Operating Manual

Rauscher Stoecklin

High current connectors

160A, 200A, 250A, 315A, 400A, 500A, 600A

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General information

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Index

1. General information

1.1. Information about this manual

This manual provides information on how to handle the unit in a safe and efficient manner. This manual is an integral part of the unit and must be kept in its immediate vicinity where it is available to the personnel at all times.

Before commencing any work, the personnel must have carefully read and understood this manual. It is essential for the safe operation of the unit that all safety information and operating instructions provided in this manual be observed.

In addition to the information provided in this manual, all local accident prevention regulations as well as all general safety regulations applicable for the unit's place of installation must be observed.

The illustrations used throughout this manual are intended to provide a general understanding and may vary from the actual design of the unit you purchased.

1.2. Explanation of symbols

Safety instructions

The safety instructions provided in this manual are identified by symbols. The safety instructions are introduced by keywords that are used to express the extent of the danger.

DANGER!

This combination of symbol and keyword points to a situation of immediate danger which will lead to major, including fatal, injuries unless avoided.

WARNING!

This combination of symbol and keyword points to a situation of potential danger which may lead to major, including fatal, injuries unless avoided.

CAUTION!

This combination of symbol and keyword points to a situation of potential which may lead to minor or moderate injuries unless avoided.

NOTICE!

This combination of symbol and keyword points to a situation of potential which may lead to damage to material property or the environment unless avoided.

Tips and recommendations

This symbol highlights useful tips and recommendations as well as information that is helpful for the efficient and trouble-free operation of the unit.

Particular safety instructions

The symbols are used as part of safety instructions in order to draw attention to specific hazards:

DANGER!

This combination of symbol and keyword points to a situation of immediate danger which is caused by electric current. Failure to observe an instruction labelled in this way may lead to severe or fatal injuries.

Additional markings

The following markings are used throughout this manual to point out instructions, results, lists, references, and other elements:

Marking	Explanation
	Step-by-step instructions
⇨	Results of action steps
	References to sections in this manual and other included documents
■	Unordered lists

1.3. Limitation of liability

All specifications and information provided in this manual have been prepared in consideration of all applicable standards and regulations, the state of the art and our long years of experience and expertise.

The manufacturer is not liable for any damage caused by:

- Failure to observe this manual
- Use that is non-compliant with the intended purpose of the unit
- Use of unqualified personnel
- Unauthorised retrofitting
- Technical modifications
- Use of unapproved spare parts

The actual scope of supply may deviate from the explanations and descriptions in this manual in case of custom models or the use of additional order options or due to the latest technical modifications.

The obligations agreed upon in the supply contract, the manufacturer's Terms and Conditions as well as the terms of delivery, and all legal requirements applicable at the time the contract is concluded apply.

1.4. Copyright

1.5. Warranty terms

The warranty terms are included in the manufacturer's Terms of Sale.

1.6. Customer service

Do not hesitate to contact our customer service department if you have any technical questions:

We are also always interested in information and experiences that result from the use of our products and may prove useful for their improvement.

Switzerland

Direct customer service is provided in Switzerland.

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2. Safety

This section provides an overview of all important aspects that are essential for the protection of personnel as well as the safe operation of the unit. Additional task-specific safety instructions will be provided in the sections that refer to the individual life stages of the unit.

2.1. Intended use

The high-current connectors are used for connecting nonstationary consumers in accordance with the technical specifications
Section 4 „Technical specifications“ on page 19.

Intended use also comprises compliance with all specifications pro-vided in this manual.

Any other use exceeding or deviating from the scope of intended use is considered to be incorrect.

WARNING!
Danger from incorrect use!

Using the high-current connectors incorrectly may lead to dangerous situations.

- Do not use the high-current connectors in explosive or combustible atmospheres.
- Do not plug in or pull out the high-current connectors under voltage and/or load.
- Do not use force when plugging in or pulling out the high-current connectors.
- Do not plug in or switch on high-current connectors that are damaged.

2.2. General hazards

The following section specifies residual risks posed by the unit even if it is used as intended.

In order to minimise the risk of personal injury and material damage, follow the safety instructions specified here as well as in the following sections of this manual.

Safety

Electric current

DANGER!
Danger to life from electric current!

There is danger to life from flashover and electric shock in case of damage to insulators and other components.

- Cut off the power supply and initiate repairs immediately after you have detected damage to the insulation.
- Have all work on the electrical system performed by qualified electricians.
- Before commencing any work on the live components of electrical systems and equipment, cut off the power supply and make sure it cannot be switched back on for the duration of the work. Observe the 5 safety rules in this regard:
  - Switch off electricity.
  - Ensure that electricity cannot be switched on again.
  - Double-check that no electric current is flowing.
  - Ground the circuit.
  - Cover or otherwise isolate components that are still electrically active.

Crushing

CAUTION!
Crushing hazard when inserting and withdrawing devices!

There is a risk of sustaining crushing injuries to the hands when Male Connector and Female Connector are inserted and withdrawn.

- Use the locking levers on Male Connector and Female Connectorat the same time on both sides when inserting and removing these devices.
- Wear safety gloves.

Corrosive atmosphere

NOTICE!
Risk of corrosion during use in corrosive atmospheres!

The aluminium alloy on the connectors collars may rust in corrosive environments.

- Provide for hard anodisation or 2-component coating of the high-current connectors.

  Contact the manufacturer in this matter; see page 2 for contact information.

2.3. Owner's responsibility

Owner

The owner is the person who operates the unit for commercial or economic purposes or provides the unit to a third person for use/application and who is legally responsible for the product during operation with regard to the protection of the user, the personnel or third parties.

Owner's obligations

The unit is used for commercial purposes. The owner of the unit is, therefore, required to observe his or her obligations with regard to occupational health and safety.

In addition to the safety instructions provided in this manual, all regulations intended to ensure safety, accident prevention as well as environmental protection at the unit's place of installation must be observed.

The following applies in particular in this regard:

- The owner must ensure that all personnel handling the unit have read and understood this manual. The owner is also required to train the staff and inform them about all hazards at regular intervals.
- The owner must provide the staff with the required protective equipment and make wearing this required protective equipment mandatory.
- The owner must ensure that the maintenance intervals specified in this manual are observed.

2.4. Qualifications

The various tasks described in this manual demand that the personnel entrusted with these tasks meet different qualification requirements.

WARNING!
Danger from insufficiently qualified personnel!

Insufficiently qualified personnel are incapable of assessing the risks involved with handling the unit and expose themselves and others to the risk of sustaining severe or fatal injuries.

- Have all work performed by qualified personnel only.
- Keep insufficiently qualified personnel away from the work area.

All work must be limited to personnel who can be expected to perform the work in a reliable manner. Persons whose reactions are impaired by, for example, drugs, alcohol or medication are not approved to perform the work.

This manual lists the following qualifications as necessary for the personnel entrusted with the respective tasks:

Qualified electrician

The qualified electrician is capable of performing work on electrical installations and able to independently detect and avoid any possible danger thanks to his or her training, expertise and experience as well as his or her familiarity with all applicable regulations.

The qualified electrician has been trained for the specific conditions present in his or her work environment and is familiar with all applicable standards and regulations.

Operator

The operator is capable of operating electrical equipment and systems properly and detecting potential hazards caused by improper behaviour thanks to the training and instructions he or she was given by the owner.

The operator must adhere to the provisions of all applicable statutory regulations that are intended to prevent accidents.

The owner must brief the personnel at regular intervals. An instruction log containing at least the following information must be kept in an effort to keep track of these instructions:

- Date instructions where given
- Name of instructed person
- Topics of the briefing
- Instructor's name
- Signatures of instructed person and instructor

2.5. Personal protective equipment

The purpose of protective equipment is to keep personnel safe and protect them against adverse effects on their health during work.

Personnel are required to wear personal protective equipment while performing the various tasks at and with the unit which are pointed out separately in the respective sections of this manual.

Description of personal protective equipment

The required personal protective equipment is explained below:

Safety gloves

Safety gloves are used to protect the hands against friction, abrasions, puncture wounds or deeper cuts as well as direct contact with hot surfaces.

2.6. Safety features

2.6.1. Circuit breaker

Connector Unit with mechanical interlockCUMI

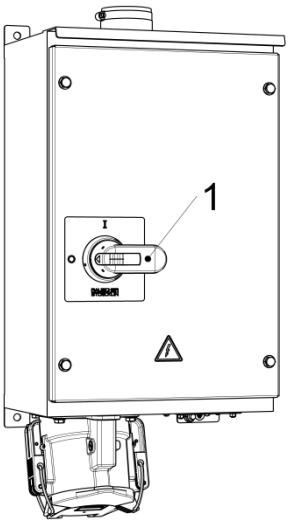


Fig. 1: Connector Unit with mechanical interlock CUMI

The Connector Unit CUMI is equipped with a circuit breaker (Fig. 1/1). Owing to the mechanical interlock (*section 2.6.3 „Mechanical interlock“ on page 14*), connectors cannot be inserted into or removed from the Connector Unit CUMI unless the circuit breaker is set to position 0. A lockable safety clip is fitted on the circuit breaker which is intended to make work on the Connector Unit CUMI safe.

2.6.2. Electrical interlock

The high-current connectors are fitted with pilot contacts which are supposed to monitor all insertion and removal operations.

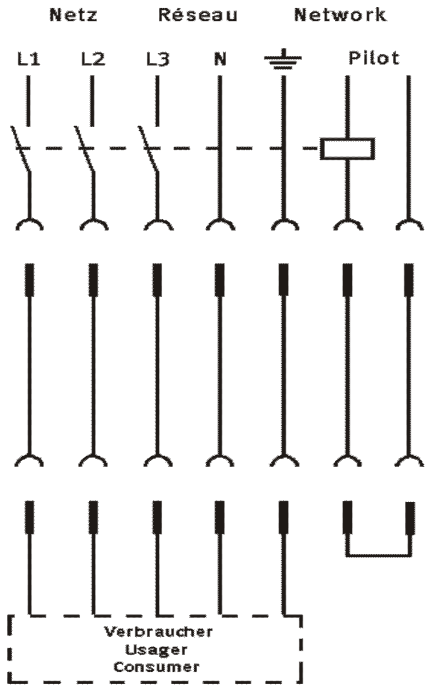


Fig. 2: Schematic of the electrical interlock

When the connector is inserted, the electric circuit will not be closed until the connection of the main contacts between Male Connector and Female Connector has been established (inductive closing).

When the connector is pulled, the electric circuit will be interrupted before the connection of the main contacts between Male Connector and Female Connector has been cut (capacitive pulling).

The schematic of the electrical interlock is illustrated in Fig. 2

2.6.3. Mechanical interlock

Contact cover discs

The female contacts on the Female Connectors are locked in a touch-proof manner.

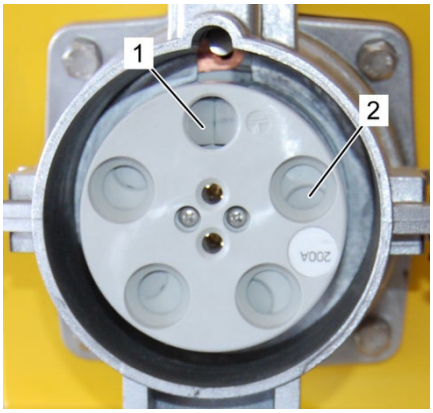
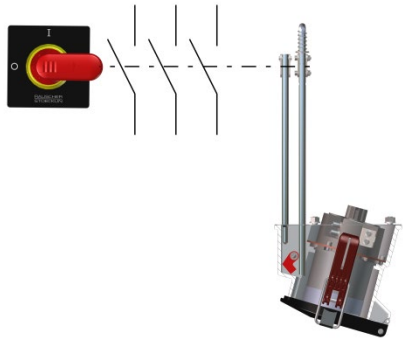


Fig. 3: Contact cover discs

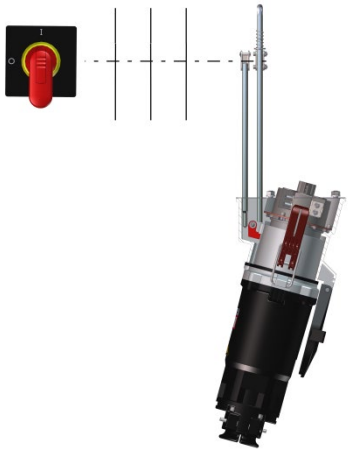
The contact cover discs of the conductors (Fig. 3/2) will open when the contact pin of the connector's earth return engages in the female contact of the Female Connectors earth return (Fig. 3/1).

Interlock



The circuit breaker cannot be moved to position I unless a connector has been inserted into Connector Unit CUMI (Fig. 4).

Fig. 4: Circuit breaker set positon 0, switching not possible



When a connector has been inserted, the mechanical interlock will release the circuit breaker so that it can be moved to position I (Fig. 5). The mechanical interlock prevents the connector from being pulled as long as the circuit breaker is set to position I.

Fig. 5: Circuit breaker set to position I, pulling not possible

2.7. Labels attached to the high-current connectors

Electrical current

There is danger to life from electric current at the high-current connectors.

Earth return

The symbol indicates the contact point designated for the earth return.

Rating plate

Fig. 6: Rating plate

Attached to all high-current connectors is a rating plate (Fig. 6) which contains the following information:

- Manufacturer
- Device type
- Voltage code
- Protection category
- Year of manufacture
- CE mark

Labels attached to Connector Units CUMI

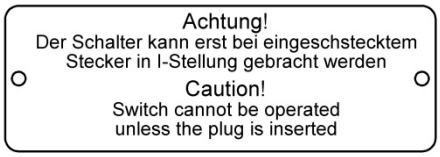


Fig. 7: Labels attached to Connector Units CUMI

The circuit breaker on a Connector Unit CUMI cannot be switched on unless a connector has been inserted.

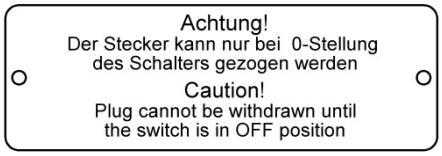


Fig. 8: Labels attched to Connector Units CUMI

The connector cannot be withdrawn from a Connector Unit CUMI unless the circuit breaker is set to position 0.

Labels attached to Connector Units CUCB and CUBC

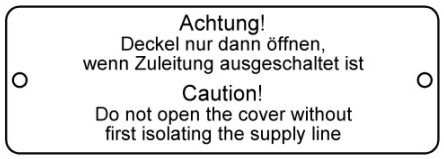


Fig. 9: Labels attached to Connector Units CUCB and CUBC

The cover on Connector Units CUCB and CUBC must not be opened unless the supply line is switched off.

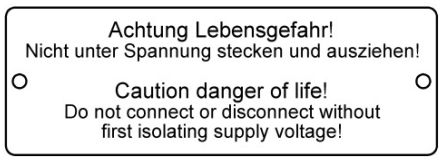


Fig. 10: Labels attached to Connector Units CUCB and CUBC

Never insert or remove the connector into or from Connector Units CUCB and CUBC while the Female Connectors are live.

2.8. Spare parts

WARNING!
Risk of injury due to the use of the wrong spare parts!

Using the wrong or faulty spare parts may endanger the personnel and cause damage, malfunctions or the total breakdown of the unit.

- Use only the original spare parts that have been supplied by the manufacturer.
- If uncertain, always contact the manufacturer.

Loss of warranty

The use of unapproved spare parts will void the warranty granted by the manufacturer.

Purchase spare parts from authorised dealers or directly from the manufacturer. See page 2 for contact information.

3. Transport, packaging and storage

Transport inspection

Check the shipment for completeness and transport damage immediately upon receipt.

Proceed as follows if detecting external transport damage:

- Accept the shipment only under protest or not at all.
- Note the extent of the damage on the transport documents or the carrier's delivery note.
- Initiate a complaint.

Report any defects immediately after detecting them. Claims for damages may only be filed within the applicable deadlines for making a complaint.

About packaging

The individual packing pieces must be packaged in accordance with the transport conditions that can be expected. The packaging consists only of environmentally friendly material.

The packaging is intended to protect the individual components against transport damage, corrosion and other damage until they are installed. Consequently, do not remove the packaging until immediately prior to installation.

Transport, packaging and storage

Handling packaging material

Dispose of packaging material following all applicable legal and local regulations.

NOTICE!
Danger to the environment from improper disposal!

Packaging materials are valuable resources and, in many cases, suitable for continued use or reasonable reprocessing and recycling. If disposed of improperly, packaging materials may pose danger to the environment.

- Dispose of packaging materials in an environmentally safe manner.
- Observe all applicable local waste disposal regulations. If necessary, contract the services of a company specialising in waste disposal.

Symbols included on the packaging

Protect agains moisture

Protect packing pieces against moisture and keep them dry.

Storing packing pieces

Store packing pieces in the following conditions:

- Do not store outdoors.
- Store in a dry and dust-free area.
- Do not expose to abrasive media.
- Protect against direct sunlight.
- Avoid mechanical vibrations.
- Storage temperature: 15 to 35 °C.
- Relative humidity: max. 60 %.
- When storing packing pieces for more than 3 months, inspect the general condition of all parts and the packaging on a regular basis. If necessary, renew or replace the preservation.

The packing pieces may contain instructions that exceed the requirements specified herein. Follow these instructions accordingly.

4. Technical specifications

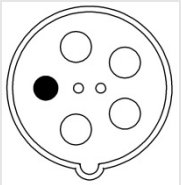
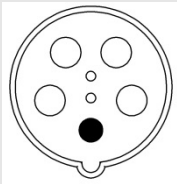
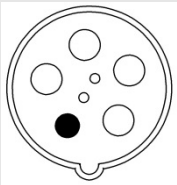
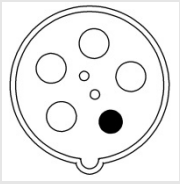
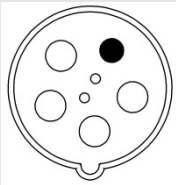
Amperage

The high-current connectors are available with nominal currents amounting to 160A, 200A, 315A, 400A, 500A, 600A

The respective amperage is specified on the rating plate.

Voltage code

The voltage code indicates the position of the earth return and the voltage of the high-current connectors.

Voltage	230 V	400 V	500 V	690 V	1000 V
Position of the earth contact					
Voltage code	9 h	6 h	7 h	5 h	1 h

The respective voltage code and the voltage are specified on the rating plate.

