FM Partec S.p.A. - Via Europa 4 - Correggio (RE) ITaly
Tel (+39) 0522 631055 - info@fmpartec.com

CONNECTIONS AND SETTING MANUAL

INVERTER CFP2000-CP2000

for GREENBLOW IE3, PLUS & 5K

GREENBLOW

USING INSTRUCTION WITH BLOWERS GREENBLOW IE3, PLUS AND 5K

(ENGLISH TRANSLATION)

PRODUCTS: INVERTER DELTA CFP2000
INVERTER DELTA CP2000

Read the instructions completely and keep them for future reference, referring to the FM Partec technical specifications contained in the catalogue. If you are not in possession of these specifications, please ask for them to be provided.

1 TABLE OF CONTENTS AND INTERPRETATION OF SYMBOLS

		
WARNING	**DANGER**	**DANGER Electrocution risk**

2 FIELD OF APPLICATION

These instructions concern the articles:
cod. 200350PLUS, 200350IE3 – Inverter DELTA model CFP2000 2.2kW
cod. 200515PLUS, 200515IE3 – Inverter DELTA model CP2000 2.2kW
cod. 200516-5K – Inverter DELTA modello CFP2000 3.7kW
and concern exclusively the use of this device to operate the blower GreenBlow IE3 cod. 1200029003*, GreenBlow Plus cod. 1200029004*, GreenBlow 5K cod. 120029007*.

With regard to health, safety, correct installation, alarms, maintenance and disposal, please consult the instruction manual of the inverter manufacturer.

The inverters are supplied appropriately programmed and protected by a password, so that do not require autotuning functions and/or other parameter changes.

The programming of the inverters has been optimized to limit noise and vibrations, **so it is strongly discouraged to reset the factory parameter of the inverter**, because the sole autotuning function is not sufficient for using the blower.

N.B. IN CASE OF PARAMETERS RESET AND/OR PASSWORD DISCLOSURE, WARRANTY BECOMES NULL AND VOID.

To avoid malfunction and/or damage to the inverter:

- Refer to the inverter instruction manual;
- Avoid direct exposure to sunlight;
- Use shielded cables with a max. lenght of 25m.

3 USING TIPS INVERTER WITH GREEN BLOW PLUS AND GREEN BLOW IE3

Inverter CFP 2000 VFD022FP4EA – 52S (frame A) presents an integrating cooling fan IP55 distribution board.
Inverter CP 2000 Modello VFD022CP43B – 21 (frame A) it's an inverter with IP20 protection equipped with a cooling fan and designed to be installed inside a distribution board.
The supplied programming provides the possibility of either manual (via keypad, FIGURE 1 lh) or automatic drive via external sensor/switch/PLC with PNP or NPN connection.
As default, the inverter are supplied with connections corresponding to PNP manual drive.

FIGURE 1

In order to make the electrical connections, it is necessary to remove the external cover of the inverter by unscrewing the 4 screws highlighted in FIGURE 1 (rh), ensuring that the selector is in OFF position. FIGURE 2 and the following table show the terminals to be used for the power supply, the motor and the grounding connections.
If making the connections is difficult, it is possible to remove the metallic plate placed at the bottom of the inverter.
For any type of connection it is essential to be sure that the terminal screws are fully tightened.

Make sure to operate always with NO VOLTAGE.

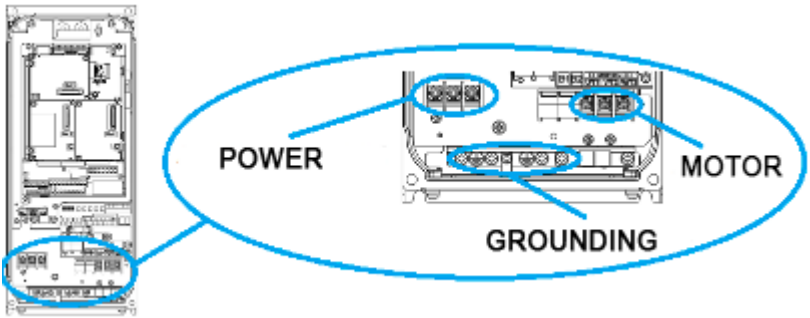

FIGURE 2

Motor connection	Terminals U/T1, V/T2, W/T3 + grounding
Power supply connection	Terminals R/L1, S/L2, T/L3 + grounding

FIGURE 3 shows a scheme of the whole terminal block of the inverter.

