MC2 CONTROLLER

SERVICE MANUAL

INDEX

1. INTRODUCTION

This handbook is meant as an extension of the instruction manual that comes with the compressor, and all those functions accessible only by authorized personnel.

The discussion of this manual is to refer to software version 2.0.1.0 and higher; earlier versions, while presenting a strong similarity, may differ in some functions. For any details is asked to refer to Customer Services of a manufacturer.

Please note that the software versions prior to 2.0.1.0 are not suitable for communication machine - machine interface with CAN-BUS.

1.2 WARNINGS

THE MC2 CONTROLLER IS AN INDUSTRIAL CONTROL DEVICE (NON SAFETY) FOR THE OPERATION OF A SCREW COMPRESSORS UNITS.
INSTALLATION MUST BE PERFORMED AS REQUIRED BY NATIONAL AND INTERNATIONAL GUIDELINES WHERE IS BUILT ON COMPRESSOR.
INSTALLATION AND SETTING MUST BE CARRIED OUT BY SKILLED PERSONNEL AFTER THIS MANUAL WAS READ AND UNDERSTAND.
THE CONTROLLER MUST BE USED IN AN INDUSTRIAL ENVIRONMENT STANDARDS AND MAY NOT BE USED IN PUBLIC AREAS AT RISK OF EXPLOSION, MARINE APPLICATIONS, MILITARY APPLICATION .
THIS MANUAL MAY BE AMENDED, IN CASE OF DOUBT ON THE LATEST EDITION CONTACT THE TECHINCAL DEPARTMENT.
THE MANUFACTER RESERVES THE RIGHT TO MAKE CHANGES IN FUNCTIONAL AND TECHNICAL NOTICE AND AGREE WITH THE ATLAS-ABAC ENGINEERS .

2 GENERAL INFORMATIONS

The MC2 controller is characterized by the following functional blocks:

a) 16bit microprocessor with a flash-EPROM for download program that controls the inputs and outputs, the LCD display, keyboard and buttons, 8 analog inputs and the CAN-BUS interface .

b) 9-button keypad with tactile effect functions of START-STOP, for scrolling through the menu and settings data.

c) LCD backlit alphanumeric 9mm characters which allows a great view of the values and energy-saving light reduced the backlight (night mode). This LCD display for extended all the information necessary for the operation of the compressor. We also have 5 LED's for anomalous signals and for warning that blocking and reporting of type of operation.

d) Analog inputs that allow for interfacing to sensors for pressure, temperature and voltage values read from the machine for fixed and variable speed.

e) Inputs and outputs suitable for different types of screw compressor.

f) Real time clock with the format DD / MM / YYYY, and hh / mm / ss with possibility of day and week programming .

g) 12 languages residents with easy dialing (option with 12 languages including the Cyrillic)

3. MENU STRUCTURE

The menus for configuring the unit MC2 are structured hierarchy level : depending on the PASSWORD LEVEL attached may be granted access to different functions.

Password entry is made in a special menu, refer to section 6.7.2 for details.

The hierarchy of access level is structured as follows:

3.1 User Level: the level of basic access, for the end user, allowing normal operation on the compressor and a basic customization of the operation thereof; do not need a PASSWORD

3.1.a User Level Encrypted with PASSWORD :is the level that provides access to the configuration of Autorestart (automatic restart after black-out and restore power) and the PASSWORD is provided by the manufacturer, after written declaration of the Customer

Indication shortened for access **UT**

3.2 Customer Center Level : is the level of access for those who must carry out the ordinary and extraordinary maintenance of the compressor, the functions available, if badly used, may cause malfunction and / or damage to the compressor

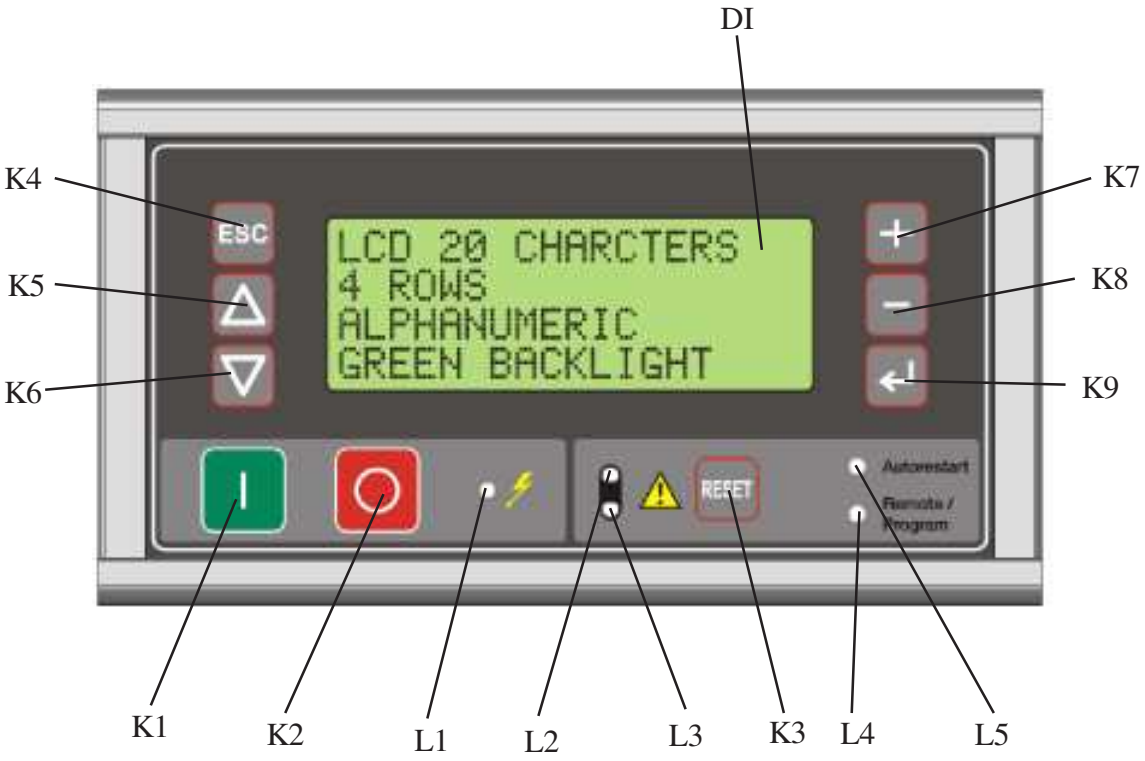
3.2.a Customer Center Level with Encrypted PASSWORD : is the level of access that allows you to perform special functions, for which you need the consent of Manufacturer: functions in changing the counters of the hours of the compressor and RESET the controller unit

Indication shortened for access **CA**

3.3 *ABAC Factory Level : is the level of access for the manufacturer of the compressor : the functions available, if badly used can cause a malfunction and / or damage to the compressor*

Menu levels are structured so that the level *"ABAC Factory"* includes both levels and the level UT CA contains only the level of UT and not vice versa.

4. CONTROL PANEL



4.1 KEYBOARD

K1 **START button (starting the compressor)**
Used to start the machine. If remote control or programming (daily/weekly) are enabled, this key is used to enable compressor functioning (priority control from keyboard). If alarm conditions have occurred, pressing of this key has no effect

K2 **STOP button (stop the compressor)**
Permits timed stopping of the machine. If remote control or programming (daily/weekly) have been enabled, this key can be used to disable compressor functioning (priority control). It does not operate at emergency level

K3 **RESET button**
Makes it possible to reset compressor fault messages after eliminating the causes of these. As the faults can be displayed only in the main screen page, the RESET key is effective only during display of this.
During parameter modification operations, the RESET key can be used to restore the preset factory (default) value for the type of compressor selected

K4 **ESC button**
Used to return to the main menu (previous level) or to cancel the modifications made.
If the key is held down, the control unit returns to the main screen page.
If OFF, back-lighting of the display is re-activated the first time the key is pressed without performing any other function

K5 **UP arrow key**
Used for upward scrolling of menu items;
during setting of multiple-choice parameters. makes it possible to select one of the available options.

K6 **DOWN arrow key**
Used for downward scrolling of menu items;
during setting of multiple-choice parameters. makes it possible to select one of the available options.
If OFF, back-lighting of the display is re-activated the first time the key is pressed without performing any other function

K7 **PLUS key**
Makes it possible to increase the value of the parameter being modified.
Starting from the main screen page, permits access to additional information and scrolling of this
If OFF, back-lighting of the display is re-activated the first time the key is pressed without performing any other function

K8 **MINUS key**
Makes it possible to decrease the value of the parameter being modified
Starting from the main screen page, permits access to additional information and scrolling of this
If OFF, back-lighting of the display is re-activated the first time the key is pressed without performing any other function

K9 **ENTER / CONFIRM key**
Used to access the menu displayed (next level).
Starting from the main screen page, makes it possible to access the menu tree.
Used to confirm the value or selection made during modification of a parameter.
If OFF, back-lighting of the display is re-activated the first time the key is pressed without performing any other function

4.2 SIGNALS / SETTINGS LED's

L1 **Voltage present LED (yellow)**
Must always be ON when the compressor is powered

L2 **warning LED (yellow)**
This LED switches on to indicate critical conditions or a minor fault that does not block the compressor; this indication may refer to the need for maintenance or irregular operating conditions. Switching ON of this LED is always accompanied by a descriptive message that can be displayed in the main screen page

L3 **Alarm LED (red)**
This LED switches on (steady light) to indicate that the compressor has been blocked by a serious fault; the type of fault is described with a message in the main screen page. Once the fault has been reset, the LED starts to flash, informing the operator that the situation can be reset with the RESET key

L4 **AUTORESTART LED (red)**
This LED switches on when the AUTORESTART function is enabled.
In the case of automatic restart following a blackout (AUTORESTART function enabled) the LED flashes to indicate that the compressor is about to restart. The display shows the countdown to restart

L5 **REMOTE / PROGRAM functions active LED (red)**
This LED switches on when the remote control function or one of the programming functions (daily-weekly) is enabled.
If the compressor is installed in line with other similar compressors and communication on a CAN-BUS is enabled, LED L5 assumes other functions. Refer to chapter "**Compressors in sequence**"

4.3 MULTIFUNCTION LCD DISPLAY

DI **DI Multi-function display**
Back-lit LCD display with four lines of twenty characters each: shows compressor operating conditions and is used to carry out all programming and control operations

4.4 SHORTCUTS LANGUAGE

Pressing the keys **K5** or **K6** from the main screen, you can instantly select the desired language without having to enter the submenu. The language chosen will become the one used for all functions of settings and messages of the controller.

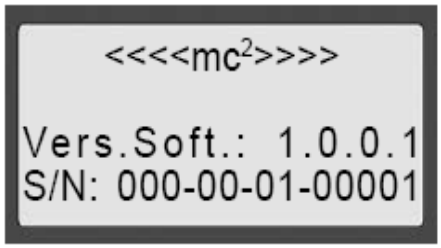
5. COMPRESSOR CONTROL

5.1 COMPRESSOR START

Switch on the machine (power) the control unit initiates the opening sequence and predisposes to control the compressor. The sequence provides that, with the L1 LED lit, is displayed on the display the following screen

This screen page indicates:

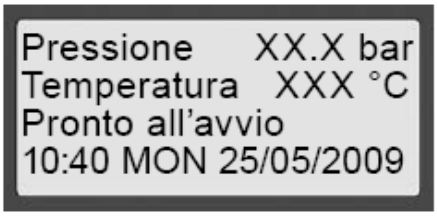
LINE 1	name of the compresso
LINE 2	/
LINE 3	software version which may differ from that indicated
LINE 4	serial number of control unit, different for each machine



After a few seconds the display shows the main screen

This screen page indicates:

LINE 1	indication of network pressure
LINE 2	indication of compression temperature of air-oil mixture
LINE 3	messages about operating conditions
LINE 4	hour and date, informations menu access, tree menu access, quick language change message



To change the language, use the **K5** and **K6** keys

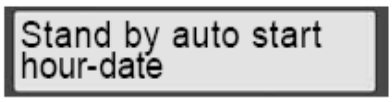
If the compressor is running rows 1 and 2 always show the information described above.
Special Reports (error message) information or additional information from the management menu is displayed on lines 3 and 4.
If the line 3 displays "ready to start the compressor and available for starters.

The compressor is started by pressing the **green K1-START key**

At this point, the compressor can:

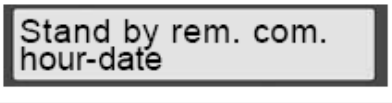
a) start, displaying messages related to the stages of starting and operating
b) ensure they start with the following message

In this case, network pressure is above the minimum threshold value set; the compressor will start automatically in the case of a request for air from the network



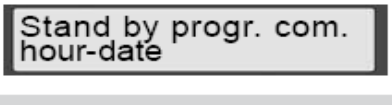
c) ensure they start with the following message

In this case, the remote control function has been enabled (see paragraph 7.4.2.3).
The compressor will start when the remote command is received



d) ensure they start with the following message

In this case, the daily or weekly programming function has been enabled and the compressor is in the OFF programming phase (see paragraph 7.4.2.6).
The compressor will start when an **ON programming phase is initiated**.



If the compressor does not start and shows none of the cases listed above, refer to Chapter 6.7.

When you start the machine will be put in sequence contactors

LINE > STAR > DELTA

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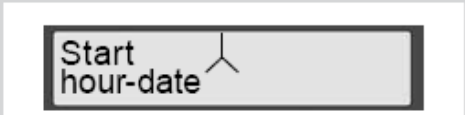

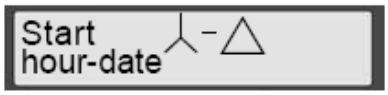

and will receive one of two messages

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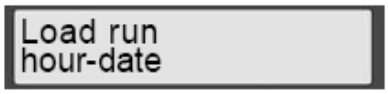

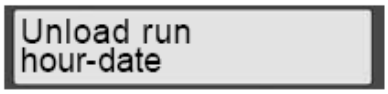

When the display shows “Load run” the inlet valve valve is opened and the machine is operating at full load (nominal production of compressed air)
During operation, the delivery pressure must be increased and, once reached the preset threshold value of the maximum line pressure, the control system enables the compressor running vacuum by closing the inlet valve (Unload run).
When the pressure falls below a preset minimum threshold value, the inlet valve is opened again and the machine resumes operation at full load.

During the unload operation may present two cases:

a) AUTOMATIC setting

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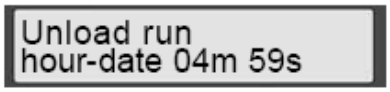
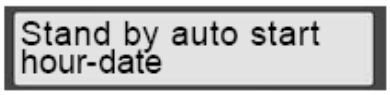
The compressor outputs this message followed by a countdown.



At the end of the countdown, the compressor switches off, changing to “Stand-by auto start”, status, ready to restart in the case of a request for air



b) CONTINUOUS setting

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The compressor outputs the “**Unload run**” message, the machine never stops, always remaining available to restart production of compressed air immediately in the case of any request.

5.2 COMPRESSOR STOP

The machine has a timer for shutting down and for restart

Simply press the **K2 button to stop** the compressor

the compressor does not stop immediately, but begins a series of operations for the downtime. depending on the operating conditions when the command STOP.
If at the time of the STOP the compressor is marching at full load, the controller puts the machine in “Unload run”.

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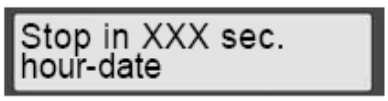
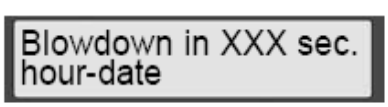
Display DI shows this countdown; at the end of the countdown, the motor is stopped.



At this point, the display shows this additional timing: during this phase, the compressor vents the pressure inside the separator reservoir preparing for subsequent restart.



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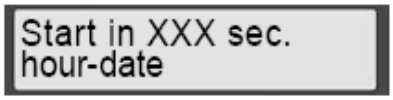
If the K1-START key is pressed again before the preset timed restart time has passed, a new timing is shown on display D1 which indicates the time to compressor restart

This function prevents restarting the compressor when it is still pressurized, avoiding electrical motor verload.



5.3 EMERGENCY STOP

Pressing the red button PE emergency stops instantly compressor operation, preventing a condition considered dangerous

The emergency stop button is intercepted by the monitoring unit which displays the following message with LED L3 on

To reset, **release the EMERGENCY STOP button lock and press button K3-RESET**

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6. CONFIGURATION - MENU TREE

The configuration of the machine and carried out in the testing phase. The manufacturer still allowing the end user to change certain operating parameters to optimize machine performance for which the use is intended.
Any other changes to the operating parameters are not accessible by the customer, but can be performed by qualified service providers.

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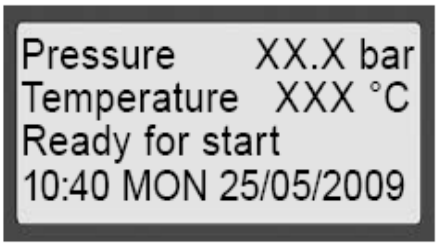
The main screen page is displayed as follows:

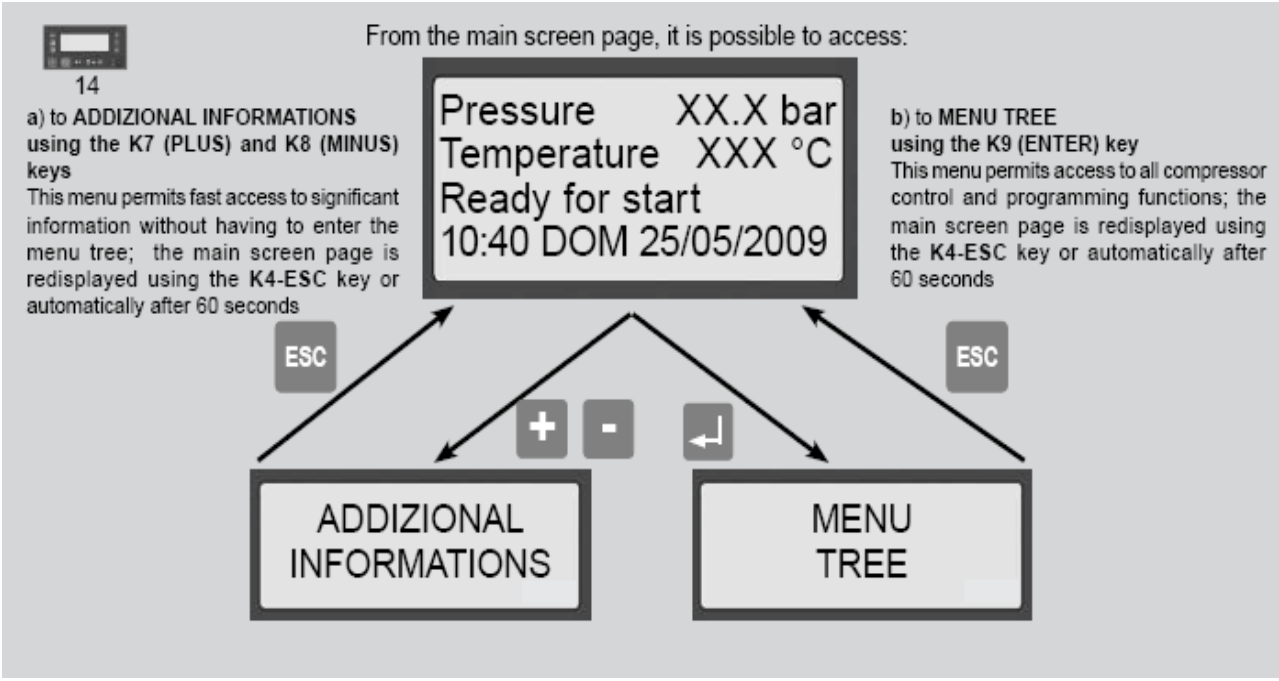
LINE 1	net pressure
LINE 2	compression temperature of air-oil mixture
LINE 3	messages about operating conditions
LINE 4	hour and date, informations menu access, tree menu access, quick language change message



To change the language, use the **K5** and **K6 keys**

After 60 seconds of the last key was pressed the display moves to a low level of brightness.

