



M-BUS

Modular measurement acquisition system

Connect. Measure. Integrate.

M-Bus

MODULAR MEASUREMENT ACQUISITION SYSTEM

The M-Bus network lets you connect probes, force and temperature sensors, and measuring instruments from different brands to Metro displays, a PLC, or a PC.



AT A GLANCE

The M-Bus network

Do you need to use different types of sensors or measuring instruments on a manual inspection station or on an automated machine?

M-BUS is the ideal solution, whether used with or without a Metro display. The strength of M-BUS lies in its great flexibility, modularity, and scalability.

M-BUS is made up of sensor-acquisition modules, which require a master module or a Metro display to operate them.

MASTER MODULES

FMB-MA Module

The **FMB-MA** is the master module dedicated to **PC-based applications**. It provides the interface between the control PC and Metro's precision measuring modules, while centralizing the configuration of the entire acquisition chain.

- **PC side:** ASCII protocol (simple text commands), directly compatible with market SPC software (Q-DAS, Sylcom...) in Ethernet or USB with no dedicated driver required. Modbus TCP communication is also available for supervision system integration.
- **Measurement side:** control of all Metro modules (LVDT, incremental, air gage, force, instruments), with a single master capable of managing up to 255 measurement inputs, covering very broad and varied applications.



FMB-PLC Module

The **FMB-PLC** is the master module dedicated to **automation applications**. It provides the interface between the production line's PLC and the M-BUS modules, while centralizing the configuration of the entire acquisition chain.



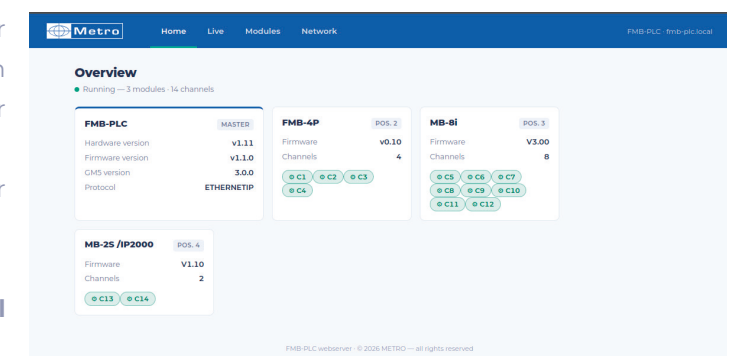
- **PLC side:** native integration with the main industrial networks (EtherNet/IP, EtherCAT, PROFINET, CC-Link), with direct availability of measurements and system states, without any gateway or intermediate software
- **Measurement side:** control of all Metro modules (LVDT, incremental, air gage, force, instruments), with a single master capable of managing up to 125 measurement inputs. Ideal for both a single inspection station and a multi-dimension bench, with easy expansion by adding modules.

Integrated Web Server

Both **FMB-MA** and **FMB-PLC** include a web server accessible from a browser, with no software installation required. It identifies connected modules, their assignment, and their full configuration.

For example, calibrating a pneumatic module or adjusting the sensitivity of a strain-gauge sensor.

Commissioning, diagnostics, and maintenance can all be carried out from any PC or tablet on the network.



The display that centralizes all your measurements

With our displays, such as the **M400**, you can **connect all the measuring instruments on a production inspection station** via the M-BUS network: probes, pneumatic plugs, dial indicators, micrometers, calipers, scales, roughness gauges, etc.

The interface guides operators through their measurement tasks, allows information to be collected via QR codes (work-order number, operator name, etc.), and even lets attribute dimensions be entered.

At the end of the inspection, the operator can view the full results, along with SPC charts if needed for adjustment, then **export the data to the network** in a format compatible with your quality or ERP system via the MB-NET module (**file creation or export to web software**).

All of this runs on a Windows-free IoT system, eliminating any risk of viruses or cyberattacks through these systems.

M400 Display



The **M400** is the display that drives the M-Bus network: it centralizes and processes **up to 99 connected inputs** via the M-Bus modules (inductive sensors, air gage, Sylvac Bluetooth, I/O, etc.). Thanks to its touchscreen and intuitive interface, **it lets you configure, calibrate, and view all measurements from a single point.**

It also handles communication with the outside world (Modbus RTU, Profinet, network) to integrate the system into an automated or manual workflow. The M400 is thus the central component that gives the M-Bus network all its flexibility and processing power.

Robust construction and installation

M-Bus modules are manufactured from an anodized aluminum profile, allowing them to be mounted on a DIN rail. Modules can be connected directly to one another via the M-Bus ports located on either side of the module (male port / female port), or separated by cables if needed. These housings are extremely rugged and suited to use in an industrial environment.



