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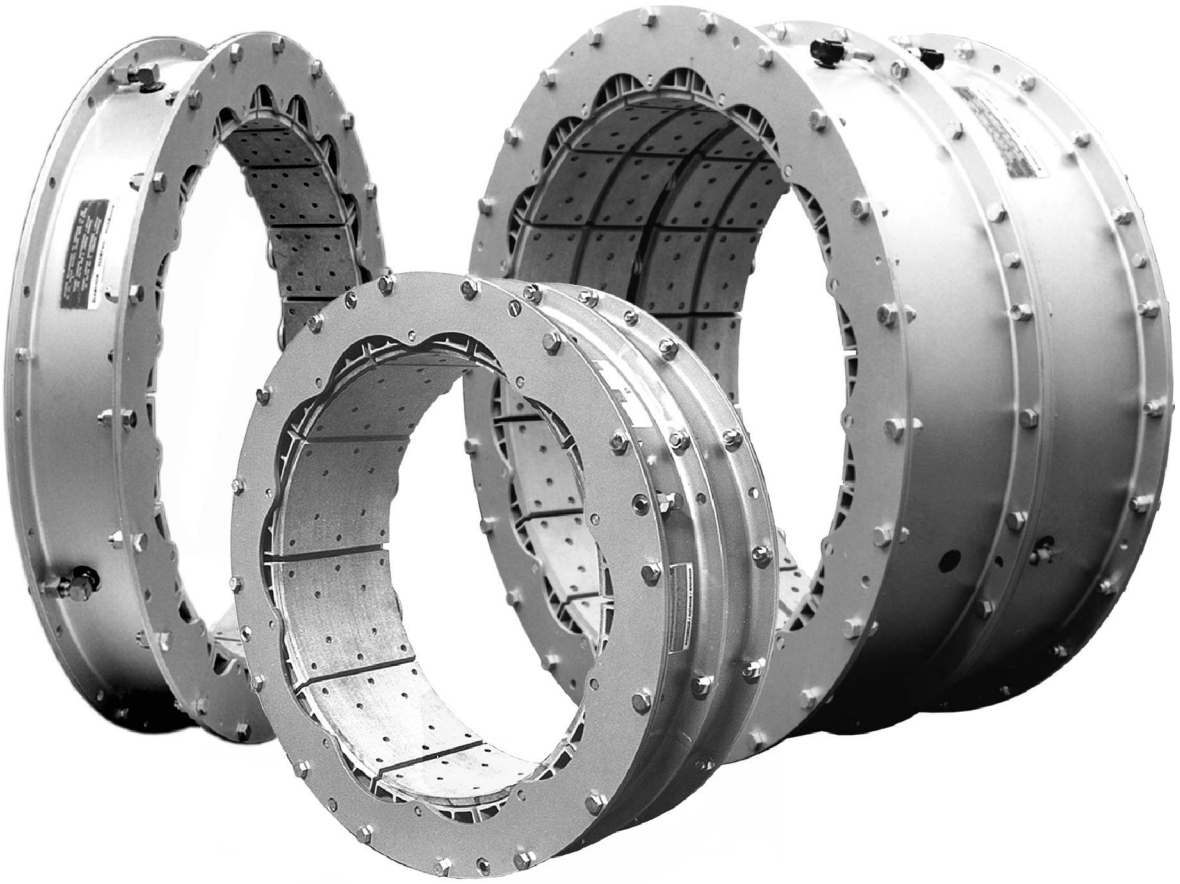
GUMMI

Assembly Instructions Clutches and Air Brakes

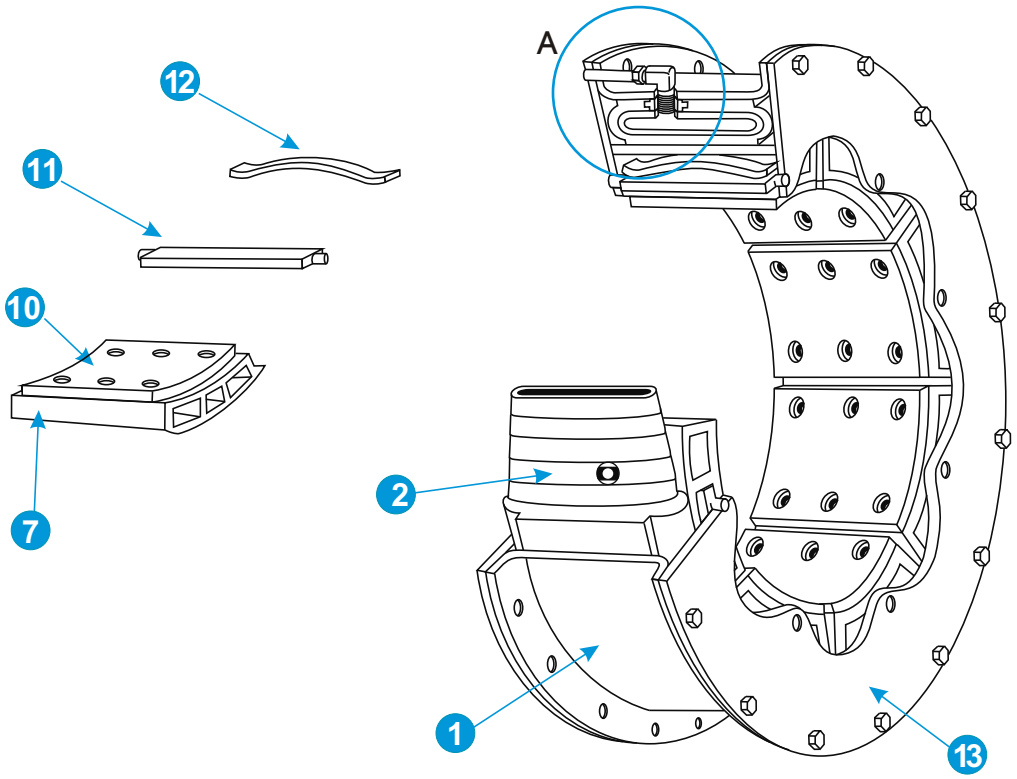
Type FKT

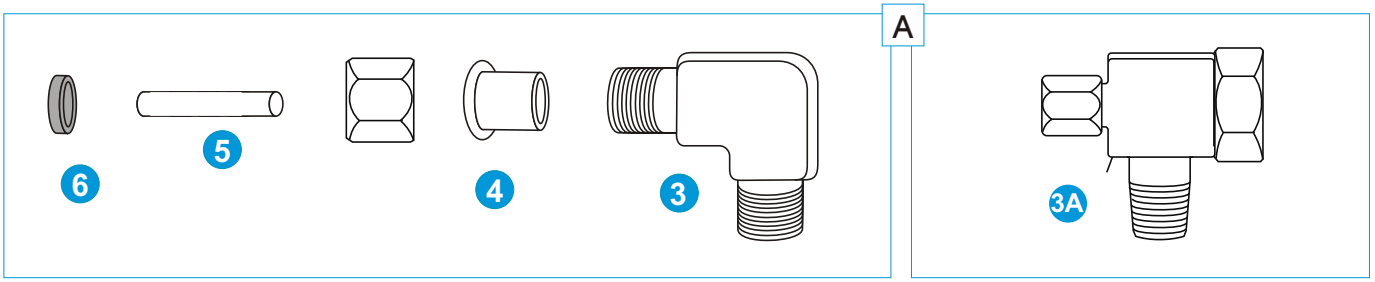
Catalog Nº:FKT-M / 001



Contents

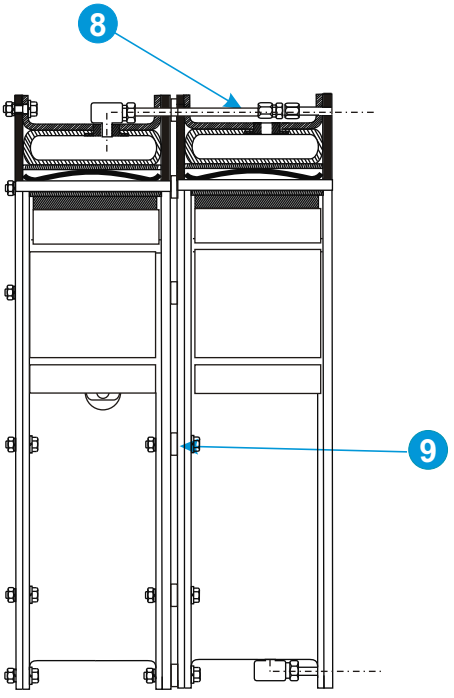
COMPONENTS OF THE FKT ELEMENT





Type - FKT/RNT

1 - Rim
2 - Tube
3 - Elbow.
3A- Optional Quick Release Valve
4 - Compression Ring or Snap Ring
5 - Air Connection Tube
6 - Rubber Washer or Air Connection Gasket
7 - Ventilated Aluminum Break Shoe
8 - Air Tube Group (dual assembly)
9 - Spacer Group (dual assembly)
10 - Replacement Friction Lining and Fastener Kit
11 - Torque Bar
12 - Release Spring
13 - Side Plate (2 pieces)
7, 11, 12 - Break shoe kit, torque bars and metal strip



NOTES:
The option for the use of a quick release valve is not applicable for 11,5-FKT-500 unit.

