

SIMATIC S7-300 Advanced Controllers

Power supplies

1-phase, 24 V DC (for S7-300 and ET200M)

Overview



The design and functionality of the SIMATIC PS 307 single-phase load power supply (system and load current supply) with automatic range switchover of the input voltage is an optimal match to the SIMATIC S7-300 PLC. By means of the connecting comb that is supplied with the system and load current supply, the supply to the CPU is quickly established. It is also possible to provide a 24 V supply to other S7-300 system components, input/output circuits of the input/output modules and, if necessary, the sensors and actuators. Comprehensive certifications, such as UL, ATEX or GL facilitate universal use (does not apply to outdoor use).

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Technical specifications

Article number	6ES7307-1BA01-0AA0	6ES7305-1BA80-0AA0	6ES7307-1EA01-0AA0	6ES7307-1EA80-0AA0	6ES7307-1KA02-0AA0
Product	PS 307	PS 305 Outdoor	PS 307	PS 307 Outdoor	PS 307
Power supply, type	24 V/2 A	24 V/2 A	24 V/5 A	24 V/5 A	24 V/10 A
Input					
Input	1-phase AC	DC voltage	1-phase AC	1-phase AC	1-phase AC
Supply voltage					
• 1 at AC Rated value	120 V		120 V	120 V	120 V
• 2 at AC Rated value	230 V		230 V	230 V	230 V
• at DC		24 ... 110 V			
• Note	Automatic range selection		Automatic range selection	Set by means of selector switch on the device	Automatic range selection
Input voltage					
• 1 at AC	85 ... 132 V		85 ... 132 V	93 ... 132 V	85 ... 132 V
• 2 at AC	170 ... 264 V		170 ... 264 V	187 ... 264 V	170 ... 264 V
• at DC		16.8 ... 138 V			
Wide-range input	No	Yes	No	No	No
Overvoltage resistance	$2.3 \times V_{in \text{ rated}}, 1.3 \text{ ms}$	154 V; 0.1 s	$2.3 \times V_{in \text{ rated}}, 1.3 \text{ ms}$	$2.3 \times V_{in \text{ rated}}, 1.3 \text{ ms}$	$2.3 \times V_{in \text{ rated}}, 1.3 \text{ ms}$
Mains buffering at I _{out} rated, min.	20 ms; at $V_{in} = 93/187 \text{ V}$	10 ms; at $V_{in \text{ rated}}$	20 ms; at $V_{in} = 93/187 \text{ V}$	20 ms; at $V_{in} = 93/187 \text{ V}$	20 ms; at $V_{in} = 93/187 \text{ V}$
Rated line frequency 1	50 Hz		50 Hz	50 Hz	50 Hz
Rated line frequency 2	60 Hz		60 Hz	60 Hz	60 Hz
Rated line range	47 ... 63 Hz		47 ... 63 Hz	47 ... 63 Hz	47 ... 63 Hz
Input current					
• at rated input voltage 120 V	0.9 A		2.3 A	2.1 A	4.2 A
• at rated input voltage 230 V	0.5 A		1.2 A	1.2 A	1.9 A
• at rated input voltage 24 V		2.4 A			
• at rated input voltage 110 V		0.6 A			
Switch-on current limiting (+25 °C), max.	22 A	20 A	20 A	45 A	55 A
Duration of inrush current limiting at 25 °C					
• maximum	3 ms	10 ms	3 ms	3 ms	3 ms
I ² t, max.	1 A ² ·s	5 A ² ·s	1.2 A ² ·s	1.8 A ² ·s	3.3 A ² ·s
Built-in incoming fuse	T 1.6 A/250 V (not accessible)	T 6.3 A/250 V (not accessible)	T 3,15 A/250 V (not accessible)	T 3,15 A/250 V (not accessible)	T 6.3 A/250 V (not accessible)
Protection in the mains power input (IEC 898)	Recommended miniature circuit breaker: 3 A characteristic C	Recommended miniature circuit breaker: from 10 A characteristic C, suitable for DC	Recommended miniature circuit breaker: from 6 A characteristic C	Recommended miniature circuit breaker: from 10 A characteristic C or from 6 A characteristic D	Recommended miniature circuit breaker: from 10 A characteristic C

