
Rack Safety Plus, 3 U

Power Distribution Unit with Emergency Stop

User Manual

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1. Safety

1.1 Intended Use

The nVent SCHROFF power distribution unit described in this manual is a power distribution unit used to supply AC mains power to electrical or electronic devices as a central power switch with emergency stop function.

Intended use includes compliance with the terms and conditions for assembly, disassembly, commissioning, operation and maintenance specified by the manufacturer.

The power distribution unit is only intended for use in dry locations, i.e. indoors and without any pollution, in an industrial environment or for commercial use.

1.2 Not intended use

The use of the power distribution unit as a safety function for a machine is not allowed and can lead to hazards.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired

1.3 Safety instructions of the manufacturer


1.3.1 Disclaimer


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1.4 Safety symbols used in this manual


In these original operating instructions, warning notices point out residual risks that cannot be avoided by constructive means when installing or operating the Power Distribution Unit. The warning notices are classified according to the severity of the damage occurring and the probability of its occurrence.

|  DANGER | |
|---|--|
| Symbol | Short description of the danger The signal word DANGER indicates an immediate danger. Non-observance will result in severe injuries or death. |

|  WARNING | |
|--|---|
| Symbol | Short description of the danger The signal word WARNING indicates a possible danger. Non-observance can lead to serious injury or death. |



|  CAUTION | |
|--|--|
| Symbol | Short description of the danger The signal word CAUTION indicates a possible danger. Non-observance can lead to injuries. |

| ATTENTION | |
|--|--|
| Short description The signal word ATTENTION indicates possible damages to equipment. Non-observance can lead to damage to the device. | |

| | |
|---|------------------------------|
|  | Important information |
|---|------------------------------|

1.5 Safety Information for the Operator

Only trained specialists are authorized to carry out assembly, commissioning, completion, maintenance and service of the power distribution unit. The nationally applicable health and safety regulations must also be adhered to.

|  WARNING | |
|--|---|
|  | <p>Risk of injury due to insufficient personal protective equipment</p> <p>If you use the wrong protective equipment or no protective equipment at all, you could be seriously injured.</p> <ul style="list-style-type: none"> - Wear protective equipment adapted to the work processes. - Check the protective equipment before each use to ensure that it is intact! - Use only approved protective equipment. |

1.6 Safety assessment

Before using the power distribution unit in conjunction with a plant/machine, a safety assessment in accordance with the Machinery Directive is required.

The products emergency stop feature is not intended to be used as a safety related function for a machine. Therefore, the user must provide own measures to ensure the required functional safety of the machine is achieved.

2. Power Distribution Unit Overview

2.1 System description

The power distribution unit is intended to supply AC mains power and various DC power to electrical or electronic devices as a central power switch with emergency stop function.

The power distribution unit has a modular design and can be configured by the customer.



Due to the modularity not all possible configurations can be described in this manual.

For further technical information and configuration options, please refer to the relevant data sheets and the online configurator at schroff.nvent.com.

Default features

- 19" 3 U aluminium subrack
- Main ON/OFF by a 2-pole circuit breaker
- Circuit breaker panel
- Emergency stop system
- Status LEDs for phase presence and emergency stop
- ON/OFF button for switched outputs

2.2 Possible configuration options

2.2.1 Mains input

- 120 V AC input, 12 A, 2.5 m cable with flying leads or NEMA Type 5-20P connector
- 120 V AC input, 16 A, 2.5 m cable with flying leads or NEMA Type 5-20P connector
- 120 V AC input, 24 A, 2.5 m cable with flying leads or NEMA Type L5-30P connector
- 208 / 240 V AC input, 12 A, 2.5 m Cable with flying leads or NEMA Type 6-20P connector
- 208 / 240 V AC input, 16 A, 2.5 m Cable with flying leads or NEMA Type 6-20P connector
- 208 / 240 V AC input, 2430 A, 2.5 m Cable with flying leads or NEMA Type L6-30P connector

2.2.2 AC outputs

- **For 120 V AC units 2 outlet panel are available:**
 - 4 x NEMA 5-15R (12 A) outlets
 - 4 x NEMA 5-20R (16 A) outlets
- **For 208 / 240 V AC units 4 outlet panel are available:**
 - 2 x block of 4 x C13 (12 A), non-lockable outlets
 - 6 x C13 (12 A), lockable outlets
 - 4 x C19 (16 A), lockable outlets
 - 4 x C19 (16 A), non-lockable outlets

