



SED2 VFD NEMA Type 3R Bypass

Description

The NEMA Type 3R Bypasses are companion packages for the family of SED2 Variable Frequency Drives. NEMA Type 3R enclosed bypasses are manufactured for outdoor locations that are not in direct sunlight. The 3R rating provides a degree of protection to the enclosed SED2 VFD and electrical control components. A heater is supplied to protect against condensation. The standard package is rated to 104°F (40°C). A high temperature package, rated to 122°F (50°C), is available.

The SED2 is designed specifically for HVAC applications and supports a variety of digital and analog I/O and provides built-in PID features to control pumps and fans. For information on the family of SED2 VFDs, see the *SED2 Variable Frequency Drives Submittal Sheet* (154-042).



Product Numbers

Your Product Number			V	B	A				3				X				
Example Product Number			V	B	A	4	4	0	.	D	3	2	0	X	H	T	1
Model(s)																	
VB			Vfd with Bypass														
Series																	
A			Conventional Bypass (Standard)														
Voltage																	
1			208 V *														
2			230 to 240 V *														
3			380 to 480 V *														
4			500 to 600 V														
HP rating																	
0.5, 0.7, 1.0, 1.5, 2.0, 3.0, 4.0, 5.0, 7.5, 10, 15, 20, 25, 30, 40, 50, 60, 75, 100, 125																	
Disconnect																	
D			Disconnect														
F			Fused Disconnect														
NEMA rating																	
3			NEMA Type 3R														
Contactor																	
0			None														
2			2 Contactors														
3			3 Contactors														
Reactor																	
0			None														
3			Line Reactor														
L			Load Reactor														
Filter																	
X			No Filter														
Options																	
HT1			High Temperature rating (NEMA 3R only) **														

* 208 Vac and 230/240 Vac to 3 hp are all HT1; 480 Vac to 5 hp are all HT1.

** HT1 (122°F, 50°C) not available for all ratings.

Features

Bypass Power

- 2-Contactor: Output and Bypass
 - Overload protection in bypass mode.
 - Step-down transformer with fused primary and secondary.
 - Contactors electrically and mechanically interlocked.
- 3-Contactor (optional): Input, Output, and Bypass
In addition to the 2-contactor features, 3-contactor features provide:
 - Drive test function.
 - Complete electrical isolation of drive.
- Input Device
 - Disconnect switch.
 - Fused disconnect (optional).
 - All doors are interlocked and padlockable.
- Reactor Options
 - Line reactor mounted in bypass enclosure.
 - Line reactor supplied separately (in NEMA Type 3R enclosure).
 - Load reactor (in NEMA Type 3R enclosure) supplied separately.

Bypass Control

- Auto Bypass
 - Relay logic allows user to send the motor to bypass mode based on the drive's programmable relay.
- Enable Input
 - Generally used for safety tie-ins; the motor will not operate the drive or bypass when open.
- Common Remote Start/Stop
 - Can be used in both drive and bypass mode.
- Essential Services Mode
 - Typically used for smoke purge; the motor goes to bypass regardless of the selected mode.
 - No call to stop will have an effect, including open safety or stop commands.
 - Only turning the power off or opening this contact will stop the motor.

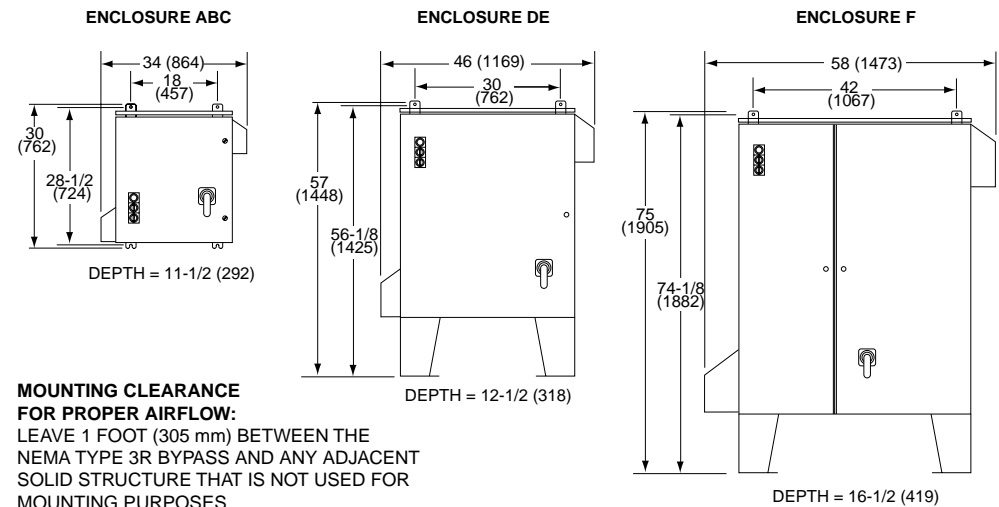
Bypass – Door Mounted Control Devices

- 2-Contactor Units
 - Drive-Off-Bypass selector
 - Bypass pilot light
- 3-Contactor Units
 - Drive-Off-Bypass selector
 - Bypass pilot light
 - Drive Test On-Off selector

