mattei®
BEST SOLUTIONS IN COMPRESSED AIR

MAESTRO XB

REFERENCE MANUAL

TEFA1G-013

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Chapter
1

GENERAL INFORMATION

1.0 Introduction

This manual is addressed to technicians, Mattei installers and all customers who wish to acquire information on the functioning of the MAESTRO XB electronic board.
The manual contains the characteristics in terms of HW and SW and the operating modes.
MAESTRO XB is a programmable device used to control a compressor, capable of adapting its operation to the specific requirements of the air network to which it is connected. It has various programming levels, operating modes and fault control/analyses. The advanced programming and analysis levels are protected by digital codes in order to prevent involuntary tampering. It also has a memory which maintains the settings carried out over time as well as the operating data even if the compressor is not connected to the electrical mains or in the event of a power failure. Weekly scheduling can be carried out for start-up/shut down (Optional).

1.1 Identification codes

Maestro XB is made up of two hardware devices which are identified by means of a code.

These codes are:

Code	Description
AC40B36625	Base control module.
AC40B24983	Expansion module.

Table 1

These codes uniquely identify the parts of which the control device is composed. Only the use of the expansion module requires careful installation.

Chapter 2

HARDWARE DESCRIPTION

As already mentioned, the Maestro XB hardware is made up of a central unit and an expansion. The central unit provides for most of the compressor management and control functions, while the expansion board manages optional functions such as a dryer and a clock for weekly scheduling.

Characteristics of the main board

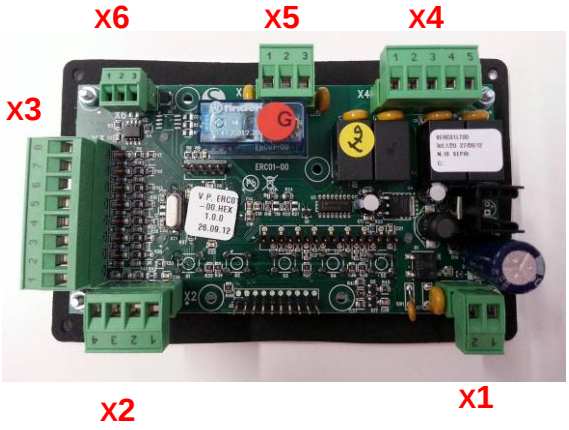
Power supply voltage	**24 Vac ±10%**
Power frequency	**50 / 60 Hz**
Operating temperature	-20 + 60°C
Humidity	90% R.H.
Front grade of protection	IP 65
Display	2 rows x 16 characters
Keyboard	5 buttons
Memory	Flash >512 Mb
Number of digital inputs	**7**
Digital inputs power supply voltage	12 Vdc
Number of digital outputs	6
Type of control signal	Free voltage
Output contacts capacity	
Maximum permitted voltage	230 Vac
Maximum permitted current	5 A resistance
Line pressure probe	
Probe power supply voltage	12 Vdc
Type of signal	4 ~ 20 mA
Oil temperature probe	
Type of signal	NTC

Characteristics of the expansion board

Number of digital inputs	1
Digital inputs power supply voltage	12 Vdc
Number of digital outputs	2
Type of control signal	Free voltage
Output contacts capacity	
Maximum permitted voltage	230 Vac
Maximum permitted current	5 A resistance
Dryer temperature probe	
Type of signal	NTC

2 .1 Main board connections

The connection to the control unit is by means of a series of extractable terminal boards; the meaning of each terminal is indicated below. The mechanical type of the connectors used is also given.



Terminal board		Description
X1	1	Board input power at 24 Vac
	2	
X2	1	Pressure probe power input at +12 Vdc
	2	Pressure probe power input at -12 Vdc
	3	Oil temperature probe (NTC)
	4	
X3	1	Common digital inputs (Gnd)
	2	Emergency stop
	3	Low oil level
	4	Motor overload (Programmable)
	5	Phases inverted
	6	Air filter clogged
	7	Start by pressure switch
	8	Remote-control enablement
X4	1	Line contactor (softstart)
	2	Triangle contactor
	3	Star contactor
	4	Vacuum command
	5	Common digital outputs
X5	1	(N.C.)
	2	(C) Compressor fault signal
	3	(N.O.)
X6	1	+ Rx/Tx
	2	Gnd
	3	- Rx/Tx

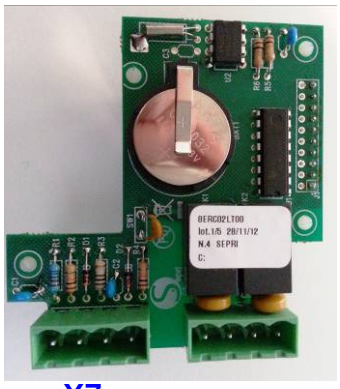
The connectors may be screw type or spring type.

Type of connectors

X1 = Phoenix extractable 2-way 5 mm pitch
X2 = Phoenix extractable 4-way 5 mm pitch
X3 = Phoenix extractable 8-way 5 mm pitch
X4 = Phoenix extractable 5-way 5 mm pitch
X5 = Phoenix extractable 3-way 5 mm pitch
X6 = Phoenix extractable 3-way 3.5 mm pitch

2.2 Expansion board connections

The expansion board which can be supplied as an optional element has the following connections.



X7 X8

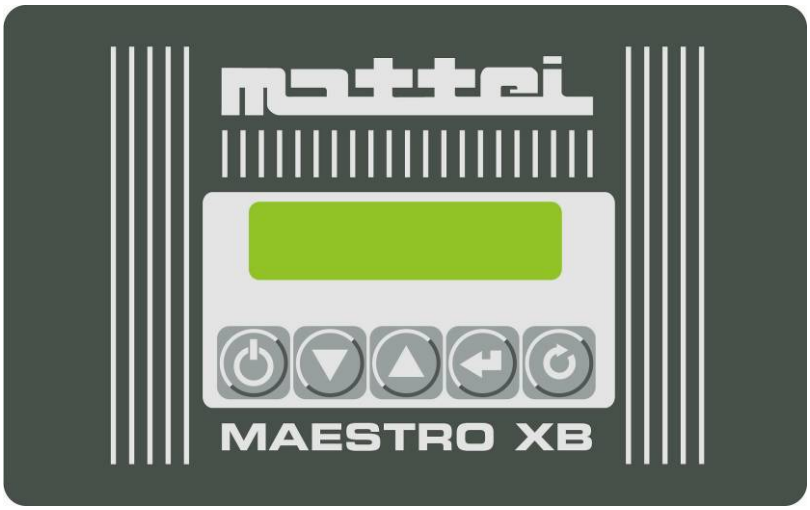
Terminal board		Description
X7	1	Dryer fault
	2	
	3	Dryer temperature probe (NTC)
	4	
X8	1	Dryer command
	2	
	3	Machine signalling enabled
	4	

Type of connectors

X7 = Phoenix extractable 4-way 5mm pitch
X8 = Phoenix extractable 4-way 5mm pitch

2.2 User interface

As previously indicated, Maestro XB controls the compressor, informing the user of system pressures and temperatures and it allows for functioning configuration. All of this takes place through an interface made up of a display and a keyboard. The purpose of the former is to display the information and allow programming of the device. The keyboard, on the other hand, carries out the active function of entering data and allows navigation through the menus.



The Maestro XB display has rear lighting, which is activated as soon as a button is pressed in order to make it easier to read. It has 2 lines of 16 characters each which allow all the parameters to be viewed. The only limitation is that accented characters cannot be used, which therefore limits use in those languages which make wide use of special characters.

The keyboard is made up of 5 buttons which carry out the various functions described below:

ON/OFF button: This enables and disables compressor functioning.

Up button: The button has several functions, namely:

- To scroll upwards through the various menu items.
- In edit mode, it increases the value of the numeric variable or moves the selection.

Down button: The button has several functions, namely:

- To scroll downwards through the various menu items.
- In edit mode, it decreases the value of the numeric variable or moves the selection.

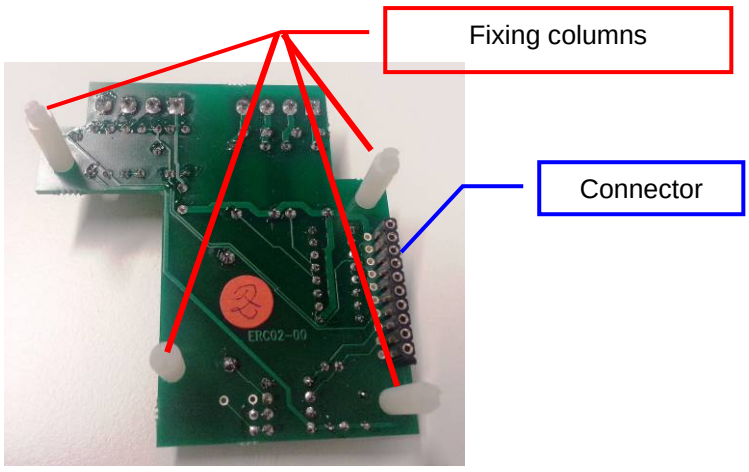
Enter button: This button also has several functions:

- It opens the memory before a modification and closes it after the modification.
- In clock mode, it disables the single work days.

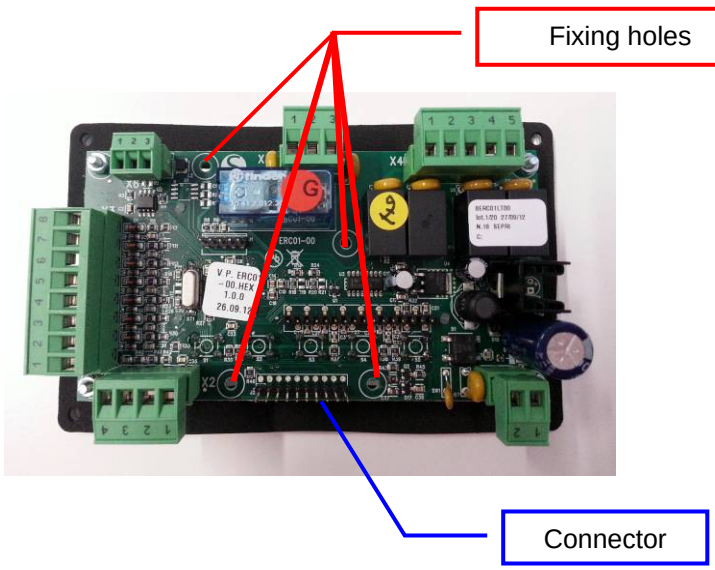
Reset / Escape button: This button allows for moving one level up while navigating through the menus.
It also carries out the "Reset" function in the case of faults.

2.3 Expansion module installation

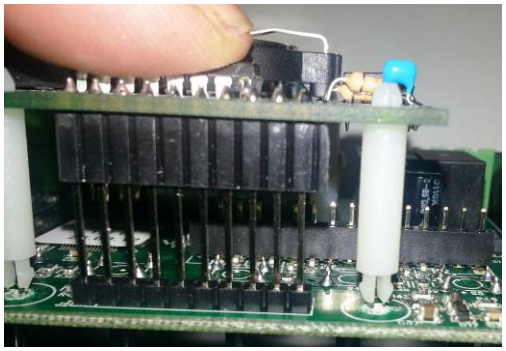
The expansion module (code AC40B36625) is an additional board which must be installed on the main board. This operation requires particular attention in order to correctly insert the comb connector of the main board without bending one or two connections. Align the columns precisely with the holes on the main board, then press the expansion board carefully so that all the teeth and the columns are inserted correctly.



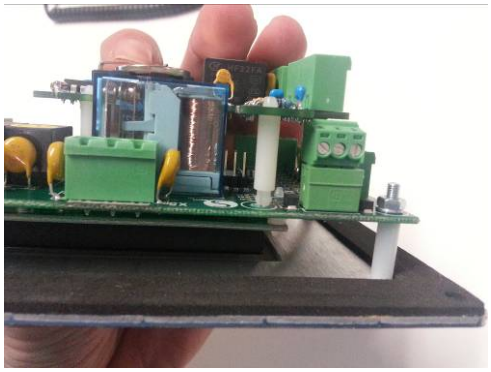
The drawing on the left shows the 4 plastic fixing columns with the board and the multi-pole connector for the electricity connection.



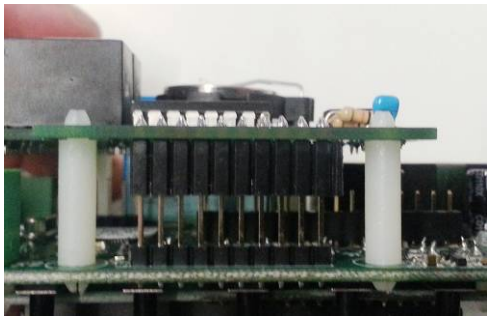
The drawing on the left shows the holes for fixing the expansion board and the connector for the electricity connection.



Align the connectors with the various terminals inserting the various terminals, and insert the columns into the fixing holes provided.
Check that both connector and columns are aligned and press until the small anchorage tongue of the columns clicks.



Carry out the same operation on the other side of the board. Take care to ensure that there is no interference with the programming connector.



The final result is shown in the photograph on the left, where it can be seen that the columns rest completely against the base board and the connector is aligned.

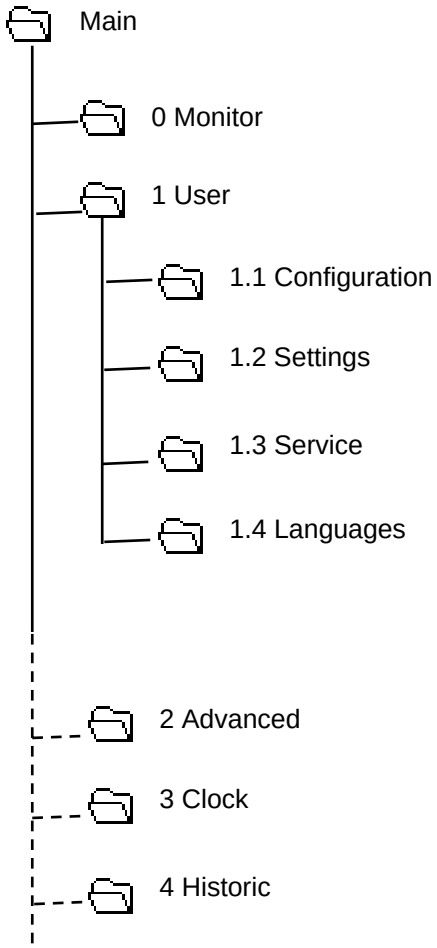
SOFTWARE MENU

Chapter 3

In order to dialogue with the user, MAESTRO XB uses an interface menu that allows for compressor monitoring and programming. These menus are subdivided by function and are not all accessible to the end customer. In fact, some menus are protected by one or more passwords.

These menus are in turn subdivided according to the various applications that the variable contents perform.

The structure of the software menus is comparable to the way computer folders are organised where the menu [Main] is the root and the various sub-menus contain the various folders.



