Emco - Simplatroll

Industrial Electromagnetic Brake & Clutches

Electromagnetic Clutch

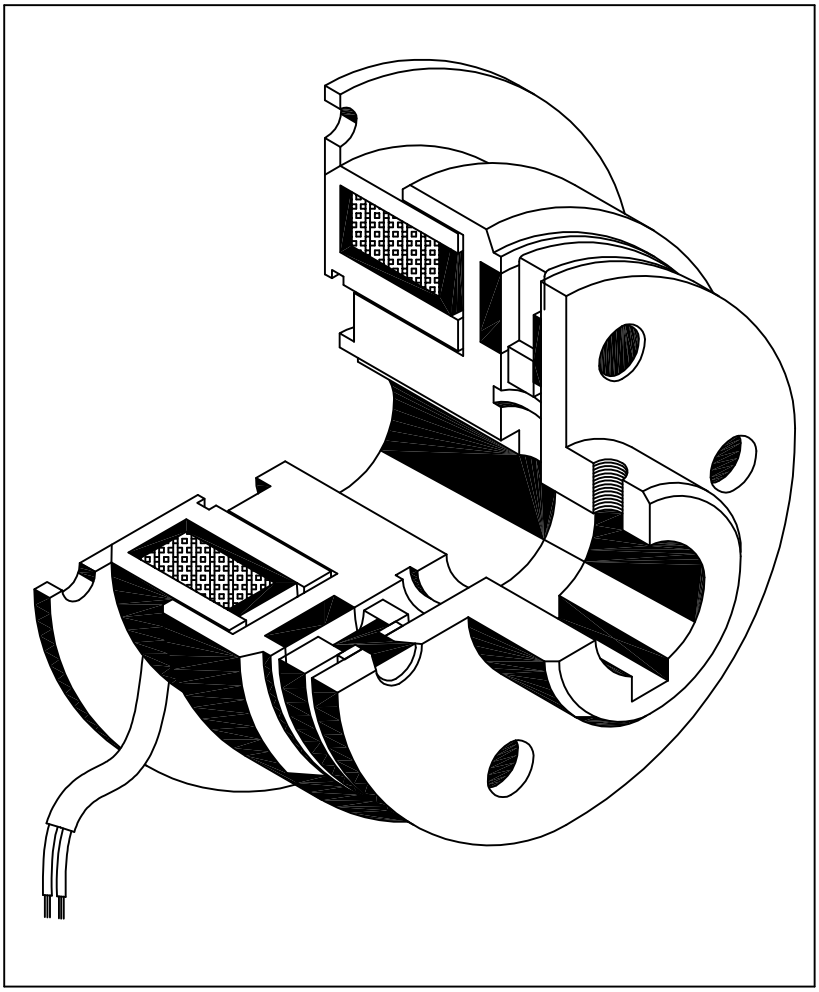
Type 14.105/102.□□.1.□

Type 14.105/102.□□.3.□

Electromagnetic Brake

Type 14.115/112.□□.1.□

Fitting and Operating Instruction Manual



SALIENT FEATURES

Single Plate Dry Type.
Zero Blacklash.
Residual-free.
Fast Switching Times.
High Operating Reliability.
High Operating Frequency.
Compact Dimensions.
Simple Construction.
Maintenance-Free.
wave Spring.
Stationary Field (No Slip Rings).
Consistent Operating Characteristics.
Simple Wear Compennsation Adjustment.
Slotted Armature For Torque Stability.
Coil with Class "F" Insulation.
Special Friction Material.
Simple Installation.
Low Inertia of Rotating Parts.
Raw Material To DIN Standards.
No Restriction on Mounting Position.

