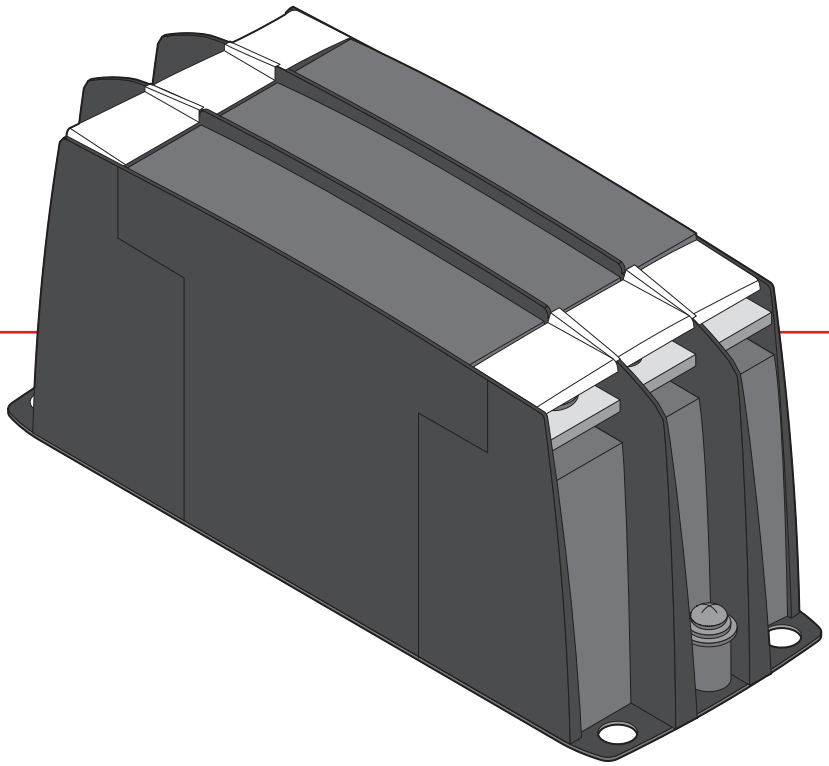
ROPEX

Line filter

LF-10520, LF-20520, LF-30520, LF-50520

Mounting and installation instructions for qualified professionals



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1 Intended use

The line filter serves to attenuate the effect of the phase angle on the grid and to protect the temperature controller from grid failure.

Always use ROPEX line filters when operating control circuitsRESISTRON® and CIRUS®. Using the proper line filter is required for CE certification of the system.

2 Safety regulations

Always read the safety regulations carefully before using the device!

Install device

Installation, startup and work on the device may be carried out only by qualified professionals. The persons must be familiar with the inherent dangers and warranty conditions.

- ▶ Install the device according to generally accepted engineering standards.

Prevent electric shock

There is mains voltage applied to the electrical connections. This can cause electric shock.

- ▶ Before performing any work, switch off the mains voltage and secure to prevent the mains voltage from being switched on again.
- ▶ Protect the system from moisture.

Requirements at installation site

The device can malfunction or be damaged if the temperature is too high or too low, or if the humidity is too high.

- ▶ Install the device indoors in a dry room that is always frost-free.
- ▶ Never install the device outdoors.
- ▶ Comply with the ambient temperature indicated on the ID plate and in the applicable documentation.
- ▶ Protect the device from liquids and sustained high humidity. Never allow condensation to form in the device.
- ▶ Never cover the device with any objects.
- ▶ Comply with the specified minimum distance between devices.

Safe operation of the device

- ▶ Operate the device only fully assembled and installed.
- ▶ Make sure that the device is undamaged, complete and correctly assembled.
- ▶ In addition to these device instructions, observe the prohibition, warning and mandatory signs on the device.

