Table of Contents

PRODUCT	PRODUCT CODE	RESOURCE DOCUMENTS	PAGE #
Variable Frequency Drives			
Introduction			F-3
Variable Frequency Drives	SED2	154-042	F-5
Variable Frequency Drives with Conventional Bypass Option	SED2	154-044	F-9
Variable Frequency Drives with Electronic (E) Bypass Options	SED2	154-051	F-15
Variable Frequency Drives NEMA Type 3R Harsh Environment Bypass	SED2	154-062	F-19
Accessories & Service Kits			F-25

Standard Shipping within 3 to 5 days Products ordered through the Rapid Response™ program can ship same day. Expect longer lead times for large quantities and unique parts. See inside back cover for details on Rapid Response™ shipping.

Go Green!

With the growing interest in maximizing energy savings in buildings, we've developed icons to help you identify products that can help contribute to achieving LEED credits.
Look for these icons throughout this catalog:

Sustainable Sites

Water Efficiency

Energy & Atmosphere

Materials & Resources

Indoor Environmental Quality

Innovation in Design/Operations

For more information about these icons, turn to page 4.

Variable Frequency Drives

From a global leader in drives technology comes a drive specifically configured for HVAC applications, the SED2 Variable Frequency drives from Siemens. Incorporating the latest advancements in IGBT technology, the SED2 is a PWM drive packed with standard features expected in a drive designed for HVAC variable torque applications. Unique design features make this Variable Frequency Drive (VFD) truly advanced.

Leading the industry in reducing harmonic distortion

Because our VFD line is so vast and proper selection is so crucial, we offer a VFD selection tool that helps you find the ideal drive for the specifics of a given situation. It will quickly narrow the list of over 3000 VFD options down to the one that best meets your specific needs.

www.us.sbt.siemens.com/database/VFD_filter/vfd_filter.html

With Siemens VFDs, you have a simple, reliable drive that installs easily, saving you time and money.

Variable Frequency Drives

SED2 Variable Frequency Drives Family.

Water Efficiency | Energy & Atmosphere | Indoor Environmental Quality

Important Note:
VFD products are only available through authorized distribution channels. To locate an authorized distributor, please contact a Siemens Building Technologies representative at: **1.888.593.7876**.

Description

The SED2 Variable Frequency Drives are designed specifically for HVAC applications. The SED2 supports a wide variety of digital and analog I/O for diverse control capability. Built-in PID features control pumps and fans, and an integral system protocol can interface P1/N2 networks. Using the SED2 multi-level parameter access, operators can quickly pinpoint relevant data.

Options
- LON Interface
- Modbus RTU Interface
- BACnet MS/TP Interface
- Advanced Operator Panel (AOP) Module
- EasyComm Drive Software
- PC Kit

Features

- Built-in SBT P1 and JCI N2 (Metasys®) building automation system protocols for easy network integration
- LON, Modbus RTU and BACnet MS/TP Interfaces optional
- Low harmonics design reduces noises and interference eliminates need for filters/reactors in most installations
- Built-in PID for fast and accurate pressure control
- Pump staging for open loop, constant pressure, and constant flow-type applications
- Multi-level program access
- Belt failure detection with or without an external sensor
- Service mode for applications requiring continuous, uninterruptible operation
- Accepts a wide variety of digital and analog I/Otypes, including direct Siemens Ni 1000 RTD sensor level inputs
- One common interface throughout all power ranges
- Optional Advanced Operator Panel for uploading/ downloading parameters
- Full form C relay contacts for digital outputs

Variable Frequency Drives Specifications

Input Voltage and Power Ranges (3 phase)
208V and 230V to 240V, 3 ac±10% ..... 1/2 hp to 60 hp
380V to 480V, 3 ac ±10% ..... 1/2 hp to 125 hp
500V to 600V, 3 ac ±10% ..... 1 hp to 125 hp

Input Frequency ..... 47 Hz to 63 Hz

Output Frequency ..... 0 Hz to 150 Hz

Power Factor ..... ≥0.9

VFD degree of efficiency ..... 96% to 97%

Switch-on Current ..... Less than nominal input current

Auxiliary Supply 24V ..... Glavanically 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 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 0 Vdc to 10 Vdc)

Serial Interface ..... RS-485 transmission rate: Up to 38.4k Baud Protocols: USS, P1 and N2

Protection Level IP20
NEMA Type 1 with protective shield and gland plate installed
IP54/NEMA Type 12

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 (1000m) above sea level without derating

Protection Features ..... Under-voltage, Over-voltage, Overload, Ground fault, Short circuit, Stall prevention, Locked motor, Motor overtemperature I^2t PTC, Over-temperature, Parameter PIN protection.

Standards ..... UL, cUL, CE, C-tick

CE Conformity ..... Conformity with EC Low Voltage Directive 73/23/EEC

Options ..... LON Interface, Modbus RTU Interface, BACnet MS/TP Interface, Advanced Operator Panel (AOP) Module, EasyComm Drive Software, PC Kit

Variable Frequency Drives Product Ordering

Your Product Number													
Example Product Number	**S**	**E**	**D**	**2**	**-**	**0**	**.**	**7**	**5**	**/**	**2**	**2**	**X**

Model
SED2- VFD only

kW rating
0.37, 0.55
[See Note 1 for these selections]
0.75, 1.1, 1.5, 2.2, 3, 4, 5.5, 7.5, 11, 15, 18.5, 22, 30, 37, 45, 55, 75, 90
[See Note 2 for these selections]

(Uses 2 to 4 spaces plus a divider "/")

Voltage
2 200 to 240V
3 380 to 480V
4 500 to 600V

NEMA rating
2 (IP 20)
1 NEMA Type 1
5 NEMA Type 12 (IP 54) [See Note 2]

Filter
X Factory Required Designator

Notes:

1. Available only with Voltage Codes 2 and 3.
2. Available only with Voltage Codes 3 and 4.

Example Shown:

SED2-0.75/22X =
SED2 VFD only, 0.75 kW (1 hp), 200 to 240V, open type IP20.

