CUSTOMER INFORMATION

ISOLAR SOLARLUX® variodirect

Insulating glass with internal blind

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ISOLAR® GLAS
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Thermal insulation with integrated solar protection

In contrast to heat and solar protection glass with permanent functionality, SOLARLUX® variodirect with variable and adaptable lamellar reflectors transforms multi-pane insulating glass into glass with an active function. The interior room conditions can thus be adapted to the respective weather and irradiation conditions in an optimum way.

Glass, shading and light control in one system

Eurotherm IGS Solar (Photovoltaik)

SOLARLUX® variodirect provides you with pleasant shade, controls the amount of light and at the same time protects against prying eyes in residential, commercial and building areas. SOLARLUX® variodirect is available in the following versions:

- Rigid lamellar system
- Movable lamellar system manual / electric
- Solar lamellar system

In order to fulfil the architectural requirements, SOLARLUX® variodirect can be implemented in a size of up to 2000 x 3500 mm. Larger dimensions are possible in individual cases.

Control options for electrically operated lamellar systems leave nothing to be desired - regardless of whether it is a bus system or a timer.

SOLARLUX® variodirect is used in a wide variety of areas: Conservatories, glass facades, shop windows, swimming pools, etc. - and all that maintenance-free! No soiling of the lamellas, no noise from wind and weather.

Eurotherm IGS Solar (Photovoltaik)

Lamellen-Standardfarben:
silber/silber oder silber/grau

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SOLARLUX® variodirect

SOLARLUX® variodirect are flexible solar protection solutions with a lasting effect. They provide shade, provide privacy and ensure a pleasant room climate. At work as well as at home within your own four walls. That brings a plus in quality of life and living comfort, reduces energy costs and relieves the environment.

Modern facades are faced with ever higher demands regarding sun, privacy and glare protection, energy savings, design and aesthetics. In particular, the aspect of energy saving is becom-ing increasingly important in order to optimise the running costs of a building.

SOLARLUX® variodirect solar protection systems offer new, innovative solutions and many functional and economic ad-vantages compared to conventional solar protection concepts. Our solar protection systems are permanently pro-tected against soiling, environmental pollution, climatic influences and damage or vandalism. Additionally, SOLARLUX®

variodirect is maintenance-free and does not require any effort for cleaning the blinds. For architects and planners, the use of SOLAR-LUX® variodirect in the design of buildings opens up possibilities never imagined before for maintaining the architectural transparency and the free design of the facade.

Energy saving

Energy saving, a topic that accompanies us every day, has been one of the greatest challenges of our time in recent years due to global climatic changes.

SOLARLUX® variodirect solar protection systems are designed to counteract these increased climatic requirements and loads and at the same time to save valuable energy.

Due to the very good g-values of 8% of SOLARLUX® variodirect lamellar systems in double insulating glass and 5% in triple insulating glass, our systems make a significant contribution to reducing the entry of solar energy to an exemplary level and thereby improve the energy balance of a building. Due to the reduced radiation energy, the climate loads can be reduced considerably in the warm months and heating costs can be saved during the cold months due to the reduced heat radiation to the outside. At the same time, SOLARLUX® variodi-rect directs daylight into the room without glare. This creates a pleasant working and room climate and reduces the costs for artificial lighting.

The use of SOLARLUX® variodirect control components in connection with modern building control technology, which automatically adjusts the closing angle of the blinds to changing climatic conditions and the changing angle of the sun over the course of a day, can further optimise the energy manage-ment of a building.

In contrast to heat and solar protection glass with permanent functionality, SOLARLUX® variodirect E transforms multi-pane insulating glass into glass with an intelligent function. The interior room conditions can thus be adapted to the respective weather and irradiation conditions in an optimum way.

Quality and functional reliability

In order to guarantee long-term, maintenance-free operation of SOLARLUX® variodirect systems, we only use high-quality materials whose physical properties are designed for operation under the special conditions in insulating glass. Intensive development work and the most reliable, state-of-the-art technology in conjunction with strict quality manage-ment guarantee a very high degree of functionality, quality and reliability. We have subjected our systems to extensive testing with regard to tightness, fogging, energy/heat permeability and service life at IFT-Rosenheim. The operational suitability according to guideline VE 07/2 has been proven.

Comfortable working and living spaces

Modern work and living spaces place very high demands on comfort and quality of life. With our products, we can contrib-ute to ensuring pleasant shading, control the light intensity in the interior, and create a glare-free working envi-ronment and a pleasant room climate. Our solar protection and light control systems fulfil all the requirements of the workplace ordinance and the VDU workstation ordinance.

The benefits prevail

In summer the heating of buildings or rooms is reduced, in the cold season the solar energy yield can be made use of. SO-LARLUX® variodirect E can be used regardless of the weather, is completely maintenance-free and, thanks to its installation in the insulating glass, always remains clean. In contrast to external solar protection, which can be expected to cause damage and loss of functionality due to the effects of the weather (e.g. wind, soiling), SOLARLUX® variodirect E ensures that the functional properties remain constant at all times. Even operation at high wind speeds and storms is no problem for SOLARLUX® variodirect.

Application

SOLARLUX® variodirect can be installed in almost every win-dow, door or facade system or partition wall system.

Thermal insulation

Thermal insulation according to EN 673 is possible with double insulating glass up to Ug = 1.2 W/m²K or with triple insulating glass up to Ug = 0.6 W/m²K.

SOLARLUX® variodirect product range

- SOLARLUX® variodirect E Blind, electric
- SOLARLUX® variodirect EC blind, electric with encoder
- SOLARLUX® variodirect M blind manually operated

SOLARLUX® variodirect E and SOLARLUX® variodirect EC are integrated blinds in the cavity between the panes. These can be raised and lowered electrically. The position of the lamellas can also be positioned electrically. This means that the opening angle of the lamellas can be individually adapted to the current position of the sun. This guarantees shading as well as privacy and glare protection.

