

.BTR

Assembly and Commissioning Instructions **BDL Uni**

according to Machinery Directive 2006 / 42 / EC (annex VI)



BDL Uni (24V DC) - LOCKING DRIVES FOR WINDOWS CE



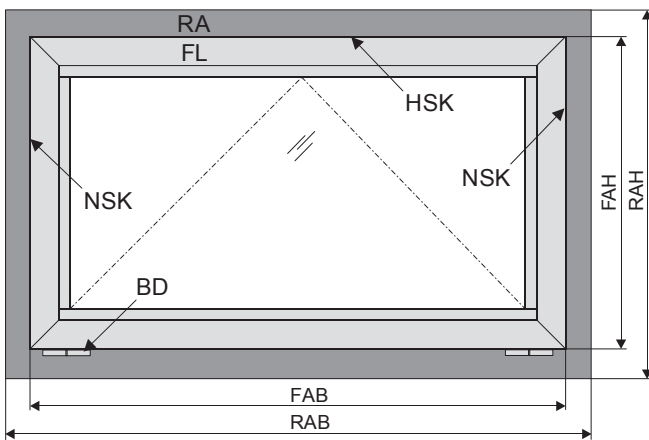
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ABBREVIATIONS

Index of abbreviations

These abbreviations are used consistently throughout these assembly & operating instructions. Unless stated differently, all dimensions indicated in this document are in mm. General tolerances in accordance with DIN ISO 2768-m.

A	drive
AK	connection cable / drive cable
AP	cover cap
BD	hinge
BDBxxx	casement bracket / frame bracket
FAB	overall width of casement
FAH	overall height of casement
FG	casement weight
FL	casement
FÜ	casement overlap
HSK	main closing edge
L	construction length of drive
MB	central hinge
NSK	side closing edge
RA	frame
RAB	overall width of frame
RAH	overall height of frame
SL	snow load
SW	wrench size
→	opening direction




TARGET GROUP


These instructions are intended for trained personnel and operators of systems for natural smoke ventilation (SHEVS) (smoke and heat exhaust ventilation system) and natural ventilation via windows, who are knowledgeable of operating modes as well as the remaining risks of the system.


WARNING AND SAFETY SYMBOLS IN THESE INSTRUCTIONS:


The symbols used in the instructions shall be strictly observed and have the following meaning:


 **DANGER** Failure to comply with the warning notes results in irreversible injuries or death.


 **WARNING** Failure to comply with the warning notes can result in irreversible injuries or death.


 **CAUTION** Failure to comply with the warning notes can result in minor or moderate (reversible) injuries.

 **NOTE** Failure to comply with the warning notes can lead to damage to property.


 **Caution / Warning**
Danger due to electric current.

 **Caution / Warning**
Risk of crushing and entrapment during device operation (is provided as a sticker with the drive).

 **Attention / Warning**
Risk of damage to / destruction of drives and / or windows.

 **WARNING** Once the assembly and commissioning has been completed, the installer of a machine „power-operated window“ shall hand these instructions over to the end-user.

The end-user shall store these instructions in a safe place over the whole lifecycle and use it for further reference, if required.

 **WARNING** This device is not intended for use by persons (including children) with physical, sensory or mental limitations or lacking experience and / or knowledge, unless they are supervised by a person who is responsible for the safety or were instructed on the usage of this equipment. Children should be supervised to ensure that they are not playing with this device.

Cleaning and operator's maintenance may not be performed by children without supervision.

INTENDED USE

Area of application / Scope of application

This drive is intended for the electromotive opening and closing of windows in facade or roof areas.

The main task of this product, in combination with a window and a suitable external control unit, **is to evacuate hot smoke and combustion gases in case of fire**, to save human lives and protect material assets. Furthermore, with the electromotive operated window and a suitable external control unit, **the natural ventilation** of the building can be ensured.

NOTE

By attaching the drive to a movable element of the window and connecting it to a power supply a so-called "power-operated window" is created which, according to the Machinery Directive 2006 / 42 / EG, represents a machine.

Intended use

The drive is intended for stationary installation and electrical connection at the window as part of a building.

The drive is in combination with an external Control Unit (e.g. from **BTR**) released for its proper use at a power-operated window for the following use:

- Application for natural ventilation
 - with an installation height of the drive and the bottom side of casement of at least 2,5 m above the floor, **or**
 - with an opening width at the HSK of the driven part of < 200 mm by a simultaneous speed of < 15 mm/s at the HSK in closing direction.
- Application as NSHEV (natural smoke and heat exhaust ventilator(s)) in accordance with EN12101-2 without dual purpose for ventilation.

Pay attention to possible hazards on tilting or rotating windows, whose side closing edges (NSK) are located at less than 2,5 m installation height above the floor, under consideration of the Control Unit and usage!

WARNING

We as manufacturers are well aware of our duties and responsibilities regarding the development, manufacturing and placing of safe window drives on the market and consistently implement them. Ultimately, however, we have no direct influence on the usage of our drives. Therefore, as a precaution, we point out the following:

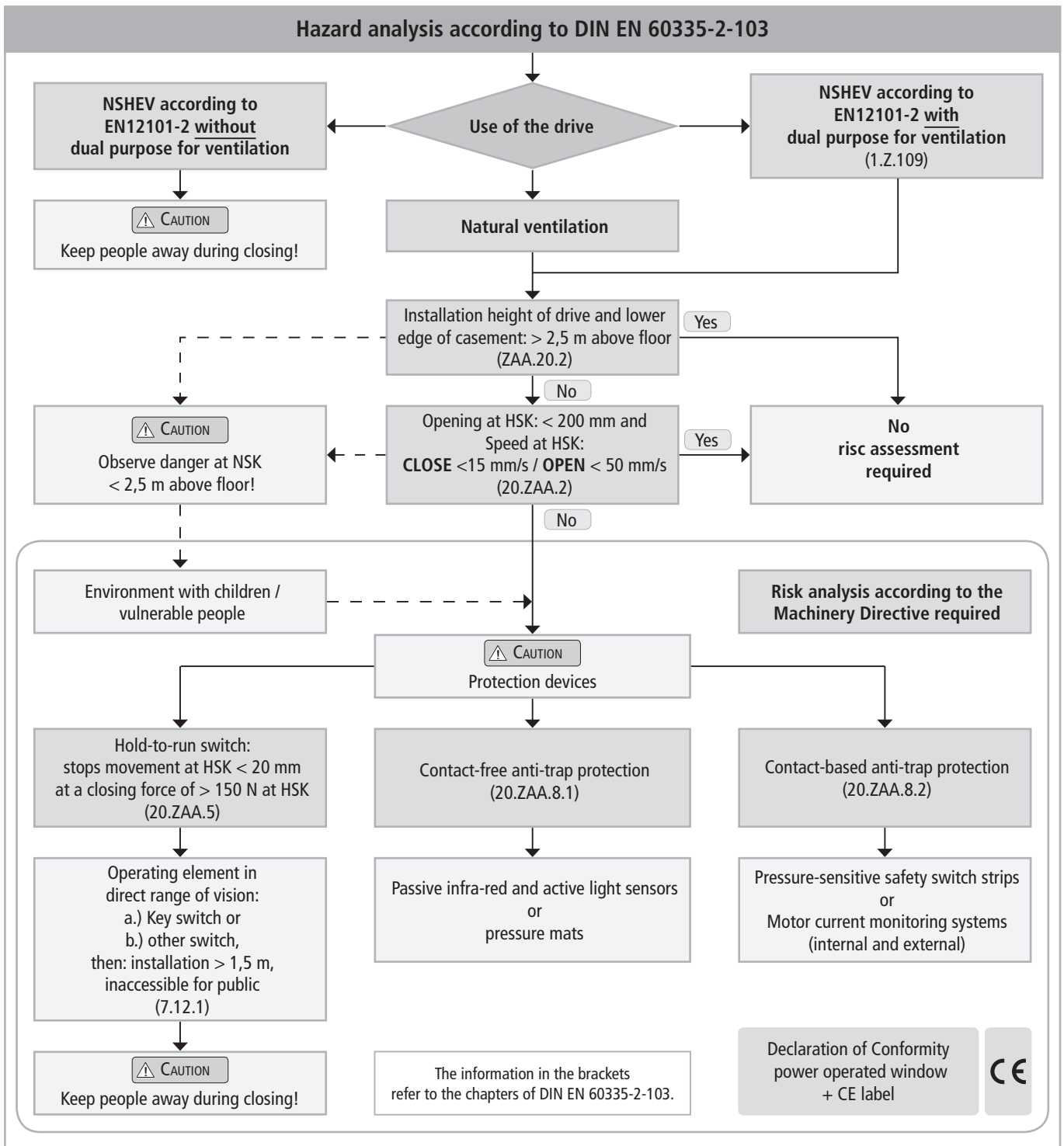
- The **constructor or his agent** (architect, specialist planner) **are obligated to evaluate the hazards to persons**, outgoing from the usage, installation position, opening parameters and from the external Control Unit of the power operated window, **already in the planning phase and to establish necessary protective measures**.
- The **constructor / manufacturer** of the machine "power-operated window" **must implement** the planned **protective measures** at the installation site or, if not yet established, **determine them** by its own responsibility and detect or **minimize possible remaining risks**.

The need for a risk assessment at the installation site due to the reasonably foreseeable misuse.

A risk assessment in accordance with the Machinery Directive 2006 / 42 / EG for the usage of the power-operated window for natural ventilation is absolutely necessary under the following conditions:

- the installation height of the drive and lower edge of casement < 2,5 m above the floor **and** one of the following conditions:
- the opening width at the HSK is > 200 mm, **or**
- the closing speed at the HSK is > 15 mm/s, **or**
- the opening speed at the HSK is > 50 mm/s, **or**
- the closing force at the HSK is > 150 N

The following flow chart can be applied, which also includes the protective measures in accordance with EN 60335-2-103/2016-05.



Casement data

Facade: bottom-hung window
 top-hung window
 side hung window
 Roof: roof window / sky light
 Opening direction: outward opening / inward opening
 Profile material: aluminum, steel, plastic or wood

When inspecting the drives for conformity with on-site requirements the following items must be observed:

- total weight of casement (glass + frame),
- casement size (FAB x FAH),
- driving force and stroke,
- mounting site at the window frame and casement frame.

SAFETY INSTRUCTIONS



It is important to follow these instructions for the safety of persons. These instructions shall be kept in a safe place for the entire service life of the products.

Risk of crushing and entrapment! Window can close automatically!

The integrated load cut-off stops the drive during closing and opening when the drive is overloaded.

The compressive force is absolutely sufficient to crush fingers in case of carelessness.



Area of application

The drive shall only be used according to its intended use. For additional applications consult the manufacturer or his authorized dealer.

Do not misuse the drive for other lifting operations!



Do not allow children to play with this drive or its electric controls, including the remote control!

Always check whether the system complies with current regulations. Special attention must be paid to the opening width, the opening area, the opening time and the opening speed of the window, the temperature range of the drives / external devices and cables as well as the cross section of the connecting cables as function of the cable length and power consumption.



All devices must be permanently protected from dirt and moisture, if the drive is not explicitly suitable for use in wet areas (see technical data).

Installation

These instructions address expert and safety-conscious electricians and / or qualified personnel knowledgeable in electrical and mechanical drive installation.



The safe operation, avoidance of injury to persons and damage to property, as well as risks, is only guaranteed by proper installation and setting according to these installation instructions.

All specifications for installation must be checked independently and, if necessary, adjusted at the installation site. The connection assignment, the electrical supply data (see product label) and performance limits (see technical data) as well as the mounting and installation instructions of the drive must be strictly observed and adhered to!



Never connect 24 V DC drives to 230 V AC mains voltage!
Danger to life!

Do not reach into the window rabbet or the operating element (chain or spindle) during installation and operation! Ensure that, based on the installation position and the opening movement of the casement, persons cannot be trapped between the driven part of the window and surrounding fixed components (e.g. wall).

Mounting material

The required mounting material must fit with the drive and occurring load and, if necessary, supplemented.



Before installing the drive, check whether the casement is in good mechanical condition, the weight in balance and whether it opens and closes easily!

Danger spots by crush and shear points

<p>Side-hung</p>	<p>Bottom-hung</p>	<p>Roof windows / skylight domes</p>	<p>Louvre windows</p>
<p> Danger spots: crush and shear points according to DIN EN 60335-2-103</p>			

Crush and shear points

To avoid injuries, **crushing and shear points** between casement and frame must be secured **against entrapment up to an installation height of 2,5 meters above the floor** with appropriate measures. This can be achieved e.g. by using contact-based or contactless protective devices against entrapment, which stop the motion through contact or through interruption by a person. At a force higher than 150 N at the main closing edge the motion must stop within 20 mm. A warning symbol at the opening element must indicate this clearly.

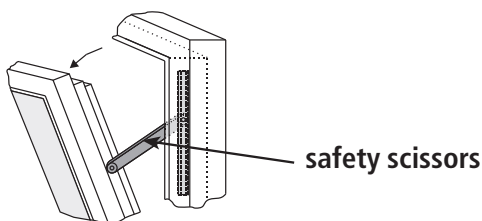
Unintentional or independent opening or falling

Casements are to be hinged or secured such way that in case one of the mounting elements fails it will not crash / slam down or move in an uncontrolled manner by e.g. using double suspensions, safety scissors, casement stays. Tilting windows shall be equipped with safety scissors or similar devices to avoid damages and risks of injury for persons through improper installation and operation. The safety scissors must be adjusted to the opening stroke of the drive (see technical data) to avoid blocking. The opening width of the safety scissors must be bigger than the drive stroke.



WARNING

The movable casement must be secured against unintentional or independent opening as well as falling down.



Routing cables and electrical connection

Routing or installing of electrical cables and connections may be performed only by specialist companies. Never operate drives, control units, operating elements and sensors at operating voltages and connections contrary to the specifications of the manufacturer. All relevant national instructions shall be observed for the installation.



All-pole disconnecting devices shall be installed in the permanent electrical installation or external Control Unit for the drive. The mains supply lines 230 V / 400 V AC shall be protected separately!



24V DC drives may only be connected to power supply sources that comply with SELV specifications.

NOTE

In the case of tandem / multiple operation of drives connected in series, the cross-section of the connection cable must be checked autonomously, depending on the total current consumption of the drive system.



