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User and Maintenance Manual



E ***Hydraulic failsafe*** **Model E4N-ID**



ISO 9001 - Certificate N°0238

Translation of the original instructions
EN 130701 REV. 1


	User and Maintenance Manual <i>“E” Failsafe caliper brake</i>		Model E4N-ID
	Date: 2013/07/01	Revision: 1	www.coremo.it

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1. Introduction

The purpose of this manual is to provide the user with all the information necessary to use the product properly, independently and safely.

This manual constitutes an integral part of the safety features and must be read in its entirety before installation and use of the product. It must therefore be kept in a safe place should future reference be necessary before proceeding with any kind of work.

The user is strongly advised to read it carefully and to follow the rules and procedures contained in it as these provide important information concerning safe use and maintenance.

If any doubt should arise concerning the correct interpretation of the instructions, contact our technical department for the necessary clarification.

It is prohibited for anyone to disclose or modify the content of this manual or to use it for personal purposes.

2. Manufacturer

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3. General information

Correct use of the product: In compliance with Italian Legislative Decree 17/2010 and DIRECTIVE 2006/42/EC the operating limits for ideal and safe use of the product are stated in this manual.

Design parameters: COREMO OCMEA caliper brakes have been designed for use in conformity with the performance and conditions stated in the catalogue and Chapter 5.1 of this manual. It is advisable not to exceed these limitations.

Model selection: Selection of the correct model for a given application is of basic importance. The technical department of COREMO OCMEA can provide you with information, suggestions and assistance regarding correct application and use.

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Use: Compliance with the assembly and maintenance instructions prevents not only costly down time but also accidents due to incomplete knowledge of the product.

Rotating parts: The caliper brakes are coupled mainly with rotating parts. In this case the moving parts must be protected in conformity with the requirements of DIRECTIVE 2006/42/EC and Italian Legislative Decree 17/2010 or equivalent legislation in force in the countries in which they are used.

Power source for hydraulic brakes: Use mineral oil SAE/SO 46.

Failsafe spring brakes: Failsafe spring brakes must be handled with special care as they contain mechanically preloaded springs. To avoid the risk of accidents during maintenance it is necessary to follow the instructions in this manual and those highlighted in red on the label attached to the brake.

Friction material: All COREMO OCMEA caliper brakes are fitted with friction material which is absolutely free of asbestos and is declared as NON toxic/harmful in full observance of health and environment regulations and laws. In any case it is better not to inhale dust produced by them and to wash hands thoroughly before eating or drinking.

Oils, greases, lubricating components: These are used in extremely limited quantities. Personnel suffering from allergies to these substances are advised to wear gloves or use protective cream which must be washed off thoroughly before eating or drinking.

Product markings: All the data on the plates must always be kept legible. Use the data shown on the plates when contacting the manufacturer for spare parts, information or assistance for example.

Disposal: Worn brake lining pads and other materials of which brakes are made are classified as special NON toxic/harmful products and therefore must be disposed of in accordance with the laws in force in the countries in which they are used.

4. Warnings



Failure to follow the instructions in this manual and on any plates attached to the product exposes persons to risks and may cause damage to other equipment and machinery.

- The product must not be used at an ambient temperature lower than -20 °C.
- The disc must be made of iron alloy (cast iron or steel) having a hardness in the range 190 to 220 HB.

The technical department of COREMO OCMEA can provide additional information in order to ensure correct application and use of the product.

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Dangers caused by a power failure: A power failure will cause the brake to be applied suddenly. It is therefore necessary to provide an uninterrupted power supply or, if the case requires, use suitable power failure warning systems as a brake failure may cause personal injury and damage to property.

Danger of breakage during operation: To reduce the risk of breakage during operation carry out the periodic inspections shown in this manual.

Risks connected with changes in operating conditions: The product is designed for the purposes stated in this user and maintenance manual therefore the minimum power supply pressure necessary to allow the brake to open and the maximum pressure required for the brake to work safely and reliably are indicated. The operating conditions also vary depending on the diameter of the brake disc used; this manual contains an equation to calculate the dynamic torque provided as a function of the disc diameter. Please note that an erroneous calculation may result in a braking torque different to the desired value which could compromise aspects of safety.

Residual risk: Residual risk can be attributed to the operator not following all the procedures stated in the user and maintenance manual and not giving due consideration to the warnings.

5. Technical data

5.1. Product performance

The failsafe brake is to be used for emergency stops or holding stops.



