

MARPOSS

M62

THE NEW LINE OF GEAR INSPECTION SYSTEMS AND MACHINES

The line of manual systems and machines for functional gear verification includes a wide range of highly precise solutions, to measure all the dimensional and functional parameters of pinions, spur gears, helical gears, shaft gears and internal ring gears.

All of these measurement products, are developed by using the most advanced engineering methods, making the most reliable and precise inspection instruments for the workshop environment.

As with all Marposs systems, the M62 family of measurement solutions can be interfaced with the entire selection of Marposs electronic measurement display units, like the compact Quick Read (multi color mini column), the E4N microprocessor column and the powerful E9066 industrial computer provided with a sophisticated graphic display algorithm for gear analysis as well as comprehensive statistical calculations.



M62 OBD (Over Ball Dimension) "Dedicated" and "Retoolable" version

Simple and compact bench for typical verification of OBD on gear wheels through calibrated spheres or pins having defined geometry. Suitable for spur and helical teeth (even or odd).

External diameter range: 15-100 mm and 25-180 mm (retoolable).

Teeth module: 0.75-5.0

Measuring force: retoolable from 4-20 N according to the part shape and part type. Through easy and simple operations it can be retooled for different diameters and / or measuring axis heights. Connectable to: mechanical indicators, Quick Read, microprocessor columns, industrial computers (Fig. 1).

M62 OBR (Over Ball Radius) external rings

Simple and compact bench for typical verification of OBR on gear wheels through spheres or rollers (pins). Parts with different tooth modules can be accommodated on the gauge, using one of the 7 different calibrated spheres/rollers (turret). Additionally root measurement can be performed using a special contact designed specifically for root radius verification and/or major radius. Standard OBR measuring range from 12 to 100 mm. Connectable to: mechanical indicators, Quick Read, microprocessor columns, industrial computers (Fig. 2).

M62 DF (double flank) gear roller - external rings

Is a system suitable for the dynamic inspection of ring gears with manual part rotation, capable of measuring the total composite action (TCA or F_i) related to double flank rolling action. Retoolable center distance from 25 to 200 mm, tooth module up to 5, part height up to 60 mm, part weight up to 10 Kg. Adjustable measuring force from 2 to 20 N. Connectable to: mechanical indicators, Quick Read, microprocessor columns, industrial computers (Fig. 3).



M62 OBD (Over Ball Dimension) - gear shafts

M62 OBD is a retoolable manual bench for shafts inspection. The part is held between precision mechanical centers and different longitudinal sections can be separately checked. Additionally minor (root) or major diameter measurements can be performed using a special multiple-contacts turret.

Other features/optional (1):

Electrical shaft axis generated by dedicated transducers (1), Vertical or Horizontal configuration, Low pressure measuring device, Multiple-contacts turrets (1), Wide range transducers (1). Checks can be displayed on dial indicators, Quick Read, E4N and E9066 industrial PC. Measurable diameter up to 150 mm, tooth module up to 5, part length from 150 to 450 mm, part weight up to 10 Kg. (22lbs) can be accommodated with this standard configuration (Fig. 5).

M62 OBR (Over Ball Radius) - gear shafts

A retoolable manual bench for radius verification on even or odd teeth on shafts using calibrated spheres or rollers (pins). The part is held between precision centers and different longitudinal part sections can be separately checked. The turret device can accommodate up to 7 different contact type (pitch, root, major radius). Measurable radii up to 75 mm, tooth module up to 5, part length from 150 to 450 mm, part weight up to 10 Kg. (22lbs) can be accommodated with this standard configuration (Fig. 4).



M62 DF (double flank) gear roller - external rings

Is a system suitable for the dynamic inspection of ring gears with automatic part rotation, capable of measuring all the typical functional parameters related to double flank rolling action (F_i'' , f_i'' , Fr'' , Aa'' , Nick). Retoolable center distance from 25 to 200 mm, tooth module up to 5, part height up to 60 mm, part weight up to 10 Kg. Adjustable measuring force from 2 to 20 N (Fig. 6).

M62 DF (double flank) gear roller - internal rings

Is a system suitable for the dynamic internal inspection of ring gears with automatic part rotation, capable of measuring all the typical functional parameters related to double flank rolling action (F_i'' , f_i'' , Fr'' , Aa'' , Nick). Retoolable center distance from 25 to 200 mm, tooth module up to 5, part height up to 70 mm, part weight up to 10 Kg. Adjustable measuring force from 2 to 20 N (Fig. 7).

M62 DF/NOISE (double flank) gear roller - shafts & pinions

Is a system suitable for the dynamic inspection of gear shafts with automatic part rotation, capable of measuring all the typical functional parameters related to double flank rolling action (F_i'' , f_i'' , Fr'' , Aa'' , Nick) and noise inspection. Retoolable center distance from 25 to 200 mm, tooth module up to 5, part length from 150 to 400 mm, part weight up to 10 Kg. Adjustable measuring force from 2 to 20 N (Fig. 8).

