USER'S MANUAL

FMB-MA

M-Bus Master Module

Revision: [REV1]
Date: [2026-03-10]
Product: [FMB-MA]
Firmware: [1.00]
Language: [EN]

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2 Introduction

2.1 Purpose of this Manual

This manual provides the information required to install, operate, maintain, and verify the equipment described in this document (hereafter referred to as the “Product”) safely and correctly.
It is intended to help users:

- understand the Product’s main functions and features,
- install and commission the Product according to the manufacturer’s requirements,
- operate the Product in industrial environments,
- ensure measurement reliability through appropriate calibration and verification practices,
- configure connectivity and data export functions (if applicable),
- troubleshoot common issues and maintain the Product in optimal condition.

This manual also defines the intended use, operating limits, and safety precautions necessary to ensure reliable measurement results and safe operation.

2.2 Scope and Applicability

This manual applies to products listed in the table below.

If the installed firmware differs, certain functions or menus may not match this document.

Part Number	Description	Firmware version	Comment
FMB-MA	Master module for M-BUS	V1.00	

2.3 Symbols and Safety Conventions

This manual uses the following symbols and conventions to highlight important information. Read and follow these instructions to ensure safe operation and reliable measurement results.

	DANGER **Indicates a hazardous situation which, if not avoided, could result in serious injury or death.**
	CAUTION Indicates a situation which, if not avoided, **could result in minor or moderate injury**, equipment damage, or incorrect measurement results.
	NOTICE / NOTE Indicates information that is important for correct operation, measurement performance, or reliability, but is not related to personal safety. Provides also additional information, recommendations, or clarification to assist the user.

All safety instructions must be followed. Failure to comply with these instructions may lead to injury, equipment damage, incorrect measurements, production issues, or loss of data.

2.4 CE Declaration of conformity

Metro

CE UK CA

EU Declaration of Conformity
Déclaration UE de Conformité
EU-Konformitätserklärung

Metro
80 impasse des Chapotines
ZAE Chez Merlin
74420 St-André de Boëge
FRANCE

We, / Nous, / Wir, die	**Metro** declare under our sole responsibility that the product / products, déclarons sous notre seule responsabilité que le produit / les produits, erklären in alleiniger Verantwortung, dass dieses Produkt / diese Produkte,
Product identification Désignation du produit Produktbezeichnung	Master module for M-Bus
P/N	FMB-MA

to which this declaration relates is/are in conformity with all essential requirements of the Council Directives relating to:
auquel/auxquels se réfère cette déclaration est/sont conforme(s) aux exigences essentielles de la Directives du Conseil relatives à :
auf welche(s) sich diese Erklärung bezieht, mit allen wesentlichen Anforderungen der folgenden Richtlinien des Rates übereinstimmen:

EMC directive / Directive CEM / EMV-Richtlinie	**2014/30/EU**
Low voltage directive / Directive basse tension / Niederspannungsrichtlinie	**2014/35/EU**
Harmonised Standards / Normes harmonisées / Harmonisierte Norme	**EN 61326-1 : 2020**
RoHS directive / Directive RoHS / RoHS-Richtlinie	**2011/65/EU** **2015/863/EU**
WEEE directive / Directive WEEE / WEEE-Richtlinie	**2002/96/EU**
The European legislations / Des législations Européennes / Der Europäischen Vorschriften	**1907/2006/EU REACH**
Place and date of issue / Lieu et date d'émission / Ausstellungsort, -datum	**St-André de Boëge, 19/05/2022**

Sébastien Jacquemard
Technical Director

3 Legal Information, Safety & Warranty

3.1 Foreword

Thank you for choosing a Metro precision measurement system.
This manual contains important information regarding safe use, compliance, warranty conditions, maintenance, and limitations of liability.
Read this chapter carefully before installing or operating the equipment.

3.2 Intended Use and Operator Responsibility

3.2.1 Intended Use

This Metro product is a**n industrial dimensional measurement system** designed for **production and quality control environments**, intended to measure parts and components within the performance limits specified in this manual.

The product is designed for use by qualified personnel in controlled industrial environments. It must be operated strictly within the specified operating conditions, limits, and procedures described herein.

3.2.2 Operator Responsibility

The user is solely responsible for:

- Ensuring that the system is suitable for the intended application and measurement objective,
- Verifying the correctness of measurement results and implementing appropriate quality assurance procedures,
- Ensuring that measurement results are not used as the only basis for critical decisions without appropriate validation (e.g., safety-related parts, regulated industries, or legal metrology),
- Ensuring that personnel operating the equipment are trained and competent.

Metro shall not be liable for results or decisions based on measurements obtained under conditions outside the specifications stated in this manual.

3.3 Safety Information

3.3.1 General Safety Precautions

Failure to follow the safety instructions may result in injury, equipment damage, or measurement errors.

- Do not use the product if it is damaged, if the enclosure is cracked, or if connectors are loose or broken.
- Keep the equipment away from liquids, aggressive chemicals, and excessive dust.
- Use the equipment only within the environmental conditions specified in this manual.

This product is not certified for use in hazardous locations and is not ATEX-certified. Do not operate the product in explosive atmospheres or in areas classified as hazardous (e.g., ATEX zones) where flammable gases, vapors, or combustible dust may be present.

3.3.2 Electrical Safety and Power Supply

- This product is powered via an **external power supply (transformer/adapter)**.
- Use only the **power supply provided or approved by Metro**, with the correct voltage and power rating.
- Ensure that the mains supply conforms to local electrical standards.
- Disconnect the equipment from mains power before cleaning, moving, or servicing.
- Do not attempt to repair, open, or modify the external power supply.

If the external power supply or its cable is damaged, stop using the product immediately and replace the power supply with an approved unit.

3.3.3 Mechanical Safety

- Ensure the bench system is installed on a stable surface and correctly secured to prevent tipping or unintended movement.
- Use only approved fixtures, probes, and mechanical accessories.

3.3.4 Electromagnetic Environment

Measurement accuracy and system stability may be affected by electromagnetic disturbances.

- Avoid installing the equipment near strong electromagnetic fields (welding machines, large motors, high-power radio transmitters).
- Use shielded cables and proper grounding as recommended in this manual.
- Do not route measurement and power cables alongside high-voltage or high-current cables.

3.4 Calibration, Verification and Measurement Uncertainty

3.4.1 Calibration Responsibility

The measurement performance of this system depends on correct installation, correct use, environmental stability, and the validity of calibration.

Before measurement operations, and periodically thereafter, the user must:

- Verify calibration status,
- Perform verification checks using appropriate reference standards (e.g., gauge blocks, master parts),
- Maintain traceability to accepted standards when required by internal procedures or industry norms.

Metro assumes no liability for measurement results obtained with instruments that are out of calibration, improperly set up, or operated outside specified conditions.

3.4.2 Environmental Influence

Accuracy, repeatability and stability may be affected by temperature, humidity, vibration, contaminants, part temperature, and handling.

The user must ensure the system is used under the specified environmental conditions and must implement warm-up, stabilization, and handling procedures as described in this manual.

3.5 Firmware, Connectivity, and Data Export

3.5.1 Firmware and Software

This product contains firmware and may include embedded measurement algorithms.

Metro may release firmware updates to improve performance, compatibility, cybersecurity, and reliability.
Installation of firmware updates must be performed according to Metro instructions.
Unauthorized modification of firmware or software may void warranty and regulatory compliance.

3.5.2 Data Integrity and Backup

Measurement results exported by the system may be used for production and quality records.
The user is responsible for:

- Data backup policies,
- Data integrity verification,
- Appropriate use of exported data within their quality management system.

Metro shall not be liable for data loss, corruption, formatting issues, cybersecurity incidents, or incompatibility with third-party systems.

3.5.3 Network and Cybersecurity

When connecting the system to a network or third-party equipment, the user is responsible for implementing adequate cybersecurity measures, including access control and network protection.
Metro shall not be responsible for damages resulting from unauthorized access, malware, network failures, or improper integration.

3.6 Regulatory Compliance

This product is designed to comply with applicable regulations and standards when installed and used as described in this manual.

Unauthorized modifications, use of non-approved accessories, or improper installation may:

- Void regulatory compliance,
- Void the user's authority to operate the equipment in certain jurisdictions,
- Void warranty coverage.

3.7 One-Year Limited Warranty

3.7.1 Warranty Coverage

Metro warrants that the product is free from defects in materials and workmanship under normal use, storage and handling conditions for a period of **one (1) year** from the date of purchase by the first end-user ("Warranty Period").

3.7.2 Warranty Remedy (Parts and Labour)

During the Warranty Period, Metro will, at its sole discretion:

- Repair the product, or
- Replace the product or defective parts,

including labour costs. Replacement parts may be new or refurbished and are warranted only for the remaining period of the original Warranty Period.

3.7.3 First End-User Only

This warranty applies only to the **first end-user** and is **non-transferable**.

3.8 Warranty Exclusions

This warranty does not cover:

- Consumables and normal wear items (if applicable),
- Calibration drift, loss of accuracy, or adjustments due to environmental conditions or usage,
- Damage caused by improper installation, misuse, negligence, abnormal operating conditions, accident, or improper maintenance,
- Damage caused by non-approved accessories, probes, fixtures, power supplies, or spare parts,
- Unauthorized repairs, modifications, or tampering (electrical, mechanical, firmware/software),
- Removal or alteration of serial numbers, labels, safety markings, or trademarks,
- Transport damage resulting from improper packaging or handling,
- Any product used outside Metro specifications or outside the conditions stated in this manual.

3.9 Return Procedure (RMA) and Transport

Before returning any product for service, the customer must fill the **Return Material Authorization (RMA)** form from the Metro's website or an authorized service partner.

Products returned without an RMA may be refused.
The customer is responsible for safe packaging and for using appropriate protective materials.
Damage caused during transport due to inadequate packaging is not covered by warranty.

3.10 Limitation of Liability

3.10.1 Exclusive Remedy

The warranty remedies set forth above are the sole and exclusive remedies available to the purchaser.

3.10.2 **No Indirect or Consequential Damages**

To the maximum extent permitted by applicable law, Metro shall not be liable for any indirect, incidental, special, punitive, or consequential damages, including but not limited to:

- loss of production,
- loss of business or profits,
- downtime,
- loss of data,
- loss of goodwill,
- or third-party claims,

arising out of or related to the product, its performance, or its use, even if Metro has been advised of the possibility of such damages.

3.10.3 **Maximum Liability**

Metro's total liability for any claim related to this product shall not exceed the amount paid for the product.

3.10.4 **Local Law Rights**

Some jurisdictions do not allow the exclusion or limitation of certain damages. In such cases, the above limitations may not apply fully. This warranty provides specific rights; additional rights may vary by jurisdiction.

3.11 Disclaimer of Other Warranties

Except as expressly stated herein, Metro disclaims all other warranties, whether express or implied, including but not limited to implied warranties of merchantability, satisfactory quality, non-infringement, and fitness for a particular purpose, to the maximum extent permitted by applicable law.

3.12 Documentation Accuracy and Changes

The information in this manual is provided “as is” and is subject to change without notice. Metro makes no warranty that the manual is free of errors and assumes no liability for errors, omissions, or damages resulting from the use of this manual.

3.13 Intellectual Property

All rights, title and interest in and to the product, firmware, software, documentation, and associated trademarks are owned by Metro and/or its licensors.
No part of this manual, software, or firmware may be copied, reproduced, translated, or transmitted in any form without Metro’s prior written consent, except as permitted by applicable law.

3.14 Cleaning and Maintenance

Disconnect the system from the mains power supply before cleaning.

