TECHNOLOGY IN MOTION

MACO TRONIC

WINDOW AND DOOR SENSORS

Assembly instructions

MACO TRONIC

Instructions: If not otherwise specified, the dimensions are stated in millimetres and packing units in items per box.

All illustrations are purely symbolic.

Further technical documents can be found in our online catalogue (TOM) at extranet.maco.eu

This print document is continuously revised and the current version can be downloaded from www.maco.eu.

If you have any ideas or suggestions for improving our instructions, please send them by e-mail to: feedback@maco.eu

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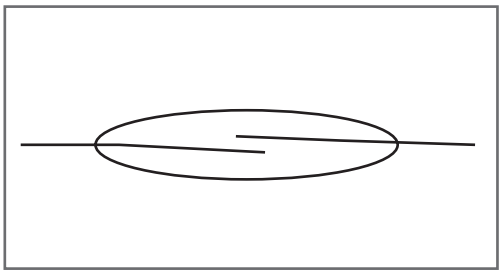
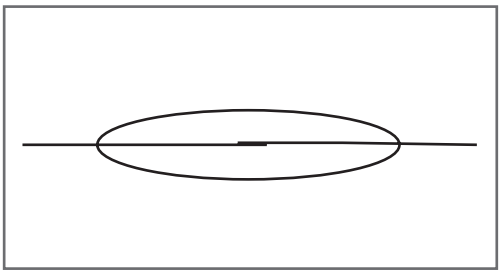
Opening and closure monitoring

Function

Fundamentally, the entire opening and locking monitoring system is based on reed contacts. The terms reed switch and magnetic switch are used synonymously. The term comes from the English word reed, a type of tube, and refers to the thin-walled glass tube (length 1 cm) within which two blades are sealed. These close or open (depending on type) in the proximity of a magnetic field. In doing so, we distinguish between NO and NC contacts. A closing contact is normally open and closes when actuated, an opener has the opposite effect (normally closed, when actuated open).



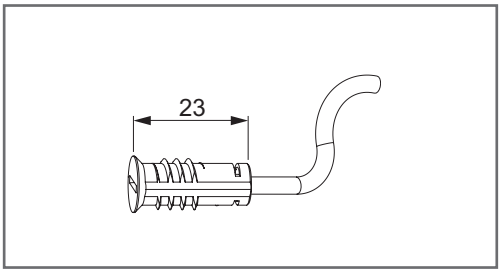
Reed contact (contact NO, NO - normally open)



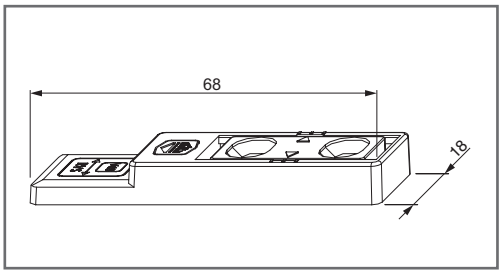
Reed contact (opener, NC - normally closed)

This reed contact is sealed in the striker plate and the terminals are extended out via a cable. The contacts are always mounted on the frame side, the appropriate contactor (see page 13) is mounted on the sash side.
The reed contact is fitted at the front end of the standard striker plate. Other versions include the screw-in magnetic contact and magnet contact with external field monitoring (discussed below).

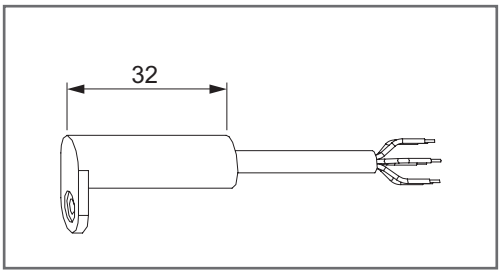
Reed contact



Screw-in reed contact



Position of the reed contact



with external field monitoring

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Electronics

Only a little technical knowledge is required to understand the fundamentals of simple circuits with electromechanical reed contacts. Everything you need to know is summarised on this page.

Voltage

The driving force behind any circuit is the voltage. Separated positive and negative charge carriers have the tendency to „mix“ due to their mutual attraction. This tendency is referred to as voltage. The unit of voltage is the volt. Voltage always exists between two poles. Comparing an electrical system with a water system, with certain inaccuracies, the voltage represents the water pressure.

Current

As discussed earlier, positive and negative charge carriers have the tendency to „mix“ again after separation. During this process, the charge carriers move. This movement is referred to as current. The unit of current is the ampere. Comparing an electrical system with a water system, the current represents the flow of water. If there are different water pressures (in electr. system voltages) at two connected sites, they equalise each other as long as the water flows (current flow), until there is no pressure difference (voltage difference). In an electrical circuit, for example, until the battery is empty.

Circuits

In order that a current can flow, an enclosed circuit must be present. Otherwise, the charges cannot move and thus cannot form a flow. Compared to a water system, if a pump circuit is a shut off by a stopcock (water cycle interrupted), no water can flow.

DC and AC

The term DC stands for direct current (DC) and is used for electricity which never changes its direction of flow. The positive pole is always positive and the negative pole is always negative.

The situation is different for AC (alternating current). In this case, the poles constantly change polarity. This means that the current always flows back and forth.

**) In reality, there are only negative charge carriers (electrons). Positive can be envisaged as the absence of electrons. This is because if an electron is removed, the site is more positive than before (since the negative charge is removed).*

VdS existing monitoring variants

Opening monitoring

If the monitoring system is required to monitor the opening of the window, an alarm is triggered as soon as the sash moves away from the frame. It should be noted that when the window is closed but the sash is **unlocked**, no alarm is triggered. The contact element (magnet) on the sash is generally rigid, i.e. executed without connection to the hardware dead-bolt.

Locking monitoring

Locking monitoring of windows not only registers the movement of the sash from the frame, but also its unlocking. Thus, locking monitoring includes monitoring of opening. However, if certified VdS contacts are required, it should be checked whether the respective certification offers the desired monitoring mode (refer to section „VdS Classes“).
The contact element (magnet) is fitted to the dead-bolt and moves with the hardware system.

Combined opening and locking monitoring

Although reed contacts, which are designed for locking monitoring, are also suitable for combined opening and locking monitoring, VdS has its own class termed „Combined opening and locking monitoring“.

Not VdS-compliant surveillance variants

Tilt monitoring (not VdS approved)

This monitoring is to be understood in such a way that when the alarm is activated, the window can be tilted WITHOUT triggering an alarm. It does not, as the name suggests, monitor if the window is moved into the tilted position. This behaviour is achieved by the position of the reed contact below horizontal, as even when the window is tilted, the magnet is still far enough above the reed contact.

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VdS classes

VdS-Schadensverhütung GmbH („Trust through Security“) tests and certifies damage prevention components and entire systems. The so-called VdS classes have been defined for classification purposes.

MACO classified products of the following monitoring types can each be subdivided into the classes A, B and C divided (see previous section).

- Opening monitoring
- Locking monitoring
- Combined opening and locking monitoring

Class A

Simple protection against attempts to overcome the system when both activated and deactivated. The detectors have medium sensitivity.

Class B

Medium protection against attempts to overcome the system when both activated and deactivated. The detectors have medium sensitivity.

Attempts to overcome the system are monitored by a tamper line.

Class C

Increased protection against attempts to overcome the system when both activated and deactivated. The detectors have an increased level of sensitivity. Extensive monitoring of safety-relevant functions is provided.

Attempts to overcome the system are recorded by a tamper line as well as a second reed switch, which triggers when approached by a foreign magnetic field. This means any attempt to manipulate the reed contact by another magnetic field will be detected.

The following table provides an overview of the relevant approvals of MACO‘s reed contacts:

	Reed contact RVS	**Reed contact MVE**	**Reed contact MVF**
Lock	C	C	C
Opening	B	B	C
Combined	B	B	C

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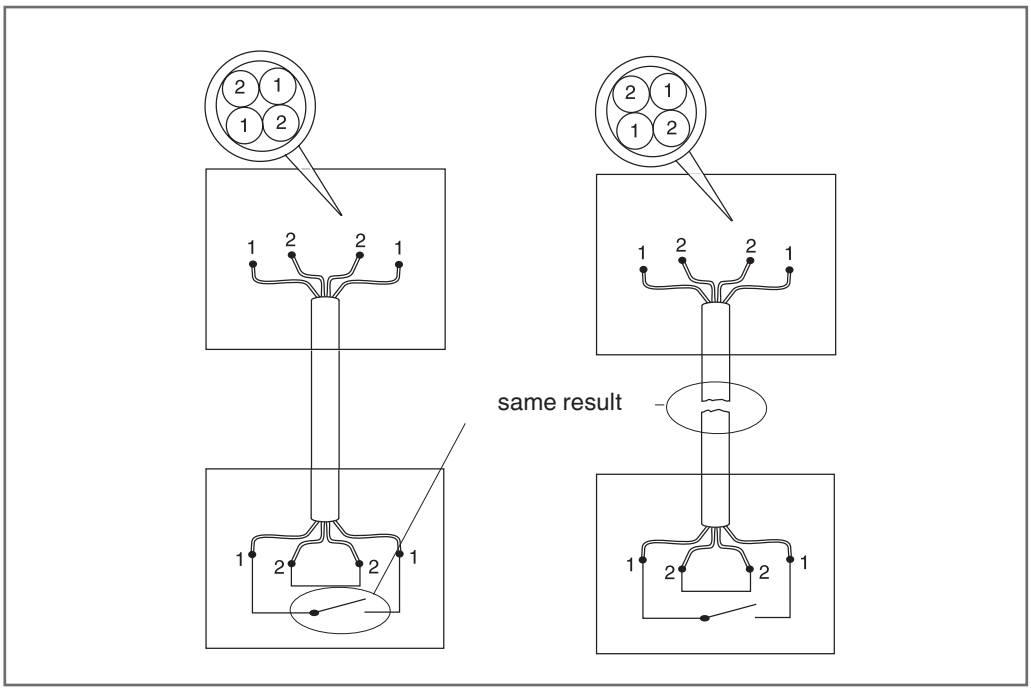
Sabotage line

In order to prevent tampering, all reed contacts have a tamper line, apart from the RHS contact (heating control). These two terminals are connected internally in the reed contact, thus forming a loop. This can be monitored by an alarm system (by switching and monitoring a voltage). If the tamper line (or the entire connection cable) is severed, this is detected by the alarm (by eliminating voltage). The act of sabotage is detected and an alarm sounds.

Why sabotage line next to reed contact?

The additional inclusion of a tamper line appears at first not directly explainable. However, once the connection cable of a reed contact is severed, the alarm system is triggered, because the same behaviour is achieved by interruption, such as by unauthorised opening of the window (see chart).



Both scenarios appear the same for the alarm system, as if the window had been opened.

However, the tamper line is based on the following regulations and offers the following benefits: On the one hand it is required by VdS, on the other hand, it extends the ability of the alarm, because using this line, the system can clearly distinguish between a sabotage attempt and a burglary. In the event of an act of sabotage, the reed contact is reported as open, but also the sabotage loop and thus the cable must have been severed. Another advantage is that the tamper line can still be monitored even when the system is deactivated. Should someone try to sabotage the „deactivated“ alarm, the tamper alarm is triggered.

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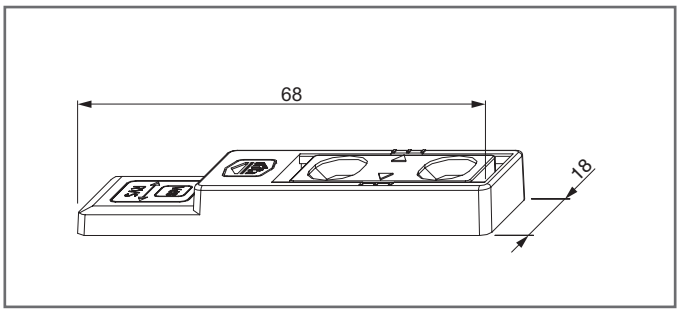
Explanations of the various reed contacts

Reed contact RVS

for lock and tilt monitoring, cable 6, 10 or 15 m

(Art. No. 363177-363179)

The term RVS is an abbreviation for „reed contact closing part for locking monitoring“. This reed contact has a contact closure (1) and a sabotage line. The sabotage line is used to monitor for manipulation or interruption of the connection cable. As can be seen from the chart below, the two terminals of the tamper line (2) are connected internally in the striker plate, this link is monitored by the alarm system in each case. Once this closed line is interrupted, the system outputs an alarm.



Reed contact RVS

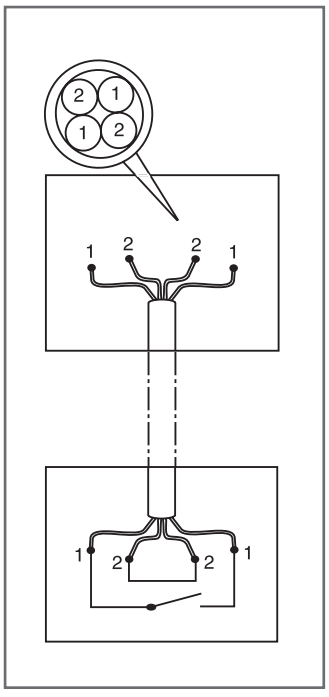


Diagram RVS

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Reed contact RHS

for heater control cable with 6 m or 15 m

(Art. No. 363180 and 363181)

The term RHS is an abbreviation for „**r**eed contact for **h**eating control“. This option is used when tilted or at opened windows should cause the heating to be turned off automatically. As shown in the graph at the bottom left, there is a choice here, whether a closing or opening function is desired, since the reed switch contains a so-called change-over contact. The choice is dependent on the heating control used in each case.

Another application of this reed contact is the exhaust control for cooker hoods in existing fireplaces, furnaces, gas furnaces or gas hobs. When, for example, a fireplace and extractor are operated simultaneously, smoke from the chimney can be sucked back into the room under certain circumstances. In Germany the fire regulation FeuVO §4 stipulates that simultaneous operation is only permissible with adequate fresh air supply, for example, through a tilted or open window. This can be done with the exit air control (Art. No. 458063) in combination with reed contact RHS, as only when the window is tilted or open can the cooker be turned on.

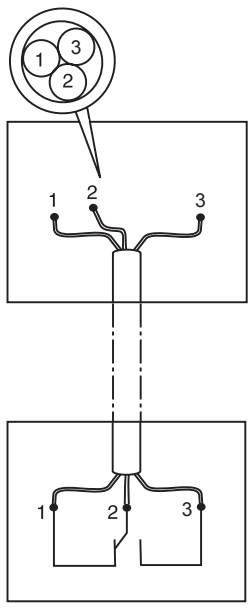
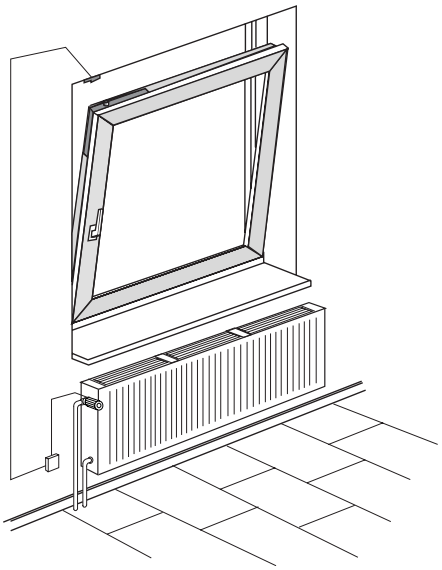
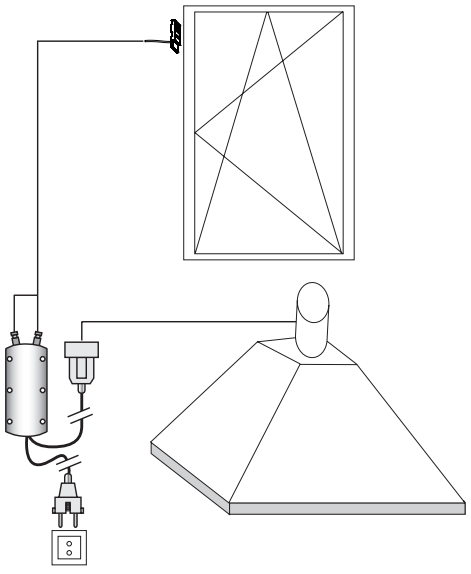


Diagram RHS



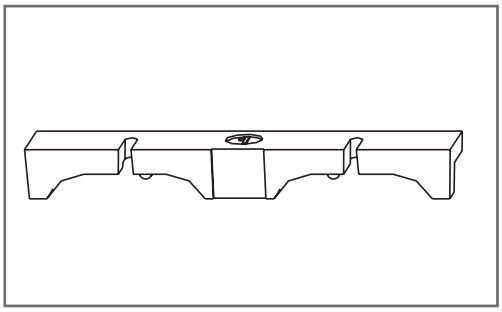
Sample application RHS



Exhaust Control with RHS

Profile adjustments for reed contact RVS and RHS

Covers are available as insertable moulded parts in order to be able to mount the reed contact RVS and RHS properly.
The assignment list is in the appendix (page 74).

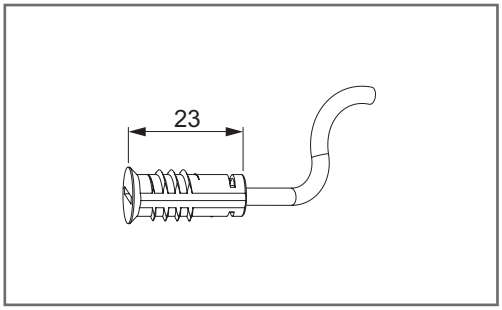


Moulded part type 1

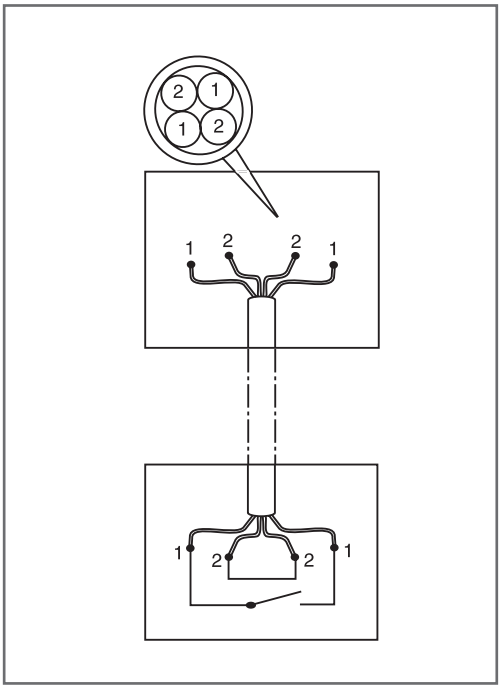
Reed contact MVE

(Art. No. 455426)

This reed contact is different from the RVS already mentioned only in terms of appearance. The wiring and operation is the same. The reed switch can be screwed in by means of the threaded casing. This is used for example in lifting sliding elements (locking monitoring for HS elements see page 46).



Magnetic switch VS screwed-in



Circuit diagram

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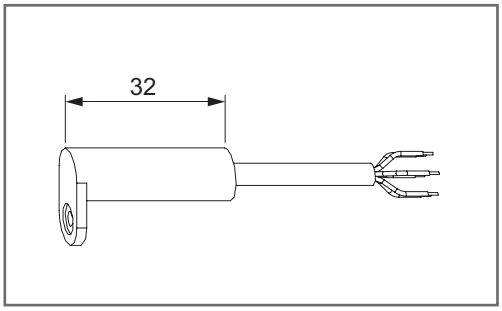
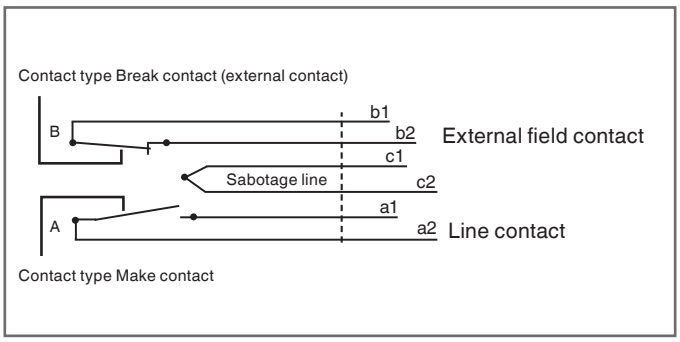
Reed contact MVF
(Art. No. 455427)

The special feature of this magnetic contact is the integrated external field monitoring system, which is realised by a second integrated reed switch. This offers increased tamper security, since in addition to monitoring for cable break by the tamper line, it also detects magnetic fields applied externally. If an attempt is made to tamper with the reed switch using an external magnet, the alarm is triggered.



Magnetic switch for combined opening and locking monitoring



circuit diagram

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Supplementary TRONIC article

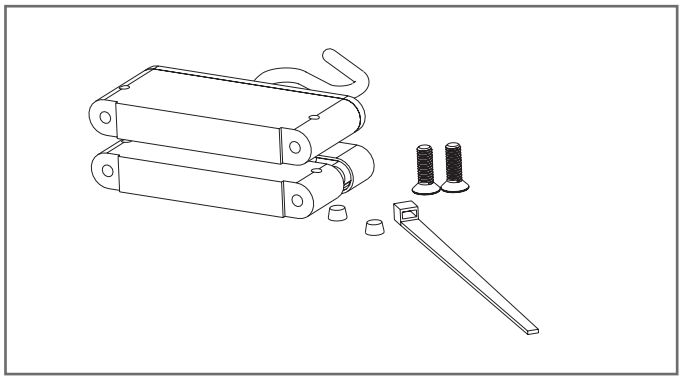
Electric, non-contact transition

(Art. No. 458062)

The contactless transition is used for the connection of alarm glass, among other things, (glass with built-in electric conductor loop also called „alarm net“) used in sliding elements. This is because it is not possible to connect via cable, due to the sliding design.

This transition is also used to implement a locking monitoring with lift and slide elements according to diagram C.

The transition consists of a transmitter (frame side) and receiver (sash side). The enclosed cable ties provide strain relief of the sash side connected cable in the receiver. The receiver cover is attached with two screws. The transmitter and receiver are sealed with resin and comply with IEC 529, protection class IP 67. In cases where the protection class is to be maintained, the soldered contacts in the receiver should be sealed with silicone rubber subsequent to connection (type: ELASTOSIL A33 from Wacker Chemie GmbH). The feed openings can be sealed with the gasket provided.

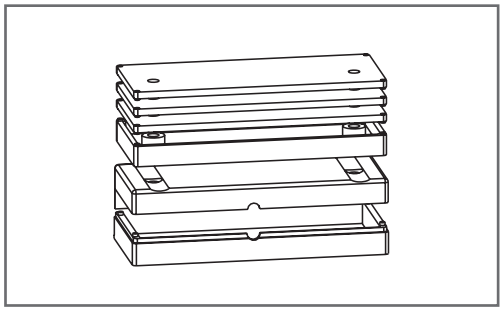


Constituent parts of package

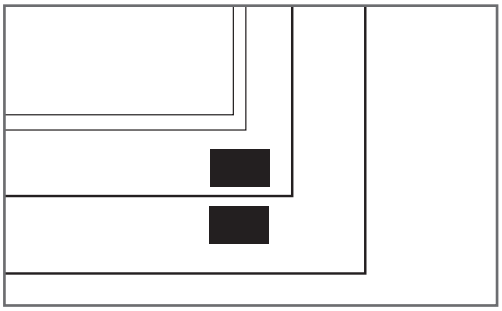
Accessories

Housing Set (white / brown) Art. No. 455431/455432

The housing can be used for attachment of the transition to the outside of a profile. This addition can be used to effect a visual and functional modification. In addition to the upper and lower casing parts, the package includes a 6 mm spacer plate and three spacer plates of 2 mm. This allows any existing offset of the transmitter and receiver to be compensated for.



