

HM1

Operator panel

Installation and use



Copy of Original Instructions



32 via Carcano
10153 Torino Italia
www.reer.it

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INTRODUCTION

PURPOSE OF THIS DOCUMENT

This manual illustrates the operation of the REER HM1 operator panel and its use within the Mosaic safety module family.

It also describes:

- mechanical installation;
- electrical connection;
- programming via the dedicated software;
- reading and interpretation of diagnostic messages displayed on the HM1 unit.

IMPORTANT SAFETY WARNINGS



This symbol indicates an important warning for the safety of persons. Failure to comply with it can lead to a very high risk for exposed personnel.



This symbol indicates an important warning, not related to personnel safety.

PRECAUTIONS

The operations indicated in this document must only be carried out by qualified personnel.

Such personnel must be in possession of the necessary requirements for operating on the electronic equipment to be installed in order to avoid any risks.

ReeR does not accept any liability for the malfunctioning of equipment installed by unqualified personnel.

DO NOT Consider HM1 as a SAFETY device.

HM1 is exclusively a diagnostic and not a control device.

Any use other than those recommended in this manual must be considered potentially dangerous for the installer and for the machine operator.



Precise and complete compliance with all regulations, indications and prohibitions set forth in this manual is a prerequisite for the proper functioning of the panel. ReeR S.p.A., therefore, does not accept any liability arising from any failure, even partial, to comply with such indications.

DISPOSAL OF MATERIALS

Acquire information on the local separate collection system for electrical and electronic products in force in the country where you intend to dispose of the product. Comply with local waste disposal legislation and do not dispose of old products with normal household waste. The correct disposal of products no longer usable helps prevent potentially negative consequences for the environment and for the population.

LIST OF APPLICABLE LEGISLATION

HM1 has been built in compliance with the following European Directives:

- 2006/42/EC "Machinery Directive"
- 2004/108/EC "Electromagnetic Compatibility Directive"
- 2006/95/EC "Low Voltage Directive"

and complies with the following standards:

- CEI EN 61131-3 "Programmable controllers, part 3: Programming languages"

PRODUCT DESCRIPTION

HM1 is an interface that allows the machine operator to read the diagnostic information coming from the Mosaic System and from any devices connected to it.

HM1 consists of a green monochromatic alphanumeric display (2 rows x 16 columns) on which the diagnostic information regarding the outputs of the safety devices selected by the user appears.

The programmer can customize the messages displayed on HM1 through a dedicated software in order to make them easily understood by the machine operator.

The main characteristics of HM1 are the following:

- 96x48 DIN 43700 enclosure with easy mechanical installation;
- 16x2 green monochromatic alphanumeric LCD;
- Mini-USB programming port for PC connection;
- Possibility to communicate with the most common Safety Buses (CANopen, PROFIBUS, DeviceNet, ETHERCAT, ETHERNET/IP, PROFINET, Modbus) through RS485 connection with the ReeR Fieldbus;
- Contact programming via ladder language using the dedicated ReeR "HSD" software.

SYSTEM ARCHITECTURE

Thanks to the various connection possibilities, the HM1 panel is able to interface as shown in the following figure with ReeR external devices.

The programmer, depending on the information to be viewed by the machine operator and the complexity of the Mosaic safety system connected, decides which type of connection to use. In particular:

- HM1 connects to Mosaic via a serial line (synchronous or asynchronous) directly through the OUT_STATUS signals of the M1, MI8O2, MO2, MO4, MOR4S8, MOS8, MOS16 modules.
- PC connection is via a USB connection (ReeR CSU cable: code 1100062).
- HM1 connects to the ReeR bus modules via an RS485 serial line.

