



TECHNOLOGY IN MOTION

MACO RUSTICO

SHUTTER HARDWARE



CATALOGUE

	Installation on timber		Packer thickness
	Part number		Total length of fixing bolts
	Packing unit		Overall component width
	Reveal depth		Overall component length
	Discharge		Shutter distance through striker pin bracket
	Hinge crank		Shutter thickness
	Long sash-hinge total length		Crank opener overall length
	Pin distance (see Section 1.5!)		Length of crank arm
	Minimum pin depth (see Section 1.5!)		Offset
	Pin length		Distance between the shutters
	Shutter pin holder height		Frame clearance
	Shutter pin holder width		Number of slat supports
	Rawlplug total length		Distance
	Shutter pin socket diameter		Hinge size
	Locking hook height		Rebate size
	Distance to wall		Lining thickness
	Screw distance		Insulation thickness
	Screw distance to middle hinge Prima		
	Screw distance to middle hinge Prima		

- BLR** = Hardware range for frame installation
- MMV** = Hardware range in steel for wall/wall cladding
- MV** = Hardware range in Zamak for wall cladding installation
- PAD** = "Padovana" hardware range
- Pcs.** = Quantity
- var.** = variable



Dear MACO customer,

You are holding our new order catalogue in your hands. Our main aim was to present our product range in a simple and easy-to-understand manner in order to provide you with a practical working document. In addition to this catalogue, our package leaflet and assembly instructions will help you to process and install our products correctly. These are available to download from www.maco.eu.

Our products help to ensure that windows, doors and large-scale elements offer optimum function and security. As a premium manufacturer, that carries out its business according to the highest standards, the optimum quality and functionality of our hardware is our top priority. While we guarantee the best possible product characteristics for our hardware components, the responsibility for professional installation and correct fixing lies in your hands.

We want to support you, as a dealer or fabricator, with your responsibility for the safety of your products. Our binding assembly instructions and package leaflets provide information about the general use and processing of our hardware. To ensure the best fabrication and attachment of the hardware components – to suit the relevant installation situation, such as strength and profile design of the timber, arrangement of chambers and reinforcement in PVC profiles, etc., you can have elements tested and evaluated at our certified test centre: an air permeability and driving rain test as well as a pull-out test will help you to meet CE marking requirements. This means that you can rest assured that you are meeting all the standards and directives applicable to you.

You can find information about how to properly store our hardware components in the VHBH guideline of the Quality Assurance Association: Locks and Hardware (www.fvsb.de) or section Information on storage and transport of hardware components.

Important for dealers: MACO supplies its products with the corresponding number of package leaflets. As a dealer, you are responsible for enclosing the correct number of package leaflets with the products sold by you. Also, please ensure that you make your customers aware of the relevant binding instructions and legal aspects of the document.

We also provide you with operation and maintenance instructions for end users for you to pass on to your customers. These can also be downloaded from the MACO website (www.maco.eu).

We offer an option in our extranet (extranet.maco.eu) with our online catalogue, which, in addition to highly up-to-date information, also offers the advantage of extensive additional technical information for all components. You can obtain access details from your contact partner in field sales.

All of our printed documentation is continuously revised and expanded. Please make sure that you are working with our most current documentation. All of our documentation is available for download from www.maco.eu. We hope that the catalogue will prove to be a valuable tool for your daily work. We wish you every success and hope to see you online soon.








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Date: _____	Signature: _____

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1 General and technical information

1.1 How to use the catalogue

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

Drawings and diagrams are not to scale.

The content of this document is constantly being updated, so regular comparison is necessary.

No liabilities are accepted for possible printing errors, mistakes or changes.

The current version is downloadable from our website (www.maco.eu).

Please send comments or suggestions about our catalogues by email to feedback@maco.eu.

1.2 Information on product safety and product liability

1.2.1 Shutter hardware for window and casement door shutters

In accordance with the manufacturer's liability for his products defined in the Product Liability Act (PHG in Austria, ProdHaftG in Germany, PrHG in Switzerland, Codice del Consumo in Italy), the following information on shutter hardware for window and casement door shutters must be heeded. Non-compliance shall release MACO from this liability.

1.2.2 Product information and proper use

"Shutter hardware" is deemed to be hardware for windows and casement door shutters (hereinafter referred to as "shutters") in building construction.

Shutter hardware are used on vertically installed shutters made of timber, PVC or aluminium and their corresponding material combinations, whereby the professional installation of the shutters can be carried out directly on the frame, directly on the wall or on an assembly frame.

Shutter hardware as a whole can be divided into three main groups and their function considered independently:

- Shutter pins, shutter hinges, shutter pin holders: These are used to close and open the shutter (installed on frame or wall).
- Shutter locks: These are used to hold and secure the shutters in a closed position.
- Shutter catches: These are used to hold and secure the shutters in an open position.

Differing applications do not correspond to their proper use. **Fixing** the sash prevents the shutter from moving in the wind. **Securing** the sash prevents the shutter from moving during a storm. In the case of wind and draught, they must be able to hold the shutters both in the closed and in the open positions. This is achieved by using the appropriate hardware components (locking mechanisms, shutter catches etc.).

1.2.3 Misuse of shutters

The following cases, in particular, shall be deemed misuse of the shutter hardware - i.e. utilisation for purposes other than their specified proper use:

- If obstacles are inserted in the opening area, thereby preventing proper use of the product.
- If shutters are pressed against the wall or windows and doors improperly or in an uncontrolled manner (by wind, for example) causing them to become damaged or destroyed.
- If additional loads, (e.g.: dead weight of people and items) act upon shutters, for example: attaching clothes lines, etc.
- If while closing or opening the shutters, someone reaches between the respective motion stop positions (frame and shutter edge) for example (RISK OF INJURY!).
- In the case of absence or in case of a storm, the shutters are to be secured.

1.2.4 Principles and limitations of MACO's liability

The relevant entire hardware set may only consist of MACO hardware components. In the case of non factory-approved combinations by and/or inappropriately assembled hardware, and/or the use of non-original and/or non factory-approved accessory components, no liability will be accepted from MACO.

All shutter hardware for windows and casement doors must be inspected and serviced systematically by certified professionals to ensure their functional integrity and safety. This maintenance must be carried out - verifiably and documented - in accordance with our maintenance documentation: otherwise, no liability can be accepted.

Our processing specifications in the product catalogues, installation instructions/information and leaflets are legally binding and must be heeded without restriction; otherwise, no liability can be accepted for the safety and/or durability of the hardware.

Where timber, PVC, light-metal or steel profiles are used, the specifications of the profile manufacturer and/or system owner must be observed.

MACO delivers top quality, reliable components and supplies the assembler with instructions for use. MACO only provides detailed specifications for processing in special cases. In these cases, MACO also provides a guarantee for a functioning solution.

1.2.5 Product performance

The fundamental principle for the safety and suitability of use of shutters equipped with MACO shutter components is compliance with all guidelines supplied to the user by MACO. These documents are being updated and the current version is downloadable from our website www.maco.eu. Failure to adhere to these guidelines can result in the damage listed under "Misuse of shutters", including the risk of serious injury to persons and considerable damage to property.

If such guidelines are missing for a specific requested application requested, the user shall be obliged to test the suitability of the parts used for this type of application, or arrange to have them tested.

1.2.6 Maximum sash weights and sash sizes

The shutter weights and maximum shutter sizes specified in this catalogue and in the assembly instructions must not be exceeded (refer to product information). The maximum permissible sash weight is determined by the component with the smallest load capacity. Application diagrams, installation instructions/information and component assignments must be observed!



1.2.7 Hardware combination

The manufacturers guidelines regarding hardware composition (e.g. the use of additional frame hinges, consoles, sash hinges or run-up blocks, as well as the use of optional components) are legally binding and also contained in the product information.

1.2.8 Assembly

The assembly of hardware components for shutters may only be carried out by qualified people. Please refer to the product information.

1.2.9 Product maintenance

1.2.9.1 General

Inspection and service are fundamental components of maintenance. The verified maintenance is in turn basis for the legal warrant and/or our guarantee.

All inspection intervals and maintenance instructions must be observed! These details must be evident from the operating and maintenance instructions.

Settings and adjustments for the hardware, as well as replacement of components may only be carried out by specialists. Similarly, inserting and/or removing the sashes may only be carried out by specialists. When treating surfaces - e.g.: painting or glazing sashes, all hardware components must be excluded from this treatment and protected to prevent contamination.

1.2.9.2 Maintaining surface finish quality

For maintaining the quality of the RUSTICO PREMIUM-PLUS surface finish permanently please observe the following instructions:

- Avoid surface damage.
- Remove soiling from paintwork.
- The hardware may only be cleaned or polished with mild, pH-neutral cleaning agents in diluted form. Never use chemically aggressive, acetic or abrasive cleaning agents. These can lead to damage of the hardware.
- Please note care instructions in coastal areas.

Care in coastal areas

Challenging environmental conditions are present within areas app. 10 km to the sea. During storms sea water is being distributed in the form of spray and may come into contact with shutter hardware. Salt deposits will form after moisture has evaporated. In combination with other deposits and soiling (dust) these salt deposits may cause increased corrosion. The home owner can prolong the hardware service life by good care and maintenance. At least once every year a thorough cleaning and application of oil is required. Even in coastal areas you will enjoy a long service life of your shutter hardware with only a small maintenance effort.

1. Wash away salt deposits and soiling with fresh water. Never

use aggressive cleaning agents!

2. Let the hardware dry.
3. After drying apply a coating of anti-corrosion spray (e.g. BRUNOX Turbo item no. 362831). Avoid spraying other areas or components (e.g. facade, untreated timber). Anti-corrosion spray may also assist during the cleaning process.

1.2.9.3 Information and instruction duties

The following is available to comply with information and instruction obligation duties and perform maintenance work in accordance with the product liability legislation:

- for dealers: catalogues, operation and maintenance instructions, installation instructions/information and leaflets for components
- for processors: catalogues, tool drawings, operation and maintenance instructions, installation instructions/information and leaflets for components
- for owners and end users: operating and maintenance instructions.

To ensure the functional integrity of shutter hardware for windows and casement doors:

- Designers must request all relevant product information from the manufacturer and observe the details provided.
- Specialised dealers are obliged to comply with all relevant product information and, in particular, request installation instructions/information, as well as operating and maintenance instructions from the manufacturer and hand these documents over to the processors or end user.
- Processors are obliged to comply with all relevant product information and, in particular, request operating and maintenance instructions from the manufacturer and forward these documents to the owner and end user.

All above mentioned reference material is available for download from the MACO website (www.maco.eu).

The shutter manufacturer is required to comply with their duty to provide information to the user of the shutters which they manufacture (according to EN 13659). This should also be indicated in an appropriate form on the operating instructions and maintenance instructions for the shutter hardware, as well as on the information on intended use of the shutters.

In particular, it is important to inform about any damage which may result from faulty maintenance or misuse. Damage to the shutter hardware and the shutters could lead to breaking off of shutter parts or even the whole shutter. This creates the risk of serious personal injury and significant damage to property.

1.2.10 Disclaimer

The manufacturer's liability can also be excluded, among other things:

- If the fault is attributed to a regulation or an official ruling, to which product compliance was stipulated.
- Characteristics of the product, which have given rise to the



claim (against the manufacturer), could not be identified as a fault according to the conditions of science and technology at the time.

- The claim (against the manufacturer) only involves a basic material or a part product that was manufactured, and the fault is due to the construction of the product that was incorporated into the basic material or the part product, or as a result of instructions issued by the manufacturer of this product.

1.2.11 Product information

Maximum sash weights and sash sizes

The shutter weights and maximum shutter sizes specified in this catalogue and in the assembly instructions must not be exceeded (refer to product information).





1.3 Wind resistance

1.3.1 General information

When constructing, installing and operating window shutters, note that these are subjected to very strong loads during storms. Storm damage to shutters can have serious consequences - if part of a shutter or an entire casement breaks free (drops) this can cause damage to property and danger to life and limb.

MACO supplies high-quality shutter fittings and also supports manufacturers, fitters and end users by offering its expertise on the following topics:

- Identifying risks
- Meeting specifications from laws and standards
- Minimising storm damage
- Covering residual risks through insurance

Causes of increased risk are

- Position exposed to wind (location, height above ground, exposed position, periphery of the building, etc.)
- High hazard potential (shopping street, etc.)
- Large and/or heavy shutters, air tight version, unfavourable arrangement
- Anchorage on the pivot point - restricted wind resistance (inner opener, snap holder)
- Shutters prone to vibration
- Folding shutters with internal pivot point (danger of falling when not in secured status)
- Inadequate user instruction, lack of care and absence
- Insufficient maintenance

Specifications from laws and standards (EU)

The national version of the relevant standard applies for each country:

- The specifications of EN 13659:2015 apply for the wind resistance of the closed shutter.
- The fixing and securing of the open shutter must be designed for wind actions determined according to EN 1991-1-4.

In June 2014, the Bundesverband Rollladen + Sonnenschutz e.V. (Federal Association for Manufacturers of Roller shutters and Sun protection) published guidelines for Germany (TR 106) and a summary (TR 106a), which go through the content of the standards and also cover the shutters. These guidelines are available for use free of charge to anyone. They were created for Germany and also offer suggestions for other countries. MACO recommends the use of these guidelines as an aid when applying the standards: <https://rs-kompetenzzentrum.de/normen-richtlinien/technische-richtlinien/>.

MACO provides special notes for the products with anchorage on the pivot point (inner opener and snap holder).

Minimising the risk for storm damage

The cause of damage is often an increased load in conjunction with errors in assembly, operation and maintenance. MACO recommends the following measures:

- Use self-engaging shutter catches which can automatically fix a non-latching shutter.
- Attach safety catches, so that the shutter cannot be unhinged by the storm.
- Provide an additional lock (e.g. lock or shutter catch) for storms and for when inhabitants are away.

Insurance

Check the scope of validity, amount of damages, excess, etc. (storm damage, building liability, and so on).

Terms

- Fixing:
Fixing the sash prevents the shutter from moving in the wind.
- Securing:
Securing the sash prevents the shutter from moving during a storm.
- Safety-catch:
The safety-catch prevents the lifting and unhinging of a shutter during a storm. This problem can also occur with low sash weights, with extreme wind gusts and in cases where the sash is beaten uncontrollably against the window and façade.

1.3.2 Closed shutters

The specifications of EN 13659:2015 apply for the wind resistance of the closed shutter.

	Wind resistance classes according to EN 13659:2015						
	0	1	2	3	4	5	6
Nominal wind pressure p_N (N/m ²)	<50	50	70	100	170	270	400
Safety pressure $p_S = 1.5 p_N$ (N/m ²)	<75	75	100	150	250	400	600

Planning:

Which wind resistance class does the shutter need?

It is the responsibility of the planner of a building to select the required wind resistance class. In many cases, the shutter supplier "automatically" takes on the role of the planner and must determine the requirements at the place of use.

The TR 106 guideline contains instructions and recommendations for selecting the required wind resistance class for a specified place of use in Germany.

In Germany, a large amount of shutters are fitted in wind zones 1 and 2 (see wind zone map). Wind resistance class 3 is normally sufficient here for installation heights up to 10 m.

Declaration of performance:

Which wind resistance class does the shutter provide?

Standard EN 13659:2015 requires shutter manufacturers to declare the wind resistance of their products (class 0 - 6). This only takes closed shutters into consideration. The wind resistance is checked by the manufacturer in accordance with EN 1932 and declared on the CE marking and the declaration of performance.

In the case of turning shutters, the wind resistance class mainly depends on the lock. With a **multi-point locking rod** the highest class can usually be achieved (class 6), but it depends on the screw fixing and profile system.

In the case of shutters **without multi-point locking rod**, i.e. with inner opener or with centre lock, lower classes are achieved.

Information for shutters with inner opener

The tables 1 and 2 show standard values for the wind resistance classes, which can be achieved for shutters with inner openers. The size of the shutter plays a decisive role here. For locations that are exposed to the wind and/or large casements, MACO recommends that an additional safety device is attached to increase wind resistance.

A 2F shutter lock can be fitted as an additional safety device. This must be locked when there is a risk of a storm or when the inhabitants are away.

When the user is away or there are wind speeds greater than the specified value, the shutters must be closed and/or also secured to prevent damage.

Wind resistance classes with inner opener

Table 1 - with inner opener hinge

		Class 5				Class 4				Class 3				
Shutter height (mm)	3 hinges	2.100												
		2.000												
		1.900												
		1.800												
		1.700												
	2 hinges	1.600												
		1.500												
		1.400												
		1.300												
		1.200												
		1.100												
		1.000												
		900												
		800												
		300	400	500	600	Shutter width (mm)								

Wind resistance classes with inner opener

Table 2 - with rotary arm and bearing block

		Class 5				Class 4				Class 3				
Shutter height (mm)	3 hinges	2.100												
		2.000												
		1.900												
		1.800												
		1.700												
	2 hinges	1.600												
		1.500												
		1.400												
		1.300												
		1.200												
		1.100												
		1.000												
		900												
		800												
		300	400	500	600	Shutter width (mm)								

Explanation for the tables 1 and 2

- Standard values for classification according to EN 13659:2015
- Testing in accordance with DIN EN 1932:2013
- Only for shutters in closed position

1.3.3 Open shutters

The design loads for open shutters are derived from EN 1991-1-4 (wind actions) and explained in the TR 106 guideline. This guideline is available free-of-charge for anyone at: <https://rs-kompetenzzentrum.de/normen-richtlinien/technische-richtlinien/>.

QUOTE: A pressure/suction of 400 N/m² should normally be sufficient for dimensioning non-air tight window shutters.

Open shutters with anchorage on the pivot point

The inner opener and the snap holder are restraining systems with anchorage on the pivot point. They do not provide any storm resistance. Therefore, MACO recommends extremely careful planning, advice, installation, use and maintenance when using these products. The instruction manual is extremely important. In practice, high level of satisfaction is achieved with due care.

In exposed locations, MACO advises against the use of inner openers and snap holders, or using them with an additional safety device.

Behaviour in the event of wind with anchorage on the pivot point

If the shutter remains open, then normally no damage will be incurred. Depending on the installation site, the stronger the wind the more likely it is that hardware components will break. In the case of an inner opener, the drive bolts can be twisted off, for





example. In the case of a snap holder, the pressure pins can be torn off, for example. The wind will then cause the shutter to hit the window and curtain wall in an uncontrolled manner, thereby causing further damage.

This situation must be taken into account when planning, to be co-ordinated with the client and documented in the handbook.

Folding shutters with inner pivot point must never be secured with a snap holder for this reason.

In extreme cases, the shutter can be unhinged by the force of the wind. This risk must be averted by installing a safety catch (1 per casement).

1.3.4 Instruction manual

According to EN 13659:2015 (Section 6), the shutter manufacturer is obligated to provide an instruction manual:

- for installation
- for operation (must be provided to the end user)
- for maintenance (fitter and end user)

The Pflichten katalog_2015_(CE) (Catalogue_of_specifications_2015_(CE)) from the Bundesverbands Rollläden + Sonnenschutz e.V. (Federal Association for Manufacturers of Roller shutters and Sun protection) also provides support at www.itrs-ev.com.

Information relating to dangerous situations (e.g. storms) must be clear and detailed. If necessary, the operating instructions must also contain information about the wind velocity at which

the shutter is to be closed (or secured using another method) in order to prevent the risk of it breaking off.

Information from MACO

MACO provides instructions for installing, operating and maintaining hardware. These instructions can be used by the shutter manufacturer as a building block for creating its manual. The latest version of these instructions is available to download at www.maco.eu.

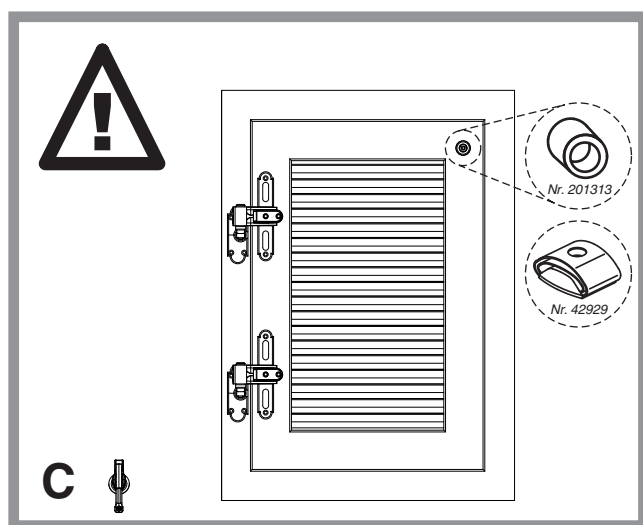
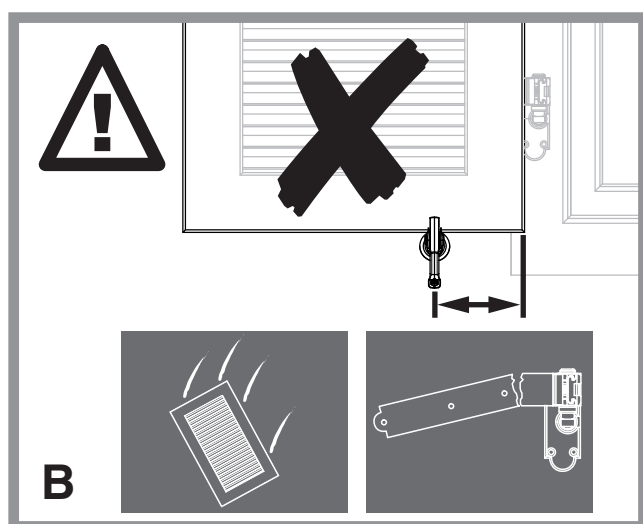
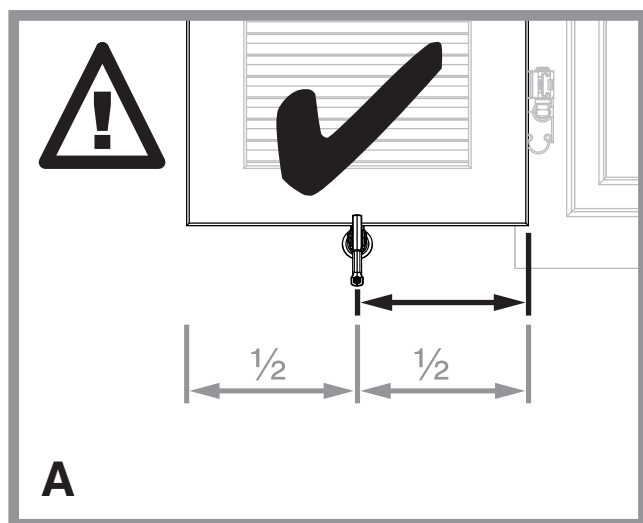
Maximum wind velocity with anchorage on the pivot point

In the case of sun protection products with limited storm resistance, EN 13659:2015 requires a maximum wind velocity to be defined in the operating instructions. When the user is away or there are wind speeds greater than the specified value, the shutters must be closed and/or secured to prevent damage.

Calculation of the permissible wind pressure and thus the permissible wind velocity can be performed according to EN 1991-1-4. However, the time, effort and uncertainty (dynamic behaviour) are so great that MACO recommends the use of experience values. The standard value of 60 km/h for peak wind values has proven successful for the permissible sash sizes and max. sash weight. Above this value, a storm warning is usually issued.

- max. shutter width 600mm
- max. width for folding shutters 2 x 600mm
- max. height 2,100mm
- max. sash weight 20kg (applies for folding shutters for the total weight of both casements)

1.4 Shutter catches and buffer stops



CAUTION: Failure to observe the following points can cause damage due to misuse of shutters described in Section 1.2 "Information on product safety and product liability", including the risk of severe injury to persons and damage to property!

- **Shutter holders minimum 1/2 shutter width**

Shutter holders must be installed at half the shutter width (see Figs. A + B). All shutter holders and locks must be installed so that they are held securely in the open and close position! Failure to do so can cause the hinges to break and shutter to drop, with risk of damage to property or personal injury.

- **Buffer stops**

A buffer stop must be used to prevent the top part of the shutter springing back when it snaps into place (see Fig. C). When the buffer stop is used, make sure that the facade has sufficient compression strength (e.g. when thermal insulation is used).

- **Distance 210mm for light shutters**

For shutters with an overall weight to a maximum of 20kg (maximum 30kg for MMV hardware range), the distance between the shutter holder and the edge of the shutter at the hinge side must be at least 210mm. This also permits the use of the deluxe shutter holder for windows for these shutters - independent of the width of the shutter.

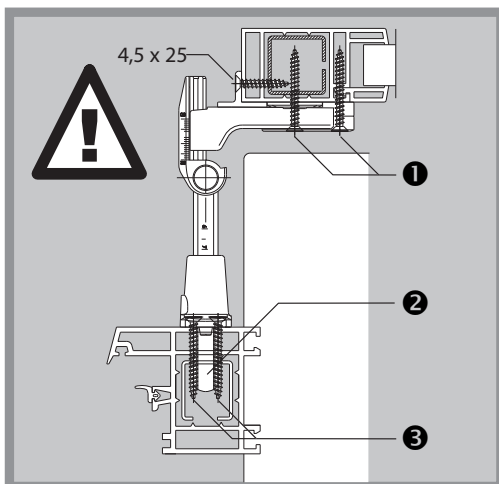
1.5 Screw fixing and pin depth

A fastening agent must be placed in each screw hole of the hardware components to ensure sufficient anchorage in the foundation.

The application diagrams are based on endurance tests (EN 14648). The MACO screws used in these endurance tests have the following values:

- In Spruce timber with 22mm insertion, without pre-drilling: 1,600N
- In Alu with 1.5mm wall thickness and drilling 2.5mm: 1,200N

Window and shutter made of PVC



1 - at least 1 screw in the reinforcement

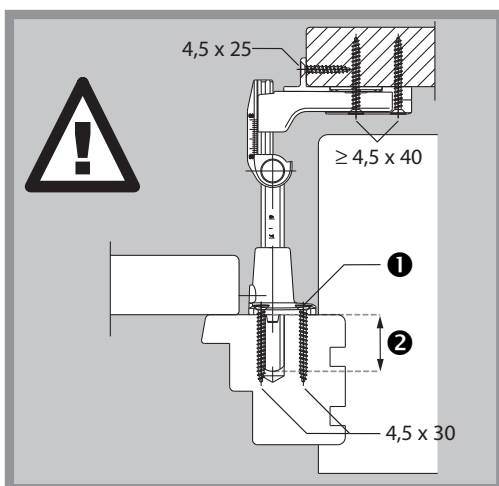
2 - Adjusting pin must reach at least 8mm into the reinforcement and be routed in the Ø 12mm pin hole

3 - Fasten the screws through at least 2 walls and through the reinforcement

If the pre-drilled hole of the straight pin causes problems, cranked pins can be used (e.g. upright reinforcement).

The force between the shutter and hinge is transferred via the hinge body, not via the decorative bracket. The hinge body and mounting bracket must be fastened through the reinforcement.

Window and shutter made of timber

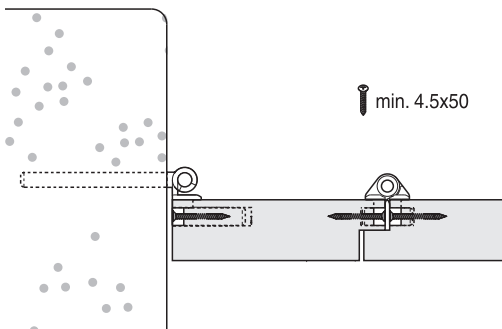


1 - In combination with snap holder $\geq 4.5 \times 40$ mm

2 - Pin insert depth in Ø 12mm pin holes:

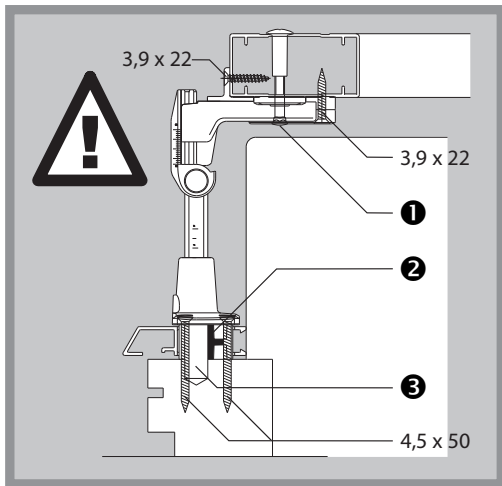
- at least 15mm for pins L59-L135
- at least 20mm for snap holder L90-L140 and for pins L150
- at least 25mm for pins or snap holders up to L165

Concealed hinges on timber



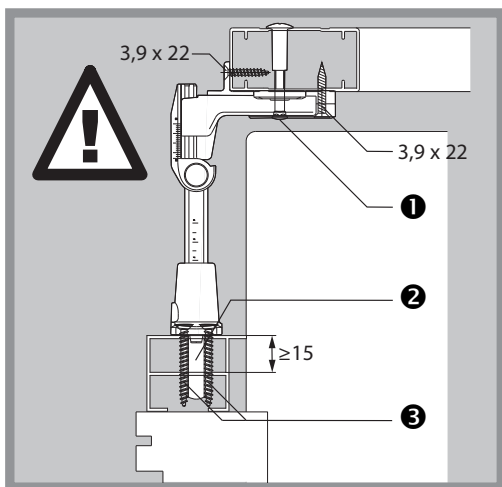
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Window made of timber-aluminium and shutter made of aluminium



- 1 - Fixing screw with threaded sleeve
- 2 - Underlay for aluminium profiles
- 3 - Pin depth in timber frame at least 15mm in pin hole Ø 12mm

Frame and shutter made of aluminium



- 1 - Fixing screw with threaded sleeve
- 2 - Adjusting pin must reach at least 8mm into the second wall and be routed in the Ø 12mm pin hole
- 3 - Fasten the screws through at least 2 walls



1.6 Application diagrams

1.6.1 Instructions for determining permissible shutter sizes

To read the permissible shutter sizes in the application diagrams, the weight per square meter (kg/m^2) of the shutter must be known.

For the application diagrams shown, the weight per square meter (kg/m^2) is always specified.

Determining the weight per square meter (kg/m^2)

The easiest method is to "**Weigh - measure - divide**". Proceed as follows: Use commercially available bathroom scales to determine the overall weight of the shutter, then calculate the shutter surface by multiplying the values for the length and width (specified in meters). Finally divide the weight (kg) by the surface area (m^2).

Example calculation

- Shutter height 2.10m, shutter width 0.75m
- Shutter surface = $2.10\text{m} \times 0.75\text{m} = 1.575\text{m}^2$
- Shutter weight acc. to scales 18kg
- Weight per square meter = $18\text{kg} : 1.575\text{m}^2 = 11.4\text{kg/m}^2$

Select the matching diagram

- For MMV hardware range: Diagram "max. 12kg/m^2 "
- For BLR hardware range: Diagram "max. 14kg/m^2 "

For solid timber shutters, the weight per square meter can be calculated as follows: Multiply the weight of a cubic meter of the timber used by the shutter thickness (specified in meters).

Benchmarks for timber weights

- Spruce $400\text{-}500\text{kg/m}^3$
- Oak $670\text{-}850\text{kg/m}^3$

Example calculation

- Cubic meter weight 430kg, shutter thickness 0.044m
- Weight per square meter = $430\text{kg} \times 0.044\text{m} = 18.92\text{kg/m}^2$

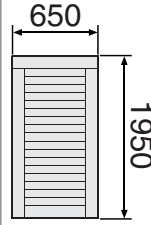
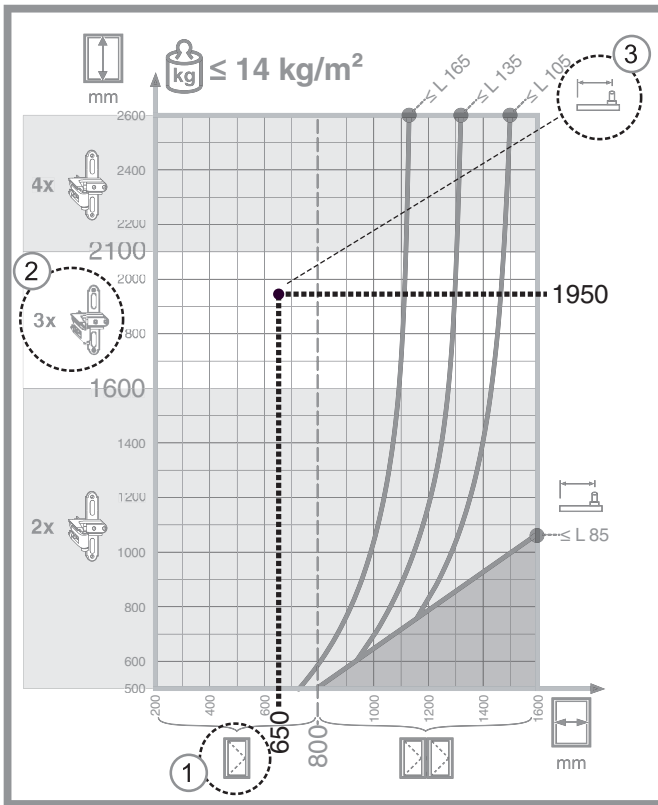
When using PVC or aluminium profiles contact the profile manufacturer to determine the weight per square metre.

In installations where hardware components from different hardware ranges are used, the corresponding diagrams for the BLR/MV hardware range must be taken into account when determining the permissible shutter sizes!

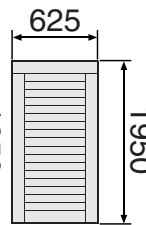
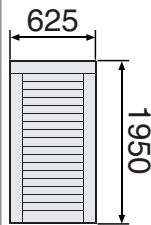
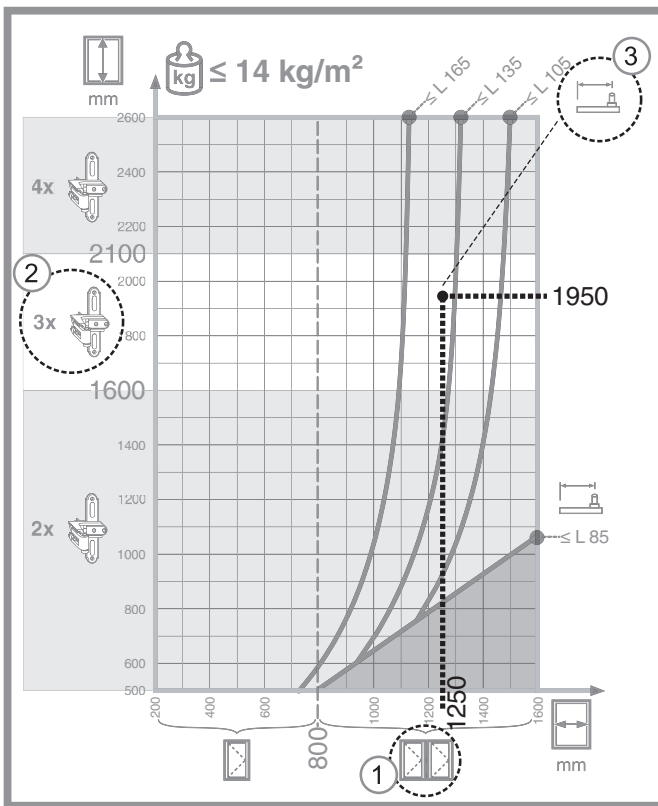
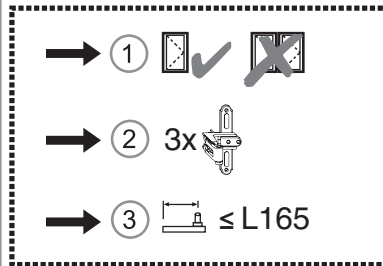
Using calculation diagrams

Mark the intersection of the width and height in the diagram for the shutter to be installed.

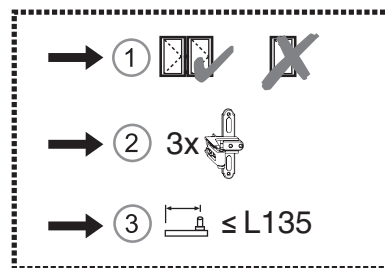
Use the examples below to determine which important information can be read from the diagrams to ensure correct hardware selection and shutter installation:



$\leq 14 \text{ kg/m}^2$

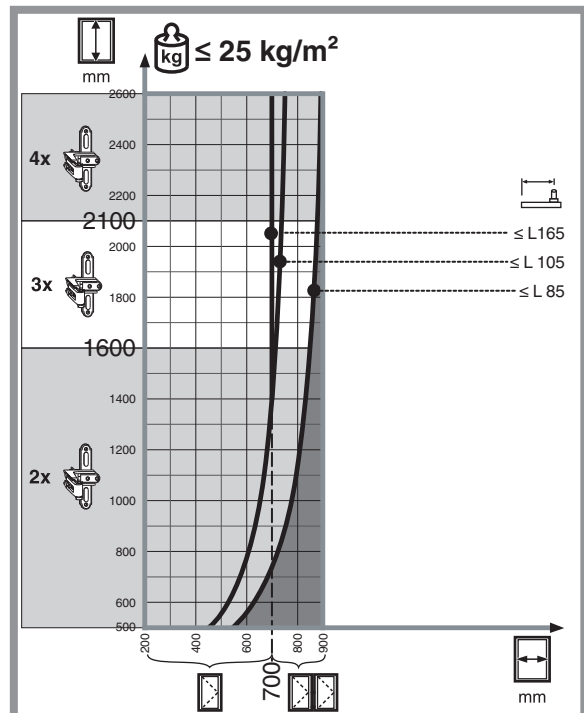
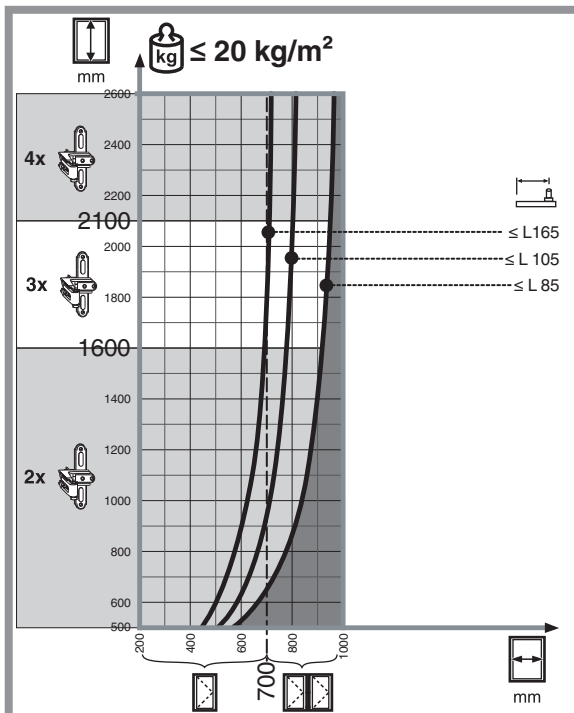
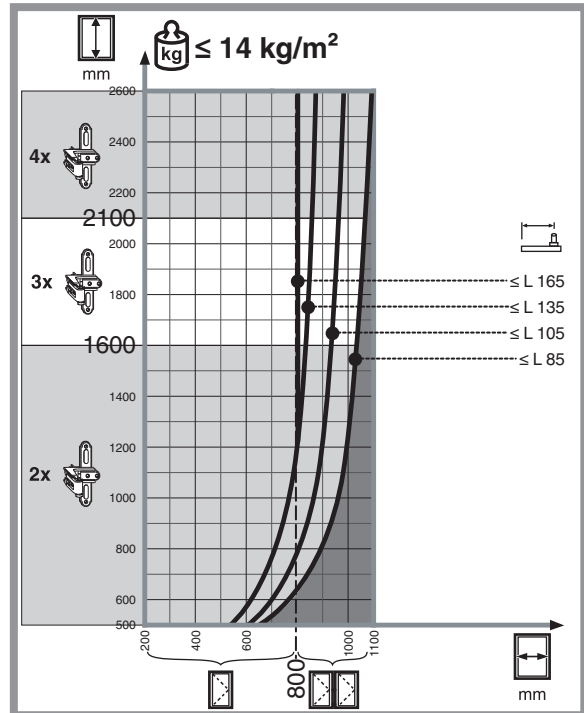
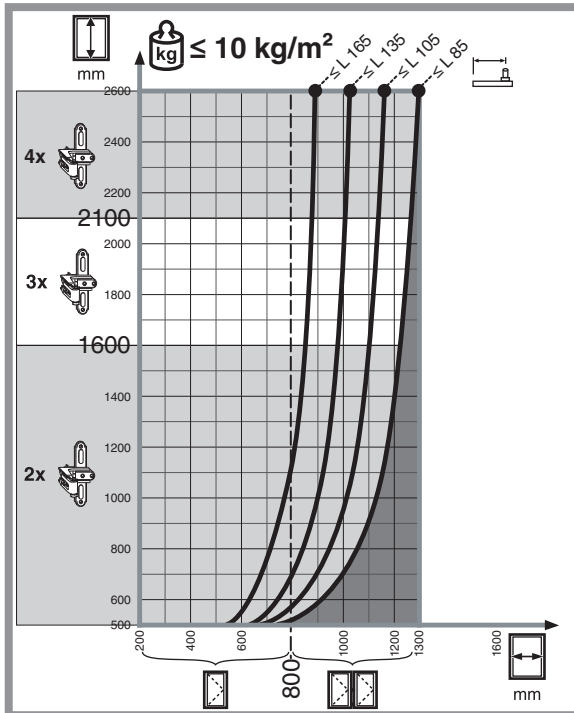


$\leq 14 \text{ kg/m}^2$



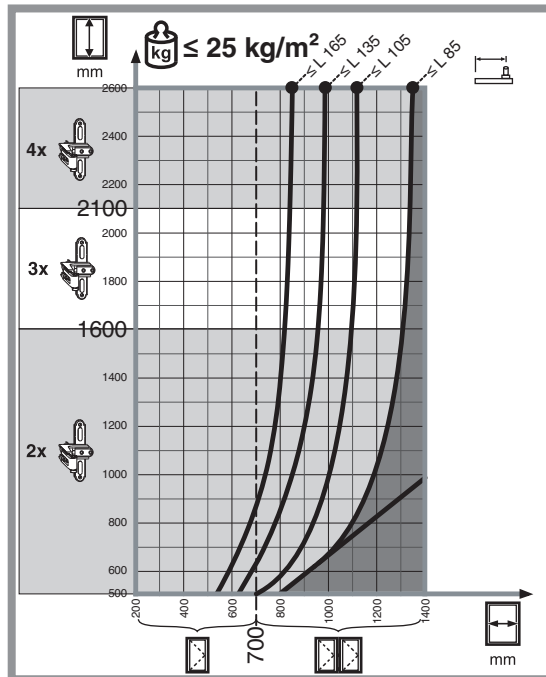
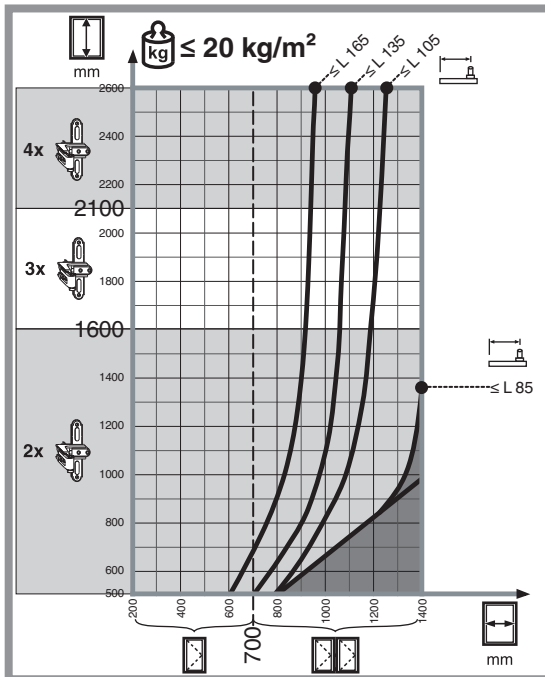
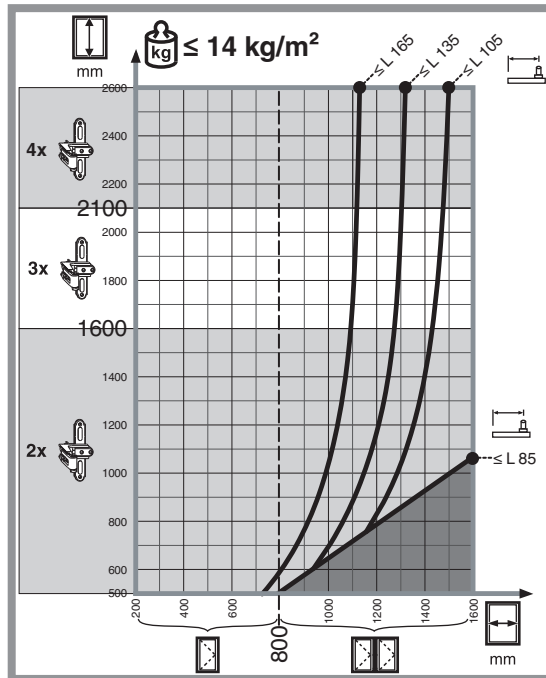
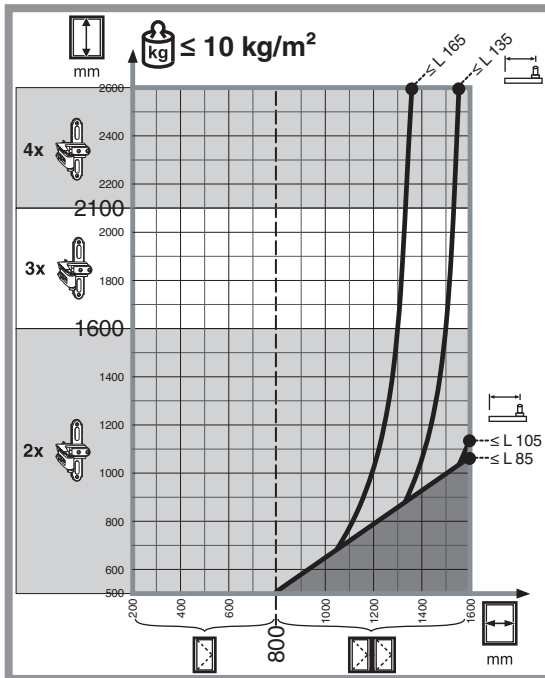
1.6.2 BLR application diagrams, 25mm wide shutter pin holder

The following diagrams apply to MV hardware and to BLR hardware with 25mm wide shutter pin holder.