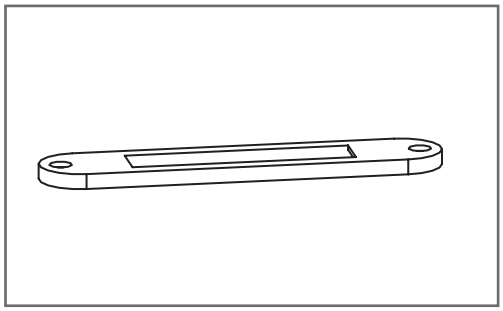
Surface mount housing with spacers



Surface mounting

Mounting frame for transition (white / brown) Art. No. 455429/455430

If the transition is to be countersunk, there is a mounting frame available for installation. This covers the cut hole and is used for fastening by screws.



Determining frames

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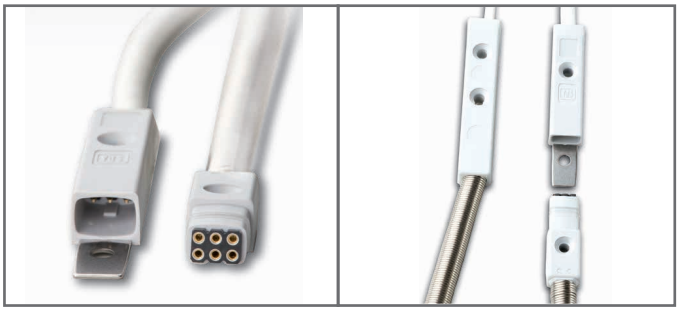
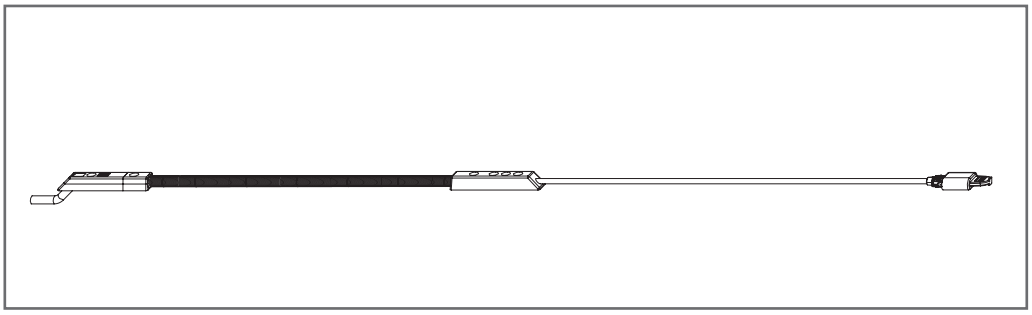
Removable cable transition for alarm contact with accessories
(Art. No. 458281 without plug / with plug 363472)

This cable transition is used for windows with alarm glasses to route the connection cable of the alarm net in the rebate. The variant without plug is used when the alarm web does not have the 4-pin „standard“ connector. The mating connector can be attached to the cable transition, since this has free cable ends (for installation see Appendix).

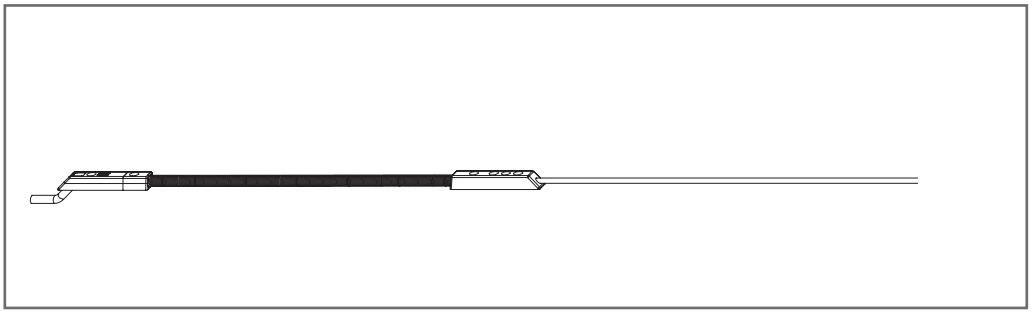
4-pin alarm web connector



Connector to unhinge sashes



Cable transition for alarm web with connector



Cable transition for alarm web without connector

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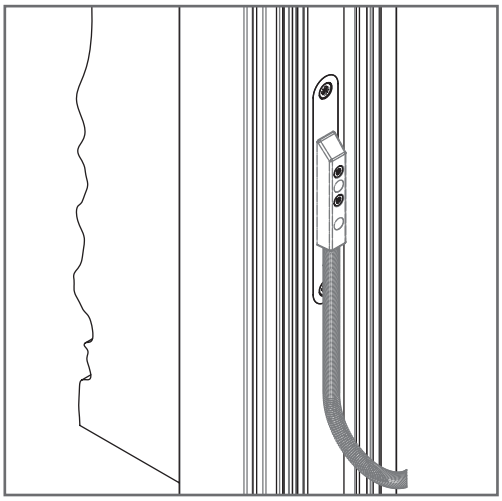
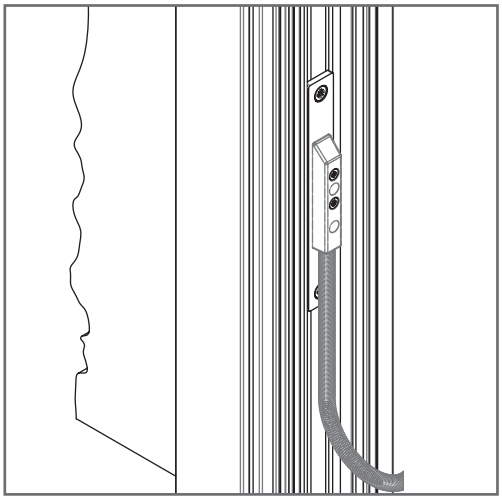
Cover plate for cable access point alarm in stainless steel

(Art. No. for timber 363473 / for PVC 363474)

A cover plate for timber and PVC (aluminium) is available in order to cover the hole for the alarm glass socket.



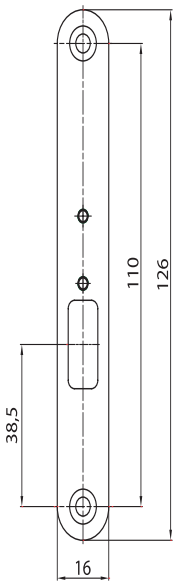
Installed state timber



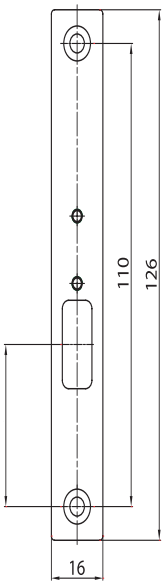
Installed state PVC / alu

Dimension

Type no. 363473



Type no. 363474



Item	Material	Dimensions (W x H x D)	Scope of supply
363473 For installation in timber	Stainless steel	16 x 126 x 3 mm	1 cover plate, 2 screws M3 x 12 mm
363474 for installation in PVC and aluminium	Stainless steel	16 x 126 x 3 mm	1 cover plate, 2 screws M3 x 12 mm

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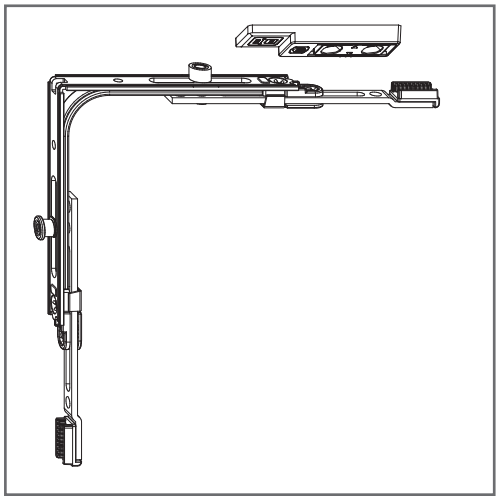
Sash-sided contactor

The sash-sided magnetic counterparts to the reed contacts are available in several versions for different applications.

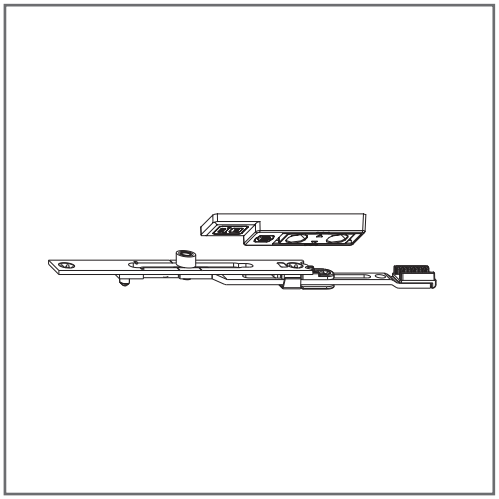
Hardware parts with contactor

The locking pin is replaced / supplemented by a magnetic contactor pin for these components.

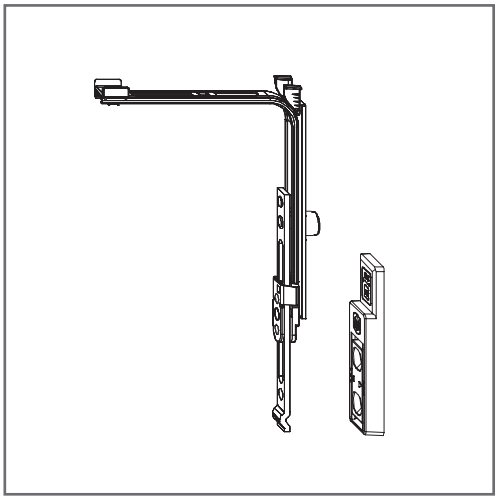
MULTI-MATIC
All of the following components are also available in TRICOAT, see MULTI-MATIC catalogue.



Corner element with 1 I. S. and 1 contactor (item no. 206190)



Extendable faceplate extension MM 140 with 1 contactor (item no. 201755)

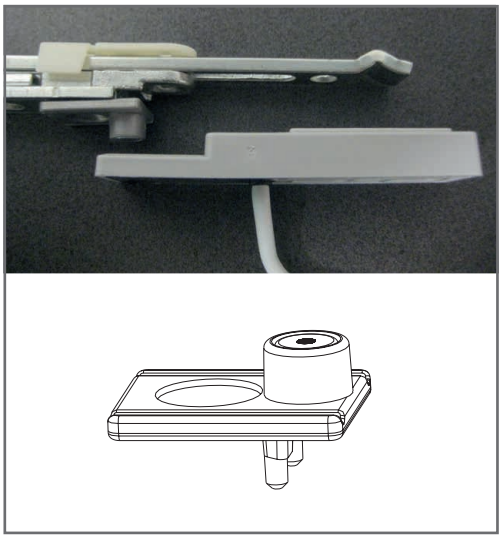


Extendable vertical corner element with 1 contactor (item no. 228493)

Adapter with contactor for MULTI-MATIC

This is used for **opening monitoring** (tilt monitoring) and has **no connection** to the bolt (thus **no** locking monitoring). It is simply attached with a fixing screw.

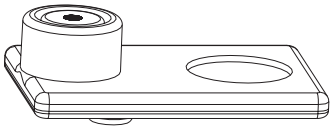
There are two types of this contactor. One is suitable for automatic bolting (Art. No. 225901), the other can only be used for manual assembly (Art. No. 200906), since no further hardware can be used subsequent to screw fixing (see figure). However, the advantage of the second variant is that in case of poor positioning of the frame-side reed contact closing part, a collision is avoided horizontally with the i.S pin of the corner element when in the tilted position.

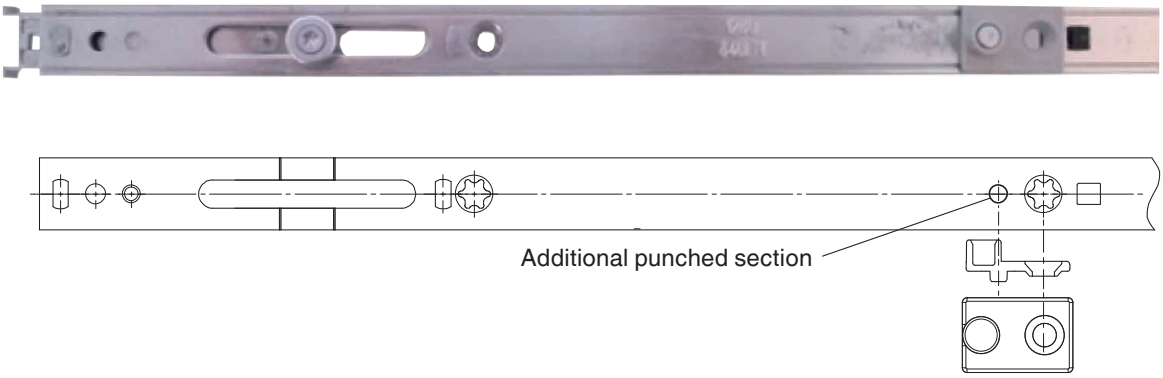


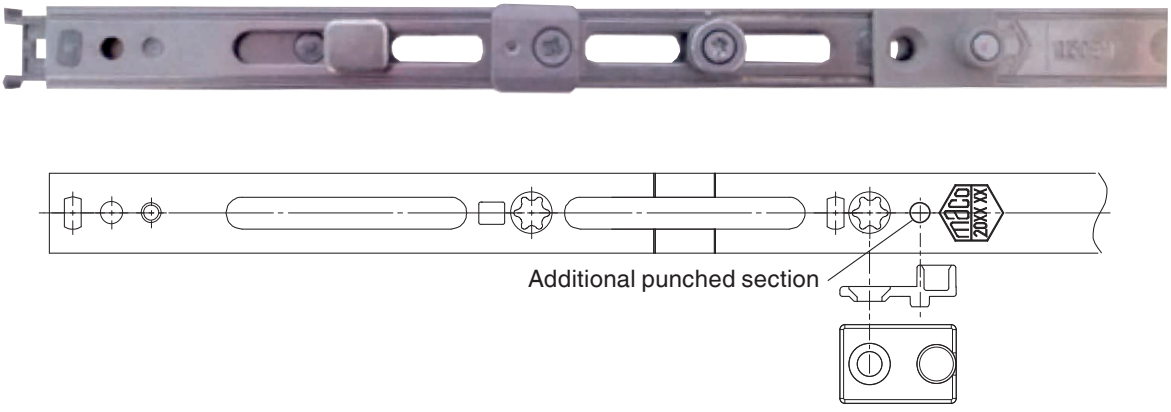
Adapter only for manual assembly

Adapter with contactor (originally designed for MULTI-TREND)

An adapter is available which was originally intended only for MULTI-TREND. This is only one type of adapter for this purpose, which can be easily fitted with a mounting screw. Also all MULTIMATIC unitary centre and tilt locks have an additional punched area to fit the TREND adapters.





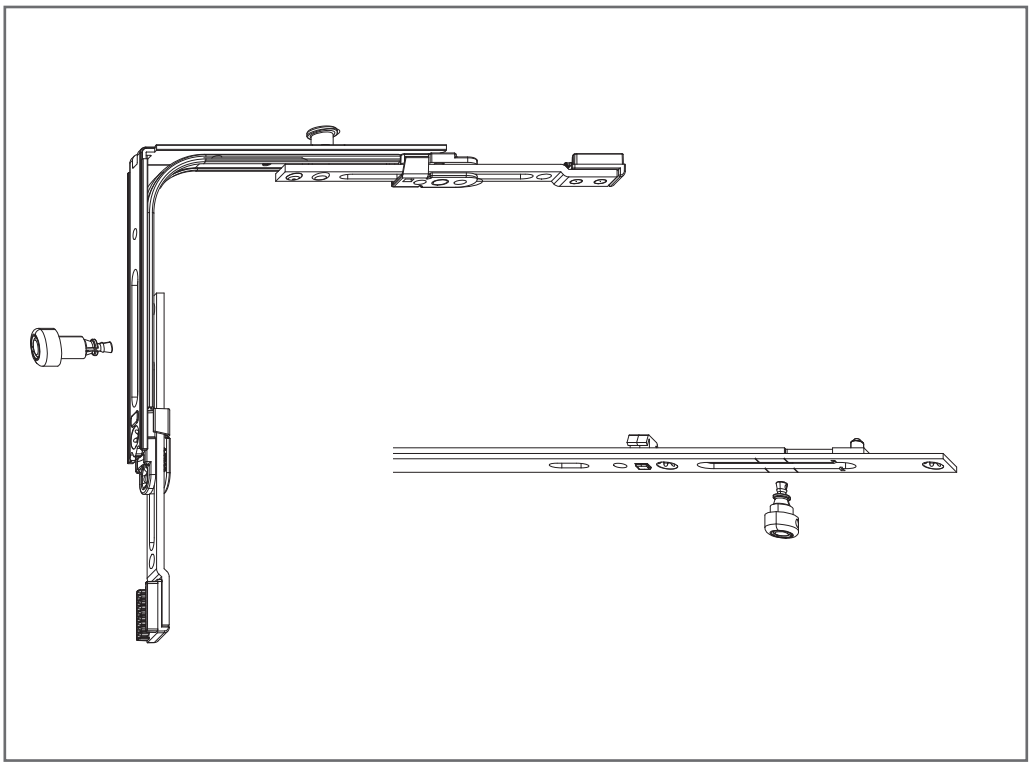


Magnetic cam

For corner element 222201 (with 1 i.S. pin) there is a magnetic cam for subsequent attachment in order to reduce inventory costs. This means it can be implemented as needed for locking monitoring.

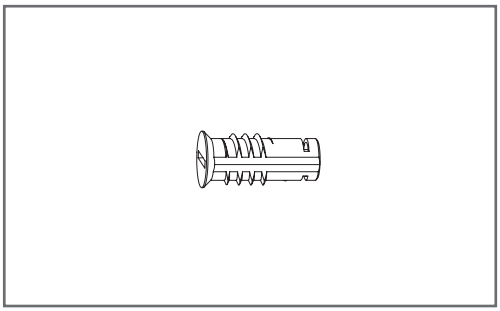
A distinction is made between the magnetic cam, long type (Art. No. 228504) for the said corner drive and the magnetic cam, short type (Art. No. 228503) for all fittings from faceplate extension 235.

The two versions differ only in the length of the mounting leg as the corner element is designed thicker than the other hardware for functional reasons. For fastening, the cams are inserted in the punched hole and the overlap on the deadbolt is hand riveted with around 5 hammer blows.



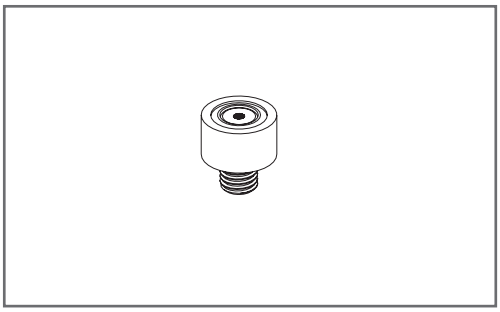
Screw-in magnet 8.5 x 23.8 mm

This magnet can be used for any application. For example, with lift-slide elements a screw-in magnet is used for locking monitoring. The magnet is in the same casing as the screw-in reed switch.



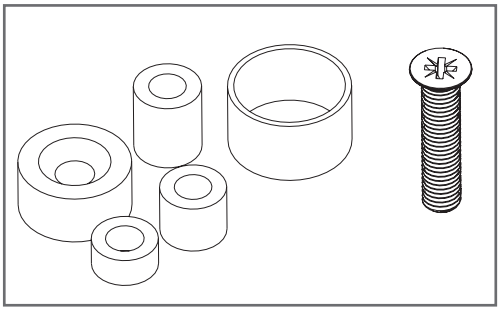
Cam for locking monitoring M5 10 x 10 mm

This magnetic cam can be used as needed. It is equipped with an M5 thread for any use. For example, the magnetic can be screwed into a faceplate piece and be positioned anywhere in the sash rebate.



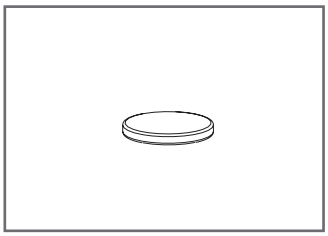
Screw-in contactor

This contactor can also be used as desired. The pack consists of the magnet itself, an M3 x 20 mm threaded screw, a plastic cover and three spacer sleeves, which are to be selected depending on the required gap.



Magnetic disk 8 x 1 mm blank „non-VdS“

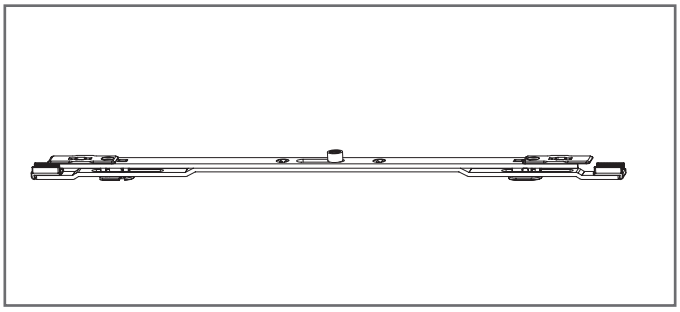
This disc is designed for amplification of the magnetic field. If the switching properties of the reed contact are negatively affected by incorrect positioning or other negative influences, the disk can be mounted with super glue on the sash side contactor (adapter with a contactor / cam with contactor).



MACO PROTECT

Locking module with magnetic cam

For MACO door locks Z-TS module and G-TS module there is an extension piece with magnetic cam. This means you can work with the same reed contacts as for window elements. Note the change in mounting position, in contrast to the window. As door locks have a stroke of 20 mm (window fittings 19 mm), the reed switch in the unlocked state must be positioned 6 mm from the magnetic stud centre (see mounting positions).



MACO TRONIC

Application variants

The following matrices are used for simple determination of the necessary hardware and reed contacts. In order to do so, click on the line with the appropriate application (opening, locking monitoring, etc.) and the column with the required VdS class („without“ means there is no VdS class required).

The intersection of these two criteria shows the various options (detailed with numbers). The numbers indicate combinations of hardware and reed contacts , which are shown on the following page. One of these design options can now be selected.
(**Note:** for 2-sashed windows, it is imperative that **two** reed contacts are used, as each sash must be monitored.)

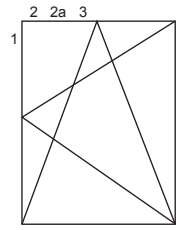
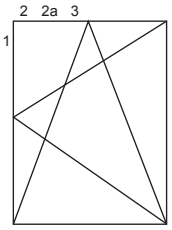
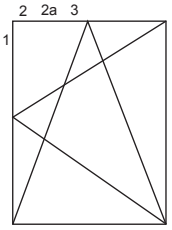
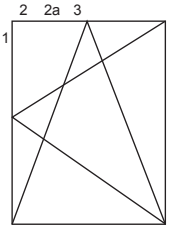
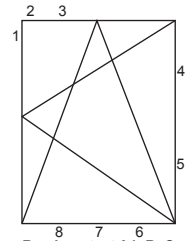
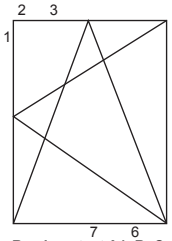
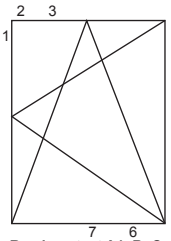
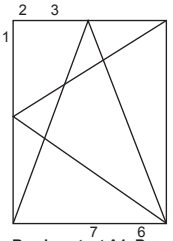
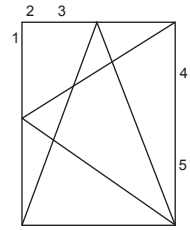
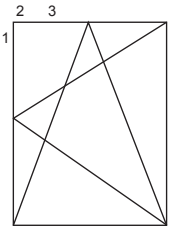
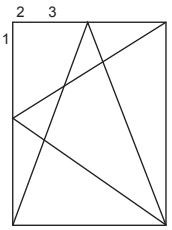
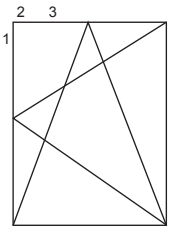
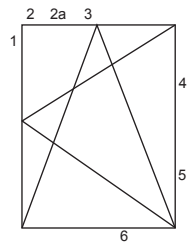
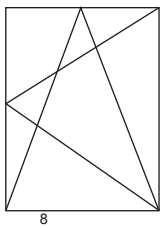
The possible usable reed contacts are denoted by A1/ A2 to C.

