



M400

Multifunction industrial display for
dimensional measurement

Versatile, robust, intuitive

M400

MULTIFUNCTION INDUSTRIAL DISPLAY FOR DIMENSIONAL MEASUREMENT

- Touchscreen display
- Intuitive to use
- Great flexibility

The M400 can be used in a wide variety of applications, from the simplest to the most complex.



AT A GLANCE

Processing and acquisition capacity

- Up to 32 characteristics processed simultaneously
- 99 possible inputs (sensors, instruments, etc.) via M-Bus module network
- 128 available programs
- Acquisition of direct characteristics via sensors or instruments, calculated characteristics, attribute or manually entered dimensions

Interface

- 7-inch screen

Connectivity

- USB (keyboard type or VCOM)
- RS232
- Network (via optional MB-NET module)
- Profinet (via optional MOD-PN module)
- Modbus RTU
- QR code readers
- Inputs/Outputs (via optional MB-IO module)

Robustness and security

- Machined aluminum housing, ruggedness proven even in the harshest industrial environments
- Proprietary embedded OS for flawless IT security

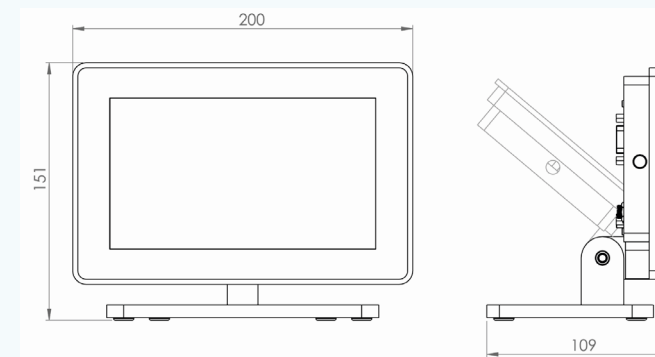
Simple and intuitive

The M400 is equipped with a 7" (17.8 cm) color TFT touchscreen. Its highly intuitive user interface allows for quick programming of the device and efficient handling by any operator.

Measurements can be displayed as a bar graph, an analog dial, or as numeric values only



Compact and robust



The housing is made of machined aluminum and is supplied on an adjustable stand that can be fixed using 4 M5 threaded holes.

The M400's front face is covered with a full polyester film, ensuring maximum protection against liquid splashes.

Connectors

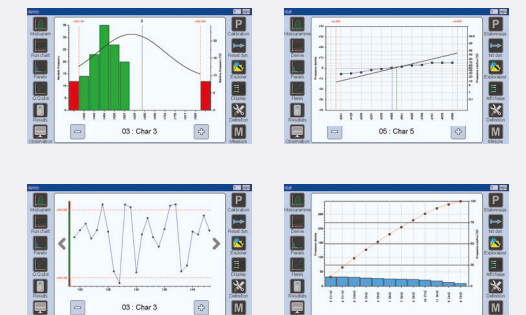
- 1 - M-Bus for connecting MB-XX modules
- 2 - 2 pedal and/or button inputs
- 3 - RS232 COM port (ASCII and Modbus RTU protocol)
- 4 - USB port – keyboard emulation (driverless)
- 5 - Virtual COM port over USB
- 6 - USB port > USB drive and QR code reader
- 7 - 24VDC power supply



SPC Function

The M400 can record **up to 1,000 measurements** per part (128 parts max). Saved measurements can be used through various SPC screens (machine or process statistics), designed to give the operator information quickly and easily right at the machine.

For more advanced processing or archiving, the **MB-NET module** takes over and interfaces with your IT system.



Connect your measuring equipment

- Instruments
- Sensors
- Air gages
- and many others...

