



National  
Measurement &  
Regulation Office

UK/0126/0089

MI-009

## EC type-examination certificate UK/0126/0089 Revision 6

Issued by:

**The National Measurement and Regulation Office  
Notified Body Number 0126**

In accordance with the requirements of the Measuring Instruments (Non-Prescribed Instruments) Regulations 2006 (SI 2006/1270) which implement, in the United Kingdom, Council Directive 2004/22/EC, this EC type-examination certificate has been issued to:

**Proton Products  
10 Aylesbury End  
Beaconsfield  
Buckinghamshire,  
HP9 1LW  
United Kingdom**

in respect of a length measuring instrument designated the SL3060MID and having the following characteristics:

Operating Speed (S)	$0.3 \leq S \leq 3000$ m/min
Minimum length (Lm):	$\geq 10$ m
Scale interval:	$\geq 0.1$ mm
Accuracy class:	I

The necessary data (principal characteristics, alterations, securing, functioning etc) for identification purposes and conditions (when applicable) are set out in the descriptive annex to this certificate.

**Issue Date: 26 November 2015**  
**Valid Until: 10 August 2020**  
**Reference No: T1150/0001**

**P R Dixon**  
**Technical Services Director**  
*For and on behalf of the Chief Executive*



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# Descriptive Annex

## 1 INTRODUCTION

This pattern of length measuring instrument incorporating a non-contact laser Doppler speed & length gauge designated the SL3060MID, is used for the determination of the length of rope-type materials (e.g. cables, bands etc.) during feed motion of the product to be measured. The instrument is also suitable for the determination of the length of, ropes, tubes, hoses, thin film, sheet and other web type materials not including textiles. The instrument consists of an SL3060MID speed and length gauge and depending upon the application may also include an infeed arrangement and outfeed arrangement.

## 2 FUNCTIONAL DESCRIPTION

### 2.1 Construction

#### 2.1.1 Mechanical

The SL3060MID is a Class 3B laser based measurement instrument housed in an IP 67 cast aluminium enclosure.

The SL3060MID is intergrated with an infeed / outfeed arrangement and may include guides (a typical example is shown in Figure 8) which align the product to be measured within geometric constraints relative to the SL3060MID (Figure 9) and also stabilise the measured product against vibrations.

The infeed / outfeed arrangement, which may consist of a motor driven roll, spool or drum, shall also ensure that the product is measured unstretched and shall ensure that speed of the material is within the range specified in section 3.2.

The SL3060MID incorporates a laser head-works coupled to an AiG2MID display module (Figure 1).

The SL3060MID laser window is positioned 300 mm (stand-off),  $\pm 30$  mm (depth of field), from the product to be measured.

Due to the nature of the laser-based measurement, there is no physical contact with the material.

#### 2.1.2 Electrical

The SL3060MID gauge is provided together with the AiG2-MID interface display and is connected together with the provided DB9 connecting cable. The nominal supply voltage for the SL3060MID is +24 Vdc (Minimum 16V / Maximum 28V) which may be provided by the optional Proton PSU-BOB power supply unit.

**2.1.2.1** The PSU-BOB is a combined gauge power supply and data junction box, which includes a laser enable key switch, and is connected via the DB25 cable to the DB25 interface port on the SL3060MID.

## 2.2 SL3060MID Laser Gauge

The SL3060MID (Figure 2) provides non-contact measurement of the length of material moving through the intersection region of its laser beams, utilising laser surface velocimetry, and is designed to work in applications where the material to be measured moves at speeds between 0.3 and 3000 m/min. When the SL3060MID gauge is fitted with the direction wheel accessory (Figure 3) it has the ability to measure in both positive and negative directions. Where the direction wheel is not fitted the SL3060MID must be connected via an interlock between the shutter release (via the DB 25 interface) and the product feed mechanism to prevent measurement if the feed motion is reversed.

The front of the gauge body has the following LEDs:

- **PWR:** indicates red if gauge power is provided to the unit, or is not lit if there is no power,
- **i-BUS:** indicates green if communication is online, or red if communication has failed, is not lit if there is no communication or there is an i-BUS failure.
- **CAN:** flashes green if communications is online, or red if communication has failed,
- **EIP:** indicates yellow if communication is online, or is unlit if there is no Ethernet IP communication
- **GR:** indicates green [constant] if reading level is OK, flashing if level is low or not lit if no readings detected (or gauge power is off).
- **LASER** status: is lit if laser diode active, flashing if laser temp is “auto-adjusting or laser shutter is closed whilst laser diode is on, or is not lit if laser is off (diode not active).

## 2.3 AiG2MID display module

The AiG2MID display module (Figure 4) is connected directly by a cable to the SL3060MID gauge.

The screen of the display module indicates the velocity and length of the material moving under the beam of the laser, and has icons to indicate the status of:

- relays 1 and 2 (e.g. open/closed),
- the gauge, and
- the signal quality (via an indicator bar). The screen is also used to

indicate system error messages.