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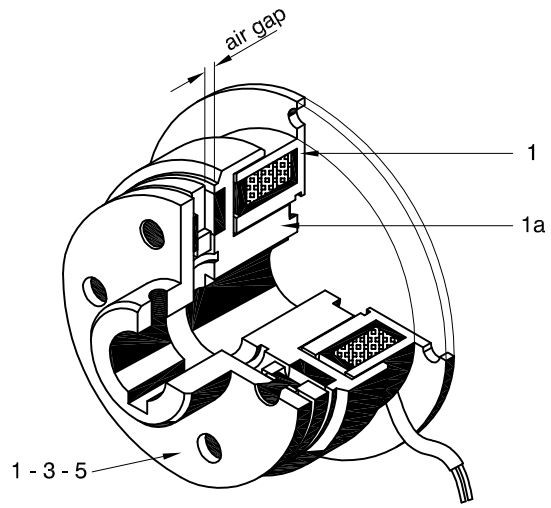
Description

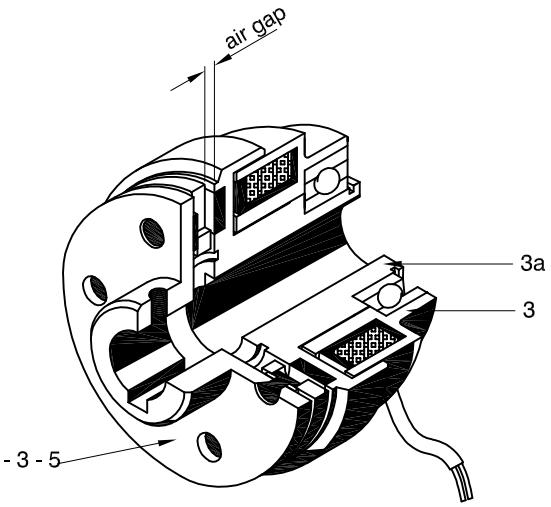
The 14.105/102.00.1.0 clutch comprises a stator (1) with an epoxy potted coil, a rotor (1a) fitted with friction material and an armature (1-3-5 fig. 1) using the wave shape prestressed spring. The stator (1) should be fastened to the machine surface, center to the shaft and the rotor fitted to the shaft with a key to transmit the torque. Designs 1.3 to 1.5 are particularly suitable for through - shaft applications, design 1.1 for split-shaft use. On applying a direct current to the coil, the magnetic field produced pulls the armature over the airgap into contact with the friction material embedded in the rotor (1a). Torque will then be transmitted without blacklash. On switching off the electric current. the prestressed spring pulls the armature plate back into its original position, and the clutch is positively with no residual torque.

14.105/102.□□ .1.□



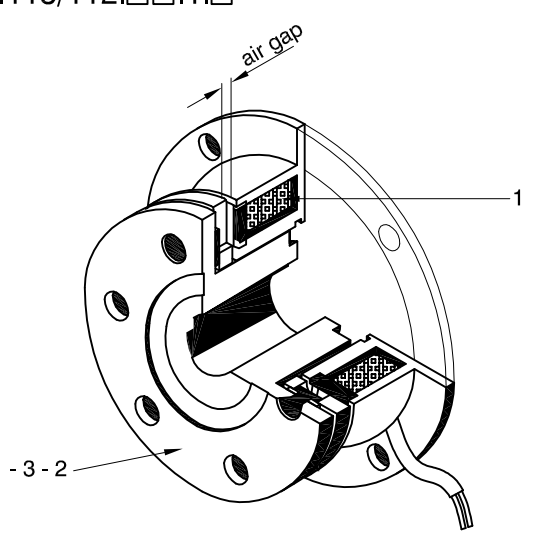
The bearing mounted 14.105/102.00.3.0 clutch is specially designed for shaft mounting. The stator is held to the rotor with a sealed ball bearing and prevented from rotating by a small torque arm. The rotor, fitted with its friction material will be fixed to the shaft and thus centering is automatic. On applying a direct current to the coil the magnetic field produced pulls the armature over the airgap into contact with the friction material embedded in the rotor (3a). Torque will then be transmitted without backlash. On switching off the electric current, the prestressed spring pulls the armature into its original position,and the clutch is positively released with no residual torque.

