

# Power supply unit - TRIO-PS-2G/1AC/24DC/20



2903151

<https://www.phoenixcontact.com/pc/products/2903151>

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Primary-switched TRIO POWER power supply with push-in connection for DIN rail mounting, input: single-phase, output: 24 V DC/20 A

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## Product Description

TRIO POWER power supplies with standard functionality

The TRIO POWER power supply range with push-in connection has been perfected for use in machine building. All functions and the space-saving design of the single and three-phase modules are optimally tailored to the stringent requirements. Under challenging ambient conditions, the power supply units, which feature an extremely robust electrical and mechanical design, ensure the reliable supply of all loads.

## Your advantages

- Save time and costs, thanks to the Push-in connection and narrow design
- Increase system availability, thanks to dynamic boost with 150% of the nominal current for five seconds
- Maximum flexibility due to the wide temperature range from -25°C to +70°C and device startup at -40°C
- Rugged design

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## Commercial Data

Item number	2903151
Packing unit	1 pc
Minimum order quantity	1 pc
Product Key	CMPO13
Catalog Page	Page 257 (C-4-2019)
GTIN	4046356960939
Weight per Piece (including packing)	1,614.1 g
Weight per Piece (excluding packing)	1,614.1 g
Customs tariff number	85044030
Country of origin	CN

## Technical Data

### Input data

#### AC operation

Network type	Star network
Nominal input voltage range	100 V AC ... 240 V AC
Input voltage range	100 V AC ... 240 V AC -15 % ... +10 %
Electric strength, max.	≤ 300 V AC 15 s
Typical national grid voltage	120 V AC
	230 V AC
Voltage type of supply voltage	AC/DC
Inrush current	≤ 20 A (typical)
Inrush current integral ( $I^2t$ )	< 0.9 A <sup>2</sup> s
Inrush current limitation	typ. 20 A (after 1 ms)
AC frequency range	50 Hz ... 60 Hz ±10 %
Mains buffering time	typ. 10 ms (120 V AC)
	typ. 15 ms (230 V AC)
Current consumption	5.6 A (100 V AC)
	4.3 A (120 V AC)
	2.4 A (230 V AC)
	2.4 A (240 V AC)
Nominal power consumption	534.7 VA
Protective circuit	Transient surge protection; Varistor
Power factor (cos phi)	0.98
Typical response time	< 1 s
Input fuse	10 A (internal (device protection))
Recommended breaker for input protection	10 A ... 16 A (Characteristics B, C, D, K)
Discharge current to PE	< 3.5 mA
POWER factor	> 0.9 (120 V AC)
	> 0.9 (230 V AC)

#### DC operation

Nominal input voltage range	110 V DC ... 250 V DC
Input voltage range	110 V DC ... 250 V DC ±10 %
Extended input voltage range in operation	> 99 V DC
Switch-on voltage	≥ 96 V DC
Shut-down voltage	< 95 V DC
Mains buffering time	> 15 ms (230 V AC)
Current consumption	4.9 A (110 V DC)
	2.1 A (250 V DC)

### Output data

Efficiency	typ. 91.4 % (120 V AC)
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	typ. 92.9 % (230 V AC)
Output characteristic	U/I with dynamic load reserve
Nominal output voltage	24 V DC $\pm$ 1 %
Setting range of the output voltage ( $U_{Set}$ )	24 V DC ... 28 V DC (> 24 V DC, constant capacity restricted)
Nominal output current ( $I_N$ )	20 A
Dynamic Boost ( $I_{Dyn.Boost}$ )	30 A (5 s)
Derating	> 60 °C ... 70 °C (2.5%/K)
POWER factor	> 0.9 (120 V AC) > 0.9 (230 V AC)
Feedback voltage resistance	$\leq$ 35 V DC
Protection against overvoltage at the output (OVP)	$\leq$ 30 V DC
Control deviation	< 1 % (change in load, static 10 % ... 90 %) < 3 % (Dynamic load change 10 % ... 90 %, 10 Hz) < 0.1 % (change in input voltage $\pm$ 10 %)
Residual ripple	< 100 mV <sub>PP</sub> (with nominal values)
Short-circuit-proof	yes
No-load proof	yes
Output power	480 W 720 W
Maximum no-load power dissipation	< 2.9 W (120 V AC) < 2.8 W (230 V AC)
Power loss nominal load max.	< 44.8 W (120 V AC) < 36.8 W (230 V AC)
Rise time	20 ms ( $U_{OUT}$ (10 % ... 90 %))
Connection in parallel	yes, for redundancy and increased capacity
Connection in series	yes