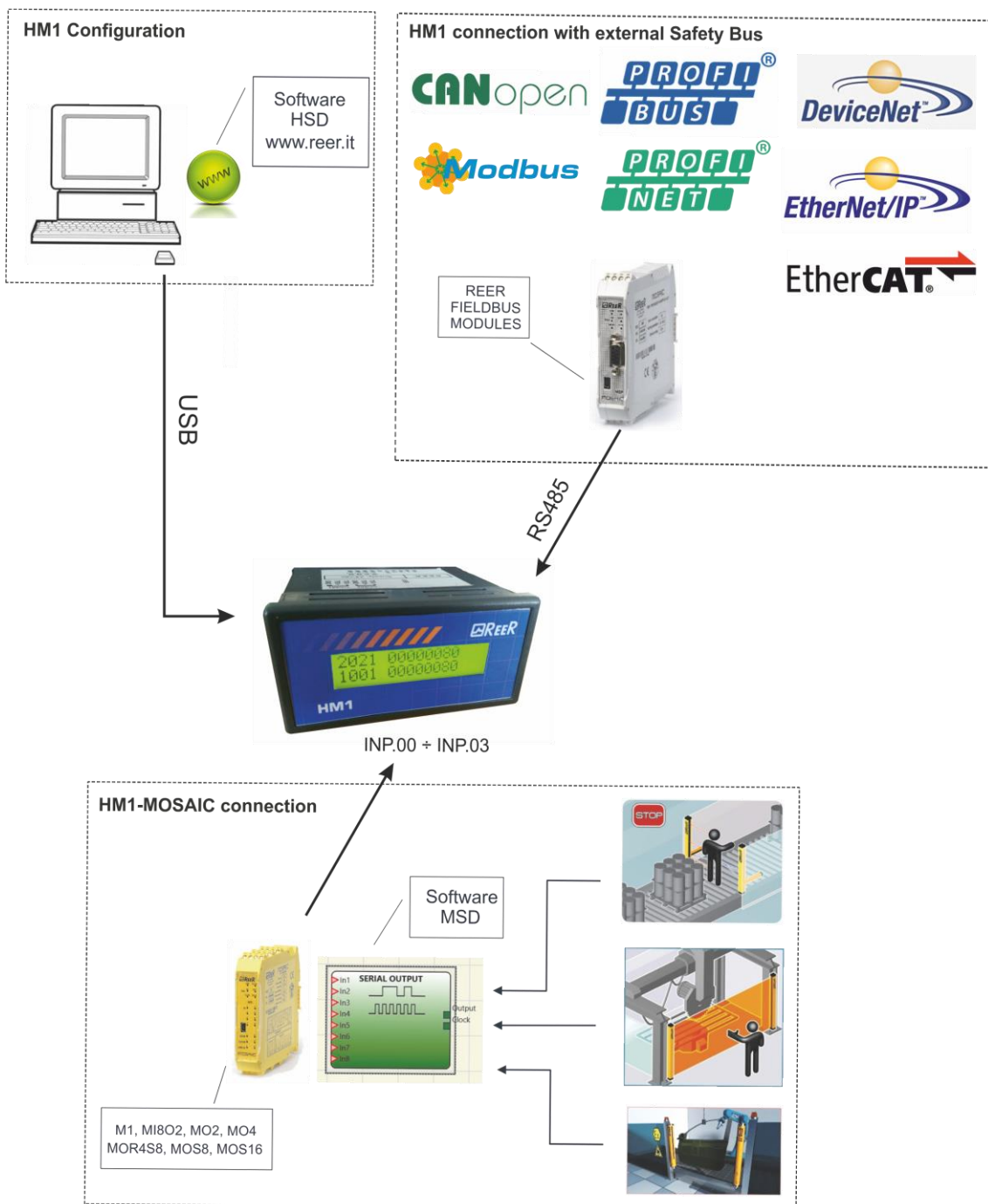


Figure 1

MECHANICAL INSTALLATION

⇒ First of all perform all the HM1 electrical connections. The connectors are positioned on the rear face of the product and may be difficult to perform with the HM1 fixed to the electrical panel.

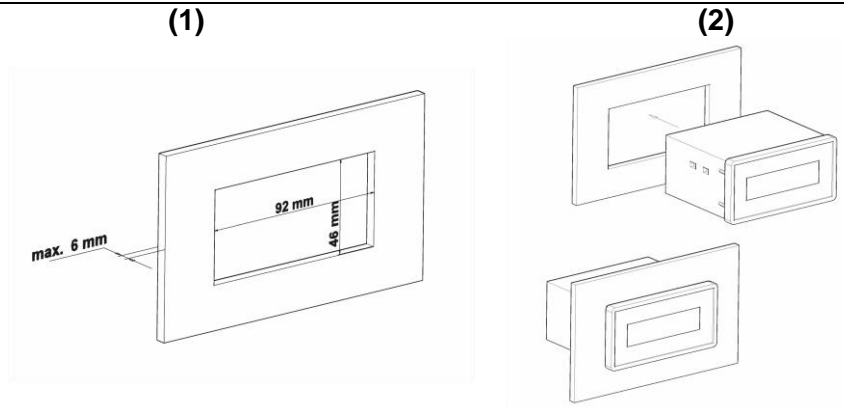
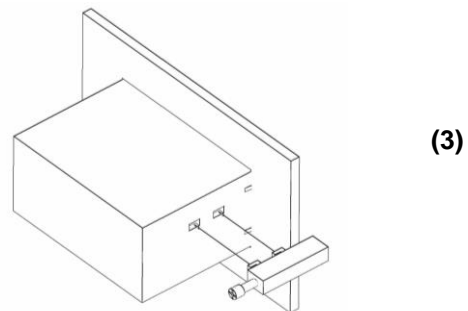


Figure 2

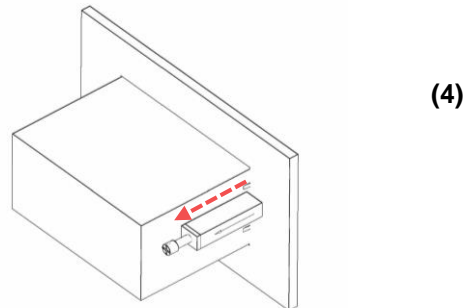
1. Prepare a recess in the panel with the dimensions shown in the figure.
Warning: the minimum depth of the housing must be sufficient to contain the terminal blocks and the USB connector.

2. House the HM1 in the panel.

3. Insert the two inserts with fixing screws laterally in the four lateral holes of the product.



4. House the inserts performing a movement towards the rear side of the product (in the direction of the arrow). In this way you will hear a click that ensures blockage of the insert itself.



5. For final fixing, tighten the two lateral screws, thus securing the HM1 to the panel.

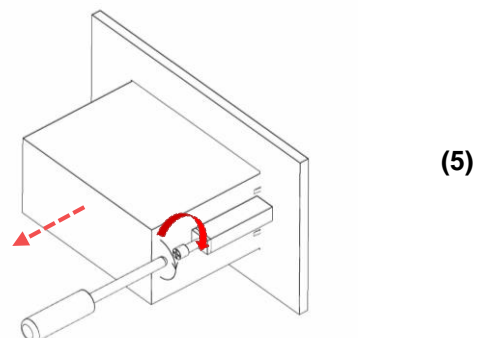


Figure 3

ELECTRICAL CONNECTIONS

The HMI operator panel has terminal blocks for electrical connections:

- with the M1, MI8O2, MOR4S8, MO2, MO4, MOS8, MOS16 modules: **10-way lower terminal block**;
- with ReeR Safety bus modules: **6-way upper terminal block (RS485)**;
- The HM1 operator panel also has a USB port for connection to the PC on which the ReeR HSD configuration software is installed (use the ReeR CSU USB cable: code 1100062).

PRECAUTIONS

- Perform the ground connection of the panel that houses the HM1 before performing all other connections.
- Connect the HM1 before powering on.
- Place the HM1 in an environment with at least IP54 protection level.
- HM1 must be supplied with a power supply voltage of 24Vdc +/-20% (PELV, compliant with EN 60204-1 (Chapter 6.4)).
- Do not use HM1 as a power supply for external devices.
- The ground connection (0VDC) must be common to all system components.

WARNINGS ON CONNECTION CABLES

- Cable dimension: 0.2-2.5 mm².
- It is recommended to keep the power supply of the HM1 separate from that of other electrical power equipment (electric motors, inverters and frequency converter) or other noise sources.
- For connections longer than 50 m, use cables with at least 1 mm² section (AWG16).

