JOHNSON CONTROLS - P66 SERIES ELECTRONIC FAN SPEED CONTROL

SELECTION CHART

P66AAB High-Pressure Models

P66BAB-1

DESCRIPTION

The P66 is a pressure-actuated electronic motor speed controller. By directly sensing pressure, this device electronically varies the speed of a fan motor. This control can be used with a single-phase permanent split capacitor and shaded pole motors that are approved by the motor and equipment manufacturer for speed control applications. To prevent overheating, use a ball bearing motor with a service factor of at least 1.25.

FEATURES

- Exclusive Johnson Controls/Penn pressure sensor rapidly responds to changes in air delivery requirements.
- Soft start provides a smooth start-up. This significantly reduces motor starting noise and abrupt changes in motor speed that could occur between zero and full output voltage time delay and bypass circuitry are not required because of the soft start feature.
- This universal model can be used on a wide range of voltage applications (208-240/277/480 volt, 60 Hz motor control)
- Available with one or two pressure sensors for single and dual compressor systems the control selects the input with the greatest demand.
- Choice of two effective throttling ranges (ETR)= 30 or 60 psi (207 or 414 kpa).
- NEMA 1 case for versatile mounting.
- Built in radio frequency interference (RFI) Suppression 60 psi
- Built in voltage surge protection.

APPLICATIONS

- Air conditioning for computer rooms, head pressure control.
- Commercial air conditioning, head pressure control
- Commercial air refrigeration, head pressure control.
- Use only with ball bearing motors that have a service factor of 1.25 or greater

This control is designed to replace on/off fan cycling controls, multiple speed motors, condenser flood back systems, temperature fan speed controls, and modulating louver systems.

ELECTRICAL RATING

Motor Rating VAC	208	240	277	480
AC Full Loading Amp	8.0	8.0	6.9	4.0
AC locked Rotor Amp	16.5	16.5	14.3	10.5

PART NO	OPERATING RANGE psig (kPa) (Factory Setting)	EFFECTIVE THROTTLING RANGE psig (kPa) (Fixed)	PRESSURE RANGE (Adjustable)	MAXIMUM OVERPRESSURE psig (kPa)	CONTROL VOLTAGE	START VOLTAGE % OF LINE	CAPILLARY LENGTH (in)
P66AAB-1C	190-250 (1310-1724)	60 (414)	140-350 (965-2413)	450 (3103)	24 VAC, 1 VA, Class 2	10	60
P66AAB-3C	180-240 (1241-1655)	60 (414)	140-350 (965-2413)	450 (3103)	24 VAC, 1 VA, Class 2	16	60
P66AAB-6C	170-230 (1172-1586)	60 (414)	140-350 (965-2413)	450 (3103)	24 VAC, 1 VA, Class 2	16	60
P66AAB-9C	170-230 (1172-1586)	60 (414)	140-350 (965-2413)	450 (3103)	24 VAC, 1 VA, Class 2	40	60
P66AAB-10C	190-250 (1310-1724)	60 (414)	140-350 (965-2413)	450 (3103)	24 VAC, 1 VA, Class 2	16	120
P66AAB-11C	140-200 (965-1379)	60 (414)	140-350 (965-2413)	450 (3103)	24 VAC, 1 VA, Class 2	16	60
P66AAB-12C	220-280 (1517-1931)	60 (414)	140-350 (965-2413)	450 (3103)	24 VAC, 1 VA, Class 2	16	120
P66AAB-14C	220-280 (1517-1931)	60 (414)	140-350 (965-2413)	450 (3103)	24 VAC, 1 VA, Class 2	40	120
P66AAB-15C	190-250 (1310-1724)	60 (414)	140-350 (965-2413)	450 (3103)	24 VAC, 1 VA, Class 2	40	60
P66AAB-25C	180-240 (1241-1655)	60 (414)	140-350 (965-2413)	450 (3103)	24 VAC, 1 VA, Class 2	10	120
P66AAB-26C	220-280 (1517-1931)	60 (414)	140-350 (965-2413)	450 (3103)	24 VAC, 1 VA, Class 2	40	60

P66AAB Low Pressure Models

PART NO	OPERATING RANGE psig (kPa) (Factory Setting)	EFFECTIVE THROTTLING RANGE psig (kPa) (Fixed)	PRESSURE RANGE (Adjustable)	MAXIMUM OVERPRESSURE psig (kPa)	CONTROL VOLTAGE	START VOLTAGE % OF LINE	CAPILLARY LENGTH (in)
P66AAB-4C	135-165 (931-1138)	30 (207)	80-200	450 (3103)	24 VAC, 1 VA, Class 2	10	60
P66AAB-7C	85-115 (586-793)	30 (207)	80-200	450 (3103)	24 VAC, 1 VA, Class 2	16	60
P66AAB-13C	60-90 (414-621)	30 (207)	60-180	450 (3103)	24 VAC, 1 VA, Class 2	16	60
P66AAB-19C	115-145 (9793-998)	30 (207)	80-200	450 (3103)	24 VAC, 1 VA, Class 2	40	60