2.2.3 DC outputs

- **5 different DC output panels are available:**
 - 24 V DC, 14.6 A
 - 28 V DC, 14.6 A
 - 24 V DC, 14.6 A & 5 V DC, 6.5 A
 - 24 V DC, 14.6 A & 12 VDC, 4.5 A
 - 24 V DC, 14.6 A & 5 V DC, 6.5 A & 12 V DC, 4.5 A

2.2.4 AC Service Outputs (Permanently powered)

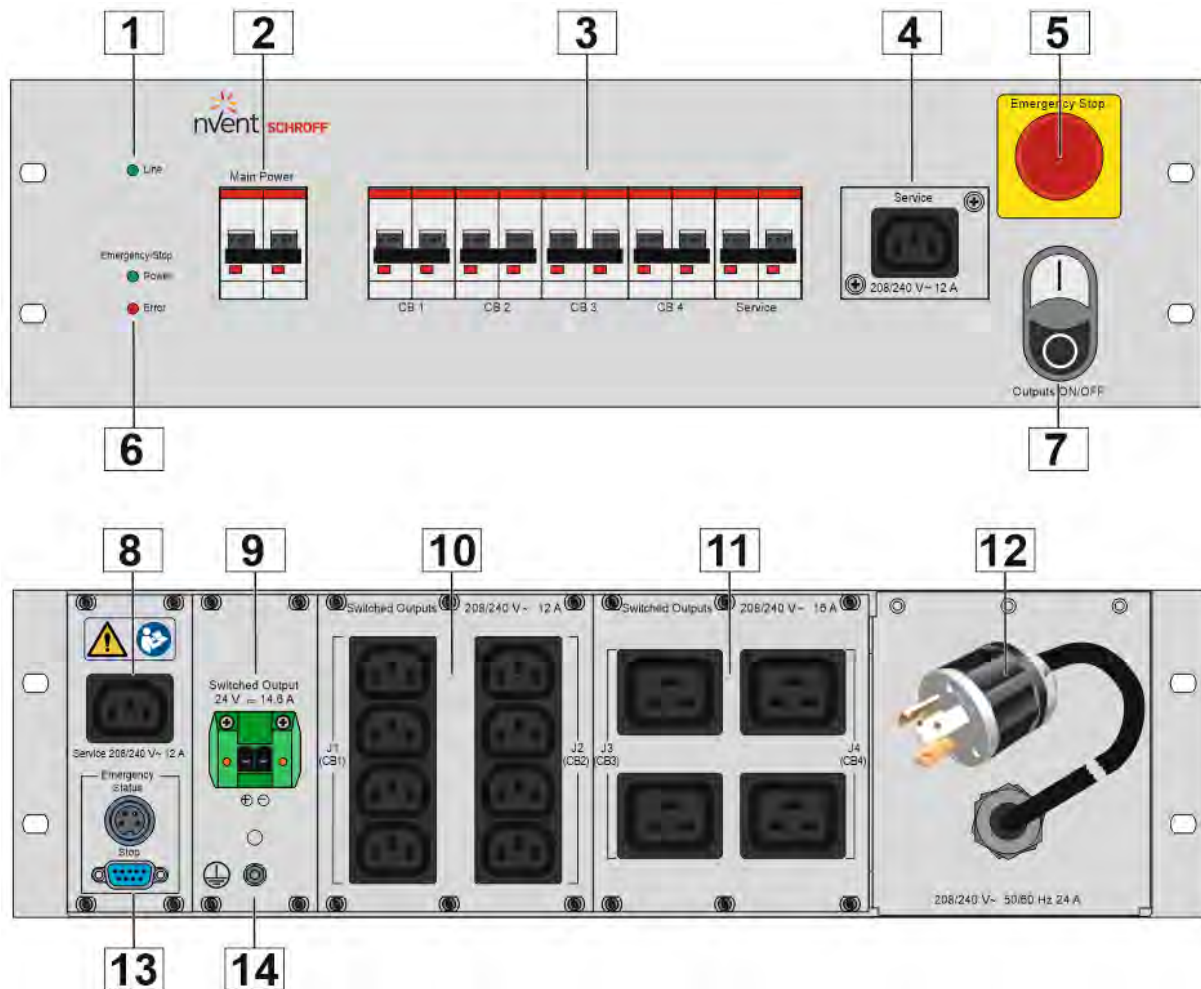
- NEMA 5-15R (120 V AC), IEC 60320-C13 (208/240 V AC) at the front and/or the rear panel

All outputs are protected by circuit breakers.

