

# Power Supplies

Switched-Mode Power Supply; Compact; 1-phase; Output voltage:  
24 VDC; Output current: 4.2 A

0787-1216



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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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# Provisions

This documentation applies to the WAGO Power Supplies Compact (787-1216).

## Note

### Observe the applicable documentation!

This product must only be installed and operated according to the instructions of the complete Instructions for use. Knowledge of the complete Instructions for use is required for proper use.




1. Carefully read the Product Manual.
2. Before commissioning, follow the instructions in section  **Safety [▶ 9]**.

Table 1: Complete instructions for use

Document Type	Contents
 <b>Product Manual</b>	Contains all the product-specific information for a product.
 <b>Instruction leaflet</b>	Is included with each product. Contains initial information on safe handling of the product.

All the documentation is available at:  [www.wago.com](http://www.wago.com).

## 1.1 Intended Use

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

- This product fulfills the requirements of protection type IP20 and is designed for use in dry indoor spaces.
- Operation of the products in Industrial area is permitted.
- The product meets the EMC requirements for Residential, businesses and commercial areas; small businesses too. if the product used complies with the emission of interference requirements (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 additional protective measures in environments within which dust, corrosive fumes, gases or ionized 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 & Contract Conditions for Delivery and Service of WAGO Kontakttechnik 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](http://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.
- The hardware or software has been modified by the user or a third party.

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
<b>bold</b>	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 reference / link to a section in a document
	Cross reference / link to a separate document
	Cross reference / link to a website
	Cross reference / link 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.

### Lists

- Lists, first level
  - Lists, second level

### 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.


### Figures

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

## 1.3 Legal Information

### Intellectual Property


Unless barred by applicable legal provisions, unauthorized copying and distribution of this document, as well as the use and communication of its content are strictly prohibited unless expressly authorized by prior agreement. Third-party products are always mentioned without any reference to patent rights. WAGO Kontakttechnik GmbH & Co. KG, or for third-party products, their manufacturer, retain all rights regarding patent, utility model or design registration.

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 [▶ 38]**).

### 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 Kontakttechnik 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.

### Licenses

The products may contain open-source software. The requisite license information is saved in the products. This information is also available under  [www.wago.com](http://www.wago.com).

# Security

This section contains safety rules that must be followed for hazard-free use of the product.

This section is aimed at the following target groups:

- Planners and installers
- Operators
- Qualified assembly personnel
- Qualified installation personnel (electrical installation, technician network installation etc.)
- Qualified operating personnel
- Qualified service and maintenance personnel

Obey the following safety rules:

## 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 Requirements for Special Applications

### Special Notes for Use per EN 60335-1

When using the product in accordance with EN 60335-1, also observe the following notes:

- Take into account the space required for the product ([🔗 Technical data \[▶ 15\]](#)).
- Maintain the minimum clearances between the product and adjacent components ([🔗 Technical data \[▶ 15\]](#)).
- Note the positions of the various mounting options ([🔗 Installation and Removal \[▶ 24\]](#)).
- Keep the ventilation openings free.
- Install the product so that it is possible to subsequently disconnect the product from the power supply (e.g., by installing a cut-off device that complies with the relevant installation requirements).

### Special Notes on Use as a Built-In Installation Device

When using the product as a built-in installation device (building installation), also observe the following information:

 **DANGER****Observe touch-proof protection when used as a built-in installation device!**

As an electrician, ensure that there is adequate protection against accidental contact when used as a built-in installation device in accordance with DIN 43880 (building installation).

## 2.3 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.

### Ground / (Lightning) 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.
- Only operate the product when the ground conductor is connected.
- Protect the product with an appropriate overcurrent protection device.

### Lines

- 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.

### Protect

- As an electrician, ensure that there is adequate protection against accidental contact when used as a built-in installation device in accordance with DIN 43880 (building installation).

## 2.4 Mechanical Safety

- As the installer of the system, you are responsible for ensuring the necessary touch-proof protection. Follow the installation guidelines for the specific application.
- The surrounding air temperature for operation indicated in the technical data applies to the nominal mounting position. Different mounting positions may affect the permissible surrounding air temperature for operation.
- Cooling of the product must not be impaired. Ensure air can flow freely and that the minimum clearances from adjacent products/areas are maintained.

- 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.

## 2.5 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.

## 2.6 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.
- Before installation and operation, please read the product documentation thoroughly and carefully. In addition, note the information on the product housing and further information, e.g. at [www.wago.com](https://www.wago.com)/.
- 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 the different technical specifications for mounting that does not correspond to the nominal mounting position.

# Properties

## 3.1 Introduction

The power supply units of the WAGO Power Supplies Compact Series are compact switched-mode power supplies with a wide range of uses. Their stepped design makes them suitable for applications, such as for use as a DIN rail built-in installation device in accordance with DIN 43880, and this is also supported by conformity with EN 60335-1.

The power supply units can be fitted on a DIN rail. Screw mounting using the fastening clips supplied with the product is also a possible alternative. In this way, products can be fitted both in the control cabinet as well as in a distribution box or screwed onto the housing of an automation device.

The products employ WAGO's *picoMAX*<sup>®</sup> Pluggable Connectors, allowing for pre-wiring for quicker installation and faster product replacement.

An LED indicates the status of the output voltage (see Section [Indicators](#) **[ 14 ]**).

## 3.2 View

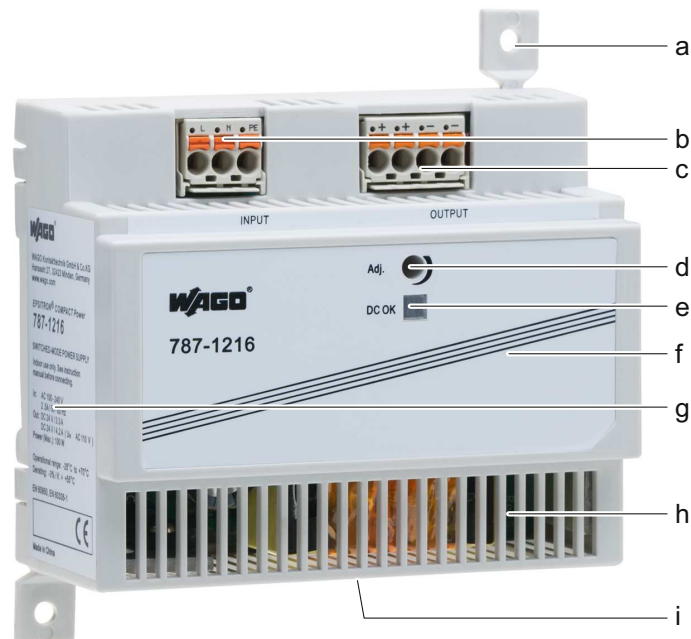


Figure 1: View

Table 2: Legend for Figure "View"

Position	Explanation	For Details, See Section
a	Screw mount clip	<a href="#">Screw Mount</a> <b>[ 26 ]</b> .
b	<i>picoMAX</i> <sup>®</sup> 5.0 input (L N PE)	<a href="#">Connections</a> <b>[ 13 ]</b> .
c	<i>picoMAX</i> <sup>®</sup> 5.0 output (+ + - -)	<a href="#">Connections</a> <b>[ 13 ]</b> .
d	Potentiometer for setting the output voltage	<a href="#">Control Elements – Introduction</a> <b>[ 15 ]</b> .
e	LED indicator	<a href="#">Indicators</a> <b>[ 14 ]</b> .
f	Front side	---
g	Type Plate	<a href="#">Type Plate</a> <b>[ 13 ]</b>

Table 2: Legend for Figure "View"

Position	Explanation	For Details, See Section
h	Ventilation slots	---
i	Latch for mounting to /removal from DIN rail	<a href="#">DIN-35 Rail [ 24]</a> .