In the following pages **Gummi** has developed a series of suggestions to consider during the installation of its clutches, especially in grinding mill applications. Since this equipment has been designed to be used for service in these severe applications, by not following these recommendations, it is possible to increase the probability of being exposed to equipment damage or injury.
For that reason you will notice a series of security symbol that are summarized as follows:
Danger - Warning - Precaution according to the danger index.

Danger:

Maximum risk, it is used when a serious accident with risk of life could be produced due to the misuse or failure to follow our specific instructions.

Warning:

Used when there exists a possibility of a serious accidents or death because of not following or misuse of the instructions.

Precaution:

Used when there exists a possibility of accidents or permanent equipment damage resulting from not following specific instructions.

It is responsibility and duty of all the involved personnel during the installation, operation and equipment maintenance, to properly understand these symbols of Danger, Warning and Precaution, to avoid any kind of hazards or accidents.

1.1 Description:

1.1.1 The **Gummi FKT** clutches is driven by compressed air and are designed and specifically made for severe service that occurs particularly in the operation of grinding mills where very high loads and intermittent slippage would normally reduce the operating life and efficiency of the clutches. The unit's constrictive action and its special ventilated construction allow the capacity to transmit torque to be high and permit excellent heat dissipation.

1.1.2 All the **Gummi** clutches are made with non-asbestos friction material composed of modern components of great resistance to wear.

1.1.3 The **Gummi** clutches are available for drum diameters ranging from 11.5" to 66" and in two versions, narrow and wide. The denomination indicates the size and type. For example: 42FKT1200; 42" is the (O.D.) outside diameter in inches of the drum where the element operates; FKT is the type of unit and 1200 indicates width of the drum, 12 inches.

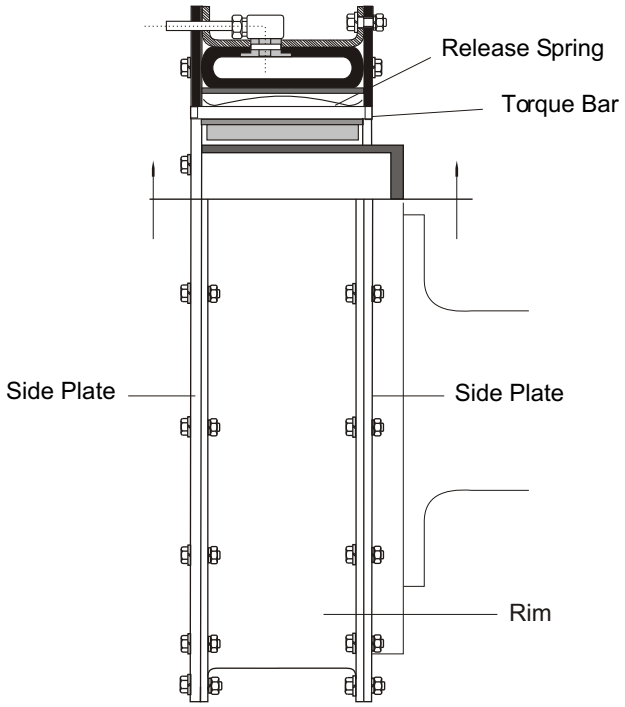
1.1.4 In all cases it is possible to provide dual units, that duplicate the units capacity of torque; for applications where the diametrical space is limited and the required torsion is superior to which a single element can transmit.

1.2 How it works:

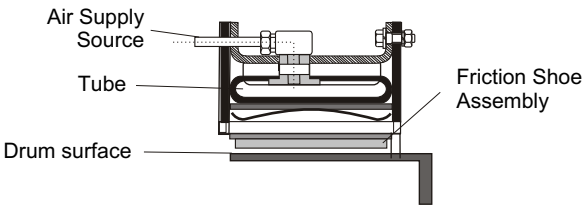
1.2.1 The **Gummi** pneumatic rims FKT are made up by steel rim that contains an air actuating tube that is contained by two lateral side plates, which are all replaceable. The torque bars are fixed into position by running through the cavities in the aluminum backing plates into two lateral side plates. Pressurizing the air chamber, it presses the break shoes on the cylindrical surface of the bell.
Once the air tube has been released of pressure, the release springs that work on the torque bars, make the friction shoes retract and centrifugal force assure positive disengagement. The torque flow comes from the driven shaft, usually through the elements mounting component, which is called a spider.

1.2.1.1 In some cases the **spider** and the element assembly can be mounted to the driven shaft instead of the driving shaft. This type of reverse arrangement is typically used during a mill drive retrofit, due to the fact that it is more practical to drill the pinion shaft for the air/media supply rather than the motor shaft.

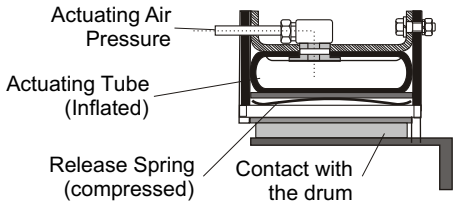
1.2.2 For applications where the clutch is mounted on a motor shaft that utilizes plain bearings, an axial locking mechanism is used to maintain and hold the motor in its magnetic center during the operation.
See fig 3 1



Friction Shoe Assembly Disengaged



Friction Shoe Assembly Engaged and contact with the drum



1.2.2.1 Figure A illustrates another type of axial locking mechanism called separation of restriction. This device is attached to the clutch as shown, with a bronze wear pad to compensate for the wearing down and which also rides against the clutch drum in order to restrict the axial movement.

Note: When the clutch is engaged, relative movement between the drum and the break shoe of wearing down does not exist.

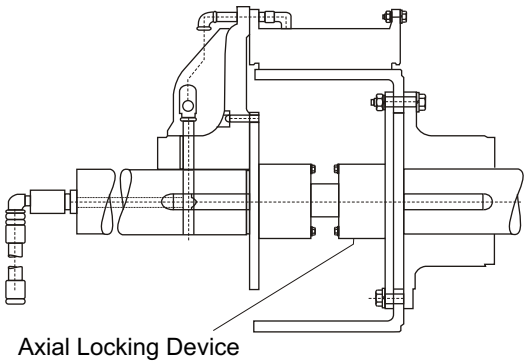
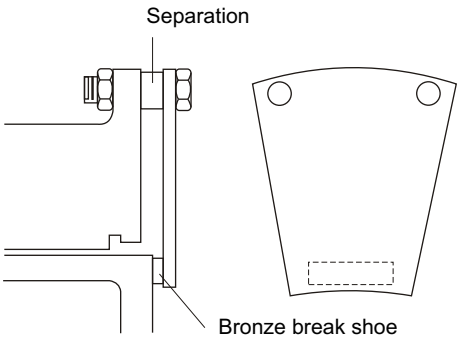


Fig. 3



Restricted separation

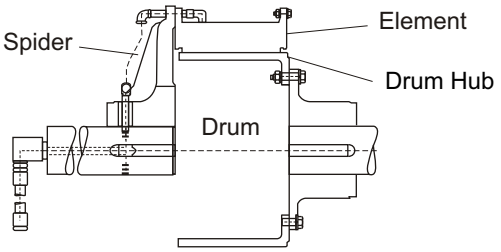
Fig.3A

1.3 Ajustment:

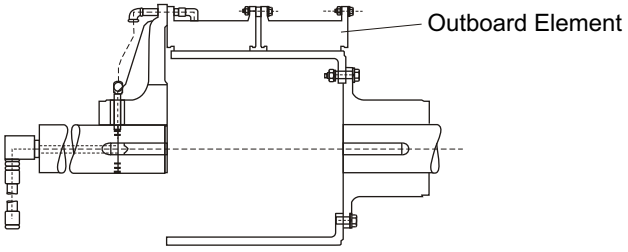
1.3.1 The **Gummi FKT** type clutches are self-adjusting and can compensate for lining and drum wear. It is not necessary lubricate the FKT type units. The torque amassed depends on the rotating speed and the air pressure that is being supplied. By regulating the air pressure being applied, the element will work as a torque limiting mechanism protecting the transmission from any overload.

1.3.2 In order to obtain the wanted mill acceleration time, a flow control valve is installed in the air supply line of the clutch, and can be adjusted in order to restrict the airflow in to the unit, while allowing an unimpeded flow away from the clutch for fast disengagement. When assembling the airflow valve, the engaged times can vary. The flow control valve does not regulate the air pressure, and it should be adjusted appropriately in order to transmit the maximum required torque.

Single Narrow series & Sing Wide series



Dual Narrow serie



Dual Wide serie

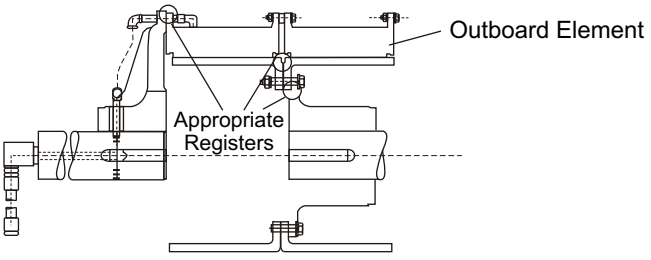


Fig. 4

Precaution:

Do not to inflate the element without having the drum in its place. Inflating the element without a drum in place will cause permanent damage to the components of the clutch.