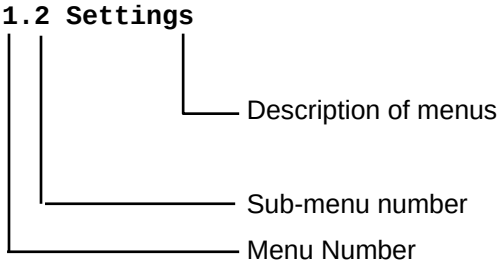
Main menus for compressor management are:

Menu	Identifying menu	User access	Password
Monitor	0	Yes	No
User	1	Yes	No
Advanced	2	No	Yes
Clock	3	Yes	No
Memory	4	Yes	No
Info	5	Yes	No

Table 2

In order to simplify the search for a variable, each menu and each sub-menu has been identified with a number.

The reading button for the pages is indicated below.



The various menus also contain text which informs the user on the meaning of the variables and the functions they perform.

Attention:

Only the menus that can be accessed by the end customer are translated into the various languages available in the software, whereas only Italian and English are available in the menus protected by a password.

> Note
>
> Hereafter the menus or sub-menus will be identified by text between [ ], whereas the items in on the individual pages will be identified by text between “ ”

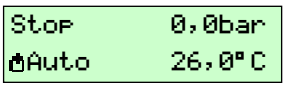
3.1 [MONITOR] Menu

The [Monitor] menu is the core of the entire software. Here the line pressure and compressor temperatures can be monitored and the operational state, hours of operation, etc. can also be checked.

Given the importance of this menu, if you are in other sections of the software for any reason, after a period of inactivity (60") on the terminal keyboard, the system will automatically display the first screen of the menu.

The information displayed on this menu will be visible only if the function is active or if the corresponding control probe is present. For example, the dew point temperature will only be displayed if the dryer is activated.

The first page of the menu is shown below, therefore the following is visible:



- Machine enabled through display of the “ ⏻ “ symbol in the first character of the second row.
- Machine Status,
- Line pressure,
- Operating mode,
- Oil temperature.

Other information is available scrolling through the menu pages, specifically:

- Hours of enablement,
- Operating hours,
- Charge hours,
- Dew point temperature (only if this option is active).

The first page also shows any compressor faults are also displayed. This information is displayed through a scrolling description of the faults on the second row of the display.

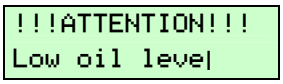
However, the signals are divided into 2 large families which are:

- Alarm signalling
- Lock signalling

In the first case the compressor has not stopped, but the fault is signalled until the condition is restored or the compressor stopped.

In the event of an alarm, this is indicated by scrolling text which describes the fault only on the second row of the display.

On the other hand, in the event of lock, the compressor is stopped and action by an operator is required to restore it.



In case of lock, the indication occupies the entire display as indicated on the left. The second row will display scrolling text as in the case of an alarm signal which describes the cause of the lock.

The descriptions of the icons that inform the user on the machine status and compressor operating mode are listed in the tables below.

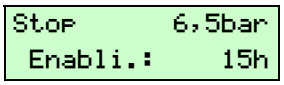
Machine status indications	
Stop	Compressor Disabled
Std-by	Compressor Enabled in Stand-By
NoLoad	Vacuum Compressor
Load	Charging Compressor
Block	Compressor Locked
NoPrs	Special compressor operation (see chapter 16).

Table 4

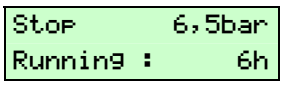
Operating Mode Indications.	
Auto	“AUTOMATIC” mode
Cont.	"CONTINUOUS" mode
Mod.	"MODULATION" mode

Table 3

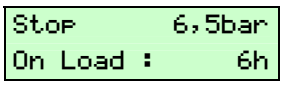
To view the other information on the monitor menu press the Down arrow button. You will note that the information varies only on the second row. In fact, the first row constantly displays the machine status and the line pressure. This allows the basic information to be kept continuously under control.



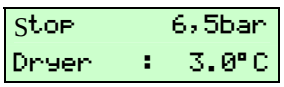
Subsequently the compressor enablement hours are displayed.



Moving down the hours of operation are displayed.



Moving farther down the charge hours are displayed.



The last screen displays the dew point temperature which, however, will be displayed only if the dryer option has been enabled.

ATTENTION:

All the menus are the circular type. In other words, both the Down and Up buttons can be used to change the menu item.

3.2 [MAIN] Menu

The [Main] menu is the one to which all the various configuration menus belong. When the controller is powered, after the internal check carried out to verify correct functioning, the software will display the first page of the [Monitor] menu. To access the [Main] menu, press “Esc” and the first item of the main menu will be displayed.

The various items that make up the main menu are indicated below.

Menu 0.0 Monitor	Accesses the Monitor menu where the information relative to normal compressor operation will be displayed.
Menu 1.0 User	Accesses the menu that allows the user to set the desired compressor operation.
Menu 2.0 Advanced	Accesses the advanced menu where authorised personnel can enable and configure the various available functions.
Menu 3.0 Clock	Accesses the clock menu (only if the expansion module is present) where weekly scheduling can be enabled.
Menu 4.0 Historical	Accesses the program memory menu, allowing any logged faults to be displayed.
Menu 5.0 Info	Provides information on the software version.

3.3 [USER] Menu

This menu, accessible by the end user, allows compressor operation to be calibrated. The variables contained in these sub-menus can be modified by the user.

Here the user can configure compressor operation based on his own needs without assistance from technical support.

1.0 User 1.1 Config.ion	**Configuration Menu:** This sub-menu allows configuration of the operating mode and the compressor control mode.

Operation: Automatic	This defines the compressor operating mode, specifically: • **Automatic,** • Continuous, • Modulation.
Control: Pressure probe	This defines the reference pressure sensor for operation, specifically: • **Pressure probe,** • Pressure switch.

1.0 User 1.2 Settings	**Settings Menu:** The compressor operating pressures can be set in this sub-menu.
Pressure band: BP1	This item allows the desired pressure band to be selected. 3 bands are available which are identified as indicated below: • **BP1,** • BP2, • BP3.
Maximum pressure BP1 7,7bar	On this screen the maximum pressure inherent to the “BP1” band is asked.
Minimum pressure BP1 6,5bar	On this screen the minimum pressure inherent to the “BP1” band is asked.
Maximum pressure BP2 7,7bar	On this screen the maximum pressure inherent to the “BP2” band is asked.
Minimum pressure BP2 6,5bar	On this screen the minimum pressure inherent to the “BP2” band is asked.
Maximum pressure BP3 7,7bar	On this screen the maximum pressure inherent to the “BP3” band is asked.
Minimum pressure BP3 6,5bar	On this screen the minimum pressure inherent to the “BP3” band is asked.
Idling time: 120sec	This defines the vacuum operating time before the compressor is stopped.
1.0 User 1.3 Service	**Service Menu:** This sub-menu allows the compressor maintenance intervals to be set.
Oil change: 5000h	This defines the frequency of maintenance relative to oil and oil filter change.
Separ. Change: 10000h	This defines the frequency of maintenance relative to separator filter change.
Oil hours: 00000h	This displays the accumulated hours of operation of the oil.
Separator hours: 000000h	This displays the accumulated operating hours of the separator filter.

These last two pages explain that every counter can be zeroed independently if the maintenance operator deems it necessary.

When a counter reaches the number of hours set for maintenance this is signalled on the display. This signalling does not stop the compressor, but advises of the need to carry out the scheduled maintenance (i.e. Oil change).

```
1.0 User
1.4 Language
```

Language Menu: This sub-menu allows the language used by the user interface to be set. Remember that only the menus which are not password protected will be translated into the selected language.

```
Language:
        Italian
```

The following languages are available:

- **Italian,**
- English,
- French,
- German,
- Spanish,
- Czech,
- Polish,
- Portuguese,
- Russian.

Attention: the password protected menus will only be in Italian / English.

```
1.0 User
1.5 Supervision
```

Supervision Menu: This allows control via PC to be enabled.

```
Start from PC:
            No
```

If activated, compressor start-up will take place by means of a command from a PC. The compressor must be enabled ahead of time using the specific On/Off switch.

```
1.0 User
1.6 Switching
```

Rotation Menu: This menu item, like the subsequent ones, will be displayed only if:

- *The clock module is present (expansion),*
- *Communication in ModBus is active.*

```
Switching
            None
```

Here you can select the type of rotation for selecting the base compressor. The possible selections are:

- **None,**
- Daily,
- Weekly,
- Monthly.

Remember that "network" operation is not the same as for compressors equipped with controls like Maestro and Maestro XS.
See the specific chapter.

```
N.Compressor:
              #
```

On this screen you must indicate in the program how many compressors are connected (**Max 3**).

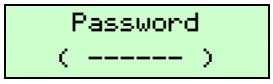
3.4 [ADVANCED] Menu

This menu is accessible only to personnel of the Mattei service; for access to this menu, in fact, a password must be used.

This menu allows for enabling accessories and special functions, the dryer itself, and other things.

This menu is also divided into sub-menus where the variables of the enabled function are grouped.

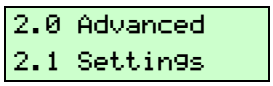
The wordings of this menu will be available in only two languages, Italian or English, according to the selection made from the [User] menu.



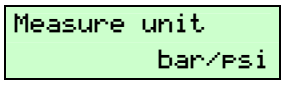
Password: To access this menu, the password must be entered. The password is composed of a combination of 6 figures obtained by pressing the arrow buttons.

Since the menu has several items, they will be accessible one by one. The other items can be visualised by scrolling up and down the list using the arrow buttons. The full list of the menus is given in the following table.

Complete list
2.1 Configurazione
2.2 Abilitazioni
2.3 Soglie
2.4 Timer
2.5 Essiccatore
2.6 Debug

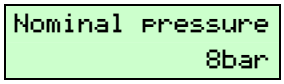


Configuration Menu: This allows for the configuration of the device according to the type of compressor on which the compressor is installed.



This defines the unit of measurement adopted by the system. The possible choices are:

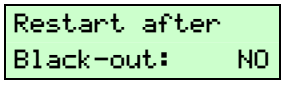
- **Bar,**
- Psi.



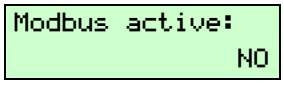
This defines the nominal pressure of the compressor. Also in this case, the possible choices are:

- **8 bars,**
- 10 bars,
- 13 bars,

When the nominal pressure is selected, the default values for the minimum and maximum pressure of the system will be modified automatically.



If enabled, this allows for automatic re-enablement after a power black-out.



If enabled, this makes it possible to use the communication port RS 485 with the Modbus protocol.
The following 2 pages are accessible only if the communication has been activated.

Address: 1	This defines the communication address of the system.
Speed: Baud: 19200	This defines the communication speed of the system.
2.0 Advanced 2.2 Enabling	**Enablement Menu:** This allows for enabling certain operating or control functions of the compressor, depending on the type of compressor and the optional devices installed.
Remote command: NO	If enabled, this allows for the compressor to be enabled by remote control via a digital contact.
Press. SW. Ck.: NO	If enabled, when the operating mode is set on "Pressure Switch", this checks the status of the digital contact generally used for the remote command. This function mainly serves when the compressor is connected to a higher controller (see Multicomp II or similar).
Motor Thermal: N.C.	This defines the type of digital contact for detecting the fault; more specifically: • **N.C. (Normally closed contact),** • N.O. (Normally open contact),
Dryer: NO	If enabled, integrated dryer management is activated. To use the dryer control the expansion module must be inserted.
Modulation: SI	This allows for enabling or disabling the "Modulation" operating mode selection. • **YES Modulation available.** • NO Modulation not available.
2.0 Advanced 2.3 Timer	**Timer Menu:** This allows for setting the main timers necessary for basic compressor operation. There are other timers, in fact, but they are found in specific sub-menus, linked to the activity performed.
Minimum time Funct.: 10min	This defines the minimum operating time of the compressor after every start-up.
Stop Delay : 60,0sec	This defines the delay before the compressor stops after the user's request.
Start delay: 10sec	This defines the delay at the next start-up after every effective stop of the motor. It allows for discharging any chamber pressures present.
Star/Delta : 2,0sec	This defines the switching time during the start-up phase in triangle start mode, as well as the time for the changeover from vacuum to charged after start-up.

```
2.0 Advanced
2.4 thresholds
```

Threshold Menu: This allows for setting the action thresholds of the various compressor alarms and protections, allowing for correct functioning.

```
Alarm Temp. :
        110.0°C
```

This defines the "oil alarm" temperature; it does not stop the compressor.

```
Trip Temp.  :
        120.0°C
```

This defines the "oil block" temperature; it stops the compressor.

```
Temp. Start :
         -5.0°C
```

This defines the oil temperature above which the compressor can be freely started up.
If the oil temperature is below the set level, the compressor will not start until the temperature rises.

```
2.0 Advanced
2.5 Dryer
```

Dryer Menu: This is accessible only if enabled previously in the [Enablement] sub-menu. It allows for the configuration for the integrated dryer operation.
It must be remembered that it is also essential to install the expansion module of the Maestro XB control unit.

```
Operation:
     Continuous
```

This defines the dryer operating mode. The possible selections are:

- **Continuous,**
- Automatic.

```
On fault:
          Alarm
```

Maestro XB can manage compressor behaviour in two different ways in the case of a dryer fault: in the first case, an alarm is generated but the compressor is not stopped; in the second case, however, the compressor is stopped. The possible selections are therefore:

- **Alarm,**
- Block.

```
Alarm delay:
          05min
```

This defines the delay in the activation of the dryer alarms.

```
Start temp.:
          5.0°C
```

This defines the dryer start-up temperature after being stopped because the block temperature had been reached.

```
Stop temp.:
          1.0°C
```

This defines the dryer block temperature and the ice alarm signal.

```
Low alarm
delay:      300s
```

This defines the signal and action delay in the case of low temperature.

```
High alarm
delay:      180s
```

This defines the signal and action delay in the case of high temperature.

```
Diff. Oil :
         60.0°C
```

This defines the temperature value which, subtracted from the environment temperature, determines the upper value of the dew temperature variability range for dryer control.

```
Diff. Ambience:
          19.0°C
```

This defines the temperature value differential by which the environmental temperature is determined.

```
2.0 Advanced
2.6 Debug
```

Debug Menu: This allows for setting and parameterising the probes of the compressor. It is also possible to check the correct functioning of the digital inputs and outputs.

```
2.6 Debug
1  Inputs
```

This menu allows for checking the status of the "digital inputs"; the meaning of the graph is as follows:

```
1 2 3 4 5 6 7 8
■ ■ ■ ■ ■ _ X X
```

" _ " the contact is open.

" ■ " the contact is closed.

