TOMELLERI ENGINEERING

HI-End articulated arms technology

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SPACE TUBO - the Pipe Inspection solution

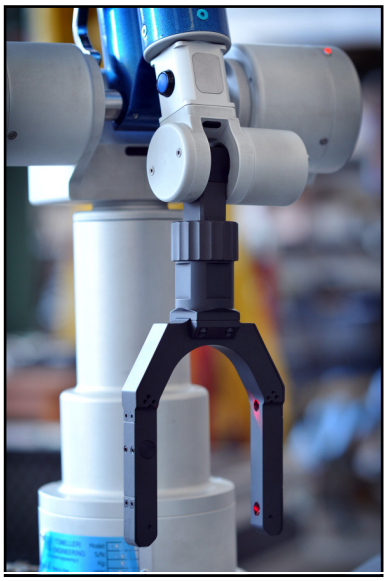
SPACE TUBO it's the perfect equipment for pipe inspection with laser fork and dedicated software.

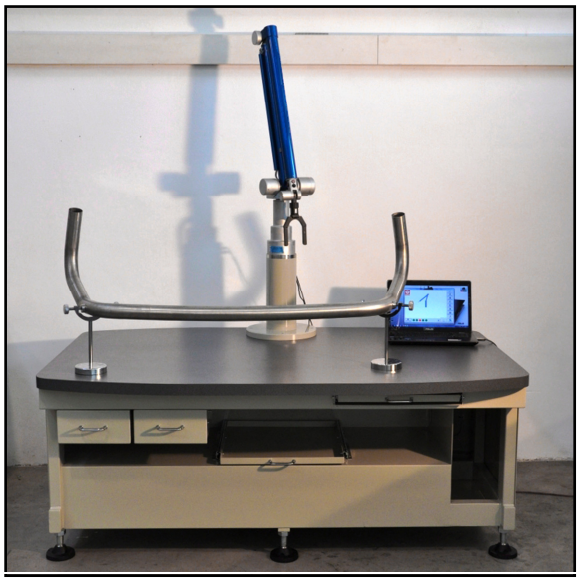
SPACE TUBO is based on the SPACE arm design, is a portable articulated arm CMM ideal for quick and accurate inspection of pipes and any other parts within its range.

SPACE TUBO is the result of more than 25 years of experience in production of portable measurement arms.

SPACE TUBO is available in several size: from 1.8m to 4.0m diameter range, and in 6 or 7 axis configuration.
The counter-balance system with a double spring also gives the machine characteristics of precision light-weight and easy handling.

SPACE TUBO is the top of reliability, accuracy, and flexibility in use. Touch trigger probe, "floating" probe, laser scanners and laser forks can be quickly interchanged thanks to a high-precision mount.
It has some unique features like the magnetic brake, or the smart the sensitive "floating" probe.





SPACE serie TUBO (6 axis arm) – all values in mm - *=2 sigma error					
SPACE *TUBO*	Measuring range	Volumetric accuracy with Laser Fork	Probe point accuracy*	Point Repeat-ability*	Weight (Kg)
SPACE 1.8 TUBO	**1800mm**	**0,062**	**0,028**	**0,020**	**7,9**
SPACE 2.5 TUBO	**2500mm**	**0,070**	**0,036**	**0,028**	**8,4**
SPACE 3.2 TUBO	**3200mm**	**0,080**	**0,043**	**0,035**	**8,8**
SPACE 4.0 TUBO	**4000mm**	**0,090**	**0,053**	**0,045**	**9,5**

ACCESSORIES and SOFTWARE

Software TUBO R.7 performance list

Measurement by laser fork or probe:

- Measurement of straight tubes
- Measurement of bent tubes measuring just the straight lengths
- Measurement of bends (survey the bending radius)
- Measurement of consecutive bends (absence of straight length between one bend and the other one, also called bend-to-bend)
- Measurement by laser fork and/or electronic probe
- Measure a scaled tube
- Possibility to change tube diameter during the measuring procedure
- Measurement of secondary tubes welded to the main tube
- Measurement of RCV (variable radius bend) tubes
- Measurement of tubes having non circular section (profiles)

Comparison and correction:

- Comparison and correction (classic mode) linked to the CNC
- Spring-back correction (20 –120)
- Alignment: possibility to obtain the data of the measured tube regarding (aligned) a master tube that is already in memory, to an external reference or to a drawing (manual and automatic procedure).
- Creation of material archive for the spring-back compensation to apply to the bending program.