The display module is also fitted with membrane keypad having 4 “navigation keys” and 4 press button keys. The functions are shown in Figure 5.

## 2.4 Access levels

There are 2 levels of access to the parameters:

- User level – LOCK/UNLOCK
- Admin level – LOCK/UNLOCK

These levels allow access to the following:

ITEM	User LOCK	User UNLOCK	Admin LOCK	Admin UNLOCK
Basic page (speed and length)	Read only	Read only	Read only	Read only
Preset length	Read only	Read / Write	User Level	Read / Write
Interface	Read only	Read only	Read only	Read / Write
Communication	Read only	Read only	Read only	Read / Write
Gauge ID	Read only	Read only	Read only	Read only
Product info	Read only	Read / Write	User Level	Read / Write
SL gauge info	Hide	Hide	Hide	Read only
Factory info	Hide	Hide	Hide	Read only

**Table 1 Access Levels**

**2.4.1** For some special applications where the products are highly reflective, or have a unique surface structure, certain internal filters may require specialist adjustment. In this case the manufacture may access the set up, via a unique and protected password, to make specialist on line adjustments.

## 2.5 Input / Output connections

**2.5.1** The top of the SL3060MID has the following connections:

- DB9, **PRINTER**
- DB9, **i-BUS**
- DB9, **CAN** (SL3060MID Laser Gauge to AiG2MID display module)
- DB25 **INTERFACE**
- Earthing stud

**2.5.2** The SL3060MID gauge can provide a number of outputs, which are referred to in product manual. The Pulse Outputs on the DB25 connector of the gauge are:

- Quadrature pulse output 1 ( pins 18, 19, 20 and 21)
- Pulse output 2 (pins 22 and 23)
- Both pulse outputs have end user configurable pulse rates and a maximum frequency of 1MHz whilst maintaining an equal mark-space ratio.
- If any pulse output rate is configured by the end user to a value other than the default value, then a warning message will be displayed on the AiG2MID display on power up and the user will be prompted to confirm these pulse rates are correct.

- The pulse outputs may be used to drive cutting and/or printing equipment as part of the integrated system. It is important to ensure that the selected cutting or printing equipment pulse inputs are compatible with the SL3060MID pulse outputs and can respond to the SL3060MID in a synchronised manner, otherwise timing issues can occur. The SL3060MID product manual (currently Ref: SL3060MID issue 1g) provides further information.
- The pulse outputs may be used with or without an industrial PLC system. If the instrument is installed and connected to an industrial PLC, then it is essential to ensure there are no program or cyclic delays during operation of the equipment.

## 2.6 Installation

**2.6.1** Detailed information on installation and operation of the SL3060MID is contained in the product manual.

**2.6.1.1** The SL3060MID gauge window must be installed 300mm from the product being measured – this is known as stand-off and is an inherent part of the product specification. There is a depth-of-field tolerance of 60mm but for best results the nominal distance of 300mm must be maintained (see Figure 7). For installations and products where this distance may vary it is essential to incorporate some form of adjustment to cope with product size variation.

Gauge head type	Stand-off distance (distance from laser window to measured product)	Depth of field
SL3060MID	300 mm	60 mm

**Table 2 Stand-off and Depth of field parameters**

It is also important to ensure that the gauge is mounted absolutely perpendicular to the product being measured (see Figure 9). If this is not possible for some reason then mathematical errors may accumulate, which can be accounted for, but it is recommended to avoid this situation. The product manual provides further explanation of the geometrical effects on installation.

Measured speed = (True object speed) × cos (α) × cos (β)		
Error angle α or β (degrees)	cos [α] or cos [β]	Measurement error (%)
0	1.000000	0.000
0.25	0.999990	-0.001
0.50	0.999962	-0.004
0.75	0.999914	-0.009
1.0	0.999848	-0.015
2.0	0.999391	-0.061
3.0	0.998630	-0.137
4.0	0.997564	-0.244
5.0	0.996195	-0.381
10	0.984808	-1.519

**Table 3 Compounded roll and yaw cosine error**

The product manual provides further explanation of the geometrical effects on installation

## 2.7 Product Stabilisation

Product stabilisation methods may include dual roller systems at either side of the measurement point for wire or similar extruded products, or some form of guiding bed for flat products, adjustable for height, to ensure that different types and thicknesses of products may be easily accommodated. Correct angular alignment of the gauge to the direction of motion of the product is critical for accurate length measurement

Rewind lines where the product is unwound from or wound to a large reel will exhibit traversal of the product; this product traversal will affect both the angle and position of the product relative to the gauge. For this situation, it is recommended that the product is guided in front of the gauge using crossed rollers pair guides located both before and after the gauge.

Regardless of the entry or exit angle of the product, the crossed roller pairs ensure that the product is aligned for accurate measurement by the gauge.