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Product	PS 307	PS 305 Outdoor	PS 307	PS 307 Outdoor	PS 307
Power supply, type	24 V/2 A	24 V/2 A	24 V/5 A	24 V/5 A	24 V/10 A
Output					
Output	Controlled, isolated DC voltage	Controlled, isolated DC voltage	Controlled, isolated DC voltage	Controlled, isolated DC voltage	Controlled, isolated DC voltage
Rated voltage V_{out} DC	24 V	24 V	24 V	24 V	24 V
Total tolerance, static $\pm$	3 %	3 %	3 %	3 %	3 %
Static mains compensation, approx.	0.1 %	0.2 %	0.1 %	0.2 %	0.1 %
Static load balancing, approx.	0.2 %	0.4 %	0.5 %	0.4 %	0.5 %
Residual ripple peak-peak, max.	50 mV	150 mV	50 mV	150 mV	50 mV
Residual ripple peak-peak, typ.	5 mV	30 mV	10 mV	40 mV	15 mV
Spikes peak-peak, max. (bandwidth: 20 MHz)	150 mV	240 mV	150 mV	240 mV	150 mV
Spikes peak-peak, typ. (bandwidth: 20 MHz)	20 mV	150 mV	20 mV	90 mV	60 mV
Product function	No	No	No	No	No
Output voltage adjustable	No	No	No	No	No
Output voltage setting	-	-	-	-	-
Status display	Green LED for 24 V OK	Green LED for 24 V OK	Green LED for 24 V OK	Green LED for 24 V OK	Green LED for 24 V OK
On/off behavior	No overshoot of V_{out} (soft start)	No overshoot of V_{out} (soft start)	No overshoot of V_{out} (soft start)	No overshoot of V_{out} (soft start)	No overshoot of V_{out} (soft start)
Startup delay, max.	2 s	3 s	2 s	3 s	2 s
Voltage rise, typ.	10 ms	5 ms	10 ms	100 ms	10 ms
Rated current value I _{out} rated	2 A	2 A	5 A	5 A	10 A
Current range	0 ... 2 A	0 ... 3 A	0 ... 5 A	0 ... 5 A	0 ... 10 A
• Note		3 A up to +60°C at $V_{in} > 24$ V			
Supplied active power typical	48 W	48 W	120 W	120 W	240 W
Short-term overload current					
• on short-circuiting during the start-up typical	9 A	9 A	20 A	20 A	38 A
• at short-circuit during operation typical	9 A	9 A	20 A	20 A	38 A
Duration of overloading capability for excess current					
• on short-circuiting during the start-up	90 ms	270 ms	100 ms	180 ms	80 ms
• at short-circuit during operation	90 ms	270 ms	100 ms	80 ms	80 ms
Parallel switching for enhanced performance	Yes	Yes	Yes	No	Yes
Numbers of parallel switchable units for enhanced performance	2	2			
Efficiency					
Efficiency at V_{out} rated, I_{out} rated, approx.	84 %	75 %	87 %	84 %	90 %
Power loss at V_{out} rated, I_{out} rated, approx.	9 W	16 W	18 W	23 W	27 W
Closed-loop control					
Dynamic mains compensation (V_{in} rated ± 15 %), max.	0.1 %	0.3 %	0.1 %	0.3 %	0.1 %
Dynamic load smoothing (I_{out} : 50/100/50 %), $U_{out} \pm$ typ.	0.8 %	2.5 %	1 %	3 %	2 %
Load step setting time 50 to 100%, typ.	0.5 ms	2.5 ms	0.3 ms	0.2 ms	
Load step setting time 100 to 50%, typ.	0.5 ms	2.5 ms	0.3 ms	0.2 ms	
Setting time maximum	1 ms	5 ms		5 ms	0.1 ms

