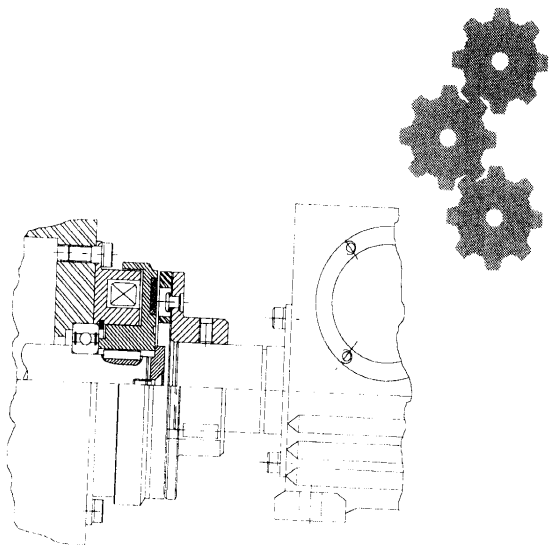



**STEPHENSON
GOBIN**


Stephenson Gobin
Electromagnetic Type 51 Flange Mounted Clutches

- Installation
- Operation
- Maintenance



Installation Section

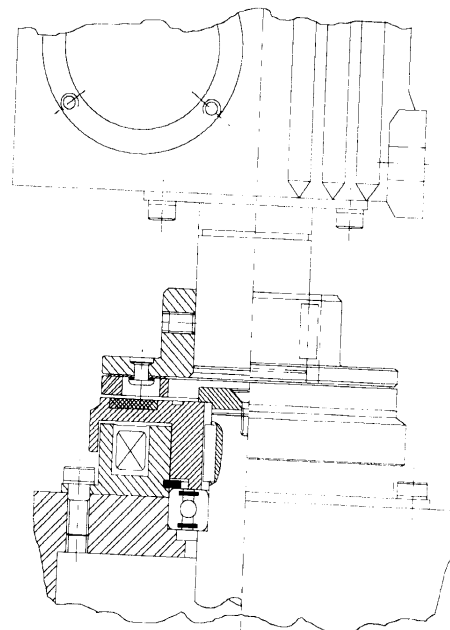
Clutch Type 51 F.M. (Flange Mounted Field).

F.M. clutches are the simplest type comprising a clutch field, rotor, and armature all supplied separately.

- i) The field should be mounted to a stationary surface, perpendicular to the axis of the shaft, using dimensions 'a1' or 'e4' to ensure good concentricity with the shaft. Often a standard series 6000 ball-bearing can be made to protrude from its housing to form a male spigot for dimension 'e4'. A circlip groove is machined in all flange mounted fields to enable the location of such a bearing. Acceptable maximum eccentricity values are as follows : up to and including Size 11 - 0.05mm,
Size 12 and over - 0.10mm
- ii) The rotor should be pushed onto the shaft using a key to B.S.3673 for torsional locking. The axial position of the rotor relative to the field is controlled by dimension 'h1' using a shoulder or circlip and spacers. The rotor should be clamped axially using either a screw in the shaft end or a circlip and spacers.
- iii) **Armature Installation.**
For C.L. Armatures. the customer furnished pulley or sprocket must be counterbored observing dimensions n2, v and k to clear the fastener heads allowing the armature spring to lie flat against the pulley flange. The air-gap 'g' can be set using spacers which may be removed for subsequent wear adjustment. Always use Schnorr type shakeproof washers and a thread locking compound fastening the armature spring assembly to the customer's pulley

For C.C. Armatures (co-axially split shafts). the input and output shaft must be concentric within 0.05mm for sizes up to and including Size 11, and 0.08mm for Size 12 and over. The armature is mounted on the input/output shaft using a key to B.S.3673 for torsional locking and the set-screw provided for axial location and setting of the air-gap 'g'.

For C.E. Armatures. some form of axial clamping using a tapped hole in the shaft end or screw thread machined onto the shaft is strongly recommended. This method is used by us and it forms a satisfactory method of holding all related clutch and brake parts firmly in position. An acceptable method of mounting pulleys, sprockets, or plate-wheels to the C.E. armature is to use the tapped holes 'u6'. This avoids set-screws, keys, or tapered locking elements and enables easy dismantling of the pulley.



Clutch F.M.C.C.

MOUNTING EXAMPLE

Installation Section

Bedding-in (all Clutch/Brake Devices)

The torque of clutches and brakes of the type we manufacture is affected by the average coefficient of friction across the faces of the armature and the clutch/brake, and the clamping pressure at the interface of these parts. This effective pressure is increased if the surfaces are in good intimate contact when engaged.

