

Flexible system for control of shaft in production's lines

Easy 10 is a flexible system with automatic rotation, that can be used for multi-gauging control of diameters, lengths and geometrical errors on shafts.

It's produced by Metrel
(Cornate d'Adda – Milan – Italy)

The main characteristics are:

- *Measuring accuracy*
- *Quick control*
- *Wearproof*
- *Flexibility*

The system made of *modular elements* is a profitable investment thanks to the possibility to re-tool it for different parts in short times. The measuring modules are designed to allow a wide number of controls on the part.

It is possible to add deviated probes to approach the control sections. Special probes are available for control of discontinued profiles.

The OBD/OBR and F^rr control modules on cylindrical, helical toothing and ASA profiles enlarge the available controls.

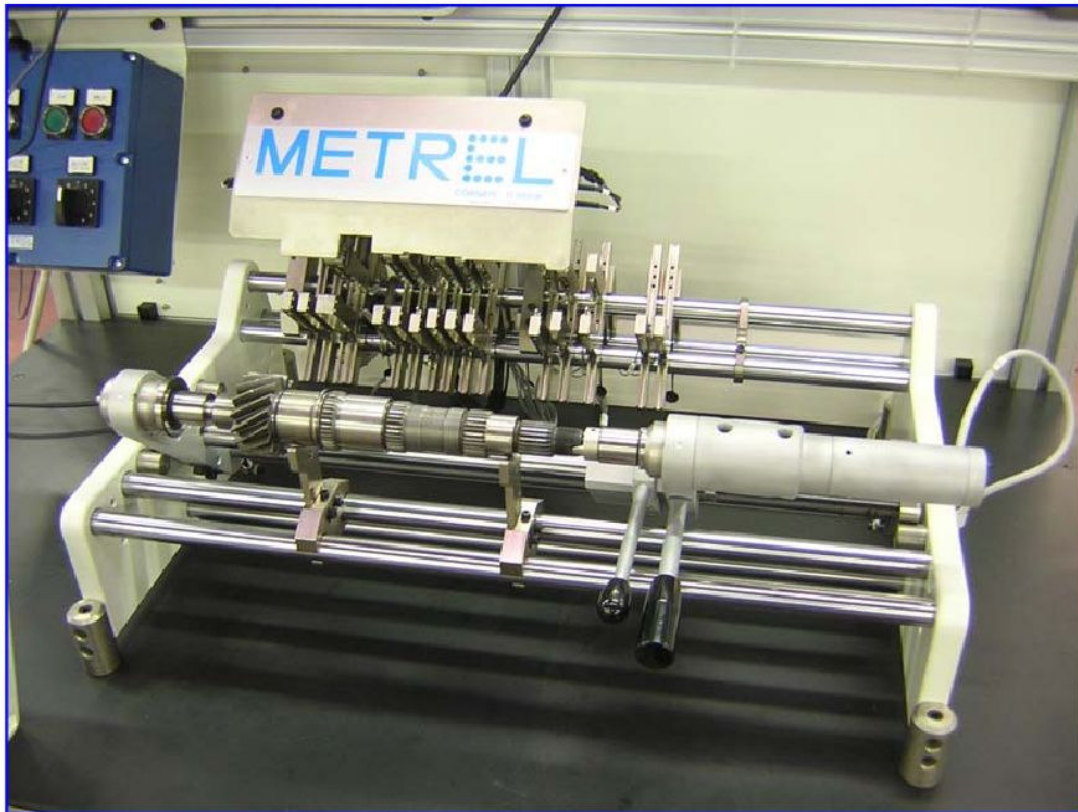


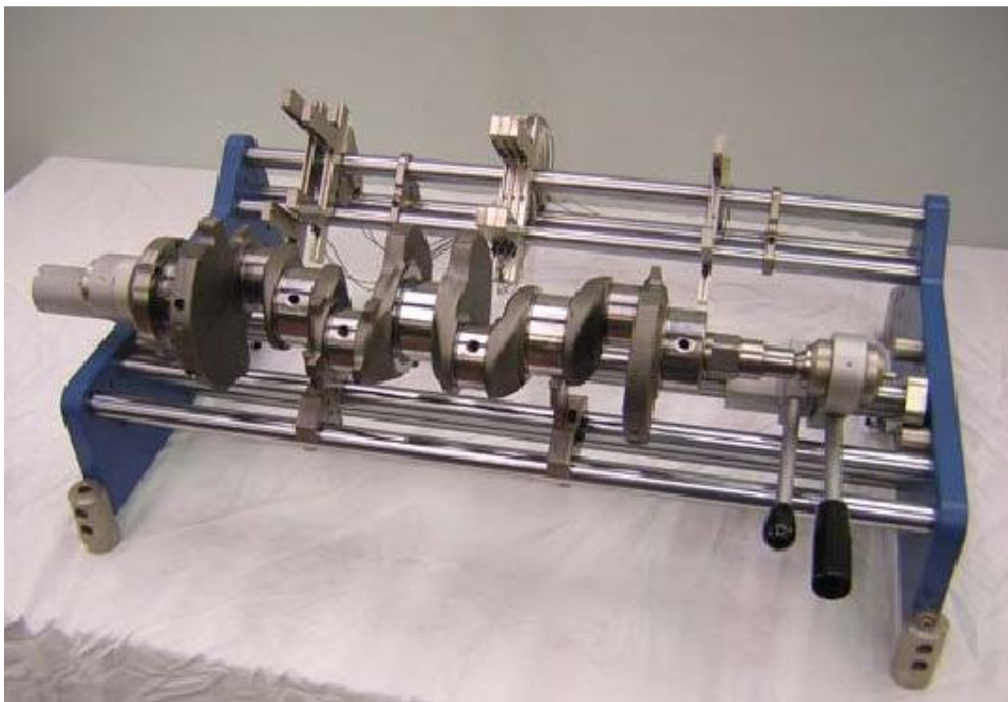
Figure N°1 - *Control of diameters and lengths of a gear box shaft*