CONNECTION DIAGRAM

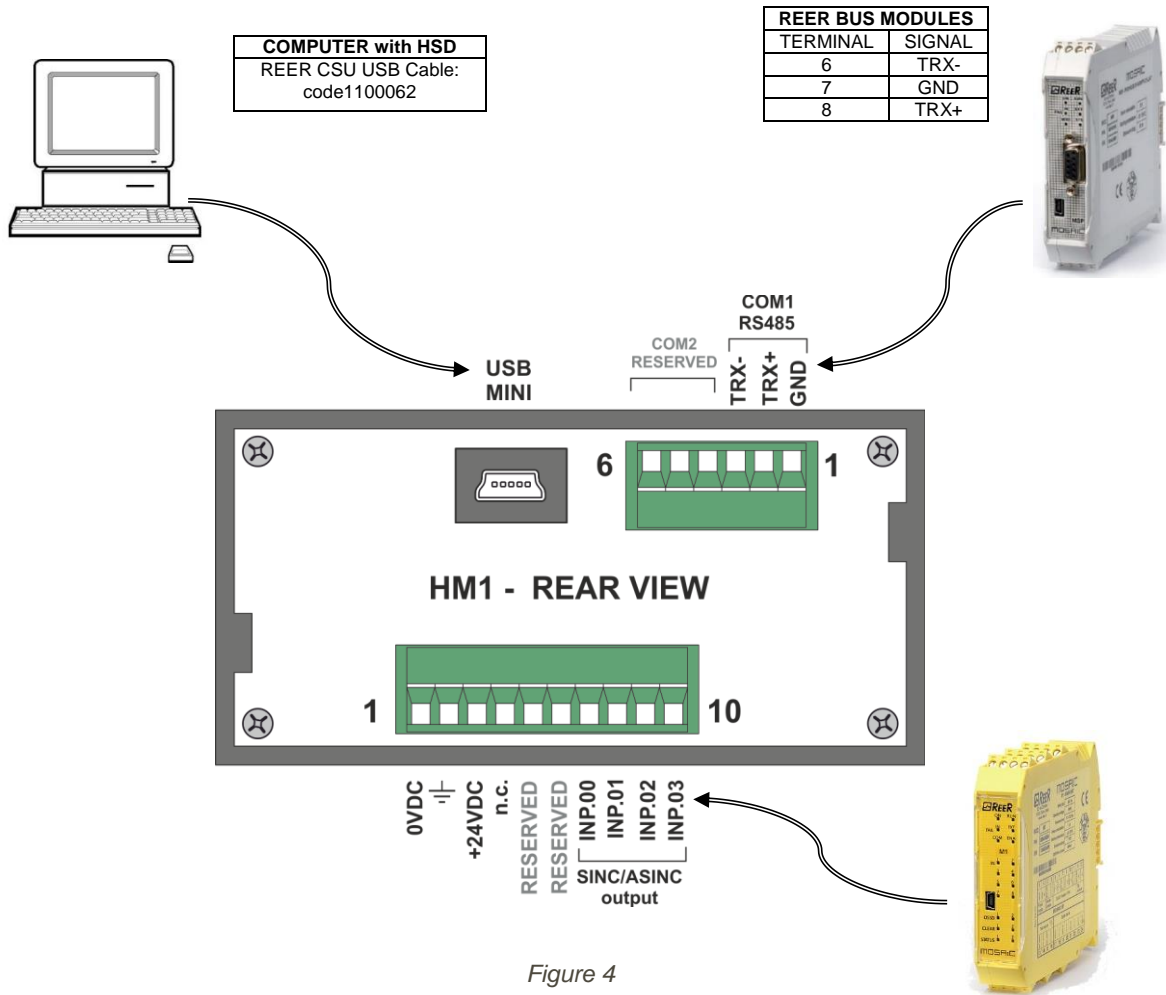


Figure 4

Connection to BUS modules

For connection of the individual modules, please refer to the FIELD BUS Modules Instruction Manual (code 8540801) present in the Reer "MSD" CDROM (code. 8545003) in the "ELECTRICAL CONNECTIONS" section.

BUS module terminal block	HM1 6 WAY REAR TERMINAL BLOCK		
	TERMINAL	SIGNAL	DESCRIPTION
6	3	TRX-	RS485
7	1	GND	
8	2	TRX+	
HM1 6 WAY REAR TERMINAL BLOCK			
	TERMINAL	SIGNAL	DESCRIPTION
	6	RESERVED	COM2
	4	RESERVED	
	5	RESERVED	

Connection to M1, MI8O2, MOR4S8, MOS8, MOS16 modules

For connection of the individual modules, please refer to the MOSAIC Safety Manual present in the Reer "MSD" CDROM (code 8545003) in the "ELECTRICAL CONNECTIONS" section.

- Bear in mind that the signals to be connected are those called OUT_STATUS (maximum number of OUT_STATUS connectible = 4).
- These signals are connected to the INP.00, INP.01, INP.02, INP.03 inputs of HM1. As indicated in the following table, the signals are wired in the 10-way rear terminal block (terminals 7, 8, 9, 10).

MOR4S8 -> HM1 connection example

Terminal block MOR4S8	HM1 10 WAY REAR TERMINAL BLOCK			
	TERMINAL	SIGNAL	DESCRIPTION	
-	1	0VDC	HM1 power supply: 0VDC	
-	2	PE	Ground connection	
-	3	+24VDC	HM1 power supply: + 24VDC	
-	4	n.c.	-	
-	5	RESERVED	-	
-	6	RESERVED	-	
			Asynchronous connection	Synchronous connection
17	7	INP.00	DATA.770	DATA.768
18	8	INP.01	DATA.771	
19	9	INP.02	DATA.772	DATA.769
20	10	INP.03	DATA.773	

⇒ The ground connection (0VDC) must be common to all system components.

Via the HSD software it is necessary to configure the type of communication:

- SYNCHRONOUS = 2 synchronous serial lines (clock+data).
(Set SERIAL OUTPUT on MSD as indicated in the figure).

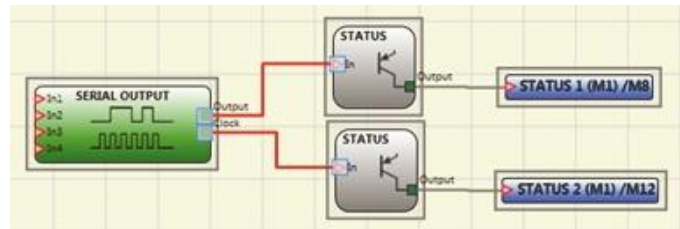


Figure 5

- ASYNCHRONOUS = 4 asynchronous serial lines (data).
(Set SERIAL OUTPUT on MSD as indicated in the figure).

