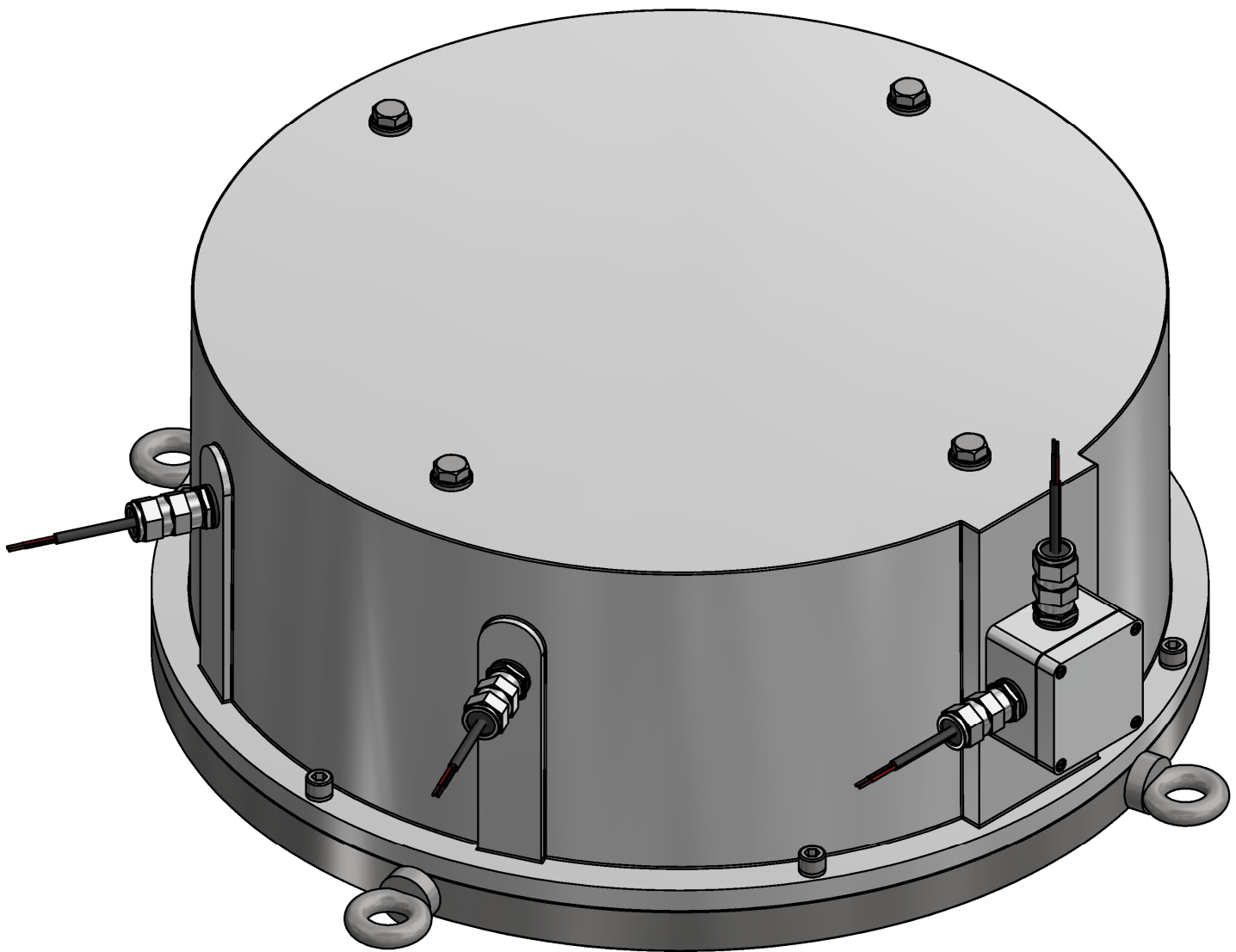




Emco Dynatorq Pvt. Ltd.

Operating Instructions Servicing Instructions Manual



**EMCO – Simplatroll Spring Applied Fail Safe Brake Weather Proof
Enclosure Type WP.458. []**

(Rev.00 / 01.03.16)

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1 Preface and general information

1.1 How to use these operating instructions

- These operating instructions are intended for safety-relevant operations on and with the spring-applied brake with electromagnetic release. They contain safety instructions which must be observed.
- All personnel working on and with the spring-applied brake with electromagnetic release must have the Operating instructions available and observe the information and notes relevant for them.
- The operating instructions must always be complete and perfectly readable.

1.1.1 Terminology used

Brake

For “spring –applied brake with electromagnetic release” the term “Spring-applied Brake” will be used in the following text.

Drive system

For drive systems with spring-applied brake with electromagnetic release and other drive components the term “drive system” will be used in following text.

1.2 Scope of delivery

- The drive system are combined individually according to a modular design. The scope of delivery can be obtained form the relevant papers.
- After receipt of the delivery, check immediately whether it corresponds to the accompanying papers. Emco Dynatorq dose not grant any warranty for subsequent claims. Claim for any
 - Visible transport damage immediately to the forwarder.
 - Visible deficiencies/incompleteness immediately to the responsible Emco-Dynatorq engineer/agency.

1.3 Emco Dynatorq DC spring applied fail safe brake

1.3.1 Manufacturer

Regd. & Marketing office:

EMCO DYNATORQ PVT. LTD.
1ST Floor, Sita Mauli,
above Bank of Maharashtra
Panch Pakhadi, Thane (W)-400 602
Phone: 022 - 25405490 / 25452244
Fax: 022-25452233
E-mail: mktg@emco-dynatorq.in
Website: www.emco-dynatorq.in

UNIT – I

Shivam Industrial Estate, Bldg. No. 3,
Gala No. 12A & 12B Tungareshwar Phata Rd
Sativali, Vasai (E), Thane – 401208
Phone : (0) 250 - 2480489 / 2480490
Fax: (0) 250 – 2481086
E-mail : vasai@emco-dynatorq.in

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1002 – 1003, GIDC Estate, Waghodia,
Dist. Baroda – 391760, Gujarat
Phone : (0) 2668 – 262186 / 263089 / 26218
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E-mail: dynatorq@gmail.com

UNIT – III

Gala No. 6A & 8,
Kedarnath Bldg. Tungareshwar Indi. Estate,
Sativali, Vasai (E)
Phone : (0) 250 – 2480178 / 2480921

UNIT – IV

Plot No. 1426,
GIDC Estate, Waghodia,
Dist. Baroda – 391760, Gujarat
Phone : (0) 2668 – 290761

