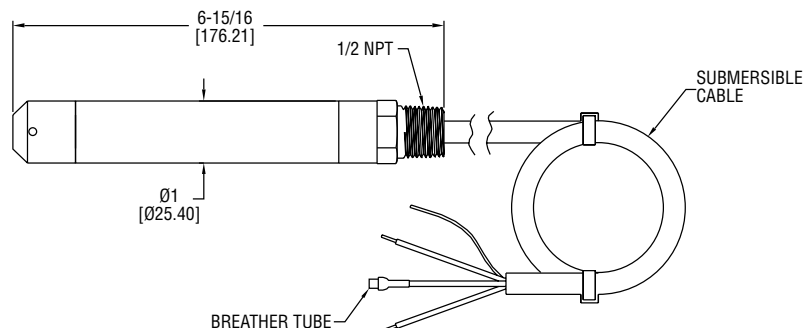




Series SBLTX Submersible Level Transducer

Specifications - Installation and Operating Instructions



The 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: 316 SS, 316L SS, epoxy adhesive; Cable: Polyether polyurethane or ETFE; Bullet Nose: PVC.

Accuracy: ±0.25% of full scale.

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% full scale/ °F.

Pressure Limit: 2X full scale.

Power Requirement: 10 to 28 VDC.

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

Response Time: 50 ms.

Max. Loop Resistance: 900 ohms.

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.

MERCOID DIVISION

DWYER INSTRUMENTS, INC.

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Fax: 219/872-9057

www.dwyer-inst.com

e-mail: info@dwyermail.com



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 to 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 Fig. 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:

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

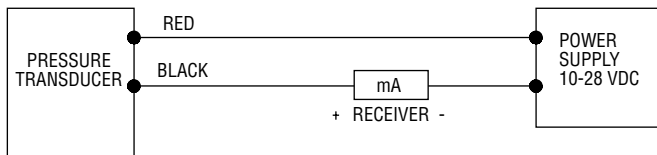


Fig. A

Shielded cable is recommended for control loop wiring. Black wire is negative (-) and red wire is positive (+).

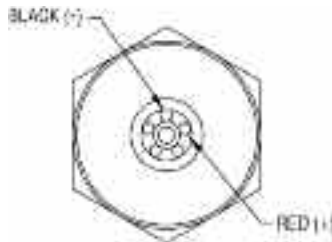


Fig. B

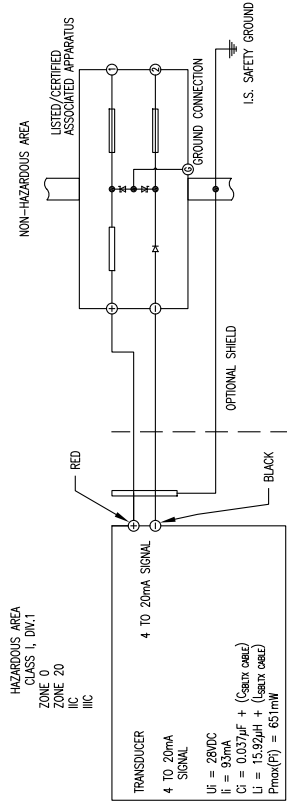
- NOTES:
1. SELECTED ASSOCIATED APPARATUS MUST BE THIRD PARTY LISTED AS PROVIDING INTRINSICALLY SAFE CIRCUITS FOR THE APPLICATION, AND NOT EXCEED THE ENTITY POWER RATING.
 2. ASSOCIATED APPARATUS CURRENT MUST BE LIMITED BY A RESISTOR SUCH THAT THE OUTPUT VOLTAGE-CURRENT PLOT IS A STRAIGHT LINE DRAWN 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 (Capax cable) AND (Cable) TO C1, WHERE (Capax cable) IS THE CAPACITANCE OF FACTORY WIRING PROVIDED WITH THE SBLTX AND (Cable) IS CAPACITANCE OF ANY ADDITIONAL END USER CABLE THAT IS WIRED TO THE SBLTX. TOTAL INDUCTANCE IS CALCULATED BY ADDING BOTH (Lmax cable) AND (Lcable) TO L1, WHERE (Lmax cable) IS THE INDUCTANCE OF FACTORY WIRING PROVIDED WITH THE SBLTX AND (Lcable) IS THE INDUCTANCE OF ANY ADDITIONAL END USER CABLE THAT IS WIRED TO THE SBLTX. WHEN PROVIDED WITH POLYURETHANE CABLE, THE CAPACITANCE (Capax cable) IS 96 pF/FT (315pF/M) AND INDUCTANCE (Lmax cable) IS 346nH/FT (1.135uH/M). WHEN PROVIDED WITH ETFE CABLE, THE CAPACITANCE (Capax cable) 162pF/FT (532 pF/M) AND INDUCTANCE (Lmax cable) IS 340 nH/FT (209pF/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 (Capax cable) AND (Lmax cable) SPECIFIED ABOVE, BASED ON THE CABLE PROVIDED. SEE NOMENCLATURE ITEM "a" FOR THE PARAMETER'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.

