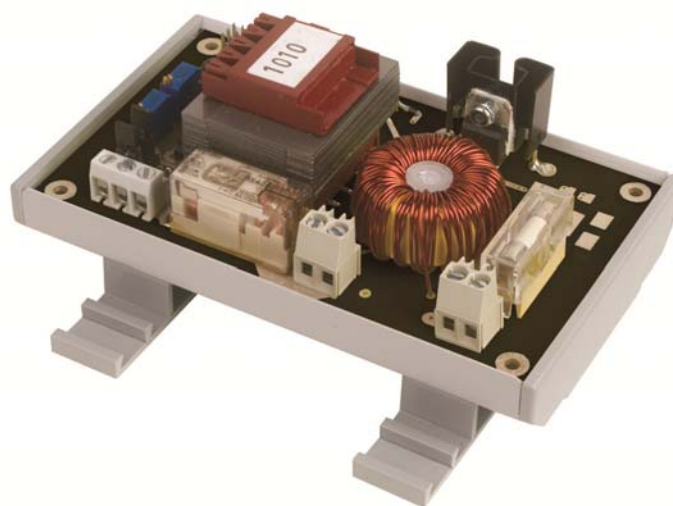


FC-DIN

DIN-Rail Mount Fan Speed Controller



Features:

- Volume or velocity reduction
- Suitable for supply & extract systems
- Minimum and maximum speed adjustment

Benefits:

- DIN-Rail mountable
- Configurable output characteristic settings

Technical Overview

The FC-DIN range of DIN rail mounting fan speed controllers offer user selectable 0-10Vdc, 4-20mA input control signal compatibility for automatic control, and a 3-wire potentiometric input for manual control.

The FC-DIN are available in 1A, 3A and 5A single phase ratings.

A fast start function is available, as well as user definable minimum and maximum run speeds. A simple linear input/output characteristic is selectable, and there is also a feature which allows a user to define, at 16 points, an input/output curve to suit a specific fan or application.

Specification:

Supply	230Vac, -6%, +10%, 47-64Hz
Control inputs, jumper selectable:	
4-20mA, 2-wire (not loop-powered)	
0-10Vdc, 2-wire	
0-5Vdc, 2-wire	
10K Ω 3-wire potentiometric	
Output	Triac, supplemented by a relay which only opens or closes when the triac is Off, eliminating arcing on the relay contacts
Dimensions	125 x 75 x 80mm (4.92 x 2.95 x 3.15")
Operating:	
Temperature	-10 to +50°C (14 to 122°F)
RH	5 to 95%, non-condensing
Storage:	
Temperature	-10°C to +80°C (14 to 176°F)
RH	0 to 90%, non-condensing
Country of origin	UK

Part Codes:

FC-DIN1	1A Single Phase Fan Speed Controller
FC-DIN3	3A Single Phase Fan Speed Controller
FC-DIN5	5A Single Phase Fan Speed Controller
Accessory	
FC-SP	Manual control adjustment potentiometer



The products referred to in this data sheet meet the requirements of EU 2004/108/EC and 2006/95/EC

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 & Nominal Current Range:

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.

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.

Pre-set Operation (Modes 1-3):

The FC-DIN controllers can operate according to pre-set characteristic modes held in firmware. Modes 1 - 3 inc. are pre-set modes. (see mode selection jumpers)

Mode 1: This is a linear characteristic, giving an output of 0% for an input of 0V, an output of 50% for an input of 5Vdc and an output of 100% for an input of 10Vdc.

Modes 2 & 3: Reserved for future development

Minimum and Maximum Speed Settings

In modes 1-3, the minimum and maximum outputs can be set by two adjustment pots on the PCB. (see PCB layout)

Note that the maximum speed should normally be set higher than the minimum speed. If the maximum speed is set lower than the minimum speed the control action is reversed (an output of 100% for an input of 0V, an output of 50% for an input of 5Vdc and an output of 0% for an input of 10Vdc).

Pre-set Operation (Modes 1-3 (continued)):

Fast Start

In modes 1-3, the fast start is enabled by fitting the fast start jumper (see fast start selection jumper). When fast start is enabled by this jumper, the output will initially be 100% (or whatever the maximum speed has been set to by the maximum speed pot) for a period of 5 seconds. After this, the output will be dependent on the input signal.

On and Off Thresholds

When the input falls below 5% of input range (for example, 0.5Vdc for 0-10Vdc input), the output will turn OFF. When the input rises above 10% of input range (for example, 1.0Vdc for 0-10Vdc input), the output will turn ON. **Note:** If fast start is enabled, each time the ON threshold is reached the fast start will operate.

