Ortlinghaus-Werke GmbH D-5632 Wermelskirchen	**Installation and Maintenance Instructions** **for pneumatically actuated single-plate clutch with spring applied single-plate brake**	Instruction No. 341 Model 0-400 Size 23

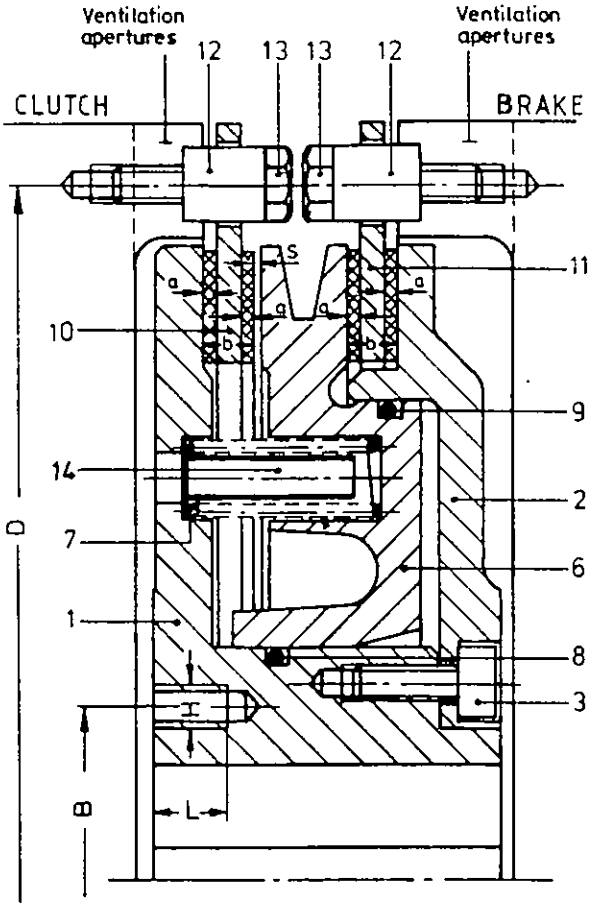

Fig.1: Twelve point plate suspension

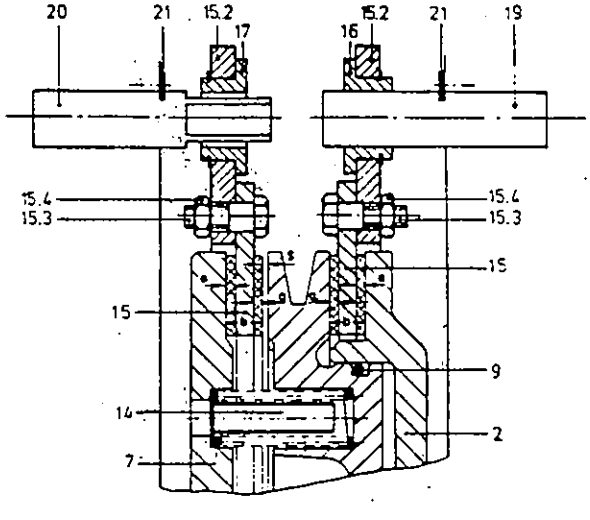

Fig. 2: Two point plate suspension

1. Operation

The clutch plate (10) is connected to the flywheel and the brake plate (11) is connected to the machine frame. The piston with the centre plate (6) moves axially on the internal hub (1) which is keyed to the shaft. The centre plate (6) is subjected to spring pressure, engaging the brake plate (11) by friction against the cylinder (2). When compressed air (nominal operating pressure 5,5 bar; max. 6 bar) is fed into the cylinder (2), the piston (6) moves against the spring pressure, thereby releasing the brake and engaging the clutch. When the compressed air is discharged via a valve, the clutch disengages and the brake is engaged by the spring.

2. Installation

To avoid damaging the O-rings (8/9), the unit consisting of hub (1), cylinder (2) and piston (6) should be fitted to the shaft in assembled state. Clutch and brake plates are split for easy fitting. By feeding compressed air into the cylinder the centre plate moves and creates clearance for the fitting of the brake plate. When the air is discharged sufficient clearance is produced for the fitting of the clutch plate.
Take care to keep the friction linings free of lubricants.
Note: It is important that - when disengaged - the plates are free to move axially to avoid for the plate suspension bolt holes as stated in the catalogue must be observe. All screws must be tightened to correct torque M_A according to table 2. The air supply line should be kept short and the valve fitted as close to the clutch as possible in order to achieve short response times. If possible it is recommended to fit the valve directly to the rotating air inlet.