The first press of a button (except K1, K2 eK3), the display goes back to normal brightness, while the subsequent actions produce the associated function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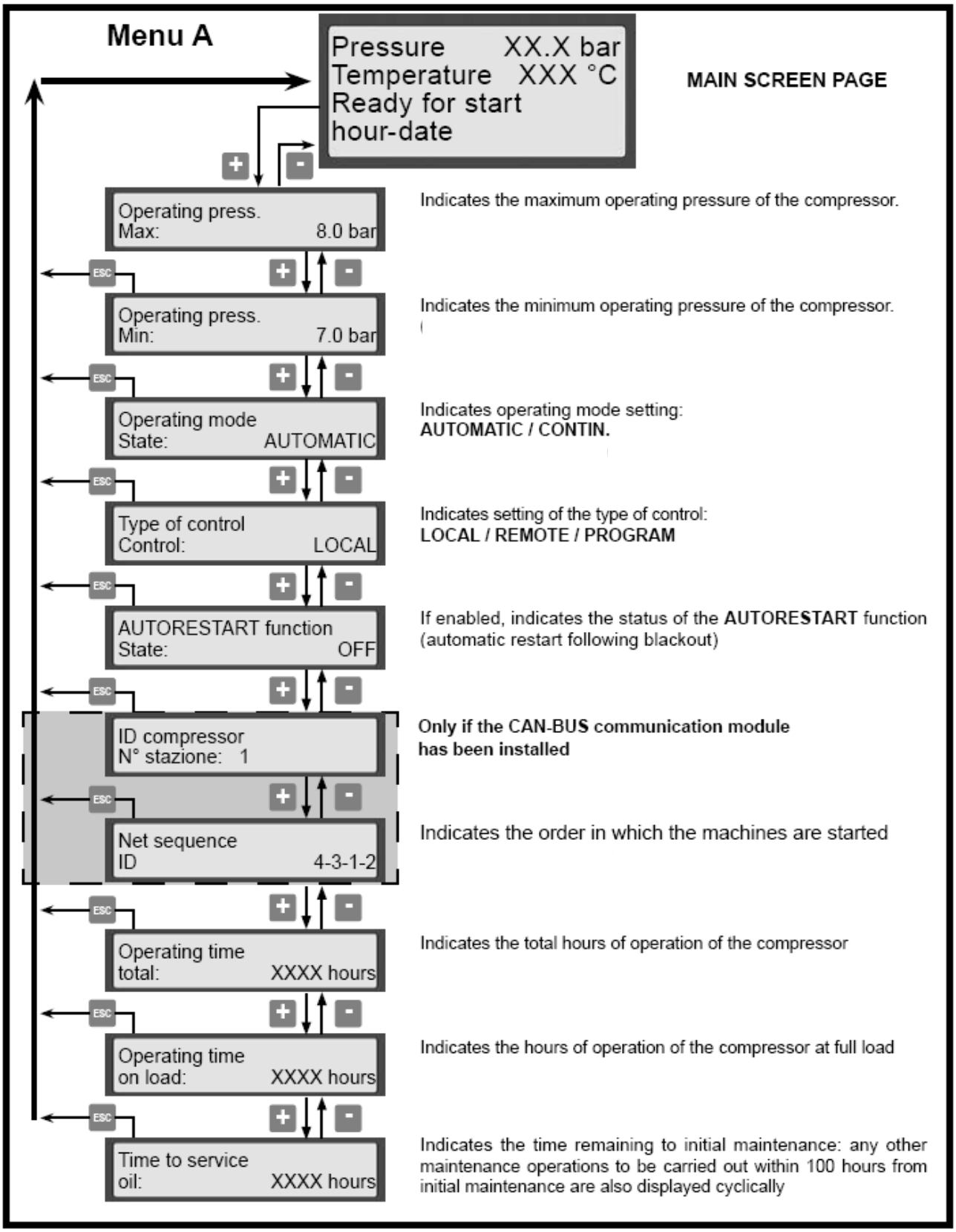
From the main screen page, it is possible to access:
a) to ADDIZIONAL INFORMATIONS using the K7 (PLUS) and K8 (MINUS) keys
This menu permits fast access to significant information without having to enter the menu tree; the main screen page is redisplayed using the K4-ESC key or automatically after 60 seconds
Pressure XX.X bar
Temperature XXX °C
Ready for start
10:40 DOM 25/05/2009
b) to MENU TREE using the K9 (ENTER) key
This menu permits access to all compressor control and programming functions; the main screen page is redisplayed using the K4-ESC key or automatically after 60 seconds
ESC
ESC
+
-
ADDIZIONAL INFORMATIONS
MENU TREE

6.1 ADDITIONAL INFORMATION MENU

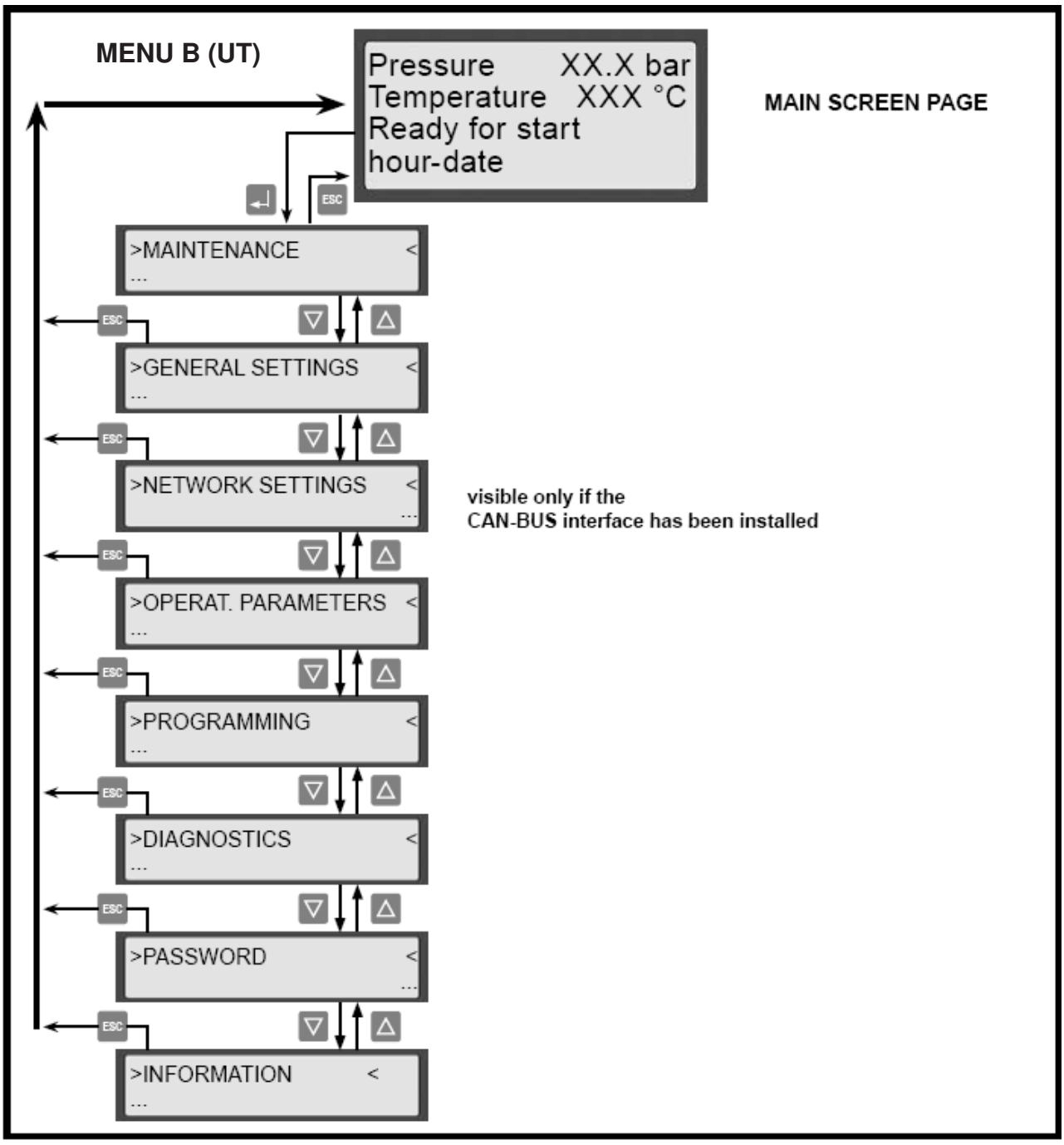


Provides all the indications of more frequent consultation, and is represented in the following menu. This menu is also accessible to the compressor running.
If you do not press any button, the display returns to the main screen automatically after 60 seconds

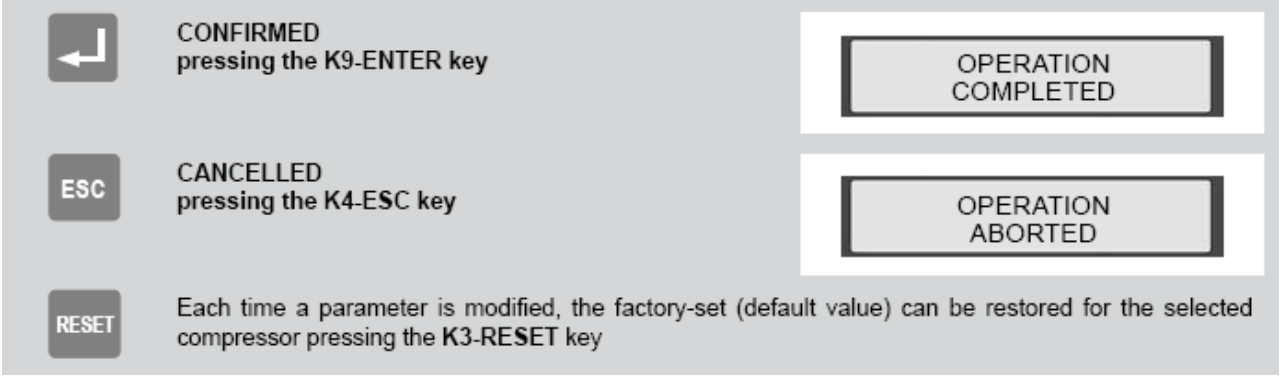
ESC It is possible to return to the main screen page from any point of the menu by holding down the **K4-ESC** key

6.2 MENU TREE (CONTROL AND PROGRAMMING)

Is the menu structure through which you perform all the functions of control and programming of the compressor

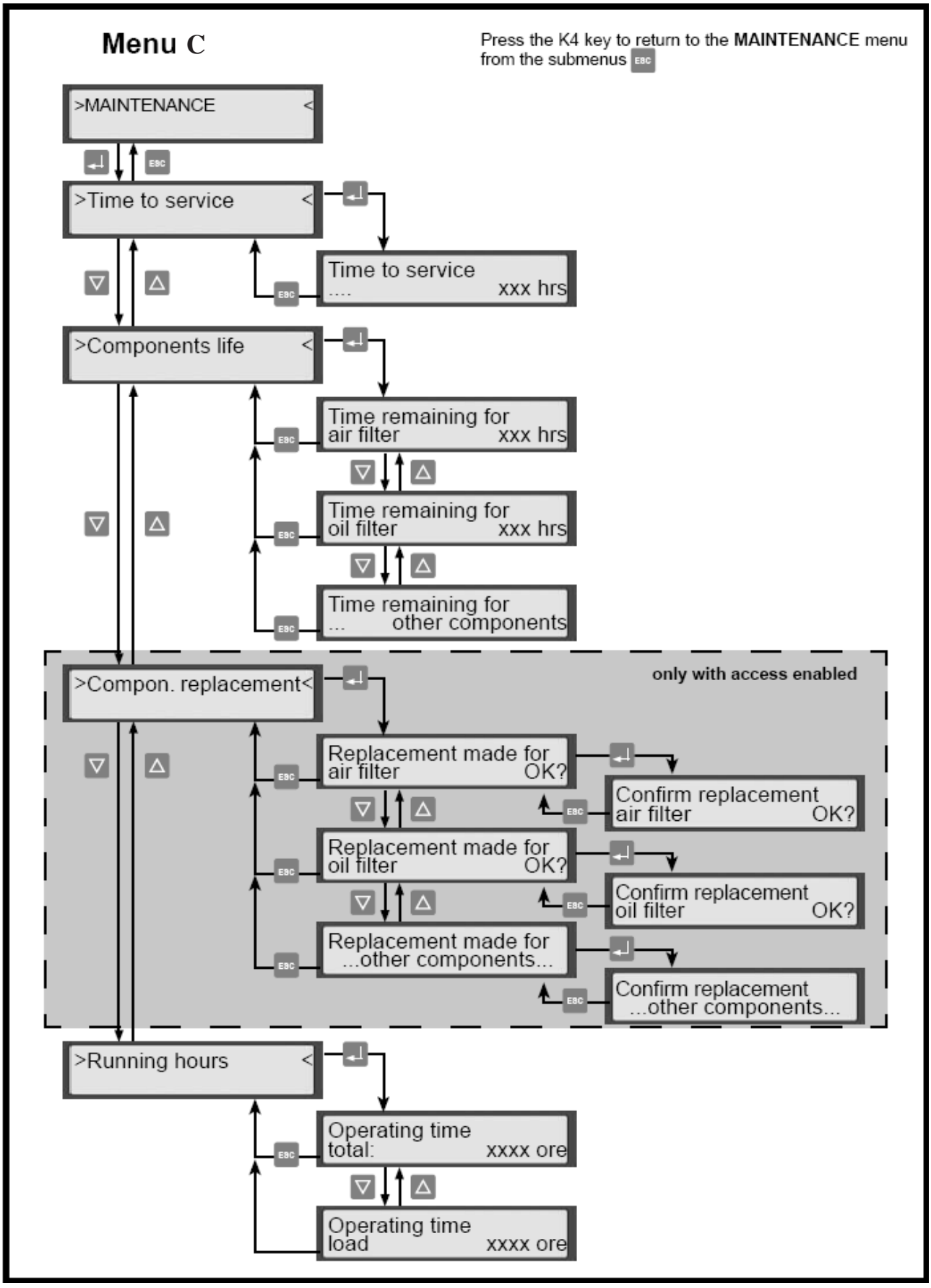


Choices and settings made in the menus can be:



6.3 MAINTENANCE MENU

This menu allows you to view the maintenance activities will be a short term, the remaining life of each component to provide for the resetting of the counters in the life of each component (when the feature is enabled) to see hours of work of the compressor.



6.3.1 MAINTENANCE TIME ACCESS :ALWAYS UT

Lets see which is the first maintenance intervention to be carried out on the compressor, also displays the maintenance activities to be performed within 100 hours on it. In this way the user can schedule the maintenance and possibly decide whether to make any substitutions of the components in a single maintenance intervention.
The same information can be obtained more quickly, from the "Additional information menu"

6.3.2 COMPONENTS LIFE ACCESS : ALWAYS UT

Indicates the remaining life of each component subject to periodic maintenance. The list of components is "customized" according to the compressor on which the unit is installed.

6.3.3 REPLACEMENT PARTS AND RESET ACCESS : STOP CA

If the function is enabled, allows you to reset the counters component life following a maintenance intervention.
This feature allows a service center to allow or deny the client the opportunity to supply their own execution of maintenance activities and is especially useful in case of concluding a contract of service scheduled:

- ***DISABLED***: with this setting is disabled at all levels to access the menu item for the replacement components, so you can not reset the hour meter of the various components (filters, oil, etc.). even if it is their effective replacement
- ***ENABLED*****:** With this setting the menu item "Replacement Parts" is visible at all levels, the user is therefore authorized the replacement of components and zeroing its hour meter

The factory setting is "Enabled", which allows the end user to arrange for maintenance.

AWARNING! When the function is disabled the menu item "Replacement Parts" is no longer visible on any level, so when you run a maintenance intervention is necessary to:

1. Enter the PASSWORD
2. Set "Enable RESET components" = Enabled
3. Provision to RESET of components being replaced through the menu "Replacement Parts" made visible the setting in step 2.
4. Set "Enable RESET components" = DISABLED

Upon completion of the steps the unit is once again protected against the execution of RESET components not authorized.

6.3.4 MIN-MAX COMPONENTS LIFE ACCESS : STOP CA

Below is a table with the planning of maintenance activities to be carried

Parameters	Default value
Minimum lifetime air filter	500 hours
Maximum lifetime air filter	2000 hours
Minimum life oil filter	500 hours
Maximum life oil filter	2000 hours
Minimum life oil	1000 hours
Maximum life oil	8000 hours
Minimum life oil-separator filter	1000 hours
Maximum life oil-separator filter	4000 hours
Minimum life filter dryer (*)	500 hours
Maximum lifetime filter dryer(*)	2000 hours

(*) Only compressor with integrated dryer

Please note that, for alphanumeric values, you can always return to factory defaults during the editing stage by pressing the button "RESET".

This menu is to change the minimum and maximum limits of the useful life of components, so that customization, enforceable at installation, will remain within the range defined.

Example:

setting the following parameters:

Minimum lifetime air filter = 800 hours

Maximum lifetime air filter = 1200 hours

you will get the customization of the "useful life air filter" can only be made within the specified limits.

6.3.5 LIFE CHANGE COMPONENTS ACCESS: STOP CA

Factory settings:

Parameter	Default value
Change air filter life	1000 hours
Change oil filter life	1000 hours
Changing life oil	2000 hours
Change oil-separator life	2000 hours
Change lifetime filter dryer(*)	1000 hours

(*) only for compressors with dryer filters

Please note that, for alphanumeric values, you can always return to factory defaults during the editing stage by pressing the button "RESET".

REMARK: The first oil filter change is expected after the first 100 hours of operation: This is the only exception to the values of the table provided. The time to first change the oil filter is not editable.

This menu is to change the useful life of the individual components, used for meters that handle scheduled maintenance. Customization is useful for special applications or operating conditions in detail.

Examples:

- use of synthetic oil in place of the mineral: the life of the component "oil" may be raised
- Installation of the compressor in places with high dust environment: the useful life of the various filters can be reduced for more frequent maintenance

6.3.6 NO-MAINTENANCE BLOCKED ACCESS : STOP CA

This feature allows the compressor protection against non-performance of maintenance activities.When the counter of life of a component reaches zero, the unit provides the message

"Replace *component*"

XXX excess hours

where XXX is the number of hours worked in excess compared to the useful life of programmable components.

You can have the following behaviors, corresponding to the possible settings of the function NO-MAINTENACE BLOCKED:

- *DISABLED*: The counting of hours in excess proceeds indefinitely, always accompanied by the message that calls for replacing the component, without ever achieving a block machine

- *ENABLED:* counting the hours, reached 30% in excess of hours over the useful life of the component, produces the block of the compressor and the related error message is stored in the register of anomalies. Example: oil filter life = 1000 hours, the compressor goes to block when the counter reaches 1300 hours of work.

This feature, once enabled and coupled to the function "Enable RESET components" (default setting = Disabled) allows full control on the maintenance program of the pressure, denying the client the opportunity to ensure themselves the maintenance activities in the knowledge that these must be enforceable under the regular schedule, otherwise the lock on the machine.

When the compressor s tops for exceeding the 30% of the hours of useful life of a component can, in cases of extreme necessity, to perform the "FORCED START PROCEDURE" described in paragraph 10.1.

6.3.7 WORKED HOURS ACCESS : ALWAYS UT

Indicates the time of operation of the compressor (total operating hours, operating hours at full load).

The same information can be obtained more quickly, from the "Menu additional information"

6.3.8 WORKED HOURS MODIFY ACCESS : STOP CA

This menu allows the variation of the total hours and / or hours of operation to load the compressor. The function is useful when you operate a major overhaul of the compressor (eg replacement of the screw), or when you install a new electronic control unit on a compressor having already a certain number of hours of work.

Center-level access requires the insertion of alphanumeric password encrypted in addition to "Center", please contact customer service by the manufacturer.

6.3.9 RESET CPU ACCESS : STOP

This menu allows you to run two different operations RESET the electronic control unit:

- **log file RESET :** allows the cancellation of the error messages stored in the register
- **totale RESET :** allows the zero total electronic control unit, with the consequent loss of "history" of the machine (compressor settings, error messages, working hours, etc.).

The function of RESET must be authorized by the manufacturer, so the Center level access requires entering alphanumeric password coded (in addition to the "Center"), please contact the Manufacturer's Customer Service for authorization.

6.3.10 TYPE COMPRESSOR MENU ACCESS : STOP CA

This menu allows setting the type of compressor on which the unit is installed. Clearly this choice is crucial because it determines how the control of the compressor and configure the basic parameters of the operation.