2.1 Assembly:

2.1.1 For applications in ball mills the following configurations of assembly are available, single narrow and dual series narrow and wide. If it is required, the clutches can be provided with axial locking mechanism, except for the single narrow series.

2.2 Considerations for the Assembly:

2.2.1 The alignment of the shafts should be done within the tolerances indicated within this section.

Precaution:

An alignment that exceeds the indicated tolerance limits will inevitably produce an accelerated wearing down of the components of the clutch.

2.2.2 The elements should be protected from polluting agents such as oil, grease or excessive dust.

Precaution:

Contamination with oil or grease will result in a reduction in the capacity of torque. Excessive dust accumulation could cause incomplete disengagement of the clutch.
Both situations can bring on conditions that will result in clutch slippage and or overheating.

2.2.3 All the assembly screws should be of the indicated size and grade, and to be tightened with the appropriate torque. Do not use commercial grade screws (Grade 2) in the place of Grade 8, due to the fact that the commercial grade may result in failure during operation, damaging the equipment or causing personal injury.

SN = single narrow

SW = single wide

DN= wide narrow

DW = dual wide

L = torque with lubricant - ft.Lb (Nm)

(Oil for motor 30 WT)

M = dry torque - ft.-Lb (Nm)

Table 1 - Torque in screws

SIZE	ELEMENT TO SPIDER	TORQUE Ft. Lb (Nm)	DRUM TO HUB	TORQUE Ft. Lb (Nm)
SA11.5FKT500	3/8 -16NC GR 2	M 16 (20)	1/2 -13NC GR 2	M 38 (51)
SA14FKT500	1/2 -13NC GR 2	M 38 (51)	1/2 -13NC GR 2	M 38 (51)
SA16FKT600	1/2 -13NC GR 2	M 38 (51)	3/4 -10NC GR 2	L 93 (126)
SA20FKT600	1/2 -13NC GR 2	M 38 (51)	3/4 -10NC GR 2	L 93 (126)
SA24FKT650	5/8 -11NC GR 2	M 77 (104)	3/4 -10NC GR 2	L 93 (126)
SA28FKT650	5/8 -11NC GR 2	M 77 (104)	3/4 -10NC GR 2	L 93 (126)
SA33FKT650	3/4 -10NC GR 2	L 93 (126)	3/4 -10NC GR 2	L 93 (126)
SA37FKT650	3/4 -10NC GR 2	L 93 (126)	3/4 -10NC GR 2	L 93 (126)
SA42FKT650	3/4 -10NC GR 2	L 93 (126)	3/4 -10NC GR 2	L 93 (126)
DA11.5FKT500	3/8 -16NC GR 2	M 16 (120)	1/2 -13NC GR 8	M 109 (148)
DA14FKT500	1/2 -13NC GR 8	M 87 (118)	1/2 -13NC GR 2	M 38 (51)
DA16FKT600	1/2 -13NC GR 2	M 38 (51)	3/4 -10NC GR 8	L 245 (332)
DA20FKT600	1/2 -13NC GR 8	M 87 (118)	3/4 -10NC GR 8	L 211 (286)
DA24FKT650	5/8 -11NC GR 2	M 77 (104)	3/4 -10NC GR 2	L 93 (126)
DA28FKT650	5/8 -11NC GR 2	M 77 (104)	3/4 -10NC GR 2	L 93 (126)
DA33FKT650	3/4 -10NC GR 2	L 93 (126)	3/4 -10NC GR 2	L 93 (126)
DA37FKT650	3/4 -10NC GR 2	L 93 (126)	3/4 -10NC GR 2	L 93 (126)
DA42FKT650	3/4 -10NC GR 2	L 93 (126)	3/4 -10NC GR 2	L 93 (126)
SC14FKT1000	1/2 -13NC GR 2	M 38 (51)	1/2 -13NC GR 8	L 109 (148)
SC16FKT1000	1/2 -13NC GR 2	M 38 (51)	3/4 -10NC GR 2	L 93 (126)
SC20FKT1000	1/2 -13NC GR 2	M 38 (51)	3/4 -10NC GR 2	L 93 (126)
SC24FKT1000	5/8 -11NC GR 2	M 77 (104)	3/4 -10NC GR 2	L 93 (126)
SC28FKT1000	5/8 -11NC GR 2	M 77 (104)	3/4 -10NC GR 2	L 93 (126)
SC32FKT1000	5/8 -11NC GR 2	M 77 (104)	3/4 -10NC GR 2	L 93 (126)
SC38FKT1200	3/4 -10NC GR 2	L 93 (126)	3/4 -10NC GR 2	L 93 (126)
SC42FKT1200	3/4 -10NC GR 2	L 93 (126)	3/4 -10NC GR 2	L 93 (126)
SC46FKT1200	7/8 -9NC GR 2	L 109 (148)	1 - 8NC GR 2	L 163 (221)
SC52FKT1200	7/8 -9NC GR 2	L 109 (148)	1 - 8NC GR 2	L 163 (221)
SC51FKT1600	7/8 -9NC GR 2	L 109 (148)	1 - 8NC GR 2	L 163 (221)
SC60FKT1600	1 - 8NC GR 2	L 163 (221)	1 ½ -6NC GR 2	L566 (767)
SC66FKT1600	1 ¼ -7NC GR 2	L 325 (441)	1 ½ -6NC GR 2	L566(767)
DC16FKT1000	1/2 -13NC GR 8	M 87 (118)	3/4 -10NC GR 8	L 245 (332)
DC20FKT1000	1/2 -13NC GR 8	M 87 (118)	3/4 -10NC GR 8	L 245 (332)
DC24FKT1000	5/8 -11NC GR 8	M 174 (236)	3/4 -10NC GR 8	L 245 (332)
DC28FKT1000	5/8 -11NC GR 8	M 174 (236)	3/4 -10NC GR 8	L 245 (332)
DC32FKT1000	5/8 -11NC GR 8	L 245 (332)	3/4 -10NC GR 8	L 245 (332)
DC38FKT1200	3/4 -10NC GR 8	L 245 (332)	3/4 -10NC GR 8	L 245 (332)
DC42FKT1200	3/4 -10NC GR 8	L 109 (148)	3/4 -10NC GR 8	L 245 (332)
DC46FKT1200	7/8 -9NC GR 2	L 109 (148)	1 - 8NC GR 2	L 510 (692)
DC52FKT1200	7/8 -9NC GR 2	L 109 (148)	1 - 8NC GR 2	L 510 (692)
DC51FKT1600	7/8 -9NC GR 2	L 163 (221)	1 - 8NC GR 2	L 510 (692)
DC60FKT1600	1 - 8NC GR 2	L 325 (441)	1 ½ -6NC GR 2	L 566 (767)
DC66FKT1600	1 ¼ -7NC GR 2		1 ½ -6NC GR 2	L 566 (767)

SIZE (inches)	SCREW	LOCKNUT
3/8 NC	9/16	9/16
1/2 NC	3/4	3/4
6/8 NC	16/16	16/16
3/4 NC	1 - 1/8	1 - 1/8
7/8 NC	1 - 6/16	1 - 1/4
1 NC	1 - 1/2	1 - 7/16
1 - 1/4 NC	1 - 7/8	1 - 13/16
1 - 1/2 NC	2 - 1/4	2 - 3/16

2 INSTALATION

2.3 Mounting the Spider and the Drum Hub:

2.3.1 The spider and the drum hub are usually bored for a press fit onto their corresponding shafts. The recommended interference is approximately (.0005 mm) or (005 in) of the diameter of the shaft.

2.3.2 Make sure that the shaft is clean and free of rough edges, and ensure the proper bore and shaft diameters for the right fit. Insert the key into the key way, making sure that it sets at the bottom, and then apply a small coat of antirust agent to the key as well as the shaft.

2.3.3 Heat both the drum hub / spider 121°C (250°F) in order to expand the bore. It is recommended to warm the drum hub / spider in oil or even an oven, but may also bee done use a torch with broad flame tips and warm evenly over the drum hub in order to avoid producing hot spots. Check the temperature of the bore to avoid overheating.

