3. Product description

3.1 Description

3.1.1 DRM controllers

Multifunction and multi-input DRM controllers regulate the speed of voltage adjustable high-speed, three-phase, asynchronous motors applied to axial or centrifugal fans. The controllers act as power units in Slave mode but are set-up for Master mode operation. In fact, transducers or sensors can be connected and the programming display (optional) and be installed to modify parameters and configurations.

3.1.2 Applications

DRM 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

DRM 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. Neutral conductor connection is not required. The controller normally operates in Slave mode but can be configured for Master mode operation using the programming display (optional).

3.1.4 Inputs

The controller has the following inputs:

- two analog inputs that can be configured to read the voltage/current signals (can be amplified with expansion modules)
- one optoisolated non-polarized input for the PWM signal
- two On/Off for activation of auxiliary functions

3.1.5 Outputs

The controller has the following outputs:

- control outputs:
  - one power for three-phase motors (models 308, 312, and 320)
  - two power for three-phase motors (models 328)
  - one in analogue voltage 0–10 Vdc for power slave units: the voltage 0-10 V follows the input (see "Operating mode" on page 25)
- one relay, for alarm, fault and operating status messages

3.1.6 Control

Therefore, slave proportional control varies the three-phase output proportionally to the input value.

3.1.7 Functions that can be activated with On/Off inputs

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

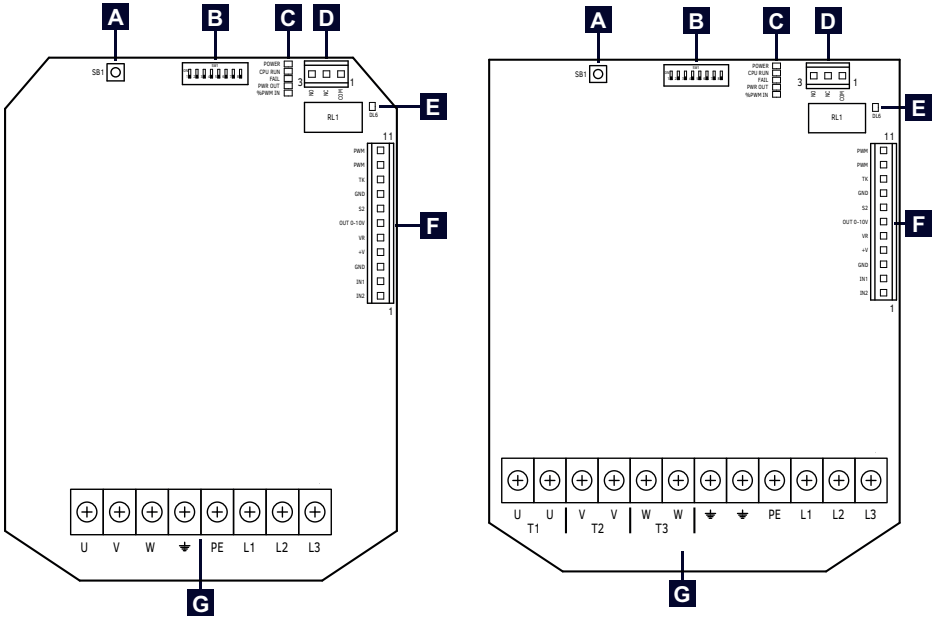
- remote enabling of start/stop
- read motor overheat protection status

3.1.8 Default configurations

The DRM controller has three configurations for Slave proportional control: current, voltage or based on PWM signal.