Variable Frequency Drives Output Ratings

Voltage (±10%)	Product No.			Output Rating		Output Current Max (amps)	Frame Size
	IP20	NEMA Type 1	IP54/NEMA Type 12	HP	kW		
208V and 230V to 240V (3-Phase)	SED2-0.37/22X	SED2-0.37/21X	—	0.5	0.37	2.3	A
	SED2-0.55/22X	SED2-0.55/21X	—	0.75	0.55	3.0	A
	SED2-0.75/22X	SED2-0.75/21X	—	1.0	0.75	3.9	A
	SED2-1.1/22X	SED2-1.1/21X	—	1.5	1.1	5.5	B
	SED2-1.5/22X	SED2-1.5/21X	—	2.0	1.5	7.4	B
	SED2-2.2/22X	SED2-2.2/21X	—	3.0	2.2	10.4	B
	SED2-3/22X	SED2-3/21X	—	4.0	3.0	13.6	C
	SED2-4/22X	SED2-4/21X	—	5.0	4.0	17.5	C
	SED2-5.5/22X	SED2-5.5/21X	—	7.5	5.5	22.0	C
	SED2-7.5/22X	SED2-7.5/21X	—	10.0	7.5	28.0	C
	SED2-11/22X	SED2-11/21X	—	15.0	11.0	42.0	D
	SED2-15/22X	SED2-15/21X	—	20.0	15.0	54.0	D
	SED2-18.5/22X	SED2-18.5/21X	—	25.0	18.5	68.0	D
	SED2-22/22X	SED2-22/21X	—	30.0	22.0	80.0	E
	SED2-30/22X	SED2-30/21X	—	40.0	30.0	104.0	E
	SED2-37/22X	SED2-37/21X	—	50.0	37.0	130.0	F
	SED2-45/22X	SED2-45/21X	—	60.0	45.0	154.0	F
380V to 480V (3-Phase)	SED2-0.37/32X	SED2-0.37/31X	—	0.5	0.37	1.2	A
	SED2-0.55/32X	SED2-0.55/31X	—	0.75	0.55	1.6	A
	SED2-0.75/32X	SED2-0.75/31X	—	1.0	0.75	2.1	A
	SED2-1.1/32X	SED2-1.1/31X	SED2-1.1/35X	1.5	1.1	3.0	A *
	SED2-1.5/32X	SED2-1.5/31X	SED2-1.5/35X	2.0	1.5	4.0	A *
	SED2-2.2/32X	SED2-2.2/31X	SED2-2.2/35X	3.0	2.2	5.9	B
	SED2-3/32X	SED2-3/31X	SED2-3/35X	4.0	3.0	7.7	B
	SED2-4/32X	SED2-4/31X	SED2-4/35X	5.0	4.0	10.2	B
	SED2-5.5/32X	SED2-5.5/31X	SED2-5.5/35X	7.5	5.5	13.2	C
	SED2-7.5/32X	SED2-7.5/31X	SED2-7.5/35X	10.0	7.5	18.4	C
	SED2-11/32X	SED2-11/31X	SED2-11/35X	15.0	11.0	26.0	C
	SED2-15/32X	SED2-15/31X	SED2-15/35X	20.0	15.0	32.0	C
	SED2-18.5/32X	SED2-18.5/31X	SED2-18.5/35X	25.0	18.5	38.0	D
	SED2-22/32X	SED2-22/31X	SED2-22/35X	30.0	22.0	45.0	D
	SED2-30/32X	SED2-30/31X	SED2-30/35X	40.0	30.0	62.0	D
	SED2-37/32X	SED2-37/31X	SED2-37/35X	50.0	37.0	75.0	E
	SED2-45/32X	SED2-45/31X	SED2-45/35X	60.0	45.0	90.0	E
	SED2-55/32X	SED2-55/31X	SED2-55/35X	75.0	55.0	110.0	F
	SED2-75/32X	SED2-75/31X	SED2-75/35X	100.0	75.0	145.0	F
	SED2-90/32X	SED2-90/31X	SED2-90/35X	125.0	90.0	178.0	F
500V to 600V (3-Phase)	SED2-0.75/42X	SED2-0.75/41X	—	1.0	0.75	1.4	C
	SED2-1.1/42X	SED2-1.1/41X	SED2-1.1/45X	1.5	1.1	2.1	C
	SED2-1.5/42X	SED2-1.5/41X	SED2-1.5/45X	2.0	1.5	2.7	C
	SED2-2.2/42X	SED2-2.2/41X	SED2-2.2/45X	3.0	2.2	3.9	C
	SED2-3/42X	SED2-3/41X	SED2-3/45X	4.0	3.0	5.4	C
	SED2-4/42X	SED2-4/41X	SED2-4/45X	5.0	4.0	6.1	C
	SED2-5.5/42X	SED2-5.5/41X	SED2-5.5/45X	7.5	5.5	9.0	C
	SED2-7.5/42X	SED2-7.5/41X	SED2-7.5/45X	10.0	7.5	11.0	C
	SED2-11/42X	SED2-11/41X	SED2-11/45X	15.0	11.0	17.0	C
	SED2-15/42X	SED2-15/41X	SED2-15/45X	20.0	15.0	22.0	C
	SED2-18.5/42X	SED2-18.5/41X	SED2-18.5/45X	25.0	18.5	27.0	D
	SED2-22/42X	SED2-22/41X	SED2-22/45X	30.0	22.0	32.0	D
	SED2-30/42X	SED2-30/41X	SED2-30/45X	40.0	30.0	41.0	D
	SED2-37/42X	SED2-37/41X	SED2-37/45X	50.0	37.0	52.0	E
	SED2-45/42X	SED2-45/41X	SED2-45/45X	60.0	45.0	62.0	E
	SED2-55/42X	SED2-55/41X	SED2-55/45X	75.0	55.0	77.0	F
	SED2-75/42X	SED2-75/41X	SED2-75/45X	100.0	75.0	99.0	F
	SED2-90/42X	SED2-90/41X	SED2-90/45X	125.0	90.0	125.0	F

*IP54/NEMA Type 12 drives start at Frame Size B.