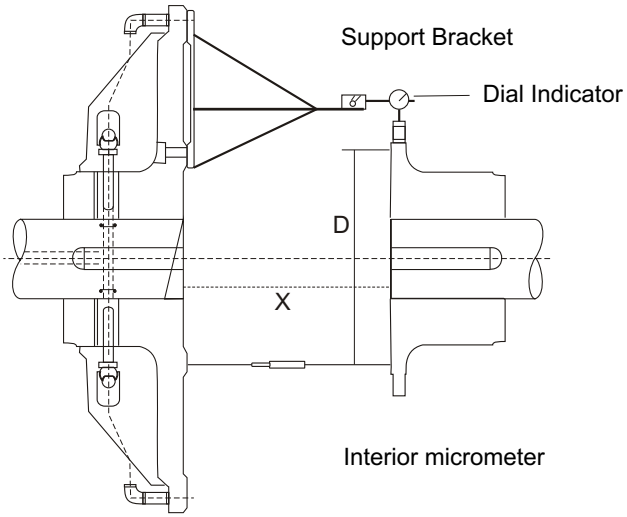


Fig. 5

Table 2 - Dimensions"X" (fig 5)

SIZE	"x" in - mm	SIZE	"x" in - mm	SIZE	"x" in - mm	SIZE	"x" in - mm
SA11.5FKT500	6.750 - 171.5	DA11.5FKT500	13.376 - 339.7	SC14FKT1000	11.875 - 301.6	DC16FKT1000	12.750 - 323.9
SA14FKT500	6.812 - 173.0	DA14FKT500	13.438 - 341.3	SC16FKT1000	11.875 - 301.6	DC20FKT1000	12.750 - 323.9
SA16FKT600	8.062 - 204.8	DA16FKT600	15.938 - 404.8	SC20FKT1000	11.875 - 301.6	DC24FKT1000	12.750 - 323.9
SA20FKT600	8.062 - 204.8	DA20FKT600	15.938 - 404.8	SC24FKT1000	11.875 - 301.6	DC28FKT1000	12.750 - 323.9
SA24FKT650	8.062 - 217.5	DA24FKT650	16.688 - 423.9	SC28FKT1000	11.875 - 301.6	DC32FKT1000	12.812 - 325.4
SA28FKT650	8.062 - 217.5	DA28FKT650	16.888 - 423.9	SC32FKT1000	11.938 - 303.2	DC38FKT1200	15.000 - 381.0
SA33FKT650	8.062 - 217.5	DA33FKT650	16.750 - 425.5	SC38FKT1200	14.124 - 358.7	DC42FKT1200	15.125 - 384.2
SA37FKT650	8.062 - 217.5	DA37FKT650	16.750 - 425.5	SC42FKT1200	14.125 - 358.7	DC46FKT1200	15.250 - 387.4
SA42FKT650	8.062 - 217.5	DA42FKT650	16.750 - 425.5	SC46FKT1200	14.125 - 358.7	DC52FKT1200	15.750 - 400.0
				SC52FKT1200	14.625 - 371.5	DC51FKT1600	20.000 - 508.0

2.4 Alignment:

Parallel Alignment Tolerance: Do not exceed 0.10" (.254 mm) with the total indicator reading (0.005") (0127mm) maximum reading. Angular Alignment Tolerance: Do not exceed 0.0005" (.0127) of the diameter in the point where readings are taken. (D")

2.4.1 The distance between the shafts must have an adjustment according to "x" shown in the table for standard applications. In case that the clutch is mounted on shafts having plain bearings, assure that at the moment of the assembly, the shaft is centered within the bearings when establishing the "x" dimension.

Note:
While aligning and setting the drive components of the mill, always work from the pinion going back to the motor.

2.4.2 Place on a rigid support bracket in order to support a dial indicator as it is shown in the fig 5.

2.4.3 Clean the flange outside diameter and the face of the drum hub where readings are to be taken for alignment.

2.4.4 Rotate the spider and take parallel readings of the outside diameter of the drum hub flange. If both shafts can turn together, the readings are less likely to be influenced by any surface irregularities.

Note:

On reverse mounted clutches where only one clutch can be rotated, the indicator is then attached to drum hub and the reading will then be taken from the outside diameter of the spider.

2.4.5 Readings for the angular alignment can be done measuring the distance or gap between the spider and the face of the drum hub with an inside micrometer.

If a dial indicator is used, it will be necessary to monitor and adjust or correct any axial movement of the shaft.

It is recommended to take at least 4 additional readings and index the spider at 90°. Use the average of the four readings at each position in order to correct any other misalignment

2.4.6

Place shims and shift the base of movable shaft in order to correct the alignment. After adjusting and tightening the base, review the alignment and correct if necessary. Assure the position after the correct alignment has been achieved.

Note:
In some applications the temperature increase in the set conditions of the operation can vary the alignment parameters. It is good making a revision in hot and correct if it is necessary.

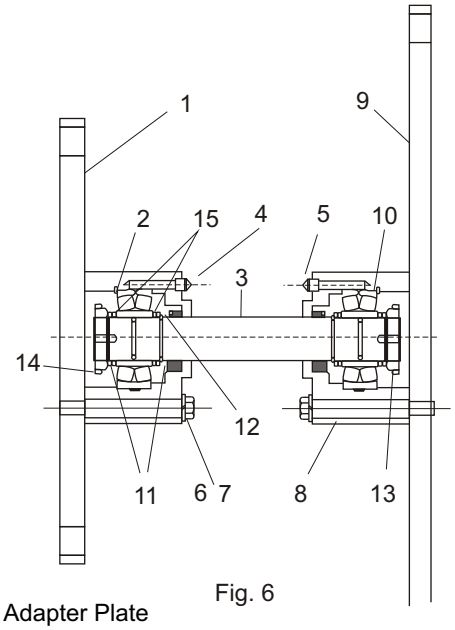


Fig. 6

1 Adapter Plate
2 Snap Ring
3 Shaft
4 Cover Screws
5 Shims
6 - 7 Lock washers
8 Bearing Housing
9 Adapter Plate
10 - 11 - 12 Spacers
13 - 14 Nut
15 Spacer washer

2.5 Adjustment of Axial Locking Device:

2.5.1 If the dimension "x" shown in table 2 cannot be obtained within +/-. 250" (6.35 mm) the axial locking device is provisioned to accept this variation.

2.5.2 Put the motor shaft in its magnetic center and measure the separation distance between the face of the drum hub and the spider ("x" of table 2). The difference between this dimension and the one of the shown value in table 2 is the amount of correction to be made with the axial locking device.

2.5.3 With reference to fig 6, the total length of the axial device could be adjusted by relocating the shims from one side to the other.

2.5.3.1 Take off the four hex head screws and lcokwashers from the bearing housing and from the adapter plate.

2.5.3.2 Take off the snap ring from the bearing housing.

2.5.3.3 After verifying that the surface of the shaft (3) is clean and free of rough edges, foreign particles, nicks or burs between both bearing housings, slip the bearing housing assembly toward the opposite assembly in order to expose the bearing /spacer assy. (10, 11).

2.5.3.4 Remove the locknut and lock washers from the shaft (13 and 14).

2.5.3.5 The length of the assembled axial locking device is established by the location of the bearings with respect to the shaft. This length can vary and be adjusted by moving the spacers from one side of the bearing to the other. Two different thickeners of spacers are provided with each assembly (.025") (.635 mm) or (.098") (2.48 mm). After making the appropriate adjustment of the length for the new assembly, make sure that the spacers sit correctly agianst the bearings.

2.5.3.6 Tighten the lock nut enough to cover the axial clearance in the assembly of the bearing, spacer, and snap ring.

2.5.3.7 Slide the housing back over the bearing and install the **snap ring.**

2.5.3.8 Tighten and secure the bearing housing to the adapter plate using the four hex head screws and lock washer. Tighten the screws to 35 Ft. Lb. torque (47 N.m.) and lubricate the bearings with No. 2 EP grease.

2.6 Installation of the Element and Drum:

2.6.1 Slide the drum into the I.D. of the clutch element with direction and respect to the opposite side of the air connections.

2.6.2 Install and attach the axial device (if it is necessary) to the drum flange with the correct screws and washers.

2.6.3 Separate the shafts as much bearing clearance will allow, and raise the element / drum into position. In the case that the axial locking device is used, take special care when lifting the element between the shafts, because the axial locking device mounting plate tightens easily against the face of the spider.

2.6.4 Attach the drum hub to the drum with the bolts according to the specifications of table 1; making sure that the bore of the drum flange fits the pilot on the drum hub.

2.6.5 Complete the installation of the of the air connection gaskets onto the air connection tubes. The metal parts of the washer are to be positioned toward the elbow and away from the spider. Fig 7.

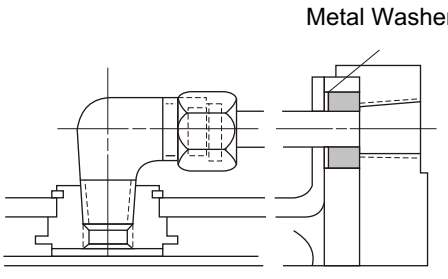
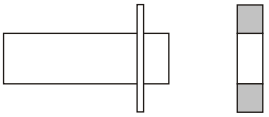


Fig. 7

2.6.6 Align the air connections of the element with the holes in the spider and attach the element to the spider with the correct fasteners according to the example of table 1. Confirm that the element fully engages the register of the spider.

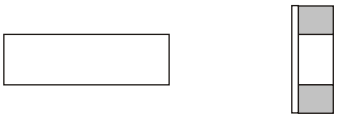
2.6.7 Attach the mounting plate of the axial device (if it is necessary) to the **spider with appropriate fasteners**. Turn the shaft of the motor and push the **spider** towards the mill until the mounting plate of the axial locking device is level and sits flush with the spider face. Tighten the screws.

