VSD Series II Variable Speed Micro Drives

Product Bulletin

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Johnson Controls® VSD Series II Variable Speed Micro Drives (JC-VSM II) are the next generation of drives specifically engineered for today's HVAC mid-market applications. These micro-processor-based drives have standard features that can be programmed to tailor the drive's performance to suit a wide variety of application requirements. The JC-VSM II product line uses a 32-bit microprocessor and insulated gate bipolar transistors (IGBTs) that provide quiet operation, high efficiency, and smooth low-speed performance for three-phase induction motors. The size and simplicity of the JC-VSM II makes it ideal for hassle-free installation. Models rated at 575 volts, three-phase, 50/60 Hz are available in sizes ranging from 1 to 7-1/2 hp. Models rated at 480 volts, three-phase, 50/60 Hz are available in sizes ranging from 1/2 to 10 hp. Models rated at 230 volts, single or three-phase, 50/60 Hz are available in sizes ranging from 1/4 to 3 hp, 230 V three-phase output. Models rated at 115 volts, single-phase, 50/60 Hz are available in 1/4 to 1-1/2 hp, 230 V three-phase output.

The standard drive includes a digital display, and operating and programming keys on a visually appealing, efficient application programming interface. The display provides drive monitoring, as well as adjustment and diagnostic information. The keys are used for digital adjustment and programming of the drive, as well as for operator control. Separate terminal blocks for control and power wiring are provided for customer connections.



Figure 1: VSD Series II Micro Drive

Table 1: Features and Benefits

Features	Benefits
Preset Application Macros, Startup Wizard, and Diagnostic Capabilities	Allows for quick and easy startup.
Rugged Construction	Offers 122°F (50°C) rated, conformal coated boards.
DIN Rail and Screw Mountable Chassis	Reduces installation time.
Compact, Space Saving Design	Allows for side-by-side installation resulting in less mounting space.
Industry-Leading Efficiency	Delivers energy savings to the customer. Provides integrated EMC filters and brake choppers as standard features in three-phase applications, which make the unit suitable for commercial and industrial applications.
IP 20 Enclosure Class Available as Standard	Offers IP21/NEMA Type 1 kits.
Temperature-Controlled Fan	Ensures extended product reliability.
RS-485/Modbus®	Includes a standard communication protocol.
PID Controller	Provides stand-alone, closed-loop control.

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Programmable Parameters

- Application macros: basic, pump, fan, and high-load
- Programmable start and stop and reverse signal logic (sinking or sourcing)
- Reference scaling
- Programmable start and stop functions
- DC brake at start and stop
- Programmable V/Hz curve
- Adjustable switching frequency
- Auto restart function after fault
- Protections and supervisions (all fully programmable; off, warning, and fault)
- Current signal input fault
- External fault
- Fieldbus communication
- Eight preset speeds
- Analog input range selection, signal scaling, and filtering
- PID controller

IMPORTANT: Use this JC-VSM II drive only as an operating control. Where failure or malfunction of the JC-VSM II drive 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 JC-VSM II drive.

Table 2: VSD Series II Micro Drives Selection Chart (Single-Phase Input, 3-Phase Output)

Code Number	V	S					0	4	B	—	M	0	0	0	0

Base Product	VS = Variable Speed Series II Micro Drive prefix
Full Load Amperes (VT/CT)	1D7 = 1.7 A (1/4 hp, 0.25 kW)[1,2] 2D4 = 2.4 A (1/2 hp, 0.37 kW)[1,2] 2D8 = 2.8 A (3/4 hp, 0.55 kW)[1,2] 3D7 = 3.7 A (1 hp, 0.75 kW)[1,2] 4D8 = 4.8 A (1.5 hp, 1.1 kW)[1,2] 7D0 = 7.0 A (2 hp, 1.5 kW)[2] 9D6 = 9.6 A (3 hp, 2.2 kW)[2]
Voltage	0 = 120 V 2 = 230 V
Enclosure Rating	0 = IP20
Enclosure Style	4 = Single-phase (Micro Drive)
Revision #	B = Rev. 2 (Americas) D = Rev. 2 (Canada)
Separator (—)	
Communications	M = Modbus
Options	00 = None EM = EMC Filter

1. 120 Volts
2. 230 Volts

Note: Horsepower ratings are based on the use of a 240 V four- or six-pole squirrel-cage induction motor and are for reference only. Select a drive where the motor current is less than or equal to the rated continuous output current.