1.6.3 BLR application diagrams, 35mm wide shutter pin holder

The following diagrams apply to BLR hardware with 35mm wide shutter pin holder and with BLR surface mounted frame hinges.



1.6.4 Instructions for masonry installation

The MMV hardware range offers a stable steel hinge and the advantages of adjustability!

The lateral adjustment is used to correct deviations that can arise in the following situations:

- Inaccuracies during installation
- Sash deformation ("hanging")
- Deformation of fasteners and/or hardware components

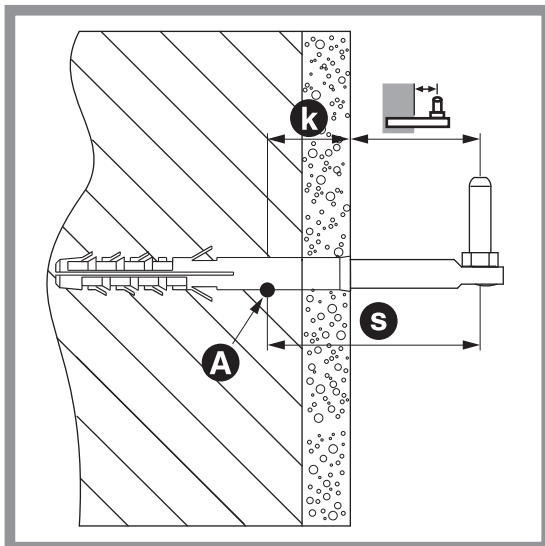
Observe the following points for all following diagrams:

- Use folding shutters for wider shutters and use folding shutter couplings to fasten them to the inside shutter or shutter

holders to fasten them the doors.

- Observe assembly instructions for masonry fixing (item no. 49490)! Particularly observe correct positioning of shutter catches and buffer stops.
- The load-carrying capacity of the shutter pin in the masonry must be checked by the user. If necessary, a different suitable fastening method (e.g. chemical dowel pin etc.) must be used.
- The support span **s** depends on how the shutter pin is fastened and on the properties of the masonry (plaster, insulation) — see figure below "Pin support span":

Pin support span



- S** Support span This length is decisive for the shutter pin strength — refer to diagrams for MMV hardware range.
 - A** Support point Pin support point in the masonry
 - k** Distance This is the distance from the wall surface to point A. This distance depends on how the shutter pin is fastened and on the properties of the masonry (plaster, insulation).
- Pin distance

Additional

- The load capacity of the anchoring of the shutter pin in the masonry must be assured by the user.
- The 90° shutter pin drilling is no longer valid in terms of current technology. Due to the low edge distance, it is not possible to achieve sufficient safety in many cases.

Recommendations from MACO

- Careful selection of a suitable fixing to match the masonry
- If in doubt, check the use of chemical dowels

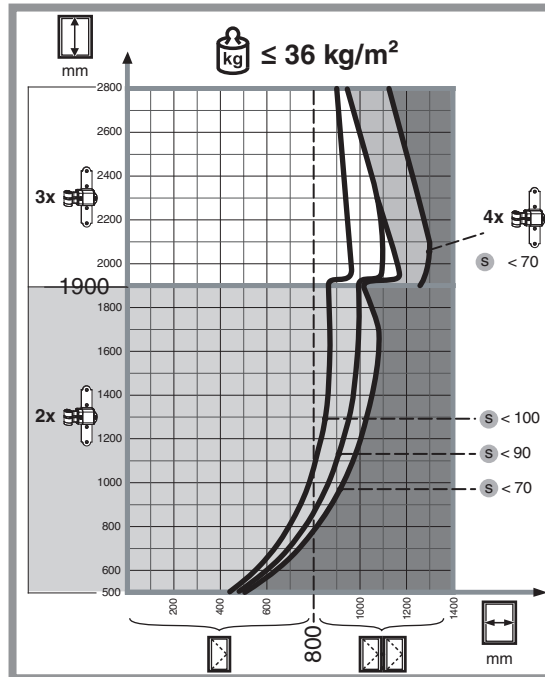
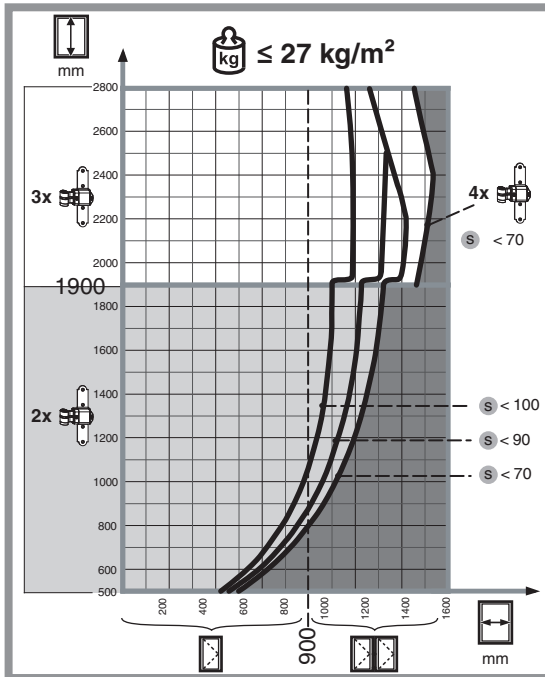
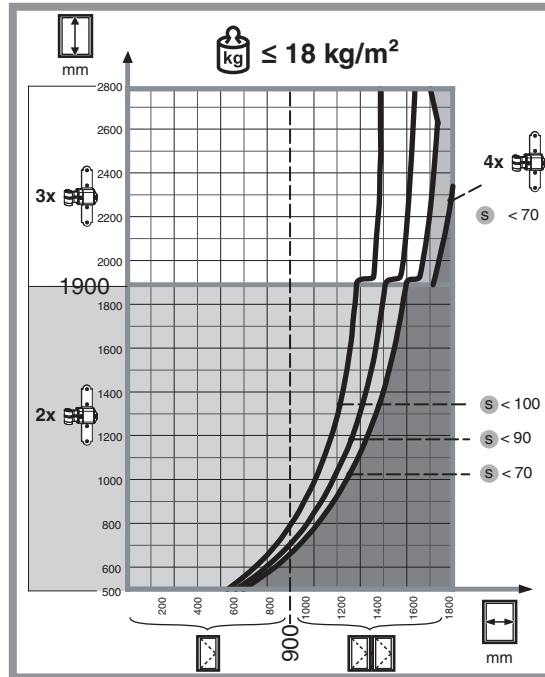
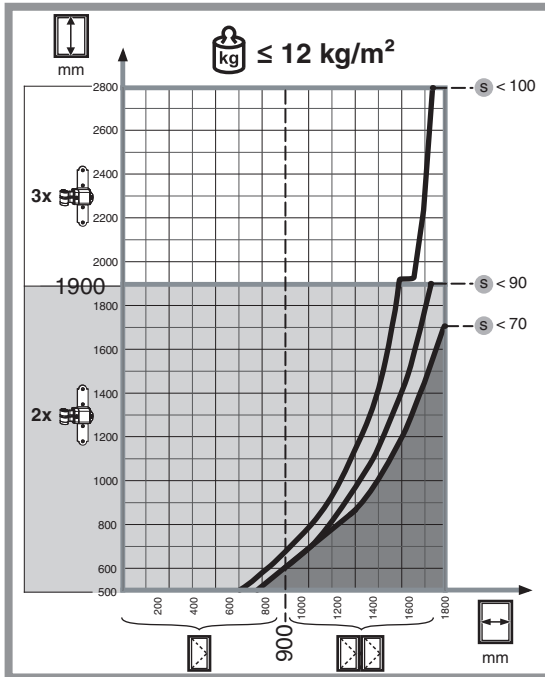
- Slanted shutter pin drilling instead of straight drilling
- Sufficient depth of anchorage (shutter pin length)
- Use of three shutter pins + three hinges for each sash
- Selection and installation of the fixing by qualified personnel
- Define and arrange for regular inspection

Restriction

- When using long hinges, the total weight must not exceed 60kg.



1.6.5 MMV application diagrams



i

1.6.6 Instructions for Ø16 masonry pins

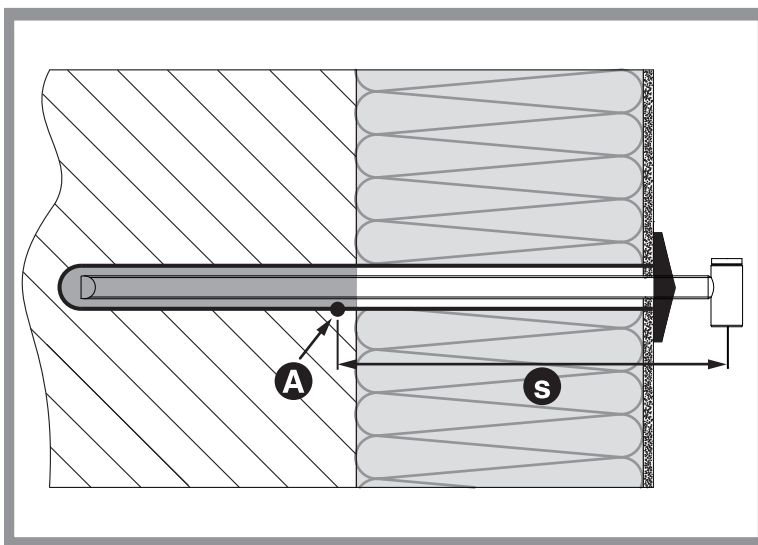
The installation instructions for Ø16 masonry pins (item no. 756580) and the package insert (item no. 750487) must be observed! In particular, make sure that the drilled hole is resistant to heavy rain and that the shutter catch and buffer stop are positioned correctly (refer to section 1.4 *Shutter catches and buffer stops*).

To fasten correctly, we recommend the use of a chemical rawlplug (e.g. from HILTI or WÜRTH).

The load-carrying capacity of the shutter pin in the masonry must be checked by the user. If necessary, a different suitable fastening method (e.g. chemical dowel pin etc.) must be used.

When using certain types of chemical rawlplugs it may be necessary to chamfer the end of the shutter pin to prevent subsequent rotation of the shutter pin after installation.

Pin support span

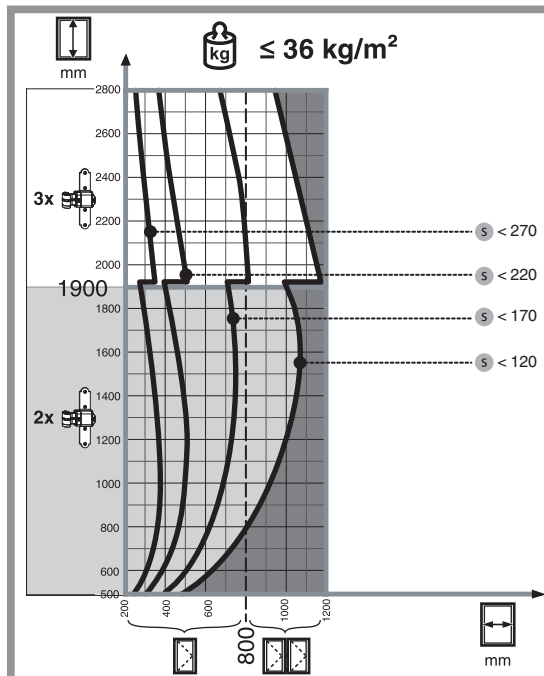
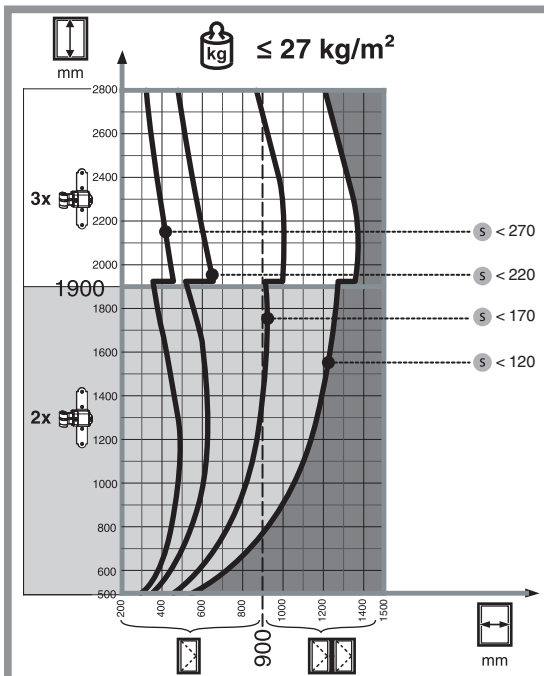
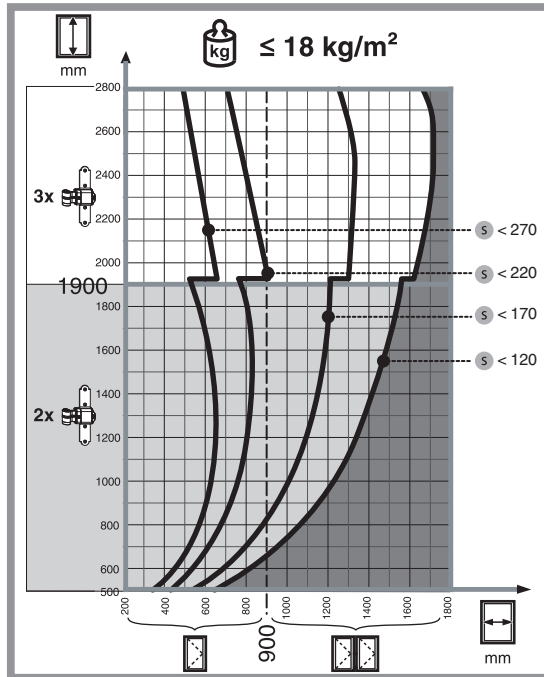
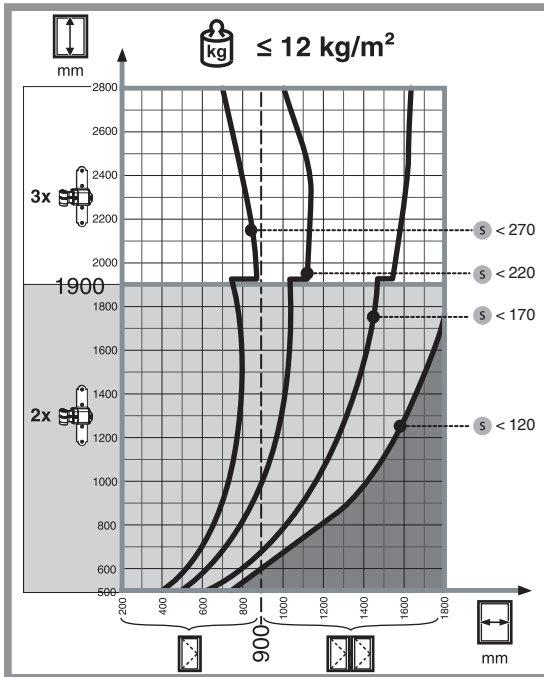


S Support span This length is decisive for the shutter pin strength — refer to diagrams on the following page!

A Support point Pin support point in the masonry

1.6.7 MMV application diagrams, Ø16 thread

The following diagrams apply to MMV hinges and MMV shutter pins, Ø16 thread.





1.6.8 PAD table

The following table applies to PAD hinges and shutter pins. Maximum sash weight 21kg/m².

Number of shutter hinges	Shutter height	Shutter width
2	≤ 1600mm	max. 900mm
2	≤ 1900mm	max. 800mm
3	≤ 2200mm	max. 900mm
3	≤ 2400mm	max. 800mm



1.7 Surface finish RUSTICO PREMIUM-PLUS

1.7.1 Surface finish with 10-year guarantee

From 2013, the RUSTICO hardware comes with a new anti-corrosion coating technology. MACO guarantees to the fabricator a 10-year resistance to corrosion. This guarantee applies to all locations, including coastal regions. For more information about the guarantee, please contact your MACO specialist or check the guarantee certificate. The certification by ift Rosenheim and the guarantee certificate can be found on our website (www.maco.eu).

1.7.2 Sustainability

- Long service life
- No solvents
- Closed production circuits
- Chrome -VI free

1.7.3 Quality

- The exceptionally high resistance to corrosion is continually tested by in-house salt-spray testing in compliance with ISO 9227. All parts are flawless after 1,500 hours. Furthermore, we continually monitor raw material quality and layer thickness.
- Test certificate issued by the accredited testing institute ift-

Rosenheim (Germany) regarding salt spray testing according to ISO 9227. All parts turned out flawless even after 1,500 hours and have therefore clearly surpassed class 5 (highest level) according to EN1670 (this standard requires only 480 hours exposure).

- UV-resistance and colour stability of all powder-coated surfaces.
- The textured surface is robust and dirt-repellent and possesses high scratch resistance.
- PVC parts made of UV-resistant and colour-stable materials.
- Natural weathering test.

1.7.4 Available colours

MACO-RUSTICO hardware components for shutters are available in three standard colours:

- Black S: fine structure RAL 9005
- Grey S: fine structure RAL 7004
- White S: fine structure RAL 9016

1.7.5 Care

To preserve the quality of the hardware for long time, please observe the information provided in the operation and maintenance instructions for window shutters.





1.8 Certificates and guarantees

MACO ensures high quality, not only with ongoing continuous internal testing, but also through external auditing by renowned, independent institutes. Copies of all our current independent test certificates, covering our quality, safety and environmental management systems, as well as our product

guarantees are available to download from our website www.maco.eu. In addition our safety descriptions relating to dangerous substances (REACH Declaration) are available, covering all MACO products.

1.9 General terms and conditions

Our current general terms and conditions are available for download from our website (www.maco.eu).



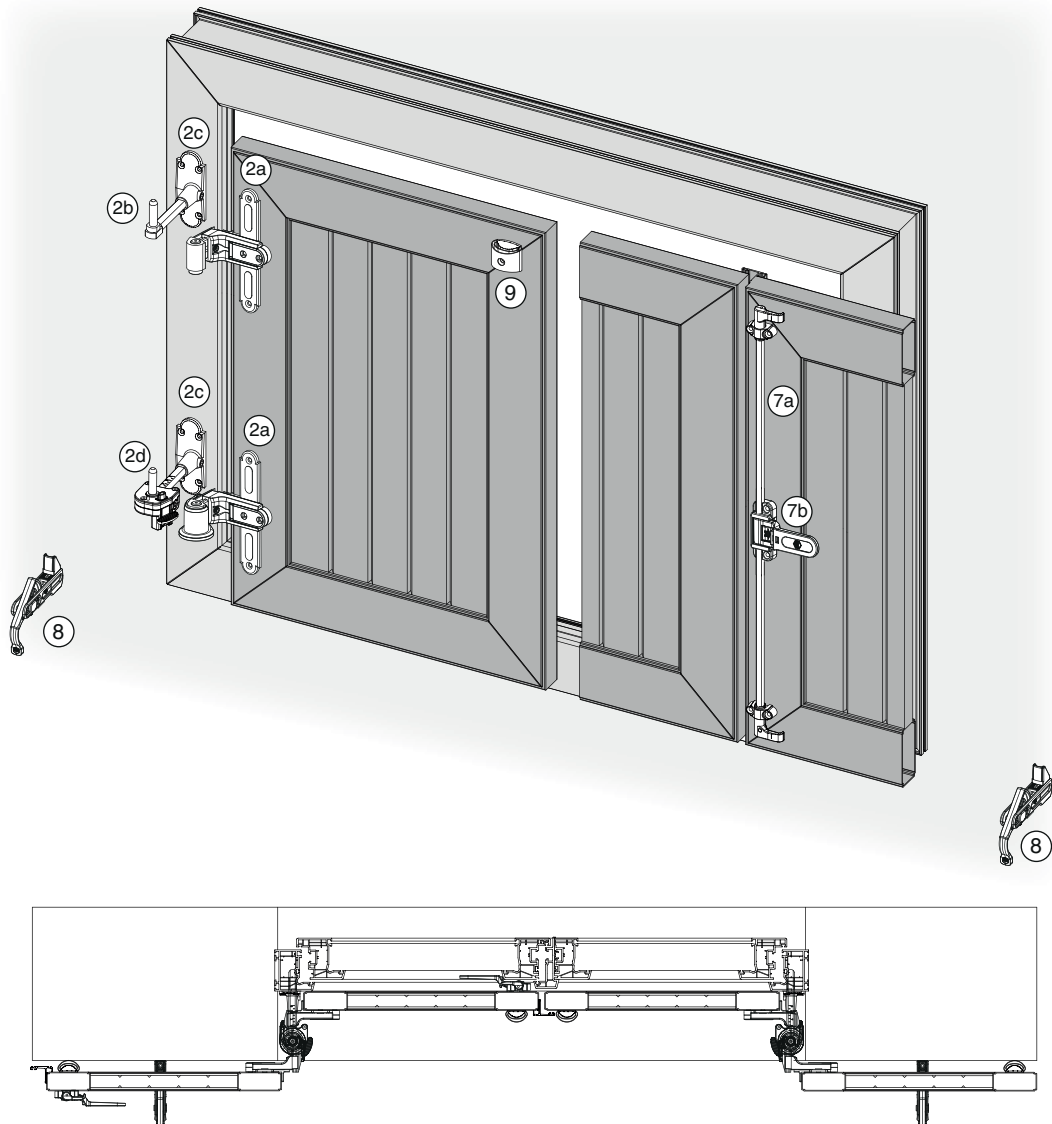
2 Frame installation

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2 Frame installation

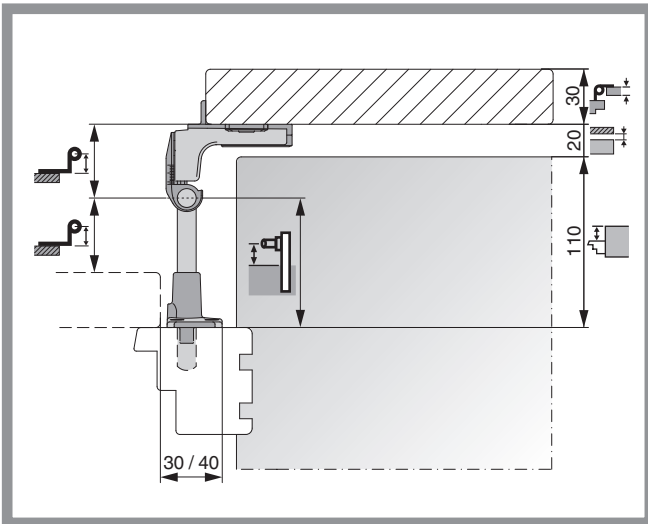
2.1 Information for hardware selection

2.1.1 2-sashed



Selection guide		Page
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2.1.1.1 Flush mounted without spacing



Calculation shutter pin distance

$$\begin{array}{r}
 \begin{array}{l} \text{Shutter pin distance} \\ \text{Shutter thickness} \\ \text{Distance between shutter and frame} \end{array} \\
 \hline
 = 110\text{mm} \\
 + 20\text{mm} \\
 + 30\text{mm} \\
 \hline
 = 160\text{mm} : 2 = 80\text{mm}
 \end{array}$$

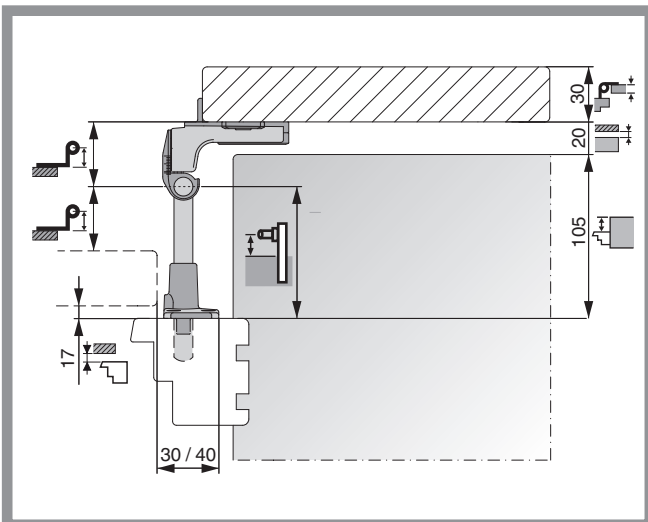
→ L 105 (60-90mm)

Calculation hinge crank

$$\begin{array}{r}
 \begin{array}{l} \text{Shutter pin distance} \\ \text{Shutter thickness} \\ \text{Distance between shutter and frame} \end{array} \\
 \hline
 = 110\text{mm} \\
 + 20\text{mm} \\
 - 30\text{mm} \\
 \hline
 = 100\text{mm} : 2 = 50\text{mm}
 \end{array}$$

→ Gr. 2 (45-70mm)

2.1.1.2 Flush mounted with spacing



Calculation shutter pin distance

$$\begin{array}{r}
 \begin{array}{l} \text{Shutter pin distance} \\ \text{Shutter thickness} \\ \text{Distance between shutter and frame} \\ \text{Shutter thickness} \\ \text{Distance between shutter and frame} \end{array} \\
 \hline
 = 105\text{mm} \\
 + 20\text{mm} \\
 + 47\text{mm} \\
 \text{(shutter thickness 30mm + distance 17mm)} \\
 \hline
 = 172\text{mm} : 2 = 86\text{mm}
 \end{array}$$

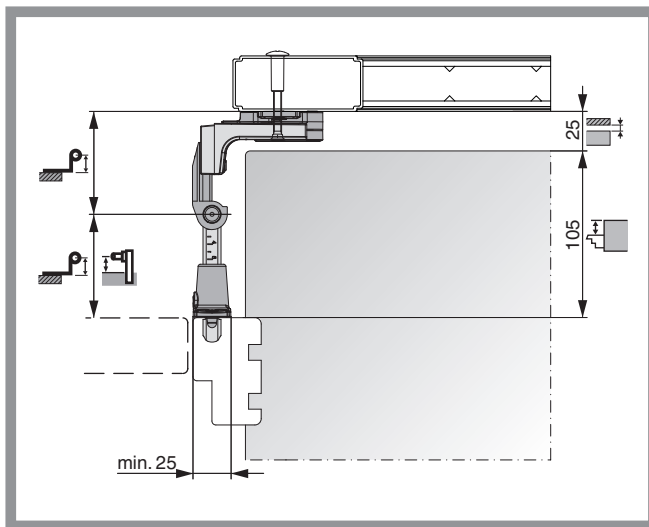
→ L 105 (60-90mm)

Calculation hinge crank




$$\begin{array}{r}
 \begin{array}{l} \text{Shutter pin distance} \\ \text{Shutter thickness} \\ \text{Distance between shutter and frame} \\ \text{Shutter thickness} \\ \text{Distance between shutter and frame} \end{array} \\
 \hline
 = 105\text{mm} \\
 + 20\text{mm} \\
 - 30\text{mm} \\
 - 17\text{mm} \\
 \hline
 = 78\text{mm} : 2 = 39\text{mm}
 \end{array}$$

→ Gr. 1 (32-50mm)

2.1.1.3 Flush



Calculation shutter pin distance = hinge crank

	25mm	
	+ 105mm	
<hr/>		
=	130mm : 2 = 65mm	
<hr/>		

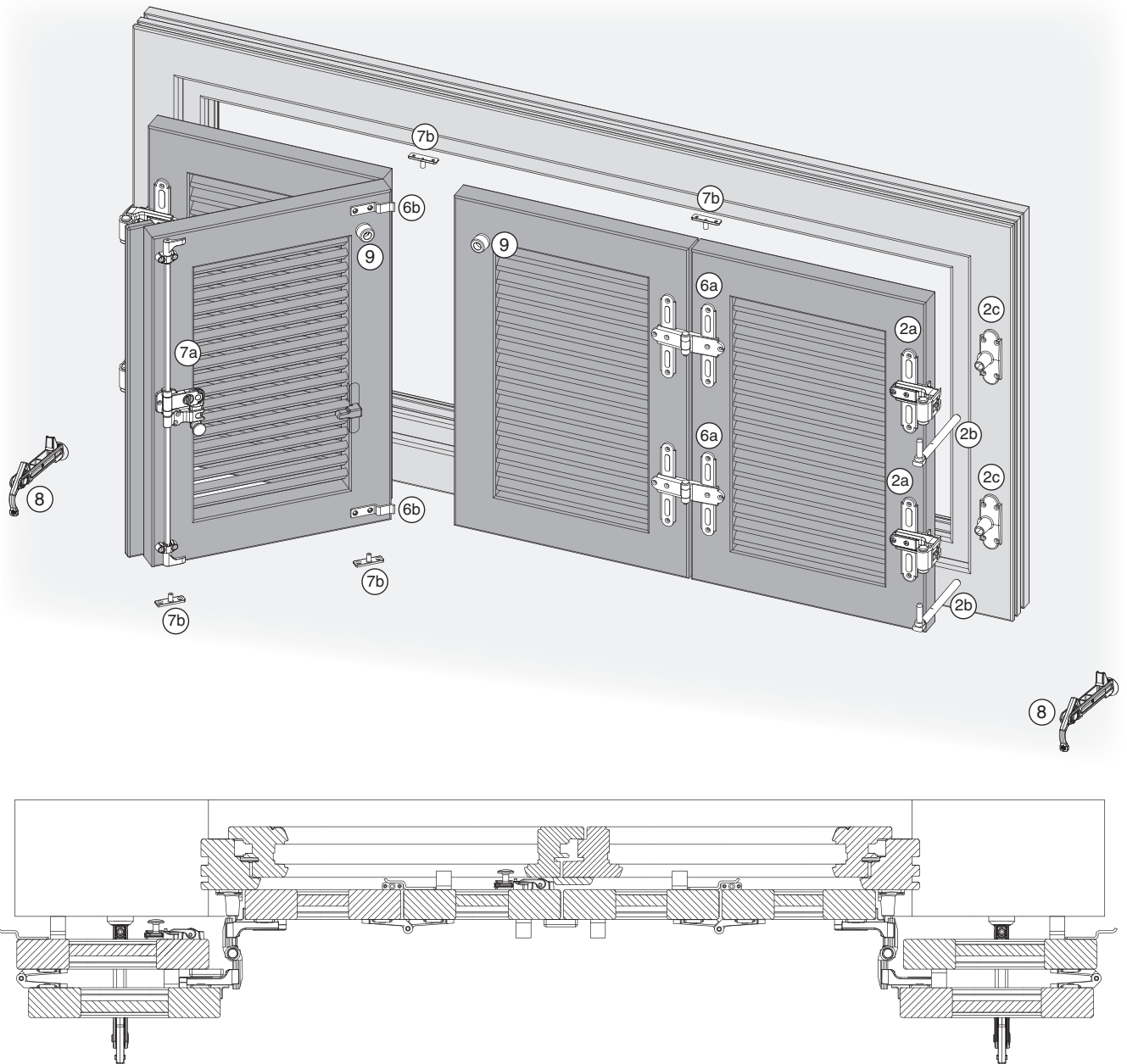
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Frame installation Information for hardware selection

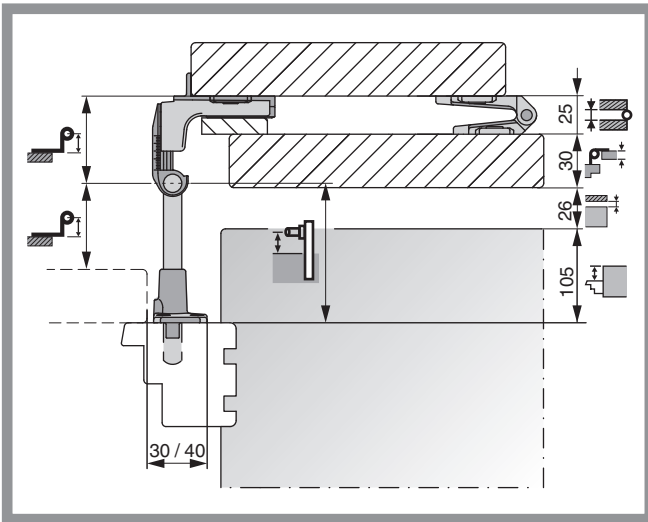


2.1.2 4-sashed with external pivot point



Selection guide		Page
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2b	2.3.1.2 BLR threaded surface mounted frame hinges straight with lateral adjustment	→54
2c	2.4.1 BLR shutter pin holders	→56
6a	6.1.1 BLR centre cross hinges	→108
6b	6.6 Multi-sash locking hooks	→114
7a	7.1.3.2 2F shutter locks without striker pin brackets without protection block with spring-loaded locking hooks	→121
7b	7.3 Striker pin brackets for frame installation	→124
8	8 Shutter catches	→138
9	9.2 Buffer stops	→152

2.1.2.1 Flush mounted without spacing



Calculation shutter pin distance

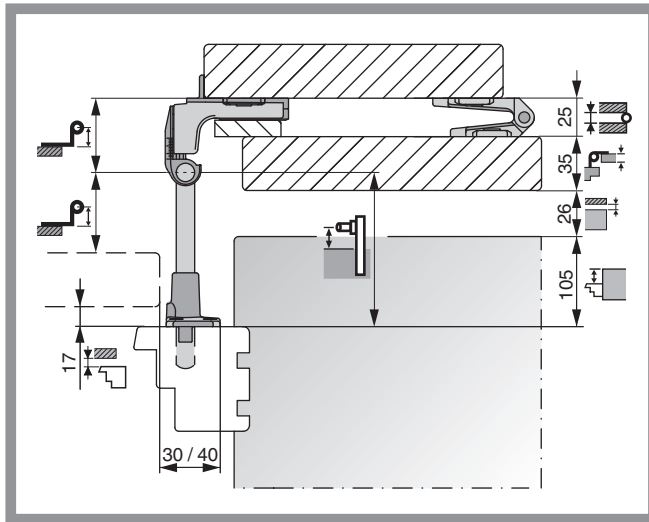
	105mm
	+ 26mm
	+ 25mm
2 x	+ 60mm
<hr/>	
=	216mm : 2 = 108mm
<hr/>	
→ L 135	(80-120mm)

Calculation hinge crank

	105mm
	+ 26mm
	+ 25mm
<hr/>	
=	156mm : 2 = 78mm
<hr/>	
→ Gr. 3	(65-100mm)



2.1.2.2 Flush mounted with spacing



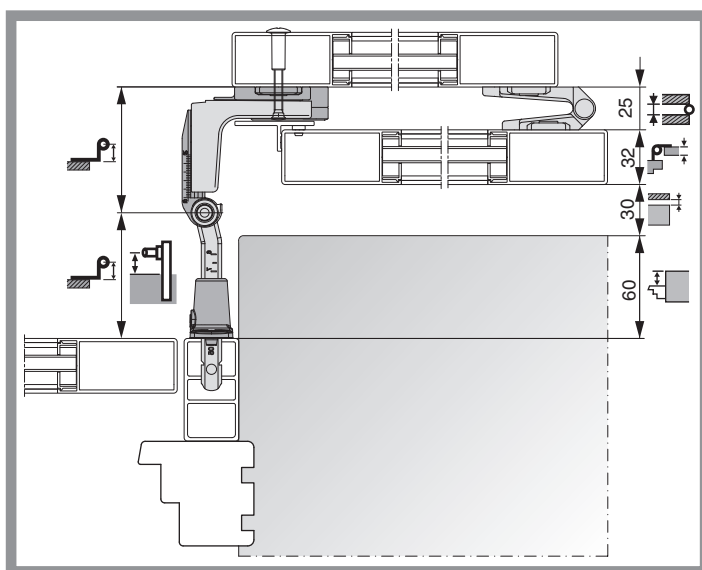
Calculation shutter pin distance

	105mm
	+ 26mm
	+ 25mm
	2 x + 70mm
	+ 17mm
<hr/>	
=	243mm : 2 = 121,5mm
<hr/>	
→ L 165	(120-140mm)

Calculation hinge crank

	105mm
	+ 26mm
	+ 25mm
	- 17mm
<hr/>	
=	139mm : 2 = 69,5mm
<hr/>	
→ Gr. 3	(65-100mm)

2.1.2.3 Flush



Calculation shutter pin distance = hinge crank

	60mm
	+ 30mm
	+ 32mm
	+ 25mm
<hr/>	
=	147mm : 2 = 73,5mm =
<hr/>	
→ L 105	
→ hinge without fixing tab Gr. 2	(70-95mm)

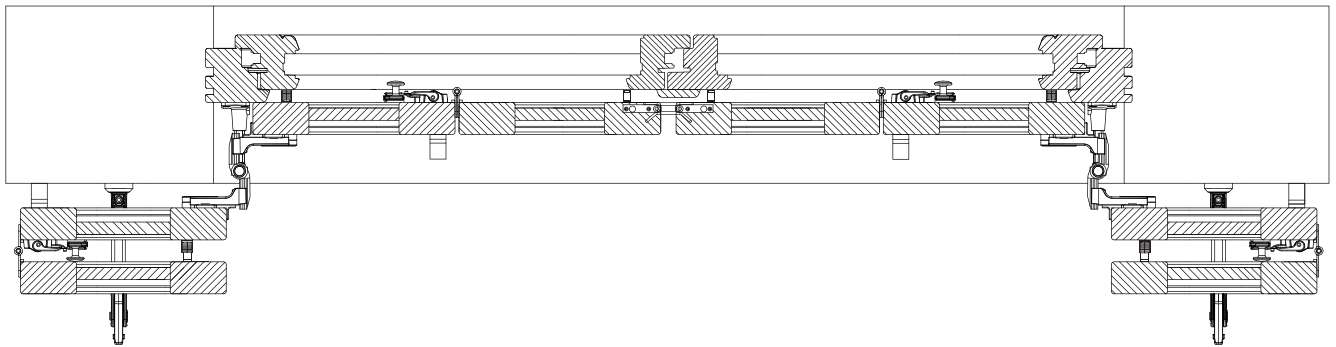
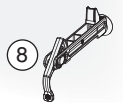
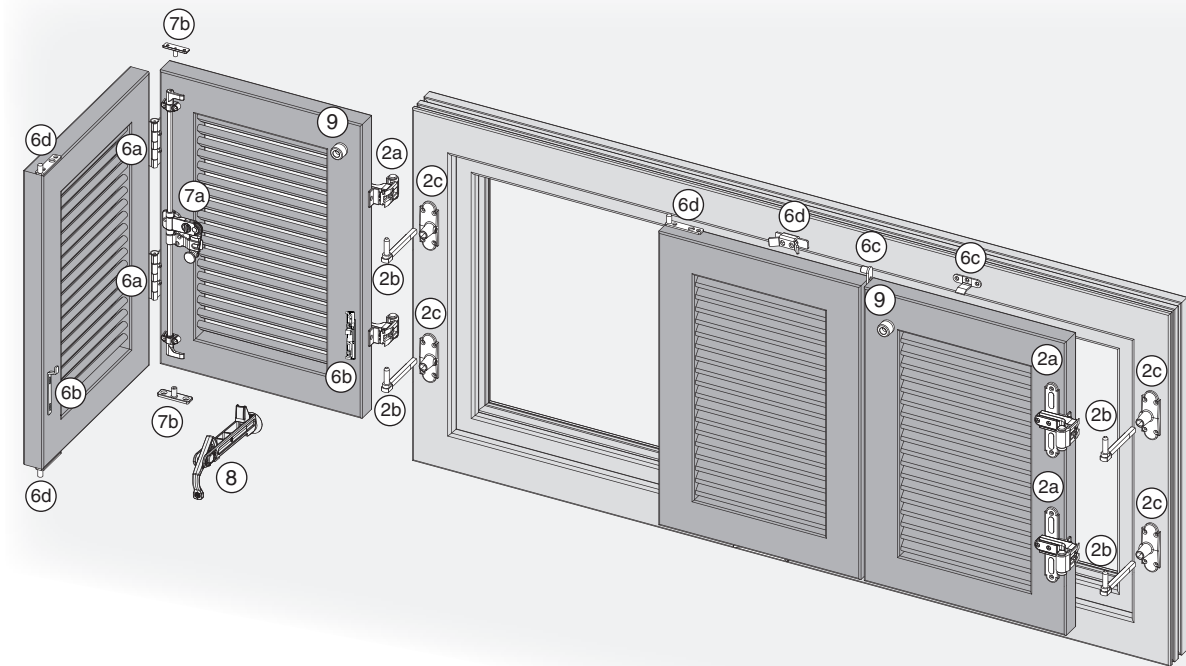
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Frame installation Information for hardware selection

