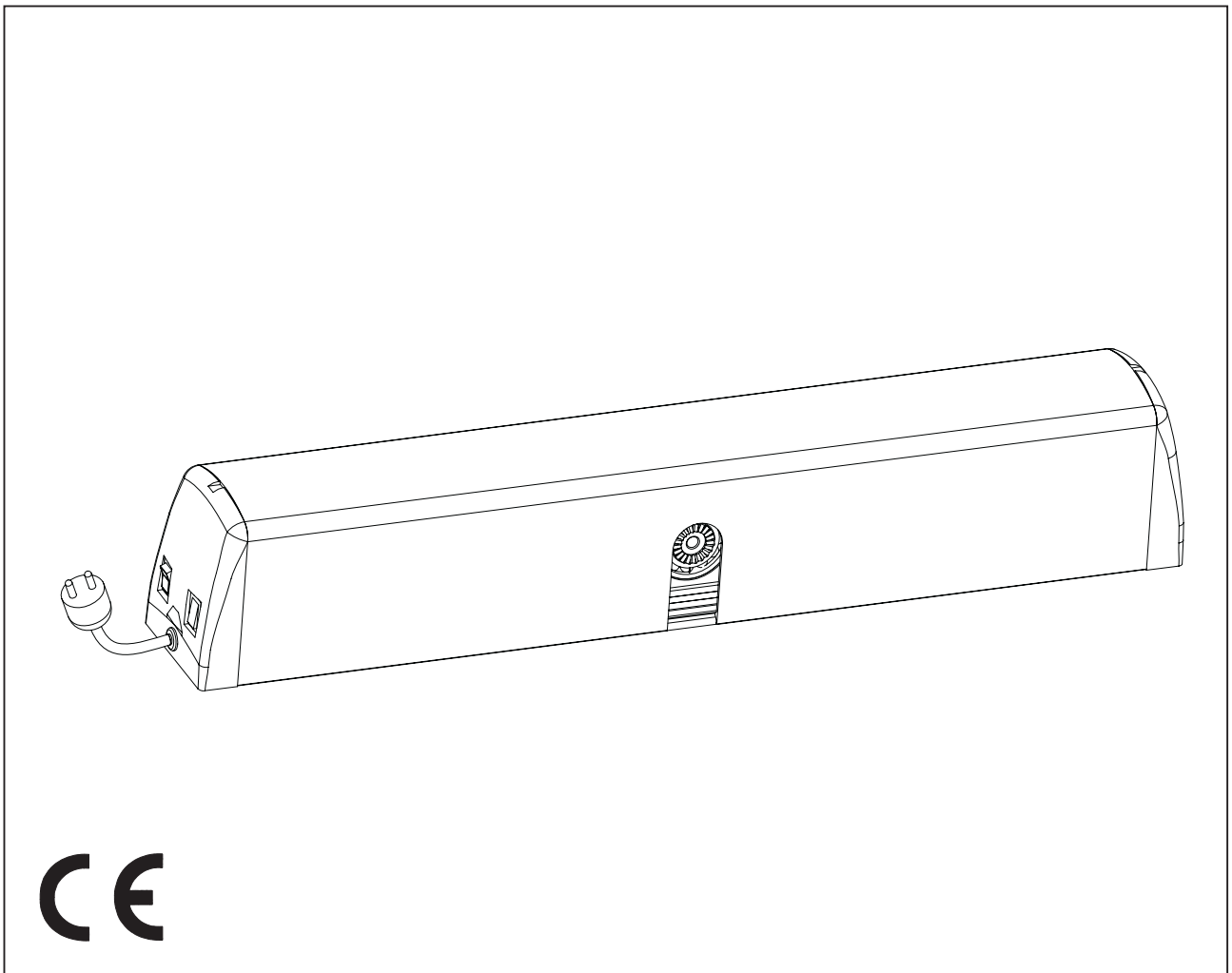


ABLOY® DA460 SWING DOOR OPERATOR

– *Installation and commissioning manual*



APPROVALS / STANDARDS

Low Voltage directive 73/23/EEC as amended by the directive 93/68/EEC
EMC directive 89/336/EEC
Statement of fire doors by Technical Research Centre of Finland



Warning!



Warning!

----- THIS MANUAL CONTAINS IMPORTANT SAFETY INSTRUCTIONS -----

Warning - IT IS IMPORTANT FOR SAFETY OF PERSONS TO FOLLOW THESE INSTRUCTIONS.

----- SAVE THESE INSTRUCTIONS -----

Do not allow children to play with fixed controls.

Frequently examine the installation for imbalance and signs of wear or damage to cables, springs and mountings. Do not use if repair or adjustment is necessary.

Disconnect the supply when cleaning or other maintenance is being carried out.

Before installing the operator, check that the door is in good mechanical condition and it opens and closes properly.

Ensure that entrapment between door and the surroundings is avoided.

Ensure that the operator is suited for installation. Check temperature, humidity, door weights, etc. restriction, what is mentioned in this manual or other Abloy® Oy material.

Note!

Instructions, design specifications and illustrations which are contained in this manual are not binding. Rights reserved for changes without previous notice.

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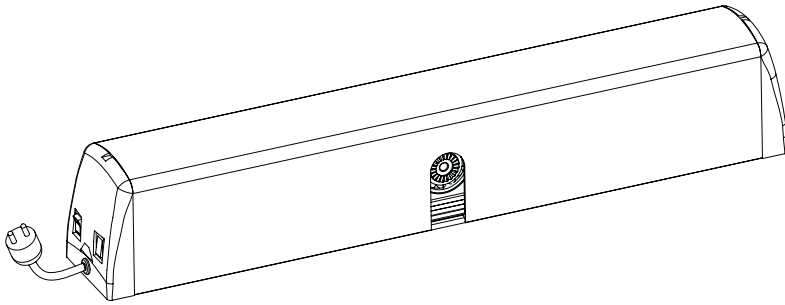
REVISION

Following pages has been revised:

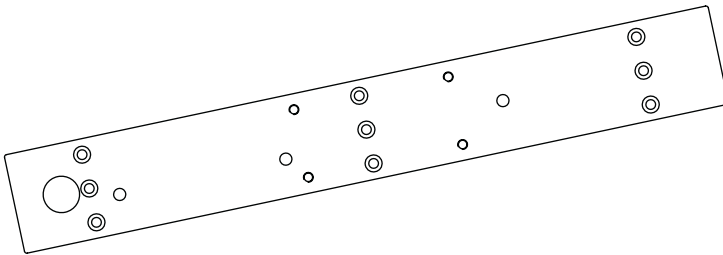
Page Revision

As at 15.11.2006.

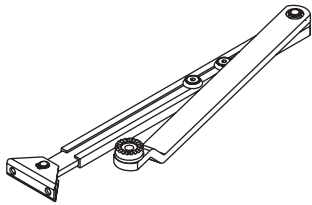
CONTENT OF DELIVERY



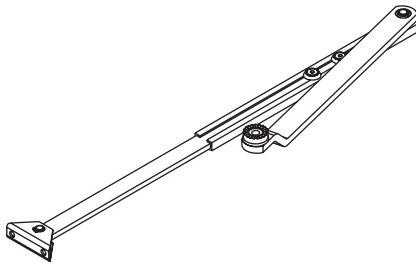
DA460 Swing door operator
- screws 4 pcs M8x22



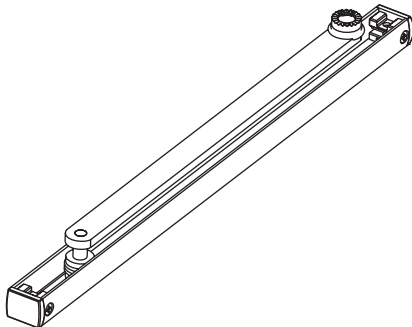
DA103 Mounting plate
- screws 6 pcs 5,5x32



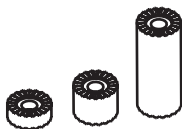
DA147 Standard arm
- screws 2 pcs 5,5x32
and 1 pcs M8x30



DA148 Extended arm
- screws 2 pcs 5,5x32
and 1 pcs M8x30



DA149 Sliding arm
- screws 2 pcs 5,5x50
and 1 pcs M8x30



DA150 Extension piece
- 10 mm + M8x35
- 20 mm + M8x35 + M8x45
- 60 mm + M8x90

GENERAL INFORMATION

Technical data

Measures

- 595 (L) x 85 (H) x 107 (W) mm
- Weight 6,5 kg

- Supply voltage 90-264 VAC, 47-63 Hz
- Rated output 70 W
- Enclosure class IP20

Temperature range

- Storage -30...+85°C (in dry premises)
- Operation: -15...+50°C (in dry premises)
- The automatic swing door operator must not be installed in applications where it is subjected to water or snow.

Interfaces

- Voltage output 24 VDC, stabilized, output current 500 mA
- Voltage output 12 VDC, stabilized, output current 1,0 A
- The total load must not exceed 12W
- Potential free relay output, preset to operate 2 seconds
2 A @ 30 VDC resistive load

Features

- Usage for heavy density of pedestrian traffic
- Push&Go as a standard feature
- Normal and delayed impulse
- Adjustable hold open time 0...60 s or sequential use
- Fire detector connection
- Free Swing operation
- Door hold force
- Prepull before opening
- Secondary DC inlet for power back up (24 VDC ($\pm 15\%$), 3A)
- Maximum opening angles:
 - With standard arm 100 degrees
 - With sliding arm on the opening side 100 degrees
 - With sliding arm on the closing side 90 degrees

OPERATION

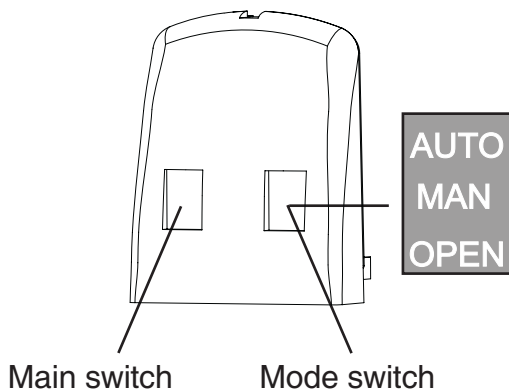
Abloy® DA460 is an electromechanical swing door operator for heavy use. The door operator includes new free swing function: when using the door manually it operates lightly without motor's resistance and the door can be left in open position when required. It can be used on both single and double, internal and external, fire and emergency exit doors.