The distance between the outer and inner crossed roller pairs (see Figure 8) is determined by maximum product diameter:

Product diameter (mm)	Minimum distance between before- and after-gauge crossed roller pairs (distance D) (mm)
< 50	500
> 50	750

**Table 4 Product stabilisation parameters**

## 3 PRINCIPLE OF OPERATION

**3.1** The SL3060MID utilizes two laser beams, which intersect and create a laser interference fringe pattern on the surface of the product to be measured. The light is scattered by the motion of the surface and the receiving optics collect the reflected Doppler signal. This is then focused onto a photo detector, and then processed to produce the measurement data.

**3.2** The SL3060MID has the following characteristics:

Operating Speed (S)	$0.3 \leq S \leq 3000$ m per min
Minimum length (Lm):	$\geq 10$ m
Scale interval:	$\geq 0.1$ mm
Accuracy class:	I
Standoff Distance:	300 mm
Measurement Depth of Field:	60 mm
Lower & Upper temperature limits:	+5°C to +40°C
Climatic Environment:	Closed, Non-condensing
Mechanical Environment:	M3
Electromagnetic Environment:	E2

**3.3** The SL3060MID has the following system specification:

Maximum Laser Power	0.040 watt
Beam power	0.025 watts/beam
Laser Wavelength	0.658 micrometers
Laser Spot Size	3 mm diameter
Power requirement	15 – 25 Vdc, 20 watts

**Table 5 System Specification**

### **3.4 SOFTWARE**

**3.4.1** The software version and date of software release of SL3060MID and the. AiG2MID are available through the MENU button of the display unit . The information is displayed on the instrument using the following procedure:

- (MENU
  - Gauge Identification
    - Gauge
    - AiG2MID

The current software version and date of software release for the: SL3060MID are:

SW Ver: 1.00

SW Date: 03/12/2010 (in the format MM/DD/YYYY) AiG2MID are:

SW Ver: 1.00

SW Date: 03/18/2010 (in the format MM/DD/YYYY)

Software identification is via the version number, X.yy, where:

- X indicates a change to the legally relevant s/ware, and requires a change to the type approval certification, and
- yy indicates a change to the non-legally relevant s/ware.

#### **3.4.2 Software changes**

Any software change requires destroying the tamper evident seals on the cover of the SL3060MID and the changing of the EPROM. This operation is carried out by the manufacturer's authorised personnel at an authorized service centre. The action will produce a new SW version number, and SW Date, on the display.

### **3.5 Calibration and adjustment method.**

Access to the calibration and adjustment method of the SL3060MID length gauge is only available to the manufacturer and requires the security seals to be broken to enable access to the internal components.

To determine the correct setup and calibration, it is recommended to run between 3 and 5 identical lengths of product, and check these lengths are within the permitted maximum permissible error (MPE) using a suitable reference standard.

**3.5.1** The SL3060MID has as part of this certification been assessed as meeting the relative requirements of the Directive. Although not specifically authorised under this certificate, the SL3060MID is considered suitable for use as a standalone calibration device.

## **4 PERIPHERAL DEVICES AND INTERFACES**

### **4.1 Interfaces**

The SL3060MID has the following Inputs/Outputs via the interface:

- 5 digital inputs that can be used to:
  - Length reset.
  - Line direction,
  - End of reel (print initiation),
  - Laser enable,
  - Sutter enable.
- 3 relay outputs
  - Preset length 1 reached,
  - Preset length 2 reached,
  - Low warning of Good Reading (GR) level, less than 60 %.
- 2 pulse outputs
  - Output 1: Opto-Isolated quadrature pulse,
  - Output 2: Pulse 2 index pulse

### **4.2 Peripheral devices**

**4.2.1** The instrument may be connected to any peripheral device that has been issued with a parts (test) certificate by a Notified Body responsible for Annex B (MI-009) under Directive 2004/22/EC in any Member State and bears the CE marking of conformity to the relevant directives; or

**4.2.2** A peripheral device without a parts (test) certificate may be connected under the following conditions:

- it bears the CE marking for conformity to the EMC Directive;
- it is not capable of transmitting any data or instruction into the instrument, other than to release a printout, checking for correct data transmission or validation;
- it prints results and other data as received from the instrument without any modification or further processing; and
- it complies with the applicable requirements of Paragraph 8.1 of Annex I

## **5 LOCATION OF SEALS AND VERIFICATION MARKS**

**5.1** Set-up data is stored within the non-volatile memory of the SL3060MID.

**5.2** The 'CE' marking, supplementary metrology marking and certificate number are located on the instrument enclosure. The markings shall be impossible to remove without damaging them. The certificate number may also be stored in the "Gauge Identification Parameters" and displayed using the procedure in section 3.4.1.

The markings and inscriptions shall fulfil the requirements of Paragraph 9 of Annex I of the Directive 2004/22/EC.