Table 3: VSD Series II Micro Drives Selection Chart (3-Phase Input, 3-Phase Output)

Code Number	V	S					0	3	B	—	M	0	0	0	0

Base Product	VS = Variable Speed Series II Micro Drive prefix
Full Load Amperes (VT/CT)	**230 V** 1D7 = 1.7 A (1/4 hp, 0.25 kW) 2D4 = 2.4 A (1/2 hp, 0.37 kW) 2D8 = 2.8 A (3/4 hp, 0.55 kW) 3D7 = 3.7 A (1 hp, 0.75 kW) 4D8 = 4.8 A (1.5 hp, 1.1 kW) 7D0 = 7.0 A (2 hp, 1.5 kW) 011 = 11.0 A (3 hp, 2.2 kW) 017 = 17.0 A (5 hp, 4 kW) 025 = 25.0 A (7.5 hp, 5.5 kW) 031 = 31.0 A (10 hp, 7.5 kW) 038 = 38.0 A (15 hp, 11 kW) **480V** 1D3 = 1.3 A (1/2 hp, 0.37 kW) 1D9 = 1.9 A (3/4 hp, 0.55 kW) 2D4 = 2.4 A (1 hp, 0.75 kW) 3D3 = 3.3 A (1.5 hp, 1.1 kW) 4D3 = 4.3 A (2 hp, 1.5 kW) 5D6 = 5.6 A (3 hp, 2.2 kW) 7D6 = 7.6 A (4 hp, 3 kW) 9D0 = 9.0 A (5 hp, 4 kW) 012 = 12.0 A (7.5 hp, 5.5 kW) 014 = 14.0 A (10 hp, 7.5 kW) 016 = 16.0 A (10 hp, 7.5 kW) 023 = 23.0 A (15 hp, 11 kW) 031 = 31.0 A (20 hp, 15 kW) 038 = 38.0 A (25 hp, 18.5 kW) **575 V** 1D7 = 1.7 A (1 hp, 0.75 kW) 2D7 = 2.7 A (2 hp, 1.5 kW) 3D9 = 3.9 A (3 hp, 2.2 kW) 6D1 = 6.1 A (5 hp, 4 kW) 9D0 = 9.0 A (7.5 hp, 5.5 kW)
Voltage	2 = 230 V 4 = 480 V 5 = 575 V
Enclosure Rating	0 = IP20
Enclosure Style	3 = 3-phase (Micro Drive)
Revision #	B = Rev. 2 (Americas) D = Rev. 2 (Canada)
Separator (—)	
Communications	M = Modbus
Options	00 = None EM = EMC Filter

Note: Horsepower ratings are based on the use of a 240 V, 460 V, and 575 V four- or six-pole squirrel-cage induction motor and are for reference only. Select a drive when the motor current is less than or equal to the rated continuous output current.

VSD Series II Micro Drives Product Selection

Table 4: VSD Series II Micro Drives (100 — 120 V Single-Phase Input, 230 V 3-Phase Output) - Frame 2

Code Number	Description	Continuous Output Ampere Rating
VS1D7004B-M0000	VSM Series II, 1/4 hp (0.25 kW), 120 V Single-Phase Input, 230 V 3-Phase Output, IP20 Enclosure	1.7
VS2D7004B-M0000	VSM Series II, 1/2 hp (0.37 kW), 120 V Single-Phase Input, 230 V 3-Phase Output, IP20 Enclosure	2.4
VS2D8004B-M0000	VSM Series II, 3/4 hp (0.55 kW), 120 V Single-Phase Input, 230 V 3-Phase Output, IP20 Enclosure	2.8
VS3D7004B-M0000	VSM Series II, 1 hp (0.75 kW), 120 V Single-Phase Input, 230 V 3-Phase Output, IP20 Enclosure	3.7

