

Power Supplies

Power Supply Eco 2; 1-phase, 24 VDC, 5 A, 120 W

2687-2144



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Every conceivable measure has been taken to ensure the accuracy and completeness of this documentation. However, as errors can never be fully excluded, we always appreciate any information or suggestions for improving the documentation.

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We wish to point out that the software and hardware terms as well as the trademarks of companies used and/or mentioned in the present manual are generally protected by trademark or patent.

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Table of Contents

| | |
|---|-----------|
| Provisions | 5 |
| 1.1 Intended Use | 5 |
| 1.2 Typographical Conventions | 6 |
| 1.3 Legal Information | 7 |
| Safety | 9 |
| 2.1 General Safety Rules | 9 |
| 2.2 Electrical Safety | 9 |
| 2.3 Mechanical Safety | 9 |
| 2.4 Thermal Safety | 10 |
| 2.5 Indirect Safety | 10 |
| Properties | 11 |
| 3.1 Overview | 11 |
| 3.2 View | 12 |
| 3.3 Type label | 13 |
| 3.4 Connections | 14 |
| 3.4.1 Terminal Blocks | 14 |
| 3.4.1.1 Terminations – Input Side | 14 |
| 3.4.1.2 Terminations – Output Side | 15 |
| 3.5 Control Elements | 15 |
| 3.5.1 Potentiometers | 15 |
| 3.6 Indicators | 16 |
| 3.7 Technical data | 16 |
| 3.7.1 Product | 16 |
| 3.7.2 Input | 17 |
| 3.7.3 Output | 18 |
| 3.7.4 Efficiency/Power Loss | 20 |
| 3.7.5 MTBF/Lifespan | 21 |
| 3.7.6 Environment requirements | 21 |
| 3.7.7 Product Protection | 22 |
| 3.7.8 Safety | 22 |
| 3.8 Guidelines, approvals and standards | 22 |
| 3.8.1 Guidelines | 22 |
| 3.8.2 Approvals | 23 |
| 3.8.3 Standards | 23 |
| Transport and Storage | 24 |
| Installation and Removal | 25 |
| 5.1 Mounting Positions and Clearances | 25 |
| 5.2 DIN-35 Rail | 25 |
| Connection | 28 |

| | | |
|-------|--|-----------|
| 6.1 | Connectors | 28 |
| 6.1.1 | Conductor Termination | 28 |
| | Operation | 30 |
| 7.1 | Setting the Output Voltage via Potentiometer | 30 |
| | Notes on Operation | 31 |
| 8.1 | Inrush Current..... | 31 |
| 8.2 | Derating | 31 |
| 8.2.1 | Derating (Temperature-Dependent)..... | 31 |
| 8.3 | Parallel Connection | 31 |
| 8.4 | Short-Circuit and Overload Behavior | 32 |
| | Decommissioning..... | 33 |
| 9.1 | Disposal and Recycling | 33 |
| | Appendix | 34 |
| 10.1 | Accessories | 34 |
| 10.2 | Protected Rights | 34 |

Provisions

This document applies to the following product:

2687-2144 (WAGO Power Supply Eco 2)

| | |
|---------------------|---|
| Product detail page | www.wago.com/2687-2144 |
|---------------------|---|

The product must only be installed and operated in accordance with the operating instructions. Knowledge of the operating instructions is required for proper use. You can find all documents and information on the detailed product page.

1.1 Intended Use

The WAGO Power Supply Eco 2 of the 2687 Series provides DC voltage to electrical or electronic devices, such as industrial control systems or display, communication and measuring devices.

The product is an open system and is designed for installation in a additional enclosure.

- The product is designed for use in dry indoor rooms.
- Operation of the products in industrial area is permitted.
- The product meets the EMC requirements for the residential, office and commercial area as well as small business, if the product used complies with the required emissions of interference (emission limits).
- Operation of the product in other application areas is only permitted when corresponding approvals and labeling are present.

Improper Use

Improper use of the product is not permitted. Improper use occurs especially in the following cases:

- Non-observance of the intended use
- Use without protective measures in an environment in which moisture, salt water, salt spray mist, dust, corrosive fumes, gases, direct sunlight or ionizing radiation can occur
- Use of the product in areas with special risk that require continuous fault-free operation and in which failure of or operation of the product can result in an imminent risk to life, limb or health or cause serious damage to property or the environment (such as the operation of nuclear power plants, weapons systems, aircraft and motor vehicles)

Warranty and Liability

The terms set forth in the General Business and Contract Conditions for Delivery and Service of WAGO GmbH & Co. KG and the terms for software products and products with integrated software stated in the WAGO Software License Contract – both available at

www.wago.com – shall apply. In particular, the warranty is void if:

- The product is improperly used.
- The deficiency (hardware and software configurations) is due to special instructions.
- Modifications to the hardware or software have been made by the user or third parties that are not described in this documentation and that has contributed to the fault.

Individual agreements always have priority.

Obligations of Installers/Operators

The installers and operators bear responsibility for the safety of an installation or a system assembled with the products. The installer/operator is responsible for proper installation and safety of the system. All laws, standards, guidelines, local regulations and accepted technology standards and practices applicable at the time of installation, and the instructions in the the products' Instructions for Use, must be complied with. In addition, the Installation regulations specified by Approvals must be observed. In the event of non-compliance, the products may not be operated within the scope of the approval.

1.2 Typographical Conventions





Number Notation

| | |
|-------------|-----------------------------------|
| 100 | Decimals: Normal notation |
| 0x64 | Hexadecimals: C-notation |
| '100' | Binary: In single quotation marks |
| '0110.0100' | Nibbles separated by a period |

Text Formatting

| | |
|---------------|---|
| <i>italic</i> | Names of paths or files |
| bold | Menu items, entry or selection fields, emphasis |
| Code | Sections of program code |
| > | Selection of a menu point from a menu |
| "Value" | Value entries |
| [F5] | Identification of buttons or keys |

Cross References / Links

| | |
|---|---|
|  | Cross references/links to a topic in a document |
|  | Cross references / links to a separate document |
|  | Cross references / links to a website |
|  | Cross references / links to an email address |

Action Instructions

- ✓ This symbol identifies a precondition.
- 1. Action step
- 2. Action step
 - ⇒ This symbol identifies an intermediate result.
 - ⇒ This symbol identifies the result of an action.
- Individual action step

Lists

- Lists, first level
 - Lists, second level

Figures

Figures in this documentation are for better understanding and may differ from the actual product design.

Notes

DANGER

Type and source of hazard

Possible consequences of hazard that also include death or irreversible injury

- Action step to reduce risk

WARNING

Type and source of hazard

Possible consequences of hazard that also include severe injury

- Action step to reduce risk

CAUTION

Type and source of hazard

Possible consequences of hazard that include at least slight injury

- Action step to reduce risk

NOTICE

Type and source of malfunction (property damage only)

Possible malfunctions that may restrict the product's scope of functions or ergonomics, but do not lead to foreseeable risks to persons

- Action step to reduce risk

Note

Notes and information


Indicates information, clarifications, recommendations, referrals, etc.

1.3 Legal Information

Intellectual property

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Third-party trademarks are referred to in the product documentation. The “®” and “™” symbols are omitted hereinafter. The trademarks are listed in the Appendix:  **Protected Rights [▶ 34]**.

Subject to Change

The instructions, guidelines, standards, etc., in this manual correspond to state of the art at the time the documentation was created and are not subject to updating service. The installer and operator bear sole responsibility to ensure they are complied with in their currently applicable form. WAGO GmbH & Co. KG retains the right to carry out technical changes and improvements of the products and the data, specifications and illustrations of this manual. All claims for change or improvement of products that have already been delivered – excepting change or improvement performed under guarantee agreement – are excluded.

Safety

2.1 General Safety Rules

- This documentation is part of the product. Therefore, retain the documentation during the entire service life of the product. Pass on the documentation to any subsequent user of the product. In addition, ensure that any supplement to this documentation is included, if necessary.
- The product must only be installed and put into operation by qualified electrical specialists per EN 50110-1/-2 and IEC 60364.
- Comply with the laws, standards, guidelines, local regulations and accepted technology standards and practices applicable at the time of installation.