Variable Frequency Drives Frame Sizes

SED2 IP20 and NEMA Type 1 Frame Sizes and Power Ranges

VFD0163R1

HP	.5	.75	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	18.5	22	30	37	45	55	75	90
240V	A			B			C				D			E		F		N/A		
480V	A					B	C						D			E		F		
575V	N/A			C																

SED2 IP54 and NEMA Type 12 Frame Sizes and Power Ranges

VFD0164R1

HP	.5	.75	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	18.5	22	30	37	45	55	75	90
480V	N/A			B					C				D			E		F		
575V	N/A			C																

Variable Frequency Drives Dimensions and Weights

IP20 SED2 VFDs

Frame Size	Height		Width		Depth		Weight Lb. (kg)	
A	6.8	(173)	2.9	(73)	5.9	(149)	2.9	(1.3)
B	8.0	(202)	5.9	(149)	6.8	(172)	7.5	(3.4)
C	9.6	(245)	7.3	(185)	7.7	(195)	12	(5.5)
D	20.5	(520)	10.8	(275)	9.6	(245)	35	(16)
E	25.6	(650)	10.8	(275)	9.6	(245)	44	(20)
F	33.5	(850)	13	(350)	12.6	(320)	116	(53)

NEMA Type 1 SED2 VFDs Assembled with Protective Shield and Gland Plate

Frame Size	Height		Width		Depth		Weight Lb. (kg)	
A	9.1	(231)	2.9	(73)	5.9	(149)	3.2	(1.5)
B	11.8	(300)	5.9	(149)	6.8	(172)	8.3	(3.8)
C	13.8	(351)	7.3	(185)	7.7	(195)	13.6	(6.2)
D	24.6	(625)	10.8	(275)	9.6	(245)	37.5	(17)
E	29.7	(754)	10.8	(275)	9.6	(245)	46.4	(21)
F	54.5	(1384)	16.0	(406)	14.0	(356)	200	(91)

IP54/NEMA Type 12 SED2 VFDs

Frame Size	Height		Width		Depth		Weight Lb. (kg)	
B	15.2	(385)	10.6	(270)	10.6	(268)	10	(22)
C	23.9	(606)	13.8	(350)	11.2	(284)	42	(19)
D	27.0	(685)	14.2	(360)	13.9	(353)	77	(35)
E	34.8	(885)	14.2	(360)	17.8	(453)	105	(48)
F	45.3	(1150)	17.7	(450)	18.6	(473)	178	(81)

Tables expressed in inches (mm).

Variable Frequency Drives with Conventional Bypass Options

SED2 Variable Frequency Drives with Conventional Bypass Options Family.

Water Efficiency | Energy & Atmosphere | Indoor Environmental Quality

Important Note:
VFD products are only available through authorized distribution channels. To locate an authorized distributor, please contact a Siemens Building Technologies representative at: **1.888.593.7876**.

Description

The Bypass Options are companion packages for the family of SED2 Variable Frequency Drives.

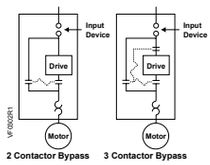
Features

Bypass Power

2-Contactor: Output & Bypass
- Overload protection in bypass mode.
- Step-down transformer with fused primary and secondary.
- Contactors electrically and mechanically interlocked.

3-Contactor (optional): Input, Output, & Bypass
In addition to the 2-contactor features, 3-contactor features provide:
- Drive test function
- Complete electrical isolation of drive

Input Device
- Fused disconnect
- Circuit breaker (optional)
- All doors are interlocked and padlockable



2 Contactor Bypass 3 Contactor Bypass

Reactor Options
- Line reactor mounted in bypass option enclosure.
- Line reactor (in NEMA 1 enclosure) supplied separately.
- Load reactor (in NEMA 1/3R 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.
- The drive's programmable relay, typically set to fault, can be set up for applications that run full speed for an extended period of time.

Enable Input
- Generally used for safety tie-ins; the motor will not operate the drive or bypass when open.

Common Remote Start/Stop
- 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

Variable Frequency Drives with Conventional Bypass Option Specifications

Conventional Bypass Specifications

Input Voltage (3-phase)

208V, 3 AC±10% .....1/2 hp to 60 hp (2.3 amps to 154 amps)
240V, 3 AC±10% .....1/2 hp to 60 hp (2.3 amps to 154 amps)
480V, 3 AC ±10% ..... 1/2 hp to 125 hp (1.2 amps to 178 amps)
575V, 3 AC ±10% .....1 hp to 125 hp (2.3 amps to 125 amps)

Protection Level.....NEMA Type 1
NEMA Type 12

Temperature

Operating..... 32 to 104°F (0 to +40°C)
Storage.....-40 to +158°F (-40 to +70°C)

Humidity .....0 to 95% RH, non-condensing

Drive Specifications

Input Voltage and Power Ranges (3-Phase)

208V and 230V to 240V, 3AC ±10%. .....1/2 hp to 60 hp
380V to 480V, 3 AC ±10%.....1/2 hp to 125 hp
500V to 600V, 3 AC ±10%.....1 hp to 125 hp

Input Frequency.....47 Hz to 63 Hz

Output Frequency.....0 Hz to 150 Hz

Power Factor.....≥ 0.9 total, ≥ 0.97 displacement

VFD Degree of Efficiency..... 96% to 97%

Switch-on Current ..... Less than nominal input current

Auxiliary Supply 24V..... Glavanically 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 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 to 20 mA or 0 Vdc to 10 Vdc)

Serial Interface..... RS-485;
Protocols: USS, P1 and N2;
Transmission rate: Up to 38.4k Baud

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 (1000m) above sea level without derating

Protection Features.....Under-voltage, Over-voltage, Overload, Ground fault, Short circuit, Stall prevention, Locked motor, Motor over-temperature I2 t PTC, Over-temperature, Parameter PIN protection.

Standards..... UL, cUL, CE, C-tick

CE Conformity .....Conformity with EC Low Voltage Directive 73/23/EEC

Options..... LON Interface, Modbus Interface, BACnet MS/TP Interface, Advanced Operator Panel (AOP) Module, EasyComm Drive Software, PC Kit

Accessories & Service Kits F-29

Variable Frequency Drives with Conventional Bypass Option Product Ordering

Your Product Number															
Example Product Number	**V**	**B**	**A**	**4**	**4**	**0**	**.**	**B**	**1**	**2**	**0**	**X**	**H**	**A**	**1**

Model

VB	VFD with Bypass

Series

A	Conventional Bypass

Voltage

1	208 V
2	230 to 240 V
3	380 to 480 V
4	500 to 600 V

HP rating

0.5, 0.75 [See Note 1 for these selections]

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 [See Note 2 for these selections]

Disconnect

F	Fused Disconnect
B	Circuit Breaker

NEMA rating

1	NEMA Type 1
5	NEMA Type 12 (IP 54) [See Note 3]

Contactor

2	2 Contactors
3	3 Contactors

Reactor [See Note 4]

