nekos
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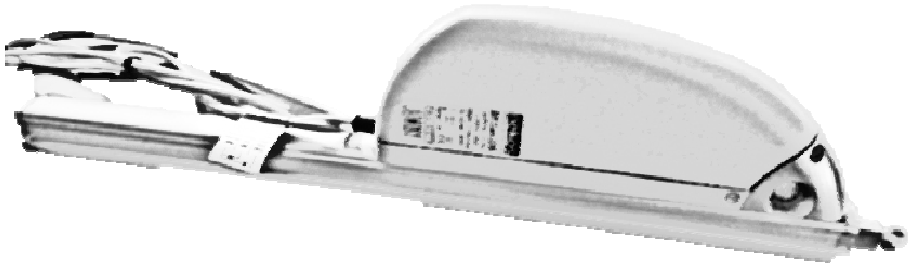
SKY 650

RACK OPERATED ACTUATOR

FORCE 600 N - TRUCKS 180, 230, 350, 550, 750, 1000 MM
VOLTAGE 110÷230V~ (A.C.), 50/60 HZ – 24V⎓ (D.C.)



MANUAL FOR INSTALLATION AND USE

CE

English

nekos products are specially manufactured in safe materials in compliance with the requirements of legislation in force. When correctly mounted, installed and used in accordance with the present instructions, our products constitute no danger to people, animals or property.

Products subject to EU directives comply with the essential requirements stipulated by the latter. CE markings mean that our products can be sold and installed throughout the European Union without any further formality.

The CE mark on our products, packaging and user manuals provided with the product, indicate "presumed in conformity with directives" issued by the EU. **nekos** holds the technical file with all the documentation to show that our products have all been inspected to ensure compliance with directives conformity.

Symbols used in the manual

	DANGER	*This indication draw the attention about potential dangers for safety and health of peoples and animals.*
	INFORMATION	*This information give further suggestions.*
	ATTENTION	*This indication draw the attention about potential dangers for the product itself.*
	WARNING	*This indication draw the attention about potential damages to goods.*
	ENVIRONMENTAL INSTRUCTION	*Environmental indication draw the attention about potential dangers for the environment.*

Contents

1. Safety indications

ATTENTION: PLEASE READ THE FOLLOWING SAFETY INDICATIONS CAREFULLY BEFORE ATTEMPTING INSTALLATION OF THIS APPLIANCE. THESE INDICATIONS WILL HELP TO AVOID CONTACT WITH ELECTRICAL CURRENT, INJURY AND OTHER ACCIDENTS. PLEASE KEEP THIS MANUAL FOR FUTURE CONSULTATION.

The SKY650 rack operated actuator has been designed exclusively for moving outward opening windows, transom windows, cupolas, dormer windows, large industrial skylights, sliding windows and blinds.

Any use of the actuator for applications other than those indicated must previously be authorized by the manufacturer upon technical verification of the application.

The device must only be installed by competent and qualified technical staff.

After removing all packaging, please verify that all parts of the appliance are present.

Any plastic bags, polystyrene, or small metallic parts such as nails, clips, etc. must be stored out of the reach of children as they constitute potential sources of danger.

Before connecting the appliance to the electricity supply, check that the electricity supply in use has the same characteristics as those indicated on the technical data label on the device.

This appliance is destined exclusively for the use for which it has been designed and the manufacture cannot be held responsible for any damages incurred by improper use.
The manufacturer must be consulted for any special application.

Installation of the device must be carried out in accordance with the instructions set out by the manufacturer. Failure to follow these instructions could compromise safety.

Electricity supply installation must be carried out in accordance with regulations in force.

To ensure effective separation from the electricity grid, we suggest installation of a temporary approved type bipolar switch (push button). A multi-pole main switch with minimum contact opening of 3 mm should be installed at the start of the command line.

Never clean the device with solvents or jets of water. Never immerse appliance in water.

Eventual repairs must only be carried out by qualified staff at a service centre authorized by the manufacturer.

Always require exclusive use of original spare parts. Failure to comply with this stipulation could compromise safety and forfeit warranty benefits for the device.

In the event of trouble or doubts, please refer to your trust retailer or directly to NEKOS S.r.l.

