

VSC & VSA Series III Variable Speed Micro Drives

Product Bulletin

Code No. LIT-12012509

Issued November 2017

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Introduction/Overview

The Johnson Controls® VSC & VSA Series III Variable Speed Micro Drives are both available in either a robust wall mount version (IP66) or a panel mount (IP20) version. The HP range extends to 30HP (480V), enabling design teams in to standardize on a single drive platform for powering and controlling all of their AC induction motors

The integrated disconnect switch option on the IP66 version has the potential to lower installed costs in certain OEM applications (e.g., fan array) by eliminating the need for external branch circuit protection. Additionally, decentralized mounting of the IP66 drive(s) offers the opportunity to reduce the size of the remaining centralized control panel, furthering the potential cost savings.

When centralized mounting of the drive(s) is the preferred design choice, the mechanical design of the IP20 model also delivers panel size reduction opportunities. First, there is the physical compactness of the drive itself. The 5HP is less than 5" wide, and the 15HP is less than 6" wide. Further contributing, is the permissible zero gap side by side mounting, and DIN rail mounting capability (FS1 and FS2). Finally the contractor style wiring minimizes the potential for mis-wiring, while streamlining the panel layout.

The Series III micro drives are selected using standard Johnson Controls order entry tools.

Figure 1: VSC IP166 and IP20



Table 1: Features and Benefits

Features	Benefits
Single phase motor capable (120 & 230V)	Use same drive series in all scheduled motors
Permanent magnet motor capable	Ready for next generation motor technology
Fire or smoke purge mode	Micro is more cost competitive than standard drive
Parameter copy stick with Bluetooth ®	Configures drive quickly with or without a computer
Built-in disconnect switch (optional on IP66)	Enables easy decentralized drive mounting
Dial type potentiometer (optional on IP66)	Quick and simple speed adjustment
DIN rail mounting capability (IP20 FS1 & FS2)	Mounts to panel without hardware reducing cost
Contractor style wiring (top entry/bottom exit)	More compact installation reduces panel size
Built in Modbus RTU® using RJ45	Supports commonly used OEM communication protocol
BACNet ® and Modbus® MS/TP optional on VSA	Adapts to common field communication protocol
VSA series supports 575 V	Uniform solution for all markets
Optional internal RFI filter	Simplify system EMC compliance

Table 2: VSC & VSA Series III Micro Drive Selection Chart

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Physical Features and Dimensions

For the exact schematic of your drive, refer to the *VSC Series III variable speed drives installation manual (LIT-12012386)*. See for VSC dimensions

