UNIMAR
THE UNIVERSAL GAUGE
FOR MACHINE TOOLS

MARPOSS
Description of the system

UNIMAR measuring heads are the ideal solution for all process control applications on machine tools. They are the basic element for creating gauging systems integrated in the process.

Universal application. The UNIMAR measuring head is the basic element for any type of process control gauging. UNIMAR can be used for all applications on machine tools, partly thanks to its miniaturization, making it easy to fit.

High level measuring performance combined with user-friendliness. The UNIMAR head features a high level of precision, long-term thermal stability and a large measurement range.

Total flexibility. The range of Unimar models not only eliminates operator intervention, but also allows maximum machine tool operating flexibility, with a resulting increase in productivity.

Maximum sturdiness. The design and materials used for the UNIMAR head give it an extremely high level of chemical and mechanical resistance.

Simple maintenance. The main components can be replaced from the outside, reducing the cost of maintenance and spare parts. Its make-up guarantees absolute reliability.

The UNIMAR head is the only one equipped with DATA (Digital Acquisition Tracking of Application) for saving application technical data and maintenance work records.

The heads can be connected to all Marposs electronic gauging amplifiers either directly, or via junction box, or using quick-release connectors.

Types of application

- Grinding for continuous/interrupted exteriors
- Grinding for continuous/interrupted interiors
- Grinding without centres
- Surface grinding
- Machining centres
- High precision lathes
- Lapping machines
- Superfinishing machines
- Post Process measuring stations

Advantages

- Versatility
- Compactness
- Precision
- Reliability
- Repeatability
- Sturdiness
- Easy installation
- Easy maintenance
- High thermal stability
The Unimar measuring heads are divided into several families, each suitable for different fields of application:

- Unimar S – small measurement range
- Unimar R – large retraction
- Unimar W – large measurement range
- Unimar P – positioner (small range) – retraction adjustable from outside
- Unimar L – positioner (large range) – retraction adjustable from outside
- Unimar A – absolute heads

Each family is made up of different models, having different technical specifications and operation: some “common” features are available for all heads (e.g.: pneumatic retraction, damping), others are special and are only available for particular models.

**General characteristics:**

- Stainless Steel Body
- IP67
- Pre-stroke (externally adjustable)
- Overstroke (externally adjustable)
- Damping device for checking interrupted surfaces
- Measurement force (externally adjustable)

### Code plan

**BASIC CODE 3427848 X Y Z**

<table>
<thead>
<tr>
<th>Head Model [X]</th>
<th>Options [ Y ]</th>
<th>Special Option [Z]</th>
</tr>
</thead>
<tbody>
<tr>
<td>S - Short Range 1</td>
<td>S10</td>
<td>0 Standard</td>
</tr>
<tr>
<td></td>
<td>S26 S36</td>
<td>6 Standard</td>
</tr>
<tr>
<td></td>
<td>S38</td>
<td>8 Special damping</td>
</tr>
<tr>
<td>L - Locator 2</td>
<td>L46 L56</td>
<td>6 Standard</td>
</tr>
<tr>
<td>R - Large Retraction 3</td>
<td>R10</td>
<td>0 Standard</td>
</tr>
<tr>
<td></td>
<td>R26 R36</td>
<td>6 Standard</td>
</tr>
<tr>
<td>W - Wide Range 4</td>
<td>W10</td>
<td>0 Standard</td>
</tr>
<tr>
<td></td>
<td>W26 W36</td>
<td>6 Standard</td>
</tr>
<tr>
<td>A - Absolute 5</td>
<td>A26 A36</td>
<td>6 Standard</td>
</tr>
<tr>
<td>P - Positionar 6</td>
<td>P46 P56</td>
<td>6 Standard</td>
</tr>
</tbody>
</table>

**NOTE:** The term “pneumatic retraction” for a measuring head means management of the mechanical movement of the finger + contact assembly essential for avoiding their impact with workpiece/part surfaces during head insertion/removal from the home position to the measuring position and vice versa. The retraction function is normally used when the aim is to measure: internal diameters of interrupted surfaces, groove diameters or for axial positioning on shoulders.
**Unimar S - Short Range**

**Innovative precision**
Unimar S is the measuring head designed by Marposs to guarantee the high precision performance and repeatability of the in-process gauge family. It allows plenty of operating flexibility thanks to easy external adjustment of the mechanical calibration parameters.

**Why choose it? Applications**
Unimar S is the ideal solution for those who need a compact gauge, suitable both for continuous and interrupted surfaces. It is sturdy, flexible, quickly repaired and has measuring performance down to hundredths of a µm.

