TECHDOCS

Manual

Compact Power

787-1211

DC power supply, 12 V

Version 1.1.0

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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 787-1211 power supply.

1.2 Copyright

1.3 Symbols

⚠ 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.

Information

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

1.4 Number Notation

Table 1: 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 2: Font Conventions

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

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. 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 EN 50110-1/-2 and IEC 60364.

2.1.3 Use of the 787 Series in Compliance with Underlying Provisions

The 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:

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.

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.

DANGER

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

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.

CAUTION

Do not touch hot surfaces!
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.

NOTICE

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

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.

NOTICE

Replace defective or damaged devices!
Replace defective or damaged device/module (e.g., in the event of deformed contacts).

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.

NOTICE

Clean only with permitted materials!
Clean housing and soiled contacts with propanol.

NOTICE

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

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.

This product may only be used as described in this note and in the complete instructions. Use other than this may represent a risk to safe, intended use and will nullify the warranty or guarantee. WAGO Kontakttechnik GmbH & Co. KG is not liable for damage resulting from non-intended or improper use.

2.2.1 Special Notes for Use in Accordance to EN 60335-1

The following additional information must be observed when using the device in accordance to EN 60335-1:

- 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 openings 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.

3 Device Description

The **Compact Power** Series are compact 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 60335-1.

The power supply units can be fitted on a DIN-rail. Screw mounting using the fastening clips supplied with the device is also a possible alternative. In this way, devices 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 devices employ pluggable WAGO *picoMAX*® connectors, enabling them to be pre-wired for quicker installation and faster device replacement.

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

3.1 View

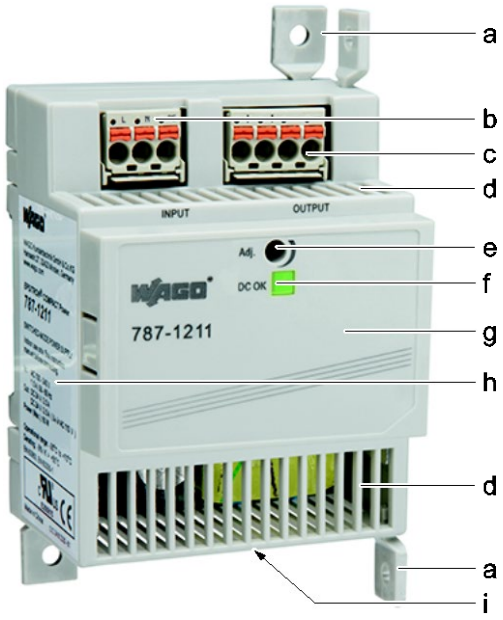

Figure 1: View

Table 3: Legend for Figure “View”

Pos.	Description	Details see section
a	Screw mount clip	“Mounting” > “Screw Mounting”
b	Input *picoMAX*® 5.0 (L N PE)	“Device Description” > “Connections”
c	Output *picoMAX*® 5.0 (+ + − −)	“Device Description” > “Connections”
d	Ventilation slots	---
e	Potentiometer for setting the output voltage	“Device Description” > “Operating Elements”
f	LED indicator	“Device Description” > “Display Elements”
g	Front panel (removable)	“Notes on Operation” > “Front Panel”
h	Type plate	“Device Description” > “Type Plate”
i	Mount/removal latch on a DIN-rail	“Mounting” > “DIN-Rail”

3.2 Type Plate

The device type plate 787-1211 is located on the side of the housing:

They contain the following information:

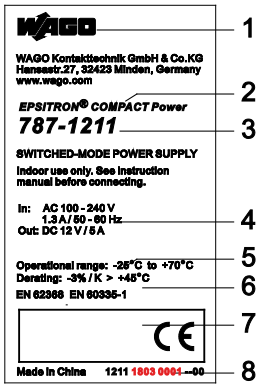

Figure 2: Information on the Type Plate

Table 4: 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	Surrounding air 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*® pluggable connectors:

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

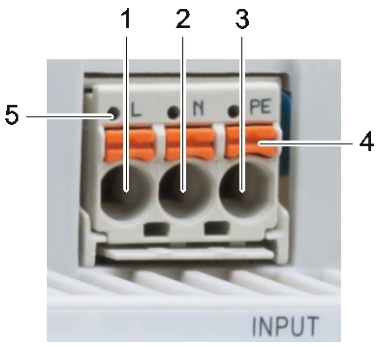

Figure 3: Connectors on the Input Side

Table 5: 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

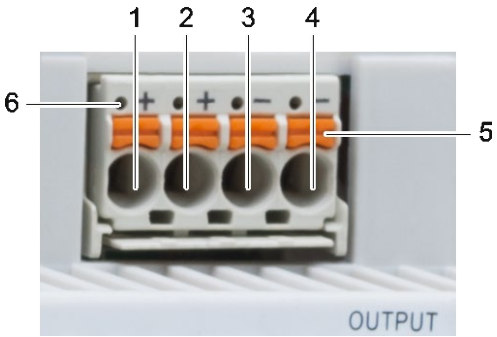

Figure 4: Connectors on the Output Side

Table 6: 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 indicating elements are located on the front of the device.

