

6 Power supplies

6.3 PSU-UNI2450U

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6.3.1 25–28 V DC Power supply (1200 W) – UL508 approved

The PSU-UNI2450U power supply is a UL approved switched-mode DC power supply with a high efficiency (>85% at 187 V AC and >80% at 93, 5 V AC). It accepts a wide range of input voltages to provide 25 V DC and 48 A output or 28 V DC and 43 A output.

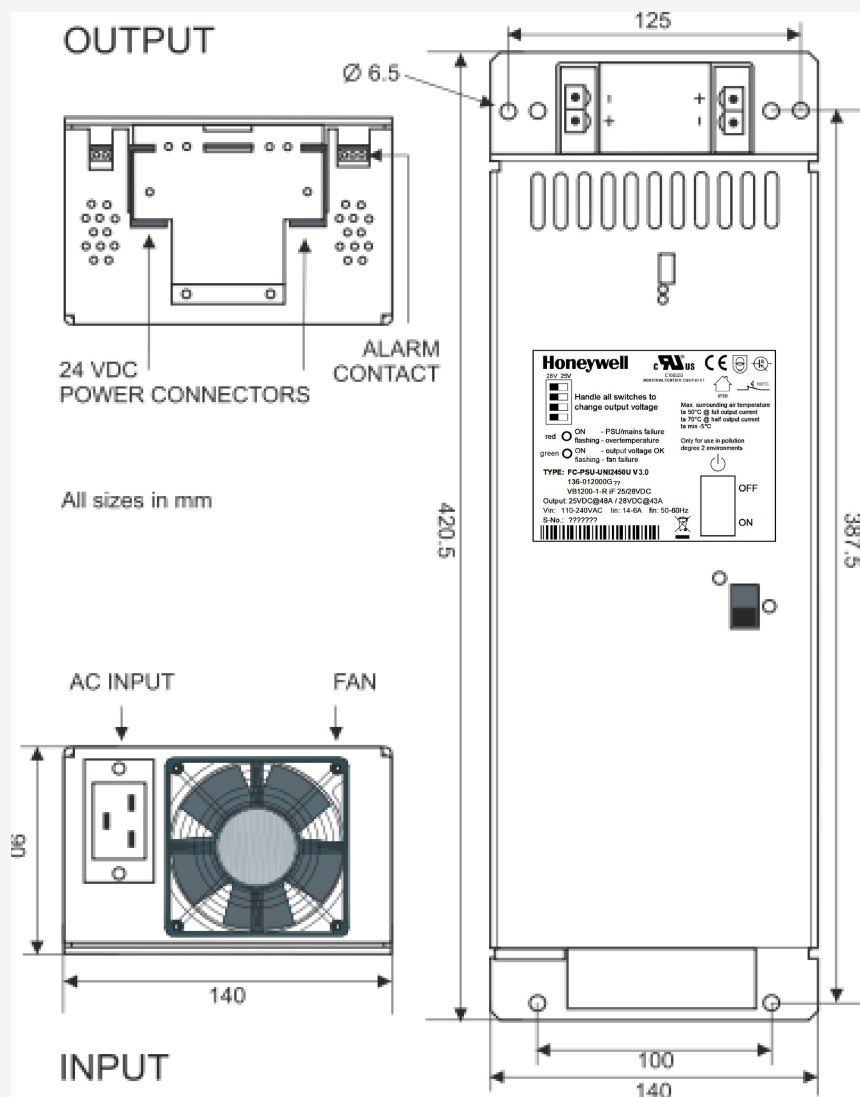


Figure 6-9: Top, bottom and front view of the PSU-UNI2450U power supply

6.3.2 Main features

The units main features include:

- Dual built-in over-voltage protection, to comply with the functional safety requirements of the IEC 61508 standard.
- ON/OFF switch on the power supply combined with isolated AC and DC power connectors enable on-line replacement of the unit in a live system.
- A current limit feature, used to limit the maximum output power to 1200 W.
- Under-voltage alarm (<22 V).
- An output diode for parallel operation.
- For FC-PSU-UNI2450U, temperature range: -5°C to 70°C.
- For FA-PSU-UNI2450U, Wide temperature range: -40°C to 70°C.
- Optimum protection against continuous overload and short-circuiting.
- 100ms holdup time.
- FAN alarm.
- For FA-PSU-UNI2450U Hazloc Certified (IECEX. ATEX. CID2).
- UL 508 approved (file no. E168320) and also EN 61558-2-16 compliant.
- The FA-Version is additionally ATEX, IECEX, and CSA approved for explosive atmospheres zone 2.