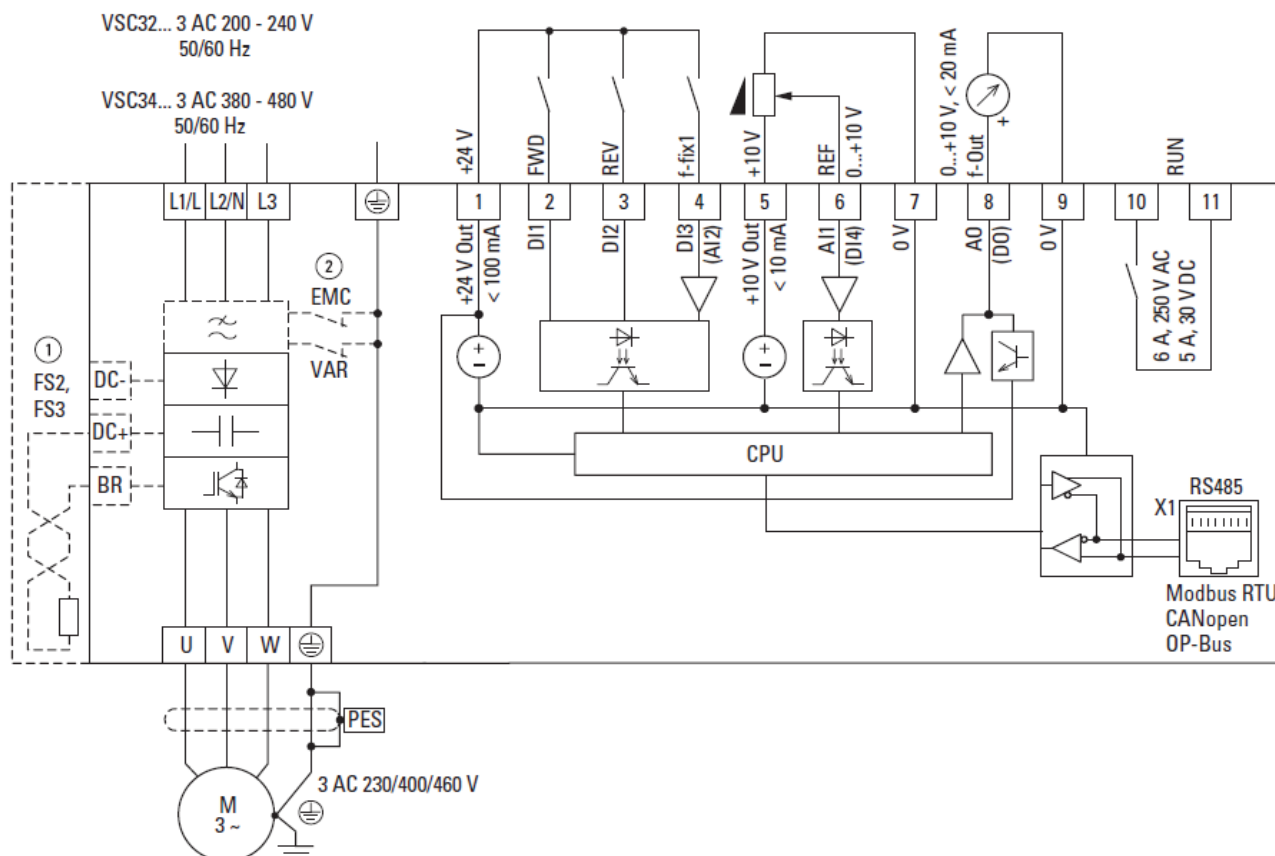


Table 3: VSC Dimensions

Frame Size	IP20				IP66			
	Height in. (mm)	Width in. (mm)	Depth in. (mm)	Weight lbs	Height in. (mm)	Width in. (mm)	Depth in. (mm)	Weight lbs
FS1	7.24 (184)	3.19 (81)	4.88 (124)	2.4	9.13 (232)	6.34 (151)	7.24 (184)	6.17
FS2	9.09 (231)	4.21 (107)	5.98 (152)	5.7	10.12 (257)	7.4 (188)	7.56 (192)	11.02
FS3	10.75 (273)	5.16 (131)	6.89 (175)	8.8	12.2 (310)	8.27 (210)	9.45 (240)	18.08
FS4	16.48 (418.5)	6.81 (173)	8.31 (211)	18.3	--	--	--	--

Power Range

120V in/out*	Limited to 0.5HP
120V in/ 230V 3 ph out	0.5 - 1.5 hP
230 V 1ph in & out*	0.5 -.5 HP
230V 3ph in & out	0.5 - 15 HP
480V	0.5 - 30 HP
575V (VSA only)	1 - 20 HP

*Single phase motor operation suitable for most shaded pole and

Table 4: VSC 110 V input and output - IP20

Code Number	Description	HP	Output A	Frame
VSCS17D0NNA20C	VSC MICRO IP20 120V 1PH IN/120V 1PH OUT 0.5HP, 7A	0.5	7	FS1

Table 5: VSC 110V input and 230V 3 phase output - IP20

Code Number	Description	HP	Output A	Frame
VSC1D2D3NNA20C	VSC MICRO IP20 120V 1PH IN/230V 3PH OUT 0.5HP, 2.3A	0.5	2.3	FS1
VSC1D4D3NNA20C	VSC MICRO IP20 120V 1PH IN/230V 3PH OUT 1HP, 4.3A	1	4.3	FS1
VSC1D5D8NBA20C	VSC MICRO IP20 120V 1PH IN/230V 3PH OUT 1.5HP, 5.8A	1.5	5.8	FS2

Table 6: VSC 230V single phase input and output - IP20

Code Number	Description	HP	Output A	Frame
VSC122D3NNA20C	VSC MICRO IP20 230V 1PH IN/3PH OUT 0.5HP, 2.3A	0.5	2.3	FS1
VSC124D3NNA20C	VSC MICRO IP20 230V 1PH IN/3PH OUT 1HP, 4.3A	1	4.3	FS1
VSC127D0NNA20C	VSC MICRO IP20 230V 1PH IN/3PH OUT 2HP, 7A	2	7	FS1
VSC12011NBA20C	VSC MICRO IP20 230V 1PH IN/3PH OUT 3HP, 10.5A	3	10.5	FS2
VSC12015NBA20C	VSC MICRO IP20 230V 1PH IN/3PH OUT 5HP, 15A	5	15	FS3