### 3.3 Type Plate

The type label for the product is attached to the side of the housing. It contains the following information:

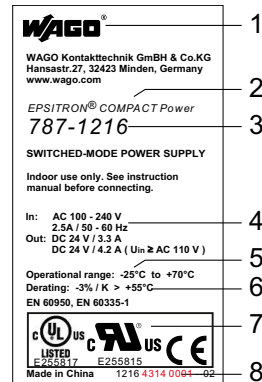


Figure 2: Type Plate

Table 3: Legend for Figure "Type Plate"

Position	Comment	For Details, See Section
1	Company logo and address	—
2	Product name	—
3	Item Number	—
4	Input and output data	<a href="#">Technical data [ 15]</a>
5	Surrounding air temperature	<a href="#">Environment requirements [ 21]</a>
6	Derating information	<a href="#">Derating (temperaturabhängig) [ 33]</a>
7	Box for approvals	<a href="#">Approvals [ 22]</a>
8	Serial Number	—

### 3.4 Connections

#### 3.4.1 Connectors

The supply lines are connected on the input and output sides using the 2092 Series WAGO's *picoMAX*® Pluggable Connectors:

- Input side: *picoMAX*® 5.0
- Output side: *picoMAX*® 5.0

Note the maximum permissible connection cross-sections of the power cables (see [Technical data \[ 15\]](#)).

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

Additional information on the connection technology is provided in section [Connect \[ 27\]](#)

### 3.4.2 Terminations – Input Side

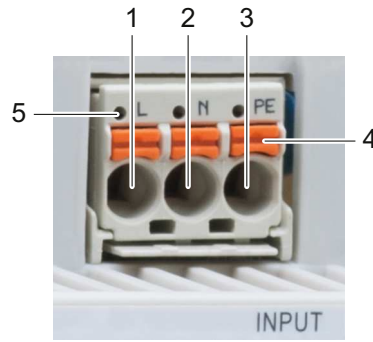


Figure 3: Terminations – Input Side

Table 4: Legend for the “Terminations – Input Side” Figure

Position	Description
1	Termination “L” for input voltage
2	Termination “N” for input voltage
3	Termination “PE” for input voltage
4	Integrated push-button
5	Test slot

### 3.4.3 Terminations – Output Side

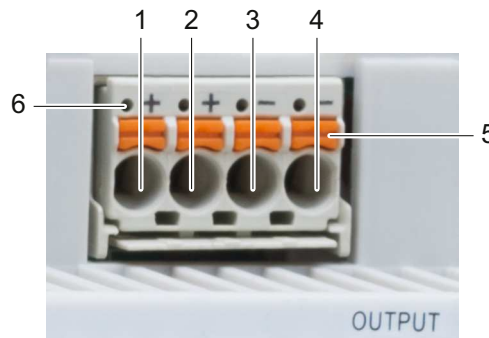


Figure 4: Terminations – Output Side

Table 5: Legend for the “Terminations – Output Side” Figure

Position	Description
1	Termination 1 “+” for output voltage
2	Termination 2 “+” for output voltage
3	Termination 1 “-” for output voltage
4	Termination 2 “-” for output voltage
5	Integrated push-button
6	Test slot

## 3.5 Indicators

The indicators are located on the front of the product.

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



Figure 5: "DC OK" LED

Table 6: Legend for "LED, DC OK" Figure

LED	Description	State	Explanation
DC OK	Green	ON	Switch-on threshold; output voltage > 21 VDC

### 3.6 Control elements

This section describes the control elements.

Instructions for using these control elements can be found in the Section [🔗 Operation \[▶ 32\]](#).

#### 3.6.1 Potentiometer

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



Figure 6: Potentiometer

The potentiometer can be used to set the output voltage between 21 ... 28 VDC:

### 3.7 Technical data

#### 3.7.1 Product

Table 7: Technical Data – Product

Property	Value
Width	108 mm
Height	90 mm
Height, incl. fastening clips	120 mm
Depth	56 mm
Depth from upper edge of DIN rail	52.5 mm
Weight	440 g
Protection class	IP20

