SKYRO 850

EN

INSTRUCTION MANUAL - TRANSLATION OF ORIGINAL INSTRUCTIONS

RACK ACTUATOR

Force 850N – Strokes 350, 550, 750, 1000 mm

Electrical feeding 110-230V~ 50/60Hz and 24V⎓

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USER INSTRUCTIONS

CAUTION. Carefully observe all the following installation instructions to ensure personal safety.

The device is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lacking experience and knowledge. Do not allow children to play with the fixed controls and keep any remote-control units out of their reach.

Have installation checks performed periodically by qualified personnel from a service centre authorised by the manufacturer. Do not use if repair or adjustment is required.

CAUTION: if the power cable is damaged, it must be replaced by qualified personnel from a service centre authorised by the manufacturer.

CAUTION. Disconnect the power supply during cleaning or maintenance operations. Do not use solvents or jets of water to wash the appliance; the appliance should not be submerged in water.

In the event of fault or malfunction, switch off the device at the main switch. All repairs and adjustments (e.g. setting the stroke) must only be performed by qualified personnel from a service centre 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.

The A-weighted sound pressure level is less than 70dB(A).

Carefully preserve these instructions after installation.

INSTALLER INSTRUCTIONS

nekos products have 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, they will not generate any danger for persons, animals or items.

Symbols used in the manual

⚠	***DANGER***	*This indication draw the attention about potential dangers for safety and health of peoples and animals.*

Contents

1. SECURITY RULES

⚠ **CAREFULLY OBSERVE ALL THE FOLLOWING INSTALLATION INSTRUCTIONS TO ENSURE PERSONAL SAFETY. IMPROPER INSTALLATION CAN SERIOUSLY ENDANGER SAFETY.**

⚠ **MANDATORY RISK ANALYSIS AND PROTECTION MEASURES.**

The Nekos electrical actuators comply with the Machinery Directive (2006/42/EC), Standard IEC 60335-2-103 (Particular requirements for drives for gates, doors and windows) and other directives and regulations indicated in the attached Declarations of Incorporation and CE Conformity (at the end of the manual). According to the Machinery Directive, actuators are “partly completed machinery” intended for incorporation into doors and windows. The manufacturer/supplier of the window is required, with exclusive responsibility, to ensure the compliance of the entire system with the applicable standards and to issue CE certification. We strongly discourage any use of the actuators other than that specified and therefore, in any case, the supplier of the complete system retains full liability.

For systems installed at a height of less than 2.5 m above floor level or other levels accessible to users, the manufacturer/supplier of the window must conduct **risk analysis** regarding potential harm (violent blows, crushing, wounds) caused to people by normal use or possible malfunction or accidental breakage of the automated windows, and to implement suitable protective measures in view of these. Such measures include those recommended by the specified standard:

- controlling the actuators via a “deadman’s button” placed near the system and within the operator’s field of view, to ensure that people are out of the way during operation. The button must be placed at a height of 1,5 m and operated by key if accessible to the public; or:
- use of contact safety systems (also included in the actuators) that ensure a maximum closing force of 400/150/25 N, measured in accordance with paragraph BB.20.107.2 of IEC 60335-2-103; or:
- use of non-contact safety systems (lasers, light grids); or:
- use of fixed safety barriers that prevent access to moving parts.

Automated windows are deemed adequately protected if they:

- are installed at a height of >2.5 m; or:
- have a leading-edge opening of <200 mm and a closing speed of <15 mm/s; or:
- are part of a smoke and heat evacuation system for emergency use only.

In any case, moving parts of windows that could fall below 2.5 m following breakage of a system component need to be fixed or secured in order to prevent them from suddenly falling or collapsing: e.g. the use of safety arms on bottom-hung windows.

The device is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lacking experience and knowledge. Do not allow children to play with the fixed controls and keep any remote-control units out of their reach.

⚠ The actuator is destined exclusively for installation indoors. For any special application we recommend you consult the manufacturer beforehand.

After removing packaging, check for any damage on the appliance.

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.

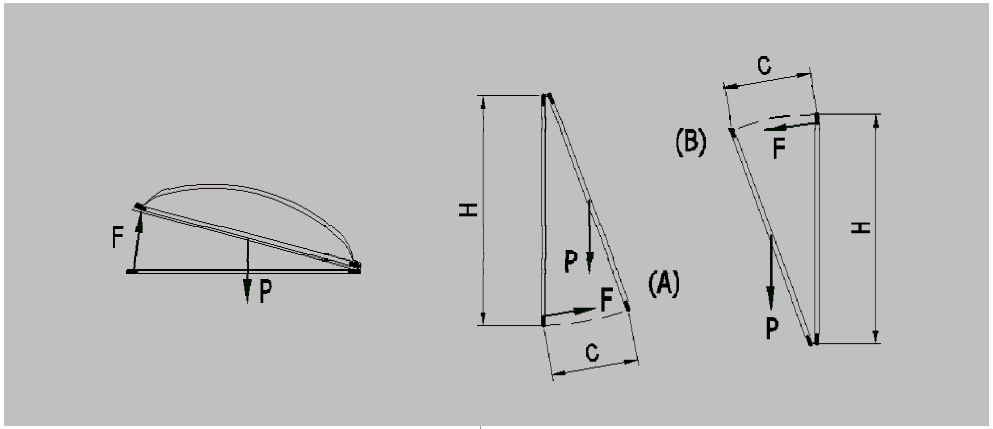
In the event of any problems or queries, consult your agent or contact the manufacturer directly.