Safety features

Opening cycle: If the door is obstructed in opening cycle. The door is set free and hold open time is started. After 1 second, new trial is done to open the door. Maximum amount for trials is 4. If this is exceeded or hold open time is end, the door is closed.

Closing cycle: If the door is obstructed in closing cycle. The door is set free and 4 new trials are done to close the door. If the closing is still obstructed, the operator tries to close the door at one minute intervals.

MAIN SWITCH AND MODE SWITCH



When the power is switched on, the mains switch lights up.

1= on

0= off

Functions of mode switch

AUTO:

The operator opens the door for the duration of the hold open time.

MAN:

Manual use.

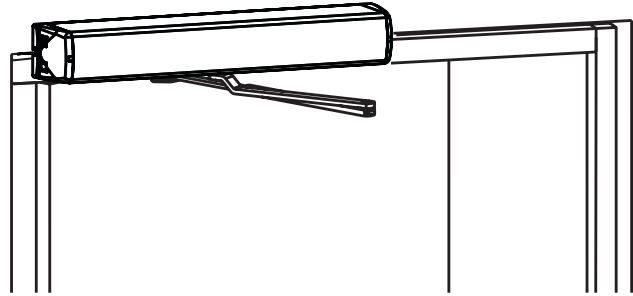
OPEN:

The door is held permanently open.

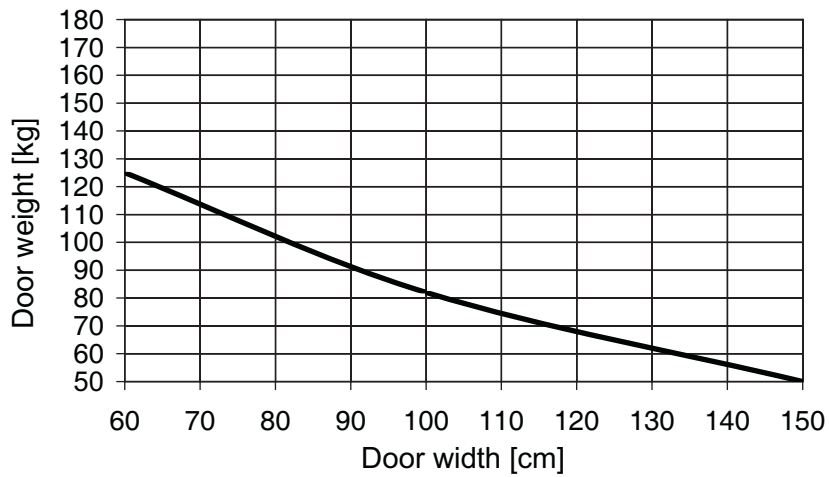
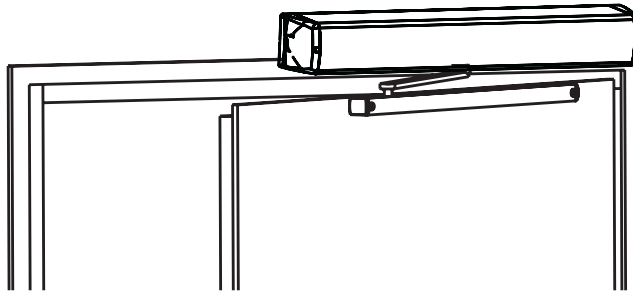
NOTE! There is 3 seconds constant delay when mode switch is changed from position OPEN to AUTO or MAN.

DOOR WEIGHT

Standard arm



Sliding arm



INSTALLATION

Tools required

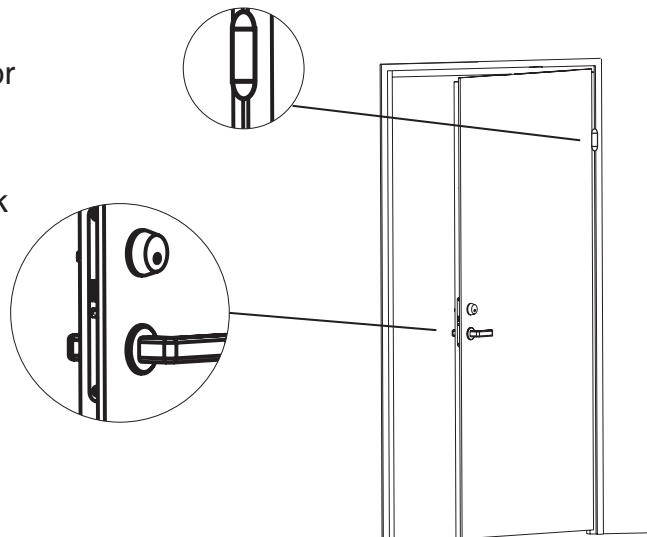
Drill
Set of ball ended allen wrenches
2 Phillips head screwdriver
Flat blade screwdrivers, 2 pcs

Steps of installation

- Preparing installation
- Installing the mounting plate
- Mounting the operator and the arm
- Connecting the operator to mains
- Commissioning
- Testing
- Connecting impulse devices

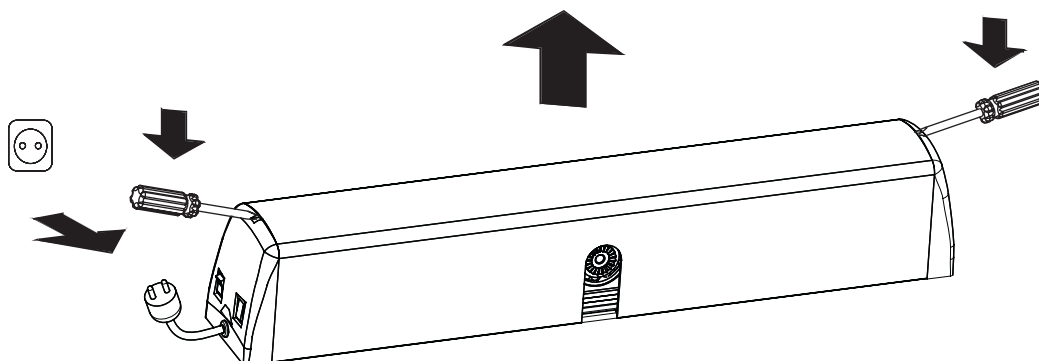
Preparing installation

- Check the proper function of the door
 - hinges
 - door clearance
- Check the proper function of the lock
 - lock case
 - striker plate



Removal of housing

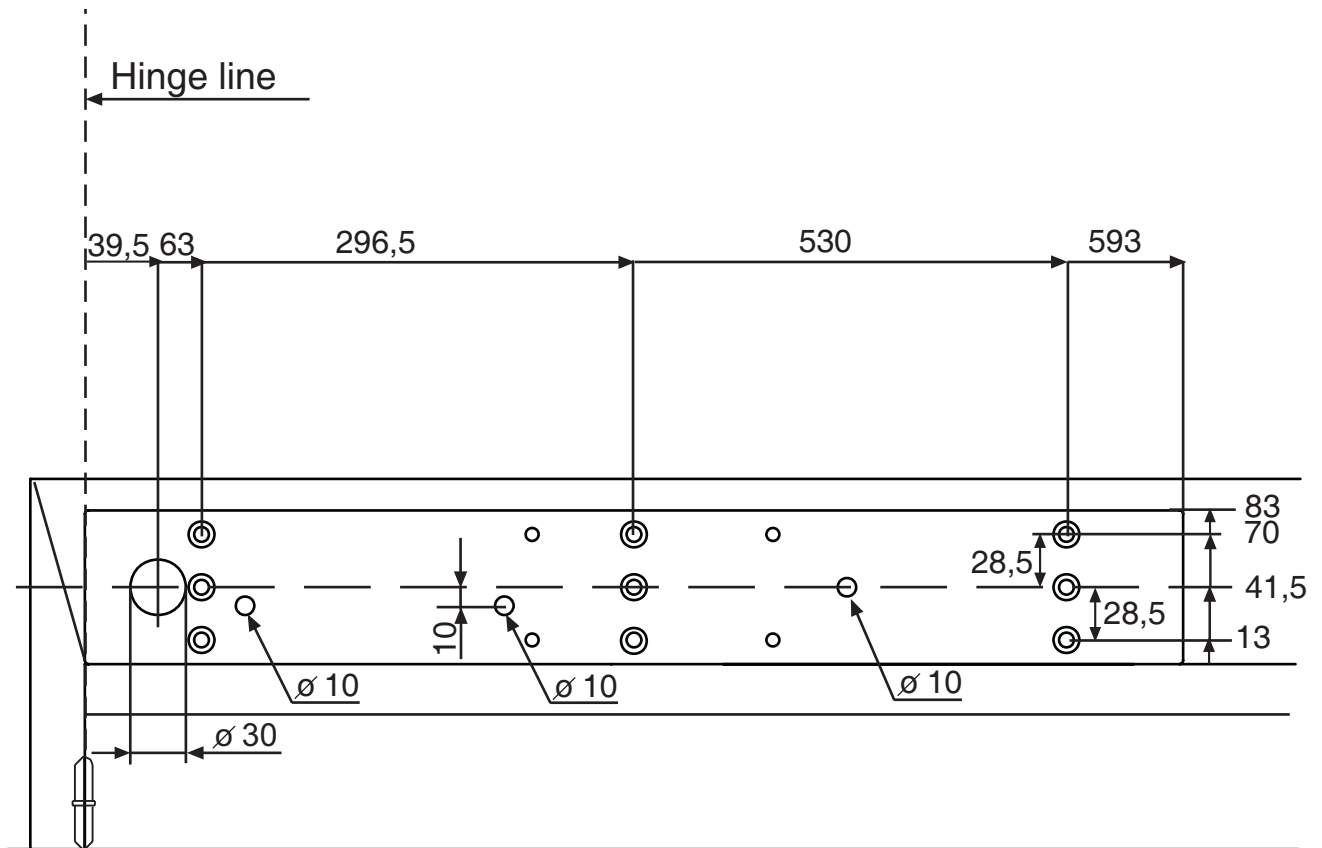
Note! Remove the protective earth wire from cover and connect it back after installation.
Keep the mains disconnected when removing or mounting cover.