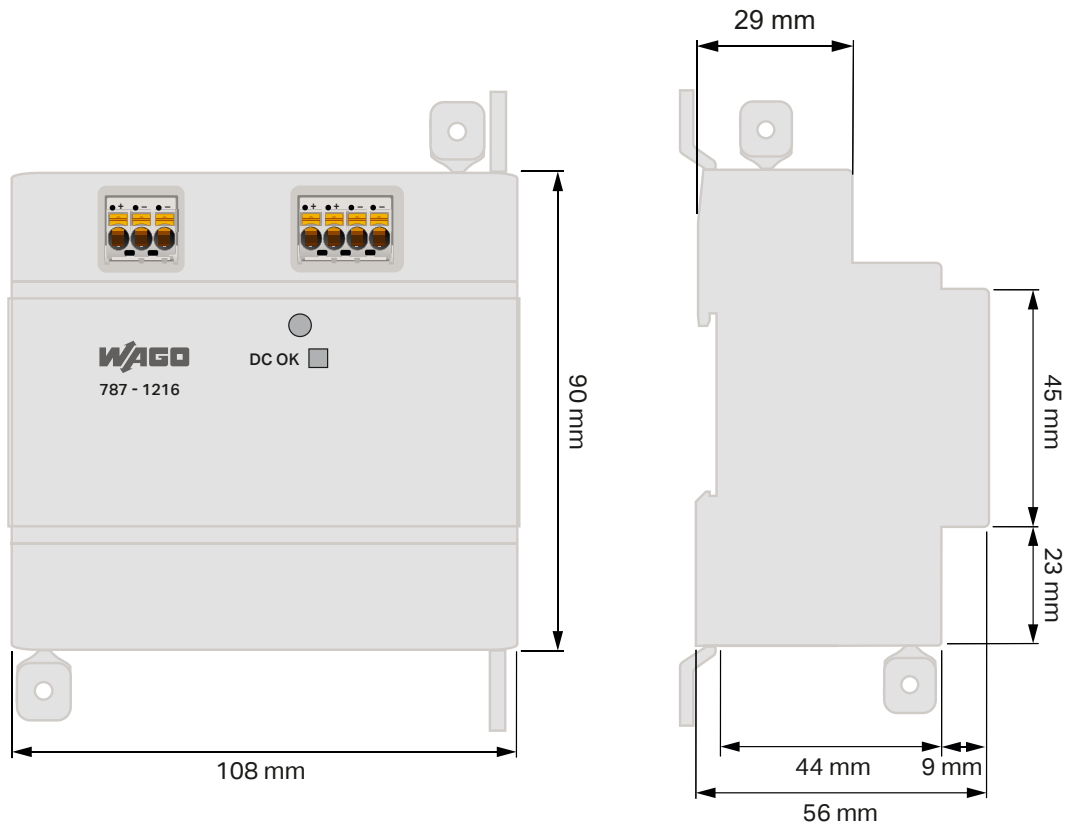


Figure 7: Dimensions

Table 8: Technical Data – Clearances

Mounting Directions	Front side	Clearance from					
		Front	Back	Top	Bottom	Left	Right
Vertical	Front	70 mm	-	70 mm	70 mm	0 mm	0 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

**Note**

**Observe mounting position!**

The following electrical data refers to the nominal mounting position (see [Mounting Positions \[▶ 24\]](#)).

**3.7.2 Input**

Table 9: Technical Data – AC Input

Property	Value	
Nominal input voltage	100 ... 240 VAC	
Input Voltage Range	90 ... 264 VAC	
Input frequency	47 ... 63 Hz	
Grounding systems	TN, TT and IT networks	
Input current (typ.) <sup>1</sup>	110 VAC	< 1.80 A
	230 VAC	< 0.85 A
Power factor (typ.) <sup>1</sup>	> 0.5	

<sup>1</sup> At nominal load

Table 10: Technical Data – CC Input

Property		Value
Nominal input voltage		140 ... 340 VDC
Input Voltage Range		125 ... 375 VDC
Input current (typ.) <sup>1</sup>	140 VDC	< 0.82 A
	220 VDC	< 0.51 A

<sup>1</sup> At nominal load

Table 11: Technical Data – Inrush Current

Property		Value
Inrush current (typ.) <sup>1)2)</sup>	230 VAC	< 20 A

<sup>1)</sup> Cold start, at room temperature of 25 °C<sup>2)</sup> After 1 ms at nominal load

Table 12: Technical Data – Mains Failure Buffering Time

Property		Value
Mains failure buffering time, typ. <sup>1</sup>	110 VAC	> 6 ms
	230 VAC	> 55 ms
Holding time, typ. <sup>1</sup>	110 VAC	> 8 ms
	230 VAC	> 55 ms

<sup>1</sup> At nominal load

Table 13: Technical Data – Input Side Connection

Property		Value
Connection Technology		Spring pressure connection technology (pico-MAX® 5.0, 3-pole)
Cross-section	Solid	0.2 ... 2.5 mm <sup>2</sup> / 24 ... 12 AWG
	Fine-stranded	0.2 ... 2.5 mm <sup>2</sup> / 24 ... 12 AWG
	Insulated ferrule with plastic collar	0.25 ... 1.5 mm <sup>2</sup> / 23 ... 16 AWG
	Ferrule without plastic collar	0.25 ... 2.5 mm <sup>2</sup> / 23 ... 12 AWG
Strip Length		9 ... 10 mm / 0.35 ... 0.39 inch
Required tools (conductor termination)		Operating tool, type 1 see <a href="#">Accessories</a> [ 37]

### 3.7.3 Output

Table 14: Technical Data – Output

Property		Value
Nominal output voltage		24 VDC (at 90 ... 264 VAC), SELV
Output voltage range		21 ... 28 VDC
Factory Settings		24 VDC; ±1 %
Output Current		3.3 A (at 100 ... 240 VAC), 4.2 A (at 110 ... 240 VAC)
Output Power		79 W (at 100 ... 240 VAC), 100 W (at 110 ... 240 VAC)
Power factor <sup>1)</sup>		> 0.5
Capacitive load (max.) <sup>1)</sup>	110 VAC	> 25000 µF
	230 VAC	> 25000 µF
Capacitive load (max.) <sup>2)</sup>	110 VAC	> 40000 µF
	230 VAC	> 40000 µF
Voltage variation		±1 % (at 100 ... 240 VAC)

Table 14: Technical Data – Output

Property	Value	
Derating of output power	For high surrounding air temperatures, see	
Line regulation <sup>1</sup>	±1 %	
Load regulation <sup>3)</sup>	±1 %	
Residual ripple/noise	< 100 mV (at 100 ... 240 VAC)	
Overload behavior <sup>4)</sup>	(1.05–1.35) × I <sub>OUT</sub> : Power limitation; shutdown in the event of a short circuit and permanent overload	
	Short-circuit condition: Hiccup mode <sup>5)</sup>	
Switch-on delay <sup>6)</sup>	110 VAC	< 1300 ms <sup>1)</sup>
	230 VAC	< 500 ms <sup>1)</sup>

<sup>1</sup> At nominal load  
<sup>2</sup> At 50 % nominal load  
<sup>3</sup> 0 % / 100 % load step  
<sup>4</sup> See “Overload Behavior” Figure  
<sup>5</sup> See “Hiccup Mode” Figure; t<sub>on</sub> = 230 ms / t<sub>off</sub> = 2000 ms  
<sup>6</sup> See “Switch-on Time” Figure