Accessories

- SED2 NEMA Type 3R VFD & Bypass EMC Filter Assembly for Enclosure Size ABC, PN 994-830
- SED2 NEMA Type 3R VFD & Bypass EMC Filter Assembly for Enclosure Size DEF, PN 994-831
- NEMA Type 3R Reactor Enclosure, Small, PN 994-816
- NEMA Type 3R Reactor Enclosure, Medium, PN 994-817
- NEMA Type 3R Reactor Enclosure, Large, PN 994-818
- Floor Mounting Kit, PN 994-809

Dimensions



LEAVE 3 FEET (914 mm) BETWEEN THE NEMA TYPE 3R BYPASS AND ANY OTHER NEMA TYPE 3R BYPASS OR VFD.

Enclosure Size	Wt. Lb (kg)
ABC	130 (59)
DE	300 (136)
F	550 (249)

NOTE: Actual weight will be affected by actual horsepower/ voltage and selected power options.

Table 1. NEMA Type 3R Bypass Non-HT1 Enclosure Sizes and Power Ranges.

HP	.5	.7	1	1.5	2	3	4	5	7.5	10	15	20	25	30	40	50	60	75	100	125
kW	.37	.5	.75	1.1	1.5	2.2	3	4	5.5	7.5	11	15	19	22	30	37	45	55	75	90
208/ 230V	(Rated as HT1, High Temperature package)							ABC			DE			F			N/A			
480V	(Rated as HT1, High Temperature package)							ABC			DE			F						
575V	ABC												DE			F				

Table 2. NEMA Type 3R Bypass HT1 Enclosure Sizes and Power Ranges.

HP	.5	.7	1	1.5	2	3	4	5	7.5	10	15	20	25	30	40	50	60	75	100	125
kW	.37	.5	.75	1.1	1.5	2.2	3	4	5.5	7.5	11	15	19	22	30	37	45	55	75	90
208/ 230V	ABC								DE					F		N/A				
480V	ABC												DE			F			N/A	
575V	ABC										DE					F		N/A		

Table 3. Bypass Output Current Ratings (Amps)—Per NEC Motor Tables.

HP	.5	.75	1	1.5	2	3	5	7.5	10	15	20	25	30	40	50	60	75	100	125
208V	2.3	3.0	3.9	5.5	7.4	10.4	16.7	22	28	42	54	68	80	104	130	154	—	—	—
230V	2.2	3.0	3.9	5.5	6.8	9.6	15.2	22	28	42	54	68	80	104	130	154	—	—	—
460V	1.1	1.6	2.1	3.0	3.4	4.8	7.6	11	14	21	27	34	40	52	65	77	96	124	156
575V	.9	1.3	1.4	2.1	2.7	3.9	6.1	9	11	17	22	27	32	41	52	62	77	99	125

NOTE: Drives are current rated devices. Verify that the listed ratings are \geq the motor full load current rating.

Typical Specifications

SED2 Bypasses shall send the motor to bypass mode based on an easily accessible door-mounted selector or based on the drive's programmable relay. A bypass pilot light shall provide indication of the bypass mode.

The bypass mode shall provide overload protection. Contactors shall be electrically and mechanically interlocked. An essential services mode shall send the motor to bypass regardless of the selected mode.