WARNING

Damaged mains supply lines of drives with plug connectors may only be replaced by the manufacturer or qualified service / maintenance personnel! Power cables which are fixed to the drive casing cannot be replaced. If the cable is damaged the device must be scrapped!

The types of cable, cable lengths and cross-sections shall be selected in accordance with the manufacturer's technical data. If necessary, the cable types shall be coordinated with the competent local authorities and energy supply companies. Low-voltage lines (24 V DC) shall be routed separate from the high-voltage lines. Flexible cables may not be flush-mounted. Freely suspended cables shall be equipped with strain reliefs.



Cables must be laid such way that they cannot be sheared off, twisted or bent during operation. Drive cables laid inside window profiles must be protected by insulating tubes with a sufficient temperature resistance. Through holes shall be equipped with cable sleeves!

Clamping points shall be checked for tightness of threaded connections and cable ends. Access to junction boxes, clamping points and external drive control boxes shall be ensured for maintenance work.

Commissioning, operation and maintenance

After the installation and after each modification in the set up all functions shall be checked with a trial run. It shall be ensured that drive and casement are set correctly and that security systems, if available, are functioning properly. **After the installation of the system is completed the end-user shall be instructed in all important operating steps.** If necessary, he must be advised of all remaining risks / dangers.

The end-user shall be specifically instructed that no additional forces, except pushing and pulling forces in the opening and closing direction of the casement, may be applied to the spindle, chain or lever of the drive.

NOTE Post warning signs!

During the proper assembly of drives with mounting elements at a window, and the connection to an external control unit, the interfaces resulting from mechanical and electrical performance characteristics of single elements shall be observed.

Other persons must be kept away from the casement when a hold-to-run switch (pushbutton) is operated or when a window, which has been opened by a smoke and heat exhaust system, is closing!

 **CAUTION**

The operating element of hold-to-run switches must be installed within direct view from the window, but apart from moving elements. If the switch is not a key-operated switch it must be installed at a minimum height of 1,5 m and inaccessible to the public!

 **CAUTION**

Do not allow children to play with permanently mounted control devices and keep remote controls out of reach for children!

 **CAUTION**



During cleaning, maintenance work and while exchanging parts the drive must be completely disconnected from the power supply and secured against unintentional reactivation.

 **WARNING**

Do not actuate the drive or the casement when repair or re-setting works are performed!

Replacement parts, fasteners and controls

The drive shall only be operated with control devices from the same manufacturer. There is no liability, warranty or customer service if third-party parts are used. Exclusively original spare parts of the manufacturer shall be used for mounting elements or expansions.

Ambient conditions

The product may not be subjected to impacts or falls, or to vibrations, moisture, aggressive vapors or other harmful environments, unless the manufacturer released it for one or more of these environmental conditions.

• Operation:

- Ambient temperature: -5 °C ... +60°C
- Relative humidity: < 90% less 20°C;
< 50% less 40°C;
no formation of condensation

NOTE Observe temperature range during installation!

• Transport / Storage:

- Storage temperature: -5°C ... +40°C
- Relative humidity: < 60%

Accident prevention regulations and workmen's compensation insurance guidelines

For work on or in a building or building part the provisions and instructions of the respective accident prevention regulations (local workmen's compensation insurance guidelines) shall be observed and adhered to.

Declaration of Conformity and of Incorporation

The drive is manufactured and inspected in accordance with European guidelines. The respective Declaration of Conformity and of Incorporation is on hand.

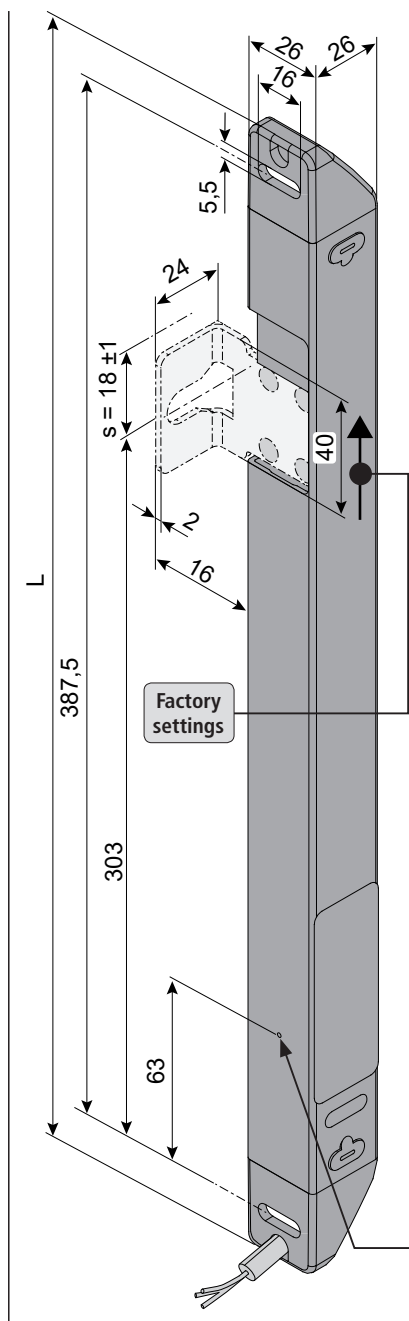
In case that the use of the drive differs from the intended use, a risk evaluation for the power operated window shall be performed and a Declaration of Conformity according Machinery Directive 2006 / 42 / EG issued.


DATA SHEET BDL UNI

- For **natural ventilation** and **smoke and heat exhausting systems** (SHEVS)
- Mounting on the window frame or casement frame profiles of inward or outward opening windows, depending of the window locking hardware and used coupling adapter
- **Coupling adapter activates the multi-point locking systems of the windows via additional locking roller**
- Robust corrosion-resistant design in a aluminium housing
- Concealed cable terminals and internal push button for setting the running direction
- Coupling adapter customizable for project-specific or profile-specific demands

Order Data

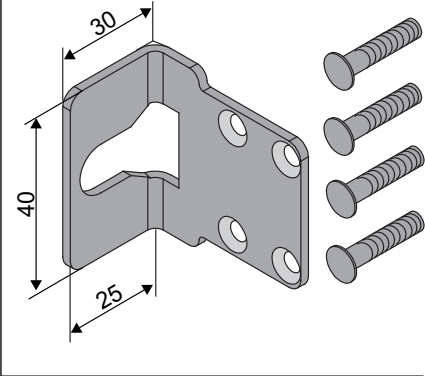
s [mm]	L [mm]	Version	Finish	PU / pcs.	Part.-No.
18	415	BDL Uni 24 V	E6/C-0	1	40.200



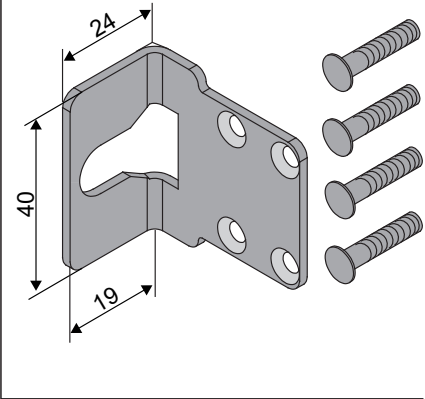
Technical Data		
U_N	Rated voltage	24V DC (19V ... 28V)
I_N	Rated current	0,6 A
I_A	Cut-off current	~ 1,0 A
P_N	Rated power	15 W
DC	Duty cycle	5 cycles (ED 30 % - ON: 3 min./OFF: 7 min.)
	Protection rating	IP 32
	Ambient temperature range	-5 °C ... +60 °C
F_A	Pushing force max.	~ 600 N
F_L	Breakout force max.	~ 1000 N
F_H	Pullout force max.	1.500 N
	Housing	aluminium (E6/C-0)
	Connecting cable	non-halogen, grey $\varnothing 6,2$ mm, 3 x 0,5 mm ² , ~ 3 m
t	Running time	~ 5,0 s
s	Stroke	~ 18 mm (± 1)
	Sound pressure level	≤ 70 dB (A)

Running direction adjustable
by internal push button
(OPEN position = factory settings)

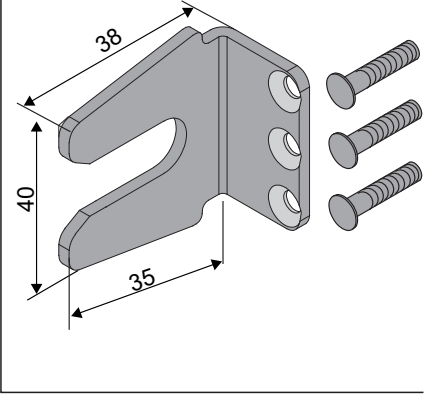
Bracket-Set BDB109

Article	BDB 109		Part.-No.
		<p>Application Surface mounting of the locking drives BDL Uni on the window frame profiles of inward opening windows.</p> <p>Coupling adapter - 22 mm the length of this adapter is 30 mm.</p> <p>Material / Finish Stainless steel</p> <p>Feature / Equipment 1x Coupling adapter 4x Screws M4x16</p>	40.250

Bracket-Set BDB110

Article	BDB 110		Part.-No.
		<p>Application Surface mounting of the locking drives BDL Uni on the frame profiles of inward opening windows.</p> <p>Coupling adapter - 16 mm the length of this adapter is 24 mm.</p> <p>Material / Finish Stainless steel</p> <p>Feature / Equipment 1x Coupling adapter 4x Screws M4x16</p>	40.251

Bracket-Set BDB111

Article	BDB 111		Part.-No.
		<p>Application Surface mounting of the locking drives BDL Uni on the case-ment profiles of inward opening windows or of the frame profiles of outward opening projected top-hung windows.</p> <p>Coupling adapter - 28,5 mm the length of this adapter is 38 mm.</p> <p>Material / Finish Stainless steel</p> <p>Feature / Equipment 1x Coupling adapter 3x Screws M4x16</p>	40.252

DETERMINATION OF LOCKING POINTS

The number of locking points depends on:

- object-specific requirements
- processing guidelines and authorized ranges of application of the manufacturer
- EN 12102-2 NRWG (depending of profile group and wind load classification WL)
- EN 12207 Air permeability
- EN 12208 Driving rain tightness
- EN 12210 Resistance to wind load
- EN 1627 Burglar resistance
- EN 14351-1 Window or door standard
- DIN 1991-1-3 Snow loads
- DIN 1991-1-4 Wind loads

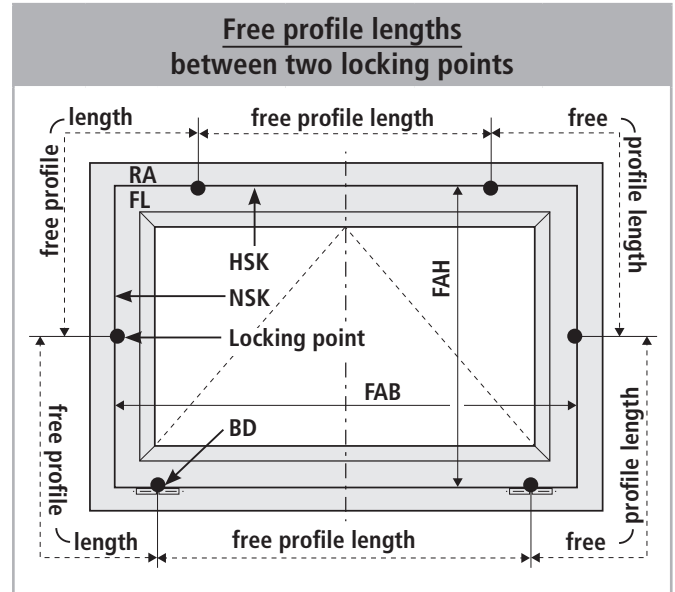
Locking points are centers / axes of the following components: casement hinges / stays (BD), sealing points of the locking system, application points of directly actuating drives (force transmission axes at 90° to the casement profile, with closed window).

Drives used in SHEV mounting devices such as: RWA 1000, RWA 1050, RWA 1100 are not included in the locking points.

Free profile lengths are effective distances between two locking points. Corner and edge distances shall be calculated as straight lines.

The number of locking points or the free profile length between two locking points are described into the respective system documents of the window profile. This information must be adhered. The requirements for the tightness of the windows according to EN 14351-1 must be observed!

NOTE



		Free profile length for I_x^4 -values of the window casement profiles			
		20-34 cm ⁴	35-50 cm ⁴	51-55 cm ⁴	56-99 cm ⁴
Static wind slipstream loads on the SHEV - according to EN 12101-2.	WL 1000	1300 mm	1500 mm	1700 mm	1900 mm
	WL 1500	1200 mm	1400 mm	1600 mm	1800 mm
	WL 2000	1100 mm	1275 mm	1450 mm	1650 mm
	WL 2500	900 mm	1025 mm	1150 mm	1275 mm
	WL 3000	800 mm	900 mm	1000 mm	1100 mm



Only the worst case with secured values and application ranges must serve as a basis.

EXPLANATIONS ON THE PRODUCT LABEL

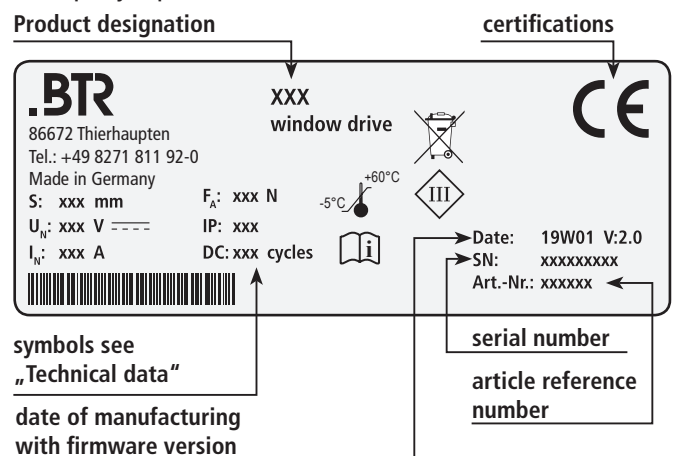
The product label provides information on the most important characteristics, such as:

- manufacturer's address
- article reference number and name
- technical characteristics
- date of manufacturing with firmware version
- serial number
- certifications

NOTE Never install and operate damaged products.

