

# EPSITRON<sup>®</sup> COMPACT Power Manual



## 787-1202 / -1212 / -1216 / -1226 EPSITRON<sup>®</sup> COMPACT Power DC power supply

Version 1.0.0

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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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# 1 Notes about this Documentation



## Note

### Always retain this documentation!

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. In addition, ensure that any supplement to this documentation is included, if necessary.

## 1.1 Validity of this Documentation

This documentation applies to the DC power supplies listed in the following table:

Table 1: Item Numbers for DC Power Supplies

Item number	Label
787-1202	DC power supply 31 W
787-1212	DC power supply 60 W
787-1216	DC power supply 100 W
787-1226	DC power supply 150 W

## 1.2 Copyright

This Manual, including all figures and illustrations, is copyright-protected. Any further use of this Manual by third parties that violate pertinent copyright provisions is prohibited. Reproduction, translation, electronic and phototechnical filing/archiving (e.g., photocopying) as well as any amendments require the written consent of WAGO Kontakttechnik GmbH & Co. KG, Minden, Germany. Non-observance will involve the right to assert damage claims.

## 1.3 Symbols

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 **DANGER****Personal Injury!**

Indicates a high-risk, imminently hazardous situation which, if not avoided, will result in death or serious injury.

---

 **DANGER****Personal Injury Caused by Electric Current!**

Indicates a high-risk, imminently hazardous situation which, if not avoided, will result in death or serious injury.

---

 **WARNING****Personal Injury!**

Indicates a moderate-risk, potentially hazardous situation which, if not avoided, could result in death or serious injury.

---

 **CAUTION****Personal Injury!**

Indicates a low-risk, potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

---

**NOTICE****Damage to Property!**

Indicates a potentially hazardous situation which, if not avoided, may result in damage to property.

---

**NOTICE****Damage to Property Caused by Electrostatic Discharge (ESD)!**

Indicates a potentially hazardous situation which, if not avoided, may result in damage to property.

---

**Note****Important Note!**

Indicates a potential malfunction which, if not avoided, however, will not result in damage to property.

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## *Information*



### **Additional Information:**

Refers to additional information which is not an integral part of this documentation (e.g., the Internet).

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## 1.4 Number Notation

Table 2: Number Notation

Number Code	Example	Note
Decimal	100	Normal notation
Hexadecimal	0x64	C notation
Binary	'100' '0110.0100'	In quotation marks, nibble separated with dots (.)

## 1.5 Font Conventions

Table 3: Font Conventions

Font Type	Indicates
<i>italic</i>	Names of paths and data files are marked in italic-type. e.g.: <i>C:\Program Files\WAGO Software</i>
<b>Menu</b>	Menu items are marked in bold letters. e.g.: <b>Save</b>
>	A greater-than sign between two names means the selection of a menu item from a menu. e.g.: <b>File &gt; New</b>
<b>Input</b>	Designation of input or optional fields are marked in bold letters, e.g.: <b>Start of measurement range</b>
“Value”	Input or selective values are marked in inverted commas. e.g.: Enter the value “4 mA” under <b>Start of measurement range</b> .
<b>[Button]</b>	Pushbuttons in dialog boxes are marked with bold letters in square brackets. e.g.: <b>[Input]</b>
<b>[Key]</b>	Keys are marked with bold letters in square brackets. e.g.: <b>[F5]</b>



## 2 Important Notes

This section includes an overall summary of the most important safety requirements and notes that are mentioned in each individual section. To protect your health and prevent damage to devices as well, it is imperative to read and carefully follow the safety guidelines.

### 2.1 Legal Bases

#### 2.1.1 Subject to Changes

WAGO Kontakttechnik GmbH & Co. KG reserves the right to provide for any alterations or modifications that serve to increase the efficiency of technical progress. WAGO Kontakttechnik GmbH & Co. KG owns all rights arising from the granting of patents or from the legal protection of utility patents. Third-party products are always mentioned without any reference to patent rights. Thus, the existence of such rights cannot be excluded.

#### 2.1.2 Personnel Qualification

All tasks performed on the 787 Series devices must only be completed by qualified electrical specialists according to DIN EN 50110-1/-2 and IEC 60364.

#### 2.1.3 Use of the 787 Series in Compliance with Underlying Provisions

The *EPSITRON*® 787 Series power supply system provides DC voltage to electric or electronic devices, such as industrial control systems or display, communication and measuring devices.

The devices have been developed for use in an environment that meets the IP20 protection class criteria. Protection against finger injury and solid impurities up to 12.5 mm diameter is assured; protection against water damage is not ensured. Unless otherwise specified, operation of the components in wet or dusty environments is prohibited.

The devices are designed for installation in an enclosure. Under no circumstances may they be used in control systems for planes or in nuclear facilities, as any malfunction in these applications could result in severe injuries or risk of death.


## 2.1.4 Technical State of the Devices

Devices are supplied from the factory with a dedicated hardware configuration. All other changes to the hardware and the non-compliant use of the components entail the exclusion of liability on part of WAGO Kontakttechnik GmbH & Co. KG.

## 2.2 Safety Advice (Precautions)

For installing and operating purposes of the relevant device to your system the following safety precautions shall be observed:

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 **DANGER**

**Do not work when devices are energized!**  
High voltage can cause electric shock or burns.  
Switch off all power to the device prior to performing any installation, repair or maintenance work.

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 **DANGER**

**Live parts are likely to be touched!**  
The party setting up the device is responsible for providing appropriate touch guards. The installation regulations must be observed for each individual application.

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 **DANGER**

**Only install this device in closed electrical service locations!**  
Only install this device in closed electrical areas per DIN EN 50178!

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 **CAUTION**

**Hot surface!**  
The surface of the housing can become hot during operation. If the device was operated at high ambient temperatures, allow it to cool off before touching it.

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**NOTICE**

**Only for electrical specialists!**  
The device described must only be installed by qualified electrical specialists acc. to DIN EN 50110-1/-2 and IEC 60364.

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**NOTICE****Switch off power supply to defective device!**

Switch off power supply to the device immediately if the device malfunctions or is damaged! Control systems connected to the device may also be damaged!  
Return the defective device directly to WAGO.

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**NOTICE****Replace defective or damaged devices!**

Replace defective or damaged device/module (e.g., in the event of deformed contacts), since the long-term functionality of device/module involved can no longer be ensured.

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**NOTICE****Protect the components against materials having seeping and insulating properties!**

The components are not resistant to materials having seeping and insulating properties such as: aerosols, silicones and triglycerides (found in some hand creams). If you cannot exclude that such materials will appear in the component environment, then install the components in an enclosure being resistant to the above-mentioned materials. Clean tools and materials are imperative for handling devices/modules.

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**NOTICE****Clean only with permitted materials!**

Clean soiled contacts using oil-free compressed air or with ethyl alcohol and leather cloths.

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**NOTICE****Do not use any contact spray!**

Do not use any contact spray. The spray may impair contact area functionality in connection with contamination.

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**NOTICE****Do not reverse the polarity of connection lines!**

Avoid reverse polarity of data and power supply lines, as this may damage the devices involved.

---

## NOTICE

### **Follow the installation instructions!**

Only install this device in dry, indoor rooms.

Do not install the device on or in the vicinity of easily flammable materials!

## Note



### **Observe the applicable regulations!**

Observe applicable laws, standards and regulations.

Observe the current, accepted technology standards and practices at the time of installation.

