121 & 122 GAUGES

OPERATING MANUAL

Issue 1: April. 2005

A&E GAUGES LTD.
Unit 7
Redbourn Industrial Estate
Redbourn
Herts
AL3 7LG

Tel: +44 (0)1582 794136

Fax: +44 (0)1582 794463

E-mail : sales@a-egauges.co.uk

Web: www.a-egauges.co.uk

ISO 9001 Registered Firm
Certificate No. GB2001469
International Accreditation Board
Registration No. 0044/1

CONTENTS

1. 121 and 122 Gauges

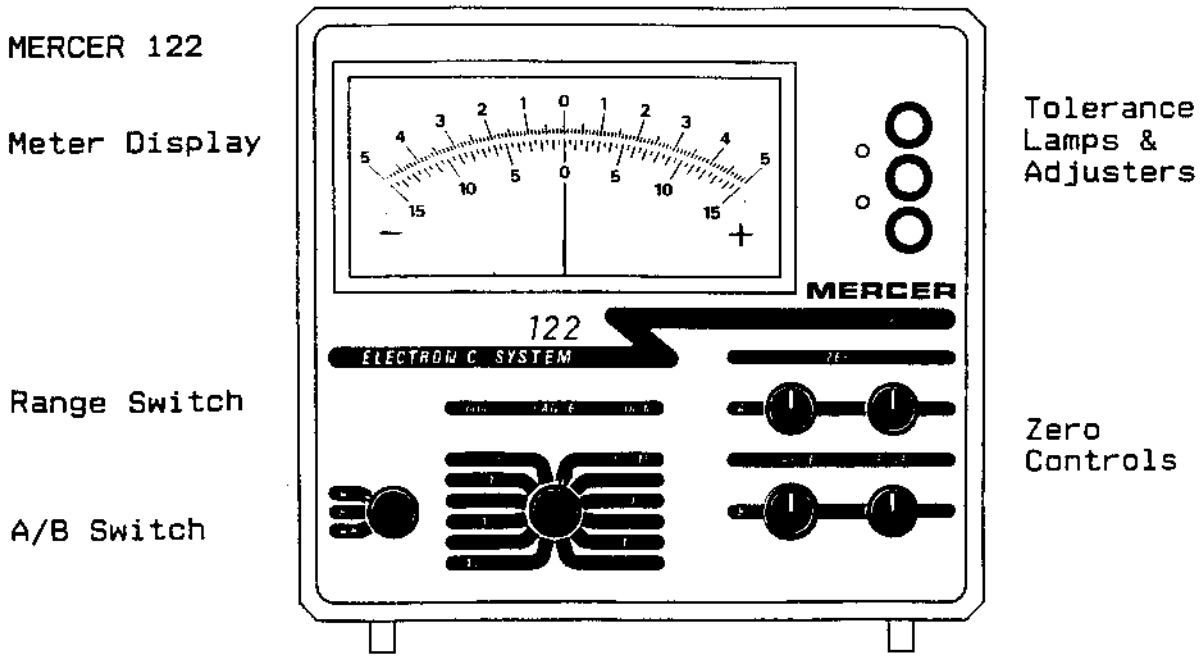
The 121 and 122 series instruments are highly accurate and reliable electronic comparator gauges for service with Mercer gauging transducers. Application areas include standards laboratories, machine shops and general workshop gauging duties.