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

Figure 5: LED “DC OK”

Table 7: Legend for Figure “LED ‚DC OK‘”

LED	Color	Status	Explanation
DC OK	Green	ON	Switch-on threshold; Output voltage > 9 VDC

3.5 Operating Elements

3.5.1 Potentiometer

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

Figure 6: Potentiometer

The potentiometer can be used to set the output voltage between 10 … 14 VDC:

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

3.6 Technical Data

3.6.1 Device Data

Table 8: Technical Data – Device Data

Width	72 mm
Height	90 mm
Height, incl. fastening clips	120 mm
Depth	56 mm
Depth without front panel	48 mm
Depth from upper edge of DIN-rail	52.5 mm
Weight	270 g
Protection type	IP20

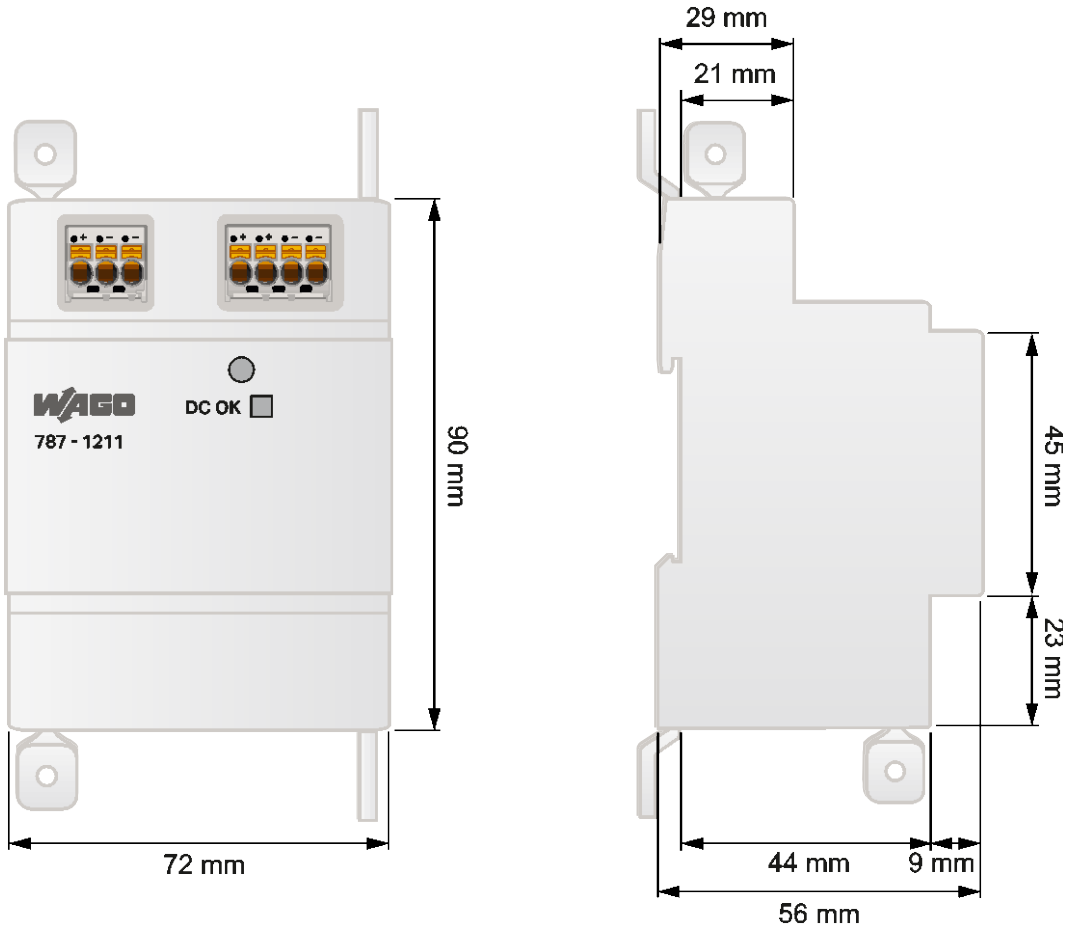

Figure 7: Dimensions

Table 9: Minimum distances

Mounting position	Front side	Distances					
		Front	Rear	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

Other mounting positions on request

Note

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

3.6.2 Input

Table 10: Technical Data – AC Input

Parameters		Value
Input nominal voltage range		100 … 240 VAC
Input voltage range, max.		85 … 264 VAC
Input frequency (max)		47 … 63 Hz
Network forms		TN, TT and IT networks
Input current [1]	100 VAC	< 1.0 A
Power factor [1]	230 VAC	> 0.5

[1] At nominal load

Table 11: Technical Data – DC Input

Parameters		Value
Input nominal voltage range		140 … 340 VDC
Input voltage range, max.		125 … 375 VDC
Input current [1]	125 VDC	< 0.6 A
	220 VDC	< 0.35 A

