Fan Speed Controller

Features

- Volume or velocity reduction
- Supply & extract ventilation systems
- Flow rate reduction on centrifugal pumps
- Minimum & maximum speed adjustment
- 2 or 3-wire fan speed connection

Specification

Nominal Supply	230Vac/1Ph/50Hz
Control type	Auto from remote signal
On/Off switch	Mounted on side
Input signal:	
	0-20mA @ 250Ω
	0-10Vdc @ 90KΩ
Starting sequence:	
Kick start	Max. speed for 10 sec, then motor speed is as input signal
No kick start	Motor speed is as input signal
Speed adjustment:	
Minimum	60-160V
Maximum	165-230V
Off level	0-4V or 10-6V (depending on switch 16)
Current ratings:	
FC-ERV1	0.1 - 1.5A
FC-ERV3	0.1 - 3.0A
FC-ERV5	0.5 - 6.0A
FC-ERV10	0.5 - 10.0A
Fuse ratings:	
FC-ERV1	F 3.15 A-H (5x20mm)
FC-ERV3	F 5.0 A-H (5x20mm)
FC-ERV5	F 10.0 A-H (5x20mm)
FC-ERV10	F 16.0 A-H (16x32mm)
Mounting style	Wall mount
Dimensions	180 x 115 x 85mm
Protection category	IP54
Conformity:	
	LVD, 2006/95/EC
	EMC, 2004/108/EC
	CE Marked
Country of origin	Belgium

Product Codes

FC-ERV1
Electronic speed controller 1A

FC-ERV3
Electronic speed controller 3A

FC-ERV5
Electronic speed controller 5A

FC-ERV10
Electronic speed controller 10A

Technical Overview

The FC-ERV series of electronic speed controllers provide an economic means of regulation for voltage controllable single -phase AC motors. Centrifugal fans, axial fans, propeller fans, and centrifugal pumps are prime candidates for electronic speed control.
Remote control via 0-10Vdc or 0-20mA signal. Suitable for direct connection to BEMS or transmitters.

Motor Compatibility

Speed controllers can only be connected to motors having appropriate characteristics. Motors must be voltage controllable, asynchronous, squirrel caged, Class 'F' wound, direct driven, with standard or external, high resistance rotors. They should be air cooled with a frame size sufficient to dissipate the additional heat generated when running at low speed/low airflow. It is recommended that motors have internal thermal protection.
Speed controllers operate most efficiently with conventional split capacitor or shaded pole motors. Six or eight pole motors are suitable but four pole motors are preferred as they have a greater control range. Two pole motors can be used but are difficult to control at low speeds (below 600 rpm) and can cause start-up problems at low voltages. **If there is any doubt regarding a motor's compatibility with electronic speed controllers, contact the fan or motor manufacturer for guidance.**

Selection Criteria

Motors must be well loaded for optimum speed control, so choose one that is just big enough for the application. The motor load must be at least 75% of the nominal power of the motor at maximum speed. Choose a speed controller with a maximum current that is just larger than the nominal motor running current, i.e. if motor rating is 2.95 amps, select a controller with a maximum current of 3 amps.
Several motors can be connected to one speed controller, so long as the controller's maximum current is not exceeded. Although rare, some motors can have a higher current consumption, when run at lower voltages, than the motor's nominal current at design voltage. The highest current should be used when selecting the speed controller.

Nominal Current Range

The speed controller Nominal Current Range refers to the nominal current rating of the motor and is based on a maximum ambient of 30°C. The speed controllers will accept a motor starting current that is up to 3 x greater than the maximum nominal current of the speed controller.

Starting Sequence

The starting sequence describes what happens when first switching on and also when power is reapplied. The FC-ERV start up mode is selected by dipswitch 18 (see page 4).

Kick start.
Full voltage is initially applied to the motor for 10 seconds to overcome friction and back-draught. After 10 seconds the motor speed will automatically follow the position set by the 0-10Vdc or 0-20mA control signal.