1.3.2 Packaging Sticker

1. Manufacturer 2. Name of the item 3. Name of customer 4. Type(see type code) 5. Brake Size 6. Rated voltage 7. Bore of Hub 8. Serial number	1. Manufacturer: EMCO DYNATORQ PVT. LTD. 2. Name of the item: D.C. ELECTROMAGNETIC BRAKE 3. Name of customer: NAME OF CUSTOMER 4. Type: WP.458 5. Brake Size: SIZE 6. Rated voltage: VDC. 7. Bore of Hub: HUB MM 8. Serial number: SR. NO. HANDLE WITH CARE
--	--

Fig.1: Packaging sticker

1.3.3 Nameplate

1. Brand Name 2. Product Description 3. IP Code 4. Rated voltage 5. Bore Hub 6. Serial Number 7. Power	1. Brand Name: EMCO DYNATORQ PVT. LTD. 2. Product Description: FAIL SAFE BRAKE WITH WEATHER PROOF ENCLOSURE 3. IP Code: IP TYPE :- WP.458. 4. Rated voltage: VOLTAGE 5. Bore Hub: HUB BORE 6. Serial Number: SR. No. 7. Power: WATTS Tel :- 022-2545 2244 E-mail : mktg@emco-dynatorq.in
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Fig.2: Nameplate

1.3.4 Type code (for complete brake assembly only)

1. Type:WP.458 2. Size: 06/08/10/12/14/16/18/20/25/31/40/50 3. Rated voltage 4. Bore of hub	WP.458.XX.190V.15
--	--------------------------

Fig.3: Type code

1.3.5 Application as directed

- Emco- Dynatorq Spring Applied Fail Safe Brake
 - Are intended for use in machinery and system.
 - Must only be used for the purpose ordered and confirmed.
 - Must only be operated under the ambient conditions prescribed in these Operating instructions.
 - Must not be operated beyond their corresponding power limit.

Any other use shall be demand inappropriate!

1.3.6 Legal regulations

Liability

- The information , data and notes in these operating instructions met the state of the art at the time of printing, claims referring to drive systems which have already been supplied cannot be derived from the information, illustrations and descriptions.
- We do not accept any liability for damage or operating interference caused by:
 - inappropriate use
 - unauthorized modifications to the drive system
 - improper working on and with drive system
 - operating faults
 - disregarding these Operating instructions

Warranty

- Conditions of warranty: see General terms & conditions of sale of Emco Dynatorq Pvt.Ltd
- Warranty claims must be made immediately after detecting defects or faults.
- The warranty is void where liability claims cannot also be made.

2 Safety information

2.1 Personnel responsible for safety

Operator

- An operator is any natural or legal person who uses the drive system or on behalf of whom the drive system is used.
- The operator or his safety officer must ensure
 - that all relevant regulations, instructions and legislation are observed.
 - that only qualified personnel work with and on the drive system.
 - that the personnel have the operating instructions available for corresponding operations.
 - that non-qualified personnel are prohibited from working with and on the drive system.

Skilled personnel

Skilled personnel are persons who- because of their education, experience, instructions, and knowledge about corresponding standards and regulations, rules for the prevention of accidents and operating conditions are authorized by the person responsible for the safety of the plant to perform the required actions and who are able to recognize potential hazards.

2.2 General safety information

- This safety information is not claimed to be complete. In case of questions and problems please contact our Emco Dynatorq representative.
- At the time of delivery the spring-applied brake meets the state of the art and ensures basically safe operation.
- The spring-applied brakes is a source of danger for persons, for the spring – applied brakes itself, and for other material assets of the operator, if
 - Unqualified personnel work with and on the spring –applied brakes.
 - The spring-applied brakes are used inappropriately.
- The spring-applied brakes must be designed such that they perform their functions after proper installation and with application as directed in fault free operation and that they do not cause hazards for persons. This also applies for their interaction with the complete system.
- Operate the spring-applied brake only when it is in a proper state.
- Retro fittings, modifications; or redesigns of the springs –applied brake are basically prohibited. Emco Dynatorq must be contacted in all cases.
- Protect the mounting flange, friction surfaces and armature against dirt. They must be kept free from oil and grease at all cases. Even small dirt particles can considerably reduce the brake torque

Application conditions of the spring-applied brake WP.458

- Not suitable to explosive or aggressive environment.
- Humidity, no restriction.
- Ambient temperature :5°C to +55°C
- With high humidity and low temperature:
 - Take measures against freezing of armature plate and rotor.
 - Cooling –air flow must not be obstructed/Free cooling-air flow.
- Protect the electrical connections against short circuit.

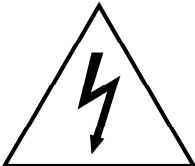
2.3 Layout of the safety information

- All safety information in these operating instructions has a uniform layout;

	Signal word Notes
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- The icon designates the kind of danger.
- The signal word designates the severity of the danger.
- The notes describe the danger and suggest how to avoid the danger.

Warning of personal injury

Icon used		Signal words	
	Warning of Hazardous electrical voltage. Warning of a general danger	Danger!	Warns of impending danger. Consequences if disregarded: Death or very severe injuries.
		Warning!	Warns of a potential, very hazardous situation. Consequences if disregarded: Death or very severe injuries.
	Warning of a general danger	Caution!	Warns of a potential material damage. Consequences if disregarded: Light or minor injuries.

Warning of material damage

Icons used	Signal words	
	Stop!	Warns of potential material damage. Consequences if disregarded: Damage of the drive system/device or its environment.

Other information

Icons used	Signal words	
	Note!	Designates a general, useful note. If you observed it, handling of the drive system/device is made easier.

