

**MINGARDI**<sup>®</sup>  
THE REFERENCE FOR WINDOW AUTOMATION

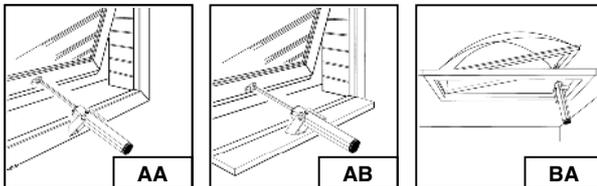
SOLUZIONI PER L'AUTOMAZIONE DEI SERRAMENTI  
SOLUTIONS FOR AUTOMATIC WINDOW OPENING  
SOLUTIONS POUR L'AUTOMATION DES MENUISERIES  
LÖSUNGEN FÜR DIE AUTOMATION FENSTERN  
OPLOSSINGEN VOOR AUTOMATISCH SLUITEN EN OPENEN  
SOLUCIONES PARA LA AUTOMACIÓN DE LOS CERRAMIENTOS  
SOLUÇÃO PARA A AUTOMATIZAÇÃO DOS FECHOS DE JANELAS  
Λύση για τον αυτοματισμό των κλειδαριών  
AUTOMATISERINGSLØSNINGER TIL VINDUER  
RATKAISUT IKKUNOIDEN AUTOMAATTISOINNILLE  
AUTOMATISERINGSLØSNINGER FOR VINDUER  
AUTOMATISERINGSLØSNINGAR FOR FONSTER

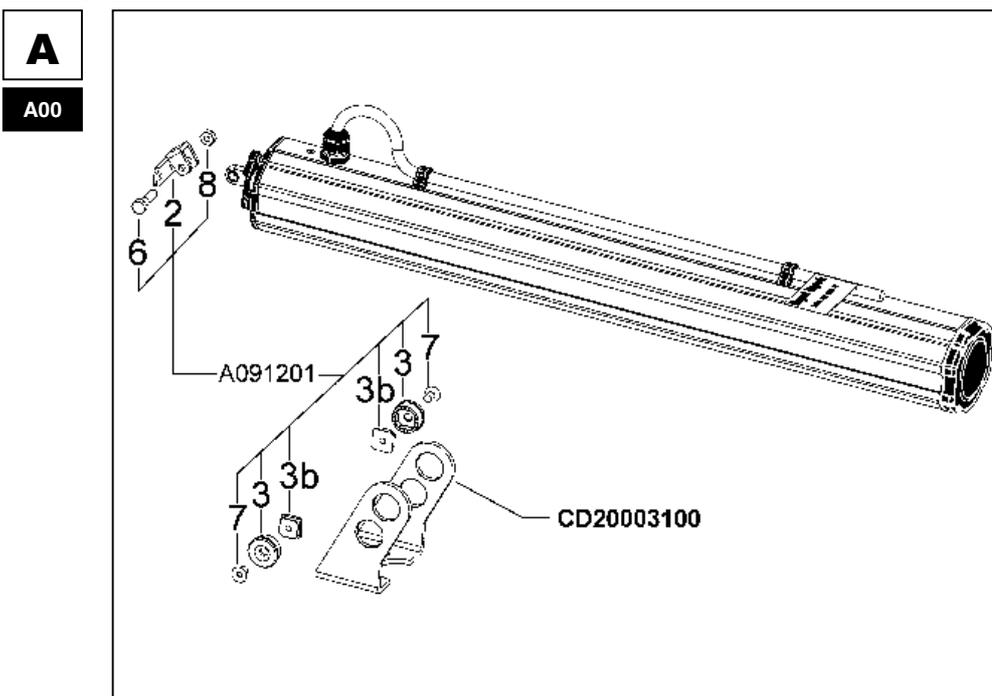
- |  |  |
|--|--|
| <b>I</b> MANUALE D'USO E INSTALLAZIONE                 | <b>P</b> MANUAL DE USO E INSTALAÇÃO              |
| <b>GB</b> USE AND INSTALLATION MANUAL                  | <b>Ε</b> Οδηγός για τη χρήση και την εγκατάσταση |
| <b>F</b> MANUEL POUR L'EMPLOI ET L'INSTALLATION        | <b>DK</b> BRUGER- OG VEDLIGEHOLDELSERVEJLEDNING  |
| <b>D</b> GEBRAUCHS-UND MONTAGEANLEITUNG                | <b>SF</b> ASENNUS- JA KÄYTTÖOPAS                 |
| <b>NL</b> GEBRUIKSAANWIJZING EN INSTALLATIE - HANDBOEK | <b>N</b> BRUKER- OG VEDLIKEHOLDSVEILEDNING       |
| <b>E</b> MANUAL DE USO E INSTALACIÓN                   | <b>S</b> BRUKS- OCH UNDERHÅLLSANVISNING          |

