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User and Maintenance Manual

Spring-applied brakes

M

ISO 9001 - Certificate N°0238

Translation of the original instructions

EN 130701 REV. 1

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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 product 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: The "M" brakes of COREMO OCMEA has been designed to operate in compliance 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. When selecting a model an appropriate service factor must be taken into consideration. In the case of failsafe

brakes the service factor must not be less than 2. The technical department of COREMO OCMEA can provide you with information, suggestions and assistance regarding correct application and use.

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: 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: Use air not contaminated with oil or water and a 25 micron filter with automatic condensation discharge.

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 "M" brakes of COREMO OCMEA 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.

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 friction materials and other materials of "M" brake units 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.

If the temperature should rise above 100°C check the efficiency of the air chamber since in these conditions it is more subject to rapid aging or carbonization.

Checks for correct use: Check that there are no infiltrations of oil, grease or other lubricants between the brake linings and discs of the product and check the wear of the working surfaces with a frequency that depends on the way the product is used. It is advisable to contact the Technical Department of COREMO OCMEA for further explanations in this regard. If necessary clean the surfaces with fine sand paper or wash with a degreasing solution.

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 “M” brake is designed for the purposes stated in this user and maintenance manual, therefore the minimum and maximum feed pressure are indicated for each product type in order to ensure safe reliable use.

Bedding in: The initial dynamic torque may vary from 30% to 50% of the rated value until the brake lining beds into the disc**.**

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 "M" brakes are used for emergency or cyclical braking.

The "M" brakes differ basically in their dimensions, values of dynamic torque and maximum speeds allowed; Table 1 contains the dynamic torques and the maximum speeds allowed for each single type of brake, considering a coefficient of friction of 0.4

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

TYPE	Dynamic torque [Nm]	Maximum speed [min^{-1}]
130 M	1400	1500
230 M	2800	1500
330 M	4200	1500
140 M	2950	1400
240 M	5900	1400
340 M	8850	1400
160 M	9050	950
260 M	18100	950
360 M	27150	950

Table 1 - M brakes performance

Caution: The initial dynamic torque may vary from 30% to 50% of the rated value until the brake lining beds into the disc.