Use of the product for any purpose other than those indicated may represent a risk to any aspect of safety.


Warning: The value of the friction coefficient is purely theoretical as it depends on environmental conditions and on how the product is used.

The type “E” failsafe caliper brakes applies a tangential force of 42000 N attributing a coefficient of friction of 0.4 . The tangential force is obtained with 16 springs, proportionately lower values can be obtained with 14, 12 or 10 springs

- **Dynamic torque**

The dynamic torque provided by the brake will be a function of the diameter of the disc used for each single type of product and can be determined using the following equation:

$$\text{Dynamic torque [Nm]} = \text{Tangential force [N]} \times (\text{radius of the disc [m]} - 0,065)$$

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An error in calculation will result in a braking torque different to the desired value and a risk to aspects of safety.

The technical department of COREMO OCMEA can provide information, suggestions and assistance for correct application and use of the product.

5.2. Brake lining wear



The thickness of each single new lining is 13 mm. A maximum overall lining wear of 12 mm is allowed. Failure to remain within the above limit may represent a risk to aspects of safety.

5.3. Special note

During braking kinetic energy is converted into heat caused by friction between the surfaces of the brake linings and the brake disc. It is therefore fundamentally important to consider the amount of heat that can be dissipated.




Ignoring the heat produced during braking affects brake lining wear and may jeopardize the safety of the operators and the reliability of the product. Since a brake can be used for many applications, it is advisable to contact the technical department of COREMO OCMEA for further explanation in this regard.

6. Transport and storage



Personnel assigned to this work must wear suitable PPE such as gloves, safety footwear and take any other precautions necessary before proceeding with transport, handling and storage of the this part.

1. **Transport:** When handling it is important to bear in mind the dimensions and weight of each single type of product as shown in the product drawing enclosed with this manual and in the catalogue of the brake type in question.
2. **Storage:** When storing brakes it is important to bear in mind that a considerable weight is concentrated in a small space. Personnel assigned to this work must wear suitable PPE (safety footwear, gloves, etc.) in order to avoid the risk of injury.

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7. Installation



THE BRAKE MUST BE INSTALLED WITH THE MACHINE OFF.

Personnel assigned to this work must wear suitable PPE such as gloves, safety footwear and take any other appropriate precautions to ensure adequate protection and avoid the risk of injury.

1. Mount the brake on a rigid flat surface of the machine or on a support capable of withstanding a tangential force of 46200 N.
2. The brake can be mounted in any position as it is provided with a balancing system for the levers and alignment of the brake shoes.
3. Anchor the brake to the supporting base using 3 class 8.8 M16 screws and a tightening torque of 200 Nm.
4. Adjust the screws C61562 located between the levers using a n. 6 spanner (Figure 1), until the weight of the thruster is balanced; when balanced lock the screw by tightening the nuts C61608.

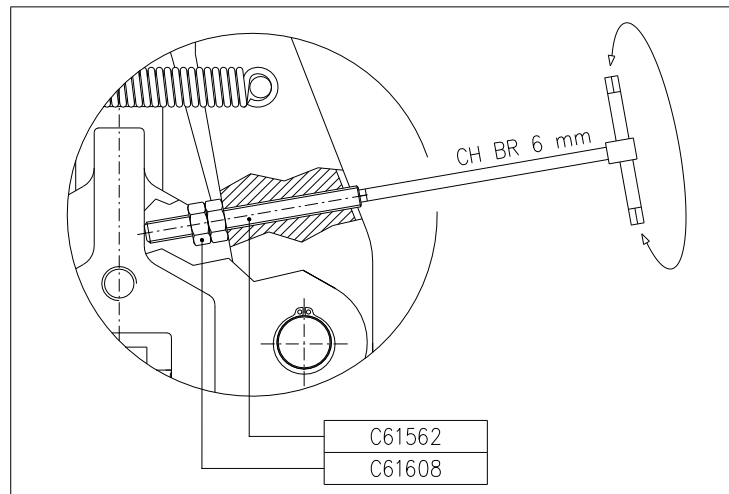


Figure 1

5. Adjust the play between the brake linings and the disc using the play adjuster D71022 (D71076 if with ON/OFF), and a n. 30 Allen key, rotating in the appropriate direction (Figure 2); when a play of 1 mm (with disc of thickness 25.4 mm) or 1.5 mm (with disc of thickness 40 mm) has been obtained between the disc and each brake lining, lock the adjuster in position screwing the ring nuts (C61711).