Table 5: VSD Series II Micro Drives (100 — 120 V Single-Phase Input, 230 V 3-Phase Output) - Frame 3

Code Number	Description	Continuous Output Ampere Rating
VS4D8004B-M0000	VSM Series II, 1.5 hp (1.1 kW), 120 V Single-Phase Input, 230 V 3-Phase Output, IP20 Enclosure	4.8

Table 6: VSD Series II Micro Drives (200 — 240 V Single-Phase Input, 230 V 3-Phase Output) - Frame 1

Code Number	Description	Continuous Output Ampere Rating
VS1D7204B-MEM00	VSM Series II, 1/4 hp (0.25 kW), 230 V Single-Phase Input, 230 V 3-Phase Output, IP20 Enclosure, EMC Filter	1.7
VS1D7204B-M00000	VSM Series II, 1/4 hp (0.25 kW), 230 V Single-Phase Input, 230 V 3-Phase Output, IP20 Enclosure	1.7
VS2D4204B-MEM00	VSM Series II, 1/2 hp (0.37 kW), 230 V Single-Phase Input, 230 V 3-Phase Output, IP20 Enclosure, EMC Filter	2.4
VS2D4204B-M0000	VSM Series II, 1/2 hp (0.37 kW), 230 V Single-Phase Input, 230 V 3-Phase Output, IP20 Enclosure	2.4
VS2D8204B-MEM00	VSM Series II, 3/4 hp (0.55 kW), 230 V Single-Phase Input, 230 V 3-Phase Output, IP20 Enclosure, EMC Filter	2.8
VS2D8204B-M0000	VSM Series II, 3/4 hp (0.55 kW), 230 V Single-Phase Input, 230 V 3-Phase Output, IP20 Enclosure	2.8

Table 7: VSD Series II Micro Drives (200 — 240 V Single-Phase Input, 230 V 3-Phase Output) - Frame 2

Code Number	Description	Continuous Output Ampere Rating
VS3D7204B-MEM00	VSM Series II, 1 hp (0.75 kW), 230 V Single-Phase Input, 230 V 3-Phase Output, IP20 Enclosure, EMC Filter	3.7
VS3D7204B-M0000	VSM Series II, 1 hp (0.75 kW), 230 V Single-Phase Input, 230 V 3-Phase Output, IP20 Enclosure	3.7
VS4D8204B-MEM00	VSM Series II, 1.5 hp (1.1 kW), 230 V Single-Phase Input, 230 V 3-Phase Output, IP20 Enclosure, EMC Filter	4.8
VS4D8204B-M0000	VSM Series II, 1.5 hp (1.1 kW), 230 V Single-Phase Input, 230 V 3-Phase Output, IP20 Enclosure	4.8
VS7D0204B-MEM00	VSM Series II, 2 hp (1.5 kW), 230 V Single-Phase Input, 230 V 3-Phase Output, IP20 Enclosure, EMC Filter	7
VS7D0204B-M0000	VSM Series II, 2 hp (1.5 kW), 230 V Single-Phase Input, 230 V 3-Phase Output, IP20 Enclosure	7

Table 8: VSD Series II Micro Drives (200 — 240 V Single-Phase Input, 230 V 3-Phase Output) - Frame 3

Code Number	Description	Continuous Output Ampere Rating
VS9D6204B-MEM00	VSM Series II, 3 hp (2.2 kW), 230 V Single-Phase Input, 230 V 3-Phase Output, IP20 Enclosure, EMC Filter	9.6
VS9D6204B-M0000	VSM Series II, 3 hp (2.2 kW), 230 V Single-Phase Input, 230 V 3-Phase Output, IP20 Enclosure	9.6

Table 9: VSD Series II Micro Drives (200 — 240 V 3-Phase Input, 230 V 3-Phase Output) - Frame 1