" X " the contact is not enabled.

```
2.6 Debug
2 Uscite
```

This menu allows for checking the functioning of the digital outputs, forcing the closure of the single relays independently of the programme.
Outputs 6 and 7 will be made active only if the expansion module is installed.

```
 1 2 3 4 5 6 7
 _ _ _ _ _ X X
```

```
2.6 Debug
3  Press. Probe
```

In this part of the programme, the pressure probe calibration operations can be carried out.

```
Press.: ###,#bar
Offset:   0,0bar
```

The first line of the two calibration screens shows the line pressure, to simplify the calibration operation. While the line below shows the following items:

```
Press.: ###,#bar
FDS   :  16,0bar
```

- The offset value for reading correction,
- The lowest value of the probe scale used.

```
2.6 Debug
4  Temp. Probe
```

In this part of the programme, the oil temperature probe calibration operations can be carried out.

```
Temp. :  ###,#°C
Offset:   0,0°C
```

The top line shows the real temperature, while the second line shows the offset value.

```
2.6 Debug
5  Dryer probe
```

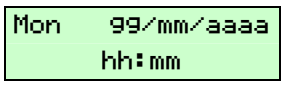
In this part of the programme, the dryer temperature probe calibration operations can be carried out.

```
Temp. :  ###,#°C
Offset:   0,0°C
```

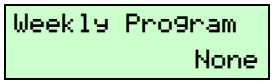
The top line shows the real temperature, while the second line shows the offset value.

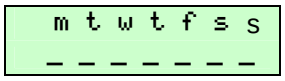
3.5 [CLOCK] Menu

This menu is accessible only if the expansion module has been installed; it allows the user to start the compressor or the compressor network completely autonomously, in other words, without the aid of an operator who physically carries out start-up.



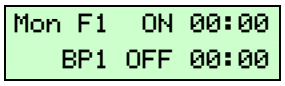
The first screen of the menu displays the system date and time as well as the day of the week. The latter is calculated automatically based on the set date.

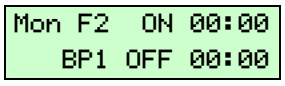


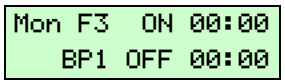


If weekly scheduling is enabled, a summary screen of the week will be displayed.

Move the cursor to the desired day and press "Enter" to access programming for the desired timeslots.
For each day of the week there are 3 scheduling timeslots and for each timeslot you must provide the following information:







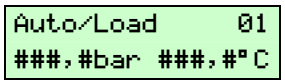
- Start time,
- Stop time,
- Pressure band.

Press "Esc" to return to the summary menu.

3.6 [MEMORY] Menu

This menu allows service personnel to verify the type of faults which may have triggered a compressor stop.

Events Menu: This menu allows for the display of any faults which have impacted compressor functioning.



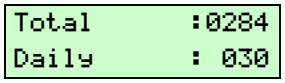
For each memorised event there are two screens in order to be able to contain all the information, specifically:

- The event number,
- The machine state and configuration,
- The event code,
- Operating hours,
- The line pressure,
- The oil temperature.

All the stored data is logged at the time of the fault, thereby creating a photograph which helps technical support to understand the possible problem.

Up to 10 operating faults will be stored. The first fault with number 00 will be the most recent. When a second fault occurs it will replace the previous one which will take the number 01, and so on. When the memory is full, any new events will overwrite the memory restarting from event "00". The most recent event will be recognisable because when you access the events menu the one displayed will actually be the last fault logged.

Start-up Menu: it is possible to know the number of start-ups carried out by the compressor. This provides useful information on compressor operation.



In particular the number of total start-ups can be displayed and, if the clock module is present, the number of daily start-ups can be viewed.

3.7 [PROTECTED] Menu

This menu is strictly protected by password, preventing access to non-authorised persons. Access is protected by a combination of keys: in fact, for access to the menu it is necessary to simultaneously press the <↑> and < ↵ > buttons.

Password (------)	After pressing the aforesaid buttons, the password request screen is visualised. This is different from the others and is known only to personnel authorised by Mattei.
Brightness: ■■■■■	This allows for adjusting display luminosity.
Contrast: ■■■■■■■	This allows for adjusting display contrast.
Enabling hours: 000000h	This screen shows and allows for editing the compressor enablement hours.
Run Hours: 000000h	This screen shows and allows for editing the times when compressor operation is enabled.
On Load hours: 000000h	This screen shows and allows for editing the compressor charging times.
Oil hours: 000000h	This screen shows and allows for editing the working hours carried out relative to the compressor oil.
Separator hours: 000000h	This screen shows and allows for editing the working hours carried out relative to the compressor separator filter.
History reset: NO	Here, the complete record of past events can be cancelled.
Device reset: NO	Here, the Maestro XB software can be reset to the initial factory configuration.
Delay rele': 30mS	This defines the delay between the opening of the Stella contact and the closure of the Triangle contact, in order to avoid possible contactor blocks caused by different opening performances.

Chapter
4

OPERATING MODES

Mattei rotating compressors are designed by the manufacturer to issue compressed air at the nominal calibrated pressure.
There are 2 different functioning modes:

- continuous,
- automatic,
- modulation.

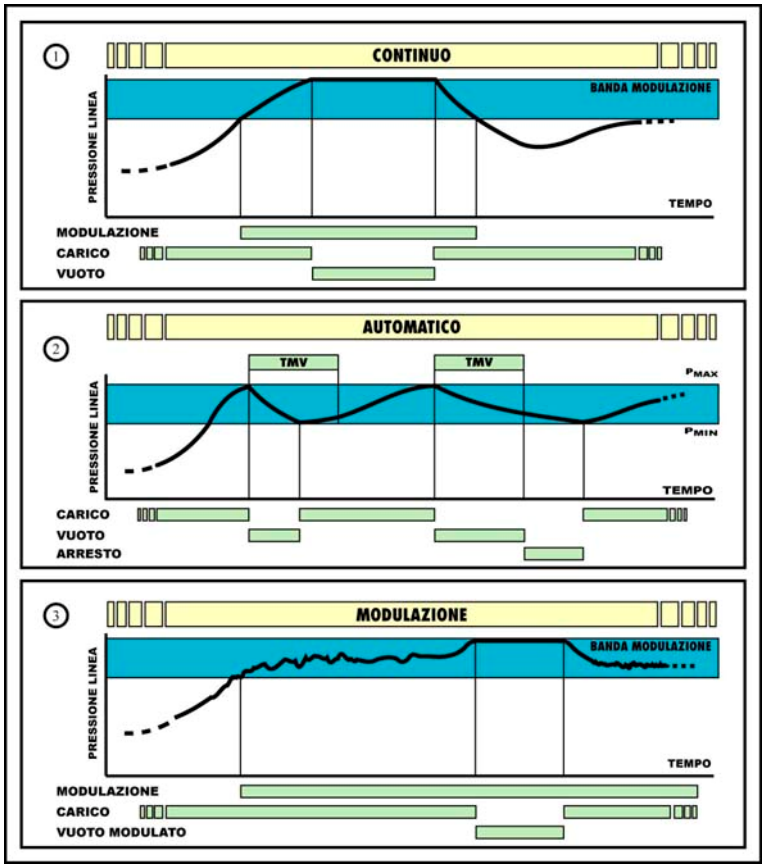


Fig. 1

The figure gives a graphic description of the aforesaid modes.

4 .1 CONTINUOUS Mode

By activating this mode, the compressor issues air within a clearly defined pressure range. The maximum and minimum are those pre-established by Mattei, although they can be customised at will using the programming functions available in the [**User**] menu. When the pressure reaches the maximum value (P_{max}), the compressor is in vacuum (operating with closed aspiration valve) and decompressed to reduce energy absorption. As soon as a request for air lowers the pressure value to the minimum (P_{min}), the compressor is placed under recharge and issues air again. The compressor can be stopped at any moment by pressing the stop button. The stop procedure includes a vacuum operating phase, of a pre-established duration, while the compressor decompresses.

Note

If the machine is enabled with line pressure above the set minimum, the compressor will not start but will wait until the pressure falls below the same.

4 .2 AUTOMATIC Mode

In this mode, another function is added to the former: when little or no air is requested, the compressor can stop automatically. The cycle is the following: When the line pressure reaches the value P_{max} the compressor will be “placed in vacuum”. Two cases are possible:

1. if no air is requested, it runs idle for a certain period of time TMV (tempo di Marcia a Vuoto: in vacuum operating time), and it will stop when the time has expired; it will start again as soon as the line pressure falls below P_{min};

2. however, if the line pressure falls below P_{min} before expiry of the time TMV the compressor will be “placed under recharge”.

The above-described operation modes can always be overridden by a feature of the MATTEI rotary compressors, the **MODULATION** phase.
In fact, by suitably adjusting the "servo-valve" of the compressor, the compressor can be made to start modulating before reaching P_{max}, so that this value can only be reached in the case of extremely low or zero consumption.

Note

If the machine is enabled with line pressure above the set minimum, the compressor will not start but will wait until the pressure falls below the same.

4 .3 MODULATION Mode

All MATTEI compressors, except for the 6000 and 8000 series, have an automatic adjustment system based on the output pressure. The internal pressure of the compressor depends (in part) on the line pressure, and consequently, for the air request. When this demands decreases or is not requested at all, the line pressure and the internal pressure increase. In the Mattei compressor, the maximum pressure at which the machine must run idle can be set (by calibrating a special valve). For values slightly below maximum, the aspiration valve is only "partially" closed, suitably modulating machine capacity according to line needs. Maximum pressure and the slightly lower values define a field or range, referred to hereinafter as the MODULATION BAND.

This functioning mode exploits precisely this potential. The controller ignores the set values P_{max} and P_{min}, so that the compressor will operate without stopping unless stopped by the operator.

Note

The value of the modulation band is normally 0.3 bars.

We can establish, for example, that the maximum vacuum pressure is set (by means of the SERVO-VALVE) at 7.3 bars.

- For pressure values below 7 bars (7.3 - 0.3 = 7) the compressor issues 100% of its capacity.
- For values between 7 and 7.3 bars (values which represent the modulation band) the compressor issues less than nominal capacity, according to the request from the line.

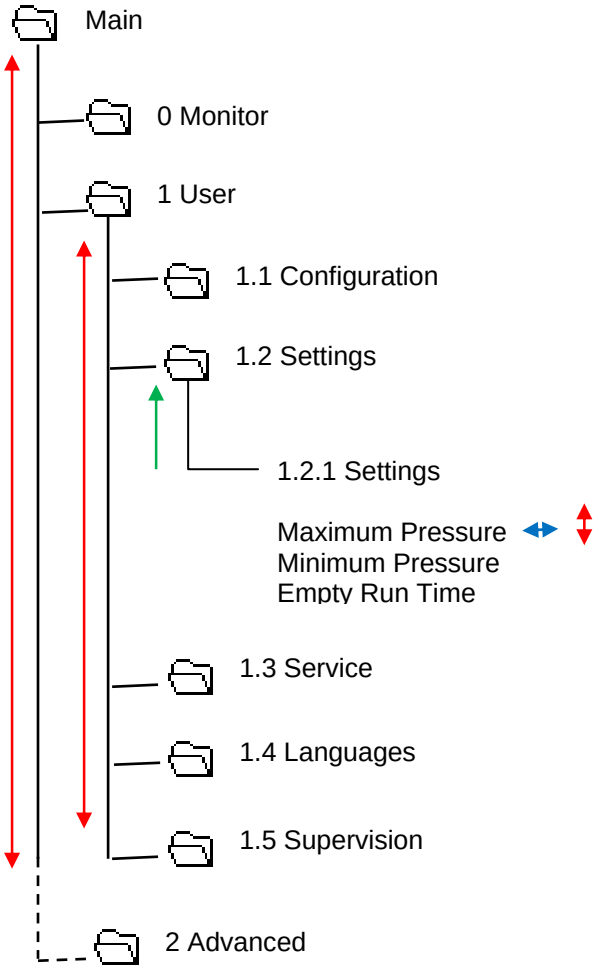
ATTENTION: If the compressor does not have the modulation valve, Mattei forbids the use of this operating mode, and the menu item will not be available for selection.

Chapter 5

MOVING BETWEEN THE MENUS

The structure of the Maestro XB software is similar to that of a PC.

Therefore, to move within the menus mainly involves the use of the 4 buttons shown below, which allow for:



To navigate through the pages.

To navigate through the variables on a page.

To increase or decrease the value of the selected variable.

To open and close the memory to edit a variable.

To confirm a selection.

To move up one level from the sub-menu.

To "Reset" an alarm.

By pressing the < Esc > button on the [Monitor] menu, we will enter the [Main] menu where the main menus of the programme are listed; usually the first menu shown is precisely the [Monitor] menu; press the arrow buttons to see the other menus. After selecting the desired menu, press the < Enter > button, and the first available sub-menu of the chosen menu will be visualised.

The above-described procedure is also to be used in the various sub-menus of the Maestro XB programme. By pressing the < Esc > button, you will return to the preceding menu item, and so on until you reach the [Main] menu again.

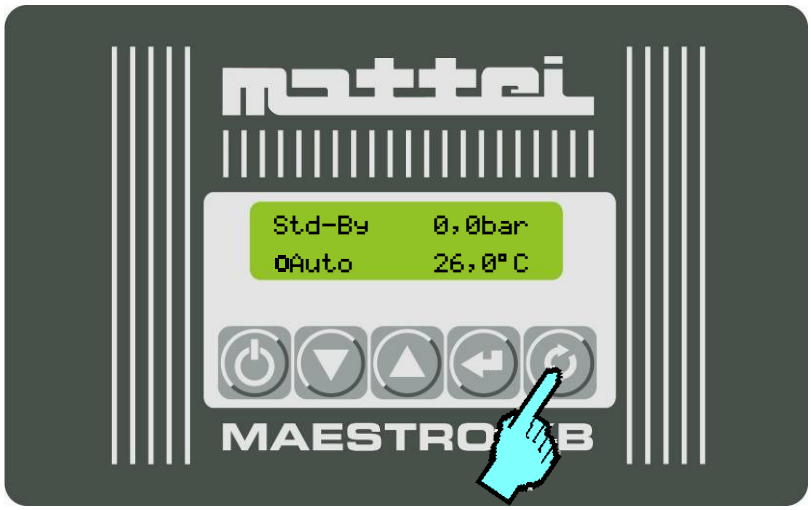
ATTENTION:

If no operations are carried out on the buttons for more than one minute, the programme will automatically visualise the first page of the [Monitor] menu.

Let's look at an example of how to navigate between the menus, assuming we want to edit the maximum pressure value of the first band of use.

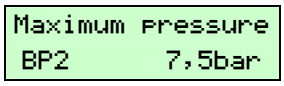
The other parameters that make up the program can also be modified, if authorised.

Remember that when the device is powered it automatically goes to the [Monitor] menu.

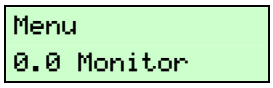


From the [Monitor] menu press <Esc>.

