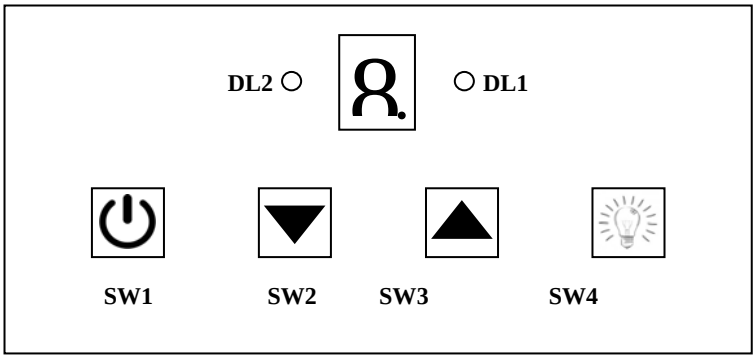
Technical and functional features:
Built-in digital speed regulator with 4-key keypad + 2 LED
p/n FE1038 (basic version)
p/n FE1038/T (with NTC temperature probe)

Technical features

- Mains power supply: 220 - 240 Vac – 50 Hz
- MAX. applicable load 230 V LIGHT output: 2 A
- MAX. load applicable 230 V MOTOR output: 4.5A
- Protection fuse: 8AT
- Electronic microprocessor control system.
- 2 relay outputs:
  - RL1 relay of 7 A for activation of GAS SOLENOID VALVE;
  - RL2 relay of 7 A for activation of LIGHT load;
- 4-key keyboard for controlling loads and for managing the configuration menu.
- Seven-segment display for displaying the indications of the regulator's operation.
- Light signals via 1 red LED (filter alarm) and 1 yellow LED (on/off gas solenoid valve).
- Possibility to set the value of the minimum, maximum and starting speed of the motor.
- Automatic operation mode management with temperature measurement via NTC probe (**only for p/n FE1038/T**).
- Management of a digital input, as an alternative to the NTC temperature probe, for the control of a thermal contact (normally closed) typically intended for the protection of the motor windings (**only for p/n FE1038/T**).
- Dimensions: 160x90x65mm
- Protection degree: IP56
- Weight: 0,4 kg

Functional features

The controller is controlled / configured via the 4-key keypad, while the seven-segment display and the DL1 and DL2 LEDs provide information on the operating status of the controller.



Keyboard:

- SW1 key: Starts/stops the engine, allows access to the configuration menu and is used as a "Confirm" button when navigating the configuration menu.
- SW2 key: Decreases the motor speed, allows navigation in the configuration menu, resets the filter usage counter and the filter alarm.
- SW3 key: Increases the speed of the motor, allows navigation within the configuration menu and (only for the code FE1038/T) allows to enable/disable the Automatic Mode.
- SW4 key: switches the light on/off and is used as the "Exit" button when navigating the configuration menu.

7-segment display:

It provides indications on the operating status of the regulator and in particular:

- speed implemented by the motor;
- menu level and configuration values in the configuration menu;
- any Automatic Mode active (**only for p/n FE1038/T**);
- any alarms in progress (**only for p/n FE1038/T**).

The display point gives additional indications:

- when it is fixed it indicates that it is inside the Configuration Menu;
- when it is flashing it indicates a phase of transitory operation: acceleration, waiting time to open the gas solenoid valve, waiting time for the motor turning off.

Red Led (DL1)

The presence of the filter alarm is indicated by the red LED (DL1) on.

Yellow Led (DL2)

The activated gas solenoid valve status is indicated by the yellow LED (DL2) on.

Management of the suction motor, the gas solenoid valve and the lights

Using the keyboard controls, it is possible to switch on/off the lights, start/stop the suction motor and set 8 different speeds for it: in the transition from one speed to the other, as well as on and off, the engine always follows an appropriate ramp.

Motor start procedure
With a short press of the SW1 key of the keypad, to be carried out with the motor off, the motor starts for three seconds at the starting speed (settable by the user, see the section "Controller configuration") and then automatically switches to speed 1.
After the time interval t_{ev} (which can be set by the user, see section "Controller configuration"), the gas solenoid valve is activated with the relative lighting of the yellow LED DL2.

Motor shutdown procedure

With a short press of the SW1 key of the keyboard, to be carried out while the motor is running, the gas solenoid valve is immediately deactivated and this event is signaled by the yellow LED DL2 extinguishing: the motor starts to suck at maximum power (speed 8) for the t_{off} time interval (which can be set by the user, see section "Controller configuration"), after which it stops.
During the transient phase that leads to the actual switching off of the motor, the display flashes and the speed can be changed manually.