## D16 FCE

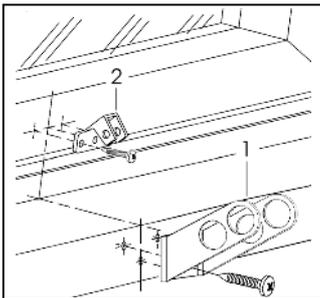


•APPLICAZIONI • APPLICATIONS • APPLICATIONS • ANWENDUNGSMÖGLICHKEITEN • TOEPASSINGEN • APLICACIONES  
•APLICAÇÕES • ΕΦΑΡΜΟΓΕΣ • ANVENDELSESOMRÅDER • KÄYTTÖALUEET • BRUKSOMRÅDER • ANVÄNDNINGSMÖGLIGHETER

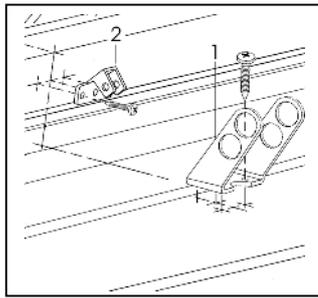




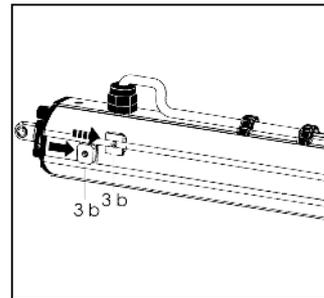
**A01** **AA**



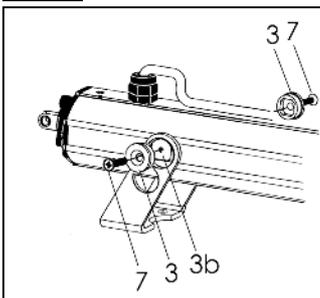
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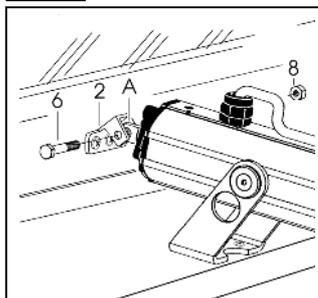
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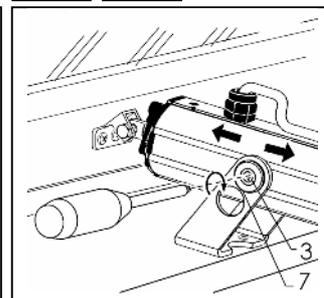
**A03**



