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- Two transducers observing the same side of a collar.
- Two complementary input transducers observing opposite sides of a collar, effectively doubling the measurable DE range.

The criteria for selecting a mounting method are the size of the available target, the expected amount of rotor axial movement, and the type of DE target that exists in the machine. If the collar height is sufficient and the required total measurement range is less than 27.9 mm 1.1 inches, the preferred configuration for redundant measurements is to use two transducers observing the same side of a collar. When 28 mm to 56 mm (1.1 to 2.2 inches) of total range are required, install the transducers in a complementary fashion

Baker Hughes

on opposite sides of the differential expansion collar or other target material.

System Compatibility

Proximity Probe and Extension Cable

The 3300 XL 50 mm probe is designed to survive the harshest steam turbine DE environments. It can continually operate and maintain its accuracy in high temperatures up to 200°C (392°F), and can withstand intermittent high temperatures up to 250°C (482°F). The 50 mm probe has both a front and rear seal which, combined with the High Temperature FluidLoc cable (standard on all 50 mm probes), prevent moisture from entering the probe tip. Special high-temperature ClickLoc connectors are also standard on the probe and extension cable. Each probe and cable comes with connector protectors and a disposable connector protector installation tool to ensure that the connectors remain free of contamination. The ClickLoc connector on the probe lead features a removable collar that facilitates routing the cable through tight clearances.

The 3300 XL 50 mm probe is available in straight exit case styles with ½-20 English threads or M14x1.5 metric threads, including a locknut with predrilled safety wire holes. The side exit probe has two ¼-20 mounting holes in the rear of the probe case. For both straight exit and side exit probes the overall case diameter is 1.99 inches.

Proximitor Sensor

Proximitor Sensors are supplied by default from the factory calibrated to AISI 4140 steel. Calibration to other target materials is available upon request.

Mounting Accessories

The correct operation of the transducer system must be initially verified during installation and periodically thereafter. This is done by physically moving the transducer to simulate the motion of the shaft collar. This requires a mounting bracket that allows the transducer system to slide relative to the shaft rotor and collar.

An optional Sliding Bracket can be ordered for the 50 mm Transducer for both single transducer and complementary input applications. This mounting bracket allows you to verify the transducer system and gap the probes by sliding the transducer system through its linear range. The base plate of the sliding bracket is installed on the inner surface of the turbine case near the differential expansion collar. Probes are installed in the probe clamp that attaches to the sliding

	Extension Cable.
Power	Requires -17.5 Vdc to -26 Vdc without barriers at 12 mA maximum consumption, -23 Vdc to -26 Vdc with barriers. Operation at a more positive voltage than -23.5 Vdc can result in reduced linear range.
Output resistance	50 Ω
Extension cable capacitance	69.9 pF/m (21.3 pF/ft) typical

Field wiring	0.2 to 1.5 mm2 (16 to 24 AWG) Recommend using three-conductor shielded triad cable.
Linear Range	27.9 mm (1100 mils). Linear range begins at approximately 1.3 mm (50 mils) from target and is from 1.3 to 29.2 mm (50 to 1150 mils) (approximately –1.5 to –12.5 Vdc).
Average Scale Factor (ASF)	394 mV/mm (10 mV/mil) nominal
Deviation from best fit straight line (DSL)	Less than ±0.74 mm (±29 mils)
System performance over extended temperatures	Over a probe temperature range of -35°C to +120°C (-31°F to +248°F) with the Proximitor Sensor and extension cable between 0°C to +45°C (+32°F to +113°F), the DSL remains within ±2.03 mm (±80 mils). Over a Proximitor Sensor and extension cable temperature range of -35°C to +65°C (-31°F to +149°F) with the probe between 0°C to +45°C (+32°F to +113°F), the DSL remains within ±2.03 mm (±80 mils).
Recommended Minimum Target Size	102 mm (4.0 in) diameter (flat target)