**Technological advantages**
The ideal partner in grinding systems, Unimar S boasts precision that allows it to be used in fields of application typical of the injector industry, where the tolerances needed are measured in microns. Unimar S achieves high standards of precision thanks to extremely low linearity, repeatability and thermal stability errors. Guarantees maximum reliability.

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**MEASUREMENT RANGE** ±500 µm  
**REPEATABILITY** range on 25 samples <0.1 µm  
**THERMAL DRIFT** <0.08 µm/°C

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**Advantages**
- Excellent repeatability  
- Excellent linearity  
- Adjustable retraction  
- Adjustable measurement force  
- Multiple damping possibilities

**Types of application**
- External diameters with continuous/interrupted surfaces  
- Internal diameters with continuous/interrupted surfaces  
- Active positioning

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**Connection cable Ø4.5 - L=300 cm**

**Retraction air inlet**

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**Dimensions**
- Width: 85 mm  
- Height: 76 mm  
- Depth: 48 mm  
- Diameter: Ø17 mm  
- Height: 25.4 mm

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**Technical specifications**

- Connection cable Ø4.5 - L=300 cm  
- Retraction air inlet  
- Measurement range ±500 µm  
- Repeatability range on 25 samples <0.1 µm  
- Thermal drift <0.08 µm/°C
Unimar P

Precise positioning
This is the Unimar gauge version that, together with mechanical and measuring features characteristic of this family, has an external adjusting system to make precision adjustment of the mechanical overstroke easy in part positioning applications.

Why choose it? Applications
Unimar P is the ideal solution for all applications requiring very narrow positioning tolerances, both for continuous and for interrupted surfaces.

Technological advantages
They can be used both for active positioning (part brought into a predetermined position in the machine, by moving the part itself or the gauge), and for passive positioning (measurement of the generic position of a part in the machine).
All Unimar P heads have a rear shank for rapid retraction adjustment, as well as the usual pre-stroke and measurement force adjustments.

Advantages
- Excellent repeatability
- Excellent linearity
- Retraction rapidly adjustable from the back of the gauge
- Adjustable measurement force

Types of application
- Active positioning on continuous or interrupted surfaces
- Passive positioning on continuous or interrupted surfaces
- Distance between two shoulders
- Active centring
- Passive centring

MEASUREMENT RANGE $\pm 1000 \mu m$
REPEATABILITY
range on 25 samples $<0.1 \mu m$
THERMAL DRIFT $<0.08 \mu m/°C$
MAXIMUM RETRACTION VALUE $1200 \mu m$
**Unimar L**

**Flexible positioning**
This is the Unimar gauge version that, as well as having the external adjusting system to make precision adjustment of the mechanical overstroke easy in part positioning applications, guarantees a large measurement range to allow flexible part positioning.

**Why choose it? Applications**
Unimar L is the ideal solution for all flexible applications requiring positioning cycles on various types of parts without the need for mechanical retooling.

**Technological advantages**
They can be used both for active positioning (part brought into a predetermined position in the machine, by moving the part itself or the gauge), and for passive positioning (measurement of the generic position of a part in the machine). All Unimar L heads have a rear shank for rapid retraction adjustment, as well as the usual pre-stroke and measurement force adjustments.

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**MEASUREMENT RANGE** ±2000 μm

**REPEATABILITY**
- range on 25 samples <0.2 μm
- THERMAL DRIFT <0.11 μm/°C
- MAXIMUM RETRACTION VALUE 0-3000 μm

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**Advantages**
- High level of repeatability
- High level of linearity
- Retraction rapidly adjustable from the back of the gauge
- Adjustable measurement force

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**Types of application**
- Active positioning on continuous or interrupted surfaces
- Passive positioning on continuous or interrupted surfaces
- Distance between two shoulders
- Active centring
- Passive centring
**Unimar W**

**Flexible measurement**
This is the Unimar gauge version equipped with a special transducer able to control the movement of its measurement range in a maximum range of 12.5mm.

If two Unimar W cells are used as a pair, they can measure internal diameters within a 1” (25.4 mm) range without needing any mechanical adjustment.

**Why choose it? Applications**
Unimar W is the ideal solution for all applications requiring maximum flexibility to be able to measure various types of parts without mechanical retooling.

**Technological advantages**
Ideal partner for flexible production processes in which the part types being processed change constantly.
Available in versions with or without retraction and also suitable for multicomparator checks on continuous and interrupted surfaces.