ATTENTION

Warning: risk of injury in the event that the window should fall on outward opening window frames. A safety system should be mounted onto the window to guard against falls. This system should be able to withstand at least three times the total weight of the window.

Warning: this device may cause injury by crushing or dragging. During function, when the actuator closes the frame, it applies a pressure force of 660N against the ledge of the casing, and all due measures, care and attention should be taken to avoid any crushing of fingers.

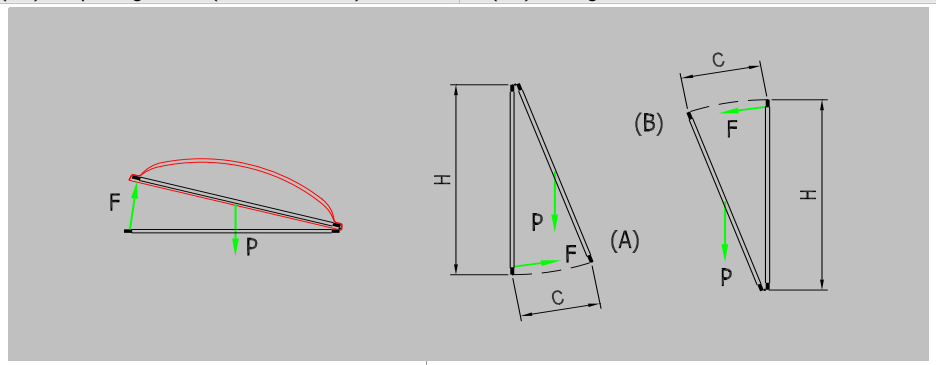
Warning: in the event of damage or malfunction, switch off the device, disconnect any electrical connections and request the intervention of a qualified technician.

2. Formulas and recommendations for installation

2.1. Calculation of opening / closure force

Using the formulas on this page, approximate calculations can be made for the force required to open or close the window considering all the factors that determine the calculation.

Symbols used for the calculation	
F (Kg) = Force for opening or closing	P (Kg) = Weight of the window (mobile sash only)
C (cm) = Opening stroke (actuator stroke)	H (cm) = Height of the mobile sash



For horizontal light domes or skylights

F = 0,54 x P

(Eventual weight of snow or wind on the cupola should be calculated separately).

For vertical windows

- **TOP HUNG WINDOWS, OUTWARD OPENING** (A)
- **BOTTOM HUNG WINDOWS** (B)

F = 0,54 x P x C : H

(Eventual load of favourable or unfavourable wind on the sash should be calculated separately.)

2.2. Maximum opening in accordance with sash height

The actuator stroke should be selected in accordance with the height of the sash and its application. Make sure that the actuator does not touch the profile of the sash when

moving along its track, and ensure there are no obstacles blocking the opening and that the rack moves smoothly along the window frame.

ATTENTION. For safety reasons, always check application before fixing the actuator to the frame or sash. In the event of difficulty, request assistance from the manufacturer to check application.

3. Technical information about function

The rack actuator performs opening and closing movements for the window using a round section steel rack. Movement is powered by electricity that feeds a reduction motor controlled by a functional electronic device.

The opening stroke for the window CANNOT be programmed as it is regulated by the length of the rod on the reduction motor. The electronic control device allows the rack to protrude until it encounters an obstacle that blocks its stroke. This could be provided by the internal lock on the rack or complete closing/opening of the window.

In both outwards and return directions the stroke-end uses a self-defining electronic process with power absorption, and for this reason, no adjustment is required.

4. Construction and standards

The SKY650 rack actuator has been designed and manufactured to open and close top hung windows opening outwards, bottom hung windows, dormer windows, light domes, skylights and louvered windows or sun blades. Specific use is for ventilation and airing of areas; any other use must previously be approved by the manufacturer.
Application is performed using the brackets provided and any other type of assembly should be checked with the manufacturer, who will not accept any responsibility for incorrect or malfunctioning assembly.
Electrical connections must comply with standards in force on the design and production of electrical appliances.
The actuator has been manufactured according to European Union directives and conforms to CE marking.
Any eventual service or control device for the actuator must be produced according to standards in force and must comply with the standards issued by the European Community.
The SKY650 actuator comes packaged in a cardboard container which contains two pieces. Boxes for tandem actuators each contain all parts required for movement of windows. Each package contains:

- 2 actuators with 2 metre (±5%) lead.
- 2 standard support brackets with respective grips and fixing screws.
- 2 brackets for fixing to the frame.
- Small parts packaging.
- Instruction manual.

