Circuit-Breaker IZM

Operating Manual

05/09 AWB1230-1407GB

MOELLER

An Eaton Brand

1st published 2001, edition date 03/01
2nd edition 10/02
3rd edition 06/05
4th edition 08/07
5th edition 05/09
See revision protocol in the "About this manual" chapter

Production: Heinz Werner Schimanke, Heidrun Riege
Translation: Nigel Green, David Long

Printed on bleached cellulose. 100 % free from chlorine and acid.

Warning!
Dangerous electrical voltage!

Before commencing the installation

- Disconnect the power supply of the device.
- Ensure that devices cannot be accidentally restarted.
- Verify isolation from the supply.
- Earth and short circuit.
- Cover or enclose neighbouring units that are live.
- Danger if spring is charged! Discharge spring.
- Follow the engineering instructions (AWA/AWB) of the device concerned.
- Only suitably qualified personnel in accordance with EN 50110-1/-2 ;VDE 0105-100 may work on this device/system.
- Before installation and before touching the device ensure that you are free of electrostatic charge.
- Connecting cables and signal lines should be installed so that inductive or capacitive interference do not impair the automation functions.
- Suitable safety hardware and software measures should be implemented for the I/O interface so that a line or wire breakage on the signal side does not result in undefined states in the automation devices.
- Deviations of the mains voltage from the rated value must not exceed the tolerance limits given in the specifications, otherwise this may cause malfunction and dangerous operation.
- Emergency stop devices complying with IEC 60204-1, EN 60204-1 must be effective in all operating modes of the automation devices. Unlatching the emergency-stop devices must not cause restart.
- The electrical installation must be carried out in accordance with the relevant regulations (e. g. with regard to cable cross sections, fuses, PE).
- All work relating to transport, installation, commissioning and maintenance must only be carried out by qualified personnel. (IEC 60364, HD 384, VDE 0100 and national work safety regulations).

Contents

0 About this manual

List of modifications

Edition date	Page	Description
10/02	All	Revision of complete manual
06/05	All	Revision of complete manual
08/07	All	Revision of complete manual
05/09	All	Revision of complete manual

Note

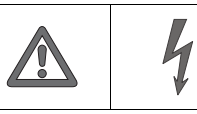
These instructions do not purport to cover all details or variations in equipment, nor to provide for every possible contingency to be met in connection with installation, operation or maintenance.

Should further information be desired or should particular problems arise which are not covered sufficiently for the Purchaser's purposes, the matter should be referred to the local Eaton Sales Office.

Our After Sales Service personnel are available for maintainance or retro-fitting of your circuit-breakers. To contact After Sales Service: → chapter 26.

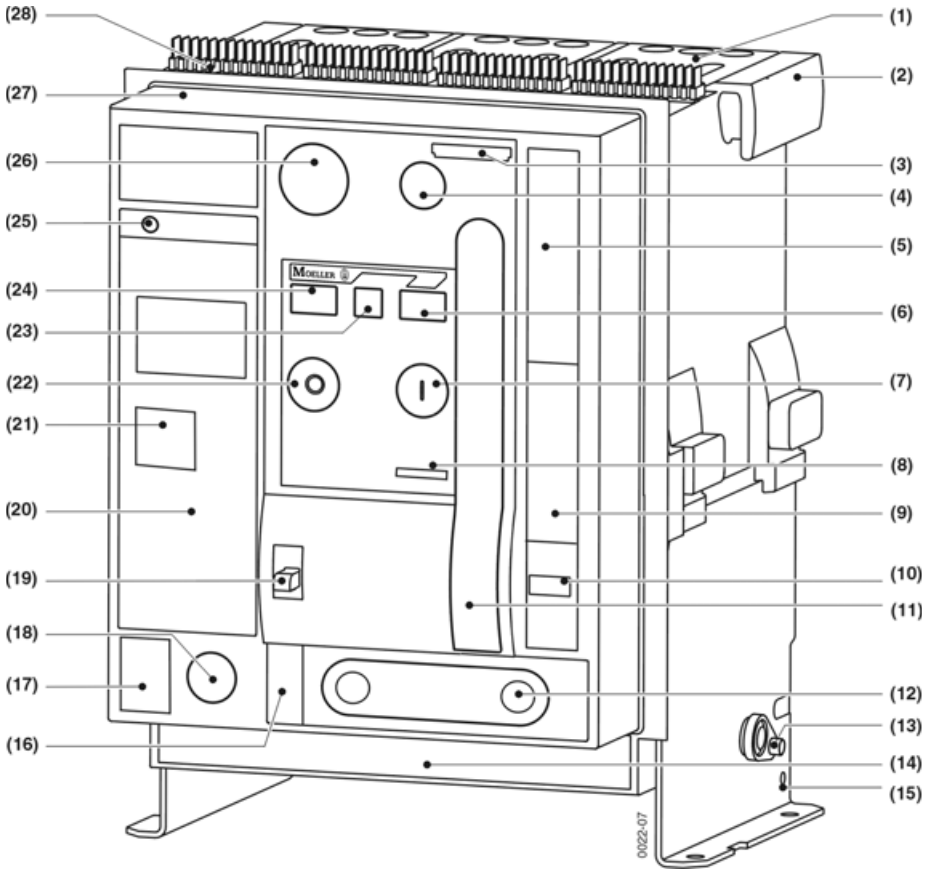
	Danger
	**Hazardous voltage!** **Can cause death or serious personal injury as well as damage to device and equipment.**
	Before working on this device the system must be switched off. Danger if spring is charged! Discharge spring.

Symbols

	Warning
	Dangerous electrical voltage!
	Safety warning
	Danger by crane transport
	Warning against personal injury
	Danger of injury
	CE-mark
	Flathead screwdriver
	Philips cross recess (type H) Pozidrive (type Z)
	Hexalobular internal driving bit
	Hexagon socket screwdriver
 **10 Nm**	Tightening torque M_A
	Cable tie
	Complete by hand
1	First step of action sequence

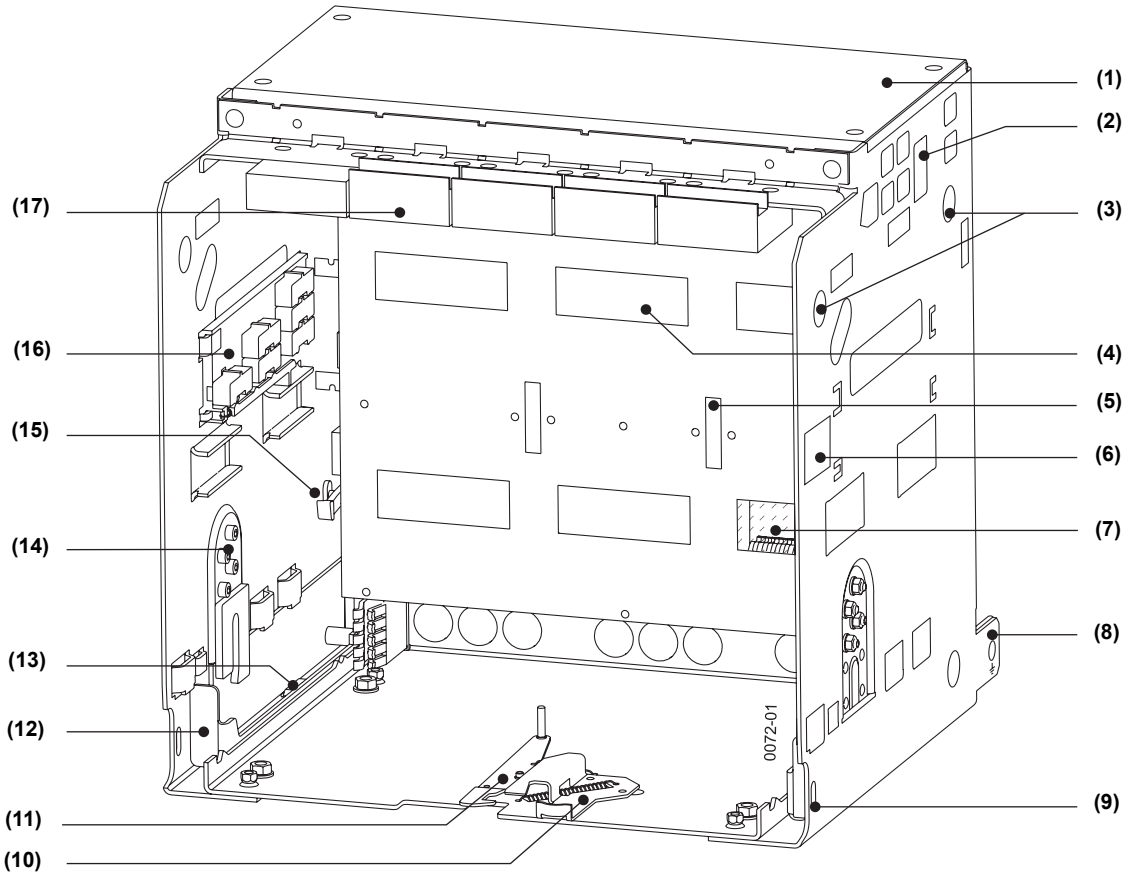
1 Construction

1.1 Circuit-breaker



(1) Arc chute → page 24 – 4
(2) Carrying handle
(3) Identification tags
(4) Motor cut-off switch (option) → page 14 – 3 **or** “Electrical ON” (option) → page 14 – 3
(5) Circuit-breaker label → page 2 – 1
(6) Stored-energy indicator → page 6 – 5
(7) “Mechanical ON” button
(8) Part no.
(9) Insertion pictograph
(10) Switching operations counter (option) → page 12 – 2
(11) Manual lever → page 6 – 4
(12) Crank handle → page 6 – 3
(13) Withdrawable unit transport shaft
(14) Options label → page 2 – 1
(15) Earthing terminal → page 5 – 21
(16) Position indicator → page 6 – 2
(17) Earth-fault tripping table (→ page 9 – 17)
(18) Safety lock crank handle (option) → page 15 – 11
(19) Control rod (option) → page 15 – 3
(20) Overcurrent release → page 9 – 1
(21) Rating plug → page 9 – 35
(22) Mechanical OFF button **or** Emergency-Stop pushbutton (option) → page 14 – 3
(23) Ready-to-close indicator → page 6 – 4
(24) Switch position indicator → page 6 – 4
(25) Tripped indicator (Reset button) (→ page 6 – 6)
(26) Locking device, “Safe OFF” position (option) → page 15 – 4
(27) Front panel → page 24 – 6
(28) Plug connector for auxiliary contacts → page 5 – 16

1.2 Withdrawable unit

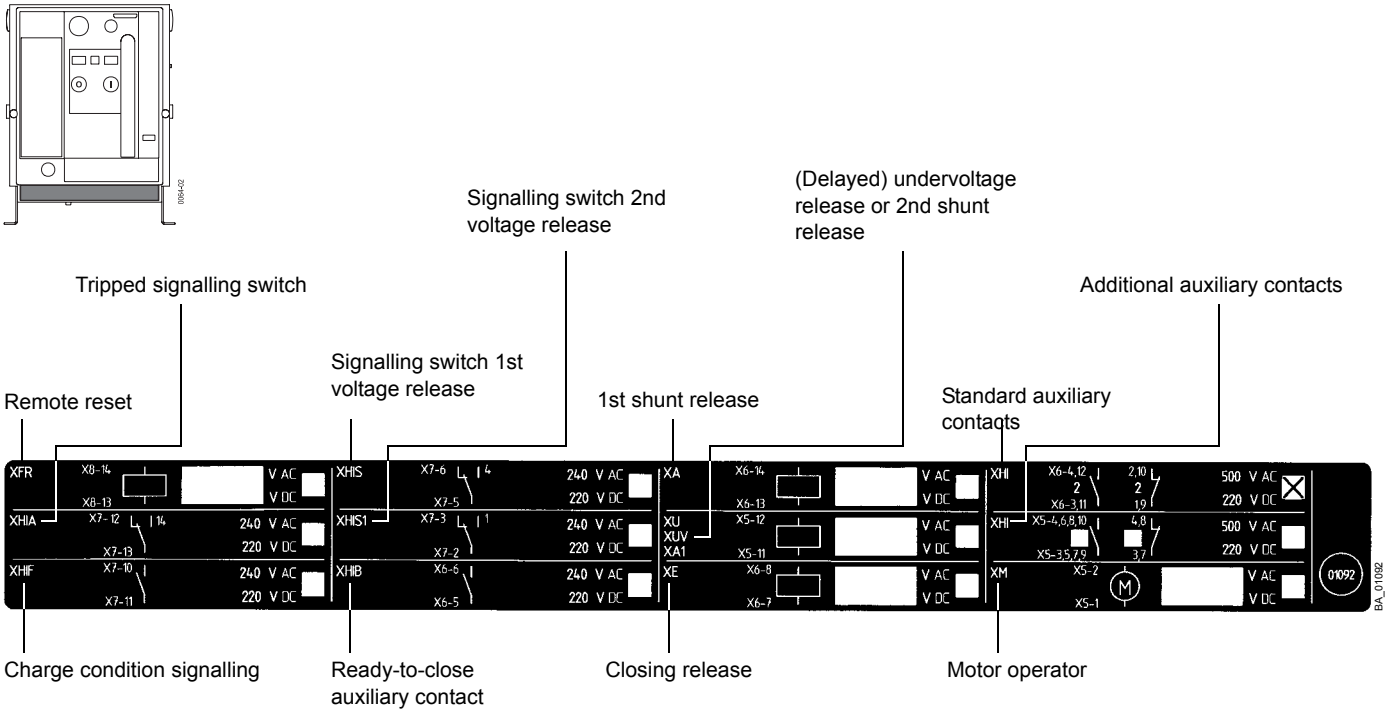


(1) Arcing chamber cover (option) → page 21 – 1
(2) Outlets → page 5 – 19
(3) Hole for crane hook → page 4 – 2
(4) Shutter (option) → page 19 – 1
(5) Locking device shutter (→ page 15 – 16)
(6) Withdrawable unit label → page 2 – 3
(7) Laminated contacts (→ page 5 – 11)
(8) Earthing terminal ∅ 14 mm → page 5 – 21
(9) Locking device guide rail → page 15 – 17
(10) Locking device to prevent racking with panel door open (option) → page 17 – 2
(11) Door locking withdrawable unit (option) → page 17 – 2
(12) Guide rail → page 6 – 1
(13) Factory setting rated current coding → page 19 – 5
(14) Equipment dependant coding (option) → page 19 – 6
(15) Shutter actuator → page 19 – 2
(16) Position signalling switch (option) → page 19 – 9
(17) Auxiliary sliding contacts module (quantity depends on configuration) → page 5 – 17

