Switch mode power supply
PFA10-T-01-3-240-DC24V-10A

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The primary switched-mode power supply of type PFA10-T is ideally suited for automation and mechanical engineering applications. Its compact design allows space-saving integration into control cabinets with limited installation space. The housing with 25° angled terminals enables tool-free installation and quick replacement. The three-phase AC input is also suitable for operation with DC voltage. With a 24 V DC output, up to 94.1 % efficiency, 240 W output power, and 150 % power reserve for up to 5 seconds, the power supply meets all the requirements of dynamic industrial applications.

Typical Features

- Slim Design (43 mm) with 25° Push-In connectors
- Fast tool-less mounting and demounting
- DC input range 450 V to 815 V / 850 V 10 s
- Best efficiency factor up to 94.1 %
- No derating at -40 °C to +70 °C, Boost Power 150 % for 5 s
- Performance bonus up to 120 % at 45 °C
- Highest Lifetime Expectancy 80.000 h /40 °C

Your benefits

- High power density
- Robustness suitable for industrial use
- Power boost for peak loads
- Quick, tool-free installation
- High efficiency and long service life

Typ. applications

Machine Building, Process Industry, Car Production

Approvals / Certifications

Web links

Further information, International approvals, Technical basics, REACH, RoHS, Contact

Compliance

Technical data (Tu = +25 °C, Ub = 3AC 400 V under full load and after warm-up, unless otherwise specified)

Input circuit	
Rated input voltage U_e	AC 320...575 V (3-phase operation) AC 350...575 V (2-phase operation) DC 450...815 V (For the DC input, see 'Terminals for DC operation' continued) Max. DC 850 V (DC input refer to „Connections for DC-operation" max. 10 s)
Rated input voltage U_n	AC 400...480 V (at 50/60 Hz)
Input current	3 x 0.7 A typ. at U_b = AC 400 V 3 x 0.6 A typ. at U_b = AC 480 V 0.8 A typ. at U_b = DC 500 V
Mains frequency	47...63 Hz
Inrush current	with 3-phase AC 400 V: max. 10 A (cold start)
Turn-on Voltage	Prevents switch-on at 1 AC operation min. AC 310 V DC operation min. DC 440 V
Turn-off Voltage	AC operation min. AC 290 V DC operation min. DC 410 V
Power factor correction	> 0.45 (full load)
Input protection	Internal back-up fuse, 2x T5 A slow-blow
Recommended back-up fuse	3 pole MCB e.g. E-T-A's 4230; C16 protector

Output circuit	
Output power rating	240 W
Rated output voltage U_o	DC 24 V
Rated output current I_o	10 A
Overload limit in constant current mode	12 A
Output voltage accuracy	±1 %
Minimum load	0 %
Input voltage regulation	±0.1 % typ. (low line to high line, full load)
Load regulation	with load range 0 % to 100 % typ. ±0.4 %
Voltage setting range	DC 24...28 V (When input voltage is below AC 350 V, the output voltage is limited to DC 24 V. Make sure that the maximum rated output power will not be exceeded when trimming up.)
Power boost factor	150 % for 5 s 250 % for 20 ms (see „Boost Power")
Residual ripple	1 % of the rated value V_{out}; 20 MHz bandwidth
Capacitive load	Max. 20 mF
Transient behaviour	10...100 % load: ±3.0 % typ. Recovery time: 100 ms typ.
Over Voltage Protection (OVP)	SELV output DC 35 V, latch off
Short-circuit behaviour	Hiccup mode, auto recovery
Reverse voltage resistance	Max. DC 35 V (continuous) DC 38 V (< 5 min)
Absorbable energy	1.5 J
Operating conditions signalling	DC OK - green LED DC OK – LED off (abnormal mode, no operation or fault) Normal operation, output voltage OK closed – signal contact (normal mode) open – signal contact (abnormal mode, no operation or fault)

Electrical data	
Rated frequency	65 kHz

Rated insulation voltage	Tested for 1 minute: I/P to O/P: AC 3.5 kV / DC 5 kV I/P to PE: AC 1.6 kV / DC 2.5 kV O/P to PE: AC 500 V / DC 700 V (For repeated Hi-Pot tests, reduce the time and/or the test voltage).
Efficiency	Typ. 94.1 %
Life time expectation	> 80,000 h (9.1 years) at 40 °C ambient temperature and 100 % load
Auxiliary circuit ratings	DC 30 V / 0.1 A
Auxiliary circuit ratings note	Do not connect signaling contact to hazardous voltages
Power consumption	< 0.8 W (3-phase AC 400 V; max. 0.8 W) < 1.1 W (3-phase AC 500 V; max. 1.1 W)
Power failure bridging time	15 ms
Switch-on delay t_{Start}	2- and 3-phase operation, AC 400 V typ. 37 ms max. 50 ms
Rise time	Typ. 23 ms max. 30 ms
Insulation co-ordination (EN IEC 60664)	Overvoltage category: II
Insulation resistance	Input to output (I/P → O/P) ≥ 4.5 MΩ