5. Id plate and marking data

All actuators have CE marking and are destined for use in the European Union without further requirements.

The CE marking on the product, packaging and indications for use provided with the product indicate 'presumed conformity to the directives' issued by the European Community.

The manufacturer holds the technical archive with documentation providing that products have been examined and evaluated for conformity to directives.

ID plate data are indicated on a polyethylene adhesive label applied externally on the outside of the container, printed in black on a grey background. Values conform to EC requirements in force.

See figure for example of labelling.

6. Technical specifications

Model	SKY650 230V	SKY650 24V
Thrust and traction force	600 N	
Course lengths	180, 230, 350, 550, 750, 1000 mm (*)	
Input voltage	110÷230V~AC 50/60 Hz	24V⎓DC
Current absorption at nominal load	0,320 A	1,600 A
Power absorption at nominal load	~ 38 W	~ 38 W
Travel speed without load	11 mm/s	9,5 mm/s
Length of run without load	In accordance with length of truck run	
Double electrical insulation	Yes	Low tension
Type of service	S_2 of 3 min	
Max. and min. temperatures for function	-5 +65 °C	
Degree of protection for electrical devices	IP55	
Adjustment of socket at casing	Position self regulating	
Connection in parallel of two or more motors	Yes	
Connection in tandem or in series	Yes	
Limit switch stop at opening and closure	At absorption of power	
Protection against overload at opening and closure	At absorption of power	
Dimensions	115x42x(Course length+135) mm	
Weight	Varies according to construction	

Information presented in these illustrations is not binding and is also subject to variation without prior notice.

(*) Technical personnel can shorten track runs by adjusting the internal limit switches.

7. Electrical supply

Depending on which model is used, the actuator can function on 24VDC (direct current), with two cables in the lead, or on 230VAC (alternating current) 50 Hz with a three cable lead.

For the low voltage version, a feeder with an outcoming tension correspondent to the one indicated on the technical data label attached to the device and which transforms supply mains voltage (230VAC 50Hz or other) in 24VDC should be used. The feeder must have class II protection, and correct functioning is guaranteed if a feeder type approved or suggested by the manufacturer is used.

Warning: SKY650 24VDC has been realized and programmed to function with a stabilized tension of 24VDC. Therefore, if fed with a stabilized tension lower than 24VDC the 600N the power is not guaranteed, while if fed with a stabilized tension higher than 24VDC some breakings could occur due to the high power the engine gives. For this we suggest, before feeding the device and during its functioning, to check that the tension applied has the correct value (24VDC stabilized).
So, if fed with a rectified but not stabilized tension, the actuator can NOT have a correct functioning.

7.1. Section choice of supply cables

In low tension supply systems, tension falls due to current passage in conductors is a basic aspect for safety and good appliance function. It is therefore extremely important that the conductor section in function of cable length is calculated correctly. The following table indicates cable lengths for an actuator connected at nominal charge.

Cables section	Actuator using	
	24VDC	230VAC
4,00 mm^2	~ 1.000 m	~ 3.000 m
2,50 mm^2	~ 750 m	~ 2.200 m
1,50 mm^2	~ 450 m	~ 1.350 m
0,75 mm^2	~ 160 m	~ 500 m
0,50 mm^2	~ 130 m	~ 400 m

8. Instructions for assembly

These indications are intended for the attention of technicians and specialized personnel. Basic job and safety techniques are therefore not included.

All preparatory operations, assembly and electrical connections must be carried out by technical and specialized personnel to guarantee best performances and good function of the chain operated actuator. First of all, please check that the following fundamental points have been satisfied:

Gear motor performances must be sufficient to move the window; any limits indicated in the technical data table on the product cannot be exceeded (page 7). Any eventual calculations may be made using the formula on page 5 of this manual.

Warning: Check that appliance has electrical feeding type equal to the one provided by checking with the data reported on the label attached to the gear motor. The actuator with the 3 (three) cable lead functions on 230VAC 50/60Hz. The actuator with the 2 (two) cable lead functions on 24VDC supplied either by batteries or by means of the lead.