3.1 Product Description

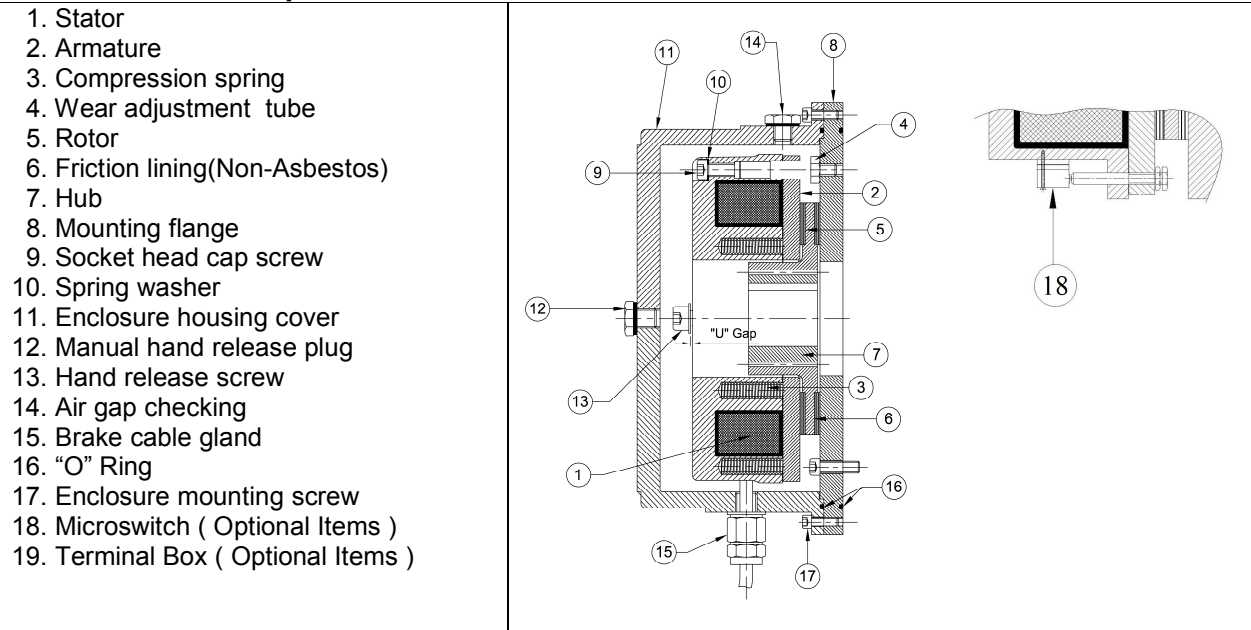


Figure 4: Design of a Spring Applied Brake Type: WP.458 (without Hand Release)

3.1.1 General

The spring applied brake type WP.458 is a single disc brake with two friction surfaces. Several springs generate the brake torque by friction. The brake is released Electromagnetically.

The spring applied brake Type WP.458 is designed for conversion of mechanical work and kinetic energy into heat. By means of the static brake torque it is possible to hold loads without a speed difference. Emergency braking at high speeds is possible; however it results in increased wear.

3.1.2 Braking

During braking, the rotor which is axially movable on the hub, is pressed against the friction Surface-via the armature plate- by means of inner and outer springs. The friction linings ensure a high brake torque. The brake torque is transmitted between hub and rotor via splines.

3.1.3 Releasing

When the brake is applied, there is an air gap between stator and armature plate. For releasing the brake, a DC voltage is applied to the stator coil. The Magnetic force generated attracts the armature towards the stator against the spring force. The rotor is then released and can rotate freely.

3.1.4 Brake Torque Reduction

By reducing the spring force brake torque can be reduced by unscrewing the torque adjusting ring in anti-clockwise direction.

3.1.5 Option: Micro Switch

The manufacturer offers the micro switch for air gap and wears monitoring. The users must provide the corresponding electrical connection. Circuit diagram can be made available on request.

With air gap monitoring, the motor does not start before the brake has been released.

With this Set-up all possible faults are monitored. For Example, in the event of defective rectifiers, interrupted connection cables, defective coil, or excessive air gaps the motor will not start.

While checking the wear, no current will be applied to the brake and motor if the air gap is too large.

3. Technical Data

3.2 Rated Data

Type	Rated Brake torque	Air Gap-'a' (mm)		Excess end Torque Adjustment ring	Torque Reduction/step	Release Gap-U (MM)
		Rated+/- 0.05mm	Max			
WP.458.06	4	0.2	0.5	6	0.1	1
WP.458.08	8	0.2	0.5	6.5	0.2	1
WP.458.10	16	0.2	0.5	8.5	0.6	1
WP.458.12	32	0.3	0.7	10	1.2	1
WP.458.14	60	0.3	0.7	11.5	1.6	1
WP.458.16	100	0.3	0.7	11.5	2.1	1.5
WP.458.18	150	0.4	1.0	13	1.4	1.5
WP.458.20	260	0.4	1.0	15	2.0	1.5
WP.458.25	400	0.5	1.2	17	5	2
WP.458.31	600/800	0.5	1.2	17	5	2
WP.458.40	1200/1600	0.5	1.2	-----	-----	2
WP.458.50	2500	0.8	2	-----	-----	2

Type	Dimensions (mm)			Tapped Holes	Screws for flange fixing	Screw Tightening torque
	Rotor Thickness		Mounting PCD	X Nos.	X nos.	Nm
	Rated	Min				
WP.458.06	6	4.5	72	M4 x 3	M4 x 3	3.0
WP.458.08	7	5.5	90	M5 x 3	M5 x 3	5.9
WP.458.10	9	6.0	112	M6 x 3	M6 x 3	10.1
WP.458.12	10	7.0	132	M6 x 3	M6 x 3	10.1
WP.458.14	10	7.0	145	M8 x 3	M8 x 3	24.6
WP.458.16	11.5	8.5	170	M8 x 3	M8 x 3	24.6
WP.458.18	13	9.5	196	M8 x 6	M8 x 4	24.6
WP.458.20	16	10.5	230	M10 x 6	M10 x 6	48
WP.458.25	20	14.0	278	M10 x 6	M10 x 6	48
WP.458.31	20	14.0	278	M10 x 6	M10 x 6	48
WP.458.40	22	14.0	325	M10 x 6	M10 x 6	48
WP.458.50	30	22.0	480	M16 x 6	M16 x 6	190

Note: Screw length depends on material and thickness of the customer's mounting surface.