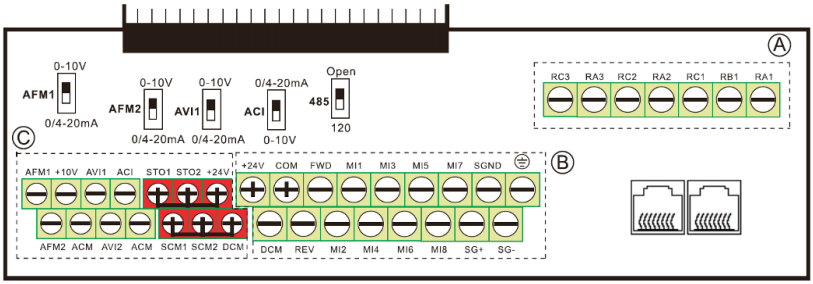

FIGURE 3

If more blowers are connected to a single inverter (this layout is available only with Green Blow IE3, cod.1200029003*), it is advisable to install 1 magnetothermic switch for each blower.

For any further information, refer to the inverter use and maintenance.

3.1 MANUAL DRIVE

In order to make the manual drive, it is necessary to make the connections as shown in FIGURE 4, **after removing the electric tension.**

As default, the inverter are supplied with connections corresponding to PNP manual drive (FIGURE 4).
Once made the connections, apply the external cover before switch on the inverter.

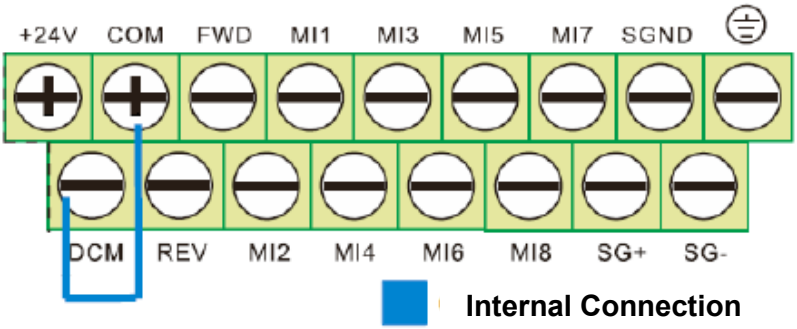

FIGURE 4: manual drive - PNP connection (default).

Once switched on the inverter, the main menu will appear (FIGURE 5) with the indication of the blower type, shown at the top right of the panel.

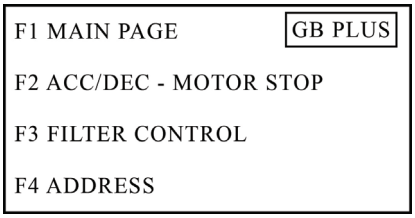

FIGURE 5

It is possible to turn on the blower, pressing the "F1" button to enter into the "MAIN PAGE". The "MAIN PAGE" (FIGURE 6) shows these following information and functionalities:

FUNCTION	DESCRIPTION
F	Currently setted frequency (Hz) adjustable by the "FREQ F4" button
H	Currently detected frequency (Hz)
A	Currently detected electrical consumption (Ampere)
MAN/AUTO	Mode of operation, selectable by the "F2" button
RUN/STOP	Blower status (on/off) selectable by the "F3" button
BACK F1	Back to the main menu by the "F1" button

Into the "MAIN PAGE" it is possible to change the state on/off ("RUN/STOP") of the blower pressing the "F3" button (FIGURE 6 rh).

