Application Gauging Bore Measurement

Although Bowers produces the most comprehensive series of bore gauges and internal measuring equipment available, not all applications can be covered by our standard instrument range. In line with our customer care ethos, Bowers has earned a reputation for manufacturing special heads for measuring non-standard applications. The following information illustrates some of the many difficult measuring problems easily solved by these special heads.

IP67

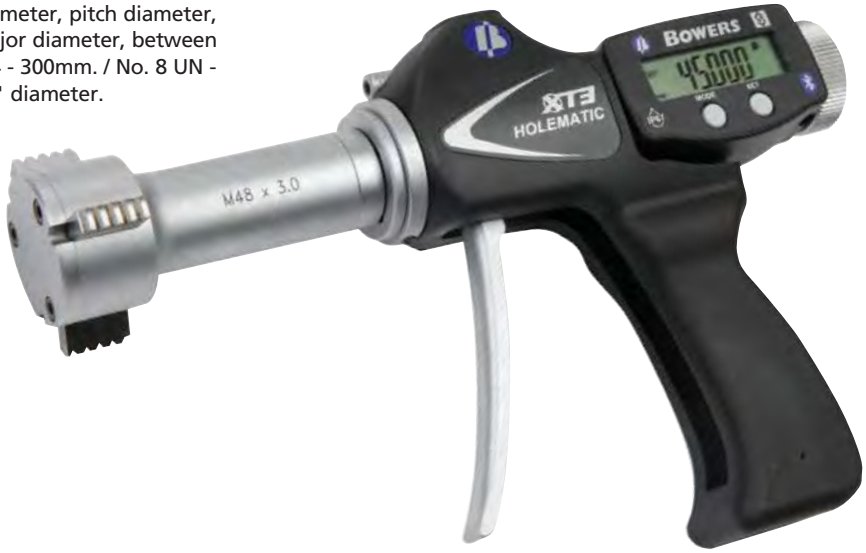
Bluetooth SMART

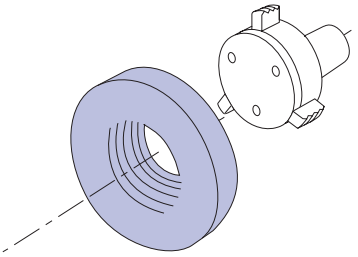
IOT READY

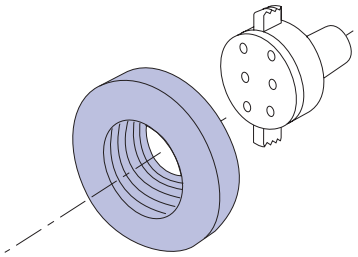
Threads

Screw Threads

To measure effective (functional) diameter, pitch diameter, major diameter, between M4 - 300mm. / No. 8 UN - 12" diameter.





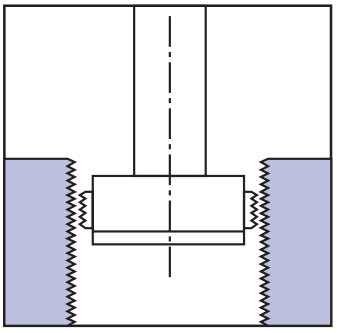


2 Point



3 Point





Ball Screw Threads

From Ø M10.



External Threads

Frames fitted with 1 x ball and 1 x pin



Custom Bore Measurement

Please contact Bowers for more details



Application Gauging Bore Measurement - Grooves

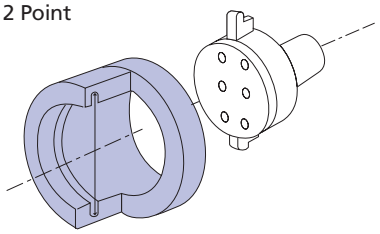
- Interchangeable with standard heads
- Suits Bowers XTD, XTH and Ultima
- Special forms, radius, ball contacts
- Depth stops available for quick location
- Annular grooves possible

Grooves

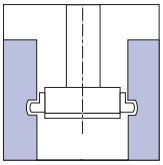
For sizes from
2-300mm diameter.



