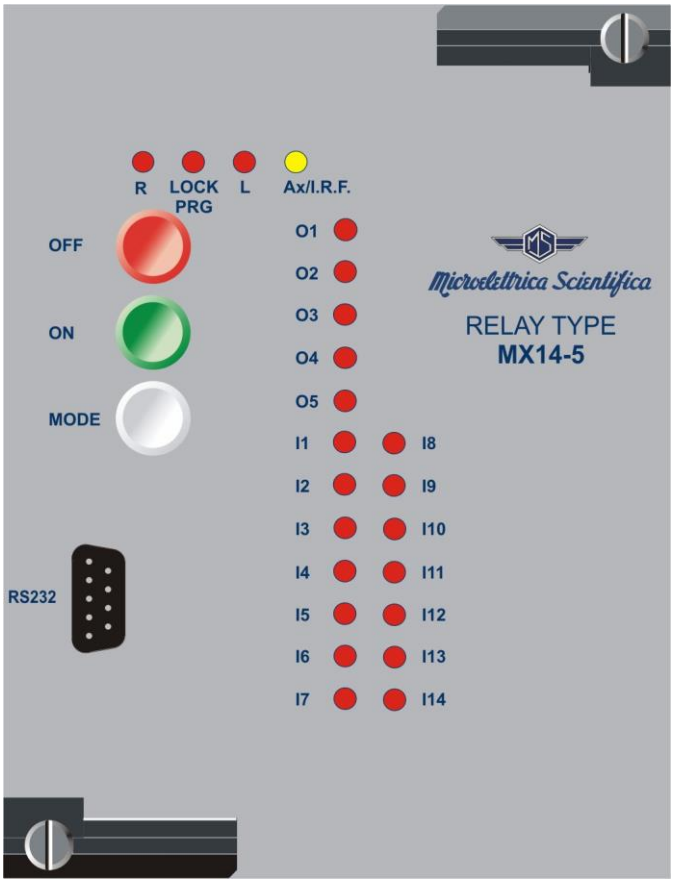
# PROGRAMMABLE INTERFACE
# and
# CONTROL MODULE

## TYPE

# MX14-5

## OPERATION MANUAL

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# INDEX

# 1. GENERAL UTILIZATION AND COMMISSIONING DIRECTIONS

Always make reference to the specific description of the product and to the Manufacturer's instruction. Carefully observe the following warnings.

## 1.1 - Storage And Transportation

must comply with the environmental conditions stated on the product's instruction or by the applicable IEC standards.

## 1.2 - Installation

must be properly made and in compliance with the operational ambient conditions stated by the Manufacturer.

## 1.3 - Electrical Connection

must be made strictly according to the wiring diagram supplied with the Product, to its electrical characteristics and in compliance with the applicable standards particularly with reference to human safety.

## 1.4 - Measuring Inputs and Power Supply

carefully check that the value of input quantities and power supply voltage are proper and within the permissible variation limits.

## 1.5 - Outputs Loading

must be compatible with their declared performance.

## 1.6 - Protection Earthing

When earthing is required, carefully check its efficiency.

## 1.7 - Setting and Calibration

Carefully check the proper setting of the different functions according to the configuration of the protected system, the safety regulations and the co-ordination with other equipment.

## 1.8 - Safety Protection

Carefully check that all safety means are correctly mounted, apply proper seals where required and periodically check their integrity.

## 1.9 - Handling

Notwithstanding the highest practicable protection means used in designing M.S. electronic circuits, the electronic components and semiconductor devices mounted on the modules can be seriously damaged by electrostatic voltage discharge which can be experienced when handling the modules. The damage caused by electrostatic discharge may not be immediately apparent but the design reliability and the long life of the product will have been reduced. The electronic circuits produced by M.S. are completely safe from electrostatic discharge (8 KV IEC 255.22.2) when housed in their case; withdrawing the modules without proper cautions expose them to the risk of damage.

a. Before removing a module, ensure that you are at the same electrostatic potential as the equipment by touching the case.
b. Handle the module by its front-plate, frame, or edges of the printed circuit board. Avoid touching the electronic components, printed circuit tracks or connectors.
c. Do not pass the module to any person without first ensuring that you are both at the same electrostatic potential. Shaking hands achieves equipotential.
d. Place the module on an antistatic surface, or on a conducting surface which is at the same potential as yourself.
e. Store or transport the module in a conductive bag.

More information on safe working procedures for all electronic equipment can be found in BS5783 and IEC 147-OF.

### 1.10 - Maintenance

Make reference to the instruction manual of the Manufacturer ;maintenance must be carried-out by specially trained people and in strict conformity with the safety regulations.

### 1.11 - Waste Disposal of Electrical & Electronic Equipment

(Applicable throughout the European Union and other European countries with separate collection program).
This product should not be treated as household waste when you wish dispose of it. Instead, it should be handed over to an applicable collection point for the recycling of electrical and electronic equipment.
By ensuring this product is disposed of correctly, you will help prevent potential negative consequence to the environment and human health, which could otherwise be caused by inappropriate disposal of this product. The recycling of materials will help to conserve natural resource.

### 1.12 - Fault Detection and Repair

Internal calibrations and components should not be alterated or replaced.
For repair please ask the Manufacturer or its authorised Dealers.

Misapplication of the above warnings and instruction relieves the Manufacturer of any liability.

# 2 - GENERAL CHARACTERISTICS AND OPERATION

## 2.1 - Digital inputs

14 optoisolated self-powered inputs controlled via cold contacts with antirebound logic:

| | | |
|---|---|---|
| No-Load output voltage | : | Vout = 30Vcc |
| Minimum pick-up current | : | Iout = 5mA |
| Max load resistance | : | 4000 Ω |

Each input is sampled every 1ms. An input is considered to be in the 1 logic state when its terminals are shorted (<4000 Ω).
The logic state of an input is valid if it doesn't change for at least 5ms. As a consequence any input pulse shorter than 5ms is ignored by the unit.

## 2.2 - Output contacts

Five output relays are available : R1, R2, R3, R4, R5 with one N/O contact (NC on request):

| | | |
|---|---|---|
| Rated current and voltage | : | 5A - 380V |
| AC resistive switching | : | 1100W max 380V |
| Make | : | 30A (peak) 0,5 sec. |
| Break | : | 0,5A 125VDC, L/R = 40ms, 10 ops. |

## 2.3 - Power supply

Power supply input (terminals 12-13) is multi-voltage autoranging 2kV isolated, has no polarity and can accept any AC or DC voltage in the range a or b

- Consumption ≤ 5W \ 12VA (all outputs energized).

**a) - { 24V(-20%) / 110V(+15%) a.c. ; 24V(-20%) / 125V(+20%) d.c. }**

**b) - { 80V(-20%) / 220V(+15%) a.c. ; 90V(-20%) / 250V(+20%) d.c. }**

## 2.4 - Serial Communication

Two ports are available for serial communication:

- A RS232 serial communication port, MODBUS RTU protocol at 9600bps, is located on relay's front (9 pins SUB-D connector). This port is active only when a dedicated cable (see § 6) is physically connected to it, thus allowing the user both to configure/test the unit and to completely monitor its status by means of a P.C.