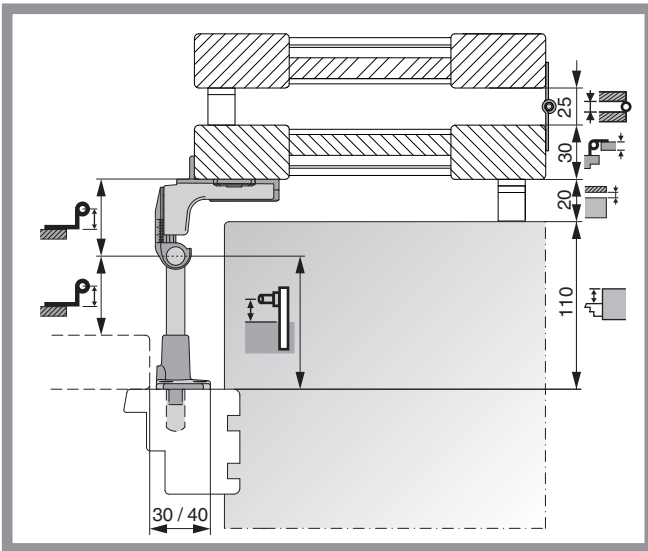


2.1.3 4-sashed with internal pivot point



Selection guide		Page
2a	2.2.2.2 BLR cross hinges with variable crank	→47
2b	2.3.1.2 BLR threaded surface mounted frame hinges straight with lateral adjustment	→54
2c	2.4.1 BLR shutter pin holders	→56
6a	6.1.3 BLR centre hinges straight/cranked	→109
6b	6.2 Folding shutter couplings	→112
6c	6.5 Shutter suspending run-up block	→113
6d	6.6 Multi-sash locking hooks	→114
7a	7.1.3.2 2F shutter locks without striker pin brackets without protection block with spring-loaded locking hooks	→121
7b	7.3 Striker pin brackets for frame installation	→124
8	8.1.3 Shutter catches "Classic" model with cover disk without fixing bolts	→140
9	9.2 Buffer stops	→152

2.1.3.1 Flush mounted without spacing



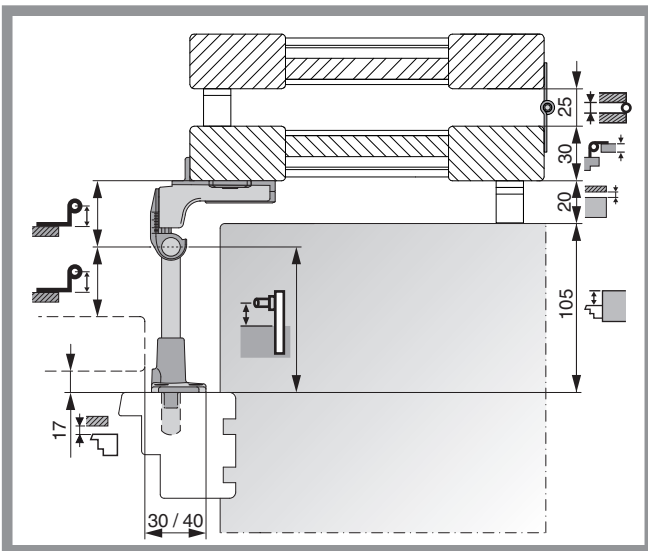
Calculation shutter pin distance

	110mm
	+ 20mm
	+ 30mm
<hr/>	
=	160mm : 2 = 80mm
<hr/>	
→	L 105 (60-90mm)

Calculation hinge crank

	110mm
	+ 20mm
	- 30mm
<hr/>	
=	100mm : 2 = 50mm
<hr/>	
→	Gr. 2 (45-70mm)

2.1.3.2 Flush mounted with spacing



Calculation shutter pin distance

	105mm
	+ 20mm
	+ 47mm (shutter thickness 30mm + distance 17mm)
<hr/>	
=	172mm : 2 = 86mm
<hr/>	
→	L 105 (60-90mm)

Calculation hinge crank

	105mm
	+ 20mm
	- 30mm
	- 17mm
<hr/>	
=	78mm : 2 = 39mm
<hr/>	
→	Gr. 1 (32-50mm)

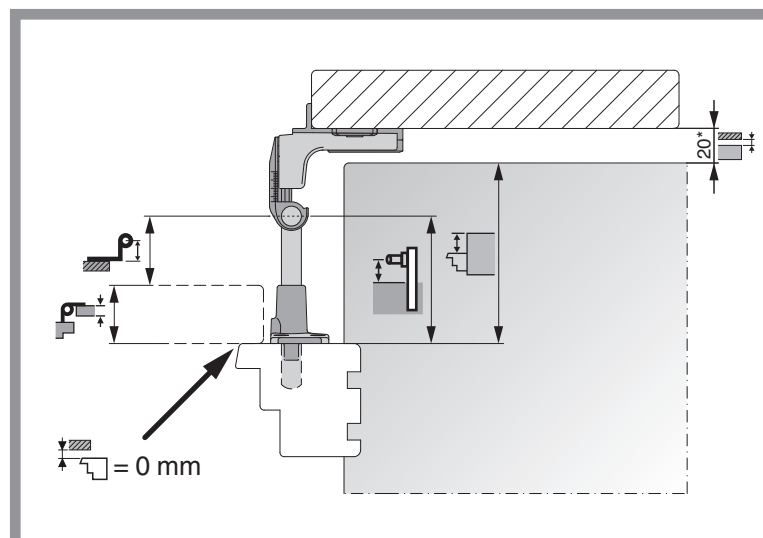
2.1.4 Tables for BLR hardware sizes

for shutter distance 0mm (pin and snap holder sizes apply for installation on timber — see Section 1.5)

Sash hinges - Crank																				Distance	0										
		Reveal-depth in mm																													
		0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210								
Shutter thickness	25 mm	0	15	15	15	20	23	28	33	38	43	48	53	58	63	68	73	78	83	88	93	98	0								
	30 mm	0	0	15	15	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100								
	35 mm	0	0	15	15	15	20	23	28	33	38	43	48	53	58	63	68	73	78	83	88	93	98								
	40 mm	0	0	0	15	15	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95								
	50 mm	0	0	0	0	15	15	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90								
		flat					flush					Gr.0					Gr.1					Gr.2					Gr.3				
		Fixed Crank with lateral adjustment										Crank with lateral adjustment																			

Adjustable shutter pin - Distance																													
		Reveal-depth in mm																											
		0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210						
Shutter thickness	25 mm	0	40	40	40	45	48	53	58	63	68	73	78	83	88	93	98	103	108	113	118	123	0						
	30 mm	30	30	45	45	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130						
	35 mm	35	35	50	50	50	55	58	63	68	73	78	83	88	93	98	103	108	113	118	123	128	133						
	40 mm	40	40	40	55	55	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135						
	50 mm	50	50	50	50	65	65	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140						
		L59	L75			L85			L95			L105			L115			L125			L135			L150			L165		

Shutter catch - Shutter pin distance																												
		Reveal-depth in mm																										
		0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210					
Shutter thickness	25 mm	0	0	0	0	0	54	54	58	63	68	73	78	83	88	93	98	103	108	113	118	123	0					
	30 mm	0	0	0	0	0	59	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	0					
	35 mm	0	0	0	0	0	64	64	68	73	78	83	88	93	98	103	108	113	118	123	128	133	0					
	40 mm	0	0	0	0	0	69	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	0					
	50 mm	0	0	0	0	0	79	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	0					
								L90			L110						L140						L165 always between 2 shutter pins					



* 20mm for hinges with adjustable crank. 20-50mm for hinges with crank fixing.

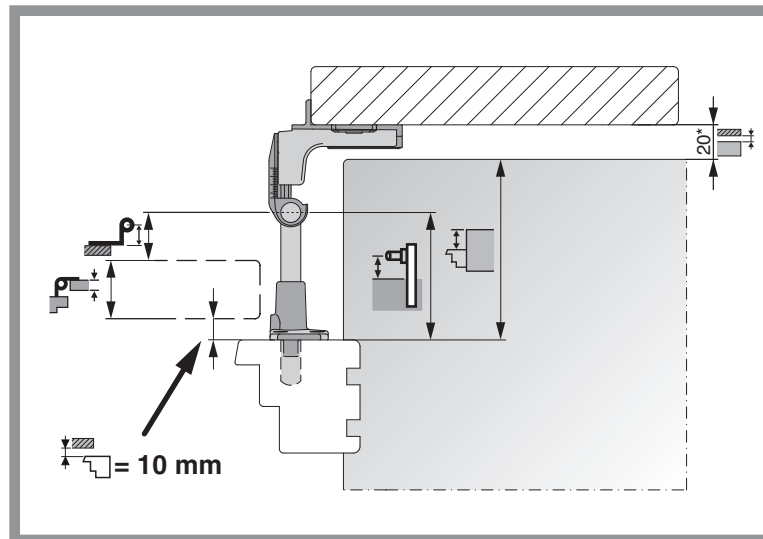
for shutter distance 10mm (pin and snap holder sizes apply for installation on timber — see Section 1.5)

Sash hinges - Crank																					Distance	10									
		Reveal-depth in mm																													
		0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210								
Shutter thickness	25 mm		0	15	15	15	20	23	28	33	38	43	48	53	58	63	68	73	78	83	88	93	98								
	30 mm		0	0	15	15	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95								
	35 mm		0	0	15	15	15	20	23	28	33	38	43	48	53	58	63	68	73	78	83	88	93								
	40 mm		0	0	0	15	15	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90								
	50 mm			0	0	0	15	15	15	20	25	30	35	40	45	50	55	60	65	70	75	80									
		flat					flush					Gr.0					Gr.1					Gr.2					Gr.3				
Fixed Crank with lateral adjustment											Crank with lateral adjustment																				



Adjustable shutter pin - Distance																												
		Reveal-depth in mm																										
		0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210					
Shutter thickness	25 mm		35	50	50	50	53	58	63	68	73	78	83	88	93	98	103	108	113	118	123	128	133					
	30 mm		40	40	55	55	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135					
	35 mm		45	45	60	60	60	63	68	73	78	83	88	93	98	103	108	113	118	123	128	133	138					
	40 mm		50	50	50	65	65	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140					
	50 mm			60	60	60	75	75	75	80	85	90	95	100	105	110	115	120	125	130	135	140						
		L59	L75		L85			L95			L105			L115			L125			L135			L150			L165		

Shutter catch - Shutter pin distance																										
		Reveal-depth in mm																								
		0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210			
Shutter thickness	25 mm							64	64	68	73	78	83	88	93	98	103	108	113	118	123	128	133			
	30 mm							69	69	70	75	80	85	90	95	100	105	110	115	120	125	130	135			
	35 mm								74	74	78	83	88	93	98	103	108	113	118	123	128	133	138			
	40 mm								79	79	80	85	90	95	100	105	110	115	120	125	130	135	140			
	50 mm									89	89	90	95	100	105	110	115	120	125	130	135	140				
							L90					L110					L140					L165 always between 2 shutter pins				



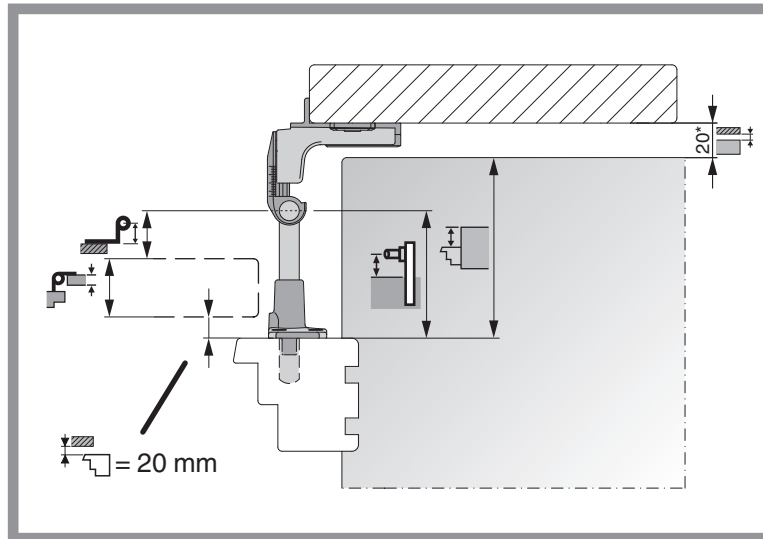
* 20mm for hinges with adjustable crank. 20-50mm for hinges with crank fixing.

for shutter distance 20mm (pin and snap holder sizes apply for installation on timber — see Section 1.5)

Sash hinges - Crank																				Distance	20										
		Reveal-depth in mm																													
		0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210								
Shutter thickness	25 mm	0	0	0	15	15	15	20	23	28	33	38	43	48	53	58	63	68	73	78	83	88	93								
	30 mm	0	0	0	0	15	15	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90								
	35 mm	0	0	0	0	15	15	15	20	23	28	33	38	43	48	53	58	63	68	73	78	83									
	40 mm	0	0	0	0	15	15	15	20	25	30	35	40	45	50	55	60	65	70	75	80										
	50 mm	0	0	0	0	15	15	15	20	25	30	35	40	45	50	55	60	65	70	75	80										
		flat					flush					Gr.0					Gr.1					Gr.2					Gr.3				
		Fixed Crank with lateral adjustment										Crank with lateral adjustment																			

Adjustable shutter pin - Distance																												
		Reveal-depth in mm																										
		0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210					
Shutter thickness	25 mm	45	45	45	60	60	60	65	68	73	78	83	88	93	98	103	108	113	118	123	128	133	138					
	30 mm	50	50	50	65	65	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140						
	35 mm	55	55	55	70	70	70	73	78	83	88	93	98	103	108	113	118	123	128	133	138							
	40 mm	60	60	60	75	75	75	80	85	90	95	100	105	110	115	120	125	130	135	140								
	50 mm	70	70	70	85	85	85	90	95	100	105	110	115	120	125	130	135	140										
		L75			L85			L95			L105			L115			L125			L135			L150			L165		

Shutter catch - Shutter pin distance																								
		Reveal-depth in mm																						
		0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	
Shutter thickness	25 mm								74	74	78	83	88	93	98	103	108	113	118	123	128	133	138	
	30 mm								79	79	80	85	90	95	100	105	110	115	120	125	130	135	140	
	35 mm									84	84	88	93	98	103	108	113	118	123	128	133	138		
	40 mm									89	89	90	95	100	105	110	115	120	125	130	135	140		
	50 mm										99	99	100	105	110	115	120	125	130	135	140			
									L110					L140					L165 always between 2 shutter pins					



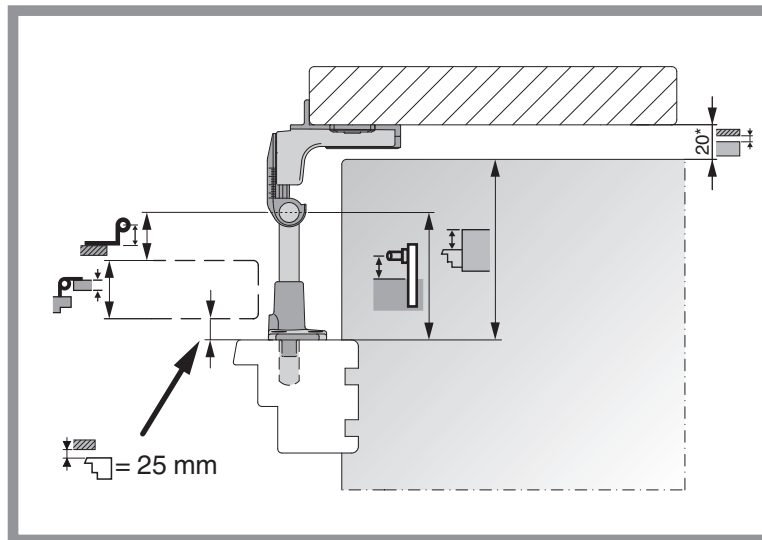
for shutter distance 25mm (pin and snap holder sizes apply for installation on timber — see Section 1.5)

Sash hinges - Crank																				Distance	25			
		Reveal-depth in mm																						
		0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	
Shutter thickness	25 mm		0	0	0	15	15	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	
	30 mm		0	0	0	15	15	15	20	23	28	33	38	43	48	53	58	63	68	73	78	83		
	35 mm			0	0	0	15	15	15	20	25	30	35	40	45	50	55	60	65	70	75	80		
	40 mm				0	0	0	15	15	15	20	23	28	33	38	43	48	53	58	63	68	73		
	50 mm					0	0	0	15	15	15	20	23	28	33	38	43	48	53	58	63			
flat							flush					Gr.0				Gr.1			Gr.2			Gr.3		
Fixed Crank with lateral adjustment										Crank with lateral adjustment														



Adjustable shutter pin - Distance																								
		Reveal-depth in mm																						
		0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	
Shutter thickness	25 mm		50	50	50	65	65	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	
	30 mm		55	55	55	70	70	70	75	78	83	88	93	98	103	108	113	118	123	128	133	138		
	35 mm			60	60	60	75	75	75	80	85	90	95	100	105	110	115	120	125	130	135	140		
	40 mm				65	65	65	80	80	80	85	88	93	98	103	108	113	118	123	128	133	138		
	50 mm					75	75	75	90	90	90	95	98	103	108	113	118	123	128	133	138			
L75			L85			L95			L105			L115		L125		L135			L150			L165		

Shutter catch - Shutter pin distance																							
		Reveal-depth in mm																					
		0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210
Shutter thickness	25 mm								79	79	80	85	90	95	100	105	110	115	120	125	130	135	140
	30 mm									84	84	88	93	98	103	108	113	118	123	128	133	138	
	35 mm										89	89	90	95	100	105	110	115	120	125	130	135	140
	40 mm											94	94	98	103	108	113	118	123	128	133	138	
	50 mm												104	104	108	113	118	123	128	133	138		
L110									L140						L165 always between 2 shutter pins								



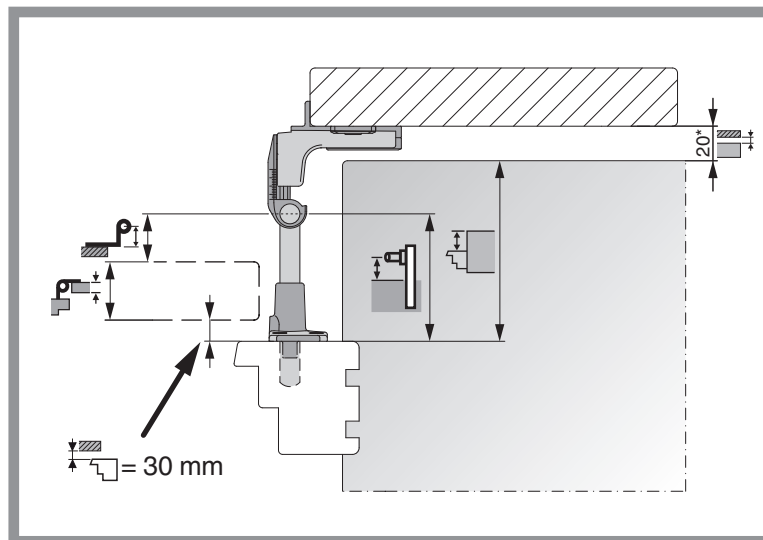
* 20mm for hinges with adjustable crank. 20-50mm for hinges with crank fixing.

for shutter distance 30mm (pin and snap holder sizes apply for installation on timber — see Section 1.5)

Sash hinges - Crank																				Distance	30			
		Reveal-depth in mm																						
		0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	
Shutter thickness	25 mm		0	0	0	15	15	15	20	23	28	33	38	43	48	53	58	63	68	73	78	83		
	30 mm			0	0	0	15	15	15	20	23	28	33	38	43	48	53	58	63	68	73	78	83	
	35 mm				0	0	15	15	15	20	23	28	33	38	43	48	53	58	63	68	73		80	
	40 mm					0	0	15	15	15	20	25	30	35	40	45	50	55	60	65	70			
50 mm						0	0	0	15	15	15	20	25	30	35	40	45	50	55	60				
		flat							flush					Gr.0			Gr.1			Gr.2			Gr.3	
Fixed Crank with lateral adjustment										Crank with lateral adjustment														

Adjustable shutter pin - Distance																						
		Reveal-depth in mm																				
		0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
Shutter thickness	25 mm		55	55	55	70	70	70	73	78	83	88	93	98	103	108	113	118	123	128	133	138
	30 mm			60	60	60	75	75	75	80	85	90	95	100	105	110	115	120	125	130	135	140
	35 mm				65	65	65	80	80	80	88	88	93	98	103	108	113	118	123	128	133	138
	40 mm					70	70	70	85	85	85	90	95	100	105	110	115	120	125	130	135	140
	50 mm						80	80	80	95	95	95	100	105	110	115	120	125	130	135	140	
		L75	L85	L95	L105			L115			L125			L135			L150			L165		

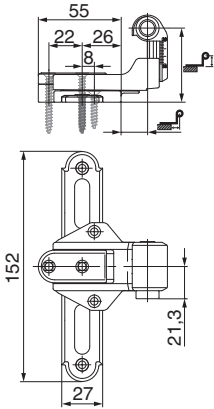
Shutter catch - Shutter pin distance																							
		Reveal-depth in mm																					
		0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210
Shutter thickness	25 mm							84	84	84	88	93	98	103	108	113	118	123	128	133	138		
	30 mm								89	89	90	95	100	105	110	115	120	125	130	135	140		
	35 mm								94	94	94	98	103	108	113	118	123	128	133	138			
	40 mm									99	99	100	105	110	115	120	125	130	135	140			
	50 mm										109	109	110	115	120	125	130	135	140				
		L110							L140					L165 always between 2 shutter pins									



* 20mm for hinges with adjustable crank. 20-50mm for hinges with crank fixing.

2.2 Hinges

2.2.1 Hinges without fixing tab

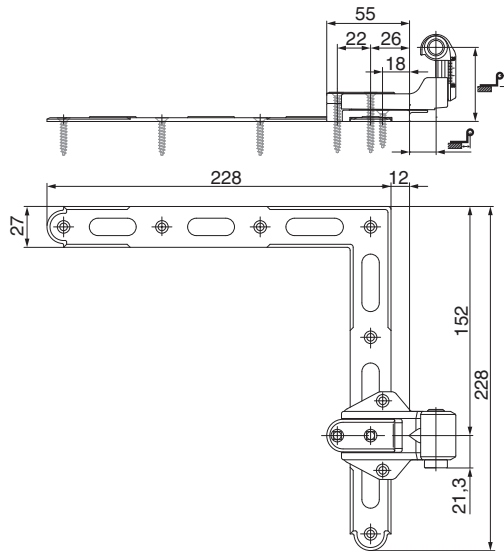


58229



2.2.1.1 BLR cross hinges with variable crank						No
black-S	size 0	60 - 78	40 - 49	16 - 19	20	58223¹
	size 1	80 - 116	50 - 68	16 - 19	20	58226¹
	size 2	120 - 170	70 - 95	16 - 19	20	58229¹
	size 3	150 - 190	85 - 105	16 - 19	20	58232¹
grey-S	size 0	60 - 78	40 - 49	16 - 19	20	210358¹
	size 1	80 - 116	50 - 68	16 - 19	20	210359¹
	size 2	120 - 170	70 - 95	16 - 19	20	210360¹
	size 3	150 - 190	85 - 105	16 - 19	20	210361¹
white-S	size 0	60 - 78	40 - 49	16 - 19	20	58225¹
	size 1	80 - 116	50 - 68	16 - 19	20	58228¹
	size 2	120 - 170	70 - 95	16 - 19	20	58231¹
	size 3	150 - 190	85 - 105	16 - 19	20	58234¹

¹ The specified reveal depths apply to installation situations with 30mm shutter thickness and 0mm shutter distance.

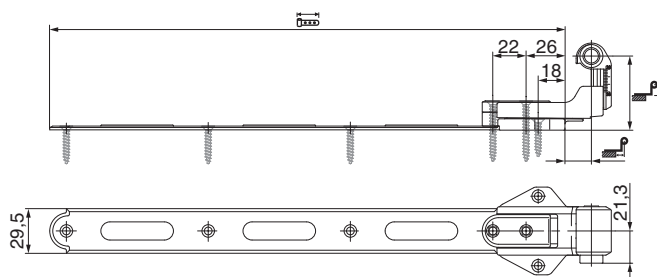


14507

2.2.1.2 BLR corner hinges with variable crank						No
black-S	size 0	60 - 78	40 - 49	16 - 19	10	14501 ^{1,2}
	size 1	80 - 116	50 - 68	16 - 19	10	14504 ^{1,2}
	size 2	120 - 170	70 - 95	16 - 19	10	14507 ^{1,2}
	size 3	150 - 190	85 - 105	16 - 19	10	14510 ^{1,2}
grey-S	size 0	60 - 78	40 - 49	16 - 19	10	102174 ^{1,2}
	size 1	80 - 116	50 - 68	16 - 19	10	102175 ^{1,2}
	size 2	120 - 170	70 - 95	16 - 19	10	102176 ^{1,2}
	size 3	150 - 190	85 - 105	16 - 19	10	102177 ^{1,2}
white-S	size 0	60 - 78	40 - 49	16 - 19	10	14503 ^{1,2}
	size 1	80 - 116	50 - 68	16 - 19	10	14506 ^{1,2}
	size 2	120 - 170	70 - 95	16 - 19	10	14509 ^{1,2}
	size 3	150 - 190	85 - 105	16 - 19	10	14512 ^{1,2}

¹ With corner hinges, a packaging unit consists of 1 piece top corner hinge and 1 piece bottom corner hinge.

² The specified reveal depths apply to installation situations with 30mm shutter thickness and 0mm shutter distance.

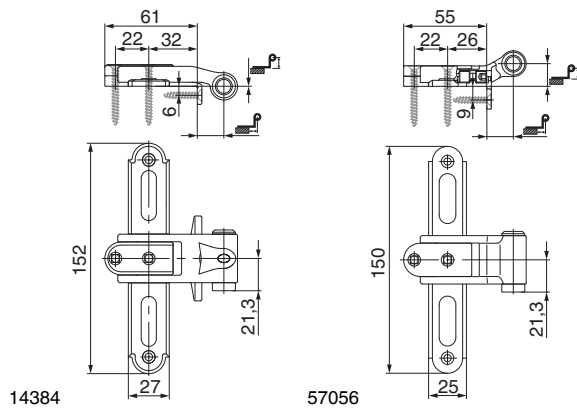


57274

2.2.1.3 BLR long hinges with variable crank						No
black-S	size 0	60 - 78	40 - 49	16 - 19	340	57272 ¹
	size 1	80 - 116	50 - 68	16 - 19	340	57273 ¹
	size 2	120 - 170	70 - 95	16 - 19	340	57274 ¹
	size 3	150 - 190	85 - 105	16 - 19	340	57275 ¹

¹ The specified reveal depths apply to installation situations with 30mm shutter thickness and 0mm shutter distance.

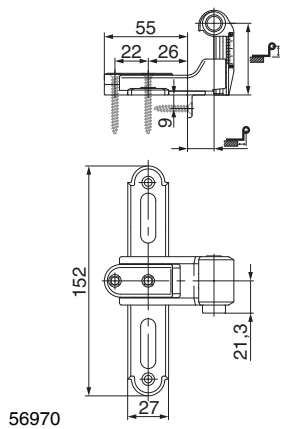
2.2.2 BLR hinges with fixing tab



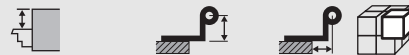
2.2.2.1 BLR cross hinges with fixed crank



						No
black-S	straight	0	18	32	20	14384
	flush	15	18	26	20	57056
grey-S	straight	0	18	32	20	102137
	flush	15	18	26	20	103421
white-S	straight	0	18	32	20	10703
	flush	15	18	26	20	52686

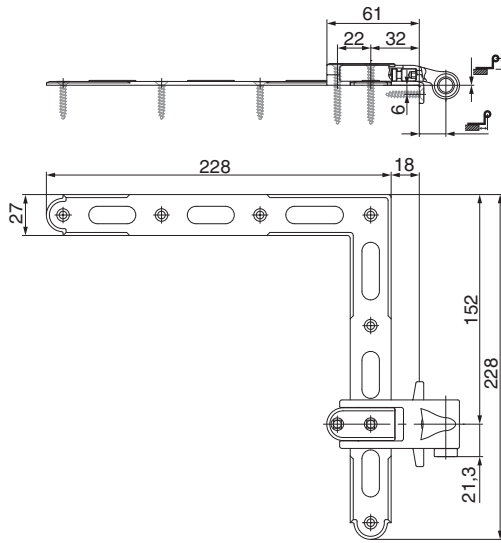


2.2.2.2 BLR cross hinges with variable crank

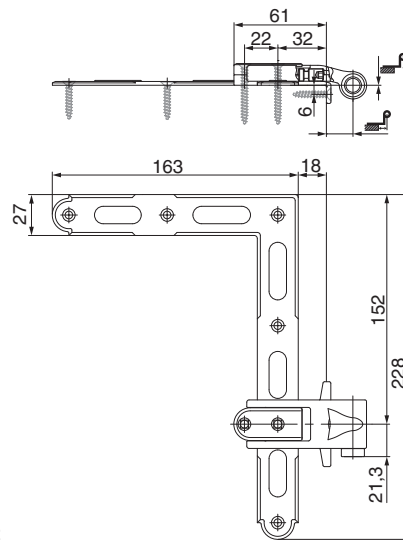


						No
black-S	size 0	50 - 74	20 - 32	18	20	208750 ¹
	size 1	74 - 110	32 - 50	18	20	56966 ¹
	size 2	100 - 150	45 - 70	18	20	56970 ¹
	size 3	140 - 210	65 - 100	18	20	56974 ¹
grey-S	size 0	50 - 74	20 - 32	18	20	210362 ¹
	size 1	74 - 110	32 - 50	18	20	210363 ¹
	size 2	100 - 150	45 - 70	18	20	210364 ¹
	size 3	140 - 210	65 - 100	18	20	210365 ¹
white-S	size 0	50 - 74	20 - 32	18	20	208754 ¹
	size 1	74 - 110	32 - 50	18	20	24988 ¹
	size 2	100 - 150	45 - 70	18	20	24991 ¹
	size 3	140 - 210	65 - 100	18	20	24994 ¹

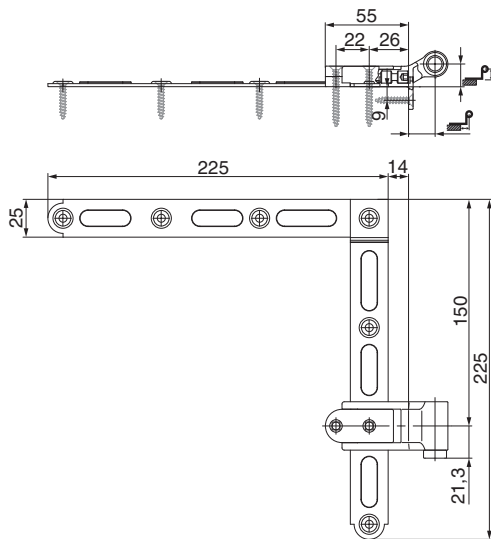
¹ The specified reveal depths apply to installation situations with 30mm shutter thickness and 0mm shutter distance.



14166



101332



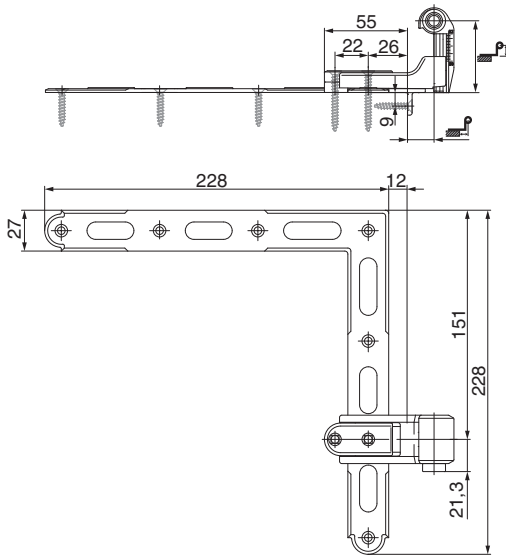
14174

2.2.2.3 BLR corner hinges with fixed crank



		0	18	32	10	No
black-S	straight	0	18	32	10	14166 ¹
	straight SL 228x163	0	18	32	10	101332 ¹
	flush	15	18	26	10	14174 ¹
white-S	straight	0	18	32	10	10706 ¹
	flush	15	18	26	10	10717 ¹

¹ With corner hinges, a packaging unit consists of 1 piece top corner hinge and 1 piece bottom corner hinge.

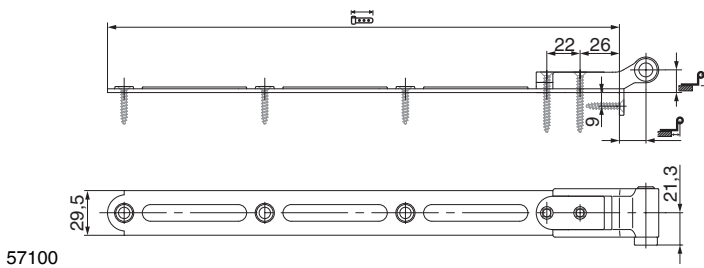
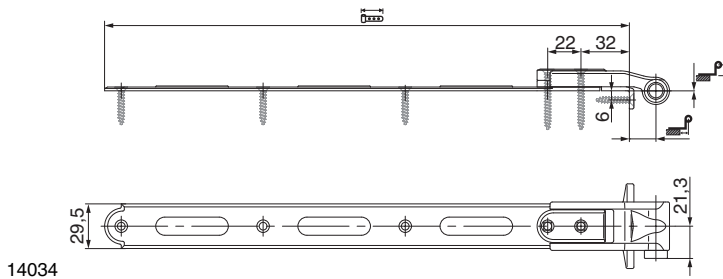


14228

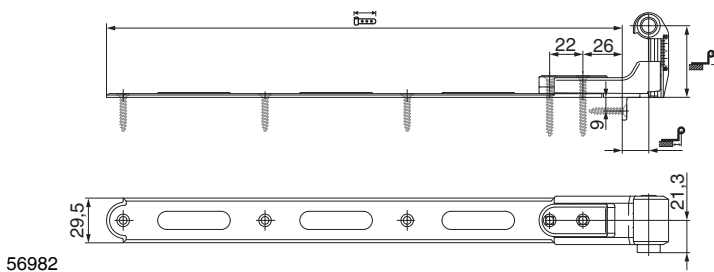
2.2.2.4 BLR corner hinges with variable crank						No
black-S	size 0	50 - 74	20 - 32	18	10	101796 ^{1,2}
	size 1	74 - 110	32 - 50	18	10	14224 ^{1,2}
	size 2	100 - 150	45 - 70	18	10	14228 ^{1,2}
	size 3	140 - 210	65 - 100	18	10	14232 ^{1,2}
grey-S	size 0	50 - 74	20 - 32	18	10	102181 ^{1,2}
	size 1	74 - 110	32 - 50	18	10	102182 ^{1,2}
	size 2	100 - 150	45 - 70	18	10	102183 ^{1,2}
	size 3	140 - 210	65 - 100	18	10	102184 ^{1,2}
white-S	size 0	50 - 74	20 - 32	18	10	101797 ^{1,2}
	size 1	74 - 110	32 - 50	18	10	13168 ^{1,2}
	size 2	100 - 150	45 - 70	18	10	13169 ^{1,2}
	size 3	140 - 210	65 - 100	18	10	13170 ^{1,2}

¹ With corner hinges, a packaging unit consists of 1 piece top corner hinge and 1 piece bottom corner hinge.

² The specified reveal depths apply to installation situations with 30mm shutter thickness and 0mm shutter distance.

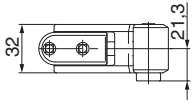
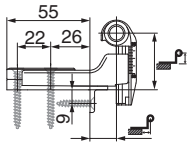


2.2.2.5 BLR long hinges with fixed crank							No
black-S	straight	0	18	340	32	20	14034
				200	32	20	14170
	flush	15	18	250	26	20	57099
				340	26	20	57100



2.2.2.6 BLR long hinges with variable crank								No
black-S	size 0	50 - 74	20 - 32	18	340	20		208751 ¹
					200	20		208752 ¹
	size 1	74 - 110	32 - 50	18	340	20		56978 ¹
					200	20		56990 ¹
	size 2	100 - 150	45 - 70	18	340	20		56982 ¹
					200	20		56994 ¹
	size 3	140 - 210	65 - 100	18	340	20		56986 ¹
					200	20		56998 ¹

¹ The specified reveal depths apply to installation situations with 30mm shutter thickness and 0mm shutter distance.



57051

2.2.2.7 BLR short hinges with variable crank



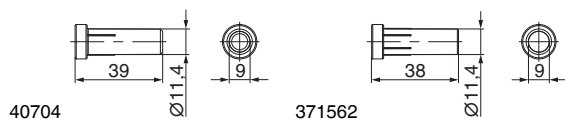
No

black-S						
	size 0	50 - 74	20 - 32	18	20	208753¹
	size 1	74 - 100	32 - 50	18	20	57050¹
	size 2	100 - 150	45 - 70	18	20	57051¹
	size 3	140 - 210	65 - 100	18	20	57052¹

¹ The specified reveal depths apply to installation situations with 30mm shutter thickness and 0mm shutter distance.



2.2.3 Accessories for shutter hinges



2.2.3.1 BLR sleeves and cover caps



No

black	closed hinge regulator sleeve	100	40704
	open hinge regulator sleeve	100	371562
	short cover cap	100	41578
grey	closed hinge regulator sleeve	100	465210
	short cover cap	100	465211
white	closed hinge regulator sleeve	100	41149
	short cover cap	100	42845



13327

2.2.3.2 BLR safety levers

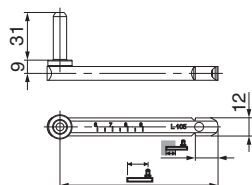


No

black	right	20	13328
	left	20	13327
grey	right	20	212599
	left	20	212598
white	right	20	13330
	left	20	13329

2.3 Shutter pins

2.3.1 BLR threaded surface mounted frame hinges

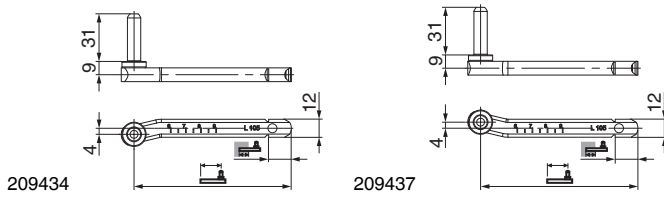


209422



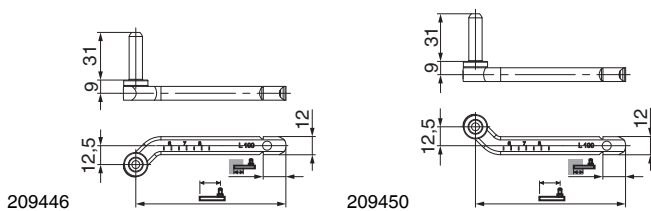
2.3.1.1 BLR threaded surface mounted frame hinges straight without lateral adjustment								No
black-S	L59	30 - 44	15	59	20	20	209935¹	
	L75	30 - 60	15	75	20	20	209936¹	
	L85	30 - 70	15	85	20	20	209422¹	
	L95	45 - 80	15	95	35	20	209937¹	
	L105	50 - 90	15	105	35	20	209423¹	
	L115	65 - 100	15	115	55	20	209938¹	
	L125	70 - 110	15	125	55	20	209471¹	
	L135	80 - 120	15	135	55	20	209424¹	
	L150	95 - 130	20	150	55	20	209939¹	
	L165	110 - 140	25	165	55	20	209425¹	
grey-S	L59	30 - 44	15	59	20	20	210402¹	
	L75	30 - 60	15	75	20	20	210403¹	
	L85	30 - 70	15	85	20	20	210401¹	
	L95	45 - 80	15	95	35	20	210404¹	
	L105	50 - 90	15	105	35	20	210409¹	
	L115	65 - 100	15	115	55	20	210405¹	
	L125	70 - 110	15	125	55	20	210411¹	
	L135	80 - 120	15	135	55	20	210410¹	
	L150	95 - 130	20	150	55	20	210406¹	
	L165	110 - 140	25	165	55	20	210412¹	
white-S	L59	30 - 44	15	59	20	20	209942¹	
	L75	30 - 60	15	75	20	20	209943¹	
	L85	30 - 70	15	85	20	20	209430¹	
	L95	45 - 80	15	95	35	20	209944¹	
	L105	50 - 90	15	105	35	20	209431¹	
	L115	65 - 100	15	115	55	20	209945¹	
	L125	70 - 110	15	125	55	20	209474¹	
	L135	80 - 120	15	135	55	20	209432¹	
	L150	95 - 130	20	150	55	20	209946¹	
	L165	110 - 140	25	165	55	20	209433¹	

¹ Given minimum shutter pin insertion depths apply only to installation on timber (refer to section 1.5)!



2.3.1.2 BLR threaded surface mounted frame hinges with crank 4mm										No
black-S	left	L85	40 - 70	15	85	20	20			209434 ¹
		L105	55 - 90	15	105	35	20			209435 ¹
		L135	80 - 120	15	135	55	20			209436 ¹
	right	L165	110 - 140	25	165	55	20			215469 ¹
		L85	40 - 70	15	85	20	20			209437 ¹
		L105	55 - 90	15	105	35	20			209438 ¹
		L135	80 - 120	15	135	55	20		209439 ¹	
		L165	110 - 140	25	165	55	20		215468 ¹	

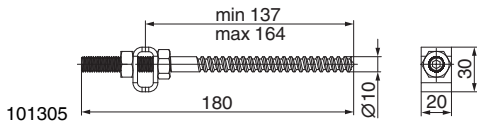
¹ Given minimum shutter pin insertion depths apply only to installation on timber (refer to section 1.5)!