2 Point





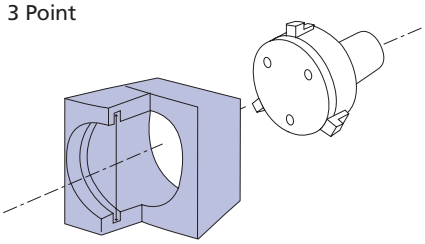


Side view



Groove Head
with Depth Stop

3 Point



Brake Caliper Measurement





Caliper Groove
Measurement

Ball Race Measurement





Measuring
Component

Application Gauging Bore Measurement - Groove Sets

Bowers XT3 digital internal micrometers offer a new ergonomic design - including a larger and clearer LCD display - along with IP67 electronics protection, proximity output with built-in Bluetooth; both allow bi-directional communication giving greater flexibility for data acquisition and storage.

The XT Groove sets are based on the standard self-aligning 3-point XT head design but with a stepped anvil to allow entry into grooves for fast and repeatable groove diameter measurement. The gauge is set using the calibrated setting rings provided and each ring size is stored in the gauge memory enabling quick and easy setting with each head change.

The trigger action pistol-grip controller enables the operator to retract the anvils instantly and pass the gauge through the entry diameter, then extend the anvils to engage with the groove diameter for an immediate absolute measurement.

Other versions of the standard XT head are also available for internal threads, splines, slots, deep hole and many more applications.



Standard XT Groove Set Features

- Generic anvil profile suits common groove sizes – see table
- Sets available to cover diameters 6 – 100mm (1/4" – 4")
- 3 point, self-centring, interchangeable heads for repeatability
- 0.001mm 0.00005" resolution
- Depth stops included
- Extensions available
- IP67 sealed
- Setting rings with UKAS certificates included
- Bluetooth with free data collection App

XT HOLEMATIC GROOVE SETS:

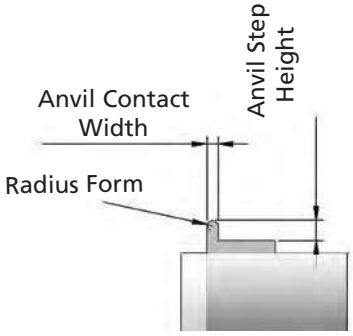
Code No	Set Range	Included Heads	Anvil Step Height	Anvil Contact Width	Depth Stop OD	Setting Ring Sizes
SP-SXTH10M-BT-GRO	6-20mm	6-8mm 8-10mm 10-12.5mm 12.5-16mm 16-20mm	1.25mm 1.25mm 1.5mm 2.0mm 2.5mm	1.5mm 1.5mm 1.5mm 1.5mm 1.5mm	18mm 20mm 22mm 26mm 33mm	8mm 12.5mm 20mm
SP-SXTH10I-BT-GRO	1/4"- 3/4"	1/4" - 5/16" 5/16" - 3/8" 3/8" - 1/2"- 1/2" - 5/8" 5/8" - 3/4"	0.049" 0.049" 0.059" 0.079" 0.098"	0.059" 0.059" 0.059" 0.059" 0.059"	0.709" 0.787" 0.866" 1.024" 1.299"	5/16" 1/2" 3/4"
SP-SXTH5M-BT-GRO	20-50mm	20-25mm 25-35mm 35-50mm	3.175mm 5.5mm 4mm	2mm 2mm 2mm	39mm 45mm 60mm	20mm 35mm
SP-SXTH5I-BT-GRO	3/4"- 2"	3/4" - 1" 1" - 1 3/8" 1 3/8" - 2"	0.108" 0.217" 0.157"	0.079" 0.079" 0.079"	1.535" 1.772" 2.362"	3/4" 1 3/8"
SP-SXTH6M-BT-GRO	50-100mm	50-65mm 65-80mm 80-100mm	8mm 8mm 10.5mm	3mm 3mm 3mm	80mm 95mm 115mm	65mm 80mm
SP-SXTH6I-BT-GRO	2"- 4"	2" - 2 5/8" 2 5/8" - 3 1/4" 3 1/4" - 4"	0.315" 0.315" 0.413"	0.118" 0.118" 0.118"	3.150" 3.740" 4.528"	2 5/8" 3 1/4"