Old method



(Flanged Tube)

Present Method



(Straight Tube)

Table 3 - Air connections for FKT elements

SIZE	AIR CONNECTION TUBE (Short)	RUBBER WASHER
11.5FKT500	107900	107901
14FKT500	107902	107903
16FKT600	107902	107903
20FKT600	107902	107903
24FKT650	107904	107905
28FKT650	107904	107905
33FKT650	107906	107907
37FKT650	107906	107907
42FKT650	107906	107907
14FKT1000	107902	107903
16FKT1000	107902	107903
20FKT1000	107902	107903
24FKT1000	107904	107905
28FKT1000	107904	107905
32FKT1000	107904	107905
38FKT1200	107906	107907
42FKT1200	107906	107907
46FKT1200	107908	107907
52FKT1200	107909	107910
51FKT1600	107912	107910
60FKT1600	107913	107911
66FKT1600	107914	107911

2.7 Installation of Element and Drums for Dual Wide Units

2.7.1 Separate the shafts as far as the bearing clearances allow.

2.7.2 Assemble the female drum onto the drum flange to the drum hub using short screws and lock washers. Confirm that the bore in the drum flanged sits full inside the pilot on the drum hub fig 4.

2.7.3 Disassemble the dual element into two halves considering the direction of the air connections on the remaining element, and slide the element onto the drum.

2.7.4 Considering the orientation of the flange on the remaining drum in regards to the direction of the air connections, slide the drum into the element.

2.7.5 Adjust and attached the axial locking device (if required) to the remaining drum.

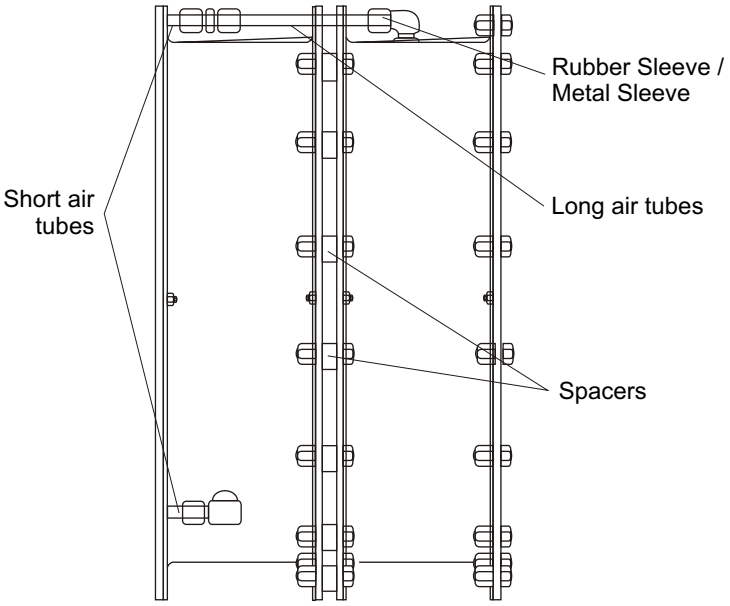


Fig. 8

2.7.6 Raise the element/drum/ axial locking device into position, aligning the threaded or tapped holes in the drum that is attached to the drum hub.
Now adjust and attach the two drums to the **drum hub** with the appropriate **fasteners** (see table 1), making sure that the male pilot is fully compatible with the female register.

2.7.7 Align the air connections and assemble the two element halves making sure the spacer are in place between the two elements (fig 8). Fix the air connections into place, and its recommended to use a pipe sealant such as Teflon on the threads in order to avoid any type of leak.

2.7.8 Once air connections have been aligned with their passages in the spider, adjust and attach the element to the spider using the appropriate **fasteners** (see fig 1), confirm that the element fully engages the spider register.

2.7.9 Adjust and attach the axial locking device mounting plate (if it is necessary) to the **spider** with the screws and washers, turn the shaft of the motor and push the **spider** towards the mill until the axial locking device mounting plate sits flush against the face of the spider, and tighten the screws.

2.8 Air control system:

2.8.1 In general a typical system is usually used for the air connection, considering that all the mills do not have identical characteristics, we can follow some general rules for the installation of the connections and air control.

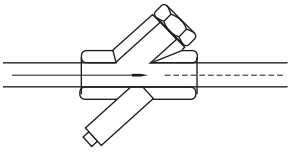
2.8.2 Install an air receiver tank as close as possible to the **rotorseal** as shown in figure 9. In order to optimize the clutch response.

2.83 Use pipe and valves sizes according to the appropriate size of the **rotorseal**. Solenoid valve of spring type are recommended, while coil or spool valves are not recommended.

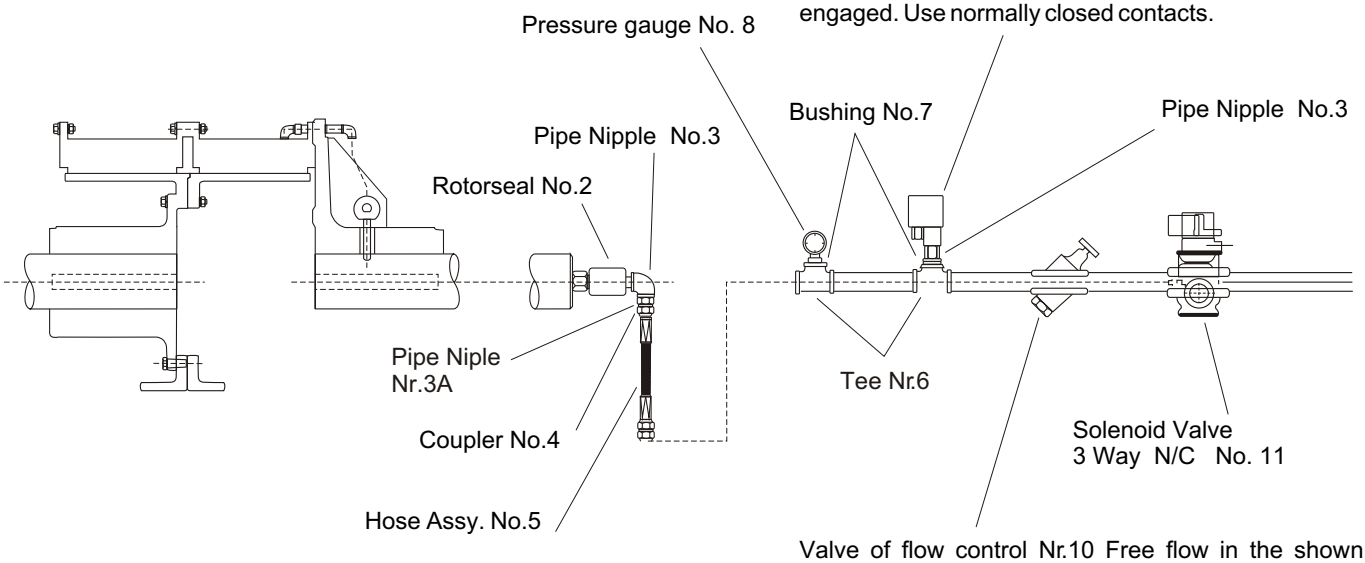
2.8.4 The use of lubricating of air line is not necessary for the clutch, nevertheless, if one is used, it must be a non-adjustable type.

2.8.5 Assure that the flow control valve is installed with "free flow" away from the clutch for unloading. The final connection for the rotor seal needs to be made with a flexible hose in order not to place a radial load upon the rotorseal. If the rotorseal is mounted at the end of the shaft of the motor, an insulating coupling should be installed between the piping and the rotorseal. Do not use rigid pipe in the connection of the rotating union.

Valve of flow control Nr.10
½, ¾ & 1- ½ NPT.



Pressure switch Nr.24
Set at Min PSI 1,5 to 5, interlock with the engine starter in such way that it cannot be started with the clutch engaged. Use normally closed contacts.



Valve of flow control Nr.10 Free flow in the shown direction. The shown valve is 1 - ¼ NPT (42 x 220).