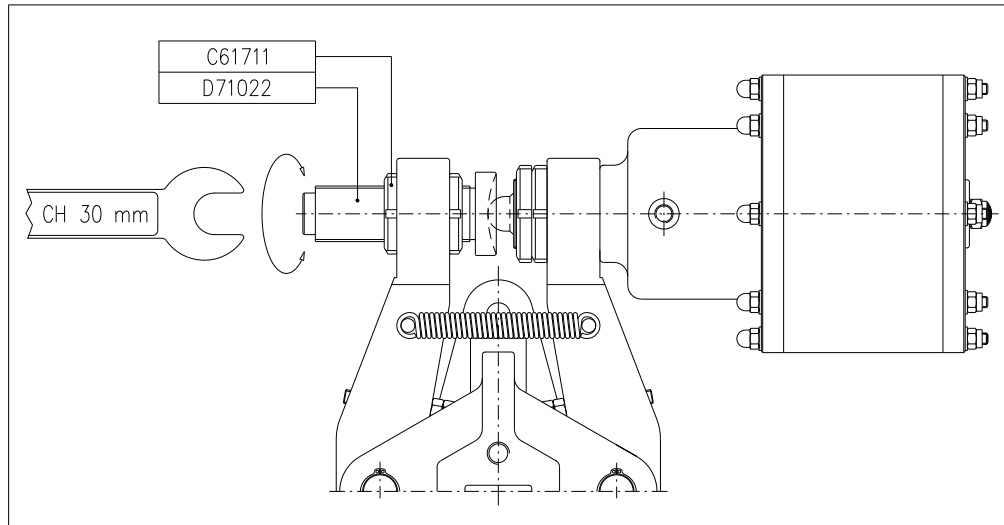


Figure 2

6. Adjust the brake shoes using the grub screw C61559 rotating it in the appropriate direction with a n. 4 Allen key; the friction surface of the brake linings must be parallel to the surface of the disc (Figure 3).

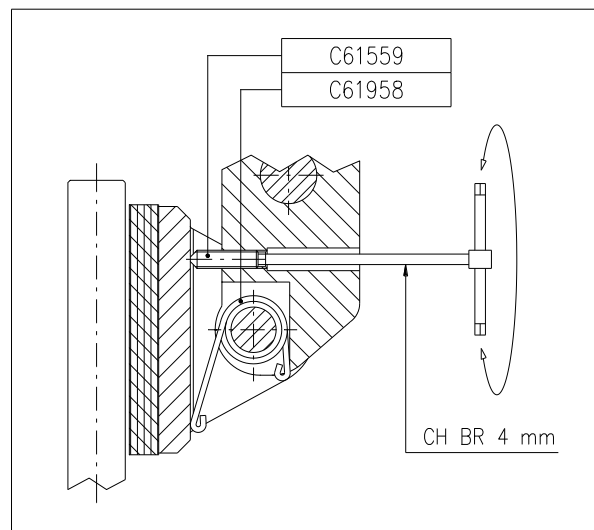


Figure 3

7. Connect the thruster piston of the brake to the power line using a 1/4" gas fitting and a flexible hose of sufficient length to allow the thruster a wide range of movement.
8. The control pressure must not exceed 100 bar while the minimum opening pressure must not be less than 60 bar.
9. Power up the thruster and substitute the safety screw TE M14 with the silencer C61846 (Figure 4).