**A04**

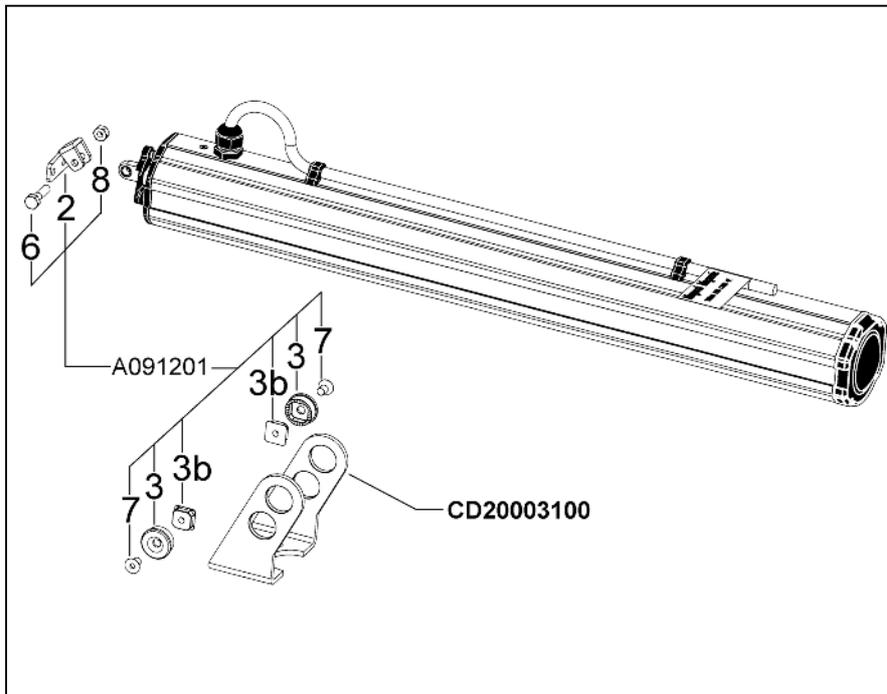


**A05** **A06**

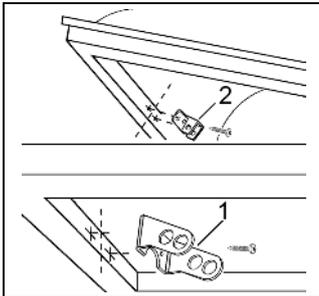


**B**

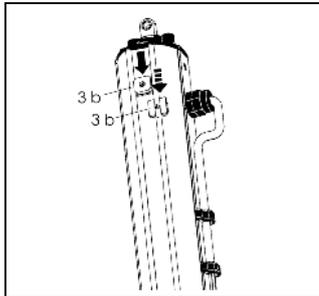
**B00**



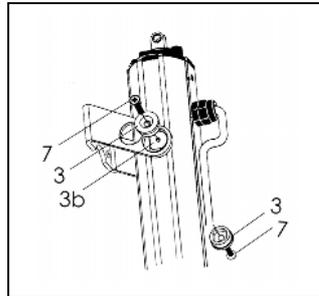
**B01**



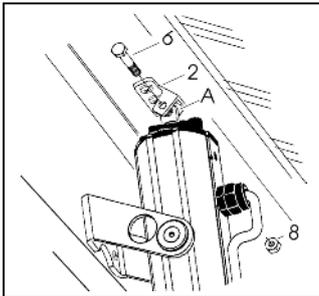
**B02**



**B03**

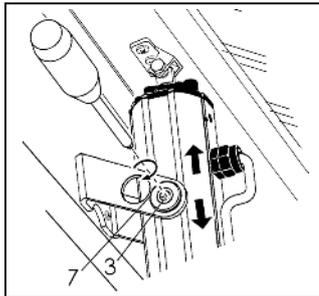


**B04**



**B05**

**B06**





Before embarking on any installation or wiring operations, read this manual extremely carefully.

The user must refer to the notes contained in it and keep it safely for future reference.

**EXPLANATION OF THE SYMBOLS**



**Danger!**  
General ranger or preventive warning with numerous implications.



**Warning!**  
Read this manual carefully.



**Danger!**  
Danger of electrocution from electric current.



**Danger!**  
Danger that could cause personal injury.



**Danger!**  
Danger of hands being crushed.



**Warning!**  
Draws attention to instructions that must be followed in order to prevent damage to the actuator.



**Notice**  
Refers to important information to which special attention must be paid.

**NOTES ON THE ACTUATOR**



The actuator D16Fce complies with current safety standards. Operational safety can be guaranteed only if installers comply with the safety regulations in force in the country where it is installed. The actuator D16Fce is designed exclusively to open and close top-hung windows and domes, and is designed only for indoor use. It is prohibited to install two or more actuators on the same window frame without using a synchronisation accessory. Any other application of the actuator must be approved by Mingardi S.r.l. after technical testing of the application. Use only original accessories or accessories approved by Mingardi S.r.l. to install the actuator.

**IMPORTANT SAFETY REGULATIONS**



**Warning!**  
Read this manual carefully.



**Warning!**  
In order to ensure personal safety, strictly comply with all the regulations that are set out below.

**USE AND MAINTENANCE**

When using the D16Fce actuator, follow these safety regulations:



Do not allow children to play with the remote control; observe the moving parts closely and allow neither adults nor children to approach until the moving parts have come to a complete stop;



At least once a year, check that the power cable has not been damaged and that it show no sign of wear;



Check that no objects obstruct the window's movement; never make any interventions on the actuator in case of failure, do not open or disassemble actuator parts that obstruct access to the inside of the mechanism.

In the event of failures or damage to the equipment, contact specialised personnel.

Do not use the actuator until it has been repaired.