Figure N°1 shows an example of control of diameter and lengths of a gear box shaft. The figures N°2 e N°3 show respectively the same equipment but for to check camshaft and crankshaft

Easy 10 system can be automated for applications with high control frequency. In this case the operator or robot/handler loads/unloads the part only while the other operations are made automatically.



Figure N°2 –Easy 10 equipment for cam shaft control



FigureN°3 –Easy 10 equipment for crankshaft control

Easy 10 for static control

It can be used for control that don't need the automatic rotation. The part loading is made on "V" references that can be adjusted in length. The wide range of modular elements for control of diameters and shoulders, easily adjustable, make it possible to construct a multi-dimensional, re-toolable gage for interoperational controls .

Figure N°4 shows an Easy 10 for static control

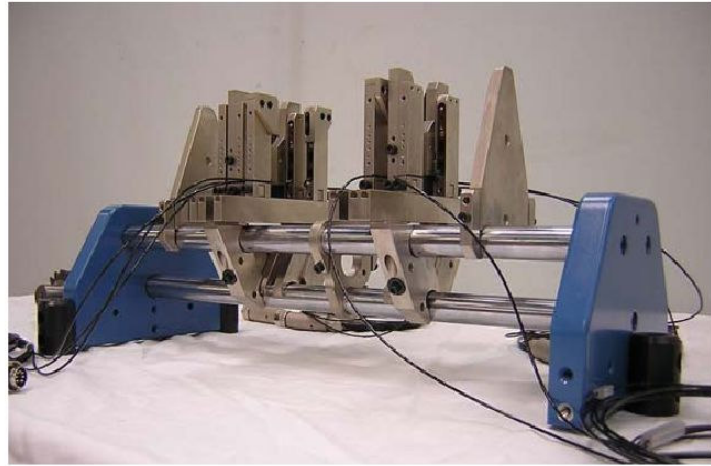
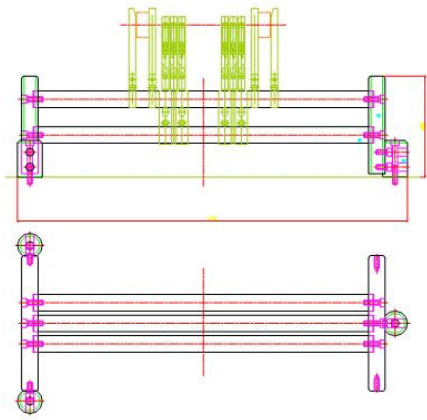


