nekos
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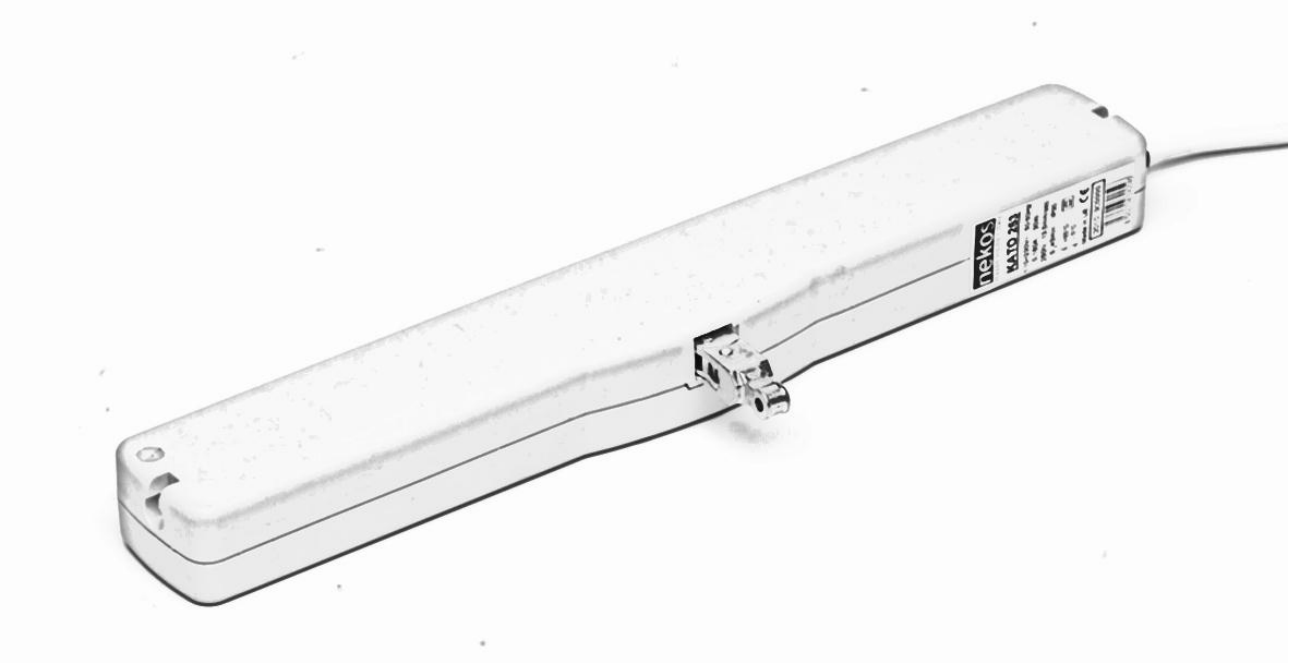
KATO 253

CHAIN OPERATED ACTUATOR

FORCE 250 N - MAXIMUM STROKE 360 MM
VOLTAGE 110/230V~ (A.C.), 50/60HZ – 24V⎓ (D.C.)



MANUAL FOR INSTALLATION AND USE

CE

English

Code 4420052

Edition no. 3 of October 2012

The machine described in this manual has been manufactured in accordance with safety standards and conforms to the stipulations of current standards in force. When correctly assembled, installed and used according to the present instructions, it will not generate any danger for persons, animals or items.

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 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.

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

ATTENZIONE PRIMA D'INIZIARE L'INSTALLAZIONE DI QUESTA MACCHINA, LEGGERE ATTENTAMENTE E COMPRENDERE LE SEGUENTI INDICAZIONI DI SICUREZZA; SONO UTILI PER PREVENIRE CONTATTI DI CORRENTE ELETTRICA, FERIMENTI ED ALTRI INCONVENIENTI. CONSERVARE QUESTO MANUALE PER ALTRE CONSULTAZIONI.

Series **KATO 253** chain actuators have been designed to move windows.

Use for any applications other than those indicated must be authorised by the manufacturer after technical review of the assembly.

The following safety indications should be observed carefully.