Screw tightening torques
Coage clamps– contact screws

Screw	Maximum torque
M4	1.4 Nm
M8	8 Nm
M10	16 Nm

Screw tightening torques – cable lugs

Screw	Torque
M8	15... 22 Nm
M10	30... 44 Nm
M12	50... 75 Nm

4.1. Technical specifications of the Male Connectors

Available Male Connectors

- Male Connector MC
- Male Connector Wall MCW
- Male Connector Panel MCP
- Male Connector Panel (Angled) MCPA

Electrical values D-Line, C-Line

	D-Line	C-Line	C-Line
Norminal current	**160 A**	**200 A**	**250 A**
Rated current	185 A	250 A	285 A
Rated voltage	1000 V	1000 V	1000 V
Rated frequency	50/60 Hz	50/60 Hz	50/60 Hz
Withstand voltage 1 Minute / 50 Hz	4000 V	4000 V	4000 V
Protection grade	IP 67	IP 67	IP 67
Ambient temperature	-40 - +100 °C	-40 - +100 °C	-40 - +100 °C
Insulation resistance Phase-phase and phase-earth	> 500 MΩ	> 500 MΩ	> 500 MΩ
Creep resistance oft he insert	> 600 CTI	> 600 CTI	> 600 CTI
Minimum terminal cross-section EN 60228 Classe 5	35 mm^2	35 mm^2	35 mm^2
Maximum terminal cross-section EN 60228 Classe 5	150 mm^2	150 mm^2	150 mm^2
Maximum terminal cross-section-pilot EN 60228 Klasse 5	4 mm^2	4 mm^2	4 mm^2
Cabel diameter	34 - 66 mm	34 - 66 mm	34 - 66 mm
Cabel diameter – separate pilot	5 - 10 mm	5 - 10 mm	5 - 10 mm
Maximum rated current for pilot contact	500V	500V	500V

Electrical values B-Line

	B-Line	B-Line	B-Line
Norminal current	**250 A**	**315 A**	**400 A**
Rated current	315 A	250 A	450 A
Rated voltage	1000 V	1000 V	1000 V
Rated frequency	50/60 Hz	50/60 Hz	50/60 Hz
Withstand voltage 1 Minute / 50 Hz	4000 V	4000 V	4000 V
Protection grade	IP 67	IP 67	IP 67
Ambient temperature	-40 - +100 °C	-40 - +100 °C	-40 - +100 °C
Insulation resistance Phase-phase and phase-earth	> 500 MΩ	> 500 MΩ	> 500 MΩ
Creep resistance oft he insert	> 600 CTI	> 600 CTI	> 600 CTI
Minimum terminal cross-section EN 60228 Classe 5	70 mm^2	70 mm^2	70 mm^2*****
Maximum terminal cross-section EN 60228 Classe 5	240 mm^2	240 mm^2	240 mm^2*****
Maximum terminal cross-section-pilot EN 60228 Klasse 5	4 mm^2	4 mm^2	4 mm^2
Cabel diameter	34 - 66 mm	34 - 66 mm	34 - 66 mm
Cabel diameter – separate pilot	8 - 15 mm	8 - 15 mm	8 - 15 mm
Maximum rated current for pilot contact	500V	500V	500V

*****On request with 150mm^2 to 300mm^2

Technical specifications

Electrical values A-Line

	A-Line	A-Line
Norminal current	**500 A**	**600 A**
Rated current	550 A	630 A
Rated voltage	1000 V	1000 V
Rated frequency	50/60 Hz	50/60 Hz
Withstand voltage 1 Minute / 50 Hz	4000 V	4000 V
Protection grade	IP 67	IP 67
Ambient temperature	-40 - +80 °C	-40 - +80 °C
Insulation resistance Phase-phase and phase-earth	> 500 MΩ	> 500 MΩ
Creep resistance oft he insert	> 600 CTI	> 600 CTI
Minimum terminal cross-section EN 60228 Classe 5	150 mm^2	150 mm^2
Maximum terminal cross-section EN 60228 Classe 5	300 mm^2	300 mm^2
Maximum terminal cross-section-pilot EN 60228 Klasse 5	4 mm^2	4 mm^2
Cabel diameter	55 - 85 mm	55 - 85 mm
Cabel diameter – separate pilot	8 - 15 mm	8 - 15 mm
Maximum rated current for pilot contact	500V	500V

Weight

Male Connector	Number of poles	D-Line	C-Line	B-Line	A-Line
MC Male Connector	4-polig (3L + PEN)	2,7 kg	2,7 kg	8,1 kg	10,0 kg
	5-polig (3L + N + PE)	2,9 kg	2,9 kg	8,6 kg	10,5 kg
MCW Male Connector Wall	4-polig (3L + PEN)	3,6 kg	3,6 kg	10,0 kg	11,0 kg
	5-polig (3L + N + PE)	3,8 kg	3,8 kg	10,5 kg	11,5 kg
MCP Male Connector Panel	4-polig (3L + PEN)	2,2 kg	2,2 kg	8,1 kg	8,1 kg
	5-polig (3L + N + PE)	2,4 kg	2,4 kg	8,6 kg	8,6 kg
MCPA Male Connector Panel (Angled)	4-polig (3L + PEN)	4,2 kg	4,2 kg	9,8 kg	9,8 kg
	5-polig (3L + N + PE)	4,4 kg	4,4 kg	10,3 kg	10,3 kg

