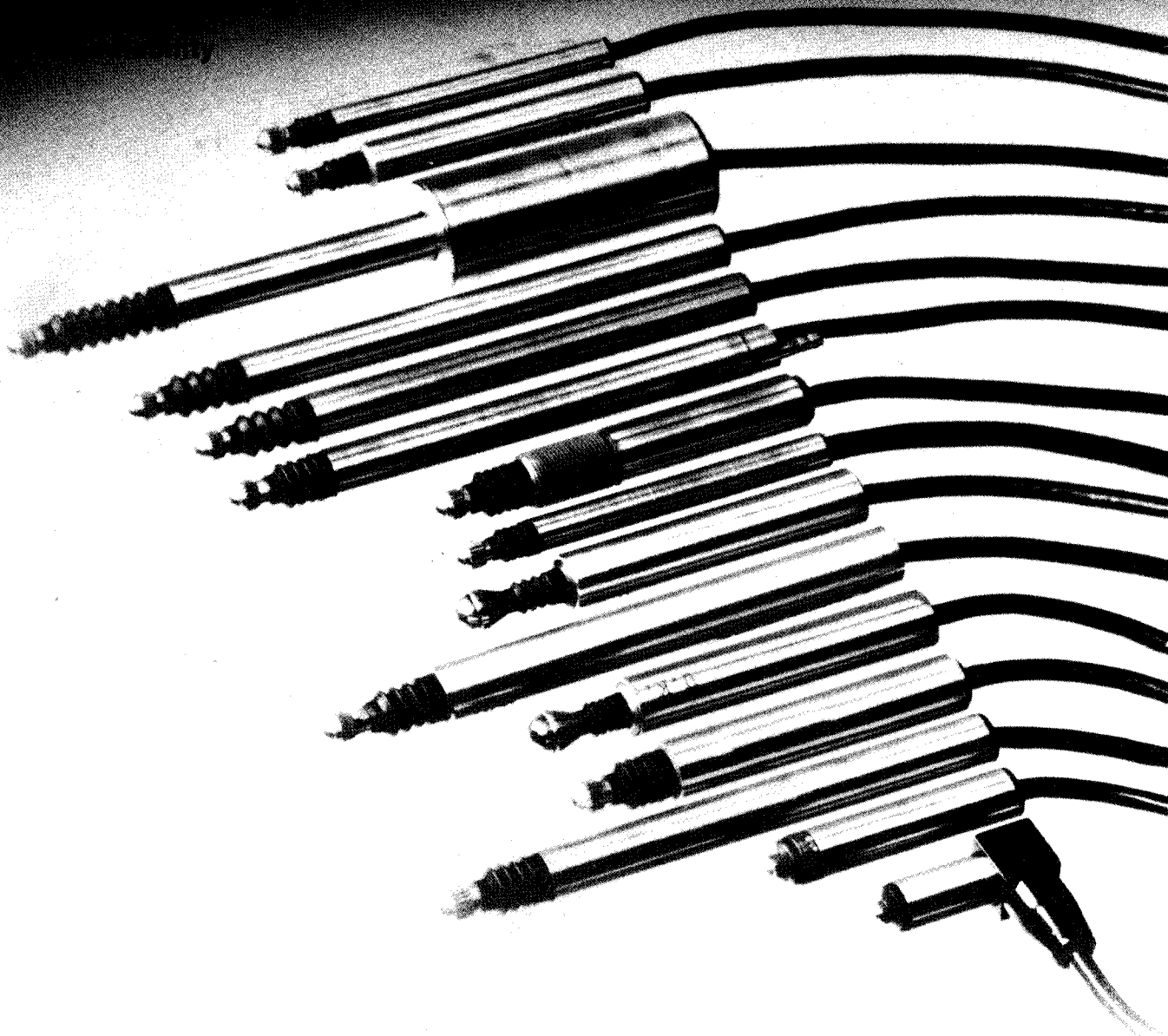


**SANGAMO**

**Schlumberger**

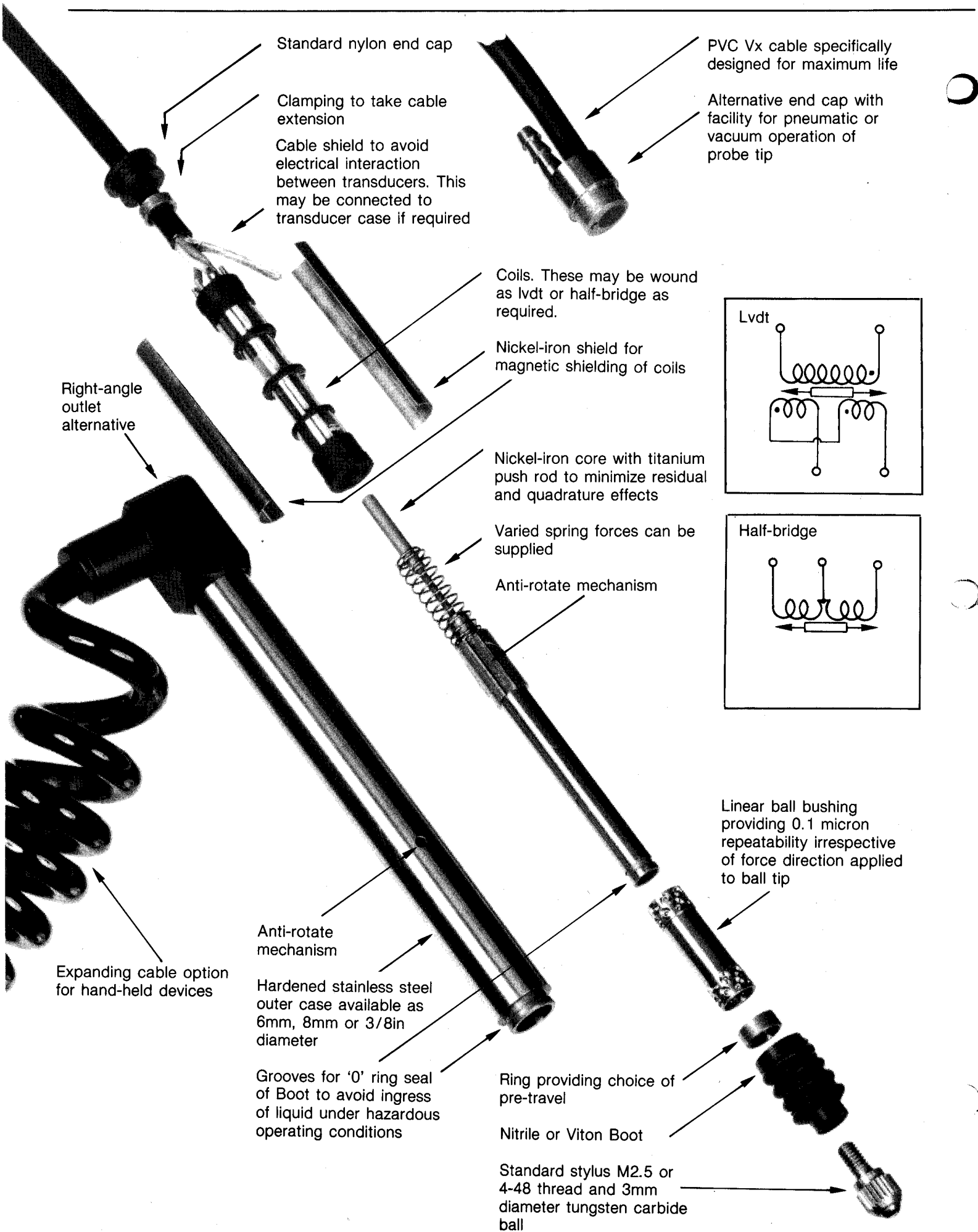
## **Gauging Transducers**



The comprehensive range of Sangamo Gauging Transducers combine rugged construction required by the industrial user with the mechanical and electrical precision normally only found in laboratory devices. Design features shown on overleaf indicate a complete understanding of the users environment thus minimizing the failure of this vital component to the Metrology industry. For example, maximum attention to case construction, cable design, method of clamping, electrical protection of coils, etc. The range is ideally suited for electronic gauging systems, automatic inspection jigs and position control on machine tools.

