

GOIZPER

MOUNTING & MAINTENANCE INSTRUCTIONS

PNEUMATIC CLUTCH-BRAKE

SERIE 57

SIZES

19N/25N/37N/55/75/76/77/78/80/81/82



PLEASE READ THIS MANUAL VERY CAREFULLY BEFORE
SETTING UP THE CLUTCH-BRAKE UNIT

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Torque Technologies, the exclusive U.S. stocking agency of GOIZPER Clutches, Brakes and Clutch-Brakes provides expert, computerized application engineering and retrofit services to customers across the USA.

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1. GENERAL ASPECTS

1.1 Application

- This kind of pneumatically actuated combined clutch-brake is mainly used in mechanical presses and other applications where it is necessary to transmit torque and accelerate important masses, and when the characteristics match together with the ones required in the 5.2 paragraph of the EN 692 norm, fulfilling its requirement.
- This clutch-brake is designed for its dry performance.
- Due to the high potential technical loads involved, it is very important to calculate the application depending on parameters such as inertia to accelerate and decelerate, speed, frequency of operation, torques, working pressure and ambient temperature. Therefore it is very important to fulfil the conditions that the clutch-brake has been calculated for.
- GOIZPER S. COOP is not responsible for the eventual personal or material damage that may arise from the unforeseen use of the clutch-brake nor for the modifications introduced in the unit without express authorisation or the non fulfilment of the indications subject of this manual.
- Besides the indications of this manual, safety regulations must be satisfied according to the working areas.

1.2 Who is this manual addressed to?

This manual should be read and understood before the installation and set up of the clutch-brake by:

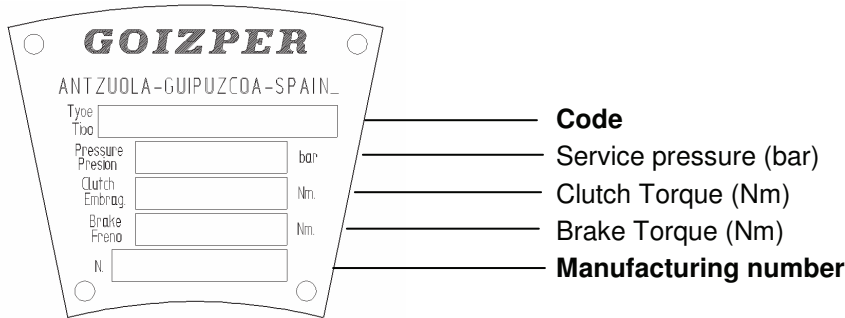
- Qualified personnel responsible for the machine
- Qualified personnel responsible for the mounting of the machine
- Qualified personnel responsible for maintenance

It is important that this manual is at the disposal of the a/r personnel.

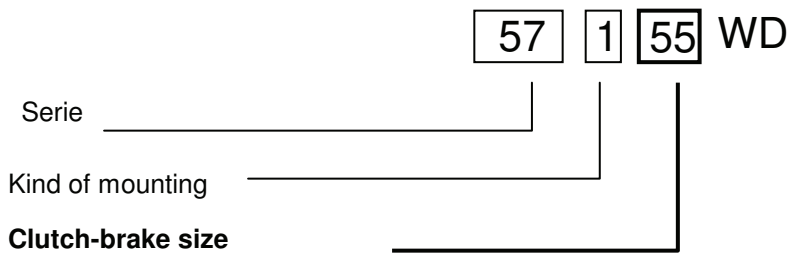
If there is any doubt, please contact Goizper S. Coop.

1.3 Identification of the unit

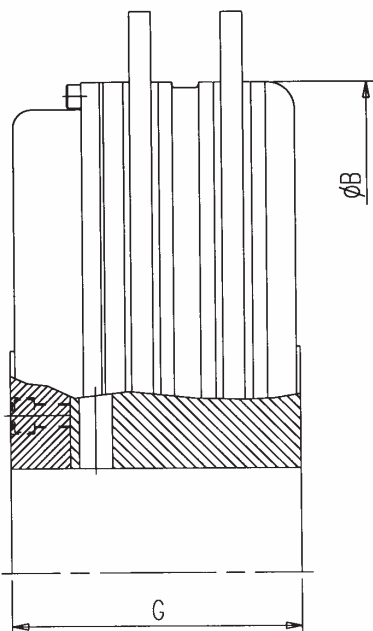
- The clutch-brakes are provided with an identification plate, where all the necessary data regarding the unit is indicated.



- For the correct application of the information in this manual, it is necessary to identify the size of the unit that is defined with the 4th and 5th digit of the code:



- We can also identify the size of the clutch-brake from its dimensions (Fig 1):



$\varnothing B$: Outer diameter of the clutch-brake (mm)

G: Width of the clutch-brake (mm)

	Size										
	19N	25N	37N	55	75	76	77	78	80	81	82
$\varnothing B$	380	420	466	543	593	675	755	830	905	1015	1140
G	112	125	140	160	185	205	230	248	260	295	330

Fig. 1

2. GENERAL FEATURES

The clutch-brake consists of mainly 3 parts:

- a) Clutch disc with bonded linings (E), driven by the flywheel and moves axially.
- b) Brake disc with linings (F), connected to the machine frame, and can move axially.
- c) Clutch-brake assembly is connected to the shaft. The clutch plate (1) and brake plate (2) are fixed by screws (7) and connected to the shaft. The piston (3) can move axially.

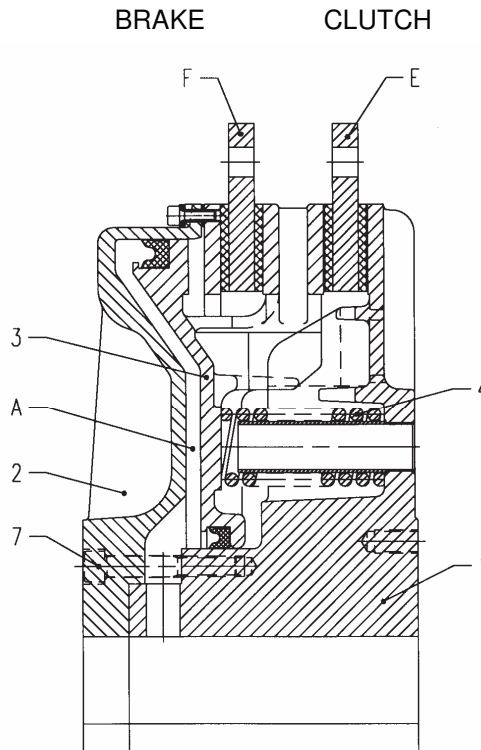


Fig. 2

- Clutch engagement: Compressed air enters chamber (A); the piston(3) releases the brake disc (F) and engages the clutch disc (E) against the clutch plate (1). Flywheel rotation is transmitted to the clutch-brake and shaft.
- Brake engagement: Compressed air exhausts from chamber (A), brake springs (4) act against piston (3), disengaging the clutch discs (F) against the cover brake (2). The clutch-brake and the shaft is now stopped.
- Friction pads are for dry operation and therefore it is important to avoid humidity and keep the friction surfaces free from oil and grease.
- Due to the high thermal energy generated, the clutch-brake should be installed in a ventilated surrounding.