The type of compressor can be chosen from the following families (the string “xx” represents the value of the nominal pressure of the compressor, the string “yy” the rated compressor):

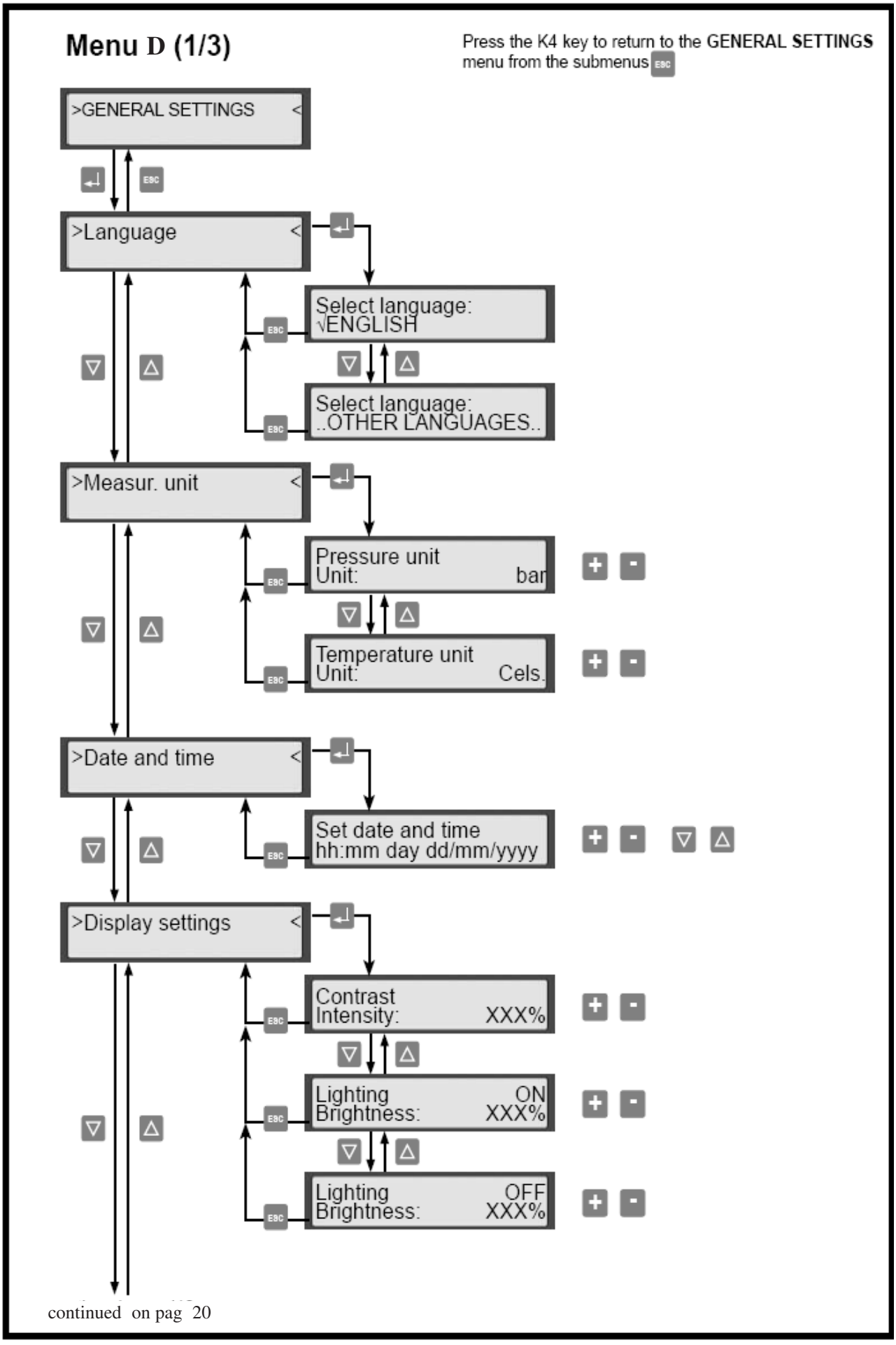
FAMILY	APPLICABLE TO
Custom	Compressor prototypes, modified or customized
GE +dryer xxbar	GENESIS / OASIS xx bar with integrated dryer
GE no dr.- SM xxbar	GENESIS / OASIS xx bar without integrated dryer SMART / STAR xx bar
RS +dryer xxbar	FORMULA / MODULO xx bar with integrated dryer (MC2 controlled)
RS no dr.- VT xxbar	FORMULA / MODULO xx bar without integrated dryer VT / VISS xx bar
RSyyVS +dryer	FORMULA / MODULO yy kW variable speed, with integrated dryer
RSyyVS no dryer	FORMULA / MODULO yy kW variable speed, without integrated dryer

The choice involves the automatic configuration of all parameters to factory defaults. Are excluded from auto-configuration, the following parameters, which retain the values previously set by the user:

MAINTENANCE	Enabling components RESET Min-Max component life Block NO-maintenance
GENERAL SETTINGS	Language Measurement units Display setting Operation mode Compressor control Type remote control AUTORESTART mode OUTPUTS configurations Pre-heating oil
NETWORK SETTINGS	ID compressor Prefill compressors Prefill Time Max n. compressors ON Running time sequence Reaction time delay ON Reaction time delay OFF

Selection of the compressor “Custom” allows you to create a configuration of the parameters of a new machine, inheriting the settings from another “type compressor”. Later you can customize the desired parameters entering the setup menu / configuration.

6.4 GENERAL SETTINGS MENU



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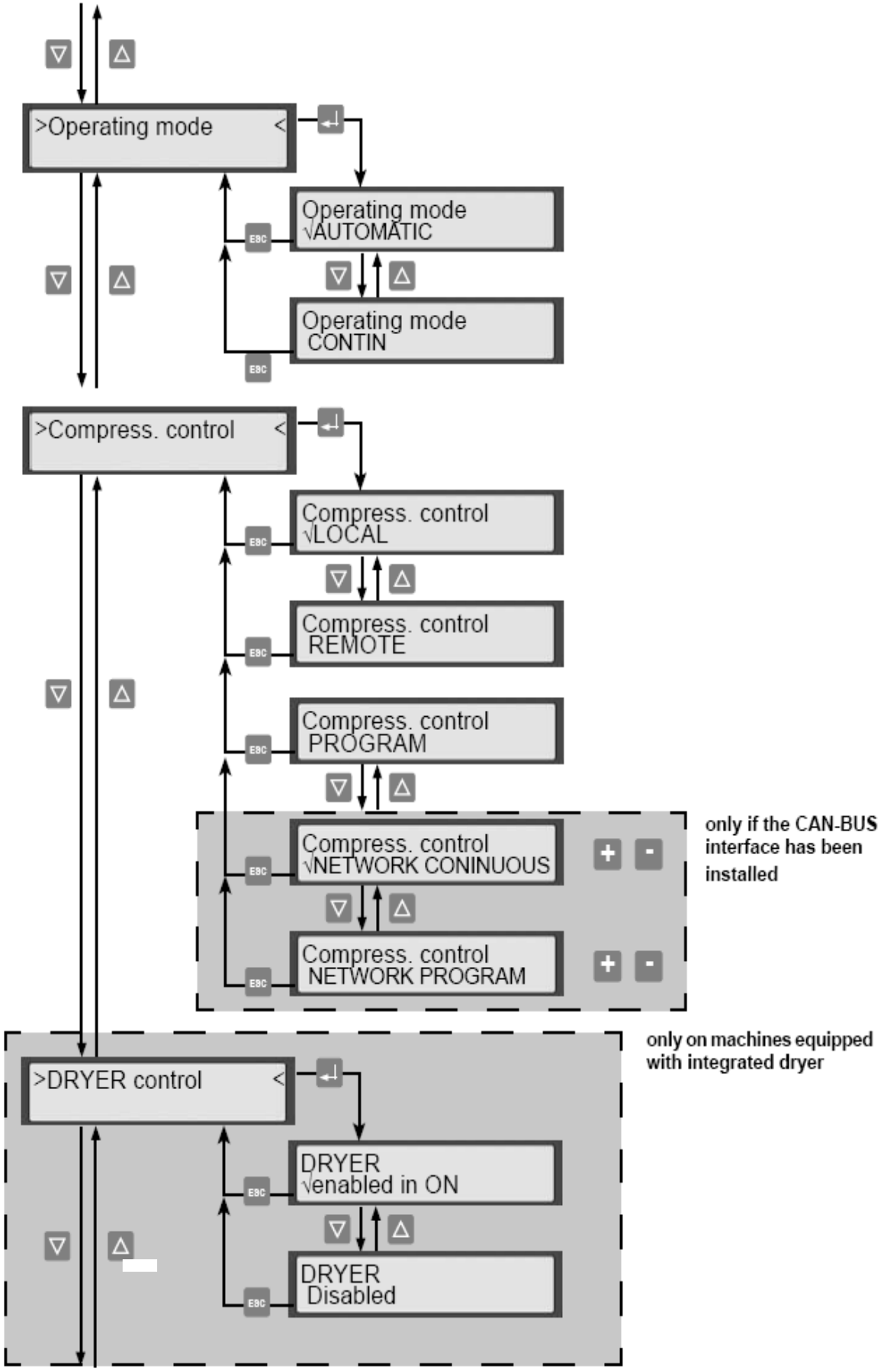
Menu D (2/3)

Press the K4 key to return to the GENERAL SETTINGS menu from the submenus ESC

continued from pag 19



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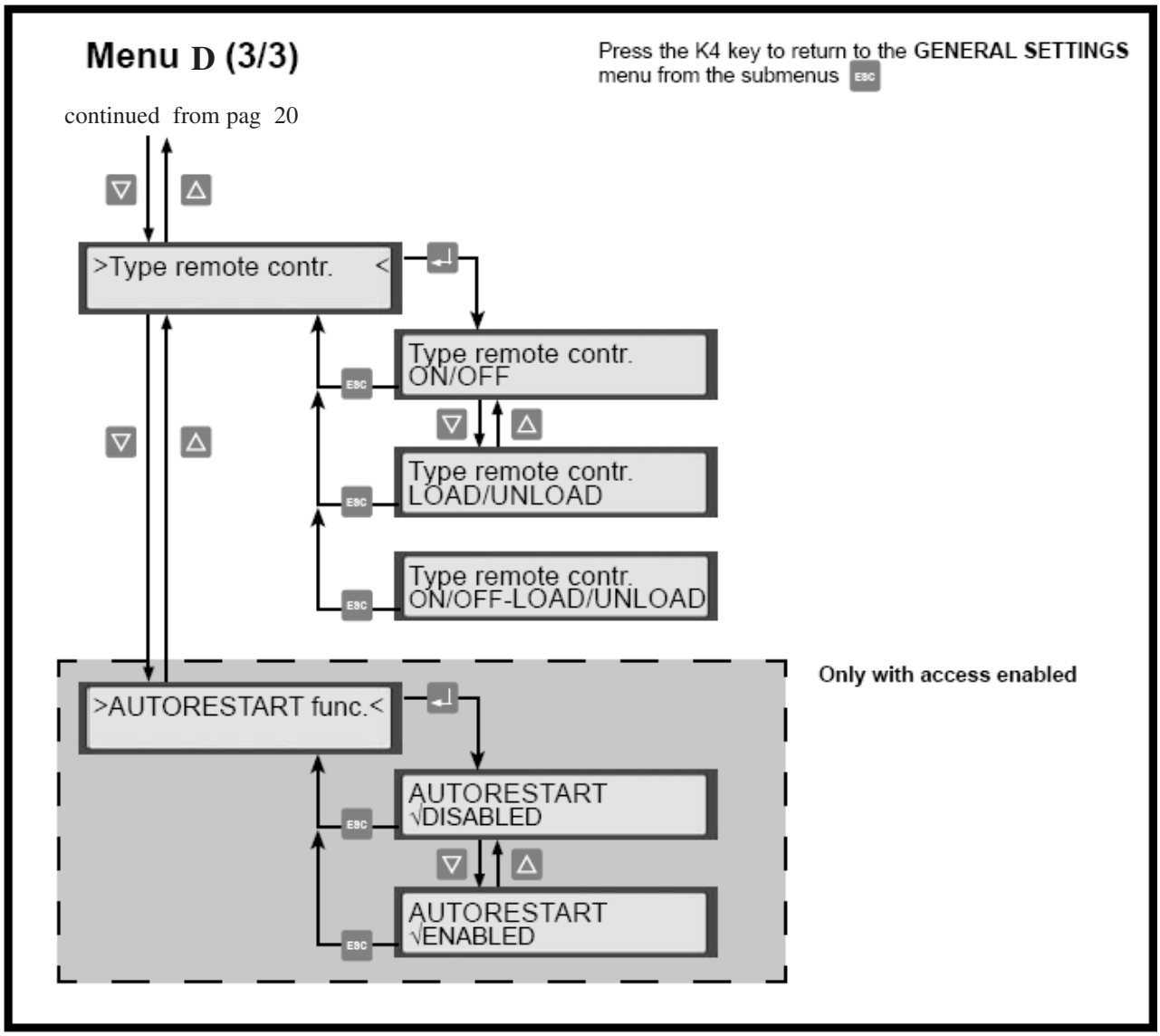


6.4.1 LANGUAGE

Factory setting: ITALIAN ACCESS : ALWAYS UT

This menu lets you select the language used for messages to display; standard software allows you to select one of the twelve following languages: Italian, English, German, French, Portuguese, Spanish, Danish, Polish, Slovenian, Dutch, Norwegian and Finnish.
(version with Cyrillic characters: Italian, English, German, French, Portuguese, Spanish, Russian, Polish, Slovenian, Dutch, Norwegian and Finnish).
The language setting can also be performed by the main screen, by pressing the arrows “keys up K5/ key down K6” ; refer to chapter 4.4 and 6.

6.4.2 MEASUREMENT UNITS °C/°F - Bar/Psi ACCESS : ALWAYS UT

Factory setting: °C - Bar

This menu allows you to set the units of measurement for pressure and temperature.

Please note that, for alphanumeric values, you can always return to factory defaults during the editing stage by pressing the button “RESET”.

6.4.3 DATE AND TIME ACCESS : STOP UT

This menu allows setting the date and time of the system, useful for the control of the compressor in “programming” and to store error messages in the log anomalies.

Editing the time and date you run as follows:

the K7 and K8 keys to modify the flashing values

the K5 and K6 keys to move to modification of the previous / next character

After entry of the values, these can be confirmed with the K9-ENTER key or cancelled with the K4-ESC key.

6.4.4 DISPLAY SETTINGS **ACCESS : ALWAYS UT**

Factory setting :	**Contrast**	**75 %**
	Light ON	**100 %**
	Light OFF	**12 %**

This menu lets you adjust the settings of the display, "Lights ON" is the brightness of the display during the phases of operation (press the buttons on the control panel), "Lights Off" is the brightness display "residual" during periods of inactivity (after a moment's lack of command emanating from the control panel).

Please note that, for alphanumeric values, you can always return to factory defaults during the editing stage by pressing the button "RESET".

6.4.5 OPERATING MODE

Factory setting : AUTO ACCESS : STOP UT

This menu lets you configure whether the compressor has to work with a timer or keep running with no load the gear load indefinitely (the compressor never stops), and those settings are AUTO or CONTINUE.

AUTO: is the approach to be used in most cases. In this mode of operation the timer is running with no load, at the end of counting the compressor stops predisposes to a later start automatically. This will save energy when the system requires no compressed air or the request is very low. The duration of the march vacuum Configurable refer to paragraph 6.5.3.

CONTINUE: is the approach to be used in very specific applications, where it has a strong variability of compressed air consumption coupled with a reduced storage capacity of the plant. With this setting, the compressor starts running empty without ever producing the engine to stop and remain available to provide air immediately following a request from the network. The system thus configured is very responsive, but has the disadvantage of higher energy consumption due to the fact that the compressor is always in motion. In the case of variable speed compressors with operating modes continue the march vacuum is maintained at a minimum speed of rotation of the motor to minimize power consumption.

6.4.6 COMPRESSOR CONTROL

Factory setting : LOCAL ACCESS : STOP UT

This menu allows you to select the control mode of the compressor between the options of **LOCAL / REMOTE / PROGRAM**

If the compressor is equipped with CAN-BUS communication module then become visible and selectable options, **NETWORK-CONTIUOUS / NETWORK-PROGRAM**.

LOCAL: is the basic setup (factory) allows direct control from keyboard control panel, the inputs for remote control program and any daily / weekly are ignored.

REMOTE: Through this setting, the compressor can be controlled by one or two remote switches outside, connected to digital inputs dedicated.

PROGRAM: empowering the daily or weekly program set and enabled in the "Programs" menu. With the setting PROGRAM compressors continue to be able to be controlled remotely through a single external switch, which determines whether the network should follow the program set up or ignore it, remaining at rest.

NETWORK-CONTIUOUS: is the setting for the operation of the battery of compressors connected via CAN-BUS module, with the functions of the communication (rotation, alarm management, etc.).. With the setting NETWORK - CONTINUOUS compressors continue to be able to be remotely controlled through a single external switch, which governs the start and stop the collective of all compressors.
Remote control of individual compressors, even if feasible, is strongly discouraged because it affects the way you manage your network, reducing the benefits from the operation of communication equipment.
NETWORK-PROGRAM: is the setting for the operation of the battery of compressors connected via CAN-BUS module, with the functions of the community (rotation, alarm management, etc.). and through the program daily / weekly.
With the setting NETWORK - PROGRAM compressors continue to be able to be controlled remotely through a single external switch, which determines whether the network should follow the program set up or ignore it, remaining at rest.
Remote control of individual compressors, even if feasible, is strongly discouraged because it affects the way you manage your network, reducing the benefits from the operation of communication equipment.
REMARK: Remember that the keyboard control unit is always the priority over any remote control and / or program: This means that to make the remote control and / or the command program to be effective, you must press the button START, placing the compressor in "Waiting com. rem. "(" Waiting com. progr. "). Likewise, it is possible to stop the compressor, without fear that it can be rebooted remotely and / or the program pre-set, pressing the STOP K2.

By way of example, to enable operation with remote control (no program) of a single compressor must:

1) Make changes to the cabling by connecting one / two breakers
2) Select REMOTE CONTROL
3) Select control mode (ON/OFF, LOAD/UNLOAD, ON/OFF - LOAD/UNLOAD)
4) Make available the compressor to the remote control by pressing the START button on the control unit K1

Again by way of example, to enable operation from the program (without remote control) of a single compressor must:

1) Select PROGRAM control
2) Select the programming mode to follow (DAILY / WEEKLY)
3) Schedule daily or weekly schedule chosen, if necessary by taking first at the RESET
4) Enable the control program by pressing the START button on the control unit K1

6.4.7 DRYER CONTROL

Factory setting: LOCAL ACCESS : STOP UT

This menu is visible only on compressors with integrated dryer controlled by the CPU, allows you to enable or disable the dryer.

With the dryer disables the solenoid drain is maintained.

6.4.8 TYPE OF REMOTE CONTROL

Factory setting: ON / OFF ACCESS : STOP UT

This parameter takes effect only if you set the mode of remote control to operate a single compressor.

When control of the compressor is set as remote and can have three types of control mode:

ON / OFF: is the setting that allows you to control the switching on and off the compressor. This is the factory (the most commonly used) that leverages its control logic of the compressor, using the pressure signal that the machine is fitted locally

LOAD / UNLOAD: is the setting that allows you to control how running at full load and the load through an external control logic: in this case the measured pressure signal from the compressor is ignored for the purpose of checking the mode of travel (the remaining active security). Compressors, variable speed control of working conditions, loading and vacuum is coupled to speed control, so when the compressor is commanded to march against the governor opens the inlet valve and the engine is operated at maximum allowable speed at that pressure and when the compressor is commanded to march to close the vacuum regulator inlet and the motor moves the minimum speed.

ON/OFF - LOAD/UNLOAD: is the setting that allows you to control both the on / off the compressor, both the mode of travel. Even in this case, you should use an external control logic, since the pressure signal is ignored for the purposes of control (remaining active safeties). For variable speed compressors are worth the statements made in the previous paragraph.

6.4.9 AUTORESTART MODE

Factory setting: **DISABILE** **ACCESS : STOP** **UT**

This menu lets you set the function Autorestart, useful to realize the automatic restart after a power outage and subsequent restoration of voltage. The function is also accessible at the user, **after entering the password coded serial number of the unit reported to the MC2.**

6.4.10 INPUTS CONFIGURATIONS ACCESSO : STOP CA

Fixed speed compressors:	
Parameter	**default value**
INPUT n.1 – Emergency	NC
INPUT n.2 – Phase sequence	NC
INPUT n.3 – Overpressure	NC
INPUT n.4 – Motor overload	NC
INPUT n.5 – Remote control	NO
INPUT n.6 – Load/unload control	NO
INPUT n.7 – Air filter blocked	NO
INPUT n.8 – Oil heating	NO

Variable speed compressors:	
Parameter	**default value**
INPUT n.1 – Emergency	NC
INPUT n.2 – Phase sequence	NC
INPUT n.3 – INVERTER alarm	NC
INPUT n.4 – Motor PTC	NC
INPUT n.5 – Remote control	NO
INPUT n.6 – Load/unload control	NO
INPUT n.7 – Air filter blocked	NO
INPUT n.8 – Oil heating	NO

This menu allows you to configure the state of the digital inputs of the electronic control unit. The main usefulness of this menu consists of the following options:

1. pattern of inputs REMOTE CONTROL (INPUT n.5 =ON/OFF control;INPUT n.6 = LOAD/ UNLOAD control)
2. temporary exclusion of a warning device to malfunction as the same (eg phase sequence relay): this avoids having to run jumpers on the wiring

Please note that, for alphanumeric values, you can always return to factory defaults during the editing stage by pressing the button "RESET".

6.4.11 MAXIMUM SPEED CALIBRATION SETUP ACCESS : STOP CA

This menu is only present on compressors, variable speed and allows you to calibrate the analog input unit designed to measure the speed of the electric motor.

The calibration is done with the compressor running at full speed, this condition can be achieved, for example, by ensuring that the pressure delivered by the compressor is less than 4 bar.

In this condition of running the calibration is done automatically when pressing ENTER.

It is helpful to have calibration after replacement of the engine control unit or the INVERTER and in all those cases in which the compressor at full speed, should have a higher percentage of use of less than 100%.