0	None
3	Line Reactor

Filter

X	Factory Required Designator

Options (If no option is required, leave field blank)

HA1	High Amp Rating [See Note 5]

Notes:

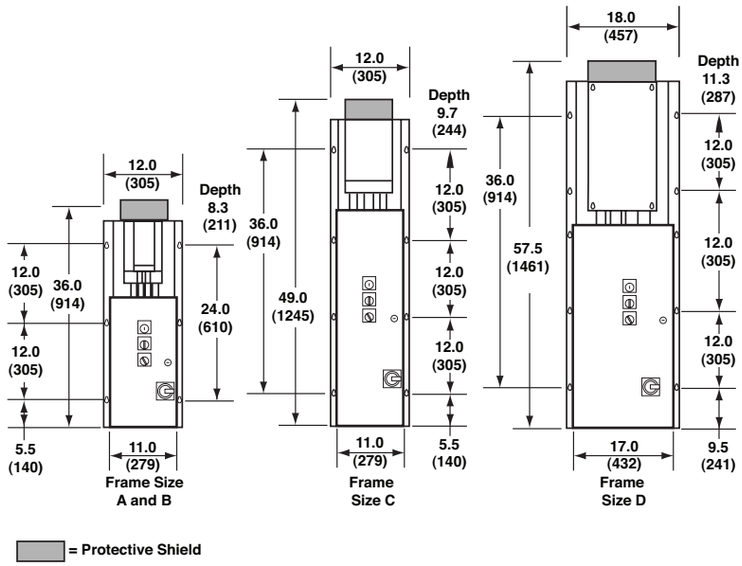
1. Available only with Voltage Codes 1, 2, and 3.
2. Available only with Voltage Codes 3 and 4.
3. Available only in certain models.
4. Input line reactors will be installed in bypass enclosures. Load reactors are supplied seperately in NEMA 1 or NEMA 3R enclosures.
5. HA1 option is a bypass rated to 178 amps at 480 Vac. It is only available as 125 hp, 480V. Though it does not meet NEC for 150 hp at 180 amps, the package will be able to control a high percentage of 150 hp motors.

NEMA 1 Dimensions

NEMA 1 Conventional Bypass Approximate Weights

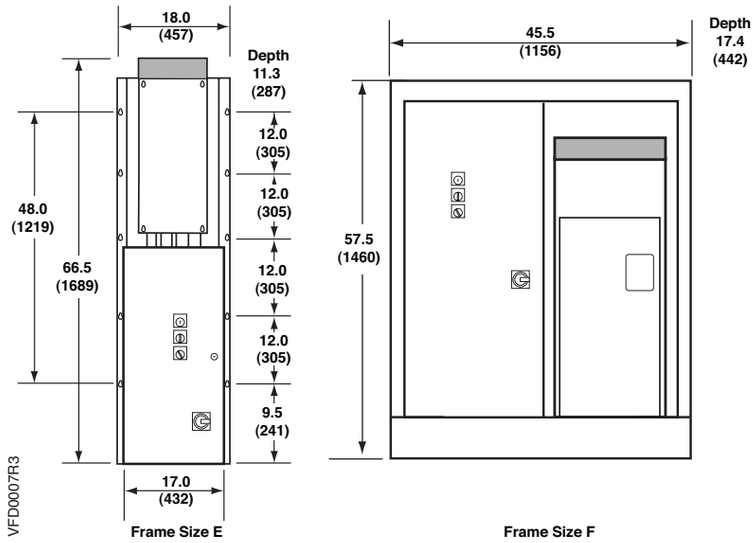
Frame Size	Wt. Lb. (kg)
A	45 (20)
B	55 (25)
C	75 (34)
D	150 (68)
E	180 (82)
F	470 (213)

Note: Exact weight will be affected by the actual horsepower/voltage and the selected power options.



NEMA 1 Conventional Bypass Frame Sizes and Power Ranges.

HP	kW	208/240V	480V	575V
.5	.37	A	A	C
.75	.55			
1	.75			
1.5	1.1	B		
2	1.5			
3	2.2		B	
5	4	C		
7.5	5.5		C	
10	7.5			
15	11	D		
20	15			
25	18.5		D	D
30	22	E		
40	30	F		
50	37		E	E
60	45			
75	55	N/A	F	F
100	75			
125	90			
HA1	—			N/A



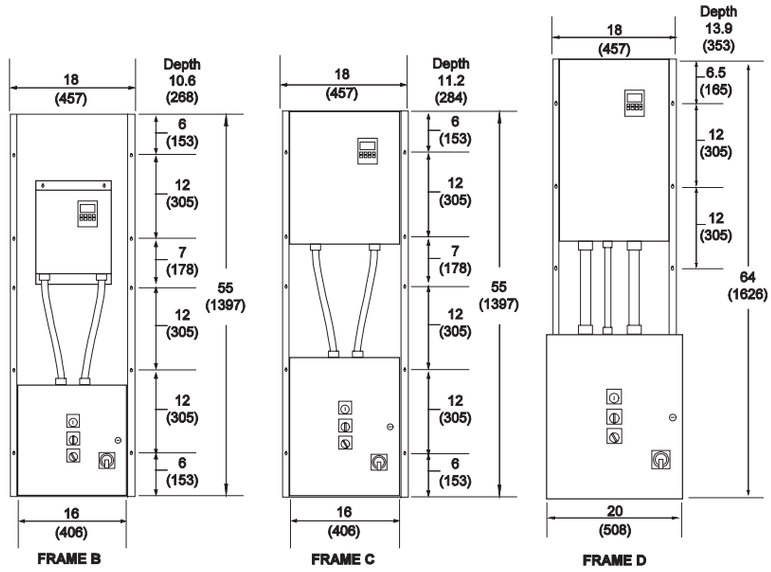
Dimensions shown in inches (mm).