Noise analysis

- Training mode for the automatic determination of limits for quality decisions and the training of the data classifier
- Automatic capturing, filtering and rating of noise characteristics
- Comparison of subjective classifications by human testers with objective classifications by the test system
- Error classifications for knowledge-based diagnosis can be added later
- Targeted and cost-efficient re-working of faulty parts through real-time analysis



M62 SF (single flank) gear roller - external gears

M62 SF is designed for the dynamic inspection of ring gears with automatic part rotation, capable of measuring all the typical functional parameters related to single flank rolling action (F_i' , f_i' , f_l' , f_k'). Retoolable center distance from 25 to 200 mm, tooth module up to 5, part height up to 60 mm, part weight up to 10 Kg. The proposed solution (fig. 9) is an example of combined double flank/single flank inspection on the same gear.

Double flank semi-automatic bench gauge - shafts

Is a semi-automatic bench with manual load, unload and retooling, for gear shafts having different geometry and weight up to 25 Kg. The unit is suitable for verification with automatic part rotation, capable of measuring all the typical functional parameters related to double flank rolling action. The bench has been designed to permit the inspection of up to 6 separate gears on a single shaft in less than 20 seconds. The part is held between precision centers in vertical a position while inspected. Inspection cycles can be selected to inspect a single individual section or any combination required up to 6 simultaneously (Fig. 10).

M62 DF/lead angle (Gimbal) gear roller - external gears

This M62 is designed for the dynamic inspection of ring gears with automatic part rotation. In addition to the typical double flank functional parameters, lead angle, lead variation and taper can be evaluated. Retoolable center distance from 25 to 200 mm, tooth module up to 5, part height up to 60 mm, part weight up to 10 Kg. The proposed solution (fig. 11) is an example of a full-retoolable gauging unit (6 different part types).



Automatic measuring machine for single/double flank inspection on gears

Marposs offers the automatic machine M110 style gear roller for the single and double flank inspection of gear shafts (the given example is for shafts of a balance cassette). The automatic inspection equipment provides an easy integration of special measuring cycles into our standard software package; management of the rotary encoders to provide single flank inspection (F_p') and LVDT measuring cells to verify the classic F_r'' in a double flank condition (no clearance between part and master) (Fig. 12).

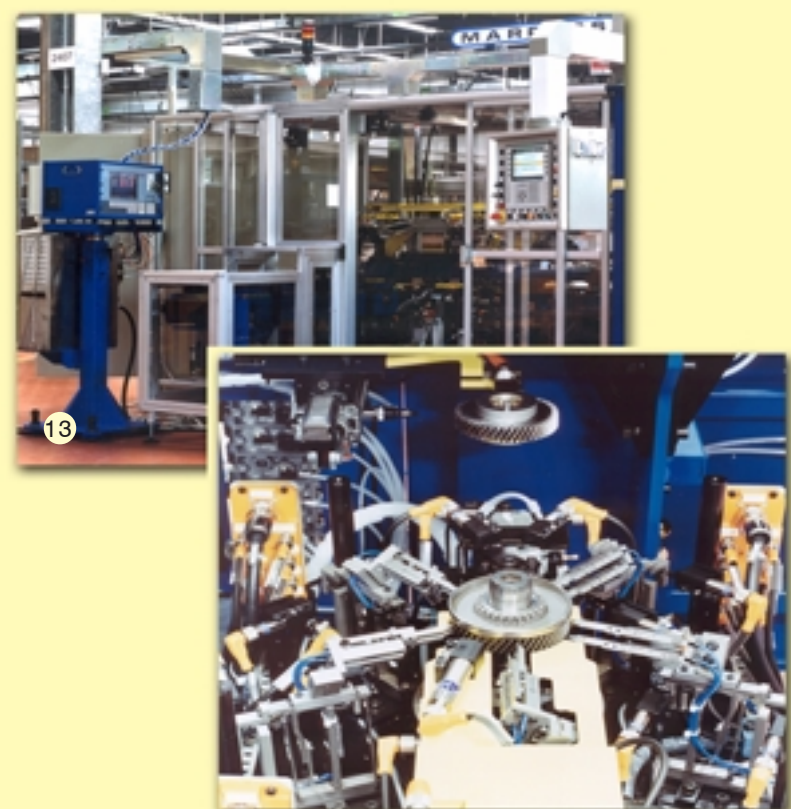
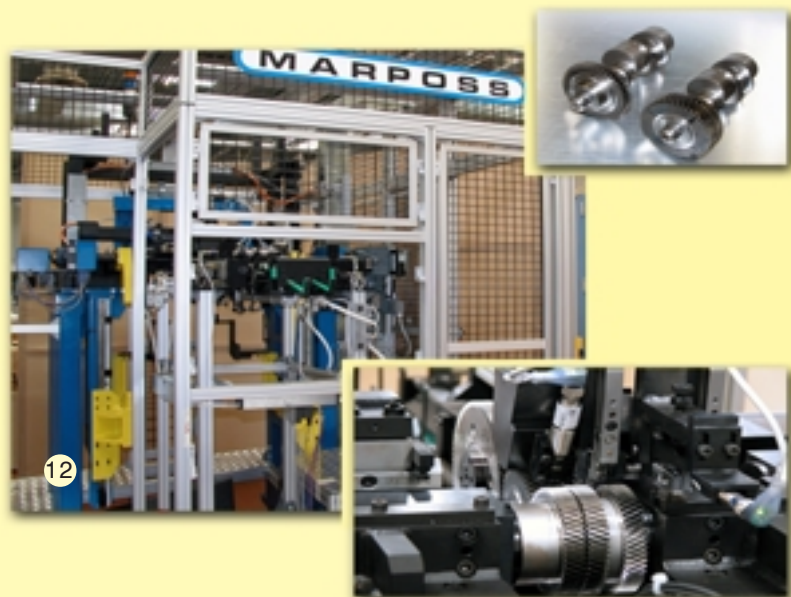
Technical Information:

- Automatic load/unload and automatic actuation of the measuring groups
- Single flank measurement: F_p' (deviation of single flank rolling per mesh cycle)
- Double flank measurement: F_r'' (pitch diameter run-out)
- Two (2) gear master
- High precision mechanical centers for part location
- Electric axis definition
- Two incremental rotary encoders (single flank)
- Two LVDT measuring cells (double flank)
- E9066N amplifier
- Quick SPC Windows / Special gear software Add-on

Automatic measuring machine for lead angle check on gears

The automatic machine for lead angle verification on gears, was designed to perform in the normal workshop environment. The unit is suitable for automatic part inspection, and performs inspections in five different angular sections; the mean value and the range of the angle measure are then elaborated. Furthermore, additional functions are available, like part marking and selection. The system is designed and manufactured by using the most advanced engineering methods, making it an extremely reliable and accurate checking instrument.

The machine is equipped with all the systems required to automatically meter and transfer the parts coming from the line (lift & carry device). The ability to maintain reduced cycle times, guarantees 100% inspection of components enabling quality control and statistical documentation of an entire production run (Fig. 13).



Special contacts for verification of root radius / diameter

These special contacts are used to check root radius / diameter of gear wheels. They can be used individually or combined (on the same measuring turret) with the contact for pitch radius / diameter check (Fig. 14).

Special contacts for verification of pitch radius / diameter

These contacts are used to check the over ball / pin dimension on the pitch diameter (in photo, a 3.5 mm diameter ball/pin). They can be used individually or combined with the contact for root radius / diameter check (Fig. 15-16).

Multiple-contact turret

The multiple-contact turret is an optional device capable to accommodate up to 7 different contacts to check pitch, root or major diameters in various configurations (Fig. 18).

Compensation and measuring devices for inner diameters

Marposs systems for gear wheels verification can be integrated with measuring and compensation devices of dimensional and geometrical errors related to inner diameters, either toothed or cylindrical smooth (Fig. 17-19).

Master gears

Marposs can offer a complete series of master gears manufactured using standard gauge steel (62-64 HRC) or high-speed tool steel (HSS) or high speed tool steel with Tin coating.

All master gears are provided with certification as per DIN 3961, DIN 3962 specifications (Fig. 20).



E9066N / E9066T Industrial Computer

Open system architecture with an integrated powerful Pentium® processor and TFT LCD 12.1" or 15" video, which can be inserted in a sealed cabinet. Industrial mouse on frontal panel, multiple keyboard handling, heat exchanger / air conditioner, direct access to the printer port, are only some of the hardware characteristics of the E9066 Flat Panel (Fig. 21).

E9066T is a very compact and extremely powerful Industrial Computer, developed to work in hard shop-floor environments. The E9066T perfectly completes the new Marposs Acquisition Data System Gage Box™. It is provided with a 15" or 17" TFT display, Intel Pentium® processors, 3 serial ports, Ethernet connection and 4 USB ports (Fig. 23).

Dedicated software for gear analysis - Gear AddOn

The new software for Windows®, elaborates measures according to DIN 3960 or ISO 1328-1, 2 specifications. In addition to the possibility of displaying in numeric format the measuring values related to F_i , F_r , f_i , A_a , A_a^e , A_a^i and Nicks, Cartesian and Polar graphic elaboration are available (Fig. 22).

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For a full list of address locations, please consult the Marposs official website

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