**5.3** Components that may not be dismantled or adjusted by the user will be secured by either a wire and seal (Figure 6) or tamper evident label and securing mark. At the final installation, the interconnecting data wires may also be lockwired – see example in Figure 10. The securing mark may be either:

- a mark of the manufacturer and/or manufacturer's representative, or
- an official mark of a verification officer.

## **6 APPROVAL CONDITIONS**

The certificate is issued subject to the following conditions:

### **6.1** Legends and inscriptions

**6.1.1** The instrument bears the following legends:

- 'CE' marking
- Supplementary metrology marking
- Notified body identification number
- Accuracy class
- Manufacturers mark or name
- Type examination certificate number
- Operating Speed (S)
- Minimum length (Lm)
- Scale interval.

**6.1.2** Where the product feed can be reversed the SL3060MID gauge shall either:

- be fitted with the direction wheel accessory, or
- connected, via an interlock, to the product feed mechanism to prevent a measurement if the feed motion is reversed.

**6.1.3** The instrument is not approved for the measurement of textiles, characterised by the characteristic factor "K" for the stretchability and force per unit area.

**6.1.4** Where:

- the measurement is non-repeatable and;
- the measuring instrument is normally intended for use in the absence of one of the trading parties.

the measuring instrument shall record by a durable means the measurement result accompanied by information to identify the particular transaction.

## **7 AUTHORISED ALTERNATIVES**

**7.1** Having an extended built in memory feature. The control board incorporates a clock chip and larger memory. The clock enables the date / time to be stored in the memory. The larger memory enables the measurement result accompanied by information to identify the particular transaction to be recorded.

**7.1.1** The stored data can be output to a PC, via a LAN cable connected to the Profibus/Eip interface connection, using the optional PCIS (PC Interface Software). The LAN cable must be fitted with a ferrite, and passing twice through the ferrite.

The stored data contains the following information:

- Length: [length accumulated since the time of the previous length reset]
- Date / Time

**7.1.2** The PCIS is a software package used to connect the SL3060MID gauge to a PC via Ethernet to enable the gauge data to be displayed on a PC. The recorded data can only be read and cannot be amended. The data is stored in the memory for 90 days, the first record is then automatically overwritten by the system.

**7.1.3** The digital inputs must be connected to a point on the production line which activates two signals

- i. Length Reset
- ii. End of Reel

The output of the measurement result accompanied by information to identify the particular transaction is stored when the “end of reel” signal is received. The “End of Reel” is the point at which the required production run is completed.

**7.1.4** Length reset will zero the accumulated length and will be the point at which length can then start to be accumulated.

**7.1.5** The software version is updated as shown below:

SL3060MID: SW Ver: 2.00  
 AiG2MID: SW Ver: 2.00

The software version and date of software release can be accessed as described in 3.4.1.

**7.1.6** Having an increased resolution on the AiG2MID display panel of 0.1mm for length measurements between 0.400 m and 99.999 m. Table 6 below shows when the display scale interval changes relative to the displayed length readings.

Accumulated Length (x)	Typical Display Content	Display Scale Interval
< 100m	99.9999m	0.1mm
100m to < 1000m	999.999m	1mm
1000m to < 10000m	9999.99m	10mm
10000m to < 100000m	99999.9m	100mm
100000m to < 214748m	214748m	1000mm
> 214748m	Overflow	N/A

**Table 6 - resolution display readings**

**7.1.6.1** The length measurements determined by the SL3060MID are maintained by having an internal resolution of 0.1mm throughout the full range of measurement. As measured length is accumulated, it is continuously processed internally at this same resolution, however the scale interval value of the displayed length changes at intervals as shown in Table 6. The maximum measured length is 214748 m.

The data is stored internally (see section 7.1) and may also be printed at full internal resolution (7.2); or displayed at full internal resolution on a computer using PCIS software (7.1.1). Additionally an AiG2MID display module may be used; see section 2.3.

**7.2** Having a printer that satisfies the requirements of section 4.2.

**7.2.1** The printer is configured to produce a printed report with the following information:

- Length: [length accumulated since the time of the previous length reset]
- Date / Time Plus (where required)
- Print number: [a unique identification number for each printout]
- Machine number: [assigned via the AiG2MID for the specific production line]
- Product number: [assigned via the AiG2MID for the specific product]
- Gauge serial number: [the serial number of the SL3060MID gauge].

**7.2.2** The output of the measurement result accompanied by information to identify the particular transaction is sent to the printer when the “end of reel” signal is received. The “End of Reel” is the point at which the required production run is completed and the reel, or end of length report can be printed.

**7.2.3** In the event of printer disconnection, the AiG2MID will display an error message.

**7.3** The software version is updated as shown below:

SL3060MID: SW Ver: 3.00  
AiG2MID: SW Ver: 3.00  
SW Issue date: 3/5/2013

The software version and date of software release can be accessed as described in 3.4.1.

