

VFD66 Series Condenser Fan Speed Controls

Description

The VFD66 Series Condenser Fan Speed Controls regulate the speed of three-phase condenser fan motors in refrigeration and HVAC systems. The VFD66 controls regulate condenser fan motor speed by varying the frequency and voltage of the power supplied to the motor.

The VFD66 controls use input signals from various devices to adjust fan speed and optimize condenser head pressure, especially during low ambient conditions.

Condenser fan speed may be controlled by pressure or temperature. The VFD66 controls accept input signals from the P35 Pressure Transducer, P499 Electronic Pressure Transducer, System 450™ controls, or any other device that provides a 0 to 5 VDC or 0 to 10 VDC analog input signal.

The VFD66 controls feature a simple interface using a display and keypad. The controls are user friendly and highlight the basic parameters that are required for setup, as outlined in the literature included with the product.

Refer to the *VFD66 Series Condenser Fan Speed Controls Product/Technical Bulletin (LIT-125467)* for important product application information.

Features

- ground fault protection extends the life of the control
- keypad interface allows for easy setup
- isolated input circuitry permits application with 0 to 5 VDC or 0 to 10 VDC controllers, sensors, and transducers
- alarm output is standard on all models

- simultaneous acceptance of two similar inputs allows use on dual refrigeration circuits cooled by a single fan
- adjustable acceleration and deceleration timing parameters allow independent timing settings to meet the requirements of the application
- compact design provides installation ease and flexibility
- three-phase 208/230 or 400/460 VAC models handle three-phase motors ranging up to 10 amperes at 208/230 VAC or 5 amperes at 400/460 VAC
- adjustable Pulse Width Modulated (PWM) frequency settings of 3, 6, 9, or 12 kHz correspond to a variety of applications
- few end-user settings simplify installation and setup

Applications

The VFD66 controls are intended for air-cooled condenser fan speed control in refrigeration and HVAC applications such as:

- commercial air-cooled condensers
- cooling tower fans
- fans in evaporative condensing units

The VFD66 controls allow the system to:

- maintain optimum condenser head pressure in low ambient temperature conditions
- eliminate short cycling in low ambient or changing load conditions
- match the condenser fan speed to the load on the condenser, which increases the efficiency of the refrigeration system. This can reduce electricity cost and help maintain a constant evaporator temperature.



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- stabilize condenser head pressures, which helps optimize compressor operation and can reduce wear and extend compressor life
- eliminate condenser fan short cycling, which can reduce motor repair and replacement costs
- stabilize evaporator temperatures, which can extend refrigerated product life and provide more consistent comfort cooling

Repair Information

If the VFD66 Series Condenser Fan Speed Control fails to operate within its specifications, replace the unit. For a replacement control, contact the nearest Johnson Controls® representative.

Selection Chart

VFD66 Model	VFD66 Kit Model (Includes a P499RCP-107K Pressure Transducer and a 79 in. [2 m] Cable)	Voltage Rating	Maximum Ampere Rating
VFD66AAA-2C	VFD66AAA-207K	230 VAC, 50 Hz (208/230 VAC, 60 Hz)	4.0
VFD66BAA-2C	VFD66BAA-207K	400 VAC, 50 Hz (460 VAC, 60 Hz)	1.8
VFD66CAA-2C	VFD66CAA-207K	230 VAC, 50 Hz (208/230 VAC, 60 Hz)	7.5
VFD66DAA-2C	VFD66DAA-207K	400 VAC, 50 Hz (460 VAC, 60 Hz)	3.6
VFD66EBA-2C	VFD66EBA-207K	230 VAC, 50 Hz (208/230 VAC, 60 Hz)	10.6
VFD66FAA-2C	VFD66FAA-207K	400 VAC, 50 Hz (460 VAC, 60 Hz)	5.5

Accessories (Part 1 of 2)

Code Number	Description	Accessory Information
P35AG-9200R	Pressure Transducer, 0 to 350 psig Range	Refer to the <i>P35 Pressure Transducer and VFD66 Control Application Note (LIT-121418)</i> for more information.
C450CCN-2C	Control Module with Liquid Crystal Display (LCD), Four-Button Keypad User Interface (UI), and Relay Output; Provides Two Relay Outputs (Single-Pole, Double-Throw [SPDT] Line Voltage Relays) for SPDT Control	Refer to the <i>System 450™ Series Modular Controls Product Bulletin (LIT-12011458)</i> and the <i>System 450™ Series Modular Controls Technical Bulletin (LIT-12011459)</i> for more information.
C450CPN-3C	Control Module with LCD, Four-Button Keypad UI, and Analog Output; Provides One Analog Output (0 to 10 VDC or 4 to 20 mA Self-Selecting Signal) for Proportional Control	Refer to the <i>System 450™ Series Modular Controls Product Bulletin (LIT-12011458)</i> and the <i>System 450™ Series Modular Controls Technical Bulletin (LIT-12011459)</i> for more information.