All outputs except the "Service" outputs can be switched off by the Emergency Stop system.

2.3 Front and Rear View

(P/N 21272-001)



| | | | |
|---|---|----|---|
| 1 | Line Monitor LED | 8 | “Service” Output 208/240 V AC 12 A (option) |
| 2 | Mains ON/OFF | 9 | 24 V DC Output, switched (option) |
| 3 | Circuit Breakers | 10 | Configurable output panel 1 Example: Switched Power Outputs IEC-60320 C13, 208/240 V AC 12 A |
| 4 | Service Output 208/240 V AC 12 A (option) | 11 | Configurable output panel 2 Example: Switched Power Outputs IEC-60320 C19, 208/240 V AC 16 A |
| 5 | Emergency Stop Push Button | 12 | Configurable input panel Example: 2.5 m Cable w/ Nema L6 Plug 24 A |
| 6 | Emergency Stop Status LEDs | 13 | Emergency Stop Input and Status Output |
| 7 | ON/OFF Button for switched Outputs | 14 | Ground Stud |

2.4 Example Configurations

PN: 21272-001



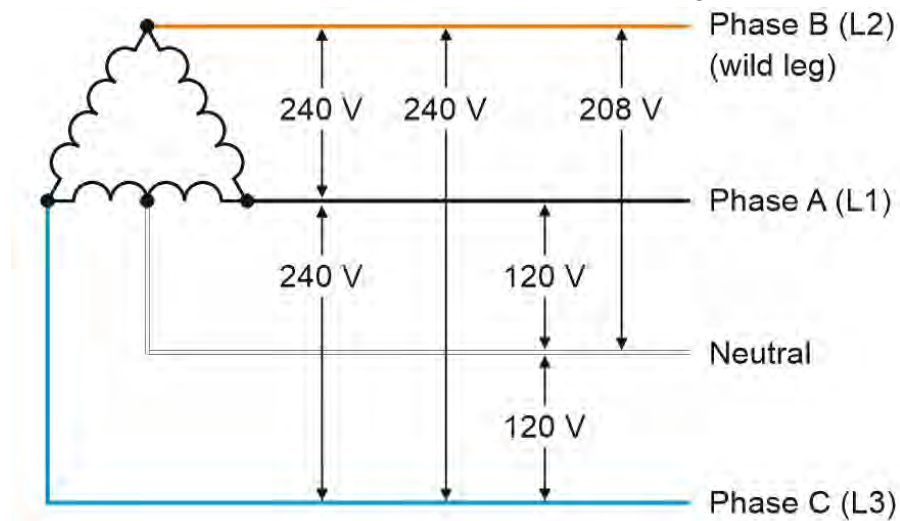
PN: 21272-002



2.5 Mains inlets

Different power inlet modules for 120 V AC and 208/240 V AC are available.

The 208 / 240 V AC input units handle different voltage inputs:



208/240 V AC Inputs



208/240 V AC 12 A cable 2.5 m



208/240 V AC 16 A cable 2.5 m



208/240 V AC 24 A cable 2.5 m



208/240 V AC 12 A
NEMA 6-20P



208/240 V AC 16 A
NEMA 6-20P



208/240 V AC 24 A
NEMA L6-30P

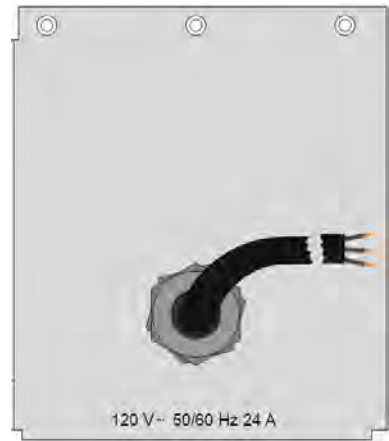
120 V AC Inputs



120 V AC 12 A cable 2.5 m



120 V AC 16 A cable 2.5 m



120 V AC 24 A cable 2.5 m



120 V AC 12 A
NEMA 5-20P



120 V AC 16 A
NEMA 5-20P



120 V AC 24 A
NEMA L5-30P

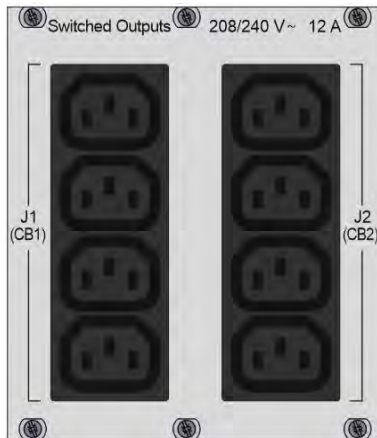
2.6 AC Outlets

Different power outlet modules for 120 V AC or 208/240 V AC are available.