Use a soft, lint-free cloth slightly moistened with an ethyl alcohol-based cleaner.
Do not allow liquids to enter the equipment.

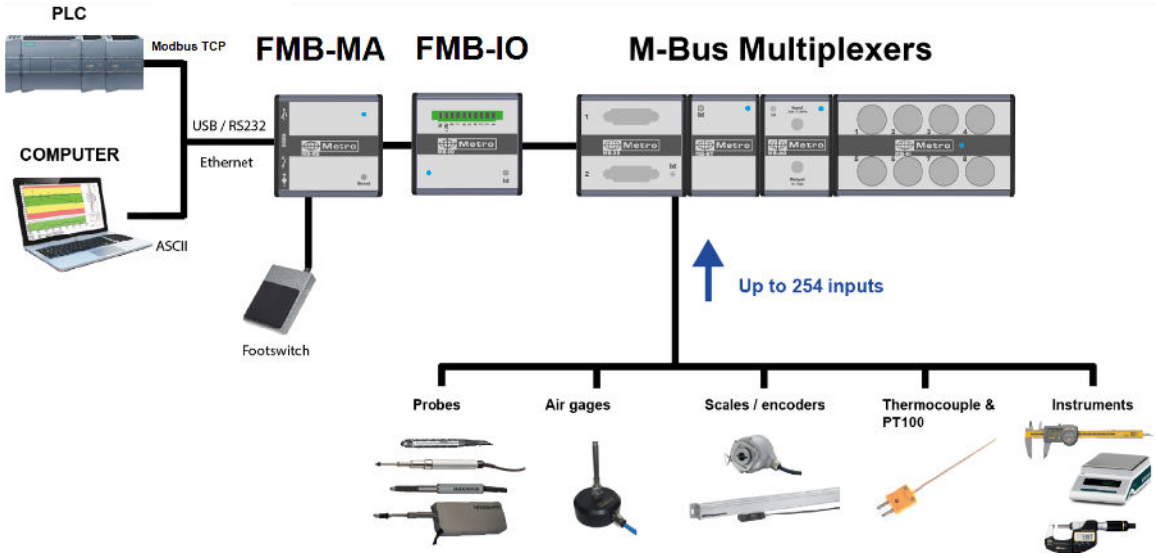
Do not use: acetone, benzene, toluene, halogenated hydrocarbons, abrasive cleaners, or aggressive solvents.

Any servicing not described in this manual must be performed only by Metro or an authorized service partner.

4 Product Overview

4.1 System Description

The FMB-MA module allows the entire Metro M-Bus range (sensor modules, instruments, or inputs/outputs) to be connected to a PC (except for the MB-BT-Bluetooth module), a PLC, or any other similar equipment.



Data can be transmitted via USB or Ethernet (ASCII or GM5 protocol) and Modbus TCP. Up to 254 inputs per FMB-MA module can be connected.

A validation pedal (ref. 18020) or a table button (ref. 18022) can be connected.

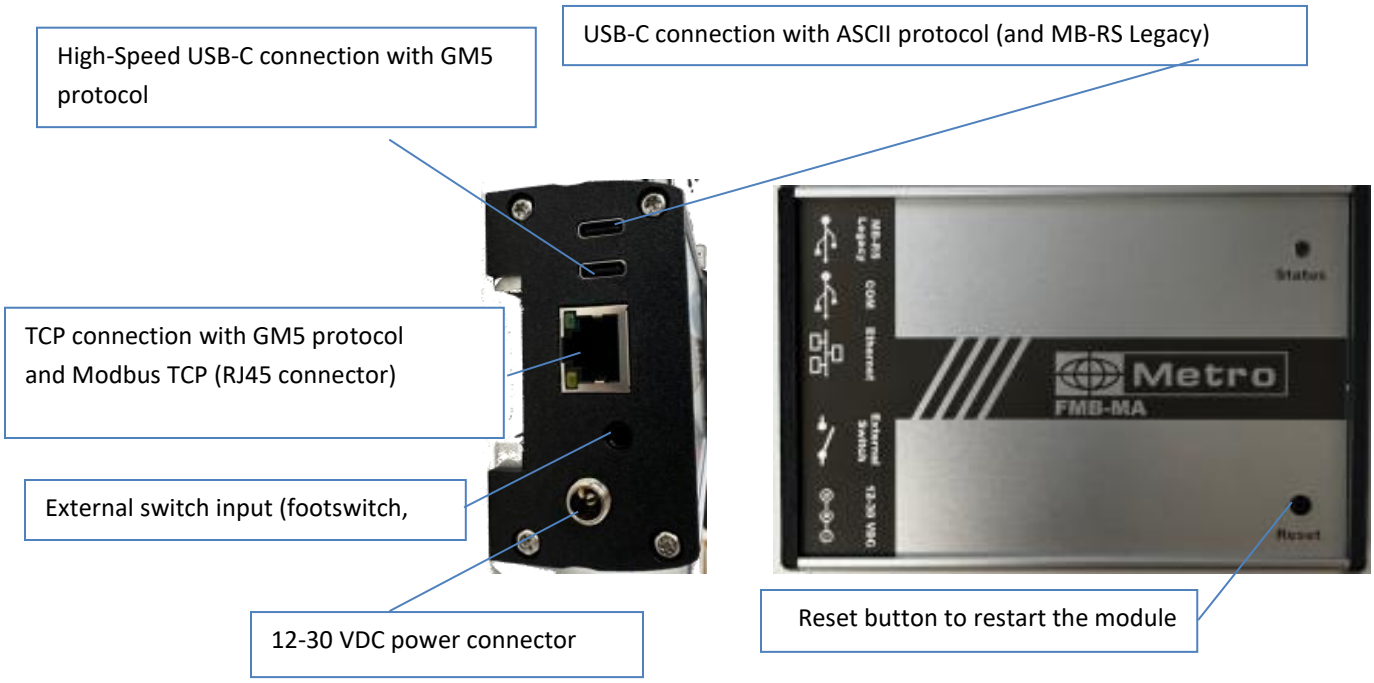
Power is supplied by the external transformer provided or directly by 12-30VDC.

This module transmits the raw values from the connected sensors to the external device (PC, PLC).

4.2 Main Components

The system is composed of the FMB-MA (master module) and other M-BUS modules depending on your application. (LVDT, Force sensors, instruments etc.)

4.3 Interfaces & Connectors



4.4 Technical Specifications

- Ethernet port for communication with a PC or PLC,
- Transfer of measurements via pedal input or retro command on the Ethernet or USB port,
- Dimensions: width 108 mm, height 39 mm, depth 74 mm,
- Weight: 205 grams,
- Up to 254 inputs can be connected,
- M-bus port for connecting M-Bus multiplexer boxes or inputs/outputs,
- USB port(s) for communication with a PC,
- Reset button,
- Operating temperature: +15°C to +30°C,
- Power supply from 85 to 265 VAC via supplied power adapter,

5 Unpacking & Storage

5.1 Unpacking Checklist

Upon receipt of the FMB-MA:

1. Check the shipping container for visible damage.
2. Carefully unpack the device and accessories.
3. Verify that all items listed below are present :

   1 × FMB-MA (1)

   1 × Wall transformer with 24VDC output, including set of country adapter. (2)

   1 × USB A to USB C - Communication cable (3)

4. Inspect the device for any signs of mechanical damage.

Do not power the device if damage is detected, especially on the transformer. Report the issue to the supplier before installation.

5.2 Storage Conditions

The FMB-MA must be stored in a clean, dry, and non-condensing environment.
Recommended storage conditions are as follows:

- **Temperature:** –20 °C to +60 °C
- **Relative humidity:** 5 % to 90 % (non-condensing)
- **Atmosphere:** Non-corrosive environment, free from conductive dust and chemical contaminants.

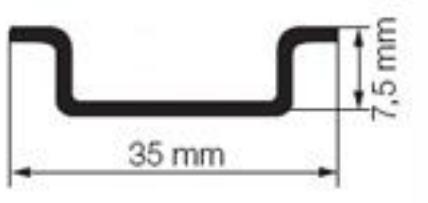
Avoid exposure to:

- Direct sunlight
- Excessive humidity or condensation
- Strong electromagnetic fields
- Mechanical shocks or vibrations during storage

6 Installation & Setup

6.1 Mechanical Installation

The FMB-MA can be mounted on a 7.5*35mm DIN RAIL. (or 15*35mm)



The sensors modules can be plugged directly at the output of the FMB-MA :

Example of FMB-MA connected with modules for LVDT, Temperature and Force sensor.

or it can also be separated by a M-BUS cable. As standard Metro propose 3 lengths :

Ref 81210-2 : 2m

Ref 81210-5 : 5m

Ref 81210-10 : 10m

Example of separation of the bus with a M-BUS cable.

6.2 Electrical Installation

Power the FMB-MA using the delivered transformer and lock it with the ring to secure the connection.

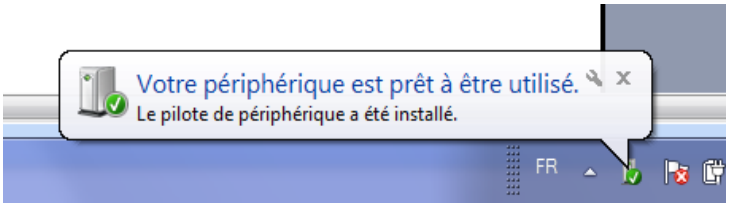
6.3 USB-C Communication Port (MB-RS Legacy)

The FMB-MA replaces the previous MB-RS module. In order to facilitate the retrofit, a legacy port with the same commands has been installed. Connecting the device to a PC via USB will create a virtual COM port.

Please follow these steps before using your device:

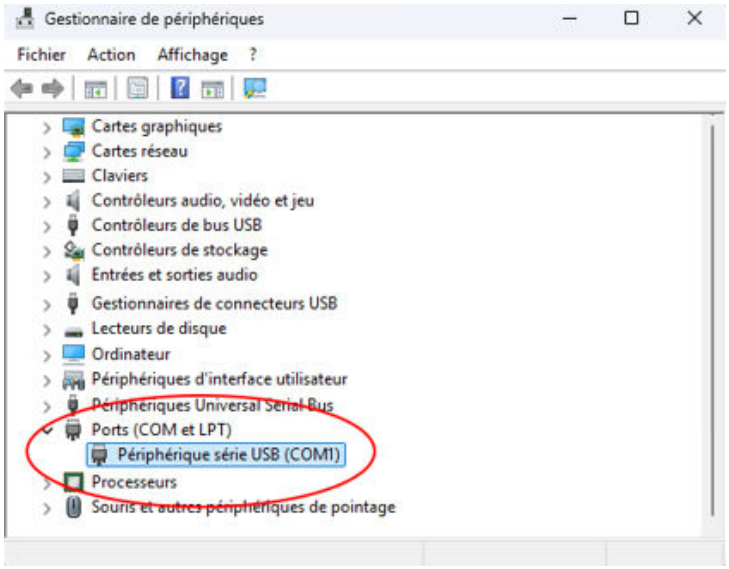
1- Download the “FTDI Drivers for Virtual COM Port” available from the download center on the Metro website (password = metro). The driver will then install automatically.