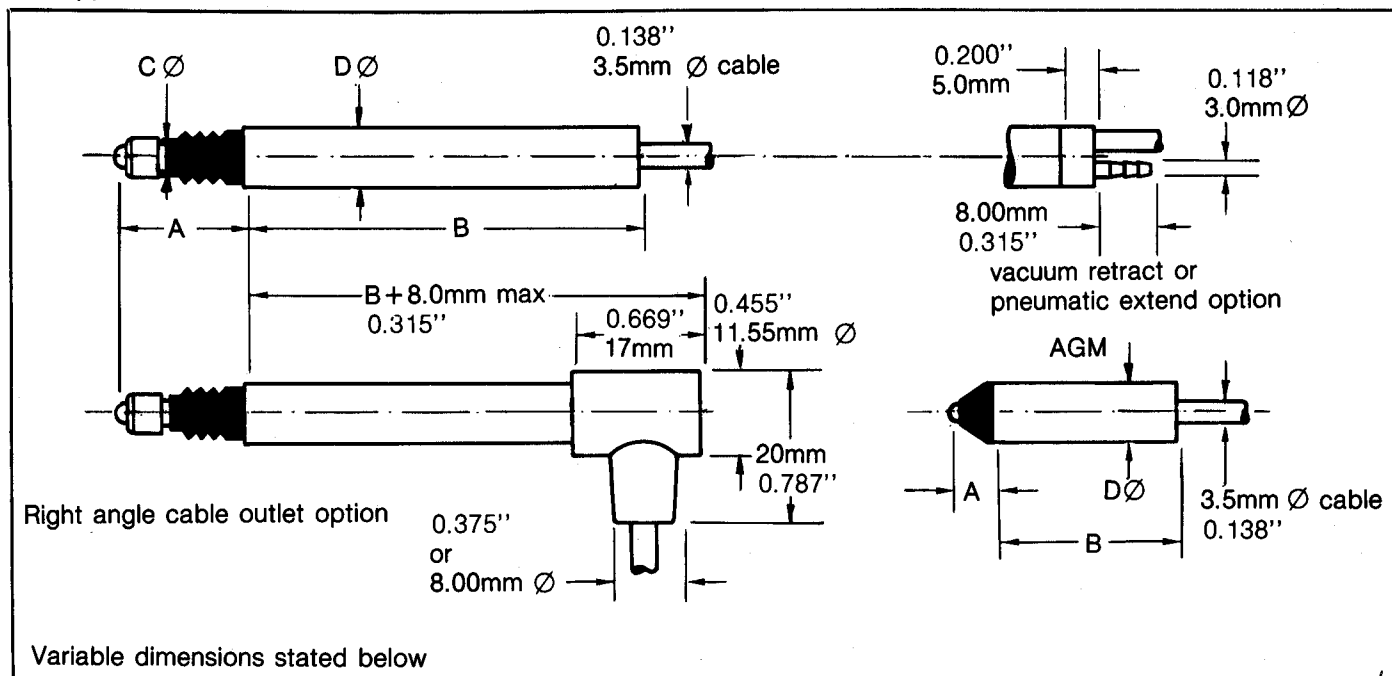
Sangamo offer a design service capability to ensure full electrical compatibility with users' existing electronic gauging systems. For the OEM customer all devices can be supplied fully calibrated with mating connector, ie. as a component-ready for use.

The optimization of design and production techniques have resulted in a range of transducers of outstanding interest to the Metrology user where price/performance consideration is of major importance, particularly for volume requirements.



## AG Series Gauging Transducers

The AG series offers a complete range of ball bearing movement gauging transducers with measuring capabilities up to 10mm (0.400"). This series forms the base of all Sangamo Gauging Transducers, the rugged yet precise construction being shown in the exploded view opposite.