Code Number	Description	Continuous Output Ampere Rating
VS1D7203B-M0000	VSM Series II, 1/4 hp (0.25 kW), 230 V 3-Phase Input, 230 V 3-Phase Output, IP20 Enclosure	1.7
VS2D4203B-M0000	VSM Series II, 1/2 hp (0.37 kW), 230 V 3-Phase Input, 230 V 3-Phase Output, IP20 Enclosure	2.4
VS2D8203B-M0000	VSM Series II, 3/4 hp (0.55 kW), 230 V 3-Phase Input, 230 V 3-Phase Output, IP20 Enclosure	2.8

Table 10: VSD Series II Micro Drives (200 — 240 V 3-Phase Input, 230 V 3-Phase Output) - Frame 2

Code Number	Description	Continuous Output Ampere Rating
VS3D7203B-M0000	VSM Series II, 1 hp (0.75 kW), 230 V 3-Phase Input, 230 V 3-Phase Output, IP20 Enclosure	3.7
VS4D8203B-M0000	VSM Series II, 1.5 hp (1.1 kW), 230 V 3-Phase Input, 230 V 3-Phase Output, IP20 Enclosure	4.8
VS7D0203B-M0000	VSM Series II, 2 hp (1.5 kW), 230 V 3-Phase Input, 230 V 3-Phase Output, IP20 Enclosure	7

Table 11: VSD Series II Micro Drives (200 — 240 V 3-Phase Input, 230 V 3-Phase Output) - Frame 3

Code Number	Description	Continuous Output Ampere Rating
VS011203B-M0000	VSM Series II, 3 hp (2.2 kW), 230 V 3-Phase Input, 230 V 3-Phase Output, IP20 Enclosure	11

Table 12: VSD Series II Micro Drives (380 — 480 V 3-Phase Input, 480 V 3-Phase Output) - Frame 1

Code Number	Description	Continuous Output Ampere Rating
VS1D3403B-MEM00	VSM Series II, 1/2 hp (0.37 kW), 480 V 3-Phase Input, 480 V 3-Phase Output, IP20 Enclosure, EMC Filter	1.3
VS1D3403B-M0000	VSM Series II, 1/2 hp (0.37 kW), 480 V 3-Phase Input, 480 V 3-Phase Output, IP20 Enclosure	1.3
VS1D9403B-MEM00	VSM Series II, 3/4 hp (0.55 kW), 480 V 3-Phase Input, 480 V 3-Phase Output, IP20 Enclosure, EMC Filter	1.9
VS1D9403B-M0000	VSM Series II, 3/4 hp (0.55 kW), 480 V 3-Phase Input, 480 V 3-Phase Output, IP20 Enclosure	1.9
VS2D4403B-MEM00	VSM Series II, 1 hp (0.75 kW), 480 V 3-Phase Input, 480 V 3-Phase Output, IP20 Enclosure, EMC Filter	2.4
VS2D4403B-M0000	VSM Series II, 1 hp (0.75 kW), 480 V 3-Phase Input, 480 V 3-Phase Output, IP20 Enclosure	2.4

Table 13: VSD Series II Micro Drives (380 — 480 V 3-Phase Input, 480 V 3-Phase Output) - Frame 2

Code Number	Description	Continuous Output Ampere Rating
VS3D3403B-MEM00	VSM Series II, 1.5 hp (1.1 kW), 480 V 3-Phase Input, 480 V 3-Phase Output, IP20 Enclosure, EMC Filter	3.3
VS3D3403B-M0000	VSM Series II, 1.5 hp (1.1 kW), 480 V 3-Phase Input, 480 V 3-Phase Output, IP20 Enclosure	3.3
VS4D3403B-MEM00	VSM Series II, 2 hp (1.5 kW), 480 V 3-Phase Input, 480 V 3-Phase Output, IP20 Enclosure, EMC Filter	4.3
VS4D3403B-M0000	VSM Series II, 2 hp (1.5 kW), 480 V 3-Phase Input, 480 V 3-Phase Output, IP20 Enclosure	4.3
VS5D6403B-MEM00	VSM Series II, 3 hp (2.2 kW), 480 V 3-Phase Input, 480 V 3-Phase Output, IP20 Enclosure, EMC Filter	5.6
VS5D6403B-M0000	VSM Series II, 3 hp (2.2 kW), 480 V 3-Phase Input, 480 V 3-Phase Output, IP20 Enclosure	5.6