- The appliance must be installed by competent and qualified technical personnel.
- After removing packaging, check for any damage on the appliance.
- Plastic bags, polystyrene, small metal parts such as nails, staples etc should be placed out of the reach of children as they constitute a potential source of risk.
- Before connecting the appliance, check that the power supply has the same specifications as those indicated on the technical data label on the appliance.
- This machine is destined exclusively for the use for which it has been designed and the manufacturer accepts no responsibility for damage incurred by improper use.
- The actuator is destined exclusively for installation indoors. For any special application we recommend you consult the manufacturer beforehand.
- The actuator must be installed in accordance with the manufacturer's instructions. Failure to respect these instructions could compromise safety.
- Power supply installation must comply with any regulations in force.
- To ensure efficient separation from the grid, an approved type of bipolar pulse switch should be used. An omnipolar general power switch with minimum distance of 3 mm between contacts should be installed upstream of the control line.
- Do not use solvents or jets of water to wash the appliance. The appliance should not be submerged in water.
- Repairs should only be performed by qualified personnel at assistance centres authorised by the manufacturer.
- Always request exclusive use of original spare parts. Failure to respect this condition could compromise safety and invalidate the benefits contained in the warranty for the appliance.
- In the event of any problems or queries, consult your agent or contact the manufacturer directly.

ATTENTION

With bottom hung windows injury could be caused if the window accidentally falls. An appropriately sized flexible link arm or fall prevention safety system designed to resist a force equal to at least three times the total weight of the window **MUST** be installed.

Danger of crushing or dragging. During function, when the actuator closes the window, a force of 300N is exerted on the bead of the frame, enough to crush fingers in the event of distraction.

Ensure that the stroke-end selection is less than one centimetre from mechanical stop blocks, stroke limiters or any physical obstacles blocking opening of the sash.

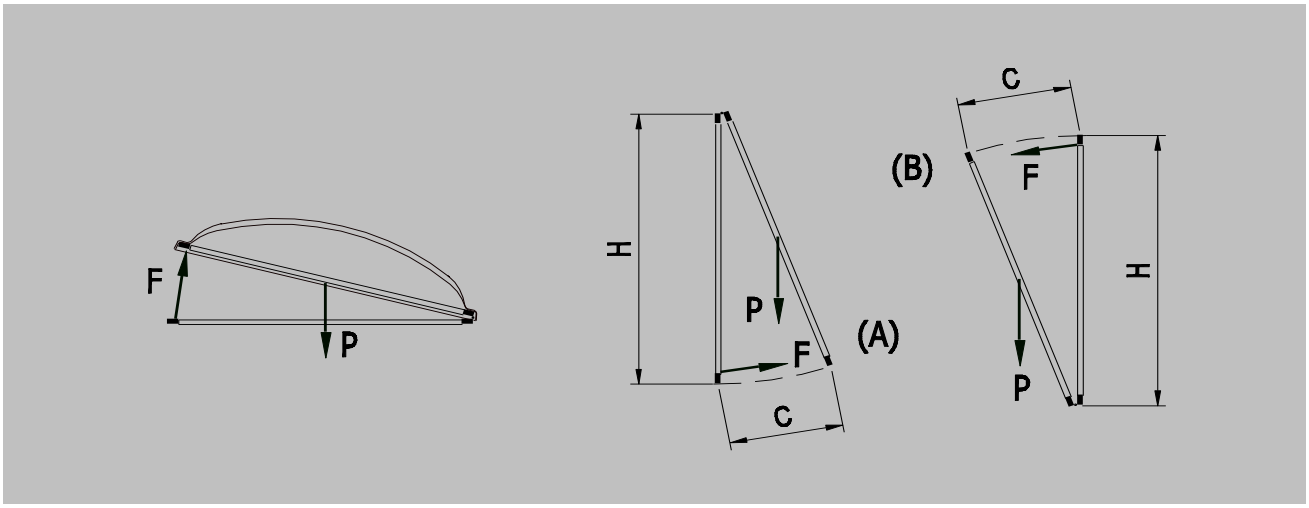
In the event of breakage or malfunction, switch the appliance off at the general switch and call for the services of a qualified technician.

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 according to height of sash

The actuator stroke is in accordance with the height of the sash and its application. Check that the actuator stroke does not touch the profile of the sash and that the chain does not exert force on the window frame (Measurements in mm).

ATTENTION. For safety reasons the actuator should not be assembled if dimensions are inferior to those indicated in the table below. In the event that the height of the sash should be lower, call on the manufacturer to check the appliance.