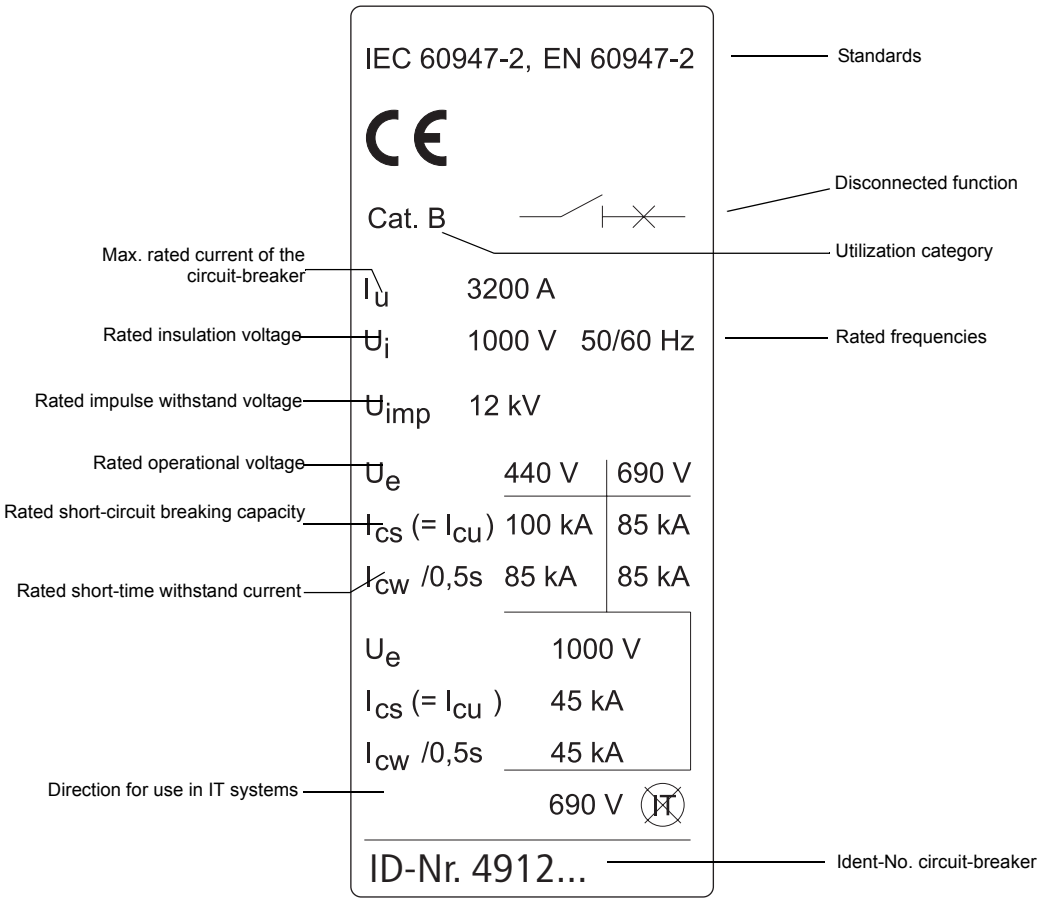
2 Labels

2.1 Circuit-breaker equipment label

(with terminal designations)

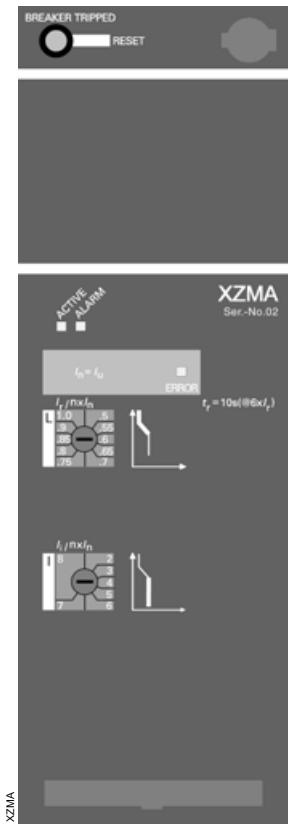


2.2 Circuit-breaker label



2.3 Identification of the control unit

IZM ...-A... Release for protection of systems

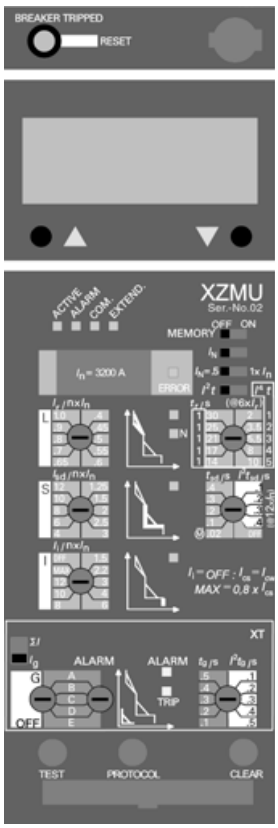


XZMA

IZM ...-U... Release for universal protection

Options:

XT(A)	Earth-fault protection N-conductor protection adjustable
XAM	LCD-display
XCOM-DP	Communication interface
XMP(H)	Measurement module

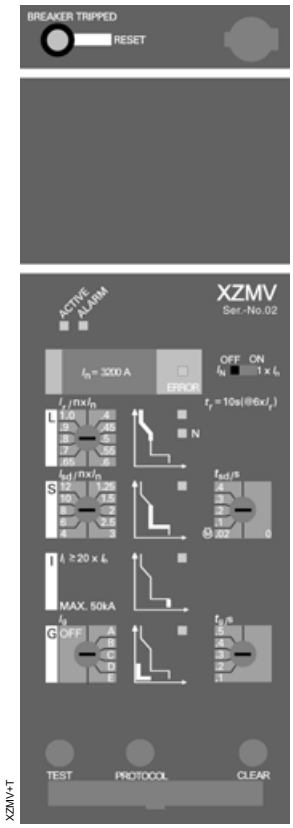


XZMU

IZM ...-V... Release for selectively-opening circuit-breakers

Options:

XT	Earth-fault protection Neutral conductor protection, can be switched on/off

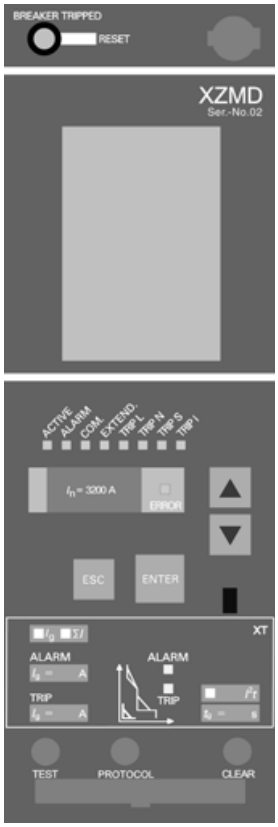


XZMV+T

IZM...-D... Digital overcurrent release

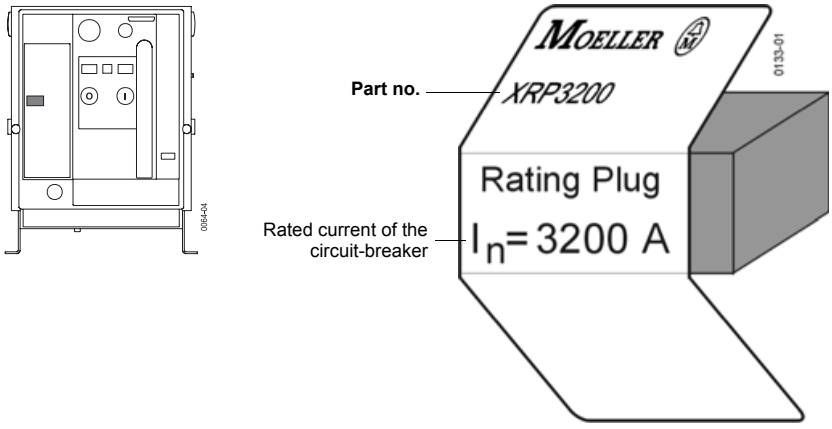
Options:

XT(A)	Earth-fault protection N-conductor protection adjustable
XCOM-DP	Communication interface
XMP(H)	Measurement module

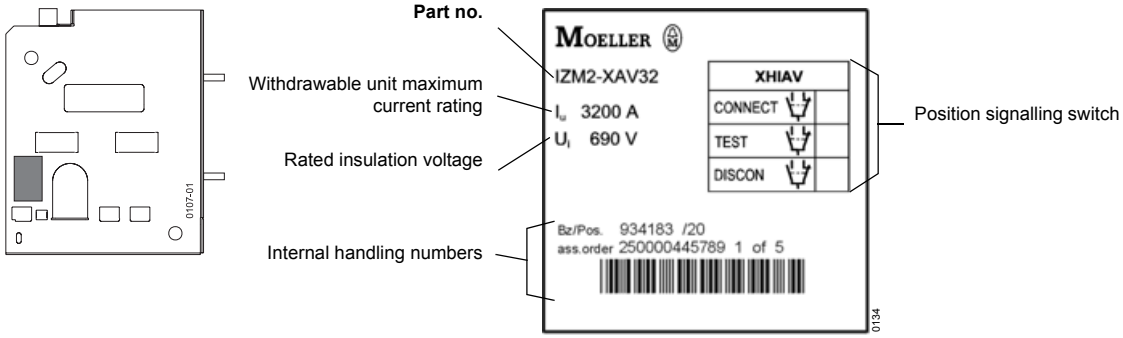


XZMD+AMG

2.4 Rating plug label



2.5 Withdrawable unit label



3 Standards and regulations

	Danger
 	**Dangerous voltage!** **Can cause death, serious injury or damage to material/property.** Only qualified personnel that are familiar with the warning and safety notices and maintenance instructions may work on the device. Qualified personnel must have the skill and experience in the operation of electrical equipment and systems as well as their construction and function. They should have taken part in safety training concerning the dangers of electrical equipment. The effective and safe function of these devices is dependant upon correct operation, installation, handling and maintenance.

Qualified Personnel

For the purpose of this instruction manual and product labels, a "qualified person" is one who is familiar with the installation, construction and operation of the equipment and the hazards involved. In addition, he has the following qualifications:

a) Training or instruction in respectively, authorisation, circuitry and device/systems in accordance with the regulations for safe on and off switching, earthing and identification.

b) Training or instruction in accordance with the regulations for the safety features in care and application of appropriate safety equipment.

c) Is trained in rendering first aid.

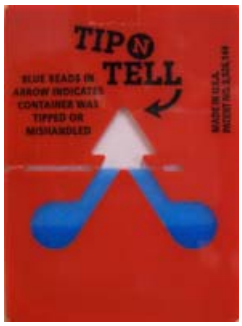
The circuit-breakers are suited for operation in enclosed spaces not subject to operating conditions aggravated by dust, caustic vapours or gases. Circuit-breakers to be installed in dusty or damp locations must be appropriately enclosed.

The circuit-breaker is in conformity with the standards:
IEC 60947-2
EN 60947-2

4 Transport

Unpack the circuit-breaker and inspect for damage. In case of later installation of the circuit-breaker or withdrawable unit: They may be stored and redispatched only in the original packing.

Transport packing

Red transport indicator	
	
Arrow in the top half is partly or fully blue.	Arrow in the top half is white
– Transport not according to instructions (switch was tilted or overturned) – Check circuit-breaker for transport damage – Notify damages to forwarding agent	– Circuit-breaker was not tilted or overturned during transport

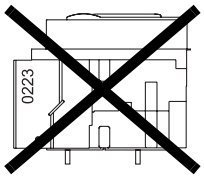
4.1 Overseas packing

Check humidity indicator		**Further storage**
Pink	Blue	Renew dessicant or seal tightly with dry plastic film Check packing regularly
Sealed packing ineffective. Check circuit-breaker for corrosion. Report damage to transport company	Good	

4.2 Unpacking

Unpack the circuit-breaker and inspect for damages.

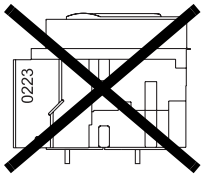
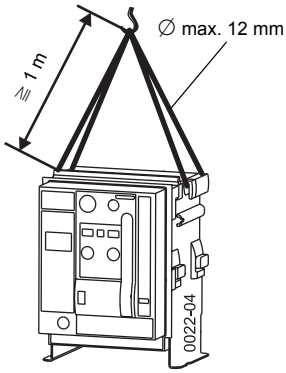
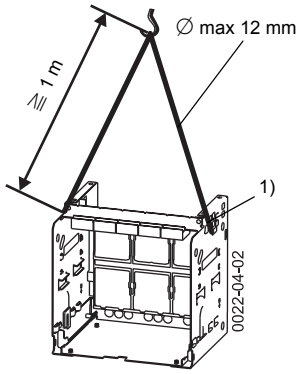
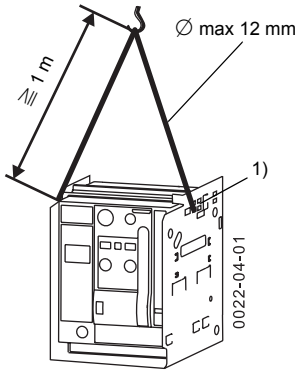
For later installation of circuit-breaker or withdrawable unit: Storage and further shipment only in original packing.



CAUTION
Do not lay the circuit-breaker on it´s back!

4.3 Lifting by crane

	Danger
	**Heavy device.** **Incorrect lifting can cause death or serious injury as well as damage to the device and equipment.** Never lift a circuit-breaker, or a withdrawable unit over a person. Follow the operating instructions of the crane. Only use OSHA/ NIOSH tested crane harnesses. Use personnel safety equipment to lift or move circuit-breakers and withdrawable unit.

