

SmartVFD HVAC

SPECIFICATION DATA



FEATURES

- **Start-up Wizards**—All you have to do is tell the VFD whether you have a pump or a fan, enter nominal motor information, and you are up and running
- **Graphic Interface**—The easy-to-use keypad and interface deliver menu-driven programming and monitoring for fast, uniform commissioning. It's also easy for the building owner or manager to learn and use, helping to reduce service calls. Plus, a manual is built into the keypad for easy access when needed.
- **Built-In Communications**—With BACnet®, N2 and Modbus built in, your customers will enjoy a lower total installed cost and reliable communications with the building management system.
- **PC Software Wizards**—Commissioning, programming and troubleshooting are all a snap thanks to these guided Startup and PID wizards.
- **Built-In PLC**—Another reason why SmartVFD HVAC is a great value for your customers, the built-in PLC eliminates the need for an expensive external controller.
- **DC Choke for harmonic protection**—5% impedance.
- **Standard RFI Filter**—Ensures that EMC/RFI requirements are met.
- **Bypass Options**—Meet specifications and system critical applications with a comprehensive bypass offering.
- **Real-Time Clock**—Battery included.
- **Fire Mode** for safe operation.
- **Motor Switch Ride-Through**—Easy, fault-free maintenance.
- **Enclosure classes NEMA 1 and NEMA 12.**
- **EMC harmonics: EN 61000-3-12 compliant.**
- **EMC radio frequencies: EN 61800-3 Category C2 built in.** Complies with radiated and conducted emissions.
- **RoHS compliant, no electrolytic capacitors, no lead in the circuit boards.**
- **Intelligent cooling arrangement.** Control and power airflow separated.

APPLICATION

The SmartVFD HVAC is a variable frequency drive designed for use in HVAC applications. The SmartVFD HVAC is designed to control the speed of HVAC pumps and fans in order to maximize energy efficiency.

The SmartVFD is easy to install, communicates effectively with building control systems to minimize energy consumption.

The SmartVFD BYPASS is easy to specify, select, install and commission. It is the perfect complement to the advanced capabilities of the SmartVFD HVAC. The SmartVFD BYPASS configurations make it easy for you to select the right bypass to complete your drive package. All configuration are available in NEMA 1, NEMA 12 and ventilated NEMA 3R.



Table 1. General.

Communication	RS485	Standard: Modbus™ RTU, BACnet, N2
	Ethernet	Standard: Modbus/TCP, BACnet/IP
Software features	Energy-saving functions	<ul style="list-style-type: none"> • Real-time clock for timed functions • Energy monitor for kWh monitoring • Sleep function to minimize downtime energy
	Protections	<ul style="list-style-type: none"> • Overload and underload protections (e.g. broken fan and dry pump) • Motor thermal protection • Missing phase detection • Automatic reset to avoid interruption of the process
Process control	2 * PID	For process control
	Multipump	For replacing the pump controller
	Flying start	For tripless catching of spinning fan
Human interfaces	Keypad	Graphical display with built-in manual and wizards.
	PC Tools	<ul style="list-style-type: none"> • PC Commissioning Tool for easy commissioning, monitoring, and troubleshooting. • Energy Savings calculator to estimate cost avoidance. • Product selection tool for selecting VFD and bypass, and creating submittal documents.

Table 2. SmartVFD HVAC Technical Specifications.

Mains connection	Input voltage U_{in}	380...480V; -10%...+10%
	Input frequency	47...66 Hz
	Connection to mains	Once per minute or less
	Starting delay	2 s (MR4 to MR6); 6 s (MR7)
Motor connection	Output voltage	$0-U_{in}$
	Continuous output current	I_L : Ambient temperature max. +104°F, overload $1.1 \times I_L$ (1 min./10 min.)
	Starting current	I_S for 2 s every 20 s
	Output frequency	0...320 Hz (standard)
	Frequency resolution	0.01 Hz
Control characteristics	Switching frequency (see parameter 3.2.1.9)	1.5...10 kHz; Defaults: 6 kHz (MR4-6), 4 kHz (MR7) Automatic switching frequency derating in case of overheating.
	Frequency reference Analogue input Panel reference	Resolution 0.1% (10-bit), accuracy $\pm 1\%$ Resolution 0.01 Hz
	Field weakening point	8...320 Hz
	Acceleration time	0.1...3000 sec
	Deceleration time	0.1...3000 sec