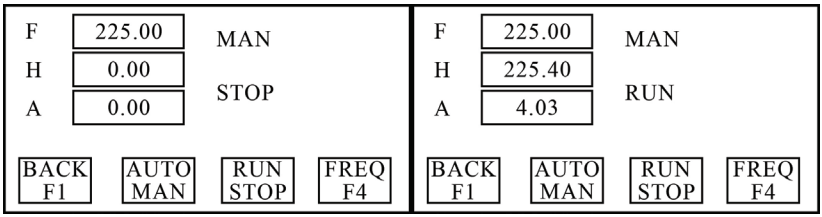

FIGURE 6

The following table shows the functions usable in manual drive.

FUNCTION	CHARACTERISTICS
Frequency change	Maximum and default value 225Hz / 4500 RPM (GB PLUS) and 65Hz / 3600RPM (GB IE3). In order to modify these values you need to (FIGURE 7 lh): • press the "F4" button; • change by the up/down arrows the frequency value; Using the left/right arrows it is possible to shift from units to tens to hundreds; • after setting up the frequency value, press "ESC".
Acceleration and deceleration ramps change	Default values equal to 10s. In order to change them it is necessary: • access from the main menu to the "F2 ACC/DEC MOTOR STOP" screen (FIGURE 7 rh) pressing the "F2" button; • Press the "F2" button (acceleration) or the "F3" button (deceleration); • change by the up/down arrows the time value (in seconds). Using the left/right arrows it is possible to shift from units to tens to hundreds; • Press "ENTER".  PLEASE NOTE: if the value set for the ramps is too small, the motor could overload, showing the alarm of FIGURE 8. In order to reset the alarm press the red button "STOP RESET" on the panel (FIGURE 1 lh)

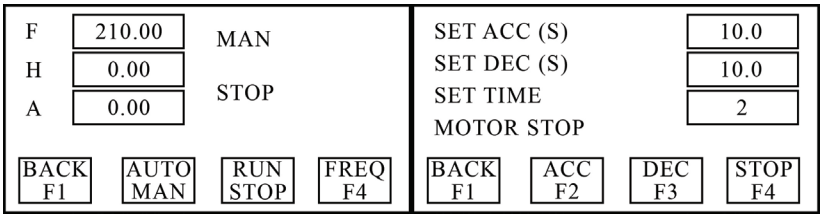

FIGURE 7

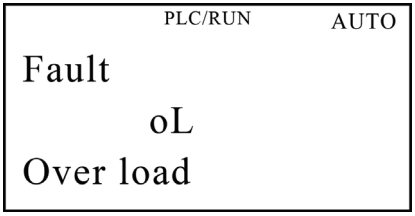

FIGURE 8

For any further information, refer to the inverter use and maintenance.

3.2 AUTOMATIC DRIVE

In order to make the automatic drive, by switch, it is necessary to make the connections as shown in FIGURE 9 and FIGURE 10, **after removing the electric tension.**

In the case of sensor that require power supply (e.g. photocells), it is necessary to make the connections as shown in FIGURE 11 and 12, **after removing the electric tension.**

Once made the connections, apply the external cover before switch on the inverter.

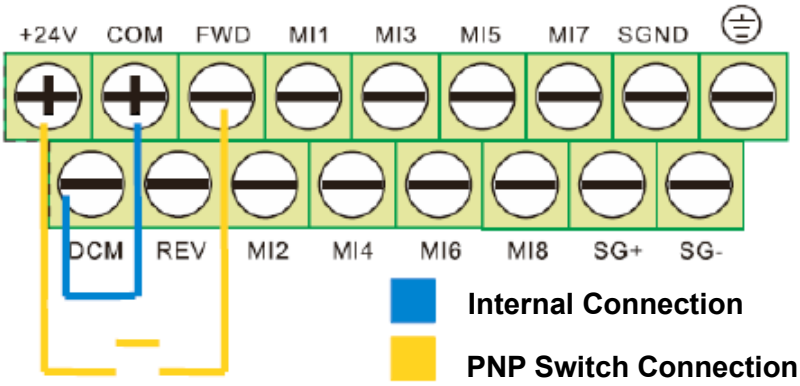

FIGURE 9: automatic drive switch/PLC – PNP connection.