Explanation of symbols:



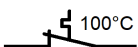
Safety isolating transformer, short-circuit proof.



Switch mode power supply unit.



For indoor use only, protection class IP20.



Contains 100°C temperature switch with automatic switch-on after cooling down.

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The LEDs on the front panel indicate the following status:

Green LED	On	PSU in operation; output OK
	Off	PSU swithed off
	Fflashing	Fan does not reach required speed
Red LED	On	PSU/MAINS failure, or in stand-by mode
	Off	No failure
	Flashing	Temperature too high

Attention:

The LEDs of the PSUs are the only indicators that determine the health/functioning of the PSU. Therefore, it is recommended to visually check LEDs of the PSUs during regular inspection.

Attention:

The unit (FA and FC variant) contain temperature switches (minimum switch OFF temperature is 100°C). After reaching the lowest temperature of the hysteresis the unit will switch ON automatically.

Caution:

The unit (FA and FC variant) is conditionally short-circuit proof, not permanent short-circuit proof.

6.3.3 Hardware control features

The PSU-UNI2450U power supply has the following hardware control features:

- Power switch
- An output adjustment selector switch (25 V DC or 28 V DC)
- An alarm contact

6.3.3.1 Power switch

Attention:

Cycling of the power switch can cause permanent damage to the power supply. After you switch the unit OFF, wait at least 30 seconds before you switch it ON again.

The power switch is sunk into the frame to prevent accidental operation. It allows you to switch off the PSU-UNI2450U before you disconnect it.

With the power switched off you can safely remove the AC and DC power cables without risk of sparks or spikes on the grid.

6.3.3.2 Output adjustment selector switch

Attention:

Only change the dip-switch settings when the power supply has been switched off.

To adjust the output to 28 V DC (e.g. for UPS applications), *all four* dip-switches in the PSU front need to be set in their left position, as shown in the below figure.

Default factory setting of the dip-switch is 25 V DC.

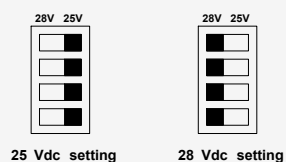


Figure 6-10: Dip-switch setting to set output voltage

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6.3.3.3 Alarm contact

The PSU-UNI2450U has an alarm contact used for voltage monitoring.

The below figure shows the alarm contact with the relay energized, which means that the PSU is powered and the output voltage is above 22Vdc, and fan reached required speed.

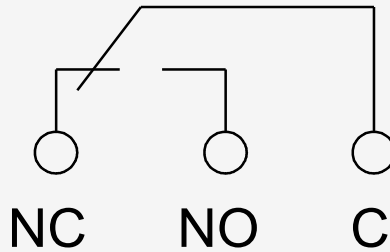


Figure 6-11: Alarm contact state with output voltage above 22 V DC

6.3.4 Installation

The unit can be mounted both vertically or horizontally.

Convection cooling works best when the unit is mounted vertically, with the power and fan input facing downwards (see the below figure).

Note:

Vertical mounting is preferred for optimal cooling.

1. When the unit is mounted vertically at least 100mm (3.94 inch) free space is required above and below the unit.
2. When the unit is mounted horizontally at least 100mm (3.94 inch) free space is required around the unit.