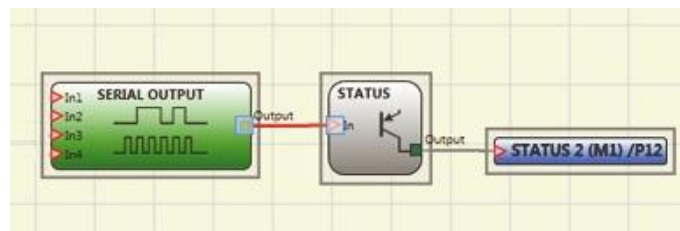


Figure 6

TECHNICAL SPECIFICATIONS

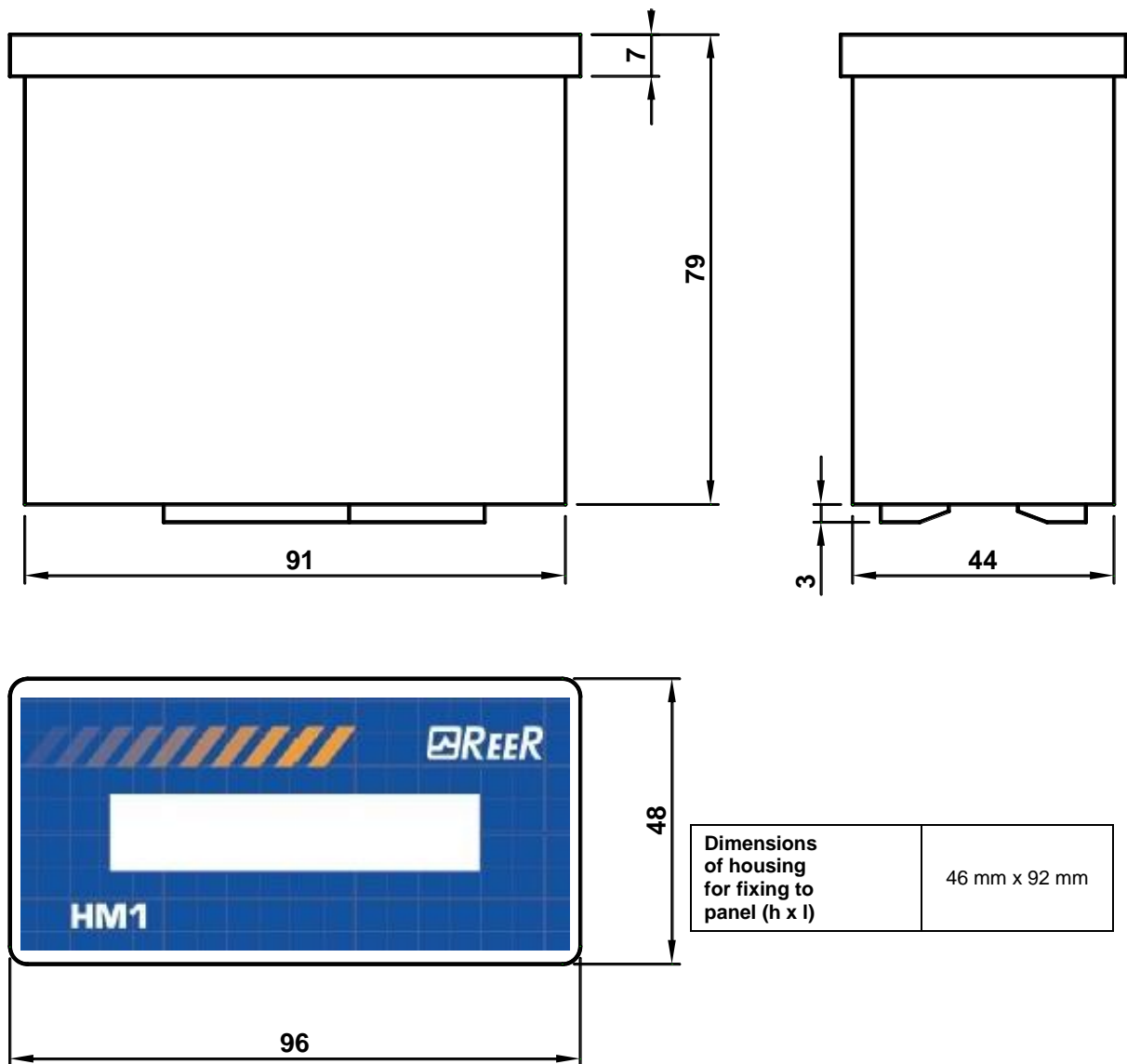
ELECTRICAL CHARACTERISTICS

Fuel supply	24VDC +/- 20%
Absorption	< 150mA under vacuum
Power dissipation	3.5W
Display	16x2 backlit alphanumeric display.
Operating temperature	0°C ÷ 50°C
Digital inputs	4, 24VDC PNP digital inputs with individually programmable noise filter (value 1...16)
BUS communication lines	2 two-wire RS485 serial lines (COM1 and COM2)
PC communication lines	programming mini USB
Page Memory	64KB
Program Memory	64KB
Cycle Time	> 5ms; programmable

MECHANICAL CHARACTERISTICS

Body material	Self-extinguishing PPO
Front module material	Self-extinguishing PC/ABS
Enclosure protection level	IP 20
Terminal block protection level	IP 2X
Dimensions (h x l x d)	48 mm x 96 mm x 75 mm
Housing dimensions (h x l)	46 mm x 92 mm
Fixing System	Fixing brackets

MECHANICAL DIMENSIONS



(Dimensions in mm)

Figure 7

HSD SAFETY DESIGNER SOFTWARE

PRECAUTIONS



*The operations described in this chapter can only be performed by a qualified operator with specific knowledge of PLC programming in **LADDER** language (IEC 61131-3).*



ReeR does not accept any liability for the malfunctioning of equipment installed by unqualified personnel.

DESCRIPTION

The "HSD" application allows programming of an HM1 configuration.

SOFTWARE INSTALLATION

HARDWARE characteristics required for the PC to be connected

- RAM: 256 MB
- Hard disk: Free space > 500Mbyte
- USB connector: 1.1, 2.0 or 3.0
- Internet connection

SOFTWARE characteristics required for the PC to be connected

Windows XP with Service Pack 3 installed (or higher OS).

How to install HSD

- Connect to www.reer.it web site.
- Enter in the tab "DOWNLOAD -> CONFIGURATION SOFTWARE"
- Download the HSD SW setup program.
- Launch the setup (double click on the file).
- Wait for the autorun installation program to prompt for SW SETUP.
- Once installed, a window appears that requires closure of the setup program.