- A second RS485 serial communication port, MODBUS RTU protocol at 9600bps, (terminal blocks 1..2) allows the MX14-5 to be connected to a central supervision system. This port is active only when the front panel port is not in use (cable physically disconnected) and makes the internal data base available to the central supervision system.

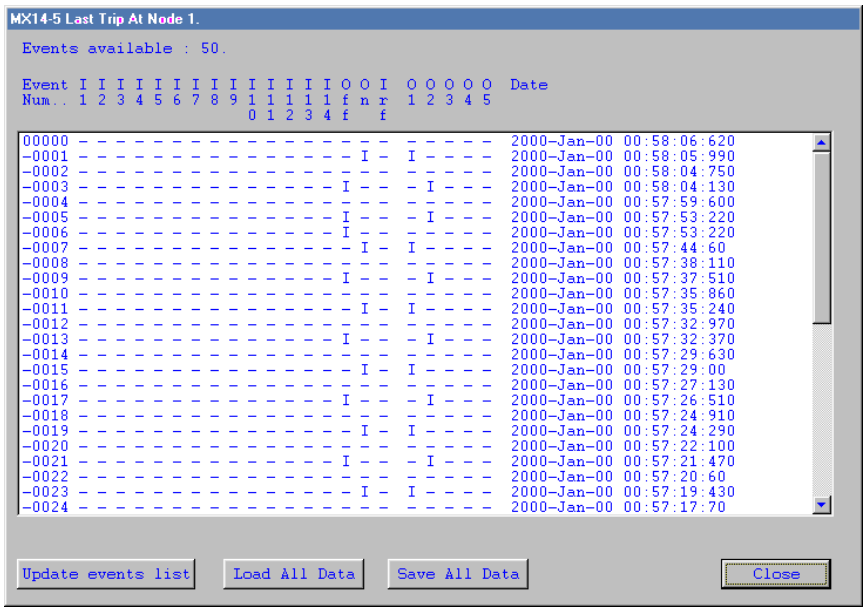
A communication software (MSCom) for Windows 95/98 is available, covering both the configuration and the monitoring tasks. Please refer to the MSCom instruction manual for more information.

## 2.5 - Last events' recording – time stamping.

The last 50 events (opening/closing of any input/output) are time stamped with a 10ms resolution and stored into a non-volatile ($E^2$PROM) memory.
All the recorded events are available via the serial communication interface with MSCom program.

**I** = status 1

**-** = status 0




| Event Num. | I 1 | I 2 | I 3 | I 4 | I 5 | I 6 | I 7 | I 8 | I 9 | I 10 | I 11 | I 12 | I 13 | I 14 | O f | O n | I r | O 1 | O 2 | O 3 | O 4 | O 5 | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00000 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2000-Jan-00 00:58:06:620 |
| -0001 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | I | - | - | I | - | - | - | - | 2000-Jan-00 00:58:05:990 |
| -0002 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2000-Jan-00 00:58:04:750 |
| -0003 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | I | - | - | - | I | - | - | - | 2000-Jan-00 00:58:04:130 |
| -0004 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2000-Jan-00 00:57:59:600 |
| -0005 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | I | - | - | - | I | - | - | - | 2000-Jan-00 00:57:53:220 |
| -0006 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | I | - | - | - | - | - | - | - | 2000-Jan-00 00:57:53:220 |
| -0007 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | I | - | - | I | - | - | - | - | 2000-Jan-00 00:57:44:60 |
| -0008 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2000-Jan-00 00:57:38:110 |
| -0009 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | I | - | - | - | I | - | - | - | 2000-Jan-00 00:57:37:510 |
| -0010 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2000-Jan-00 00:57:35:860 |
| -0011 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | I | - | - | I | - | - | - | - | 2000-Jan-00 00:57:35:240 |
| -0012 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2000-Jan-00 00:57:32:970 |
| -0013 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | I | - | - | - | I | - | - | - | 2000-Jan-00 00:57:32:370 |
| -0014 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2000-Jan-00 00:57:29:630 |
| -0015 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | I | - | - | I | - | - | - | - | 2000-Jan-00 00:57:29:00 |
| -0016 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2000-Jan-00 00:57:27:130 |
| -0017 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | I | - | - | - | I | - | - | - | 2000-Jan-00 00:57:26:510 |
| -0018 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2000-Jan-00 00:57:24:910 |
| -0019 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | I | - | - | I | - | - | - | - | 2000-Jan-00 00:57:24:290 |
| -0020 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2000-Jan-00 00:57:22:100 |
| -0021 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | I | - | - | - | I | - | - | - | 2000-Jan-00 00:57:21:470 |
| -0022 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2000-Jan-00 00:57:20:60 |
| -0023 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | I | - | - | I | - | - | - | - | 2000-Jan-00 00:57:19:430 |
| -0024 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2000-Jan-00 00:57:17:70 |

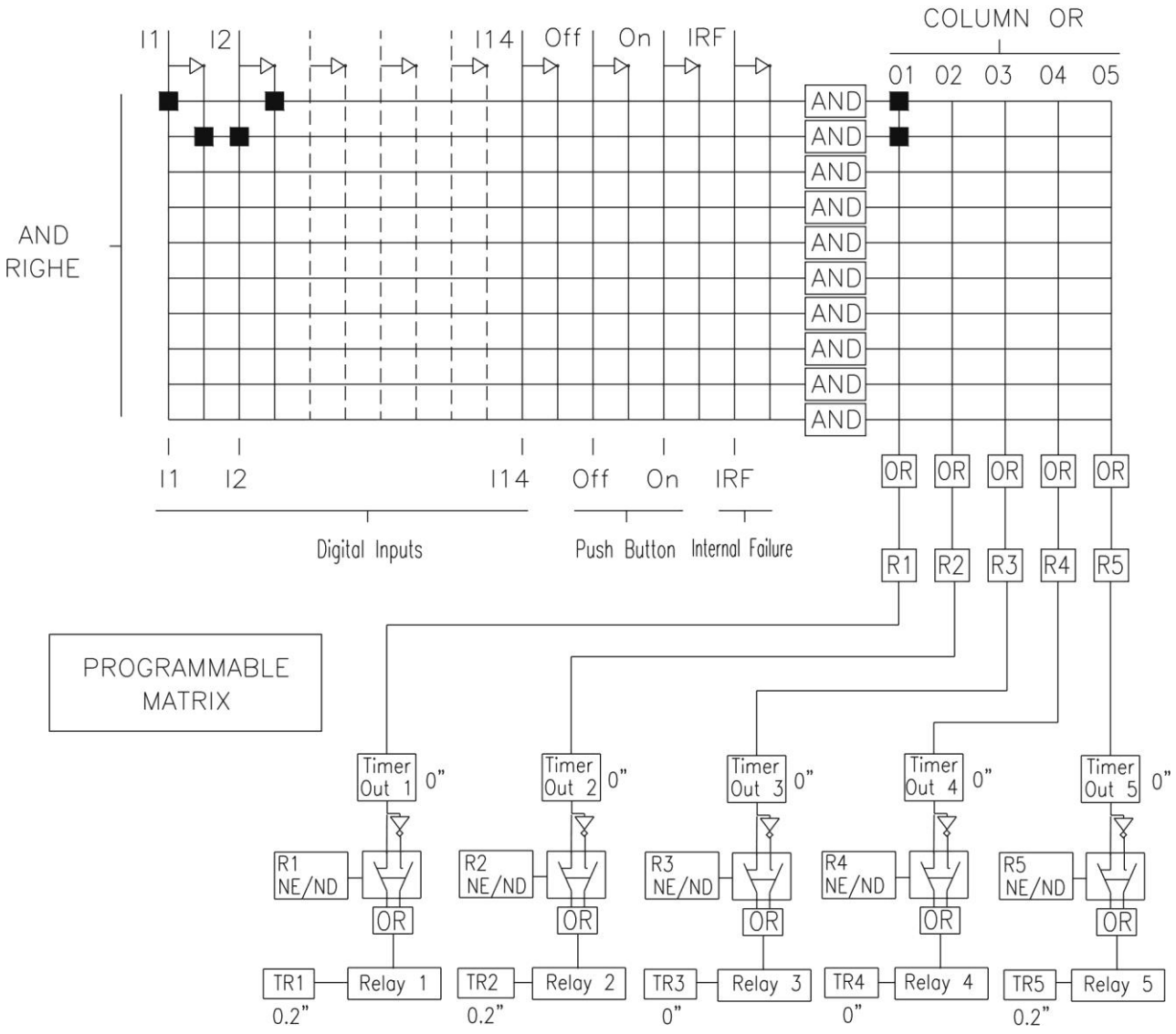
## 2.6 - Logic matrix.

