

Installation manual plugs and connectors with screw connection (16/32 A)



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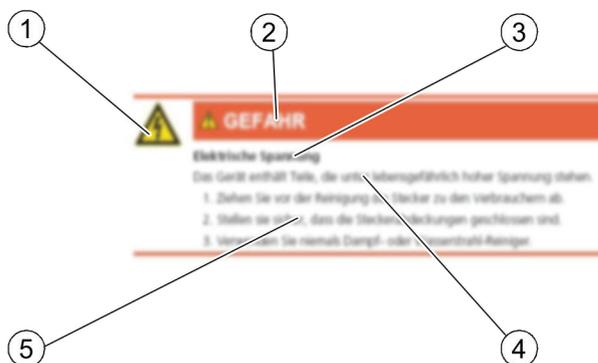
1 About this manual

This manual

- describes the assembly and disassembly of plugs and sockets with screw connections of Bals Elektrotechnik GmbH & Co. KG
- is an integral part of the product and must be kept in safe custody during the product service life
- must be read carefully and understood before use and any work.

1.1 Structure of the warnings

The following picture illustrates the structure of a sample warning.



1	Hazard-specific symbol
2	Signal word
3	Type and source of the hazard
4	Possible consequences of failing to comply
5	Procedure for avoiding hazards

1.2 Symbols used

	General warning of a hazardous area
	Warning – dangerously high voltage
	Notice

1.3 Signal words used

All warnings in this manual are clearly highlighted. The following signal words are used for warnings:

DANGER	Warns of dangers which will lead to serious injuries or to death if the instructions are not followed.
WARNING	Warns of dangers that may lead to serious injuries or to death and/or cause considerable damage to property if the instructions are not followed.
CAUTION	Warns of dangers that may lead to reversible injuries and/or considerable damage to property if the instructions are not followed.
NOTICE	Warns of dangers that may lead to operational disruptions and/or considerable damage to property. Damage to the environment, too, may occur if the instructions are not followed.

2 Intended use

Plugs and sockets with screw connections are built for professional use. The installation and the fixed connection to the mains supply should be carried out only by trained and qualified experts.

Any use going beyond the intended use is considered to be improper. The manufacturer is not liable for damages resulting from improper use. Any such risk shall be borne solely by the user.

In case of unauthorised modifications or conversions, the CE conformity becomes null and void, and thus, also all claims for warranty. Modifications may lead to risks for life and limb as well as damage to the plugs and sockets or loads connected.

Factory-fitted labels and markings on the plugs and sockets should not be removed, modified or blurred.

Protect against foreign bodies and impact of weather

The plugs and sockets meet either the protection degree IP44, IP54 or IP67 in accordance with **DIN EN 60529** (VDE 0470-1), depending on the respective design. Each of these mean:

- Protection degree IP44:
 - Protected against solid bodies with a diameter beyond 1.0 mm, e.g. a wire
 - Protection against water sprayed from all sides
- Protection degree IP54:
 - Protected against dust in damaging quantity
 - Complete protection against contact
 - Protection against water sprayed from all sides
- Protection degree IP67:
 - Dust-proof
 - Complete protection against contact
 - Protection against temporary immersion

Environment

The following operating temperatures apply for the safe operation of the product:

Standard version	Military version
-25 °C ... +40 °C	-33 °C ... +49 °C

3 General safety instructions



- Safe use is ensured only if this manual is followed completely.
- Before installation, commissioning or operation, read this manual thoroughly.
- The plugs and sockets must be installed, maintained and put into operation properly by qualified experts in accordance with the laws, ordinances and standards.
- Keep easily combustible and explosive materials away from the plugs and sockets.
- Handle the cables with care
 - by always pulling at the plug and not the cable when unplugging,
 - by preventing the cable from getting damaged mechanically,
 - by keeping intense heat away.
- Never use faulty products or products with dirty, scratched or damage contacts.
- Keep the contacts on the product clean.
- Avoid tripping hazards.

4 Packaging, transport and storage

4.1 Packaging



Packaging materials are valuable raw materials and can be reused. The packaging materials should therefore be brought to an appropriate recycling facility. If this is not possible, dispose of the packaging materials according to the locally applicable regulations.