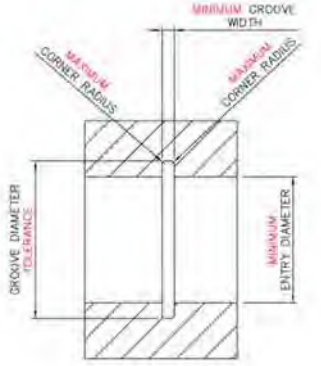
INDIVIDUAL HEADS

Code No (with BT)	Range
XTHD6M-GRO	6-8mm
XTHD8M-GRO	8-10mm
XTHD10M-GRO	10-12.5mm
XTHD12M-GRO	12.5-16mm
XTHD16M-GRO	16-20mm
XTHD20M-GRO	20-25mm
XTHD25M-GRO	25-35mm
XTHD35M-GRO	35-50mm
XTHD50M-GRO	50-65mm
XTHD65M-GRO	65-80mm
XTHD80M-GRO	80-100mm
XTHD6I-GRO	1/4 - 5/16"
XTHD8I-GRO	5/16 - 3/8"
XTHD10I-GRO	3/8 - 1/2"
XTHD12I-GRO	1/2 - 5/8"
XTHD16I-GRO	5/8 - 3/4"
XTHD20I-GRO	3/4 - 1"
XTHD25I-GRO	1 - 1 3/8"
XTHD35I-GRO	1 3/8 - 2"
XTHD50I-GRO	2 - 2 5/8"
XTHD65I-GRO	2 5/8 - 3 1/4"
XTHD80I-GRO	3 1/4 - 4"

Standard Groove Anvil Detail

Minimum entry diameter: 0.3mm / 0.012" below minimum measuring range of each head

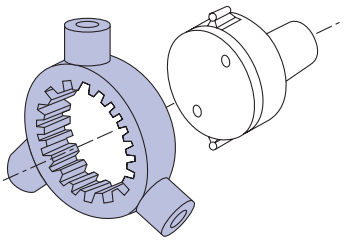


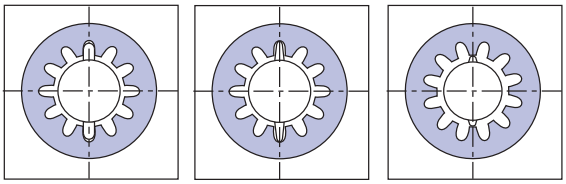


Application Gauging Bore Measurement - Internal Spline

2 and 3 point heads available.
Anvils manufactured from tool steel.
Between pin, major and minor diameter heads available.
Diameters from 8-300mm diameter (5/16"-12").

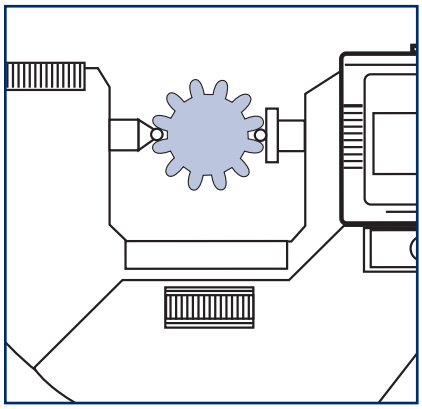




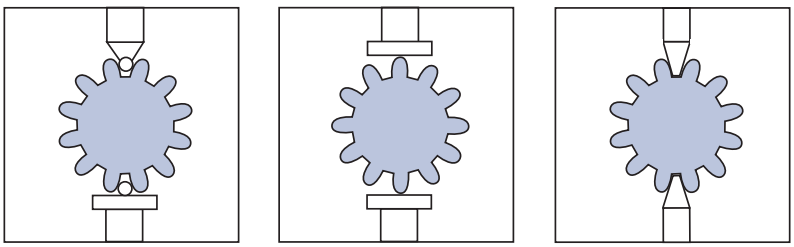


Pitch Diameter | Major Diameter | Minor Diameter

Special Measurement - External Spline



Frames fitted with 1 x ball and 1 x pin



Pitch Diameter | Major Diameter | Minor Diameter

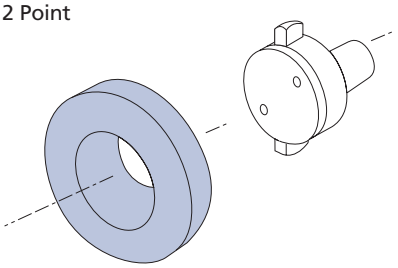
Application Gauging Bore Measurement - Spherical

2 Point Spherical

Measurement of ovality in bore.
Measurement of bores with irregularities.