Caution Do not put on the rear side! 	**Circuit-breaker**	**Withdrawable unit**	**Circuit-breaker + Withdrawable unit**
			
Frame size/No. of poles	**Weight**		
IZM(IN).1-... / 3	43 kg	25 kg	70 kg
IZM(IN).1-... / 4	50 kg	30 kg	84 kg
IZM(IN).2-... / 3	max. 64 kg	max. 45 kg	max. 113 kg
IZM(IN).2-... / 4	max. 77 kg	max. 54 kg	max. 136 kg
IZM(IN).3-... / 3	max. 90 kg	max. 70 kg	max. 166 kg
IZM(IN).3-... / 4	max. 108 kg	max. 119 kg	max. 227 kg

1) Hook cable above the label.

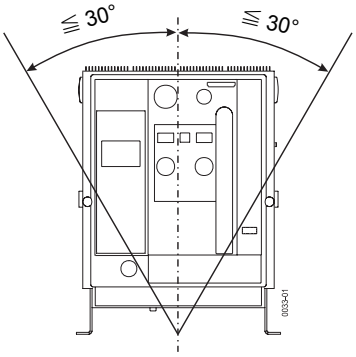
5 Mounting

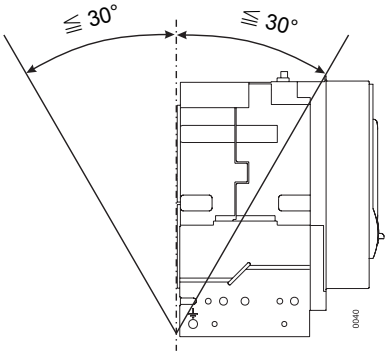
	WARNING
	Safe operation is dependent upon proper handling and installation by qualified personnel under observance of all warnings contained in this instruction manual. The general installation and safety regulations for working on high current systems (e.g. DIN VDE) and also standards concerning the correct use of lifting equipment and tools and the use of personal protection equipment (safety glasses, etc.) should be especially observed. Non-observance can result in death, severe personal injury or substantial property damage.

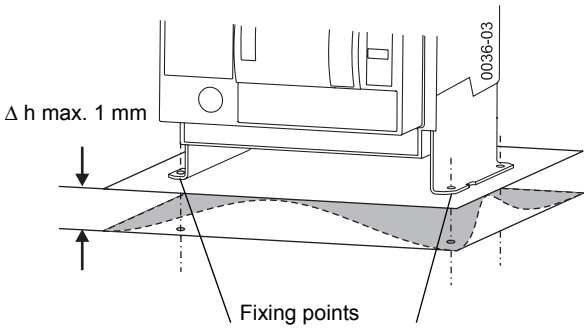
	Danger
	**Heavy device.** **Incorrect lifting can cause death or serious injury as well as damage to the device and equipment.** Never lift a circuit-breaker, or a withdrawable unit over a person. Follow the operating instructions of the crane. Only use OSHA/ NIOSH tested crane harnesses. Use personnel safety equipment to lift or move circuit-breakers and withdrawable unit.

5.1 Installation

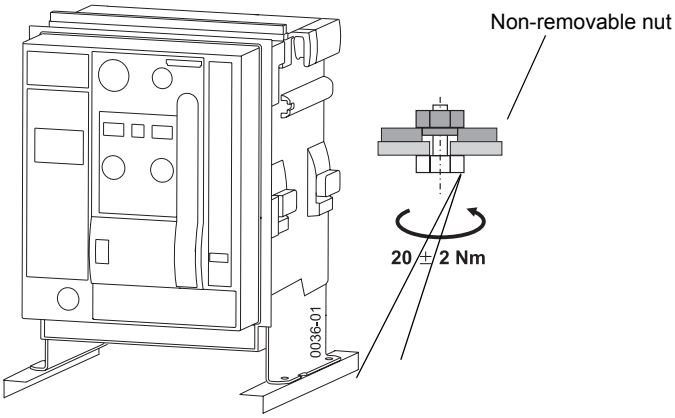
5.1.1 Mounting position



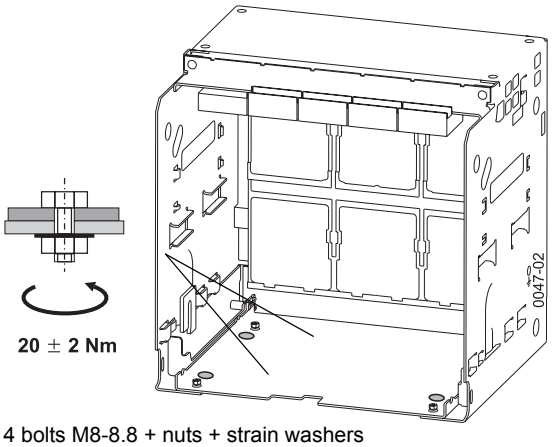




5.1.2 Mounting on horizontal surface



4 bolts M8-8.8



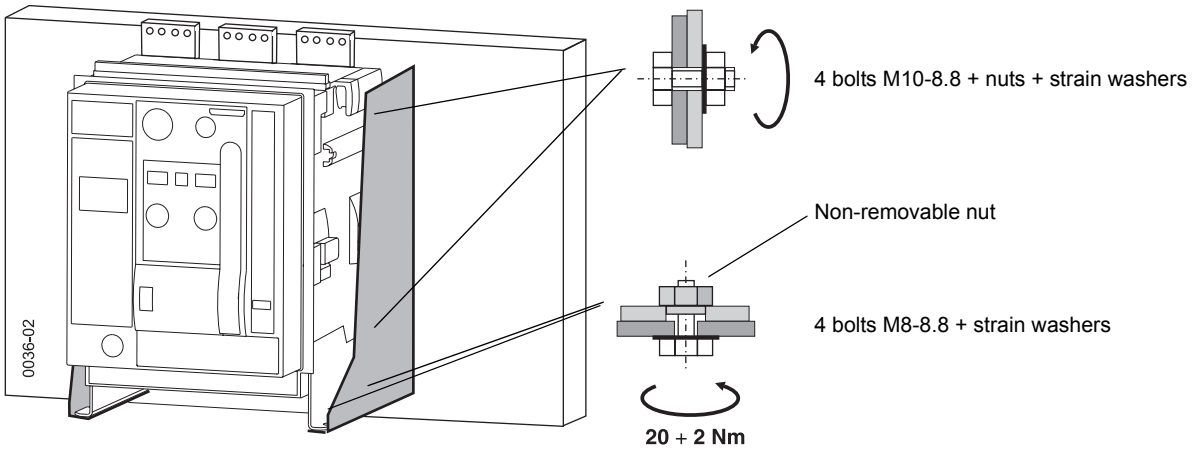
4 bolts M8-8.8 + nuts + strain washers

If several withdrawable units are arranged one above the other in cubicles **without** compartment bases we recommend the use of arc chute covers (→ page 21 – 1).

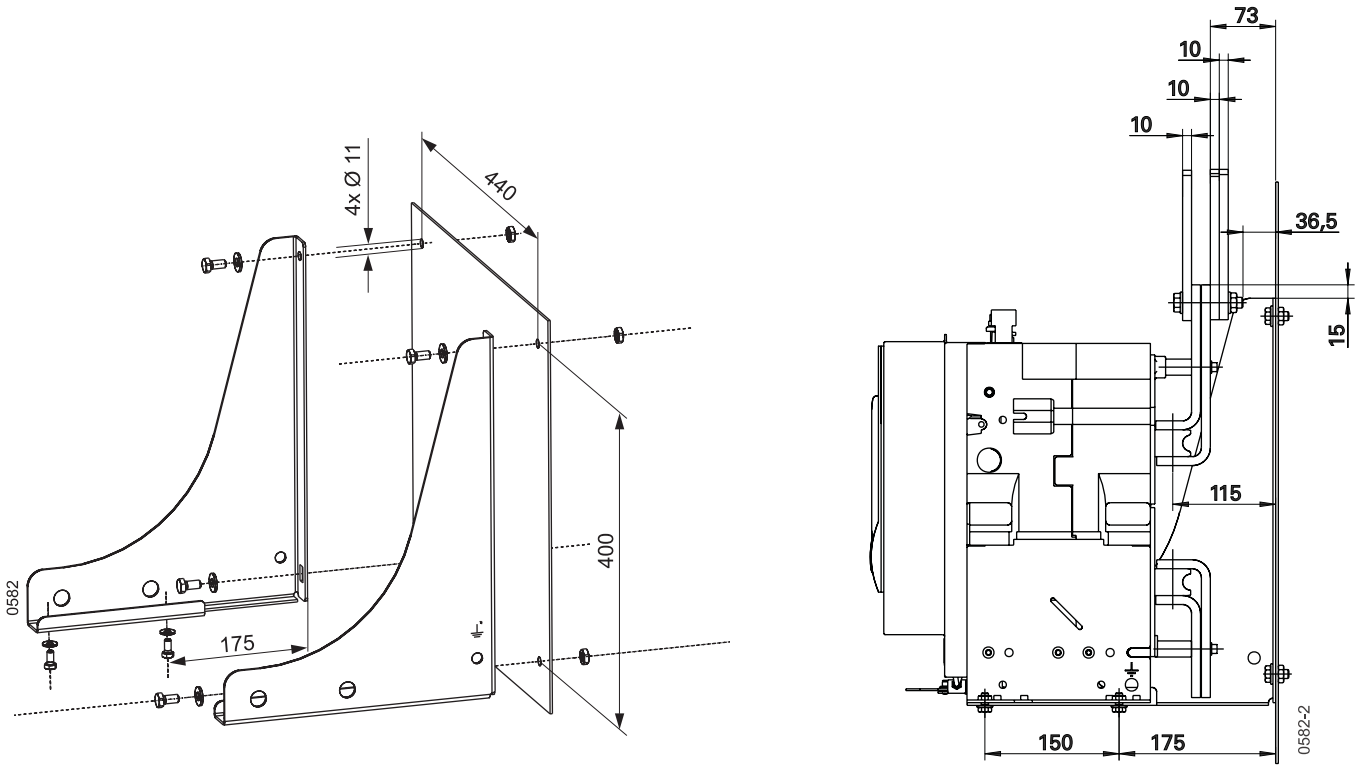
5.1.3 Mounting on a vertical surface with mounting brackets

For fixed-mounted circuit-breaker only.

	Part no.
Mounting brackets (only for IZM(IN).1-... and IZM(IN).2-...)	IZM1/2-XTW

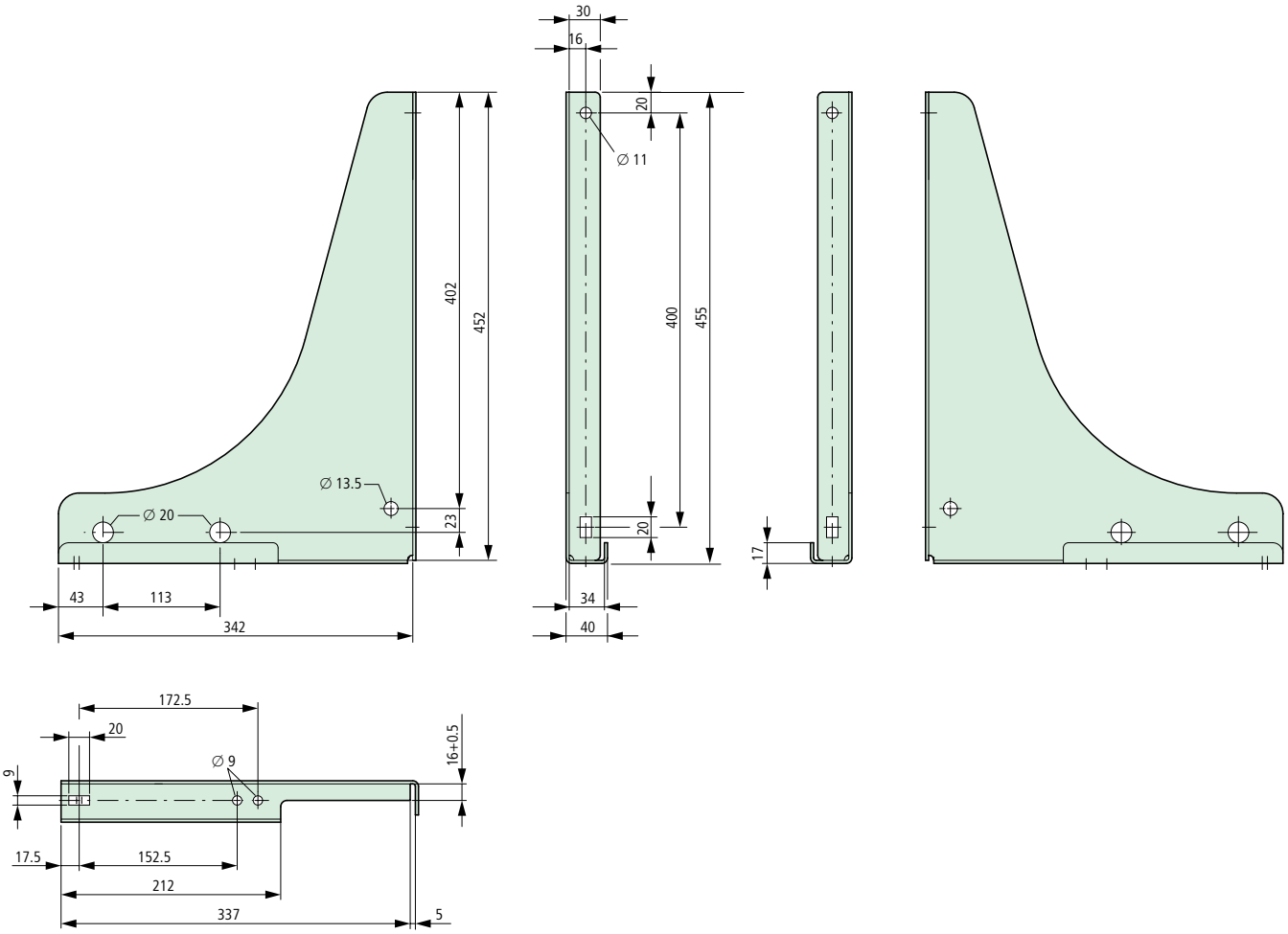


Mounting dimensions



Representation of IZM(IN).2-... with front connection.