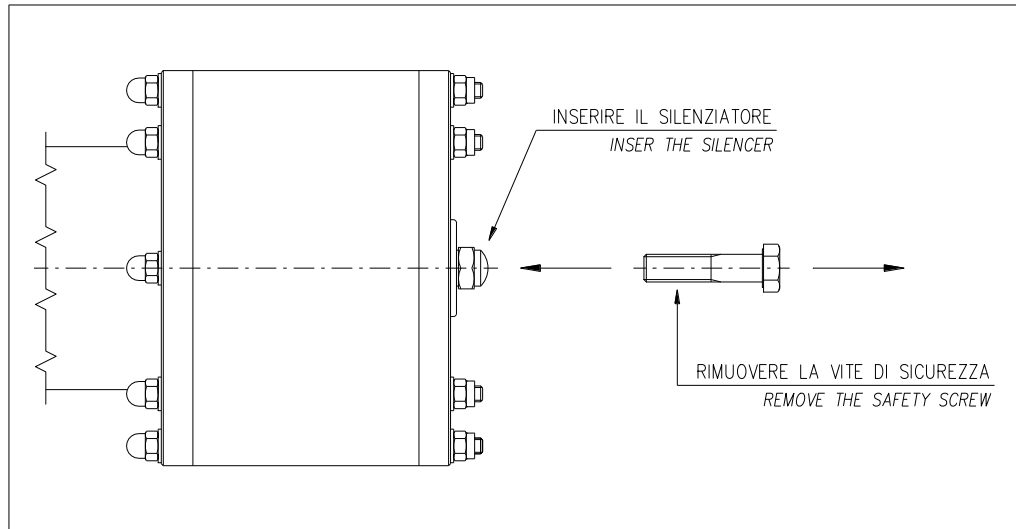


Figure 4



Do not apply the brake without the disc positioned between the brake linings; failure to follow this rule could result in fingers being crushed and other dangers in addition to damage to the brake itself.

10. Bleed air out of the oil circuit by loosening the grub screw C61961 with a n. 4 Allen key, until oil begins to come out. When all the air has been bled out tighten the grub screw again (Figure 5).

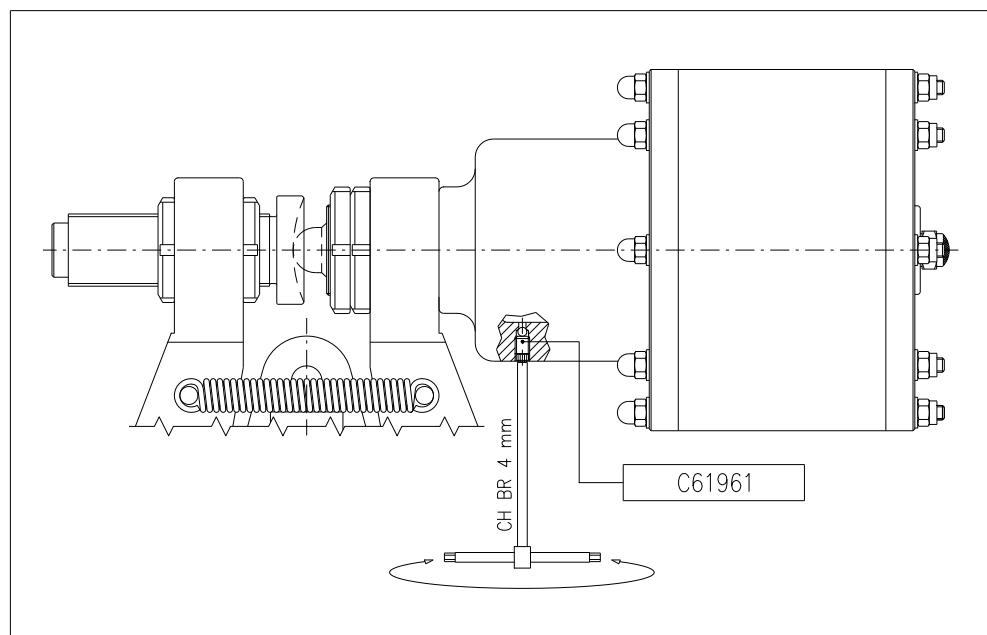


Figure 5

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Personnel assigned to these operations must take special care, working cautiously when bleeding the circuit, wearing suitable PPE such as gloves, goggles and safety footwear and taking any other precautions necessary before proceeding.

11. **BEDDING-IN:** The initial braking torque may be from 30% to 50% less than the rated value until the brake lining adjusts to the disc.

8. Operation

8.1. Power supply of the safety component

For the correct operation of the brake the control pressure must not exceed 100 bar while the minimum opening pressure must not be less than 60 bar. Use mineral oil SAE/SO 46.

The technical department of COREMO OCMEA can provide information, suggestions and assistance for correct application and use of the brake.

8.2. Improper use

The products considered here must be used exclusively as described in Chapter 5 of this manual. Any other use is to be considered improper. The manufacturer declines all responsibility for damage caused by erroneous or unreasonable use of the product.



Use of the product for purposes other than those stated in this manual may compromise any aspect of safety.

9. Maintenance and cleaning



TUTTI I TIPI DI INTERVENTO SUL FRENO DEVONO ESSERE EFFETTUATI A MACCHINA FERMA.

Staff assigned to this work must wear suitable PPE such as gloves and safety footwear and take any further precautions necessary to ensure adequate protection and prevent injury. Failure to follow the instructions given for maintenance and cleaning of the product may compromise personal safety and cause damage to equipment and machinery.