Visualize your measurements on an intuitive interface

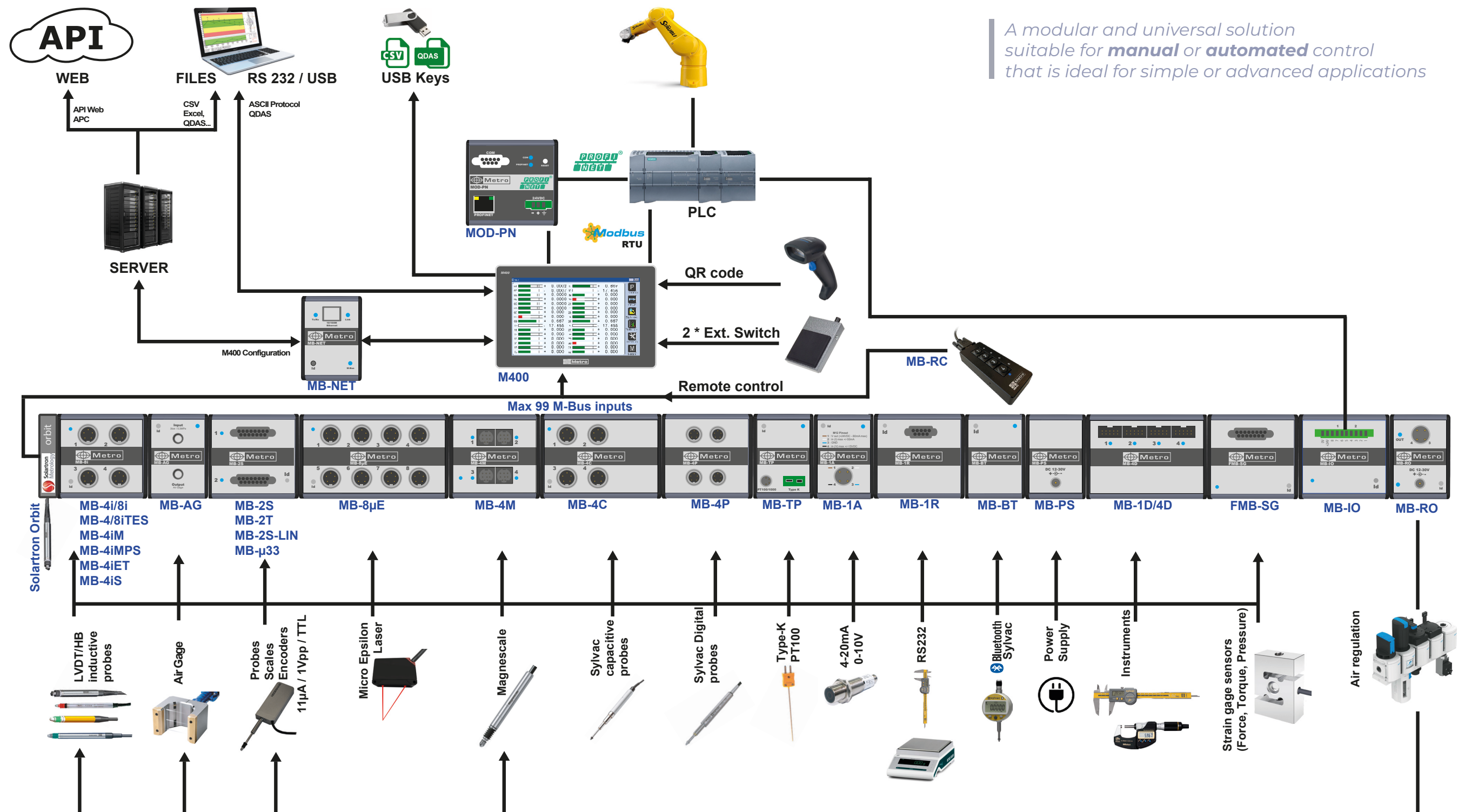
- Program your tolerances, calibrate dimensions
- Enter inspection-related information via QR code
- Display statistics

Communicate with your various tools

- A PLC with MODBUS RTU, Profinet, or I/O
- A computer via USB, RS232, network
- Web applications such as SPC or APC

Improve the quality of your production!

- Reduce the risk of error
- Automate your measurement acquisition
- Get the most out of your measurement data



SOLUTIONS FOR AUTOMATION

The M400 offers extensive possibilities for integrating into or building automated systems.