For opening monitoring it is not possible to monitor on the underside. VdS 2311 specifies that opening monitoring must be undertaken in the centre top section, maximum 60 cm from the espagnolette side. For opening monitoring and surveillance applications, locking monitoring can be used (moving magnetic cam). Locking monitoring also indicates an open sash, however locking monitoring also detects if the sash is ajar. If PURE opening monitoring is required, application 2a is to be used.

MACO TRONIC

Single sash

VdS class

	Without	A	B	C
Opening monitoring	 Reed contact A1, B, C	 Reed contact A1, B, C	 Reed contact A1, B, C	 Reed contact C
Locking monitoring (for VdS, hinge-side installation is not allowed!)	 Reed contact A1, B, C	 Reed contact A1, B, C	 Reed contact A1, B, C	 Reed contact A1, B
Combined locking and opening monitoring (only with movable cams)	 Reed contact A1, B, C	 Reed contact A1, B, C	 Reed contact A1, B, C	 Reed contact C
Heating control	 Reed contact A2			
Tilt monitoring The burglar alarm system can be activated even if a window is tilted.	 Reed contact A1, B, C			

A1 Reed contact RVS
(363177 6m, 363178 10m, 363179 15m)

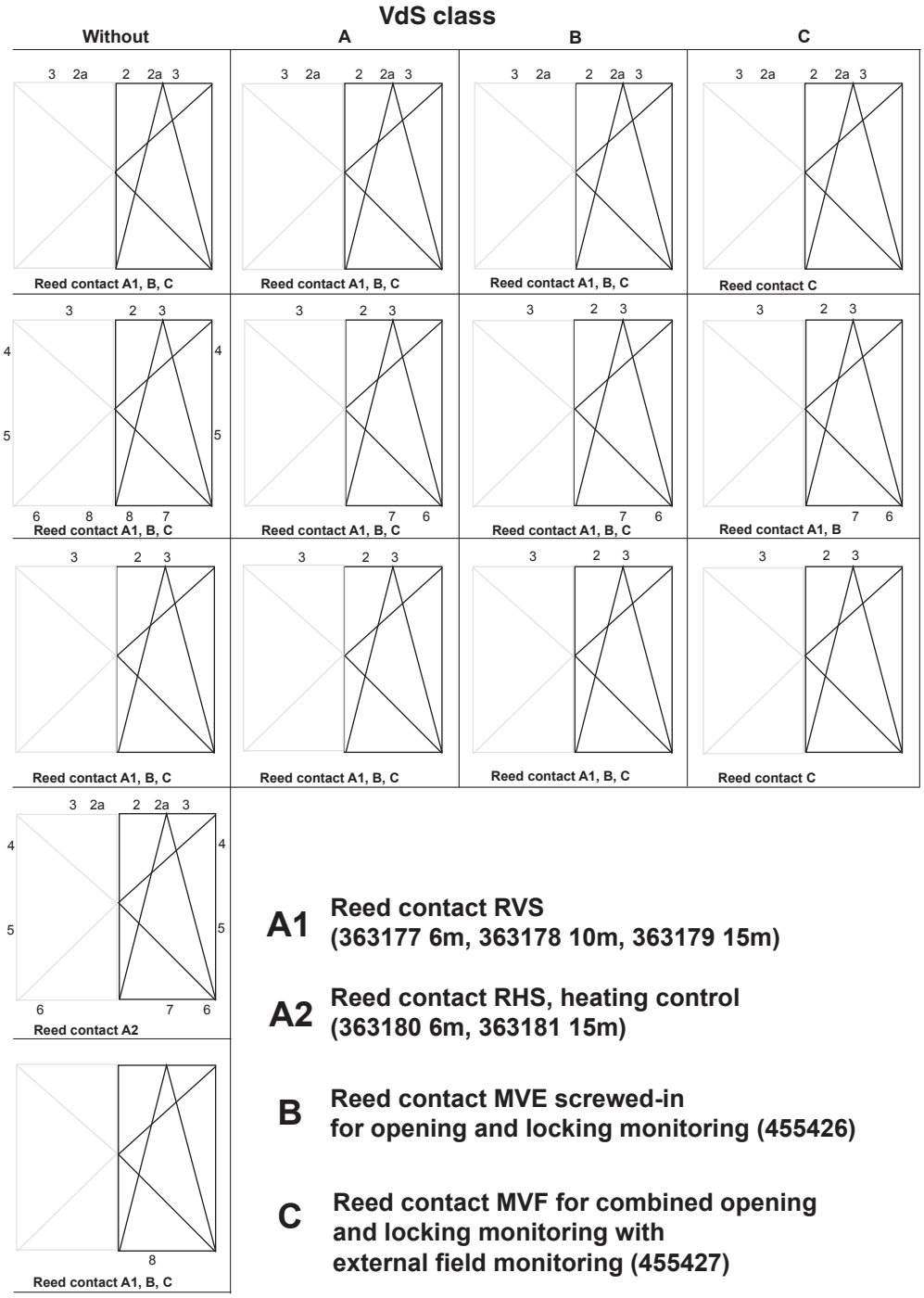
A2 Reed contact RHS, heating control
(363180 6m, 363181 15m)

B Reed contact MVE screwed-in
for opening and locking monitoring (455426)

C Reed contact MVF for combined opening and locking monitoring with external field monitoring (455427)

MACO TRONIC

2-sashed



A1 **Reed contact RVS (363177 6m, 363178 10m, 363179 15m)**

A2 **Reed contact RHS, heating control (363180 6m, 363181 15m)**

B **Reed contact MVE screwed-in for opening and locking monitoring (455426)**

C **Reed contact MVF for combined opening and locking monitoring with external field monitoring (455427)**

Locking monitoring of burglar-inhibiting elements

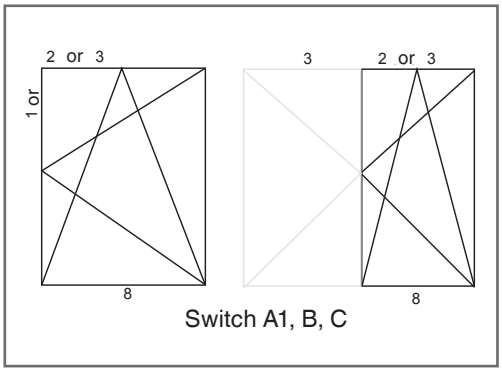
In accordance with RC 2, a clip-in cam can be used for matrix fabricated windows from faceplate extension 1280. Likewise, an existing faceplate extension 140 without supporting-pins can be replaced by a faceplate extension 140 with contactor. A further possibility is to use an additional faceplate extension 140 with contactor, but without altering the other pin journals.

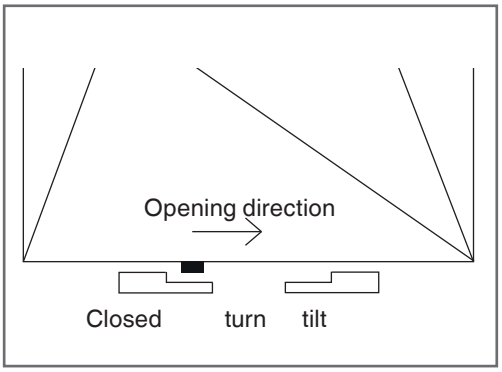
MACO TRONIC

Monitoring of all possible sash positions

However, if it is required to able to detect each state, two reed switches must be used. For each state of a 2-sashed windows, a reed contact for French window sashes must be provided.

In doing so, for 1-sash, an application is to be installed above and below! For 2-sash, one for sash at the top (for fixed & moving sash) and below!





Explanation:

Single sash
The movable magnetic cam is located at the top of the sash and opens as soon as the sash is no longer locked. As it is necessary to distinguish between rotating and tilting position, there is a rigid adapter with a contactor at the bottom. If the sash is tilted, the adapter is still above the reed contact. However, if the sash is opened, the adapter is removed and the reed contact opens.

It should be noted that when the sash is push closed in the turn position, the system reports „tilted“, as the magnetic cam at the top is not above the reed contact, but the rigid adapter below is. Under normal circumstances, this form should be sufficient as an unlocked window is reported in any case and window sashes are not usually pushed to on purpose.

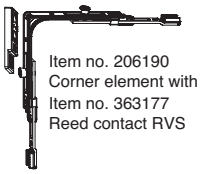
However, if this should not be required, movable magnetic cam should also be used on the underside of the sash and the reed contact in the frame should be mounted such that the **magnet pin is positioned above when in the tilted position**. Also viable is the use of **two reed contacts on the bottom**, whereby one monitors locking and the other the tilt position, thus only one contactor is required (diagram top right).

This means that all states can be properly distinguished, because with a locked sash the upper reed switch is closed, in the rotational position both reed contacts (top and bottom) open, and in the tilted position, only the lower contact is closed.

2-sashed:
The same applies to the initially opening sash as for the single sash, but the second sash must be monitored with a movable magnetic cam in order to evaluate its unique position.

Ausführungsmöglichkeiten MULTI-MATIC

Implementation 1a

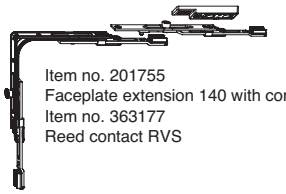


Item no. 206190
Corner element with contactor
Item no. 363177
Reed contact RVS

Implementation 2

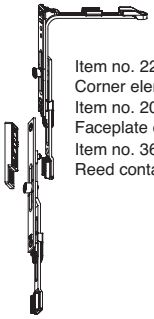
Item no. 206190
Corner element with contactor
Item no. 363177
Reed contact RVS

Implementation 3



Item no. 201755
Faceplate extension 140 with contactor
Item no. 363177
Reed contact RVS

Implementation 1b



Item no. 222203
Corner element short
Item no. 201755
Faceplate extension 140 with contactor
Item no. 363177
Reed contact RVS

Implementation 4a

Item no. 228493
Vertical corner element
with contactor
Item no. 363177
Reed contact RVS

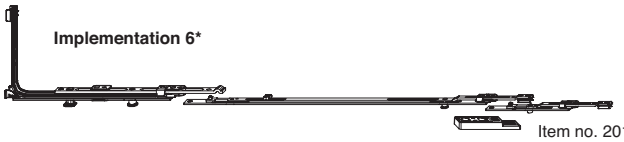
Implementation 4b

Item no. 228503
Cam with contactor short
Item no. 363177
Reed contact RVS

Implementation 5

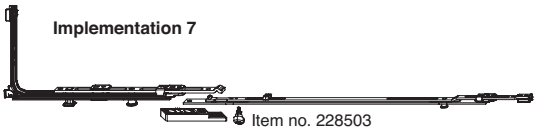
Item no. 201755
Faceplate extension 140 with contactor
Item no. 363177
Reed contact RVS

Implementation 6*



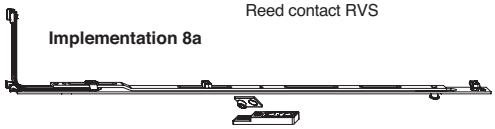
Item no. 201755
Faceplate extension 140 with contactor
Item no. 363177
Reed contact RVS

Implementation 7



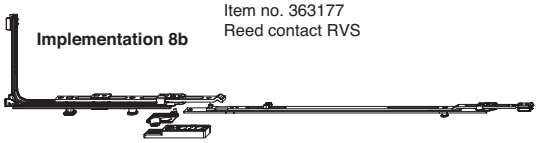
Item no. 228503
Cam with contactor short
Item no. 363177
Reed contact RVS

Implementation 8a



Centre & tilt lock in one piece
Item no. 57425
Adapter with contactor
Item no. 363177
Reed contact RVS

Implementation 8b



Item no. 200906
Adapter with contactor
Item no. 363177
Reed contact RVS

* allowed due to mechanical inevitability for locking monitoring and opening and locking combined monitoring

MACO TRONIC

Important notes on using reed contacts

Reed contacts are sensitive to shock and vibration, as the thin-walled glass tubes can easily break. Under no circumstances should they be hit with a hammer or forced in. Also, the built elements should not be fitted too tightly, otherwise the contactor in the reed contact closing part can damage the glass tube.

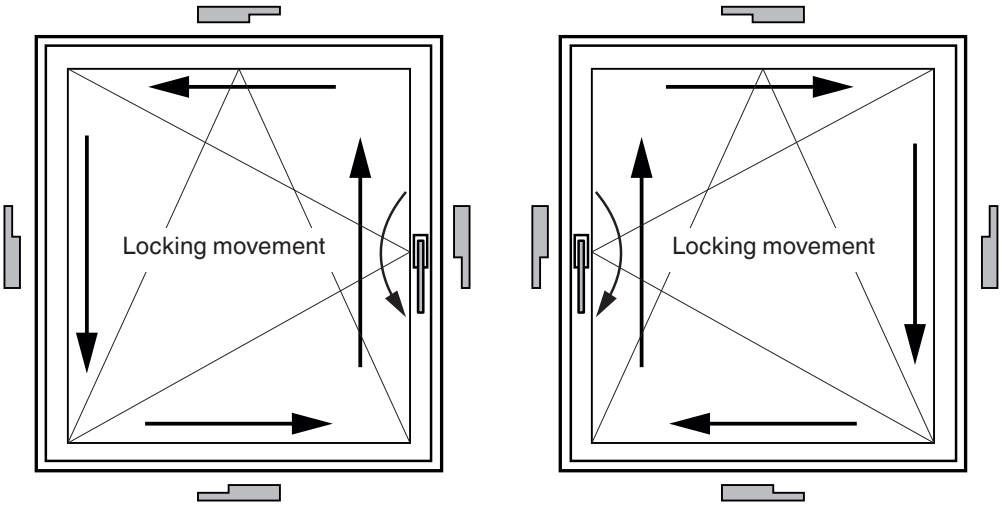
Reed contacts may not be tested with a continuity tester with light bulb!
Due to the high inrush current of the light bulb, the reed contacts can be permanently damaged.

Considerations to be taken before ordering / installation

The following points should be noted:

- Opening (fixed adapter) or locking monitoring (contact on the dead-bolt)?
- Is there enough space for the reed contact + contactor (on the sash)?
- For locking monitoring, the reed switch must be mounted such that the cam can move freely.

Rule of thumb: Location of the mounting holes always in „direction“ of lock (see chart), since in reverse mounting the cam inserts into the reed contact striker plate when opening.



Mounting positions

Mounting VdS / general

The customer places great value on installation according to VdS (for insurance benefits or similar). Therefore the following rules must be followed. If no VdS conformity is required, the regulations can be still seen as guidelines.

Opening monitoring
Reed contacts must be arranged on windows and doors so that each intended use of opening leads to a system response. Installation should be centred above if possible, but in any case at a **maximum of 60 cm from the espagnolette side**.
For multi-sash windows, at least one reed contact must be fitted **per sash**.

Furthermore, reed contacts must be mounted so that small movements do **not** result in a response (e.g. of the door panel, window sash) of **less than 10 mm**.

When installing, make sure that the device signals only when the lock bolt is 50% into the recess.

CAUTION: If the alarm contact is mounted in or on ferromagnetic material, such as steel panels, this affects the switching distance. Also anti-magnetic screws should be used, such as V2A screws.

Special features for opening and locking monitoring

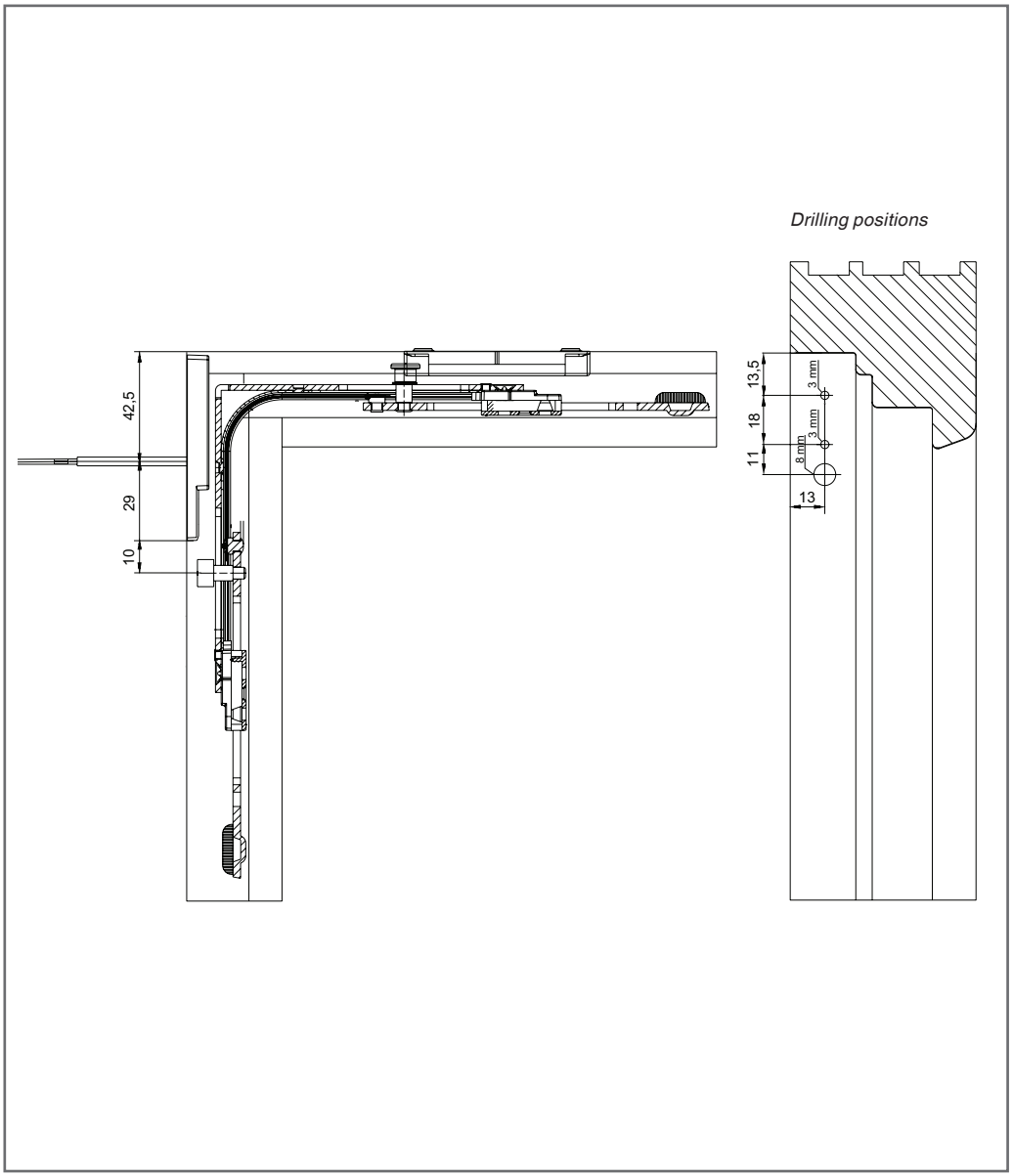
VdS 2311 specifies no special installation guidelines (installation site) for reed contacts with combined opening and locking monitoring. Due to mechanical inevitability, such contacts may also be mounted on the hinge side.

HOWEVER, certified VdS companies or similar, who are authorised to certify the overall system may raise concerns regarding delayed responsiveness and thus may not certify the installation despite following VdS regulations. The delayed responsiveness by mounting on the hinge side assembly results from the fact that the contactor can only respond as „open“ when the sash is sufficiently removed from the reed contact.

MACO TRONIC

MULTI-MATIC corner element with 1 i.S. and 1 contactor
(example with 12 mm gap and 13 mm offset)

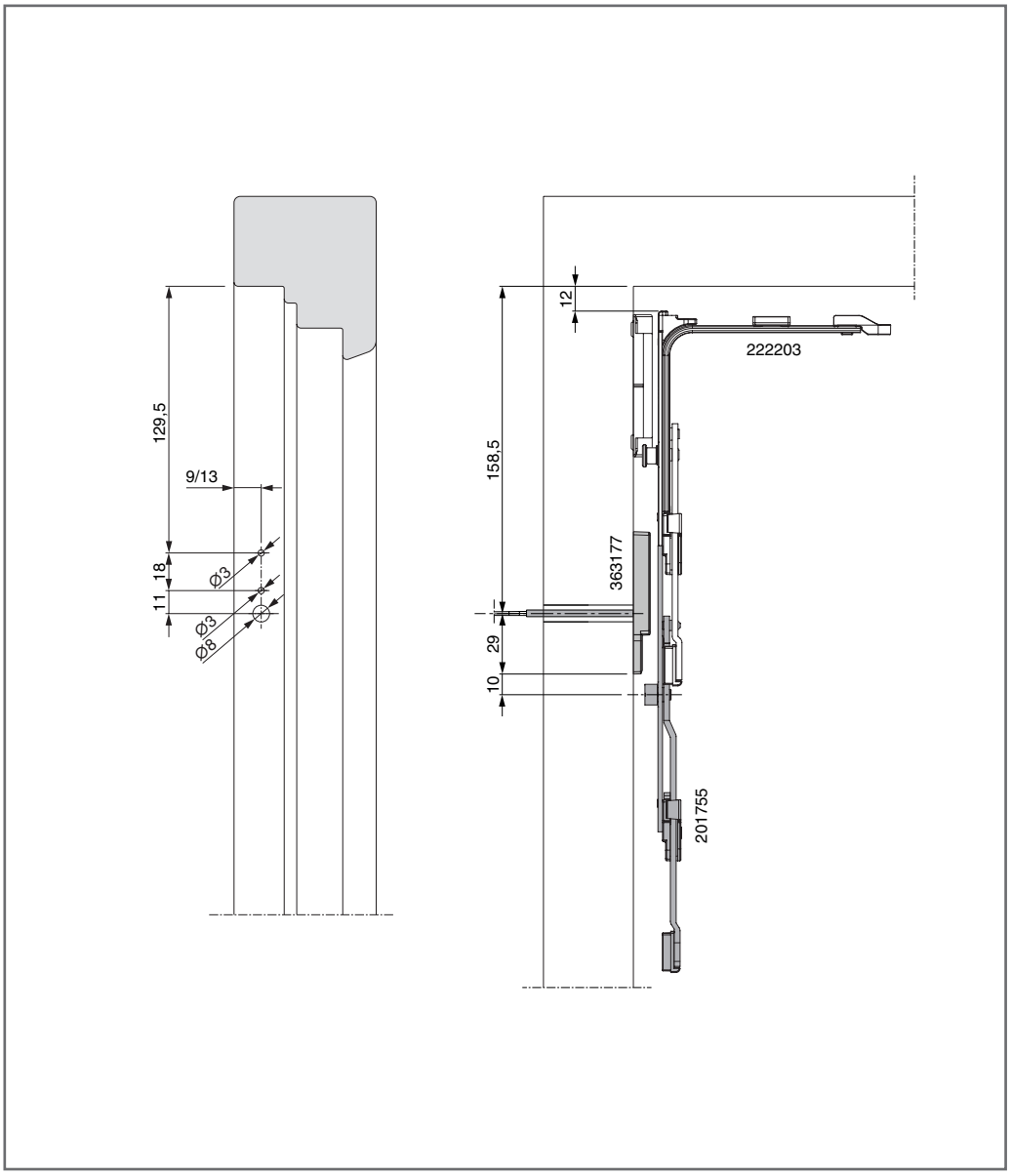
Fitting in rotational position



MACO TRONIC

MULTI-MATIC corner element short and faceplate extension 140 with 1 contactor
(example with 12 mm gap)

