3. Product description

3.1 Description

3.1.1 RGM controllers

Multifunction and multi-input RGM controllers regulate the speed of voltage adjustable high-speed, three-phase, asynchronous motors applied to axial or centrifugal fans. Connected to transducers, sensors or a Modbus network, they can receive signals (pressures, temperatures, etc.) that, together with the set parameters, regulate motor speeds.

3.1.2 Applications

RGM controllers are suitable for HVAC/R environment applications with voltage adjustable high-speed asynchronous motors, for example, ventilated heat exchangers used in air conditioning and refrigeration systems.

3.1.3 How they work

RGM controllers are three-phase voltage transformers that use the principle of phase partialization or phase cut-off. Partialization is totally controlled on the three phases, regulating the effective voltage applied to the load. During installation, the motor cosϕ can be taken into account and manually compensated. You can exclude up to two speed zones with higher acoustic disturbances. Neutral conductor connection is not required.

There are two regulation outputs, one for power for the three-phase motors and the other for the Slave unit signal.

3.1.4 Controls

The control can be:

- **Slave proportional**: changes the three-phase output proportionally to the prevalent input value.
- **Master proportional**: changes the three-phase output to maintain the value of the prevalent input within the proportional band.
- **Master PID**: changes the three-phase output to keep the prevalent input value near the setpoint.

Voltage regulation at the signal output can be:

- for 0-10 V dc Slave units, proportional variable to the value of the power output
- for 0–10/10–0 V dc outdoor units or 1–10 V dc spray units with independent setpoint and proportional band

3.1.5 Setpoints and associated parameters

Two different regulation setpoints and two set of associated parameters are available. You can select one or the other setpoint, and its parameter set, using an On/Off input.

Within each set of parameters there is an additional setpoint and proportional band dedicated to signal regulation for slave units.

3.1.6 Inputs and outputs

The controller has two expandable analog inputs with expansion module and a relay output that can be used both to activate external alarm devices and to control external units (i.e. slave units, sprays).

Regulation may occur considering the only connected input or one of the two (the largest or the smallest). If you choose to use only one input, the other will remain visible from the display or from the Modbus protocol and can be connected, for example, to a probe.

3.1.7 Functions that can be activated with On/Off inputs

The following controls are possible via the On/Off inputs:

- start reverse mode: the output voltage decreases as the input increases
- motor heating activation
- start according to setpoint and relative set of parameters
- enabling night limit
- stop power and signal output regulation signal
- motor thermal protection status reading (only with Modbus board, optional)

3.1.8 Default configurations

To facilitate installation, the RGM controller has 13 configurations that can be customized by editing a single parameter. There are configurations for Master or PID proportional control (temperature, pressure, current or voltage) and configurations for Slave proportional control (in current or in voltage).

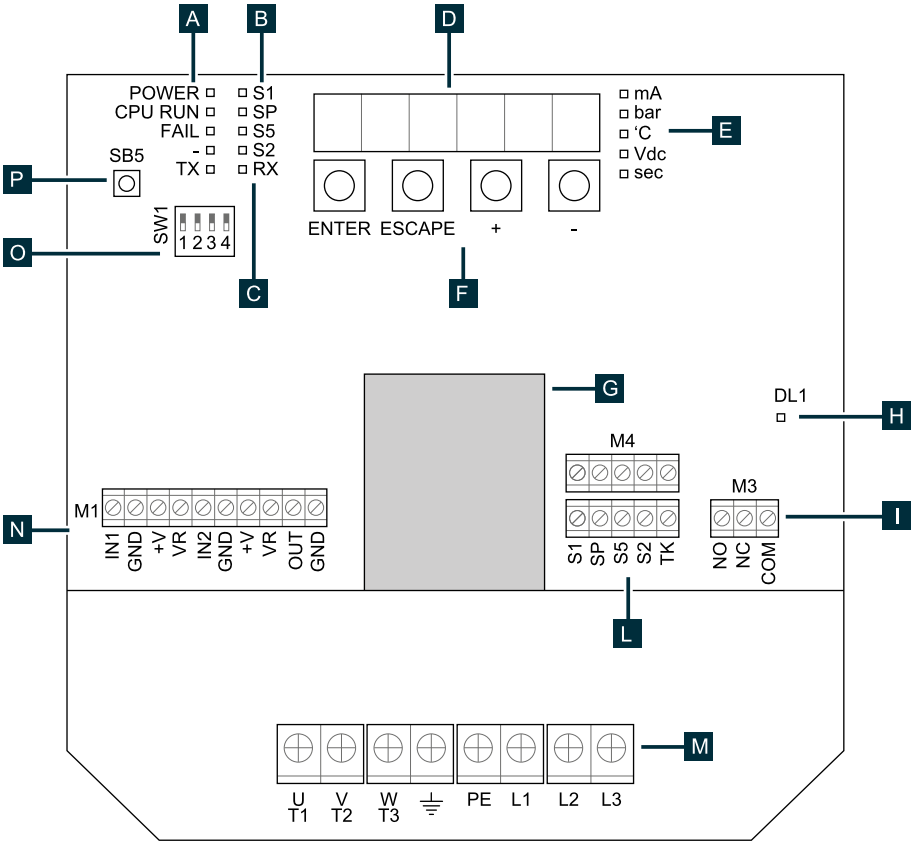
3.1.9 Optional functions

The following are available upon request:

- overload protection function
- an optional card to communicate with a supervision system via Modbus RTU RS-485 protocol

3.2 Presentation

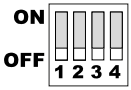
3.2.1 Main components



Part	Description	Reference in the manual
A	Device status LED.	"Status LED" on page 15
B	On/Off input LEDs active.	"On/Off inputs LED" on page 15
C	Modbus communication status LED (with optional Modbus card included)	"Modbus communication LED" on page 15
D	Display.	-
E	Unit of measure LED for the displayed value.	"Unit of measure LED" on page 16
F	Keyboard to scroll parameters and set them.	"Programming display keyboard" on page 16
G	Optional board for connection to supervisor via serial RS485-Modbus (RTU).	"Modbus card (PB1073C) - optional" on page 21
H	LED **DL1** relay status.	"Relay status LED" on page 16

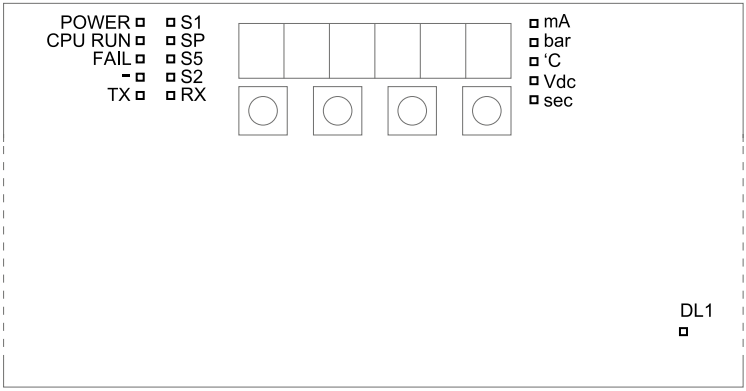
Part	Description	Reference in the manual
I	Terminal board M3 with relay output.	"Relay output" on page 20
L	Terminal board M4 for remote On/Off inputs or from motor overload protections.	"On/Off inputs" on page 19
M	Terminal board input and three-phase voltage output (M1 or M3 or M5 according to the model).	"Three-phase power supply and power output for motor(s)" on page 17
N	Terminal board M1 with analog inputs and analog regulation output.	"Analog inputs and outputs" on page 18
O	DIP switch SW1 to turn functions on/off.	"DIP switch SW1" on page 14
P	Reset button.	-

3.2.2 DIP switch SW1



Switch	Function
1	Enables/disables reserved parameter editing ■ On: enables reserved parameter editing by expert users. **PArA**, **conF**, **conn** and **Pid** menus are available with all parameters editable. ■ Off: disables reserved parameter editing. Only basic parameters can be edited (visible after the "ProGra" message).
2	With regulation in PID mode, enters an area +/-2.5% on the PID proportional band around the setpoint (dead band) to avoid excessive regulation adjustments. ■ On: dead band on ■ Off: dead band off
3	Sets external overload protection alarm management for input **TK**. ■ On: with overload protection input **TK** = Off (contact open) the fan regulation will not stop, but **TK** input status can be read by the supervisor via RS485-Modbus (if applicable). Typical for installations with several fans. ■ Off: with overload protection **TK** = Off (contact open) puts regulation in stand-by and generates an alarm.
4	With Modbus card only. Defines the duration of non standard Modbus forcing received by the supervisor (Clima-Sinergy or third party). ■ On: the received control is kept until the next control that cancels/changes it or until the controller is turned off or reset. ■ Off: the received control is kept for no more than 10 minutes

3.2.3 LED overview



3.2.4 Status LED

Name	Description
POWER	Power on
CPU RUN	■ Blinking: micro controller running ■ Steady (on or off): micro-controller fault, contact SELPRO customer service
FAIL	One or more errors, check alarm message on the display
-	Non standard Modbus force control with effects on the controller

3.2.5 On/Off inputs LED

Name	Description
S1	Motor heating on/reverse mode on
SP	Setpoint 2 on ■ on: setpoint 2 on ■ off: setpoint 1 on
S5	Maximum night limit % RPM on ■ on: limit active ■ off: limit not active
S2	Power regulation consent status: ■ on: regulation consent on ■ off: regulation consent off

3.2.6 Modbus communication LED

Name	Description
TX	Blinking: transmitting data.
RX	Blinking: receiving data.

3.2.7 Relay status LED

Name	Description
DL1	Alarm relay status/external unit control. ■ on: relay energized (closed between **COM**-**NO**) ■ off: relay at rest (closed between **COM**-**NC**)

3.2.8 Unit of measure LED

Name	Description
mA	The value displayed is expressed in milliamps.
bar	Value displayed expressed in bar.
'C	Value displayed expressed in degrees Celsius.
Vdc	Value displayed expressed in Vdc.
sec	Value displayed expressed in seconds.

3.2.9 Programming display keyboard

Key	Function
ENTER	Confirms the selection or saves new settings with the **ESCAPE** key.
ESCAPE	Cancels the selection. Saves the new settings with the **ENTER** key.
+	Increases the value read or scrolls the parameter list up.
-	Decreases the value read or scrolls the parameter list down.