

# SPDE



## Single Phase Compact Power Supply



### Benefits

- **Compact dimensions:** SPDE can save up to 50% panel-width space thanks to its ultra-slim design. The 480 W model is just 48 mm wide.
- **High efficiency:** The built-in PFC (on SPDE..R models) results in high operating efficiency up to 94%.
- **Flexible installation:** Universal AC/DC input range with AC voltage (90 VAC to 264 VAC) or with DC voltage (120 VDC to 370 VDC).
- **Integrated protection:** Output short circuit, over-current, over-voltage, over-temperature protection.
- **Wide operating temperature:** SPDE..R models can work in extreme temperatures from -40°C to +70°C (-40°F to +158°F).

### Description

The SPDE series of DIN-rail mount power supplies encompasses high performance within an extremely compact footprint. Power ratings start from 75 W up to 480 W with 12, 24 and 48 VDC output. The SPDE achieves high operating efficiency of up to 94% @ 230 VAC. Features such as DC ok output relay (for SPDE..R models) and built-in protection functions ensure a high degree of reliability during operation.

All specifications are at nominal values, full load, 25°C unless otherwise stated.

### Applications

Installations with limited panel space, industrial equipment, machinery.

### Main functions

- Output short circuit, over-current, over-voltage and over-temperature protection
- DC OK relay indication (only in SPDE..R models)
- Built-in active PFC (only in SPDE..R models)

## References

### Order code



SPDE   1



Enter the code entering the corresponding option instead of .

Code	Option	Description	Notes
S	-	Switching	Device typology
P	-	Power	
D	-	DIN rail	
E	-	High efficiency	
<input type="checkbox"/>	12	12 VDC	Rated output voltage
	24	24 VDC	
	48	48 VDC	
<input type="checkbox"/>	75	75 W	Rated output power
	120	120 W	
	190	192 W	
	240	240 W	
	480	480 W	
1	-	Single phase input	Input type
<input type="checkbox"/>	-	-	
	R	Relay output	

### Selection guide

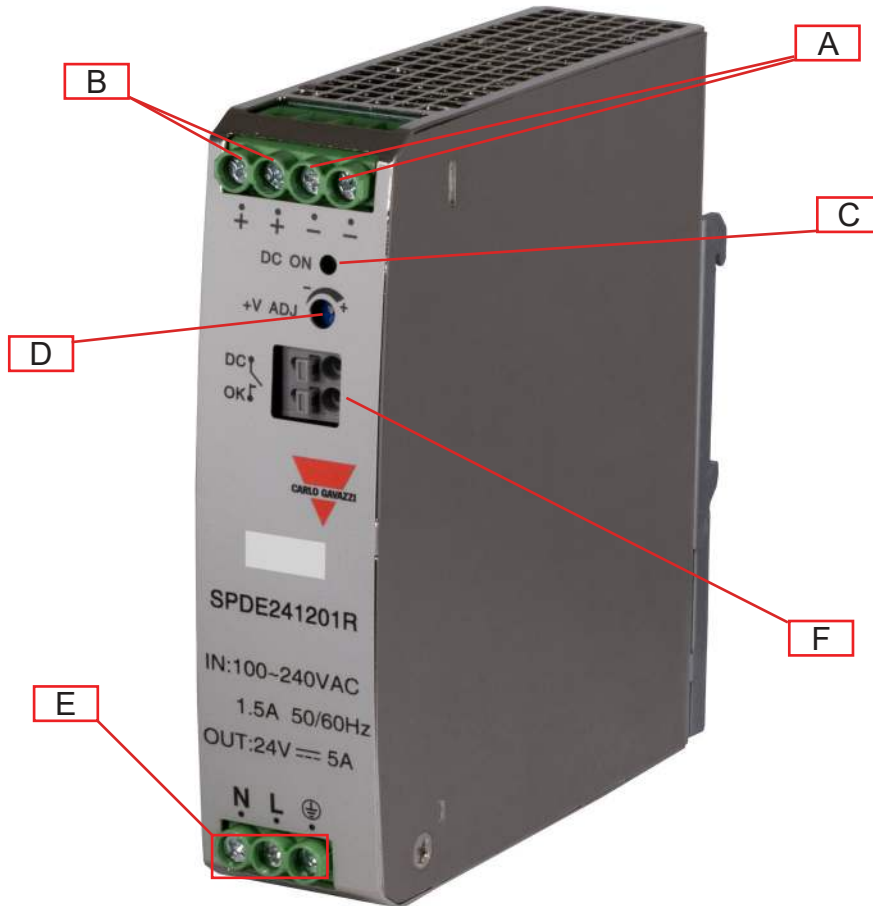
Output Voltage	SPDE..75	SPDE..120	SPDE..190	SPDE..240	SPDE..480
12 VDC	SPDE12751	SPDE121201R	SPDE121901R	-	-
24 VDC	SPDE24751	SPDE241201 SPDE241201R	-	SPDE242401 SPDE242401R	SPDE244801R
48 VDC	SPDE48751	SPDE481201R	-	SPDE482401R	SPDE484801R

### Further reading

Information	Where to find it	QR code
SPDE datasheet	<a href="https://gavazziautomation.com/images/PIM/DATASHEET/ENG/SPDE_DS_EN.pdf">https://gavazziautomation.com/images/PIM/DATASHEET/ENG/SPDE_DS_EN.pdf</a>	
SPDE installation sheet	<a href="https://gavazziautomation.com/images/PIM/MANUALS/ENG/SPDE_IM.pdf">https://gavazziautomation.com/images/PIM/MANUALS/ENG/SPDE_IM.pdf</a>	

# Structure

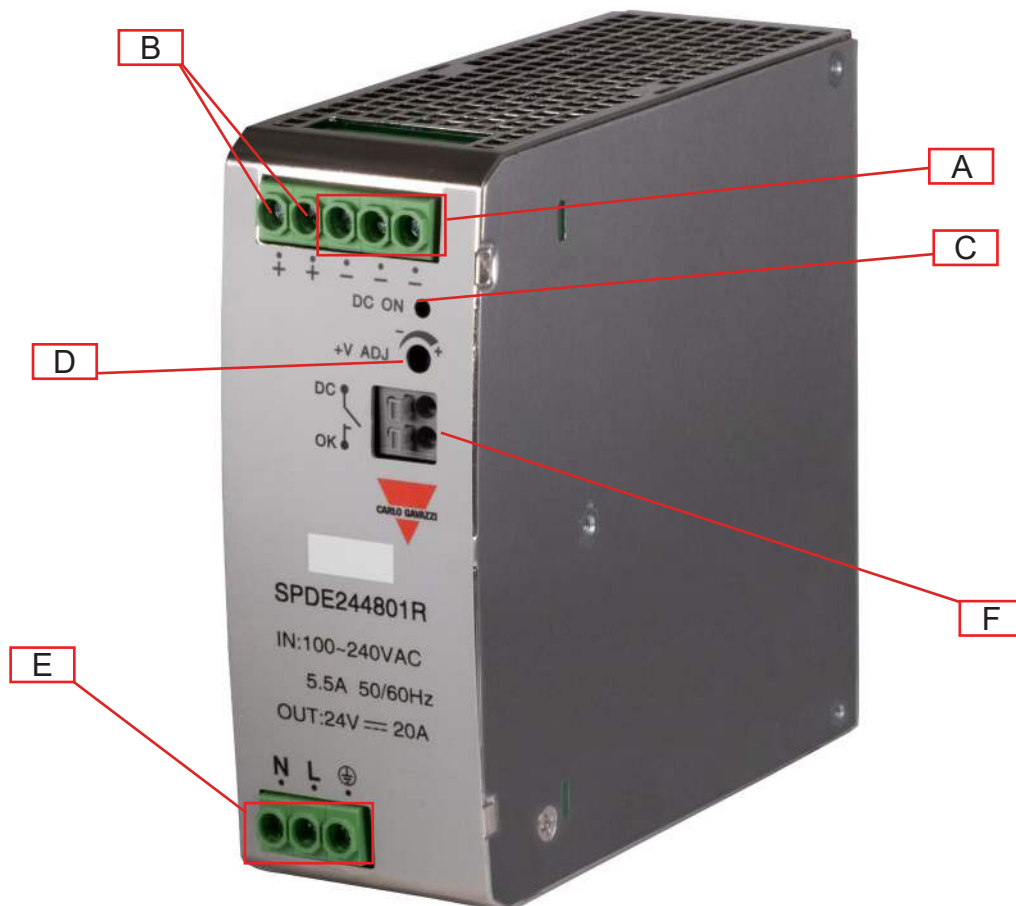
SPDE..75 / SPDE..120 / SPDE..190 / SPDE..240