Motor management

With the motor running it is possible to:

- Increase the motor speed in sequence (V1 → V2 → ... → V7 → V8) using the SW3 key on the keyboard;
- Decrease the motor speed in sequence (V8 → V7 → ... → V2 → V1) using the SW4 key on the keyboard.

It is not possible to start the motor with the Speed Increment command and the engine cannot be switched off with the Speed Decrease command.

Light Management

At any time and in any operating condition the light can be switched on or off using the SW5 key on the keyboard.

Automatic operation *(only for p/n FE1038/T)*

For models equipped with NTC temperature probe, the motor can work in:
- Manual mode, according to 8 preset speeds controlled by the keyboard;
- Automatic Mode, to automatically adjust the speed of the suction motor according to the temperature detected by the NTC temperature probe.

Instead of the NTC temperature probe it is possible to manage a digital input for the control of a thermal contact (normally closed) typically intended for the protection of the motor windings: for more information on the Automatic Mode and the logic of operation of the digital input, refer to the dedicated paragraphs.

Functional Description

When an NTC temperature probe is connected to the digital controller, it is possible to enable the Automatic Mode to obtain an automatic and linear regulation of the suction motor speed as a function of the temperature measured by the NTC probe itself.
The Automatic Mode is activated and deactivated alternately keeping the SW3 key of the keyboard pressed for about 2 seconds when the engine is off and not in the configuration menu. The activation of the Automatic Mode is indicated by the temporary display on the letter "A"; while the deactivation of the Automatic Mode (that is, the return to manual mode) is signaled by the temporary display on the display of the number "0".
In Automatic Mode, the speed varies between the minimum and the maximum speed set for non-automatic operation: the latter are controlled at settable temperature limits (see section "Controller configuration").

The Automatic Mode is active with the motor running if the digital controller is not in the condition of:
- configuration via menu;
- the initial starting speed;
- motor shutdown delay.

The automatism does not control the switching on and off of the motor but, if activated, regulates its speed.
The automatic operation of the motor is indicated by the letter "A" which alternates with the indication of the non-automatic speed closest to the current one.
The automatic operation can be temporarily suspended for 15 minutes by increasing or decreasing the speed manually: it is thus possible to manually set the desired speed for particular and temporary needs.
In order to optimize the automatic functioning according to the probe position and the size of the extractor hood, it is possible to set, in the configuration menu, the two temperature limits corresponding to the minimum and maximum motor speeds (see section "Controller configuration"); for intermediate temperatures, an intermediate speed is implemented.

Management of a thermal contact for the protection of the motor windings *(only for p/n FE1038/T)*

Functional description

For models equipped with NTC temperature probe it is possible to manage, instead of the probe, a digital input for the control of a thermal contact (normally closed) typically intended for the protection of the motor windings. If this configuration is used (connection of a thermal contact in place of the NTC temperature probe), the Manual mode for adjusting the motor speed must always be selected.
As long as the thermal contact is closed, all the functions of the digital controller can be managed:

- turn the motor on/off and increase/decrease the speed by pressing the appropriate keys on the keyboard;
- switch the lights on/off;
- enter the configuration menu and reset the filter counter.

When the contact opens, any loads that are switched on are switched off and the display shows the indication "c" flashing; if, before the power supply to the regulator is disconnected, the thermal contact closes, the functions that were active before the event of opening the contact are restored (unless the engine shut-off keys have been pressed in the meantime and/or light).
As long as the thermal contact is open, it will not be possible:

- turn the motor on/off;
- turn on/off the light;
- access the configuration menu.

With the thermal contact open, however, it will be possible to reset the filter counter.

Visualization and management of alarm conditions when the NTC temperature probe is connected to the controller *(only for p/n FE1038/T)*

If the NTC probe, connected to the regulator, doesn't work properly and the regulator is in particular working conditions (as described below), the display report an alarm condition showing the letter "c" or "E", in particular:

1. if the NTC probe is not detected, (possible damage to the wiring) or if it returns temperature measurements below the minimum permissible limit, you will see the letter "c" flashing on the display;
2. If the NTC probe returns temperature measurements above the maximum permissible limit, the display indicates the letter "E" flashing.
3. If the alarm condition occurs with the Automatic Mode activated, the automation is inhibited until the correct functioning of the probe is restored and:

- if the anomaly occurs with the motor running, then the maximum speed set for the motor is activated and the display shows an alarm code (represented by the letter "c" or the letter "E", as specified above) alternating with the indication of the current speed; in this situation it is always possible, by pressing the appropriate keys on the keypad, to set a different speed of the motor as well as switch off/on the light and the motor;

- when you switch off the motor, a flashing alarm code appears on the display (represented by the letter "c" or the letter "E", as specified above); in this situation it is always possible, by pressing the appropriate keys on the keyboard, to switch on/off the light and the motor and, if necessary, set the desired speed;
- if the anomaly is signaled by the letter "E" you can deselect the Automatic Mode (by pressing for about 2 seconds the SW3 key of the keyboard, as already specified above) in order to use the controller according to the Manual Mode without having any alarm signal to display;
- if the anomaly is signaled by the letter "c" the controller cannot be used by deselecting the Automatic Mode: if in this situation the SW3 key of the keyboard is pressed for about 2 seconds to activate the Manual Mode, the display shows the letter "C" flashing and the light and motor ignition commands are ignored.

If the alarm condition occurs when the Automatic mode is deactivated, only the anomaly related to point 1 (NTC probe not detected or temperature measurement below the minimum permissible limit) is signaled and managed, and in particular:

- if the anomaly occurs with the motor running, then the motor and the light are switched off and the display shows the alarm code represented by the letter "c" flashing;
- after the motor and light have been switched off, any light and motor ignition commands are ignored and the display continues to show the letter "c" flashing;
- if the alarm condition ends before the power supply to the controller is removed, the active functions are restored before the alarm occurs (unless these functions have been disabled from the keypad or remote control after the alarm event occurs same); with the alarm returned, the display no longer shows the letter "c" flashing;
- if with active alarm the Automatic Mode is selected (by pressing the SW3 key of the keyboard for about 2 seconds, as already specified above) the automatism will be inhibited, but it will be possible to use the controller to switch the light on/off, switch on/off the motor and change its speed using the appropriate keyboard commands; in this case the display shows the letter "c" alternating with the indication of the current speed.

Reset filter alarm

When the motor is turned off and the configuration menu is not active, pressing the SW2 key on the keyboard for about three seconds resets the filter usage hours counter and any filter alarm.

REGULATOR CONFIGURATION

Configuration menu

With motor and lights off, access the Configuration Menu by keeping the "SW1" key pressed for at least 3 seconds. The keys of the keyboard allow navigation in the Configuration Menu as follows:

- **SW1** key ("**ENTER**"): Confirm value set or Input in submenu;

- **SW2** or **"-"** key ("**DOWN**"): Value decrease during setting or scrolling of the active submenu items;
- **SW3** or **"+"** key ("**UP**"): Value increase during setting or scrolling of the active submenu items;
- **SW4** (**"ESC**"): Value decrease during setting or scrolling of the active submenu items.

"**P**" menu: the "**P**" menu is the entry point in the Configuration Menu and allows setting the starting, minimum and maximum speed; use the **UP** button to switch to the "**T**" menu. Press **DOWN** key to go to the "E" menu (only for p/n FE1038/T at menu "A". With the **ESC** key, you exit the Configuration Menu.

Use the **ENTER** key to enter the submenu to set the starting speed "**b**" (boost). The motor moves to the minimum speed that can be associated with this parameter (it should be noted that this speed, depending on the type of load applied, may not be sufficient to start the engine, in which case press the **UP** key to increase it when the engine starts). The speed can be changed to the desired point with the **UP** and **DOWN** keys.

With the **ENTER** key, the current speed is acquired as the starting speed and the minimum "**L**" speed setting submenu is entered (Low); with the **UP** and **DOWN** keys the motor speed can be brought to the desired minimum level; it is not possible to select a speed greater than the chosen for the starting speed.

With the **ENTER** key, the current speed is acquired as minimum speed (1) and the submenu for setting the maximum speed "**H**" (High) is entered; the motor goes to the maximum speed (8) that can be changed to the desired point with the **UP** and **DOWN** keys.

With the **ENTER** key, the current speed is acquired as the maximum speed (8); the intermediate speeds are automatically calculated; the 8 speeds plus the inrushing speed are memorized and you return to the "**P**" menu.

Pressing the **ESC** key in the submenus "**b**", "**L**", and "**H**" returns to the "**P**" menu without saving any speed settings.

Menu "**t**": the "**t**" menu allows to set the delay for the actual switching off of the motor upon receiving the switch-off command (see engine shutdown procedure); use the **UP** key to go to the "**F**" menu while using the **DOWN** key to switch to the "**P**" menu. With the **ESC** key, you exit the Configuration Menu.