SOLARLUX® variodirect EC

These blinds are equipped with an encoder motor which controls the speed and position of blinds and lamellas. An encoder motor is required, among other things, if the synchronisation of blinds is required with different pane sizes or if the lamella tracking is required via a sun position query.

SOLARLUX® variodirect is characterised by the fact that, when closed, only 8% of the solar energy enters the room as radiant heat, thereby significantly reducing the cooling loads.

Control

There are various options for controlling the blinds. From operation via buttons and remote control to fully automatic control via bus systems and sensor technology.

Structural dimensioning

Special conditions must be observed for the structural dimensioning: Deformations due to wind pressure or suction in relation to the centre of the pane of max. 15 mm are permissible.

SOLARLUX® variodirect

Introduction of solar protection

Solar protection insulating glass is measured at vertical incidence of radiation. Insulating glass with an internal blind, however, requires a calorimetric measuring method. The different inclination options of the lamella, the changing position of the sun and the building orientation cause different energy inputs depending on the time of year and day.

Half-open lamellas or partially raised blinds let more energy through the insulating glass than closed ones.

The energy input depends, among other things, on the position of the lamella and the degree of reflection of the surface of the lamella. Painted lamellas absorb energy in the space between the panes, which leads to a higher energy input and a higher load on the system.

The system offered is only suitable for vertical use. If, for example, tilt windows are installed, it must be ensured that they cannot be operated when they are open.

Control

We recommend using only system-matched motor control units and power supplies.

The regulation of the blind motor 24DC has to be done with a suitable controller. The control lines must be laid in such a way that no electromagnetic interference can occur.

If controllers from ISOLAR GLAS partners are used, potential-free contacts are available as an input for blind buttons that are not mutually locked, or another for central commands. (Impulses can be made either via manual switches or via a control centre.)

All motors are designed with an encoder (incremental encoder). The connection cables are 6-pin and marked as follows: Motor+, Vcc, Channel A, Channel B, Gnd and Motor – “Motor +” and “Motor –” for the drive, changing the power supply changes the direction of travel. The other four are the connection cables for the encoder. After each blind has been programmed, the encoder provides precise information about the position of the blind. The encoder generates 16 pulses per motor revolution. The motor idles at approx. 8500 1/min.

An RS485 interface is suitable for controlling the central units or user-related commands.

All blinds are equipped with one limit switch each for the upper and lower hardware limit points. If these are approached, the hanging is in the pack position or closed. The power supply is interrupted. The hanging can then only be moved in the oppo-site direction. (Attention: precise positioning is only possible between the two limit switches - not as long as one limit switch is activated!) Limit switches can also be used for reference runs.

When closing the blinds, it can happen that not all lamellas are neatly fanned out. The control should therefore correct this effect itself by simply “extending” once.

Blind control

Sun tracking

The purpose of tracking the position of the sun is to ensure no glare. It is therefore necessary to approach the so-called cut/off angle. Cut/off means that the lamellas are opened so far that no direct sunlight can enter the room. A so-called lead angle should be taken into account so that there is no need to constantly readjust. (We recommend readjusting every 30 minutes.) Constant turning is also not permitted (whether for example through manual operation or due to cloud cover!) We also recommend moving the lamellas between the horizontal position and the fully closed position in a maximum of 6 steps.

Blind control

Modern architecture is characterised by an above-average degree of functionality. In this context, new challeng-es also apply to daylight and artificial light controls. The day-light control not only has to optimise the incidence of light, taking into account glare protection, it also plays an important role in the room climate. Through the connection with the artificial light control, on the one hand, an energetic optimisa-tion of the room and building is achieved and, on the other hand, the well-being in the room is significantly improved. The complete integration into a comprehensive building manage-ment system makes the functions into a standardised part of the technical building equipment. The industrial standard ena-bles full integration of all common light modules through to daylight-dependent control and scene control of complex light-ing systems.

Automatic sun tracking

The blind is aligned according to the current position of the sun at defined time intervals. The lamellas are positioned in such a way that as much daylight as possible can penetrate the room and at the same time ensures optimum glare protection for the people in the room. The adjustment interval of the blind can be individually adjusted depending on customer requirements.

If there is no direct sunlight, the automatic sun tracking is disabled and the blinds are moved to a fixed, so-called “cut off” position. With increasing twilight, privacy protection from the outside is no longer given in fully illuminated rooms. This is why the blinds close automatically as soon as twilight sets in to prevent unwanted views from outside. All param-eters for sun tracking can be set via a configuration page in the visualisation.

Basic regulation description for insulating glass with SOLARLUX® variodirect

In principle

The SOLARLUX® variodirect blind in the insulating glass can provide sufficient solar protection, glare protection and privacy protection if used correctly. The blind is powered by a 24 VDC motor. The blinds are operated manually using buttons and, after all work has been completed, automatically by a central control. The angle of the lamellas of the blind can be adjusted, which means that daylight as well as solar thermal radiation can be regulated. The complete hanging can also be moved completely up and down.

General usage information

The operator behaviour, in particular the frequency and intervals of complete UP and DOWNWARDS (cycles), influences the service life of the complex mechanical and electrical components of the system. Particularly in the case of changeable weather conditions, it is recommended that the impulse setting be delayed according to the weather (system inertia), which should preferably only be adapted via the lamella angle position. Only turning the lamella angle without moving it up and down contributes to the longer service life of the system.