Mode of installation	*Selection of actuator stroke*	
	240	***360***
Light domes, skylights or vertical top hung windows opening outwards with frontal assembly	**400**	**550**
Top hung windows opening outwards with horizontal assembly	**400**	**550**
Bottom hung windows *(motor on frame)*	**400**	**550**
Bottom hung windows *(motor on sash)*	**Consult manufacturer**	

3. Technical information about function

The chain actuator opens and closes the window using a double row steel chain inside a sheath. Movement is generated using electrical energy that powers a reduction motor controlled by a functional electrical device.

Windows can be programmed to open and the device allows chain opening at 240 and 360 mm.

When the window returns to start position, that is during closure, the stroke-end uses an electronic self regulating process with absorption of energy and no regulation is therefore required.

The actuator is produced by the factory with the stroke-end for return set at around +1 cm (out by 1 cm). This allows the actuator to be assembled without electrical energy powering movement and means that the window remains closed after assembly.

The joint between actuator and support brackets is quick, requires no fixing screws (NEKOS patent) and allows the actuator to rotate to follow the track of the chain even on shorter windows.

4. Manufacture and applicable standards or regulations

- The chain operated **series 253 KATO** actuator has been designed and manufactured to open and close top hung windows; bottom hung windows; dormer windows; light domes and skylights. It has been specifically designed for ventilation and climate control and any other use is prohibited unless previously authorised by the manufacturer.

- 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 actuator is packaged in cardboard boxing and each package contains:

- Electrical actuator with either 110÷230V~ (a.c.) 50/60Hz or 24V⎓ (d.c.) with electrical cable directly connected to the machine.
- Drilling template.
- Standard support brackets (A).
- Bracket for bottom hung window (C).
- Bracket for top hung window (D).
- Instructions manual.

5. Technical data

Model	***KATO 253/230V***	***KATO 253/24V***
Force exerted by thrust and traction	250 N	
Strokes *(can be selected at any time)*	240, 360 mm	
Power supply voltage	110÷230V~ (a.c.) 50/60Hz	24V⎓ (d.c.)
Rated absorbed current	0,180 A	0,800 A
Power absorbed at nominal load	~ 30 W	~ 18 W
No load speed	13,5 mm/s	12,8 mm/s
Duration of no load stroke *(240-360 mm)*	18 s – 27 s	19 s – 28 s
Double electrical insulation	YES	
Type of service	S_2 of 3 min	
Operating temperature	- 5 + 65 ºC	
Protection index for electrical devices	IP30	
Adjustment of connection to window frame	Automatic definition of position	
Parallel powering of two or more motors	YES *(max 30 actuators)*	
Synchronised function	Not foreseen	
Static hold force	1500N	
Stroke-end at opening	At absorption of power	
Stroke-end at closing	At absorption of power	
Length of power cable	1 m	
Dimensions	356x56x33,5 mm	
Weight	0,840 Kg	0,820 Kg

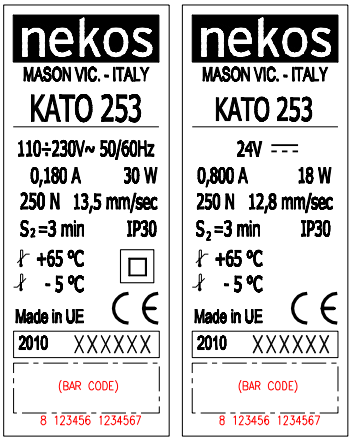
The data indicated in these figures is not binding and is subject to variation without notification.

6. 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.

7. Electrical power supply

The **KATO 253** actuator is commercially available in two versions identified according to electrical specifications:

1. **KATO 253 230V~ (a.c.)**: runs on grid tension of 110/230V~ (a.c.), 50/60Hz (±10%), with a three wire cable *(**LIGHT BLUE**, common neutral; **BLACK**, phase open; **BROWN**, phase closed)*.
2. **KATO 253 24V⎓ (d.c.)**: runs on 24V⎓ (d.c.), with two wire cable, ***LIGHT BLUE**, connected to the + (positive) opens; **Brown**, connected to the + (positive) closes*.