**INSTALLATION**

**Only qualified installers can carry out installation.**

**The D16Fce actuator must be assembled and wired only by specialised personnel who have been properly trained and who are familiar with problems of automatic window opening and closing systems, technical reference standards and safety standards.**



**Warning!**  
Incorrect installation may make the actuator dangerous! Follow all the instructions set out below.



### Checks

Before installing, check that:

- The actuator's performance is sufficient to open and close the window (ensure that the limits displayed on the actuator ratings plate are not exceeded). Remember that the window, especially if it is a dome, will have to withstand not only the wind, but also snow and perhaps even ice.
- The minimum height of the window is greater than 300 mm for actuators with a travel distance up to 300 mm and 500 mm for actuators with a travel distance up to 500 mm.
- The profiles and fastening components are of an adequate size to stand up to the operating stress.
- The types of hinges or fixtures used enable the actuator to complete its opening stroke in order to avoid damage to the structures caused by the thrust or tensile stress exerted by the actuator.
- The electric systems comply with the regulations in force in the country of installation.
- The electric cables used have the proper section.
- The mains power supply and the main switch are near the window.
- There is a junction box to house the power cable conductors.
- The packing contains all the components and accessories required to install the actuator (Fig. A00 -Fig. B00).
- The actuator operates smoothly and correctly when it is powered up and the two limit switches that limit the rod extension and retraction intervene.
- That during assembly and disassembly of the actuator from the window, as it is not blocked in the open or closed position, appropriate measures are taken to avoid accidental banging with blows, breakages of the window and injury to the operator.
- A platform or scaffolding is provided if the actuators are to be installed at a height of more than 2.5 meters.

### Operations to be carried out before installing the actuator

- Power up the actuator and have it perform one stroke to be sure that it was not damaged during transit.



#### Warning!

If safety components prevent the window from being fully opened or if the window is opened less than the actuator's stroke, the actuator or window may be damaged.

## A

### FITTING ON TOP-HUNG WINDOWS

#### A01

- Find and mark the centre line of the window and the fixed frame.
- Mark the fixing holes referring to the brackets provided.
- Drill holes in the window and on the sill (or frame) using the appropriate bits to fit the front bracket (2) and the motor support bracket (1).
- Fix the front bracket (2) to the window without completely tightening the screws (not supplied).
- Fix the motor support bracket (1) with screw (not supplied) and tighten thoroughly. Align the motor support bracket (1) with the front bracket (2) and tighten the screws (not supplied).

#### A02

- Insert dovetail nuts (3b) into the guides on the sides of the actuator (D16 FCE) and move them close to the front part.

#### A03

- Insert the actuator inside the motor support bracket (1).  
**Note: the bracket (1) is provided with two holes for fastening it to the actuator. The inclination of the actuator depends on the hole chosen.**
- Insert the side fixtures (3) into the holes of the bracket (1) and centre them with dovetail guides (3b).
- Insert and screw the screws (7) without fully tightening them.

#### A04

- With the window closed and the actuator at the end of stroke (closed), position everything so that the head "A" goes inside the front bracket (2).
- Insert the screw (6) and secure with nut (8).



**A05**

- Move the actuator along its own axis so that sufficient pressure is exerted on the window seals.
- Tighten the screws (7) completely inside the fixtures (3).
- Connect the actuator to the electric system while using the INSTRUCTIONS FOR ELECTRIC NETWORK CONNECTION (part C of this manual), in compliance with the safety standards in force.
- Start up the actuator to open the window, run it to the end of stroke and switch it off again in order to check if the actuator is working correctly, the limit switches trip and if the window closes properly.



**Danger!**

Danger of hands being crushed. When the window is moving, do not put your hands between the fixed and moving parts.

**A06**

- If the window does not close completely or if the limit switch is not activated during the closing phase, an adjustment must be made by performing these operations:
  - 1) Disconnect the actuator.
  - 2) Loosen the screws (7) inside the side fixtures (3).
  - 3) Move the actuator along its axis in order that the window closes properly with sufficient pressure on the gaskets.
  - 4) Thoroughly tighten the screws (7) inside the side fixtures (3).



**Danger!**

Danger of hands being crushed. When the window is moving, do not put your hands between the fixed and moving parts.

**B**

**FITTING ON DOME WINDOWS**

**B01**

- Find and mark the centre line of the window and the fixed frame.
- Mark the fixing holes referring to the brackets provided.
- Drill holes in the window and on the sill (or frame) using the appropriate bits to fit the front bracket (2) and the motor support bracket (1).

- Fix the front bracket (2) to the window without completely tightening the screws (not supplied).
- Fix the motor support bracket (1) with screw (not supplied) and tighten thoroughly. Align the motor support bracket (1) with the front bracket (2) and tighten the screws (not supplied).

**B02**

- Insert dovetail nuts (3b) into the guides on the sides of the actuator (D16 FCE) and move them close to the front part.

**B03**

- Insert the actuator inside the motor support bracket (1).