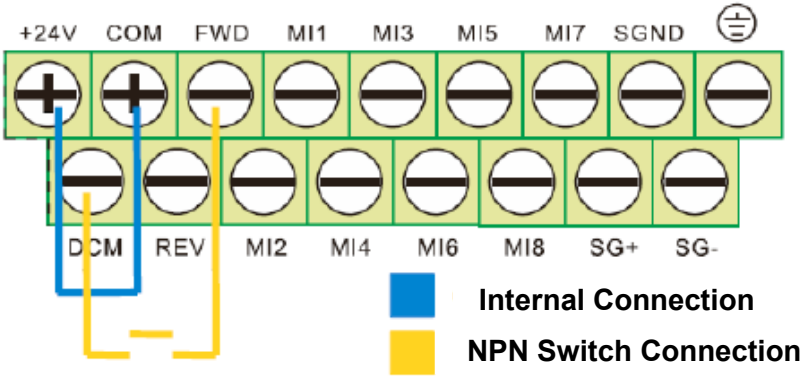

FIGURE 10: automatic drive switch/PLC – NPN connection.

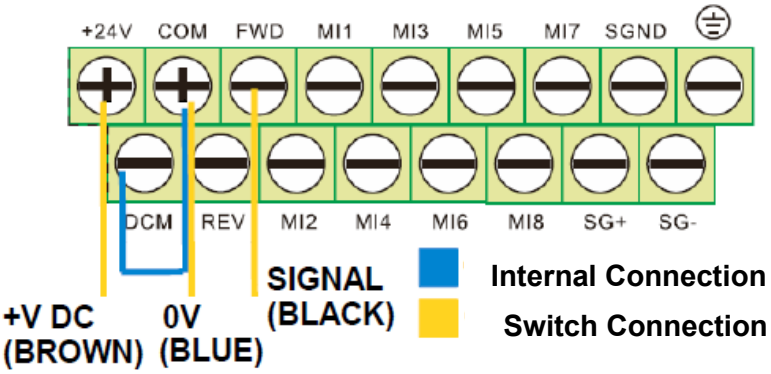

FIGURE 11: automatic drive powered sensor/photocell – PNP connection.

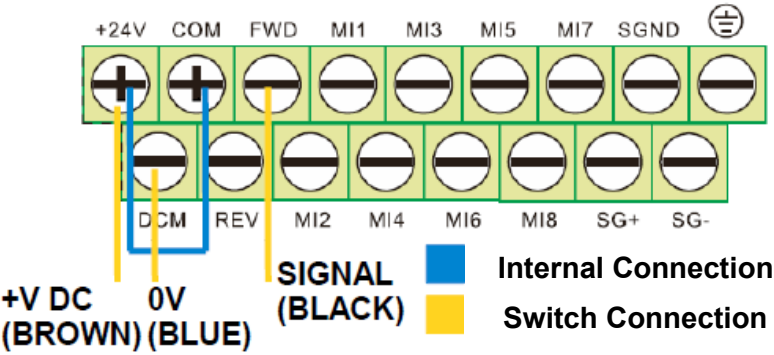

FIGURE 12: automatic drive powered sensor/photocell – NPN connection.

Once switched on the inverter, the main menù will appear (FIGURE 13) with the indication of the blower type, shown at the top right of the panel.

