MAESTRO XS

REFERENCE MANUAL
TECA1G-110

ING. ENEA MATTEI SpA
Strada Padana Superiore 307 – 20090 VIMODRONE (MI)
Tel +39 – 02253051 (16 lines) – Fax +39 – 0225305243
E-mail: info@mattei.it - www.mattei.it

Ing. Enea Mattei S.p.A. reserves the right to modify the product, the instructions and the data contained in this publication at any time, with no obligation to update information previously supplied.

Service and spares

M.T.A. s.p.a.
C.so Italia, 47
Verdello/Zingonia (BG) - ITALY
tel. +39 035 4186400 - Fax +39 035 4186490
e-mail: info@mta.bg.it

S U M M A R Y

GENERAL

Chapter 1

1 .0 Introduction

This manual is aimed at technicians, Mattei installers and all customers who wish to find out how the MAESTRO xs electronic board works.
The manual describes hardware and software characteristics and operating modes.
MAESTRO xs is a programmable control device for the compressor that can adapt its operation to the specific needs of the airline to which it is connected. Various levels of programming and control/analysis of operation and faults are available. The advanced levels of programming and analysis are protected by digital codes to prevent accidental interference. There is also a memory that stores settings and operational data even if the compressor is disconnected from the power supply or power fails. A weekly switch on/switch off schedule can be programmed, together with handling of connections to other compressors, so that multiple installations can be controlled in the most efficient way.

1 .1 identification codes

MAESTRO xs consists of a number of hardware units, identified by codes.

These codes are:

Code	Description
AC40C23975	Base control module.
AC40C23976	Expansion module.
AC40C23979	Video terminal.
AC40C23981	Serial communication board.

Table 1

These codes unambiguously identify the elements making up the control device; only the use of the expansion module demands careful configuration since an address must be assigned to it to enable its use (see specific chapter).

Chapter 2

HARDWARE DESCRIPTION

2 .1 Control devices

MAESTRO xs is a device for controlling Mattei compressors. It controls that correct operation, displays operating temperatures and pressures and also checks for the presence of faults, switching off the compressor if these are serious.

MAESTRO xs is made up of different pieces of hardware according to the needs of the compressor on which it is installed.

The minimum operational setup is:

Fig. 1

A video terminals that displays the operating data of the compressor and is used for programming its correct operation.

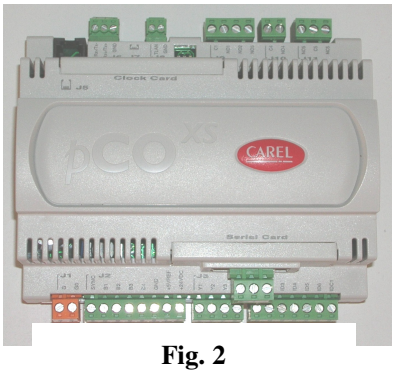


Fig. 2

A base module for acquiring data to which all external connections (probes, contactors etc) lead.

The two units are connected with a six wire telephone cable.

Fig. 3

Expansion modules are available that allow the number of input/outputs to be increased to handle more complex compressors.

Usually these expansions are installed directly by Mattei on the basis of the machinery concerned, but they may be installed later according to the functions desired (remote signalling of the machine state, dryer handling, etc).

2 .2 Video terminal

MAESTRO xs has a terminal that acts as the user interface, informing him on the state of the compressor and allowing the various handling parameters to be programmed.

The characteristics of this interface are:

- A semi-graphic monochrome interface with 132 x 64 pixel resolution.

Fig. 4

below is a brief description of the main characteristics of the video terminal:

Technical characteristics

Display	Graphic FSTN
Backlighting	LED
Resolution	132 x 64 pixel
Level of protection	IP 65
Keypad	
Material	Silicone rubber
Number of keys	6
Key backlighting	Yes
Power supply	
Tension	From base module via telephone cable
Operating conditions	
Temperature	-20 / +60°C
Humidity	90% R.H.

Table 2

Description of keys

Reset key: Resets faults found by the system. First remove the cause of the fault.	**Up key:** Used to navigate software menus and also to increase the value of a variable during modification.
On / **Off key:** used to enable and disable the compressor.	**Enter key:** Used to access selected menus, and open and close the memory during modification.
Esc key: used to access the main menu and exit a menu.	**Down key:** Used to navigate software menus and also to decrease the value of a variable during modification.

Table 3

Dimensions

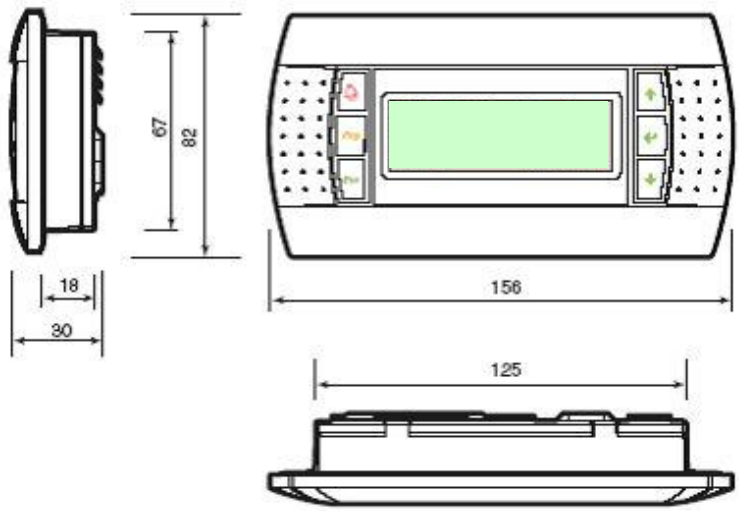


Fig. 5

2 .3 The BASE module

The base module of the MAESTRO xs is the core of the system: the management software is installed on it. There is no software installed on the two expansion modules because the base module automatically recognizes the modules connected on the basis of the address assigned to the module

Below is a brief description of the main characteristics of the base model.

Technical characteristics

Power supply	24 Vac ±10%
Power frequency	50 / 60 Hz
Operating temperature	-10 + 60°C
Humidity	90% R.H.
Serial connection (tlan)	RS - 485
Serial connection (Plan)	RS - 485
Serial connection (optional)	RS - 485
Memory	2 Mb
Digital inputs	6
Digital input power supply	24 Vdc
Digital outputs	5
Command signal type	Free voltage
Analogic outputs	3
Signal type	0÷10 Vdc
Output contactors range	
Maximum allowed voltage	250 Vac
Maximum allowed current	8 resistive A
Pressure probe	2
Probe power supply	24 Vdc
Signal type	4 ÷ 20 mA
Temperature probe	2
Signal type	NTC

Table 4

Dimensions

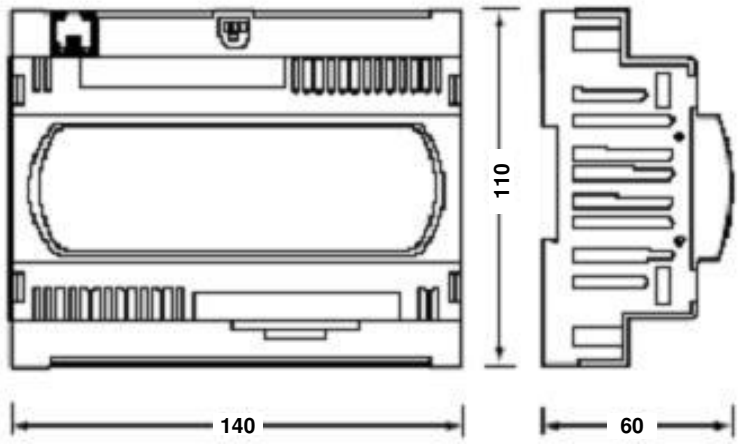


Fig. 6

Base module electrical connections

Terminal n°	Connector	Reference	Description
1	J1	G	Power supply + 24 Vac or 24 Vdc
2		G0	Power supply reference
3	J2	SYNC	Not used
4		B1	Line pressure (4÷20 mA)
5		B2	Chamber pressure (4÷20 mA)
6		B3	Oil temperature C1 (NTC 150 °C)
7		B4	Air temperature (NTC 150 °C)
8		GND	Common probes B3 - B4
9		+ 5 Vdc	Inutilizzato
10		+ 24 Vdc	Alimentazione sonda B1 - B2
11	J3	Y1	0-10 Vdc outlet for Inverter command
12		Y2	Not used
13		Y3	Not used
14		GND	Analogic reference
15	J4	ID1	Emergency stop
16		ID2	Low oil level
17		ID3	Motor overload
18		ID4	Inverter fault
19		ID5	Manostat startup
20		ID6	Remote enabling
21		IDC1	Common digital input
22	J11	NC5	Signal machine in "BLOCK"
23		C5	
24		NO5	
25	J10	NO4	Vacuum electric valve
26		C4	Common outlet 4
27	J9	NO3	Star contactor
28		NO2	Triangle contactor
29		NO1	Line contactor / (ON inverter)
30		C1	Common outputs 1 - 2 - 3
31	J8	GND	RS- 485 network connection for tLAN networks
32		tLan	
33	J6	GND	RS- 485 network connection for pLAN networks
34		TX +	
35		TX -	

Table 5

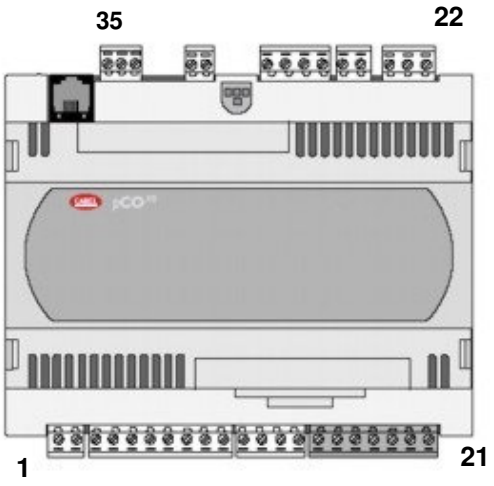


Fig. 7

2 .4 The EXPANSION module

The MAESTRO xs expansion module,as mentioned above, allows the number of physical inputs and outputs to be increased. This allows more sophisticated compressors to be handled.

Below is a brief description of the main characteristics of the expansion module.

Technical characteristics

Power supply	24 Vac ±10%
Power frequency	50 / 60 Hz
Operating temperature	-10 + 60°C
Humidity	90% R.H.
Serial connection (tlan)	RS - 485
Digital inputs	4
Digital inputs power supply	24 Vdc
Digital outputs	4
Command signal type	Free voltage
Analogical outputs	1
Signal type	0÷10 Vdc
Output contactor range	
Maximum allowed voltage	250 Vac
Maximum allowed current	8 A
Temperature probes	4
Signal type	NTC

Table 6

Dimensions

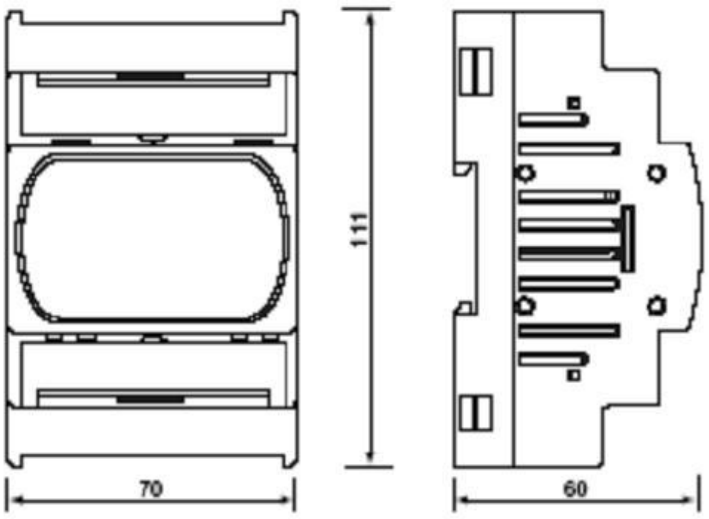


Fig. 8

2 .5 Electrical connections

The MAESTRO xs expansion modules, as mentioned above, allow the number of physical inputs and outputs to be increased, but since they contain no software they do not know to which sensors they are connected. The application software installed in the base module recognizes the functions assigned through the communication address in the tlan network. These addresses are assigned by suitably configured minidips, thus assigning a kind of map of the module connections (see paragraph 2.7 addressing expansion modules).

The addresses also assign a numerical name to the model:

Address 1 = Module **N° 1**

Address 2 = ModulE **N° 2**

Below is a list of the connections on the basis of the expansion number assigned.

2.5.1 Electrical connections Expansion N°1

Terminal n°	Connector	Reference	Descrizione
36	J1	G	Power supply + 24 Vac o 24 Vdc
37		G0	Power supply reference
38	J2	VG	
39		VG0	
40		Y1	Not used
41	J3	GND	RS- 485 network connection for tLAN network
42		T+	
43	J4	ID1	Cooling blocked
44		ID2	Oil filter clogged
45		ID3	Air filter clogged
46		ID4	Plant in excess pressure
47		IDC1	Common digital inputs
48	J8	NC4	Dryer command
49		C4	
50		NO4	
51	J7	NC3	Signals machine in "LOAD"
52		C3	
53		NO3	
54	J6	NC2	Signals machine in "OPERATION"
55		C2	
56		NO2	
57	J5	NC1	Signals machine "ENABLED"
58		C1	
59		NO1	
60	J10	+ 24 Vdc	Not used
61		+ 5 Vdc	Not used
62		GND	B3 – B4 probe power supply
63		B4	Dew point temperature (NTC 150 °C)
64		B3	Oil temperature C2 (NTC 150 °C)
65	J9	+ 24 Vdc	Not used
66		+ 5 Vdc	Not used
67		GND	B1 - B2 probe power supply
68		B2	Temperature bush C2 (NTC 150 °C)
69		B1	Temperature bush C1 (NTC 150 °C)

Table 7

2.5.2 Electrical connections Expansion N°2

Terminal n°	Connector	Reference	Descrizione
70	J1	G	Power supply + 24 Vac o 24 Vdc
71		G0	Power supply reference
72	J2	VG	
73		VG0	
74		Y1	Not used
75	J3	GND	RS- 485 network connection for tLAN network
76		T+	
77	J4	ID1	Oil pump command input
78		ID2	Programmable input 1 (Alarm / Block)
79		ID3	Programmable input 2 (Alarm / Block)
80		ID4	Programmable input 3 (Alarm / Block)
81		IDC1	Common digital inputs
82	J8	NC4	
83		C4	
84		NO4	
85	J7	NC3	Oil fan command
86		C3	
87		NO3	
88	J6	NC2	Air fan command
89		C2	
90		NO2	
91	J5	NC1	Oil pump command
92		C1	
93		NO1	
94	J10	+ 24 Vdc	Not used
95		+ 5 Vdc	Not used
96		GND	B3 – B4 probe power supply
97		B4	Available (NTC 150 °C)
98		B3	Available (NTC 150 °C)
99	J9	+ 24 Vdc	Not used
100		+ 5 Vdc	Not used
101		GND	B1 - B2 probe power supply
102		B2	Available (4÷20 mA)
103		B1	Available (4÷20 mA)

Table 8

2 .6 Installation

The MAESTRO xs is a modular controller consisting of a base unit and expansion modules to be used on the basis of the complexity of the machine or the accessory units installed on the compressor.

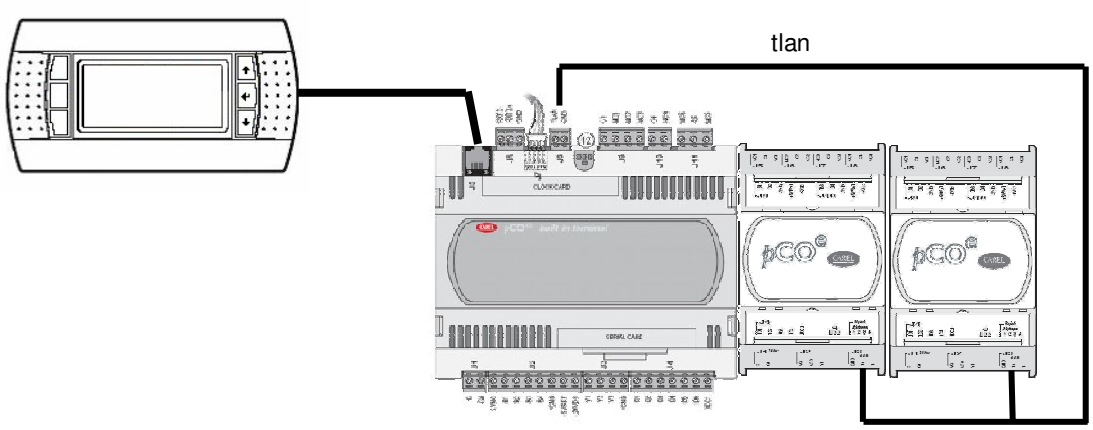


Fig. 9

The controller is powered with 24 Vac, which must be taken both to the base unit and the expansion modules respecting the connections shown in the electrical diagrams supplied with the compressor.

the video terminal is powered directly from the board with a six wire RJ cable.

the expansion units are interconnected through an internal **tlan** network to which various expansions may be connected; we will not be using more than two.

In this case too take great care not to invert the connections of the various devices, since an incorrect connection will cause incorrect working and a fault signal.

Any connection errors will be signalled by the device on the main display (see section on faults and Log).

Take care not to invert the power supply between the base module and the various expansion units to avoid malfunctioning.

2 .7 Addressing the expansion modules

to assign a logical communication address to the expansion module just used the false switches on the bottom of the unit. The table below shows the possible configurations.

Fig. 10

remembers that since we are not using more than two expansion modules there will only be two useful addresses.

Module	Address	Switch N° 1	Switch N° 2	Switch N° 3	Switch N° 4
N° 1	01	1	0	0	0
N° 2	02	0	1	0	0

Table 9

Note

any different configurations will be considered module connection errors.

2 .8 State indication diodes (Base unit)

The central MAESTRO xs unit has three LED diodes indicating the operational state of the device. The diodes are in the upper part of the unit as shown in figure 11.

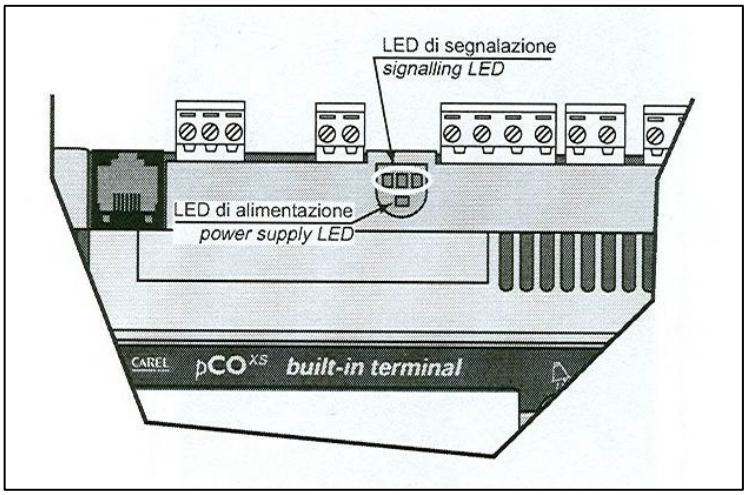


Fig. 11

the meaning of these LEDs is shown in table 10, which gives the states of each LED and the corresponding operating conditions of the system.

This is very useful for verifying correct operation and pinpointing any connection errors.

Legenda
○ LED spento ● LED acceso ☼ LED lampeggiante

Key
○ *LED off* ● *LED on* ☼ *LED flashing*

LED ROSSO	LED GIALLO	LED VERDE	
			pCO^{xs} NON in pLAN (indirizzo= 0)
○	○	○	funzionamento corretto con o senza terminale locale.
			pCO^{xs} indirizzato in pLAN
●	○	○	applicativo con errore o mancanza di tabella pLAN.
●	●	●	applicativo con errore o mancanza di tabella pLAN. pCO^{xs} collegato SOLO ad un terminale.
○	●	○	applicativo con tabella pLAN corretta.
○	●	●	funzionamento corretto in pLAN.
			pCO^{xs} a basso livello(*)
○	☼	○	in attesa di comunicazione con WinLoad. Controllare indirizzo pCO su WinLoad.
○	☼ / ○	○ / ☼	(Led lampeggianti alternativamente) comunicazione con WinLoad NON valida. Possibili cause: - mancanza alimentazione del convertitore RS232/485 - driver sbagliato nel PC.
○	○	☼	in comunicazione con WinLoad.
			pCO^{xs} in funzionamento normale
○	☼	☼	comunicazione con WinLoad sospesa. Dopo 20 sec. viene ripristinato nel pCO^{xs} il protocollo originario.
☼	☼	☼	WinLoad non adatto o Password di Protezione Software errata.
○	●	☼	in comunicazione con WinLoad.
			pCO^{xs} usato come Espansione I/O
○	○	●	Protocollo Supervisore Carel (slave) attivo sulla seriale 0.

RED LED	*YELLOW LED*	*GREEN LED*	
			pCO^{xs} NOT in pLAN (address= 0)
○	○	○	*correct operation with or without local terminal.*
			pCO^{xs} pLAN address set
●	○	○	*application with error or no pLAN table.*
●	●	●	*application with error or no pLAN table.* *pCO^{xs} connected to ONLY one terminal.*
○	●	○	*application with correct pLAN table.*
○	●	●	*correct operation in pLAN.*
			pCO^{xs} at low level (*)
○	☼	○	*awaiting communication with WinLoad.* *Check pCO address on WinLoad.*
○	☼ / ○	○ / ☼	*(LED flashing alternately)* *communication with WinLoad NOT valid.*
			Possible cause: - no power supply to the RS232/485 converter *- wrong driver on the PC.*
○	○	☼	*communicating with WinLoad.*
			pCO^{xs} in normal operation
○	☼	☼	*communication with WinLoad on hold.* *After 20 sec. the original protocol is reset on the pCO^{xs}.*
☼	☼	☼	*WinLoad not suitable or incorrect Software Protection Password.*
○	●	☼	*communicating with WinLoad.*
			pCO^{xs} used as I/O Expansion
○	○	●	*Carel supervisor protocol (slave) active on serial 0.*

Table 10

2 .9 State indication diodes (Expansion unit)

The correct functioning of the expansion modules can be verified with the three LEDs close to the address selector (see figure 12); their meaning was explained in table 11.

In the case of system malfunction, check the state of these LEDs to ensure they are working properly.

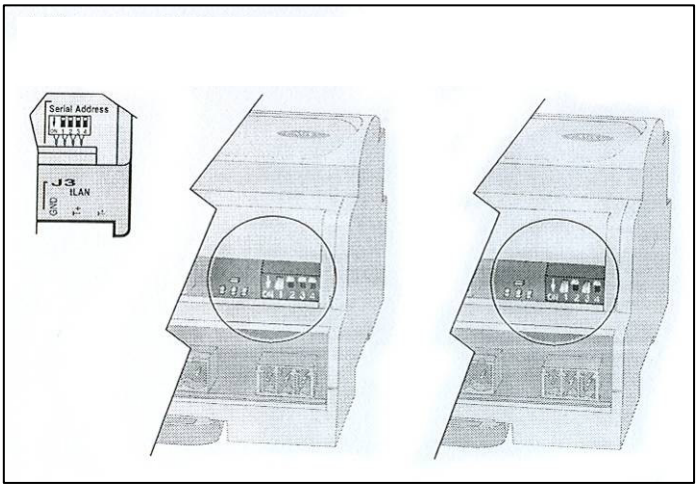


Fig. 12

Significato LED di segnalazione / *Signal LED meaning*

LED rosso	LED giallo	LED verde	significato
-	-	acceso	protocollo supervisore CAREL/tLAN attivo
-	acceso	-	errore sonde
acceso	-	-	errore di "I/O mis-match" causato dalla matrice di inibizione
lampeggiante	-	-	mancanza comunicazione
-	-	-	attesa di inizializzazione del sistema da parte del master (max. 30 s)

red LED	*yellow LED*	*green LED*	*meaning*
-	-	*ON*	*active CAREL/tLAN supervisor protocol*
-	*ON*	-	*probe error*
ON	-	-	*"I/O mis-match" error caused by the inhibition matrix*
flashing	-	-	*lack of communication*
-	-	-	*waiting for the system startup by the master (max. 30 s)*

Table 11

2 .10 Installing the serial board

MAESTRO xs can be connected to a remote control software using suitable management software. However, it is necessary to install an RS-485 serial communication board.

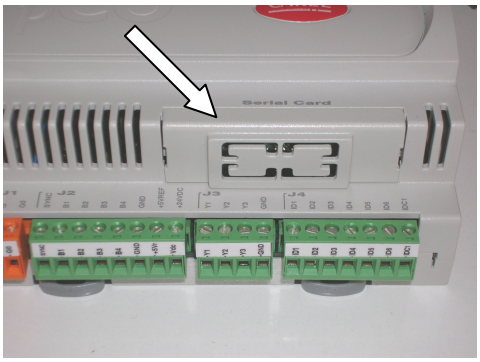


Fig. 13

To install the serial board the housing in the base module must first be identified; it is on the lower right (see Arrow).

Fig. 14

Remove the cover with a screwdriver as shown on the left. this will give access to the housing of the board we will install.

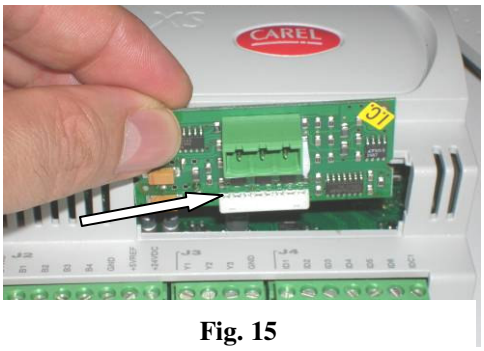


Fig. 15

Insert the serial board as shown in the picture, taking care that the connector indicated with the arrow fits correctly into the corresponding connector in the module.

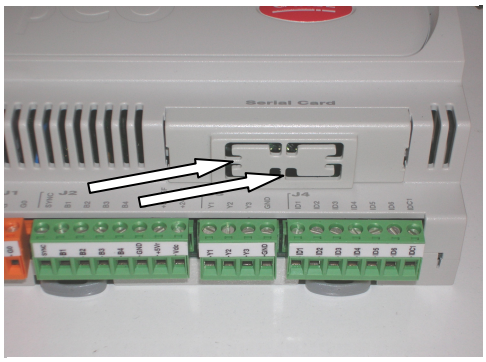


Fig. 16

Remove the central protection of the cover, cutting the four tabs shown on the left with scissors, thus revealing the board connector.

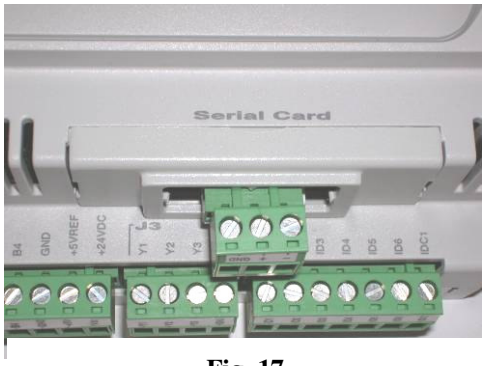


Fig. 17

Once the board is installed connections must be made to the extractable terminals. The final configuration is shown on the left.

This board will allow communication with two different protocols:

- **Carel Protocol**: communication with private protocols for connection to a supervisor supplied by Mattei.
- **Modbus Protocol**: standard communication for connection to non Mattei devices.

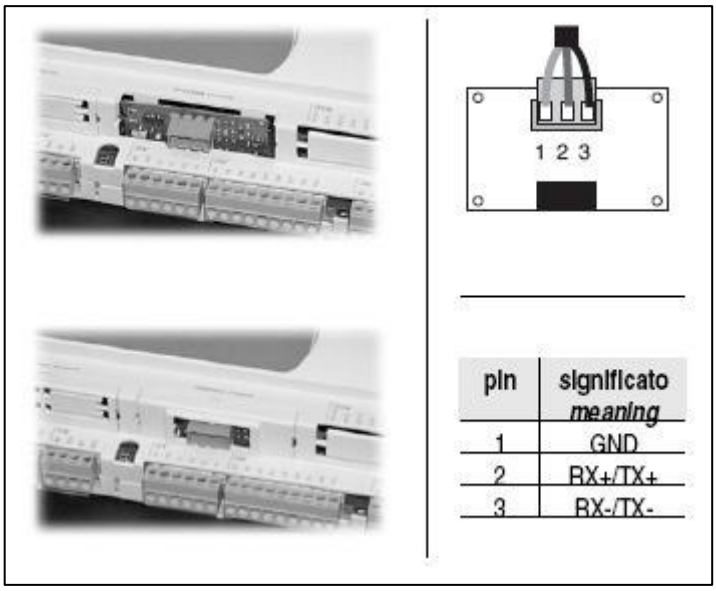


Fig. 18

On the left is the correspondence of the electrical connections of the serial board.

Note

We will give a more precise description in the section on connection (see network chapter).

2 .11 Software installation

The compressor is supplied with the management software already installed, but for various reasons it could be necessary to update it or perform new installations.

To install the software in the base unit, we recommend the use of a specially programmed key (see figure 19).

This key (cod. **AC40C24260**) allows easy and rapid installation without using a computer.

On request, Mattei can supply this key with the software for operating the compressor already loaded. For updates, the key can be sent to Mattei for replacement.

Fig. 19

Connect the key to the video display terminal and power up the MAESTRO xs. The key will carry out some connection tests, after which an arrow "⇧" (see red arrow in figure 19a) will light up. Press the "start" button to download the software. As shown in figure 19a, there is a second arrow on the key. If this arrow lights up, press the "mode" button. The arrow indicated in the figure will light up and you can continue downloading the software ("start" button).

Fig. 20.a

Press the "start" button to begin downloading the programme. The arrow "⇧" will flash to show downloading is in progress, and flashing speed increases during the download. When the download is finished a buzzer sounds to mark the end of the operation.