[1] At nominal load

Table 12: Technical Data – Inrush Current

Parameters		Value
Inrush current [1][2]	230 VAC	< 30 A

[1] Cold start, at room temperature of 25 °C
[2] After 1 ms at nominal load

Table 13: Technical Data – Mains Failure Buffering Time

Parameters		Value
Mains failure buffering time, typ. [1]	110 VAC	> 12 ms
	230 VAC	> 60 ms
Holding time, typ. [1]	110 VAC	> 12 ms
	230 VAC	> 60 ms

[1] At nominal load

Table 14: Technical Data – Input Side Connection

Property		Value
Connection technology		Spring pressure connection technology (*picoMAX*® 5.0, 3-pole)
Cross section	Solid	0.2 … 2.5 mm² / AWG 24 … 12
	Fine-stranded	0.2 … 2.5 mm² / AWG 24 … 12
	Insulated ferrule	0.25 … 1.5 mm² / AWG 23 … 16
	Uninsulated ferrule	0.25 … 2.5 mm² / AWG 23 … 12
Strip length		9 … 10 mm / 0.35 … 0.39 inch
Recommended tools (conductor termination)		Operating tool, Type 1 (see Section “Accessories”)

3.6.3 Output

Table 15: Technical Data – Output

Parameters		Value
Output voltage		12 VDC (at 90 … 264 VAC), SELV
Voltage range, output		10 … 14 VDC
Factory default		12 VDC; ±1 %
Output current (max.)		5 A (at 100 … 240 VAC)
Rated power, output		60 W
Power factor [1]		> 0.5
Capacitive load (max.) [1]		≥ 50000 µF
Voltage variation		±1 % (at 100 … 240 VAC)
Derating of output power		Refer to Section “Derating” for high ambient temperatures
System regulation [1]		±1 %
Load regulation [2]		±1 %
Residual ripple/Noise		< 200 mV (at 100 … 240 VAC)
Overload behavior [3]		> 6 A (120 %) constant output
		> 8.5 A (170 %) Hiccup mode [4]
Hiccup mode [4]	t_{on}	100 ms
	t_{off}	350 ms
Switch-on delay [5]	110 VAC	< 1 s [1]
	230 VAC	< 1 s [1]

[1] At nominal load
[2] 0 % / 100 % load step
[3] See Figure “Overload Behavior”
[4] See Figure “Hiccup Mode”
[5] See Figure “Switch-on Time”