2.1 Compliance

We, the manufacturer, confirm that the line filters *LF-10520, LF-20520, LF-30520, LF-50520* have been developed and manufactured in accordance with the following standards:

- DIN EN 60939-1 Passive filter units for electromagnetic interference suppression - part 1: Generic specification (IEC 60939-1)

CE

We, as the manufacturer, confirm that this product complies with the following EU guidelines:

- 2014/30/EU Electromagnetic compatibility (EMC)
- 2014/35/EU Low-voltage directive
- 2011/65/EU Restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)

We, as the manufacturer, confirm that this product complies with the following EU standards:

- UL 1283 Electromagnetic interference filters standard

- CSA 22.2 no. 8 1986 Electromagnetic interference (EMI) filters

We, as the manufacturer, confirm that this product complies with the following UKCA guidelines:

- 2014/30/EU Electromagnetic compatibility (EMC)
- S.I. 2016/1101 Electrical equipment (safety) regulations 2016
- 2011/65/EU Restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)

Note

Using the proper line filter is required for CE certification of the system.

2.2 Regulations

Observe the following regulations and guidelines:

Legal requirements

- Legal regulations for the prevention of accidents
- Legal regulations for environmental protection
- Regulations for occupational insurance schemes

Standards

- The respective safety regulations of DIN, EN and VDE
- DIN EN 50561-1 Power line communication apparatus used in low-voltage installations - Radio disturbance characteristics - Limits and methods of measurement - Part 1: Apparatus for in-home use
- DIN EN 55011/VDE 0875-11 Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement
- DIN EN 50561-1 Power line communication apparatus used in low-voltage installations - Radio disturbance characteristics - Limits and methods of measurement - Part 1: Apparatus for in-home use
- DIN EN 55032 Electromagnetic compatibility of multimedia equipment. Emission requirements
- DIN EN 60204-1 Safety of machinery - Electrical equipment of machines - Part 1: General requirements
- DIN EN 61439-1 Low-voltage switchgear and controlgear assemblies - Part 1: General rules
- DIN EN IEC 62368-1 Audio/video, information and communication technology equipment - Part 1: Safety requirements

3 Device overview

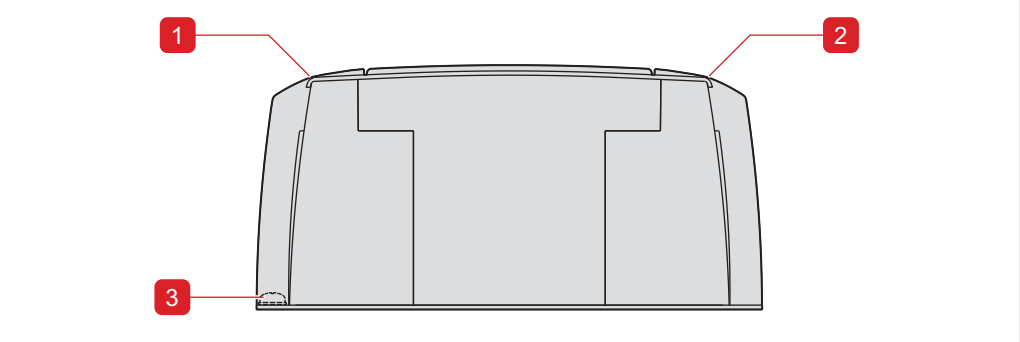


Illustration 1: Overview of line filter

1	Output side with terminals L1´, L2´, L3´ (temperature controller)	2	Input side with terminals L1, L2, L3 (voltage supply)

3	Ground terminal (temperature controller)		

3.1 Name plate

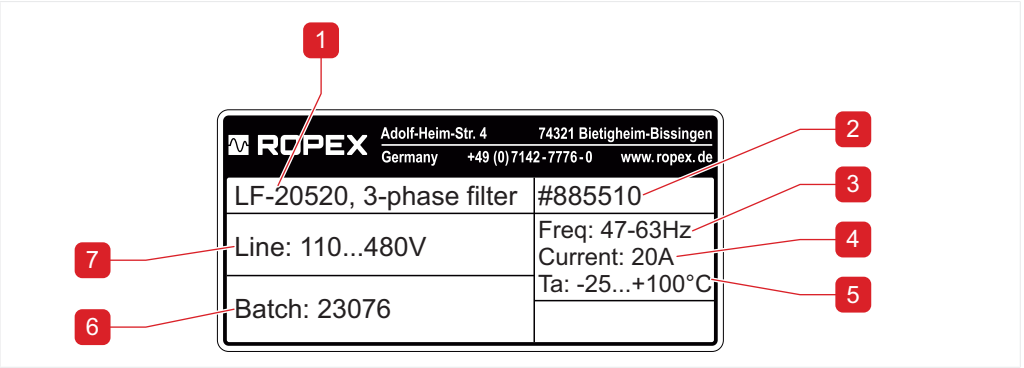


Illustration 2: Name plate, example showing line filter LF-20520

1	Product name	2	Article number
3	Frequency	4	Continuous current
5	Ambient temperature	6	Batch number
7	Voltage		

Position The name plate is affixed to the side of the line filter.