Wiring Diagrams

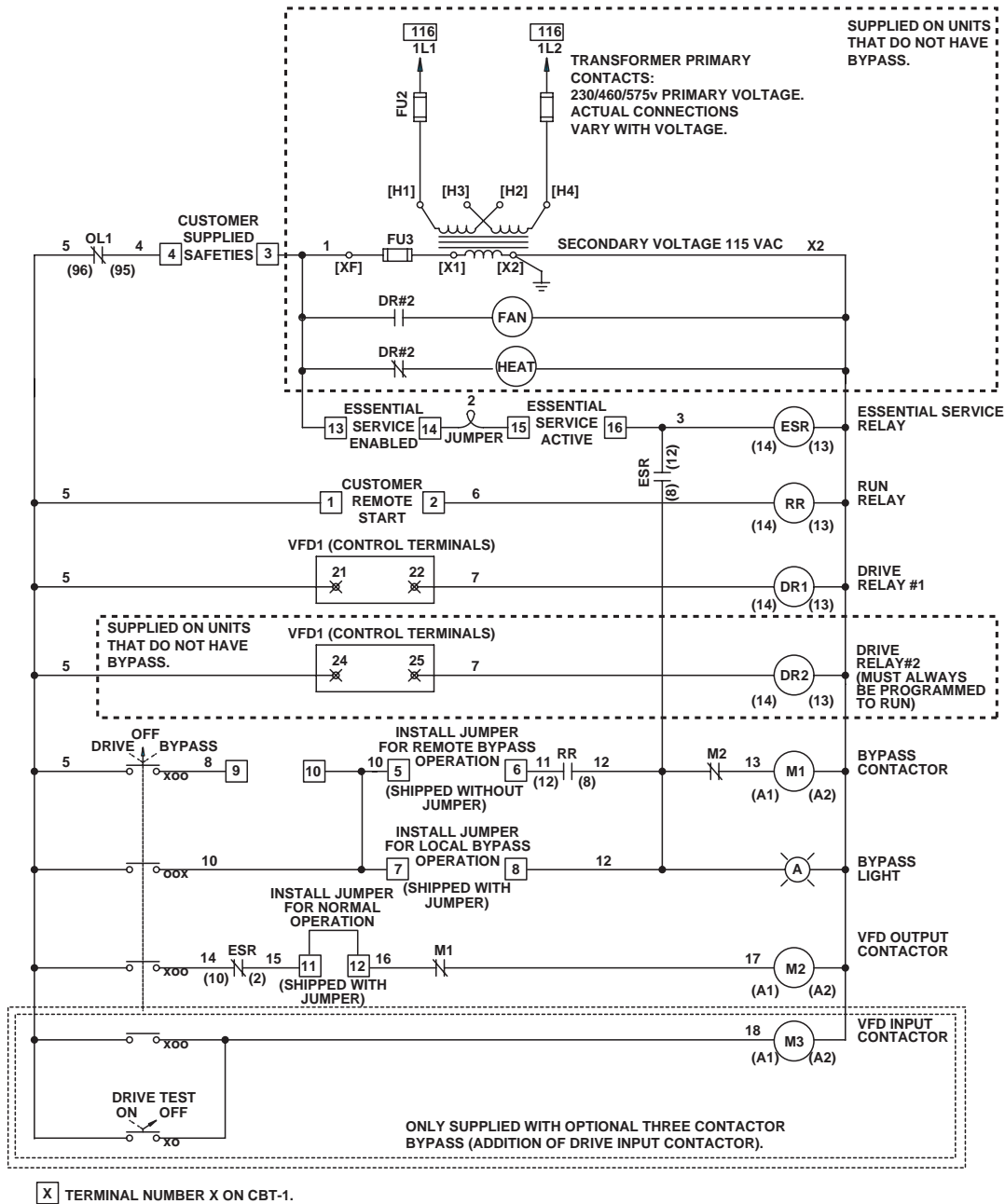


Figure 1. NEMA Type 3R Bypass 120 Vac Control Circuit.