14.105/102.□□.3.□



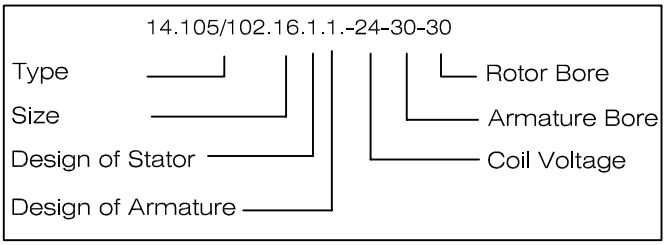
The 14.115/112.00.1.0 brakes comprise a stator (1) with an epoxy potted coil and fitted with friction material, and an armature (1,3,2 in Fig.1) using the wave shape prestressed sping. The stator (1) should be fastened to the machine surface, center to the shaft and the armature fitted to the shaft with a key to transmit the torque. On applying a direct current to the coil. the magnetic field produced pulls the armature over the airgap into contact with the friction material embedded in the stator (1). Torque will then be applied to the brakes shaft, without backlash. On switching off the electric current, the prestressed spring pulls the armature plate back into its original position, and the brake is positively released with no residual torque.

14.115/112.□□.1.□



Mounting

1.1 Information of the unit



1.2 Design

Size -

Refer table no.1 (Page no. 4)

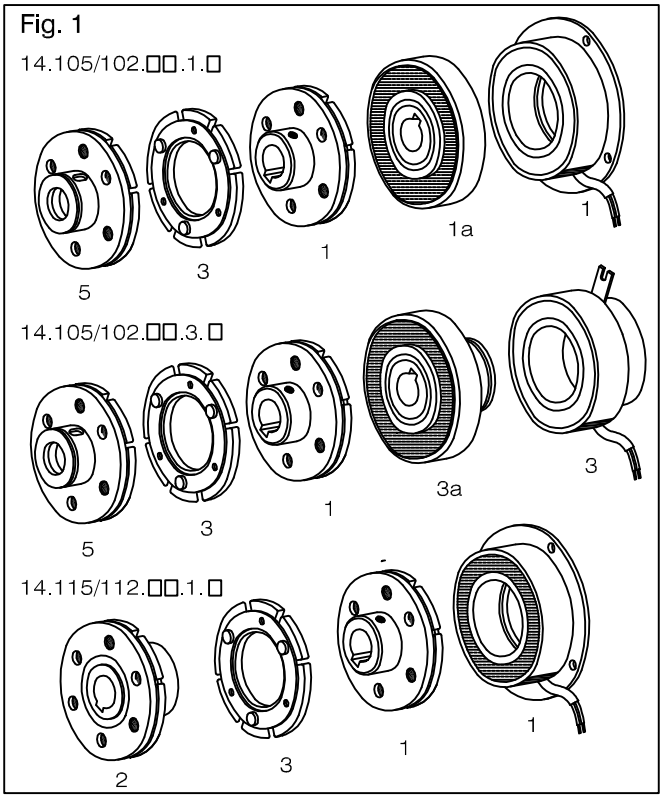
Design of the Stator -

E.M.Clutch flange mounted - 1
E.M.Clutch shaft mounted - 3
E.M.Brake - 1

Design of the Armature -

E.M.Clutch flange mounted - 1, 3, 5
E.M.Clutch shaft mounted - 1, 3, 5
E.M.Brake - 1, 2 ,5

Fig. 1



2. Fitting the clutch or Brake

Keep friction surfaces free from oil and grease. Only use sealed Ball Bearings.

The stator of clutch or brake of the design 1 is to be centered internally (fig.2) or externally (fig.3) (Dimension ZK for concentricity to be observed, as in table 1). The fitting surface should have a maximum ' perpendicular error 'b' as shown in table1, and also should not be convexed. when using the inner centering method (fig.2).
The armature design 1, 2 and 5 are pushed onto the shaft.

The maximum permissible concentricity of the shaft dimension 'Zw' to be taken from table 1, Airgap (table 1) to be adjusted by using feeler gauges (See figures 5 ang 6). For the exact airgap setting and for later wear reserve use an assorfed set of shims. The armatures have to be located axially.
When you finally fit the rotor, you should ensure that dimension 'M' (table 1) is correct within 0.2mm. Then you should secure the rotor axially (fig.5).

When using the bearing mounted clutch (design 3) you do not need a stator mounting surface, as the centring is done by the built-in bearing and rotor. A small torque arm is needed to stop the stator rotating with bearing friction, and you should restrain this without putting any strain on the bearing assembly.

NOTE : Use of ball bearing (s) will ensure automatic centering of the stator in case of design 1.

Single face clutches and brakes transmit only approx.40-50% of the stated catalogue torque when new.Only after an intial running-in period on load, when friction surface carry fully, will the rated torque be safely transmitted.