## Note



### **Observe for long-term storage!**

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

## Note



### **Follow the instructions!**

Incorrect installation may compromise safety in the event of a failure. Before installation and operation, please read these instructions thoroughly and carefully.

Improper use and failure to follow these instructions for use will render the warranty or guarantee null and void.

## 2.2.1 Special Notes for Use in Accordance to EN 60335

The following additional information must be observed when using the device in accordance to EN 60335:

- Ensure that the space required by the device is provided (see section “Device Description” > “Technical Data”).
- Observe the minimum distances between the device and adjacent components (see section “Device Description” > “Technical Data”).
- Observe the positions for the different fastening options (see section “Mounting”).
- Keep the ventilation slots free.

- Install the device so that subsequent isolation of the device from the mains supply is possible (e.g., by installing a mains isolator in accordance with the relevant installation requirements).

## 2.2.2 Special Notes on Use as a DIN-Rail Built-in Installation Device

The following additional information must be observed when using the device as a DIN-rail built-in installation device (domestic installation):



### **DANGER**

#### **Ensure contact protection when used as a DIN-rail built-in installation device!**

When used as a DIN-rail built-in installation device according to DIN 43880 (domestic installation), the electrical installer must provide appropriate contact protection.

For 787-1202 and 787-1212 only:

Only use the device as a DIN-rail built-in installation device with the front panel fitted.

### 3 Device Description

The *EPSITRON*® **COMPACT Power** Series power supplies are compact primary switched-mode power supply units 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.

The power supply units are DIN-rail mountable. Screw mounting using the fastening clips supplied with the device is also possible. This enables the devices to be mounted in either a switch cabinet or distribution box, as well as screwed onto the housing of an automation device.

The front panel on the 787-1202 and 787-1212 devices can be removed. This improves thermal properties when not mounted vertically and ensures greater output performance at high ambient temperatures.

The devices employ pluggable WAGO *picoMAX*® connectors, enabling them to be pre-wired for quicker installation and faster device replacement.

The device is provided with a potentiometer for setting the output voltage (see section “Operating Elements” > “Potentiometer”).

An LED indicates the status of the output voltage (see section “Display Elements”).

### 3.1 View

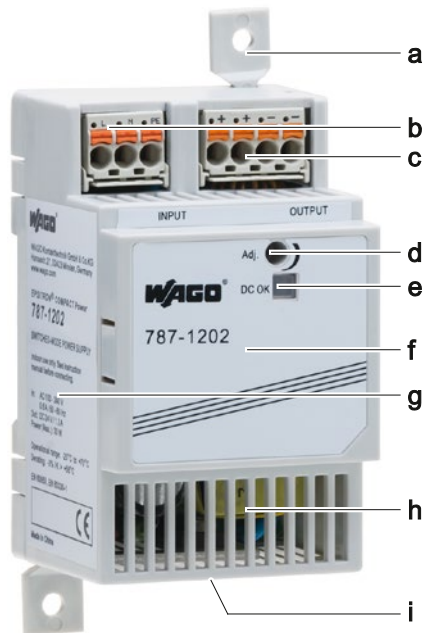


Figure 1: View 787-1202

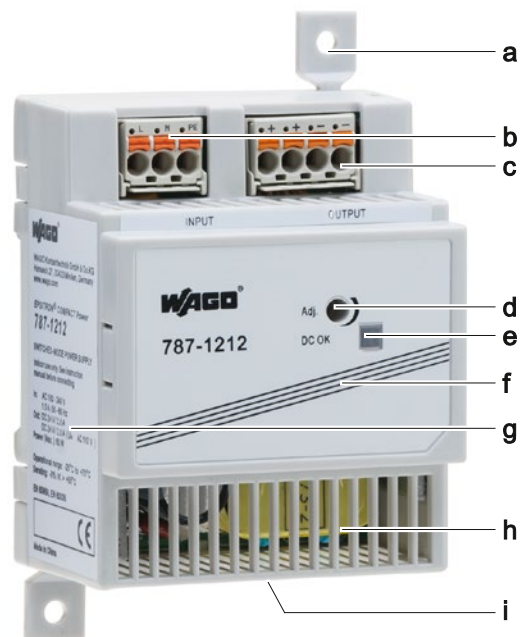


Figure 2: View 787-1212



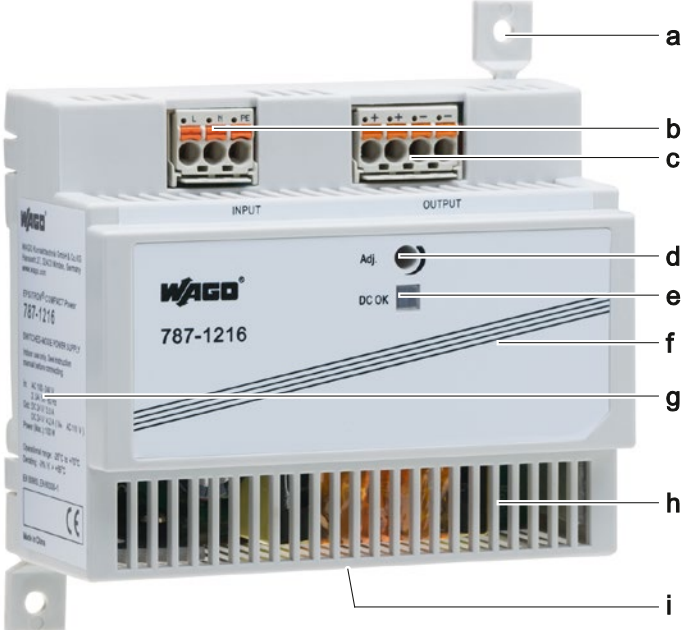


Figure 3: View 787-1216

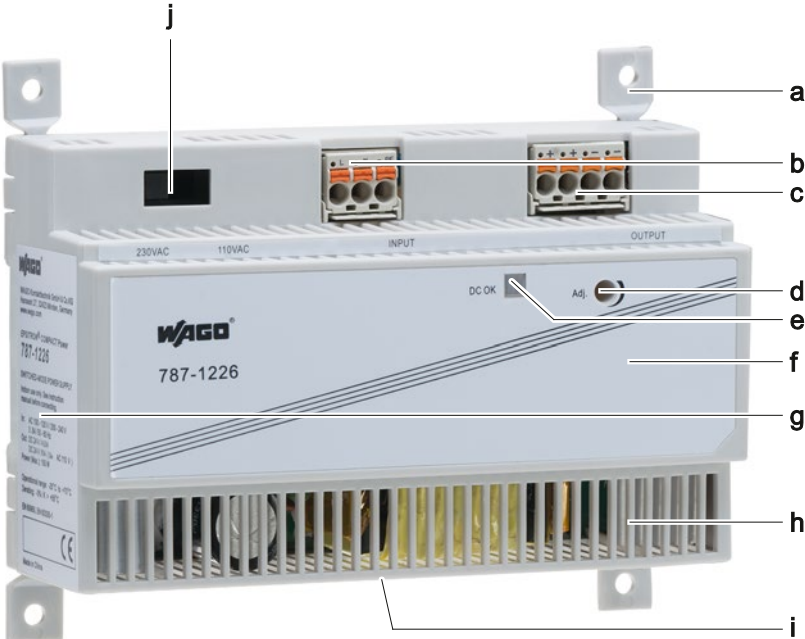


Figure 4: View 787-1226

Table 4: Legend for Figure “View”