**Note: the bracket (1) is provided with two holes for fastening it to the actuator. The inclination of the actuator depends on the hole chosen.**
- Insert the side fixtures (3) into the holes of the bracket (1) and centre them with dovetail guides (3b).
- Insert and screw the screws (7) without fully tightening them.

**B04**

- With the window closed and the actuator at the end of stroke (closed), position everything so that the head "A" goes inside the front bracket (2).
- Insert the screw (6) and secure with nut (8).

**B05**

- Move the actuator along its own axis so that sufficient pressure is exerted on the window seals.
- Tighten the screws (7) completely inside the fixtures (3).
- Connect the actuator to the electric system while using the INSTRUCTIONS FOR ELECTRIC NETWORK CONNECTION (part C of this manual), in compliance with the safety standards in force.
- Start up the actuator to open the window, run it to the end of stroke and switch it off again in order to check if the actuator is working correctly, the limit switches trip and if the window closes properly.



**Warning!**

The D16 DOMES VERSION products are provided with a safety limit switch. The safety limit switch function is an arrest system that intervenes in an emergency situation only when the rod re-enters.



## INSTRUCTIONS ON ASSEMBLING, USING AND INSTALLING THE ACTUATOR

### D16Fce

In this way, it prevents it and/or the window from suffering possible mechanical damage, as well as physical damage being done to persons and animals. It is for this reason that you must make sure that the closing limit switch intervenes and not, instead, the safety intervention microswitch during installation. Incorrect installation would jeopardize proper operation of the actuator.



#### Danger!

Danger of hands being crushed. When the window is moving, do not put your hands between the fixed and moving parts.

#### B06

- If the window does not close completely or if the limit switch is not activated during the closing phase, an adjustment must be made by performing these operations:
  - 1) Disconnect the actuator.
  - 2) Loosen the screws (7) inside the side fixtures (3).
  - 3) Move the actuator along its axis in order that the window closes properly with sufficient pressure on the gaskets.
  - 4) Thoroughly tighten the screws (7) inside the side fixtures (3).



#### Danger!

Danger of hands being crushed. When the window is moving, do not put your hands between the fixed and moving parts.



#### Warning!

The D16 DOMES VERSION products are provided with a safety limit switch. The safety limit switch function is an arrest system that intervenes in an emergency situation only when the rod re-enters. In this way, it prevents it and/or the window from suffering possible mechanical damage, as well as physical damage being done to persons and animals. It is for this reason that you must make sure that the closing limit switch intervenes and not, instead, the safety intervention microswitch during installation. Incorrect installation would jeopardize proper operation of the actuator.

#### C

### CONNECTING TO THE POWER SUPPLY

**These connection instructions are exclusively for skilled installers who are qualified to install electrical systems. Installers must at all times comply with current regulations governing electrical installations.**



#### Danger!

In order to avoid the danger of electrocution from electric current, turn off the power supply to the control line prior to working on the actuators or the electric system. Always install a main bipolar power supply switch with a minimum contact opening of 3 mm upstream of the actuator control line.



#### Danger!

Danger of hands being crushed. When the window is moving, do not put your hands between the fixed and moving parts.

#### Warning!



Always arrange for the installation of change-over switches with mid OFF position with "live-man" control or equivalent.

- Connection to the mains is carried out by means of cables with wires of 1 mm<sup>2</sup> in section and having the appropriate length to reach the junction box, which must be placed near the actuator. The electric cables must be suitably sized in accordance with the requirements of each system.
- It is recommended to install the remote controls, if any, in such a position that the controlled automation is visible and at a minimum height of 1.5 m.
- If the actuator is expected to operate unattended (automatic or remote operation), it is advisable to install additional safety devices.
- For connection to the electric system and signalling wires, it is necessary that you carefully follow the instructions given on the side of the wiring diagrams contained in this manual.
- Only the power absorbed by the actuator appears on the rating plate. If a signalling source present, it will be necessary to size the electric system appropriately.



#### NOTES:

Signalling with load is delivered with a voltage equal to the actuator's power supply voltage. Signalling without load is made with an electrical contact, and so it needs external power supply.



#### Danger!

If the actuator to be installed is in the 24V DC version, it must be connected to the mains with a double insulation power supply with very low safety voltage that is properly sized for its use. Also the following power supply and system characteristics must be observed:  
Supply voltage: 24 V +/- 10%  
Ripple max: +/- 10%  
Max supply line capacity: 250 nF  
Max supply line inductance: 10 mH



**CONFIGURATIONS AVAILABLE:**

**• D16 FCE THRUST FORCE/TRACTION 1000N:**

**-C01/ C02 Basic version**

**-C03 Signalling with open and closed load**

With rod completely retracted as long as the closing command stays on, a voltage equivalent to the power supply voltage between wire no. 1 and wire no. 4 is delivered; with rod completely extended as long as the opening command stays on, a voltage equivalent to the power supply voltage between wire no. 1 and wire no. 5 is delivered. Maximum current with incandescent lamp: 0.5A.