Fig.2

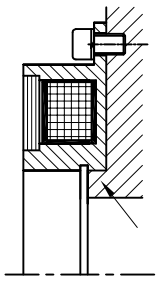
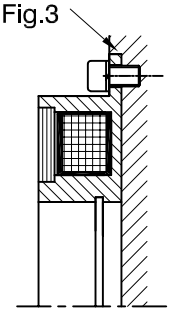


Fig.3



Typ.14.105/102 (115/112)

Fig.5

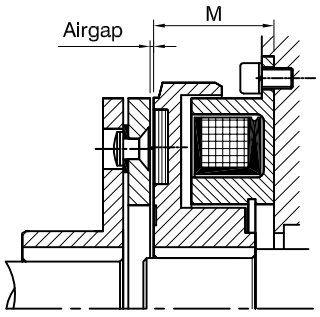
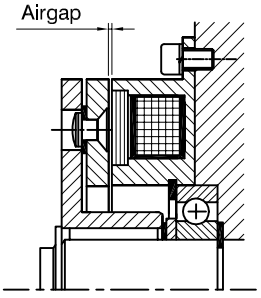


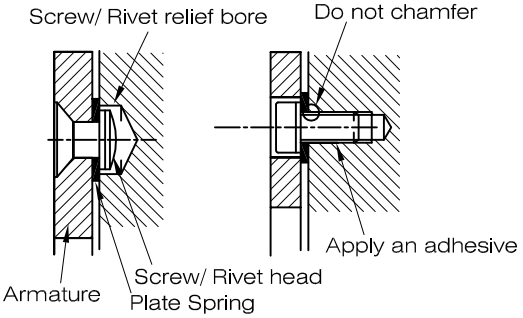
Fig.6

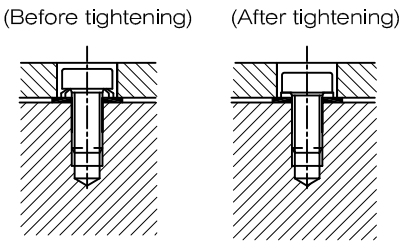


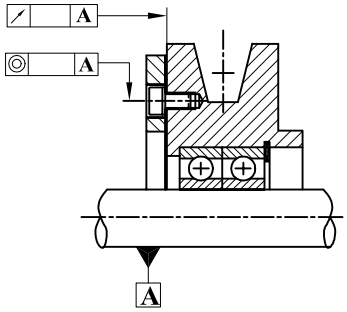
Installation of the armature type - 3

Apply a bore processing to screw or a runout processing for the rivet head on the mounting surface. Mounting is performed with the attached special hexagon socket bolt and disc spring washer. For the thread part, apply a small amount of adhesive to prevent loosening. (Do not apply too much adhesive, Which may disrupt the operation if it is attached to the plate spring.) For the mounting screw bore , chamfering is not necessary just remove the burr. The attached hexagon socket bolt is a special bolt with a low head. For the size below 06 the standard Chease head machine screw is attached. The disc spring washer must be used as the following figure. For the armature type-3, the concentricity and squareness of the positioning diameter must be below the permissible value to the rotating shaft.

Size	Concentricity (T.I.R.)	Squareness (T.I.R.)
03	0.1	0.03
04	0.1	0.04
05	0.1	0.04
06	0.16	0.04
08	0.16	0.05
10	0.16	0.05
12	0.16	0.06
16	0.16	0.07
20	0.24	0.11
25	0.24	0.11
31	0.30	0.15
40	0.30	0.15
50	0.30	0.15