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High temperatures may be produced after braking on the surfaces of the disc brake and the brake linings. Personnel must therefore wait for parts subject to overheating to cool down and wear suitable protective gloves and PPE.

9.1. Readjusting the play

1. Power up the thruster (minimum supply pressure of 60 bar and maximum of 100 bar).
2. Loosen the ring nuts C61711.
3. Rotate the play adjuster clockwise until the optimal play of 1 mm (with disc of thickness 25.4 mm) or 1.5 mm (with disc of thickness 40 mm) is obtained between the disc and each brake lining (Figure 2).
4. Lock the ring nuts C61711.
5. Realign the brake shoes as described in point 6 of Chapter 7 (Figure 3).

9.2. Changing the lining pads


1. Power up the thruster (minimum supply pressure of 60 bar and maximum of 100 bar) and replace the silencer with the safety screw.
2. Pull out the pin K90073 and remove the shoe D71026 for brakes with disc of thickness 25.4 mm or the shoe D71023 for brakes with disc of thickness 40 mm.
3. Unscrew the 4 screws C61171, remove the brake lining and replace it with a new one. Put a few drops of threadlock on the screws C61171 and tighten them to a torque of 12 Nm.
4. Reassemble the shoe following the sequence in point 2 in reverse order, positioning the shoe alignment spring C61958 as indicated in Figure 3.
5. Readjust the play between the disc and lining as described in Chapter 9.1.
6. Replace the safety screw with the silencer.

9.3. Cleaning the friction surfaces

1. Dismantle the brake linings as explained in Chapter 9.2.
2. Remove any oil or grease from the surface of the disc using a non-pollutant detergent.
3. If the discs are contaminated only superficially it is better to clean them using fine emery cloth. If the contamination of the linings is deep or at the maximum wear limit as indicated in Chapter 5.2 and stated in the catalogue, replace them with new linings.

9.4. Changing the thruster springs

1. Power up the thruster (minimum supply pressure of 60 bar and maximum of 100 bar).
2. Replace the silencer C61846 with the safety screw TE M14.
3. Unscrew the ring nuts and remove the thruster from the brake.

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4. Remove the safety screw TE M14.
5. Cut off the pressure to the thruster and disconnect the power line.
6. Remove the threaded bars and their nuts which anchor the thruster body E80823, the bell and the cover (Figure 6); unscrew slowly and carefully so that the preloaded springs are released gradually.

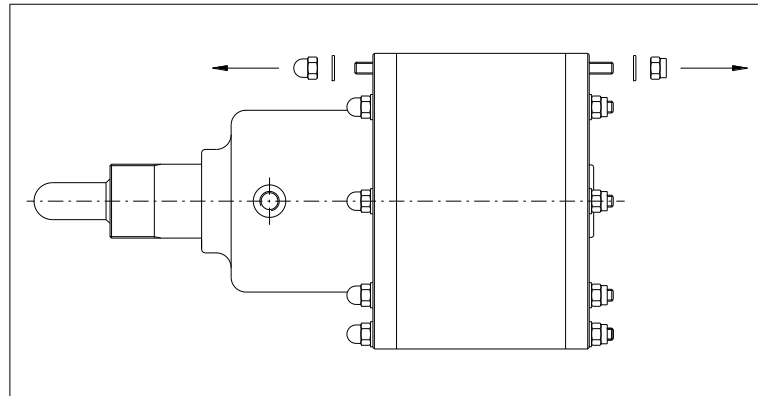


Figure 6



Take the utmost care in these operations as the thrusters contain preloaded springs. Therefore proceed gradually with the utmost care and attention until they are completely released and no longer represent a threat to safety