The normal service pressure is 5.5 bar, and maximum should be 6 bar. **Clutch-side elements could be broken at a higher pressure**

3. ASSEMBLY OF THE CLUTCH-BRAKE IN THE MACHINE



The assembly/disassembly of the clutch-brake should be carried out by qualified personnel, taking into consideration the security procedures.

3.1 Unpacking the unit

- The clutch-brake has some threaded holes making it easier to take the clutch-brake out from the box (Unit 4.4.1 Point 2).
- When cleaning the unit take into account that friction surfaces should be free from oil and grease.

3.2 Air supply

Air feeding scheme:

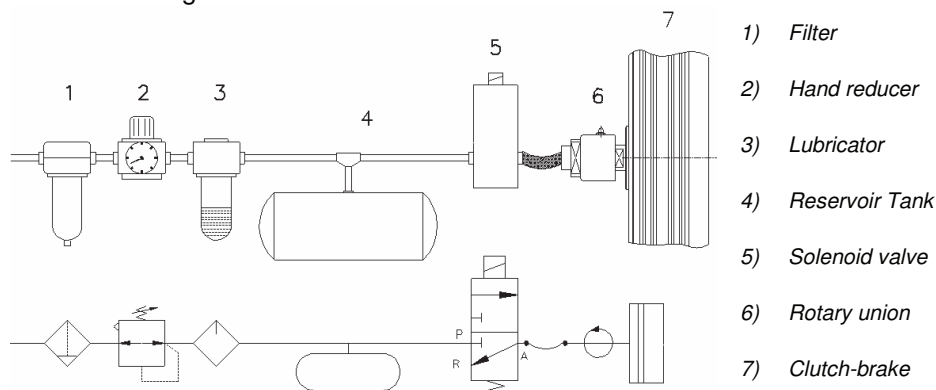


Fig. 3

- The air supply should be dry, filtered and lubricated (1 or 2 drops of oil by m³ of air) and properly connected.
- The rotary seal should be mounted concentric with regard to the clutch-brake and without air leakage. It should be connected to the installation with a flexible hose/pipe, in order to avoid tension.
- It is important to connect the solenoid valve as near as possible to the clutch-brake in order to avoid a delay in the response time.
- Elements of the pneumatic installation should be sized according to the needs of the clutch-brake, to avoid a delay in the response time.
- During operation, service pressure should not go below 90% from the nominal pressure. For high operating frequencies, a reservoir tank, correctly sized, should be used (V_{DC}).

$$V_{DC} = 4 \cdot p \cdot V$$

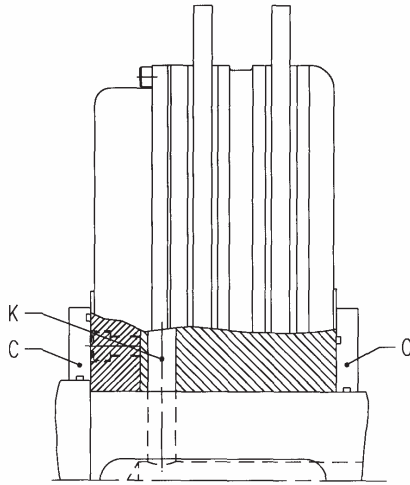
V_{DC} : Volume of the reservoir tank (litres)

p : Nominal working pressure (bar)

V : Volume of the chamber with maximum war + vol. Tubes to the electro valve (litres)

3.3 Assembly of the clutch-brake to the shaft

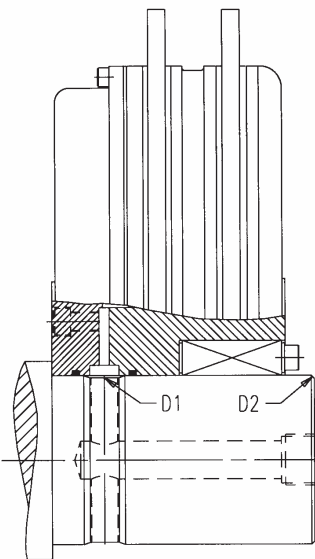
3.3.1 With keyway and air inlet from inside the shaft

**Fig. 4**

Mounting the unit to the shaft should be carried out with two keyways at 180°. Clutch-brake has two air inlets (K) at 180° and at 90° from the keyways (fig.4)

- In order to avoid air leakage the customer will mount the discs (C) to the clutch-brake with a lateral o-ring and another o-ring in the shaft (these o-rings are not supplied by us).

3.3.2 With locking ring from clutch side

**Fig. 5**

Clutch-brake has two air inlets at 180° and an air distribution channel between two o-rings (Fig.5) (supply of the o-rings and locking ring under request).

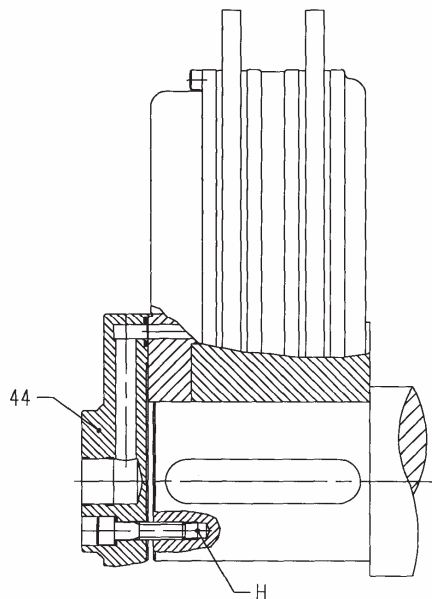
- Avoid rough edges to protect the o-rings, by machining the shaft diameter at the air inlet (D1).
- Prepare a chamfer at the end of the shaft (D2) to avoid damaging the o-rings during assembly.
- Tighten the bolts of the locking ring to the correct torque, by using a dynamometric key. **It is very important to keep the tightening torque indicated by GOIZPER S. COOP.**

An excess in the tightening can result negatively on the resistance of the clutch-brake and an insufficient tightening could carry out a slide within the shaft



- For the assembly of the ring, please follow up the instruction of the manufacturer. The usual process is the following:
 1. Clean the contact surfaces and cover with a light oil cover (do not use any oil that might contain molybdenum disulfure).
 2. Tighten opposite and uniformly the bolts 2-3 times until the tightening torque indicated by GOIZPER S. COOP is reached.
 3. Tighten all the bolts to the torque indicated by GOIZPER S. COOP, and according to the instructions indicated by the locking ring manufacturer

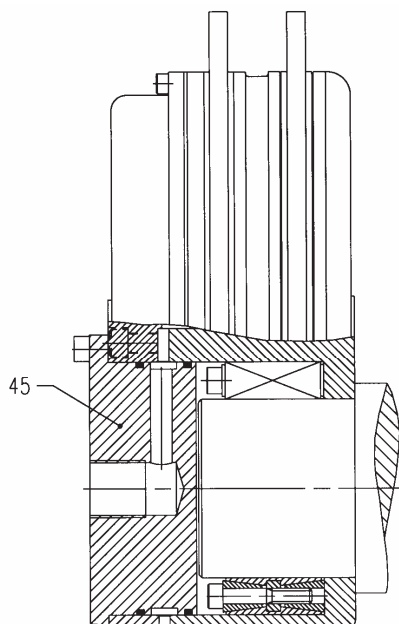
3.3.3 Assembly with keyways and air side inlet



This version is only available when it is an assembly with the brake side free. The customer that chooses this assembly, has to make 2 keyways at 180° and the indicated 4 threaded bores (H). For fixing the clutch-brake unit, mount it on the shaft, put the air side inlet (44) provided with the necessary seals and tighten it with the bolts and washers previously fixed with LOCTITE.