Signal: DC OK

Continuous load current	100 mA
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Signal relay 13/14

Default	closed
Digital	30 V AC 30 V DC 100 mA

## Connection data

Input

Connection method	Push-in connection
Conductor cross section solid min.	0.2 mm <sup>2</sup>
Conductor cross section solid max.	4 mm <sup>2</sup>
Conductor cross section flexible min.	0.2 mm <sup>2</sup>
Conductor cross section flexible max.	2.5 mm <sup>2</sup>
Single conductor/terminal point, stranded, with ferrule, min.	0.2 mm <sup>2</sup>
Single conductor/terminal point, stranded, with ferrule, max.	2.5 mm <sup>2</sup>
Conductor cross section AWG min.	24

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Conductor cross section AWG max.	12
Stripping length	10 mm

## Output

Connection method	Push-in connection
Conductor cross section solid min.	0.2 mm <sup>2</sup>
Conductor cross section solid max.	10 mm <sup>2</sup>
Conductor cross section flexible min.	0.2 mm <sup>2</sup>
Conductor cross section flexible max.	6 mm <sup>2</sup>
Single conductor/terminal point, stranded, with ferrule, min.	0.2 mm <sup>2</sup>
Single conductor/terminal point, stranded, with ferrule, max.	6 mm <sup>2</sup>
Conductor cross section AWG min.	24
Conductor cross section AWG max.	8
Stripping length	15 mm

## Signal

Connection method	Push-in connection
Conductor cross section solid min.	0.2 mm <sup>2</sup>
Conductor cross section solid max.	1.5 mm <sup>2</sup>
Conductor cross section flexible min.	0.2 mm <sup>2</sup>
Conductor cross section flexible max.	1.5 mm <sup>2</sup>
Single conductor/terminal point, stranded, with ferrule, min.	0.2 mm <sup>2</sup>
Single conductor/terminal point, stranded, with ferrule, max.	1.5 mm <sup>2</sup>
Conductor cross section AWG min.	24
Conductor cross section AWG max.	16
Stripping length	8 mm

## LED signaling

Types of signaling	LED
	Floating signal contact

## Signal output: LED status indicator

Signalization designation	DC OK
Status display	LED
Color	green

## Electrical properties

Number of phases	1.00
Insulation voltage input/output	3 kV AC (type test)
	1.5 kV AC (routine test)

## Product properties

Product type	Power supply
MTBF (IEC 61709, SN 29500)	> 1800000 h (25 °C)
	> 1000000 h (40 °C)
	> 480000 h (60 °C)

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## Insulation characteristics

Protection class	I (in closed control cabinet)
Degree of pollution	2

## Dimensions

Width	68 mm
Height	130 mm
Depth	160 mm

## Installation dimensions

Installation distance right/left	0 mm / 0 mm
Installation distance top/bottom	50 mm / 50 mm

## Mounting

Mounting type	DIN rail mounting
Assembly instructions	alignable: horizontally 0 mm ( $\leq 40\text{ }^{\circ}\text{C}$ ) 10 mm ( $\leq 70\text{ }^{\circ}\text{C}$ ), vertically 50 mm
Mounting position	horizontal DIN rail NS 35, EN 60715
With protective coating	No

## Material specifications

Inflammability class in acc. with UL 94 (housing / terminal blocks)	V0
Housing material	Metal
Type of housing	Aluminum (AlMg3)
Hood version	Polycarbonate

## Environmental and real-life conditions

### Ambient conditions

Degree of protection	IP20
Ambient temperature (operation)	-25 °C ... 70 °C (> 60 °C Derating: 2,5 %/K)
Ambient temperature (storage/transport)	-40 °C ... 85 °C
Ambient temperature (start-up type tested)	-40 °C
Maximum altitude	$\leq 4000\text{ m}$ (> 2000 m, Derating: 10 %/1000 m)
Climatic class	3K3 (in acc. with EN 60721)
Max. permissible relative humidity (operation)	$\leq 95\%$ (at 25 °C, non-condensing)
Shock	18 ms, 30g, in each space direction (according to IEC 60068-2-27)
Vibration (operation)	< 15 Hz, amplitude $\pm 2.5\text{ mm}$ (according to IEC 60068-2-6) 15 Hz ... 150 Hz, 4g, 90 min.