2.3.1.3 BLR threaded surface mounted frame hinges with crank 12.5mm										No
black-S	left	L80	40 - 65	15	80	20	20			209446 ¹
		L100	55 - 85	15	100	35	20			209447 ¹
		L130	75 - 115	15	130	55	20			209448 ¹
	right	L150	95 - 130	20	150	55	20			209449 ¹
		L80	40 - 65	15	80	20	20			209450 ¹
		L100	55 - 85	15	100	35	20			209451 ¹
		L130	75 - 115	15	130	55	20		209452 ¹	
		L150	95 - 130	20	150	55	20		209453 ¹	
white-S	left	L100	55 - 85	15	100	35	20			209463 ¹
		L130	75 - 115	15	130	55	20			209464 ¹
	right	L100	55 - 85	15	100	35	20			209467 ¹
		L130	75 - 115	15	130	55	20			209468 ¹

¹ Given minimum shutter pin insertion depths apply only to installation on timber (refer to section 1.5)!

2.3.2 Accessories for shutter pins



101305

2.3.2.1 BLR shutter pin support

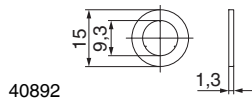


No

black-S	shutter pin support, length 180mm	20	101305¹
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¹ These parts are excluded from the 10-year surface guarantee.



40892

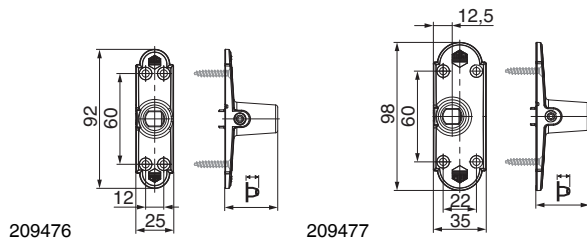
2.3.2.2 Spacers for shutter pin



No

black	spacer BLR, for shutter pin	Ø 15mm	1,3	100	40892
grey	spacer BLR, for shutter pin	Ø 15mm	1,3	100	361316

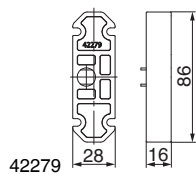
2.4 BLR shutter pin holders



2.4.1 BLR shutter pin holders					No	
black-S	for adjustable shutter pin up to	L85	25	20	20	209475
		L105	25	35	20	209476¹
		L165	25	55	20	209479¹
		L105	35	35	20	209477
		L165	35	55	20	209478
grey-S	for adjustable shutter pin up to	L85	25	20	20	210353
		L105	25	35	20	210354¹
		L165	25	55	20	210357¹
		L105	35	35	20	210355
		L165	35	55	20	210356
white-S	for adjustable shutter pin up to	L85	25	20	20	209485
		L105	25	35	20	209486¹
		L165	25	55	20	209488¹
		L105	35	35	20	209487
		L165	35	55	20	209489

¹ Not suitable for use with shutter catches and crank openers.

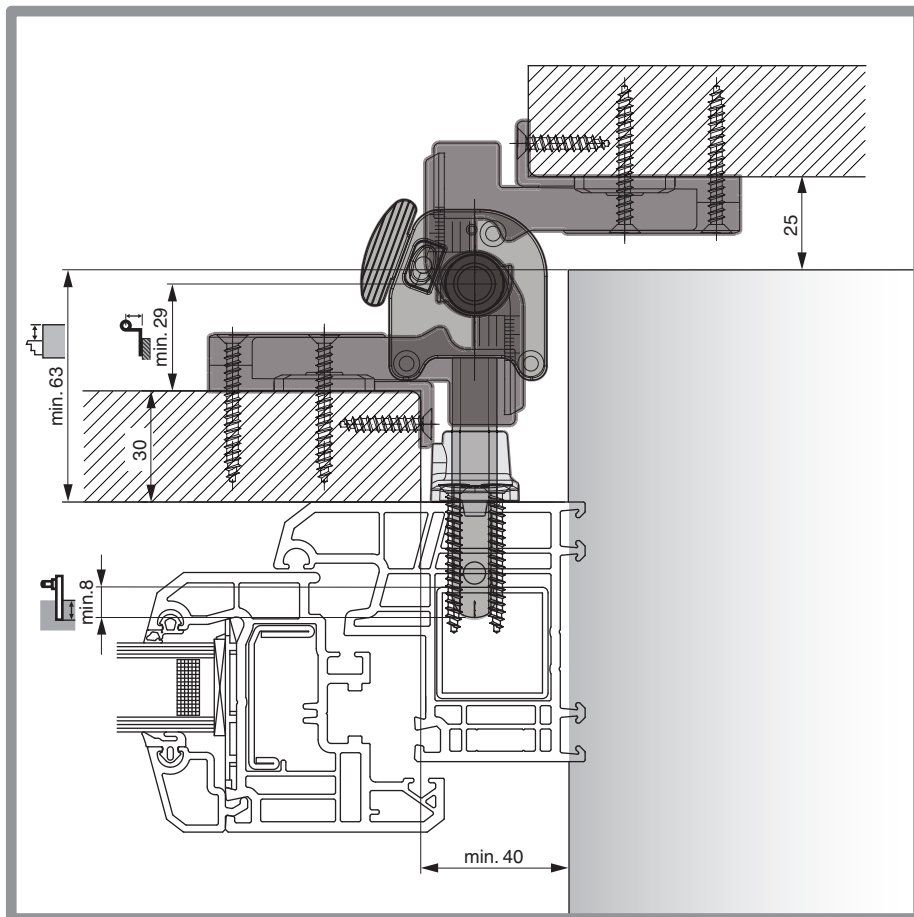
2.4.2 Accessories for shutter pin holders




2.4.2.1 Packer for shutter pin holder for timber-aluminium windows			No
packer shutter pin holder 16mm high for timber-alu windows black		100	42279


2.5 BLR snap holders


2.5.1 Installation example



Calculation minimum reveal depth





2 x  (2 x 29) 58mm

 + 30mm

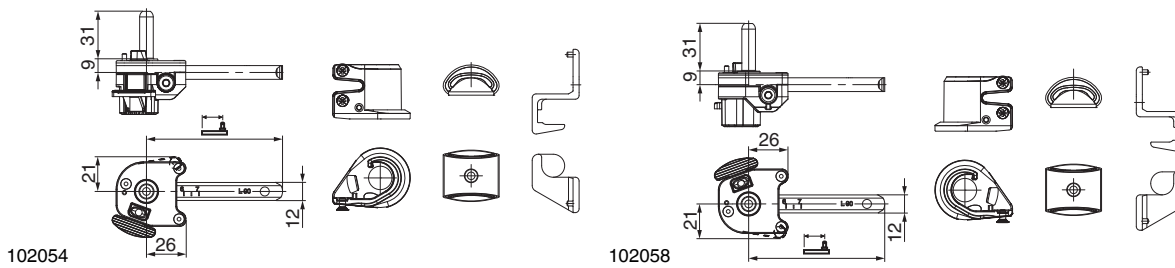
 - 25mm




= 63mm Minimum reveal depth

Application ranges for snap holders for pin distance and bracket width

			
55-70mm		25mm	20mm
70-90mm	25mm	35mm	35mm
90-140mm	25mm	35mm	55mm

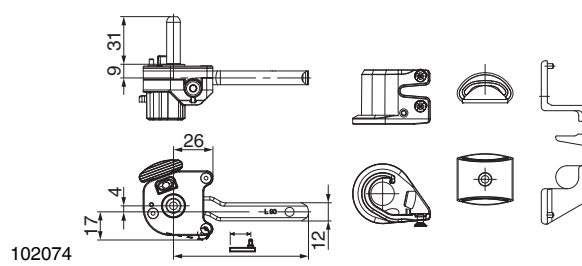
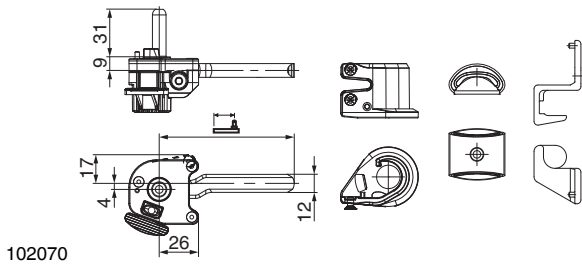
The minimum reveal depth shown in the above example applies for installations with shutter thicknesses of 30mm, 25mm distance to wall and installation without clearance to frame.



2.5.2 BLR snap holders straight						No	
black-S	left	L90	55 - 70	90	20	102053¹	
		L110	55 - 90	110	20	102054¹	
		L140	85 - 120	140	20	102055¹	
		L165	110 - 140	165	20	102056¹	
	right	L90	55 - 70	90	20	102057¹	
		L110	55 - 90	110	20	102058¹	
		L140	85 - 120	140	20	102059¹	
		L165	110 - 140	165	20	102060¹	
	grey-S	left	L90	55 - 70	90	20	102185¹
			L110	55 - 90	110	20	102186¹
			L140	85 - 120	140	20	102187¹
			L165	110 - 140	165	20	102188¹
right		L90	55 - 70	90	20	102189¹	
		L110	55 - 90	110	20	102190¹	
		L140	85 - 120	140	20	102191¹	
		L165	110 - 140	165	20	102192¹	
white-S		left	L90	55 - 70	90	20	102061¹
			L110	55 - 90	110	20	102062¹
			L140	85 - 120	140	20	102063¹
			L165	110 - 140	165	20	102064¹
	right	L90	55 - 70	90	20	102065¹	
		L110	55 - 90	110	20	102066¹	
		L140	85 - 120	140	20	102067¹	
		L165	110 - 140	165	20	102068¹	

¹ **CAUTION:** Shutters with snap holders have a limited storm resistance. The information in chapter 1.3 Wind Resistance must be observed!

- At peak wind speeds over 60km/h, the shutters have to be closed or locked!
- max. shutter width 600mm
- max. folding shutter width 2 x 600mm
- max. height 2,100mm
- max. sash weight 20kg (applies to folding shutters for the total weight of both sashes)
- Use only in combination with 35mm wide shutter pin holder, except for shutter pin distances of ≤ 70 mm.
- The buffer stop must always be installed. When the buffer stop is used, make sure that the facade has sufficient compression strength (e.g. for thermal insulation)!
- A safety catch must be installed on every sash!
- DO NOT use a snap holder L165 as a load-bearing shutter pin!
- **CAUTION:** On multi-sash shutters with an internal rotation-point, no snap holders may be used (risk of falling out during storm)!



102070

102074

2.5.3 BLR snap holders with crank 4mm



No

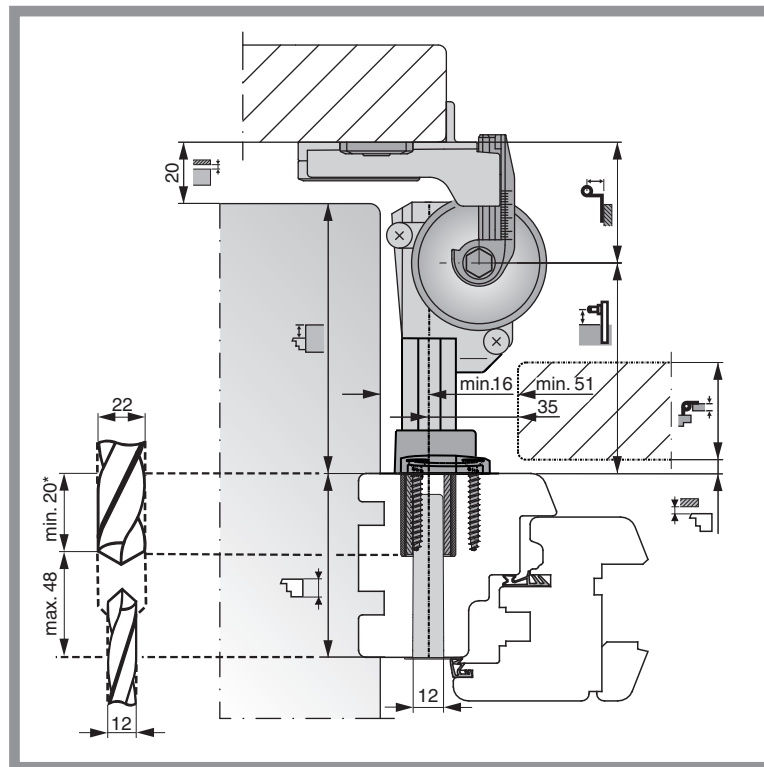
black-S							
	left	L90	68 - 70	90	20	102069¹	
		L110	70 - 90	110	20	102070¹	
		L140	90 - 120	140	20	102071¹	
		L165	110 - 140	165	20	102072¹	
	right	L90	68 - 70	90	20	102073¹	
		L110	70 - 90	110	20	102074¹	
		L140	90 - 120	140	20	102075¹	
		L165	110 - 140	165	20	102076¹	

¹ **CAUTION:** Shutters with snap holders have a limited storm resistance. The information in chapter 1.3 Wind Resistance must be observed!

- At peak wind speeds over 60km/h, the shutters have to be closed or locked!
- max. shutter width 600mm
- max. folding shutter width 2 x 600mm
- max. height 2,100mm
- max. sash weight 20kg (applies to folding shutters for the total weight of both sashes)
- Use only in combination with 35mm wide shutter pin holder, except for shutter pin distances of ≤ 70mm.
- The buffer stop must always be installed. When the buffer stop is used, make sure that the facade has sufficient compression strength (e.g. for thermal insulation)!
- A safety catch must be installed on every sash!
- DO NOT use a snap holder L165 as a load-bearing shutter pin!
- **CAUTION:** On multi-sash shutters with an internal rotation-point, no snap holders may be used (risk of falling out during storm)!

2.6 Crank openers

2.6.1 Installation example with hinge



Calculation shutter pin distance

	105mm
	+ 20mm
	+ 30mm
	+ 17mm
<hr/>	
=	172mm : 2 = 86mm

→ L 105 (60-90mm)

Calculation hinge crank

	105mm
	+ 20mm
	- 30mm
	- 17mm
<hr/>	
=	78mm : 2 = 39mm

→ Gr. 1 (32-50 mm)

Calculation drive gear length

	86mm
Depth (min. 20mm) + 40mm*	
<hr/>	
=	126mm Drive gear length

→ Drive gear L 130

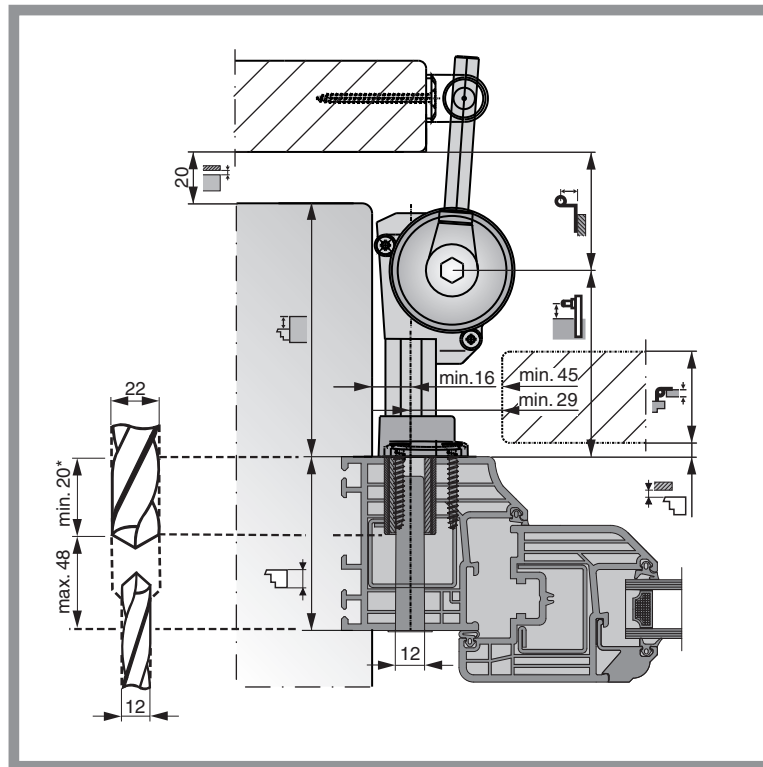
* Greater depth improves stability.

→ Cut the drive pipe, insulation and rotary arm as necessary!




Information on hardware selection:


- The pivot points of the hinge and the inner opener hinge must be exactly in line. This requires a precise drilling and adjustment.
- Storm resistance is higher on the inner opener hinge than on the rotary arm.
- For doors with inner openers, the inner opener hinge can be inserted between two load-bearing hinges. A third supporting hinge is not required.
- The shutter pin holder for the threaded surface mounted frame hinge must be 35mm wide.
- A safety catch must be installed on every sash.
- The information in chapter 1.3 Wind resistance must be observed!


2.6.2 Installation example with rotary arm




Calculation shutter pin distance

	105mm
	+ 20mm
	+ 30mm
	+ 17mm

= 172mm : 2 = 86mm 

→ L 105 (60-90mm) 

Calculation drive gear length

	86mm
Depth (min. 20mm) + 40mm*	

= 126mm Drive gear length

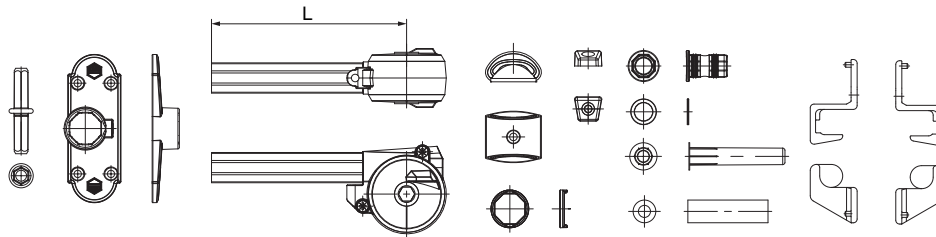
→ Drive gear L 130

* Greater depth improves stability.

→ Cut the drive pipe, insulation and rotary arm as necessary!

Information on hardware selection:

- The pivot points of the hinge and the rotary arm do not have to be exactly in line. Precise drilling and adjustment is not required. Minor deviations are allowed.
- Storm resistance is lower for the rotary arm than for the inner opener hinge.
- For doors with rotary arm, at least three load-bearing hinges must be used in addition to the inner opener. In the middle, a third supporting hinge is required.
- The gap between the hinge and rotary arm should be as small as possible, and maximum 200mm.
- The shutter pin holder for the threaded surface mounted frame hinge must be 35mm wide.
- A safety catch must be installed on every sash.
- The information in chapter 1.3 Wind resistance must be observed!



105299

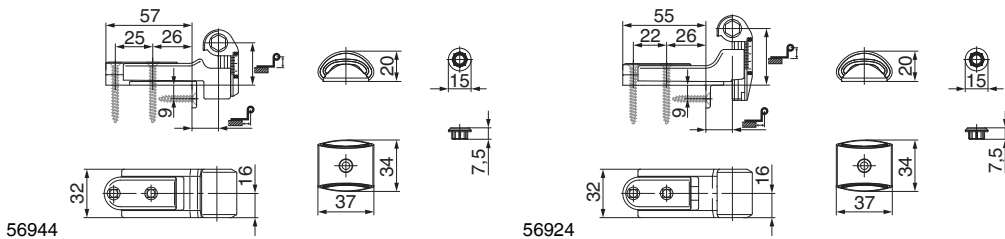
2.6.3 Drive gears for V2 crank openers with octagon				No
black-S	L130	103 - 180	10	105299 ^{1,2}
	L210	103 - 260	10	105300 ^{1,2}
	L340	103 - 390	10	105301 ^{1,2}
grey-S	L130	103 - 180	10	105305 ^{1,2}
	L210	103 - 260	10	105306 ^{1,2}
white-S	L130	103 - 180	10	105303 ^{1,2}
	L210	103 - 260	10	105304 ^{1,2}

¹ When using shutter hardware for special non-standard designs all responsibility for correct use of hardware parts and safety of the complete design lies entirely with the designer and manufacturer of the special design solution.

² **CAUTION:** Shutters with crank opener have a limited storm resistance. The information in chapter 1.3 Wind resistance must be observed!

- At peak wind speeds over 60km/h, the shutters have to be closed or locked!
- max. shutter width 600mm
- max. folding shutter width 2 x 600mm
- max. height 2,100mm
- max. sash weight 20kg (applies to folding shutters for the total weight of both sashes)
- Folding shutters can only be installed with an internal rotation-point and with folding shutter rod.
- Use threaded surface mounted frame hinge only in combination with 35mm wide shutter pin holder.
- The buffer stop must always be installed. When the buffer stop is used, make sure that the facade has sufficient compression strength (e.g. for thermal insulation)!
- A safety catch must be installed on every sash!

2.6.4 Hinges for crank openers



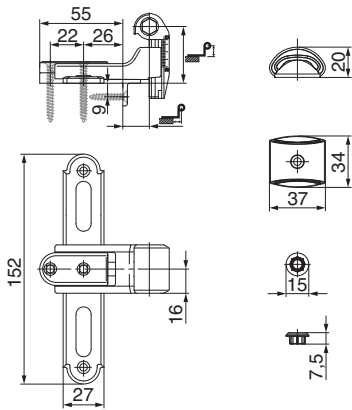
56944

56924

2.6.4.1 Short hinges for crank openers						No
black-S	size 0	58 - 74	24 - 32	18	10	56944 ^{1,2}
	size 1	74 - 110	32 - 50	18	10	56921 ^{1,2}
	size 2	100 - 150	45 - 70	18	10	56924 ^{1,2}
	size 3	140 - 210	65 - 100	18	10	56928 ^{1,2}
grey-S	size 1	74 - 110	32 - 50	18	10	210066 ^{1,2}
	size 2	100 - 150	45 - 70	18	10	210067 ^{1,2}
white-S	size 0	58 - 74	24 - 32	18	10	22691 ^{1,2}
	size 1	74 - 110	32 - 50	18	10	22060 ^{1,2}
	size 2	100 - 150	45 - 70	18	10	22063 ^{1,2}
	size 3	140 - 210	65 - 100	18	10	22066 ^{1,2}

¹ The specified reveal depths apply to installation situations with 30mm shutter thickness and 0mm shutter distance.

² These shutter hinges may not be used as a load-bearing element!



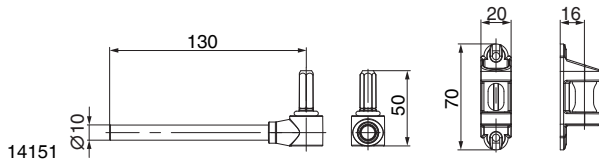
56936

2.6.4.2 Cross hinges for crank openers

						No
black-S	size 0	58 - 74	24 - 32	18	10	101448 ^{1,2}
	size 1	74 - 110	32 - 50	18	10	56932 ^{1,2}
	size 2	100 - 150	45 - 70	18	10	56936 ^{1,2}
	size 3	140 - 210	65 - 100	18	10	56941 ^{1,2}
grey-S	size 0	58 - 74	24 - 32	18	10	102860 ^{1,2}

¹ The specified reveal depths apply to installation situations with 30mm shutter thickness and 0mm shutter distance.

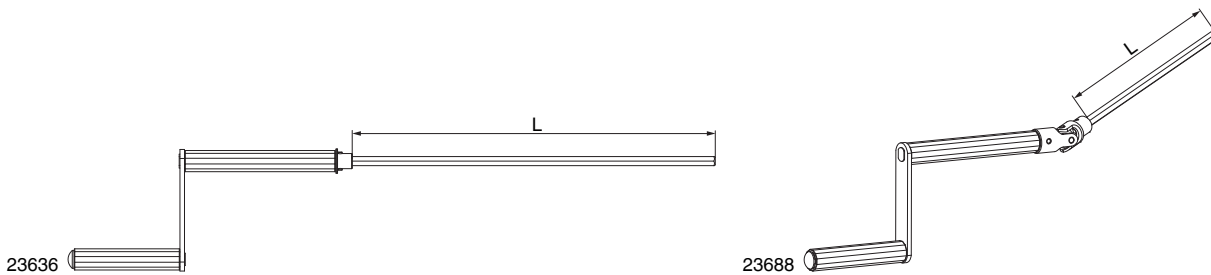
² These shutter hinges may not be used as a load-bearing element!



14151

2.6.5 Rotary arms for crank openers

			No
black-S		20	14151
white-S		10	102653



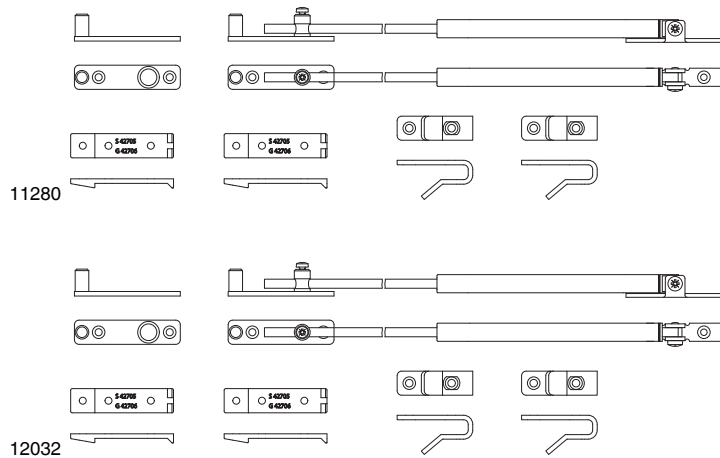
23636

23688

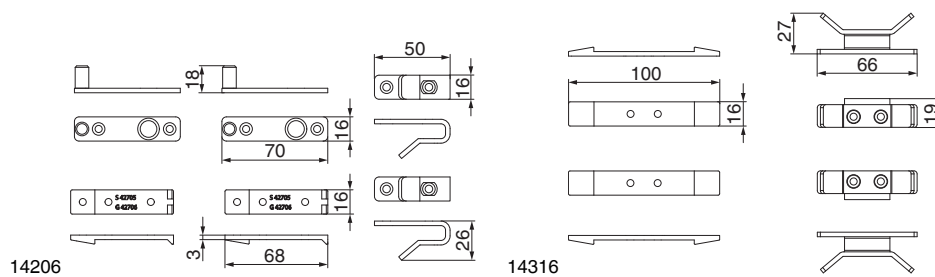
2.6.6 Crank arms

		L		No
rigid		240	10	23636
		400	10	23859
		500	10	27438
		950	10	212589
with u-joint		160	10	23688
		240	10	23635

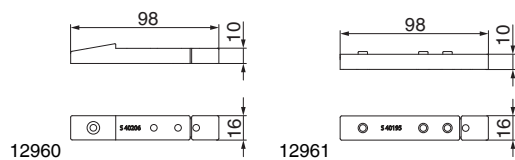
2.6.7 Folding shutter rods for crank openers



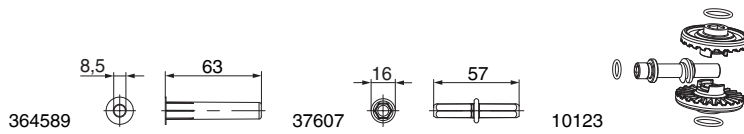
2.6.7.1 Folding shutter rods			No
black-S	folding shutter rods for crank opener for multi-sash shutters	10	11280
white-S	folding shutter rods for crank opener for multi-sash shutters	10	12546
black-S	folding shutter rods for crank opener, 90° opening for multi-sash shutters	10	12032




2.6.7.2 Locking hooks for folding shutter rods			No
black-S	2-sash locking hook	10	14206
grey-S	2-sash locking hook	10	102166
black-S	4-sash locking hook with internal pivot point in pairs	10	14316
white-S	4-sash locking hook with internal pivot point in pairs	10	14801



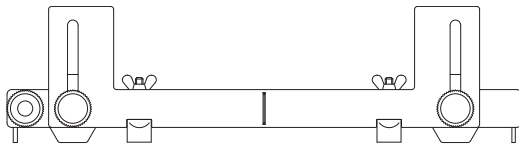
2.6.7.3 Packers for locking hooks			No
black	for locking hook with internal pivot point for 10mm gap	10	12960
	for locking hook with internal pivot point for 20mm and 30mm gap	10	12961
white	for locking hook with internal pivot point for 10mm gap	20	44352
	for locking hook with internal pivot point for 20mm and 30mm gap	20	44353



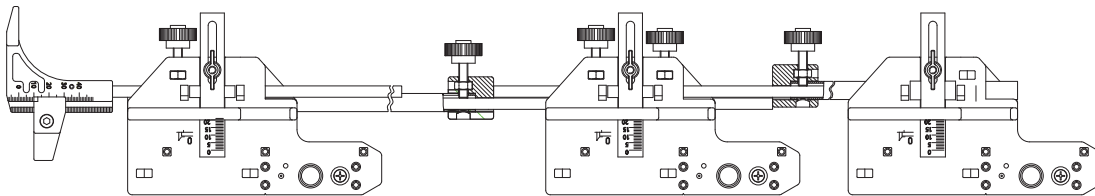
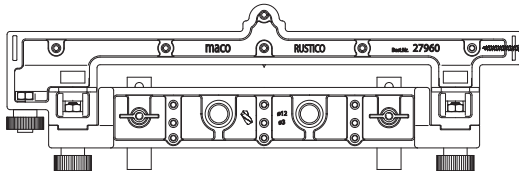
2.6.8 Accessories and single components for crank opener drive gears		No
crank opener cover white	10	41902
crank opener cover grey	20	364589
drive gear bolt Ø 16 x 59 black	10	37607
transmission set for crank opener	50	10123
Insulation for loading inner opener	20	364189
grease gun for crank opener 20ml	10	362833
repair cover for crank opener black-S	20	367887
replacement cover for pivot arm black-S	20	369863



2.7 Jigs



27960



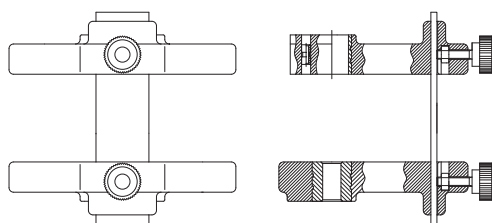
27958

2.7.1 Jigs for BLR hardware range



Nº

jig	BLR	for dual installation	hinge with fixing tab, shutter pin holder and straight shutter pin, on frame	1	27960
		for separate installation	hinge with fixing tab, shutter pin holder and straight shutter pin, on frame	1	27958
stop piece			42 high for jig 27958	10	370594
jig	BLR	for dual installation	hinge without fixing tab and 4mm cranked shutter pin, on frame	1	201851
			hinge without fixing tab and 12.5mm cranked shutter pin, on frame	1	28724
clamp for drilling jig		for separate installation on frame		1	28379



102888

2.7.2 Jigs for crank openers



Nº

jig	BLR	for dual installation	crank opener with hinge (distance 35)	1	102888
			crank opener with rotary arm (distance min. 29)	1	205649
		for separate installation	crank opener with hinge or rotary arm	1	102889



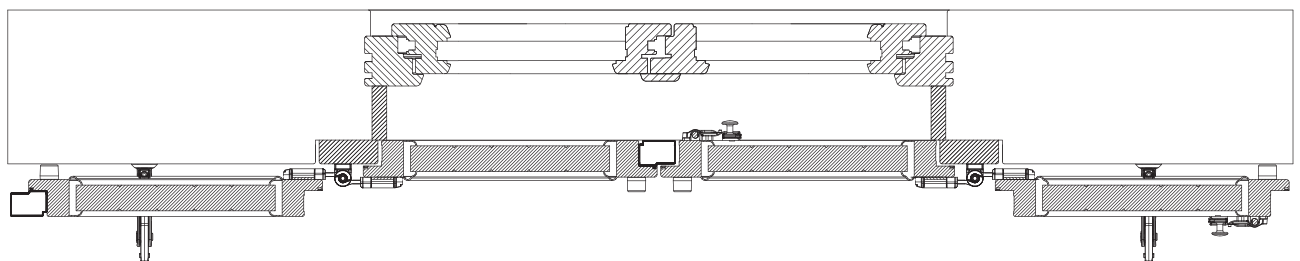
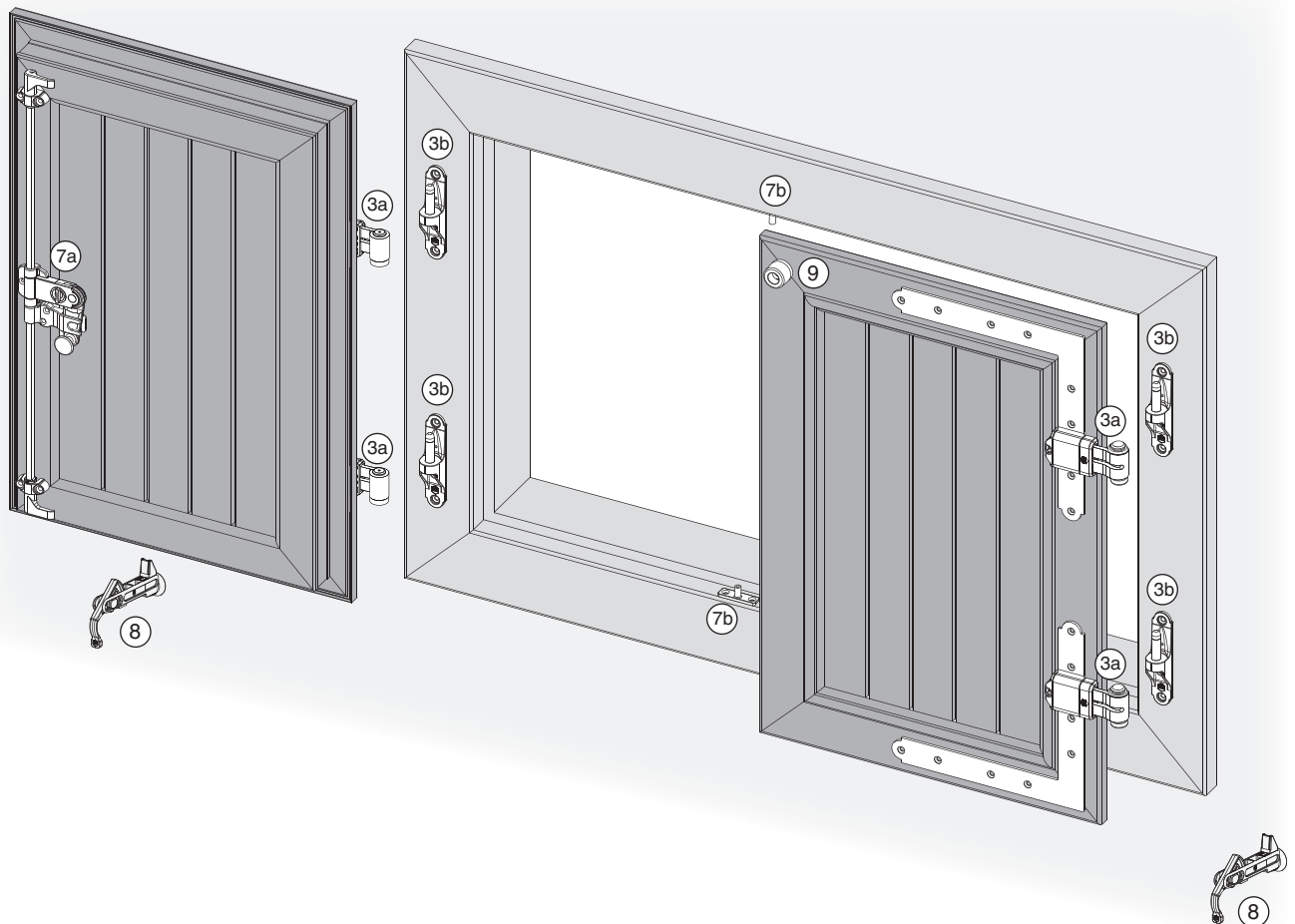
3 Wall cladding installation

3.1	Information for hardware selection	68
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3.1.2	4-sashed with internal pivot point	70
3.2	Hinges	72
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3.4	Jigs	84
3.4.1	Jigs for surface mounted frame hinges	84

3 Wall cladding installation

3.1 Information for hardware selection

3.1.1 2-sashed

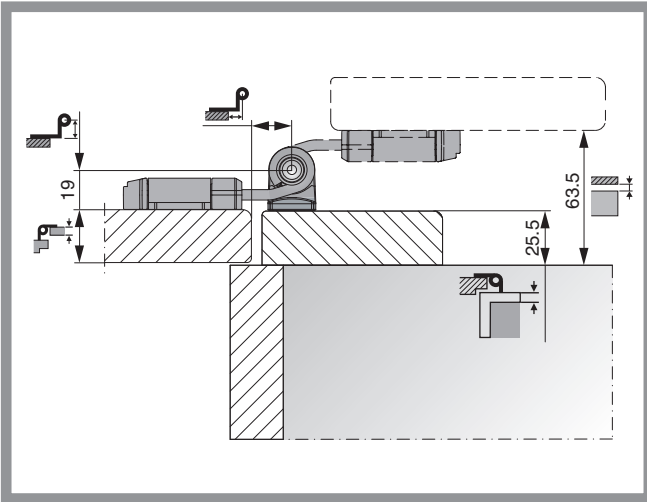


Selection guide

Page

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3b	3.3.1.1.1MMV surface mounted frame hinges	→81
7a	7.1.3 2F shutter locks	→120
7b	7.3 Striker pin brackets for frame installation	→124
8	8 Shutter catches	→138
9	9.2 Buffer stops	→152

3.1.1.1 Flush

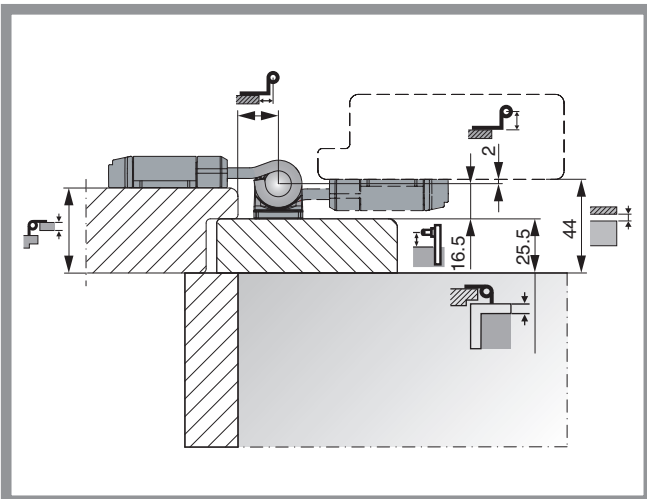


Calculation distance to wall

$$\begin{aligned}
 & 25,5\text{mm} \\
 & 2 \times 38,0\text{mm} \\
 \hline
 & = 63,5\text{mm}
 \end{aligned}$$



3.1.1.2 Shutter with rebate



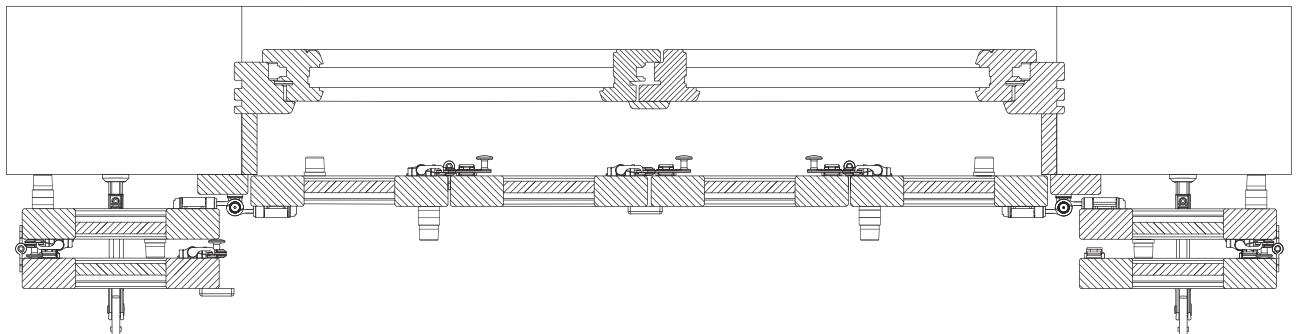
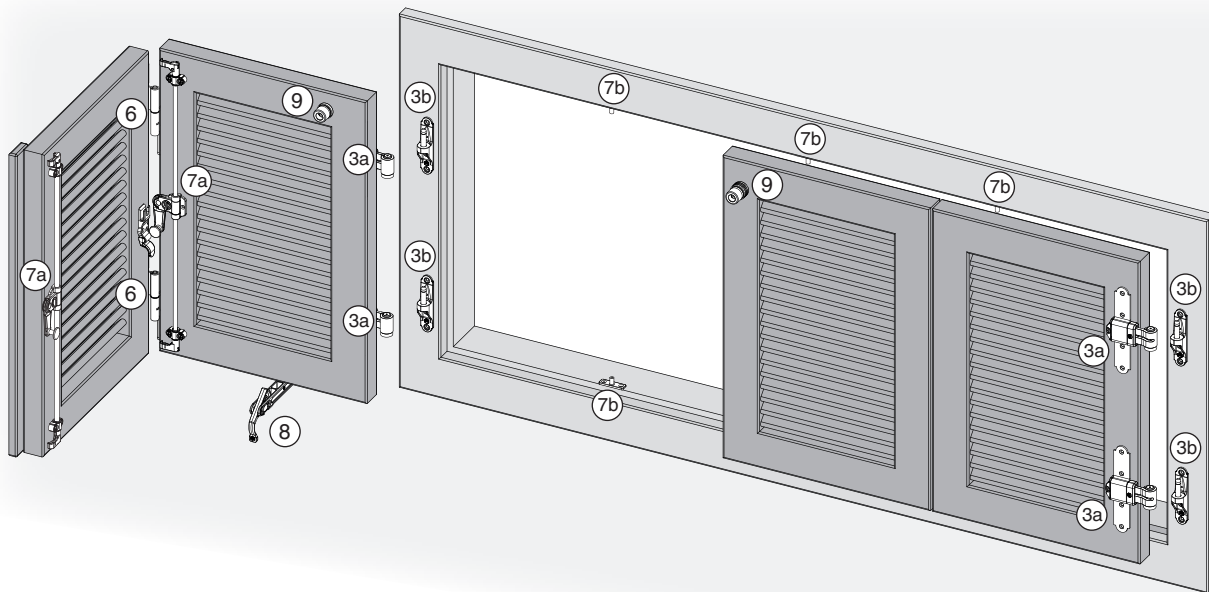
Calculation cladding thickness

$$\begin{aligned}
 & 40,0\text{mm} \\
 & + 2,0\text{mm} \\
 & - 16,5\text{mm} \\
 & - 0,0\text{mm Packer surface-mounted frame hinge} \\
 \hline
 & = 25,5\text{mm}
 \end{aligned}$$