Mechanical data	
Mounting dimensions (WxHxD)	43 x 135 x 140.4 mm
Mounting position	Wall mounting with input terminals pointing downwards (see dimensions)
Mass	Approx. 531 g
Material	Polycarbonate / Aluminum
Mounting data	Mounting on DIN rail

Mounting values - cage clamp			
Connection capacity Connection L1, L2, L3	**Cable cross section [mm²]**	**Cable cross section [AWG]**	**Stripping length [mm]**
rigid	0.25...6	24...8	12...13
flexible	0.25...6	24...8	12...13
Connection capacity Connection PE	**Cable cross section [mm²]**	**Cable cross section [AWG]**	**Stripping length [mm]**
rigid	0.25...6	24...8	12...13
flexible	0.25...6	24...8	12...13
Connection capacity Connection +1, +2 (V_{out})	**Cable cross section [mm²]**	**Cable cross section [AWG]**	**Stripping length [mm]**
rigid	0.75...25	18...4	18...20
flexible	0.75...25	18...4	18...20
Connection capacity Connection -1, -2 (V_{out})	**Cable cross section [mm²]**	**Cable cross section [AWG]**	**Stripping length [mm]**
rigid	0.75...25	18...4	18...20
flexible	0.75...25	18...4	18...20

Use flexible (stranded wire) or solid cables with above wire cross-section is recommended. Use copper conductors designed for an operating temperature of at least 90°C.

Mounting values			
Connecting capacity signal (13, 14)	**Cable cross section [mm²]**	**Cable cross section [AWG]**	**Stripping length [mm]**
flexible with wire end ferrule	0.25...1.5	24...16	8...9

Do not connect signaling contact to hazardous voltages

Ambient conditions	
Ambient temperature	-40...+70 °C (with derating)
Storage temperature	-40...+85 °C (non-condensing, max. 85 % rel. Humidity with regard to packaging)
Damp heat	non-condensing, max. 95 % rel. humidity
Vibration	**Test according to IEC 60068-2-6** Out of service, 3.5 mm deviation (5...8.4 Hz), 2 G (8.4...150 Hz), 10 cycles per axis (min-max-min), 1 octave/min
Shock	**Test according to IEC 60068-2-27, test Ea** 15 g (11 ms), 3 x (positive/negative) per side

IP code	I with PE connection
IP code (standard)	IP20
Insulation Grade	reinforced
Earth Leakage Current	AC 480 V / 60 Hz 3.5 mA max.
MTBF	**Test according to EN/IEC 61709 (SN29500)** 1015 x 10^3 h
Operating altitude	5,000 m (Recognised by the safety authorities for safe operation at altitudes of up to 5,000 m. Operation at high altitudes can impair performance and service life.)

Ordering number code

PFA10	-	T	-	01	-	3	-	960	-	DC24V	-	40A
1		2		3		4		5		6		7

1 Type number	
PFA10	Switch mode power supply

2 Mounting	
T	DIN rail mounting

3 Terminal	
01	Push-in terminals

4 Phase	
3	Phase

5 Power in watts	
240	240 watts
480	480 watts
960	960 watts Three-phase version only

6 Rated voltage	
DC24V	DC 24 V
DC48V	DC 48 V Only available as a single-phase 480 W version or a three-phase 960 W version

7 Rated current	
10A	10 A
20A	20 A
40A	40 A

Approvals

Test standard	File Certificate No.	Types
UL 62368-1 CSA C22.2 No. 62368-1	E471781	PFA10-T-01-03-240-DC24V-10A PFA10-T-01-03-480-DC24V-20A PFA10-T-01-03-960-DC24V-40A PFA10-T-01-03-960-DC48V-20A
UL 61010-1 UL 61010-2-201 CSA C22.2 No. 107	E492388	PFA10-T-01-03-240-DC24V-10A PFA10-T-01-03-480-DC24V-20A PFA10-T-01-03-960-DC24V-40A PFA10-T-01-03-960-DC48V-20A
IEC/EN 61010-1 IEC/EN 61010-2-201 IEC/EN 62368-1		PFA10-T-01-03-240-DC24V-10A PFA10-T-01-03-480-DC24V-20A PFA10-T-01-03-960-DC24V-40A PFA10-T-01-03-960-DC48V-20A