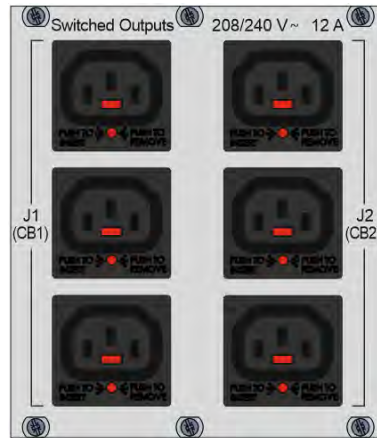
The following overview represents the availability at the time of publication of this manual.

For the current availability visit schroff.nvent.com

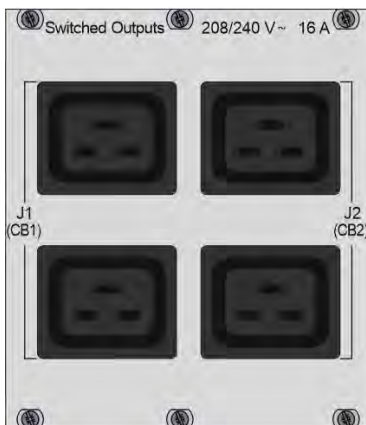
Switched 208/240 V AC Outlets



IEC 60320-C13, 12 A



IEC 60320-C13 lockable, 12 A

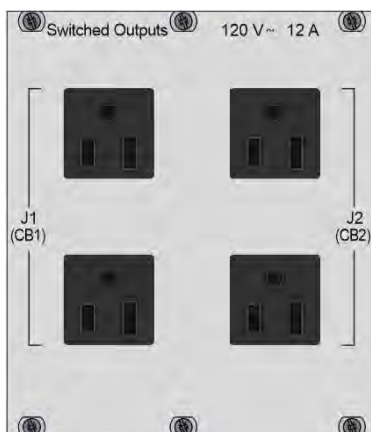


IEC 60320-C19, 16 A

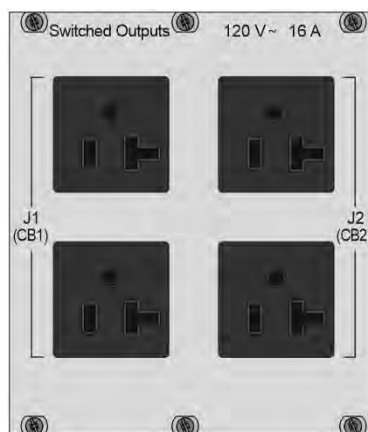


IEC 60320-C19 lockable, 16 A

Switched 120 V AC Outlets

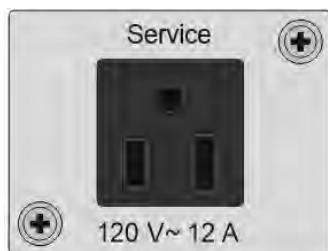


NEMA 5-15R, 12 A



NEMA 5-20R, 16 A

Permanent Service Outlets (Option)



Front

NEMA 5-15R



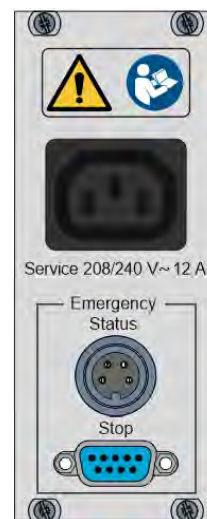
Front

IEC 60320-C13



Rear

NEMA 5-15R



Rear

IEC 60320-C13

2.7 DC Outlets (Option)

| 24 V DC, 14.6 A | 28 V DC, 14.6 A | 24 V DC, 14.6 A 5 V DC, 6.5 A | 24 V DC, 14.6 A 12 V DC, 4.5 A | 24 V DC, 14.6 A 5 V DC, 6.5 A 12 V DC, 4.5 A |
|-----------------|-----------------|----------------------------------|-----------------------------------|--|
| | | | | |

The connector for 24/28 V is Phoenix Contact P/N: 1840557

The mating connector is Phoenix Contact P/N: 1828249

The connector for 5/12 V is Phoenix Contact P/N: 1096152

The mating connector is Phoenix Contact P/N: 1777989

2.8 Circuit Breakers

The outputs are protected by circuit breakers (5). The number of the circuit breaker corresponds to the number of the output, for example, X1 is connected to CB1, X2 is connected to CB2 and so on.