Air Piping Diagram

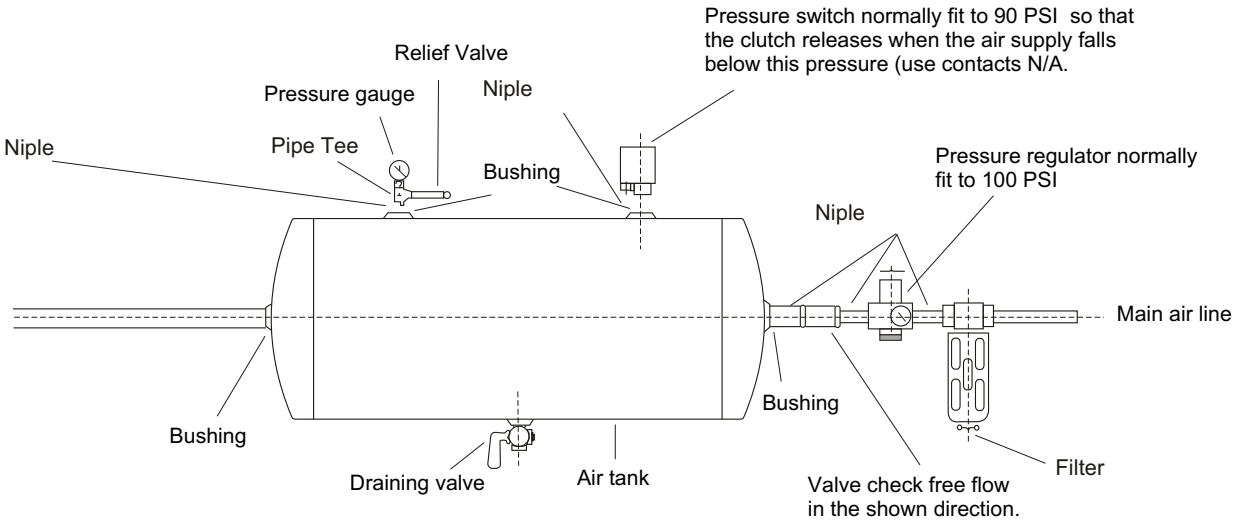


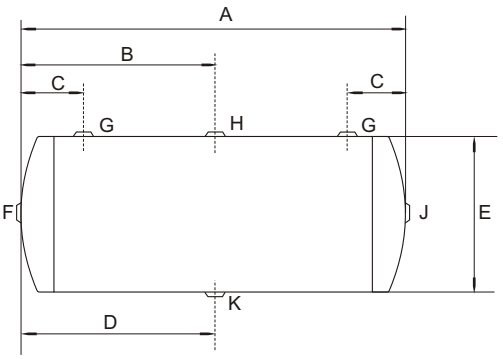
Fig. 9

Air tanks for FKT elements

SINGLE	Nr.
11.5FKT500 - 14FKT500 - 16FKT600	I
20FKT600 - 24FKT650 - 28FKT650	II
33FKT650 - 37FKT650 - 42FKT650	II
14FKT1000 - 16FKT1000 - 20FKT1000	III
24FKT1000 - 28FKT1000	II
32FKT1000	III
38FKT1200 - 42FKT1200	III
46FKT1200 - 52FKT1200	III
51FKT1600 - 60FKT1600 - 66FKT1600	IV

DUAL	Nr.
11.5FKT500 - 14FKT500 - 16FKT600 - 20FKT650	II
24FKT650 - 28FKT650	II
33FKT650 - 37FKT650	III
42FKT650	III
16FKT1000	I
20FKT1000 - 24FKT1000	III
28FKT1000 - 32FKT1000	III
38FKT1200	III
42FKT1200 - 46FKT1200	IV
52FKT1200 - 51FKT1600 - 60FKT1600 - 66FKT1600	V

DIMENSIONS (mm)						N.P.T.					VOLUME
Nr.	A	B	C	D	E	F	G	H	J	K	Liters
I	965.2	N/A	254.0	482.6	406.4	2	¾	N/A	2	1/2	15
II	609.6	N/A	152.4	304.8	254.0	¾	¾	N/A	3/4	1/2	30
III	1219.2	N/A	304.8	609.6	508.0	2	¾	N/A	2	1/2	230
IV	1778.0	254	254.0	254.0	609.6	2	2	2	1	3/4	510
V	2133.6	292	292.1	292.1	762.0	2	2	2	1	3/4	970



N/A = No Applicable

Note:

It is recommended to make the tanks according to ASME (Sec VIII) of containers of no inflammable pressure, maximum pressure of work 125 PSI.

Warning:

Exceeding the described limits of operation in this section could cause damage or even death to personnel and to the equipment.

3.1 Limits of torque, rpm and pressure:

3.1.1 The developed torque is directly proportional to the applied air pressure. If the developed torque seems to be insufficient, check for any type of contamination (oil, grease, dust). The developed torque is directly proportional to the applied air pressure. If the developed torque seems to be insufficient, check for any type of contamination (oil, grease, dust).

Precaution:

The maximum applied air pressure is 125 psi (8,5 bar), if the pressure exceeds this value it could cause damage in the actuating tube of the clutch. Grinding Mills clutches normally have operating work pressures of 100 psi (6,8 bar).

Precaution:

The non-asbestos friction material used by **Gummi** might not develop the rated torque at the beginning, since a minimum initial wear in period is required. It is very important to observe the first few starts of the mill in order to avoid excessive heating generated by slippage.

3.1.2 See table with 4 maximum velocities of security.

Danger:

Do not exceed the operation speeds (table 4).
Working above these speeds is very risky , an may result in permanent damage to the clutch as well as injury or death to personnel near the equipment..

3.2 Adjustment of the control component:

This section shows how to adjust typical components. Because the operation characteristics vary from one mill to another one, absolute values cannot be given. The described adjustments offer a basic reference in order to obtain an acceptable acceleration value in the mill, and will probably require only a small adjustment.

3.2.1 Set the pressure switch (9), which will be located on the air receiver tank to open at 90 psig (6.1 bar). In a series, use normal contacts and wire along with the solenoid valve coil.

This pressure switch is used so that if the pressure falls below the 90 psi (to 6,1bar), the disengagement of the clutch automatically takes place or avoids the engagement of the clutch if the pressure falls below 90psi (to 6.1bar).

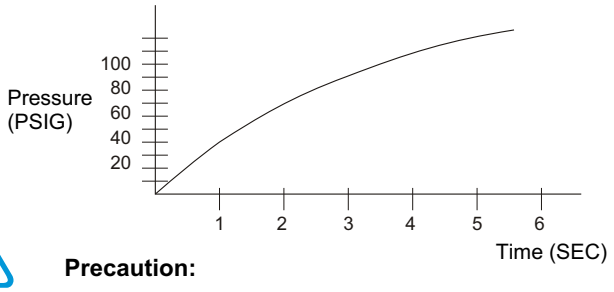
3.2.2 Adjust and set the pressure control switch (24), which is situated in the air supply line to the clutch to open at around 5 psig (.3 bar). Use normal closed contacts and wire in the electrical circuit of the engine starter. The purpose of this switch is to prevent the engine start-up with the clutch engaged.

3.2.3 Adjust and set the pressure controller (13) to 100 psig (6.8 bar). This to the nominal pressure to be used in the starting of the mill.

3.2.4 With the motor off, manually trip the solenoid valve and note how much time has passed for the pressure gauge to register the full tank pressure.

3.2.5 If the tank pressure is 100 psig (6.8 bar) to obtain a flow rate of 20 psi/sec (1.4 bar/sec), note the time it take for the pressure to build from 0 to 80 psig (5.4 bar) and adjust the flow control valve in order to provide this pressure in a total of 4 seconds, so that it would practically equal the required 20 psig/sec (1.4 bar/sec).

3.2.6 Engage the clutch several times manually in order to verify the proper adjustment and setting of the flow control valve.



Precaution:

The described flow rate, will usually result in a acceleration time of 4 to 7 seconds for the mill. (This is timed from the moment that the break shoes of the clutch make contact with the drum to the instant time with the clutch actually locks up). Since the all mill characteristics vary, and are not always the same, the time of acceleration at the flow settings, could possibly be greater or less that the 4 to 7 second range.

Precaution:

The non-asbestos friction material used by **Gummi** might not develop the rated torque at the beginning, since a minimum initial wear in period is required. It is very important to observe the first few starts of the mill in order to avoid an excessive heating generated by slippage and to prevent damage to the components of the clutch.

Table 4 - Maximum Safe Speeds of Operation.

NARROW SERIES	Maximum RPM	NARROW SERIES	Maximum RPM	WIDE SERIES	Maximum RPM	WIDE SERIES	Maximum RPM
11.5FKT50	1800	**28FKT650**	1000	**14FKT1000**	1800	**42FKT1200**	670
14FKT500	1500	**33FKT650**	900	**16FKT1000**	1400	**46FKT1200**	600
16FKT600	1400	**35FKT650**	900	**20FKT1000**	1300	**52FKT1200**	550
20FKT600	1200	**37FKT650**	800	**24FKT1000**	1250	**51FKT1600**	550
24FKT650	1050	**42FKT650**	800	**28FKT1000**	1100	**60FKT1600**	520
				32FKT1000	1050	**66FKT1600**	475
				38FKT1200	740		

3 OPERATION

3.2.7 Start the motor and engage the clutch, writing down the mill acceleration time. If the clutch slips for more than 7 seconds, CANCEL THE START OF THE CLUTCH.

3.2.8 Disengage the clutch (if the starting was not aborted) and let the drums cools off to ambient room temperature. Make the necessary adjustments in the flow control valve, if the mill acceleration time fell outside the 4 to 7 seconds range. Repeat the operation until obtaining the appropriate acceleration time.

Note: There is a groove in the friction block shoe that indicates the end of its operating life. See Fig A
Groove - Fig. A

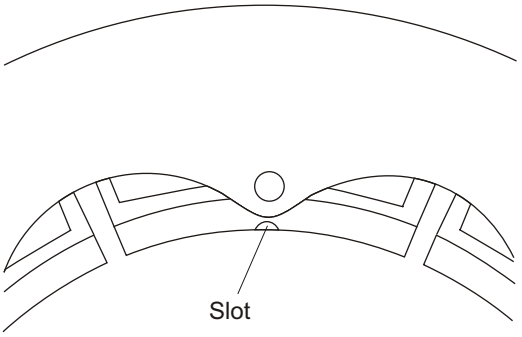


Fig. A

4 MAINTENANCE

Warning:

Only qualified personnel should work on, maintain or repair these units. Bad repair work can cause damage as much to the personnel as to the equipment.