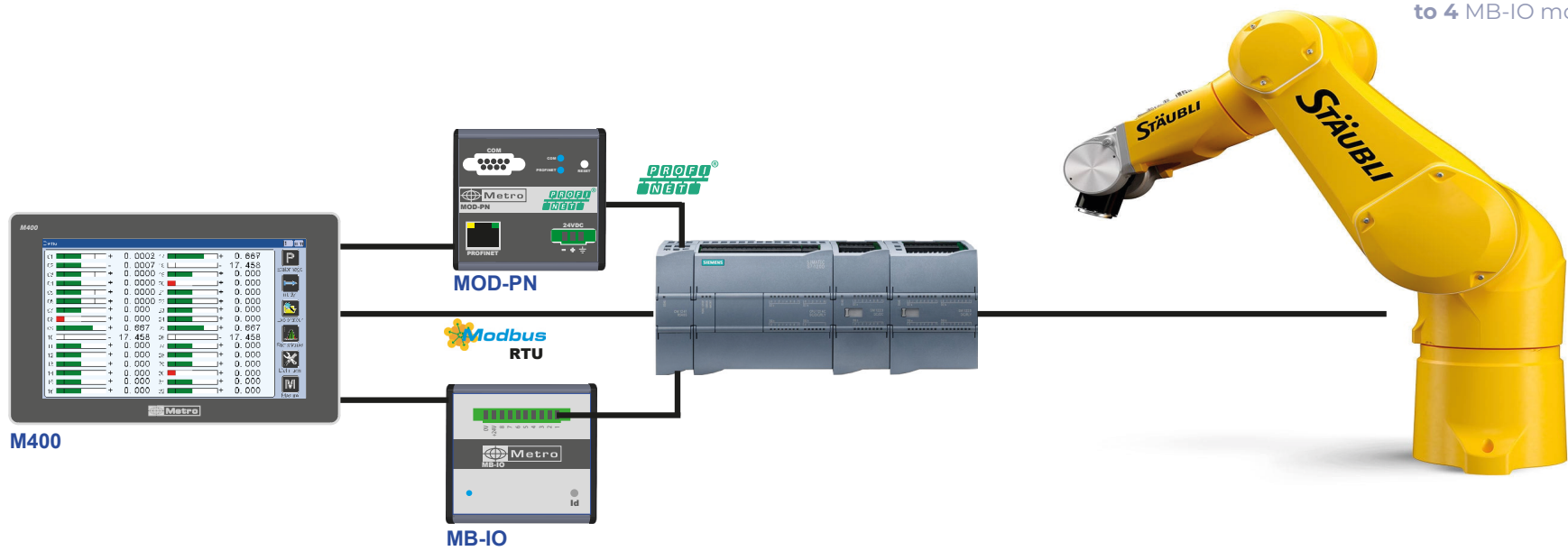
Inputs
Outputs

Script

Modbus
RTU

Profinet

Offload measurement tasks to the M400 and benefit from all its power for your automated machine.



MOD-PN Modules • A certified Profinet module

The M400 can communicate over Profinet via our MOD-PN module. This module has obtained official certification, guaranteeing a high level of performance and rock-solid reliability.

The MOD-PN is supplied with a GSDML file (downloadable from our website) allowing the M400 to be programmed directly from official Siemens tools such as TIA Portal.

The M400 can then be fully controlled from a compatible PLC: editing tolerances, calibration, live measurement values, program changes, etc.

MOD-PN module

The M400 is also directly compatible with the protocol

Panel mounting for seamless integration

The M400 can be supplied with an **adjustable stand**, or it can be **panel-mounted**.
M-BUS modules mount on a DIN rail.