HM1 MANAGEMENT THROUGH ASYNCHRONOUS INPUT / SYNCHRONOUS INPUTS

Following hardware connection, it will be possible to find on certain registers of the HM1 panel the status of the Mosaic safety module inputs.

To do this, it is possible to connect to the HM1 an asynchronous signal (one wire) or a synchronous signal (two wires) coming from Reer modules. The HM1, interpreting the signal received, will update certain registers (the register will change depending on the signal source) with state of the module inputs. The registers will be as shown below:

Synchronous Signal

- INP.00/INP.01 = DATA.768
- INP.02/INP.03 = DATA.769

Asynchronous Signal

- INP.00 = DATA.770
- INP.01 = DATA.771
- INP.02 = DATA.772
- INP.03 = DATA.773

USER INTERFACE

Through a dedicated user interface, HSD allows the operator to configure the parameters listed above.

Synchronous Signal: configuration

The operator decides on the MSD (Mosaic Safety Designer) logic diagram which signals to output through the SERIAL_OUTPUT functional block.

The parameters of this block must be set on the HM1 using the HSD interface.

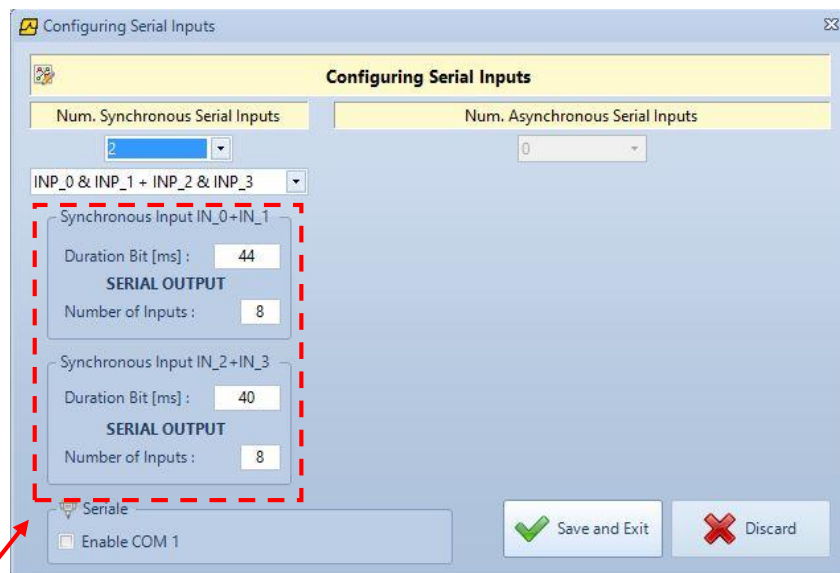


Figure 8

⇒ Verify that the values selected in the HSD software are properly set in the MSD software.

Asynchronous Signal: configuration

The operator decides on the MSD (Mosaic Safety Designer) logic diagram which signals to output through the SERIAL_OUTPUT functional block.

The parameters of this block must be set on the HM1 using the HSD interface.

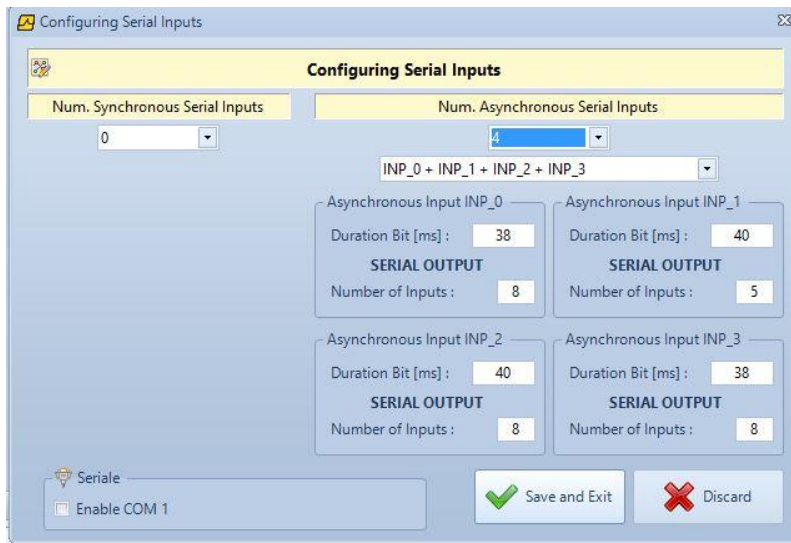


Figure 9

Combination of HM1 registers with software data

The figure below shows what to select on the screen to generate the associations of the panel registers (connected Mosaic module inputs) with the program data (word).

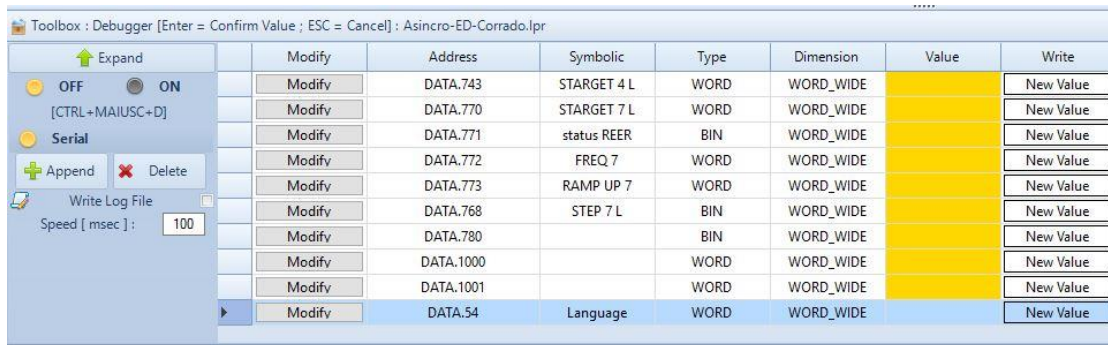


Figure 10

Setting user messages (Page)

The figure below shows what to select on the screen to generate/edit a particular user message. Each message is linked to a "Page" decided by the operator.

Below, what to do to determine the conditions that allow the display of each individual message (page) is described.