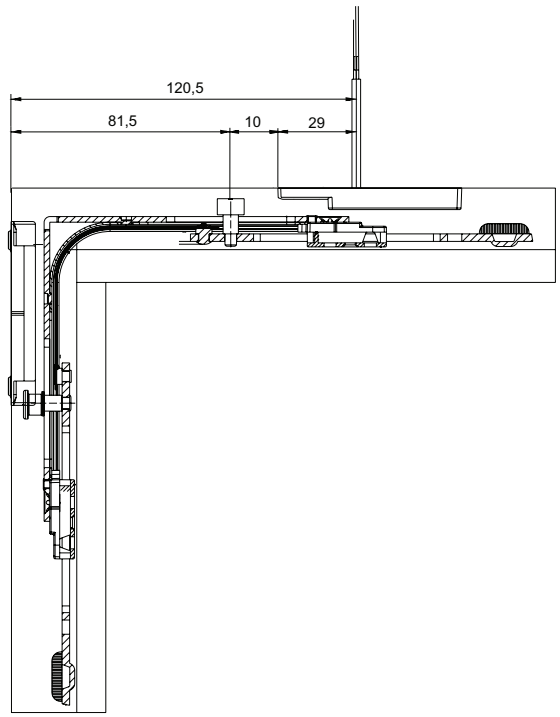
Fitting in rotational position



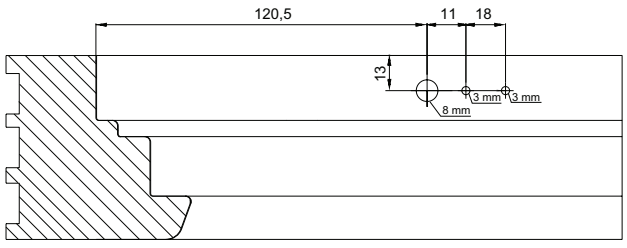
MACO TRONIC

MULTI-MATIC corner element with 1 i.S. and 1 contactor
(example with 12 mm gap and 13 mm offset)

Fitting in rotational position



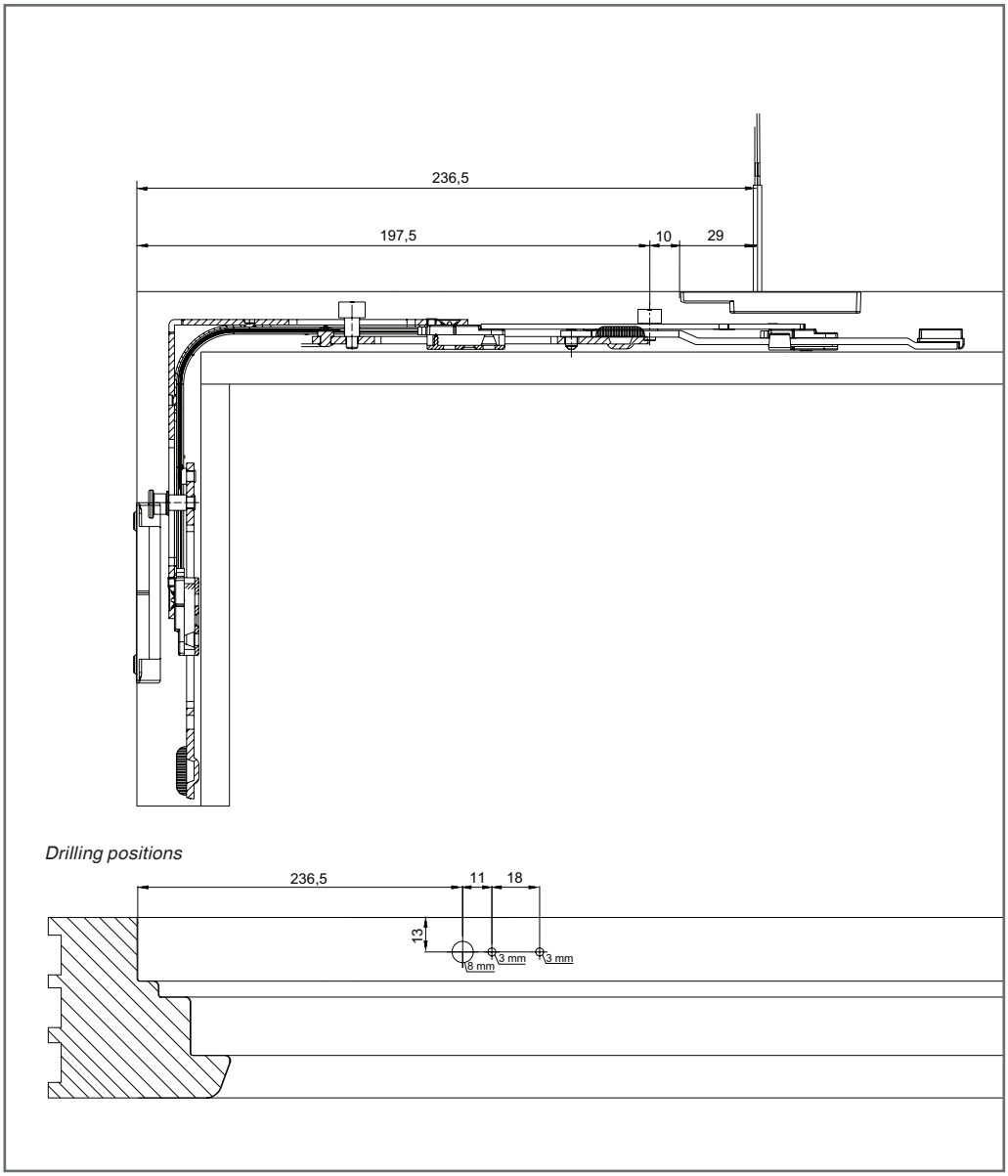
Drilling positions



MACO TRONIC

MULTI-MATIC faceplate extension 140 with 1 i.S. and 1 contactor
(example with 12 mm gap and 13 mm offset)

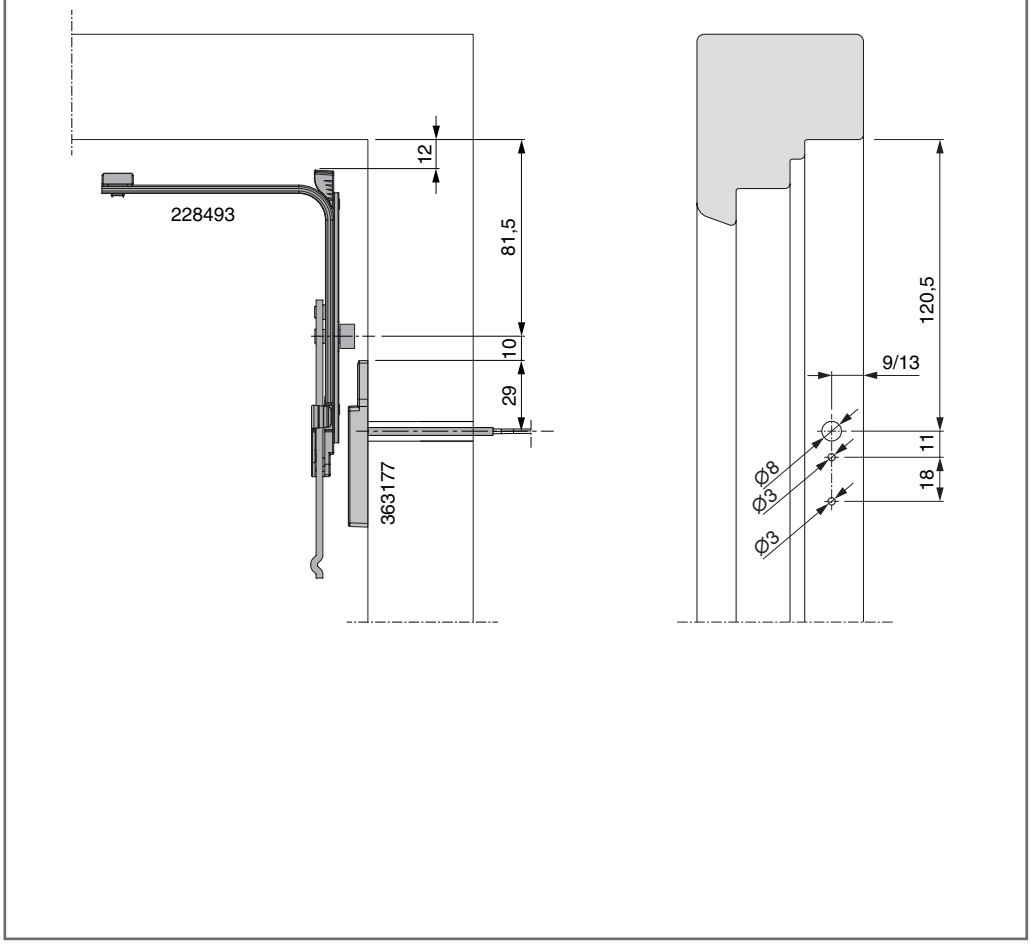
Fitting in rotational position



MACO TRONIC

MULTI-MATIC corner element vertical with 1 contactor
(example with 12 mm gap)

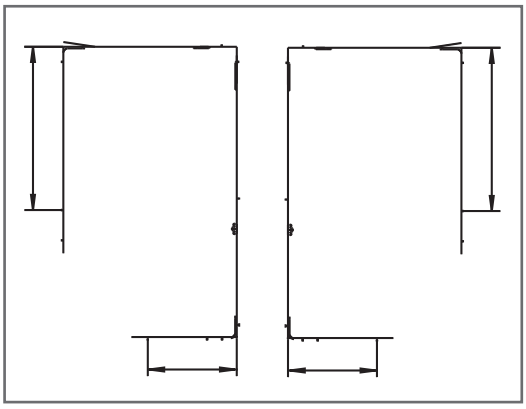
Fitting in rotational position



Faceplate extensions / centre locks

The following assembly drawings do not cover all possible combinations of clip-on cams and faceplate extensions / centre locks, but all mounting positions can be calculated. For this purpose, the following instructions must be followed:

- The start of calculation is each frame corner (see chart), depending on the reed contact position (bottom / hinge-side).
- Length determination of the respective corner section
- Length determination of all faceplate extensions / centre locks to / from the faceplate extension / centre lock with clip-on cam inserted.
- Cam seat determination of the clip-on cam in final faceplate extension / centre lock



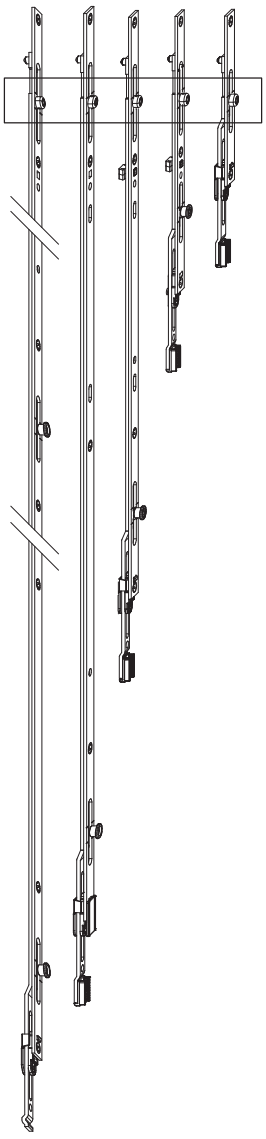
All measured values and the clearance added together give the distance from the frame to the magnetic cam. To determine the cable bore for the reed contact closing part, 39 mm should be added to this value if on the hinge-side and 39 mm should be subtracted if on the lower horizontal side (due to closure directions). The mounting holes are 11 and 29 mm away from the connection cable hole.

MATIC corner element	Article number	width in mm	height in mm
Vertical with 1 i.S.	222208	181	-
Vertically extendable with 1 i.S.	222209	-	113,5
Vertically extendable without i.S. cam	222214	-	113,5
4 gap vertically extendable with 1 i.S.	222215	-	181
Vertically extendable with serrated carrier and 1 i.S.	210096	-	113,5
Short with 1 i.S.	222203	113,5	5
Short with shootbolt protrusion	225021	5	113,5
Short with French casement window hardware 1 i.S.	216712	113,5	10
Horizontal with 1 i.S. not extendable	222204	248,5	-
Horizontally extendable with serrated carrier and 1 i.S.	216784	181	-
Horizontally extendable with 1 i.S.	222205	181	-
For night vent with 1 i.S.	209034	113,5	113,5
with 1 i.S.	222201	113,5	113,5
with 2 i.S.	222202	113,5	113,5
for turn-only window with 1 i.S.	209610	113,5	113,5
with 5 ventilation positions and 1 i.S.	101879	113,5	113,5
with 7 ventilation positions and 1 i.S.	101880	113,5	113,5

Faceplate extensions / centre locks	Article number	Length	Possible magnetic cam journal
Faceplate extension extendable 235	206197	235	72
Faceplate extension extendable 140*	206630	138.5	
Faceplate extension extendable 235 with 1 i.S.	201750	235	72
Faceplate extension extendable 140* with 1 i.S.	201841	138.5	
Centre lock extendable i.S. 1280V	201840	470	72
Centre lock extendable i.S. 1500V	201753	705	72
Centre lock extendable i.S. 2200V	201754	1410	72

**Note: faceplate extension 140 has only one cam recess and thus must be ordered directly with magnetic cam (art. no. 201755).*

Always use the same magnetic clip-on cam seat (72 mm)



Examples for calculation

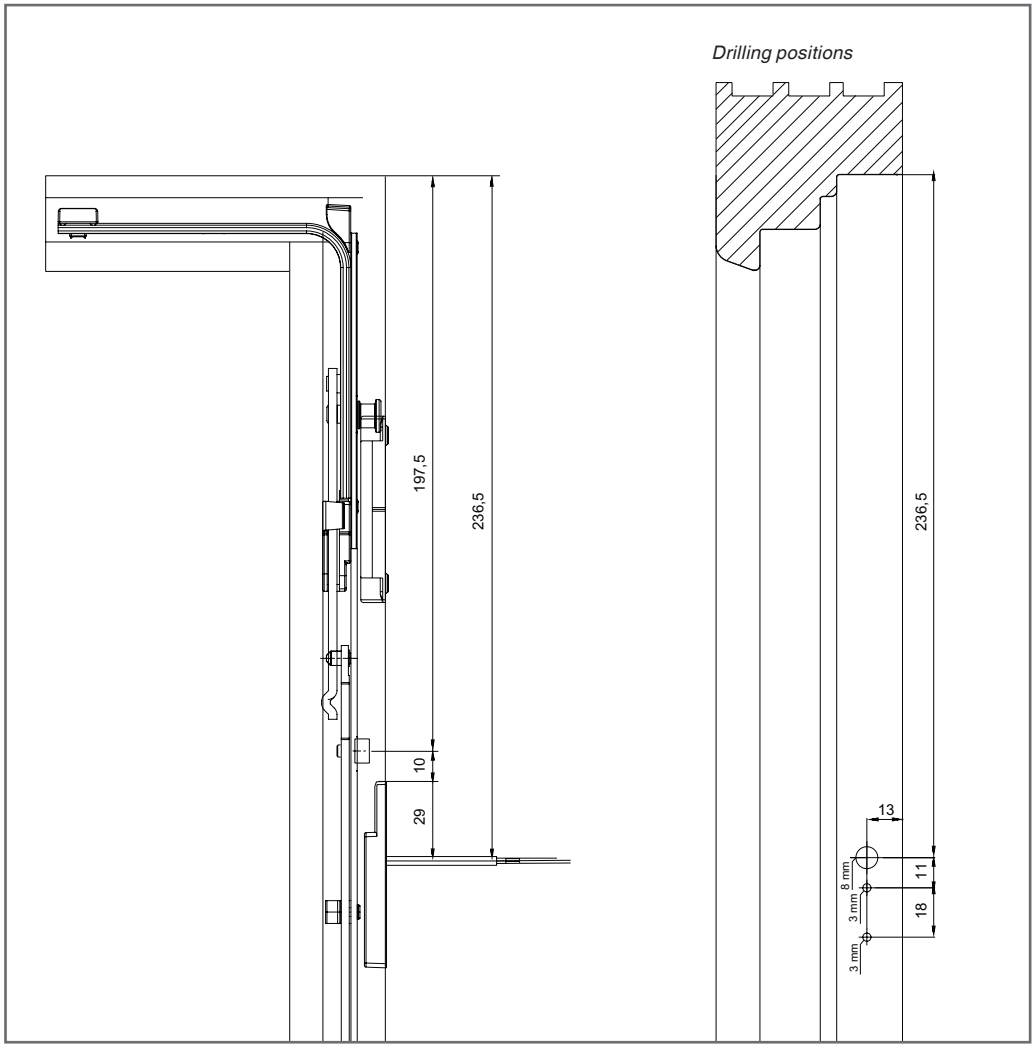
Faceplate extension 1280

- Upper right corner
- Limb length vertically extendable corner element with 1 iS = 113.5 mm
- Faceplate extensions used up to cam => none
- Possible magnetic cam journal with centre lock extendable i.S. 1280V = 72mm

Both values plus 12 mm air gap result in 197.5 mm as pin journal. The connection cable hole is 197.5 mm + 39 mm = 236.5 mm (added to hinge-side) away from the corner.

MULTIMATIC with snap-on cams in faceplate extension 1280
(example with 12 mm gap and 13 mm offset)

Fitting in rotational position



Faceplate extension 1280 + 140 faceplate extension with contactor

- Upper right corner
- Limb length vertically extendable corner element with 1 iS = 113.5 mm
- Faceplate extension up to cam => 1280 with length 470 mm
- Magnetic cam journal with 140 faceplate extension with contactor = 72 mm

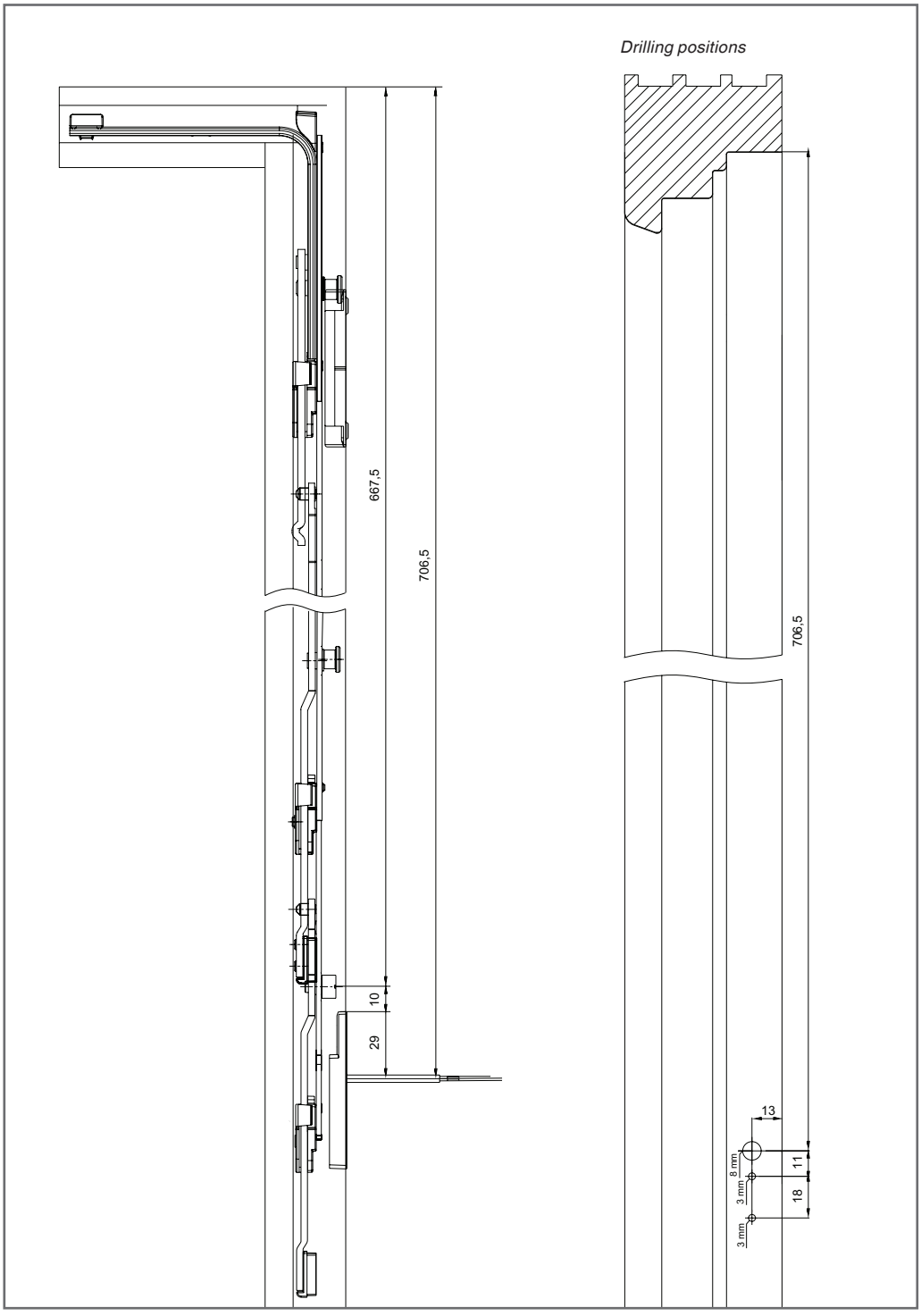
Both values plus 12 mm air gap result in 667.5 mm as cam journal. The connection cable hole is 667.5 mm + 39 mm = 706.5 mm (added to hinge-side) away from the corner.

MACO TRONIC

MULTI-MATIC faceplate extension 1280 with faceplate extension 140 with 1 contactor

(example with 12 mm gap and 13 mm offset)

Fitting in rotational position

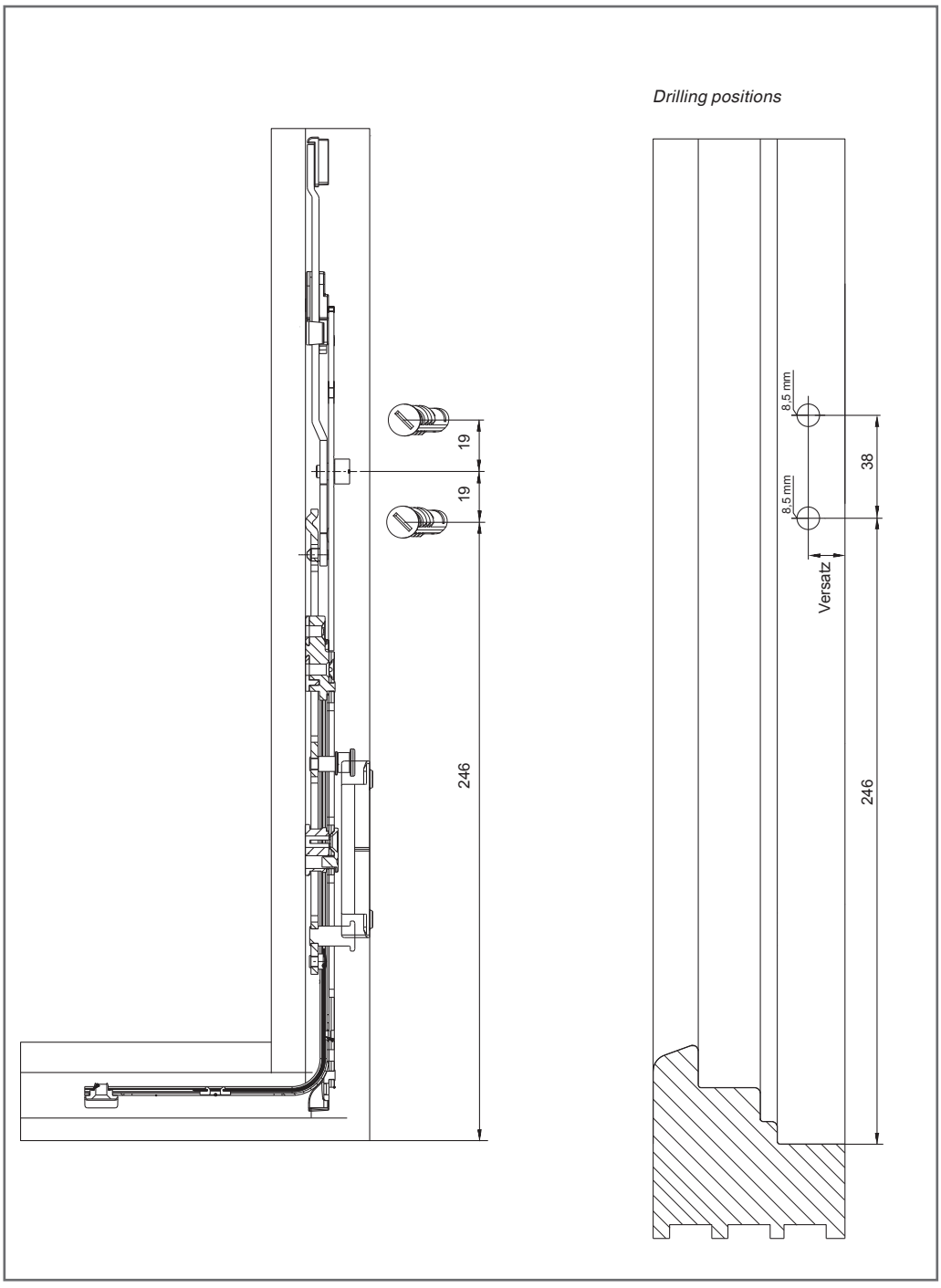


MACO TRONIC

Installation for tilt and locking monitoring
(example 12 mm gap)

If both tilt and lock states can be detected, two reed switches must be used. This is an example with screw-in reed switch.