Recommendation for lamella positioning

The solar protection function is only ensured if the appropriate lamella position is set on sunny days before the room is heat-ed up. A completely lowered hanging with completely closed lamellas offers the best solar protection. A hanging that is always completely down always offers a certain minimum amount of solar protection. Steep lamella angles of around 45° offer a higher degree of solar protection than flat lamella angles. The strategy of the lamella angle adjustment is primarily based on the need for solar protection in order not to over-heat the rooms. As a compromise between optimum daylight and good solar protection, the “CUT OFF” strategy for the adjustment angle is at least necessary. The angle of the lamel-las is always set at least in such a way that no direct rays of sun enter the room and that there is shade in the room throughout the day. The lamella angle must always be read-justed depending on the position of the sun and the angle of incidence on the facade. If automatic operation is not running, optimum solar protection must be ensured manually by the room user using the manual button. (Annex: The principle of lamella angle positions depending on the angle of incidence of the sun)

Operating instructions - standard control

General usage information

The operator behaviour, in particular the frequency and intervals of complete up and downwards (cycles), influences the service life of the complex mechanical and electrical components of SOLARLUX® variodirect. We therefore recommend only setting the cycles required to achieve the desired room climate. Particularly in the case of changeable weather conditions, it is recommended that the impulse setting be delayed according to the weather (system inertia), which should preferably only be adapted via the lamella angle position.

Function description

Manual operation with button – Standard

- Up/down button press: slow, complete turning, duration approx. 4 sec.
- Self-holding: automatically after 4 sec.
- Transition in running speed up or down until the limit point is reached. Closing and automatic cut/off position after departure.
- Stopping: by pressing a button (in the opposite direction) in any position
- Lamella position: fine adjustment possible by briefly pressing the button

Recommendation for lamella positioning

The solar protection function of SOLARLUX® variodirect is only ensured if the appropriate lamella position is set on sunny days before the room is heated up. If the lamellas are fanned out when the blinds are closed, it cannot be ruled out in all cases that individual lamellas do not come to lie neatly in the ladder cord. This impression, which is visually perceived as an une-venness, is usually corrected with our control units by means of an automatic extension when the lower limit point is reached. We recommend manual turning several times.

Misuse

The blind and the drive must be protected against misuse. Constant raising or lowering of the hanging without a break between operations or constant “zipping” in the upper limit point is not permitted, as this can damage the drive and the lamella unit.

In the SOLARLUX® variodirect -EN system, operating data storage is integrated. If necessary, the operating data can be read out.

System components

Upper casing: Made from extruded aluminium with a height (view) of 42 mm, H-shaped design for high self-supporting capacity and torsional stiffness; serves to accommodate the motor, gear unit and winding components including limit switches. Standard colours: Silver or black anodised.

Travelling or winding shaft: For moving and turning the hanging

Storage and reversible sliding rings: Take up the winding shaft and ensure the exact position of the lamellas; the pull cord is guided through the bearing block using a special slide pin.

Lamellas: Rolled aluminium lamellas; width: Standard 15 mm (or 12.5 mm for Sys 20); Standard colour: SC 15 silver/silver or SC 6 silver/stone grey, other colours on request

Ladder cord: 100% polyester yarn, thermally post-set

Lifting cord: two-part cord; inside: polyester yarn; sheath: braided polyes-ter yarn fabric, thermally post-set

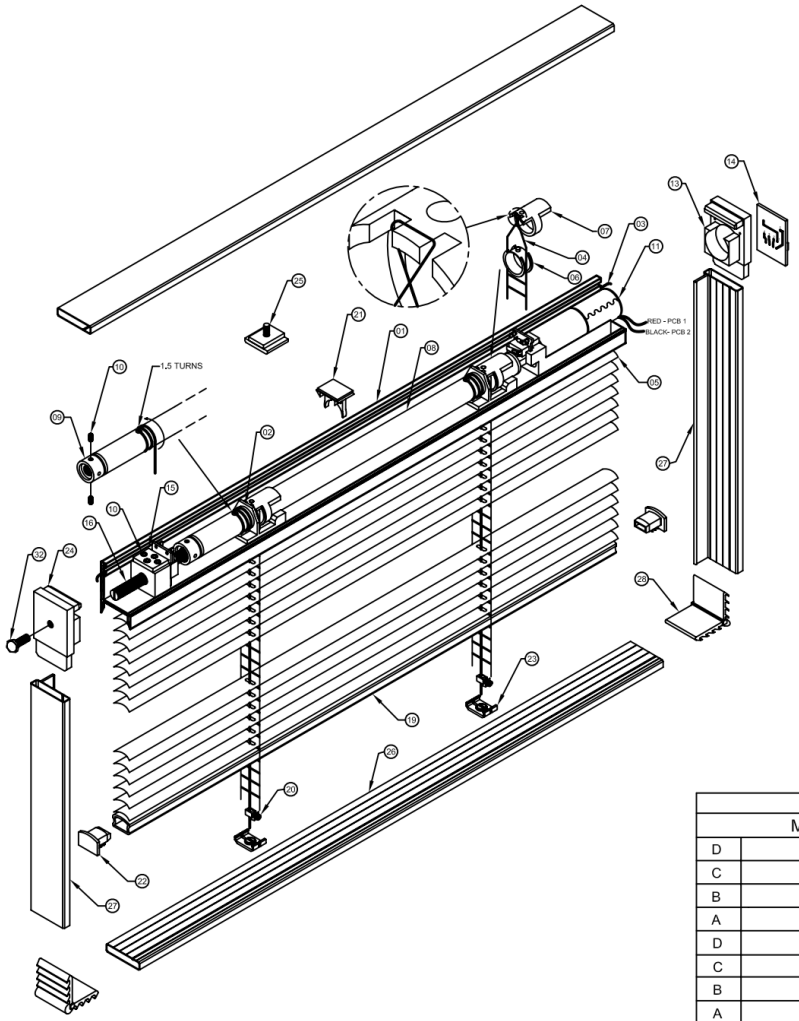
Lower rail: extruded aluminium profile, lifts the lamella pack during the drive up. Standard colours: Silver or black anodised

Connection board: this means that there is no direct cable connection through the edge seal. The connection board is gas and water vapour diffusion tight. A cable soldered to the circuit board with a protective insulated plug (IP54) including strain relief leads to the outside.

Drive: Maxon motor with planetary gear, power supply 24V DC and 6 watt power. (On request with Maxon encoder)

Cables: Connection cables are not included in the scope of delivery (separate order required!). Standard cable lengths of 5, 10 and 15 m are used. Special lengths are available on request.