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Product	PS 307	PS 305 Outdoor	PS 307	PS 307 Outdoor	PS 307
Power supply, type	24 V/2 A	24 V/2 A	24 V/5 A	24 V/5 A	24 V/10 A
Protection and monitoring					
Output overvoltage protection	Additional control loop, shutdown at < 28.8 V, automatic restart	Additional control loop, shutdown at approx. 30 V, automatic restart	Additional control loop, shutdown at < 28.8 V, automatic restart	Additional control loop, shutdown at approx. 30 V, automatic restart	Additional control loop, shutdown at < 28.8 V, automatic restart
Current limitation	2.2 ... 2.6 A	3.3 ... 3.9 A	5.5 ... 6.5 A	5.5 ... 6.5 A	11 ... 12 A
Property of the output	Yes	Yes	Yes	Yes	Yes
Short-circuit proof					
Short-circuit protection	Electronic shutdown, automatic restart	Electronic shutdown, automatic restart	Electronic shutdown, automatic restart	Electronic shutdown, automatic restart	Electronic shutdown, automatic restart
Enduring short circuit current RMS value					
• maximum	2 A	2 A	7 A	5 A	12 A
Overload/short-circuit indicator	-	-			-
Safety					
Primary/secondary isolation	Yes	Yes	Yes	Yes	Yes
Galvanic isolation	Safety extra-low output voltage U _{out} acc. to EN 60950-1 and EN 50178	Safety extra low output voltage V _{out} according to EN 60950-1 and EN 50178, creepage distances and clearances > 5 mm	Safety extra-low output voltage U _{out} acc. to EN 60950-1 and EN 50178	Safety extra low output voltage V _{out} according to EN 60950-1 and EN 50178, creepage distances and clearances > 5 mm	Safety extra-low output voltage U _{out} acc. to EN 60950-1 and EN 50178
Protection class	Class I	Class I	Class I	Class I	Class I
Leakage current					
• maximum	3.5 mA		3.5 mA	3.5 mA	3.5 mA
• typical	0.5 mA		0.5 mA	0.3 mA	0.6 mA
CE mark	Yes	Yes	Yes	Yes	Yes
UL/cUL (CSA) approval	cULus-Listed (UL 508, CSA C22.2 No. 142), File E143289	UL-Listed (UL 508), File E143289, CSA (CSA C22.2 No. 142)	cULus-Listed (UL 508, CSA C22.2 No. 142), File E143289	UL-Listed (UL 508), File E143289, CSA (CSA C22.2 No. 142)	cULus-Listed (UL 508, CSA C22.2 No. 142), File E143289
Explosion protection	ATEX (EX) II 3G Ex nA II T4; cULus (ISA 12.12.01, CSA C22.2 No.213) Class I, Div. 2, Group ABCD, T4, File E330455	-	ATEX (EX) II 3G Ex nA II T4; cULus (ISA 12.12.01, CSA C22.2 No.213) Class I, Div. 2, Group ABCD, T4, File E330455	-	ATEX (EX) II 3G Ex nA II T4; cULus (ISA 12.12.01, CSA C22.2 No.213) Class I, Div. 2, Group ABCD, T4, File E330455
FM approval	Class I, Div. 2, Group ABCD, T4	-	Class I, Div. 2, Group ABCD, T4	-	Class I, Div. 2, Group ABCD, T4
CB approval	No	No	No	No	No
Marine approval	In S7-300 system	-	In S7-300 system	-	In S7-300 system
Degree of protection (EN 60529)	IP20	IP20	IP20	IP20	IP20
EMC					
Emitted interference	EN 55022 Class B	EN 55011 Class A	EN 55022 Class B	EN 55011 Class A	EN 55022 Class B
Supply harmonics limitation	not applicable	not applicable	EN 61000-3-2	-	EN 61000-3-2
Noise immunity	EN 61000-6-2	EN 61000-6-2	EN 61000-6-2	EN 61000-6-2	EN 61000-6-2
Operating data					
Ambient temperature					
• during operation	0 ... 60 °C	-25 ... +70 °C	0 ... 60 °C	-25 ... +70 °C	0 ... 60 °C
- Note	with natural convection	with natural convection	with natural convection	with natural convection	with natural convection
• during transport	-40 ... +85 °C	-40 ... +85 °C	-40 ... +85 °C	-40 ... +85 °C	-40 ... +85 °C
• during storage	-40 ... +85 °C	-40 ... +85 °C	-40 ... +85 °C	-40 ... +85 °C	-40 ... +85 °C
Humidity class according to EN 60721	Climate class 3K3, no condensation	Climate class 3K5, transient condensation permitted	Climate class 3K3, no condensation	Climate class 3K5, transient condensation permitted	Climate class 3K3, no condensation