6.4.12 OUTPUTS CONFIGURATIONS ACCESSO : STOP CA

Parameter	default value
OUTPUT n.7 – Alarm	NO
OUTPUT n.8 – Motor ON	NO

This menu allows you to configure the digital output status “free” (not for the actions is in the machine) of the electronic control unit. The main usefulness of this menu is that you can configure the alarm output at will, according to system requirements. The motor output ON is available only for compressors that are not controlled by the dryer unit, otherwise this is destined to rule out the dryer and therefore not accessible to its configuration.

Please note that, for alphanumeric values, you can always return to factory defaults during the editing stage by pressing the button “RESET”.

6.4.13 START UP MODE ACCESS : STOP

This menu allows you to set the startup type of compressor settings are possible:

- STAR -DELTA START UP
- DIRECT START UP
- SOFT-START START UP

This menu is not present on compressors, variable speed. The configuration has utility only for factory settings or the creation of special compressors.

6.4.14 DRAIN VALVE DRIVE ACCESS : STOP UT

This menu allows the setting of the mode of operation of the solenoid drain (DRAIN) between the following possible alternatives:

- operational ON: the condensate drain solenoid valve is actuated (timed) when the compressor is running, whether load or unload
- operational LOAD : the condensate drain solenoid valve is actuated (timed) only when the compressor is in running LOAD
- disable : the condensate drain solenoid valve is disabled

The factory setting is variable depending on the type of compressor.

The configuration has utility only for factory settings or the creation of special compressors.

6.4.15 PRE-HEATING OIL ACCESS : STOP CA

This menu allows the setting on the device pre-heating oil in the separator tank. The device is supplied in kit as an accessory after the sale. Refer to the manual of the kit instructions for installation and configuration.

With the “PRESENT” the unit becomes “sensitive” state digital input n.8, realizing, for safety reasons, inhibiting the initiation of the compressor when the resistance of the oil heater is active.

6.4.16 BASE TIME MAINTENANCE ACCESS : STOP CA

Factory setting: 1 hour → 1 hour maintenance

This menu lets you configure the time base on which the unit operates. Changing the setting with:

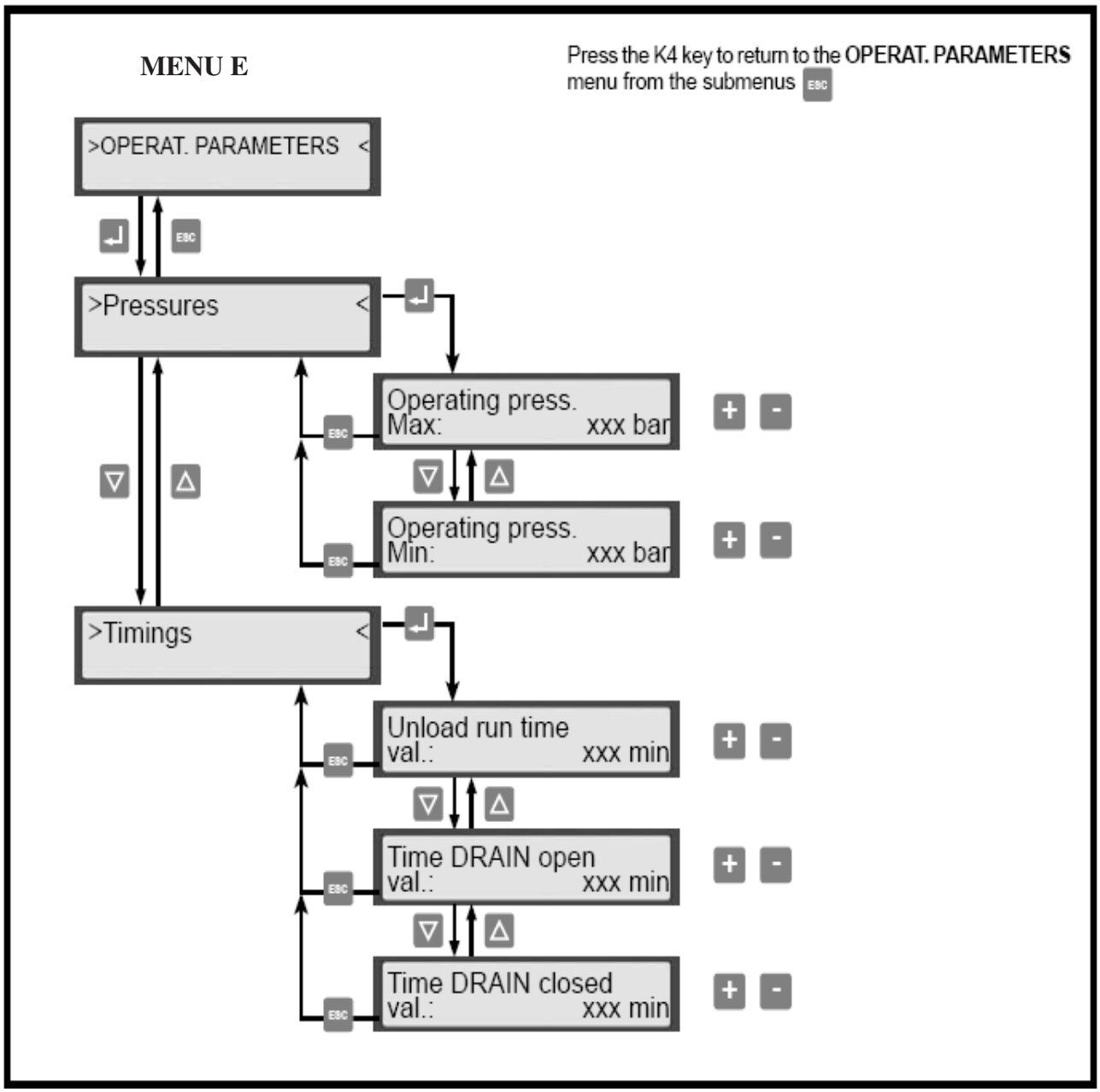
1 min → 1 hour maintenance
1 sec → 1 hour maintenance

is possible to conduct simulation tests in accelerated time. The function has only useful for running simulations.

6.4.17 NETWORK SETTINGS

This menu is visible only when the unit is equipped with the communication module CAN-BUS. For the configuration of control parameters of the compressors in the network refer to Chapter 7

6.5 OPERATING PARAMETERS ACCESS : STOP UT



6.5.1 PRESSURE ACCESS : STOP UT/CA

- **Operating Pressure Max:** is the value of system pressure after which the compressor is placed in gear to empty the parameter is also accessible to the user level. The maximum value set is represented by the parameter "Max Pressure plate". Variable speed compressors to achieve the maximum pressure is also accompanied by the slowdown to the minimum speed allowed.
  The factory setting coincides with the value of "Max Pressure plate" to the type of compressor.

- **Operating Pressure Min:** is the value of system pressure at which the compressor to continue our march to load or restart after a stop automatically and the parameter is also accessible to the user level. The maximum value set is limited by the parameter "pressure max" and the value of the "Differential Min". Variable speed compressors to achieve the minimum pressure is also accompanied by accelerating the speed limit at that pressure.
  The factory setting corresponds to the value of "Max Pressure plate" to the type of compressor, minus 1 bar (value of "Differential Min").

- **Max pressure plate:** is the value of pressure that the upper limit the "Operating pressure Max", **this value is set at the factory, based on the configuration of the machine (compressor type, gear ratio, safety valves, pressure tanks for approval, etc.). .** There are no special contraindications in reducing the value of the parameter, its growth, however, since it brings the compressor working at pressures higher than the project requires the execution of a series of changes of the machine.

- **Overpressure Max:** is the value of system pressure at which the compressor stops for "excessive system pressure. This threshold alarm helps protect the compressor from external pressure, prompted by other compressors (the system pressure is measured downstream of the valve and valve Minimum pressure of the machine).
  The factory setting provides an overpressure of 1.5 bar than the "pressure Max" scheduled, exception compressors with nominal pressure of 15 bar, for which the value of "Max overpressure" is limited to 1 bar. The alarm does not give any indication of pressure on the state of clogging of the oil separator filter .

- **Differential Min:** is the minimum difference between the values of "pressure max" and "pressure min ". When the "pressure Max" is reduced to "pressure min" is reduced accordingly, respecting the "Differential Min" set.
  The factory setting provides a differential of 1 bar. It is recommended not to program the lower values, to prevent a switching frequency between the march and the march against vacuum too high or in the case of variable speed compressor, an adjustment range is too narrow, resulting in unstable operation.

6.5.2 TEMPERATURES ACCESS : STOP CA

- **Fan Temperature ON:** compressors with thermostatically controlled fan provides the value of the temperature at which the fan is activated.
  The factory setting requires a value of 80 ° C for the compressors to 8 and 10 bar and 90 ° C for the compressors to 13 and 15 bar. When "Fan ON temperature" is reduced "temperature fan OFF" is reduced accordingly, respecting a minimum differential of 5 ° C, useful to preserve the fan by frequent start-ups. Changing the "Temperature Fan ON", together with that of the "Temperature fan OFF" can be useful to tailor the thermal regime of the machine to the environment in which to operate. Very hot and humid climates (eg tropical climates) generally require a rise in operating temperature to avoid condensation within the separator tank, on the other hand this reflects negatively on the performance of the machine (oil should be used more viscous) and the life of the oil (rapid decay). For temperate and relatively low humidity, you can use a temperature control system centered on values of the lower temperature, to the benefit of the integrity of components over time (eg hoses, seals, etc.)..

- **Fan Temperature OFF** : compressors with thermostatically controlled fan provides the value of the temperature at which the fan is turned off. **The factory setting requires a value of 70 ° C for the compressors to 8 and 10 bar and 80 ° C for the compressors to 13 and 15 bar.** For tips on setting this parameter to refer to the description of the previous parameter.

- **Max alarmTemperature :** represents the temperature at which the compressor indicates critical operating condition, which is achieved without blocking machine.**The factory setting requires a value of 100 ° C. You should not modify this parameter.**

- **Max Temperature blocked:** represents the temperature at which the compressor goes into blocking temperature compression excessive.
  The factory setting requires a value of 110 ° C. You should not modify this parameter.

- **Min Temperature alarm :** represents the temperature at which the compressor indicates critical operating condition (typically startups), without blocking the machine is achieved.**The factory setting requires a value of 5 ° C. You should not modify this parameter.**

- **Min Temperature blocked:** represents the temperature at which the compressor goes into blocking low temperature.**The factory setting requires a value of 0 ° C. You should not modify this parameter.**
  The low temperature environment is a critical condition for the start of the compressor, in fact, high oil viscosity, can generate a low flow rate of the same (lack of lubrication or insufficient) and high torque. Temperatures below 0 ° C are absolutely to be avoided because they may experience the following events: the oil separates from water (moisture) contained therein creating a layering of liquids in the separator tank and the water, which is positioned at the bottom of the tank freezes, creating an ice cap for tubing draft oil, compressor oil startup has no chance to move and can be reached in a few seconds of operation, seizure of airend.
  When the compressor stops for low temperature can, in cases of extreme necessity, follow the procedure of "forced start" described in paragraph 9.
  Compressors equipped with a system of pre-heating the oil block machine for low temperature is inhibited, because the oil in the separator tank temperature is maintained through the electrical resistance.

- **Temperature DRYER OFF:** This parameter is present only when the compressor is equipped with integrated air dryer controlled by the electronic control unit. Represents the value of the temperature at which the refrigeration compressor dryer is turned off.
  The factory setting requires a value of 0 ° C. You should not modify this parameter.

- **Differential temperature DRYER :** This parameter is present only when the compressor is equipped with integrated air dryer controlled by the electronic control unit. Are the difference (positive) between the temperature of deactivation of the compressor refrigerator ("Temperature DRYER OFF") and that of activation.
  The factory setting requires a value of 6 ° C. You should not modify this parameter.
  If the setting of the two control parameters is the original setting of the dryer, the refrigerator compressor is activated when the dew-point temperature reaches 6 ° C and deactivated when it reaches 0 ° C.

- **OFFSET dew point:** represents the difference between the temperature measured by the sensor and the one shown in the display.
  The factory setting requires a value of 0 ° C. You should not modify this parameter.

6.5.3 TIMERS ACCESS : STOP UT/CA

- **UNLOAD timer :** Time is unload running and begins when the compressor reaches the "pressure max" if during the march to the vacuum system pressure falls below the "Low pressure" at the end of counting of timer stops the compressor, by providing an automatic restart in case of request for air from the network. If the compressor is configured mode of operation "Continue" instead of setting "Automatic", then running with no load is of indefinite duration. **The factory setting requires a value of 5 minutes for the fixed speed compressors and 1 minute for variable speed compressors.**
  The value of running with no load is to "link up" later stages of travel charges (supply air) and have the air compressor immediately ready to produce when there is a request from the network.

The use of running with no load times too short can lead to frequent starts and the dilution resulting from atmospheric moisture condensate in the oil due to the low temperature of the compressor.

- **Time DRAIN open :** is the time of opening of the solenoid for the drain, determines the length of the exhaust and the possible waste of air.

  The factory setting is variable depending on the type of compressor.
  The parameter must be configured, in conjunction with the "Time DRAIN closed", according to the humidity environment of the place of installation; humid climates require a longer time of discharge, dry climates require a shorter time of discharge. The adjustment of the discharge time is also function of the compressor requires a machine with dryer, with the same environmental conditions, timing of condensate drain longer than an equivalent compressor without desiccator. In general terms it is better to have frequent discharges condensate and of short duration, rather than infrequent and long lasting.

- **Time DRAIN closed :** is the time to maintain the solenoid for the drain in position "closed". More the parameter is set to low values, the more frequent (close) the drain.
  The factory setting is variable depending on the type of compressor. The parameter must be configured, in conjunction with the "Time DRAIN open," according to the humidity environment of the place of installation; humid climates require discharges more frequently. The adjustment of the frequency of discharge is also function of the compressor, a machine with dryer requires, for the same environmental conditions, discharges more frequently than an equivalent compressor without desiccator. In general terms it is better to have frequent discharges condensate and of short duration, rather than infrequent and long lasting.

- **Stopping Time :** is the time to keep the engine - the compressor in rotation after the stop command by the operator, with closed suction regulator (brand A vacuum exhaust of internal pressure), the usefulness of this step is the reduction of blood pressure inside before shutdown of the pumping unit in order to avoid mechanical stress due to the abrupt halt in pressure. Compressors, variable speed the "stop time" is the running time accompanied by the down-load at minimum speed, which precedes the deceleration ramp for the arrest of the compressor.
  The factory setting is variable depending on the type of compressor and the "Max Pressure plate". You should not modify this parameter.

- **Download Time :** is the time during which the compressor discharge the internal pressure in order to minimize the energy consumed in the process of running with no load or to arrange for to restart with a low load of the electric motor. The counting will exhaust part simultaneously with the closing of the inlet air compressor regulator, as a result of the passage running empty, a timed shutdown ordered by the operator of an emergency stop or a machine alarm. During the "download time" if the electric motor is stopped any kind of startup is inhibited.
  The factory setting is variable depending on the type of compressor and the "Max Pressure plate". You should not modify this parameter.

- **Fan ON Time :** is the time spent on the ventilator after stopping the engine driving the compressor. This parameter is effective only for those compressors where it performs a check of the fan for temperature control of the oil circuit, otherwise the fan stops simultaneously with the main engine.
  The factory setting requires a value of 15 seconds.

- **Min Time DRYER OFF :** This parameter is present only when the compressor is equipped with integrated air dryer controlled by the electronic control unit. Represents the minimum time for retention of the refrigerator compressor turned off the dryer, has the function of protecting the dryer from boots too frequent. The timer starts every time the refrigerator compressor is turned off, during the counting of timing restart is inhibited, regardless of the values of dew point measured.
  The factory setting requires a value of 60 seconds. You should not modify this parameter.

- **AUTORESTART delay :** This parameter represents the delay with which the compressor will restart automatically after restoring power after a blackout. The setting is effective only if the function of Autorestart is active. During reset, the display unit shows the message "Autorestart" and a countdown, the LED blinks XXX warning the operator of the impending restart.
  The factory setting requires a value of 10 seconds.

- **Star-Delta Time :** this parameter, only visible on fixed speed compressors (with start - delta startup) represents the duration of the "stage star" during the boot of the machine. The ideal value is appropriate to achieving operating speed during the star. Too short cause severe overloads and mechanical switching of the contactors star - delta ; too long cause unnecessary delays in the compressed air.
  The factory setting is variable depending on the type of compressor. You should not modify this parameter.

- **Star - Delta delay :** is the delay in closing the "contactor delta" with respect to the opening of the "star contactor". The parameter is present only on the fixed speed compressors (with start - delta startup). **The factory setting is 20 msec. You should not modify this parameter.**

- **Acceleration time :** is the time that elapses between the end of the "contactor delta" and the opening command regulator inlet. This delay allows the engine to regain speed in the conditions of speed switching as a result of the star - delta . The parameter is present only on the fixed speed compressors.
  The factory setting is 20 msec. You should not modify this parameter.

- **Delay switch max pressure :** This parameter is present only on the fixed speed compressors. Some compressors are equipped with a safety pressure switch capable of intercepting the state of clogging of oil separator filter, causing the blocking machine if the pressure upstream of this is excessive. The benchmark applies a filter to the delay signal from the pressure switch to avoid unwanted blocks, caused by pressure spikes of short duration.
  The factory setting is 200 msec. You should not modify this parameter.

- **Maximum number starts/hour :** This parameter defines the maximum number of starts that the compressor can make in one hour, in order to protect the electric motor. **The factory setting is variable depending on the type of compressor. You should not modify this parameter. When the compressor stops for exceeding the number of starts may be permitted in cases of extreme necessity, follow the procedure of "forced start" described in paragraph 9.**

6.5.4 SPEED CONTROL ACCESS : STOP

This menu and its submenus are present only in variable speed compressors.

- **Bottom speed :** represents the motor speed electric signal corresponding to the minimum (4 mA) provided by the control unit to INPUT analog inverter. At this signal, the inverter is programmed to match the minimum frequency power of the engine.
  The factory setting is variable depending on the type of compressor. You should not modify this parameter.

- **Top speed :** represents the speed of the electric motor corresponding to the maximum signal (20 mA) supplied by the control unit to INPUT analog inverter. At this signal, the inverter is programmed to match the maximum frequency of the engine power.
  The factory setting is variable depending on the type of compressor. You should not modify this parameter.

- **Min speed :** represents the minimum speed allowed to the electric motor in driving conditions. Typically, this speed is achieved when the pressure approaches the "Operating pressure Max", when the compressor operates for a time above the target pressure (average between the "pressure max" and "Low pressure"), or when the compressor is running empty or shutting down.
  The factory setting is variable depending on the type of compressor. You should not modify this parameter.

- **Max speed :** represents the maximum speed allowed to the electric motor in driving conditions. Typically, this speed is achieved when the pressure is low, during the first filling plant.
  The factory setting is variable depending on the type of compressor. You should not modify this parameter.

- **Max speed at 13 bar:** represents the maximum speed allowed to the electric motor in a hypothetical point of operation at 13 bar, this parameter is used to define the slope of the adjustment of the maximum permissible speed at each pressure, consistent with the available power.
  The factory setting is variable depending on the type of compressor. You should not modify this parameter.

- **Fan speed ON:** This parameter allows you to define how fast the main engine must occur the start of the compressor fan, accelerating engine.
  The factory setting is variable depending on the type of compressor. You should not modify this parameter.