Information on approvals

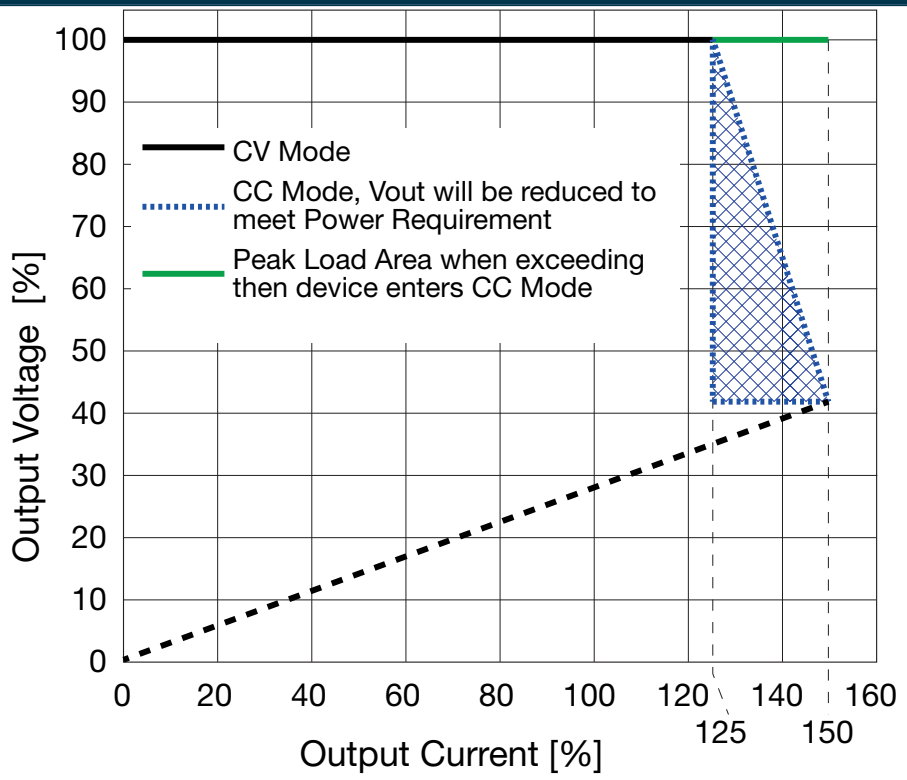
c US	UL 62368 File #E471781
c UL us LISTED	UL 61010 File# E492388
IECEE CB SCHEME	IEC/EN 61010-1, IEC/EN 61010-2-201, IEC/EN 62368-1

The products have been submitted for approval for AC and DC operation in safety-related applications. (AC 350...575 V and DC 450...600 V). If input voltage is > DC 500 V consider an external fuse according to applicable standards. 2-phase operation is not included in the safety approvals. Additional tests might be necessary when the complete application has to be approved according to UL 62368-1, 61010-1 and UL 61010-2-201

Output power derating for Line-input of less than 3AC 350 V (derate linearly from 100% at AC 350 V to 90% at 3AC 320 V)