Spacer: There are three aluminium spacer widths - 27, 29 and 32 mm - available (colours: silver or black anodised). The spacer must be dimensioned in such a way that, in combination with the glass thickness, pane format and aspect ratio, height difference, production location or installation location, installation and local conditions, wind and climatic loads, even under extreme conditions, they guarantee that the lamella pack can be moved up and down in an unhindered way.



SR.NO.	DWG. NO.	DESCRIPTION
33	SE/SK-9012	SILICON SEALANT
32	SE/SK-0052	HEX BOLT
31	SE/SK-	GLASS
30	SE/SK-9011	NORTON TAP
29	SE/SK-9010	MOLECULAR SEIVES
28	SE/SK-0051	CORNER BRACKET
27	SE/SK-0050	ISO PROFILE RIGHT ANGLE
26	SE/SK-0049	ISO PROFILE FLAT
25	SE/SK-1016	HEAD SPACER FIXING PLATE ASSLY.
24	SE/SK-0038	ENDCAP
23	SE/SK-0034	BOTTOM CAP
22	SE/SK-0033	ENDCAP (B.P.)
21	SE/SK-0032	CLIP
20	SE/SK-1011	CHORD HOLDER ASSLY.
19	SE/SK-1102	BOTTOM PROFILE DRILLED
18	SE/SK-1013	WIRING DIGRAM(4PIN PCB)
17	SE/SK-0021	CORD
16	SE/SK-0028	STUD
15	SE/SK-1010	LIMIT SWITCH PANEL ASSLY.
14	SE/SK-1008	4PIN PCB ASSLY.
13	SE/SK-0017	ENDCAP (MOTOR)
12	SE/SK-0018	SCREW ZN PLATED
11	SE/SK-1005	MOTOR ASSLY.
10	SE/SK-0023	HEX SOCKET SET SCREW
9	SE/SK-0022	ADJUSTING RING
8	SE/SK-1002	PIPE ASSLY.
7	SE/SK-0020	OUTER RING
6	SE/SK-0019	INNER RING
5	SE/SK-1015	SLATS FORMED & PUNCHED
4	SE/SK-1003	LADDER ASSLY.
3	SE/SK-0008	WIRE (YELLOW)
2	SE/SK-0007	BEARING
1	SE/SK-1101	TOP PROFILE DRILLED&PUNCHED

***	***	***	AS-REQ.
MATERIAL	WT.	ASSLY. DRG. NO.	QTY.

D		SCALE	DRAWN	HGP	05.10.07
C		NTS	CHKD.	BSS	06.10.07
B			REPLACED BY: XXX		
A			REPLACES: XXX		

D		STANDARD-BLIND	DWG. NO. SE/SK-1001
C			
B			
A			
REV.	DATE		

CAD FILE :

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Motor characteristics

Values at nominal voltage

Nominal voltage	24 V
Idle speed	10500 min^{-1}
No-load current	23.7 mA
Nominal speed	7330 min^{-1}
Nominal torque (max. continuous torque)	6.84 mNm
Nominal current (max. continuous load current)	0.344 A
Stopping torque	23.2 mNm
Start-up current	1.09 A
Max. efficiency	72 %

Characteristics

Connection resistance	22 Ω
Connection inductance	1.37 mH
Torque constant	21.2 mNm A^{-1}
Speed constant	450 min^{-1} V^{-1}
Characteristic gradient	466 min^{-1} mNm^{-1}
Mechanical starting constant	20.2 ms
Rotor moment of inertia	4.13 gcm^2

Thermal data

Thermal resistance housing-air	20 KW^{-1}
Thermal Resistance winding-housing	6 KW^{-1}
Thermal Time constant of the winding	9.78 s
Thermal Time constant of the motor	313 s
Ambient temperature	-30... +85 °C
Max. Winding temperature	+125 °C

Mechanical data

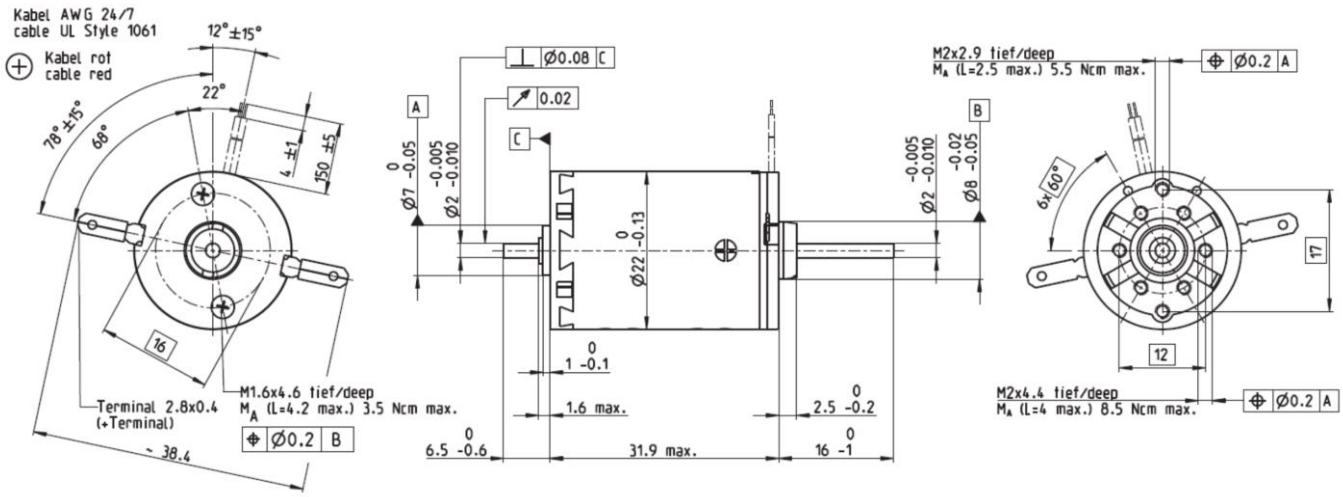
Bearing type	Sintered bearing
Limit speed	9800 min^{-1}
Axial play	0.05 - 0.15 mm
Radial play	0.012 mm
Max. axial load dynamic)	1 N
Max. axial pressing force (static)	80 N
(static, shaft supported)	440 N
Max. radial load	2.8 N, 5 mm from flange

