



P216 Series Condenser Fan Speed Controller

Installation Instructions

P216xxx-x

Part No. 24-85895-18, Rev. D
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Refer to the [QuickLIT website](#) for the most up-to-date version of this document.

Applications

IMPORTANT: Use this P216 Series Condenser Fan Speed Controller only as an operating control. Where failure or malfunction of the P216 Series Fan Speed Controller could lead to personal injury or property damage to the controlled equipment or other property, additional precautions must be designed into the control system. Incorporate and maintain other devices, such as supervisory or alarm systems or safety or limit controls, intended to warn of or protect against failure or malfunction of the P216 Series Fan Speed Controller.



CAUTION: Risk of Property Damage

Use only single-phase Permanent Split Capacitor (PSC) motors approved by the manufacturer for speed control application with the P216 Series controller. Failure to use a single-phase PSC motor may damage the motor and other property.

Mounting

Location and Mounting Considerations

Observe these guidelines when locating and mounting a P216 Series Fan Speed Controller:

- Ensure that the mounting surface and mounting hardware can support the control and wiring.
- Mount the P216 Series controller upright on a vertical surface with the heat sink fins oriented vertically and the conduit/electrical holes facing down.

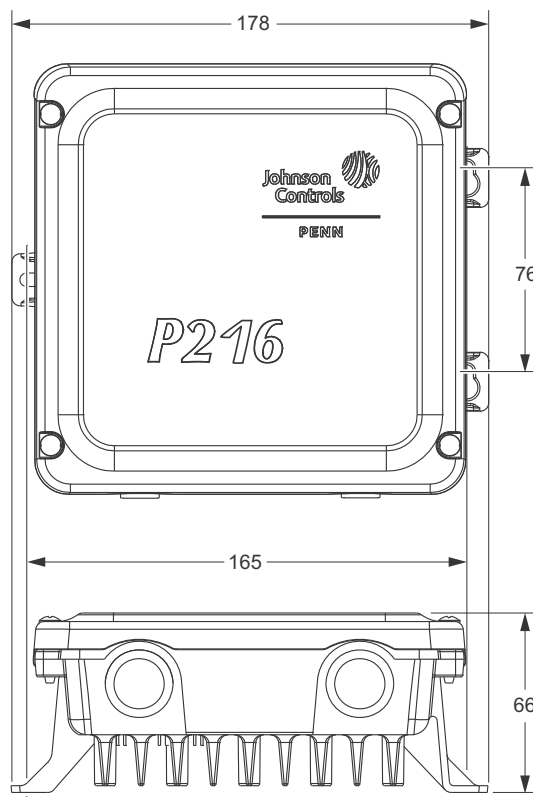
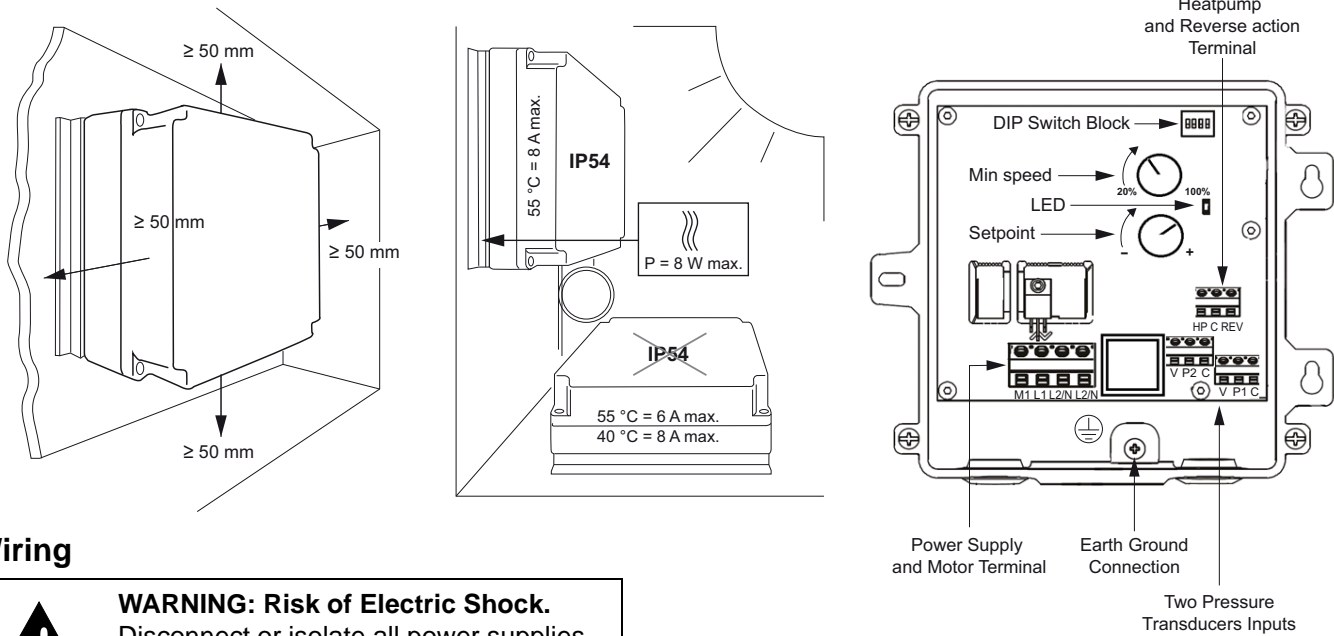