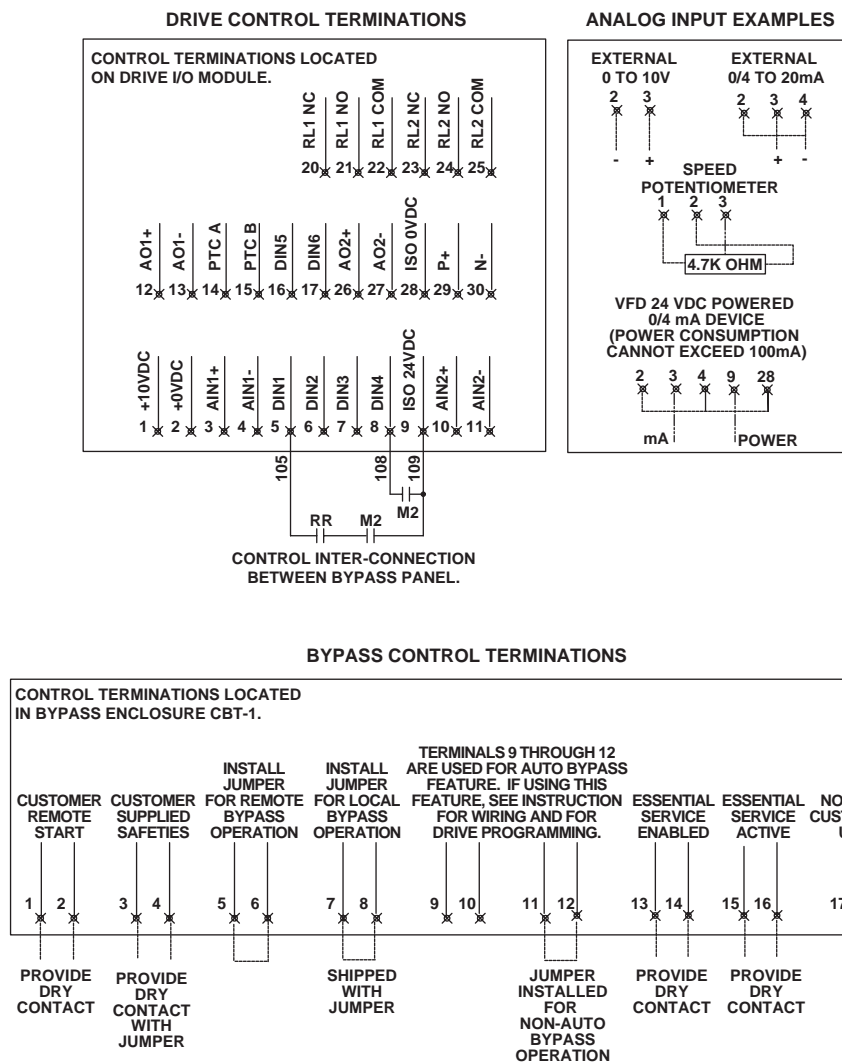
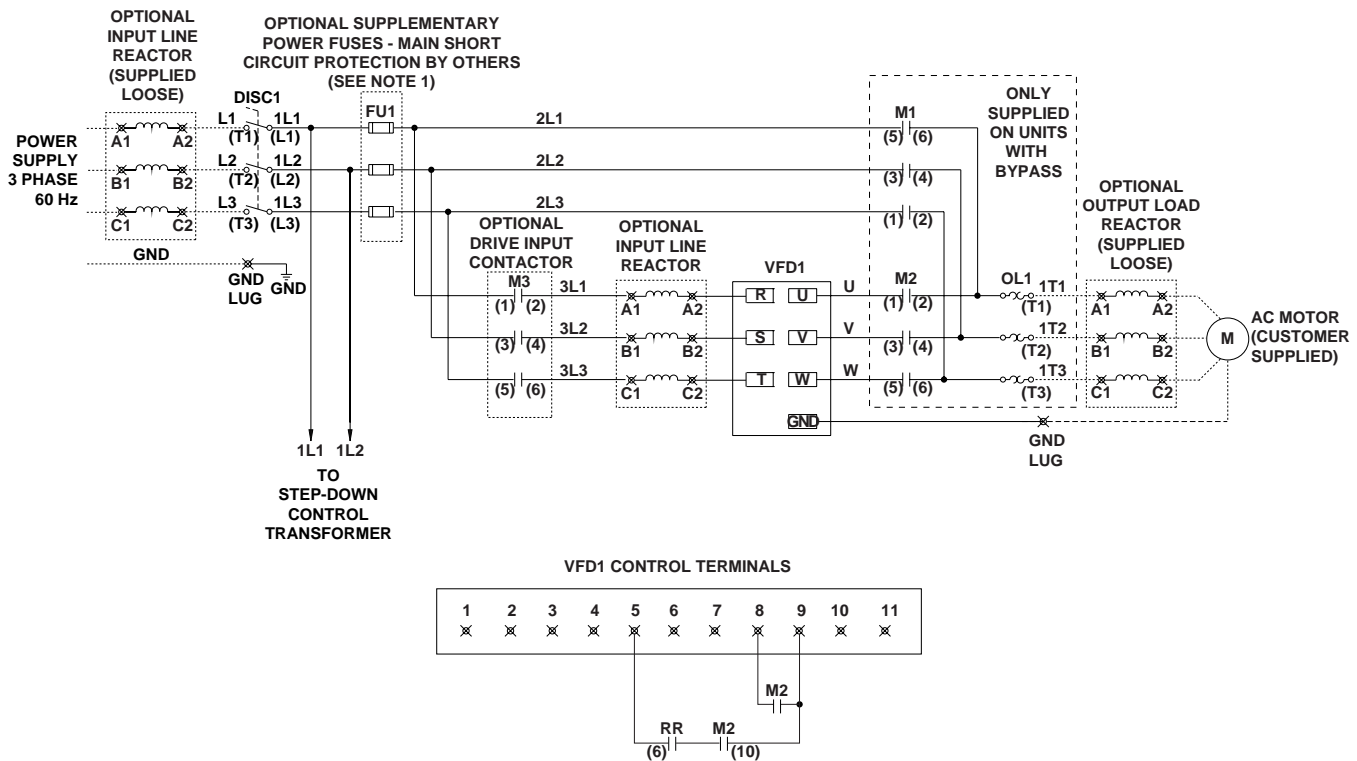


Figure 2. NEMA Type 3R Bypass Control Terminals.



