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Compact Power Supply Units

QUINT-PS-120AC/24DC/5 (... 5/F)

QUINT-PS-230AC/24DC/5 (... 5/F)

- **Electronically short-circuit/idle proof**
- **Extended input voltage range**
- **Reliable isolation (DIN VDE0100-410, EN 60 950)**
- **Mains buffer > 20 ms**
- **LED function display in secondary circuit**
- **COMBICON connecting plug**
- **Redundant circuits can be set up**
- **Small depth of housing**
- **Sturdy high-grade steel housing**

1. Short Description

Compact power supply units from Phoenix Contact have proven themselves for years in the distributed power supply for electrotechnical components. Designed to supply 24 V peripheral devices, QUINT POWER provides output currents of 1, 2.5 and 10 A with a precisely regulated fixed-voltage of 24 V DC and 10, 20, 30 and 40 A, with a regulated, adjustable output voltage of 22.5 to 28.5 VDC. All devices from 10 A upwards have a U/I-characteristic-curve-controlled output. Instead of switching off if a consumer short circuits, they reduce the output voltage if there is an overload, whilst still providing full output current. This ensures that both heavily capacitive loads and devices with DC/DC converters in the primary circuit can be fed without problems using QUINT POWER. Downstream fuses are also triggered reliably. Selectivity in the design of your system is thus guaranteed at all times.

2. Area of Application

The rail-mountable power supply unit QUINT POWER is designed as a primary switched-mode regulator and limits the heat loss to a minimum thanks to an efficiency of about 90%. The low design and high efficiency make the power supply units particularly suitable for installation in decentral distributor boards. Each module keeps the limit values for interference suppression class B, and can thus be used universally – in both extreme industrial conditions and in office and residential environments susceptible to interference.

Headquarters: © Phoenix Contact GmbH & Co. KG • Flachsmarktstraße 8-28 • 32825 Blomberg • Germany
Phone +49-(0) 52 35-3-00 • Fax +49-(0) 52 35-3-4 1200 • http://www.phoenixcontact.com

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3. Technical Data

Type / Order No.

QUINT-PS-120AC/24DC/5	29 39 069
QUINT-PS-120AC/24DC/5/F	29 39 263
QUINT-PS-230AC/24DC/5	29 39 166
QUINT-PS-230AC/24DC/5/F	29 39 360

Input data		**QUINT-PS-120...5(... 5F)**	**QUINT-PS-230...5(... 5F)**
Input voltage		120 V AC	230 V AC
• input voltage range		93 -132 V AC	187 -264 V AC
• short-term input voltage range (1 min)		75 - 135 V AC	150 -270 V AC
Frequency		47 - 63 Hz	47 - 63 Hz
Inrush surge current at 25 °C		< 23 A	< 12 A
Current consumption at nominal input voltage		approx 1.53 A	approx 0.8 A
Input fuse, soldered internally		4 AT	4 AT
Power factor		0.6 (0.7)	0.6 (0.7)
Mains buffering		> 20 ms	> 20 ms
Transient surge voltage protection		varistor (response voltage 150 VAC)	varistor (response voltage 275 VAC)
Output data			
Nominal output voltage/current		24 V DC / 5 A	24 V DC / 5 A
Tolerance		± 3 % (typical ± 1,5 %)	± 3 % (typical ± 1,5 %)
Setting range		fixed-voltage	fixed-voltage
Starting delay			
• ohmic load / capacitive load		approx. 100 ms / approx. 300 ms	approx. 100 ms / approx. 300 ms
Switching on after applying the mains voltage		approx. 0.5 s	approx. 0.5 s
Startup of capacitive loads		approx. 30 000 µF	approx. 30 000 µF
Surge voltage protection against internal surge voltages		yes	yes
Function display		LED	LED
Connection in parallel		yes, only for the design of redundant systems	yes, only for the design of redundant systems
Current limitation		>1.1 X $I_{nominal}$	>1.1 X $I_{nominal}$
System deviation with change in load:			
Static 10 - 90 %		< 1 %	< 1 %
Dynamic 10 - 90 %		< 5 %	< 5 %
System deviation with change in input voltage ±10 %		< 0.1 %	< 0.1 %
Ascent time U out (10 % - 90 %)		100 ms	100 ms
Residual ripple / peak switching voltages (1.2 MHz)	idling	10 mV pp / 10 mV pp	10 mV pp / 10 mV pp
	nominal load	150 mV pp / 100 mV pp	150 mV pp / 100 mV pp
Maximum power dissipation	idling	4 W	4 W
	nominal load	20 W	20 W
Climatic Data			
Ambient temperature	Operation	-20 °C to +50 °C	-20 °C to +50 °C
	Storage	-25 °C to +85 °C	-25 °C to +85 °C
Moisture, without condensation		95 %, 25 °C	95 %, 25 °C
Vibration in acc. with IEC 68-2-6		10 Hz-150 Hz, 0.15 mm or 2 g	10 Hz-150 Hz, 0.15 mm or 2 g
Shock in acc. with IEC 68-2-27		30 g for 18 ms in 3 directions	30 g for 18 ms in 3 directions
Contamination class in acc. with EN 50 178		2	2