Dimensions, Male Connector MC

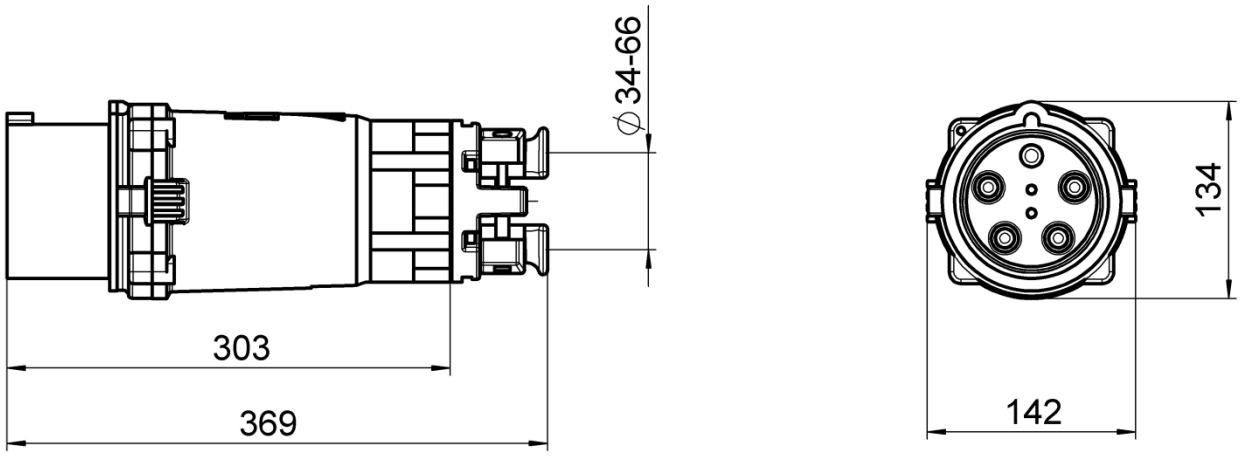


Fig. 11: Dimensions Male Connector MC D-Line, C-Line (160A – 250 A) in mm

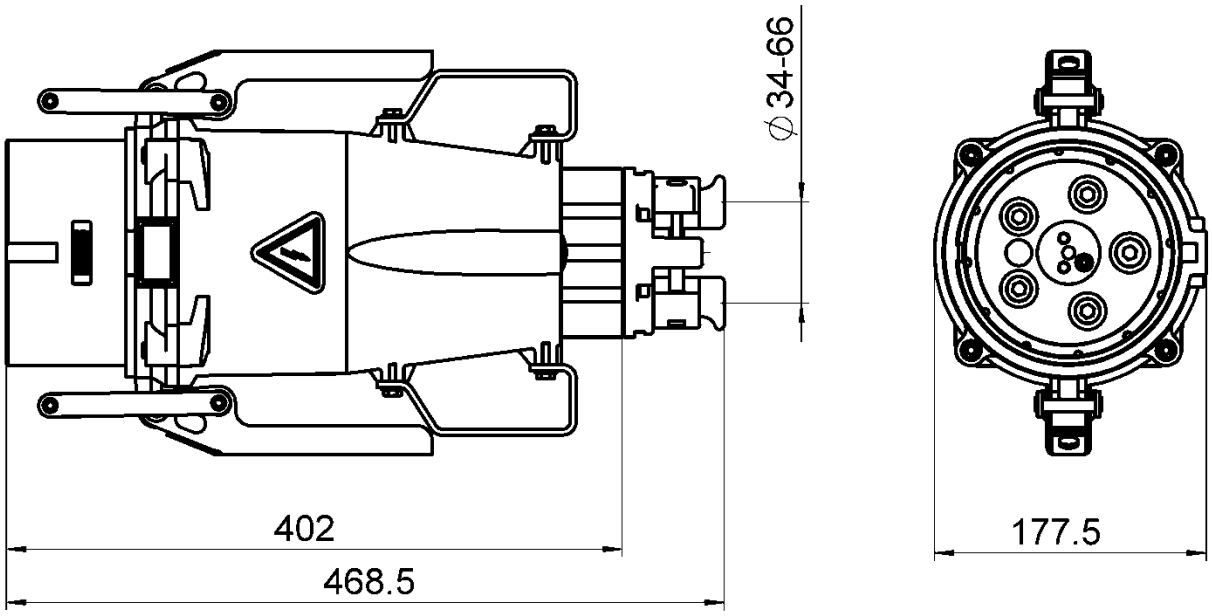


Fig. 12: Dimensions Male Connector MC B-Line (250 A – 400 A) in mm

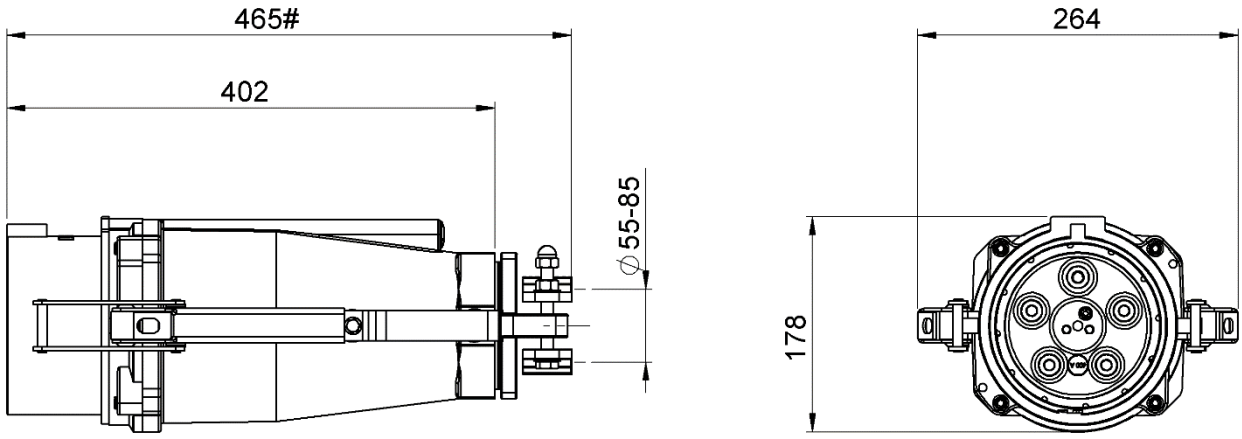


Fig. 13: Dimensions Male Connector MC A-Line (500 A – 600 A) in mm

DImensions, Male Connector Wall MCW

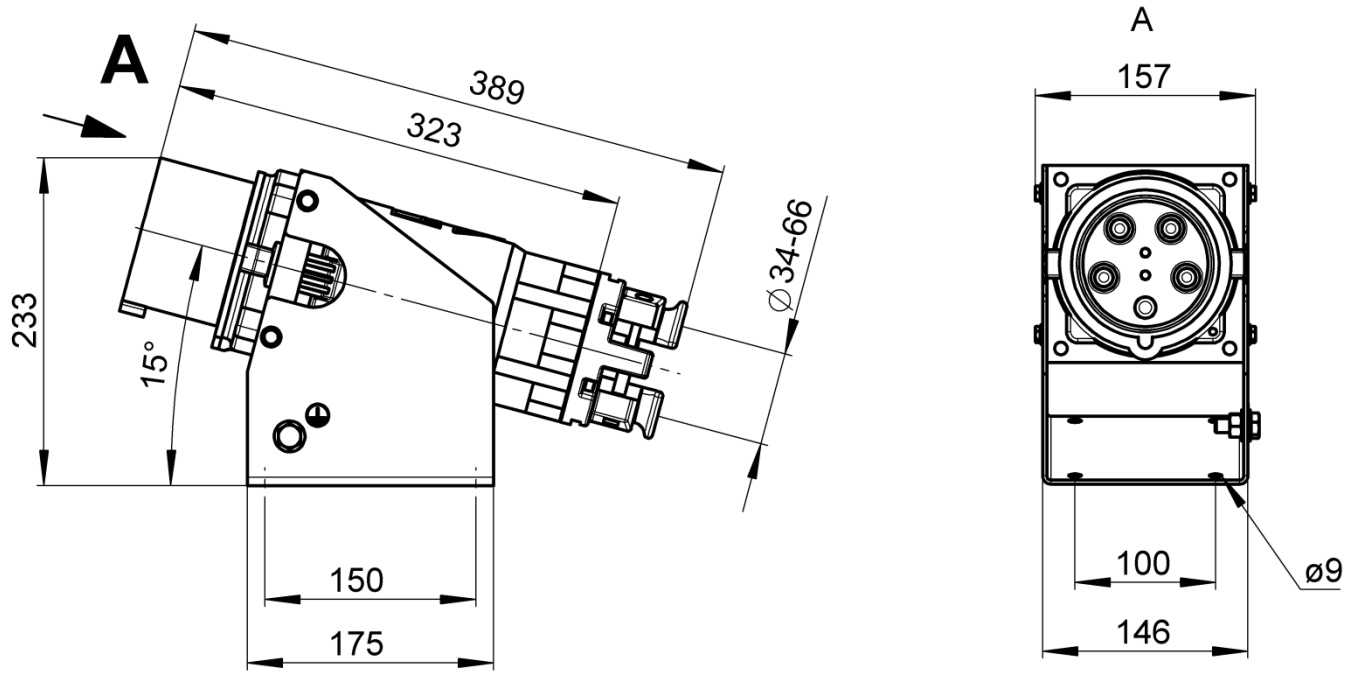


Fig. 14: Dimensions Male Connector Wall MCW D-Line, C-Line (160A – 250 A) in mm

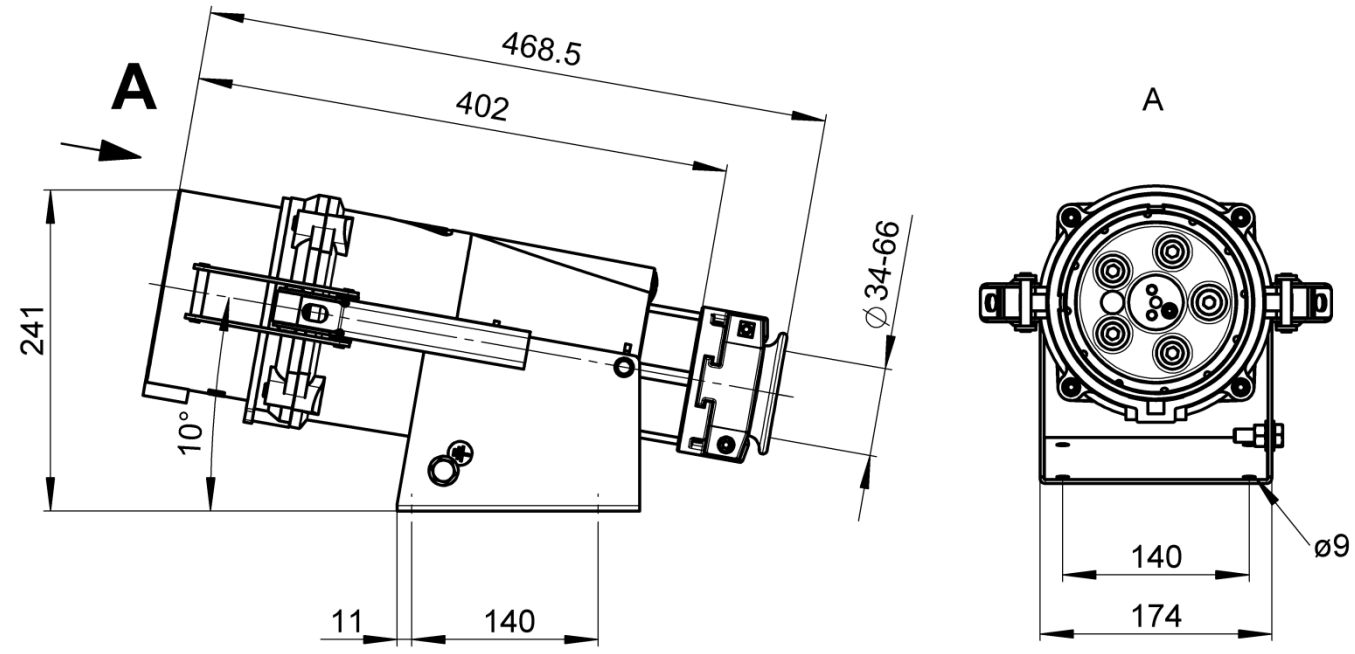


Fig. 15: Dimensions Male Connector Wall MCW B-Line (250 A – 400 A) in mm

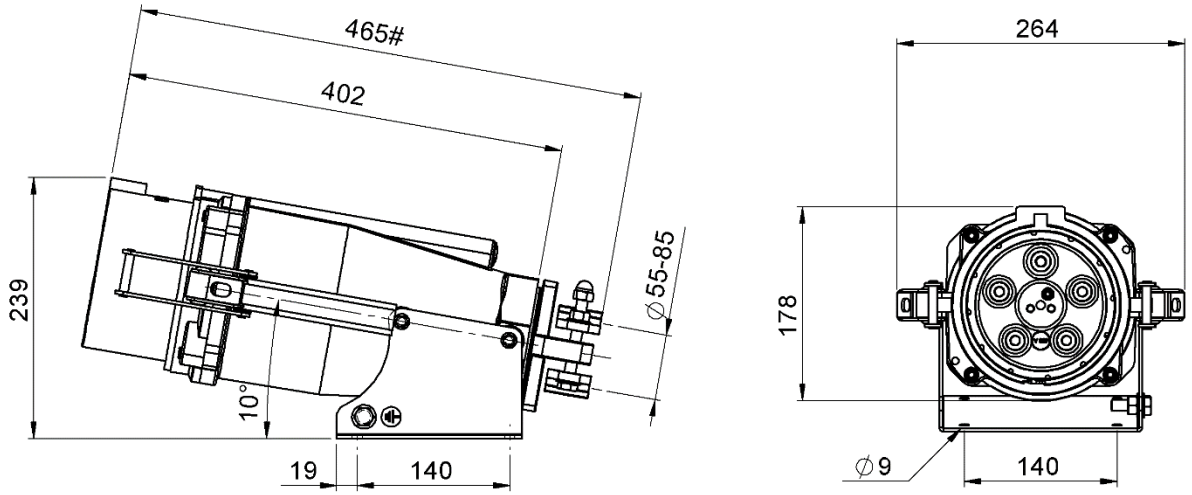


Fig. 16: Dimensions Male Connector Wall MCW A-Line (500 A – 600 A) in mm

Dimensions, Male Connector Panel MCP

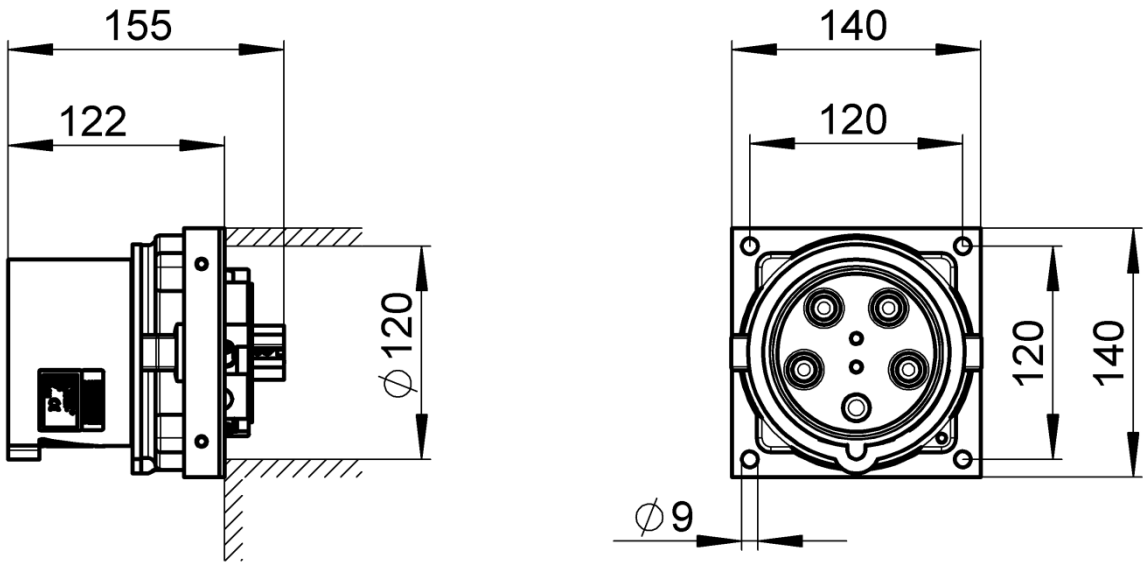


Fig. 17: Dimensions Male Connector Panel MCP D-Line, C-Line (160A – 250 A) in mm

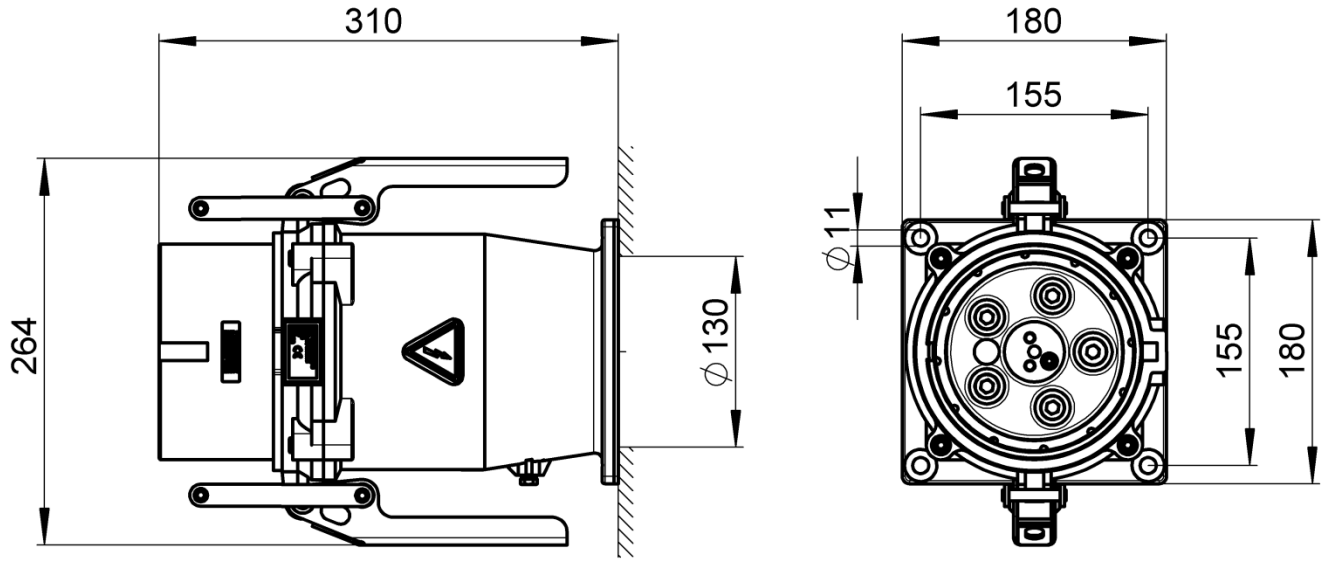


Fig. 18: Dimensions Male Connector Panel MCP B-Line, A-Line (250 A – 600 A) in mm

Dimensions, Male Connector Panel (Angled) MCPA

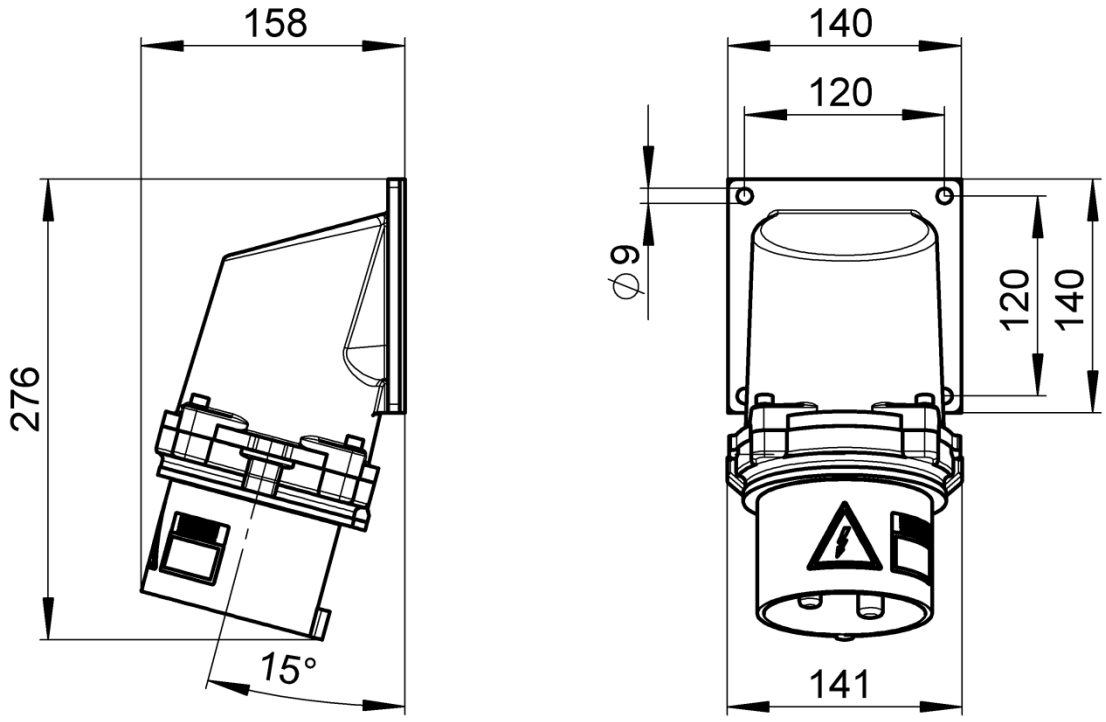


Fig. 19: Dimensions Male Connector Panel (Angled) MCPA D-Line, C-Line (160A – 250 A) in mm

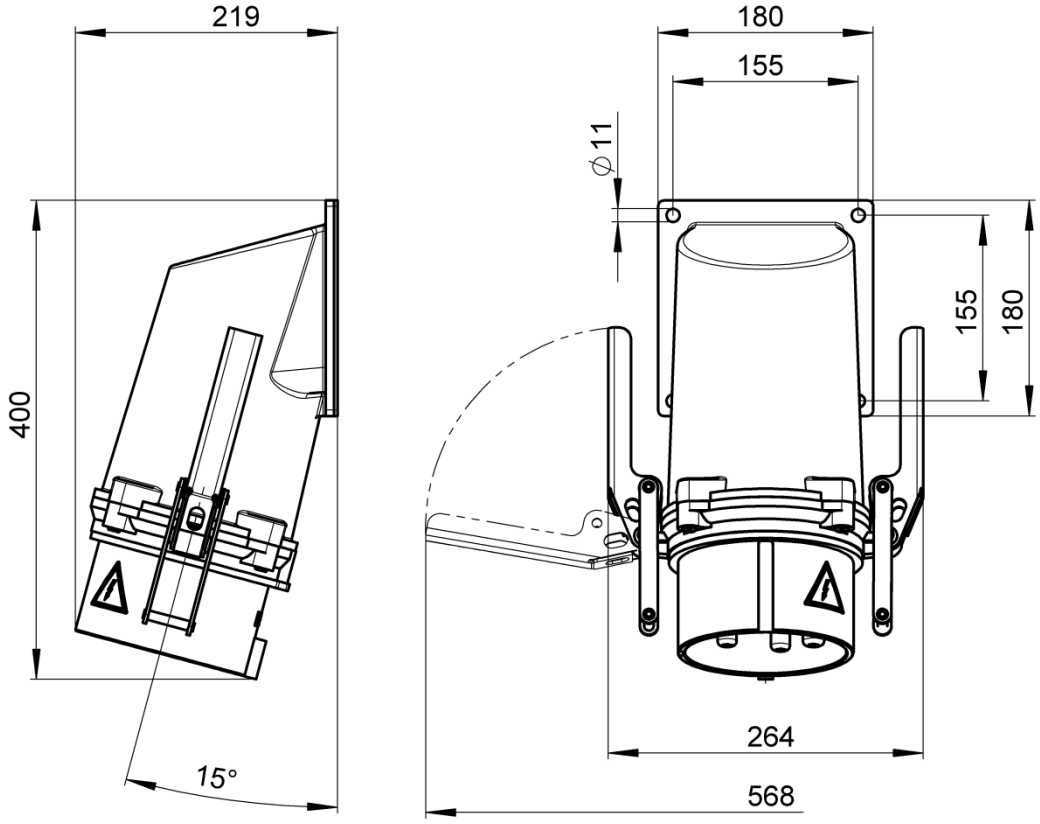


Fig. 20: Dimensions Male Connector Panel (Angled) MCPA B-Line, A-Line (250 A – 600 A) in mm

4.2. Technical specifications of Female Connectors

Available female connectors

- Female Connector FC
- Female Connector Wall FCW
- Female Connector Panel FCP
- Female Connector Panel (Angled) FCPA

Electrical Value D-Line, C-Line

	D-Line	C-Line	C-Line
Norminal current	**160 A**	**200 A**	**250 A**
Rated current	185 A	250 A	285 A
Rated voltage	1000 V	1000 V	1000 V
Rated frequency	50/60 Hz	50/60 Hz	50/60 Hz
Withstand voltage (1 Min / 50 Hz)	4000 V	4000 V	4000 V
Protection grade	IP 67	IP 67	IP 67
Ambient temperature	-40 - +100 °C	-40 - +100 °C	-40 - +100 °C
Insulation resistance Phase-phase and phase-earth	> 500 MΩ	> 500 MΩ	> 500 MΩ
Creep resistance of the insert	> 600 CTI	> 600 CTI	> 600 CTI
Minimum terminal cross-section EN 60228 Class 5	35 mm^2	35 mm^2	35 mm^2
Maximum terminal cross-section EN 60228 Class 5	150 mm^2	150 mm^2	150 mm^2
Maximum terminal cross-section - pilot EN 60228 Class 5	4 mm^2	4 mm^2	4 mm^2
Cable diameter	34 - 66 mm	34 - 66 mm	34 - 66 mm
Cable diameter - separate pilot cable	5 - 10 mm	5 - 10 mm	5 - 10 mm
Maximum rated current for pilot contact	500V	500V	500V

Technical specifications

Electrical Value B-Line

	B-Line	B-Line	B-Line
Norminal current	**250 A**	**315 A**	**400 A**
Rated current	315 A	250 A	450 A
Rated voltage	1000 V	1000 V	1000 V
Rated frequency	50/60 Hz	50/60 Hz	50/60 Hz
Withstand voltage (1 Min / 50 Hz)	4000 V	4000 V	4000 V
Protection grade	IP 67	IP 67	IP 67
Ambient temperature	-40 - +100 °C	-40 - +100 °C	-40 - +100 °C
Insulation resistance Phase-phase and phase-earth	> 500 MΩ	> 500 MΩ	> 500 MΩ
Creep resistance of the insert	> 600 CTI	> 600 CTI	> 600 CTI
Minimum terminal cross-section EN 60228 Class 5	70 mm^2	70 mm^2	70 mm^2*****
Maximum terminal cross-section EN 60228 Class 5	240 mm^2	240 mm^2	240 mm^2*****
Maximum terminal cross-section - pilot EN 60228 Class 5	4 mm^2	4 mm^2	4 mm^2
Cable diameter	34 - 66 mm	34 - 66 mm	34 - 66 mm
Cable diameter - separate pilot cable	8 - 15 mm	8 - 15 mm	8 - 15 mm
Maximum rated current for pilot contact	500V	500V	500V

*****On request with 150mm^2 to 300mm^2

Electrical Value A-Line

	A-Line	A-Line
Norminal current	**500 A**	**600 A**
Rated current	550 A	630 A
Rated voltage	1000 V	1000 V
Rated frequency	50/60 Hz	50/60 Hz
Withstand voltage (1 Min / 50 Hz)	4000 V	4000 V
Protection grade	IP 67	IP 67
Ambient temperature	-40 - +80 °C	-40 - +80 °C
Insulation resistance Phase-phase and phase-earth	> 500 MΩ	> 500 MΩ
Creep resistance of the insert	> 600 CTI	> 600 CTI
Minimum terminal cross-section EN 60228 Class 5	150 mm^2	150 mm^2
Maximum terminal cross-section EN 60228 Class 5	300 mm^2	300 mm^2
Maximum terminal cross-section - pilot EN 60228 Class 5	4 mm^2	4 mm^2
Cable diameter	55 - 85 mm	55 - 85 mm
Cable diameter - separate pilot cable	8 - 15 mm	8 - 15 mm
Maximum rated current for pilot contact	500V	500V

Technical specifications

Weight

Female Connector	Number of poles	D-Line	C-Line	B-Line	A-Line
Female Connector FC	4- pin (3L + PEN)	3,4 kg	3,4 kg	9,4 kg	10,5 kg
	5- pin (3L + N + PE)	3,6 kg	3,6 kg	9,9 kg	10,7 kg
Female Connector Wall FCW	4- pin (3L + PEN)	4,3 kg	4,3 kg	11,5 kg	12,0 kg
	5- pin (3L + N + PE)	4,5 kg	4,5 kg	12,0 kg	12,5 kg
Female Connector Panel FCP	4- pin (3L + PEN)	3,2 kg	3,2 kg	6,8 kg	7,0 kg
	5- pin (3L + N + PE)	3,5 kg	3,5 kg	7,3 kg	7,5 kg
Female Connector Panel (Angled) FCPA	4- pin (3L + PEN)	4,4 kg	4,4 kg	10,3 kg	10,3 kg
	5-pin (3L + N + PE)	4,6 kg	4,6 kg	10,8 kg	10,8 kg