The degree of intimate contact is controlled to a minimum level during production by grinding the opposing faces in contact. This increases during normal operation where some slip occurs naturally, the amount of slip depends upon the magnitude of the load, speed, and cycle rate thus increasing the torque. We consider bedding-in to be essential and in most cases inevitable. If maximum torque is required immediately after installation then this process can be accelerated by lowering the operating voltage to 40/50% of the nominal value. This induces artificial slip during operation and results in an increase in the degree of contact.

Care must be taken not to slip the device excessively as this will lead to an undesirable thermal overload causing electrical failure. Thermal overload may be avoided by cycling the unit 'on and off', allowing enough time for cooling between the periods of slip.

Excessive Slipping / Inconsistent Operation

Some degree of slip occurs naturally during the operation of electromagnetically operated clutches and brakes. If the unit has been selected correctly then this slip should not be excessive. New units may need bedding-in to obtain immediate optimum torque, see the Installation / Bedding-in Section of this manual. The following are additional points which should be considered when investigating operational problems :-

- i) **Large Air-gaps** : the effective torque of a clutch or brake is affected by the size of the air-gap. A large air-gap reduces the clamping force between the interfaces of the clutch or brake surfaces thus reducing the torque. Excessive air-gaps can also result in inconsistent or intermittent operation. This occurs when the magnetic field no longer has the strength to pull the armature plate across the air-gap against the action of the return spring. The optimum air-gap value 'g' is given in the 'Dimensional Information Section' of this manual.

- ii) **Low Supply Voltage** : for optimum performance we recommend that the supply voltage to any clutch or brake field is maintained at the device's nominal voltage within the range +5% to -10%. This voltage for d.c. devices must also be full-wave rectified if derived from an a.c. supply, smoothing also improves performance. Any reduction in this supply voltage will affect the magnetic field strength and may cause performance related problems.

iii) **Electrical Problems** :

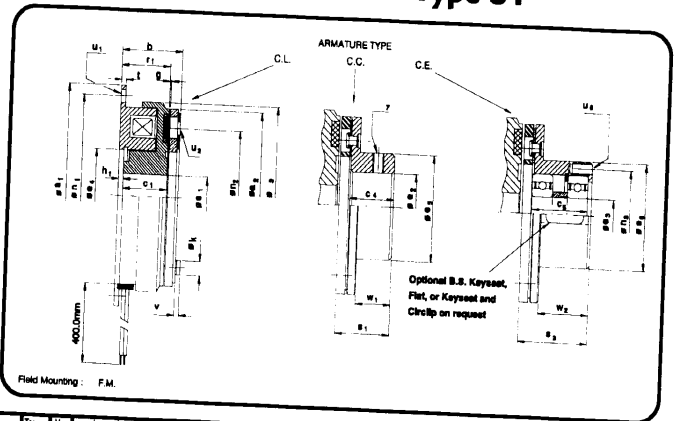
- (a) Open Circuit: Unit fails to operate at all, return for repair/replacement
(b) Short Circuit: Unit continually 'blows' fuses, return for repair/replacement
(c) Partial Short Circuit: Unit has a lower than expected resistance compared to rated wattage & voltage, return for repair/replacement.

- iv) **Contamination** : this product is designed to be used in DRY running conditions, therefore the presence of water or oil and grease can seriously reduce torque. In applications where such contaminants are present particular care must be taken to prevent these from reaching the friction surfaces, this may be achieved by providing adequate sealing and shielding.

Light contamination of the friction surfaces may be removed by lightly wiping the surfaces with a commercial degreasing fluid. Heavy contamination can never be removed successfully as any contaminant below the surface will inevitably be dissipated throughout the material resulting in a further failure. These units should be replaced or returned for refurbishment.

- v) **Excessive Wear** : some degree of wear is unavoidable because of natural slip but the presence of abrasive materials or foreign bodies in the atmosphere can accelerate this process. Accelerated wear results in need for frequent air-gap resetting operations and the premature failure of the unit.

High operating temperatures and excessive heat build-up can also result in rapid wear, therefore good natural or forced ventilation may be required in some applications, particularly where rapid cycling or large inertia loads are cycled.

