

Block Gauge Family

Digital and Analogue Universal Gauges

Datasheet
502624
Issue 3



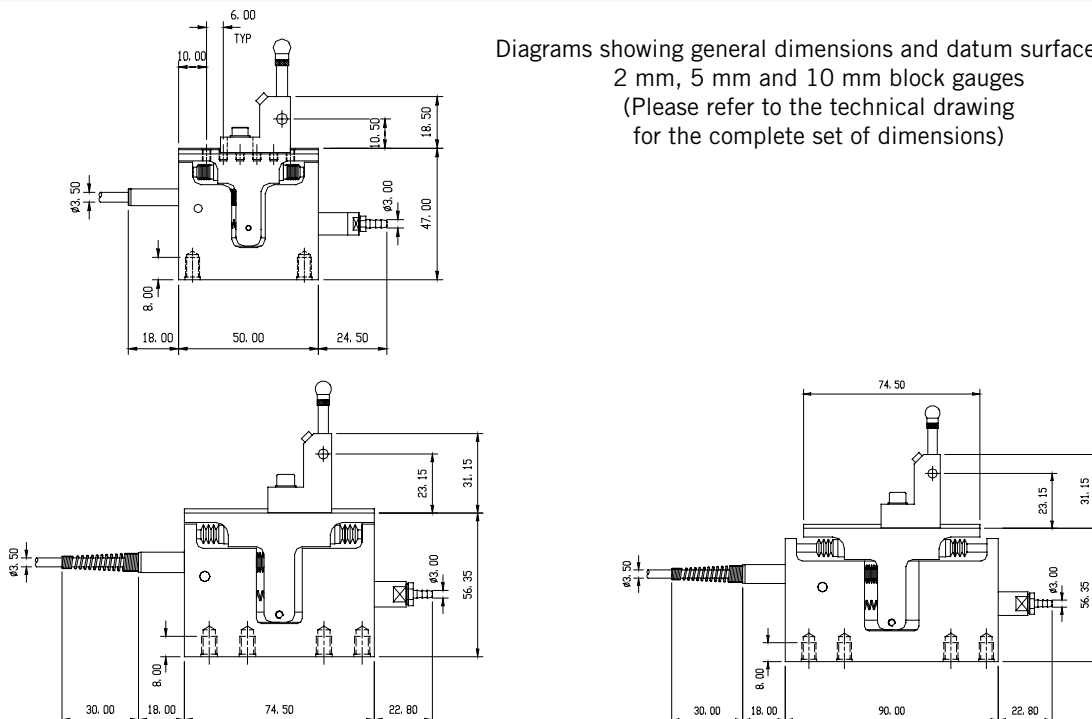
Features

- ▶ 2 mm, 5 mm and 10 mm Total Measuring Range
- ▶ Repeatability: < 0.25 μm
- ▶ Compact size 2 mm unit
- ▶ Digital, LVDT and Half Bridge
- ▶ Pneumatic or Spring Actuation
- ▶ Adjustable Anti-rotation Guide
- ▶ All Stainless Steel Construction
- ▶ Large Range of Changeable Tips
- ▶ IP65 Protection
- ▶ Good linearity over the full measuring range
- ▶ High Accuracy
- ▶ Traceable calibration

