# JC-VSD FP Series II Drives

## Description

The Johnson Controls® VSD FP Series II provides the advanced technology and features of the Johnson Controls VSD Series II with a Disconnect or Bypass in a factory mount option. Either option is available in NEMA 1 galvanized steel or NEMA 3R painted product. The FP Series II IntelliDisconnect comes with an enclosed disconnect (fused or non-fused) and door mounted operator. The FP Series II IntelliPass offers a fused or non-fused disconnect switch, a two contactor bypass design, and door mounted controls.

Refer to the *JC-VSD FP Series II Drives Product Bulletin (LIT-12012081)* for important product information.

## Features

- Network Connectivity for Drive and Bypass (BACnet®, SA Bus, N2, and LON) — allows for compatibility with current and future Johnson Controls network architecture
- Software parameters that utilize engineering units common to the HVAC industry — allow for quick and easy startup using the onboard startup wizard with engineering units transmitted over a communications bus
- Johnson Controls Support That Includes Ordering, Estimating, and Project Management Tools: Advanced Order Management System (AOMS), Advanced Installation Management (AIM) Tools - QuickLIT, Catalog, PRESTO, and STORE— allows users to easily identify and order products
- Closed-Loop Control Programmed with Engineering Units for Specific HVAC Applications: Standard, PID, or multi-pump— provides software parameters using engineering units common to the HVAC industry
- Standard TYPE 12 Keypad on all Drives with Copy and Paste Function; Capable of Monitoring Three Parameters Simultaneously — allows easy transfer of parameter settings from one drive to another drive
- Drive Programming Capability Using Auxiliary 24 V Power Supply (VS-AUX24V) — allows variable speed drive programming (including network communication validation) prior to wiring 3-phase power to the drive

## Additional FP Series II Features

- NEMA 1 or NEMA 3R designs
- Temperature range of -10°C to 40°C (14° to 104°F)
- OSHPD Certified
- Plenum rated
- Fused or Non-fused disconnect designs with handle lockable in Off position
- EMI/RFI Filters standard on all drives
- I/O and communication cards provide plug-and-play functionality
- Active Energy Control on-board all drives to minimize energy losses and provide industry leading efficiency
- Real Time Clock supporting calendaring and PLC functionality
- Thin metal capacitor design for efficient drive operation and extended life
- Standard DC link choke with MOVs for enhanced transient and harmonic distortion protection
- Top and bottom conduit entry for ease of installation
- Copy and paste keypad function that allows you to transfer parameter settings from one drive to another
- Keypad that displays up to nine monitored parameters simultaneously
- Standard TYPE12 keypad on all drives
- Simplified operating menu allows for quick programming changes
- Anti-trip DC bus regulation
- Onboard RS-485 Communications (BACnet, N2, Modbus®)
- Onboard Ethernet-based communications (BACnet/IP, Modbus/TCP)
- SA bus communication factory installed option
- Standard I/O: 6DI, 2AI, 1AO, 1 Form C RO (NO/NC),
- Short circuit withstand rating of 100kAIC (additional fuses required for non-fused disconnect designs)
- Input surge protection against voltage spikes (varistor input)
- Hard-wired external/damper interlock
- Accommodates a wide variety of expander boards and adapter boards
- Control logic can be powered from an external auxiliary control panel
- Robust steel enclosure for simple installation

**FP Series II Drive with IntelliPass and IntelliDisconnect**

## Additional FP Series II IntelliPass Only Features

- HAND/OFF/AUTO and DRIVE/OFF/BYPASS selector on keypad that simplifies control
- 2 contactor bypass with drive isolation switch
- Control power transformer with primary and secondary fusing
- Bypass can be controlled mechanically, electronically, and via SA Bus

## Repair Information

If the FP Series II Drive fails to operate within its specifications, contact the nearest Johnson Controls representative.

## *JC-VSD FP Series II Drives (Continued)*

### Catalog Number Selection

| Catalog Number | Y | K | 4 | D | 8 | 4 | 1 | 1 | B | - | 0 | 0 | 0 | 0 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Base Product**
YK = VSD Series II Base Drive
YM = VSM Drive

**Amps, kW, Hp**

**208V, 230V 3-Phase (YK product)**
4D8 = 4.8 Amp, 0.75kW (1 Hp)
8D0 = 8.0 Amp, 1.5 kW (2 Hp)
011 = 11 Amp, 2.2 kW (3 Hp)
016 = 16 Amp, 4.0 kW (5 Hp)[1]
018 = 18 Amp, 4.0 kW (5 Hp)
024 = 24 Amp, 5.5 kW (7.5 Hp)[1]
025 = 25 Amp, 5.5 kW (7.5 Hp)
031 = 31 Amp, 7.5 kW (10 Hp)
048 = 48 Amp, 11 kW (15 Hp)
062 = 62 Amp, 15 kW (20 Hp)
070 = 70 Amp, 18.5 kW (25 Hp)[1]
075 = 75 Amp, 18.5 kW (25 Hp)
088 = 88 Amp, 22 kW (30 Hp)
115 = 115 Amp, 37 kW (40 Hp)[1]
140 = 140 Amp, 37 kW (40 Hp)
150 = 150 Amp, 45 kW (50 Hp)[1]
170 = 170 Amp, 45 kW (50 Hp)