Over View - What it does

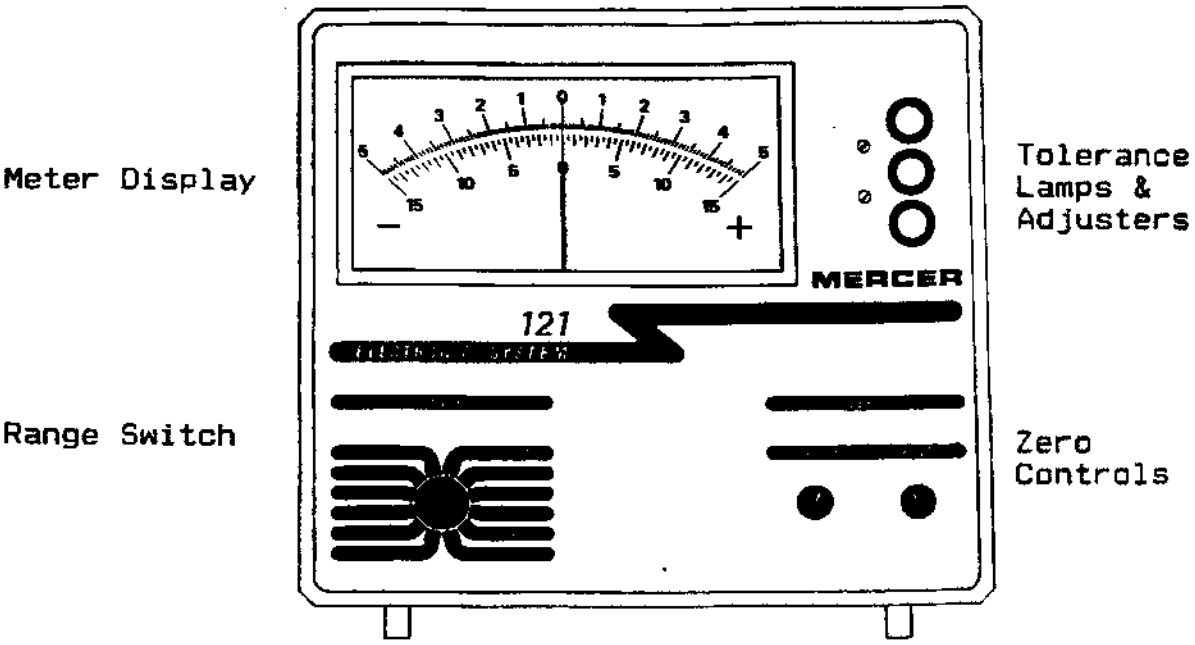
The 121 and 122 gauges operate with all Mercer standard gauging transducers, providing a complete gauging system. Precision and stability are key features of these gauges. Front panel controls give the user full access to the main functions. The gauge signal displays on the meter and operates lights showing tolerance limits. The range switch sets magnification. Zero controls provide fine offset adjustment to aid setting the transducer position in the gauge fixture. Front panel screwdriver controls set the tolerance lamp limits. Rear panel screwdriver controls allow fine adjustment of transducer calibration. The gauge also presents a measurement voltage and tolerance logic signals on, a connector on the rear panel. These signals are useful for. remote meters, logging data and driving external, systems.

2. Models - Analogue 122 and 121

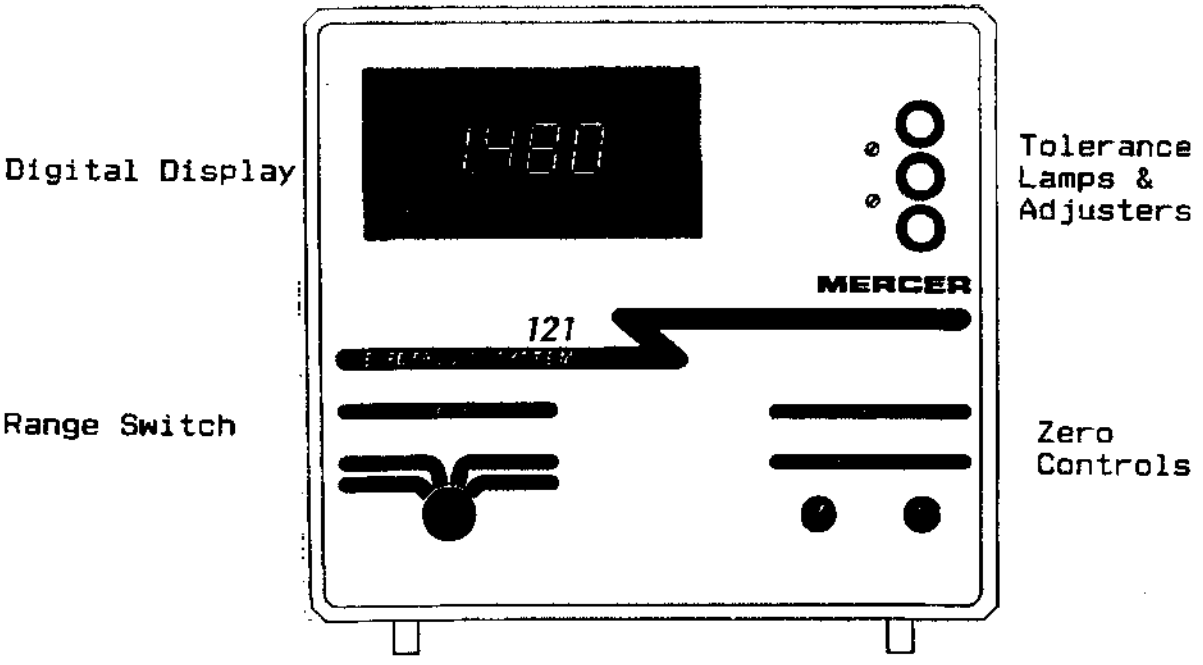
Analogue versions have a moving coil meter display. 121 single input and 122 dual input versions have the same ranges. Metric ranges cover ± 1.500 to ± 0.005 *mm.* Inch ranges cover ± 0.050 to ± 0.00015 in. Inch and Metric and Metric only versions are available. Direct scale resolution is 1% of range on the 5-0-5 scale, and 1.7% of range on the 15-0-15 scale. You can achieve up to ten times better resolution by interpolation. A knife edge pointer moving over a large, clear scale assists accurate reading.