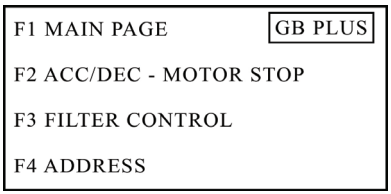

FIGURE 13

It will possible to turn on the blower, pressing the "F1" button to enter into the "MAIN PAGE". The "MAIN PAGE" (FIGURE 14) presents these following information and functionalities:

FUNCTION	DESCRIPTION
F	Currently setted frequency (Hz) adjustable by the "FREQ F4" button
H	Currently detected frequency (Hz)
A	Currently detected electrical consumption (Ampere)
MAN/AUTO	Mode of operation, selectable by the "F2" button
RUN/STOP	Blower status (on/off) selectable by the "F3" button
BACK F1	Back to the main menu by the "F1" button

In order to make the automatic drive it is necessary to press the "F2" button until the word "AUTO" appear (FIGURE 14 lh).
At this point the "RUN/STOP" condition of the blower will depend on the switch or the sensor.

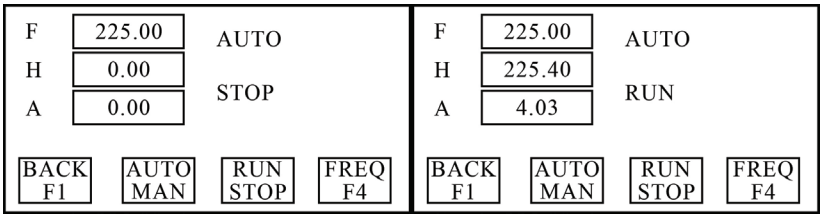

FIGURE 14

FUNCTION	CHARACTERISTICS
Frequency change	Maximum and default value 225Hz / 4500 RPM (GB PLUS) and 65Hz / 3600RPM (GB IE3). In order to modify these values you need to (FIGURE 15 lh): • press the "F4" button; • change by the up/down arrows the frequency value. Using the left/right arrows it is possible to shift from units to tens to hundreds; • after setting up the frequency value, press "ESC".
Acceleration and deceleration ramps change	Default values equal to 10s. In order to change them it is necessary: • access from the main menu to the "F2 ACC/DEC MOTOR STOP" screen (FIGURE 15 rh) pressing the "F2" button; • Press the "F2" button (acceleration) or the "F3" button (deceleration); • change by the up/down arrows the time value (in seconds). Using the left/right arrows it is possible to shift from units to tens to hundreds; • Press "ENTER".  PLEASE NOTE: if the value set for the ramps is too small, the motor could overload, showing the alarm of FIGURE 16. In order to reset the alarm press the red button "STOP RESET" on the panel (FIGURE 1 lh)
Time interval change	Default values equal to 2s. In order to change the value: • Press on the keypad (FIGURE 1 lh) the "F4" button; • Change the time (maximum value 999 s) (FIGURE 15); • Press "ENTER" to confirm.

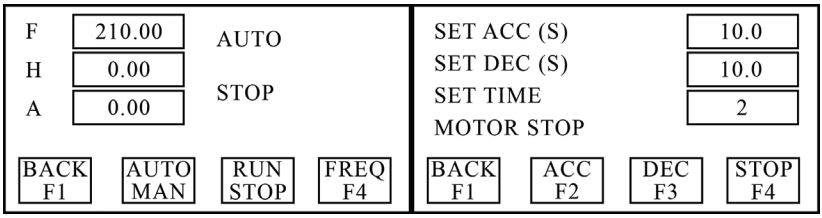

FIGURE 15

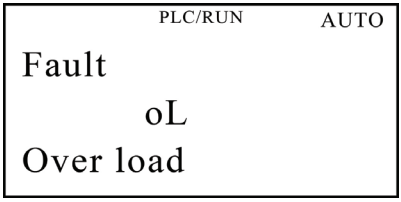

FIGURE 16

For any further information, refer to the inverter use and maintenance manual.

3.3 PREDICTIVE MAINTENANCE FOR SUCTION FILTER

This function signals an excess of dust or other material into the suction filter, by monitoring the actual adsorbtion of electrical current into the inverter and comparing this value to a reference value measured in presence of a clean filter.

If the decrease of adsorbtion exceeds a specified limit (default value equal to 10%), the inverter goes into alarm and automatically switches off the blower.