Calculation distance to wall

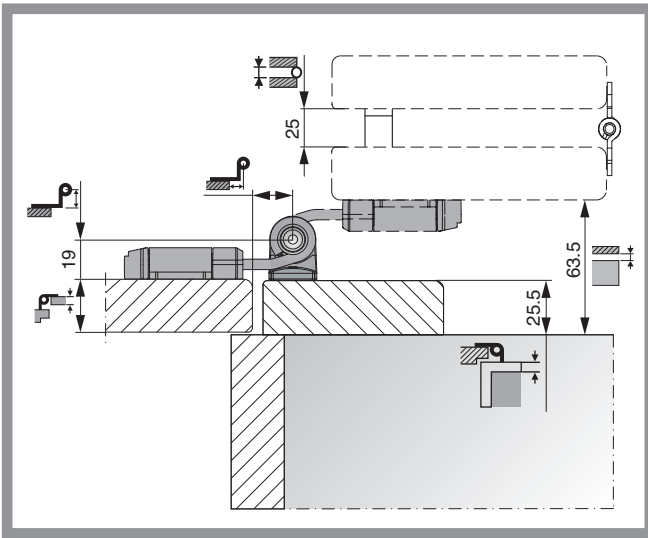
$$\begin{aligned}
 & 25,5\text{mm} \\
 & + 16,5\text{mm} \\
 & + 2,0\text{mm} \\
 \hline
 & = 44,0\text{mm}
 \end{aligned}$$

3.1.2 4-sashed with internal pivot point



Selection guide		Page
3a	3.2.1.1 MMV cross hinges	→72
3b	3.3.1.1.1MMV surface mounted frame hinges	→81
6	6.1.6 Prima MMV centre hinges	→111
7a	7.1.3 2F shutter locks	→120
7b	7.3 Striker pin brackets for frame installation	→124
8	8.1.3 Shutter catches "Classic" model with cover disk without fixing bolts	→140
9	9.2 Buffer stops	→152

3.1.2.1 Flush

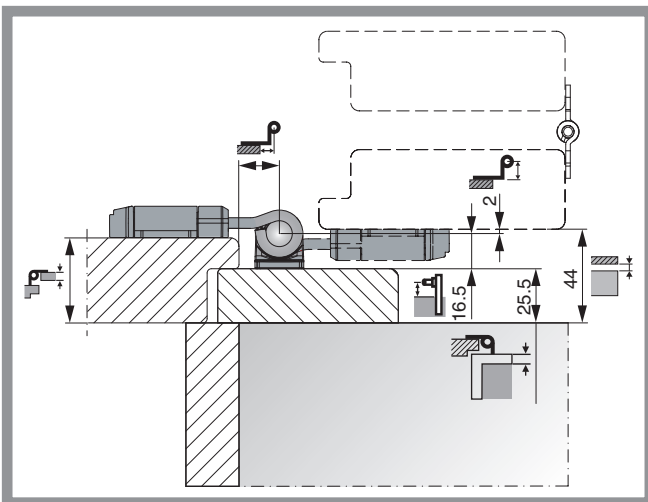


Calculation distance to wall

$$\begin{aligned}
 & 25,5\text{mm} \\
 & 2 \times 19,0\text{mm} \quad +38,0\text{mm} \\
 \hline
 & = 63,5\text{mm}
 \end{aligned}$$



3.1.2.2 Shutter with rebate



Calculation cladding thickness

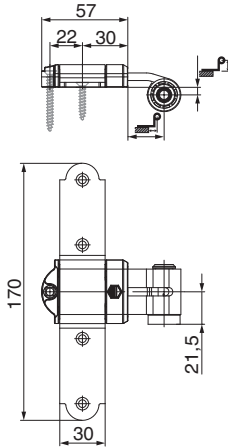
$$\begin{aligned}
 & 40,0\text{mm} \\
 & + 2,0\text{mm} \\
 & - 16,5\text{mm} \\
 & - 0,0\text{mm Packer surface-mounted frame hinge} \\
 \hline
 & = 25,5\text{mm}
 \end{aligned}$$

Calculation distance to wall




$$\begin{aligned}
 & 25,5\text{mm} \\
 & + 16,5\text{mm} \\
 & + 2,0\text{mm} \\
 \hline
 & = 44,0\text{mm}
 \end{aligned}$$

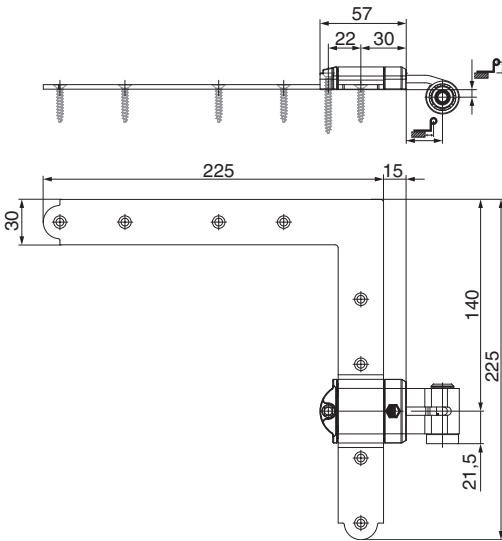
3.2 Hinges

3.2.1 Hinges without fixing tab



101449

3.2.1.1 MMV cross hinges					No
black-S	-5	16 - 24	20	101449	
		37 - 45	20	101450	
	2	16 - 24	20	100000	
		37 - 45	20	100005	
	7	16 - 24	20	100001	
		37 - 45	20	100006	
	12	16 - 24	20	100002	
		37 - 45	20	100007	
	19	16 - 24	20	100003	
		37 - 45	20	100008	
grey-S	-5	16 - 24	20	102636	
		37 - 45	20	102480	
	2	16 - 24	20	102342	
		37 - 45	20	102446	
	7	16 - 24	20	102253	
		37 - 45	20	102255	
	12	16 - 24	20	102509	
		37 - 45	20	102511	
	19	16 - 24	20	102510	
		37 - 45	20	102512	
white-S	-5	16 - 24	20	102037	
		37 - 45	20	102038	
	2	16 - 24	20	101359	
		37 - 45	20	101364	
	7	16 - 24	20	101360	
	12	16 - 24	20	101361	
	19	16 - 24	20	101362	

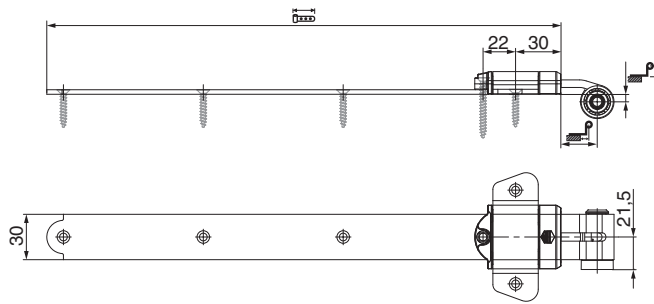


101453

3.2.1.2 MMV corner hinges

				No	
black-S	-5	16 - 24	10	101453¹	
		37 - 45	10	101454¹	
	2	16 - 24	10	100020¹	
		37 - 45	10	100025¹	
	7	16 - 24	10	100021¹	
		37 - 45	10	100026¹	
	12	16 - 24	10	100022¹	
		37 - 45	10	100027¹	
	19	16 - 24	10	100023¹	
		37 - 45	10	100028¹	
	grey-S	-5	16 - 24	10	102639¹
			37 - 45	10	102640¹
2		16 - 24	10	102520¹	
		37 - 45	10	102445¹	
7		16 - 24	10	102257¹	
		37 - 45	10	102259¹	
12		16 - 24	10	102521¹	
		37 - 45	10	102523¹	
19		16 - 24	10	102522¹	
		37 - 45	10	102524¹	
white-S		-5	16 - 24	10	102039¹
			37 - 45	10	102040¹
	2	16 - 24	10	101379¹	
		37 - 45	10	101384¹	
	7	16 - 24	10	101380¹	
		37 - 45	10	101385¹	
	12	16 - 24	10	101381¹	
		37 - 45	10	101386¹	
	19	16 - 24	10	101382¹	
		37 - 45	10	101387¹	

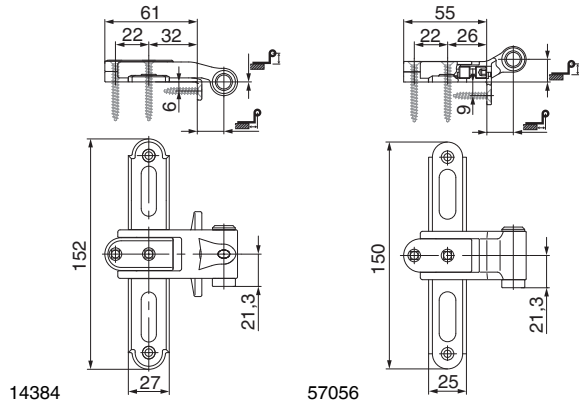
¹ With corner hinges, a packaging unit consists of 1 piece top corner hinge and 1 piece bottom corner hinge.



101451

3.2.1.3 MMV long hinges					№
	Quantity	Length	Length	Pieces	
black-S	-5	16 - 24	340	20	101451
		37 - 45	340	20	101452
	2	16 - 24	340	20	100010
		37 - 45	340	20	100015
	7	16 - 24	340	20	100011
		37 - 45	340	20	100016
	12	16 - 24	340	20	100012
		37 - 45	340	20	100017
19	16 - 24	340	20	100013	
	37 - 45	340	20	100018	
grey-S	2	16 - 24	340	20	102513
		37 - 45	340	20	102517
white-S	7	37 - 45	340	20	101375
		16 - 24	340	20	101372

3.2.2 BLR hinges with fixing tab



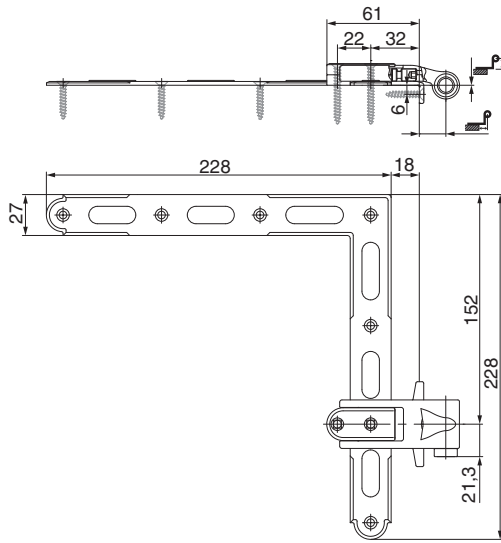
3.2.2.1 BLR cross hinges with fixed crank



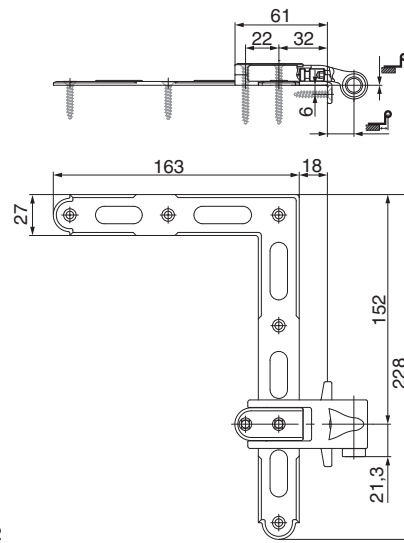
No

black-S	straight	0	18	32	20	14384
	flush	15	18	26	20	57056
grey-S	straight	0	18	32	20	102137
	flush	15	18	26	20	103421
white-S	straight	0	18	32	20	10703
	flush	15	18	26	20	52686

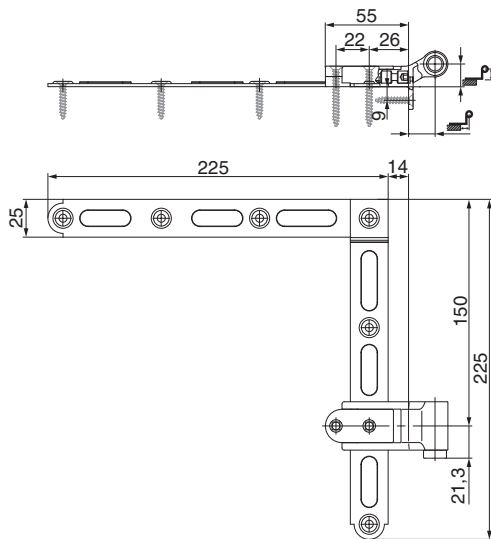




14166



101332



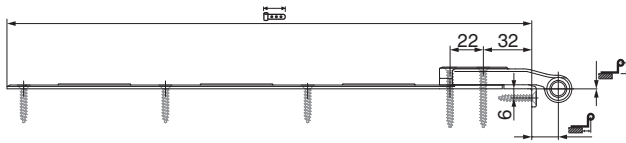
14174

3.2.2.2 BLR corner hinges with fixed crank

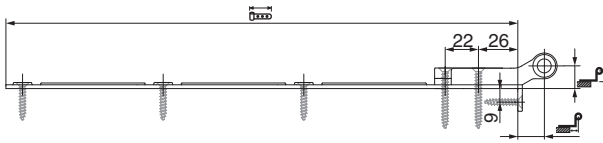
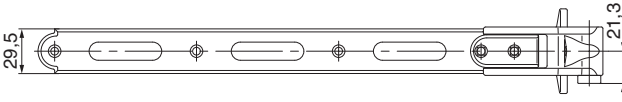


					No	
black-S	straight	0	18	32	10	14166 ¹
	straight SL 228x163	0	18	32	10	101332 ¹
	flush	15	18	26	10	14174 ¹
white-S	straight	0	18	32	10	10706 ¹
	flush	15	18	26	10	10717 ¹

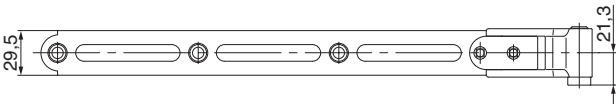
¹ With corner hinges, a packaging unit consists of 1 piece top corner hinge and 1 piece bottom corner hinge.



14034



57100



3.2.2.3 BLR long hinges with fixed crank

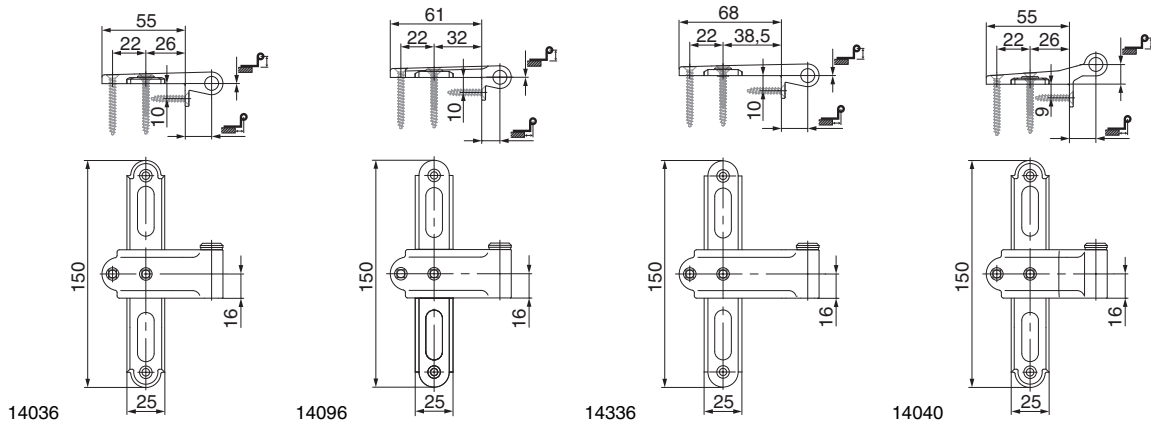


No

black-S	straight	0	18	340	32	20	14034
				200	32	20	14170
	flush	15	18	250	26	20	57099
				340	26	20	57100



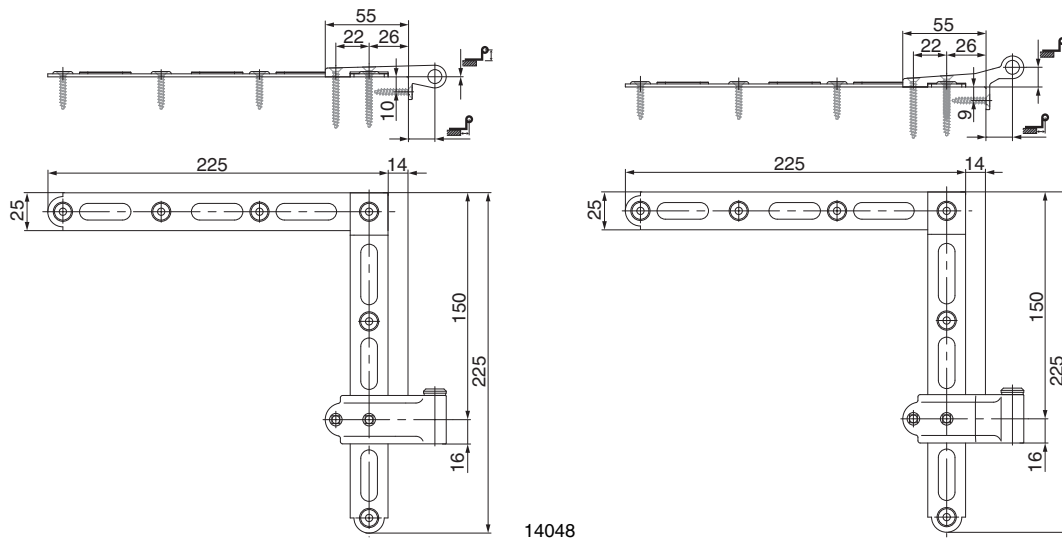
3.2.3 MV hinges without lateral adjustment



3.2.3.1 MV cross hinges

						No
black-S	straight	0	18	26	20	14036 ¹
	straight with offset end position	0	12	32	20	14096 ¹
	straight with 38.5mm screw-fixing distance	0	18	38,5	20	14336 ¹
	flush	13	18	26	20	14040 ¹

¹ We recommend to use pin disc item no. 40892.

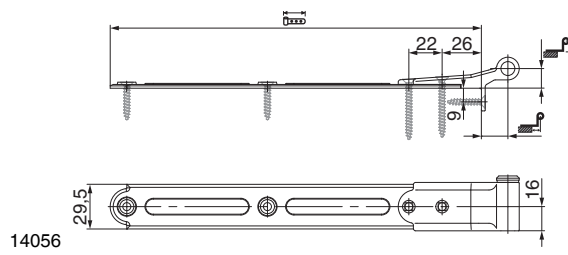
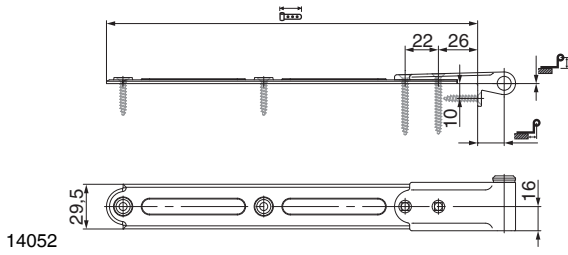


3.2.3.2 MV corner hinges

						No
black-S	straight	0	18	26	10	14044 ^{1,2}
	straight with offset end position	0	12	32	10	14100 ^{1,2}
	straight with 38.5mm screw-fixing distance	0	18	38,5	10	14340 ^{1,2}
	flush	13	18	26	10	14048 ^{1,2}

¹ With corner hinges, a packaging unit consists of 1 piece top corner hinge and 1 piece bottom corner hinge.

² We recommend to use pin disc item no. 40892.

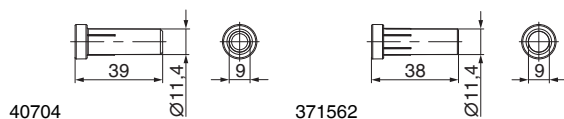


3.2.3.3 MV long hinges								No
black-S	straight	0	18	250	26	20	14080¹	
				340	26	20	14052¹	
	flush	13	18	250	26	20	14084¹	
				340	26	20	14056¹	

¹ We recommend to use pin disc item no. 40892.




3.2.4 Accessories for shutter hinges



3.2.4.1 BLR sleeves and cover caps				No
black	closed hinge regulator sleeve		100	40704
	open hinge regulator sleeve		100	371562
	short cover cap		100	41578
grey	closed hinge regulator sleeve		100	465210
	short cover cap		100	465211
white	closed hinge regulator sleeve		100	41149
	short cover cap		100	42845



3.2.4.2 MMV sleeves and cover caps				No
black	open hinge regulator sleeve	Ø 10mm	100	44382^{1,2}
		Ø 9mm	100	44381^{1,2}
		Ø 8mm	100	44380^{1,2}
	short cover cap		100	44383¹
	long cover cap		100	44384²
grey	open hinge regulator sleeve	Ø 10mm	50	465423^{1,2}
		Ø 8mm	50	465422^{1,2}
	long cover cap		100	360382²
white	open hinge regulator sleeve	Ø 10mm	100	454977^{1,2}
		Ø 9mm	100	454976^{1,2}
		Ø 8mm	100	454975^{1,2}
	short cover cap		100	454978¹
	long cover cap		100	454979²

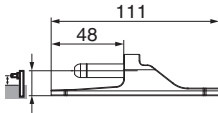
¹ For hinges with fixed crank.

² For hinges with variable crank 32-55mm.

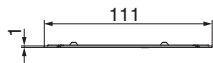
3.3 Shutter pins

3.3.1 Surface mounted frame hinges

3.3.1.1 MMV surface mounted frame hinges

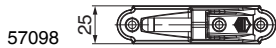
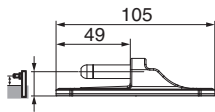


3.3.1.1.1 MMV surface mounted frame hinges					No
black-S		16,5	23	20	202223
		19,5	23	20	202224
		22,5	23	20	202225
		25,5	23	20	202226
grey-S		16,5	23	20	211811
		19,5	23	20	212742
		22,5	23	20	211230
		25,5	23	20	212743
white-S		16,5	23	20	201813
		19,5	23	20	201814
		22,5	23	20	201815
		25,5	23	20	201816

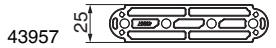
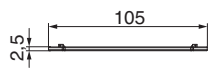


3.3.1.1.2 Packers for MMV surface mounted frame hinges				W	L		No
black	surface mounted frame hinge MMV	stackable	1	23	111	100	441782
grey	surface mounted frame hinge MMV	stackable	1	23	111	100	360816

3.3.1.2 BLR surface mounted frame hinges

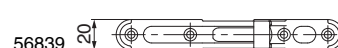
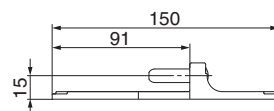
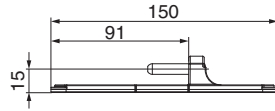
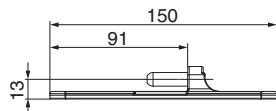


3.3.1.2.1 BLR surface mounted frame hinges						No
black-S			15	25	20	57098
			20	25	20	56891
grey-S			20	25	20	212649
white-S			20	25	20	29267



3.3.1.2.2 Packers for BLR surface mounted frame hinges				W	L		No
black	for short surface mounted frame hinge		2,5	25	105	100	43957

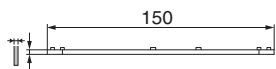
3.3.1.3 MV surface mounted frame hinges



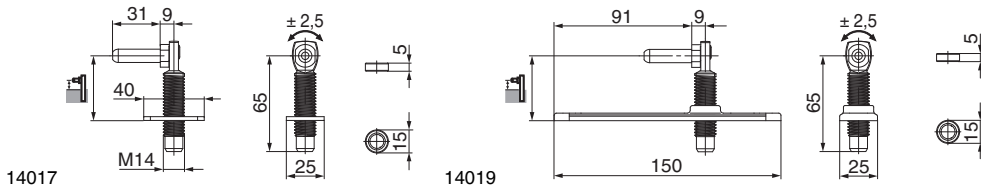
3.3.1.3.1 MV surface mounted frame hinges						No
black-S	surface mounted frame hinge		13	25	20	14076¹
	surface mounted frame hinge with regulator-sleeve		15	20	20	101042²
	surface mounted frame hinge		15	20	20	56839

¹ Only suitable for "straight and flush hinges without lateral adjustment".

² Use surface-mounted frame hinge with regulator sleeve for hinges WITHOUT regulator sleeve, e.g. cross hinges item nos. 14036, 14096 and 14040.



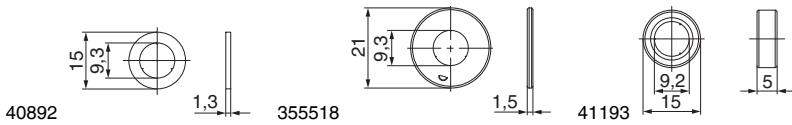
3.3.1.3.2 Packers for MV surface mounted frame hinges				W	L		No
black	for surface mounted frame hinge - 13mm distance	stackable	3	25	150	100	41882
			5	25	150	100	41811
			8	25	150	100	41810
grey	for surface mounted frame hinge - 15mm distance	stackable	2	20	150	100	40436
			2	20	150	100	361315
white	for surface mounted frame hinge - 13mm distance	stackable	3	25	150	100	42837
			2	20	150	100	44108



3.3.1.4 MV surface mounted frame hinges with thread and lateral adjustment						No
black-S	15 - 50	15	65	25	20	14017 ¹
	22 - 50	15	65	25	20	14019 ¹
grey-S	22 - 50	15	65	25	20	102173 ¹

¹ Permissible only for installation on timber!

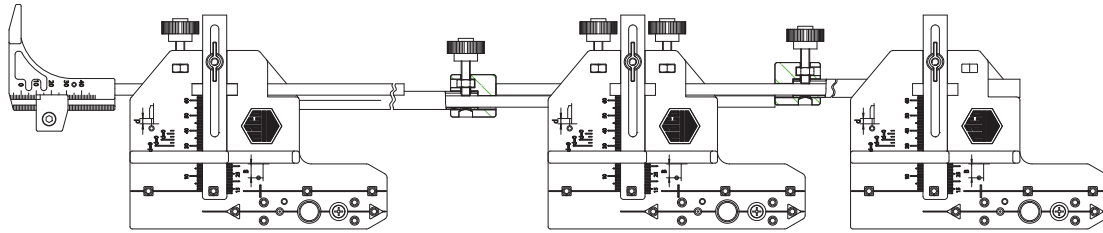
3.3.2 Accessories for shutter pins



3.3.2.1 Spacers for shutter pin				No
black	spacer BLR, for shutter pin	Ø 15mm	1,3 100	40892
	spacer MMV, for shutter pin	Ø 22mm	1,5 100	355518
	spacer MV	Ø 15mm	5,3 50	41193
grey	spacer BLR, for shutter pin	Ø 15mm	1,3 100	361316
	spacer MMV, for shutter pin	Ø 22mm	1,5 50	363286
	spacer MV	Ø 15mm	5,3 50	360379
white	spacer MMV, for shutter pin	Ø 22mm	1,5 100	363323
	spacer MV	Ø 15mm	5,3 50	41198



3.4 Jigs



101263

3.4.1 Jigs for surface mounted frame hinges



Nº

jig	MV	for dual installation	hinge with 26mm screw-fixing distance, surface mounted frame hinge on masonry cladding	1	24081
	BLR	for dual installation	Straight hinge with 32mm screw-fixing distance, short surface mounted frame hinge	1	55905
	MMV	for separate installation	hinge and surface mounted frame hinge	1	101263



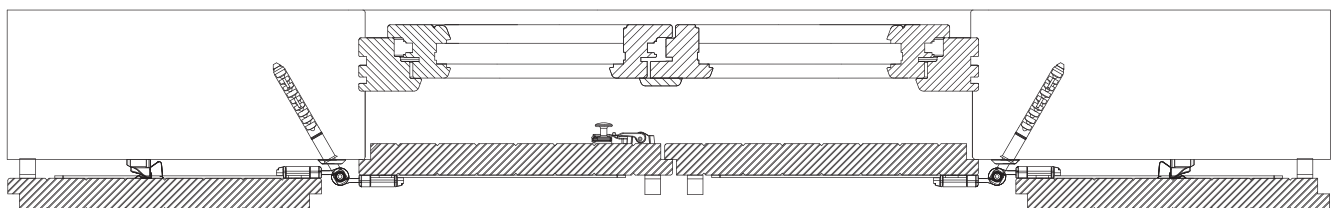
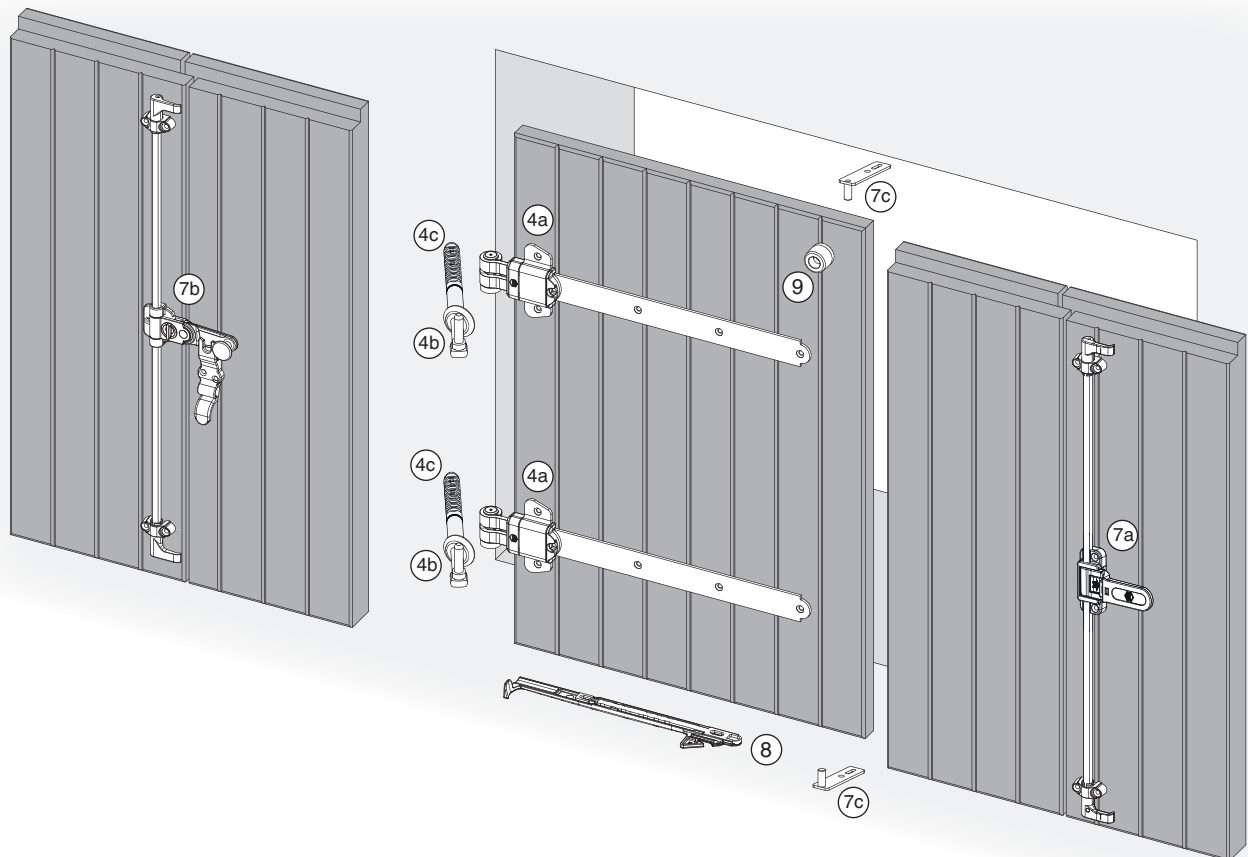
4 Masonry installation

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4 Masonry installation

4.1 Information for hardware selection

4.1.1 2-sashed, with universal shutter pin

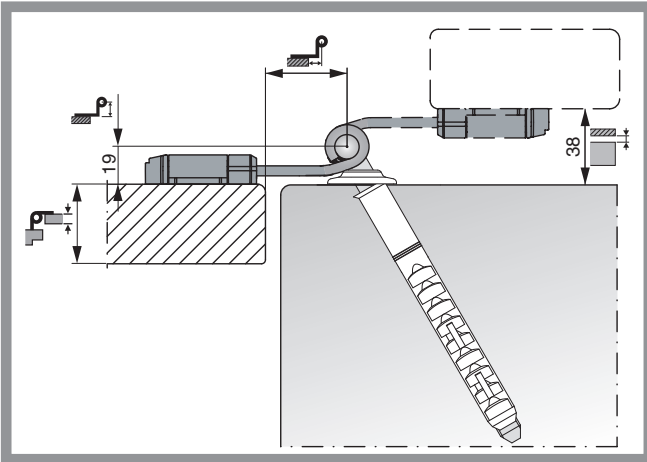


Selection guide

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4b	4.4.1.1 MMV universal shutter pins with lateral adjustment	→97
4c	4.4.1.2.1 Rawplugs for universal shutter pins	→97
7a	7.1.1 Snap locks 26mm wide	→116
7b	7.1.3 2F shutter locks	→120
7c	7.4.1 Striker pin brackets for masonry installation	→130
8	8.5.1 Comfort shutter catches for windows	→143
9	9.2 Buffer stops	→152

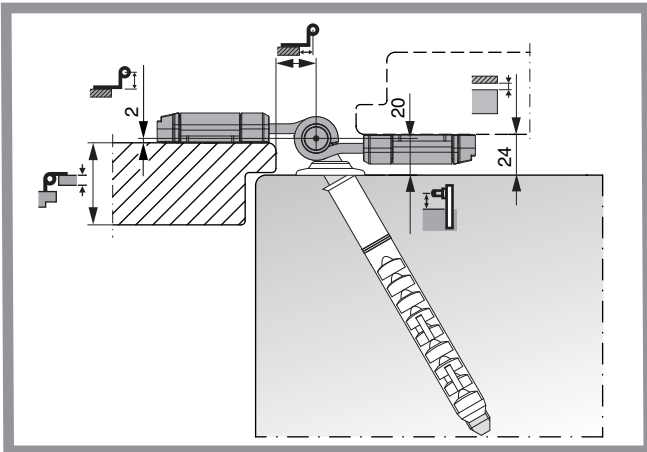
4.1.1.1 Flush



Calculation distance to wall

$$\begin{array}{r}
 2 \times \text{[Hinge Icon]} \quad 38\text{mm} \\
 \hline
 = \quad 38\text{mm} \quad \text{[Shutter Icon]}
 \end{array}$$

4.1.1.2 Shutter with rebate

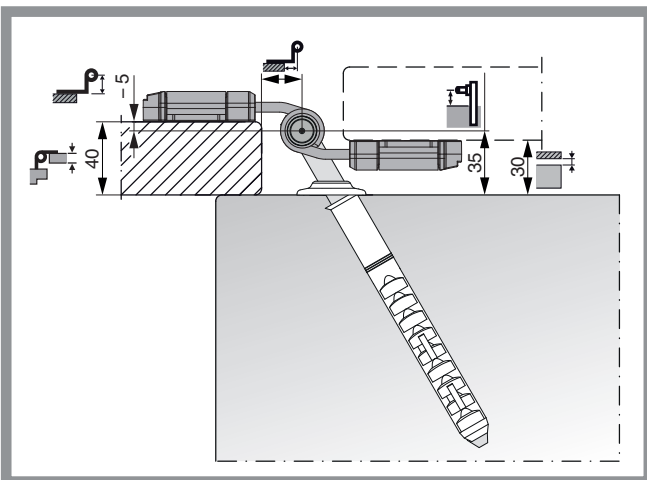


Calculation distance to wall

$$\begin{array}{r}
 2 \times \text{[Hinge Icon]} \quad 4\text{mm} \\
 \text{[Shutter Icon]} \quad + 20\text{mm} \\
 \hline
 = \quad 24\text{mm} \quad \text{[Shutter Icon]}
 \end{array}$$



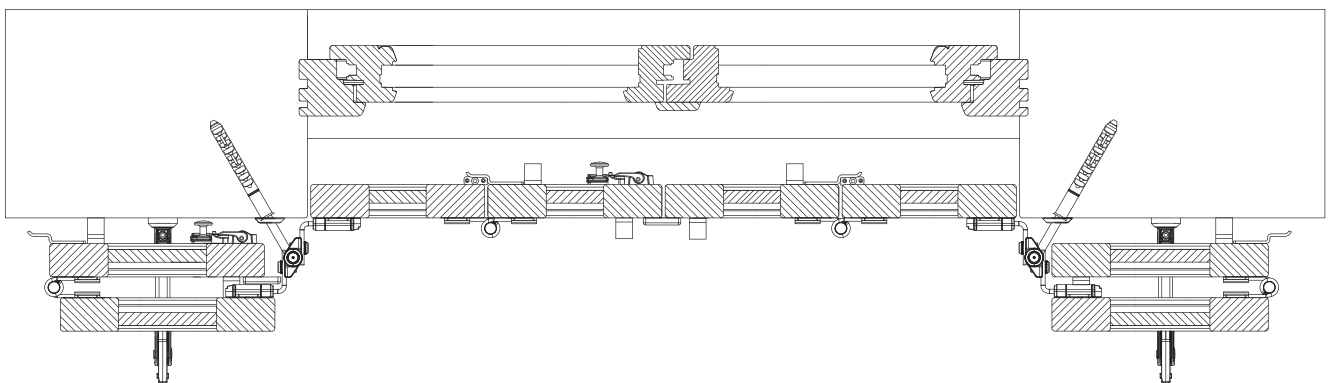
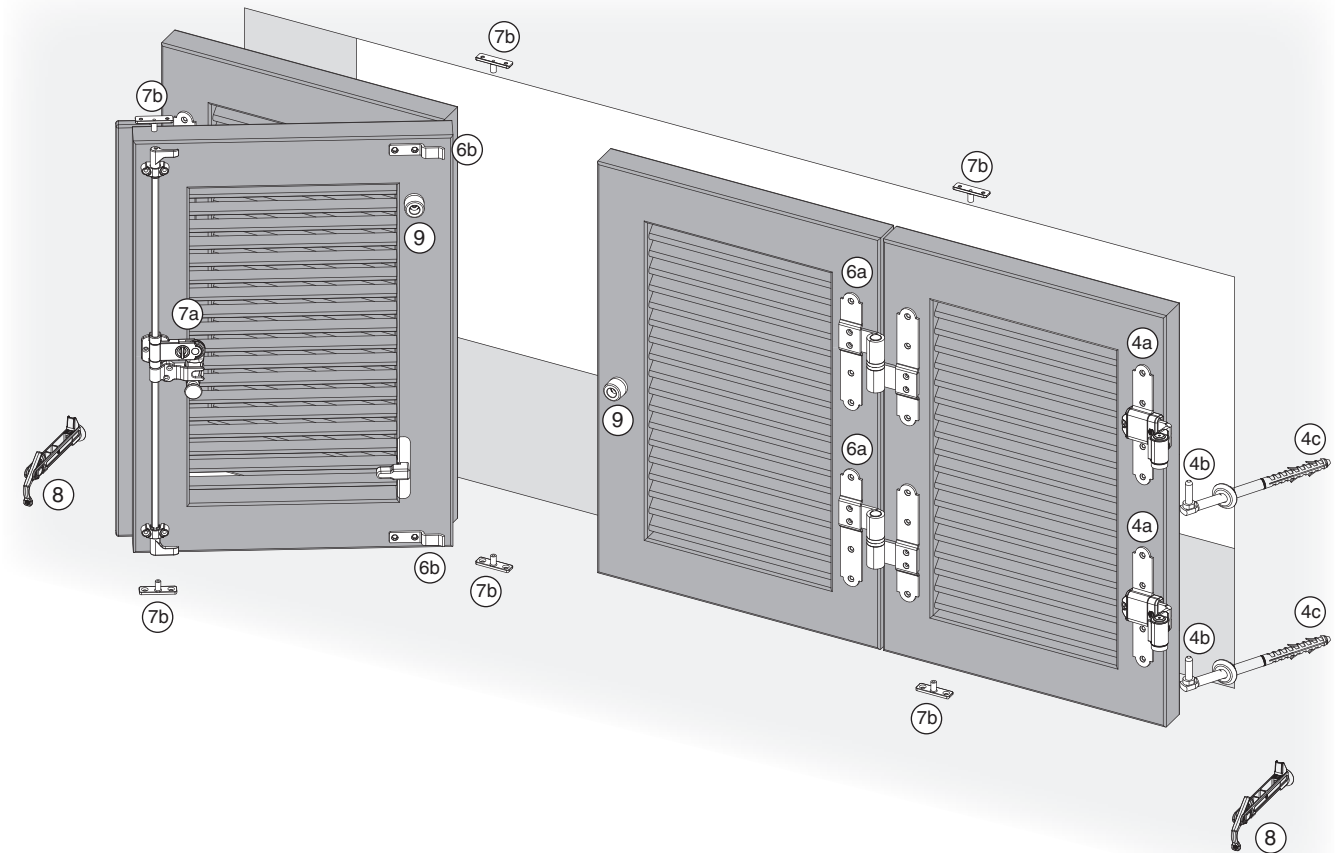
4.1.1.3 Flush mounted



Calculation distance to wall

$$\begin{array}{r}
 \text{[Hinge Icon]} \quad 40\text{mm} \\
 + 2 \times \text{[Hinge Icon]} \quad - 10\text{mm} \\
 \hline
 = \quad 30\text{mm} \quad \text{[Shutter Icon]}
 \end{array}$$

4.1.2 4-sashed with external pivot point, with universal shutter pin

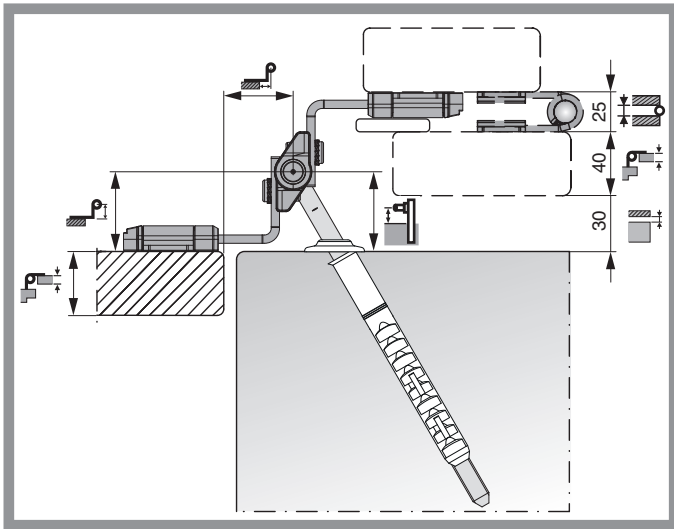


Selection guide

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4a	4.3.1.2 MMV cross hinges with variable crank	→92
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8	8.1.3 Shutter catches "Classic" model with cover disk without fixing bolts	→140
9	9.2 Buffer stops	→152

4.1.2.1 Flush



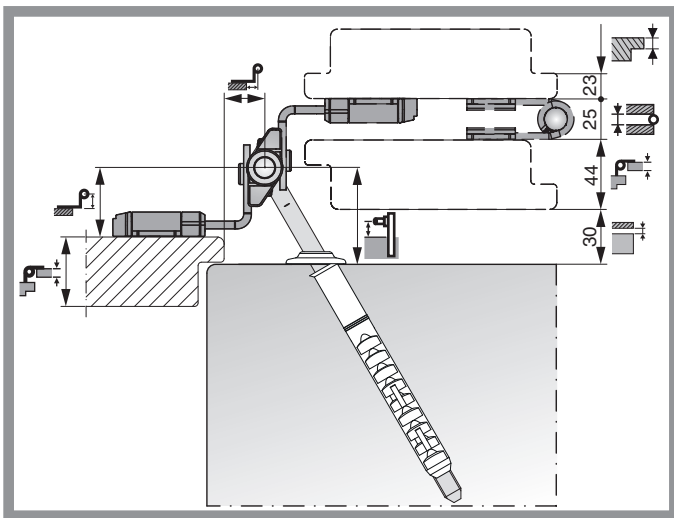
Calculation shutter pin distance

	25mm
	+ 40mm
	+ 30mm
<hr/>	
=	95mm : 2 = 47,5mm

Calculation hinge crank

	25mm
	+ 40mm
	+ 30mm
<hr/>	
=	95mm : 2 = 47,5mm

4.1.2.2 Shutter with rebate



Calculation shutter pin distance

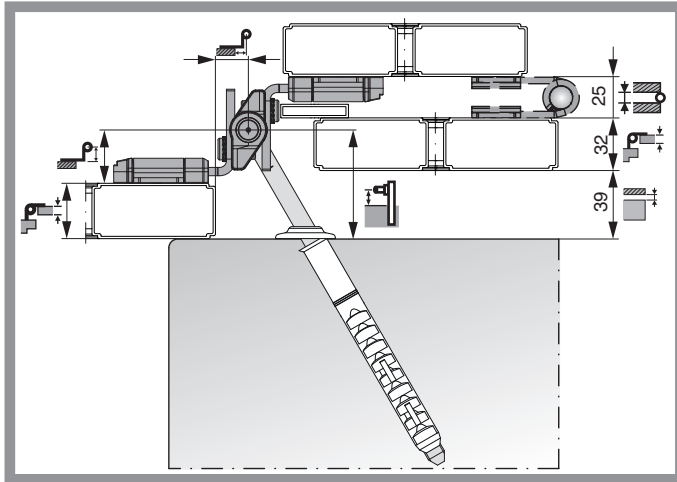
	23mm
	+ 25mm
	+ 44mm
	+ 30mm
<hr/>	
=	122mm : 2 = 61mm

Calculation hinge crank

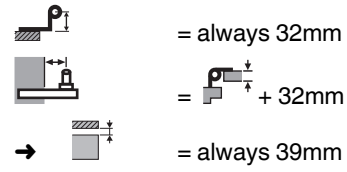
	25mm
	+ 44mm
	+ 30mm
	- 23mm
<hr/>	
=	76mm : 2 = 38mm

→ Calculation for flush mounted shutters ==>
see next page!





