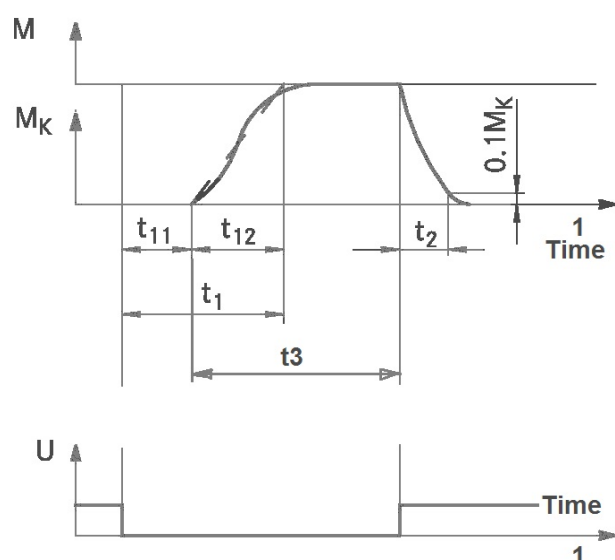
3. Technical Data

Type & Brake Size	Power Watts	DC Voltage	Coil Resistance (Ω)		Rated torque Nm
			Min	Max	
WP.458.06	20	24	27.5	30.5	4
		96	430.8	491	
		103	491	570	
		110	569	647	
		190	1660	1950	
		205	1933	2270	
		220	2224	2610	
WP.458.08	25	24	22	24.5	8
		96	346.5	391	
		103	399	450	
		110	456	513	
		190	1336	1552	
		205	1555	1807	
		220	1782	2091	
WP.458.10	30	24	18.24	20.1	16
		96	281	313	
		105	313	350	
		110	381.1	425.5	
		190	1125	1282	
		205	1191	1358	
		220	1413	1610	
WP.458.12	40	24	13.8	15	32
		96	218.8	242.5	
		103	250.6	279.8	
		110	287.5	319	
		190	848.4	956.7	
		205	987.6	1114	
		220	1138	1284	
WP.458.14	50	24	11	12	60
		96	175.1	193.5	
		103	190.2	210.2	
		110	230.18	256.82	
		190	682.3	761.7	
		205	749.3	836.5	
		220	921	1017	
WP.458.16	76	24	7.29	7.9	100
		96	116	126	
		103	134	145	
		110	152	166	
		190	456	494	
		205	530	575	
		220	611.5	662.5	
WP.458.18	85	24	6.4	7.1	150
		96	103.5	113.5	
		103	120	130	
		110	133.94	151	
		190	403.5	446	
		205	469.7	519.1	
		220	540.5	598	
WP.458.20	100	24	5.5	6.02	260
		96	88.0	96.5	
		103	101.8	110.2	
		110	112	131	
		190	342.5	379.5	
		205	399	441	
		220	459.5	508.5	
WP.458.25	110	24	5.0	5.5	400
		96	80.0	87.6	
		103	91.5	101.3	
		110	105	115	
		190	311.8	341.6	
		205	366.7	397.2	
		220	413.6	466.4	
WP.458.31	140	24	3.95	4.28	600
		96	63.1	68.4	
		103	72.8	78.8	
		110	83.04	90	
		190	235.65	269.47	
		205	288	312	
		220	332	360	

3. Technical Data

Type & Brake Size	Power Watts	DC Voltage	Coil Resistance (Ω)		Rated torque Nm
			Min	Max	
WP.458.31	180	24	3.07	3.32	800
		96	49.1	53.2	
		103	56.6	61.4	
		110	64.6	70	
		190	192	208	
		205	223.6	242.3	
		220	258.2	279.8	
WP.458.40	340	96	26	28.18	1200 / 1600
		103	30	32.2	
		110	34.17	37.02	
		190	99.83	112.57	
		205	121	131	
		220	136.6	148	
WP.458.50	440	96	20.1	21.84	2500
		103	23.14	25.07	
		110	25.8	28.2	
		190	77.94	86.15	
		205	91.7	99.3	
		220	105.6	114.4	

3.3 Operating Times



- t1** Engagement time
- t2** Disengagement time
- t11** Delay time
- t12** Rise time of brake torque
- t3** Slipping time

Brake size	t11 ms	t12 ms	t1 ms	t2 ms
WP.458.06	7	10	17	35
WP.458.08	10	25	35	65
WP.458.10	10	30	40	90
WP.458.12	10	40	50	120
WP.458.14	15	50	65	150
WP.458.16	20	70	90	180
WP.458.18	30	80	110	300
WP.458.20	50	150	200	400
WP.458.25	70	200	270	500
WP.458.31	73	207	280	650
WP.458.40	82	243	325	780
WP.458.50	90	300	390	980

The engagement times are valid for switching on DC side. The table shows the delay during engagement **t11**, the rise time of brake torque **t12** and the engagement time **t1=t11 + t12**. Disengagement time is not influenced by DC or AC side switching. However it can be reduced by suitable excitation or over excitation.

Disengagement time

The disengagement time is not influenced by DC or AC switching operations. It can only be shortened by special equipment for fast-response excitation or over-excitation.

Engagement time

The engagement time **t1** is apply to DC switching with rated air gap work approximately 8 to 10 times longer for AC switching coil and standard rated torque.

AC side switching

- Low-noise switching of the brake
- No protective measures required for switching contact.
- Slow application of the brake.

DC side switching

- Noisy switching
- Burn-up protection for switching contact required (e.g. varistor, free-wheeling diode)
- Fast application of the brake.

Note: Engagement time is the time when armature is fully released from the brake stator after voltage is withdrawn. Disengagement time is the time when brake is released after voltage is applied to the coil

3.4 Torque v/s Speed data

Torque v/s Speed				
Brake Size	Rated torque (Nm)	Reduction of rated torque at specified speed to x% --- max. speed		
		at 1500 rpm	at 3000 rpm	Max.
WP.458.06	4	85 %	80 %	70 %
WP.458.08	8	85 %	78 %	72 %
WP.458.10	16	82 %	78 %	70 %
WP.458.12	32	82 %	78 %	70 %
WP.458.14	60	81 %	73 %	70 %
WP.458.16	100	80 %	72 %	69 %
WP.458.18	150	78 %	70 %	69 %
WP.458.20	260	76 %	68 %	66 %
WP.458.25	400	72 %	68 %	66 %
WP.458.31	600 / 800	69 %	67 %	66 %
WP.458.40	1200 / 1600	66 %	64 %	64 %
WP.458.50	2500	64 %	61 %	60 %

Liner wear increases proportional to speed & liner powder will be observed falling.

3.6 Emission

Heat

Since the brake converts kinetic energy as well as mechanical and electrical energy into heat, the surface temperature varies considerably, depending on the operating conditions and the possible heat dissipation. Under unfavorable conditions, the surface temperature can reach 130°C.

Noises

The switching noises during engagement and disengagement depend on the air gap and the brake size.

Depending on the natural oscillation after installation, operating conditions and state of the friction faces, the brake may squeak during braking.

Others

The abrasion of the friction parts produces dust. With large loads, the friction face heats up so strongly, that odors may occur.

4.1 Preparation

1. Unpack spring- applied brake.
2. Check if delivery arrived as ordered.
3. Check name plate data, especially rated voltage.
4. Remove the mounting flange by unscrewing the mounting screws

4.2 Assembly

4.2.1 Assembly of mounting flange on to Motor End Shield.



Stop !

Check the motor end shield. It must be free from Grease and Oil

- 4 Mounting flange
- 9 'O' Ring
- 10 End Shield

*** Face run-out of motor end shield w.r.t. shaft should not be more than 0.08mm**

Flange mounting bolt not in our scope

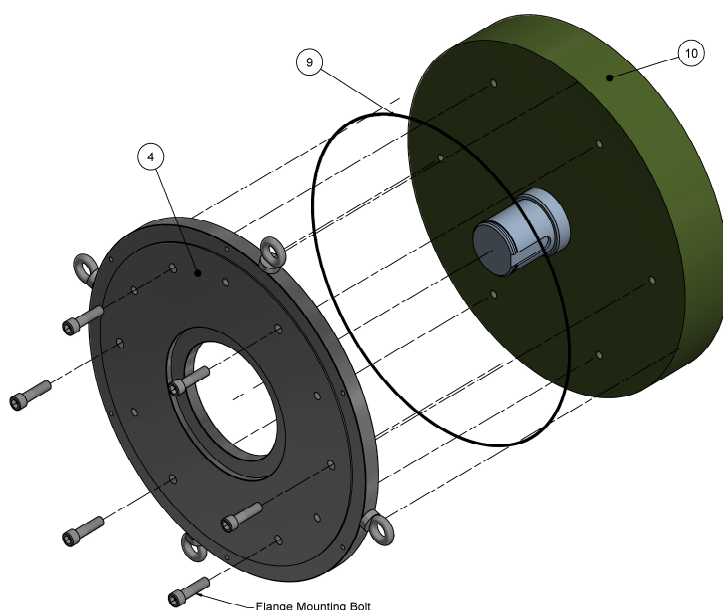


Figure 5: Assembly of mounting flange.