Probe DC Resistance	<table><tr><th>Probe Length</th><th>Resistance from Center to Coaxial Conductor</th></tr><tr><td>1.0 m</td><td>6.4 ± 0.5 Ω</td></tr><tr><td>5.0 m</td><td>7.6 ± 0.8 Ω</td></tr><tr><td>9.0 m</td><td>8.9 ± 1.1 Ω</td></tr></table>
Cable DC Resistance	<table><tr><th>Cable Length</th><th>Resistance from Center to Coaxial Conductor</th><th>Resistance from Coaxial to Coaxial Conductor</th></tr><tr><td>4.0 m</td><td>1.0 ± 0.25 Ω</td><td>0.3 ± 0.1 Ω</td></tr><tr><td>8.0 m</td><td>2.0 ± 0.5 Ω</td><td>0.6 ± 0.2 Ω</td></tr></table>
Electrical Classification	Complies with the European CE mark.

Mechanical

Probe Tip Material	Polyphenylene Sulfide (PPS).
Probe Case Material	AISI 304 stainless steel (SST).
Probe Cable Specifications	75 Ω triaxial, perfluoroalkoxyethylene (PFA) insulated FluidLoc probe cable in the following total probe lengths: 1, 5 or 9 meters.
Extension Cable Material	75 Ω triaxial, perfluoroalkoxyethylene (PFA) insulated FluidLoccable.
Proximitor Sensor Material	A380 aluminum
Sliding Bracket Material	Anodized aluminum and stainless steel
System Length	5 or 9 meters including extension cable
Probe and Extension Cable Armor (optional)	Flexible SST with PFA outer jacket.
Tensile Strength (maximum rated)	330 N (75 pounds) probe case to probe lead. 270 N (60 pounds) at probe lead to extension cable connectors.
Connector material	Gold-plated brass and gold-plated beryllium copper

Torque Specifications	
Description	Maximum Rated
All threaded probe cases	45 N•m (400 in•lbf)
M5x8 sliding bracket cap screws	9.6 N•m (85 in•lbf)
Connector-to-connector Torque	
Recommended torque	Finger tight
Maximum torque	0.565 N•m (5 in•lb)
Minimum Bend Radius (with or without SST Armor)	25.4 mm (1.0 in)

Thread Engagement Limits

Probe Case Thread	Maximum Length of Thread Engagement
1/2-20	0.750 in
M14x1.5	21 mm

Maximum thread engagement lengths are per the industry standard of 1.5 times the nominal thread diameter. A fit class matching that of the external probe thread is assumed for all internal threads. Applications with thread engagement lengths exceeding the values in the table above may exhibit binding during installation. Contact your Bently Nevada representative if you require probe thread engagement lengths exceeding the values above. Bently Nevada does not replace proximity probes under warranty due to excessive thread engagement lengths.

Environmental Limits

Probe Temperature Range	
Operating and Storage Temperature	-35°C to +200°C (-31°F to +392°F)
Short-term Operating and Storage Temperature	+250°C (+482°F) for less than 24 hours.
Extension Cable Temperature Range	
Operating and Storage Temperature	**--51°C to +200°C (-31°F to +392°F)**
Proximitor Sensor Temperature Range	
Operating Temperature	-51°C to +100°C (-60°F to +212°F)
Storage Temperature	-51°C to +105°C (-60°F to +221°F)
Sliding Bracket Temperature Range	
Operating and Storage Temperature	-35°C to +200°C (-31°F to +392°F)
Relative Humidity	Less than a 3% change in Average Scale Factor (ASF) when tested in accordance with IEC standard 68-2-66.

3300 XL probes are designed to seal differential pressure between the probe tip and case. The probe is sealed with Viton O-rings. Probes are not pressure tested prior to shipment. Contact our custom design department if you require a test of the pressure seal for your application.

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Part 1, Offshore Units and Structures

1-1-4/9.7, 1-1-A2, 1-1-A3

Hazardous Area Approvals

For the detailed listing of country and product-specific approvals, refer to the *Approvals Quick Reference Guide (108M1756)*.