Fig. 6

3.3.4 Assembly with locking ring in the brake side



With this kind of assembly, the clutch brake will be fixed after the fixation ring. The tightening of the bolts will be done as explained in paragraph 3.3.2.

Then the air side flange (45), provided with seals, will be mounted and fixed with bolts with LOCTITE.

- Tighten the bolts of the locking ring at the correct torque by using a dynamometric key. **It is very important to respect the tightening torque indicated by GOIZPER S. COOP.**

An excess in the tightening torque can affect the resistance of the clutch-brake and an insufficient torque can origin the sliding in the shaft.



Fig. 7

3.4 Assembly of the clutch and brake discs.

There are many assembly possibilities depending on the type of clutch and brake disc.

3.4.1 Fixed disc with friction blocks

Each disc is fixed by 12 bolts (**Minimum quality 10.9**) at 30° among each one. The blocks side in their holes.

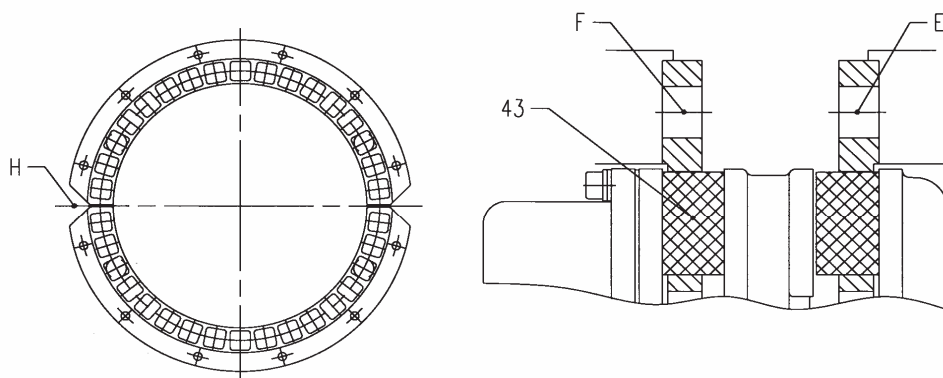


Fig. 8

Assembly (Fig. 8):

1. Take out the two clutch side discs (E).
2. Mount the clutch-brake on the shaft and in its correct position.
3. **Hold temporarily the 2 brake discs (F) to avoid them falling.**
4. Introduce air to engage the clutch discs.
5. The brake bores and the cover bores must match. Tighten the bolts at the indicated torque and apply LOCTITE (270 or similar).

Size		19N	25N	37N	55	75	76	77	78	80	81	82
Bolt	10.9	M10	M12	M14	M14	M16	M20	M24	M24	M24	M27	M30
Tightening torque	Nm	69	120	190	190	295	580	1000	1000	1000	1500	2000

Table 1

6. Release the air to engage the brake discs.
7. Mount the clutch disc with their blocks (43).
8. Turn the flywheel so that its threaded mounting holes match the clutch disc holes allowing a gap (H) between the discs. Tighten the bolts to the torque indicated in Table 1. use LOCTITE (270 or similar).
9. Proceed accordingly with the second disc.

3.4.2 Sliding disc over 12 fixed bushes

Each friction disc slides over 12 equally spaced bushes. Place in line with the frame or flywheel and fixed by bolts.

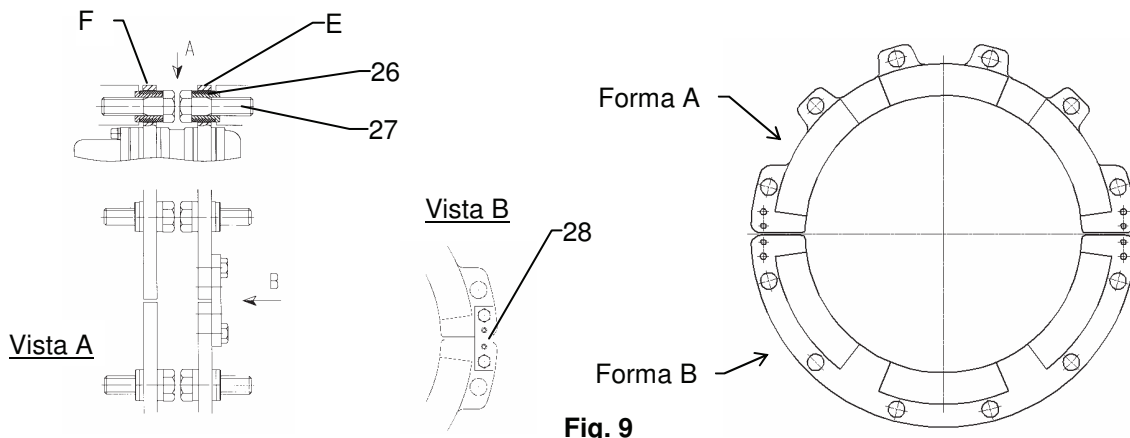


Fig. 9

Assembly (Fig. 9):

1. When the friction discs are supplied as per Form B, disassembly and take out the clutch-side discs (when form A, it is not necessary to do so).
2. Assemble the clutch-brake to the shaft and fix into its correct position.
3. **Hold temporarily the brake side discs (F) to avoid them falling.**
4. Introduce air to engage the clutch discs.
5. Make the brake side holes match with the placements to the fixed part. Put the bushes (26) and tighten the bolts (27) to their tightening torque indicated in Table 2 applying fixation LOCTITE (270 or similar).

Size		19N	25N	37N	55	75	76	77	78	80	81	82
Bolt	8.8	M10	M12	M14	M14	M16	M20	M24	M24	M24	M27	M30
Tightening torque	Nm	49	86	135	135	210	410	710	710	710	1050	1450

Table 2

6. Release the air to engage the brake discs..
7. If the clutch discs have become loose, mount them again with the adjusting plates (28), with their corresponding bolts and pins and apply LOCTITE (270 or similar).



