



## Manual

## Content

Dear customer,

Below you will receive important information for the purpose of planning, installation and application of **ISOLETTE®**.

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## I - Planning

### ISOLETTE - Venetian blind insulating glass

ISOLETTE® is a thermal insulation glass with integrated maintenance-free blind in the space between the panes. The operation can be done manually or by motor, depending on requirements profile for lifting, lowering, turn and turn (full function) or only for turning and reversing.

The Venetian blind insulating glass takes over in only one component the functions: sunscreen, blinds, glare protection and daylight steering.

The ISOLETTE® makes a significant contribution to a balanced climateing, daylight supply and energy balance of buildings. Involved in an automated building management, it ensures optimal and individually determinable room conditions. The hanging system works in all windows and door systems indoors and outdoors.

The standard system with slats for turning and turning as well as lifting and lowering is driven with a 24V encoder motor.

Manually operated systems with same function are operable with a drawstring chain or rotating crank.

The Roof-system (I-DACH) is used for slanted glazing from 12 ° with the function turn and turn.

The SOLAR-system (on request) is for installation situations without power supply, for a self-sufficient operation throughout the year.



## I - Planning

### Function

The **ISOLETTE**® Venetian blind insulating glass is a sun protection system with slats for lifting, lowering and turning, integrated in the SZR (space between the panes).

At motorized systems with a 24 V DC encoder motor with automatic limit switch and temperature-resistant system parts in the head box.

A complete darkening is not possible. The movement of the slats takes place in cycles. A cycle consists of once lifting and lowering the blind.

### Systems

The following systems are available:

- System **I-06 Model 1** - Motor drive for lifting, lowering and turning
- System **I-06 Model 4** - Motor drive only for turning
  
- System **I 06 Model KH** - Motor drive only for turning for heights >3m
- System **I DACH** - Motor drive for turning (horizontal glazing)
- System **I-09 Model 1** - Crank drive for lifting, lowering and turning
- System **I-10 Model 1** - Chain hoist for lifting, lowering and turning
- System **I-11 Model 4** - Rotary knob only for turning



## I - Planning

### Pane space

The following pane spaces (SZR) are possible:

- SZR 32mm (standard version up to a slice height of max. 3000mm at model 1)
- SZR 27mm (special version up to a slice height of max. 2200mm at model 1)
- SZR 27mm (standard version up to a slice height of max. 2000mm at I-DACH/roof-system)

### Color

Standard color of the slats and the upper box is the shade silver gray 16.018 or white 16.008.

Further color combinations can be found in the slat color chart of our **ISOLETTE®** planning booklet.

For other technical possibilities, configurations, glass structures and relevant test certificates please refer to our detailed **ISOLETTE®** planning folder (downloadable from [www.isolette.de](http://www.isolette.de)).

### Energy and granting

Equipping new buildings and re-equipping existing buildings, which have an area share of more than 10% of the facade area, with heat-insulating Venetian blinds falls under the specifications of national energetic rules. Therefore - with regard to several regional or national funding - the examination of the action is worthwhile.



## I - Planning

### Pane format

Important in the planning is the format of the Venetian blinds. The bigger the pane, the bigger the influences by climate and handling on the durability and functionality of the Venetian blind insulating glass.

The following should be noted:

- The larger the pane, the bigger it is climate load. Temperature and atmospheric pressure causes larger "pumping movements".
- The less favorable the pane format, the greater is the risk of glass breakage. Width height ratios of 1: 1 (square) and > 1: 6 are especially critical.
- The larger the pane, the bigger is hanging weight. Drive, drawstring and textile tapes are more stressed.
- A pane width <450mm or> 3200mm is technically practicable only in special cases.
- A pane height > 3000mm is only with the model 4 for turning and turning realizable.

We recommend an **area of max. 6.5 sqm**. An aspect ratio of max. 1: 6 should not be exceeded. Larger surfaces are to be examined individually.



## I - Planning

### Lifespan

Already in the planning phase it is important to plan the potential of a Venetian blind insulating glass in that way, that the product can be used easily by user and installer.

For the durability of the **ISOLETTE**® therefore the following points have to be considered:

- Communication + exchange with processors and users
- To train these and handing out all relevant documents
- Early involvement of the **ISOLETTE**® manufacturer (cooperation partner) in the planning
- No sensitive sun monitor control
- Moderately programmed cycle control
- Moderate pane format and hanging weight
- Regular, appropriate and not excessive use
- Factory default programming of reference run and angular momentum
- Electrical connection by qualified electricians
- Correct use of glazing blocks and vertical installation
- Handling according to transport and installation recommendation (see "Installation recommendations")
- Prevention of a so-called "ping-pong effect" (heat accumulation between low-E layer and Slat) by placing the low-E layer on pane position 3 behind the slat



## I - Planning

### Perception of the glass

All materials used in glassware have raw material inherent colors, which can become clearer with increasing thickness. To fulfil the legal requirements of energy saving, low energy dissipation glasses (Low-E) are used. Coated glasses also have a natural color. This intrinsic color may be differently recognizable in review and plan view.