4.2 Transport

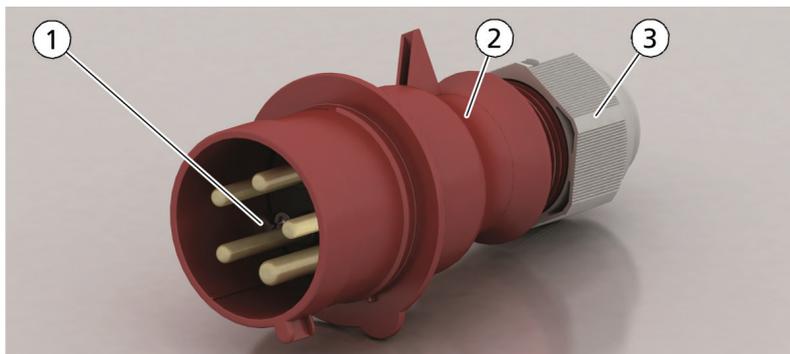
Check the delivery for completeness and integrity. If you identify transit damage or if the delivery is incomplete, notify your dealer or supplier immediately.

4.3 Storage

The product must be stored in clean condition and protected from dust and humidity. The original packaging is best suited for this purpose.

5 Design

Based on an example, the following figure illustrates the main components of the plugs and sockets with screw connections.



1	Use with screw terminals for all types of copper conductors
2	Housing
3	Cable gland with multi-grip as integrated strain relief

Conductor cross-sections

The following table displays the possible conductor cross-sections that can be connected to the plugs and sockets:

Design	Possible conductor cross-section
16 A	1 mm ² ... 2.5 mm ²
32 A	2.5 mm ² ... 6 mm ²

Cable diameter

The following table displays the cable diameters that can be used for plugs and sockets with multi-grip:

Design	Possible cable diameter
16 A, 3-pin to 5-pin	8 mm ... 18 mm
32 A, 3-pin to 5-pin	11 mm ... 23 mm

Technical specifications

The technical specifications of the plugs and sockets depend on the design. You will find them in our catalogue or on our website <http://www.bals.com>.

6 Assembly and disassembly



DANGER

Danger to life by electrical voltage

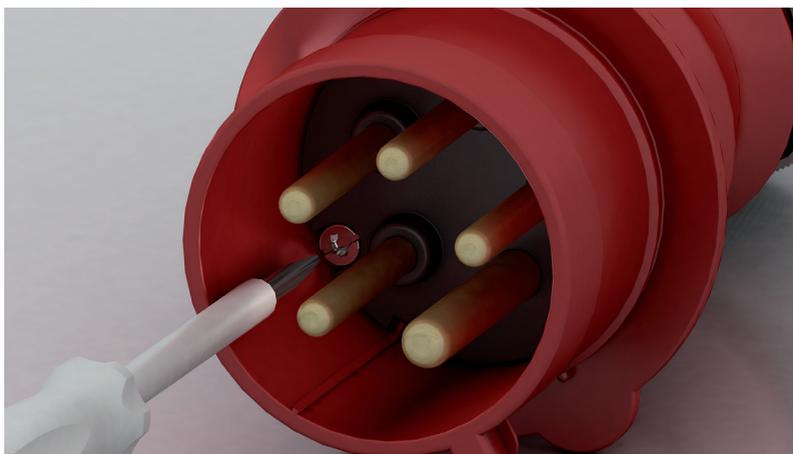
The supply cable may carry high electrical voltage that is fatal. Pay attention to the five safety rules of electricity:

1. De-energise
2. Secure the supply from being switched on again
3. Ensure the de-energised condition
4. Connect to earth and short circuit
5. Cover or cordon off adjacent live parts