**7.3.1** The stored data contains the following information:

- Length: [length accumulated since the time of the previous length reset]
- Date / Time

Plus (where required):

- Print number: [a unique identification number for each printout]
- Machine number: [assigned via the AiG2MID for the specific production line]
- Product number: [assigned via the AiG2MID for the specific product]
- Gauge serial number: [the serial number of the SL3060MID gauge].

**7.3.2** Having a printer that satisfies the requirements of section 4.2. The printer is configured to produce a printed report as detailed in 7.2.1.

**7.4** Having the AiG2-MID Display situated remotely to the SL3060 MID gauge head.

**7.5** The software version is updated as shown below:

SL3060MID: SW Ver: 4.00

AiG2MID: SW Ver: 4.00

SW Issue date: 30/11/2014

The software version and date of software release can be accessed as described in 3.4.1.

## **8 ILLUSTRATIONS**

- Figure 1 Schematic - SL3060MID
- Figure 2 SL3060MID gauge
- Figure 3 Direction wheel
- Figure 4 Example of the AiG2MID display
- Figure 5 Keypad functions
- Figure 6 Position of securing devices
- Figure 7 Depth of field and Stand-off distances
- Figure 8 Crossed rollers pair guides
- Figure 9 Gauge alignment
- Figure 10 Securing arrangement for interconnecting data wires

## CERTIFICATE HISTORY

ISSUE NO.	DATE	DESCRIPTION
UK/0126/0089	11 August 2010	Type examination certificate first issued.
UK/0126/0089 Revision 1	26 November 2010	<p>Revision 1 issued.</p> <p>Section 2.1 Mechanical          “The SL3060MID is connected, via the DB9 interface, to an Epson dot-matrix-printer model U220.”, is removed</p> <p>Amendment to sections 4.2.1 &amp; 4.2.2:          “parts certificate” is replaced by “parts (test) certificate”.</p> <p>Addition of section 6.1.4.</p> <p>Addition of new section 7          AUTHORISED ALTERNATIVES</p> <p>Sections 7 &amp; 8 renumbered as 8 &amp; 9 respectively</p>
UK/0126/0089 Revision 2	08 May 2013	<p>Revision 2 issued.</p> <p>Amendment to section 7.1.1 to remove text which had been included in error:-</p> <ul style="list-style-type: none"> <li>• Print number: [a unique identification number for each printout]</li> <li>• Machine number: [assigned via the AiG2MID for the specific production line]</li> <li>• Product number: [assigned via the AiG2MID for the specific product]</li> <li>• Gauge serial number: [the serial number of the SL3060MID gauge]</li> </ul> <p>Addition of section 7.3.</p>

<p>UK/0126/0089 Revision 3</p>	<p>14 October 2013</p>	<p>Revision 3 issued. Correction of typographical error on front page: Operating Speed (S) <math>0 &lt; S \leq 3000</math> m/min Is replaced by: Operating Speed (S) <math>0.3 &lt; S \leq 3000</math> m/min (as stated in section 3.2)</p>
<p>UK/0126/0089 Revision 4</p>	<p>22 December 2014</p>	<p>Revision 4 issued. Additional text in section 1 Addition of sections 2.1.1, 2.1.2, 2.5.2, 2.6, 2.7, 3.5, 7.2.3, 7.4, 7.5 and Figures 7, 8 &amp; 9. These sections of text are to more properly describe the function of the gauge. The software changes in 7.5 reference the following:</p> <ol style="list-style-type: none"> <li>1. added pulse 1 and 2 rate setting .</li> <li>2. added pulse default changed warning. the SL/SLR won't start to measure speed until user confirmed this warning message.</li> <li>3. software version number and release date changed.</li> </ol> <p>Amendment to Table 1 Access Levels, User LOCK for SL gauge info &amp; Factory info changed from: "Read only" to "Hide" Correction to section 2.5.1</p> <ul style="list-style-type: none"> <li>• DB9, CAN</li> <li>• DB25 INTERFACE (SL3060MID LASER Gauge to AiG2MID display module.</li> </ul> <p>Is replaced by:</p> <ul style="list-style-type: none"> <li>• DB9, CAN (SL3060MID LASER Gauge to AiG2MID display module</li> <li>• DB25 INTERFACE.</li> </ul> <p>Change of wording in section 3.1.</p>