The clutch discs have to match each other using adjusting plates that are supplied with pins and bolts. If they are not mounted in this way, they will not slide due to centrifugal forces.

8. Turn the flywheel so that its' threaded mounting holes match the clutch disc holes. Tighten the bushes and bolts to the torques indicated in Table 2. Use LOCTITE (270 or similar).
9. **Check that the discs slide axially freely**

3.4.3 Sliding disc with 2 anchor pins

Both half-discs match each other by two lugs (short or long), provided with bushes that slide on pins fixed in the machine frame or the flywheel.

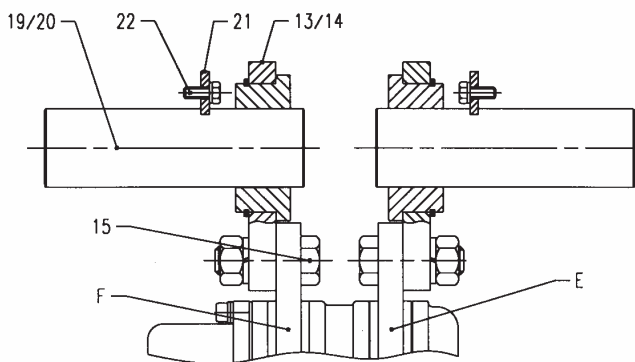


Fig. 10

Assembly (Fig 10):

1. Mount the pins in the machine (it is recommended H7/k6), fixed them by the adjusting plate (21) and tighten the bolts (22) by using LOCTITE (270 or similar).

One of the pins has **2 parallel flats** allowing radial compensation. In the assembly, these flats have to be completely parallel to the clutch-brake radius from the centre of the pin.

2. Disassemble the lugs from the discs and take out the clutch side discs.
3. Put the bushes (13/14) on the corresponding pins (19/20).
4. Mount the clutch-brake on the shaft and fix it in its correct position.
5. **Hold temporarily the brake discs (F) to avoid them falling.**
6. Introduce air to engage the clutch discs.
7. Fix the brake discs to the lugs with the pins, bolts (15) and nuts with elastic washer supplied. Tighten the bolts to their tightening torque Table 3 using LOCTITE (270 or similar). **The bolts must be mounted with their head towards the inside part of the clutch, but the lugs must be mounted from outside the discs.**

Size		19N	25N	37N	55	75	76	77	78	80	81	82
Tightening torque (*)	Nm	49	49	86	135	210	210	410	710	710	1050	1450

(*) Bolt quality 8.8

Table 3

8. Release the air, leaving the unit in brake operation.
9. Repeat point 7 with the clutch side discs (E).
10. **Check that the discs slide axially without effort**

Remarks: If it is possible, assemble the unit without disassembling the lugs from the discs but **do not forget to tighten the bolts (15) to their recommended tightening torque as per Table 3 and by applying LOCTITE (270 or similar).**



3.4.4 Combined assembly

- Clutch-brakes can be delivered by combining the described mountings.
- For its assembly, the instructions in each paragraph should be followed.

In the case of sliding the discs, please check that after the assembly the discs slide axially freely

3.5 Set up

- Stop the machine, disconnect and connect the air a few times, and check that the piston (3) (Fig. 2) moves correctly.
- Once the mobile elements of the machine (turn of the wheel, movement of the ram etc.) are properly adjusted and mounted, set up the clutch-brake.
- When the discs or the friction parts of the clutch-brake are new, the nominal transmissible torque can be reduced considerably. The nominal torque is reached after an appropriate working period (3 ÷ 4 hours to 20 ÷ 30 hours depending on conditions), taking into account that **the maximum cycling frequency indicated for the clutch-brake should not be exceeded.**

4. MAINTENANCE



- The assembly and disassembly operations and the necessary adjustments should be carried out by **qualified personnel** taking the necessary **security measurements**.
- Ensure that the machine has **stopped** and cannot be started.
- For similar machines or presses, be sure that the flywheel is at **BDC (Bottom Dead Center)** secured with **chocks**. In any case, please follow the instructions of the manufacturer of the machine.

Precautionary measures should be used as a complement to the security prescriptions and advice included in:

- ⇒ Health and Safety regulations and factory and section norms.
- ⇒ Laws and national regulations.

4.1 Periodical checks

- Check the wear of the friction elements, measuring periodically the piston travel (**see Chapter 4.2 for measuring the wear**). The replacement of the friction discs has to be done with parts supplied by the original manufacturer and following the given instructions (**Chapter 4.3**).
- When changing the friction discs, please check that the clutch-brake fixing hole/pins are in good conditions.
- Revise the situation of the rest of components of the clutch-brake (bolts, etc.).
- Check that during operation, the **temperature** of the clutch-brake metal parts does not exceed 110°C.
- Control the correct performance of the air supply **avoiding leaks** and providing an appropriate **pressure and lubrication** (1 or 2 drops of oil each air m³).
- If there is an unusual variation of the braking or clutching time, or any other anomaly, **stop the machine immediately and request technical assistance**.
- Make the necessary revisions as per the manufacturer of the machine, considering the clutch-brake as a part of the machine. A **complete revision** of the clutch-brake should be done every 3 million cycles or every 2 years. Clean in particular the friction surfaces, brake springs, seals, bolts and others, and if necessary replace them with original spares from the manufacturer (see **Chapter 4.4** for assembly/disassembly of the clutch-brake).

4.2 Control and adjustment of clearance

- Check for wear at 3 points at 120° and with the unit in braking position:
- Measure the **S gap** (Fig. 11) existing between the brake side cover (1) and the clutch disc (E), when the clutch disc is moved against the piston (3).

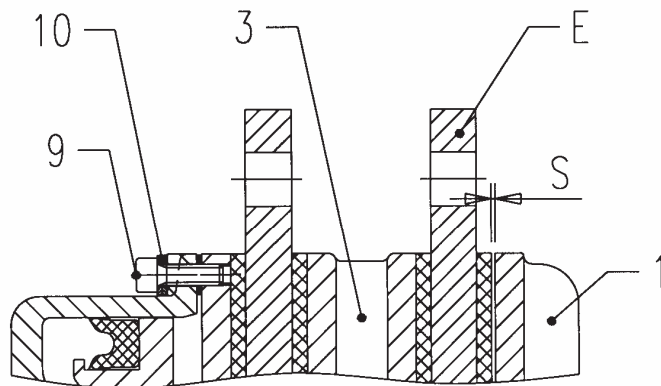


Fig.11

- The discs or pads should be changed when wear **S** has reached the maximum admissible values indicated in Table 4.

Size	19N	25N	37N	55	75	76	77	78	80	81	82
New S mm	0.5	0.5	0.5	1	1	1	1.5	1.5	2	2	2,5
Max S mm	8.5	8.5	8.5	14	14	14	16.5	18.5	18.5	20	24,5

Table 4

The discs should also be replaced when, without reaching these maximum wear values, the thickness of either of the clutch or brake discs' friction material is **1 mm or less**(Fig. 12).

