

INSTALLATION MANUAL FOR EVO BRAKES

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ALZOLA S.L



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1 SAFETY INSTRUCTIONS:

1.1 Symbols used:



1.2 General instructions:



Every intervention must be carried out by authorised personnel who are in possession of this manual.

- Brake installation.



- Maintenance.

During maintenance work, ensure that the braking mechanism is in standby mode and there is no risk of accidental starting up.



2. PRODUCT DISCRIPTION:

2.1. Operating principle:

The EVO brake family belongs to the compression spring type of brakes. In the absence of an electric current, springs, located in their casing, exercise a force on the mobile plates that stops the movement of the friction disc. When the electromagnet is connected, the magnetic field generated attracts the mobile plates, displacing them and releasing the friction disc. The displacement of the mobile plates may be monitored by use of detectors (*micro-switches*).



The following image makes it possible to notice the main components that make up an EVO brake.



Fig. 1

Number	Description		
1	Casing		
2	Mobile plates		
3	Disc		
4	Hubs		
5	Detectors (micro-switches)		
6	Fixing screws		
7	Manual release lever		
8	Shipping screws		
9	Cables		

Table 1

2.2. Labelling:

All ALZOLA brakes belonging to the EVO family incorporate two labels. In the first are marked the main technical characteristics of the brake model. In the second the serial number, brake model within the EVO range, and a safety information note are specified.





2.3. Physical dimensions:



Fig.	3
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Model	Dim.	Dim.	Dim.	Dim.	Dim.	Dim.	Dim.	Dim.	Dim.	Dim.	Dim.	Dim.	Dim.	Dim.
	A	В	ں	U	Ľ	F	G	н		J	ĸ	L	IVI	N
EVO-01	238	213	185	138	114	18	80	17	22	48	120	0	65	35
EVO-02	275	245	225	184	173,2	18	90	17	22	47	120	0	65	35
EVO-03	300	272,5	250	184	142	20	90	17	23	53	125	5	65	40
EVO-04	348	318	292	232	166	20	110	17	23	58	132	5	110	40
EVO-05	450	415	385	325	222	25	118	17	23	58	139	5	95	40



2.4. General characteristics:

Model	EVO-01	EVO-01 SE	EVO-02	EVO-02 SE	EVO-03	EVO-03 SE	EVO-04	EVO-04 SE	EVO-05	EVO-05 SE
Static torque (-15%, +50%) [N·m]	2x200	2X250	2x450	2x550	2x800	2x900	2x1100	2x1300	2x2000	2x2300
Dynamic torque (-0%, +50%) [N⋅m]	2x200	2X250	2x450	2x550	2x800	2x900	2x1100	2x1300	2x2000	2x2300
Maximum speed [r.p.m]	62	20	76	64	63	37	35	50	3	50
Nominal air gap [mm]	0.20	/0.40	0.20	/0.40	0.20	/0.40	0.20/	/0.40	0.20	/0.40
Maximum admissible air gap [mm]		-	-	-	0.	55	·			
Over-excitation	NO	Sí	NO	SI	NO	SI	NO	SI	NO	SI
Voltage [V _{DC}]	207	207/104	207	207/104	207	207/104	207	207/104	207	207/104
Resistance [Ω]	690	333	504	210	306	200	231	133	133	80
Connection					PARA	LELO				
Power [W]	2X62	2x (128/32)	2x85	2x (204/51)	2x140	2x (214/54)	2x185	2x (322/81)	2x322	2x (535/135)
ED					C).5				
Sound Level [dB]					< 55 dB	(A) a 1 m				
Maximum ambience Temp [ºC]		40								
Maximum voltage to operate detectors (micro-switches)			30 \	VDC (Mecha i	nical detecto	or) / 24 Voc (Optical dete	ctor)		
Maximum intensity for detectors (<i>micro-</i> <i>switches</i>) to operate			0,7	1 A (Mechan	ical detecto	r) / 15 mA (C	Optical detec	tor)		
Peso [Kg]	2	3	2	9	3	9	5	4	1	13
Exam type CE 2014/33/EU (Annex IV A) EN 81-1:1998+A3:2009 EN 81-20:2014 EN 81-50:2014	TRI/D A.000	AS.IV- 001/16	TRI/D A.000	AS.IV- 002/16	TRI/D A.000	AS.IV- 003/16	TRI/D/ A.0000	AS.IV- 004/16	TRI/D A.000	AS.IV- 005/16
System to ensure quality according to 2014/33/UE (Annex VII)					77600	150004				

Table 3

2.5. Available toothing:

The following table shows the standard toothing of the EVO range brake discs:

DIN	5480						
d _B [mm]	45	55	60	65	75	85	
m	1.25	2	3	3	3	3	
z	34	26	18	20	24	27	
Pressure angle[⁰]	30						
Tolerance	7Н						

Table	94
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For measurements different from the above table, consult ALZOLA.