Element	Component	Function
A	- V terminals	Negative DC Output terminals
B	+ V terminals	Positive DC Output terminals
C	DC OK LED	Green when output voltage is active
D	VADJ trimmer	Output voltage adjustment
E	Input terminals	L, N supply terminals and Protective Earth (PE)
F	DC OK relay*	Relay rating: 30 VDC / 1 A max. (resistive load) Relay contacts closed when output voltage $\geq$ 90% of rated output voltage.

\* applies to SPDE..R models only

**SPDE..480..R**



Element	Component	Function
A	- V terminals	Negative DC Output terminals
B	+ V terminals	Positive DC Output terminals
C	DC OK LED	Green when output voltage is active
D	VADJ trimmer	Output voltage adjustment
E	Input terminals	L, N supply terminals and Protective Earth (PE)
F	DC OK relay	Relay rating: 30 VDC / 1 A max. (resistive load) Relay contacts closed when output voltage $\geq$ 90% of rated output voltage.

# Features

## General data

	SPDE..75	SPDE..120	SPDE..190	SPDE..240	SPDE..480
Leakage current (input-output)	<0.5 mA	<1.0 mA	<0.5 mA		<0.8 mA
Earth leakage current (input-GND)		-	<1.0 mA		-
Efficiency	86% (12 VDC) 89% (24 VDC) 90% (48 VDC)	88%* 93.5% (12 VDC) 94% (24 VDC) 94% (48 VDC)	92% (12 VDC)	94% (24 VDC) 94% (48 VDC)	94% (24 VDC) 94% (48 VDC)
Power loss @ nominal load	≤1.5W	-			
Power factor (full load)					
115 VAC	-	0.98		0.98	0.99
230 VAC		0.94		0.94 / 0.95*	0.99
Ingress protection	IP20				
MTBF (MIL-HDBK-217F)	>300,000 h				
Case material	Metal				
Weight	350 g	410 g* 490 g ± 10%	600 g	600 g** 650 g	980 g

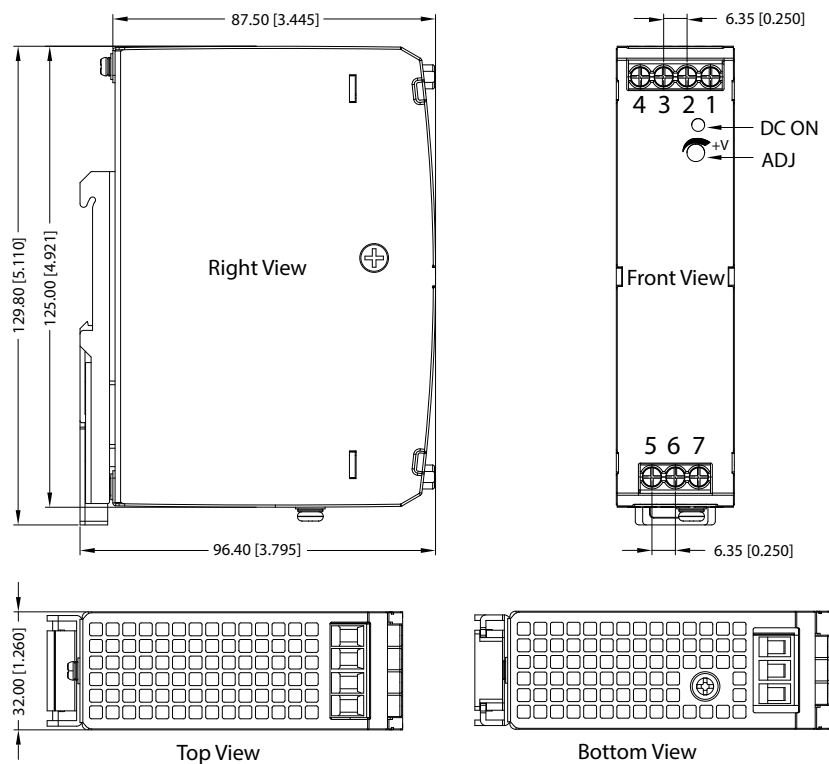
\* applies to SPDE241201 only

\*\* applies to SPDE242401 only

## Dimensions

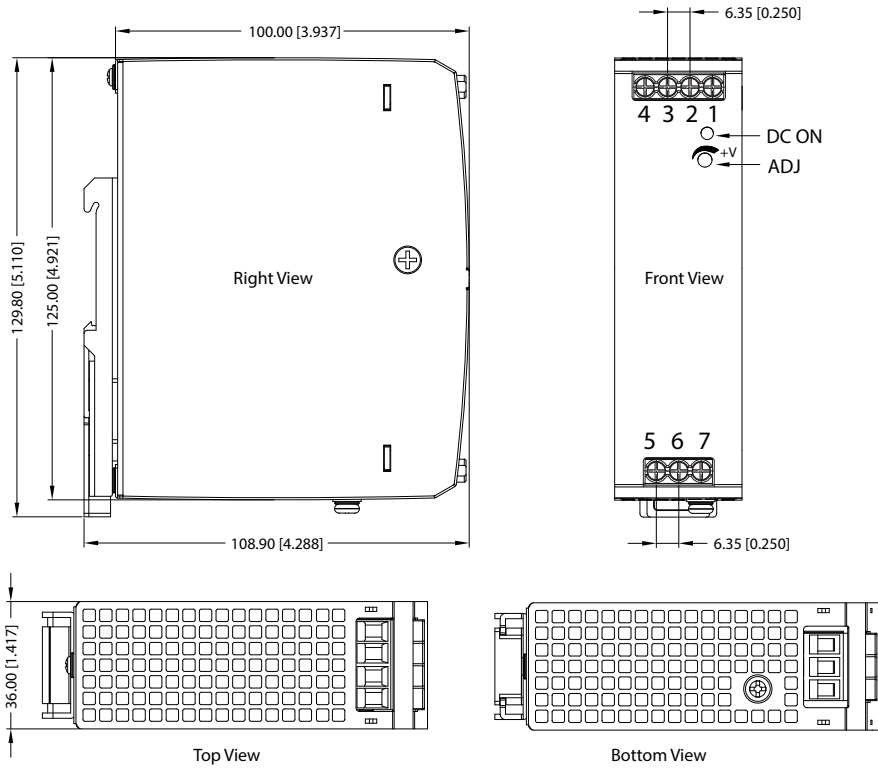
### SPDE..75

Unit: mm [inch]