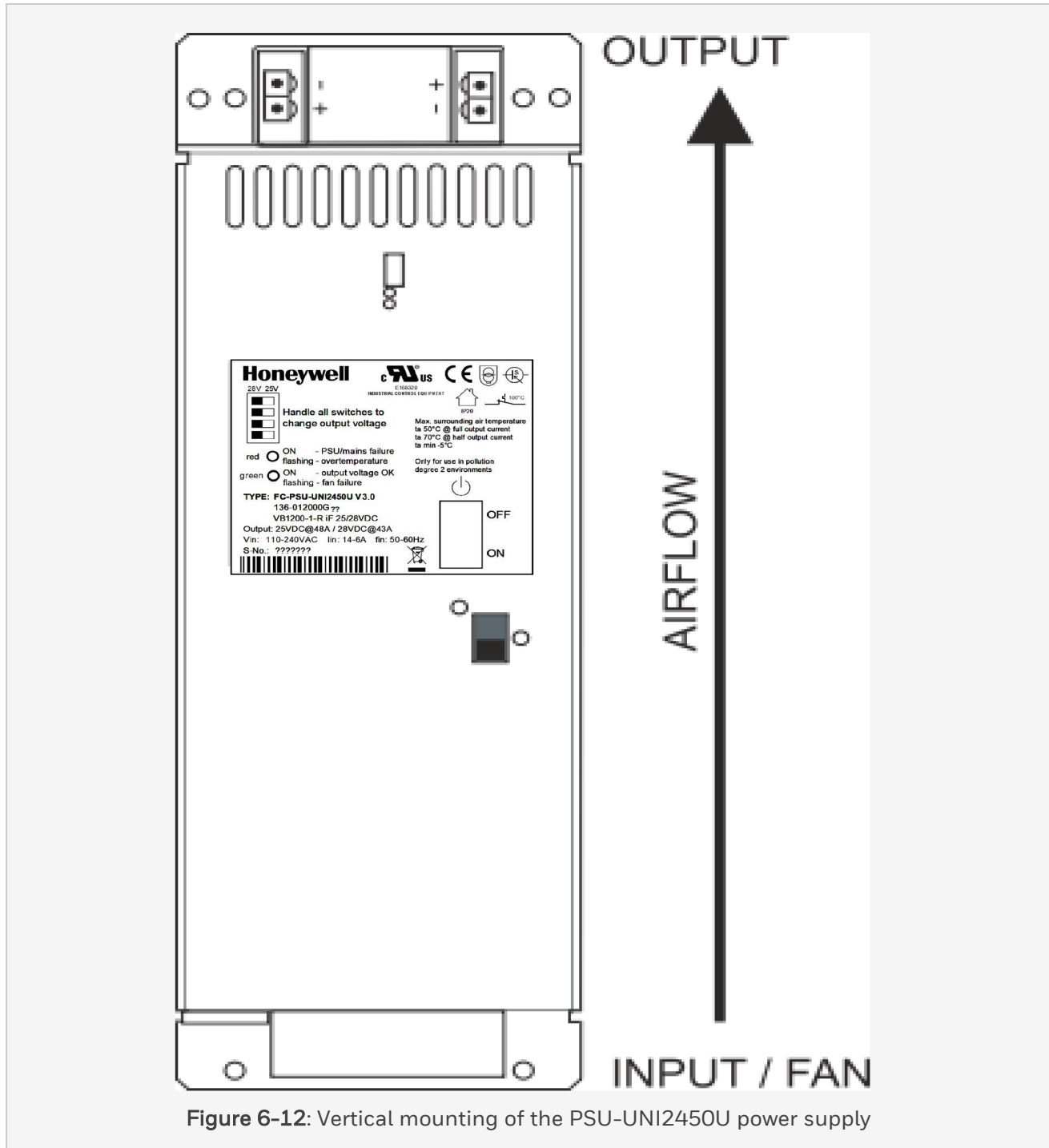


Figure 6-12: Vertical mounting of the PSU-UNI2450U power supply

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The below figure shows that:

- The maximum PSU ambient temperature may not exceed 50°C (122°F) when operating at full load.
- When mounting vertically the maximum PSU ambient temperature may go up to 70°C (158°F) when operating at half load or less.