1. The flange should be screwed on to the shield with the inner or outer pitch Circle (for dimensions see rated data table 3.2).

**** If flange is spigot mounted on motor end shield one should ensure that it is seated perfectly butting with motor end shield.**

2. Hold the flange to the end shield and check the pitch circle and the threads of the fastening holes.
3. Push the spring lock washers onto the screws and screw the flange onto the end shield.
4. Tighten the screws evenly.
5. Check the height of the screw heads. On the outer pitch circle the screw heads must not be higher than the minimum rotor thickness.(for dimensions refer rated data table, chapter 3.2)

4.2.2 Mounting the Hub onto Motor Shaft.

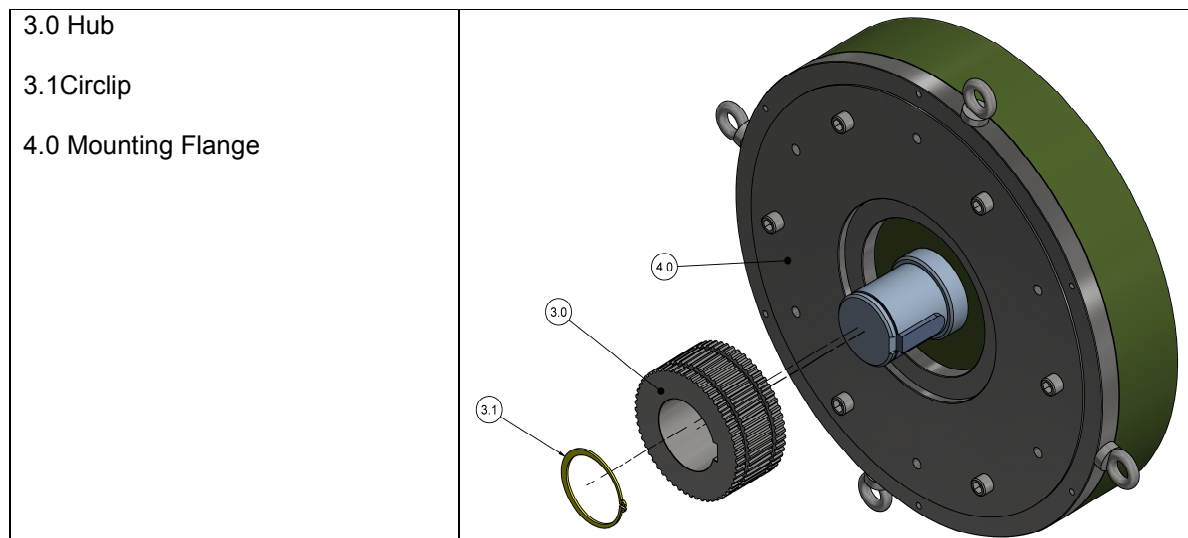


Fig 6: Mounting of Hub

1. Press the hub on the shaft & key. Ensure that hub should not be insert on shaft by hammering. Also ensure that hub should not be loose on motor shaft.
2. Secure the hub against axial movement, e.g. with a circlip. (3.1)



Stop !

Check the motor end shield/flange. It must be free from Grease and Oil.

4.2.3 Assembly of Rotor

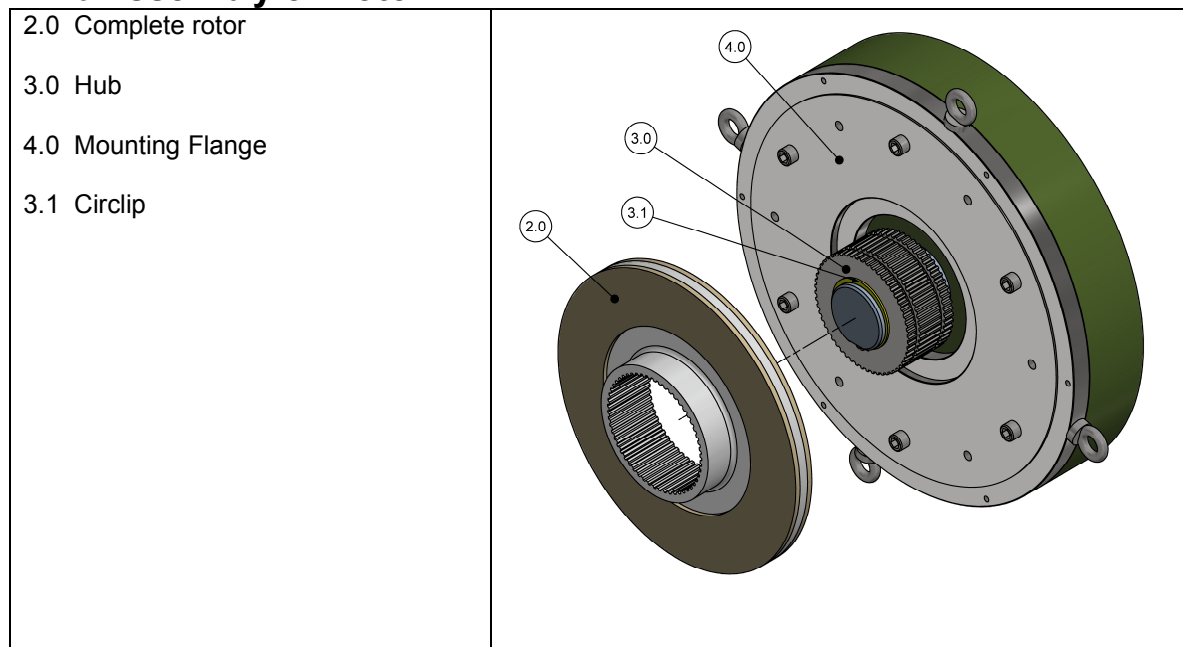


Figure 7: Mounting of Rotor

1. Push the rotor onto the hub and check whether it can be moved to and fro freely by hand.
2. Ensure that rotor is not too tight on hub, it should slide on it.