Table 14: VSD Series II Micro Drives (380 — 480 V 3-Phase Input, 480 V 3-Phase Output) - Frame 3

Code Number	Description	Continuous Output Ampere Rating
VS7D6403B-MEM00	VSM Series II, 3 hp (3 kW), 480 V 3-Phase Input, 480 V 3-Phase Output, IP20 Enclosure, EMC Filter	7.6
VS7D6403B-M0000	VSM Series II, 3 hp (3 kW), 480 V 3-Phase Input, 480 V 3-Phase Output, IP20 Enclosure	7.6
VS9D0403B-MEM00	VSM Series II, 5 hp (4 kW), 480 V 3-Phase Input, 480 V 3-Phase Output, IP20 Enclosure, EMC Filter	9
VS9D0403B-M0000	VSM Series II, 5 hp (4 kW), 480 V 3-Phase Input, 480 V 3-Phase Output, IP20 Enclosure	9
VS012403B-MEM00	VSM Series II, 7.5 hp (5.5 kW), 480 V 3-Phase Input, 480 V 3-Phase Output, IP20 Enclosure, EMC Filter	12
VS012403B-M0000	VSM Series II, 7.5 hp (5.5 kW), 480 V 3-Phase Input, 480 V 3-Phase Output, IP20 Enclosure	12
VS014403B-MEM00	VSM Series II, 10 hp (7.5 kW), 480 V 3-Phase Input, 480 V 3-Phase Output, IP20 Enclosure, EMC Filter	14
VS014403B-M0000	VSM Series II, 10 hp (7.5 kW), 480 V 3-Phase Input, 480 V 3-Phase Output, IP20 Enclosure	14

Table 15: VSD Series II Micro Drives (575 V 3-Phase Input, 575 V 3-Phase Output) - Frame 3

Code Number	Description	Continuous Output Ampere Rating
VS1D7503B-M0000	VSM Series II, 1 hp (0.75 kW), 575 V 3-Phase Input, 575 V 3-Phase Output, IP20 Enclosure	1.7
VS2D7503B-M0000	VSM Series II, 2 hp (1.5 kW), 575 V 3-Phase Input, 575 V 3-Phase Output, IP20 Enclosure	2.7
VS3D9503B-M0000	VSM Series II, 3 hp (2.2 kW), 575 V 3-Phase Input, 575 V 3-Phase Output, IP20 Enclosure	3.9
VS6D1503B-M0000	VSM Series II, 5 hp (4 kW), 575 V 3-Phase Input, 575 V 3-Phase Output, IP20 Enclosure	6.1
VS9D0503B-M0000	VSM Series II, 7.5 hp (5.5 kW), 575 V 3-Phase Input, 575 V 3-Phase Output, IP20 Enclosure	9

VSD Series II Micro Drives Spare Parts

Table 16: Spare Parts

Code Number	Description
VSM2-IP21-FS1	Type 1/IP21 Kit for Frame 1
VSM2-IP21-FS2	Type 1/IP21 Kit for Frame 2
VSM2-IP21-FS3	Type 1/IP21 Kit for Frame 3
VSM2-TEXTKEYPAD	Micro Drive Keypad
VSM2-PCADAPTER	For MaxConnect
VSM2-KEYADAPTER	Remote Keypad Kit
VSM2-DEMO	Series II Micro Drive Demo Kit