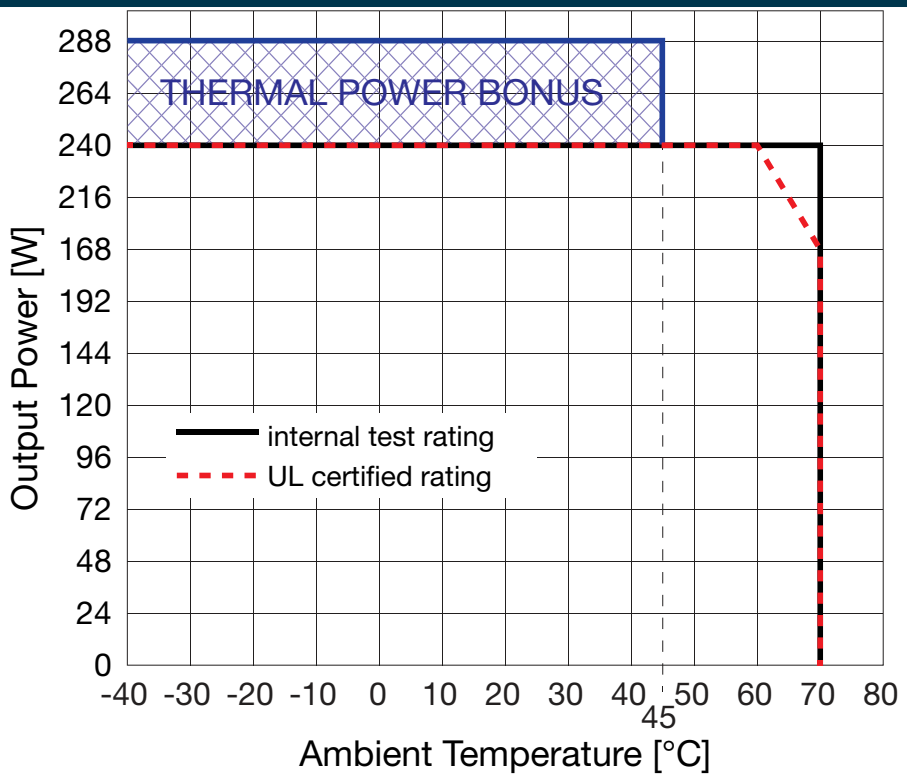
Time-/current characteristics

Operating mode - U/I Factory Setting (Single Mode)