Dimensions, Female Connector FC

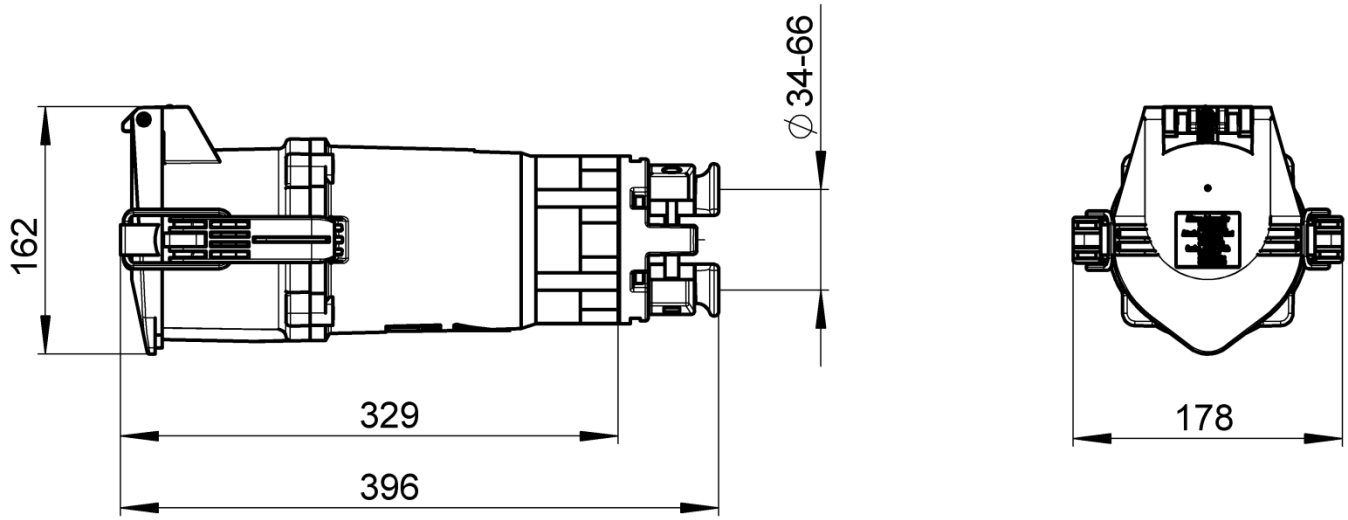


Fig. 21: Dimensions Female Connector FC D-Line, C-Line (160A – 250 A) in mm

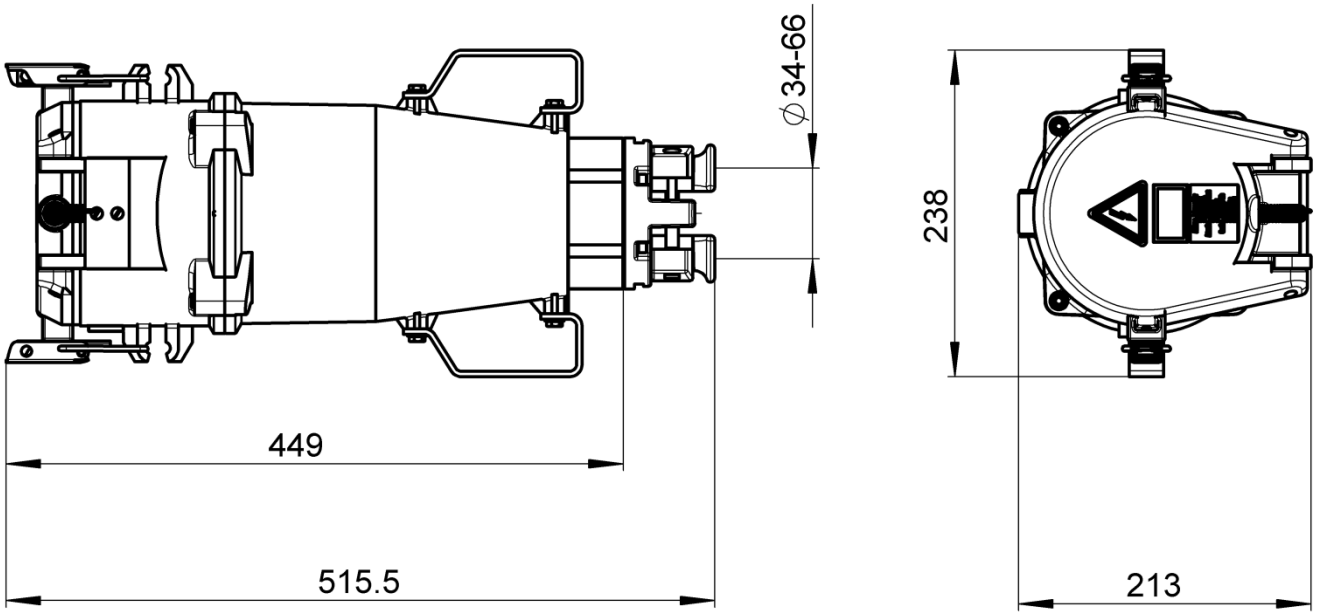


Fig. 22: Dimensions Female Connector FC B-Line (250 A – 400 A) in mm

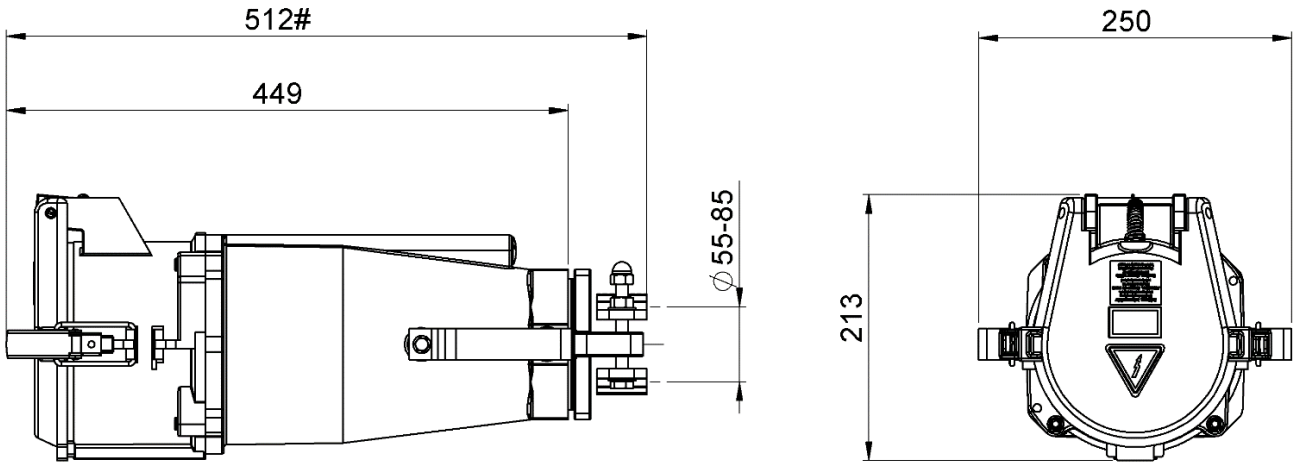


Fig. 23: Dimensions Female Connector FC A-Line (500 A – 600 A) in mm

Dimensions, Female Connector Wall FCW

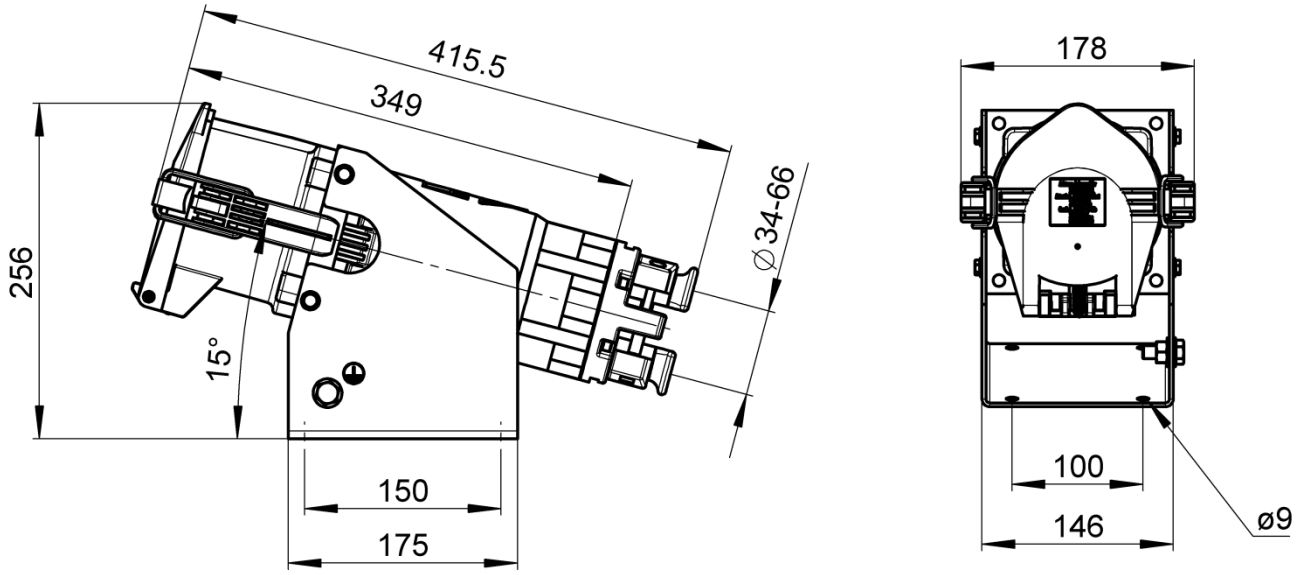


Fig. 24: Dimensions Female Connector Wall FCW D-Line, C-Line (160A – 250 A) in mm

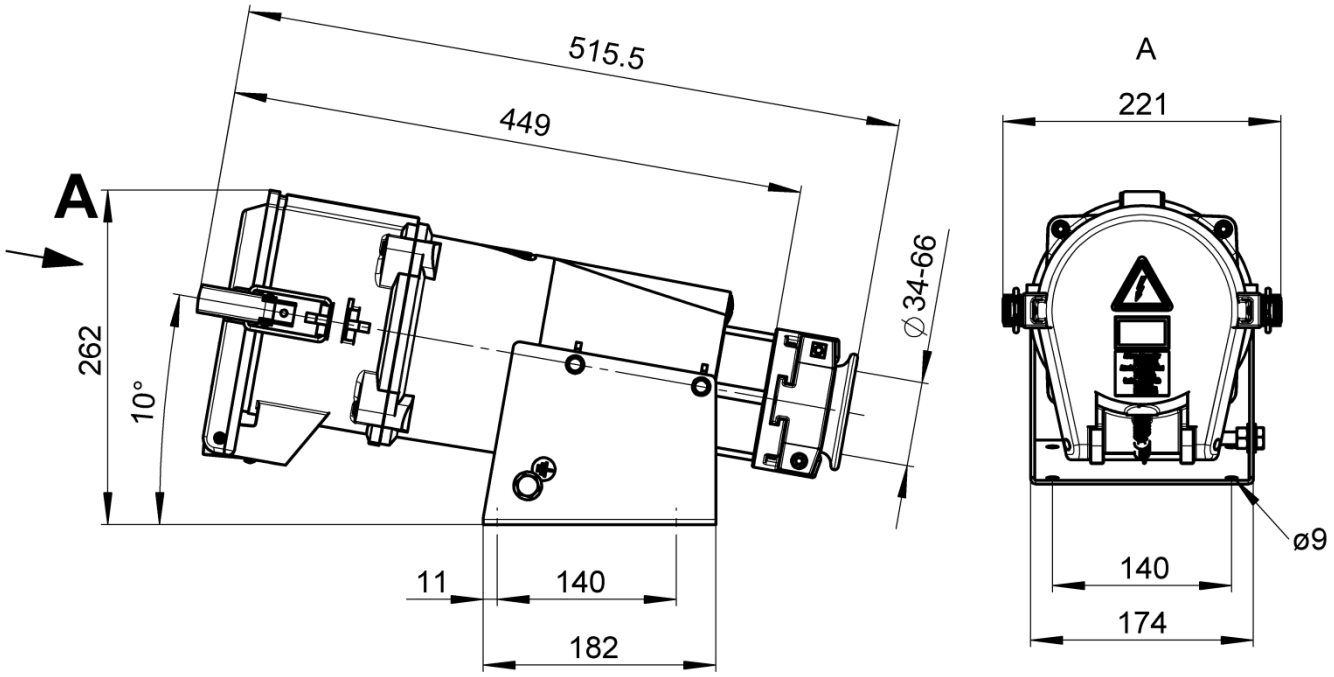


Fig. 25: Dimensions Female Connector Wall FCW B-Line (250 A – 400 A) in mm

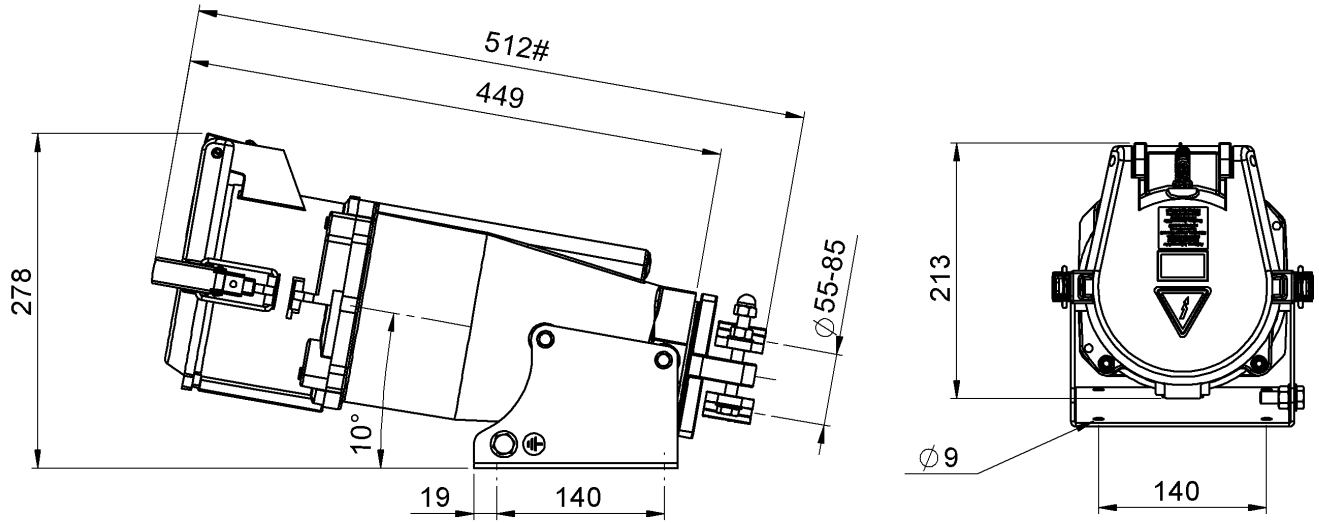


Fig. 26: Dimensions Female Connector Wall FCW A-Line (500 A – 600 A) in mm

Technical specifications

Dimensions, Female Connector Panel FCP

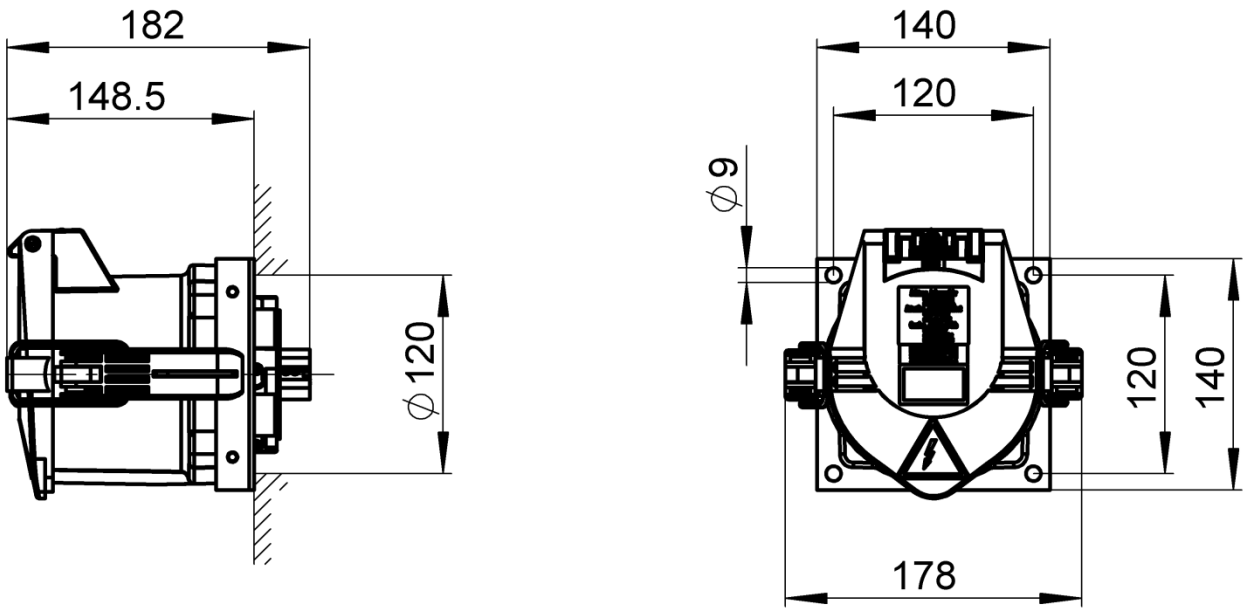


Fig. 27: Dimensions Female Connector Panel FCP D-Line, C-Line (160A – 250 A) in mm

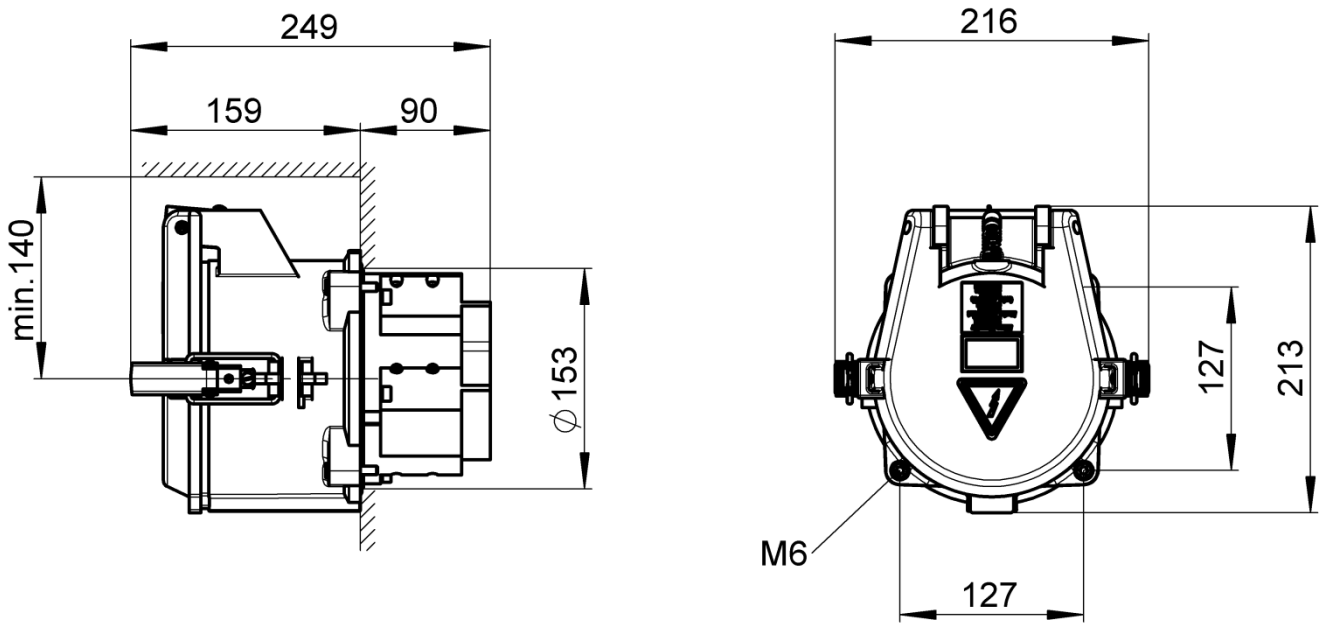


Fig. 28: Dimensions Female Connector Panel FCP B-Line, A-Line (250 A – 600 A) in mm