2.1 Twelve point plate suspension (Fig. 1)
Series 0-400-..9
a) Brake plate (11):
Apply compressed air to the cylinder and place the plate halves (11) in position. Position the bushes (12) in the centring counterbore of the machine frame and tighten the self-locking hexagon screws (13) to the correct torque M_A according to table 2.

b) Clutch plate (10):
Discharge the compressed air and turn the flywheel until a counterbore is opposite the chamfer on the brake plate. place the plate halves (10) in position and insert all 12 bushes (12) and screws (13) opposite the chamfer by turning the flywheel 30° for each. Tighten the screws to the correct torque M_A according to table 2. The clutch plate halves (10) are connected by straps (10.1) to compensate for the centrifugal force. The strapping screws must be secured with Loctite 245 or equivalent.

2.2 Two point plate suspension (Fig. 2)
Series 0-400-..7 with non-coaxial pins
Series 0-400-..8 with coaxial pins
The plate halves (15) are connected by two lugs (15.2), secured to the plates by hexagon screws (15.3) and hexagon nuts (15.4) as well as expanding dowels (15.5). Each plate with the lugs is suspended on shoulder bushes (16/17), guided by a square (20) and a round (19) pin, which are fixed to flywheel secured by keys (21).

2.3 Combined suspension
Series 0-400-..3 : Twelve point suspension of clutch plate and two point suspension of brake plate (short lugs)
Series 0-400-..4 : Twelve point suspension of clutch plate and two point suspension of brake plate (long lugs).
Installation according to relevant parts of 2.1 and 2.2.

3. Replacement of fiction linings

Remove the plates (10/11/15) in reverse order of installation as described in 2.1 and 2.2. The friction lining (15.1.2) is bonded to the steel part (15.1.1) and the complete plate must be replaced.

4. Dismantling

Note: The cylinder (2) is under spring pressure. The dismantling should be carried out by an experienced engineer.

Instructions: For extraction from the shaft, the hub (1) is provided with two tapped holes (dim. B, H and L) on the clutch side. If the unit must be withdrawn from the brake side, extraction holes are provided by removing two screws (3) at 180°. To dismantle the unit, two of the screws (3) at 180°, are replaced by auxiliary screws of approx. 15 mm extra length. Remaining screws (3) are successively unscrewed until the cylinder (2) is resting on then auxiliary screws and then removed. The spring pressure is the released by unscrewing the auxiliary screws and the cylinder (2) and the piston (6) can be removed. Before re-assembly in reverse order, all parts should be cleaned and sealing compound applied to the joint between hub(1) and cylinder (2). Use new screws (3) and tighten to correct torque M_A according table 2.

Size	D	B	H	L
23	166	45	M6	10

Table 1

5. Spare parts

When ordering spare parts it is necessary, in addition to description and part's number, to state the factory number which is stamped on the clutch. To avoid delivery of wrong parts, always place orders in writing or by telex.

6. Special features

6.1 Plate positioning springs

Special positoning springs can be fitted to the clutch and brake plates of units with 12 point suspension, used on high speed shafts. Be centreing the plates between the two adjacent friction surfaces the springs eliminate drag and unnecessary heat generation (see fig. 3 and 4). Dimensions O, P and S (see catalogue) must be accurately maintained.

6.2 Damping bolts (fig. 5)

Resonance at certain critical speeds can somtimes cause noisy running of a disengaged clutch. This can be eliminated by fitting two spring loaded damping bolts in place of two of the standard fixing bolts (see fig.5) These should be displaced at 120° and can be fitted to new or existing installations.

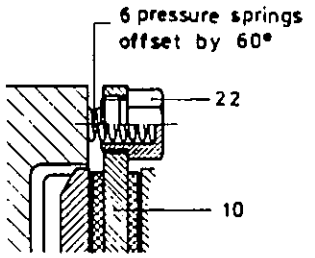

Fig. 3

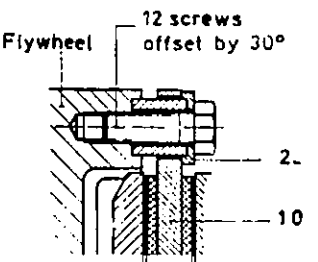

Fig. 4

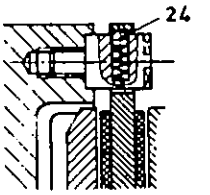

Fig. 5

Equal clearance!

7. Accessories

7.1 Air supply

In mobile applications or if no central air supply is available the size of the compressor is decided by the air consumption of the clutch. The cylinder volume is min. 0,03 litre (new linings) and max. 0,05 litre (fully worn linings). The volume of the supply line between the clutch and the control valve must be added. the required amount of free air can be calculated as follows:

$Q = 1,5 \cdot V \cdot p \cdot z$ = compressor capacity at atmospheric pressure in l/min.

V = volume of cylinder and connection pipe. p = working pressure in bar.

z = max. number of engagements per minute. 1,5 = leakage factor, depending on operations.

If more than one unit is incorporated this must be correspondingly considered.