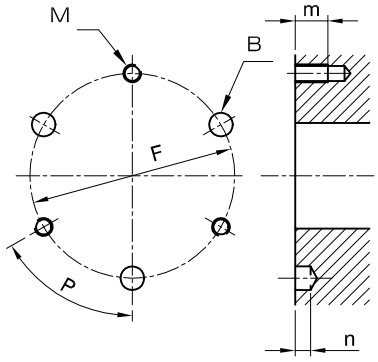




How to use washer

Mounting accuracy

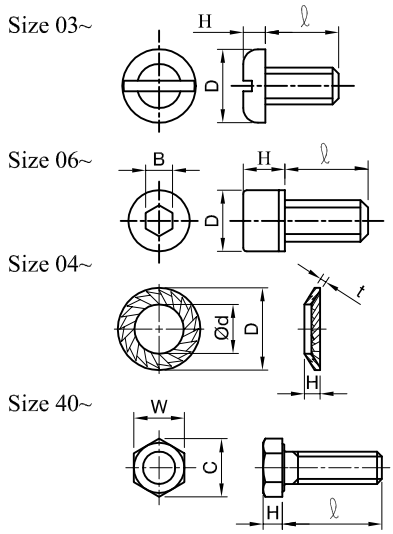
Armature type - 3 mounting dimensions



Armature type - 3 mounting dimensions

Clutch & Brake Size	Mounting pitch diameter		Mounting Angle		Mounting screw bore		Screw / rivet relief bore	
	F (P.C.D)	Tolerance	P (degree)	Tolerance (min.)	No. of bores x M (Nominal designation)	Effective Screw	No. of bores x Bore diameter	Depth of counterbore
03	23	±0.05	60°	±5	M2.5 x 3	7	Ø6 x 3	1.2
04	30				M3 x 3	8	Ø6.5 x 3	1.5
05	38						Ø6.5 x 3	1.5
06	46	±0.05	60°		M3 x 3	8	Ø6.5 x 3	2.2
08	60				M4 x 3	10	Ø8 x 3	2.2
10	76				M5 x 3	12	Ø10.5 x 3	3.1
12	95				M6 x 3	15	Ø12 x 3	3.3
16	120				M8 x 3	20	Ø15 x 3	3.6
20	158				M10 x 3	25	Ø18 x 3	5.3
25	210	±0.1	45°		M12 x 4	30	Ø22 x 4	6
31	250				M16 x 4	35	Ø28 x 4	8
40	315				M18 x 4	40	Ø36 x 4	8
50	400				M20 x 4	45	Ø36 x 4	10.2

Armature type - 3 mounting dimensions



Clutch & Brake Size	Hexagon socket special bolt (Cross- recessed chease head machine screw)					Disc spring washer			
	Nominal dimension	ØD/C	H	B/W	ℓ	ØD	Ød	H	t
03	M2.5	3.5	1.1	-	5	Disc spring washer is not used			
04	M3	5.5	1.8	-	6	5.5	3.2	0.6	0.45
05	M3	5.5	1.8	-	6	5.5	3.2	0.6	0.45
06	M3	5.5	2.0	2.0	6	5.5	3.2	0.6	0.45
08	M4	7	2.8	3.08	8	7.0	4.3	0.7	0.5
10	M5	8.5	3.5	4.09	10	9.0	5.3	0.9	0.6
12	M6	10	4.0	5.09	12	10.0	6.4	0.9	0.7
16	M8	13	5.0	6.09	16	13.0	8.4	1.2	0.8
20	M10	16	6.5	8.11	20	16.0	10.5	1.5	1.0
25	M12	18	7.5	10.11	25	18.0	13.0	1.5	1.1
31	M16	24	10	14.14	30	24.0	17.0	1.9	1.3
40	M18	30	11.5	27	35	27.0	19.0	2.2	1.5
50	M20	33.5	12.5	30	40	30.0	21.0	2.2	1.5

Table 1

Size	Air Gap mm	b mm	Zk mm	ZW mm	M mm
03	0.15±0.05	0.03	0.12	0.06	22.2
04	0.15±0.05	0.04	0.12	0.06	25.4
05	0.2 ±0.05	0.04	0.12	0.06	28.1
06	0.2±0.06	0.04	0.1	0.05	24
08	0.2±0.06	0.05	0.15	0.05	26.5
10	0.2±0.06	0.06	0.15	0.05	30
12	0.3±0.10	0.07	0.15	0.05	33.5
16	0.3±0.10	0.09	0.2	0.1	37.5
20	0.5±0.15	0.11	0.2	0.1	44
25	0.5±0.15	0.14	0.25	0.1	51
31	1.0±0.15	0.14	0.3	0.15	63
40	1.0±0.15	0.14	0.4	0.2	76.5
50	1.0±0.15	0.15	0.4	0.2	93

Electrical Connection

Maintenance Disassembly

3. Electrical Connections

The connection is to D.C.voltage (observe the voltage stamp on the stator)

For example :

14.105.10.1 = 24V/28W

14.105.10.1 — Stator Description

24V/28W — Coil Voltage/ Power

If no D.C.voltage is available voltage is supplied via transformer and rectifier (Fig. 7). Clutch and brakes should be switched on the D.C.side as this causes short switching on the D.C.side we recommended the use of a Universal spark suppressor to prevent damage to the contacts. All of these clutches and brakes have flying leads.These wires are a multi-strand copper cable with multi-layer insulating.