Table 2. SmartVFD HVAC Technical Specifications. (Continued)

Ambient conditions	Ambient operating temperature	MR4-MR7: I _L : 14°F (no frost)...+104°F
	Storage temperature	-40°F...+158°F
	Relative humidity	0 to 95% RH, non-condensing, non-corrosive
	Air quality: chemical vapors mechanical particles	IEC 60721-3-3, unit in operation, class 3C2 IEC 60721-3-3, unit in operation, class 3S2
	Altitude	100% load capacity (no derating) up to 3,280ft. 1-% derating for each 328ft. above 3,280ft. Max. altitudes: 380...480V : 9,842ft. (TN and IT systems)
	Vibration EN61800-5-1/ EN60068-2-6	5...150 Hz Displacement amplitude 1 mm (peak) at 5...15.8 Hz (MR4...MR9) Max acceleration amplitude 1 G at 15.8...150 Hz (MR4...MR9)
	Shock EN61800-5-1 EN60068-2-27	UPS Drop Test (for applicable UPS weights) Storage and shipping: max 15 G, 11 ms (in package)
	Enclosure class	IP21/NEMA 1 standard in entire kW/HP range IP54/NEMA12 option Note: Keypad required for IP54/NEMA12
EMC (at default settings)	Immunity	Fulfils EN61800-3 (2004), first and second environment
	Emissions	Depend on EMC level. +EMC2: EN61800-3 (2004), Category C2 Honeywell Smart VFD HVAC will be delivered with class C2 EMC filtering, if not otherwise specified. Honeywell Smart VFD HVAC can be modified for IT-networks.
Safety		EN 61800-5-1 (2007), CE, cUL; (see unit nameplate for more detailed approvals)
Protections	Overvoltage trip limit	Yes
	Undervoltage trip limit	Yes
	Ground fault protection	In case of ground fault in motor or motor cable, only the drive is protected.
	Mains supervision	Yes
	Motor phase supervision	Trips if any of the output phases is missing.
	Overcurrent protection	Yes
	Unit overtemperature protection	Yes
	Motor overload protection	Yes
	Motor stall protection	Yes
	Motor underload protection	Yes
Short-circuit protection of +24V and +10V reference voltages	Yes	

Table 3. Product Nomenclature.

HVFDSD	3	C	0100	G	1	0	0
							<p>Options 0 = Drive Only or No Special Options 1 = Auto-Bypass 2 = Auto-Bypass and HOA</p>
							<p>Contactors 0 = Drive Only 1 = Disconnect Only 2 = Two Contactor Bypass 3 = Three Contactor Bypass</p>
							<p>Enclosure Type 1 = NEMA 1 2 = NEMA 12 3 = NEMA 3R</p>
							<p>Interface T = Text KeyPad G = Graphic KeyPad</p>
							<p>Nominal Horsepower 0007 = .75 Horse Power 0010 = 1 Horse Power 0100 = 10 Horse Power</p>
							<p>Nominal Voltage A = 208/230 Vac Drive Alone, 208 Vac Bypass B = 230 Vac Bypass C = 480 Vac D = 575 Vac</p>
							<p>Input Phase 3 = Three Phase (3~in, 3~out)</p>
<p>Product Family HVFDSD = Honeywell SmartVFD HVAC HVFDSB = Honeywell SmartVFD BYPASS</p>							

Table 4. VFD Only, 460 VAC.