<b>Pos.</b>	<b>Description</b>	<b>Details see section</b>
a	Screw mount clip	“Mounting” > “Screw Mounting”
b	Input	“Device Description” > “Connections”
c	Output	“Device Description” > “Connections”
d	Potentiometer for setting the output voltage	“Device Description” > “Operating Elements”
e	LED indicator	“Device Description” > “Indicating Elements”
f	Front panel (removable on 787-1202 and 787-1212)	“Notes on Operation” > “Front Panel”
g	Type plate	“Device Description” > “Type Plate”
h	Ventilation slots	---
i	DIN-rail mount/removal latch	“Mounting” > “DIN-Rail”
j	Slide switch (only on 787-1226)	“Device Description” > “Operating Elements”

## 3.2 Type Plate

The device type plates 787-1202 / -1212 / -1216 / -1226 are located on the side of the housing:

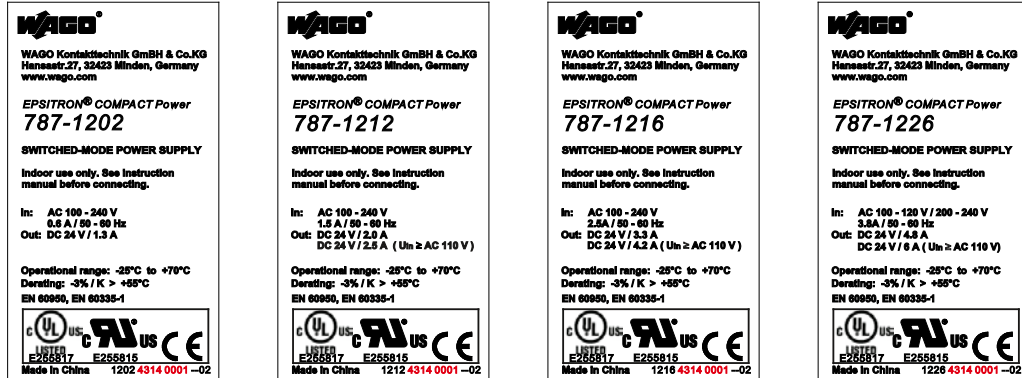


Figure 5: Type Plates

They contain the following information:

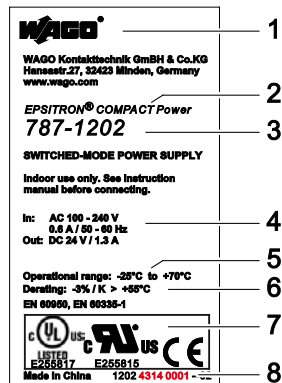


Figure 6: Information on the Type Plate (Example: 787-1202)

Table 5: Legend for Figure “Information on the Type Plate”

Pos.	Description	Details see section
1	Company logo and address	---
2	Device name	---
3	Item number	---
4	Input and output data	“Device Description” > “Technical Data”
5	Operating temperature	“Device Description” > “Technical Data”
6	Derating information	“Notes on Operation” > “Derating”
7	Field for the approvals	“Device Description” > “Approvals”
8	Serial number	---

### 3.3 Connectors



#### DANGER

**Do not work on devices while energized!**

All power sources to the device shall be switched off prior to performing any installation, repair or maintenance work.

#### 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 device 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!

#### 3.3.1 Connectors

The supply lines are connected on the input and output side using the 2092 Series WAGO *picoMAX*<sup>®</sup> pluggable connectors:

- Input side: *picoMAX*<sup>®</sup> 5.0
- Output side: *picoMAX*<sup>®</sup> 5.0

Observe the maximum admissible conductor cross sections for the signal and power cables (see section “Device Description” > “Technical Data”).

Check the appropriate operating voltage before connecting equipment (see type plate).

Additional information on the connection technology is provided in the section “Connecting Devices.”

### 3.3.1.1 Connector Input Side

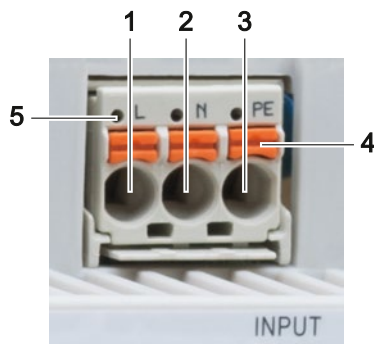


Figure 7: Connectors on the Input Side

Table 6: Legend for Figure “Connectors on the Input Side”

Pos.	Description
1	Connector “L” for input voltage
2	Connector “N” for input voltage
3	Connector “PE” for input voltage
4	Integrated push-button
5	Test hole

### 3.3.1.2 Connector Output Side

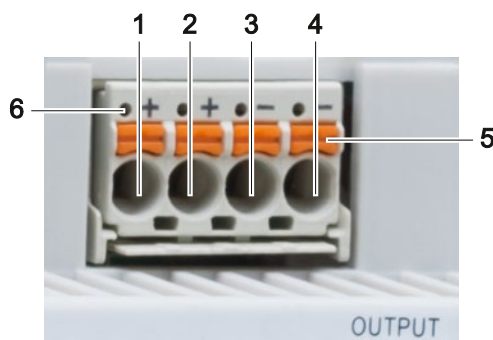


Figure 8: Connectors on the Output Side

Table 7: Legend for Figure “Connectors on the Output Side”

Pos.	Description
1	Connector 1 “+” for output voltage
2	Connector 2 “+” for output voltage
3	Connector 1 “-” for output voltage
4	Connector 2 “-” for output voltage
5	Integrated push-button
6	Test hole

## 3.4 Display Elements

The LED on the front panel of the device indicates the status of the output voltage  $U_{OUT}$ .



Figure 9: Display Element

Table 8: Legend for Figure “Display Element”

LED	Status	Description
DC OK	ON	Nominal output voltage $U_{OUT}$ present.
	OFF	Nominal output voltage $U_{OUT}$ not present.

## 3.5 Operating Elements

### 3.5.1 Potentiometer

A potentiometer [Adj.] is provided on the front of the device for setting or adjusting the nominal output voltage  $U_{OUT}$ .



Figure 10: Potentiometer

This potentiometer enables you to set the nominal output voltage  $U_{OUT}$  in the range between 22 VDC ... 26 VDC.

### 3.5.2 Slide Switch (only with 787-1226)

The 787-1226 device is also provided with a slide switch that enables the range for nominal input voltage  $U_{IN}$  to be set.



Figure 11: Slide Switch (787-1226)

Table 9: Slide Switch Setting Options

Slide switch setting	Input voltage range
110VAC	100 VAC ... 120 VAC
230VAC	200 VAC ... 240 VAC

## 3.6 Technical Data

Table 10: Device Data

	787-1202	787-1212	787-1216	787-1226
Dimensions (in mm)				
Width	54 mm	72 mm	108 mm	144 mm
Total height	56 mm	56 mm	56 mm	56 mm
Height from upper edge of DIN-rail	52.5 mm	52.5 mm	52.5 mm	52.5 mm
Depth	90 mm	90 mm	90 mm	90 mm
Depth incl. fastening clips	120 mm	120 mm	120 mm	120 mm
Weight	210 g	270 g	415 g	510 g
Protection type	IP20	IP20	IP20	IP20

### Note



#### Observe mounting position!

The following electrical data refers to a vertical position (e.g. DIN-rail mount).



