3. Product description

3.1 Description

3.1.1 DSV controllers

Multifunction and multi-stepper DSV controllers regulate the speed of voltage adjustable high-speed, three-phase, asynchronous motors applied to axial or centrifugal fans. Connected to transducers or sensors can receive signals (pressures, temperatures, etc.) that, together with the set parameters, control motor speeds. This control ring can be connected to a spray unit, too, with a 1–10 V dc signal.

3.1.2 Applications

DSV 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

The DSV controllers are three-phase stepper transformers that use a pair of three-phase autotransformers to regulate the voltage effectively applied to the load. Neutral conductor connection is not required.

3.1.4 Inputs

The controller has the following inputs:

- three analog inputs that can be configured to read the voltage/current signals or NTC resistance (can be amplified with expansion modules)
- if On/Off for remote activation of functions

3.1.5 Outputs

The controller has the following outputs:

- one power output for delivering voltage to the connected fans
- two analog outputs with voltages that can be configured for external units for analogue control 0–10 V dc or 1–10 V dc
- three relays, for alarm signals and other auxiliary functions that can be configured.

3.1.6 Communications port

The controller has two RS485 ports that communicate with a supervisory system and it is managed with Modbus RTU protocol.

3.1.7 Controls

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.

A third input is available to read the voltage, current and NTC resistance signals that can be used to activate some special functions, see "Special functions" on page 11.

The control of the speed command transmitted to the output can be:

- **Slave proportional**: the input signals are generated by an external controller or a manually controlled potentiometer. The value of the control command can vary in proportion to the prevalent input value.

- **Master proportional**: input signals are generated by temperature sensors or transducers of other magnitudes. The control command changes the three-phase output to maintain the value of the prevalent input within the proportional band.

Proportional control can be direct, if increasing the input the control value increases, or reverse, if it decreases.

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

3.1.8 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.

3.1.9 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
- start according to setpoint and relative set of parameters
- enabling night limit
- stop regulation signal
- read motor overheat protection status

3.1.10 Default configurations

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

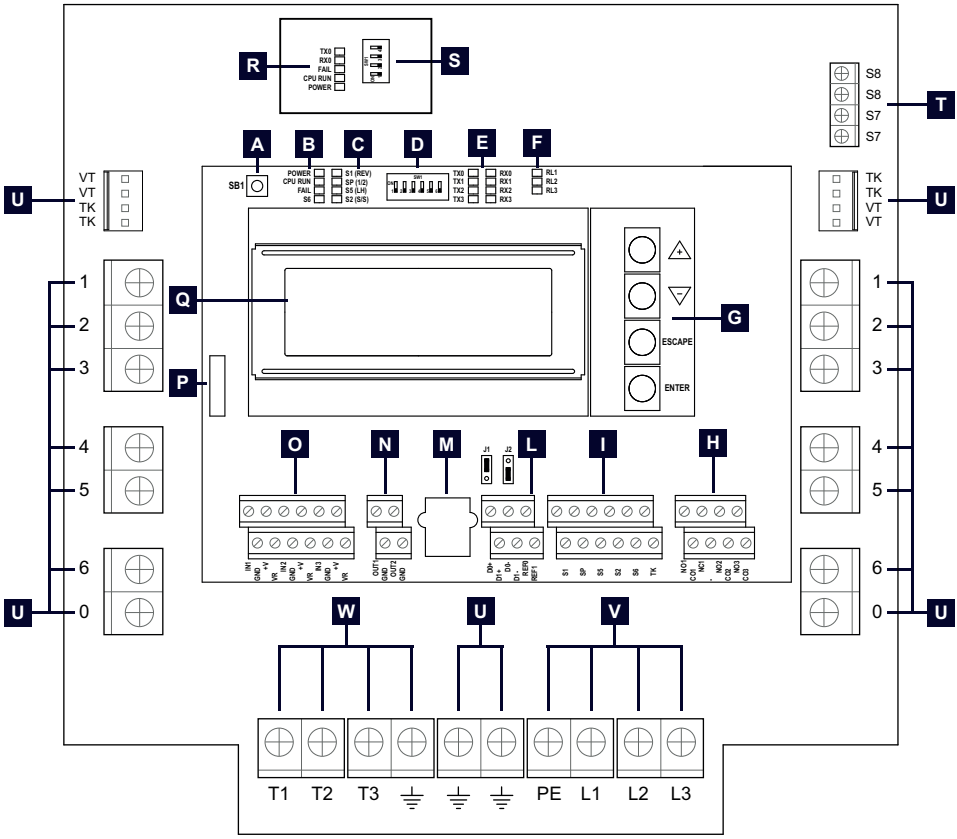
3.1.11 Special functions

The controller also manages the following special functions:

- output overload safeguarding (function always active)
- timed washing of the heat exchanger (if combined with AWS or EPS)
- fan anti-locking
- night limits for speed using internal clock and/or On/Off input
- switching of setpoint following the ambient temperature and/or On/Off input
- external setpoint control with 0-10 V signal
- adjustment of the setpoint following the ambient temperature
- Slave Safety mode

3.2 Presentation

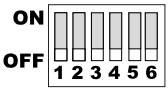
3.2.1 Main components



Part	Description	Reference in the manual
A	Reset button. Restarting the controller (for ex.: after being locked), allows one of the predefined configurations to be chosen.	"Select a configuration" on page 60
B	Device status LED.	"Status LED" on page 14
C	On/Off input LEDs active.	"On/Off inputs LED" on page 14
D	DIP switch SW1 to turn functions on/off.	"DIP switch SW1" on page 13
E	Modbus communication status LED.	"Modbus communication LED" on page 14
F	Relay status LED.	"Relay status LED" on page 15
G	Keyboard to scroll parameters and set them.	"Programming display keyboard" on page 15

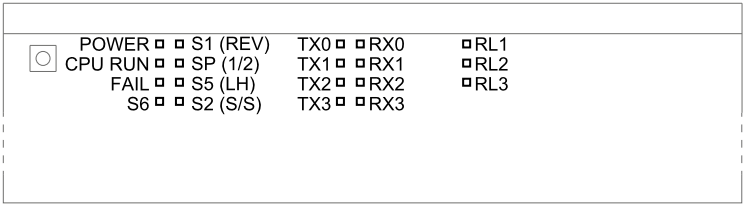
Part	Description	Reference in the manual
H	Terminal board M5 with relay output.	"Relay outputs" on page 23
I	Terminal board M4 for remote On/Off inputs or from motor overheat protections.	"On/Off inputs" on page 22
L	Terminal board M3 with serial outputs and relative serial terminal jumpers.	"Modbus Ports" on page 20
M	Reserved.	-
N	Terminal board M2 with analog regulation outputs.	"Analog outputs" on page 20
O	Terminal board M1 with analog inputs.	"Analog inputs and outputs" on page 18
P	Connector for remote key pad (ZCKEY.01.0100020)	-
Q	Back lit LCD display.	-
R	Power section status LED.	-
S	Power section pre-setting DIP switch (reserved)	-
T	Terminal boards for connection of the external auxiliary remote controllers for steps No. 7 and No. 8 ***Note**: in models DSV312 and DSV316, terminals S7 and S8 are in inverted position.*	"Terminal board for autotransformer connection" on page 17
U	Connectors for right and left autotransformer surveillance cables (only for DSV327 and DSV348) Terminal boards for the connection of the right and left autotransformer (only for DSV327, DSV334 and DSV348)	
V	Power terminals for the connection of the power supply and PE external protection conductor	"Three-phase power supply and power output for motor(s)" on page 16
W	Power terminals for the connection of the load and the protection conductor	

3.2.2 DIP switch SW1



Switch	Function
1	Enables/disables reserved parameter editing ■ On: enables editing of all parameters. ■ Off: only basic parameters can be edited.
2	Not used
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	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
5	Not used
6	Not used

3.2.3 LED overview



3.2.4 Status LED

Name	Description
POWER	Power supply present for output components (+5 V) from the power supply on the board
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

3.2.5 On/Off inputs LED

Name	Description
S1	Reverse mode active ■ on: reverse control mode active ■ off: direct control mode active
SP	Setpoint 2 on ■ on: setpoint 2 on ■ off: setpoint 1 on
S5	Maximum night limit on ■ on: limit active ■ off: limit not active
S2	Power regulation consent status: ■ on: regulation consent on ■ off: regulation consent off
S6	Maximum spray speed limit ■ on: limit active ■ off: limit not active

3.2.6 Modbus communication LED

Name	Description
TX0	Flashing: transmitting data on serial line COM 0 (Host).
TX1	Not used
TX2	Blinking: transmitting data on serial line COM 2 (from the surveillance board to the power board).
TX3	Not used
RX0	Flashing: receiving data on serial line COM 0 (Host).
RX1	Not used
RX2	Blinking: transmitting data on serial line COM 2 (from the power board to the surveillance board).
RX3	Not used

3.2.7 Relay status LED

Name	Description
RL1	Alarm relay status. ■ on: relay energized (closed between **COM**-**NO**) ■ off: relay at rest (closed between **COM**-**NC**)
RL2	Spray unit relay on/off status ■ on: relay energized ■ off: relay at rest
RL3	Heat exchanger washing relay status. ■ on: relay energized ■ off: relay at rest

3.2.8 Programming display keyboard

Key	Function
ENTER	Confirms the selection. With the **ESCAPE** key, enters the menu or saves the new settings.
ESCAPE	Cancels the selection. With the **ENTER** key, enters the menu or saves the new settings.
+	Increases the value read, scrolls upwards through the parameter list or confirms the address manually.
-	Decreases the value read or scrolls the parameter list down.