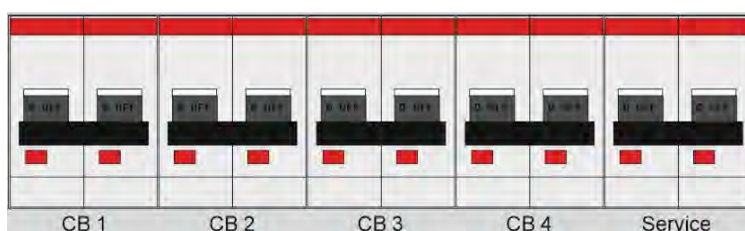
ATTENTION

Electrical overload hazard

The total current consumption of all outputs must not exceed the current rating of the mains input.



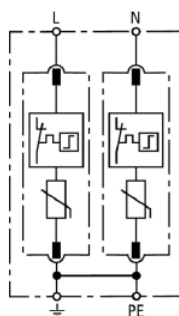
One pole circuit breakers for
120 V AC systems



Dual pole circuit breakers for 208/240 V AC systems

2.9 Surge Arrester (Option)

The Power Distribution Unit can be equipped with a surge arrester as an option.



| Technical Data | 120 V AC | 208/240 V AC |
|--|---------------------------------|---------------------------------|
| SPD according to EN 61643-11 / IEC 61643-11 | type 2 / class II | type 2 / class II |
| Energy coordination with terminal equipment (≤ 10 m) | type 2 + type 3 | |
| Nominal voltage (a.c.) (U_N) | 120 V (50 / 60 Hz) | 230 V (50 / 60 Hz) |
| Max. continuous operating voltage (a.c.) (U_C) | 150 V (50 / 60 Hz) | 275 V (50 / 60 Hz) |
| Nominal discharge current (8/20 μ s) (I_n) | 15 kA | 20 kA |
| Max. discharge current (8/20 μ s) (I_{max}) | 40 kA | 40 kA |
| Voltage protection level [L-PE]/[N-PE] (U_P) | ≤ 0.7 / ≤ 0.7 kV | ≤ 1.5 kV |
| Voltage protection level [L-PE] / [N-PE] at 5 kA (U_P) | ≤ 0.55 / ≤ 0.55 kV | ≤ 1 kV |
| Response time (t_A) | ≤ 25 ns | ≤ 25 ns |
| Max. mains-side overcurrent protection | 125 A gG | 125 A gG |
| Short-circuit withstand capability for max. mains-side overcurrent protection (I_{SCCR}) | 50 kA _{rms} | 50 kA _{rms} |
| Temporary overvoltage (TOV) (U_T) – Characteristic | 175 V / 5 sec. – withstand | 335 V / 5 sec. – withstand |
| Temporary overvoltage (TOV) (U_T) – Characteristic | 230 V / 120 min. – safe failure | 440 V / 120 min. – safe failure |

2.10 Inrush Current Limiter (Option)

The Power Distribution Unit provides an inrush current limiter as an option.

The inrush current limiter is designed for capacitive loads. In the moment of switching-on the system the inrush current of the connected load will be limited for the defined time T_{on} .

Independent from the previous inrush level, the current limiting is always strict. After T_{on} elapses the current limiting circuit of the inrush current limiter will be bypassed. Then the load is directly connected to the AC. If an AC dump overshoots the defined time T_{off} , it will be detected by the inrush current limiter. As soon as the AC recovers the inrush will be limited, again. The inrush current limiter provides an internal temperature control. In case of a failure the device shuts down to prevent overheating or fire.

| Technical Data | | |
|---|-----------------------|-----------------------|
| Model | 208/240 V AC | 120 V AC |
| Peak Current Limiting $\pm 6\%$ | 48 A | 43 A |
| R.M.S Current Limiting $\pm 6\%$ | 33,9 A | 30,4 A |
| Maximum Allowed Capacitive Load | 6.000 μF | 10.000 μF |
| Limiting Time (T_{on} Power On) | 300 ms (± 50 ms) | 300 ms (± 50 ms) |
| Release Time (T_{off} Low Voltage) | 550 ms (± 50 ms) | 550 ms (± 50 ms) |
| Limiting Interval [$T_{interval}$ for AC _{cont.})] | ≥ 900 ms | ≥ 900 ms |