**-C04 Signalling without open and closed load**

The microswitch contact connected between wires no. 4 and no. 5 can open and close with the rod completely retracted, and the microswitch contact connected between wires no. 6 and no. 7 can open and close with the rod completely extended. Maximum current with incandescent lamp: 230VAC 0.5A, 30VDC 2A, 50VDC 0.4A.

**• D16 FCE DOMES VERSION – Thrust force 1000N - Traction 300N**

(The D16 DOMES VERSION products are provided with a safety limit switch. The safety limit switch function is an arrest system that intervenes in an emergency situation only when the rod re-enters. In this way, it prevents it and/or the window from suffering possible mechanical damage, as well as physical damage being done to persons and animals. It is for this reason that you must make sure that the closing limit switch intervenes and not, instead, the safety intervention microswitch during installation. Incorrect installation would jeopardize proper operation of the actuator):

**-C01/ C02 Safety limit switch, only for the domes version**

If the window blocks when the rod returns and before the closing limit switch intervenes, the actuator stops after having exercised a traction of about 300N due to intervention of the safety limit switch, which cuts off power supply to the motor. This condition remains stable until the window's block is removed. Afterwards, the actuator resumes its normal operation. Warning: the safety limit switch must not be used as an alternative to the closing limit switch.

**-C05 Safety limit switch and signalling without closing load, only for the domes version**

If the window blocks when the rod returns and before the closing limit switch intervenes, the actuator stops after having exercised a traction of about 300N due to intervention of the safety limit switch, which cuts off power supply to the motor. This condition remains stable until the window's block is removed. Afterwards, the actuator resumes its normal operation. The contact of a limit switch connected between wires no. 4 and no. 5 may open or close when the rod is completely retracted. Maximum current with incandescent lamp: 230VAC 0.5A, 30VDC 2A, 50VDC 0.4A.

Warning: the safety limit switch must not be used as an alternative to the closing limit switch.

**-C06 Safety limit switch, defect signalling and signalling without closing load, only for the domes version**

If the window blocks when the rod returns and before the closing limit switch intervenes, the actuator stops after having exercised a traction of about 300N due to intervention of the safety limit switch, which cuts off power supply to the motor. This condition remains stable until the window's block is removed. Afterwards, the actuator resumes its normal operation. The defect signalling activates at the same time the safety limit switch intervenes, opening and closing the contact of a limit switch connected between wires no. 6 and no. 7. The defect signalling remains until the window's block is removed. The signalling without closing load is activated with the rod completely retracted, opening and closing the contact of a limit switch connected between wires no. 4 and no. 5. Maximum current with incandescent lamp: 230VAC 0.5A, 30VDC 2A, 50VDC 0.4A.

Warning: the safety limit switch must not be used as an alternative to the closing limit switch.



# INSTRUCTIONS ON ASSEMBLING, USING AND INSTALLING THE ACTUATOR

## D16Fce

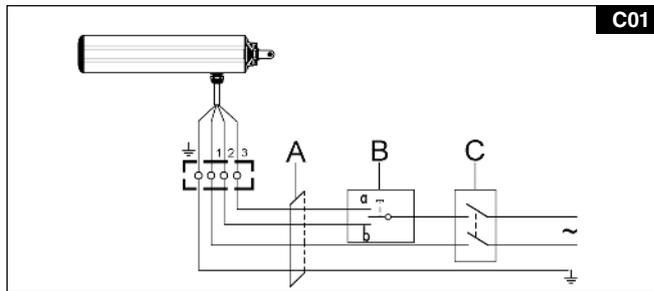
- A - Wires, section 1 mm<sup>2</sup>
- B - Single-pole switch with mid OFF position (a= opens / b= closes).
- C - Bipolar main power supply switch with minimum contact opening of 3 mm.