- **Inlet speed value :** This parameter allows you to define how fast the main engine must occur to open the inlet valve, accelerating engine.
  The factory setting is variable depending on the type of compressor. You should not modify this parameter.
  - **Time Integration PWM:** This parameter allows you to manage the change in control voltage inverter
  - **Time Integration PRS:** This parameter determines the value of "window" of the system pressure to be monitored
  - **Time Integration VEL:** This parameter defines the time interval between two successive adjustments of speed based on the evaluation of system pressure. If the pressure is below the target value correction velocity is positive (the engine is accelerated), and if, instead, the pressure is higher than the target value correction velocity is negative (the engine is decelerating). **The factory setting is 200 msec.You should not modify this parameter.**

This correction is defined by the speed parameter follows:

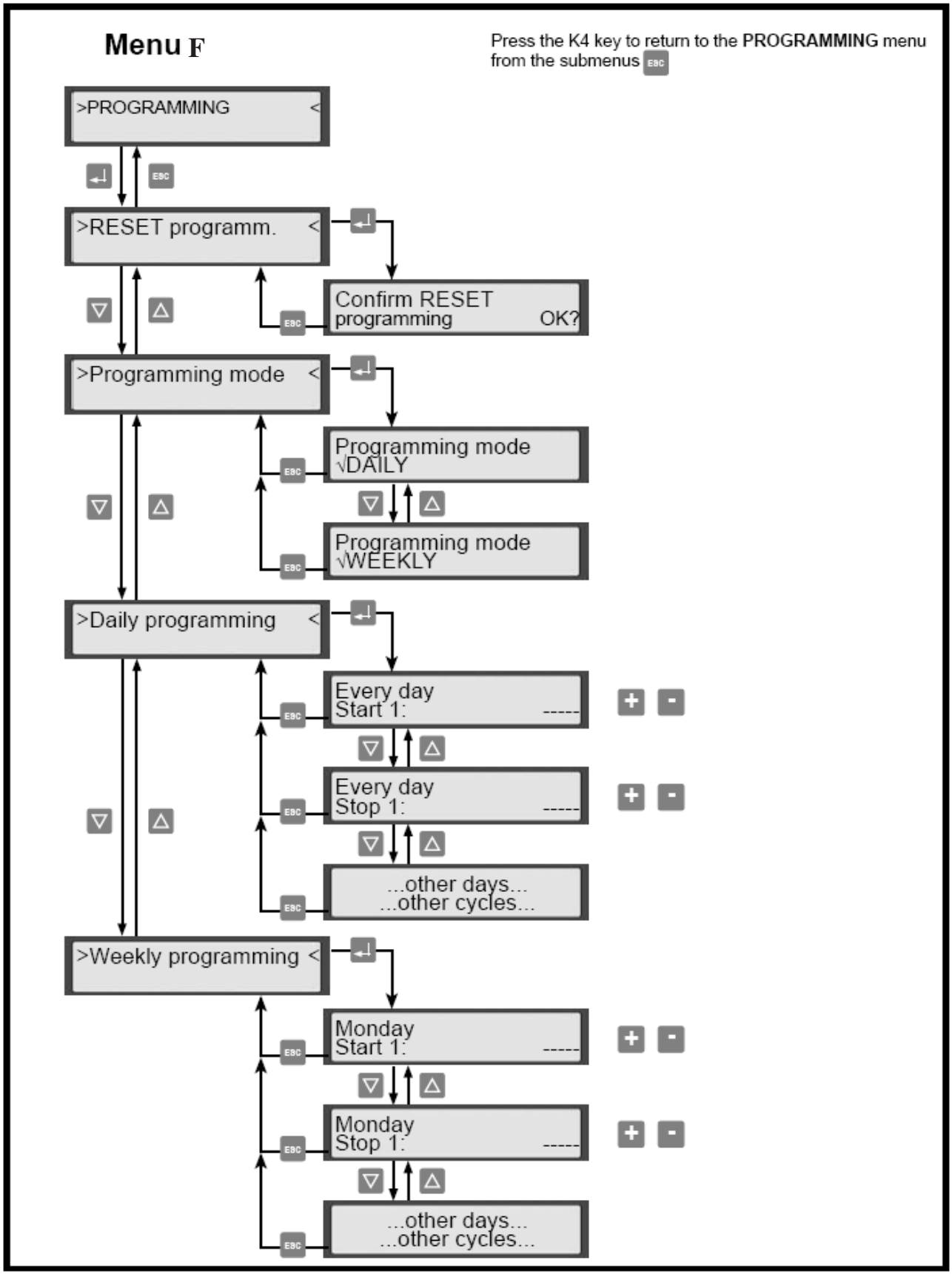
- **RPM integrating VEL:** This parameter defines the maximum correction (positive or negative) to be made to any "Time integration VEL." Keep in mind that, for better fluidity and stability of adjustment, the correction is greatest when the pressure is at the extremes of the range of adjustment ("pressure max" and "Low pressure") but nothing at the target value (average between "pressure max" and "Low pressure").**The factory setting is 10 RPM.**
  Normally this parameter is suitable for most of the applications, where compressor indicates very slowly to restore the pressure to provide objective is conceivable increase in the value of the parameter, and conversely if the mains pressure is unstable and continually oscillating around the target value should decrease the value of the parameter. Resetting the parameter the system will no longer capable of correcting speed regime and, therefore, to ensure a constant system pressure.

- **Max speed pressure :** represents the maximum pressure at which the compressor reaches "(at first filling plant) with the engine to the" Max Speed ".
  The factory setting is equal to 5.5 bar. You should not modify this parameter.

6.6 PROGRAMMING MENU ACCESS : STOP UT

The Program menu allows you to set the calendar of activities of the network of the compressor or compressors, calling days and times when they should be on. Programming can be done on a daily basis (equal for all days) or on a weekly basis (a different program for each day of the week).

The programming does not exclude the possibility of remote control, but it integrates with this. It can also be used even if the network control of compressors.



REMARK : Please remember that the keyboard control unit is always the priority over any remote control and / or program: This means that to make the remote control and / or the command program to be effective, you must press the START button , placing the compressor in "Waiting com. rem. "(" Waiting com. progr. "). Likewise, it is possible to stop the compressor, without fear that it can be rebooted remotely and / or the program pre-set, pressing the STOP K2.

To enable the operation control program must:

1) Select the control PROGRAM or, in the case of compressors in communications, NET-PROGRAM
2) Select the mode of programming to follow (DAILY / WEEKLY)
3) Schedule daily or weekly schedule chosen, if necessary by taking first at the RESET
4) Enable the control program by pressing the START button K1 on the control unit
5) If there is a remote control device, enabling the latter to provide consent to the compressor to follow the program set

6.6.1 PROGRAMMING RESET ACCESS : STOP UT

Clears all the cycles foreseen in both planning day in that week.
The erase operation is not undoable.

6.6.2 PROGRAMMING MODE ACCESS : STOP UT

This menu tells the unit if, once activated the control PROGRAM the machine to follow the daily or weekly program. The two types of programming are independent.

6.6.3 DAILY PROGRAM ACCESS : STOP UT

The programming allows the setting of daily cycles of start / stop up to a maximum of four. These cycles are repeated the same every day of the week.

Apply the following rules:
- The cycles are not programmed, identified by five dashes to substitute time, are ineffective
- Cycles with start time and stop coincidences are ineffective, like those unplanned
- If the last round has programmed stop time to 24:00 and the first cycle presents daily start time to 00:00, then the compressor will keep the unit active in the midnight shift from day to day

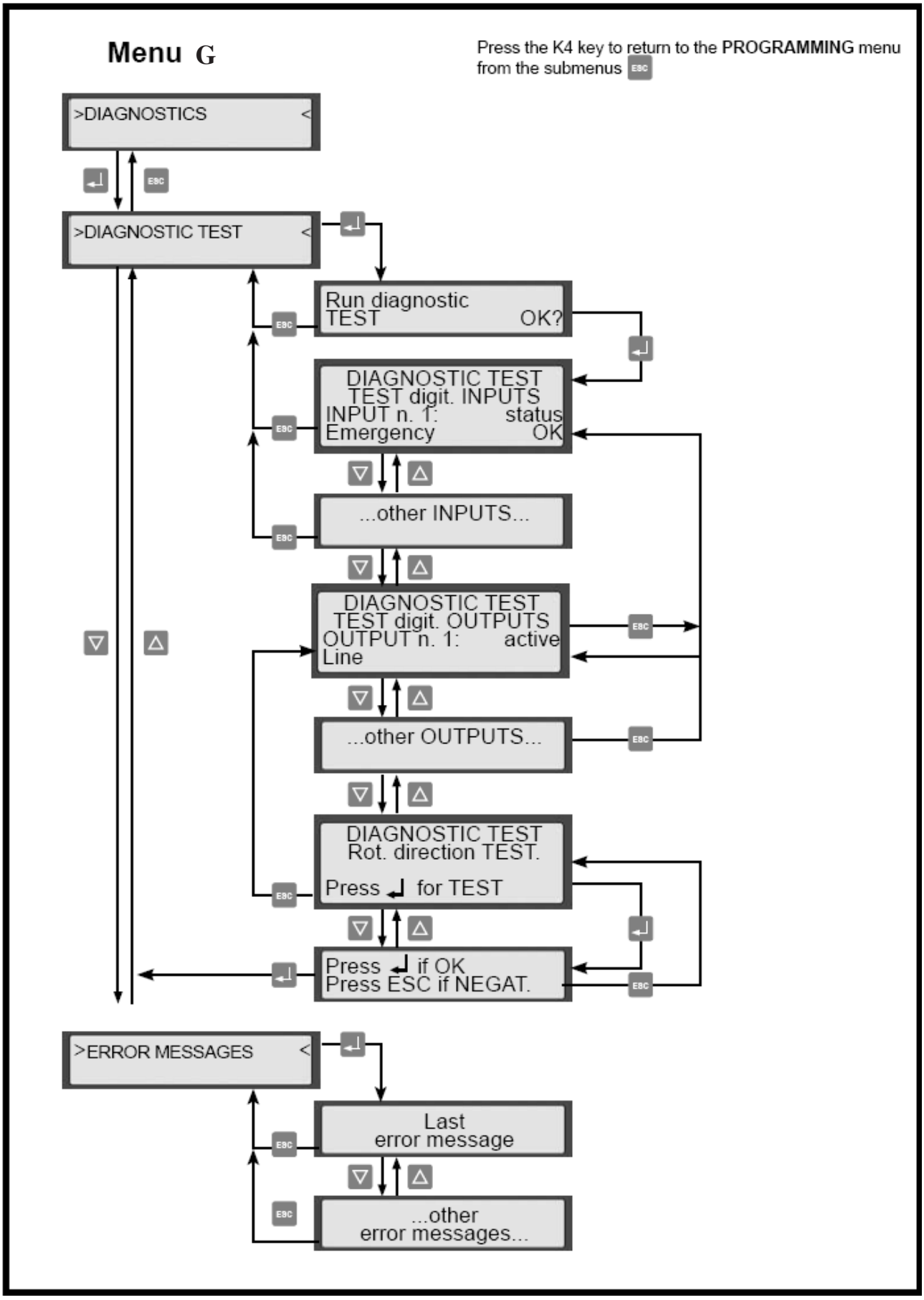
6.6.4 WEEKLY PROGRAM ACCESS : STOP UT

The programming allows the setting of weekly cycles of start / stop different for each day of the week, up to a maximum of three per day.

Apply the following rules:
- The cycles are not programmed, identified by five dashes to substitute time, are ineffective
- Cycles with start time and stop coincidences are ineffective, like those unplanned
- If the last round scheduled for a particular day shall stop time to 24:00 and the first round scheduled for the next day shows start time to 00:00, then the compressor will keep the unit active in the midnight shift from a overnight.

6.7 DIAGNOSTIC MENU ACCESS : STOP UT

The diagnostic menu allows the verification of the functionality ‘of inputs (INPUT) and outputs (output), the direction of screw rotation motor and fan. E ‘can also read the register of anomalies on the compressor.



E' opportuno che queste funzioni diagnostiche siano utilizzate da persona esperta, che conosca in modo approfondito il compressore ed il suo funzionamento.

DIAGNOSTIC TEST FOR THE IMPLEMENTATION OF THE SAFETY RULES MUST BE OBSERVED

ATTENZIONE!!!
Durante l'esecuzione del test vengono messe in tensione parti della macchina (bobine di comando) ed azionati organi rotanti (motore, compressore, ventilatore). E' quindi indispensabile che gli operatori prendano tutte le precauzioni opportune durante le verifiche.

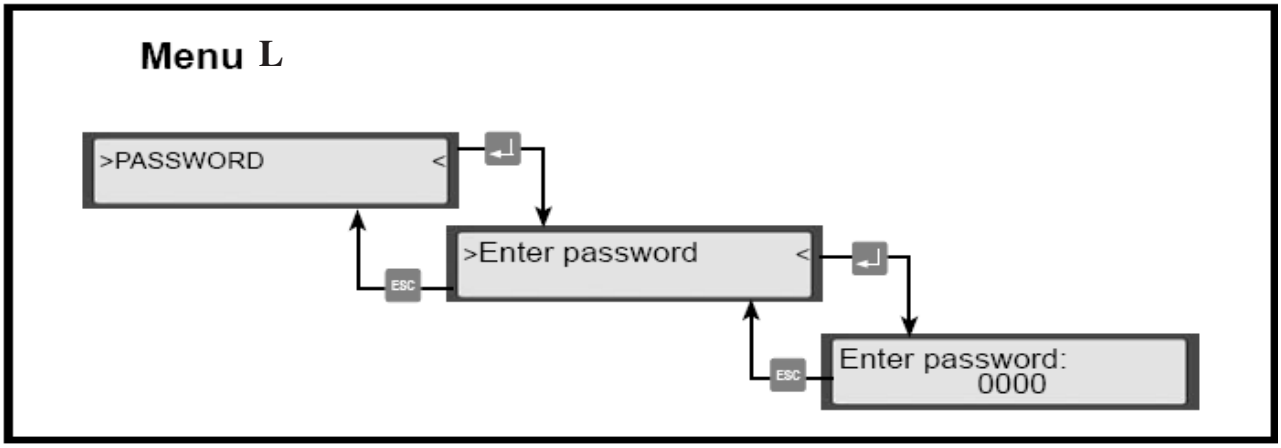
6.7.1 ERROR MESSAGE MENU ACCESS : ALWAYS UT

The MC2 controller stores all the anomalies that have occurred and produced the block-machine (alarms). For each of the error messages (max 100 type FIFO) are stored:

- Tipo di errore (allarme)
- Ora, giorno, data in cui l'allarme si è verificato
- Ore totali ed ore di marcia a carico quando si è verificata l'anomalia

Queste indicazioni vengono visualizzate ciclicamente nella terza e quarta riga del display.

6.7.2 PASSWORD MENU ACCESS : ALWAYS UT



keys K7 and K8 to modify the flashing character; numbers and letters are displayed subsequently

the K5 and K6 keys to move to modification of the previous / next character

After inserting the password, this can be confirmed with the K9-ENTER key or cancelled with the K4-ESC key

The password is provided by the manufacturer, depending on the qualifications of the applicant.

The inclusion of password access on the level or the Affiliate Center ATLAS-ABAC is running in the menu:

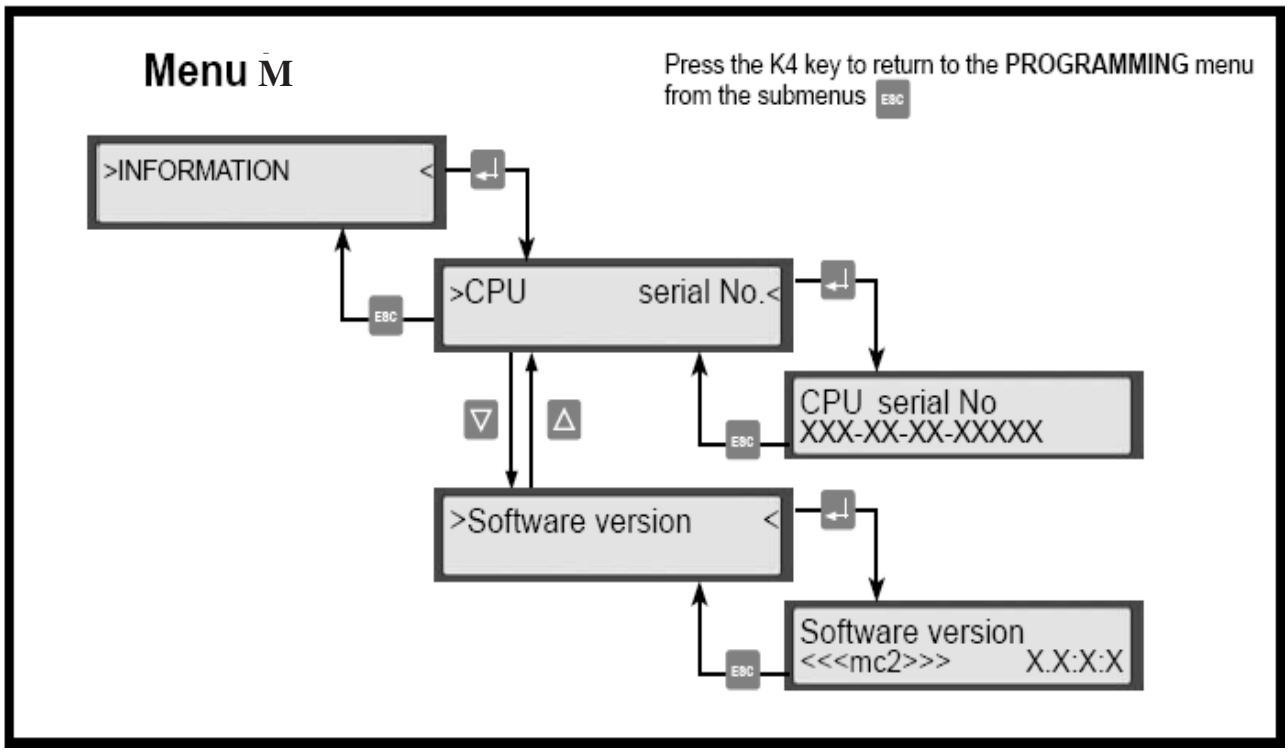
PASSWORD > Enter password <

The encrypted password based on the serial number of the electronic control unit must be included in the menu:

>PASSWORD>Enter Password >Enter Password: 0000
where, instead of zeros, will be introduced to four alphanumeric characters that make up the password.
Please note that the password “expire”, bringing the system to “user level”:

- five minutes passed without any key press on the control unit
- switch-off power supply to the controller

6.7.3 INFORMATIONS MENU ACCESS : ALWAYS UT



CPU SERIAL NR
Indicates the serial number of the unit unique and distinct
The serial number of the unit and MC2 ‘essential to ask the manufacturer certification of protective functions (eg. Autorestart) and obtain a password for access
SOFTWARE VERSION
Indicates the software version installed.

7 COMMUNICATION BETWEEN COMPRESSOR

The MC2 controller has the peculiarity of being connected to control units of the same type to create a "communication" between the compressors.
The communication allows the operation of a compressor, **up to a maximum of four machines connected with control functions coordinated**, the operation performed through the communication are:

1. timed rotation of the compressors running
2. the coordinated operation of fixed-speed compressors and variable speed
3. alarm management
4. limiting the number of compressors that work simultaneously
5. the function of pre-filling in Time (Prefill) of the plant
6. programming daily / weekly network compressors
7. the remote control of the network of compressor

The benefits derived from management through coordinated communication between the compressors are:

1. equitable sharing of the workload of the compressor, resulting in synchronization of scheduling maintenance
2. energy saving, thanks to the "splitting" the flow of air to produce and the automatic reduction of the differential pressure of work
3. "intelligent" management of the compressors redundant

The control algorithm of the rotation of the compressors (sequence) offers the best performance when connected compressors **have performance equal to or comparable** (comparable flow rates of compressed air), but may not provide the benefits described if the machines providing courses related strongly different. One exception is the combination of fixed-speed compressors and variable speed (typically a single unit), where the variable speed compressor performance can be substantially different from those fixed speed. The control algorithm in synchronous mode allows, however, the connection of compressors of different sizes with each other, although with limitations on the capabilities of network control.

7.1 INSTALLATION

In this section we provide instructions for installing the communication network adapters and their connection. Variable speed compressors have the outset, the network communication module. It is assumed that all compressors have already been properly installed (link pneumatic and electric) according to the instructions in the user manual of each machine.

Remark : This paragraph does not substitute the manual that came inside the packages of communication modules CAN-BUS, but it is an expansion.

To achieve the CAN-BUS communication must be in possession of a form for each compressor to be networked.

For the network operation is essential that the compressors are connected in communication to the same storage capacity and if there is a manifold of flow rates of individual compressors that must be appropriately sized so that, under operating conditions, the individual machines "read" the same pressure.

WARNING! Verify that the version of software installed on the control unit is 2.0.1.0 or later. In the event that the software version was prior to that indicated need to be updated: Please contact Customer Service by the manufacturer. To check the software version see the screen that appears when power is given to the compressor, or visit the Information menu.

WARNING! Before installing communication modules CAN-BUS remove the power supply to the compressors.

7.2 ASSEMBLY OF THE CAN-BUS MODULE

The CAN-BUS communication module must be assembled in the rear of the unit in the area indicated in figure COM1.

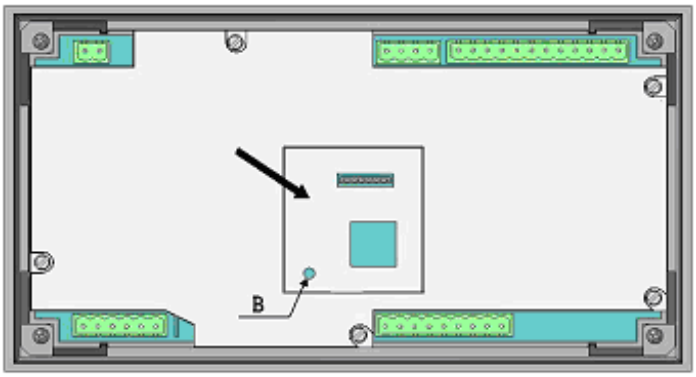


Fig. COM1

1. remove the protective plastic label at the connector X07
2. enter the communication module into the slot, making sure that the terminals of the card fit in the corresponding terminals of the controller (Figure COM2)

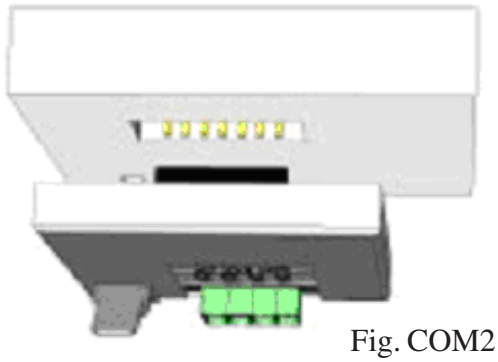


Fig. COM2

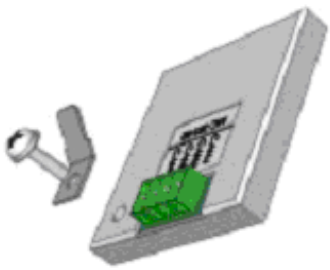


Fig. COM3

3 tighten the screw supplied in 3 x 10 hole B (Figure COM1) interposing the faston as in Figure COM3

7.3 COMMUNICATION LINK

The connection cable **(not supplied)** must be a twisted 3-wire + screen, the screen must be connected to Faston of land each control box. The maximum allowed length is 800 meters between the first and last machine.