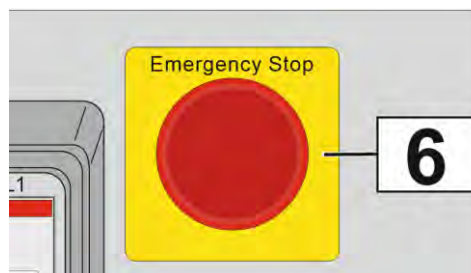
For reliable operation of the optional inrush current limiter, a type B or C circuit breaker in the electrical feed to the Rack Safety Plus Unit is required. Faster circuit breakers are not recommended.

3. Emergency Stop System

The device is equipped with an emergency stop button (6).

Pressing the emergency stop button disconnects the switched AC and DC outputs from the mains. The button is mechanically latching. Emergency stop is deactivated by pulling the button.

The switched AC and DC outputs can be turned on again by pressing the Outputs ON button.



| | |
|-----------------|---|
| ⚠ DANGER | |
| | <p>Danger of electric shock</p> <p>The “Service” AC outputs are not switched off via the Emergency Stop System.</p> |

3.1 Emergency Stop safety features

The Emergency Stop function of the nVent SCHROFF power distribution unit is controlled and monitored by a safety relay.

The safety relay provides a safety-related interruption of the switched outputs. The safety relay meets the requirements of EN 60947-5-1 and EN 60204-1 in applications with E-STOP push buttons.

The emergency stop push button is vandalism-proof. If the emergency stop is sheared off during operation, the emergency stop function is also triggered.

The safety relay meets the following safety requirements:

- The circuit is redundant with built-in self-monitoring.
- The safety function remains effective in the case of a component failure.
- The correct opening and closing of the safety function relays is tested automatically in each on-off cycle.
- Two emergency stop input circuits with cross-circuit detection.
- Emergency stop function is triggered when either one of the two emergency stop input circuits is interrupted or a cross-circuit between the circuits is detected.

| | |
|--|--|
| | <p>The safety relay drives two power contactors responsible for switching the outputs.</p> <p>The power contactors are monitored by auxiliary contacts within a feedback loop of the safety relay. In case of one power contactor failing by a stuck contact the system can not be turned on again.</p> <p>The red ERROR LED on front panel signals if one of the power contactors got stuck</p> |
|--|--|

3.2 Emergency Stop Input and Output

An additional emergency stop push button can be connected to the system at the "Emergency Stop" input (14).

If no additional emergency stop push button is connected, the socket must be terminated with a jumper plug. (Scope of delivery)

The "Emergency Status" connector can be used to transfer status signals to other devices. The Emergency Status plug connector provides a relay output with the status of the safety relay. If the AC and DC outputs are enabled, the relay output (pin 1+2) is closed. If the emergency stop function is triggered, the safety relay interrupts the relay contact.

If the outputs are not enabled via the Output ON/OFF button, the relay output is permanently open.

Emergency Stop (DSUB9)

Pin 1&6 Emergency stop input circuit 1

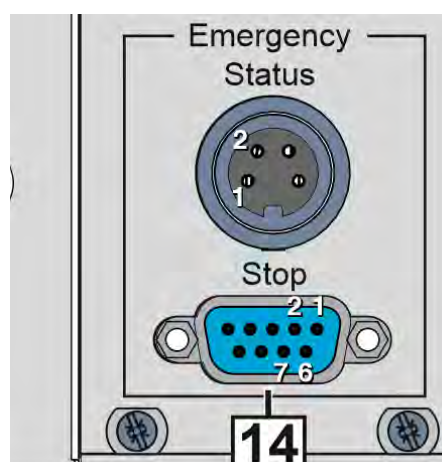
Pin 2&7 Emergency stop input circuit 2

Emergency Status (Lumberg KfV 40)

Pin 1&2 Relay output status safety relay

Max. voltage = 24 VDC or 24 VAC

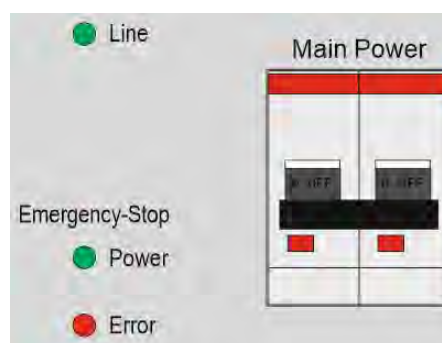
Max. current = 4 A




3.2.1 Emergency Stop Status LEDs


The emergency stop system is powered by a dedicated power supply. The presence of the supply voltage for the emergency stop system is signaled by the green "Power" LED.