MERCER 121



MERCER 121 Digital



The digital version uses a 3.5 digit display. Metric ranges cover 1999 to 199.9 microns. Inch ranges cover 0.1999 to 0.01999 inch. Digital resolution is 0.025% of scale. Inch and Metric and Metric only versions are available.

3 Front Panel Controls

3.1 Range Switch - This sets the gauge magnification. Your choice of range switch setting will be governed by the tolerance sizes you wish to measure. Gauging typically requires setting gauge zero at the work piece nominal size. Tolerance limits are usually symmetrical and either side of zero. Choose a range switch setting which allows the tolerance band to fit within about 80% of the scale width.

3.2 A/B Switch - This control is provided on 122 versions only. In two transducer applications you must set up each one individually (see Calibration). Switch positions A and B select the transducer inlets on the rear panel marked A and B respectively. Position AB causes the gauge to show the sum of the two transducer readings.

3,.3 Zero Control - The 121 gauge has two controls, one for coarse and one for fine adjustment. These controls introduce an adjustable offset to the transducer reading. This helps fine adjustment, especially on high magnification ranges.,

The 122 has four zero controls, coarse and fine for both the A and B inlets. Select the A and B zero controls with the A/B switch in step with the transducer inlets.

3.4 Tolerance Lamps - These respond to the meter reading. The settings are made by Screwdriver to the adjusters located between the lights. The location of each adjuster indicates which light change-over it controls.

4. Tolerance Settings - Procedure.

A 2.5 mm flat screwdriver is recommended for making these adjustments. Choose the high tolerance setting point from your working requirement. Use the zero control to position the meter pointer to that value - change the range switch to a higher magnification if you run out of adjustment. If the yellow tolerance lamp is on, rotate the upper adjuster clockwise until the green light turns on. If the green tolerance light is on, rotate the adjuster anticlockwise until the yellow lamp turns on. Turn the adjuster carefully clockwise and anticlockwise until the yellow light just comes on.

Choose the low tolerance setting point from your work requirement. Use the zero control to position the meter pointer to that value. If the red tolerance light is on, rotate the lower adjuster anticlockwise until the green light turns on. If the green tolerance light is on. rotate the adjuster clockwise until the red light turns on. Turn the adjuster carefully clockwise and anticlockwise until the red light just comes on.

NOTE 1 Each control spans the full meter scale length with 20 turns of adjustment. Rotating either control clockwise moves the change-over point to the right. If the controls get crossed over (i.e. if the low point is set higher than the high point) both lights come on together when the meter pointer lies between the two change-over points.

NOTE 2 If the light setup gets confused, turn the yellow control fully clockwise and the red control fully anticlockwise. The end of travel is found when the spindle starts clicking. This setting ensures the green light is on for all on-scale readings.