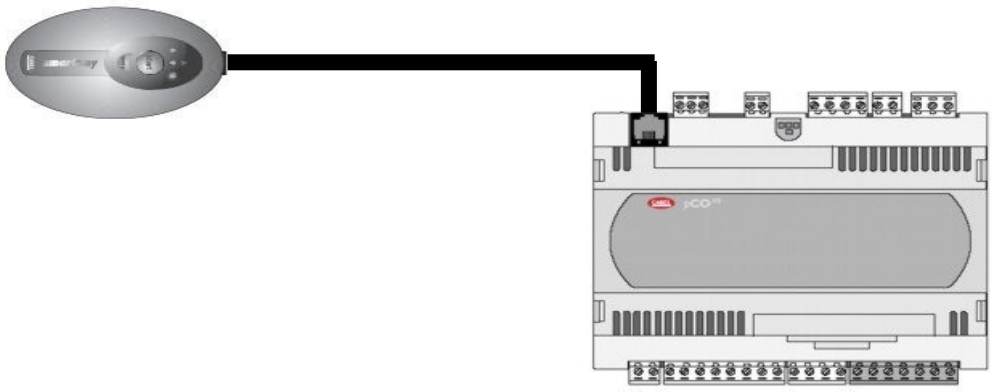


Fig. 22

Once the software is installed, cut the power supply to the compressor to remove the key and reconnect the terminal. Then set the parameters according to the compressor in question.

Below is a legend showing all the usage conditions of the programming key. It also shows the meaning of the buttons on the device and fault signals.

Significato Tasti/Simboli

↑ ↓	Lampeggianti: la chiave è in fase di collegamento con il pCO o µC³, durante questa fase, che può durare alcuni secondi, il tasto **start** è disabilitato.
start	lampeggiante: la chiave ha rilevato il pCO e sta verificando i permessi di accesso
start + ↑	Accesi fissi: la pressione del tasto start fa partire la scrittura del software nel pCO
start + ↓	Accesi fissi: la pressione del tasto start fa partire la lettura del software dal pCO
start + 📄	Accesi fissi: la pressione del tasto start fa partire la lettura degli storici dal pCO o µC³
mode	Acceso fisso: per la chiave di tipo C o G premuto per 1 secondo effettua la commutazione da lettura a scrittura

Nel caso di chiave di tipo C o G premendo il tasto **"mode"** per 1 s si effettua la commutazione da lettura, a lettura storici (solo G) oppure a scrittura, i simboli ↑ (scrittura verso pCO), ↓ (lettura da pCO), 📄 (lettura storici) seguono lo stato selezionato. **Se la chiave non è di tipo "C" o "G" il tasto "mode" è disabilitato e spento.**

Il tasto **"start"** fa partire l'azione di lettura o scrittura che sarà indicata dal lampeggio del simbolo relativo (↑ oppure ↓) con frequenza proporzionale allo stato di avanzamento. Quando l'operazione è completata il buzzer suona in modo intermittente per 2 s. La successiva pressione del tasto **"start"** fa suonare nuovamente il buzzer senza rieseguire il comando, per ripetere l'operazione è necessario scollegare la chiave.

In caso di errore viene acceso il simbolo ⚠ in combinazione con gli altri LED. La tabella seguente permette di risalire alla causa del problema:

Errori prima della pressione del tasto START

⚠ + ↑ + ↓	lampeggianti	Errore comunicazione: nessuna risposta dal pCO oppure Versione firmware della chiave incompatibile
⚠ + **mode**	continui	Errore password
⚠ + **mode**	lampeggianti	Tipo chiave incompatibile (usare la chiave tipo F solo con µC³)
⚠ + ↑	continui	La chiave è priva di uno o più files obbligatori (memoria vuota; nessun kit per il tipo di pCO connesso)
⚠ + ↑ + **start**	continui + **start** lampeggiante	Incompatibilità tra il software contenuto nella chiave e l'hw del pCO (il pCO ha BOOT vers < 3.00; il pCO ha BIOS vers < 3.43; il BIOS nel kit è incompatibile con il pCO connesso)
⚠ + ↑ + **mode**	continui + **mode** lampeggiante	Incompatibilità tra applicativo e hw pCO (dimensione applicativo)
⚠ + ↓ + 📄	continuo	Dati storici non presenti nel pCO o µC³
⚠	continuo	Tipo chiave non programmato

Errori dopo la pressione del tasto START

⚠ + **start** + ↑ + **buzzer**	lampeggianti e **buzzer** intermittente	Il comando di scrittura è fallito
⚠ + **start** + ↓ + **buzzer**	lampeggianti e **buzzer** intermittente	Il comando di lettura è fallito
⚠ + **start** + 📄 + **buzzer**	lampeggianti e **buzzer** intermittente	Il comando di lettura storici è fallito
⚠ + ↑ + 📄	continui + 📄 lampeggiante	Incompatibilità tra configurazione storici e hw pCO (assenza memoria flash dedicata). Questo errore non pregiudica la scrittura degli altri files
⚠ + 📄	continuo	Spazio insufficiente per lettura dati storici
⚠	lampeggiante	Errore generico

Meanings of the buttons/symbols

↑ ↓	*Flashing: the key is connecting to the pCO or µC³, during this phase, which may last a few seconds, the Start button is disabled.*
start	*flashing: the key has detected the pCO and is checking the access rights*
start + ↑	*On steady: pressing the start button starts writing the software to the pCO*
start + ↓	*On steady: pressing the start button starts reading the software from the pCO*
start + 📄	*On steady: pressing the start button starts reading the logs from the pCO or µC³*
mode	*On steady: for key type C or G, pressed for 1 second switches from read to write*

*If the key is type C or G, pressing the "**mode**" button for 1 second switches from read to read logged data (only G) or write, the symbols ↑ (write to pCO), ↓ (read from pCO), 📄 (read logged data reflect the selected status. **If the key is not type "C" or "G", the "mode" button is disabled and off.***

*The "**start**" button starts the read or write operation, indicated by the flashing of the corresponding symbol (↑ or ↓) at a frequency proportional to the progress of the operation. When the operation is completed, the buzzer sounds intermittently for 2 seconds. Pressing the "**start**" button again, the buzzer sounds without repeating the operation; to repeat the operation, the key must first be unplugged.*

In the event of error, the corresponding symbol ⚠ comes on in combination with the other LEDs. The table below shows the causes of the problem:

Errors before pressing START

⚠ + ↑ + ↓	*flashing*	*Communication error: no response from the pCO or alternatively Firmware version of the key incompatible*
⚠ + ***mode***	*continuous*	*Password error*
⚠ + ***mode***	*flashing*	*Type of key incompatible (use the key F type only with µC³)*
⚠ + ↑	*continuous*	*The key is missing one or more required files (empty memory; no kit for the connected pCO type)*
⚠ + ↑ + ***start***	*continuous + **start** flashing*	*Incompatibility between the key software and pCO hw (pCO features BOOT vers < 3.00; pCO features BIOS vers < 3.43; the BIOS in the kit is not compatible with the connected pCO)*
⚠ + ↑ + ***mode***	*continuous + **mode** flashing*	*Incompatibility between pCO application and hw (application dimension)*
⚠ + ↓ + 📄	*continuous*	*No logged data present on the pCO or µC³*
⚠	*continuous*	*Type of key not programmed*

Errors after pressing START

⚠ + ***start*** + ↑ + ***buzzer***	*flashing and **buzzer** intermittent*	*The write operation has failed*
⚠ + ***start*** + ↓ + ***buzzer***	*flashing and **buzzer** intermittent*	*The read operation has failed*
⚠ + ***start*** + 📄 + ***buzzer***	*flashing and **buzzer** intermittent*	*The read logs operation has failed*
⚠ + ↑ + 📄	*continuous + 📄 flashing*	*Incompatibility between log configuration and pCO hw (no dedicated flash memory). This error does not damage the writing of the remaining files*
⚠ + 📄	*continuous*	*Insufficient space to read logged data*
⚠	*flashing*	*general error*

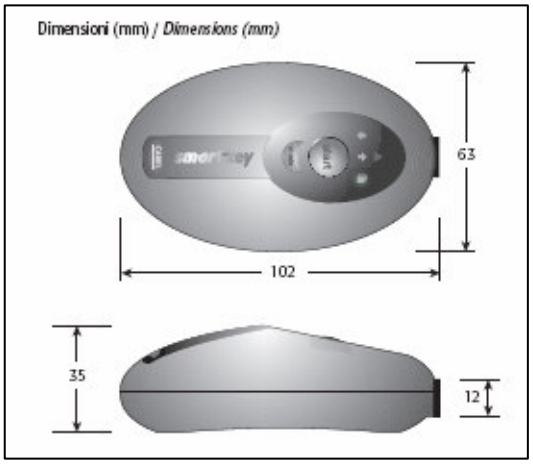


Fig. 23

Remember that if there are any power cuts during transfer it could be necessary to repeat the operation.

once the video terminal is reconnected, power up the controller and configure it on the basis of the type of compressor on which it is installed.

2 .12 Hardware settings

To install the software the base unit must first be configured to allow it to receive the application software.

Power up the controller simultaneously pressing the <↓> <↑> < ↵ > keys for five seconds until you see the display below.

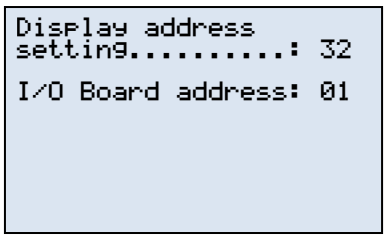


Fig. 24

In the top left-hand corner of the mask you will see the flashing cursor: Make sure that the values entered correspond to the screen above and wait a few seconds. The first page of the application (usually the monitor menu) will then be displayed.

The only exception is when the compressor is part of a network, where these values may vary because of communication requirements between the various units installed.

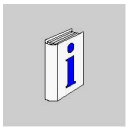
If the base unit is supplied as a replacement it will be configured with an address set to “0” and must thus be set to “1” before loading the BIOS and the application software.

If any reason the addresses displayed are different from those indicated, refer to the “network” section which describes how to modify these addresses.

WARNING: To modify the address of the base module follow the instructions in the “network” chapter.

If “No LINK” appears on the display or there are no indications at all, this often means there is no communication between the base module and the video terminal. The reason is probably incorrect entering of the addresses of the terminal or the video.

If programming needs to be carried out on units connected in a network, it is OBLIGATORY to remove these connections during programming.



Note: the compressor is usually supplied with the controller already configured with the standard communication addresses; these must only be modified when creating a network.

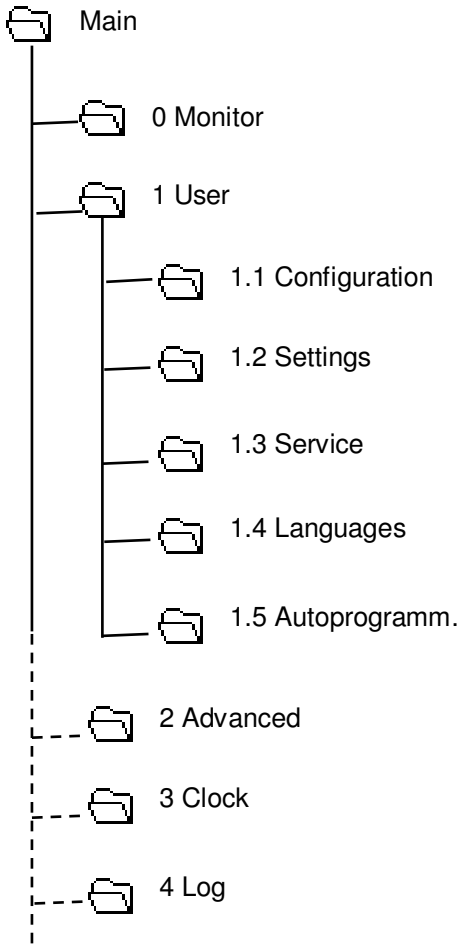
SOFTWARE MENU

Chapter 3

MAESTRO xs communicates with the user through interface menus that allow the compressor to be monitored and programmed. These menus are subdivided by function and not all are available to the end user, since some are protected by one or more passwords

These menus are in terms subdivided according to the various applications carried out by the variables they contain.

The structure of the software menu is like that of the folders in a computer, where the [main] menu is the root and the various submenus are the folders it contains.



The main menus for managing the compressor are:

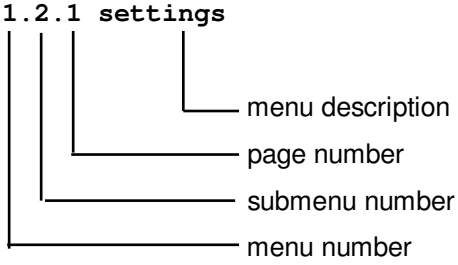
Menu	Identification	User access	Password
Monitor	0	Yes	No
User	1	Yes	No
Advanced	2	No	Yes
Clock	3	Yes	No
Log	4	Yes	No
Network	5	Yes	No
Info	6	Yes	No

Table 12

To make variables easier to trace, each menu is identified by a number, and the same is true for the sub menus down to the individual variable.

In all displays except for those of the monitor menu, the top line tells us in which branch of the menu we are. For example, if we are in the working pressure settings submenu, we will see [**1.2.1 Settings**]: we are thus in menu one, submenu two, page 1.

Below is the key to interpreting the top line in the various menus.



To facilitate the use of the compressor, there are also icons that serve to represent graphically certain functions, for example the indication of machine state and other settings.

There are also icons indicating operating problems, particular functions enabled etc.

In the various menus there is also text explaining the meaning of the variables and the functions they carry out.

We must mention that only the menus accessible to the end user will be translated into the various languages contained in the software, while menus requiring a password will only be available in Italian and English.

Note

Below the menus and submenus will be identified by the text contained in the square brackets [ ] ,while the labels of individual pages will be identified by the text contained in the quote marks “ ”.

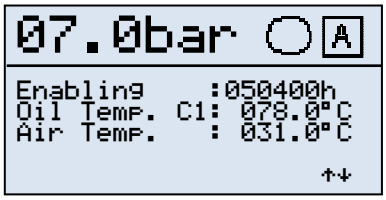
3 .1 [MONITOR] Menu

The [Monitor] menu is the core of the entire software. Here it is possible to monitor all pressures and temperatures of the compressor, and also verify its operating state, working hours etc.

Given the importance of this menu, if you are in other sections of the software, the system will automatically display the initial menu screen after a period of inactivity on the terminal keypad.

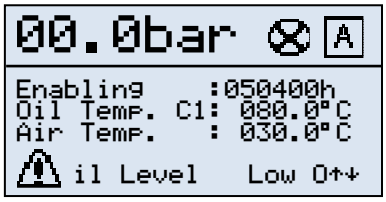
The information that can be displayed on this menu will be visible only if the related probe is activated. For example, dew point temperature will only be displayed if the dryer is activated.

Below is the first page of the menu, showing:



- Line pressure
- Machine state (graphic)
- Operating mode (graphic)
- Enabled hours for compressor
- Oil temperature
- Output air temperature

The first page also displays any compressor faults. This appears at the bottom of the page with a warning icon and text describing the fault.



This is an example of a fault report: in addition to a description of the type of fault the user is told that the compressor is in “BLOCK”.

The description of the fault scrolls so as to display in a full the type of fault.

The tables below give descriptions of the icons that inform the user on machine state and operating mode.

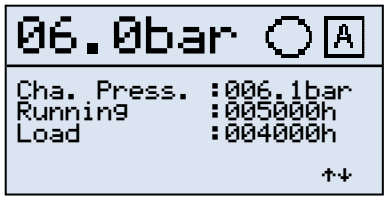
Machine State Indications	
	Compressor Disabled
	Compressor Enabled in Stand - By
	Compressor Unloaded
	Compressor Loaded
	Compressor in Block

Table 14

Operating Mode Indications	
A	“AUTOMATIC” operation
C	“CONTINUOUS” operation
M	“MODULATION” operation
	“OPTIMA” operation

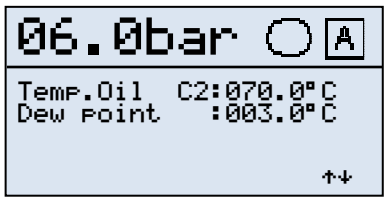
Table 13

Continuing through the pages of the menu using the down arrow key, the following data are displayed:



- Chamber pressure
- Compressor running hours
- Compressor load hours

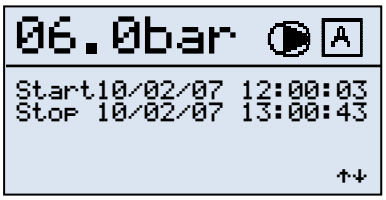
The following pages only displayed if the temperature probe of the second compressor (when there are two compressors) is enabled or if the dryer is enabled.



This page can display the following data:

- Oil temperature of the second compresso
- Dew point temperature

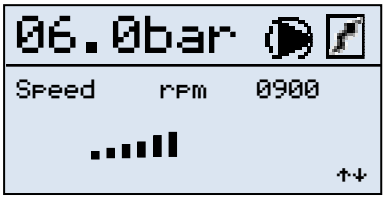
Continuing through the pages of the menu we get to a display showing the following data:



- date and time compressor was last started up
- date and time compressor was last stopped

This helps us to understand how long the compressor has been working for or for how long it has been stopped.

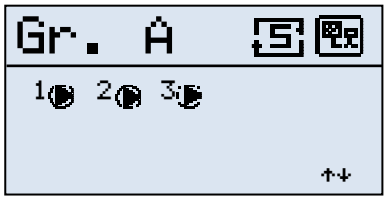
There are other pages that are only enabled ifparticular operational modes are enabled, the optima mode and network mode.



When the Optima mode is enabled the page on the left showing the rotation speed of the compressor is displayed.

The speed variable is displayed not only in numerical form but also graphically.

When the network operating mode is enabled one or two additional pages will be displayed showing the two groups of compressors. These groups function autonomously but with predefined priorities



It is thus possible to know the state of each compressor in the group from the state icons.

The number refers to the compressor, and the icon shows its state.

Next to the group indicator there are two icons:

- the first shows the operating mode assigned to the group,
- the second, which is present in all pages of the menu, indicates whether the compressor is configured as “Master” or “Slave”.

The operating modes are available are shown as follows:

Group operating mode symbols	
	Sequence
	Cascade
	Equal hours

Table 15

Below are the icons showing the setting of the compressor:

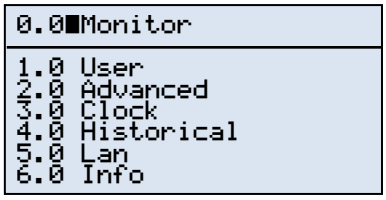
Compressor mode symbols	
	Master
	Slave

Table 16

For further clarification refer to the “network mode” chapter.

3 .2 [MAIN] Menu

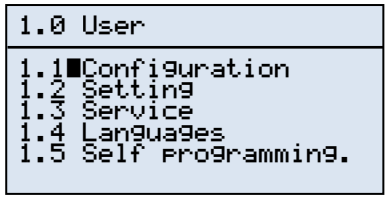
The [Main] menu is the one that all the various configuration menus derive from. When we switch on the controller, after an internal check to ensure correct functioning, the software will display the first page of the [Monitor] menu. To access the [Main] menu, press the “Esc” key and the following page will be displayed.



3 .3 [USER] Menu

This menu, which can be accessed by the end user, allows the operating parameters of the compressor to be set. The variables contained in this submenu can be modified by the user.

Here the user can configure the operation of the compressor according to his needs without the help of service.

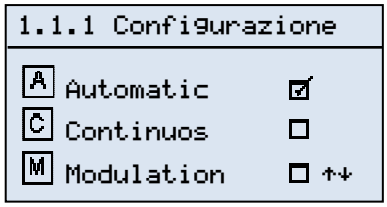


There are a number of submenus that contain the variables divided by function.

3.3.1 [Configuration] Submenu

This submenu allows the operating and control modes of the compressor to be configured.

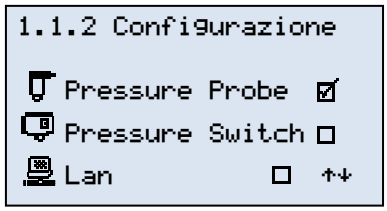
Questo sottomenu permette la configurazione del modo di funzionamento e del modo di controllo del compressore.



MAESTRO xs can operate in different modes:

- **Automatic**
- Continuous
- Modulation

This parameter cannot be modified when the compressor is enabled.



MAESTRO xs can control the compressorusing a pressure probe or a mechanical manostat.
It is also possible to disable or enable the network function.

The settings are:

- **pressure probe**
- manostat
- Lan (network)

This selection cannot be made with the compressor enabled.

WARNING:

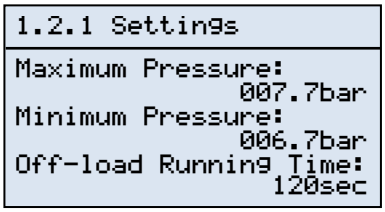
The pages of the [Configuration] menu displayed or hidden according to the operation and use settings:

Page “1.1.1 Configuration” is not accessible if the “network” or “Optima” modes are enabled

Page “1.1.2 Configuration” is not accessible only if the “Optima” mode is enabled.

The “Lan” icon is displayed only if the network is enabled in the “Advanced \ Enable” menu.

3.3.2 [Settings] Submenu



This submenu allows configuration of such basic compressor settings as:

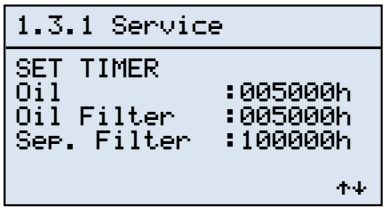
- Maximum Pressure
- Minimum Pressure
- Unloaded running time

These variables may always be changed.
Warning: if the “modulation” is enabled, this page will not be accessible. In this mode the Pmin and Pmax values are in fact excluded.

WARNING: if the compressor is part of a network and is configured as “**Slave**” the values of “maximum pressure” and “minimum pressure” **cannot be modified**.

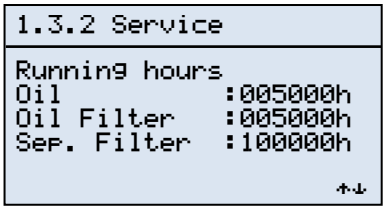
3.3.3 [Service] submenu

This submenu allows the maintenance intervals for the compressor to be set.



On the first page of the menu we can set the maintenance intervals for:

- Compressor oil
- Compressor oil filter
- Separator filter



The following page displays the hours clocked by the various hour metres.

This information is useful for compressor maintenance engineers.

This page also offers the possibility of independently resetting each counter if the maintenance engineer feels it is necessary.

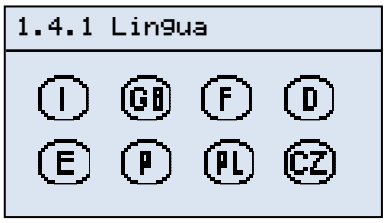
When an hour counter reaches the number of hours set for maintenance this is signalled on the display. The compressor will not be stopped; it is simply a warning of the need to carry out maintenance (e.g. oil change).

The warning can only be removed by entering a password (see chapter 9).

3.3.4 [Language] submenu

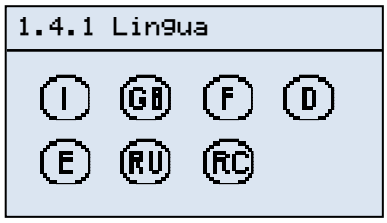
This submenu allows us to set the language used by the user interface. Remember that only menus not protected by a password will be translated into the language chosen.

To reduce the amount of memory needed for translations, two versions of the software have been developed.



Release " **x.xx W** " offers the following languages:

- **Italian**
- English
- French
- German
- Spanish
- Portuguese
- Polish
- Czech



Release " **x.xx E** " offers the following languages:

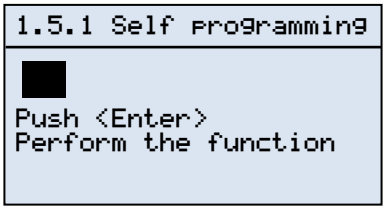
- **Italian**
- English
- French
- German
- Spanish
- Russian
- Chinese

To find out which version of the software is installed, refer to the [Info] menu.

WARNING:

Remember that, except for the Italian language, menus protected by a password and certain other pages, though accessible to the user, will be in English only.

3.3.5 [Selfprogramming] Submenu



This submenu allows a user who has accidentally or for other reasons cancelled certain parameters to reset factory values.

These are:

- Maximum pressure
- Minimum pressure
- unloaded running time
- Operating mode
- Control mode

The values of maximum and minimum pressure reset depend on the calibration of the nominal pressure active at the time of self-programming.

Below are shown the minimum and maximum pressure default values in relation to the value of the active nominal pressure.

.

Nominal pressure	Maximum pressure	Minimum pressure
8 Bar	7,7	6,5
10 Bar	9,7	8,5
13 Bar	12,7	11,5

Table 17

The operating and control modes will become:

Operating mode: Automatic
Control mode: Pressure Probe

3 .4 [ADVANCED] Menu

This menu can only be accessed by Mattei service personnel; a password is necessary for access.

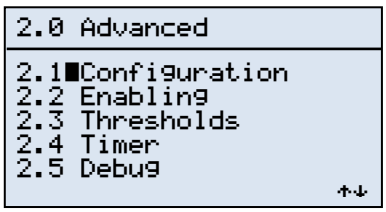
This menu allows accessories and particular functions such as Optima, the dryer and other devices to be enabled.

This menu too is subdivided into submenus containing the variables on the basis of their function.

Text in this menu will be exclusively bilingual, Italian or English depending on which was selected in the [User] menu.

As already mentioned, a password must be entered to access this menu.

The password is a combination of six numbers, entered by pressing the arrow keys.

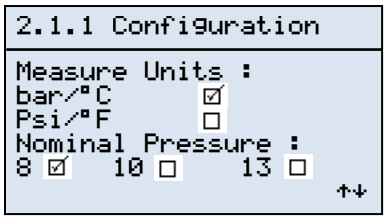


Once the password is entered, the list of submenus for configuring and enabling particular functions will be displayed.

Since there are many items in the list of menus, only a part will be displayed. The other items can be displayed by scrolling through the list with the arrow keys. The complete list of menus is given in the following table.

Complete list
2.1 Configuration
2.2 Enabling
2.3 Thresholds
2.4 Timer
2.5 Debug
2.6 Dryer
2.7 Inverter
2.8 Network
2.9 New Password

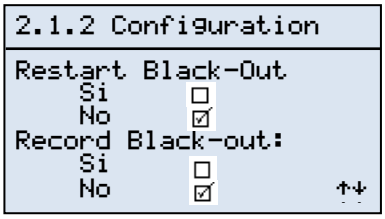
3.4.1 [Configurazione] Submenu



The first page of the submenu allows us to select:

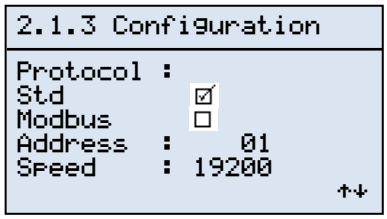
- The units of measurement used by the system. The possibilities are:
  - **Bar**
  - Psi
- The nominal pressure of the compressor. Here are the possibilities are:
  - **8 bar**
  - 10 bar
  - 13 bar

When a value for the nominal pressure is selected, the default values for the minimum and maximum system pressure are automatically modified.



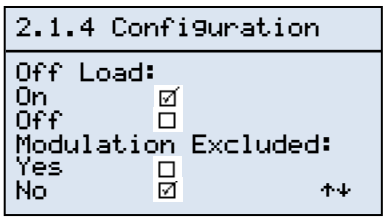
On the following page we can decide whether to:

- Re-enable the compressor automatically after a power cut.
- Record the power cut in the Log.



The final page of this menu allows us to select the communication protocol and related settings:

- Protocol
  - **Standard**
  - Modbus
- Logical address for communication in the case of supervision and network address of the network of compressors is created with a unit such as Maestro or Micro C (see "network mode" chapter).
- Communication speed.



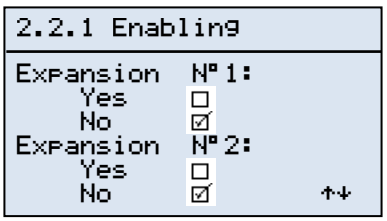
this functioned handles the way in which the controller armloads the compressor. In some cases unloading is done by cutting the power to the compressor valves.

It is also possible to exclude the "modulation" operating mode when the is no modulating valve on the compressor.

If the compressor does not have the modulating valve (compressors ON/OFF), as in the case of 6000 and 8000 family compressors, the "modulation" operating mode is blocked as the system could go into excess pressure.

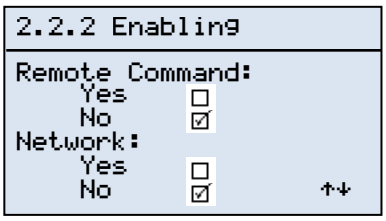
3.4.2 [Enabling] Submenu

The [Enabling] submenu allows certain operational or control options of the compressor to be enabled; this depends on the type of compressor and the optional devices installed.



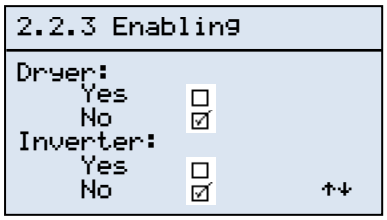
The first page allows us to enable hardware expansions; remember that MAESTRO xs is made up of a base unit and two expansion modules.

Before enabling a function connected to one of the expansions, the expansion must first be enabled.



On the second page we can enable:

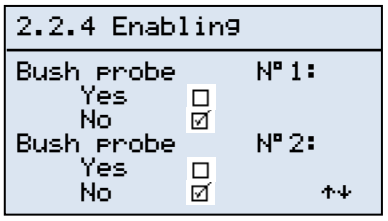
- Remote control
- The network function



On the third page we can enable:

- The dryer
- The inverter

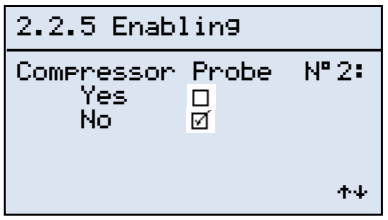
To enable the dryer function, the related expansion unit must first be enabled.