4. General Data

Insulation voltage input/output		1.8 kV (3 kV type test)	1.8 kV (3 kV type test)
Electric safety		VDE 0805, EN 60950 UL 1950, CSA 22.2 No. 950 VDE 160, EN 50178 UL 508 c, CSA 22.2 No. 14-M-91 VDE 0100-410 / DIN 57100-410 DIN VDE 0106-101	VDE 0805, EN 60950 UL 1950, CSA 22.2 No. 950 VDE 160, EN 50178 UL 508 c, CSA 22.2 No. 14-M-91 VDE 0100-410 / DIN 57100-410 DIN VDE 0106-101
Safe isolation		No (yes)	No (yes)
Limit for mains current harmonics in acc. with EN 61000-3-2			
Installation position		horizontal mounting rail	horizontal mounting rail
Mounting		NS 35 / 7,5 in acc. with EN 50022 can be aligned: distance vertical > 10cm horizontal without spacing	NS 35 / 7,5 in acc. with EN 50022 can be aligned: distance vertical > 3,94in horizontal without spacing
Connection / Cross section	Input	COMBICON /0.2- 2.5 mm^2 (AWG 24-12)/rigid/flexible	COMBICON /0.2- 2.5 mm^2 (AWG 24-12)/rigid/flexible
	Output	COMBICON /0.2- 2.5 mm^2 (AWG 24-12)/rigid/flexible	COMBICON /0.2- 2.5 mm^2 (AWG 24-12)/rigid/flexible
Protection type		IP 20	IP 20
Protection class		I, with PE connection	I, with PE connection
MTBF		> 500 000 h in acc. with SN 29 500	> 500 000 h in acc. with SN 29 500
Efficiency		> 86 %	> 86 %
Weight		approx. 1.1 kg (approx. 1.2 kg)	approx. 01.1 kg (approx. 1.2 kg)
Approx. dimensions (W x H x D) in mm		180 x 87 x 78	180 x 87 x 78

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Complies with EMC guideline 89/336/EEC and low voltage directive 73/23/EEC

Immunity to interference in acc. with EN 50082-2		
• Electrostatic discharge (ESD)	EN 61000-4-2	Level 3 (6/8 kV) [2]
• Electromagnetic HF field:	EN 61000-4-3	Level 3 (10 V/m) [2]
• Fast transients (Burst)	EN 61000-4-4	Level 3 (2 kV) [2]
• Surge voltage capacities (Surge)	EN 61000-4-5	Inst. class 3 (2 kV) [2]
• Conducted disturbance	EN 61000-4-6	10 V, 150 kHz-80 MHz
• Voltage fluctuations	EN 61000-4-11	100%, 40%, 0%[1]
• Simulation mobile phones	ENV 50204	20 V/m, 900 MHz ± 5 MHz, 50 % VT
Noise emission in acc. with EN 50081-1		
• Housing	EN 55011	Class B
• A.C. supply current	EN 55011	Class B