Menu 0.0 Monitor	The [Main] menu page is displayed. The maximum pressure value that we want to edit is in the [User/Settings] menu, therefore we must first move the cursor to [User] menu, using the <🡻> button.
Menu 1.0 User	Once the desired menu is selected press the < ↵ > button to access it.
1.0 User 1.1 Config.ion	Once inside the [User] menu, the first selectable sub-menu is displayed.
1.0 User 1.2 Settings	Use the arrow buttons to display the sub-menu 1.2 Settings Press the < ↵ > button
Pressure band: BP1	The operating band selection screen will be displayed.
Maximum pressure BP2 7,7bar	However, if we want to change the maximum pressure value associated with the second band we will press the <🡻> arrow button until the desired variable is displayed.
Maximum pressure BP2 7,7bar	Press the < ↵ > button and the pressure value will begin to flash, indicating that it can now be edited. Now use the arrow buttons to modify the value as desired and then press < ↵ > again.



The variable value stops flashing, indicating that the change has been memorised.



Now press < Esc > until the [User] menu is displayed and press the button again to go directly to the [Monitor] menu, otherwise select another menu.

All of the menus are the circular type. In other words the up or down buttons can be used indifferently to select a variable.

ALARMS DISPLAY AND MEMORY

Chapter 6

In the Maestro XB memory menu, as mentioned in the menu descriptions, some data relative to the compressor is logged. Specifically any faults and the number of start-ups carried out by the compressor are logged.

Accessing the [Memory] menu the screen below is displayed.

```
4.0 Historical
4.1 Events
```

```
4.0 Historical
4.2  Starts
```

There are 2 sub-menus listed in the menu which subdivide the data stored in the device. These sub-menus are:

1. Events.
2. Start-ups.

6.1 Events Sub-menu

During compressor operation faults may occur in one or more of its parts or temperatures higher than those anticipated for correct operation may occur. These faults must be intercepted and appropriately managed by the control unit, preventing the compressor from encountering more serious problems or even a breakdown.
These faults, defined as "Events", can be sub-divided into 2 categories with quite different operational performance. These two categories are:

- Events which generate an "Alarm",
- Events which generate a "Lock".

6.1.1 Alarm Mode

If the type of event is not serious enough to cause immediate breakdown or serious malfunction of the compressor, it is defined as an "Alarm". The user is immediately signalled but it does not cause the compressor to be stopped.
It is understood that this event must be verified and it may be necessary to contact technical support in the event of a repeated notice.

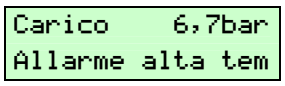
6.1.2 Lock Mode

Unlike the alarm mode, the "Lock" mode stops the compressor. An event of this type can cause serious damage to the compressor which must therefore be immediately stopped in order to prevent more serious consequences.
These events must be assessed very carefully by technical support.

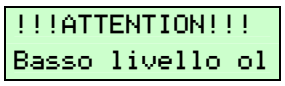
Attention: In the event of a fault caused by breakage of a sensor, we recommend replacing the sensor if possible with one similar to the faulty one, otherwise contact Mattei service.

6.1.3 Displaying events

The occurrence of a fault, as already mentioned, triggers a notice or stoppage of the compressor, depending on the type as described above. In both cases a signal is displayed on the screen, informing the user of a problem with the compressor.
Signalling of a fault takes place in two different ways depending on whether it is an alarm or a lock as already seen in the [Monitor] menu.



In the event of an "Alarm" on the lower row the description is displayed in scrolling test format.
On the first row, on the other hand, the compressor operating data remains displayed.
This signal ceases when the cause that triggered it ceases.



Whereas, in the event of a lock, the notice occupies the entire display in order to point out the presence of a fault.

Press <Esc> to return to the [Monitor] menu and restart the compressor. Naturally the reason for which the compressor stopped must first be checked and if, after enabling the compressor, it should stop again, do not persist in the operation.

Proceed with a careful examination of the compressor and in case of any doubts contact the general technical support.

6.2 Displaying stored events

Enter the [Events] sub-menu to view the last event logged in the memory. Because the display is small, for each event two pages are required, where the following information is listed:

- The event number,
- The machine state and configuration,
- The event code,
- Operating hours,
- The line pressure,
- The oil temperature.

All the stored data is logged at the time of the fault, thereby creating a photograph which helps technical support to understand the possible problem.

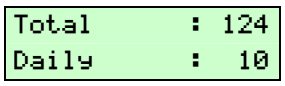
All of this information allows technical support to identify the type of compressor malfunction. The control unit stores a maximum number of **10 faults**.
Any additional events will overwrite the memory restarting from event "01". The most recent event will be recognisable because when you access the events menu the one displayed will actually be the last fault logged.

The table below lists all the fault codes in the system. The type and possible cause of the fault which occurred are also indicated.

Notification	Action	Cod	Type	Cause
Emergency Stop	Block	00	Digital	The electrical panel emergency stop push button has been pressed.
Low Oil Level	Block	01	Digital	Low oil level in the chamber (the quantity of oil is less than that necessary for correct operation).
Overload. Motor	Block	02	Digital	Main electric motor overload.
Phases inverted	Block	03	Digital	Indicates that the network connection is incorrect or connected out of phase.
Temp. Alarm Oil	Alarm	04	Analogue	The compressor oil temperature has exceeded the alarm temperature.
High Temp. Oil	Block	05	Analogue	Compressor oil high temperature.
Air Filter Clogged	Alarm	06	Digital	Indicates that the air filter is clogged. This alarm is available if the machine has the specific sensor.
Low oil temperature	Inhibition	07	Analogue	Prevents start-up of the compressor if the oil temperature is too low.
Ice Alarm	Alarm	08	Analogue	Indicates excessive cooling of any dryer that may be connected. This signal is treated as an Alarm.
	Block	09		Indicates excessive cooling of any dryer that may be connected. This signal is treated as a lock.
High Dew Point	Alarm	10	Analogue	Indicates failed cooling of any dryer that may be connected. This signal is treated as an Alarm.
	Block	11		Indicates failed cooling of any dryer that may be connected. This signal is treated as a lock.
Dryer fault	Block	12	Digital	Indicates malfunctioning of the dryer.
Oil Change	Alarm	13	Service	Indicates the need to change the oil due to the number of hours envisaged for changing being reached.
Separator change	Alarm	14		Indicates the need to replace the separator filter due to reaching the number of hours
BlackOut	Alarm	15	----	Indicates a loss of power to the compressor (only if the enabling option is enabled).
S. Line Fault	Block	16	Software	Indicates a fault with the pressure probe fitted in the radiator. Also indicates an interruption of the connection
S. Oil Fault	Block	17	Software	Indicates a fault with the temperature probe fitted on the compressor. Also indicates an interruption of the connection
S. Dew Fault	Alarm	18	Software	Indicates a fault with the temperature probe mounted on the dryer. Also indicates an interruption of the connection
Clock Error	Alarm	19	Software	Clock module defective or low battery.
Expansion Error	Block	20	Software	Indicates a communication fault between the base board and the expansion board
Serial error	Alarm	21	Software	Indicates a lack of communication on the ModBus port when compressors are connected to one another.

6.3 Start-ups Sub-menu

In this sub-menu the start-ups carried out by the compressor during its operating life can be monitored. Specifically we can monitor:



- The total number of start-ups carried out by the compressor
- The number of start-ups carried out daily by the compressor, only if the expansion module is installed.

The second counter is reset each time the on board clock passes midnight.
These counters are useful for verifying correct compressor settings. If the machine is correctly configured, the number of daily start-ups will be limited.

Attention: Obviously replacing the control unit implies losing all this information since it is not possible to insert this data into the new control unit.

Chapter 7

PASSWORD MANAGEMENT

Maestro XB is protected from any tampering by unauthorised personnel by means of access passwords for the various menus and particular functions. These can be subdivided into two categories, namely:

- USER Password,
- SERVICE Password.

7.1 USER Password

This has the simple function of allowing the user to delete the maintenance event. In fact, when the time set in the [User \ Service] menu is reached, it is signalled by means of notice on the screen.

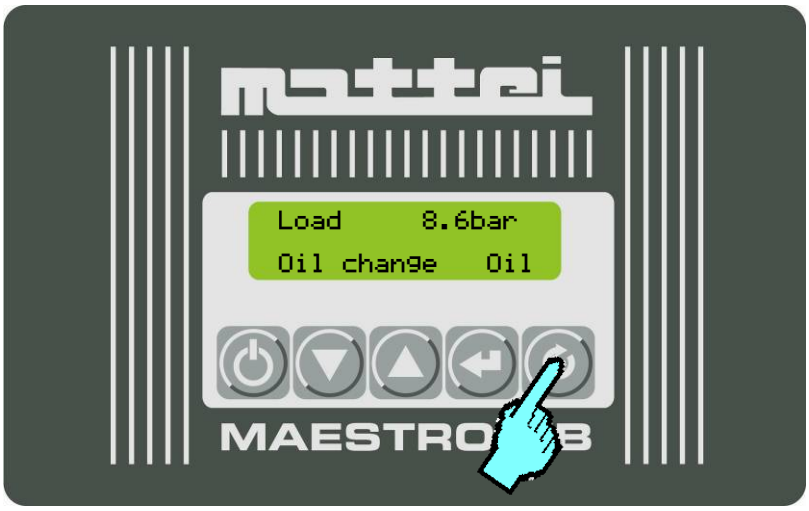
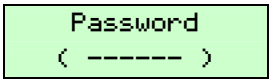


Fig. 2

To delete the signal triggered by the hour counter a password must be entered. The purpose of this is to prevent unauthorised personnel from involuntarily deleting the signal.
The password is made up of a combination of buttons which, pressed one after the other, form a sort of sequence.
This must be entered when requested in the special template shown below.



The **User** password is: <↑> <↑> <↓> < ↵ > <↑> < ↵ >

7.2 SERVICE Password

This password is used by the service or by personnel authorised by Mattei, and it must not be disclosed to customers. This gives access to the [Advanced] menu where the various functions can be enabled and configuration is carried out according to the customer's needs or the devices installed on the machine; configuration carried out by untrained personnel can lead to malfunctioning and, in more serious cases, it can damage the compressor.

WEEKLY SCHEDULING

Chapter 8

With Maestro XB the compressor can be started automatically using the on board clock.
To use this function the expansion module which houses the clock module must first be installed and then the [Clock] menu must be accessed.
For each day of the week there are three operating "Timeslots" available which allow flexible scheduling throughout the day.

These timeslots have operational priority:

- Timeslot 1 High priority,
- Timeslot 2 Medium priority,
- Timeslot 3 Low priority.

For each timeslot the following can be set:

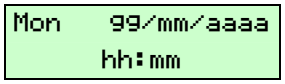
- Start time,
- Stop time,
- Pressure band.

The pressure bands must be configured ahead of time in the [User \ Settings] menu.

Maestro XB also allows continuous features to be managed during the week, also allowing system operating pressure variations. This makes scheduling even more flexible.
However, you must take great care when entering the start and stop times. In fact, although there are checks and guides, it is possible to carry out scheduling inconsistent with operation.
Remember also that for continuous operation all the days that you want to use the compressor must be scheduled. For example, if you want continuous operation from Monday to Friday, in order to obtain this operation you must necessarily schedule all of the intermediate days.

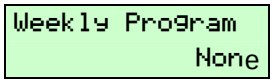
8 .1 Programming

Setting the clock takes place in a simple and functional way, also allowing particular compressor operating modes to be managed.
After configuring the pressure bands in the [User] menu they can be recalled from the clock menu, thereby allowing the compressor to function at different operating pressure values during the day.

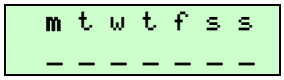


Go to the [Clock] menu. The basic clock settings page will be displayed.

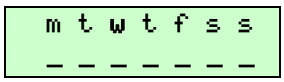
Attention: Maestro does not manage Daylight Savings Time. The change in time must be carried out manually.



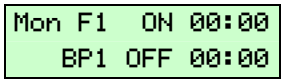
Press <🡻> to display the screen which allows time programming to be activated.



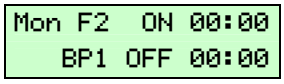
If enabled a summary screen is displayed showing any daily scheduling and active or de-active status.
The cursor, which can be identified because it is flashing (for convenience it is shown here in bold) goes to the first day of the week (m).



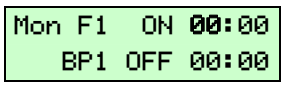
Press the <🡹> <🡻> arrow buttons to move the cursor to the day of the week that you want to configure (Wednesday in the example).



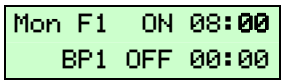
Press the < ↵ > button to access programming.
The screen for programming timeslot No. 1 will be displayed.



Press the <🡹> <🡻> buttons to select the other scheduling timeslots.

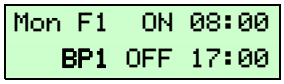


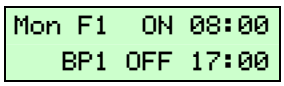
If you want to schedule only the first timeslot, press the < ↵ > button. The start time will begin to flash indicating that the hour can be changed. Press the <🡹> <🡻> buttons to set the start time.



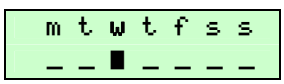
Then press the < ↵ > button to move the cursor to the minutes and use the <🡹> <🡻> buttons again to change the minutes.
Press the < ↵ > button again and the cursor will move in the following order:

- Stop time,
- Start time,
- Select pressure band.





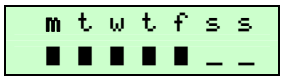
Press the < ↵ > button again and the cursor will stop flashing, saving the programming which has been carried out.
In case of error, repeat the operations described above, correcting the incorrect parameter.



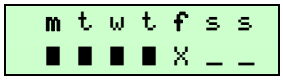
Press < Esc > to return to the summary page. You will note that a square appears under the day which has just been programmed. This indicates that at least one scheduling timeslot is active.

8.2 Temporary daily bypass

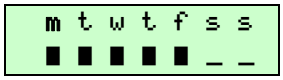
One or more days of the week can be excluded from normal operation. This may be necessary for scheduled maintenance operations which require the machine to be stopped for a certain day or for other reasons.
To carry out the exclusion, go to the [Clock] menu and select the scheduling summary page.



In the screen on the left you can see an example of active scheduling which manages five work days.



To exclude one or more days from weekly operation, you must select the day to be disabled using the <↑> <↓> buttons. Then hold the < ↵ > button in for 5 seconds. An "X" will be displayed which indicates that the scheduling for that day will not be considered and the compressor will remain stopped.



To re-enable operating, select the disabled day and hold in the < ↵ > button for 5 seconds again. The " ■ " symbol will be displayed which indicates that it has been enabled again.

Return to the [Monitor] menu by pressing < Esc >.

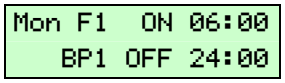
8.3 Exclusion from weekly scheduling

In the event that the time scheduling must be temporarily excluded, simply access the [Clock] menu and change the value from "Active" to "None".
The memorised times will not be lost, but will remain stored even if the expansion card where the clock resides is removed.