Dimensions, Female Connector Panel (Angled) FCPA

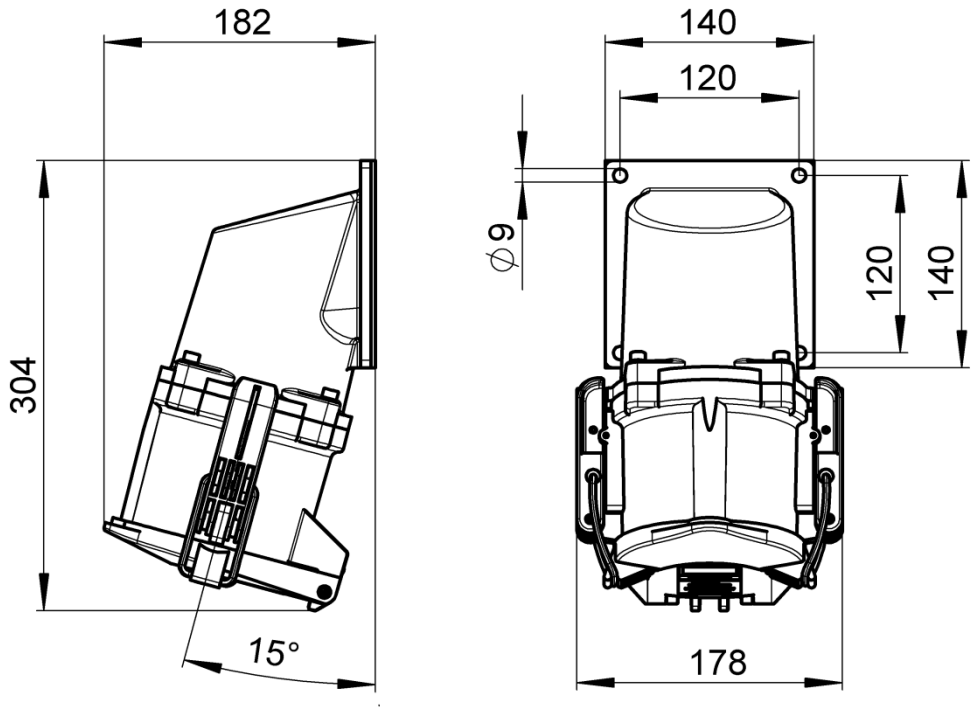


Fig. 29: Dimensions Female Connector Panel (Angled) FCPA D-Line, C-Line (160A – 250 A) in mm

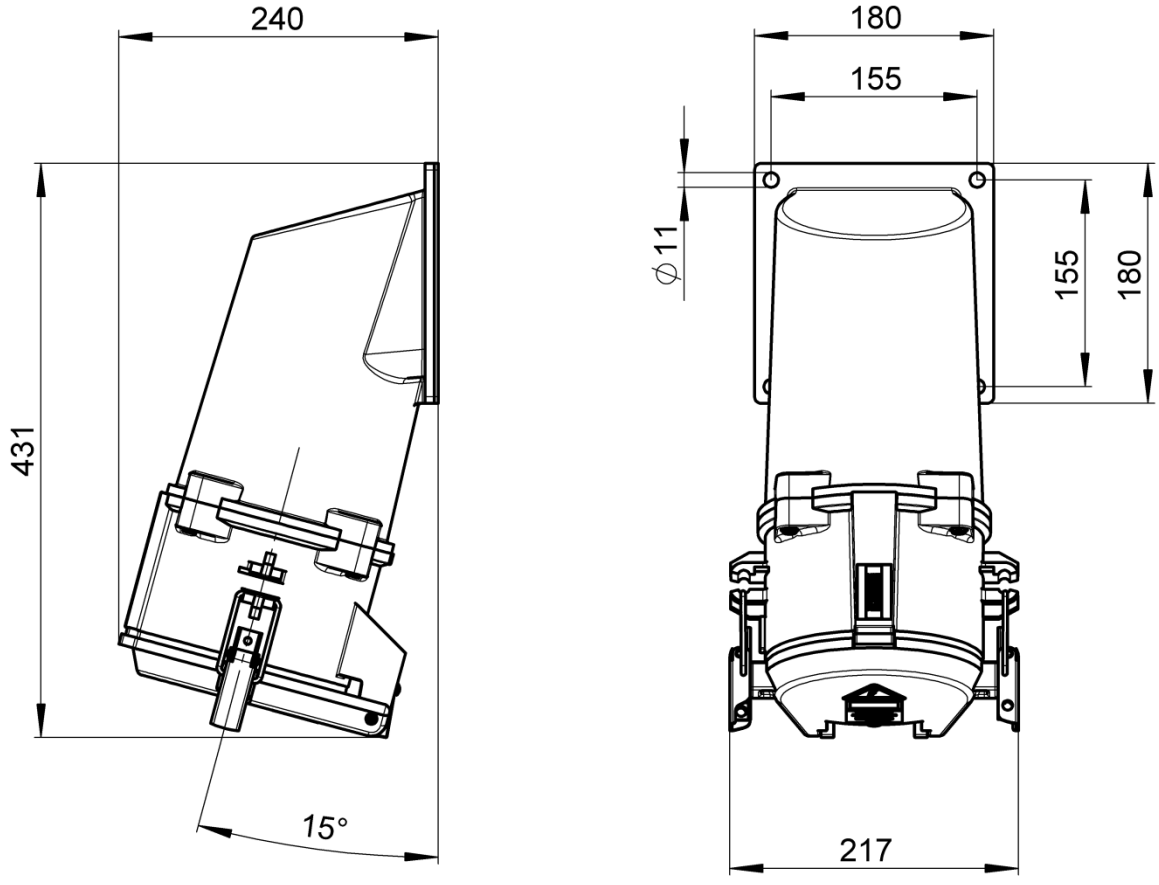


Fig. 30: Dimensions Female Connector Panel (Angled) FCPA B-Line, A-Line (250 A – 600 A) in mm

4.3. Technical specifications of Connector Units

Available Connector Units

- Connector Unit with Mechanical Interlock CUMI
- Connector Unit with Block Contactor CUBC
- Connector Unit with Circuit Breaker CUCB

Electrical Value D-Line

Size		160 A D-Line
Nominal current		160 A
Rated current		185 A
Rated voltage	Type CUMI	1000 V
	Type CUBC	1000 V
	Type CUCB	690 V
Rated frequency		50/60 Hz
Rated short-circuit limit breaking capacity Icu (400 V) type CUCB with power switch		36 kA
Thermomagnetic release type CUCB		to 250 A
Test voltage 1 minute at 50 Hz	Type CUMI	4000 V
	Type CUBC	4000 V
	Type CUCB	3000 V
Protection category, tested	Type CUMI	IP 55
	Type CUBC	IP 55
	Type CUCB	IP 54
Insulation resistance (Phase-phase and phase-earth)		> 500 MΩ
Creep resistance of the insert		> 600 CTI
Bolt plug for cable lugs	Type CUMI	M8
	Type CUBC	M8
	Type CUCB	M10
Maximum Terminal cross-section pilot, wire EN 60228 Class 1		4 mm²
Cable diameter		20 – 70 mm
Rated voltage for pilot		500V

Electrical Value C-Line

Grösse		200 A C-Line	250 A C-Line
Nennstrom		200 A	250 A
Bemessungsstrom		250 A	285 A
Bemessungsspannung	Typ CUMI	1000 V	1000 V
	Typ CUBC	1000 V	1000 V
	Typ CUCB	690 V	690 V
Bemessungsfrequenz		50/60 Hz	50/60 Hz
Bemessungsgrenzkurzschluss-Ausschaltvermögen Icu (400 V) Typ CUCB mit Leistungsschalter		36 kA	36 kA
Thermomagnetischer Auslöser Typ CUCB		bis 200 A	bis 250 A
Prüfspannung 1 Minute bei 50 Hz	Typ CUMI	4000 V	4000 V
	Typ CUBC	4000 V	4000 V
	Typ CUCB	3000 V	3000 V
Schutzart, geprüft	Typ CUMI	IP 55	IP 55
	Typ CUBC	IP 55	IP 55
	Typ CUCB	IP 54	IP 54
Isolationswiderstand (Phase-Phase und Phase-Erde)		> 500 MΩ	> 500 MΩ
Kriechstromfestigkeit des Einsatzes		> 600 CTI	> 600 CTI
Anschluss für Kabelschuhe	Typ CUMI	M8	M8
	Typ CUBC	M8	M8
	Typ CUCB	M10	M10
Maximaler Anschlussquerschnitt Pilot, Draht EN 60228 Klasse 1		4 mm²	4 mm²
Kabeldurchmesser		20 – 70 mm	20 – 70 mm
Bemessungsspannung für Pilotkontakt		500V	500V

Technical specifications

Electrical Value B-Line

Grösse		250 A B-Line	315 A B-Line	400 A B-Line
Nennstrom		250 A	315 A	400 A
Bemessungsstrom		315 A	380 A	450 A
Bemessungsspannung	Typ CUMI	1000 V	1000 V	1000 V
	Typ CUBC	1000 V	1000 V	1000 V
	Typ CUCB	690 V	690 V	690 V
Bemessungsfrequenz		50/60 Hz	50/60 Hz	50/60 Hz
Bemessungsgrenzkurzschluss-Ausschaltvermögen Icu (400 V) Typ CUCB mit Leistungsschalter		36 kA	36 kA	36 kA
Thermomagnetischer Auslöser Typ CUCB		bis 250 A	bis 315 A	bis 400 A
Prüfspannung 1 Minute bei 50 Hz	Typ CUMI	4000 V	4000 V	4000 V
	Typ CUBC	4000 V	4000 V	4000 V
	Typ CUCB	3500 V	3500 V	3500 V
Schutzart, geprüft	Typ CUMI	IP 55	IP 55	IP 55
	Typ CUBC	IP 55	IP 55	IP 55
	Typ CUCB	IP 54	IP 54	IP 54
Isolationswiderstand (Phase-Phase und Phase-Erde)		> 500 MΩ	> 500 MΩ	> 500 MΩ
Kriechstromfestigkeit des Einsatzes		> 600 CTI	> 600 CTI	> 600 CTI
Anschluss für Kabelschuhe	Typ CUMI	M10	M10	M10
	Typ CUBC	M10	M10	M10
	Typ CUCB	M10	M10	M10
Maximaler Anschlussquerschnitt Pilot, Draht EN 60228 Klasse 1		4 mm²	4 mm²	4 mm²
Kabeldurchmesser		20 – 70 mm	20 – 70 mm	20 – 70 mm
Bemessungsspannung für Pilotkontakt		500V	500V	500V

Electrical Value A-Line

Grösse		500 A A-Line	600 A A - Line
Nennstrom		500 A	600 A
Bemessungsstrom		550 A	630 A
Bemessungsspannung	Typ CUMI	1000 V	1000 V
	Typ CUBC	1000 V	1000 V
	Typ CUCB	690 V	690 V
Bemessungsfrequenz		50/60 Hz	50/60 Hz
Bemessungsgrenzkurzschluss-Ausschaltvermögen Icu (400 V) Typ CUCB mit Leistungsschalter		36 kA	36 kA
Thermomagnetischer Auslöser Typ CUCB		bis 500 A	bis 600 A
Prüfspannung 1 Minute bei 50 Hz	Typ CUMI	4000 V	4000 V
	Typ CUBC	4000 V	4000 V
	Typ CUCB	3500 V	3500 V
Schutzart, geprüft	Typ CUMI	IP 55	IP 55
	Typ CUBC	IP 55	IP 55
	Typ CUCB	IP 54	IP 54
Isolationswiderstand (Phase-Phase und Phase-Erde)		> 500 MΩ	> 500 MΩ
Kriechstromfestigkeit des Einsatzes		> 600 CTI	> 600 CTI
Anschluss für Kabelschuhe	Typ CUMI	M10	M10
	Typ CUBC	M10	M10
	Typ CUCB	M10	M10
Maximaler Anschlussquerschnitt Pilot, Draht EN 60228 Klasse 1		4 mm²	4 mm²
Kabeldurchmesser		20 – 70 mm	20 – 70 mm
Bemessungsspannung für Pilotkontakt		500V	500V

Weight

		C-Line		B-Line		
Connector	**Number of poles**	**200 A**	**250 A**	**250 A**	**315 A**	**400A**
CUMI	4-pin (3L + PEN)	25,1 kg		45,6 kg		
	5-pin (3L + N + PE)	25,3 kg		47,1 kg		
CUBC	4-pin (3L + PEN)	25,1 kg		45,6 kg		
	5-pin (3L + N + PE)	25,3 kg		47,1 kg		
CUCB	4-pin (3L + PEN)	25,1 kg		45,6 kg		
	5-pin (3L + N + PE)	25,3 kg		47,1 kg		

Technical specifications

Dimensions, Connector Unit with mechanical interlock CUMI

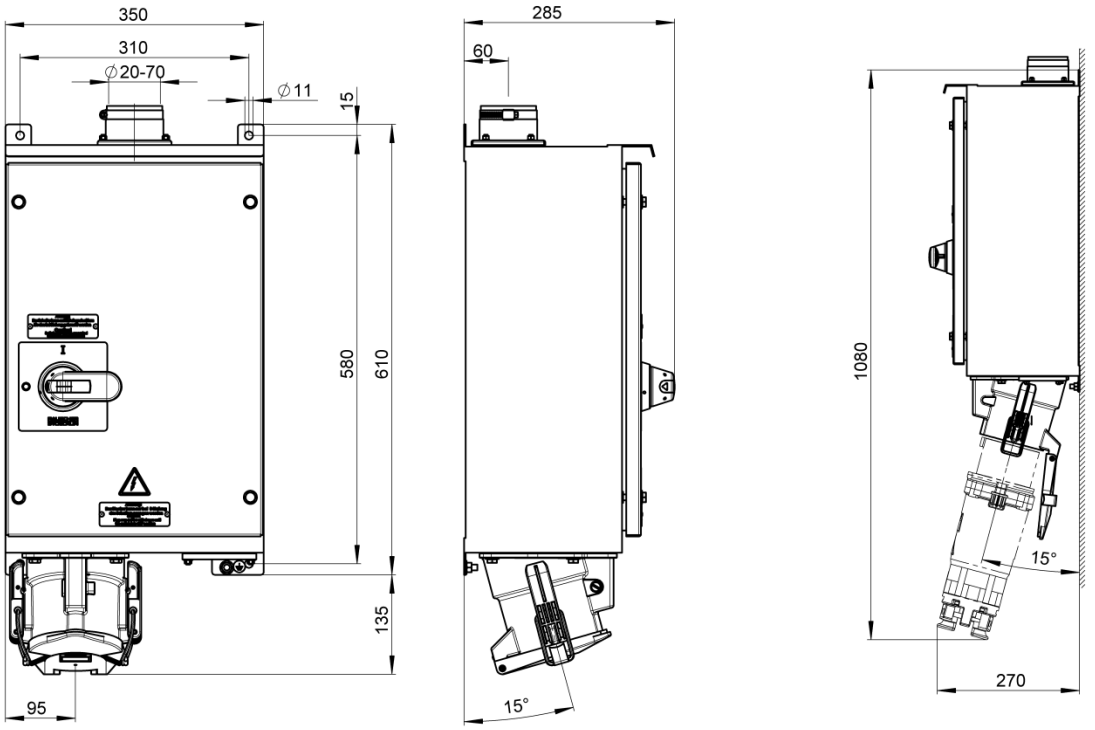


Fig. 31: Dimensions Connector Unit with mechanical interlock CUMI C-Line (200A – 250 A) in mm

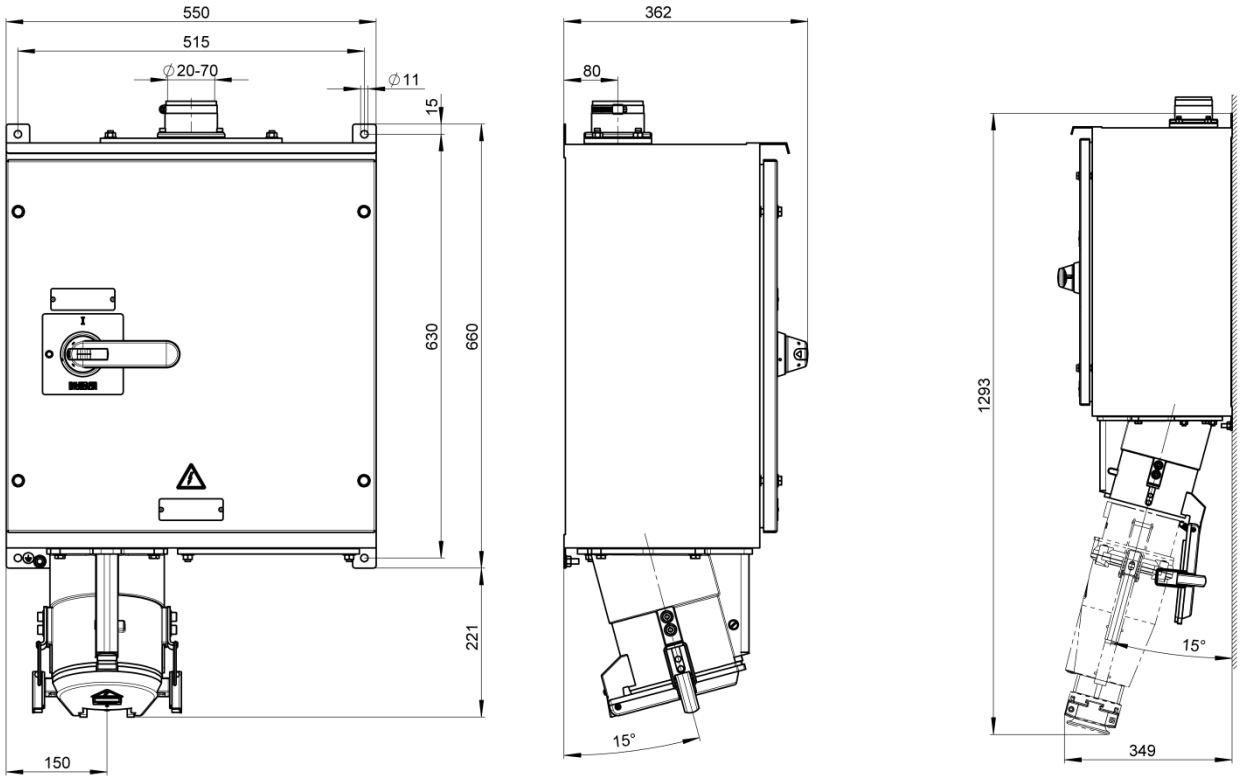


Fig. 32: Dimensions Connector Unit with mechanical interlock CUMI B-Line (250 A – 400 A) in mm