Dimension diagram, mounting brackets



5.1.4 Safety clearances

5.1.5 Safety clearance to earthed parts

Rated operational voltage	above control circuit plug	Side (each)	Rear
[V AC]	[mm]	[mm]	[mm]
IZM(IN).1-..., Fixed mounting			
440	75[1)]	0	0
690	75[1)]	0	0
IZM(IN).1-..., Withdrawable, without arc chute cover			
440	50[1)]	0	0
690	50[1)]	0	0
IZM(IN).1-..., Withdrawable, with arc chute cover			
440	0	0[2)]	0
690	0	0[2)]	0
IZM(IN).2-..., Fixed mounting			
440	75[1)]	0	0
690	75[1)]	0	0
1000	180	0	0
IZM(IN).2-..., Withdrawable, without arc chute cover			
440	50[1)]	0	0
690	50[1)]	0	0
1000	100	0	0
IZM(IN).2-..., Withdrawable, with arc chute cover			
440	0	0[2)]	0
690	0	0[2)]	0
IZM(IN).3-..., Fixed mounting			
440	75[1)]	0	0
690	75[1)]	0	0
1000	180	0	0
IZM(IN).3-..., Withdrawable, without arc chute cover			
440	50[1)]	0	0
690	50[1)]	0	0
1000	100	0	0
IZM(IN).3-..., Withdrawable, with arc chute cover			
440	0	0[2)]	0
690	0	0[2)]	0

5.1.5.1 Safety clearances to live parts

Rated operational voltage	above control circuit plug	Side (each)	Rear
[V AC]	[mm]	[mm]	[mm]
IZM(IN).1-..., Fixed mounting			
440	150	20	20
690	300	50	125
IZM(IN).1-..., Withdrawable, without arc chute cover			
440	150	20	14
690	300	50	14
IZM(IN).1-..., Withdrawable, with arc chute cover			
440	14	100	14
690	14	100	14
IZM(IN).2-..., Fixed mounting			
440	250	50	20
690	600	100	140
1000	430	100	125
IZM(IN).2-..., Withdrawable, without arc chute cover			
440	250	50	14
690	600	100	30
1000	350	100	14
IZM(IN).2-..., Withdrawable, with arc chute cover			
440	14	50	14
690	14	225	14
IZM(IN).3-..., Fixed mounting			
440	75	20	20
690	500	100	125
1000	430	100	125
IZM(IN).3-..., Withdrawable, without arc chute cover			
440	50	20	14
690	500	100	14
1000	350	100	14
IZM(IN).3-..., Withdrawable, with arc chute cover			
440	14	50	14
690	14	200	14

1) Value for plates, 0 mm for supports and grills.

2) 40 mm (IZM(IN).2-...: 70 mm) for plates that cover openings in drawer frame.

All safety clearances above the circuit-breaker are from the top edge of the control circuit plug not the top edge of the arc chute!
→ dimension drawings

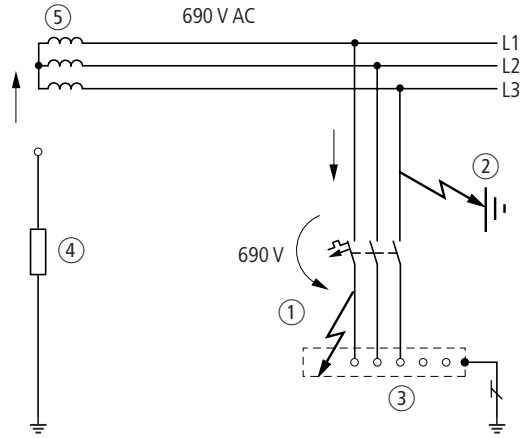
5.1.6 Use in IT systems

5.1.7 Regulations

In EN 60947-2 “Low voltage switchgear Part 2: circuit-breakers” for the use of circuit-breakers in an unearthed or impedance earthed network (IT systems) an extra test to IEC 60947-2 Appendix H is required.

Subsequently the tests with 1.2 times the highest setting of the short time delayed overcurrent trip (S trip) or the undelayed overcurrent trip (I trip) when no S trip is available, as single pole short-circuit switch-off capacity I_{IT} are to be verified. This is for a maximum of 50 kA. The tests are to carried out with the phase voltages of the highest rated operating voltage Ue for use in the network.

With this the worst case fault that could occur in the IT system is covered, with a double earth fault on the load and incoming sides See following illustration:



① Fault 1
② Fault 2
③ Frame
④ Impedance
⑤ Transformer

Explanation:

– After fault 1 fault 2 then occurs.

– With that there is then a double earth fault on the load and incoming sides.

– On the main contacts in phase L1 is then the full phase voltage of e.g. 690 V.

– At the same time the contact must carry a high short-circuit current.

5.1.7.1 Conditions for use in IT Systems

The IZM circuit-breaker fulfills the requirements for use in IT systems with the standard IEC 60947-2 Appendix H demanded maximum values with consideration of the following options and safety clearances (blow-out space).

The details for the blow-out space above the control circuit plug is based on the necessary blow-out space over the arc chute and serves as additional information to users who want to bring their safety clearances to the appropriate highest point of the device (control circuit plug). The short-circuit breaking capacity shown in the table I_{IT} corresponds to the maximum demanded value in the standard IEC 60947-2 Appendix H , to fulfill an acceptibility in the IT systems with the respective rated operating voltage U_e.

The circuit-breakers of type IZM1 cannot be used in 690 V IT systems, here the option IZM...-X1000 V is generally suitable.

Overview circuit-breaker IZM in IT systems to IEC 60947-2 or EN 60947-2 Appendix H				
Type (3/4-pole)		**IZM1**	**IZM2**	**IZM3**
Rated operating voltage Ue ≦ 440 V				
– Single pole short-circuit breaking capacity I_{IT}	kA	23	50	50
– neccessary options		–	–	–
– minimum required blow-out space above arc chute.	mm	100	100	50
– corresponding minimum blow-out space above control circuit plug. (fixed/withdrawable)	mm	70/40	70/40	20/0
– labelling to IEC 60947-2 Appendix H		690 V IT	690 V IT	500 V IT
Rated operating voltage Ue ≦ 500 V				
– Single pole short-circuit breaking capacity IIT	kA	23	50	50
– neccessary options		–	–	–X1000 V[1)]
– minimum required blow-out space above arc chute.	mm	150	150	50
– corresponding minimum blow-out space above control circuit plug. (fixed/withdrawable)	mm	120/90	120/90	65/0
– labelling to IEC 60947-2 Appendix H		690 V IT	690 V IT	1000 V IT
Rated operating voltage Ue ≦ 690 V				
– Single pole short-circuit breaking capacity IIT	kA	–	50	50
– neccessary options		–	–X1000 V [2)]	–X1000 V [1)]
– minimum required blow-out space above arc chute.	mm	–	50	50
– corresponding minimum blow-out space above control circuit plug. (fixed/withdrawable)	mm	–	65/0	65/0
– labelling to IEC 60947-2 Appendix H		690 V IT	1000 V IT	1000 V IT

1) –X1000 V ist option IZM...-X1000 V for rated operating voltage Ue = 1000 V AC

2) Exception: IZM...2-(4-)A(V)800...1600, this circuit-breaker fulfills the requirement for 690V IT networks corresonding to IEC 60947-2, Appendix H (contrary to the details on the rating label: IT)

5.1.8 Labelling of the IZM circuit-breaker

The standard IEC 60947-2 Appendix H demands the labelling of devices that are in their existing features not suitable for IT networks for all values of the rated operating voltage and the corresponding types or sizes. The following symbol must be directly behind the rated operating voltage e.g. 690 V .IT

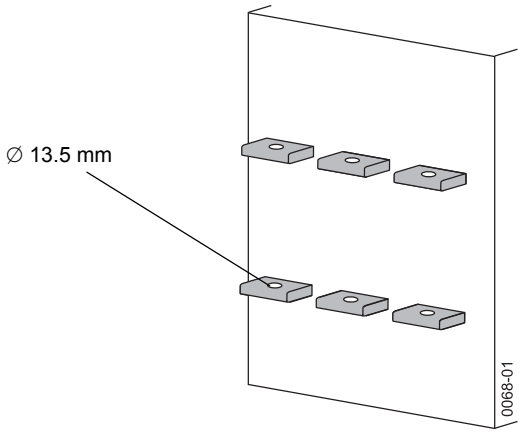
The labelling for single sizes and voltages can be seen in the above table.

5.2 Connecting bars

→ Frame sizes, dimension drawings (page 7 – 1)

5.2.1 Horizontal connection

The horizontal connection is up to 5000 A including the standard connection for fixed-mounted circuit-breakers and withdrawable unit.

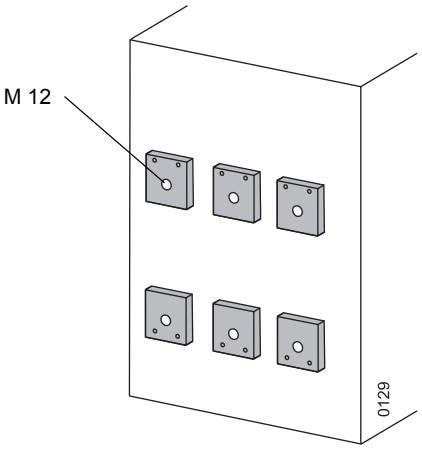


For withdrawable unit only:

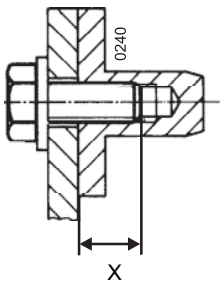
→ Retrofit installation of horizontal connections (page 5 – 12)

5.2.2 Flange connection

(only for withdrawable)



The mounting of the flange connection is similar to the mounting of the vertcal and horizontal connections (→ page 5 – 12)



70 ±4 Nm

Screw-in depth:

x = 18...24 mm

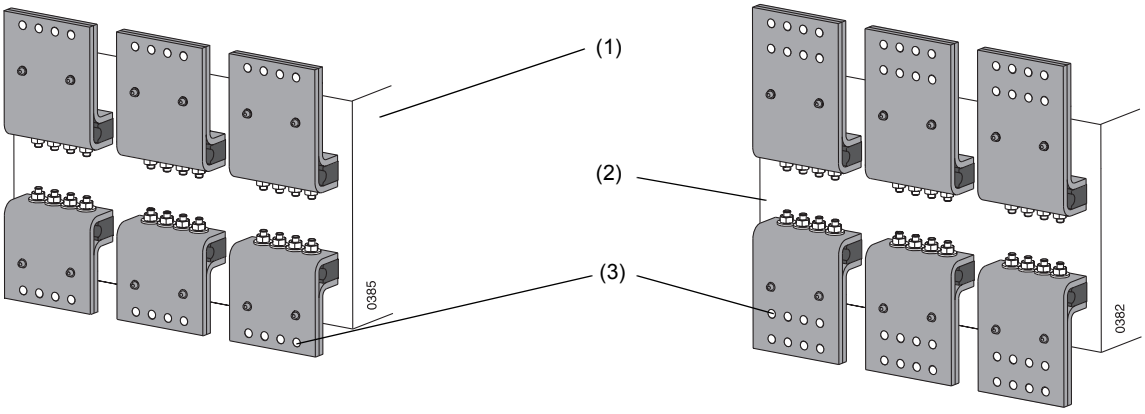
5.2.3 Front connection

Note

When front connections are used, a partition between busbar and arcing space must be fitted on the system side.

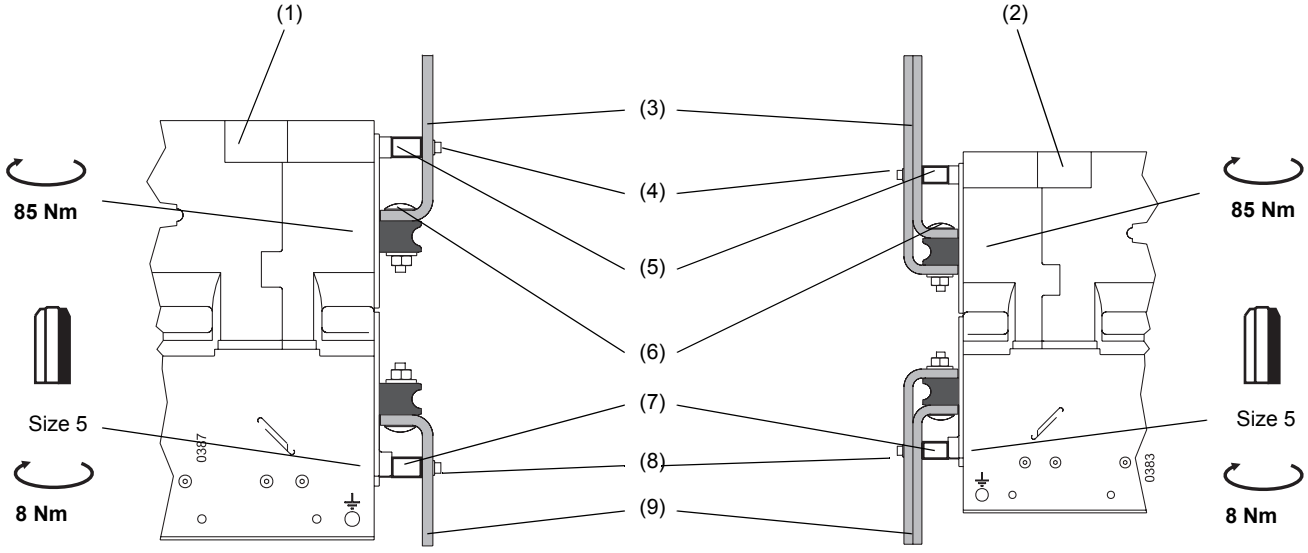
Fixed-mounted circuit-breaker

Two variations are offered:



(1) Standard version: single-hole fitting
(2) Version double-hole fitting
(3) Holes ∅ 13.5

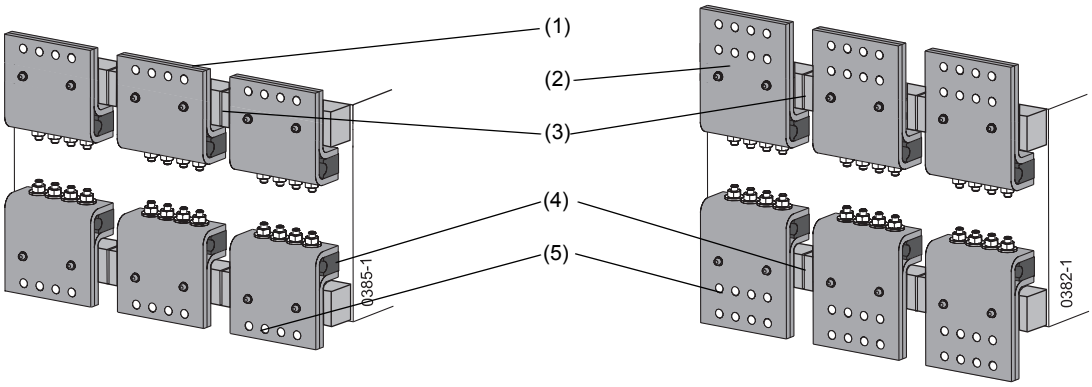
Fastening connecting bars:



(1) For
IZM(IN).1-... ≦ 1000 A and
IZM(IN).2-... ≦ 2000 A
(2) For
IZM(IN).1-... 1600 A
IZM(IN).2-... 2500 A, 3200 A
IZM(IN).3-... 4000 A
(3) Long connecting bar
(4) Short hexagon socket screw ISO 4762 M6 with strain washer
(5) Short spacer
(6) Coach screw DIN 603 M12 with strain washer and nut
(7) Long distance sleeve
(8) Long hexagon socket screw ISO 4762 M6 with strain washer
(9) Short connecting bar

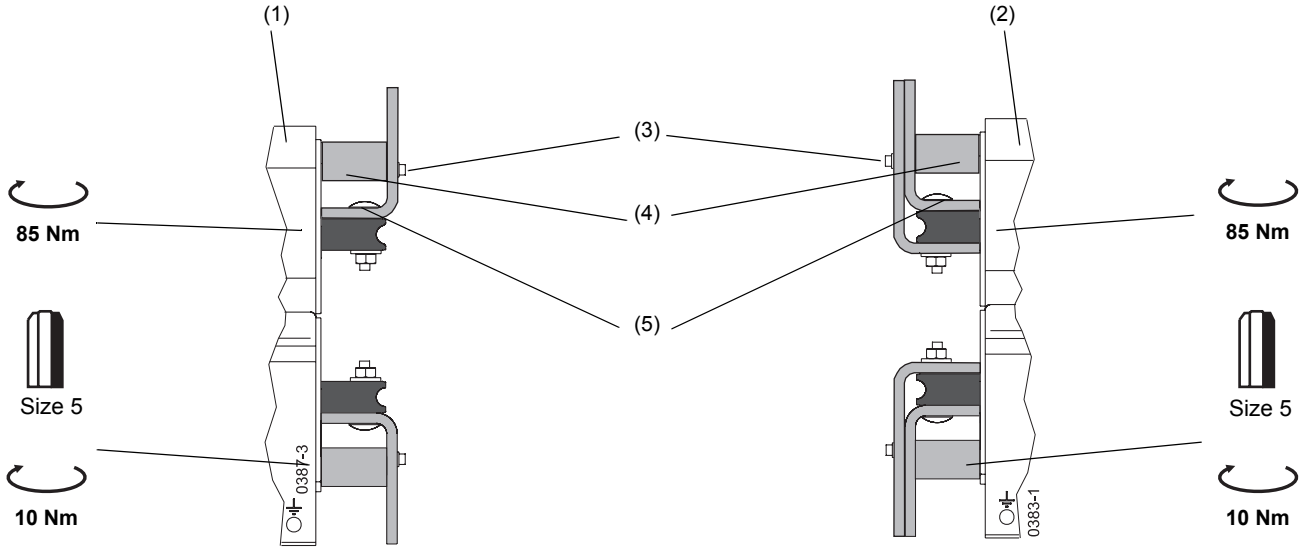
Withdrawable unit

Two variations are offered:



(1) Standard version: single-hole fitting
(2) Version double-hole fitting
(3) Slots for phase separation walls; mounting position as shown!
(4) Support
(5) Holes ∅ 13.5

Fastening connecting bars:



(1) For
IZM(IN).1-... ≦ 1000 A and
IZM(IN).2-... ≦ 2000 A
(2) For
IZM(IN).1-... 1600 A
IZM(IN).2-... 2500 A, 3200 A
IZM(IN).3-... 4000 A
(3) Hexagon socket screw ISO 4762 M6 with strain washer
(4) Support; mounting position as shown!
(5) Coach screw DIN 603 M12 with strain washer and nut

Conversion from vertical or flange connection to front connection requires installation of horizontal connection first!

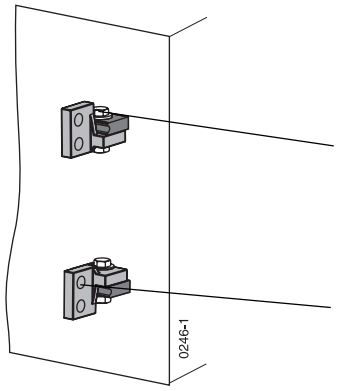
→ (page 5 – 11)

5.2.4 Vertical connection

Fixed-mounted circuit-breaker

Size	Rated current
IZM(IN).1-...	1000 A 1600 A[1)]

1) 2 connection bars per main connection, above and below fixing by offset slot,
→ Picture for IZM(IN).2-...



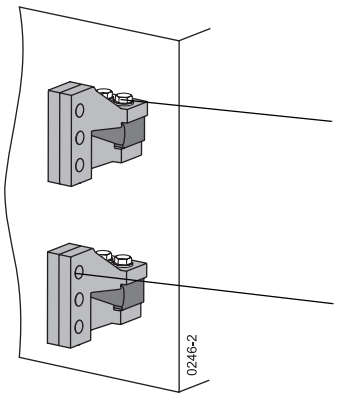
1 × M12-8.8 + nut
+ spring washer (above + below)

2 × ∅ 13.5 mm

85 Nm

Size	Rated current
IZM(IN).2-...	**2500** A**1)** 3200 **A**

1) 1 connect bar per main connection, middle fixing,
→ Picture for IZM(IN).1-...

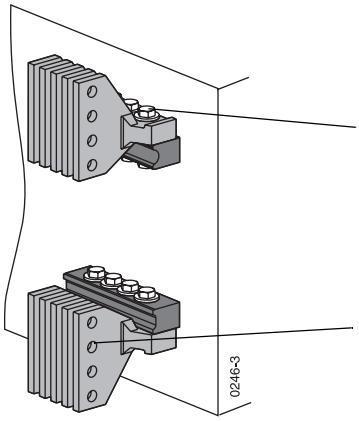


3 × M12-8.8 + nut
+ spring washer (above + below)

3 × ∅ 13.5 mm

85 Nm

Size	Rated current
IZM(IN).3-...	5000 **A**

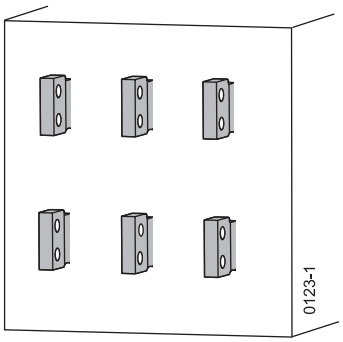


4 × M12-8.8 + nut
+ spring washer (above + below)

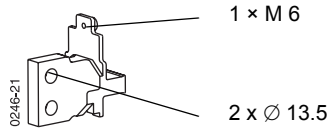
4 × ∅ 13.5 mm

85 Nm

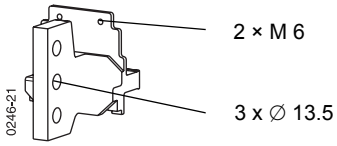
Withdrawable unit



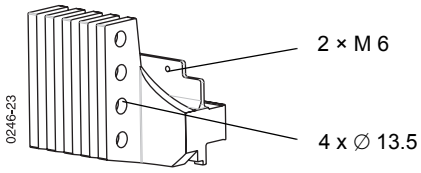
Size	Rated current
IZM(IN).1-...	1000 A, 1600 A



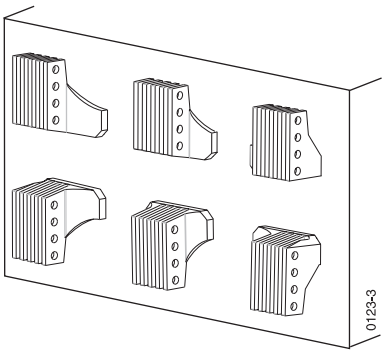
Size	Rated current
IZM(IN).2-...	2000 A, 2500 A 3200 **A**



Size	Rated current
IZM(IN).3-...	5000 **A**



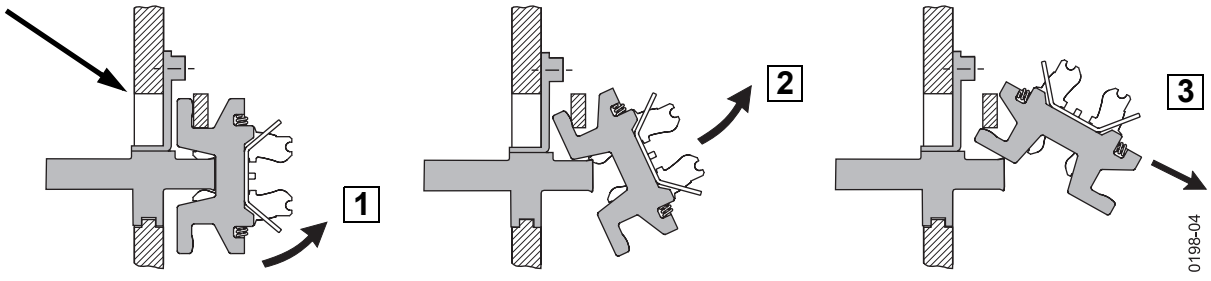
Size	Rated current
IZM(IN).3-...	6300 **A**



Vertical connections left and right asymmetric

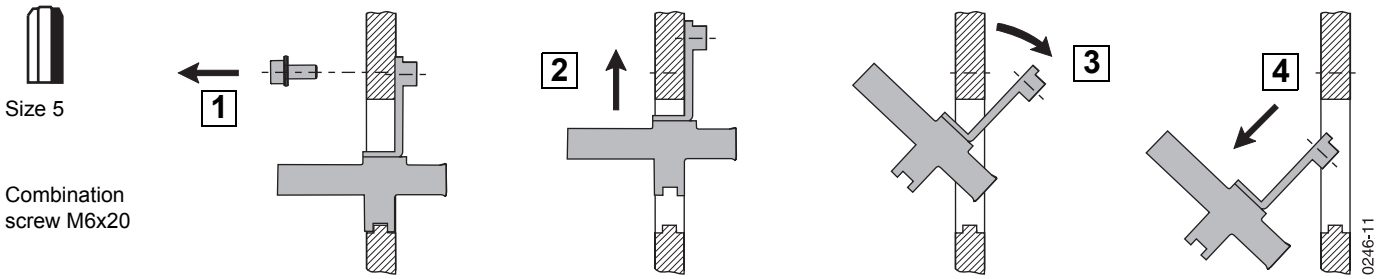
Removal of lamelle contacts

Rear side of withdrawable unit



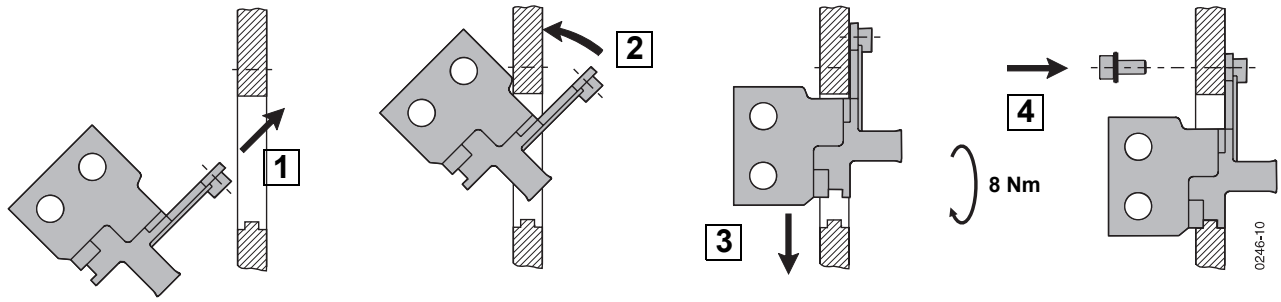
Removing horizontal connection

Rear drawer area



Installing vertical connection

Rear drawer area



Mounting steps for installation of horizontal or flange connection are similar.

Note

The lamelle blocks for circuit-breaker IZM(IN).3-..., 4000 A, are not fully equiped with lamelle.

ATTENTION
Only use similarly equiped lamelle blocks for assembly.

