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User and Maintenance Manual



Brakes and Clutches Low Inertia BI



ISO 9001 - Certificate N°0238

Translation of the original instructions
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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 "BI" brakes and clutches 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

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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.


Friction material: "BI" brakes and clutches 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 "BI" brake/clutch 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.

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4. Warnings

	<p>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.</p>
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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.

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: “BI” brakes and clutches are 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.

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5. Technical data

5.1. Product performance

The “BI” brakes and clutches are used for emergency or cyclical braking.

The “BI” 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

The "BI" clutches are removable mechanical transmission device for transmitting power between a self-propelled machinery/shaft and a recipient machinery/shaft.

The “BI” clutches differ basically in their dimensions, values of dynamic torque and maximum speeds allowed; Table 2 contains the dynamic torques and the maximum speeds allowed for each single type of clutch, if powered at 6 bar, 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]
110 BI	218	4000
210 BI	420	4000
115 BI	420	3500
215 BI	840	3500
315 BI	1260	3500
106 BI	370	3500
206 BI	740	3500
125 BI	900	2700
225 BI	1800	2700
325 BI	2700	2700
130 BI	2600	1500
230 BI	5200	1500
330 BI	7800	1500
140 BI	6000	1400
240 BI	12000	1400
340 BI	18000	1400
118 BI	6500	1300
218 BI	13000	1300
318 BI	19500	1300
160 BI	16500	950
260 BI	33000	950
360 BI	49500	950

Table 1 - BI brakes performance

TYPE	Dynamic torque [Nm]	Maximum speed [min ⁻¹]
110 BI	210	1800
210 BI	420	1800
115 BI	420	1800
215 BI	840	1800
315 BI	1260	1800
106 BI	370	1800
206 BI	740	1800
125 BI	900	1750
225 BI	1800	1750
325 BI	2700	1750
130 BI	2600	1300
230 BI	5200	1300
330 BI	7800	1300
140 BI	6000	1050
240 BI	12000	1050
340 BI	18000	1050
118 BI	6500	1000
218 BI	13000	1000
318 BI	19500	1000
160 BI	16500	750
260 BI	33000	750
360 BI	49500	750

