

# VSD Series Variable Speed IntelliPass/IntelliDisconnect Drives

## Description

The VSD Series variable speed IntelliPass/IntelliDisconnect drives, powered by Eaton®/Cutler-Hammer® technology, provide a premier intelligent drive integrated with a reliable bypass configuration. The IntelliDisconnect variable speed drive combines a premier quality drive with an integrated circuit breaker disconnect (no bypass). The IntelliPass bypass is a two- or three-contactor design using the Eaton/Cutler-Hammer 24 VDC Series of contactors and power supplies. The features, function, and form allow the drive and bypass to become an integrated design, the world's smallest drive and bypass package. The IntelliPass drives come standard with an Eaton/Cutler-Hammer circuit breaker integrated into the drive and bypass design.

## Features

- True Full Network Connectivity for Both Drive and Bypass N2, XT, SA Bus, LON, and BACnet® Protocol — allow for compatibility with current and future Johnson Controls® network architecture
- Software Parameters 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 communication bus
- Hinged Cover and Removable Top and Bottom Conduit Plates — provide access to cabling and components for ease of installation

- Johnson Controls Support Includes Ordering, Estimating, and Project Management Tools: Advanced Order Management System (AOMS), Advanced Installation Management (AIM) Tools - QUICKLIT, Catalog, PRESTO, and STORE — allow to easily identify and order products
- Closed-Loop Control Programmed with Engineering Units for Specific HVAC Applications: Duct Static, Building Static, Pressure Control, and Temperature Control — provide 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 Programming Capability Using Auxiliary 24 V Power Supply (VS-AUX24V) — allow variable speed drive programming (including network communication validation) prior to wiring 3-phase power to the drive

## Additional Features

- Run permissive damper control in drive or bypass mode
- Up to six user-defined skip frequencies
- Selectable Analog Input (AI) Min/Max/Averaging feature
- Digital inputs can be defined for normally open (N.O.) or normally closed (N.C.) operation



**VSD Series Variable Speed IntelliPass Drive**

- Automatic fault display captures 16 drive operating parameters at time of fault
- Solid-state motor overload relay provides motor protection while in bypass
- HAND/OFF/AUTO and DRIVE/ BYPASS selector on keypad simplifies control
- Plenum rated
- Standard 3% line reactors for enhanced transient and harmonic distortion protection
- EMI/RFI Filters standard on all drives
- Standard drive current rating of 100 kAIC, bypass rating of 65 kAIC
- Lockable disconnect in OFF position
- 3rd Contactor drive isolation option
- I/O and communication cards provide plug-and-play functionality

## Options List

00 = none  
 P6 = Third Contactor Drive Isolation

## Repair Information

If the Variable Speed IntelliPass Drive fails to operate within its specifications, contact the nearest Johnson Controls representative.

## Selection Chart

	Code Number	V	S	0			1	1	A	—				
<b>Base Product</b>	VS = Variable Speed Drive prefix													
<b>Horsepower (VT)<sup>1</sup></b>	001 = 1.0 hp to 075 = 75 hp <sup>2</sup>													
<b>Voltage</b>	1 = 208 V 2 = 230 V 4 = 480 V													
<b>Enclosure Rating</b>	1 = NEMA TYPE 1													
<b>Enclosure Style</b>	1 = IntelliPass (with 2 or 3 contactor bypass) 4 = IntelliDisconnect (no bypass includes circuit breaker/disconnect)													
<b>Revision #</b>	A = Rev. 1													
<b>Separator (—)</b>														
<b>Communications<sup>3</sup></b>	0 = None N = N2/XT/SA Bus Communication(N2 by default) B = MS/TP BACnet Communications L = LONWORKS® Network													
<b>Option 1</b>	See Options List.													
<b>Option 2</b>	See Options List.													

1. All horsepower ratings are Variable Torque (VT).  
 2. 1 to 30 hp at 208/230 V; 1 to 75 hp at 480 V.  
 3. N2/XT/SA Bus, MS/TP BACnet, or LONWORKS Communications selectable on drive keypad based on installed communication card.