Precaution:

When components and spare parts of the clutch are replaced, use only **Gummi** original parts; otherwise it may void your warranty and cause substandard performance. All **Gummi** original parts are clearly marked and identified.

4.1 Periodic inspection:

4.1.1 *Wearing down Friction Shoe Assembly Lining*. Breaking down and dissembling the clutch is not required to inspect wear on the lining. Reviewing and inspecting the thickness of the friction blocks is a simple operation, verify the indicator groove that indicates the minimum allowable thickness. If it is necessary to replace the blocks, it should be done as a complete set. See attached table in regards to the minimum allowable lining compared to the original thickness of the lining.

Precaution:

Do not operate the element with friction material that is worn less than the minimum allowable thickness, because it can result in damage to the drum.

4.1.1.2 *Break shoe or drum contamination* : The contamination with oil or grease will reduce the capacity of the clutch to transmit torque; in this case, it is recommended to disassemble the unit and to clean it up all build up. In atmospheres with serious dust saturation, its possible that it could accumulate in the cavities of the aluminum break shoes, so much so that the break shoes might not retract appropriately. The dust accumulations can be vacuumed from the cavities.

Table 5 - Thickness of Material of Friction

SIZE	Minimum allowed thickness		Original thickness	
	inches (in)	Millimeter(mm)	inches (in)	Millimeter(mm)
NARROW SERIES				
11.5FKT500 / 20FKT600	.15	3.8	.33	8.4
24FKT650 / 28FKT650	.15	3.8	.45	11.4
33FKT650 / 42FKT650	.28	7.1	.58	14.7
WIDE SERIES				
14FKT1000 / 20FKT1000	.15	3.8	.33	8.4
24FKT1000 / 28FKT1000	.15	3.8	.45	11.4
32FKT1000 / 42FKT1200	.38	9.5	.58	14.7
46FKT1200 / 52FKT1200	.38	9.5	.69	17.5
51, 60 y 66FKT1600	.30	7.6	.67	17.0

Precaution:

It is not recommendable the use any solvent to remove oil or grease without first disassembling the element. The use of solvent in the installed clutch may improve performance temporarily, but there is a serious fire danger because of the heat generated during slippage.

Precaution:

Do not use compressed air to get rid of the dust accumulation in the cavities of the aluminum break shoes. Although the friction material is non asbestos, the dust generated by the its normal wearing, along with the dust within the operating environment can seriously irritate the respiratory system.

4.1.1.3 *Air Control Components:*
General recommendations to consider in order detecting possible operation faults. Repair any air leaks that are detected

4.1.2 In order to inspect the following items it is necessary to partially or totally disassemble the clutch

4.1.2.1 *Wearing down of the bell*: Check the outside diameter of the drum, and compare the permissible wearing down values indicated in (table 6). Minor heat checks in the drum can be eliminated machine the outside diameter. In case that a drum has been exposed to excessive heat, its possible that the open end may protrude out and would give the impression that it has not worn. Its there fore advisable to control the diameter in several points around the face of the drum.

Precaution:

Operating a clutch with a drum that has excessive wear, or has been machined with its outside diameter falling below the minimum allowed, could damage the components of the clutch.

4.1.2.2 *Air Actuating Tube*. Verify that the tube has not been affected or damaged by excessive heat. If any parts of the tube is hard, it must be replaced. It is necessary to proceed in the same way if the presence of bubbles, ply separation also signals that this tube must be replaced.

Table 6 - Limits on the Drum Wear

SIZE	Permissible maximum wear on drum diameter.	
	inches	millimeter
NARROW SERIES		
11.5FKT500 / 16FKT600	.09	2
20FKT600 / 24FKT650	.12	3
28FKT650	.19	5
33FKT650 / 42FKT650	.19	5
WIDE SERIES		
14FKT1000 / 16FKT1000	.09	2
20FKT1000 / 24FKT1000	.13	3
28FKT1000	.19	5
32FKT1000 / 38FKT1200	.19	5
42FKT1200 / 46FKT1200	.25	6
52FKT1200 / 66FKT1600	.25	6

4.1.2.3 *Crystallization of the Friction Shoe Linings.* In case of a crystallization of the friction shoe linings, it is possible to sand them slightly until removing the glazing on the surface. If they were not original **Gummi** friction shoe linings, due not sand them due to the fact that they may contain asbestos.

4.1.2.4 *Irregular or uneven wear down of the friction linings*. Any angular or uneven wear across the surface of the friction lining could mean that the drum is worn or misaligned. If two or more friction linings show wear at only one end, it is quite possible that the air actuating tube has developed a bubble as a result of a ply separation.

4.1.2.5 *Aluminum Break Shoe Wear*. The wearing down at ends of the aluminum break shoes as a result of rubbing against the side plates indicates misalignment. If the wearing down is only occurring on one side of the Aluminum Break shoes and is uniform for all the break shoes, it is usually as result of a worn drum that causes the aluminum break shoes to thrust as the clutch engages. If the wearing down is occurring on both ends of the aluminum break show, it would indicate an excessive **misalignment.** Minor notching in the cavity of the torque bars is normal, but if the mark appears in a short period of time, check the alignment of the shafts. If both side walls in the cavity of the toque bars have a mark, its possible that a serious torsion vibration problem exists.

4.1.2.6 *Toque Bars and Release Springs*. If there is excessive wear down at the ends of the torque bars, where the release springs make contact, it indicates a serious parallel misalignment**.**

4.1.2.7 *Side Plates*. Any wear in the aluminum break shoes, will be reflected as a lengthening of the toque bar holes in the side plates.

4.2 Disassembling and Removal of the Element Assembly and Drum Assy. (Narrow, Single Wide, and Dual Narrow)

Warning:

Before disassembling the clutch make sure that the mill is in and will stay in a safe position during the whole disassembly and removal process. Mark the position of the element with reference to the spider, and the drum with reference to the drum hub, the mark should be easy to locate in the future and difficult to erase.

4.2.1 Disconnect the element from the spider, which would allow it to rest upon the drum.

4.2.2 Disconnect the axial locking device (if it is used) from the spider and separate the shafts as much as the bearings will allow.

4.2.3 Take off the screws that attach the drum to the drum hub and raise them out from between the shafts. If axial locking device was used, take special care of since the device sheets bends easily against the face of the spider.

4 MAINTENANCE

4.3 Disassembling and Removal of Element Assembly and Drums (Dual Wide Series)

4.3.1 Mark the position of the element with respect to the spider, and the drums with each other and to the drum hub. The mark should be easy to locate in the future and difficult to erase.

4.3.2 Disconnect the dual element assembly from spider and allow it to rest upon the drums. Then remove all air connection tubes.

4.3.3 Remove all fasteners and spacers that are used for attaching the two elements halves together.

4.3.4 Disconnect the axial locking device (if it was used) from the **spider** and separate the shafts and separate the shafts as much as the bearing will allow.

4.3.5 Use and overhead support to suspend the element on the spider side, applying enough tension to support the weight of the element half as well as one of the drums.

4.3.6 Take off the screws and the nuts attaching the drums to the drum hub. Do not take off the short screws or lock washers, which are used to hold the female drum onto the drum hub. Carefully raise carefully the spider side element and drum out from between the shafts. If the axial locking device was is used, carefully raise the element and drum between the shafts, due to the fact the sheets of the axial locking device plate bends easily against the to the spider.

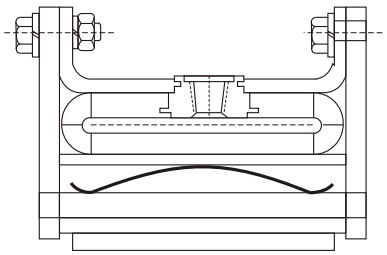
4.3.7 Use and overhead support on the remaining element and use enough tension in order to support the weight of the element and drum.

4.3.8 Remove the screws and lock washers and hoist the clutch up out between the shafts.

4.4 Disassembling and Removal of the Spider and Drum Hub:

4.4.1 Both the Spider and the drum hub a provided with holes for removal, it is recommended to heat the elements along with the puller. Be sure to evenly heat the elements in order not to create hot spots.

Snap Ring and Counter bore Eliminated



11.5FKT50	24FKT650	42FKT650	24FKT1000
14FKT500	28FKT650	14FKT1000	28FKT1000
16FKT600	33FKT650	16FKT1000	32FKT1000
20FKT600	37FKT650	20FKT1000	

4.5 Disassembling of the Clutch Element:

4.5.1 Position the element flat laying down, on a clean work surface area.

4.5.2 Remove one of the side plates and clean so it will be ready for reassembly. If the toque bar holes are elongated more that ½ of the diameter of the pen at the end the toque, this side plate must be replaced.