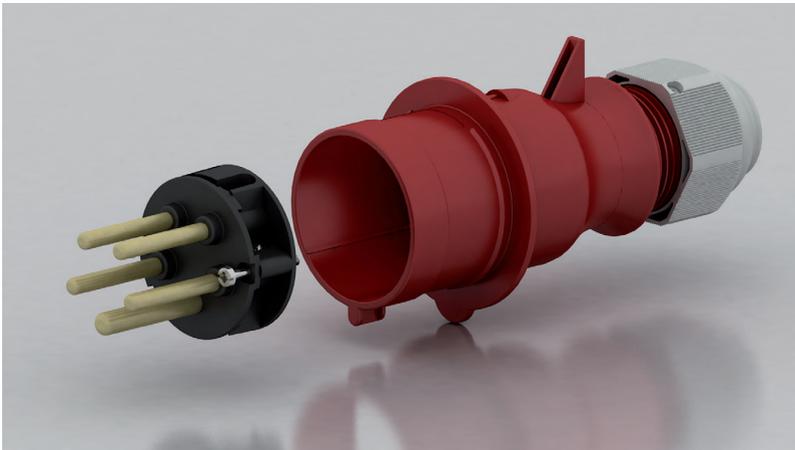
6.1 Connecting a cable to a 16-A / 32-A plug or socket

Proceed as follows:

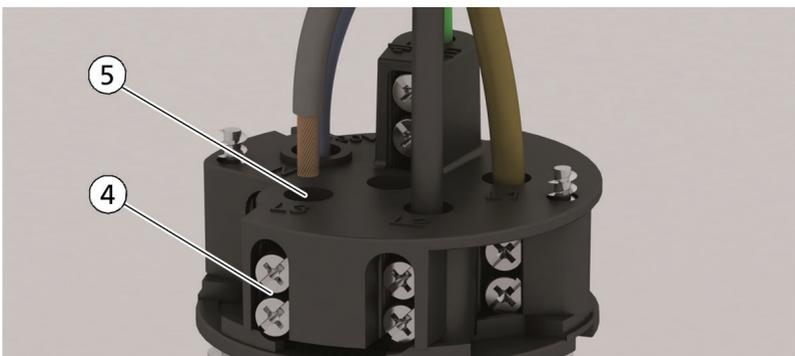
1. Make sure that the cable is de-energised.
2. Loosen the screws in order to disconnect the inserts with the screw terminals (1) from the housing (2).



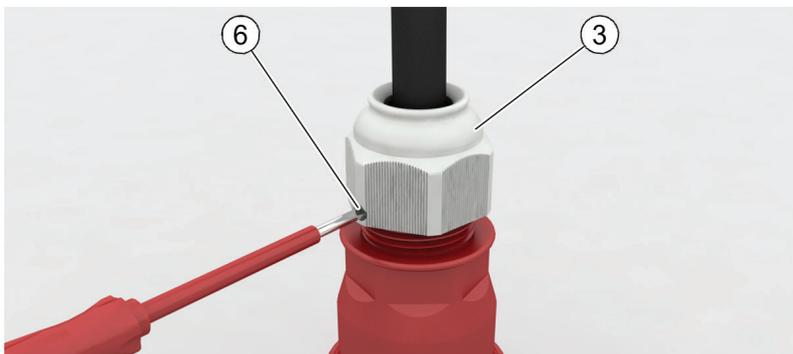
3. Remove the insert with the screw terminal in front out of the housing.



4. Push the cable about 50 cm wide through the cable gland and housing.
5. Strip the cable to the required length (16-A designs: 60 mm; 32-A designs: 70 mm).
6. Remove the insulation from the individual conductors (16-A designs: 7 mm; 32-A designs: 12 mm).
7. For better, permanent contact, provide the individual conductors with suitable conductor end sleeves.
8. The terminals are open at the time of delivery. Guide the individual conductors into the opening (5) and tighten the screws (4) with a torque of at least 0.8 Nm. Take care to see that only the individual conductor (without insulation) is clamped. Pay attention to the marking of the terminals and ensure that the assignment of the individual conductors to the terminals is correct.



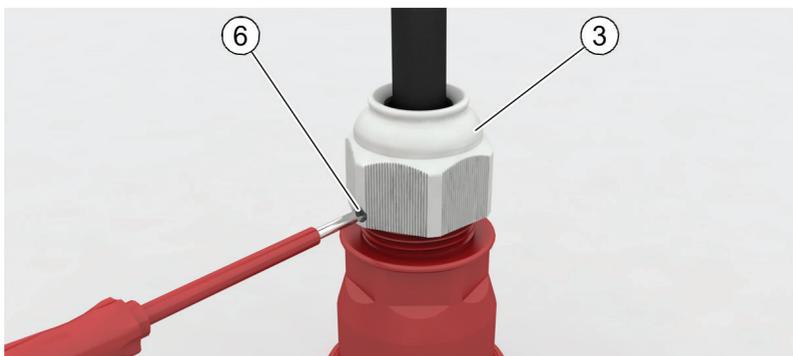
9. Connect the housing and the insert with the screws foreseen for this purpose.
10. Next, tighten the cable gland (3). The tightening torque must be between 4 Nm and 7 Nm for the 16-A designs and between 5 Nm and 9 Nm for the 32-A designs. Please refer to the embossing on the cable gland for the exact value of the respective design. Secure the cable gland using the screw placed on the side for this purpose (6, depending on the design).