Order numbers

Connecting bars fixed-mounted circuit-breaker	Frame size	Rated current I_u	Part no.
Front connection (single-hole fitting) top	IZM(IN).1-...	≦ 1000 A	(+)IZM1-XAT1F10-0
		1250 A...1600 A	(+)IZM1-XAT1F16-0
	IZM(IN).2-...	≦ 2000 A	(+)IZM2-XAT1F20-0
		2500 A	(+)IZM2-XAT1F25-0
		3200 A	(+)IZM2-XAT1F32-0
	IZM(IN).3-...	≦ 4000 A	(+)IZM3-XAT1F40-0
Front connection (double-hole fitting) top	IZM(IN).1-...	≦ 1000 A	(+)IZM1-XATF10-0
		1250 A...1600 A	(+)IZM1-XATF16-0
	IZM(IN).2-...	≦ 2000 A	(+)IZM2-XATF20-0
		2500 A	(+)IZM2-XATF25-0
		3200 A	(+)IZM2-XATF32-0
	IZM(IN).3-...	≦ 4000 A	(+)IZM3-XATF40-0
Front connection (single-hole fitting) bottom	IZM(IN).1-...	≦ 1000 A	(+)IZM1-XAT1F10-U
		1250 A...1600 A	(+)IZM1-XAT1F16-U
	IZM(IN).2-...	≦ 2000 A	(+)IZM2-XAT1F20-U
		2500 A	(+)IZM2-XAT1F25-U
		3200 A	(+)IZM2-XAT1F32-U
	IZM(IN).3-...	≦ 4000 A	(+)IZM3-XAT1F40-U
Front connection (double-hole fitting) bottom	IZM(IN).1-...	≦ 1000 A	(+)IZM1-XATF10-U
		1250 A...1600 A	(+)IZM1-XATF16-U
	IZM(IN).2-...	≦ 2000 A	(+)IZM2-XATF20-U
		2500 A	(+)IZM2-XATF25-U
		3200 A	(+)IZM2-XATF32-U
	IZM(IN).3-...	≦ 4000 A	(+)IZM3-XATF40-U
Vertical connection	IZM(IN).1-...	≦ 1000 A	(+)IZM1-XATV10
		1600 A	(+)IZM1-XATV16[1)]
	IZM(IN).2-...	≦ 2500 A	(+)IZM2-XATV25
		3200 A	(+)IZM2-XATV32[2)]
	IZM(IN).3-...	≦ 5000 A	(+)IZM3-XATV50

1)IZM1-XATV16 = 2x IZM1-XATV10

2)IZM2-XATV32 = 2x IZM2-XATV25

Connecting bars withdrawable unit		Frame size	Rated current I_u	Part no.
Front connection (single-hole fitting) When these connections are ordered individually, additional supports must also be ordered.		IZM(IN).1-...	≦ 1000 A	(+)IZM1-XAT1F10-AV
			1250 A...1600 A	(+)IZM1-XAT1F16-AV
		IZM(IN).2-...	≦ 2000 A	(+)IZM2-XAT1F20-AV
			2500 A	(+)IZM2-XAT1F25-AV
			3200 A	(+)IZM2-XAT1F32-AV
		IZM(IN).3-...	≦ 4000 A	(+)IZM3-XAT1F40-AV
Front connection (double-hole fitting) When these connections are ordered individually, additional supports must also be ordered.		IZM(IN).1-...	≦ 1000 A	(+)IZM1-XATF10-AV
			1250 A...1600 A	(+)IZM1-XATF16-AV
		IZM(IN).2-...	≦ 2000 A	(+)IZM2-XATF20-AV
			2500 A	(+)IZM2-XATF25-AV
			3200 A	(+)IZM2-XATF32-AV
		IZM(IN).3-...	≦ 4000 A	(+)IZM3-XATF40-AV
Supports for front connections with withdrawable unit 2 supports per switch required	3-pole for 3 front connections	IZM(IN).1-...	≦ 1600 A	IZM1-XATFS
		IZM(IN).2-...	≦ 3200 A	IZM2-XATFS
		IZM(IN).3-...	≦ 4000 A	IZM3-XATFS
	4-pole for 4 front connections	IZM(IN).1-4-...	≦ 1600 A	IZM1-XATFS4
		IZM(IN).2-4-...	≦ 3200 A	IZM2-XATFS4
		IZM(IN).3-4-...	≦ 4000 A	IZM3-XATFS4
Vertical connection		IZM(IN).1-...	≦ 1000 A	(+)IZM1-XATV10-AV
			1250 A...1600 A	(+)IZM1-XATV16-AV
		IZM(IN).2-...	≦ 2000 A	(+)IZM2-XATV20-AV
			2500 A	(+)IZM2-XATV25-AV
			3200 A	(+)IZM2-XATV32-AV
		IZM(IN).3-...	≦ 5000 A	(+)IZM3-XATV50-AV
Flange connection		IZM(IN).1-...	≦ 1000 A	(+)IZM1-XATA10-AV
			1250 A...1600 A	(+)IZM1-XATA16-AV
		IZM(IN).2-...	≦ 2000 A	(+)IZM2-XATA20-AV
			≦ 2500 A	(+)IZM2-XATA25-AV
			≦ 3200 A	(+)IZM2-XATA32-AV
		IZM(IN).3-...	≦ 4000 A	(+)IZM3-XATA40-AV

5.3 Connection of main conductors

Main conductor - minimum cross section:

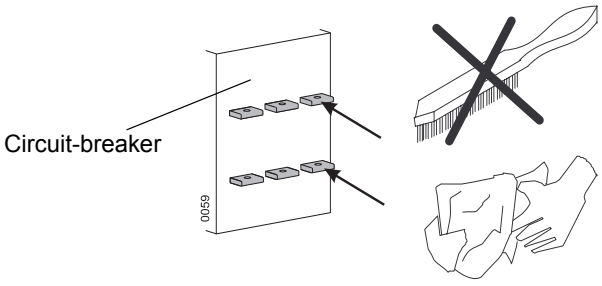
Frame size	Rated current I_u	Cross section Cu bars	
		bare/bare	black/bare
	[A]	[mm2][1)]	[mm2][1)]
IZM(IN).1-...	630	1 × 40 × 10	1 × 40 × 10
	800	1 × 50 × 10	1 × 60 × 10
	1000	1 × 60 × 10	1 × 60 × 10
	1250	2 × 40 × 10	2 × 40 × 10
	1600	2 × 50 × 10	2 × 50 × 10
IZM(IN).2-...	800	1 × 50 × 10	1 × 50 × 10
	1000	1 × 60 × 10	1 × 60 × 10
	1250	2 × 40 × 10	2 × 40 × 10
	1600	2 × 50 × 10	2 × 50 × 10
	2000	3 × 50 × 10	3 × 50 × 10
	2500	2 × 100 × 10	2 × 100 × 10
	3200	3 × 100 × 10	3 × 100 × 10
IZM(IN).3-...	4000	4 × 100 × 10	4 × 100 × 10
	5000	5 × 100 × 10	5 × 120 × 10
	6300	6 × 120 × 10	6 × 120 × 10

1) Other Cu bar sizes possible, but the total Cu cross section must not be less.

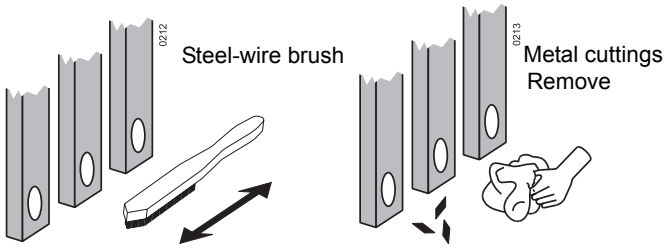
ATTENTION

On 4-pole circuit-breakers, the neutral conductor must always be connected all on the left (front view).
Otherwise this can cause malfunctions of the electronic overcurrent release.
Connection of cables directly on the circuit-breaker connections is not permissible.

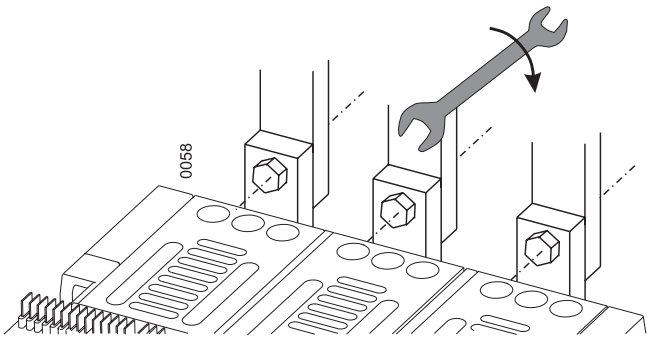
Cleaning the main conductor connection



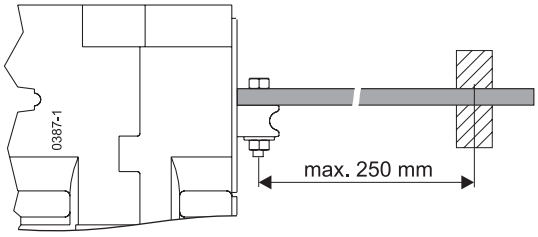
Cleaning the copper bars

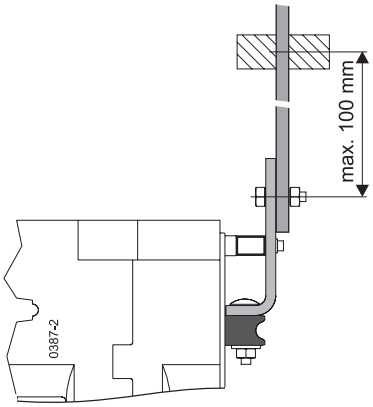


Bolt tight line-side bars



Bracing the main conductors



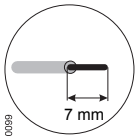
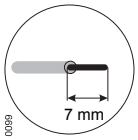


5.4 Auxiliary conductor connection

Terminal assignment:

→ Circuit diagrams (page 8 – 1)

Cross section connection type

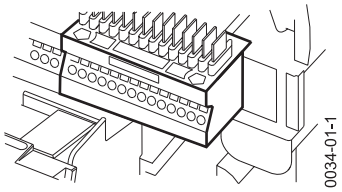
Strip conductors	1 x 	2 x 
Screw terminals 	0.5 – 2.5 mm² AWG 20...14 + Wire end ferrule[1)]	0.5 – 1.5 mm² AWG 20...15 + Wire end ferrule[1)]
Spring-loaded terminals 	0.5 – 2.5 mm² AWG 20...14 + Wire end ferrule[2)]	0.5 – 2.5 mm² AWG 20...14 + Wire end ferrule[2)]

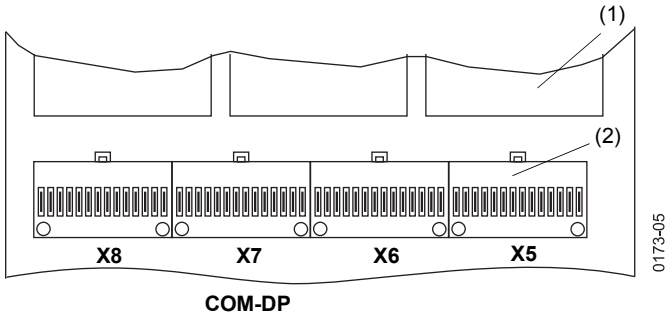
1) 1 × up to 2.5 mm² tubular without plastic sheath to DIN 46228-1
1 × up to 1.5 mm² tubular **with** plastic sheath to DIN 46228-2
2 × up to 1.5 mm² tubular **with** plastic sheath, twin ferrules

2) 2 × up to 2.5 mm² tubular without plastic sheath to DIN 46228-1
2 × up to 1.5 mm² tubular **with** plastic sheath to DIN 46228-2