7.3.1 CONNECTING 4 COMPRESSORS

The connections between the 4 machines must be operated according to figure COM4 (wiring diagram) and Figure COM5 (functional diagram). The first machine (compressor no.1) and the last machine (compressor No.4) must provide a bridge between CAN3 and CAN4, which makes the connections of the network terminal CAN-BUS.

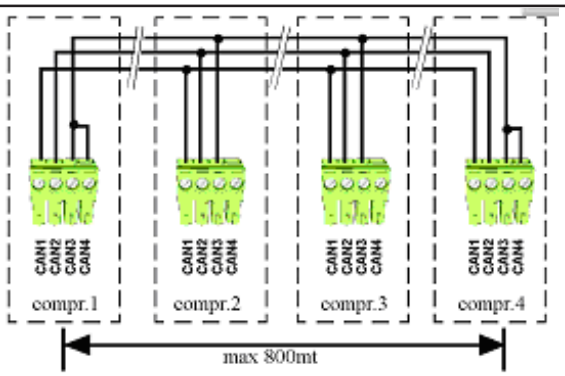


Fig. COM4

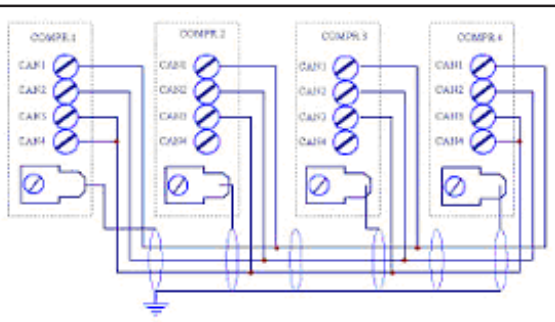


Fig. COM5

7.3.2 CONNECTING 3 COMPRESSORS

The wiring diagram is in figure COM6

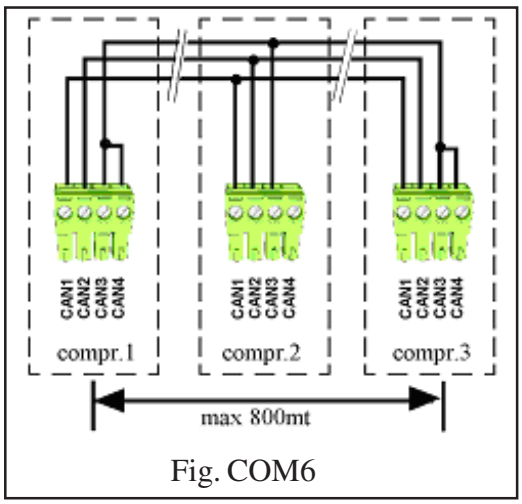


Fig. COM6

Connect the shielding in a similar way as shown in Figure COM5

7.3.2 CONNECTING 2 COMPRESSORS

The wiring diagram is in figure COM7

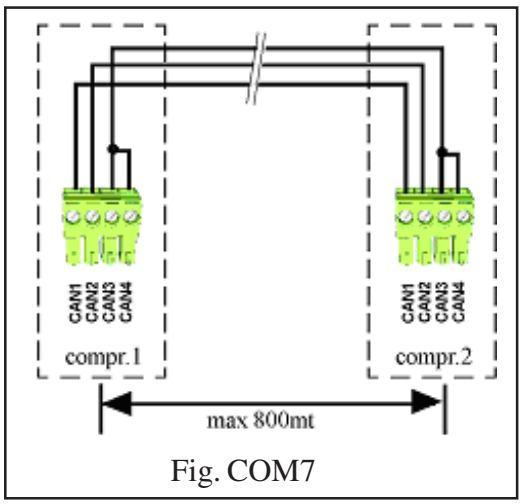


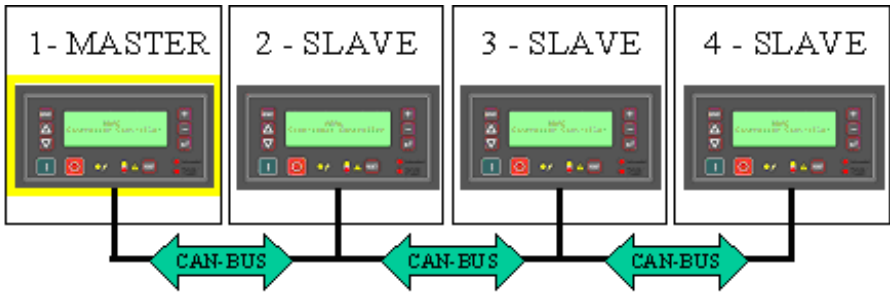
Fig. COM7

Connect the shielding in a similar way as shown in Figure COM5

8 CONFIGURATION AND OPERATION

8.1 MASTER-SLAVE SYSTEM

Compressors in the network of communication is based on the principle MASTER - SLAVE. This principle consists in the role of MASTER (master) to a machine on the network and the role SLAVE (slave) to the remaining machines. MASTER controls the network, receiving, through communication, all the relevant information from the SLAVE.

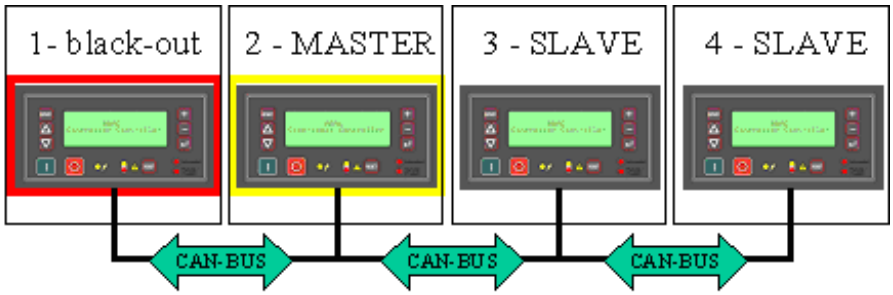


The Master is defined through the allocation of the number of network identifier ID # 1, the Slavs other ID numbers # 2, # 3, # 4.

The configurations of the parameters must always be performed on the master, the only machine able to "impose" on others its own configuration.

The MASTER is always recognizable by the LED L4 Remote / Program flashing. Moreover, the main screen, by pressing + / - you can view various parameters, including the identification number of network ID.

The system developed on a "MC2" is of type REAL MULTI-MASTER and communication technology is based on CAN-BUS. Through this technology, the network is not "hard" setting, but, when necessary (eg black-out compressor MASTER), the role of Master and automatically transferred from one machine to another, the latter inherits all parameters for network management. The system is thus very flexible and reliable.



8.2 THE RULES SYNCHRONOUS AND SEQUENCE

The network of compressors can work on two different levels of communication: synchronous mode and sequence mode.

8.2.1 SYNCHRONOUS MODE

In this mode, the compressor connected to exchange among themselves a small number of information:

- time and date system
- language of the messages displayed

The operation in SYNCHRONOUS mode is, in effect, an independent operation of each compressor, which provides neither the rotation timer or alarm management. SYNCHRONOUS mode of limited use to those cases where, compressors of different size, must operate at different hours, in the certainty that the clock that governs them is unique to every machine.
The setting of the SYNCHRONOUS mode provides:

1. Setting the ID of each compressor (see paragraph 6.1)
2. the choice of a mode of operation independent of the individual compressors as desired (LOCAL / REMOTE / PROGRAM) GENERAL SETTINGS MENU → compressor control , refer to the instruction manuals of the individual compressors.

EXAMPLE:
means to run a 40 HP from 7:30 to 13:00 and a 15 HP from 14:00 to 17:30; communication takes place in synchronous mode and set the compressor for operation to Programs (daily or weekly) the schedules you want. Note: Because there is no alarm management, if a compressor goes into lock abnormality, the other does not work.

8.2.2 SEQUENCE MODE

In this mode, the compressor connected to exchange a significant amount of information, including:

- time and date system
- language of the messages displayed
- operating parameters
- alarm conditions
- pressure measured by each sensor network

The functions carried out through the sequence mode are those of the coordinated management of the compressors in the network, with rotation of the boot priority for a fair distribution of work hours.

The priorities change after compressor startup "time rotation sequence", programmed by the user, this time is calculated based on total hours of work of the network, ie the time when **at least a compressor,** including those in communication, is function.
The boot sequence of the compressors, according to the priorities assigned to them, more information is visible in the menu, accessed from the main screen by pressing the buttons + / -.

EXAMPLE:
a network of four compressors is scheduled to rotate the boot priority every 24 hours of its operation by setting "A" the compressor is started first (highest priority) and the other letters compressors with boot priority gradually decreasing , then:

time	ID #1	ID #2	ID #3	ID #4
at 0 hrs	A	B	C	D
after 24 hrs	B	C	D	A
after 48 hrs	C	D	A	B
after 72 hrs	D	A	B	C
after 96 hrs	A	B	C	D

Setting the sequence mode provides:

1. Setting the ID of each compressor (see paragraph 6.1)
2. the choice made on individual compressors, a mode of operation of the network (RETE_CONTINUO / NETWORK-PLAN) GENERAL SETTINGS MENU → compressor control , refer to the instruction manuals of the individual compressors.
3. the configuration of the operating parameters of compressors, the same for all machines, **built on the compressor MASTER**
4. the setting of other parameters of network management, such as, for example, "Rotation time sequence", the function of Prefill, etc.., **always on the compressor MASTER**

In sequence mode the compressors are started, stopped, put on running gear load or empty depending on the demands of the network.
Control is based on system pressure (average pressure measured by individual compressors in communication).
The diagram in Figure COM8 represented the activity of a network of four compressors in communication, sequence mode.

- the "Low pressure (Pmin) is the pressure value below which all compressors available and enabled are started and / or commanded to march at full load
- the "pressure max (Pmax) is the pressure value above which all the available compressors are controlled and authorized the march empty
- p_{ON} is the pressure pressure value below which the compressor with highest priority is initiated and / or ordered to march at full load
- p_{OFF} pressure is the pressure value above which the compressor with highest priority is commanded to march empty

p_{ON} and p_{OFF} values are calculated by the control system based on the limits p_{max} and p_{min}, the number of compressors available in the march against the number of compressors running already on load . So the higher the number of compressors available the more it tightens the "band" is bounded by p_{ON} and $p_{OFF,}$ achieving control "end" of pressure, to the benefit of energy savings. In the "band" is bounded by p_{max} and p_{min}, the "band" is bounded by p_{ON} and p_{OFF} moves upwards or downwards in order to make the network stable, turn on the minimum number of compressors needed and minimize the number of compressors running unload.

WARNING! For the smooth running of the battery of compressors is important that the values of "Max running pressure " and "Min running pressure" are set to equal to what you would on a single compressor, because the control system automatically decreases the differential pressures of work on the basis of a set of network parameters.

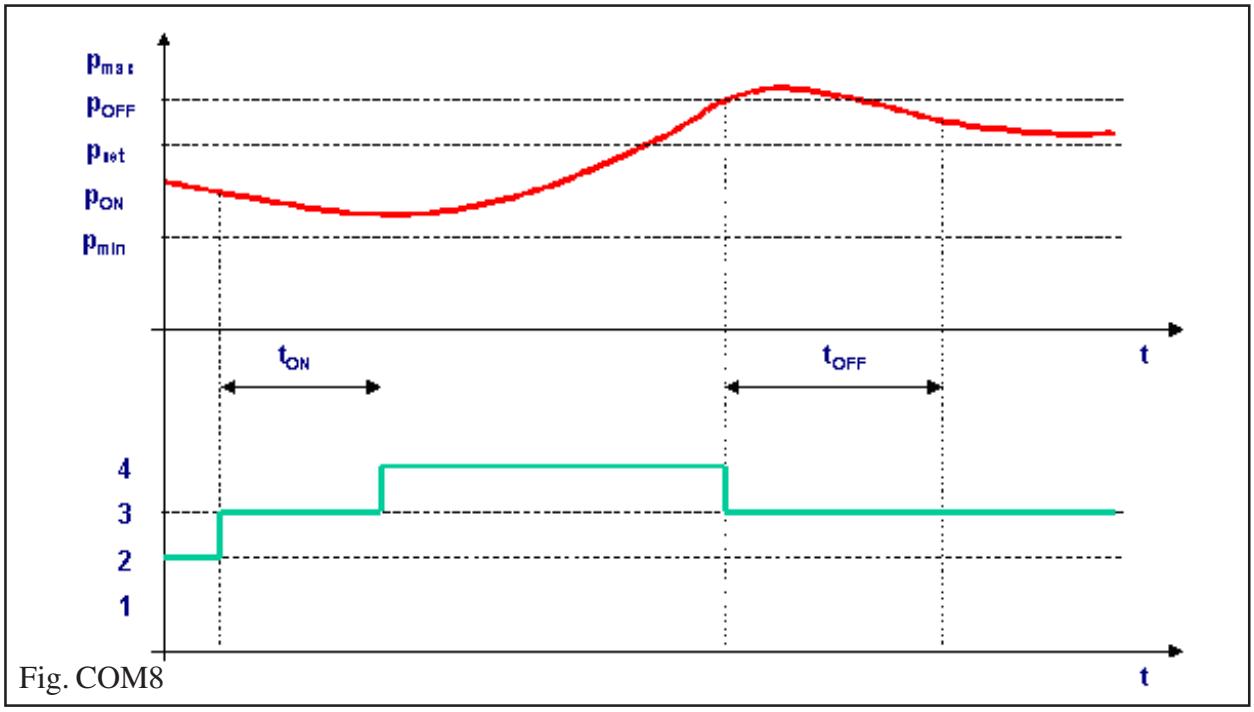


Fig. COM8

8.2.3 NETWORK CONFIGURATION PARAMETERS

Run the installation as described in Chapter 7, you can proceed to configure the parameters of the communication.

- Open the taps of interception between the individual compressor and pneumatic net
- Electrically powered compressors
- If the communication boards and wiring harnesses were installed correctly,
  - The compressor MASTER (the one that governs the network) will present the LED flashing L4
  - Compressors SLAVE present the L4 LED On Steady

REMARK: if the control units have never been previously configured to operate on your network all the compressor, the L4 LED flashing until it is assigned an identification number "Network ID" different for each compressor (see paragraph below).

8.2.4 ID COMPRESSOR ACCESS : STOP UT

Represents the identification number of the compressor in a battery of machines, each compressor has an ID different from the others, otherwise the failure of the network.

The compressor MASTER (is identified by assigning the ID # 1, the compressors SLAVE by assignment of ID # 2, # 3, # 4).

The master role is played by the compressor configured with ID # 1, unless the compressor is not operating (non-powered), in which case the role is assumed by the compressor ID later.

All configurations of operating parameters of the network (eg, maximum pressure, minimum pressure, unload running time , etc..) Must be made on the compressor MASTER (L4 detected by the LED flashing): so all settings are inherited from compressors SLAVE as soon as you provide confirmation of the parameters. Any changes to the parameters performed on SLAVE compressors are slow effect, as the parameters are immediately overwritten with the values stored on the master.

8.2.5 Number of compressors in Prefill / time Prefill

The Prefill is the stage of pressurization of the plant from the condition of zero pressure or at least very low.
If the number of compressors in Prefill is set to zero, the phase Prefill be managed like any operating condition, if the pressure is low the system will start in quick succession, all compressors are available in the network in order to reach in the shortest time possible, the working pressure of the plant.

Normally, issues of energy savings would choose to make the first "filling" of the plant through a limited number of compressors, accepting that the pressure reaches the work takes place in a longer time. Setting the number of compressors in Prefill you define how many machines have to take part in this phase.
The phase of Prefill ends in one of the following cases:

- pressure has been reached involving the shutdown of a compressor the network assets
- has spent time Prefill

At the conclusion of phase Prefill the system will go into normal operation of the network: if the pressure has not reached the values of all compressors work still available are initiated in rapid succession.

8.2.6 Max number of compressors ON

This parameter defines the maximum number of compressors that are qualified to operate contemporary. In many installations, in fact, the compressors in the network can not operate simultaneously for all the limitations of electrical power available in other cases you want to limit the number of compressors working in parallel because it is the network has redundant machines (to be activated only in case block than those in normal operation).

EXAMPLE:
a network of three compressors has been designed so that two machines can meet the needs of compressed air, the third machine acts as a "reserve". Set the maximum number of compressors ON equal to two, we get, the more the contemporary work of two machines and the third is activated only if one of the first two stops. The two active machines are "choices" in rotation from among those available, by the time the rotation sequence (SEQUENCE mode)

8.2.6 Rotation time sequence

Is the time after which re-assigns the boot priority of the compressors, to ensure that, for a long period of time, the workload is distributed evenly among the available machines. For the purposes of the rotation sequence is given the time of operating the network, the time in which **at least a compressor**, including those in communication, is in operation.
The minimum time for the rotation sequence is equal to one hour; for the verification of the functionality of the sequence is available a test time of five minutes. Through this approach, the installer can verify whether the procedure for reallocation of priorities is working properly.

WARNING! Do not use this setting for normal operation of the network, but only for testing during installation! Fact, a rotation time so short sequence involves frequent and damaging compressor starts, not allowing them to reach operating conditions stabilized.

- The mode "rotation time sequence = OFF "allows you to disable rotation, remain valid boot priority in the compressor when it is placed in OFF the rotation sequence. This feature is particularly useful when you plan to balance the number of hours of compressors installed at different times.

EXAMPLE:
network of two compressors has been made, adding to an existing compressor (which is assigned ID # 1), another new compressor (which is assigned ID # 2). can balance their working periods of two compressors through the following steps:

1. Activate the sequence mode, set up, only for the time of configuration, the rotation time sequence texts as five minutes
2. enable the operation of the network, start both compressors, until the boot sequence moves to "2-1" (ID # 2 = compressor compressor boot priority). Stop the compressors.

3. set the rotation time sequence to OFF, in order to "freeze" the situation involving ID # 2 started precedence over ID # 1

The network should work with this setting until the hours of work of the two compressors are balanced and the verification of this event budget must be done manually, periodically checking the hour meter of the two machines. For the case of equilibrium working hours must be provided to bring the rotation time sequence to a defined value (eg 24 hours), to reactivate the actual rotation of the boot priority.

8.2.7 Reaction time delay ON and OFF

When the control system activates a compressor due to the decrease in pressure of the network, starts timer t ON: by the end of the counting system checks the system pressure to determine if you need to start another compressor.

When the control system deactivates a compressor effect of the increased stress of the network, starts timer t OFF: By the end of the counting system checks the system pressure to determine whether you must disable another compressor.

A proper functioning of the network must provide that, in addiction, a single compressor to switch between running load and unload, if there is more that of a compressor that operates the switching network can be defined as "nervous", while if all compressors available simultaneously, then switch the network is called "unstable".

The values pre-set time delay t ON and t OFF cover a wide range of facilities, with an appropriate size of storage capacity than the course provided by the compressor and the type of air consumption. For particular types of installation you can follow the following general configuration:

- If the network proves "nervous" or "unstable" due to a smaller capacity than the flow provided the compressors, it should tend towards lower values of t OFF, the limit approaching zero, this will quickly turn off the compressors when the air consumption becomes much lower than the range provided. In parallel you can shorten the time t ON to start the compressors in quick succession when the consumption is higher than the output flow.

  Unlike the parameter t OFF must never take the value of t ON is close to zero, since the compressor has its own inertia boot (switching the star - delta, delayed the opening of the inlet valve) which delays the delivery of air compressed than the moment in which it is given the command to "pump". t ON time must not be less than the delay time of initiation (eg time the star - delta = 4 sec; acceleration time = 2sec → not ever set a time t ON under 6 sec)

- If your network has a large storage capacity and is characterized by an almost constant use you can think of the long time t OFF and t ON, resulting in a lower frequency of start and stop cycles of the compressors. Reaction times are too long will result in instability of the network.

In case of problems in the configuration and network optimization, contact Customer Service.