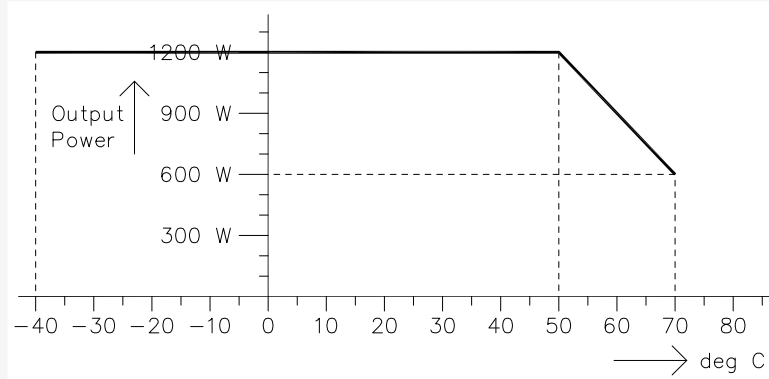


Figure 6-13: Derating curve¹ for the PSU-UNI2450U power supply.

1. Operation outside these perimeters may cause a temporary PSU shut-down.

6.3.5 Electrical connections

The following connection details apply to the power supply:

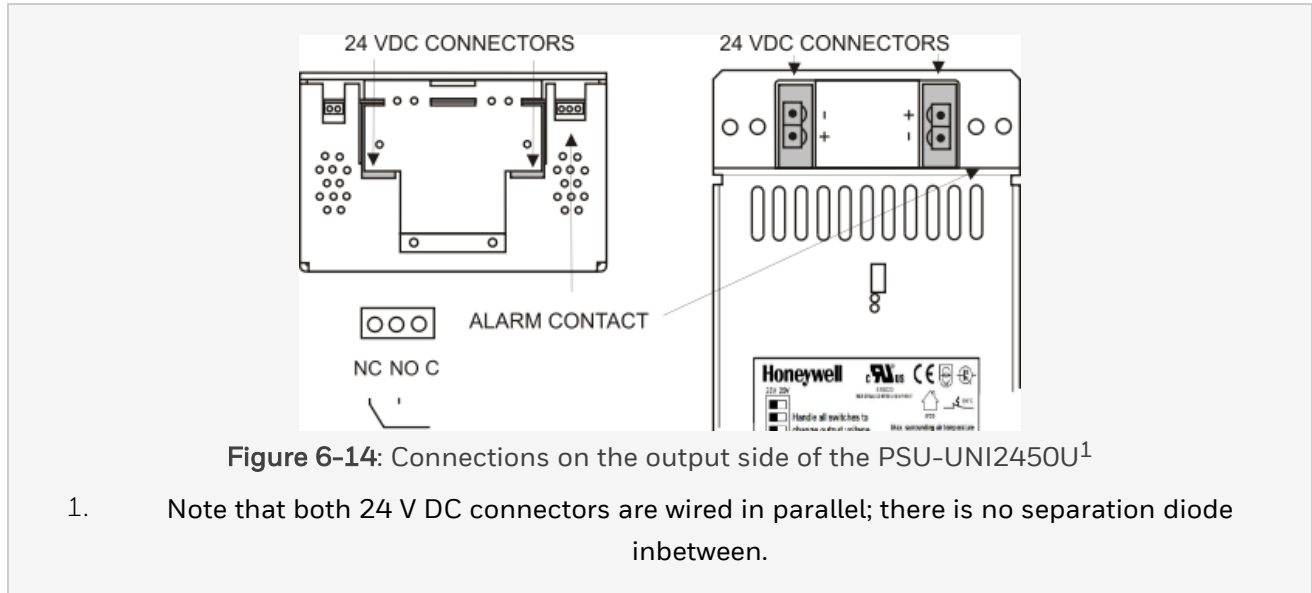
- The AC input uses a IEC60320 C20 inlet socket type with a retaining clip to hold the IEC60320 C19 power connector. A cable is included to connect the PSU to the mains.
- The DC output uses 2 internally mounted male output connectors, type Phoenix PCV6-16/2-G1F-10,16 with locking nuts. A dual cable set is included to transfer the load to the main power rail. For more information see MB-0001.