The output contacts are operated according to a programmable AND/OR matrix (see Figure 1) by the following inputs:

- Digital inputs I1..I14.
- Front panel push buttons (On and Off).
- Internal fault diagnostic signal (I.R.F.)

Note that in remote operation mode, the front panel push buttons are ignored and they can be operated only via the serial communication interface. In the remote mode it is also possible for the user to change from 0 to 1 the status of the digital inputs via the serial port.

**Figure 1: internal logic matrix**



The state of each AND row is calculated as the logic product of the inputs which are on the same row, while the state of each OR column is obtained as the logic sum of the selected AND rows.
The outputs are controlled by the relevant columns with a user programmable delay.

Figure 1 shows a simple programming example.
The following logic function of I1 and I2 is implemented:

$$O1 = I1 \oplus I2. \quad (XOR \Leftrightarrow \text{exclusive OR}) \Rightarrow \; I1 \times \overline{I2} + \overline{I1} \times I2$$

If we write down the truth table relevant to the XOR function we have:

| I1 | I2 | O1 |
|---|---|---|
| 0 | 0 | 0 |
| 1 | 0 | 1 |
| 0 | 1 | 1 |
| 1 | 1 | 0 |

By examining such table, we can say that O1 is TRUE when :

I1 is TRUE AND I2 is NOT TRUE. (1)
OR
I1 is NOT TRUE AND I2 is TRUE. (2)

If we now want to program the MX14-5 to implement the XOR function, we just reserve two AND rows for statements (1) and (2) and then connect those rows to the OR column corresponding to output O1.

Generally speaking, a method for programming the internal logic matrix consists of the following steps:

- Write down the truth table relevant to the function which has to be implemented.
- Express the function as sum of logic products.
- Assign to each logic product a AND row.
- Connect the resulting AND rows to the OR column corresponding to the output which has to be activated.

The application program MSCom provides a programming windows same as Fig.1

## 2.7 – Operating modes

Three main operating modes are available:

| | | |
|---|---|---|
| ○ **Lock/PRG** (Lockout mode factory default) | : | This mode allows the user to change the settings and to run the automatic self-test procedure. When this mode is entered the output relays are blocked and the inputs are disregarded. |
| ○ **L** (Local mode) | : | In this mode the inputs can only be controlled via the relevant terminals of the MX14-5. In the local mode N° change of configuration or test command via push buttons or serial port is accepted. |
| ○ **R** (Remote mode) | : | In this mode all the inputs are sill controlled via the relevant terminals but their status can also be changed from 0 to 1 (not from 1 to 0) via the serial communication interface. The push buttons on relay front face are disactivated: their function is controlled via the serial interface. N° change of configuration is accepted. |

The following table summarizes the three operating modes:

| | Local mode | Remote mode | Lock-out mode |
|---|---|---|---|
| **On/Off buttons** | Enabled | Disabled | Enabled (On = test, Off = ignored) |
| **Mode button** | Enabled | Enabled | Enabled |
| **Digital inputs I1..I14** | Enabled | Enabled | Ignored |
| **Logic matrix inputs** | = digital inputs | = each input can be activated (Logic state 1) both locally and via serial interface | Ignored |
| **Outputs** | Enabled | Enabled | Blocked |
| **Programming** | Disabled | Disabled | Enabled |
| **Event recording (Option)** | Enabled | Enabled | Disabled |
| **RS232 front face port** | Enabled when the communication cable is connected to the front port. | | |
| **RS485 serial port** | Enabled when cable is disconnected from front port. | | |

## 2.8 - Configuration of outputs.

All the output contacts can be configured as:

- Normally Energised or Normally De-Energised.
- Instantaneous or delayed (0.01 to 655s). Different values can be selected for set and reset time delays of any relay.
  The time needed for the acquisition of the status of the inputs (50ms) must be added to the set operation time delay.

## 2.9 - Signalizations and controls.

### *2.9.1 - Leds I1 – I14*

- Lit-on when the corresponding physical inputs are ON (logic state 1).

### *2.9.2 - Leds O1 – O5*

- Lit-on when the corresponding outputs are active (LOGIC state 1) and during the reset time delay.
- Flashing during the operation set time delay.

### *2.9.3 - Led R (Remote mode)*

- Lit-on when in remote mode.
- Flashing for 2s before entering a different mode selected via the MODE push button.

### *2.9.4 - Led LOCK/PRG (Lock-out mode)*

- Lit-on while working in lock-out mode.
- Flashing for 2s before entering a different mode selected via the MODE push button.

### *2.9.5 - Led L (Local mode)*

- Lit-on while working in local mode.
- Flashing for 2s before entering a different mode selected via the MODE push button.

### *2.9.6 - Led Ax/I.R.F (Power supply / Internal failure)*

- Lit-on during normal operation.
- Flashing in case of internal fault.
- Extinguished when power supply is off.

### *2.9.7 - Push button Off*

- Local Circuit Breaker Open Command

### *2.9.8 - Push button On*

- Local Circuit Breaker Close Command
- Pressing the On button while working in lock-out mode makes the unit enter an automatic self-test procedure.

### *2.9.9 - Push button Mode*

- Operating mode selection command
- Cyclical selection of the operating mode (-------). Any new mode is entered after 2 sec from push button activation.