4.1.2.3 Flush mounted



Calculation shutter pin distance/hinge crank/
distance to wall

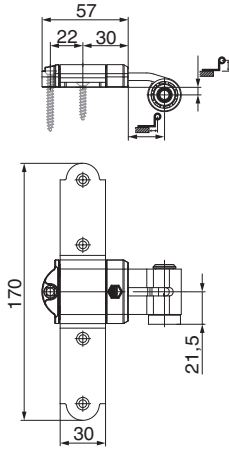


4.2 Overview of hardware variants

	 16-24 mm	 37-45 mm
 -5 mm		
 2 mm		
 7 mm		
 12 mm		
 19 mm		
 32-55 mm		




4.3 Hinges

4.3.1 Hinges without fixing tab

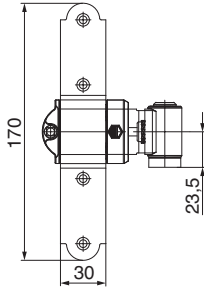
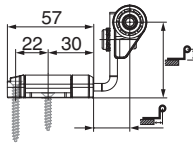


101449

4.3.1.1 MMV cross hinges

				№
black-S	-5	16 - 24	20	101449
		37 - 45	20	101450
	2	16 - 24	20	100000
		37 - 45	20	100005
	7	16 - 24	20	100001
		37 - 45	20	100006
	12	16 - 24	20	100002
		37 - 45	20	100007
	19	16 - 24	20	100003
		37 - 45	20	100008
grey-S	-5	16 - 24	20	102636
		37 - 45	20	102480
	2	16 - 24	20	102342
		37 - 45	20	102446
	7	16 - 24	20	102253
		37 - 45	20	102255
	12	16 - 24	20	102509
		37 - 45	20	102511
	19	16 - 24	20	102510
		37 - 45	20	102512
white-S	-5	16 - 24	20	102037
		37 - 45	20	102038
	2	16 - 24	20	101359
		37 - 45	20	101364
	7	16 - 24	20	101360
		12	16 - 24	20
	19	16 - 24	20	101362





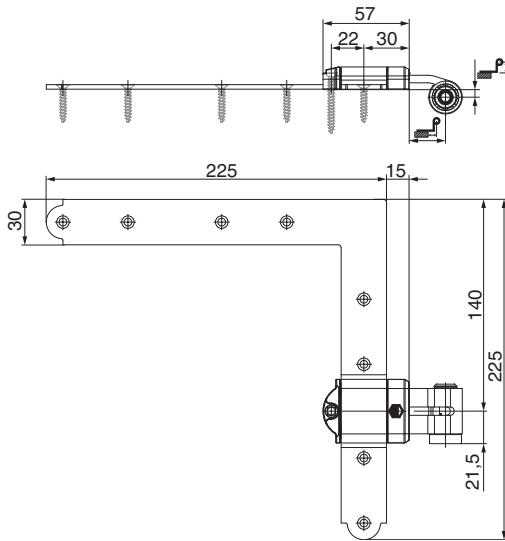
100004

4.3.1.2 MMV cross hinges with variable crank



No

black-S	32 - 55	16 - 24 37 - 45	20 20	100004 100009
grey-S	32 - 55	16 - 24 37 - 45	20 20	102254 102256
white-S	32 - 55	16 - 24	20	101363

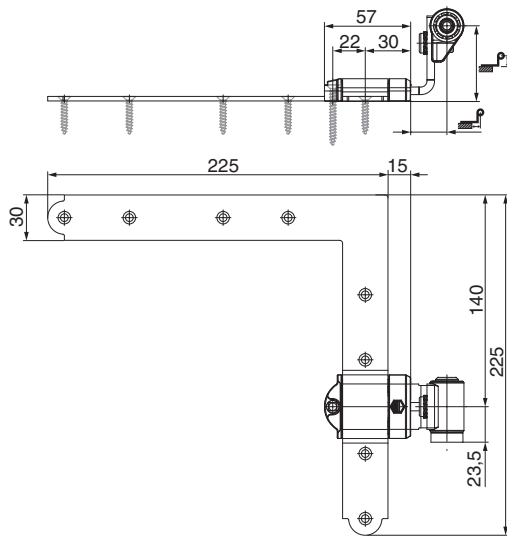


101453

4.3.1.3 MMV corner hinges

				No	
black-S	-5	16 - 24	10	101453¹	
		37 - 45	10	101454¹	
	2	16 - 24	10	100020¹	
		37 - 45	10	100025¹	
	7	16 - 24	10	100021¹	
		37 - 45	10	100026¹	
	12	16 - 24	10	100022¹	
		37 - 45	10	100027¹	
	19	16 - 24	10	100023¹	
		37 - 45	10	100028¹	
	grey-S	-5	16 - 24	10	102639¹
			37 - 45	10	102640¹
2		16 - 24	10	102520¹	
		37 - 45	10	102445¹	
7		16 - 24	10	102257¹	
		37 - 45	10	102259¹	
12		16 - 24	10	102521¹	
		37 - 45	10	102523¹	
19		16 - 24	10	102522¹	
		37 - 45	10	102524¹	
white-S		-5	16 - 24	10	102039¹
			37 - 45	10	102040¹
	2	16 - 24	10	101379¹	
		37 - 45	10	101384¹	
	7	16 - 24	10	101380¹	
		37 - 45	10	101385¹	
	12	16 - 24	10	101381¹	
		37 - 45	10	101386¹	
	19	16 - 24	10	101382¹	
		37 - 45	10	101387¹	

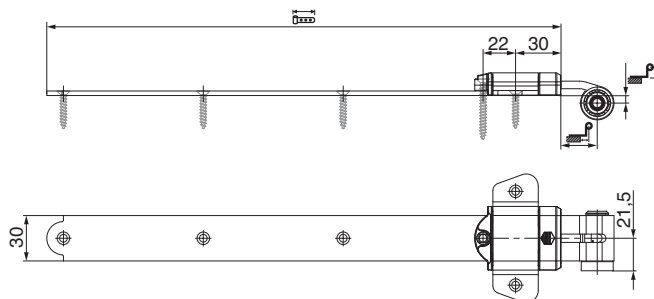
¹ With corner hinges, a packaging unit consists of 1 piece top corner hinge and 1 piece bottom corner hinge.



100024

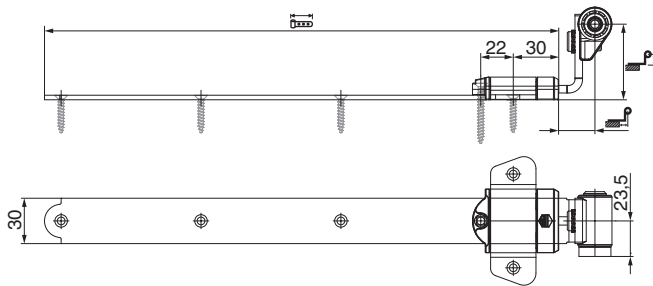
4.3.1.4 MMV corner hinges with variable crank				No
black-S	32 - 55	16 - 24	10	100024 ¹
		37 - 45	10	100029 ¹
grey-S	32 - 55	16 - 24	10	102258 ¹
		37 - 45	10	102260 ¹
white-S	32 - 55	16 - 24	10	101383 ¹
		37 - 45	10	101388 ¹

¹ With corner hinges, a packaging unit consists of 1 piece top corner hinge and 1 piece bottom corner hinge.







101451

4.3.1.5 MMV long hinges				No	
black-S	-5	16 - 24	340	20	101451
		37 - 45	340	20	101452
	2	16 - 24	340	20	100010
		37 - 45	340	20	100015
	7	16 - 24	340	20	100011
		37 - 45	340	20	100016
	12	16 - 24	340	20	100012
		37 - 45	340	20	100017
19	16 - 24	340	20	100013	
	37 - 45	340	20	100018	
grey-S	2	16 - 24	340	20	102513
		37 - 45	340	20	102517
white-S	7	37 - 45	340	20	101375
		16 - 24	340	20	101372




100014

4.3.1.6 MMV long hinges with variable crank					No
black-S	32 - 55	16 - 24	340	20	100014
		37 - 45	340	20	100019
white-S	32 - 55	16 - 24	340	20	101373



4.3.2 Accessories for shutter hinges



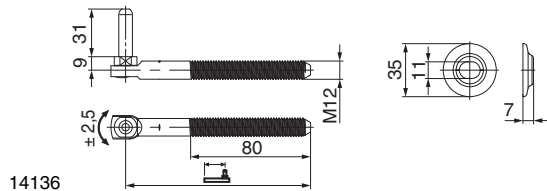
4.3.2.1 MMV sleeves and cover caps				No
black	open hinge regulator sleeve	Ø 10mm	100	44382^{1,2}
		Ø 9mm	100	44381^{1,2}
		Ø 8mm	100	44380^{1,2}
	short cover cap		100	44383¹
	long cover cap		100	44384²
grey	open hinge regulator sleeve	Ø 10mm	50	465423^{1,2}
		Ø 8mm	50	465422^{1,2}
	long cover cap		100	360382²
white	open hinge regulator sleeve	Ø 10mm	100	454977^{1,2}
		Ø 9mm	100	454976^{1,2}
		Ø 8mm	100	454975^{1,2}
	short cover cap		100	454978¹
	long cover cap		100	454979²

¹ For hinges with fixed crank.

² For hinges with variable crank 32-55mm.

4.4 Shutter pins

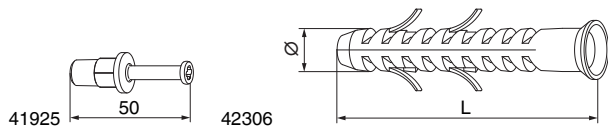
4.4.1 M12 universal shutter pins with lateral adjustment



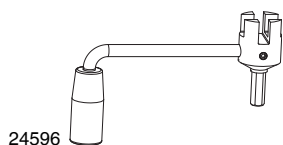
14136

4.4.1.1 MMV universal shutter pins with lateral adjustment			No
black-S	size 1	122 20	14136
	size 2	147 20	14140
	size 3	172 20	14144
	size 4	250 20	14148
grey-S	size 1	122 20	102448
	size 2	147 20	102449
	size 3	172 20	102545
white-S	size 2	147 20	11781
	size 4	250 20	101028

4.4.1.2 Accessories for M12 universal shutter pins



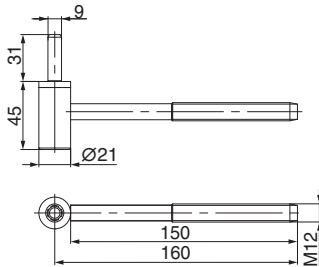
4.4.1.2.1 Rawplugs for universal shutter pins	∅	L		No
installation aid for plastered-in rawplug			20	41925
rawplug for shutter pin	16	100	20	42306
		140	20	42308



24596

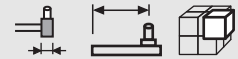
4.4.1.2.2 Screw-driving tool		No
screw-driving tool with crank handle for universal shutter pin	1	24596

4.4.2 M12 masonry shutter pins



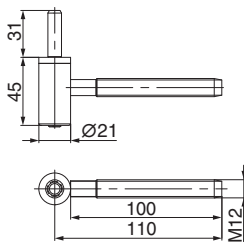
477945

4.4.2.1 MMV M12 masonry shutter pins with locking washer



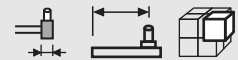
No

black-S	L110	21	110	24	477944
	L160	21	160	24	477945
grey-S	L110	21	110	24	477968
	L160	21	160	24	477969
white-S	L110	21	110	24	477965
	L160	21	160	24	477966



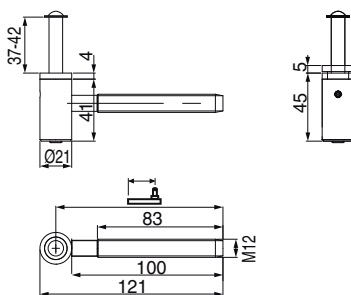
477972

4.4.2.2 MMV M12 masonry shutter pins with height adjustment and locking washer



No

black-S	L90	21	90	24	477971
	L110	21	110	24	477972
	L160	21	160	24	477973



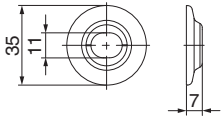
477979

4.4.2.3 MMV M12 masonry shutter pins with height adjustment and safety catch



No

black-S	L90	21	90	24	477978
	L110	21	110	24	477979
	L160	21	160	24	477980
grey-S	L110	21	110	24	477983
	L160	21	160	24	477984
white-S	L110	21	110	24	477981
	L160	21	160	48	477982



42454

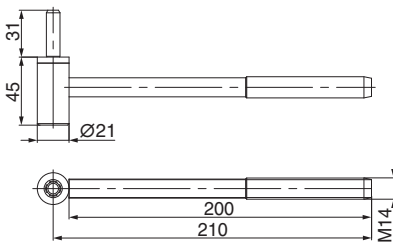
4.4.2.4 Cover disks for M12 shutter pins



No

black	100	42454
grey	100	465285
white	20	42844

4.4.3 M14 masonry shutter pins



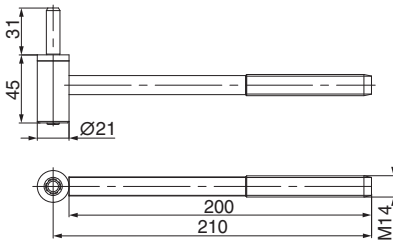
477946

4.4.3.1 MMV M14 masonry shutter pins with locking washer



No

black-S	L210	21	210	24	477946
grey-S	L210	21	210	24	477970
white-S	L210	21	210	24	477967



477974

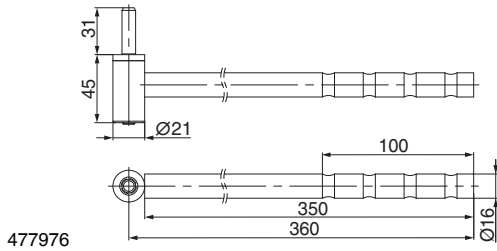
4.4.3.2 MMV M14 masonry shutter pins with height adjustment and locking washer



No

black-S	L210	21	210	24	477974
---------	------	----	-----	----	---------------

4.4.4 Ø16 masonry shutter pins



477976

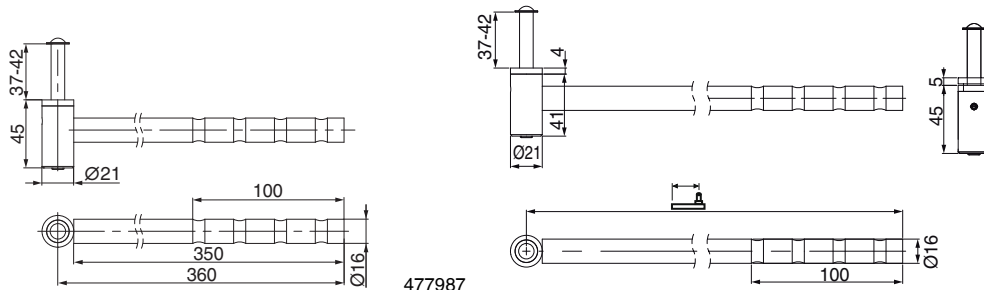
4.4.4.1 MMV Ø16 masonry shutter pins with height adjustment and locking washer



No

black-S

Length	Pin diameter	Pin length	Pin diameter	No
L260	21	260	20	477975
L360	21	360	16	477976
L460	21	460	16	477977



477986

477987

4.4.4.2 MMV Ø16 masonry shutter pins with height adjustment and safety catch



No

black-S

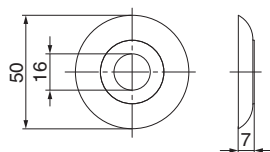
Length	Pin diameter	Pin length	Pin diameter	No
L260	21	260	20	477985
L360	21	360	16	477986
L460	21	460	16	477987

grey-S

L360	21	360	16	477989
------	----	-----	----	--------

white-S

L360	21	360	16	477988
------	----	-----	----	--------



364274

4.4.4.3 Cover disks for Ø16 masonry shutter pins



No

black

100	364274
-----	--------

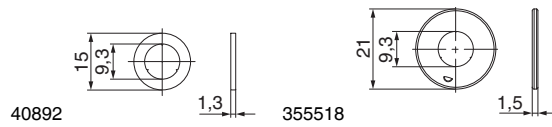
grey



50	365880
----	--------

white

50	367600
----	--------

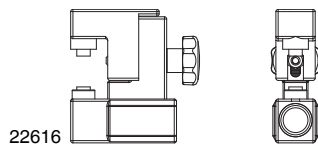
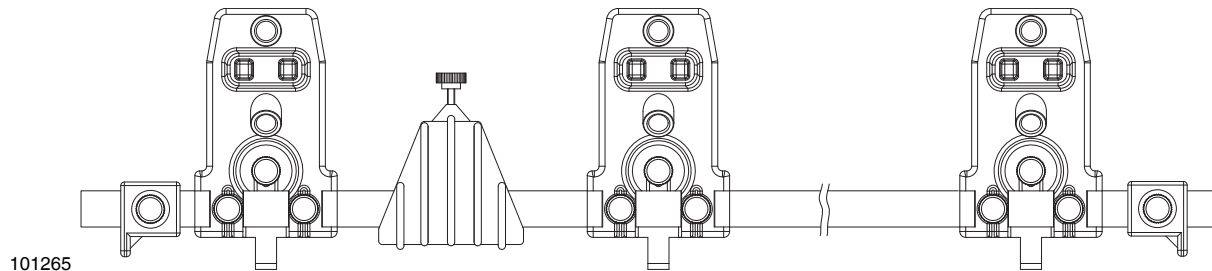
4.4.5 Accessories for shutter pins



4.4.5.1 Spacers for shutter pin					No
black	spacer BLR, for shutter pin	Ø 15mm	1,3	100	40892
	spacer MMV, for shutter pin	Ø 22mm	1,5	100	355518
grey	spacer BLR, for shutter pin	Ø 15mm	1,3	100	361316
	spacer MMV, for shutter pin	Ø 22mm	1,5	50	363286
white	spacer MMV, for shutter pin	Ø 22mm	1,5	100	363323



4.5 Jigs



4.5.1 Jigs for MMV shutter pins masonry installation



Nº

jig	MMV	for universal shutter pin	30° sloped drillhole AT=16-24, 2 rods + 3 drilling blocks	1	101265
		for shutter pin with separate pin	drill hole Ø 16mm	1	22616
				1	27054



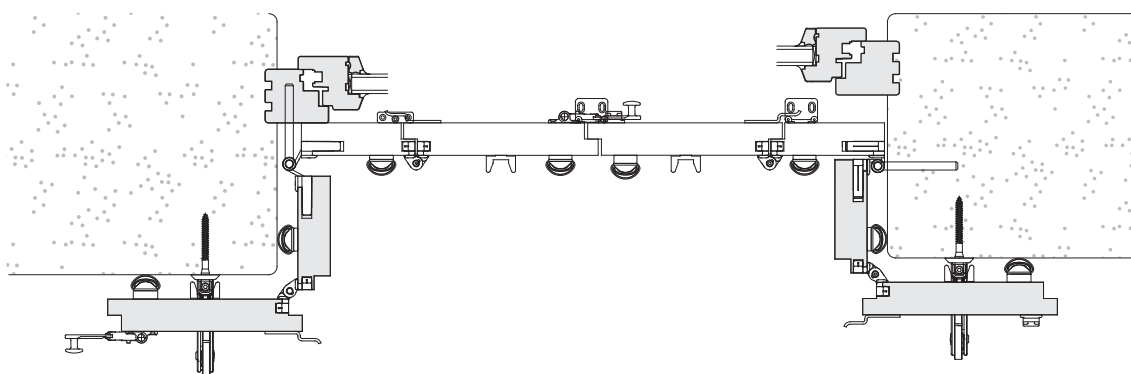
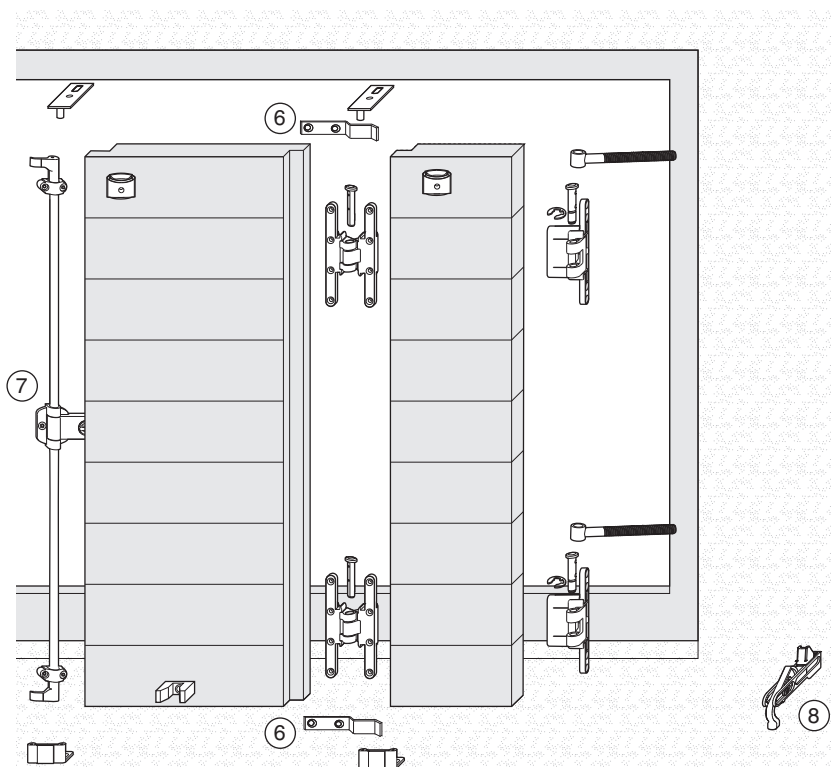
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5 Padovana / Vicentina installation

5.1 Information for hardware selection

5.1.1 2-sashed, with masonry shutter pins and shutter pins in frame



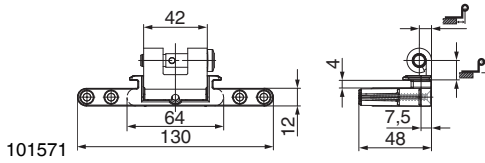
Selection guide

Page

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7	7	Shutter locks	→116
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5.2 Hinges

5.2.1 Concealed hinges with lateral adjustment



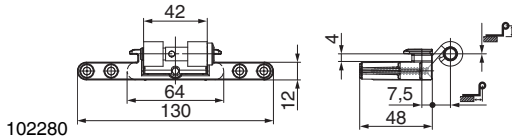
101571

T 5.2.1.1 PAD hinges for masonry installation



No

black-S	13	-8	20	101571
grey-S	13	-8	20	102139



102280

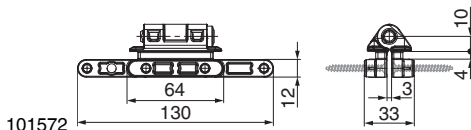
T 5.2.1.2 PAD hinges for frame installation



No

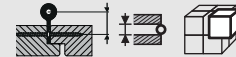
black-S	12	20	102280
grey-S	12	20	102352

5.2.1.3 Shutter centre hinges



101572

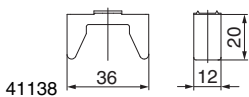
T 5.2.1.3.1 PAD shutter centre hinges



No

black-S	21	20	20	101572
grey-S	21	20	20	102158

5.2.2 Accessories for shutter hinges



41138

5.2.2.1 Stop for PAD shutter catches

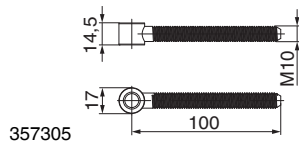


No

black	50	41138
-------	----	--------------



5.3 Shutter pins



T 5.3.1 Shutter pins for PAD shutter hinges



No

black-S	17	100	20	357305
grey-S	17	100	20	359885

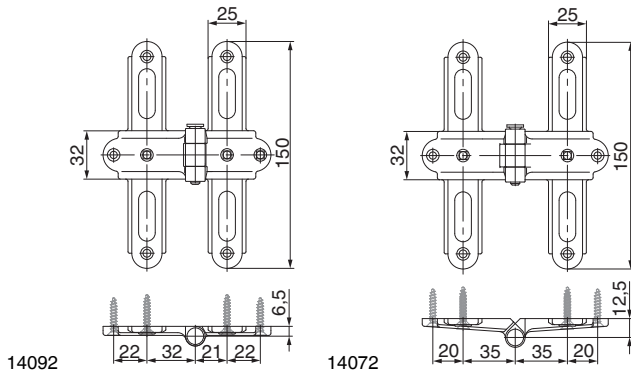


6 Accessories for folding shutters

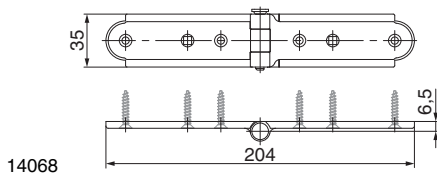
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6 Accessories for folding shutters

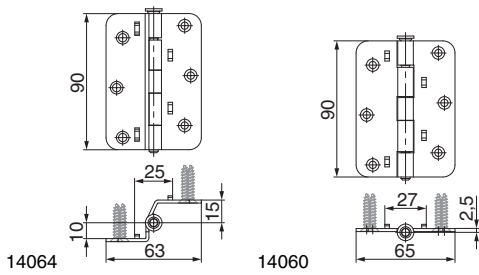
6.1 Centre hinges for folding shutters in sight



6.1.1 BLR centre cross hinges						No
black-S	asymmetrical	21-32	0-25	13	20	14092
	symmetrical	34-34	0	25	20	14072
grey-S	asymmetrical	21-32	0-25	13	20	102332
	symmetrical	34-34	0	25	20	102159
white-S	asymmetrical	21-32	0-25	13	20	27746
	symmetrical	34-34	0	25	20	20293



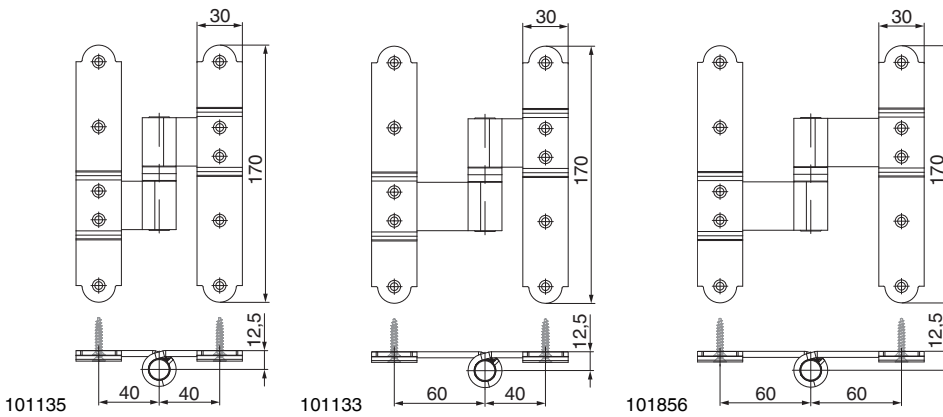
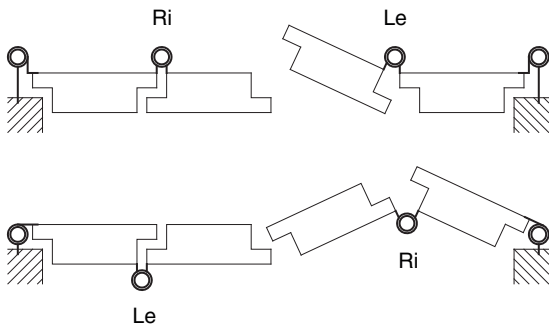
6.1.2 BLR batten hinges						No	
black-S	symmetrical			26	13	20	14068



6.1.3 BLR centre hinges straight/cranked						Nº
black-S	asymmetrical	20 (24)	25	25	20	14064
	symmetrical	22 (26)	0	27	20	14060
grey-S	symmetrical	22 (26)	0	27	20	102490
white-S	asymmetrical	20 (24)	25	25	20	10107
	symmetrical	22 (26)	0	27	20	21883



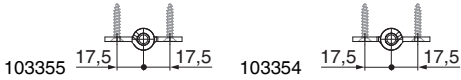
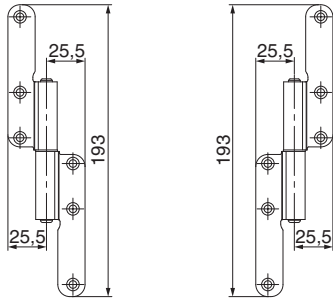
6.1.4 Centre hinges for folding shutters with opening direction left or right



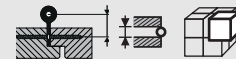
6.1.5 MMV centre cross hinges



								No
black-S	asymmetrical	left	60-40	0-80	25	20		101133
		right	60-40	0-80	25	20		101134
	symmetrical	left	40-40	0-40	25	20		101135
			60-60	0-40	25	20		101856
		right	40-40	0-40	25	20		101136
			60-60	0-40	25	20		101883
grey-S	asymmetrical	left	60-40	0-80	25	20		102525
		right	60-40	0-80	25	20		102526
	symmetrical	left	40-40	0-40	25	20		102261
		right	40-40	0-40	25	20		102262
white-S	asymmetrical	left	60-40	0-80	25	20		101257
		right	60-40	0-80	25	20		101258
	symmetrical	left	40-40	0-40	25	20		101259
			60-60	0-40	25	20		101884
		right	40-40	0-40	25	20		101260
			60-60	0-40	25	20		101885



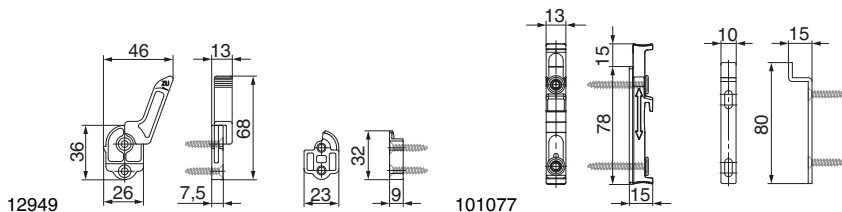
6.1.6 Prima MMV centre hinges



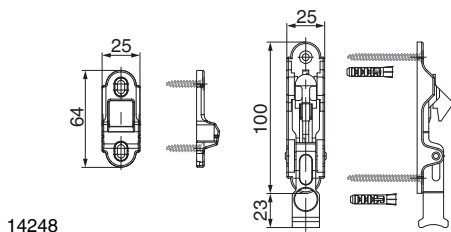
№

black-S	left	17.5	15	20	103355
		21	25	20	103288
		22.5	25	20	103357
	right	27.5	35	20	103359
		17.5	15	20	103354
		21	25	20	103289
		22.5	25	20	103356
		27.5	35	20	103358
	grey-S	left	21	25	20
		27.5	35	20	105784
	right	21	25	20	105783
		27.5	35	20	105785
	white-S	left	21	25	20
		27.5	35	20	103365
	right	21	25	20	104114
		27.5	35	20	103364

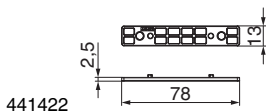




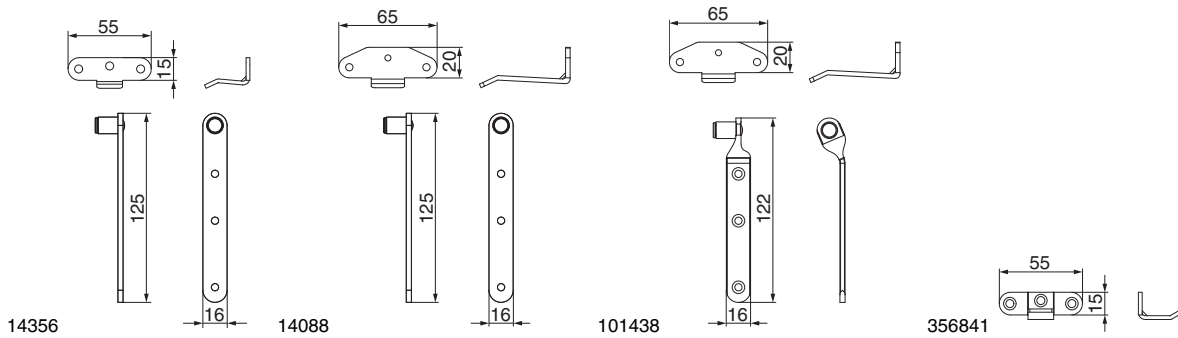
6.2 Folding shutter couplings				No
black	with lever	for 13mm distance	20	12949
		for 25mm distance	20	13101
black-S	small	for 20mm distance	20	101799
		for 25mm distance	20	101077
white	with lever	for 25mm distance	20	10223
white-S	small	for 25mm distance	20	101261




6.3 Door shutter catches as folding shutter coupling				No
black-S			20	14248
grey-S			20	102147
white-S			20	13110

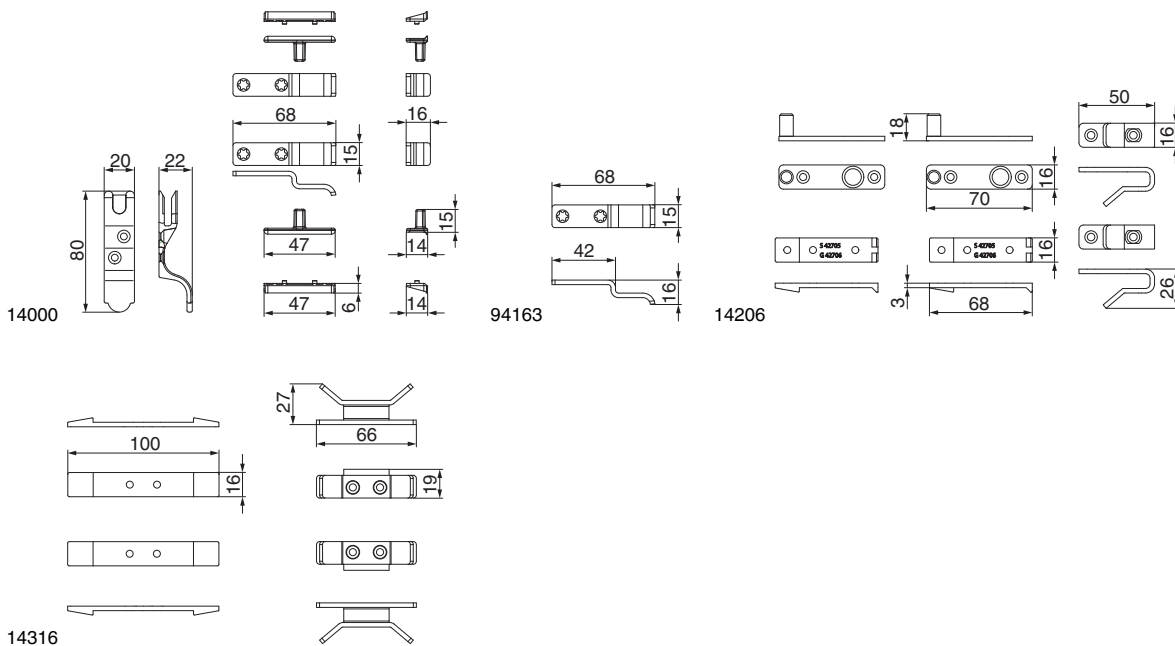


6.4 Packers for folding shutter couplings					No
black	for folding shutter coupling - slimline		2,5	50	441422
white	for folding shutter coupling - slimline		2,5	50	454768



6.5 Shutter suspending run-up block				No
black-S	shutter suspending run-up block	for 0-5mm shutter distance	20	14356
		for 5-32mm shutter distance	20	14088
	shutter suspending run-up block cranked	20	101438	
	shutter suspending run-up block bottom	50	356841	
	Shutter run-up block plate	for 0-5mm shutter distance	50	360812
grey-S	shutter suspending run-up block	for 0-5mm shutter distance	20	102138
		for 5-32mm shutter distance	20	102491
white-S	shutter suspending run-up block	for 0-5mm shutter distance	20	10235
		for 5-32mm shutter distance	20	101304
	shutter suspending run-up block cranked	20	101695	
	shutter suspending run-up block bottom	50	356842	



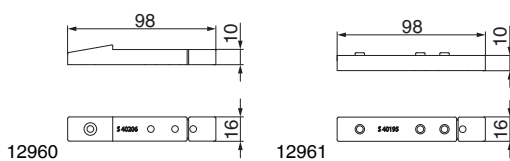


6.6 Multi-sash locking hooks



No

black-S	in pairs, multi-sashed, external pivot point	with striker pin brackets and packers	20	14000
	single multi-sashed external pivot point		200	94163
	in pairs, multi-sashed, internal pivot point	with striker pin brackets and packers	10	14206
	4-sash locking hook with internal pivot point in pairs		10	14316
grey-S	in pairs, multi-sashed, external pivot point	with striker pin brackets and packers	20	102165
	single multi-sashed external pivot point		200	359871
	in pairs, multi-sashed, internal pivot point	with striker pin brackets and packers	10	102166
white-S	in pairs, multi-sashed, external pivot point	with striker pin brackets and packers	20	12537
	single multi-sashed external pivot point		200	365862
	in pairs, multi-sashed, internal pivot point	with striker pin brackets and packers	10	101554
	4-sash locking hook with internal pivot point in pairs		10	14801



6.7 Packers for locking hooks with inside pivot point



No

black	for locking hook with internal pivot point for 10mm gap		10	12960
	for locking hook with internal pivot point for 20mm and 30mm gap		10	12961
white	for locking hook with internal pivot point for 10mm gap		20	44352
	for locking hook with internal pivot point for 20mm and 30mm gap		20	44353