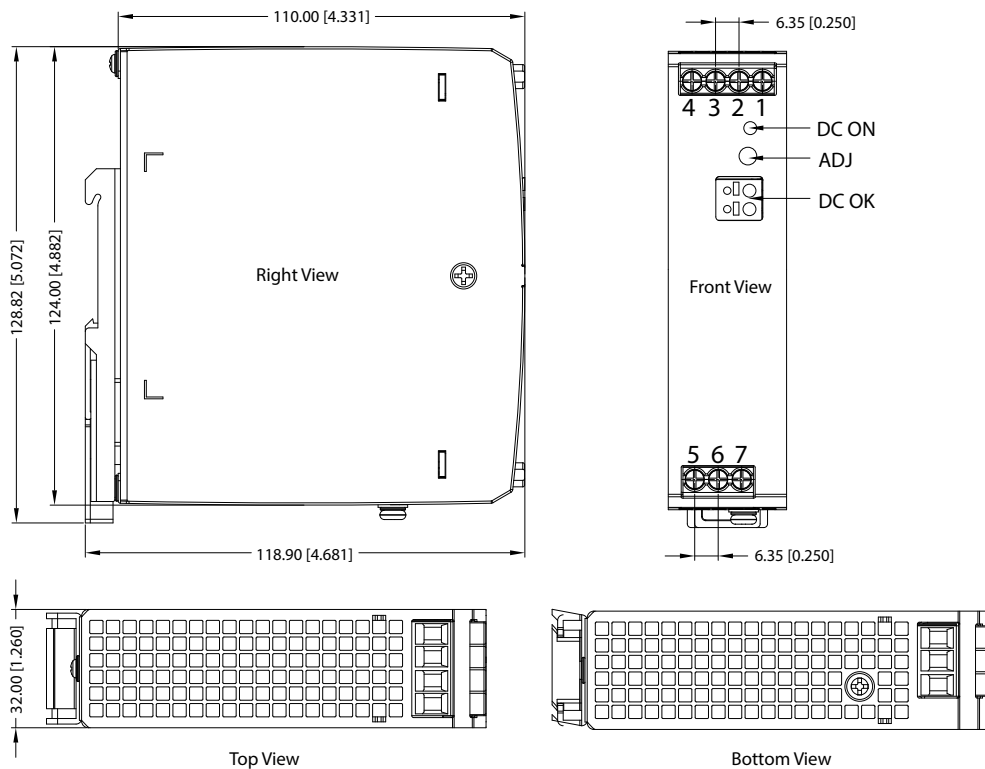
**SPDE..120**

Unit: mm [inch]

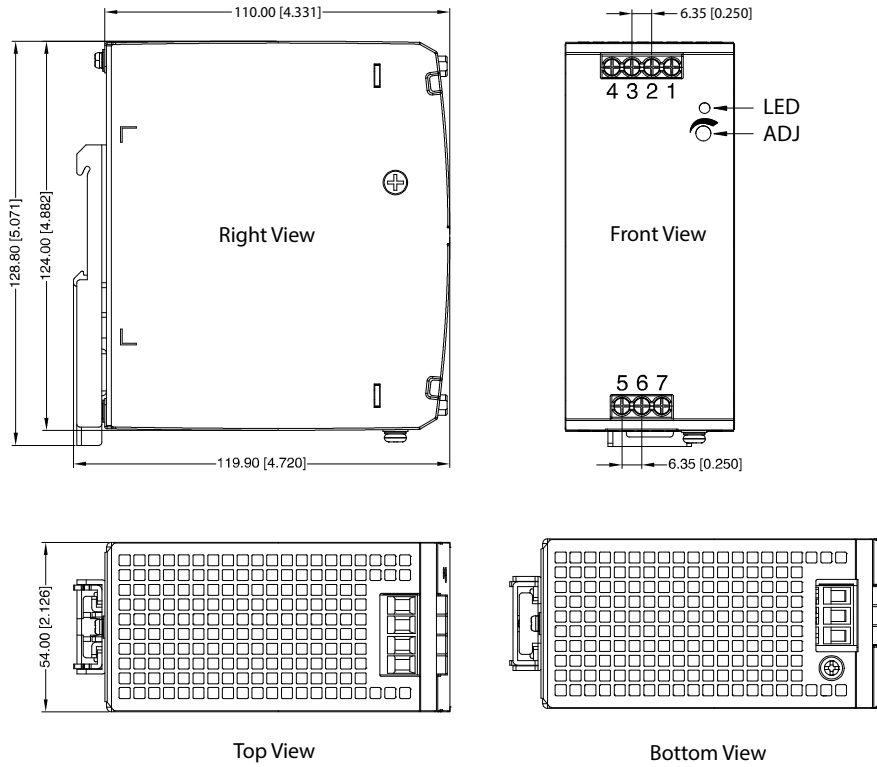


**SPDE..120..R**

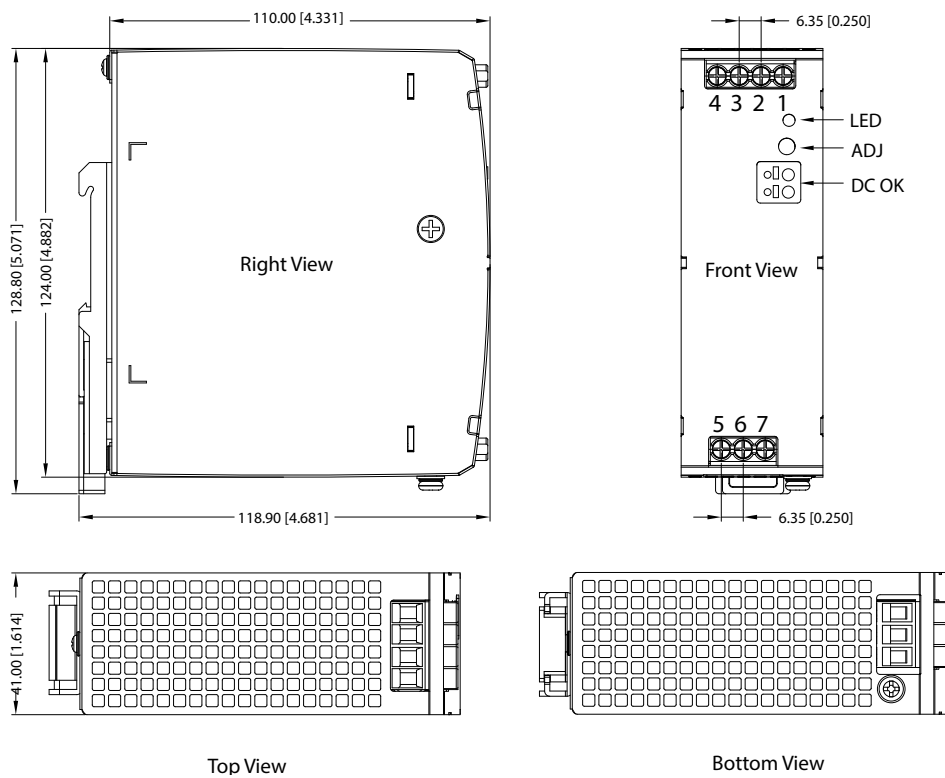
Unit: mm [inch]



