

Installation and Maintenance Manual BICA-disc brake for Compact motors

EN643-3h 2005

Preface

Häggglunds Drives is one of the worlds leading manufacturers of large hydraulic Drive Systems. A leading position, made possible by unbeatable service spirit and of continuing development of both products and markets all over the world. Our drives are to be found in most industrial and marine segments, where there are extremely high demands for efficiency and reliability. Our main office and production plant is in Mellansel, Sweden and we have our own sales- and representation offices in some 40 different countries.

Our high quality Drive Systems, are based upon our developed through a wealth of experience accumulated over 30 years in marine and industrial areas. Today this ongoing development work has resulted in the BICA industrial brake. New, as well as established technical solutions, contribute to the creation of this product. The most desirable features and operating reliability have been designed in this brake.

This manual provides necessary information for installation and maintenance of the brake. In order to find particular information, just search for the wanted section as listed in the table of contents. However, changes in the equipment may occur. We therefore reserve the right to introduce amendments in the manual as we seem necessary without notice or obligations.

This service manual shall enable the user to operate the Häggglunds Drives AB product safely and effectively, to use it sensibly and to maintain it properly so as to exclude the possibility of any damage of incorrect operation.

Häggglunds Drives AB products comply with the Quality Standard to DIN ISO 9001.

Contents

1.	GENERAL.....	4
1.1	Safety precautions	4
2.	Technical data	5
2.1	Data on the sign of the brake.....	5
2.2	Torque, speed and other technical data.....	5
2.3	Connenctions.....	5
2.4	Application range and utilization as per specifications.....	5
3.	Safety guidelines	5
3.1	Symbol for safety at work.....	5
3.2	Instructions "Caution".....	5
3.3	Safety instructions for workning	5
4.	Transportation.....	6
4.1	Packing	6
4.2	Delivery condition	6
4.3	Sensitivity.....	6
4.4	Disc brake in stock.....	6
4.5	Delivery extent	6
5.	Construction, functioning, constr.characteristics	7
5.1	Figures with item numbers and designation of the single parts.....	7
5.2	Functioning and constructional characteristics	11
5.3	Manual emergency release	11
5.4	Hydraulic connections.....	14
6.	Assembly and dismantling	14
6.1	Assembly	14
6.2	Fitting torque arm to BICA	18
6.3	Fitting to flange for BICA.....	18
6.4	Dimensions, space requirement and weight	19
6.5	Dismounting.....	19
7.	Setting into service	19
8.	Operation.....	19
8.1	Service conditions	19
8.2	Oil requirement.....	19
8.3	Hydraulic oils	20
8.4	Filtering.....	20
8.5	Trouble shooting.....	20
9.	Maintenance	21
9.1	Maintaining and inspection works.....	21
9.2	Dismantling of the BICA.....	21
9.2.1	Safety instructions for workning	21
9.2.2	Exchange of the disc set.....	21
9.2.3	Exchange of the seals.....	22
9.2.4	Exchange set of pressure springs	23
10.	Spare parts stocking, after-sales service.....	24
10.1	Spare parts stocking.....	24
10.2	Data for spare parts stocking.....	24
10.3	Address for spare parts orders and after-sales service.....	24
11.	Listed standards and regulations	25

1. GENERAL

1.1 Safety precautions

It is of high importance that the Safety precautions are always followed, if you are unsure about something, please don't hesitate to contact your nearest HD-office for advice.

Warning signs

In this manual you will find the following signs which indicate a potential hazard, which can or will cause personal injury or substantial property damage. Depending on the probability of the hazard, and how serious the injury or property damage could be, there are three levels of classification.



DANGER is used to indicate the presence of a hazard which will cause severe personal injury, death, or substantial property damage if the warning is ignored.



WARNING is used to indicate the presence of a hazard which can cause severe personal injury, death, or substantial property damage if the warning is ignored.



CAUTION is used to indicate the presence of a hazard which will or can cause minor personal injury or property damage if the warning is ignored.

Application area

All new and rebuild applications, should always be approved and supervised by Hägglunds personnel.

Mounting

Carefully follow the instructions and be aware of the high weights and forces during lifting.

Before starting up

Before starting up new, rebuild or just worked on applications, all accessories and safety arrangements functions, should be controlled/tested.

Periodic maintenance

Notice the intervals in maintenance chart and keep a record.

Dismounting

Carefully follow the instructions and be aware of the high weights and forces during lifting.

Item number

Item number in the text is referring to Fig. BICA 13 and Fig. BICA 24 and 37.

2. Technical Data

2.1 The following data is stated on the sign of the brake:

Hägglunds Drives AB

Individ no.

Series and size e.g. BICA 13

Weight, max pressure

2.2 Torque, speed and other technical data

The brake type and size as well as the occurring torques, refers to the speed of the Compact motor (max. permissible speed). The brake is made for dry operation of the discs and is not approved for hanging load applications. Other technical data are stated on the dimensional drawing and the Engineering manual.

This drawing is attached to the delivery and can also be inquired at our after-sales service (the address is given in chapter 10.3).

2.3 Connections

The pressure connections are stated on the dimensional drawing.

2.4 Application range and utilization as per specification



The spring-applied multidisc brake, hydraulically released, is designed only to be used in compliance with the corresponding technical data (as per chapter 2.2)

It must only be used for the prescribed service conditions (chapter 8).

The brake is designed to be used as parking brake only for Hägglunds Compact motors.

The instructions for mounting, dismantling, setting into service and maintenance given by the manufacturer must be adhered to.

The non-observance of these instructions or many utilization exceeding these instructions will be considered as "not according to specification".

The manufacturer will not be liable for any possible resulting damage; the user will bear sole responsibility in such cases. Should the brake be used outside the contracted applications range, consult the after-sales service of the Hägglunds Drives AB; otherwise the warranty will no longer apply.

3. Safety Guidelines

3.1 Symbol for safety at work



This symbol denotes all the safety instructions in this manual which deal with danger to life and limb of personnel.

These instructions must be adhered to and particular caution exercised in these cases. All users must be familiarised with the safety instructions.

3.2 Instructions



The term "caution" denotes those sections in this manual which require special attention, in that the guidelines, recommendations and correct procedures are complied with to prevent damaging or destroying the brake.

3.3 Safety instructions for working

The following recommendations are of particular importance:

The brake has been manufactured to the up to date standard and is operationally safe. However, the brake can become a risk to safety when used improperly by untrained personnel or for an application it is not designed for.

Every person involved in assembling, disassembling, commissioning, operating and maintaining (inspecting, servicing and repairing) the brake must be authorised, adequately trained and instructed. Each such person must have read and understood this instruction manual, especially in respect to the safety instructions.

We do not accept liability for damage or malfunctioning, resulting from non-adherence to

this manul.

Any work process involving the product which impairs safety is to be avoided.

The user is obliged to inform the supplier immediately of any charge occuring to the product which adversely affects safety.

The user is obliged to only operate the brake when it is functioning correctly.

Unauthorised changes and modifications which impair safety, as well as the use of non-authentic components is not permitted.



In every case the local safety and accident prevention regulations are also applicable, the user must ensure that these are complied with.

We reserve the right to make modifications of a technical nature to this manual if required for brake development.

We recommend that these instructions are incorporated into the service manual of the user (machine manufacturer).

4. Transportation

(Single parts with item designation as per chapter 4.1)

4.1 Packing

The Type of packing depends on the transportation route. The symbols marked on the packing must be adhered to.

4.2 Delivery condition

BICA 13-37

The brake is supplied in mounted condition. The disc center (302, 303) and the O-rings (146, 123, 124) are loosely attached.

Brakes of BICA are supplied in condition "released by the emergency screws".