Dimensions

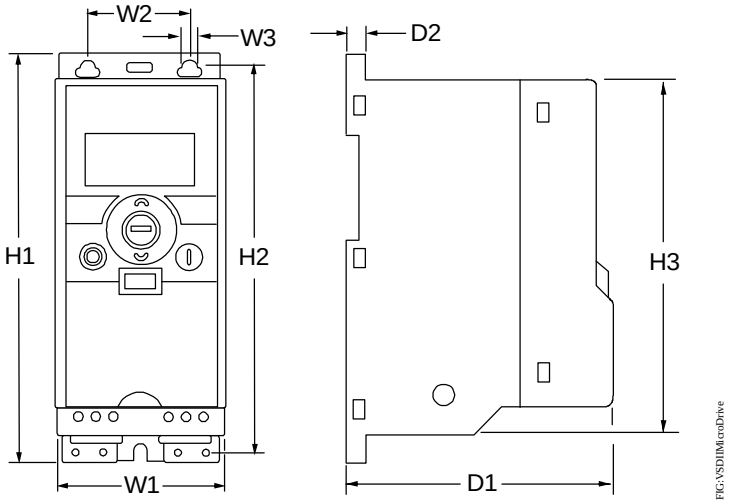


Figure 2: VSD Series II Micro Drive

Table 17: IP20 Chassis VSD Series Micro Drive Dimensions

Frame Size	Dimensions in. (mm), approximate							
	H1	**H2**	**H3**	**W1**	**W2**	**W3**	**D1**	**D2**
FS1	6.16 (156.5)	5.79 (147)	5.40 (137.3)	2.58 (65.5)	1.49 (37.8)	0.17 (4.5)	3.88 (98.5)	0.27 (7)
FS2	7.68 (195)	7.20 (183)	6.69 (170)	3.54 (90)	2.46 (62.5)	0.22 (5.5)	4 (101.5)	0.27 (7)
FS3	10.33 (262.5)	9.93 (252.3)	9.50 (241.3)	3.94 (100)	2.95 (75)	0.22 (5.5)	4.27 (108.5)	0.27 (7)

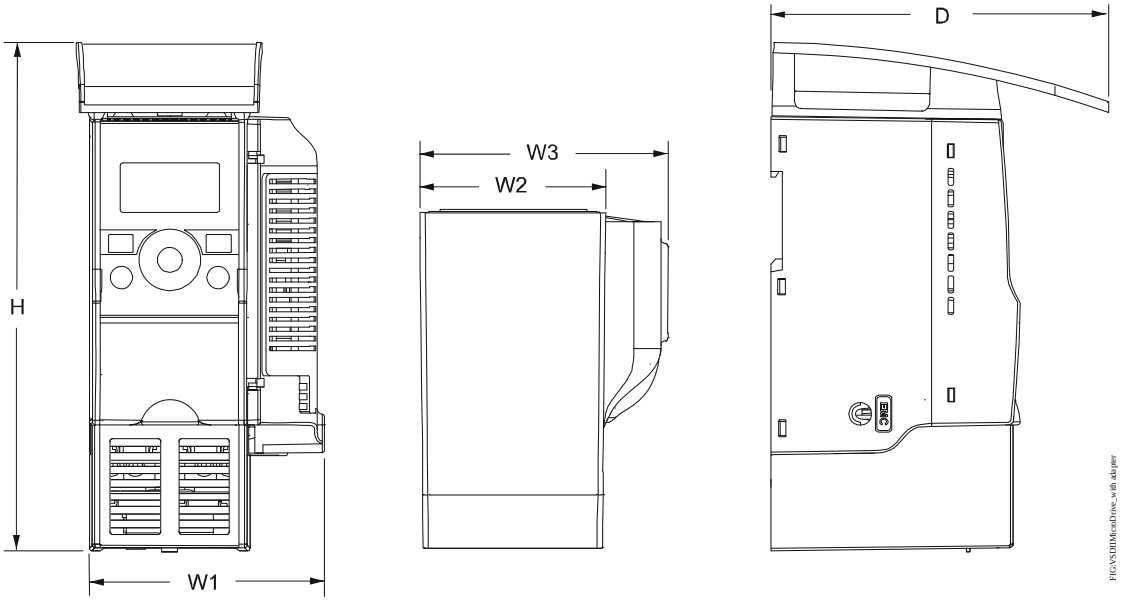


Figure 3: VSD Series II Micro Drive with IP21/NEMA Type 1 Adapter Kit

Table 18: Type 1 VSD Series II Micro Drive Dimensions

Frame Size	Dimensions in. (mm), approximate				
	H	**W1**	**W2**	**W3**	**D**
FS1	8.14 (206.7)	3.77 (95.7)	2.99 (75.9)	3.98 (101.2)	5.41 (137.5)
FS2	9.90 (251.5)	4.72 (120)	3.97 (100.8)	4.94 (125.5)	5.68 (144.2)
FS3	12.26 (311.5)	5.12 (130.1)	4.36 (110.8)	5.33 (135.3)	6.32 (160.5)