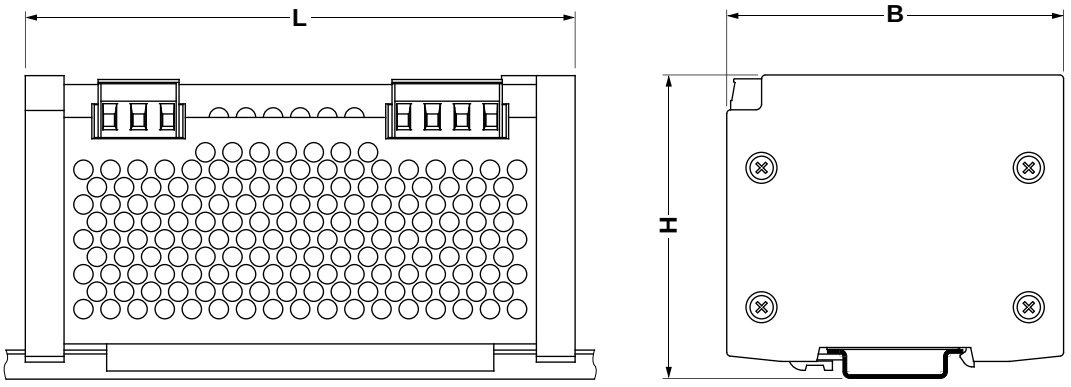
EN 61000 corresponds to IEC 1000 / EN 55011 corresponds to CISPR11

[1] Criterion A: Normal operating behavior within the defined limits.

[2] Criterion B: Temporary impairment to operational behavior that is corrected by the device itself.

Class B: Area of application industry and residential

5. Dimensioned Drawing



L= 180 mm
W= 87 mm
H= 78 mm

Fig. 2

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6. Connection Scheme

Primary switched-mode compact power supply unit

QUINT-PS-120AC/24DC/5(...5/F)

QUINT-PS-230AC/24DC/5(...5/F)

① AC input
pluggable COMBICON screw terminal block
(0.2 mm^2 to 2.5 mm^2 rigid/flexible)
(AWG24-12)

② DC output
pluggable COMBICON screw terminal block
(0.2 mm^2 to 2.5 mm^2 rigid/flexible)
(AWG 24-12)