Without kick (soft) start.
The motor will start according to the position set by the 0-10Vdc or 0-20mA control signal.

Fused Mains Isolator

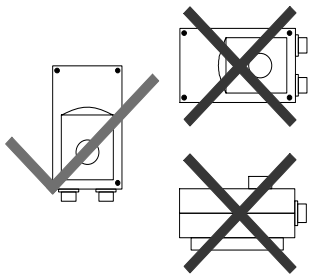
It is recommended that a fused mains isolator is installed upstream of the speed controller. The fuses should be of the slow blow type with a current rating that is the same as the speed controller's internal fast blow fuse.

Maintenance

In normal use, the speed controllers are maintenance free. If the fuse blows, it should only be replaced with a new fuse of the correct size and rating.
To remove light dirt and grime, wipe surfaces with a dry or slightly damp cloth. To remove heavy dirt and grime, use a proprietary non-aggressive cleaning agent. In all cases, ensure that the unit is completely dry prior to reconnecting the power supply.

Mounting

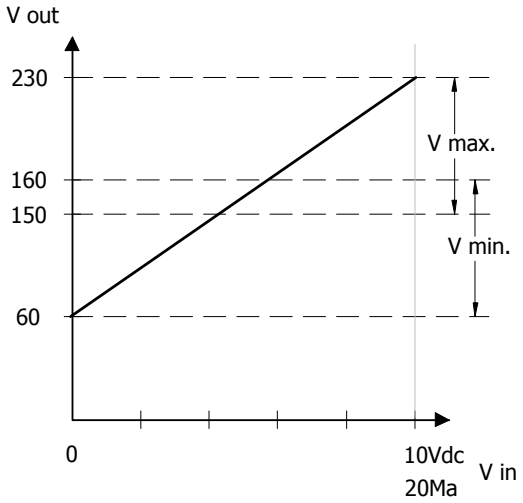
Always mount the FC-ERV vertically on a flat surface.



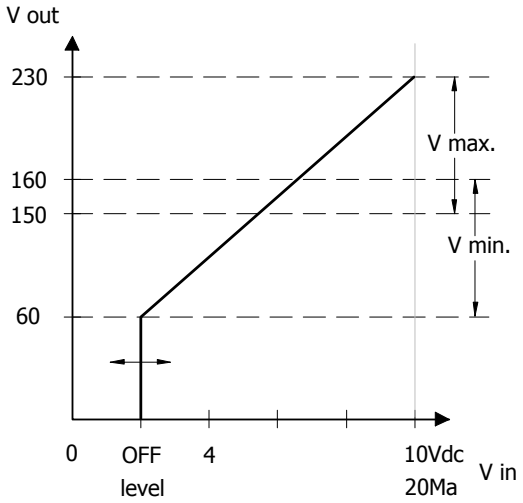
Off Level

The off level is controlled by dipswitch 17 and potentiometer PT3.

OFF level disabled:



OFF level enabled:



Calculation formula.

V out = ((V in/10)*(V max-V min))+V min

V out = (((V in-OFF-level)/(10-OF-level))*(V max-V min))+V min

Installation

1. The FC-ERV should only be installed by a competent, suitably trained technician, experienced in installation with hazardous voltages. (>50Vac & <1000Vac or >75Vdc & 1500Vdc)

2. Ensure that all power is disconnected before carrying out any work on the FC-ERV.

3. Maximum cable is 2.5mm², care must be taken not to over tighten terminals.

4. Undo the four retaining screws that secure the housing lid.

5. Remove the lid which can then be put aside. Take care not to loose the fixing screws.

6. Fix the housing to a suitable flat surface, using the four fixing screws and raw plugs provided.

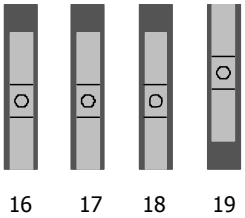
7. Feed the cable through the waterproof gland and terminate the cores at the terminal blocks. Leaving some slack inside the unit, tighten the cable gland onto the cable to ensure watertightness.