**460V 3-Phase (YK product)**
2D4 = 2.4 Amp, 1.1 kW (1 Hp)[2]
3D4 = 3.4 Amp, 1.1 kW (1 Hp)
4D0 = 4.0 Amp, 1.5 kW (2 Hp)[2]
4D8 = 4.8 Amp, 1.5 kW (2 Hp)
5D6 = 5.6 Amp, 2.2 kW (3 Hp)
9D0 = 9.0 Amp, 4.0 kW (5 Hp)[2]
9D6 = 9.6 Amp, 4.0 kW (5 Hp)
012 = 12 Amp, 5.5 kW (7.5 Hp)
016 = 16 Amp, 7.5 kW (10 Hp)
023 = 23 Amp, 11 kW (15 Hp)
031 = 31 Amp, 15 kW (20 Hp)
038 = 38 Amp, 18.5 kW (25 Hp)
046 = 46 Amp, 22 kW (30 Hp)
061 = 61 Amp, 30 kW (40 Hp)
070 = 70 Amp, 30 kW (50 Hp)[2]
072 = 72 Amp, 37 kW (50 Hp)
080 = 80 Amp, 45 kW (60 Hp)[2]
087 = 87 Amp, 45 kW (60 Hp)
105 = 105 Amp, 55 kW (75 Hp)[2]
140 = 140 Amp, 75 kW (100 Hp)
170 = 170 Amp, 90 kW (125 Hp)

**200-240V 3-Phase (YM product)**
2D8 = 2.8 Amp, 0.37 kW (0.5 Hp)
3D7 = 3.7 Amp, 0.55 kW (0.75 Hp)
4D8 = 4.8 Amp, 0.75 kW (1 Hp)
7D0 = 7.0 Amp, 1.1 kW (1.5 Hp)

**380-480V 3-Phase (YM product)**
1D3 = 1.3 Amp, 0.37 kW (0.5 Hp)
1D9 = 1.9 Amp, 0.55 kW (0.75 Hp)
2D4 = 2.4 Amp, 0.75 kW (1 Hp)
3D3 = 3.3 Amp, 1.1 kW (1.5 Hp)
4D3 = 4.3 Amp, 1.5 kW (2 Hp)

**Voltage**
1 = 208V (YK only)
2 = 230V (YK only)
4 = 460V (YK only)
6 = 200-240V (YM only)
7 = 380-480V (YM only)

**Enclosure**
1 = NEMA Type 1
2 = NEMA Type 3R (YK only)

**Style**
1 = Non-fused IntelliDisconnect
2 = Fused IntelliDisconnect[3]
3 = IntelliPass w/ Fused Disconnect
4 = IntelliPass w/ Non-fused Disconnect

**Revision**
B = Rev 2 (Americas)

**Separator**

**Options**
00000 = No options
S0000 = SA Bus Communication Card (YK Only)

1 = 230V 3-phase IntelliPass only
2 = 460V 3-phase IntelliPass only
3 = Fused Disconnect is only option for YM product