BICA 48-134

The brake is supplied pre-assembled except for the disc centre (300–303) with distance sleeve (362–365), screws (20–22) with washers (55, 97) and O-rings (105, 157) and (80–81) which are supplied separately.

Brakes are supplied in the braked state, i.e. the emergency release screws (342, 350) and washers (370–371) are not fitted.

4.3 Sensitivity

Be particularly careful on transportation of the brake in order to avoid damage due to external force or careless loading and unloading. In relation to the type and duration of transportation provide corresponding transportation devices. During transportation avoid shocks as well as the generation of condensation water due to temperature fluctuations.

4.4 Disc brake in stock

BICA 13-37

The piston (311, 312, and 313) is permanently protected against corrosion by a surface refinement. All other parts are provided with a preventive against corrosion.

BICA 48-134

The brake piston (311–313) and brake housing (305–307) have a surface coating that provides permanent protection from corrosion. Other parts have been treated with a corrosion inhibitor.

The store for disc brakes must be dry and not subject to high temperature fluctuations. When properly stored, the BICA can be stocked up to 12 months. Should it be intended to stock the brake for a period exceeding 1 year, another protection against corrosion has to be provided. Please consult our HD representative.



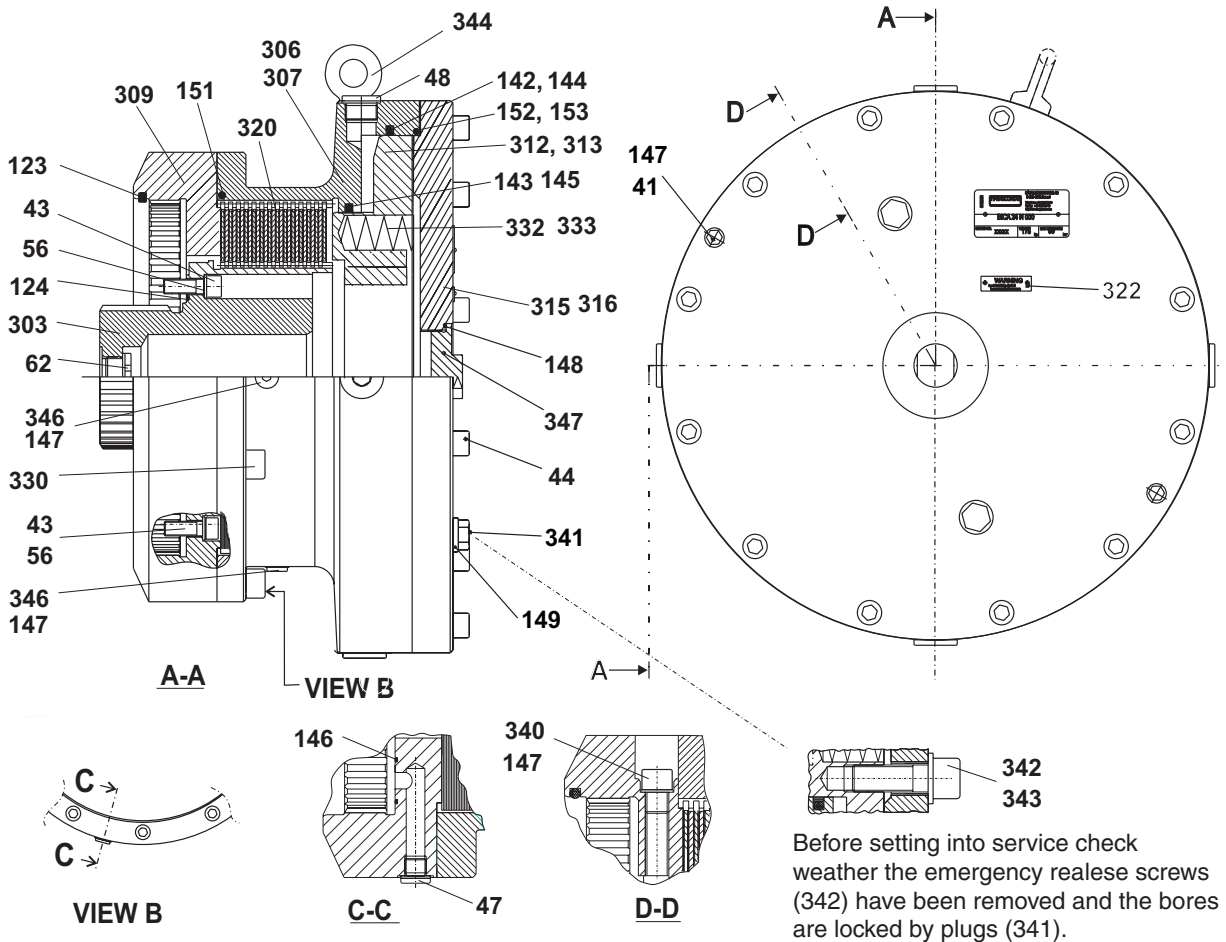
The friction faces and seal running faces must not be treated with any preventive against corrosion.

4.5 Delivery extent

On receipt check the consignment for completeness (see packing list). Possible damage during transportation and/or missing parts must be advised immediately and in writing.

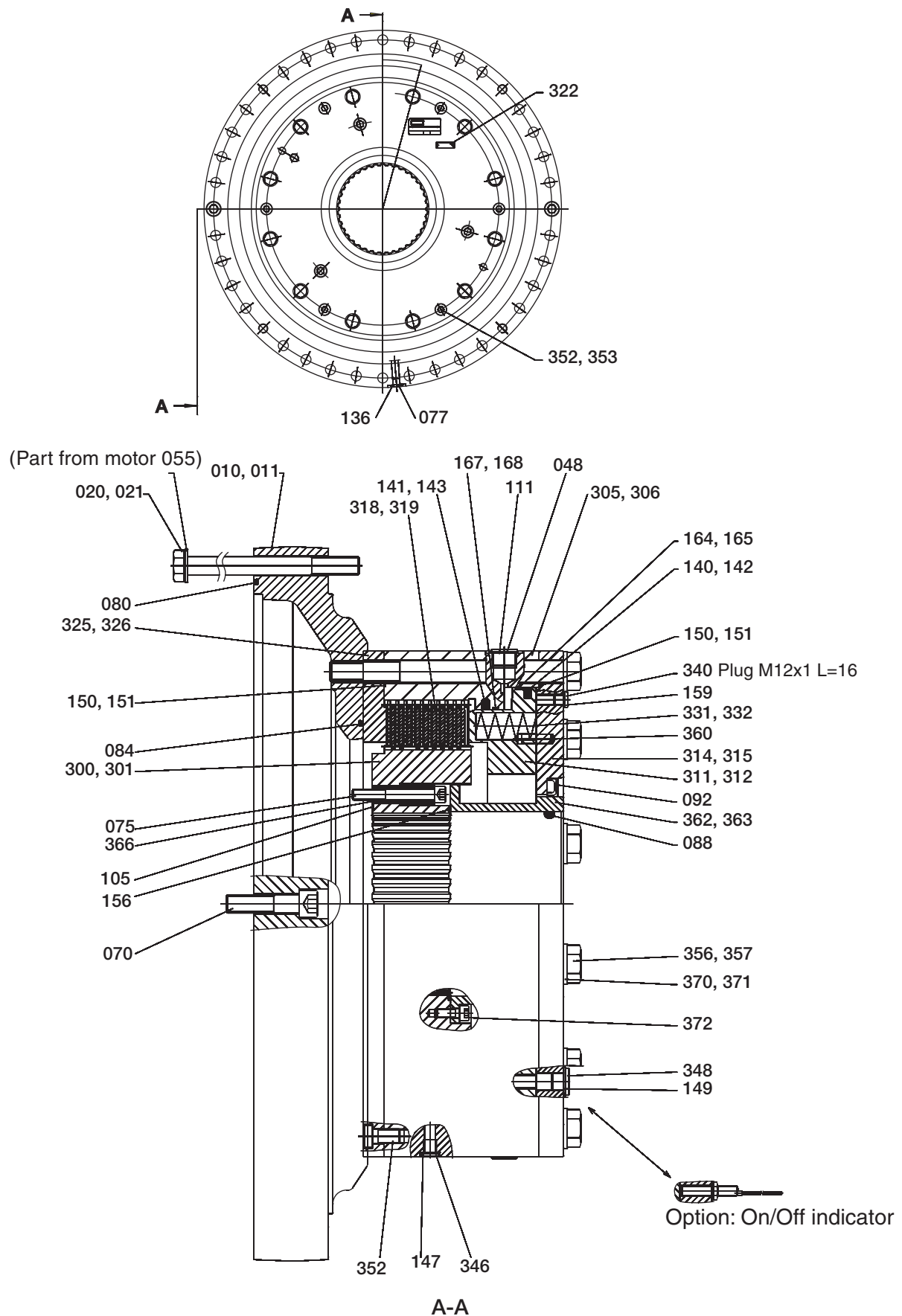
5.1 Figure with item numbers of the single parts