4.2.4 Assembly of Stator

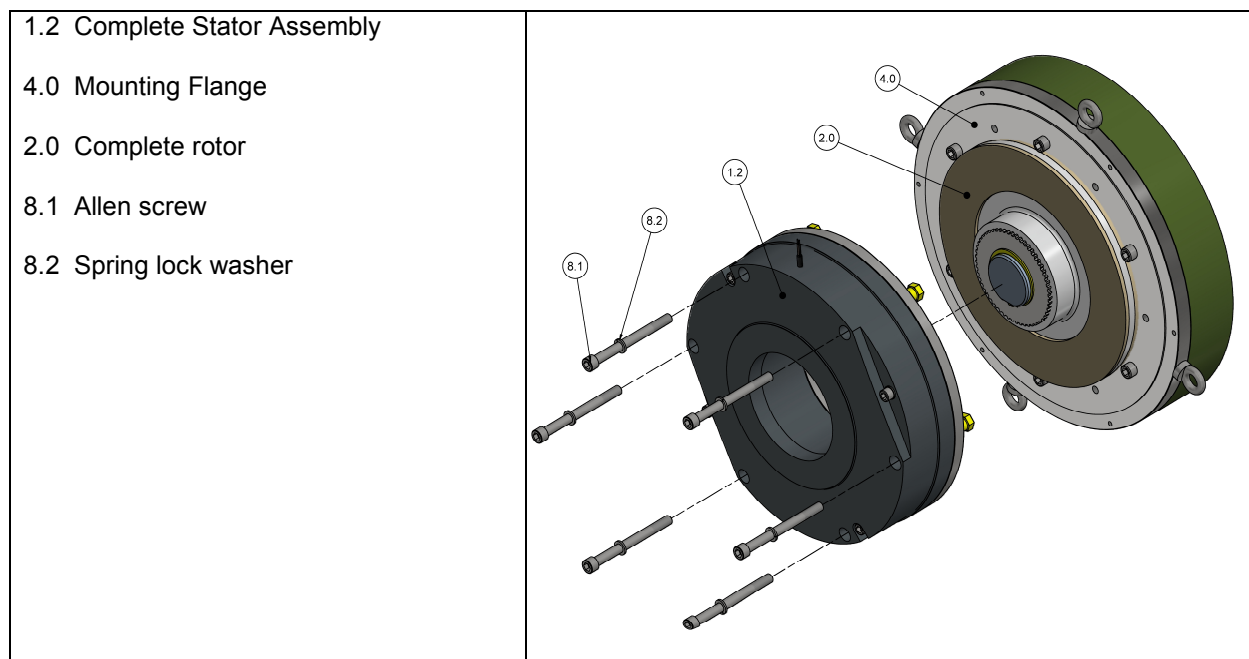


Figure 8: Mounting of Stator

1. Push the spring lock washers (8.2) on the screws and screw (8.1) the complete stator (1.2) onto the flange/end shield.
2. Tighten the screws (8.1) evenly (Refer data 3.2 on page 10 for screw tightening torque)
3. Check the rated air gap near the bolts by means of the feeler gauge (for air gap see rated data table-chapter 3.2)

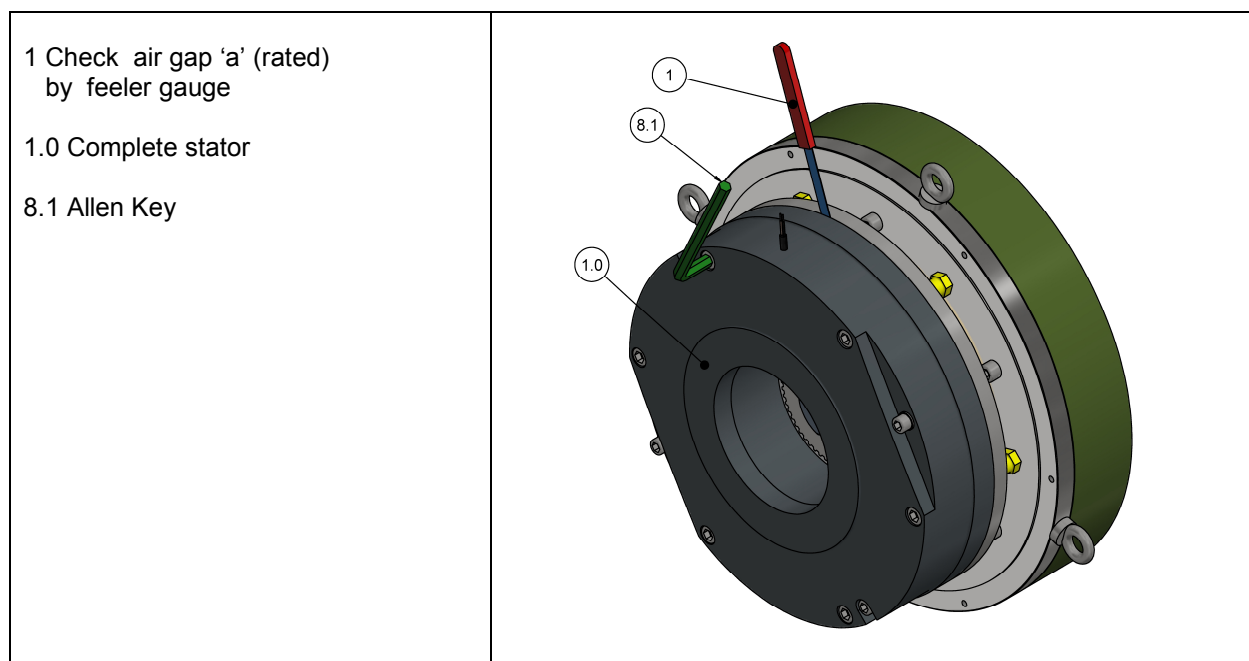


Figure 9: Setting of Air gap.

- 1.0 Complete stator
- 1.6 Adjustment tubes
- 8.1 Socket head cap screw
- 1 Check air gap 'a' (rated) by feeler gauge