24V⎓ low voltage actuators can be powered using a station with emergency battery or approved Class II power supply unit *(double safety insulation)* with an output voltage of 24V⎓ *(-15% ÷ +25%, ie. min. 20,4V, max. 30V)*.

7.1. Selection of power cable section

For 24V⎓ (dc) power supply cable section must be checked and calculated according to cable length. The following table indicates maximum cable lengths for connection to motors.

Cable section	*Maximum cable length*
4.00 mm²	~ 270 m
2.50 mm²	~ 170 m
1.50 mm²	~ 100 m
0.75 mm²	~ 50 m
0.50 mm²	~ 35 m

8. Instructions for assembly

These indications are for specialised technical personnel and basic work and safety techniques are not indicated.

All preparatory, assembly and electrical connection operations must be performed by specialised technical personnel to guarantee optimal function and service of the actuator. Check that the following fundamental conditions have been met:

Actuator specifications must be sufficient for movement of the window without encountering any obstacle. The limits indicated in the technical data table must not be superseded *(page 7)* and the most appropriate stroke should be selected. Calculations should be checked using the formula indicated on page 5.

Attention. Check that the electrical power supply corresponds to that indicated on the TECHNICAL DATA label on the machine.

Ensure that the actuator has not been damaged during transport, first visually and then by powering in both directions.

Check that the width of the inside of the window (where the actuator is to be assembled) is over 375 mm, otherwise the actuator should not be installed.

Check that once the actuator has been installed the distance between the fixed part of the window frame (where the actuator is to be assembled) and the mobile part of the window frame (where the bracket is to be fixed) is greater than or equal to 0 mm (Fig. 1). If this is not the case the actuator will not function correctly as the window will not close correctly. If required, add additional thickness below the support brackets to reset the quota.

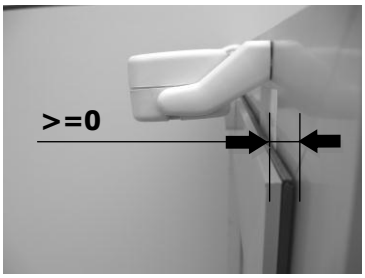


Figure 1

For bottom hung window frames injury could be caused by accidental falls of the window. An appropriately sized flexible link arm or fall prevention safety system designed to resist a force equal to at least three times the total weight of the window **MUST** be installed.

8.1. Preparation of actuator for assembly

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

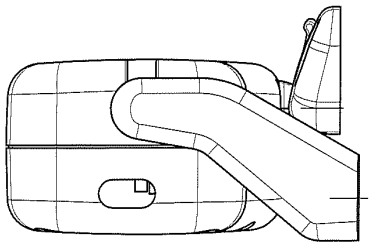
- For fixing onto metal window frames: M5 threaded inserts *(6 pieces)*, M5x12 flat headed metric screws *(6 pieces)*.
- For fixing onto wooden window frames: self threading screws for wood Ø4.5 *(6 pieces)*.

- 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.

8.2. Assembly for top hung windows, outward opening

Aside the drawing of specific application using accessories provided. For different mountings, please contact manufacturer.

A. Trace centrepoint X in pencil onto the window frame (Fig.2).
B. Use brackets "A" art. 4010002 and hinge "D" art. 4010005 *(provided)* (Fig.3).
C. Apply the template onto the window frame (fixed part), taking care to ensure that the axis of the template coincides with centrepoint X traced earlier (Fig.4). ***Attention****: for non coplanar window frames, cut the grey part of the template along the red line and apply onto the mobile part of the window frame, taking care to keep it in the same reference position for the* ***X*** *axis.*
D. Bore the window frame at the points indicated on the template (Fig.5).
E. Apply the brackets (A) to the window frame using flat head screws as indicated above. Check both horizontal and vertical alignment of brackets.
F. Assemble the hinge for top hung windows (D) onto the mobile part of the window frame using the reference points indicated on the template.
G. Complete assembly between chain terminal and quick hook using the Ø4x32 pin provided and insert into central position (Fig.6).
H. Hook the actuator onto the brackets inserting the two channels at the end of the actuator into the pins provided.
I. Rotate the actuator 90°, bring the chain terminal up to the hinge and insert the pin into the channel of the latter. Connect the quick hook onto the bracket. At initial connection the hook will present some resistance, this is normal as pieces need to adjust to their sockets.
J. Perform the electrical connections according to the diagram below or the label on the feeder cable.
K. Check that the output of the chain is perfectly aligned with the bracket. In the event that this should not be the case, loosen the fixing screws and reposition the bracket correctly.