Further specifications

Number of pole pairs	1
Number of collector segments	9
Direction of rotation	Clockwise (CW)
Number of sterilisation cycles	0

Product

Program	A-max. 22 GB
Weight	54 g



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Gearbox characteristics

General data

Gear box type	GP
Outer diameter	22 mm
Design type	A

Gear box data

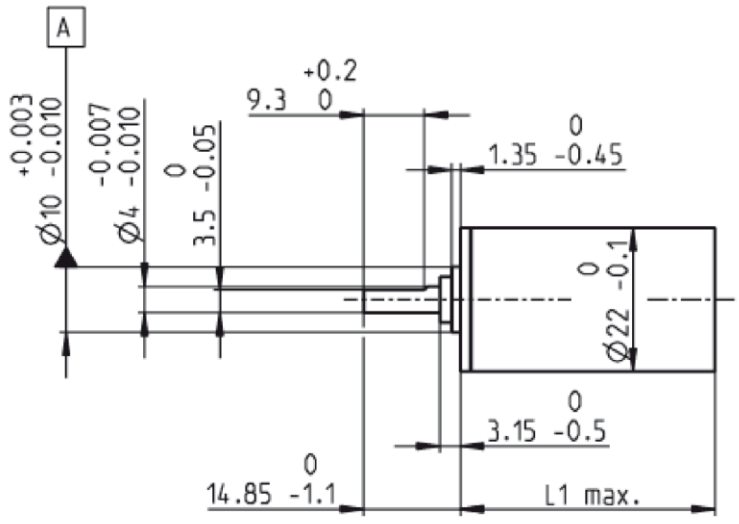
Gear reduction	370: 1
Absolute gear reduction	10556001/28561
Max. Motor shaft diameter	3.2 mm
Number of stages	4
Max. Continuous torque	1 Nm
Temporary permissible torque	1.6 Nm
Direction of rotation, drive to drive	=
Max. efficiency	49 %
Weight	81 g
Average gear backlash unloaded	2 °
Mass moment of inertia	0.4 gcm²
Gear length (L1)	43 mm
Max. transferable power (continuous)	1.7 W
Max. transferable power (short)	2.7 W

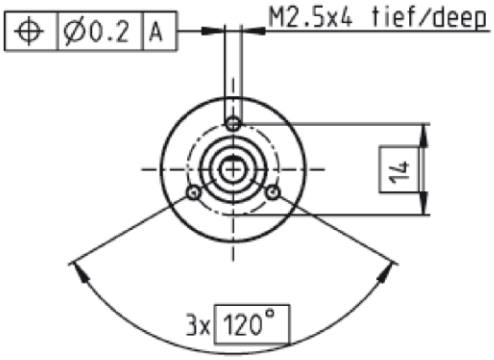
Thermal data

Radial play	max. 0.2 mm, 10 mm from flange
Axial play	0 – 0.2 mm
Max. Radial load	70 N, 10 mm from flange
Max. axial load (dynamic)	100 N
Max. permissible pressing force	100 N
Recommended motor speed	6000 min^{-1}
Max. Input speed (short)	6000 min^{-1}
Recommended temperature range	-40... +100 °C
Number of sterilisation cycles	0

Product

Program	GP 22 A





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Encoder characteristics

Type

Number of pulses per revolution	16
Number of channels	2
Line Driver	false
Max. electrical speed	18750 min-1
Max. Speed	75000 min-1

Technical data

Supply voltage V_{cc}	24...3.8 V
Output driver logic	TTL
Current per channel	max. -40 mA
Phase shift	90 °e
Phase shift, inaccuracy	45 °e
Max. Current consumption at standstill	8 mA
Max. Moment of inertia of the pulse disc	0.1 gcm²
Operating temperature	-20... +80 °C

Product

Program	MENC 13

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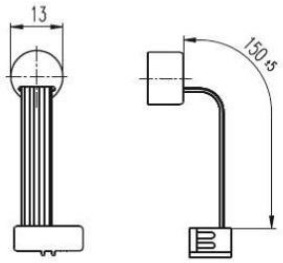