Remember that **the compressor cannot be used** outside the timeslots programmed for use. To do so, the scheduling must be disabled.

8.4 Special programming

Maestro XB allows various types of configurations. For example, operating timeslots can be configured which allow continuous operating for two or more days in the event that continuous operation is required during the week.
Supposing the compressor must be used from Monday to Wednesday in continuous mode, the following configuration can be set.

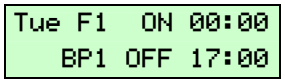


To obtain continuous operation only the first timeslot for use needs to be configured, leaving the other two unchanged.

Monday

Timeslot 1 Start at 06:00 >>>>> Stop at 24:00.

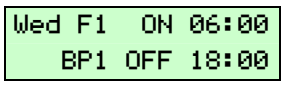
Setting the stop time at 24 hours means that the compressor must not be stopped; however, in this case, it is necessary to set a starting time for the next day at “00:00”, otherwise the compressor will stop at midnight.



Tuesday

Timeslot 1 Start at 00:00 >>>>> Stop at 17:00.

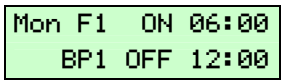
ATTENTION: The operating pressure band must be set as in the previous timeslot, otherwise the compressor will follow the new operating pressures configured in the selected band.



Wednesday

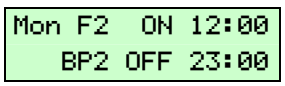
Timeslot 1 Start at 06:00 >>>>> Stop at 18:00.

Maestro XB can be programmed to use the compressors with different pressure values during daily or weekly use, thereby making compressor use even more flexible.
To take advantage of this possibility you must first program the pressure bands in the [User] menu. These can then be recalled via time scheduling.

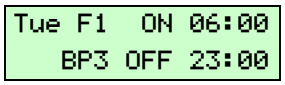


As already mentioned, the compressor operating pressures can be varied simply by recalling them according to the times.

In the first operating timeslot we can tell Maestro XB to operate from 6:00 in the morning until 12:00 using the BP1 pressure band (E.g.: Pmin= 6.5 bar Pmax 7.7 bar).



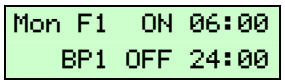
In the second timeslot, on the other hand, we may want to use different operating pressures, set the compressor start time (12:00) and stop time (23:00).
Then select the pressure band with the desired operating pressures (BP2: Pmin= 6.0 bar PMax=7.2 bar).



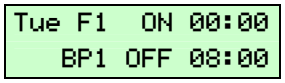
Whereas, on the next day we can use our compressor for the entire day at a third operating pressure band
(E.g. BP3: Pmin= 6.2 bar PMax=7.6 bar).

Since there are 3 bands available where different operating pressures can be set and which can be quickly recalled, we can carry out flexible programming for various types of use.

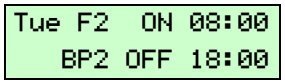
Using the combination of the two operating modes described above, even better performance can be obtained from the compressor.

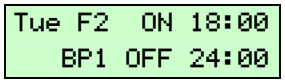


This example provides a different possibility of time scheduling.



The compressor is started at 6:00 on Monday using the BP1 band operating pressures.
At 8:00 on Tuesday the compressor will stop using the BP1 band operating pressures and switch to timeslot 2 where it will use the BP2 band operating pressures until 18:00.



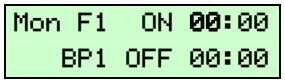


It will then go back to using the BP1 band operating pressures from 18:00 until 8:00 on Wednesday.

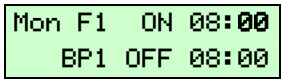
The examples above demonstrate how it is possible, using 3 daily timeslots and the 3 operating pressure bands, to cover most operational needs.

8.5 Checking the times entered

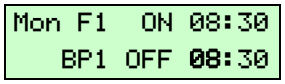
Maestro XB has a control system for entering start and stop times. When a start time is entered it is automatically listed as the stop time. The purpose of this measure is to prevent stop times being entered which are previous to the start times.



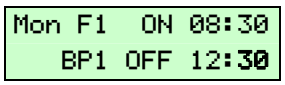
When scheduling begins as indicated above, the start hours begin to flash, indicating that their values can be set.



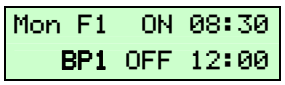
After entering the start hour and moving the cursor to enter the start minutes, you will note that the stop hours take on the same value as the start hours.



The same control is carried out on the value entered for start minutes



After modifying the stop hour the stop minutes must be entered.



Then, if the data entered is congruent, the cursor will move to the operating pressure band selection.

This type of check on the data entered helps to streamline scheduling, at the same time preventing invalid times from being entered.

Attention: The above check does not exonerate the operator from paying attention to the coherence of the times entered.

Chapter 9

The HOUR COUNTERS

Maestro XB has a series of hour counters which, in addition to determining the hours of operation, also manage the maintenance intervals on the compressor wear parts.

For this purpose there are two types of hour counters:

- Operating hours counter
- Maintenance hours counter

The task of the former is to inform the user of the compressor hours of operation, while the latter is to advise the user that a predetermined operating period has expired and that a maintenance operation is required.

9.1 Operating hours counter

Maestro XB provides the user with 3 types of hour counters with different operating modes.
Unlike the maintenance counters, these cannot be modified by the user.
The following are the compressor operating hours counters:

- Enabled hours counter,
- Running hours counter,
- Charge hours counter.

9.1.1 Enabled hours counter

The "Enabled" hours counter indicates for how many hours the compressor has been enabled, or made available for operation. This hour counter also takes into consideration periods in which the compressor is not on because it is stopped in the work cycle.
Remember that the compressor "Enabled" state is signalled by the yellow “**On**” button LED being lit.

9.1.2 Running hours counter

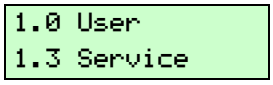
The “Running” hours counter indicates how many hours the compressor has been running. The Machine maintenance hours counter is associated with this hour counter.

9.1.3 Charge hours counter

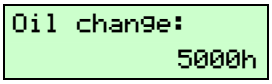
The “Charge” hours counter indicates how many hours the compressor has operated under charge.

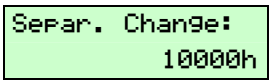
9.2 Scheduled Maintenance Intervals

The purpose of the maintenance hours counter is to advise the user that maintenance is required on the compressor parts subject to wear in order to ensure correct functioning.



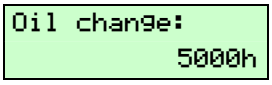
Enter the [**User**] menu and select the [**Service**] sub-menu to access the maintenance interval settings page.

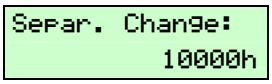




The first two screens allow you to set the maintenance intervals for:

- Compressor oil,
- Air/oil separator filter.





The subsequent screens display the hours accumulated according to the above-described hour counters.

When one of the timers reaches the prescribed maintenance hours a warning signal appears on the display (see alarms signalling) to advise that maintenance is required on an element (i.e. oil change). As we will see later, this warning can be removed only with a password which, if correct, in addition to removing the warning will also reset the relative hour counter for the next count.

9.2.1 Changing the Timer

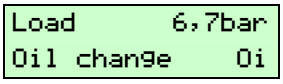
Enter the [**1.3 Service**] menu to set the desired maintenance interval, always referring to the indications from Mattei.
For example, if we want to change the value of the “Oil Change” timer from 5000 hours to 4500 hours, first we must access the [**1.3 Service**] menu.

Then press the < ↵ > button. The value will begin to flash. Then use the <🡻> button to modify the value, decreasing it. Once the desired value is reached press the < ↵ > button again.

Once the desired value is entered, press the <🡻> button to view the next hour counter.

9.3 Maintenance Warning

When one of the hour counters reaches the predetermined number of hours it provides the user with a visual instruction to carry out the relative maintenance (e.g. Oil).



As indicated in paragraph 3, scrolling text appears on the display which describes the type of fault which has occurred.

To eliminate the maintenance warning a password must be entered (see password management) in order to prevent erroneous deletion.
Press <Reset> to view the page which requests the password to cancel the fault warning and automatically reset the hour counter.
The warning can be eliminated only by entering this password, otherwise it will be repeated until the password is entered.

9 .4 Early maintenance

It may be necessary for the service personnel to zero the maintenance timers in advance and individually, or one by one.
To zero a service hours count in advance, it is necessary to go to the screen of the hours count to be zeroed.
Press the < ↵ > button until the password request page appears, and then enter the service password.
To zero another maintenance hours count, repeat the operation described above.
This operation must be carried out only and exclusively by trained personnel and, in any case, after the component has actually been replaced.

SYSTEM CONTROL

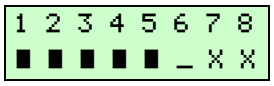
Chapter
10

Maestro XB has a diagnostic system for the equipment connected to the same, thus allowing for detecting any failures of the various devices which manage and control the compressor.
All this can be carried out from the [Advanced\Debug] menu. In fact, the following operations can be carried out:

- Verification of status of the digital inputs,
- Verification of the functioning of the connected devices,
- Calibration of the pressure probes,
- Calibration of the temperature probes.

10.1 Verification of digital inputs

This part of the programme allows the service to check the status of the digital inputs of the compressor. From this point, in fact, it can be established if a possible fault is due to an external device.
It must be remembered that the successive screens show the closed contact by means of the " ■ " symbol, while the open contact is represented by the " _ " symbol, and the symbol " X " indicates that the input is disabled.



When the [Advanced\Debug\Inputs] sub-menu is entered, the page on the left will be shown, containing the status of the digital inputs.

The meaning of the inputs is listed below:

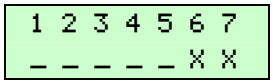
Input	Description
1	Emergency stop
2	Low oil level
3	Motor overload
4	Mains phases inverted
5	Air filter clogged
6	Start by pressure switch
7	Remote-control enablement
8	Dryer fault (on expansion module)

Attention: Inputs n° 7 and n° 8 must be enabled in advance.

In particular, input n° 8 is available only if the expansion module has been installed.

12.1 Verification of digital outputs

This part of the programme allows the service to check the correct functioning of the various devices connected to the Maestro XB digital outputs (contactors, solenoid valves, etc.). This operation also allows for the correct functioning of the various command relays.
It must be remembered that the following screens show the enabled output by the symbol " ■ ", while the disabled outputs are shown by the symbol " – ", and the symbol " X " indicates that the output is on the expansion module and is disabled if the module is not installed.



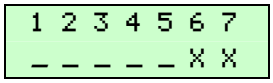
When the [Advanced\Debug\Inputs] sub-menu is entered, the page on the left will be shown, allowing for the "forcing" of the single digital outputs.

The meaning of the outputs is listed below:

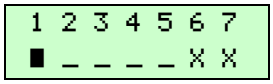
Output	Description
1	Line contactor / Inverter command
2	Triangle contactor
3	Star contactor
4	Vacuum solenoid valve
5	LOCK signalling
6	Dryer command
7	COMP. signalling ENABLED

ATTENTION: Pay great attention when checking the digital outputs.

To enable the digital outputs, proceed as follows:



After entering the outputs enablement menu, the cursor positions itself on the first output; press the < ↵ > button to carry out the tests on the selected output, and press the <↑> <↓> buttons to move between the available outputs.



Press the < ↵ > button; the cursor will start flashing. Then press the <↑> button to activate the output.

You will see the visualisation change on the display at the point of the activated output and you will then hear the line contact close.

To deactivate the output, press the <↓> button, or the <↑> <↓> buttons to move to the next output.

In both cases, the output will be opened by moving the cursor to the next output.

Attention: For safety, there is a delay between the enablement of one output and the next to prevent the simultaneous activation of two outputs.

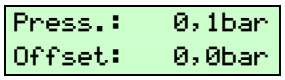
12.3 Pressure probe configuration

Maestro XB detects line pressure by a pressure probe on the machine. This not only visualises network pressure, but also allows for compressor management.

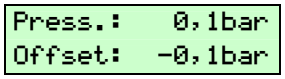
In particular, it can be said that:

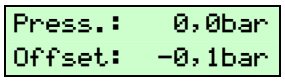
- ✓ ***Line probe:*** This manages the plant pressure, placing the compressor under charge or stopping the compressor according to the calibrations set in the [User\Settings] menu.

For these reasons, correct setting is necessary. An example of probe calibration is given below.

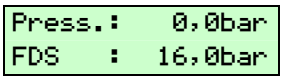


By entering the [Advanced\Debug\Pressure Probe] sub-menu, the probe on the compressor can be configured.





Supposing the probe detects a slight pressure when the compressor is stopped and you want to correct this reading, you must act on the offset valve entering a value to correct the reading; this value can be entered as either a positive or a negative value. If the offset value entered is correct, the reading value will change to 0.0 bar.



The next page gives the bottom of the pressure probe scale used; this allows for using probes at different pressures.

Mattei provides probes with signals in current of the 4÷20 mA type, with a range of 0÷16 bars.

Attention: If one of these data is not correctly set, the reading will not be accurate with consequent malfunctioning of the compressor.

12.4 Temperature probe configuration

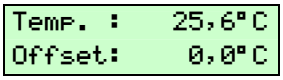
Maestro XB has two temperature probes, of the NTC type, installed in the sensitive parts of the compressor. These probes, like the pressure probes, also carry out various tasks as well as visualising the temperatures.

The temperatures measured are:

- ✓ **Oil temperature:** This is the temperature of the compressor oil. This probe signals a high compressor temperature and blocks the compressor if necessary.
- ✓ **Dew point temperature:** This is the dew point temperature of the dryer, if installed. Also this reading is visualised in the [Monitor] menu only if the dryer is enabled.

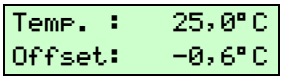
For calibration of these probes, although there are two different sections, the same calibration mode is used.

For correct calibration of the reading, a **50 kΩ** resistor must be obtained and connected to the input of the device; you must then go to the probe calibration page (e.g. Oil probe).



As shown on the screen to the left, a temperature value will be visualised. This value is that of the resistance applied to the input.

We know that by applying a resistor with a resistance value equal to that indicated, the temperature visualised must be 25 °C (77°F); in the example the value indicated is therefore inaccurate by + 0.6 °C.



At this point, press the < ↵ > button to open the memory, and change the value with the <🡻> button until the offset value visualised is equal to -0.6°C. Press the < ↵ > button again, and the value read will be correct.

Important: For the dryer probe, setting the resistance at **50 kΩ**, the value read must be equal to 15°C.

Important: Even if we set the unit of measurement at "**psi/°F**", these calibration menus will always give pressure values in bars and temperatures in degrees centigrade.

THE DRYER

Chapter 13

13.1 Connection of a dryer to the compressor

Maestro XB can manage an air dryer fitted on the machine.
All the connections necessary for the installation of this device are provided. Consult the electrical diagrams of the machine model in question.