On the fourth page we can enable:

- The C1 bush probe
- The C2 bush probe

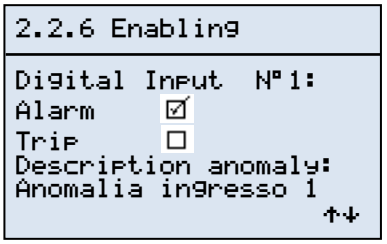
To enable the probes the related expansion unit must first be enabled.



On the fifth page we can enable:

- The C2 oil probe

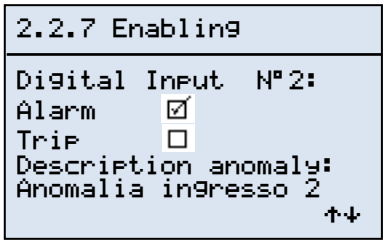
To enable probes, the related expansion unit must first be enabled.

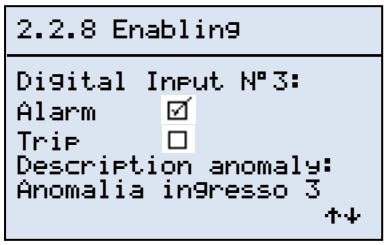


When expansion number two is enabled, three further pages for handling the additional digital inputs will be displayed. For each input we can:

- Select how the controller will behave if faults are detected, choosing between:
  - Alarm
  - Block
- Modify the label displayed on the fault summary page (see relevant section).

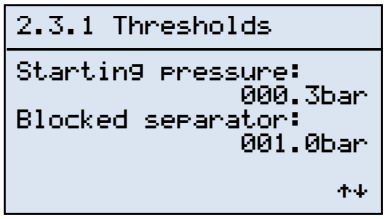
In the scrolling text on the monitor menu, the phrase “fault input n° x” will be displayed; “x” is the number of the input where the fault has occurred.





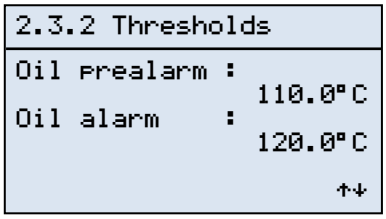
3.4.3 [Thresholds] Submenu

The [Thresholds] submenu allows us to set the thresholds at which the various alarms and protection devices of the compressor will cut in, ensuring its correct operation.



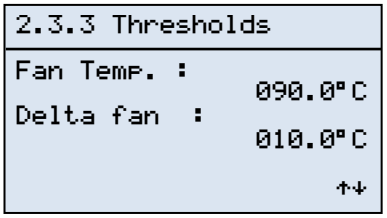
The first page allows us to configure:

- The internal pressure below which the compressor is free to start up in safety. This variable is also used to check that the compressor is turning over correctly.
- The differential pressure at which the system will signal a clogged separator filter fault.



On the second page we can configure:

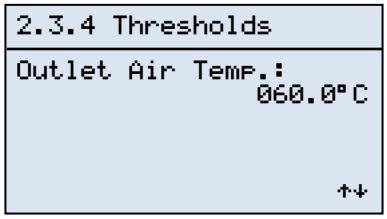
- The temperature for an oil alarm signal.
- The temperature at which the compressor is shut down for oil overheating.



On the third page we can configure:

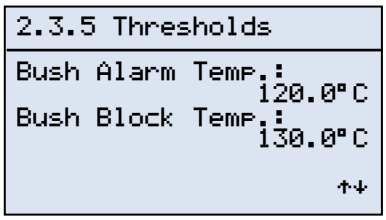
- The temperature at which the fans (if present) switch from low to high speed.
- The temperature differential for the fans to return to low speed.

This page will be displayed only if expansion n°2 is enabled.



On the fourth page we can configure:

- The shutdown temperature for the compressor if output air is overheated.



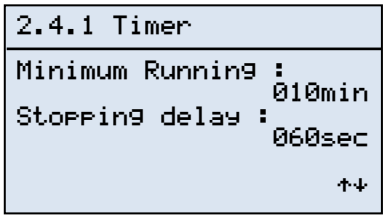
On the first page we can configure:

- The bush alarm signal temperature.
- The shutdown temperature for the compressor when bushes are overheated.

This page will be displayed only if at least one probe is enabled in the relevant menu.

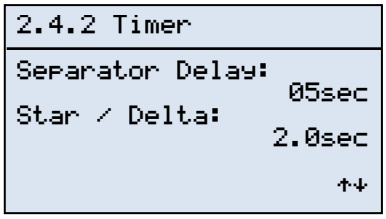
3.4.4 [Timer] Submenu

The [Timer] submenu allows us to set the main timers needed for the basic operation of the compressor. there are in fact other timers, but they are called up in specific submenus linked to their activities.



The first page allows us to configure:

- Minimum operating time, the minimum time for which the compressor may operate.
- The delay to stop time, activated by the stop key or the external contactor.
-

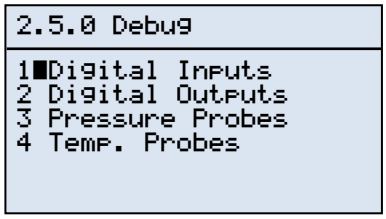


On the second page we can configure:

- Delay for reading of pressure differential between chamber and line.
- Star/triangle commutation time.

3.4.5 [Debug] Submenu

The [Debug] submenu allows us to set up and set parameters for the probes on the compressor. We can also check that the digital inputs and outputs are working correctly.

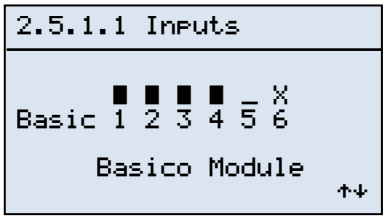


This submenu is further subdivided into sections that allow hardware to be checked and set.

This section is useful for service personnel who can pinpoint any faults in electrical components of the compressor.

[Digital inputs] Section

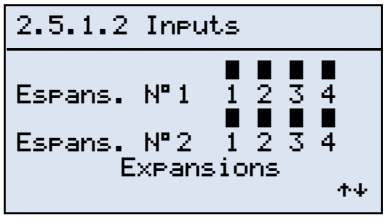
This section allows service personnel to check in real-time the state of the digital inputs of the compressor. Since the hardware consists of a number of units, the check is carried out on two different pages.



This first page checks the state of the digital inputs on the base module of MAESTRO xs.

The state is displayed graphically with icons that may have the following values:

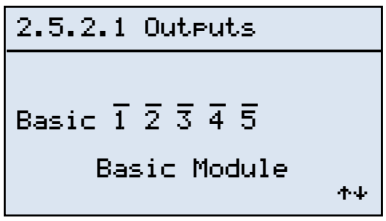
- ■ Contactor closed
- _ Contactor open



on the second page, which is visible only if one or both expansion modules are enabled, we can monitor the four digital inputs of each expansion.

[Digital Outputs] Section

This section allows service personnel to check the correct operation of the digital outputs and so also of the associated electrical device.



This first page checks the state of the digital outputs of the base module of MAESTRO xs.

The state is displayed graphically with icons that may have the following values:

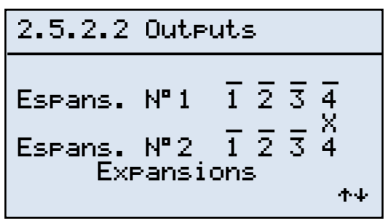
- ■ Output Closed
- _ Output Open

the number below the icon indicates the output it represents:

Il numero alla base dell'icona indica quale ingresso rappresenta, ovvero:

1. Digital output 1
2. Digital output 2
3. Digital output 3
4. Etc.

To use the menu refer to the description below.



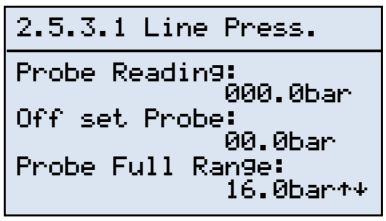
On the second page, which can be seen only if one or both of the expansion modules is enabled, we can activate the digital outputs of each expansion.

The symbols have the same meaning as on the previous page.

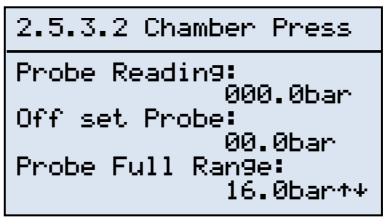
For safety reasons it will not be possible to activate two or more digital outputs simultaneously but only one at a time. There is a delay between the deactivation of an output and the activation of the next one to avoid any damage to the devices connected.

[Pressure probes] Section

In this section we can configure and calibrate the pressure probes on the compressor.



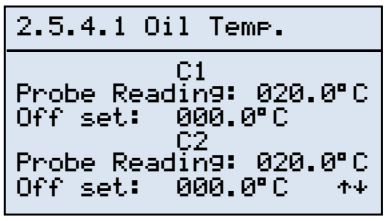
This first page allows us to configure the working field of the **line** pressure probe and if necessary to calibrate it.



On the second page reconfigure the working field of the **chamber** pressure probe and if necessary to calibrate it.

[Temperature Probes] Section

In this section we can calibrate the temperature probes on the compressor or on any optional devices connected to the controller.

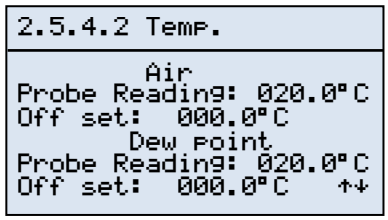


this first page allows us to calibrate the readings of the temperature probes of:

- Primary compressor oil (C1)
- Secondary compressor oil (C2)

D. C. to compressor is usually installed on versions:

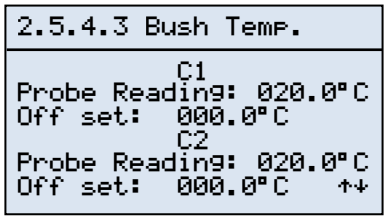
- Maxima 110
- 8000 Series



On the second page we can calibrate the readings of the temperature probes of:

- Air leaving the compressor.
- Dew.

Clearly the calibration of the latter probe is necessary only an integrated dryer has been installed and enabled.

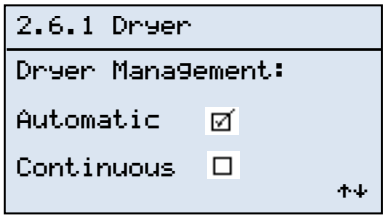


On the final page we can calibrate the readings of the temperature probes of:

- Compressor bush (C1).
- Compressor bush (C2).

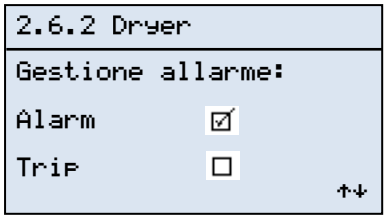
3.4.6 [Dryer] Submenu

The [Dryer] submenu, which can be accessed only if it has first been enabled in the [Enable] submenu,allows operation of the integrated dryer to be configured.

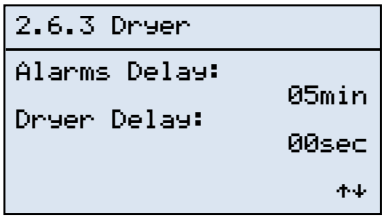


The first page allows us to configure the type of operation of the dryer:

- **Automatic**
- Continuous

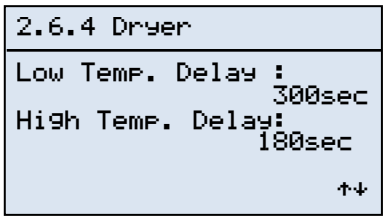


MAESTRO xs can handle any faults that occur during operation in two different ways. we can decide whether to stop the compressor or report the fault and attempt to restore optimal conditions.



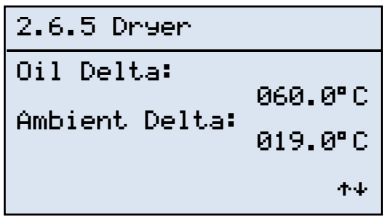
On this page we can define the following functions:

- A delay in the activation of the dryer alarms when the compressor is first activated.
- A delay in the start-up of the dryer with respect to the start-up of the compressor.



On this page we can define the following functions:

- A delay in the activation of the alarm signal if the dew point is < 0°C. If the temperature does not return within the limits after this time the option chosen in 2.6.02 is executed.
- A delay in the high dew point alarm activation. If the temperature does not return within the limits after this time the option chosen in 2.6.02 is executed.

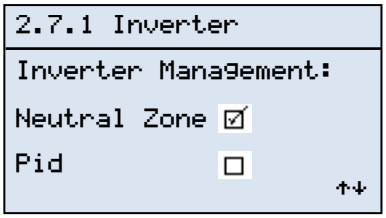


On this page we can define the following functions:

- The value of the temperature of which, subtracted from environmental temperature, determines the upper value of the variability range of the dew point for controlling the dryer.
- The value of the temperature differential with which environmental temperature is determined.

3.4.7 Submenu [Inverter] Submenu

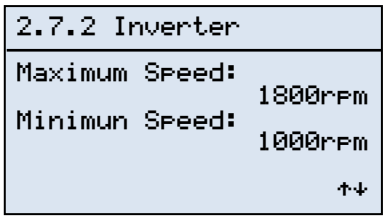
The [Inverter] submenu, which is accessible only if it has first been enabled in the [Enable] submenu, allows configuration for operation in Optima mode.



On the first page we can select the operating mode of the inverter:

- **Neutral zone**
- Pid

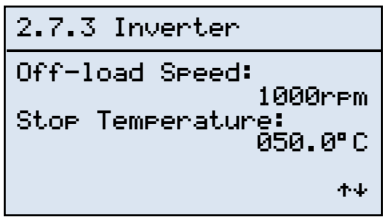
for more information on these modes referred to the “Optima mode” chapter.



On this page we can set:

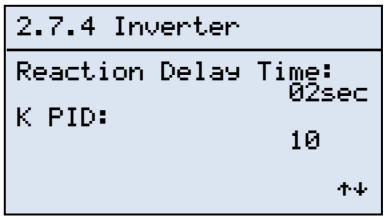
- Maximum rotation speed for the motor.
- Minimum rotation speed for the motor.

Warning: The maximum speed must be the same as that entered in the inverter. If these values are not the same, the effect of rotation speed of the compressor will be that established at the level of the inverter, while the speed indicated on the display will not be the true speed.



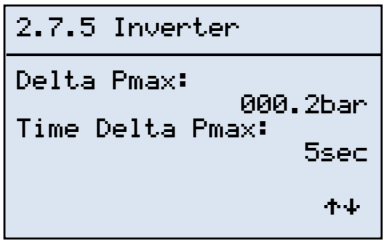
On this page we can set:

- The operating speed when the compressor is working unloaded.
- The minimum temperature of the oil must reach to allow the compressor to be stopped if it reaches an unloaded condition.



On this page we can display the settings of:

- The reaction time of the MAESTRO xs as pressure varies in the “neutral zone” mode.
- This variable, together with the previous one, regulates the response of the inverter, making it more or less reactive to network variations. This variable must be used **only in the PID mode**.



On this page we can display the settings of:

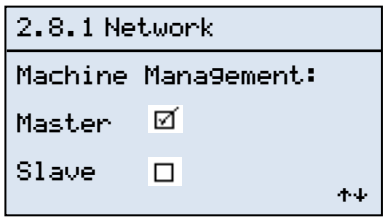
- The value of the pressure of which, added to the value of the maximum pressure, causes the immediate unloading of the compressor.
- The maximum time the maximum pressure value can be maintained before the compressor is unloaded.

These parameters will be explained in more detail in the “Optima mode” section.

3.4.8 [Network] Submenu

The [Network] submenu, which can be accessed only if previously enabled in the [Enabling] submenu, allows the network operating mode to be configured. This mode allows a number of compressors connected in a network to operate: one compressor acts as Master and the others are Slaves, and the settings determine whether all these compressors are activated or not.

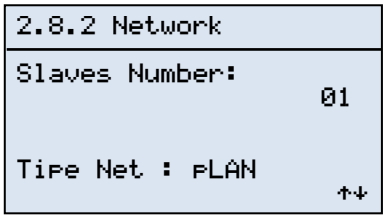
This mode requires two menus to function, the first can be accessed also by the end user, while the second is accessible only to trained personnel.



On the first page of the submenu we must establish in which mode the compressor will function, choosing between:

- **Master**
- **Slave**

Warning: in a network only one compressor must be configured as Master.



On this page, we must configure:

- The number of compressors (units) connected to the Master compressor
- The kind of network to use, choosing from:
  - **pLAN**
  - RS-485

The former should be used for networks consisting only of MAESTRO xs compressors; the latter is for networks with such terminals as Maestro and Micro C.

The following pages are displayed only if the compressor is configured as Master. All these variables refer to the management of the compressors in the network, and cannot be used if the compressor is configured as Slave

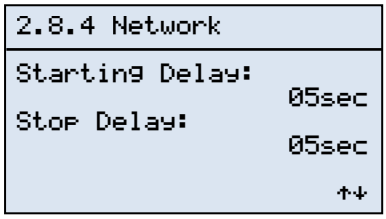
On this page we will configure, for each compressor in the network (excluding the Master) the following parameters:

- The type of controller installed on the unit.

For "***Controller***" we can choose from the following controllers:

- **MAESTRO xs**
- Maestro
- Micro C

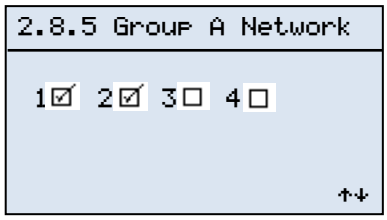
We will discover the meaning of these in the "Network" chapter.

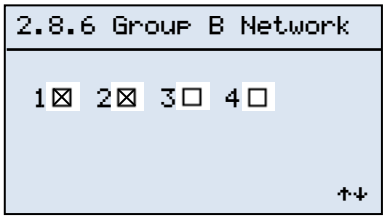


On this page we will configure:

- The delay between the start-up of the various compressors.
- The delay between the shut down of the various compressors.

These parameters allow the network to function better, avoiding any electrical overloads due to the simultaneous start-up of several compressors.





On these final pages we will configure the two groups:

- Group A
- Group B

In particular, we will decide, among the compressors available on the network, which will be part of Group A and which of Group B.

A compressor can never be part of both groups, it must be part of either of group A or of group B.

Note that the compressors selected for group A will no longer be available for the following selection.

3.4.9 [New Password] submenu

The [New password] submenu allows service personnel to customise the password for accessing the [Advanced] menu, making it unique for that compressor.

However, we must be very careful not to forget this password, because if we do we will have to replace the MAESTRO xs or contact the main service centre.

The new password must be created with a combination of the Up and Down keys.

3 .5 [CLOCK] Menu

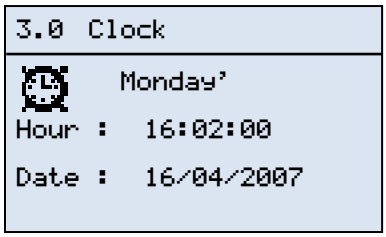
This menu allows the user to start-up the compressor or network of compressors completely autonomously, that is without an operator to carry out start-up manually.

The timer can be programmed in two modes:

Sono disponibili 2 modalità di programmazione oraria:

- 5 days
- 7 days

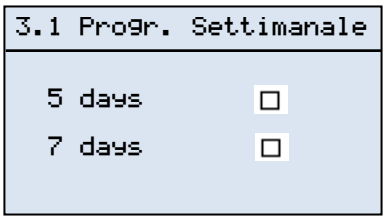
As we will see below, the first option allows three identical daily start-ups for the five working days (Monday to Friday), while the second allows three daily start-ups that are different for each day, for all days of the week (Monday to Sunday).



When we access the first page of the menu the following data are modified:

- Day of the week (extrapolated from data)
- Hours: minutes: seconds
- Day/month/year

Warning: this screen allows the time to be displayed; since it is a mask for entering data, it is not updated in real-time.

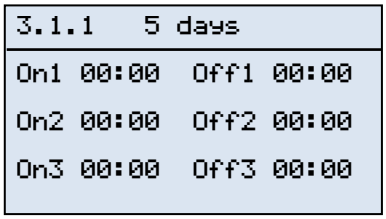


The page on the left allows us to select the operating mode of the compressor, which may be:

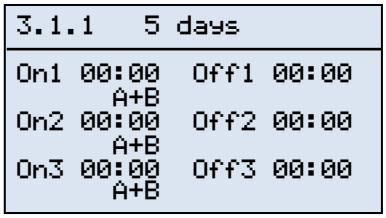
- **None** (no selection)
- 5 days
- 7 days

3.5.1 [5 Days] Submenu

If we activate the five-day mode, we will access a page for configuring compressor startup and shutdown times.



Remember that the three operating bands shown on the left are valid from Monday to Friday. On the other days the compressor will not operate.



If we enable the network mode on the compressor configured as Master, the timer configuration page on the left will appear.

We can see that for each time band, we can select the groups that best satisfy our needs. This allows network configuration to be optimised when we have very variable demand during the working day.

For each operating time band we can select the following ways of handling the groups:

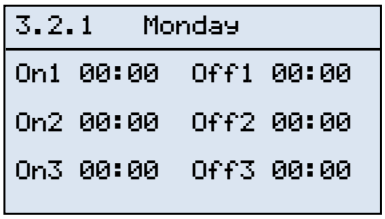
- A
- B
- A + B
- B + A
- Personal

as you can imagine, and if we select the **A** operating mode only the compressors in group A will be started up; in the **A + B** mode, first the compressors in group A will be started up and then those in group B.

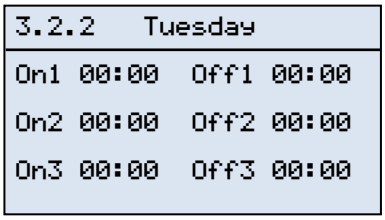
The **Personal** mode allows us to choose which compressors to start-up, selecting them directly from those available. Their working mode will be that set for group A.

3.5.2 [7 Days] submenu

If we activate the 7 day mode we will access a page for configuring compressor startup and shutdown times on Mondays.



As in the five day mode, we can configure three operating time bands, but unlike the former mode these will be valid only for the day selected. For operation on the other days we must programme each day individually.



In this case too, if the compressor is configured as Master, the groups functioning modes will also appear.

These various programming operations allow the user to configure different start-ups for each day of the week.

All this allows the user full and practical control over the use of the compressor or network of compressors.

3 .6 [LOG] Menu

This menu allows service personnel to verify the nature of any faults that may have caused the shutdown of the compressor. Any changes in the programming, carried out either by the user or by service personnel, can also be verified. In addition the last time the compressor operated can be displayed in graphical form.

This menu too is subdivided into submenus for different functions. These are:

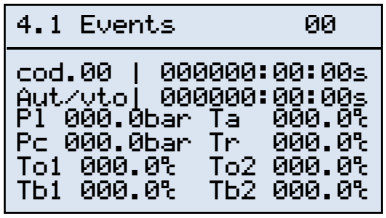
- Events
- Modifications
- Start-ups

3.6.1 [Events] Submenu

In this submenu, service personnel can check what faults have caused malfunctioning of the compressor, and this often gives useful indications for pinpointing the problem that caused the fault.

Up to 20 operating faults can be stored. The first fault will be numbered 00 and will be the most recent, when another fault occurs it will replace the first fault as number 00 and the earlier fault will be numbered 01, and so on. When the Log is full, fault number 19 will be cancelled and the numbers will scroll down and the new fault will be recorded as number 00.

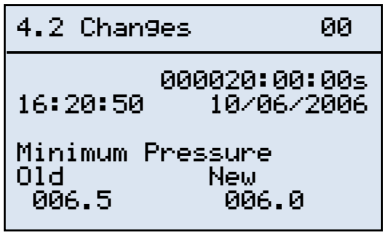
Each page will display a single fault event with a series of data that will help the technician evaluate the problem that has caused the compressor to malfunction.

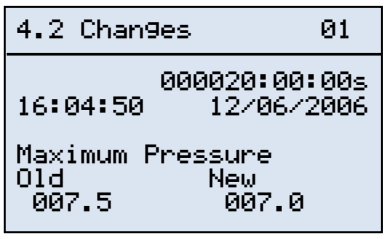


as shown on the left, each page of events displays a series of data on operating hours, temperature and pressure at the time of the fault. For further information referred to the [Log] menu chapter. ***(ci siamo già! ndt.)***

3.6.2 [Modifications] Submenu

In this submenu, service personnel can verify if configuration parameters have been modified and if these modifications could have caused the fault signalled.



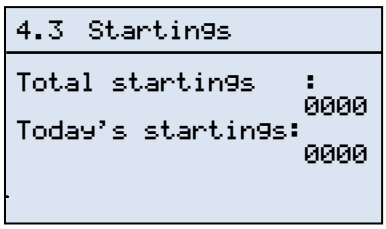


As shown on the left, each modification page shows a series of data concerning the modified variable, storing:

- modification number
- operating hours at the time of modification
- date and time of modification
- description of parameter modified
- value of variable before modification
- value of variable after modification

3.6.3 [Start-ups] Submenu

This submenu allows us to verify the number of start-ups of the compressor during its operation.



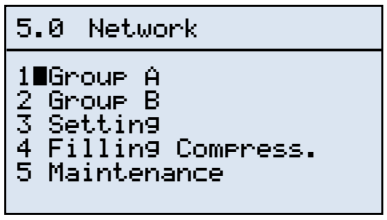
We can see:

- The total number of start-ups of the compressor.
- The number of start-ups in a day of the compressor.

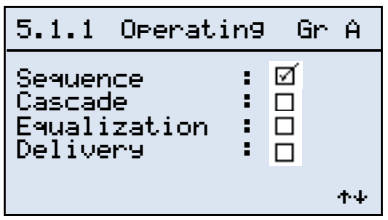
This menu allows us to monitor the correct setup of the compressor: a low number of motor start-ups shows that the machine is correctly calibrated.

3 .7 [NETWORK] Menu

This menu, which can be accessed only after enabling the control function and only if the compressor is configured as “Master”, allows the network of compressors and its operation to be configured on the basis of the requirements of the end user.

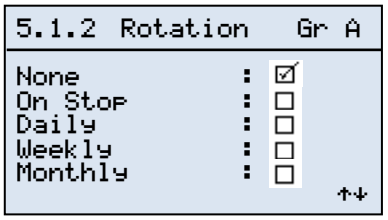


This menu too is subdivided into various specific submenus that make it easier to configure the network on the basis of your requirements.



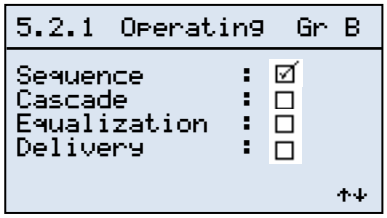
If we select “group A” we will be able to configure the operation of the compressors in this group, choosing from:

- **Sequence**
- Cascade
- Equalisation



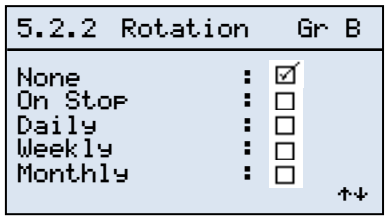
If we select the “Sequence” mode we can select programmed rotation of the first compressor to be started up when the group A network is enabled. This rotation may be:

- **Null**
- On shutdown
- Daily
- Weekly
- Monthly



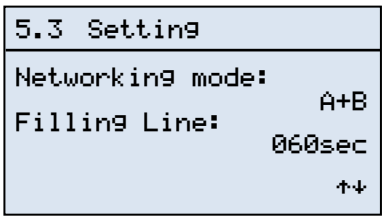
If we select “group B” we can configure the operation of the compressors in that group, choosing from:

- **Sequence**
- Cascade
- Equalisation



For group B too, if we select the “Sequence” mode we can select programmed rotation of the first compressor to be started up when the group B network is enabled.

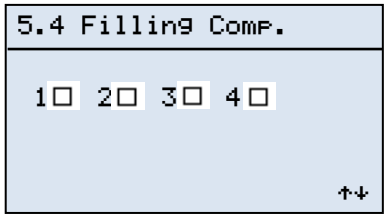
The rotations available are the same as those for group A.



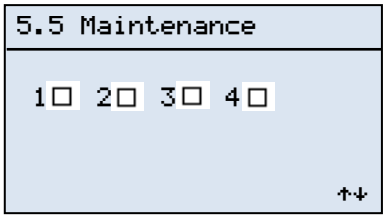
We must then set how to use the groups we have configured, or rather select the order in which the two groups available are started up. The possibilities are:

- **A + B**
- B + A
- A
- B

Another parameter we must set is the time for filling the line each time the line is enabled.



We can select a compressor for filling the line. The display shows the n compressors available in the network, but we can only select one compressor for filling the line.



On the final page we can inform the "Master" that compressor n has been removed for maintenance.

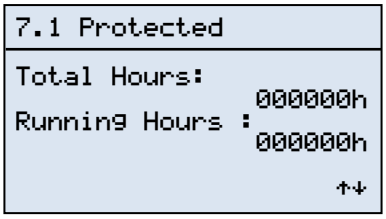
This allows the network to function better because the controller "skips" the removed compressor, thus speeding up the dialogue among the controllers.

3 .8 [PROTECTED] Menu

This menu is strictly protected by a password that prevents access by unauthorised persons. accesses are protected by a combination of keys, and to access this menu you must press simultaneously the <Esc> and < ↵ > keys.

The password request page is displayed; this password is different from the others that can be given to suppliers.

Access to this menu is reserved for specialised personnel directly trained by Mattei, and only in case of necessity.



The screen on the left displays and modifies:

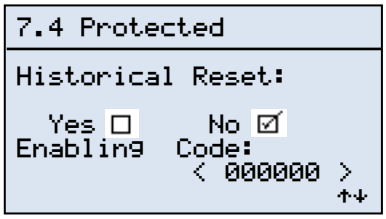
- total enabled hours for the compressor
- running hours of the compressor

The screen on the left displays and modifies:

- working hours of the compressor
- working hours of compressor oil

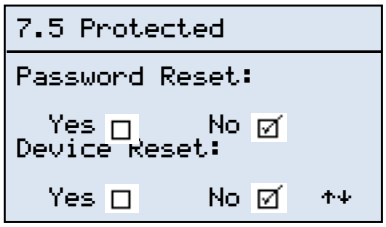
The screen on the left displays and modifies:

- working hours of the compressor oil filter
- working hours of the compressor separator filter



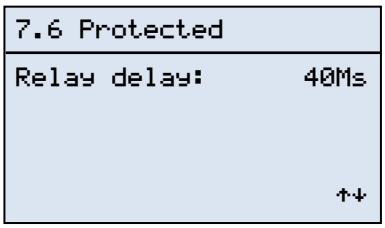
The display on the left permits the Log of the controller to be "reset", but not including the number of start-ups, which can be reset to zero only by completely resetting the unit.