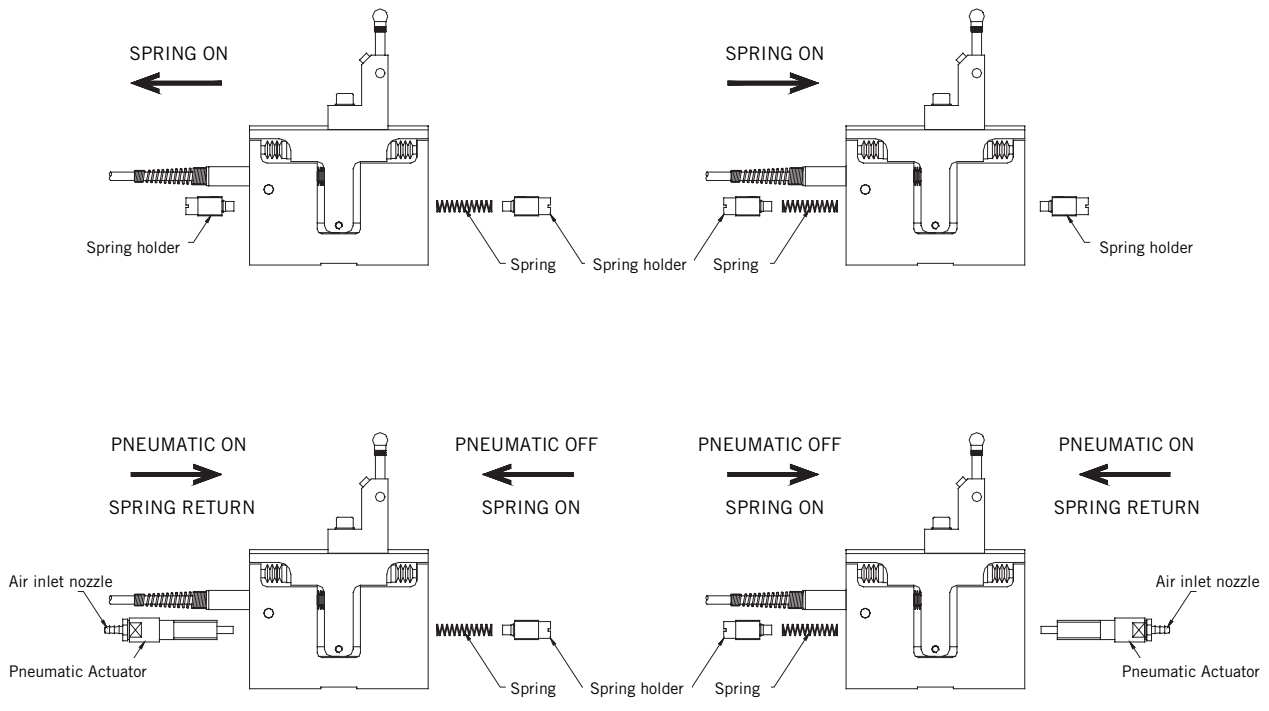
Description

Solartron's new family of Block Gauges makes precision measurements of bores and cavities a simple and reliable process. More generally, the use of these devices is recommended in applications where space is limited and where the use of axial probes is not possible. The family of universal gauges includes 2 mm, 5 mm and 10 mm measurement ranges, the 5 mm unit is used in most gauging applications and the 10 mm unit is designed for applications requiring a longer range. The 2 mm unit is a miniaturised version in length, height and thickness and is recommended for applications where space is very restricted. The block gauges are available in LVDT, half bridge or digital variants, and offer unrivalled ruggedness, accuracy and repeatability. All three units are extremely versatile and provide datum surfaces and all the adjustments required for precision gauging applications.

Mechanical Outline



Configuration Drawing



The Block Gauge pneumatic kit enables automatic loading of components. Pneumatic actuation coupled with a spring to control the tip force ensures repeatable measurement results (fig.1)

The 5 mm and 10 mm block gauges are equipped with an industry standard tool holder. This ensures that the gauge is rigid yet easy to adjust. The tip carriers have an M2.5 fitting that accepts all standard tips. Due to its size, the 2 mm gauge has a modified adjustment system that provides equal rigidity and ease of adjustment (fig.2)

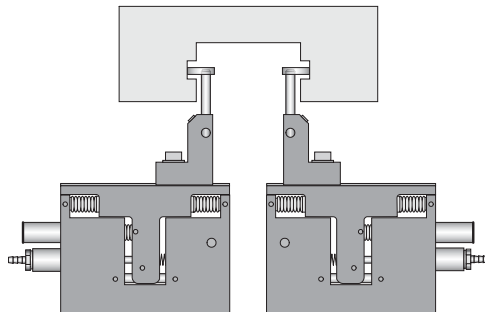


fig.1

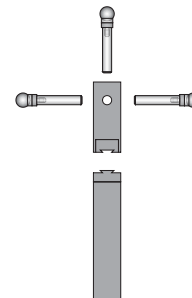


fig.2

As many Block Gauges as required can be banked close together. The compact configuration and the ability to gauge off the centreline is useful when tightly packed points need to be measured (fig.3)

Measurements with offset tip are possible with all the units, so to reduce the footprint of the gauge, adjustment along the frame is provided (fig.4)