Figure 1: P216 Condenser Fan Speed Controller Mounting Dimensions, mm

- Ensure that air can flow through the heat sink fins and provide 10 cm (4 in.) minimum clearance around the heat sink.
- Mount the P216 Series controller in a location away from sources of excessive heat and within the specified ambient operating conditions. See *Technical Specification* for ambient operating conditions.

Installation



Wiring



WARNING: Risk of Electric Shock.

Disconnect or isolate all power supplies before making electrical connections. More than one disconnect or isolation may be required to completely de-energize equipment. Contact with components carrying hazardous voltage can cause electric shock and may result in severe personal injury or death.

IMPORTANT: Do not connect supply power to the P216 Series controller before finishing wiring and checking all wiring connections. Short circuits or improperly connected wires can result in damage to the P216 Series controller and void any warranty.

IMPORTANT: Do not exceed the P216 Series Fan Speed Controller electrical ratings. Exceeding P216 Series controller electrical ratings can result in permanent damage to the P216 Series controller and void any warranty.

IMPORTANT: Use copper conductors only. Make all wiring in accordance with local, national, and regional regulations.

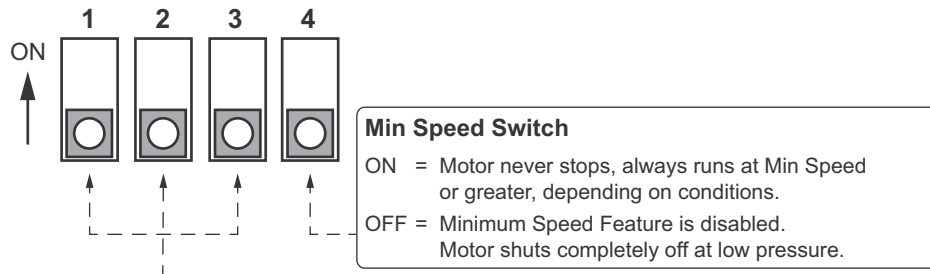
IMPORTANT: Electrostatic discharge can damage P216 controller components. Use proper Electrostatic Discharge (ESD) precautions during installation and servicing to avoid damaging P216 components.

- Ensure that the wires between the P216 Series controller and the fan motor do not exceed 100 m (328 ft).
- Wires connected to the line-voltage terminal block must be 3,31 mm² (12 AWG) or smaller.
- Low-voltage wires must be less than 30 m (100 ft).

Description

A DIP switch will be used to select one of 4 different pressure ranges. There is one potentiometer to manually adjust the setpoint.

- There is one potentiometer to manually adjust the minimum speed.
- A green LED will indicate that power is applied.
- Two 3 position screw terminal blocks will be used to connect the 50 bar transducers.
- A 3 position screw terminal block will be used to select HP or Reverse modes.
- Contacts between HP and C will run the fan at full speed.
- Contacts between REV and C will increase the fan speed as pressure decreases (Reverse Operation).



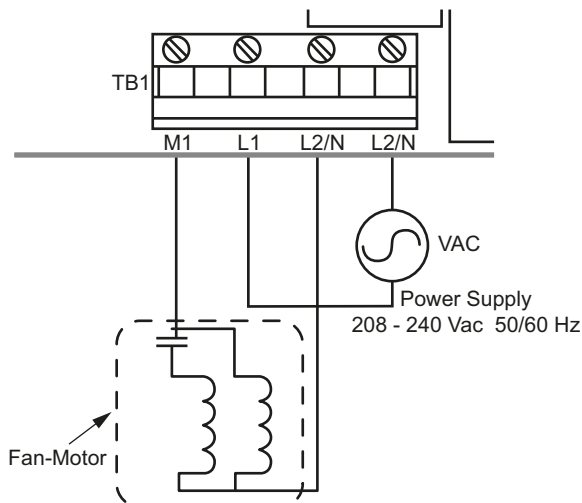
P216 Operation Using P499VCS-405C Transducer

SW1	SW2	SW3	Mode	Setpoint Range CCW - CW (BAR)	Proportional Band (BAR)
OFF	OFF	OFF	Master	4 - 10	2,0
OFF	ON	OFF	Master	8 - 14	2,5
ON	OFF	OFF	Master	14 - 24	4,0
ON	ON	OFF	Master	22 - 42	5,0

P216 Operation in Slave Mode

SW1	SW2	SW3	Mode	Setpoint Range CCW - CW (Vdc)	Proportional Band (BAR)
OFF	OFF	ON	Slave	2 - 10 Vdc	(See Note 1)
OFF	ON	ON	Slave	1 - 5 Vdc	

Note 1: The Proportional Band in Slave Mode Extends from 0 Vdc to the Setpoint Voltage.