Fig: 2 BICA 24 and 37



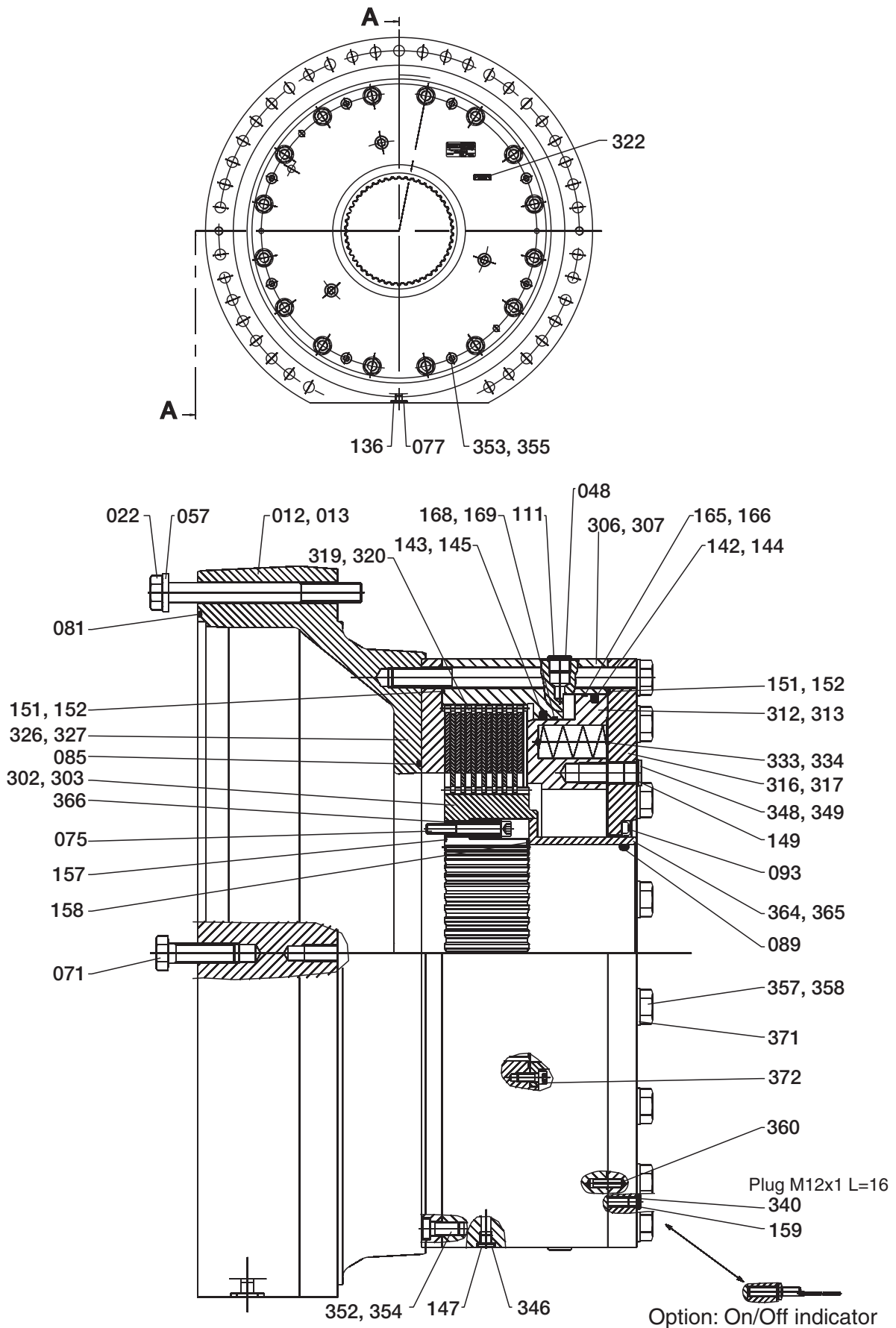
5.1 Figure with item numbers of the single parts

Fig: 3 BICA 48 and 64



5.1 Figure with item numbers of the single parts

Fig: 4 BICA 90 and 134



5.2 Functioning and constructional characteristics

The Hågglunds Drives spring - applied multi - disc brake is made for dry operation.

BICA 13-37

The multi - disc brake is actuated by spring force and released by hydraulic pressure.

The pressure springs **(332-334)** are compressing the disc package.

Thereby a spring - forced locking is achieved between brake housing **(305-307)** and disc center **(302, 303)**.

For the BICA 13 the brake housing **(305)** and the end cover **(314)** are screwed to form a unit.

The BICA 24 and 37 is mounted with mounting flange **(309)**, brake housing **(306, 307)** and end cover **(315, 316)** to form a unit.

The completely assembled brake is mounted to the motor housing by cyl. screws. The disc center **(302, 303)** is connected to the shaft, which shall be braked, by means of a splined hub profile.

When the oil pressure is equal to or higher than the opening pressure for the brake, the brake piston **(314-317)** advances to the limit set by the end cover **(311-313)**. The outer and inner discs then move apart and the brake is released.

BICA 48-134

The springs **(331-334)** compress the disc set **(318-320)**. This provides a spring-activated locking action between the brake housing **(305-307)** and the disc centre **(300-303)**.

The brake and adapter are fitted to the end of the motor or to the attachment ring using the screws **(20-22)**. The disc centre **(300-303)** is secured to the motor cylinder block using the screw **(75)** and sleeve **(366)**.

(Absolutely necessary to adhere to chap.6).

5.3 Manual emergency release

On failure of the hydraulic system, the brake can be released mechanically. Proceed as follows (see fig. 5 or 6):

BICA 13-37

Remove the plugs **(341)** and the bonded seals **(149)** from the front of the brakes.

Insert the emergency release screws **(342)** with washer **(343)** into the - now free - holes (see table 1), and screw them into the piston **(311-313)** until the screw head is in contact with the end cover **(314-316)**. Tighten the emergency release screws slowly and uniformly until the brake is released.

After actuation of this emergency switching, unscrew the emergency release screws again uniformly. Screw - in again the plugs **(341)** with the bonded seals **(149)**.

BICA 48-134

Remove the plugs **(348, 349)** and bonded seals **(149)** from the front of the brake.

Fit the emergency release screws **(342, 350)** to the now empty holes (see table 1) and screw them into the brake piston **(311-313)** until the screw heads touch the brake cover **(314-317)**. Tighten the emergency release screws alternately one turn at a time until the brake is released.

When you have finished using the emergency release function, unscrew the emergency release screws alternately by equal amounts and refit the plugs **(348, 349)** and bonded seals **(149)**.