2.2 Electrical Safety

- High voltage can cause electric shock or burns! Disconnect all power sources from the product before performing any installation, repair or maintenance.
- Make sure the product does not carry any voltage before starting work.

Power Supply

- Connecting impermissible current or frequency values may destroy the product.
- Provide suitable disconnect and overcurrent protection on the system side. The protection device must be located near the product where it can be operated. The **OFF** position must be clearly marked on the protection device.

Grounding/Protection/Fuses

- When handling the product, please ensure that environmental factors (personnel, work space and packaging) are properly equalized. Do not touch any conducting parts.
- Protect the product with an appropriate overcurrent protection device.

Cables

- Only use conductor cross-sections sufficient for the current load.
- Observe permissible temperature range of connecting cables.
- Only clamp one conductor to each connection terminal. If several conductors must be clamped, wire them using an upstream wiring assembly (e.g., WAGO Through Terminal Blocks).
- Use appropriate strain relief.

2.3 Mechanical Safety

- Before startup, please check the product for any damage that may have occurred during shipping. Do not put the product into operation in the event of mechanical damage.
- Replace any defective or damaged devices.
- Do not open the product housing.
- The product is an open-type device and is designed for installation in an additional enclosure, which supplies the following safety aspects:
 - Restrict access to authorized personnel and may only be opened with tools.
 - Ensure the required pollution degree in the vicinity of the system.

- Offer adequate protection against direct or indirect contact.
- Offer adequate protection against UV irradiation.
- Prevent fire from spreading outside of the enclosure.
- Guarantee mechanical stability.

2.4 Thermal Safety

- The surface of the housing heats up during operation. Under special conditions (e.g., in the event of a fault or increased surrounding air temperature), touching the product may cause burns. Allow the product to cool down before touching it.
- The temperature inside the additional enclosure must not exceed the surrounding air temperature permitted for the mounted product.
- Cooling of the product must not be impaired. Ensure air can flow freely and that the minimum clearances from adjacent products/areas are maintained.

2.5 Indirect Safety

- Only use a dry or cloth or a clothed dampened with water to clean the product. Do not use cleaning agents, e.g., abrasive cleaners, alcohols or acetone.
- Clean tools and materials are imperative for handling the product.
- The product contains no parts that can be serviced by the user. Always have all service, maintenance and repair work performed by specialists authorized by WAGO.
- Observe possible different technical specifications for mounting that does not correspond to the specified mounting position.
- Only use accessories authorized by WAGO.

Properties

3.1 Overview

The WAGO Power Supplies Eco 2 Series 2687 are switched mode Power supplies with a wide range of uses. They include all important basic functions and are available in different performance classes and widths.

The Power supplies are fitted on a DIN-rail. With their slim design, they are suitable for use both in the control cabinet and in a compact distribution box.

The connection technology is made using the WAGO PCB terminal blocks with levers. These allow for quicker installation, as well as quicker and easier product replacement.

There is a potentiometer on the product for setting the output voltage.

An LED indicates the status of the output voltage (see Section Indicators).

The Power supplies can withstand a wide variety of environmental conditions, such as input overvoltages or the effects of shocks and vibrations.

The Power supplies meet the EN/IEC/UL 61010-2-201 standards.

3.2 View

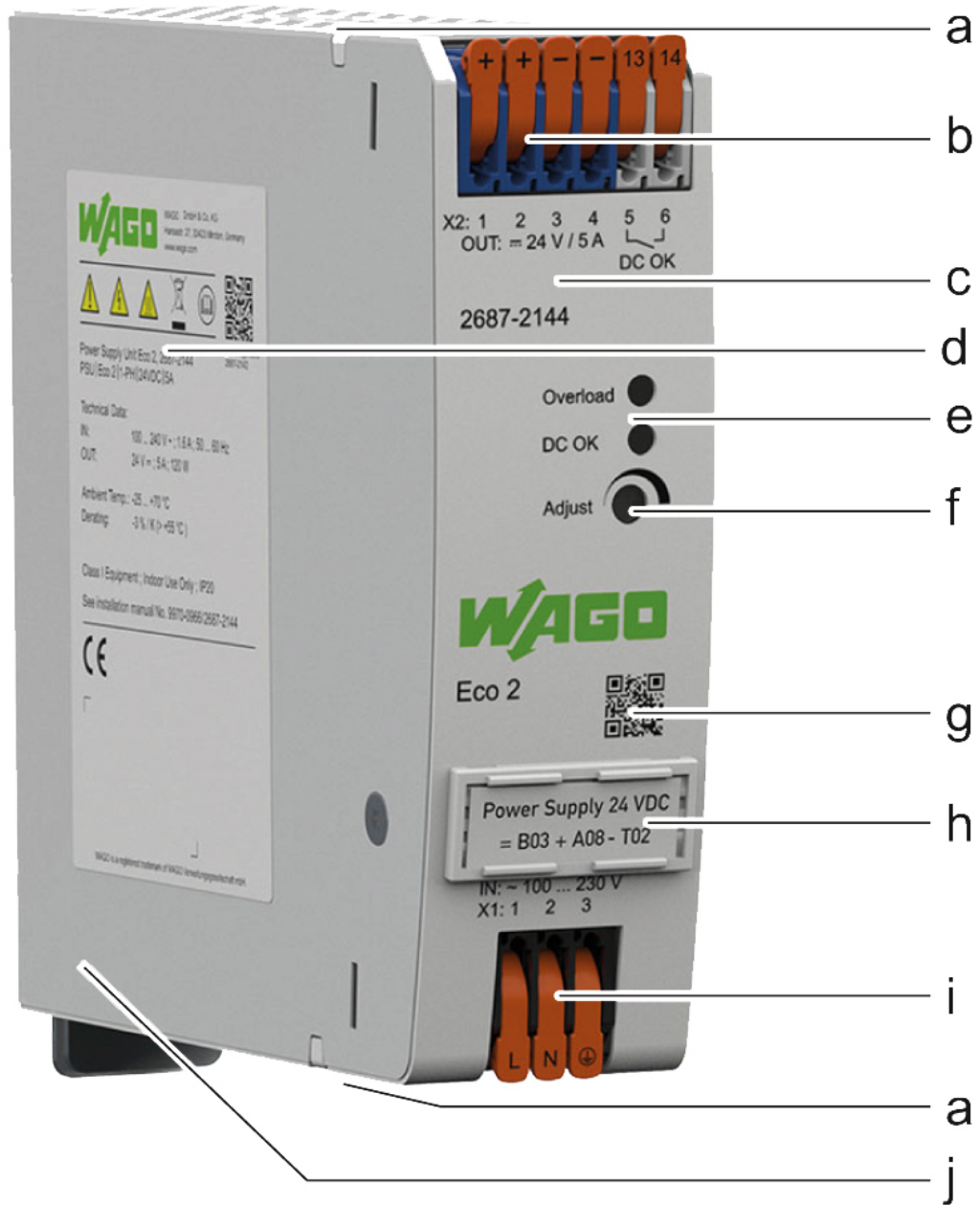


Figure 1: View

| Pos. | Comment | Details |
|------|--|---------------------------------------|
| a | Ventilation openings | – |
| b | Output X2 (+ – – 13 14) | Connections [▶ 14] |
| c | Front side | – |
| d | Type label | Type label [▶ 13] |
| e | LED indicator | Indicators [▶ 16] |
| f | Potentiometer for setting the output voltage between 22 ... 29 VDC | Potentiometers [▶ 15] |
| g | QR code | – |

| Pos. | Comment | Details |
|------|--|------------------------------------|
| h | Marker carrier | Accessories [▶ 34] |
| i | Input X1 (L N) | Connections [▶ 14] |
| j | Latch for mounting to /removal from DIN rail | – |