HAZARDOUS (CLASSIFIED) LOCATION INTRINSICALLY SAFE FOR:

CLASS I DIV.1 GROUPS A, E, C, D
 CLASS II DIV.1 GROUPS E1, F, G
 CLASS III DIV.1 GROUPS E1, F, G
 CLASS I ZONE 0 AEx in IIC T4 Gc
 ZONE 20 AEx in IIC T1.35C Dc
 Ex in IIC T4 Gc
 Ex in IIC T1.35C Dc
 Ta = -20°C TO 65°C (POLYURETHANE CABLE)
 Tc = -20°C TO 80°C (ETFE CABLE)

STANDARDS:
 AS REFERENCED BY ILL 913 - 8th EDITION CAN/CSA C222 NO. 60079-015
 UL 60079-0 - 8th EDITION CAN/CSA C222 NO. 60079-11:14
 UL 60079-11 - 8th EDITION

- SBLTX-aaa-bbbb-cccc-d-e-f
- BLANK (STANDARD) OR 2YR(2 YEAR WARRANTY) WARRANTY TYPE, AND OR P1(1/4 INPT), OR P2(1/4 INPT), OR P3(1/4 INPT), P4(1/4 INPT) FITTING
 - BLANK (POLYURETHANE CABLE) OR ETFE(ETFE CABLE) CABLE TYPE
 - BLANK (FEET) OR (METERS) CABLE UNITS
 - ONE TO THREE DIGIT NUMERIC CHARACTER
 - 1 TO 4 (FEET) OR 1 TO 14 (METERS) FOR POLYURETHANE CABLE
 - 1 TO 275 (FEET) OR 1 TO 84 (METERS) FOR ETFE CABLE LENGTH
 - BLANK (PSI) OR (METERS) RANGE UNITS
 - ONE TO FIVE DIGIT NUMERIC CHARACTER,
 - 10.4 TO 15.1 (PSI) OR
 - 2.2 TO 230 (METERS) OF WC SENSOR RANGE



HAZARDOUS AREA
 CLASS I, DIV.1
 ZONE 0
 IIC

NON-HAZARDOUS AREA
 LISTED/CERTIFIED
 ASSOCIATED APPARATUS

OPTIONAL SHIELD

I. SAFETY GROUND

GROUND CONNECTION

RED

BLACK

4 TO 20mA SIGNAL

4 TO 20mA SIGNAL

TRANSUCER

4 TO 20mA SIGNAL

U1 = 28MΩC
 I1 = 9.3mA
 C1 = 0.037uF + (Capax cable)
 L1 = 15.92uH + (Lmax cable)
 Pmax(F1) = 651mW

ASSOCIATED APPARATUS

Voc (Vo) ≤ 28V
 Isc (Ib) ≤ 9.3mA
 Po (Pb) ≤ 0.051W
 Co (Cb) ≥ 0.037uF + (Capax cable) + (Cable)
 Lo (Lb) ≥ 15.92uH + (Lmax cable) + (Cable)

