BBP 315 Series
Ultrahigh Precision LVDT Gaging Probes

Features

- Ultra-precision linear ball bearing assembly gives 0.000006 inch (0.15 μm) repeatability
- Industry-standard sizes and ranges
- Exceptionally long life - 2 x 10^8 cycles
- NIST-traceable calibration

Applications

- Point-of-production Q.C.
- Automated data collection for SPC
- On-line inspection of parts
- Manufacturing process control

Description

The Macro Sensors BBP family of 8 mm diameter pencil-type gaging probes offers ultra-precise measurement of dimensions in a wide variety of Q.C., SPC, and industrial metrology applications. They utilize a linear ball bearing assembly precisely fitted to a hardened-and-ground, non-rotating probe shaft to minimize radial play and the effects of side loading. This results in the probes' exceptional repeatability of 0.000006 inch (0.15 μm).

One end of the probe shaft is coupled to the core of a friction-free LVDT sensor, which produces an output voltage that is very linearly proportional to the probe shaft position. The use of an LVDT for probe shaft displacement sensing eliminates any additional transducer errors due to friction, stiction, or mechanical hysteresis. The output from the LVDT can be connected to any standard LVDT signal conditioner and then passed to a gaging column display, digital readout, or computer based data acquisition system.

The other end of the shaft is internally threaded to accept an interchangeable tungsten carbide contact tip for wear resistance and reliability. For normal applications, the probe shaft is fully extended by a spring exerting a force of about 2.5 ounces (70 grams) at the probe's mechanical zero position. The entire bearing, shaft, and LVDT assembly are enclosed in a stainless steel tubular housing.

The front of a BBP Series gaging probe is attached to a rubber bellows that also covers the probe shaft, thereby preventing contaminants from entering the bearing. The rear end of the probe features a flexible coiled strain relief for the polyurethane - jacketed cable that connects the LVDT's output to the signal conditioner. Each probe is supplied with a replaceable end piece that converts the axial cable exit to a radial cable exit to minimize overall installed length in space-critical applications. Probe sealing meets the requirements of IEC IP-65.

For setting up a probe in a fixture, the BBP gaging probes' mechanical design permits the user to make fine adjustments to the probe shaft's contact position with a small spanner wrench that is supplied. A positive stop prevents mechanical damage to the probe from repeated overstroking.

General Specifications

Excitation Voltage: 3.0 Vrms Nominal

Excitation Frequency: 5 kHz

Output Load: 100,000 Ω Min.

Operating Temperature: 15°F to 175°F (-10°C to 80°C)

Non-Linearity: <0.5% of Reading

Repeatability: 0.000006 inches (0.15 μm) or better

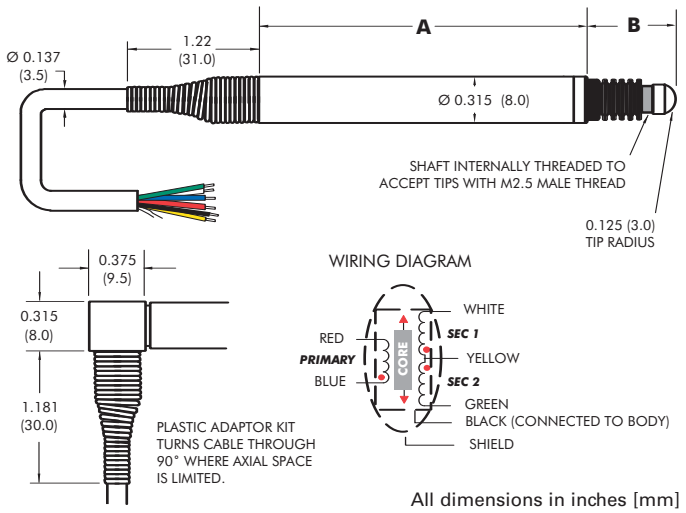
Configurations

BBP 315 Series gaging probes have an 8 mm diameter housing. Standard ranges normally in stock are shown in the specification table. On special order, BBP probes are available in shorter ranges of ±0.010 inches and ±0.020 inches, or in standard ranges configured for air-extend, spring retract operation in automatic gaging systems. Consult the factory for details on these units and other custom variations.

Macro Sensors uses gaging-industry-standard color coding and LVDT connections for the BBP cables, which are 6.5 feet (2 m) long and supplied with stripped-and-tinned ends. On special order and at extra cost, they can be supplied with one of several popular connectors wired to the cable end and with "standardized" sensitivities. Consult the factory for pricing and connector availability.

Ordering Information

Specify BBP 315-(range) for standard units as shown in the table.



All dimensions in inches [mm]

Specifications

Parameter ▼ / Model ▶	BBP 315-040	BBP 315-100	BBP 315-200
Range (inches)	±0.040	±0.100	±0.200
Range (mm)	±1.0	±2.5	±5.0
Sensitivity (mV/V/.001 in)	5.3	3.8	2.7
Sensitivity (mV/V/mm)	210	150	105
Pretravel (inches)	0.006	0.006	0.006
Pretravel (mm)	0.15	0.15	0.15
Overtravel (inches)	0.014	0.033	0.033
Overtravel (mm)	0.35	0.85	0.85
Dimension "A" (inches)	1.89	2.68	3.58
Dimension "A" (mm)	48.0	68.0	91.0
Dimension "B" (inches) (fully extended)	0.56	0.69	1.01
Dimension "B" (mm) (fully extended)	14.15	17.65	25.65

MACRO SENSORS™
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