③ DC o.k. control lamp

④ Retaining bracket for mounting rail

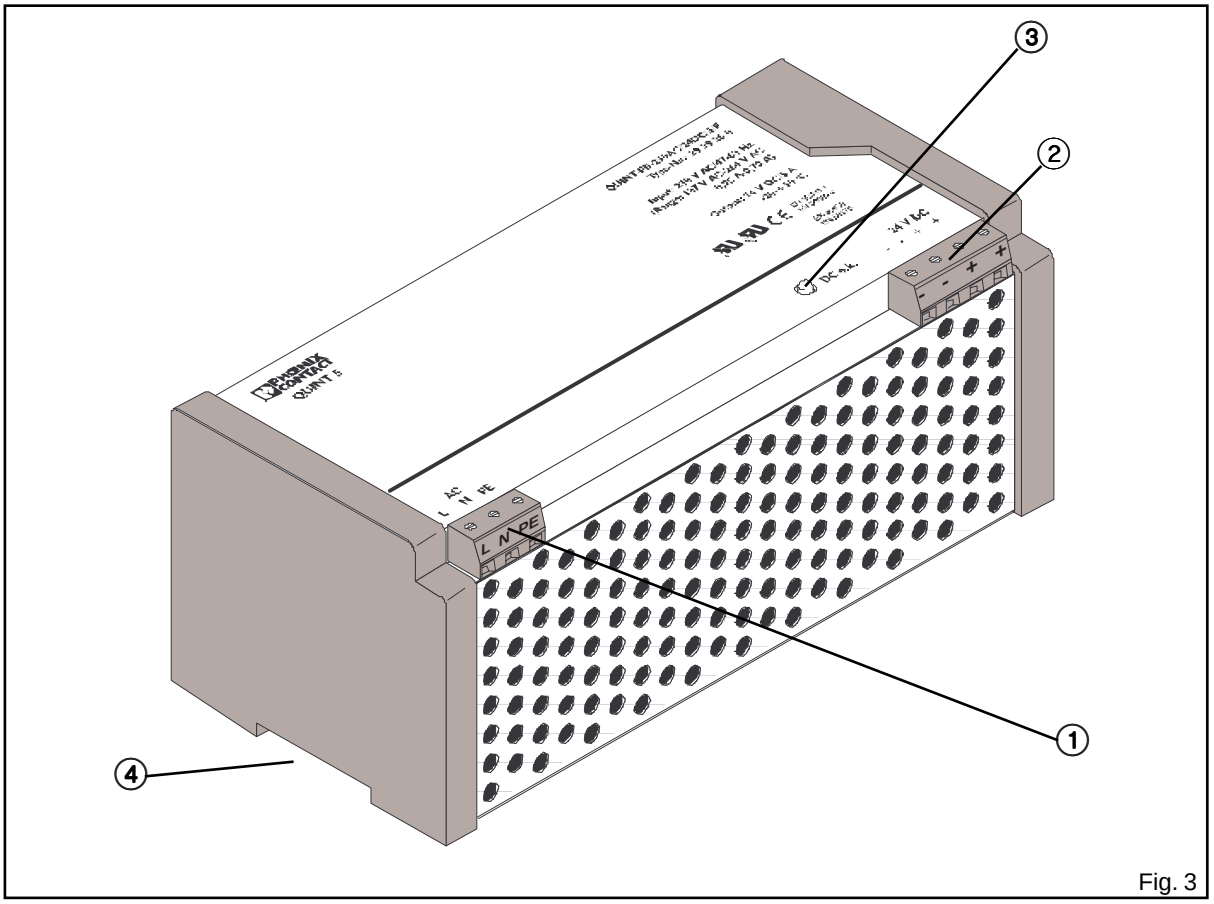

Fig. 3

7. Block Diagram: Primary Switched-Mode Power Supply Unit

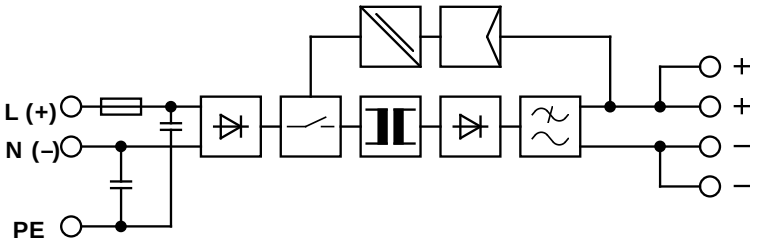

Fig. 4

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8. Connection and Operating Instructions

In the vertical direction, a minimum distance of 10 cm between other modules and this power supply unit is necessary in order to guarantee sufficient convection. If they are lined up horizontally, no minimum distance must be observed!

8.1. Rail mounting

The power supply units can be snapped onto top-hat rails
NS 35 / 7,5 in acc. with EN 50022-35.

Assembly: Position the module with the mounting rail guide on the **lower edge** of the mounting rail, and snap it in with an **upward motion** (fig. 5a).

Dismantling: Press the module upward against the existing spring resistance ① and slide the module out at the **top edge** of the mounting rail ② (fig. 5b)

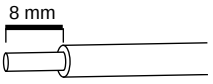
8.2. Cable connection

The device is equipped with COMBICON plug connectors. This method of connection, so convenient for installation allows equipment to be replaced quickly and the electrical connection to be visibly separated.

Attention: Never carry out work on live parts Danger!

Connecting cable:
You can use cable cross sections of
0.2 mm^2 to 2.5 mm^2 rigid or
0.2 mm^2 to 2.5 mm^2 flexible (AWG 24-12).

In order to comply with the UL, use copper cables that are designed for operating temperatures of 75 °C. **To achieve reliable and shockproof contacts**, strip the connecting ends as shown here!



Input (fig. 6): The 120 V/230 V AC connection is made using the L, N and PE screw connections on the COMBICON plug connection (torque 0.5 Nm) (fig.6). The connection to the various network types is shown in fig. 7.