Installing the mounting plate

Operator is to be installed on the transom, with the main switch located towards the hinge.

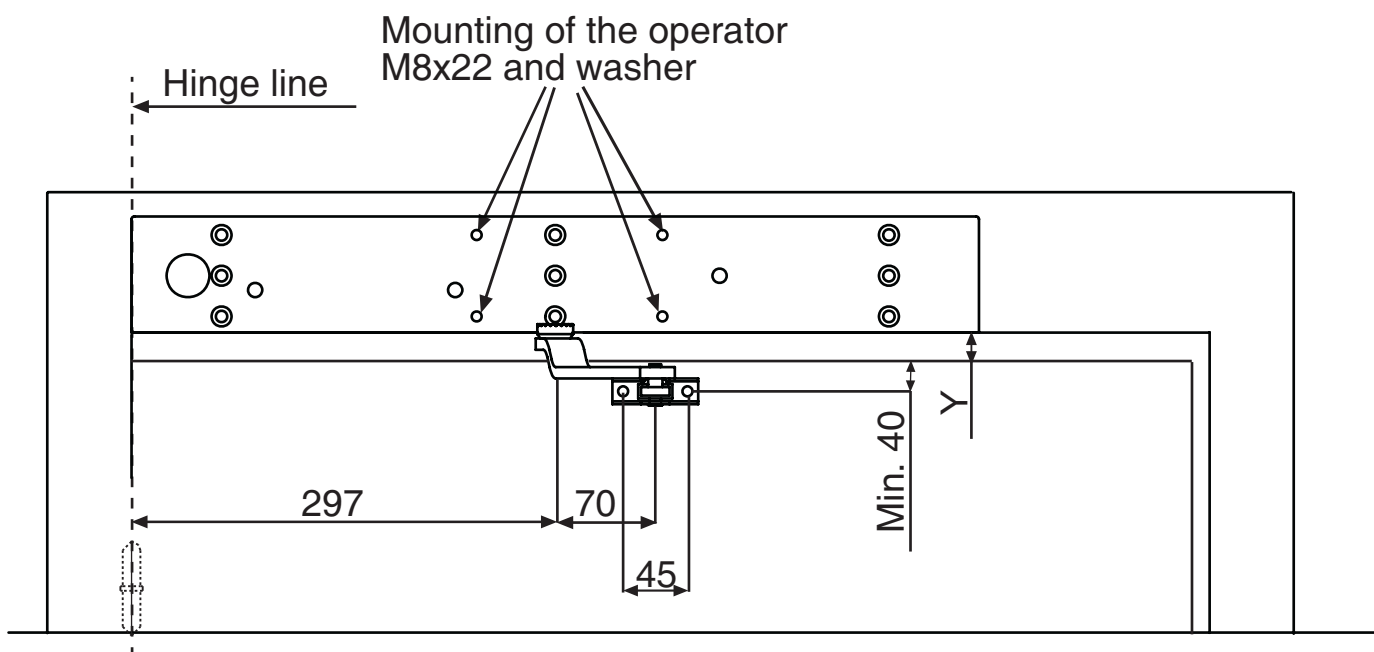
Use the mounting plate DA103 with the door operator ensuring the installation base is level and securely fixed to a flat surface.



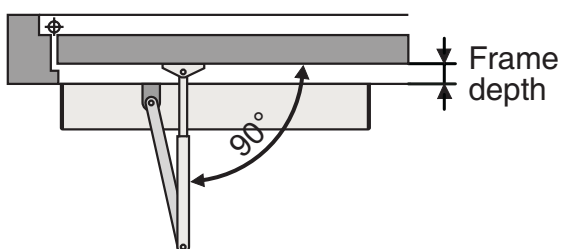
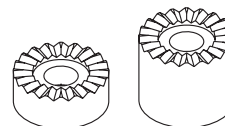
Installation measurements for standard arm and for sliding arm DA149 to the closing side installation.

When installing operator to the opening side of the door, refer to page 13.

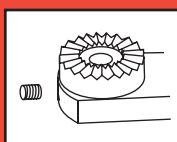
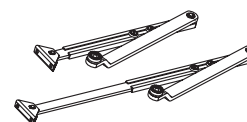
Assembly of the operator and the standard arm to the closing side



| Y (mm) | Length of extension piece |
|--------|----------------------------|
| 0 | No extension piece |
| 10 | 10 mm (DA150/01) |
| 20 | 20 mm (DA150/02) |
| 30 | 30 mm (DA150/01, DA150/02) |
| 40 | 40 mm (DA150/02 * 2 pcs) |
| 60 | 60 mm (DA150/06) |

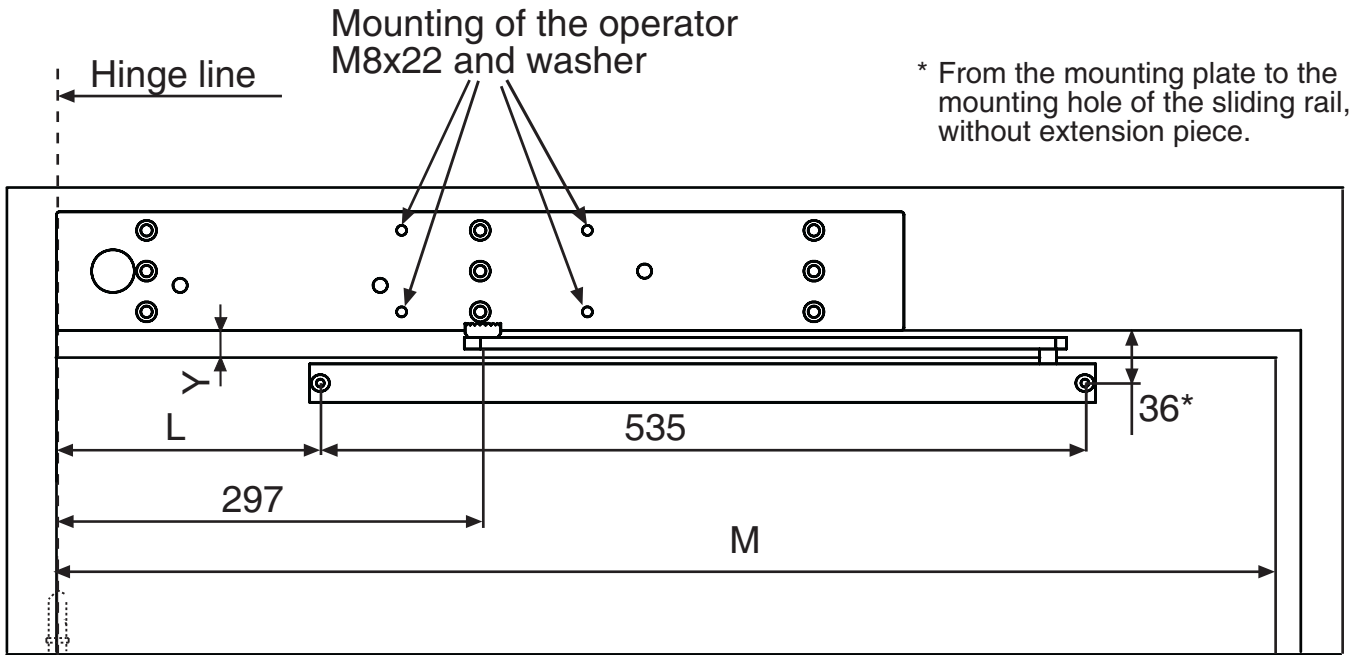


Frame depth
 DA147 0-150 mm
 DA148 150-250 mm

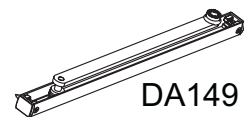
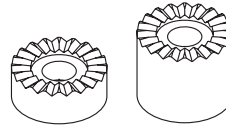


- After installation, ensure that the arm and door are properly adjusted.
- Mount a door stop to the door open position so that wind will not drive the door against the wall, resulting in damage.
- **Tighten the holding screw.**

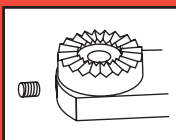
Assembly of the operator and the sliding arm DA149 to the closing side



| Y (mm) | Length of extension piece |
|--------|----------------------------|
| 0 | 10 mm (DA150/01) |
| 10 | 20 mm (DA150/02) |
| 20 | 30 mm (DA150/01, DA150/02) |
| 30 | 40 mm (DA150/02 2 pcs) |
| 50 | 60 mm (DA150/06) |

