Series U215

0-10 Vdc / 4-20 mA Signal Input Fan Speed Controllers for Single Phase Motors (include. built-in RFI suppression filter)

Introduction

These controls can be used to modulate the fan speed in response to the demand of a control system in ventilation applications and VAV systems. A 0-10 Vdc or 4-20 mA signal coming from a (e.g. temperature/ pressure/ humidity/ flow) control loop is used as input while the U215 fan speed controller acts like an actuator.

The controller modulates the speed of single phase permanent split-capacitor or shaded pole motors which do not draw more than 3 A (rms) full load current. The device varies the supply voltage to the motor from 45 % to ≥ 95 % of the supplied voltage using the phase cutting principle.

The motor manufacturer should have approved his product for this speed control principle. It is recommended to confirm with the electric motor manufacturer that the motor can be used with a controller using the phase cutting principle for speed variation. You can also provide a copy of this U215LR product data sheet to the motor manufacturer/supplier for review.

U215LR 0 - 10 Vdc / 4 - 20 mA Signal Input Fan Speed Controller

Features and Benefits	
❑ **Built-in suppression filter.**	The control meets the electro-magnetic compatibility requirements of the 89/336 EEC directive.
❑ **Input galvanically separated from high voltage part.**	Prevents damage to the control system.
❑ **Adjustable minimum speed or cut-off selection.**	Selection to keep the fan running on (adjusted) minimum rpm or to switch it off.
❑ **Input selection 0-10 V or 4-20 mA.**	Reduces inventory, one model is easier and less costly to stock.
❑ **Small dimensions.**	Easy to fit in small units.
❑ **DIN rail mounted**	Quick to install.

Order No. PD-U215LR-E

Note

The U215LR is intended to control equipment under normal operating conditions.
Where failure or malfunction of the U215LR could lead to an abnormal operating condition that could cause personal injury or damage to the equipment or other property, other devices (limit or safety controls) or systems (alarm or supervisory systems) intended to warn of or protect against failure or malfunction of the U215LR must be incorporated into and maintained as part of the control system.

! Caution

Because the U215LR is a single phase control, it may be used only with single-phase motors approved by the manufacturer for speed control applications.

Installation

The controller consists of a DIN rail mounted electronic module. It can be installed in any convenient location provided that the ambient conditions are suitable for the IP20 enclosure, within the specified limits regarding temperature and humidity and normal pollution situation. More motors can be wired in parallel provided that the total full load current does not exceed 3 Amp (rms).

! Caution

To ensure proper operation, the U215LR must be connected to a suitable earth ground.

Wiring (see fig. 1)

To meet the EMC directive shielded cable has to be used for motor wiring. Both sides of the shield have to be connected to earth. To prevent stray current the controller, motor and cable shield connections all have to be connected to one earthing pole. Non-shielded cable may be used if the control and motor are mounted in one frame.

The controller can be used for 4-20 mA as well as for 0-10 V dc input signal.
The current of the 0-10 V dc input signal is max. 2.5mA.

EMC

The controller does have a built-in suppression filter and meets all required EC directives. Please note that when two or more EMC compliant components are built together the total system may not be compliant. To make the total system compliant is the responsibility of the producer.

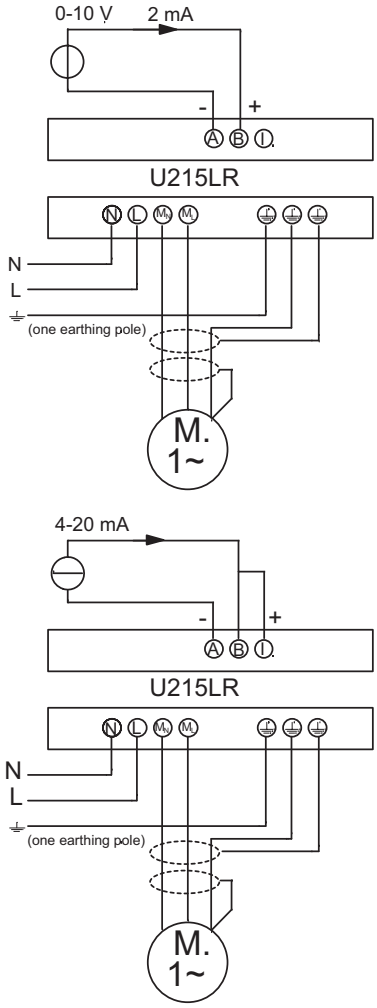

Fig. 1

Measuring

For measuring amps or volts values a true rms meter should be used.

! Caution

The U215LR is not equipped with a power switch. Therefore an additional switch to isolate the device should be used in the power supply wiring to the U215LR. Also the U215LR should be externally fused against miswiring or short circuits (max. 6 A slow). Use a thermal/current overload relay with a current rating according to the motor.