Variations in impression are possible and unavoidable, due to the iron oxide content of the glass, the coating process, the coating itself as well as through changes in glass thicknesses and the pane construction.

Apparently visual differences in use of same products in one facade are a known topic and are indeed extensively but ultimately easy to explain. It should be noted that actual low optical deviations are unavoidably depending on product and production, and therefore permissible.

The pure product values of the Low-E glass used are only nominal values, based on the vertical installation of a reference glass construction according to Standard (EN 1279 and EN 410). With the actual glass construction and installation the photometric values can deviate:

- The thicker the glass, the lower the (light) transmission, the better the g-value.
- Does the SZR change, compared to reference structure, the Ug value changes.
- With installation deviating from the vertical, the technical values change.
- Increasing glass-thickness means changing the intrinsic color.





## I - Planning (*continued perception ...*)

Transmission (light passage) is in the practice of planners largely equated with the review. Furthermore, the glass color and the layer reflection (also perceived by the eye as color) essentially determine the optics of the glass.

If transmission or reflection is changing, we only consider this for the same product types as minor changes.

Change values between 1-3% are difficultly perceptible with the eye, especially as an accurate assessment between two glass-panes can anyway only be done under exactly the same conditions (same environment, viewer, time, viewing style) and directly next to each other.

The human eye (sensor for input) and in extension our brain (processor) are in no way an authoritative objective measuring instrument!

Example: By regarding a pane first time and then second time looking briefly in the sun, the pane looks completely different (retinal receptors and iris correct light situation).

Significant factors influencing the perception are:

- **Viewing angle** (centered or off-center)
- **Flatness** of the facade (crinkles, recesses, ledge)
- **Incidence of light** or position of the sun (time, season)
- **Reflections** of the environment (e.g. opposite buildings)
- **Installation situation** (for example cardinal directions)
- **Installation angle** (vertical / oblique glazing)
- **Installation depths** in the facade (e.g. elements, flush)
- **Shadow falling** and surroundings (e.g. ledges, trees)
- **Surrounding materials** and colors
- **Pane formats** (wide or narrow, etc.)
- **Pane shape** (e.g., arch shape, rectangle)

## I - Planning (*continued perception ...*)

Only then we perceive influences of material properties that affect:

- Different **pane configurations / thicknesses**
- Low permissible **color tolerances** of different low-E layers (tempered glass / float glass, production batches)
- Low permissible **interference** and anisotropy of toughened glass (e.g., surface tension of the glass)
- Different **foils** for bodies with laminated glass.
- Possibly **installations** in the space between the panes (blinds, rungs).

Together these factors can “irritate” the human eye spontaneously and generate differences although it is the same product. To orientation is also the VFF leaflet V.03.

### Perception of the blind

All the factors mentioned for the color perception of the glass also affect the color perception of the blind.

By the storage of rigid elements (slats) in flexible guides (textile tapes) may, due to the use of highly reflective slats or of permissible tolerances as well as ambient and light effects (reflections) depending on the position of the slats, locally different shades in the overall view are possible.



## I – Planning

### Thermal load

Venetian blinds, installed in insulating glass or composite windows, can be subject to thermal stress at appropriate climatic conditions. The outer pane of a blind insulating glass system usually consists of a tempered glass, without any heat or solar control coating. This is necessary as it would otherwise cause interactions between the coating and the blind by heating up the blind's chamber. Without coating, the incoming heat radiation can be reflected mostly from the slats back to the outside. Conversely, the unimpeded heat input leads at days of extreme sun exposure to extreme stress for the blinds components. An essential role is played here by the different expansion coefficients of individual components. The most heavily loaded are the tension and conductor strips or cords. These are differently worn out, caused by the weight of the slat pack to be supported and through the thermal load. Under certain circumstances, it may temporarily increase minimal slanting of the blinds. This can be additionally reinforced, depending on sun angle by partial shading of a partial area of the blind.

In contrast to the summer-situation, in winter (due to strong pressure differences between interior and exterior) a bulge of glass panes to the blind chamber is possible. This bulge can already be avoided by choosing appropriate glass type and thickness. In winter, it is recommended to do temporarily without lifting and lowering, otherwise the slats between the domed panes can be pinched or damaged.