NEMA 12 Dimensions

NEMA 12 Conventional Bypass Approximate Weights

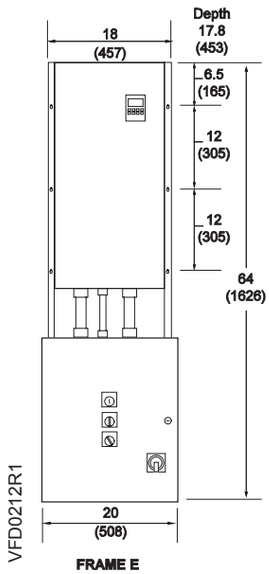
Frame Size	Wt. Lb. (kg)
A	100 (45)
B	100 (45)
C	130 (59)
D	185 (84)
E	225 (102)
F	350 (159)

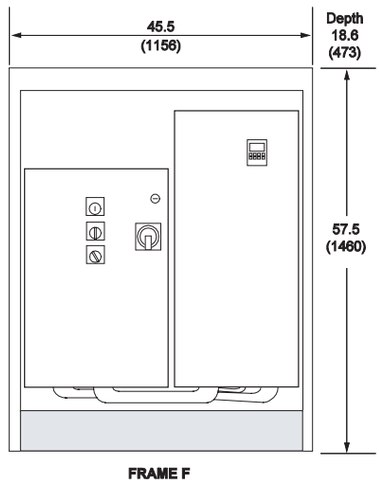
Note: Exact weight will be affected by the actual horsepower/voltage and the selected power options.



NEMA 12 Conventional Bypass Frame Sizes and Power Ranges.

HP	kW	480V	575V
.5	.37	B & C	B & C
.75	.55		
1	.75		
1.5	1.1		
2	1.5		
3	2.2		
5	4		
7.5	5.5		
10	7.5		
15	11		
20	15		
25	18.5	D & E	D & E
30	22		
40	30		
50	37		
60	45		
75	55	F	F
100	75		
125	90		
HA1	–		N/A





Dimensions shown in inches (mm).

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

Need additional assistance?

Contact Siemens Inside Sales or your Account Executive any time. Call Inside Sales at 1-888-593-7876 from 7 am to 5:30 pm (CST) Monday through Friday. Or, send an email to bgcustomersupport.us.sbt@siemens.com

We appreciate your business and look forward to helping you!

Variable Frequency Drives
Electronic Bypass (E-Bypass) Options

SED2 Variable Frequency Drives with Electronic Bypass family.

Water Efficiency | Energy & Atmosphere | Indoor Environmental Quality

Important Note:
VFD products are only available through authorized distribution channels. To locate an authorized distributor, please contact a Siemens Building Technologies representative at: **1.888.593.7876**.

Description

The SED2 Electronic Bypass (E-Bypass) Options are companion packages for the family of SED2 Variable Frequency Drives (VFDs).

Features

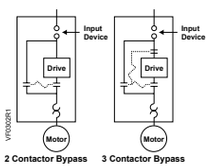
E-Bypass

- Enhanced visual interface for improved monitoring and diagnostics
- E- Bypass guarantees continuous operation even if SED2 fails
- Electronic touch-sensitive keypad
- Standard built-in networking compatibility
- Service mode isolates drive from the control scheme
- Six relay outputs for indication of operation
- Fourteen LEDs indicate monitoring and operation
- Six digital inputs
- Remote start via networking
- Contactors electrically and mechanically interlocked.

2-Contactor: Output & Bypass
- Overload protection in bypass mode

3-Contactor (optional): Input, Output, & Bypass.
- Drive test function
- Complete electrical isolation of drive

Input Device
- Fused disconnect
- Circuit breaker (optional)
- All doors are interlocked and padlockable



Reactor Options
- Line reactor mounted in bypass option enclosure
- Line reactor (in NEMA 1 enclosure) supplied separately
- Load reactor (in NEMA 1 enclosure) supplied separately

E-Bypass Control Features

Auto Bypass
- Relay logic allows user to send the motor to bypass mode based on the drive's programmable relay.
- The drive's programmable relay, typically set to fault, can be set up for applications that run full speed for an extended period of time.

Enable Input
- Generally used for safety tie-ins; the motor will not operate the drive or bypass when open.

Common Remote Start/Stop
- Common remote start/stop can be used in both drive and bypass mode.

Essential Services Mode
- Also 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.

Variable Frequency Drives E-Bypass Options Specifications

Electronic Bypass Specifications

Input Voltage (3-phase)

208V, 3 AC±10%. .....1/2 hp to 60 hp (2.3 amps to 154 amps)

240V, 3 AC±10%. .....1/2 hp to 60 hp (2.3 amps to 154 amps)

480V, 3 AC ±10%. ..... 1/2 hp to 125 hp (1.2 amps to 178 amps)

575V, 3 AC ±10%. .....1 hp to 125 hp (2.3 amps to 125 amps)

Protection Level.....NEMA Type 1

Digital Inputs

Six Digital Inputs as follows.....Remote start input, Remote safety 1, Remote safety 2, Interlock start, Essential services, Overload trigger. Inputs require a contact closure capable of providing a low impedance path at currents less than 20 mA.

Relay/Digital Outputs

Six Relay/Digital Outputs as follows.....VFD fault, Programmable output, Drive select, Bypass select, Running on bypass, Overload fault, Each relay has a maximum rating of 2A at 120Vac.

Temperature

Operating .....14°F to 104°F (-10°C to 40°C)

Storage ..... –40°F to 158°F (–40°C to 70°C)

Humidity .....0 to 95% rh, non-condensing

Drive Specifications

Input Voltage and Power Ranges (3 phase), amps

208V and 230V to 240V, 3 ac ± 10% .....1/2 hp to 60 hp (2.3 amps to 154 amps)

380V to 480V, 3 ac ± 10%..... 1/2 hp to 125 hp (1.2 amps to 178 amps)

500V to 600V, 3 ac ± 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.....≥ 0.9

VFD Degree of Efficiency.....96% to 97%

Switch-on Current ..... Less than nominal input current

Auxiliary Supply 24V..... Glavanically 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 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 0 Vdc to 10 Vdc)

Serial Interface..... RS-485 transmission rate: Up to 38.4k Baud
Protocols: Siemens Building Technologies, Inc., P1 and Johnson, N2

Temperature Ranges

Operating ..... 14°F to 104°F (–10°C to 40°C)

Storage ..... –40°F to 158°F (–40°C to 70°C)