<p>UK/0126/0089 Revision 5</p>	<p>27 January 2015</p>	<p>Revision 5 issued.</p> <p>Front page and section 3.2: Change of Scale interval from “ = 1 mm”, to “ ≥ 0.1 mm”.</p> <p>Amendment to:</p> <p>Section 2.2, 2nd bullet point: <b>PROFI</b>: is replaced by <b>I-BUS</b>, and in the text “Profibus” is replaced by “Profibus/Eip”.</p> <p>Section 2.5.2 .product manual Ref is updated to: SL3060MID issue 1g</p> <p>Section 7.3.1 first paragraph is deleted, [duplication of text in 7.1.1].</p> <p>Addition of section 7.1.6 Amendment to legend of Figure 4 to include “<b>Example of the</b> “.</p>
<p>UK/0126/0089 Revision 6</p>	<p>26 November 2015</p>	<p>Revision 6 issued.</p> <p>Front page:</p> <p>Operating Speed (S) <math>0.3 &lt; S \leq 3000</math> m/min,</p> <p>Is replaced by</p> <p>Operating Speed (S) <math>0.3 \leq S \leq 3000</math> m/min</p> <p>Section:</p> <p>2.2 2nd bullet point: “PROFI/EIP” replaced by “i-BUS”.</p> <p>5.3 Addition of text: “At the final installation, the interconnecting data wires may also be lockwired – see example in Figure 10.”</p> <p>7.1.6.1 Deletion of text: “Additionally an AiG2MID display module may be used; see section 2.3”.</p> <p>7.3 Addition of text: “SW Issue date: 3/5/2013”</p> <p>7.5 AiG2MID SW Ver: 3.00 replaced by S AiG2MID SW Ver: 4.00.</p> <p>Addition of information in Cert History for Revision 4</p> <p>Addition of Figure 10</p>