Table 11: Electrical Data 787-1202 / 787-1212

	787-1202	787-1212
<b>Input</b>		
Nominal input voltage $U_{IN}$	100 VAC ... 240 VAC	100 VAC ... 240 VAC
Input voltage range	85 VAC ... 264 VAC 125 VDC ... 375 VDC <sup>1)</sup>	85 VAC ... 264 VAC 125 VDC ... 375 VDC <sup>1)</sup>
Input current $I_{IN}$	< 0.6 A	< 1.5 A
Frequency	47 Hz ... 63 Hz	47 Hz ... 63 Hz
Power factor	> 0.5	> 0.5
Leakage current according to EN 60950	< 0.25 mA eff.	< 0.25 mA eff.
Inrush current	< 20 A	< 20 A
Mains failure hold-up time	≥ 70 ms	≥ 60 ms
<b>Output</b>		
Nominal output voltage $U_{OUT}$	24 VDC	24 VDC
Output voltage range	22 VDC ... 26 VDC	22 VDC ... 26 VDC
Output current $I_{OUT}$ $U_{IN} = 100 \text{ VAC} \dots 240 \text{ VAC}$ $U_{IN} = 110 \text{ VAC} \dots 240 \text{ VAC}$	1.3 A 1.3 A	2.0 A 2.5 A
Max. output power $U_{IN} = 100 \text{ VAC} \dots 240 \text{ VAC}$ $U_{IN} = 110 \text{ VAC} \dots 240 \text{ VAC}$	31 W 31 W	48 W 60 W
Default setting	24 VDC	24 VDC
Control deviation	± 1 %	± 1 %
Load regulation	± 1 %	± 1 %
Residual ripple (peak–peak)	≤ 100 mV	≤ 100 mV
Overload behavior	(1.05 ... 1.35) × $I_{OUT}$ : Power limitation; shutdown in the event of a short-circuit and permanent overload	(1.05 ... 1.35) × $I_{OUT}$ : Power limitation; shutdown in the event of a short-circuit and permanent overload
<b>Efficiency/Power Losses</b>		
Efficiency $U_{IN} = 230 \text{ VAC}$ $U_{IN} = 110 \text{ VAC}$	> 87 % > 82 %	> 89 % > 87 %
Power loss $P_V$	0.43 W (at 230 VAC idle mode)	0.6 W (at 230 VAC idle mode)
Max. power loss $P_V$	5.5 W (at 100 VAC and 1.3 ADC)	9 W (at 100 VAC and 2.5 ADC)
<b>Fuse Protection</b>		
Internal fuse	T 1 A / 250 V	T 2 A / 250 V

Table 11: Electrical Data 787-1202 / 787-1212

	<b>787-1202</b>	<b>787-1212</b>
Recommended external fuse	Miniature circuit breaker 6 A (C characteristic), 10 A (B characteristic) or higher. An external DC fuse is required for the DC input voltage.	Miniature circuit breaker 6 A (C characteristic), 10 A (B characteristic) or higher. An external DC fuse is required for the DC input voltage.
<b>Safety and Protection</b>		
Test voltage Primary–Secondary	3 kV AC	3 kV AC
Protection class	II	II
Overvoltage protection	≤ 31 V	≤ 31 V
Short-circuit protected	Yes	Yes
No-load-proof	Yes	Yes
Maximum feedback voltage	35 VDC	35 VDC
Parallel connection	Yes	Yes
Series connection	Yes	Yes
MTBF acc. to IEC 61709	> 700000 h	> 500000 h
<b>General</b>		
Degree of pollution	2 (acc. to EN 50178)	2 (acc. to EN 50178)

<sup>1)</sup> see section “Notes on Operation” > “Derating”

Table 12: Electrical Data 787-1216 / 787-1226

	787-1216	787-1226
<b>Input</b>		
Nominal input voltage $U_{IN}$	100 VAC ... 240 VAC	100 VAC ... 120 VAC 220 VAC ... 240 VAC Selectable by slide switch
Input voltage range	85 VAC ... 264 VAC 125 VDC ... 375 VDC <sup>1)</sup>	90 VAC ... 132 VAC 180 VAC ... 264 VAC 250 VDC ... 375 VDC <sup>1)</sup>
Input current $I_{IN}$	< 2.5 A	< 3.8 A
Frequency	47 Hz ... 63 Hz	47 Hz ... 63 Hz
Power factor	> 0.5	> 0.5
Leakage current according to EN 60950	< 0.25 mA eff.	< 0.25 mA eff.
Inrush current	< 20 A	< 20 A
Mains failure hold-up time	≥ 50 ms	≥ 30 ms
<b>Output</b>		
Nominal output voltage $U_{OUT}$	24 VDC	24 VDC
Output voltage range	22 VDC ... 26 VDC	22 VDC ... 26 VDC
Output current $I_{OUT}$ $U_{IN} = 100 \text{ VAC} \dots 240 \text{ VAC}$ $U_{IN} = 110 \text{ VAC} \dots 240 \text{ VAC}$	3.3 A 4.2 A	4.8 A 6.0 A
Max. output power $U_{IN} = 100 \text{ VAC} \dots 240 \text{ VAC}$ $U_{IN} = 110 \text{ VAC} \dots 240 \text{ VAC}$	77 W 100 W	120 W 150 W
Default setting	24 VDC	24 VDC
Control deviation	± 1 %	± 1 %
Load regulation	± 1 %	± 1 %
Residual ripple (peak–peak)	≤ 100 mV	≤ 100 mV
Overload behavior	(1.05 ... 1.35) × $I_{OUT}$ : Power limitation; shutdown in the event of a short-circuit and permanent overload	(1.05 ... 1.35) × $I_{OUT}$ : Power limitation; shutdown in the event of a short-circuit and permanent overload
<b>Efficiency/Power Losses</b>		
Efficiency $U_{IN} = 230 \text{ VAC}$ $U_{IN} = 110 \text{ VAC}$	> 90 % > 87 %	> 90 % > 89 %
Power loss $P_V$	0.7 W (at 230 VAC idle mode)	0.4 W (at 230 VAC idle mode)
Max. power loss $P_V$	15 W (at 100 VAC and 4.2 ADC)	16.5 W (at 100 VAC and 6 ADC)
<b>Fuse Protection</b>		
Internal fuse	T 3.15 A / 250 V	T 3.15 A / 250 V

Table 12: Electrical Data 787-1216 / 787-1226

	787-1216	787-1226
Recommended external fuse	Miniature circuit breaker 6 A (C characteristic), 10 A (B characteristic) or higher. An external DC fuse is required for the DC input voltage.	Miniature circuit breaker 6 A (C characteristic), 10 A (B characteristic) or higher. An external DC fuse is required for the DC input voltage.
<b>Safety and Protection</b>		
Test voltage Primary–Secondary	3 kV AC	3 kV AC
Protection class	II	II
Overvoltage protection	≤ 31 V	≤ 31 V
Short-circuit protected	Yes	Yes
No-load-proof	Yes	Yes
Maximum feedback voltage	35 VDC	35 VDC
Parallel connection	Yes	Yes
Series connection	Yes	Yes
MTBF acc. to IEC 61709	> 500000 h	> 500000 h
<b>General</b>		
Degree of pollution	2 (acc. to EN 50178)	2 (acc. to EN 50178)

<sup>1)</sup> see section “Notes on Operation” > “Derating”

Table 13: Wiring

	Input Side	Output Side
Connection Technology	Spring pressure connection technology ( <i>picoMAX</i> <sup>®</sup> 5.0)	Spring pressure connection technology ( <i>picoMAX</i> <sup>®</sup> 5.0)
Cross section	0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup> / AWG 24 ... 12	
Strip length	9 mm ... 10 mm / 0.35 in ... 0.39 in	

## NOTICE

### Select conductor cross sections as required for current load!

In the event of a fault, the output current of a power supply can be up to  $2 \times I_{OUT}$ . Only use conductor cross sections designed for this current load.