P66ABB All General Application Models

PART NO	OPERATING RANGE psig (kPa) (Factory Setting)	EFFECTIVE THROTTLING RANGE psig (kPa) (Fixed)	PRESSURE RANGE (Adjustable)	MAXIMUM OVERPRESSURE psig (kPa)	CONTROL VOLTAGE	START VOLTAGE % OF LINE	CAPILLARY LENGTH (in)
P66ABB-21C	220-280 (1517-1931)	60 (414)	140-350(965-2413)	450 (3103)	24 VAC, 1 VA Class 2	16	120
P66ABB-24C	190-250 (1172-1724)	60 (414)	140-350(965-2413)	450 (3103)	24 VAC, 1 VA Class 2	16	60
P66BAB-1C	190-250(1310-1724)	60(414)	140-350(965-2413)	450 (3103)	24 VAC, 1 VA Class 2	10	80
P66BAB-3C	170-230(1172-1586)	60(414)	140-350(965-2413)	450 (3103)	24 VAC, 1 VA Class 2	16	60
P66BAB-4C	190-250(1310-1724)	60(414)	140-350(965-2413)	450 (3103)	24 VAC, 1 VA Class 2	16	120
P66BAB-5C	190-250(1310-1724)	60(414)	140-350(965-2413)	450 (3103)	24 VAC, 1 VA Class 2	40	60

JOHNSON CONTROLS - Condenser Fan Speed Control

VFD66

VFD66 Condenser Fan Speed Control

Description

The VFD66 Series Condenser Fan Speed Controls are designed for speed control of 3-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, P399 Electronic Pressure Transducer, System 350™ controls or any other device that provides a 0-5 VDC or 0-10 VDC analog input signal. The VFD66 controls have a simple interface, and are easy to understand and use. Minimal end-user setup is required because of the application-specific design.

Features

- Permits application with 0-5 VDC or 0-10 VDC controllers, sensors, and transducers including Johnson Controls System 350TM
- Allows use on dual refrigeration circuits cooled by a single fan
- Provides installation ease and flexibility
- Handles 3-phase motors ranging from fractional to multiple hp at 208/230 VAC or 400/460 VAC
- Provides fast, easy installation and setup
- NEMA 1 or NEMA 4 enclosures

Applications

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

- 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, reduces electricity cost, and helps maintain a constant evaporator temperature.

Other advantages of using the VFD66 controls are:

- Stabilized condenser head pressures help optimize compressor operation, which may reduce wear & extend compressor life
- Eliminating condenser fan short cycling may result in reduced motor repair and replacement costs
- Stable evaporator temperatures extend refrigerated product life and provide more consistent comfort cooling

Selection Chart

NEMA 1 Enclosure without Alarm Output		NEMA 1		
VFD66 Model	Kit = VFD66 Model Packaged with P35AG-9200	Enclosure with Alarm Output	Voltage	Max Amp
VFD66AAA-1C	VFD66AAA-100C	VFD66AAE-1C	230 VAC 50 Hz, 208/230 VAC 60 Hz	4.0
VFD66BAA-1C	VFD66BAA-100C	VFD66BAE-1C	400 VAC 50 Hz, 460 VAC 60 Hz	1.8
VFD66CAA-1C	VFD66CAA-100C	VFD66CAE-1C	230 VAC 50 Hz, 208/230 VAC 60 Hz	7.5
VFD66DAA-1C	VFD66DAA-100C	VFD66DAE-1C	400 VAC 50 Hz, 460 VAC 60 Hz	3.6
VFD66EBA-1C	VFD66EBA-100C	VFD66EBE-1C	230 VAC 50 Hz, 208/230 VAC 60 Hz	10.6
VFD66FBA-1C	VFD66FBA-100C	VFD66FBE-1C	400 VAC 50 Hz, 208/230 VAC 60 Hz	5.5

ACCESSORIES

PART NO	DESCRIPTION
P35AG-9200R	Pressure Transducer, 0-350 psi range
VFD66-CVR-1C	External Potentiometer Replacement Cover (NEMA 1 models only)
A350PS-1C	Proportional Plus Integral Temperature Control
P352PN-3C	Proportional Plus Integral Pressure Control
P399AAA-1-200C	Pressure Transducer, 0-100 psis, 1/8 in. NPTM pressure connection, with 6-1/2 ft (2m)wire harness with pigtails
P399AAC-1-200C	Pressure Transducer, 0-100 psis, 1/4 in. SAE female flare pressure connection with valve depressor, with 6-1/2 ft (2m) wire harness with pigtails
P399BAA-1-200C	Pressure Transducer, 0-500 psis, 1/8 in. NPTM pressure connection, with 6-1/2 ft (2m)wire harness with pigtails
P399BAC-1-200C	Pressure Transducer, 0-500 psis, 1/4 in. SAE female flare pressure connection with valve depressor, with 6-1/2 ft (2m) wire harness with pigtails
P399CAA-1-200C	Pressure Transducer, 0-750 psis, 1/8 in. NPTM pressure connection, with 6-1/2 ft (2m)wire harness with pigtails