For additional technical

cNRTLus

3300 XL Proximitor Sensor

ia When installed with intrinsically safe zener barriers per drawing 141092 or when installed with galvanic isolators.	Class I, Zone 0: AEx/Ex ia IIC T4/T5 Ga; Class I, Groups A, B, C, and D, Class II, Groups E, F and G, Class III; T5 @ Ta= -55°C to + 40°C. T4 @ Ta= -55°C to + 80°C.
nA, ec When installed with non-incendive circuit connected per drawing 140979.	Class I, Zone 2: AEx/Ex nA IIC T4/T5 Gc; Class I, Division 2, Groups A, B, C, and D; Class I, Zone 2: AEx/Ex ec IIC T4/T5 Gc; Class I, Division 2, Groups A, B, C, and D; T5 @ Ta= -55°C to + 40°C T4 @ Ta= -55°C to + 80°C

3300 XL Probe

ia When installed with intrinsically safe zener barriers per drawing 141092 or when installed with galvanic isolators.	Class I, Zone 0: AEx/Ex ia IIC T5...T1 Ga; Class 1, Groups A, B. C, and D, Class II, Groups E, F, and G, Class III; (see Temperature Schedule table to follow)
nA, ec When installed with non-incendive circuit connected per drawing 140979.	Class I, Zone 2: AEx/Ex nA IIC T5...T1 Gc; Class 1, Division 2, Groups A, B, C, D; Class 1, Zone 2: AEx/Ex ec IIC T5...T1 Gc; Class I, Division 2, Groups A, B, C, and D; (see Temperature Schedule table to follow)

ATEX/IECEx

3300 XL Proximitor Sensor

ia	II 1 G Ex ia IIC T4/T5 Ga Ex ia IIIC T90C/T105C Dc For EPL Dc: T105C @ Ta = -55°C to 100°C T90C @ Ta = -55°C to +85°C Ui= -28V / Uo= -28V Ii= 140mA / Io= 140mA Pi= 0.91W / Po= 0.742W Ci- 47nF / Co= 1.5nF Li= 1460µH / Lo= 610µH
nA,ec	II 3 G Ex nA IIC T4/T5 Gc Ex ec IIC T4/T5 Gc Ui= -28V / Ii= 140 mA T5 @ Ta= -55˚C to + 40˚C T4 @ Ta= -55 ˚C to + 80˚C

3300 XL Probe

Probe entity parameters are met when used with BN extension cables and connected to BN Prox.

<table>
<tr><td>ia</td><td>II 1 G
Ex ia IIC T5...T1 Ga,
(see Temperature Schedule table to follow)
Ex ia IIIC T90°C ... T280°C Dc
For EPL Dc:<table><tr><td>Ui= -28V</td><td>Ci = 1.5 nF</td></tr><tr><td>Ii = 140 mA</td><td>Li =610 µH</td></tr><tr><td>Pi = 0.91 W</td><td></td></tr></table></td></tr>
<tr><td>nA,ec</td><td>II 3 G
Ex nA IIC T5...T1 Gc,
Ex ec IIC T5...T1 Gc,
(see Temperature Schedule table to follow)<table><tr><td>Ui= -28V</td><td>Ii= 140 mA</td></tr></table></td></tr>
</table>

Temperature Schedule

Temperature Classification	Ambient Temperature (Probe Only)
For EPL Ga and Gc	
T1	-55°C to +232°C
T2	-55°C to +177°C
T3	-55°C to +120°C
T4	-55°C to +80°C
T5	-55°C to +40°C
For EPL Dc	
T280°C @ Ta	-55°C to +232°C
T225°C @ Ta	-55°C to +177°C
T170°C @ Ta	-55C to +120°C
T130°C @ Ta	-55°C to +80°C
T105°C @ Ta	-55°C to +100°C
T90°C @ Ta	-55°C to +40°C

Hazardous Area Conditions of Safe Use

cNRTLus:

ia

Install per Bently Nevada drawing 141092.

nA, ec

Install per Bently Nevada drawing 140979.

ATEX/IECEx:

ia

Install per Bently Nevada drawing 141092.

nA, ec

The Proximitor must be installed so as to provide the terminals with a degree of protection of at least IP54.