3.3 Type label

The product's type plate contains the following information:

| | | |
|---|---|--------|
| | WAGO GmbH & Co. KG Hansastr. 27, 32423 Minden, Germany www.wago.com | 1 |
| | | 2 3 |
| Power Supply Unit Pro 2, 2787-2144 PSU Pro 2 1-PH 24VDC 5A | www.wago.com/ 2787-2144 | 4 |
| Technical Data: | | |
| IN: 100 ... 240 V ~ ; 1.3 ... 0.6 A ; 50 ... 60 Hz | | 5 |
| OUT: 24 ... 28 V ≐ SELV ; 5 ... 4.3 A ; 120 W | | |
| Ambient Temp.: $-25^{\circ}\text{C} \leq T_{\text{amb}} \leq +70^{\circ}\text{C}$ | | 6 |
| Derating: $-3\ \%/K$ ($> +55^{\circ}\text{C}$ and $< 230\ \text{V} \sim$) | | 7 |
| $-3\ \%/K$ ($> +60^{\circ}\text{C}$ and $\geq 230\ \text{V} \sim$) | | |
| Class I Equipment ; Indoor Use Only ; IP20 | | 8 |
| See installation manual No. 9970-0966/2787-2144 | | 9 |
| | | 10 |
| | | 11 |
| WAGO is a registered trademark of WAGO Verwaltungsgesellschaft mbH. | | |

| Pos. | Comment | Details |
|------|---|---|
| 1 | Company logo and address | – |
| 2 | Warning notice symbols | Safety [▶ 9] |
| 3 | QR link with link to website | – |
| 4 | Product name and order number | – |
| 5 | Input and output data | Technical data [▶ 16] |
| 6 | Surrounding air temperature | Environment requirements [▶ 21] |
| 7 | Derating information | Derating [▶ 31] |
| 8 | Additional technical data | Technical data [▶ 16] |
| 9 | Information on the instruction leaflet | – |
| 10 | Field for guidelines, approvals and standards | Approvals [▶ 23] |
| 11 | Label with product-specific information | – |

3.4 Connections

3.4.1 Terminal Blocks

The supply lines are connected on the input and output side using the WAGO PCB terminal blocks with levers:

- Input side: 3-pole
- Output side: 6-pole

Note the maximum permissible connection cross-sections of the power cables (see [Technical data \[▶ 16\]](#)).

Check the associated operating voltage before connecting the equipment (see [Type label \[▶ 13\]](#)).

Additional information on the connection technology is available in Section [Connect \[▶ 28\]](#).

Table 1: Terminal Blocks

| | Input Side | Output Side | Contact “DC OK” |
|------------------------------------|------------------------------|------------------------------|--------------------------|
| WAGO PCB Terminal Block with Lever | 2604-1103 | 2604-1104 | 2604-1102 |
| Termination | 3-pole: “L”, “N” and “PE” | 4-pole: twice “+” and “-” | 2-pole: “13” and “14” |

3.4.1.1 Terminations – Input Side

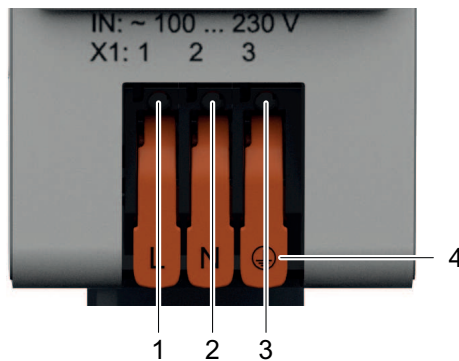


Figure 2: Terminations – Input Side

| Position | Description |
|----------|---------------------------------------|
| 1 | Termination "L" for input voltage |
| 2 | Termination "N" for input voltage |
| 3 | Termination "PE" for ground conductor |
| 4 | Lever |

3.4.1.2 Terminations – Output Side

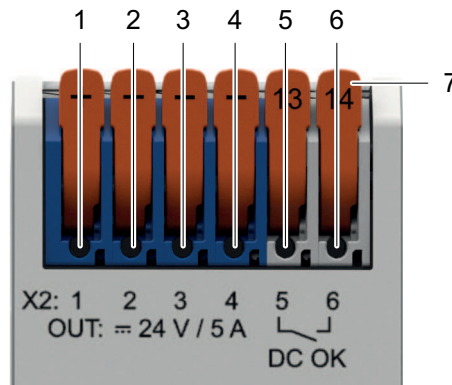


Figure 3: Terminations – Output Side

| Position | Description |
|----------|--------------------------------------|
| 1 | Termination 1 "+" for output voltage |
| 2 | Termination 2 "+" for output voltage |
| 3 | Termination 3 "-" for output voltage |
| 4 | Termination 4 "-" for output voltage |
| 5 | Termination 5 "13" for DC OK |
| 6 | Termination 6 "14" for DC OK |
| 7 | Lever |

3.5 Control Elements

This section describes the control elements.

Instructions for using these control elements can be found in the Section [🔗 Operation](#) [▶ 30].

3.5.1 Potentiometers

A potentiometer [Adj.] is provided on the front of the product for setting or adjusting the output voltage.

The potentiometer can be used to set the output voltage between 23 ... 28 VDC.

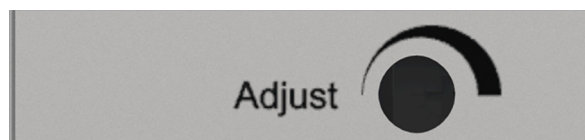


Figure 4: Potentiometer

3.6 Indicators

The indicators are located on the front of the product.

The “DC OK” LED indicates the status of the output voltage U_{OUT} .

The “Overload” LED indicates the overload status.

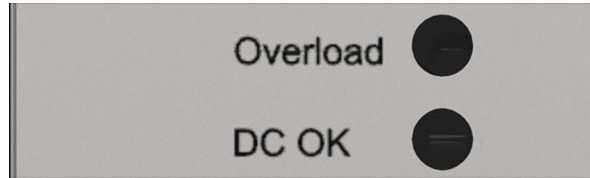


Figure 5: “Overload” LED and “DC OK” LED

| LED | Description | Status | Explanation |
|----------|-------------|-------------|----------------------------|
| DC OK | Green | ON | Output voltage ≥ 21 V |
| Overload | Red | Overload on | $I_{OUT} > 95\% I_{NOM}$ |

3.7 Technical data

3.7.1 Product

Table 2: Technical Data – Product

| Property | Value |
|-----------------------------------|--------|
| Width | 38 mm |
| Height | 130 mm |
| Depth | 138 mm |
| Depth from upper edge of DIN rail | 131 mm |
| Weight | 650 g |
| Protection type | IP20 |



Figure 6: Dimensions

Table 3: Technical Data – Clearances

| Mounting Directions | Front Side | Clearance from | | | | | |
|---------------------|------------|----------------|-------|-------|--------|-------|-------|
| | | Front | Back | Top | Bottom | Left | Right |
| Vertical | Front | 70 mm | - | 70 mm | 70 mm | 6 mm | 6 mm |
| Horizontal | Top | 70 mm | 70 mm | 70 mm | - | 20 mm | 20 mm |
| Horizontal | Bottom | 70 mm | 70 mm | - | 70 mm | 20 mm | 20 mm |

i Note

Observe mounting position!

The following electrical data refers to the nominal mounting position (see Mounting Positions).

3.7.2 Input

Table 4: Technical Data – AC Input

| Property | Value |
|------------------------------------|------------------------|
| Nominal input voltage | 1 × 100 ... 240 VAC |
| Input Voltage Range | 90 ... 264 VAC |
| Input frequency | 50 ... 60 Hz |
| Grounding systems | TN, TT and IT networks |
| Input current (typ.) ¹⁾ | 110 VAC ≤ 1.5 A |
| | 230 VAC ≤ 0.8 A |
| Power factor (typ.) ¹⁾ | > 0.85 |

¹⁾ At nominal load

Table 5: Technical Data – CC Input

| Property | | Value |
|-------------------------------------|---------|---|
| Nominal input voltage ¹⁾ | | 90 ... 300 VDC |
| Input Voltage Range | | 90 ... 300 VDC (< 110 VDC derating required 1.5 %/V) |
| Input current (typ.) ²⁾ | 110 VDC | < 1.30 A |
| | 220 VDC | < 0.65 A |

¹⁾ An external DC fuse must be used with DC supply (see [Accessories \[▶ 34\]](#)).