11. Check that the cable is seated tightly in the plug or socket.

6.2 Disconnecting a cable from a 16-A / 32-A plug or socket

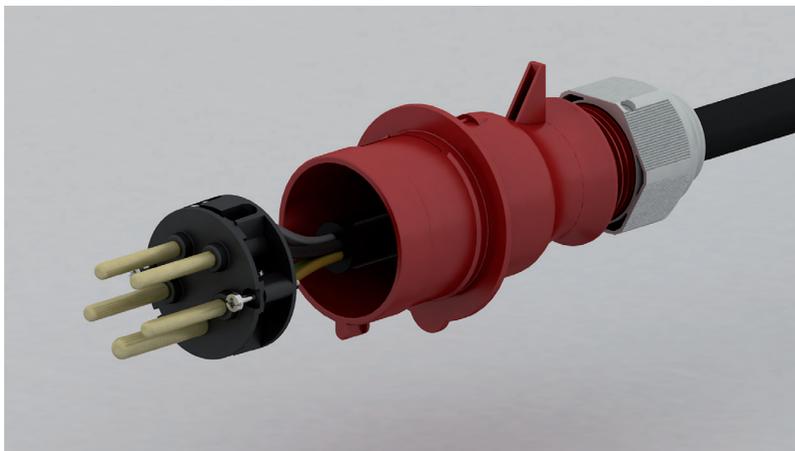
1. Make sure that the cable is de-energised.
2. If the cable gland (3) is secured with the help of a screw (6), loosen this screw.



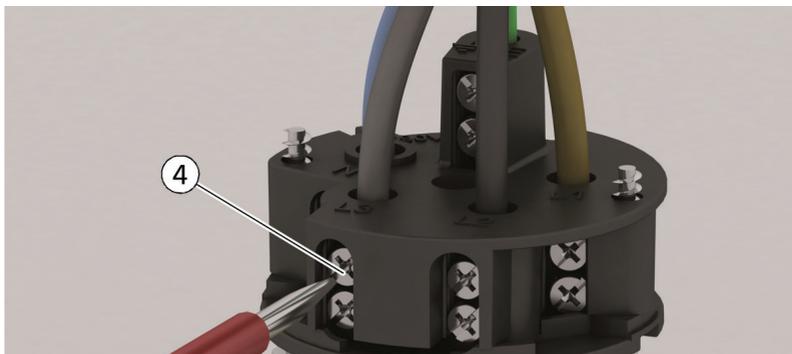
3. Loosen the cable gland.
4. Disconnect the joint between the housing (2) and the insert (1). To do this, loosen the connecting screws.



5. Push the housing and the cable gland back on the cable until the connections in the front part are easily accessible.



6. Loosen the screws (4) of the terminals and pull out the individual conductor.



7. Pull the cable out of the housing and out of the cable gland.

7 Cleaning and care

It is recommended to clean the device as required. Use a dry cloth to clean the device. Use a wet cloth if the device is very dirty.



DANGER

Electrical voltage

The device contains parts that carry hazardous voltage that may be fatal.

1. Pull out the plugs to the loads before cleaning them.
2. Make sure that the plug covers are closed.
3. Never use steam or water jet cleaners.



NOTICE

Damage to the plastic parts.

Corrosive cleaning agents may attack or destroy the plastic parts.

Use only a cloth moistened with water for cleaning.

8 Decommissioning and disposal



Send the worn-out product for recycling or for proper disposal. Always make sure to observe and follow the local regulations.

The product should not be disposed of in household waste. Environmental damage and risk to personal health are avoided with proper disposal.

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