Archive:

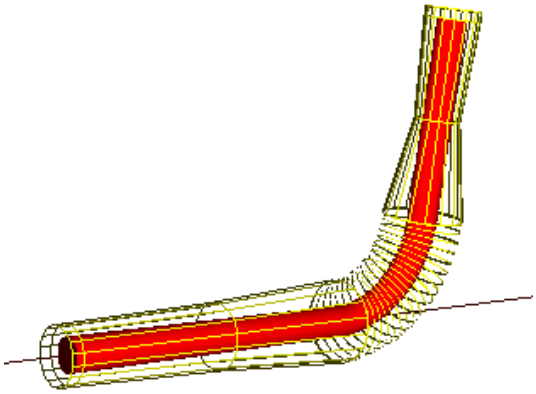
- Creation of Tubes and Masters archives
- Automatic research in archive
- Creation, modification and printing of models in:
  - Cartesian coordinates
  - Polar coordinates
  - Double Cartesian coordinates
  - Calandering both in setting and in acquiring

Data Transmission:

- Export via ethernet, via serial line RS232

Electronic Gauge:

- Graphic representation of the measured tube
- Graphic overlap of a tube on its master (flanges/holes/small pipes included)
- Manual and automatic positioning of the tube inside the Gauge
- Data regarding the axial and radial shifting of:
  - Beginning point of a tract
  - Middle point of a tract
  - Ending point of a tract
  - Middle point of a curve (this for each program = tract + curve)
  - Flanges, holes, small pipes
  - Setup of Gauge's tolerances for each of the above mentioned points with graphic visualisation of the stated tolerances
  - Rotation, shifting, and dynamic zoom
  - Printing of the graph and of the obtained data



- **RCV Tubes:**
  - Measurement of tubes having non constant bending radius and variable rotation along the bend without straight lengths.
  - Measurement RCV mixed with parts having variable bending radius and parts having constant bending radius
  - Setting of RCV and RCV mixed tubes from file
  - Automatic correction of the bending program for RCV and RCV mixed tubes

- **Tubes having non circular section (profiles):**
  - Measurement of tubes having non circular section (profiles)
  - Automatic correction of the bending program

LASER FORK

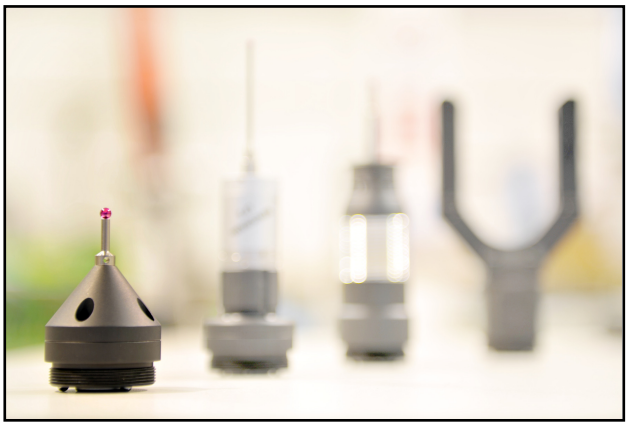
Ideal accessory for the rapid measurement without direct contact with the pipe.

5 forks size are available (mm):
30mm 50mm 80mm 150mm 200mm

The smaller forks feature with a laser pointer to spot small pipes during the measure.
Pipes from 2mm to 180mm of diameter can be measured with the use of laser forks, larger diameters can be measured with the touch probe.

MECHANICAL PROBE

The mechanical probe is the standard touch probe, available with different sphere diameter.
Points can be taken touching the part and pushing the button on board the arm's wrist.
The smallest usable probe diameter is 3mm to guarantee the point accuracy (smaller probes can bend and easily lose point precision confidence)

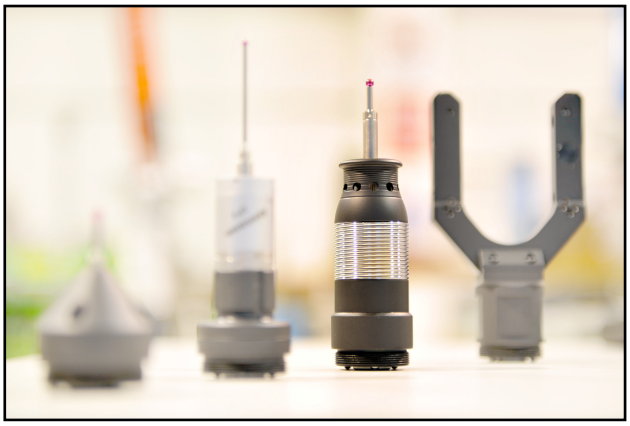


TOUCH TRIGGER (electronic) PROBE

The touch trigger probe allow to acquire points applying the minimum force on the measured part.
Is a very precise, quick and comfortable in use, acquires points only touching the surface, without triggering buttons.
Available with many different stylus length and sphere diameters.
Touch trigger probe head offered is produced by Renishaw, model LP2