## II - Technique and installation

The complete documentation is available at [www.isolette.de](http://www.isolette.de)

### Hermetic installation

The blinds curtain is in the space between the panes hermetically sealed between 2 panes. In the built-in state thus act neither direct physical loads, such as climatic loads (wind, rain, frost) or UV radiation nor dirt and dust on the components lamella, drive and drawstrings. Surface damage (kinks, twists, cracks) neither come through improper handling nor through vandalism. The self referencing of the system and the parallel winding of the drawstrings on a spool exclude a canting, tearing or skewing of the blind. The lateral U-profile spacers provide a uniform guidance of the lamella during a cycle and thus prevent possible abrasion damage or scratches on the slat and the glass pane. Precondition is the proper transport and installation of the Venetian blind insulating glass. The whole package makes the system not only maintenance and cleaning free, but in reverse also no system-relevant parts in the installed state can get damaged manually . A subsequent correction of the curtain position, however, is easily adjustable manually or via connection cable. A change of engine is also possible.

### Bi-material system

By the storage of rigid elements (slats) in flexible guides (conductors and cords) the **ISOLETTE®** is a so-called bi-material system. Thermal, physical and systemic wear out, shortenings, deflections and slanting can occur under the tolerances of the VE07-Rule (IFT). To compensate, a factory-programmed reference run is performed.



## II - Technique and installation

### Transport

The system has to be transported standing, with raised curtain and pulled tight cord, otherwise the automatic shutdown and the mechanics can change. The panes do not to be unloaded by turning over the edge.

### Curtain position after installation

Venetian blinds that are not yet used after installation must be basically shut down and the slats need to (horizontally) be parked in open state! In case an on-site test run is planned before connection to the object-internal electrical system, we recommend the **ISOLETTE®** testing device.

### Reference run

The reference run refers to the tight pulling in of the curtain into the upper end position. Due to the strain relief of the belts following the reference run, a small gap is created for each reference run below the top box. By using an incremental encoder on the 24V DC encoder motor, the system is always aware of the current blind position and orientation. Sometimes it is necessary for the motor to refer to the hangings, even after a temporary voltage drop or power failure. At the same time, the reference run also corrects a possible slight misalignment of the blind, caused e.g. by possibly high climatic loads. The factory default setting is an automatic reference run after every 50 operation commands. Although the frequency can be reprogrammed, we recommend keeping the default settings for optimal lifetime of the system.



## II - Technique and installation

### Installation recommendations

Due to the increased edge coverage, the frame per edge should be at least 5 mm lower than the usual frame recess in the window profile.

The frame fold must be adequately ventilated and drained. Moisture retention should be avoided.

The cable and plug connection must be laid cleanly and protected against moisture in the fold base and must not be squeezed, forced, kinked or damaged by setting blocks or other mechanical damage.

The polarity reversal protected plug connection has protection class IP67 and requires no further processing. Other types of connections (cutting, stripping and soldering) must be avoided! The connection of the plug connection can be done by the glazing company. Further electrical work as well as programming and integration in the building services should be carried out by qualified personnel.

Unless stated separately, the drive and the cable outlet are located from the inside, top right. For widths <600mm, a center motor is used with cable exit in the middle of the pane.

The yellow protective plug-provided cable should be laid with enough clearance in the frame.

With fixed glazing, the supply leads are laid directly through the frame. For turn-tilt elements this is done by a flexible cable spiral loop. If the glasses are to be stored on the site for a long time before installation, they must be adequately protected against UV radiation and moisture.

## II - Technique and installation

### Installation recommendations (continue...)

The compatibility of the sealant with the materials used in construction and glazing must be checked to avoid unwanted chemical reactions or corrosion. Possibly the insulating glass manufacturer can support with information on sealants and laminated films (VSG).

Before installation, the glazing company must inspect all cables, glass edges, surfaces and slats for visible damage. Possibly a further functional test should be carried out by means of a test device. Incidentally, the generally accepted guidelines and regulations of the business apply.

### Changing the engine

The engine-gearbox unit is located in the upper box as a plug-in unit on a hexagon shaft, seen from the top right. In the event of a defect (e.g. over-tension), the patented corner angle allows an easy removal and replacement of the unit from the shaft. For this purpose, the insulating-glass is tilted out of the frame, the unit is de-energized (unplug connector) and the edge composite is cut out at the corner. The corner angle can be opened after loosening two fixing screws and the unit can be pulled to the side. Through an inspection opening in the corner cap, the location of the hanging can be readjusted. After replacement, the angle is closed again, the removed edge composite refilled and the connector is reconnected. For good accessibility in case of repair, care should be taken to ensure that an estimated time of about 1 hour (depending on the installation situation) is not exceeded.