7 Shutter locks

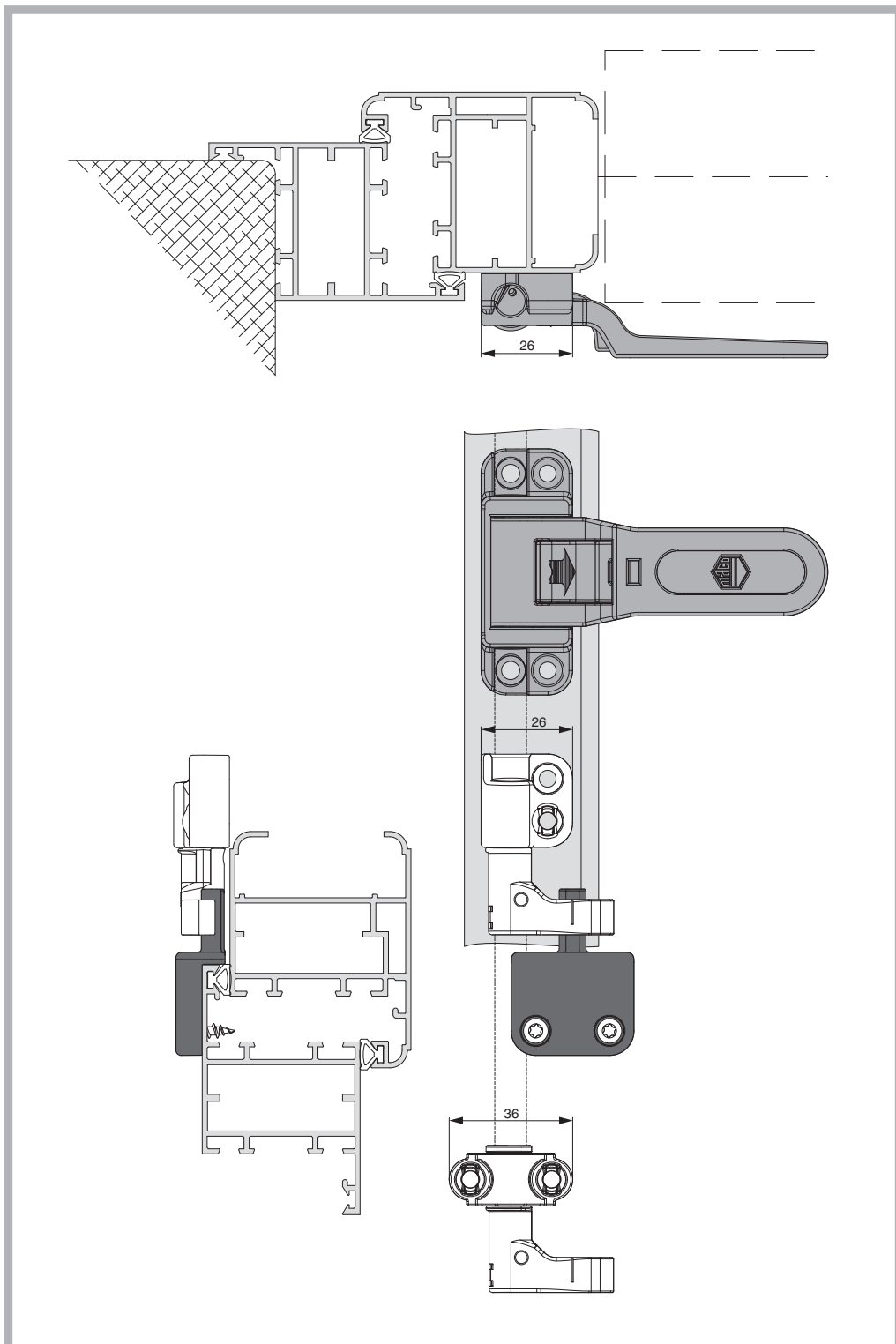
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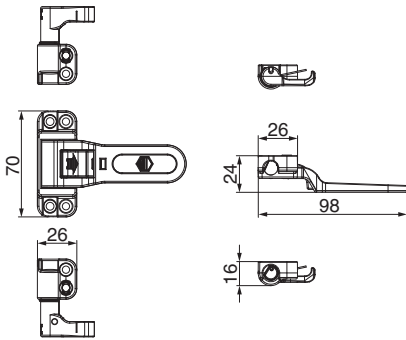


7 Shutter locks

7.1 Snap locks packages

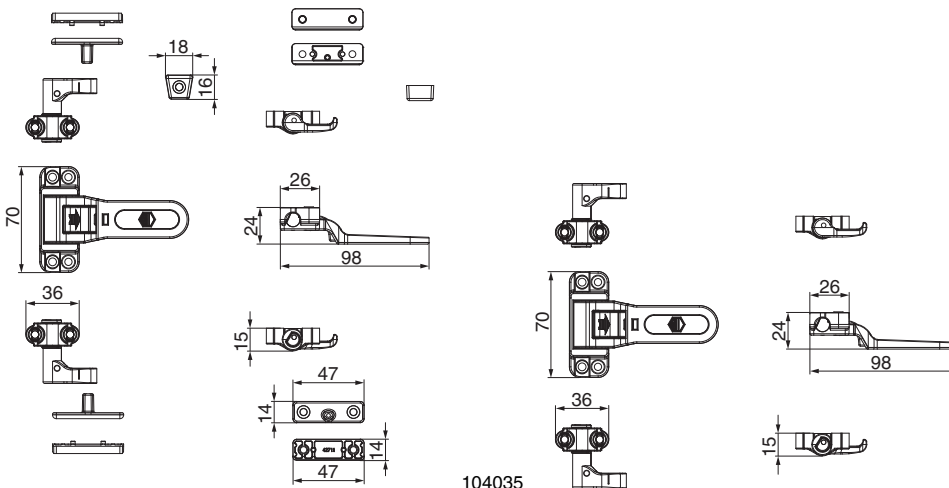
7.1.1 Snap locks 26mm wide





104033

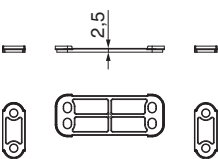
7.1.1.1 Snap locks 26mm wide with spring-loaded locking hooks 26mm wide			L		No
black-S	without striker pin brackets without protective block	with 26mm wide spring-loaded locking hooks	98	20	104033



104036

104035

7.1.1.2 Snap locks 26mm wide with locking hooks 36mm wide			L		No
black-S	with striker pin brackets and packers with protective block	with 36mm wide locking hooks	98	20	104036
	without striker pin brackets without protective block	with 36mm wide locking hooks	98	20	104035
grey-S	with striker pin brackets and packers with protective block	with 36mm wide spring-loaded locking hooks	98	20	104037
	without striker pin brackets without protective block	with 36mm wide locking hooks	98	20	104057
white-S	with striker pin brackets and packers with protective block	with 36mm wide locking hooks	98	20	104054
	without striker pin brackets without protective block	with 36mm wide locking hooks	98	20	104053
		with 36mm wide spring-loaded locking hooks	98	20	104055

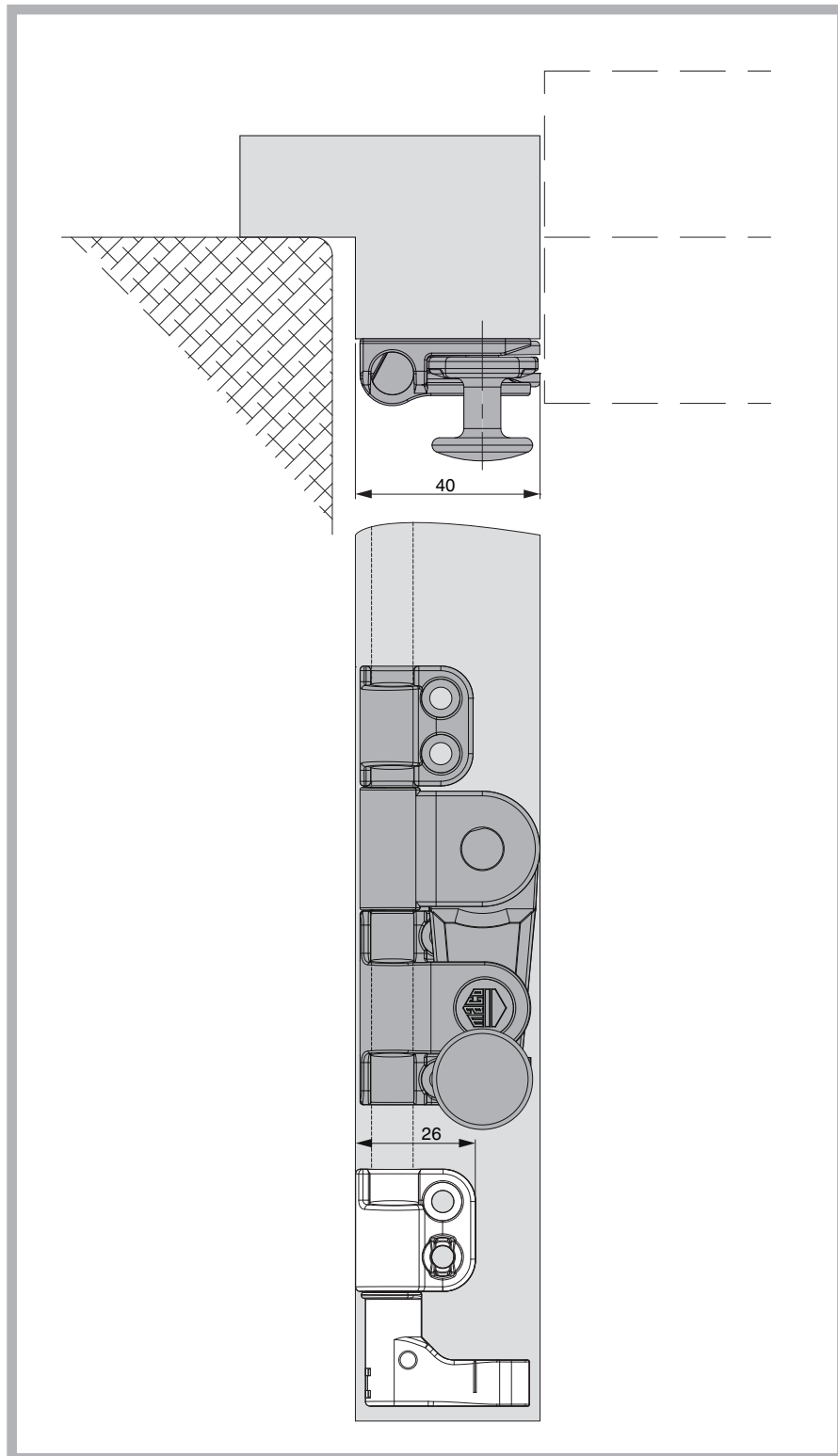


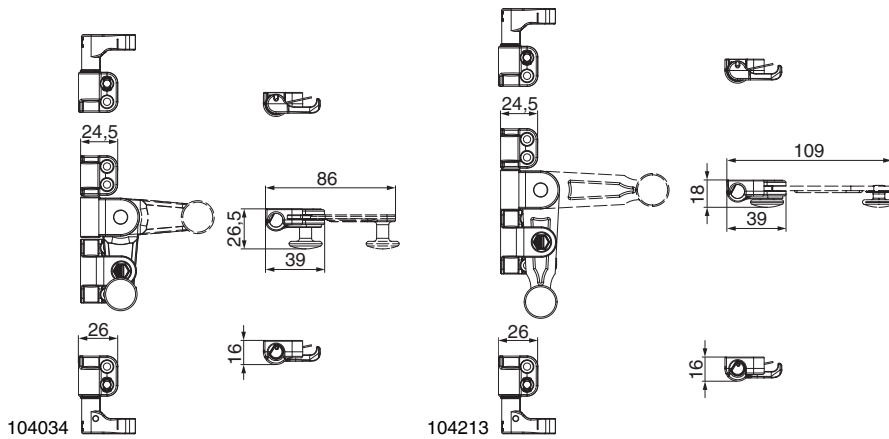
368162

7.1.1.3 Packers for snap lock and locking hooks					No
black	for snap lock and 36mm wide locking hooks	stackable 2.5mm high	2,5	50	368162
grey	for snap lock and 36mm wide locking hooks	stackable 2.5mm high	2,5	50	368213
white	for snap lock and 36mm wide locking hooks	stackable 2.5mm high	2,5	50	368212

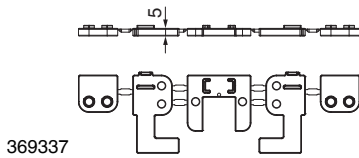


7.1.2 1F shutter locks 40mm wide





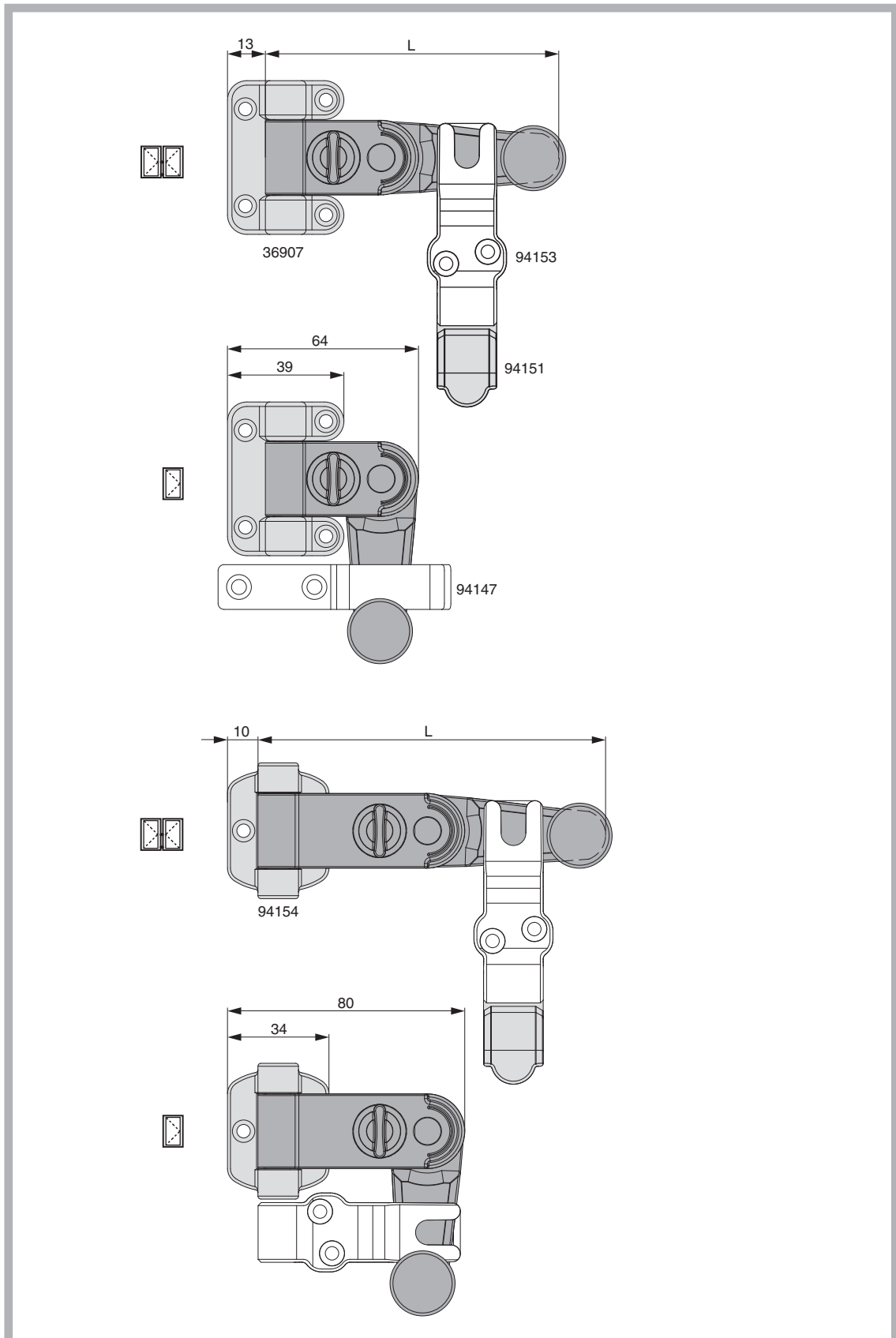
7.1.2.1 1F shutter locks with spring-loaded locking hooks 26mm wide				L		No
black-S	shutter lock 1F without striker pin brackets without protective block	left/right	40 wide	86	20	104034
	shutter lock 1F with low head without striker pin brackets without protective block	left/right	40 wide	109	20	104213
grey-S	shutter lock 1F without striker pin brackets without protective block	left/right	40 wide	88	20	104624
white-S	shutter lock 1F without striker pin brackets without protective block	left/right	40 wide	86	20	104654
	shutter lock 1F with low head without striker pin brackets without protective block	left/right	40 wide	109	20	104617

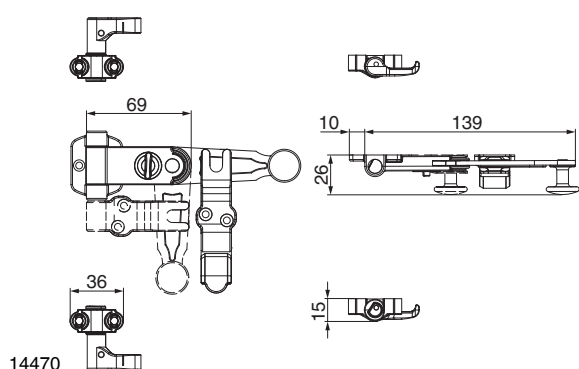
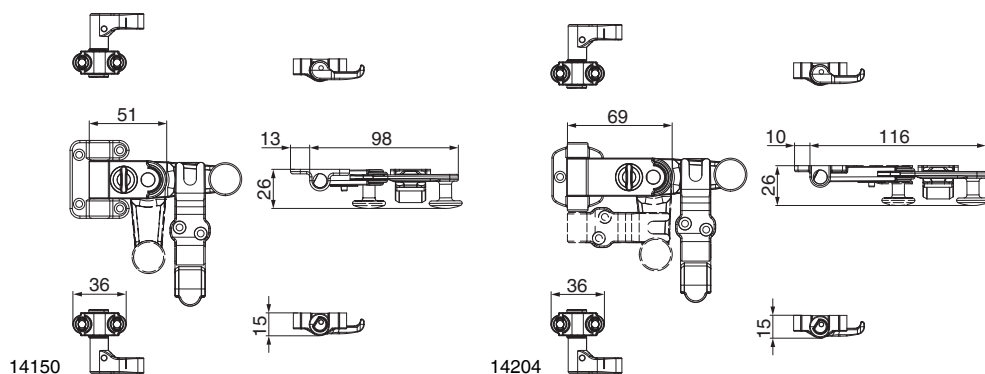


7.1.2.2 Packer 1F shutter lock, locking hooks and rod guide						No
black	for shutter lock 1F and 26mm wide locking hooks and rod guide		stackable 5mm high	5	50	369337

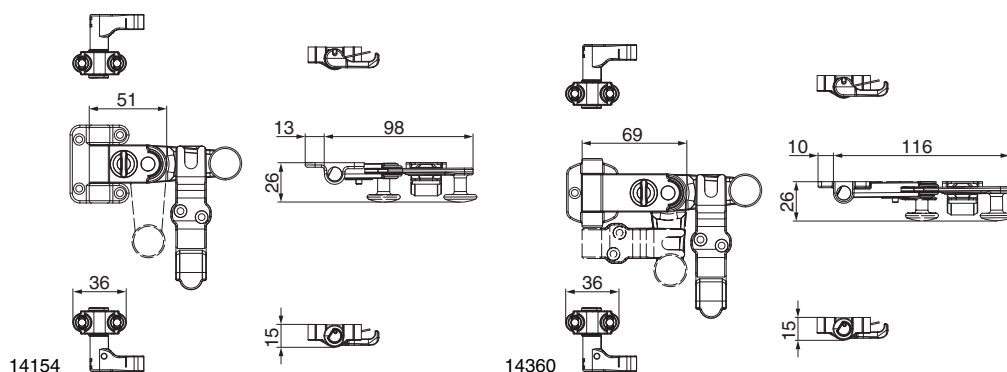


7.1.3 2F shutter locks



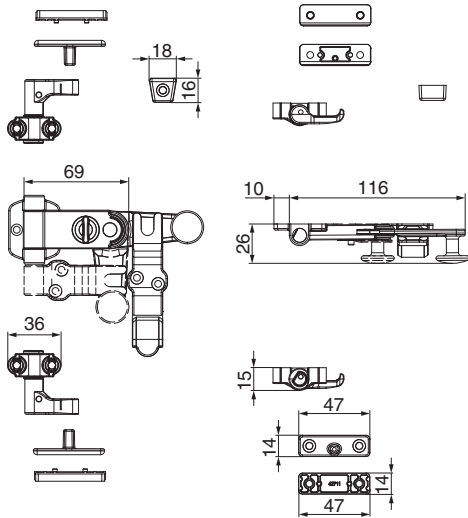


7.1.3.1 2F shutter locks without striker pin brackets without protection block with locking hook without spring			L		No
black-S	with short crank handle	with 36mm wide locking hooks	98	20	14150
	with standard crank handle	with 36mm wide locking hooks	116	20	14204
	with long crank handle	with 36mm wide locking hooks	139	20	14470
grey-S	with short crank handle	with 36mm wide locking hooks	98	20	102251
	with standard crank handle	with 36mm wide locking hooks	116	20	102481
	with long crank handle	with 36mm wide locking hooks	139	20	102252
white-S	with standard crank handle	with 36mm wide locking hooks	116	20	13267
	with long crank handle	with 36mm wide locking hooks	139	20	100040



7.1.3.2 2F shutter locks without striker pin brackets without protection block with spring-loaded locking hooks			L		No
black-S	with short crank handle	with 36mm wide spring-loaded locking hooks	98	20	14154
	with standard crank handle	with 36mm wide spring-loaded locking hooks	116	20	14360
	with long crank handle	with 36mm wide spring-loaded locking hooks	139	20	14364
grey-S	with short crank handle	with 36mm wide spring-loaded locking hooks	98	20	102477
	with standard crank handle	with 36mm wide spring-loaded locking hooks	116	20	102152
	with long crank handle	with 36mm wide spring-loaded locking hooks	139	20	102483

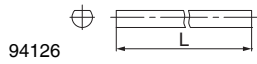




14208

7.1.3.3 2F shutter locks with striker pin brackets with packers with protection block			L		No
black-S	with standard crank handle	with 36mm wide locking hooks	116	20	14208
grey-S	with standard crank handle	with 36mm wide locking hooks	116	20	102469
white-S	with standard crank handle	with 36mm wide locking hooks	116	20	13273

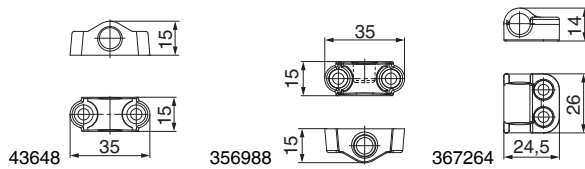
7.2 Locking rods



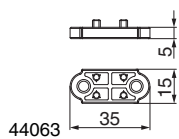
94126

7.2.1 Locking rods		L		Nº
black-S		1.400	10	94126
		2.200	10	94130
		2.600	10	94134
grey-S		1.400	10	465217
		2.200	10	465218
		2.600	10	465220
white-S		1.400	10	30053
		2.200	10	36860
		2.600	10	97509

7.2.2 Rod guides



7.2.2.1 Rod guides			Nº
black	36mm wide	100	43648
	closed	20	356988
black-S	26mm wide	50	367264
grey	36mm wide	100	359888
	closed	20	360958
white	36mm wide	100	43649
	closed	20	365566



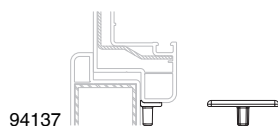
44063

7.2.2.2 Packers rod guides				Nº
black	for 36mm wide rod guide	5	100	44063
		8	100	364330
grey	for 36mm wide rod guide	5	100	359901
white	for 36mm wide rod guide	5	100	44072

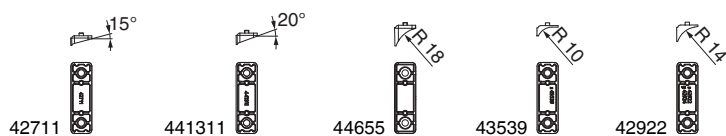


7.3 Striker pin brackets for frame installation

7.3.1 R1 striker pin brackets for frame installation

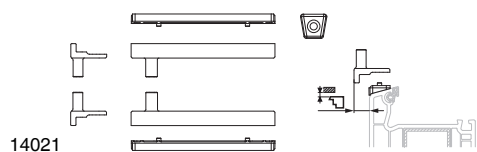


7.3.1.1 R1 striker pin brackets for frame installation				No
black-S	single		50	94137
grey-S	single		50	212479
white-S	single		50	39020

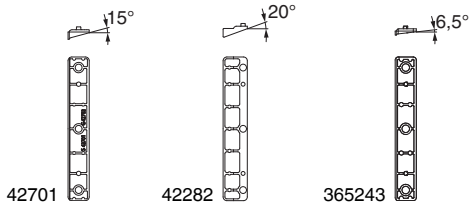


7.3.1.2 Packers for R1 striker pin brackets for frame installation			L		No
black		15° pitched	47	100	42711
		20° pitched	47	100	441311
		Alphacan R18	47	100	44655
		r = 10	47	100	43539
		r = 14	47	500	42922
grey		15° pitched	47	100	360166
white		15° pitched	47	100	40044
		20° pitched	47	100	44422
		Alphacan R18	47	100	44654

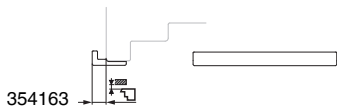
7.3.2 R2 striker pin brackets for frame installation



7.3.2.1 R2 striker pin brackets for frame installation				No		
black-S	in pairs	with 15° packer and protective block	10	20	14021	
			17	20	14024	
	single		left	10	50	94433
			right	10	50	94434
			left	17	50	97500
			right	17	50	94184
			left	34	20	97501
			right	34	20	97502
	grey-S	in pairs	with 15° packer and protective block	10	20	102377
	white-S	in pairs	with 15° packer and protective block	17	20	12563
left				10	50	36862
right		10	50	36864		
	single		right	17	50	36866



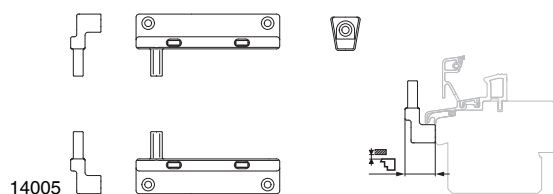
7.3.2.2 Packers for R2 striker pin brackets for frame installation		L		Nº
black	15° pitched	95	200	42701
	20° pitched	95	200	42282
	6.5° pitched	95	200	365243
white	15° pitched	95	100	40043



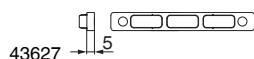
7.3.2.3 R2 arm fixing brackets for frame installation				Nº
black-S	single	10	50	94141
		17	50	94143
white-S	single	17	50	354163



7.3.3 R3 striker pin brackets for frame installation



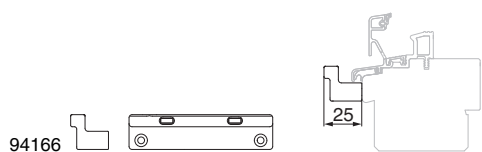
7.3.3.1 R3 striker pin brackets for frame installation					No
black-S	in pairs	with protective block	17	20	14005
			20	20	14008
			25	20	14011
grey-S	in pairs	with protective block	17	20	102757
white-S	in pairs	with protective block	17	20	10327
			20	20	10330
			25	20	10333



7.3.3.2 Packers for R3 striker pin brackets for frame installation				L		No
black			5	95	100	43627
white			5	95	100	43851

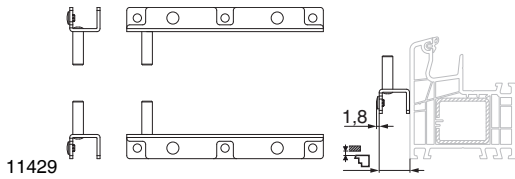


7.3.3.3 Buffers for R3 striker pin brackets for frame installation				No
black	1.3mm high		100	42911
white	1.3mm high		100	44277



7.3.3.4 R3 arm fixing brackets for frame installation					No
black-S	single		17	20	360441
			25	20	94166

7.3.4 R4 striker pin brackets for frame installation

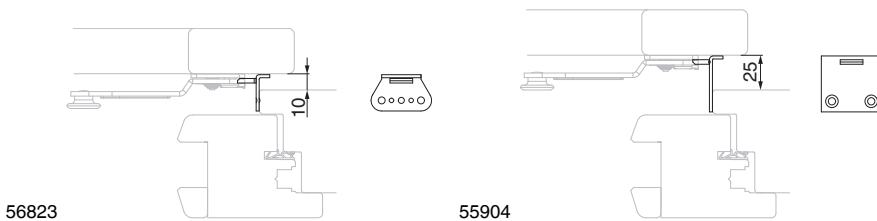


7.3.4.1 R4 striker pin brackets for frame installation					No
black-S	in pairs	with buffer 1.8mm	15	50	11429
			20	20	11459
			25	20	11465
			30	20	11467
white-S	in pairs	with buffer 1.8mm	15	50	11456
			20	20	11462
			25	20	11466

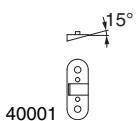


7.3.4.2 Buffers for R4 striker pin brackets for frame installation				No
black	1.3mm high	100	44444	
	1.8mm high	100	44333	
white	1.3mm high	100	44443	

7.3.5 R5 striker pin brackets for frame installation



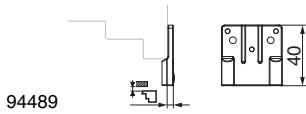
7.3.5.1 R5 striker pin brackets for frame installation					No
black-S	0	100	56819		
	10	100	56823		
	17	100	56827		
	25	100	55904		
white-S	0	100	28828		
	10	100	28829		
	17	100	28830		



7.3.5.2 Packers for R5/R7/R11 striker pin brackets for frame installation			L		No
black	15° pitched	40	100	40001	
grey	15° pitched	40	100	465213	
white	15° pitched	40	100	43850	

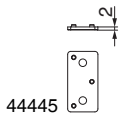


7.3.6 R6 striker pin brackets for frame installation



94489

7.3.6.1 R6 striker pin brackets for frame installation				No
black-S	40mm high	4	50	94489
	50mm high	4	50	202366



44445

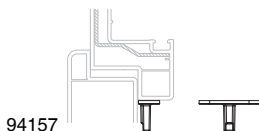
7.3.6.2 Packers for R6 striker pin brackets for frame installation			L		No
black	stackable	2	40	100	44445
white	stackable	2	40	100	44455



44444

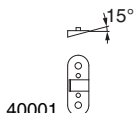
7.3.6.3 Buffers for R6 striker pin brackets for frame installation			No
black	1.3mm high	100	44444
	1.8mm high	100	44333
white	1.3mm high	100	44443

7.3.7 R7 striker pin brackets for frame installation



94157

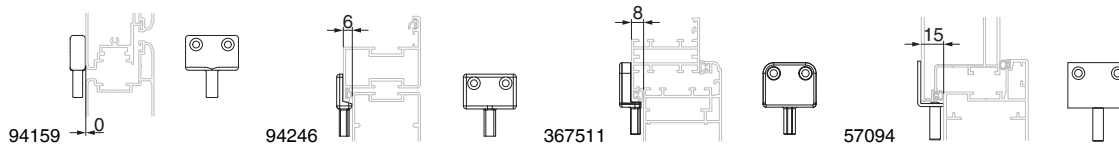
7.3.7.1 R7 striker pin brackets for frame installation			No
black-S		50	94157
grey-S		50	359870
white-S		50	97531



40001

7.3.7.2 Packers for R5/R7/R11 striker pin brackets for frame installation		L		No
black	15° pitched	40	100	40001
grey	15° pitched	40	100	465213
white	15° pitched	40	100	43850

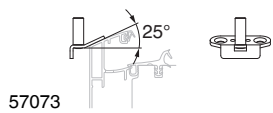
7.3.8 R8 striker pin brackets for frame installation



7.3.8.1 R8 striker pin brackets for frame installation

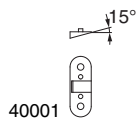
			Nº
black-S	rebate leg 0	50	94159
	rebate leg 6	50	94246
	rebate leg 8	50	367511
	rebate leg 15	100	57094
grey-S	rebate leg 0	50	361183
	rebate leg 15	100	211809
white-S	rebate leg 0	50	364275

7.3.9 R11 striker pin bracket for frame installation



7.3.9.1 R11 striker pin bracket for frame installation

			Nº
black-S	25° pitched	200	57073

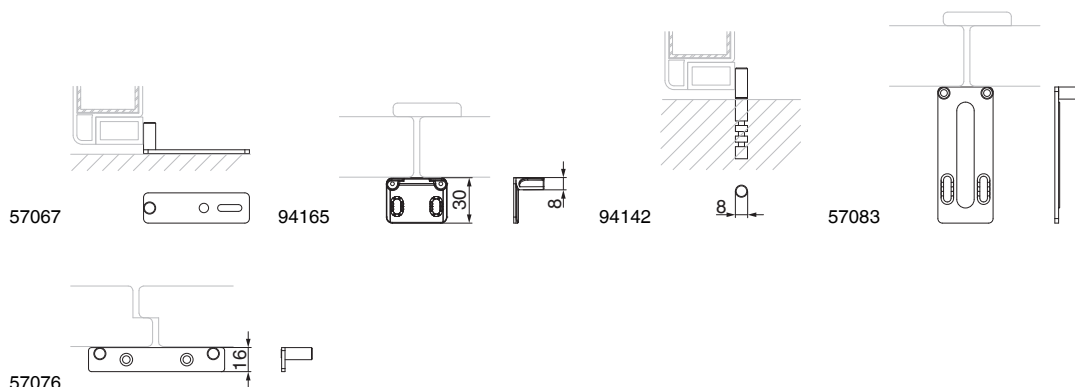


7.3.9.2 Packer for R5/R7/R11 striker pin brackets for frame installation

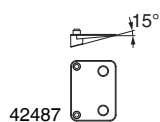
		L		Nº
black	15° pitched	40	100	40001



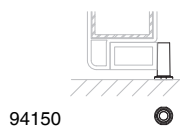
7.4 Striker pin brackets for masonry installation



7.4.1 Striker pin brackets for masonry installation					No
black-S	M1	in pairs with screws and rawplugs	20		14003
		single	50		57067
	M2,d=8	single with rawplug	20		14176
		single without rawplugs and screws	50		94165
	M3	single	50		94142
	M4, size 1 (40-60)	single without rawplugs and screws	20		57083
	M4, size 2 (60-80)	single without rawplugs and screws	20		57082
grey-S	M5	single	50		57076
	M2,d=8	single without rawplugs and screws	50		359867
	M4, size 1 (40-60)	single without rawplugs and screws	20		211578
	M4, size 2 (60-80)	single without rawplugs and screws	20		211960
white-S	M5	single	50		211506
	M1	in pairs with screws and rawplugs	20		14025
	M2,d=8	single with rawplug	20		14026
	M4, size 1 (40-60)	single without rawplugs and screws	20		206077
	M5	single	50		57215

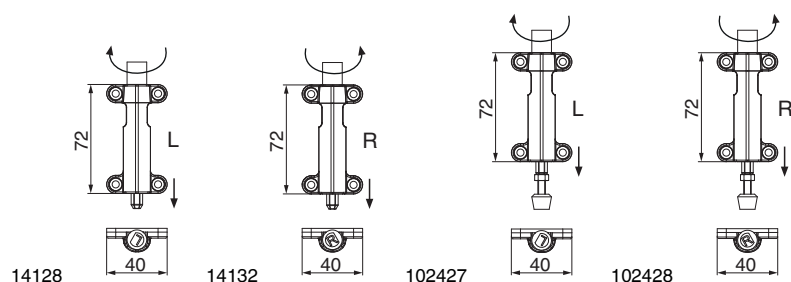


7.4.2 Packers for M2 striker pin brackets for masonry installation				L		No
black	M2	15° pitched	40	100		42487



7.4.3 Screwing bushes					No
Rustico screwing bush black-S				50	94150
Rustico screwing bush grey-S				50	361320

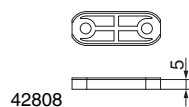
7.5 Shutter lock end pieces



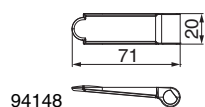
7.5.1 Shutter lock end pieces				No
black-S	shutter lock end piece with shootbolt protrusion	locking to the left	20	14128 ¹
		locking to the right	20	14132 ¹
	shutter lock end piece with shootbolt protrusion and rubber buffer	locking to the left	20	102427 ^{1,2}
		locking to the right	20	102428 ^{1,2}
grey-S	shutter lock end piece with shootbolt protrusion	locking to the left	20	102140 ¹
		locking to the right	20	102141 ¹
white-S	shutter lock end piece with shootbolt protrusion	locking to the left	20	11248 ¹
		locking to the right	20	11249 ¹
	shutter lock end piece with shootbolt protrusion and rubber buffer	locking to the left	20	102470 ^{1,2}
		locking to the right	20	102471 ^{1,2}

¹ These parts are excluded from the 10-year surface guarantee.

² Using gasket compression to latch does not produce a high resistance to storms.



7.5.2 Packers for shutter lock end pieces					No
black	for shutter lock end piece with shootbolt protrusion		5	100	42808
			8	100	364332
grey	for shutter lock end piece with shootbolt protrusion		5	100	359900
white	for shutter lock end piece with shootbolt protrusion		5	100	363325



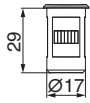
7.5.3 Stop tabs for shutter lock end pieces				No
black-S	stop tab for shutter lock end piece		20	94148
grey-S	stop tab for shutter lock end piece		20	359859
white-S	stop tab for shutter lock end piece		20	358473
black	buffer for self-adhesive stop tab		50	370103



7.5.4 Turn-alignment for shutter lock end pieces				No
silver	turn-alignment for left-handed shutter lock end piece on folding shutters		100	39126 ¹
	turn-alignment for right-handed shutter lock end piece on folding shutters		100	39125 ¹

¹ Required for folding shutters with shutter end piece.





59432

7.5.5 Shootbolt locking bush for shutter lock end pieces



Nº

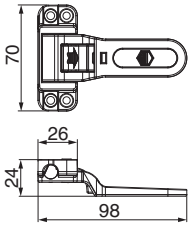
shootbolt locking bush with lid/spring-loaded cover silver

20

59432¹

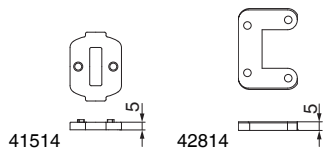
¹ This part is excluded from the 10-year guarantee.