You must ensure that the toothing is sufficiently robust for the requirements of the application.



2.6. Product reception:



The type of packaging may vary according to the brake model and the shipping batch.

2.7. Warranty:

Unless there is a specific agreement with the client, the terms of Warranty shall be the general ALZOLA terms, set in the quotation conditions.

Any modification or manipulation carried out on the brake without the express authorization of ALZOLA, as with any use not complying with the technical specifications set by ALZOLA, shall lead to the suppression of the Warranty and the annulment of ALZOLA's liability with regard to the non-conformity.

2.8. Legal regulations:

UNE-EN 81-20/50: 2014: Safety rules for the construction and installation of lifts. Part 1: electric lifts.

In order for the brake to conform to the directive 2014/33/UE, the integrator must respect the general implementation and use conditions defined in the CE type certificate exam established by the notified body.

3 MECHANICAL INSTALLATION:



3.1 Before starting:

Check that the brake is suitable for the machine. Check the characteristics plate check that both the operating voltage and the braking torque correspond to the requirements for the installation.

3.2 Tools:



3.3 Installation:

1º- Check the position is perpendicular between the axle and the support surface of the brake.



Danger: Do not hang the brake from the cables: this may lead to damage to the brake and/or the brake falling.

2º- Degrease the friction material support surfaces.



Danger: Deficient cleaning of the braking surfaces may lead to a decrease in the brake torque.

We recommend the use of *Loctite®* 7063 or similar. Procedure: Apply the spray on the two support sides of the brake disc. Clean both sides with a clean cloth. Repeat the process until no dirt shows on the cloth.

3°- Place the disc in the machine axle groove. Remove the film protection from the disc. Move the disc to its end position in contact with the braking surface of the machine. The adjustment must slide and not be loose.



Danger if loose.

The disc brakes must not be contaminated.







4^o- Position the brake in the machine and clamp it to it by tightening the corresponding fixing screws. You should guarantee the correct concentricity between the machine axle and the central gap of the brake (in which the *encoder* is usually clamped).

3.4 Screw tightening torques:

Screw tightening torques must be respected: insufficient tightening may lead to the separation hubs being displaced and the corresponding transmission of the braking torque to the fixing screws, with the risk of them shearing. An excessive tightening may also jeopardise the safety of the brake. The use of torque wrenches is recommended.

Screw type (Metric-Class)	Tightening Torque [N⋅m]	Location
M3 - 5.6	0,44	Micro-switches
M4 - 8.8	2,2	Micro-switch controller
M6 - 8.8	7,5	Manual release lever
M8 - 8.8	18,2	Manual release
M10 - 8.8	36	Brake fixing
M12 - 8.8	62	Brake fixing
M14 - 8.8	99	Brake fixing
M16 - 9.8	173	Manual release lever

Table 5

3.5 Shipping screws:





These screws are painted red. Clamp the mobile plates to the casing through the holes found in the casing. They must be removed following the mechanical installation of the brake. Tightening them will cause the mechanical release of the brake. They must never be placed in the installation, to avoid them being accidentally tightened and causing the lift to fall.





After being removed, it is convenient to place the caps supplied with the brake to avoid the insertion of particles in the inside of the brake.



If the brake incorporates *Bowden* release levers (by cable), once the opening cables have been placed in position, the red fixing screws must be removed from the handles. If the screws remain tight they could cause the brake to be released and the lift to fall.



3.6 Positioning the rubber dust cover:



Position the rubber dust cover before plugging in the electric connection.



Once the brake has been clamped to the machine place the rubber. The rubber avoids the insertion of dirt particles in the mobile parts the brake. Precaution: It is not prepared to prevent penetration by liquids.



Optical detectors must be covered, as they are sensitive to dirt and light.

3.7 Placement of the manual release lever:

Types of lever and their components:

• *"Manual Release* Lever":



"Bowden Release" Lever (by cable):



Fig. 9

Both lever models share the same brake assembly process.

Tools to be used:





Installation Process:

EVO brakes may be factory supplied with the lever, but if this is not the case, and installation was required by the client, the following procedure should be observed:

Following a mechanical and electric installation of the brake

1- Remove the central caps from the brake:



2- Lubricate the threads of the lever axle and the screwed hub. Position the axial roller and clamp the handle to the screwed hub using the three screws.





3- Position the above set in one of the open holes after removing the caps.



4- Turn this, screwing the end in the mobile plate as far as it will go.



The right hand lever is screwed in anticlockwise, and the left hand lever is screwed in clockwise.





5- Remove the handle by loosening the fixing screws.