**SPDE242401**  
Unit: mm [inch]

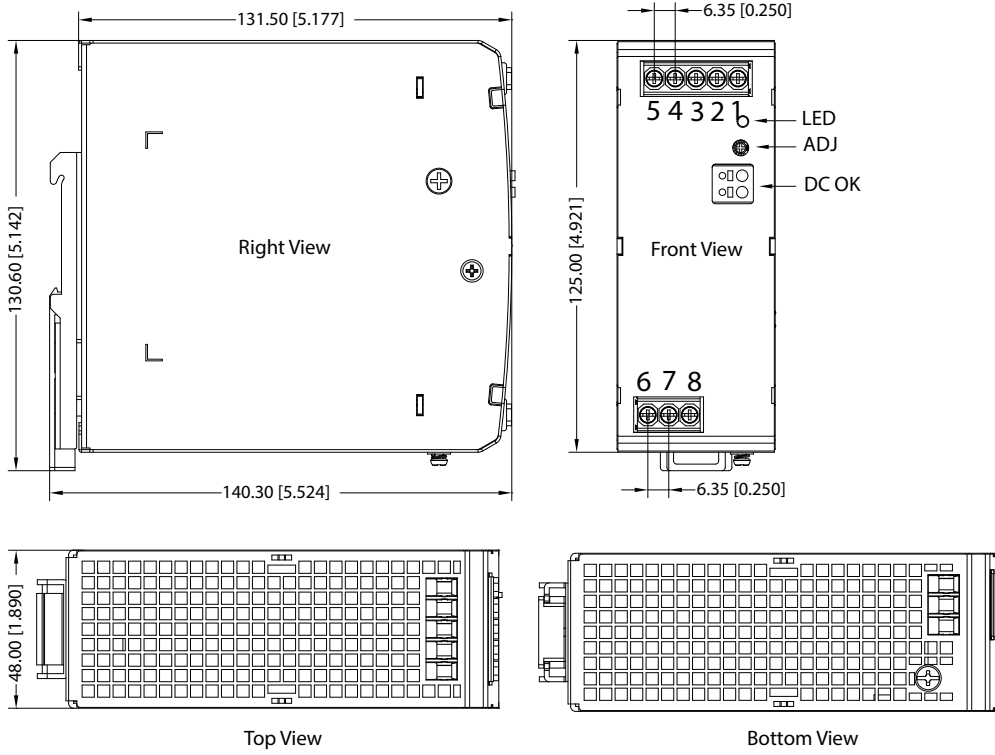


**SPDE..190..R / SPDE..240..R**  
Unit: mm [inch]



**SPDE..480..R**

Unit: mm [inch]



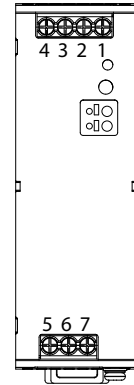


# Connection diagram

## Terminal markings

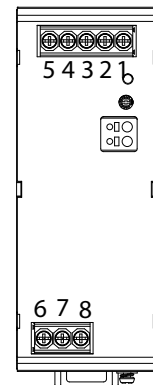
### SPDE..75 / SPDE..120 / SPDE..190 / SPDE..240

Terminal	Designation	Description
1	-V <sub>o</sub>	Negative output terminal
2	-V <sub>o</sub>	Negative output terminal
3	+V <sub>o</sub>	Positive output terminal
4	+V <sub>o</sub>	Positive output terminal
5	AC(N)	Input terminals (neutral conductor, no polarity with DC input)
6	AC(L)	Input terminals (phase conductor, no polarity with DC input)
7	PE	Ground this terminal to minimize high frequency emissions



### SPDE..480

Terminal	Designation	Description
1	-V <sub>o</sub>	Negative output terminal
2	-V <sub>o</sub>	Negative output terminal
3	-V <sub>o</sub>	Negative output terminal
4	+V <sub>o</sub>	Positive output terminal
5	+V <sub>o</sub>	Positive output terminal
6	AC(N)	Input terminals (neutral conductor, no polarity with DC input)
7	AC(L)	Input terminals (phase conductor, no polarity with DC input)
8	PE	Ground this terminal to minimize high frequency emissions




## Environmental

	SPDE..75	SPDE..120	SPDE..190	SPDE..240	SPDE..480
Operating temperature	-30°C to 70°C -22°F to 158°F	-20°C to 60°C* -4°F to 140°F* -40°C to 70°C -40°F to 158°F	-40°C to 70°C -40°F to 158°F		-30°C to 70°C -22°F to 158°F
Storage temperature	-40°C to 85°C -40°F to 185°F				
Humidity	<95% RH Non-condensing				
Temperature derating	Refer to derating diagram				

\* applies to SPDE241201 only

**Compatibility and conformity**

	SPDE..75	SPDE..120	SPDE..190	SPDE..240	SPDE..480
<b>Safety standards</b>	UL/EN62368-1 UL61010-1	EN62368-1 <sup>1</sup> UL61010-1 <sup>1</sup> UL61010-2-201	EN62368-1 UL61010-1		EN62368-1 UL61010-1
<b>Approvals</b>					
<b>Conducted (CS)</b> IEC/EN 61000-4-6	10 Vrms (PC A)				
<b>Voltage dips and interruptions</b> IEC/EN61000-4-11	0% (PC B) 70% (PC B)				0% (PC A) 70% (PC A)
<b>EMC emission</b> CE: CISPR32/EN55032 RE: CISPR32/EN55032	CLASS B CLASS B	CLASS A CLASS A	CLASS B CLASS B		
<b>Harmonic current</b>	IEC/EN61000-3-2 CLASS A		IEC/EN61000-3-2 CLASS A and CLASS D		
<b>EMC immunity</b>	EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61000-4-11				
<b>Vibration resistance</b>	10 ~ 500 Hz, 2G, 10 min. / 1 cycle, period for 60 min. Each along X, Y, Z axes.				
<b>Semi F47</b>	Tolerated sags to 50% of equipment nominal voltage for duration of up to 200 ms				

- 1. applies to SPDE241201 only
- 2. applies to SPDE..75 only

**Insulation**

	SPDE..75	SPDE..120	SPDE..190	SPDE..240	SPDE..480
<b>Insulation / withstand voltage (input / GND)</b>	2.0 kVAC / < 10 mA	2.0 kVAC / < 10 mA* 1.5 kVAC / < 15 mA	2.0 kVAC / < 15 mA		2.0 kVAC / < 10 mA
<b>Insulation / withstand voltage (input / output)</b>	4.0 kVAC / < 10 mA	4.0 kVAC / < 10 mA* 3.0 kVAC / < 15 mA	3.0 kVAC / < 15 mA		3.0 kVAC / < 10 mA
<b>Insulation / withstand voltage (output / GND)</b>	0.5 kVAC / < 10 mA	0.5 kVAC / < 10 mA* 0.5 kVAC / < 15 mA	0.5 kVAC / < 15 mA		0.5 kVAC / < 10 mA
<b>Output / DC OK<sup>3</sup></b>	-	30 VDC / 1A max. (resistive load)			
<b>Insulation resistance</b>	≥ 50 MΩ	≥ 100 MΩ	≥ 50 MΩ		≥ 100 MΩ
<b>Overvoltage category</b>	II				
<b>Pollution degree</b>	2				

- 3. applies to SPDE..R models only
- \* applies to SPDE241201 only

**Inputs**

	SPDE..75	SPDE..120	SPDE..190	SPDE..240	SPDE..480
<b>Rated input voltage</b>	100 VAC to 240 VAC				
<b>Input voltage range</b>	90 VAC to 264 VAC		85 VAC to 264 VAC		
	120 VDC to 370 VDC	127 VDC to 370 VDC	120 VDC to 370 VDC		
<b>AC current (max)</b> 115 VAC 230 VAC	<2.0 A <1.0 A	<3.0 A* / <1.5 A <1.6 A* / <0.75 A	<3.0 A <1.5 A		<5.5 A <2.5 A
<b>Frequency range</b>	47 Hz to 63 Hz				
<b>Inrush current</b> 115 VAC 230 VAC	25 A 45 A	30 A* / 15 A 55 A* / 30 A	15 A 30 A		20 A 40 A

