BINDER

Operating Instructions

for Flange Mounting Clutch-Brake Units
fitted with D. C. Single Disc Clutch and Brake

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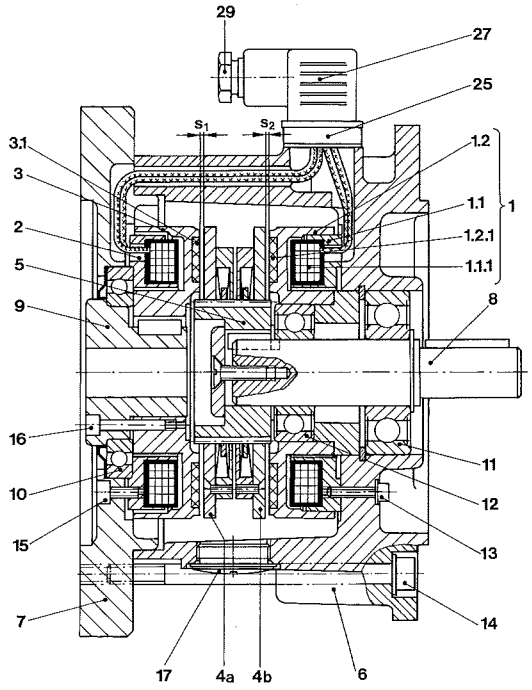

Fig. 1

1 Brake
1.1 Brake Coil Body
1.1.1 Brake Operating Coil
1.2 Brake Stator
1.2.1 Brake Friction Lining
2 Clutch Stationary Coil Body
3 Clutch Rotor
3.1 Clutch Friction Lining
4 a Armature (Clutch)
4 b Armature (Brake)
5 Toothed Hub
6 Unit Casing
7 Adapter Flange
8 Output Shaft
9 Input Sleeve
10 Sleeve Support Bearing
11 Shaft Outer Bearing
12 Shaft Inner Bearing
13 Brake Body Fixing Screws
14 Unit Assembly Screws
15 Clutch Coil Body Fixing Screws
16 Clutch Rotor Retaining Screws
17 Screwed Inspection Plug
25 Connecting Pin Body B to DIN 43 650
27 Connecting Plug A to DIN 43 650
29 Cable Gland Pg 9

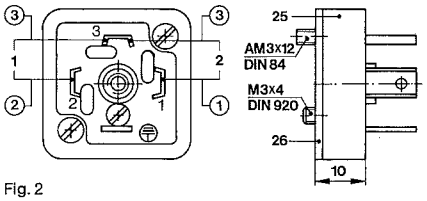

Fig. 2

25 Pin Base B to DIN 43 650
26 Gasket Seal

Clutch and Brake Connections

1 Brake
③ Blue lead — to Pin 3
② Red lead + to Pin 2
2 Clutch
③ Red lead — to Pin 3
① Blue lead + to Pin 1

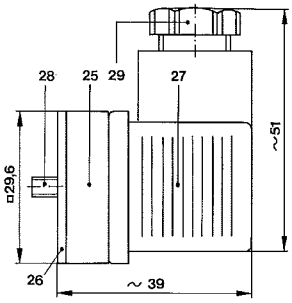

Fig. 3

25 Pin Base B to DIN 43 650
26 Gasket Seal
27 Plug A to DIN 43 650
28 Central Fixing Screw M3
29 Cable Gland Pg 9

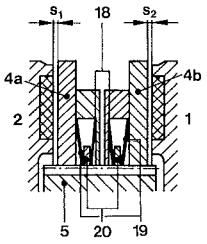

Fig. 4

1 Brake
2 Clutch
4 a Armature (Clutch)
4 b Armature (Brake)
5 Toothed Hub
18 Armature Retractor Springs
19 Armature Damping Springs
20 Armature auto-set Ring
s_1 Air Gap (Clutch)
s_2 Air Gap (Brake)

Construction

The Clutch-Brake Unit comprises of an aluminium die-cast Casing (6) with integral mounting flange and removable Adapter Flange (7).

The unit is constructed in the form of two sub-assemblies. On the input side the Clutch Stationary Coil Body (2) is centralised on the outer race of the Sleeve Support Bearing (10) and is attached to the Adapter Flange (7) by Fixing Screws (15). The Sleeve Support Bearing (10) carries Input Sleeve (9) onto which the Clutch Rotor (3) is keyed and retained by Fixing Screws (16). The output side sub-assembly comprises of the Unit Casing (6) to which is attached the Brake (1) by Fixing Screws (13), centralisation of the brake is effected by the bearing spacer bush. The bore of the brake body is utilised to carry the Shaft Inner Bearing (12). The Shaft Outer Bearing (11) is located in the casing.

Fitted and keyed to Output Shaft (8) is the Toothed Hub (5) onto which are meshed the Clutch and Brake Armatures (4 a / 4 b). The respective armatures transfer drive/braking from the clutch resp. brake to the output shaft via the toothed hub.

The armature assemblies embody a self-compensating wear feature and are totally free from idling torque when dis-engaged.

Operating Principle

The Clutch-Brake Units are in general mounted directly onto a standard metric flange mounting electric motor, for use as a (Stop/Start) power transmission interface, between a motor and gearbox, or as a direct power take-off drive.

In principle, the motor is coupled to the input side of the unit and drives the electro-magnetic Clutch Rotor (3) via Input Sleeve (9). Fitted to the Input Adapter Flange (7) is the Clutch Stationary Coil Body (2), which when energised, fluxes the Clutch Rotor (3) and attracts Armature (4 a) to the rotor friction face, so transmitting drive to Output Shaft (8) via Toothed Hub (5).

The Brake (1), is attached to the inner wall of the Unit Casing (6) and its Armature (4 b) is located on the Toothed Hub (5) in identical manner to that of the clutch.