2- Connect your device to your PC using the USB cable. The following message will appear in Windows:



3- A COM port (USB Serial Port) will appear in Device Manager (Control Panel > Device Manager > Ports (COM and LPT)

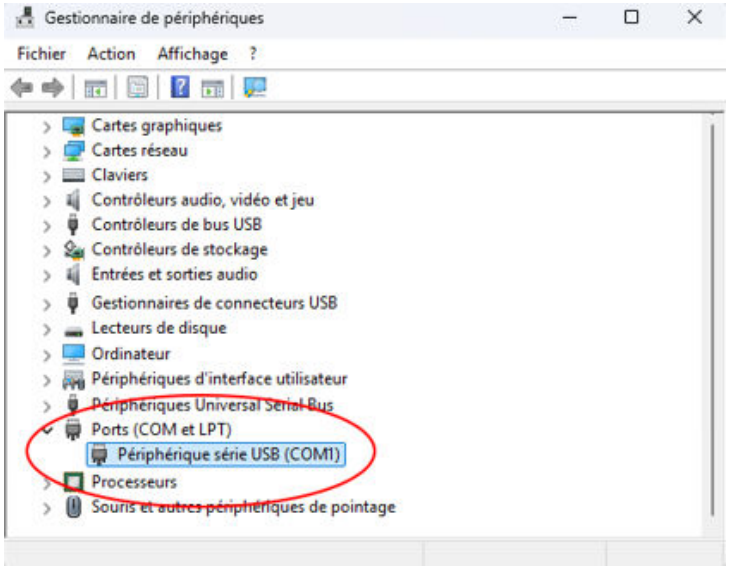
You can then note the port number that has been assigned to your device, which may be useful when configuring your acquisition software.



6.4 USB-C Communication Port (COM)

This port does not require a driver, it uses the original HID drivers from Windows.

After connecting it you can find it on the device manager :



6.5 RJ45 – Ethernet port

This can be used to communicated with a PC with GM5 protocol and to a PLC using the Modbus TCP protocol.

Description of signals and pin assignments.

Pin	*Signal*	*Direction*	*Description*
1	N.C.		
2	N.C.		
3	Ground	-	Signal mass/return
4	TX	Output	Data transmission
5	RX	Input	Data reception
6	N.C.		
7	N.C.		
8	N.C.		

7 Communication – GM5 Protocol (ASCII)

The GM5 protocol allows individual sensor reading, complete product configuration, management of all types of M-Bus modules, etc.

Commands begin with a code consisting of a capital letter and a number, followed or not by numbers separated by a space, then comes the operator indicating read ? or write = and ends with the character <CR> (\r, 0x0D).

Responses use the same format. In the case of a read, the value read is provided after the operator =. In the case of a write, it is a return code, either <ACK>\0x06 or <NACK>\0x15.

7.1 General controls

7.1.1 Product information

7.1.1.1 Product reference

The C2 command allows you to obtain the reference/trade name of the product in text form.

- Command: C2 ?<CR>
- Answer : C2=FMB-MA<CR>

7.1.1.2 Hardware version

The C3 command allows you to obtain the hardware version of the product.

- Command : C3 ?<CR>
- Anwser : C3=v1.00<CR>

7.1.1.3 Software version

The C4 command allows you to obtain the software version of the product.

- Command : C4?<CR>
- Anwser: C4=v1.00<CR>

7.1.1.4 Serial Number

The C5 command allows you to obtain the product serial number.

- Command : C5?<CR>
- Answer : C5 =MA254xxxx<CR>

7.1.2 Commands

7.1.2.1 Restarting the productt

The A1 command allows the product to restart after a period of ttt milliseconds, for example after a network configuration change, so that the new parameter values are taken into account.

- Command : A1=ttt<CR>
- Answer : A1=\x06Ok <CR>

7.1.2.2 Resetting the product

The A2 command resets the product configuration, deleting all registered M-Bus modules and settings.

- Command : A2=1<CR>
- Answer : A2=\x06Ok <CR>

7.1.2.3 Configuration backup

The A3 command forces the product configuration to be saved.

- Command : A3=1<CR>
- Answer : A3=\x06Ok <CR>

7.2 Network setting

7.2.1.1 Ethernet connection status

The C210 command allows you to obtain the status of the Ethernet connection.

- Commande : C210?<CR>
- Answer : C210=dd<CR>

0	disconnected
1	connected

Table 1

7.2.1.2 Information about changes to the IP configuration

The C207 command provides information on whether the Ethernet interface configuration has changed, for example, if the DHCP server has provided an IP address.

- Command : C207?<CR>
- Answer : C207=dd<CR>

0	unchanged
1	changed

Table 2

7.2.1.3 MAC address of the product's Ethernet interface

The C201 command allows you to obtain the MAC address of the Ethernet interface.

- Command : C201?<CR>
- Answer : C201=3c:6a:2c:a0:00:f0<CR>

7.2.1.4 DHCP management

The C203 command allows you to determine whether the product's IP settings are assigned via a DHCP server or defined manually.

- Command : C203 ?<CR>
- Answer : C203=dd<CR>

The C203 command allows you to select whether the product's IP settings are assigned by a DHCP server or manually.

- Command : C203=dd<CR>
- Answer : C203=\x06Ok<CR>

0	manual
1	DHCP server

Table 3

Any changes require the product to be restarted (see §6.1.2.1 Restarting the product) in order for the new settings to take effect.

7.2.1.5 IP Address

The C204 command allows you to find out the product's IP address.

- Command : C204?<CR>
- Answer : C204=ddd.ddd.ddd.ddd<CR>

The C204 command is used to define the product's IP address if it is not assigned by a DHCP server (see § 6.2.1.4 DHCP management).

- Command : C204 = ddd.ddd.ddd.ddd <CR>
- Answer : C204 =\x06Ok<CR>

7.2.1.6 IP address mask

The C205 command allows you to find out the IP address mask of the product.

- Command : C205?<CR>
- Answer : C205=ddd.ddd.ddd.ddd<CR>

The C205 command is used to define the IP address mask for the product if the assignment is not made by a DHCP server (see § 6.2.1.4 DHCP management).

- Command : C205= ddd.ddd.ddd.ddd<CR>
- Answer : C205=\x06Ok<CR>

7.2.1.7 IP Gateway

The C206 command allows you to find out the product's network connection gateway.

- Command : C206?<CR>
- Answer : C206=ddd.ddd.ddd.ddd<CR>

The C206 command allows you to define the product's network connection gateway if the assignment is not made by a DHCP server (see § 6.2.1.4 DHCP management).

- Command : C206= ddd.ddd.ddd.ddd<CR>
- Answer : C206=\x06Ok<CR>

7.2.1.8 NetBios name

The C208 command allows you to find out the NetBios name of the product's Ethernet interface.

- Command : C208?<CR>
- Answer : C208=fmb-ma <CR>

The C208 command allows you to define the NetBios name of the product's Ethernet interface.

- Command : C208=mon-fmb-ma<CR>
- Answer : C208=\x06Ok<CR>

See §8.3.2) Netbios name for more details.

7.2.1.9 GM5 communication port on TCP

The C211 command allows you to obtain the connection port for the product's GM5 protocol.

- Command : C211?<CR>
- Answer : C211=4001<CR>

7.2.1.10 Web server port

The C212 command allows you to obtain the connection port of the web server.

- Command : C212?<CR>
- Answer : C212=80<CR>

7.2.1.11 Web server Home Page

The C215 command returns the path to the web server's home page.

- Command : C215?<CR>
- Answer : C215=/index.html<ETX><CR>

7.2.1.12 Modbus communication port

The C213 command allows you to obtain the Modbus/TCP connection port of the product.

- Command : C213?<CR>

- Answer : C213=502<CR>

7.3 M-Bus Commands

7.3.1 M-Bus reset

The M1 command allows you to restart the M-Bus manager and resume communication with any M-Bus modules that may have been added or lost.

- Command : M1=1<CR>
- Answer : M1=\x06Ok <CR>

7.3.2 Configuration reset

The M2 command allows you to reset the M-Bus configuration and release paired M-Bus modules.

- Command : M2=1<CR>
- Answer : M2=\x06Ok <CR>

7.3.3 List of identified modules + presence information

The M3 command provides a list of configured M-Bus modules and certain individual information.

- Command : M3=dd<CR>
- Answer : M3=\x06Ok <CR>

Followed by

- Answer : M52 1=MBUS_ID_MODULE_1 …<LF>
- …<LF>
- Answer : M52 N=MBUS_ID_MODULE_N …<LF><CR>

Information requested	Value		
	Decimal	Hexadecimal	Binary
Managed	1	0x01	00000001
Connected	2	0x02	00000010
Communication errors encountered	4	0x04	00000100
Disconnected since startup	8	0x08	00001000
Absent at startup	16	0x10	00010000
Internal module or card	32	0x20	00100000
Channel numbers in decimal	64	0x40	01000000
Channel numbers in hexadecimal	128	0x80	10000000

Table 4

Example :

dd = 95 (0x5F) = 64 + 16 + 8 + 4 + 2 +1 (0x40 + 0x10 + 0x08 + 0x04 + 0x02 + 0x01)

M3=95<CR>

```
M3=<ACK>Ok<CR>
M52 1=9#I410XXXX 1 1 1 0 0   [1,4]<LF>
M52 2=9#T100XXXX 1 1 0 0 0   [6,6]<LF>
M52 3=9#W2K0XXXX 1 0 0 0 1   [13,14]<LF>
M52 4=9#I800XXXX 1 0 0 1 0   [15,22]<LF><CR>
                 | | | | |    |
                 1 2 4 8 16 32
```

In summary,

- the product manages 4 M-Bus modules,
- the 3rd and 4th modules do not communicate,
- the 3rd module has been lost since startup,
- the 4th module was not present at startup,
- the product is having difficulty communicating with the 1st module,
- the channel numbers for module 1 range from 1 to 4,
- the channel number for module 2 is 6,
- the channel numbers for module 3 range from 13 to 14,
- the channel numbers for module 4 range from 15 to 22.

7.3.4 Measure management

The M4 command allows you to determine whether the M-Bus modules are in measurement mode (querying the value of their channels) or in configuration mode.

- Command : M4?<CR>
- Answer : M4=dd <CR>

The M4 command enables or disables the channel value measurement mode.

- Command : M4=dd<CR>
- Answer : M4=\x06Ok<CR>

0	disabled
1	enabled

Table 5

Note: In disabled mode, the value returned by the command to read channel nn: M102 nn, will be the last known value for that channel and not the current measurement.

7.3.5 Status of module addition/removal operation

The M5 command allows you to determine whether the M-Bus configuration has changed.

- Command : M5?<CR>
- Answer : M5=dd<CR>

0	unchanged
1	changed

Table 6

7.3.6 Maximum number of channel given

The M6 command returns the highest M-Bus channel number defined in the product.

- Command : M6?<CR>
- Answer : M6=dd<CR>

7.4 General commands for the M-BUS modules

7.4.1.1 Adding a module

7.4.1.1.1 Free placement

The A101 command allows you to add the module starting from the first available sensor number.

- Command : A101=0<CR>
- Answer : M52 nn=MBUS_ID_MODULE_AJOUTE*<CR>*

With nn the assigned module number

7.4.1.1.2 Forced placement

The A101 command allows you to add the module using the sensor number nn requested for the first sensor of the module.

- Command : A101=nn<CR>
- Answer : M52 yy=MBUS_ID_MODULE_AJOUTE<CR>

With nn = number of the first sensor requested and yy the assigned module number

7.4.1.2 Informations

7.4.1.2.1 Module description

The M57 command is used to obtain the description/commercial name in text form of module yy.

- Command : M57 yy ?<CR>
- Answer : M57 yy=Description<CR>

7.4.1.2.2 Channel number of the module

The M53 command allows you to obtain the number n of channels (paths) of the yy module.

- Command : M53 yy ?<CR>
- Answer : M53 yy=n<CR>

7.4.1.2.3 Software version of the module

The M55 command displays the software version of module yy in text form.

- Command : M55 yy ?<CR>
- Answer : M55 yy=v2.00<CR>

7.4.1.3 Reading

The M102 command returns the value of channel nn as a decimal number.