Figure 11

Setting message display conditions (NET)

- (1) In the "Net" ladder diagram, as first function the unconditional "MOV" is set to support the 768/769 word datum (for synchronous) or the 770/772 datum (for asynchronous) on the 780 word datum. This operation is performed to avoid changing the programming part every time the synchronous/asynchronous configuration is changed.
- (2) If all bits are seen as 0 (closed) we have functioning with no critical messages, display of page 0.
- (3) When one of the single bits changes its status (0 -> 1) corresponding Flag is activated which consequently invokes the message page.

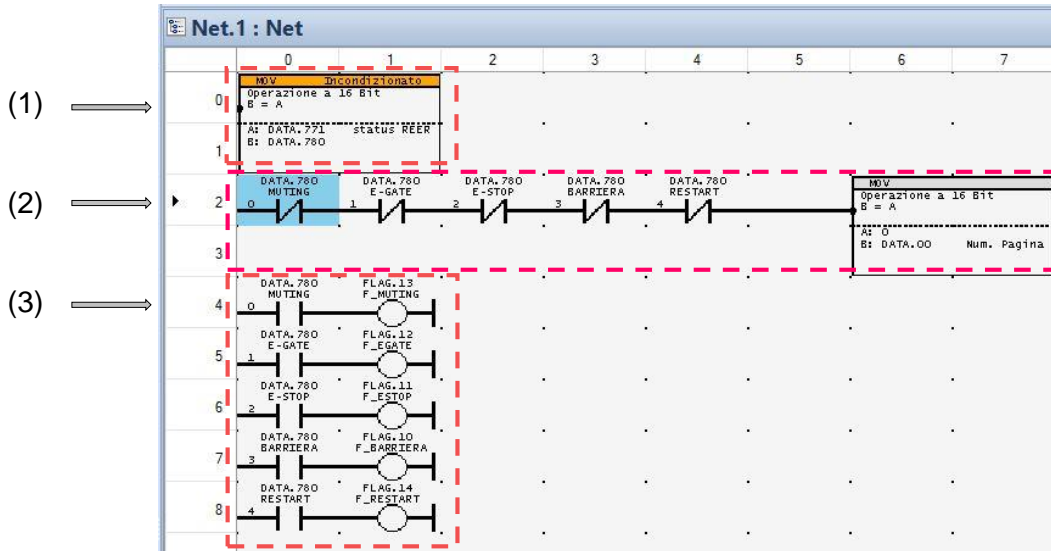


Figure 12

Setting page activation conditions

Reading the rising edge of each Flag moves a 1 in DATA.00 (word) to activate the corresponding message pages.

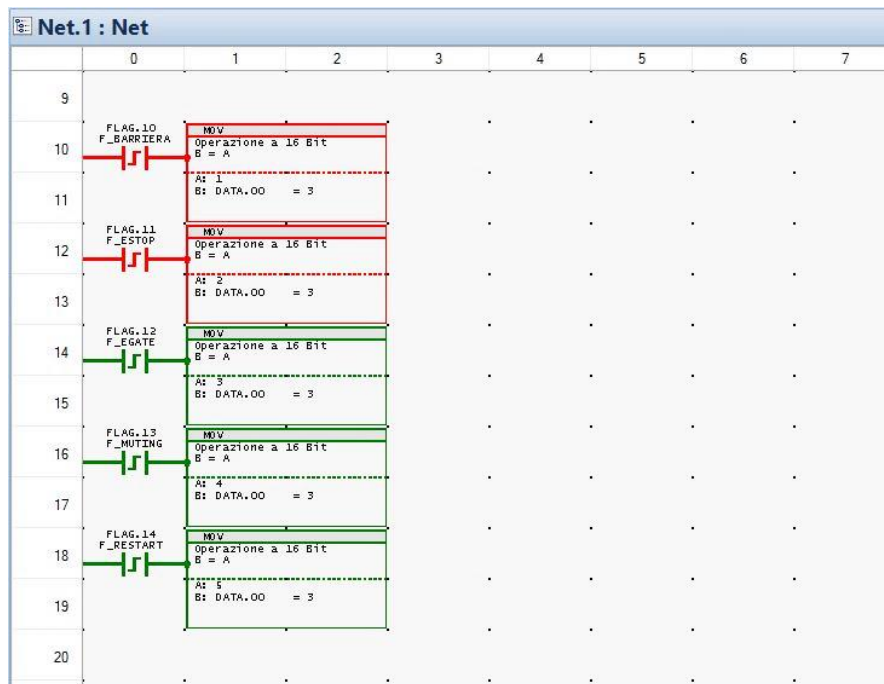


Figure 13

Dynamic condition display

The following figure describes the situation of the programmed conditions in real time. Activate the "ON" button of the debugger to get to this display.