The machine enabling code may be entered; this operation is usually carried out in the factory during testing.



The display on the left makes it possible to "reset" the access password for the "service" menu, restoring the password predefined by Mattei.

In extreme cases, following incorrect configuration by service personnel, the unit can be reset to standard configuration.



the display on the left makes it possible to modify the delay times of the commutation of the starring triangle contactors.

Warning: do not modify these values, which factory set by Mattei, if their function is not completely clear to you.

The variables in these displays must only be used and entered by personnel specially trained in their functions and activities. Unauthorised modification of just one of these variables invalidates the guarantee.

Chapter 4

OPERATING MODES

Mattei rotating compressors are set by the manufacturer to supply compressed at the nominal calibration pressure. There are three distinct operating modes:

- continuous,
- automatic,
- modulation.

In addition there is the OPTIMA mode available when an inverter is installed on the machine.

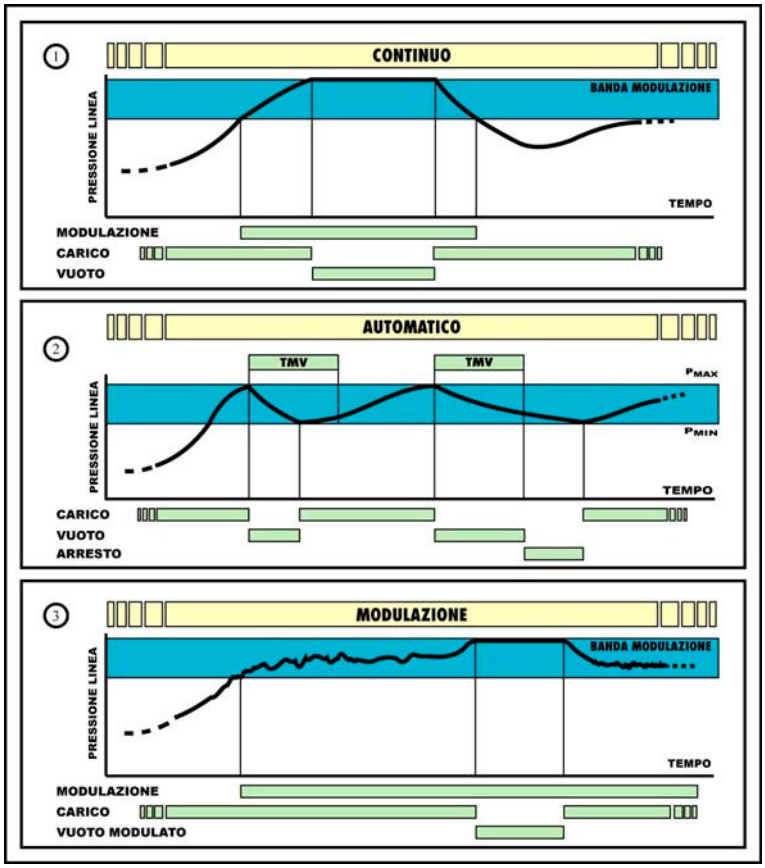


Fig. 23

Figure 23 gives a graphical description of these modes.

4 .1 CONTINUOUS mode

When this mode is activated the compressor supplies air in a well-defined pressure band; the maximum and minimum values are preset by Mattei, but can be customised at will using the programming functions available in the [**User**] menu. When the pressure releases the maximum value (P_{max}), the compressor is unloaded (runs with the suction valve closed) and decompressed to reduce energy consumption. As soon as a request for air from the network lowers the pressure value to the minimum (P_{min}), the compressor is loaded again and start supplying air. The compressor can be stopped at any moment by pressing the stop button: the shutdown procedure includes a phase of unloaded running, of a preestablished duration, during which the compressor is decompressed.

Note

If we enable the machine with a line pressure greater than the minimum pressure set, the compressor will not start up but will wait for the pressure to fall below this value.

4 .2 AUTOMATIC mode

In this mode a further function is added to the previous one: in conditions of low or zero demand for air, the compressor can shut down automatically. The cycle is as follows. When the line pressure reaches the value of P_{max} , the compressor is "unloaded"; two things can now happen:

1. if there is no demand for air the compressor runs unloaded for a certain interval, and then shuts down; it will start up again as soon as the line pressure drops to the P_{min} value;

2. if the line pressure falls to the P_{min} value before the unloaded running time is up, the compressor is "reloaded".

A particular feature of MATTEI rotary compressors can always be superimposed on the operating modes described above. This is the **MODULATION** phase.

By regulating the "servovalve" of the compressor we can make the compressor start to modulate before reaching the value of P_{max}, making this value attainable only if there is very low or null consumption.

Note

If we enable the machine with a line pressure greater than the minimum pressure set, the compressor will not start up but will wait for the pressure to fall below this value.

4 .3 MODULATION mode

All MATTEI compressors, except for the 6000 and 8000 series,have an automatic pressure adjustment system on the basis of the output pressure. The internal pressure in the compressor depends (partly) on the line pressure and, as a result, on the demand for air; when this falls or is absent, both line and internal pressure rise. In Mattei compressors we can, by using a special valve, set the maximum value of pressure at which the machine will run unloaded. For values slightly less than the maximum, the suction valve is only “partly” closed, modulating the output of the machine on the basis of line requirements. The maximum pressure and slightly lower values define a field or band which is referred to below as the MODULATION BAND.

This operating mode exploits this potential. The controller ignores the set values of P_{max} and P_{min}, making the compressor function without ever stopping unless the operator intervenes.

Note

The width of the modulation band is typically 0.3 bar.

Let us say for example that the maximum unloaded pressure is set (using the servovalve) at 7.3 bar.

- For pressure values lower than7 bar (7.3 - 0.3 = 7) the compressor supplies 100% of its capacity.
- For values between 7 and 7.3 bar (these values represent the modulation band) the compressor supplies less than its nominal capacity, adjusting the supply to meet line demand.

WARNING: if the compressor is not fitted with a modulation valve, Mattei makes it impossible to use this operating mode by rendering the menu item non-selectable.

Chapter 5

OPTIMA VERSION

The machine in its OPTIMA version equipped with an INVERTER today represents the maximum in flexibility in compressed air production among MATTEI industrial compressors.
From the user's point of view, the demand for air in a network is generally not constant and undergoes continual variation. These variations are caused by various reasons, for example the varying use of machinery, maintenance and reprogramming intervals, non use or overuse due to different production cycles and shifts.

The result of all this is variable demand for air, which OPTIMA can meet thanks to its great operating flexibility.
OPTIMA adjusts its operation to demand by varying rotation speed so as to make the amount of air supplied by the machine match the effective demand.

To do this, OPTIMA is fitted with pressure sensors that constantly read the pressure of the air supplied and so that of the line.

There are two different modes of using the compressor so as to exploit it to the full on the basis of user requirements.

These modes are:

- Neutral zone mode
- PID mode

Before giving a detailed description there are some notes relevant to both modes.

The limit velocity that can be reached is closely tied to the value of the maximum pressure at which we will use the compressor, and is calculated by the following algorithm:

$$\textbf{V limit} = 1500 + \frac{(Pn - Pmax)}{3} * (Vmax - 1500)$$

Where:

Pn = Nominal pressure
Pmax = Maximum pressure

This allows the energy consumption of the compressor to be optimised and avoids any overloading of the motor.

Once the unloaded condition is reached and the unloaded running time has passed, the compressor shuts down only if the oil temperature has exceeded the set value.

There is a control on the line pressure that prevents the Pmax being exceeded by more than a certain amount. If the compressor is installed in a plant were the tanks are not large enough, it may happen that the inverter is not able to decelerate quickly and will thus allow line pressure to exceed the value of Pmax, so afterwards the compressor is unloaded for a certain length of time, whatever the operating velocity.

Unlike the earlier unit (Maestro), where with a reference value of zero volts the compressor turned over at a speed set by the inverter, MAESTRO xs handles the reference signal using the following associations:

0 V = 0 Rpm = 0 Hz

10 V = 1800 Rpm = 60 Hz (default value of the unit)

in the configuration parameters, we have seen that there are also values for minimum, maximum and unloaded speed; the meaning of these parameters is:

Minimum Speed = this is the minimum operating speed of the compressor, that is the speed which the compressor must reach when started up or when line pressure is high.

Maximum Speed = this is the maximum speed the compressor may reach during operation, and is usually reached only with operating pressure close 7 bar. This value must coincide with that entered in the inverter.

Unloaded Speed = this is the operating speed of the compressor when running unloaded, and is usually equal to the minimum speed.

As mentioned earlier, there is an additional control (which functions only in the OPTIMA mode) on the value of line pressure which avoids it increasing excessively while the compressor is operating. It may in fact happen that the capacity of the tank is not suitable for the quantity of air produced, and that the pressure reaches excessive values rapidly and does not allow the compressor to reduce its speed sufficiently.

Two new parameters have been inserted:

Delta Pmax = this is the value line pressure may reach with respect to the value entered for maximum pressure.

For example:

Pmax = 7.7 bar

Delta Pmax = 0.2 bar

This means that line pressure may reach the value of 7.9 bar in the control phase without causing problems.

Time delta Pmax = this is the maximum time the above condition may persist before the compressor is unloaded.

Again referring to the example above, we can set the value of Time Delta Pmax to 5 sec, and this means that if line pressure reaches 7.9 bar for more than five seconds the compressor will immediately be unloaded, even if the operating speed has not reached the minimum value.

5 .1 NEUTRAL ZONE mode

The inverter (frequency converter) is an electrical device that can modulate the tension and frequency of the electrical power supply to the machine.
On the basis of the commands of MAESTRO xs and the parameters set by the user, the inverter powers the motor varying its speed of rotation.

As a result, and through the monitoring of line pressure, the output of the compressor can vary as a function of the speed of rotation of the electric motor.
The way this is handled is based on the attainment and maintenance of pressure within a pressure band defined by $\mathbf{P_{min}}$.

Operation

As for all standard compressors, the user sets the values of $\mathbf{P_{min}}$ and $\mathbf{P_{max}}$ (the minimum difference between these two values may not be less than 0.1 bar), thus defining the pressure interval within which to operate.

MAESTRO xs calculates the value of maximum speed associated with the value set for $\mathbf{P_{max}}$.
During operation, on the basis of the value of line pressure, MAESTRO xs varies the operating speed in an autonomously calculated field, adjusting the speed of rotation and thus modifying the output.

During startup, the machine accelerates so as to reach the condition Pline >= Pmax as quickly as possible.

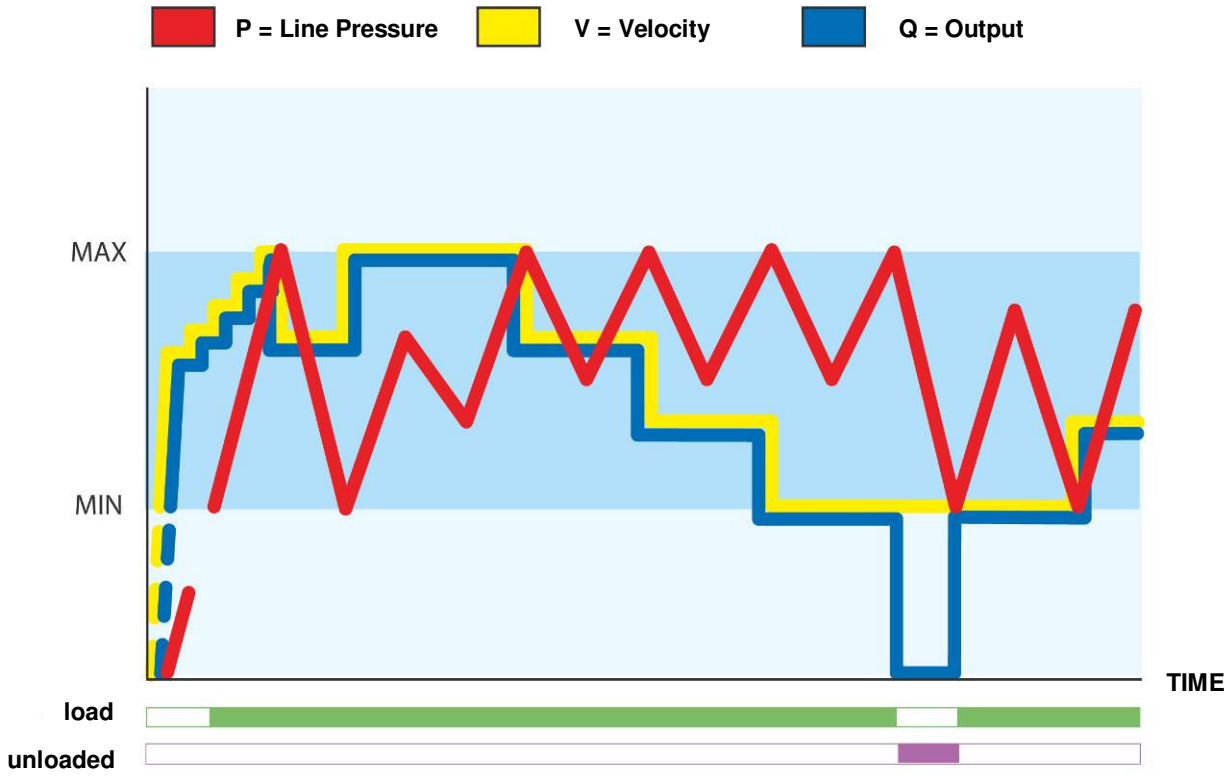
The pressure starts to rise. When **Plinea** > $\mathbf{P_{max}}$, which means that air production exceeds effective consumption, the rotation speed of the motor drops, thus diminishing the amount of air produced and also reducing energy consumption.

Speed diminishes progressively as long as the condition **Pline** > $\mathbf{P_{max}}$ persists.

If pressure still continues to rise although the minimum speed has been reached, the machine is downloaded to reduce energy consumption further.
At the same time the unloaded running time timer is started.

Once the time set has passed and if the oil temperature is greater than the predefined value, which is necessary to prevent the formation of condensation, the machine shuts down.
following the shutdown (or unloading) of the compressor, line pressure starts to fall. When the condition **Pline** < $\mathbf{P_{min}}$ is reached, the OPTIMA reloads (or restarts if the limit time for unloaded running has expired) and starts increasing its rotation speed so as to return to operation inside the set pressure field.
When the measured line pressure is between $\mathbf{P_{min}}$ and $\mathbf{P_{max}}$ the rotation speed of the machine remains constant.
Generally the machine accelerates when, following an increase in the line's air consumption, the **Pline** < $\mathbf{P_{min}}$ condition occurs, and decelerates when, following a reduction in consumption, there is the condition **Pline** > $\mathbf{P_{max}}$.

If **Pline** < $\mathbf{P_{min}}$ the compressor will function with $\mathbf{V = V_{min}}$.
The rotation speed will increase up to $\mathbf{V = V_{max}}$ until the condition $\mathbf{P = P_{max}}$ is reached.
When $\mathbf{P = P_{max}}$ the inverter will reduce the rotation speed so as to match the output of the compressor to the demands of the network.



Graph 1

If line pressure tends still to increase beyond $\mathbf{P_{max}}$ even with $\mathbf{V = V_{min}}$, the compressor is unloaded ($\mathbf{V_{unloaded}}$ = modifiable; see Sect. 3.4.7, page 2.7.3).

There are now two possibilities:

1. **Pline > P_{min}** e **t ≥TMV** : the compressor is shut down (if $\mathbf{T_{olio} > T_{olio\ consenso\ arr.}}$ > default = 50°C).
2. **Pline < P_{min}** e **t < TMV**: the compressor is reloaded.

Note: The condition $\mathbf{T_{olio} > T_{olio\ consenso\ arr.}}$ has been set to avoid the formation of condensation in the compressor.
$\mathbf{T_{olio\ consenso\ arr.}}$ is set for all kinds of machine during testing, or in the case of particular installation with a different thermal regime with respect to standard machines.

Thanks to the use of the inverter which reduces the peaks of current in the motor during start up, the unloaded running time can be significantly reduced with respect to the value used in other operating modes. However, to allow complete discharge of the pressure in the chamber the interval must not be excessively reduced.

	The lower limit value for the unloaded running time is **TMV ≥ 30 sec.**

5 .2 PID Mode

PID mode, rather than reacting to values of line pressure > Pmax or < Pmin, attempts to maintain pressure close to an intermediate value between the two limits.

Operation

The average value at which the MAESTRO xs should function is automatically calculated on the basis of the operational values entered for Pmin and Pmax.

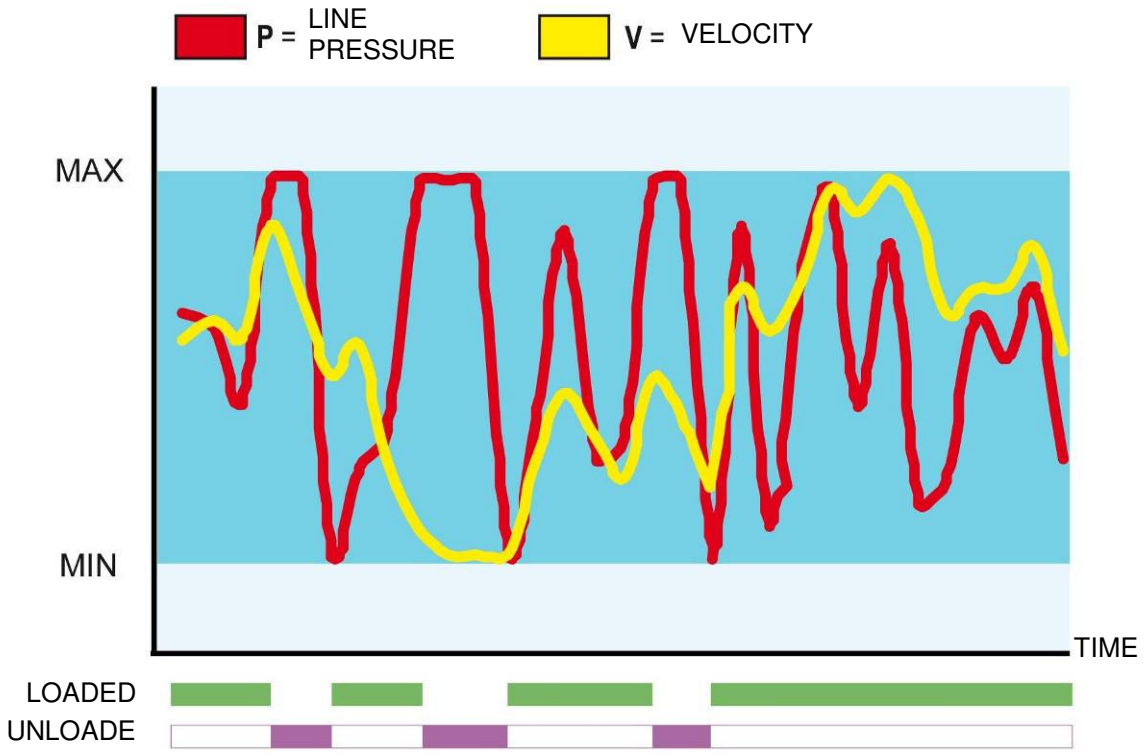
For example:

Pmax = 7.5 bar

Pmin = 6.5 bar

Pmed = 7.0 bar

With these settings, the compressor will maintain the line pressure around the 7.0 bar calculated, increasing motor speed if the pressure drops or diminishing speed if the pressure exceeds the target value.



Graph 2

When the compressor is enabled the operating speed will be increased to the maximum value available (calculated as described above) and then drop when the pressure reaches the median value (target pressure); if it drops below the target pressure speed will increase until it rises and so on.

The system adapts automatically to the desired pressure, calculating the most suitable rotation speed for achieving the line pressure around the desired value, so we can have constant pressure with speed that is not the minimum but suited to supplying network demand.

Unlike the previous mode, the system is unlikely to reach operating stability, and speed will be continually increased and decreased to maintain constant pressure.

If there is a big drop in the consumption of air, speed will drop to the minimum and if even then the amount of air produced is greater than that consumed, pressure will increase until it reaches the value of Pmax.

When this limit value is reached the compressor will be unloaded and only reloaded when the pressure reaches the value of Pmin.

Note that line pressure is maintained almost constant with minimal variation, and when there is a big demand for air the compressor will increase its speed to compensate for the pressure drop created as quickly as possible.

In this mode too, when the compressor reaches the unloaded state it is shut down if the minimum unloaded running time has passed and the oil temperature is above the stop value.

5 .3 Selecting the operating mode

The selection is made on the page shown below; the default value is the “Neutral Zone” mode.

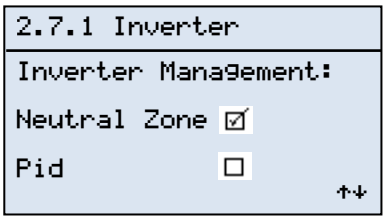


Fig. 24

Note

Remember that to access to the inverter configuration menu is dependent on whether it has been enabled in the [Advanced\Enabling] menu; otherwise access will be denied.

ENABLING THE COMPRESSOR

Chapter 6

When delivered, the compressor is protected by an alphanumeric code which must be supplied by Mattei and entered when it is first switched on.
Without this code nobody can use the compressor; in fact as soon as the compressor is powered up the display in figure 25 is shown with a flashing cursor at the top left.

Fig. 25

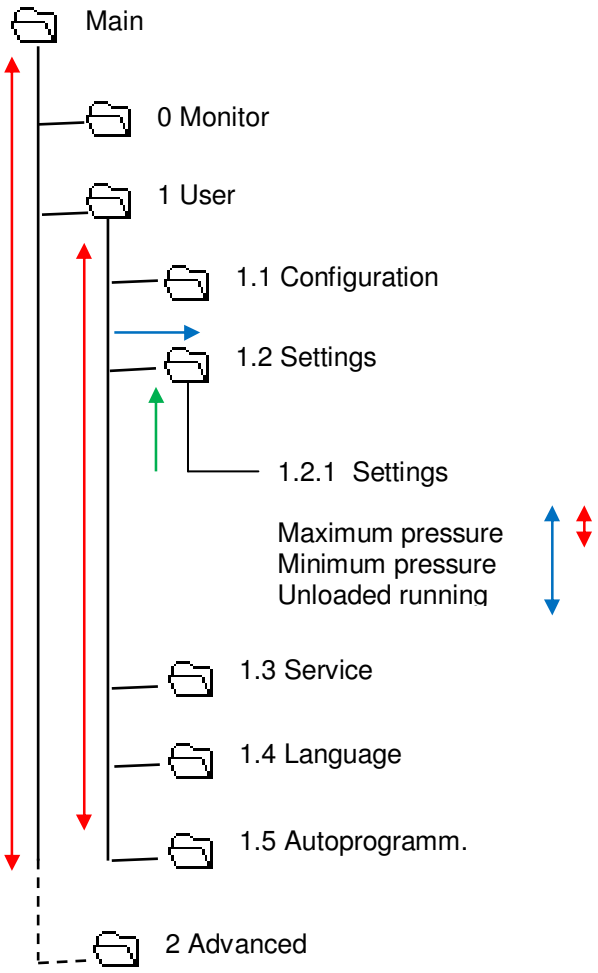
Press the < ↵ > key to position the cursor over the first character of the code; use the <🡻> <🡹> keys to scroll the characters from A-Z and from 0-9; when the desired character is displayed press the < ↵ > key.
The cursor will move to the second character and the above operation must be repeated, and so on until the entire code is entered. If after pressing the < ↵ > key for the final character the code proves correct, the first page of the [Monitor] menu will be displayed.
If the code is not correct, the code request mask will be displayed again (fig. 25).

The enabling code, once entered, will not be requested again.
From now on the compressor will be available for use and configuration by the user.

SWITCHING BETWEEN MENUS

Capitolo 7

as mentioned in the chapter on the menus, the structure of the software menus is similar to that of the PC. To switch between menus the 4 keys displayed below are mainly used, and these allow us to:



scroll between pages.

increase or decrease the value of the selected variable.

move between the variables on a page

confirm the modification of a variable.

access the [Main] menu.

move up a level from submenus.

Pressing the “ESC” key in one of the program menus takes us automatically to the [Monitor] menu.

to display movements, a cursor with the flashing symbol “ ■ “ is used; usually in the [Monitor] menu this cursor is at the bottom right of the display.

Once we leave this menu the cursor may appear in three different positions depending on the page displayed. it may be between the identifying number and the description of the menu or submenu, indicating the submenu selected; it may be at the top left indicating that we are in the page change mode, or finally it may be in front of the value of a numerical variable or selection showing that we are in value modification mode.

Let us see how to switch between menus assuming we wish to modify the value of the maximum pressure of the system.

In the same way we can also modify the other parameters in the programme, assuming we are authorised to do so.

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

From the [Monitor] menu we press the <Esc> key.

```
0.0■Monitor
1.0 User
2.0 Advanced
3.0 Clock
4.0 Historical
5.0 Lan
6.0 Info
```

Displayed is the page of the [Main] menu that lists all the menus making up the control software. The maximum pressure that we want to modify is in the [User/Settings] menu, so first we bring the cursor to the [User] menu using the key <🡻>.

```
0.0 Monitor
1.0■User
2.0 Advanced
3.0 Clock
4.0 Historical
5.0 Lan
6.0 Info
```

Once we have selected the menu we want we press the < ↵ > key to access it.

```
1.0 User
1.1■Configuration
1.2 Setting
1.3 Service
1.4 Languages
1.5 Self programming.
```

Once we're in the [User] menu we see it is made up of other submenus divided by category that group the system variables on the basis of their function.

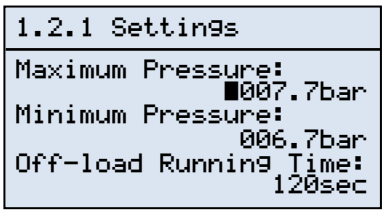
So we must go to the [Settings] submenu that contains the variable we want to modify. To do this we repeat the operations described above.

```
1.2.1 Settings
Maximum Pressure:
              007.7bar
Minimum Pressure:
              006.7bar
Off-load Running Time:
                120sec
```

When we enter the [1.2.1 Settings] menu we see that the flashing cursor has moved to its starting position (at the top left).

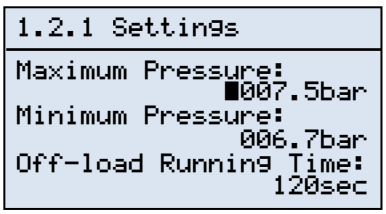
Press the < ↵ > key to move the cursor on to the variable we wish to modify.

press once to select the Pmax variable, twice to select the Pmin variable and so on.

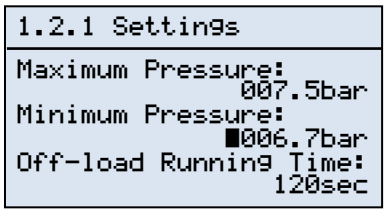


once selected, the cursor positions itself in front of the variabl to modify. Press the <🡻> or <🡹> key according to whether we want to decrease or increase the value.

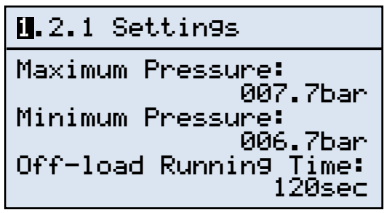
Supposing we want to modify it to 7.5 bar, press the <🡻> key until you see the value “007.5bar”.



Press the < ↵ > to accept the modification and move the cursor to the next parameter



If you do not wish to modify other parameters on the page, press the < ↵ > key until the cursor returns to its initial position.



Press the <Esc> key to exit the menu and move up one level; press it again to return to the menu [Monitor].

There are also submenus made up of several pages, unlike the one in the example; to move from one page to another simply use the <🡻> or <🡹> keys.

menu is made up of more than one page are identified by two arrows “ 🡹🡻 “ in the bottom right-hand corner of their pages. These menus are of the “loop” type.

LOG

Chapter 8

In the Log menu MAESTRO xs stores data on the compressor; and in particular its stores any faults and modifications to the operating parameters of the compressor.
When we access the [Log] menu we see the display below.

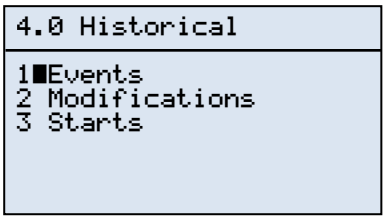


Fig. 26

The menu lists three submenus that subdivide the data stored in the device. These submenus are:

1. Events
2. Modifications
3. Start-ups

8 .1 Events Submenu

during the operation of the compressor, it may happen that a component develops a fault or a temperature exceeds that required for correct operation. These thoughts must be intercepted and suitably managed by the software to avoid the compressor encountering more serious problems or even breaking down.
These faults, defined as “Events”, can be subdivided into two categories with quite different behaviours. These categories are:
Questi guasti, definiti “Eventi”, possono essere suddivisi in 2 categorie con comportamenti funzionali ben differenti, queste categorie sono:

- Events generating an “Alarm”
- Events generating a “Block”

8 .1.1 Alarm mode

If the type of event is not so serious as to provoke an immediate breakage or serious malfunctioning of the compressor, it is defined as an “alarm”, and is immediately reported to the user but does not cause the shutdown of the compressor.
However, it is clear that such an event must be checked out and it may be necessary to contact service personnel if it persists.