Outward application

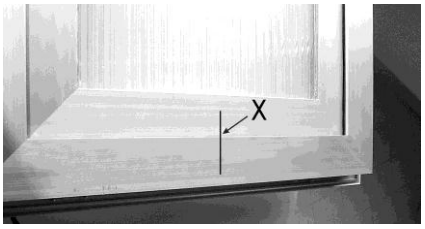


Figure 2

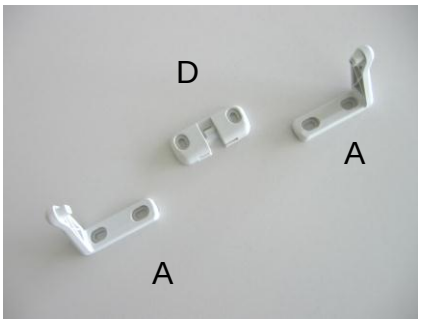


Figure 3

Figure 4

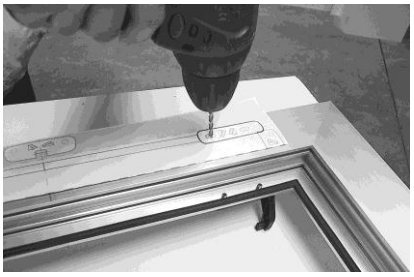


Figure 5

L. Perform a complete test of opening and closing of the window frame. After closure, check that the window frame is completely closed and check pressure against the seals.
M. The stroke-end of the actuator during return is automatic. The appliance exerts traction of over 280N to guarantee perfect pressure against the seals.

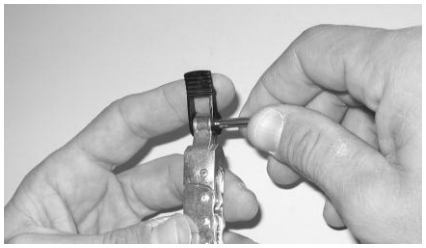
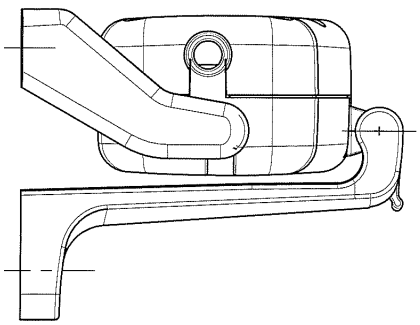


Figure 6

8.3. Assembly for bottom hung windows

Aside the drawing of specific application using accessories provided. For different mountings, please contact manufacturer.

a) Before starting works, at least two flexible mechanical link arms or other form of safety stops **MUST** be installed to guarantee hold and prevent accidental falling of the window in order to provide safe working conditions.
b) Trace centrepoint X in pencil onto the window frame (Fig.7).
c) Use brackets "A" art. 4010002 and hinge "C" art. 4010006 *(provided)* (Fig.8).
d) Apply the template onto the window frame (fixed part), taking care to ensure that the axis of the template coincides with centrepoint X traced earlier (Fig.9). *Attention: for non coplanar window frames, cut the grey part of the template along the green line and apply onto the mobile part of the window frame, taking care to keep it in the same reference position for the X axis*.
e) Bore the casement at the points indicated on the template (Fig.5).
f) Apply the brackets (A) to the window frame using flat head screws as indicated above. Check both horizontal and vertical alignment of brackets.
g) Assemble the bracket for bottom hung windows onto the mobile part of the window frame using the reference points indicated on the template.
h) Complete assembly between chain terminal and quick hook using the Ø4x32 pin provided and insert into central position (Fig.6).
i) Hook the actuator onto the brackets inserting the two channels at the end of the actuator into the pins provided.
j) Rotate the actuator 90°, bring the chain terminal up to the hinge and insert the pin into the channel of the latter. Connect the quick hook onto the rod (Fig. 10).
k) Perform the electrical connections according to the