## Standards and regulations

Rail applications	EN 50121-4
Standard – Electronic equipment for use in electrical power installations and their assembly into electrical power installations	EN 50178/VDE 0160 (PELV)
Standard – Limitation of mains harmonic currents	EN 61000-3-2

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Standard - Electrical safety	IEC 60950-1/VDE 0805 (SELV)
Standard – Safety extra-low voltage	IEC 60950-1 (SELV) and EN 60204-1 (PELV)
Standard - Safe isolation	DIN VDE 0100-410
Standard - Safety of transformers	EN 61558-2-16 (air clearances and creepage distances only)

## Approval data

Shipbuilding approval	DNV GL
UL approvals	UL Listed UL 508
	UL/C-UL Recognized UL 60950-1

## Conformity/Approvals

SIL in accordance with IEC 61508	0
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## EMC data

Low Voltage Directive	Conformance with Low Voltage Directive 2014/35/EC
Electromagnetic compatibility	Conformance with EMC Directive 2014/30/EU
EMC requirements for noise emission	EN 61000-6-3
	EN 61000-6-4
EMC requirements for noise immunity	EN 61000-6-1
	EN 61000-6-2
Conducted noise emission	EN 55016
	EN 61000-6-3 (Class B)
Interference emission	Noise emission according to EN 61000-6-3 (residential and commercial) and EN 61000-6-4 (industrial)
Noise emission	EN 55011 (EN 55022)
Noise emission	EN 55016
	EN 61000-6-3 (Class B)
Noise immunity	Immunity according to EN 61000-6-1 (residential), EN 61000-6-2 (industrial)

## Harmonic currents

Frequency range	Class A, B
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## Flicker

Frequency range	0 kHz ... 2 kHz
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## Electrostatic discharge

Standards/regulations	EN 61000-4-2
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## Electrostatic discharge

Contact discharge	6 kV (Test Level 4)
Discharge in air	8 kV (Test Level 4)
Comments	Criterion A

## Electromagnetic HF field

Standards/regulations	EN 61000-4-3
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## Electromagnetic HF field

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Frequency range	80 MHz ... 1 GHz
Test field strength	10 V/m (Test Level 3)
Frequency range	1 GHz ... 2 GHz
Test field strength	10 V/m (Test Level 3)
Frequency range	2 GHz ... 3 GHz
Test field strength	10 V/m (Test Level 3)
Comments	Criterion A

## Fast transients (burst)

Standards/regulations	EN 61000-4-4
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## Fast transients (burst)

Input	4 kV (Test Level 4 - asymmetrical)
Output	2 kV (Test Level 3 - asymmetrical)
Signal	1 kV (Test Level 2 - asymmetrical)
Comments	Criterion A

## Surge voltage load (surge)

Standards/regulations	EN 61000-4-5
Input	3 kV (Test Level 3 - symmetrical) 6 kV (Test Level 4 - asymmetrical)
Output	1 kV (Test Level 2 - symmetrical) 2 kV (Test Level 1 - asymmetrical)
Signal	1 kV (Test Level 2 - asymmetrical)
Comments	Criterion B

## Conducted interference

Standards/regulations	EN 61000-4-6
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## Conducted interference

Input/Output	asymmetrical
Frequency range	0.15 MHz ... 80 MHz
Comments	Criterion A
Voltage	10 V (Test Level 3)

## Emitted interference

Standards/regulations	EN 61000-6-3
Radio interference voltage in acc. with EN 55011	EN 55011 (EN 55022) Class B, area of application: Industry and residential
Emitted radio interference in acc. with EN 55011	EN 55011 (EN 55022) Class B, area of application: Industry and residential
Criterion A	Normal operating behavior within the specified limits.
Criterion B	Temporary impairment to operational behavior that is corrected by the device itself.



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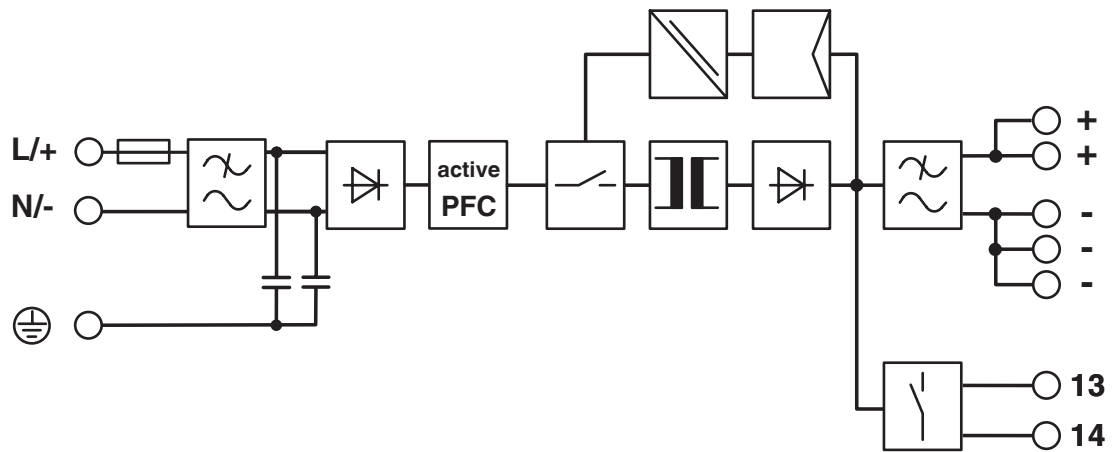