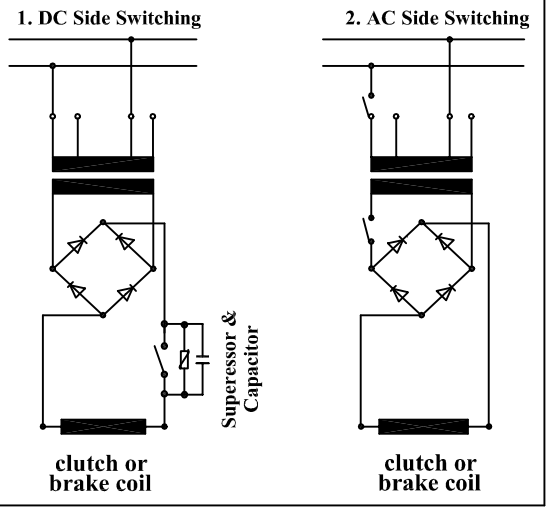
4.Maintenance

The Emco Simplatroll electromagnetic clutches and brakes are maintenance free.Once with applications where a very high friction work has to be carried out airgap must be checked and if necessary adjusted from time to time setting the airgap in case of wear. see under dismantling. The shims mentained in paragraph 2 can be removed or distance bushes can be shortened.

Emco Simplatroll clutches and brakes run-in after a certain time. Therefore, you can ignore a slight scoring of the armature surface, as this is quite normal. Do not reface the friction surfaces!

Note : Under no circumstances allow any lubricant to contaminate the friction surfaces.

Fig.7



5. Disassembly

To dismantle the armature design 1 or 2 for the rotor, the axial location device (fig.8 & 9) (circlip or shaft end disc) has to be removed. Thereafter the rotor or armature flange hub can be withdrawn from the shaft by using the withdrawal tapped holes d (see figures 8 and 9 and table 2). To reset the airgap after drawing the armature off according to size of airgap (fig. 5,6 and table 1) remove shims and later reassemble these between the step and flanged hub.

Fig.8

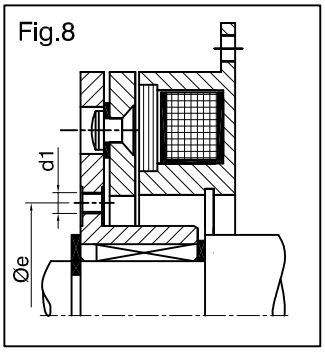


Fig.9

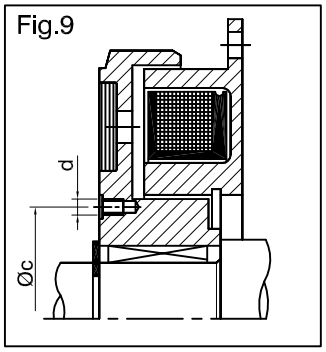


Table 2

Size	06	08	10	12	16	20	25	31	40	50
Ø c	29	36	46	56	73	92	114	145	185	235
d	M4	M4	M4	M4	M5	M6	M8	M10	M10	M10
d1	M4	M4	M4	M4	M5	M6	M8	M8	M10	M10
Ø e	31	37	47	56	73	93	120	145	115	140

All dimension are in mm.

6. Spare Parts

Although Emco Simplatroll clutches and brakes have considerable when you order your spare parts. they must be accurately wear capacity, the time will come after several adjustments described so please use the method shown in the ordering when replacement will be required. clutches must have rotor example below. in conjunction with the drawing and the armature changed together, and brakes replaced entirely. associated table.