Check that the actuator has not been damaged during transport, first visually and then by working it in both directions.

Transom window frames entail the risk of injury caused by accidental fall of the window. A compass limit switch or alternative safety system suitably designed to prevent any accidental falls should be installed.

8.1. Preparation of actuator for assembly

Before starting assembly of the actuator, prepare the following material for completion, equipment and tools.

- For fixing onto metal window frames: M5 threaded inserts *(6 pieces)*, M5x12 flat headed metric screws *(6 pieces)*.
- For fixing onto wooden window frames: self threading screws for wood Ø4.5 *(6 pieces)*.
- For fixing onto PVC window frames: self threading screws for metal Ø4.8 *(6 pieces)*.
- Equipment and tools: measuring tape, pencil, drill/screwdriver, set of drill heads for metal, insert for screwing in, electricians pliers, screwdrivers.

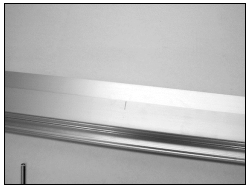


Fig. 1


Fig. 2

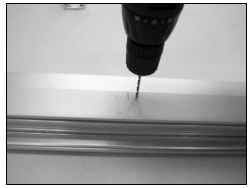


Fig. 3


Fig. 3 bis

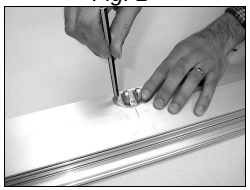


Fig. 4

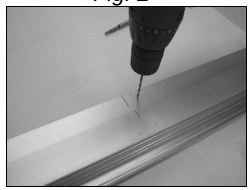


Fig. 5

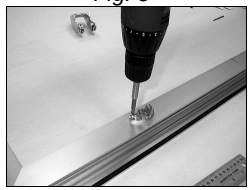


Fig. 5 bis


Fig. 6

8.2. Assembly with outward opening window

A. Mark the centre line of the frame in pencil on both moveable and fixed parts (Fig. 1).
B. Place the motor support bracket along the edge of the fixed part of the frame in line with the centre line marked out previously and mark the positions for the four holes for the fixing screws (Fig. 2).
C. Drill holes into the frame and screw in the motor support bracket, making sure that all screws are fitted tightly (Fig. 3 and 3bis).
D. Line up the front bracket along the centre line on the moveable part of the frame and mark out the three holes required for the screws (Fig. 4).
E. Drill the holes and screw in the front bracket, making sure that all screws are fitted tightly (Fig. 5 and 5bis).
F. Assemble the clamp screws onto the motor support bracket and screw in lightly.
G. Insert the dove-tailed section of the actuator into the clamp screws. Make sure the shaped part of the base fits neatly into the slot to ensure the actuator runs smoothly along its axis.
H. Now position the actuator so the eyebolt head is inserted into the front bracket support. Insert the M6x25 screw into the bracket and into the eyebolt and tighten the self-locking bolt with two 10 spanners.
I. Manually move the actuator along its axis to close the frame and make it weather tight. Tighten the clamp screws and set the actuator in line with the frame.

J. Plug the actuator in and carry out a test to check opening and closure of the frame. Make sure the frame closes fully and is weather tight. The limit switch for the actuator is automatic on reentry.
K. The equipment will exert a pressure of over 660 N to guarantee even the largest of frames is completely weather tight.

8.3. Assembly for cupolas or dormer windows

(Follow the instructions set out in “Assembly for outward opening windows”).

8.4. Assembly for transom windows

A. Mark the centre line of the frame in pencil on both moveable and fixed parts (Fig. 1).
B. Place the motor support bracket along the edge of the moveable part of the frame in line with the centre line marked out previously and mark the positions for the four holes for the fixing screws (Fig. 2).
C. Drill holes into the frame and screw in the motor support bracket, making sure that all screws are fitted tightly (Fig. 3 and 3bis).
D. Line up the front bracket along the centre line on the fixed part of the frame and mark out the three holes required for the screws (Fig. 4).
E. Drill the holes and screw in the front bracket, making sure that all screws are fitted tightly (Fig. 5 and 5bis).
F. Assemble the clamp screws onto the motor support bracket and screw in lightly.
G. Insert the dove-tailed section of the actuator into the clamp screws. Make sure the shaped part of the base fits neatly into the slot to ensure the actuator runs smoothly along its axis.
H. Now position the actuator so the eyebolt head is inserted into the front bracket support. Insert the M6x25 screw into the bracket and into the eyebolt and tighten the self-locking bolt with two 10 spanners.
I. Manually move the actuator along its axis to close the frame and make it weather tight. Tighten the clamp screws and set the actuator in line with the frame.
J. Plug the actuator in and carry out a test to check opening and closure of the frame. Make sure the frame closes fully and is weather tight.
K. The limit switch for the actuator is automatic on reentry. The equipment will exert a pressure of over 660N to guarantee even the largest of frames is completely weather tight.