# JC-VSD FP Series II Drives(Continued)

## Technical Specifications

| FP Series II Drives (Part 1 of 2) | |
|---|---|
| **Input Voltage ($V_{in}$)** | 208, 230, 460 VAC -10%/+10% |
| **Input Frequency ($f_{in}$)** | 50/60 Hz (Variation Up to 47-66 Hz) |
| **Connection to Power** | Once Per Minute or Less (Typical Operation) |
| **Current Withstand Rating** | 15k AIC |
| **Output Voltage** | 0 to $V_{in}$ Line Voltage In |
| **Continuous Output Current** | Ambient Temperature Maximum 104°F (40°C), Overload 1.1 x $I_L$ (1 min./10 min.) |
| **Overload Current** | 110% (1 min./10 min.) |
| **Initial Output Current** | 150% for 2 Seconds |
| **Output Frequency** | -320 to 320 Hz |
| **Frequency Resolution** | 0.01 Hz |
| **Control Method** | Frequency Control (V/f) Open Loop Sensorless Vector Control |
| **Switching Frequency** | 1.5 to 10 kHz; default = 6 kHz |
| **Frequency Reference** | Analog Input: Resolution 0.1% (10 bit), Accuracy +/-1%<br>Panel Reference: Resolution 0.01 Hz |
| **Field Weakening Point** | 8 to 320 Hz |
| **Acceleration Time** | 0.1 to 3,000 s |
| **Deceleration Time** | 0.1 to 3,000 s |
| **Braking Torque** | DC Brake: 30% x $T_n$ (without Brake Option) |
| **Ambient Operating Temperature** | 14 (No Frost) to 104°F (-10 to 40°C)<br>De-rating to operate at 122°F (50°C) |
| **Storage Temperature** | -40 to 158°F (-40 to 70°C) |
| **Relative Humidity** | 0 to 95% RH, Noncondensing, Noncorrosive, No Dripping Water |
| **Air Quality** | Chemical Vapors: IEC 60721-3-3, Unit In Operation, Class 3C2;<br>Mechanical Particles: IEC 60721-3-3, Unit In Operation, Class 3S2 |
| **Altitude** | 100% Load Capacity (No Derating) Up to 3,280 ft (1,000 m);<br>1% Derating for Each 328 ft (100 m) Above 3,280 ft (1,000 m); Maximum 9,842 ft (3,000 m) |
| **Vibration** | EN 61800-5-1, EN 60068-2-6; 5 to 150 Hz, Displacement Amplitude 1 mm (Peak) at 5 to 15.8 Hz, Max. Acceleration Amplitude 1 G at 15.8 to 150 Hz, OSHPD Seismic Certified |
| **Shock** | EN 61800-5-1, EN 6068-2-27 United Parcel Service® (UPS) Drop Test (for Applicable UPS Weights) Storage and Shipping: max. 15 G, 11 ms(in package) |
| **Enclosure Class** | NEMA Type 1 or NEMA Type 3R |
| **EMC (at default settings)** | Immunity: Fulfills all Electromagnetic Compatibility (EMC) Immunity Requirements;<br>Emissions: EN 61800-3 (2004), LEVEL H (EMC C2) |
| **Emissions** | EMC Level Dependent: +EMC 2: EN 61800-3 (2004) Category C2, Delivered with Class C2 EMC filtering as Default |
| **Analog Input Voltage** | 0 to 10 V, R = 200 kOhms Differential Resolution 0.1%; Accuracy ±1%, Dip Switch Selection (Voltage/Current) |
| **Analog Input Current** | 0 (4) to 20 mA; $R_i$ - 250 Ohms Differential |
| **Digital Inputs (6)** | Positive or Negative Logic; 18 to 30 VDC |
| **Auxiliary Voltage** | 24 V ±10%, Maximum 100 mA |
| **Output Reference Voltage** | 10 V +3%, Maximum Load 10 mA |

| FP Series II Drives (Part 2 of 2) | |
|---|---|
| **Analog Output** | 0 to 10 V, 0 (4) to 20 mA; $R_L$ max. 500 Ohms; Resolution 10 bit; Accuracy ± 2%, Dip Switch Selection (Voltage/Current) |
| **Relay Outputs** | 3 Programmable, 2 Form C, 1 Form A Relay Outputs Switching Capacity: 24 VDC/8 A, 250 VAC/8 A, 125 VDC/0.4 A |
| **Hard-Wired Jumper** | Between Terminal 6 and 10 (Factory Default) |
| **DIP Switch Setting Default** | RS485 = Off, AO1 = Current, AI2 = Current<br>AI1 = Voltage |
| **Overcurrent Protection** | Yes |
| **Overvoltage Protection** | Yes |
| **Undervoltage Protection** | Yes |
| **DC Bus Regulation Anti-trip** | Yes (Accelerates or Decelerates the Load) |
| **Earth Fault Protection** | Yes, in case of earth fault in motor or motor cable, only the frequency converter is protected. |
| **Input Phase Supervision** | Yes, trips if any of the input phases are missing |
| **Motor Phase Supervision** | Yes, trips if any of the output phases are missing |
| **Overtemperature Protection** | Yes |
| **Motor Overload Protection** | Yes |
| **Motor Stall Protection** | Yes |
| **Motor Underload Protection** | Yes |
| **Short Circuit Protection** | Yes |
| **Surge Protection** | Yes (Varistor Input) |
| **Conformed Coated (Varnished) Board** | Yes (Prevents Corrosion) |
| **OHSPD Special Seismic Certification Pre-Approval** | Yes |
| **Compliance** | UL Listed File No 508C, cUL Listed |
| | Safety – EN 61800-5-1 |
| **Warranty** | 30 Months Standard Terms;<br>39 Months with Certified Startup |
| **Reliability** | 500,000 hours Mean Time Between Failures (MTBF) |
| **Weight** | Depends on configuration and horsepower. Refer to *JCI FP Series Drives Product Bulletin (LIT-12012081)* for more information. |
| **Horsepower/Amps/kW** | 208V: 1-50 Hp, 4.8-170 A, 0.75 to 45 kW |
| | 230V: 1-50 Hp, 4.8- 170 A, 0.75 – 45 kW |
| | 200-240V: 0.5-1.5 Hp, 2.8-7 A, 0.37-1.1 kW |
| | 380-480V: 0.5-2 Hp, 1.3-4.3 A, 0.37-1.5 kW |
| | 460V: 1-125 Hp, 3.4-170 A, 1.1-90 kW |