Figure N°4 – Easy 10 for static control

Easy 10 for dynamic controls

This is a solution for to make dynamic controls. It has two station: the first one for loading between tailstock and the second one for checking.

The rotation is automatic with the possibility to add an encoder for automatic learn the data.

Features

Standard step among the modules 8 mm.

Dimensions that can be measured with the base model:

- Lengths :50 ÷ 950 mm.
- Diameters : 8÷ 100 mm. (Ø max.160 mm.).
- Other structures can be customized to measure shafts with different dimensions for any requirement.

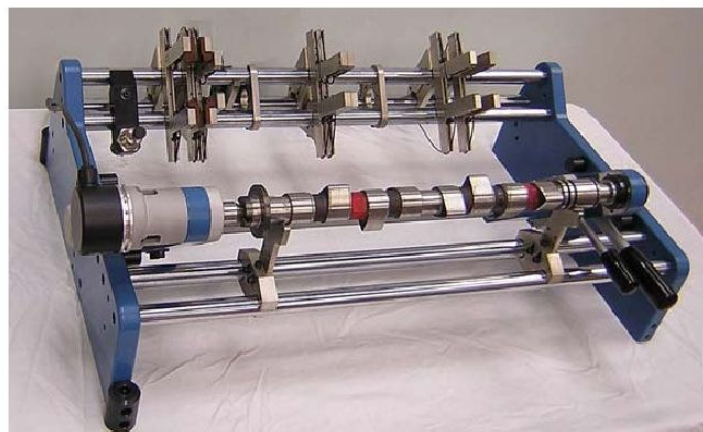
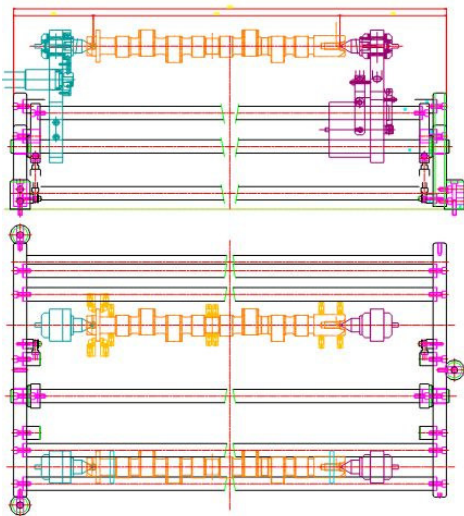


Figure N°4- Easy 10 for dynamic control of a cam shaft

Easy Profile

Easy Profile is a measuring system with manual loading/unloading and automatic rotation designed for the measurement of the cams.

The performed measurements are:

- *base circle radius,*
- *total lift*
- *cam profile*

The system has been developed starting from the modular equipment for the measurement of shafts type METREL Easy 10, this allows to add other measurements by inserting new control sets to check the dimensions and geometrical errors of the supports and shims.

Easy Profile, depending on the control requirements and the available time for the same, can be supplied with only one head for profile measurement that is moved manually in correspondence of the cam to be checked or different measuring heads (up to max. 8) pre-positioned in correspondence of the cams to be measured.