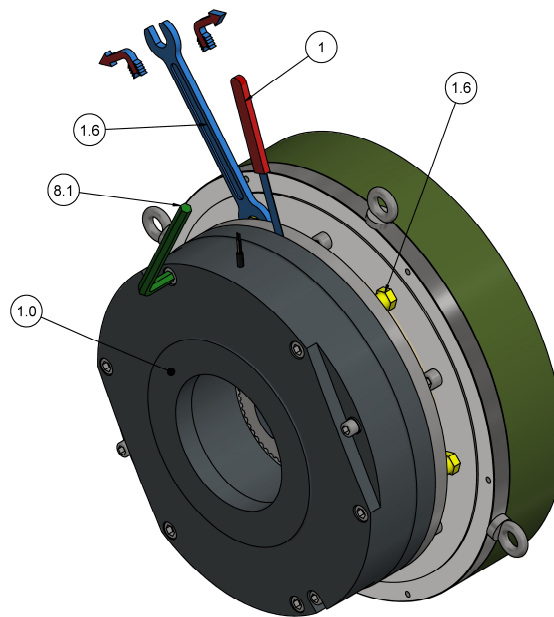
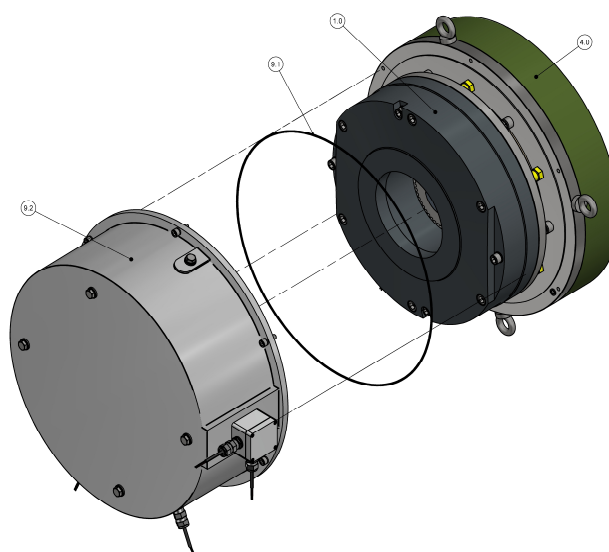


Figure10: Readjustment of Air gap.

Note: If the air gap deviates too much from rated air gap 'a' re-adjust as follows.

1. Loosen the screws. (8.1) with the help of allen key
2. Turn the threaded adjustment tubes by means of a spanner.
 - Screw the adjustment tubes (1.6) into the stator (1.0) (i.e rotate it in clockwise direction)if the air gap is too large.
 - Screw the adjustment tubes (1.6) out of the stator (1.0) (i.e rotate it in anti-clockwise direction) if air gap is too small.
 - The width of the air gap changes by approx 0.15mm when turning the wear adjustment tube by 1/6 revolution.
3. Tighten the screws. (8.1)
4. Check the air gap again and repeat the adjustment if necessary.

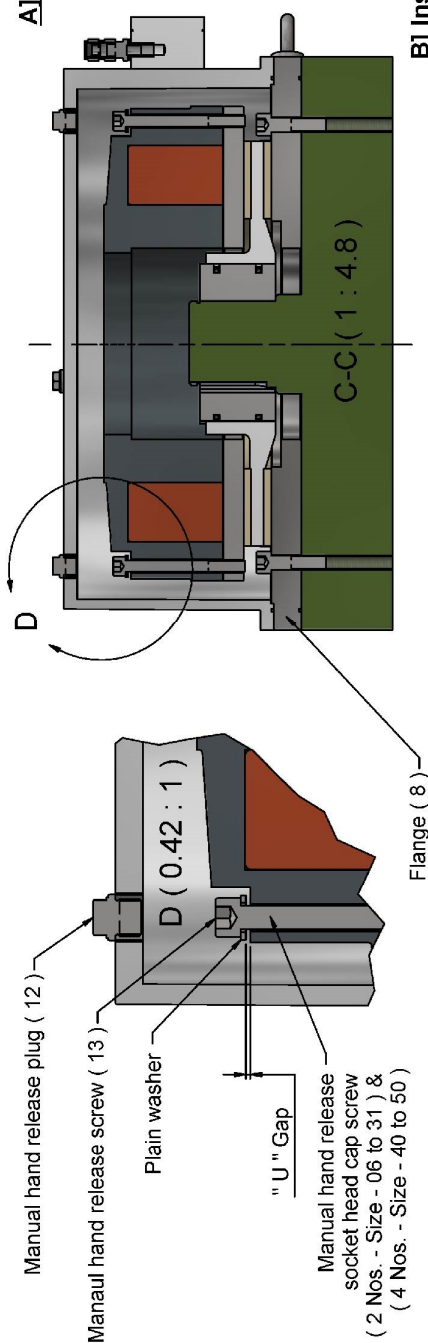
- 1.0 Complete Stator
- 4.0 Mounting Flange
- 9.1 'O' Ring
- 9.2 Enclosure Housing



4.2.5 Assembly of manual release for size – 06 to 50

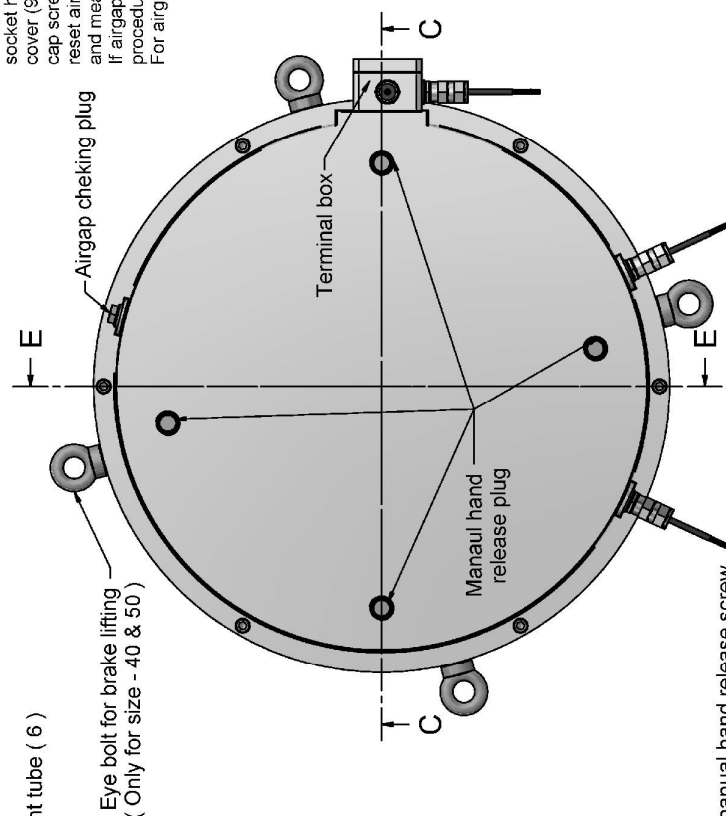
A) Instruction for manual release

In the event of power failure the brake can be released manually. Unscrew the plug for manual hand release plug (12). Tight manual hand release screw (13) with allen key till the brake release.
Before operating the brake unscrew manual hand release allen screw and keep "U" gap clearance between screw and stator approximately as shown in drawing. this will allow the brake to operate till "U" gap wear. Tight plug for manual hand release plug (12) in the normal position to avoid leakage.