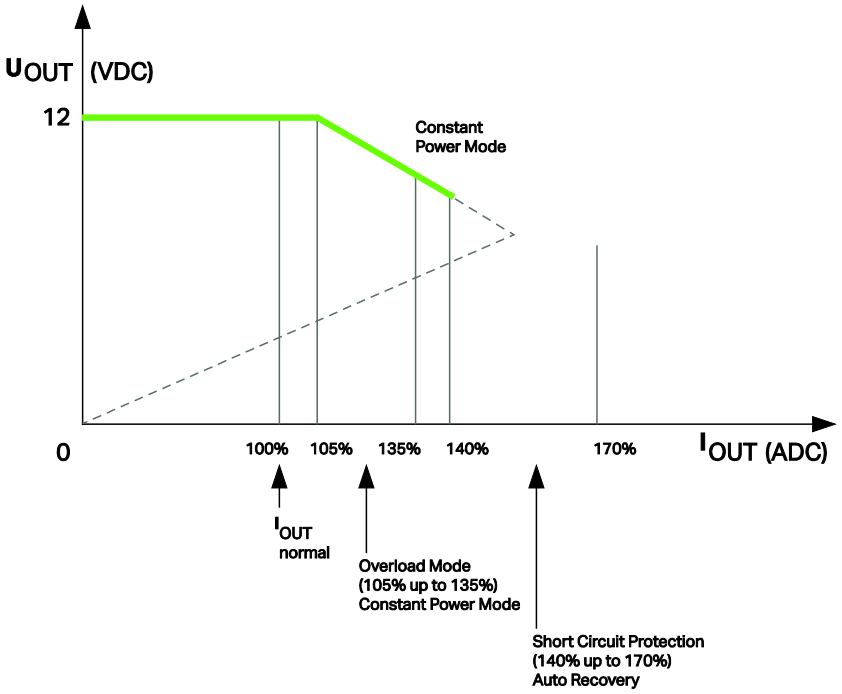

Figure 8: Overload Behavior

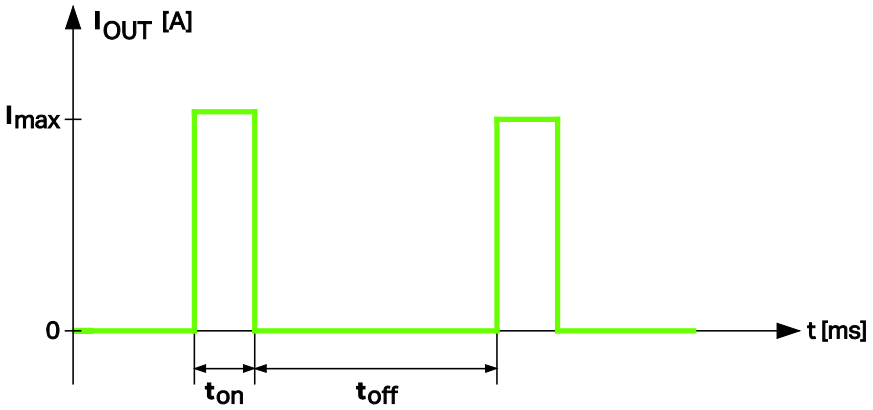

Figure 9: Hiccup Mode

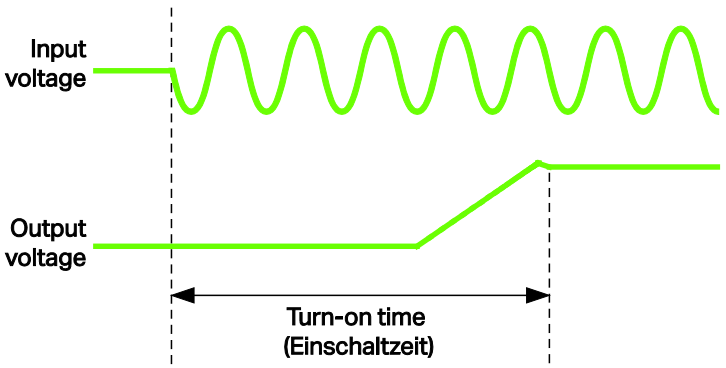

Figure 10: Turn-on Time

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 1.5 × I_{OUT}.
Only use conductor cross sections designed for this current load!

Table 16: Technical Data – Output Side Connection

Property		Value
Connection technology		Spring pressure connection technology (*picoMAX*® 5.0, 4-pole)
Cross section	Solid	0.2 … 2.5 mm² / AWG 24 … 12
	Fine-stranded	0.2 … 2.5 mm² / AWG 24 … 12
	Insulated ferrule	0.25 … 1.5 mm² / AWG 23 … 16
	Uninsulated ferrule	0.25 … 2.5 mm² / AWG 23 … 12
Strip Length		9 … 10 mm / 0.35 … 0.39 inch
Recommended tools (conductor termination)		Operating tool, Type 1 (see Section “Accessories”)

3.6.4 Efficiency/Power Loss

Table 17: Technical Data – Efficiency/Power Loss

Parameters		Value
Efficiency [1]	110 VAC	≥ 87.5 %
	230 VAC	≥ 88.5 %
Power loss [1]	110 VAC	≤ 8.6 W
	230 VAC	≤ 7.4 W