JOHNSON CONTROLS - Condenser Fan Speed Control

VFD66 Condenser Fan Speed Control (Continued)

Accessories (Continued)

PART NO	DESCRIPTION
P399CAC-1-200C	Pressure Transducer, 0-750 psis, 1/4 in. SAE female flare pressure connection with valve depressor, with 6-1/2 ft (2m) wire harness with pigtails
P399AAA-1C	Electronic Pressure Transducer, 0-100 psi range; 1/8 in. NPT male connector
P399AAC-1C	Electronic Pressure Transducer, 0-100 psi range; 1/4 in. SAE female connector
P399BAA-1C	Electronic Pressure Transducer, 0-500 psi range; 1/8 in. NPT male connector
P399BAC-1C	Electronic Pressure Transducer, 0-500 psi range; 1/4 in. SAE female connector
P399CAA-1C	Electronic Pressure Transducer, 0-750 psi range; 1/8 in. NPT male connector
P399CAC-1C	Electronic Pressure Transducer, 0-750 psi range; 1/4 in. SAE female connector
WHA-P399-200C	Wire Harness, 6 1/2 ft (2.0 m.) length with pigtails
WHA-P399-400C	Wire Harness, 13 ft (4.0 m.) length with pigtails
WHA-P399-600C	Wire Harness, 19-5/8 ft (6.0 m.) length with pigtails

SPECIFICATIONS

VFD66 Condenser Fan Speed Control	
Input Power Voltage/Frequency	230 VAC 50 Hz, 208/230 VAC 60Hz, or 400 VAC 50 Hz / 460 VAC, 60 Hz, continuous duty
Input Devices	**Johnson Controls/PENN**(A350P, P35, P352P, P399, Performer Rack Controllers) **Johnson Controls/Metasys**(AHU, DME, DX9100, UNT, VAV) Also works with rack controllers, electronic pressure transducers, and other 0-5 VDC or 0-10 VDC input signal devices made by various manufacturers.
Output Voltage/Frequency	230 VAC 50 Hz, 208/230 VAC 60Hz, or 400 VAC 50 Hz / 460 VAC, 60 Hz, continuous duty
Pulse Width Modulation Carrier Frequency	2.3 kHz
Motor Requirements	Service Factor 1.0, VFD rated motors required
Overload Capacity	110% of ampere rating for 1 minute
Maximum Output Ampere Limit	110% of ampere rating, non-adjustable
Start/Stop	Line starting with single auto-restart 30 seconds after fault (500 second cycle)
Storage Temperature	-40 to 158°F (-40 to 70°C)
Operating Temperature	-40 to 140°F (-40 to 60°C) (a)
Altitude	3300 feet (1,000 meters) maximum without derating (a)
Relative Humidity	0 to 95% non-condensing (storage and operating)
	NEMA 1, UL Type 1 convection cooled (3 hp is fan cooled).
Available Enclosures	NEMA 4 convection and internal fan cooled Enclosures have three 1/2 in. trade size conduit openings.
Lead Length	Maximum lead length between motor and VFD66 is 50 ft (15 meters)
Agency Listings	UL Listed, File E184521, Guide NMMS cUL Listed, File E184521, Guide NMMS7
Emissions Compliance	FCC (US), DOC (Canada), CE (With additional components, see product literature)
Dimensions (H x W x D)	NEMA 1, 1-3 hp 7-1/2 x 7-1/4 x 6-1/4 in. (190 x 184 x 159 mm) NEMA 4, 1 hp 8-13/16 x 7-7/16 x 9-1/16 in. (224 x 189 x 230 mm) NEMA 4, 2 hp 11-13/16 x 7-7/16 x 9-1/16 in. (300 x 189 x 230 mm) NEMA 1 Enclosure models – 5.6 lb (2.5 kg)
Shipping Weight	NEMA1 Enclosure models with Optional Alarm Board – 5.8 lb (2.6 kg) NEMA 4 Enclosure (1 hp nominal) models – 5.6 lb (2.5 kg) NEMA 4 Enclosure (2 hp nominal) models – 7.2 lb (3.3 kg)

(a) Maximum Output Ampere Ratings affected by altitudes over 3300 ft (1000m) and by temperatures over 122°F (50°C). See Product Literature for more information.