5. Rear Panel Controls

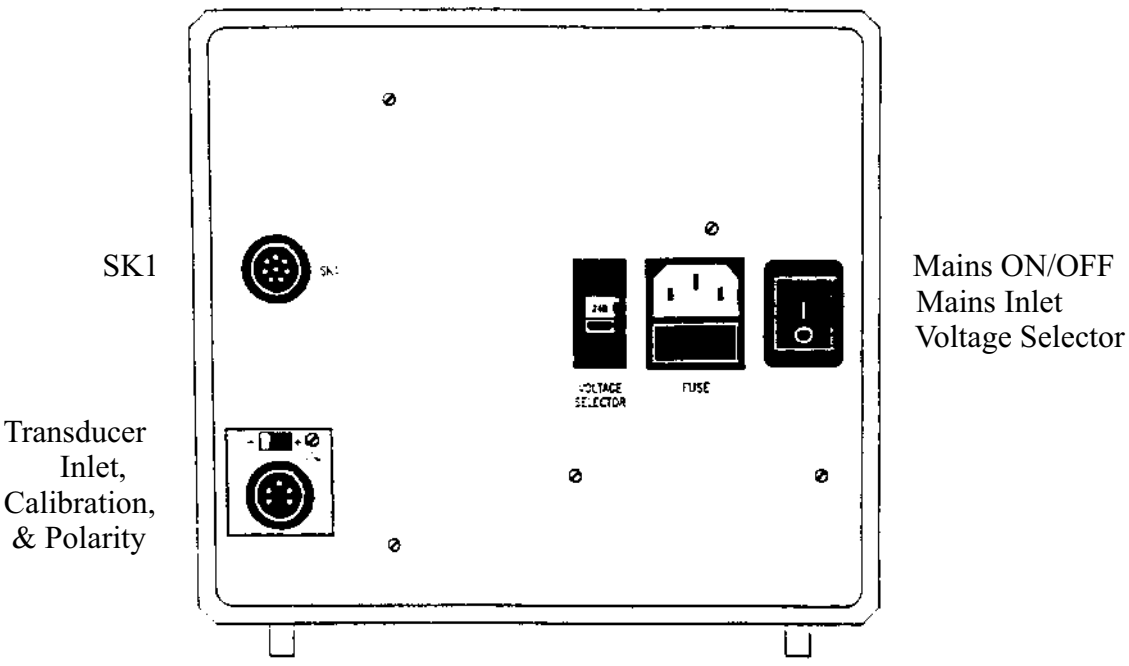
5.1 On/Off Switch LOCATED REAR LEFT of unit as SEEN FROM FRONT.

5.2 Power Inlet - Accepts standard IEC 320 line power connector. Dual fuses within the inlet socket. Fuse drawer is locked when the lead connector is in place.

5.3 Fuses - 160 mA AntiSurge for 240 V setting. 315 mA AntiSurge for 120 V setting,

IMPORTANT In the event of a fuse failure check the integrity of both fuses.

MERCER 121 Rear Panel



5.4 CAUTION:

Voltage Selector must be set to suit supply.

If 240V is applied to a gauge set to 120 V one or both fuses will fail and possible damage will result.
If 120 V is applied to a gauge set to 240 V no damage will result but the gauge will not work.

6. Transducer Inlets - The 121 has one transducer inlet labeled A. Next to it is a polarity switch and a calibration control. The switch is marked "+" (plus) and "-" (minus). Use this to set the sense of the transducer reading. Selecting switch "+" causes the gauge to read "+" for inward movement of the transducer tip. The plus setting is normally used for simple thickness measurements. Use minus settings for gap or bore measurements. Calibration is covered separately, but it provides a fine adjustment of sensitivity to ensure high measurement capability.

   The 122 gauge has two transducer inlets. They are identical in operation. The controls are as described above. Inlet A is selected when the A/B switch is in the A position, inlet B is selected in the B position and both inlets are selected in the AB position. Two transducers are used for differential measurements. Squareness and floating centre diameter are examples of differential applications.,

   Calibrating two transducers in a 122 gauge results in small variations in the two inlet settings. If you have to dismantle the system, each transducer should be identified with its inlet letter to ensure the system can be reassembled with the minimum of readjustments.

7. Calibration Procedure - recommended for 121 and 122

   The procedure is the same for all transducer inlets on the121 and 122. Described below is a simple and quick way to set calibration with the minimum number of moves. You can easily adapt it to suit your requirements.

   Select the range required. Choose two slip gauges of known precision and place them on the platen of a suitable gauge stand. The slip gauges should span between 60% and 80% of the chosen range. This example uses the range ±0.150mm on the 121 analogue gauge. The method used here extend to all other ranges. Choose slip gauges 0.200 mm apart in size.