The electrical parts of which the dryer is composed are:

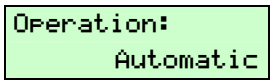
- A refrigerator compressor,
- One or more cooling fans,
- One or more condensation discharge solenoid valves,
- A probe to measure the dew point temperature.

The dryer will be activated the first time the compressor is started, and it will remain active until:

- The compressor is stopped with the "STOP" button or a similar command (Clock, remote stop).
- The dew point temperature falls below the value set in the item "Stop point".
- The compressor stops in the automatic cycle (only if the Automatic operation option is selected for the dryer).

If the dryer temperature goes out of the predetermined range for normal compressor functioning, you can decide whether to stop operation or not.
The selection as shown below is made in the dryer configuration menu, and it can be set so that, in the case of an anomalous temperature, it simply gives a signal or completely stops the compressor. If it is set to simply give a signal, it can be further set so that it will stop the refrigeration group if the temperature falls below the stop value, giving an alarm signal, but without stopping the compressor.

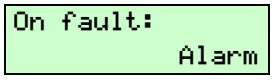
An example of the dryer management software programming is given below.



The first choice to be made is whether we want the compressor to operate in automatic mode or in continuous mode, where:

Automatic: The dryer group stops when the compressor stops. This is recommended if the compressor has long stand-by periods.

Continuous: The dryer operates continuously until the compressor is disabled. This means that if the compressor stops in stand-by mode, the dryer will continue to function. This mode is recommended for compressors which operate for long periods in vacuum.



To select compressor behaviour if the dryer is not functioning correctly.

Alarm: The compressor is not stopped, and the system will try to correct the error.

Lock: The compressor stops.

Alarm delay: 05min

We enter a delay in the signalling of anomalies when the dryer starts, to allow the dew point temperature to reach operating value; otherwise, an anomaly would immediately be signalled since the temperatures do not fall within the standard ranges.

Start temp.: 5.0°C

Stop temp.: 1.0°C

We now enter the temperature limits for dryer functioning; these temperatures define:

- The temperature above which the dryer must re-start after a stop caused by a low temperature.
- The temperature below which the dryer must be stopped to avoid the formation of ice in the system.

Attention: The dryer stops only after the "low alarm delay" time.

Low alarm delay: 300s

High alarm delay: 180s

As indicated above, if the dew point temperature reaches the contemplated alarm level, an anomaly signal is immediately generated but the actions contemplated for correcting or stopping the compressor take place with a certain delay.

These delays are managed by two independent timers which can be regulated according to the customer's real needs.

The first manages the delay after the "ice alarm" signal, if after this time the dryer is stopped or the compressor is stopped, according to the selection described above.

The "high alarm delay", however, delays the compressor stop if the "Lock" function has been selected. In fact, if the "alarm" option has been selected, no corrective action will be carried out.

Diff. Oil : 60.0°C

This temperature serves to determine the environmental temperature. This will determine the behaviour to be adopted by the dryer based on the environmental temperature.

Diff. Ambience: 19.0°C

This temperature intervenes in the calculation of the upper alarm thresholds. In fact, if the environmental temperature exceeds 25°C, the intervention point will have a value 6°C higher than contemplated.

Avoid changing these last values, since they determine the intervention value of the dew point high temperature alarm. Changing these values requires perfect knowledge of the functioning of the integrated dryer.

Attention: Remember that the expansion module must be installed in order to access the dryer management menu and the function must be enabled from the relative menu.

13.2 Operation

When the compressor is enabled with the pre-set delay, the dryer unit is also activated.
The alarms are inserted with a delay that can be modified in order to give the dryer time to bring the dew point temperature within the operating range (Tr < 6°C).
Once this delay has expired the alarms become active and the dew point control is activated.
Supposing the "**Alarm**" mode has been selected in order to avoid stopping the connector, if the temperature is between the set "Stop point" and +6 °C, no signal will be given; otherwise the following faults will be signalled:

If Tr > 6°C >>>> "High Dew Point".

If Tr < Stop point >>>> "Ice Alarm".

For the first signal, no correction attempt will be made by Maestro XB, while for the second signal, after the delay, **the dryer will be stopped** to allow for the dew point temperature to return within the correct operating range.
The dryer will re-start when the dew point temperature is higher than the set "Start-up Point".

Attention: The fault indication is immediate, but the dryer unit or compressor arrest takes place after the set delay.

While the "ice alarm" signal value is defined by a fixed temperature setting, the value for the "high dew point" signal is variable, since it is strictly linked to the value of the environmental temperature. If the environmental temperature is high, the critical point moves upwards, i.e. Tr > 6°C.

The environmental temperature is calculated by Maestro XB as follows:

Ta = To - Tdiff

Where:

Ta is the environmental temperature.
To is the oil temperature measured by the oil probe.
Tdiff is the value of the "Oil Differential" parameter entered.

The "high dew point" signal is set at 6°C while the environmental temperature remains below 25°C.
If the environmental temperature is above 25°C, the intervention point will be above 6°C.

Ti = Ta - Tda

Where:

Ti is the alarm intervention temperature.
Ta is the environmental temperature.
Tda is the value of the “Environmental Differential" parameter entered.

If the dew point temperature remains within this range, no temperature signals are generated, and if they are generated, when the temperature returns within the operating limits, the signals are automatically reset.

Attention: In the dryer configuration, pay attention to the type of functioning in loco. For example, if the machine operates with frequent functioning mode changes, from charged to vacuum and vice versa, we recommend selecting the "Continuous" mode for the dryer to avoid continuous start-up of the same.


Attention: The dryer is powered by a different source from that which powers the compressor (see electrical diagrams); in the case of maintenance, remove voltage also from the dryer.

Chapter 14

INPUT OVERLOAD MANAGEMENT

Maestro XB has a programmable input overload signalling system, which allows for selecting whether to activate the failure signal on either the opening or the closure of the contact.
This allows for connecting absorbed power control devices which are triggered off when there is an opening or a closure contact.

The selection is carried out in the [Advanced\Enablement] menu on the screen shown on the left.

Therefore we can define the type of digital contact for detecting the fault; specifically:

- **N.C. (Normally closed contact),**
- N.O. (Normally open contact),

The active default selection is “N.C.” (Normally closed), which indicates that the normal condition of the system is with the contact closed, and the fault signal will be triggered off if the contact is open.
However, by selecting the option “N.O.” (Normally open), the normal condition of the system is with the input open, and a fault signal will be triggered off it the contact is closed.

This allows for connecting various types of motor overload signals to Maestro XB, thus allowing for connecting both thermal and standard devices such as softstart or others, which signal a fault by closing a specific signal contact.

REMOTE CONTROLS

Chapter 15

Maestro XB allows for the remote control of some functions regarding compressor management and status, specifically enabling and disabling, fault signalling, etc.

15.1 Remote enablement

Usually the compressor is enabled or disabled with the <**On/Off**> button on the keyboard. However, the compressor can be enabled by means of a digital contact from a facility other than the one where the compressor is located.

To use this possibility, it is necessary:

1. to install a contact which:
   - if **Open,** causes the compressor to be Disabled.
   - if **Closed,** causes the compressor to be Enabled.
2. to enable the function from the [**Advanced/Enablement**] menu.

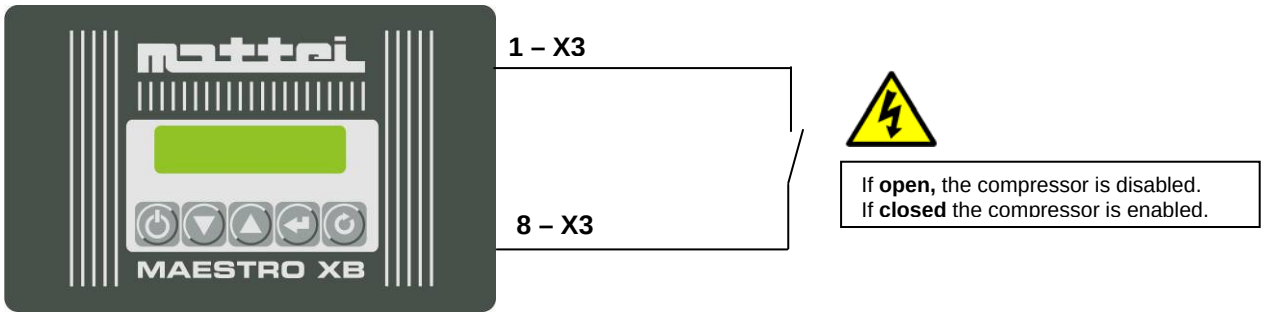
Remote command: NO

To enable the use of the remote enablement /disablement function, it is necessary to select the item "Yes" of the [remote-control] function.

You must now provide for the primary enablement, always from the keyboard, pressing the <**On/Off**> button.

The compressor can now be enabled / disabled by remote control. You must remember that this procedure is carried out with a control voltage of 12 Vdc supplied by the unit itself. Therefore, the maximum distance for this command must not exceed 200 metres, otherwise it will be necessary to install signal repeater devices (for which the customer must provide).

The figure shows a simple connection diagram of the remote-controlled enablement system, in which a switch is used for the function. To connect the compressor, refer to the electrical diagram supplied together with the compressor.



ATTENTION: When the "Check Pressure Switch" option is activated, the remote control option will no longer be available.

In order to remotely enable the compressor it must first be enabled from the on keyboard (On/Off button). Only if this operation is carried out will the remote command work. If enabling is not carried out, closing the remote contact will have no effect on the compressor.

Remember that enabling the compressor does not mean starting the compressor. Starting is subordinate to the line pressure value detected by the on board probe. If this pressure is within the "Minimum pressure" and "Maximum pressure" the compressor will NOT be started, but will go into STAND-BY mode.

15.2 Remote signalling

Sometimes it may be necessary to "remotely send" some information relative to compressor operation. It is possible to view the following machine status signals remotely:

- Compressor in lock status,
- Compressor enabled,
- Compressor running (detected by the equipment).

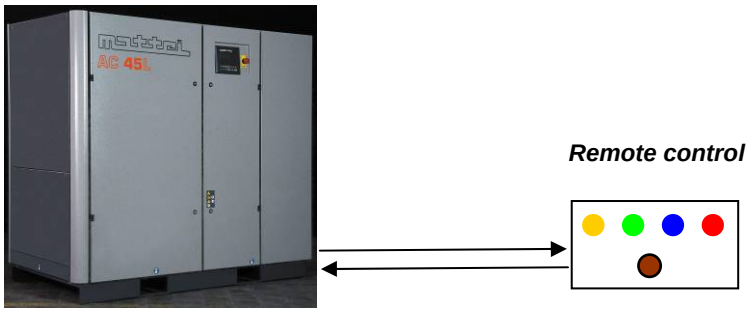
Some of the signals indicated above are obtained directly from the board as well as from the electrical panel. The only characteristics in common is that the digital contacts are not powered.

Specifically, the signals from the board are:

- Compressor in lock status,
- Compressor enabled (only if expansion board P/N **AC40B24983** is installed)

In order to obtain correct operation of the system the following parameters must be observed:

- Maximum applied voltage **240 Vac 48 Vdc,**
- Maximum applied load **2 A** resistance.

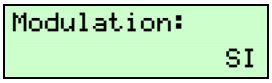


On some models these signals are already present by default since the expansion is already installed by Mattei. This information can be found directly on the electrical diagram provided with the compressor.
These signals are provided through the closing of **N.O.** contacts,

EXCLUSION OF THE MODULATION MODE

Chapter 16

Some compressors do not have the modulation valve, when enablement of the "Modulation" mode could cause malfunctioning, or even breakdown, of the compressor.



To avoid this, the user must not select this operating mode. To prevent the possibility of this selection, enter the “Advanced\enablement” menu and select the item “Modulation”. The default selection is [YES], i.e. enabled. Press the < ↵ > button and edit the selection to [**NO**]. Then press the < ↵ > button again to confirm the selection.

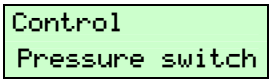
This procedure will hide the "Modulation" selection in the compressor functioning mode which is in the menu "User\Configuration", and the only operating modes available will be:

- Automatic,
- Continuous.

CONNECTION TO HIGHER DEVICES

Chapter 17

A compressor managed by Maestro XB can be connected to higher network management devices (e.g. Multicomp II, etc.). This type of connection allows networks to be created between different compressors which are of different brands and control types, such as electro-mechanical command compressors and compressors with electronic boards. The start command takes place through the closing of a digital contact, while opening triggers the vacuum and subsequent arrest of the compressor.

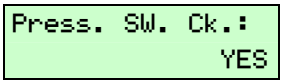


In order to obtain this type of operation, you must enter the [User\configuration] menu and then go to Control, usually set to “Pressure probe”, and modify it to “Pressure Switch”. Then enable the machine using the On/Off button.

Once enabled, the control unit checks the status of the digital input to which the external control device is connected (pressure switch or Multicomp II, etc.). If the contact is open the compressor remains in stand-by, otherwise, if it is closed, the compressor is started.
If the higher controller goes into fault condition this will stop the compressor. To restart it the control at "Pressure Probe" must be reset.

17.1 Higher controller check

It is possible to make the compressor return automatically to the "automatic" operating mode in the case of a fault. This prevents the compressor from being excluded from operation if the higher device goes into fault status and opens the management contacts.



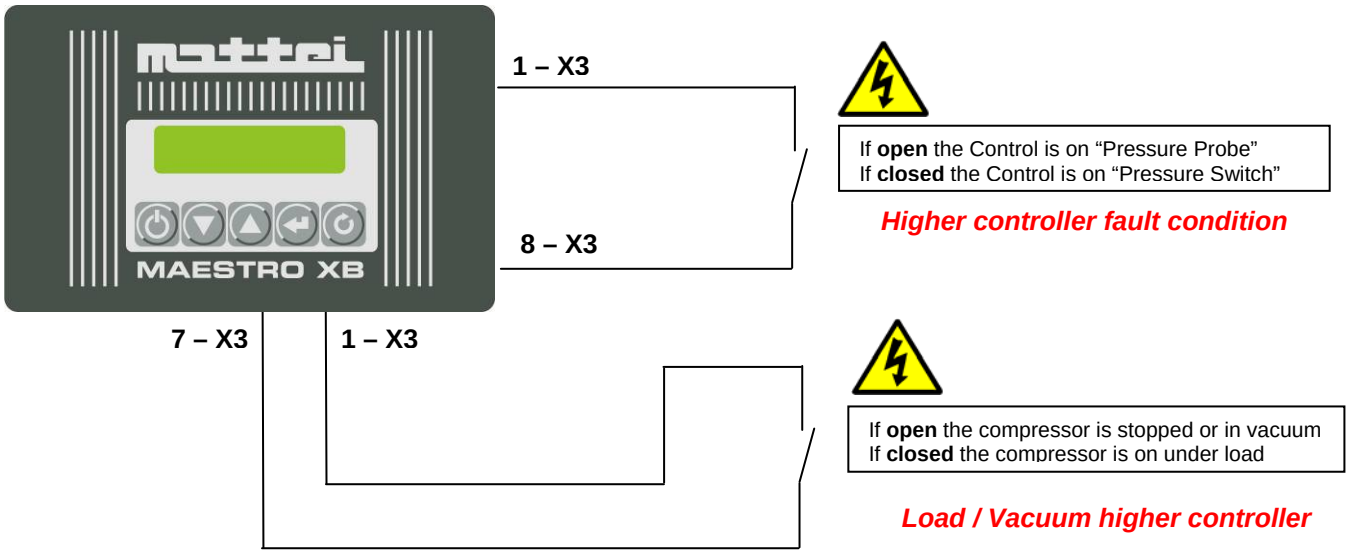
For this purpose use the “Pressure switch check” option in the [Advanced \ Enablement] menu. This function carries out a check on the digital contact usually tasked with the “remote control” function. If the contact is closed, Maestro XB waits for the commands coming from the higher controller, otherwise, if it is open for more than 5 seconds, control returns automatically to “Pressure Probe”, thereby ensuring the operational continuity of the compressor.