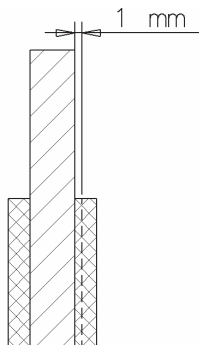


Fig. 12

This change should be done with the material of the original supplier and as per instructions written in **Chapter 4.3**.



- The increase of clearance **S** causes higher braking times and angles. For avoiding this effect, clearance can be adjusted by using adjusting plates (10) (Tabla 5).

Size		19N	25N	37N	55	75	76	77	78	80	81	82
Adjusting thickness with 2 plates	mm	3	3	3	4	4	4	4	4	4	4	5

Table 5

- For adjusting the clearance, with the machined stopped and taking the security measurements indicated in Chapter 4, please proceed as follows:
 1. Introduce air, leaving the unit in clutch position.
 2. Loosen the bolts (9).
 3. Separate the friction ring from the brake side cover with a screwdriver.
 4. Loosen the 2 bolts (9) that tighten each adjusting plate, put the adjusting plates in the middle and tighten the two bolts.
 5. Once that all the adjusting plates have been moved, tighten the 2 bolts (9) as per the tightening torque indicated in Table 6 applying fixation LOCTITE (270 or similar).

Size		19N	25N	37N	55	75	76	77	78	80	81	82
Bolt	8.8	M6	M6	M6	M8	M8	M8	M8	M8	M8	M8	M10
Tightening torque	Nm	10	10	10	25	25	25	25	25	25	25	49

Table 6: Bolts for adjusting plates (9)

6. Check that the clearance **S** is at least the one indicated as **S new** in Table 4.



Having changed the position of the adjusting plates, take it into account that the maximum admissible clearance for changing the discs or pads decreases, being the new values the ones indicated in Table 7 as **S max without washer**:

Size		19N	25N	37N	55	75	76	77	78	80	81	82
S max without washers	mm	5.5	5.5	5.5	10	10	10	12.5	14.5	14.5	16	19.5

Table 7

NOTE: When replacing the clutch and brake discs for new ones, do not forget to change the adjusting plates to their original position.



4.3 Disassembly and assembly of the clutch and brake discs

This chapter describes the disassembly and assembly of the clutch and brake discs for their replacement. Chapter 3.4 explains in more detail the assembly process.

4.3.1 Disassembly

- Disassemble the clutch half-discs and then the brake half-discs.

Clutch side discs:

- Release the air and engage the brake discs.
- **Assembly with blocks:** Loosen the bolts and take out the clutch disc
- **Assembly with 12 bushings:** Loosen the 12 bolts and the adjusting plates of the clutch side half-discs. Take out the bolts and bushings using the gaps in the brake side half-discs and take out the clutch-side half-discs.
- **Assembly with 2 pins:** Remove the bolts connecting the lugs to the clutch half-discs. Then, take out towards the clutch side.

Brake side discs:

- Introduce the air to engage the clutch half-discs.
- Take out the brake half-discs following the procedure indicated for clutch side half-discs.

4.3.2 Assembly

- Proceed in the reverse way, assemble first the clutch side discs and then the brake side discs.
- Do not forget to tighten the bolts to the appropriate torque, using LOCTITE and assemble all the pieces correctly (**Chapter 3.4**).

Please check that after assembly the discs slide axially easily.

4.4 Disassembly and assembly of the clutch-brake

4.4.1 Disassembly

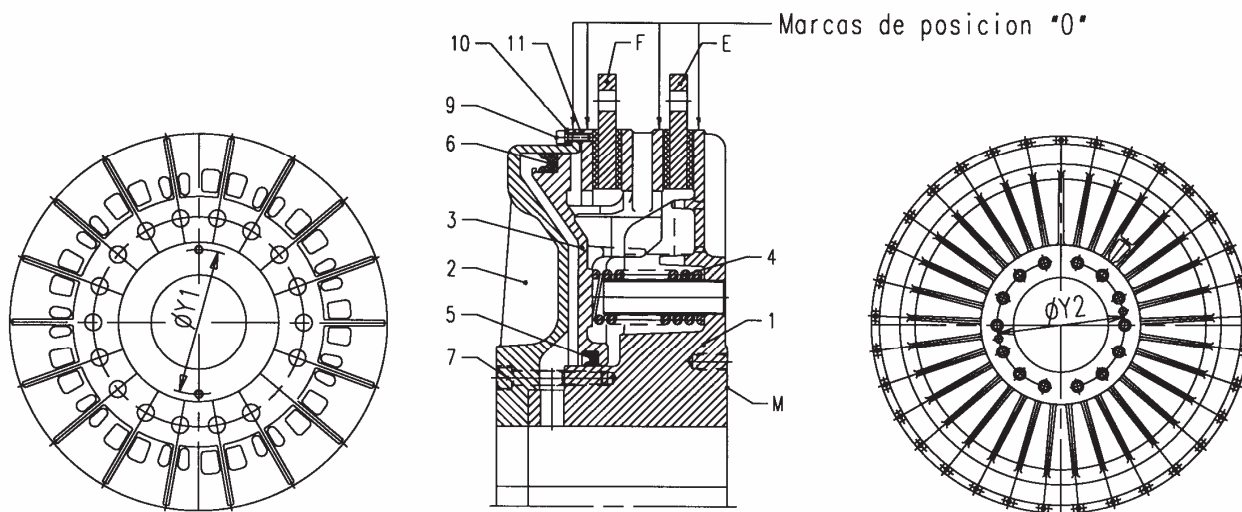


Fig. 13

1. Disassemble the brake (F) and clutch (E) discs (Fig. 13) as explained in **Chapter 4.3**.
2. Remove the clutch-brake from the shaft, by using the 2 threaded extraction holes at 180° (Table 8). In sizes 19/25/37 for removing the clutch-brake from the brake side, loosen 2 bolts (7) and use the threaded holes as extraction hole.

Size	19N	25N	37N	55	75	76	77	78	80	81	82
Hole	M8	M10	M12	M16	M16	M16	M16	M18	M18	--	M24
Ø Y1	Mm. 182	200	226.5	290	329	373	290	320	500	570(M20)	628
Ø Y2	Mm. -	-	-	188	214	240	256	285	319	366(M24)	417

Table 8

3. Put the clutch-brake on face M (Fig. 13) of the clutch side cover (1).
4. Both covers are tightened with bolts (7). There is an expansion force due to resorts (4). This expansion force persists, having loosen the bolts (7).



Take into account that due to the compression of the springs there is an important expansion force.

5. Loosen two bolts (7) in cross pattern and take them out.
6. Instead of these two bolts (7), tighten 2 anchor pins as much as possible and tighten nuts in the thread until they reach the brake side cover.

7. Loosen the 2 previous nuts and the remaining bolts (7). The 2 covers will separate and the springs will loose their expansion force. Once the bolts (7) are completely loosen do the same with the anchor pins until the springs are completely expanded.
8. The rest of the pieces of the clutch-brake can be dismantled now.