A range of springs is available to ensure that the Block Gauge can be used in any attitude. IP65 protection helps to extend the life of the gauge in dirty environments (fig.5)



fig.3

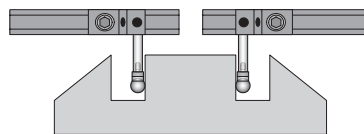


fig.4

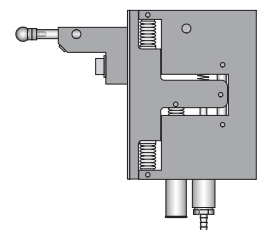


fig.5

Technical Specification

Measurement

| | Analogue | Digital |
|---|---|----------------------------|
| Measurement Range (mm) | ±1.0, ±2.5 and ±5.0 | 2, 5 and 10 |
| Mechanical Travel (mm) | 3, 6 and 11 | 3, 6 and 11 |
| Accuracy ¹ | (whichever is greater) at 5 kHz for LVDT at 10 kHz for Half Bridge | |
| 2 mm | ±1.0 µm or ±0.5% x D | ±0.1 µm ±0.1% x D |
| 5 mm | ±2.5 µm or ±0.5% x D | ±0.1 µm ±0.15% x D |
| 10 mm | ±5.0 µm or ±0.5% x D | ±0.1 µm ±0.15% x D |
| Repeatability (on-axis at 70 g tip force) | | |
| 2 mm | < 0.25 µm | |
| 5 mm | < 0.25 µm | |
| 10 mm | < 0.50 µm | |
| Resolution | Dependant on associated electronics | User selectable to < 0.1µm |
| Null Position | Adjustable | Not applicable |
| Tip Force | | |
| 2 mm | 0.75 N | |
| 5 mm | 0.75 N | |
| 10 mm | 0.75 N | |
| Temperature Coefficient | | |
| 2 mm | ±0.2 µm/°C | |
| 5 mm | ±0.5 µm/°C | |
| 10 mm | ±1.0 µm/°C | |
| Life | Better than 5 million measuring cycles (dependant on application) | |

Mechanical

| | Analogue | Digital |
|--|--|--|
| Mass (less tool holder) | | |
| 2 mm | 160 g (0.232 lbs) | |
| 5 mm | 390 g (0.858 lbs) | |
| 10 mm | 385 g (0.847 lbs) | |
| Mass of moving part (less tool holder) | | |
| 2 mm | 35 g (0.077 lbs) | |
| 5 mm | 90 g (0.198 lbs) | |
| 10 mm | 95 g (0.209 lbs) | |
| Material | Stainless Steel (300 series) with Viton® Gaiters | |
| IP Rating | IP65 | IP65 for gauge IP43 for electronics |
| Operating Pressure | 1 bar to 3 bar | |

Environmental

| | Analogue | Digital |
|----------------------------|--|------------|
| Storage Temperature (°C) | -40 to +85 | -20 to +70 |
| Operating Temperature (°C) | +5 to +85 | +5 to +65 |
| Shock | To maintain best performance the Block Gauge should be protected from excessive shock loads and dropping | |

Electrical Interface

| | Analogue | | Digital |
|-----------------------|-----------------|------------------|----------------|
| | LVDT | Half Bridge | |
| Energising Voltage | 1 to 10 V rms | | 5 V ±0.25 VDC |
| Energising Frequency | 2 to 20 kHz | | Not applicable |
| Energising Current | 2 mA/V at 5 kHz | 2 mA/V at 10 kHz | 55 mA at 5 VDC |
| Calibration Voltage | 3 V | | Not applicable |
| Calibration Frequency | 5 kHz | 10 kHz | Not applicable |
| Calibration Load | 10 kΩ | 2 kΩ | Not applicable |
| Sensitivity (mV/V/mm) | (at 5 kHz) | (at 10 kHz) | Not applicable |
| 2 mm | 200 ±0.5% | 73.5 ±0.5% | |
| 5 mm | 80 ±0.5% | 29.4 ±0.5% | |
| 10 mm | 40 ±0.5% | 14.7 ±0.5% | |

¹ Accuracy includes both linearity and sensitivity errors (D is the distance from setting master)

² Maximum Tip Force is 3.5 N, a selection of springs is supplied for attitude and dead weight compensation. Care should be taken as the probe performance (accuracy and repeatability) may degrade at high tip forces.