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 can be recessed mounted in the frame as well as outside on the frame or on the sash. In any case 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 there are no obstacles for the opening or it does not exert force on the window frame.

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.

3. GENERAL INFORMATION ABOUT THE ACTUATOR

The SKYRO 850 actuator moves the window by means of a rack that runs inside the device. The rack is moved by a gear motor driven by an electric motor, which in turn is powered and controlled by an electronic card.

The opening and closing movement is determined by the polarity of the power supply wires depending on how the wiring is carried out *(see wiring diagrams on page 14-15).*

The opening and closing stroke-end stop occurs with an automatic positioning process through power absorption when the rack encounters an obstacle that stops its stroke (the internal stop in the rack or complete opening/closure of the window); therefore, no adjustments are required and the end position depends on the length of the rod connected to the gear reducer or the stroke set during production.

During initial operation, the actuator memorises the stroke end position; during subsequent operation, it maintains the memorised stroke end positions and also adjusts the start and stop ramp.

4. CONSTRUCTION AND REGULATORY REFERENCES

INTENDED USE. The SKYRO 850 rack actuator is designed and built to move awning windows, bottom-hung windows, parallel-opening windows, light domes, dormer windows and skylights. Its use is specifically intended for ventilation and natural air conditioning of rooms; any other use is strongly discouraged, with the supplier of the entire system in any case retaining sole liability.

The actuator is manufactured in accordance with the Directives and following Regulations listed in the attached Declaration of Incorporation and Conformity CE.

Electrical connections must conform to regulations in force for the design and set up of electrical equipment.

To ensure efficient separation from the grid, an approved type of bipolar “dead-man” 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.

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.

The SKYRO 850 actuator is individually packaged in a cardboard container and each pack contains:

- 1 actuator with 2 metre (±5%) lead,
- 1 standard support bracket with respective grips and fixing screws,
- 1 bracket for fixing to the frame,
- Small parts packaging,
- Instruction manual

IMPORTANT: The Syncro³ version of the actuator comes individually packaged in a cardboard box and is factory tested as an individual machine.

When installing a system that requires the use of several Syncro³ actuators or a K-LOCK electro-lock, a new RESET procedure must be performed. *(see § 12.1).*

5. USE OF ACTUATOR IN SYNCRO³ VERSION

In the SYNCRO³ version the actuator has been equipped with the new system patented by NEKOS for coordinated synchronisation of a group of actuators (up to eight at the same time).

Electronic control of speed is completely automatic device inside the actuator and does not require any external control station: just connect the feeder cable communication wires to each other *(see diagram on page 15)* and carry out ***RESET*** procedure.

5.1. Recognition

Three elements differentiate the SYNCRO³ version of the actuator:

- The technical data label with the "..... **SYNCRO³**" label.
- The SYNCRO label to one side of the technical data label on the actuator.
- In the 230V ~ version, the power cord has 4 wires *(3 power +1 signal).*

5.2. Use of a Syncro³-version actuator

The Syncro³ version of the actuator is used when the window is particularly heavy or wide *(more than approximately 1,2 m wide)* and a single actuator doesn't allow complete closure of the window, especially in the corners, therefore making it necessary to have two or more retention points.

When a group of Syncro³ actuators is used, the movement of the window sashes occurs in a synchronized manner, i.e., uniformly without interruptions and/or variations in the speeds of the actuators. If one of the actuators stops, due to mechanical obstruction or an electronic problem, the other actuators stop as well, thereby guaranteeing the integrity of the window.

Recall that the force exerted by a group of actuators installed on the same window sash is equivalent to the sum of the forces exerted by each actuator; so assembling two actuators doubles the force exerted on the window.

IMPORTANT: when calculating the dimensions of a system with multiple Syncro³ actuators, it is advisable to consider the force of each actuator as 90% of that stated on the plate.

6. ID PLATE AND MARKING DATA

The actuators have CE marking and comply with the Standards listed in the Declaration of Conformity. They also come with a Declaration of Incorporation, due to their classification by the Machinery Directive as "partly completed machines". Both declarations are included in the final pages of this manual.

The plate data is displayed on an adhesive label placed on the outside of the casing, which must remain intact and visible.
The main information it displays includes: manufacturer's address, product name - model number, technical characteristics, production date and serial number.

In the event of a complaint, please indicate the serial number (SN) displayed on the label.

An explanation of the symbols used on the label to abbreviate the technical characteristics is given in the table in the chapter on "TECHNICAL DATA".