## 2.10 - Real time clock.

The unit features a built in clock calendar with Years, Months, Days, Hours, Minutes, Seconds, Tenths of seconds and Hundredths of seconds.

### *2.10.1 - Clock synchronization.*

The clock can be synchronized via the serial communication interface.
The following synchronization periods can be set: 5, 10, 15, 30, 60 minutes.
Synchronization can also be disabled, in which case any synchronization command is ignored.
In case synchronization is enabled, the unit expects to receive a sync signal at the beginning of every hour and once every $T_{syn}$ minutes. When a sync signal is received, the clock is automatically set to the nearest expected synchronization time.
For example: if $T_{syn}$ is 10min and a sync signal is received at 20:03:10 of January 10$^{th}$, 98, then the clock is set to 20:00:00 January 10$^{th}$, 1998.
On the other hand, if the same sync signal was received at 20:06:34, the clock would be set to 20:10:00, January 10$^{th}$ 98.
Note that if a sync signal is received exactly in the middle of a $T_{syn}$ period, the clock is set to the previous expected synchronization time.
Warning: if time is adjusted (via the serial port) while synchronization is enabled, the clock stops and can be restarted only by sending a sync. message.

### *2.10.2 - Resolution.*

The clock has a 10ms internal resolution.

### *2.10.3 - Operation during power off.*

The unit features an on board Real Time Clock which maintains time information for at least 1 hour in case of power supply failure.

### *2.10.4 - Time tolerance.*

During power on, time tolerance depends on the on board crystal
(+/-50ppm typ, +/-100ppm max. over full temperature range).
During power off, time tolerance depends on the RTC's oscillator
(+/-50ppm typ, +65 –270 ppm max over full temperature range).

## 2.11 - Diagnostics

The unit features three different self-test procedures:

- Start-up test: this is activated at power-up. The on-board E2PROM and RTC are tested. The software also looks for stuck keys on the front panel.
- Periodic test: this is activated every 10mins and checks the contents of the on board E2PROM.
- User-requested test: this is activated whenever a test command is issued to the unit while working in lock-out mode (via front panel or serial communication interface).

The $E^2$PROM is tested and all the leds are lit-on for 4 seconds.

In case errors are detected the lock-out mode is automatically entered and the Ax/I.R.F. green led starts flashing.

# 3. PROGRAMMING

The configuration of the logic matrix can be programmed by the serial port RS232 on the front connected to the PC through the connection cable (see § 5) with the support of MSCom software.

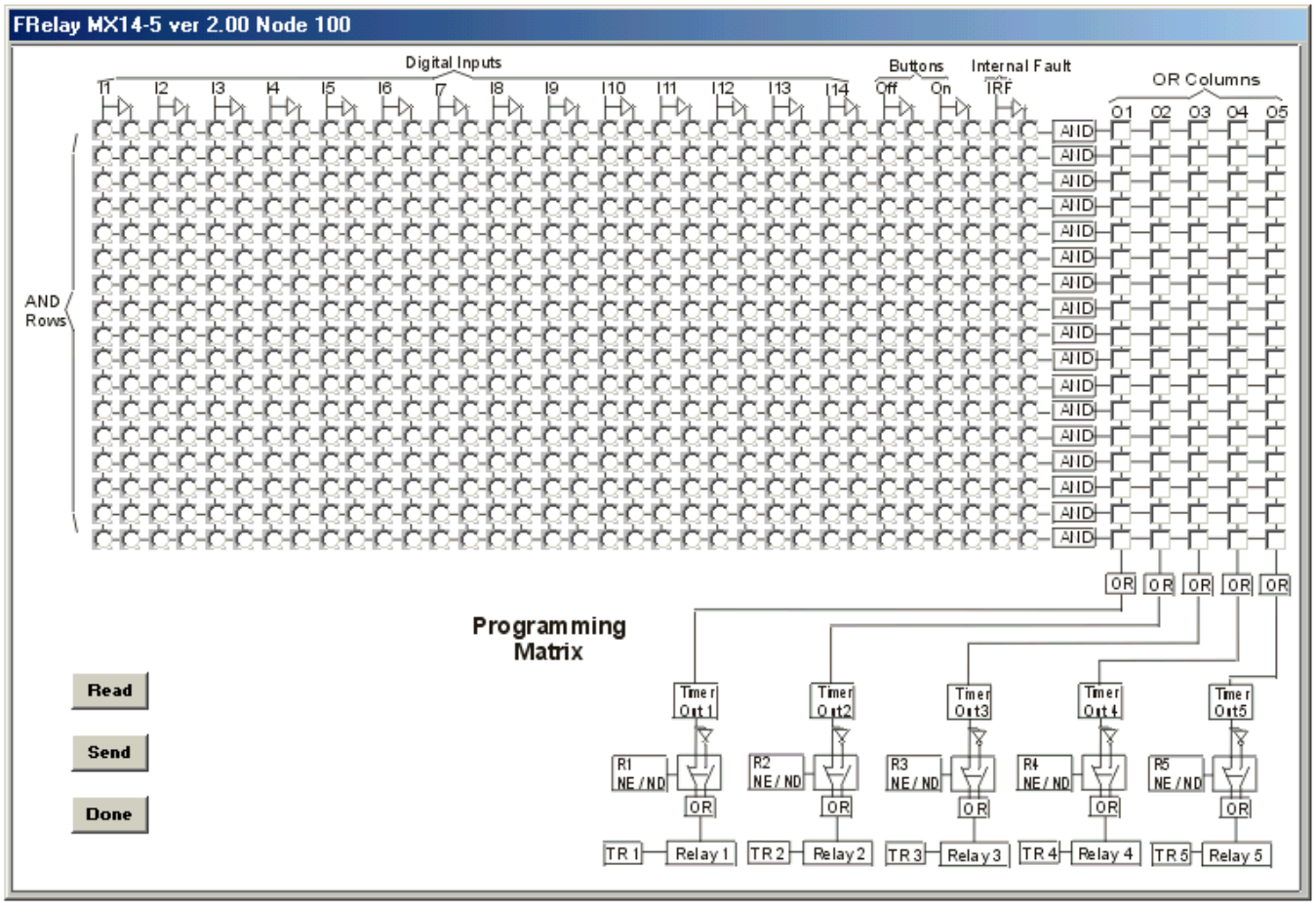
## 3.1 – Matrix Configuration

Power-on the relay and enter MODE “LOCK/PRG” by the white button.

Connect the serial port on the relay front to the PC, where MSCom Software has been previously installed.