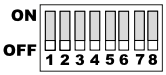
3.2 Presentation

3.2.1 Main components



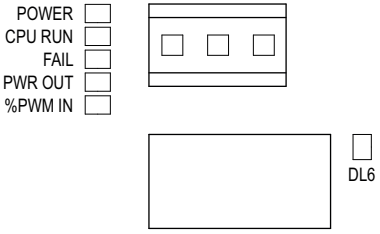
Part	Description	Reference in the manual
A	Reset button.	-
B	DIP switch SW1 to turn functions on/off.	"DIP switch SW1" on page 12
C	Device status LED.	"Status LED" on page 12
D	Terminal board M4 with relay output.	"Relay output" on page 16
E	LED **DL6** relay status.	"Relay status LED" on page 13
F	Terminal board M3 with analog inputs and analog control output.	"Analog inputs and outputs" on page 15
G	Terminal board M1 three phase voltage input and output.	"Three-phase power supply and power output for motor(s)" on page 14

3.2.2 DIP switch SW1



Switch	Function
1	Sets the type of analogue command input: ■ On: 4-20 mA ■ Off: 0-10 Vdc or PWM
2	Sets the control mode: ■ On: inversely proportional to the command signal ■ Off: directly proportional to the command signal
3	Sets the **TK** contact operation (terminal board M3): ■ On: NO contact. Function not available. ■ Off: NC contact. Serial connection of the motor overload protections (**TK**).
4	Sets the **START/STOP** contact operation (terminal board M3): ■ On: ○ Closed contact: start ○ Open contact: stop ■ Off: ○ Open contact: start ○ Closed contact: stop
5	Set the behavior of the relay in the various operative states and in the event of a fault. See "Behavior of relay and LED DL6 to indicate the operative and fault states" on page 13.
6	
7	Enables/disables editing parameter **cosϕ**: ■ On: enables manual editing of the parameter. See "Modify the cosϕ of the motor" on page 29 ■ Off: disables manual editing of the parameter
8	Function not available.

3.2.3 LED overview



3.2.4 Status LED

Name	Description
PWR	Power on
CPU RUN	■ Blinking fast: micro controller running ■ Blinking slowly (on its own): manual setting of the motor cosϕ active ■ Blinking slowly (with the **PWR OUT** LED blinking): standby

Name	Description
FAIL	***Note**: if multiple alarms are present, the one with highest priority is indicated.* ■ 1 flash: temperature of the board greater than 85 °C ■ 2 flashes: power phase missing ■ 3 flashes: motor overload protection open ■ 4 flashes: input value out of range see "Minimum and maximum limits for inputs IN1 and IN2" on page 30. For the causes and resolutions of the alarm messages, see "Alarm messages" on page 30.
PWR OUT	■ On: output voltage distribution ■ Blinking: standby, no voltage distribution but controller ready ■ Off: no output voltage distribution
%PWM IN	The varying intensity indicates the percentage of the PWM command signal

3.2.5 Relay status LED

Name	Description
DL6	Alarm relay status/external unit control. ■ on: relay energized (closed between **COM**-**NO**) ■ off: relay at rest (closed between **COM**-**NC**)

3.2.6 Behavior of relay and LED DL6 to indicate the operative and fault states

The behavior of the relay depends on the settings of switches 5 and 6 of the DIP switch.

***Note**: the relay is energized with contact COM-NA closed; the relay is at rest with contact COM-NC closed.*

Operative status	ON OFF 1 2 3 4 5 6 7 8	ON OFF 1 2 3 4 5 6 7 8	ON OFF 1 2 3 4 5 6 7 8	ON OFF 1 2 3 4 5 6 7 8
Stop	Relay energized	Relay de-energized	Relay de-energized	Relay energized
Standby	Relay energized	Relay energized	Relay de-energized	Relay energized
Alarm	Relay de-energized	Relay de-energized	Relay de-energized	Relay energized
Normal operation	Relay energized	Relay energized	Relay energized	Relay energized
Manual setting of cosϕ	Relay energized	Relay energized	Relay energized	Relay energized
No power supply	Relay de-energized	Relay de-energized	Relay de-energized	Relay de-energized
Insufficient power supply	Relay de-energized	Relay de-energized	Relay de-energized	Relay energized
Device faulty	Relay de-energized	Relay de-energized	Relay de-energized	Relay energized
No power supply phase	Relay de-energized	Relay de-energized	Relay de-energized	Relay energized