Table 7: VSC 230V three phase input and output - IP20

Code Number	Description	HP	Output A	Frame
VSC322D3NNA20C	VSC MICRO IP20 230V 3PH IN/3PH OUT 0.5HP, 2.3A	0.5	2.3	FS1
VSC324D3NNA20C	VSC MICRO IP20 230V 3PH IN/3PH OUT 1HP, 4.3A	1	4.3	FS1
VSC327D0NNA20C	VSC MICRO IP20 230V 3PH IN/3PH OUT 2HP, 7A	2	7	FS1
VSC32011NBA20C	VSC MICRO IP20 230V 3PH IN/3PH OUT 3HP, 10.5A	3	10.5	FS2
VSC32018NBA20C	VSC MICRO IP20 230V 3PH IN/3PH OUT 5HP, 18A	5	18	FS2
VSC32024NBA20C	VSC MICRO IP20 230V 3PH IN/3PH OUT 7.5HP, 24A	7.5	24	FS3
VSC32030NBA20C	VSC MICRO IP20 230V 3PH IN/3PH OUT 10HP, 30A	10	30	FS4
VSC32046NBA20C	VSC MICRO IP20 230V 3PH IN/3PH OUT 15HP, 46A	15	46	FS4

permanent split capacitor motors. Motors with both a start and a run capacitor are not compatible with the VSA and VSC.

Ordering information

VSC and VSA Product Selection - IP20

Optional RFI filter available for most configurations. Contact your nearest Johnson Controls, Inc. sales representative for availability.

Table 8: VSC 480V - IP20

Code Number	Description	HP	Output A	Frame
VSC342D2NNA20C	VSC MICRO IP20 480V IN/460V OUT 1HP, 2.2A	1	2.2	FS1
VSC344D1NNA20C	VSC MICRO IP20 480V IN/460V OUT 2HP, 4.1A	2	4.1	FS1
VSC345D8NBA20C	VSC MICRO IP20 480V IN/460V OUT 3HP, 5.8A	3	5.8	FS2
VSC349D5NBA20C	VSC MICRO IP20 480V IN/460V OUT 5HP, 9.5A	5	9.5	FS2
VSC34014NBA20C	VSC MICRO IP20 480V IN/460V OUT 7.5HP, 14A	7.5	14	FS3
VSC34018NBA20C	VSC MICRO IP20 480V IN/460V OUT 10HP, 18A	10	18	FS3
VSC34024NBA20C	VSC MICRO IP20 480V IN/460V OUT 15HP, 24A	15	24	FS3
VSC34030NBA20C	VSC MICRO IP20 480V IN/460V OUT 20HP, 30A	20	30	FS4
VSC34039NBA20C	VSC MICRO IP20 480V IN/460V OUT 25HP, 39A	25	39	FS4
VSC34046NBA20C	VSC MICRO IP20 480V IN/460V OUT 30HP, 46A	30	46	FS4

Table 9: VSA 575V - IP20

Code Number	Description	HP	Output A	Frame
VSA352D1NBA20C	VSA MICRO IP20 575V 2.1A 1HP COATED CIRCUIT BOARD	1	2.1	FS2
VSA353D1NBA20C	VSA MICRO IP20 575V 3.1A 2HP COATED CIRCUIT BOARD	2	3.1	FS2
VSA354D1NBA20C	VSA MICRO IP20 575V 4.1A 3HP COATED CIRCUIT BOARD	3	4.1	FS2
VSA356D5NBA20C	VSA MICRO IP20 575V 6.5A 5HP COATED CIRCUIT BOARD	5	6.5	FS2
VSA359D0NBA20C	VSA MICRO IP20 575V 9A 7.5HP COATED CIRCUIT BOARD	7.5	9.0	FS2
VSA35012NBA20C	VSA MICRO IP20 575V 12A 10HP COATED CIRCUIT BOARD	10	12.0	FS3
VSA35017NBA20C	VSA MICRO IP20 575V 17A 15HP COATED CIRCUIT BOARD	15	17.0	FS3
VSA35022NBA20C	VSA MICRO IP20 575V 22A 20HP COATED CIRCUIT BOARD	20	22.0	FS2

VSC and VSA Product Selection - IP66

Models with disconnect (shown below) also include the built in pontentiometer. Optional RFI filters are available for most configurations. Contact your nearest Johnson Controls, Inc. sales representative for availability of models not shown.