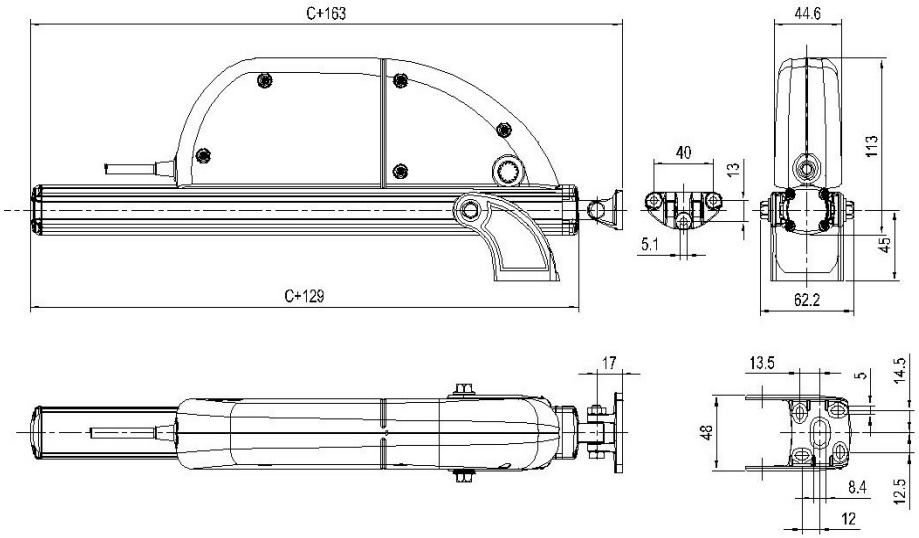
7. TECHNICAL DATA

Model ***SKYRO 850***	***230V***		***24V***	
	SOLO	***SYNCRO³***	***SYNCRO³***	***RWA***
Thrust and traction force (F_N)	850 N			
Course lengths (S_V)	350, 550, 750, 1000 mm			
Input voltage (U_N)	110-230V~ 50/60 Hz		24V⎓	
Current absorption at nominal load (I_N)	0,37A (110V) - 0,18A (230V)		1,0 A	2,0 A
Power absorption at nominal load (P_N)	28W (110V) - 24W (230V)		24 W	48 W
No load speed *(Open / Close)*	5 mm/s		7 mm/s	↑ 10mm/s ↓ 7 mm/s
Duration of no load stroke	In relation to the stroke			Stroke 550 < 60 s
Electrical insulation	Class II		Class III (Selv)	
Type of service (D_R)	2 cycles		5 cycles	
Operating temperature	(- 20°C) (+ 70 °C)			
Protection index for electrical devices	IP65			
Soft-stop function	Yes			
Relax function	Yes			
Adjustment of connection to window frame	Position self-determining			
Parallel powering of two or more motors	Yes (max 20)			
Synchronised function	No	Yes - max 4	Yes max 8	
Holding nominal force	3000 N			
Stroke-end at opening	Electronic with encoder *(once the end position is acquired)*			
Stroke-end at closing	At absorption of power			
Protection against overload	At absorption of power			
Noise level	55 dB(A)			
Type and length of power cable	H05VV-F - 2m		S-FG4GA/2 - 2m	
Dimensions	44,6 x 113 x (Stroke + 163) mm			
Weight (Kg)	2,0 / 2,34 / 2,69 / 3,11		1,95 / 2,29 / 2,64 / 3,07	

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

8. ACTUATOR DIMENSIONS

The main overall dimensions of the actuator are shown in the figure below.



9. ELECTRICAL POWER SUPPLY

The actuator is commercially available in four versions identified according to electrical specifications:

1. **SKYRO 850 230V**: runs on grid tension of 110-230V~ 50/60Hz, with a three wire cable *(**LIGHT BLUE**, common neutral; **BLACK**, phase open; **BROWN**, phase closed)*.
2. **SKYRO 850 230V SYNCRO³**: is powered by 110-230V~ 50/60Hz mains voltage, with a four-wire power cord (***BLUE***, common neutral; ***BLACK***, open live; ***BROWN***, close live), and a **GREEN** fourth wire for electronic synchronisation with other similar (NEKOS patent) actuators.
3. **SKYRO 850 24V SYNCRO³**: is powered by 24V⎓ voltage with a three-wire power cable: ***BLACK*** connected to + (positive) open, ***RED*** connected to + (positive) close. The **GREEN** "***3***" third wire is used both for synchronisation with other similar actuators and for connection to the K-Lock electromechanical lock.
4. **SKYRO 850 24V RWA SYNCRO³**; this version is destined for the smoke and heat extraction: is powered by 24V⎓ voltage with a three-wire power cable: ***BLACK*** connected to + (positive) open, ***RED*** connected to + (positive) close. The **GREEN** "***3***" third wire is used both for synchronisation with other similar actuators and for connection to the K-Lock electromechanical lock.

Low tension actuators 24V⎓ can be powered using a specific RWA station with emergency battery or a security feeder with an output tension of 24V 24V⎓ *(min. 20.4V, max. 28.8V)*.

IMPORTANT FOR PRODUCT SAFETY: The Syncro³ version actuators in 24V⎓, wire **GREEN** if not used, **must be insulated.**

9.1. Selection of power cable section

The following table indicates maximum cable lengths for connection to a single motors.