- Command : M102 nn ?<CR>
- Answer : M102 nn=1.2345<CR>

The M103 command is used to obtain the raw value of channel nn, for example for an input/output module where the decimal value has no meaning.

- Command : M103 nn ?<CR>
- Answer : M102 nn=64<CR>

7.4.1.4 Removing

The M59 command allows you to remove the yy module from the list of managed modules.

- Command : M59 yy=<CR>
- Answer : M59 yy=\x06Ok<CR>

7.5 commands for M-Bus modules

7.5.1 FMB-4i – 4 channels for Metro Inductive probes

7.5.1.1 Reading the sensor type

The M116 command returns the character string describing the type of probe connected to channel nn.

- Command : M116 nn ?<CR>
- Answer : M116 nn=M804<CR>

7.5.1.2 Reading of the probe's stroke

The M117 command allows you to obtain the total stroke of the probe connected to channel nn.

- Command : M117 nn ?<CR>
- Answer : M117 nn=4<CR>

7.5.2 MB-8i – 8 Metro inductive probes

7.5.2.1 Reading the probe stroke

The M117 command returns the stroke m of the METRO probe detected on channel nn in mm.

- Command : M117 nn ?<CR>

- Answer : M117 nn=m<CR>

By default, if the sensor is not connected or not recognized, the value is 4.

7.5.2.2 Reading the probe type

The M116 command is used to obtain the stroke m of the METRO probe detected on channel nn.

- Command : M116 nn ?<CR>
- Answer : M116 nn=m<CR>

Value	Probe model
1	M801
2	M802
4	M804S (set as standard)
10	M810
20	M820

Table 7

7.5.2.3 Reading the presence of error 25

The M120 command checks whether a METRO probe is connected to channel nn and, if not, triggers error 25. It is useful only if you connect a module sold before 2022.

- Command : M120 nn ?<CR>
- Answer : M120 nn=m<CR>

0	No error
1	Error 25

Table 8

7.5.3 FMB-IO – 8 input / output

7.5.3.1 Input reading

The M103 command returns the decimal value of channel nn, describing the active inputs of the module.

- Command : M103 nn ?<CR>
- Answer : M103 nn=dd<CR>

Input	Value		
	Decimal	Hexadecimal	Binary
1	1	0x01	00000001
2	2	0x02	00000010
3	4	0x04	00000100
4	8	0x08	00001000
5	16	0x10	00010000
6	32	0x20	00100000

7	64	0x40	01000000
8	128	0x80	10000000

Table 9

Example :

dd = 80 (0x50) = 64 + 16 (0x40 + 0x10) i.e., inputs 7 & 5 active

7.5.3.2 Output control

M204 command is used to control the module's outputs.

- Command : M204 nn=dd<CR>
- Answer : M204 nn=\x06Ok<CR>

Example :

dd = 132 (0x84) = 128 + 4 (0x80 + 0x04) i.e. outputs 8 & 3 activated

7.5.4 MB-RO – 1 relay output

7.5.4.1 Relay output control

The M204 command is used to control the relay of channel nn.

- Command : M204 nn=d<CR>
- Answer : M204 nn=\x06Ok<CR>

Relay	Value		
	Decimal	Hexadecimal	Binary
Open	0	0x00	0000
Closed	1	0x01	0001

Table 10

7.5.5 MB-2S – 2 channel for 1Vpp or 11µA input

7.5.5.1 Reference mark

The M163 command allows you to find out whether the reference mark is used for track nn.

- Command : M163 nn ?<CR>
- Answer : M163 nn=rf<CR>

Command M163 allows you to define whether or not to use the reference mark for track nn.

- Command : M163 nn=rf<CR>
- Answer : M163 nn=\x06Ok<CR>

0	No
1	yes

Table 11

7.5.5.2 Encoder type (rotary or linear)

The M164 command allows you to find out the type of linear or rotary encoder used for channel nn.

- Command : M164 nn ?<CR>
- Answer : M164 nn=t<CR>

The M164 command is used to define the type of linear or rotary encoder used for channel nn.

- Command : M164 nn=t<CR>
- Answer : M164 nn=\x06Ok<CR>

0	linear
1	rotary

Table 12

7.5.5.3 Linear encoder - step

The M161 command allows you to find out the linear encoder pitch in mm for channel nn.

- Command : M161 nn ?<CR>
- Answer : M161 nn=rr<CR>

The M161 command is used to define the linear encoder pitch in mm for channel nn.

- Command : M161 nn=rr<CR>
- Answer : M161 nn=\x06Ok<CR>

7.5.5.4 Rotary encoder, step by revolution

The M161 command allows you to find out the number of steps per revolution of the rotary encoder for channel nn.

- Command : M161 nn ?<CR>
- Answer : M161 nn=pp<CR>

The M161 command is used to define the number of steps per revolution of the rotary encoder for channel nn.

- Command : M161 nn=pp<CR>
- Answer : M161 nn=\x06Ok<CR>

7.5.5.5 Interpolation

M162 command allows you to read the interpolation rate for channel nn.

- Command : M162 nn ?<CR>
- Answer : M162 nn=ii<CR>

The M162 command is used to set the interpolation rate for channel nn.

- Command : M162 nn=ii<CR>
- Answer : M162 nn=\x06Ok<CR>

The possible values for ii are 200, 400, 500, 800, 1000, 1600, and 2000.

7.5.6 MB-1D/MB-4D – 1 or 4 channel for Digimatic instruments

7.5.6.1 Degraded mode – slow reading

This mode can be useful depending on the instrument brand connected. Some instrument stop answering if the reading speed is too high.

The M109 command allows you to know whether the device connected to channel nn is reading normally or slowly.

- Command : M109 nn ?<CR>
- Answer : M109 nn=dd<CR>

The M109 command allows you to define whether the device connected to channel nn is read normally or slowly.

- Command : M109 nn=dd<CR>
- Answer : M109 nn=\x06Ok<CR>

0	normal
1	degraded

Table 13

7.5.7 MB-AG – 1 channel for Air Gage

7.5.7.1 Calibration

7.5.7.1.1 Processus

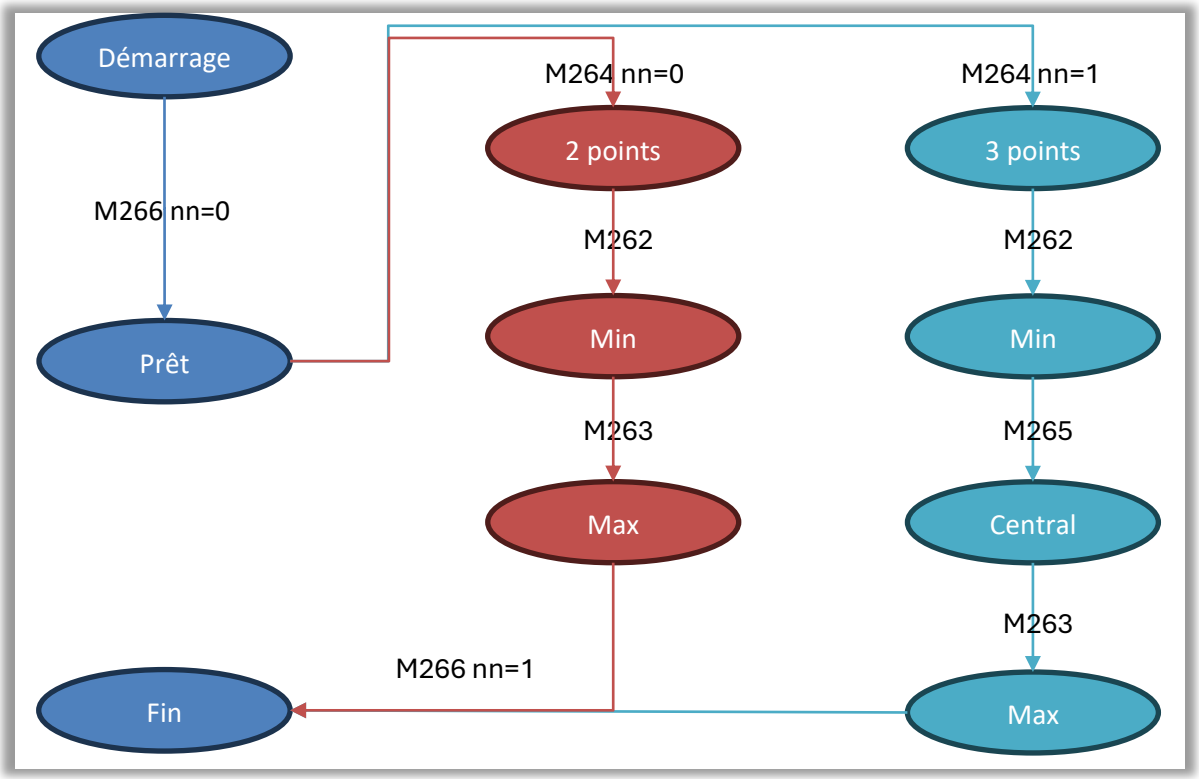


Figure 1

7.5.7.1.2 Management of the Min master value

The M262 command allows you to find out the value in mm of the Min master defined for the calibration of channel nn.

- Command : M262 nn ?<CR>
- Answer : M262 nn=x.x<CR>

The M262 command is used to define (and apply) the value in mm of the Min master for channel nn.

- Command : M262 nn=x.x<CR>
- Answer : M262 nn=\x06Ok<CR>

This definition command should only be used as part of a channel calibration sequence (see 6.5.12.2.1) Process.

7.5.7.1.3 Management of the value of the Max master

The M263 command allows you to find out the value in mm of the Max master defined for calibrating channel nn.

- Command : M263 nn ?<CR>
- Answer : M263 nn=x.x<CR>

The M263 command is used to define (and apply) the value in mm of the Max master for channel nn.

- Commande : M263 nn=x.x<CR>
- Answer : M263 nn=\x06Ok<CR>

This definition command should only be used as part of a channel calibration sequence (see 6.5.12.2.1) Process.

7.5.7.1.4 2- or 3-point calibration management

The M264 command allows you to find out the value in mm of the Max master defined for calibrating channel nn.

- Command : M264 nn ?<CR>
- Answer : M264 nn=dd<CR>

The M264 command is used to define (and apply) the value in mm of the Max master for channel nn.

- Command : M264 nn=dd<CR>
- Answer : M264 nn=\x06Ok<CR>

0	2 points
1	3 points

Table 14

This definition command should only be used as part of a channel calibration sequence (see 6.5.12.2.1) Process.

7.5.7.1.5 Management of the value of the master standard (3-point calibration)

The M265 command allows you to find out the value in mm of the master defined for calibrating channel nn.

- Command : M265 nn ?<CR>
- Answer : M265 nn=x.x<CR>

The M265 command is used to define (and apply) the value in mm of the master calibration standard for channel nn.

- Command : M265 nn=x.x<CR>

- Answer : M265 nn=\x06Ok<CR>

This definition command should only be used as part of a channel calibration sequence (see 6.5.12.2.1) Process.

7.5.7.1.6 Calibration control

The M266 command allows you to find out whether channel nn is calibrated.

- Command : M266 nn ?<CR>
- Answer : M266 nn=dd<CR>

0	uncalibrated
1	calibrated

Table 15

The M266 command is used to start/end the calibration of channel nn.

- Command : M266 nn=dd<CR>
- Answer : M266 nn=\x06Ok<CR>

0	start
1	end

Table 16

7.5.7.2 Filter level

The M267 command allows you to find out if the filter level dd is applied to the value of channel nn. The filter level helps to stabilize the reading.