Table 10: VSC 110 V input and output - IP20

Code Number	Description	HP	Output A	Frame
VSCS17D0NNA6SC	VSC MICRO IP66 120V 1PH IN/120V 1PH OUT 0.5HP, 7A DISCONNECT	0.5	7	FS1

Table 11: VSC 110V input and 230V 3 phase output - IP20

Code Number	Description	HP	Output A	Frame
VSC1D2D3NNA6SC	VSC MICRO IP66 120V 1PH IN/230V 3PH OUT 0.5HP, 2.3A DISCONNECT	0.5	2.3	FS1
VSC1D4D3NNA6SC	VSC MICRO IP66 120V 1PH IN/230V 3PH OUT 1HP, 4.3A DISCONNECT	1	4.3	FS1
VSC1D5D8NBA6SC	VSC MICRO IP66 120V 1PH IN/230V 3PH OUT 1.5HP, 5.8A DISCONNECT	1.5	5.8	FS2

Table 12: VSC 230V single phase input and output - IP20

Code Number	Description	HP	Output A	Frame
VSC122D3NNA6SC	VSC MICRO IP66 230V 1PH IN/3PH OUT 0.5HP, 2.3A DISCONNECT	0.5	2.3	FS1
VSC124D3NNA6SC	VSC MICRO IP66 230V 1PH IN/3PH OUT 1HP, 4.3A DISCONNECT	1	4.3	FS1
VSC127D0NNA6SC	VSC MICRO IP66 230V 1PH IN/3PH OUT 2HP, 7A DISCONNECT	2	7	FS2

Table 13: VSC 230V three phase input and output - IP20

Code Number	Description	HP	Output A	Frame
VSC322D3NNA6SC	VSC MICRO IP66 230V 3PH IN/3PH OUT 0.5HP, 2.3A DISCONNECT	0.5	2.3	FS1
VSC324D3NNA6SC	VSC MICRO IP66 230V 3PH IN/3PH OUT 1HP, 4.3A DISCONNECT	1	4.3	FS1
VSC327D0NNA6SC	VSC MICRO IP66 230V 3PH IN/3PH OUT 2HP, 7A DISCONNECT	2	7	FS1
VSC32011NBA6SC	VSC MICRO IP66 230V 3PH IN/3PH OUT 3HP, 10.5A DISCONNECT	3	10.5	FS2
VSC32018NBA6SC	VSC MICRO IP66 230V 3PH IN/3PH OUT 5HP, 18A DISCONNECT	5	18	FS2

Table 14: VSC 480V - IP20

Code Number	Description	HP	Output A	Frame
VSC342D2NNA6SC	VSC MICRO IP66 480V IN/460V OUT 1HP, 2.2A DISCONNECT	1	2.2	FS1
VSC344D1NBA6SC	VSC MICRO IP66 480V IN/460V OUT 2HP, 4.1A DISCONNECT	2	4.1	FS1
VSC344D1NNA6SC	VSC MICRO IP66 480V IN/460V OUT 2HP, 4.1A DISCONNECT	3	5.8	FS2
VSC345D8NBA6SC	VSC MICRO IP66 480V IN/460V OUT 3HP, 5.8A DISCONNECT	5	9.5	FS2
VSC349D5NBA6SC	VSC MICRO IP66 480V IN/460V OUT 5HP, 9.5A DISCONNECT	7.5	14	FS3
VSC34014NBA6SC	VSC MICRO IP66 480V IN/460V OUT 7.5HP, 14A DISCONNECT	10	18	FS3
VSC34018NBA6SC	VSC MICRO IP66 480V IN/460V OUT 10HP, 18A DISCONNECT	15	24	FS3

Table 15: VSA 575V - IP20

Code Number	Description	HP	Output A	Frame
VSA352D1NBB6SC	VSA MICRO IP66 575V 2.1A 1HP COATED CIRCUIT BOARD, DISCONNECT	1	2.1	FS2
VSA353D1NBB6SC	VSA MICRO IP66 575V 3.1A 2HP COATED CIRCUIT BOARD, DISCONNECT	2	3.1	FS2
VSA354D1NBB6SC	VSA MICRO IP66 575V 4.1A 3HP COATED CIRCUIT BOARD, DISCONNECT	3	4.1	FS2

Table 15: VSA 575V - IP20

Code Number	Description	HP	Output A	Frame
VSA356D5NBB6SC	VSA MICRO IP66 575V 6.5A 5HP COATED CIRCUIT BOARD, DISCONNECT	5	6.5	FS2
VSA359D0NBB6SC	VSA MICRO IP66 575V 9A 7.5HP COATED CIRCUIT BOARD, DISCONNECT	7.5	9.0	FS2
VSA35012NBB6SC	VSA MICRO IP66 575V 12A 10HP COATED CIRCUIT BOARD, DISCONNECT	10	12.0	FS3
VSA35017NBB6SC	VSA MICRO IP66 575V 17A 15HP COATED CIRCUIT BOARD, DISCONNECT	15	17.0	FS3