In the event of any complaints, please indicate the product serial number (SN) (see product label).

Exemplary representation



INSTALLATION STEP 1: INSPECTION BEFORE THE INSTALLATION



WARNING

Important instructions for a safe installation. Observe all instructions, wrong installation may result in serious injury!

Storage of drives at the construction site

Protective measures against damages, dust, moisture or contamination shall be taken. Store drives intermediately only in dry and well ventilated rooms.

Inspection of drives before installation

Check drives and window before installation for good mechanical condition and completeness. The chains / spindles of the drives must be extendable or retractable easily. The casement must run smoothly and the weight must be in balance.

The test procedure of drives may only be performed on a non-slip and secured mat or a test fixture. During the test run the test element must not be interfered with. The test may only be conducted by or under the supervision of expert personnel.

For testing chain drives the chain must be extended and retracted at an angle of approx. 90°. The spindle tubes of spindle drives in round housing tubes must be secured against independent spinning before starting the test to avoid deviations in the integrated position encoder.

Inspection of the intended use

The planned use of the drive must be checked for compliance with its intended use. If used otherwise the liability and warranty claim expires.

Predictable misuse

It is imperative that foreseeable misuse of drives is avoided! Here are a few examples:

- do not connect 24 V DC drives to a 230 V AC mains voltage,
- observe synchronous run and sequence control by drives with multiple interconnection (if existing),
- use drives only indoors,
- avoid additional force influences, e.g. transverse forces.

Testing mechanical requirements

Prior to the start of the installation check whether :

- the support surface and the profile static for the load transmission is sufficient,
- a support construction for the secure fastening of the drives is required,
- cold bridges (thermal separation) are avoidable at action points,
- there is sufficient space for the swivel movement of the drive.

If not, counter measures must be taken!



The support surface of the frame brackets or casement brackets must rest completely on the window or frame profile. There must be no tilting of the fastening elements during extension and retraction of the drives. A safe and solid fastening must be ensured at the window profile.



CAUTION

It is imperative that the sufficiently mechanical stiffness of the fastener type as well as of the swivel range of the drive is observed.

If this is not guaranteed another type of fastening or another type of drive must be selected.

INSTALLATION STEP 2: INSTALLATION PREREQUISITE AND INSTALLATION PREPARATION

The following conditions must be fulfilled for the installation of the drives so they can be properly assembled with other parts and constructed to a complete machine at the window without impairing the safety and health of persons:

1. The design of the drive must fulfill the requirements.
2. The fastening accessories (casement brackets or frame brackets) must fit the window profile; the profile-dependent hole lay-out must be complied with.
3. The space required for the installation of the drive on the frame and casement profile must be sufficient.
4. The window must be in perfect mechanical condition before the installation. It should open and close easily.
5. The fastening material for the installation of the drive must fit the window material (see table).

Wood windows	Wood screws: i.e. DIN 96, DIN 7996, DIN 571 round head with slot, round head with cross, hex head, special type	
steel, stainless steel, aluminum windows	Self-tapping screws, thread screws, sheet-metal screws i.e. ISO 4762, ISO 4017, ISO 7049, ISO 7085, DIN 7500 cylinder head with hex socket, internal serration (Torx), Phillips head or external hex head blind rivet nut	
plastic windows	Screws for plastic i.e. DIN 95606, DIN 95607, ISO 7049, ISO 7085, DIN 7500 round head with cross, external hex head, Torx	Recommendation: if possible, screw through two cavity webs

Tools required

- Marker
- Grains
- Hammer
- Screwdriver (slotted-head, cross or Torx) size by site conditions
- Hexagonal wrench (inside) size 3 / 4 / 5 / 6
- Torque wrench
- Power drill
- Threadlock adhesive
- possibly a tool for blind rivet nuts (size 6)

Check window data on site

- Measure FAB and FAH.
- Check / calculate weight of casement.
If unknown, it can be determined approximately with the following formula:

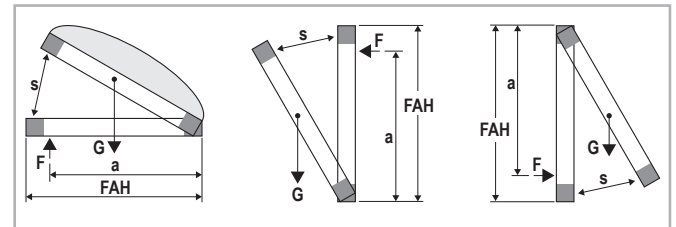
$$G \text{ (Casement weight) [kg]} = \frac{FAB \text{ [m]} \cdot FAH \text{ [m]} \cdot \text{Glass thickness [mm]} \cdot 2,5 \cdot 1,1}{\text{glass-density} \cdot \text{frame share}}$$

- Check / calculate the required drive force and compare with drive data. If unknown, it can be determined approximately with the following formula:

$$F \text{ [N]} = \frac{5,4 \cdot G \text{ [kg]} \cdot s \text{ [m]}}{a \text{ [m]}} \quad \text{Facade}$$

$$F \text{ [N]} = \frac{5,4 \cdot G \text{ [kg]} \cdot FAH \text{ [m]}}{a \text{ [m]}} \quad \text{Roof}$$

- a = Distance of action point to hinges
- F = Drive force
- s = Stroke



Scope of delivery:

Prior to assembly, check items quantity in the delivery for completeness.

Accessories: Locking drive BDL Uni	
	Assembly Instruction
	2x Cover caps
	1x Warning sign sticker „Risk of entrapment“

INSTALLATION STEP 3: ON-SITE ASSEMBLY AT COUPLING ADAPTER

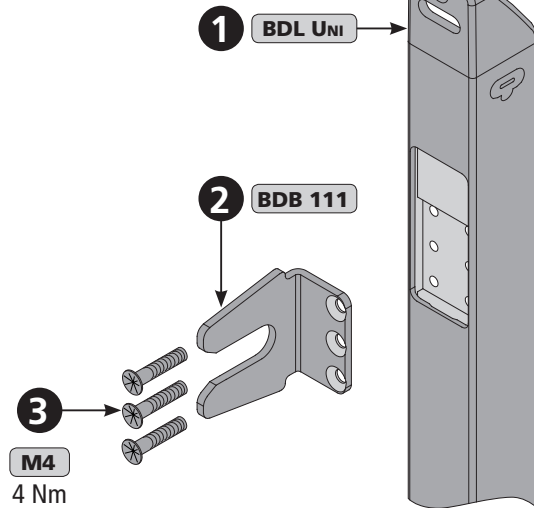
- Mount the coupling adapter **BDB 109 / BDB 110 / BDB 111** ② - according to on-site conditions:
- Use the supplied countersunk screws ③ to fix the coupling adapter ② on the locking drive **BDL Uni** ①.
- Firmly tighten with countersunk screws ③ (4 Nm).

NOTE

Application examples see chapter: „INSTALLATION STEP 7 - HOLE LAYOUTS“.

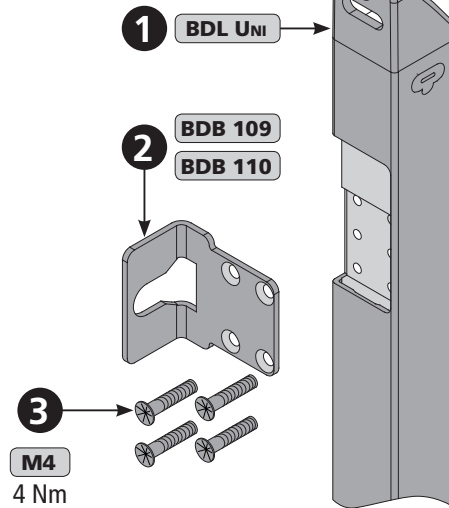
On-site assembly of the coupling adapter

BDB 111



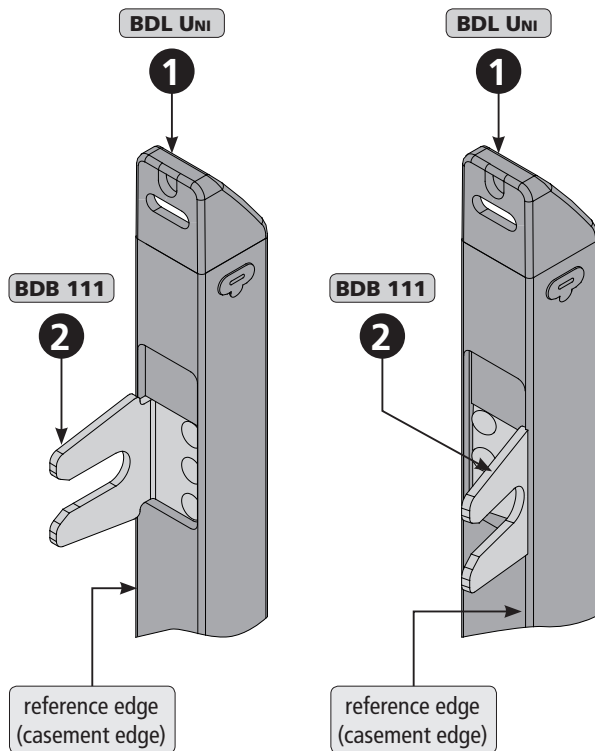
BDB 109

BDB 110



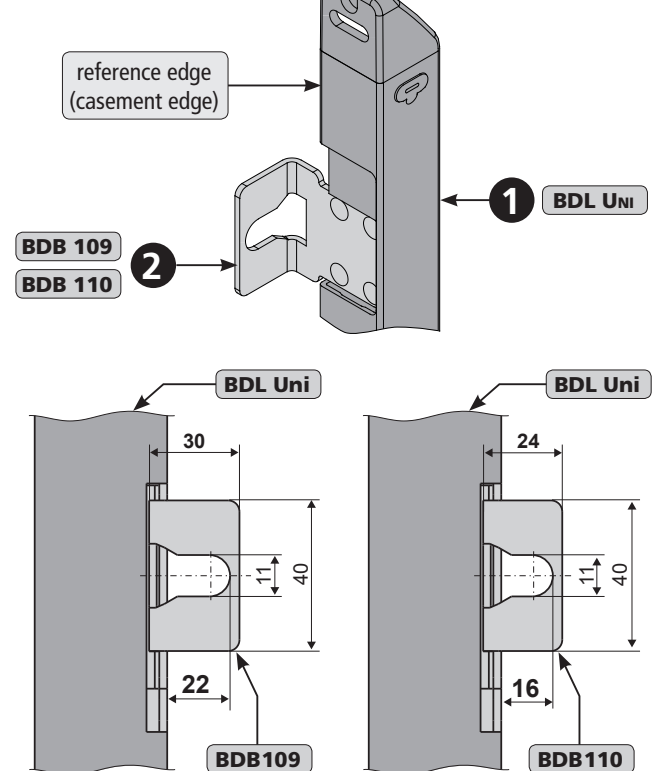
Mounting possibilities of the coupling adapter

BDB 111



BDB 109

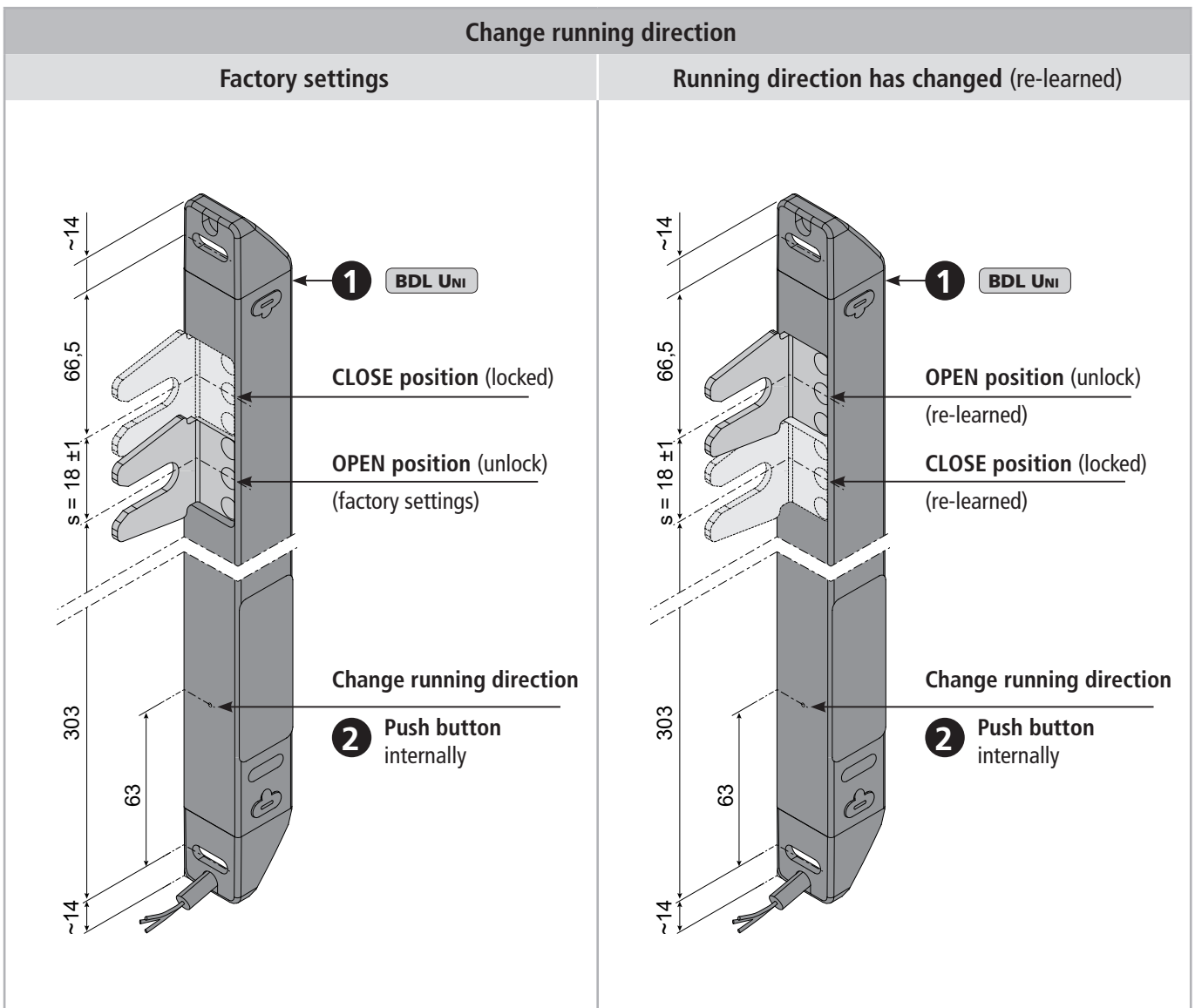
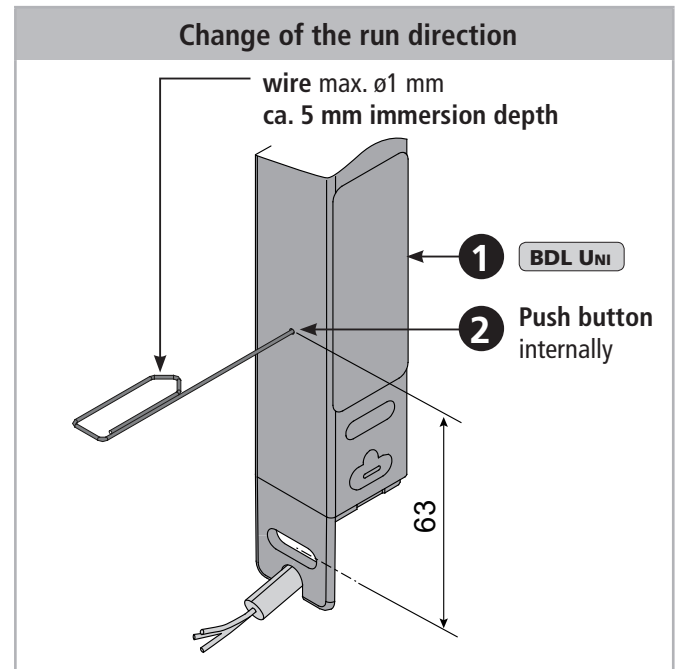
BDB 110



INSTALLATION STEP 4: CHANGE OF THE RUN DIRECTION

The push button ② in the locking drive **BDL Uni** ① is used to change the run direction.