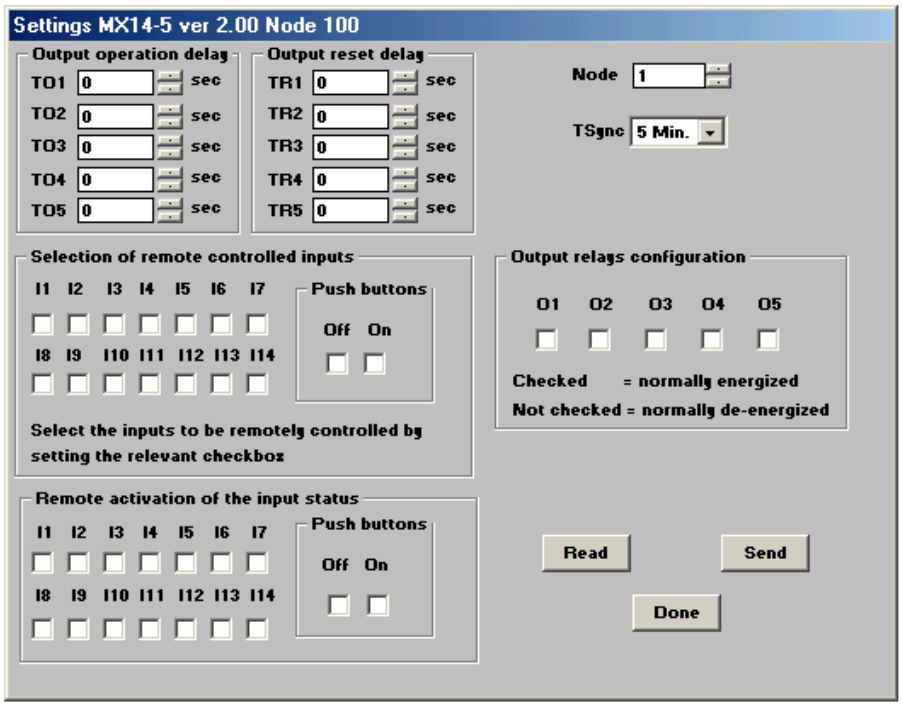
Connect the relay through the option “Scan Network “.

Select the function F→Relay : logic matrix will be displayed, and clicking on the selected nodes it’s possible to program the operation logic. At the end of matrix configuration, enter “SEND” to confirm the programming.



## 3.2 – Input and Output Configuration

At the end of the matrix programming, activate function “Settings”. Herebelow window will be displayed.




### *3.2.1 – Output relay configuration*

- Output relays can be programmed to be normally energized or normally deenergized, activating or not activating the correspondent box.
- In the normally energized configuration, the output relay is energized when the correspondent command is set “ 0 ” while it is deenergized when the command is set to “ 1 “.
- In the normally deenergized configuration, the output relay is deenergized when the correspondent command is set to “ 0 “ while it is energized when the command is set to “ 1 “.

### *3.2.2 – Delay of output relay operation*

For each relay (R1, R2, R3, R4, R5) it is possible to program the Response Time delay (TO1, TO2, TO3, TO4, TO5) to the state “ 1 “ of its operation logic.

### *3.2.3 – Delay of output relay reset*

For each relay (R1, R2, R3, R4, R5) it is possible to program the Response Time delay (TR1, TR2, TR3, TR4, TR5) to the state “ 0 “ of its operation logic.

### *3.2.4 – Output relay operation delay*

For each relay (R1, R2, R3, R4, R5) set the operation time delay in seconds (TO1....TO5).

### *3.2.5 – Output relay reset delay*

For each relay (R1, R2, R3, R4, R5) set the drop-off time delay in seconds (TR1....TR5)

### 3.3 – Selection of remotely controlled inputs

Select the inputs to be remotely controlled by activating the correspondent box.

### 3.4 – Activation of the remotely controlled inputs

The inputs selected for remote control can be forced from status " 0 " to status " 1 " activating the correspondent box. Activation via the serial port is possible only if the relay is in REMOTE mode.

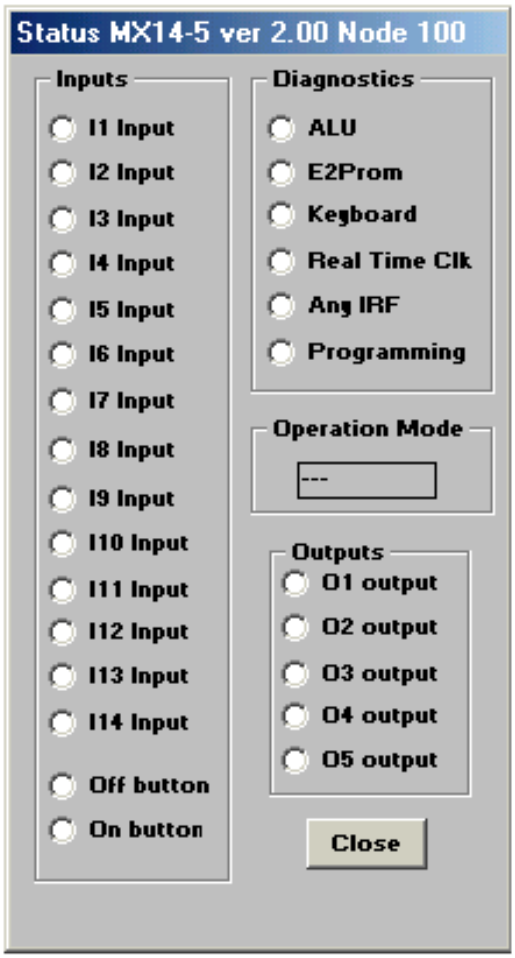
N.B. Inputs already in the status " 1 " cannot be switched to the status " 0 " via the remote serial command.