4.4.2 Assembly

1. Before mounting, clean the pieces, especially the ones in contact areas.
2. Put the clutch side cover (1) on face M (Fig. 14).
3. Distribute the springs uniformly (4) in clutch side cover.
4. Put molybdenum disulphide grease (MOLYKOTE BR2Plus or similar) in the clutch side cover part where the seal has to be placed.
5. Put the seals (5 and 6) correctly in the piston (3).
6. Mount the piston (3) on the clutch side cover (1) making the marks match in position "0".
7. Put molybdenum disulphide grease (MOLYKOTE BR2Plus or similar) in the brake side cover part where the seal has to be placed.
8. Apply loctite (510 or similar) in the contact surface of the clutch side cover (1), with the brake side cover (2) ensuring no air leakage.
9. Put the brake side cover (2) on the clutch side cover (1) and piston (3) and match their slots with the air inlet holes and marks position "0".
10. Fix with pins and tighten bolts in a cross pattern (7) to their corresponding torque as per table 9. Use LOCTITE (270 or similar).

Size		19N	25N	37N	55	75	76	77	78	80	81	82
Bolt	8.8	M8	M10	M12	M12	M12	M16	M14	M16	M16	M18	M24
Tightening torque	Nm	25	49	86	86	86	210	135	210	210	290	710

Table 9

11. Put the isolating plates (10) and the adjusting plates (11) in their position, making the "0" mark of the friction disc match with the rest of the parts.
12. Tighten the bolts (9) at their corresponding torque as per Table 10, after applying LOCTITE (270 or similar).

Size		19N	25N	37N	55	75	76	77	78	80	81	82
Bolt	8.8	M6	M6	M6	M8	M8	M8	M8	M16	M8	M8	M10
Tightening torque	Nm	10	10	10	25	25	25	25	210	25	25	49

Table 10

5. SPARE PARTS

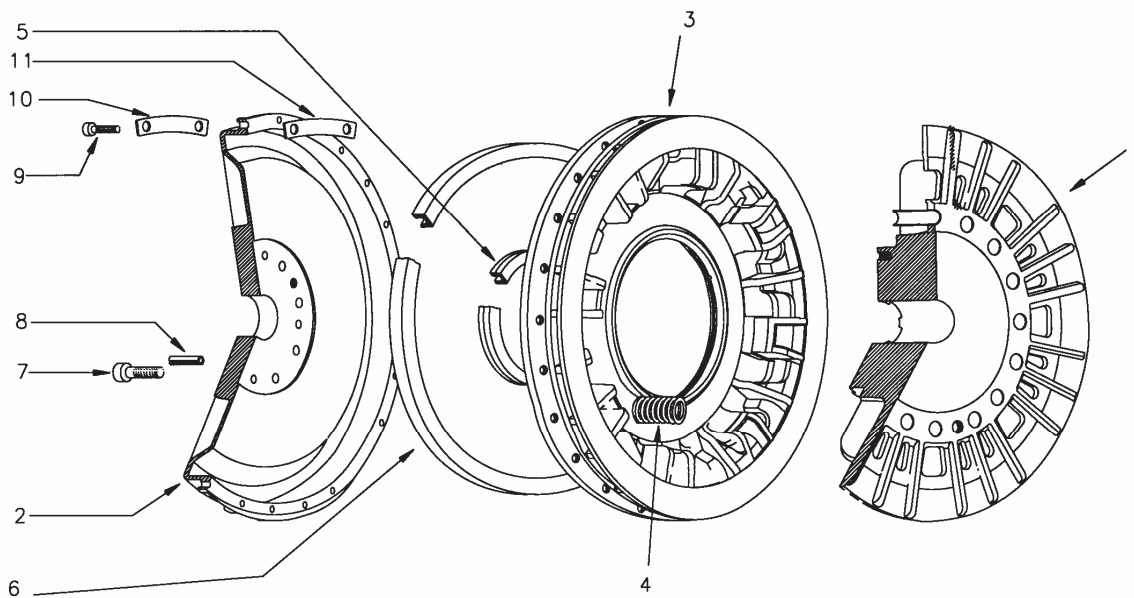
Replace the pieces with the materials supplied only by the original manufacturer. In order to ask for spare parts, please follow the instructions listed below:

- Indicate the code and manufacturing number of the clutch-brake unit, indicated in the plate (**Chapter 1.3**).
- Identify the spare part as per the following figures and tables.


Serie: 5.7 – Main pieces

N.	Denomination
1	Clutch side cover
2	Brake side cover
3	Piston
4	Springs
5	Inlet seal
6	Outer seal
7	Bolt
8	Pin
9	Bolt
10	Adjusting plate
11	Isolating plate