8. Set positions of dipswitches and potentiometers for application (see page 4).

9. Replace lid, tighten the four lid fixing screws.

10. Switch the power on to the controller and check correct operation.

Dip Switch Settings



16. Down = 0-10Vdc
    Up = 10-0Vdc

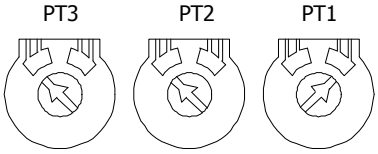
17. Down = Disable off-level
    Up = Enable off-level

18. Down = Disable kickstart
    Up = Enable kickstart

19. Down = 0-20mA
    Up = 0-10Vdc

Example shows:-
16. Down 0-10Vdc
17. Down Disable off-level
18. Down Disable kickstart
19. Up 0-10Vdc

Potentiometer Settings



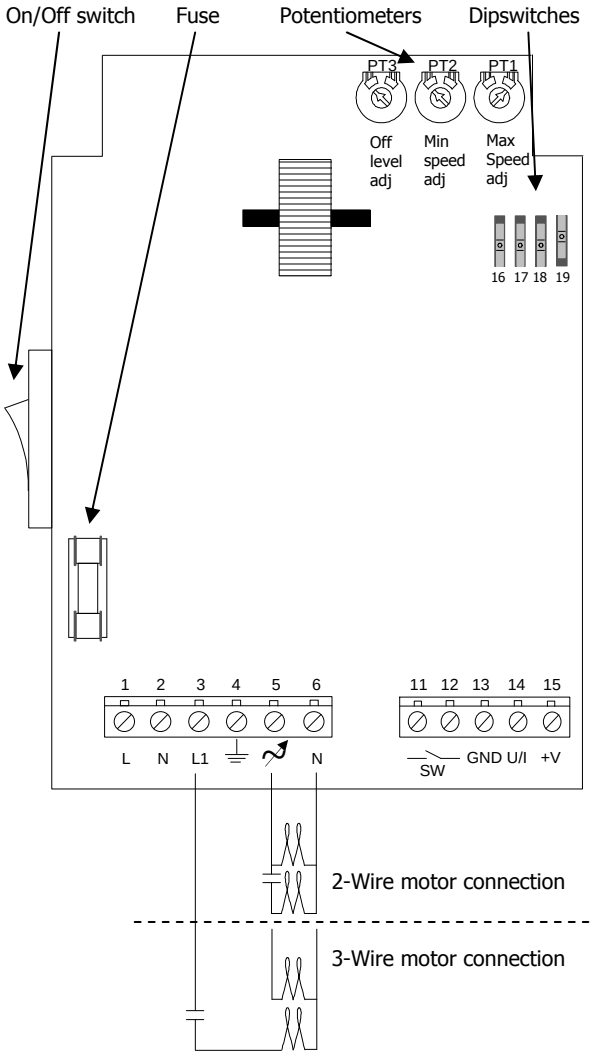
PT1. Maximum speed adjustment, range 165-230V

PT2. Minimum speed adjustment, range 60-160V

PT3. Off level adjustment, 0-4V or 10-6V depending on the position of dipswitch 16.

Example shows:-
PT1. Maximum speed, 230V
PT2, Minimum speed, 60V
PT3, Off level, 0V

Connections



Wiring (high voltage):

1,	**L**	**Input** Mains supply 230Vac @ 50Hz
2,	**N**	**Input** Neutral
3,	**L1**	**Output** 230Vac Non regulated output to motor (3-wire only)
4,		**Earth** (only for 3, 5 & 10A)
5,	⏚	**Output** Regulated output to motor (2-wire)
6,	**N**	**Output** Neutral

Wiring (low voltage):

11,	**SW**	On/off switch
12,	**SW**	On/off switch
13,	**GND**	Ground (0V)
14,	**U/I**	Control signal 0-10Vdc or 0-20mA depending on the position of dipswitch 19.
15,	**+V**	12Vdc @ 1mA output supply