[1] At nominal load

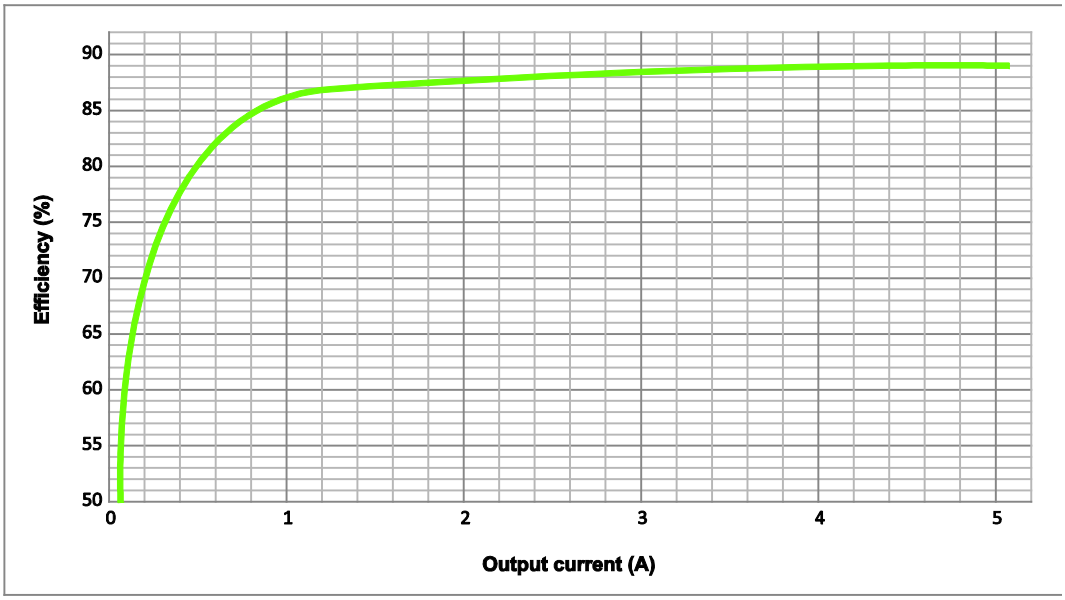

Figure 11: Efficiency at 230 VAC

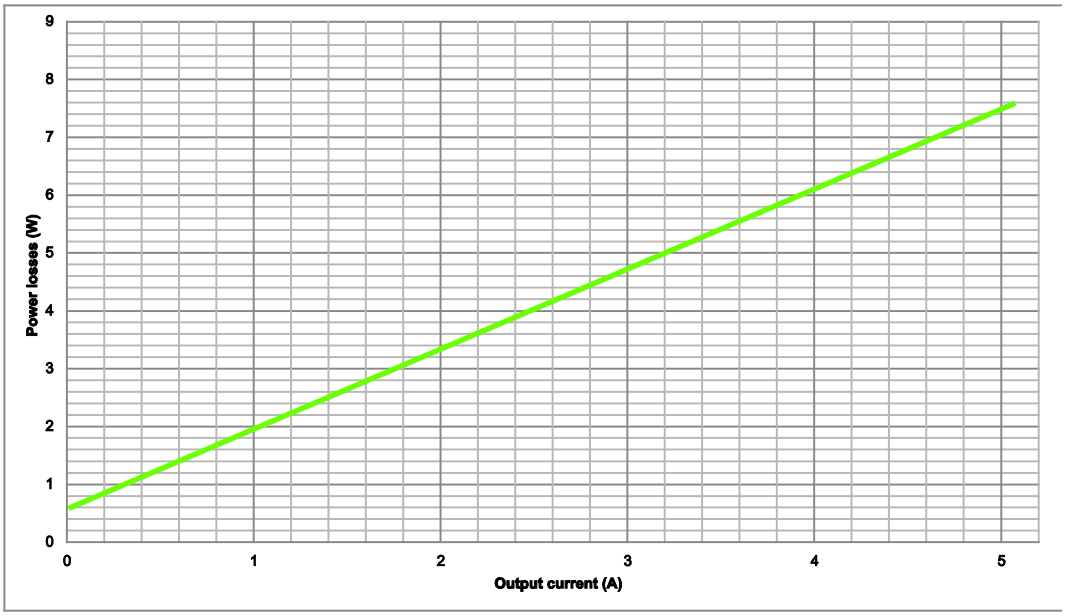

Figure 12: Power Loss at 230 VAC

3.6.5 MTBF/Lifespan

Table 18: Technical Data – MTBF/Lifespan

Property	At	Nominal Load	T_{amb}	Value
MTBF, typ. (IEC 61709)	240 VAC	100 %	25 °C	> 450000 h
		100 %	40 °C	> 210000 h

3.6.6 Environmental Conditions

Table 19: Technical Data – Environmental Conditions

Parameter		Value
Surrounding air temperature, operation		−25 … +70 °C
Derating (surrounding air temperature, operation > 45 °C)	90 VAC	−3 %/K [1)2)]
	230 VAC	−2.3 %/K [1)3)]
Relative humidity, operation (without condensation)		20 … 90 %
Surrounding air temperature, storage		−40 … +85 °C
Relative humidity, storage		10 … 95 %
Temperature coefficient		≤ ±0.03 %/K (at 12 V)
Operating altitude, 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 Hz: 3.5 mm, 90 min
Shock according to IEC 60068-2-27		15g / 11 ms
Pollution degree according to IEC/EN 60664-1		2
Climatic category		3K3
LBS freedom [4)]		Yes
RoHS II/Reach		Yes

1) See Figure “Derating – Surrounding Air Temperature”
2) Surrounding air temperature, operation > 45 °C
3) Surrounding air temperature, operation > 50 °C
4) LBS = Paint-wetting impairment substances
The materials used in manufacturing do not contain any substances harmful to the wetting properties of lacquers.

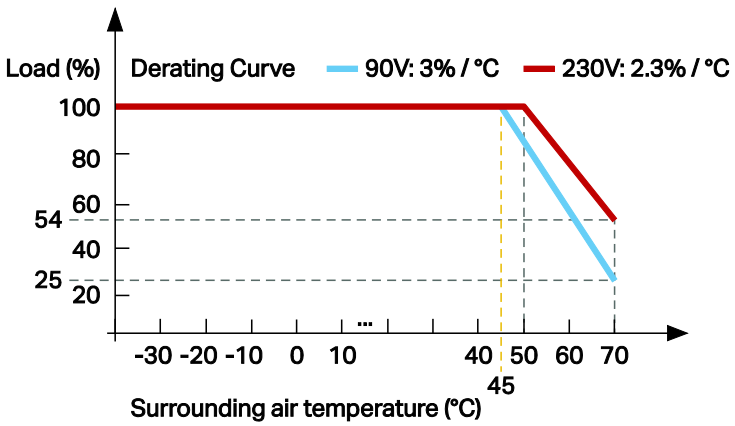

Figure 13: Derating – Surrounding Air Temperature

Note

Observe 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.

3.6.7 Equipment Protection

Table 20: Technical Data – Equipment Protection

Property	Value
Internal input fuse [1]	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. [2]	16 … 20 VDC
Feedback voltage, max. [3]	Yes, max. 16 VDC
Protection type	IP20
Ingress protection against foreign objects	> 5 mm
Overtemperature protection [4]	Yes
Short circuit protection [4]	Yes

[1] Used only as an AC fuse.
An external DC fuse must be used with DC supply (see Section “Accessories”).
[2] Internal limitation using a second control loop, deactivation of power supply, automatic restart
[3] The user must ensure that the voltage is not exceeded for power feedback.
[4] Shutdown, automatic restart