The red "Error" LED signals if one of the power contactors got stuck.



4. Installation and Commissioning

| ⚠ WARNING | |
|---|---|
|  | <p>Risk of injury and accidents due to insufficiently qualified personnel!</p> <ul style="list-style-type: none"> The installation may only be carried out by qualified personnel who are authorized to do so according to the valid safety regulations, e.g. by authorized specialized companies or authorized departments of the company. |

| ⚠ WARNING | |
|---|--|
|  | <p>Protective earth/GND connection</p> <p>The power distribution unit must be operated with protective earth/GND connection. Use only a three conductor AC power cable with a protective earth conductor that meets the IEC safety standards!</p> |

| ATTENTION | |
|--|--|
| <p>Incorrect mains voltage or overload can lead to component damage!</p> <p>The devices may have a 120 V or 208/240 V power input. The total current consumption of all outputs must not exceed the value printed on the power input panel (12/16/24 A).</p> | |

4.1 Installation

| ⚠ DANGER | |
|---|---|
|  | <p>Danger of electric shock</p> <p>The EMERGENCY STOP button must be easy to access and not be blocked by any objects.</p> |

The device is designed to be installed indoors in dry environment without pollution, in 19" rack systems with access to the front panel and rear panel.

4.2 Rack mounting

WARNING

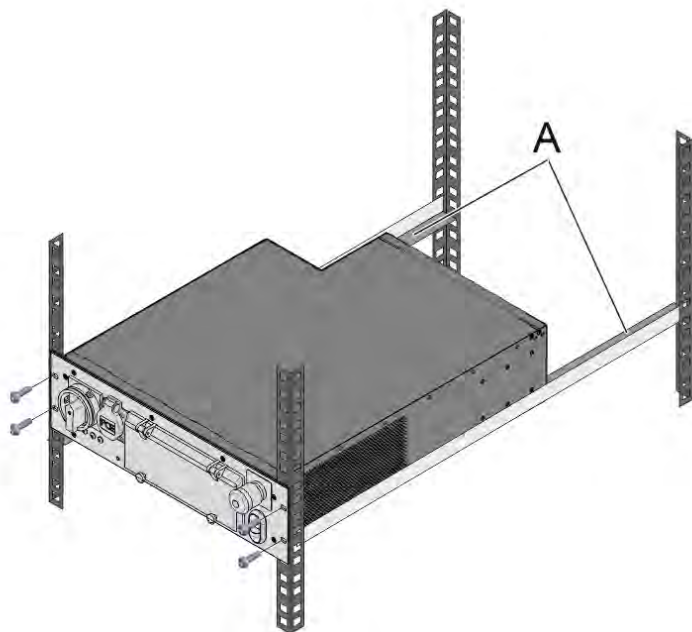


Risk of injury and accidents due to insufficiently qualified personnel!

- The installation may only be carried out by qualified personnel who are authorized to do so according to the valid safety regulations, e.g. by authorized specialized companies or authorized departments of the company.
- It is mandatory to mount the power distribution unit with slide rails (A).

The power distribution unit can be installed into the 19" plane of electronics cabinets.

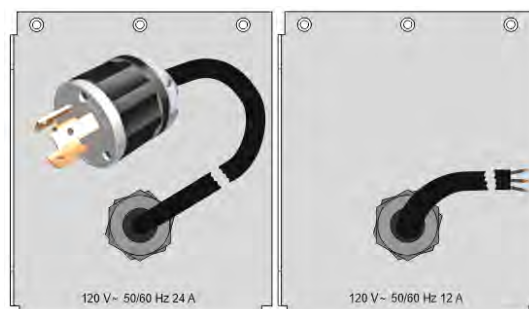
1. Install slide rails (A) at the corresponding position
2. Install cage nuts at the 19" posts
3. Slide in the power distribution unit
4. Fix the power distribution unit with 4 screws at the 19" posts



4.3 Mains connection and system start-up

Connect the system to 120 V AC or 208/240 V AC mains voltage.

Note: Input and connector type depends on the configuration.