Inward application – transom window

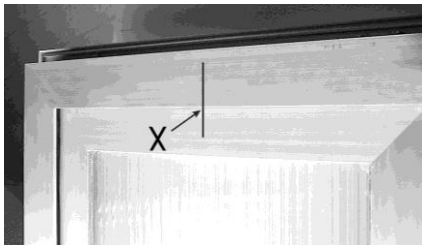


Figure 7

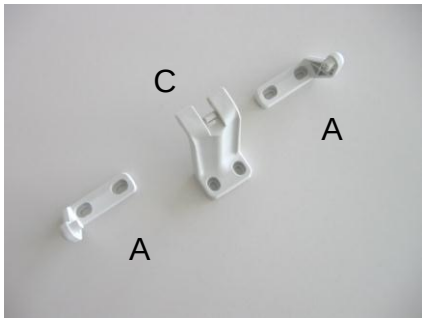


Figure 8

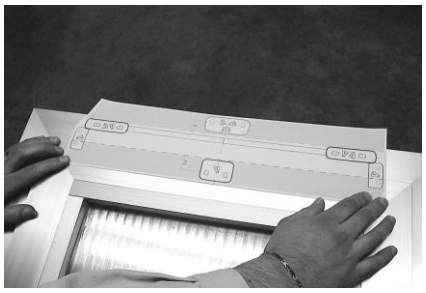


Figure 9

diagram below or the label on the feeder cable.

l) Check that the output of the chain is perfectly aligned with the bracket. In the event that this should not be the case, loosen the fixing screws and reposition the bracket correctly.

m) Perform a complete test of opening and closing of the window frame. After closure, check that the window frame is completely closed and check pressure against the seals.

Figure 10

n) The stroke-end of the actuator during return is automatic. The appliance exerts traction of over 280N to guarantee perfect pressure against the seals.

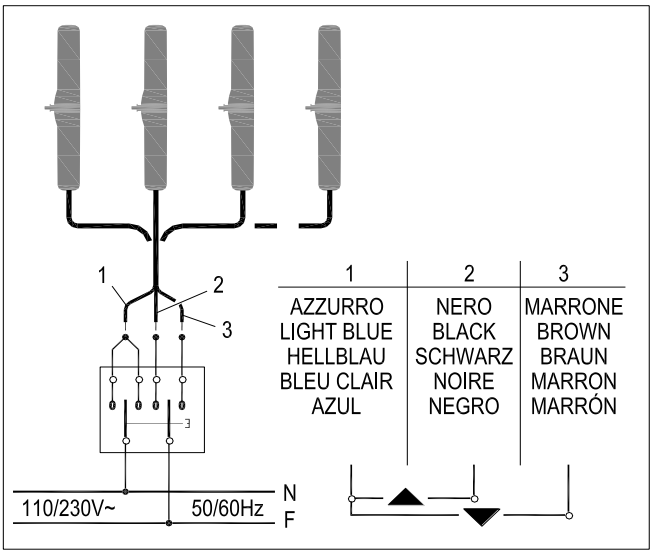
9. Electrical connections

Machines have been equipped with a power connection cable which complies with safety regulations and protection against radio disturbance.

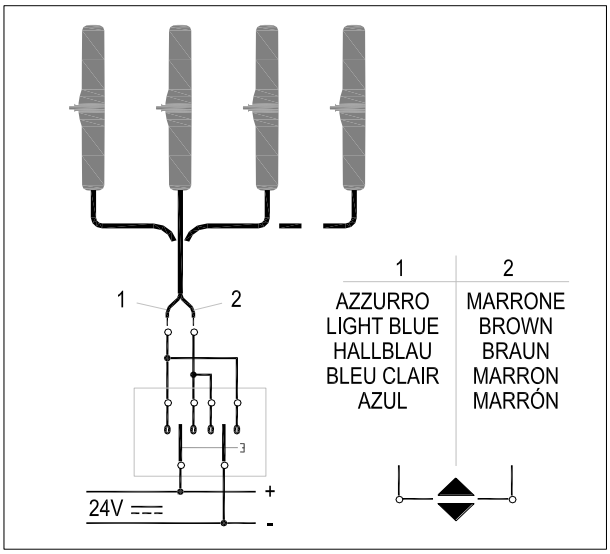
Before performing the electrical connection consult the table below and check correspondence between the feeder cable and the tension data on the actuator label.