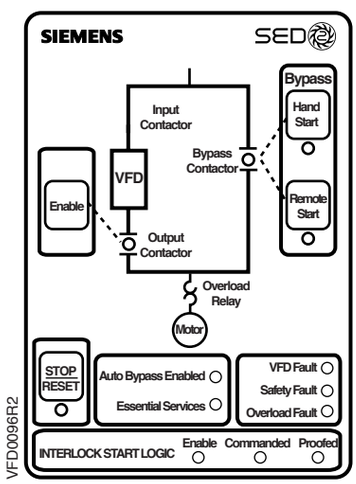
Humidity .....95% rh, non-condensing

Operational Altitudes .....Up to 3280 ft (1000 m) above sea level without derating

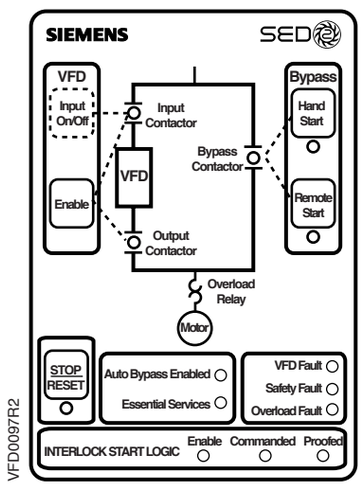
Protection Features.....Under-voltage, Over-voltage, Overload, Ground fault, Short circuit, Stall prevention, Locked motor, Motor over-temperature I^2t PTC, Over-temperature, Parameter PIN protection.

Standards.....UL, cUL

E-Bypass — Door Mounted Control Devices



2-Contactor Unit Keypad



3-Contactor Unit Keypad

Variable Frequency Drives E-Bypass Options Options Product Ordering

Your Product Number															
Example Product Number	**V**	**B**	**E**	**3**	**1**	**2**	**5**	**F**	**1**	**2**	**0**	**X**	**H**	**A**	**1**

Model
- **VB** — VFD with Bypass

Series
- **E** — Electronic Bypass

Voltage
- **1** — 208 V
- **2** — 230 to 240 V
- **3** — 380 to 480 V
- **4** — 500 to 600 V

HP rating
- **0.5, 0.75** [See Note 1 for these selections]
- **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** [See Note 2 for these selections]

Disconnect
- **F** — Fused Disconnect
- **B** — Circuit Breaker

NEMA rating
- **1** — NEMA Type 1

Contactor
- **2** — 2 Contactors
- **3** — 3 Contactors

Reactor [See Note 3]
- **0** — None
- **3** — Line Reactor

Filter
- **X** — Factory Required Designator

Options (If no option is required, leave field blank)
- **HA1** — High Amp Rating [See Note 4]

Notes:

1. Available only with Voltage Codes 1, 2, and 3.
2. Available only with Voltage Codes 3 and 4.
3. Input line reactors will be installed in bypass enclosures. Load reactors are supplied seperately in NEMA 1 or NEMA 3R enclosures.
4. HA1 option is a bypass rated to 178 amps at 480 Vac. It is only available as 125 hp, 480V. Though it does not meet NEC for 150 hp at 180 amps, the package will be able to control a high percentage of 150 hp motors.

Example Shown:

VBE3125F120XHAI

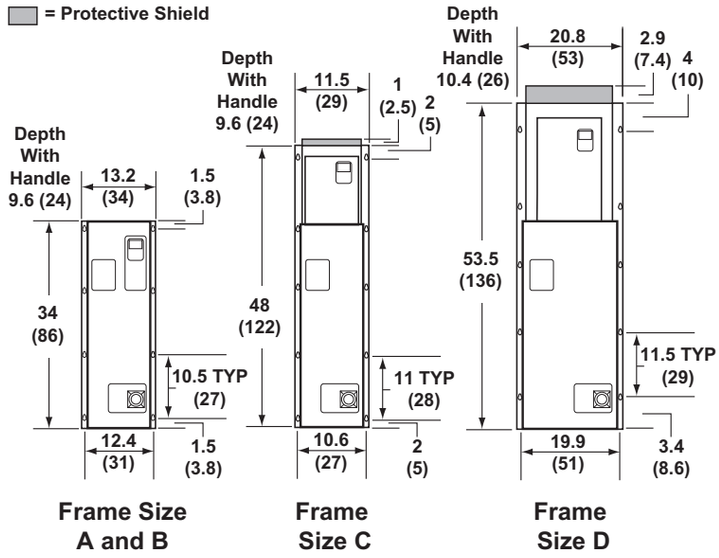
VBE Electronic Bypass, 125 hp, 480V, fused disconnect, NEMA Type 1, 2 contactors, no reactor, with 178 amp rated bypass.

Variable Frequency Drives E-Bypass Dimensions

E-Bypass Approximate Weights

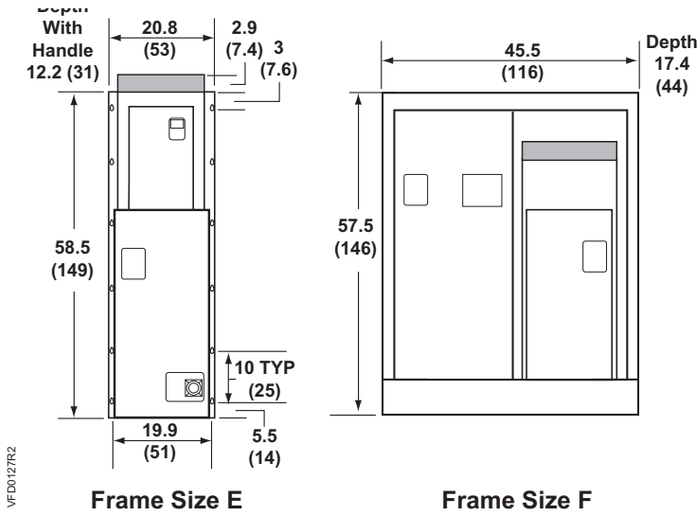
Frame Size	Wt. Lb (kg)
A	45 (20)
B	55 (25)
C	75 (34)
D	150 (68)
E	180 (82)
F	470 (213)

Note: Exact weight will be affected by the actual horsepower/voltage and the selected power options.



E-Bypass Frame Sizes and Power Ranges.

HP	kW	208/240V	480V	575V
.5	.37	A	A	C
.75	.55			
1	.75			
1.5	1.1	B		
2	1.5			
3	2.2		B	
5	4	C		
7.5	5.5		C	
10	7.5			
15	11	D		
20	15			
25	18.5		D	D
30	22	E		
40	30	F		
50	37		E	E
60	45			
75	55	N/A	F	F
100	75			
125	90			
HA1	—			N/A



Dimensions shown in inches (mm).