In order to change the alarm limit, which optimal value depends on the specific application, please consult the 3.5 chapter.

FUNCTION	CHARACTERISTICS
Predicitive maintenance for filter	PLEASE NOTE: in order to set correctly this function it is necessary that the blower/diffuser or blower/air knife system **is running at the desired frequency and with clean suction filter** • Enter into the "F3 FILTER CONTROL" page (FIGURE 17 lh) by pressing the "F3" page on the "MAIN PAGE"; • Press the "F2" button ("CURR READ"): the inverter will sample automatically the mean value of the adsorbed current for about 60 seconds. Once the sampling is finished, the mean value will shown at the top right of the panel (FIGURE 17 rh). • Activate the control system by pressing the "F3" button ("CTRL ON"). The central rh box will become "ON" (FIGURE 18 lh). It is possible to off the control system by pressing "F4" ("CTRL OFF").

If the adsorbtion of current decreases below the specified limit, an alarm symbol will compare on all screens of the inverter (FIGURE 18 rh) and the blower will stop.
In order to reset the alarm it is necessary to go into the "MAIN PAGE" by pressing the "F1" button in the main menu and press 2 times the "F3" button ("RUN/STOP").

PLEASE NOTE: if the frequency value is changed while the control system is active, the system will be automatically deactivated because the previous reference current value doesn't result correct.

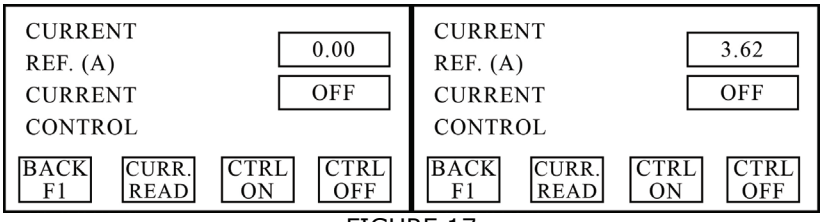

FIGURE 17

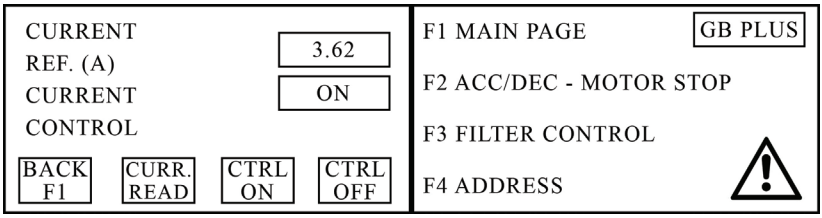

FIGURE 18

3.4 REMOTE MONITORING OF THE INVERTER

FUNCTION	CHARACTERISTICS
Protocollo MODBUS	It allows to monitor: • the operating status of the inverter (on/off); • the setted and current frequency; • the absorbed current; • the alarms. It allows to change: • the operating status of the inverter (on/off); • the setted frequency. It is possible to use a standard RS485 (with RJ45 connector or with SG+, SG-, SGND terminals, FIGURE 20). By pressing the "F4 ADDRESS" button on the customized main page, it is possible to display the name of the nodes (FIGURE 21).
Alarms detection on a relay.	Allows to detect the alarms by means of a relay-based system that requires the connections shown in FIGURE 22. The signal in case of alarm is a voltage of 24V.

In order to activate the external control by MODBUS, it is necessary to disable the internal PLC of the inverter by pressing the "MENU" button on the keypad of FIGURE 1 lh, select by the arrows the fuction 10 "PLC" (FIGURE 19 lh) and select the function "Disable" (FIGURE 19 rh).

Menu	PLC
▲▼ 10: PLC 11: Copy PLC 12: Displ Setup	▼ 1: Disable ■ 2: PLC Run 3: PLC Stop

FIGURE 19

For any further information, refer to the inverter use and maintenance manual.