²⁾ At nominal load

Table 6: Technical Data – Inrush Current

| Property | | Value |
|---------------------------------------|---------|---------------------|
| Inrush current (typ.) ¹⁾²⁾ | 230 VAC | ≤ 10 A (after 1 ms) |

¹⁾ Cold start, at room temperature of 25 °C

²⁾ After 1 ms at nominal load

Table 7: Technical Data – Mains Failure Buffering Time

| Property | | Value |
|--|---------|---------|
| Mains failure buffering time, typ. ¹⁾ | 110 VAC | ≥ 20 ms |
| | 230 VAC | ≥ 25 ms |
| Holding time, typ. ¹⁾ | 110 VAC | ≥ 40 ms |
| | 230 VAC | ≥ 40 ms |

¹⁾ At nominal load

Table 8: Technical Data – Input Side Connection

| Property | | Value |
|-----------------------|---------------------------------------|--|
| Connection Technology | | 2604 Series (see Appendix [▶ 34]) |
| Cross-section | Solid | 0.2 ... 4 mm ² / 24 ... 12 AWG |
| | Fine-stranded | 0.2 ... 4 mm ² / 24 ... 12 AWG |
| | Insulated ferrule with plastic collar | 0.25 ... 2.5 mm ² |
| | Ferrule without plastic collar | 0.25 ... 2.5 mm ² |
| Strip length | | 9 ... 11 mm / 0.35 ... 0.43 inch |

3.7.3 Output

Table 9: Technical Data – Output

| Property | | Value |
|---|---------|--|
| Nominal output voltage U _{OUT} | | 24 VDC (at 90 ... 264 VAC), SELV |
| Output voltage range | | 23 ... 28 VDC |
| Factory settings | | 24 VDC; ±1 % |
| Output current I _{OUT} | | 5 A (at 100 ... 240 VAC) |
| Output power ¹⁾ | | 120 W (at 100 ... 240 VAC) |
| Power factor ²⁾ | | > 0.85 |
| Capacitive load (max.) ²⁾ | 110 VAC | 16,000 µF |
| | 230 VAC | 16,000 µF |
| Capacitive load (max.) ³⁾ | 110 VAC | 16,000 µF |
| | 230 VAC | 16,000 µF |
| Voltage variation | | ±1 % (at 100 ... 240 VAC) |
| Derating of output power | | For high ambient temperatures, see Derating (Temperature-Dependent) [▶ 31] |
| Line regulation ²⁾ | | ±0.5 % |

| Property | | Value |
|---------------------------------|---------|--|
| Load regulation ⁴⁾ | | ±1 % |
| Residual ripple/noise | | ≤ 75 mV (peak-to-peak, at 230 VAC) |
| Overload behavior ⁵⁾ | | Constant power up to 125 % Shutdown and automatic restart in the event of a short circuit ⁶⁾ |
| Switch-on delay ⁷⁾ | 110 VAC | < 1900 ms ²⁾ |
| | 230 VAC | < 1800 ms ²⁾ |

¹⁾ In Nominal mounting position: (see [Mounting Positions and Clearances \[▶ 25\]](#))

²⁾ At nominal load

³⁾ At 50 % nominal load

⁴⁾ 0 % / 100 % load step

⁵⁾ See "Overload Behavior" Figure

⁶⁾ See "Hiccup Mode" Figure ; $t_{on} = < 155 \text{ ms}$ / $t_{off} = \text{approx. } 800 \text{ ms}$

⁷⁾ See "Turn-on Time" Figure

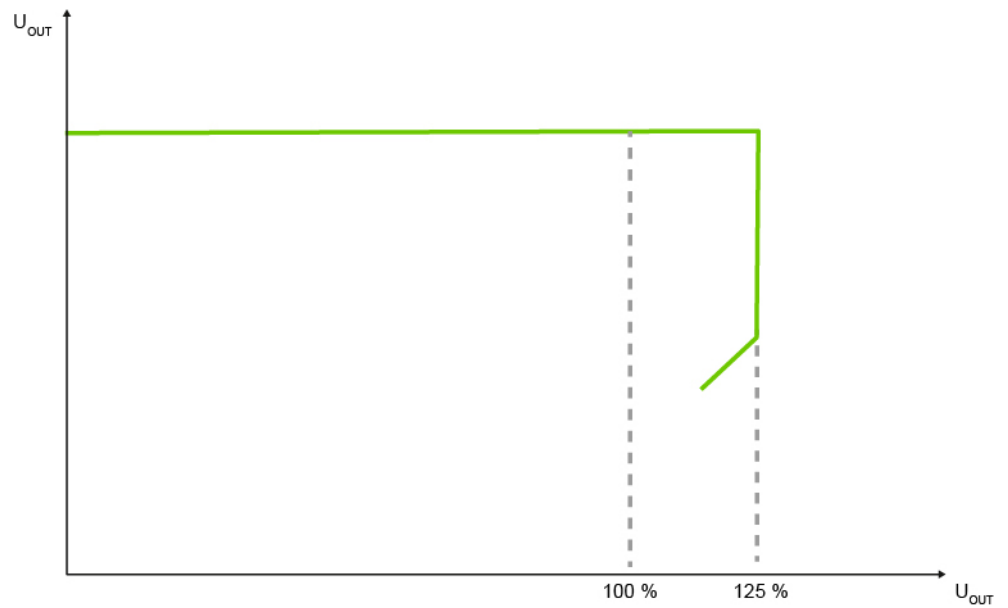


Figure 7: Overload behavior

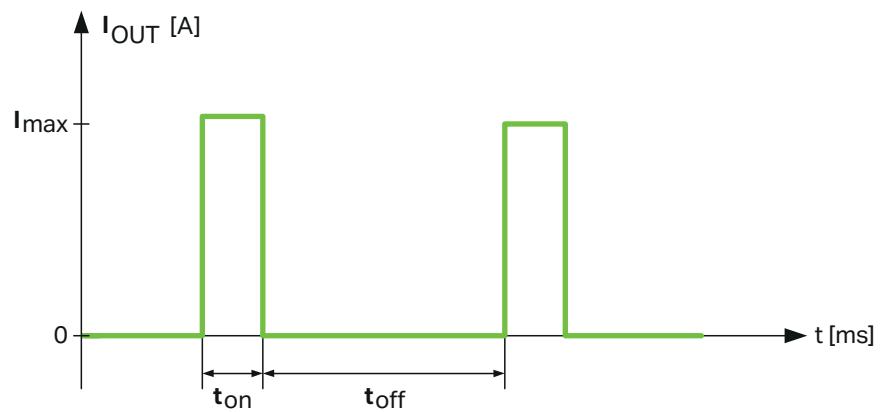


Figure 8: Hiccup mode

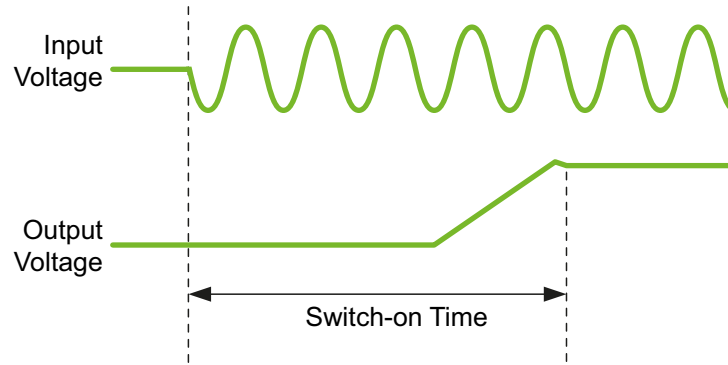


Figure 9: Turn-on time

Table 10: Technical Data – Output Side Connection

| Property | | Value |
|-----------------------|---------------------------------------|--|
| Connection Technology | | 2604 Series (see Appendix [▶ 34]) |
| Cross-section | Solid | 0.2 ... 4 mm ² / 24 ... 12 AWG |
| | Fine-stranded | 0.2 ... 4 mm ² / 24 ... 12 AWG |
| | Insulated ferrule with plastic collar | 0.25 ... 2.5 mm ² / 22 ... 14 AWG |
| | Ferrule without plastic collar | 0.25 ... 2.5 mm ² / 22 ... 14 AWG |
| Strip length | | 9 ... 11 mm / 0.35 ... 0.43 inch |