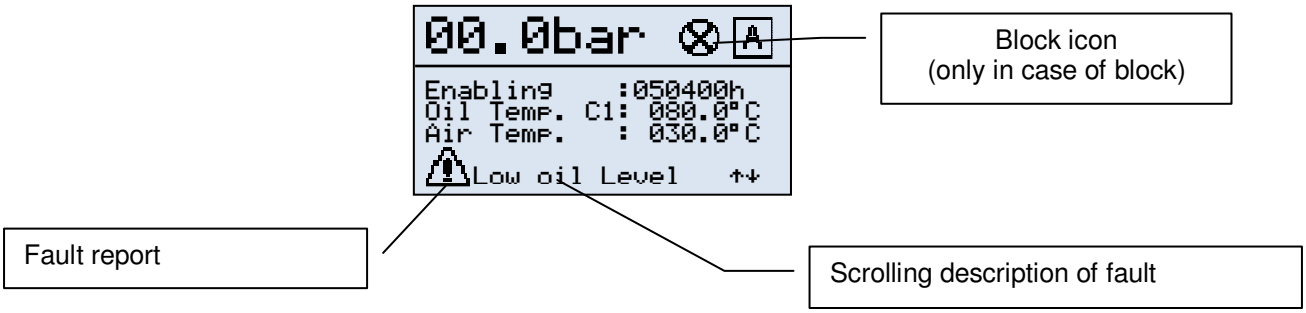
8 .1.2 Block mode

Unlike the alarm mode, the “block” mode immediately shuts down the compressor. An event of this kind may cause serious damage to the compressor which must thus be immediately shut down to avoid more serious consequences.
These events must be very carefully evaluated by service personnel.

Warning: In the case of a fault caused by the breakage of a sensor, we recommend, if possible, replacing the sensor with an identical one, otherwise consult the Mattei service personnel.

8 .1.3 Displaying events

The occurrence of a fault, as mentioned above, causes either a simple report or a shutdown of the compressor, according to the type of event. In both cases there is a video report that informs the user of a problem with the compressor.
The report is displayed as below.



On the first page of the [Monitor] menu, an icon is displayed at the bottom left showing the presence of a fault on the compressor; alongside it is the description of the fault. This description scrolls to allow a complete report to be given.

at the same time the <Reset> key lights up red, giving an additional warming, while if the event causes a block, the icon showing the machine state will be as shown in the preceding figure, warning that the compressor has been shut down because of a serious event.

If we press the <Reset> key a screen is displayed (see figure 27) giving some details on the kind of fault.

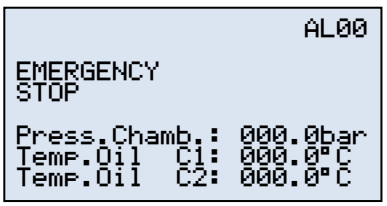


Fig. 27

if more than one falls is registered before research, a list of the faults can be displayed by pressing the <↓> and <↑> keys, but the value of chamber pressure and oil temperature display refer only to the last event occurring.

Pressing the <Reset> key a second time takes us to a display showing the there is no alarm active (see figure 28): the display of this page shows that the fault has been cancelled and the compressor is again ready to be started up.

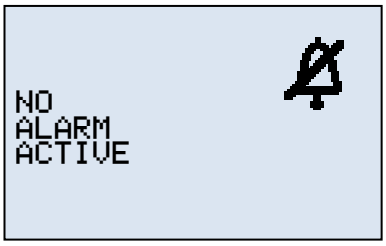


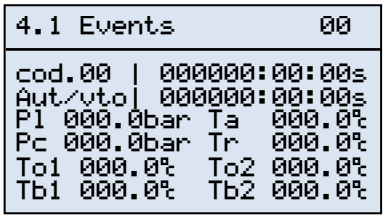
Fig. 28

Press the <Esc> key to return to the [Monitor] menu and restart the compressor. Logically it is necessary first to check the reason why the compressor shut down, and if the compressor shuts down again after being enabled you should not insist.
Instead carefully examine the compressor, and in case of doubt contact general service personnel

Warning: If you press the <Reset> key when there is no fault active, the page shown in figure 28 is displayed.

8 .1.4 Displaying stored events

when you enter the [Events] submenu, the last event is stored in memory is displayed. The page containing an event is shown below, and it gives the following data:



- Event number
- Event code
- Operating hours at time of start-up
- Operating hours at time of fault
- Active operating mode
- Machine state
- Line pressure
- Chamber pressure
- Output air temperature
- Dewpoint temperature if dryer is active
- Oil temperature of base compressor (C1)
- Oil temperature of auxiliary compressor (C2)
- Compressor bush temperature (C1)
- Compressor bush temperature (C2)

All these data allow service personnel to identify the kind of malfunctioning of the compressor. The unit stores a maximum of 20 fault events.
any additional events will override the Log restarting from event “00”, it is possible to recognize which is the most recent event because when you enter the event menu the one displayed is the last one stored.

Below is a table showing the fault codes in the system, together with the type and possible cause of the fault.

Report	A	Cod	Type	Cause
Emergency stop	Block	00	Digital	The emergency button has been pressed on the electrical control panel
Low oil level	Block	01	Digital	Low oil level in chamber (quantity of oil below that needed for correct operation)
Motor overload	Block	02	Digital	Main electric motor overload (temperature exceeds limit set)
Inverter fault	Block	03	Digital	Malfunction of connected and managed inverter
Incorrect ventilation	Block	04	Digital	Compressor access door opened or thermal relay protecting fan motor (if installed) has been triggered
Oil filter clogged	Alarm	05	Digital	Oil filter is clogged and should be replaced
Air filter clogged	Alarm	06	Digital	Air filter is clogged. This Alarm is available if the machine is fitted with the relevant sensor
Sep filter clogged	Alarm	07	Analogue	Separator filter is clogged
Alarm Oil Temp. C1	Alarm	08	Analogue	Compressor oil temperature has exceeded the alarm temperature
High oil temp. C1	Block	09	Analogue	High temperature of C1 compressor oil (temperature exceeds limit set)
Alarm Oil Temp. C2	Alarm	10	Analogue	Compressor oil temperature has exceeded the alarm temperature
High oil temp. C2	Block	11	Analogue	High temperature of C2 compressor oil (temperature exceeds limit set)
High air temp.	Block	12	Analogue	High temperature of ouput air (temperature exceeds limit set)
High temp. bush C1	Block	13	Analogue	High bush temperature in compressor C1 (temperature exceeds limit set)
High temp. bush C2	Block	14	Analogue	High bush temperature in compressor C2 (temperature exceeds limit set)
Power cut	Alarm	15	----	Power supply to compressor has been cut (only if option is enabled)
Startup problem	Block	16	Analogue	Fault in startup sequence has blocked startup
Excess pressure	Block	17	Digital	Excess network pressure. Measured by external emergency manostat.
Oil change	Alarm	18	Service	Oil should be substituted as hours indicated for substitution have been reached.
Oil filter	Alarm	19	Service	Oil filter should be substituted as hours indicated for substitution have been reached.
Separator filter	Alarm	20	Service	Separatorfilter should be substituted as hours indicated for substitution have been reached.
Ice alarm	Alarm	21	Analogue	Excessive cooling of dryer. Handled as a Block
	Block	22	Analogue	Excessive cooling of dryer. Handled as an Alarm.
Dewpoint alarm	Alarm	23	Analogue	Lack of cooling of dryer. Handled as a Block
	Block	24	Analogue	Lack of cooling of dryer. Handled as an Alarm.
Input 1 fault	Alarm	25	Digital	Fault in generic device connected to programmable input 1. Does not cause compressor shutdown.
	Block	26	Digital	Fault in generic device connected to programmable input 1. Causes compressor shutdown.
Input 2 fault	Alarm	27	Digital	Fault in generic device connected to programmable input 2. Does not cause compressor shutdown.
	Block	28	Digital	Fault in generic device connected to programmable input 2. Causes compressor shutdown.
Input 3 fault	Alarm	29	Digital	Fault in generic device connected to programmable input 3. Does not cause compressor shutdown.
	Block	30	Digital	Fault in generic device connected to programmable input 3. Causes compressor shutdown.

Table 18

Report	Action	Cod	Type	Causa
Chamber probe fault	Block	31	Software	Fault in pressure probe in compressor chamber. Also indicates interrupted connection.
Line probe fault	Block	32	Software	Fault in pressure probe in radiator. Also indicates interrupted connection.
Air probe fault	Block	33	Software	Fault in temperature probe in radiator. Also indicates interrupted connection.
C1 Oil probe fault	Block	34	Software	Fault in temperature probe on compressor. Also indicates interrupted connection.
C2 Oil probe fault	Block	35	Software	Fault in temperature probe on compressor. Also indicates interrupted connection.
C1 bush probe fault	Alarm	36	Software	Fault in temperature probe on compressor bearing. Also indicates interrupted connection.
C2 bush probe fault	Alarm	37	Software	Fault in temperature probe on compressor bearing. Also indicates interrupted connection.
Dewpoint probe fault	Alarm	38	Software	Fault in temperature probe on dryer. Also indicates interrupted connection.
Clock error	Alarm	39	Software	Incorrect connection of clock module
Expansion 1 error	Block	40	Software	Communication fault between base board and expansion board N° 1
Expansion 2 error	Alarm	41	Software	Communication fault between base board and expansion board N° 2
Time Out Slave	Alarm	42	Software	In “network” mode compressor configured as “slave” cannot communicate with “Master”.
C1 bush temp alarm	Alarm	43	Analogue	Compressor C1 bush has exceeded alarm temperature
C2 bush temp alarm	Alarm	44	Analogue	Compressor C2 bush has exceeded alarm temperature
	Block	45	Software	No communication between base module and video terminal

Table 18

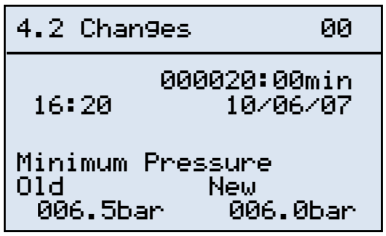
8 .2 Handling video connection

Normally all compressor commands are given via the MAESTRO xs keyboard, so a breakdown of this would prevent the user from starting up or shutting down the compressor.
If the former case does not present problems for the user, the second could lead to serious problems since the only way of shutting down the compressor would be cutting the power supply.
Mattei has allowed for this hypothesis, and if for any reason communication between the base terminal and the video terminal is interrupted for more than 30 seconds the compressor is immediately shut down.
As shown in table 18, the code stored is number 45, but nothing will be displayed on the video and it will only be available in the events Log.

8 .3 Modifications submenu

In this submenu is stored the modifications carried out on the analogue configuration parameters of the unit. This allows us to check, in the case of compressor malfunction, if incorrect setting of one or more parameters is to blame.
Here too, as in the case of events, a maximum of 20 modifications are stored and later modifications are handled in the same way, with the oldest modification being cancelled and the most recent taking the number “00”.

Each page of this submenu displays the following information:



- modification number
- working hours at time of modification
- date and time of modification
- description of parameter modified
- value of variable before modification
- value of variable after modification

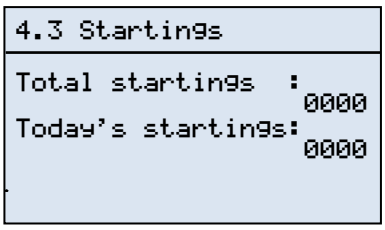
In the table below we show which variables are stored by the unit so as to allow any modifications to be traced.

settings submenu		**dryer submenu**
Pmax		environment delta
Pmin		oil delta
threshold submenu		**debug submenu**
start-up pressure		line probe at limit
separator clogged		line probe offset
air temperature high		chamber probe at limit
oil pre-alarm		chamber probe offset
oil alarm		**inverter submenu**
fan command		Press. differential Pmax
fan differential		
bush pre-alarm		
bush alarm		

Table 19

8 .3 Start-up submenu

This submenu makes it possible to monitor the start-ups of the compressor during its working life; in particular we can monitor:



- the total number of start-ups of the compressor
- the number of start-ups during the day of the compressor.

The first counter counts all start-ups in the life of the unit.
The second counter counts the start-ups during the working day. This counter is reset every time the clock passes midnight.
These counters are useful for checking that the compressor settings are correct: if the machine is well configured the number of daily start-ups will be low.

Warning: Obviously the substitution of the unit means all this information will be lost since it is not possible to insert these data into the new unit.

Capitolo 9

MANAGING PASSWORDS

MAESTRO xs is protected from tampering by unauthorised personnel by a series of passwords required to access the various menus in particular functions. These can be subdivided into two categories:

- USER password
- SERVICE passwords

9 .1 USER Password

This is used simply to allow maintenance events to be cancelled. When the time for maintenance set in the [User \ Service] menu is reached, there is a warning on the display and the <Reset> key lights up.

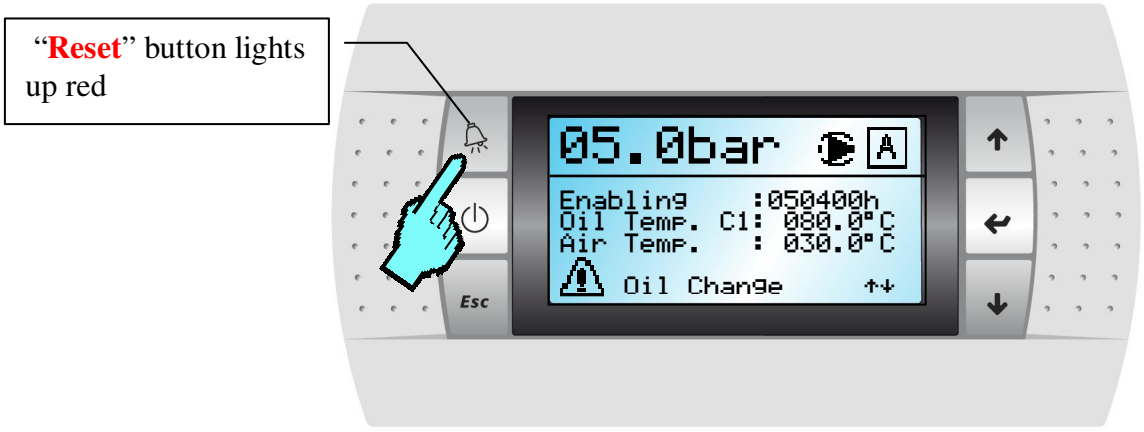


Fig. 29

To cancel the warning triggered by the hour counter a password must be entered; this avoids unauthorised people involuntarily cancelling the warning.
The password consists of a combination of keys that when pressed in sequence form a kind of combination. It must be entered when requested using the mask shown below.

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

9 .1 SERVICE Password

This password is used by service personnel, authorised by Mattei, and must not be given to customers. It gives access to the [Advanced] menu were the various functions can be enabled and configurations carried out according to user needs or to the devices installed on the machine; configuration by untrained personnel may lead to malfunction and in the most serious cases to breakdown of the compressor.

This password can be changed by service personnel using the special mask in the [Advanced] menu to avoid other maintenance personnel accessing and modifying the configuration of the compressor.

Fig. 30

to modify the service password it is necessary to access the [2.0 Advanced] menu and then, using the <↑> <↓> keys, select the [2.9.1 New Password] submenu. Note the flashing cursor on the upper left of the display. When the < ↵ > key is pressed, the cursor will move to the first field of the new password.

Now use the following keys to create the new password:

<↑> <↓> < ↵ >

Once the new combination of keys is entered the cursor returns to its original position. Now except the menu to make the new password effective. Logically this new password must be written down to avoid forgetting it.

Warning: If the password is forgotten or incorrectly transcribed only Mattei personnel can return it to its default value.

Chapter 10

WEEKLY PROGRAMMING

With MAESTRO xs it is possible to start of the compressor automatically using the internal clock.
To use this function we must access the [Clock] menu, where there are two selection modes available:

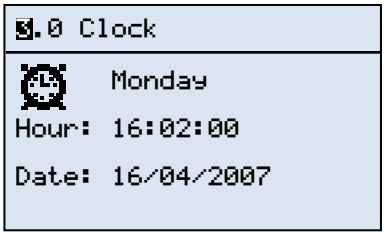
- ✓ 5 day mode
- ✓ 7 day mode

Both modes offer three time bands for daily operation. These bands have the following priorities:

- Band 1 high priority
- Band 2 medium priority
- Band 3 low priority

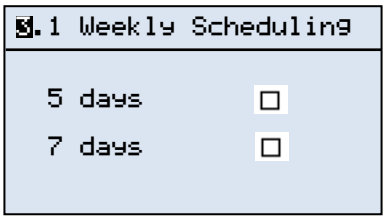
This means that band 1 has the priority over band 2 and so on. There is a control on the validity of the times entered in the individual bands, for example a stop time that is earlier than a startup time.
Since there is no control between the three bands, be very careful when entering times.

10 .1 Enabling programming

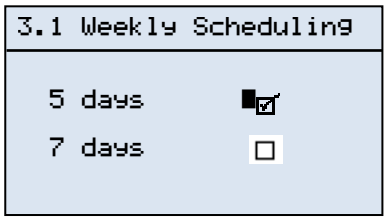


to enable weekly programming we must go to the [Clock] menu. We will see the flashing cursor on the first character a the top left of the screen, and from here we will use the <🡻> key to access the page where programming is enabled and selected.

Warning: Maestro does not manage the transition to and from daylight saving time and the time must be changed manually.



Once you are on the enabling page press the < ↵ > key to choose the desired operating mode.



Once you have made the selection press the <🡻> or <🡹> key to enable the function. A check mark will be displayed showing that the required function has been selected (e.g. 5 day mode).

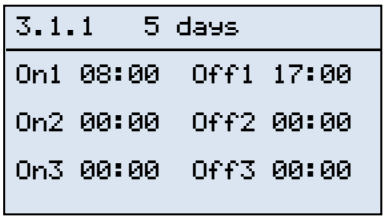
Press the < ↵ > key until the cursor returns to the top left hand corner of the screen.

10 .2 5 day programming

In the 5 day mode the compressor can only be used on standard working days, that is from Monday to Friday, and with identical times for the entire week.

Example:

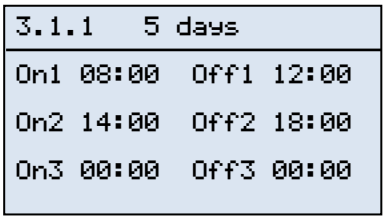
Start-up at 08:00 >>>>>>>>> Shut down at 17:00



This configuration means the compressor will work in a well-defined time band that will be valid from Monday to Friday.
As mentioned, there are three operating bands available to allow complete flexibility in the use of the compressor.
weakens subdivided operation during the day, excluding the compressor in the times when it is not needed. A typical configuration would be excluding it during the lunch break.

Example1:

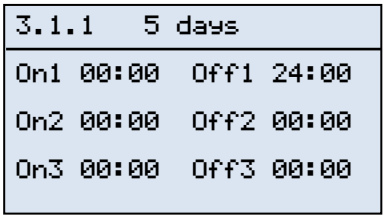
Band 1 Start-up at 08:00 >>>>> Shut down at 12:00
Band 2 Start-up at 14:00 >>>>> Shut down at 18:00
Band 3 Start-up at 00:00 >>>>> Shut down at 00:00



The third band is inactive since it is excluded; a time configuration of "00:00" for both the on and off setting excludes the compressor.

Example2:

Fascia 1 Start-up at 00:00 >>>>> Shut down at 24:00



This kind of programming allows the compressor to be used continually for all five days without ever being shut down.

10 .3 7 day programming

In the 7 day operating mode it is possible to configure operating time bands that differ from day to day for all days of the week. This promotes greater flexibility in using the compressor compared with the mode described above. If we use also in this case the three time bands available for each day we can configure operating times that are different for each day of the week, as shown in the example below.

Example:

- Monday

  Band 1 Start-up at 08:00 >>>>> Shut down at 17:00
  Band 2 Start-up at 00:00 >>>>> Shut down at 00:00
  Band 3 Start-up at 00:00 >>>>> Shut down at 00:00

3.2.1 Monday	
On1 08:00	Off1 17:00
On2 00:00	Off2 00:00
On3 00:00	Off3 00:00

- Tuesday

  Band 1 Start-up at 08:00 >>>>> Shut down at 12:00
  Band 2 Start-up at 14:00 >>>>> Shut down at 18:00
  Band 3 Start-up at 00:00 >>>>> Shut down at 00:00

3.2.2 Tuesday	
On1 08:00	Off1 12:00
On2 14:00	Off2 18:00
On3 00:00	Off3 00:00

- Wednesday

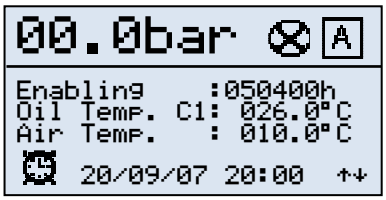
  Band 1 Start-up at 08:00 >>>>>> Shut down at 12:00
  Band 2 Start-up at 13:00 >>>>>> Shut down at 16:30
  Band 3 Start-up at 18:00 >>>>>> Shut down at 22:00

3.2.3 Wednesday	
On1 08:00	Off1 12:00
On2 14:00	Off2 18:00
On3 00:00	Off3 00:00

Etc.

10 .4 Excluding weekly programming

It is possible provisionally to exclude weekly programming if this means shutting down the compressor. this is very useful when, for example, we wish to use the compressor on Saturday for plant maintenance when it is in the 5 day mode.



Ronan weekly programming is active a clock icon is displayed on the screen. To exclude programming we can proceed in two ways. The first is to go to the clock menu and deactivate the selected mode. The second involves pressing the < ↵ > key for five seconds: the clock icon will start to flash, telling the user that programming has been excluded.

To start the compressor, press the <On/Off> button as for standard manual start-up. After use press the <On/Off> key again, wait for shutdown and once the compressor has stopped press the < ↵ > key again for 5 seconds to restore weekly programming.

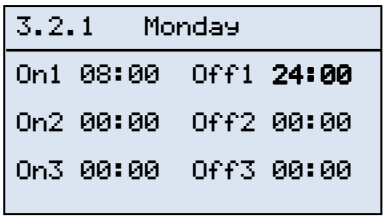
10 .5 Special programming

Only in the 7 day operating mode is it possible to configure operating time bands to allow continuous operation for two or more days if there is a need for continuous operation during the week.

Example:

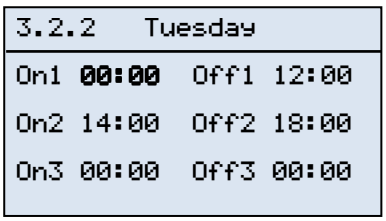
- Monday

  Band 1 Start-up at 08:00 >>>>> Shut down at 24:00
  Band 2 Start-up at 00:00 >>>>> Shut down at 00:00
  Band 3 Start-up at 00:00 >>>>> Shut down at 00:00



- Tuesday

  Fascia 1 Start-up at 00:00 >>>>> Shut down at 12:00
  Fascia 2 Start-up at 14:00 >>>>> Shut down at 18:00
  Fascia 3 Start-up at 00:00 >>>>> Shut down at 00:00



In the above example we have simulated the need to use the compressor all day Monday and for half the day on Tuesday without it ever stopping; to do this simply configure the times as shown in the example.

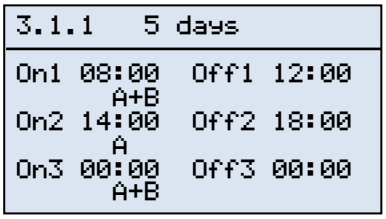
10 .6 Programming a network

There may also be a network of compressors that needs to be activated at predefined times. to activate the network only the “master” compressor needs to be configured; it is not necessary to programme all the compressors in the network because they are driven by the “master” compressor.

When entering the programming mask (e.g. 5 days) we see that among the hourly settings are other indications that represent the ways of using the two groups of compressors created (see Network chapter); that is we can reduce the number of compressors in use if in a given time band consumption is limited and can thus be covered by just one group of compressors.

Let us suppose we have a network of four compressors and that these compressors have been subdivided in this way:

Group A = C1 + C2
Group B = C3 + C4



In this example we assumed that the user requires a lot of air in the morning while demand is much lower in the afternoon. It is thus useless to enable the entire network if group A by itself is sufficient; we can thus exclude group B. in the afternoon and also obtain a saving in energy consumption.

it is also possible to create a mixed group of compressors from group Aa or from group B, which makes the network even more flexible.

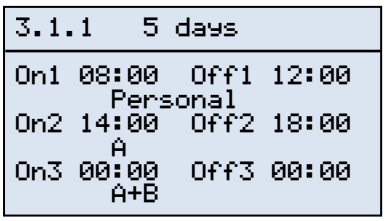


Fig. 31

If we insert the term “Personal” in one of the three time bands available (see figure 31), when we get to the end of the hourly programming by pressing the <🡻> key one or more pages (see figure 32) are displayed for selecting the compressors we wish to use in that time band.

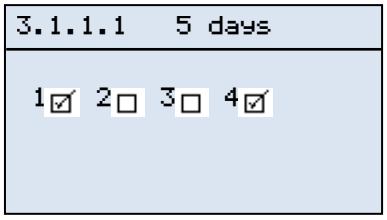


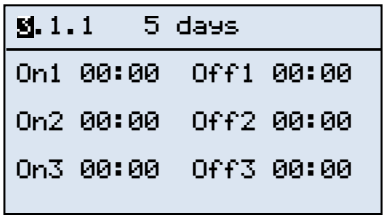
Fig. 32

In the example in figure 39 we simulate the use of compressors numbers one and four which, looking at the preceding example, are part of different groups.
This type of configuration makes the network very flexible in meeting the various demands that can be met during installation on customer premises.

10 .7 Controlling the times entered

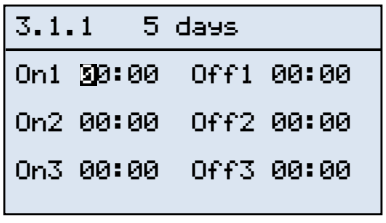
MAESTRO xs operates checks on the startup and shutdown times entered. When we enter a start-up time it is automatically set as the shutdown time, which prevents us entering shutdown times earlier than start-up times.

Suppose we wish to carry out the following programming:

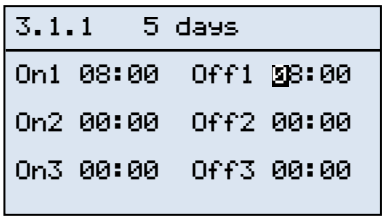


Band 1 Start-up 08:00 >>>>> Shut down at 17:30

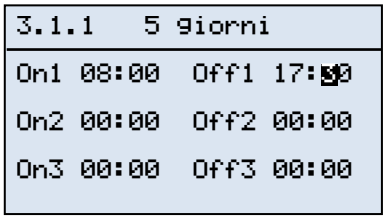
If we press the < ↵ > key the cursor moves to On1 of the N° 1 time band.



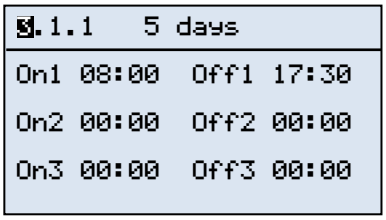
We use the <🡹> <🡻> keys to modify the value of the “start” hour, and then press the < ↵ > key to select the “start” minutes.



We will see that when we confirm the “start” hour the value of the “stop” hour is automatically updated to the same value as the “start” hour. The same thing happens with the minutes.



We now increase the value of hours and minutes until we reach the desired stop time.



now press the < ↵ > key to return the cursor to its original position and press the <Esc> key until you return to the [Monitor] menu.

Warning: The presence of this check does not mean the operator does not need to take care over the coherence of the times entered.

Chapter 11

THE HOUR COUNTERS

MAESTRO xs has a series of hour counters that not only determine the hours of operation but also handle the maintenance intervals for materials consumed by the compressor.

To this end there are two types of hour counters:

- operating hour counters
- maintenance hour counters

The former serve to inform the user on the working hours of the compressor, while the latter inform the user when a preset operating period has passed and maintenance is required.

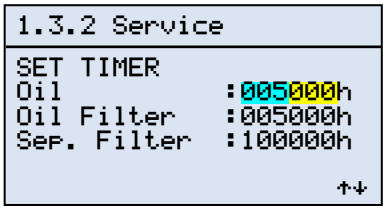


Fig. 33

Before describing the hour counters we must explain that every hour counter is divided into two parts, as shown in the figure on the left, which permits quicker and easier modification when configuring the counter.

In the first part of the hour counter are, reading from right to left, the following items:

- thousands of hours.
- tens of thousands of hours.
- hundreds of thousands of hours.

In the second part, still reading from right to left, are the following:

- hours.
- tens of hours.
- hundreds of hours.

Below are indications for using the various maintenance hour counters.

11 .1 Operating hour counters

MAESTRO xs provides the user with three kinds of hour counters with different operating modes.
Unlike the maintenance counters, these cannot be modified by the user.
The compressor operating hour counters displayed are:

- Enabled hours counter
- Running hours counter
- Loaded hours counter

11.1.1 Enabled hours counter

The “enabled” hours counter shows for how many hours the compressor has been enabled, that is available for operation. This counter also takes account of periods when the compressor is not switched on because it is in a stopped phase of the working cycle.
Remember that the yellow light on the “**On**” key shows that the compressor is enabled.

11.1.2 Running hours counter

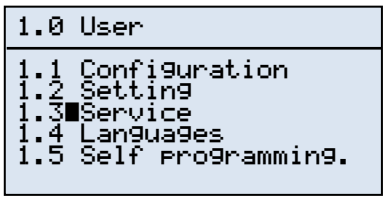
The “Running” hour counter shows for how many hours the compressor has been running, and the maintenance hour counters are linked to this counter.

11.1.3 Loaded hours counter

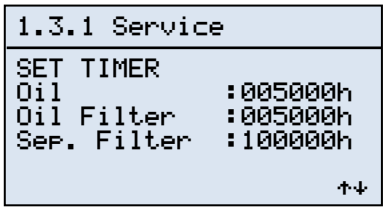
The “Loaded” hours counter shows for how many hours the compressor has been running loaded.

11 .2 Programmed Maintenance Intervals

The maintenance hour counter advises the user that maintenance must be carried out on components of the compressor subject to wear, to ensure correct functioning.

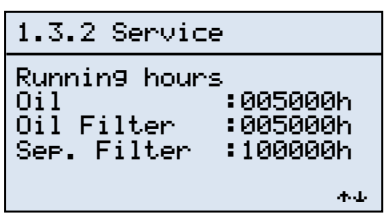


Go to the [**User**] menu and with the cursor select the [**Service**] submenu to access the page where maintenance intervals are set.