Dimensional Information**FM CLUTCH Type 51**

Size	Power W	Max T _q Nm	A ₁	A ₂	A ₃	b	c ₁	c ₂	c ₃	Max Shaft Dia mm	Shaft Dia mm	Shaft Dia mm	g	h ₁	k	n ₁	n ₂	r ₁	A ₁	A ₂	t	U ₁	U ₂	U ₃	U ₄	V	W ₁	W ₂				
00	0.30	8	38	28.8	28	18.5	12.5	7	-	6.5	6.5	-	11	10	-	0.1	0.5	5	33.3	19.5	-	15.5	8.7	-	1.5	3.2	2x2.8	-	M3	1	4.5	-
01	0.80	8	38	30	31	18.5	13.6	10	-	6.5	6.5	-	11.5	12	-	0.1	0.5	5	33.3	19.5	-	15.5	12.8	-	1.5	3.2	2x2.8	-	M3	1	8	-
02	0.75	8	45	32	34	25	20.2	10	-	6.5	6.5	-	13	12	-	0.1	2	5	38	23	-	22.2	12.8	-	2	3.5	3x2.8	-	M3	1.5	8	-
03	1.30	8	54	40	43	28.5	23.4	12	-	10	10	-	19	17	-	0.15	2.2	6.1	47	30	-	25.8	15.3	-	2	3.5	3x3.1	-	M3	1.5	9.5	-
04	1.80	8	62	42	44	28.5	19	12	-	10	10	-	19	17	-	0.15	2.2	6.1	54	29	-	25.4	15.3	-	2	5	2x3.1	-	M3	1.5	9.5	-
05	3	10	65	50	54	31.8	25.1	12	12	15	16	7	26	24	30	0.2	2	6.1	58	38	24	25.1	15.5	18	2	3.5	3x3.1	3x3.1	M4	1.5	11.5	12
06	8	16	80	63	66.5	28	22	15	20	17	17	12	35	27	38	0.2	2	6.1	72	46	33	24	19	27	2	4.5	3x3.1	3x3.1	M4	1.5	11.5	20
07	8	16	89	63	68	36	22.5	15	20	15	17	12	27	27	38	0.2	2.5	8	80	80	37	28.5	24.7	34	2.5	5.5	3x4.1	3x4.1	M5	2	15	25
08	16	18	100	80	85	31	24	20	23.5	22	20	15	42	32	45	0.2	2.5	8	80	80	37	28.5	24.7	34	2.5	5.5	3x4.1	3x4.1	M5	2	15	25
10	32	31	125	100	107	36	27	25	32	30	30	20	52	42	55	0.2	3	9	112	78	47	30	30	41	3	6.5	3x5.1	4x4.1	M6	2	19	30
11	32	38	143	105	107	42	33	25	32	25	30	20	47.8	42	55	0.2	4.7	9	127	78	47	38	30	41	3	7.5	3x5.1	4x4.1	M6	2	19	30
12	60	38	150	125	133	41	30	30	42	40	35	25	62	49	84	0.3	3.5	10	137	95	52	33.5	37.2	53.5	5.5	5.5	3x6.1	4x4.1	M6	2.5	24	40
16	120	48	190	160	170	47	38	36	54	60	40	30	80	65	75	0.3	3.5	13	175	120	62	37.5	48	65	4	8	3x8.2	4x4.1	M8	3	30	50
20	240	68	230	200	213	54	40	48	67	66	80	40	100	82	90	0.5	4	16	215	158	75	44	59	80.8	5	8	3x10.2	4x4.1	M8	11	39	60

Keyways to B.S. 4235

Circlip Grooves to B.S. 3673

Insulation Class B

TYPICAL IDENTIFICATION CODE

PRODUCT TYPE 51 - 1224 - U001 - 24V - 32W - 1295

DESIGN NUMBER DATE CODE (WEEK & YEAR)

PRODUCER SIZE, ARMATURE TYPE, FINISH NOMINAL WATTAGE VOLTAGE

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Maintenance Section**General**

Stephenson Gobin Clutches and Brakes are robustly designed and are virtually maintenance free. However, in cases where they are used to control relatively large inertia loads or high switching frequencies are employed, they may periodically require the air-gap checking and adjusting. Where necessary, these air-gaps should be reset in accordance with the dimension 'g' in the dimensional information section of this manual. The period between adjustment is governed by the application and will differ depending upon your specific requirements.

Air-gap Resetting : ALWAYS remove all electrical supplies from machinery BEFORE attempting any adjustment.

Clutch Type 51 : styles F.M., S.B., and B.B. can be adjusted by the removal of the correct number of shims between clutch rotor and armature hub.

Split shaft arrangements using C.C. style armature assemblies may only require the locking screw in the hub boss loosening and the hub sliding along the shaft until the required dimension is obtained

Other Armature styles are adjusted as follows :

- With the clutch coil de-energised measure the air-gap, in three places, between the clutch face and armature plate using feeler gauges.
- If the air-gap exceeds the dimension 'g' by more than 0.20mm then some adjustment may be necessary.
- Remove the armature assembly from the shaft and measure/remove the required number of shims to obtain the given dimension.
- Examine the clutch rotor face and armature face for evidence of oil/grease, if the surfaces are contaminated consult the "Operating Problems - Contamination" section of this manual.
- If the surfaces appear acceptable then re-fit the armature assembly and re-check the air-gap.
- Operate the unit and check it is functioning correctly.