8.5. Assembly for louvered windows with no mechanical block and for sun screens

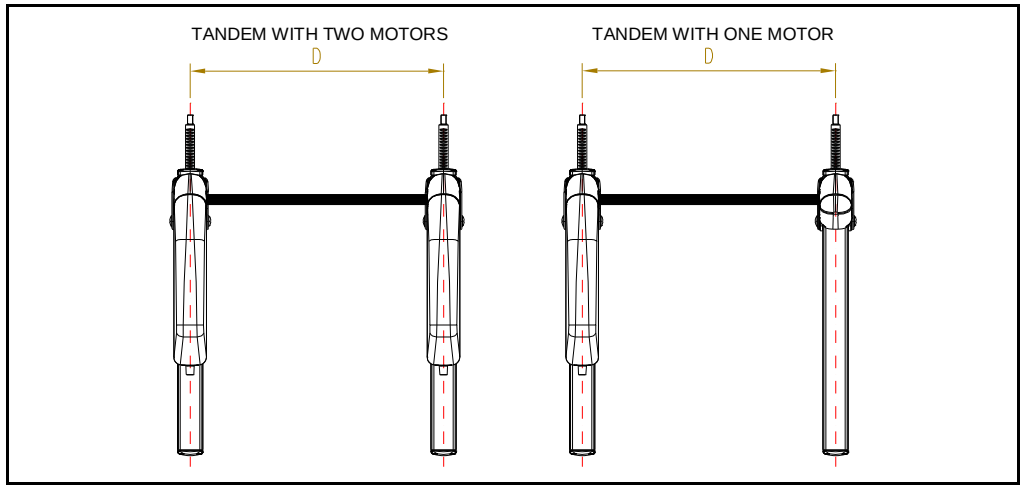
This type of assembly requires electricity to move the actuator. Check the technical specifications label on the motor for required voltages.
A. Connect the actuator to the electricity supply, and turn it on until the bar reaches the limit switch maximum opening point.
B. Close the louvres of the frame by manually operating the levers on the frame.
C. Place the eyebolt head of the actuator in between the two levers (or in line with the opening on the lever if there is only one), insert the pin and lock into position with the nuts provided.

D. Assemble the clamp screws onto the motor support shaft and screw lightly into position.
E. Mount the motor support shaft onto the profile of the actuator, ensuring the clamp screws fit correctly into the profile socket, and make sure the socket is positioned correctly into the base of the actuator (Fig. 6).
F. Keep louvres or sun screen closed and place the shaft on the wall vertical to the frame, making sure that the axis of the actuator is parallel to the lever and perpendicular to the connection pin. Check the shaft has been inserted into the base of the actuator
G. Mark out the four holes for drilling for the screws for the motor support shaft.
H. Drill holes, insert the screws and fix the motor support shaft to the frame.
I. Turn on the actuator and carry out a complete test to check window opens and closes correctly.

8.6. Assembly of more than one actuator with connection bar

SKY650 actuators can be used in tandem or series by means of a mechanical connection bar. Movement is thus transmitted mechanically and uniformly and at the same speed.

Two or more actuators can be mounted on the frame with one or more motors in accordance with force requirements. The following diagram indicates position and distance between centres to be used during mounting.