3.6.8 Safety

Table 21: Technical Data – Safety

Property	Value
Safety Transformer	According to EN 61558-2-16
Input and output insulation, acc. EN 60335-1	SELV/PELV
Protection class, with protective wire connection	I
Discharge current, typ. [1)]	≤ 0.25 mA
Insulation resistance, input to output, min. [2)]	≥ 100 MΩ/500 VDC
Dielectric strength (input – output) [3)]	3000 VAC

[1)] At 230 VAC
[2)] At 25 °C and 75 % RH
[3)] Type testing / 60 s

3.7 Approvals

The following approvals and declarations of conformity have been granted for the 787-1211 device:


Conformity Marking


UL508 / UL62368-1

3.8 Standards and Guidelines

The 787-1211 device complies with the following standards and guidelines:

Table 22: Mechanical and Climatic Environmental Conditions

Standard	Test value
Mechanical Environmental Conditions	
EN 60068-2-6	1g: f < 9 Hz: 3.5 mm, 90 min 2g: f < 9 Hz
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)
Climatic Environmental Conditions	
EN 60870-2-2	3K3 (except for low air pressure)

Table 23: Other General Standards

Standard	Title
Electrical safety	
EN 62368-1	Audio/Video, information and communication technology equipment
EN 60335-1	Safety of Household Appliances and Similar Electrical Devices

The device 787-1211 complies with the following EMC standards:

Table 24: EMC – Immunity to Interference

Standard	Title
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 61000-4-11	Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests
Transients	
VDE 0160	Electronic equipment for use in power installations

Table 25: EMC – Emission of Interference

Standard	Title
Conducted Emission of Interference	
EN 55011	Industrial scientific and medical (ISM) radio-frequency equipment – Electromagnetic disturbance characteristics – Limits and methods of measurement
EN 55015	Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment
EN 55022	Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement
IEC/CISPR 16-1-2	Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-2: Radio disturbance and immunity measuring apparatus - Coupling devices for conducted disturbance measurements
Interference Radiation	
EN 61204-3	Low-voltage power supplies with direct current output Part 3: Electromagnetic Compatibility (EMC)

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 DGUV Regulation 2) 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 60204-1.
- 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 26: Values for Mounting Position – Mounting with Front Panel at Top or Bottom

Device	Output power	Ambient operating temperature
787-1211	50 %	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 height of the device (see Section “Device Description” > “Technical Data”).

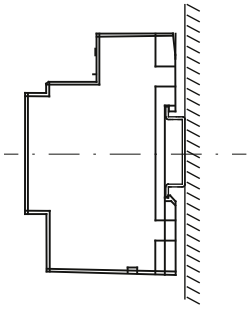

Figure 14: Position of the DIN-Rail

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

4.2.1 DIN-Rail Mounting

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

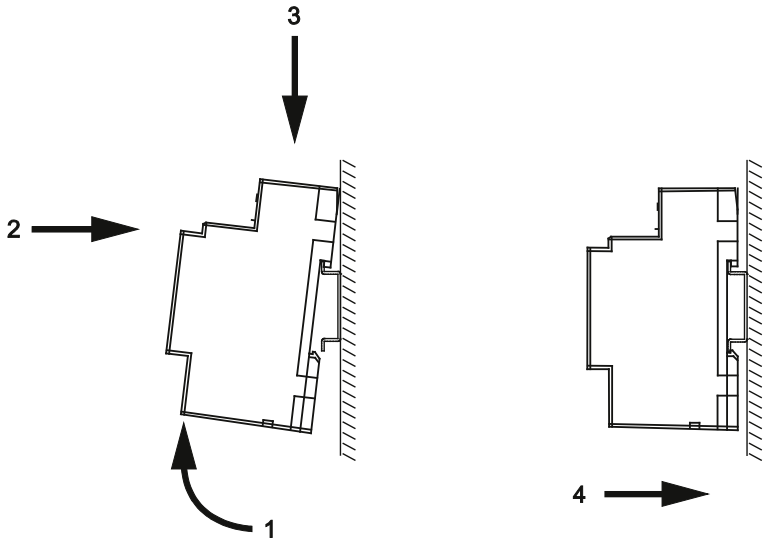

Figure 15: Mounting the Device on DIN-Rail

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

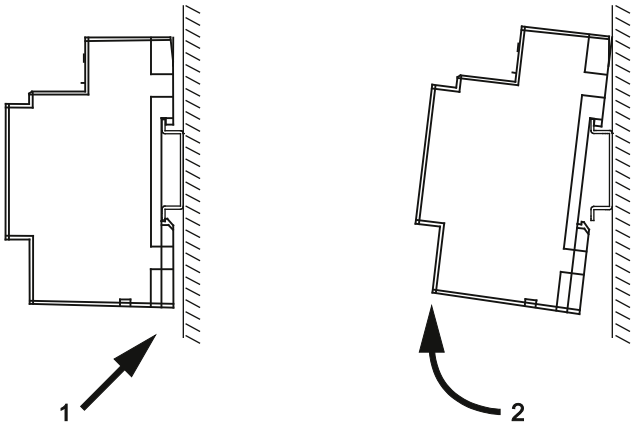

Figure 16: Removing the Device from DIN-Rail

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 screw mounting.