9 DRYER - VIEWING

If the compressor is configured to dry the second line will indicate the temperature will rotate the same in two ways:

9.1 DISPLAY TEMPERATURE DEW BAR UT

Bar consists of 5 characters - filled bar, left to right, towards the right

TEMP °C	FILLED RECTANGLE	COMMENT
t <= 4	1	Optimum dew temperature
4 < t <= 6	2	"
6 < t <= 8	3	"
9 < t <= 10	4	Limit dew temperature
t >10	5	Critical dew temperature

9.1 EXTENDED VIEW TEMPERATURE DEW CA

Clear display (° C or ° F) below the dew point values in the above table

10 DIAGNOSTICS AND TROUBLE SHOOTING

10.1 FORCED START PROCEDURE

For the following types of anomaly:

a) Block compressor for continued non-performance of one or more maintenance activities
b) Block compressor to ambient temperature too low
c) Compressor block for exceeding the maximum number of starts per hour allowed

There is an emergency procedure that allows you to start the compressor in any case, ignoring the anomaly, **to be performed only in cases of extreme necessity.**
This procedure goes by the name of **"forced start"** and run with the following actions:

pressing the RESET button (K3) and pressing the START button (K1)

In the third and fourth row of the display appears the message "FORCED START PROCEDURE" and the LED L3 becomes flashing, the compressor starts up regularly and the operation is stored in the register anomalies, by pressing the RESET button, the display is back to normal view messaging operation.

IIn any case, the subsequent arrest of the motor (whether controlled or automatic), the compressor will again block conditions, requiring, possibly, a new FORCED START PROCEDURE.

The process of "forced start" does not work if abnormalities other than those mentioned above.

10.2 ERROR MESSAGES

10.2.1 Alert with blinking LED L2 (Warning)

reporting on alternate lines 3 and 4 of DI. The compressor does not go block and once restored the problem L2 LED turns off.

MESSAGE	COMMENT
High temperature . compres	exceeding the parameters set temperature See the table of parameter values
Low ambient temperature	oil temperature is too low See the table of parameter values
Sobst. air filter XXX excess hours	excess hours=hours over the life prefixed to the component; See the table of parameter values
Sobst. oil filter XXX excess hours	excess hours=hours over the life prefixed to the component; See the table of parameter values
Sobst. oil XXX excess hours	excess hours=hours over the life prefixed to the component; See the table of parameter values
Sobst. oli separator XXX excess hours	excess hours=hours over the life prefixed to the component; See the table of parameter values
Sobst. dryer filter XXX excess hours	excess hours=hours over the life prefixed to the component; See the table of parameter values if present on the compressor
Sobst. air filter excessive clogging	excess hours=hours over the life prefixed to the component; X01-8 = closed

10.2.2 Signaling L3 fixed or flashing LED (alarm)

The signal on alternate lines 3 and 4 of DI. The compressor should block if L3 is fixed, once restored, the problem becomes L3 LED blinks.
Remark : When the anomaly is removed and the compressor is “resettable” the LED turns red and blinks.
For example: When the emergency button is pressed --> fixed, when it is restored --> flashing, with reset --> off

MESSAGE	COMMENT
EMERGENCY STOP Compressor block	X01-2 open
Temp compression excessive - block	See the table of parameter values
Ambient temp too low bassa - block	See the table of parameter values
Internal pressure excessive - block	X01-4 open
Fan Motor overload block	X01-4 open
Network pressure excessive - block	line pressure greater than or equal to the pressure max limit
Pressure transducer Error block	fault on the circuit pressure sensor A1/+
Error temperature oil sensor block	fault circuit sensor oil temperature A2/+
Error temperature dew sensor block	fault circuit sensor dew temperature A4/+
Phase sequence error di alimentaz. - blocco	X01-3 open
Main motor overload block	X01-5 open
N. starts per hour excessive - block	startup counting (complete cycles of startup) on last hour
Main voltage blackout block	this message is disabled when the power function AUTORESTART is active
Voltage line microinterruption block	motor protection by blocking extracurrent inrush
Short circ. analog INPUTS block	verify analog inputs from short-circuit

11 TECHINCAL DATA

11.1 MAIN FEATURES

Industrial control device for the management of single screw compressors;
not be mounted in explosive environment.

Conforms to CE regulations :
Low voltage unit : 2006/95/CE
Safety : EN 60730-1 (General regulations)
EMC: 2004/108/CE

Power supply (conn X03):
24 VAC +/-25% - 50-60 Hz -max power 10VA
short circuits-proof , auto-resettable

Analog inputs (conn X02):

X02-A+ output voltage 24VDC/100mA +/-5% for sensors
for example 4/20mA or others that need to be supplied
short circuits-proof , auto-resettable

X02-A1 sensor input 4/20mA - toll +/- 0,25% fs

X02-A2 isensor input KTY210 (2000ohm/25°C) toll +/- 0,5% fs

X02-A3 input 0/10VDC signal from inverter toll +/-0,2% fs

X02-A4 idryer sensor input KTY210 toll +/- 0,5% fs

X02-A5 common supply A+ , common groun for sensors (GND)

Digital inputs (conn X01) :

X01-C+ Output 24VDC 100mA +/- 5%-common inputs from external on-off
short circuits-proof , auto-resettable

X01-C1 idedicated input to the command of emergency that interrupts internally to supply the output relay will open if the contact C + and C1.

X01-C2-3 genereic inputs on-off

X01-C4 on-off input and for PTC winding engine when driven by inverter

X01-C5/8 genereic inputs on-off

Features common to all digital inputs
Surge protection up to 40 VDC
Line noise protection according to EC
The signals and / or contacts must be free from external voltages.
The inputs are PNP type with common C +

Rele outputs (conn X08):

X08-1/2 until X08-15/16
8 rele' 5 A 250V AC resistive load.-Indipendent contacts output

Clock : clock format hh-mm-ss / mm-yyyy with lithium battery with duration to equipment off up to 5 years - toll + / - 10 min / year.

LCD : Alfhanumeric LCD 20 charcters for 4 rows with backlight yellow/ green di intensity programmable active operation or standby

Keyboard: 9 tactile keybuttons - 4 signals LED's - 1LED for power supply on

Processor 16 bit microprocessor with 512Kx8 flash memory
CAN-BUS protocol included
no-volatile EEPROM for data retention- format 32Kx8
Power supply microinterruption > di 200msec

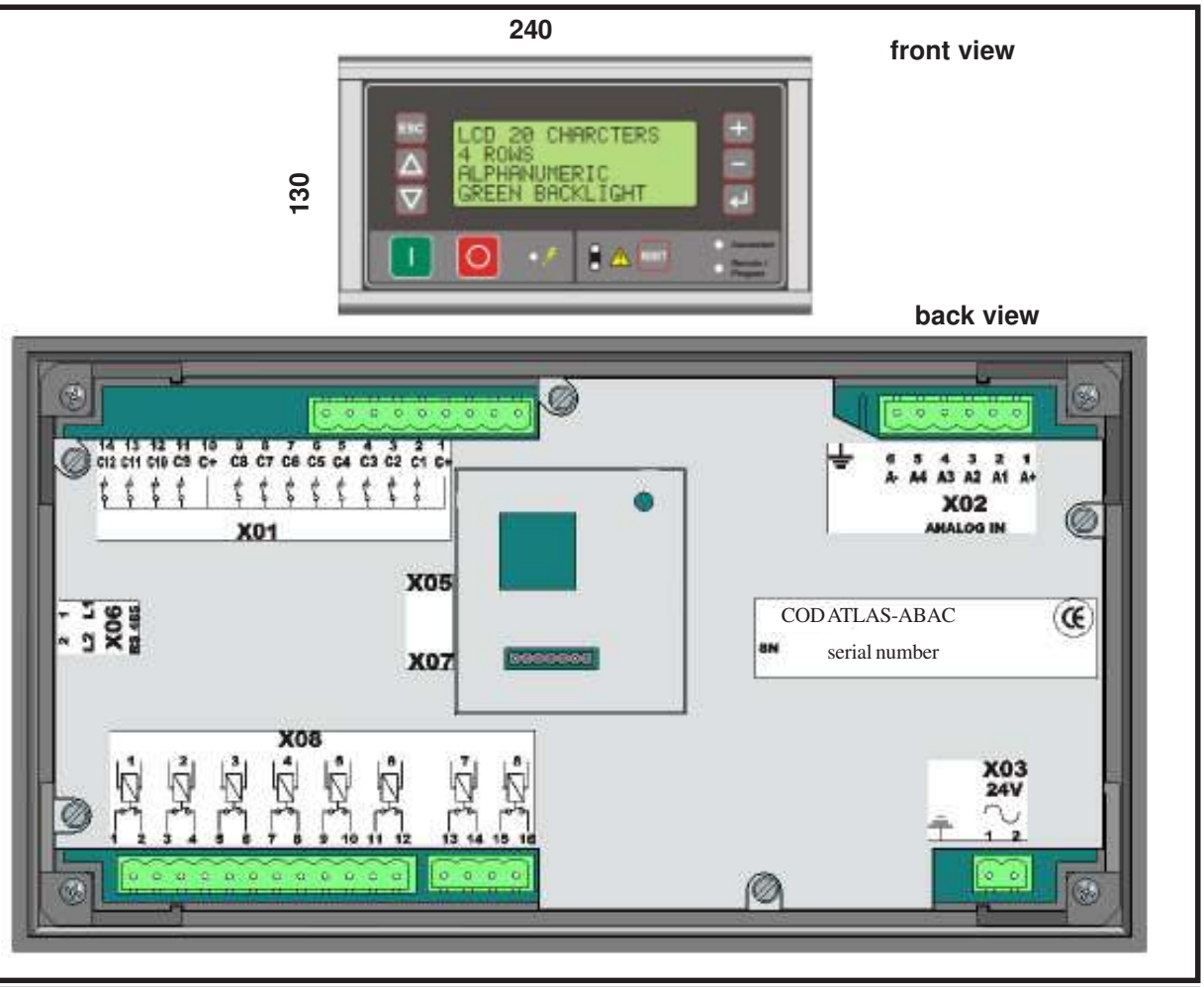
Connectors Plug-in - step 5,08mm

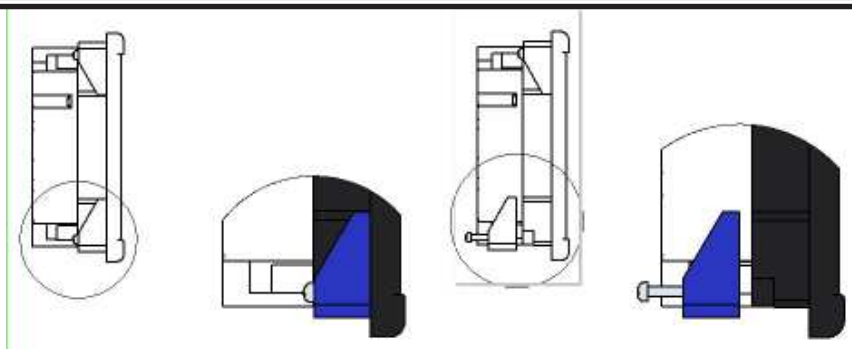
Operating conditions :

Storage temperature :	-20/+75°C
Working temperature :	0/+55°C
Enviromental umidity max :	85% RH noncondensing

11.2 DIMENSIONS AND PANEL DRILLING

Dimension (fig D1) : Frontal plate 240x130 mm
maximum deep from front pannel : 45mm
ABS self-extinguishing black container in accordance with UL regulation.
Protection IP 64 for front and IP 20 for the other parts





Rear bracket with nr 4 angular coupling
Sheet thickness from 0.5 to 5 mm.

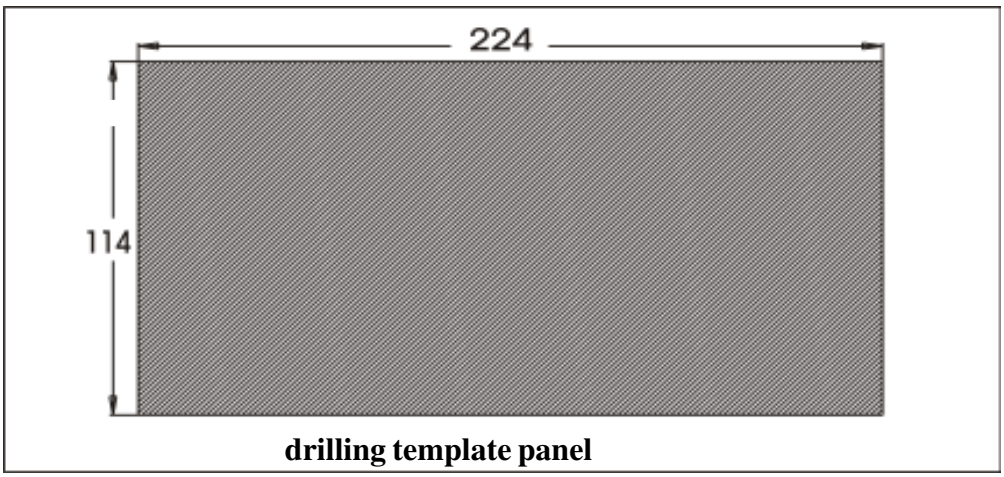


fig D1

drilling template panel

MISURE IN mm

FLASH PROGRAMMER MOD SBS-P2

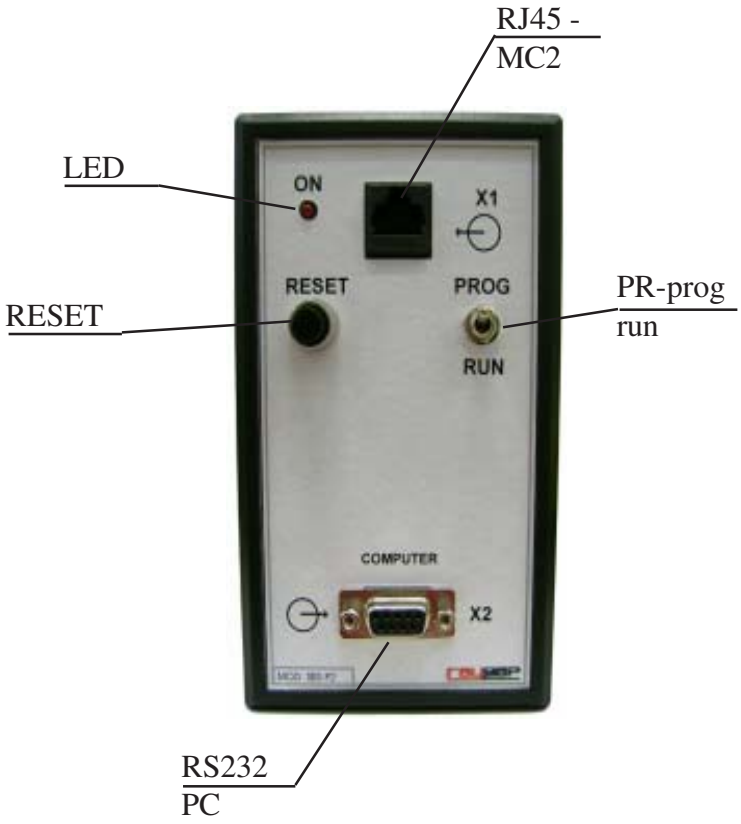


fig 1a

FLASH PROGRAMMER MOD SBS-P

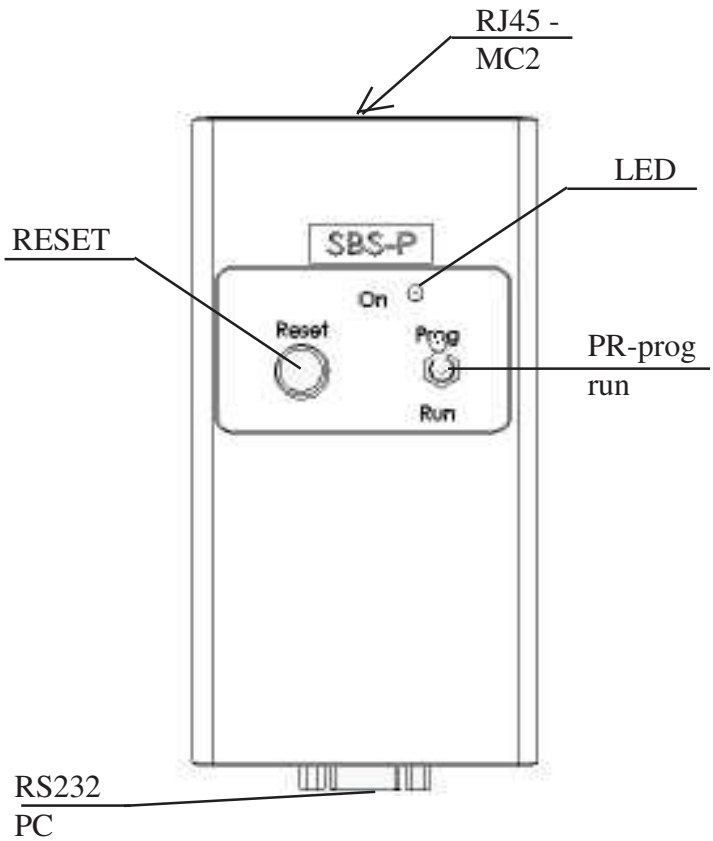


fig 1b

APPENDICES A MANUALE D'USO FLASH-PROGRAMMER

A1.1 PRELIMINARY INFORMATION

SBS-P2 programmer is useful for programming units equipped with FUJITSU microprocessor (company brand name registered) . We decline any responsability coming from improper use of the programmer. The FLASH program is free distributed by Fujitsu company for specific use with FUJITSU microcontrollers.

A1.2 SYSTEM

The FLASH programmer and .EXE program work with the following operative systems: Windows95, Windows98, WindowsNT4, Windows2000.
("Windows" is registered brand of Microsoft company)

A1.3 STANDARDS

SBS-P unit follow the CE-EMC standard. This unit can be used only for downloading programs into MC2 controllers.No other use is allowed. This unit must be used indoor by a skilled operator.

A1.4 TECHNICAL FEATURES

Power supply	delivered by MC2 (typical 5VDC)
working temperature	from 0 to 50 °C
Rel Humidity	10-85% without moisture
interface	RS232 - RJ45 proprietary
case and dimension	ABS shockproof 150x80x35mm

A1.5 PACKAGE CONTENT:

Bill of materials:

a> SBS-P2 programmer unit
b> Floppy disk 1,44MB
c> 8 poles cable RJ45 - 1,5mt length
d> RS232 M/F cable 1mt length
e> this manual

Check all the components are in the package.

A1.6 FILES ON FLOPPY DISK

Chipdef.ini	driver file
Customize.ini	driver file
Datafile.txt	txt file
flash.cnt	driver file
flash.exe	application file
flash.hlp	help file
m_flash.543	flash type file
m2bs.exe	driver file
M2bsErr.txt	error file - list
directory lib	directory for flash memory library

Do not modify files names and extensions.

A2.1 PROGRAM INSTALLATION

Copy all files of the floppy disk into a directory of your computer i.e. C:\FLASHMEM
When the copy is done , run FLASH program(flash.exe).

A2.2 SBS-P2 DESCRIPTION (Fig 1a or 1b)

RESET Reset button for MC2 unit.MUST-BE pushed before any programming procedure.
RJ45-MC2 Connection plug for cable from SBS-P2 to MC2 unit
Check for the typical "click" when you plug-in the connector
PR selector switch for programming and normal operations.
RS232-PC RS232 connection port for cable from standard PC to SBS-P unit.
LED Red light led showing when SBS-P2 unit is connected to MC2 unit.

A2.3 WARNINGS

Before starting the programming procedure be sure about the following:

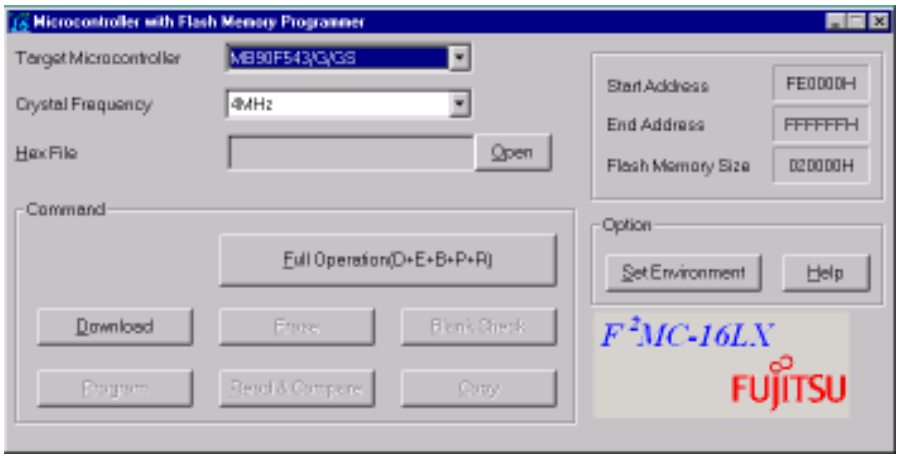
A> The machine must be powered and in "**STOP**" condition
B> **DON'T make any maintenance operation during programming.**
C> Verify connections according to fig 2
D> Wait until program operations are over (with OK message) before running again the machine.