5.4.1 Plug connector

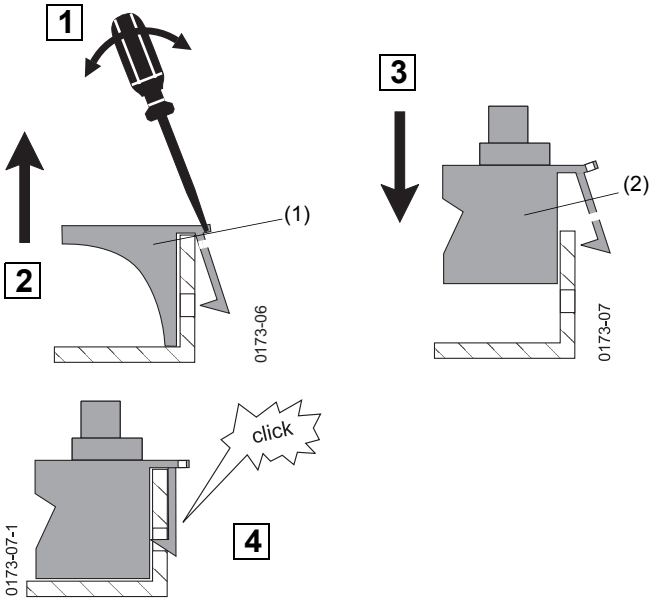
Arrangement





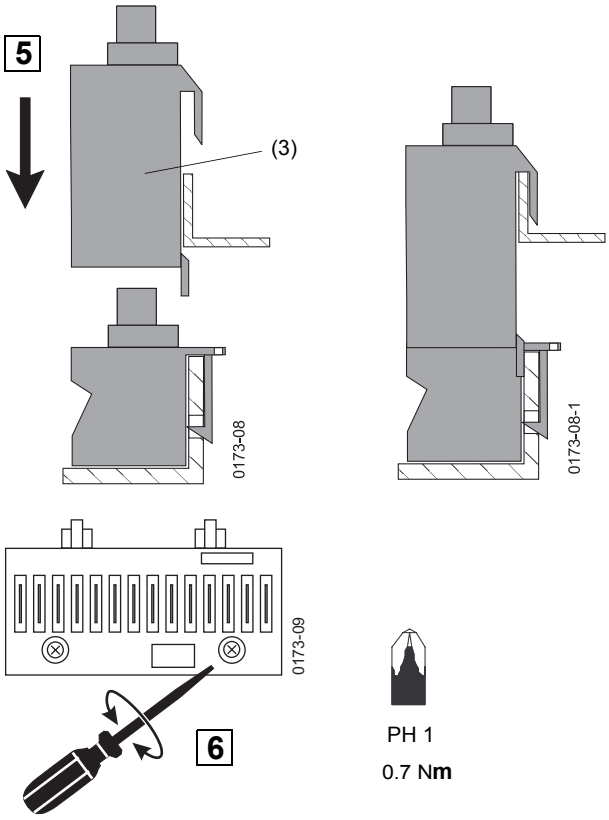
(1) Arc chute
(2) Plug connector

Retrofitting



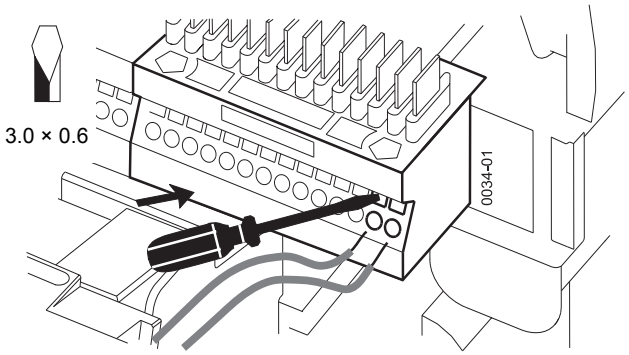
(1) Blanking cover
(2) Plug connector

Only for circuit-breakers, 1000 V version



(3) Knife-contact rail adapter for higher arc chute

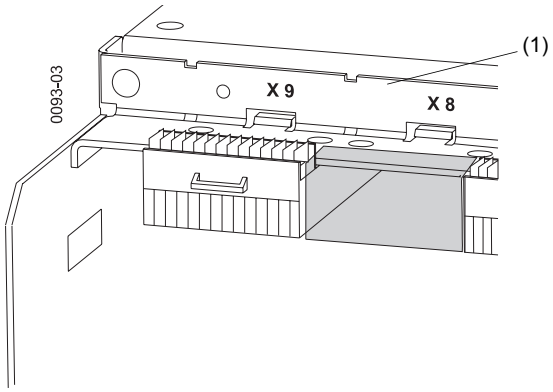
Spring-loaded terminals

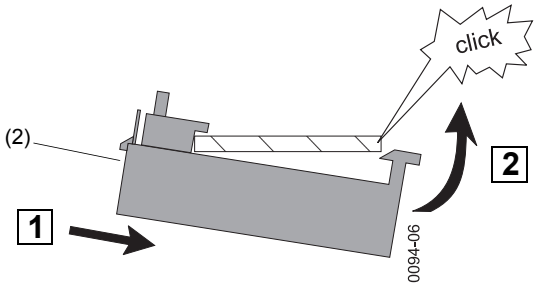


Connecting wires

5.4.2 Sliding contact module

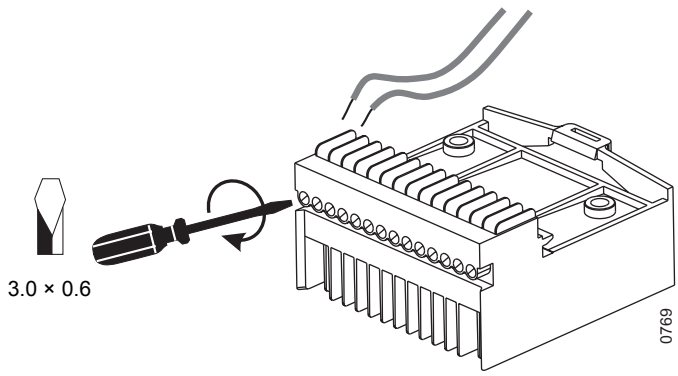
Retrofitting





(1) Connection area with sliding contact modules
(2) Sliding contact module

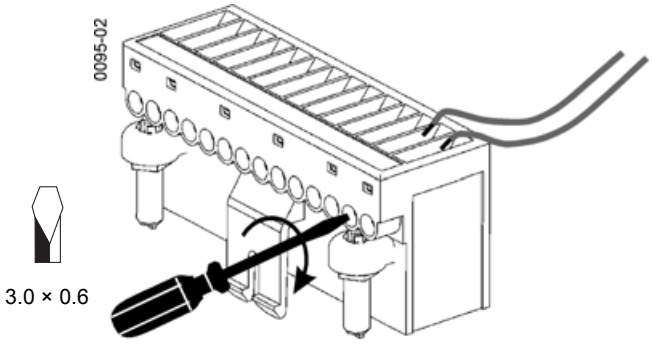
A single piece sliding contact module is also available with standard screw terminals.



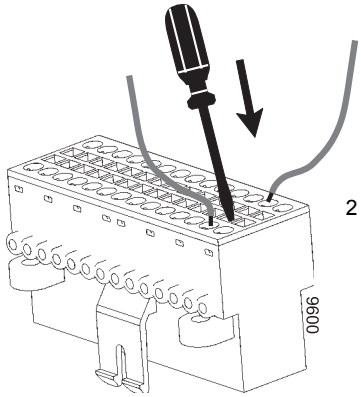
Single-piece sliding contact modules don´t require a control circuit plug. The cable is directly connected to the sliding contact module.

5.4.3 Control circuit plug

Screw terminals



Spring-loaded terminals

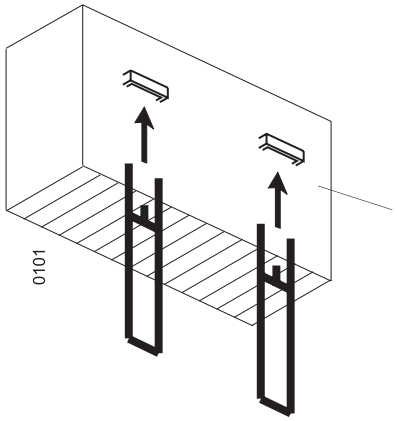


3.0 × 0.6

2 terminals in parallel per contact

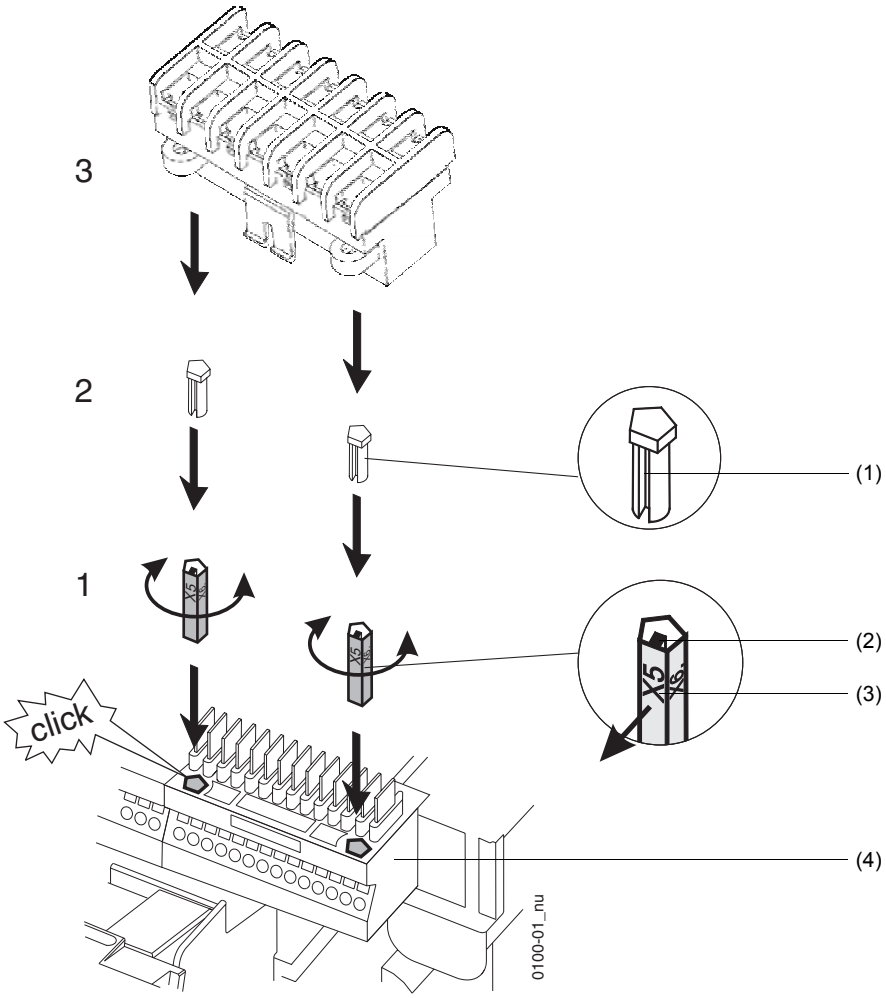
Attach guide tongues

(fixed-mounted circuit-breaker only)



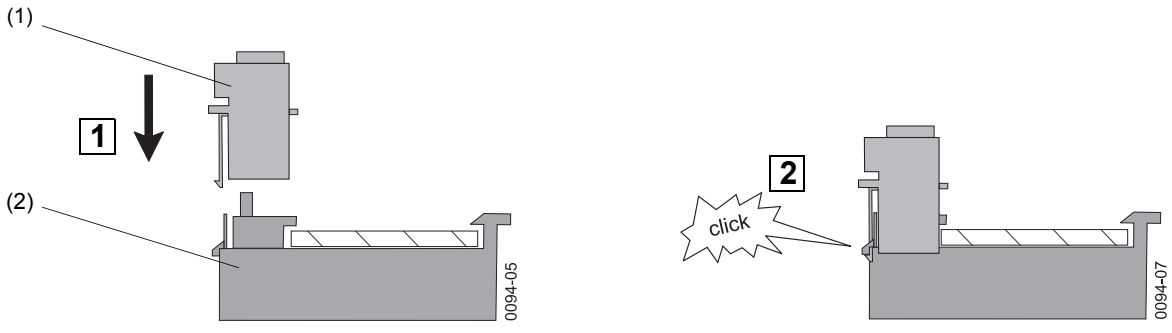
Back side of auxiliary connector

Coding (only fixed-mounted circuit-breakers)



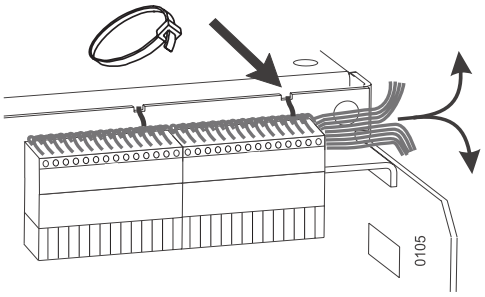
(1) Groove
(2) Guide
(3) Modul labelling (here X5; must show at front)
(4) Module X5

Fitting auxiliary connectors

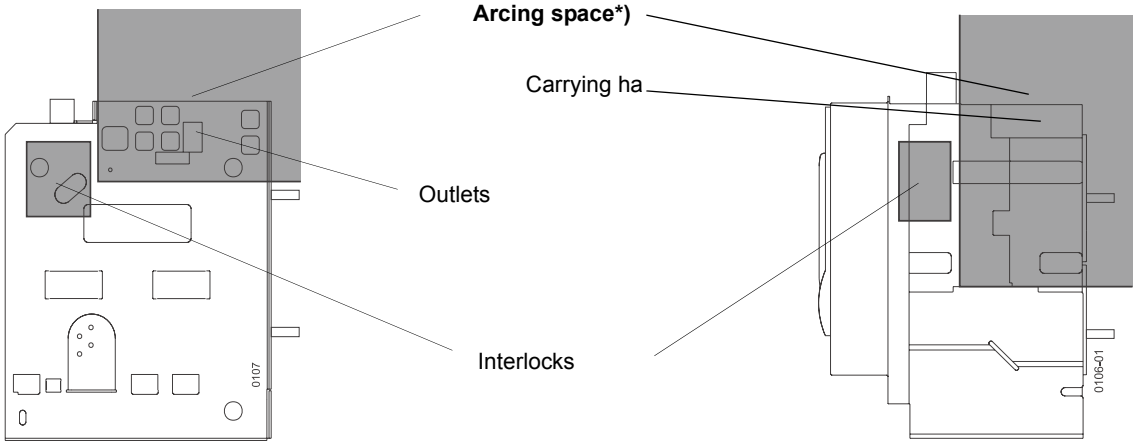


(1) Control circuit plug
(2) **Fixed mounting:** Knife contact rail
Withdrawable: Sliding contact module

5.4.4 Wiring on withdrawable unit



	Danger
	**Impermissible area for wires:** **Wires could be damaged.**



*)When arc chute cover is used control circuit wires must not be laid on this cover..

5.4.5 Assembly with control circuit connections

Terminal X6 always available. Depending upon the equiping of the circuit-breaker with additional accessories other terminals are necessary.

If necessary, with additional accessories the corresponding knife contact rail, control circuit plug and for connection area also sliding contact module must be retrofitted.

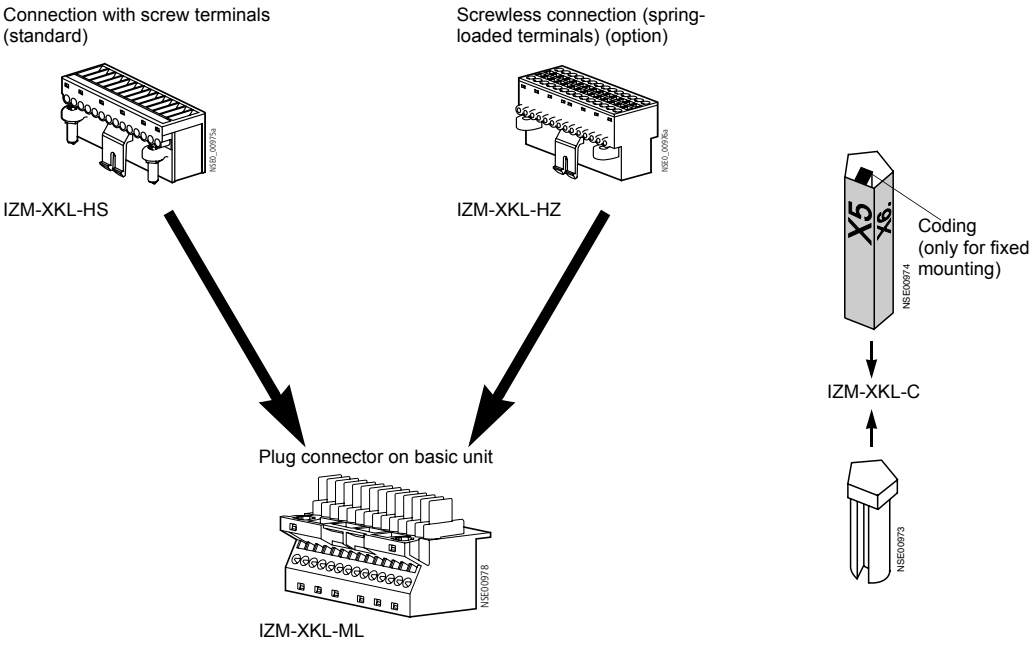
Terminal	Optional accessories
X5	– Motor drive with storage with mechanical and electrical release. – 2. Auxillary release (shunt release F2, undervoltage release F3, delayable undervoltage release F4) – Control circuit switch S3 + S4 or S7 + S8 or S3 + S8 – Motor cut-off switch S12 (only possible when motor drive selected)
X7	– Activated- signalling switch S24 – Stored condition indication S21 – Electrical ON pushbutton S10 – Signalling switch on 1st release S22 – Signalling switch on 2nd release S23
X8	– Overcurrent release XZMU, XZMD (internal System bus) – Connection for external current transformer for overload protection in N conductor and earth fault protection – Current transformer mounted in N conductor – Current transformer mounted in star point of transformer – Remote reset magnet F7 – External voltage transformer