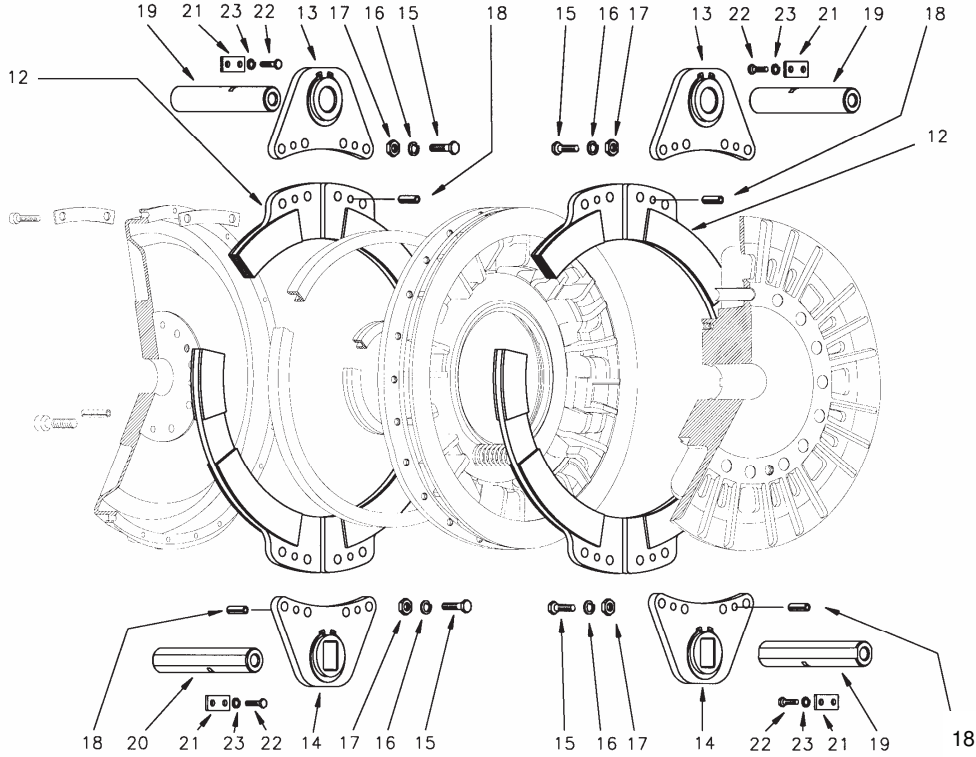
Fungible material



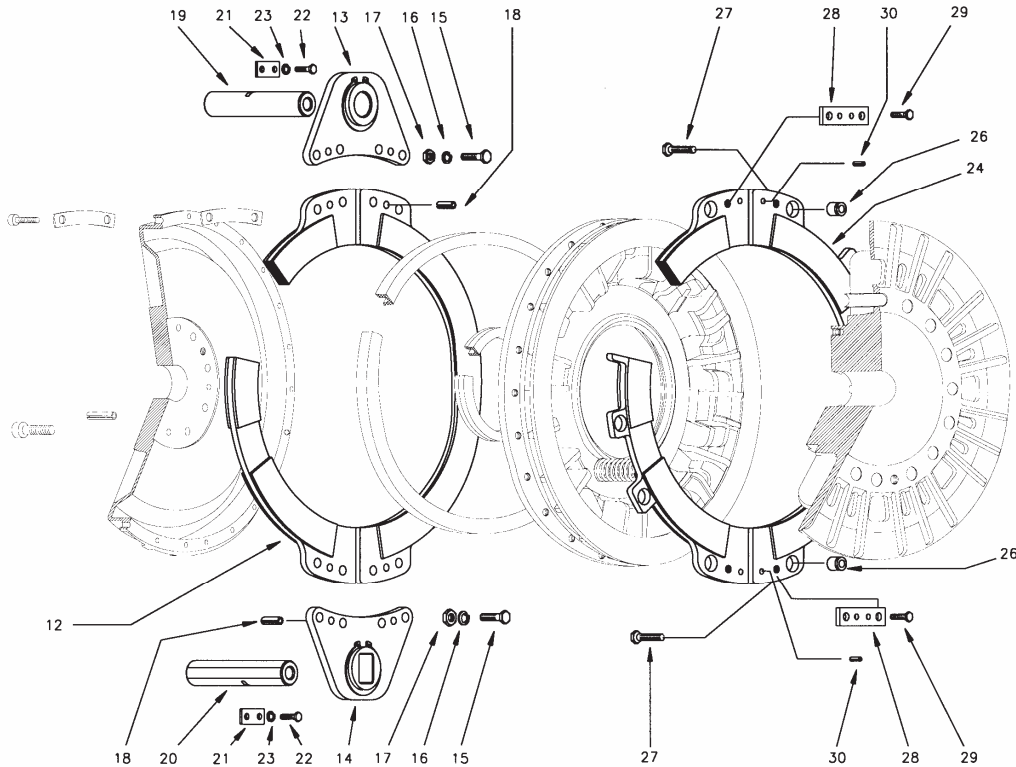
N.	Denomination	Serie					
		571_WD	572_WD	574_WD	575_WD	575_WA	576_WD
12	Disc	●	●	●			●
13	Short bush holder	●	●	●			
14	Compensating short bush holder	●	●	●			
15	Bolt DIN 933 – 8.8	●	●	●			
16	Spring washer A DIN 127	●	●	●			
17	Nut DIN 934 - 8	●	●	●			
18	Elastic washer DIN 1481	●	●	●			
19	Bush	●	●	●			
20	Compensating bush	●	●	●			
21	Plate	●	●	●			
22	Bolt DIN 933 – 8.8	●	●	●			
23	Spring washer A DIN 127	●	●	●			
24	Disc		●		●		●
25	Brake side disc (size 78)				●		
26	Bushing		●		●		●
27	Bolt DIN 933 / 931 – 8.8		●		●		●
28	Adjusting plate		●		●		●
29	Bolt DIN 933 – 8.8		●		●		●
30	Elastic pin DIN 1481		●		●		●
31	Long bus holder			●			●
32	Compensating long bush holder			●			●
33	Bolt DIN 933 – 8.8			●			●
34	Spring washer A DIN 127			●			●
35	Nut DIN 934 – 8			●			●
36	Elastic pin DIN 1481			●			●
37	Bush			●			●
38	Compensating bush			●			●
39	Adjusting plate			●			●
40	Bolt DIN 933 – 8.8			●			●
41	Spring washer A DIN 127			●			●
42	Disc					●	
43	Friction block					●	