Configurable Operation (Mode 4):

Custom Characteristic Curve

The FC-DIN controllers can operate according to a user programmable characteristic mode held in EEPROM. Mode 4 is the configurable mode. (see mode selection jumpers). The characteristic is defined using the FC-Software tool together with the FC-Cable programming interface cable. A custom curve can be defined at 16 points, and allows the user to create a characteristic curve to suit a specific motor, fan or pump system characteristic. When the new curve values are written to the FC-DIN, these new settings are held in flash memory, and are retained if power is lost to the device.

Minimum and Maximum Speed Settings

In mode 4, the minimum and maximum outputs are beset using the FC-Software tool together with the FC-Cable programming interface cable.

Notes:

The pots used for modes 1-3 are not recognized in mode 4.

The maximum speed should normally be set higher than the minimum speed. If the maximum speed is set lower than the minimum speed the control action is reversed (an output of 100% for an input of 0V, an output of 50% for an input of 5Vdc and an output of 0% for an input of 10Vdc).

Fast Start

In mode 4, fast start is set using the FC-Software tool together with the FC-Cable programming interface cable (see full speed start up setting). When fast start is enabled, the output will initially be 100% (or whatever the maximum speed has been set to by the software) for a user definable period (see start up setting). After this period, the output will be dependent on the input signal (see input enable setting).

Input Enable

The software allows the user to disable the input control signal. In this instance, the motor will run at the speed defined by the maximum speed setting (after fast start, if enabled). This can be useful for commissioning, or where a control signal is not available.

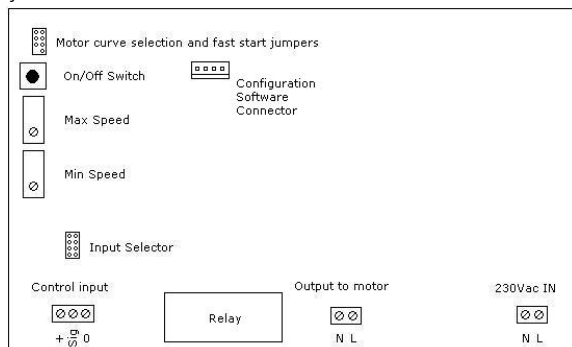
Other Options

"Remember status" is a continuation mode after power failure, i.e. if set to "True" the output does what it did before the power failure. The "Restart at power-up" setting is ignored.

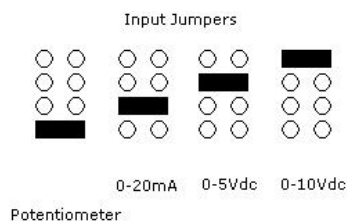
If "Remember status" is set to "False" the "Restart at power-up" setting is read. If set to "True" the output is ON when power is restored. If set to "False" the output is OFF when power is restored.

Connections & Jumper Settings:

PCB Layout:



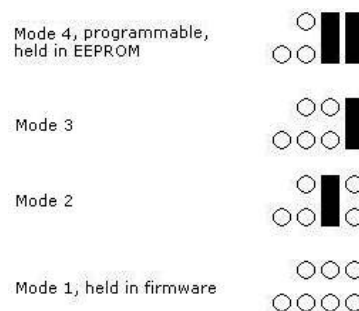
Input signal:



Fast Start:

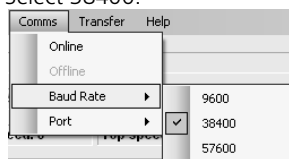


Mode Selection:

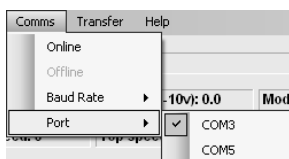


Configuration Software:

The FC-Software connects to an FC-DIN via the FC-Cable USB cable. To start communications, click on <Comms> then <Baud Rate>. Select 38400.



The FC-Cable has an integral USB to serial TTL converter. When plugged into a USB socket on a PC, drives will be installed and appear as a serial port. Note the serial port number in Windows Device Manager. To select which comm. Port for the software to use, click on <Comms> then <Port>. Select the serial port noted above..



To establish communications, click on <Comms> then <Online>.