NOTES:

1. Branch circuit protection to be provided by installer, per UL508A, if not provided with drive.
2. For bypass operation modify these drive parameters: P0704 (0) and P0704 (1) = 3.
3. Control and communication wiring should be 300V UL minimum.
4. Communication wiring should be run with maximum separation possible from all other wiring.
5. Essential service mode operates the motor full speed (bypass) with no protection for the motor or system.
6. Ensure that automatic bypass will not damage the system before activating.
7. See Siemens publication *SED2 VFD NEMA Type 3R Bypass Operating Instructions* (125-3377) for proper fuse and wire sizes.
8. See Siemens publication *SED2 VFD Startup, Operation and Maintenance Manual* (125-3201) for SED2 VFD input/output signal wiring details.

Figure 3. NEMA Type 3R Bypass Wiring Schematic.

Table 4. NEMA Type 3R Bypass Specifications.

NEMA Type 3R Bypass Specification	Description
Input Voltage (3 phase)	208V, 3 AC $\pm 10\%$
	230V, 3 AC $\pm 10\%$
	460V, 3 AC $\pm 10\%$
	575V, 3 AC $\pm 10\%$
Temperature	Operating: 14°F to 104°F (–10°C to 40°C), HT1 to 122°F (50°C)
	Storage: –40°F to 158°F (–40°C to 70°C)
High-Temperature Model	Operating: 14°F to 122°F (–10°C to 50°C)
	Storage: –40°F to 158°F (–40°C to 70°C)
Humidity	0 to 95% rh, non-condensing

Table 5. SED2 VFD Specifications.

Drive Specification	Description
Input voltage and power ranges (3 phase)	200V to 240V, 3 AC \pm 10%. 1/2 hp to 60 hp (2.3 Amps to 154 Amps)
Amps	380V to 480V, 3 AC \pm 10% 1/2 hp to 125 hp (1.2 Amps to 178 Amps)
	500V to 600V, 3 AC \pm 10% 1 hp to 125 hp (2.3 Amps to 125 Amps)
Input frequency	47 Hz to 63 Hz
Output frequency	0 Hz to 150 Hz
Power factor	\geq 0.9 total, \geq 0.97 displacement
VFD degree of efficiency	96% to 97%
Switch-on current	Less than nominal input current
Auxiliary supply 24V	Galvanically separated, unregulated auxiliary supply (18V to 32V) 100 mA
Overload capacity	110% for 60 seconds
Control method	Linear, parabolic and programmable V/f; and flux current control low-power mode
PWM frequency	2k Hz to 16k Hz (adjustable in 2k Hz increments)
Fixed frequencies	15 programmable
Skip frequency bands	4 programmable
Setpoint resolution	0.01 Hz digital
	0.01 Hz serial
	10 bit analog
Digital inputs (sink/source)	6: fully programmable and scalable isolated digital inputs, switchable
Analog inputs	2: 0 to 10 Vdc, 0/4 mA to 20 mA, can also be configured as digital inputs or Ni 1000 input
Relay outputs	2: configurable 30 Vdc/5A (resistive), 250 Vac 2A (inductive)
Analog outputs	2: programmable (0/4 mA to 20 mA or 0V to 10 Vdc)
Serial interface	RS-485; Protocols: Siemens, P1 and Johnson, N2; Transmission rate: Up to 38.4k Baud
Protection level	IP20: NEMA Type 1 (with protective shield and gland plate installed)
	IP54: NEMA Type 12 (400V and 500V series only)
Temperature ranges	Operating: 14°F to 104°F (–10°C to 40°C)
	Storage: –40°F to 158°F (–40°C to 70°C)
Humidity	95% rh, non-condensing
Operational altitudes	Up to 3280 ft (1000 m) above sea level without de-rating
Protection features	<ul style="list-style-type: none"> • Under-voltage • Over-voltage • Overload • Ground fault • Short circuit • Stall prevention • Locked motor • Motor over temperature I²t, PTC • Over-temperature • Parameter PIN protection
Standards	UL, cUL
CE conformity	Conformity with EC Low Voltage Directive 73/23/EEC

Table 6. Order Worksheet.

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