WIRING PROVIDED WITH THE SBLTX AND (L_{cabl}) IS THE INDUCTANCE OF ANY ADDITIONAL END USER CABLE THAT IS WIRED TO THE SBLTX. WHEN PROVIDED WITH POLYURETHANE CABLE, THE CAPACITANCE (C_{cabl}) IS 36 pF/FT (315pF/M) AND INDUCTANCE (L_{cabl}) IS 346nH/FT (1.135uH/M). WHEN PROVIDED WITH ETEC CABLE, THE CAPACITANCE (C_{cabl}) IS 162pF/FT (532 pF/M) AND INDUCTANCE (L_{cabl}) IS 340 nH/FT (1.119uH/M), WHERE CABLE CAPACITANCE AND INDUCTANCE PER UNIT LENGTH ARE NOT KNOWN, THE CAPACITANCE (C_{cabl}) OF 609P/FT (2009P/M) AND INDUCTANCE OF 0.2uH/FT (1.0 uH/M) MAY BE USED. PLEASE NOTE THAT THE SBLTX CABLE LENGTH IS SPECIFIED WITHIN THE NOMENCLATURE, SEE ITEM "ccc" FOR LENGTH AND ITEM "d" FOR UNIT OF LENGTH. THIS LENGTH WILL NEED TO BE MULTIPLIED BY THE CORRECT PARAMETER (C_{cabl}) AND (L_{cabl}) SPECIFIED ABOVE, BASED ON THE CABLE PROVIDED, SEE NOMENCLATURE ITEM "e" FOR THE DEVICE'S CABLE TYPE.
2. THE ASSOCIATED APPARATUS MANUFACTURER'S INSTALLATION INSTRUCTIONS MUST BE FOLLOWED WHEN INSTALLING THE EQUIPMENT.
3. WARNING - ALL FIELD WIRING SHALL BE SUITABLE FOR AN AMBIENT TEMPERATURE RANGE OF -20° TO 80°C.
4. THE CABLE USED IN THIS DEVICE HAS A VENT TUBE. THEREFORE THE CABLE ATTACHED TO THE SBLTX SHALL BE TERMINATED IN THE HAZARDOUS AREA.
5. NO REVISIONS TO THIS DRAWING WITHOUT PRIOR APPROVAL TO IEC/EN 60079-14 OR ANY LOCAL INSTALLATION CODES/REQUIREMENTS.
6. NO REVISIONS TO THIS DRAWING WITHOUT PRIOR APPROVAL TO IEC/EN 60079-14 OR ANY LOCAL INSTALLATION CODES/REQUIREMENTS.
7. TRANSUCER MUST BE INSTALLED IN ACCORDANCE TO IEC/EN 60079-14 OR ANY LOCAL INSTALLATION CODES/REQUIREMENTS.

ATEX CLASSIFICATION: $\text{II } 1 \text{ G Ex ia IIC T4 Ga } (-20^{\circ}\text{C} \leq \text{Tamb} \leq 80^{\circ}\text{C (ETEC CABLE)})$ $(-20^{\circ}\text{C} \leq \text{Tamb} \leq 65^{\circ}\text{C (POLYURETHANE CABLE)})$
 $\text{II } 1 \text{ D Ex ia IIC T135C Da } (-20^{\circ}\text{C} \leq \text{Tamb} \leq 80^{\circ}\text{C (ETEC CABLE)})$ $(-20^{\circ}\text{C} \leq \text{Tamb} \leq 65^{\circ}\text{C (POLYURETHANE CABLE)})$

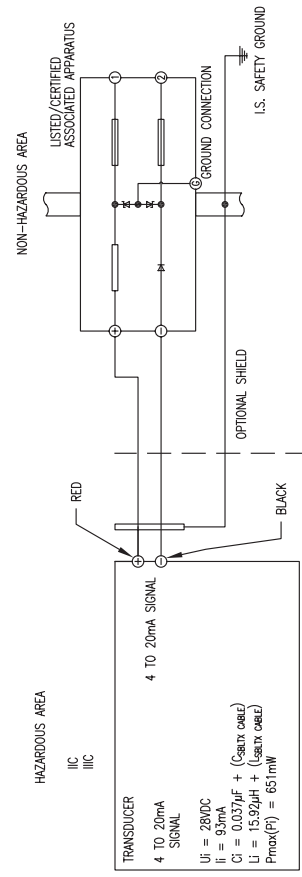
IECEx CLASSIFICATION: Ex ia IIC T4 Ga $(-20^{\circ}\text{C} \leq \text{Tamb} \leq 80^{\circ}\text{C (ETEC CABLE)})$ $(-20^{\circ}\text{C} \leq \text{Tamb} \leq 65^{\circ}\text{C (POLYURETHANE CABLE)})$
 Ex ia IIC T135C Da $(-20^{\circ}\text{C} \leq \text{Tamb} \leq 80^{\circ}\text{C (ETEC CABLE)})$ $(-20^{\circ}\text{C} \leq \text{Tamb} \leq 65^{\circ}\text{C (POLYURETHANE CABLE)})$

ATEX STANDARDS: EN 60079-0:2012/A11:2013
 EN 60079-11:2012

IECEx STANDARDS: IEC 60079-0:2011 6TH ED.
 IEC 60079-11:2011 6TH ED.

SBLTX-ccc-ccc-d-e-f

- BLANK (STANDARD) OR 2YR(2 YEAR WARRANTY) WARRANTY TYPE, AND OR P1(1/4 MNPT), OR P2(1/4 FNPT), OR P3(1/4 MBSPT), P4(1/4FBSPT) FITTING
- BLANK(POLYURETHANE CABLE) OR ETEC(ETEC CABLE) CABLE TYPE
- BLANK(FEET) OR (METERS) CABLE UNITS
- ONE TO THREE DIGIT NUMERIC CHARACTER
- 1 TO 470(FEET) OR 1 TO 143(METERS) FOR POLYURETHANE CABLE
- 1 TO 275(FEET) OR 1 TO 84(METERS) FOR ETEC CABLE CABLE LENGTH
- BLANK(PSI) OR (METERS) RANGE UNITS
- ONE TO FIVE DIGIT NUMERIC CHARACTER,
- 3 TO 400 PSI OR
- 2.2 TO 280 METERS OF WC SENSOR RANGE



ASSOCIATED APPARATUS

Voc (Vo) ≤ 28V

Isc (Io) ≤ 93mA

Pe (Po) ≤ 0.657W

Ce (Co) ≥ 0.037uF + (C_{cabl})

Le (Lo) ≥ 15.92uH + (L_{cabl})

⊕ = CRITICAL DIMENSION
 STATUTORY TOLERANCES UNLESS NOTED:
 ALL DIMENSIONS ± .005
 ALL ANGLES ± 1°

MATERIAL		DATE		NAME	
FINISH		02-14-18		I.S. CONTROL DRAWING	
		DWN BY		SBLTX	
		AMS		ATEX/IECEx	
		RBS			
		6-20-18			
		AMS			
		02-28-18			
		DGH			
		APFD			
		BY/DATE		LR	
		CHANGES			
		NO.		AG02002	
				3	

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 MICHIGAN CITY, INDIANA 46360 U.S.A.

FR. NO. 001833-46

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