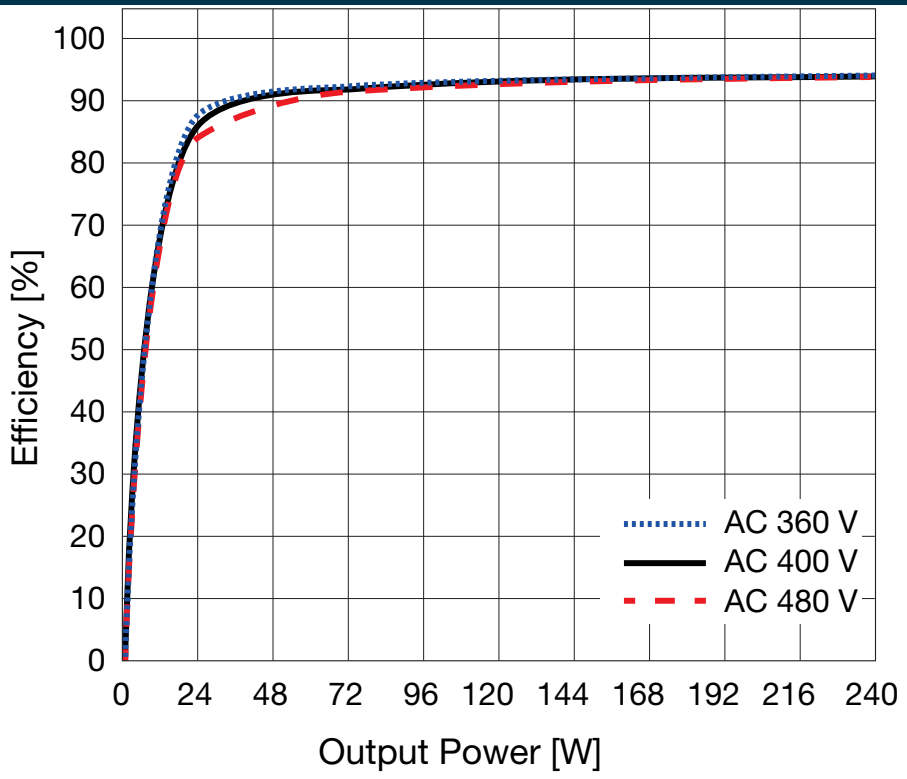
Derating

Derating curve

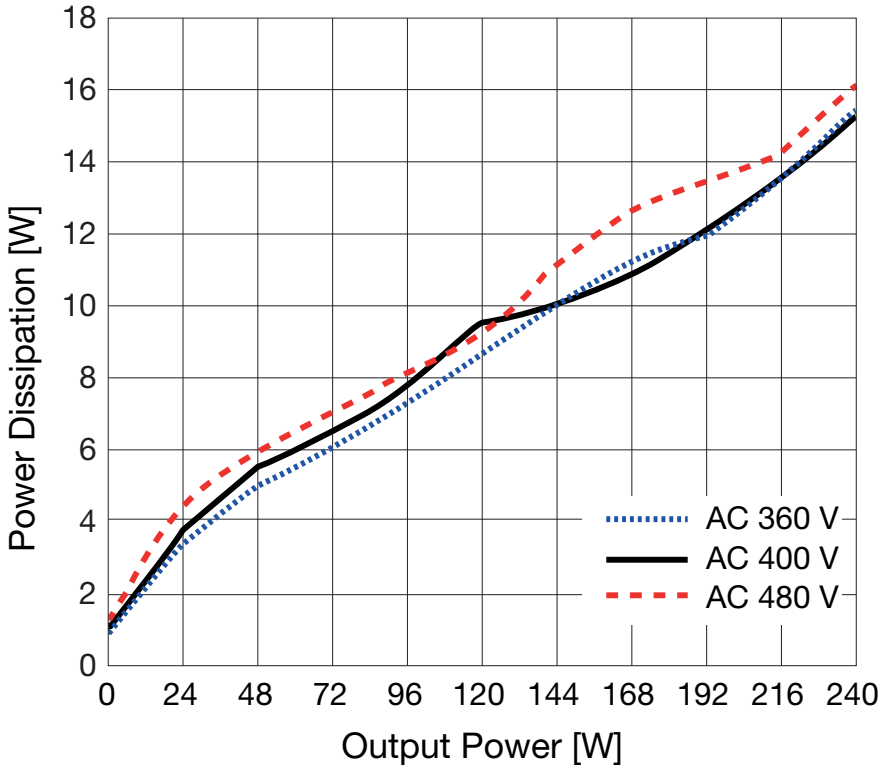


Efficiency

Efficiency vs Load 240 W DC 24 V

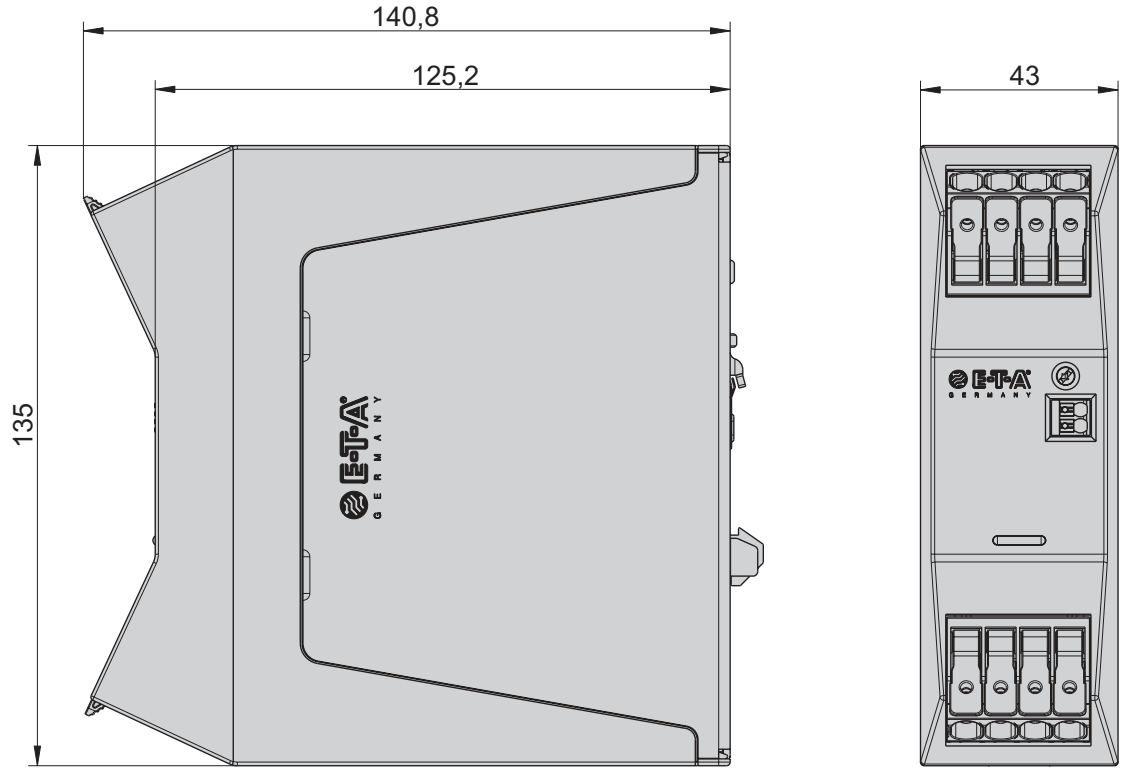


Power Dissipation vs. Load 240 W DC 24 V



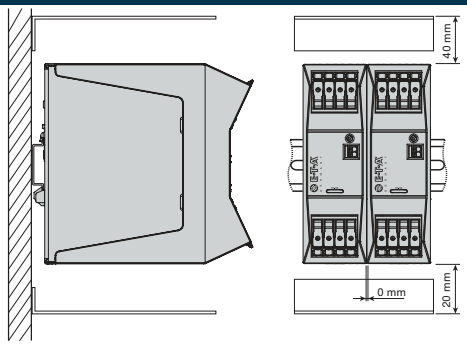
Dimensions

Dimensional drawing - PFA10-T-240-DC24V-10A



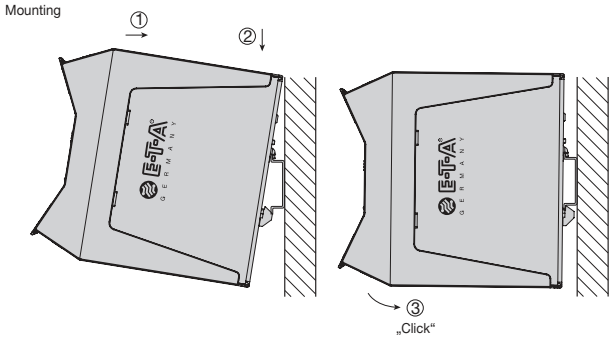
Installation instructions

Mounting dimensions



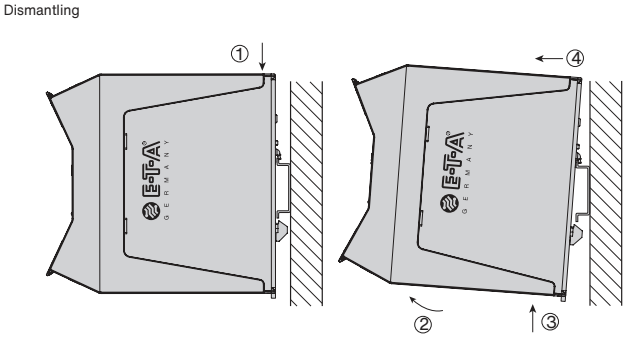
To guarantee sufficient convection cooling, keep a distance of 40 mm above and 20 mm below the device.
For vertical mounting the device should be installed with the input terminal on the bottom.
No space between supplies are required.