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).

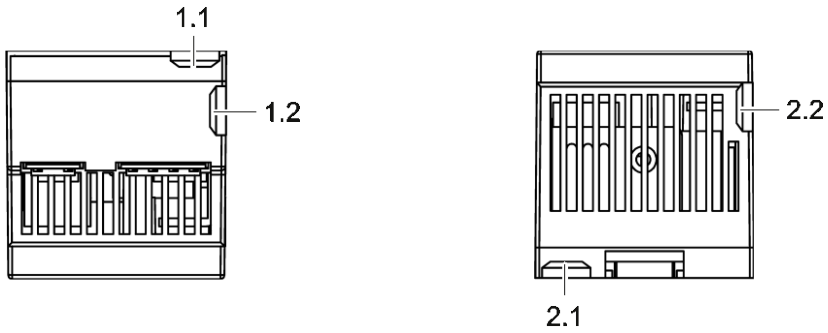

Figure 17: Snap-fit Openings for Fastening Clips

Table 27: 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.

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.

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*® plugable connectors (see section “Device Description” > “Connections”):

Table 28: Connectors

	Input Side	Output Side
WAGO connector	*picoMAX*® 5.0	*picoMAX*® 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 ≤ 0.5 mm²/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 mm²/AWG 22
- Solid conductors with a cross section > 0.25 mm²/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.

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".

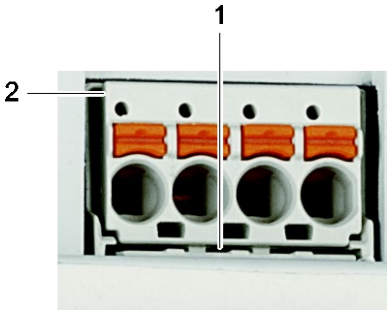

Figure 18: Removing the Female Connector without Wiring (Application Example)

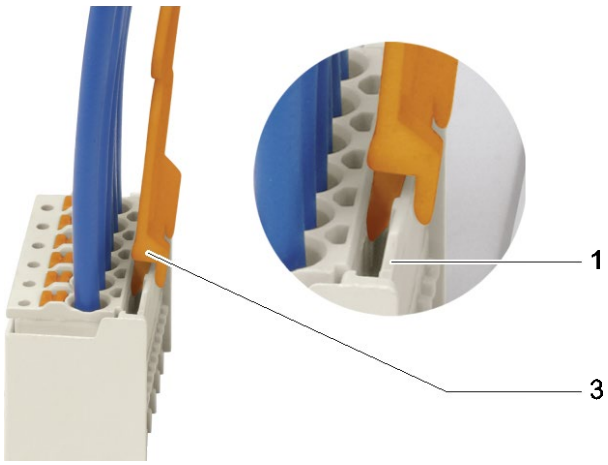

Figure 19: Removing the Female Connector with Wiring (Application Example)

Table 29: 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

6.1 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 in startup, is recommended.

The maximum number of devices connected to a circuit in parallel depends on the amount of leakage current. According to EN 62368-1, this total value must not exceed the maximum value of 3.5 mA.

The maximum number of devices 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.

6.2 Parallel connection (output side)

In parallel operation, set the output voltage of the devices 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 virtually the same. Only connect devices of the same type in parallel.

Please use external rail-mount terminal blocks when connecting in parallel. A parallel connection directly on the connectors on the secondary side of the device 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 configured for the device's maximum output current.

6.3 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 nominal current (see Section “Device Description” > “Technical Data”)
- $I_{OUT(IST)}$ Actual output current
- U_{OUT} Output voltage (see Section “Device Description” > “Technical Data”)

The output voltage U_{OUT} is reduced if the output current $I_{OUT(IST)}$ is in the range $1.2 \times I_{OUT} < I_{OUT(IST)} < 1.7 \times I_{OUT}$ (see Figure “Output Characteristics”).

In the event of a short circuit ($1.7 \times I_{OUT} < I_{OUT(IST)}$), the output voltage U_{OUT} is switched off. The device checks whether the short circuit is still present through cyclical re-activation of the output voltage (Hiccup mode, see Chapter “Device Description” >> “Output”).