Dimensions, Connector Unit with Block Contactor CUBC

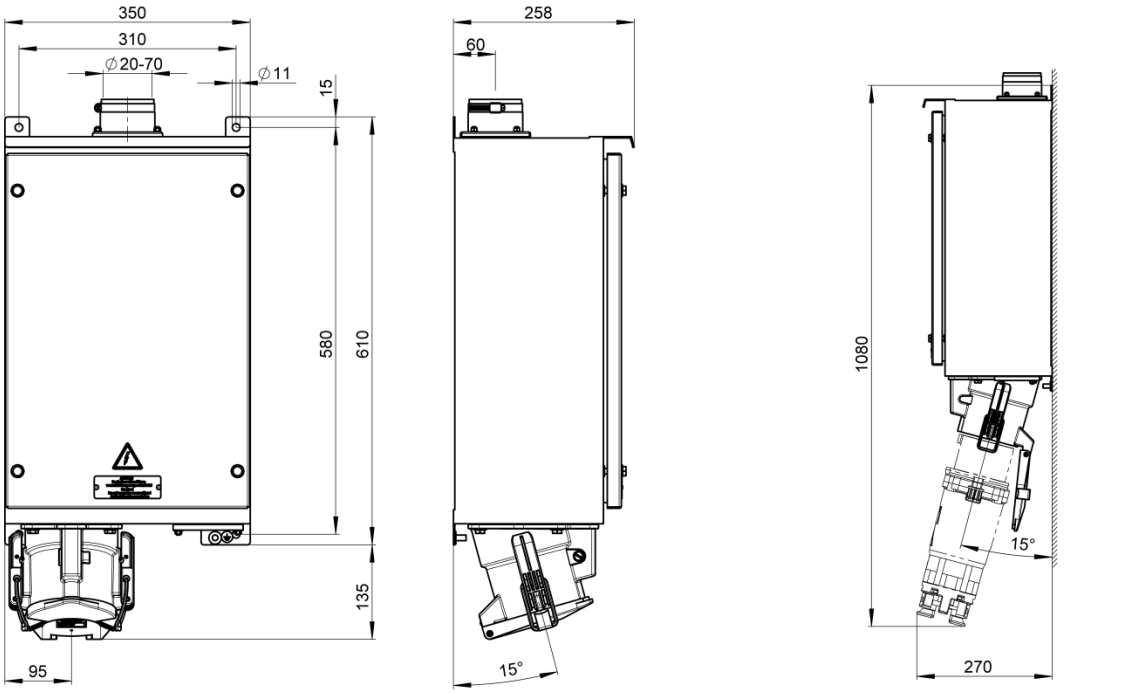


Fig. 33: Dimensions, Connector Unit with Block Contactor CUBC C-Line (200A – 250 A) in m

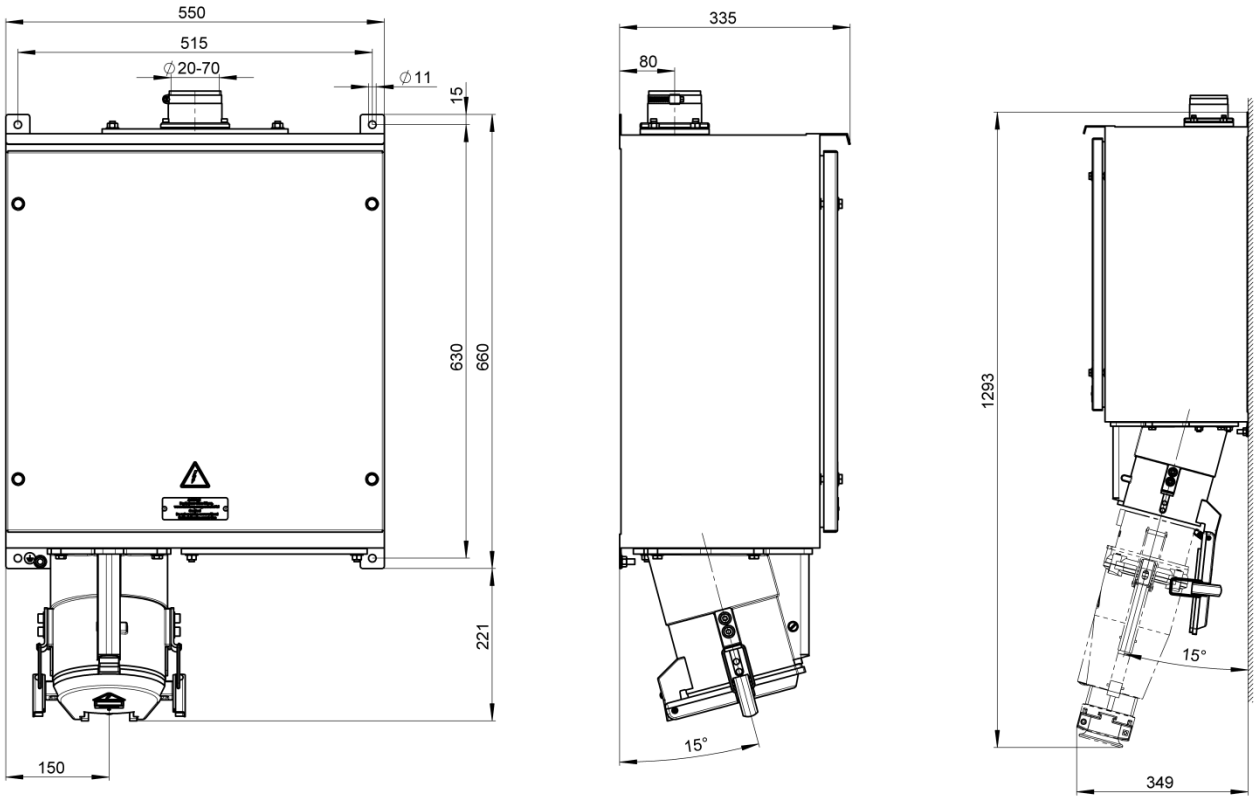


Fig. 34: Dimensions, Connector Unit with Block Contactor CUBC B-Line (250 A – 400 A) in mm

Dimensions, Connector Unit with Circuit Breaker CUCB

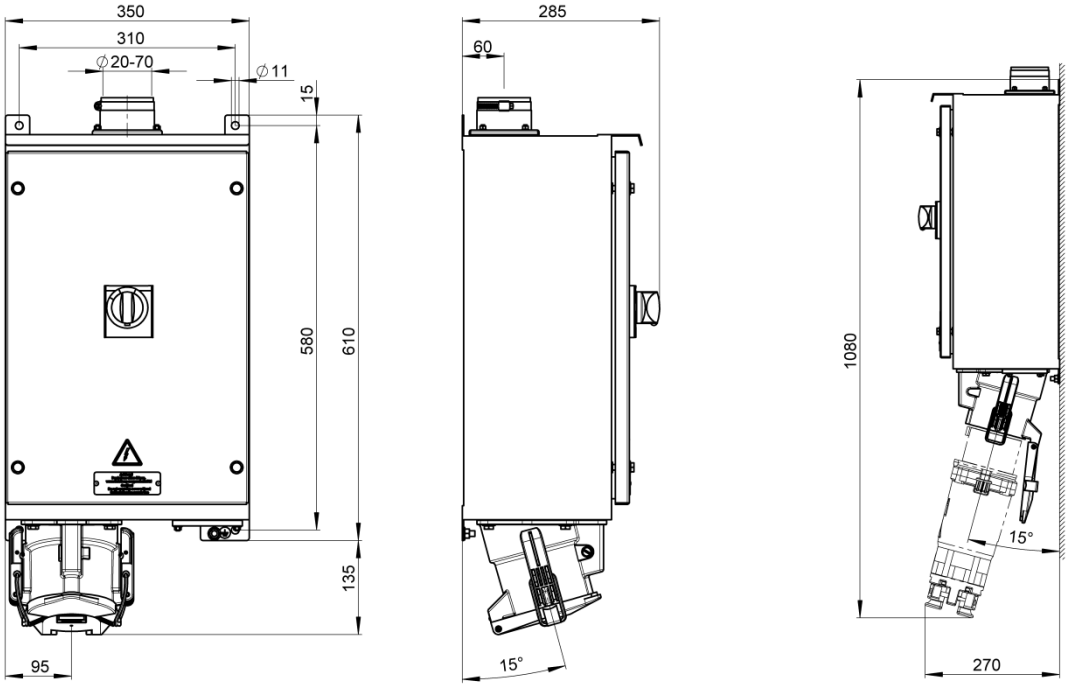


Fig. 35: Dimensions, Connector Unit with Circuit Breaker CUCB C-Line (200A – 250 A) in mm

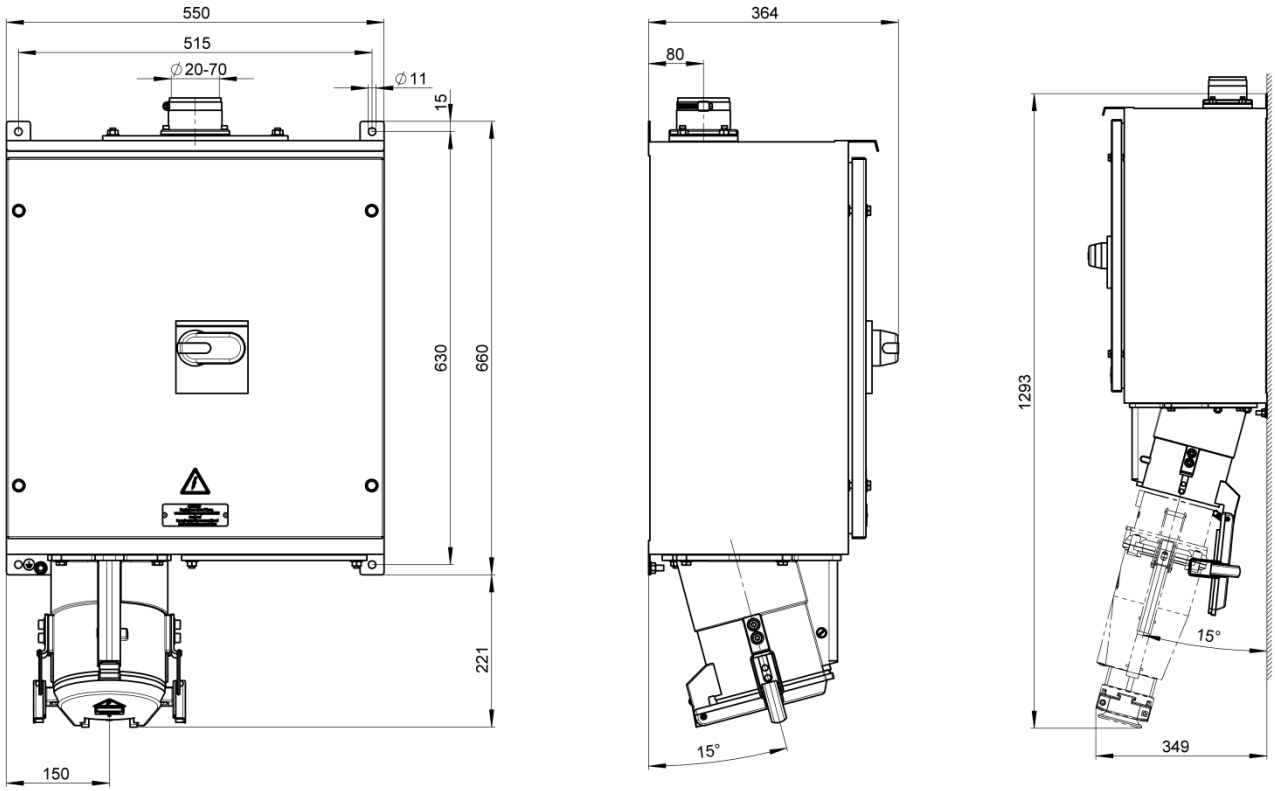


Fig. 36: Dimensions, Connector Unit with Circuit Breaker CUCB B-Line (250 A – 400 A) in mm

5. Overview

5.1. Overview – Male Connectors

Basic design

Fig. 37: Male Connector MC C-Line

1 Contact pins

2 Nose

The contact pins (Fig. 37 /1) make contact with the matching Female Connectors.

The nose (Fig. 37 /2)) indicates the position of the earth return's contact pin. The nose ensures that the connector will always be inserted in the correct position into the Female Connector.

Male Connector MC

Fig. 38:Male Connector MC C-Line (left) and B-Line (right)

1 Contact pin

2 Nose

3 Strain relief

4 Locking leversl

A strain relief on the Male Connectors MC secures the connected cables (Fig.38 /3).

Locking levers (Fig. 38 /4) on Male Connectors MC B-Line are used as insertion and removal aids.

Male Connector Wall MCW

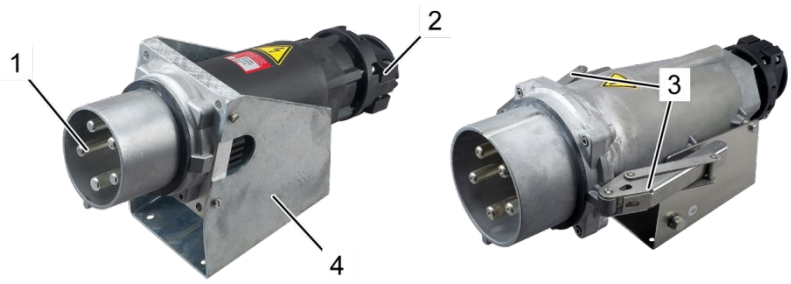


Fig. 39: Male Connector Wall MCW C-Line (left) and B-Line (right)

1 Contact pins

2 Strain relief

3 Locking levers

4 Housing for wall installation

Male Connector MCW are used for installation inside a housing or on the wall (Fig. 39 /4).

Locking levers on Male Connectors MCW B-Line are used as insertion and removal aids (Fig. 39 /3).

Overview

Male Connector Panel MCP

Male Connector Panel MCP are used for installation inside a housing or on the wall (Fig. 40 /1).

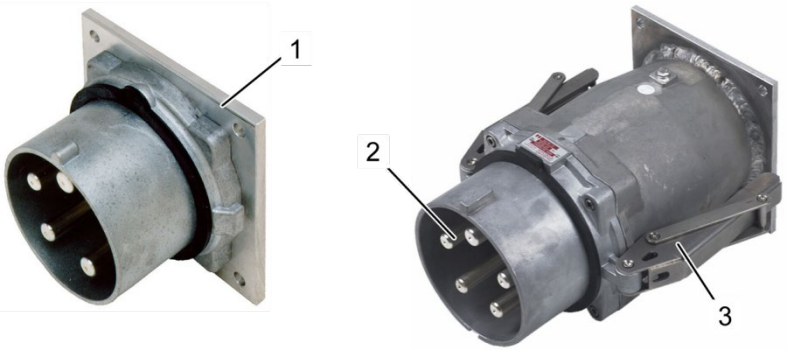


Fig. 40: Male Connector Panel MCP C-Line (left) and B-Line (right)

1 Mounting plate
2 Contact pins
3 Locking levers

Locking levers on Male Connector Panel MCP B-Line are used as insertion and removal aids (Fig. 40 /3).

Male Connector Panel (Angled) MCPA

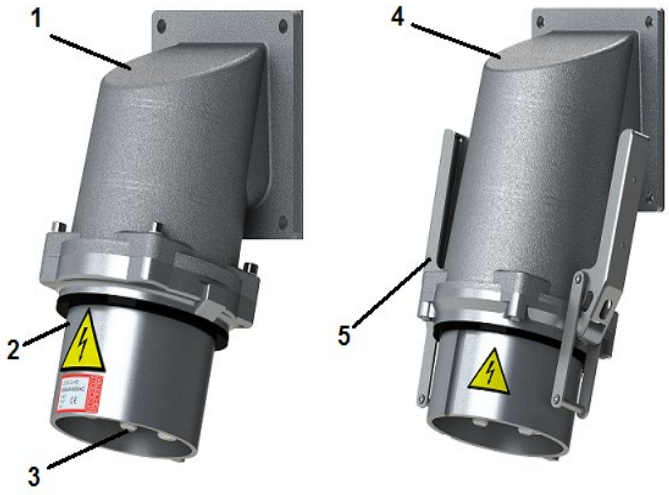


Fig. 41: Male Connector Panel (Angled) MCPA C-Line (left) and B-Line (right)

1 Angled Housing C-Line
2 Connector collar
3 Contact pins
4 Angle housin B-Line

Male Connector Panel (Angled) are used for installation inside a housing or on the wall (Fig.41/4).

Locking levers on Male Connectors Wall MCW B-Line are used as insertion and removal aids (Fig. 41 /5).

5.2. Overview – Female Connectors

Basic design

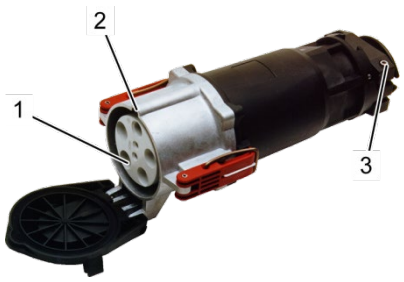


Fig. 42: Female Connector FC C-Line

1 Female contacts
2 Groove
3 Strain relief

The female contacts (Fig. 42 /1) make contact with the matching connectors. Thanks to the groove (Fig. 42 /2) a plug cannot be inserted into the Female Connector unless it is positioned correctly.

The strain relief (Fig. 42 /3) secures the connected cables.