\* applies to SPDE241201 only

**Outputs**

	SPDE..75	SPDE..120	SPDE..190	SPDE..240	SPDE..480
<b>Output power</b>	75 W	120 W	192 W	240 W	480 W
<b>Voltage accuracy</b>	±2 % (12 VDC) ±1 % (24/48 VDC)		±2 %	±1 %	±1%
<b>Line regulation</b>	±0.5 %				
<b>Load regulation</b>	±1.0 %				
<b>Voltage regulation span</b>					
<b>12 VDC</b>	12 V to 14 V	12 V to 14 V	12 V to 14 V		
<b>24 VDC</b>	24 V to 28 V	24 V to 28 V		24 V to 28 V	24 V to 28 V
<b>48 VDC</b>	48 V to 53 V	48 V to 55 V		48 V to 53 V	48 V to 56 V
<b>Rated output current</b>					
<b>12 VDC</b>	6.3 A	10 A	16 A		
<b>24 VDC</b>	3.2 A	5 A		10 A	20 A
<b>48 VDC</b>	1.6 A	2.5 A		5 A	10 A
<b>Ripple and noise 20 MHz bandwidth</b>					
<b>12 VDC</b>	< 80 mV	< 120 mV* < 100 mV	75 - 150 mV	75 - 150 mV**	
<b>24 VDC</b>	< 120 mV	< 100 mV		60 - 120 mV	<100 mV
<b>48 VDC</b>	< 150 mV	< 200 mV		75 - 150 mV	<120 mV
<b>Hold up time</b>	≥ 12 ms (115 VAC) ≥ 60 ms (230 VAC)	≥ 8 ms (115 VAC)* ≥ 16 ms (230 VAC)* ≥ 20 ms		≤ 20 ms	≤ 22 ms
<b>Set-up time</b>	< 3 s	2.5 s (115 VAC)* 1.2 s (230 VAC)* < 3 s		< 1 s	< 3 s
<b>Rise time</b>	-	≤ 60 ms* ≤ 100 ms		< 100 ms	< 150 ms
<b>Turn-on overshoot</b>	< 10 %				
<b>Overshoot and undershoot</b>	±10%		< 10 %		±10%
<b>Mounting space</b>	No requirement for the installation distance	Top / bottom: 20 mm lateral: 5 mm (when the device is loaded permanently with more than 50% of the rated power)			
<b>Series operation</b>	Support output series boost voltage, it is suggested additional 15 mm space				
<b>Parallel operation</b>	No				
<b>Power boost</b>	-	110%~150% of rated output current within 1 s* / 3 s	150% of rated output current		110%~150% of rated output current within 1 s

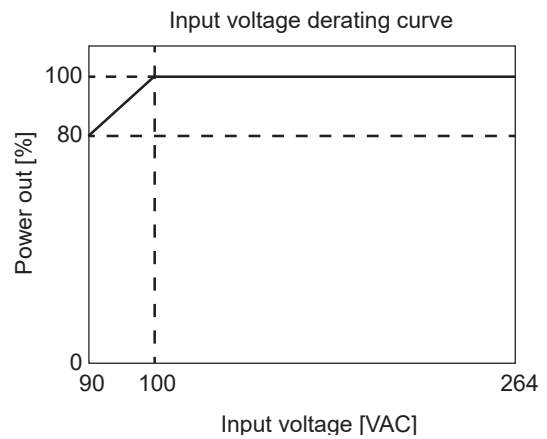
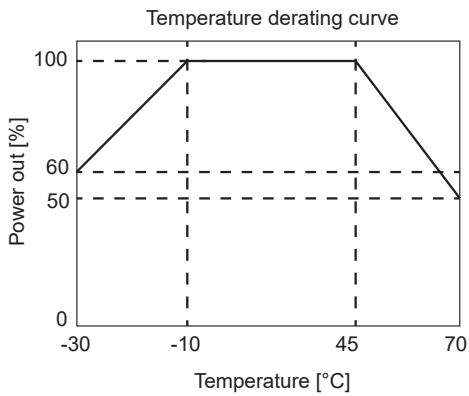
\* applies to SPDE241201 only

\*\* applies to SPDE242401 only

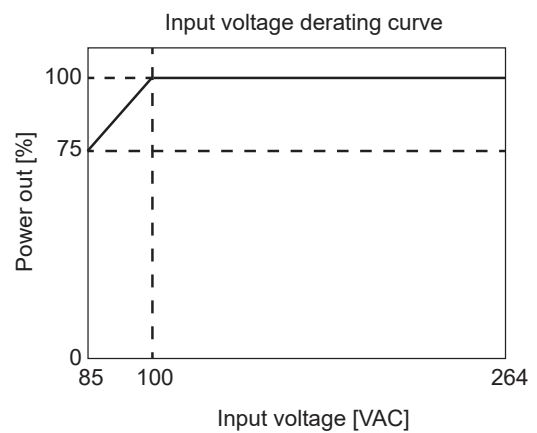
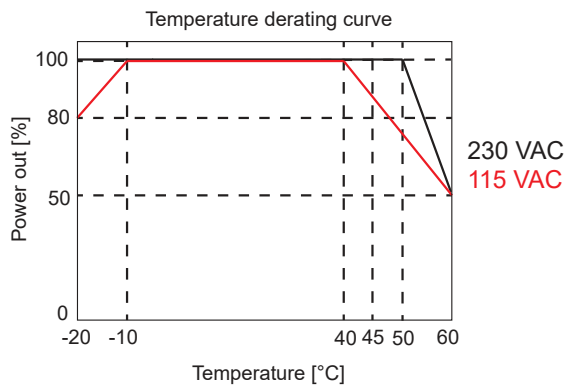
# Performance

## Current derating

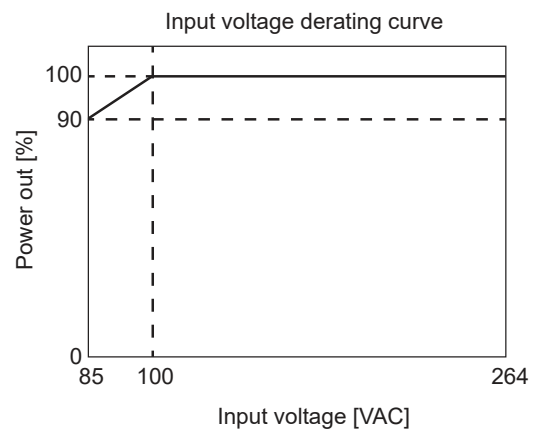
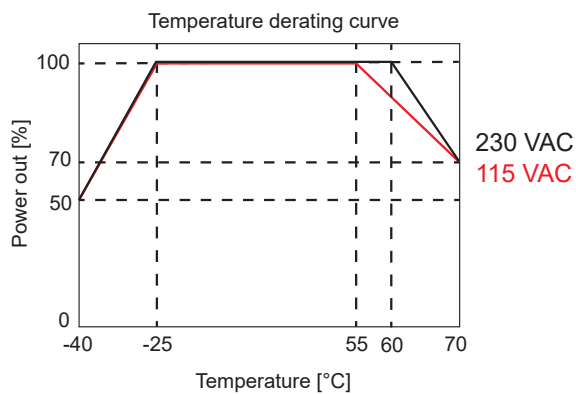
### SPDE..75