3.7.4 Efficiency/Power Loss

Table 11: Technical Data – Efficiency/Power Loss

| Property | | Value |
|---------------------------------|---------|--|
| Efficiency (typ.) ¹⁾ | 110 VAC | 86 % |
| | 230 VAC | 90 % |
| Power Loss | 110 VAC | < 1.2 W (no load), ≤ 19 W (nominal load) |
| | 230 VAC | < 1.1 W (no load), ≤ 13 W (nominal load) |

¹⁾ At nominal load

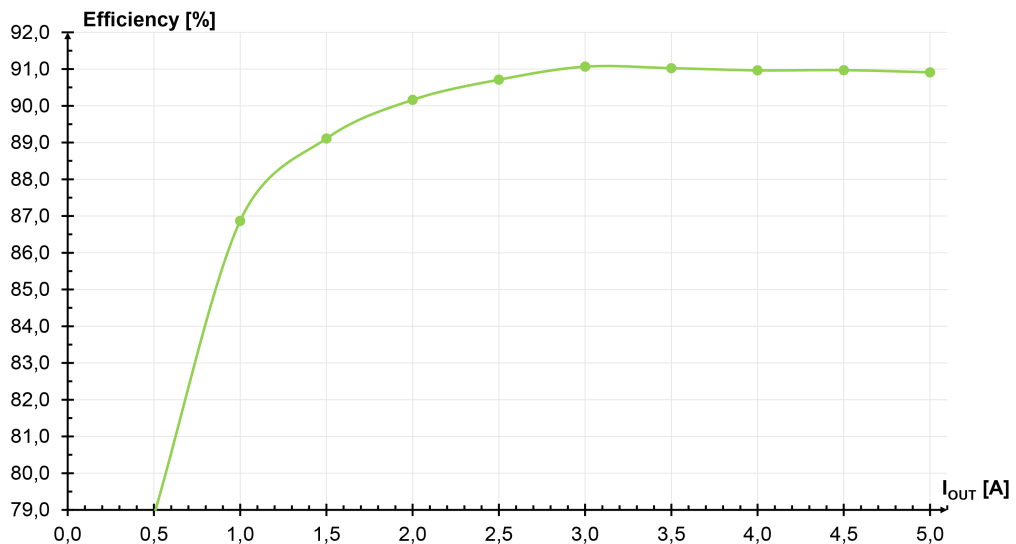


Figure 10: Efficiency at 230 VAC

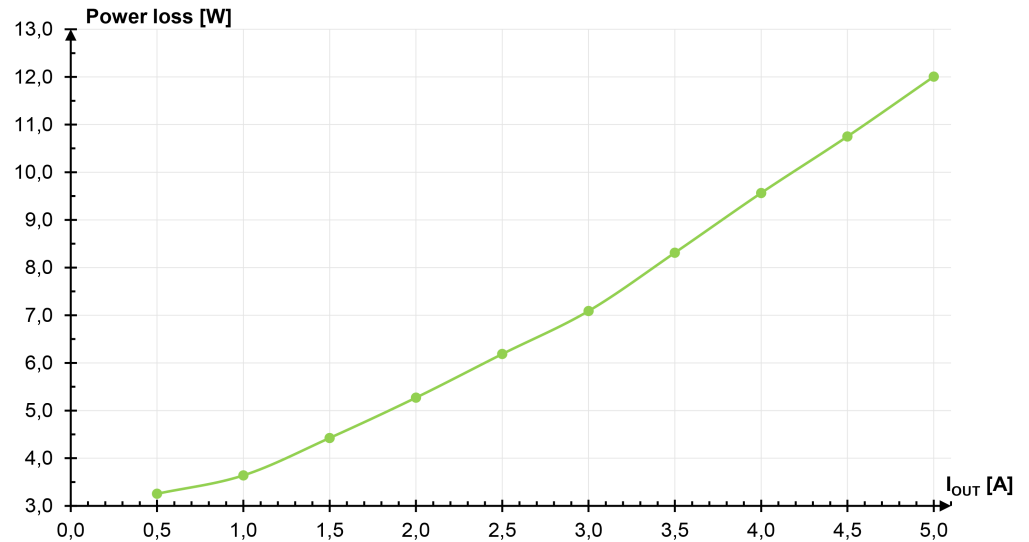


Figure 11: Power loss at 230 VAC

3.7.5 MTBF/Lifespan

Table 12: Technical Data – MTBF/Lifespan

| Property | T _{amb} | Value |
|------------------|------------------|------------|
| MTBF (IEC 61709) | 25 °C | > 700000 h |

3.7.6 Environment requirements

Table 13: Technical Data – Environmental Conditions

| Property | Value |
|---|---|
| Ambient temperature, operation | -25 ... +70 °C (device starts at -40 °C, type-tested) |
| Derating (Temperature-Dependent, > +55 °C) | -2.5 %/K ^{1) 2)} |
| Relative humidity | 5 ... 96 % (no condensation permissible) |
| Ambient temperature, storage | -40 ... +85 °C |
| Relative humidity, storage (without condensation) | 5 ... 96 % (no condensation permissible) |
| Temperature coefficient | ≤ ±0.005 %/K |
| Derating (operating altitude) ²⁾ | - |
| Operating altitude above sea level, max. | 5000 m |
| Overvoltage category | III (≤ 2000 m a. s.l.) II (> 2000 m a. s.l.) |
| Vibration according to IEC 60068-2-6 | 5 Hz ≤ f ≤ 8.4 Hz: 3.5 mm , 8.4 Hz ≤ f ≤ 150 Hz: 1g |
| Shock according to IEC 60068-2-27 | 15 g, 11 ms, 3 shocks per axis (18 shocks in total) |
| Pollution degree according to IEC/EN 60664-1 | 2 |
| Climatic category | 3K3 (per EN 60721) |
| LABS freedom ³⁾ | Yes |
| RoHS II / Reach | Yes |

¹⁾ See [Derating ambient temperature \[▶ 22\]](#) Figure, see also [Derating \(Temperature-Dependent\) \[▶ 31\]](#).

²⁾ Ambient temperature, operation > 50 °C

³⁾ LABS = Paint-wetting impairment substances

The materials used in manufacturing do not contain any substances harmful to the wetting properties of lacquers.

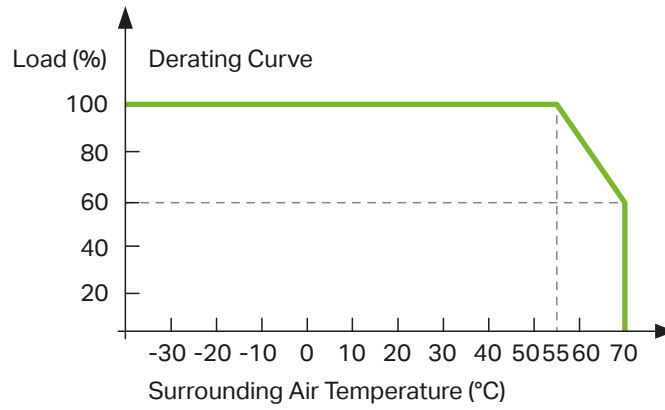


Figure 12: Derating ambient temperature

3.7.7 Product Protection

Table 14: Technical Data – Product Protection

| Property | Value |
|---|--|
| Internal input fuse ¹⁾ | T 3.15 A / 250 VAC |
| Transient suppression at input | Varistor |
| Overload protection at output | Load limited to max. 140 % of the nominal load |
| Overvoltage protection at output (max.) ²⁾ | ≤ 33 VDC |
| Feedback voltage (max.) ³⁾ | Yes, max. 35 VDC |
| Protection type | IP20 |
| Ingress protection against foreign objects | > 5 mm |
| Overtemperature protection ⁴⁾ | Yes |
| Short circuit protection ⁴⁾ | Yes |

¹⁾ Used only as an AC fuse. An external DC fuse must be used with DC supply (see [Accessories \[▶ 34\]](#)).

²⁾ Internal limitation via a second control loop, deactivation of power supply, automatic restart

³⁾ The installer and operator must ensure that the voltage is not exceeded for power feedback.