5.4.6 Order numbers

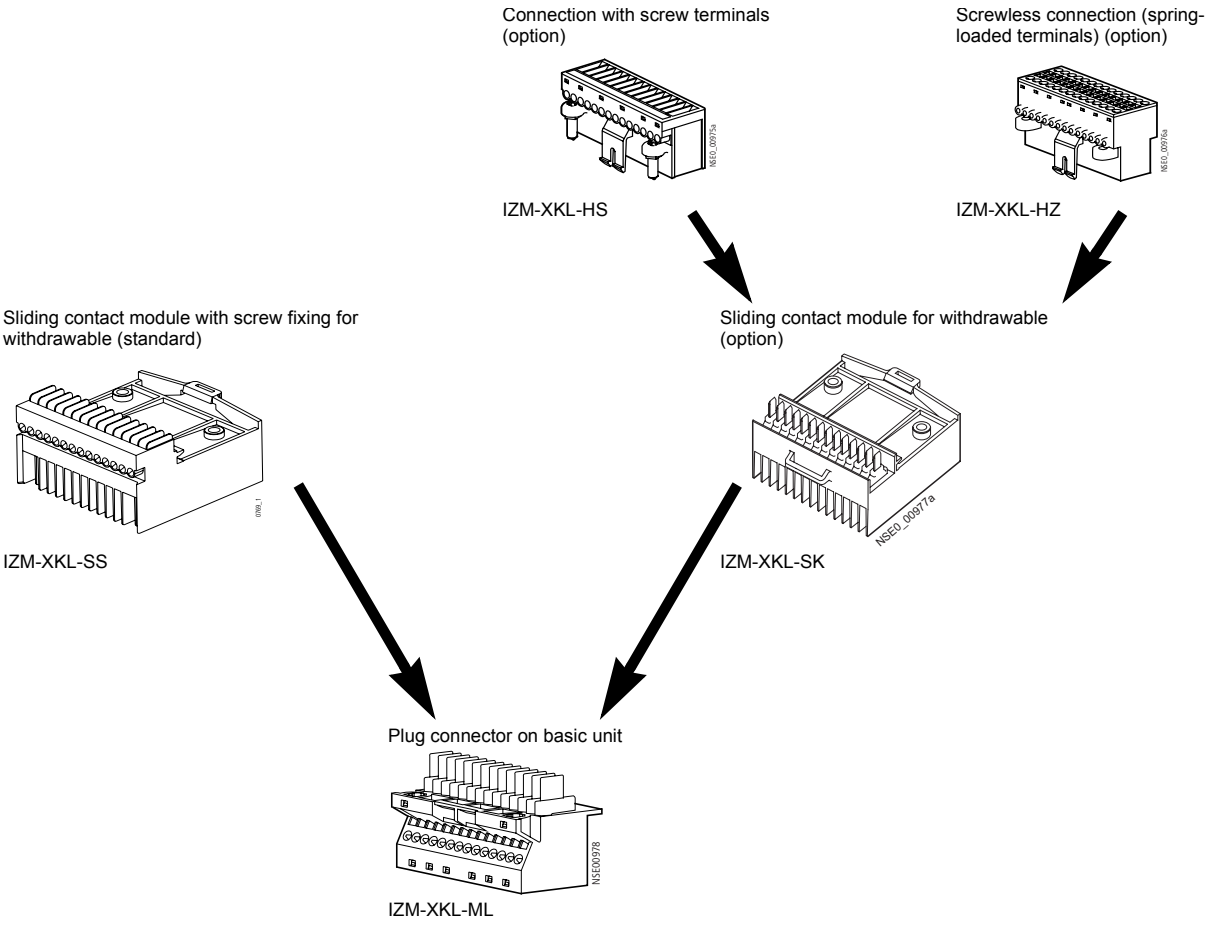
	Auxiliary conductors	Order numbers
A	Control circuit plug with screw terminals	IZM-XKL-HS
B	Spring-loaded terminals auxiliary conductor	IZM-XKL-HZ
C	Sliding contact module screw fixing / standard (only for withdrawable)	IZM-XKL-SS
D	Sliding contact module optional (only for withdrawable)	IZM-XKL-SK
E	Knife contact rail spring fixing	IZM-XKL-ML
F	Blanking cover (instead of a plug connector)	IZM-XKL-B
G	Coding set for fixed mounting for 4 control circuit plugs (not necessary for withdrawable)	IZM-XKL-C
H	For 1000 V withdrawable the following device is addditionally necessary: Additional knife contact rail for adpation on higher arc chute	IZM-XKL-AML1000V

Connection possibilities of the control circuit connections

Fixed mounted

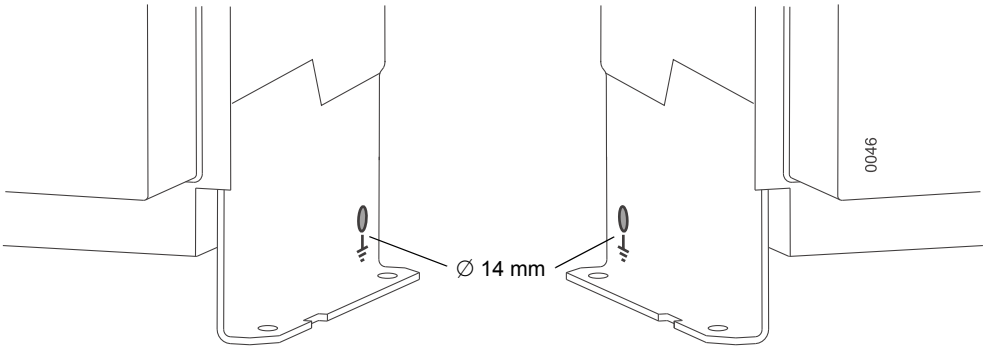


Withdrawable units

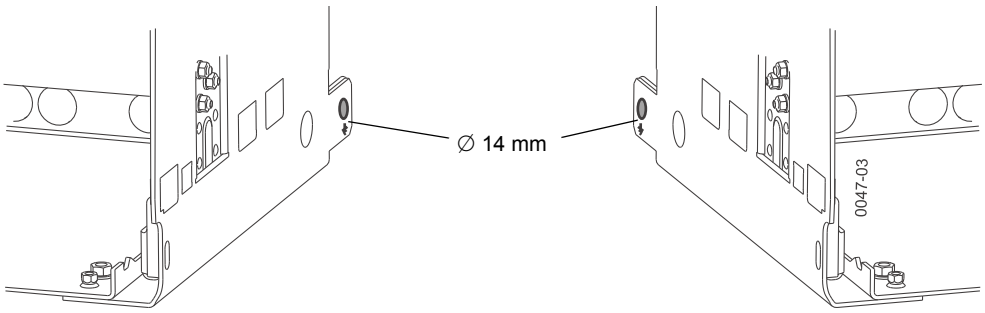


5.5 Connection of protective conductor

5.5.1 Fixed-mounted circuit-breaker



5.5.2 Withdrawable unit



5.6 Changeover of fixed mounting circuit-breaker into withdrawable circuit-breaker

Note

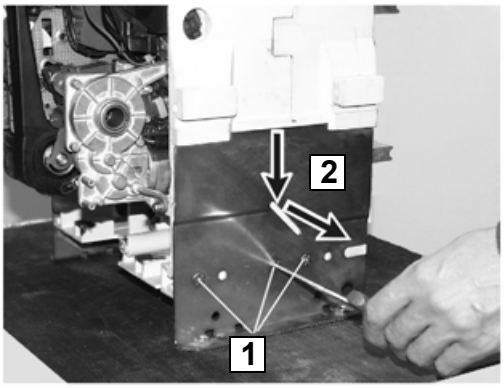
For the changeover of your circuit-breaker our After Sales Service can be used.

To contact After Sales Service: → chapter 26.

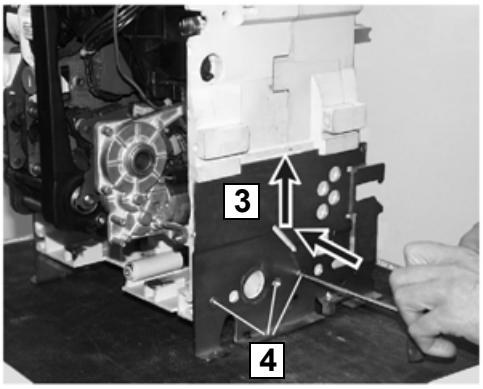
– Switching off and discharging the storage spring (→ page 24 – 2)
– Remove fixed-mounted circuit-breaker(→ page 5 – 1)
– Remove terminals other than horizontal terminals (→ page 5 – 7)
– Remove front panel (→ page 24 – 6)
– Remove overcurrent release (→ page 9 – 39)
– Install rated current coding on the new circuit-breaker feet and on the withdrawable unit (→ page 19 – 5)

5.6.1 Conversion

Replacing circuit-breaker feet




Size 4

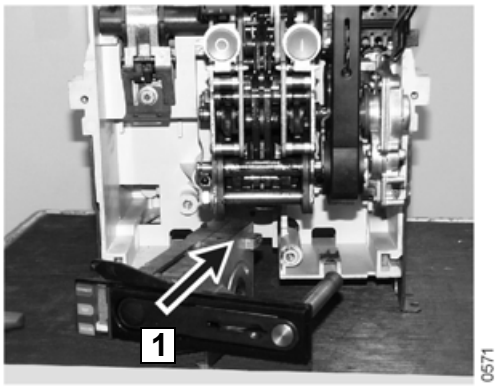


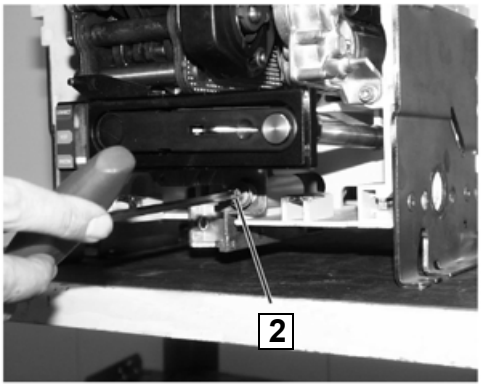

Size 4


10 Nm

1 Loosen and remove 3 M6x20 countersunk screws
2 Remove foot of fixed-mounted circuit-breaker
3 Replace by foot for withdrawable circuit-breaker
4 Attach the circuit-breaker foot with 3 countersunk M6x20 screws

Installing racking mechanism



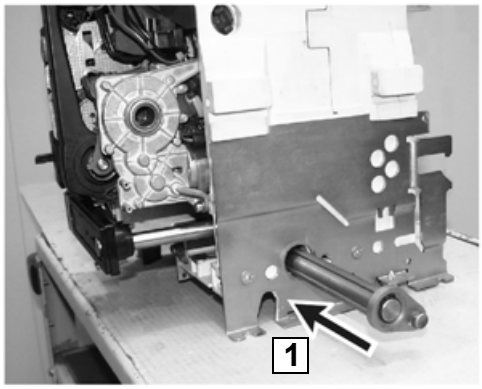


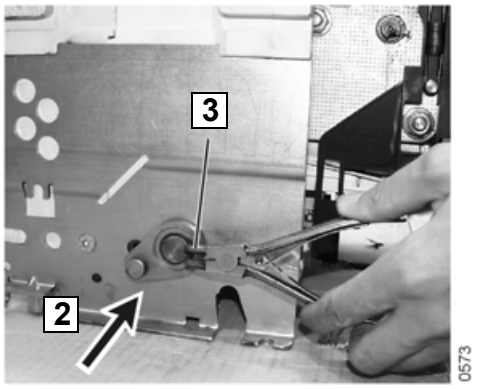

Size 5


***Nm**

1 Install racking mechanism
2 When threaded holes exist bolt the racking mechanism tight with M6x12 cheese-head screw, strain washer and 6x18x3 washer. When no screw thread exists grease a self-tapping screw and screw in.
*) Tightening toque :machine screw 6 Nm
self-tapping screw 5 Nm

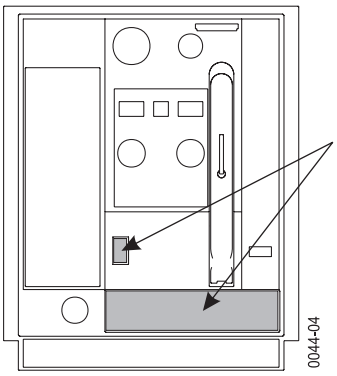
Installing racking shaft

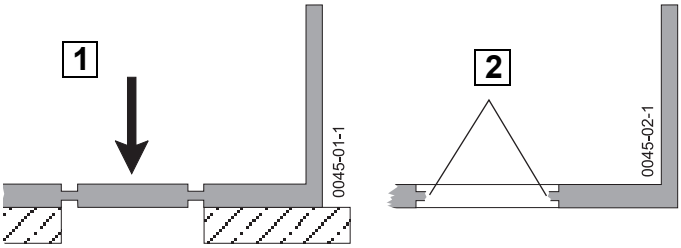




1 Insert racking shaft
2 Fit crank
3 Secure crank handle with circlip DIN 471-17x1

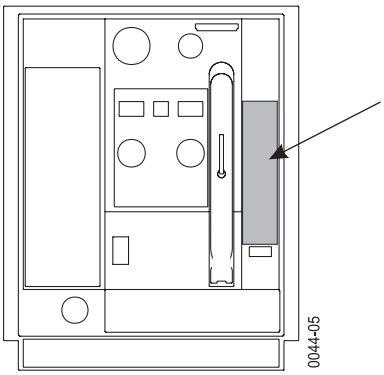
Knock out front panel





1 Knock-out section from operating panel; use suitable support
2 Deburr the edges

Fix adhesive label at the front panel



Then:

– Fit control gate(→ page 15 – 3)
– Install overcurrent release (→ page 9 – 39)
– Install front panel (→ page 24 – 13)
– Assemble the required terminals on the withdrawable unit (must be ordered separately) (→ page 5 – 7)
– Install withdrawable unit (→ page 5 – 1)
– Insert the circuit-breaker in the withdrawable unit and rack into connected position (→ page 6 – 1)

Conversion kit part numbers

Conversion kit for fixed-mounted into withdrawable circuit-breaker.

Frame size	Part no.
IZM(IN).1-...	IZM1-XUS-AV
IZM(IN).1-4-...	IZM1-XUS4-AV
IZM(IN).2-...	IZM2-XUS-AV
IZM(IN).2-4-...	IZM2-XUS4-AV
IZM(IN).3-...	IZM3-XUS-AV
IZM(IN).3-4-...	IZM3-XUS4-AV

Note

Conversion kits can only be ordered using the part no. shown above and also giving the Indent no. of the circuit-breaker.