Ordering Guide for Block Gauge Components

All gauges are supplied configured as spring push. A customer fit pneumatic actuator is required to convert spring push to pneumatic operation. The Block Gauge is inclusive of integral sensor but does not include the pneumatic actuator, additional springs, tool holder (4 mm and 6 mm bore), tip carrier (4 mm and 6 mm diameter) or tips. These must be ordered separately.



Tips

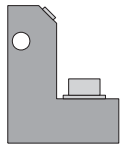
With industry standard M2.5 thread.

See page 98/99 of Solartron Metrology Catalogue 02 or download the PDF file for the tips from www.solartronmetrology.com



Tip Carrier

| Length | 4 mm Ø Tip Carriers (for use with 4 mm Tool Holder) | 6 mm Ø Tip Carriers (for use with 6 mm Tool Holder) |
|--------|--|--|
| | Part Number | Part Number |
| 20 mm | 208221/20 | - |
| 30 mm | 208221/30 | 208453/30 |
| 40 mm | 208221/40 | 208453/40 |
| 50 mm | - | 208453/50 |



Tool Holder

| Block Gauge | 4 mm Tool Holder | 6 mm Tool Holder |
|-------------|------------------|------------------|
| | Part Number | Part Number |
| 2 mm | 804797-SX | - |
| 5 & 10 mm | 804448-SX | 804798-SX |



Pneumatic Actuator

| Block Gauge | Pneumatic Actuator |
|-------------|--------------------|
| | Part Number |
| 2 mm | 804878 |
| 5 & 10 mm | 804574 |



Replacement Springs

| | Replacement Spring Part Number | | |
|-------|--------------------------------|------------------|-------------------|
| | 2 mm Block Gauge | 5 mm Block Gauge | 10 mm Block Gauge |
| 70 g | 208574/070 | - | - |
| 75 g | - | 208212/075 | 208418/075 |
| 100 g | 208574/100 | 208212/100 | 208418/100 |
| 150 g | 208574/150 | 208212/150 | 208418/150 |
| 250 g | - | 208212/250 | 208418/250 |
| 350 g | - | 208212/350 | 208418/350 |

Ordering Guide for Block Gauges

Digital or Analogue Block Gauge

| Digital | 2.0 mm | | 5.0 mm | | 10.0 mm | |
|-----------------|---------|---------|---------|---------|----------|---------|
| | Product | Part N° | Product | Part N° | Product | Part N° |
| Standard | DK/2/S | 973025 | DK/5/S | 973000 | DK/10/S | 973008 |
| Standard Radial | - | - | DKR/5/S | 973005 | DKR/10/S | 973009 |

| LVDT | ±1.0 mm | | ±2.5 mm | | ±5.0 mm | |
|-----------------------------|---------|---------|-----------|---------|---------|---------|
| | Product | Part N° | Product | Part N° | Product | Part N° |
| Standard (Plugged) | BG/1/S | 925165 | BG/2.5/S | 924750 | BG/5/S | 924992 |
| Standard Radial (Plugged) | - | - | BGR/2.5/S | 924886 | BGR/5/S | 924996 |
| Standard (Unplugged) | BG/1/S | 925099 | BG/2.5/S | 924713 | BG/5/S | 924990 |
| Standard Radial (Unplugged) | - | - | BGR/2.5/S | 924884 | BGR/5/S | 924994 |

| Half Bridge | ±1.0 mm | | ±2.5 mm | | ±5.0 mm | |
|-----------------------------|---------|---------|------------|---------|----------|---------|
| | Product | Part N° | Product | Part N° | Product | Part N° |
| Standard (Plugged) | BG/1/SH | 925166 | BG/2.5/SH | 924751 | BG/5/SH | 924993 |
| Standard Radial (Plugged) | - | - | BGR/2.5/SH | 924887 | BGR/5/SH | 924997 |
| Standard (Unplugged) | BG/1/SH | 925100 | BG/2.5/SH | 924714 | BG/5/SH | 924991 |
| Standard Radial (Unplugged) | - | - | BGR/2.5/SH | 924885 | BGR/5/SH | 924995 |



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