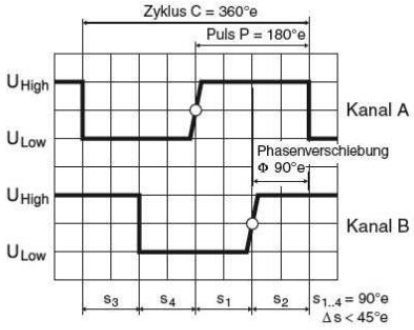

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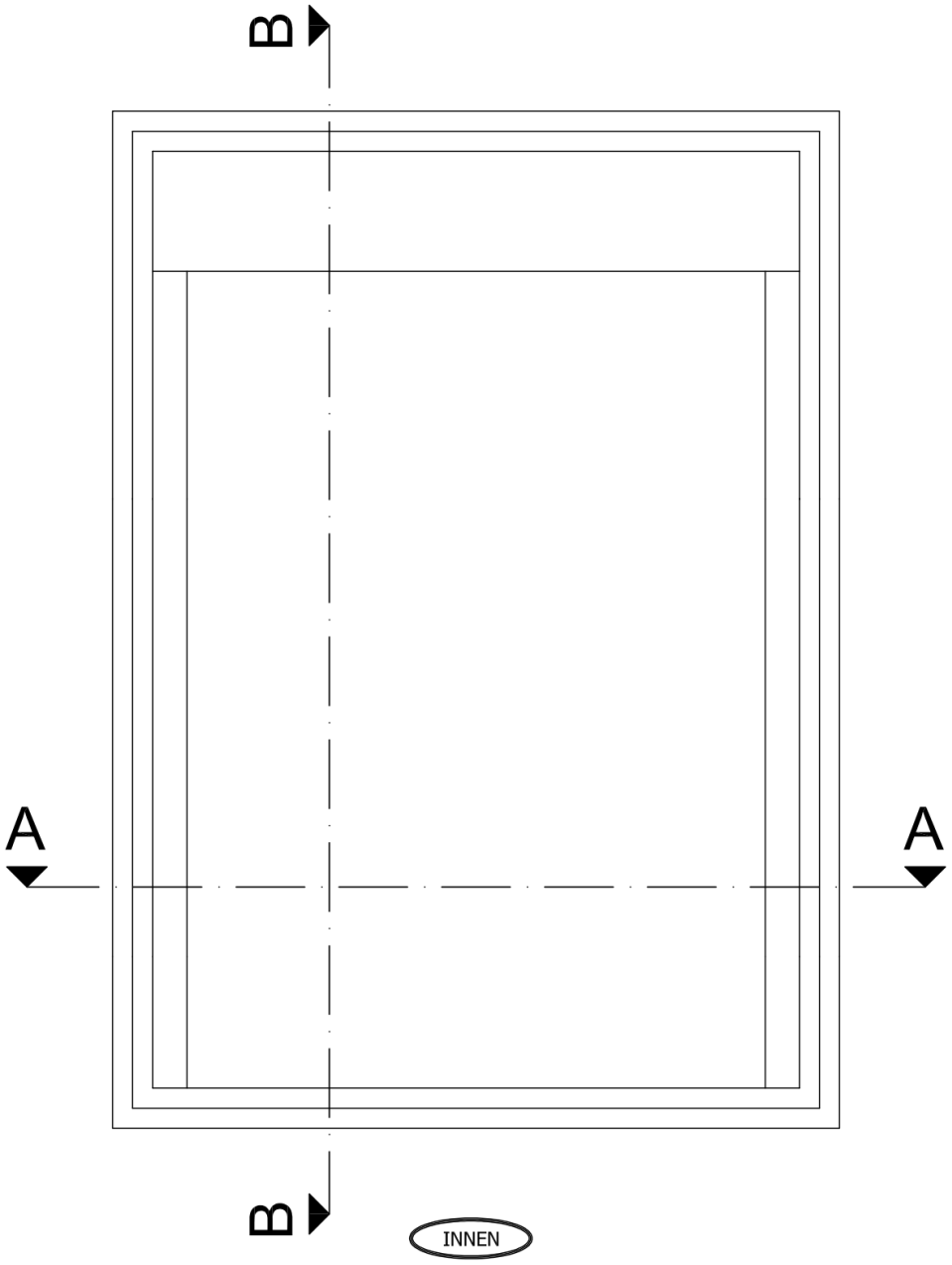
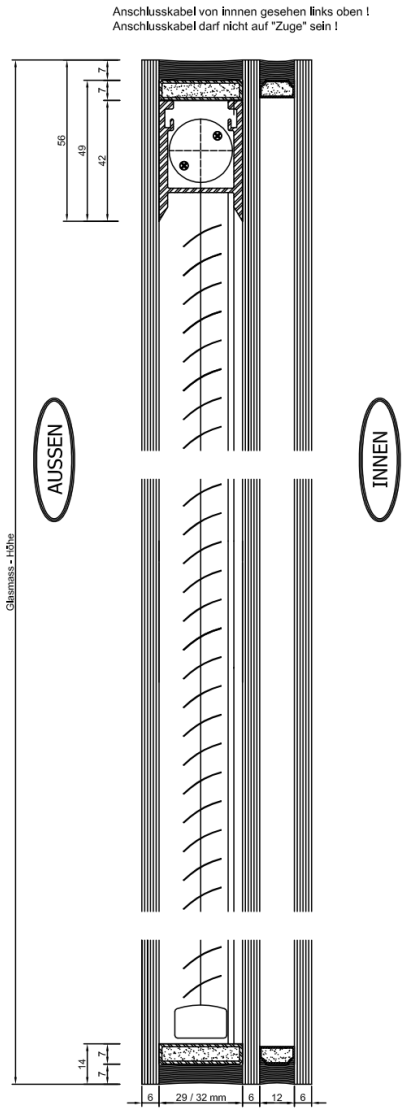
Data sheet connection cable

Cable with plug on one side L = 5 m
Cable with plug on one side L = 10 m
Cable with plug on one side L = 20 m

Operating voltage	up to 30 V
Voltage proof	up to 100 V
Current carrying capacity	up to 2 A
Connections	8-pole socket connector
Protection class	IP 54
Max. permissible Tensile load connector	88 N
Cables	Stranded wire, fine wire 0.14 mm² 6-pole
Temperature resistance	fixed installation: -30°C to + 80°C
Outer diameter	4.4 mm,
Insulation	Outer sheath made of halogen-free material, flame retardant according to VDE 0472





Schnitt B-B

Lamellenfarbe: aussen silber

Technical data

Triple insulating glass SOLARLUX® variodirect IGS - SC

		SOLARLUX® variodirect – Triple insulating glass Ug-value 0.6 W/m²K at sun elevation angle		
		0°	30°	60°
		Lamella setting		
	Pulled up *	closed	approx. 45°	horizontal 0°
T_A	0.70	0.04	0.07	0.14
P_A	0.14	0.63	0.58	0.35
T_{D65}	0.70	0.04	0.07	0.14
P_{D65}	0.14	0.64	0.53	0.35
$T_{e, Glo}$	0.38	0.02	0.04	0.08
$P_{e, Glo}$	0.24	0.57	0.52	0.32
q_i	0.12	0.05	0.06	0.08
g	0.50	0.07	0.10	0.17