330876-AA-BB-CC-DD

A: Probe Case Type Option	
0 1	½-20 Thread
0 2	M14x1.5 Thread
0 3	Smooth 1.99 in dia - Side Exit
B: Total Length Option	
1 0	1.0 meter (3.3 feet)
5 0	5.0 meters (16.4 feet)
9 0	9.0 meters (29.5 feet) Five meter probes are designed for use with the five meter Proximitor Sensor only.
C: ArmorOption	
0 0	High Temperature FluidLoc Cable
0 1	High Temperature FluidLoc Cable with Armor
D: Agency Approval Option	
0 0	No Approvals
0 5	Multiple Approvals

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Mounting Brackets

Each Sliding Mounting Bracket comes with:

- One sliding plate
- One base plate
- Sliding plate securing bolts with safety wire holes
- Lock washers

The material used for the mounting brackets is T6061-T6 aluminum. Base plate securing bolts are not provided; recommended bolt size is 3/8in or M8 socket head bolts.

330877-AAA-BB-CC

Make sure that the extension cable length and the probe length, when added together, equal the Proximitor Sensor total length.

A: Cable Length Option	
0 4 0	4.0 meters (13.1 feet)
0 8 0	8.0 meters (26.2 feet)
B: Armor and Cable Option	
3 6	FluidLoc cable
3 7	FluidLoc ext. cable w/ armor
C: Agency Approval Option	
0 0	No Approvals
0 5	Multiple Approvals

330879-AA-BB

A: Probe Clamp Style	
0 1	Left Exit
0 2	Right Exit
0 3	Two clamps (used for CIDE applications)[1]
B: DE Mounting Bracket	
0 0	No Mounting Bracket; Clamp Only (4)
0 1	Single DE Mounting Bracket (2)
0 2	Short CIDE Mounting Bracket (3)
0 3	Long CIDE Mounting Bracket (3)



This bracket is recommended for most installations. While any probe may be used, the smooth side exit probe is most often used with this bracket.

(1) When ordering two clamps, one right exit and one left exit clamp will be provided so that the cables exit from the same side of the CIDE bracket.

(2) The B01 probe mounting bracket option is only available with the A01 or A02 probe clamp style options.

(3) The B02 and B03 probe mounting bracket options are only available with the A03 probe clamp style options.

(4) When replacing 50 mm DE 130713, part number 330879-AA-00 should be ordered. Ordering with BB=00 will prevent unnecessary parts from being ordered with the clamp.

Sliding Mounting Brackets without clamps

131071-01	Single Transducer Mounting Bracket
131030-01	Short Complementary Input Differential Expansion (CIDE) Mounting Bracket
131031-01	Long Complementary Input Differential Expansion (CIDE) Mounting Bracket

Non-sliding Mounting Brackets

167285	Kit, 50 mm Clamp Mount (used with smooth-case side exit or threaded straight exit probes).
167286	Kit, 50 mm Bolt Mount (used only with smooth-case side exit probes).

Verification Kits

Each verification kit comes with:

- a verification kit bracket
- a spindle micrometer with either a 0 to 2 in. or 0 to 50 mm range
- two set screws
- a bracket securing bolt

The material used for the verification kit bracket is T6061-T6 aluminum.

131036-01	Verification Kit, Spindle Micrometer with English Units
131036-02	Verification Kit, Spindle Micrometer with Metric Units

148722-01

Extended Range Micrometer Kit

The extended range micrometer kit contains a precision micrometer and a 100 mm (4 inch) AISI 4140 target and is intended for acceptance testing of Bently Nevada extended range transducers. Bracket options are available to hold 8mm – 50mm probes as well as the 50 mm Integral DE transducer.