3.2 Dimensions

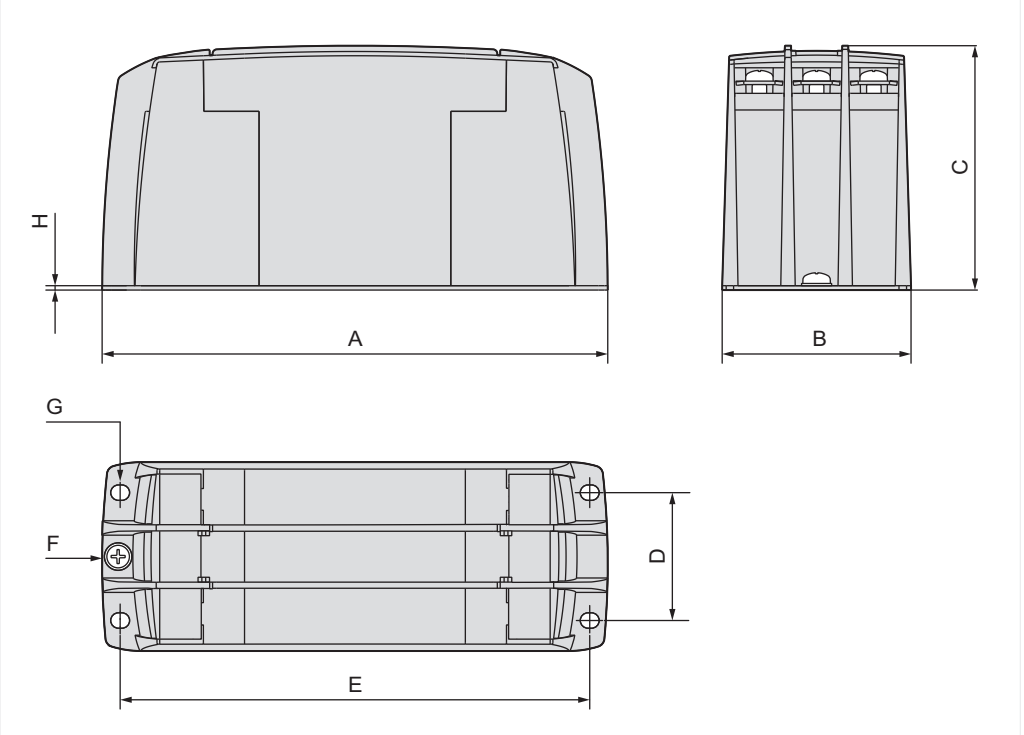


Illustration 3: Dimensions

	Unit	LF-10520	LF-20520	LF-30520	LF-50520
A	mm	150	150	150	177
B	mm	50	50	50	65

	Unit	LF-10520	LF-20520	LF-30520	LF-50520
C	mm	78	78	78	84
D	mm	32	32	32	44
E	mm	140	140	140	162
F	mm	M4	M4	M4	M5
G	mm	4.3 × 5.5	4.3 × 5.5	4.3 × 5.5	5.3 × 6.5
H	mm	1.5	1.5	1.5	1.5

Tolerances according to DIN ISO 2768/EN 22768.

4 Mounting and installation

⚠ DANGER

Risk of death due to electric shock

There is mains voltage applied to the electrical connections on the device.

- ▶ Only qualified electricians should perform installation.
- ▶ Stop the power supply.
- ▶ Secure the power supply from being switched back on.

4.1 Attaching line filter to mounting plate

Tool The following tools are required:

- Phillips screwdriver

Proceed as follows to attach the line filter to the mounting plate.

Requirements

✓ The supply voltage is switched off.

