

# XV105D

## FAN SPEED CONTROLLER

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### **⚠ GENERAL WARNING**

#### 1.1 Please read before using this manual

- This manual is part of the product and should be kept near the instrument for easy and quick reference.
- The instrument shall not be used for purposes different from those described hereunder. It cannot be used as a safety device.
- Check the application limits before proceeding.

#### 1.2 **⚠ Safety Precautions**

- Check the supply voltage is correct before connecting the instrument.
- Do not expose to water or moisture: use the controller only within the operating limits avoiding sudden temperature changes with high atmospheric humidity to prevent formation of condensation
- Warning: disconnect all electrical connections before any kind of maintenance.
- The instrument must not be opened.
- In case of failure or faulty operation send the instrument back to the distributor or to "SAE s.r.l." (see address) with a detailed description of the fault.
- Consider the maximum power of the load (see Technical Data).
- Ensure that the wires for probes, loads and the power supply are separated and far enough from each other, without crossing or intertwining.

- Fit the instrument away from heater sources and be sure to have sufficient air flow to allow a good thermal exchange.

### 2 GENERAL DESCRIPTION

Models **XV105D**, din rail format, are speed controllers suitable for industrial and refrigeration applications in particular to control the air flow in condensing and evaporating processes. By closing an external jumper it is possible start the fan at the maximum speed for 10 seconds. The input signal can be ordered choosing among temperature probe NTC, 4/20mA or 0/1Vdc and 0/10Vdc signals.

### 3 OPERATING

Example of functioning with a condensing unit (direct): the probe must be fit where the sensor detects the most critic place of the condenser. Calibrate the Set trimmer to the temperature (or pressure) at which the fan runs at the maximum speed. Then calibrate the Diff trimmer to set the temperature (or pressure) differential at which the fan is stopped. E.g. if the Set is 40°C and the Diff is 10°C, when the temperature is above 40° the fan runs at maximum speed, if the temperature is between 30° and 40° the fan speed is controlled, and below 30°C the fan is stopped.

### 4 COMMANDS ON FRONT PANEL

**Trimmer SET:** by turning clockwise this trimmer, the set is changed from the minimum to the maximum value. See the default value table for the range.

**Trimmer differential:** by turning clockwise this trimmer, the differential is changed from the minimum to the maximum value. See the default value table for the range.

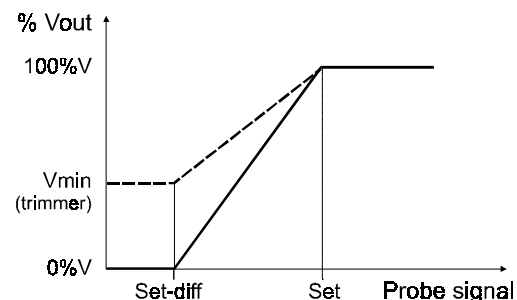
**Trimmer V min:** by turning clockwise this trimmer, the minimum fan speed can be changed from 0 to 50% of the maximum voltage output.

**Trimmer Cut Off:** by turning clockwise this trimmer, the fan cut-off can be changed from 10 to 30% of the maximum voltage output.

**Green LED:** this LED signals when the load is being controlled.

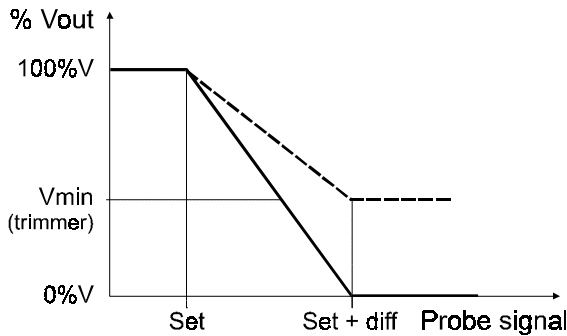
### 5 DIRECT AND INVERSE ACTION

**Direct action:** if the input signal increases, the voltage output proportionally increases (condensing or cooling applications).



If the input signal is higher than the Set, the output signal is 230 Volt (fans are running at the maximum speed). When the signal decreases and enters the range between the Set and Set-Diff the output signal follows the temperature variation. Below the Set-diff value the output signal is always 0V (if no Vmin has been set).

**Inverse action:** if the input signal increases, the voltage output proportionally decreases (evaporating or heating applications).



If the input signal is lower than the Set, the output signal is 230 Volt (fans are running at the maximum speed). When the signal increases and enters the range between the Set and Set+Diff the output signal follows the temperature variation. Above the Set+diff value the output signal is always 0 Volt (if no Vmin has been set).