CABLE SECTION	Actuator fed at		
	24V ⎓	110V~	230V~
0,50 mm²	~20 m	~300 m	~1400 m
0,75 mm²	~30 m	~450 m	~2100 m
1,00 mm²	~40 m	~600 m	~2800 m
1,50 mm²	~60 m	~900 m	~4000 m
2,50 mm²	~100 m	~1500 m	~6800 m
4,00 mm²	~160 m	~2500 m	~11000 m
6,00 mm²	~240m	~3700 m	~15000 m

10. 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:

Before installing the actuator, check that the moving parts of the window on which it is to be installed are in perfect working condition and that they open and close properly and are well balanced (where applicable).

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 8)* and the most appropriate stroke should be selected. Calculations should be checked using the formula indicated on page 5.

Attention. Check that the electrical supply used corresponds to the indications on the technical data plate on the machine and that the indicated temperature range is compatible with the installation site.
Ensure that the actuator has not been damaged during transport.

Check, once the actuator is installed, that the window is fully closed.
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.

10.1. 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.

10.2. Calculation of the number of push / retention points

If the window has a width exceeding 120 cm, it is advisable to use several push / retention points by assembling several actuators. The simple formula below allows you to calculate the position of these points.

Formula:	*Legend:*
The two side dimensions - **LA : (PA x 2) = QL**	***LA** = Window Sash Width (hinges side)*
The central dimensions - **QL x 2**	***PA** = Actuator Attachment Points*
	***QL** = Side Dimensions*

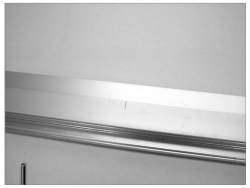


Fig. 1

Fig. 2

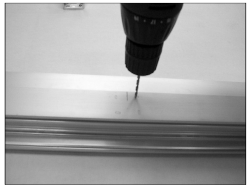


Fig. 3

Fig. 3 bis

Fig. 4

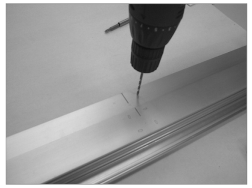


Fig. 5

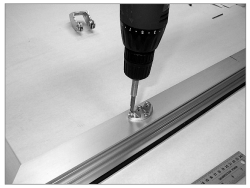


Fig. 5 bis

Fig. 6

10.3. Assembly with outward opening window

A. Mark the centre line of the frame in pencil on both moveable and fixed parts (Fig. 1). When more than one actuator is installed on the same window, mark as indicated in § 10.2 above.
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 Fig. 3bis).
D. Line up the front bracket along the centre line on the moveable part of the frame and mark out the 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 Fig. 5bis).
F. Take the clamp screws and connect them to the motor support bracket. Leave them slack by at least two turns.
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 (Fig. 6).
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 previously only placed and set the actuator in line with the frame. Suggested tightening torque is 4-5 Nm.

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 re-entry. The equipment will exert a pressure to guarantee even the largest of frames is completely weather tight.

10.4. Installation on domed rooflights, dormers or industrial skylights

To install the actuator on these types of windows, follow the instructions for “Installation on awning windows” given in § 10.3 above.

10.5. Assembly with opening inwards

A. Mark the centre line of the frame in pencil on both moveable and fixed parts (Fig.1). When more than one actuator is installed on the same window, mark as indicated in § 10.2 above.
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 Fig. 3bis).
D. Line up the front bracket along the centre line on the fixed part of the frame and mark out the 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 Fig. 5bis).
F. Take the clamp screws and connect them to the motor support bracket. Leave them slack by at least two turns.
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 (Fig. 6).
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 previously only placed and set the actuator in line with the frame. Suggested tightening torque is 4-5 Nm.
J. Perform a complete opening and closing test on the window. When the closing operation is completed, ensure that the window is properly closed by checking the compression of the seals.
K. The stroke-end of the actuator during return is automatic. The device exerts traction to ensure perfect compression of the seals.

10.6. Installing the actuator and rod (or transmission) with a connection bar

Skyro 850 actuators can be connected in tandem using a rod without a motor, by means of a mechanical connection bar. The movement of one actuator is mechanically linked to the rod in order to transmit motion in a uniform manner and at the same speed.

Two or more actuators can be installed on the window frame, with one or more Syncro³ version motors, depending on the force requirements.

Assemble as follows:

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

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)*.
- 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.