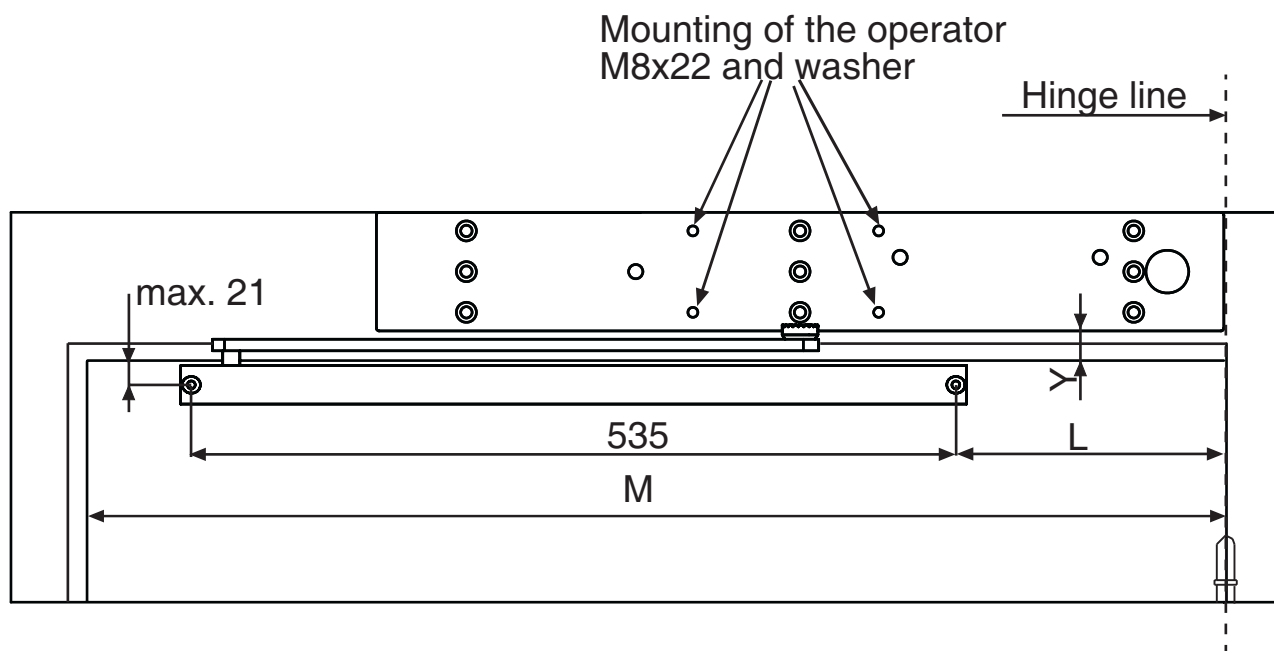


| Frame depth H/mm | Arm distance L/mm | Minimum door width M/mm |
|---------------------|----------------------|----------------------------|
| 0 | 194 | 760 |
| 150 | 150 | 760 |
| 150-200 | 120 | 760 |
| 200-250 | 77 | 760 |

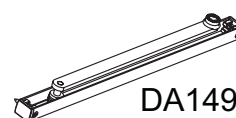
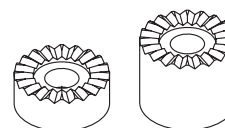


- After installation, ensure that the arm and door are properly adjusted.
- Mount a door stop to the door open position so that wind will not drive the door against the wall, resulting in damage.
- **Tighten the holding screw.**

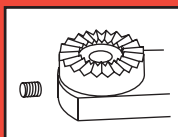
Assembly of the operator and the sliding arm DA149 to the opening side



| Y (mm) | Length of extension piece |
|--------|----------------------------|
| 20 | No extension piece |
| 30 | 10 mm (DA150/01) |
| 40 | 20 mm (DA150/02) |
| 50 | 30 mm (DA150/01, DA150/02) |
| 60 | 40 mm (DA150/02 * 2 pcs) |
| 80 | 60 mm (DA150/06) |



| Frame depth H/mm | Arm distance L/mm | Minimum door width M/mm |
|---------------------|----------------------|----------------------------|
| 0 | 180 | 750 |
| 0 - 150 | 225 | 795 |
| 150-200 | 260 | 830 |
| 200 - 250 | 305 | 875 |



- After installation, ensure that the arm and door are properly adjusted.

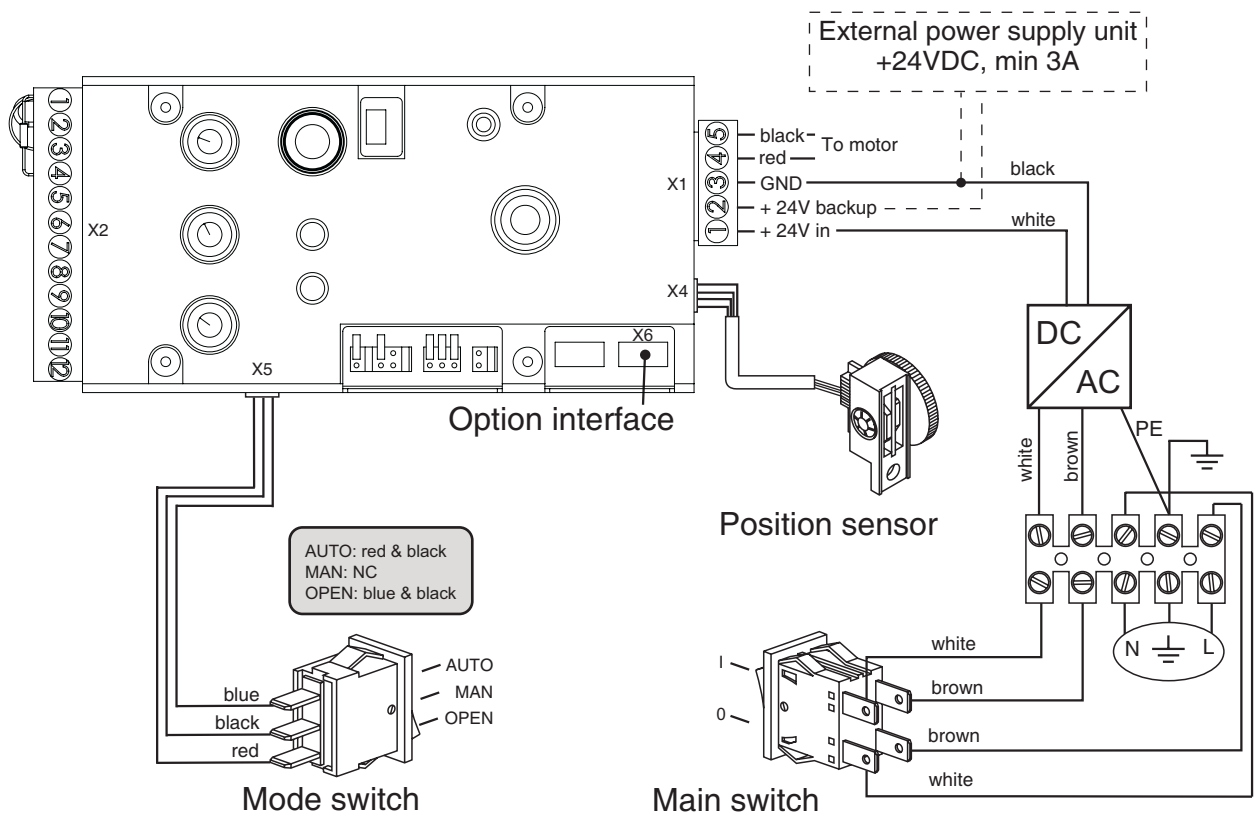
- Mount a door stop to the door open position so that wind will not drive the door against the wall, resulting in damage.

- **Tighten the holding screw.**

INTERNAL CONNECTIONS



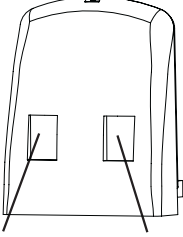
- Electrical connections should be made by a qualified electrician.
- The power plug must have an easy access.
- If a permanent connection is made unit must be equipped with an external switch providing all pole disconnection.
- Keep the mains disconnected during installation.



DC supply back-up

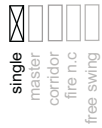
When not mains operated, or for back-up supply, the external 24 VDC (min. 3A) supply can be connected to X1 connectors 2 and 3. Connect + from DC supply back-up to X1 connector 2 and GND to X1 connector 3. No battery charging or maintenance is provided by DA460.

COMMISSIONING

| | |
|--|--|
| <p>1 Check the free movement of the door.</p> | |
| <p>2 Turn mode switch to MAN. The mode switch is located in the head panel.</p> | |
| <p>3 Plug in the mains and turn main switch on. The main switch is located in the head panel.</p> |  |
| <p>4 Choose the type of the arm</p> <p> <input checked="" type="checkbox"/> standard <input type="checkbox"/> sliding ARM </p> <p>The jumpers are located on the control board.</p> <p> <input checked="" type="checkbox"/> Jumper is connected <input type="checkbox"/> Jumper is disconnected </p> | <p>Main switch Mode switch</p> |
| <p>5 Check the DOOR</p> <p> <input checked="" type="checkbox"/> sealed <input type="checkbox"/> hold closed Push&Go DOOR </p> <p> <input type="checkbox"/> sealed <input checked="" type="checkbox"/> hold closed Push&Go DOOR </p> <p> <input type="checkbox"/> sealed <input type="checkbox"/> hold closed <input checked="" type="checkbox"/> Push&Go DOOR </p> | <p>"Sealed" enables motorized closing pull before opening and final pull when closing. Select this to ensure the proper function of the lock when prepull and final pull are needed. Final pull will be activated 20 - 30 mm before the doors closed position. Final pull is activated 1 second, when door is closed position.</p> <p>When hold closed jumper is selected, operator pushes the door against the frame.</p> <p>Push&Go is in operation, when mode switch is in AUTO position. When door is pushed or pulled manually operator opens the door. Operator opens the door to adjusted opening angle and closes the door after 3 second hold open time. Note! It is not possible to use Push&Go and free swing options at the same time.</p> |

COMMISSIONING

6 Check the OPTION



Select "single" for a stand alone door. "Master" and "Corridor", not yet available.