DISTANCE BETWEEN CENTRES OF THE CONNECTION BARS			
Code	Description	Length of bar (mm)	"D" distance between centres (mm)
4010009	Connection bar 1000 mm length	1.035	**1.000**
4010010	Connection bar 1500 mm length	1.535	**1.500**
4010011	Connection bar 2000 mm length	2.035	**2.000**
4010011	Connection bar 2500 mm length	2.535	**2.500**

Assemble as follows:


Fig. 7

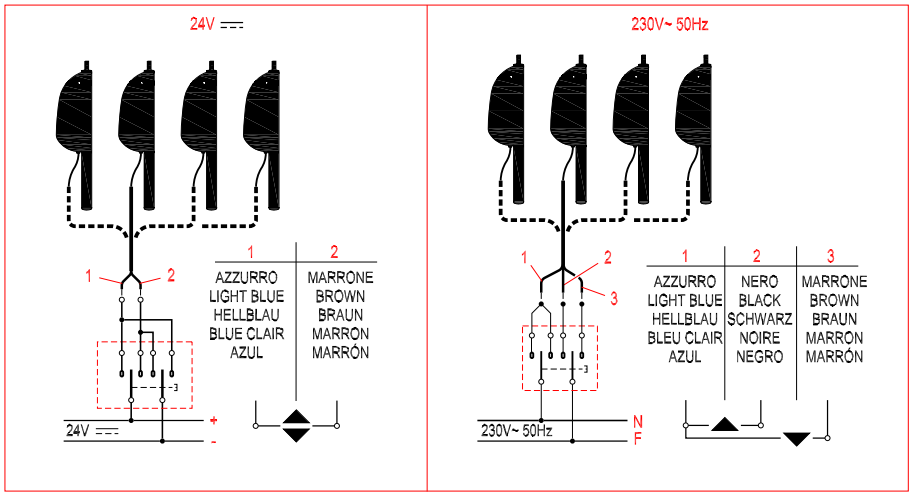

Fig. 7 bis

A. Mark the assembly distance between centres for the two actuators out onto the frame in accordance with the measurements in the above table.
B. Place the support brackets of the actuator into position, mark out the holes for drilling, drill the frame and mount the brackets (see "Assembly for outward opening windows" for details).
C. Place the front brackets into position, mark out the holes for drilling, drill the frame and mount the front brackets (see "Assembly for outward opening windows" for details).
D. Mount the actuators (see "Assembly for outward opening windows" for details) – see Fig.7.
E. Mount the connection bar as follows:
   - Insert the connection bar first into one of the actuators, and then into the second actuator. Make sure the bar protrudes at least 2 mm from each actuator (Fig. 7 bis).
   - Mount and screw the M8x14 mm flat headed screw (provided with connection bar), into the two ends of the bar to prevent the bar from slipping out.

9. Electrical connections

The actuator comes with a 2 m long circa (±5%) lead which has been calculated in accordance with safety rules.

In the event that the distance between the actuator and the control button should exceed this length, the cable should be extended. See table on page 8 for conductor section indications. For harness, please follow the these diagrams.



After connecting the electricity supply to the control button (bipolar with arrows if possible), check that the up key function opens the window frame and the and down key function closes it. In the event of incorrect function, invert the two wires marked light blue and

brown in the case of 24VDC motors and invert the two wires marked black and brown for 230VAC motors.

WARNING: after every limit switch or electronic protection device function the rack will back track for around 2 mm in the opposite direction. This is quite normal, and has been designed to release tension on mechanical parts and allow complete weather proofing to enhance durability of mechanical parts.

10. Limit switches

10.1. Stroke-end at opening and closure

The limit switch at opening / closure is automatic, electronically operated and cannot be programmed. The actuator stops when the charge is absorbed when the window is completely open / closed, or when the charge absorbed is more than 10% of the nominal charge. In this case, at maximum charge the actuator exercises a traction force of over 660N.

10.2. Stroke adjustment where required

Factory settings for track lengths can be shortened to regulate how much of the rod protrudes. This operation must be carried out at the workbench with proper equipment by technical personnel qualified to operate with maximum care and safety.
Procedure:

1. Remove the four screws on the front head of the SKY650 actuator.
2. Extract the head and rod from the body of the actuator.
3. Unscrew the two screws locking the two limit switch block pieces.
4. Move the rubber stopper and block to the required position.
5. Screw the two screws used for fixing the block into position back in again.
6. Re mount everything back onto the body of the actuator.
7. Screw in the four screws on the front head and check the settings for the new track run.

11. Checking for correct assembly

Check that the frame has closed completely, even at the corners, and check there are no obstacles caused by assembly in the wrong position.