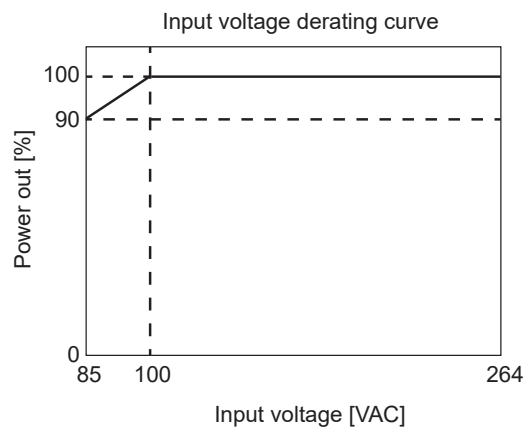
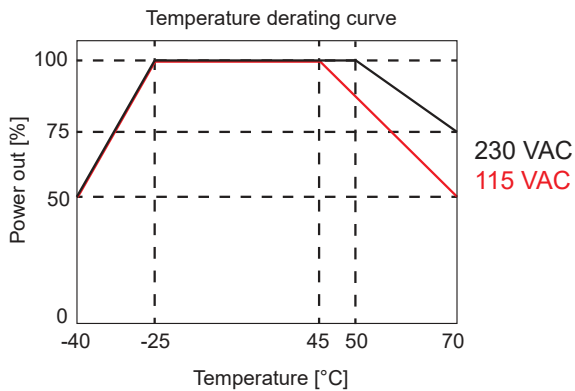
### SPDE241201



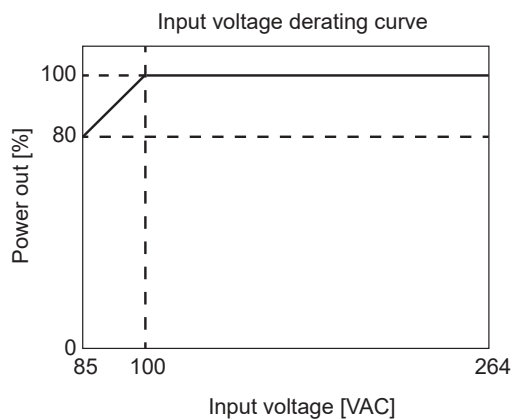
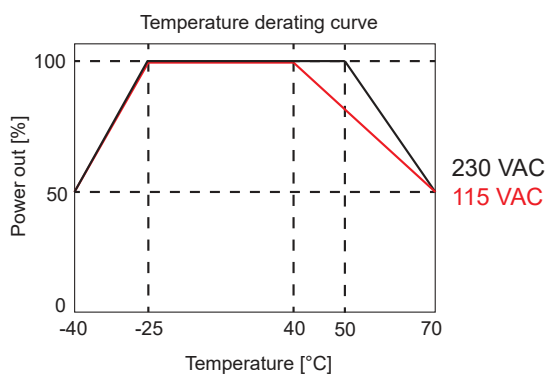
### SPDE..120



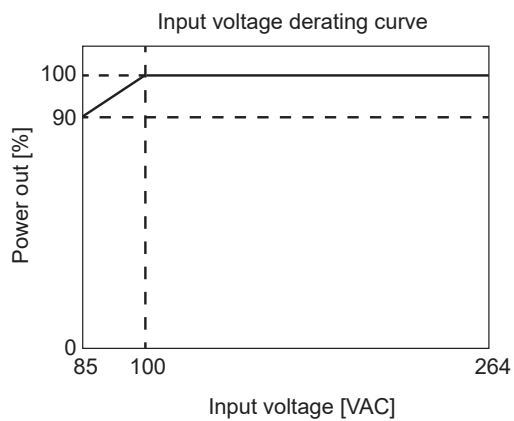
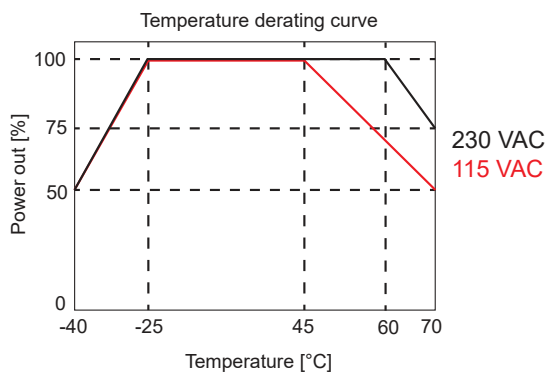
**SPDE..190**



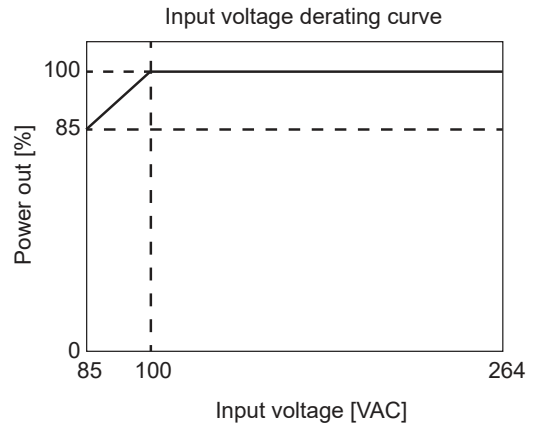
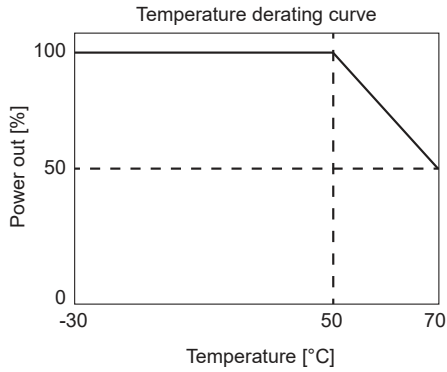
**SPDE242401**



**SPDE..240**

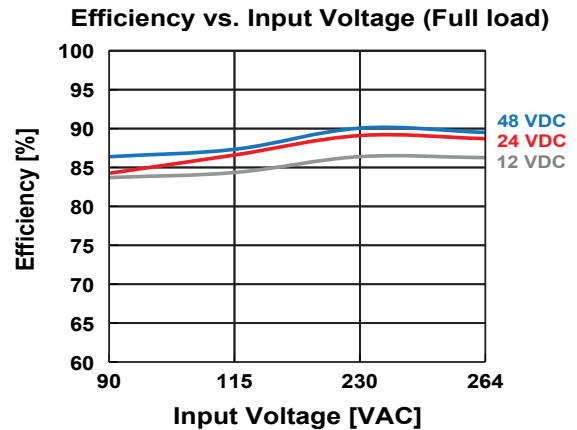
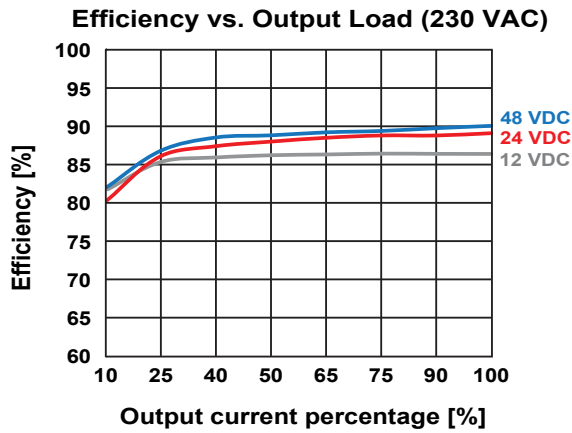