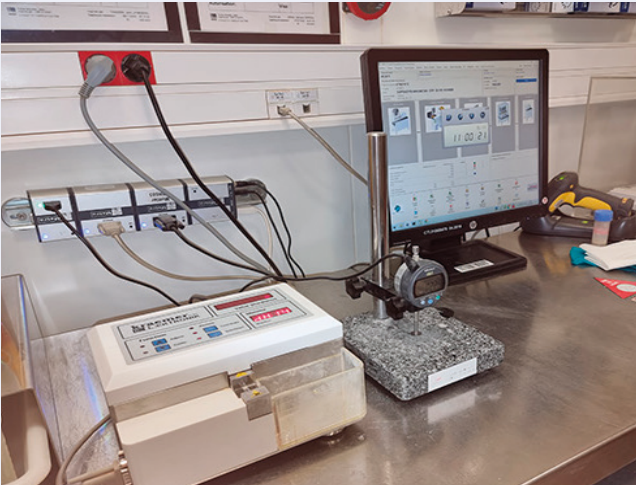
APPLICATION EXAMPLES

Medical

At this tablet manufacturer, several devices are used for quality control: **durometers, dial indicators, and scales.**

We supply **acquisition systems** that centralize measurements from these various devices for import into a quality-tracking software package.

Installed here: **an FMB-MA module** (master module for PC communication), **an MB-ID** (for the dial indicator), and **2 MB-IR modules** (for the durometer and the scale).



Automotive

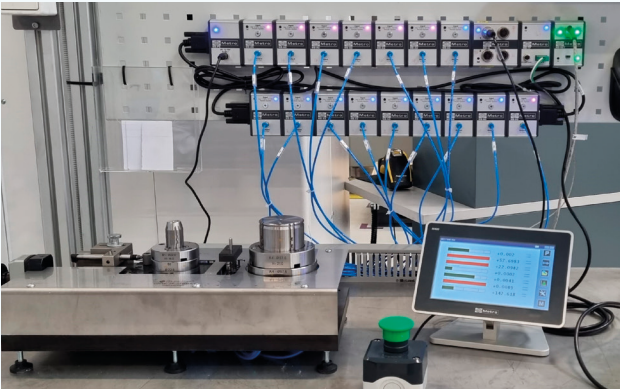
This **inspection fixture** verifies several characteristics on connecting rods using Air gage.

Several parameters are checked, including inner diameters as well as twist and bend. Measurements are temperature-compensated.

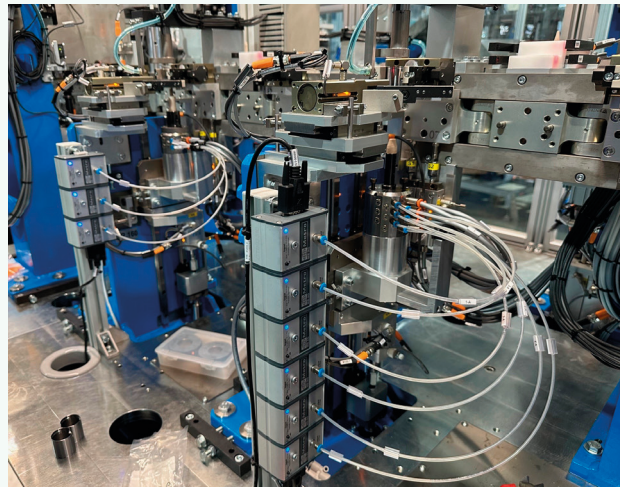
The operator enters the connecting rod's serial number and other information on the **M400 display's screen** using a QR code reader.

Finally, the measurements and associated information are then automatically exported