- Make the connection for the control voltage at the not yet mounted locking drive **BDL Uni** ① (see chapter: „ELECTRIC CONNECTION“).
- To change the running direction, switch on the supply voltage in **CLOSE** direction.
- Using a wire (max. Ø 1mm) and press carefully the internally push button within the drilling ② (for about one second).
Now the locking drive **BDL Uni** automatically moves to the **changed CLOSE** position.



INSTALLATION STEP 5: ASSEMBLY OPENING DRIVE

- Mount opening drive (see separate „Assembly and Commissioning Instructions“ for each drive).
- Make the connection for the control voltage to the opening drive (see chapter: „ELECTRIC CONNECTION“).



The opening drives **must have** an integrated disconnection and / or an electronic overload disconnection.

INSTALLATION STEP 6: TEST RUN BEFORE ASSEMBLY

The opening drive and the not mounted locking drive **BDL Uni** must be tested **separately**.

Test run: Opening drive

- **Switch on the control voltage** at the opening drive.
- Move opening drive in **CLOSE** direction.
- Move opening drive in **OPEN** direction and ensure the ease of movement of casement.
- Unhinge the opening drive.
- **Switch off the control voltage** from the opening drive.

Test run: Locking drive

- Make the connection for the control voltage to the not mounted locking drive **BDL Uni** (see chapter: „ELECTRIC CONNECTION“).



During **start-up** of locking drives **BDL Uni** the voltage may be switched on only:

- with opened casement
- unhinged opening drive

- **Switch on the control voltage** at locking drive **BDL Uni** - in **CLOSE** direction.
- Check whether the traverse path of the locking drive **BDL Uni** with the traverse path of the on-site locking bar moves synchronously.
- If necessary, change the run direction (see chapter: „CHANGE OF THE RUN DIRECTION“).
- Move locking drive **BDL Uni** in **OPEN** direction.
- **Switch off the control voltage** from the locking drive **BDL Uni**.
- Assemble the locking drives **BDL Uni** (see installation step 7 to 10).

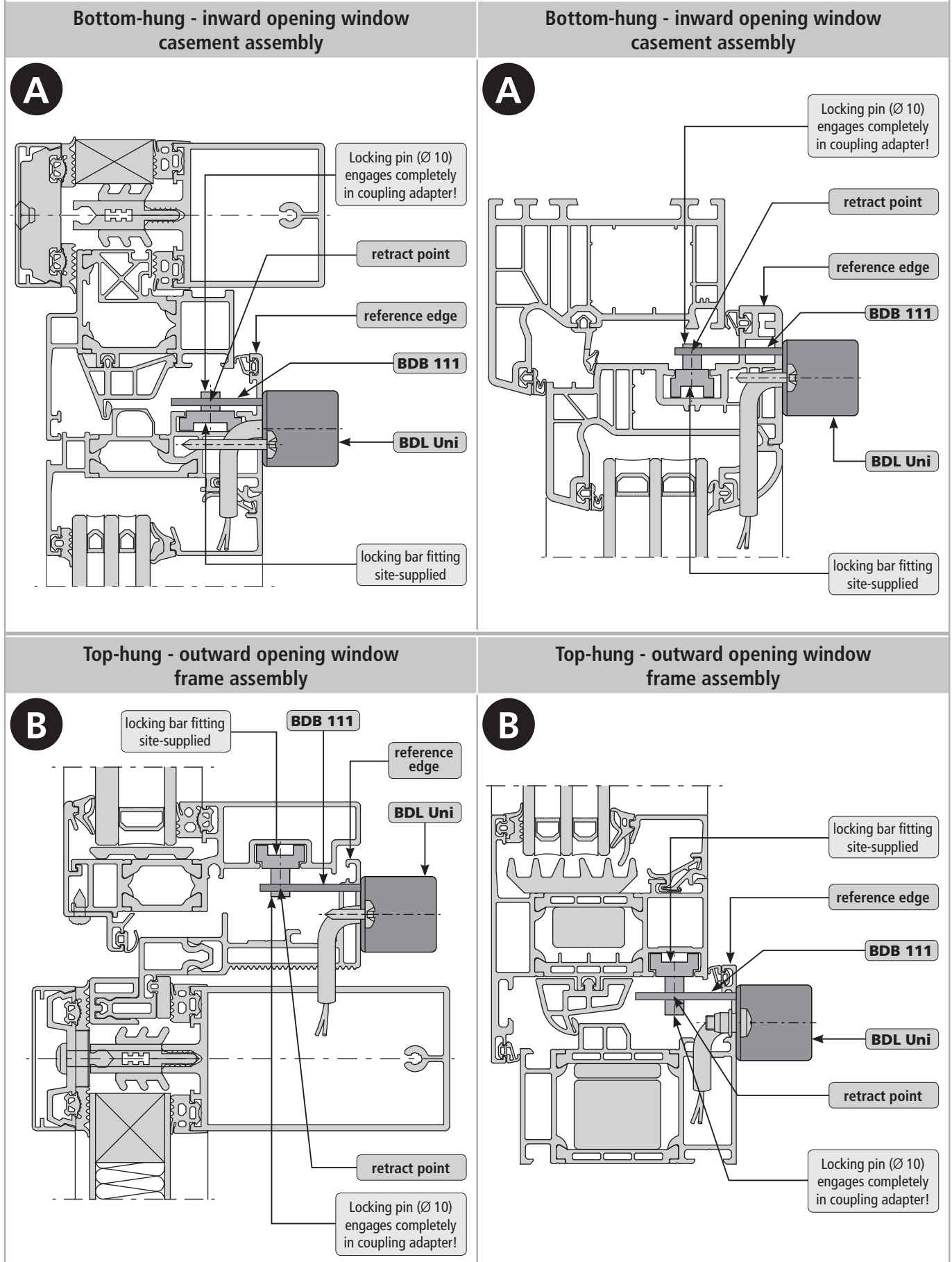
PREREQUISITE FOR SUBSEQUENT INSTALLATION STEPS



The window fitting is prepared by the customer for operation with the locking drive **BDL Uni** and the locking pin - for the coupling adapter - is in a suitable position mounted.

INSTALLATION STEP 7A: HOLE LAYOUTS FOR BDL UNI WITH BDB 111

Application examples

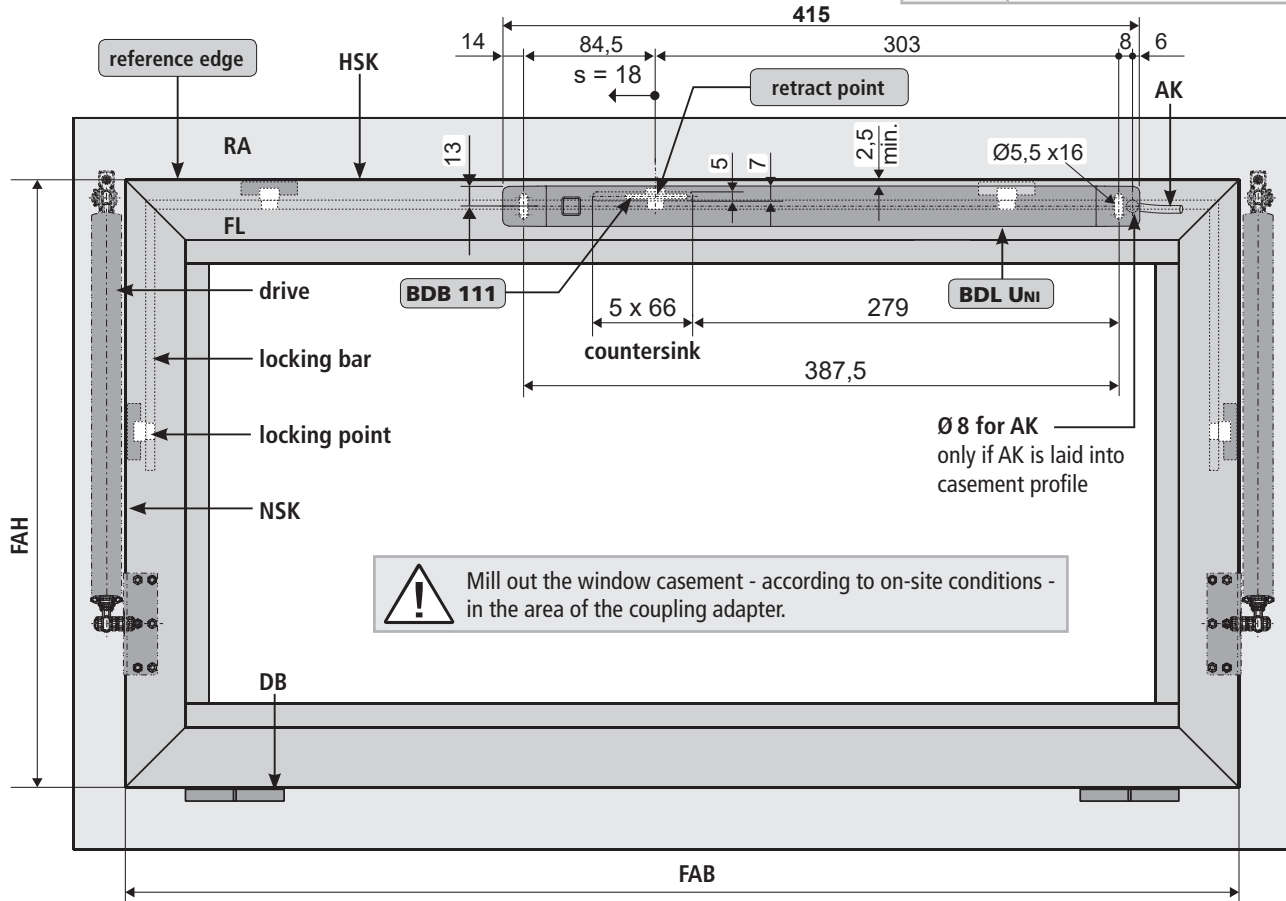


HOLE LAYOUTS FOR BDL UNI WITH BDB 111

Hole layout BDL Uni - casement assembly at the inward opening window - HSK

A See: **INSTALLATION STEP 9A**

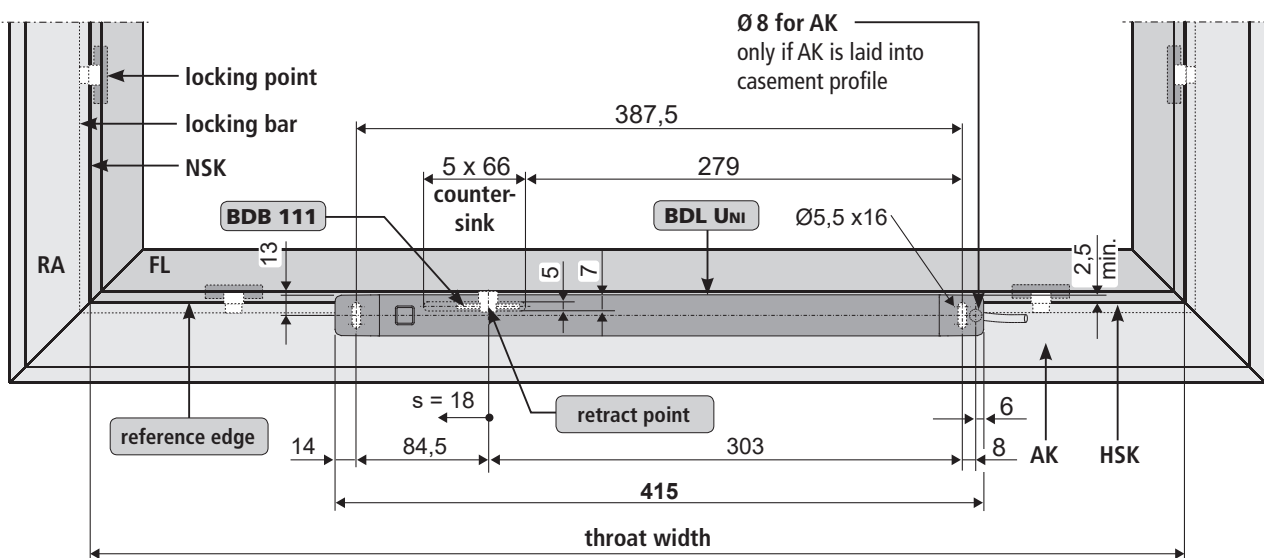
Window versions	Bottom-hung	- inward opening
	Top-hung	- inward opening
	Side-hung	- inward opening