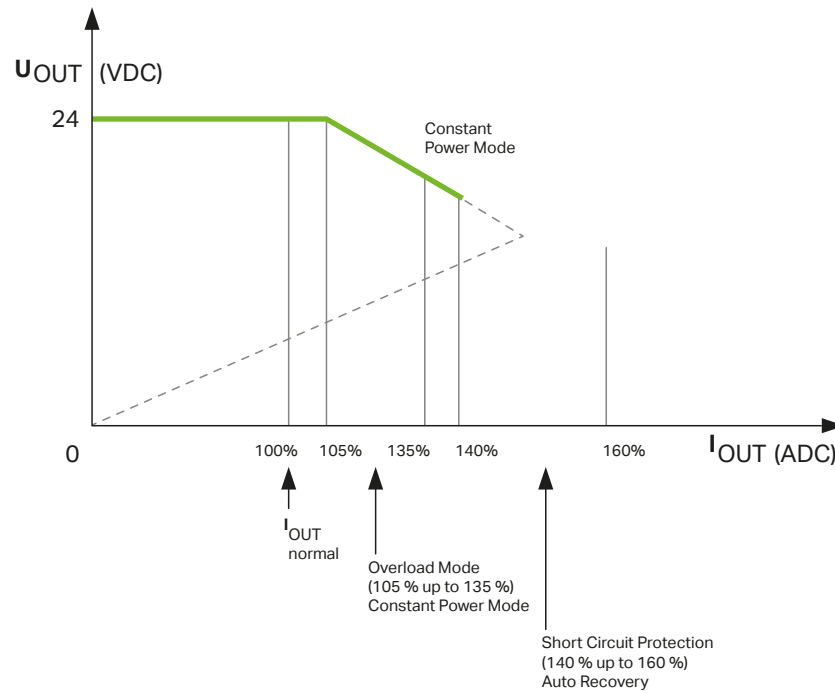


Figure 8: Overload Behavior

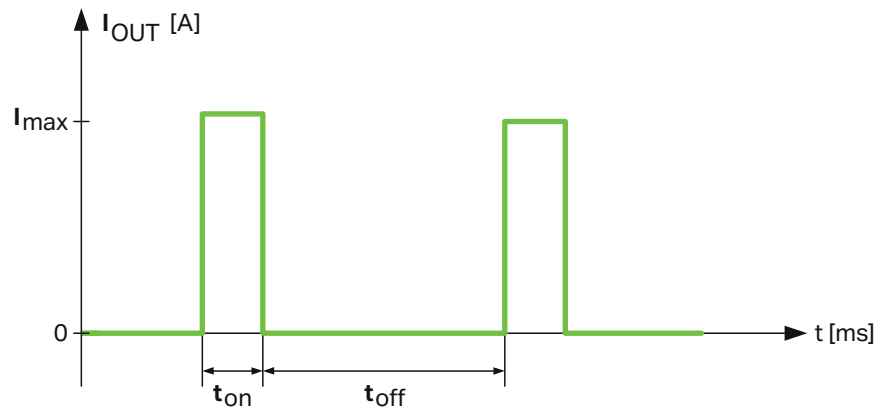


Figure 9: Hiccup Mode

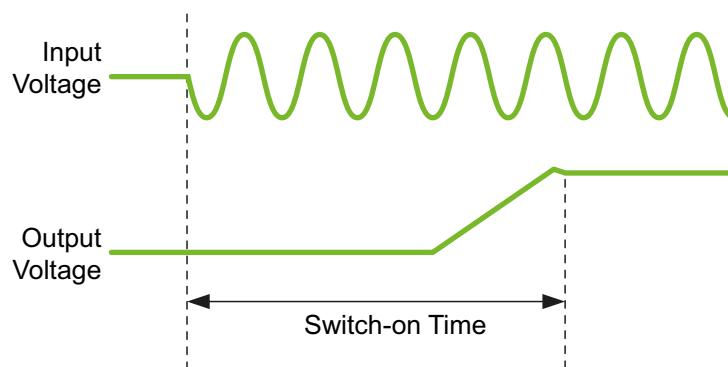


Figure 10: Turn-on Time

### ! NOTICE

#### Select conductor cross-sections according to current load!

In the event of a fault, the output current of a power supply can be up to  $1.5 \times I_{OUT}$ . Only use conductor cross-sections sufficient for the current load!

Table 15: Technical Data – Output Side Connection

Property		Value
Connection Technology		Spring pressure connection technology (pico-MAX® 5.0, 4-pole)
Cross-section	Solid	0.2 ... 2.5 mm <sup>2</sup> / 24 ... 12 AWG
	Fine-stranded	0.2 ... 2.5 mm <sup>2</sup> / 24 ... 12 AWG
	Insulated ferrule with plastic collar	0.25 ... 1.5 mm <sup>2</sup> / 23 ... 16 AWG
	Ferrule without plastic collar	0.25 ... 2.5 mm <sup>2</sup> / 23 ... 12 AWG
Strip Length		9 ... 10 mm / 0.35 ... 0.39 inch
Required tools (conductor termination)		Operating tool, type 1 (see <a href="#">Accessories</a> <a href="#">[p. 37]</a> )

### 3.7.4 Efficiency/Power Loss

Table 16: Technical Data – Efficiency/Power Loss

Property		Value
Efficiency (typ.) <sup>1</sup>	110 VAC	≥ 88 %
	230 VAC	≥ 90 %
Power loss (typ.) <sup>1</sup>	110 VAC	≤ 13.5 W
	230 VAC	≤ 10.5 W