### 3.5 – Selection of the Node address

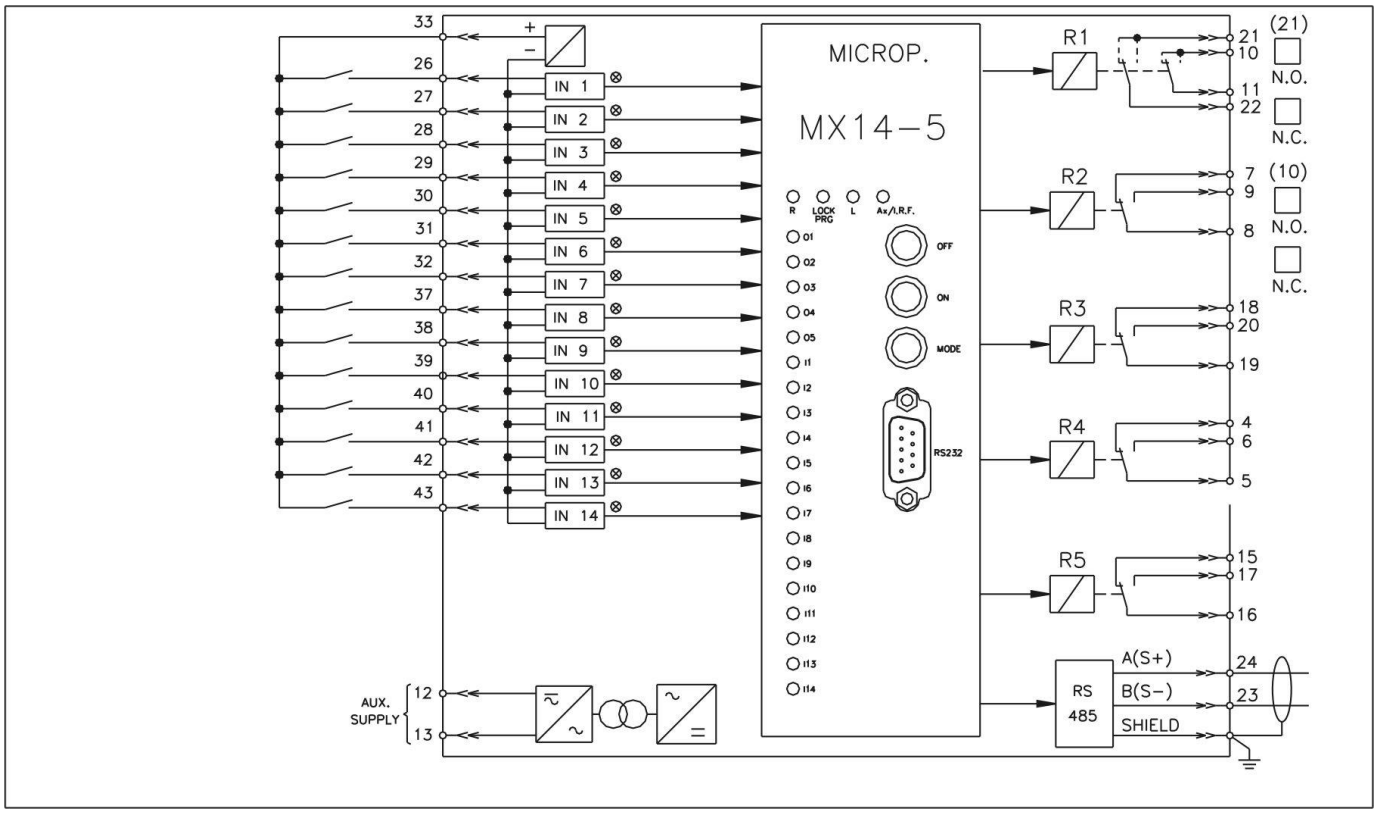
The node address is the call number to which the relay will answer during operation on serial line. Always choose a number different from those used for other relays connected to the same line. Set the node address and press the button "SEND" to confirm the number. The relay accepts its address number and the communication is interrupted. To start again the communication, go back to the window "Relay Manager" and ask again the connection of the relay using its number.

## 4. Monitoring INPUTS/OUTPUTS Status

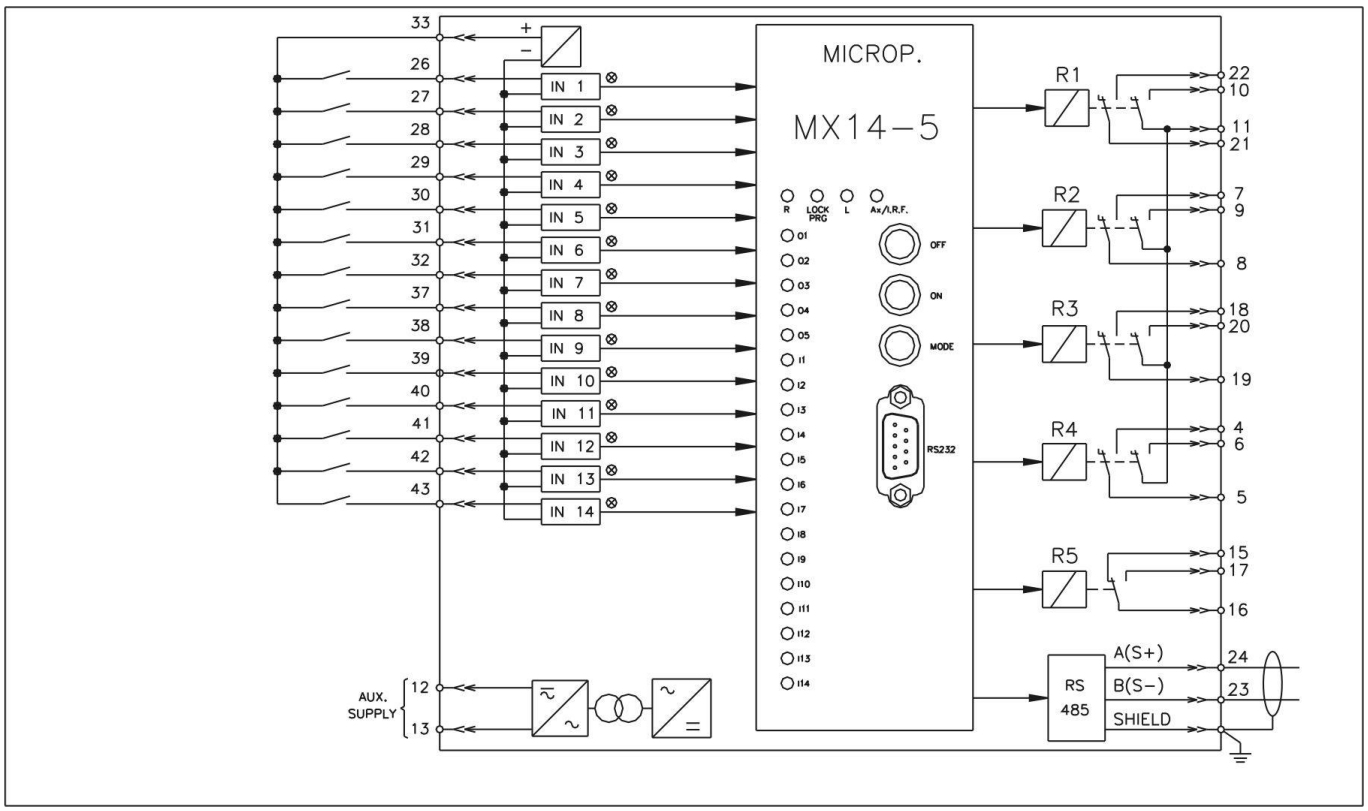
It's possible to monitor the status of inputs, commands and outputs through serial communication. For this reason, after connection to MSCom, select the windows "Status".



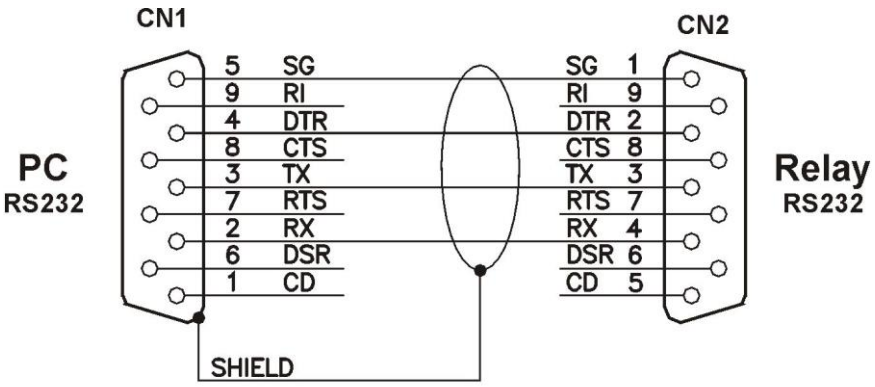
## 5. CONNECTION DIAGRAM (SCE1704 R0 Standard Output)