## II - Technique and installation

### Synchronicity

The 24V DC encoder motor guarantees an approximate synchronization of several blinds next to each other. The requirement for this is the use of a relay for the respective curtain group to be operated. Height differences between window sashes and fixed parts lead to a staggered run of the blinds. Differences in the current consumption between the drives, different lengths of the supply cables and permissible tolerances in the textiles and mechanical components used, can influence the operation of the system or lead to minimally different running speeds. Due to the system, a synchronicity of the slats is not guaranteed in one pane which is controlled by just one button, with double curtain and 2 motors. The motors can, be switched in parallel and operated via a push-button, simultaneously lifting and lowering or turning and turning both slat hangings. We recommend the use of a continuous slat or the use of a second button. Overall, it cannot be guaranteed a synchronicity of the running speeds between the hangers when lifting and lowering and an exact synchronization in the positioning of the slats when turning and turning.





## II - Technique and installation

### Spacer and Frame Recess

The vertical and the bottom spacers are provided with a U-guide to prevent the blades from contacting the soft coating. When mounting, make sure that the edge composite of ISOLETTE® insulating glass is approx. 5 mm wider on each edge than the standard insulating glass (width approx. 17 mm from edge of glass to end of spacer). For glazing we recommend a fold stop of min. 20mm plus sealing profile. Please note that the edge seal must be protected against UV radiation according to the glazing regulations. (Width of glazing beads and sealing profiles). Depending on the system, due to the sometimes high temperatures in the frame-space (SZR), so-called minimal butyl migration in the edge area at the border of the spacer can occur over the course of time. The tightness of the pane is not affected. These minimal visual impairments are not a cause for complaint due to the need to use butyl as the primary sealant and composite between the pane and the spacer. In order to avoid any visual interference in the field of vision of the window beforehand, it is imperative to use the venetian blind insulating glasses with the recommended raised edge (see above).



## II - Technique and installation

### Traces of use

Depending on the frequency of use (cycles), traces of use can be seen on the inside of the glass. These are very small particles of the conductor strip, which can be deposited on the glass surface of the frame-space (SZR). In intense sunlight or unfavorable light incidence angle, these "stripes" can be temporarily visible. At the same time there may be minimal abrasion between the lamella end and the spacer, especially if the Venetian insulating glass unit was not exactly clogged and the curtain "scrapes" to one side of the spacer.

### Material compatibility

Since silicone and other sealants today often contain uncontrollable constituents which cause damage to the edge bond in the area of butyl, the industrial and private processor must ensure that silicone or other materials used by him, as well as blocking materials, are compatible with the supplied edge composite. This compatibility statement should be in writing, prior to execution. In all cases, the mentioned events are no functional- and quality impairments and are therefore not a reason for complaint.



## II - Technique and installation

### Winter situation

In the cold season there is a high climate load for glasses with a large space between the panes. Operation of the blind is only permitted to a limited extent in this state, as the pumping action of the panes can damage the curtain. Due to temperature changes (day-sun/night frost) and the associated difference in atmospheric pressure, so-called indentations of the panes can occur, depending on the dimensioning of the glass thickness. These can cause individual hangings to become temporarily trapped. In this case, it must be ensured that the blinds are not "overrun" (continued movement of the blind despite jammed slats). As a result, the drawstring can roll so far that it winds in the reverse direction on the pulley. If this happens with all pulleys of a pane, it may lead to a slight misalignment and a staggered run of the other blinds. However, if only one pulley is overrunning, there is a risk of permanent misalignment or, in extreme cases, of the tension band break. We recommend not to operate overrun hangings before a "reset" in the sub-distribution. In general, we recommend for the winter situation, to drive down all hangings completely once in the lunch time and then to use only the function turn and turn.



## II - Technique and installation

### Electrical work

The patented design with the 24V DC motor enables a change of the motor unit (see above). The 4-core cable is equipped with a reverse polarity protected IP67 plug. All plug connections must be closed by the customer with the motor connection cable. The cables must not be damaged! The power transmission must be permanently ensured and must be carried out with cable transitions between the frame and sash, or at sliding systems with an energy chain. Contact plates must not be used! For the purpose of motor referencing, the drive has a current consumption of approx. 16mA when it is switched off and when at rest. The cable outlet in the system I-06 is seen from the inside top right. The cable outlet in the system I-06 with central motor (system width <600) is seen from the inside top center of the width edge. All cable connections must be professionally permanently protected against moisture! When glazing a 30 cm long cable loop must be placed in the fold base on the motor side, so if necessary, a later revision of the engine is feasible!

### Electrical accessories

For installation please use system-related **ISOLETTE**-accessories and electrical components (switches, transformers, relays, control units, etc.!) Depending on the desired operation, the necessary accessories must be clarified before! If not observed, the warranty is void! The electrical work has to be carried out according to the relevant circuit diagrams by qualified personnel!