### Mechanical

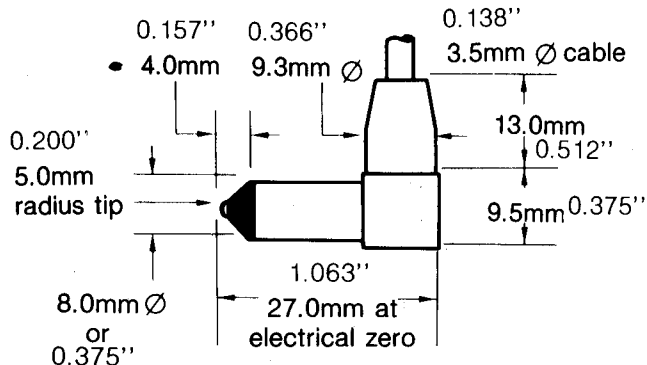
| <i>Lvdt type</i>         | <i>AGM/0.5</i>  | <i>AGS/0.5</i>    | <i>A6G/1</i>       | <i>AG/1</i>       | <i>AG/1.5</i>      | <i>AG/2.5</i>      | <i>AG/5</i>        |
|--------------------------|---|-------------------|--------------------|-------------------|--------------------|--------------------|--------------------|
| <i>Half-bridge type</i>  | <i>AGMH/0.5</i>   | <i>AGSH/0.5</i>   | <i>A6GH/1</i>      | <i>AGH/1</i>      | <i>AGH/1.5</i>     | <i>AGH/2.5</i>     | <i>AGH/5</i>       |
| Linear stroke            | ±0.5mm<br>±0.020"   | ±0.5mm<br>±0.020" | ±1mm<br>±0.040"    | ±1mm<br>±0.040"   | ±1.5mm<br>±0.060"  | ±2.5mm<br>±0.100"  | ±5mm<br>±0.200"    |
| Dimensions               |   |                   |                    |                   |                    |                    |                    |
| A, at electrical zero    | 0.20 5.0  | 0.59 15.0         | 0.55 14.0          | 0.49 12.5         | 0.63 16.0          | 0.63 16.0          | 0.91 23.0          |
| B                        | 0.94 24   | 1.57 40           | 1.89 48            | 2.00 51           | 2.83 72            | 3.03 77            | 3.78 96            |
| C                        | -   | 0.16 4            | 0.12 3             | 0.16 4            | 0.16 4             | 0.16 4             | 0.16 4             |
| D                        | 3/8 8 H6  | 3/8 8 H6          | 1/4 6 H6           | 3/8 8 H6          | 3/8 8 H6           | 3/8 8 H6           | 3/8 8 H6           |
| Maximum stroke           | ±1.3mm<br>±0.50"  | ±1.5mm<br>±0.60"  | ±1.15mm<br>±0.045" | ±1.5mm<br>±0.060" | ±1.65mm<br>±0.065" | ±2.65mm<br>±0.104" | ±5.15mm<br>±0.203" |
| Spring rate              | 15g   | 15g               | 15g                | 15g               | 10g                | 13g                | 10g                |
| Force at electrical zero | 70g   | 70g               | 70g                | 70g               | 70g                | 90g                | 105g               |
| Temperature range        | -40°C to +100°C (-40°F to +212°F)                               |                   |                    |                   |                    |                    |                    |
| Temperature coefficient  | Zero: less than 0.005% / °C. Sensitivity: less than 0.005% / °C |                   |                    |                   |                    |                    |                    |
| Linearity                | 0.1%, 0.3% and 0.5% are available                               |                   |                    |                   |                    |                    |                    |

### Electrical

| <i>Lvdt type</i>         | <i>AGM/0.5</i>  | <i>AGS/0.5</i>  | <i>A6G/1</i>  | <i>AG/1</i>  | <i>AG/1.5</i>  | <i>AG/2.5</i>  | <i>AG/5</i>  |
|--------------------------|-----------------|-----------------|---------------|--------------|----------------|----------------|--------------|
| Current at 5Vrms 5kHz    | 12mA            | 12mA            | 30mA          | 20mA         | 10mA           | 10mA           | 8mA          |
| Input/output phase shift | 20°             | 20°             | 12°           | 9°           | 2°             | 2°             | 0°           |
| Zero phase frequency     | 16kHz           | 16kHz           | 13.5kHz       | 12kHz        | 4kHz           | 4kHz           | 5kHz         |
| Sensitivity into 100k    | 281             | 281             | 248           | 220          | 150            | 150            | 110          |
| mV/V/mm                  | 7.1             | 7.1             | 6.3           | 5.6          | 3.8            | 3.8            | 2.8          |
| <i>Half-bridge type</i>  | <i>AGMH/0.5</i> | <i>AGSH/0.5</i> | <i>A6GH/1</i> | <i>AGH/1</i> | <i>AGH/1.5</i> | <i>AGH/2.5</i> | <i>AGH/5</i> |
| Current at 5Vrms 10kHz   | 5mA             | 5mA             | 6mA           | 4mA          | 5mA            | 8mA            | 6mA          |
| Input/output phase shift | 3°              | 3°              | 2°            | 0°           | 2°             | 5°             | 3°           |
| Zero phase frequency     | 12kHz           | 12kHz           | 13kHz         | 10kHz        | 12kHz          | 20kHz          | 14kHz        |
| Sensitivity into 1K      | 84              | 84              | 88            | 80           | 86             | 84             | 63           |
| mV/V/mm                  | 2.1             | 2.1             | 2.2           | 2.0          | 2.2            | 2.1            | 1.6          |

## AGb Series Gauging Transducers

The AGb series offers a much shorter body length provided by the incorporation of a leaf spring support for the core. Designed for 0.20" movement free from lateral loads, these devices include all other Sangamo features necessary for trouble-free use in multi-purpose gauging applications.