Wiring

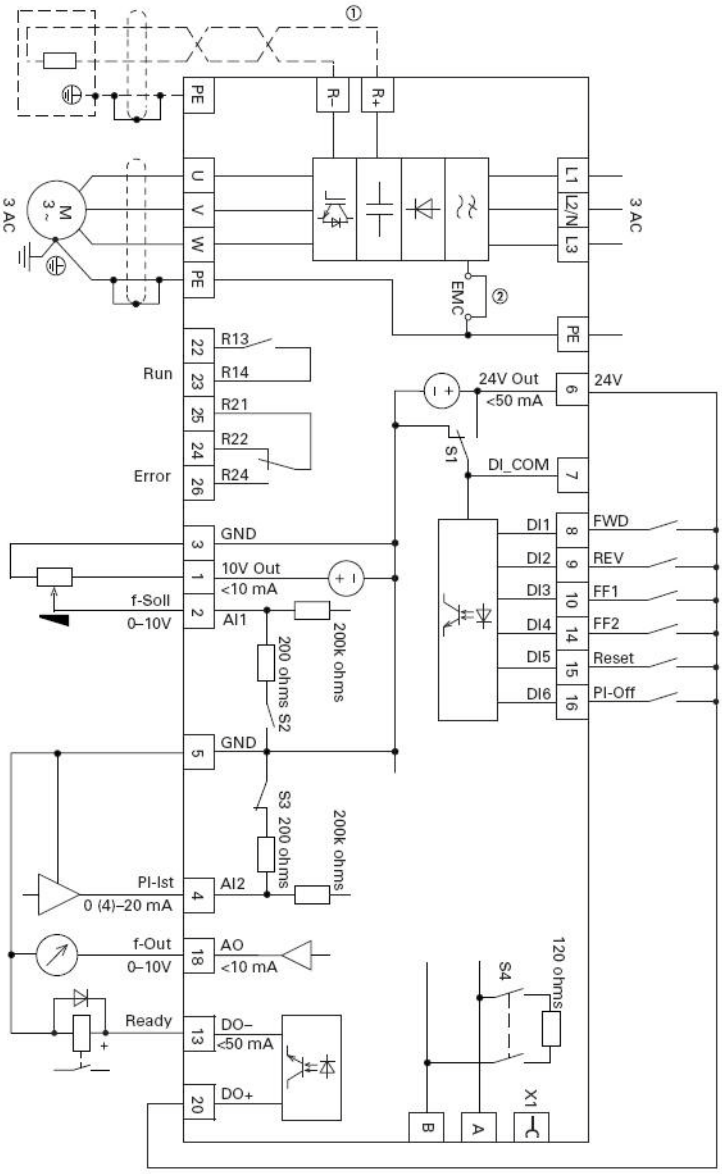


Figure 4: Three-Phase Input Block Diagram

Technical Specifications

VSD Series II Variable Speed Micro Drives (Part 1 of 2)