SPDE..480

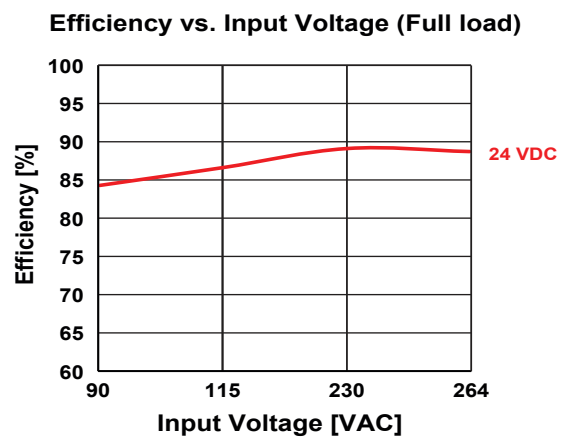
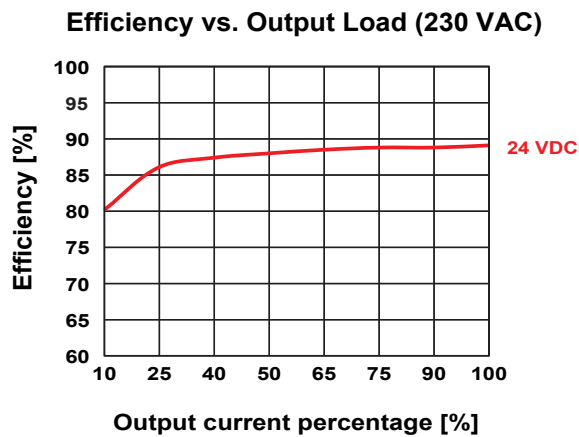


Efficiency

SPDE..75

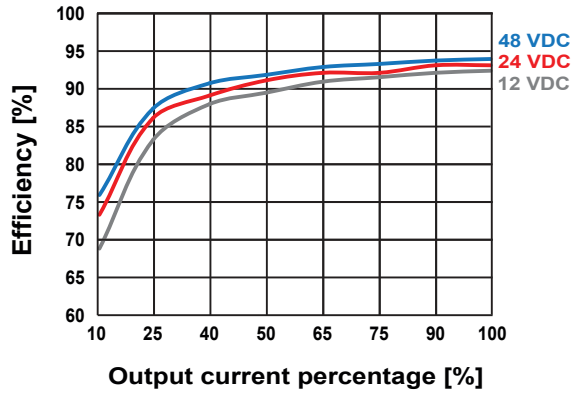


SPDE241201

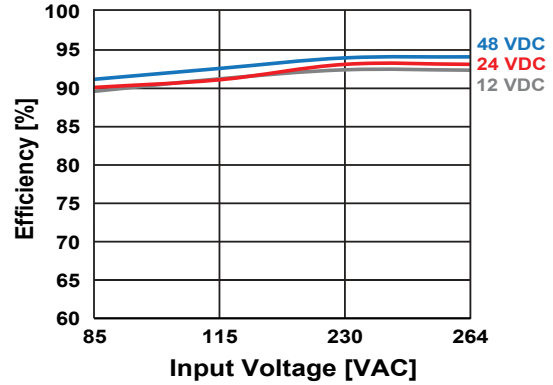


**SPDE..120**

**Efficiency vs. Output Load (230 VAC)**

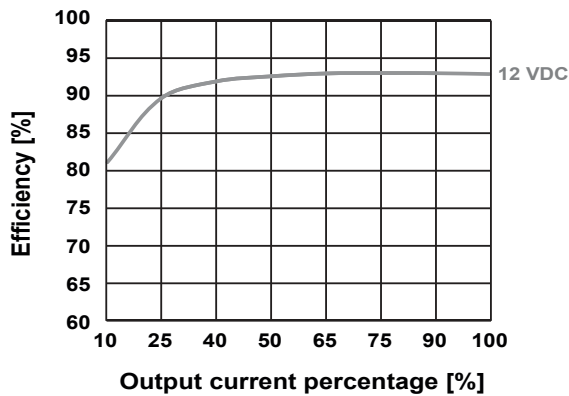


**Efficiency vs. Input Voltage (Full load)**

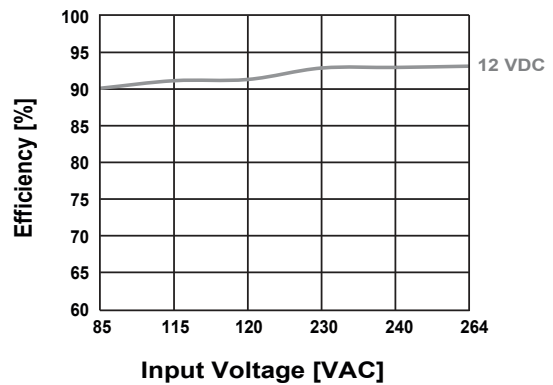


**SPDE..190**

**Efficiency vs. Output Load (230 VAC)**

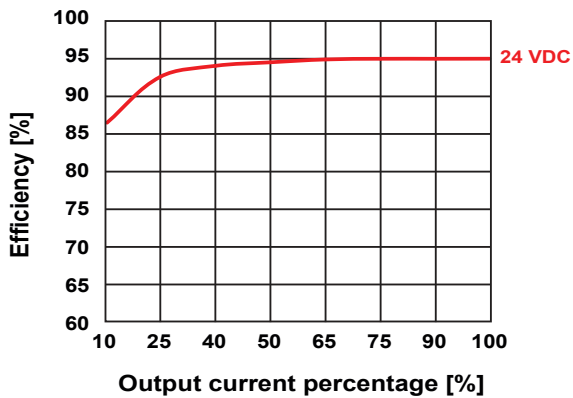


**Efficiency vs. Input Voltage (Full load)**

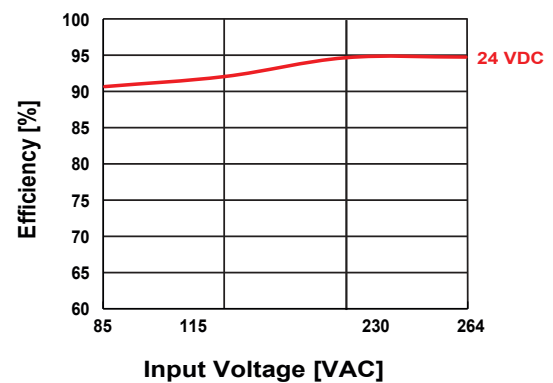


**SPDE242401**

**Efficiency vs. Output Load (230 VAC)**



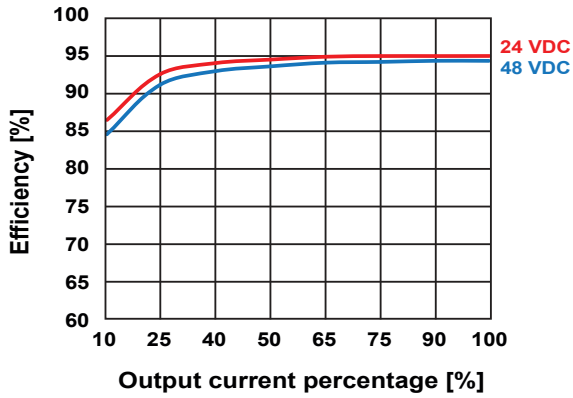
**Efficiency vs. Input Voltage (Full load)**