Hole layout BDL Uni - frame assembly at the outward opening window - HSK

B See: **INSTALLATION STEP 9A**

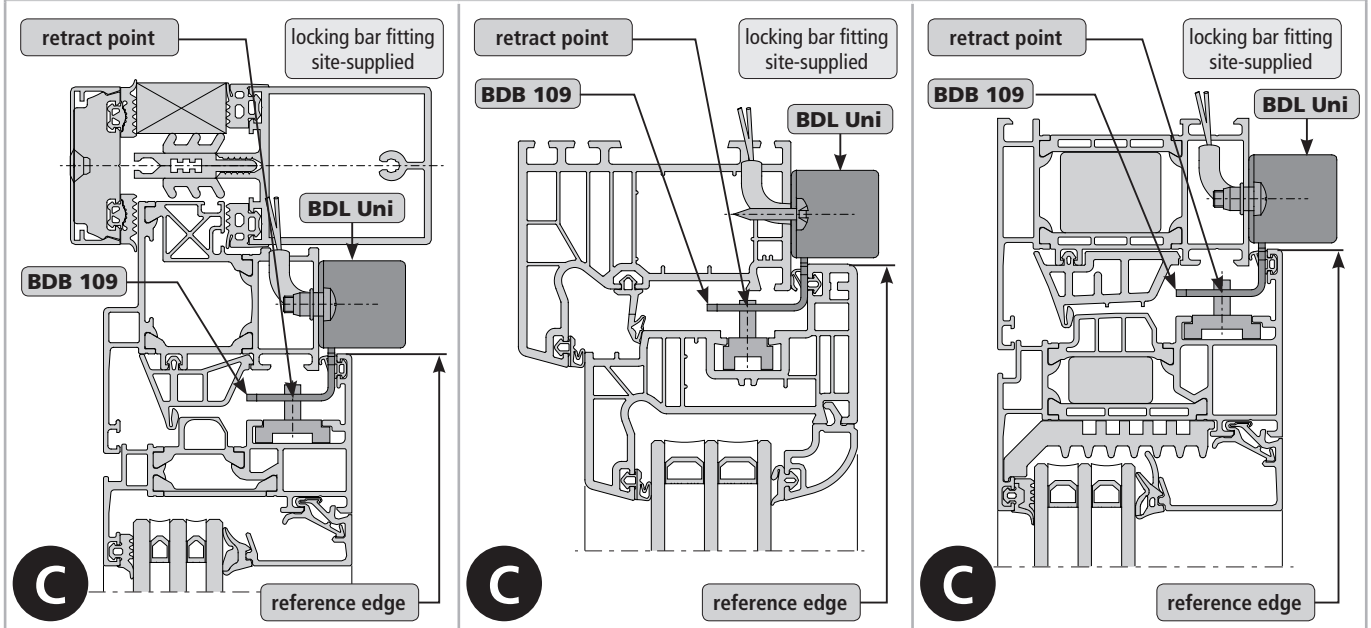
Window versions	Bottom-hung	- outward opening
	Top-hung	- outward opening
	Side-hung	- outward opening



INSTALLATION STEP 7B: HOLE LAYOUTS FOR BDL UNI WITH BDB 109 OR BDB 110

Application examples

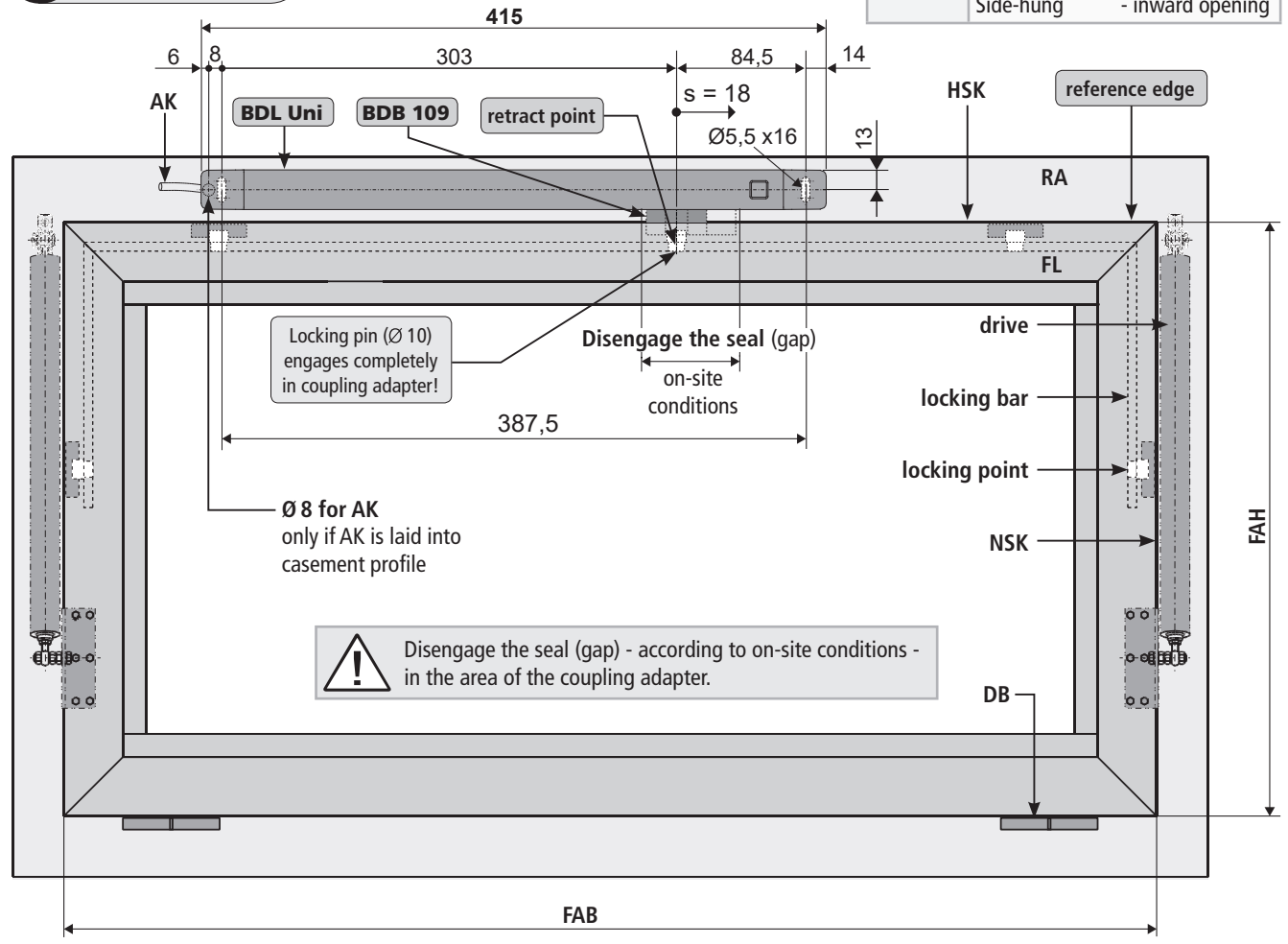
Bottom-hung - inward opening windows - frame assembly



Hole layout BDL Uni - frame assembly at the inward opening windows - HSK

C See: **INSTALLATION STEP 9B**

Window versions	Bottom-hung	- inward opening
	Top-hung	- inward opening
	Side-hung	- inward opening



INSTALLATION STEP 8A: DRILL HOLES ACCORDING TO MOUNTING VARIANTS

- Determine position of locking drive **BDL Uni** on the casement or on the frame.
- Determine locking direction. Possibly see the chapter "INSTALLATION STEP 4 - CHANGE OF THE RUN DIRECTION".
- Determine fastenings.
- Produce drill holes with appropriate cross-section. For the mounting dimensions please refer to the above-mentioned hole layout drawings (see chapter "INSTALLATION STEP 7" or project-specific documents and drawings).

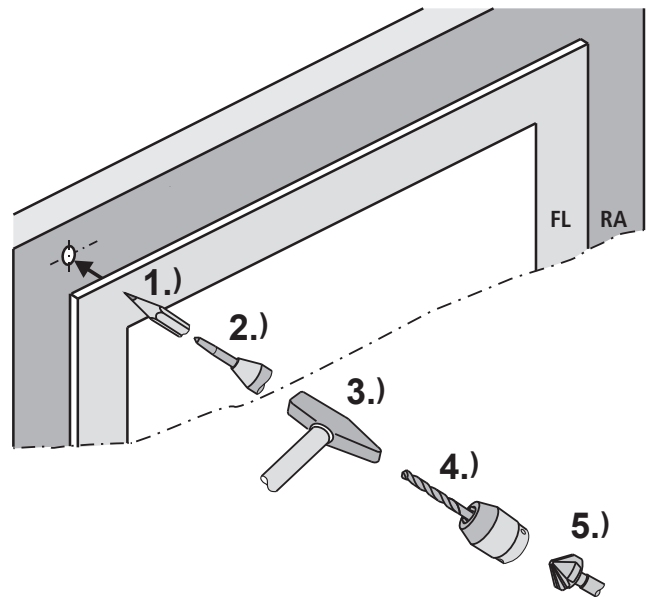
NOTE

Pay attention to the position "retract point of the locking pin" in the coupling adapter!

NOTE

If necessary, make a countersink (free space) for the coupling adapter. See the next assembly installation steps.

- Secure fasteners against loosening; i. e. by applying removable thread-locking compound such as "Loctite".



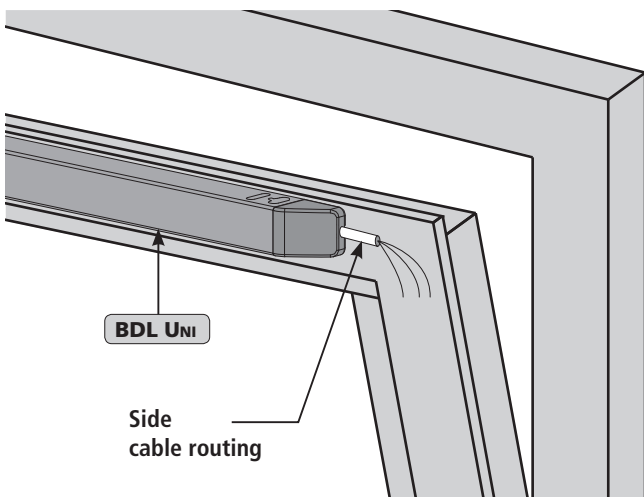
Carefully clear away drilling swarfs to prevent seals from being damaged. Avoid surface scratches, for example by using masking tape.

INSTALLATION STEP 8B: SIDE CABLE ROUTING (CABLE OUTPUT)

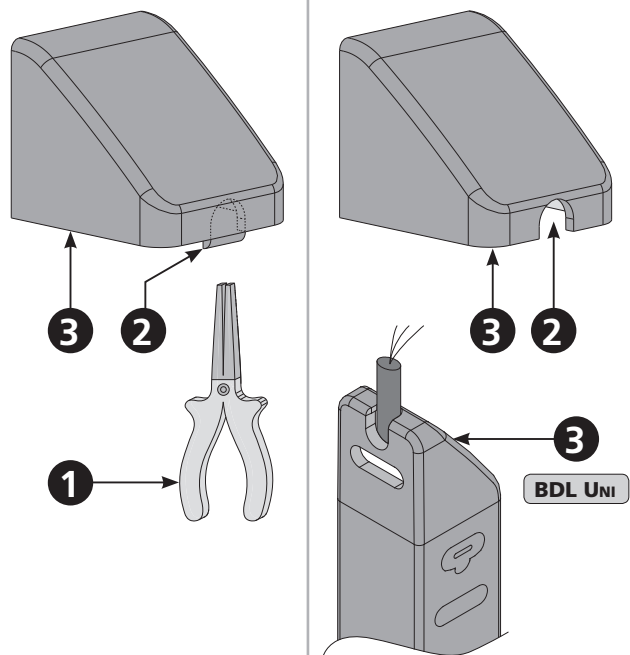
NOTE

For side cable routing, the cover cap **3** has a pre-punched opening.

- Using flat nose pliers **1**, remove the pre-punched opening **2** from the cover cap **3** and then deburr.



Remove pre-punched opening



INSTALLATION STEP 9A: BDL Uni + BDB 111 - CASEMENT ASSEMBLY - INWARD OPENING

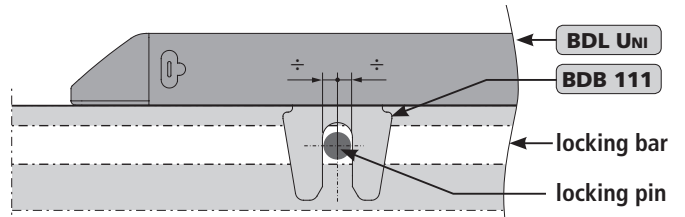
■ Ensure free space (countersink) in the area of the locking bar (catch) according to the window profile and the actual stroke of the window bar.



Ensure that the locking bar and the coupling adapter moves freely.