WARNING

The manual emergency release is provided for an emergency case only. In no case use it to maintain an auxiliary operation.

BICA 13 - 37

Brake "On"

Brake released with
emergency release
screw

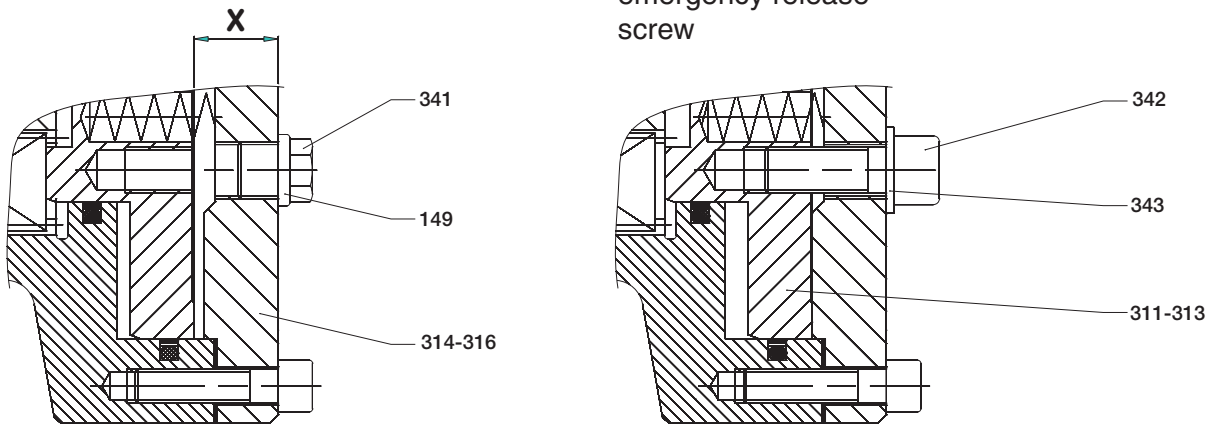


Fig. 5

Emergency release screws see table 1.

BICA 48 - 134

Brake "On"

Brake released with
emergency release
screw

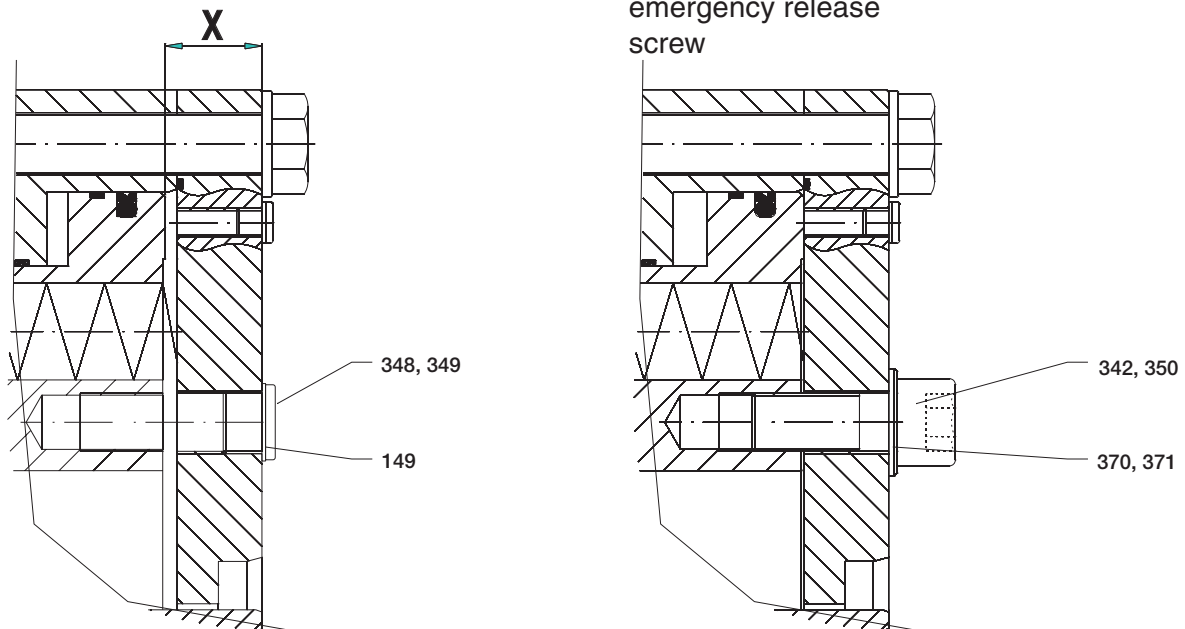


Fig. 6

Emergency release screws see table 1.

Technical data for Compact brake BICA 13 - 134

Table 1

Brake size	Screw for manual emergency release
BICA 13	2 st M16 x 50 - 10.9
BICA 24	2 st M16 x 50 - 10.9
BICA 37	3 st M16 x 50 - 10.9
BICA 48	3 st M20 x 50 - 10.9
BICA 64	3 st M20 x 50 - 10.9
BICA 90	3 st M20 x 50 - 10.9
BICA 134	3 st M24 x 60 - 10.9

Table 2

Brake size	"x" new disc	"x" Disc max. year
BICA 13	30 mm	33,5 mm
BICA 24	35 mm	39 mm
BICA 37	40 mm	44 mm
BICA 48	29,5 mm	33 mm
BICA 64	34 mm	38 mm
BICA 90	34 mm	38 mm
BICA 134	36 mm	41 mm

Table 3

Brake size	Weight kg (lb)	Weight with adapter kg (lb)
BICA 13	87 (191)	
BICA 24	175 (385)	
BICA 37	210 (462)	
BICA 48	210 (462)	360 (792)
BICA 64	310 (682)	455 (1000)
BICA 90	310 (682)	670 (1474)
BICA 134	570 (1254)	925 (2035)

5.4 Hydraulic connections

The high pressure oil pipe/hose must be short and free from sharp bends or cross section contractions. To protect the brake against inadmissible pressure peaks, a pressure relief valve has to be installed to limit the pressure. It will indicate if a leakage appears, with reduced brake torque as a result. The brake must in such case be taken out of service and has to be repaired.



The stated brake torque can only be achieved with an unpressurized hydraulic oil line.

When providing an oil leakage pipe, it must be arranged vertically to bottom allowing the leakage oil to drain unpressurized to the oil tank. To that effect remove the plug (346) at the lowest point.

BICA 13-37

The brake has four hydraulic couplings, BSP 3/4", set at 90° to each other.

The multi disc brake has two plugs, BSP 1/4", for flushing the motor that are set at 180° to each other. When flushing the motor, follow the precautions and instructions for the hydraulic motor.

BICA 48-134

The brake has two hydraulic couplings, BSP 3/4", set at 180° to each other.

The adapter (10–13) is fitted with a plug (77) to allow drainage of any internal leakage from the motors shaft seal.

6.0 Assembly and disassembly



The brake must only be operated, maintained and repaired by accordingly authorized, trained and instructed people. Each such person must have read and understood the complete instruction manual and must have been informed on particular about possible risk and danger.

6.1 Assembly

Mounting instructions BICA 13

1. Remove end cover (A) mounted with six screws and bearing retainer (B) mounted with eight screws (43).
2. Remove the two plugs (C) on the motor.
3. Put the o-ring (124) into the groove on the disc centre (302) at assembled side against the motor.
4. Oil the splines on the disc center (302) located at the same side as the o-ring. Clean the mounting surfaces from oil before assembly. To be able to assemble the disc centre, rotate the disc centre so that the screw holes fits against the threaded holes on the motor. Oil the screws (43) and washer (56) and tighten to 136 Nm.
5. **Note!** The splines for the brake discs have to be absolute dry from oil.
6. Remove the 3/4" plug (48). Mount the lifting eye, thread M12, at the brake and the opposite plug to drain remaining oil from the brake. **This is an important factor to avoid oil at the discs.**
7. Turn the brake vertical and remove the plugs (341) and washer (149) insert emergency release screws (342) at remaining place. Tighten the screws whereby the brake piston (311) is pulled against the brake cover (314) and the set of pressure springs (331) are compressing.
8. Loosen the 12 screws (44) at the brake cover (314) and lift off the brake piston. Be careful so that the piston seals are not damaged.
9. Do **NOT** apply oil on the external splines at brake or motor. The disc brakes have to be absolute dry from oil.