## II - Technique and installation

### Butyl migration

Due to the sometimes high temperatures in the SZR, especially in the summer, so-called minimal butyl migration in the edge area at the border of the spacer can occur over time. The impermeability of the pane is not affected. Due to the need of using butyl as primary sealant and composite between pane and spacer, these minimal visual impairments are not a cause for complaint. In order to prevent in advance any visual interference in the field of vision of the window, it is imperative to use the blinds with the recommended wheel spacer (see above) to be installed in the frame.

### Sliding door systems

For sliding door systems we recommend the use of an energy chain (cable drag chain) and to avoid using contact plates.

If for constructive reasons contact plates are used instead, it must be noted that the required permanent power supply is missing for the reference of the motor when operating the sliding sash. Thus, in these cases, the reference run programming is dropped, since in particular a synchronization of several abreast hangings cannot be guaranteed. In addition, it may come to temporary power interruptions even in closed state, because of thermal stress on the sliding door frame in the summer-winter change, by the "warping" of the frame a proper passage of electricity is not guaranteed. Since the cable routing is 4-pin, 2 contact plates are required for each sliding door.

## II - Technique and installation

### Rules and planning aids (selection)

For the purpose of correct assessment and use of ISOLETTE-Venetian blind insulating glass, the following rules apply:

- BF guideline - Assessment of the visual quality of glass for construction
- BF guideline - Assessment of visual quality for systems in multi-pane insulating glass
- BF leaflet - Installation recommendations for integrated systems in multi-pane insulating glass
- IFT guideline - VE07 for jalousie insulating glass
- BF guideline - Sun protection systems in the space between the panes
- BF planning aid - Integrated systems in multi-pane insulating glass
- DIN 18008 - Glass in construction
- DIN 68121 - Wood profiles for windows and doors
- DIN EN 1279 - Multi-pane insulating glass
- Guideline BiV - Setting blocks correctly
- Guideline VFF 02 - Thermal stress
- ISOLETTE - processing guidelines
- ISOLETTE - guarantee conditions
- All other recognized rules of technology

All rules and regulations, if released for distribution, are available on request from our regional **ISOLETTE-**cooperation partners.



### III - Application

#### Lifting and lowering

This function can be found in **model 1** of **ISOLETTE** products. Normally, the key command is carried out via double pushbuttons, in which one pushbutton takes over the "up" function and another pushbutton takes over the "down" function. A long press (> 3s) of the "Down" button causes the shutter to be shut down to its lowest position. A short press (<3s) of the "up" button stops the ride. A long press (> 3s) of the "up" button causes the blind to be raised lone to the upper position. A short press (<3s) of the "Down" button stops the ride. For minor height corrections of the blind, the up or down buttons must be pressed accordingly with a key command <3s.

#### End position of the blind

By "turning" the curtain is pulled upwards (<1 cm) by the length of the coil's circumference in the top box.

#### Shading and closing angle

With the **ISOLETTE**-Systems, a complete darkening is not possible! Depending on the viewing angle, size and hanging weight, a greater incidence of light is created in the lower area by extending the textile strips. By reducing the power transmission of the textile bands to the slats, the closing angle decreases minimal.



### III - Application

#### Turning

This feature can be found in **Model 4 of all ISOLETTE(R)** products. To completely turn the slats after the blinds have been completely shut down, the factory presets an operation of approx. 12 sampling intervals. This setting is recommended but can be shortened. Normally, the key command is carried out via double pushbuttons, in which one pushbutton takes over the "up" function and the other pushbutton takes over the "down" function. If the blinds are lowered, the slat position can be changed by briefly pressing (<3s) the "Up" or "Down" button. By approx. 12 keystrokes (<3s) in one direction, the slats are turned completely once with the blind lowered. If the keys are to be pressed in quick succession, the corresponding key must be released for at least 1 second.

#### Slat tilting

Depending on the frequency of the load (cycles), it can occasionally lead to inclinations of individual slats when the shutter is shut down. With a two-time turning and turning maneuver the slats can easily be inserted into the set angle of the blind again. A temporarily occurring slat warping does not represent a functional and quality impairment and thus no reason for complaint.





### III - Application

#### Product properties

Due to technical reasons, **ISOLETTE®** Venetian Blind insulating glass with the same dimensions and which are installed side by side, have a small offset when driving up and down. The slat packs can therefore have slightly different heights. The engine noises occurring during the operation of motorized hangings are technically conditioned. Due to the movement of the slats during turning and when driving up and down, it is not possible to rule out technically induced abrasion in the area of the guide rails, draw strings and belts, etc. (see "Traces of use"). In particular, at widths <600 mm, it can sometimes come at drive up to a skew of the curtain. This is compensated again with the reference run (see "Reference run"). Experience has shown that skewing eliminates over time in the case of frequent operation. Irregular light passages between the slats are permitted (unavoidable with the System I DACH), as long as these are due to tolerances of the individual components in accordance with VE07, or the other tolerances of the blinds be respected.