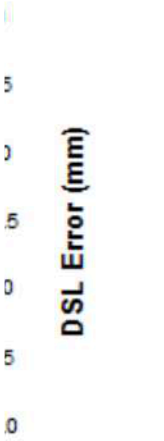
330187-AA-BB

A: Probe options	
0 1	8 mm to 50 mm probe threaded or smooth cases
0 3	8 mm to 50 mm probe threaded or smooth casesand an adapter for 50 mm Integral DE probes
B: Micrometer Option	
0 1	Standard English 0-2 inch micrometer
0 2	Standard metric 0-50 mm micrometer

Spares

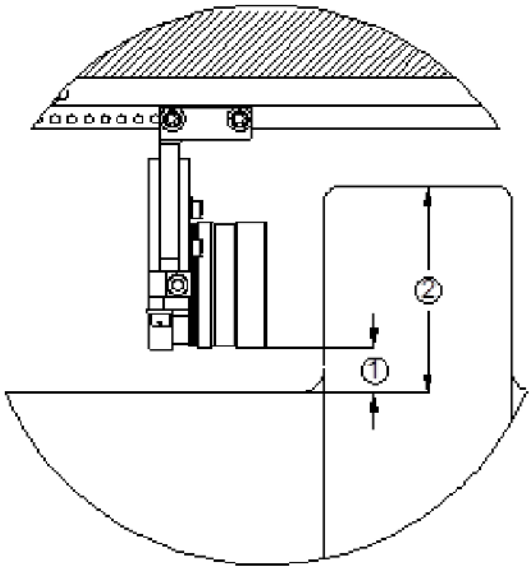
02120015	Bulk field wire. 1.0 mm^2 (18 AWG), 3 conductor, twisted, shielded cable with drain wire. Specify length in feet.
02173009	Bulk field wire. 1.0 mm^2 (18 AWG), 3 conductor, twisted, shielded cable. Specify length in feet.
138492-01	Replacement panel-mount mounting pad
138493-01	Replacement DIN-mount mounting pad
04310310	
03200006	Silicone self-fusing tape. A 9.1 meter (10 yard) roll of silicone tape to protect connectors. It is easy to install and provides excellent electrical isolation and protection from the environment. It is not recommended for use inside the casing of the machine.
40180-02	Connector Protectors. Package contains 10 pairs of connector protectors.
03839410	Male Connector Protector. Placed on the extension cable to connect to the female connector protector on the probe and provide environmental protection of connectors.
03839420	Female Connector Protector. Placed on the probe lead to connect to the male connector protector on the extension cable and provide environmental protection of connectors. Also placed on the extension cable to slide over the Proximitor Sensor connection and protect it from the environment.
330153-10	
163356	Connector Crimp Tool Kit. Includes one set of multi-connector inserts and connector installation instructions. Supplied with carrying case.
173873	High Temperature Cable Zip-Ties. PEEKcable tie is rated for use up to 200 C continuous temperature. Available in bags of 50 zip ties.
174804-01	Side Exit Probe Adapter Kit. Used to adapt side exit probes for the 330187 Extended Range Verification Kit.

d.




DSL Error (mm)

DSL Error (mm)