Table 14: Environmental Conditions

Ambient operating temperature $T_A$	-25 °C ... +70 °C <sup>1)</sup>
Storage temperature	-40 °C ... +85 °C
Relative humidity	10 % ... 95 %
Climatic category	3K3 (acc. to EN 60721, except for low air pressure)
Elevation above sea level	≤ 2000 m

<sup>1)</sup> see section “Notes on Operation” > “Derating”

Table 15: Mounting

Mounting options	<ul style="list-style-type: none"> <li>• on DIN 35 rail</li> <li>• Screw mount with fastening clips (supplied)</li> </ul>
Vertical mounting (front panel front) Distance top/bottom/front Distance left/right	70 mm 0 mm
Horizontal mounting (front panel top) Distance front/bottom/top Distance left/right	70 mm 20 mm
Horizontal mounting (front panel bottom) Distance front/back/bottom Distance left/right	70 mm 20 mm

Other mounting positions on request

## Note



### Observe for long-term storage!

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

## 3.7 Approvals

The following approvals and conformities have been issued for the devices 787-1202 / -1212 / -1216 / -1226:

 Conformity Marking

 cUL<sub>US</sub>                      UL 60950

The following approvals are pending for the devices 787-1202 / -1212 / -1216 / -1226:

 cUL<sub>US</sub>                      UL508

### 3.8 Standards and Guidelines

The devices 787-1202 / -1212 / -1216 / -1226 comply with the following standards and directives:

Table 16: Mechanical and Climatic Environmental Conditions

Standard	Test value
<b>Mechanical environmental conditions</b>	
EN 60068-2-6	f < 9 Hz: 3.5 mm, 90 min 9 Hz < f < 150 Hz: 2g, 90 min
IEC 60068-2-27 shock	15g, 11 ms, 1000 shocks per axis and direction, half-sine
EN 61131-2, section 4.3	Free fall ≤ 1000 mm (in transport packaging)
<b>Climatic environmental conditions</b>	
EN 60870-2-2	3K3 (except for low air pressure)

Table 17: Other General Standards

Standard	Title
<b>Electrical safety</b>	
EN 60950-1	Information Technology Equipment – Safety
EN 60335-1	Household and Similar Electrical Appliances – Safety

The devices 787-1202 / -1212 / -1216 / -1226 comply with the following EMC standards:

Table 18: EMC – Immunity to Interference

Standard	Test value			
<b>Electrostatic discharge</b>				
• EN 61000-4-2	6 kV (contact discharge) 8 kV (air discharge)			
<b>High-frequency electromagnetic fields</b>				
• EN 61000-4-3 + A1 + A2	10 V/m (0.08 GHz ... 1 GHz) Criterion A			
<b>Fast electrical transient disturbances/burst</b>				
• EN 61000-4-4	±2 kV, 5 kHz, 5 min, direct coupling Criterion A (±1 %)			
<b>Surge voltage/surge</b>				
• EN 61000-4-5	Input (L-N): 1 kV, 2 Ohm, 18 µF, Differential Mode Output (+ -) : 0.5 kV, 2 Ohm, 18 µF, Differential Mode			
<b>Conducted disturbances, induced by high-frequency fields</b>				
• EN 61000-4-6	10 V (0.15 MHz ... 80 MHz) Criterion B (±10 %)			
<b>Magnetic fields with electrical frequencies</b>				
• EN 61000-4-8	30 A/m			
<b>Voltage dips, AC input voltage</b>				
• EN 61000-4-11	Test level % $U_T$ *	Voltage drop % $U_T$ *	Duration (in periods)	Criterion
	0	100	1	B
	40	60	10	C
	70	30	25	C
<b>Voltage interruptions, AC input voltage</b>				
• EN 61000-4-11	Test level % $U_T$ *	Voltage drop % $U_T$ *	Duration (in periods)	Criterion
	0	100	250	C

\*  $U_T$  = minimum value of the input voltage range (see section “Device Description” > “Technical Data”).



Table 19: EMC – Emission of Interference

Standard	Test value <sup>1)</sup>
<b>Emission – enclosure</b>	
• EN 61004-3 Class B	40 dB(μV/m), QP, 30 MHz ... 230 MHz 47 dB(μV/m), QP, 230 MHz ... 1 GHz
<b>Conducted emission – line connection AC voltage</b>	
• EN 61204-3 Class B • EN 55022 Class B	66 dBμV ... 56 dBμV, QP, 150 kHz ... 500 kHz 56 dBμV ... 46 dBμV, AV, 150 kHz ... 500 kHz 56 dBμV, QP, 500 kHz ... 5 MHz 46 dBμV, AV, 500 kHz ... 5 MHz 60 dBμV, QP, 5 MHz ... 30 MHz 50 dBμV, AV, 5 MHz ... 30 MHz
• EN 61000-6-4 + A1 • EN 55011 + A1 Class A	79 dBμV, QP, 150 kHz ... 500 kHz 66 dBμV, AV, 150 kHz ... 500 kHz 73 dBμV, QP, 500 kHz ... 30 MHz 60 dBμV, AV, 500 kHz ... 30 MHz

<sup>1)</sup> QP = Quasi Peak Detector; AV = Average Detector

### 3.9 Other Information on Standards and Directives

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 BGV A2) and accepted technical regulations.
- This electrical equipment 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 the machine complies with the requirements of machinery directive EN 60204.
- Commencing normal operation is only allowed under compliance of the EMC directive.
- The manufacturer of the system or machine is responsible for ensuring compliance with the limit values required by EMC legislation.

## 4 Mounting



### NOTICE

#### Avoid electrostatic discharge!

The devices 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 devices, please ensure that environmental factors (personnel, work space and packaging) are properly grounded.

### 4.1 Mounting Positions

Install the device vertically to ensure proper heat dissipation (ventilation slots above and below).

The following values should not be exceeded when installing with the front panel at the top or bottom:

Table 20: Values for Mounting Position – Mounting with Front Panel at Top or Bottom

Device	Output power	Ambient operating temperature
787-1202	50 %	55 °C
787-1212	50 %	55 °C
787-1216	50 %	55 °C
787-1226	40 %	55 °C

Other mounting positions should only be used at one's own risk!



### Note

#### Observe minimum distances!

Observe the specified minimum distances to prevent functional faults (see section "Device Description" > "Technical Data").

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

## 4.2 DIN 35 Rail

The DIN-rail is centrally located relative to the depth of the device (see Section “Device Description” > “Technical Data”).