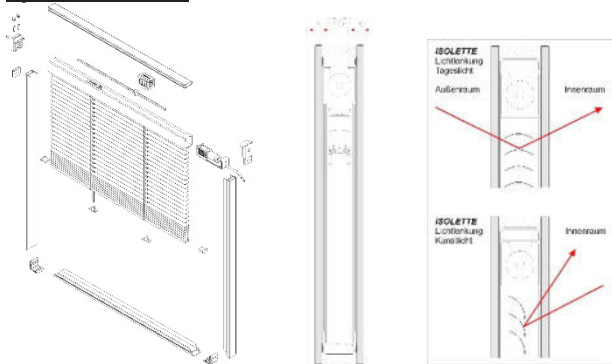
Uneven light transmission can also be caused by uneven deflection of individual slats or closing angle tolerances. In purely physical terms, the slats in the open position can lead to slight deflections in the edge area. These are caused by the interplay of pane format, weight and attachment. The conductor strips are fastened below the top box with clips, so that this deflection can be further enhanced by the resulting pressure on the first plates.

### III - Application

#### Incorrect operation

Damage caused by incorrect operation, e.g. which occur due to overload or increased effort in the operation are excluded from the warranty. To avoid damaging the slats in the edge area, only operate the system in a vertical position (closed window). This does not apply to the System I DACH. Here, additional tension cables and conductor strips prevent contact during the turning function. For horizontal glazing, we recommend a minimum inclination of 12 degrees for proper operation.

#### System schemes



The properties described above are technical and do not constitute a complaint. Without any guarantee of technical changes and errors:

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### III - Application

#### Product function

A thermal insulation glass with integrated blinds in the space between the panes has 2 main functions:

1. Sun protection:

Venetian blind in lower end position, curtain closed

2. Thermal protection and transparency

Venetian blind in the upper end position (I-06 Mod. 1)

Venetian blind looking through (I-06 Mod. 4)

All other functions are to be considered in addition and are not intended as main function of the product, including light control, privacy and glare protection.

In its main function as sun protection, insulating glass for blinds has a cooling load-reducing effect. It is not intended to be a substitute for air conditioning or other cooling load installations in a building.

#### Aspect ratio of blind insulating glass

Units with different aspect ratios and pane dimensions have differences in running speed, slat closing angle, slat position and slat running characteristics. This is caused, among other things, by

- different lamella proportions
- different slat and tie lengths
- different number of textile strings
- different hanging weights

Furthermore, the aspect ratio always affects the intensity of the climate load on the pane.



### III - Application

#### Light slit (top)

Depending on the system, the upper slat is designed as a double slat so that the slat turning angle is transferred as evenly as possible to the entire curtain. This may lead to overlapping, skewing or light gaps above and below the double slat. According to the BF guidelines, this is state of The art and outside of the relevant area.

#### Blind position (up, down, while driving)

If slat ends touch the spacer on one side while driving, this is the result of minimal misalignment due to non-horizontal pane installation. If all slats point in the same direction after reaching the end position and completing the turning movement, there is no reason for complaint. In addition, there may be occasional differences in the position of the slats in the case of small, narrow and long formats with a low hanging weight. The effect diminishes with the duration of use. Differences in the position of the blinds outside of the lower and upper end position and during travel are generally not the subject of an assessment, since it is not a question of the condition of the main use as glare protection (curtain down) or transparency (curtain up), but the condition of the change in position.



### III - Application

#### Intended Use

With regard to the longevity of a blind system with an electric drive, it is important that the number and frequency of the daily control commands are regulated, especially with regard to the readjustment of the turning angle of the slats. Too many and too frequent control commands under full load in the millisecond range increase wear on the drive and material and shorten service life.

The following guidelines apply:

#### 1. Frequency of readjustment

With normal use of a building, an average of 8 working hours per day, spread over 210 working days, is assumed. Assuming that the weather changes significantly every hour, the sun protection system is subject to up to 8 subsequent adjustments per day. Together with a blind being lowered in the morning and raised in the evening, the system receives up to 10 control commands per day, which corresponds to a normal type of use in practice.

#### 2. Delay in readjustment

In practice, a measuring interval of approx. 20 minutes is expected, especially with sun control with sun sensors. If there is a permanent significant change in the weather during this period, the sun protection receives a control command for readjustment after this period.



#### **IV - FAQ** Is the installation more complex and expensive than with normal insulating glass?

The installation is actually reduced to just one trade, that of window construction. Like any conventional insulating glass, the venetian blind insulating glass units are glazed into a window frame or a mullion-transom system. A separate installation of e.g. blinds hanging alternatively in front of the facade is no longer necessary and thus not only an entire trade, but also an additional facade level. By positioning the blind between the panes, the curtain is also protected from wind and weather. This eliminates the rain and wind sensor and simplifies the conception of the control. What remains the same for all systems is the wiring, which is basically done by the electrical trade. The production of the plug connection in the glass frame is done in one go by the window construction. Potential savings can even be expected from the organizational consolidation of the trades.

