



SED2 Variable Frequency Drives

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.



Features

- Built-in SBT P1 and JCI N2 (Metasys®) building automation system protocols for easy network integration
- LON Interface and Modbus Interface 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/O types, including direct 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

Frame Sizes

SED2 IP20 and NEMA Type 1 frame sizes and power ranges are as follows:

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
240V	A		B			C			D			E		F						
480V	A			B			C			D			E		F					
575V					C															

SED2 IP54/NEMA Type 12 frame sizes and power ranges are as follows:

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
480V				B			C			D			E		F					
575V					C															

Product Numbers

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																	
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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.

Typical Specifications

SED2 shall provide control of fan and pump HVAC applications. A wide range of I/O allows for simple control solutions, with integral P1 and N2 protocols embedded for full control capabilities.

Technical Data

Table 1. Drive Specifications.

Drive Specifications	Description
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	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 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 ² t PTC, Over-temperature, Parameter PIN protection.
Standards	UL, cUL, CE, C-tick
CE conformity	Conformity with EC Low Voltage Directive 73/23/EEC

NOTE: SED2 Compliance with EN61000-3-12:
 From September 1st, 2005 all electrical apparatus covered by the EMC directive will have to comply with EN61000-3-12 "Limits for harmonic currents produced by equipment connected to public low voltage systems with input currents > 16A and =< 75 A per phase".

Siemens variable speed drives of the product range SED2 (Micromaster 436) fulfill the requirements of the EN 61000-3-12 (without the need for external line reactors) regarding the THD values of Table 3 under the pre condition of Rsce > 190. The required PWhd values will not be achieved. Due to this fact it is recommended to apply for connection approval at the local electricity board.

The local electricity board will evaluate among many other data the content of the 5th harmonic current and the Line Power Factor "Lambda", which is the ratio of active power and apparent power.

Siemens frequency inverters are optimized in design and operation characteristics regarding energy efficiency and less interference with line supplies.

Table 2. Output Ratings.

Voltage (±10%)	Product Number			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.

Accessories

Gland Plates (included with NEMA Type 1):

- SED2-GL-A Gland Plate, Frame A
- SED2-GL-B Gland Plate, Frame B
- SED2-GL-C Gland Plate, Frame C

Protection Shield (included with NEMA Type 1):

- SED2-PS-A Protection Shield, Frame A
- SED2-PS-B Protection Shield, Frame B
- SED2-PS-C Protection Shield, Frame C
- SED2-PS-DE Protection Shield, Frame D, E

Operator Panel:

- SED2-BOP1 Basic Operator Panel (included with all SED2s)
- SED2-AOP1 Advanced Operator Panel

BOP/AOP Door Mounting Kits:

- SED2-DOOR-KIT1 BOP/AOP Single Inverter Door Mounting Kit
- SED2-DOOR-KIT2 AOP Multi-Inverter Door Mounting Kit

LON Interface Option

- SED2-LONI/F

Modbus Interface Cable

- SED2-MODBUS1 Converts VFD's USS bus to Modbus RTU

Dimensions

Table 3. Overall Dimensions for IP20 SED2 VFDs in Inches (Millimeters).

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)

Table 4. Overall Dimensions for NEMA Type 1 SED2 VFDs Assembled with Protective Shield and Gland Plate in Inches (Millimeters).

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)

Table 5. Overall Dimensions for IP54/NEMA Type 12 SED2 VFDs in Inches (Millimeters).

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)