* Values according to EN 410

Technische Daten

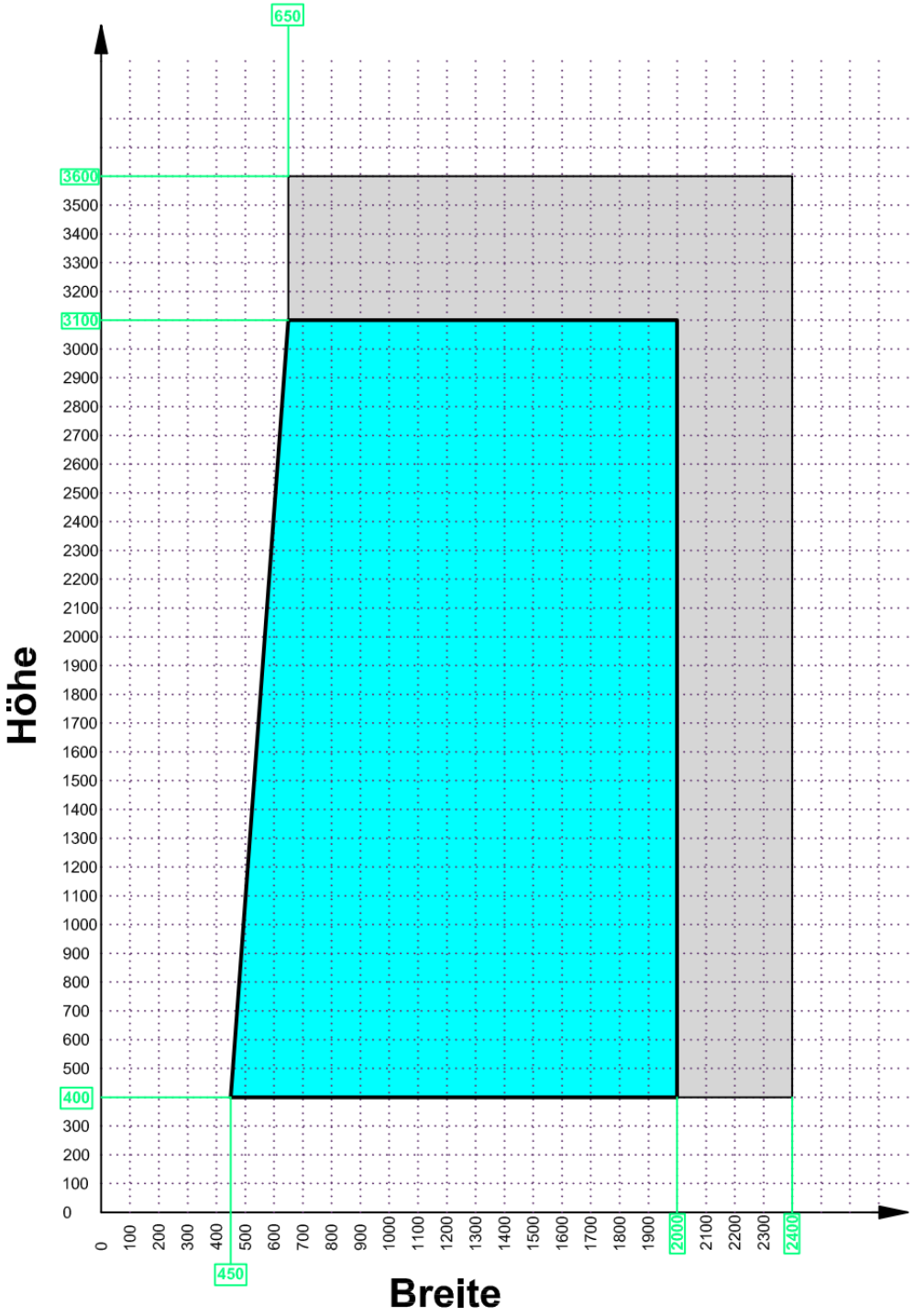
3-fach Isolierglas SOLARLUX® variodirect – SC 6

		SOLARLUX® variodirect – Triple insulating glass Ug-value 0.6 W/m²K at sun elevation angle		
		0°	30°	60°
		Lamella setting		
	Pulled up *	closed	approx. 45°	horizontal 0°
T_A	0.70	0.01	0.05	0.06
P_A	0.14	0.56	0.42	0.31
T_{D65}	0.70	0.01	0.05	0.06
P_{D65}	0.14	0.56	0.43	0.32
$T_{e, Glo}$	0.38	0.01	0.04	0.04
$P_{e, Glo}$	0.24	0.47	0.35	0.27
q_i	0.12	0.04	0.06	0.08
g	0.50	0.05	0.10	0.11

* Values according to EN 410

Production sizes for insulating glass with internal blinds

Dependency of pane width (min) to pane height



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Warranty

SOLARLUX® variodirect is an insulating glass with an integrated motor-driven blind which is intended for vertical use. The following warranty and liability conditions apply to our insulating glass elements:

1 Warranty period

1.1 Transparency of the insulating glass
We guarantee for a period of 5 years from the time of delivery that there will be no impairment of the view in the space be-tween the panes due to the formation of condensation in the space between the panes.

1.2 Blind drive and lamella unit
We guarantee the functionality of the drive and the lamellar unit, taking into account our special instructions for the execution of the control, for a period of 2 years from delivery.

1.3 Deviating from point 1.2
The guarantee for material-specific or environmental changes to the lamella that we cannot influence, in particular abrasion and deflection, is excluded.

2 Assertion

All warranty claims are to be submitted to us in writing within 14 days of delivery or, in the case of hidden defects, immediately after they have been identified. A possible warranty claim can only be asserted after full payment.

3 Claims

3.1 Claims
We provide the warranty at our discretion by means of improvement, price reduction or exchange.

3.2 Replacement glass
If the glass is to be replaced, we shall deliver a replacement free of charge to the installation location. Any further claims from the title warranty and/or compensation such as exchange costs, accommodation costs etc. ... are ex-cluded.