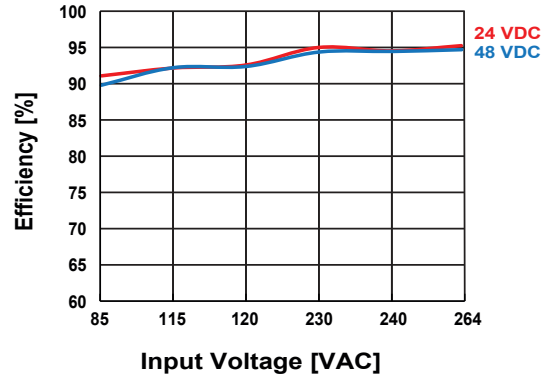


SPDE..240

Efficiency vs. Output Load (230 VAC)

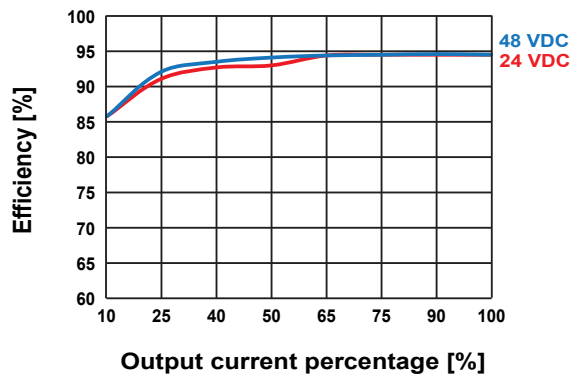


Efficiency vs. Input Voltage (Full load)

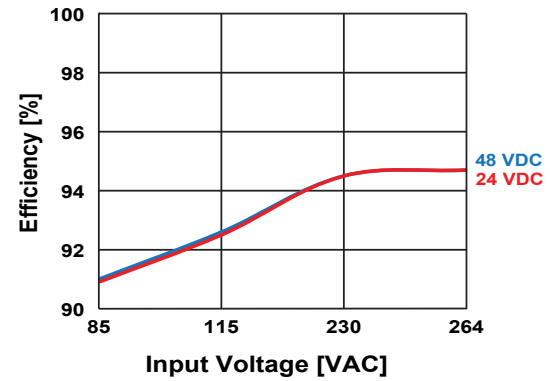


SPDE..480

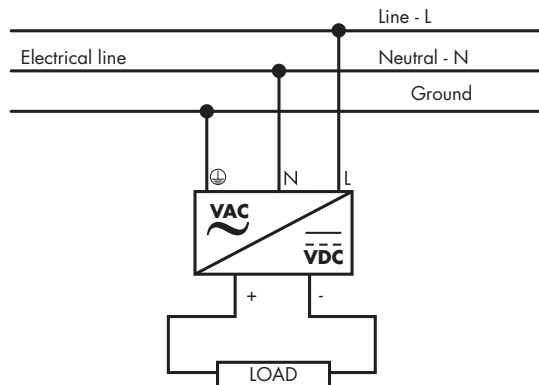
Efficiency vs. Output Load (230 VAC)



Efficiency vs. Input Voltage (Full load)



▶ **Wiring diagram**



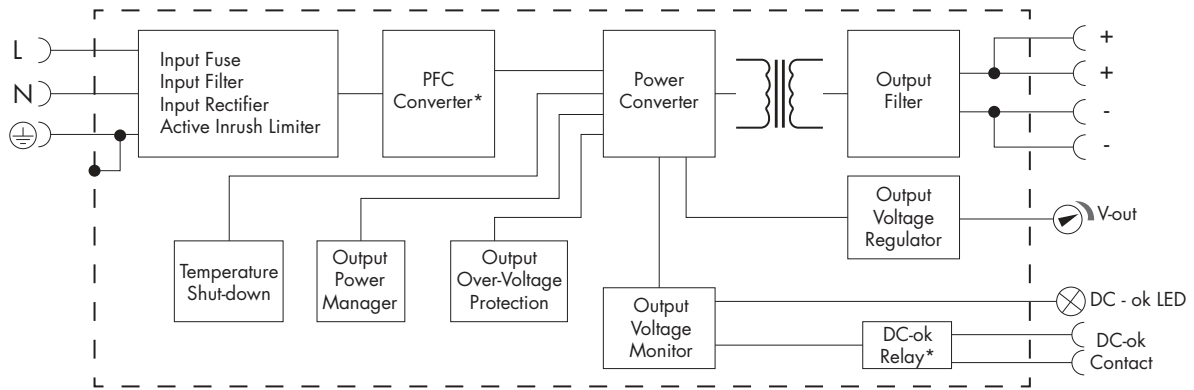
▶ **Connection specification**

		SPDE..75	SPDE..120	SPDE..190	SPDE..240	SPDE..480
<b>Terminal type</b>		Screw terminals with Phillips screw head				
<b>Screw driver blade</b>		3.5 mm slotted or Phillips				
<b>Tightening torque (recommended)</b>		0.4 Nm		0.79 Nm		0.5 Nm
<b>Conductor cross section (input terminals)</b>		0.14 - 6 mm <sup>2</sup> (26 - 10 AWG)	0.14 - 6 mm <sup>2</sup> (26 - 10 AWG)	0.14 - 6 mm <sup>2</sup> (26 - 10 AWG)		0.5 - 6 mm <sup>2</sup> (20 - 10 AWG)
<b>Conductor cross section (PE connection)</b>				4 - 6 mm <sup>2</sup> (12 - 10 AWG)		
<b>Conductor cross section (output terminals)</b>	<b>12 VDC</b>	0.14 - 6 mm <sup>2</sup> (26 - 10 AWG)	1.5 - 6 mm <sup>2</sup> (16 - 10 AWG)	4 - 6 mm <sup>2</sup> (12 - 10 AWG)	-	
	<b>24 VDC</b>		0.5 - 6 mm <sup>2</sup> (20 - 10 AWG)	-	1.5 - 6 mm <sup>2</sup> (16 - 10 AWG)	2.5 - 6 mm <sup>2</sup> (14 - 10 AWG)
	<b>48 VDC</b>		0.34 - 6 mm <sup>2</sup> (22 - 10 AWG)	-	1.0 - 6 mm <sup>2</sup> (18 - 10 AWG)	
<b>DC OK relay output*</b>		-	0.25 - 1.5 mm <sup>2</sup> (24 - 16 AWG)			

\* applies to SPDE..R models only

Note: for SPDE241201 Conductor cross section (output terminals): 1.5 - 6 mm<sup>2</sup> (16 - 10 AWG)

**Block diagram**



\* only in SPDE..R versions

## Operating description

**Control and protection**

		SPDE..75	SPDE..120	SPDE..190	SPDE..240	SPDE..480
<b>Oversvoltage protection</b>						
	<b>12 VDC</b>	≤ 17 V	≤ 16 V	≤ 18 V		
	<b>24 VDC</b>	≤ 33 V	≤ 33 V		≤ 35 V	29 - 35 V
	<b>48 VDC</b>	≤ 60 V	≤ 60 V		≤ 60 V	56 - 60 V
<b>Over-current protection</b>	<b>100% ~ 150% of rated current</b>	Constant current mode, automatic recover after fault condition is removed		Self-recovery		The output turned off after working normally for 1 s, self-recovery
	<b>&gt;150% of rated current</b>					Automatic recover after fault condition is removed
<b>Current limiting</b>		< 2 A	< 2.7 A (115 VAC)* < 1.6 A (230 VAC)* < 1.5 A	< 4 A		< 5.5 A
<b>Short circuit protection</b>		Constant current, continuous, self-recovery				Hiccup, continuous, self-recovery
<b>Over temperature protection</b>		Output voltage turn off, re-power on for recover after the temp. drops.	Output voltage turn off, re-power on for recover.	80°C		60°C to 90°C
<b>Reverse voltage protection</b>		No				

\* applies to SPDE241201 only