### 5.1 – Connection diagram (SCE1669 Rev.1 Double Output)



## 6. CABLE FOR FRONT PANEL SERIAL PORT (SCE1593 Rev.2)





## 7. MAINTENANCE

No maintenance is required. Periodically a functional check-out can be made by operating the TEST button on relay's front. In case of malfunctioning please contact Microelettrica Scientifica Service or the local Authorised Dealer mentioning the relay's Serial No reported in the label on relays enclosure.

| | |
|---|---|
| ⚠ | IMPORTANT NOTICE: in case of $E^2$PROM error (green led Ax/I.R.F. flashing after power-up or a test) try the following recover procedure: |

Run a user-requested test.
If the error is reset (green led Ax/I.R.F. lit) turn the relay off and then on again. Check relay's settings via the serial communication interface before restarting normal operation.
If the error is not reset repeat the operations listed at point 1.
If the error can't be corrected please contact Microelettrica Scientifica Service or the local Authorised Dealer

## 8. POWER FREQUENCY INSULATION TEST

Every relay individually undergoes a factory insulation test according to IEC255-5 standard at 2 kV, 50 Hz 1min.
Insulation test should not be repeated as it unusefully stresses the dielectrics.
When doing the insulation test, the terminals relevant to serial output must always be short circuited to ground. When relays are mounted in switchboards or relay boards that have to undergo the insulation tests, the relay modules must be drawn-out of their enclosures and the test must only include the fixed part of the relay with its terminals and the relevant connections.
This is extremely important as discharges eventually tacking place in other parts or components of the board can severely damage the relays or cause damages, not immediately evident to the electronic components.

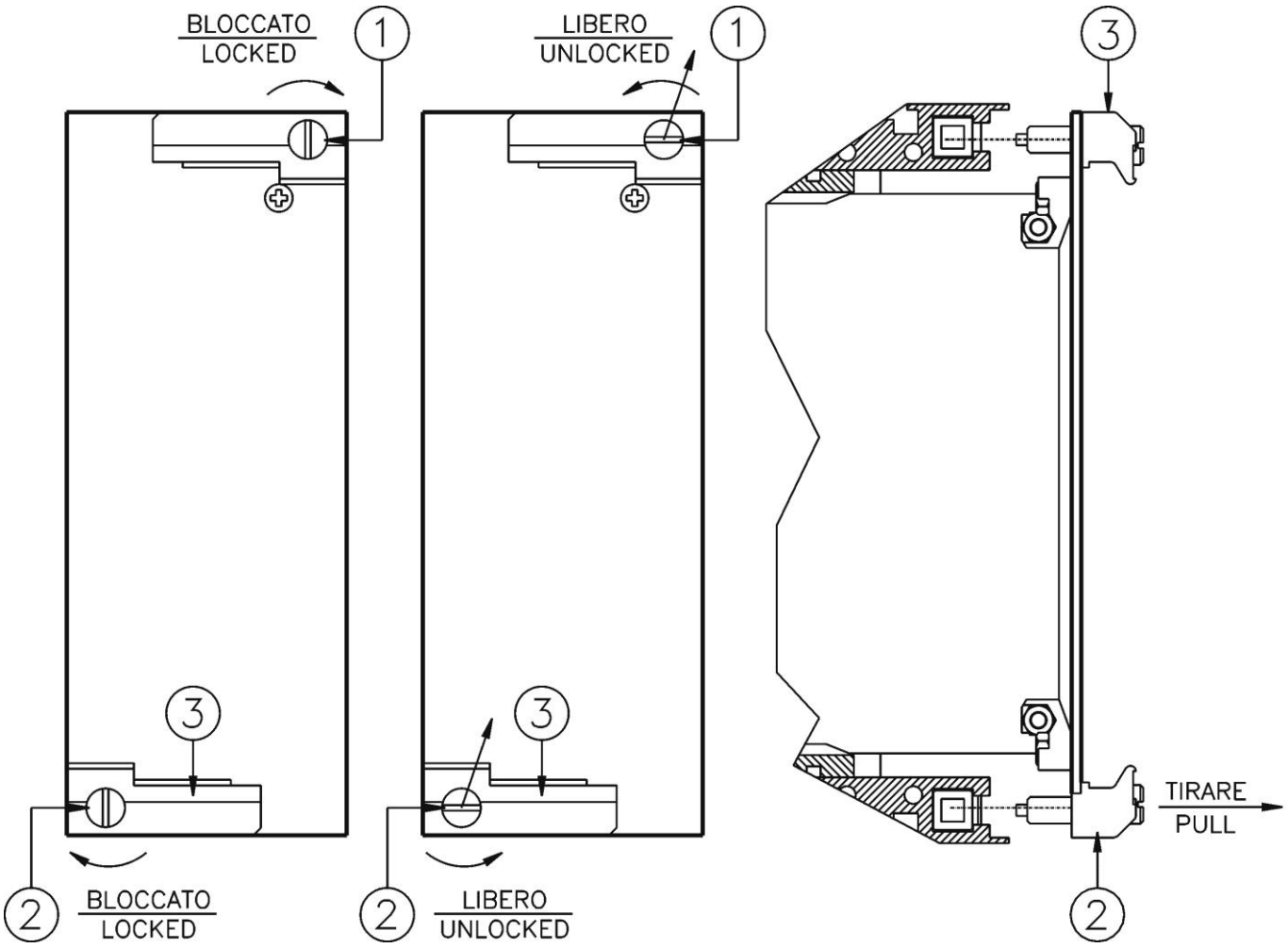
# 9. DIRECTION FOR PCB'S DRAW-OUT AND PLUG-IN