Note:

Both the connectors of output cable set do not contain a separate strain relief. Protect the cable from tension and twisting in the end application.

- The external alarm wires are mounted to a 3 pole female screw socket, make Phoenix, type MC 1,5/3-G-3,81. This connector is plugged into a male connector next to the power connectors.

The below figure shows the connections and connector lay-out on the output side of the PSU-UNI2450U.



The below table shows the recommended wire sizes for the power supply's input and output wiring.

Recommended wire sizes for the PSU-UNI2450U power supply

INPUT	OUTPUT	
110 –240 V AC	25 V DC	Voltage drop (with dual output cable, length 1.8 m)
2.5 mm ² ; (AWG 14)	2 sets of black and red wires – 8.3 mm ² ; (AWG 8)	192 mV/m at 48 A

Spare part list

Spare parts	Article numbers
Retaining clip for IEC 60230 C19 connector	Bulgin article number: KT0012
Input cable including IEC 60230 C19 connector	Honeywell article number: 148-020002C
Output cable including both connectors	Honeywell article number: 148-020003L

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6.3.6 Technical data

The FC-PSU-UNI2450U power supply unit has the following specifications:

General	Type number:	FC-PSU-UNI2450U
	Version ³ :	V2.1, V3.0
	Approvals:	TUV;  
Power	Power requirements:	110-240 V AC
		(operating limits: 93-253 V AC)
	Power consumption at no load:	13 W
	Power factor:	Close to 1
	Input frequency range	47- 63 Hz
Physical	Dimensions:	420.5 × 140 × 90 mm (W × H × D)
		16.57 × 5.51 × 3.54 in (W × H × D)
	Weight:	5.7 kg (12.5 lb) – including the cable set
Environment	Storage temperature:	-25 °C to +85 °C (-13 °F to +185 °F)
	Operating temperature:	-5 °C to +70 °C (23°F to +158°F)
		(see Figure 2 for derating of output current as a function of ambient temperature)

Input	Inrush current:	< 15A
	Input power:	< 1400 VA (rated voltage 220-240 V AC) < 1500 VA (rated voltage 110-120 V AC)
	Input current:	< 7.5 A (rated voltage 220-240 V AC) < 16 A (rated voltage 110-120 V AC)
Output	Output voltage:	25 V DC or 28 V DC; dual overvoltage protection
	Ripple and noise:	< 40 mVpp
	Output current (25 V DC):	48 A at -5 °C to +50 °C (23 °F to +122 °F)
	Output current (28 V DC):	43 A at -5 °C to +50 °C (23 °F to +122 °F)
	Derating output current:	Starting at 50 °C (122 °F): 30 W/°C
		(see "Derating curve1 for the PSU-UNI2450U power supply." on page 207 for derating curve)
	Hold-up time:	100 ms at full load
	Output voltage setting:	25 V DC
Isolation	Efficiency:	>85% (rated voltage 220-240 V AC) >80% (rated voltage 110-120 V AC)
	Input to output:	3750 V _{rms} (1 min.) ¹
	Input to case:	2500 V _{rms} (1 min.) ¹
	Output to case:	500 V DC

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Connectors	AC input:	IEC 60320 C20 inlet type socket, 16 A with retaining clip
	DC output:	2 x Phoenix PCV6-16/2-G1F-10,163
		With locking screws
	Cable connector	Phoenix PC 16/2-STF-10,16 ²
	• Min. wire size	0.75 mm ²
	• Max. wire size	16 mm ²
	• Strip length	12 mm
	Alarm contact:	3 pole Phoenix socket type MC 1,5/3-G-3,81
	Cable connector	Phoenix MC 1,5/3-ST-3,81
	• Min. wire size	0.14 mm ²
	• Max. wire size	1.5 mm ²
	• Strip length	7 mm
Alarm contact	Contact rating	100 mA / 30 V
	Undervoltage alarm contact:	Relay de-energizes when output voltage drops below 22 V DC.
	Voltage limit:	For safety, two independent regulation circuits limit the output voltage to approximately 27 V (30 V for 28 V mode) in case of malfunction of the normal regulation.