④ = CRITICAL DIMENSION
 UNLESS OTHERWISE NOTED:
 ALL DIMENSIONS ARE IN INCHES ± .010
 ALL ANGLES ± 1°

MATERIAL		DATE				NAME			
FINISH		02-12-18				SBLTX CONTROL DRAWING			
		DWN BY		AMS		RDR		6-11-18	
		CHKD BY		DOH		RDR		02-28-18	
		APPR		LR		BY/DATE			
		CHANGES		NO.		ACAD0002		3	
<p>ZONE AND DIVISION ENTITY PARAMETERS ARE SHOWN AS: DIVISION (ZONE)</p> <p>NOTE: This drawing and the physical and chemical elements of the enclosed apparatus are the property of Dwyer Instruments, Inc. and shall remain the property of Dwyer Instruments, Inc. if the apparatus is ever resold, transferred, or otherwise disposed of in any way. No part of this drawing is to be reproduced or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or by any information storage and retrieval system, without the written consent of Dwyer Instruments, Inc.</p>									
<p>DWYER INSTRUMENTS, INC. MICHIGAN CITY, INDIANA 46360 U.S.A.</p> <p>FR. NO. 001833-43</p>									

001833-46

- NOTES:
1. SELECTED ASSOCIATED APPARATUS MUST BE THIRD PARTY LISTED AS PROVIDING INTRINSICALLY SAFE CIRCUITS FOR THE APPLICATION, AND NOT EXCEED THE INDICATED PARAMETERS LISTED IN THIS DRAWING.
 2. 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_{ext cable}) AND (C_{ext}) TO C₁, WHERE (C_{ext cable}) IS THE CAPACITANCE OF FACTORY WIRING PROVIDED WITH THE SBLTX AND (C_{ext}) IS CAPACITANCE OF ANY ADDITIONAL END USER CABLE THAT IS WIRED TO THE SBLTX. TOTAL INDUCTANCE IS CALCULATED BY ADDING BOTH (L_{ext cable}) AND (L_{ext}) TO L₁, WHERE (L_{ext cable}) IS THE INDUCTANCE OF FACTORY WIRING PROVIDED WITH THE SBLTX AND (L_{ext}) IS THE INDUCTANCE OF ANY ADDITIONAL END USER CABLE THAT IS WIRED TO THE SBLTX. WHEN PROVIDED WITH POLYURETHANE CABLE, THE CAPACITANCE (C_{ext cable}) IS 96 pF/FT (0.159pF/M) AND INDUCTANCE (L_{ext cable}) IS 346nH/FT (1.139pF/M). WHEN PROVIDED WITH ETFE CABLE, THE CAPACITANCE (C_{ext cable}) IS 162pF/FT (0.52 pF/M) AND INDUCTANCE (L_{ext cable}) IS 340 nH/FT (1.116pH/M). WHERE CABLE CAPACITANCE AND INDUCTANCE PER UNIT LENGTH ARE NOT KNOWN, THE CAPACITANCE IS 60pF/FT (200pF/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_{ext cable}) AND (L_{ext cable}) SPECIFIED ABOVE, BASED ON THE CABLE PROVIDED. SEE NOMENCLATURE ITEM "e" FOR THE PARAMETER'S CABLE TYPE.
 3. THE ASSOCIATED APPARATUS MANUFACTURER'S INSTALLATION INSTRUCTIONS MUST BE FOLLOWED WHEN INSTALLING THE EQUIPMENT.
 4. THE CABLE MUST BE USED WITHIN THE OPERATING TEMPERATURE RANGE OF 20°C TO 50°C.
 5. THE CABLE USED IN THIS DEVICE HAS A VENT TUBE. THEREFORE THE CABLE ATTACHED TO THE SBLTX SHALL BE TERMINATED IN THE HAZARDOUS AREA.
 6. NO REVISIONS TO THIS DRAWING WITHOUT PRIOR APPROVAL BY IUL/DEMKO.
 7. TRANSDUCER MUST BE INSTALLED IN ACCORDANCE TO IEC/EN 60079-14 OR ANY LOCAL INSTALLATION CODES/REQUIREMENTS.