6- Repeat the operation with the handle on the other side (screwing in the opposite direction).







Check that both hubs have one of their three holes on the upper side. Otherwise extract the hub, turn it slightly and relocate it. Repeat this operation until the position of the screwed hub does not show any of its holes on the upper side.





7- Mount the bolt, DIN 985 M8 release nut and the washer onto the handles.



8- Position the handles appropriately and clamp them with DIN7991 M6x12 screws.





8

Check that, without using force, that it is possible to turn both handles slightly (approximately 4 degrees).

9- In the *manual release* levers, not in the *Bowden release* levers, tighten the DIN 912 M8x20 central fixing screw for both levers. (In the *Bowden release* levers we recommend removing the screws).







To simplify the manual lever assembly process, in circumstances where this operation has to be repeated on numerous occasions, ALZOLA may make special tooling available to facilitate this task.

- 4 ELECTRIC INSTALLATION
 - 4.1 Before starting:



CAUTION: Danger of electrocution.

CAUTION: Danger of the lift falling.

CAUTION: Danger of causing irreparable damage to the brake.

4.2 Tools:



Screwdriver

ALZOLA transformaciones electromecánicas s.

4.3 Brake connection:



EVO brakes are brakes that use direct current. Peaks in voltage must be prevented from damaging the winders. Varistors capable of absorbing voltage peaks must be placed in position.

Ensure that the Voltage in the grid is suited to the brake (consult the characteristics label).

EVO brakes consist of two independent electric circuits. They must be connected according to the following diagram:





4.4 Detector connection (micro-switches):

Connecting the optical detectors:

An incorrect connection of the detectors may cause unrepairable damage to them. The detector connection diagram is as follows:







These detectors are equipped with a red LED that indicates the status:

- Brake blocked: LED remains on.
- Brake released: LED remains off.

Connection of mechanical detectors:

The connection diagram for the detectors is the following:



5 OPERATIONAL CHECK:



Run the brake. The mobile plates will be attracted by the brake casing, releasing the disc, and allowing movement of the machine axle.

Immediately disconnect the brake if you should observe:

- The brake produces a loud noise during connection/disconnection.
- The axle does not turn freely once it has been released.

Consult section 8: "POTENTIAL FAILURES".

6 MAINTENANCE:

EVO brakes have been designed to function free of maintenance. In any case, we recommend checking the following points:

Operation	How often?
Air-gap verification	Six monthly
Detector verification	Annually
Winding verification	Annually

Table 6



Every intervention must be carried out by authorised personnel who are in possession of this manual.
During maintenance work, ensure that the braking mechanism is in standby mode and there is no risk of accidental starting up.
It is compulsory to carry out the assembly and disassembly of the encoder following the manufacturer's instructions.
Do not damage cables during maintenance operations.
These devices are designed to work in dry conditions. The friction sides must be totally free of oil, grease or abrasive dust that might alter their characteristics.

6.1 *Air-gap* verification:

Under normal operations, *gearless* machine brakes only carry out static braking, except for emergency stops. That is why under normal working conditions there should be no wearing of the brake.

In order to check the *air-gap*, the brake being blocked (braking), insert the measuring gauges between the mobile plates and the brake casing. An excessive air-gap could lead to the electromagnet not being able to release the brake. Faced with this circumstance the brake disc must be replaced (section 7.1).



6.2 Detector verification:

Mechanical detectors (*micro-switches*) are mounted on the brakes, when connecting/disconnecting the brake you must alternate the status discontinuity/continuity between the detector cables.





In brakes that have optical detectors (*micro-switches*) mounted, on connecting/disconnecting the brake the red LED of the detector must change status.



Fig. 25

Should any of the *micro-switches* not behave in the way described above it may be necessary to readjust or replace the detector. Consult point 7.2 "*Replacement and adjustment of detectors (micro-switches)*".

Check that the detector is clean.

Check that the rubber dust-cover fits and prevents the insertion of particles or light (in the case of optical *micro-switches*) in the detector.



Exposing of the microswitches to silicon gas may cause their dysfunction.

6.3 Winding verification:

Checking the resistance: Check that the resistance of the winding is correct. A reading below that shown on the characteristics plate will be a sign that the winding has been damaged. In this case it will be necessary to replace the brake as a whole. Consult the nominal value of the resistance in section 1.5 *"General characteristics"*.

7 SPARE PARTS:

Spare parts are considered to be those components that may be replaced in the installation of the lift without prejudice to the safety of the brake.

7.1 Disc replacement:





Danger: the following process leads to releasing the brake, with the consequent risk of uncontrolled movement of the lift cabin and the counterweight.

Danger of entrapment.

Carrying out this process may require prior withdrawal of the *encoder* and subsequent assembly and readjustment.