Note:

1. For type test only.
2. Both the connectors of output cable set do not contain a separate strain relief. Protect the cable from tension and twisting in the end application.
3. From V3.0 the Alarm contact reports fan failure.

The FA-PSU-UNI2450U power supply unit has the following specifications:

General	Type number ¹ :	FA-PSU-UNI2450U
	Version ⁴ :	V2.1, V3.0
	Approvals ² :	TUV;   ; CSA; ATEX; IECEx
		Ex signature:  Ex nA nC IIC T4 Gc IECEx cert. No: EPS 17.0044X CSA Signature: Ex nA nC IIC T4 Gc Class 1, Division 2, Groups ABCD T4
Power	Power requirements:	110–240 V AC
		(operating limits: 93-253 V AC)
	Power consumption at no load:	13 W
	Input frequency range	47-63 Hz
Physical	Dimensions:	420.5 × 140 × 90 mm (W × H × D)
		16.57 × 5.51 × 3.54 in (W × H × D)
	Weight:	5.7 kg (12.5 lb) – including the cable set
Environment	Storage temperature:	-25 °C to +85 °C (-13 °F to +185 °F)
	Operating temperature:	-40 °C to +70 °C (-40 °F to +158 °F)
		(see Figure 2 for derating of output current as a function of ambient temperature)

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Input	Inrush current:	< 15A
	Input power:	• <1400VA (rated voltage 220-240 Vac) • <1500VA (rated voltage 110-120 Vac)
	Input current:	• <7.5A (rated voltage 220-240 Vac) • <16A (rated voltage 110-120 Vac)
Output	Output voltage:	25 V DC or 28 V DC; dual overvoltage protection
	Ripple and noise:	< 40 mVpp
	Output current (25 V DC):	48 A at -40 °C to +50 °C (-40 °F to +122 °F)
	Output current (28 V DC):	43 A at -40 °C to +50 °C (-40 °F to +122 °F)
	Derating output current:	Starting at 50 °C (122 °F): 30 W/°C
		(see "Derating curve1 for the PSU-UNI2450U power supply." on page 207 for derating curve)
	Hold-up time:	100 ms at full load
	Output voltage setting:	25 V DC
Isolation	Efficiency at 230 V AC:	>87%
	Input to output:	3750 V _{rms} (1 min.)
	Input to case:	2500 V _{rms} (1 min.)
Connectors	Output to case:	500 V DC
	AC input:	IEC 60320 C20 inlet type socket, 16 A with retaining clip
	DC output:	2 x Phoenix PCV6-16/2-G1F-10,16 with locking screws
	cable connector	Phoenix PC 16/2-STF-10,16 ³

	• Min. wire size	0.75 mm ²
	• Max. wire size	16 mm ²
	• Strip length	12 mm
	Alarm contact:	3 pole Phoenix socket type MC 1,5/3-G-3,81
	cable connector	Phoenix MC 1,5/3-ST-3,81
	• Min. wire size	0.14 mm ²
	• Max. wire size	1.5 mm ²
	• Strip length	7 mm
Alarm contact	Contact rating	100 mA / 30 V
	Undervoltage alarm contact:	Relay de-energizes when output voltage drops below 22 V DC.
	Voltage limit:	For safety, two independent regulation circuits limit the output voltage to approximately 27 V (30 V for 28 V mode) in case of malfunction of the normal regulation.

Note:

1. FA-type modules can be used to connect to devices in explosive atmospheres, conform to the applicable ATEX / IECEx guidelines.
2. In case the FA-PSU-UNI2450U is applied for ATEX / IECEx certified projects, the end user shall ensure that it is placed in an IP54 compliant enclosure.
3. Both the connectors of output cable set do not contain a separate strain relief. Protect the cable from tension and twisting in the end application.
4. From V3.0 the Alarm contact reports fan failure.