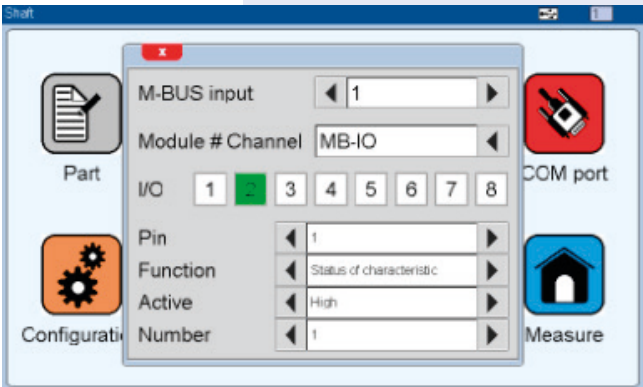
MB-IO Modules

Thanks to its **8 optocoupler-isolated inputs/outputs**, the MB-IO module lets you interface automation components with the M400. **Up to 4 MB-IO modules** – i.e. 32 inputs/outputs – can be managed.

Each terminal is very easily configurable as an input or output from the touchscreen interface. Simply select a terminal and assign it a function from around thirty available, for example:

- Good / bad part
- Data transfer
- Cycle start

MB-IO Module



Have a semi-automated application?

The M400 includes a VB-script type editor that lets you automate your station via the MB-IO modules.

Display messages, control actuators and presence sensors, transfer measurements.
The script can be written using the “Display Manager” PC software.

No more need for a PLC for simple applications!

```
Definition screen(01)
Characteristic 01 measure()
Fixtures if not footswitch() goto 01
Measure trigger loop while footswitch()
Calibration screen(02)
Classification 02 measure()
Script if not footswitch() goto 02
        loop while footswitch()
```

Metro can assist you in building your scripts.

Sequential mode

For manual measurement applications, the M400 has a sequence-editing mode that lets you define an inspection procedure simply and intuitively. It is a graphical script inspired by a simplified grafcet, used to define steps that guide the operator through the inspection.

The sequence mode offers a multitude of possibilities for both very simple and more elaborate applications, with disarming ease of implementation.

For your manual line-side inspections, the M400 lets you centralize your various instruments and brings rigor to your inspection plan.

Configuration side

Simply **select actions from a list** and place them in the desired order to fully customize the measurement procedure.

Characteristics are **pre-defined** in the characteristic editor, where you can select the instrument, set tolerances, the master dimension, etc. in just a few clicks.

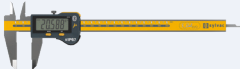
The sequence editor offers great flexibility. It lets you create loops and conditional steps, define the export type, control pneumatic sensor outputs, turn on the air supply for Air Gage, or display statistics.

1 Display message

2 Scan QR code



3 Measure Station 1

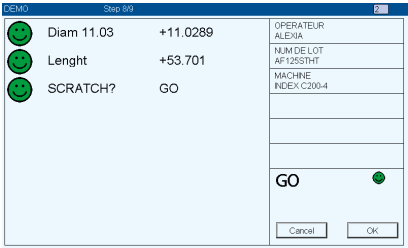
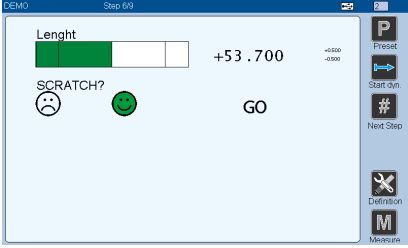
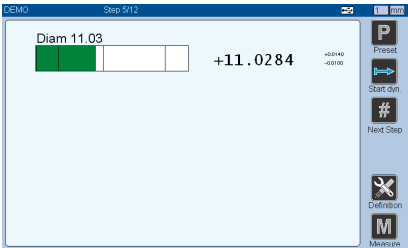
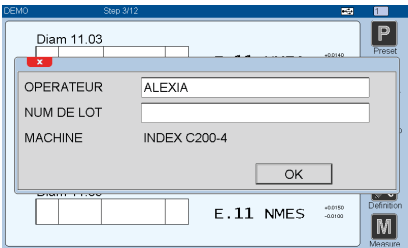
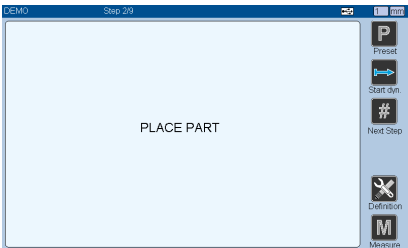


4 Measure Station 2



5 Display part result

6 Transfer to network



Measurement export

Visualization side

Once the M400 is configured, the operator simply follows the on-screen instructions.