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

5.2. Section through the unit

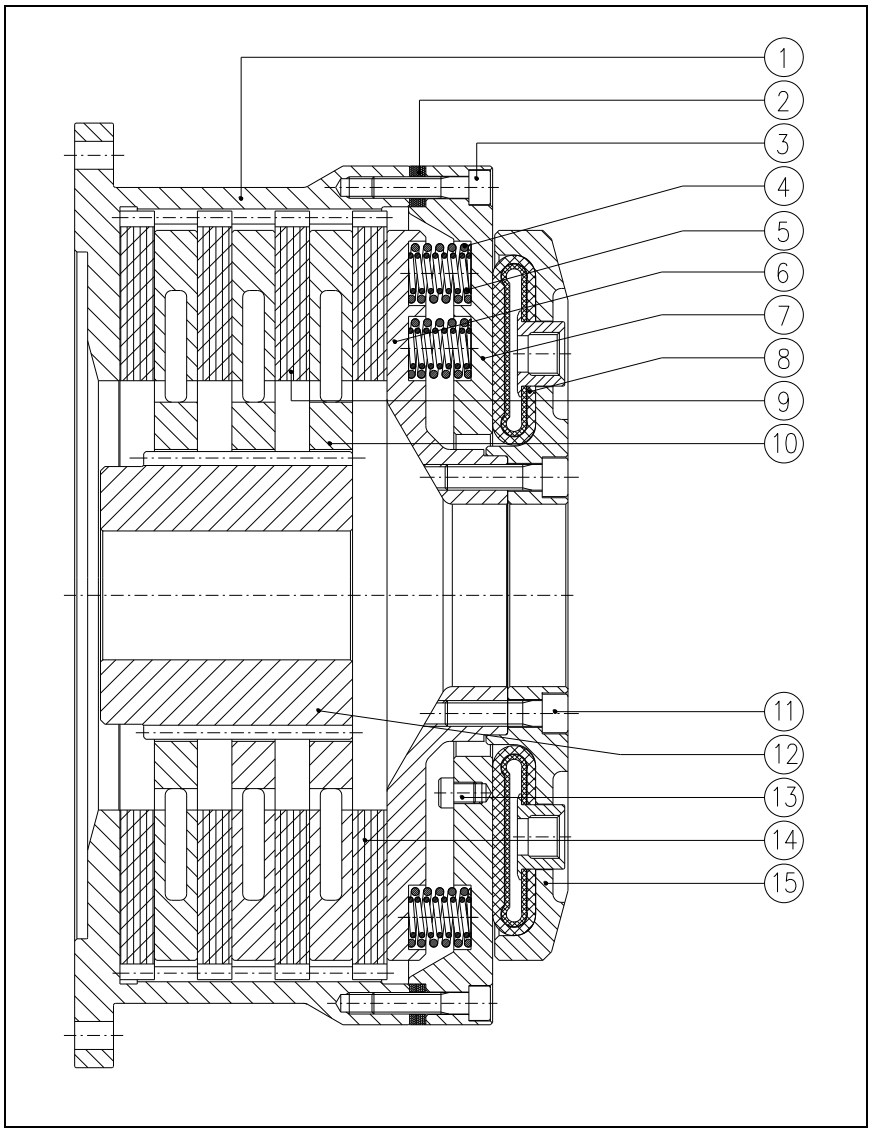


Figure 1 - Section of the brake with relative components labeled

1 – Housing
2 – Play recovery shims
3 – Screw (Thruster disc / Housing)
4 – Outer springs
5 – Inner springs
6 – Sliding disc
7 – Thruster disc
8 – Air chamber
9 – Central friction disc
10 – Internally toothed disc
11 – Screw (Cover / Sliding disc)
12 – Hub
13 – Stroke end screw
14 – Side friction disc
15 – Cover

5.3. Special note

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

Ignoring the heat produced during braking affects lining wear and may jeopardize the safety of the operators and the reliability of the product. Since the unit 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 unit.

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.
2. **Storage**: When storing the unit 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.

7. Installation

THE UNIT 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 hub (12) on the shaft and secure it axially.
2. After powering the brake, place it on the hub (12).
   The seat of the brake must have a centre piece suitable for coupling correctly with the brake. In this regard Table 2 shows the maximum admissible angular offset.

Type	Max offset [mm]
130/230/330 M	0.17
140/240/340 M	0.21
160/260/360 M	0.30

Table 2

Before mounting the brake/clutch check that the offset does not exceed the values shown above.

3. Lock the brake using the relative screws to the shoulder of the machine.
4. Rotate the shaft to check that the internally toothed discs (10) rotate freely with the brake disengaged.
5. Mount the fittings chosen from those indicated in the diagram.
6. Power up the brake at a maximum pressure of 6 bar and not below 4.5 bar to ensure that the brake always opens completely, in order to check that the discs work perfectly in axis.
7. To ensure that the air chamber works properly the air must not be contaminated with oil or water. We suggest using a 25 micron filter with automatic condensate discharge.

8. Operation

8.1. Power supply

The control pressure must not exceed 6 bar and drop below 4.5 bar. Erroneous power supply pressure below the value indicated will result in the brake failing to open. The air must not be contaminated with oil, water or other impurities; therefore it is necessary to use a 25 micron filter with automatic condensate discharge. As regards the methods of connection to the air power line, Table 3 contains the configuration (B2 or B3) to use depending on the type of brake used. For the number and dimensions of the connections of the air chamber consult Table 4.