Installation instructions Mounting



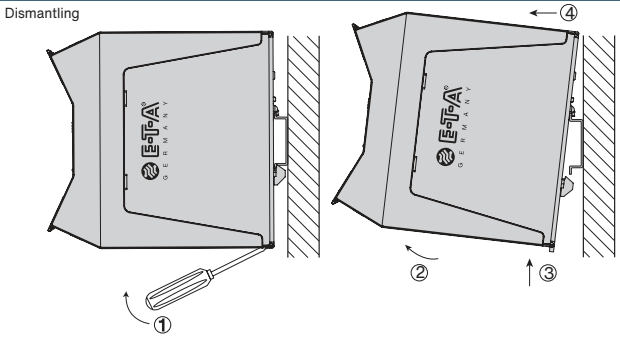
1. Place the device on the DIN rail with a slight upward tilt. Snap the device onto the DIN rail.
2. Now tilt the device downwards until it reaches the lower part of the DIN rail.
3. Press the lower part of the device firmly against the rail until the device clicks into place on the DIN rail.
4. Shake the device gently to ensure that it is securely engaged.

Installation instructions Dismantling



1. Press the unlock button on the top of the device to release the latch from the rail.
2. While pushing the button, slightly tilt the device forward.
3. Pull the device away from the DIN rail by pushing it up
4. Remove the power supply completely from the rail.