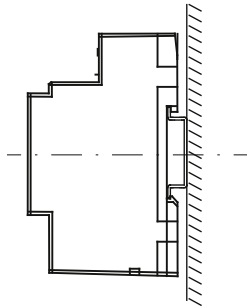


Figure 12: Position of the DIN-Rail

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

### 4.2.1 DIN-Rail Mounting

Install the device in accordance with EN 60715 by snapping it onto DIN-rail without tools:

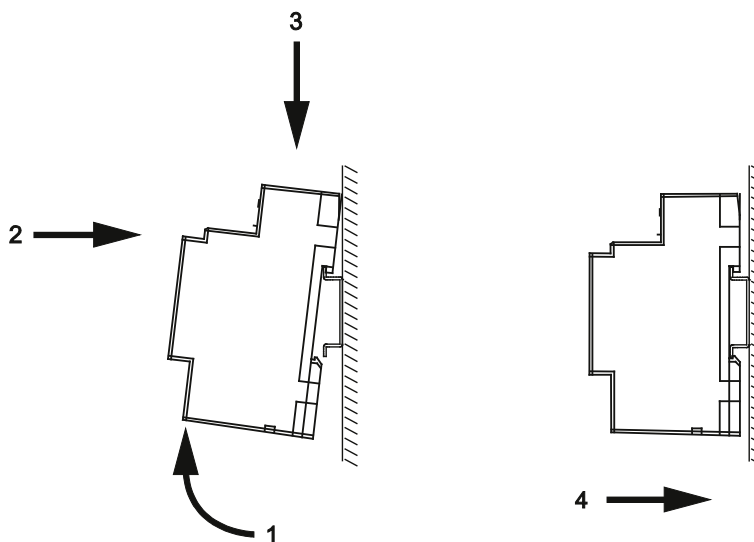


Figure 13: Mounting the Device on DIN-Rail

1. Tilt the device slightly.
2. Place the device with its DIN-rail guide on the top edge of the DIN-rail.
3. Press the device onto the DIN-rail.
4. Press it against the bottom fastener until you hear it lock into place.

If the device does not lock into place automatically, pull down the DIN-rail mounting/removal latch with a screwdriver or operating tool while pressing the device onto the bottom fastener.

5. Gently shake the device 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 device (with a block arrangement: on either side of the devices).

#### 4.2.2 Removal from DIN-Rail

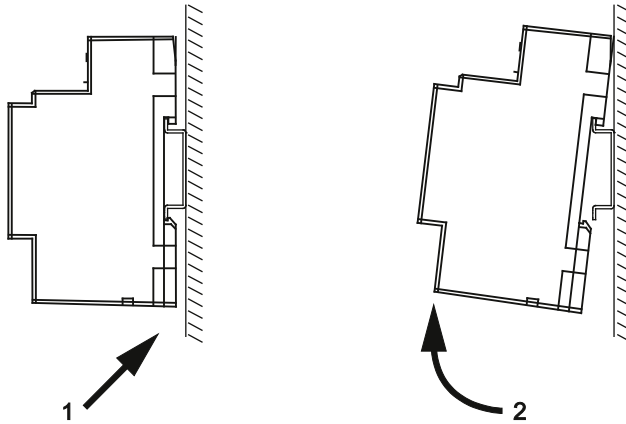


Figure 14: Removing the Device from DIN-Rail

1. To remove the device, pull down the DIN-rail mount/removal latch using a screwdriver or an operating tool to unhook the device.
2. Tilt the device forward and unhook it from the DIN-rail.

### 4.3 Screw Mounting

Fastening clips are supplied with the device for screw mounting. These fastening clips allow the following fastening positions:

Table 21: Fastening Options for Screw Mounting

Device	Number of Fastening Clips	Rear Fastening	Side Fastening
787-1202	2	X	X
787-1212	2	X	X
787-1216	2	X	--
787-1226	4	X	--

1. Insert one fastening clip into each of the corresponding top and bottom snap-fit openings on the housing (see figures “Snap-fit Openings for Fastening Clips,” views from the top and bottom).

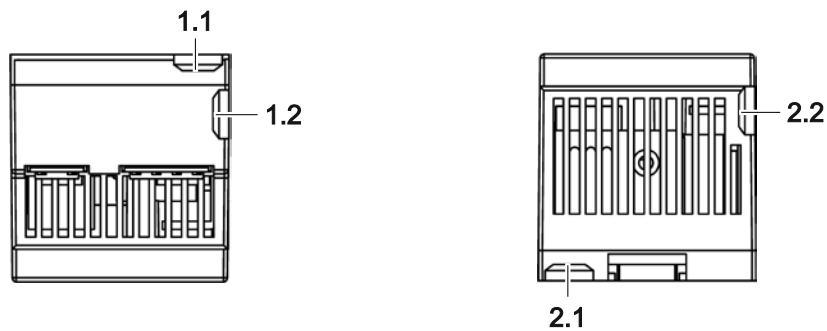


Figure 15: Snap-fit Openings for Fastening Clips (787-1202 / 787-1212)

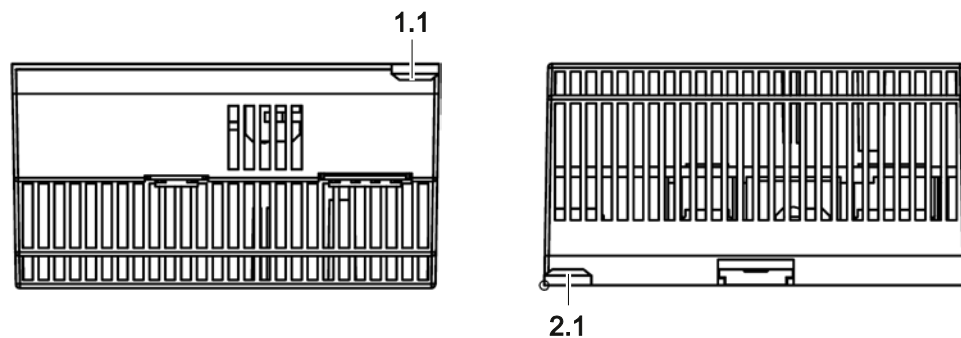


Figure 16: Snap-fit Openings for Fastening Clips (787-1216 / 787-1226)

Table 22: Legend for Figures “Snap-fit Openings for Fastening Clips”

Pos.	Description
1.1	Snap-fit opening top; rear fastening
1.2	Snap-fit opening top; side fastening
2.1	Snap-fit opening bottom; rear fastening
2.2	Snap-fit opening bottom; side fastening

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 device with the appropriate M4 screws (not included).  
Observe the maximum torque of 2.9 Nm.

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

## 5 Connect Devices



### DANGER

**Do not work when devices are energized!**

High voltage can cause electric shock or burns.

Switch off all power to the device prior to performing any installation, repair or maintenance work.



### Information

**Additional Information on the Recommended Tools**

Additional information on the WAGO tools recommended in this section is provided in the section “Accessories” > “Tools”.

Observe the maximum admissible conductor cross sections for the signal and power cables (see section “Device Description” > “Technical Data”).

Check the appropriate operating voltage before connecting equipment (see type plate).

### 5.1 Connectors

The supply lines are connected on the input or primary side and on the output or secondary side with WAGO's 2092 Series *picoMAX*® pluggable connectors (see section “Device Description” > “Connections”):

Table 23: Connectors

	Input Side	Output Side
WAGO connector	<i>picoMAX</i> ® 5.0	<i>picoMAX</i> ® 5.0
Termination	three-pole: “L”, “N” and “PE”	four-pole: twice each “+” and “-”

#### 5.1.1 Connecting Conductors

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



### 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!

### 5.1.1.1 Connecting Using a Tool

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

- Fine-stranded conductors without ferrules
- Fine-stranded conductors with uninsulated ferrule, cross section  $\leq 0.5 \text{ mm}^2/\text{AWG } 22$

Proceed as follows:

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

### 5.1.1.2 Directly Inserting Conductors

The following conductors can be inserted directly without tools:

- Fine-stranded conductors with insulated ferrules for all permissible cross sections
- Fine-stranded conductors with uninsulated ferrules, 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*® Connectors

WAGO's *picoMAX*® pluggable connectors enable you to prewire devices to expedite device installation and avoid rewiring during device replacement.