The contact that informs the Maestro XB that the external controller is in fault condition must be voltage-free and must come from a specific signal if available, or through a relay that signals the lack of voltage.
On the next page we will provide an indication of how the connection should be carried out if you want to use this additional function.

ATTENTION: If the input pressure switch check function is enabled “Remote control” can no longer be used. If access is attempted the program will give an error signal.

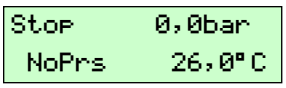
This function must be enabled, otherwise the compressor will operate in the usual operating mode for control by the Pressure switch.

To connect the compressor to a higher controller the electrical connections that must be carried out are indicated below.



For standard connection to a pressure switch connect a normally open (N.O.) voltage-free contact to the clamps of this device (see electrical diagram supplied with the machine).
However, to conduct a fault control of the external device, connect a normally open (N.O.) voltage-free contact to the clamps of this device (see electrical diagram supplied with the machine).
Take care in connecting this contact. It must be closed when the controller is in normal conditions. You may need to connect a normally closed (N.C.) contact. This depends on the control device that is being used.

If the higher control device should go into fault condition, opening the above-mentioned contact will restore the compressor to operation using the onboard pressure probe and it will use the onboard references (Pmin and Pmax).



The indication “**NoPrs**” will appear on the display beside the enabling icon which informs the user that the compressor is not operating in pressure switch mode, but via the pressure probe.

The switch takes place without stopping the compressor. There will be a switch through vacuum condition to then go to control by the probe.
To automatically return operation to pressure switch mode simply restore the controller.

In all the indications we refer to the Maestro XB terminal block. Actually this is in a terminal block in the electrical cabinet, and therefore the connections which need to be carried out must be verified against the electrical diagram supplied with the compressor.

COMMUNICATION PORT

Chapter 18

Maestro XB has an RS-485 serial port for programming and communication. By default, the RS-485 port is enabled for programming the device by means of a PC in which a simple programme has been installed, which allows for the transfer of the software; the second function of the port is that of communicating with a supervision programme by means of the Modbus protocol.

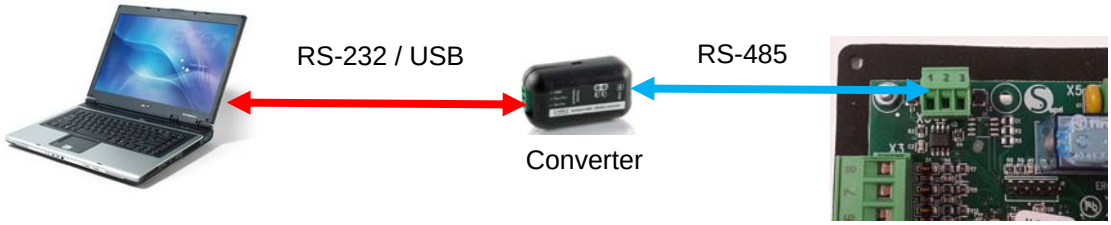
18.1 Programming Maestro XB

Maestro XB is supplied already programmed and configured on the basis of the compressor on which it is installed. However, the software can be updated by means of specific devices for this purpose, namely:

- An RS-485 / RS-232 converter or USB (advised),
- The Downloader programme (supplied by Mattei),
- A 3-wire cable to connect Maestro XB to the converter.

18.1.1 Connection to the device

The physical connection must be by means of a multi-pole 3-conductor cable for the RS-485 connection, while for the connection between a PC and the converter, the wire usually supplied with the same can be used.



Maestro XB has a 3-way connector which is used, as mentioned, for both the programming of the device and for communication with the SCADA monitoring software; it will therefore be necessary to check in the [Advanced/Configuration] menu that the item “Modbus active” is set at NO.

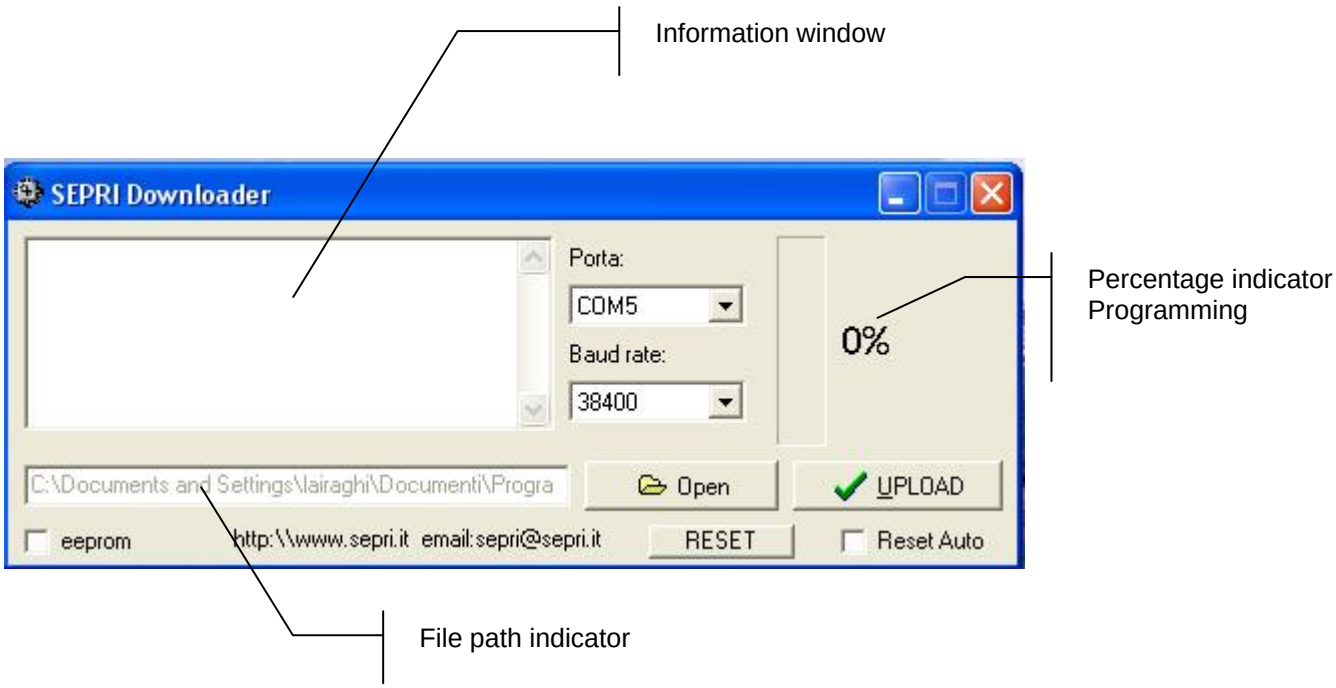
18.1.2 The Downloader software

The software provided for the programming of the application Firmware is simple to use and to configure. This software must be installed on portable computers due to their convenient operating methods.

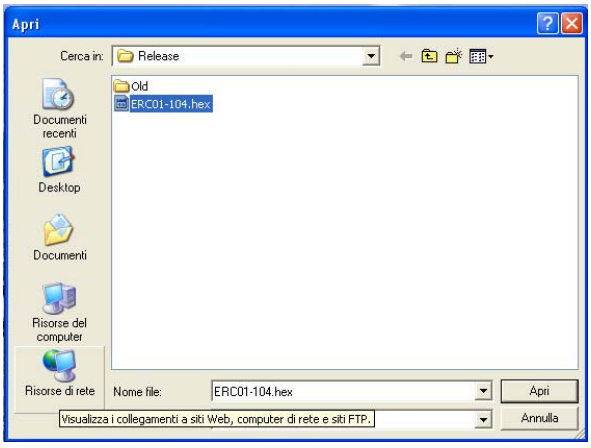
For correct programming, it is essential to follow a simple procedure. But first, we will give a short description of the interface to be used.

After installing the software on a PC, carry out the programme. The screen below will appear. You must then carry out the configuration of the port to be used to communicate with Maestro XB.

In particular, you must inform the software which port (COM), is to be used and the communication speed. For the first request, you must indicate the COM port which you will use; this depends on the assignment carried out by the PC, especially if you use a USB converter. The second request, however, must be set at a communication speed of 38400 Baud.



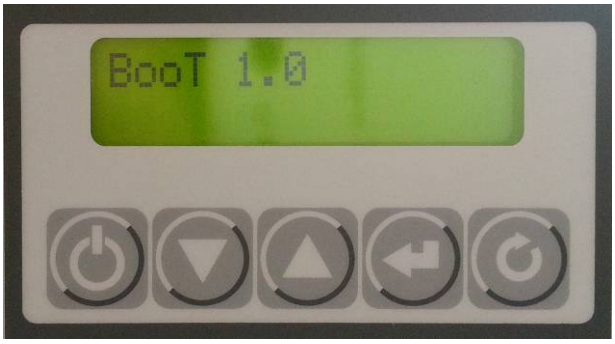
After entering the primary communication data, you must select the file to be loaded into the device. This file will be supplied by Mattei in the case of updates for improvements or corrections. We therefore recommend creating a folder in which to save these updates in order to simplify the search.



By pressing the "Open" button, the typical file search window will open. This depends very much on the operating system installed. Once you have identified the file with the "XXX" extension, select it.

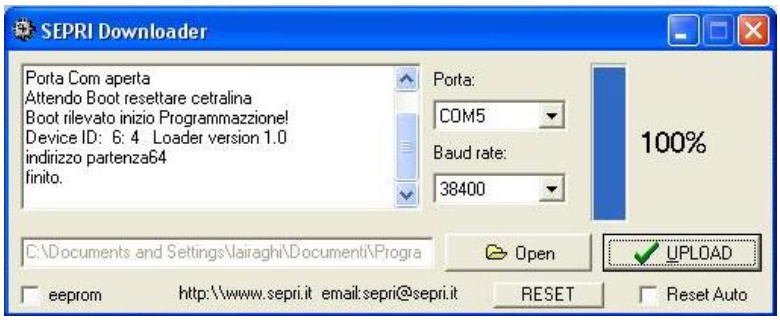
The path where the file is memorised is indicated in the box on the left of the "Open" button. You are now ready to install the firmware into the device.

First, check that Maestro XB is not powered. The press the button "UPLOAD" and then switch on the power to Maestro XB. In the information window, the programming conditions and any problems will be indicated.



After activating the procedure, the programme will wait for the BOOT of the board. Now switch on the control unit. You will see the indication "BooT 1.0" visualised on the control unit display (see image on the left), and the percentage indicator of the software will begin to increase. This indicates that programming is in progress.

If the programming process proceeds regularly, a blue bar which rises gradually accompanied by the indication of the percentage will be visualised in the specific indicator, and the information box will not report any anomalies.



After the programming process has completed, the bar will be at the maximum level and the percentage will be 100%. The information window will indicate that the process has been completed.

However, if the programming is not carried out or is carried out in an anomalous manner, the blue bar rises but no percentage increase will be indicated, and the information window will report any anomalies found.

Mattei must inform the personnel whether to reset the board or not after the installation of the update.

18.2 Port configured by the Modbus Protocol

Maestro XB, like its predecessor XS, allows for control and monitoring of the device by means of the Modbus protocol. This allows for remote control.

Supervision allows for monitoring the functioning of up to a maximum of 8 compressors (there are 8 logic addresses available), allowing for the configuration of certain operating parameters such as operating pressure, weekly programming and others.

To take avail of this opportunity it is necessary to activate the port which, as already mentioned, is set for the programming of the control unit.

The next chapter gives an indication of the possible use of the Modbus serial communication.

NETWORK

Chapter 19

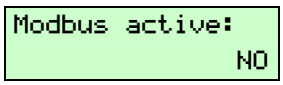
In the presence of two or more compressors in a system, you may need to have the production compressor rotate independently. Maestro XB is able to manage a small network made up of a maximum of 4 compressors, allowing a compressor to rotate daily, weekly or monthly. Also, if the production compressor should lock due to fault, the next compressor will start in order to compensate for the lack of air, thereby ensuring air supply to the network.

19.1 Installation

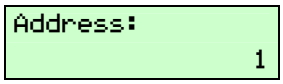
Before physically proceeding with connecting the compressors, you must:

- Install the expansion module on board the main board (See chapter 2) of the compressor to which you want to assign the Master function (it does not need to be installed on all the compressors).
- Assign the physical communication address.

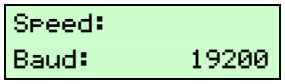
To assign logical addresses to each compressor in order to carry out this activity you will need to access the “Advanced \ configuration” menu.



Select the protocol enabling item and change the selection from NO to YES.



Assign the network address, taking care not to enter an address which has already been assigned.



Check the communication speed (the standard value is 19200 baud).

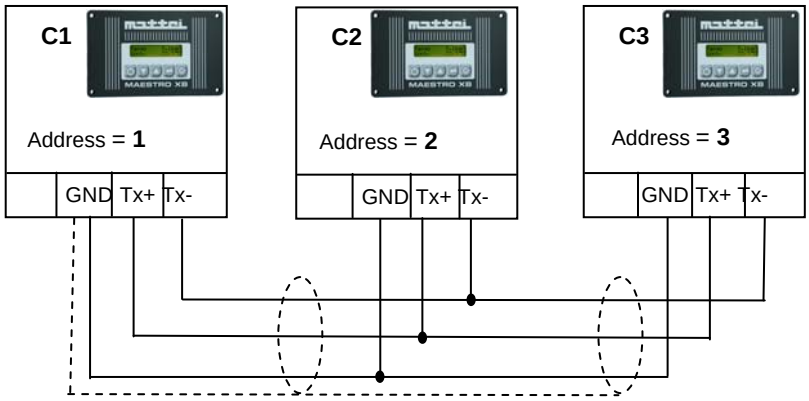
ATTENTION: The Master compressor must have the following settings:

1. The expansion board must be installed
2. ModBus must be active
3. The assigned address must be 1

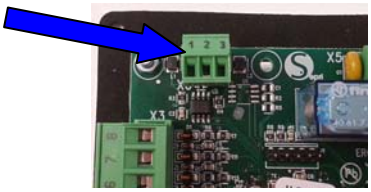
Only on the Master will the “User” menu contain the page that allows for selecting the number of compressors connected and the desired type of rotation to be used.