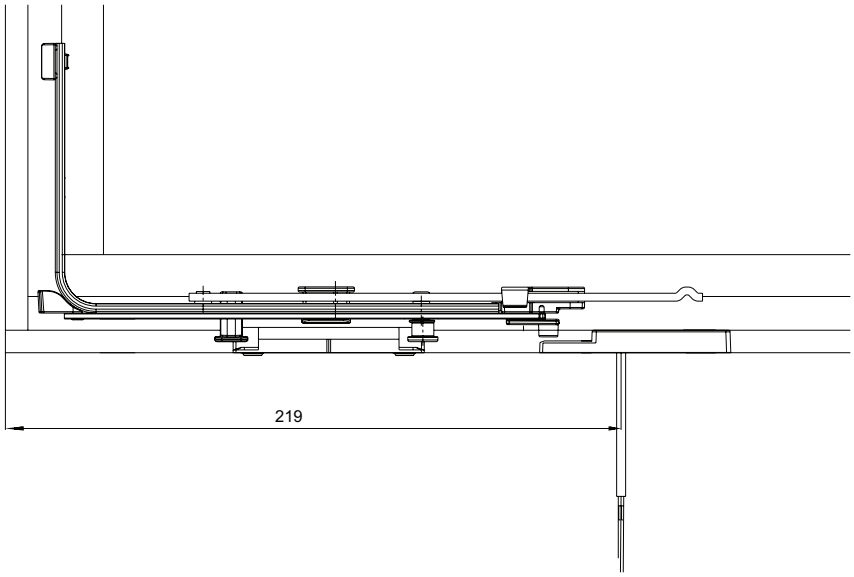
Fitting in rotational position



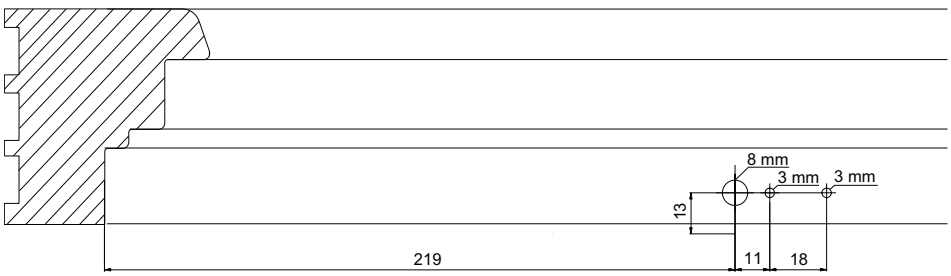
MACO TRONIC

Mounting for tilt monitoring and adapter with contactor for manual production
(example 12 mm gap)

Fitting in rotational position



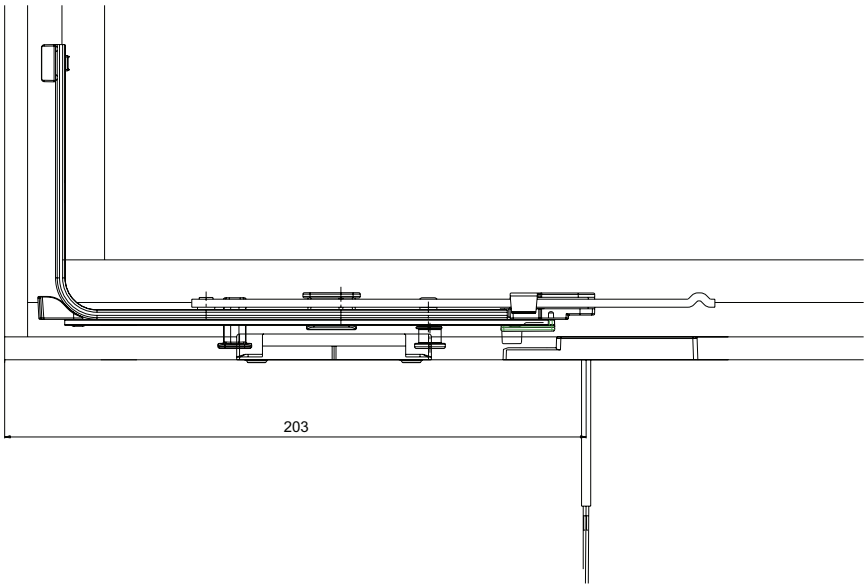
Drilling positions



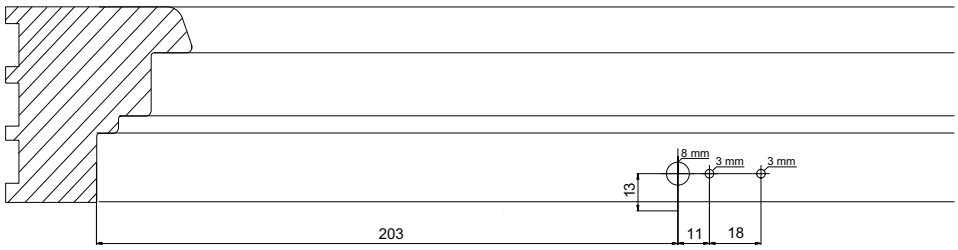
MACO TRONIC

Mounting for tilt monitoring and adapter with contactor for automatic production
(example 12 mm gap)

Fitting in rotational position



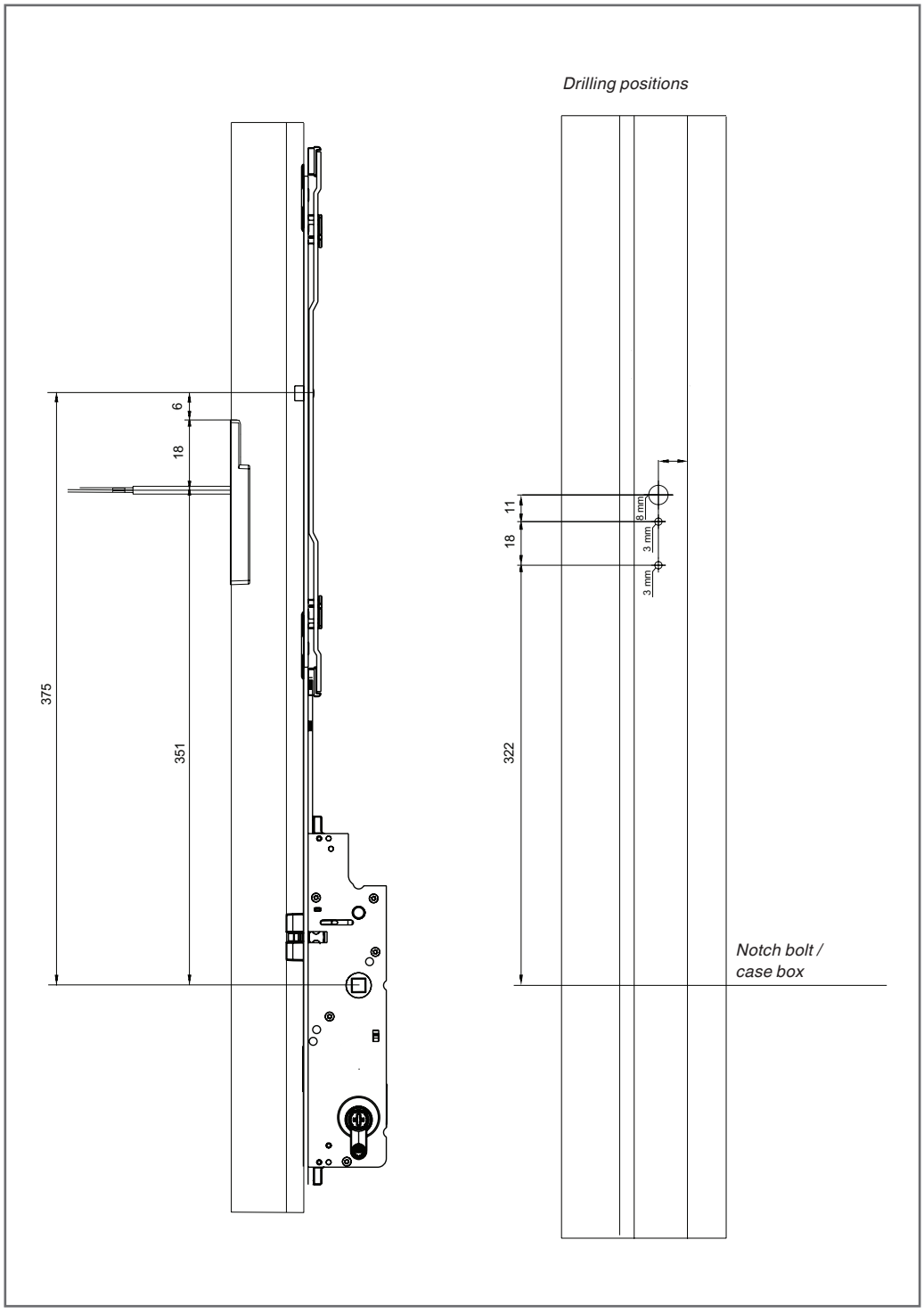
Drilling positions



MACO TRONIC

Locking module with magnetic cam

If a faceplate module with magnetic cam is to be used for the two MACO Protect module locks, the following fixed defined installation positions result from the marked notches on the locks for inserting the module.

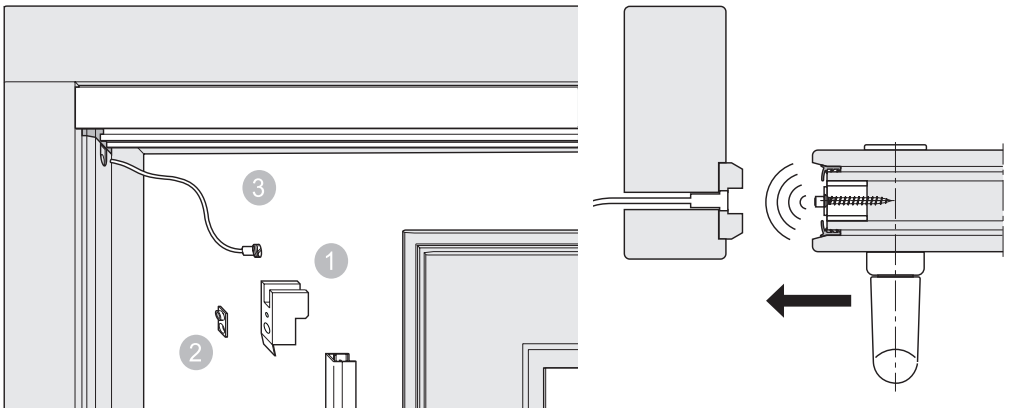


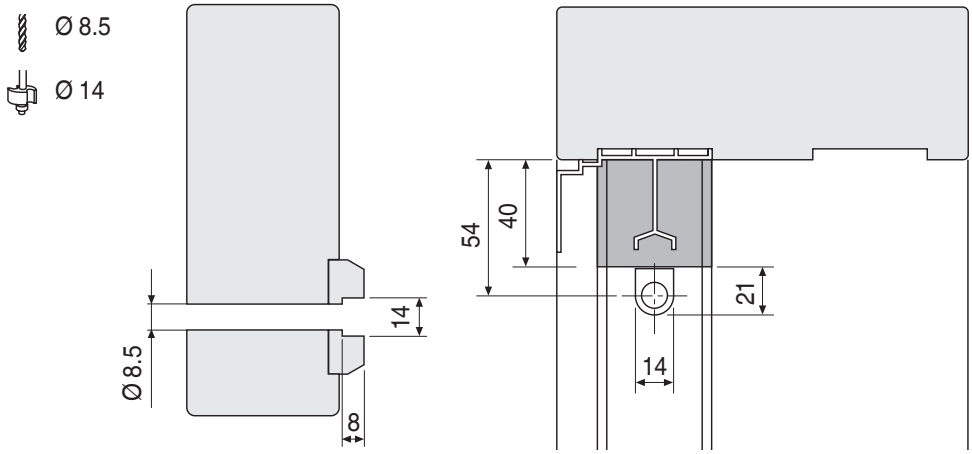
MACO TRONIC

Lift and slide diagram A

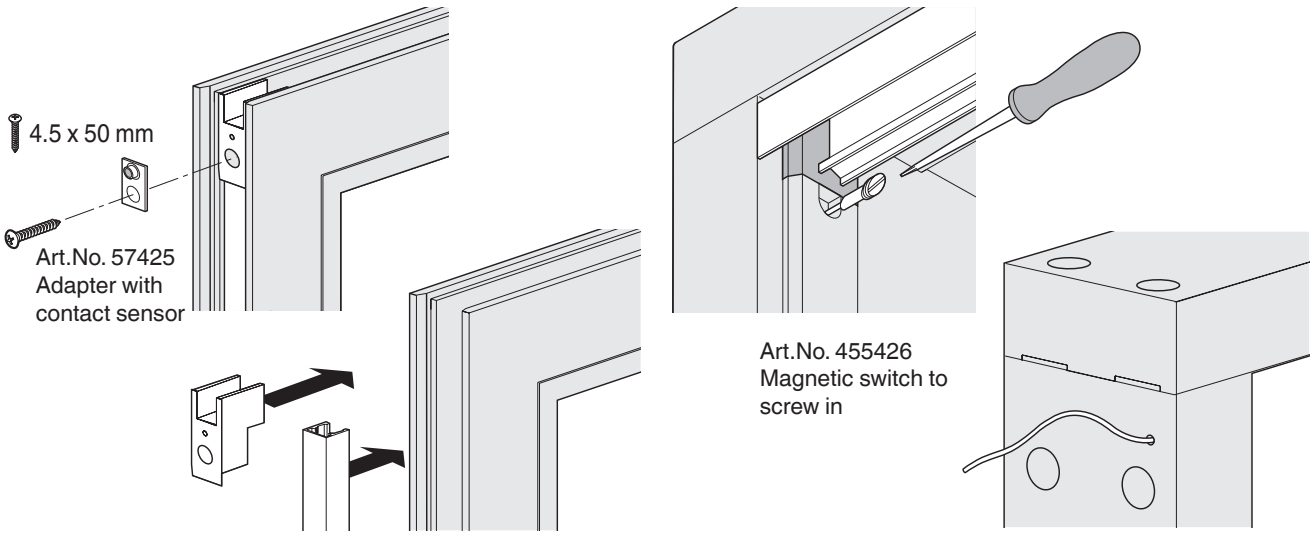
L&S fittings
with cover

1. Guiding device top front
2. Magnetic cam
3. Reed contact



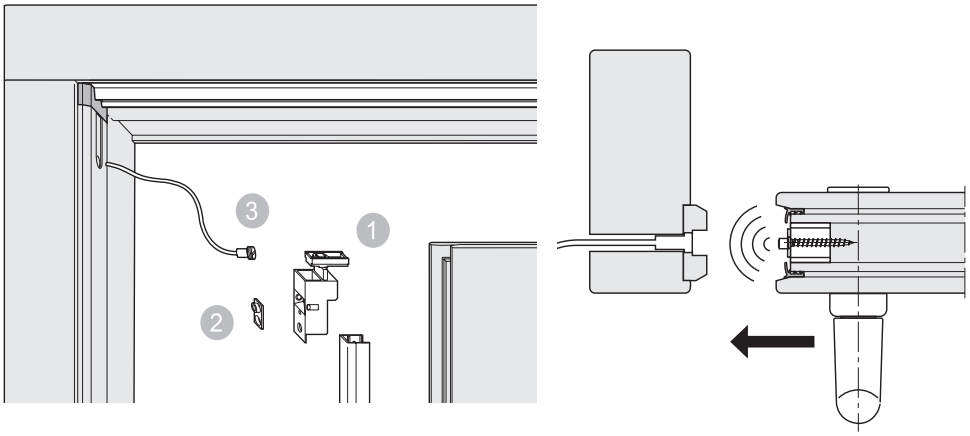


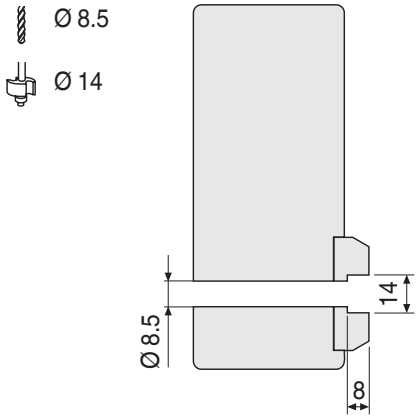
Installation

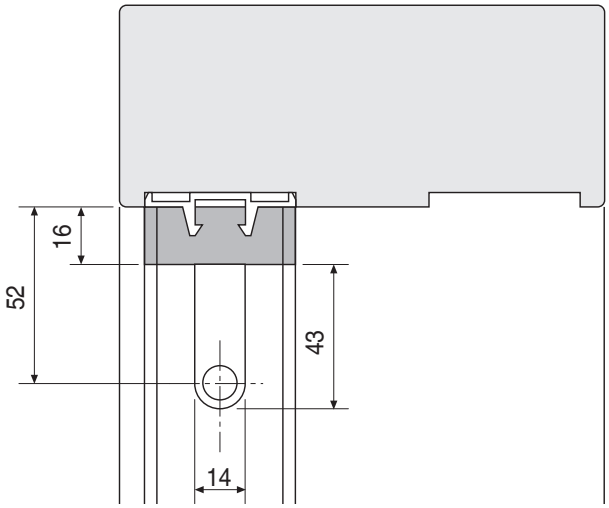


L&S fittings
“C” slider

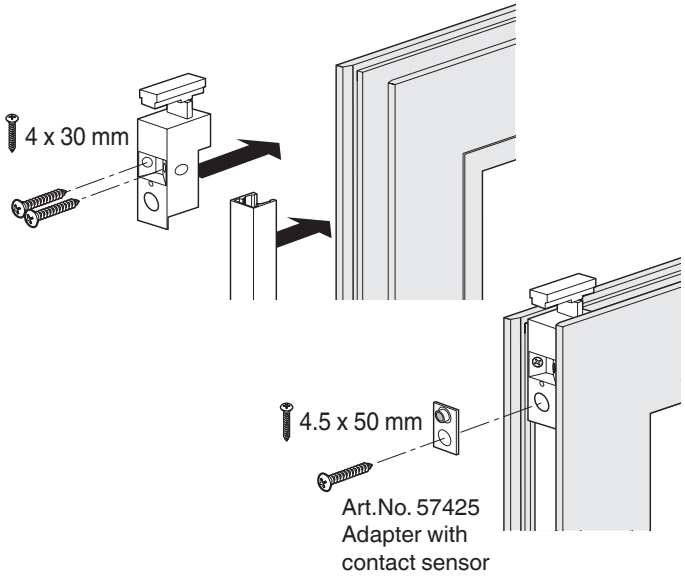
1. Guiding device top front
2. Magnetic cam
3. Reed contact



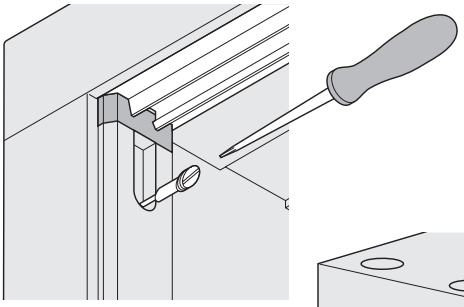




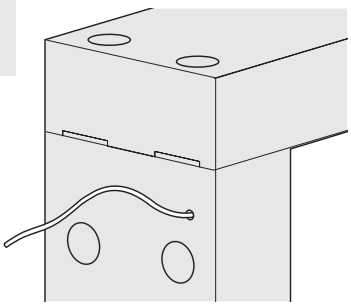
Installation



Art.No. 57425
Adapter with
contact sensor

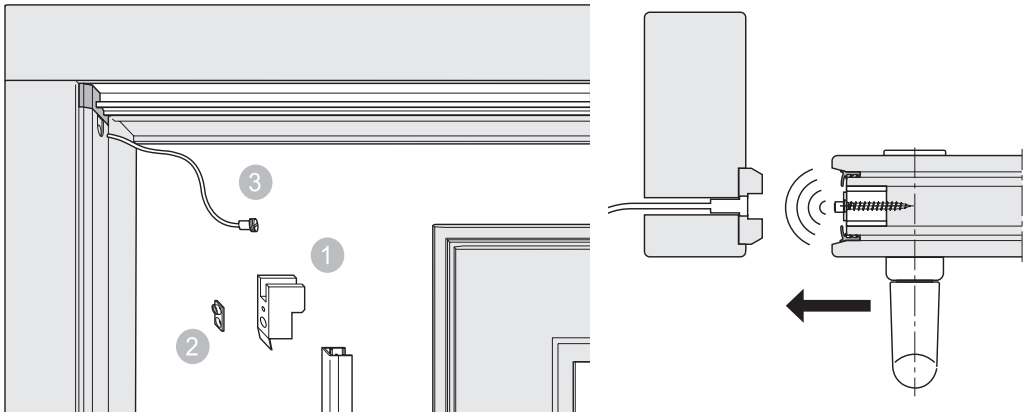


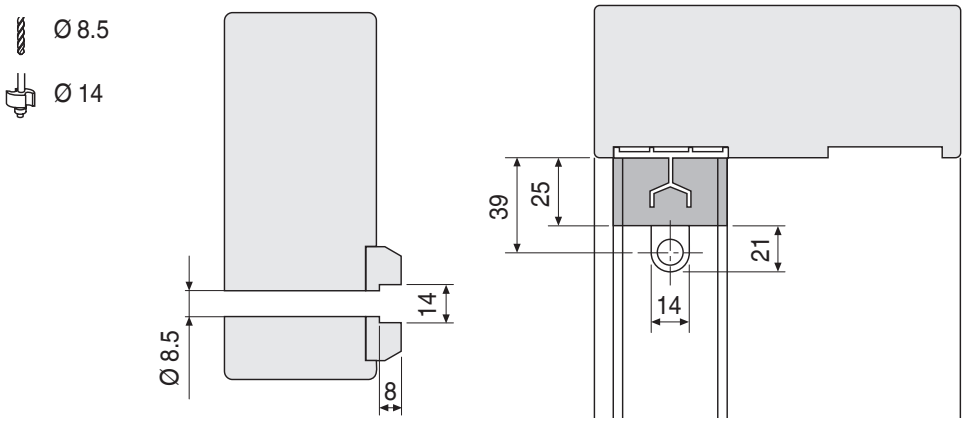
Art.No. 455426
Magnetic switch
to screw in