to the customer's server in QDAS format via an **MB-NET module.**



Automation

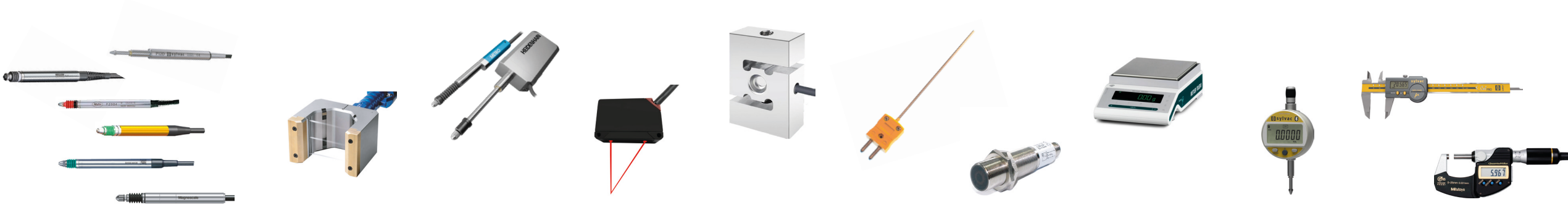
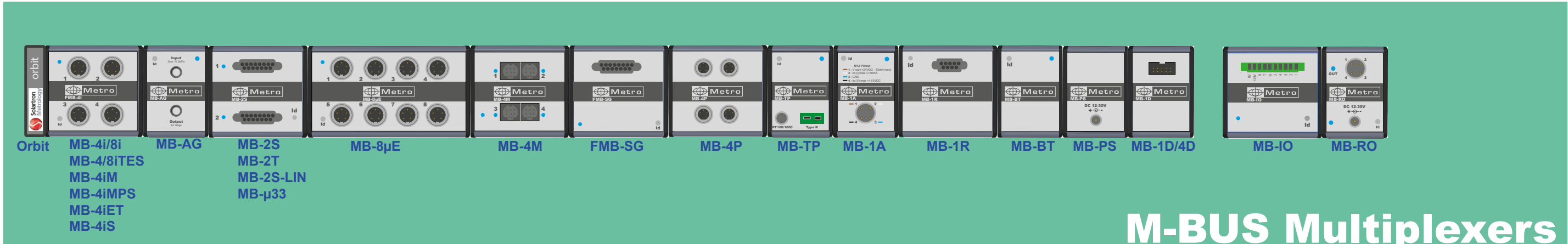
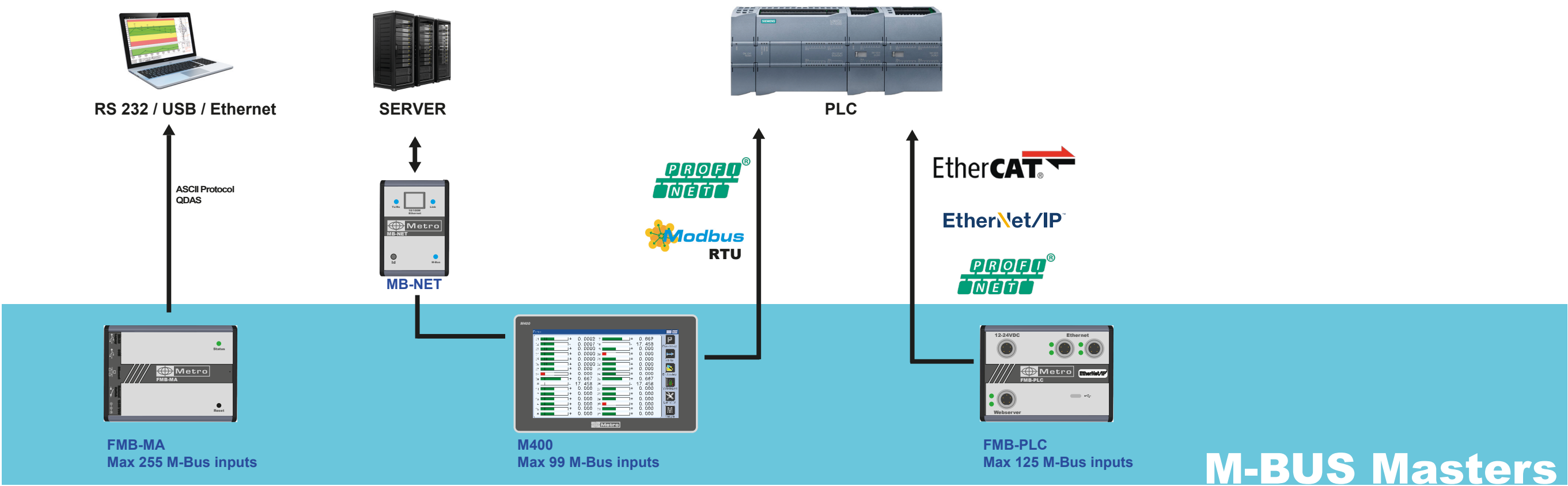


Automated sorting machine. Here, the **M-BUS** is used to measure 9 inner diameters using 2 Air gages, and heights using inductive probes.

The modules are separated by cables and installed in groups to stay as close as possible to the sensors.

The whole system is controlled by an **FMB-PLC**, which communicates with the machine's main PLC via the EtherCAT protocol.

M-BUS MODULES



LVDT - ORBIT® - INCREMENTAL - AIR GAGE - FORCE - TEMPERATURE - INSTRUMENTS

Master modules	Ref
M-Bus FMB-MA	FMB-MA
M-Bus FMB-PLC Ethernet/IP	FMB-PLC-IP
M-Bus FMB-PLC EtherCAT	FMB-PLC-EC
M-Bus FMB-PLC Profinet	FMB-PLC-PN
Measurement acquisition modules	
M-Bus for force/torque strain-gauge sensor	FMB-SG
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 LVDT sensors, type F10-F25	MB-4IMPS
M-Bus for 4 Etamic LVDT sensors, type ZDBxx	MB-4IE
M-Bus for 4 Solartron LVDT sensors, type AX/xx/S	MB-4IS
M-Bus for 8 Micron Epsilon laser sensors, opto NCDT type	MB-8μE
M-Bus for 2 Heidenhain sensors with 11μA or 1Vpp signal (max. interpolation 2000)	MB-2S
M-Bus for 4 Sylvac capacitive sensors (type P25)	MB-4C
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 P12D)	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 (formerly Sony)	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)	MB-NET

Compatible displays & accessories

M400 display (max. 32 characteristics, 99 inputs, 128 programs)	45500
M5 displays (max. 3 characteristics, 4 inputs, 10 programs)	see M5 brochure



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