2 Point

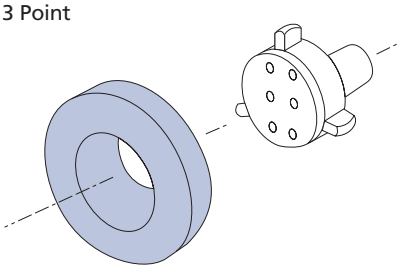


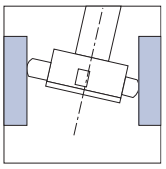
3 Point Spherical

Gives good repeatability even when out of line with bore centre.
Available from 6-300mm diameter on digital systems.



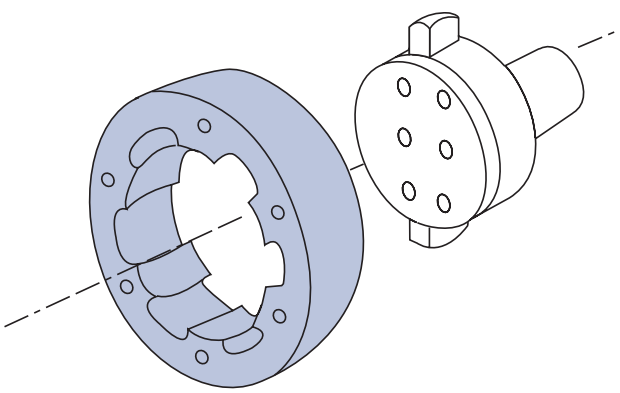
3 Point

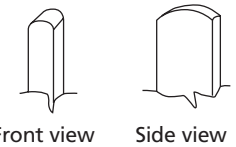




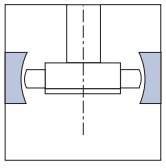
Spherical Radius

Can be supplied as a 2 point
(for ovality) or 3 point contact.
Available from 6-300mm.





Front view Side view



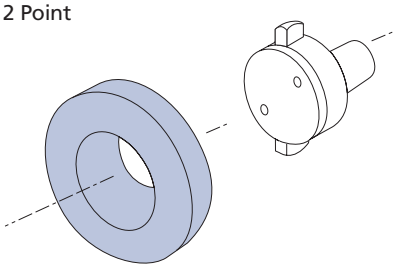
Custom Bore Measurement - Deep Hole Pneumatic

Operated by a pneumatic actuator powered by a 3 bar compressed air supply - either from a compressor or a workshop air-line. The measurement data is collected by a capacitive probe fitted just behind, and in constant contact with the measuring head. This direct contact ensures high-quality transducer-type accuracy, even at great depths. Measurements are taken by pressing a footswitch connected to the airline and the data is then passed automatically via cable back down the bore to the digital readout at the operator end.

Features

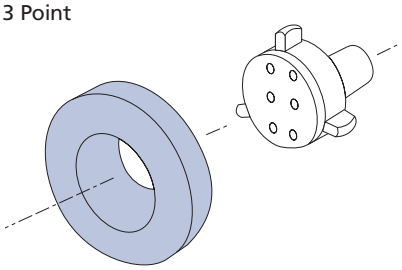
- Measures diameters from 50-310mm, up to 15m deep
- Spherical, Tungsten Carbide anvils
- 2 point and 3 point heads available
- Accuracy +/-0.005mm (subject to bore condition)
- Quick set-up time
- Easy to use
- Not adversely effected by temperature fluctuation
- Robust design
- Various readouts available

2 Point





3 Point

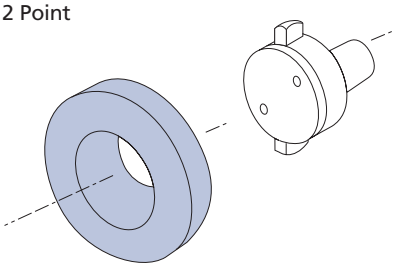


Deep Hole XT - Under 2 Metres

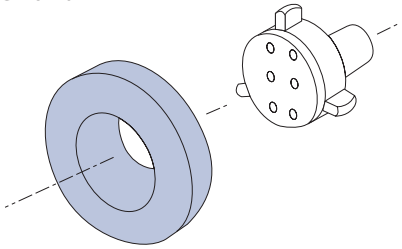
Up to 2.0 metres deep with standard extensions.