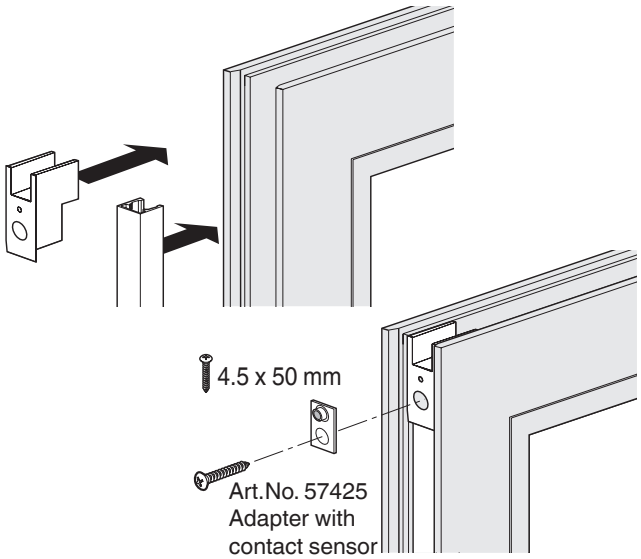
L&S fittings
Universal lower

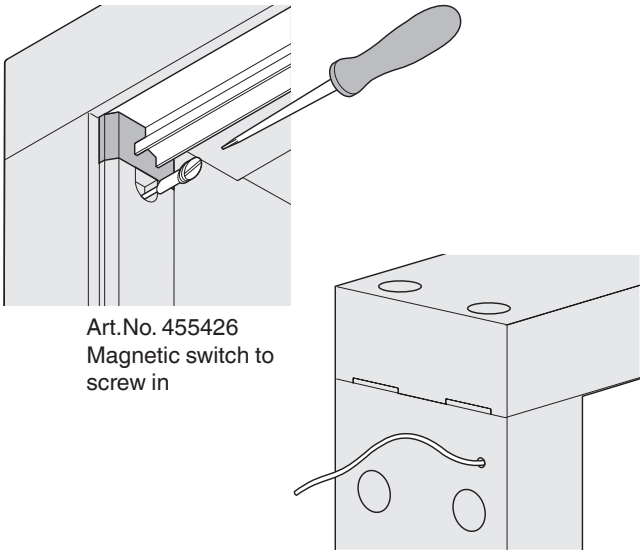
1. Guiding device top front
2. Magnetic cam
3. Reed contact





Installation

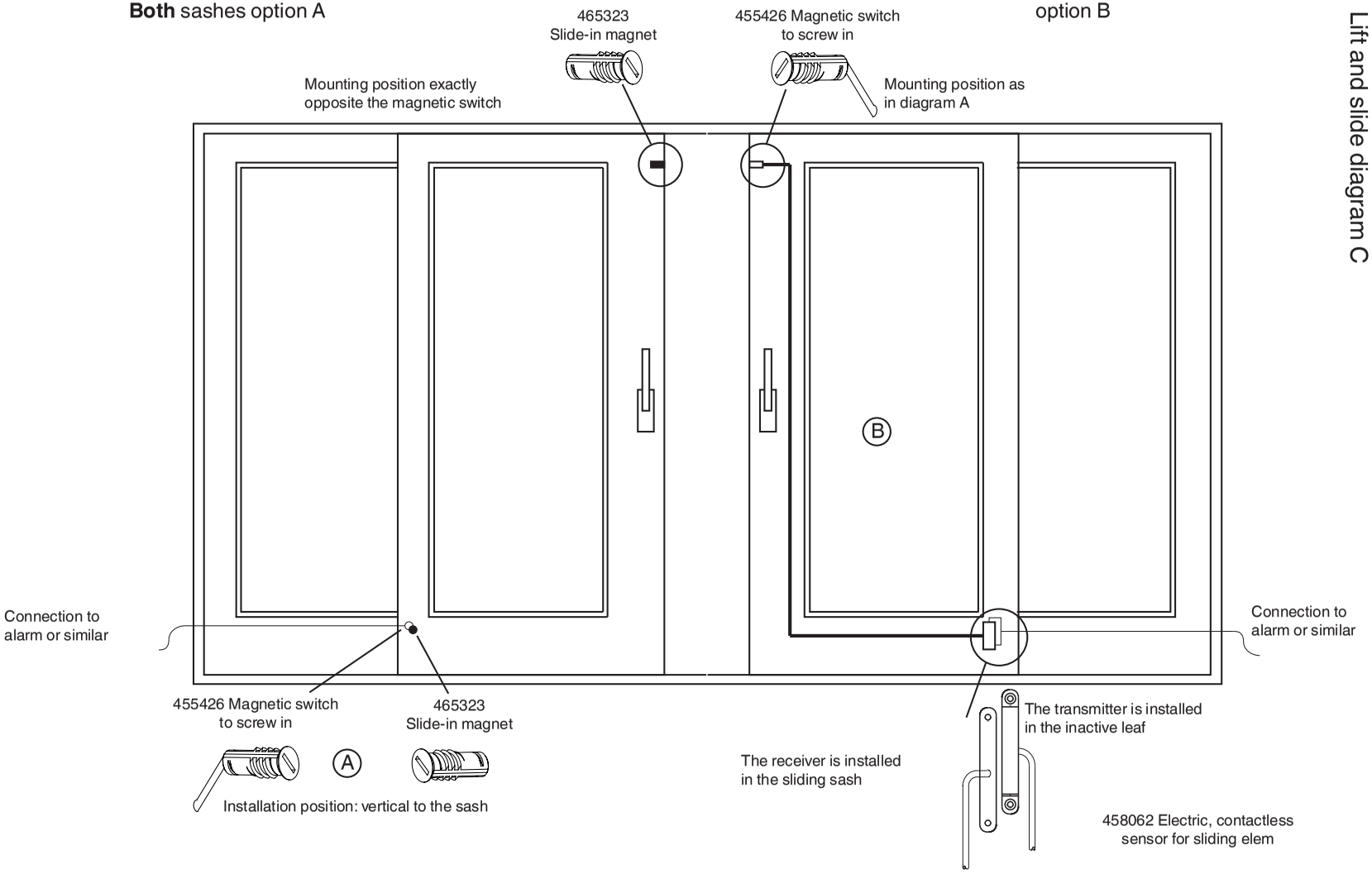




Lift and slide diagram C

Timber sealing strip:
Both sashes option A

PVC or aluminium sealing strip:
option B



MACO TRONIC

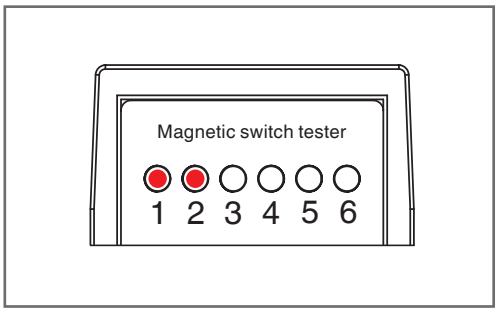
Magnetic switch tester

When connecting reed contacts, knowledge of the connections is essential. However, since these are unmarked (due to VdS / tamper protection), there is a test device for reed contacts RVS & RHS (Art. No. 364524). If an ohmmeter is available, this can also be used, of course.

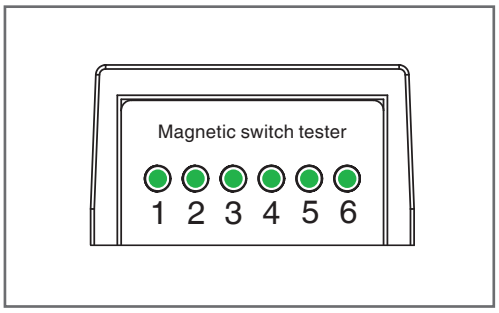
Caution! No continuity testers can be used with incandescent lamps because momentary power spikes in the lamp can destroy the reed contact!

Operation

1. The magnetic switch to be tested (max. 6-pin) is **arbitrarily** connected to the test device with the alligator clips (the order does not matter).
2. The magnet must be removed from the magnetic switch to be tested (e.g. by opening the window). Then press the button briefly to turn on the test device, which then indicates the battery status for a moment (the higher the display, the greater the charge).



Low battery voltage LED display: 2 x red



High battery voltage LED display: 6 x green

Caution!
If the power indicator is in the red zone,
the battery must be replaced soon.

3. The magnetic switch tester now automatically determines the non-operated status of the magnetic switch (however, nothing is yet shown on the display).

4. After two beeps, place the magnet (adapter with contactor, or similar) on the magnetic switch (e.g. by closing the window); the test device then determines the operating state selected.

Caution!
If the magnetic switch is not operated within one minute, the magnetic switch tester switches off again. Simply press the button to restart the measurement. The tester starts by checking the battery status (step 2).

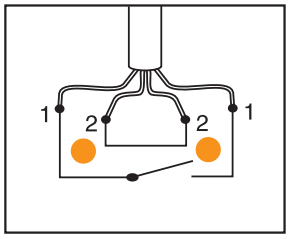
Note!
The magnet should be brought **QUICKLY** to the reed contact, otherwise a measurement error occurs and only the temper line is shown under point 5 (two orange lights).

5. A third beep signals the end of measurement and the determined wire assignment of the magnetic switch is displayed for 5 seconds.

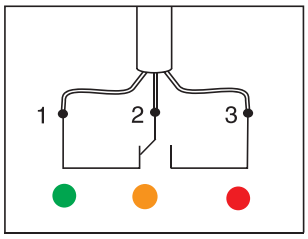
   • RED = NO contact (closes when actuated) 

   • GREEN = Normally Closed (opens when actuated) 

   • ORANGE = tamper line or the common connection with changer



sabotage link
two orange lights



Common connection with changer (e.g. RHS)

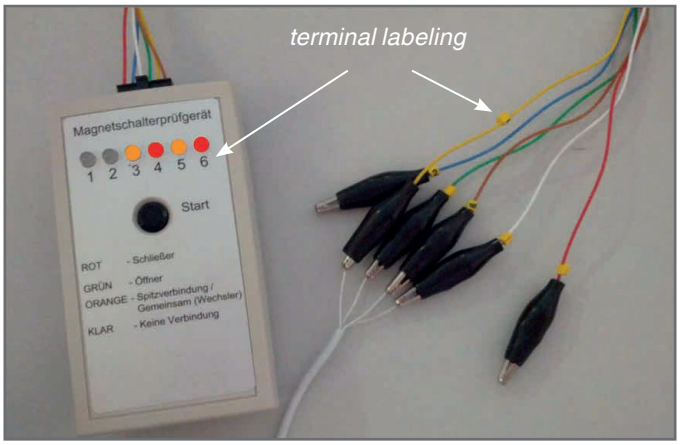
   • CLEAR = No connection

   The respective contacts are numbered on the meter and connection cables.

6. A renewed beep signals changeover to function test mode. In this mode, it is possible to check the function or correct installation (switching distance) of the connected magnetic switch. The different states of integrated reed contacts can be observed by opening and closing of window sash. When removed, a magnet (adapter with a contactor or equivalent) is required as a signal generator. The various switching states of the magnetic switch are displayed visually and acoustically.

Sample measurements

Reed contact RVS

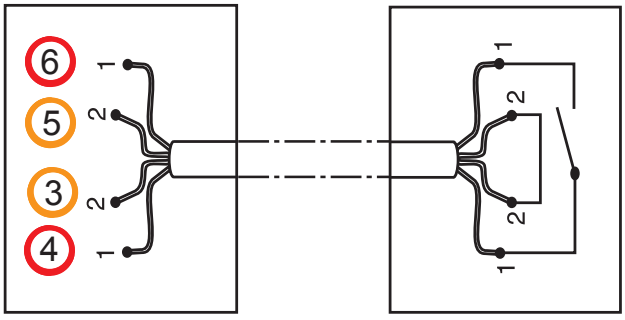


1 + 2 clear / 3 + 5 orange / 4 + 6 red

Terminals 3 and 5 are the connections for the sabotage line (peak connection), because there is a continuous connection which can be interrupted by tampering (by cutting the cables).

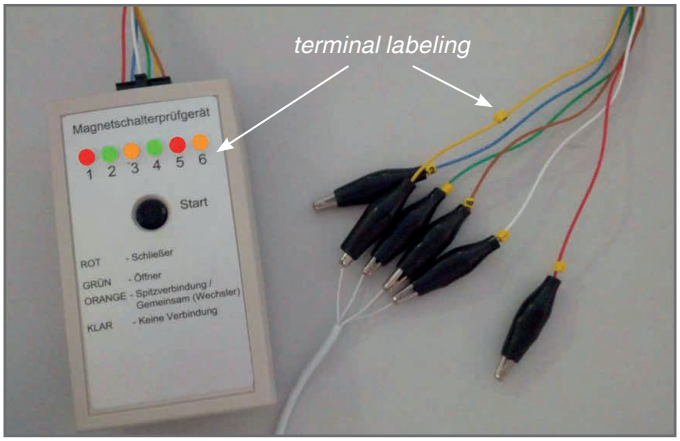
Terminals 4 and 6 are the terminals for the reed contact itself, which is a normally open contact type (if the magnet approaches the sash => contact closes).

Knowing this, the connections can be assigned as follows according to the RVS diagram:



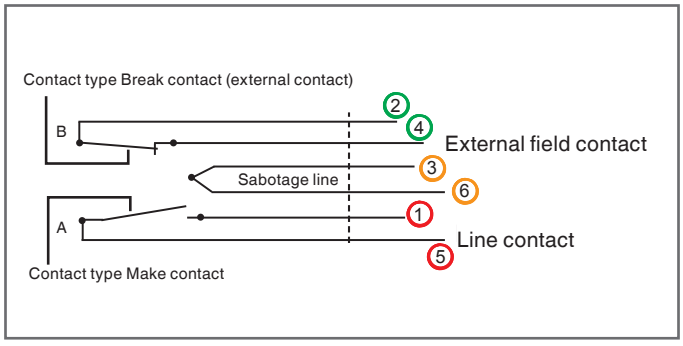
3 + 5 orange / 4 + 6 red

Magnetic switch for combined opening and locking monitoring



1 + 5 clear / 2 + 4 orange / 3 + 6 red

This reed contact contains a second reed switch in the casing in order to detect manipulation by another magnet (second reed contact opens).
However, no second magnet is needed for measurement purposes because the external field monitoring reed switch responds as soon as the distance between the reed contact and contactor is less than 5 mm.
Terminals 3 and 6 are the connections for the sabotage line (peak connection), because there is a continuous connection which can be interrupted by tampering (by cutting the cables).
Terminals 1 and 5 are the terminals for the reed contact itself, which is a normally open contact type (if the magnet approaches the sash => contact closes).
Terminals 2 and 4 are the terminals for the reed contact, which responds when approaching a foreign magnet (also reduction in the distance of the adapter with contactor causes the reed contact to open).



2 + 4 green / 3 + 6 orange / 1 + 5 red

Connection cable routing

A spare cable length of 25 cm should be laid as a reserve loop in the frame profile when installing reed contacts. This is necessary to ensure easy replacement without removing the entire connection cable in the event of a reed contact fault (only when installation according to VdS is **NOT** required!). If VdS is required, the reed contact must be replaced together with the entire connection cable.
The cable can be fixed to the frame with silicone or similar to protect it from being pulled out.

The installation should ideally be undertaken in the window sill connection profile (= base profile window ledge), so that the connection cable is largely protected from mechanical damage. For this purpose, the through hole for the cable must be drilled obliquely so that it routes through the frame section into the connection profile from the closed position.

For timber windows, it is advisable to take out the cable output from the frame in order to sink the cable into the wood.

When installing the window sill, make sure that the connection cable is not pinched (make recess or similar).

Integration into home automation system

Simple inputs on the respective bus system should be used for integration of the reed contacts into a home automation system. These are sold under the following names:

Binary inputs, button interface

A request must be made to the respective manufacturer in order to ensure maintenance of the VdS certification.

Exchange of defective integrated reed contacts

A defective contact in a VdS system must be completely replaced together with the cable because the cable is part of the tested assembly.

If these requirements do not apply, you can proceed according to the following instructions.

In the event of a defect, the reed contact can be easily replaced by means of replacing the designated reserve loop.

1. Disassemble the reed contact from the window frame.
2. Cut the cable as close as possible to the defective reed contact.
3. Remove insulation from old connection cable.
4. Shorten the connection cable of the new reed switch assembly to sufficient length.
5. Solder and insulate the wires.
6. Allow for new reserve loop and secure reed contact.
7. Use voltmeter or tester to check assignment at the junction and rewire correctly.

References to other publications

Excessive strain should be avoided when laying the connection cable in order not to pull the reserve loop out of the frame profile.

The connection cable may not be damaged under any circumstances.

Issues that may arise under certain circumstances

Combining magnets and contacts from different manufacturers is not allowed according to VdS. Magnetic contacts are tested and certified as a unit and may also only be used as such.

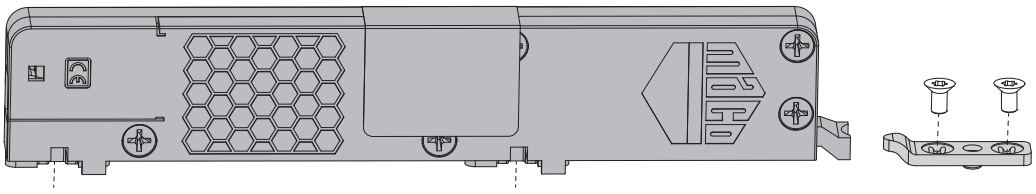
MACO TRONIC

Electronic components PROTECT

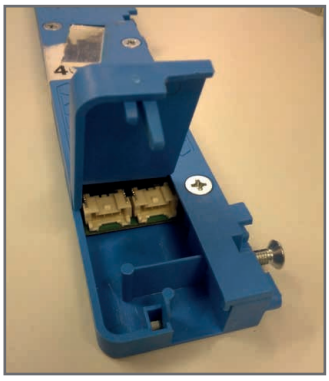
The MACO door lock Z-TA Automatic locks automatically when the door is closed. In order to automate the opening process, it can be upgraded with a motor to Z-TA Comfort. Various MACO-open door access controls are available as control elements.

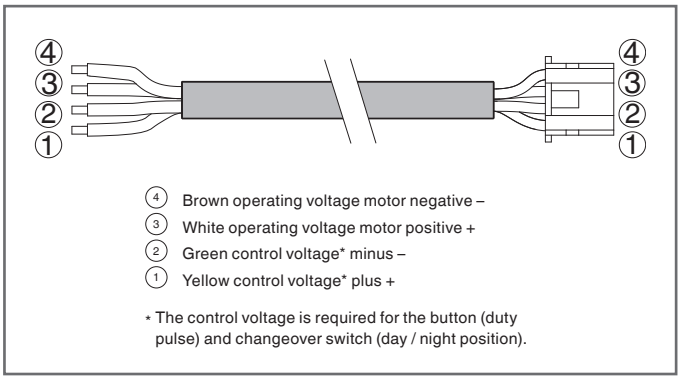
Motor for Z-TA Comfort (Art. No. 104130)

This motor is used for automatic unlocking of the lock by directly actuating the dead-bolt (mounted on the dead-bolt assembly, see chart to the right).



Connections and alternative options

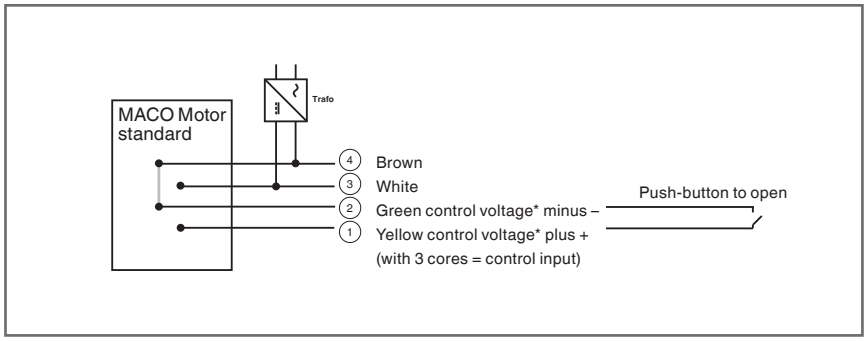




Connection cable to the motor

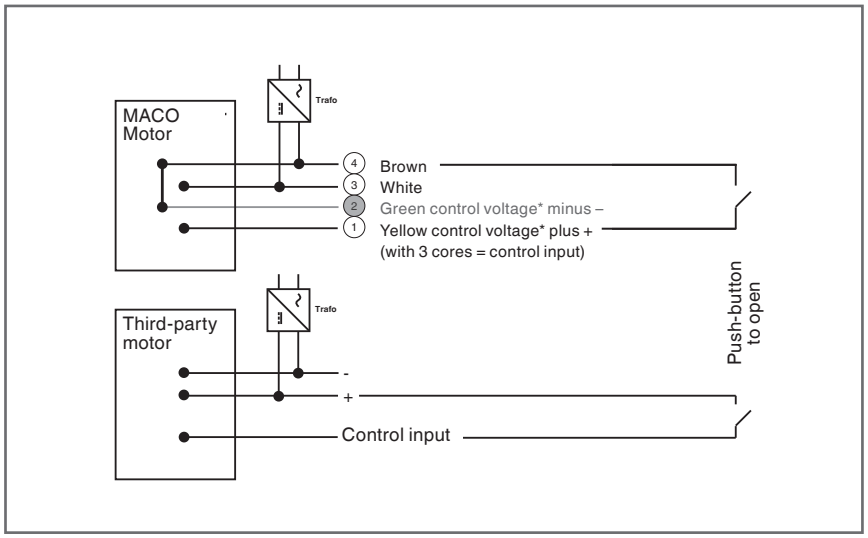
The motor has two IDENTICAL connection sockets, one for the power cable from the cable transition and one for access control, if required. It **does not** matter which sleeve is used for what purpose.

The standard assignment uses four connections. The power supply with + white / brown - and the potential-free contacts yellow and green. Both potential free contacts should be connected to open the motor (e.g. with a switch).



All MACO access controls operate on the above mentioned principle and are therefore designed for the four connections.
However, with third-party access control or other applications where it is not possible, the motor can be controlled with just three terminals. This is due to the fact that the brown and green wires are connected in the motor. This means that the motor also starts when you connect the brown wire to the yellow wire.
If the MACO Comfort Motor is controlled with third-party products, it should be noted that the positive pole is provided as a control contact, unlike MACO Comfort Motor negative (brown).

This must be checked before connection, otherwise a short circuit may occur!