Assembly Instructions

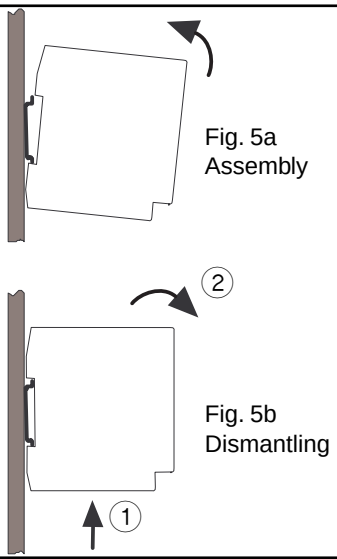


Fig. 5a
Assembly

Fig. 5b
Dismantling

Fig. 5

AC cable connection

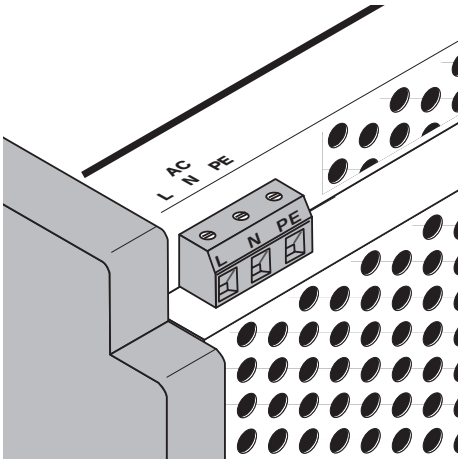


Fig. 6

Network types

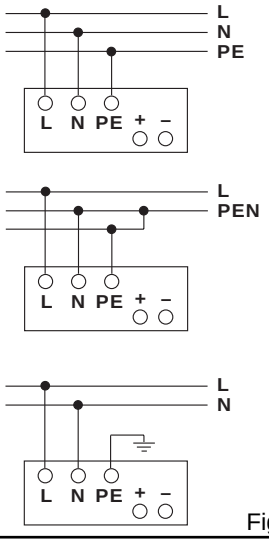


Fig. 7

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Output (fig. 8): The 24 V DC connection is made using the "+" and "–" screw connections on the COMBICON plug connection (torque 0.5 Nm).

The DC o.k. control lamp (fig. 8 ①) signalizes a secondary voltage of more than 20 V DC. When the LED is off, there is either a short circuit on the secondary side, or the 120 V/230 V AC power supply has been interrupted.

DC cable connection

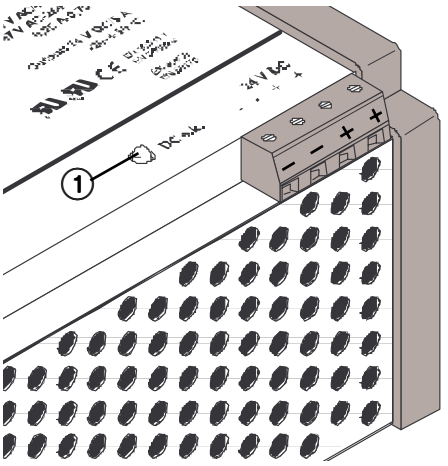

Fig. 8

8.3. Fusing

Primary side: The device is equipped internally with a T4A/250 V fine-wire fuse.

If the internal fuse on the primary side is triggered, there is most probably a malfunction in the device.In this case, the device must be inspected in the factory!

Secondary side: The device is electronically protected against short-circuit and idling. In the event of a malfunction, the output voltage is limited to 33 V.

8.4. Redundant operation

These devices can only be connected in parallel for redundant operation (fig. 9). If a fault occurs in the primary circuit of device no. 1, device no. 2 automatically takes over the entire power supply, without interruption, and vice versa.