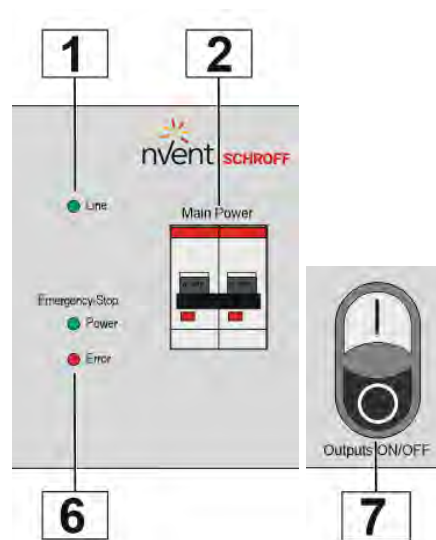
Switch the system on via the main circuit breaker (2).

The AC “Service” (8) outputs will be switched on.

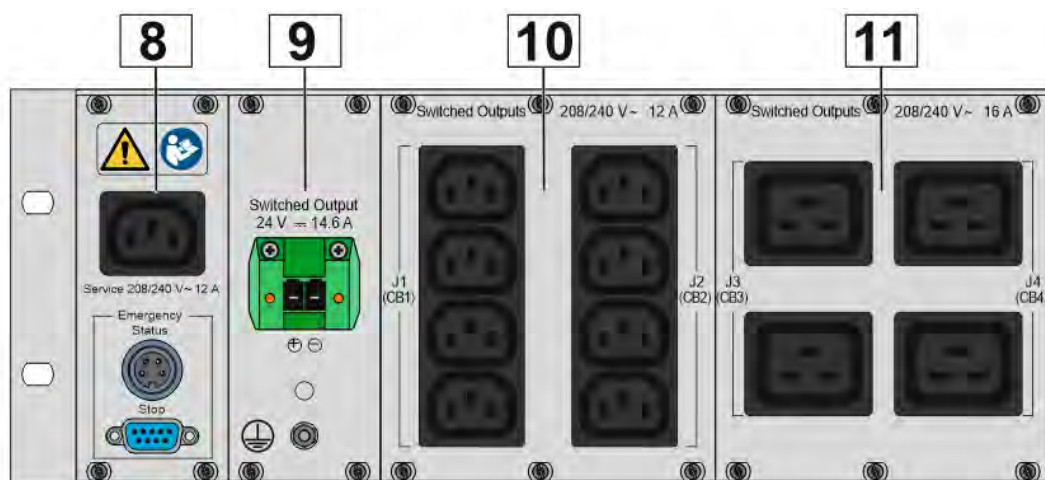
The presence of mains power is indicated via the LED (1) and the Power LED (6) should light up.

Turn on the switched AC outputs (10,11) and DC output (9) with the Outputs ON/OFF button (7).

(The picture below shows a possible configuration)





The red Error LED on front panel signals if one of the power contactors got stuck.



5. Maintenance

The device is maintenance-free. Depending on the operating conditions, the emergency stop function should be tested regularly at intervals specified by the operator.

5.1 Cleaning

|  WARNING | |
|--|---|
|  | Electrical shock when cleaning To prevent electrical shock, disconnect the device from mains power before cleaning with dampened cloth! |

Use a dry cloth or are cloth slightly dampened with clean water or soapy water to clean the case.

Do not use chemical cleaning agents.

6. Disposal



The devices described in this manual must be recycled. In accordance with the Directive 2012/19/EC on waste electronic and electrical equipment (WEEE), they may not be disposed of in the municipal waste disposal services. To ensure environmentally friendly recycling the devices can be returned to a locally approved disposal center. Make sure that you observe the regulations applicable in your country.

7. Technical data

| Type | Power Distribution Unit |
|---------------------------------------|------------------------------------|
| Part No. | 21272-0xx |
| Electrical data | |
| Supply voltage | 120 V AC or 208/240 V AC, 50/60 Hz |
| Input current (derated) | 12 A, 16 A or 24 A |
| Mains supply voltage fluctuations | 10 % |
| Overvoltage category | II |
| Environment | |
| Ambient temperature operation | 5.....40 °C |
| Ambient temperature transport/storage | -25.....65 °C |
| Maximum operational altitude | 2000 meters |
| Pollution degree | 2 |
| Max. relative humidity level | 85 %, non condensing |
| Weight | Up to 13 kg |
| Safety | |
| Protection class | 1 |
| Safety | DIN EN 61010-1 |
| Dimensions | |
| Height | 3 U / 132,5 mm |
| Width | 19" / 483 mm |
| Depth | 547,11 mm |

7.1 Dimensions