VFD66 Series Condenser Fan Speed Controls (Continued)

Accessories (Part 2 of 2)

Code Number	Description	Accessory Information
C450CQN-3C	Control Module with LCD, Four-Button Keypad UI, and Analog Output; Provides Two Analog Outputs (0 to 10 VDC or 4 to 20 mA Self-Selecting Signals) for Proportional Control	Refer to the <i>System 450™ Series Modular Controls Product Bulletin (LIT-12011458)</i> and the <i>System 450™ Series Modular Controls Technical Bulletin (LIT-12011459)</i> for more information.
C450SBN-3C	Relay Expansion Output Module; Provides One Relay Output (SPDT Line Voltage Relay) for SPDT Control	Refer to the <i>System 450™ Series Modular Controls Product Bulletin (LIT-12011458)</i> and the <i>System 450™ Series Modular Controls Technical Bulletin (LIT-12011459)</i> for more information.
C450SCN-3C	Relay Expansion Output Module; Provides Two Relay Outputs (SPDT Line Voltage Relays) for SPDT Control	Refer to the <i>System 450™ Series Modular Controls Product Bulletin (LIT-12011458)</i> and the <i>System 450™ Series Modular Controls Technical Bulletin (LIT-12011459)</i> for more information.
C450SPN-1C	Analog Output Expansion Module; Provides One Analog Output (0 to 10 VDC or 4 to 20 mA Self-Selecting Signal) for Proportional Control	Refer to the <i>System 450™ Series Modular Controls Product Bulletin (LIT-12011458)</i> and the <i>System 450™ Series Modular Controls Technical Bulletin (LIT-12011459)</i> for more information.
C450SQN-1C	Analog Output Expansion Module; Provides Two Analog Outputs (0 to 10 VDC or 4 to 20 mA Self-Selecting Signals) for Proportional Control	Refer to the <i>System 450™ Series Modular Controls Product Bulletin (LIT-12011458)</i> and the <i>System 450™ Series Modular Controls Technical Bulletin (LIT-12011459)</i> for more information.
P499RAP100K P499RCP100K	One Electronic Pressure Transducer (-10 to 100 psig [sealed for wet and freeze/thaw applications] Range) and One WHA-PKD3-200C Wire Harness	Product code numbers ending in K are P499 kit models that include one P499 Pressure Transducer model and one WHA-PKD3-200C (6-1/2 ft [2 m]) Wire Harness. To order a single P499 Pressure Transducer model (without a WHA-PKD3-200C Wire Harness), replace the K with a C at the end of the P499 product code number. P499RxP type models are 0.5 to 4.5 VDC ratiometric pressure transducers with Packard style electrical connections. P499RAP type models have a 1/8 in. 27 NPT external thread (Style 49) pressure connection. P499RCP type models have a 1/4 in. SAE 45° flare internal thread (7/16-20 UNF) with depressor (Style 47) pressure connection. Refer to the <i>P499 Series Electronic Pressure Transducers Product/Technical Bulletin (LIT-12011190)</i> for more information on P499 Pressure Transducer models and the associated wire harnesses.
P499RAP102K P499RCP102K	One Electronic Pressure Transducer (0 to 200 psig [sealed for wet and freeze/thaw applications] Range) and One WHA-PKD3-200C Wire Harness	
P499RAP-101K P499RCP-101K	One Electronic Pressure Transducer (0 to 100 psig Range) and One WHA-PKD3-200C Wire Harness	
P499RAP-102C	One Electronic Pressure Transducer (0 to 200 psig Range) and One WHA-PKD3-200C Wire Harness	
P499RAP-105K P499RCP-105K	One Electronic Pressure Transducer (0 to 500 psig Range)	
P499RAP-107K P499RCP-107K	One Electronic Pressure Transducer (0 to 750 psig Range) and One WHA-PKD3-200C Wire Harness	
WHA-PKD3-200C	Wire Harness with Pigtail Leads, 6-1/2 ft (2 m)	
WHA-PKD3-400C	Wire Harness with Pigtail Leads, 13 ft (4 m)	
WHA-PKD3-600C	Wire Harness with Pigtail Leads, 19-5/8 ft (6 m)	

Technical Specifications

VFD66 Series Condenser Fan Speed Controls	
Input Power Voltage/Frequency	230 VAC, 50 Hz (208/230 VAC, 60 Hz) or 400 VAC, 50 Hz (460 VAC, 60 Hz) Continuous Duty
Input Devices	Johnson Controls/PENN (P35, P499, C450); Johnson Controls/Metasys® Branded Products (Also works with rack controllers, electronic pressure transducers, and other 0 to 5 VDC or 0 to 10 VDC input signal devices made by various manufacturers.)
Output Voltage/Frequency	230 VAC, 50 Hz (208/230 VAC, 60 Hz) or 400 VAC, 50 Hz (460 VAC, 60 Hz) Continuous Duty
PWM Carrier Frequency	Adjustable 3, 6, 9, or 12 kHz
Motor Requirements	Service Factor 1.0; Inverter Rated Motors Required
Overload Capacity	110% of Ampere Rating for 1 Minute
Start/Stop	Line Start with Single Auto-Restart 30 Seconds after Fault (500-Second Cycle)
Storage Temperature	-40 to 122°F (-40 to 50°C)
Operating Temperature	-40 to 122°F (-40 to 50°C) ¹ ; -40 to 140°F (-40 to 60°C) with De-rating
Altitude	3,300 ft (1,000 m) Maximum without De-rating
Relative Humidity (RH)	0 to 95% RH Noncondensing (Storage and Operating Conditions)
Available Enclosures	NEMA 1, UL Type 1 Convection Cooled (3 hp, 230 VAC Model is Fan Cooled) (Enclosures have three 1/2 in. trade size conduit openings.)
Maximum Lead Length	Up to 167 ft (50 m) Between Motor and VFD66
Agency Listings	UL Listed, File E244421, Guide NMMS cUL Listed, File E244421, Guide NMMS7
Emissions Compliance	FCC (US), DOC (Canada), CE (With additional components, refer to the product literature.)
Dimensions (H x W x D)	1 to 3 hp: 8-3/32 x 7-1/4 x 6-7/32 in. (206 x 184 x 158 mm)
Shipping Weight	5.6 lb (2.5 kg)

1. The maximum output ampere ratings are affected by altitudes over 3,300 ft (1,000 m) and by temperatures over 122°F (50°C); refer to the product literature for more information.