<sup>1</sup> At nominal load

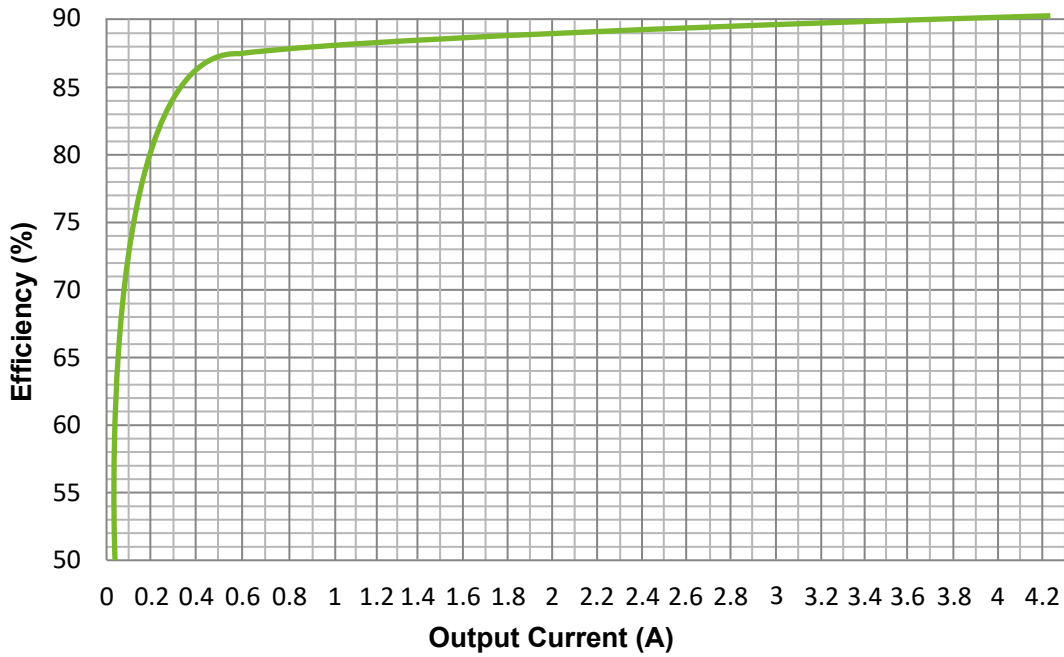


Figure 11: Efficiency at 230 VAC

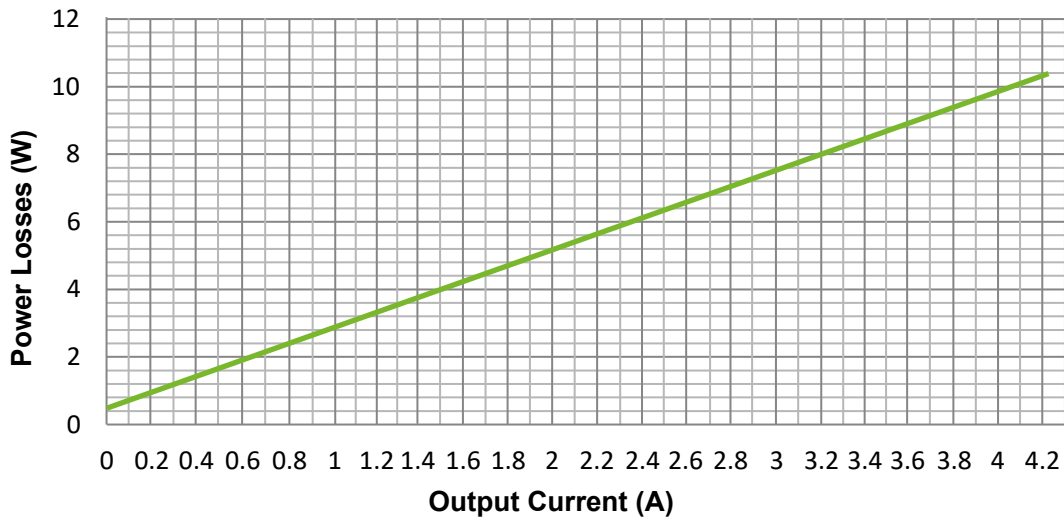


Figure 12: Power loss at 230 VAC

### 3.7.5 MTBF/Lifespan

Table 17: Technical Data – MTBF/Lifespan

Property	At	Load	T <sub>amb</sub>	Value
MTBF (IEC 61709)	240 VAC	100 %	25 °C	> 500000 h

### 3.7.6 Environment requirements

Table 18: Technical Data – Environmental Conditions

Property	Value
Surrounding air temperature, operation	-25 ... +70 °C
Derating (surrounding air temperature, operation > 55 °C)	-2.67 %/K <sup>1) 2)</sup>
Relative humidity	20 ... 90 %
Surrounding air temperature, storage	-40 ... +85 °C
Relative humidity, storage (without condensation)	10 ... 95 %
Temperature coefficient	≤ ±0.03 %/K
Derating (operating altitude) <sup>2)</sup>	—
Elevation above sea level, max.	2000 m (3000 m for storage)
Overvoltage category	II
Vibration according to IEC 60068-2-6	1g: < 9 Hz: 3.5 mm, 90 min, 2g: 9 < f < 150 Hz
Shock according to IEC 60068-2-27	15g, 11 ms, 1000 shocks per axis and direction, half-sine
Pollution degree according to IEC/EN 60664-1	2
Climatic category	3K3
LBS freedom <sup>3)</sup>	Yes
RoHS II / Reach	Yes

<sup>1)</sup> See [Derating surrounding air temperature \[ 21\]](#) Figure, see also [Derating \(Temperature-Dependent\) \[ 33\]](#).

<sup>2)</sup> Surrounding temperature, operation > 55 °C

<sup>3)</sup> LBS = Paint-wetting impairment substances

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

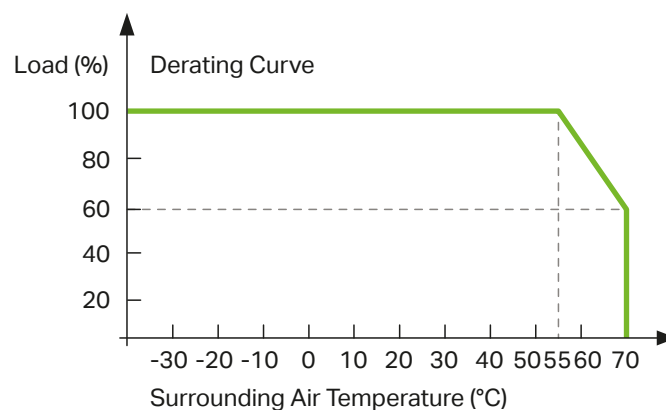


Figure 13: Derating surrounding air temperature

#### **Note**

#### Observe the following for long-term storage:

For long-term storage, power must be applied to equipment with built-in capacitors for five minutes at least every two years.

### 3.7.7 Product Protection

Table 19: Technical Data – Product Protection

Property	Value
Internal input fuse <sup>1</sup>	T 3.15 A / 250 V
Transient suppression at input	Varistor
Overload protection at output	122 ... 170 % rated current per output
Overvoltage protection at output, max. <sup>2</sup>	≤ 31 VDC
Feedback voltage, max. <sup>3</sup>	Yes, max. 16 VDC
Protection type	IP20
Ingress protection against foreign objects	> 5 mm
Overtemperature protection <sup>4</sup>	Yes
Short circuit protection <sup>4)</sup>	Yes

<sup>1</sup> Used only as an AC fuse. An external DC fuse must be used with DC supply (see [Accessories \[p. 37\]](#)).

<sup>2</sup> Internal limitation via a second control loop, deactivation of power supply, automatic restart

<sup>3</sup> The user must ensure that the voltage is not exceeded for power feedback.

<sup>4</sup> Shutdown, automatic restart

### 3.7.8 Safety

Table 20: 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	I
Leakage current, max. <sup>1)</sup>	≤ 0.25 mA
Insulation resistance, input to output, min. <sup>2)</sup>	≥ 100 MΩ/500 VDC
Dielectric strength (input – output) <sup>3)</sup>	3000 VAC

<sup>1)</sup> For power at 230 VAC




<sup>2)</sup> at 25 °C and 75 % RH

<sup>3)</sup> Type testing / 60 s

## 3.8 Approvals

The following approvals have been granted for the product:

Table 21: Approvals

Logo	Approval	Standard
	CE Conformity Marking	
	UL 508	
	UL 60950-1	

#### Note

#### More information on approvals

You can find detailed information on the approvals online at: [www.wago.com/](http://www.wago.com/)<item number>

### 3.9 Standards

The product meets the following standards:

Table 22: Standards: Mechanical and Climatic Environmental Conditions

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

Table 23: Standards: EMC – Immunity to Interference

Standard	Title
EN 61204-3	Low-Voltage Switch Mode Power Supplies – Part 3: Electromagnetic Compatibility (EMC)
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 24: Standards: EMC – Emission of Interference

Standard	Title
EN 61204-3	Low-Voltage Switch Mode Power Supplies – Part 3: Electromagnetic Compatibility (EMC)

### 3.10 Special Requirements

Observe the following:

- Perform installation according to the local conditions, applicable regulations (e.g., VDE 0100), national accident prevention specifications (e.g., UVV-VBG4 or DGUV Regulation 2) and accepted technical regulations.
- This product is intended for installation in electrical systems or machines and fulfills the requirements of the Low Voltage Directive.

When installing in machines, the following also applies:

- When installing in machines, normal operation must not commence until it is determined that the machine complies with the requirements of the Machinery Directive, EN 60204.
- Commencement of normal operation is allowed only on the condition of compliance with the EMC Directive.
- The manufacturer of the system or machine is responsible for ensuring compliance with the limit values required by EMC legislation.