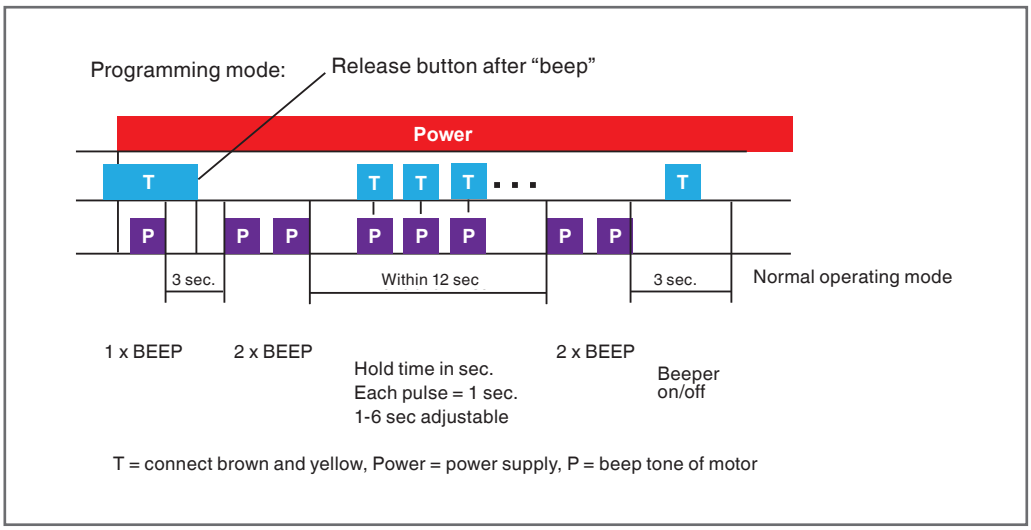
Comparison MACO motor (when used with only 3 connections) with third-party and positive pole control contact

MACO TRONIC

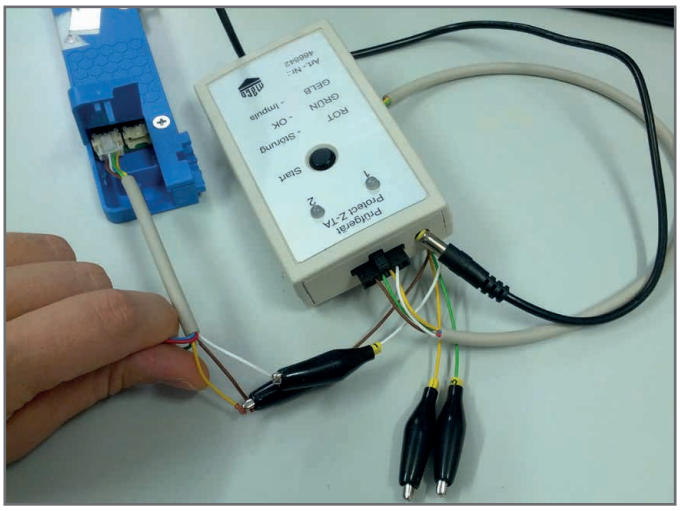
Programming options

The motor has two settings. The opening time, i.e. the time the motor remains in the open position, can be varied between 1 - 6s (seconds) and the acoustic feedback can be disabled.

The potential free contacts must be easily accessible for programming and the power supply must be made separable. This can **NOT** be done with the test device, as the internal electronics do not allow for it. However, the test device can be used as a power supply. Since, as mentioned above, the motor is started by connecting the brown (negative) and yellow (potential free) wires, this should be used here for easier handling.

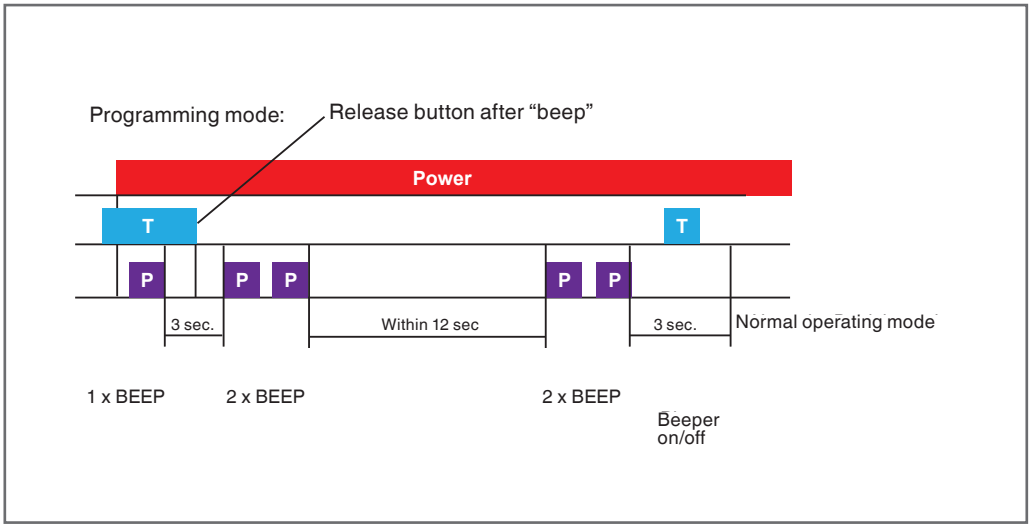


1. Connect brown and yellow.
2. Meanwhile connect the power supply.
3. After beep, disconnect brown and yellow.
4. Motor beeps twice.
5. Now the opening time can be set within 12s by repeatedly connecting and disconnecting the brown and yellow wires. Connecting once means 1s, twice, 2s, etc. up to 6s.
6. After 12s, the motor will beep twice again.
7. Now, joining the brown and yellow within 3 s serves to switch the beeper on / off.



Connect brown and yellow before connecting the power supply.

If only the acoustic feedback is cleared, it is necessary to wait 12s prior to adjusting the holding time.



Only switch beeper on or off (interaction).

Access control

The following access control systems are also available in a set with the matching lock (4 Air F20 / F20 / F16) and the opening motor available (see catalogue).

Code (keypad) (Art. No. 466830)
If a security code is entered to open, the code access control can be used. It should be emphasised that the keyboard is made of stainless steel and is a key switch matrix instead of the cheaper film matrix conventionally used.

Transponder Plus (Art. No. 466699)
Multiple RFID / NFC compatible devices can be used as access control media. Many car keys have built-in chips, which can be detected by the access control. Furthermore, credit cards with MasterCard PayPass and Visa payWave are also compatible as access media. Traditional media such as access cards and key rings are also available.

Touch (fingerprint scanner) 2 versions(Art. No. 466830)
For biometric access control, there are 2 versions. A basic version is included as standard in the program and extension which has additional administrative functions. This version, however, is only available on request and needs to be ordered.

Additional function:

- Delete individually saved fingerprints (not just all, as per basic version)
- Granting temporary access authorisation (visitors)
- Two instead of one relay (e.g. door opening and alarm control)

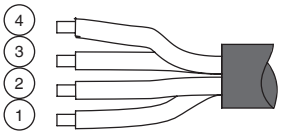
Each access control is set up through the same assembly steps. The only difference is in the function. The assembly diagram is explained as follows.

The entire structure of the electronic expansion components is designed for maximum user-friendliness, in addition to the proper function of the system. Each connector is polarised and only compatible components can be interconnected.

MACO TRONIC

Z-TA Comfort motor for openDoor access control system Transponder Plus

Cable Configuration



4 Brown operating voltage motor minus -

3 White operating voltage motor plus +

2 Green control voltage* minus -

1 Yellow control voltage* plus +

**The control voltage is required for the push-button (pulse) and the change-over switch (daytime/nighttime)*

*Push-button for switching pulse

*Changeover switch for day/night setting

12 - 24V DC
direct current
at least 1.5 A

Cable transition

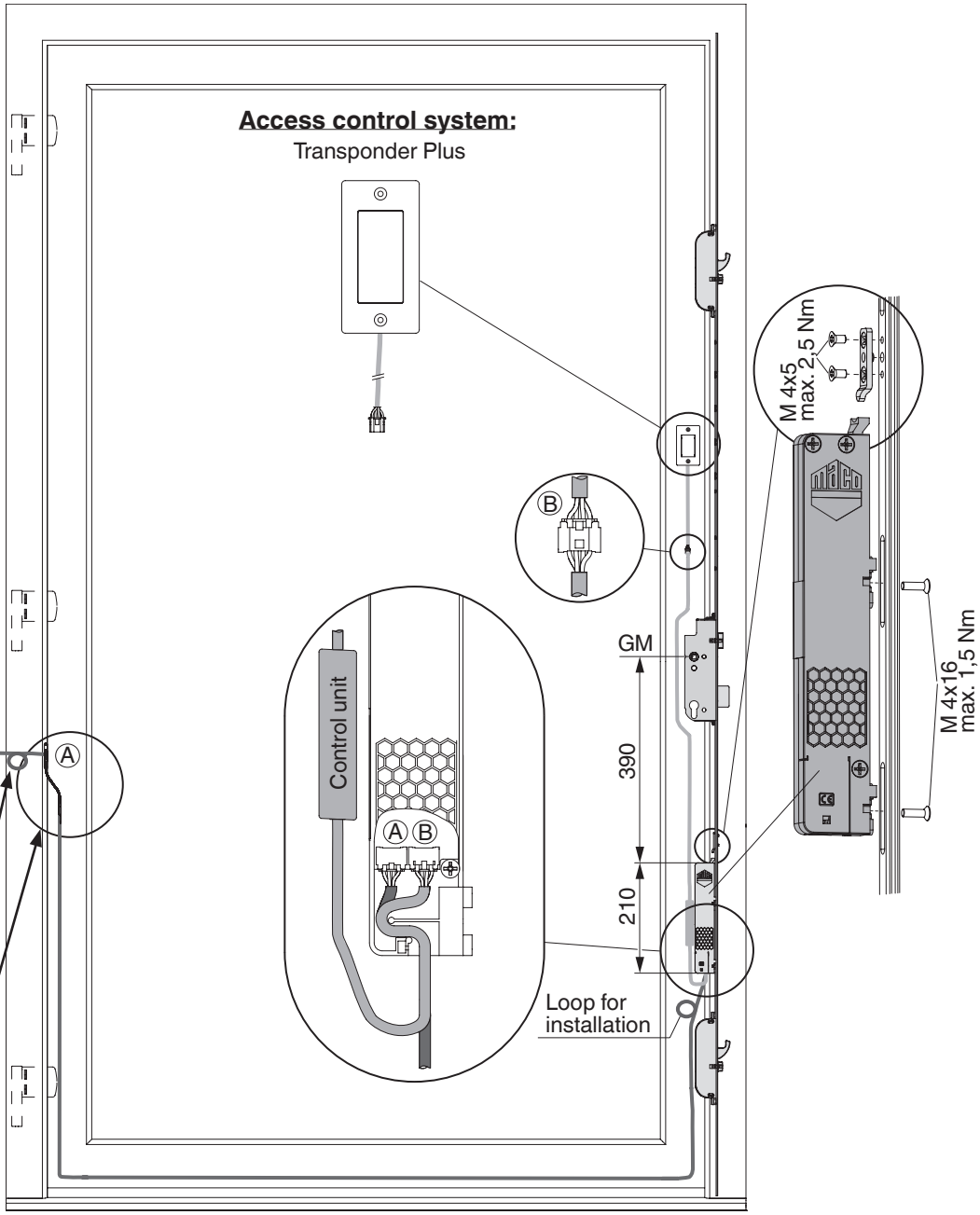
2.5 m door leaf / 6 or 10 m routing length outside

Ⓐ **Connection motor - cable transition**

Ⓑ **Connection motor - access control system**

Ⓒ **Power supply 12–24V DC, at least 1.5A**

Ⓓ **Strain relief**

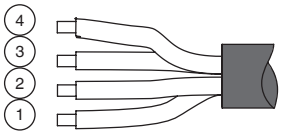


NOTE:
Electrical connections (power pack connection, connecting cable 0.15m and 10m) may only be carried out by authorised personnel!

MACO TRONIC

Z-TA Comfort motor for openDoor access control systems Keypad und Touchkey

Cable Configuration



4 Brown operating voltage motor minus -

3 White operating voltage motor plus +

2 Green control voltage* minus -

1 Yellow control voltage* plus +

**The control voltage is required for the push-button (pulse) and the change-over switch (daytime/nighttime)*

*Push-button for switching pulse

*Changeover switch for day/night setting

12 - 24V DC direct current at least 1.5 A

Cable transition

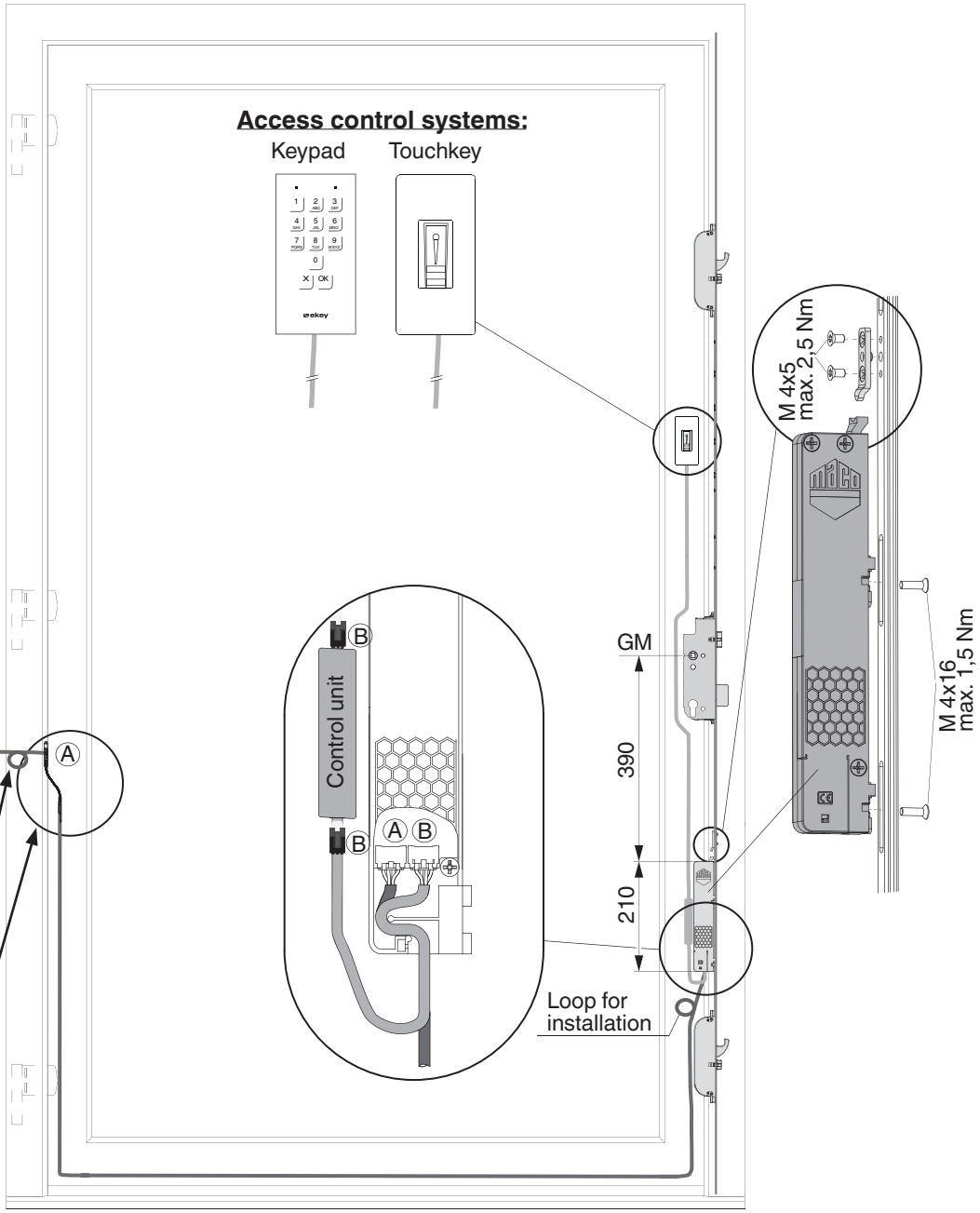
2.5 m door leaf / 6 or 10 m routing length outside

Ⓐ **Connection motor - cable transition**

Ⓑ **Connection motor - access control system**

Ⓒ **Power supply 12–24V DC, at least 1.5A**

Ⓓ **Strain relief**



NOTE:
Electrical connections (power pack connection, connecting cable 0.15m and 10m) may only be carried out by authorised personnel!

As seen in the previous diagram, the entire structure is relatively simple. The central connection point is the motor. The connection cable and access control can be connected to this.

NOTE:
Which of the two sockets plugs into the motor is immaterial. The choice is arbitrary.

There are two types of connection cable available. One has a cable with cable transition (see page) or a continuous connection cable for using a third-party cable junction.

General instructions for cabling in the door panel

For PVC doors, the cable routing is relatively simple. Due to the surrounding Eurogroove, the cable fitting can be covered with a faceplate strip cover. Another option is to run the cable in the rebate (note the positions of the glass).

For timber doors, routing is more complex, since no peripheral fittings groove is present as a rule. To remedy this, either a groove must be milled (faceplate strip cover) or the cable is laid in a rebate, if possible. Another possibility is also creating a through drill hole from the motor connection cable to the cable transition.

As with the reed contacts for windows, a reserve loop of connection cable should also be provided on the motor when installing the lock. Also the cable transition to the frame exit should have a reserve loop to allow for exchange in the event of a defective cable transition.

Installation steps for door panel integrated access control

- Make necessary cutouts / milling
- Attach the cable transition to the sash and pull the connection cable through to the motor.
- Install access control and pulling the connection cable to the motor
- Attach the motor to the lock
- Attach access control plug and power supply to the motor
- Install lock
- Put in sash and connect the cable transition
- Make electrical connections

Installation steps for external door panel access control or installation for third-party products

(see chart on following page)

The following components are required if a MACO access control is to be installed outside of the door panel or the door is to be opened via bus controller, buttons, external access control or similar:

- Motor
- Cable transition
- Connection cable
- Switch (access control, push button or similar)

Installation steps:

- Make necessary cutouts / milling
- Attach the cable transition to the sash and pull the connection cable through to the motor.
- Attach the motor to the lock
- Attach plug to the motor

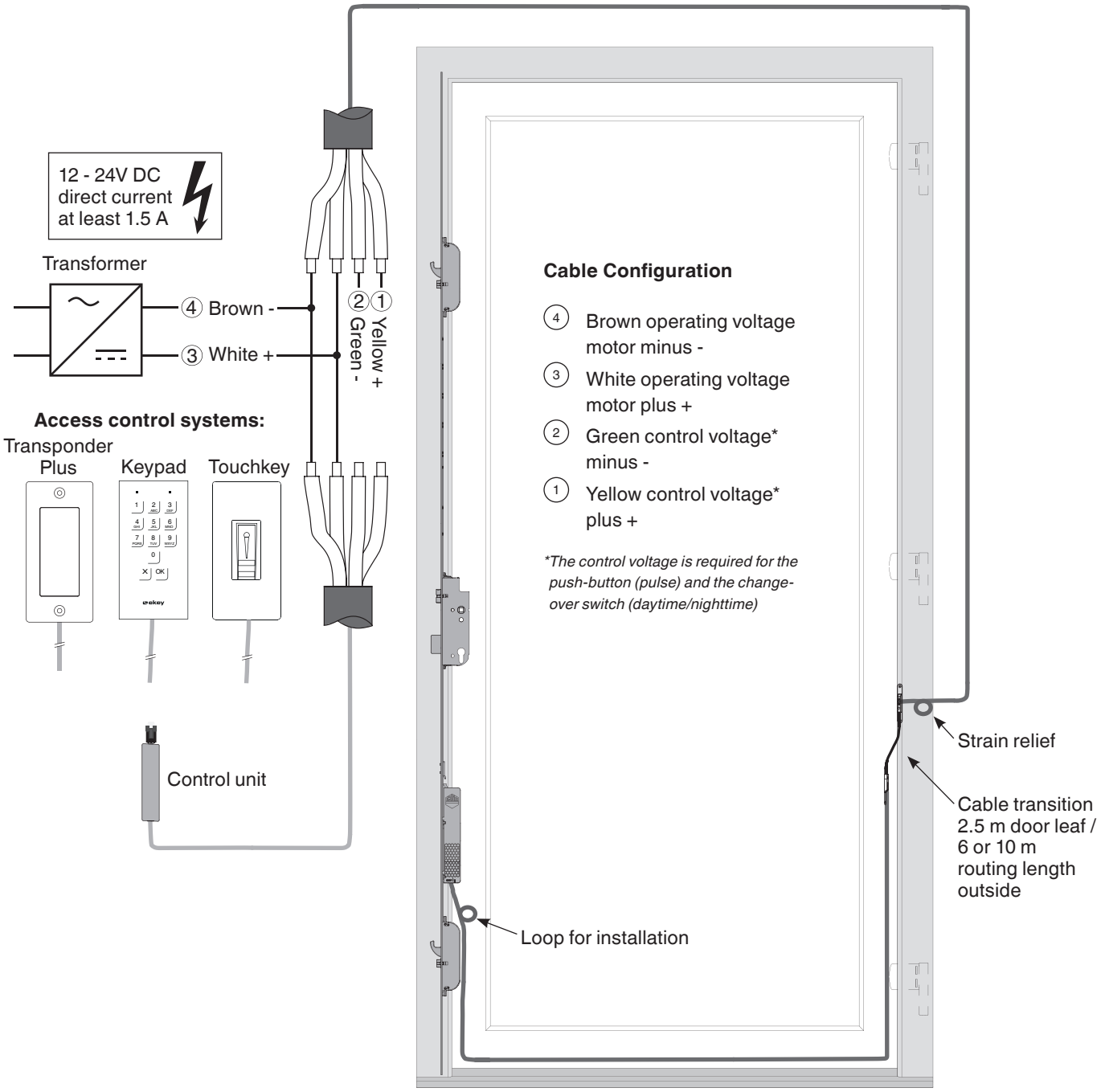
NOTE:
Which of the two sockets plugs into the motor is immaterial. The choice is arbitrary.

- Install lock
- Hinge in sash and connect the cable transition, if available
- Make electrical connections

To connect the motor, a DC voltage is applied to wires 4 and 3 as supply voltage and wires 1 and 2 (potential free contacts) must be shorted (with switch, pushbutton or similar) in order to activate the unlocking process.

MACO TRONIC

openDoor access control systems
Circuit diagram on frame side



NOTE:
Electrical connections (power pack connection, connecting cable 0.15m and 10m) may only be carried out by authorised personnel!

Use of an access control system with electric opener

MACO access control can be used to unlock a lock with electric opener. Please note that currently only access controls Touch and Code can be used because the Transponder Plus solution is only a very short pulse, thus the door is unlocked only very briefly.

As can be seen in the connection diagram, the positive pole of the supply is assigned to a potential free contact. This is switched by the access control to the second potential free contact when unlocked and thus the supply of to the opener is closed, since the second pole is permanently connected to the negative pole.

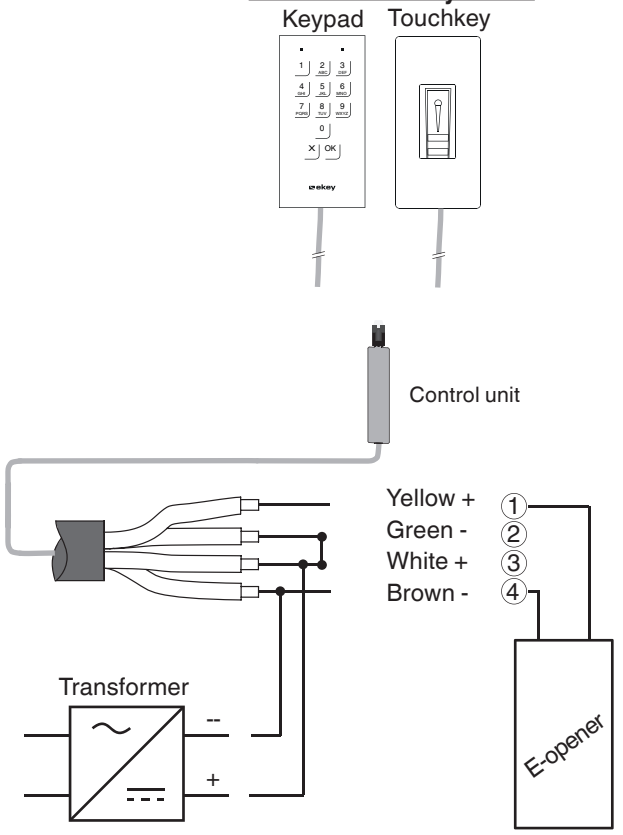
Note: With electric opener only three connections can be used because the motor only has the connections brown – to green internally.