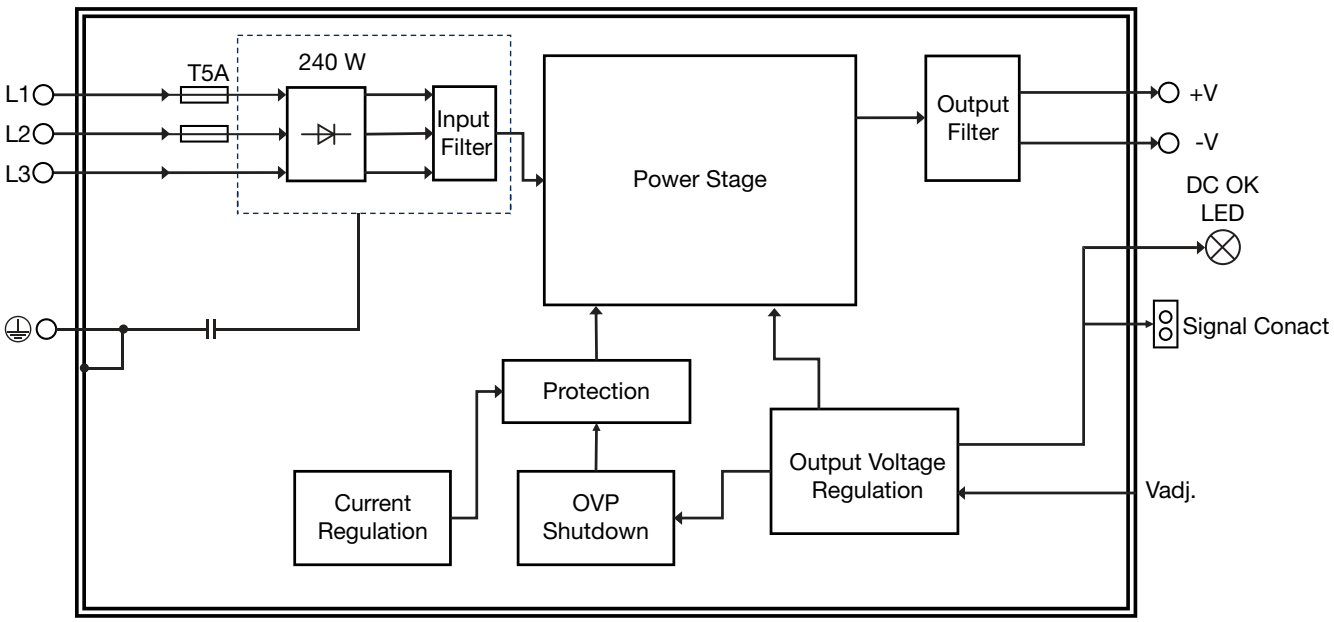
Installation instructions Dismantling



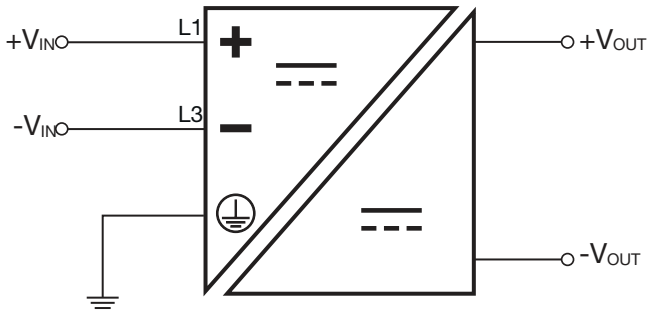
1. Pull the DIN rail latch by using a screwdriver OUT of the device and HOLD it.
2. Tilt the bottom of the device OUT.
3. Pull the device away from the DIN rail by pushing it up.
4. Remove the power supply completely from the rail.

Schematic diagrams

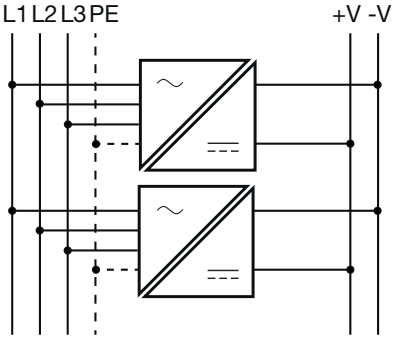
Schematic diagram



Connections for DC-operation

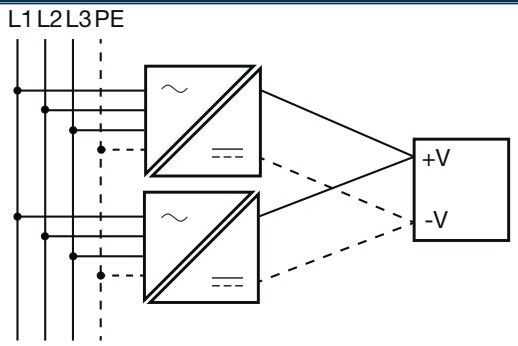


Phase redundancy



1) If one phase fails, operation is still guaranteed. (2-phase operation)