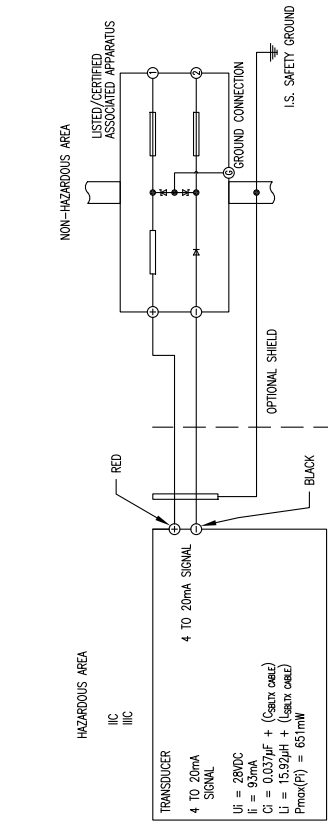
ATEX CLASSIFICATION: **Ex ia IIC T4 Ga (-20°C ≤ Tamb ≤ 80°C (ETFE CABLE)) (-20°C ≤ Tamb ≤ 65°C (POLYURETHANE CABLE))**
Ex ia I D Ex ia IIC T1.35°C Da (-20°C ≤ Tamb ≤ 80°C (ETFE CABLE)) (-20°C ≤ Tamb ≤ 65°C (POLYURETHANE CABLE))

IECx CLASSIFICATION: **Ex ia IIC T4 Ga (-20°C ≤ Tamb ≤ 80°C (ETFE CABLE)) (-20°C ≤ Tamb ≤ 65°C (POLYURETHANE CABLE))**
Ex ia IIC T1.35°C Da (-20°C ≤ Tamb ≤ 80°C (ETFE CABLE)) (-20°C ≤ Tamb ≤ 65°C (POLYURETHANE CABLE))

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

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

- SBLTX-**ccc**-**ddd**-**eee**-**fff**
 - ccc = BLANK (STANDARD) OR 2R(2-YEAR WARRANTY) WARRANTY TYPE, AND OR P1(1/4 MINPT), OR P2(1/4 FNPT), OR P3(1/4 MBSPT), P4(1/4 FBSPT) FITTING
 - ddd = BLANK (POLYURETHANE CABLE) OR ETFE (ETFE CABLE) CABLE TYPE
 - eee = BLANK (FEET) OR (METERS) CABLE UNITS
 - fff = ONE TO THREE DIGIT NUMERIC CHARACTER FOR POLYURETHANE CABLE (1 TO 27.5 (FEET) OR 1 TO 8.4 (METERS)) FOR ETFE CABLE LENGTH (BLANK (PS) OR (METERS) RANGE UNITS)
 - g = ONE TO FIVE DIGIT NUMERIC CHARACTER, 3 TO 400 PSI OR 2.2 TO 280 METERS OF WC SENSOR RANGE



TRANSDUCER
 4 TO 20mA SIGNAL
 UI = 28VDC
 Ii = 93mA
 Ci = 0.037uF + (C_{ext cable})
 Li = 15.92uH + (L_{ext cable})
 Pmax(Pi) = 651mW

HAZARDOUS AREA
 IIC
 IIC

NON-HAZARDOUS AREA
 LISTED/CERTIFIED ASSOCIATED APPARATUS

OPTIONAL SHIELD

I.S. SAFETY GROUND

RED

BLACK

4 TO 20mA SIGNAL

ASSOCIATED APPARATUS
 Voc (Vo) ≤ 28V
 Isc (Io) ≤ 93mA
 Po (Po) ≤ 0.651W
 Ca (Co) ≥ 0.037uF + (C_{ext cable}) + (C_{ext})
 La (Lo) ≥ 15.92uH + (L_{ext cable}) + (L_{ext})

⊕ = CRITICAL DIMENSION
 UNLESS OTHERWISE NOTED:
 ALL DIMENSIONS IN INCHES ± .005
 ALL ANGLES ± 1°

MATERIAL		NAME	
DATE	02-14-18	DWN BY	AMS
CHK'D BY	AMS	CHK'D BY	AMS
DOH	02-28-18	APPR	LR
BY/DATE		CHANGES	
NO.		ACAD0002	3

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

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FR. NO. 001833-46