2 Point



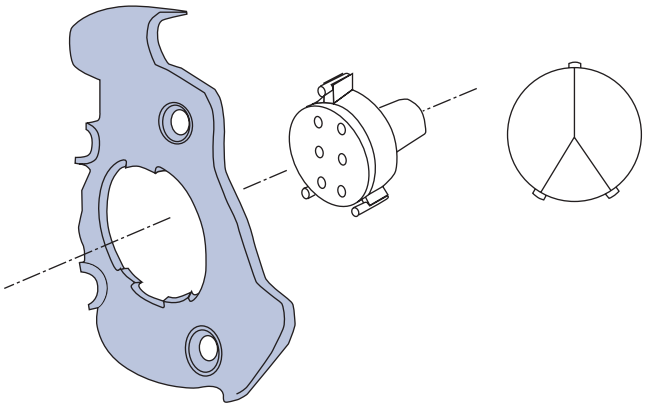
3 Point



Custom Bore Measurement - Miscellaneous

Irregular Spacing

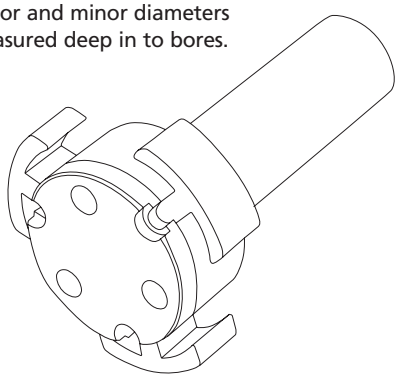
Available between 16-300mm diameter to measure between odd spaced lobes.



Gun Barrel Head

Measurement of smooth bore and rifled bore gun barrels.

Major and minor diameters measured deep in to bores.

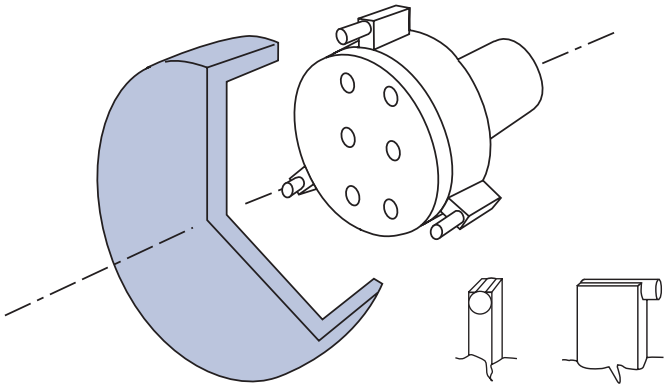


Right Angled Adaptor



Blind Bore

Standard between 2-6mm and 12.5-300mm.
Between 6-12.5mm on request.

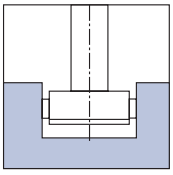


Front view Side view

Slot Width (Large)

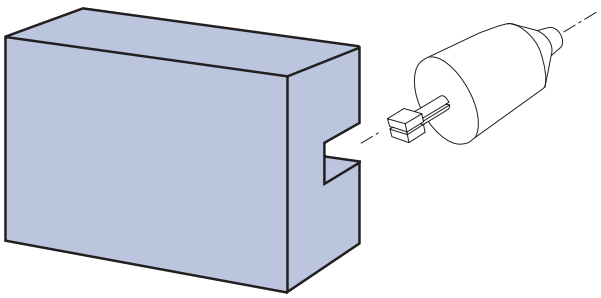
Slot widths from 6-100mm.