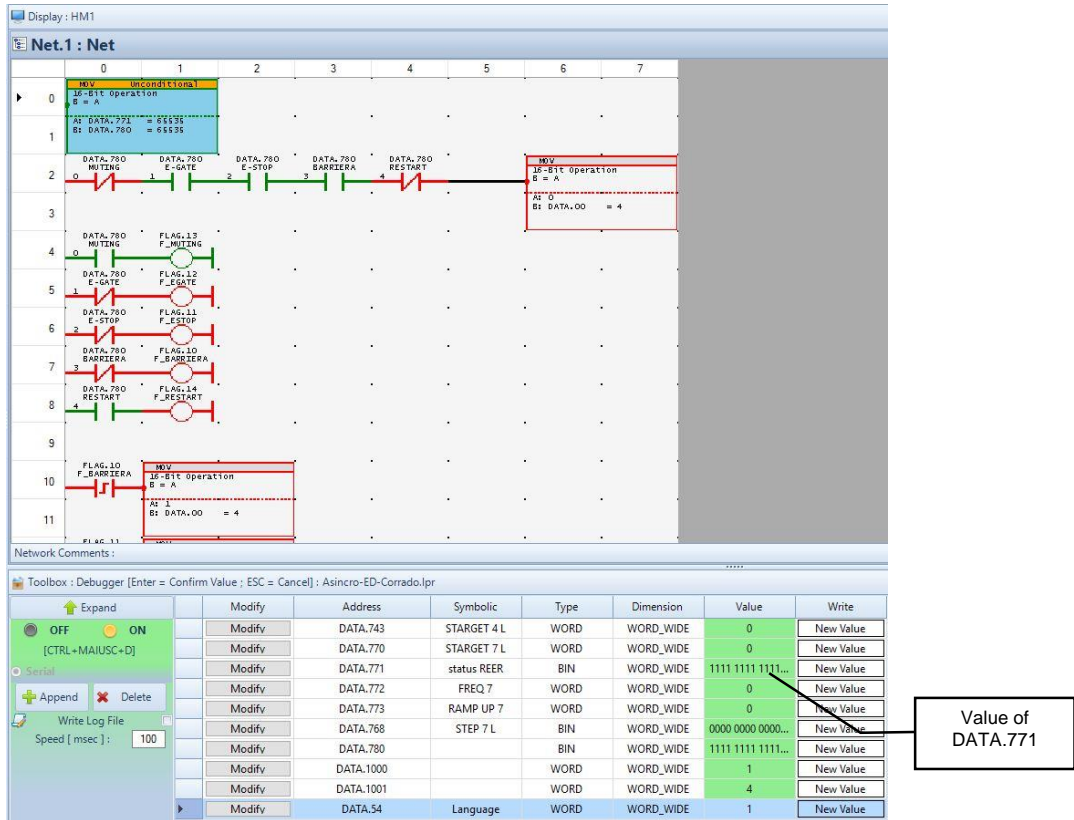


Figure 14

Setting message display transitions (SCROLL)

In the "Scroll" ladder diagram we find the conditions previously set on the bits of word 780 that are monitored with a clock of 1sec to the increase the individual pages.

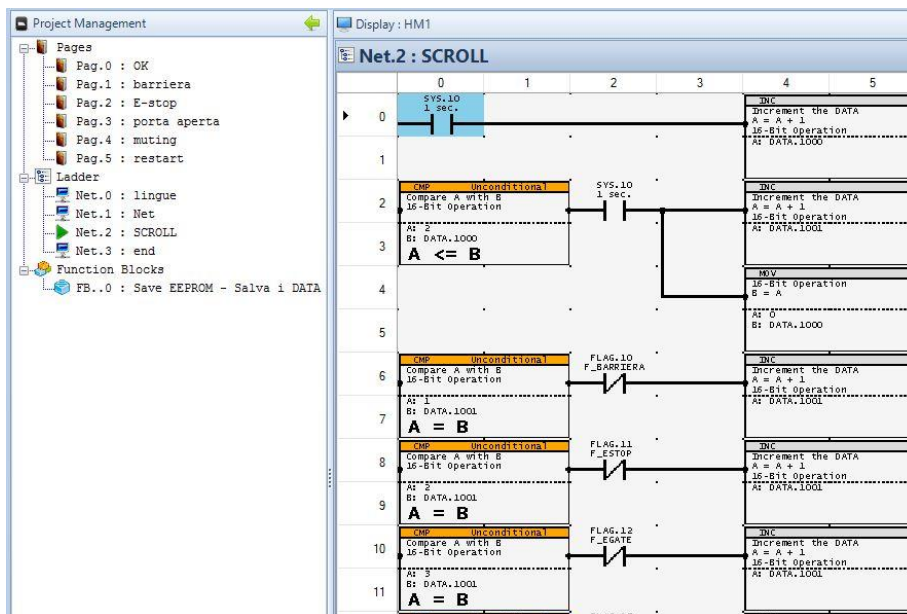


Figure 15

RS485 <-> HM1 COMMUNICATION

The Mosaic bus modules transmit to the HM1 panel via the RS485 serial line a complete packet of information concerning the Mosaic system coming from the safety bus. This information concerns:

- Physical inputs.
- Fieldbus inputs.
- Outputs.
- Diagnostics.
- Probes.

This chapter describes the composition of the HM1 memory map while receiving data from the fieldbus; for details of the meaning of each individual single word, please refer to the field bus manual 8540801 contained in the CDROM 8545003.

**The memory map consists of a DATA_MEMORY sequence.
1 DATA_MEMORY = 1 Word**

- The position in the HM1 memory of the first DATA_MEM of the packet is determined by a datum that is OFFSET_REER.
- The OFFSET_REER default value is 1024. From DATA.MEMORY number 1024 the first DATA_MEM of data starts (404 DATA.MEMORY are reserved).
- Through the configuration software, the user can vary the OFFSET_REER parameter depending on his needs in order to change the memory addresses containing the data packet.

HM1 memory map in communication with Mosaic bus.

RS485 Data Packet		
OFFSET REER=1024	DATA.MEMORY = 1 Word	
Address	High byte	Low byte
DATA.1024	00000000	INCREMENTAL COUNTER which shows that communication is active (1 DATA_MEM). This counter is incremented every time Mosaic transmits a new message.
DATA.1025	00000000	MOSAIC STATUS (1 DATA_MEM) System status (1 Byte): <ul style="list-style-type: none"> ▪ B0=0: Mosaic offline ▪ B0=1: Mosaic online ▪ B1=1: Diagnostics present ▪ B1=0: No diagnostics present
DATA.1026	00000000	NUMBER OF VIRTUAL INPUTS (1 DATA_MEMORY)
DATA.1027	00000000	VIRTUAL INPUTS (1 DATA_MEMORY)
DATA.1028	00000000	NUMBER OF PHYSICAL INPUT DATA_MEM (1 DATA_MEMORY)
DATA.1029 - DATA.1044	00000000	PHYSICAL INPUT STATUS VECTOR (16 DATA_MEMORY)
DATA.1045 - DATA.1172	00000000	PHYSICAL INPUT DIAGNOSTIC VECTOR (128) (A)
DATA.1173	00000000	NUMBER OF PHYSICAL OUTPUT DATA_MEM (1 DATA_MEMORY)
DATA.1174 - DATA.1175	00000000	PHYSICAL OUTPUT STATUS VECTOR (2 DATA_MEMORY)
DATA.1176 - DATA.1191	00000000	PHYSICAL OUTPUT DIAGNOSTIC VECTOR (16 DATA_MEMORY) (A)
DATA.1192	00000000	NUMBER OF PROBE DATA_MEM (1 DATA_MEMORY)
DATA.1193 - DATA.1194	00000000	PROBE STATUS VECTOR (2 DATA_MEMORY)
DATA.1278	00000000	SCROLL DIAGNOSTIC INDEX (B)
DATA.1279	00000000	SCROLL DIAGNOSTIC CODE (B)
DATA.1283	00000000	TOTAL DIAGNOSTICS PRESENT "n" (C)
DATA.1284	DIAGNOSTIC INDEX 1	DIAGNOSTIC CODE 1 (C)
DATA.1285	DIAGNOSTIC INDEX 2	DIAGNOSTIC CODE 2 (C)
(...)		
DATA.1428 (max)	DIAGNOSTIC INDEX n	DIAGNOSTIC CODE n (C)