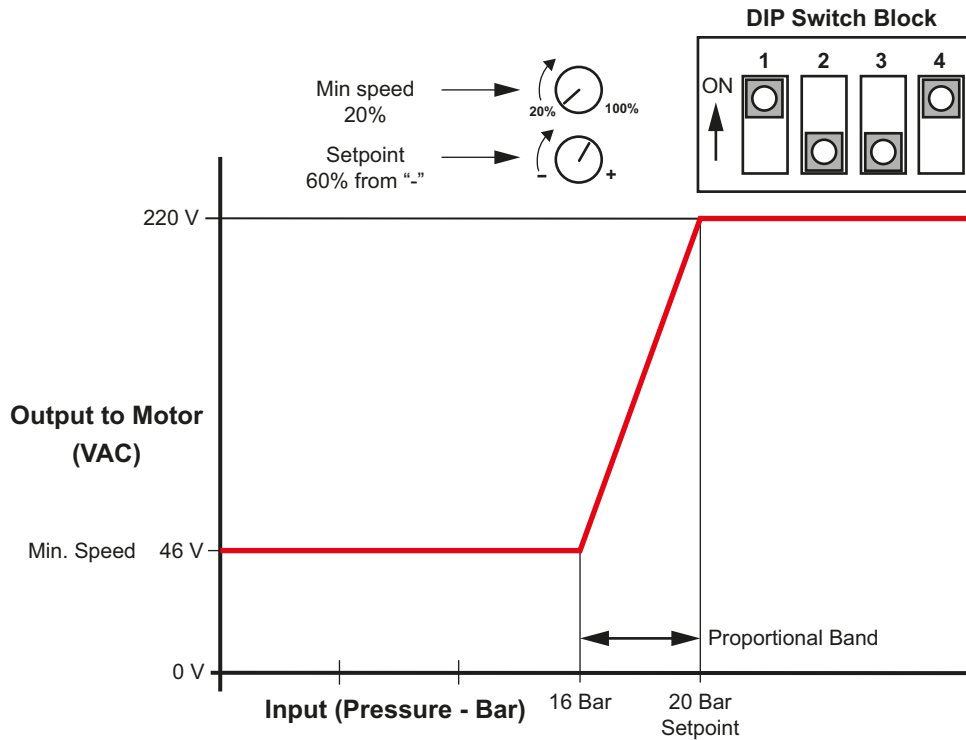
There is a 4 position DIP switch to choose various setup configurations.

When Switch 3 is set to OFF, the Master Mode is selected and one or two P499VCS-405C Pressure Transducers are used as inputs to change the speed of a fan motor. In Normal Operation, the maximum speed occurs when the higher of the 2 pressure inputs is greater than or equal to the setpoint and the minimum speed occurs when the pressure is equal to the setpoint minus the prop. band (see *P216 Normal Operation Example*).

In Reverse Operation (selected by connecting a jumper between the REV and C terminals), the minimum speed occurs when the pressure is equal to the setpoint and the maximum speed occurs when the pressure is less than or equal to the setpoint minus the prop. band.