Fig. 7

DISTANCE BETWEEN THE CENTRES OF THE CONNECTION BARS

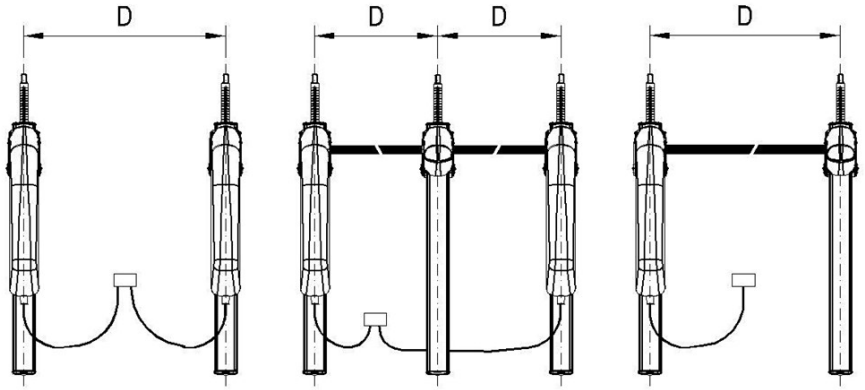
Code	*Description*	*Length of Bar (mm)*	*“D” distance between centres*
4010009	Connection bar 1000 mm length	1.035	**1.000**
4010010	Connection bar 1500 mm length	1.535	**1.500**
4010011	Connection bar 2000 mm length	2.035	**2.000**
4010011	Connection bar 2500 mm length	2.535	**2.500**
For special measurements, consult the manufacturer			

The drawing below shows an installation example with various push point solutions, with actuators and rods on a large window or on “strip” windows. It should be noted that up to a maximum of 8 Syncro actuators (4 for 230V) can be fitted, with various rod solutions for additional push points.

Two or more Syncro³ version motors in tandem

Two or more Syncro³ version motors + 1 rod with a connection bar in tandem

One motor + 1 rod + connection bar in tandem



11. ELECTRICAL CONNECTIONS

Appliances are equipped with cable manufactured in accordance with safety standards and protection against radio disturbances.

EACH ACTUATOR MODEL MUST USE ITS OWN SPECIFIC CABLE.

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

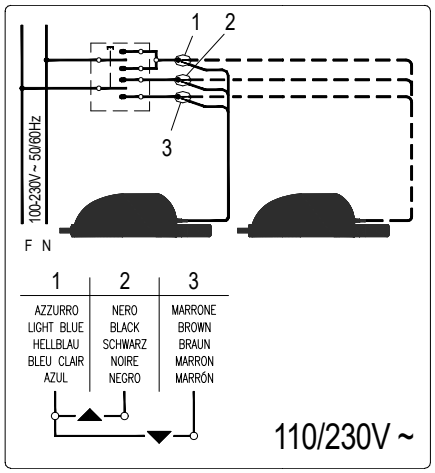
Tension	*Cable length*	*Number of wires*	*Wire colours*	*Colour of wires used for notification*
110-230V~ 50/60Hz	2 m	3	**LIGHT BLUE** **BLACK** **BROWN**	-
110-230V~ 50/60Hz Syncro³	2,5 m	4	**LIGHT BLUE** **BLACK** **BROWN**	**GREEN**
24V⎓ Syncro³ 24V ⎓ RWA	2 m	3	**RED** **BLACK**	**GREEN**

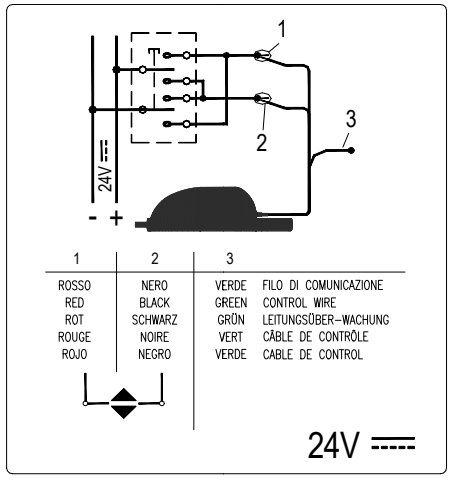
If feeder cables require extending to the control button for low voltage actuators (24V⎓), cable sections should be selected accordingly. Conductor sections are indicated in the table on page 10 *(Selection of cable section)*.

IMPORTANT FOR PRODUCT SAFETY: in 24V⎓ actuators, wire Green if not used must be insulated.

11.1. Connections of SKYRO 850

For cabling, follow the diagrams below.





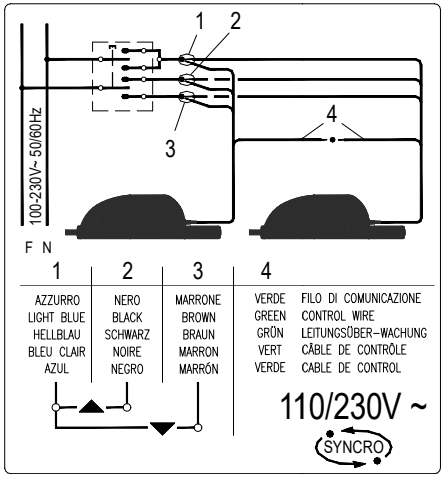
11.2. Connections of SKYRO 850 Syncro³

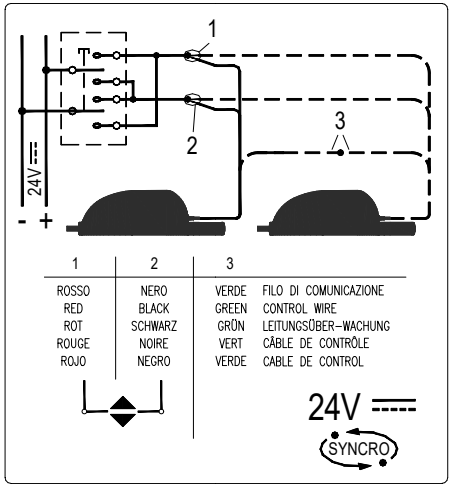
Cable supplied together with the SYNCRO³ actuator is 2,5 m long for 230V~ Syncro³ version and 2 m long for 24V⎓ Syncro³ version; it's calculated in accordance with safety rules.