NEMA 1	NEMA 12	HP	Frame Size	Current (A)	Overall Dimensions			
					Width (in.)	Height (in.)	Depth (in.)	Weight (lb)
HVFDSD3C0015G100	HVFDSD3C0015G200	1.5	MR4	3.4	5	12.9	7.5	13.2
HVFDSD3C0020G100	HVFDSD3C0020G200	2	MR4	4.8	5	12.9	7.5	13.2
HVFDSD3C0030G100	HVFDSD3C0030G200	3	MR4	5.6	5	12.9	7.5	13.2
HVFDSD3C0050G100	HVFDSD3C0050G200	5	MR4	8	5	12.9	7.5	13.2
HVFDSD3C0075G100	HVFDSD3C0075G200	7.5	MR4	12	5	12.9	7.5	13.2
HVFDSD3C0100G100	HVFDSD3C0100G200	10	MR5	16	5.7	16.5	8.4	22
HVFDSD3C0150G100	HVFDSD3C0150G200	15	MR5	23	5.7	16.5	8.4	22
HVFDSD3C0200G100	HVFDSD3C0200G200	20	MR5	31	5.7	16.5	8.4	22
HVFDSD3C0250G100	HVFDSD3C0250G200	25	MR6	38	7.7	21.9	9	44.1
HVFDSD3C0300G100	HVFDSD3C0300G200	30	MR6	46	7.7	21.9	9	44.1
HVFDSD3C0400G100	HVFDSD3C0400G200	40	MR6	61	7.7	21.9	9	44.1

Table 5. NEMA 1 VFD and 3-Contactor Bypass with Fused Disconnect, 460 VAC.

3-Contactor BYPASS w/ Fused Disconnect	HP	Frame Size	Current (A)	Overall Dimensions			
				Width (in.)	Height (in.)	Depth (in.)	Weight (lb)
HVFDSB3C0015G13_	1.5	MR4	3.4	8.9	38.7	10.7	44
HVFDSB3C0020G13_	2	MR4	4.8	8.9	38.7	10.7	44
HVFDSB3C0030G13_	3	MR4	5.6	8.9	38.7	10.7	44
HVFDSB3C0050G13_	5	MR4	8	8.9	38.7	10.7	44
HVFDSB3C0075G13_	7.5	MR4	12	8.9	38.7	10.7	44
HVFDSB3C0100G13_	10	MR5	16	8.9	41.5	10.7	55
HVFDSB3C0150G13_	15	MR5	23	8.9	41.5	10.7	55
HVFDSB3C0200G13_	20	MR5	31	8.9	41.5	10.7	55
HVFDSB3C0250G13_	25	MR6	38	12.4	55	12.6	96
HVFDSB3C0300G13_	30	MR6	46	12.4	55	12.6	96
HVFDSB3C0400G13_	40	MR6	61	12.4	55	12.6	96

Table 6. NEMA 1 VFD and 2-Contactor Bypass or Fused Disconnect, 460 VAC.