In operation power transmission, or braking, is effected by energisation of the clutch, resp. brake.

The advantages of this drive system are that the motor runs continuously, so providing benificial kinetic energy from the motor rotor when the drive is clutched-in, without having to arrest the detrimental energy of the motor rotor when the drive is braked. This enables the drive to be operated at very high Stop/Start frequencies.

Since both clutch and brake armature mechanisms are self-compensating for wear, they therby maintain repetative operating characteristics, without need of maintenance, throughout their operational life.

Pre Operational Check and Maintenance Proceedure

After the unit has been fitted to the motor/gearbox, it is necessary to undertake a pre-operational check, to ensure that the clutch/brake operating air gaps (s_1 and s_2 Fig. 4.) have not been disturbed due to any axial shocks which have occurred during mounting of the unit.

Remove Inspection Plug (17) and observe if the Air Gap s_1 and s_2 are nominally equidistant between Armature (4 a) and Clutch Rotor (2) and Armature (4 b) and Brake Stator (1) as illustrated in Fig. 4. If this is not so, adjust the armature systems by use of a screwdriver blade. The nominal gap should range between 0,3 and 0,4 mm. Since the armatures embody a self compensating wear feature, it is then only necessary to individually energise the Clutch and Brake (see Unit Nameplate for rated D. C. voltage) and observe that the to and fro action of the respective armatures takes place.

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The correct operating air gaps are self setting by the automatic wear compensating feature.
The Ball bearings used are sealed pre-lubricated types and have an operational life of nominally 15 000 Hours or 2 years max. continuous duty.

Electric Connections
The Clutch-Brake Units must be operated from pure D. C. supply alt. Bridge Rectified Single Phase A. C.
Connections are effected via a multi-way connector (DIN 43 650). The Pin Base (25) is screwed to the Unit Casing (6) and is internally connected as per Fig. 2.
The Plug (27) has a multi-way block to accept external supply via a Pg 9 Cable Gland (29), which is suitable for a multi-core cable up to a maximum sheath dia. of 8 mm.
N. B. In order to avoid clutch/brake operational overlap, which results in excessive wear and detrimental heat build-up, ensure that the switching element employed to control the clutch and brake sequence, has a time constant which is greater than the t_2 response times listed for respective units (see Technical leaflet).

Assembly and Dismantling
The Clutch-Brake Units as supplied are fully tested and ready to fit directly onto a metric flange mounting motor.
Prior to fitting, ensure that the motor shaft key has a suitable top clearance to prevent any binding in the Input Sleeve (9).
As a preventative against fretting corrosion, it is recommended that the motor shaft and key, be lightly smeared with "Copaslip" High Temperature lubricant, or an equivalent proprietary type.
In order to cater for tolerance variations in mating equipment, the loaction recess ('E' dia. Technical leaflet) in Adapter Flange (7) is manufactured having a diametrical clearance of 0,3 mm above that of the motor flange locating spigot, this serves to eliminate any possibility of imparting un-desirable loading onto the Sleeve Support Bearing (10).
N. B. The user must note, that Flange/Flange Spigot and Shaft of mating equipment, must be manufactured having a concentricity and squareness, relative to shaft, in full accordance with DIN 42 955 and B. S. 4999 Part. 10. (1976) to Tolerance Class N.
To dismantle the Clutch-Brake Unit. Firstly remove the connection Plug (27), then dismount the unit from the motor, etc., by use of jacking-off holes in Adapter Flange (7). Remove screws holding connector Pin Base (25), lift out and un-sweat soldered connections of the clutch (i. e. Red lead — Pin 3 and Blue lead — Pin 1 per Fig. 2.). Lay unit on Adapter Flange (7) and remove Assembly Screws (14).
Support Unit Casing (6) by its flange and remove Adapter Flange (7), by lightly tapping around its periphery with a hide, or similar soft faced hammer. The output end of the assembly complete with shaft etc., will then separate, leaving two individual sub-assemblies. On removal of Retaining Screws (16) the Clutch Rotor (3) can be withdrawn from Input Sleeve (9) leaving access to the Clutch Stationary Coil Body (2), this can be removed by unscrewing Fixing Screws (15).
When re-assembling with new components etc., proceed in reverse order.
To dismantle the output end sub-assembly. Firstly remove Armatures (4 a / 4 b) from Toothed Hub (5), this requires some axial effort, due to the frictional retention force of the Armature auto-set Ring (20 Fig. 4.). Then remove the hub retaining washer and draw off Toothed Hub (5), remove key and also bearing inner race spacer washer from Output Shaft (8).
Brake (1) can then be removed complete with Shaft Inner Bearing (12) by unscrewing Fixing Screws (13).
If it is required to extract the Output Shaft (8), remove shaft circlip and key, then lightly knock the shaft backwards through the Shaft Outer Bearing (11) by use of a hide or soft faced hammer, so as to prevent any damage to the shaft end.
When re-assembling, firstly ensure that the Output Shaft (8) is correctly located axially, by abutment of its circlip with the inner race of the outer bearing, also similarly ensure the outer race of this bearing is in full abutment with the case circlip, then press the bearing spacer bush into positive contact with the case circlip. After this has been accomplished, proceed with re-assembly in reverse order to dismantling proceedure.
When finally replacing the armature assemblies, set Brake (1) Air Gap (s_2) at nominally 0,3 to 0,4 mm, the Clutch Air Gap (s_1) should also be set to this dimension when the unit is fully assembled. After which the Clutch resp. Brake must be separately energised, on which, the correct operating air gaps will self-set automatically.

Protection and Operating Conditions
These Clutch-Brake Units are constructed in accordance with VDE 0580 and have an IP 54 enclosure per DIN 40 050.
Units can be operated either horizontally or vertically.