- Command : M267 nn ?<CR>
- Answer : M267 nn=dd<CR>

The M267 command allows you to select the filter level applied to channel nn.

- Command : M267 nn=dd<CR>
- Answer : M267 nn=\x06Ok<CR>

The filter level ranges from 0 (inactive) to 5.

7.5.8 MB-TP - Temperature

7.5.8.1 Temperature sensor type management

The M191 command allows you to find out the type of temperature sensor used by channel nn.

- Command : M191 nn ?<CR>
- Answer : M191 nn=dd<CR>

The M191 command is used to define the type of temperature sensor used by channel nn.

- Command : M191 nn=dd<CR>
- Answer : M191 nn=\x06Ok<CR>

0	Type K
1	PT100

Table 17

8 MODBUS TCP PROTOCOL

8.1 Modbus TCP

This protocol allows the FMB-MA to be connected to a compatible programmable logic controller via its RJ45 connection port.

8.1.1 Configuration

. The IP connection port number is 502.

8.1.2 Reading sensor values

8.1.2.1 Enteger mode

The commands described below are available in the sample file for the Modbus Poll software ‘fmb-ma_integer_values.mbw’.

To obtain the 32-bit integer value, simply read registers 8000 to 8506:

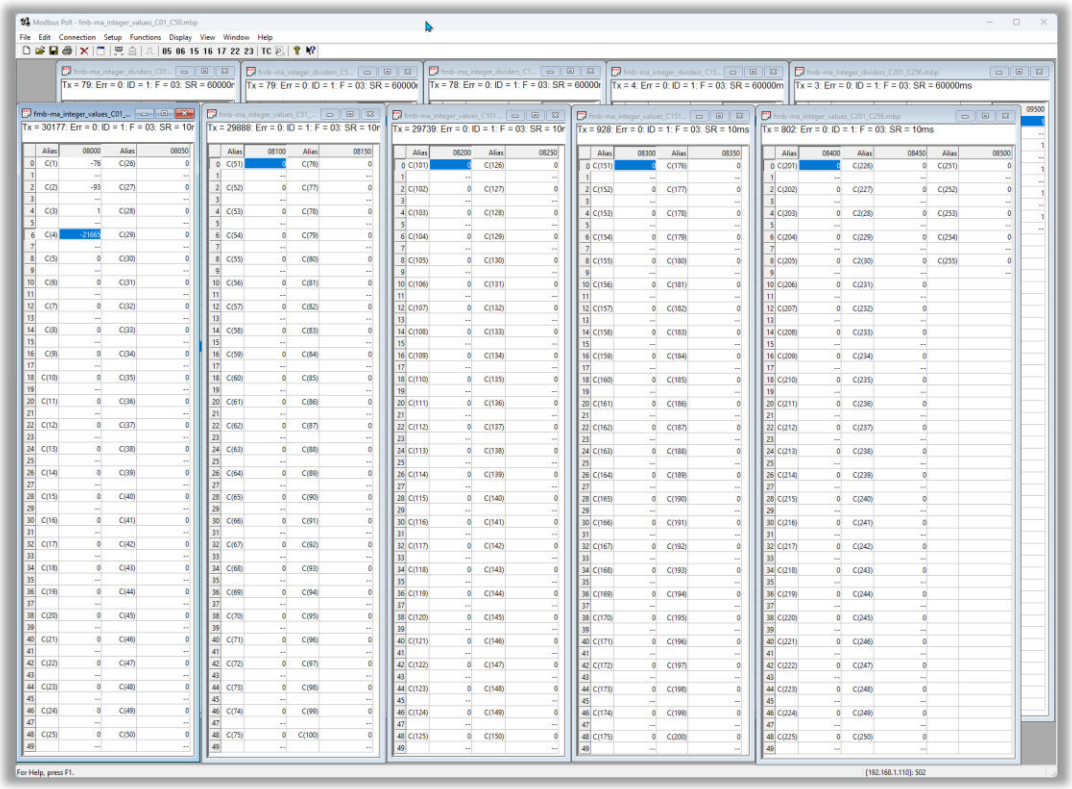
Sensor 1: register 8000

Sensor 2: register 8002

Sensor 3: register 8004

...

Sensor 254: register 8506



To obtain the 32-bit divider associated with each channel, simply read registers 9000 to 9506:

Sensor 1: register 9000

Sensor 2: register 9002

Sensor 3: register 9004

...

Sensor 254: register 9506

Example 1: The FMB-4i gives a position in 1/10000 of a mm, so its divider is 10000. If the value is 7595, this means that it has measured 0.7595 mm.

Example 2: The MB-TP gives the temperature in 1/10 of °C, so its divisor is 10. If the value is 181, this means that it has measured 18.1 °C.

8.1.2.2 Real mode

The commands described below are available in the sample file for the Modbus Poll software 'fmb-ma_real_values.mbw'.

To obtain the actual value, simply read registers 7000 to 7506:

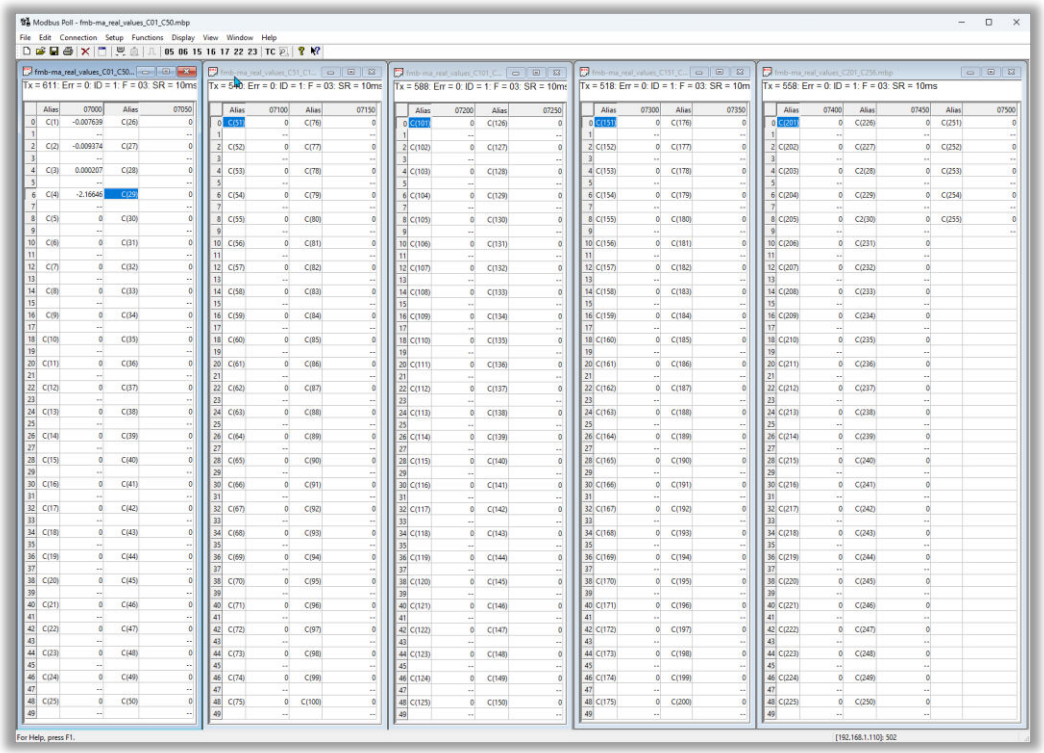
Sensor 1: register 7000

Sensor 2: register 7002

Sensor 3: register 7004

...

Sensor 254: register 7506



9 WEB INTERFACE

product offers a web-based configuration/consultation interface available from a browser at http://fmb-ma/.

9.1.1 Navigation

At the top of each page, the banner provides a link to

Home page

Network settings

M-Bus settings

9.2 Homes page

The home page /index.html is shown in Figure 5.

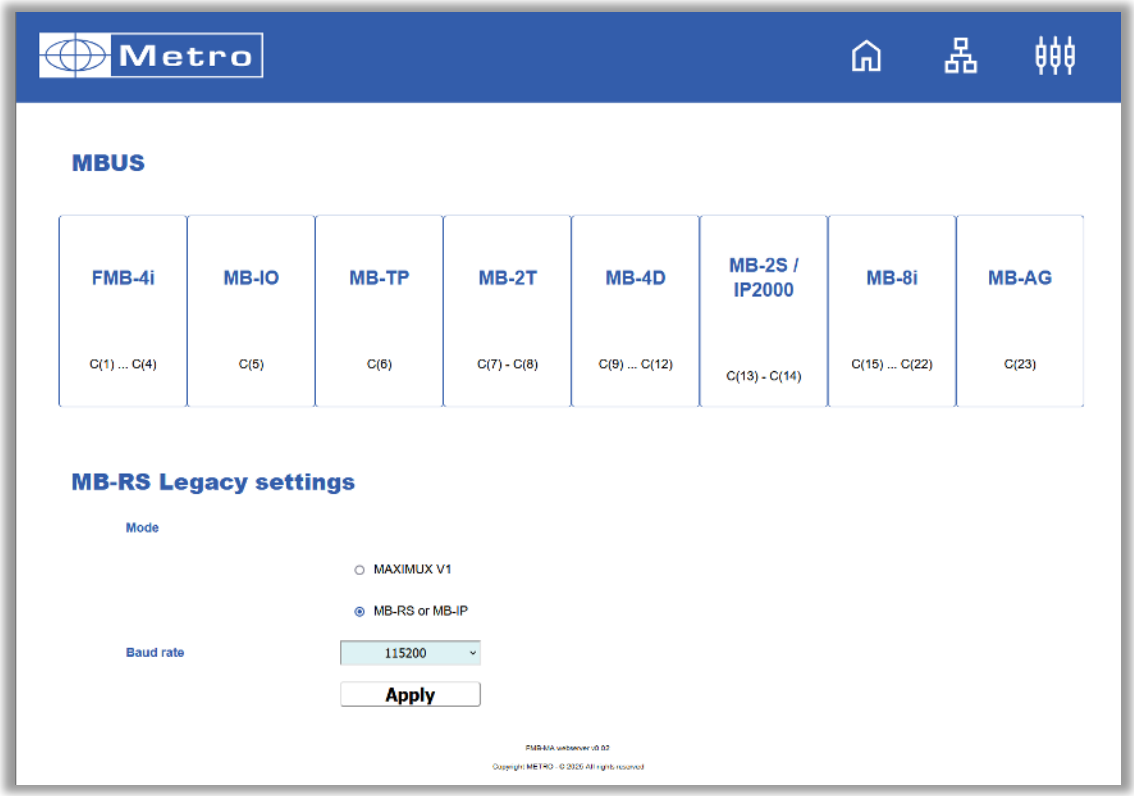


Figure 2

9.2.1 MBUS view

The M-Bus modules identified in the product are displayed from left to right in sensor number order.

9.2.2 “MB-RS Legacy” interface settings

The “**MB-RS Legacy**” USB port on the FMB-MA implements the management of MB-RS ASCII protocol commands described in section 5) COMMUNICATION - ASCII PROTOCOL.

9.2.3 Standard mode

To use the FMB-MA in an environment compatible with standard MB-RS and MB-IP, select “MB-RS or MB-IP” and the commonly used baud rate of 115200.

9.2.4 MAXIMUX V1 mode

To use the FMB-MA in an environment using the MAXIMUX V1 protocol, select “MAXIMUX V1” and the generally used baud rate is 9600. The Maximux is an old and discontinued Metro product.

9.3 Network settings

The network settings page /network.html is shown in Figure 6.