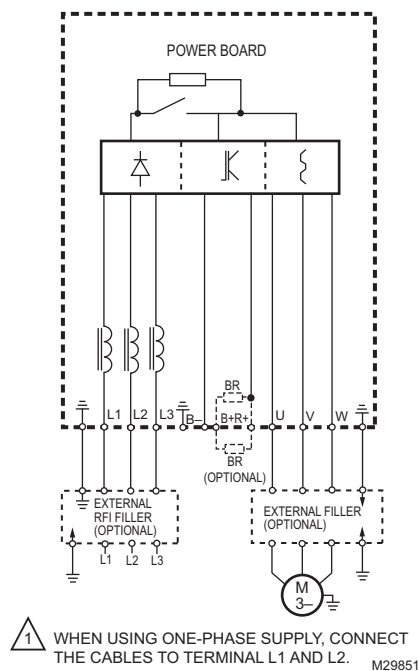
Disconnect Only No Bypass	2-Contactor Bypass No Disconnect	HP	Frame Size	Current (A)	Overall Dimensions			
					Width (in.)	Height (in.)	Depth (in.)	Weight (lb)
HVFDSB3C0015G11_	HVFDSB3C0015G12_	1.5	MR4	3.4	8.9	31.7	10.7	38
HVFDSB3C0020G11_	HVFDSB3C0020G12_	2	MR4	4.8	8.9	31.7	10.7	38
HVFDSB3C0030G11_	HVFDSB3C0030G12_	3	MR4	5.6	8.9	31.7	10.7	38
HVFDSB3C0050G11_	HVFDSB3C0050G12_	5	MR4	8	8.9	31.7	10.7	38
HVFDSB3C0075G11_	HVFDSB3C0075G12_	7.5	MR4	12	8.9	31.7	10.7	38
HVFDSB3C0100G11_	HVFDSB3C0100G12_	10	MR5	16	8.9	34.5	10.7	48
HVFDSB3C0150G11_	HVFDSB3C0150G12_	15	MR5	23	8.9	34.5	10.7	48
HVFDSB3C0200G11_	HVFDSB3C0200G12_	20	MR5	31	8.9	34.5	10.7	48
HVFDSB3C0250G11_	HVFDSB3C0250G12_	25	MR6	38	12.4	45	12.6	85
HVFDSB3C0300G11_	HVFDSB3C0300G12_	30	MR6	46	12.4	45	12.6	85
HVFDSB3C0400G11_	HVFDSB3C0400G12_	40	MR6	61	12.4	45	12.6	85

Table 7. I/O Connections.

Basic I/O Board		
Terminal		Signal
1	+10	Reference output
2	AI1+	Analogue input, voltage or current
3	AI1-	Analogue input common (current)
4	AI2+	Analogue input, voltage or current
5	AI2-	Analogue input common (current)
6	24	24 V aux. voltage
7	GND	I/O ground
8	DI1	Digital input 1
9	DI2	Digital input 2
10	DI3	Digital input 3
11	CM	Common A for DI1-DI6
12	24	24 V aux. voltage
13	GND	I/O ground
14	DI4	Digital input 4
15	DI5	Digital input 5
16	DI6	Digital input 6
17	CM	Common A for DI1-DI6
18	AO1+	Analogue signal (+output)
19	AO-/GND	Analogue output common
30	+24	24 V auxiliary input voltage
A	RS485	Differential receiver/transmitter
B	RS485	Differential receiver/transmitter

Table 8. I/O Connections, Relay Board 1.

Relay Board 1		
Terminal		Signal
21	RO1/1	Relay output 1
22	RO1/2	
23	RO1/3	
24	RO2/1	Relay output 2
25	RO2/2	
26	RO2/3	
32	RO3/1	Relay output 3
33	RO3/2 NO	



1 WHEN USING ONE-PHASE SUPPLY, CONNECT THE CABLES TO TERMINAL L1 AND L2. M29851

Fig. 1. Typical Line Wiring of SmartVFD.

SmartVFD BYPASS Features

The Smart VFD BYPASS is available in 5 configurations as explained below. All configurations are available in NEMA 1, NEMA 12 and ventilated NEMA 3R.

SmartVFD Disconnect:

Fused Disconnect with no bypass

SmartVFD 2-Contactor:

Provides an economical means of bypassing the VFD.

- No Main Disconnect
- Freeze/Fire/Smoke Interlock

SmartVFD 3-Contactor:

Commission, service or replace the VFD without affecting the operation of the motor. Provide additional bypass control capabilities with Auto-bypass and HOA options.

- Fused Disconnect
- Freeze/Fire/Smoke Interlock

- VFD can be isolated from power with motor running in BYPASS mode
- TEST position powers the VFD without sending power to the motor

SmartVFD 3-Contactor Options:

AUTO-BYPASS

- Any VFD fault will automatically send the bypass to BYPASS mode
- A contact closure sends the bypass to BYPASS mode
- Dry contacts indicate when the bypass is in BYPASS mode, alerting the building management system

AUTO-BYPASS AND HOA (HAND-OFF-AUTO)

- Auto-bypass functions above
- Potentiometer on front of bypass panel allows "Hand" control of the VFD

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63-4520-01 M.S. 01-10
Printed in U.S.A.

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