4 Special conditions

4.1 All warranty claims expire in the event of improper assembly, installation, use and control.

4.2 All warranty claims also expire if the blinds are incorrectly, defective or not controlled according to our specifications.

4.3 Defects that are caused by lightning strikes, incorrect voltages or currents, especially those occurring on the encoder lines, are also excluded from all warranty claims.

4.4 Improper use such as constant lifting and lowering of the hanging or constant “zipping” in the upper limit point will result in the loss of all warranty claims.

5 Structural dimensioning

5.1 The static proof of the insulating glass must be carried out by the client by authorised test engineers. Local wind and climatic loads as well as increased pane temperatures must be taken into account.

5.2 Application note
Deformation due to wind pressure, or so-called deformation, in relation to the centre of the pane must not exceed 15 mm. Deformation under climatic loads per individual pane, relative to the centre of the pane, may be max. -5.0 mm for SZR 32 mm.

6 Glazing and processing guidelines SOLARLUX® variodirect

6.1 The detailed glazing and processing guidelines must be strictly observed.

6.2 These can be found in an extra document.

Final inspection form SOLARLUX® variodirect									
Production Sr.:				Lamella width: 15 mm					
Production Date:				Colour:					
Comission:				Motortype: M 24V 6 W					
Counter No:				Blind Version No.:					
examined scores	exit shutter supplier	Entrance Isoprod.	Entrance Isoprod.	customer control					
Regular function speed				☐	yes	☐	no	Max. travel speed	
Top limit point / turn off point				☐	yes	☐	no	Disconnection in top limit point	
Position of bottom profile				☐	yes	☐	no	Bottom strip in lower limit point horizontal	
Bottom limit point / turn off				☐	yes	☐	no	Shutdown in the lower limit point	
Lamella length (air sufficient)				X	X	X	X	Lamella length (air sufficient)	
Lamella damaged (bent, scratched, dirty)				☐	yes	☐	no	Lamella damaged (bent, scratched, dirty)	
Head profile (scratched, dirty)				☐	yes	☐	no	Head profile damaged (scratched, dirty)	
Colour (equal with order)				☐	yes	☐	no	Colour equal with order	
Plumb-vertical assembly	XXX	XXX	XXX	☐	yes	☐	no	Plumb-vertical assembly	
				T:_____ S:_____ I:_____					
	supplier								
checked by: signature:				checked by customer: signature: name in capital letters: date:					
Name in capital letters:									
date:									
A warranty claim can only be acknowledged if this form was filled out and sent back to **us within 14 days.** The control is to be accomplished under reference of the product description of SOLARLUX® variodirect.		remarks:							

Guideline for assessing the visual quality

Scope

This guideline regulates the assessment of the visual quality of insulating glass with internal blinds, the SOLARLUX® variodirect system. In particular, the assessment of the surfaces regulates the materials used, such as the upper casing, lamellas, etc., or the position of the lamellas or the lamella pack, regardless of the position.

Check

The assessment takes place at a distance of 3 m, from an angle corresponding to normal room use. The assessment has to take place in diffuse daylight.

Permissible defects

Only defects that are visible from a distance of 3 m are to be assessed.

- Linear defects > 10mm max. width 0.3mm are permissible
- Point defects up to 2mm² / defects per 0.25m² pane area. (Inclusions, bubbles, stains, abrasion, residues, etc.)

General tolerances

Length tolerance of head profile or lamella:
< 2000 mm element width: ± 2mm, beyond that + 1 mm per linear metre / element width

Length tolerance package height (raised)
± 10mm

Perpendicularity / position of the hanging:
max. 15 mm deviation of the hanging - regardless of the intermediate position

Lamella tolerances

Twisting: max. 4 degrees / rm. min. 5 degrees

Bending: max. 8 mm at the time of delivery, plus 1 mm per year of use for standard lamellas, plus 2 mm per year of use for painted lamellas.

Depending on the system, there may be abrasion at the ends of the lamellas – this is not a reason for complaint.

Notes

When moving up, the lamella hanging is stacked on the lower bar, the ladder cord comes to lie between each lamella. Depending on the system, light gaps or the lamellas can appear in an arched shape.

When lowering the hanging, individual lamella cannot come to rest correctly, the control must turn the hanging once in the lower limit point so that all lamellas come to rest correctly.

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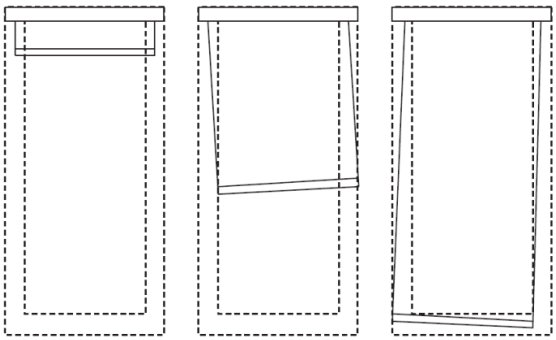
Perpendicularity of the hanging

If the hanging is in the idle state, a deviation from the vertical or horizontal is also permitted at any point between the fully retracted and extended position.

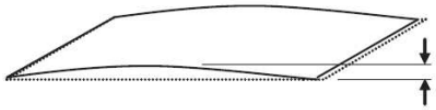
Aspect ratio of W to H 1 : < 2.5 max. 10 mm
W to H 1 : < 2.5 max. 15 mm



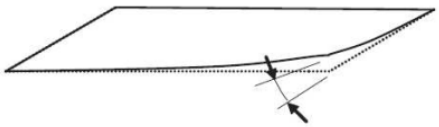
Lamella tolerances

Warping

Bending



Twisiting



Type of deformation		Shape tolerances		
Warping	C[mm] L[m]	a	$C = 0.5. L^2$	
Bending	Opened	b	max. 15 mm	
	Closed		L ≤ 1.5 m	b = 5 mm
			1.5 < L ≤ 2.5 m	b = 10 mm
			2.5 < L ≤ 3.5 m	b = 15 mm
Twisting		c	5°/m	