Voltage	Cable length	Number of wires	Colour of wires
110/230V~ (a.c.), 50/60Hz	1 m	3	**LIGHT BLUE** **BLACK** **BROWN**
24V⎓ (d.c.)	1 m	2	**LIGHT BLUE** **BROWN**

If feeder cables require extending to the control button for low voltage actuators (24V⎓DC), cable sections should be selected accordingly. Conductor sections are indicated in the table on page 8 *(Selection of cable section)*. For cabling, follow the diagrams below.



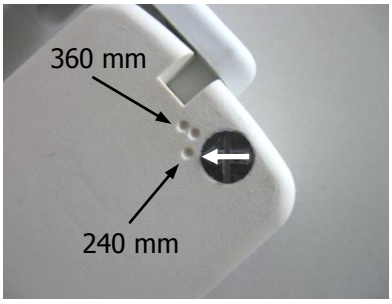
110/230V~ (a.c.), 50/60Hz



24V⎓ (d.c.)

10. Programming the actuator

10.1. Stroke-end at opening



At one end of the actuator is a pin which can be adjusted using a screwdriver and an indicator arrow (see photo) to set stroke length (240 or 360 mm).

The actuator cover has two reference marks:

- 1 mark (240 mm stroke);
- 2 marks (360 mm stroke).

Attention: never select 360 stroke when actuator is at 240 end stroke; inner selector can irremediably brakes.

10.2. Stroke-end at closure

The stroke-end at closure is automatic and cannot be programmed. The actuator stops when the power encountered by the actuator when the window reaches complete closure is absorbed and the seals are pressed right in, or when the absorbed power is over 15% of the nominal power. In this case, at maximum load the actuator exerts traction of over 280N.

After each closure or intervention of electronic protection devices, the chain will move about 1 mm in the opposite direction to give correct compression to the seals and release the mechanical parts.

Check that hinges and support brackets are rigidly attached to the window frame and all screws correctly fixed into position. For aluminium window frames, do not use self threading or self perforating screws as these will tear the profile after a few manoeuvre; use metric screws with threaded inserts *(see indication on page 9)*.

11. Checking for correct assembly

Check that the window is perfectly closed at corners and that there are no obstacles caused by incorrect positioning during assembly.

Check that when the window frame is closed the chain terminal is at least a few millimetres away from the actuator body. This will ensure the window is properly closed and seals are correctly compressed. In the event that this should not be the case there is no guarantee that the window is closed correctly.

Check that hinges and support brackets are aligned to each other and tightly fixed against the window frame with screws fixed correctly into position.

Check that the window reaches the desired position according to the stroke-end selected.

12. Emergency manoeuvres, maintenance or cleaning

In the event that the window frame should require manual opening due to power failure or problem with the mechanism or for normal maintenance or external cleaning of the window frame, the NEKOS patent allows rapid unhooking of the chain. To perform this operation, proceed as follows:

1. Unhook the flap of the quick hook locking the chain terminal to the bracket.
2. Hold the window in one hand and remove the pin of the chain terminal from the two u channels on the bracket with the other. *(This operation should be performed with the window open at least 10 cm to facilitate unhooking of the chain)*.
3. Manually open the window frame.

   ***ATTENTION**: DANGER – the window could fall as the sash is no longer held in position by the chain*.
4. After maintenance and/or cleaning repeat points 1 and 2 in reverse order.

13. Troubleshooting

Possible causes of malfunction during installation or use.

Problem	*Possible cause*	*Solution*
Actuator does not work	▪ No electricity at feeder ▪ Cable not connected or wire disconnected.	▪ Check status of circuit breaker or safety switch ▪ Check electrical connections at reduction 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 conformita'

DECLARATION OF CONFORMITY

nekos
my home technology

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☎ 0424 411011 – Fax 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: **NEKOS** S.r.l.

dichiara
declares

che il prodotto elettrico:
that the electrical product:

***Modello** / Model*	***Designazione /** Designation*
KATO 253 230V	**Attuatore a catena 110/230V~ (a.c.)** *Chain actuator 110/230V~ (a.c.)*
KATO 253 24V	**Attuatore a catena 24V⎓ (d.c.)** *Chain actuator 24V⎓ (d.c.)*

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

complies 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: **10**
Last two figures of the year of the CE marking:

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

Data: **25/05/2010**
Date:

Firma: **Giuliano Galliazzo**
President

Signature:

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