OPTION



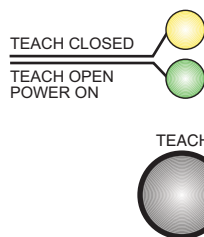
If the jumper is connected then operator requires N.C. output from the fire detector.
If the jumper is disconnected then operator requires N.O. output from the fire detector.

OPTION



When jumper is connected the door can opened and closed manually. When opening impulse comes, the door is opened to fully open position and closed after adjusted hold open time. Free swing is in operation when mode switch is in AUTO position. Note! It is not possible to use Push&Go and free swing options at the same time.

7 Teach door open and closed position



- **Push TEACH-button to enter learning mode.**

- **Teach the door closed position**

Yellow led blinks: close the door and push TEACH-button.

- **Teach the door open position**

Green led blinks: Open the door to the desired angle and push TEACH-button.

- Yellow "TEACH CLOSED" led blinks: Close the door manually.

8 Operators force, opening speed and hold open time

Force



The operator's force requires adjustment to suit door weight. Use lowest possible value to ensure the smooth function of safety feature.

Start the adjustment by putting the force potentiometer to middle position (= 50%) and fine-tune it after opening speed adjustment.

Note! Important: as less force as possible

COMMISSIONING



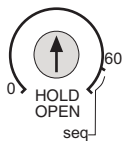
Adjust the opening speed.

| Time (sec) | | Door weight (kg) | | | |
|--------------------|------|------------------|-----|-----|-----|
| | | 60 | 80 | 100 | 120 |
| Door width (mm) | 800 | 2,7 | 3,2 | 3,5 | 3,9 |
| | 1000 | 3,4 | 4,0 | 4,4 | 4,8 |
| | 1200 | 4,1 | 4,7 | 5,3 | 5,8 |
| | 1300 | 4,5 | 5,1 | 5,8 | 6,3 |

Minimum safe opening and closing times for door of various widths and weights are summarized in the table.

Hold open times

Adjust first hold open time for delayed impulse and then hold open time for normal impulse



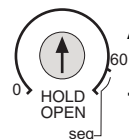
Adjusting the hold open time for delayed impulse

Entering the mode:

- Turn mode switch to **AUTO** position.
- Press **TEACH** button at least 3 seconds.
- In the programming mode green led is lit, yellow led is flashing 3 times, pause, 3 times, pause...
- Adjust the hold open time for delayed impulse (0...60 sec). Time starts when the door is in open position. Full right position (seq) of the potentiometer means that every other impulse either opens or closes the door.

Back to normal mode:

- Press **TEACH** button at least 3 seconds or wait 2 minutes.
- Turn mode switch to **MAN** position.



Adjusting hold open time for normal impulse

- Adjust the hold open time (0...60 s). Time starts when the door is in open position. Full right position (seq) of the potentiometer means that every other impulse either opens or closes the door.

Note!

For safe operation, always use low force, speed and long hold open time.

9 Test the operation

- Turn mode switch to **AUTO**.
- Test the operation.
- If the function is not desired, repeat steps 4 to 9.

A SAFE DOOR

The safety of the door operator is controlled by basic adjustments; operator force, speeds, and hold open times.

- The operator force is an important adjustment. A high value affects to the safety feature and also to its sensitivity.
- High speeds increases the energy transferred in the door causing it not stop correctly.
- With hold open times the distance from impulse device to door is preset.

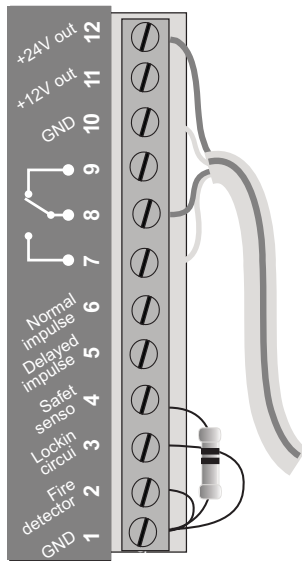
1. Adjust low speeds.
2. Adjust the operator force to a low setting ensuring the safety feature activates on door moving.
3. Adjust the hold open times.

By following these basic procedures the operator is safe in operation.

Note!!! High speeds and safety is only possible by fitting of Safety sensors.

**A safe door environment needs ALWAYS a safety sensor.
It is recommended to use safety sensor when possible,
not only with high speeds.**

EXTERNAL CONNECTIONS



| | | |
|---------|--|--|
| 12 | +24 VDC, 500 mA output | Note! The total load must not exceed 12W |
| 11 | +12 VDC, 1,0 A output | |
| 10 | Ground | |
| 7, 8, 9 | Potential free relay output for lock drive | |
| 6 | Normal impulse | |
| 5 | Delayed impulse. Door will open after 1,0 seconds delay. | |
| 4 | Safety sensor Ground to stop the door movement during operation | |
| 3 | Locking circuit Inhibits the opening if the lock bolt is out. Grounding this input allows the opening | |
| 2 | Fire detector | |
| 1 | Ground | |

Fire detector

Take connection loop between 1 and 2 away if fire detector is connected. Connect fire detector between 1 and 2 and check fire jumper (fire n.c.). After fire alarm, one manual opening is required to re-energise the operator to chosen program selector mode.

Safety Sensor

On the opening side of the door:

Safety sensor is connected between terminals 1 and 4. The cable loop must have 1KOhm resistance inside the safety sensor for cable break detection. Leave resistor connected to the terminals 1 and 4, when safety sensor is not used. Always use safety sensor for maximum safety.

On the closing side of the door:

Safety sensor is connected to impulse input.



- Do not strip any cables for unnecessary length. Loose wires may cause unwanted contacts.

EXTERNAL CONNECTIONS

Impulse inputs

The closing contact drive (NO) must be potential free. The impulse device, like a push button or motion sensor, must be installed within direct sight of the door. Maximum length of the impulse device cable is 30 meters. The total resistance of the control switch and its wiring must not exceed 100 ohm, when switch is closed.

Delayed impulse: delay = 1,0 seconds. When the operator receives the opening impulse, the lock is released immediately and door is opened after 1,0 seconds.

Normal impulse: Door is opened immediately.

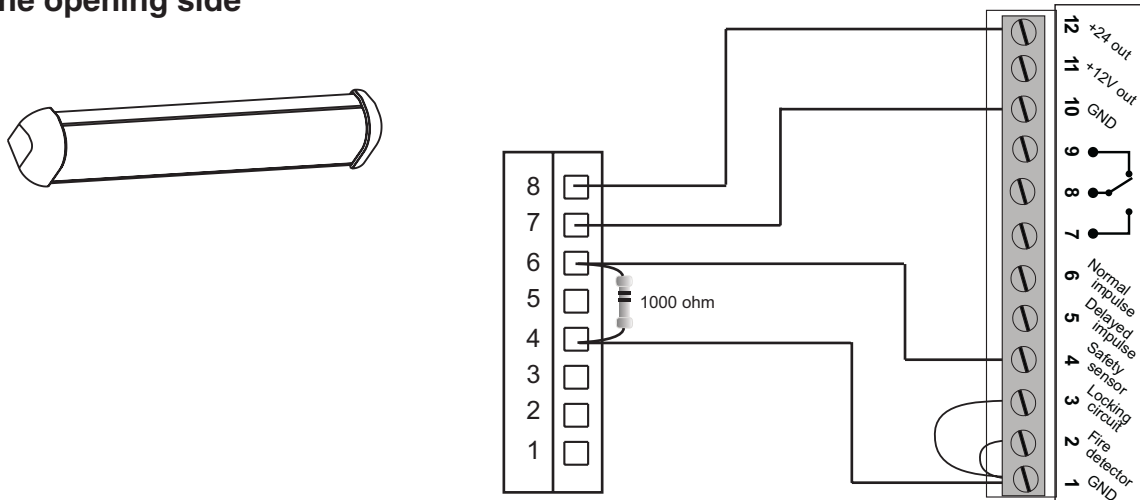


- Do not strip any cables for unnecessary length.
Loose wires may cause unwanted contacts.