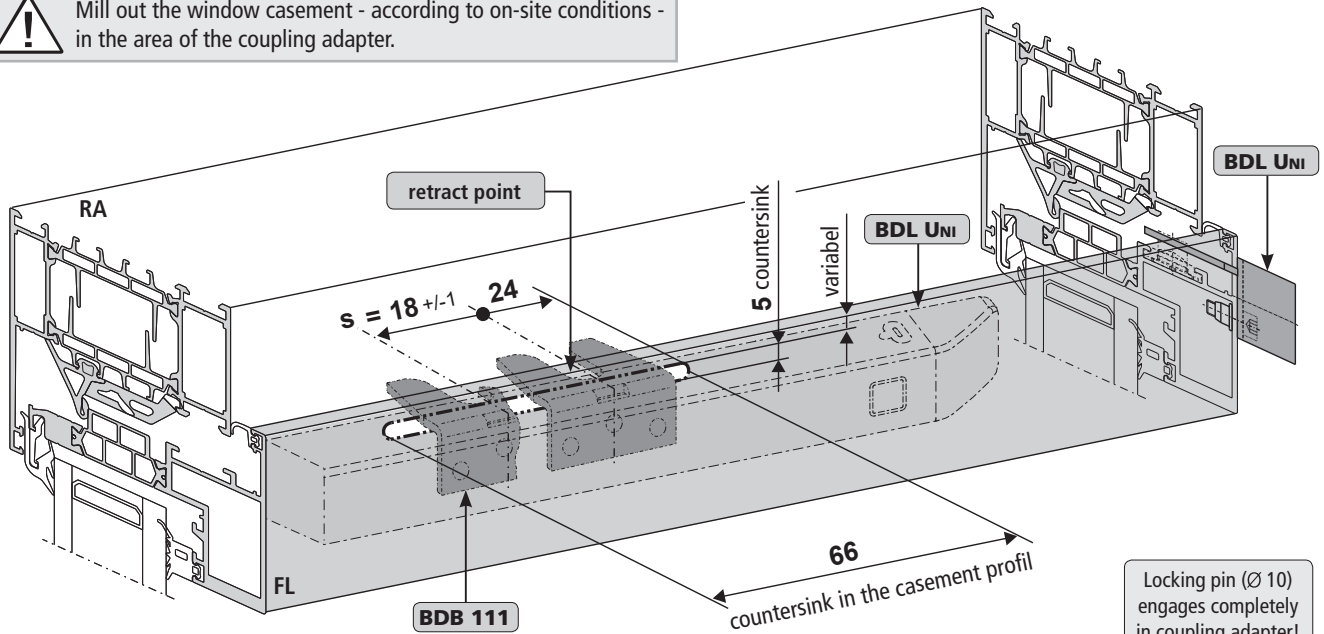
The locking pin (Ø10 mm) of the locking bar must be centered in the mounting slot of the coupling adapter **BDB 111** from the locking drive **BDL Uni**. Maybe adjust the locking pin.



Position of the locking drive BDL Uni - application example



Mill out the window casement - according to on-site conditions - in the area of the coupling adapter.

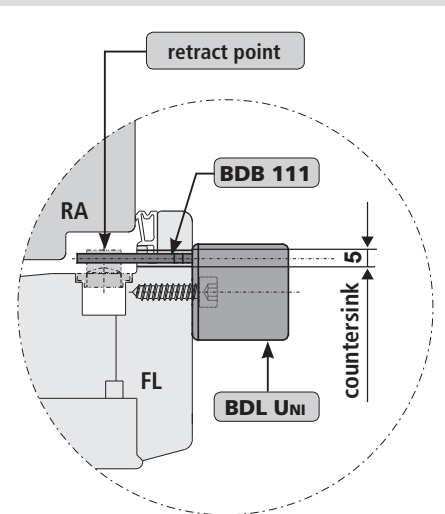
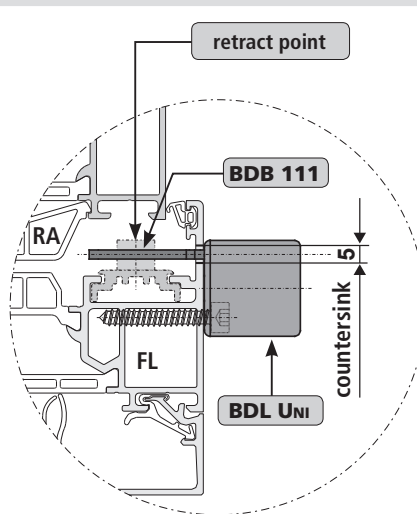
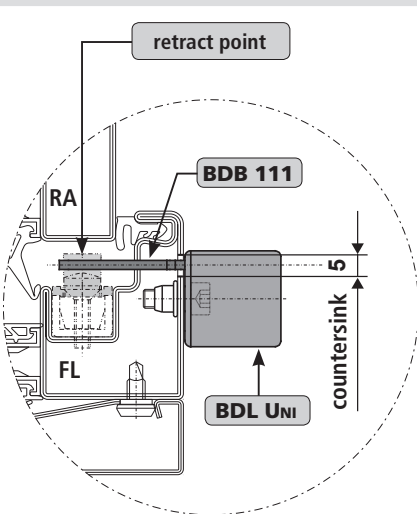


Countersink for BDL Uni - application example

steel window

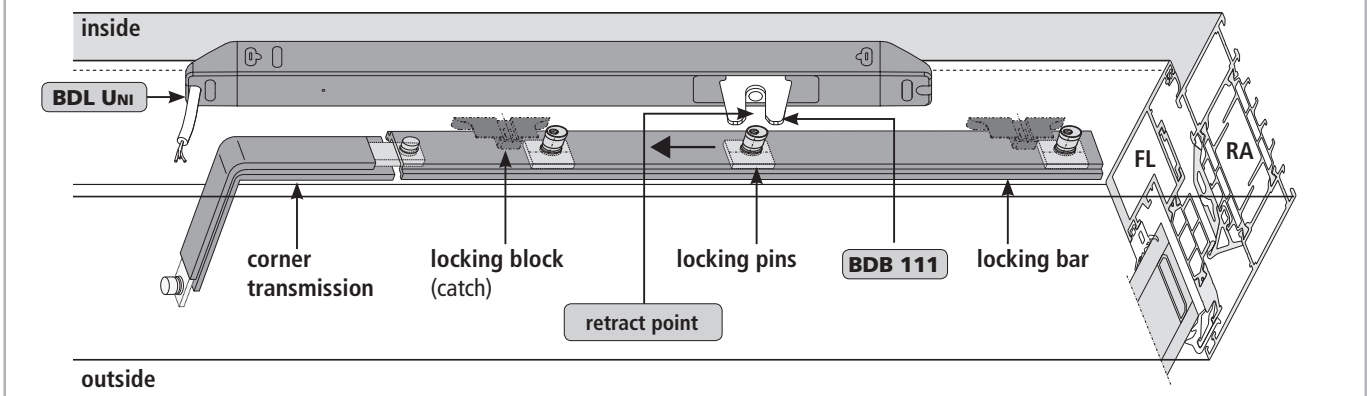
aluminium window

wood window



Mill out the window casement - according to on-site conditions - in the area of the coupling adapter.

Stroke control: Locking drive BDL Uni and locking bar fitting

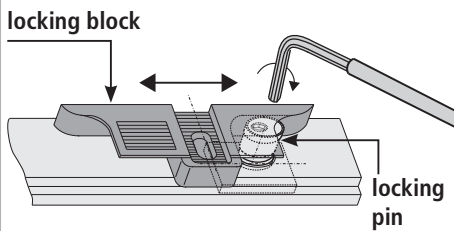


- Screw locking drive **BDL Uni** onto casement frame (M5).



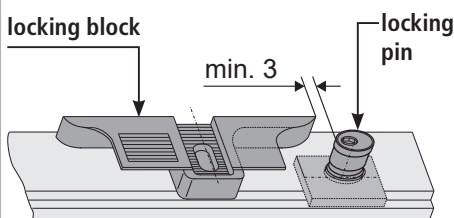
Make sure they are parallel to casement edge. The drive body must lie completely flush on the casement frame surface.

Locking block: locked



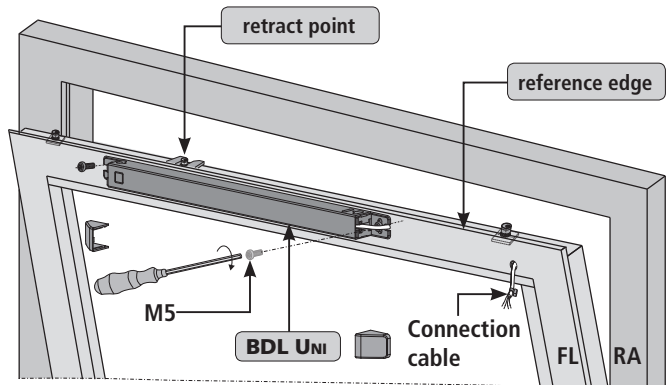
The locking pin should completely move into the locking block when locking.

Locking block: unlocked

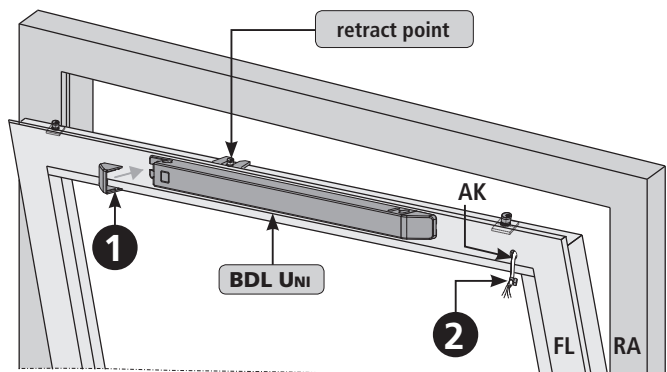


The locking pin should completely move out of the locking block when unlocking.

- Check whether the traverse path of the locking drive **BDL Uni** with the traverse path of the on-site locking bar moves synchronously.
- Adjust locking block and locking pin on-site-supplied fittings.



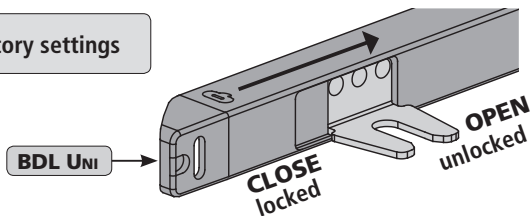
- Depending on the conditions on-site, prepare the connection cable (**AK**) for installation (see chapter „CABLE ROUTING“).
- Put the cover cap **1** on the locking drive **BDL Uni**.
- Pay attention to a strain relief **2** of the cable.



Check function! (see chapter „SAFETY CHECK AND TEST RUN“).

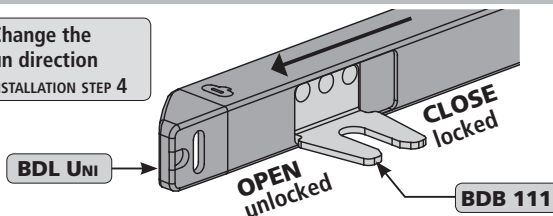
Locking drive in **CLOSE** (locked)

Factory settings



Locking drive in **OPEN** (unlocked)

Change the run direction see INSTALLATION STEP 4



INSTALLATION STEP 9B: BDL Uni + BDB 109 - FRAME ASSEMBLY - INWARD OPENING

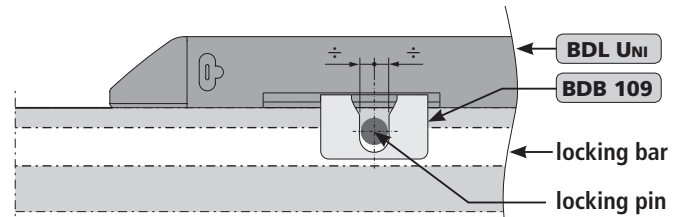
■ Ensure free space (countersink) in the area of the locking bar (catch) according to the window profile and the actual stroke of the window bar.



The locking pin (Ø10 mm) of the locking bar must be centered in the mounting slot of the coupling adapter **BDB 109** / **BDB 110** from the locking drive **BDL Uni**. Maybe adjust the locking pin.



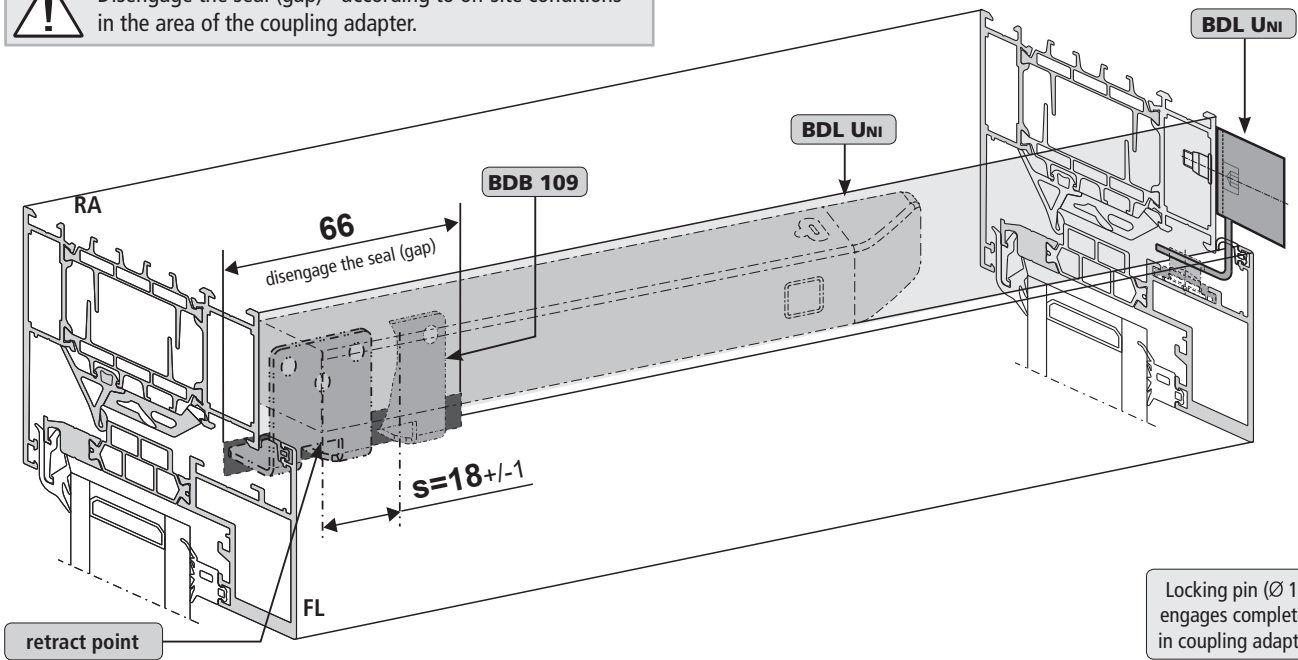
Ensure that the locking bar and the coupling adapter moves freely.