Press **ENTER** to enter the submenu for setting the switch-off delay; with the **UP** and **DOWN** keys you can choose between 10 possibilities (from 0 to 9) to which the times correspond as follows:

0: 0 sec.
1: 20 sec. (default)
2: 40sec.
3: 60 sec.
4: 80 sec.
5: 100sec.
6: 120 sec.
7: 140 sec.
8: 160 sec.
9: 180 sec.

With the **ENTER** key, the selected delay is acquired and memorized, and you return to the "**t**" menu.
Pressing the **ESC** key returns to the "**t**" menu without saving the current setting.

Menu "**F**": the "**F**" menu allows to set the engine operating hours before generating, for their saturation, a

Filter Alarm; press the **UP** button to go to the "**E**" menu, while the **DOWN** button will go to the "**t**" menu. With the **ESC** key, you exit the Configuration Menu.

Use the **ENTER** key to enter the submenu for setting the saturation hours; with the **UP** and **DOWN** keys you can choose between 10 possibilities (from 0 to 9) to which the times correspond as follows:

0: 0 hours (Default – alarm OFF)
1: 10 hours
2: 20 hours
3: 30 hours
4: 40 hours
5: 50 hours
6: 60 hours
7: 70 hours
8: 80 hours
9: 90 hours

With the **ENTER** key, the filter duration hours are acquired and stored and you return to the "**F**" menu.

Pressing the **ESC** key returns to the "**F**" menu without saving the current setting.

"**E**" **menu**: the "**E**" menu allows to set the activation delay of the Gas Solenoid valve when the motor is switched on (see Motor starting procedure); use the **UP** key to go to the "**P**" menu (to menu "**A**" only for p/n FE1038/T) while using the **DOWN** key to go to the "**F**" menu. With the **ESC** key, you exit the Configuration Menu.

With the **ENTER** key you enter the submenu for setting the activation delay of the Gas solenoid valve; with the **UP** and **DOWN** keys you can choose between 10 possibilities (from 0 to 9) to which the times in the following table correspond:

0: 1 sec.
1: 10 sec.
2: 20 sec. (Default)
3: 30 sec.
4: 40 sec.
5: 50 sec.
6: 60 sec.
7: 70 sec.
8: 80 sec.
9: 90 sec.

With the **ENTER** key, the selected delay is acquired and stored and you return to the "**E**" menu.

Pressing the **ESC** key returns to the "**E**" menu without saving the current setting.

"**A**" **menu**: the "**A**" menu (only for p/n FE1038/T) allows setting the temperature limits to which minimum and maximum speed correspond in automatic mode; press the **UP** button to go to the "**I**" menu while using the **DOWN** button to go to the "**E**" menu. With the **ESC** key, you exit the Configuration Menu.

Press **ENTER** to enter the submenu for selecting the temperature limit to be set; with the **UP** and **DOWN** keys it is possible to select the lower temperature limit indicated by the letter "**L**" (Low) or the upper

temperature limit indicated by the letter "**H**" (High); press **ENTER** to enter the relative temperature selection submenu and return to menu "**A**" with the **ESC** key.

Submenu "**L**": with the **UP** and **DOWN** keys you can choose between 4 possibilities (from 1 to 4) to which the temperatures correspond as follows:

1: 25°C
2: 30°C (default)
3: 35°C
4: 40°C

Press **ENTER** to acquire and store the selected temperature level and return to the "**L**" menu.
Press the **ESC** key to return to the "**A**" menu without saving.

Sub-menu "**H**": with the **UP** and **DOWN** keys you can choose between 6 possibilities (from 1 to 6) to which the temperatures correspond as follows:

1: 45°C
2: 50°C (default)
3: 55°C
4: 60°C
5: 65°C
6: 70°C

With the **ENTER** key, the selected temperature level is acquired and stored and you return to the "**H**" menu.
Press the **ESC** key to return to the "**A**" menu without saving.

Restore default settings

To restore the default configuration of the controller, enter the Configuration Menu (first menu level) keeping the SW1 key pressed for at least 3 seconds and after, keep the SW3 and SW4 keys pressed simultaneously for at least 3 seconds; the exit from the Configuration Menu with simultaneous temporary display of the letter "d" indicates the successful restoration.

This operation involves restoring the default conditions for:
· the 8 speeds of non-automatic operation
· the starting speed
· the activation delay of the gas valve when the fan is switched on
· the delay in switching off the motor
· the hours of filter saturation (Alarm disabled)
· Automatism (disabled).