Redundant operation

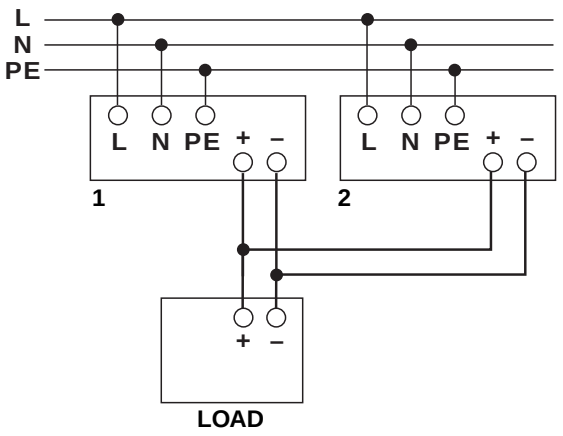

Fig. 9

9. Characteristic Curves

9.1. Short circuit/overload

The output of the device is **electronically** protected against overload and short-circuiting.
The device can provide 1.1x the nominal current, without switching off. If the overload is greater, the operating point follows the curve displayed in figure 10 and switches the device off within 80 ms if there is an overload. The power supply unit emits a maximum current of 2.4x I_N. After the device has switched off, it attempts to switch on again after approx. one second. This procedure is repeated until the short circuit on the secondary side has been remedied.

Output characteristic curve

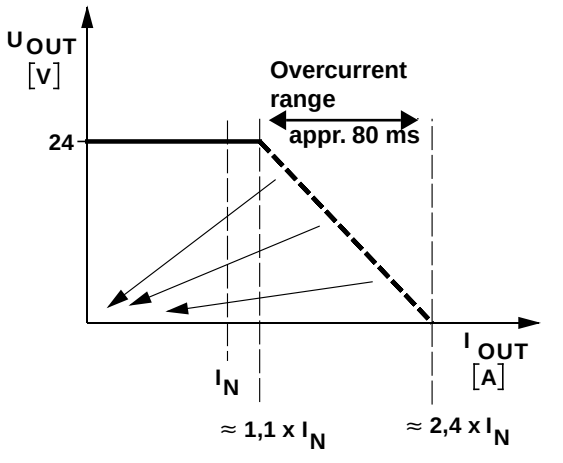

Fig. 10

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9.2. Thermal behavior

The device supplies a maximum output current of 5 A in the case of ambient temperatures up to 50 °C. In the case of ambient temperatures above 50 °C, the output current must be reduced by 1 % per Kelvin increase in temperature.
Depending on the load and the environmental conditions, the temperature of the housing can be up to 70 °C.

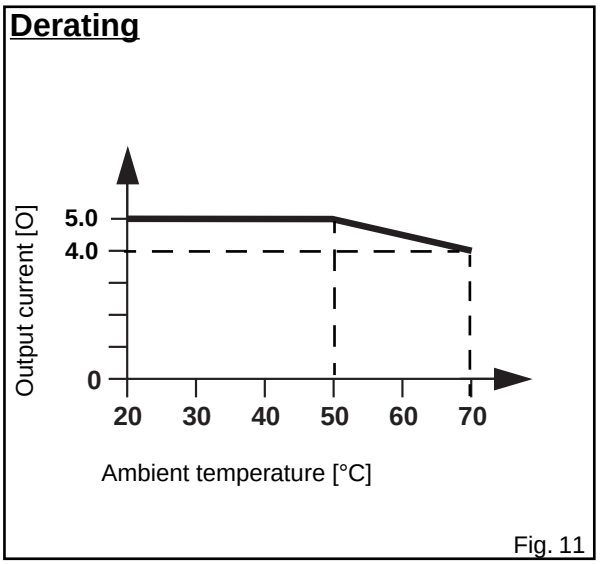

Fig. 11

10. Standards Certifications

10.1. Electric safety

Electrical safety is guaranteed by the construction of the device in acc. with EN 60950 (VDE 0805) and EN 50178 (VDE 0160). The device is certified in accordance with EN 60950/VDE 0805, UL 1950, CSA 22.2 No. 950, and EN 50178/VDE 0160, UL 508 c, CSA 22.2 No. 14-M-91. The requiremnts made of reliable isolation in accordance with VDE 0100-410 und VDE 0106-101 are fulfilled.
• Radio interference suppression in acc. with EN 55 022 class B (industry and residential area)
• Compliance with the EN 61 000-3-2(mains harmonic currents) for all devices of type .../F (filtered).
The device must be installed in acc. with the regulations as in EN 60950. It must be possible to disconnect the device using a suitable **isolating facility outside the power supply unit**.