The procedure for removal and connection is the same for both WAGO plug connectors.

WAGO *picoMAX*® connectors consist of a male header (fixed in the device) and a female connector (pluggable).

Additional information on *picoMAX*® is available in the catalog "*picoMAX*® – The Pluggable Connection System" or online at [www.wago.com](http://www.wago.com).

### 5.1.2.1 Status at delivery

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



### 5.1.2.2 Removing the Female Connector

WAGO recommends using a *picoMAX*® unlocking tool (referred to in the following text as the “unlocking tool”). Further information on the unlocking tool is provided in the Section “Accessories” > “Tools”.

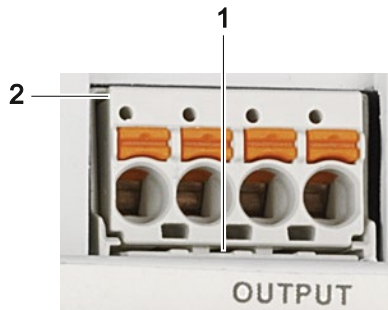


Figure 17: Removing the Female Connector without Wiring (Application Example)

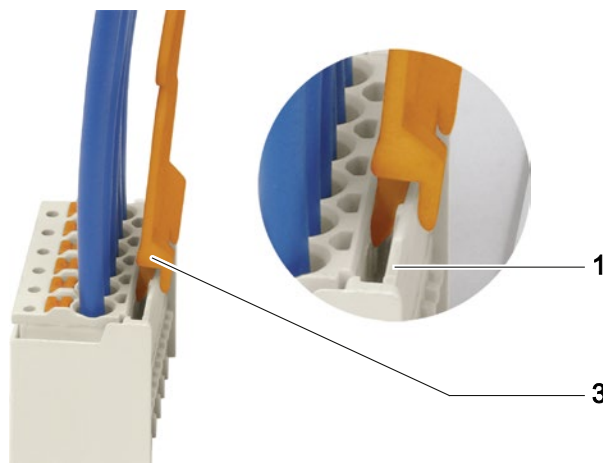


Figure 18: Removing the Female Connector with Wiring (Application Example)

Table 24: Legend for Figures “Removing the Female Connector ...”

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

#### 5.1.2.2.1 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.  
Wedge opens locking latches (also see the figure “Removing the female connector with wiring”).
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 the tool in 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 actuation tool, ensure correct positioning between the locking latch and the female connector!

---

Proceed as follows:

1. Push the locking latch (1) away from the female connector using the screwdriver or operating tool.
2. Grip underneath the protruding rim of the female connector (2).
3. Pull out the female connector.

#### 5.1.2.2.2 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.  
Wedge opens locking latches.
3. Pull out the unlocking tool together with the cables and 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 the tool in 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 actuation 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.

### 5.1.2.3 Plugging in the Female Connector



## DANGER

**Make sure that the *picoMAX*® Female Connectors are mated properly!**  
Mismating the input female connector into the output connector may lead to a hazardous voltage of 230 V on the output side.  
Make sure that 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:  
The orange push-buttons must point outward from the device.

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

## 6 Notes on Operation



### Note

#### Observe minimum distances!

Cooling of the equipment shall not be impaired. Ensure air can flow freely and that the minimum distances from adjacent components/areas adheres to the guidelines in the table “Distances.”

Table 25: Distances \*

Vertical mounting (front panel forward)	
Distance top/bottom/front	70 mm
Distance left/right	0 mm
Horizontal mounting (front panel top)	
Distance front/bottom/top	70 mm
Distance left/right	20 mm
Horizontal mounting (front panel bottom)	
Distance front/back/bottom	70 mm
Distance left/right	20 mm

\* Other mounting positions on request

Depending on the operating mode, audible noise may develop.

### 6.1 Front Panel

The 787-1202 / -1212 / -1216 / -1226 devices are provided with a front panel as a cover. This panel is removable depending on the device:

Table 26: Front Panel

Device	Removable	Not Removable
787-1202	X	
787-1212	X	
787-1216		X
787-1226		X

The following warning must be observed when using the device as a DIN-rail built-in installation device per DIN 43880!



## DANGER

### **Ensure contact protection when used as a DIN-rail built-in installation device!**

When used as a DIN-rail built-in installation device according to DIN 43880 (domestic installation), the electrical installer must provide appropriate contact protection.

For 787-1202 and 787-1212 only:

Only use the device as a DIN-rail built-in installation device with the front panel fitted.

## 6.2 Inrush Current

If several devices 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 during startup, is recommended (see Figure “Delayed Switching of Power Supply Units”).

The maximum number of devices connected to a circuit in parallel depends on the amount of leakage current. According to EN 60950, this total value must not exceed the maximum value of 3.5 mA.

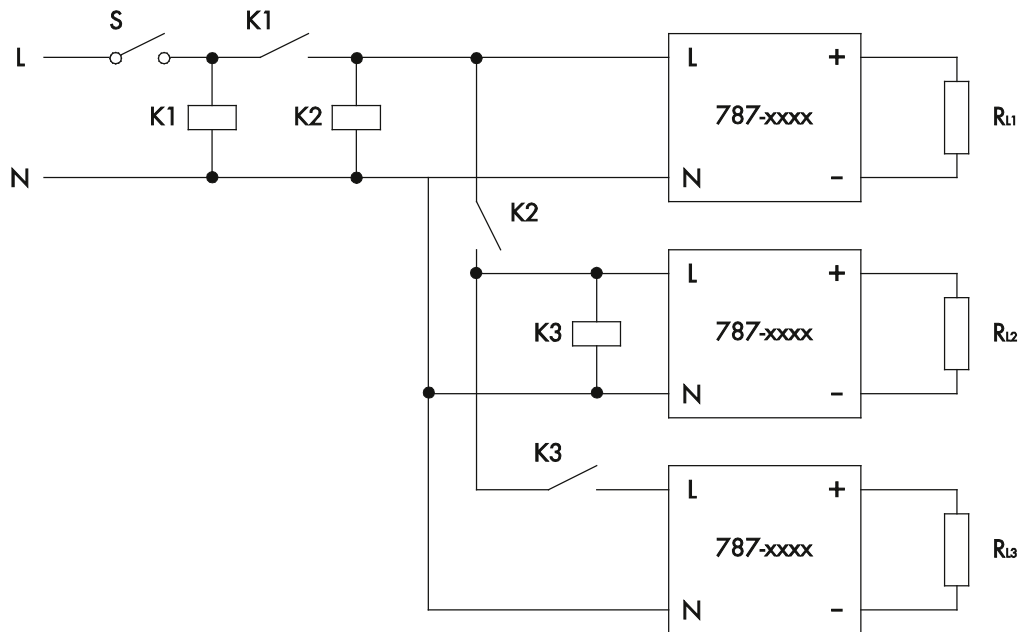


Figure 19: Delayed Switching of Power Supply Units

## 6.3 Parallel Connection (Output Side)

In parallel operation, set the output voltage of the devices that will be connected in parallel as precisely as possible to the same value. The resistance of the conductors between the power supply units and the load must be virtually the same. Only connect devices of the same type in parallel.

Please use external rail-mounted terminal blocks when connecting in parallel. A parallel connection directly on the connectors of the device's secondary side is not allowed.

For decoupling the outputs in parallel mode, the use of diodes in the positive path is recommended. These diodes must be configured for the device's maximum output current.