CONNECTION EXAMPLES

Safety sensors DA001 and DA002

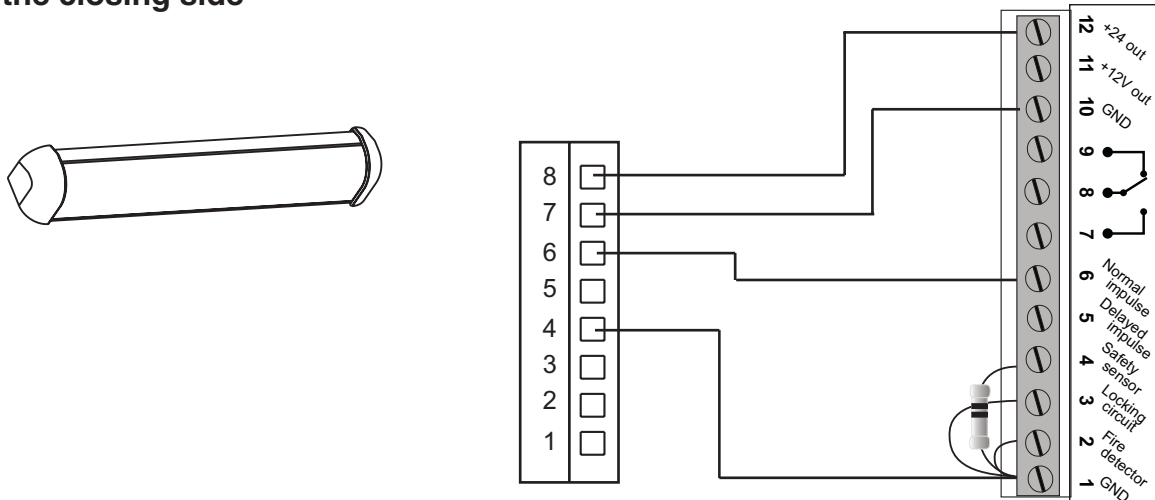
On the opening side



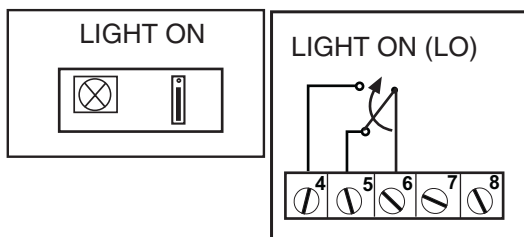
Connect the 1000 ohm resistor from connectors 1 and 4 to safety sensor connectors 4 and 6. The resistor connection controls the condition of cable. If cable is cut or short circuit, the door will stop.

When sensor detects an obstacle, the operator stops the door.

On the closing side



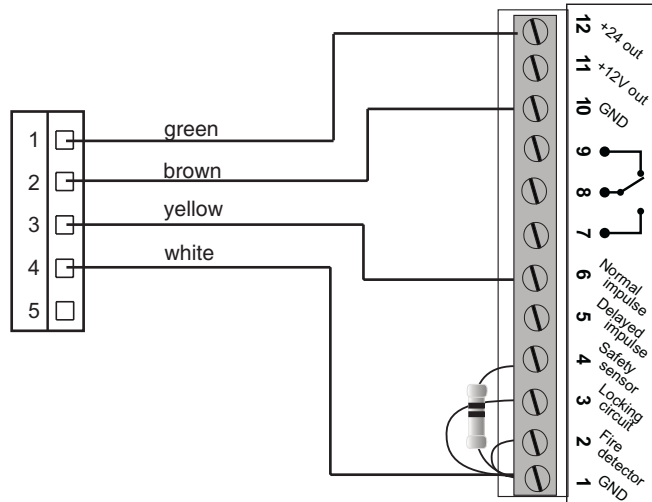
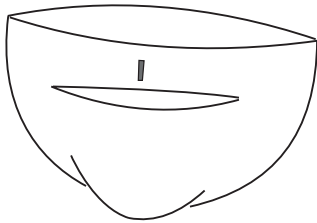
When sensor detects an obstacle, the operator opens the door for duration of the hold open time.



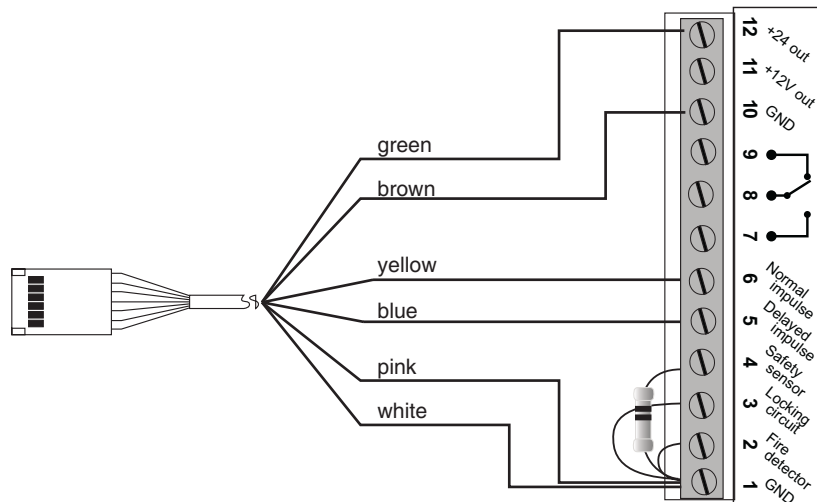
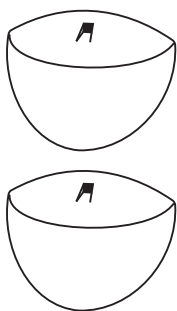
Jumper settings and connection block for DA001 and DA002

CONNECTION EXAMPLES

DA061 and DA062 Microwave motion sensor

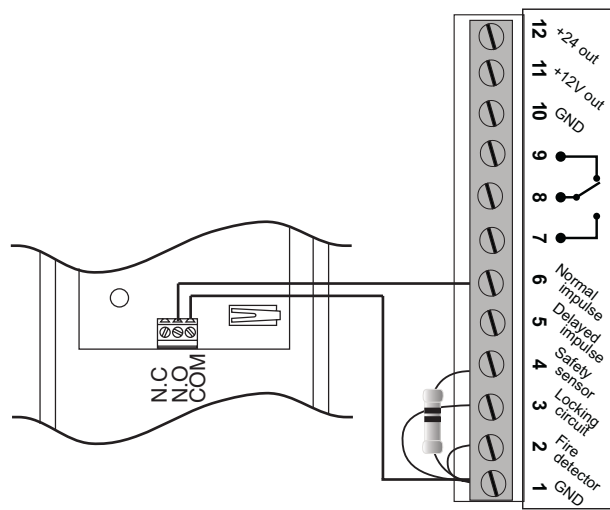


DA063 Microwave motion sensor

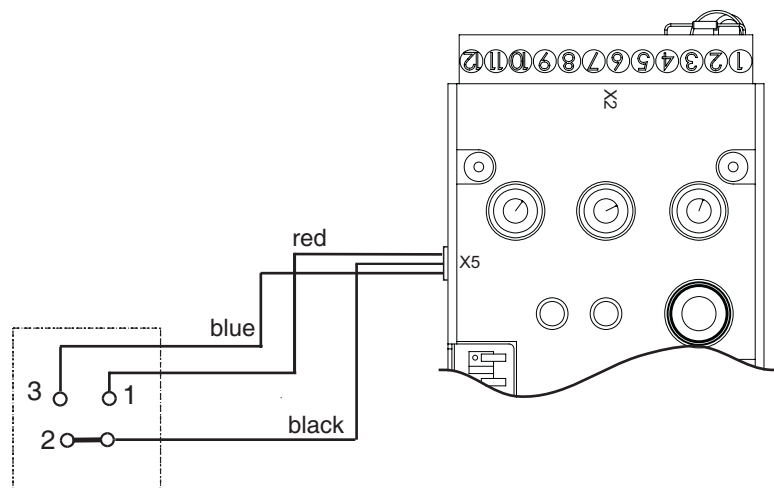
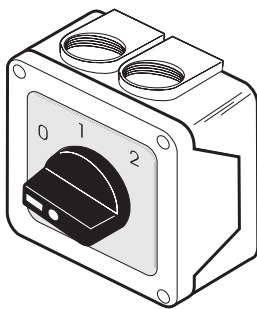


CONNECTION EXAMPLES

DA033 Elbow switch



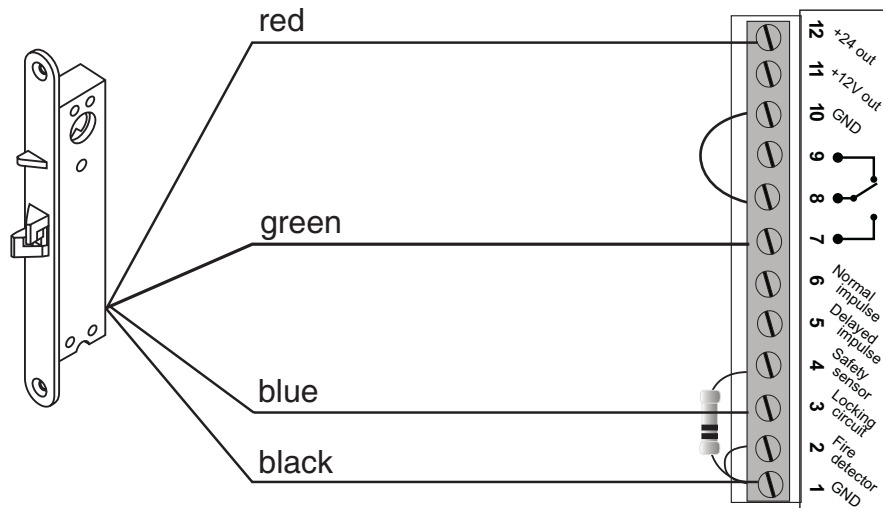
DA039 and DA049 rotary switch



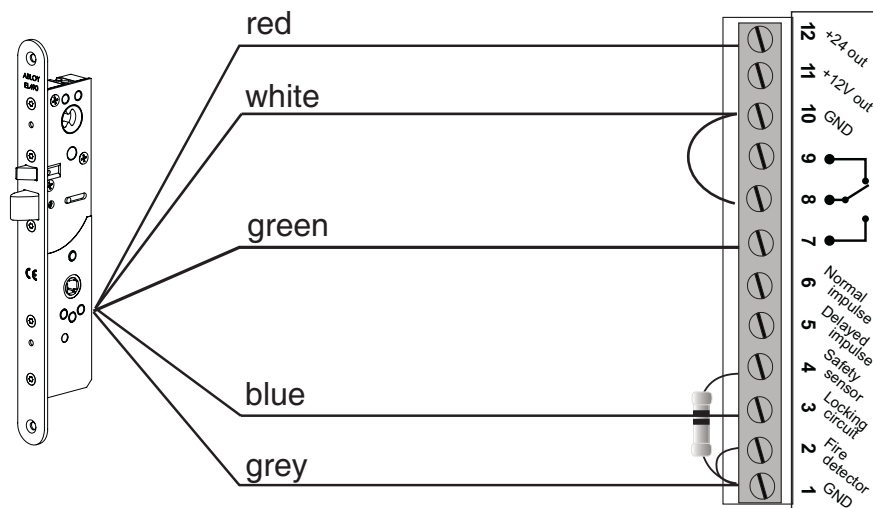
MANUAL = no connection
 AUTO = 2...1
 OPEN = 2...3