1. Shaft to side of probe distance.
2. Collar Height.

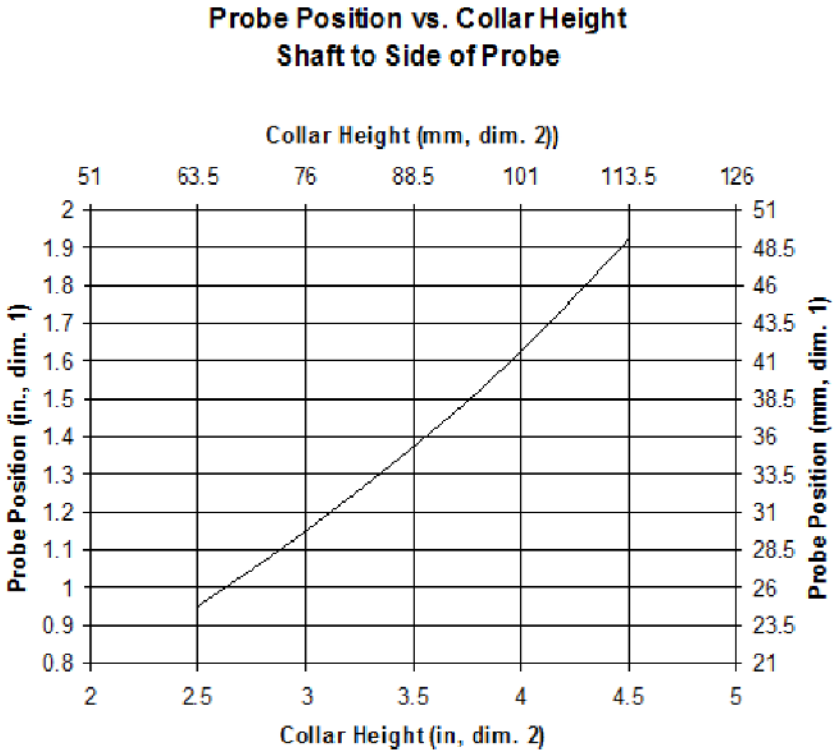


Figure 9: Recommended Probe Position Based on Collar Height

es

in)

um



in)



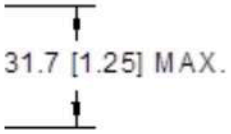
(0.29 in)

laces
ket, 7.65 mm
.0400 in)

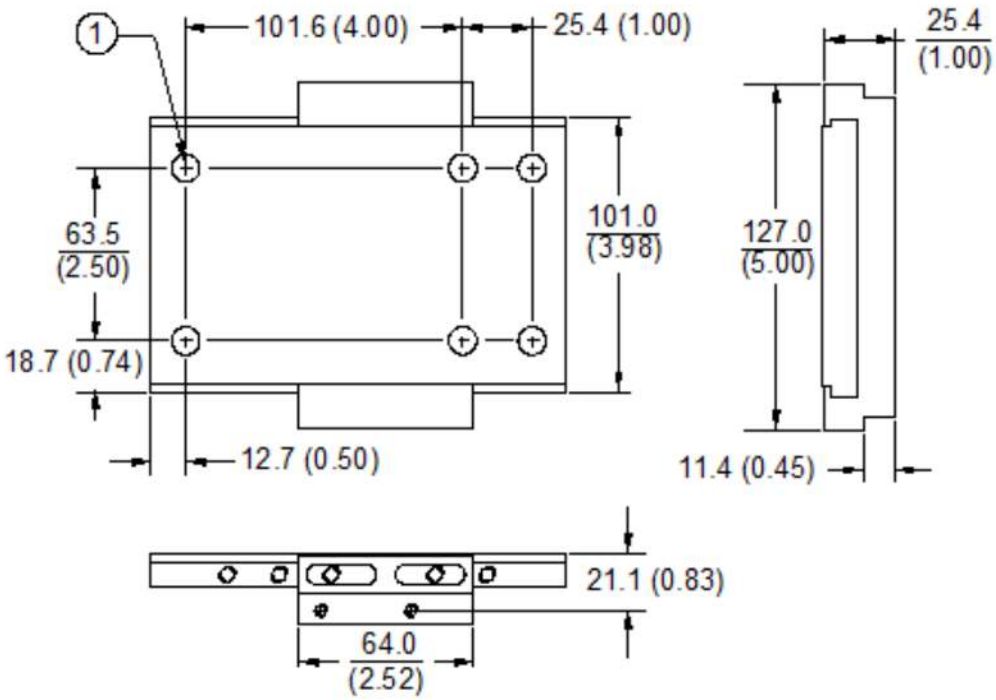
mm (0.155 in)

m (0.285 in)

1.8 in)