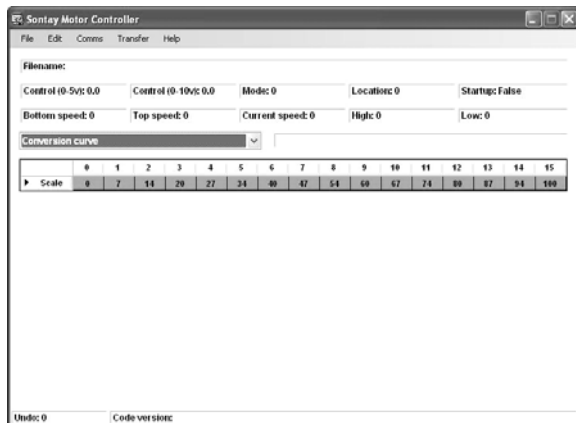
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Configuration Software (continued):

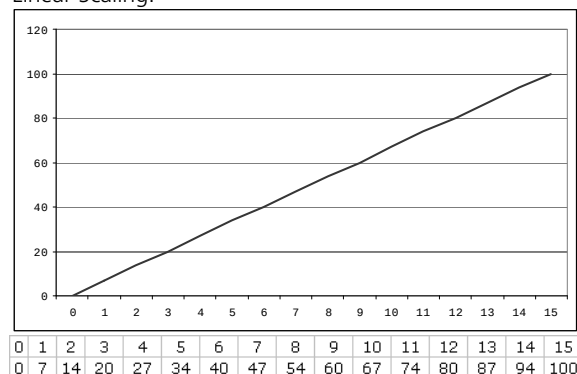
Defining a Custom Curve

Using the FC-Software configuration software, user defined control curves can be easily produced. Select "Conversion curve" from the drop down menu, then enter values (between 0 and 100) to define the curve required.

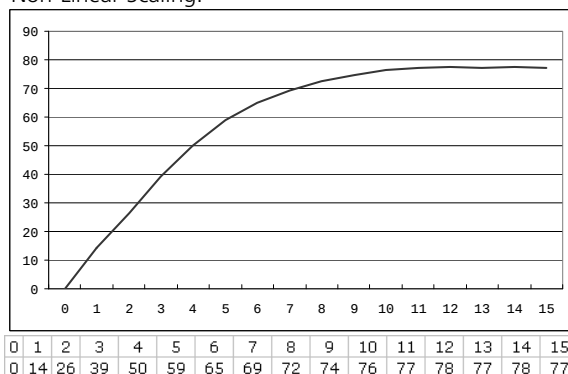


Examples,

Linear Scaling:

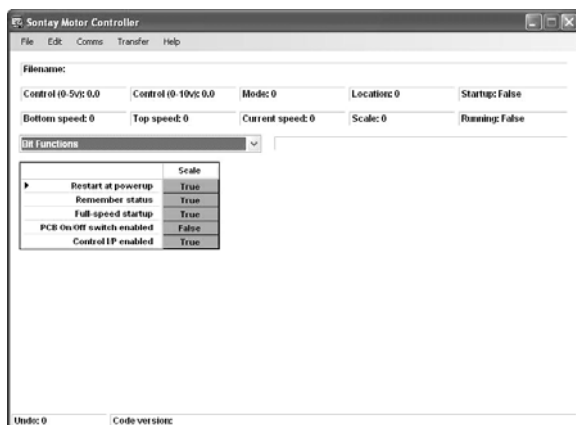


Non-Linear Scaling:



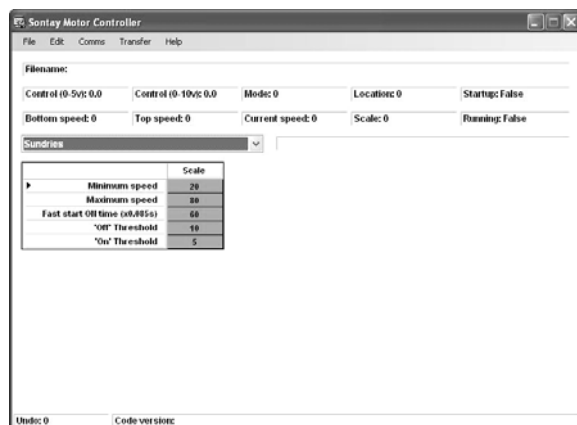
Configuration Software (continued)

Select "Bit Functions" from the drop down menu. Each bit function can be enabled by setting the value to "True" or disabled by setting the value to "False". See Configurable Operation (Mode 4) for details of each function.



Select "Sundries" from the drop down menu. Each function can have a value set between 0 and 100. See Configurable Operation (Mode 4) for details of each function.

On and Off Thresholds



When the input falls below the Off threshold, the output will turn OFF. When the input rises above the On threshold, the output will turn ON.

Note that the settings made can be saved by clicking <File> then <Save Data As>. To retrieve saved settings, click <File> then <Open Data>.

To send the new settings to the FC-DIN controller, click <Transfer> then <Write All>.

To retrieve settings from an FC-DIN controller, click <Transfer> then <Read All>.

Whilst every effort has been made to ensure the accuracy of this specification, Sontay cannot accept responsibility for damage, injury, loss or expense from errors or omissions. In the interest of technical improvement, this specification may be altered without notice.

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