This automatically excludes any compressors which are also equipped with the expansion board in that they will have addresses different than 1.

Once the network addresses and the role of Master are assigned, proceed with physical connection of the compressors using a shielded 3*1 mm^2 cable, completing the connections indicated below.



We recommend carrying out cable connection activity without power or after temporarily disabling the ModBus mode, reactivating it once the connections have been completed.



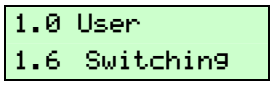
The connector is physically located in the left hand corner of the board (see photo on the left).

The connector must be removed in order to facilitate connection of the cables. Then reposition the connector on the board.

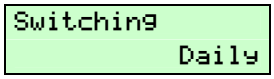
It may be helpful to remove the entire Maestro XB board.

19.2 Preliminary operations

Once the electrical connections have been completed, go to the Master compressor and activate the weekly scheduling. Carry out the desired scheduling (see Clock chapter). In the “User” menu a selection item will be added, specifically you will see the item “1.6 Rotation”.

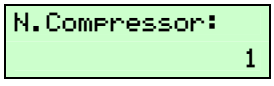


This menu item is displayed only if the control unit is configured as Master, otherwise these items will not be displayed because they are not required for normal use of the machine.



Once you are in the menu, the first selection you should make is the compressor rotation frequency. This can be:

- Daily,
- Weekly,
- Monthly.



Then enter the number of compressors connected to the Master (Min = 1 Max = 3).

At this point enable the slave compressors on the network, thereby making them available.

19.3 Operation

As already mentioned, operation of the network created this way allows use which aims toward energy savings where only one compressor is able to cover the customer's demand, avoiding start-up of unnecessary compressors. However, for this function all the connected compressors must have the same or very similar volume capacities.

In fact, with only one compressor in operation, if it is not able to meet the current demand, no other compressor will start up in support because the network operation thus designed does not provide for this. Only a fault with the compressor in operation causes the next compressor to start up.

This function does not require the use of timeslot scheduling, but it does not exclude this possibility, thereby making network programming even more flexible.

This implies two different network use modes:

1. Operation only with scheduled rotation.
2. Timed operation and scheduled rotation operation.

19.3.1 Operation only with programmed rotation

This mode allows rotation of the compressor being used when the network is started manually by an operator or used 24 hours a day. The Master independently starts up the next compressor and stops the outgoing one, following the desired frequency.

The said mode does not require the use of the clock and in the event that some of the compressors do not have the clock, you must ensure that the function is disabled.

19.3.2 Operation with clock and scheduled rotation operation

It is possible to combine scheduled rotation with weekly scheduling. This makes it possible to obtain compressor rotation even for those customers who have clearly defined times of use.

Since it is not possible to stop the scheduled rotation when machine functioning is not required (for example on Saturday and Sunday), there may be gaps, specifically with 4 compressors, but this will be compensated for in the following week, guaranteeing uniform operation of all the compressors.

19.4 Faults management

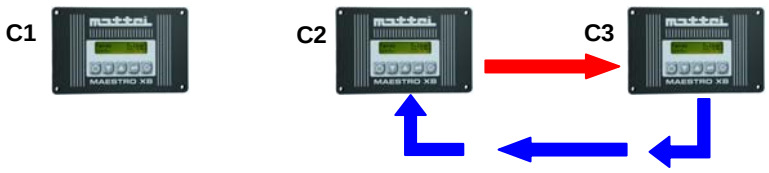
The use of only one compressor to cover the line demands requires excellent maintenance in order to prevent any operational faults which may lead to a lack of air production. Despite this, there is always a possibility of faults on the compressor which is destined for production on any given day. Maestro XB will recognise a fault and will take steps in the least possible time to compensate for the lack of the compressor, starting the next one and thereby limiting the inconvenience caused by the stoppage of the primary compressor.

When the compressor which is in fault condition is restored, use the On button to re-enable it. The compressor will be started and will resume normal operations, while the replacement compressor will be stopped.

To better understand how the network performs, let's suppose that we have a network comprised as follows:

Compressors present:	3
Scheduled rotation:	Weekly
Day of the week:	Tuesday
Production compressor:	C2

Now, if during the day on Tuesday a fault occurs on the production compressor configured as Master, Maestro XB will start the next compressor, that is, compressor C3 (see red arrow).



When the compressor that was in fault condition is available again, it will be started to resume its production operation (see blue arrow), while the replacement compressor will be stopped to await the scheduled rotation which makes it the production compressor.

19.5 Power outage

For correct network operation we recommend not removing power from the compressors unless required for maintenance. However, during normal operation power outages may occur. The master compressor memorises the production compressor so that it can restart the same compressor that was in operation.
If this occurs, remember that the various compressors must be re-enabled manually or the restart after blackout function must be enabled, but remember that this condition must be pointed out clearly through special signalling and the customer must sign a release.

SUPERVISION

Chapter 20

As mentioned in the previous chapter, Maestro XB allows remote control to be conducted through the use of a PC capable of conducting local monitoring.

The advantages of supervision are:

- ✓ Local or remote monitoring of one or more compressors.
- ✓ Signalling of any faults to service via the Internet or telephone.
- ✓ Verification and analysis of the faults which have occurred.

All of this information depends on the software which will then be realised. Remember that Mattei **does not supply** any supervision software.

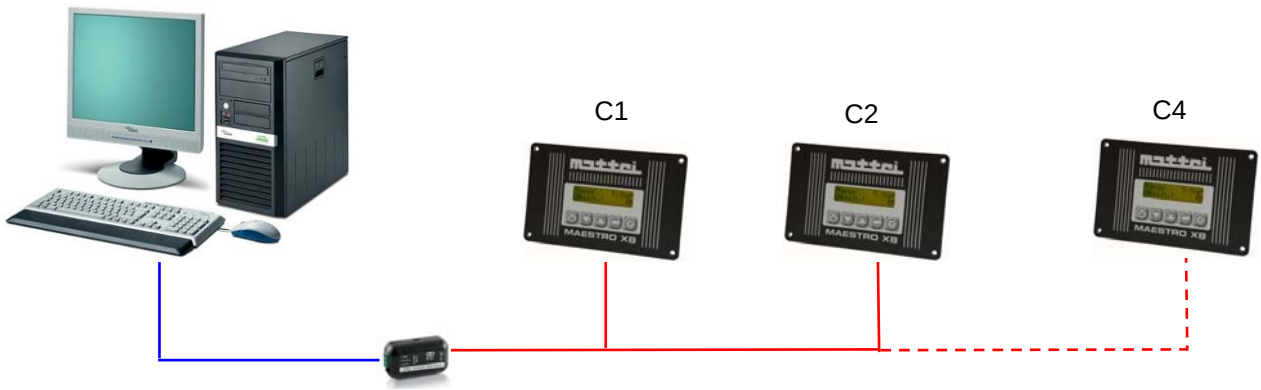
If a network of compressors is created (see specific chapter) supervision will not be possible because the compressor configured as Master will use the serial port to communicate with the connected compressors, thereby preventing the possibility of accessing it with any supervision software.

20.1 Electrical connections

Maestro XB has an RS 485 serial port which is part of a 3-way connector. The monitoring computer will need to be connected here to the other compressors which are to be monitored.

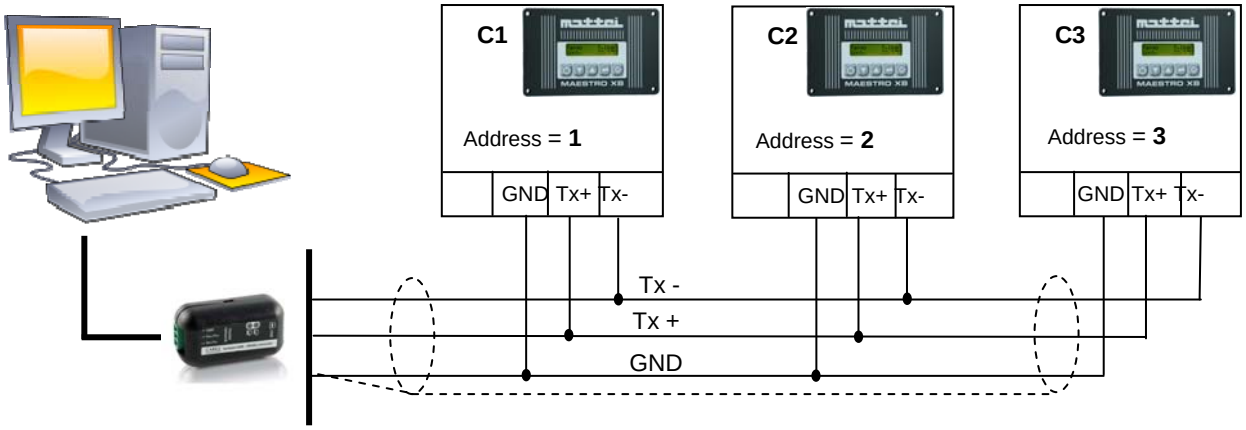
To connect to the PC a converter is needed which converts the RS 485 signal coming from the field into the RS 485 or USB protocol suitable for communication with the PC.

Below is a simple graphic representation for connection of the compressors for system supervision.



Once the connections are made it will be possible to monitor and configure the compressors via a PC. Remember that the software is the customer's responsibility. Mattei supplies a list of variables which are transmitted so that a programmer can access and manage the compressor.

ATTENTION: Remember that supervision of the compressors will not be possible if they are networked to perform operational compressor rotation (see network chapter).



For the electrical connection use specific 2 wire cables with shielding for serial communication. If the distances are short (under 10 metres) you can use standard 2 x 1 mm^2 shielded cables.

Mattei does not supply signal converters. Because of the vast range of converters available on the market today, this choice is left up to the customer based on his own needs.

20.2 ModBus Protocol

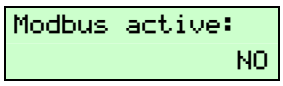
This is the most widespread communication protocol in the computer monitoring field. If the user does not intend to use the software supplied by Mattei, he can create his own management software.

The only limitation that Mattei imposes is that only those variables required for monitoring and for modifying only the parameters in the user accessible menus will be provided, thereby preventing access to the other variables. This is to prevent modifications unauthorised by Mattei which could lead to compressor malfunction.

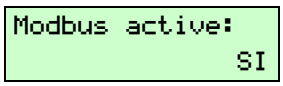
ATTENTION: Modification of these parameters via software is not permitted by Mattei and therefore any variations of these variables will immediately void the compressor warranty.

20.3 Serial configuration

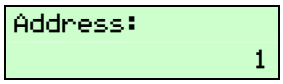
Before starting network monitoring the serial protocol configuration must be enabled. Without this operation the control units will be isolated from the supervision system.



To activate communication go to the [Advanced\Configuration] menu and select the screen shown here.

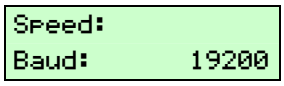


Once the ModBus protocol is enabled the following 2 pages will be displayed which define the communication parameters.



Assigning the address for data interrogation is essential. Do not place two compressors on the same network with the same address. This would cause a malfunction of the entire network.

We recommend carrying out this operation before physically connecting the compressors to one another since the default address for all the Maestro XB control units is 1.



The communication speed, which is usually set to 19200 baud, defines the transmission speed. Usually this value is aligned by the person who sets up the supervision software.

After configuring all the compressors present they can be connected to the serial converter which will manage communication with the PC, providing all data relative to the connected compressors.

For further clarification, please see the specific reference manual where all the operations that should be carried out are indicated, as well as the variables which can be managed by this protocol.

ATTENTION: For supervision of machines that have the clock, remember NOT to enable “rotation” because this function is valid only for operation in “Network” mode and it would cause a loss of the connection with the PC in which the monitoring software is installed.

Chapter 21

TROUBLESHOOTING

This chapter provides a description of possible MAESTRO XB malfunctions. They are subdivided into:

- General faults,
- Faults connected to the dryer.

For each category the potential problems which may be found are listed along with possible causes and possible remedies to correct the malfunction on site without having to replace the electronics since the malfunction may be caused by problems which do not depend on them.

In general we recommend always verifying that the compressor is correctly powered and that the mains voltage falls within the compressor's rated values, otherwise there could be malfunctioning which would not occur with correct power supply voltage.

Attention: We recommend expressly avoiding any manoeuvres on the live electrical panel if not specifically trained to operate in these conditions. If possible, carry out verification operations in the complete absence of power supply voltage in order to prevent electrocution.

21.1 Generic problems

The term generic problems refers to any faults which may occur in compressors from any compressor family without distinction.

Problem	Cause	Remedy
Maestro XB does not switch on	There is no power supply voltage.	Verify that there is mains voltage. Verify that there are 24 Vac on the transformer.
	Fuse blown.	Replace the fuse.
	Defective connections to terminal block.	Check the terminal block connections.
	Door opening protection relay defective.	Replace relay.
	Missing program.	Load the program (only Mattei personnel).
	Video terminal defective.	Replace video terminal.
The compressor does not start when “On” is pressed	Defective pressure probes.	Replace the pressure probe
	Probe operating range different than what is set in the control unit.	Set the correct operating range in the “Debug” menu (only Mattei personnel).
	Pressure probe incorrectly connected.	Check the probe connections.
	Faulty probes.	Replace the probes.
	Oil temperature too low.	Check the oil temperature and wait for it to rise.
Incorrect pressure values	Inaccurate values.	Modify the probe offset in the “Debug” menu (only Mattei personnel).
	Faulty pressure probe	Replace the probe.
	Probe operating range different than what is set in the control unit.	Set the correct operating range in the “Debug” menu (only Mattei personnel).
Incorrect Temperature Values	Faulty probe.	Replace the probe
	Probe is a different type than NTC.	Replace it with a correct probe.

21.2 Dryer malfunctions

These malfunctions are closely tied to the installation and use of compressors equipped with dryers.

Problem	Cause	Remedy
The dew point does not drop to within operational values	The dryer fuses are blown.	Replace the dryer fuses.
	The dryer compressor does not work.	Check for power supply voltage to the dryer. Call Mattei technical support service.
	The dryer fans do not work.	
	The refrigerant system is not adequate for the capacity produced.	Call Mattei technical support service
	One of the dryer protection devices has been triggered.	Check the protection devices, referring to the dryer manual.
	Intervention of electrical protection of dryer.	Wait for automatic rearming.
The dew point drops below 0°C	The dryer compressor is not stopped.	Check the Maestro XB commands.
		The command contactor is locked in closing.
	The mechanical throttle valve is locked.	Call Mattei technical support service