Adhere to the position of the screw borers at the pitch circle dia. 247.



Mounting instructions BICA 13

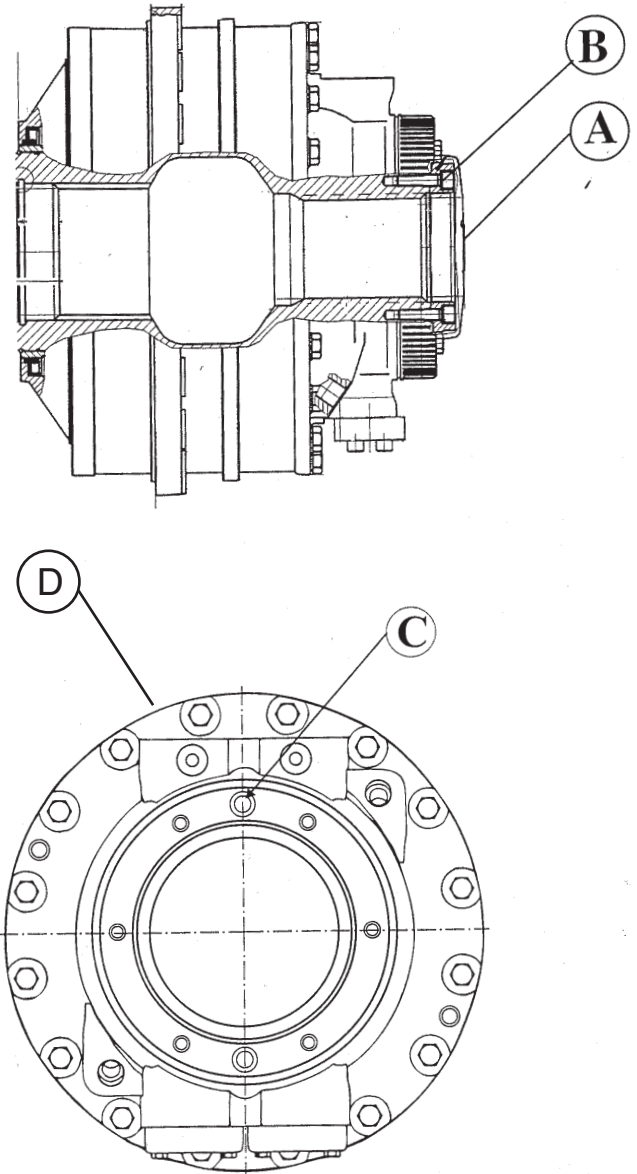
10. Mount the o-ring (123) in the splines at motor. Check that 2 x O-rings (146) are mounted in the splines at brake housing. Mount the brake on the motor.
11. Mount the brake housing so that the lifting eye points against the right outlet at the test nipple on the motor (see figure). The connections at brake and motor, for the flushing of the axial thrust bearing, will be above each other, and the plug (346) will be downwards. The plug must be pointing downwards if the motor is mounted with horizontal shaft.
12. Oil the screws (43) and tighten to 136 Nm. Use a special torque because the space is limited.
13. If the discs for any reason have to be lifted out (for example soaked with oil) so be careful with their mutual order and position.
14. Apply the o-ring (150) between the brake housing and the cover. Mount the piston package at the brake housing, be careful with the piston seals, so that they are not damaged. Mount the screws (44) and tighten to 136 Nm.
15. To better locate how, the disc cog are in position to the splines cog, remove the centre plug (347) at the assembly work. The centre plug is used to lock the motor and brake against the shaft, remove plug (71) and replace with a special adapter.
16. ***IMPORTANT!***
Remove the emergency release screws (342) and replace them with the plug (341) and bonded seal (149).
17. After that brake assembly is completed, remove the lifting eye from the brake.

Mounting instructions BICA 24 - 37

1. Remove end cover (A) mounted with six screws and bearing retainer (B) mounted with eight screws (43).
2. Remove the two plugs (C) on the motor.
3. Put the o-ring (124) into the groove on the disc centre (302) at assembled side against the motor.
4. Oil the splines on the disc center (302) located at the same side as the o-ring. Clean the mounting surfaces from oil before assembly. To be able to assemble the disc centre, rotate the disc centre so that the screw holes fits against the threaded holes on the motor. Oil the screws (43) and tighten to 136 Nm.
5. ***Note!*** The splines for the brake discs have to be absolute dry from oil.
6. Remove the measuring plugs (D) and replace them with the plugs (C) dismantled in item 2 above. Consequently to be able to shut the measuring connections.
7. Remove the 3/4" plug (48). Mount the lifting eye, thread M12, and the opposite plug to drain remaining oil from the brake.
This is an important factor to avoid oil at the discs.
8. Turn the brake vertical and mark with a felt-tip pen the different parts position, in relation to each other, the middle part, the brake housing and the brake cover.
9. Remove the plugs at the brake housing (341) and bonded seal (149) insert emergency release screws (342) at remaining place. Tighten the screws whereby the brake piston (311) is pulled against the brake cover (314) and the set of pressure springs (331) are compressing.
10. Loosen the 12 screws (44) at the brake cover (315-316) and lift off the brake piston. Be careful so that the piston seals are not damaged.
11. Remove the screws (330) to split the brake housing (306, 307) from the attachment unit (309). Lift off the brake housing from the attachment unit. With that the discs are exposed (320). Place the discs at a clean frame. Be careful with their mutual order and position.

12. Do **NOT** apply oil at the brake housing or the external splines at the motor. The disc brakes have to be absolute dry from oil.
13. Mount the o-ring (123) in the splines at motor. Check that 2 x O-rings (146) are mounted at the splines on the attachment unit (309) before it is mounted on the motor.
14. Mount the attachment unit (309) on the motor so that the connections at motor and brake for flushing of the axial thrust bearing meet each other.
15. Oil the screws (43) and tighten to 136 Nm.
16. Put the discs in the disc centre in the same order as they were removed.
17. The remaining part, the brake housing (306/307) with o-ring (151), is mounted on the motor so that the earlier marking with a felt-tip pen will be opposite each other. The lifting eye then points to the right outlet on the measuring nipple at the motor (see figure).
18. Oil the screws (330) and tighten to 277 Nm. The plug (346) must be pointing downwards if the motor is mounted with horizontal shaft.
19. Apply the o-ring (152/153) between the brake housing and the cover. Mount the piston package at the brake housing, be careful with the piston seals, so that they are not damaged. Mount the screws (44) and tighten to 136 Nm.
20. To better locate how the disc cog are in position to the splines cog, remove the centre plug (347) at the assembly work. The centre plug is used to lock the motor and brake against the shaft, remove plug (71) and replace with a special adapter.
21. **IMPORTANT!**
Remove the emergency release screws (342) and replace them with the plug (341) and bonded seal (149).
22. After that brake assembly is completed, remove the lifting eye from the brake.

Fig. 7



The brake shall only be exerted to pressure when all fastening screws have been tightened with the prescribed wrench torque.

Mounting instructions BICA 48-64

(For Compact CB 280-400)

1. Remove all full-length hexagon-headed screws, nuts and washers from the motor. The screws will not be used any more.
2. Turn the motor so that the shaft end is facing upwards.
3. Turn the adapter (**10, 11**) so that the side with the biggest diameter is facing upwards. Apply grease to the O-ring channel and fit the O-ring (**80**) to the adapter.