Many benefits result:

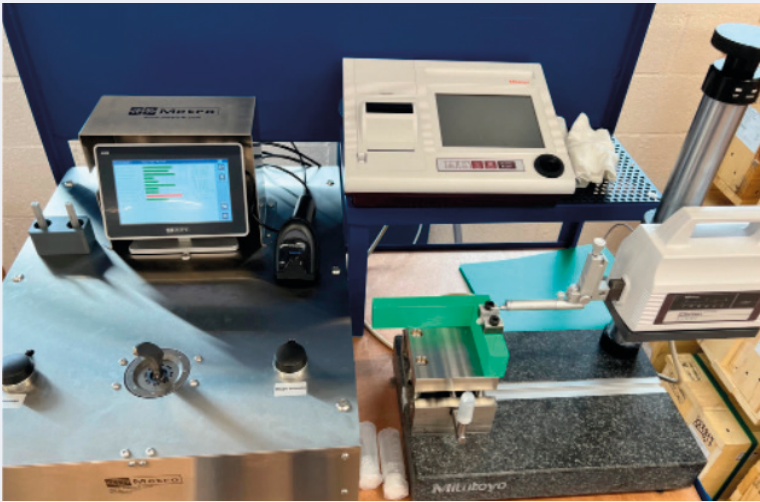
- Limited risk of error
- Rigor in following an inspection plan
- Centralizing multiple inspection tools on a single screen
- Simple, consistent graphical interface, easy for any operator to learn
- Export of measurements, optionally with local statistical processing
- The PC at the station becomes optional
- No risk of viruses or cyberattacks from connecting the M400 to your network, since it isn't a PC

APPLICATION EXAMPLES

Medical

Manual measurement station for cone features on hip prostheses. The inspection fixture consists of a pneumatic ring with 24 independent measurement points, spread across 3 heights.

The M400's measurement sequence prompts the operator to enter various information using a QR-code reader, such as the batch number, their name, the drawing number, etc.



- Direct measurement of diameters at the 3 heights via the MB-AG air gage modules
- Calculation of roundness at each height, of the cone angle, and of the theoretical diameter at the gauging plane
- Acquisition of a Mitutoyo roughness gauge via the M-BUS MB-1R module

The measurements and acquired data are then compiled into a final report in the customer's format and uploaded to their server. Files are automatically archived and reports printed at the end of each batch. Calibrations are also integrated into the traceability system.

Finally, we control the air regulator, reducing pressure by a factor of 10 when the ring is not measuring, to save air (and therefore electricity) and reduce noise. We do not shut off the air completely, in order to keep the measuring tool at a constant temperature.

Measurement

Diameters and height

Calculation

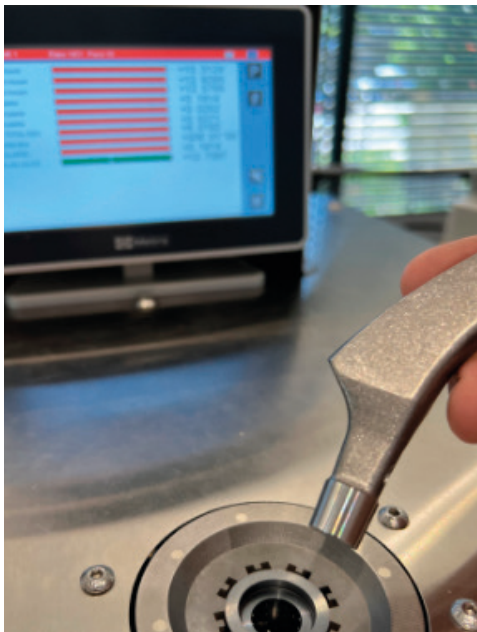
Cone angle, roundness

Acquisition

Roughness gauge, attribute dimensions, production information (work order, operator...)

