Series P215TR

Triple Pressure Input Condenser Fan Speed Controllers For Single Phase Motors (incl. built-in RFI suppression filter)

Introduction

The P215TR is a triple pressure input fan speed controller for air cooled condensers with triple refrigerant circuits. The controller varies the fan speed by directly sensing the pressure changes of three separate refrigerant circuits. Each pressure transducer can be separately adjusted at a setpoint between 14 to 24 bar.

The controller selects the input with the greatest cooling demand to control the fan speed. The controller can be used in non corrosive refrigerant systems. The P215TR varies the supply voltage to the motor from 45% to at least 95 % of the supply voltage using the phase cutting principle. If the pressure drops below the adjusted setpoint minus the proportional band, the output to the motor is zero volt. This provides speed variation of permanent split capacitor or shaded pole motors which do not draw more than 3 A (rms) full load current.

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.

P215TR
Condenser Fan Speed Controller

You can also provide a copy of this P215TR product data sheet to the motor manufacturer/supplier for review.

Feature and Benefits

❑ **Condenser pressure control by fan speed variation.**	Optimum condenser pressure control all the year round.
	Less noise during colder (night) period.
❑ **Pressure input.**	Direct and fast response to pressure variations.
	Easy to install
❑ **Transducers with proven reliability.**	More than half a million in use today.
❑ **Easy accessible setpoint screw.**	Setpoint easy adjustable. For use on various non-corrosive refrigerants.
❑ **Built-in suppression filter.**	The control meets the electro magnetic compatibility requirements of the 89/336/EEC directive.
❑ **Motor speed action can be reversed by interchanging wires.**	Easy change over from direct to reverse action
❑ **Three pressure inputs.**	Can be used on condensers with three separate refrigerant circuits.
❑ **Small dimensions.**	Easy to fit in small units.
❑ **DIN rail mounted**	Quick to install.

Order No. PD-P215TR-E

Note

The P215TR is intended to control equipment under normal operating conditions. Where failure or malfunction of the P215TR 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 P215TR must be incorporated into and maintained as part of the control system.

! Caution

Because the P215TR 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 type P38AA and three pressure transducers type P35AC. 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 will not exceed 3 Amp (rms).
Enclosed mounting brackets can be used.

Note

For style 50 pressure connections two copper sealrings (one spare) are delivered with the control. Each time the pressure connection is removed this sealring has to be replaced.

Wiring motor (see Fig. 1)

To meet the EMC directive shielded cable has to be used for motor wiring.

Non shielded cable may be used if the control and motor are mounted in one frame.

If the distance between the transducers and the controller exceeds two metres shielded cable has to be used (The shield can be connected under the screw used to connect the transducers to the mounting brackets).

Both sides of the shield (motor and pressure transducers wiring) have to be connected to earth. To prevent stray current, the earth connections of the transducers, the controller, the motor as well as the cable shield, all have to be connected to one earthing pole.

Enclosed quick connector plugs can be used to connect wires to the transducers.

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.

! Caution

The enclosed quick connector plugs are especially designed (special terminal numbering) for this control and should not be used for other purposes. Take care to connect the correct wires when the original connector is replaced by a non Johnson Controls type.

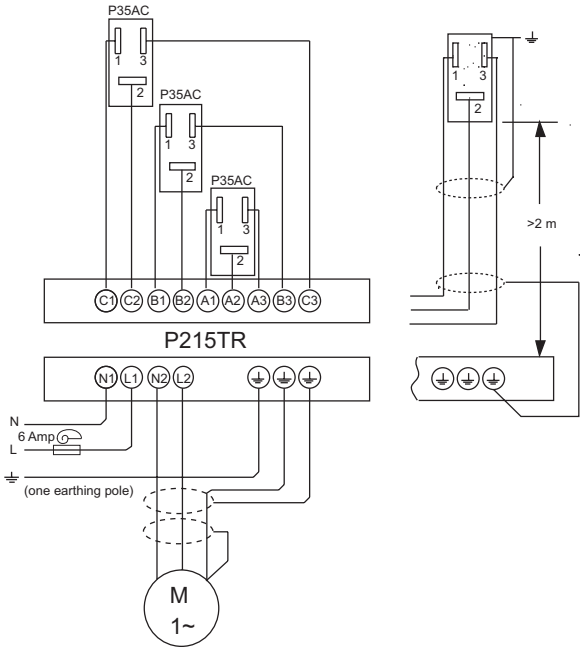

Fig. 1

! Caution

There will be line voltage on the wiring between the pressure transducers and the electronic module.