# Installation and Removal

## **! NOTICE**

### **Avoid electrostatic discharge!**

The products are equipped with electronic components that may be destroyed by electrostatic discharge when touched. Please observe the safety precautions against electrostatic discharge per DIN EN 61340-5-1/-3. When handling the products, please ensure that environmental elements (personnel, work space and packaging) are properly grounded.

## **4.1 Mounting Positions**

For proper cooling, mount the product vertically (ventilation slots at the top and bottom, front facing forward).

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

*Table 25: Values for Mounting Position – Mounting with Front Panel at Top or Bottom*

Product	Output Power	Surrounding air temperature
787-1216	50 %	55 °C

The product can be mounted on a DIN-35 rail or with screws.

## **i Note**

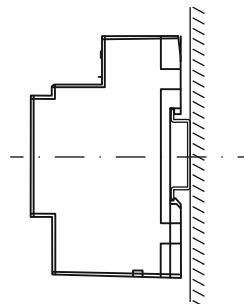
### **Observe minimum clearances!**

To avoid malfunctions, maintain the required minimum clearances (see [🔗 Technical data \[▶ 15\]](#))!

The product can be mounted on a DIN-35 rail or with screws.

## **4.2 DIN-35 Rail**

The DIN rail is located in the center of the vertical axis (see [🔗 Technical data \[▶ 15\]](#)).



*Figure 14: Position of the DIN Rail*

The distances from the central axis of the DIN rail to the top and bottom are 45 mm.

### Mounting on the DIN Rail

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

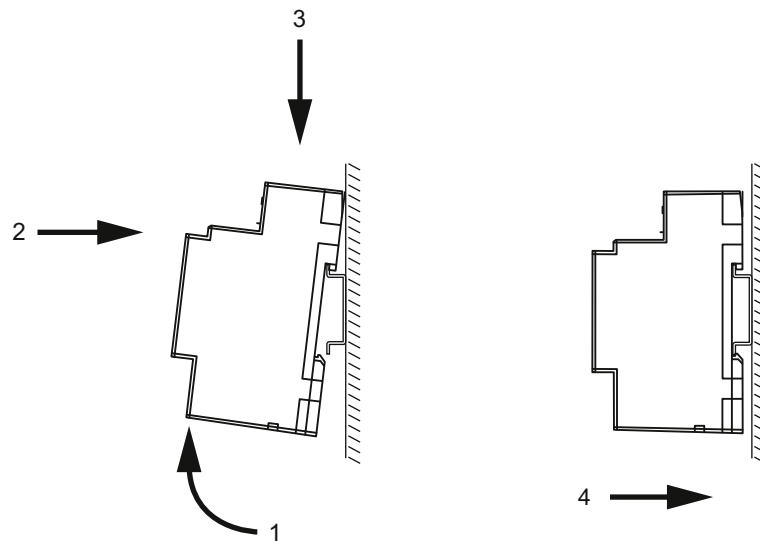


Figure 15: Mounting the Product on the DIN rail

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

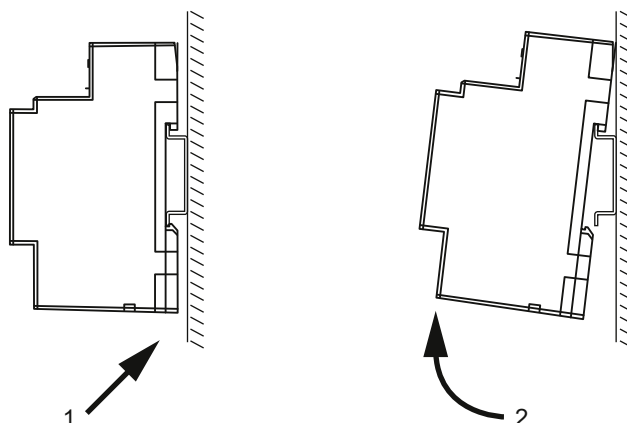


Figure 16: Removing the Product from the DIN Rail

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 forward forward and unhook it from the DIN rail.

### 4.3 Screw Mount

Two fastening clips are supplied with the product for screw mounting. Screw mounting is possible using these fastening clips.

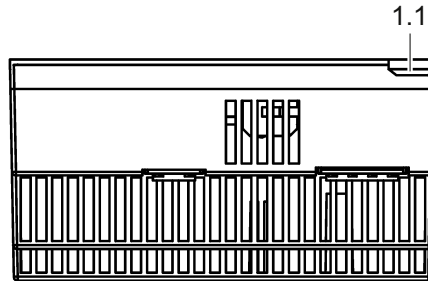


Figure 17: Snap-fit Openings for Fastening Clips – Top

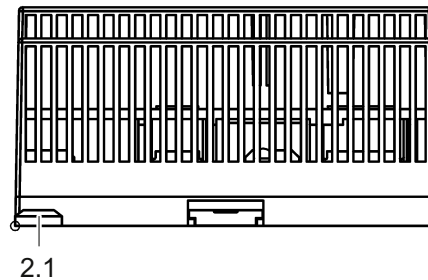


Figure 18: Snap-fit Openings for Fastening Clips – Bottom

Table 26: Legend for “Snap-fit Openings for Fastening Clips” Figures

Position	Description
1.1	Snap-fit opening top; rear fastening
2.1	Snap-fit opening bottom; rear fastening

1. Insert one fastening clip into each of the corresponding top and bottom snap-fit openings on the housing (see “[Snap-fit Openings for Fastening Clips – Top \[▶ 26\]](#)” and “[Snap-fit Openings for Fastening Clips – Bottom \[▶ 26\]](#)” views from the top and bottom).
2. Push down the fastening clip until it locks into position with an audible click.
3. Gently shake the fastening clip to verify that it is fitted securely.
4. Fasten the product with the respective M4 screws (not included).  
Please note the maximum torque of 2.9 Nm.

The exact dimensions and positions of the fastening clips are provided on the drilling template supplied with the product.

# Connection

## DANGER

### Do not work on products while energized!

- Dangerous electrical voltage can lead to electric shock and burns. Disconnect all power sources to the product before performing any installation, repair or maintenance.

## DANGER

### Ensure a standard connection!

- To minimize any hazardous situations resulting in personal injury or to avoid failures in your system, the data and power supply lines shall be installed according to standards, with careful attention given to ensuring the correct terminal assignment. Always adhere to the EMC directives applicable to your application.

## NOTICE

### Do not plug in or disconnect the female connector while a load is applied!

Only plug in or disconnect the female connectors when the product is not live! Failure to observe this can result in damage to the contacts due to arcing!

## NOTICE

### Plug the female connectors all the way into the male connectors!


Always plug the female connectors all the way in to the male connectors. This ensures proper contact at all times.

## NOTICE

### Attach the free ends of the conductors using a strain relief device!

Female connectors can be pulled out of the male connectors by high vibration levels or shock impacts!

Provide appropriate strain relief means to attach and cap any free ends of the conductors.

Note the maximum permissible connection cross-sections of the power cables (see  [Technical data \[▶ 15\]](#)).