VFD NEMA Type 3R & Type 3R Harsh Environment (3RHE) Bypass

SED2 Variable Frequency Drives
NEMA Type 3R Bypass.

Water Efficiency | Energy & Atmosphere | Indoor Environmental Quality

Important Note:
VFD products are only available through authorized distribution channels. To locate an authorized distributor, please contact a Siemens Building Technologies representative at: **1.888.593.7876**.

Description

The NEMA Type 3R Bypasses are companion packages for the family of SED2 Variable Frequency Drives (VFD). NEMA Type 3R/3RHE enclosed bypasses are manufactured for outdoor locations that are not in direct sunlight.

Two primary styles of 3R cabinets are provided. The standard 3R rating provides protection from falling rain to the enclosed SED2 VFD and electrical control components. The harsh environment 3R rating is identical to the standard, but it is supplied with a more robust NEMA 12 SED2 VFD.

A heater is supplied in the Type 3R models 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 also available.

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

- Fused disconnect.
- 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

NEMA Type 3R/3RHE Bypass Specifications

Input Voltage (3 phase) ..... 208V, 3 AC ±10% *
240V, 3 AC ±10% *
480V, 3 AC ±10%
575V, 3 AC ±10%*

* Not available in the 3RHE models

Protection Level ..... NEMA Type 3R

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 (HT1 and HT2)

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

Drive Specifications

Input Voltage and Power Ranges (3 phase) Amps

200V and 230V to 240V,
3 AC ± 10% ..... 1/2 hp to 60 hp (2.3 Amps to 154 Amps)

380V to 480V, 3 AC ± 10%.... 1/2 hp to 125 hp (1.2 Amps to 178 Amps)

500V to 600V, 3 AC ± 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..... ≥0.9 total, ≥0.97 displacement

VFD Degree of Efficiency..... 96% to 97%

Switch-on Current ..... Less than nominal input current

Auxiliary Supply 24V ..... Glavanically 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

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 derating

Protection Features..... Under-voltage, Over-voltage, Overload, Ground fault, Short circuit, Stall prevention, Locked motor, Motor overtemperature I^2t PTC, Over-temperature, Parameter PIN protection.

Standards..... UL, cUL

CE Conformity ..... Conformity with EC Low Voltage Directive 73/23/EEC

Options..... LON Interface, Modbus Interface, BACnet MS/TP Interface, Advanced Operator Panel (AOP) Module, EasyComm Drive Software, PC Kit

VFD NEMA Type 3R & Type 3R Harsh Environment (3RHE) Bypass Product Ordering

Your Product Number															
Example Product Number	**V**	**B**	**A**	**4**	**4**	**0**	**.**	**D**	**3**	**2**	**0**	**X**	**H**	**T**	**1**

Model
- **VB** — VFD with Bypass

Series
- **A** — Conventional Bypass

Voltage
- **1** — 208 V
- **2** — 230 to 240 V
- **3** — 380 to 480 V
- **4** — 500 to 600 V

HP rating
- **0.5, 0.75** [See Note 1 for these selections]
- **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** [See Note 2 for these selections]

Disconnect
- **F** — Fused Disconnect

NEMA rating
- **3** — NEMA Type 3R

Contactor
- **0** — None
- **2** — 2 Contactors [See Note 7]
- **3** — 3 Contactors

Reactor [See Note 3]
- **0** — None
- **3** — Line Reactor

Filter
- **X** — Factory Required Designator

Options (If no option is required, leave field blank)
- **HT1** — High Temperature [See note 4]
- **HE2** — Harsh Enviroment Nema 3R [See note 5]
- **HT2** — Harsh Enviroment Nema 3R — High Temperature Rating [See note 6]

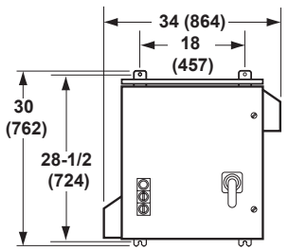
Notes:

1. Available only with Voltage Codes 1, 2, and 3.
2. Available only with Voltage Codes 3 and 4.
3. Input line reactors will be installed in bypass enclosures. Load reactors are supplied seperately in NEMA 1 or NEMA 3R enclosures.
4. HT1 (122°F, 50°C) is not available for all ratings. 208V and 230 to 240V to 3 hp are all HT1; 480V to 5 hp are all HT1.
5. HE2 available only with Voltage Codes 3 and 4. (480V to 40 hp)
6. HT2 (122°F, 50°C) is not available for all ratings. 480V to 5 hp are all HT2
7. Not available for HE2 and HT2 options.

Example Shown:
VBA440.D320X HT1 =
VBA Conventional Bypass, 500 to 600 V, 40 hp, disconnect switch, NEMA Type 3R, 2 contactors, no reactor, high temperature.

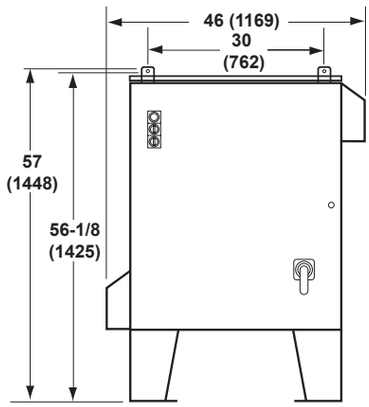
NEMA Type 3R Enclosure Dimensions

Enclosure Frame ABC



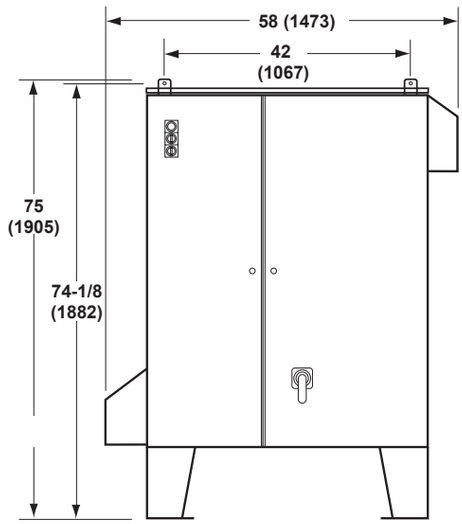
Depth = 11-1/2 Inches (292)

Enclosure Frame DE



Depth = 12-1/2 Inches (318)

Enclosure Frame F



Depth = 16-1/2 Inches (419)

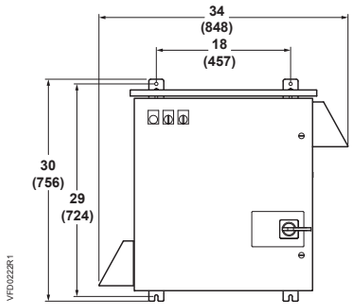
MOUNTING CLEARANCE FOR PROPER AIRFLOW:
LEAVE 1 FOOT (305 mm) BETWEEN THE NEMA TYPE 3R BYPASS AND ANY ADJACENT SOLID STRUCTURE THAT IS NOT USED FOR MOUNTING PURPOSES.