Turn the adapter over and place it on the motor so that the two countersunk holes are centred over the two M20 threaded lifting eyes.

4. Oil the two screws (**70**) and insert them in the countersunk holes. Tighten the screws to a torque of 540 Nm. The adapter is now secured to the motor.
5. Oil the screws (**20, 21**) and fit these to the motor using the previously removed nuts and washers, and tighten to a torque of 540 Nm.
6. Check that the brake has been supplied in the braked state, i.e. that the brake springs (**331, 332**) are released. Lift out the disc centre (**300, 301**) from the brake and remove the distance sleeve (**362, 363**) by undoing the six screws (**372**). Then remove the two sleeves (**366**) from the countersunk holes.
7. Remove the O-rings (**105, 156**) from the disc centre, apply grease to the O-ring channel and refit the O-rings.

Place the disc centre on the motor so that the cylindrical countersunk holes are centred over the two M12 threaded holes in the motor cylinder block. Place the sleeves (**366**) in the countersunk holes, oil the hexagon-socket head cap screws (**75**) and tighten them to a torque of 136 Nm. The disc centre should now be held securely but still be able to rotate slightly. Check that the splines on the motor and disc centre are correctly aligned with each other.

8. Fit the distance sleeve (**362, 363**) to the disc centre (**300, 301**), oil the screws (**372**) and tighten to a torque of 47 Nm.
9. Apply grease to the O-ring channel on the adapter and fit the O-ring (**84**). Turn the brake so that the discs are facing downwards. Fit the dust seal (**92**) using the special fitting tool. Apply grease to the dust seal and the mating surface on the distance sleeve.

10. Now fit the brake to the adapter. The brake pressure coupling, B1, must face the Minimesse nipples on the motor. If the holes in the brake are not aligned with the holes in the adapter, the brake must be rotated into the correct position. To do this, remove the plugs (**348**) and bonded seals (**149**) and screw in the emergency release screws (**342**) and washers (**370**) in place of the plugs. Tighten the emergency release screws alternately one turn at a time.

This moves the brake piston (**311, 312**) towards the brake cover (**314, 315**), compressing the springs (**331, 332**) and allowing the brake to be rotated into the correct position.

Fit the screws (**356, 357**) and tighten to a torque of 580 and 710 Nm respectively. Remove the emergency release screws (**342**) and refit the plugs (**348**) and bonded seals (**149**).

11. Remove the lifting eyes from the brake, if fitted.

Mounting instructions BICA 90-134

(For Compact CB 560-840)

1. Turn the motor so that the shaft end is facing upwards.
2. Turn the adapter (**12, 13**) so that the side with the biggest diameter is facing upwards. Apply grease to the O-ring channel and fit the O-ring (**81**) to the adapter.

Turn the adapter over and place it on the motor so that the two countersunk M24 holes are positioned at 90° to the Minimesse nipples.

3. Oil the two screws (**71**) and insert them through the motor attachment ring into the holes in the adapter. Tighten the screws to a torque of 900 Nm. The adapter is now secured to the motor.
4. Check that the brake has been supplied in the braked state, i.e. that the brake springs (**333, 334**) are released. Lift out the disc centre (**302, 303**) from the brake and remove the distance sleeve (**364, 365**) by undoing the six screws (**372**). Then remove the two sleeves (**366**) from the countersunk holes.
5. Remove the O-rings (**157, 158**) from the disc centre, apply grease to the O-ring channel

and refit the O-rings.

Place the disc centre on the motor so that the countersunk holes are centred over the two M12 threaded holes in the motor cylinder block. Place the sleeves (366) in the countersunk holes, oil the hexagon-socket head cap screws (75) and tighten them to a torque of 136 Nm. The disc centre should now be held securely but still be able to rotate slightly. Check that the splines on the motor and disc centre are correctly aligned with each other.

6. Fit the distance sleeve (364, 365) to the disc centre (302, 303), oil the screws (372) and tighten to a torque of 47 Nm.
7. Apply grease to the O-ring channel on the adapter and fit the O-ring (85). Turn the brake so that the discs are facing downwards. Fit the dust seal (93) using the special fitting tool. Apply grease to the dust seal and the mating surface on the distance sleeve.
8. Now fit the brake to the adapter. The brake pressure coupling, B1, must face the Minmess nipples on the motor. If the holes in the brake are not aligned with the holes in the adapter, the brake must be rotated into the correct position. To do this, remove the plugs (348, 349) and bonded seals (149) and screw in the emergency release screws (342, 350) and washers (370–371) in place of the plugs. Tighten the emergency release screws alternately one turn at a time. This moves the brake piston (312, 313) towards the brake cover (316, 317), compressing the set of springs (333, 334) and allowing the brake to be rotated into the correct position.
Fit the screws (357, 358) and tighten to a torque of 710 and 1000 Nm respectively.
Remove the emergency release screws (342, 350) and refit the plugs (348, 349) and bonded seals (149).
9. Remove the lifting eyes from the brake, if fitted.

6.2 Fitting torque arm to BICA 48–134 with motor

The torque arm should be fitted to the brake adapter before the assembly (brake/motor) is mounted on the driven shaft.

1. Clean the mating surfaces on the torque arm and brake adapter.
2. Oil the screws (20-22).
3. Make sure the torque arm is facing in the correct direction when the assembly is mounted on the driven shaft. To achieve the highest possible oil level in the motor housing, the motor must be turned until the drain outlets are in the correct position. (See fig. 3.12, Installation and Maintenance Manual, Compact CB).
4. Align the torque arm on the motor and fit the hexagon headed screws (20-22) and washers (55, 57). Tighten the screws to their specified torque: 540 Nm for (20, 21) and 935 Nm for (22).
5. Otherwise follow section 3.1.4b, "Mounting the motor onto the driven shaft" in the Installation and Maintenance Manual, Compact CB.

6.3 Fitting to flange for BICA 48–134 with motor

1. Clean the mating surfaces on the customer's flange and the brake adapter.
2. Oil the screws (20-22).
3. Make sure the assembly is facing in the correct direction on the driven shaft. To achieve the highest possible oil level in the motor housing, the motor must be turned until the drain outlets are in the correct position. (See fig. 3.12, Installation and Maintenance Manual, Compact CB).
4. Align the assembly and fit the hexagon headed screws (20-22) and washers (55, 57).
Tighten the screws to their specified torque: 540 Nm for (20, 21) and 935 Nm for (22).
5. Otherwise follow section 3.1.4b, "Flange mounted motors" in the Installation and Maintenance Manual, Compact CB.

6.4 Dimensions, space requirement and weight

The binding dimensions, the mass (weight) and the other technical data are stated on the dimensional drawing which is binding for the pertinent order. This drawing is attached to the delivery and can also be inquired at our after-sales service (address is given in chapter 10.3).

6.5 Dismounting

Loosen the supply lines in unpressurized condition. The brake is dismantled in inverted order of succession than the assembly described in chapter 6.1.



Warning! When disassembly the brake, pay attention to the oil spill.

7. Setting into service.

(Single parts with item designation as per chapter 5.1)

Before setting into service check whether the emergency release screws have been removed and plugs **(341)** with washer **(149)** are mounted. (See chapter 5.3)

8. Operation



Independent from the following hints, the legal safety prescriptions for prevention of accident prescribed for the particular application case apply to the operation of the brake. The user is held responsible to adhere to these prescriptions.

8.1 Service conditions

Following service conditions has to be fulfilled in order to maintain trouble free operation of the brake.