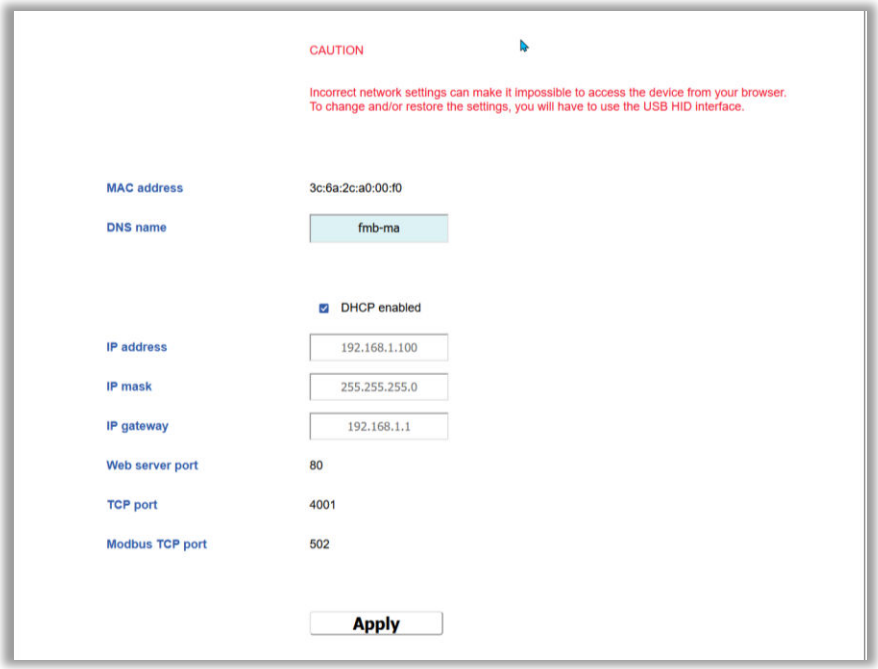


Figure 3

9.3.1 Information

The product is identified by the unique MAC address of its Ethernet interface. It offers

- the web server delivering this page on the “Web server port,”
- command management using the GM5 protocol on the “TCP port,”
- Modbus TCP protocol management on the “Modbus TCP port.”

9.3.2 Netbios name

The Netbios name or “DNS name” allows you to address the product's Ethernet interface without having to know its IP address.

It is recommended not to use characters with accents or symbols when defining a Netbios name.

The product configuration is effective when you press the “Apply” button, but you must restart the product to use the new Netbios name.

Reminder: If several products are connected to the same Ethernet network, they cannot have the same Netbios name. As they are named “fmb-ma” by default, you must assign each of them a different Netbios name.

9.3.3 IP address settings

The product requires an IP address in order to be queried. This address can be defined statically or provided by a DHCP server on the network.

9.3.3.1 Fixed IP mode

To use fixed IP mode, uncheck the “DHCP enabled” box and fill in the “IP address,” “IP mask,” and “IP gateway” fields.

The product configuration takes effect when you click the “Apply” button, but you must restart the product to use the new IP address.

9.3.3.2 DHCP mode

To use DHCP server mode, check the “DHCP enabled” box.

The product configuration takes effect when you press the ‘Apply’ button, but you must restart the product to use the new IP address.

In DHCP mode, the “IP address,” “IP mask,” and “IP gateway” fields contain the configuration provided by the DHCP server.

9.3.4 Warning

Changing network settings, especially if they are incorrect, may prevent future connection to the product. If this occurs, section 6.2) Network settings allows you to adjust these settings from the USB COM interface.

Changes to parameter values require the product to be restarted. Until this restart is complete, the product's behavior cannot be guaranteed.

9.4 General M-Bus module commands

The M-Bus settings page /modules.html, shown in Figure 7, displays a table listing the channels defined in the device.

Action	Channel	Module type	Module ID	Firmware	Value	Settings	GM5 request Short | Standard	MB-RS Legacy request	Modbus as real | as integer
x	1	FMB-4i	9#I4100028	v4.11	0.4735		01 | M102 1?	00<CR>	7000 | 8000
x	2	FMB-4i	9#I4100028	v4.11	-0.0094		02 | M102 2?	01<CR>	7002 | 8002
x	3	FMB-4i	9#I4100028	v4.11	0.0002		03 | M102 3?	02<CR>	7004 | 8004
x	4	FMB-4i	9#I4100028	v4.11	-0.0018		04 | M102 4?	03<CR>	7006 | 8006
x	5	MB-IO	9#E1000428	V2.00	0		05 | M103 5?	04<CR>	7008 | 8008
x	6	MB-TP	9#T1001038	V2.00	24.8000		06 | M102 6?	05<CR>	7010 | 8010
x	7	MB-2T	9#H2000212	V1.00	0.0000		07 | M102 7?	06<CR>	7012 | 8012
x	8	MB-2T	9#H2000212	V1.00	0.0000		08 | M102 8?	07<CR>	7014 | 8014
x	9	MB-4D	9#D4101144	V2.12	0.0000		09 | M102 9?	08<CR>	7016 | 8016
x	10	MB-4D	9#D4101144	V2.12	0.0000		10 | M102 10?	09<CR>	7018 | 8018
x	11	MB-4D	9#D4101144	V2.12	0.0000		11 | M102 11?	10<CR>	7020 | 8020
x	12	MB-4D	9#D4101144	V2.12	0.0000		12 | M102 12?	11<CR>	7022 | 8022
x	13	MB-2S /IP2000	9#W2K00975	V1.10	-0.3500		13 | M102 13?	12<CR>	7024 | 8024
x	14	MB-2S /IP2000	9#W2K00975	V1.10	-0.1000		14 | M102 14?	13<CR>	7026 | 8026
x	15	MB-8i	9#I8009535	V2.01	0.0000		15 | M102 15?	14<CR>	7028 | 8028
x	16	MB-8i	9#I8009535	V2.01	0.0000		16 | M102 16?	15<CR>	7030 | 8030
x	17	MB-8i	9#I8009535	V2.01	0.0000		17 | M102 17?	16<CR>	7032 | 8032
x	18	MB-8i	9#I8009535	V2.01	0.0000		18 | M102 18?	17<CR>	7034 | 8034
x	19	MB-8i	9#I8009535	V2.01	0.0000		19 | M102 19?	18<CR>	7036 | 8036
x	20	MB-8i	9#I8009535	V2.01	0.0000		20 | M102 20?	19<CR>	7038 | 8038
x	21	MB-8i	9#I8009535	V2.01	0.0000		21 | M102 21?	20<CR>	7040 | 8040
x	22	MB-8i	9#I8009535	V2.01	0.0000		22 | M102 22?	21<CR>	7042 | 8042
x	23	MB-AG	9#A1002917	V1.10	0.1734		23 | M102 23?	22<CR>	7044 | 8044
+	24								

Figure 4

Buttons are used to perform commands applicable to all types of M-Bus modules, i.e., adding, removing, and configuring.

Each module added consumes one line per internal channel, i.e., 4 for an MB-4i.

Each line contains, in order:

- its number,
- the type, M-Bus identifier, and software version of the module to which it is attached,
- the current value of the channel,
- a link to the channel information/settings,
- the various commands for accessing the channel value in the different communication protocols.

9.4.1 Adding a module

To add a module, you must choose the position in which it will be inserted. The position is the number assigned to the first channel of the module in the device table, as shown in the figure. If the module has several channels, the table must have as many free lines as the module has channels.

Empty lines are indicated by the "+" button. Clicking on this button indicates the position where the first channel of the module will be added.

9.4.2 Removing a module

To remove a module, press the "x" button on one of the lines corresponding to the desired module. Once removed, all lines related to the module will disappear.

9.4.3 Removing all modules

To remove all modules, press the "Remove All" button at the bottom of the page. Once this is done, the table will appear empty of all modules.

9.4.4 Refreshing the M-Bus

To reset communication with the modules, refresh their Present/Absent status, and reread their type, ID, and version information, press the "Reset" button at the bottom of the page. Once this is done, the table will gradually update.

9.4.5 Viewing information for a module channel

If a module channel has no settings, the link to the page /probe.html specific to that channel can be accessed via the **magnifying glass** button.

The different pages are presented in chapter 8.5) Commands specific to M-Bus modules.

9.4.6 Configuring a module channel

If a module channel has settings, the link to the page /probe.html specific to this channel can be accessed via the pencil button.

The different pages are presented in chapter 8.5) Commands specific to M-Bus modules.

9.5 Specific commands for M-Bus modules

9.5.1 inductive channels – MB-4i

9.5.1.1 Adding a module

To add an MB-4i module with the first sensor number set to 1, click on the "+" button to the left of Channel No. 1, as shown in Figure 8, then press the module's "Id" button.

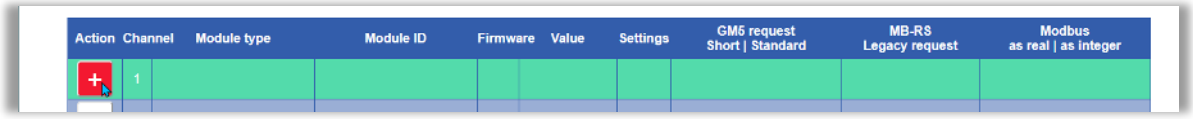


Figure 5

9.5.1.2 Information

Once the module is paired, its LED changes from flashing to steady, and the web page refreshes with the module's information. The table in Figure 9 has as many rows (4) as the module has channels.

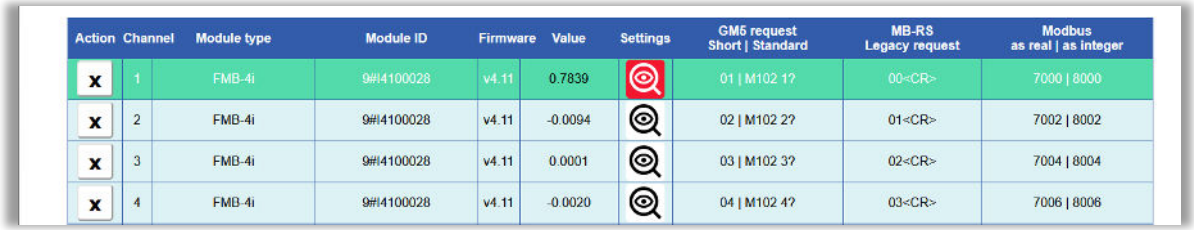


Figure 6

9.5.1.3 Viewing channel information

Figure 10 shows the information available for this type of module:

· The channel number in the module,

· The entry number in the sensor table,

· The current value of the channel.

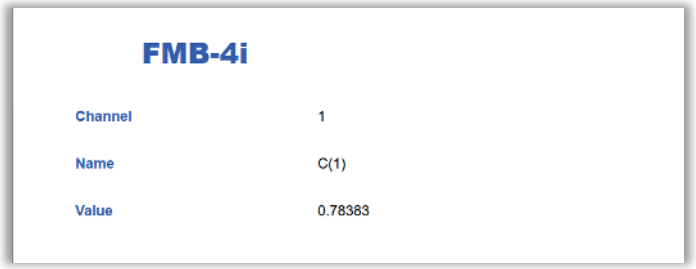


Figure 7

9.5.2 8 inductive channels – MB-8i

9.5.2.1 Adding the module

To add an MB-8i module with the first sensor number set to 15, click on the "+" button to the left of Channel No. 15, as shown in Figure 23, then press the module's "Id" button.

Figure 8

9.5.2.2 Informations

Once the module is paired, its LED changes from flashing to steady, and the web page refreshes with the module's information. The table in Figure 24 has as many rows (4) as the module has channels.