⁴⁾ Shutdown, automatic restart

3.7.8 Safety

Table 15: Technical Data – Safety

| Property | Value |
|---|----------------------------|
| Safety transformer | According to EN 61558-2-16 |
| Input and output insulation, per EN 62368-1 | SELV/PELV |
| Protection class, with protective wire connection per EN/UL 61010-2-201 | I |
| Leakage current (max.) ¹⁾ | ≤ 0.25 mA |
| Insulation resistance, input to output (min.) ²⁾ | > 100 MΩ / 500 VDC |
| Dielectric strength (input – output) ³⁾ | 3.6 kVAC |

¹⁾ For power at 230 VAC

²⁾ at 25 °C and 75 % RH

³⁾ Type testing / 60 s

3.8 Guidelines, approvals and standards

3.8.1 Guidelines

An EU “Declaration of Conformity” and CE marking exist for the product.

For additional information, visit www.wago.com.

3.8.2 Approvals

The current approvals can be found on the product details page at: www.wago.com/.

3.8.3 Standards

The product meets the following standards:

Table 16: Standards: Mechanical and Climatic Environmental Conditions

| Standard | Test Value |
|--|--|
| Mechanical Environmental Conditions | |
| EN 60068-2-6 | f = 5 ... 150 Hz: 1g, 3.5 m |
| IEC 60068-2-27 shock | 15g, 11 ms, 3 shocks per axis and direction, half-sine |
| EN 61131-2, Section 4.3 | Freefall ≤ 300 mm (packaged in the product packaging) |
| Climatic Environmental Conditions | |
| EN 60870-2-2 | 3K3 (except for low air pressure) |

Table 17: Standards: EMC – Immunity to Interference

| Standard | Title |
|------------------|---|
| EN IEC 61204-3 | Low-Voltage Switch Mode Power Supplies – Part 3: Electromagnetic Compatibility (EMC) |
| EN IEC 61000-6-2 | Part 6-2: Generic standards – Immunity for industrial environments |
| EN 61000-4-2 | Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test |
| EN 61000-4-3 | Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test |
| EN 61000-4-4 | Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test |
| EN 61000-4-5 | Part 4-5: Testing and measurement techniques – Surge immunity test |
| EN 61000-4-6 | Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields |
| EN 61000-4-8 | Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test |
| EN 61000-4-11 | Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests |

Table 18: Standards: EMC – Emission of Interference

| Standard | Title |
|----------------|---|
| EN IEC 61204-3 | Low-Voltage Switch Mode Power Supplies – Part 3: Electromagnetic Compatibility (EMC) |
| EN 61000-6-3 | Part 6-3: Generic standards – Emission standard for residential, commercial and light-industrial environments |

Table 19: Standards: LVD – Low Voltage Directive

| Standard | Title |
|--------------------|---|
| EN IEC 61010-2-201 | Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 2-201: Particular requirements for control equipment |
| EN 61010-1 | Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements |

Transport and Storage

The original packaging offers optimal protection during transport and storage.

- Store the product in suitable packaging, preferably the original packaging.
- Only transport the product in suitable containers/packaging.
- Make sure the product contacts are not contaminated or damaged during packing or unpacking.
- Observe the specified ambient climatic conditions for transport and storage.

Installation and Removal

The product can either be mounted on a DIN-35 rail or alternatively by means of a screw mount.

5.1 Mounting Positions and Clearances

Table 20: Technical Data – Minimum Clearances

| Mounting Directions | Front Side | Clearance from | | | | | |
|------------------------|------------|----------------|-------|-------|--------|-------|-------|
| | | Front | Back | Top | Bottom | Left | Right |
| Vertical ¹⁾ | Front | 70 mm | - | 70 mm | 70 mm | 6 mm | 6 mm |
| Horizontal | Top | 70 mm | 70 mm | 70 mm | - | 20 mm | 20 mm |
| Horizontal | Bottom | 70 mm | 70 mm | - | 70 mm | 20 mm | 20 mm |

¹⁾ Nominal mounting position

When mounting with the front side up or down, the following values must not be exceeded:

Table 21: Values for Mounting Position – Mounting with Front Side Up or Down

| Product | Output Power | Ambient Temperature |
|-----------|--------------|---------------------|
| 2687-2144 | 50 % | 55 °C |

5.2 DIN-35 Rail

The DIN rail is located in the center of the vertical axis (see [🔗 Technical data \[▶ 16\]](#)).

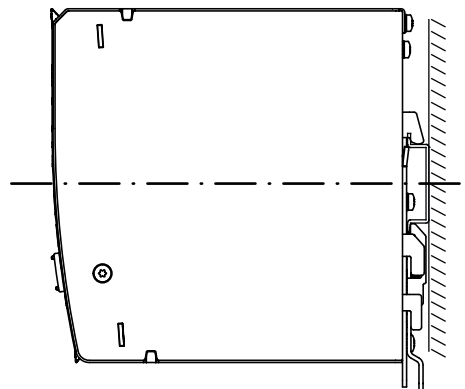


Figure 13: Position of the DIN Rail

The distances from the central axis of the DIN rail to the top and bottom are 50 mm.

Mounting on the DIN Rail

Mount the product per EN 60715 by snapping it onto the DIN rail without any tools.

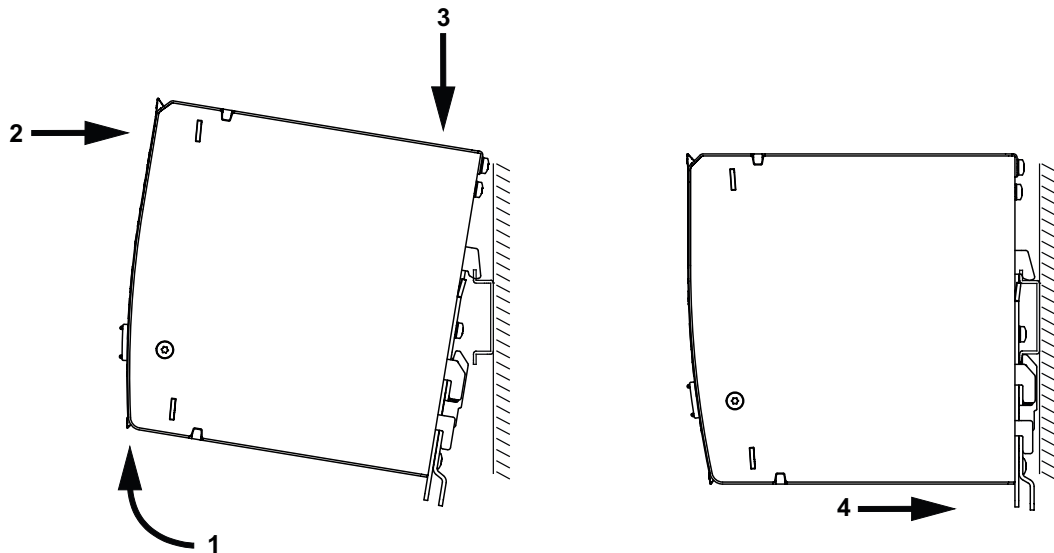


Figure 14: Mounting the Product on the DIN rail

1. Tilt the product slightly.
2. Place the product, with its DIN rail guide, on the top edge of the DIN rail.
3. Press the product onto the DIN rail.
4. Press the product against the bottom fastener until you hear it lock into place.
 - ⇒ If the product does not lock into place automatically, pull down the DIN rail mounting/removal latch with a screwdriver or operating tool while pressing the product onto the bottom fastener.
5. Gently shake the product to ensure that it is correctly locked into place.
6. To ensure secure fastening on the DIN rail, fit end clips on either side of the product (with a block arrangement: on either side of the product).