**6 CONTROLS**

**6.1 Minimum fan speed**

To avoid that the fan can be damaged with low voltage output, it is possible set a minimum voltage (minimum speed). The range is selectable from 0 to 50% of the power supply.

**6.2 Cut-off function**

The Cut-off function drastically reduces the output to 0V, when the voltage on the load is lower than a percentage set with this trimmer. The range is selectable from 10 to 30% of the power supply. Example: if set to the middle position (15%), when the voltage on the load is lower than 15% of 230V, the fan immediately are stopped.

**6.3 MAXIMUM FAN SPEED AT START UP**

By closing the external jumper at terminals 13 and 14, each time the fan restarts, for 10 seconds it will run at maximum speed.

**6.4 Trigger signal**

To control loads having more than 500W an external power module can be connected at terminals 15 and 16.

**6.5 Changing the action type with current or voltage input models**

All the instruments with 4/20mA or 0/1Vdc and 0/10Vdc inputs can be changed from direct to inverse actions. By removing completely the front panel, an available jumper is fit on the back of the panel circuit. Jumper closed = direct action, jumper open = reverse action.

**7 INSTALLING AND MOUNTING**

The instrument shall be mounted on an omega DIN rail. The temperature range allowed for correct operation is 0 - 60 °C. Avoid places subject to strong vibrations, corrosive gases, excessive dirt or humidity. The same recommendations apply to probes. Let air circulate nearby the instrument.

**8 ELECTRICAL WIRES**

The instruments are provided with screw terminal block to connect cables with a cross section up to 2,5 mm<sup>2</sup>. Before connecting cables make sure the power supply complies with the instrument's requirements. Separate the input signal cable from the power supply cables, from the outputs and the power connections. Do not exceed the maximum current allowed on the output terminals.

**9 OUTPUT STATUS FOR FAULTY PROBE**

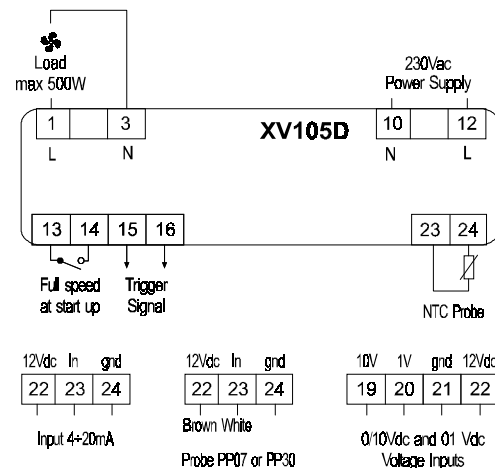
|                            |        |
|----------------------------|--------|
| Open probe (direct action) | 0 Volt |
|----------------------------|--------|

|  |          |
|--|----------|
| Short circuited probe (direct action)  | 0 Volt   |
| Open probe (inverse action)            | 230 Volt |
| Short circuited probe (inverse action) | 230 Volt |

**10 TECHNICAL DATA**

- Housing:** self extinguishing ABS.
- Case:** 4 DIN modules 70x85 mm; depth 61mm.
- Mounting:** DIN RAIL mounted in a omega (3) din rail .
- Frontal protection:** IP40
- Connections:** Screw terminal block ≤ 2,5 mm<sup>2</sup> wiring.
- Power supply:** 230Vac, ± 10% 50/60Hz.
- Power absorption:** 1VA max.
- Maximum load:** 500W.
- Input:** NTC or 4/20mA or 0/1 and 0/10Vdc.
- Range:** depending on the probe.
- Operating temperature:** 0÷60 °C.
- Storage temperature:** -30÷85 °C.
- Relative humidity:** 20÷85% (not condensing).

**11 CONNECTIONS**



**12 DEFAULT VALUES**

| Code           | Input   | Action  | Range     | Diff   |
|----------------|---------|---------|-----------|--------|
| XV105D – 50DNO | NTC     | Direct  | 0÷60°C    | 1÷30°C |
| XV105D – 50RNO | NTC     | Inverse | -40÷+10°C | 1÷30°C |
| XV105D – 50DAO | 4/20mA  | Direct  | 4÷20mA    | 1÷10mA |
| XV105D – 50RAO | 4/20mA  | Inverse | 4÷20mA    | 1÷10mA |
| XV105D – 50DVO | 0/1Vdc  | Direct  | 0÷1Vdc    | 0÷0,5V |
| XV105D – 50RVO | 0/1Vdc  | Inverse | 0÷1Vdc    | 0÷0,5V |
| XV105D – 50DWO | 0/10Vdc | Direct  | 0÷10Vdc   | 0÷5V   |
| XV105D – 50RWO | 0/10Vdc | Inverse | 0÷10Vdc   | 0÷5V   |

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