## 9.1 - Draw-out

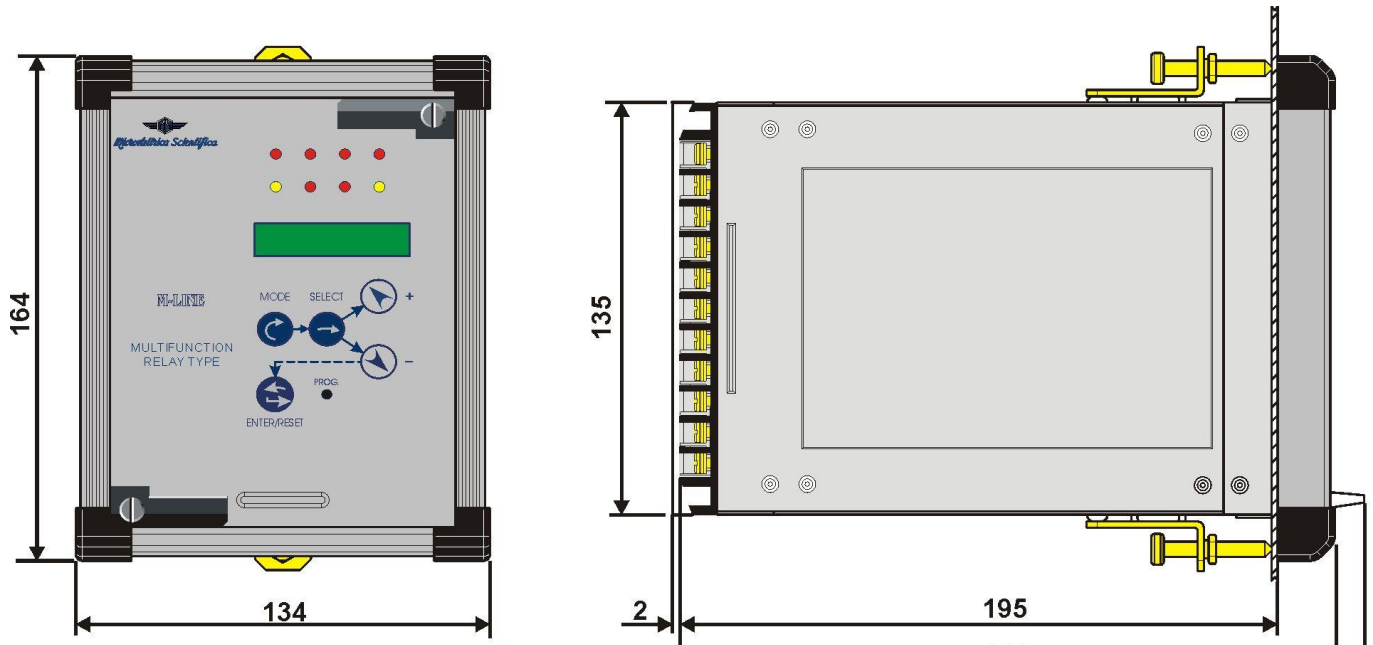
Rotate clockwise the screws ① and ② in the horizontal position of the screws-driver mark.
Draw-out the PCB by pulling on the handle ③

## 9.2 - Plug-in

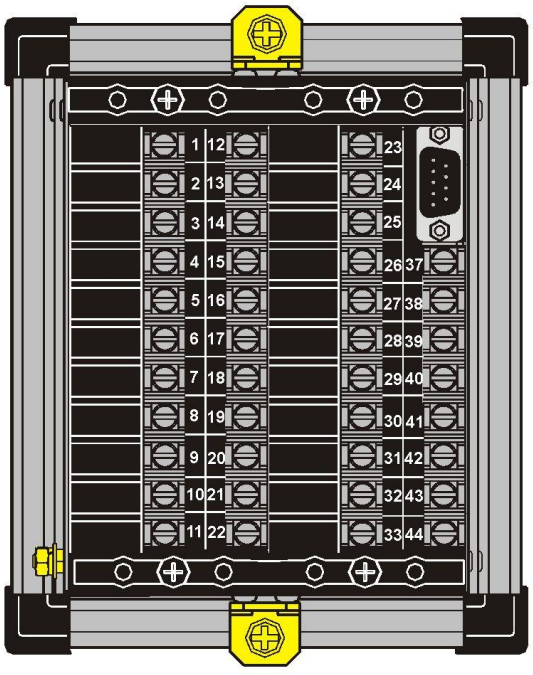
Rotate clockwise the screws ① and ②in the horizontal position of the screws-driver mark.
Slide-in the card on the rails provided inside the enclosure.
Plug-in the card completely and by pressing the handle to the closed position.
Rotate anticlockwise the screws ① and ② with the mark in the vertical position (locked).



## 10. OVERALL DIMENSIONS




FORATURA PANNELLO
PANEL CUT-OUT
115x137 (LxH)


VISTA POSTERIORE - MORSETTI DI CONNESSIONE
VIEW OR REAR - TERMINAL CONNECTION

# 11. ELECTRICAL CHARACTERISTICS

**APPROVAL : CE**
**REFERENCE STANDARDS IEC 60255 - CE Directive - EN/IEC61000 - IEEE C37**

| | | | | | |
|---|---|---|---|---|---|
| ▪ Dielectric test voltage | | IEC 60255-5 | 2kV, 50/60Hz, 1 min. | | |
| ▪ Impulse test voltage | | IEC 60255-5 | 5kV (c.m.), 2kV (d.m.) – 1,2/50μs | | |
| ▪ Insulation resistance | | > 100MΩ | | | |
| **Environmental Std. Ref. (IEC 60068)** | | | | | |
| ▪ Operation ambient temperature | | -10°C / +55°C | | | |
| ▪ Storage temperature | | -25°C / +70°C | | | |
| ▪ Environmental testing | (Cold) | IEC60068-2-1 | | | |
| | (Dry heat) | IEC60068-2-2 | | | |
| | (Change of temperature) | IEC60068-2-14 | | | |
| | (Damp heat, steady state) | IEC60068-2-78 | RH 93% Without Condensing AT 40°C | | |
| **CE EMC Compatibility (EN61000-6-2 - EN61000-6-4 - EN50263)** | | | | | |
| ▪ Electromagnetic emission | | EN55011 | industrial environment | | |
| ▪ Radiated electromagnetic field immunity test | | IEC61000-4-3<br>ENV50204 | level 3 | 80-2000MHz<br>900MHz/200Hz | 10V/m<br>10V/m |
| ▪ Conducted disturbances immunity test | | IEC61000-4-6 | level 3 | 0.15-80MHz | 10V |
| ▪ Electrostatic discharge test | | IEC61000-4-2 | level 3 | 6kV contact / 8kV air | |
| ▪ Power frequency magnetic test | | IEC61000-4-8 | | 1000A/m | 50/60Hz |
| ▪ Pulse magnetic field | | IEC61000-4-9 | | 1000A/m, 8/20μs | |
| ▪ Damped oscillatory magnetic field | | IEC61000-4-10 | | 100A/m, 0.1-1MHz | |
| ▪ Immunity to conducted common mode disturbance 0Hz-150KHz | | IEC61000-4-16 | level 4 | | |
| ▪ Electrical fast transient/burst | | IEC61000-4-4 | level 3 | 2kV, 5kHz | |
| ▪ HF disturbance test with damped oscillatory wave (1MHz burst test) | | IEC60255-22-1 | class 3 | 400pps, 2,5kV (m.c.), 1kV (d.m.) | |
| ▪ Oscillatory waves (Ring waves) | | IEC61000-4-12 | level 4 | 4kV(c.m.), 2kV(d.m.) | |
| ▪ Surge immunity test | | IEC61000-4-5 | level 4 | 2kV(c.m.), 1kV(d.m.) | |
| ▪ Voltage interruptions | | IEC60255-4-11 | | | |
| ▪ Resisnce to vibration and shocks | | IEC60255-21-1 - IEC60255-21-2 10-500Hz 1g | | | |

**CHARACTERISTICS**

| | |
|---|---|
| ❑ Average power supply consumption | 5W/12V |
| ❑ Output relays | rating 5 A; Vn = 380 V<br>A.C. resistive switching = 1100W (380V max)<br>make = 30 A (peak) 0,5 sec.<br>break = 0.3 A, 110 Vcc,<br>L/R = 40 ms (100.000 op.) |

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