Control action (direct/reverse)

The wiring as shown in fig. 1 is for direct action (output voltage increases at increasing pressure). If reverse action is desired, this can be obtained by interchanging the wires at terminals 1 and 3 on the pressure transducers.

Measuring

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

Caution

The P215TR 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 P215TR. Also the P215TR should be externally fused against miswiring or short circuits (max. 6A slow). Use a thermal/current overload relay with a current rating according to the motor.

Adjustments

The electronic module P38AA gives a control characteristic according to fig.2.

The control characteristic can be affected by the load and the supply voltage.

The proportional band is fixed and defined as the pressure difference between the points where the output values are 45% and 90% of the supply voltage.

	Range
	14 to 24 bar
Prop. band	4 ± 1 bar
Δ p (max.)	6 bar

There is a built-in (fixed) hysteresis. This is not indicated in the control characteristic. The hysteresis is included In the prop. band.

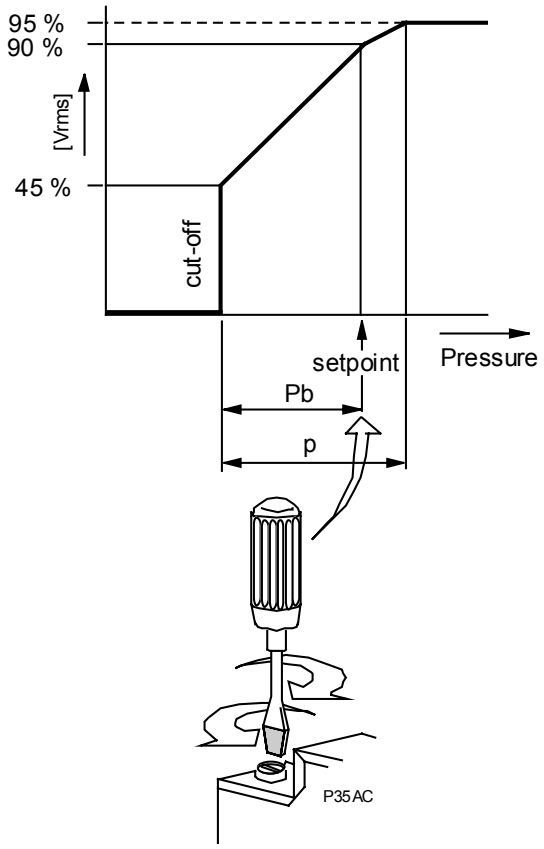

Fig.2

Setpoint

The pressure setpoint at which your equipment has to work can be adjusted by the range screw (see fig. 2) on the pressure transducers P35AC between 14 to 24 bar.

The setpoint is factory set at:

range 14 to 24 bar	16 bar

If it is necessary to make setpoint adjustments care should be taken that the additional transducers do not affect the output voltage of the electronic module P38AA while adjustment is being made on one of the transducers.

The most safe and easy way to do this, is to disconnect the wiring (blue connector) of the transducers that are not being adjusted.

Repair and replacement

Field 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 table

Order number			Replacement	
Fan speed control	**Range (bar)**	**Element style**	**Pressure transducer**	**Electronic module**
P215TR-9110	14 to 24	50	P35AC-9500	P38AA-9311

Note: 1 bar = 100 kPa ≈ 14.5 psi

Pressure connection

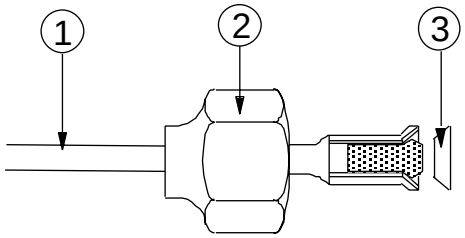

Fig. 3

Style 50 (incl. valve depressor mounted into machined flare)

1. 90 cm capillary.
2. 7/16 - 20 UNF flare nut.
3. copper sealring

Dimensions (mm)