FLOATING PROBE

Is the revolutionary new concept probe designed by Tomelleri Engineering. It is a rigid mechanical probe suspended on a spring driven by an aluminum ring that triggers the probe with a simple touch.
The integrated force control avoid to apply uncontrolled load on the part, improving accuracy and repeatability.
The control ring is isolated from the probe stylus to avoid thermal impact from the hands of the user.



All the available **probes fits the same mechanical mount** of the standard SPACE version and are interchangeable. The precision mount is **extremely repeatable** and allow to switch from one probe to another **without recalibration**.

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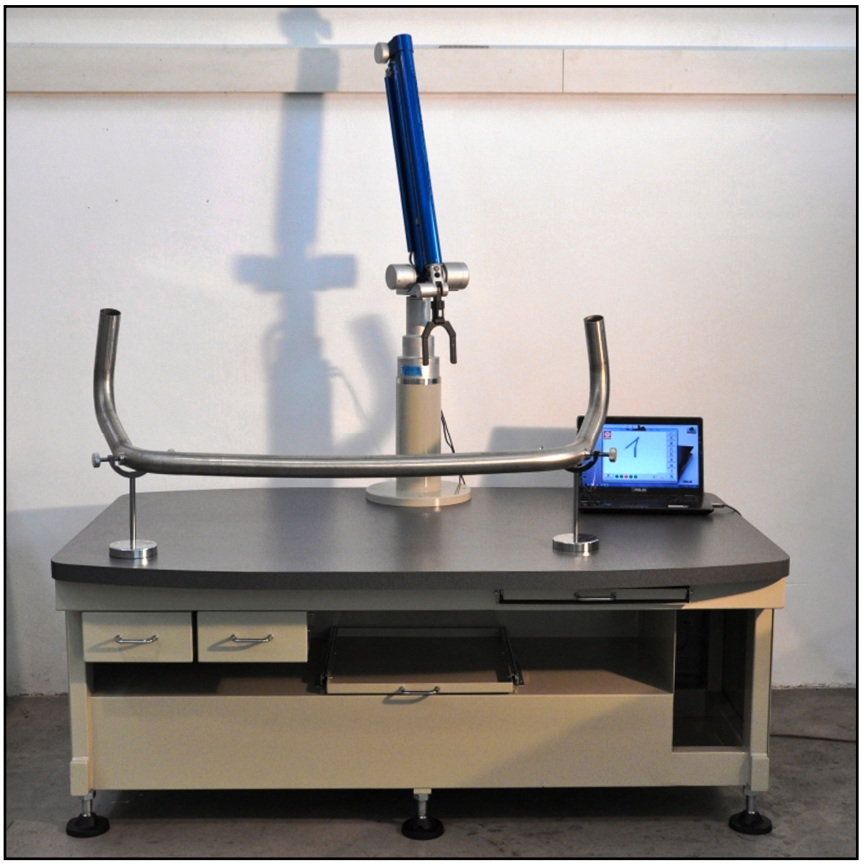
MOBILE TRIPOD

Stable and practical, is the ideal accessory to move easily and quickly the SPACE arm.
The leaflet at the base allows you to quickly switch the from measurement position to mobile position, and vice versa in a gradual way without shocks.
The tripod is adjustable in height and the weight of the tripod column is balanced by a gas spring, and a side handle allows for vertical and horizontal movement of the tripod.
The removable lateral shelf allows positioning of the laptop next to the measuring arm.



TABLE

Perfect and unique accessory for this type of arm.
The portable arm unit can be placed on the top of the table with a support or just directly on the rigid laminate top surface.

Tube supports can hold the part in a correct position to allow the inspection with great comfort of use. Simply creating your inspection zone, beside the pipe bending machine or just in a dedicated area of your workshop.

Available for every size of SPACE TUBO arm.

ALL the SPACE arms products are MADE IN ITALY.

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