The first screen displayed is the one where we can decide on the maintenance intervals for the main elements that need replacing, which are:

- compressor oil
- oil filter
- air/oil separator filter



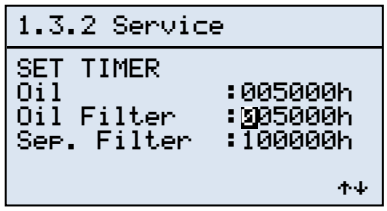
the second screen displays the hours accumulated by the various hour counters so that maintenance on the compressor can be programmed.

When one of the timers reaches the number of hours set for maintenance, a warning is displayed on the screen that maintenance should be carried out on an element (e.g. oil substitution).
This warning, as we will see below, can only be removed using a password which, if correctly entered, not only removes the warming signal but also resets the hour counter for a new count.

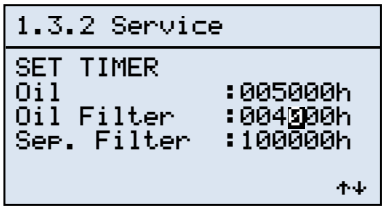
11.2.1 Timer Modification

By entering the [**1.3.1 Service**] menu we can set the maintenance interval that interests us, but always refer to indications from Mattei.
When we access the display we see that the cursor is flashing in the top left hand corner of the screen. If we press the < ↵ > key we can move it to the first field of the"oil" timer, while if we continue to press the < ↵ > key the cursor moves to the second part of the timer; further pressure on the key moves the cursor to the first field of these second timer, "oil filter", and so on.
To modify the value of a timer, once we have moved the cursor to the part of the timer we wish to modify, press the keys to decrease or increase the existing value.

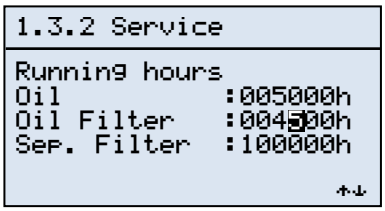
For example, if we want to modify the value of the "oil filter" timer from 5000 hours to 4500 hours, we must first access the [1.3.1 Service] menu.



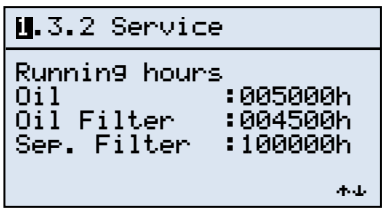
Then we press the < ↵ > key three times until we see the flashing cursor on the first part of the timer (see figure on the left), then we press the <🡻> key until we see 4 in the thousands field.



Once we have entered the desired value we press the <↵ > key to move the cursor to the second part of the timer, then press the <🡹> key until 500 is displayed.



At this point press the < ↵ > key until the cursor returns to its original position.



We can now exit the menu by pressing the <Esc> key or press the <🡻> key to access the [**1.3.2 Service**] menu where the hours accumulated by the counters are displayed.

11 .3 Maintenance warnings

When one of the hour counters reaches the number of hours set it gives the user a visual warning to carry out the maintenance of the counter (eg Oil). an icon is displayed on the screen and next to it an explanation of the type of warning, while at the same time the reset key lights up red to give further warning of an anomalous condition. However, the compressor is not shut down and the user is simply warned of the need for maintenance.

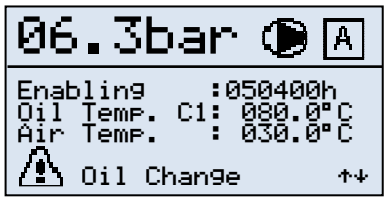


Fig. 25

To remove the maintenance warming we must enter a password (see password management) to prevent it being incorrectly cancelled.

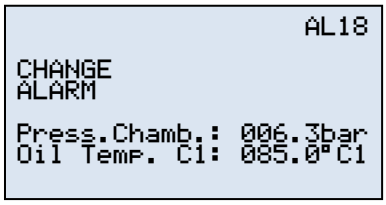


Fig. 35

If we press the <Reset> key the page identifying the event that has occurred is displayed, so the user is advised that, as in this example, he must replace the compressor oil.
if we press the <Reset> key again, a page is displayed that asks for the password to cancel the fault and automatically reset the OIL hour counter.
Only by entering this password can we remove the warning, otherwise it will be repeated until the password is entered.

11 .4 Early maintenance

It is however possible to reset the maintenance counters ahead of time and singly. However, this means the maintenance must be carried out, since otherwise Mattei will assume no responsibility for any malfunction.
To reset a service hour counter ahead of time we must go to the [**1.3.2 Service**] submenu and press the < ↵ > key until the page requesting the password is displayed, enter the service password, use the <🡅> or <🡇> keys to a select the hour counter we wish to reset and press < ↵ >.
To reset another maintenance hour counter repeat the operation described above.
This operation must be carried out exclusively by trained personnel and in any case after the component has effectively been replaced.

CONTROL OF THE SYSTEM

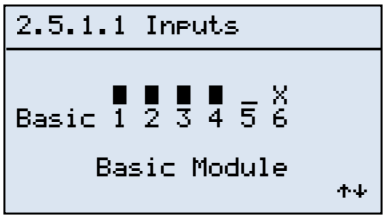
Chapter 12

MAESTRO xs has a diagnostics system for the apparatus connected to it, thus allowing any faults in the various devices that manage and control the compressor to be pinpointed.
All of this can be done from the [Advanced\Debug] menu, where we can carry out the following operations:

- verify the state of digital inputs.
- verify the state of devices controlled by Maestro.
- calibrate the pressure probes.
- calibrate the temperature probes.

12 .1 Verifying digital inputs

This part of the program allows service personnel to verify the state of digital inputs on the compressor, and from here we can establish if a malfunction is due to an external device.
Since MAESTRO xs has two expansions in addition to the base module, there are two pages showing the state of these inputs.
remember that in the following displays a closed contract will be represented by the symbol " ■ " while an open contactor will be represented by the symbol " – ".
The " X " symbol is valid only for the input dedicated to remote start up and shows that the input is disabled.

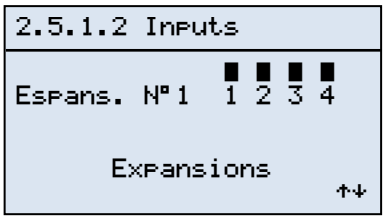


If we enter the submenu [Advanced\Debug\Inputs] the page to the left will be displayed. It shows the state of the digital inputs of the base module of MAESTRO xs.

The meaning of the inputs is as follows:

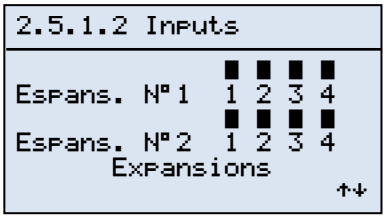
Input	Description
1	emergency stop
2	low oil level
3	motor overload
4	inverter fault
5	manostat startup
6	remote enabling

Warning: input N° 6 must first be enabled.



If the first expansion of the system is enabled, the screen on the left is displayed. It indicates the logical state of:

Input	Description
1	cooling blocked
2	oil filter clogged
3	air filter clogged
4	plant in excess pressure



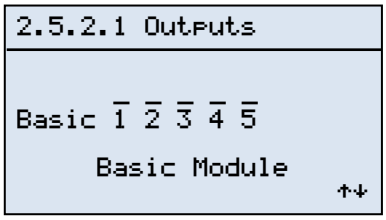
If the second expansion of the system is enabled, the screen on the left is displayed. It indicates the logical state of:

Input	Description
1	pump command input
2	digital input N°1
3	digital input N°2
4	digital input N°3

Remember that page ***2.5.1.2*** will only be displayed if at least one of the expansions has been enabled; otherwise it will not be visible.

12 .2 Verifying digital outputs

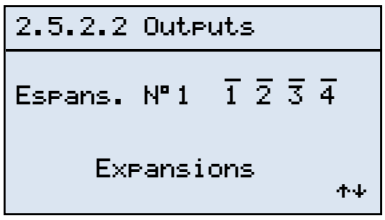
This part of the program allows service personnel to verify the correct functioning of the various devices connected to the digital output of MAESTRO xs (contactors, electrovalves, etc), and also the correct operation of the various command relays of MAESTRO xs.
Remember that in the screams shown below an enabled outlet is represented by the symbol " ■ " and a disabled outlet by the symbol " – ".



When we enter the [Advanced\Debug\Outputs] submenu overpaid shown on the left is displayed. It allows us to "force" the individual digital outputs of the base module of MAESTRO xs.

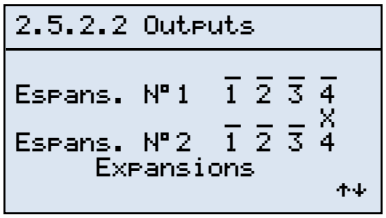
The meaning of the outputs is as follows:

Output	Description
1	Line / Inverter command contactor
2	Triangle contactor
3	Star contactor
4	Vacuum electrovalve
5	BLOCK report



When we enable the first expansion of the system the page on the left will be displayed; it shows the logical state of:

Output	Description
1	Remote “Enabling” report
2	Remote “Running” report
3	Remote “Load” report
4	Dryer command

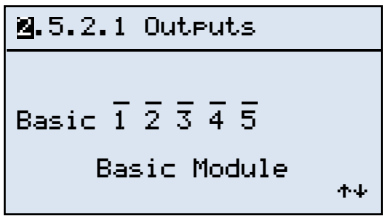


When we enable the first expansion of the system the page on the left will be displayed; it shows the logical state of:

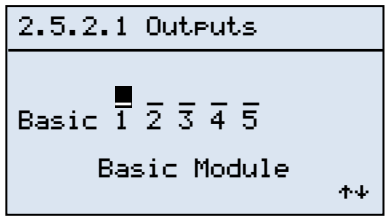
Output	Description
1	Oil fan command
2	Air fan command
3	Pump command
4	Not used

Remember that page ***2.5.2.2*** will be displayed only if at least one of the expansions has been enabled, and not otherwise.

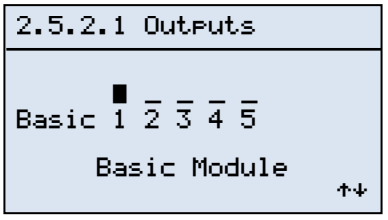
To enable the digital outputs go to the [Advanced\Debug\Outputs] menu and proceed as follows:



once you are in the output enabling menu press the < ↵ > key to test the outputs on the base module, or the <🡻> key to go to the expansions page.

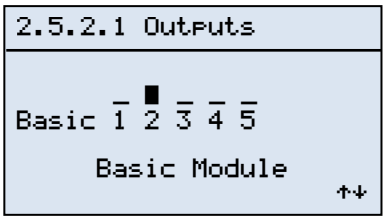


Pressing the < ↵ > key takes the cursor to output N°1, and then pressing the <🡹> key activates the output.



We will see that on the display the icon of the activated output changes and we will hear the line contactor close.

to deactivate the output, press the <🡻> key; press the < ↵ > key to move the cursor to the next output.



it is possible to activate one specific output by pressing the < ↵ > key until you reach the desired output and then pressing the <↑> key to activate it.

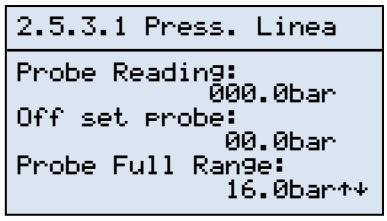
Warning: For safety there is a delay between the enabling of one output and the next to avoid two outputs being activated simultaneously.

12 .3 Configuring pressure probes

MAESTRO xs reads line and chamber pressure through two pressure probes mounted on the machine. These not only gives the working pressure but allow the compressor to be managed.
In particular:

- ✓ ***Line probe:*** This manages to pressure render system, loading or shutting down the compressor on the basis of the calibration carried out in the [User\Settings] menu and comparing pressure with that in the chamber to check whether the separate filter is clogged.
- ✓ ***Chamber probe:*** This checks the pressure in the chamber during start up, preventing start-up if the pressure is higher than the set value (see [Advanced\Thresholds] menu). At the same time it checks that the pressure rises, thus showing that the compressor is effectively working.

For this reason it is necessary to set these probes correctly.
Below is an example of line probe calibration, but it is valid also for the chamber probe.



By entering the [Advanced\Debug\Pessure Probes] submenu we can configure the pressure probes on the machine. The display is divided into two pages (one per probe) structured as shown on the left.

Remember that the output of the probes used must be in 4÷20 mA current with a range of 0÷16 bar.

Fig. 36

Page 2.5.3.1 shows the data of the line pressure probe, and we can note:

- ❖ **Probe reading:** the pressure value read by the probe. This value must be 0 bar when there is no pressure, or the reading must be corrected.
- ❖ **Probe offset:** on this allows the reading of the probe to be corrected, bringing it to 0 bar. Remember that this operation must be carried out in the absence of pressure in the line.
- ❖ **Probe at limit:** this is the maximum value of the measurement range of the probe and should be modified only if the probe used has a range different from the Mattei standard.

Warning: If one of these data is not correctly set, readings could be inaccurate and cause compressor malfunction. So be very careful when modifying these parameters. If the connecting cables are inverted, there will be a reading of **– 4 bar**.

12 .4 Configuring temperature probes

MAESTRO xs reads temperatures on the compressor through NTC type probes installed in sensitive parts of the compressor. These probes too, like the pressure probes, do various jobs apart from showing temperatures.
The temperatures measured are:

- ✓ **C1 Oil temperature:** this is the temperature of the oil in the main compressor. This temperature, apart from giving a warning and if needed blocking the compressor if the temperature becomes too high, manages the speed of the cooling fans where two-speed fans are installed.
- ✓ **C2 Oil temperature:** this is the temperature of the oil in the secondary compressor, when installed (see Maxima 110 – 160 and 8000 series). This too reports the temperature and stops the compressor. This temperature can be displayed in the [Monitor] menu only if the related probe has been enabled.
- ✓ **Air temperature:** this is the temperature of the air leaving the compressor, and if it is too high causes the compressor to be blocked.
- ✓ **Dewpoint temperature:** this is the dewpoint temperature of the compressor where a dryer has been installed. this reading too will be displayed in the [Monitor] menu only if the dryer has been enabled.

- ✓ **C1 bush temperature:** this is the temperature of the bush of the primary compressor and can stop the compressor. This probe needs to be enabled to be used.
- ✓ **C2 bush temperature:** this is the temperature of the bush of the secondary compressor and can stop the compressor. This probe needs to be enabled to be used.

The menu pages dedicated to calibration permit reading and correction of the two probes at a time to speed up calibration operations.

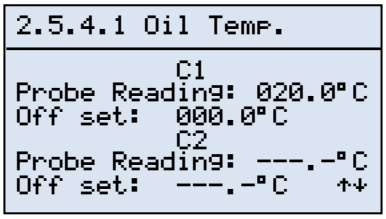


Fig. 37

The pages show the following information for each probe:

Probe reading: as with the pressure probes, this shows the current temperature value and cannot be modified.
Probe offset: this allows the reading to be modified.

Note that for non-enabled probes, readings and not hidden but replaced by dashes, showing that the probe is not enabled (see figure 37).

Important: if American units of measurement are set, these configuration menus will still will use bars for pressure and degrees centigrade for temperatures.

THE DRYER

Chapter 13

13 .1 Connecting a dryer to the compressor

MAESTRO xs can manage an air dryer mounted on the compressor.
All connections necessary for fitting this unit are supplied. Refer to the electrical diagrams of the model in question.

The electrical components of the dryer:

- a refrigerating compressor.
- one or more cooling fans.
- one or more condensation discharge electrovalves.
- a probe for measuring dewpoint temperature.

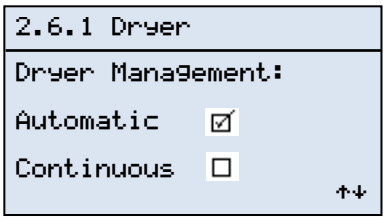
The dryer is activated when the compressor is first started up and remains active until one of the following conditions occur:

- the compressor is shot down with the “STOP” button or similar command (clock, remote shutdown).
- the dewpoint temperature falls below 0°C.
- the compressor runs unloaded.

The dryer is protected by MAESTRO xs through the shutdown of the compressor or of the refrigerating unit according to the setting chosen.

We can decide whether the compressor is shut down or not when there is a fault on the dryer: the unit is able to shut down the refrigerating unit if the temperature falls below 0°C and give only an alarm signal without causing the compressor to be shut down.

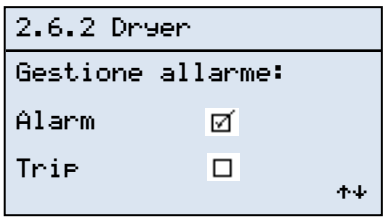
Below is an example of programming of the software that manages the dryer.



The first thing we must decide is whether we want the compressor to operate automatically or continuously, where:

Automatic: The dryer unit is stopped when the compressor is shut down; this is recommended if the compressor spends long periods in Stand-by.

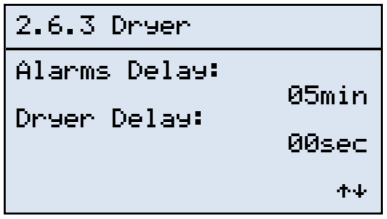
Continuous: The dryer unit operates continuously until the compressor is disabled. This means that if the compressor goes into standby, the drying unit will continue to operate. This mode is recommended for compressors that run unloaded for long periods.



As mentioned earlier, we must select how the compressor will behave if the dryer does not function correctly.

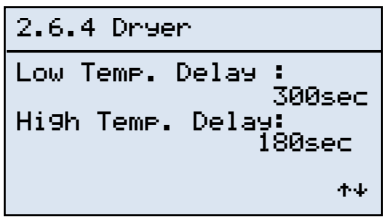
Alarm: the compressor is not shut down

Block: the compressor is shut down

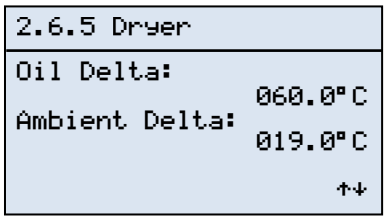


We can delay the start up of the dryer with respect to that of the compressor, which is useful when avoiding peaks of current is important; the drying unit does have a minimal current peak when starting up.

We can also decide with what delay MAESTRO xs should start considering the dewpoint temperature, to avoid pointless warnings when the compressor has just been started up and the dewpoint temperature will certainly be high.



We can decide with what delay we want to be warned when the temperature moves outside the working range, becoming too high or too low. Remember that after this delay the controller will shut down the compressor or simply report a fault, depending on the mode selected earlier (see page 2.6.2 Dryer).



Avoid modifying these values; they set the value at which the highly dewpoint temperature alarm will be given.

Modifying these parameters requires perfect knowledge of the workings of the integrated dryer.

Warning: remember that the menu for managing the dryer must first be enabled in the enabling menu.

Operation

When we enable the compressor the dryer unit is also activated with a preset delay.
The alarms are entered with a modifiable delay to give the dryer time to bring the dewpoint temperature into the operating range of (Dp < 6°C).
When this delay has elapsed the alarms become active and start monitoring the dewpoint temperature. If we have selected the “alarm” mode so as not to stop the compressor, so long as the temperature is between 0 e 6° C there will be no report, otherwise the following fault signals will be given:

If Dp > 6°C >>>> “High Dew Point”

If Dp < 0°C >>>> “Ice Alarm”

The first report will not trigger any attempt to correct the situation by MAESTRO xs, but after the second report, once the delay time has passed, the dryer unit will be stopped so as to allow the dew point temperature to return to the operating range.
The dryer unit will be reactivated when the temperature reaches Dp > 0°C.

Warning: The fault is reported immediately, but the dryer unit or the compressor will be shut down after the preset delay.

While the value for the “ice alarm” report is fixed at 0°C, the value for the “high dew point” alarm is variable and linked to environmental temperature. If environment temperature is high, the critical point becomes higher: Dp > 6°C.

Environmental temperature is calculated by MAESTRO xs using the following formula:

Ta = To - Tdiff

Where:

Ta is environmental temperature.
To is the oil temperature read by the C1 oil probe.
Tdiff is the value of the “oil differential” parameter entered on page (2.6.5 Dryer).

The “high dew point” alarm is fixed at 6°C so long as environmental temperature is below 25°C.
if environmental temperature is higher than 25°C, the alarm temperature will be higher than 6°C.

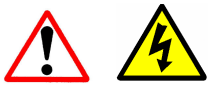
Ti = Ta - Tda

Where:

Ti is the alarm temperature.
Ta is the environmental temperature.
Tda is the value of the “environment differential” parameter entered on page (2.6.5 Dryer).

If dewpoint temperature remains in this range there will be no temperature warnings, and even if these are generated, they will be automatically reset when temperature returns within the operating range.

Warning: In configuring the dryer pay attention to the kind of operating conditions. for example, if the machine operates frequently changing the operating state from loaded to unloaded and vice versa, we recommend selecting the “continuous” mode (see menu 2.6.1) for the dryer to avoid it being continually switched on.



Warning: the dryer is powered from the electrical power model of the compressor; during maintenance cut the power supply to the compressor.

Chapter 14

THE INVERTER

Using an inverter on the compressor allows the amount of air produced to be varied on the basis of the requirements of the air line on which it is installed. We have already illustrated the operational modes of the compressor with this device, and we will now describe how to configure the various submenus that handle its operation.

14 .1 General

MAESTRO xs manages the rotation speed of the compressor through a signal in 0÷10 Vdc current that varies on the basis of the line pressure to be maintained and the preselected operating mode.
To do this, MAESTRO xs must be suitably configured.
The basic datum is the maximum rotation speed with which the inverter has been configured. The maximum command current (10 Vdc) will be associated with the maximum speed the inverter can reach:

Eg. 60Hz >>> 1800 rpm = 10 Vdc

Maestro will thus automatically subdivided the operating range of the compressor associating the following values:

0 Vdc >>>>> **0** rpm
10 Vdc >>>>> **1800** rpm

However, this speed is reached only by compressors with Pmax values of < 7.5 bar, to avoid overloading the main electric motor.
MAESTRO xs autonomously calculates the limit speed that the compressor may reach during operation.
As already mentioned, this limit speed is closely linked to the value for “Maximum Pressure” entered in the system and is calculated using the formula:

$$\textbf{V limit} = 1500 + \frac{(Pn - Pmax)}{3} * (Vmax - 1500)$$

Where :

Pn = Nominal pressure (Default 10bar).
Pmax = Maximum pressure

This allows the system never to exceed the installed electrical power whatever the value of the operating pressure of the compressor.

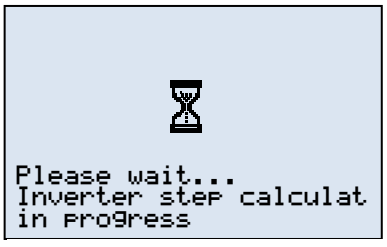
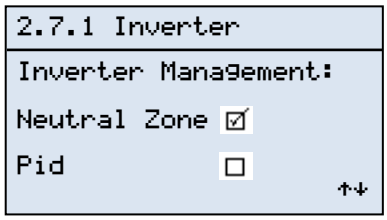


Fig. 38

When we modify the value of “Maximum pressure” the screen in figure 38 will be displayed. This shows that the limit speed of the system is being recalculated.

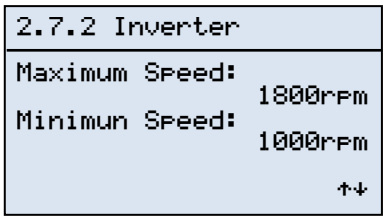
14 .2 Programming

We will now give an example of the programming of the MAESTRO xs unit, describing the various functions and any counterindications that may lead to malfunctioning of the compressor during its operation in the plant where it has been installed.



The first thing we must decide is in which mode we want the compressor to operate.

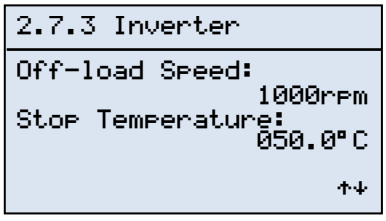
the description of the two operating modes has already been illustrated in the “OPTIMA mode” chapter.



The next step is to set the reference speed of the system, which is usually set by Mattei in the factory

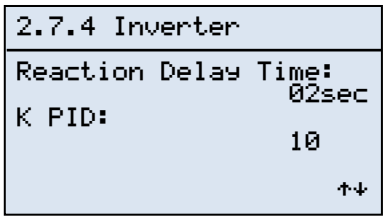
As we said above, the value of “maximum speed” must correspond to that entered in the inverter.

However, the value of “minimum speed” is not linked to the programming of the inverter, but determines the minimum speed the compressor will have during operation. this value may be different from one compressor to another depending on the Mattei settings.



The third page of the menu allows us to set the speed while the compressor operates in the unloaded condition, that is when it is not producing pressure. This speed may be different from, but never less than the “minimum speed”.

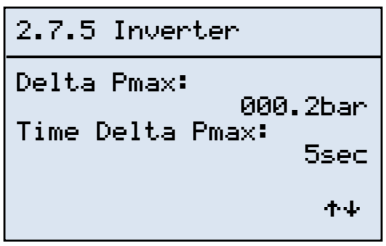
To avoid condensation caused by operation for brief periods, we can set a minimum oil temperature which prevents shutdown even of the compressor is operating unloaded for a period of time greater than the “TMV”.



This is the most critical page of the entire inverter programming menu. These parameters are defined by Mattei, but can be modified by service personnel during testing on customer premises.

The first parameter is the delay between the decision and the effective modification of the speed.

The second, valid only in PID mode, determines the response curve of the system to the variations in the “Objective” pressure. The lower this value the faster the system response, but we must be careful because a low value may lead to unstable operation.



MAESTRO xs has an integrated pressure control that avoids the system going into excess pressure.

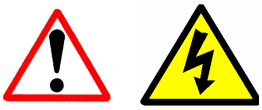
It may happen that, because of tanks that are not sufficiently large with respect to the output of the compressor, that line pressure exceeds the “maximum pressure” value because the compressor is still decelerating.

To avoid line pressure reaching values that are excessive for the plant, we will enter a “delta” referred to the value of “maximum pressure” that determines the real maximum value of line pressure, and we must also decide for how many seconds the pressure may remain at this value.

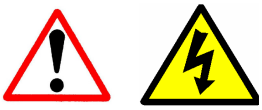
Once this time has passed, if the pressure is still high the compressor is immediately unloaded, even if it was in the speed modulation phase.

14 .3 Use

For correct programming and installation of a compressor fitted with an inverter: we must know the true output values in question; the compressor must be installed in a suitable and well-ventilated place; under must be adequate electrical protection (this is true for all machines).
A suitable sized compressor operates in an optimal way at between 40 and 70% of available speed, and rarely reaches the unloaded condition.
If a compressor fitted with an inverter operates most of the time at high speed, this means it is too small, while a compressor that operates mostly at low speed or unloaded is too big with respect to network demands.
Another important factor is the value of the current: the compressor operates correctly if the current remains within 400 Vac +/- 10%, otherwise there could be problems of overload on the electric motor.



Warning: Do NOT carry out any operations on the inverter or the electric motor when they are under power and wait least five minutes after the power supply has been turned off.



Warning: Protect the compressor with magnet-thermal disconnecting switches in the **D** or **F** curves (recommended), or with type **AM** sectionable fuses.

NETWORK MODE

Chapter 15

15 .0 Network operating modes

This operating mode allows up to 10 compressors to be interconnected so as to create a “NETWORK”. This function allows energy savings by managing the compressors available on the basis of the actual usage of the air produced.

The system manages the compressors autonomously, using only the compressors actually needed to maintain the necessary line pressure.

The management modes available are:

- Sequence
- Cascade
- Equalisation

These operating modes allow the customer to adapt the functioning of the network to his working needs.
Remember that generally the “Cascade” mode is used when the network is made up of compressors with different air outputs, while the “Sequence” mode is recommended for networks of compressors of equal power.
If operating hours need to be balanced the recommended mode is “Equalisation”.

We will now describe the operating modes mentioned above, then explain how to create and configure a network by programming Maestro and MAESTRO xs; it is in fact possible to connect compressors using the earlier version of the controller so long as the “Master” is always MAESTRO xs.

MAESTRO xs can dialogue with its predecessor on condition that the master compressor is MAESTRO xs, as this is more recent and can control Maestro, but not vice versa.

15 .1 Cascade mode (LIFO – Last In First Out)

In the CASCADE mode the first compressor to start up is also the last to go unloaded and shut down. Let us suppose we must start up N compressors and set the line pressure value Pmax to 7.0 bar and the minimum value Pmin to 6.0 bar. The management programme will start up the “fill” compressor for a period of time defined by the “Filling Time” (TR) value. After this filling time has elapsed, compressor n°2 will be started up, and so on to the last compressor if necessary. When line pressure reaches the Pmax value compressor n°4 (the last) will be excluded. If the pressure continues to be ≥ Pmax n°3 will be excluded and so on until the pressure drops below the Pmax value.

Summing up, if pressure remains within the range bounded by Pmin and Pmax, there are no start-ups or shutdowns, while as soon as the pressure moves outside this range Maestro will bring it back within the limits by starting up or shutting down the compressors available.