1. Once the installation has been secured, remove the plastic caps and position and tighten the shipping screws, painted red, to avoid the brake dismantling.





- 2. Disconnect the power cables of the brake and the detectors.
- 3. Remove the fixing screws of the brake and extract it.



Fig. 28

- 4. Extract the disc to be replaced. In the diagram find the series number and model. With this data request a replacement from ALZOLA.
- 5. Reassemble the brake according to the instructions in section 3.3 and the following sections.
- 6. Remove the shipping screws, and, in the holes, insert the initially removed caps again.
- 7. Following the disc replacement check the detectors work correctly (section 6.2), adjust them if necessary (section 7.2).
- 7.2 Replacement and adjustment of detectors (*micro-switches*):



Danger of lift falling: During the operation described in this section the brake will be released allowing the uncontrolled movement of the cabin.

Danger of entrapment.

The reference for the mechanical detector is *D2SW-01MS* by OMRON©.

The references for the standard optical detectors mounted on EVO brakes are *EE-SX950-R* (NPN) and *EE-SX950P-R* (PNP), both by OMRON©.

Tools:





all to	Spanner size 10 (2 units).
	Torque wrench.
	Feeler gauge
	Multimetre (only for mechanical micro-switches)

Failure of one or both detectors will cause, despite the fact that the brake may be working correctly, the manoeuvre to incorrectly detect the changes of status of the brake, and to stop the installation. The failure may be due to a maladjustment of the actuator screw, which will require the readjustment of the detector, or may be due to the detector breaking, which will require it to be replaced. Below is a description of both processes.

Replacement of detectors (both optical and mechanical):

1. Remove the defective detector by unscrewing the fixing screws and the staple that clamps the cable.



2. Put the new detector in position. In the case of mechanical detectors, ensure that the actuator screw is facing the button. In the case of optical detectors, pass the cable through the orifice in the brake casing.





3. Clamp the detector in position. In the case of mechanical detectors, using DIN84 M2.5x10 screws and DIN125 M2.5 washers with a tightening torque of 0.23N·m. In the case of optical detectors, using DIN84 M3x10 screws with a tightening torque of 0.59N m it is recommended that the screw heads be sealed. Clamp the cable using the staple provided.



- 4. Proceed to adjust the detectors according to the procedure described below.
- Adjust the detectors (both optical and mechanical):



This operation may only be carried out with the brake mounted on the machine.

If the shipping screws (red) are present, remove or loosen them.



1. Insert a 0.10mm gauge between the mobile plate and the casing of the brake, close to the detector. Connect the brake to the current.



Loosen the locknut and move the adjusting screw until the point where the detector is active: In the case of optical detectors the red light will switch off. In the case of mechanical detectors, continuity will be interrupted between the *micro-switch* cables.





2. Then tighten the locknut of the adjusting screw.



3. Activate and deactivate the brake repeatedly, even with the gauge in the previous position, it works correctly.





4. Extract the gauge from its position (with no power in the brake), and insert it (powering the brake) between the disc and the mobile plate. Then disconnect the brake.



- 5. Check that the detector is deactivated: In the case of the optical detector, where the *micro-switch* light is on. In the case of the mechanical detector check that there is continuity between the *micro-switch* cables.
- 6. Activate and deactivate the brake repeatedly to check that, even with the gauge in the previous position, it works correctly.





7. If correct operation cannot be achieved, repeat the adjustment process from step 1.

7.3 Replacement of the manual release lever:

1. Extract the lever to be replaced by turning it so that is goes away from the opposite lever.



Remember that the threading of each lever is in the opposite direction.

2. For assembly of a new lever follow the procedure explained in section 3.7 of the manual.



8 POTENTIAL FAILURES:

Failure	Possible reasons	Solutions	
	Wrong Voltage.	Apply the correct voltage.	
	<i>Air-gap</i> too large (disc deteriorated).	Replace the rotor.	
The brake does not work.	Coil broken.	Replace the brake.	
	<i>Micro-switch</i> broken.	Change the micro-switch.	
	Micro-switch badly adjusted.	Adjust the micro-switch.	
The brake is slow to react in the case of an emergency stop.	The brake is connected to an alternating current.	Connect to the direct current.	
The brake does not release.	Particles stop the casing from moving.	Replace brake.	
The torque is insufficient.	Greasy disc.	Clean disc support and replace the disc.	
The brake is very noisy.	Air-gap too large.	Replace disc.	
The broke gets too bet	Wrong Voltage.	Apply the correct voltage.	
The blake gets too hot.	The winding is short-circuited.	Replace the brake.	
The release lever turns.	Tightening torque is insufficient.	Tighten (See table 3.1).	

Table 7







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