Female Connector FC

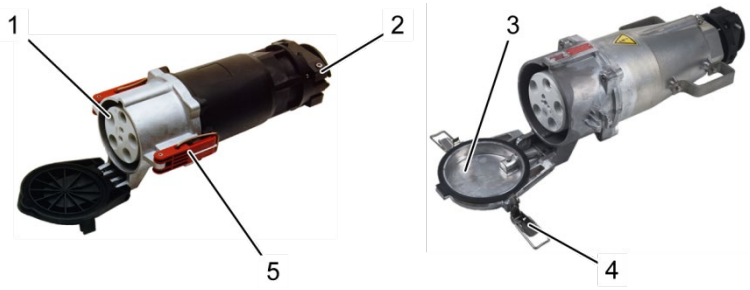


Fig. 43: Female Connector FC C-Line (left) and B-Line (right)

1 Female contacts
2 Strain relief
3 Cover
4 Cover lock
5 Locking levers

The cover (Fig. 43 /3) protects the female contacts against dirt. The Female Connectors FC B-Line are fitted with cover locks (Fig. 43/4).

Locking levers on Female Connector FC C-Line are used as insertion and removal aids (Fig. 43 /5).

Overview

Female Connector Wall FCW

Female Connector Wall FCW are used for installation inside a housing or on the wall (Fig. 44 /5).

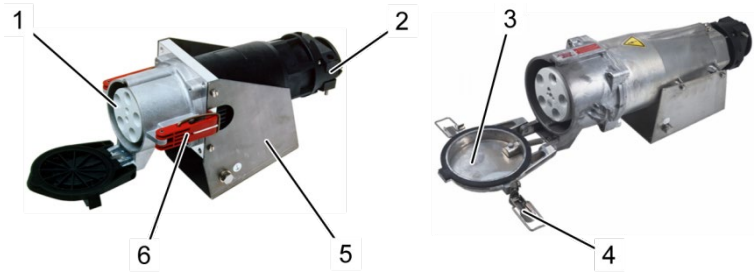


Fig. 44: Female Connector Wall FCW C-Line (left) and B-Line (right)

1 Female contacts
2 Strain relief
3 Cover
4 Cover lock
5 Housing for wall installation
6 Locking levers

The cover (Fig. 44 /3) protects the female contacts against dirt. The Female Connector Wall FCW B-Line are fitted with cover locks (Fig. 44 /4).

Locking levers on Female Connector Wall FCW C-Line are used as insertion and removal aids (Fig. 44 /6).

Female Connector Panel FCP

Female Connector Panels FCP C-Line are used for installation inside a housing or on the wall (Fig. 45 /2). Female Connector Panels FCP B-Line are used for installation inside the wall (Fig. 45 /3).

Fig. 45: Female Connector Panel FCP C-Line (left) and B-Line (right)

1 Female contacts
2 Mounting plate
3 Fitting
4 Cover lock
5 Cover
6 Locking levers

The cover (Fig. 45 /5) protects the female contacts against dirt. The Female Connector Panels FCP B-Line are fitted with cover locks (Fig. 45 /4).

Locking levers on Female Connector Panel FCP C-Line are used as insertion and removal aids (Fig. 45 /6).

Female Connector Panel (Angled) FCPA

Female Connector Panel (Angled) FCPA are used for installation inside a housing or on the wall (Fig. 46 /2).

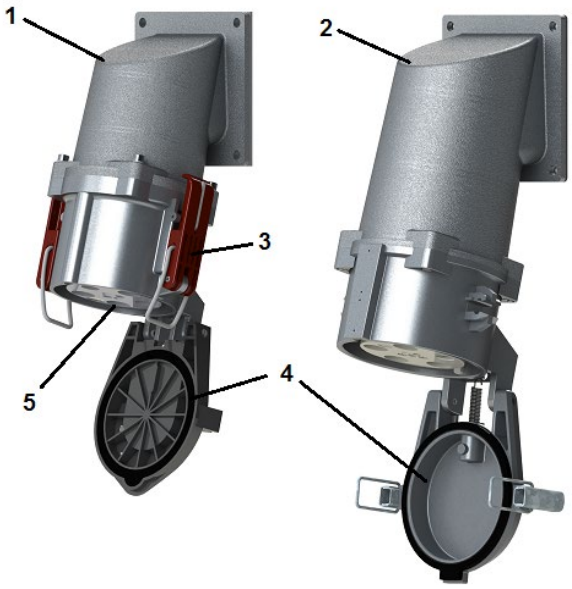


Fig. 46: Female Connector Panel (Angled) FCPA C-Line (left) and B-Line (right)

1 Angled housing C-Line
2 Angled housing B-Line
3 Locking levers
4 Cover
5 Female contact

The cover (Fig.46 /5) protects the female contacts against dirt. The Female Connector Panels FCPA B-Line are fitted with cover locks (Fig.46 /4).

Locking levers on Female Connector Panel FCPA C-Line are used as insertion and removal aids (Fig .46 /6).

5.3. Overview – Connector Units

Basic design

Connector Units are used for installation on the wall (Fig. 47 /1).

A cable entry sleeve (Fig. 47 /2) is located at the top. Another drill hole through which cables can be inserted is located at the bottom of the housing, allowing Connector Units to be installed at the top or the bottom.

Fig. 47: Connector Unit with mechanical interlock CUMI

1 Drill hole for wall installation
2 Cabel entry sleeve
3 Circuit breaker
4 Female contacts
5 Locking levers

The female contacts that can be used for suitable connectors are located at the bottom of the Connector Unit (Fig. 47 /4). Locking levers are used as insertion and removal aids (Fig. 47 /5).

Connector Unit with mechanical interlock CUMI

The 3-pin circuit breaker (Fig. 48 /3) is used to switch the power supply on and off. The circuit breaker can be locked to ensure that the power supply will not come back on.

The Connector Unit, switched, CUMI has a mechanical safety mechanism which ensures that connectors cannot be inserted or withdrawn under load (*section 2.6.3 „Mechanical interlock“ on page 14*).

Fig. 48: Recptacle Mechanically Switched and Interlocked CUMI

1 Drill hole for wall installation
2 Cabel entry sleeve
3 Circuit breaker
4 Female contacts
5 Locking levers

Overview

Connector Unit with Block Contactor CUBC

The Connector Unit with Block Conactor CUBC is fitted with a 3-pin contactor.

The following voltage types and quantities can be used as control voltage:

- 24 VDC
- 48 VDC
- 230 VAC
- 400 VAC

The accurate control voltage is specified on the rating plate.

Fig. 49: Connector Unit with Block Contactor CUBC

1 Drill hole for wall installation
2 Cabel entry sleeve
3 Female contacts
4 Locking levers

Connector Unit with Circuit Breaker CUCB

The 3-pin Circuit Breaker (Fig. 50 /3) is fitted with a thermomagnetic release and used to switch the power supply on and off.

The following voltage types and quantities can be used as control voltage:

- 24 VDC
- 48 VDC
- 230 VAC
- 400 VAC

The accurate control voltage is specified on the rating plate.

Fig. 50: Connector Unit with Circuit Breaker CUCB

1 Drill hole for wall installation
2 Cabel entry sleeve
3 Circuit Breaker
4 Female contacts
5 Locking levers

5.4. Accesories

Cover cap

Fig. 51: Cover cap

Available for the following device types:

- Male Connector Panel MCP
- Male Connector Wall MCW
- Male Connector MC
- Male Connector Panel (Angled) MCPA

Nominal current	Weight
D-Line, C-Line: 160 A - 250 A	0,83 kg
B-Line, A-Line: 250 A - 600 A	1,20 kg

Angled cable gland for seperate pilot cable

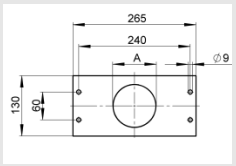
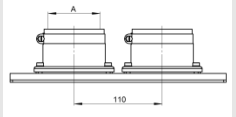
Fig. 52: Angled cable gland

Available for the following device types:

- Male Connector Wall MCW
- Female Connector FC
- Female Connector Wall FCW
- Male Connector MC

Nominal current	Thread	Cable diameter	Weight
D-Line, C-Line: 160 A - 250 A	PG11	5 - 10 mm	0,03 kg

Cover plates matching the Connector Units

Discription	Dimension drawing	Thread A	Weight
Cover plate including one cable entry sleeve for B-Line, A-Line		1xM64x2	0,50 kg
		1xM80x2	0,46 kg
		1xM94x2	0,60 kg
Cover plate including two cable entry sleeves for B-Line, A-Line		2 x ø70	1,18 kg

5.5. Combination options

Fig. 51 shows an overview of the possible combinations that can be achieved with the high-current connectors.

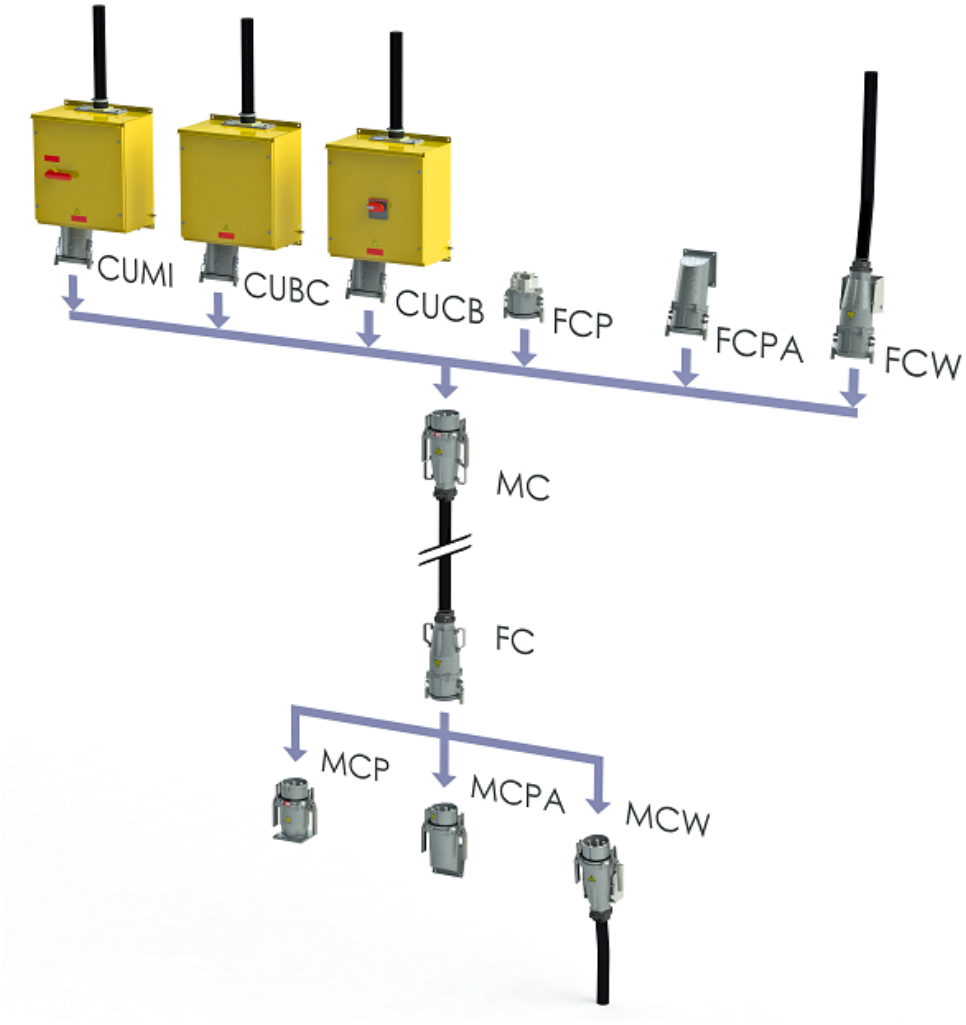


Fig. 53: Overview of possible combinations

Available high-current connectors

The following high-current connectors are available:

- Male Connector MC
- Male Connector Wall MCW
- Male Connector Panel MCP
- Male Connector Panel (Angled) MCPA
- Female Connector FC
- Female Connector Wall FCW
- Female Connector Panel FCP
- Female Connector Panel (Angled) FCPA
- Connector Unit with mechanical interlockCUMI
- Connector Unit with Block Contactor CUBC
- Connector Unit with Circuit Breaker CUCB

6. Installation

Electric current

DANGER!
Danger to life from electric current!

There is danger to life if work is performed on live components.

- Before commencing any work, ensure that the cable you want to connect is not live.
- Have all work on electrical components performed by qualified electricians.
- Secure the Connector Unit, switched, CUMI to prevent accidental restoration of power (*„Securing against accidental restoration of power“ on page 66*).
- Use a padlock at the handle to secure the Connector Unit with Circuit Breaker CUCB in order to prevent accidental restoration of power.

6.1. Connecting Male Connector and Female Connector

Connecting the different types

- Male Connector MC
- Male Connector Wall MCW
- Male Connector Panel MCP
- Male Connector Panel (Angled) MCPA
- Female Connector FC
- Female Connector Wall FCW
- Female Connector Panel FCP
- Female Connector Panel (Angled) FCPA

Pilot contacts

DANGER!
Risk of injury from non-operational pilot contacts!

Pilot contacts ensure the operation of the electrical interlock. There is danger to life if pilot contacts are missing or connected incorrectly.

- When using extension cords, include the pilot contacts in the extension cord connection.
- Ensure that the pilot contacts have been properly connected prior to start-up.

Installing

Personnel: ■ Qualified electrician

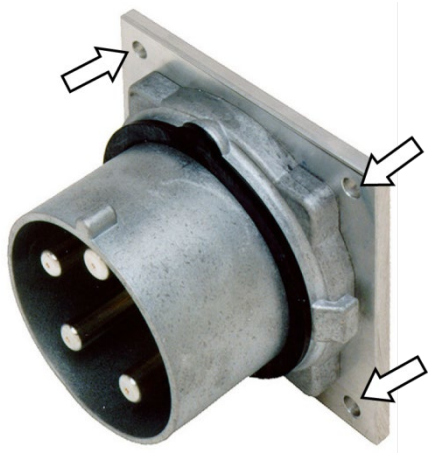


Fig. 54: Drill hole for installation

1. If necessary, install the Male Connector or Female Connector to a housing or the wall using drill holes (Fig. 54 /Arrows) .

Information: Type MCP,FCP,MCPA and FCPA

When mounting, make sure that the mounting holes are sealed.

E.g. with sealant or gaskets

Take the weight into consideration (*section4 „Technical specifications“ on page 19*).

Removing the insulation

- Proceed as specified in Fig. 55 if no pilot contacts are present.
- Proceed as specified in Fig. 56 if pilot contacts have been integrated.
- Proceed as specified in Fig. 57 if the pilot contacts are separate.

1. Pull the cable gland (Fig. 55 /1, Fig. 56 /1 bzw. Fig. 57 /1) over the cable

Cables without pilot contacts

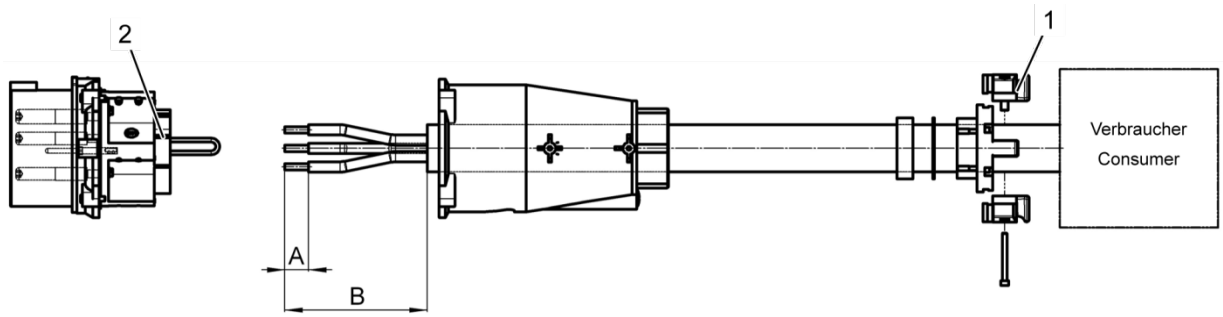


Fig. 55: Schematic for cables without pilot contacts

1 Cable gland

2 Female contacts

1.

	D-Line, C-Line	B-Line, A-Line
Length	**160 A – 250 A**	**250 A - 600 A**
A	30 mm	60 mm
B	150 mm	200 mm

Strip off the exterior insulation along length B (Fig. 55).

2. Strip the insulation off each individual line along length A (Fig. 55).

Cabels with integrated pilot contacts

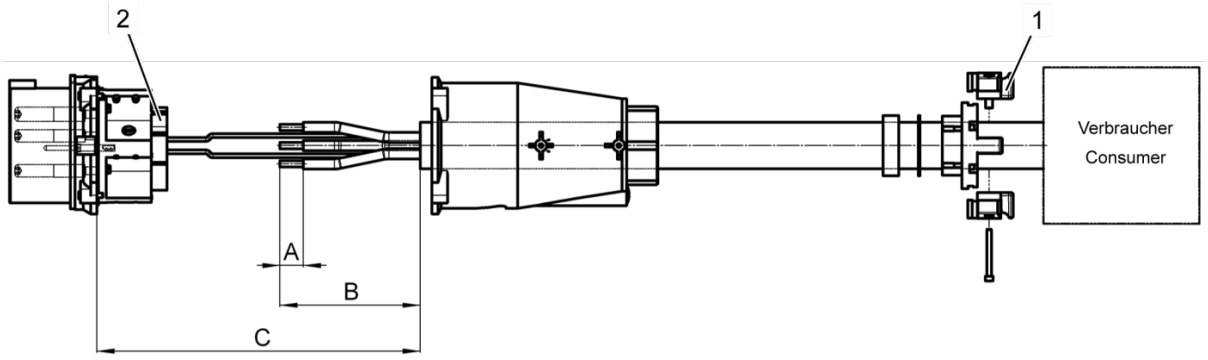


Fig. 56: Schematic for cables with integradet pilot contacts

1 Cable gland

2 Female contacts

1.

	D-Line, C-Line	B-Line, A-Line
Length	**160 A – 250 A**	**250 A – 600 A**
A	30 mm	60 mm
B	150 mm	200 mm
C	200 mm	400 mm

Strip off the exterior insulation along length B (Fig. 56).

2. Strip the insulation off each individual line along length A (Fig. 56) Length C represents the length of the integrated pilot contact.