Fig.10a

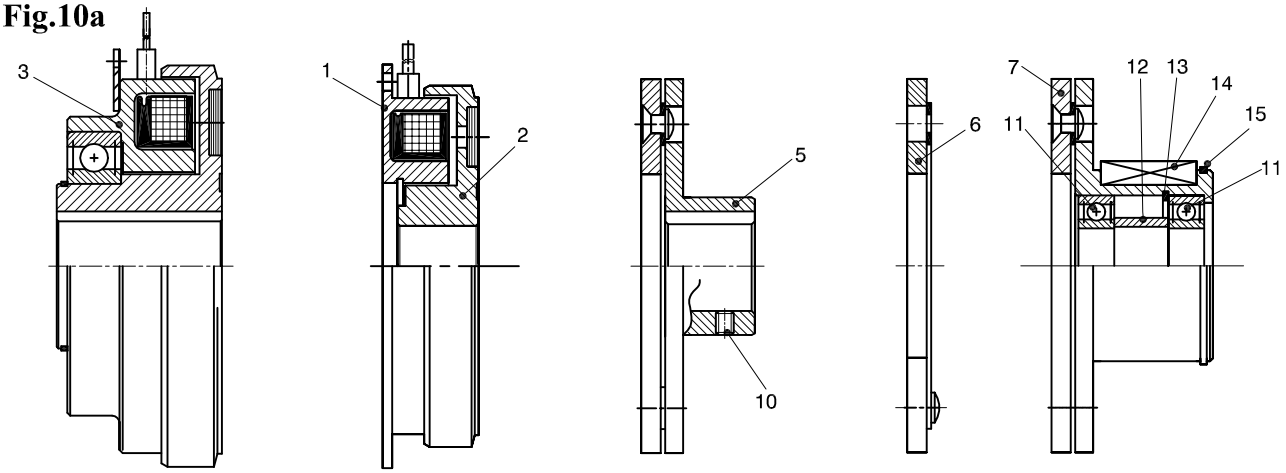
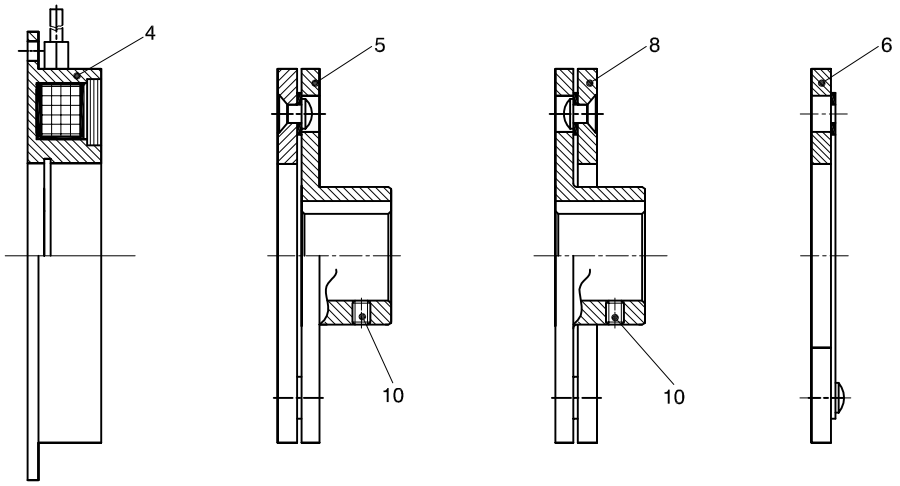


Fig.10b



1. Flanged clutch stator (Design 1)
2. Rotor for flanged clutch (design 1)
3. Bearing mounted clutch stator / rotor assembly
4. Brake stator 14.115/112
5. Armature 1
6. Armatuer 3
7. Armature 5
8. Armature 2
10. Soc. Hd. Set Screw
11. Ball bearing
12. Distance Bush
13. Circlip (Int.)
14. Key
15. Circlip (Ext.)

ordering example
spare part for Emco simplatroll clutch

14.105/102.10. - 24 V / 28 W

Type size Coil Voltage/power

14.115/112. 16.

Type size

When ordering stators the description must be supplemented by adding the coil voltage and coil power (see paragraph 3 electrical connection) with rotor and armature components orders, please also give their bore diameters.