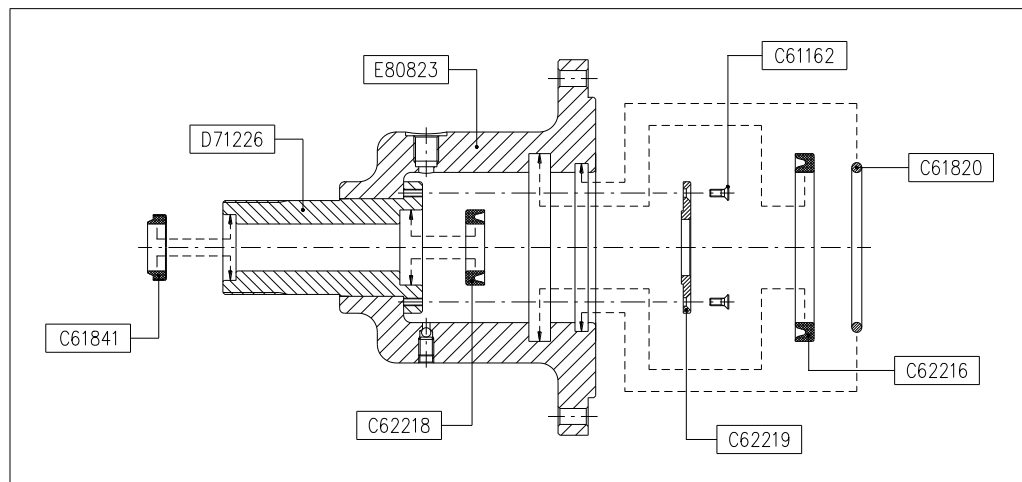
7. Remove the cover Z50313 and replace all the springs including those which seem to be in good condition.
8. Rest the cover on the springs, align the anchoring holes and insert the threaded rods complete with nuts and flat washers in their seats. Tighten following a diagonal sequence locking the unit in position with the self-locking nuts.
9. Reconnect the flexible hose and power up the thruster (minimum supply pressure of 60 bar and maximum of 100 bar).
10. Insert the safety screw TE M14.
11. Remount the thruster on the brake locking it in position with the ring nuts.
12. Replace the safety screw TE M14 with the silencer C61846.
13. Apply the brake a number of times to ensure that the internal thruster slides perfectly and check for any oil leaks.

9.5. Changing the brake shoe alignment springs

1. Power up the thruster (minimum supply pressure of 60 bar and maximum of 100 bar) and replace the silencer with the safety screw TE M14.
2. Pull out the pin K90073 and remove the brake shoe D71026 (for brakes with disc of thickness 25.4 mm) or D71023 (for brakes with disc of thickness 40 mm).

3. Remove the shoe alignment spring C61958 from its seat and replace it with a new one positioning it as shown in Figure 3.
4. Remount the brake shoe following the procedure in point 2 in reverse.
5. Readjust the play between the disc and the lining as described in Chapter 9.1.
6. Substitute the safety screw with the silencer.

9.6. Changing the gaskets



1. Proceed as explained in Chapter 9.4 from point 1 to point 6.
2. Remove the cover Z50313.
3. Remove the bell E80822 and springs.
4. Remove the plate unit Z50314 and pull out the internal thruster piston D71224 complete with rod D71225.
5. Using a n. 2.5 Allen key unscrew the screws C61162 and remove the gasket locking flange C62219.
6. Remove the damaged gaskets (C62216 - C62218 - C61841) and the o-ring (C61820) and replace them with new ones. Before placing the new gaskets in their seats, lubricate with mineral oil. Grease the stem (D71225) and the internal thruster (D71224) too before remounting the thruster unit.
7. Remount following the instructions from point 5 to point 3 of Chapter 9.6 in reverse order.
8. Remount following the instructions in Chapter 4 from point 8 to point 13 in reverse order.

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9.7. Periodic maintenance



All inspections must be done with the machine switched off.

Although the intervals between these inspections depend on the frequency of use of the brake, they should be done every 3 months in any case so as not to compromise all aspects of safety.

1. Check that the play between each lining pad and the friction disc does not exceed 1 mm. If the play is too large, adjust it to the initial value as described in Chapter 9.1. When the wear of each lining reaches 6 mm replace it as described in Chapter 9.2.
2. Check that the surfaces of the linings and the disc are not contaminated with grease, oil or similar substances because these prevent the brake from working effectively.
3. Check that the anchoring screws of the brake and the brake units are correctly tightened.
4. Check the condition of the flexible hoses.
5. Apply the brake a number of times to check the condition of the gaskets, the operation of the springs and correct sliding of the stem.

10. Spare parts list

To avoid costly down time we recommend keeping a stock of spare parts adequate for the number of brakes as listed below:

Lining pads:	Cod. N° D71000 ST 10
	Cod. N° D70997 ST 11
	Cod. N° D70998 ST 12
Thruster springs:	Cod. N° cod. N° C61844 - C61845
Shoe alignment springs:	Cod. N° C61958
Lever balance springs:	Cod. N° C61959
Gaskets:	Cod. N° C62216 - C62218 - C61841
O-Ring:	Cod. N° C61820

These spare parts must be kept in a place that is preferably dark, cool and far from substances that could reduce their functionality.