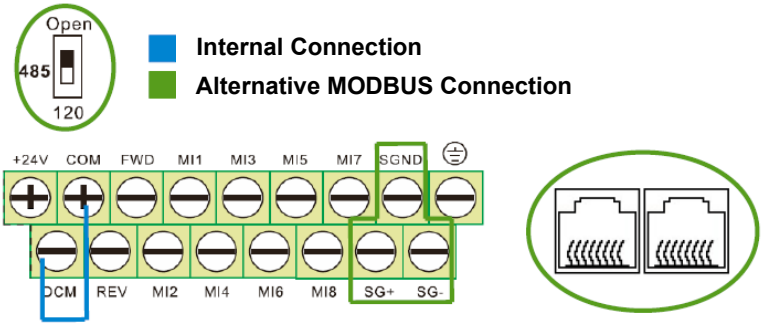

FIGURE 20: RS485 connection

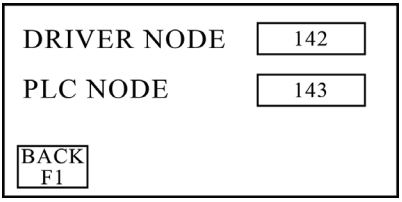

FIGURE 21

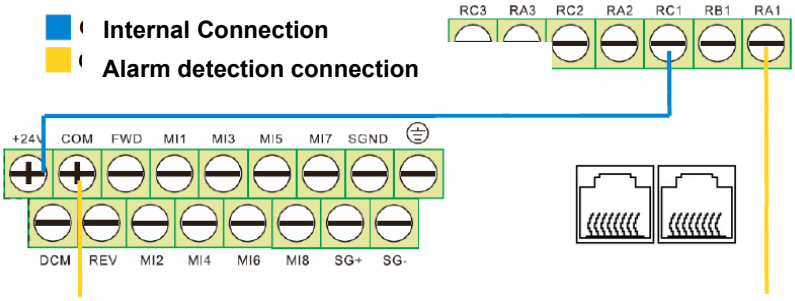

FIGURE 22: connections for alarms detection via relay.

3.5 HANGE OF FILTER ALARM LIMIT

The decrease of electrical adsorbtion (i.e. current) to which efficiency of a specific blower/diffuser or blower/air knife system results too low **is strongly dependent on the application.**
For this reason it is available a page for the configuration of this limit expressed as % respect to the mean measured current (see paragraph 3.3 PREDICTIVE MAINTENANCE FOR SUCTION FILTER).
EXAMPLE: for a reference current value equal to 4,0 Ampere, with a limit equal to 10% the alarm will start in for a mean value lower than 3,6 Ampere. With a limit equal to 5% the alarm will start for a mean value lower than 3,8 Ampere.

FUNCTION	CHARACTERISTICS
Change of the predictive maintenance limit	• Enter into the "F3 FILTER CONTROL" page (FIGURE 23 lh) by pressing the "F3" button on the "MAIN PAGE"; • Deactivate the control system by the "F4" button ("CTRL OFF"); • **Press the right arrow, entering into the page shown in FIGURE 23 (centre);** • Press the "F3" button ("% MOD"); • change by the up/down arrows the frequency value. Using the left/right arrows it is possible to shift from units to tens to hundreds; • Once defined the value of the limit, press "ENTER".

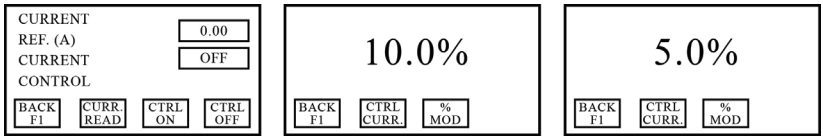
CURRENT
REF. (A)
CURRENT
CONTROL
0.00
OFF
BACK F1
CURR. READ
CTRL ON
CTRL OFF
10.0%
BACK F1
CTRL CURR.
% MOD
5.0%
BACK F1
CTRL CURR.
% MOD

FIGURE 23