CONNECTION EXAMPLES

Electric locks EL412, EL414, EL512

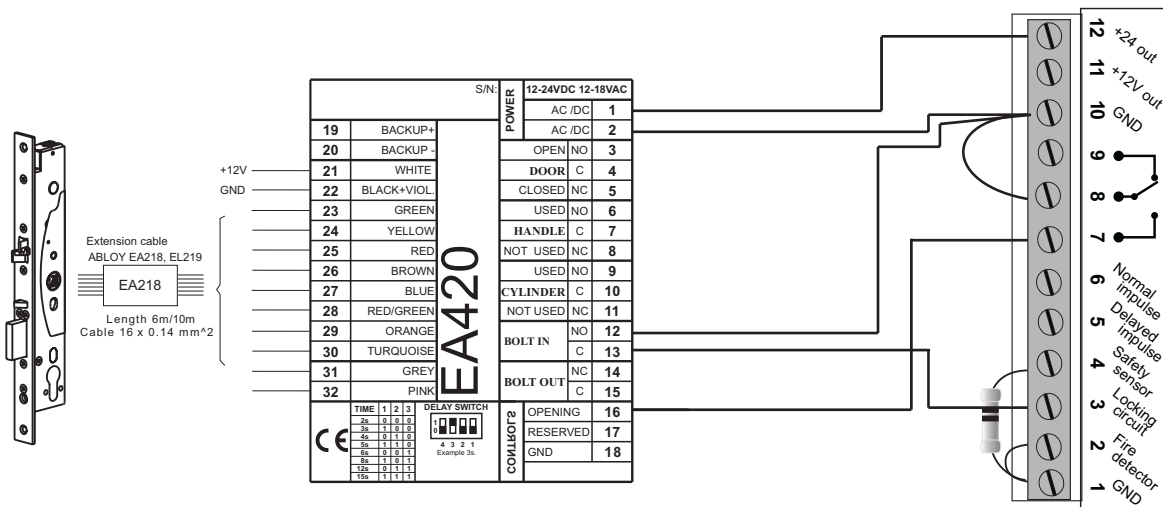


Motor locks EL490, EL590



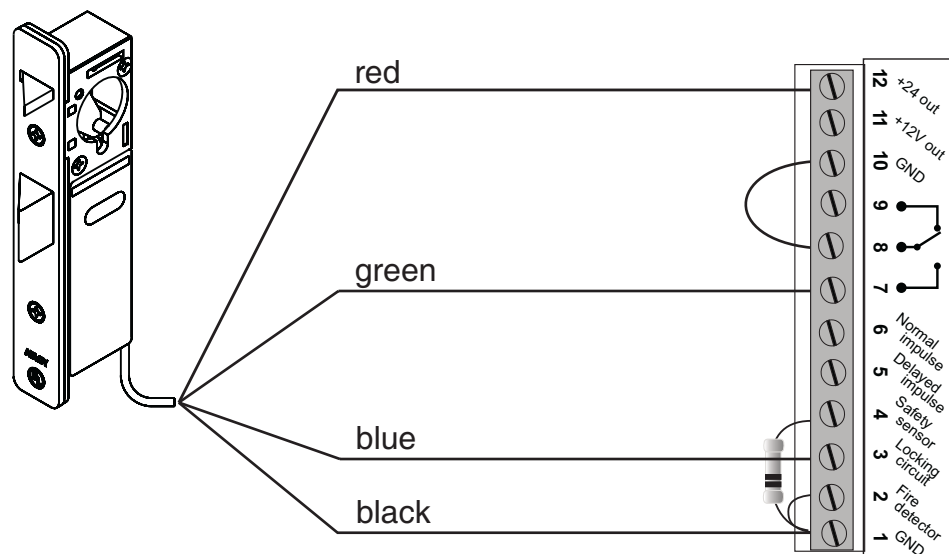
CONNECTION EXAMPLES

Motorlocks EL420, EL520



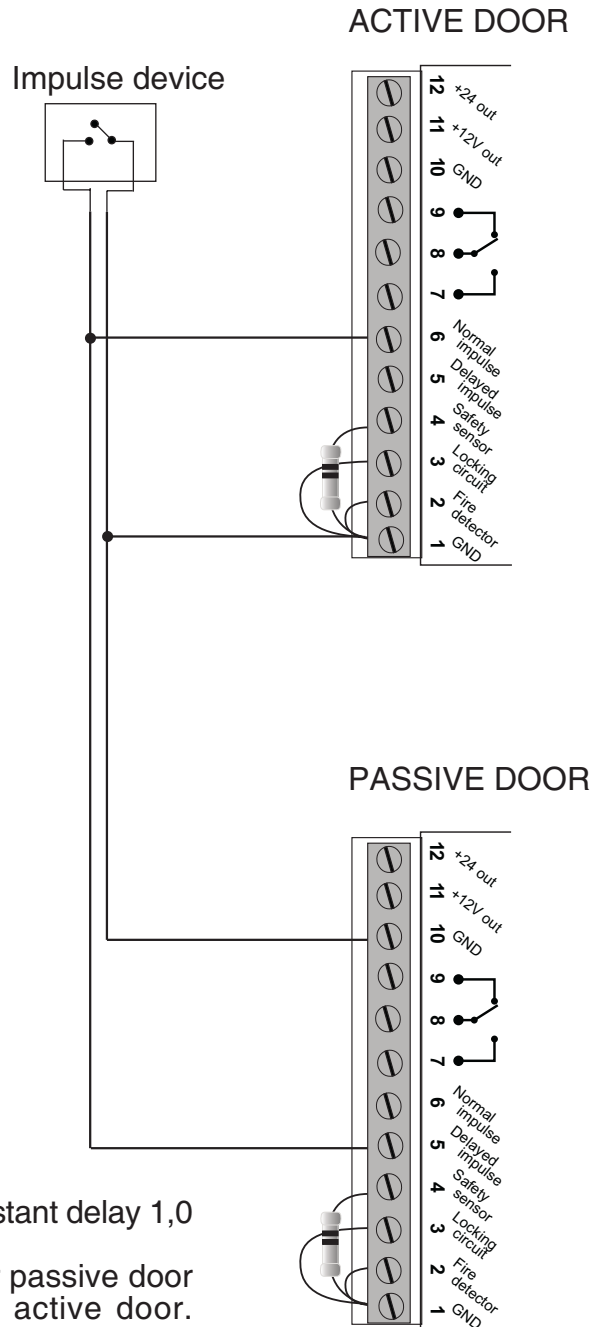
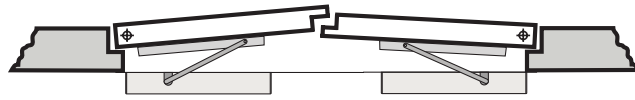
EL520 consumes max. 600mA current.