7.6 Multi-point locking rods separate parts



219841

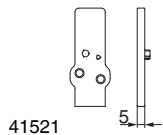
7.6.1 Snap locks - loose		L		No
black-S	snap lock 26 wide	98	50	219841
grey-S	snap lock 26 wide	98	20	225586
white-S	snap lock 26 wide	98	20	225585



41514

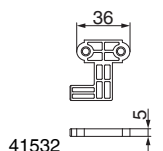
42814

7.6.2 Packers 2F rod guides				No
black	for 2-sash rod guide for crank handle	5	100	41514
	for 2-sash rod guide for short crank handle	8	100	44184
grey	for 2-sash rod guide for crank handle	5	100	359899
white	for 2-sash rod guide for crank handle	5	100	355950



41521

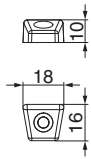
7.6.3 Packers 2F locking brackets				No
black	for multi-purpose double-sashed shutter latch	5	100	41521
	for multi-purpose double-sashed shutter latch	8	100	44182
grey	for multi-purpose double-sashed shutter latch	5	100	359894
white	for multi-purpose double-sashed shutter latch	5	100	355951




41532

7.6.4 Packers locking hooks			W		No
black	for 36mm wide locking hook	5	36	100	41532
	for 36mm wide locking hook	8	36	100	44180
grey	for 36mm wide locking hook	5	36	100	359898
white	for 36mm wide locking hook	5	36	100	355952

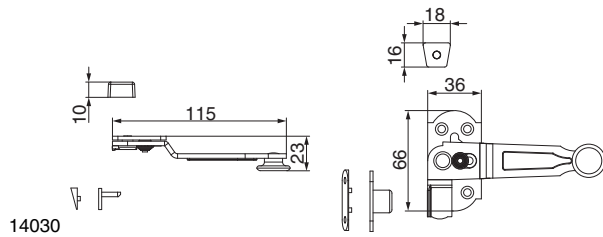




40002

7.6.5 Protective blocks			Nº
dark brown	10mm high	100	40002
	20mm high	100	40418
	30mm high	20	41632
grey	10mm high	100	359892
	20mm high	100	357950
white	10mm high	100	40058
	20mm high	100	40571

7.7 Centre locks



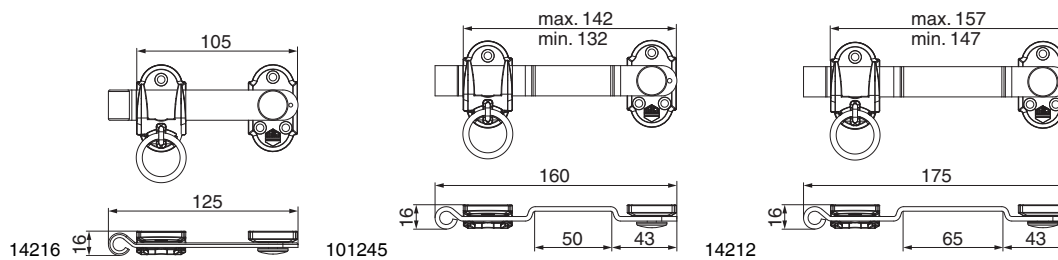
14030

7.7.1 for 1-sashed shutters



No

black-S	with striker pin brackets and packers with protective block	right	20	14027
		left	20	14030
grey-S	with striker pin brackets and packers with protective block	right	20	102150
		left	20	102151
white-S	with striker pin brackets and packers with protective block	right	20	13095
		left	20	13096



14216

101245

14212

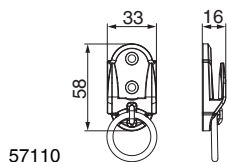
7.7.2 for 2-sashed shutters, with ring part

L



No

black-S	with short crank handle	125	20	14216
	with 160mm offset crank handle	160	20	101245
	with 175mm offset crank handle	175	20	14212
grey-S	with short crank handle	125	20	102149
	with 175mm offset crank handle	175	20	102148
white-S	with short crank handle	125	20	13308
	with 160mm offset crank handle	160	20	101247
	with 175mm offset crank handle	175	20	13187



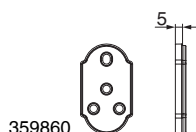
57110

7.7.3 Locking plates for double-sash shutter lock



No

black-S	locking plate for double-sash shutter lock	20	57110
---------	--------------------------------------------	----	--------------



359860

7.7.4 Packers for centre lock



No

black	stackable 5mm high	5	100	359860
white	stackable 5mm high	5	100	361191

MACO
RUSTICO



Shutter Locks



8 Shutter catches

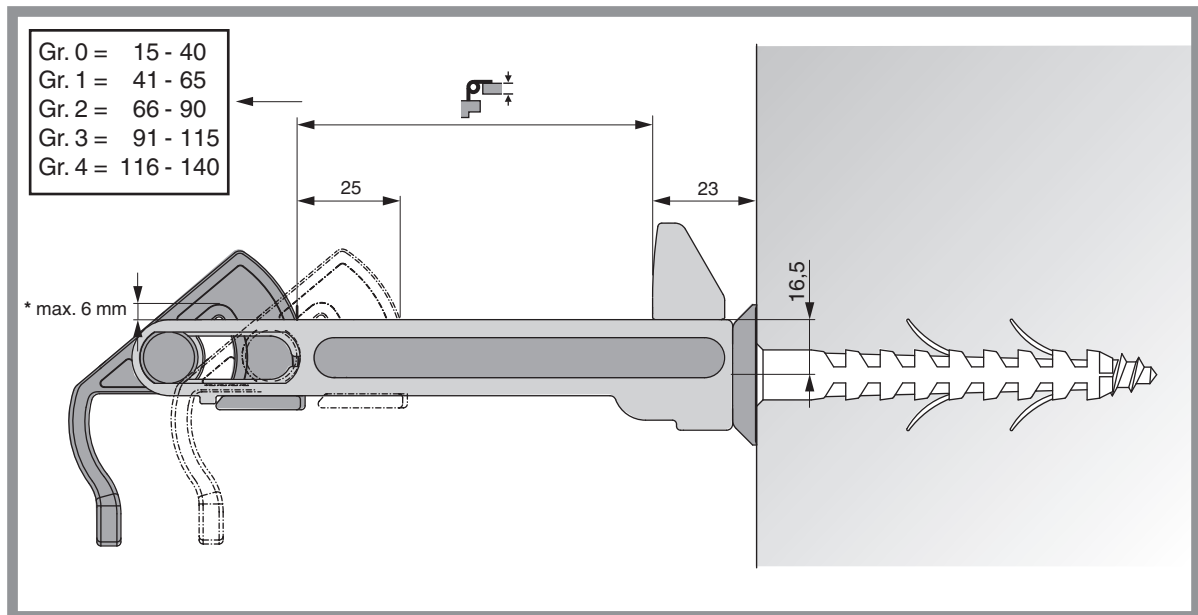
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8 Shutter catches

8.1 Shutter catches "Classic" model

8.1.1 Application range with default setting

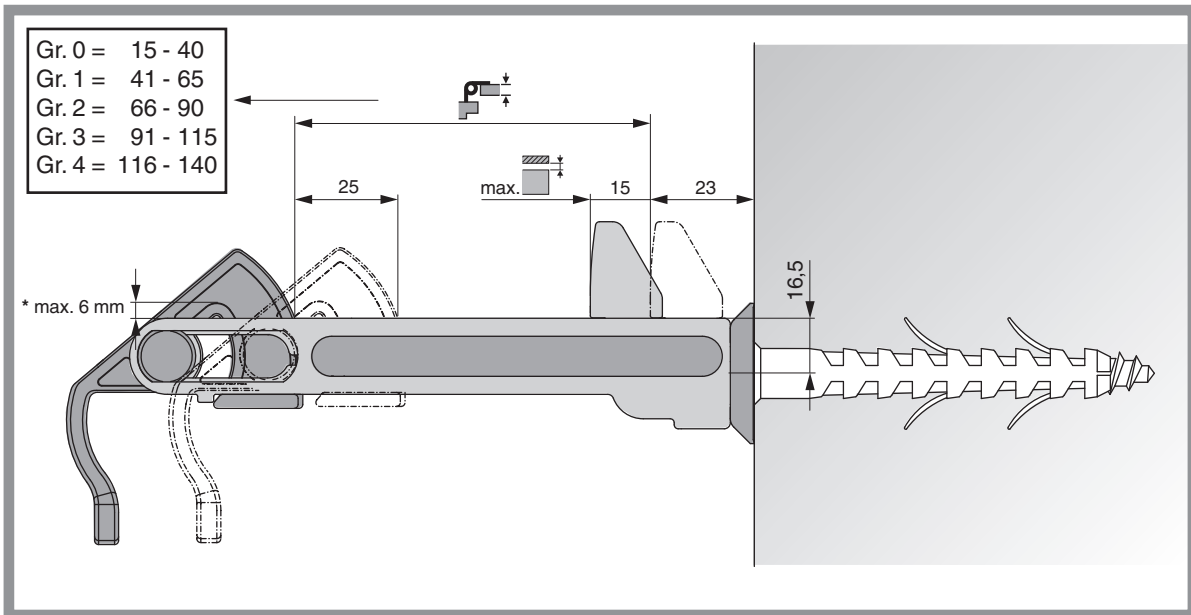


* max. 6mm distance to bottom edge of shutter

Calculation of application range with default setting

35mm	Shutter thickness
+ 0mm	Additional distance to wall
<hr/>	
= 35mm	Application range
<hr/>	
→	Shutter catch size 0 (15-40mm)

8.1.2 Application range with additional distance to wall

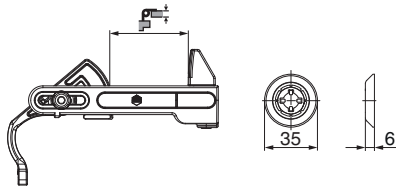


* max. 6mm distance to bottom edge of shutter

Calculation of application range with additional wall distance

35mm	Shutter thickness
+ 15mm	Additional distance to wall
<hr/>	
= 50mm	Application range
<hr/>	
→	Shutter catch size 1 (41-65mm)





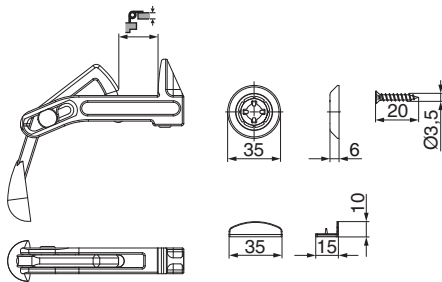
10860

8.1.3 Shutter catches "Classic" model with cover disk without fixing bolts



No

black-S	size 0	15 - 40	20	10860
	size 1	41 - 65	20	10865
	size 2	66 - 90	20	10868
	size 3	91 - 115	20	10871
	size 4	116 - 140	20	10874
grey-S	size 0	15 - 40	20	102142
	size 1	41 - 65	20	102143
	size 2	66 - 90	20	102144
	size 3	91 - 115	20	102145
	size 4	116 - 140	20	102146
white-S	size 0	15 - 40	20	10862
	size 1	41 - 65	20	10867
	size 2	66 - 90	20	10870
	size 3	91 - 115	20	10873
	size 4	116 - 140	20	10876



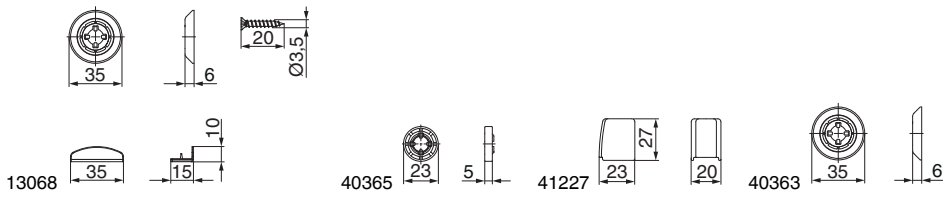
13058

8.2 Shutter catches "Fir cone head" model with cover disk, with shutter protection-bracket



No

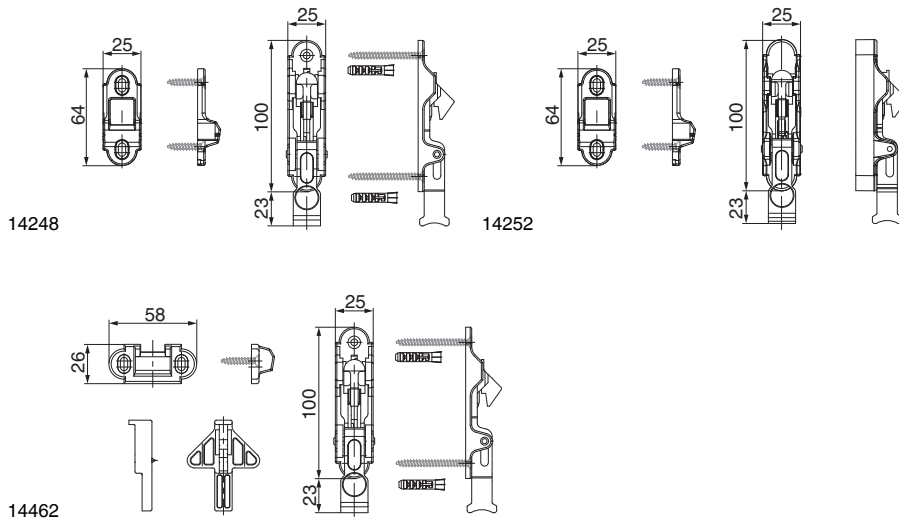
black-S	size 0	12 - 35	20	13065
	size 1	25 - 50	20	13058
	size 2	50 - 75	20	13059
	size 3	75 - 100	20	13060



8.3 Installation accessories for shutter catches "Classic" and "Fir cone head" models				No
black	accessories pack for shutter catches		20	13068
	spacer for shutter catches	5mm	50	40365
		10mm	50	40370
	clip-on component for shutter catch fir cone	15mm	50	41227
	cover disk for shutter catches	Ø 35x6mm	100	40363
grey	spacer for shutter catches	10mm	50	361313
	cover disk for shutter catches	Ø 35x6mm	100	465212
white	accessories pack for shutter catches		20	13078
	spacer for shutter catches	10mm	50	40644
	cover disk for shutter catches	Ø 35x6mm	20	40642



8.4 Door shutter catches

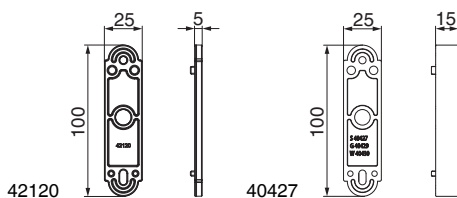


8.4.1 Package door shutter catches

					No
black-S	door shutter catch	25	20		14248¹
	door shutter catch for fixing bolt	35	20		14252²
	door shutter catch with short locking console	25	20		14462¹
grey-S	door shutter catch	25	20		102147¹
	door shutter catch for fixing bolt	35	20		102376²
white-S	door shutter catch	25	20		13110¹
	door shutter catch for fixing bolt	35	20		13111²

¹ Packaging contents: 1 shutter catch for doors, 2 chipboard screws 4,5x25, 2 rawlplugs S6, 2 chipboard screws 4,5x50.

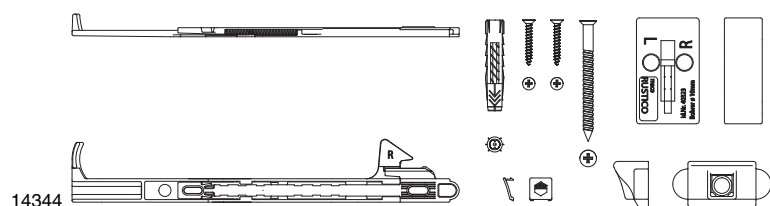
² Packaging contents: 1 shutter catch for doors, 2 chipboard screws 4,5x25.



8.4.2 Packers for door shutter catches

			W	L		No	
black	for door shutter catches	stackable 5mm high	5	25	100	100	42120
		stackable 15mm high	15	25	100	50	40427
grey	for door shutter catches	stackable 5mm high	5	25	100	50	360621
		stackable 15mm high	15	25	100	50	360619
white	for door shutter catches	stackable 5mm high	5	25	100	100	42122
		stackable 15mm high	15	25	100	50	40430

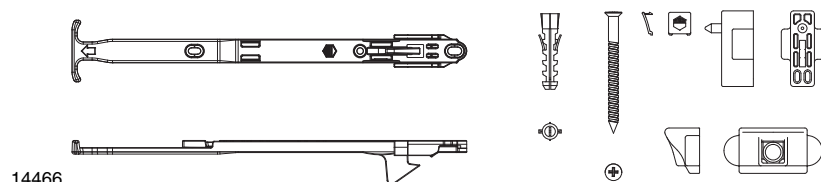
8.5 Comfort shutter catches



8.5.1 Comfort shutter catches for windows					No
black-S	with screws and Ø10mm rawlplugs	right	25	20	14344 ^{1,2}
		left	25	20	14348 ^{1,2}
grey-S	with screws and Ø10mm rawlplugs	right	25	20	102315 ^{1,2}
		left	25	20	102316 ^{1,2}
white-S	with screws and Ø10mm rawlplugs	right	25	20	13003 ^{1,2}
		left	25	20	13004 ^{1,2}

¹ Application ranges: max. shutter weight 20kg, with MMV 30kg.

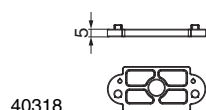
² Package contents: 1 shutter catch for windows, 3 screws 4x30 / 4,5x30 / 70x80, 1 rawlplug S10, 1 locking console, 1 jig.



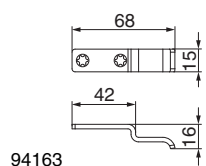
8.5.2 Comfort shutter catches for doors					No
black-S	with screws and Ø10mm rawlplugs	33	20	14466 ^{1,2}	
grey-S	with screws and Ø10mm rawlplugs	33	20	102317 ^{1,2}	
white-S	with screws and Ø10mm rawlplugs	33	20	10791 ^{1,2}	

¹ Package contents: 1 shutter catch for doors, 4 screws 4x25 / 4,5x25 / 7x80, 1 rawlplug 10x50, 1 locking console, 1 jig.

² Max. shutter weight 20kg. Use of item no. 94163 increases the permissible shutter weight to 30kg.



8.5.3 Packers for comfort shutter catches			W	L		No	
black	for comfort shutter catch	stackable 5mm high	5	25	100	50	40318
		stackable 20mm high	20	25	100	50	40377
grey	for comfort shutter catch	stackable 5mm high	5	25	100	50	361190
		stackable 20mm high	20	25	100	50	361314
white	for comfort shutter catch	stackable 5mm high	5	25	100	50	40319
		stackable 20mm high	20	25	100	50	40378

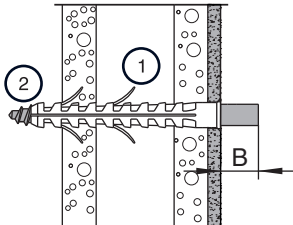


8.5.4 Reinforcing corner brackets for comfort shutter catches for doors				No
black-S		200	94163	
grey-S		200	359871	
white-S		200	365862	

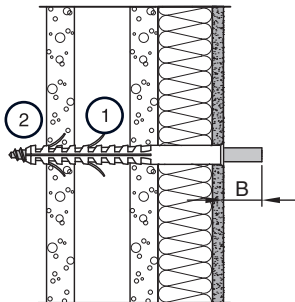
8.6 Fixing material for shutter catches

8.6.1 Assembly instructions for fixing bolts

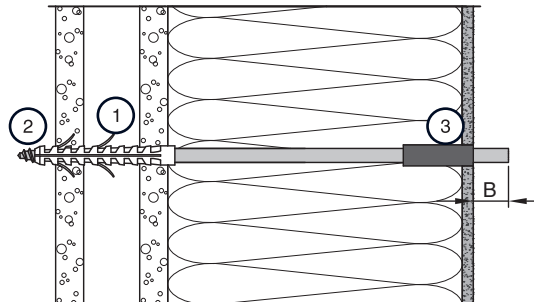
Without wall insulation
Fixing bolt L96 and L140



With wall insulation
Fixing bolt L180, L215 and L265



Fixing bolt L350 and L450



B = Fixing bolt distance

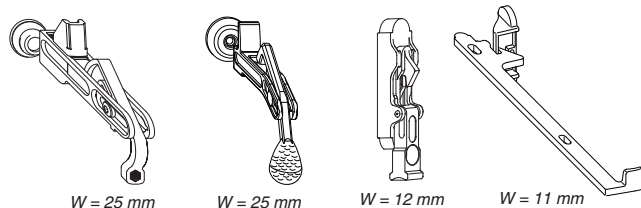
- 1 The dowel pin must be long enough to penetrate through two brick walls. It must be ensured that the dowel pin spreads vertically. Otherwise, the brick could break.
- 2 The fixing bolt must be fastened through the dowel pin.
- 3 When using L350 and L450 fixing bolts, it must be ensured that the support pipe included can rest on the masonry plaster and masonry insulation. To do this, push the support pipe onto the fixing bolt flush with the plaster.

Fixing bolt	Insulation thickness	Rawplug	Drilling-Ø	Support pipe
L96	0	50	10	-
L140	0	100	14	-
L180	20 - 45	135	14	-
L215	45 - 95	185	14	-
L265	95 - 140	230	14	-
L350	140 - 215	100 (without flush)	14	ja
L450	215 - 315	100 (without flush)	14	ja

Values in mm

Selection of the correct rawplug is essential for the stability of the fixing bolt.

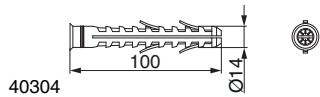
When using L350 and L450 fixing bolts, it is essential to use the included support pipe.



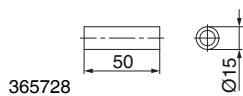
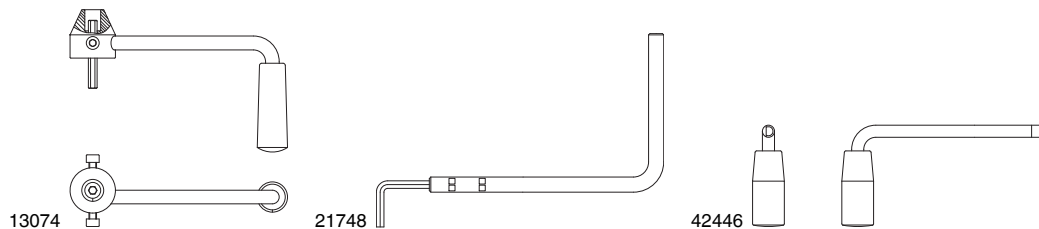
8.6.2 Fixing bolts and accessories



8.6.2.1 Fixing bolts			Ø		Nº
black	L96	0	7,7	20	43823
	L140	0	10	20	40226
	L180	20 - 45	10	20	40227
	L215	45 - 95	10	20	40232
	L265	95 - 140	10	20	40234
	L350	140 - 215	10	20	103318
	L450	215 - 315	10	20	103319

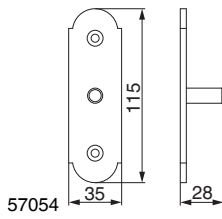


8.6.2.2 Rawplugs for fixing bolts		Ø	L		Nº
rawplug	for fixing bolt L96	10	50	20	40013
	for fixing bolt L140	14	100	20	40304
	for fixing bolt L180	14	135	20	40305
	for fixing bolt L215	14	185	20	40306
	for fixing bolt L265	14	230	20	365607
rawplug without collar	for fixing bolt L350 + L450	14	100	20	365729

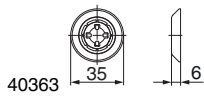



8.6.2.3 Accessories for fixing bolts			Nº
drill adapter for fixing bolts		1	13074
screw-driving tool with crank handle for fixing bolts with 5mm allen key		20	21748
crank handle for drill adapter for fixing bolt		1	42446
grub screw for fixing bolt with thermal barrier M10X50 black		20	364520
support pipe 50mm for fixing bolt grey		50	365728

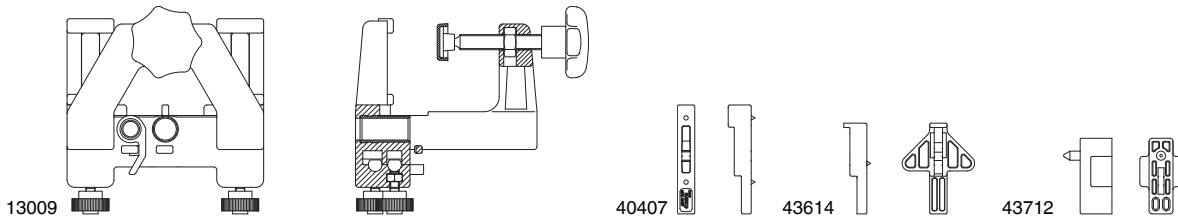





8.6.3 Support plates for shutter catches			Nº
black-S		20	57054



8.6.4 Cover disks for shutter catches			Nº
black	Ø 35x6mm	100	40363
grey	Ø 35x6mm	100	465212
white	Ø 35x6mm	20	40642



8.7 Jigs for shutter catches				Nº
drill jig	for shutter catches	Classic and Comfort for windows	1	13009
marking jig	for door shutter catches		50	40407
		short base-plate	50	43614
		for comfort shutter catch on balcony doors	50	43712
disposable jig	for comfort shutter catch on windows		50	40323



MACO
RUSTICO



Shutter catches



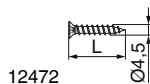
9 Accessories


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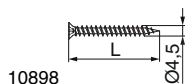
9 Accessories


9.1 Screws



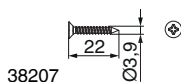
9.1.1 Hardware screws 4.5mm stainless steel (guarantee)		Ø	L		No
stainless steel black	Pozidrive	4,5	25	100	12472¹
			30	100	12473¹
			40	100	12474¹
			60	100	101549¹
stainless steel grey	Pozidrive	4,5	25	100	104346¹
			30	100	104348¹
			40	100	104349¹
			60	100	104350¹
stainless steel white	Pozidrive	4,5	25	100	12577¹
			30	100	12578¹
			40	100	12579¹


¹ These parts are necessary for the 10-year surface guarantee. For high demands and particularly for processing in aluminium.



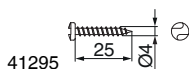
9.1.2 Hardware screws 4.5mm galvanized		Ø	L		No
black	Pozidrive	4,5	25	100	11185¹
			30	100	11434¹
			35	100	14022¹
			40	100	11186¹
			50	100	10898¹


¹ These parts are excluded from the 10-year surface guarantee.



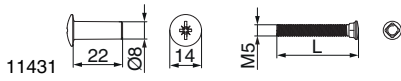
9.1.3 Self-tapping screws		Ø	L		No
black	cross recess	3,9	22	100	38207¹
white	cross recess	3,9	22	100	38208¹



¹ These parts are excluded from the 10-year surface guarantee.



9.1.4 One-way security screws		Ø	L		No
black	slot	4	25	100	41295¹

¹ These parts are excluded from the 10-year surface guarantee.

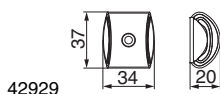


9.1.5 M5 fastening screws with female threaded sleeve		Ø	L		No
black-S	22 - 26	5	23	100	11431¹
	26 - 38	5	35	100	11432¹
	36 - 48	5	45	100	11433¹
	43 - 53	5	50	100	11207¹
	53 - 63	5	60	100	11208¹
grey-S	26 - 38	5	35	100	102550¹
	36 - 48	5	45	100	102551¹
white-S	22 - 26	5	23	100	12543¹
	26 - 38	5	35	100	12544¹
	36 - 48	5	45	100	12545¹

¹ The dimensions for the shutter thickness increase by 6mm for hinges without side regulation!



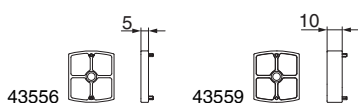
9.2 Buffer stops



42929

9.2.1 Buffer stops for snap holder			N^o
black	20mm high	20	42929¹
grey	20mm high	20	359891¹
white	20mm high	20	42932¹

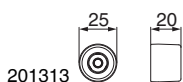
¹ The buffer stop must always be installed. When the buffer stop is used, make sure that the facade has sufficient compression strength (e.g. for thermal insulation).



43556

43559

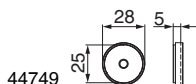
9.2.2 Packers for buffer stop snap holder			N^o
black	stackable 5mm high	100	43556
	10mm high, stackable	50	43559
grey	stackable 5mm high	100	360559
	10mm high, stackable	50	361317
white	stackable 5mm high	100	43558
	10mm high, stackable	50	43561



201313

9.2.3 Buffer stops soft			N^o
black	20mm high	20	201313¹
grey	20mm high	20	216813¹
white	20mm high	20	201314¹

¹ The buffer stop must always be installed. When the buffer stop is used, make sure that the facade has sufficient compression strength (e.g. for thermal insulation).

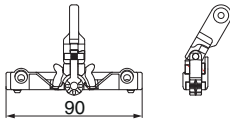


44749

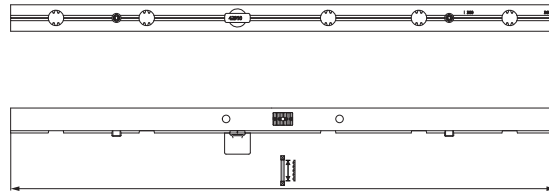
9.2.4 Packers for buffer stop soft			N^o
black	stackable 5mm high	100	44749
grey	stackable 5mm high	100	359893
white	stackable 5mm high	50	44750

9.3 Louvre window hardware

9.3.1 Sets



13321

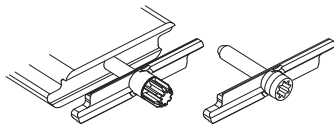


9.3.1.1 Hardware sets without louvre end pieces

					No
black-S	size 1	300 - 360	6	5	13321¹
	size 2	420 - 540	9	5	13322¹
	size 3	600 - 720	12	5	13323¹
	size 4	780 - 900	15	5	13324¹
	size 5	960 - 1.080	18	5	13325¹
	size 6	1.140 - 1.260	21	5	13326¹

¹ A set consists of: 1 locking rod, 1 pivoting rod, 1 lock.

9.3.2 Louvre end pieces



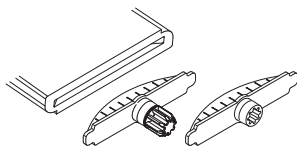
13235

9.3.2.1 Drilled-in end pieces

			No
black	right	50	13236^{1,2}
	left	50	13235^{1,2}

¹ Depending on the desired position of the operating lever (viewed from the inside), the corresponding end piece pack must be ordered. For example: Operating lever right - end pieces item no. 13236 respectively 13354.

² On louvre end pieces, a packaging unit consists of 1 left end piece and 1 right end piece.



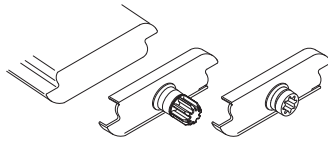
10070

9.3.2.2 Routed-in end piece

			No
black	left/right	100	10070¹

¹ On louvre end pieces, a packaging unit consists of 1 left end piece and 1 right end piece.





13354

9.3.2.3 "Gripping" end pieces			No
black	right	20	13354 ^{1,2}
	left	20	13355 ^{1,2}

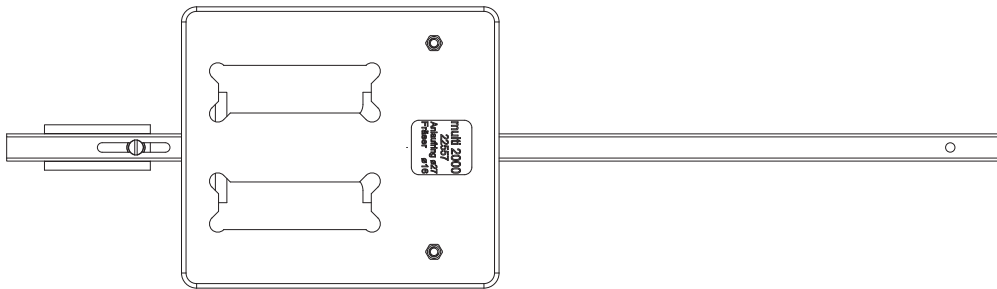
¹ Depending on the desired position of the operating lever (viewed from the inside), the corresponding end piece pack must be ordered. For example: Operating lever right - end pieces item no. 13236 respectively 13354.

² On louvre end pieces, a packaging unit consists of 1 left end piece and 1 right end piece.

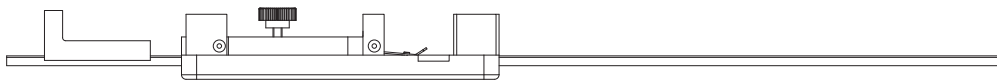


41255

9.3.3 End piece for pitched frieze			No
black		100	41255

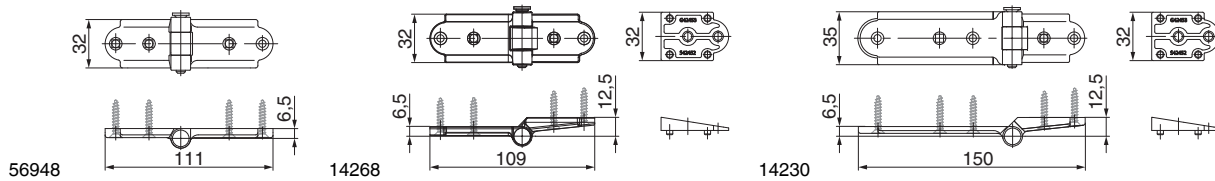


10057

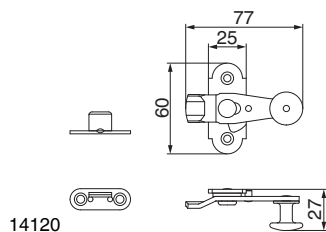


9.3.4 Jig for louvre fittings			No	
jig	for Vario louvre fittings	for lock	1	10057

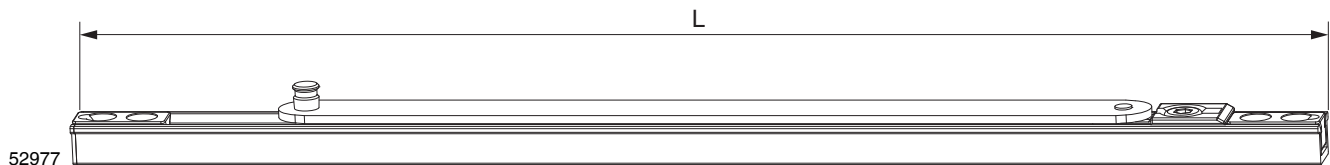
9.4 Accessories for projecting shutter-inserts



9.4.1 Hinges for projecting shutter-inserts				No
black-S	hinge for projecting shutter-insert	flush	20	56948
		with 13mm rebate leg packer	20	11583
		with 15mm rebate leg packer	20	14268
white-S	hinge for projecting shutter-insert	long hinge for projecting shutter-insert with 15mm rebate leg packer	10	14230
		hinge for projecting shutter-insert with 13mm rebate leg packer	20	101986

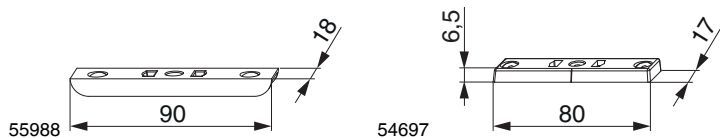


9.4.2 Locking mechanisms for projecting shutter-inserts				No
black-S			20	14120
grey-S			20	102476
white-S			20	101988



9.4.3 Opening restrictor for projecting shutter-inserts			L		No
silver	opening restrictor with brake	arm length 250mm	333	20	52977¹

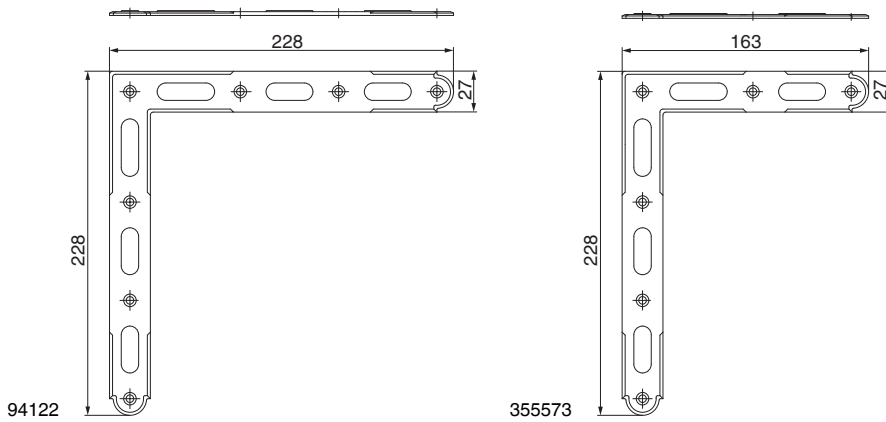
¹ These parts are excluded from the 10-year surface guarantee.



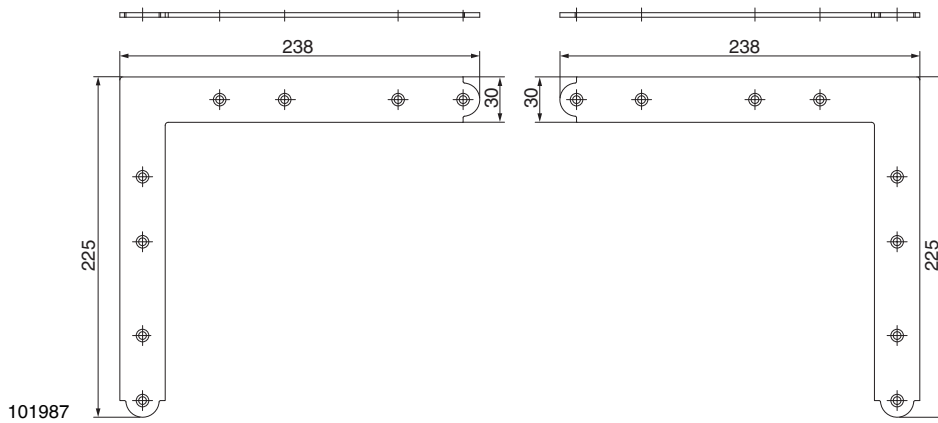
9.4.4 Strikers for opening restrictors				No
silver	frame component for opening restrictor for 4mm air gap 9mm offset	angled screw-fixing	50	55988¹
		frame component for opening restrictor Euro-rebate 18mm	50	54697¹

¹ These parts are excluded from the 10-year surface guarantee.

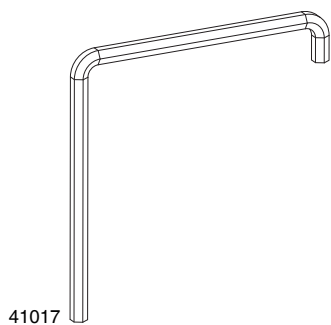
9.5 Decorative corner brackets



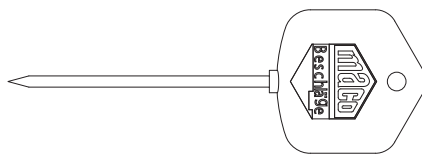
9.5.1 Decorative corner-brackets for BLR and MV hardware range				Nº
black-S	decorative corner-bracket		20	94122
	decorative corner-bracket SL 228x163	left top	20	355573
		right top	20	355575
white-S	decorative corner-bracket		20	32410



9.5.2 Decorative corner-brackets for MMV hardware range				Nº
black-S		in pairs	10	101987



41017



42465

9.6 Adjusting key and marking pin



No

adjusting spanner/key allen key, bent twice, 75 mm long SW 4

50

41017¹

scriber

100




42465¹

¹ Can also be supplied in quantities less than one packaging unit.











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100002	20	72,91	101452	20	74,94	102165	20	114
100003	20	72,91	101453	10	73,93	102166	10	64,114
100004	20	92	101454	10	73,93	102173	20	83
100005	20	72,91	101532	50	124	102174	10	46
100006	20	72,91	101549	100	150	102175	10	46
100007	20	72,91	101554	10	114	102176	10	46
100008	20	72,91	101571	20	105	102177	10	46
100009	20	92	101572	20	95,115,105,132	102178	10	79
100010	20	74,94	101587	20	98	102179	10	48,76
100011	20	74,94	101588	20	98	102180	10	78
100012	20	74,94	101589	20	98	102181	10	49
100013	20	74,94	101590	20	98	102182	10	49
100014	20	95	101591	20	98	102183	10	49
100015	20	74,94	101592	20	98	102184	10	49
100016	20	74,94	101596	20	98	102185	20	58
100017	20	74,94	101597	20	98	102186	20	58
100018	20	74,94	101598	20	98	102187	20	58
100019	20	95	101599	20	98	102188	20	58
100020	10	73,93	101600	20	98	102189	20	58
100021	10	73,93	101601	20	98	102190	20	58
100022	10	73,93	101695	20	113	102191	20	58
100023	10	73,93	101796	10	49	102192	20	58
100024	10	94	101797	10	49	10223	20	112
100025	10	73,93	101799	20	112	102248	20	100
100026	10	73,93	101856	20	110	102249	20	100
100027	10	73,93	101883	20	110	102251	20	121
100028	10	73,93	101884	20	110	102252	20	121
100029	10	94	101885	20	110	102253	20	72,91
100040	20	121	101886	20	155	102254	20	92
10057	1	154	101987	10	156	102255	20	72,91
10070	100	153	101988	20	155	102256	20	92
101016	20	97	102037	20	72,91	102257	10	73,93
101028	20	97	102038	20	72,91	102258	10	94
101042	20	82	102039	10	73,93	102259	10	73,93
10107	20	109	102040	10	73,93	102260	10	94
101077	20	112	102042	20	74,95	102261	20	110
101133	20	110	102053	20	58	102262	20	110
101134	20	110	102054	20	58	102263	20	98
101135	20	110	102055	20	58	102264	20	98
101136	20	110	102056	20	58	102267	10	111
10123	50	65	102057	20	58	102268	10	111
101245	20	135	102058	20	58	102280	20	105
101247	20	135	102059	20	58	102315	20	143
101257	20	110	102060	20	58	102316	20	143
101258	20	110	102061	20	58	102317	20	143
101259	20	110	102062	20	58	102332	20	108
101260	20	110	102063	20	58	102342	20	72,91
101261	20	112	102064	20	58	102343	10	158
101263	1	84	102065	20	58	10235	20	113
101265	1	102	102066	20	58	102352	20	105
101279	20	142	102067	20	58	102365	20	132
101304	20	113	102068	20	58	102374	20	98
101305	20	55	102069	20	59	102375	20	98
101331	10	48,76	102070	20	59	102376	20	142
101332	10	48,76	102071	20	59	102377	20	124
101359	20	72,91	102072	20	59	102379	20	107
101360	20	72,91	102073	20	59	10238	10	79
101361	20	72,91	102074	20	59	102427	20	131
101362	20	72,91	102075	20	59	102428	20	131
101363	20	92	102076	20	59	102445	10	73,93
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101365	20	72,91	102134	20	78	102448	20	97
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101367	20	72,91	102136	20	78	102469	20	122
101368	20	92	102137	20	47,75	102470	20	131
101369	20	74,95	102138	20	113	102471	20	131
101370	20	74,95	102139	20	105	102474	20	126
101371	20	74,95	102140	20	131	102476	20	155
101373	20	95	102141	20	131	102477	20	121
101374	20	74,95	102142	20	140	102480	20	72,91
101375	20	74,94	102143	20	140	102481	20	121
101376	20	74,95	102144	20	140	102482	20	130
101377	20	74,95	102145	20	140	102483	20	121
101378	20	95	102146	20	140	102490	20	109
101379	10	73,93	102147	20	112,142	102491	20	113
101380	10	73,93	102148	20	135	102495	20	155
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101382	10	73,93	102150	20	135	102509	20	72,91
101383	10	94	102151	20	135	102510	20	72,91
101384	10	73,93	102152	20	121	102511	20	72,91
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101438	20	113	102158	20	95,115,105,132	102516	20	95
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102546	20	97	105306	10	62	13324	5	153
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102639	10	73,93	10871	20	140	14019	20	83
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102757	20	126	11186	100	150	14027	20	135
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103421	20	47,75	12960	10	64,114	14224	10	49
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104053	20	117	13065	20	140	14264	20	56
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104056	20	117	13072	20	142	14316	10	64,114
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104088	10	62	13074	1	145	14340	10	78
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104346	100	150	13110	20	112,142	14364	20	121
104348	100	150	13111	20	142	14384	20	47,75
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14504	10	46	210066	10	62	24988	20	47
14506	10	46	210067	10	62	24991	20	47
14507	10	46	210353	20	56	24994	20	47
14509	10	46	210354	20	56	24997	20	50
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14512	10	46	210356	20	56	27004	20	50
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201314	20	152	210360	20	45	27744	20	82
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201814	20	81	210362	20	47	27747	20	108
201814	20	81	210363	20	47	27958	1	66
201815	20	81	210364	20	47	27960	1	66
201816	20	81	210365	20	47	28379	1	66
201851	1	66	210368	20	50	28724	1	66
202223	20	81	210369	20	50	28828	100	127
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202226	20	81	210372	20	46	29267	20	82
202366	50	128	210373	20	46	3		
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208752	20	50	210390	20	55	355574	20	156
208753	20	51	210391	20	55	355575	20	156
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209424	20	53	210401	20	53	359859	20	131
209425	20	53	210402	20	53	359860	100	135
209430	20	53	210403	20	53	359867	50	130
209431	20	53	210404	20	53	359869	50	130
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209434	20	54	210409	20	53	359885	20	106
209435	20	54	210410	20	53	359888	100	123
209436	20	54	210411	20	53	359889	50	103
209437	20	54	210412	20	53	359891	20	152
209438	20	54	211230	20	81	359892	100	134
209439	20	54	211506	50	130	359893	100	152
209440	20	54	211578	20	130	359894	100	133
209441	20	54	211809	100	129	359895	100	83
209442	20	54	211811	20	81	359896	100	83
209443	20	54	211960	20	130	359897	100	83
209444	20	54	212478	20	137	359898	100	133
209445	20	54	212479	50	124	359899	100	133
209446	20	54	212500	20	108	359900	100	131
209447	20	54	212506	20	50	359901	100	123
209448	20	54	212589	10	63	360166	100	124
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209451	20	54	212649	20	82	360380	100	80,96
209452	20	54	212651	20	155	360381	100	80,96
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209464	20	54	212656	20	146	360559	100	152
209465	20	55	212657	20	82	360619	50	142
209466	20	55	212742	20	81	360621	50	142
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209478	20	56	21883	20	109	361314	50	143
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209486	20	56	22063	10	62	361317	50	152
209487	20	56	22066	10	62	361318	50	82
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209936	20	53	225586	20	133	363323	100	83,101
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367511	50	129
367600	50	100
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36860	10	123
36862	50	124
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37607	10	65
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40043	100	125
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40058	100	134
40226	20	145
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40306	20	145
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40319	50	143
40323	50	147
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40365	50	141
40370	50	141
40377	50	143
40378	50	143
40407	50	147
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40430	50	142
40436	100	82
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40644	50	141
40704	100	52,80
40892	100	55,83,101
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41149	100	52,80
41193	50	83
41198	50	83
41227	50	141
41255	100	154
41295	100	150
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41521	100	133
41532	100	133
41578	100	52,80
41632	20	134
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41882	100	82
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42465	100	157
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43539	100	124
43556	100	152
43558	100	152
43559	50	152
43561	50	152
43614	50	147
43627	100	126
43648	100	123
43649	100	123
43712	50	147
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43957	100	82
44063	100	123
44072	100	123
44108	100	82
441311	100	124
441422	50	112
441782	100	81
441783	100	81
44180	100	133
44182	100	133
44184	100	133
44277	100	126
44333	100	127,128
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44353	20	64,114
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44383	100	80,96
44384	100	80,96
44422	100	124
44433	100	127,128
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44444	100	127,128
44445	100	128
44455	100	128
44654	100	124
44655	100	124
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44750	50	152
454768	50	112
454975	100	80,96
454976	100	80,96
454977	100	80,96
454978	100	80,96
454979	100	80,96
465210	100	52,80
465211	100	52,80
465212	100	141,146
465213	100	127,128
465217	10	123
465218	10	123
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465285	100	99
465422	50	80,96
465423	50	80,96

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52977	20	155
54657	20	50,77
54697	50	155
54746	20	82
55904	100	127
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55988	50	155
56819	100	127
56823	100	127
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