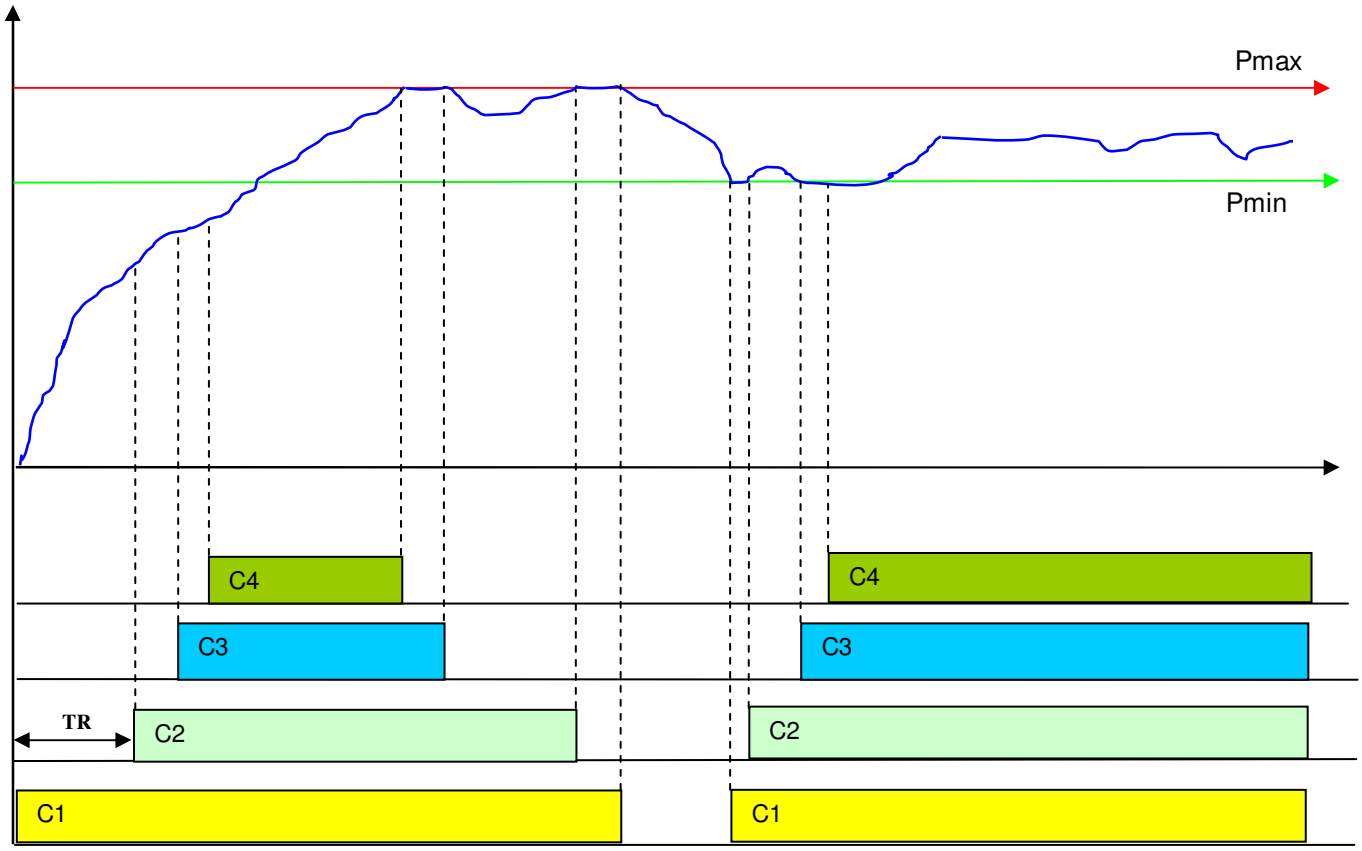
Startup order **1⇒2⇒3⇒4**
Shutdown order **1⇐2⇐3⇐4**

Only in this operating mode is it possible to select a compressor in the network for line filling.
Thus, supposing we have selected compressor n°3 for filling, when we enable the network compressor n°3 will start up first until filling time is over.
After this time (TR), if line pressure is ≥ di Pmin there will be no further start-ups, otherwise first compressor n°1 will be started up, then n°2 and finally n°4.

Startup order **3⇒1⇒2⇒4**
Shutdown order **1⇐2⇐3⇐4**

From this point on the startup and shutdown order will be the standard one:

Startup order **1⇒2⇒3⇒4**
Shutdown order **1⇐2⇐3⇐4**



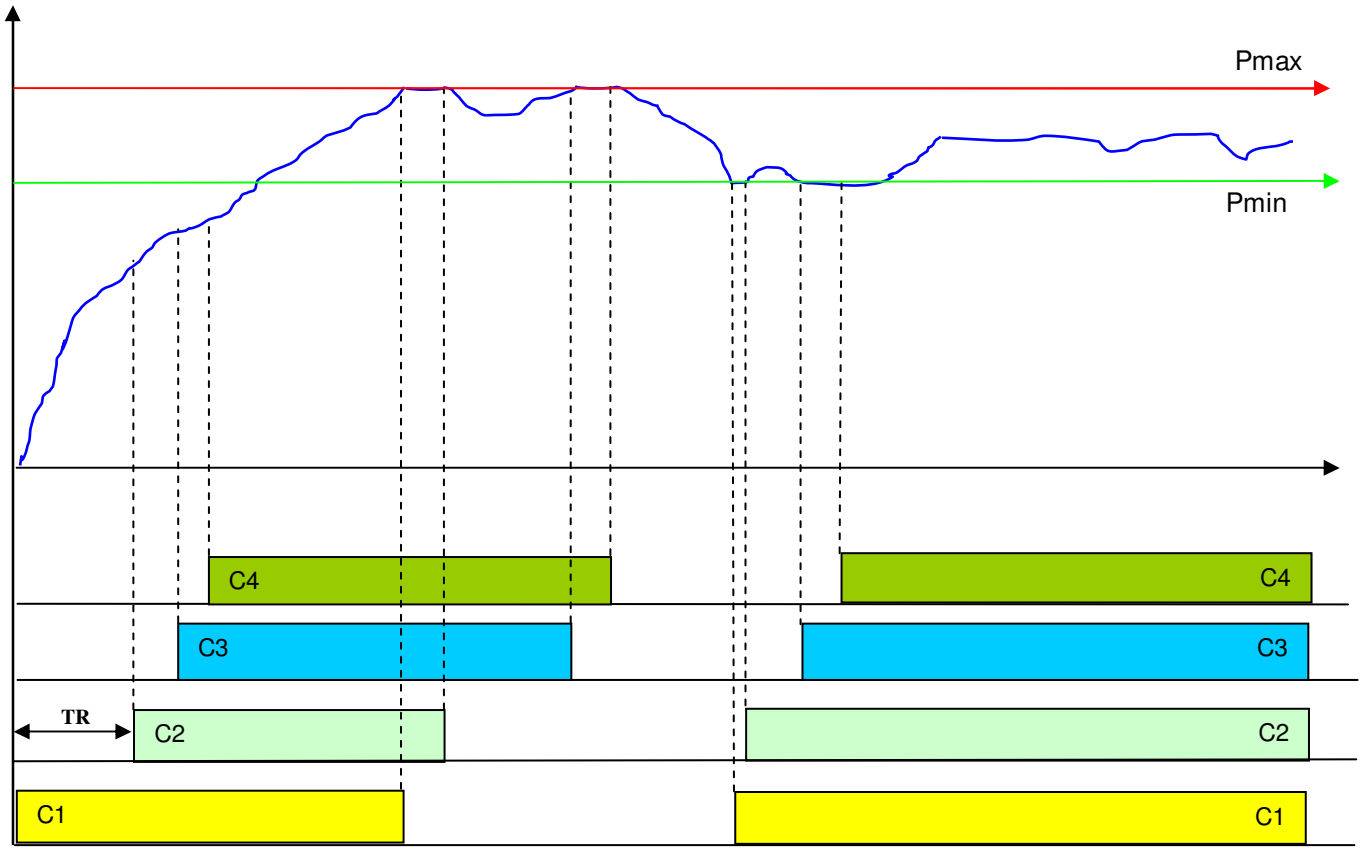
15 .2 Sequence mode (FIFO – First in First out)

In the **SEQUENCE** mode, the first compressor to be started up will also be the first to be unloaded, and when line pressure falls it will be the first to be reloaded; below is an indication of the startup and shutdown cycles.

Startup sequence **1⇒2⇒3⇒4**

Shutdown sequence **1⇒2⇒3⇒4**

This startup/shutdown sequence can be varied by moving the base compressor one unit. This move can be subordinated to certain conditions, which are explained in detail below in paragraph 15.5.
During operation, if the line requests more air than is being supplied by the system (need to start up another compressor), the “Master” unit will check if there is an unloaded compressor running in the network and if so will reload it. If there is more than one compressor running unloaded, the last one to unload will be reloaded, and so on.
This avoids starting up a stopped compressor, with notable energy savings.



15 .3 Equalisation mode

In the **OPERATING HOURS EQUALISATION** mode, MAESTRO xs automatically equalises the working hours of the various compressors in the network.
This means that the compressors with fewest loaded working hours will be activated.
Once an equal number of working hours have been reached, select the SEQUENCE operating mode for the network. In this mode too, similarly to the SEQUENCE MODE, if there is more than one compressor running unloaded when pressure drops, the last compressor to go unloaded will be reloaded.

15 .4 Configuring the network

To create a network, simply connect the compressors using a simple multi-pole screened cable (see electrical connections). No optional supplementary serial boards need be added.

If the compressors are more than 100 m apart we recommend using RS 485 BUS connecting cables as there could be disturbance along the cables causing interference with correct network operation.

The terminals must then be assigned addresses and finally the compressors in the network identified.

Below we describe the connection of the electric compressor control apparatus supplied with MAESTRO xs.

15 .4.1 Electrical connections

For electrical connection between the compressors a **screened 3 x 1 mm^2** (minimum) cable must be used, and we recommend placing the compressors close together even if the distance covered by the serial communication is more than a kilometre.

Mattei provides its machines with a dedicated terminal board for making these connections between compressors, making the operation easier. All that needs to be done is to use one of the accessories with the cable to enter the electrical cabinet and connect to this terminal board.

In the figure below is an example of the connection of 3 compressors with MAESTRO xs. If you wish to connect compressors using the earlier version, Maestro, just be careful with the numbering of the terminal board as this is different from that on compressors using the xs version.

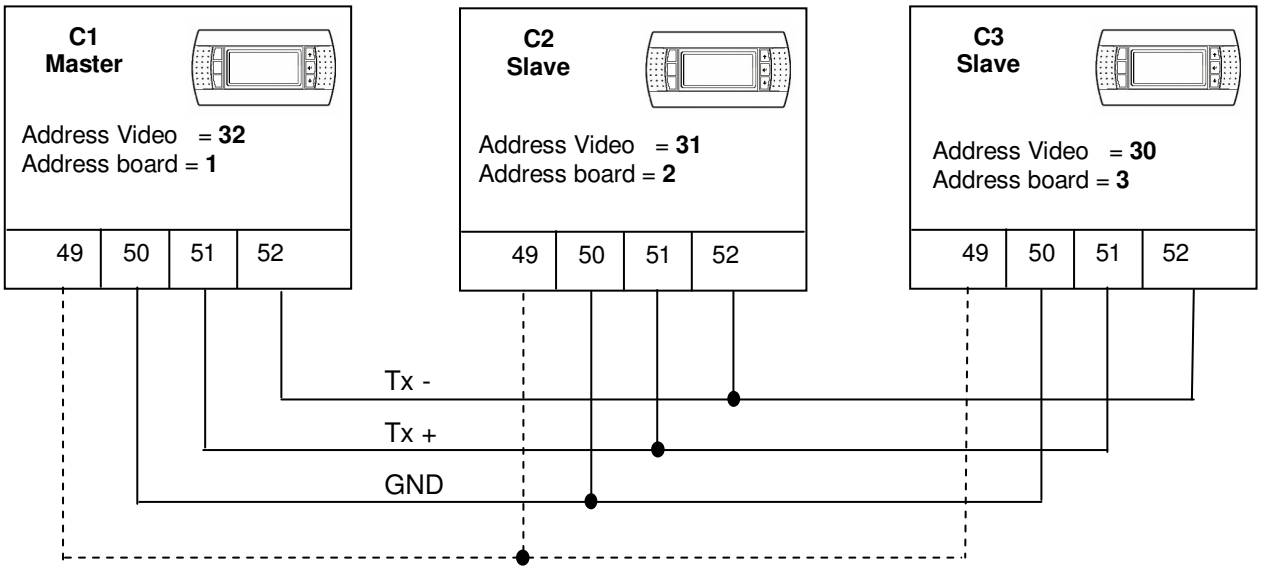


Fig. 39

Each unit has a communication port connected to the terminal board of the electrical equipment of the compressor. Each port has four terminals that carry the following signals:

- Cable screen
- GND signal
- Tx + signal
- Tx – signal

In making the connections follow the connections shown in figure 46.

Warning: Before making the electrical connections between compressors it is **OBLIGATORY** to assign addresses to the terminals. This is to avoid communication conflicts leading to malfunctioning during configuration.

Warning: If terminal software has to be updated it is **OBLIGATORY** to cut the power supply. It is not necessary to remove the cables from the terminal board, but simply to remove the J6 connector from MAESTRO xs.

15 .4.2 Assigning addresses to MAESTRO xs

The compressors dialogue via a “network”. This usually consists of a “Master” compressor and n “Slave” compressors. The Master compressor needs to know the address of each slave compressor so as to communicate with them and not create command or monitoring confusion.

If addresses were not assigned to them, the compressors would not respond to the commands of the Master, since information would circulate in a chaotic way.

Note

These addresses must not be confused with those relating to supervision since those have different functions from those described in this chapter.

To assign an address to MAESTRO xs we must first clarify certain concepts:

- ✓ MAESTRO xs is composed of two parts, each of which has its own logical address.
- ✓ Two identical addresses cannot exist in a network.

The first operation is to verify the logical address of the base module. To do this follow the procedure below:

Power up the unit by pressing simultaneously the <↓> <↑> <↵> keys for 5” until the display below appears.

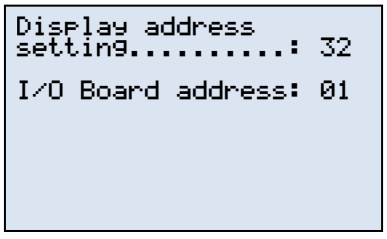


Fig. 26

This shows the current state of address programming, which is usually:

- Base Module **Address = 1**
- Video Module **Address = 32**

15 .4.3 Modifying the address of the base module

To modify the address of the base module we must press the < ↵ > key once. The cursor will move to the address (32) field. Use the <🡻> <🡹> keys to select the value (00) and confirm by again pressing the < ↵ > key. If the value selected is different from the one stored previously, the mask below will appear.

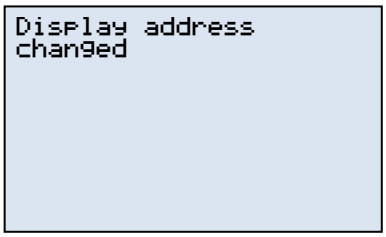


Fig. 41

Note

If the field is set to the 00 value, the terminal will communicate with the pCO board using the "point to point" (not pLAN) protocol, and the "I/O Board address: xx" field will disappear as it no longer has any meaning.

Now switch off the power supply and switch it on again; after 2 seconds press simultaneously the <Reset> and <🡹> keys. A "self testing" report will be displayed; release the keys and wait until the screen below is displayed.

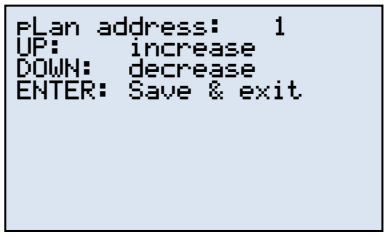


Fig. 42

Use the <🡻> <🡹> keys to modify the address as needed (see table 20) and then press the < ↵ > key to confirm the modification. The display will go blank.

Again simultaneously press the <🡻> <🡹> < ↵ > keys and set the configurations as shown on the screen below to assign the address to the board and video terminal (see table 20).

Fig. 43

To move between the variables use the < ↵ > key; the flashing cursor " ■ " will move over the first character of the variable to be modified.

Once the board and terminal addresses have been entered, press the < ↵ > key again and the screen below will be displayed.

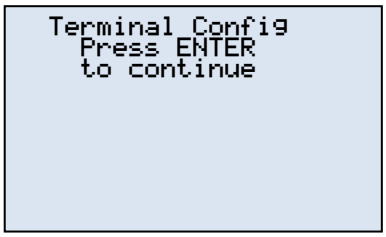


Fig. 44

This will thus give us access to the page where we can save the settings we have selected.

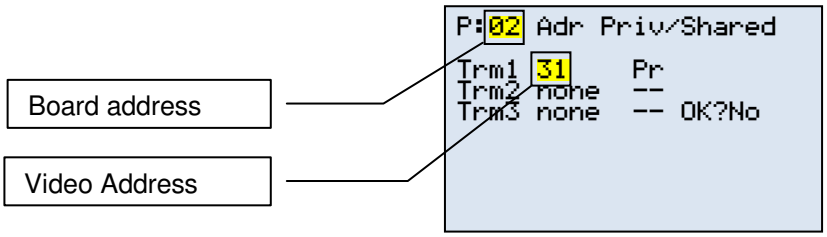


Fig. 45

We must check, and if necessary modify to made sure that the configuration display is as shown above, then bring the cursor to "OK?", select "Yes" and confirm with the < ↵ > key.

Below is a table listing the possible configurations of the addresses to assign to the units on the basis of the number of the compressor.

Compressor	Address Board	Address Video
C1	1	32
C2	2	31
C3	3	30
C4	4	29
C5	5	28
C6	6	27
C7	7	26
C8	8	25
C9	9	24
C10	10	23

Table 20

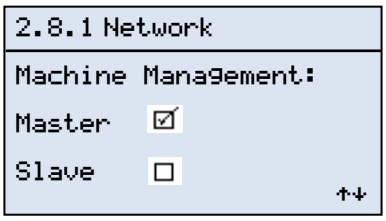
We then number the compressors according to our critera and assign the addresses on this basis (see figure 39).

15 .5 Configuring MAESTRO xs as “Master”

Once the terminals of the compressors forming the network have their addresses, we can programme Maestro xs and select the operating mode desired.
First we must decide which of the compressors to configure as “Master”. This compressor will manage the entire network, while the others will be the “Slaves” and be run by the Master compressor.
This means that all decisions on the operation of the network will be taken exclusively by the compressor configured as Master.

Programming is divided between two menus, one accessible only to service personnel and the other also to the end user.

The [2.8 Network] submenu can be accessed only be service personnel and is in the [Advanced] menu. Access to this submenu also requires the function to be enabled in the [Enabling] submenu, otherwise these menus will not be accessible.

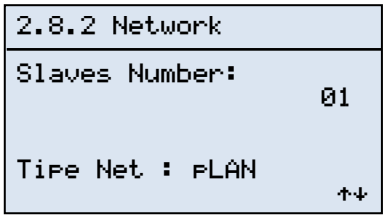


Once we enter the submenu we must first set whether the compressor must function as “Master” or as “Slave”.

This is indispensable for defining the operating mode of the compressor and must be done for all the compressors in the network.

Obviously only one compressor can be the “Master”.

If we have chosen to have the compressor operating as “Master”, other pages will be displayed to allow us to configure the entire set-up.
Otherwise the following pages will not be displayed, as all the data will be entered exclusively in the Master compressor.
Any weekly programming must also be entered exclusively in the Master compressor.



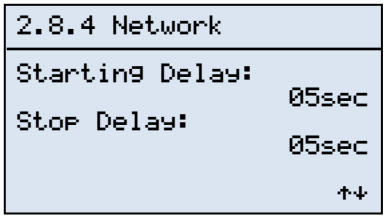
The “Master” compressor needs additional information to function. The first and most important piece of information is the number of slave units connected.

We will also be asked if the network created is pLAN or RS 485; this information too is indispensable for the correct functioning of the network.

Then a page is displayed where we must enter the type of controller installed on each compressor in the network.

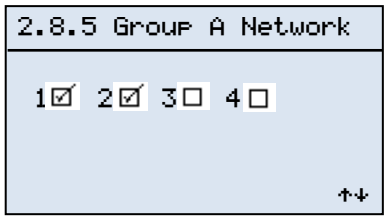
This information must be entered in particular when networks with different types of controllers are created.

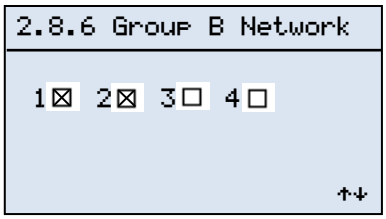
This configuration si superfluous if the network is made up solely of MAESTRO xs controllers.



We must now assign the waiting times between the calls to one compressor and the next one.

This avoids startup peaks, preventing the simultaneous startup of two or more compressors.





The final operations to carry out is to subdivide the compressors in the network into two operating groups. This is NOT obligatory, and must be carried out only for certain particular programming operations.

We access group A and define which of the compressors in the network will be part of it by using the <🡻> <🡹> < ↵ > keys.

If we do not feel it is necessary to subdivide the compressors into two groups, we must assign them all to “Group A”. Otherwise we first select the compressors for “Group A” and then select those for “Group B”.

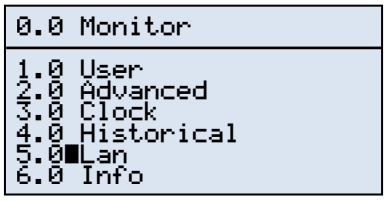
Logically, a compressor cannot be part of both groups, so those in Group A will be excluded by the indication ⊠

on the screen for assigning compressors to group B.

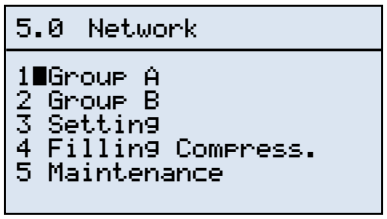
Maestro automatically avoids inadmissible or anomalous configurations, but we must still be careful when configuring these menu pages.

It is possible to avoid entering data on the volume of tanks and output of the compressors if you do not wish to use the output mode, but if you do these are fundamental.

The second menu, which can also be accessed by the user, allows the operating mode of the network to be managed on the basis of user needs.



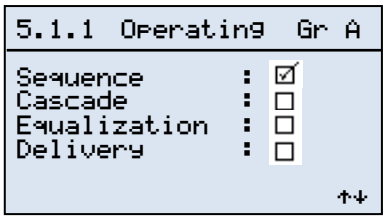
Select the [Network] menu in the main menu to access the configuration menu.
This menu too can only be accessed if the function has previously been enabled.



Will will enter a submenu that summarises the configuration of groups and the various activities linked to the operation of compressors linked in a network.

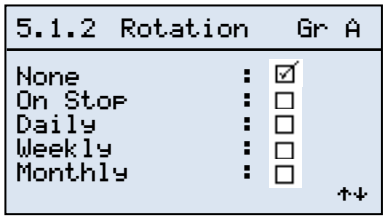
For simplicity in the descriptions below relating to the groups we will only consider the configuration of group A, but the operations are valid also for group B.

The groups created can function independently and with different priorities according to requirements. Usually this configuration is combined with weekly programming where different operating modes are required for different time segments.



For each group of compressors we will select the operating mode from those described above.

The default operating mode is “Sequence”, but we can modify it according to user needs.



For the “Sequence” mode only we can programme the rotation of the first compressor to be started up when the network is enabled.

This option allows us to use all the compressors in the network even if there are compressors that are not often used.

In particolar:

None = There will be no rotation of compressor operation, so the startup sequence will always be:

C1 ⇒ C2 ⇒ C3 ⇒ C4

On shutdown = Every time all the compressors in the network run unloaded the sequence is varied by moving the reloading sequence along by one compressor. So if the first startup sequence is:

C1 ⇒ C2 ⇒ C3 ⇒ C4

when all the compressors are running unloaded, the next loading sequence will be modified as follows:

C2 ⇒ C3 ⇒ C4 ⇒ C1

Daily = The sequence is varied each day by moving along the reloading sequence. So if the first startup sequence is:

C1 ⇒ C2 ⇒ C3 ⇒ C4

the following day the loading sequence will be modified as follows:

C2 ⇒ C3 ⇒ C4 ⇒ C1

Weekly = Once a week the sequence is modified by moving the reloading sequence along by one compressor. So if the first startup sequence is:

C1 ⇒ C2 ⇒ C3 ⇒ C4

the following week the sequence will be modified as follows:

C2 ⇒ C3 ⇒ C4 ⇒ C1

Monthly = Once a month the sequence is modified by moving the reloading sequence along by one compressor. So if the first startup sequence is:

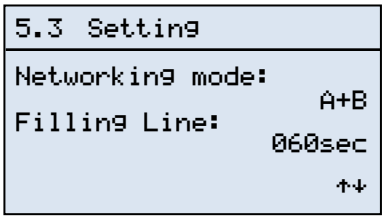
C1 ⇒ C2 ⇒ C3 ⇒ C4

the following month the sequence will be modified as follows:

C2 ⇒ C3 ⇒ C4 ⇒ C1

This variable thus allows us to rotate the starting compressor on the basis of our operational needs, permitting balanced usage of the compressors.

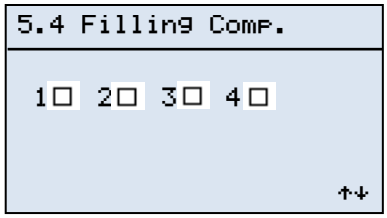
The following displays allow us to define the operating modes of the compressor network. These parameters will be common to both groups and define:



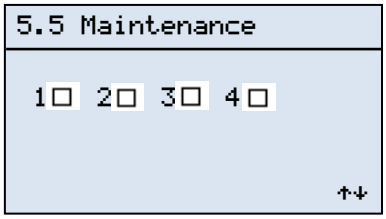
The operating sequence of the groups: we can define which group has usage precedence over the other. As we saw in the menu description chapter (Chapter 3.7) we can decide the sequence of intervention of the 2 groups.

If we decide to use hourly programming this sequence can be varied at will according to needs.

In line filling, we define the compressor that must fill the air line.



During this period only the chosen compressor will operate and the others will await startup.



The final page of the menu allows us to exclude one or more compressors from the network to enable maintenance.
This information is needed to avoid slowing down the network, since if the system knows that one or more compressors are missing MAESTRO xs will not try to start them up but will select directly the first compressor available.

Fig. 46

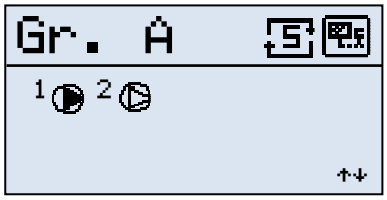
15 .6 MONITOR menu display

As mentioned in the chapter on menu description, when the “Network” mode is enabled additional information is displayed in the [Monitor] menu on the operation of the compressors.

If the compressor is enabled as “Master” the operating icon will be as shown on the left.

If the compressor is enabled as “Slave” the operating icon will be as shown on the left.

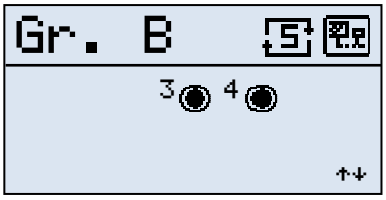
These displays allow us to check whether a compressor is being used as Master or Slave.
Only on the “Master” compressor is it possible to verify the state of the entire compressor network, and in particular the state of the individual compressors in it.
Before proceeding we must remember that the screens displayed are closely linked to the way the “Master” compressor has been configured.



In this display we can see the working mode of “Group A”.

It also shows us the operating state of the compressors in the group.

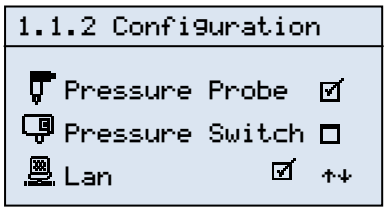
The icons used are identical to those displayed on the home page of the [Monitor] menu.



In this display, which will appear only if we have divided the compressors into two groups, we can see the working mode of “Group B”.

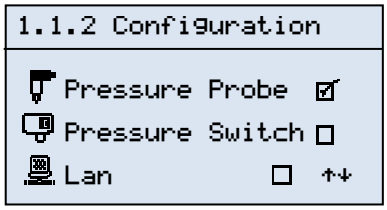
15.6.1 Other masks that change in the “Network” mode

Apart from the masks in the [Monitor] menu, there are also displays that are different from usual, in particular the configuration mask in the [User \ Configuration] menu.



If we enable the compressor to operate in “Network” mode the 1.1.1 configuration page will no longer be accessible, while page 1.1.2 will display a third icon as shown on the left.

This means that the network is active and operational; the page can be accessed by the customer, who can disable the compressor and return it to “Local” mode, excluding it from the network should the network develop a fault.



Excluding the compressor from the [User] menu allows it to be used until service personnel arrive, but does not exclude the settings in the [Advanced] menu, nor does it disable its operation until the problem is solved.

The above operating condition is displayed as shown on the left.

This possibility of excluding the compressor from network operation must only be used if the network is correctly connected but does not function.

15 .7 Adding an OPTIMA compressor

It is also possible to add to the network one or more compressors fitted with an inverter, but there are certain rules to follow for correct management of compressors with this device.
We will analyse each operating mode to explain these usage rules.

CASCADE mode

The compressor with the inverter must be inserted as compressor n°1. It will be started up first, and if network pressure is insufficient when it reaches maximum speed the first ON/OFF compressor available in the cascade will be started up. If pressure is still low the second will be started up, and so on. If pressure reaches the PMax value, the speed of the inverter starts dropping towards the minimum; if the pressure is still high an ON/OFF compressor will be shut down to accelerate the inverter again, and if the pressure is still high after this the inverter will slow down until network pressure is brought into the operating range.

Important warning: The compressor with **Micro C** (Optima 11) can only be used as the final compressor in the “Cascade” mode.

SEQUENCE mode

In this operating mode the “Master” compressor manages the various inverters (up to three) according to the following rules:

- Before starting up the next compressor it must have reached the maximum speed available.
- The same is true in deceleration: before being excluded the inverter must have reached its minimum speed.

Calls follow exactly the sequence mode, but before a compressor with an inverter is activated or deactivated, it must have reached its respective speed limits.

Adding more than one compressor to a network is not always worthwhile, since usually, as mentioned above, inverters are used to handle any peaks of production in the network.

Important warning: The compressor with **Micro C** (Optima 11) cannot be inserted in this mode.

EQUALISATION mode

In this operating mode the “Master” compressor manages the various inverters according to the following rules:

- Before starting up the next compressor it must have reached the maximum speed available.
- The same is true in deceleration: before being excluded the inverter must have reached its minimum speed.

Unlike the cascade mode, the call order will be the same as that described in the relevant section, and will follow a sequence based on accumulated working hours.

OUTPUT mode

The use of compressors with an inverter is not recommended in this mode.