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## Drawings

Block diagram



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## Approvals



**cUL Recognized**  
Approval ID: FILE E 211944



**UL Recognized**  
Approval ID: FILE E 211944



**IECEE CB Scheme**  
Approval ID: DK-45301-A1-UL



**EAC**  
Approval ID: RU S-DE.BL08.W.00764



**EAC**  
Approval ID: RU S-DE.BL08.W.00764



**UL Listed**  
Approval ID: FILE E 123528



**cUL Listed**  
Approval ID: FILE E 123528

**DNV**

Approval ID: TAA00000BM



**cUL Listed**  
Approval ID: FILE E 199827



**UL Listed**  
Approval ID: FILE E 199827

**cULus Recognized**

**cULus Listed**

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**cULus Listed**

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## Classifications

### ECLASS

ECLASS-9.0	27040701
ECLASS-10.0.1	27040701
ECLASS-11.0	27040701

### ETIM

ETIM 8.0	EC002540
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### UNSPSC

UNSPSC 21.0	39121000
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## Environmental Product Compliance

REACH SVHC	Lead 7439-92-1
China RoHS	Environmentally Friendly Use Period = 25;
	For information on hazardous substances, refer to the manufacturer's declaration available under "Downloads"

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## Accessories

### Redundancy module

Redundancy module - TRIO2-DIODE/12-24DC/2X20/1X40 - 2907379

<https://www.phoenixcontact.com/pc/products/2907379>

Redundancy module, 12 V - 24 V DC, 2 x 20 A, 1 x 40 A



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### Redundancy module

Redundancy module - TRIO2-DIODE/12-24DC/2X10/1X20 - 2907380

<https://www.phoenixcontact.com/pc/products/2907380>

Redundancy module, 12 V - 24 V DC, 2 x 10 A, 1 x 20 A



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## Type 3 surge protection device

Type 3 surge protection device - PLT-SEC-T3-230-FM-PT - 2907928

<https://www.phoenixcontact.com/pc/products/2907928>



Type 2/3 surge protection, consisting of protective plug and base element with Push-in connection. For single-phase power supply network with integrated status indicator and remote signaling. Nominal voltage: 230 V AC/DC

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## Type 3 surge protection device

Type 3 surge protection device - PLT-SEC-T3-24-FM-PT - 2907925

<https://www.phoenixcontact.com/pc/products/2907925>



Type 3 surge protection, consisting of protective plug and base element, with integrated status indicator and remote signaling for single-phase power supply networks. Nominal voltage: 24 V AC/DC

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## Potential distributors

Potential distributors - VIP-2/SC/PDM-2/24 - 2315269

<https://www.phoenixcontact.com/pc/products/2315269>



VARIOFACE module, with two equipotential busbars (P1, P2) for potential distribution, for mounting on NS 35 rails. Module width: 70.4 mm

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## Potential distributors

Potential distributors - VIP-3/PT/PDM-2/24 - 2903798

<https://www.phoenixcontact.com/pc/products/2903798>



VARIOFACE module with push-in connection and two equipotential busbars (P1, P2) for potential distribution, for mounting on NS 35 rails. Module width: 57.1 mm



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## Electronic circuit breaker

Electronic circuit breaker - CBM E4 24DC/0.5-10A NO-R - 2905743

<https://www.phoenixcontact.com/pc/products/2905743>



Multi-channel, electronic circuit breaker with active current limitation for protecting four loads at 24 V DC in the event of overload and short circuit. With nominal current assistant and electronic locking of the set nominal currents. For installation on DIN rails.

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## Electronic circuit breaker

Electronic circuit breaker - CBM E8 24DC/0.5-10A NO-R - 2905744

<https://www.phoenixcontact.com/pc/products/2905744>



Multi-channel, electronic circuit breaker with active current limitation for protecting eight loads at 24 V DC in the event of overload and short circuit. With nominal current assistant and electronic locking of the set nominal currents. For installation on DIN rails.

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