7.2 Rotating air inlets

Air inlets for direct connection to solenoid valves and safety valves can be supplied. The connection of the air inlet to the shaft should be adequately sealed and well aligned. Accurate performance and long life can only be warranted if the inner part is running true with the shaft. Air supply pipes must be connected to the air inlet by a flexible hose of at least 300 mm length to prevent excessive load on the bearing.

Maintenance: Lubricate with 6-8 grams of grease at intervals of approx. 7 000 h.

7.3 Air accumulator

Especially with high engagement figures, i.e. eccentric presses or similar, it is recommended to use a pressure compensating tank (accumulator) of suitable size in order to avoid a drop in pressure during engagement. The connecting pipeline should be kept as short as possible. A pressure switch can be incorporated to prevent engagement at too low a pressure which might cause the clutch to slip. The volume of the accumulator should be at least 3 to 4 times the max. volume of cylinder and connection pipes. $V_{Dr} = 3$ to $4 \cdot p \cdot V$

V = volume of clutch cylinder and connecting pipes

During engagement the pressure in the supply line just before the clutch should not fall below 90% of normal value.

7.3 Air accumulator
When the engagement frequency is high,it is recommended that an accumulator is provided just before the valve to ensure that there is sufficiente air available for each engagement process.
Accumulator volume:

$$V_{Dr} = 15 \text{ to } 20 \cdot (V_{cyl} + V_L)$$

V_{cyl} = max. cylinder volume (max. 0,05 litre)

V_L = volume of supply line between valve and cluth/brake combined unit.

In order to be able to check the operating pressure, it is of advantage to fit a pressure gauge. If the pressure is too low, the cluth can slip and fail as the result of overheating or wear. When the cluth is being engaged, the air pressure measured directly before the unit should not fall below 90% of the operating pressure. Operating pressure 5.5 bar. Max. permissible operating pressure 6 bar.

7.4 Air supply system
To achieve precise performance in rapidly working presses, it is necessary to use pipes min. G 1/4 A supply pipes. The oiler (3, fig.6) must be set in such a way that the oil feed rate lies between 1 and max. 3 drops per m^3. air.

Diagram of a compressed air system:

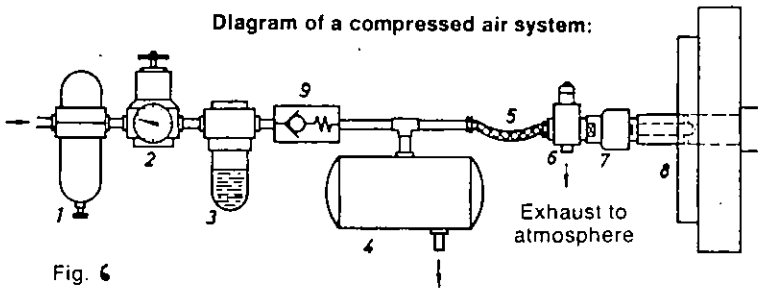

Fig. 6

1 = Compressed air filter
2 = Pressure reducing valve
3 = Lubricator
4 = Air accumulator
5 = Flexible metal hose
6 = Three way solenoid valve or press safety valve
7 = Air inlet adaptor
8 = Clutch-brake combined unit
9 = Check valve

Table 2 Part No.	M_A in Nm	Screw grade	Secured by
1 Hub 1.1 Torque pin 1.2 Grub screw 2 Cylinder			
3 Screw	8,5	12.9	Replace screws on re-assembly
5 Dowel 6 Piston 7 Pressure spring 8 O-ring 9 O-ring 10 Clutch plate 10.1 Strap 10.2 Locking washer 10.3 Expanding dowel			
10.4 Hexagon screw			Secure with Loctite 245 or equivalent on assembly
11 Brake plate 12 Cylindrical bush			
13 Hexagon screw	8,5	10.9	Selflocking when properly tighten, but should be secrured with Loctite 245 or equivalent after repeated removal
14 Tubular rivet 15 Plate for two point suspension 15.1 Plate without lug 15.2 15.1.1 Steel plate 15.1.2 Friction lining 15.2 Lug 15.3 Hexagon screw			
15.4 Hexagon nut	15	8	Secure with Loctite 245 or equivalent on assembly
15.5 Expanding dowel 16 Shoulder bush 17 Shoulder bush 18 Circlip 19 Round section pin 20 Square section pin 21 Key			

Air gap s	new max mm	0,70	Check every 3 months
	fully worn mm	4,70	
Plate thickness b	new mm	7,00	
	fully worn mm	5,00	
Lining thickness a	new mm	1,75	
	fully worn mm	0,75	
Wear per plate max.	mm	2,00	

ORTLINGHAUS-WERKE GMBH · D-5632 WERMELSKIRCHEN · W.-GERMANY
P.O.Box ; 1440 - Telephone: (0 21 96) 851 - Telex: 8 513 311 - Telegr.: Ortlinghauswerk Wermelskirchen