10.2. Mechanical safety

• The devices have been tested for shock resistance in acc. with IEC 68 part 2-27 and for vibrations in acc. with IEC 68 part 2-6.
• Protection class I, IP 20 protection.

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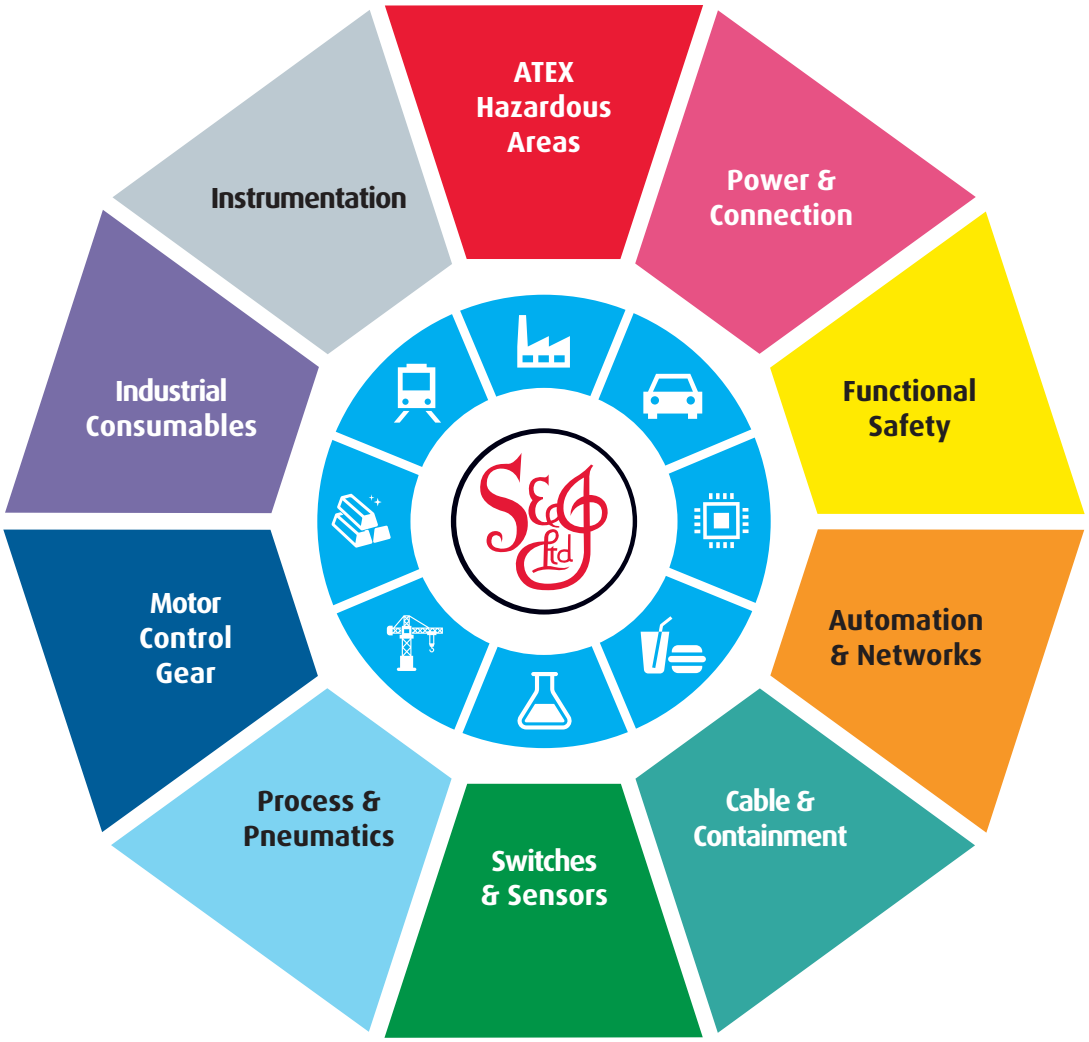

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