#### Are costs higher than for normal insulating glass?

A comparison must be made between ISOLETTE and the comparative purchase of normal insulating glass plus an outdoor system (external venetian blind, blinds, roller shutters, etc.) for the purpose of cost assessment. When purchasing an Isolette, the value is about 20% higher, depending on the installation situation, type of glass and quantity. Saving potential arises over the term, since the Isolette does not require any maintenance or cleaning due to the absence of dirt, wind and weather. Annual maintenance is not required. Glass cleaning costs remain.



### How are the acquisition costs compared to insulating glass with external blinds?

A precise comparison can never be made here. This is due, among other things, to the following points, which must always be considered in a building project-specific manner:

- Type of attachment in case of using an external blind
- Façade texture and orientation
- Structural physics calculation and requirements for the respective products (frame, glass and blinds)
- Additional effort for the additional installation of the "external blind" trade

Irrespective of the points mentioned, the acquisition costs of insulating glass for blinds are approx. 20% higher. The additional price is essentially due to the transformation of blinds and insulating glass in insulating glass production. In order to compare the construction project-specific total costs for both alternatives, these must be determined precisely in each individual case.

### What exactly is included in the guarantee?

The functional guarantee for all components installed in the insulating glass for the blinds (including the drive) covers the 20,000 cycles specified therein, spread over 5 years. This corresponds to the specifications of the VE07 test of the IFT and reflects intended use.



### When and how often are replacement and repair costs incurred?

If the glass breaks, the replacement costs are the purchase price plus assembly of the respective unit. The same applies to defects in the curtain, which, however, hardly ever occur, since the curtains are protected in the space between the panes and are therefore not exposed to the weather or vandalism. In rare cases, overvoltage damage (e.g. short circuit, lightning strike) can lead to defects in the drives. The drives have a motor bridge as overvoltage protection. However, should a drive fail, it could be exchanged on site at the element using a patented corner bracket, without having to exchange the entire pane. Depending on the installation situation, the cost of replacing the drive, including the drive and labor, averages around 50% of the purchase price of the glazing.

### What are the delivery times for blinds insulating glass?

Depending on the market situation, the delivery times are approx. 6-8 weeks after receipt of the order and depend on the manufacture of the slat blinds, the delivery time of the basic glass and the manufacture of the insulating glass for the blinds as the end product. The respective market situation may cause delays in delivery for all trades to the same extent, even regardless of the position of the blind (outside, integrated or inside), since both the outdoor systems plus insulating glass and the blinds insulating glass consist of the same individual components.





### Where do I get the finished blind insulating glass from?

The finished blind insulating glass is manufactured by the insulating glass manufacturers of the ISOLETTE Group (cooperation partner) and consists of the sub-components glass (basic glass) and blind (Faltenbacher Jalousienbau). Since the insulating glass is part of a window or facade element, it is purchased from a specialist company (window construction, facade construction, conservatory construction, carpentry, glazing, specialist trade).

### Are the pane dimensions and the glass surface limited?

The minimum width is 450mm. As far as minimum dimensions of 450mm are concerned, this basically applies to all types of blinds and external venetian blinds. On the one hand, this is due to the width and geometry of the drive and, on the other hand, to the positioning of the tension and ladder strips, which is intended to prevent the slats from skewing. The maximum width with a continuous slat is 2700mm. All larger widths are only manufactured with double blinds in exceptional cases. There is theoretically no restriction on the minimum height. However, at least 5 slats should be on top of each other so that the curtain can perform a protective function at all. The maximum height of the standard spacer for a 32mm wide space between the panes is 3000mm. Larger heights would have to be checked for feasibility in individual cases. All width and height dimensions depend on the total area of the insulating glass pane of max. 6.5 sqm.



### Can sun protection glass also be used outside?

In principle, the outer pane should be uncoated in order to avoid the aforementioned ping-pong effect. If sun protection glass is required for energy or design reasons, the sun protection coating should have a g value of  $<0.30$ .

### What is the efficiency of blinds insulating glass compared to normal insulating glass with external sun protection?

Sun protection in front of the facade is generally the most efficient. Expressed in numbers, outdoor systems achieve a residual energy input of approx. 5-10% (g value between 0.05 and 0.10), blind insulating glass depending on the installation situation approx. 10-15% residual energy input (g value between 0.10 and 0.15).