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**Typical Measurement Range**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection cable</td>
<td>Ø4.5 - L=300 cm</td>
</tr>
<tr>
<td>Retraction air inlet</td>
<td>37 mm</td>
</tr>
<tr>
<td>Ø17</td>
<td>25.4 mm</td>
</tr>
<tr>
<td>MAXIMUM RETRACTION VALUE</td>
<td>6100 μm</td>
</tr>
</tbody>
</table>

**Advantages**
- High level of repeatability
- High level of linearity
- Adjustable measurement force
- Adjustable pre-stroke (from the rear for several models)
- Adjustable overstroke
- Possibility of measuring sections having different diameter without retooling
- Rapid part type changeover (if within the same range)

**Types of application**
- External diameters with continuous/interrupted surfaces
- Internal diameters with continuous/interrupted surfaces
- Flat continuous/interrupted surfaces
Unimar R

Large retraction
This is the Unimar gauge version with a special mechanical solution able to guarantee contact retraction of up to 14 mm.

Why choose it? Applications
Unimar R measuring heads are the perfect solution for applications involving types of parts with particular geometries, requiring considerable retraction to allow measurement at the desired point.

Technological advantages
Ideal for applications such as measuring cams, and for bearing grooves. As well as the standard models (with retraction, with damping) there are many special models developed for particular applications. Those special solutions include the possibility of having heads made of completely non-magnetic material.

Technical Specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical measurement range</td>
<td>±1000 μm</td>
</tr>
<tr>
<td>Repeatability range on 25 samples</td>
<td>&lt;0.2 μm</td>
</tr>
<tr>
<td>Thermal drift</td>
<td>&lt;0.11 μm/°C</td>
</tr>
</tbody>
</table>

Advantages
- High level of repeatability
- High level of linearity
- High retraction value
- Adjustable measurement force
- Adjustable pre-stroke
- Adjustable overstroke
- Possibility of non-magnetic material

Types of application
- External diameters with continuous/interrupted surfaces
- Internal diameters with continuous/interrupted surfaces
- Active positioning
- Applications for semiconductors
- Applications for bearings
- Applications for cam measurement
Unimar A

**Absolute Measurement**
This is the Unimar gauge version developed to meet application requirements that call for absolute measurement rather than multi-comparison.

**Why choose it? Applications**
Unimar A is the ideal solution for all applications that need a 12.5 mm measurement range for the contact (25 mm diameter) without mechanical retooling and multiple masters for multi-comparison measurement.

**Technological advantages**
Ideal partner for flexible production processes in which the part types being processed change constantly. By taking an absolute measurement, it does not need a reference master for each diameter measured. Available in versions with or without retraction and also suitable for checks on continuous and interrupted surfaces. Supplied exclusively for use with the BLU system.

![Unimar A image]

**Repeatability**
- Range on 25 samples: <0.2 μm
- Thermal drift: <0.11 μm/°C

**Advantages**
- Excellent repeatability
- Excellent linearity
- Adjustable measurement force
- Adjustable pre-stroke
- Adjustable overstroke

**Types of application**
- Length measurement
- Centring
- External diameters with continuous/interrupted surfaces
- Internal diameters with continuous/interrupted surfaces
- Active/passive positioning
**Accessories**

The extreme application flexibility of gauging solutions with Unimar heads is also made possible thanks to the related accessories, allowing each application to be correctly configured according to the type of machine, type of part and the performance required.

**Junction Box**

The measuring heads are connected to the amplifiers either directly, or via Junction box, using quick-release connectors. Up to 2 Unimars can be connected to each J-box.

There are three J-box models:
- **passive** – with sensitivity adjusted via software from the electronic unit
- **with solenoid valve** – for controlling retraction directly from the electronic unit
- **with buffer** – for which sensitivity is adjusted directly on the J-box: finger ratio recovery is by means of potentiometer

Depending on the application specifications of the measuring head, the transducer and the amplifier used, the most suitable J-box can be selected.

When using Unimar heads with the BLÚ system, they do not require J-Boxes since they are connected directly to the measurement function node.

**Extension cables**

There are three types of extension cables:
- for non-fixed connections (1)
- with integrated J-box (2)
- for wall connections (3)

Extensions not compatible with the BLÚ system.
Fingers
As for contacts, there are also many solutions for fingers: the choice is based on the type of contact to be accommodated, length and offset.

Zeroing guides
There are various types of rapid zeroing guides that can be used to set-up the measuring heads simply, accurately and rapidly. Customers can choose the solution that best suits their requirements, depending on the type of application.

Contacts
There are many types of contacts, standard or special, which differ from one another according to shape and material. Length, diameter and rounding are parameters which can be decided according to the type of part to be measured. Contact shapes: punctiform (1), bar-shaped (2) or with shoe (3), having a tip made of tungsten carbide or diamond, are selected depending on the type of application.
Supports

There are many support options depending on the type of application (parameters to be considered: measurement range and tip height) and the level of retoolability required. The supports may be integrated with a slot, quick-retooling equipment and a shower. Supports and measuring heads may also be mounted on linear slides (with hydraulic, pneumatic or electro-mechanical operation).