Table 2 - BI clutches 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

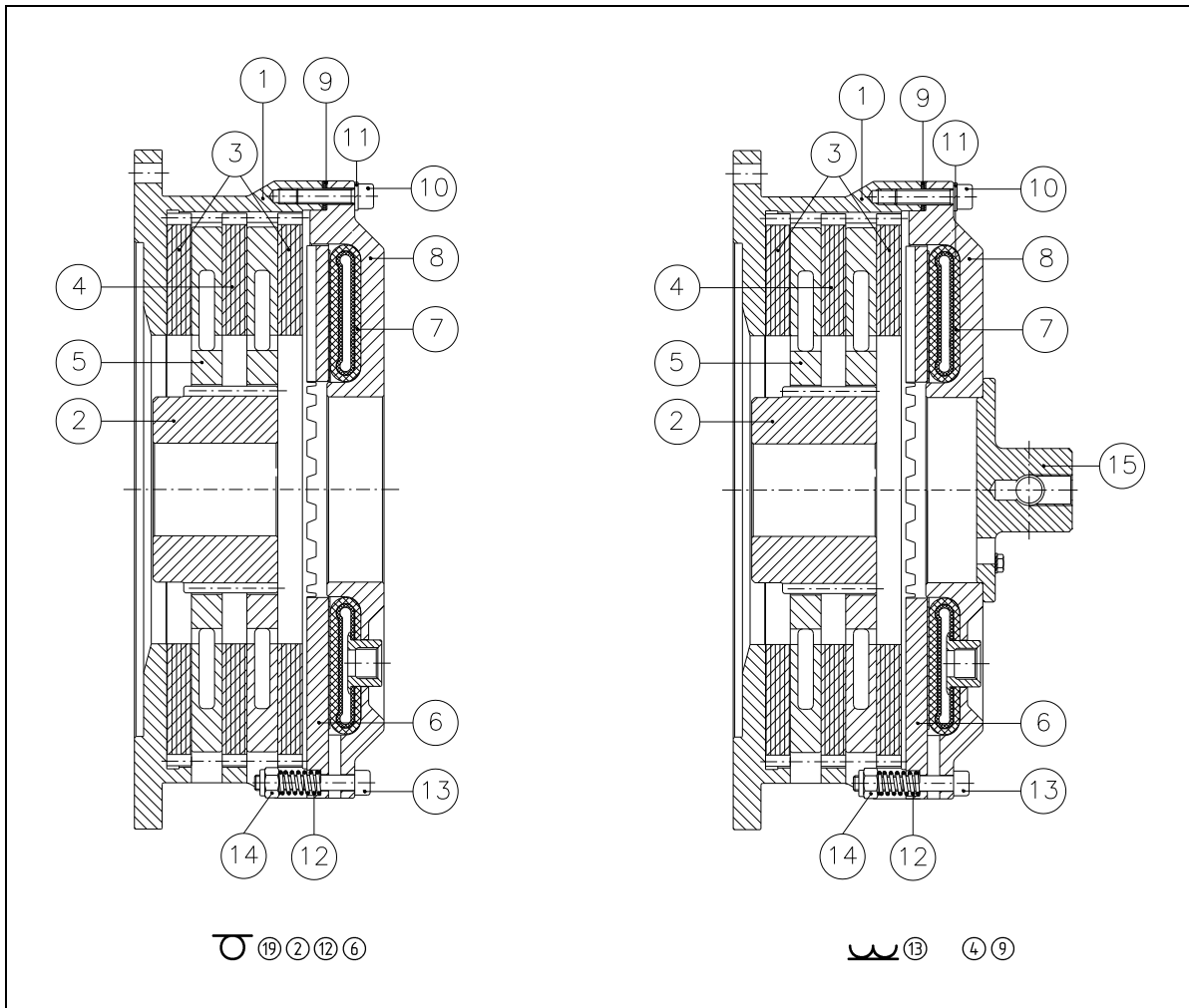


Figure 1 - Section of the brake / clutch with relative components labeled

- | | |
|---------------------------|--------------------------------------|
| 1 – Housing | 9 – Play recovery shims |
| 2 – Hub | 10 – Screw |
| 3 – Side friction disc | 11 – Washer |
| 4 – Central friction disc | 12 – Return spring |
| 5 – Central disc | 13 – Screw for self-locking nut |
| 6 – Thruster disc | 14 – Self-locking nut |
| 7 – Air chamber | 15 – Protuberance for rotating joint |
| 8 – Cover | |

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5.3. Special note

During braking or engaging, 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 or engaging 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 (2) on the shaft and secure it axially.
2. Mount the brake/clutch on the hub (2) and position it with the relative screws to the shoulder/flywheel of the machine. The seat of the brake/clutch must have a centre piece

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suitable for coupling correctly with the brake/clutch. In this regard Table 3 shows the maximum admissible angular offset.

Brake/Clutch BI	Max offset [mm]
110/210	0.06
115/215/315	0.08
106/206	0.08
125/225/325	0.10
130/230/330	0.17
140/240/340	0.21
118/218/318	0.23
160/260/360	0.30

Table 3

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

3. Lock the brake/clutch using the relative screws to the shoulder/flywheel of the machine.
4. Rotate the shaft to check that the central discs (5) rotate freely with the brake/clutch disengaged.
5. Only for the brake: mount the fittings chosen from those indicated in the diagram.
The clutch is supplied complete with pipes and fittings.
6. Power up the brake/clutch at a maximum pressure of 6 bar 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 power supply pressure for the unit in question must not exceed 6 bar. 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. The wrong power supply pressure will result in a dynamic torque different to the value indicated in this manual therefore the Technical Department of COREMO OCMEA can provide information, suggestions and cooperation for correct application and use of the unit.

As regards the methods of connection to the air power line, Table 4 contains the configuration (B1, B2 or B3) to use depending on the type of brake used and Table 5 contains the configuration (C1, C2 or C3) to use depending on the type of clutch used. For the number and dimensions of the connections of the air chamber consult Table 6.

B1	B2	B3
110/210 BI	106/206 BI	140/240/340 BI
115/215/315 BI	130/230/330 BI	118/218/318 BI
125/225/325 BI		160/260/360 BI

Table 4 - Brake power supply configuration

C1	C2	C3
110/210 BI	125/225/325 BI	140/240/340 BI
115/215/315 BI	130/230/330 BI	118/218/318 BI
		160/260/360 BI

Table 5 - Clutch power supply configuration

TYPE	QUANTITY	AIR INLET A	CONNECTION
110/210 BI	1	1/4" gas	2
115/215/315 BI	1	1/2" gas	1
106/206 BI	2	1/2" gas	1
125/225/325 BI	1-2	1/2" gas	1
130/230/330 BI	2	1/2" gas	1
140/240/340 BI	3	1/2" gas	1
118/218/318 BI	3	1/2" gas	1
160/260/360 BI	3	1/2" gas	1

Table 6 - Air chamber connection

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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.