Accessories

Table 16: VSC demo case

Code Number	Description
VSC-DEMO	VSC ADVANCED, DEMO CASE

Table 17: Software and cables

Code Number	Description
DX-CBL-PC-3M0	VSC, VSA PROGRAMMING CABLE (USB TO KEYPAD)
DX-CBL-J45-0M5	RS485 DATA CABLE, RJ45, 0.5M
DX-CBL-J45-1M0	RS485 DATA CABLE, RJ45, 1.0M
DX-CBL-J45-3M0	RS485 DATA CABLE, RJ45, 3.0M
DX-SPL-J45-2SL1PL	RS485 DATA CABLE SPLITTER, RJ45, (1 CONNECTOR TO 2 SOCKET)
DX-SPL-J45-3SL	RS485 3 WAY DATA CABLE SPLITTER, RJ45
DX-CBL-TEM	RJ45 TERMINATION PLUG CANOPEN/MODBUS
DX-COM-PCKIT	USB PC CONNECTION KIT
DX-COM-SOFT	DRIVESCONNECT PLC LICENSE

Table 18: Parameter USB stick and keypads

Code Number	Description
DX-COM-STICK	BLUETOOTH COPY PASTE STICK
DX-KEY-LE	LED REMOTE KEYPAD
DX-KEY-OLE	OLED REMOTE KEYPAD

Table 19: VSA Communication Options

Code Number	Description
DX-NET-BACNETIP-2	BACNET PLUG-IN INTERFACE MODULE
DX-NET-ETHERNET-2	ETHERNET IP PLUG-IN INTERFACE MODULE
DX-NET-MOBUSTCP-2	MODBUS TCP PLUG-IN INTERFACE MODULE

Table 20: VSA Expanded I/O Options

Code Number	Description
DXA-EXT-3I1O	EXTERNAL I/O - 3 DIGITAL INPUTS AND 1 RELAY OUTPUT
DXA-EXT-3O	3 RELAY OUTPUT CARD
DXC-EXT-IO110	110V LOGIC Micro INPUT CARD
DXC-EXT-IO230	230V LOGIC Micro INPUT CARD
DXC-EXT-LOCSIM	LOCAL CONTROL/TEST OPTION CARD

Table 20: VSA Expanded I/O Options

Code Number	Description
DXC-EXT-20	DUAL RELAY OUTPUT CARD
DXC-EXT-201AO	DUAL RELAY OUTPUT, 1 ANALOG OUTPUT CARD

Technical Specifications

Description	Specification
Input Voltage (Vin)	110-115V, 200-240V, 380-480V, $\pm 10\%$
Input Frequency	48-68 Hz, $\pm 10\%$
Connection to mains	Once per minute or less
Current withstand rating	100k AIC with Type 1 fuses
Continuous output current	Ambient temperature range -10
Output frequency	0-500 Hz (standard)
Frequency Resolution	0.1 Hz
Switching frequency	4-32 kHzx
Frequency reference analog input	Resolution 0.1% (12-bit), accuracy +1%
Acceleration / Deceleration time	0-600s
Ambient operating temperature	IL: 10°C (no forst) to 40°C, up to 50°C with derating
Storage temperature	-40°C to 70°C
Relative humidity	0-95% RH, non-condensing, non-corrosive
Altitude	100% load capacity (no derating) up to 3280 ft (1000m); 1% derating for each 328 ft (100m) above 3280 ft (1000m). Maximum altitude is 13,123 ft (4000m)
EMC Immunity (at default settings)	EMC Category C1, C2 and C3 at default settings (1 m, 5 m, 25 m)
Analog Input Voltage/ Current	0 to 10 V, 0 (4)-20mA (Voltage/Current set by Parameter P16)
Digital Inputs	Up to 3, limited to 2 if using 2 analog outputs; 18 to 30 VDC
Auxiliary Voltage	24 V $\pm 5\%$, Maximum 100 mA
Output Reference Voltage	10 V +3%, Maximum Load 20 mA
Analog Output	0 to 10 V; Resolution 10 bit; Accuracy $\pm 1\%$, Function set by Parameter 25
Relay Outputs	1 Programmable, Switching Capacity: 30 VDC/5 A, 250 VAC/6 A
Protections	Over voltage, under voltage, earth fault, over current, over temperature, motor overload, motor Stall, motor underload
Compliance	UL Listed File No 508C; cUL Listed
	EN 61800-3 installation possible with optional RFI filter
	CE Mark – Johnson Controls, Inc., declares that the VSC & VSA Series III Variable Speed Drives are in compliance with the essential requirements and other relevant provisions of EMC Directive 2004/EC



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