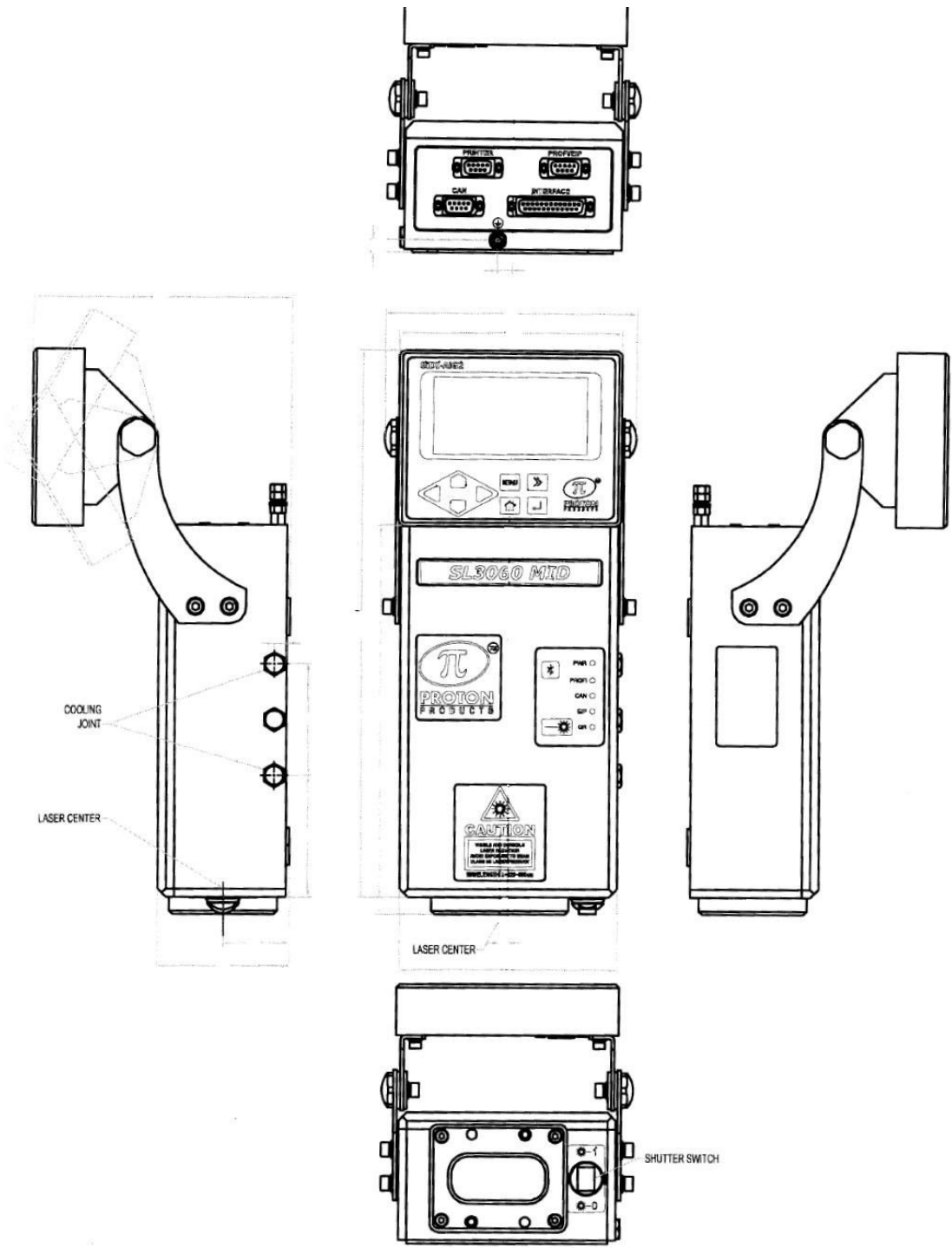


Figure 1 Schematic - SL3060MID





Figure 2 SL3060MID gauge

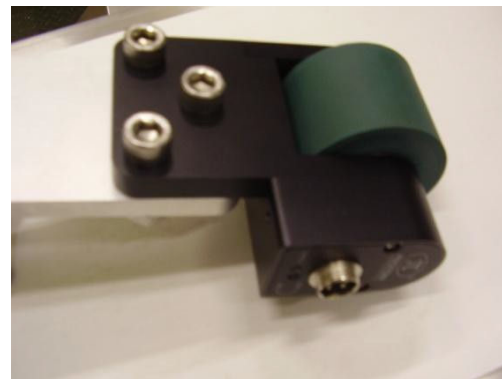


Figure 3 Direction wheel

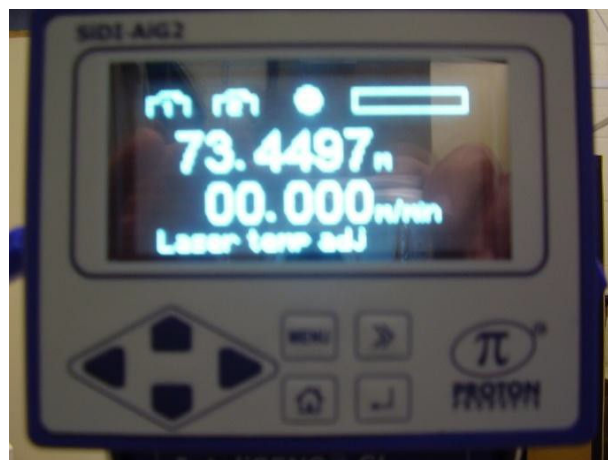


Figure 4 Example of the AiG2MID display







	<p><b>'Page key'</b> Step through the pages of a parameter group. After last page it returns to page 1 of that group.</p>
	<p>Step right or left between digits and functions. Press together to reset speed and length</p>
	<p>Increase or decrease the value of digits when altering parameters and presets Step up &amp; down through menus. Step up &amp; down through options for fixed-option parameters</p>
	<p>Go to the Menu page (for a list of parameter groups) See 'MENU PAGE', page 34.</p>
	<p>Go to the Length &amp; Speed display page (home page) See 'HOME PAGE', page 34.</p>
	<p>Select a group: When highlighted on the menu, go to page 1 of that group</p> <p>When an option is highlighted: show option screen</p> <p>In the parameter change sequence: save value and move to the next value</p> <p><i>Note that items are initially saved to RAM when ↵ is pressed, they are transferred to non-volatile memory when leaving the menu group [effectively this means that the Menu or Home key acts as save to non-volatile memory].</i></p>