Electric lock EL410



CONNECTION EXAMPLES

Rebated doors



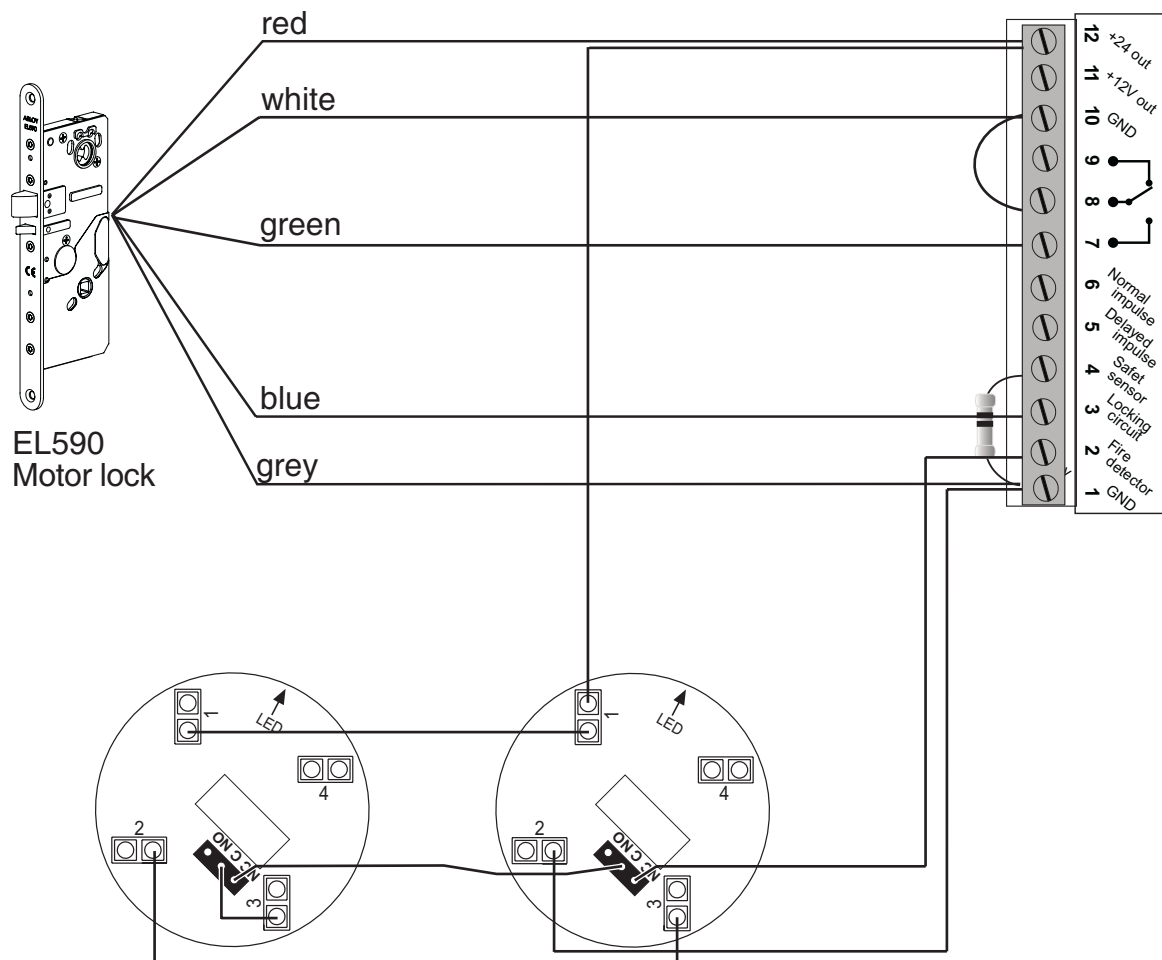
Passive door opens after constant delay 1,0 seconds.
Adjust the hold open time for passive door 1 - 2 seconds shorter than active door.



Mechanical coordinator ensures that double doors close correctly!

CONNECTION EXAMPLES

Fire door system



OPERATION:

When detector reacts, it's relay switches on. Then the GND (-) is disconnected from the operator's control unit (connector 2). The operator doesn't open the door from impulse but it have to be opened manually. The operator closes the door after manual opening.

In fire door use the operator have to be connected to external battery back-up (24VDC, min. 3A).

In case of fire -> the door closes

After fire alarm, one manual opening is required to re-energise the operator to chosen program selector mode.

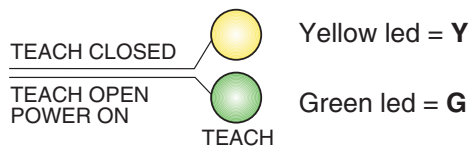
SELF DIAGNOSTICS

The means of diagnostic features is to

- detect malfunctions
- try to take care of safety during malfunction
- get the operator to recover from the defected state.

In case the result of the diagnostics shows unrecoverable malfunctions, the door operator is considered as unsafe, and the door is set free for manual use. The user is informed by blinking both of the LED's in control unit.

Control units LED's



| Indication | Possible Fault | Corrective user interventions in defined order |
|--|---|--|
| G not lit Y not lit | No power. Faulty power supply unit. Faulty control board. | <ol style="list-style-type: none"> 1) Check the mains. 2) Remove 12 pin connector from the control board. 3) Measure the voltage from 5 pin connector, connection points 1 and 3. If voltage is under 24VDC, change the power supply unit. 4) Measure the voltage from 12 pin connector, +24V out against GND. If voltage is not 24 VDC, change the control board. |
| G lit Y lit | The door "close" and "open" positions are not successfully taught. Impulse device is active all the time. Fire detector is active. | <ol style="list-style-type: none"> 1) Teach the door open and close positions . 2) Check all impulse devices and connections. 3) Check fire detector connection and fire N.C. jumper. |
| G lit Y flash | Flash short...short...short...: 1000 ohm resistor is missing or cable of safety sensor is cut. Flash short...long...short...long...: Safety sensor is active or cable of safety sensor is short-circuited. | <ol style="list-style-type: none"> 1) Check that 1000 ohm resistor is connected in control board or in safety sensor. 2) Check that cables are not damaged. <ol style="list-style-type: none"> 1) Move obstacle from safety sensor detection area. 2) Check that cables are not damaged. |
| G flash Y flash | Internal fault in the control board. Door motion is stopped. | <ol style="list-style-type: none"> 1) Switch main switch off for 10 seconds. 2) Check that all applicable jumpers are in place (one of the two arms is selected, "single" is selected). 3) Teach the door open and close positions. 4) Change a spare control board. |
| G flash Y flash alternates | Internal fault in the position sensor board. Door motion is stopped. | <ol style="list-style-type: none"> 1) Switch main switch off for 10 seconds. 2) Check that all applicable jumpers are in place (one of the two arms is selected, "single" is selected) Check position sensor's cable and connector. 3) Teach the door positions. 4) Change a spare position sensor. |

MAINTENANCE

Requirements for trouble-free use of the operator

Installation, commissioning and maintenance is made by trained and qualified technician.

Door leaf is moving sensitively and locking works well.

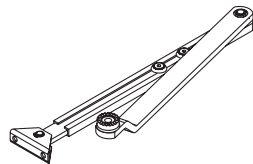
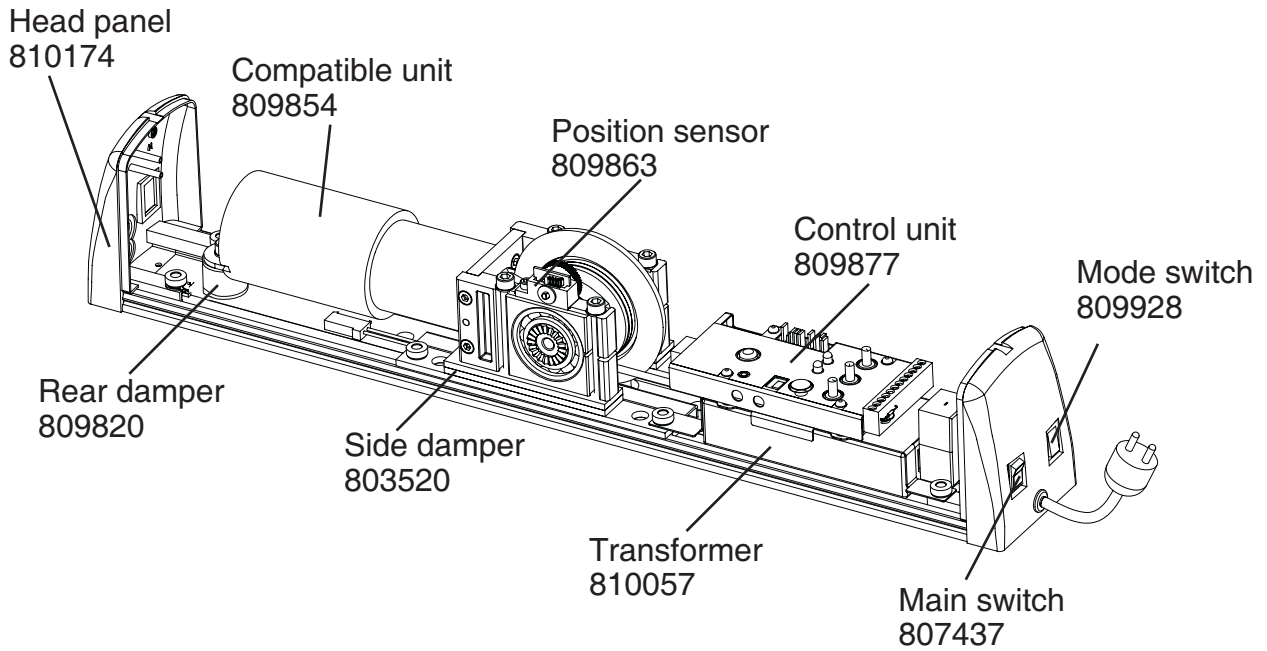
Regular annual services are made:

- Under 100 openings per day; service once a year
- 100 ... 500 openings per day; service two times a year
- Over 500 openings per day; service 3... 4 times a year

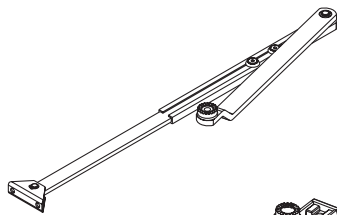
Inspections made in the service:

- Greasing of the bevel gears
- Fixing of the operator and arm
- Function and adjustments of impulse and safety devices
- Programming and adjustments of the operator

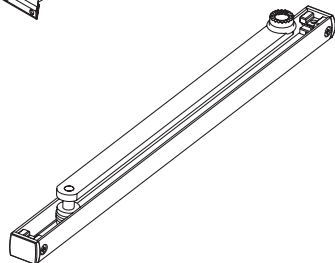
DA460 SPARE PARTS



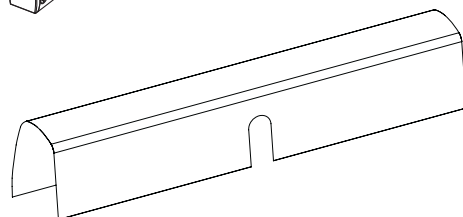
DA147



DA148

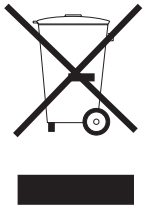


DA149



Cover aluminium 410358

Cover white 410357



Some of the materials in this product, such as electronic components, require specialist recycling techniques.

Nimike
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