## 6.4 Short-Circuit and Overload Behavior

The equipment's output is electronically protected from overload and short-circuits.

The following values apply to the description below:

- $I_{OUT}$  output current (see section “Device Description” > “Technical Data”)
- $I_{OUT(act)}$  actual output current
- $U_{OUT}$  output voltage (see section “Device Description” > “Technical Data”)

The output voltage  $U_{OUT}$  is reduced if the output current  $I_{OUT(act)}$  is in the range  $1.05 \times I_{OUT} < I_{OUT(act)} < 1.35 \times I_{OUT}$  (see figure “Output characteristic”).

In the event of a short-circuit ( $I_{OUT(act)} > 1.4 \times I_{OUT}$ ), the output voltage  $U_{OUT}$  is switched off. The device checks whether the short-circuit is still present through the cyclical re-activation of the output voltage.

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

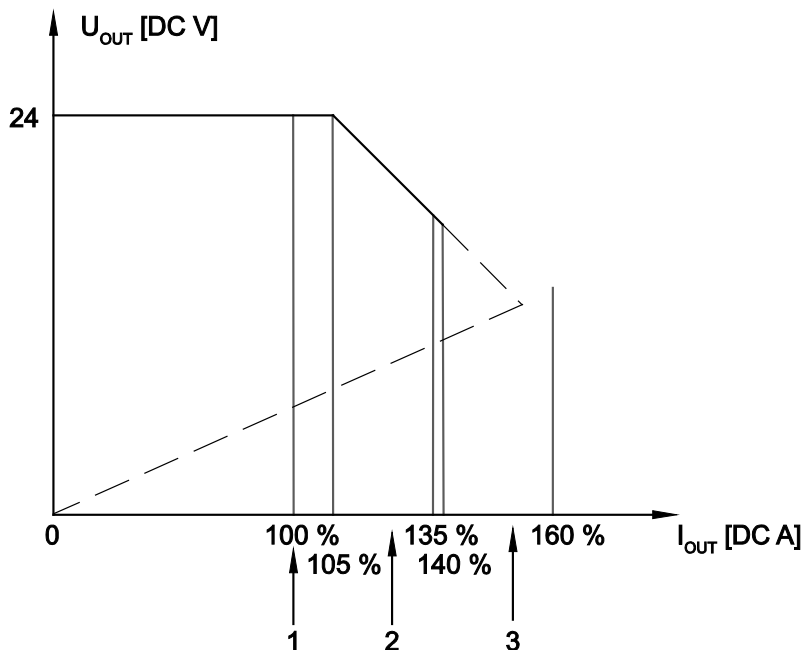


Figure 20: Output Characteristic



Table 27: Legend for Figure “Output Characteristic”

<b>Pos.</b>	<b>Description</b>
1	$I_{OUT(Act)}$ normal
2	Overload mode ( $1.05 \times I_{OUT} < I_{OUT(Act)} < 1.35 \times I_{OUT}$ ); Constant power mode
3	Short-circuit protection ( $1.40 \times I_{OUT} < I_{OUT(Act)} < 1.60 \times I_{OUT}$ ); Hiccup mode

## 6.5 Derating

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

Table 28: Performance Data According to UL

	787-1202	787-1212	787-1216	787-1226
$U_{IN}$	100 VAC ... 240 VAC			
$P_{OUT}$ 100 VAC ... 240 VAC	31 W	48 W	48 W	48 W
110 VAC ... 240 VAC		60 W	60 W	60 W
$T_A$	+55 °C			

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

Table 29: Deratings

Input voltages $U_{IN}$	Derating	See figure
$U_{IN} < 140$ VDC	-1,33 %/V	“Input voltage load characteristic” > “Input voltage [DC V]”
$U_{IN} < 100$ VAC	-2 %/V	“Input voltage load characteristic” > “Input voltage [AC V] / 50 Hz”
$T_A > +55$ °C	-2.66 %/K	“Temperature load characteristic”

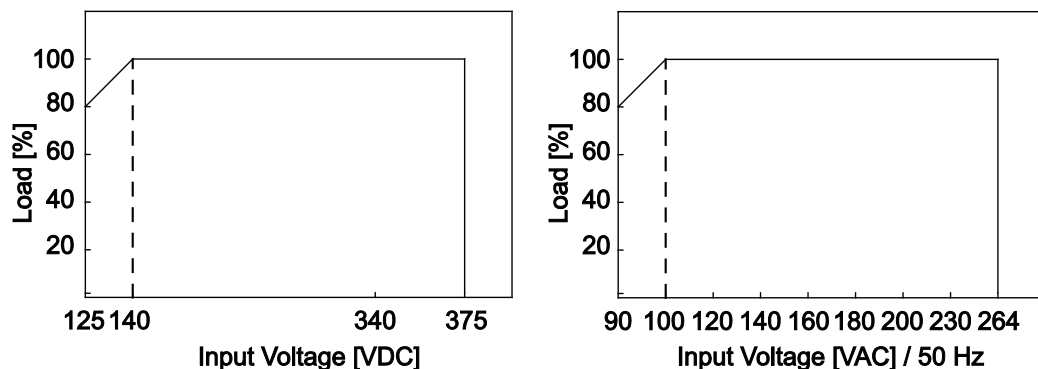


Figure 21: Input Voltage Load Characteristic

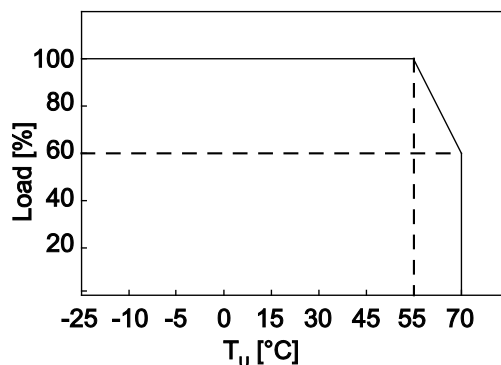


Figure 22: Temperature Load Characteristic

## 6.6 Maintenance

Electrical equipment does not require special maintenance; however, depending on the degree of protection, it must be protected from dust accumulation, moisture, radiation and aggressive chemicals.

Repairs shall only occur within the scope of the measures outlined in these operating instructions. Should a fault occur, return the device to WAGO for repair. Provide the following information:

- Type of fault
- Circumstances (operating conditions, input wiring)
- Your estimation as to the fault's cause
- Previous instances of unusual operation, etc.

---

### Note



#### **Observe for long-term storage!**

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

---

## 6.7 Disposal

Please observe current regulations.

---

### Note



#### **Do not dispose of in household garbage!**

This device must not be disposed of in the household garbage!  
The devices must be collected separately (e.g., via appropriate collection sites).

---

Dispose of equipment according to material composition, e.g., electronic scrap (circuit boards), plastic, sheet metal, copper, etc.

## 7 Accessories

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

### 7.1 Tools

Only use insulated tools.

Table 30: Accessories – Tools

<i>picoMAX</i> <sup>®</sup> unlocking tool		2092-1630
Operating tool with partially insulated shaft	Type 2, 3.5 × 0.5 mm blade	210-720
Operating tool	Phillips PH0	210-769

### 7.2 Spare Parts for Wiring

The following spare parts are available for wiring:

Table 31: Accessories – Wiring Spare Parts

<i>picoMAX</i> <sup>®</sup> 5.0 female connector, three-pole	2092-1123/0000-9500
<i>picoMAX</i> <sup>®</sup> 5.0 female connector, four-pole	2092-1124/0000-9504

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