4.5.3 Remove the friction shoe assemblies, along with the release spring and torque bars. Then remove the toque bars and release springs from the aluminum shoe backing plates; verify and note any wear on each toque bar and spring, and pay special attention to any wear in the cavity of the break shoes and replace if necessary.

Precaution:

It is always recommended to replace the release springs each time the element has been disassembled.

4.5.4 Dismantle the air connection tube, elbows, and **snap rings** that hold the actuating tube to the rim. If any type of wear, hardness, or ply separation is noticed on the tube, it must be replaced.

4.5.5 Remove the remaining side plate only if it needs to be replaced.

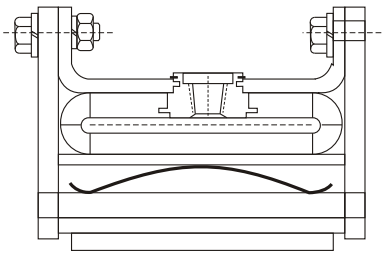
4.6 Replacement of Friction Linings:

Precaution:

Use only **Gummi** original parts, otherwise it may void you warranty and or cause substandard product performance.

4.6.1 Make sure that the release spring and torque bars have been removed from the aluminum shoe

Counter bore Eliminated and second snap ring Groove that has been added



38FKT1200	46FKT1200	46FKT1200	51FKT1600
42FKT1200	52FKT1200	52FKT1200	60FKT1600
			66FKT1600

4.6.2 In case of the friction blocks have been riveted to the aluminum shoe, drill the rivets of 6 mm (15/64) drill and tap them out. For the elements assembled with bolts and nuts, use a suitable tool for removal.

Table 7 - Friction Shoe Assembly Fasteners and Rivets

RIVETS			
11.5FKT500	24FKT650	42FKT650	24FKT1000
14FKT500	28FKT650	14FKT1000	28FKT1000
16FKT600	33FKT650	16FKT1000	
20FKT600	37FKT650	20FKT1000	
FLAT HEAD SCREWS (BRASS) and LOCK NUTS			
32FKT1000	42FKT1200	52FKT1200	60FKT1600
38FKT1200	46FKT1200	51FKT1600	66FKT1600

* Screws of 3/8" - 16ÑC - 2 x 1,25 of flat head.

4.6.3 When assembling new friction shoe assemblies, use new screws and nuts. Beginning tightening the friction block to the shoe starting in center towards the perimeter of the shoe.

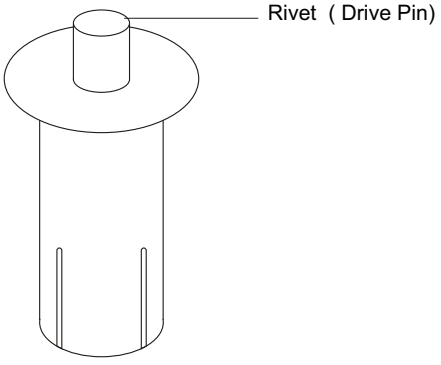


Fig. 14

4.7 Assembling the Clutch Element:

4.7.1 Before beginning with the assembly, verify that all component parts that could have been damaged or that have shown wear, have been replaced.

4.7.2 Place one of the side places into position on the rim and with necessary bolts, washers and nuts.

4.7.3 Install the air actuating tube into position by guiding the inlet valves of the tube through the orifices in the rim and secure using the snap rings.

4.7.4 Place each toque bar in each toque bar hole of the side plate, and then slide the friction shoe assembly over the toque bar and spring.

(Sizes 51FKT1600; 60FKT1500 and 66FKT1600 utilize two spring per shoe assembly).

4.7.5 Place the remaining side plate in such way that the toque bars and the air connections are aligned.

4.7.6 Attach the side plate to rim with the screws, washers and nuts, making sure all the toque bars are nestled in their respective side plate holes.

4.7.7 Verify the placement of all the air connections and install the bolts and nuts where applicable.

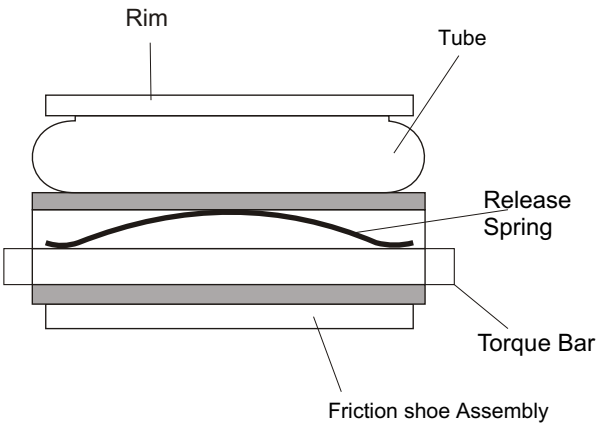


Fig. 15

5 STORE OF SPARE PARTS

5.1 Clutch Elements:

5.1.1 Element should always be stored flat. Storage in the standing up position for a long period of time could cause the rim to become an oval shape instead of round.

5.1.2 DRUMS. Just like the clutch elements, we suggested that the drums be stored open end down; due to the fact that storage in the standing position could cause the rim to become an oval shape.

5.1.3 ACTUATING TUBES. They should be stored with flat and not folded, in a dark climate controlled environment that is dry, and cool away from any electrical equipment and light.

Table 8 - Shoes and Rivets

SIZE	NARROW SERIES		TAMAÑO	WIDE SERIES	
	Quantity of Break Shos	Quantity of Rivets		Quantity of Break Shoes	Quantity Nut and bolts
11.5FKT500	8	54	14FKT1000	16	102
14FKT500	8	90	16FKT1000	8	90
16FKT600	8	90	20FKT1000	8	90
20FKT600	10	110	24FKT1000	10	110
24FKT650	12	130	28FKT1000	10	110
28FKT650	14	150	32FKT1000	12	130
33FKT650	16	170	38FKT1200	12	130
35FKT650	18	190	42FKT1200	14	150
37FKT650	18	190	46FKT1200	32	198
42FKT650	20	210	52FKT1200	36	222
			51FKT1600	36	222
			60FKT1600	40	246
			66FKT1600	44	246

Table 8 - Shoes and Rivets

SIZE	NARROW SERIES			SIZE	WIDE SERIES		
	Quantity of Break Shos	Quantity ok Torque Bars	Quantity ok Springs		Quantity of Break Shos	Quantity ok Torque Bars	Quantity ok Springs
11.5FKT500	8	8	8	14FKT1000	8	8	8
14FKT500	8	8	8	16FKT1000	8	8	8
16FKT600	8	8	8	20FKT1000	8	8	8
20FKT600	10	10	10	24FKT1000	10	10	10
24FKT650	12	12	12	28FKT1000	10	10	10
28FKT650	14	14	14	32FKT1000	12	12	12
33FKT650	16	16	16	38FKT1200	12	12	12
35FKT650	18	18	18	42FKT1200	14	14	14
37FKT650	18	18	18	46FKT1200	16	16	16
42FKT650	20	20	20	52FKT1200	18	18	18
				51FKT1600	18	18	36
				60FKT1600	20	20	40
				66FKT1600	22	22	44

6 TECHNICAL ATTENDANCE

With regard to any **Gummi** equipment the client will have to refer to the identification plate, where he/she will obtain the series number, model and other data that appears there, if the client do not have it, he/she will have to inform the assembled configuration, quantity of air intakes and with any other characteristic that helps its identification, will have to go to:

www.gummi.com.ar
info@gummi.com.ar

www.gummiusa.com
info@gummiusa.com

www.gummi.com.br
vendas@gummi.com.br

7 GENERAL GUARANTEE OF GUMMI PRODUCTS AND WARRANTY OF PRODUCT

GUMMI USA, Inc. Warrants all parts and spare components ("products") manufactured and sold by **GUMMI** and **GUMMI USA, Inc.** to meet our strict product specifications and to be free from defects in material and workmanship (but not against damage caused by accident, misuse, or installation) for a period of 12 months from the date of sale prior to installation.

GUMMI USA, Inc makes no warranty of merchantability or of fitness for a particular application or purpose. **GUMMI USA, Inc** will, upon examination of the products(s) and at its sole discretion repair, replace, credit the net purchase price in effect at the time of purchase from **GUMMI USA** any product found to be defective. Product claimed to be defective must be held for **GUMMI USA** shipping and or delivery instructions. **GUMMI USA, Inc**. retains the right to request that any and all return charges be prepaid. Any and all charges incurred without **GUMMI USA, Inc.** authorization will be disallowed. If a product is to be returned under this warranty, the buyer agrees not to make any deduction on account thereof from payment on current accounts while the claims are being reviewed or dispositioned.

Other than stated above, **GUMMI USA, Inc.** makes not warranty, either expressed or implied. In no event shall **GUMMI USA, Inc.** Liabilities exceed the net purchase price for those products as to which a claim is made no shall **GUMMI USA, Inc.** be liable for consequential, incidental, or special damage.

Any and all claims must be received with the **GUMMI** warranty card completed in full by the company or client claiming the product to be defective.

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Total Quality

ECOLOGICAL TECHNOLOGY