 Fungible material

Serie: 5.71__WD



Serie: 5.72__WD

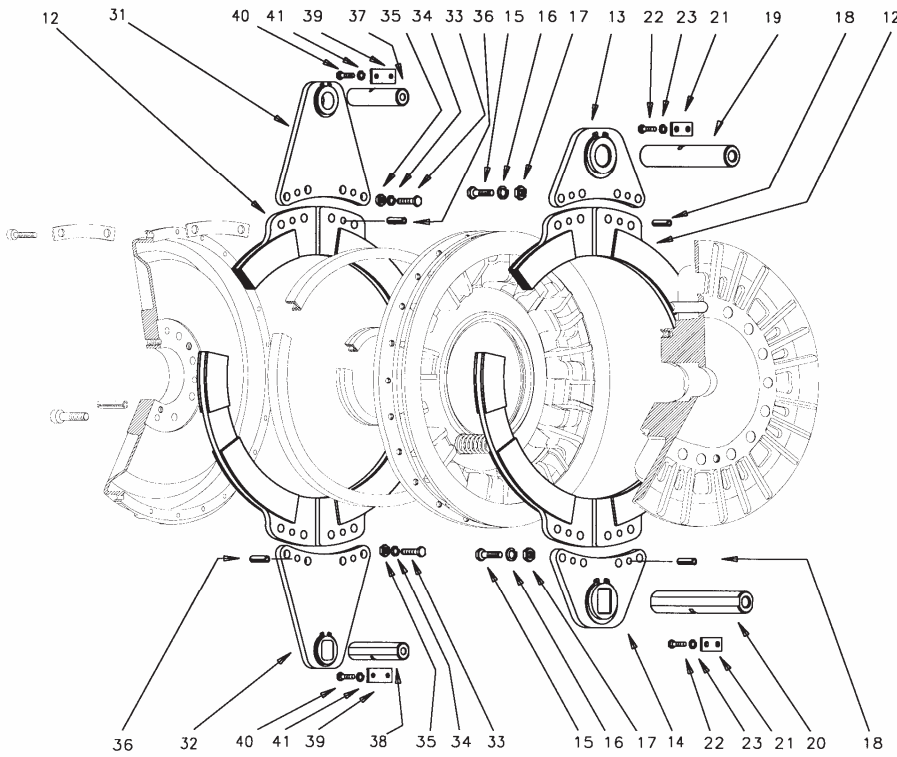


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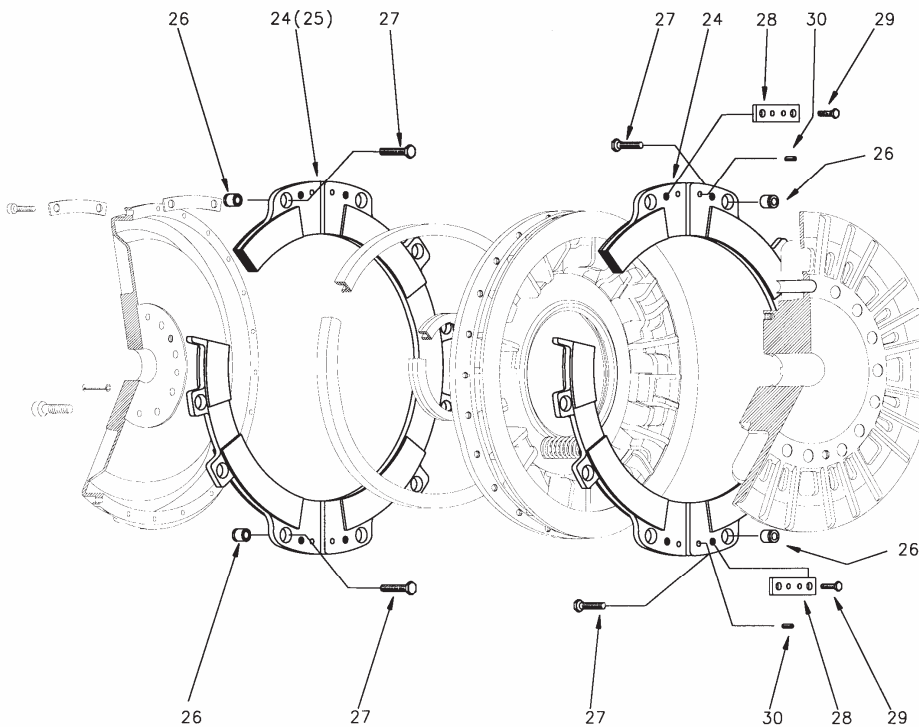


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Serie: 5.74__WD



Serie: 5.75__WD

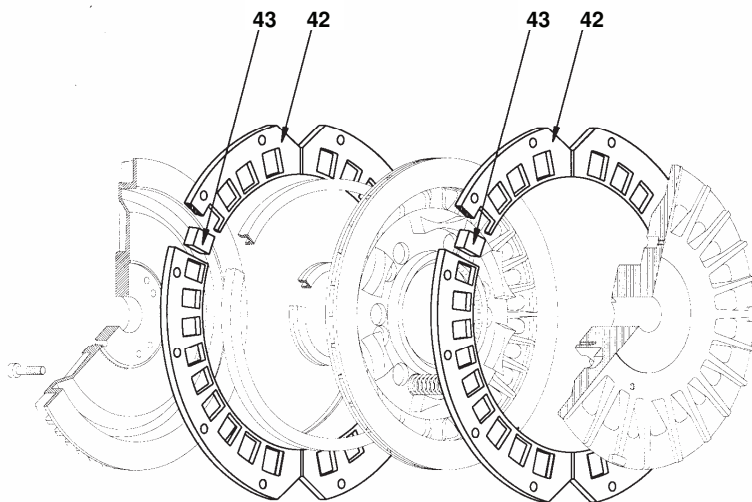


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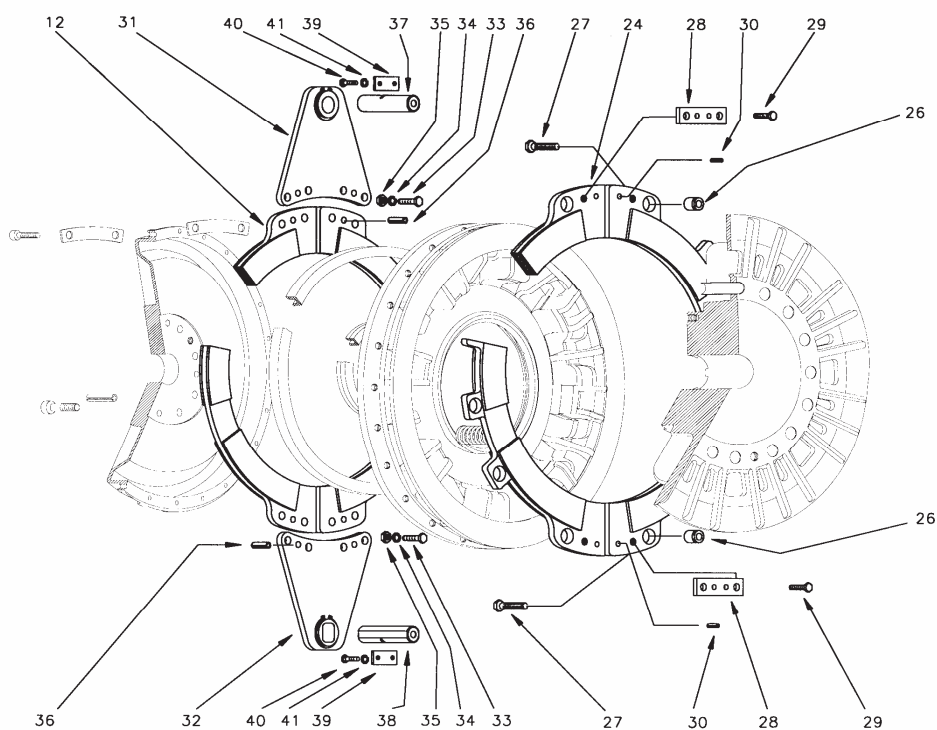


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Serie: 5.75__WA



Serie: 5.76__WD



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6. REPAIRS: CAUSES AND SOLUTIONS

In the following table we indicate the most common problems. If any other problem occurs, please contact the technical assistance service.

■ PROBLEM	■ CAUSE	■ SOLUTION
The clutch torque is insufficient	The clutch disc does not slide axially.	Check the sliding of the disc on the bushes/pins Check the position of the bushes /pins
	Worn friction elements (discs/pads)	Change clutch discs/blocks
	Oil or grease in friction elements	Eliminate oil or grease and avoid humid ambience
	Low or lack of air pressure	Check the air pressure
		Check if there is air leak from the clutch-brake seals
		Check the pneumatic installation (valves, etc.)
New friction materials. Friction elements not bedded in	Running in (Chapter 3.5)	
Increase of the braking angle	The brake disc does not slide axially	Check the sliding of the disc on the bushes/pins Check the position of the bushes /pins
	Worn friction elements (discs/pads)	Change clutch discs/blocks
	Oil or grease in friction elements	Eliminate oil or grease and avoid humid ambience
	New friction materials. Friction elements not bedded in	Running in (Chapter 3.5)
	Fast or unequal wear of the friction material	High temperature of the friction surface
Try to have good ventilation surrounding (avoid solid guards)		
Do not exceed the calculated parameters (speed, inertia, and operations)		
The clutch or brake disc does not slide axially.		Check the sliding of the disc in the bushes/pins Check the position of the bushes /pins