Figure 5

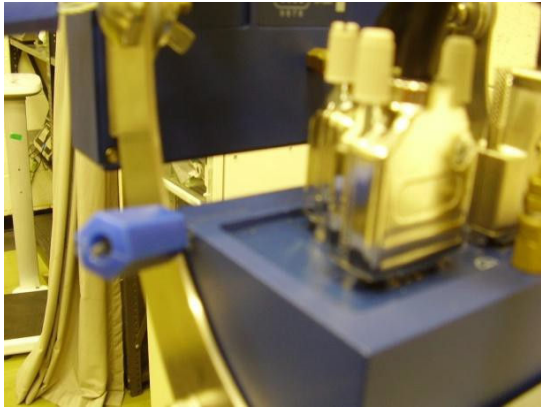
Keypad – functions



Left side of Indicator



Right side of Indicator

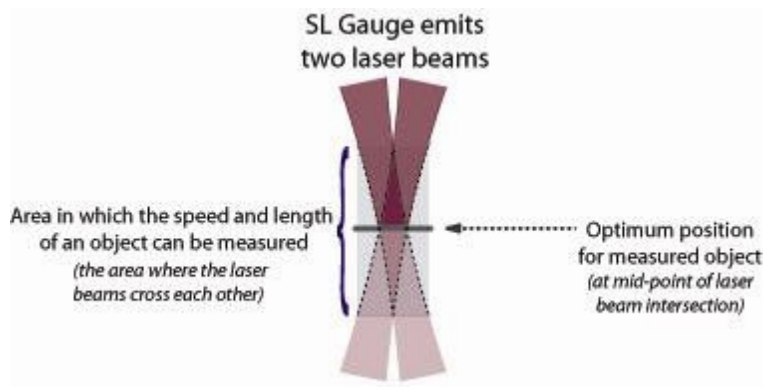


Top of Gauge



Bottom of gauge

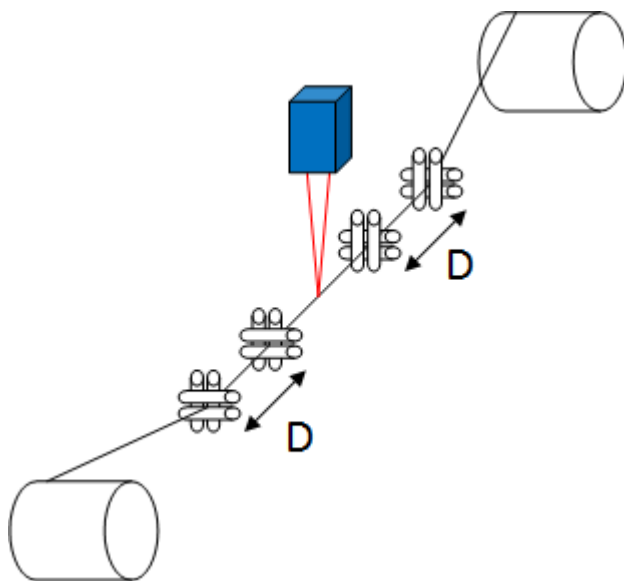
**Figure 6** Position of securing devices



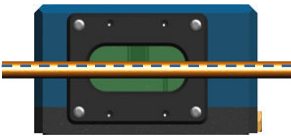
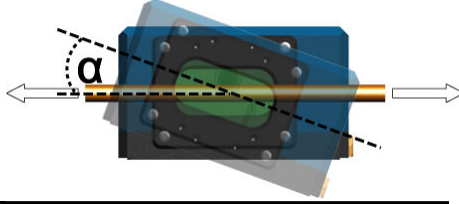



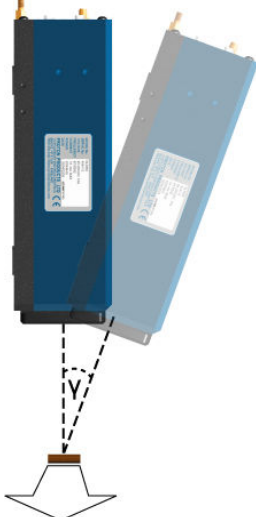
Depth of field – the area within which a product can be measured.



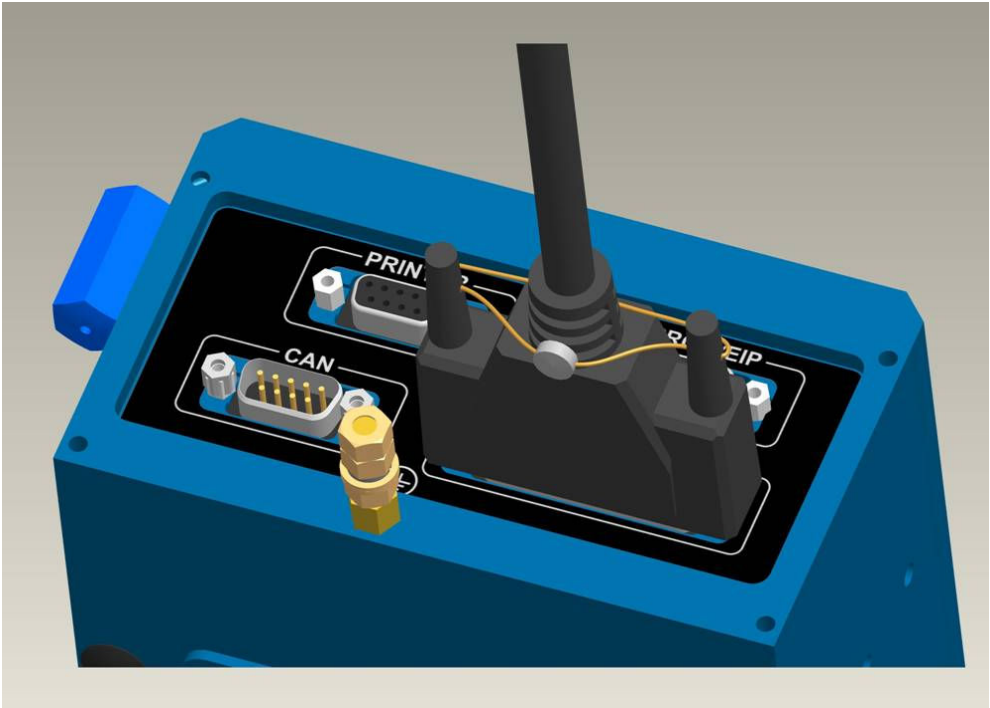
**Figure 7** Depth of field and Stand-off distances



**Figure 8** Crossed rollers pair guides

<b>Roll alignment</b>		<b>Roll cosine error</b>	
✓		✗	
<b>Yaw alignment</b>		<b>Yaw cosine error</b>	
✓		✗	
<b>Pitch alignment</b>			
<b>Ideal</b>	<b>Acceptable for <math>\gamma</math> within <math>\pm 5^\circ</math></b> ( $\gamma \neq 0$ may be used to prevent receiver saturation for highly-reflective objects)		
			

**Figure 9 Gauge Alignment**



**Figure 10**     **Securing arrangement for interconnecting data wires**

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