Cabel with separate pilot contacts

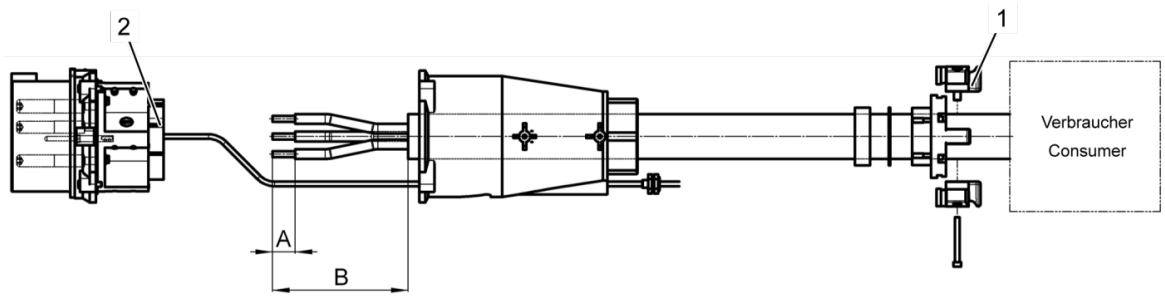


Fig. 57: Schematic for cables with separate pilot contacts

1 Cabel gland

2 Female contacts

1.

	D-Line, C-Line	B-Line, A-Line
Length	**160 A – 250 A**	**250 A – 600 A**
A	30 mm	60 mm
B	150 mm	200 mm

Strip off the exterior insulation along length B (Fig. 57).

2. Strip the insulation off each individual line along length A (Fig. 57).

3. Strip the insulation off the pilot contacts along length A (Fig. 57) abisolieren.

4. Fit the pilot cable with an angled cable gland as specified in Fig. 58 when using 160A – 250A C-Line high-current connectors.

For information on the angled cable gland, see *section 5.4 „Accesories“ on page 54*.

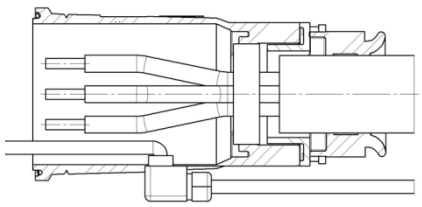


Fig. 58: Angled cable gland

Screwing in place

1. Screw the female contact (Fig. 55 /2, Fig. 56 /2 bzw. Fig. 57 /2) to the cable.

2. Connect the cable using the cage clamps.

3. Tighten all screws.

4. If necessary, tighten the screws of the strain relief to fix the cable in place (59/arrows). Manually with a max. 3Nm.

Fig. 59: Strain relief

6.2. Connecting Connector Units

Personnel: ■ Qualified electrician

Fig. 60: Drill holes in the housing

1. Use a suitable lifting device to hold the housing up to the wall and fix it in place using the 4 drill holes (Fig. 60 /arrows).

   Take the weight of the Connector Units into consideration (*Section 4 „Technical specifications“ on page 19*).

Fig. 61: Screws on the cover

2. Loosen and remove the screws from the cover (Fig. 61 /Arrows).

   Take off the cover.

Fig. 62: Cable entry sleeve

3. Route the cable into the housing through the cable entry sleeve.
4. Connect the cables to the existing terminals. Pay attention to the correct screw tightening torque that needs to be applied to the cable lugs (*„Screw tightening torques – cable lugs“ on page 19*).

   If applicable, make the connection directly to the Circuit Breaker, the circuit breaker or the contactor.
5. Connect the earth return.
6. Refit the cover on the housing.

6.3. Tests prior to start-up

Inspection by a qualified electrician

Personnel: ■ Qualified electriciant

1. Check if the electrical interlock functions properly.
2. Check if the mechanical interlock functions properly.
3. Make sure that conductor and earth return are properly connected in accordance with the labelling on the connecting terminals.
4. Make sure the pilot contacts are properly connected.
5. Make sure the contact screws are properly connected and tightened to the specified screw tightening torque *Kapitel 4 „Technical specifications“ on page 19*.
6. Make a high voltage test.

Inspection by the operator

Personnel: ■ Operator

1. Make sure the technical specifications given on the rating plate correspond to the necessary operating data.

Fig. 63: Strain relief

2. If applicable, ensure that the screws of the strain relief have been tightened Manually with a max. 3Nm (Fig. 63 /arrows).
3. If applicable, make sure that all screws on the housings and walls have been tightened.

7. Powering up and powering down

Insertion and removal

DANGER!
Danger to life from electric current!

There is a risk of sustaining life-threatening injuries if high-current connectors are inserted or withdrawn while they are live.

- Never Male Connector in or pull out the devices under load.

CAUTION!
Crushing hazard when inserting and withdrawing devices!

There is a risk of sustaining crushing injuries to the hands when Male Connector and Female Connector are inserted and withdrawn.

- Use the locking levers on Male Connector and Female Connectorat the same time on both sides when inserting and removing these devices.
- Wear safety gloves.

Personnel: ■ Operator

Protective equipment: ■ Safety gloves

The locking levers fitted on the Male Connector and Female Connector facilitate insertion and removal.

The functional principle is explained by means of connector MC B-Line

Insertion

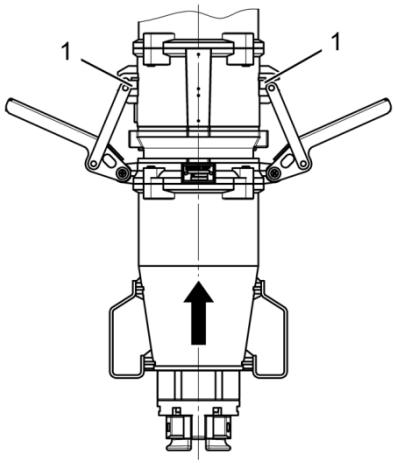


Fig. 64: Hooking in the locking levers

1. Push the Male Connector into the Female Connector. Use your body to support the connector.
2. Hook the locking levers of the Male Connector into the groove of the Female Connector (Fig. 64 /1).

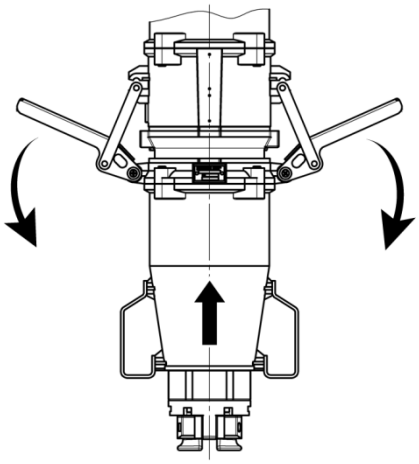


Fig. 65: Closing the locking levers

3. Pull both locking levers towards your body at the same time in order to close the locking levers (Fig. 65 /arrows).

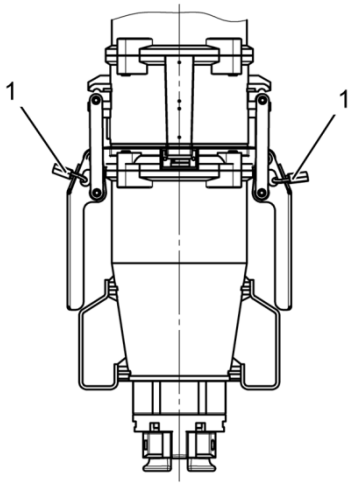


Fig. 66: Securing the locking levers

4. Use a padlock to secure the locking levers (Fig. 66 /1).

Removal

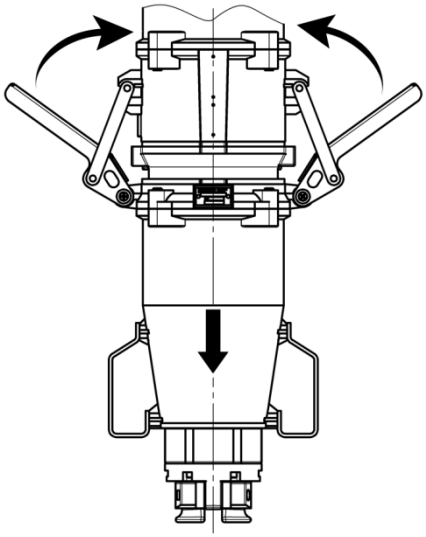


Fig. 67: Opening the locking levers

5. Remove the padlock.
6. Use your body to support the connector.
7. Push the locking levers up (Fig. 67 /Arrows), to open the locking levers.
8. Remove the Male Connector from the Female Connector.

Powering on and powering down

Connector Units have a circuit breaker, while Connector Units CUCB are equipped with a Circuit Breaker that can be switched on and off. All other Male Connector and Female Connector are operational as soon as they are plugged in.

Connector Unit with mechanical interlock CUMI

Personnel: ■ Operator

Powering on

1. Plug in the connector as described in „*Powering up and powering down*“ *on page 62*.

   ⇨ The circuit breaker has been released.

2. Turn the circuit breaker to position I (Fig. 68 /1).

   ⇨ Connector Unit CUMI is switched on.

   The connector is locked.

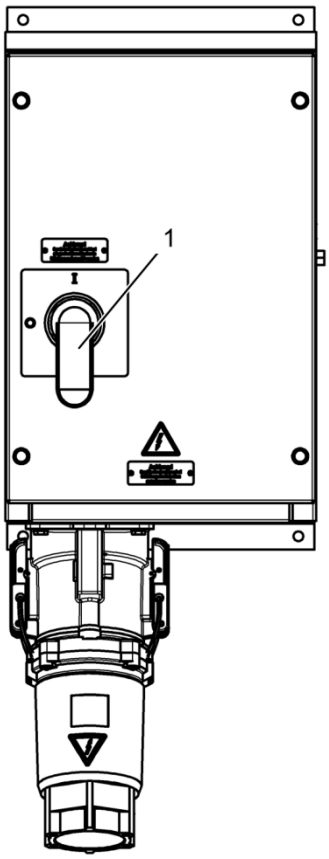


Fig. 68: Powering on

Powering down

3. Turn the circuit breaker to position 0.

   ⇨ Connector Unit CUMI is switched off.

   The connector can be released.

4. Remove the connector from the Connector Unit as described in „*Powering up and powering down*“ *on page 62*..

Powering up and powering down

Connector Unit with Circuit Breaker CUCB

Personnel: ■ Operator

Powering up

1. Plug in the connector as described in „*Powering up and powering down*“ *on page 62*
2. Turn the Circuit Breaker to position I.

   ⇨ Connector Unit CUCB is switched on.

Powering down

3. Turn the Circuit Breaker to position 0.
4. Pull the connector as described in „*Powering up and powering down*“ *auf Seite 62*.

   ⇨ Connector Unit CUCB is switched off.

Securing against accidental restoration of power

Personnel: ■ Qualified electriciant

1. Turn the circuit breaker to position 0.
2. Push up the safety clip on the bottom of the circuit breaker (Fig. 69).

Fig. 69: Safety clip on the circuit breaker

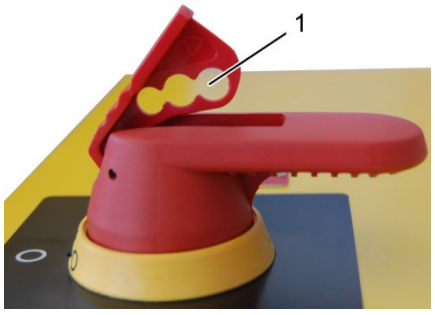


Fig. 70: Securing safety clip

3. Use a lock to secure the safety clip (Fig. 70).

8. Servicing

Electric current

DANGER!
Danger to life from electric current!

There is danger to life if work is performed on live components.

- Before commencing any work, ensure that the cable you want to connect is not live.
- Have all work on electrical components performed by qualified electricians.
- Secure the Connector Unit, switched, CUMI to prevent accidental restoration of power (*„Securing against accidental restoration of power“ on page 66*).
- Use a padlock at the handle to secure the Connector Unit with Circuit Breaker CUCB in order to prevent accidental restoration of power.

Improper maintenance

WARNING!
Risk of injury from improperly performed maintenance!

Improper maintenance may cause severe injuries and significant material damage.

- Have all maintenance performed by qualified personnel only.
- When reinstalling previously removed components, refit all fasteners and tighten all screws to the specified torque.

8.1. Maintenance schedule

Interval	Maintenance step	Personnel
monthly	Check if the screws on the housings and in the walls are firmly seated. Tighten them as necessary.	Operator
	Check if the screws on the strain relief are firmly seated. Tighten them as necessary.	Operator
	Check the strain relief for damage. Replace it if necessary.	Operator
	Check if the terminal screws used for the cables are firmly seated. If necessary, tighten them to the specified screw tightening torque (*section 4 „Technical specifications“ on page 19*).	Qualified electrician
before and after use	Perform a visual inspection of the high-current connectors exterior to look for any damage. Replace damaged components as necessary.	Operator
	Check if contact pins and female contacts have become fouled. Clean them as necessary with a cloth or a soft brush.	Operator
	Check contact pins and female contacts for wear and damage. Replace if necessary (*section 0 „ Replacing contact pins and female contacts“ on page 69*).	Qualified electrician
	Check if the rubber seals on Male Connectors, Female Connectors and covers have become brittle. Replace if necessary. The spare parts list is included in the appendix.	Operator

8.2. Replacing contact pins and female contacts

D-Line, C-Line Male Connector and Female Connector

: ■ Qualified electriciant

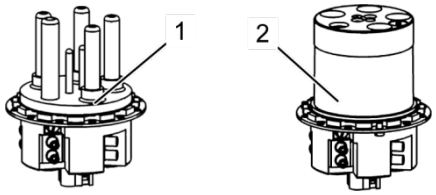


Fig. 71: Insert for contact pins and female contacts

Replace complete inserts with contact pins (Fig. 71 /1) and female contacts (Fig. 71 /2) for D-Line, C-Line Connector and Female Connector.

1. Use a screwdriver or a sharp object to remove the insert from the connector or the Female Connector.
2. Slide a new insert into the connector or the Female Connector.

B-Line, A-Line connectors

Always replace female contacts and the associated contact pins in pairs.

Replacing B-Line, A-Line male contacts

Personnel: ■ Qualified electrician

Special tools: ■ Allen key

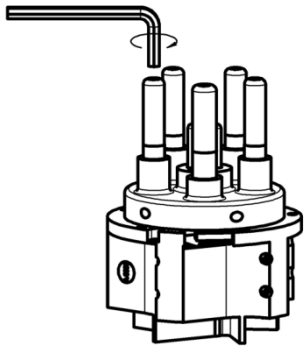


Fig. 72: Loosening the contact pin

1. Use a size 8 Allen key to loosen and remove the contact pin from its holder (Fig. 72).

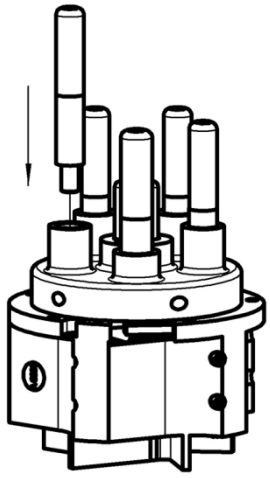


Fig. 73: Inserting the contact pin

2. Insert the new contact pin (Fig. 73).
3. Retighten the contact pin using an Allen key.

   Screw tightening torque 16 Nm.

Replacing B-Line, A-Line female contacts

Personnel:
- Qualified elctrician

Special tools:
- Philips head screwdriver
- Allen keyl

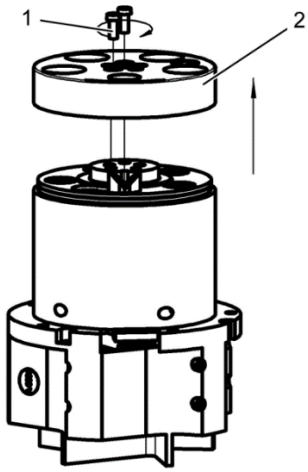


Fig. 74: Loosening the screws

1. Loosen and remove the two inside screws (Fig. 74 /1) from the cover (Fig. 74 /2).
2. Remove the cover in its entirety.

   Make sure that the spring and the washers do not fall out of the cover.

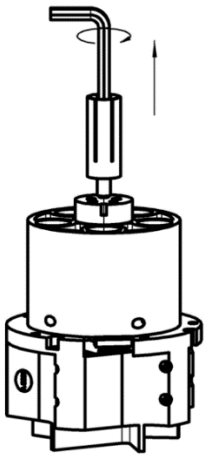


Fig. 75: Loosening the female contact

3. Use a size 8 Allen key to loosen and remove the female contact (Fig. 75).

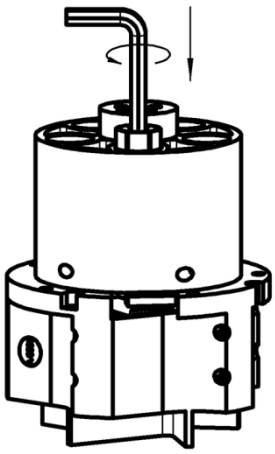


Fig. 76: Inserting the female contact

4. Use an Allen key to insert and tighten the new female contact (Fig.76).

   Screw tightening torque 16 Nm.

8.3. Faults

Improperly performed troubelshooting operations

WARNING!
Risk of injury from improperly performed troubleshooting operations!

Improperly performed troubleshooting operations may cause severe injuries and significant material damage.

- Provide for sufficient mounting clearance before starting to work.
- Keep the assembly area tidy and clean! Components and tools that are stacked or lie about loosely may cause accidents.
- When reinstalling previously removed components, refit all fasteners and tighten all screws to the specified torque.
- Have all troubleshooting operations performed by qualified electricians.

Behaviour in the event of faults

Personnel: ■ Qualified electriciant

Contact the manufacturer for all necessary troubleshooting operations that are not described in ↬ *section 6 „Installation“ on page 56* and in ↬ *section 8 „Servicing“ on page 67*. See page 8 for contact information.

1. Immediately disconnect the power supply in case of faults that pose imminent danger to personnel or material property.
2. Determine the cause of faults.
3. Check if connectors and cables are damaged and verify that they are firmly seated.

Fault cannot be corrected

4. Contact the manufacturer; see page 8. for contact information.

9. Disposal

When it has reached the end of its useful life, the unit must be disassembled and disposed of in an environmentally safe manner.

Disposal

NOTICE!
Danger to the environment from improper disposal!

Improper disposal may pose danger to the environment.

- High-current connectors can be returned to the manufacturer when they have reached the end of their useful life.
- Have electronic scrap, electronic components, lubricants and other supplies disposed of by authorised waste management companies.
- If in doubt, contact your local authorities or specialist waste disposal companies for information on environmentally safe disposal.

Index