Figure 9

9.5.2.3 Viewing channel information

Figure 25 shows the information available for this type of module:

- The channel number in the module,
- The entry number in the sensor table,
- The current channel value,
- The type of sensor connected to the channel, if recognized. (MB-8i only)

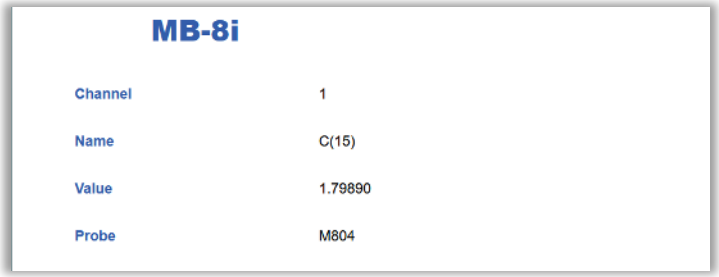


Figure 10

9.5.3 8 inputs/outputs – MB-IO

9.5.3.1 Adding the module

To add an MB-IO module with sensor number 5, click on the "+" button to the left of Channel No. 5 as shown in Figure 26, then press the module's "Id" button.

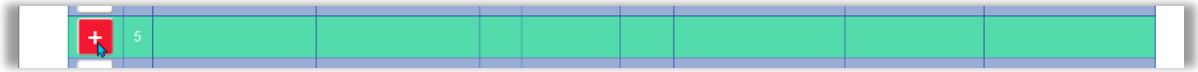


Figure 11

9.5.3.2 Informations

Once the module is paired, its LED changes from flashing to steady, and the web page refreshes with the module's information. The table in Figure 27 has as many rows (1) as the module has channels.

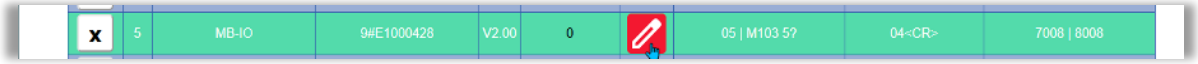


Figure 12

9.5.3.3 Control

Figure 28 shows the information available for this type of module:

- The number of the entry in the sensor table,
- The current value of the inputs

Figure 13

9.5.3.3.1 Input reading

Active entries are identifiable because they are displayed in green.

Entries are coded in 8-bit binary, entry 1 on bit 0 and so on... i.e.

Input	8	7	6	5	4	3	2	1
bit	7	6	5	4	3	2	1	0
Decimal value if bit is 1	128	64	32	16	8	4	2	1
Hexadecimal value	0x80	0x40	0x20	0x10	0x08	0x04	0x02	0x01

Example:

For a value of 99, i.e., 0x63 = 0x40 + 0x20 + 0x02 + 0x01, this means that inputs 1, 2, 6, and 7 are active.

9.5.3.3.2 Output control

To activate an output, simply click on the corresponding button.

9.5.4 relay output – MB-RO

9.5.4.1 Adding the module

To add an MB-RO module with sensor number 38, click on the "+" button to the left of Channel No. 38 as shown in Figure 32, then press the module's "Id" button.

Figure 14

9.5.4.2 Informations

Once the module is paired, its LED changes from flashing to steady, and the web page refreshes as shown in Figure 33.

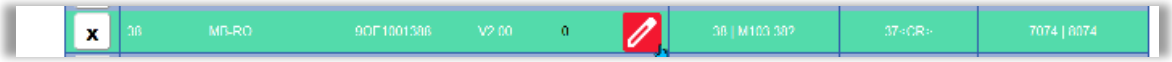


Figure 15

9.5.4.3 Control

Figure 34 shows the information available for this type of module:

- The number of the entry in the sensor table,

Figure 16

To activate the relay, simply click on the "**O**" button. Figure 33.

9.5.5 MB-2S - 2 channels 1Vpp or 11µA

9.5.5.1 Adding a module

To add an MB-2S module with the first sensor number set to 13, click on the "+" button to the left of Channel No. 13 as shown in Figure 40, then press the module's "Id" button.

Figure 17

9.5.5.2 Informations

Once the module is paired, its LED changes from flashing to steady, and the web page refreshes with the module's information. The table in Figure 41 has as many rows (2) as the module has channels.

Figure 18

9.5.5.3 Setting and viewing information for a channel

Figure 42 shows the information available for this type of module:

- The channel number in the module,
- The input number in the sensor table,
- The current channel value, The raw counter value.

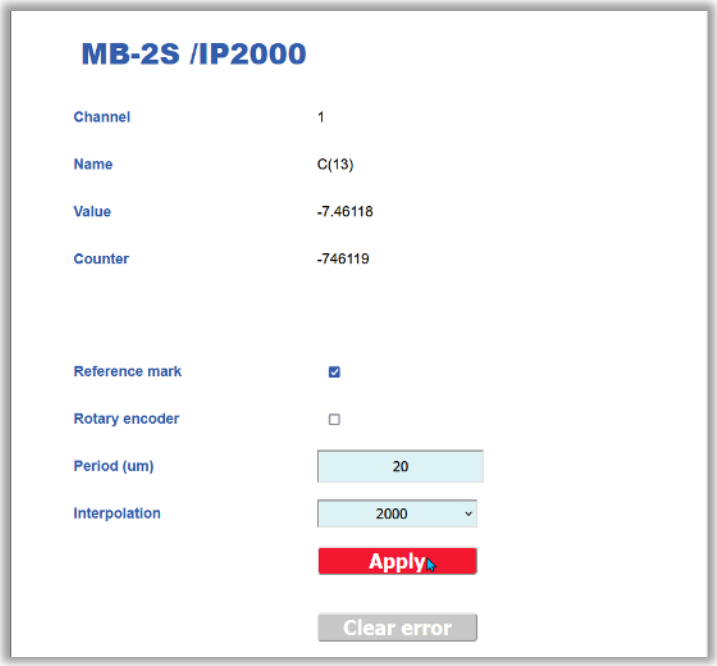


Figure 19

9.5.5.3.1 Reference mark

The "**Reference mark**" checkbox allows you to indicate whether or not the encoder has a reference mark. The information is transmitted to the module by pressing the "**Apply**" button.

9.5.5.3.2 Interpolation

Figure 43 shows the different interpolation options available. Once you have made your selection, confirm it along with the other settings by clicking the "**Apply**" button.

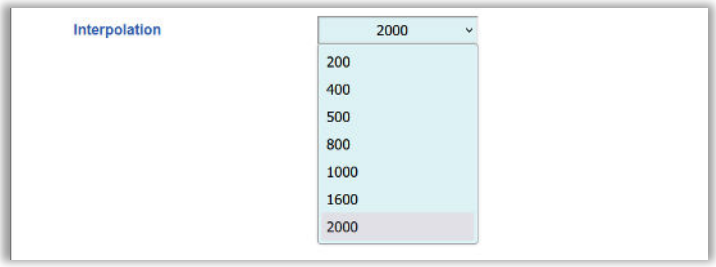


Figure 20

9.5.5.3.3 Linear encoder

The inactive "**Rotary encoder**" checkbox indicates that the encoder is linear.

In this case, the module must be told its period, i.e., how many µm correspond to the counter increment of 1, or one period of the sine wave.

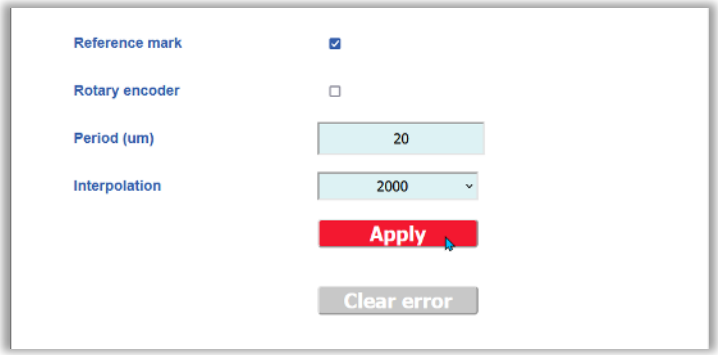


Figure 21

All configuration information in Figure 44 is transmitted to the module by pressing the "**Apply**" button.

9.5.5.3.4 Rotary encoder

The "**Rotary encoder**" checkbox, when enabled, indicates that the encoder is rotary.

In this case, the module no longer requires a period value, but rather the number of edges per complete revolution.

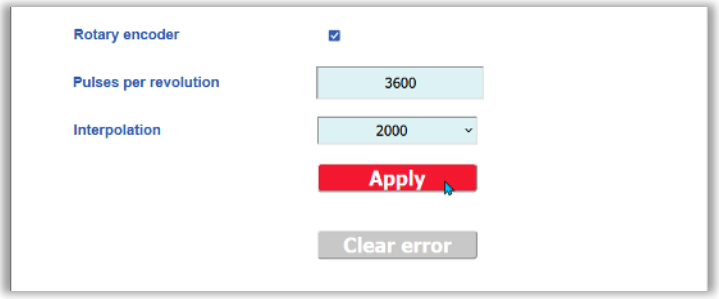


Figure 22

All configuration information in Figure 45 is transmitted to the module by pressing the "**Apply**" button.

9.5.5.3.5 Error reset

If the module has reported an error (e.g., overspeed) and cannot provide a value to the track, the "**Clear error**" button can be used to remedy this.

9.5.6 MB-1D/MB-4D – 1 or 4 digimatic channels

9.5.6.1 Adding a module

To add an MB-1D or MB-4D module with the first sensor number set to 9, click on the "+" button to the left of Channel No. 9 as shown in Figure 46, then press the module's "Id" button.

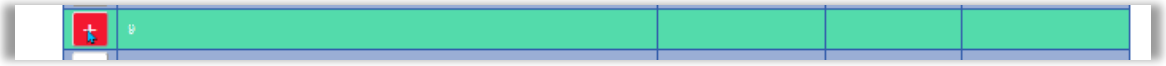


Figure 23

9.5.6.2 Informations

Once the module is paired, its LED changes from flashing to steady, and the web page refreshes with the module's information. The table in Figure 47 has as many rows (1 to 4) as the module has channels.

Figure 24

9.5.6.3 Setting and viewing channel information

Figure 48 shows the information available for this type of module:

- The channel number in the module (MB-4D only),
- The input number in the sensor table,
- The current value of the c

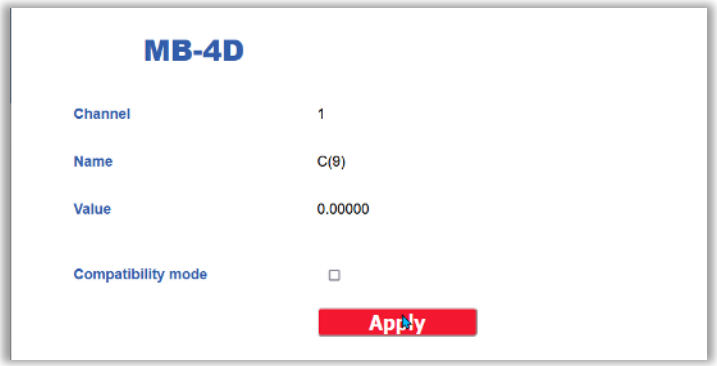


Figure 25

As well as the device interrogation mode using the Digimatic protocol.

If the device reading does not work (red LED lit opposite its connector), it is possible to activate/deactivate “Compatibility mode” or slow mode to change the reading mode. Validation is effective by pressing the “Apply” button.

Reminder: Some instruments are not designed to be interrogated too frequently, so slow mode allows for better communication in data transmission.

9.5.7 Airgage channel – MB-AG

9.5.7.1 Adding the module

To add an MB-AG module with sensor number 23, click on the “+” button to the left of Channel No. 23 as shown in Figure 49, then press the module's “Id” button.