15 .8 Handling network faults

During operation one or more compressors may develop faults that can cause them to be shut down.
The Master compressor will compensate for the faulty compressor by inserting another compressor in the network's operating cycle when necessary.
The faulty compressor will thus be automatically excluded until the fault is repaired and it is thus returned to its normal working condition.
To do this, once the fault is repaired the fault must be <Reset> so that the network knows the machine is available again.
If the Master compressor develops a fault, network operation is not stopped because MAESTRO xs continues to manage it. But another compressor will have to be configured as "Master" if the faulty compressor needs to be removed for maintenance in the workshop.

15 .8.1 Handling network faults

In the paragraph above we spoke of handling faults on the compressors comprising the network. Now we will look at faults in basic network communication. As described in the preceding paragraphs, the network is made up of N compressors connected together by means of a simple multi-pole cable and of address settings for the various units connected.
For various reasons, one of the connections may be broken, for example by a cable being cut or a unit without a correct address. If there is no communication for more than one minute, the system autonomously returns to the "Local" mode.
Imagine that in a network of five compressors, the cable connecting the second compressor to the third is cut. The serial communication needed for receiving instructions from the "Master" will be missing from the third to the fifth compressor.
These compressors will autonomously return to the "local automatic" operating mode, and operate according to the settings programmed on the individual compressor.
"Network" operation can only be restored after the fault has been repaired. If the compressors were restarted without the broken connection being repaired, after operating for one minute they would return again to "local automatic" mode.
In case of necessity a compressor can be excluded from the network and made provisionally available in automatic mode without the need to call service personnel.
The procedure for this is explained in paragraph 15.6.1.

Capitolo 16

REMOTE CONTROLS

MAESTRO xs allows certain functions concerning the management and state of the compressor to be handled remotely; in particular enabling and disabling, fault warnings etc.

16 .1 Remote enabling

Usually the compressor is enabled or disable using the <**On**/**Off**> key on the keyboard. However, it is possible to enable the compressor with a digital contact coming from elsewhere.

To do this we must:

1. Create a contact that:
   - If **Open** means the compressor is disabled.
   - If **Closed** means the compressor is enabled.
2. Enable the function in the [**Advanced**/**Enabling**] menu.

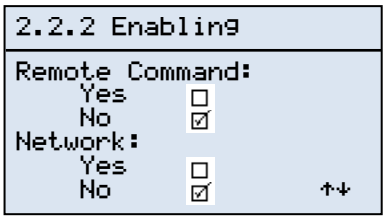


Fig. 47

To enable the use of remote enabling/disabling, we must select “Yes” in the [Remote command] function of the [**2.2.2 Enabling]** menu.
Now carry out the primary enabling, from the keyboard, by pressing the <On/Off> key.

Now the compressor can be enabled/disabled remotely. Remember that this command is given with a command current of supplied by the unit itself. This means the remote control can be no more than 200 m away, otherwise signal repeating devices will be needed (at the customer’s responsibility).

Figure 48 shows a simple connection diagram for the remote enabling command, where a switch is used to create the function.

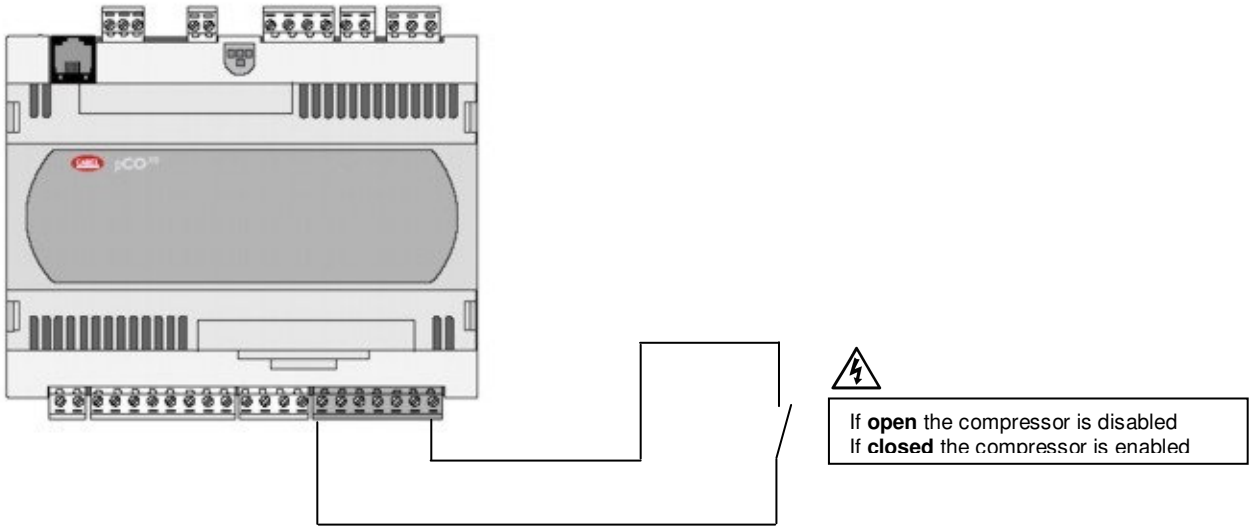


Fig. 48

This command can be effected without adding expansion modules: the command is part of the normal settings of the electrical apparatus where the unit is installed.

To enable the compressor remotely it must first be enabled from the keyboard on the unit: the remote control will only work once this has been done, otherwise closing the remote contact would have no effect on the compressor.

Remember that enabling the compressor does not mean starting it up. Startup is subordinated to the line pressure read by the probe on the compressor. If this pressure lies between “Maximum pressure” and “minimum pressure”, the compressor will NOT be started up but will go into STAND-BY.

16 .2 Remote reporting

It is sometimes necessary to “send out” certain information on the operation of the compressor. It is possible to display on a remote terminal the following machine state reports:

- Compressor blocked
- Compressor enabled
- Compressor running
- Compressor loaded

These reports are obtained through digital contacts with no current.
To make the system work properly the following parameters must be respected:

- Maximum current applicable **240 Vac 48 Vdc**
- Maximum load applicable **6 A** resistive

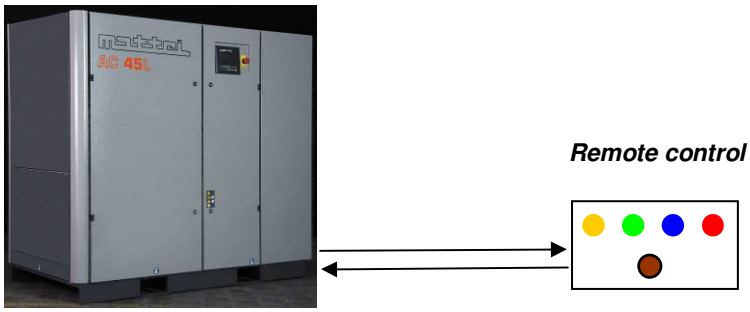


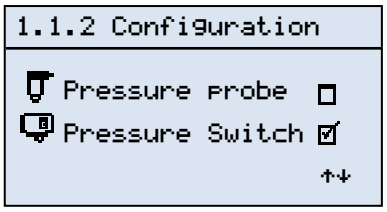
Fig. 49

The first report available for all compressor models is supplied by default from the base module through a commutation output.
The other reports can only be obtained by installing the expansion module (cod. **AC40C23976**).
On some models these reports are already present by default as the expansion has already been installed by Mattei; this information can be obtained from the electrical diagram supplied with the compressor.
The reports are obtained by closing **N.O.** contacts.

CONNECTING TO SUPERIOR UNITS

Capitolo 17

A compressor managed by MAESTRO xs can be connected to superior network management devices (eg. Multicomp II, etc). This kind of connection allows networks to be created with compressors of different makes and control methods, such as compressors with electromechanical comman and those with electronic boards. The startup command is by closure of a digital contact while opening this leads to the unloading and subsequent shutdown of the compressor.



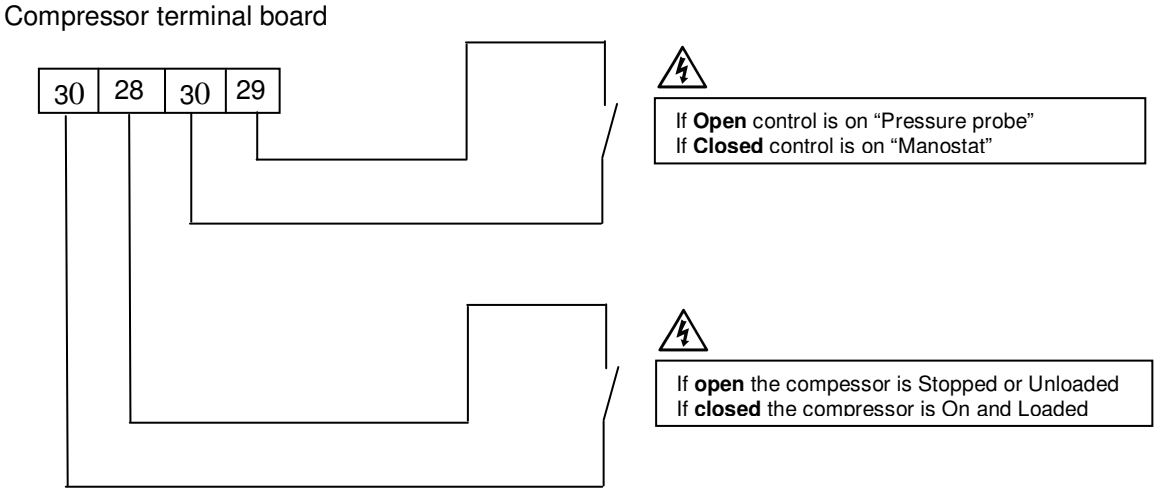
For this kind of operation, access the “1.1.2 Configuration” menu page, move the “Pressure probe” selection to “manostat” and then use the On/Off key to enable the machine.

Once enabled, the unit checks the state of the digital input to which the external control device (manostat, Multicomp II etc.) is connected, and if the contact is open the compressor waits, otherwise, if it is closed, the compressor is started up.

If the superior controller developes a fault, this shuts down the compressor and to restart it control must be reset to “Pressure probe”.

By setting the “Remote Control” option to <YES > in the [Advanced] menu, we can make MAESTRO xs verify the state of the superior controller via the dedicated digital input. If the contact is closed, MAESTRO xs waits for commands from the superior controller, otherwise, if it remains open for more than 15 seconds, it automatically returns control to “Pressure probe”, thus guaranteeing continuity of operation for the compressor.

Below is a diagram of how to connect the machine to obtain the function described above.



In the above example the numbering of the terminal board is common to all compressors with MAESTRO xs; for greater clarity refer to the electrical diagram supplied with the machine.

Capitolo
18

PARTICULAR FUNCTIONS

MAESTRO xs has certain controls and functions that contribute to a better functioning and greater control of the activities the compressor can carry out.
These controls are:

- Control of separator filter clogging.
- Control of two-speed fans.

These activities are handled automatically on the basis of certain values configured by Mattei during testing.

18 .1 Control of separator filter clogging

For the compressor to function correctly, its separation filter must always be efficient, so it must be monitored while the compressor is operating.
This is done by pressure probes on the machine that check the values of line pressure and oil chamber pressure. They continually monitor the compressor pressure values, but to check whether the filter is clogged the following operating conditions must all be true:

- The compressor is running LOADED.
- Chamber pressure is greater than Pmin.
- The separator delay time set must have passed (see menu 2.4.2).

At this point, if the pressure difference is greater than the set value (see menu 2.3.1) a fault signal is generated.
If only one of the conditions described above is not true, the check is interrupted.

18 .2 Control of two-speed fans

On some compressors there are two-speed fans (see Maxima). Speed control is based on the compressor cooling oil temperature.
Compressor fans normally operate at low speed so long as the oil temperature remains within the set limits; if the temperature exceeds the limit MAESTRO xs will vary the speed of the fans and set them to high speed.

The operation of the fans is shown in figure 50. We can see the change in the speed of the fans as oil temperature (To) varies.
As shown, two control thresholds are created:

- TMax is the temperature at which fan speed goes from low to high.
- TMin is the temperature at which fan speed goes from high to low.

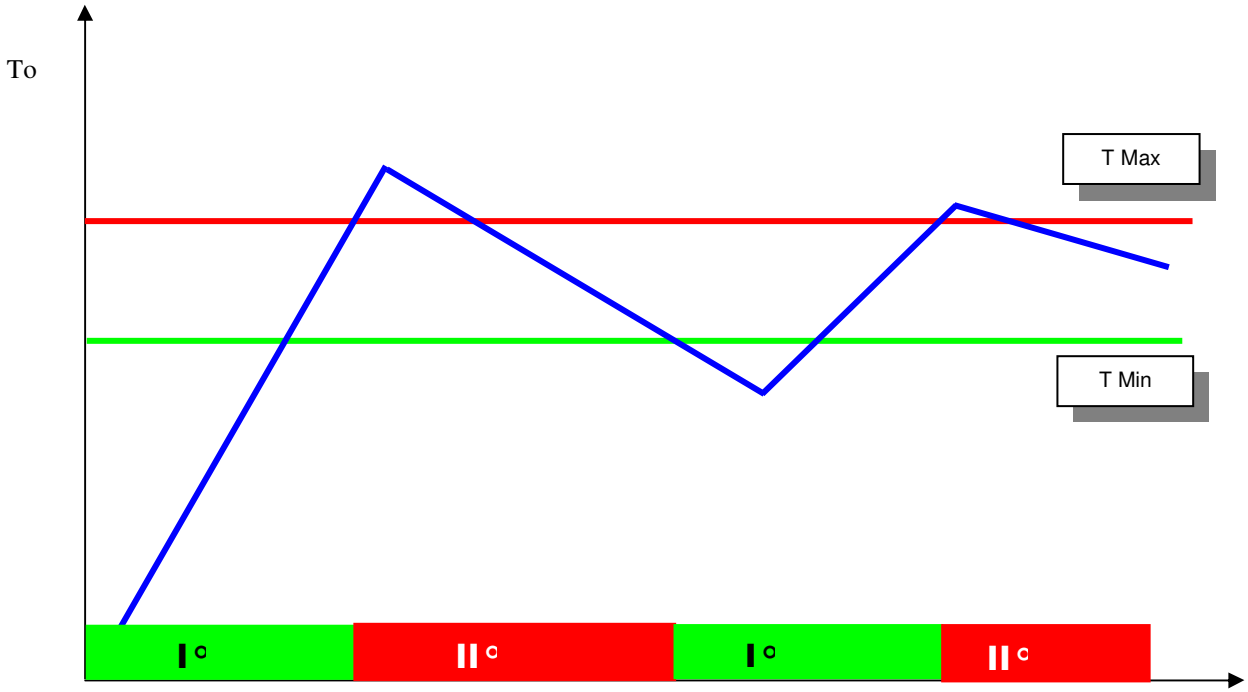


Fig. 27

Key:

T Max = Fan temp. (90°C)
T Min = Fan temp. – Differential Temp. (80°C)

These two values are entered in the page shown below.

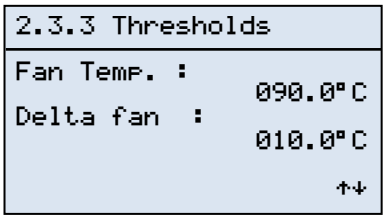


Fig. 51

On this page, which is available only after expansion module n°2 has been enabled, we enter the speed commutation temperatures. Note that, for the temperature for passing from low to high speed, the value to enter is that of the temperature at which this commutation must take place (90°C). As regards the temperature for passing from high to low speed, this is calculated by subtracting from the LOW > HIGH (90°C) commutation value the value of the differential temperature (90°C – 10°C = 80°C).
As mentioned, fan control is possible only by installing expansion module n°2. It will thus be necessary to configure and install the module with a correct logical address for the connection (see Hardware paragraph).
The expansion must be enabled in the [Advanced\Enabling] menu, and finally the desired working temperatures configured.

Note

This operation is usually performed by Mattei directly in the factory.

Chapter 19

PROGRAMMABLE INPUTS

MAESTRO xs has three programmable digital inputs on the n° 2 expansion module that permit the integration of sensors normally not used on standard compressors, such as manostats or various probes.

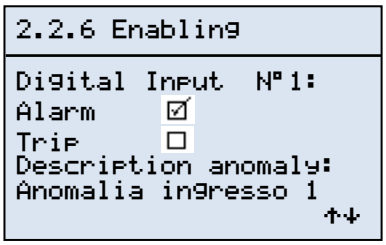
These inputs are available only for compressors fitted with the second expansion or on special compressors designed by Mattei for particular applications.

These inputs are completely programmable for operating functions (alarm or block, see below) and for the related fault descriptions.

We can decide whether to have the compressor shut down or just receive a fault report from a sensor connected, and we can also decide what indications the display on the page describing the fault should give.

Only the scrolling report will always give the indication “Fault input n° X”, even if the description of the fault is modified.

All this is possible only by enabling expansion n°2; three additional pages will be displayed in the [Advanced\Enabling] submenu. Figure 61 shows an example of one of these pages where we can:



- Select the operating function in case of fault between:
  - **Alarm** (default)
  - Block
- Modify the label describing the fault so as to display the correct description on the alarms page.

Fig. 52

Remember that the scrolling indication on the Monitor page will always give the standard indication and will not display the modified label, which will be shown when we press the <Reset> key.

19 .1 Modifying a Label

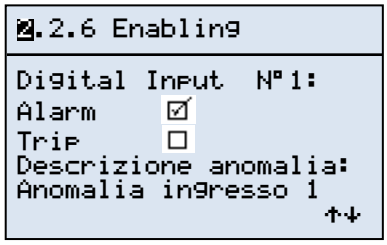
To modify the descriptive label that will be displayed we must go to the page of the menu relating to the digital input we wish to use.

We must first mention that to modify individual characters we must scroll the alphabet and numbers using only the <↑> <↓> keys.

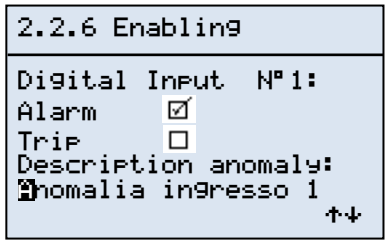
For example if the letter “a” is displayed and we press:

<↑> we will display the letters b, c, d etc.

<↓> we will display the numbers 9,8,7,6 etc.



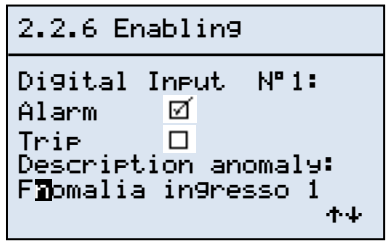
Once you enter the menu relating to the desired input, press the < ↵ > key until the cursor is over the first character of the description.



Now to modify the label press:

<↑> to increase the letter

<↓> to decrease the letter



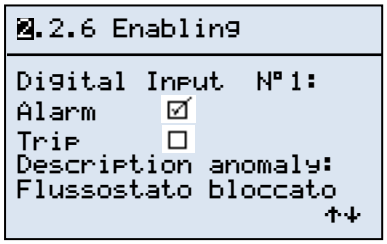
Once the desired character is displayed press to pass to the next character, and again press:

<↑> to increase the letter

<↓> to decrease the letter

Continue in this way until the label with the desired text is complete.

If the description is shorter than the 24 characters available we must in any case clear the remaining characters that are not needed.



When the fault description is complete the cursor will return to its original position; we can then go to the description of the next digital input or return to the preceding menu.

Chapter 20

SERIAL COMMUNICATION

MAESTRO xs has a number of serial communication ports, which handle various communication functions. In particular we have:

⇒ 1 RS - 485 (tLAN) port for communication between the base module and the expansions.

⇒ 1 RS - 485 (pLAN) port for communication between compressors in network mode with MAESTRO xs.

⇒ 1 RS - 485 port (optional) for communication between compressors in network mode where there are compressors with earlier control devices. Also used for communication with the supervision system.

The first two ports are fitted as standard, but the third must be installed subsequently as shown in chapter 2.10 of this manual.

This optional port can carry out two functions, but not at the same time, so if we decide to use the port for managing a compressor network it will not be able to carry out supervision activities.

When the port is used for supervision, MAESTRO xs offers two communication protocols:

- **Standard**: private communication not accessible by other software packages not supplied by Mattei.
- **Modbus**: communication protocol normally used for controlling and managing electronic units.

SUPERVISION

Chapter 21

As mentioned in the previous chapter, MAESTRO xs allows remote control using a PC to carry out local monitoring and send messages over the internet or standard telephones.

The advantages of supervision are:

- ✓ Local or remote monitoring of one or more compressors.
- ✓ Reporting of faults to service personnel via the internet or by phone.
- ✓ Post-event check and analysis of faults occurring.

As mentioned in the previous chapter the are two types of communication for setting up compressor supervisory activities; these are described later in this chapter.

21 .1 Electrical connections

To carry out supervision it is necessare to install a serial communication board as indicated in chapter 2.10 and connect to the convertor that will be connected to the supervising PC.

If we want to monitor a network of compressors it will be necessary to install on each compressor one of these serial communication boards and interconnect them.

Once the serial boards are installed on every compressor, connect them electrically installing, also in this case, the connection kit for serial communication (cod. AC00F00015). Now connect all the compressors to the RS - 485 to RS – 232 signal converter, which in its turn will be connected to the PC where the supervising software is installed.

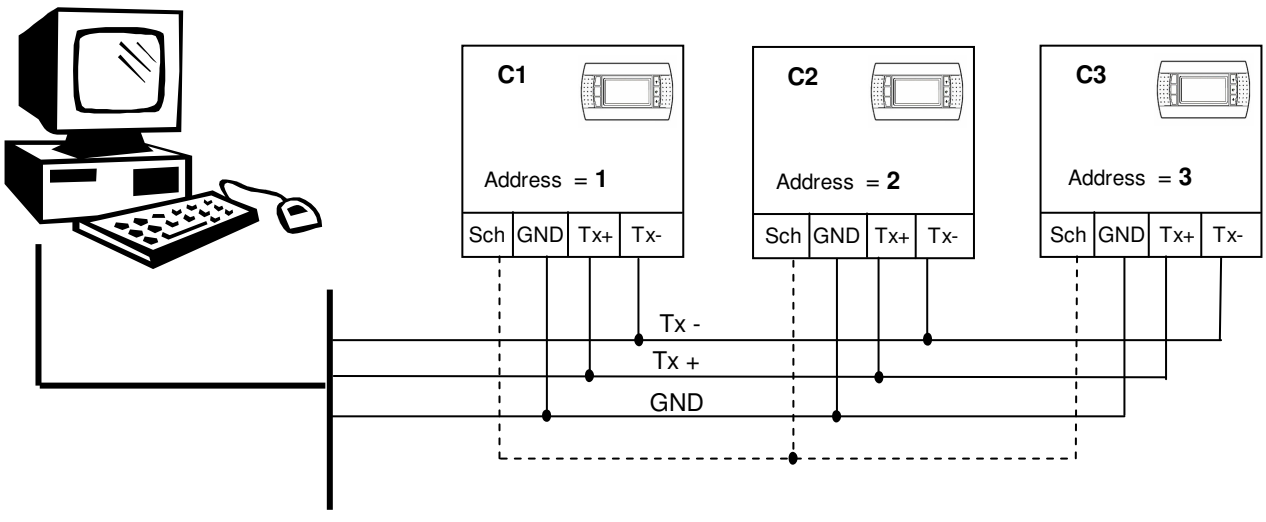


Fig. 53

Important: Remember that it is not possible to connect compressors with differing controllers to the supervisor because they are already connected in a network using the same port. If you wish to create supervision for these compressors you must use the Multicomp xs superior controller.

21 .2 Standard Protocol

This protocol permits dialogue exclusively with supervision software supplied by Mattei, iwth which one or more compressors can be managed and monitored locally or by remote control.

This makes it possible to alert service personnel in case of fault in the plant via the internet or by phone.

See the appropriate reference manual for clarifications on the use of the supervision package.

21 .3 Modbus Protocol

This is the most widespread communication protocol in computer monitoring; if the user does not intend to use the software supplied by Mattei he may create his own managing software.

The only limitation imposed by Mattei is that only the variables needed for monitoring and for modifying the parameters in the menus that can be accessed by the user will be supplied, and access to the other variables will be blocked. This is to prevent modifications not authorised by Mattei that could lead to compressor malfunction.

WARNING: Modifying these parameters via software is not allowed by Mattei and so any variation in these variables will cause the immediate invalidity of the compressor guarantee.

21 .4 Serial configuration

For MAESTRO xs communication the items in the [Advanced\Configuration] menu must be configured. The information that must be entered:

- The protocol to use
- The logical address
- Communication speed

This information is grouped in a single display for ease of configuration.

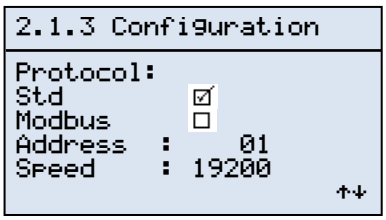


Fig. 28

The **protocol** defines the type of communication to be used.

The **address** allows the supervision software to be recognised and consulted by the supervisor.

The **speed** defines the speed of communication with the supervisor and varies according to the device used for communicating with the PC (it is usually 19200).

TROUBLESHOOTING

Chapter 22

In this chapter we describe possible faults on the MAESTRO xs. These are divided into:

- General faults
- Dryer faults
- Inverter faults
- Network faults

The problems that may be met in each category are listed, together with possible causes and remedies for on the spot repair without replacing electronic components since the malfunction may be due to other causes.

Generally we recommend always checking that the compressor is correctly powered and that the current is within the nominal values for the compressor, since if it is not there could be a malfunction that would not occur if the current were at the correct value.

Warning: We expressly recommend not working on the electrical panel under power if you are not expressly trained for this. It is better to carry out checks with the power supply disconnected to avoid electric shocks.

22 .1 General problems

By general problems we mean all faults that could occur indiscriminately on compressors of all series.

Problem	Cause	Remedy
MAESTRO xs does not start	Lack of power.	Check the power supply and the presence of 24 Vac on the transformer.
	Electrical connection out of phase.	Check the phase sequence relay and the power connection.
	Protection fuse blown	Replace the fuse.
	Defective terminal connection.	Check the terminal connections.
	Gate opening protection relay defective.	Replace the relay.
	Video terminal defective.	Check that the base module is correctly powered and the telephone cable correctly connected.
MAESTRO xs starts but the display is blank	Programme missing.	Load the programme (Mattei personnel only).
	Video terminal defective.	Replace the video terminal
	Incorrect video terminal address.	Correct the address (Mattei personnel only).
	Incorrect connection of telephone cable.	Check the connection.
	Incorrect addresses stored.	Check logical addresses of unit and terminal.
Compressor does not start up when "On" is pressed	Chamber pressure exceeds startup threshold.	Wait for pressure to drop.
	Line pressure exceeds Pmin.	
	Compressor is connected in network mode.	Startup is subordinated to the order chosen for operation, so you must wait for the compressor to be called.
	There is a block.	Check and correct fault.
	Remote control is enabled.	Verify state of remote control.
	An hourly programme is active and we are outside the operating time.	Check weekly programming
"NO LINK" appears on the display	No communication between unit and video terminal.	Check addresses of unit and video terminal.
Incorrect pressure values	Defective pressure probe.	Replace pressure probe
	Operating range of probes differs from that entered in the unit.	Set correct operating range in "Debug" menu (Mattei personnel only).
	0 shown in pressure value (eg. 0.1 bar)	Modify probe offset in "Debug" menu (Mattei personnel only).
	Probe incorrectly connected.	Check probe connection
Incorrect temperature values	Probes defective.	Replace probes.
	Wrong probes.	Ensure they are NTC probes.
	Incorrect or broken connection.	Check probe connections.
	Inaccurate values.	Modify probe offset in "Debug" menu (Mattei personnel only).

22 .2 Dryer faults

These faults regard the installation and use of compressors fitted with a dryer.

Problem	Cause	Remedy
Dewpoint temperature does not drop to operating values	Dryer protection fuses blown.	Replace dryer protection fuses.
	Dryer compressor not working	Check dryer power supply current. Call Mattei service personnel.
	Dryer fans not working.	
	Cooling system insufficient for output produced.	Call Mattei service personnel.
	Dryer protection device has cut in	Check protection devices consulting dryer manual.
	Electrical protection of dryer compressor has cut in.	Wait for automatic release.
Dewpoint temperature drops below 0°C	Dryer compressor is not stopped.	Check MAESTRO xs commands.
		Command contactor is blocked shut.l
	Mechanical valve partly blocked.	Call Mattei service personnel.

22 .3 Inverter faults

These faults regard the installation and use of compressors fitted with a frequency modifier (inverter).

Problem	Cause	Remedy
Compressor does not start up and signals "Startup problem" fault	Reference current not supplied to inverter.	Check command current on inverter.
	Defective or incorrect connection between electrical terminal and inverter.	Check electrical connections.
Compressor speed does not vary with pressure changes	MAESTRO xs defective	Replacee MAESTRO xs
	Disconnected or broken 0 ÷10 Vdc reference cable.	Check connection between unit and inverter.
	Pmin and Pmax wrongly calibrated.	Check calibration.
Impossible to reset "inverter fault" report	Some inverter faults can only be reset by interrupting the power supply.	Cut power supply to dryer for at least 30 seconds then repower the compressor.

22 .4 Network faults

These faults regard the installation and use of interconnected compressors forming a network of two or more communicating compressors.

Problem	Cause	Remedy
"TO" message appears on Slave compressor	Defective electrical connection.	Check electrical connections.
	Defective RS 485 port on Slave terminal.	Replace terminal.
	Defective RS 485 port on Master terminal.	Replace Master terminal.
"TO00" message appears on Master compressor	Defective electrical connection.	Check electrical connections.
	RS 485 port of Slave terminal with "00" address defective.	Replace terminal.
"TO00" message alternating with other addresses appears on Master compressor	Defective electrical connection.	Check electrical connections.
	RS 485 Port of Master / Slave terminal defective.	Replace terminal.

As mentioned in the chapter on network operation, if there are communication problems the programme will return to automatic mode.

We recommend calling MATTEI service personnel to carry out repairs and permit safe usage.