Adjustments

The controller gives a control characteristic according to fig. 2. The control characteristic can be affected by the load and the supply voltage.

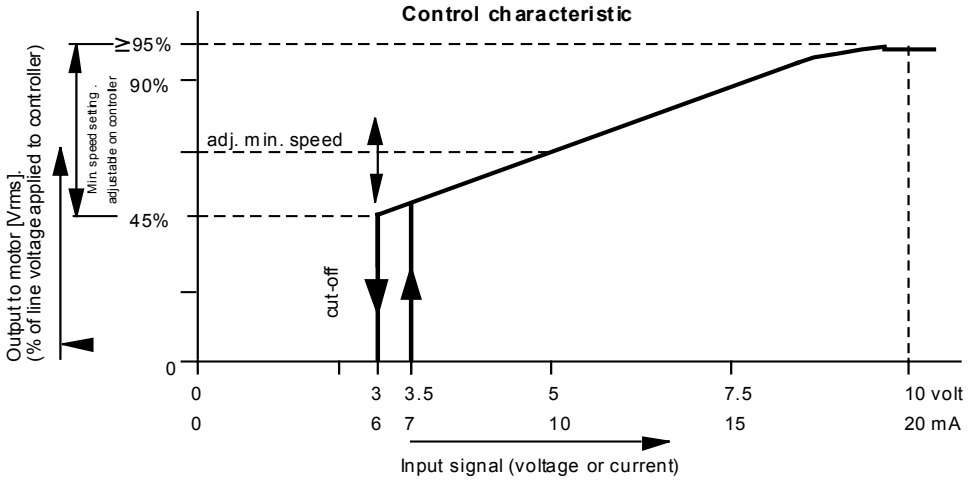

Fig. 2

Minimum speed setting

The minimum speed voltage setting, to prevent fan speed reduction below desirable levels, can be adjusted between 45 % and 90 % of the line voltage by means of the knob on the controller. The minimum speed setting influences the proportional band. A higher setting of the minimum speed results in a smaller proportional band.

Cut-off mode

If minimum speed is not required, turn the knob on the electronic module to the cut-off mode. The output to the motor drops to 0 V when the input signal decreases below 3 V dc or 6 mA (fan stops).There is a built-in fixed hysteresis. The fan starts again as soon as the input signal increases above 3.5 V dc or 7 mA.

Repair and replacement

Repair is not possible. In case of an improperly functioning control, please check with your nearest supplier. When contacting the supplier for a replacement you should state the type-model number of the control. This number can be found on the data plate.

Type number selection

Order number	U215LR - 9110

Dimensions

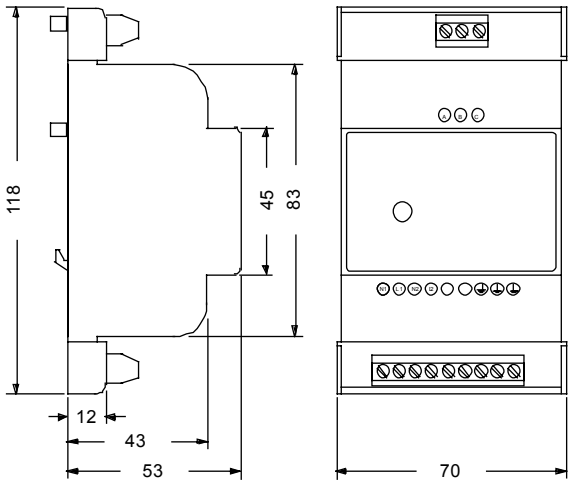

Fig. 3

Specifications

Product type	**U215LR**
Input signal	4-20 mA 0-10 V dc (The current of the 0-10 V input signal is max. 2.5 mA)
Control action	direct
Maximum output voltage	≥95% of supply voltage
Maximum current	3 A rms (at maximum voltage output)
Minimum current	≥100 mA
Power factor (cosφ) motor	≥0.6
Mains supply voltage	230 V + 10 %/-15 %
Mains supply frequency	50 Hz
Operating ambient temperature	-20 to +55 °C
Operating /storage ambient humidity	10 to 98 % R.H. (non-condensing)
Storage ambient temperature	-40 to +85 °C
Minimum speed	adjustable from 45 to ≥90 % of supply voltage
Cut-off point	45 % of supply voltage
Start voltage	50 % of supply voltage
Enclosure	IP20
Material	enclosure ABS/PC mixture
Shipping weight	individual pack 0.28 kg
Residual current motor	in cut-off mode (at zero input) ≤ 15 mA
Wiring connections input signal	screw terminals 1 mm^2 up to 2½ mm^2
motor/earth	screw terminals 1 mm^2 up to 2½ mm^2
Mounting	DIN rail 35 mm.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office or representative. Johnson Controls shall not be liable for damages resulting from misapplication or misuse of its products.

JOHNSON CONTROLS

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