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

VFD0178R2

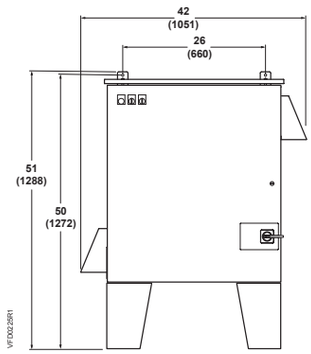
NEMA Type 3RHE Enclosure Dimensions

Enclosure Frame B



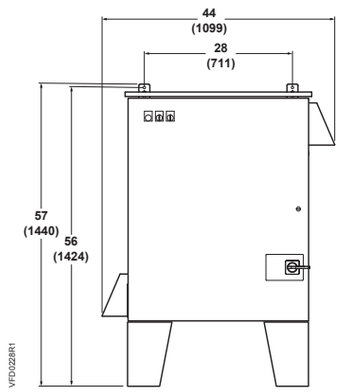
Depth = 10 Inches

Enclosure Frame C



Depth = 11 Inches

Enclosure Frame D



Depth = 14 Inches

Dimensions shown in inches (mm).

NEMA Type 3R and 3RHE Approximate Weights.

3R Frame Size	Wt. Lb (kg)
ABC	130 (59)
DE	300 (136)
F	550 (249)

3RHE Frame Size	Wt. Lb (kg)
B	150 (68)
C	220 (100)
D	330 (150)

Note: Exact weight will be affected by actual horsepower/voltage and selected power options

NEMA Type 3R Bypass *Non-HT1* Enclosure Frame Sizes and Power Ranges

VFD0179R2

HP	.5	.75	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	18.5	22	30	37	45	55	75	90
208/240V	(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		

NEMA Type 3R Bypass *HT1* Enclosure Frame Sizes and Power Ranges

VFD0180R2

HP	.5	.75	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	18.5	22	30	37	45	55	75	90
208/240V	ABC									DE				F		N/A				
480V	ABC											DE				F			N/A	
575V	ABC										DE					F			N/A	

NEMA 3RHE Bypasses HE2 Frame Sizes and Power Ranges

VFD0180R2

HP	.5	.75	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	18.5	22	30	37	45	55	75	90
208/240V	N/A																			
480V	N/A								C			D				N/A				
575V	N/A																			

NEMA 3RHE Bypasses HT2 Frame Sizes and Power Ranges

VFD0180R2

HP	.5	.75	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	18.5	22	30	37	45	55	75	90
208/240V	N/A																			
480V	N/A			B					C			D				N/A				
575V	N/A																			

At your fingertips!

Now there is 24/7 product ordering ease and convenience online, so you can:

- Place orders
- Browse catalog
- Check product availability
- Create personalized order templates
- Specify FREE valve tagging
- Download invoices
- Track shipments
- Download submittal documents

See how easy it is today to save time and money with Siemens Online Ordering. Go online to:
www.usa.siemens.com/buildingtechnologiesonlineordering

www.usa.siemens.com/hvac

SIEMENS

Table of Contents

PRODUCT	PAGE #
SED2	
Software	F-26
Mounting Hardware	F-26
Filter Kits	F-26
Operator Panel	F-26
LON Interface Option	F-27
Modbus Interface	F-27
BACnet Interface	F-27

Accessories and Service Kits

	Description	Part No.
SED2		
	PC Kit.	**SED2-PC-KIT**
	EasyComm Drive Programming Software.	**SED2-EASYCOMM**
	Gland Plates. (included with NEMA Type 1)	
	• Frame A	**SED2-GL-A**
	• Frame B	**SED2-GL-B**
	• Frame C	**SED2-GL-C**
	Protection Shield. (included with NEMA Type 1)	
	• Frame A	**SED2-PS-A**
	• Frame B	**SED2-PS-B**
	• Frame C	**SED2-PS-C**
	• Frame D, E	**SED2-PS-DE**
	NEMA Type 1 and 3R Enclosed Reactors.	Contact Sales Partners
	NEMA Type 3R Floor Mounting Kit.	
	• Frames A, B, C	**994-809**
	BOP/AOP Door Mounting Kits.	
	• BOP/AOP Single Inverter	**SED2-DOOR-KIT1**
	• AOP Multi-Inverter	**SED2-DOOR-KIT2**
	EMC Filter Kit.	
	• For use with E-Bypass Frames A & B	**994-975**
	• For use with E-Bypass Frame C	**994-976**
	• For use with E-Bypass Frames D & E	**994-977**
	• For use with E-Bypass Frame F	**994-978**
	Operator Panel.	
	• Basic Operator Panel (included with all SED2s)	**SED2-BOP1**
	• Advanced Operator Panel (AOP)	**SED2-AOP1**

	Description	Part No.
SED2		
	LON Interface Option.	**SED2-LONI/F**
	Modbus RTU Interface Module for SED2. Converts VFD's USS bus to Modbus RTU.	**SED2-MODBUS2**
	SED2 Modbus Configuration Kit.	**SED2-MODBUS_KIT**
	SED2 BACnet Interface.	**SED2-BACNET**

Notes

Notes

Notes

Notes

Notes

Leading the industry in reducing harmonic distortion

Because our VFD line is so vast and proper selection is so crucial, we offer a VFD selection tool that helps you find the ideal drive for the specifics of a given situation. It will quickly narrow the list of over 3000 VFD options down to the one that best meets your specific needs.

www.us.sbt.siemens.com/database/VFD_filter/vfd_filter.html

With Siemens VFDs, you have a simple, reliable drive that installs easily, saving you time and money.