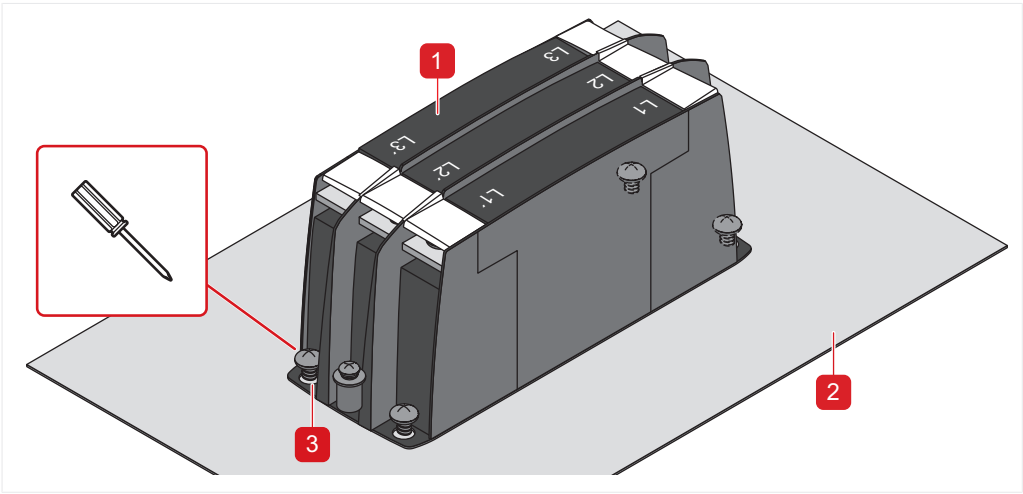


Illustration 4: Mounting line filter

- ▶ Use 4 screws (3) to attach the line filter (1) to the galvanized mounting plate (2).

⇨ The line filter is attached to the mounting plate.

4.2 Installing line filter (example of nominal voltage with 230 V)

To install the line filter, proceed as follows:

Requirements

✓ The supply voltage is switched off.

✓ The line filter is then attached to the mounting plate.

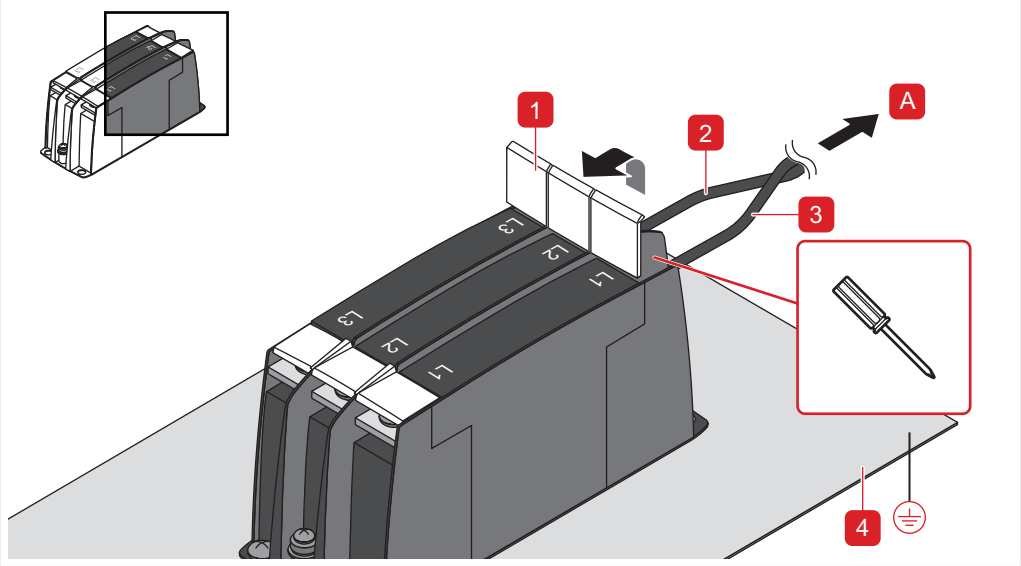


Illustration 5: Connecting line filter to supply voltage

A	Input side with terminals L1, L2, L3 (voltage supply)	1	Plastic cover
2	L1 - Neutral conductor N (voltage supply)	3	L2 - Phase wire P (voltage supply)
4	Mounting plate		

1. Connect the mounting plate (4) to earth potential using a grounding cable.
   Example: If the cross-section of the outer connector is 16 mm² copper, use a protective conductor 16mm² copper to connect the mounting plate to an equipotential bus board.
2. Carefully fold back the plastic cover (1) on the input side (A) of the line filter.
3. At terminal L1, press the cable lug down, attach the phase wire P (3) for the mains and then secure it with the screw.
   The required torque is indicated on the top of the line filter.
4. At terminal L2, press the cable lug down, attach the neutral conductor N (2) for the mains and then secure it with the screw.
   The required torque is indicate on the top of the line filter.