Make sure the actuator is aligned with the axis of the window at 90°to the window itself, otherwise the rack will exert incorrect pressure on the rod and consume more voltage.

Check the lead is not too tight, as this could damage the actuator during rotation, opening and closing of the window.

Check all screws and nuts have been properly tightened.

12. Emergency manoeuvres, maintenance and cleaning

Should the window have to be opened manually in the event of no electricity, mechanical failure, or for normal maintenance or cleaning of the external surface of the window frame, the following instructions should be followed:

1. Unscrew the nut from the pin screw fixing the eyebolt head to the front shaft.
2. Hold the window with one hand and use the other hand to remove the pin screw *(this operation should be performed with the window open at least 10 cm to make it easier to remove the screw).*
3. Manually open the window.

   ***ATTENTION**: RISK OF THE WINDOW FALLING OUT; THE SASH IS IN DANGER OF FALLING OUT AS IT IS NO LONGER HELD IN PLACE BY THE RACK.*
4. After maintenance and/or cleaning operations are complete, repeat points 1 and 2 in reverse order.

In the event in which the cable of feeding it is damaged, to make to replace it from the constructor or a qualified technician.

13. Troubleshooting

Please consult the following table for any eventual problems with function during installation or normal use:

Problem	*Possible cause*	*Solution*
• Gear motor does not work.	• No electricity at source. • Lead not connected, or one of the wires has come loose.	• Check trip switch and safety switch. • Check all electrical connections on gear motor.

14. Environmental protection

All materials used in the manufacture of this appliance are recyclable.
We recommend that the device itself, and any accessories, packaging, etc. be sent to a centre for ecological recycling as established from laws in force on recycling.
The device is mainly made from the following materials: aluminium, zinc, iron, plastic of various type, cuprum. Dispose materials in conformity with local regulations about removal.

15. Certificate of guarantee

The manufacturer will guarantee good function of the appliance. The manufacturer shall undertake to replace defective parts due to poor quality materials or manufacturing defects in accordance with article 1490 of the Civil Code.

The guarantee covers products and individual parts for **2 years** from the date of purchase. The latter is valid as long as the purchaser possesses proof of purchase and completion of all agreed conditions of payment.

Guarantee of good function of appliances agreed by the manufacturer implies

that the latter undertakes to repair or replace free of charge and in the shortest period possible any parts that break while under warranty.

The purchaser is not entitled to any reimbursement for eventual direct or indirect damage or other expenses incurred. Attempt to repair by personnel unauthorised by the manufacture shall render the warranty null and invalid.

The warranty does not cover fragile parts or parts subject to natural wear and tear or corrosion, overload, however temporary etc. The manufacturer will accept no responsibility for eventual damage incurred by erroneous assembly, manoeuvre or insertion, excessive stress or inexpert use.

Repairs performed under guarantee are always "*ex factory of the manufacturer*". Respective transport expenses (out/back) are the responsibility of the purchaser.

16. Certificato di conformità

Declaration of conformity

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☎ +39 0424 411011 – Fax +39 0424 411013
www.nekos.it info@nekos.it

Il sottoscritto legale rappresentante del costruttore **NEKOS** S.r.l.
The undersigned, representative of the following manufacturer

dichiara
declares

che il prodotto elettrico:
that the electrical product:

***Modello** / Model*	***Designazione /** Designation*
SKY650	**Attuatore a cremagliera 110÷230VAC - 24VDC** *Rack actuator 110÷230VAC - 24VDC*

è conforme alle disposizioni legislative che traspongono le seguenti direttive:

- Direttiva 2004/108 CE (Direttiva EMC) e successivi emendamenti
- Direttiva 2006/95 CE (Direttiva Bassa Tensione) e successivi emendamenti

Is in accordance with the following Directives:

- *2004/108 EC Directive (EMC Directive) and subsequent amendments*
- *2006/95 EC Directive (Low Voltage Directive) and subsequent amendments*

Ultime due cifre dell'anno in cui è affissa la marcatura CE:
Last two figures of the year of the CE marking: **06**

Luogo:
Place: **Mason Vicentino (VI) - Italy**

Data:
Date: **15/12/2006** ***/*** *2006/12/15*

Firma: **Giuliano Galliazzo**

Signature: *President*

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