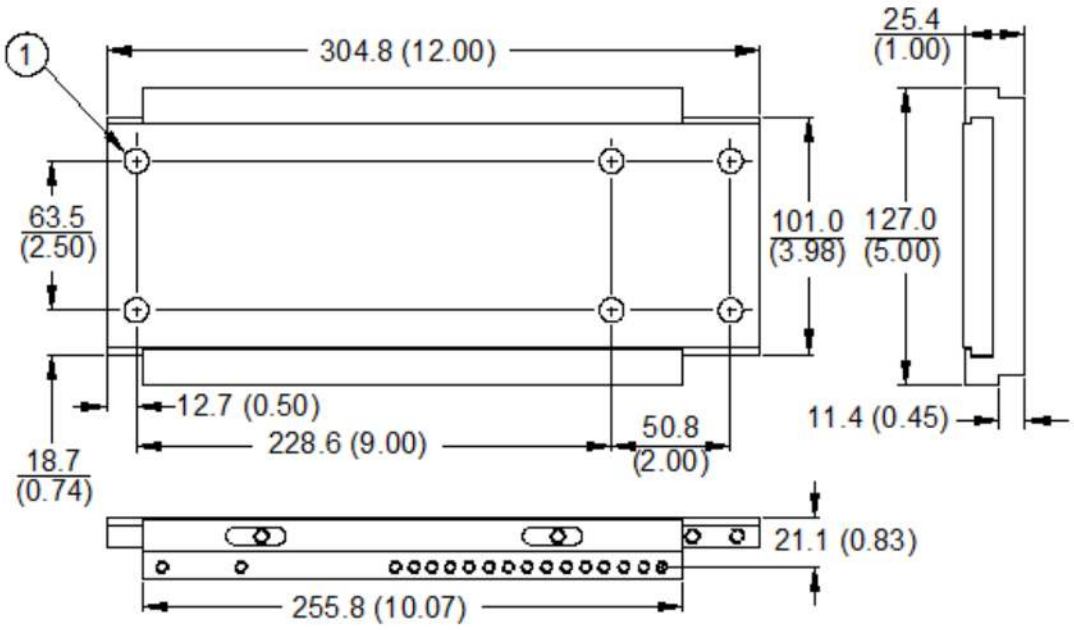


.120 in) required



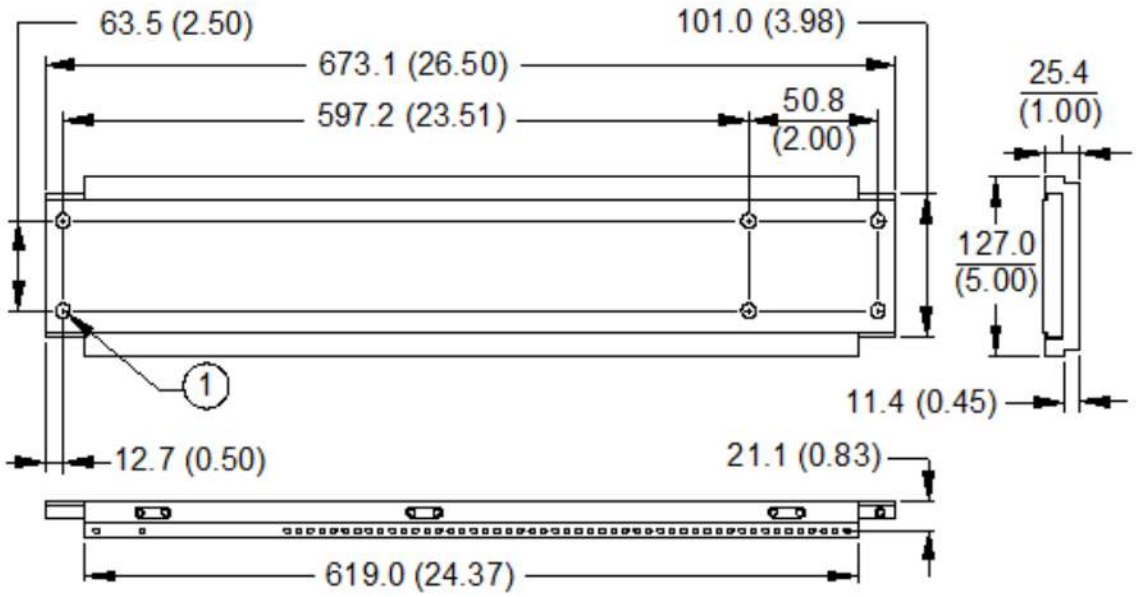
1. 10(0.40) diameter through, 15 (0.61) counterbore typical