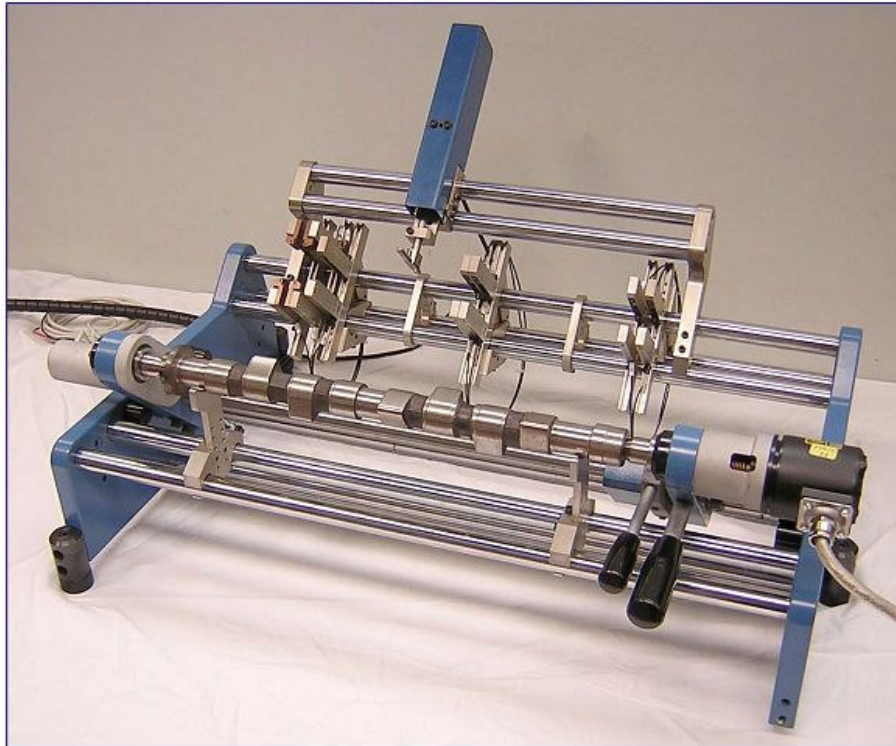


Figure N°5- *Easy Profile equipment*

Principle of measure

One high resolution digital probe, that reads the linear shifting of a probe resting on the cam and an incremental encoder reading the angular position are used for profile determination. From the combination of the 2 readings one profile point is determined. The profile is made by using 2000 measures on 360° (1 measure every 0,18°).

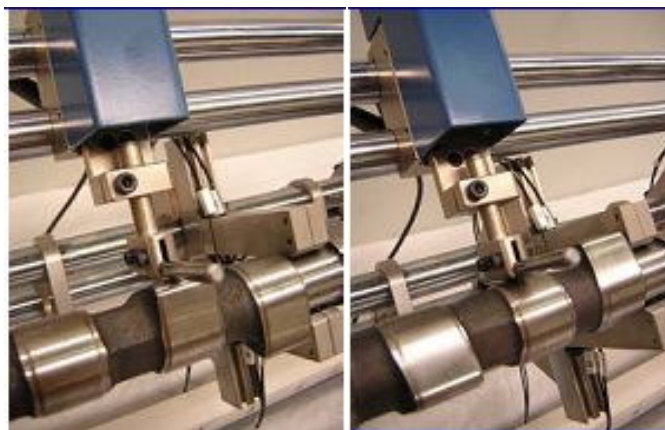


Figure N°6 - *Details of probe position*

Processing unit

All measures are acquired and processed through a powerful real time measuring system (Metrel M4M) with operator interface under Windows. The unit M4M performs the Best Fit between the theoretical profile and the real one, by pointing out eventual profile errors depending on the required tolerances which are usually different in the various areas of the same. The equipment allows the data storing in QS-stat compatible format and thanks to a powerful integrated statistical analyser, processes and displays the stored measurements on the generally used charts.