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

Use only the recommended tools (see  [Accessories \[▶ 37\]](#)).

## 5.1 Connectors

The supply lines are connected on the input or primary sides and on the output or secondary sides with WAGO's 2092 Series *picoMAX*® Pluggable Connectors (see [🔗 Connections \[▶ 13\]](#)):

Table 27: Connectors

	Input side	Output Side
WAGO Connectors	<i>picoMAX</i> ® 5.0	<i>picoMAX</i> ® 5.0
Connection	3-pole: "L", "N" and "PE"	4-pole: twice "+" and "-"

### 5.1.1 Conductor Termination

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

#### **i** Note

#### **Connect only one conductor per connector!**

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

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 Connectors**

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  $> 0.5 \text{ mm}^2/\text{AWG } 22$
- Solid conductors with a cross section  $> 0.25 \text{ mm}^2/\text{AWG } 24$

### 5.1.2 WAGO *picoMAX*® Pluggable Connectors

WAGO's *picoMAX*® Pluggable Connectors allows you to prewire products to expedite product installation and avoid rewiring during product replacement.

The procedure for removal and connection is the same for both WAGO Pluggable Connectors.

WAGO's *picoMAX*® Pluggable Connectors consist of a male header (fixed in the product) and a female connector (pluggable).

For more information on *picoMAX*®, please visit “WAGO *picoMAX*® Pluggable Connection System” in the catalog or on the internet at [www.wago.com](http://www.wago.com).

#### 5.1.2.1 Delivery Condition

When delivered, the female connectors are plugged into the product.

#### 5.1.2.2 Pulling the Female Connector

WAGO recommends using a *picoMAX*® unlocking tool (referred to in the following text as the “unlocking tool”). More information on the unlocking tool is available in the Section [🔗 Accessories \[▶ 37\]](#).

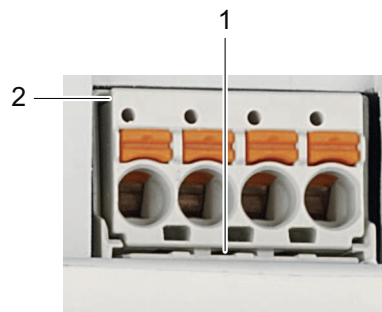


Figure 19: Removing the Female Connector without Wiring (Application Example)

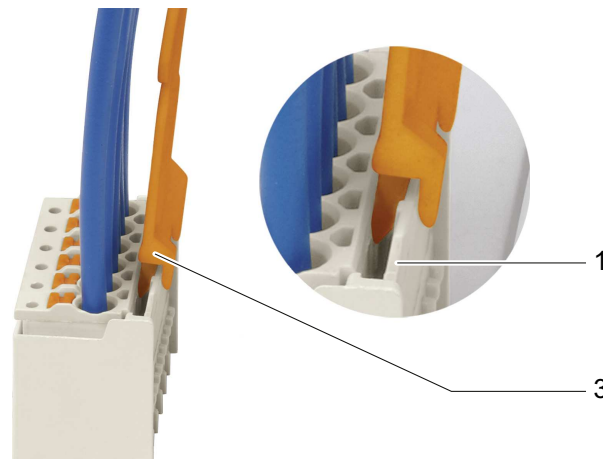


Figure 20: Removing the Female Connector with Wiring (Application Example)

Table 28: Legend for “Removing the Female Connector ...” Figures

Position	Description
1	Male locking latch
2	Protruding rim of the female connector
3	Unlocking tool

#### Removing the Female Connector without Wiring

Proceed as follows to remove the female connector with the unlocking tool:

1. Place the unlocking tool (3) onto the locking latch (1).

2. Insert the unlocking tool fully.  
The wedge on the unlocking tool opens the locking tab and the lock is release (see also the “Removing the Female Connector with Wiring” figure).
3. Grip underneath the protruding rim of the female connector (2).
4. Pull out the female connector.

If you do not have an unlocking tool available, you can also remove the female connector with a WAGO operating tool or a screwdriver.

### **WARNING**

#### **Do not insert a tool into the ventilation slots!**

Components inside the device may be damaged if the blade of an operating tool enters the ventilation slots. This may lead to serious damage with a risk of injury caused by malfunction, overheating or electric shock!

- When using a screwdriver or an operating tool, ensure correct positioning between the locking latch and the female connector!

Proceed as follows:

1. Use the screwdriver or operating tool to push the locking tab (1) away from the female connector.
2. Grip underneath the protruding rim of the female connector (2).
3. Pull out the female connector.

#### **Removing the Female Connector with Wiring**

Proceed as follows to remove the female connector with the unlocking tool:

1. Place the unlocking tool (3) onto the locking latch (1).
2. Insert the unlocking tool fully.  
The wedge on the unlocking tool opens the locking tab and the lock is released.
3. Pull on the unlocking tool together with the conductors to remove the female connector.

If you do not have an unlocking tool available, you can also remove the female connector with a WAGO operating tool or a screwdriver.

### **WARNING**

#### **Do not insert a tool into the ventilation slots!**

Components inside the device may be damaged if the blade of an operating tool enters the ventilation slots. This may lead to serious damage with a risk of injury caused by malfunction, overheating or electric shock!

- When using a screwdriver or an operating tool, ensure correct positioning between the locking latch and the female connector!

**! NOTICE****Do not pull on the cables when using a screwdriver or operating tool!**

When using a screwdriver or operating tool to remove the female connector **do not** pull on the cables!

Grip underneath the protruding rim of the female connector to pull it out!

**Inserting the Female Connector****! DANGER****Make sure that the *picOMAX*<sup>®</sup> female connectors are mated correctly.**

Mismating the input female connector into the output connector may lead to a hazardous voltage of 230 V on the output side.

- Make sure the female connector is properly mated!

Proceed as follows to plug the female connector into the corresponding male header:

1. Insert the female connector into the corresponding male header.

**! Note** **Ensure the correct alignment!**

Make sure that the female connector is inserted with the correct alignment and in the right male header:

The orange push-buttons must point outward from the product housing.

2. Push in the male header until the female connector snaps into position with an audible click.
3. When inserting with wiring: Check that the spring clamp is seated securely by gently pulling on the wires.

# Operation

## 6.1 Setting the Output Voltage via Potentiometer

The potentiometer [Adj.] can be used on the front of the product to set the output voltage between 21 ... 28 VDC:

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

# Notes on Operation

## 7.1 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.

## 7.2 Parallel Connection (on the Output Side)

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 power supply units 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.