Traceability

Creation and printing of measurement files on the network in the customer's format calibration traceability



Automation

Automated sorting machine. Here, the M400 is used to measure 9 precision inner diameters using **2 stepped pneumatic plug gauges**, and heights using inductive probes, across 5 separate stations.

The M400 enables:

- Calculation of **characteristics** against their tolerances, including dynamic dimensions (form error)
- Calibration as well as pneumatic plug gauge calibration
- Display of simple, live statistics
- A simple, intuitive HMI useful for sensor adjustment and machine commissioning
- A very simple data-transfer system via keyboard emulation (driverless), making it easy to run measurement tests while commissioning the machine

Profinet communication is provided to the machine's main PLC. The main PLC thus fully offloads the measurement task to the M400.

The **MOD-PN** (the M400's Profinet module) is certified by the PROFIBUS & PROFINET International organization, guaranteeing maximum performance.



M400 and accessories	REF
M400 display	45500
Panel-mount bracket option	45512
Rear-panel M-Bus module mounting kit option (eliminates the need for an M-Bus cable)	45510
MOD-PN – PROFINET communication module	MOD-PN
M-Bus cable between M400 and modules, 2, 5, or 10m	81210-X
Multi-function foot pedal with jack	18020
Desktop button with jack	18022
Measurement acquisition modules	
M-Bus for 4 or 8 METRO inductive sensors (half-bridge)	MB-4I / 8I
M-Bus for 4 or 8 inductive sensors (half-bridge), TESA-compatible	MB-4IT / 8IT
M-Bus for 4 Mahr inductive sensors (LVDT), type P2004M	MB-4IM
M-Bus for 4 Marposs inductive sensors (LVDT), type F10-F25	MB-4IMPS
M-Bus for 4 Etamic inductive sensors (LVDT), type ZDBxx	MB-4IE
M-Bus for 4 Solartron inductive sensors (LVDT), type AX/xx/S	MB-4IS
M-Bus for 8 Micron Epsilon laser sensors, opto NCDT type (requires an MB-PS)	MB-8μE
M-Bus for 2 Heidenhain sensors, scales, or encoders with 11μA or 1Vpp signal (max. interpolation 2000)	MB-2S
M-Bus for 2 Heidenhain sensors or scales with 11μA or 1Vpp signal, with channel linearization	MB-2S-LIN
M-Bus for 1 strain-gauge sensor (force, torque, pressure) with TEDS reading	FMB-SG
M-Bus for 8 Sylvac Bluetooth instruments	MB-BT
M-Bus for 1 or 4 Digimatic instruments (or other, via Metro adapter cable)	MB-ID / 4D
M-Bus for 4 Sylvac digital sensors (Type PI2D)	MB-4P
M-Bus for 1 non-contact “Air Gage” pneumatic gauge (plug, ring...). Requires an air preparation unit ref. ACS-PNE-003 or ACS-PNE-004 (air-saving) + MB-RO	MB-AG
M-Bus for 2 TTL sensors, scales, or encoders with SUBD-15 connector	MB-2T
M-Bus for 4 Magnescale sensors (Type DK)	MB-4M
Accessory, automation, and communication modules	
M-Bus for PT100/1000 probe or Type K thermocouple input	MB-TP
M-Bus with 1 relay output (to control ACS-PNE-001 or 004 air preparation units)	MB-RO
M-Bus remote control with 4 programmable buttons (new 2024 version)	MB-RC
M-Bus with 1 analog input, 4-20mA or 0-10VDC	MB-1A
M-Bus with RS232 input for instruments (list of compatible instruments on request)	MB-1R
M-Bus power supply unit for M-Bus	MB-PS
M-Bus with 8 optocoupled inputs/outputs	MB-IO
M-Bus network communication module for displays (file generation over the network or communication with Web API)	MB-NET



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