Removing from the DIN Rail

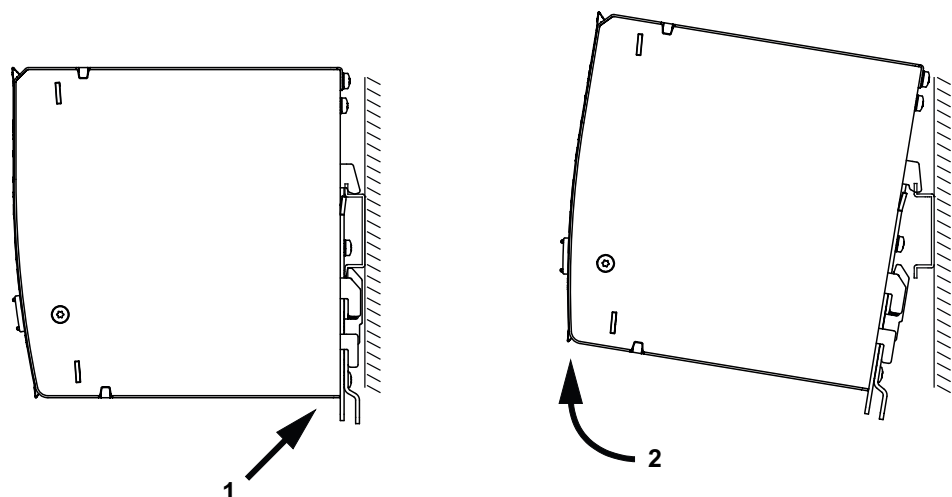


Figure 15: Removing the Product from the DIN Rail

1. To remove the product, pull down the DIN rail mount/removal latch.
 - ⇒ Use a screwdriver or an operating tool.
 - ⇒ The product is now unlocked.

-
2. Tilt the product forward and unhook it from the DIN rail.


Connection

DANGER


Do not work on products while energized!

High voltage can cause electric shock or burns!

- Disconnect all power sources from the product before performing any installation, repair or maintenance.

Note the maximum permissible connection cross-sections of the power cables (see  [Technical data \[▶ 16\]](#)).

Check the associated operating voltage before connecting the equipment (see Type plate).

Use only the recommended tools (see  [Appendix \[▶ 34\]](#)).

6.1 Connectors

6.1.1 Conductor Termination

WAGO's spring pressure connections are designed for solid or fine-stranded wires with and without ferrules.

If more than one conductor must be routed to one connection, these must be connected in an up-circuit wiring assembly; for example, using WAGO Through Terminal Blocks.

Connecting Using a Tool

You must use a screwdriver or an operating tool to connect the following conductors:

- Fine-stranded conductors without ferrules
- Fine-stranded conductors with ferrules without plastic collars with a cross-section $\leq 0.5 \text{ mm}^2/\text{AWG } 22$

Proceed as follows:

1. To open the spring pressure connection, depress the orange integrated push-button with a tool.
2. Insert the conductor into the corresponding connection opening.
3. To close the spring pressure connection, release the push-button. This secures the conductor.

Direct Insertion of Conductors

The following conductors can be inserted directly without tools:

- Fine-stranded conductors with ferrules and plastic collars for all permissible cross-sections
- Fine-stranded conductors with ferrules without plastic collars with a cross-section $> 0.5 \text{ mm}^2/22 \text{ AWG}$
- Solid conductors with a cross section $> 0.25 \text{ mm}^2/24 \text{ AWG}$

Connecting by Opening the Connector

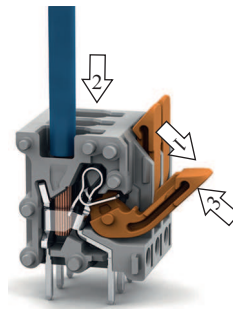


Figure 16: Wiring by Opening the Lever

The wiring requires no tools.

Proceed as follows:

1. Open the connection of the corresponding conductor using the orange-colored lever [1].
2. Insert the stripped conductor into the corresponding connection opening [2].
3. Use the lever to close the connection [3]. This secures the conductor.

Disconnect the Wiring

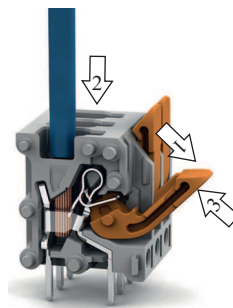


Figure 17: Disconnecting the Wiring

Proceed as follows:

1. Open the connection of the corresponding conductor using the orange-colored lever [1].
2. Remove the conductor from the corresponding connection opening [2].
3. Use the lever to close the connection [3].

i Note

Connect only one conductor per spring clamp connection!

You must only connect one conductor to each spring clamp connection. Do not connect more than one conductor at a single spring clamp connection!

Operation

7.1 Setting the Output Voltage via Potentiometer

The potentiometer [Adj.] (see Control Elements) can be used on the front of the product to set the output voltage between 23 ... 28 VDC:

- Turning clockwise increases the output voltage.
- Turning counterclockwise decreases the output voltage.

Note

Operating Tool

The recommended operating tool is: "Operating tool, Phillips PH0, type 1", Item No. 210-769.

Notes on Operation

8.1 Inrush Current

If several products are connected in parallel and supplied on the input side using the same circuit, higher inrush currents can result. In this case, the use of auxiliary relays, which cause a time delay in startup, is recommended.

The maximum number of products that can be operated in parallel on one circuit is given by the sum of the leakage currents. According to EN 62368-1, this sum must not exceed the maximum value of 3.5 mA.

The maximum number of products that can be switched on at the same time depends, among other things, on the backup fuse used and the impedance of the supply network.

8.2 Derating

The maximum load is dependent on the surrounding air temperature and the input voltage.

8.2.1 Derating (Temperature-Dependent)

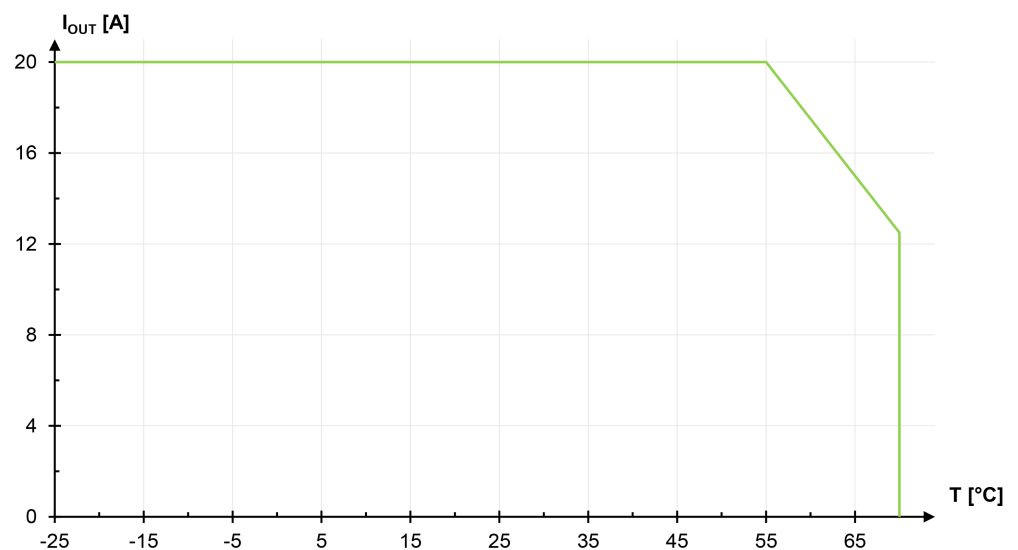


Figure 18: Derating (Temperature-Dependent)

8.3 Parallel Connection

In parallel operation, set the output voltage of the products that will be connected in parallel to precisely the same value, if possible. The resistance of the conductors between the product and the load must be nearly identical. Only connect products of the same type in parallel.

Use external rail-mount terminal blocks when connecting in parallel. A parallel connection directly on the connectors on the secondary side of the product is not allowed.

To decouple the outputs in parallel mode, a suitable redundancy module or diodes in the positive path are recommended. These diodes must be designed for the product’s maximum output current.

8.4 Short-Circuit and Overload Behavior

The product’s output is electronically protected against overload and short circuits.

The following values apply to the description below:

- I_{OUT} Nominal output current (see [Technical data \[▶ 16\]](#))
- $I_{OUT(IST)}$ Actual output current
- U_{OUT} Output voltage (see [Technical data \[▶ 16\]](#))

The output voltage U_{OUT} is reduced at an output current $I_{OUT(IST)}$ in the range $1.05 \times I_{OUT} < I_{OUT(IST)} < 1.35 \times I_{OUT}$ (see [Figure Output Characteristics \[▶ 32\]](#)).