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

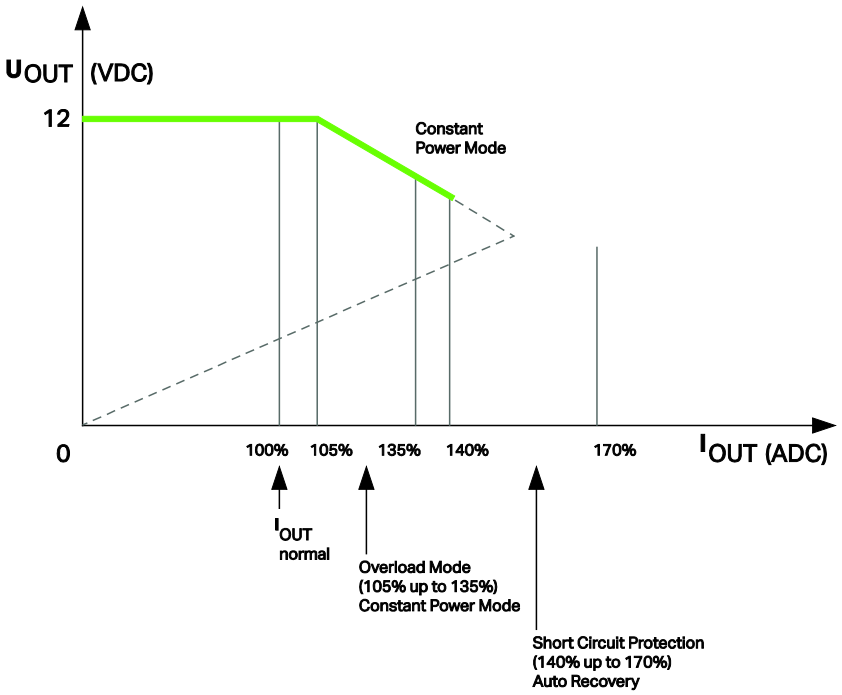

Figure 20: Output Characteristic

Table 30: Legend for Figure “Output Characteristic”

No.	Description
1	$I_{OUT(ACT)}$ normal
2	Overload mode ($1.2 \times I_{OUT} < I_{OUT(IST)} < 1.7 \times I_{OUT}$); constant power mode
3	Short circuit protection ($1.7 \times I_{OUT} < I_{OUT(IST)}$); Hiccup mode

6.4 Derating

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

Table 31: Nominal Values according to UL

IN	100 … 240 VAC; 1.3 A / 50 … 60 Hz
OUT	12 VDC, 5 A
Ambient temp.	+45 °C

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

Table 32: Deratings

Nominal voltage	Temperature value T_U	Derating
90 VAC	> +45 °C	− 3.0 %/K
230 VAC	> +50 °C	− 2.3 %/K
< 100 VAC	--	− 1.5 %/V

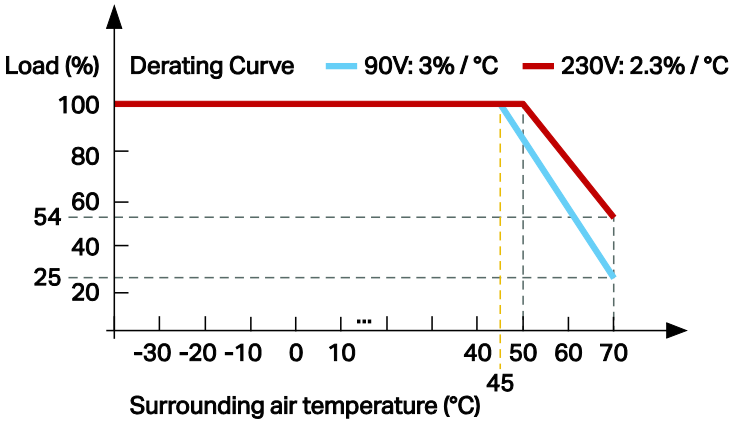

Figure 21: Temperature Load Curve

6.5 Maintenance

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.

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.

The convenient, standardized and therefore faster RMA (Return Merchandise/Material Authorization) process is available for return shipments or for complaints.

The corresponding report form for return shipments and complaints is available at www.wago.com/gb/returns-complaints.

6.6 Disposal

6.6.1 Electrical and Electronic Equipment

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

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.
WEEE 2012/19/EU applies throughout Europe. Directives and laws may vary nationally.

Environmentally friendly disposal benefits health and protects the environment from harmful substances in electrical and electronic equipment.

- Observe national and local regulations for the disposal of electrical and electronic equipment.
- Clear any data stored on the electrical and electronic equipment.
- Remove any added battery or memory card in the electrical and electronic equipment.
- Have the electrical and electronic equipment sent to your local collection point.

Improper disposal of electrical and electronic equipment can be harmful to the environment and human health.

6.6.2 Packaging

Packaging contains materials that can be reused.
PPWD 94/62/EU and 2004/12/EU packaging guidelines apply throughout Europe. Directives and laws may vary nationally.

Environmentally friendly disposal of the packaging protects the environment and allows sustainable and efficient use of resources.

- Observe national and local regulations for the disposal of packaging.
- Dispose of packaging of all types that allows a high level of recovery, reuse and recycling.

Improper disposal of packaging can be harmful to the environment and wastes valuable resources.

7 Accessories

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

7.1 Tools

Only use insulated tools.

Table 33: Accessories – Tools

picoMAX® unlocking tool		2092-1630
Operating tool with partially insulated shaft	Type 1, 2.5 × 0.4 mm blade	210-719
Operating tool	Phillips PH0	210-769

7.2 Spare Parts for Wiring

The following spare parts are available for wiring:

Table 34: Accessories – Wiring Spare Parts

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

7.3 Miscellaneous Accessories

The following accessory items are recommended for DC operation:

Table 35: Accessories – Miscellaneous Accessories

Fuse terminal blocks for cylindrical fuses [1] 10 × 38 mm	811 Series

[1] Cylindrical fuses are not offered by WAGO.

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