The service temperature must not exceed +70°C and not under - 35°C. The relative humidity of the ambient air shall not exceed 50% with 40°C. With lower temperatures higher humidities are allowed, e.g. 90% at 20°C. When using the brake in low temperature, flushing is needed.

When using sealings made of FPM (Viton), operation is admissible in a service temperature range from -20°C to +100°C.

In case of any other temperature ranges, please consult our aftersales service.

8.2 Oil requirement



Warning! The brake is only made to be used in dry operation and no oil and grease are permitted to be in contact with the discs. See chapter 5.4

The Hågglunds Drives hydraulic motors and brakes are primarily designed to operate on conventional petroleum based oils. The hydraulic oil can be chosen in consultation with the oil supplier of your local sales office, bearing the following requirements in min:

General

Generally the choice of oil is normally based on the oil requirements for the Compact CA or/and Compact CB motor, see Installation and Maintenance manual, Compact. The oil shall have FZG (90) fail stage minimum 11 described in IP 334 (DIN 51354). The oil must also contain inhibitors to prevent oxidation, corrosion and foaming. The viscosity is highly dependent of the temperature. The final choice of oil must depend on the operating temperature that can be expected or that has been established in the system and not in the hydraulic tank.

High temperatures in the system greatly reduce the service life of oil and rubber seals, as well as resulting in low viscosity, which in turn provides poor lubrication.

Content of water shall be less than 0,1%.
 In Industrial applications with high demands for service life, the content of water shall be less than 0,05%.

Remark! Fire resistant fluids like HFA, HFB, HFC and syntethic fluids HFD are not permitted to be used without consultation with Hågglunds Drives AB.

8.3 Hydraulic oils

To release the brake, preferable use mineral oils to DIN 51524. The ISO viscosity range should be within ISO VG 15 to ISO VG 100.

Fire resistant fluids HFB, HFC must be used only to release the brake after having consulted our after-sales service (see chapter 10.3).

8.4 Filtering

Pay very special attention to cleanness and good filtering in the hydraulic system in order to exclude faulty operation.

Recommended filter mesh width: 10 µm.

8.5 Trouble shooting (single parts with item numbers as per chapter 5.1)

Trouble	Possible cause	Required measures
Braking effect insufficient	Inner disc not degreased when replaced.	Degrease the frictional faces (see chapter 9.1 and 9.2).
	Admissible wear exceeded	Replace the disc set (see chapter 9.2.2).
	Leakage oil pipe not connected or choked.	With strongly oiled discs, replace the disc set (see chapter 9.2.2).
	Residual pressure available in the pressure oil pipe for opening of the brake.	Check the cause and eliminate the fault.
	Leaking seal in brake or motor.	Replace seal and disc set, see chapter 9.2.2 and 9.2.3.
No braking effect	Screws for manual emergency release not removed.	Remove the screws (see chapter 5.3).
Brake is getting too hot	The min. excessive release pressure for opening of the brake not available.	Check the technical data (see chapter 2.2).

9. Maintenance

9.1 Maintenance and inspection works

(Single parts as per chapter 5.1)

When carrying-out maintenance and inspection works pay attention to chapter 3 "Safety guidelines". Because of the varying service ratios it cannot be fixed in advance the exact intervals for inspection, maintenance or repair.

Higher charges of the brake (e.g. by torque, switching frequency, ambient temperature etc) require shorter maintenance intervals. Therefore observe the brake for its functional safety and adapt the maintenance intervals accordingly (experience).

With dry operation, it is absolutely necessary to keep the discs free from grease. Even dry lubricants must not reach the friction faces. Slight greasy spots can be eliminated by a suitable degreasing agent.

Leakage oil losses at the sealings cannot be avoided. When no leakage oil pipe is provided, drain the leakage oil losses by loosening the leakage oil plug (346) and catch it. The time intervals for draining the leakage oil losses can only be detected on the basis of proven maintenance intervals. Check also wear of disc pack, see table 2.

9.2 Dismounting of the BICA

9.2.1 Safety instructions for working



A great deal of force is exerted on the brake cover (314–317) and spacer ring/attachment unit/end cover (308–309, 325–327) by the compressed springs (331–334).

To avoid accidents and injury during dismantling, we recommend that you contact the service engineers at Hågglunds Drives.

When it is absolutely necessary to replace the disc pack and/or the sealings, proceed as described in the chapters 9.2.2 or 9.2.3.

9.2.2 Exchange of the disc set

BICA 13

Remove the plugs (341) and bonded seals (149) from the brake cover (314) and screw in the emergency release screws (342) and washers (343) in place of the plugs. Tighten the screws alternately one turn at a time. This moves the brake piston (311) towards the brake cover (314) and compresses the set of springs (331).

Fit the lifting eye (344) or use a lifting strap to secure the brake.

Undo the screws (43) on the brake housing. Remove the brake from the disc centre (302) and splines on the motor attachment unit. Remove the circlip (304), spacer ring (308) and disc set (318). Fit the new discs by starting and finishing with an outer disc. Fit the spacer ring (308) and circlip (304). Oil the screws (43) and tighten to a torque of 136 Nm.

IMPORTANT! Remove the emergency release screws (342) and washers (343) and refit the plugs (341) and bonded seals (149).

BICA 24 - 37

Remove the plugs (341) and bonded seals (149) from the brake cover (315–316) and screw in the emergency release screws (342) and washers (343) in place of the plugs. Tighten the screws alternately one turn at a time. This moves the brake piston (312–313) towards the brake cover (315–316) and compresses the set of springs (332–333).

Fit the lifting eye (344) or use a lifting strap to secure the brake.

Undo the screws (330) on the brake housing. Remove the brake from the disc centre (303). The attachment unit (309) must be left on the motor. Remove the disc set (320) from the brake. Fit the new discs by starting and finishing with an outer disc. Refit the brake and check that the O-ring (151) is fitted in the O-ring channel. Oil the screws (330) and tighten to a torque of 277 Nm.

IMPORTANT! Remove the emergency release screws (342) and washers (343) and refit the plugs (341) and bonded seals (149).

BICA 48-134

Remove the plugs (348–349) and bonded seals (149) from the brake cover (314–317) and screw in the emergency release screws (342, 350) and washers (370–371) in place of the plugs. Tighten the screws alternately one turn at a time. This moves the brake piston (311–313) towards the brake cover and compresses the set of springs (331–334). Use a lifting strap to secure the brake before removing the screws (356–358).

Undo the screws (356–358) on the brake cover (314–317) and remove the brake. The disc unit (300–303) must be left on the motor. Turn the brake so that the screws (352, 354) are facing upwards. Remove the screws (352, 354) and lift off the end cover (325–327). Remove the disc set (318–320) from the brake. Fit the new discs by starting and finishing with an outer disc.

Check that the O-ring (150–152) is fitted in the O-ring channel on the brake. Refit the end cover (325–327). Oil the screws (352, 354) and tighten to a torque of 210 Nm.

Check that the O-ring (84–85) is fitted in the O-ring channel on the adapter (10–13) before refitting the brake. Also check that the dust seal (92–93) is correctly fitted in the brake cover, and oil the surface of the distance sleeve (362–365) that is in contact with the dust seal. Oil the screws (356–358) and tighten to a torque of 580 Nm for (356) and 1,000 N for (357–358).

IMPORTANT! Remove the emergency release screws (342, 350) and washers (370–371) and refit the plugs (348–349) and bonded seals (149).

NOTE! For all sizes of brake: check that the number of discs removed matches the number of discs fitted.



Before assembly, it is absolutely necessary to degrease the steel discs; this applies to dry operation.

Before re-mounting the brake, check the disc centre splines for any possible wear. With switching traces exceeding 0,1 mm depth, replace the disc center. Re-mount the brake as described in chapter 6.1.

9.2.3 Exchange of the sealings

Disconnect the depressurized hydraulic couplings and drain the oil from the brake.