In the event of a short circuit ($1.4 \times I_{OUT} < I_{OUT(IST)}$) the output voltage U_{OUT} is switched off. The product checks whether the short circuit is still present through cyclical re-activation of the output voltage (Hiccup mode, see also [Output \[▶ 18\]](#)).

After eliminating the overload or short circuit, the product automatically supplies the output voltage as indicated.

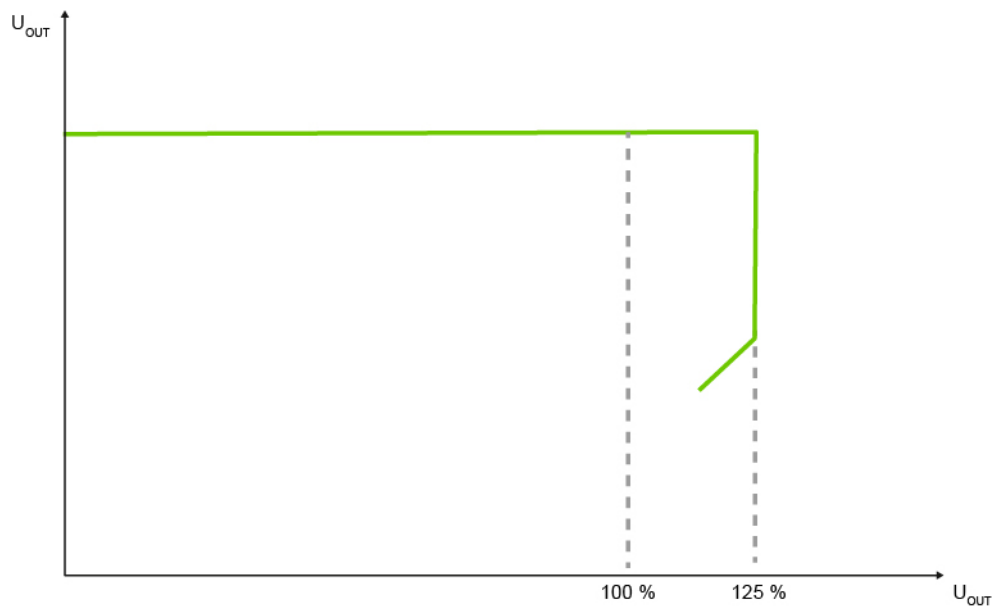



Figure 19: Output Characteristics

Table 22: Legend for the “Output Characteristics” Figure

| Position | Explanation |
|----------|---|
| 1 | $I_{OUT(IST)}$ normal |
| 2 | Overload mode ($1.05 \times I_{OUT} < I_{OUT(IST)} < 1.35 \times I_{OUT}$); constant power mode |
| 3 | Short circuit protection ($1.4 \times I_{OUT} < I_{OUT(IST)}$); Hiccup mode |

Decommissioning

9.1 Disposal and Recycling

| | |
|---|--|
|  | <p>WEEE Mark</p> <p>Electrical and electronic equipment may not be disposed of with household waste. This also applies to products without this mark.</p> |
|---|--|

Electrical and electronic equipment contain materials and substances that can be harmful to the environment and health. Electrical and electronic equipment must be disposed of properly after use. Environmentally friendly disposal benefits health, protects the environment from harmful substances in electrical and electronic equipment and enables sustainable and efficient use of resources.

- Observe the national and local regulations for the disposal of electrical and electronic equipment, lithium-ion batteries, lead–acid batteries and packaging.
- Clear any data stored on electrical and electronic equipment.
- Remove lithium-ion batteries, lead–acid batteries or memory cards that are added to the electrical and electronic equipment.
- Wear appropriate personal protective equipment when removing the lithium-ion batteries/lead–acid batteries.
- Dispose of the removed lithium-ion batteries/lead–acid batteries according to your local waste regulations (e. g. collection boxes at the retail or local collection points).
- Have electrical and electronic equipment sent to a local collection point.
- Dispose of all types of packaging to ensure a high level of recovery, reuse and recycling.
- Transport packages from the B2B area can be taken back free of charge via a return system in accordance with the Packaging Act. Please contact our service provider Interseroh directly. The corresponding certificate can be found at: [🌐 corporate-certificates](#)
- Throughout Europe, Directives 2006/66/EC, 94/62/EC and 2012/19/EU (WEEE) apply. National directives and laws may differ.

Appendix

10.1 Accessories

Details on accessories are available online at www.wago.com.

The following accessories are available for the product:

Accessories – Tools

Table 23: Accessories – Tools

| Description | Name | Item Number |
|--|-----------------|-------------|
| Operating tool for setting the potentiometer | Screwdriver PH0 | 210-769 |

Accessories – Other

Table 24: Accessories – Other

| Description | Item Number |
|---|-------------|
| Fuse terminal blocks for cylindrical fuses ¹⁾ 10 × 38 mm | 811 Series |

¹⁾ Cylindrical fuses are not offered by WAGO.

Accessories – Marking

Table 25: Accessories – Marking

| Description | Item Number |
|--------------------------|---------------------|
| Marking System | 2009-0110 |
| WMB Multi Marking System | 2009-0115 |
| | 2009-0115/0000-0002 |

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List of Tables

| | | |
|----------|--|----|
| Table 1 | Terminal Blocks | 14 |
| Table 2 | Technical Data – Product..... | 16 |
| Table 3 | Technical Data – Clearances..... | 17 |
| Table 4 | Technical Data – AC Input..... | 17 |
| Table 5 | Technical Data – CC Input..... | 18 |
| Table 6 | Technical Data – Inrush Current..... | 18 |
| Table 7 | Technical Data – Mains Failure Buffering Time | 18 |
| Table 8 | Technical Data – Input Side Connection..... | 18 |
| Table 9 | Technical Data – Output | 18 |
| Table 10 | Technical Data – Output Side Connection..... | 20 |
| Table 11 | Technical Data – Efficiency/Power Loss..... | 20 |
| Table 12 | Technical Data – MTBF/Lifespan..... | 21 |
| Table 13 | Technical Data – Environmental Conditions | 21 |
| Table 14 | Technical Data – Product Protection | 22 |
| Table 15 | Technical Data – Safety..... | 22 |
| Table 16 | Standards: Mechanical and Climatic Environmental Conditions..... | 23 |
| Table 17 | Standards: EMC – Immunity to Interference..... | 23 |
| Table 18 | Standards: EMC – Emission of Interference..... | 23 |
| Table 19 | Standards: LVD – Low Voltage Directive..... | 23 |
| Table 20 | Technical Data – Minimum Clearances | 25 |
| Table 21 | Values for Mounting Position – Mounting with Front Side Up or Down | 25 |
| Table 22 | Legend for the “Output Characteristics” Figure..... | 32 |
| Table 23 | Accessories – Tools..... | 34 |
| Table 24 | Accessories – Other..... | 34 |
| Table 25 | Accessories – Marking..... | 34 |

List of Figures

| | | |
|-----------|--|----|
| Figure 1 | View | 12 |
| Figure 2 | Terminations – Input Side | 14 |
| Figure 3 | Terminations – Output Side | 15 |
| Figure 4 | Potentiometer | 15 |
| Figure 5 | “Overload” LED and “DC OK” LED | 16 |
| Figure 6 | Dimensions | 17 |
| Figure 7 | Overload behavior | 19 |
| Figure 8 | Hiccup mode | 19 |
| Figure 9 | Turn-on time | 20 |
| Figure 10 | Efficiency at 230 VAC | 20 |
| Figure 11 | Power loss at 230 VAC | 21 |
| Figure 12 | Derating ambient temperature | 22 |
| Figure 13 | Position of the DIN Rail | 25 |
| Figure 14 | Mounting the Product on the DIN rail | 26 |
| Figure 15 | Removing the Product from the DIN Rail | 26 |
| Figure 16 | Wiring by Opening the Lever | 29 |
| Figure 17 | Disconnecting the Wiring | 29 |
| Figure 18 | Derating (Temperature-Dependent) | 31 |
| Figure 19 | Output Characteristics | 32 |

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