Electrical connection of the communication wires should be performed using a simple appropriately sized bell clamp *(supplied with the appliance)*. Secure connections with good electrical contact (copper to copper) are vital to avoid communication disturbs.

Maximum length of feeding cables can be 10 m.

For cabling, follow the diagrams below.





WARNING: after every limit switch or electronic protection device function the rack will back track for around 1-2 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.

12. PROGRAMMING THE ACTUATOR

Once all electrical connections are completed, before putting the actuator into operational use, the procedure for acquiring the operating parameters must first be performed; this operation is known as ***RESET***.

The actuator has been individually tested in the factory, its operation is guaranteed and it comes already programmed for the maximum opening stroke. During initial installation or ***RESETTING***, or if the actuator loses its basic settings, the internal memory automatically recognises and saves the installation and operating parameters, including the distance between sash and frame.

The difference in height between the protruding part of the sash and the frame is known as "overlay" *(See § 12.3)* and in the acquisition phase it allows the actuator to acquire the closing stroke-end parameter. This is seen the first time the device fully closes the window, or following a ***RESET*** operation, and it is saved as an operating parameter.

On the left side of the gear reducer there is a screw cap that must be removed in order to access the dip-switch. Beside it there is also an LED indicator used to define errors and the identifiers of the various machines.

Programming is quick and simple and can be done at any time.

- With the dip-switch set to **ON**, the actuator is operational, the parameters are implemented and the stroke is memorised.
- With the dip-switch set to **OFF** (1), the actuator performs the ***RESET*** or initial installation procedure and implements the operating parameters and stroke end position.

IMPORTANT: If the K-Lock electro-mechanical lock is fitted, even to only one actuator, a new *RESET* procedure must be performed.

Before starting the RESET procedure, it is advisable to check the electrical connection with the K-LOCK.

12.1. *RESET* procedure

The procedure is valid for configuring a single actuator, a Syncro³ array or when a K-LOCK electromechanical lock is installed.

IMPORTANT: The dip-switch settings should be changed to non-powered actuators; after each change it is necessary to wait a few seconds (~ 5 sec) before restoring the power to the actuators in order for the change to become effective.

- Set the dip-switch to **OFF**. For configuration with multiple devices (or when a K-LOCK electric lock is installed) in which the **GREEN** wires are connected, the dip-switch only needs to be set for one actuator, the other devices will link to it automatically
- The actuator will start at once (or after about 8 seconds if there is an electro-lock) and perform a full closing manoeuvre (rack completely retracted) and then an opening manoeuvre of about 5 cm. During this phase, ensure that there are no obstructions to the movement of the rack and, when using Syncro actuators, wait for all the machines to complete the procedure.
- When the operation is finished, each connected device gives a flashing orange signal to indicate completion of the RESET procedure. Each device will give a different number of flashes to indicate that the access code is received (actuator 1 → 1 flash → pause → 1 flash → pause; actuator 2 → 2 flashes → pause → 2 flashes → pause, etc.).
- The power supply to the devices can now be switched off.
- The opening stroke *(outward rack movement)* may be left as set in the factory *(maximum stroke)* or can be customised as required; this is decided at this stage.
- Command the actuator to *OPEN,* **without interrupting the command**, up to the desired position (stroke customisation). The point at which the command is stopped will be the outward stroke-end position. **This outward distance will be saved and used as the *OPENING* stroke end**. With Syncro³ actuators, they will move in sync and stop at the same point.
- If the window does not open to the desired position, repeat the ***RESET*** procedure.

If the K-LOCK electro-lock is present, refer to the respective user and installation manual.

12.2. Closing stroke-end

There are two options for the opening stroke end *(outward rack travel)* of the actuator: full stroke *(factory default)*, which depends on the length of the rod, or ***RESETTING*** and programming the desired stroke *(see §12.1)*.

The closing stroke end *(rack return travel)* is automatic and not programmable. The actuator stops due to the power absorption it encounters when the rack reaches complete closure of the window, with the seals fully compressed, or when the power absorbed exceeds a threshold set in the microprocessor.

CAUTION: After each closure or activation of the electronic protection, the rack moves slightly in the opposite direction, to allow the right compression of the seals and/or to relax the internal mechanical components of the actuator.

After programming the stroke end positions, it is recommended to check the opening and closing of the window a few times. In the case of error, the programming can be repeated to achieve the desired stroke. If you need to perform the ***RESET*** procedure, see the instructions given above.

12.3. Overlap acquisition

The operation that must be carried out to acquire the overlap (after the *RESET* procedure has already been executed) is described below:

- The steps for installing the actuator/s on the window and the electrical connections have already been explained (see § 10 and 11).
- Use the controls to open the window a few centimetres.
- Use the controls to close the window up to the stroke end.
- When the window is completely closed, if acquisition of the overlap is successful, the actuator will display an orange flashing light for 3 seconds.