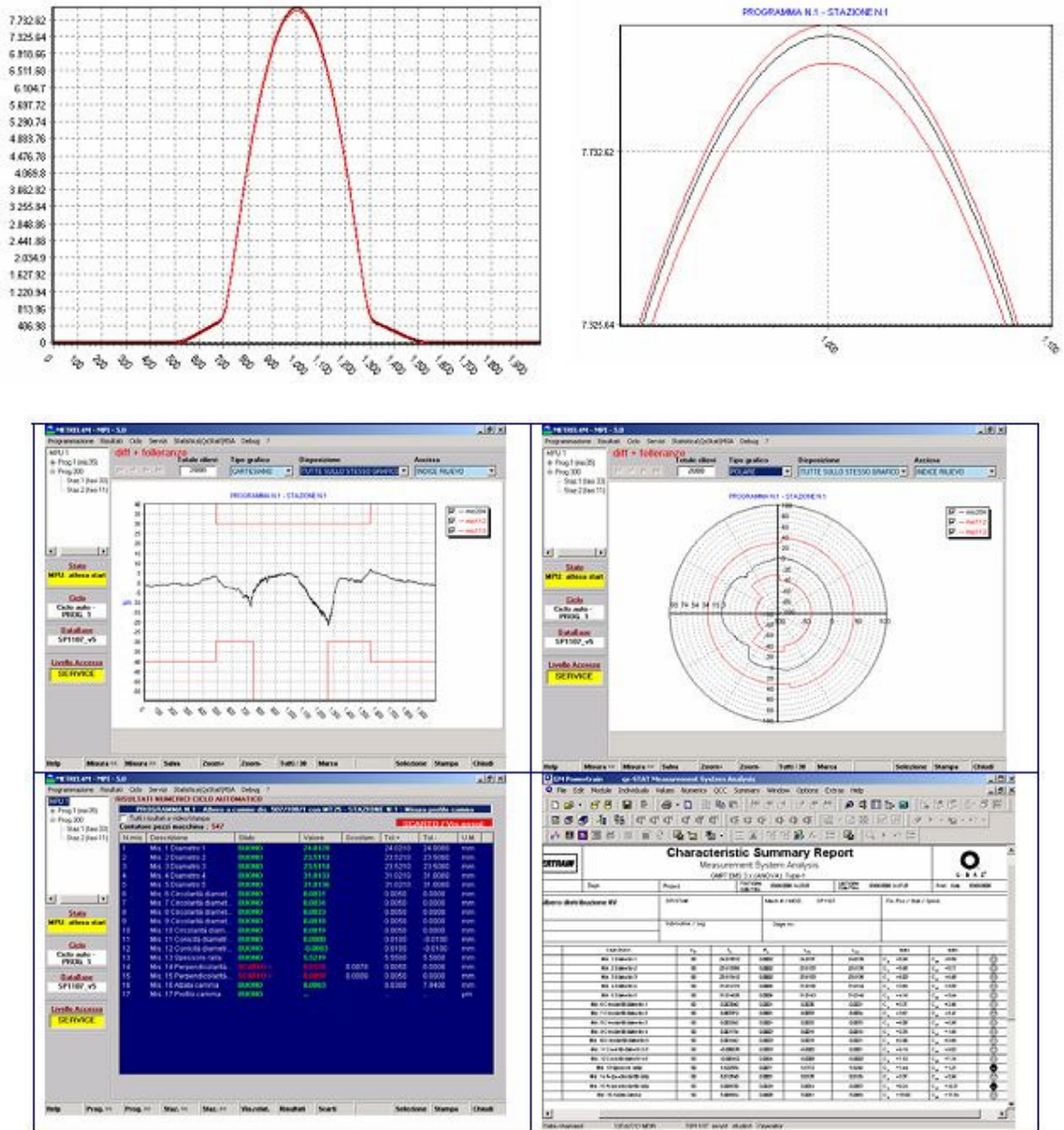


Figure N°7 – Example of report charts