Figure 26

9.5.7.2 Information

Once the module is paired, its LED changes from flashing to steady, and the web page refreshes with the module's information. The table in Figure 50 has as many rows (1) as the module has channels.

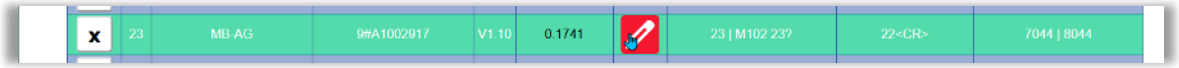


Figure 27

9.5.7.3 Setting and viewing channel information

Figure 51 shows the information available for this type of module:

- The input number in the sensor table,
- The current channel value. (if calibrated, this is the deviation from the smallest master)

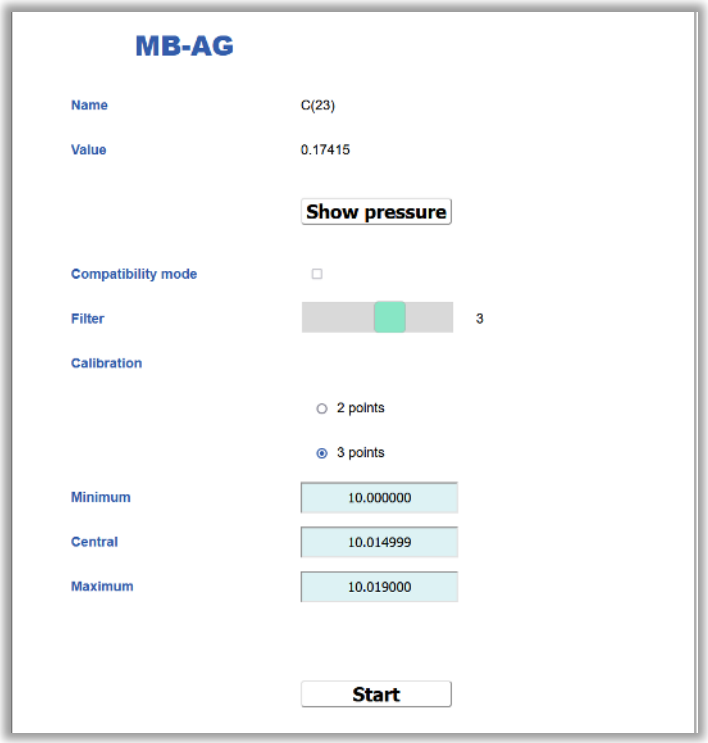


Figure 28

9.5.7.3.1 Measure type

Once calibrated, the value displayed in Figure 52 is a distance. It is possible to view the corresponding pressure for 10 seconds by pressing the "**Show pressure**" button. The display then appears as shown in Figure 53.

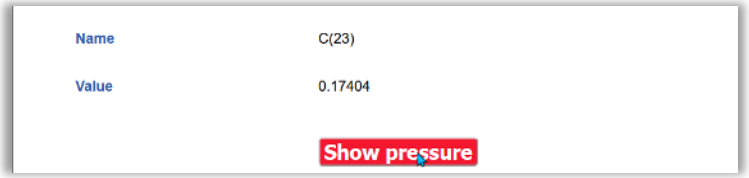


Figure 29

If the channel is calibrated but the value displayed is the pressure value, you can return to the measured distance value by pressing the "**Show distance**" button.

If the channel is not calibrated, the value displayed is always the pressure value.

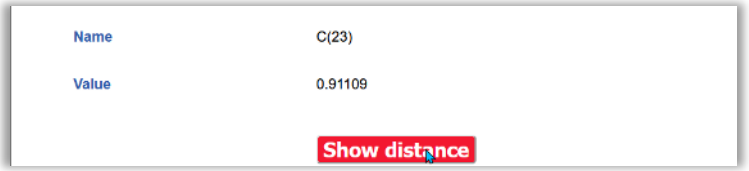


Figure 30

9.5.7.3.2 Resolution

If the "**Compatibility mode**" box is checked, the resolution of values, including those of the masters, is 10^{-4} of the unit; otherwise, the resolution is 10^{-5} of the unit. For calibration in mm, this means one-tenth of a µm if the box is checked and one-hundredth if it is not.

9.5.7.3.3 Filter

Reminder: The filter stabilizes the measurement (but slows it down).

Moving the slider between 0 and 5 is directly reflected in the module.

9.5.7.4 Calibration of a channel

If the module is not calibrated, the message "**Calibration needed**" will be displayed.

9.5.7.4.1 2-point calibration

The module must be calibrated using at least 2 points. Enter the “Minimum” and ‘Maximum’ master values, then press the “Start” button.

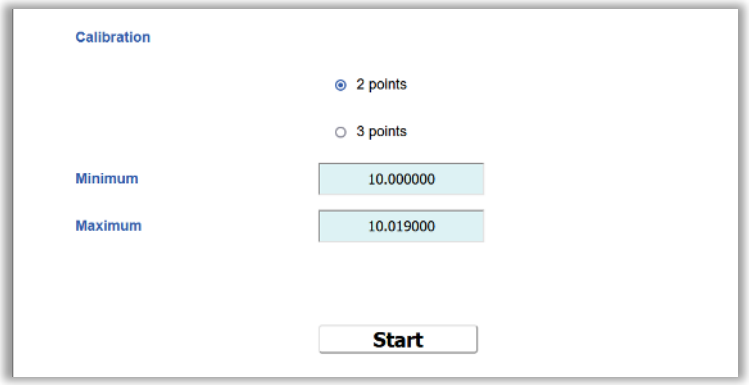


Figure 31

The page will display the message “**Insert MIN master**.” Set the master corresponding to the “**Minimum**” value and press the “**Continue**” button.

The page will display the message “**Insert MAX master**.” Set the master corresponding to the “**Maximum**” value and press the “**Continue**” button.

Calibration is complete. However, if calibration fails, the page will display the message “Calibration fails.”

9.5.7.4.2 3-point calibration

3-point calibration requires defining an additional “**Central**” master between “**Minimum**” and “**Maximum**” as shown in Figure 51.

The procedure is identical, but you must set the master corresponding to the “**Central**” value when the page displays the message “**Insert CENTRAL master**.”

9.5.8 Temperature – MB-TP

9.5.8.1 Adding the module

To add an MB-TP module with sensor number 6, click on the “+” button to the left of Channel No. 6, as shown in Figure 63, then press the module's “Id” button.

Figure 32

9.5.8.2 Informations

Once the module is paired, its LED changes from flashing to steady, and the web page refreshes with the module's information. The table in Figure 64 has as many rows (1) as the module has channels.

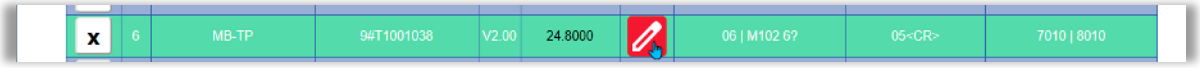


Figure 33

9.5.8.3 Adjustment and consultation

Figure 65 shows the information available for this type of module:

- The number of the entry in the sensor table,
- The temperature currently measured by the sensor

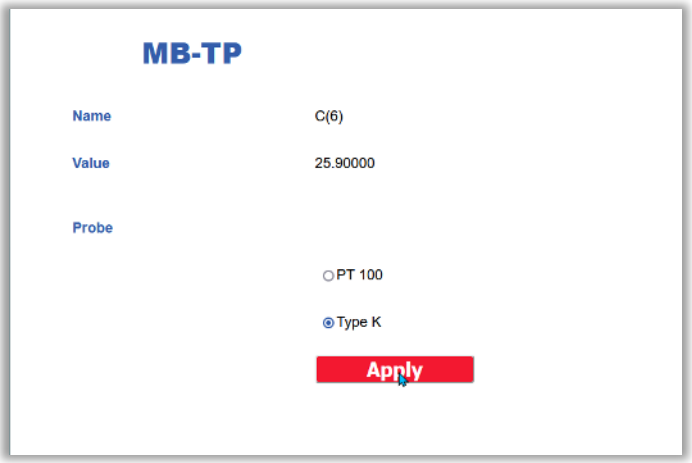


Figure 34

As well as the type of temperature probe used, PT 100 or Type K. If the probe type is changed, it must be confirmed by pressing the “Apply” button.

10 SUMMARY TABLE OF GM5 COMMANDS

10.1 General commands

Command	?	=	Title

C2	x		Product reference
C3	x		Hardware version
C4	x		Software version
C5	x		Serial number
C6	x		GM5 protocol version
A1 ttt		x	Product restart after ttt ms
A2		x	Product reset (erase modules and settings)
A3		x	Configuration backup

10.2 Network commands

Command	?	=	Title
C210	x		Ethernet connection status
C207	x		IP configuration change information
C201	x		MAC address of the product's Ethernet interface
C203	x	x	DHCP management
C204	x	x	IP address
C205	x	x	IP address mask
C206	x	x	IP gateway
C208	x	x	NetBios name
C211	x		Connection port for GM5 communication over TCP
C212	x		Connection port for the web server
C215	x		Path to the web server home page
C213	x		Connection port for Modbus communication over TCP

10.3 M-Bus commands

Command	?	=	Title
M1		x	BUS reset
M2		x	Configuration reset
M3		x	List of identified modules + presence information
M4	x	x	Measurement management
M5	x	x	Status of module addition operation
M6	x		Maximum number of channels given

10.4 M-Bus modules commands

Command	?	=	Title
A101		x	Adding a module, starting pairing
A102		x	Stopping/canceling pairing
M53 x	x		Number of channels on module x
M55 x	x		Software version of module x
M57 x	x		Description of module type x
M59 x		x	Removing module x

10.5 M-Bus channels commands

Command	?	=	Title
M102 nn	x		Sensor reading (channel) nn

10.5.1.1 MB-4i Specific commands

Command	?	=	Title
M116 nn	x		Type of sensor detected on channel nn
M117 nn	x		Sensor travel detected on channel nn

10.5.1.2 MB-8i Specific commands

Command	?	=	Title
M116 nn	x		Type of sensor detected on channel nn
M117 nn	x		Sensor travel detected on channel nn
M120 nn	x		Error No. 25 triggered on channel nn

10.5.1.3 MB-IO Specific commands

Command	?	=	Title
M103 nn	x		Reading inputs from channel nn
M204 nn		x	Activating outputs from channel nn

10.5.1.4 MB-RO Specific commands

Command	?	=	Title
M204 nn		x	Activation of relay nn

10.5.1.5 MB-2S Specific commands

Command	?	=	Title
M161 nn	x	x	Step of scale nn channel
M162 nn	x	x	Interpolation rate for channel nn
M163 nn	x	x	Reference mark for channel nn
M164 nn	x	x	Linear or rotary mode on channel nn

10.5.1.6 MB-1D & MB-4D Specific commands

Command	?	=	Title
M181 nn	x	x	Channel nn playback mode

10.5.1.7 MB-AG Specific commands

Command	?	=	Title
M261 nn	x	x	Pressure or distance measurement selection on channel nn
M262 nn	x	x	Master calibration value for channel nn
M263 nn	x	x	Maximum calibration value for channel nn
M264 nn	x	x	2- or 3-point calibration on channel nn
M265 nn	x	x	Master calibration value (3rd point) for channel nn
M266 nn	x	x	Calibration management for channel nn
M267 nn	x	x	Filter level on channel nn
M268 nn	x		Type of measurement: pressure or distance on channel nn

10.5.1.8 MB-TP Specific commands

Commande	?	=	Title
M191 nn	x	x	Temperature sensor used for channel nn

Changes without prior notice
Sous réserve de toute modification
Änderungen vorbehalten

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