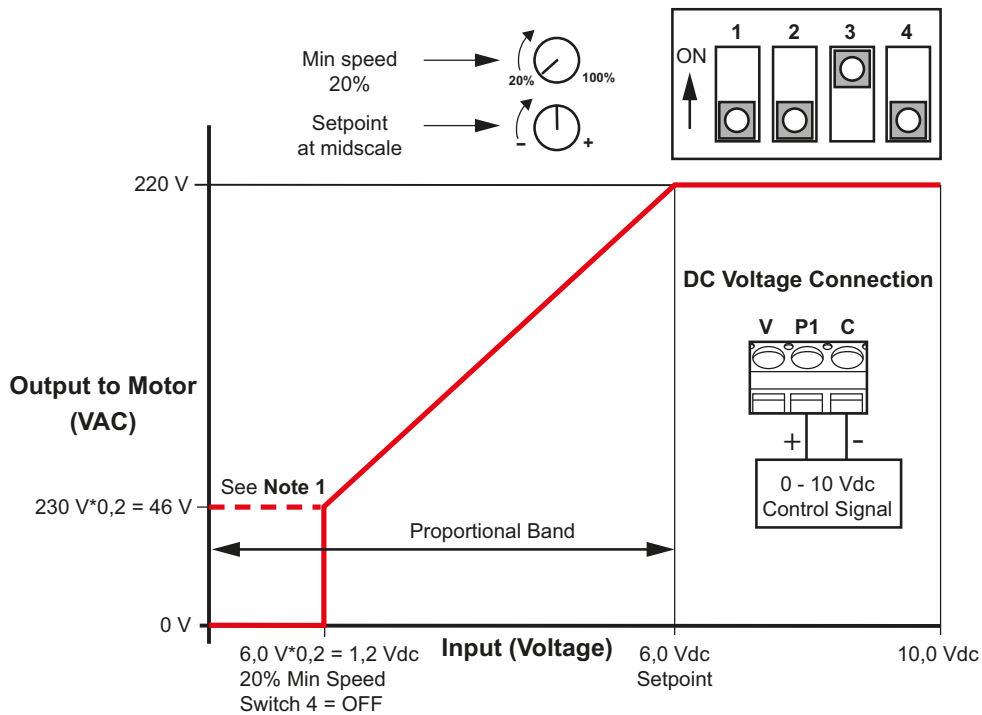
When Switch position 3 is set to ON, the Slave Mode is selected and the Setpoint potentiometer defines the input voltage level that causes the motor to run at full speed. For example, if the 2-10 Vdc Setpoint Range is selected and the Setpoint potentiometer is adjusted completely to "+", then the motor will run at full speed when $V_{in} = 10$ Vdc. If the Setpoint potentiometer is adjusted midway between "-" and "+", then the motor will run at full speed when $V_{in} = 6,0$ Vdc (see *P216 Slave Operation Example*).

P216 Normal Operation Example using a 230 V Supply- Output Voltage vs Input Pressure



Note: Set switches 1-3 as shown to select a 14-24 Bar Setpoint range with a 4 Bar Proportional Band. Adjust the Setpoint potentiometer to 20 Bar (which is 60% rotation from the "-" or CCW end of the Setpoint potentiometer). Adjust the Min. Speed potentiometer completely CCW (to set the Min Speed to 20% of 230V or 46V). Setting Switch 4 to ON causes the motor to always run at minimum speed or greater.

P216, 0 - 10 Vdc Slave Operation Example using 230 V Supply - Output vs Input Voltage



Note 1: If Min Speed is set to 40%, then Output turns off at $230\text{ V} * 0,4 = 92\text{ VAC}$ when Input Voltage drops to $6,0\text{ V} * 0,4 = 2,4\text{ Vdc}$.

P499 Electronic Pressure Transducers

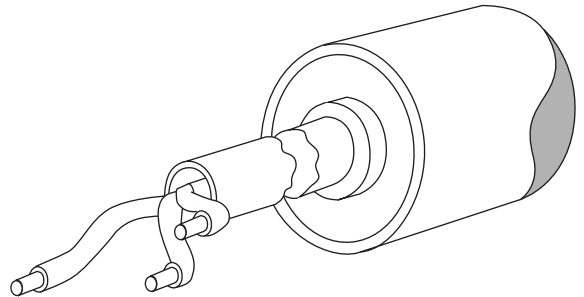
P216 Series controllers are designed to reference either one or two Johnson Controls P499 Electronic Pressure Transducers to monitor condenser pressure.

On P216 Series controller applications that use two P499 transducers, the P216 Series controller always references the transducer that is sensing the higher pressure.

IMPORTANT: Operate the P216 only in combination with one or two P499VCS-405C Pressure Transducers.

P499VCS-405C, 0-50 bar, 0-10 Vdc Output, Pressure Transducer


Only P499 models that have a 0-10 Vdc output signal can be used with the P216 control.



Wire Connection	Terminal
Red	V
Black	C
White	P

Technical Specifications

P216xxx-x Condenser Fan Speed Controller

Input Signal	0 - 10 Vdc
Power Supply	208 - 240 Vac 50 - 60 Hz
Control Action	Direct or reverse mode
Maximum Motor Current	12 Amp
Minimum Motor Current	0,5 Amp
Ambient Operating Conditions	-40 to 60°C (-40 to 140°F)
Ambient Shipping and Storage Conditions	-40 to 85°C (-40 to 185°F)
Enclosure Type	NEMA 3R, IP54
Dimensions (H x W x D)	159 x 177 x 70 mm (6-1/4 x 7 x 2-3/4 in.)
Weight	1,0 kg (2,2 lb)
Compliance 	Johnson Controls, Inc., declares that these products are in compliance with the essential requirements and other relevant provisions of the EMC Directive 2004/108/EC, Low Voltage Directive 2006/95/EC.

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



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