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 7 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]
110 BI	1	7
210 BI	2	7
115 BI	1	8
215/315 BI	2	8
106 BI	1	8
206 BI	2	8
125 BI	1.5	10
225/325 BI	2.5	10
130 BI	2	12
230 BI	2.5	12
330 BI	3.5	12
140 BI	2	14
240 BI	3.5	14
340 BI	4.5	14
118 BI	2.5	14
218 BI	3	14
318 BI	4	14
160 BI	2.5	14
260 BI	3	14
360 BI	4	14

Table 7

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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 7 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. Remove in sequence:
 - the air pressure
 - the power line pipes
 - the screws (10) and washers (11)
 - the cover of the clutch (8) assembled with (7-6-12-13-14).
2. Remove an adequate number of shims (9) to readjust the play.
3. Reassemble in the following order:
 - the cover of the clutch (8) assembled with (7-6-12-13-14)
 - the screws (10) with their washers (11)
 - the power supply pipes.

9.2. Changing the friction discs

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

1. Remove in order:
 - the air pressure
 - the power line pipes
 - the screws (10) and washers (11)
 - the cover of the clutch (8) without removing the thruster disc (6) and the air chamber (7).
2. Pull out the discs (3, 4 and 5) from the housing (1).
3. Remove any deposits of friction material dust from the toothing of the housing (1) and the hub (2).
4. Check the wear of the surfaces of the central discs (5) and replace them in the event of excessive wear; in general after 2-3 changes of the friction discs (3-4).
5. Mount the new discs alternating a friction disc (3-4) with a central discs (5).
6. Reassemble in the following order:
 - the cover (8) assembled with (7-6-12-13-14)
 - the screws (10) with their washers (11)
 - the power supply pipes.
7. Check that the brake/clutch works properly.

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9.3. Cleaning the friction discs

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

1. Remove in order:
 - the air pressure
 - the power line pipes
 - the screws (10) and washers (11)
 - the cover of the clutch (8) without removing it from the thruster disc (6) and the air chamber (7).
2. Pull out the discs (3, 4 and 5) from the housing (1).
3. Remove any deposits of friction material dust from the toothing of the housing (1) and the hub (2)
4. Remove any oil or grease from the surface of the central discs (5), 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 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 clean discs alternating a friction disc (3-4) with a central disc (5).
7. Reassemble in the following order:
 - the cover (8) assembled with (7-6-12-13-14)
 - the screws (10) with their washers (11)
 - the power supply pipes.
8. Check that the brake/clutch works properly.

9.4. Changing the air chamber

1. Remove in order:
 - the air pressure
 - the power supply pipes
 - the screws (10) and washers (11)
 - the cover of the clutch (8)
2. Unscrews the bolts (13-14) which keep the cover (8) joined to the thruster disc (6) and remove the disc (6).
3. Replace the air chamber (7).
4. Check that the brass connections of the air chamber (7) are lodged correctly in the seats on the cover (8).
5. Screw back the bolts (13-14) to reunite the thruster disc (6) and the cover (8).
6. Reposition the cover (8) and tighten the anchor screws (10-11) all the way in.

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7. Reconnect the flexible tube and power up the brake/clutch at a pressure not exceeding 6 bar. To avoid a rupture of the air chamber the play should be kept below the values shown in Table 7.

9.5. Replacement of the springs

1. Remove in order:
 - the air pressure
 - the power supply pipe
 - the screws (10) with their washers (11)
 - the cover of the clutch (8)
2. Unscrew the bolts (13-14) which keep the cover (8) joined to the thruster disc (6).
3. Replace the springs (12).
4. Screw back the screws (13) with self-locking nuts (14).
5. Reassemble in the following order:
 - the complete cover (8)
 - the screws (10) with their washers (11)
 - the power supply pipes.

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/clutch 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. If the play encountered should exceed the values shown in Table 7, readjust the initial play as described in Chapter 9.1. When the wear of the discs (3-4-5) reaches the values of maximum shift of the air chamber (Table 7) replace them.
2. Check that the surface of the friction discs and discs 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 or the clutch a number of times to check that it is working properly.

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10. List of spare parts

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

- Friction discs: details 3 and 4
- Air chamber: detail 7
- Central discs: detail 5
- Return springs: detail 12

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/clutch unit in order to make sure that correct spare part is obtained.