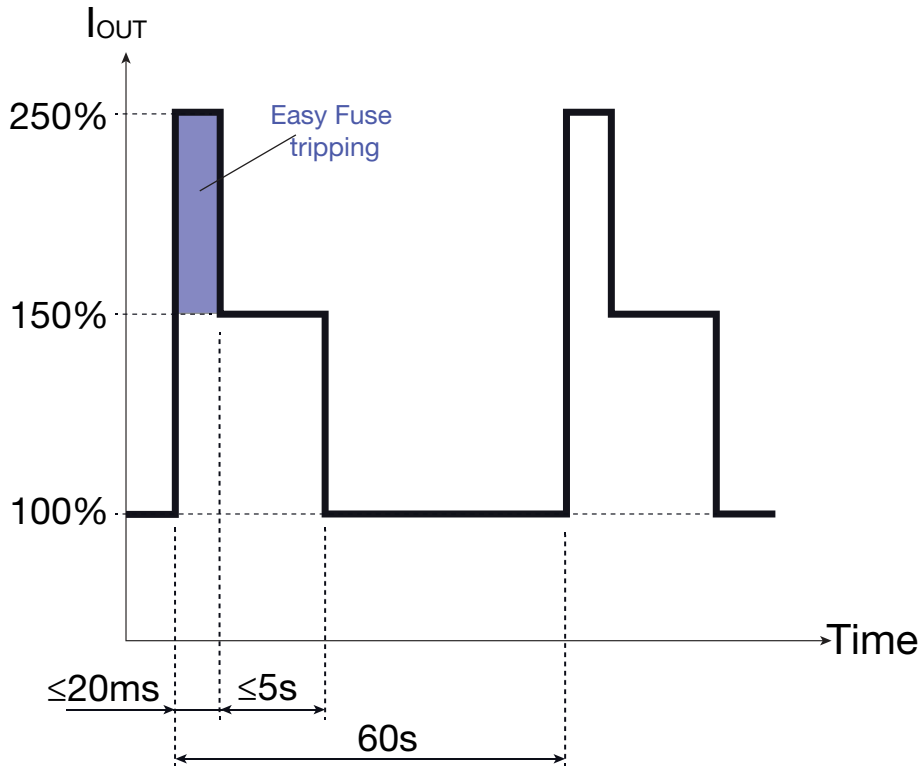
Parallel Operation



1) Set DIP switch 1 to “ON” to enable parallel operation.
2) Adjust all power supplies to exactly the same output voltage under identical load and cooling conditions.
2) Use identical cable lengths and cross-sections (star configuration). Switch on all units simultaneously to prevent triggering overload protection.
3) Only use parallel operation in the standard mounting position (input terminals at the bottom). Do not connect in parallel under conditions that require output current reduction (e.g., above 60 °C ambient temperature,...).
4) Leakage current, EMI, inrush current, and harmonics increase when using multiple power supplies in parallel.

Functional diagrams

Boost Power (AC 400V...480 V or DC 500 V; -40°C to +60°C max.)



Further products

Related products

PFA10-T-01-3-480-DC24V-20A	The primary switched-mode power supply of type PFA10-T is ideally suited for automation and mechanical engineering applications. Its compact design allows space-saving integration into control cabinets with limited installation space. The housing with 25° angled terminals enables tool-free installation and quick replacement. The three-phase AC input is also suitable for operation with DC voltage. With a 24 V DC output, up to 95.3 % efficiency, 480 W output power, and 150 % power reserve for up to 7.5 seconds, the power supply meets all the requirements of dynamic industrial applications.	

PFA10-T-01-3-960-DC24V-40A	The primary switched-mode power supply of type PFA10-T is ideally suited for automation and mechanical engineering applications. Its compact design allows space-saving integration into control cabinets with limited installation space. The housing with 25° angled terminals enables tool-free installation and quick replacement. The three-phase AC input is also suitable for operation with DC voltage. With a 24 V DC output, up to 96.9 % efficiency, 960 W output power, and 150 % power reserve for up to 6 seconds, the power supply meets all the requirements of dynamic industrial applications.	
PFA10-T-01-3-960-DC48V-20A	The primary switched-mode power supply of type PFA10-T is ideally suited for automation and mechanical engineering applications. Its compact design allows space-saving integration into control cabinets with limited installation space. The housing with 25° angled terminals enables tool-free installation and quick replacement. The three-phase AC input is also suitable for operation with DC voltage. With a 24 V DC output, up to 97.1 % efficiency, 960 W output power, and 150 % power reserve for up to 6 seconds, the power supply meets all the requirements of dynamic industrial applications.	

All information and data given on our products are accurate and reliable to the best of our knowledge, but E-T-A does not accept any responsibility for the use in applications which are not in accordance with the present specification. E-T-A reserves the right to change specifications at any time in the interest of technical improvement. Dimensions are subject to change without notice. Please enquire for the latest dimensional drawing with tolerances if required. All dimensions, data, pictures and descriptions are for information only and are not binding. Amendments, errors and omissions excepted. Ordering part numbers may differ from the device marking.