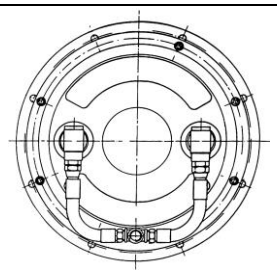
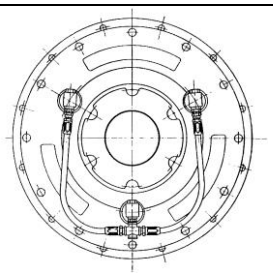
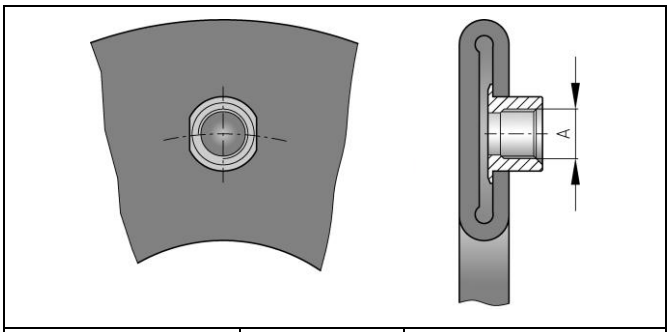
 **B2**	 **B3**
130/230/330 M	140/240/340 M
	160/260/360 M

Table 3 - Brake power supply configuration



TYPE	QUANTITY	AIR INLET A
130/230/330 M	2	1/2'' gas
140/240/340 M	3	1/2'' gas
160/260/360 M	3	1/2'' gas

Table 4 - Air chamber connection

8.2. Uses not allowed

The units dealt with here must be used exclusively for the uses described in this Manual as indicated in Chapter 5. All other uses are to be considered as improper. The manufacturer declines all responsibility for damage caused by erroneous or unreasonable use of the unit.

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

9. Maintenance and cleaning

ALL TYPES OF WORK ON THE PRODUCT MUST BE DONE WITH THE MACHINE OFF.

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.

9.1. Readjusting the play

Table 5 contains the data for the total play admissible taken as the axial slip of the discs and the maximum shift of the air chamber.

TYPE	Play [mm]	Max shift of the air chamber [mm]
130 M	2	12
230 M	2.5	12
330 M	3.5	12
140 M	2	14
240 M	3.5	14
340 M	4.5	14
160 M	2.5	14
260 M	3	14
360 M	4	14

Table 5

The total play must not exceed the maximum shift of the air chamber. Please note that the capacity of the air chamber to expand, due to wear of the lining pads, considerably increases the values shown in Table 5 with consequent increase in the time needed for engaging and braking. Play values lower than those shown may cause residual torque and anomalous increase in the working temperature.

To readjust the play proceed as follows:

1. Power up the brake and remove the screws (3) and the thruster disc (7) assembled with the sliding disc (6), air tube (8) and cover (15).
2. Remove an adequate number of shims (2) to restore the play indicated in Table 5.
3. Put back the thruster disc (7) on the housing using the screws (3) already assembled on the sliding disc (6), air tube (8) and cover (15).

9.2. Changing the friction discs

Replace the friction discs when the maximum play value has been reached.

1. Power up the brake and remove the screws (3), the shims (2) and the thruster disc (7) assembled with the sliding disc (6), air tube (8) and cover (15).
2. Pull out the discs (9, 10 and 14) from the housing (1).
3. Remove any deposits of friction material dust from the toothing of the housing (1) and the hub (12).
4. Check the wear on the surfaces of the internal toothed discs (10) and replace them if there is excessive wear; in general after 2-3 changes of the friction discs (9-14).
5. Mount the new discs alternating a friction disc (9-14) with a internally toothed disc (10).
6. Position the shims (2) on the housing before mounting the thruster disc (7).
7. Put back the thruster disc (7) on the housing using the screws (3) already assembled on the sliding disc (6), air tube (8) and cover (15).
8. Check that the brake works properly.

9.3. Cleaning the friction discs

Replace the friction discs when the maximum play value is reached.