## VSD Series Variable Speed IntelliPass/IntelliDisconnect Drives (Continued)

### Technical Specifications

VSD Series Variable Speed IntelliPass Drives (Part 1 of 2)	
Input Voltage ( $V_{in}$ )	10%/-15%
Input Frequency ( $f_{in}$ )	50/60 Hz (Variation up to 45 – 66 Hz)
Connection to Power	Once per Minute or Less (Typical Operation)
Current Withstand Rating	65 kAIC
Output Voltage	0 to $V_{in}$
Continuous Output Current	Ambient Temperature Maximum 104°F (40°C), Overload 1.1 x $I_L$ (1 min./10 min.)
Starting Current	110%
Output Frequency	0 to 320 Hz
Frequency Resolution	0.01 Hz
Control Method	Frequency Control (V/f) Open Loop Sensorless Vector Control
Switching Frequency	Adjustable Parameter 1 to 40 hp: 1 to 16 kHz; Default 10 kHz 50 to 75 hp: 1 to 10 kHz; Default 3.6 kHz
Frequency Reference	Analog Input: Resolution 0.1% (10 bit), Accuracy $\pm$ 1% Panel Reference: Resolution 0.01 Hz
Field Weakening Point	30 to 320 Hz
Acceleration Time	0 to 3,000 s
Deceleration Time	0 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)
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 721-3-3, Unit In Operation, Class 3C2; Mechanical Particles: IEC 721-3-3, Unit In Operation, Class 3S2
Altitude	100% Load Capacity (No Derating) Up to 3,280 ft (1,000 m); 1% Derating for Each 328 ft (100 m) Above 3,280 ft (1,000 m); Maximum 9,842 ft (3,000 m)
Enclosure Class	TYPE 1/IP21

VSD Series Variable Speed IntelliPass Drives (Part 2 of 2)	
EMC (at default settings)	Immunity: Fulfills All Exhaust Motor Contactor (EMC) Immunity Requirements; Emissions: EN 61800-3, LEVEL H
Safety	UL 508C; CSA C22.2 No. 14
Product	IEC 61800-2; Plenum Rated
Air Quality Chemical Vapors	IEC721-3-3, Unit In Operation, class 3C2
Mechanical Particles	IEC721-3-3, Unit In Operation, class 3S2
Analog Input Voltage	0 to 10 V, R = 200 Ohms Differential (-10 to 10 V Joystick Control) Resolution 0.1%; Accuracy $\pm$ 1%
Analog Input Current	0 (4) to 20 mA; $R_L$ - 250 ohms differential
Digital Inputs (6)	Positive or negative logic; 18 to 24 VDC
Auxiliary Voltage	24 V $\pm$ 15%, maximum 250 mA
Output Reference Voltage	10 V 3%, maximum load 10 mA
Analog Output	0 (4) to 20 mA; $R_L$ maximum 500 ohms; Resolution 10 bit; Accuracy $\pm$ 2%
Digital Outputs	Open Collector Output, 50 mA/48 V
Relay Outputs	Two Programmable Form C Relay Outputs Switching Capacity: 24 VDC/8 A, 250 VAC/8 A, 125 VDC/0.4 A
Overcurrent Protection	Trip Limit 4.0 x $I_H$ Instantaneously
Overvoltage Protection	Yes
Undervoltage Protection	Yes
Earth Fault Protection	In case of earth fault in motor or motor cable, only the frequency converter is protected.
Input Phase Supervision	Trips if any of the input phases are missing.
Motor Phase Supervision	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 (of the 24 V and 10 V Reference Voltages)
Line Voltage	208/230/480 V
Drive Efficiency	>95%
Reliability	500,000 Hours Mean Time Between Failures (MTBF)
Power Factor (Displacement)	0.96
Ratings	UL Listed, File No. E244421; cUL Listed
Warranty	2 Years Standard Terms; 3 Years with Certified Startup