This is important to avoid getting oil on the discs!

BICA 13-37

Remove the plugs (341) and bonded seals (149) from the brake cover (314–316) and screw in the emergency release screws (342) and washers (343) in place of the plugs. Tighten the screws alternately one turn at a time. This moves the brake piston (311–313) towards the brake cover (314–316) and compresses the set of springs (331–333).

Undo the 12 or 20 screws (44) on the brake cover (314–316) and lift out the brake piston (311–313). Remove the old piston seals (140–145), which consist of a ring seal and an O-ring. Also remove the O-ring (150, 152–153) from the brake housing (305–307).

BICA 48-134

Remove the plugs (348–349) and bonded seals (149) from the brake cover (314–317) and screw in the emergency release screws (342, 350) and washers (370–371) in place of the plugs. Tighten the screws alternately one turn at a time.

This moves the brake piston (311–313) towards the brake cover and compresses the set of springs (331–334). Use a lifting strap to secure the brake before removing the screws (356–358).

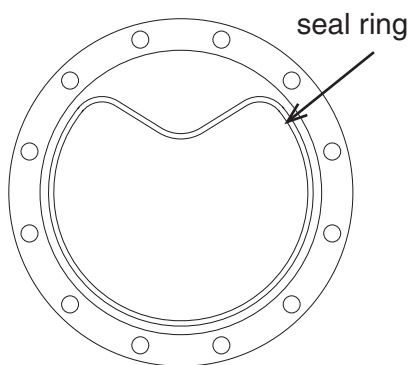
Undo the screws (356–358) on the brake cover (314–317) and remove the brake. The disc centre (300–303) must be left on the motor. Turn the brake so that the screws (352–353, 355) are facing upwards. Remove the screws (352–353, 355) and lift off the complete assembly consisting of the brake cover (314–316) and brake piston (311–313). Remove the old collars (164–169) and piston seals (140–145). The piston seals consist of a ring seal and an O-ring. Also remove the O-ring (150–152) from the brake housing (305–307).

To simplify the mounting of new sealings, the seal rings may be heated to approx. 80°C in water or oil.

Mount them upheated to the brake piston and let the seal rings cool down to room temperature. The seal rings may not fit exactly, it have to be stretchen a little bit.

Mount the new o-ring in the groove for the sealing and take away the seal ring from the piston. Mount it in the groove as shown in figure 4.

Fig. 8



Be sure that the curved part of the seal ring are bended back to original position before mounting the brake piston, otherwise the seal ring can be damaged.

After fitting of the seal rings into the groove, oil carefully the sealing faces and the seal rings by hydraulic oil.

BICA 13-37

Fit the O-ring (150, 152–153) and brake piston (311–313) in the brake housing (305–307) in the same position they were in before removal. Do not use excessive force or hammer blows. The brake piston must slide smoothly on the piston seals. Oil the screws (44) and tighten to a torque of 136 Nm.

IMPORTANT! Remove the emergency release screws (342) and washers (343) and refit the plugs (341) and bonded seals (149).

BICA 48–134

Fit the collars (164–169) in the brake housing and on the brake piston. Fit the O-ring (150–152) and the complete assembly consisting of the brake cover (314–316) and brake piston (311–313) in the brake housing

(305–307) in the same position they were in before removal.

Do not use excessive force or hammer blows. The brake piston must slide smoothly on the piston seals. Oil the screws (352–353, 355) and tighten to a torque of 210 Nm for (352) and 295 Nm for (353, 355). Check that the O-ring (84–85) is fitted in the O-ring channel on the adapter (10–13) before refitting the brake.

Also check that the dust seal (92–93) is correctly fitted in the brake cover, and oil the surface of the distance sleeve (362–365) that is in contact with the dust seal. Refit the brake in the same position it was in before removal. Oil the screws (356–358) and tighten to a torque of 580 Nm for (356) and 1,000 Nm for (357–358).

IMPORTANT! Remove the emergency release screws (342, 350) and washers (370–371) and refit the plugs (348–349) and bonded seals (149).

The piston seals must only be replaced as a complete unit.

Take note of the fitting position of the piston seals as shown in the figures in sections 5.1.



CAUTION

Before continuing with the mounting, the seal rings must cool down to room temperature!



CAUTION

Before fitting the piston (311-313) check the position of the discs.

It is absolutely necessary that the first outer disc is within the toothing of the brake housing (305-307).

9.2.4 Exchange set of pressure springs

RISK OF EXPLOSION!

BICA 13–37

Undo the 12 or 20 screws (44) on the brake

cover (314–316) alternately by half a turn at a time. The springs exert a great deal of force on the brake cover (314–316).

Unscrew the screws (44) until the set of springs (331–333) is no longer compressed. Remove the brake cover (314–316). Take note of the number and positions of the old springs. Remove the old set of springs and replace it with the new set. Refit the brake cover in the same position as it was in before removal. Oil the screws (44) and tighten to a torque of 136 Nm.

BICA 48–134

Use a lifting strap to secure the brake before removing the screws (356–358).

Undo the screws (356–358) on the brake cover (314–317) and remove the brake.

Turn the brake so that the screws (352–353, 355) are facing upwards. Undo the screws (352–353, 355) alternately by half a turn at a time. The springs exert a great deal of force on the brake cover (314–316).

Unscrew the screws (352–353, 355) until the set of springs (331–334) is no longer compressed.

Remove the brake cover (314–317). Take note of the number and positions of the old springs. Remove the old set of springs and replace it with the new set. Refit the brake cover in the same position as it was in before removal. Oil the screws (352–353, 355) and tighten to a torque of 210 Nm for (352) and 295 Nm for (353, 355).

Check that the O-ring (84–85) is fitted in the O-ring channel on the adapter (10–13) before refitting the brake.

Also check that the dust seal (92–93) is correctly fitted in the brake cover, and oil the surface of the distance sleeve (362–365) that is in contact with the dust seal. Oil the screws (356–358) and tighten to a torque of 580 Nm for (356) and 1,000 Nm for (357–358).

10. Spare parts stocking and after-sales service

10.1 Spare parts stocking

To safeguard the brake's continuing operation

and readiness for use, major spare parts and parts that are subject to normal wear should be kept in stock.

BICA 13–37

The parts that are subject to wear are the discs (318, 320), piston seals (140–145) and cylindrical sets of springs (332–334) (position numbers are given in section 5.1).

BICA 48–134

The parts that are subject to wear are the discs (318–320), piston seals (140–145), collars (164–169) and cylindrical sets of springs (331–334) (position numbers are given in section 5.1).

We only accept liability for the original spare parts supplied by ourselves.

We express clearly that the assembly and/or utilisation of other parts than the original spare parts supplied by ourselves, can change unfavourably the characteristics of the brake prescribed by the construction and that thereby the direct and/or indirect safety can be affected.

For damage caused by the utilisation of not original spare parts and accessories, any liability of the Hägglunds Drives AB is excluded.

Please bear in mind that often special manufacturing and delivery specifications apply to own as well as to foreign parts and that always offer spare parts to the up-dated technical conditions and the up-dated legal prescriptions.

10.2 Data for spare parts orders

When ordering spare parts, refer to the spare parts list for BICA 13–37, COPL-3.xx.3 and BICA 48–134, COPL-3.xx.4.

10.3 Address of the after-sales service

For Aftersales service and spare parts please contact nearest Hägglunds Drives office or visit our web-site, www.hagglunds.com.

11. Listed standards and regulations

The brake comply with the usual standards and regulations, in particular with:

Titel	DIN	VDI
Screwed plugs and tapped holes	3852	-
Tolerances of shaft extension run-out and of mounting flanges	42955	-
ISO viscosity classification	51519	-
Hydraulic oils	51524	-
Systematic calculation of high-duty bolted joints	-	2230