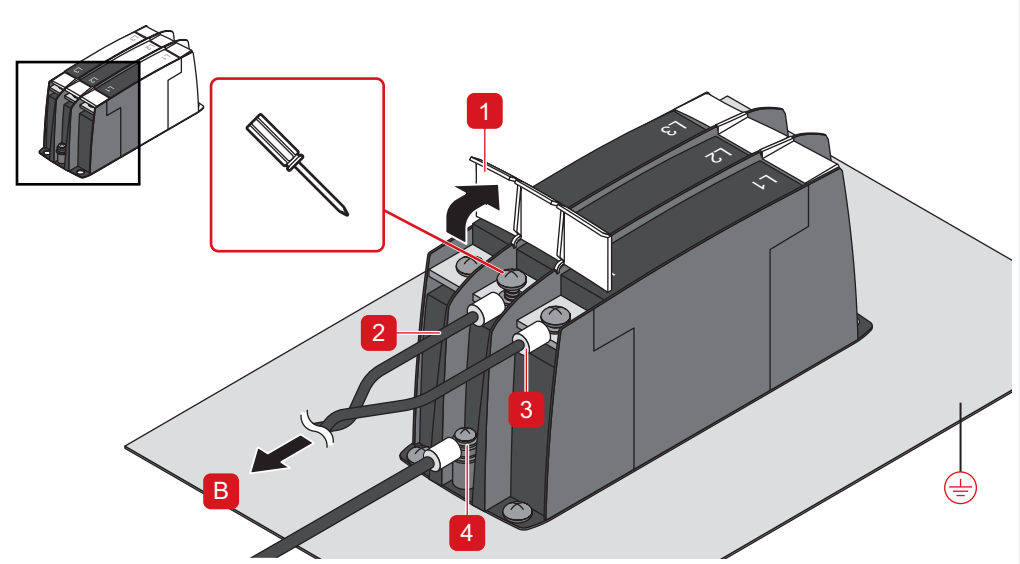


Illustration 6: Connecting temperature controller to line filter

B	Output side with terminals L1´, L2´, L3´ (temperature controller)	1	Plastic cover
2	L2´ - Neutral conductor N (temperature controller)	3	L1´ - Phase wire P (temperature controller)
4	Ground terminal		

5. Carefully fold back the plastic cover (1) on the output side (B) of the line filter.
6. At terminal L1´, press the cable lug down, attach the phase wire P (3) for the temperature controller and then secure it with the screw.
   The required torque is indicated on the top of the line filter.
7. At terminal L2´, press the cable lug down, attach the neutral conductor N (2) for the temperature controller and then secure it with a screw.
   The required torque is indicated on the top of the line filter.
8. Connect the green/yellow protective conductor to the ground terminal (4) for the line filter.
   ⇨ All of the wires are now secured.