P38AA

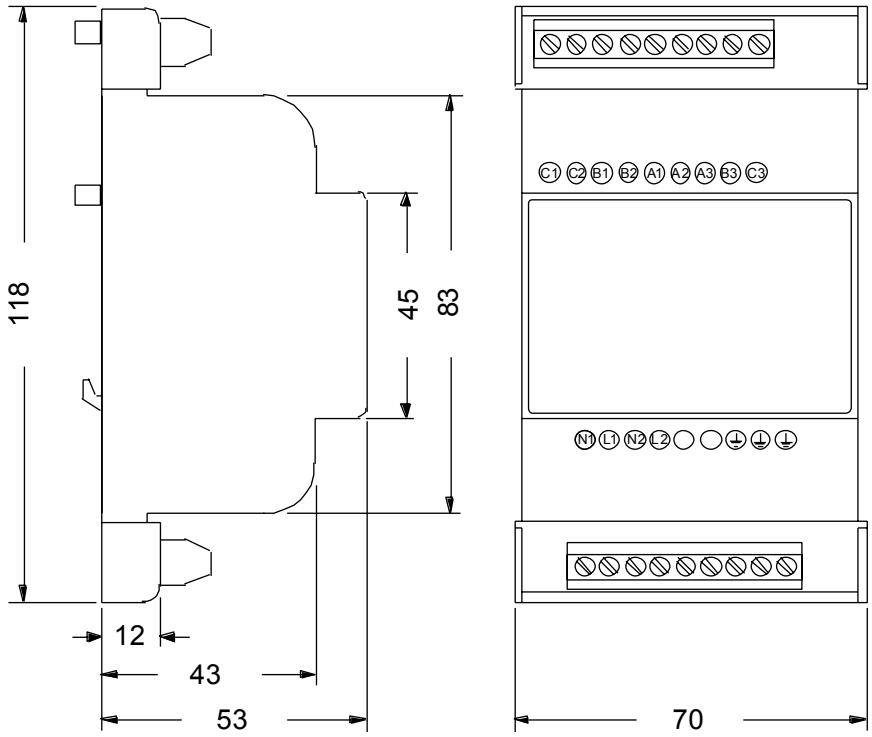

Fig. 4

P35AC
Capillary types

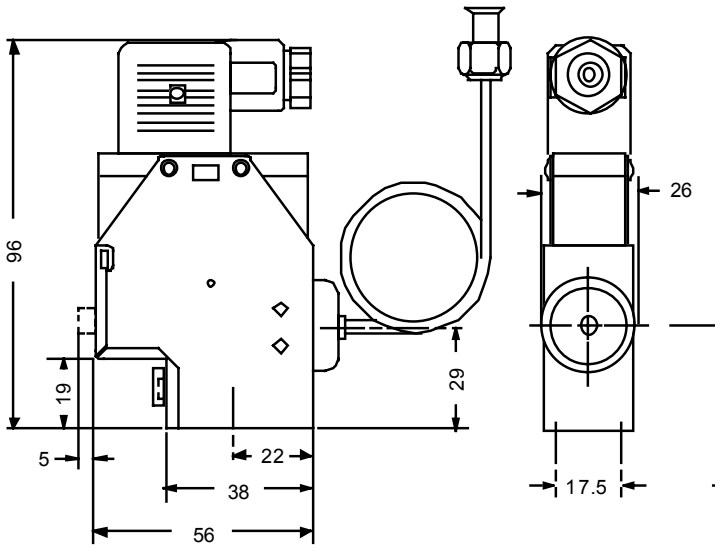

Fig. 5

Specifications

Product type	**P215TR**	
Pressure range	14 to 24 bar	
Maximum overrun pressure	14 to 24 bar = 40 bar	
Pressure connection	style 50 with 90 cm of capillary	
Control action	direct/reverse	
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 Vac +10 % / -15 %	
Mains supply frequency	50/60 Hz	
Operating ambient temperature	-20 to +55° C	
Operating /storage ambient humidity.	10 to 98 % R.H. (non-condensing)	
Storage ambient Temp.	-40 to 85 °C	
Min. speed	adjustable from 45 to ≥90 % of supply voltage	
Cut-off point	45 % of supply voltage	
Prop. band range	14 to 24 bar = 4 ± 1 bar	at the minimum speed adjustment of 45% of line voltage
Enclosure electronic module	IP20	
pressure transducer	IP20	
Material	enclosure ABS/PC mixture	
Shipping weight	individual pack	1.6 kg
Residual current motor	in cut-off mode ≤ 15 mA	
EMC	89/336/EEC	
Wiring connections P35AC	screw terminals 1 mm^2 up to 1½ mm^2	
P38AA	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

Johnson Controls International, Inc.
Headquarters: Milwaukee, WI, USA
European Headquarters: Brussels, Belgium
European Factories: Lomagna (Italy), Leeuwarden (The Netherlands) and Essen (Germany)
Branch Offices: Principal European Cities.
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