Position of the locking drive BDL Uni - application example



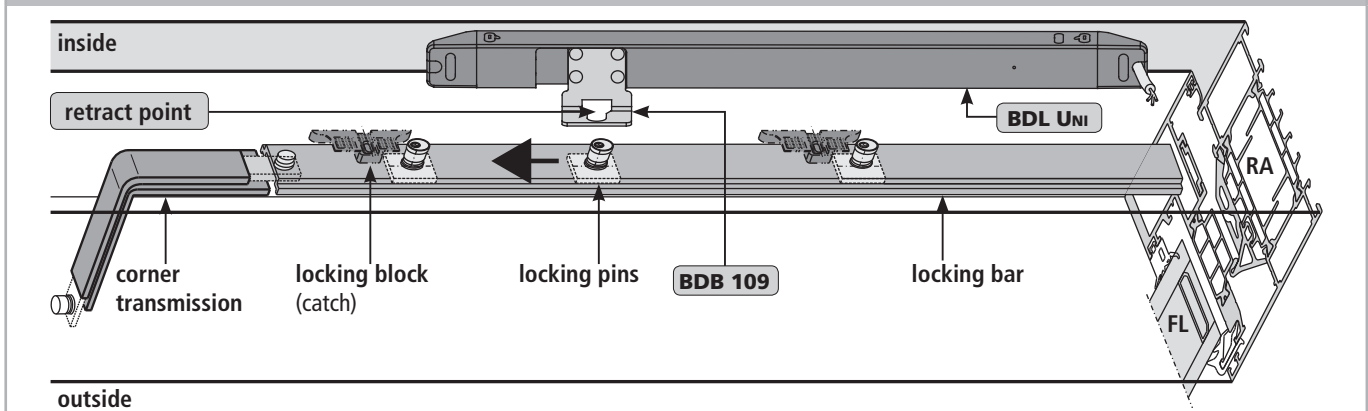
Disengage the seal (gap) - according to on-site conditions - in the area of the coupling adapter.



Disengage the seal (gap) for BDL Uni - application example

steel window	aluminium window	PVC window	wood window

Stroke control: Locking drive BDL Uni and locking bar fitting



- Screw locking drive **BDL Uni** onto casement frame (M5).

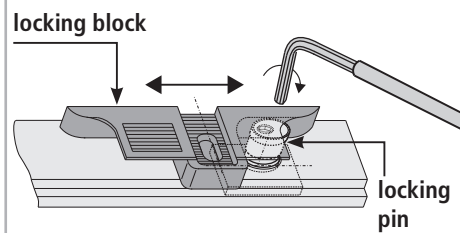


Make sure they are parallel to casement edge. The drive body must lie completely flush on the casement frame surface.

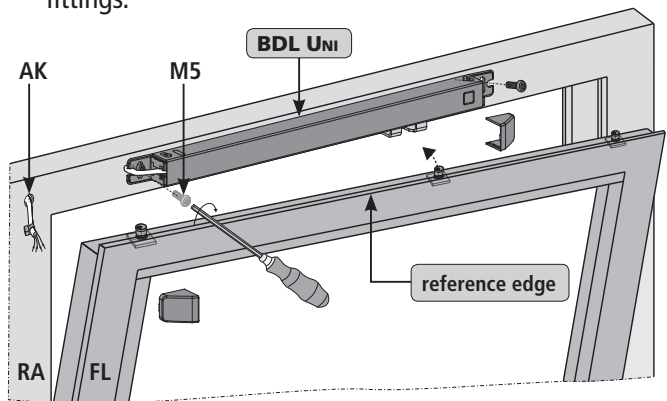
- Check whether the traverse path of the locking drive **BDL Uni** with the traverse path of the on-site locking bar moves synchronously.

- Adjust locking block and locking pin on-site-supplied fittings.

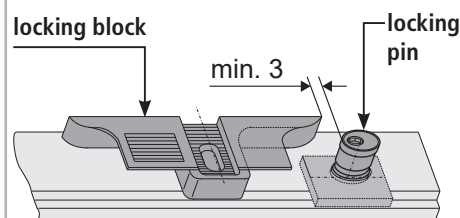
Locking block: locked



The locking pin should completely move into the locking block when locking.



Locking block: unlocked

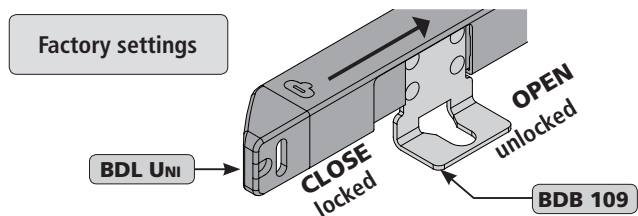


The locking pin should completely move out of the locking block when unlocking.

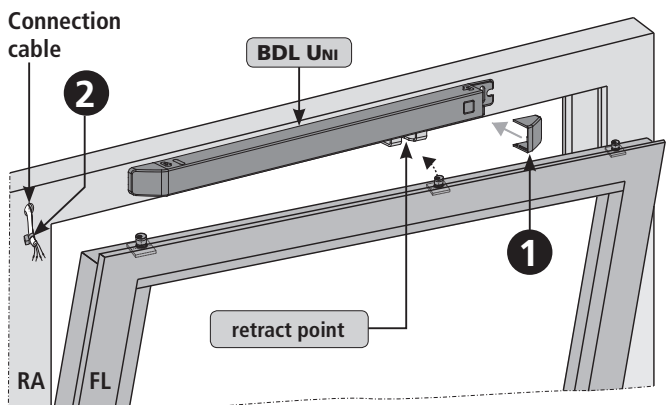
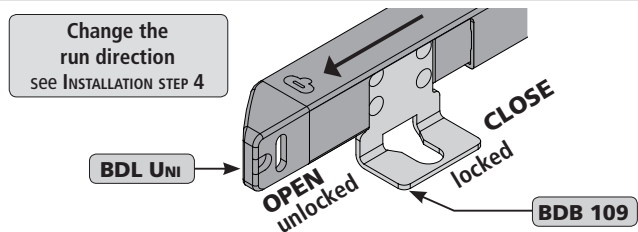
- Depending on the conditions on-site, prepare the connection cable (**AK**) for installation (see chapter „CABLE ROUTING“).

- Put the cover cap **1** on the locking drive **BDL Uni**.
- Pay attention to a strain relief **2** of the cable.

Locking drive in **CLOSE** (locked)



Locking drive in **OPEN** (unlocked)



Check function! (see chapter „SAFETY CHECK AND TEST RUN“).

Installation step 10: CHANGE THE CONNECTION CABLE (REMOVE COVER CAPS)

Remove cover caps

In case of cable break or on-site conditions, a cable change may be necessary.

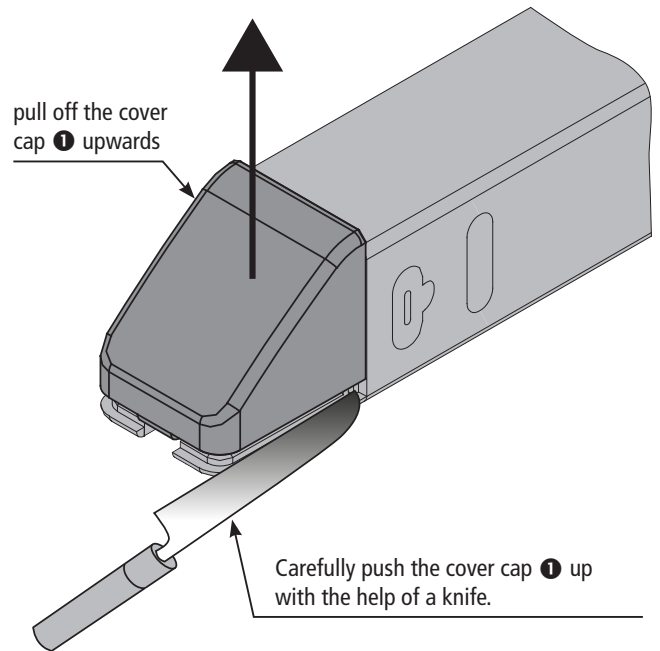
- Therefore remove the cover cap ❶ from the locking drive **BDL Uni** - as described below:
- Pull off the cover cap ❶ upwards.
Simultaneously release the cover cap ❶ from the locking drive **BDL Uni** with a knife or screwdriver.

NOTE

In order to protect the cover cap ❶ from loss or improper use, it is firmly engaged on the locking drive **BDL Uni**.



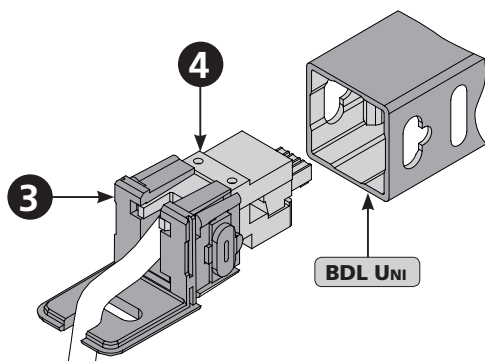
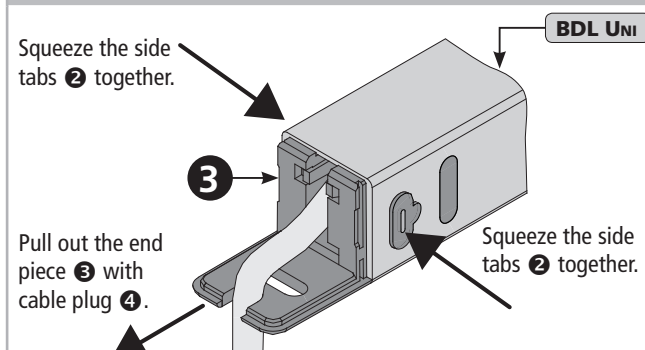
If the force is applied too much, the snap-in hooks of the cover cap ❶ will be destroyed!



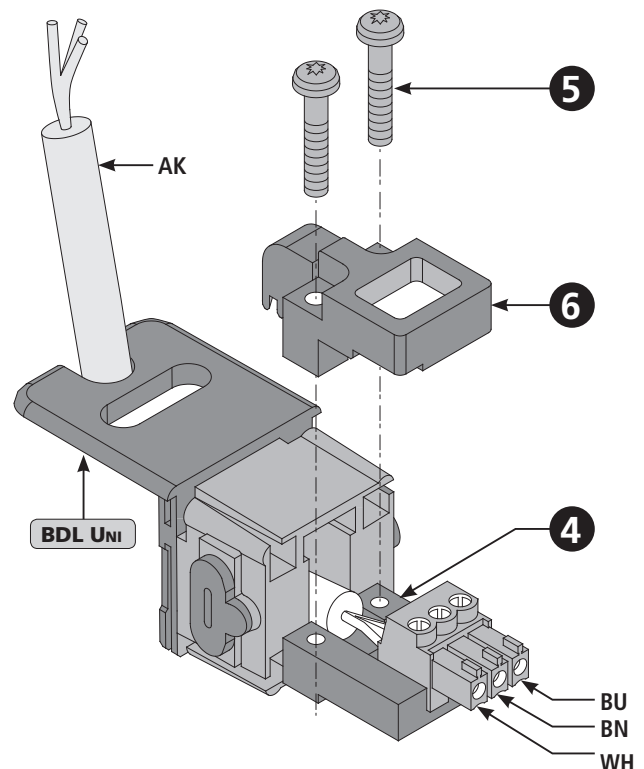
Change the connecting cable

- Press the two side straps ❷ together.
At the same time pull out the end piece ❸ and the cable plug ❹ from the locking drive **BDL Uni**.

Dismantle the end-piece and the cable plug



- Loosen the two screws ❺.
- Remove the upper part ❹ from the cable plug ❸.
- Replace connecting cable by on-site customer connection cable.



Connection assignment

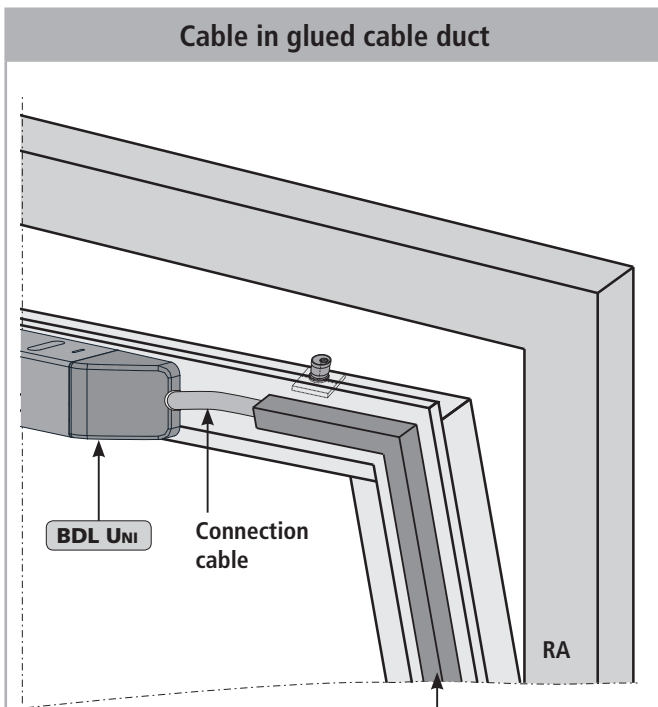
Function	Finish	DIN IEC 757
OPEN / CLOSE	blue	BU
OPEN / CLOSE	brown	BN
Data	white	WH

NOTE

Reassemble the locking drive **BDL Uni**. This assembly is done in reverse order as just described.

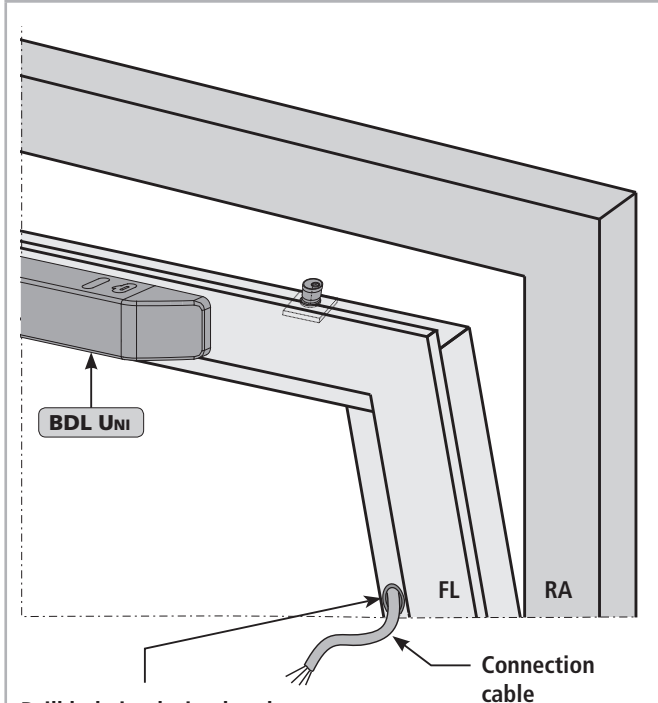
INSTALLATION STEP 11: CABLE ROUTING

Cable routing at the window casement



Cable duct glued on
(in addition secured with countersunk screws against breaking away).