### Does the blind package reduce the glass area?

The blind package is in the visible area when retracted at the top. The package heights are listed in a table in the respective system data sheet for the systems with full function for lifting, lowering, turning and turning. By integrating the blind in the space between the panes, the constructive development of a "parking area" for outdoor facilities (blind box) is no longer necessary.

### Maintenance intervals compared to external blinds?

There is no maintenance required for venetian blind insulating glass, since the venetian blind is weather- and tamper-proof and hermetically sealed in the space between the panes. It remains to clean the windows.



### Does high climate load lead to problems with large panes?

The only problem can arise during the transitional seasons (spring, autumn) due to sometimes large temperature and air pressure differences distributed throughout the day (morning, noon). This thermal stress leads to a temporary "buckling" of the pane. This can temporarily cause the blind to become jammed while driving or deviations in the closing angle of the slats. Proper sizing of pane thicknesses, increased space between panes and the recommended use of toughened safety glass normally prevent any type of glass and blind failure.

### What happens if the drive is defective?

For all Isolette systems with an electric drive, the motor can be replaced directly on the pane on site. The exchange takes place via a reversible corner bracket. In the unlikely event of a 24V drive failure (lightning strike, overvoltage damage, connection error or short circuit in the supply), the pane would remain intact.

### How is the power supply for sliding doors?

To ensure a constant power supply of at least 22V DC and a maximum of 30V DC, slim cable drag chains should be installed above or at floor level.

### Where do I get the electrical accessories from?

The ISOLETTE® electrical accessories are sold and installed by the respective specialist companies for electrical engineering.



### What happens if the slat curtain is defective?

Since the curtain is built into the insulating glass without being touched by the weather and without being touched, and because the use of tension tape coils and constant self-referencing means that the curtain runs almost straight (requirement: professional installation and transport!), a mechanical curtain defect can be ruled out. In addition, the weight of the venetian blind is lower due to the use of smaller slats, even using the same UV-resistant textile straps as for outdoor systems. In rare cases, a curtain can temporarily get stuck between bulging panes due to so-called bulges as a result of extreme fluctuations in air pressure and temperature. In this case, a stop function on the drive protects the system via the load pickup. However, should there be a defect in the curtain, this usually occurs immediately after commissioning and is caused either by incorrect installation of the insulating glass unit or by a factory defect in the blind. In this case, the pane must be replaced immediately.

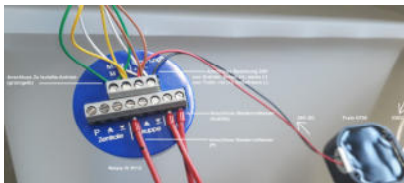
### What happens in case of overvoltage?

If the upper limit of 30V is briefly exceeded, a storage capacitor ensures that the drive retains its programming (reference points, driving speed, etc.). A motor bridge should also cushion any voltage fluctuations. Frequent or even permanent overvoltage can damage the ballast electronics on the drive and thus cause the programming to be lost or even permanent defects. If necessary, reprogramming can remedy the situation. Otherwise a drive replacement is required.



What happens if you connect more ISOLETTE units to a transformer or controller than recommended by the manufacturer?

In this case, there is usually an undersupply of the units, which causes malfunctions or drive defects, as



long as the power supply is permanently below 22V DC.

How to reprogram the drive?

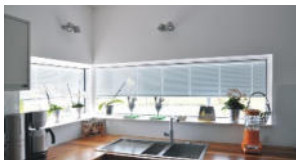
The programming of the drive and thus the running properties of the curtain as well as its upper and lower end position is basically only possible via the IP67 plug of the motor connection cable as an interface, which is protected against polarity reversal. Programming is done either via a test device (end positions only) or an interface with drive software (all functions). Programming from another supply point (e.g. sub-distribution) depends on the cable lengths. In general, the lower end position is programmable. The upper end position (zero point) is set via self-referencing. Furthermore, travel speeds, readjustment pulses, automatic self-retention of a command and even the interval between referencing runs (standard = 50 commands until the next self-referencing) can be changed via software. When using contact plates on sliding doors or window sashes, self-referencing can also be programmed out.

What happens if the curtain keeps turning independently in the lower end position?

There is a permanent shutdown command or one that has been programmed too long from the on-site control. In general, after approx. 2 minutes, the relay automatically switches off all pending commands in order to reopen the command channel for new follow-up commands. If the external departure command is still present, the automatic turn command would be reactivated after reaching the lower end position.

Is ISOLETTE suitable for a construction project?

Whether a product is suitable for a construction project depends, among other things, on the installation situation, user behavior and the user's need to install the product. Ultimately, only the architect as the client's representative or the client himself can make the decision.



Further questions about the product?

Please contact us via e-mail at [kontakt@isolette.de](mailto:kontakt@isolette.de)

Further information can be found at [www.isolette.de](http://www.isolette.de)

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