Figure 15: 131071-01 Single Transducer Mounting Bracket



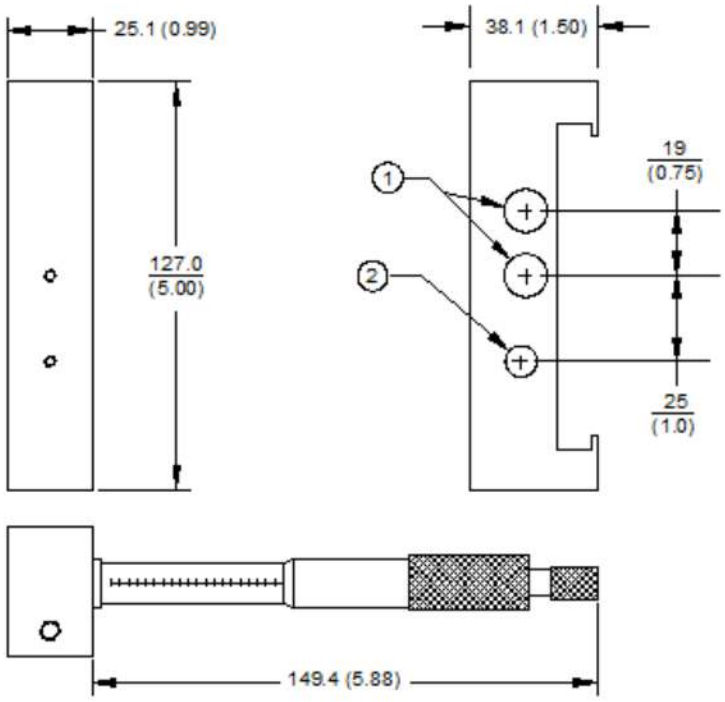
1. 10(0.40) diameter through, 15 (0.61) counterbore typical

Figure 16: 131030-01 Short Complementary Input Differential Expansion (CIDE) Mounting Bracket



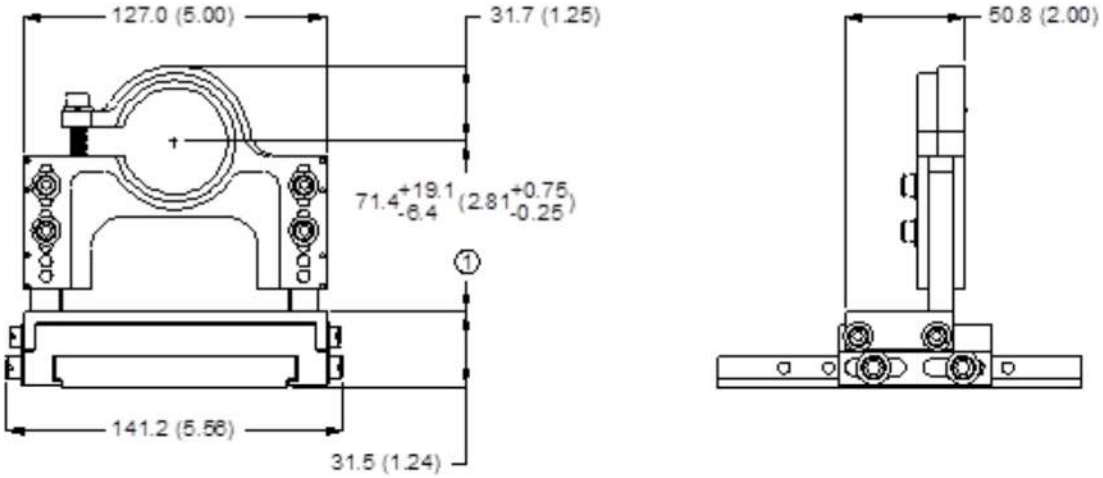
1. 10 (0.40) diameter through, 15 (0.61) counterbore typical

Figure 17: 131031-01 Long Complementary Input Differential Expansion (CIDE) Mounting Bracket



1. 12.7 (0.5) diameter, 2 places
2. 9.5 (0.37) diameter

Figure 18: 131036-01 and 131036-02 Verification Kit Spindle Micrometer



1. Vertical adjustments in ¼" increments

Figure 19: 330879 Probe Clamp (330879-01 Shown)