1. Power up the brake and remove the screws (3), the shims (2) and the thruster disc (7) assembled with the sliding disc (6), air tube (8) and cover (15).
2. Pull out the discs (9, 10 and 14) from the housing (1).
3. Remove any deposits of friction material dust from the toothing of the housing (1) and the hub (12).
4. Remove any oil or grease from the surface of the internally toothed disc (10), using a non-pollutant detergent product. In the event of allergies to these substances it is advisable to use gloves or protective creams (which should be removed by thorough washing of the hands before eating or drinking).
5. If the friction discs (9-14) are contaminated only on the surface they should be cleaned using fine grade emery. If the contamination is deep they should be replaced as described in Chapter 9.2.
6. Mount the new discs alternating a friction disc (9-14) with a internally toothed disc (10).
7. Position the shims (2) on the housing before mounting the thruster disc (7).
8. Put back the thruster disc (7) on the housing using the screws (3) already assembled on the sliding disc (6), air tube (8) and cover (15).
9. Check that the brake works properly.

9.4. Changing the air tube

1. Remove in order:
   - the air pressure
   - the power supply pipes
   - the screws (11)
   - the cover (15).
2. Remove the air chamber (8) from the cover (15) and replace it with the new one.
3. Check that the brass connections of the air chamber (8) are lodged correctly in the seats on the cover (15).
4. Put back the cover (15) and the air tube (8) positioned properly on the thruster disc (7).
5. Tighten the screws (11) to reunite the thruster disc (7) and the cover (15).
6. Reconnect the flexible tube and power up the brake at a pressure not exceeding 6 bar and below 4.5 bar. To avoid a rupture of the air chamber the play should be kept below the values shown in Table 5.
7. Check that the brake works properly.

9.5. Replacement of the springs

1. Remove the brake from the machine and place it on a flat surface.

2. Remove in order:
   - the air pressure
   - the power supply pipes
   - the screws (11)
   - the cover (15)
3. Unscrew the screws (3), which hold together the thruster disc (7) and the housing (1), with the utmost caution and proceeding in a diagonal sequence.

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.

4. Remove the thruster disc (7) and the shims (2).
5. Remove the springs (4-5) and replace them with new ones positioning them in their seats in the sliding disc (6).
6. Position the shims (2) on the housing before mounting the thruster disc (7).
7. Reposition the thruster disc (7) on the housing (1) making sure that the springs are positioned properly in their seats in the thruster disc (7).
8. Tighten the screws (3).
9. Reconnect the flexible tube and power up the brake at a pressure not exceeding 6 bar and below 4.5 bar.
10. Check that the brake works properly.

9.6. Periodic maintenance

All inspections must be done with the machine switched off.
Even if the frequency of these operations depends on the frequency with which the brake unit is used, it is necessary to do them every three months in any case in order not to compromise safety aspects.

1. Check the play between the friction discs. S If the play encountered should exceed the values shown in Table 5, readjust the initial play as described in Chapter 9.1. When the wear of the discs (9-14) reaches the values of maximum shift of the air chamber (Table 5) replace them.
2. Check that the surface of the friction discs (9-14) and the internally toothed discs (10) are free of grease, oil or similar substances, as these prevent the brake or the clutch from working properly.
3. Check that the anchor screws of the brake or the clutch unit are tightened correctly.
4. Check the condition of the flexible hoses.
5. Engage the brake a number of times to check that it is working properly.

10. List of spare parts

To avoid costly downtime we recommend keeping a stock, adequate in quantity for the number of brake units in service, of the following spare parts:

- Friction discs: details 9 and 14
- Air chamber: detail 8
- Internally toothed disc: detail 10
- Springs: details 4 and 5

These spare parts must be kept in a dark cool place if possible and far from substances that could damage their ability to perform correctly.
Always refer to the serial number of the brake unit in order to make sure that correct spare part is obtained.