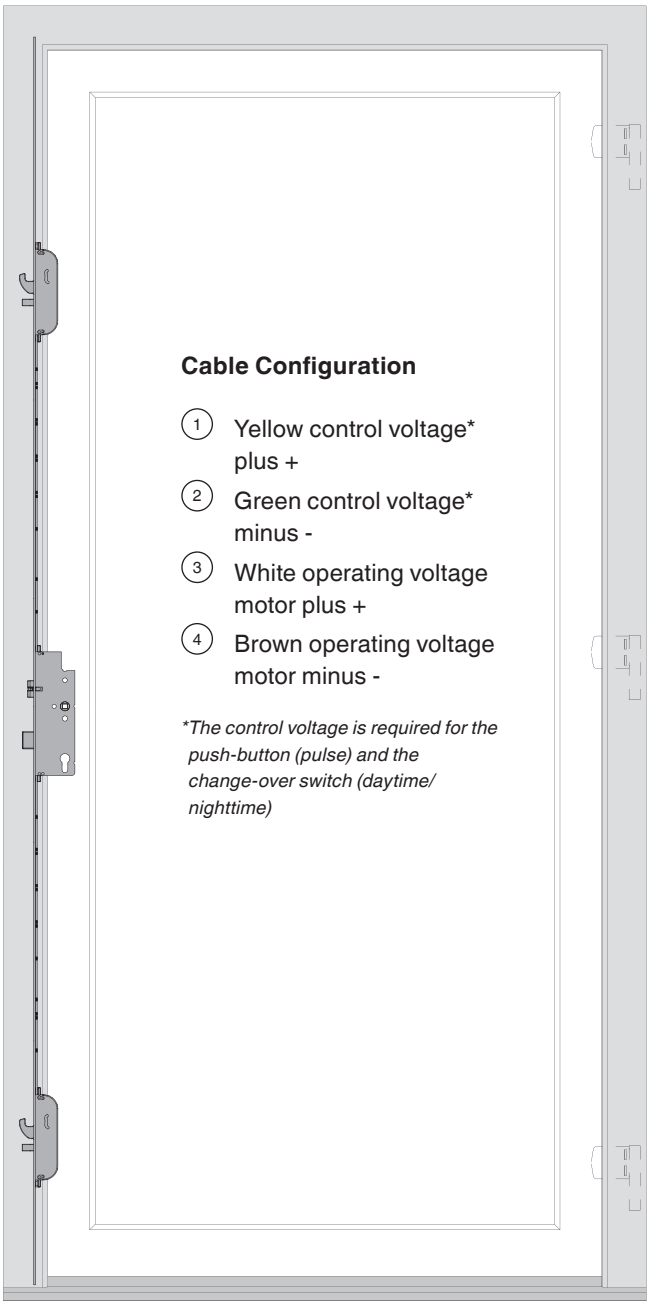
MACO TRONIC

openDoor access control systems

Circuit diagram for electric opener

Access control systems:





Cable Configuration

1. Yellow control voltage* plus +
2. Green control voltage* minus -
3. White operating voltage motor plus +
4. Brown operating voltage motor minus -

**The control voltage is required for the push-button (pulse) and the change-over switch (daytime/ nighttime)*

NOTE:
Electrical connections (power pack connection, connection cable 0.15m and 10m) may only be carried out by authorised personnel!

Motorised opening of the lock with switch / push button

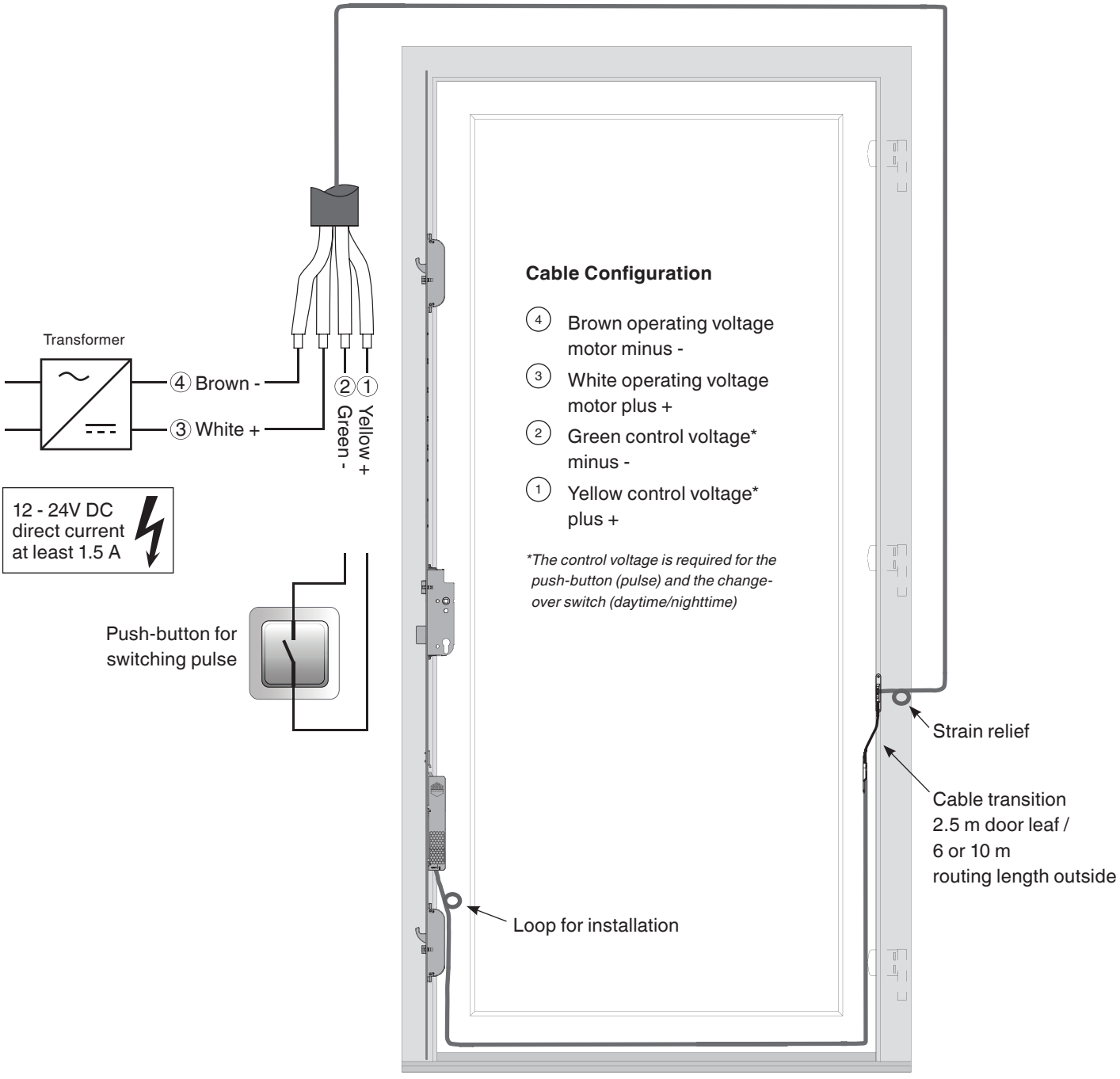
The Z-TA Comfort can also be used without access control, if the opening signal is given by way of a switch / button. Typically a button is used for easy opening of the lock, as it automatically goes back to the unactuated position after pressing. If day / night position is to be realised, which means the door is unlocked all day and locked only at night, a toggle switch must be used. This is because it remains in the respective actuated switching position.

When unlocked, all of the catches are also retracted, so the sash can move freely. If possible, door closers or similar should be provided!

As can be seen in the connection diagram, the two potential-free contacts are connected by the switch / push button, as this causes the motor to open, locking/unlocking the corresponding lock. The button only provides the motor a short opening signal, opening the lock once and locking it again. In contrast, a toggle switch is closed and generates a permanent opening signal, so the motor moves in the open position and remains there.

MACO TRONIC

openDoor access control systems
Circuit diagram for switching pulse



NOTE:
Electrical connections (power pack connection, connection cable 0.15m and 10m) may only be carried out by authorised personnel!

Accessories

Clip-on cable transition 2.5 m / 6 m and 2.5 m/10 m (Art. No. 466833 and 466834)
The cable transition is equipped with a suitable JST plug for the motor on the sash-side. The cable has to be laid in the sash to a length of 2.5 m. The power supply cable can be ordered with either 6 or 10 m cable length on the frame exit.

Cable 10 m (Art. No. 466835)
If a third-party cable transition used, the 10 m connection cable can be used. This cable has the appropriate JST plug on one end and the other has the wires for the electrical connection. It should be noted that the possibility for unhinging the sash no longer exists, because the cable is made continuously.

Cable tray for 4 mm gap (Art. No. 466837)
Milling is required on timber doors with a 4 mm gap to accommodate the cable transition without pinching it in the rebate. The cable tray enables the milling to be concealed in a visually appealing manner. Six screws are enclosed, of which two are provided for fixing the tray in timber / aluminium and for fixing the cable transition.

Cable transition cover plate timber for alarm web stainless steel / F20 cover plate (Art. No. 363473 and Art. No. 466838)
Cover plates are available in order to accurately cover the drill holes for the cable transition. These need to be milled into the timber in order that they lay flat in the rebate. Cable transition cover plates are available for 16 mm (Art. No. 363473) and 20 mm (Art. No. 466838).

Cable harness 150 mm (Art. No. 466836)
The cable harness 150 mm can be used to make the Z-TA Comfort motor compatible for third party products. This has at one end of the matching JST plug for the motor and loose wires at the other. This enables easy connection of third-party products as required.

MACO TRONIC

openDoor test device (Art. No. 466842)

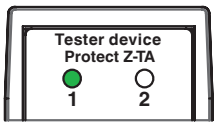
Technical specifications

Power supply	Power supply 230 V AC ~ 0.7 A - 12 V DC min. 1.5A
Measuring inputs	– 4 alligator clips – Connector for M13 34 cable transition – JST connector
Measurements	Door lock motor and correct wiring to the door frame Door lock motor and correct wiring in the door leaf Directly to lock motor
signalling	visually (by LED)
Casing	Hand case with belt-clip
Operation	One-button operation

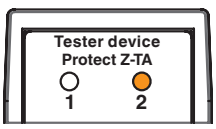
Notes:
The intended use of the openDoor test device is to test the variable connected components (wiring to door frame / wiring to door panel / door lock motor) for proper operation by way of the three connection cables (alligator clips / cable transition M13 34 / JST plug). Only MACO door motors for Z-TA Comfort may be connected to the test device. Any use other than specified is impermissible!

Scope of supply

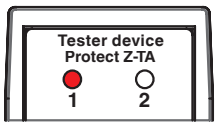
- Tester device
- Power supply
- 3 connection cables:
  - Alligator clips
  - Cable transition sleeve M 13 34
  - JST connector and stripped wires (cable harness)



Applied supply voltage
LED 1 lights up green



Pulse transfer
LED 2 lights up orange



Fault
LED 1 lights up / flashes red

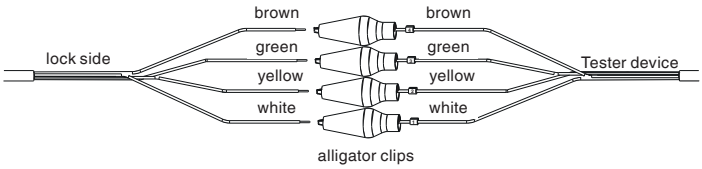
Power supply
The entire power supply is provided by the included AC adapter. This is operated in a commercial 230V / AC outlet and plugged in at the top of the test device.

Inspection procedure / Meaning of the LEDs
In each test mode the test device opens the door lock and puts it back into the initial position after unlocking. If the proper supply voltage is present during operation, LED 1 lights up green. If LED 1 lights up red, the supply voltage of the test device is outside the allowable range, meaning the power supply should be checked and / or replaced.
LED 2 lights up orange after pressing the start button, signalising pulse transmission. If LED 1 flashes red after pressing the start button, an overcurrent is detected. Check or replace the door lock motor and test again (in order to do so, briefly disconnect the test device from the power supply). If no LEDs light up after switching on and / or pressing the start button, there is a short circuit in the door lock motor or the supply cable. The door lock motor and wiring should be checked.

Modes
Test 1

Door lock motor and complete wiring to the door frame
The door lock is installed and fully wired. Correct function is to be demonstrated.

Operation:
1. Connect the test device to the cable as follows using alligator clips, the red and blue wires are not needed:



CAUTION!
The alligator clips must not touch each other, otherwise a fault occurs.

2. Connect power supply
3. Start the test by pressing the button briefly.
4. evaluation:
   a) If the door lock opens and then moves to the home position, a complete installation has been correctly undertaken.
   b) If the door lock indicates no reaction, there is a fault in the wiring from the door lock motor to the door frame and / or the door lock motor is defective (carry out test 2).

Test 2

Door lock motor and complete wiring in the door panel
This test measures directly at the cable transition for correct wiring from the door lock motor to the cable transition.

Operation:
1. The test device is connected with the polarised connection cable for the cable transition M13 34.

Connecting cable cable transition M13 34

2. Connect power supply
3. Start the test by pressing the button briefly.
4. evaluation:
   a) If the door lock opens and then moves to the home position, the cabling has been correctly undertaken.
   b) If the door lock indicates no reaction, there is a fault in the wiring from the door lock motor to the cable transition and / or the door lock motor is defective (carry out test 3).

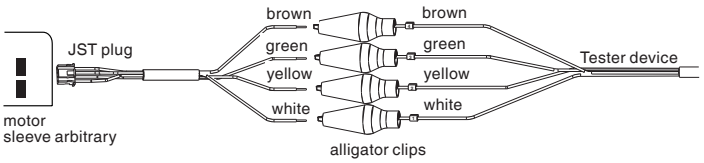
Test 3

Door lock motor

This test verifies the correct operation of the door lock motor, whereby other possible sources of faults are excluded, since the door lock motor is actuated directly. For this purpose, the door lock must be removed.

Operation:

1. Connect the connection cable with JST plug (cable harness) to one of the two sleeves of the door lock motor. The test device is connected to the connecting cable via alligator clips and the cable harness according to the colours, the red and blue wires are not needed:



CAUTION!
The alligator clips must not touch each other, otherwise a fault occurs.

2. Connect power supply
3. Start the test by pressing the button briefly.
4. evaluation:
   a) If the door lock opens and then moves to the home position, there is no fault.
   b) If the door lock gives no reaction, the door lock motor is defective.

MACO TRONIC

Assignment profile systems with moulded parts for magnetic switch old and new

Profile	System	Type	magnetic switch old	reed contact new
ACTUAL	System A600	4	454909	363185
ACTUAL	System A500	4	454909	363185
AKAPEN	Akapen Türkei	1	454906	363182
ALCAN	Focus - Aluprofil	3	454908	363184
ALFAPEN	Venüs Serisi - Türkei	2	454907	363183
ALFAPEN	Armada Serisi - Türkei	2	454907	363183
ALPHACAN	System Class	1	454906	363182
ALPHACAN	System Alpha 70	4	454909	363185
ALPHACAN	Master (ex.FERSINA)	2	454907	363183
ALUPLAST	IDEAL 2000	4	454909	363185
ALUPLAST	IDEAL 3000	4	454909	363185
ALUPLAST	TBT (Warwick)	4	454909	363185
ALUPLAST	IDEAL 5000	3	454908	363184
ALUPLAST	IDEAL 4000	3	454908	363184
ALUPLAST	IDEAL 6000	3	454908	363184
ALUPLAST	IDEAL 7000	3	454908	363184
ALUPLAST	IDEAL 8000	3	454908	363184
ALUPLAST	Energeto	3	454908	363184
BECKER	Becker	2	454907	363183
BRUEGMANN	System AD	4	454909	363185
BRUEGMANN	System MD	4	454909	363185
DECCO	System 60	2	454907	363183
DECEUNINCK	System Zendow	2	454907	363183
DECEUNINCK	Mondial Ege	3	454908	363184
DECEUNINCK	MD Serie 1700	3	454908	363184
DECEUNINCK	Serie Mondeal	3	454908	363184
DEKAI	DEKAI China	4	454909	363185
DIMEX	Taicang China	4	454909	363185
DIMEX	System Komfort	3	454908	363184
DIMEX ACCORD	System Contour 7.0	4	454909	363185
DIMEX ACCORD	System Elegance 8.0	4	454909	363185
ELVIAL MULTI LOCK	Serie 5700	2	454907	363183
ERPEN	Smartline	4	454909	363185
ERPEN	Radline	2	454907	363183
EUROCELL	Euro - Logic 70	2	454907	363183
Europen	Fiesta Tuerkei	1	454906	363182
Europen	Elite Series Tuerkei - Greiner 443	4	454909	363185
FINSTRAL	System 500 / 60	4	454909	363185
FINSTRAL	System 500 / Top 72	3	454908	363184
FINSTRAL	Alu Fenster	3	454908	363184
Funke Gruppe	System KS Phoenix	2	454907	363183
Funke Gruppe	System Fortuna	2	454907	363183
Funke Gruppe	System Helois	2	454907	363183
GEALAN	S 3000	2	454907	363183
GEALAN	S 7000	2	454907	363183
GEALAN	S 8000	2	454907	363183
GREINER	Intertec WD	3	454908	363184
GROMATHIC	AD 3100	3	454908	363184
GUOFENG	Greiner S-334	2	454907	363183
Hailu + Dalien	China - Shide	3	454908	363184
HELMITIN	System KSL	3	454908	363184
HEROAL	System 065	3	454908	363184
HEROAL	System 110E	3	454908	363184
HEROAL	System 90S	3	454908	363184
HIS	5 Star TBT UK	2	454907	363183
INOUTIC	AD (ex Thyssen)	3	454908	363184

MACO TRONIC

Assignment profile systems with moulded parts for magnetic switch old and new

Profile	System	Type	magnetic switch old	reed contact new
INOUTIC	MD 100 (ex Thyssen)	3	454908	363184
INOUTIC	System Prestige AD (ex Thyssen)	3	454908	363184
INOUTIC	System Deluxe (ex Thyssen)	3	454908	363184
INOUTIC	System Prestige MD (ex Thyssen)	3	454908	363184
JOSKO	Proline 70	1	454906	363182
KARPEN	Greiner S-444 - Türkei	4	454909	363185
KBE	Mitteldichtung	1	454906	363182
KBE	Serie 58 13V Hoehe 3mm Russland	4	454909	363185
KBE	AD-Universal	2	454907	363183
KBE	System 70 AD	2	454907	363183
KBE	System 70 MD	2	454907	363183
KBE	AD 13V	2	454907	363183
KBE	System 88	2	454907	363183
KÖMMERLING	Solid MS	4	454909	363185
KÖMMERLING	FMS	4	454909	363185
KÖMMERLING	System Gold 70	2	454907	363183
KÖMMERLING	Gold	2	454907	363183
KÖMMERLING	Euro Futur	2	454907	363183
KÖMMERLING	Eurodur 3S	2	454907	363183
KÖMMERLING	Combidur VS France	2	454907	363183
KÖMMERLING	Eurodur MPF	2	454907	363183
KÖMMERLING	Combidur MPF	3	454908	363184
KÖMMERLING	Combidur VK	3	454908	363184
KOMPEN - Tuerkei	Thermo Line (Kom600)	4	454909	363185
KOMPEN - Türkei	Neu Greiner	4	454909	363185
KOMPEN - Türkei	Super Line (Kom200(AD)+300(MD))	2	454907	363183
LB. Profile	System PAD	4	454909	363185
LB. Profile	System PMD	4	454909	363185
Metalplast Bielsko SA	Profil MB-59S	3	454908	363184
Metalplast Bielsko SA	Profil MB W86 ST	3	454908	363184
NOVAKY	S-376 Internova	4	454909	363185
PAK PEN	P 2000 Serisi - Türkei	2	454907	363183
Panorama	3000-ES	2	454907	363183
PLAFEN	E-Line	2	454907	363183
PLAFEN	S-Line AD	2	454907	363183
PLASTIL	Elodie	3	454908	363184
PLASTIVAL	Crescendo	2	454907	363183
Plus Plan	Durham - Swish 70 Window	4	454909	363185
PlusTec	Euroline (3K-System) + 4K System	4	454909	363185
PRAMOS	Horizont Penta	4	454909	363185
PRAMOS	Horizont PS 990	4	454909	363185
Prokal	Prokal-P58	4	454909	363185
PROPLEX	Optima - Russland	2	454907	363183
Ramplast Oltchim	EcoTherm - Rumänien	2	454907	363183
REHAU	S711	1	454906	363182
REHAU	S730	4	454909	363185
REHAU	S735	4	454909	363185
REHAU	S923 Thermo Design 70	4	454909	363185
REHAU	Brillant Design AD S799	4	454909	363185
REHAU	Basic Design S730	4	454909	363185
REHAU	Brillant Design MD S 788	4	454909	363185
REHAU	S796	2	454907	363183
REHAU	Tritec, Tritec IG (Gasketed)	2	454907	363183
REHAU	GENEO AD+MD	2	454907	363183
REHAU	System Euro Design 86	2	454907	363183

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Assignment profile systems with moulded parts for magnetic switch old an new

Profile	System	Type	magnetic switch old	reed contact new
REHAU	S702, S705, S709	3	454908	363184
REYNAERS	REYNAERS	2	454907	363183
ROPLASTO	Schrägfalz 6001	4	454909	363185
ROPLASTO	System 7001 AD	2	454907	363183
ROPLASTO	System 7001 MD	2	454907	363183
ROPLASTO	System 6002	2	454907	363183
ROPLASTO	System 7001 7K MD	2	454907	363183
ROPLASTO	Mitteldichtung	3	454908	363184
ROYAL	Schanghai - China	4	454909	363185
RYVEN	System 5 KOM	4	454909	363185
SALAMANDER	Design 2D	2	454907	363183
SALAMANDER	bluEvolution	2	454907	363183
SALAMANDER	Streamline 76	2	454907	363183
SALAMANDER	Universal AD	2	454907	363183
SALAMANDER	Design 3D	3	454908	363184
SAPA	Sapa TBT England	1	454906	363182
SCHÜCO	Corona CT 70	4	454909	363185
SCHÜCO	Corona SI 82	4	454909	363185
SCHÜCO	System Corona AS	3	454908	363184
SELECTA	System 13mm Versatz	2	454907	363183
SEPALUMIC	Iprocess	3	454908	363184
SOCREDIS	S33	2	454907	363183
SPECTUS	TK 60 European System	4	454909	363185
SPECTUS	TK62 Classic	2	454907	363183
STOECKEL	Twinstep	1	454906	363182
TEMAX	Profiles (B&S Group)	1	454906	363182
TROCAL	900	1	454906	363182
TROCAL	Innonova 2000	1	454906	363182
TROCAL	System 88+	1	454906	363182
TROCAL	Confort	4	454909	363185
TROCAL	InnoNova 70.M5 elegance + classic	4	454909	363185
TROCAL	Innonova A5 Elegance + Classic	4	454909	363185
TRYBA	System Profen 100	1	454906	363182
VEKA	MD	4	454909	363185
VEKA	Softline AD + MD	4	454909	363185
VEKA	Schrägfalz	4	454909	363185
VEKA	Topline AD	4	454909	363185
VEKA	Softline AD 13mm Versatz	4	454909	363185
VEKA	Topline AD + MD Schliessteile	4	454909	363185
VEKA	Contour	4	454909	363185
VEKA	Kietis	4	454909	363185
VEKA	Perfectline	4	454909	363185
VEKA	Swingline	4	454909	363185
VEKA	Euroline 13 Versatz	4	454909	363185
VEKA	Softline 70 AD	4	454909	363185
VEKA	Matrix 70 - Höhe 3mm	4	454909	363185
VEKA	Softline 70 MD	4	454909	363185
VEKA	Softline 82 MD	4	454909	363185
VEKA	Softline 82 AD	4	454909	363185
Winsol	Winsol	3	454908	363184
WYMAR	Profex 2500	1	454906	363182
WYMAR	3000 MD	3	454908	363184
WYMAR	3000 AD	3	454908	363184
WYMAR	Profex 2000	3	454908	363184
Zhongcai	Zhongcai	3	454908	363184

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Created: October 2014 - Changed: 10.01.2023
Order No. 757120EN

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