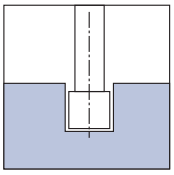




Slot Width (Small)

Slot widths from 3-6mm.





Custom Bore Measurement - Measurement of Dovetail Slots & Turbine Blade Grooves

The Challenge:

Bowers was approached by a well-known industrial turbine manufacturer to develop a method of measuring dovetail slot width and position in a circular component. The datum for the measurements was taken from the shoulder of the slot replicating the final 'In Service' blade datums.

The Solution:

Bowers' Special Applications Team developed a special 2 Point head solution based on the popular Bowers XT system. The system incorporates tungsten carbide ball contacts for high accuracy. The Bowers XT digital readout offers the capability to send data for SPC and part traceability.

Advantages over Competitor Solutions:

The Bowers dovetail variable gauge is able to output the actual size and position as opposed to competitors' attribute (Go / No Go) gauging. The gauge has a long working life and doesn't wear like attribute gauging.

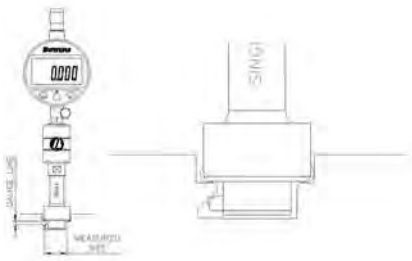
Potential Industries:

- Aerospace
- Nuclear
- Turbines
- Power Generation

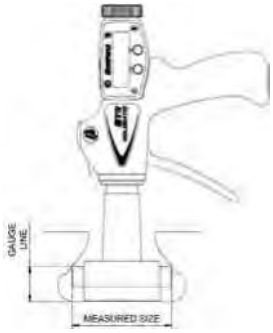




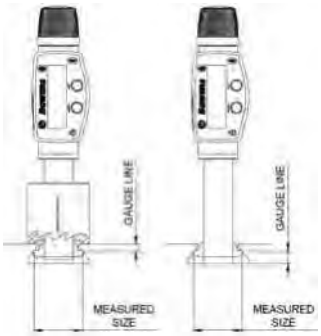
Single side measurement for set-up / symmetry



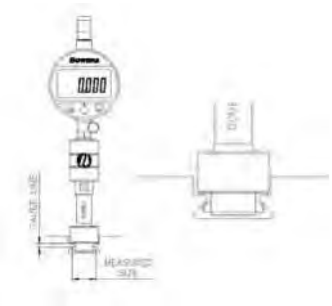
Measurement of dovetail seat face width



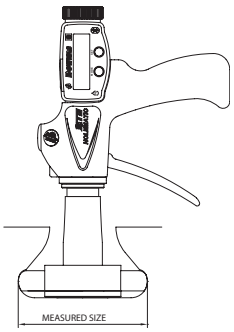
Other Dovetail & Fir Tree Slots

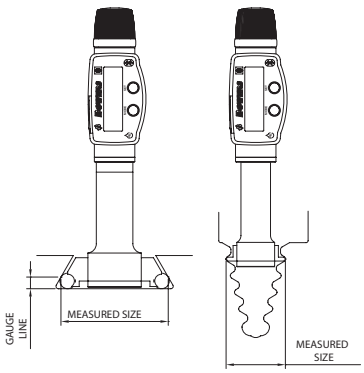


Double side measurement for overall width



Measurement of bottom lobe width





Custom Bore Measurement - Internal Measurement of Surface/Subsea Valve Cavity-Seat Pockets

The Challenge:

Bowers was approached by a well-known solutions provider to the global oil & gas industry to develop a method of measuring the internal cavity in valve bodies.

Features to measure include:

- Internal diameters inside seat pocket
- Internal spot face distance between flats
- Internal spot face to diameter measurement

Potential Industries:

- Oil & Gas
- Hydraulics
- Industrial Pipework



Typical part

The Solution:

Bowers' Special Applications Team developed a solution utilising a one-piece right angle adapter to allow entry down a perpendicular bore. This allows measurement to take place at 90 degrees to entry of the bore. An optimised anvil form and guide pieces aid entry and position the measuring head correctly for higher accuracy measurements and ease of use for operator.



Features:

- Higher accuracy
- Improved ease of use
- Faster inspection