- Power supply voltage shown on the rating plate.
- No-load signalling contact.
- Signalling contact with load.
- Earth

D16FCE VAC WIRES/COLOURS COMPARATIVE TABLE		
COLOUR	NUMBER	SIGNAL
BLUE	1	COMMON
BLACK	2	CLOSES
BROWN	3	OPENS
WHITE	4	SIGNALLING
RED	5	SIGNALLING
GREY	6	SIGNALLING
GREEN	7	SIGNALLING
YELLOW/GREEN	/	EARTH

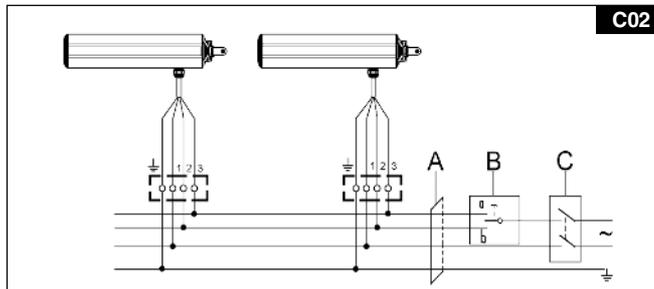
### C01

Single connection



### C02

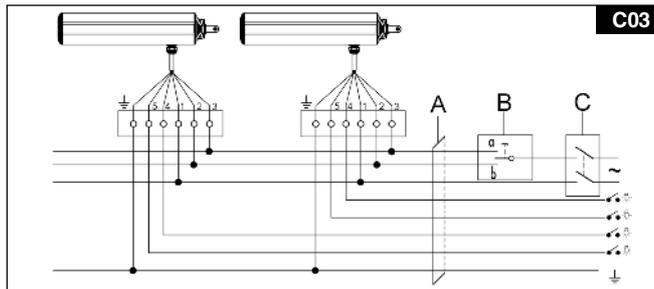
Connection of more than one actuator



### C03

Connection of one or more actuators provided with signalling having open and closed load

- 0.5A max.

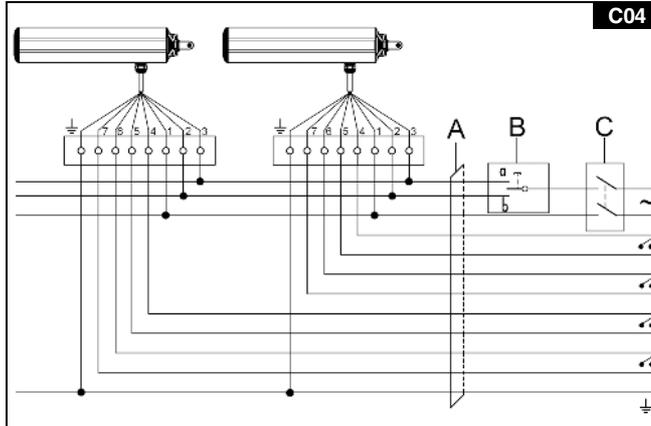




**C04**

Connection of one or more actuators provided with signalling without open and closed load

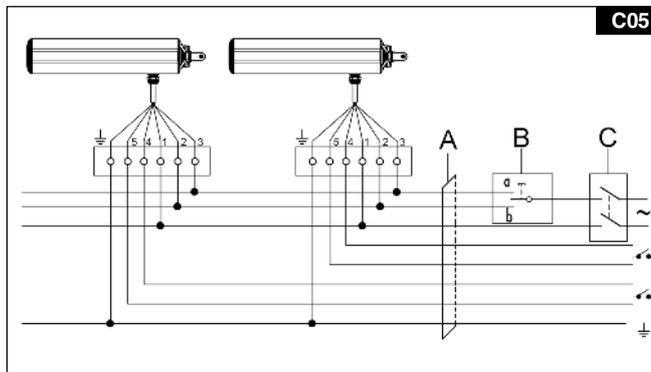
- ● 230VAC 0.5A max.
- ● 30VDC 2A max.
- ● 50VDC 0.4A max.



**C05**

Connection of one or more actuators provided with safety limit switch and signalling without closed load

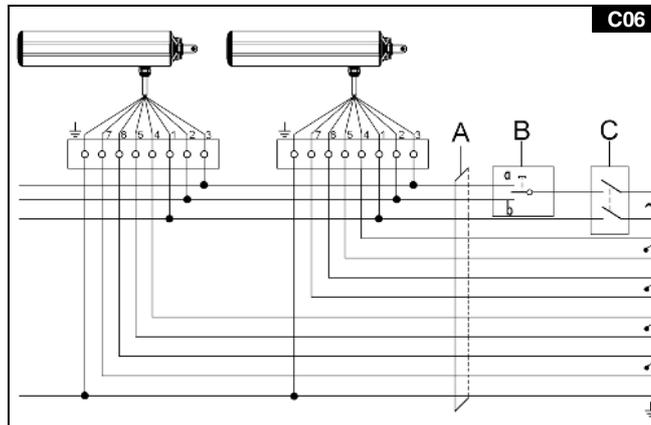
- ● 230VAC 0.5A max.
- ● 30VDC 2A max.
- ● 50VDC 0.4A max.