Cable in glazing bead



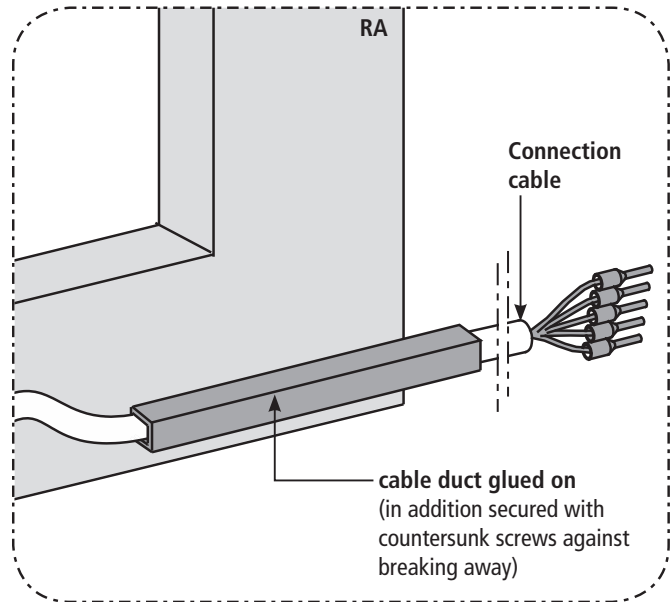
Drill hole in glazing bead
(cable bushing protects against damage to cable).

Connection cable routing on the window casement:

- Cable must be protected against damage (shearing-off, kinking, splitting), i.e. by using cable hose.

Cable routing at the window frame

- Route cable on the frame or mullion/transom. Cable must be protected against damage (shearing-off, kinking, splitting).

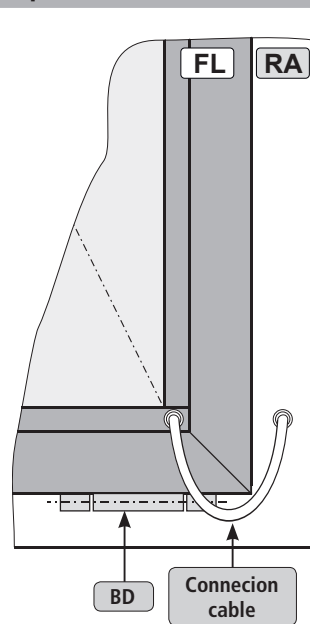


cable duct glued on
(in addition secured with countersunk screws against breaking away)

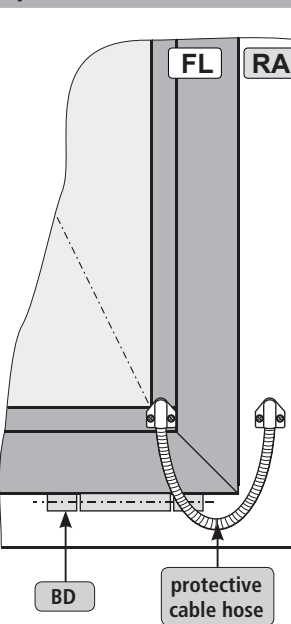


Upon removal of the glazing bead is the danger that the glass may fall.

Cable crossover without protective cable hose



Cable crossover with protective cable hose



Connection cable routing on the hinge side:

- Make sure that during opening or closing procedure the cable will not be damaged by shearing-off, kinking, crushing.
- Protect cable feedthrough in profile e.g. by using cable bushings, cable transitions.

INSTALLATION STEP 12: ELECTRIC CONNECTION



Make sure when establishing the connection that there is no voltage at the terminals! Unused wires must be safely insulated!



No voltage on white wires (WH) - drives can be damaged!

Wire colour coding	
Colour	DIN IEC 757
white	WH
brown	BN
blue	BU
green	GN
violet	VT
grey	GY

Direction of travel	
OPEN	↑
CLOSE	↓
Polarity reversal	
+	↑
-	↓

Connection assignment

Opening drive	Locking drive																		
<table border="1" style="margin-left: 20px;"> <tr> <td></td> <td>↑</td> <td>↓</td> </tr> <tr> <td>BN</td> <td>+</td> <td>-</td> </tr> <tr> <td>BU</td> <td>-</td> <td>+</td> </tr> </table> <p>WH is used for communication, with synchronized multi-drive operation) Version Z: Contact max. 24 V, 500 mA (min. 10mA)</p>		↑	↓	BN	+	-	BU	-	+	<table border="1" style="margin-left: 20px;"> <tr> <td></td> <td>↑</td> <td>↓</td> </tr> <tr> <td>BN</td> <td>+</td> <td>-</td> </tr> <tr> <td>BU</td> <td>-</td> <td>+</td> </tr> </table> <p>WH is used for communication, with synchronized multi-drive operation)</p>		↑	↓	BN	+	-	BU	-	+
	↑	↓																	
BN	+	-																	
BU	-	+																	
	↑	↓																	
BN	+	-																	
BU	-	+																	

Multi-drive operation:

Opening drive is done by **master / slave**

The programming of the drives in multi-drive occurs at factory.

WH: is used for communication, with synchronized multi-drive operation. **WH** connection, otherwise no function.

Optional: to 4 drives and max. 2 locking drives are possible.

INSTALLATION STEP 13: SUPPLY LINES OF CONTROL UNIT TO THE DRIVES

Observe current regulations and guidelines regarding the "Fire behavior of building materials-circuit integrity maintenance of electric cable systems" (E30, E60, E90) and the prescribed constructional regulations!

RECOMMENDATION For safety reasons a cable of the next higher wire cross section should be selected.

Formula to calculate

the required wire cross-section of a supply line

24V

$$A \text{ mm}^2 = \frac{I_{A \text{ (total)}} * L_{m \text{ (length supply line)}} * 2}{2,0V_{\text{ (voltage drop)}} * 56 \text{ m} / (\Omega * \text{mm}^2)}$$

Calculation example

Available data:

- cut-off current per drive (i. e. 2 x 4.0A) from data sheet
- length to be bridged from the last window to the control unit (i. e. 10 meters)

$$A = \frac{(2 * 4,0A) * 10m * 2}{2,0V * 56m / (\Omega * \text{mm}^2)}$$

$$A = 1,42\text{mm}^2 \rightarrow 1,5\text{mm}^2 \text{ chosen}$$

Laying and connecting the drive cable

- Avoid extreme temperature differences in the installation area (danger of condensation).
- Set clamping point close to window and ensure accessibility.
- Ensure expansion possibilities of the drive and the drive cable.
- Consider the cable length and the cross sections of the drives supply lines.

INSTALLATION STEP 14: SAFETY CHECK AND TEST RUN

Check the mounted system for its safety; perform test run and commissioning.

Safety test:

- Connect operating voltage.
- Check fastening (frame brackets, casement brackets) for firm fit or tightening.

Test run:

- Visual inspection of casement movements.
- Stop immediately by malfunction!
- Pay attention to collision with facade construction and correct installation, if required.

Risk evaluation:

Before operating a power-operated window to which window drives were mounted, which were sold by the manufacturer as incomplete machines according to installation declaration, the possible risk to ahazard of persons must be determined, evaluated and minimized by taking appropriate technical measures in accordance with the Machinery Directive. Separate documents for performing a risk assessment can be downloaded from the homepage of

Firm BTR GmbH
(www.btr-hamburg.de).

Operation of the power-operated window

When operating the power-operated window safety instructions must be observed, specifically those pertaining to commissioning, operation and maintenance.

HELP IN CASE OF MALFUNCTIONS, REPAIRS AND MAINTENANCE

Professional repair of a defect drive can only be performed at the manufacturer's factory or manufacturer-certified specialist company. Unauthorized opening or manipulation of the drive terminates warranty.

1. Exchange defect drives or have them repaired by the manufacturer.
2. In case of problems during installation or normal operation the following table might be useful:

Problem	Possible causes	Possible solutions
Locking drive does not start	<ul style="list-style-type: none"> • Duration of mains power supply too short • Drive run direction from the opening drive is not correct • Connecting cable not connected 	<ul style="list-style-type: none"> • Adjust supply voltage as specified in the technical documentation • Check drive cables change polarity • Check all connection cables

MAINTENANCE AND MODIFICATION

To ensure continuous function and safety of the drive periodic maintenance by a specialist company is required at least once a year (as mandated by law and recommended by manufacturer). Operational readiness must be checked regularly. Frequent inspection of the system for imbalance and signs of wear or damages of cables and fastening elements must be performed.

During maintenance contaminations must be removed from the drive. Fastenings and clamping screws must be checked for tightness. Test runs during the opening and closing procedure of the devices must be performed.

The drive itself is maintenance-free. Defect devices may only be repaired in our factory. Only spare parts of the manufacturer may be used. When the connection cable of this device is damaged it must be replaced by the manufacturer or his customer service or a similarly qualified person to avoid endangerment.

It is recommended to conclude a maintenance contract. A sample maintenance contract can be downloaded from the homepage of

Firm BTR GmbH
(www.btr-hamburg.de).

While cleaning the windows, drives may not have direct contact with water or cleaning agents. Drives must be protected from dirt and dust during the construction phase or renovations.

Maintenance process

1. Open or extend power-operated casement completely.
2. Completely disconnect the system from the mains and secure it against automatic or manual activation.
3. Check windows and fittings for damages.
4. Check all mechanical fastenings (if required, observe information on torques in installation instructions).
5. Check electric drives for damages and contaminations.
6. Check connecting cables (drive cable) for:
 - tightness of the cable screw
 - functionality of the strain relief
 - damages
7. Check the mobility of hinges and fittings and re-adjust or apply lubricant, e.g. silicone spray (observe the instructions of the manufacturer of this window system).
8. Check peripheral seal, remove contaminations or replace.
9. Perform cleaning to maintain functionality (e.g. clean extending elements of the drive, such as chains or spindles by damp wiping them with acid or lye-free agents and drying them and, if required, lubricate them with cleansing oil e.g., Ballistol).
10. Turn on operating voltage.
11. Open and close the power-operated window via the operating voltage (functional test).
12. If available, check and re-adjust protection systems of the safe guard fixture.
13. Check the intactness of the CE label at the power-operated system.
14. Check the intactness of warning instructions and labels at the respective drive.
15. Perform a risk assessment in accordance with Machinery Directive 2006 / 42 / EG, if required, e.g. after modifying the machine.

DEMOUNTING

The drives are demounted by reversing the steps, as for the installation. The adjustments are omitted.

1. Completely disconnect the system from the power supply before demounting a drive.
2. After demounting a drive the window must be secured against independent opening.

Dispose of parts according to the locally applicable legal provisions.

DISPOSAL

According to the European Directive 2012/19 / EU on Waste Electrical and Electronic Equipment (WEEE) and its transposition into national law, obsolete electrical appliances must be collected separately and sent for environmentally friendly recycling.



LIABILITY

We reserve the right to change or discontinue products at any time without prior notice. Illustrations are subject to change. Although we take every care to ensure accuracy, we cannot accept liability for the content of this document.

WARRANTY AND CUSTOMER SERVICE

In principal apply our:

„General Terms for the Supply of Products and Services of the German Electrical Industry (ZVEI)“.

The warranty corresponds with legal provisions and applies to the country in which the product has been acquired.

The warranty includes material and manufacturing defects incurred during normal use.

The warranty period for delivered material is twelve months.

Warranty and liability claims for personal injuries or material damages are excluded, if caused by one or more of the following:

- No proper incoming goods inspection.
- Improper use of the product.
- Improper installation, commissioning, operation, maintenance or repair of the product.
- Operating the product by defect and improper installed or not functioning safety and protection devices.
- Ignoring instructions and installation requirements in these instructions.
- Unauthorized constructional modifications at the product or accessories.
- Disaster situations due to effects of foreign bodies and Acts of God.
- Wear and tear.

Contact persons for possible warranty claims, for spare parts or accessories are the employees of the responsible branch office or the responsible person at

Firm BTR GmbH.

Contact data are available at our homepage
(www.btr-hamburg.de)

CERTIFICATE AND DECLARATION OF CONFORMITY

We declare under our sole responsibility that the product described under "Data sheet" is in conformity with the following directives:

- 2014/30/EU
Directive relating to Electro-Magnetic Compatibility
- 2014/35/EU
Low voltage Directive



We further declare that the drive is an incomplete machine within the meaning of the European Machinery Directive (2006/45/EG).

Technical file and declaration at firm:

BTR GmbH
Gemeindewald 11
D-86672 Thierhaupten

Ramona Meinzer
Managing Director (Chairman)

NOTE:

The proof of the application of a quality management system is for company:

BTR GmbH

according to the certification basis **DIN EN 9001** as well the "Declaration of Incorporation and Conformity" can be accessed via the QR code or directly on our homepage:
(www.btr-hamburg.de)



THIS IS THE ORIGINAL INSTRUCTIONS FOR ASSEMBLY AND COMMISSIONING

Important note:

We are aware of our responsibility, which is why we present life-supporting and value-preserving products with greatest possible conscientiousness. Although we make every effort to ensure that the data and information are as correct and up-to-date as possible, we still cannot guarantee that they are free from mistakes and errors.

All information and data contained in this document are subject to alterations without prior notice.

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Offenders will be held liable for the payment of damages. All rights reserved in the case of a patent award or utility model registration.

Basically the General Terms and Conditions of **BTR GmbH** apply to all offers, supplies and services.

The publication of these assembly and commissioning instructions supersedes all previous editions.

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