If the main voltage shutdown during a program operations , repeat the whole program sequence from the beginning.

fig 2

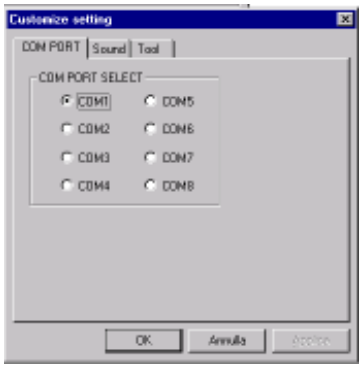
A3.1 PROGRAMMING - PROCEDURE

After making all the connections, FLASH run program on PC. The following window will be displayed:

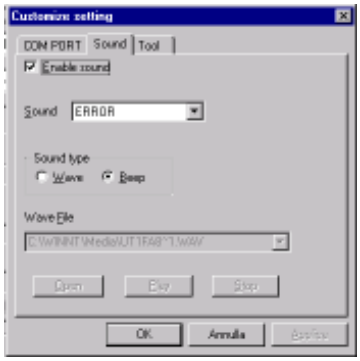


Preliminary operations

1> Check the serial port connected with your PC (i.e. COM1)
2> Open "Set Environment" window



select the correct serial port connected to your PC.



Select the other options basing on the configuration of your PC.
It is recommended to use default settings.
Do not modify parameters into "Tool" window.
Confirm all with Applica or OK buttons.

3> Check "Target Microcontroller" box if the right model of microprocessor is displayed

if not, choose the above model from the list using the selection arrow .

4> Check "Crystal Frequency" is set on 4MHz ; if not, choose the right value from the list using the selection arrow.

5> Using a "Open" command select a programming file to load from directory where it was saved before (i.e. PROGR_MC2) with .mhx extension.

6> Now the system is ready for downloading the file.

Final procedure for download- sequence command:

a> Set PR switch on SBS-P2 unit in "Prog" mode

b> Push "Reset" button on SBS-P2 unit

c> Click on "Full operation" button of "Command" window on PC

At this time the programming procedure will start and transfer (download) the -file.mhx- a progress window from PC to microprocessor memory.

During the programming time will be shown ,with the following operations sequence:
Download > Erase > Blank Check> Program >Read & Compare
The longest operation is "Program" one, that requires about 3 minutes.
As soon as the system has completed all the operations,"OK" message window will be displayed. It means that the program file has been downloaded correctly without errors.
If any error occurs, repeat operations from point a> or from 1> (connections check)

A3.2 ERRORS LIST

You can see a list of error in the help menu of the toolbar.

A3.3 FAST CHECK

In order to verify if in "MC2" unit the correct version of the program has been loaded, set the PR switch on RUN mode and push RESET . The MC2 controller will restart and you will be able to read software version on the first screenshot of the display.

A3.4 MACHINE RESTART

Before restarting the machine it is suggested to disconnect the RJ45 connector. Switch-off and switch-on again the main line switch in order to run the updated software.

APPENDICES B

B VARIABLE SPEED COMPRESSOR CONNECTIONS

For ease of reference you attach a schema "type" of connection with inverter control unit MC2 (Figure B1 and Figure B2).

In the description below are only given the inputs and outputs for connecting compressors other than the "fixed speed".

B.1 DIGITAL INPUTS CONFIGURATION

CONNECTOR X01 input C3, wire 24 / Common C +, 3 wire

This input is enabled to receive the alarm signal by the inverter.

With inverter turned on and functioning of the contact between C + and C3 is normally closed (NC) and opens only in case that the inverter has a fault or a generic signal of alarm.

The command "RESET" K3 on the front of the unit, it returns also the state inverter, though what caused the allrme is removed, even the reset signal by the inverter returns to operating condition (NC).

CONNECTOR X01 input C4, wire 4 / Common C +, 3 wire

The measure of excess current (thermal protection) and an overheating of the following main engine driven by the inverter is impossible to monitor with the "thermal motor protectors" traditional. To overcome the drawback, you include a NTC (Negative - Temperature - Coefficient) inside the engine which reduces the inner resistance as a function of temperature reached, ie, under conditions of ambient temperature of 25 ° C the resistance is around a value of about 2700 / 4700 ohm and if decreases around below the value of 470 ohms means it has reached an equivalent temperature of 90 ° C, which becomes a symptom of excessive overheating of the engine (the values are VDE regulation).

When the resistance becomes less than 470 ohms then the unit will report a "motor overload" with the same procedure described in paragraph 10.

B.2 ANALOG INPUT CONFIGURATION

CONNECTOR X02 input A3, wire 19 / common A -, 11 wire

This analog input reads a value between 0 and +10 VDC from the inverter. The value that the inverter sends the controller is divided into two modes:

RUN MODE: The drive sends a voltage that corresponds to the speed of rotation of the engine with the values preset in paragraph 6.5.4.
0 to 10 VDC voltage read by the MC2 controller is converted to RPM and then displayed in%. The percentage is equal to the carrying capacity of the engine at that value of the pressure. The display becomes expressed in RPM when you insert the CA or Abac password.

ALARM MODE: When the controller detects the signal input X01/C3 (alarm inverter), the drive itself sends a voltage value corresponding to 4 abnormalities that may occur more frequently and precisely:

voltage 0 VDC: Alarms -Generic anomaly inverter. Check the drive if it is repeated several times in succession.

voltage 3 VDC: Alarm, "inverter overtemperature" which indicates an excessive overheating of the inverter. Check that the ventilation vents of the drive are in good condition cooling heat.

voltage 6 VDC: Alarm "overcurrent inverter" which indicates an excessive current required by the engine. If you were to repeat frequently, check the cables and power terminals of both the motor inverter.

voltage 9VDC: Alarm, "inverter overload" which indicates that the drive, although it may work correctly, has the values speed-current-power supplied to the engine above the maximum values and may depend on the parameters is not properly seated, speed / pressure. See section 6.5.4.

B.3 DIGITAL OUTPUTS CONFIGURATION

CONNECTOR X08 relay output 1, wire 10 / common wire 26

This output sends the command "INVERTER ENABLE", ie starts the main engine by following a procedure described in section 6.5.4.
The contact of relay 1 closes the signal to the inverter between the positive (line 26) input is headed to the wire 10.

X08 CONNECTOR 2 relay output, wire 8> 25 / common wire 26

This output sends a command to "STOP" which stops the drive in case of an emergency stop for failures detected by the controller as an intervention BLOCK compressor. The signal (wire 8) leaving the controller is also interrupted by the emergency button SBE compressor . In normal operation the contact of the controller is normally closed (NC).

CONNECTOR X08 relay output 5, wire 47 / common wire 26

This output allows you to "Reset" the drive for a previous shutdown due to an failure detected by it. The contact of the relay, normally open (NO) is closed to restore the signaling defect visible on the controller MC2.
The reset output inverter is controlled cyclically (1 sec ON-5 sec OFF) in order to search, with successive attempts, to restore the internal functions of the drive and reboot back into normal operating condition. When the inverter starts to work properly, the output signal 5 returns in terms of contact NO permanent until the occurrence of a subsequent failure. This automatic procedure avoids intervening in the electrical panel for the restoration of the inverter from a condition of failure of the same.

Once off through the main section of line, the drive maintains an internal tension for about 4 / 5 seconds. was added an auxiliary relay (A1) to take the auxiliary voltage inverter, and once that line is missing, then cut power to the controller MC2. This was necessary to prevent the interception of signals 'false' of blackouts or microinterruptions.

B4 4/20mA MODULE

To operate the controller combined with an inverter, you must have the communication module + inverter or install it as described in paragraph 7.2.
WARNING : The inverter module for connection, it combines the possibility of connecting compressor network, to be left disconnected if used for a single compressor. If you want to also implement the communication network, use Chapter 7 for all related functionality.

4 / 20 mA MODULE 23 wire - neg. signal / common wire 26 - pos. signal

This unit. already pre-assembled, sends a signal current proportional to the speed calculated by controller MC2. The nature of this signal allows a significant immunity to electromagnetic interference (EMC) and manage, with a high precision, control of turns of the main engine.

The current of 4 mA refers to the minimum speed of the engine
The current of 20 mA refers to the maximum speed of the engine
For speeds see chapter 6.5.4.

4/20mA output is optically isolated from the rest of the signals involved in the controller, thus avoiding any unwanted connection returns.

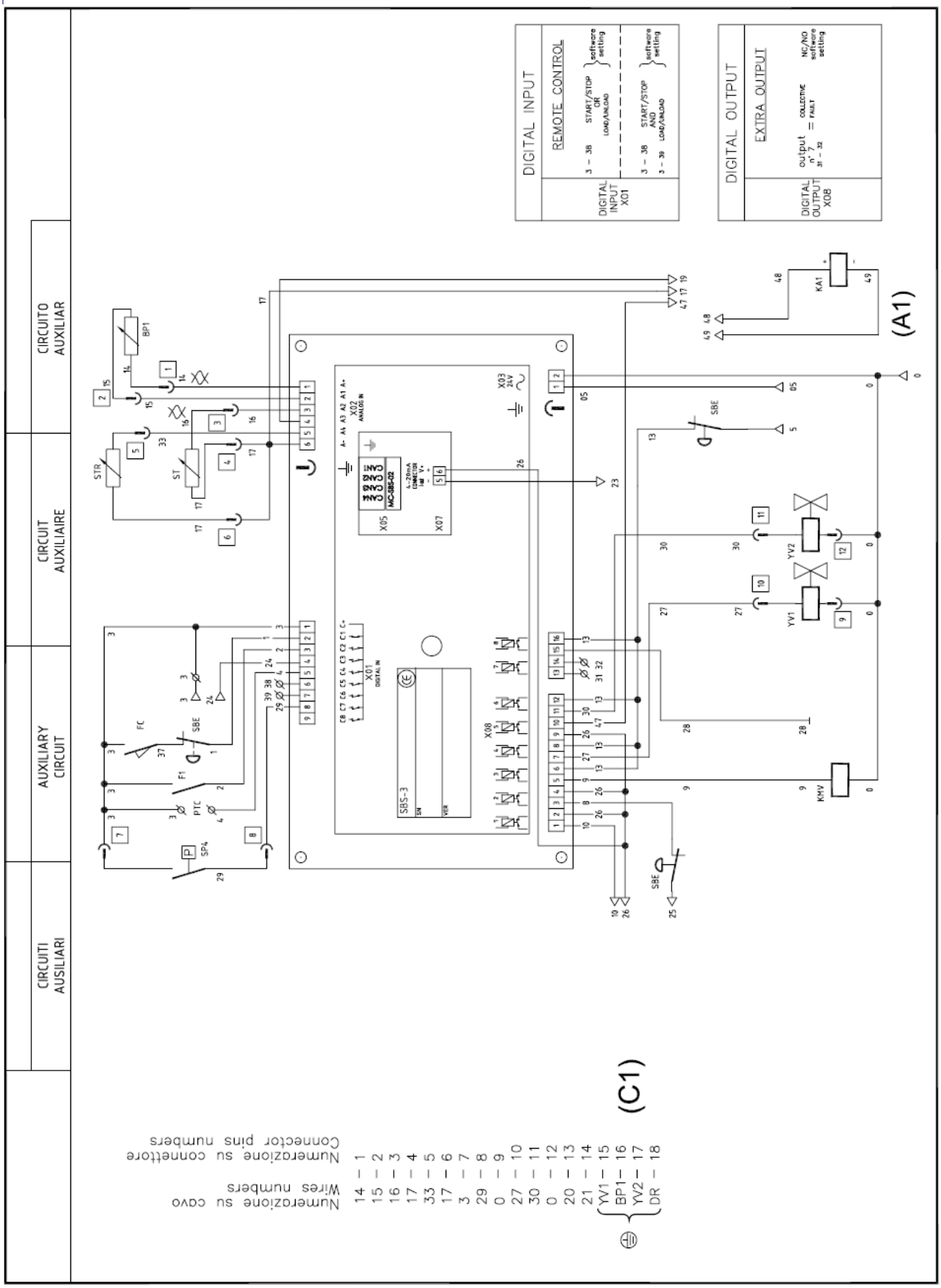

CIRCUITI AUSILIARI
AUXILIARY CIRCUIT
CIRCUIT AUXILIAIRE
CIRCUITO AUXILIAR
DIGITAL INPUT
REMOTE CONTROL
DIGITAL INPUT X01
DIGITAL OUTPUT
EXTRA OUTPUT
DIGITAL OUTPUT X08
(A1)
(C1)
Numerazione su cavo
Wires numbers
Numerazione su connettore
Connector pins numbers
14 – 1
15 – 2
16 – 3
17 – 4
33 – 5
17 – 6
3 – 7
29 – 8
0 – 9
27 – 10
30 – 11
0 – 12
20 – 13
21 – 14
YV1 – 15
BP1 – 16
YV2 – 17
DR – 18

fig B1

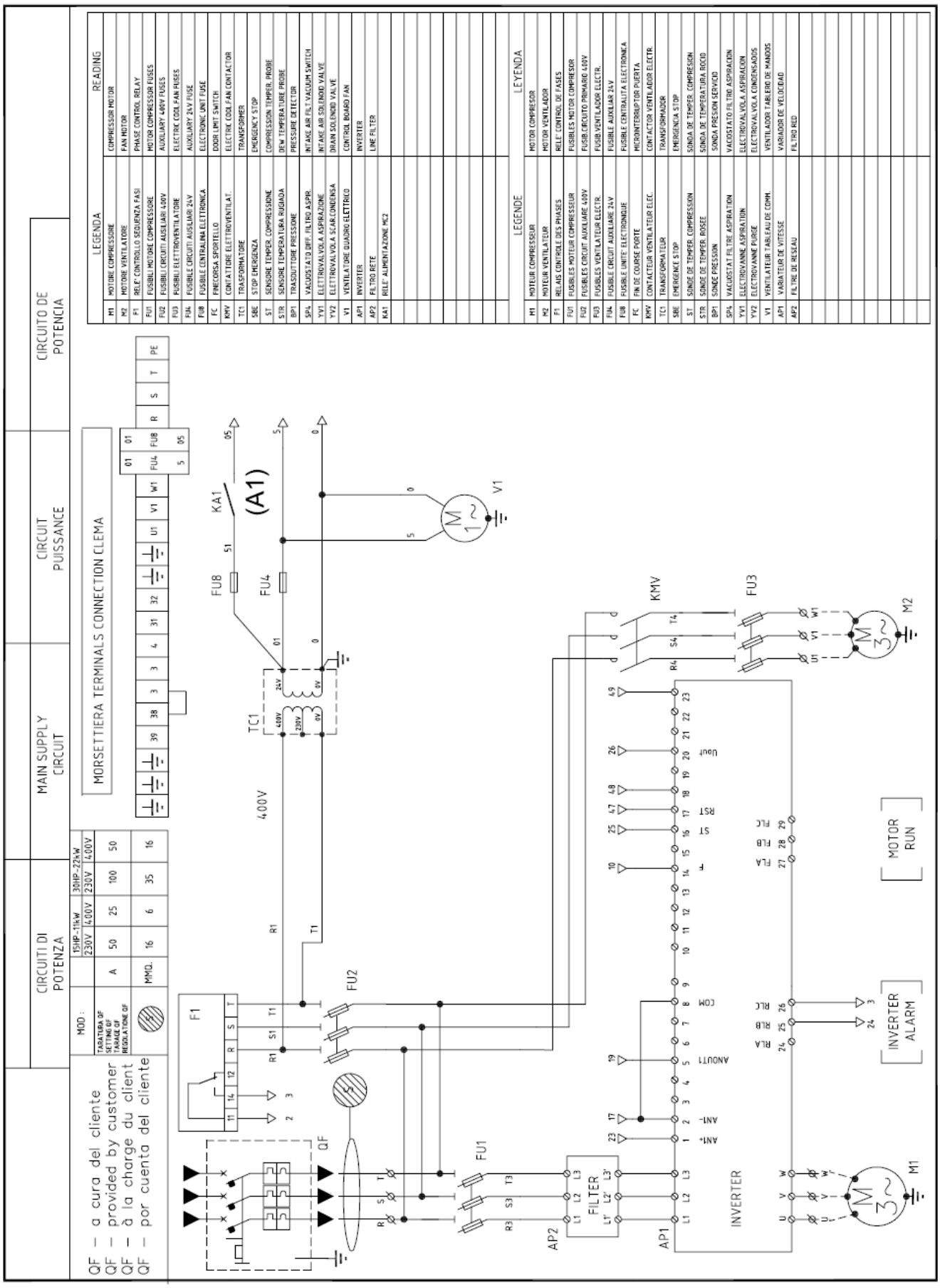

CIRCUITI DI POTENZA
MAIN SUPPLY CIRCUIT
CIRCUIT PUISSANCE
CIRCUITO DE POTENCIA
MORSETTIERA TERMINALS CONNECTION CLEMA
LEGENDA
LEGENDE
LEYENDA
READING
MOTORE COMPRESSORE
MOTEUR COMPRESSEUR
MOTOR COMPRESOR
COMPRESSOR MOTOR
MOTORE VENTILATORE
MOTEUR VENTILATEUR
MOTOR VENTILADOR
FAN MOTOR
RELE' CONTROLLO SEQUENZA FASI
RELAIS CONTROLE DES PHASES
RELE' CONTROL DE FASES
PHASE CONTROL RELAY
FUSIBILI MOTORE COMPRESSORE
FUSIBLES MOTEUR COMPRESSEUR
FUSIBLES MOTOR COMPRESOR
MOTOR COMPRESSOR FUSES
FUSIBILI CIRCUITI AUSILIARI 400V
FUSIBLES CIRCUIT AUXILIAIRE 400V
FUSIBLES CIRCUITO AUXILIAR 400V
AUXILIARY 400V FUSES
FUSIBILI ELETTROVENTILATORE
FUSIBLES VENTILATEUR ELECTR.
FUSIBLE VENTILADOR ELECTR.
ELECTRIC COOL.FAN FUSES
FUSIBILE CIRCUITI AUSILIARI 24V
FUSIBLE CIRCUIT AUXILIAIRE 24V
FUSIBLE AUXILIAR 24V
AUXILIARY 24V FUSE
FUSIBILE CENTRALINA ELETTRONICA
FUSIBLE UNITE' ELECTRONIQUE
FUSIBLE CONTRALITA ELECTRONICA
ELECTRONIC UNIT FUSE
FINECORSA SPORTELLO
FIN DE COURSE PORTE
MICROINTERRUPTOR PUERTA
DOOR LIMIT SWITCH
CONTATTORE ELETTROVENTILAT.
CONTACTEUR VENTILATEUR ELEC.
CONTACTOR VENTILADOR ELECTR.
ELECTRIC COOL.FAN CONTACTOR
TRASFORMATORE
TRANSFORMATEUR
TRANSFORMADOR
TRANSFORMER
STOP EMERGENZA
EMERGENCE STOP
EMERGENCY STOP
SENSORE TEMPER. COMPRESSIONE
SONDE DE TEMPER. COMPRESSION
SONDA DE TEMPER. COMPRESION
COMPRESSION TEMPER. PROBE
SENSORE TEMPERATURA RUGIADA
SONDE DE TEMPER. ROSEE
SONDA DE TEMPERATURA ROCIO
DEW TEMPERATURE PROBE
TRASDUTTORE PRESSIONE
SONDE PRESION
SONDA PRESION SERVICIO
PRESSURE DETECTOR
VACUOSTATO DIFF. FILTRO ASPIR.
VACUOSTAT FILTRE ASPIRATION
VACUOSTATO FILTRO ASPIRACION
INTAKE AIR FILT.VACUUM SWITCH
ELETTROVALVOLA ASPIRAZIONE
ELECTROVANNE ASPIRATION
ELECTROVALVOLA ASPIRACION
INTAKE AIR SOLENOID VALVE
ELETTROVALVOLA SCAR.CONDENSA
ELECTROVANNE PURGE
ELECTROVALVOLA CONDENSADOS
DRAIN SOLENOID VALVE
VENTILATORE QUADRO ELETTRICO
VENTILATEUR TABLEAU DE COMM.
VENTILADOR TABLERO DE MANDOS
CONTROL BOARD FAN
INVERTER
FILTRO RETE
FILTRE RESEAU
FILTRO RED
LINE FILTER
RELE' ALIMENTAZIONE MC2
VARIATEUR DE VITESSE
VARIADOR DE VELOCIDAD
MOD :
TARATURA DI SETTING DI TARAGE DI REGOLATORE DI
MMG.
15HP-11kW
30HP-22kW
230V
400V
400V
230V
400V
A
50
25
100
50
16
6
35
16
QF – a cura del cliente
QF – provided by customer
QF – à la charge du client
QF – por cuenta del cliente
400V
230V
24V
0V
(A1)
KA1
KMV
TC1
FU1
FU2
FU3
FU4
FU8
QF
F1
V1
M1
M2
AP1
AP2
INVERTER
FILTER
INVERTER ALARM
MOTOR RUN
ANOUT1
ANIN+
ANIN-
COM
RST
Uout
PLA
PLB
PLC
RLA
RLB
RLC

fig B2