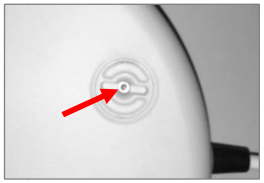
IMPORTANT: If, for any reason, the actuator fails to complete the closure of the window correctly, stopping before finishing the stroke, the *RESET* and overlap acquisition operation will have to be repeated in that order, until the procedure is completed correctly

12.4. LED Light signals

If there are any problems during installation or operation of the machines, consult the possible causes listed below:

The LED can be seen on the cap that conceals the dip-switch, positioned to the left of the gear reducer, and has three colours:

- ***RED***, indicates an error or malfunction;
- ***GREEN***, operation is OK;
- ***ORANGE***, wait: functions in progress.



WITH RED LED		
Number of Flashes	***Type of Error***	***Possible Solution***
1	***Current error:*** *The actuator has detected an overcurrent in the motor.*	Check that there are no obstacles preventing the actuator from completing its stroke. Check that the actuator is installed correctly.
2	***Communication error:*** *Communication between the devices is interrupted, or the devices being used have undergone the **RESET** procedure separately*	Check the condition of the connection cables, and repeat the ***RESET*** procedure if necessary.
3	***Electro-lock error***	Check the electro-lock. See the relevant manual
4	***Discordant internal setting:*** *The internal setting of the actuators is discordant.*	Repeat the ***RESET*** procedure
5	***RESET Procedure error:*** *The **RESET** procedure was not completed successfully or was interrupted.*	Repeat the ***RESET*** procedure
6	***Wiring error:*** *The power supply cables of the devices configured in Syncro³ are inverted.*	Check and correct the wiring.
7	***Encoder error:*** *The internal encoder had a counting error*	Repeat the ***RESET*** procedure
8	***Electric power supply error:*** *The power supply voltage is outside the permitted range or is unstable.*	Check the electrical contacts at the ends of the actuator cable and ensure that the power supply is correct.
9	***Alignment error:*** *The rack position displacement of the actuators connected in Syncro is beyond the permitted maximum.*	Repeat the ***RESET*** procedure
10	***Memory error:*** *The internal memory write process failed.*	Repeat the ***RESET*** procedure
11	***Connection error:*** *A RESET procedure is being started with actuators different than Syncro³*	Check the type of actuators chosen for the system. Repeat the ***RESET*** procedure

WITH GREEN LED	
LED Status	***Meaning***
STEADY-ON	*Device powered correctly.* *The device has correctly performed a return stroke and is completing the operation by memorising the position, or is currently in movement.*
FLASHING	*Device powered correctly.* *The device has successfully performed an outward stroke. The number of flashes indicates the number previously assigned to the device during the **RESET** procedure*

WITH ORANGE LED	
LED Status	***Meaning***
STEADY-ON Duration < 0.5 sec.	*Internal memory write process in progress.*
STEADY-ON	***RESET*** *Procedure in progress.*
STEADY-ON for 3 sec.	*Overlap acquisition procedure finished correctly.*
FLASHING	***RESET*** *Procedure finished correctly. The number of flashes indicates the number assigned to the device in a configuration with several devices.*

13. CHECKING FOR CORRECT ASSEMBLY

CAUTION: In order the ensure perfect operation of the machine, its constant performance over time and safety for persons and property, it must be installed in accordance with professional standards, and therefore the following indications for testing after installation are necessary.

- Check that the window is perfectly closed at corners and that there are no obstacles caused by incorrect positioning during assembly.
- Check the alignment of the actuator with the sash bracket; if out of line, the rack will require more energy in order to slide.
- Check that when the window is closed there is a gap of at least 5 mm between the sash bracket and the actuator body. This will ensure that the window closes properly, with the right compression on the seals. Otherwise, there is no certainty of complete closure.
- Check also that the attachments and support brackets are aligned with one another and firmly secured to the window frame, and that the screws are properly tightened. The use self-tapping or self-drilling screws on aluminium windows is not recommended as they would tear the profile after a few operations; use metric screws with threaded inserts *(see the indications in § 10.1)*.
- Check that the power cord does not impede the rotation of the actuator or interfere with proper operation; this could affect the safety of persons and property.
- Check that the window reaches the desired position according to the stroke-end selected.

14. 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, proceed as follows:

1. Unscrew the nut from the pivot screw securing the rack to the sash bracket.
2. Hold the window in one hand and pull the pivot screw out of the hole with the other *(this operation should be performed with the window open at least 10 cm to facilitate the extraction of the screw)*.

3. Manually open the window frame.

ATTENTION*: DANGER – the window could fall as the sash is no longer held in position by the rack*.

4. After maintenance and/or cleaning 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.

15. TROUBLESHOOTING

Please consult the following table for any eventual problems with function during installation or normal use. Check also the ***RED*** LED indications:

Problem	Possible cause	Solution
Gear motor does not work.	No electricity at source.	Check trip switch and safety switch.
	Lead not connected, or one of the wires has come loose.	Check all electrical connections on gear motor.
	The electrical supply is incorrect	Check whether the power supply to the actuator has the voltage indicated in the technical data plate
The actuator switches on but does not function	Electrical wiring error	Check the electrical connections of the individual wires and their function
	Connection with other incompatible machines	Check that the machines connected in the array are compatible by consulting the relevant instruction manuals

16. 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.