Input Voltage (V_{in})		+10%/-15% (575V units: +15%/-15%)
Input Frequency (f_{in})		50/60 Hz (Variation Up to 47–66 Hz)
Connection to Power		Once Per Minute or Less (Typical Operation)
Output Voltage		0 to V_{in} 1[1]
Continuous Output Current		Ambient Temperature Maximum 104°F (40°C), Overload 1.1 x I_L (1 min./10 min.)
Initial Output Current		Current 2 x I_N for 2 Seconds in Every 20-Second Period Torque Depends on Motor
Output Frequency		0 to 320 Hz
Frequency Resolution		0.01 Hz
Control Method		Frequency Control (V/f) Open Loop Sensorless Vector Control
Switching Frequency		1.5 to 16 kHz; Default 6 kHz
Frequency Reference		Analog Input: Resolution 0.1% (10-bit), Accuracy ± 1% V/Hz 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)
Braking Resistor (Minimum Values)[2]	230 V	Frame 2, 35 ohms; Frame 3, 26 ohms
	480 V	Frame 2, 75 ohms; Frame 3, 54 ohms
	575 V	Frame 3, 103 ohms
Ambient Operating Temperature		14°F (-10°C), No Frost to 122°F (+50°C): Rated Loadability I_N
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 6,560 ft (2,000 m)
Vibration		60068-2-6; 3 to 150 Hz, Displacement Amplitude 1 mm (peak) at 3 to 15.8 Hz, Maximum Acceleration Amplitude 1 G at 15.8 to 150 Hz
Shock		EN 50178, IEC 68-2-27 UPS Drop Test (for Applicable UPS Weights); Storage and Shipping: Maximum 15 G, 11 ms (In Package)
Enclosure Class		IP20
EMC (at default settings)		Category C2, C3, and C4 (Level H): With an Internal RFI Filter Option
Emissions		EMC Level Dependent: +EMC 2: EN 61800-3 (2004)
Analog Input Voltage		0 to 10 V, R = 200 kOhms Differential Resolution 0.1%; Accuracy ±1%, Dip Switch Selection (Voltage/Current)
Overcurrent Protection		Trip Limit 4.0 x IH Instantaneously
Overvoltage Protection		115/230 V Series: 437 VDC; 400 V Series: 874 VDC; 575 V Series: 1048 VDC Trip Level

VSD Series II Variable Speed Micro Drives (Part 2 of 2)

Undervoltage Protection		115/230 V Series: 183 VDC; 400 V Series: 333 VDC; 575 V Series: 460 VDC Trip Level
Earth Fault Protection		Ground fault is tested before every start. In case of ground fault in motor or motor cable, only the frequency converter is protected.
Overtemperature Protection		Yes
Motor Overload Protection		Yes
Motor Stall Protection		Yes
Motor Underload Protection		Yes
Compliance CE		UL Listed File No 508C; cUL Listed, IEC, RoHS Compliant
		CE Mark – Johnson Controls, Inc. declares that the VSD Series II Variable Speed Micro Drives are in compliance with the essential requirements and other relevant provisions of EMC Directive 2004/108/EC and Low Voltage Directive 2006/95/EC.
		Safety – EN 61800-5-1
Warranty		30 months (parts only) from date of shipment
Reliability		500,000 Hours Mean Time Between Failures (MTBF)
Weight	FS1	1.21 lb (0.55 kg)
	FS2	1.54 lb (0.69 kg)
	FS3	2.18 lb (0.99 kg)
Single-Phase Voltage/Horsepower/Amperes	FS1	230 V, 1/4 to 3/4 hp, 0.25 to 0.55 kW, 1.7 to 2.8 A
	FS2	120 V, 1/4 to 1 hp, 0.25 to 0.75 kW, 1.7 to 3.7 A
		230 V, 1 to 2 hp, 0.75 to 1.5 kW, 1.7 to 7 A
	FS3	120 V, 1.5 hp, 1.1 kW, 1.7 to 3.7 A
		230 V, 3 hp, 2.2 kW, 4.8 A
3-Phase Voltage/Horsepower/Amperes	FS1	230 V, 1/4 to 1 hp, 0.25 to 0.75 kW, 1.7 to 3.7 A
		480 V, 1/2 to 1.5 hp, 0.37 to 1.1 kW, 1.3 to 3.3 A
	FS2	230 V, 1.5 to 2 hp, 1.1 to 1.5 kW, 4.8 to 7 A
		480 V, 2 to 3 hp, 1.5 to 2.2 kW, 4.3 to 5.6 A
	FS3	230 V, 3 hp, 2.2 kW, 11 A
		480 V, 3 to 10 hp, 3 to 7.5 kW, 7.6 to 16 A
		575 V, 1 to 7.5 hp, 0.75 to 5.5 kW, 1.7 to 9 A

1. The exception is 115 V single-phase in, 230 V 3-phase out.
2. Frame 2 and Frame 3, 3-phase drives are equipped with a brake chopper circuit.

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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