## 7.3 Derating

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

### 7.3.1 Derating (Temperature-Dependent)

Table 29: Nominal values per UL

Parameter	Value per UL
IN	100 ... 120 VAC / 200 ... 240 VAC; 1.8 A / 50 ... 60 Hz
OUT	24 VDC, 3.3 A / 24 VDC, 4.2 A ( $U_{IN} > 110$ VAC)
Ambient temp.	+55 °C

Restrictions (derating) apply when the power supply unit is used in applications that exceed its performance specifications; these are listed below:

Table 30: Deratings

Nominal voltage	Temperature value $T_U$	Derating
90 ... 264 VAC	> +55 °C	-2.67 %/K
< 110 VAC	-	- 2.0 %/V
< 140 VDC	-	- 1.33 %/V

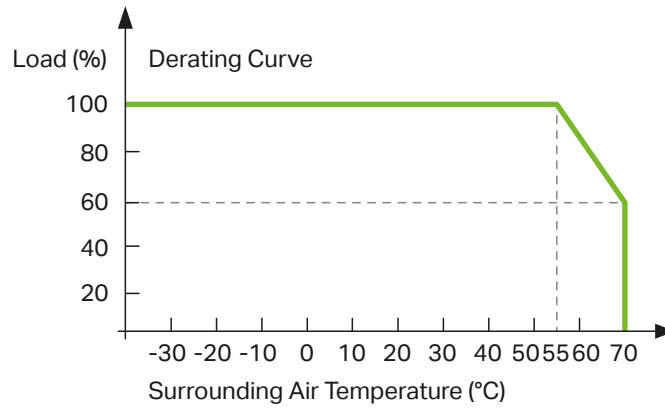


Figure 21: Temperature Load Curve

### 7.4 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 \[ 15\]](#))
- $I_{OUT(IST)}$  Actual output current
- $U_{OUT}$  Output voltage (see [Technical data \[ 15\]](#))

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 ).

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 \[ 17\]](#)).

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

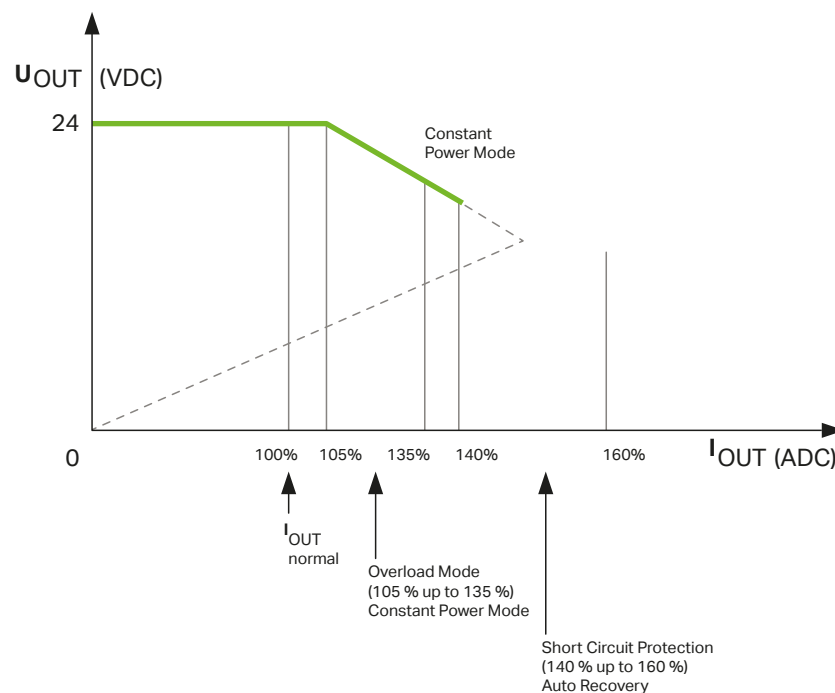


Figure 22: Output Characteristics

Table 31: 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

## 7.5 Maintenance

### Note

#### Observe the following for long-term storage:

For long-term storage, power must be applied to equipment with built-in capacitors for five minutes at least every two years.

The product requires no special maintenance; however it must be protected (as per the protection class) against dust accumulation, moisture, radiation and aggressive chemicals.

Permitted repairs are limited to the measures listed in these operating instructions.

Should a fault occur nonetheless, return the product to WAGO for repair. Provide the following information:



- Type of fault
- Circumstances (operating conditions, input wiring)
- Your suspicion about the fault's cause
- Previous instances of unusual incidents etc.

The convenient, standardized and therefore faster RMA process is available for returns and reports of defects. The corresponding report form for returns and reports of defects is available at <https://www.wago.com/us/ruecksendungen-reklamationen>.

# Decommissioning

## 8.1 Disposal and Recycling

Table 32: WEEE Mark

Logo	Description
 	Electrical and electronic equipment may not be disposed of with household waste. This also applies to products without this mark.

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 national and local regulations for the disposal of batteries, packaging and electrical and electronic equipment.
- Clear any data stored on electrical and electronic equipment.
- Remove any batteries or memory cards installed in electrical and electronic equipment.
- Dispose of all types of packaging to ensure a high level of recovery, reuse and recycling.
- Have electrical and electronic equipment sent to a local collection point.
- The guidelines 2006/66/EG, PPWD 2018/852/EU and WEEE 2012/19/EU apply throughout Europe. National directives and laws may vary.

# Appendix

## 9.1 Accessories

Details on accessories are available online at [www.wago.com](http://www.wago.com).

The following accessories are available for the product:

### Accessories – Communication

Table 33: Accessories – Communication

Description	Designation	Item Number
Attachable communication module for I/O-Link for power supply units of the 2787-2xxx family	Communication module IO-Link for WAGO Power Supplies	2787-9080
WAGO USB Communication Cable	2.5 m	0750-0923

### Accessories – Tools

Only use insulated tools.

Table 34: Accessories – Tools

Description	Designation	Item Number
<i>picoMAX</i> <sup>®</sup> Unlocking Tool		2092-1630
Operating tool, with partially insulated shaft	Type 1, blade 2.5 × 0.4 mm	210-719
Operating tool	Phillips-type PH0	210-769

### Accessories – Wiring

Table 35: Accessories – Wiring

Description	Item Number
<i>picoMAX</i> <sup>®</sup> 5.0 Female Connector, 3-pole	2092-1123/0000-9500
<i>picoMAX</i> <sup>®</sup> 5.0 Female Connector, 4-pole	2092-1124/0000-9504

### Accessories – Other

Table 36: Accessories – Other

Description	Item Number
Fuse terminal blocks for cylindrical fuses <sup>1)</sup> 10 × 38 mm	811 Series

<sup>1)</sup> Cylindrical fuses are not offered by WAGO.

### Accessories – Marking

Table 37: Accessories – Marking

Description	Item Number
Marker carrier	2787-1233
Marking System	2009-0110
WMB Multi Marking System	2009-0115
	2009-0115/0000-0002

### Accessories – Spare Parts

Table 38: Accessories – Spare Parts

Description	Designation	Item Number
Female connector as spare part, input	<i>picoMAX</i> <sup>®</sup> 5.0, 3-pole	2092-1123/0000-9500

Table 38: Accessories – Spare Parts

Description	Designation	Item Number
Female connector as spare part, output	<i>picoMAX</i> ® 5.0, 4-pole	2092-1124/0000-9504

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