17. 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.

18. DICHIARAZIONE DI INCORPORAZIONE *(per una quasi macchina)* e DICHIARAZIONE CE DI CONFORMITA' / *Declaration of Incorporation (for a partly completed machine) and EC Declaration of Conformity.*

Con la presente il / *Hereby the*

Costruttore: *Manufacturer:*	**NEKOS S.r.l.** Via Capitoni 7/5- 36064 Colceresa – VI – Italy Tel +39 0424 411011 – Email info@nekos.it

dichiara sotto la propria responsabilità che i seguenti prodotti
declare under its own responsibility that the following products

Descrizione prodotto : *Product Designation:*	**Attuatore a cremagliera** *Rack and pinion drive*
Modello / *Type :*	**230 V: SKYRO 850 230V – SKYRO 850 230V SYNCRO³** **24 V: SKYRO 850 24V SYNCRO³ – SKYRO 850 24V RWA SYNCRO³**

Anno di costruzione dal / *Year of manufacturing from:* **2021**

Soddisfano gli applicabili requisiti essenziali della **Direttiva Macchine 2006/42/EC, Allegato I**
*Fulfil the essential requirements of the Machinery Directive **2006/42/EC, Annex I,*** **Art. 1.1.2, 1.1.3, 1.1.5, 1.2.1,1.2.3, 1.2.6; 1.3.2, 1.3.4, 1.3.9, 1.5.1, 1.5.2, 1.5.6, 1.5.7, 1.5.8, 1.5.9, 1.5.10, 1.5.11, 1.7.1, 1.7.1.1, 1.7.3, 1.7.4.2, 1.7.4.3**
La documentazione tecnica pertinente è compilata secondo l'**Allegato VII, sezione B**
*The relevant technical documentation is compiled in accordance with **Annex VII, Part B***

La persona autorizzata a costituire la documentazione tecnica pertinente è:
The person authorised to compile the relevant technical documentation is: **Giuliano Galliazzo – Nekos S.r.l.**

Su richiesta adeguatamente motivata delle autorità nazionali, la documentazione tecnica dei citati prodotti sarà resa disponibile, via e-mail, entro un tempo compatibile con la sua importanza.
In response to a reasoned request by the national authorities, we will provide, via e-mail, the relevant information on the product listed above within an adequate period proportional to its importance.

Inoltre i succitati prodotti sono conformi alle disposizioni pertinenti delle seguenti Direttive:
Furthermore the products listed above complies with the provisions of followings Directives:

- **2014/30/EU Direttiva Compatibilità Elettromagnetica** */ ElectroMagnetic Compatibility Directive (EMCD)*
- **2014/35/EU Direttiva Bassa Tensione** */ Low Voltage Directive (LVD)*
- **2011/65/EU Direttiva sulla restrizione dell'uso di determinate sostanze pericolose nelle apparecchiature elettriche ed elettroniche (Direttiva RoHS)** */ Restriction of the use of certain hazardous substances Directive (RoHS Directive)*
- **2015/863/EU Direttiva Delegata recante modifica dell'allegato II della Direttiva 2011/65/EU del Parlamento Europeo e del Consiglio per quanto riguarda l'elenco delle sostanze con restrizioni d'uso.** */ Delegated Directive amending Annex II of Directive 2011/65/EU of the European Parliament and of the Council regarding the list of substances with usage restrictions*

e delle seguenti norme armonizzate e/o specifiche tecniche:
and of the following harmonised standards and/or technical specifications:

EN 60335-2-103; EN 61000-6-3:2007 + A1:2011 + AC:2012; EN IEC 61000-6-2:2019;
EN 60335-1:2012 + AC:2014 + A11:2014; EN 50581:2012;

La messa in moto di una macchina completa che includa la quasi macchina sopra menzionata, da noi fornita, non è permessa finché non sia accertato che l'installazione sia stata fatta secondo le specifiche e le indicazioni di installazione contenute nel "Manuale d'istruzioni" fornito con la quasi-macchina, e che sia stata espletata e documentata, in apposito protocollo, una procedura di accettazione da parte di un tecnico abilitato.

Commissioning of the complete machinery including the above mentioned drives delivered by us is not allowed until it is ascertained that the installation of the complete machinery was performed in accordance with the specifications and the operating and installation advice given in our Mounting Instructions, and that the acceptance procedure was duly carried out and documented in an acceptance protocol by a specialist.

Questa dichiarazione è fatta dal costruttore / *This is declared by the manufacturer :*
NEKOS S.r.l. - Via Capitoni 7/5- 36064 Colceresa (Vicenza) - Italy
Rappresentato da / Represented by : **Giuliano Galliazzo** – A.D. Presidente / President CEO

Luogo e data / *Place and date*: Colceresa **22/09/2021**

Firma / Valid signature

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