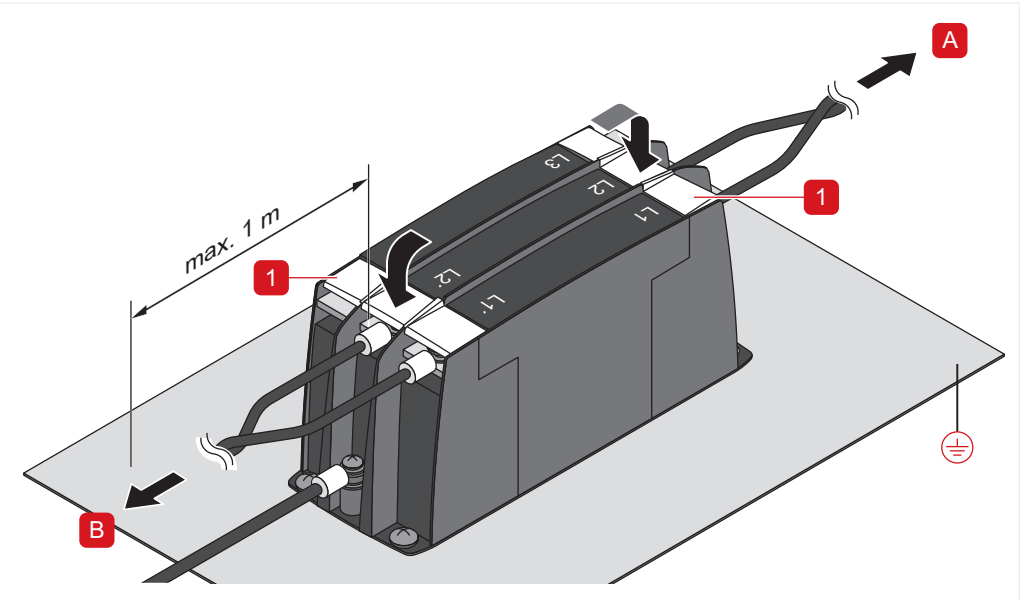


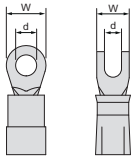
Illustration 7: Line filter is connected and grounded

9. Tighten screws that are not used and then close both plastic covers (1).

⇨ The line filter is connected to the temperature controller and the mains.

Correct installation and wiring ensure compliance with EMC limits.

4.2.1 Overview of input and output connections

		Unit	LF-10520	LF-20520	LF-30520	LF-50520
Flexible cable		mm^2	1.3…2.5	4…6	8…10	16…20
 Cable lug	Input/output terminal Max. width W	mm	11	11	11	16.5
	Ground terminal Max. width W	mm	9.5	9.5	9.5	15
	Diameter d	mm	4.3	4.3	4.3	5.3
Tightening torque		Nm	1.0…1.2	1.0…1.2	1.0…1.2	1.9…2.2

Tip Use insulated and UL-approved ring and forked cable lugs.

4.2.2 Check list

	Completed
Check that no other live cables cross the output cables.	
Do **not** lay input and output cables to and from the mains parallel to one another.	
When multiple control circuits are laid together, **always** twist wires ("crosstalk") (at least 20 twists/meter). For further information, see the instructions for the temperature controller, section "Power connection."	
To improve EMC, twist wires (at least 20 twists/meter).	

Notes

- Two line filters of the same type can be switched in parallel when the connection lines are laid symmetrically.
  The total current in this case may not exceed twice the maximum current of a line filter.
- When the total current does not exceed the maximum line filter current, supplying multiple control circuits with temperature controllers via a single line filter is permitted.

5 Technical data

	Unit	LF-10520	LF-20520	LF-30520	LF-50520
Nominal current at 50 °C (40 °C)	A	10 (10.7)	20 (21.4)	30 (32.1)	50 (53.5)
Operating frequency (Europe/USA)	Hz	50/60	50/60	50/60	50/60
Maximum voltage	VAC	3 × 520/300			
Ambient temperature	°C	-25 to +100			
Power loss at 25 °C and 50 Hz	W	4.8	6.2	7.0	10.5
Weight	kg	0.52	0.52	0.54	0.93
MTBF at 50 °C and 400 V (Mil-HB-217F)	h	> 200,000			
Degree of protection		IP 00			
Flammability pursuant to UL 94		V-2 or better			
Certification		• UL (file number E64388) • CSA			
Development and manufacturing pursuant to		• DIN EN 60939-1 (IEC 60939-1) • UL 1283 • CSA 22.2 no. 8 1986			

6 How to order

	Line filter	Product label	Continuous current	Article number
	LF-10520	FN 3025HP-10-71	10 A, 520 VAC	885504
	LF-20520	FN 3025HP-20-71	20 A, 520 VAC	885510
	LF-30520	FN 3025HP-30-71	30 A, 520 VAC	885511
	LF-50520	FN 3025HP-50-72	50 A, 520 VAC	885509

Tip In the event of extremely high load requirements, please contact ROPEX at www.ropex.de or info@ropex.de.