## Mechanical

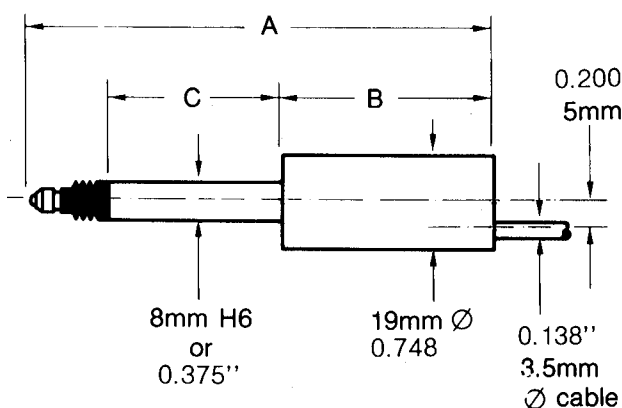
| <b>Lvdt type</b>         | <b>AGb/0.25</b>   |                       |
|--------------------------|---|-----------------------|
| <b>Half-bridge type</b>  | <b>AGbH/0.25</b>  |                       |
|                          | mm  | in.                   |
| Linear stroke            | ± 0.25  | ± 0.010               |
| Maximum stroke           | 0.6   | 0.024                 |
| Spring rate              | 140g  |                       |
| Force at electrical zero | 65g   |                       |
| Temperature range        | ( - 4 0 C to<br>+ 1 0 0 C )   | (-40 F to<br>+ 212 F) |
| Temperature coefficient  | Zero: less than 0.015 % / °C<br>Sensitivity: less than 0.005 % / °C |                       |
| Linearities available    | 0.3% and 0.5%   |                       |

## Electrical

|                          |                           |
|--------------------------|---------------------------|
| <b>Lvdt type</b>         | <b>AGb/0.25</b>           |
| Current at 5Vrms 5kHz    | 20mA                      |
| Input/output phase shift | 9°                        |
| Zero phase frequency     | 12kHz                     |
| Sensitivity into 100k    | 220mV/V/mm    5.5mV/V/mil |
| <b>Half-bridge type</b>  | <b>AGbH/0.25</b>          |
| Current at 5Vrms 10kHz   | 4mA                       |
| Input/output phase shift | 0°                        |
| Zero phase frequency     | 10kHz                     |
| Sensitivity into 1K      | 80mV/V/mm    2mV/V/mil    |

## DG Series DC - DC Gauging Transducers

These provide the same basic construction as the AG series incorporating non-rotating spring return actuators running in individually fitted precision linear ball bearings. In addition an oscillator/demodulator circuit is included to provide dc-dc operation, thus avoiding the cost of conventional ac excitation, amplification and demodulation equipment.



Variable dimensions stated below

## Mechanical

| <b>Type</b>              | <b>DG/1 &amp; DG/2.5 DG15</b>     |         |          |      |
|--------------------------|-----------------------------------|---------|----------|------|
| Linear stroke            | ± 1mm                             | ± 2.5mm | ± 5mm    |      |
|                          | ± 0.040"                          | ± 0.100 | ± 0.200" |      |
| Dimensions               | mm                                | in      | mm       | in.  |
| A, at electrical zero    | 92                                | 3.62    | 116      | 4.57 |
| B                        | 42                                | 1.65    | 48       | 1.89 |
| C                        | 34                                | 1.34    | 45       | 1.77 |
| Spring rate              | 13g/mm                            |         | 10g/mm   |      |
| Force at electrical zero | 90g                               |         | 105g     |      |
| Repeatability            | Better than 0.1 microns           |         |          |      |
| Temperature range        | -20°C to +80°C                    |         |          |      |
| Temperature coefficient  | Zero: less than 0.01% / °C        |         |          |      |
|                          | Sensitivity: less than 0.02% / °C |         |          |      |
| Linearities available    | 0.1%, 0.3% and 0.5%               |         |          |      |

## Electrical

| <b>Type</b>           | <b>DG/1, DG/2.5 &amp; DG/5</b> |
|-----------------------|--------------------------------|
| Electrical data       | Stated at 22°C                 |
| Winding configuration | Lvdt with integral osc/demod   |
| Energizing voltage    | 10 to 24 stabilized            |
| Energizing current    | 13mA at 10V dc                 |
| Output load           | 20kΩ                           |
| Output impedance      | 2.5kΩ                          |
| Nominal sensitivity   |                                |
| (DG/1 & DG/2.5)       | 800mV/V/mm<br>20mV/V/mil       |
| (DG/5)                | 560mV/V/mm<br>14mV/V/mil       |

Due to continuous improvements and changes in design we reserve the right to amend any specification without notice.

# SANGAMO

# Schlumberger

**SANGAMO TRANSDUCERS**  
1875 GRAND ISLAND BLVD.  
GRAND ISLAND, N.Y. 14072  
TEL (716) 773-0090 TELEX 646759



## HIGH-TECHNOLOGY LITERATURE