   Fit the transducer into the stand over the smaller slip. Set the zero controls to mid travel. Plug in the transducer and set the polarity switch to plus. Mechanically adjust the transducer so that the gauge reads as close as possible to -0.100mm. Set to exactly -0.100mm with the zero controls. Move to the larger slip gauge and note how far from +0.100mm the gauge is reading.

   Use the zero control to move the meter pointer HALF way to +0.100 mm. Use the calibration control to move the pointer the OTHER HALF way to the +0.100 mm mark. Move back to the smaller slip gauge to check the -0.100 mm reading. If necessary repeat this procedure. If the initial error was small and your settings were accurate you will remove the error completely in one pass using this method.

8. Quick Start - When using the 121 and 122 for simple measurement only.

1. Set the Voltage Selector to your supply voltage.
2. Connect the supply lead and switch on.
3. Select the range required.
4. Set to zero using the zero controls.
5. Plug in and mechanically zero the transducer on the setting master or component in the stand or fixture.
6. Set to precise setting point using the zero controls.
7. The equipment is now set up and ready to use.

Specification of Mercer 121 and 122 Gauges

1. Power System

1.1 Power Supply: 115 V ± 20% or
230 V ± 20%
Selection by switch

50 to 60 Hz, AC.
25 VA Max.

1.2 Power Input: IEC 320 Standard Inlet
Live & Neutral Fusing
230 V 160 mA Antisurge
115 V 315 mA Antisurge
2-Pole Switching

2. Probe Drive

2.1 Probe Drive 5KHz, 2 V rms, 200 mA capability

3. Gauge Circuit

3.1 Input Amplifier: 10KR ±1% fixed load resistive to transducer.
± 5% Calibration range

3.2 Range Switching: Front panel rotary switch

3.3 Ranges as per model selected:

Analogue Metric	Analogue Inch	Digital	
±1.500mm	±0.05000 inch	1999	Micron
0.500	0.01500	199.9	
0.150	0.00500		
0.050	0.00150		
0.015	0.00050	199.9	0.001 Inch
0.005	0.00015	19.99	

3.4 Zero Control Ranges:

Coarse: ± 150 micron by single turn control
Fine: ± 10 micron by single turn control.

3.5 Analogue Output: ± 1.000 V DC full scale. analogue and digital versions.
Residual Noise at zero < 5 mV p-p
Source resistance = IKR

3.6 Tolerance Signals:

High	Yellow	LED
Size	Green	LED
Low	Red	LED

Logic yellow pull-down via 1KR
Logic Green no pull down
Logic red pull-down via 1KR

3.7 Tolerance Settings: Anywhere on scale by multi-turn controls.

.4. Gauge Performance, after 30 minutes warm-up:

4.1 Linearity Error < 0.02%

4.2 Probe Drive Amplitude Stability < ± 3 mV

4.3 Zero Stability Error < ± 5 µm per month

4.4 Gain Stability Error < ± 0.05%/ºC ± 0.05%/month

5. EMC Regulation Compliance.

CE marking indicates compliance of product to standards and directives in force in 1995

6. Dimensions

6.1 Sizes overall 184 mm high
195 mm wide
208 mm deep

6.2 Weight 2.1 Kg

SERVICE

Your gauging and inspection procedures are a critical part of your production process, and their integrity is vital to your business.

Regular maintenance and calibration of this air gauge will ensure continuity of its usefulness, assure accuracy of measurement and prolong its service life. Time and production losses through unplanned repairs will be minimised.

Current BS/ISO approval requires regular maintenance and traceable calibration of all gauges and test equipment used in a manufacturing process.

A & E Gauges Ltd offers comprehensive service and calibration facilities for all its products. In line with current British Standard and ISO requirements we recommend that any gauge is serviced at least once a year. Some quality procedures require more frequent equipment servicing and re-calibration.

A & E Gauges gauging references are fully traceable to National Standards. Conformity and calibration certificates are available if required.

Full service support is provided for all air gauging products, and on-site service contracts for larger users are strongly recommended. The Service Department will be pleased to provide full details of service rates and contract terms.

Contact : The Service Department

A & E GAUGES LTD.

Unit 7
Redbourn Industrial Estate
Redbourn
Herts
AL3 7LG

Tel: +44 (0) 1582 794136

Fax: +44 (0) 1582 794463

E-mail: sales@a-egauges.co.uk

Web: www.a-egauges.co.uk