(A) (MODE 1 in next paragraph)

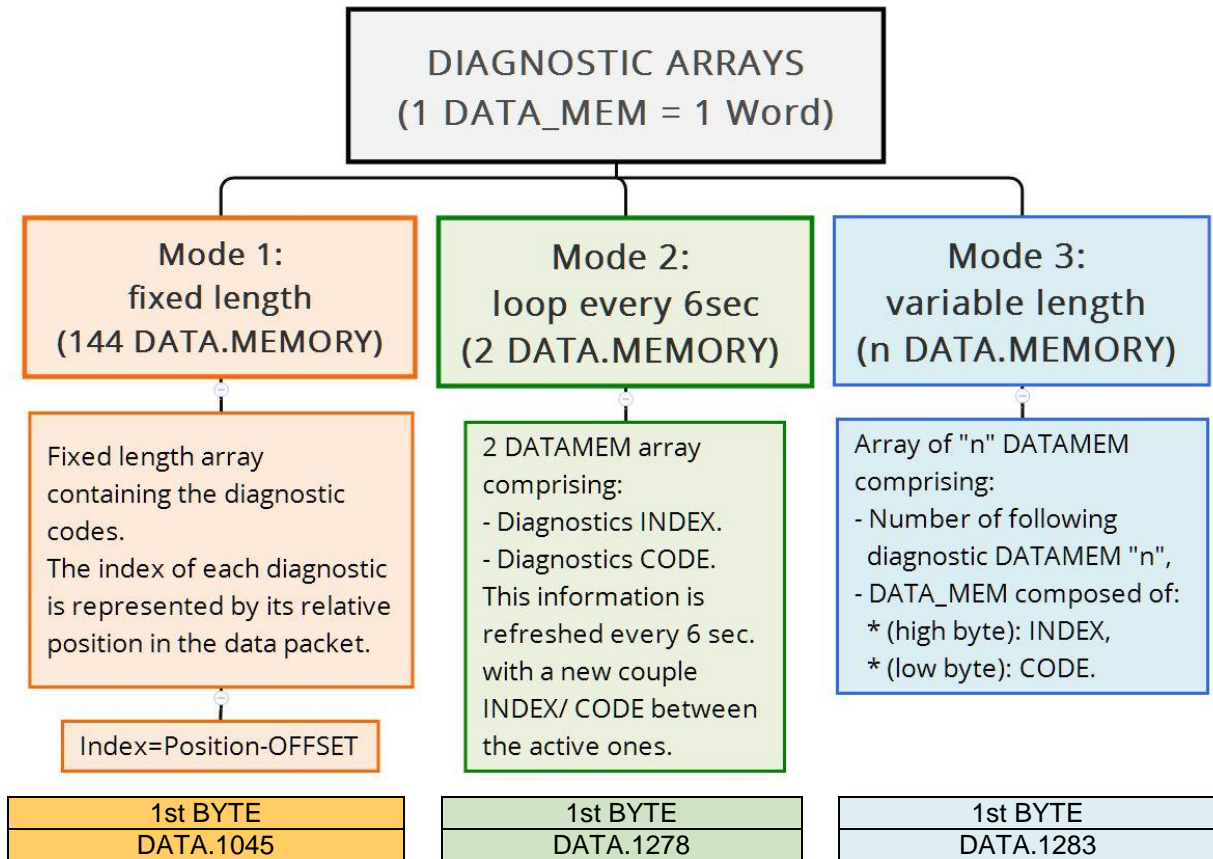
(B) (MODE 2 in next paragraph)

(C) (MODE 3 in next paragraph)

Diagnostic information on HM1.

The figure below summarises the three different modes of diagnostic representation present in the HM1 memory.

-  The programmer can choose one of the three modes to access the diagnostic information to be transformed into messages on the HM1 through the HSD software.
-  Please refer to the table (memory map) of the previous page.





Dichiarazione CE di conformità
EC declaration of conformity

Torino, 13/04/2016

REER SpA
via Carcano 32
10153 – Torino
Italy

dichiara che il pannello operatore **REER HM1** è un dispositivo realizzato in conformità alle seguenti Direttive Europee:

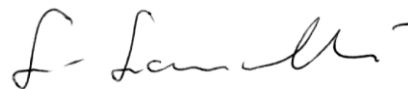
*declares that the the **REER HM1** operator panel is a device complying with the following European Directives:*

- **2014/30/EU** "Direttiva Compatibilità Elettromagnetica"
"Electromagnetic Compatibility Directive"
- **2014/35/EU** "Direttiva Bassa Tensione"
"Low Voltage Directive"

Carlo Pautasso
Direttore Tecnico
Technical Director



Simone Scaravelli
Amministratore Delegato
Managing director



WARRANTY

ReeR provides a 12 (twelve) month warranty for each brand new HM1 system, in conditions of normal use, against defects in materials and workmanship.

In this period, ReeR undertakes to eliminate any product fault, by repair or replacement of faulty parts, completely free of charge for both materials and labour.

ReeR nevertheless reserves the right to proceed, in lieu of repair, with replacement of the entire defective device with another one or one with the same characteristics.

The validity of the warranty is subject to the following conditions:

- Reporting of the fault is forwarded by the user to ReeR within twelve months of the date of delivery of the product.
- The device and its component parts are in the conditions in which they were delivered by ReeR.
- The fault or malfunction has not been directly or indirectly originated by:
 - Use for inappropriate purposes;
 - Failure to follow the usage instructions;
 - Carelessness, inexperience, improper maintenance;
 - Repairs, modifications, adaptations not carried out by ReeR personnel, tampering, etc.;
 - Accidents or impacts (also due to transportation or force majeure);
 - Other causes independent of ReeR.

The repair will be carried out at the ReeR laboratories, to which the goods must be delivered or sent: the transport costs and risks of any damage or loss of goods during shipment are the responsibility of the Customer.

All replaced products and parts become the property of ReeR.

ReeR does not recognise any warranty or rights other than those specifically described above; under no circumstances, therefore, may claims be made for compensation for damages for expenses, suspension of activities or other factors or circumstances in any way related to the non-functioning of the product or one of its parts.

Please visit the website www.reer.it to consult the list of authorised distributors of each country.



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