**C06**

Connection of one or more actuators provided with safety limit switch, defect signalling and signalling without closed load

- ● 230VAC 0.5A max.
- ● 30VDC 2A max.
- ● 50VDC 0.04A max.





**Applications**

Electric remote opening and closing of top-hung windows and domes in public, private and industrial buildings.

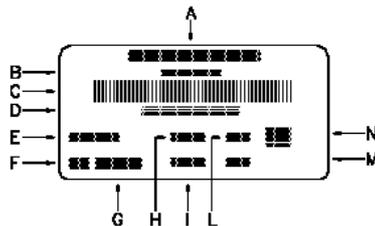
**Equipment features**

- Automatic limit switch that triggers when the **open/closed** end position is reached (open = rod completely extended / closed = rod completely retracted).
- Maximum opening strokes available: 300/500 mm.
- Safety limit switch during closing phase (only for the D16FCE DOMES VERSION).

**Possible actuator controls**

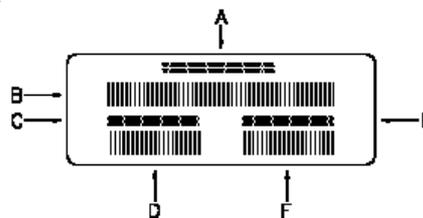
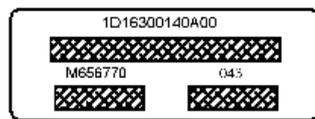
- Manual switch
- Control unit for two actuators
- Remote-controlled receiver

**Identification data on the actuator rating plate**



DATA PLATE (placed on the product)

- A MANUFACTURER'S NAME
- B PRODUCT MODEL
- C PRODUCT BAR CODE
- D PRODUCT CODE NO.\*
- E WORKING VOLTAGE AND FREQUENCY
- F PRODUCT STROKE SYMBOL
- G PRODUCT STROKE MAGNITUDE
- H PRODUCT POWER
- I PRODUCT THRUST/TENSILE FORCE
- L PRODUCT DEGREE OF TIGHTNESS
- M CONTINUOUS TIME OF OPERATION
- N CE APPROVAL MARK



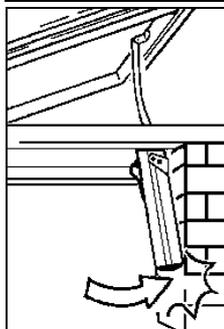
EL. INS. PLATE (placed on the product)

- A PRODUCT CODE NO.
- B PRODUCT BAR CODE
- C WORK ORDER CODE NO.\*/MINGARDI PRODUCTION LOT
- D WORK ORDER BAR CODE/MINGARDI PRODUCTION LOT
- E MINGARDI TEST REPORT NO.\*
- F MINGARDI TEST REPORT BAR CODE NO.\*

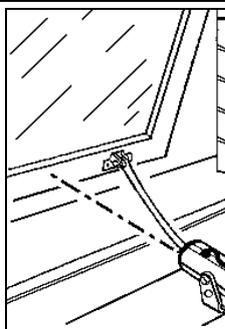
1D16	500	1	4	0	A	00
Family	Max. stroke	Power supply voltage	No. wires per cable	Type of connection	Colour	Customised variants
	300=300mm 500=500mm	1=230V~50Hz	4 6 8	0=No connection	N = Anodised black A = Anodised silver B = White RAL 9016	00=No variants



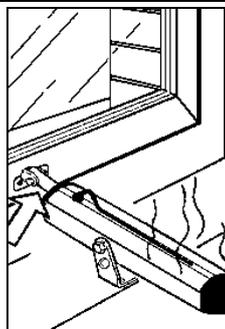
**ERRORS TO BE AVOIDED**



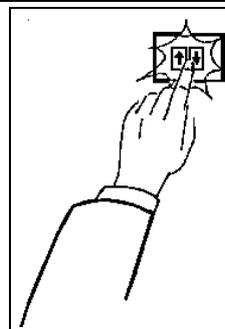
The actuator cannot rotate to follow the window's opening.



Actuator assembly misaligned.



Stroke has not been adjusted, or has been incorrectly adjusted.



Use control push button panel with double push button that is not interlocked.