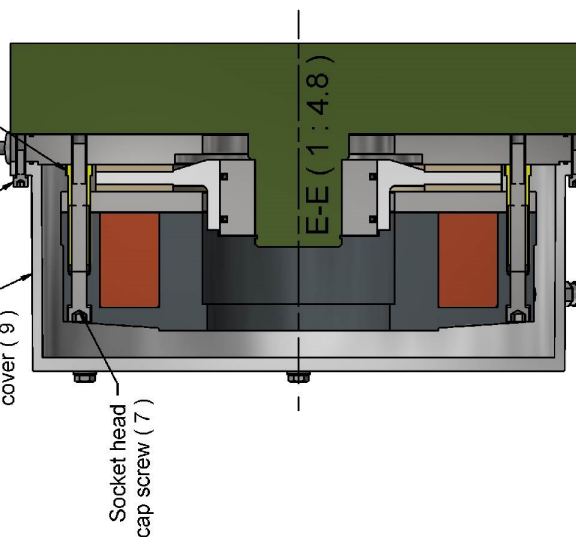


B) Instruction for airgap adjustment

If airgap adjustment is necessary, unscrew the socket head cap screw (10) and remove enclosure cover (9) from the flange (8). Loosen socket head cap screw (7) rotate the adjustment tube (6) to reset airgap "a" (normal) value, retighten screw (7) and measure airgap with feeler gauge at 3 positions. If airgap is not found set to it is rated value repeat the procedure for air gap readjustment. For airgap value refer Table 3.2.



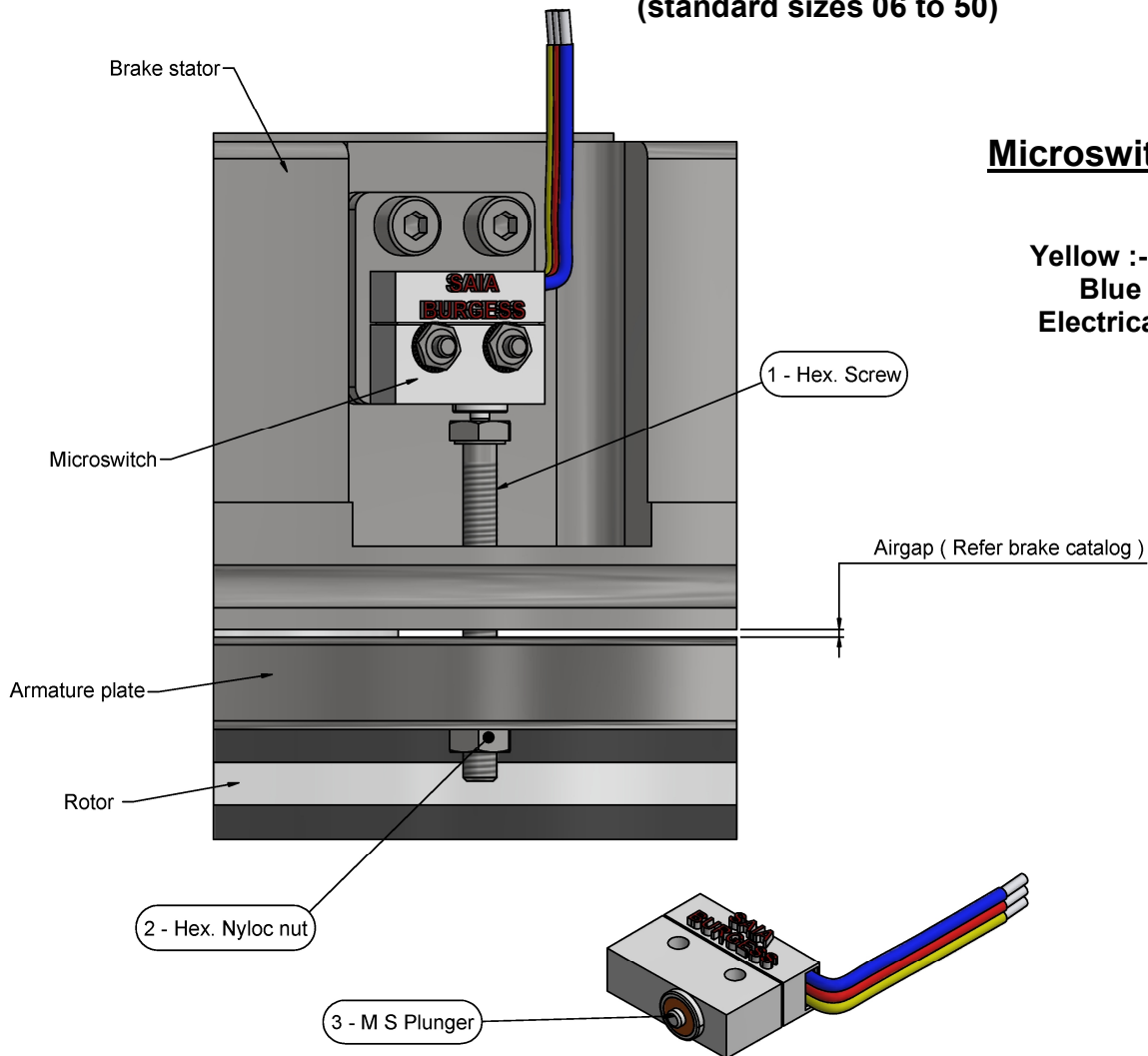
Cover Mounting screw (10)
Enclosure housing cover (9)
Socket head cap screw (7)



Precautions :-

Ensure to check that manual hand release screw lessens maintaining "U" gap after hand releasing the brake before putting it in operation

4.2.6 Work instruction to adjust micro-switch for monitoring brake release (standard sizes 06 to 50)



Microswitch Lead wire detail

Red :- C (Common)
 Yellow :- N.C. (Normally Closed)
 Blue :- N.O. (Normally Open)
 Electrical Rating :- 3A / 250 V AC
 Sealed :- IP 67
 Model No. - V4NSUL
 Make :- Saia-Burgess

To ensure smooth functioning & adjustment of Microswitch below mentioned procedures are to be followed.

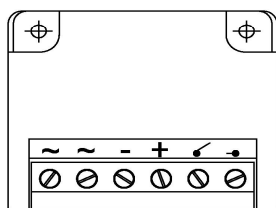
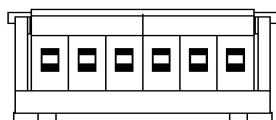
- Rotate hex nyloc nut in anti-clockwise direction to release nut from armature plate.
- Release hex screw (1) from MS plunger (3) by rotating it in clock wise direction.
- Connect micro switch wire red(C) & blue(NO) with the continuity tester/multimeter.
- Release brake by applying DC volt to brake coil.
- Rotate hex screw (1) slowly in anti-clockwise direction till it touches & press MS plunger(3) which changes its state from "NO" to "NC".
- For fine tuning rotate $\frac{1}{4}$ to $\frac{1}{2}$ turn of hex screw (1) in clockwise direction which changes microswitch condition from "NO" to "NC".
- Fix hex screw (1) by tightening nyloc nut (2) so that micro switch setting is fixed & it doesn't get disturbed on brake operations.
- Now remove DC voltage from brake, micro switch should now show "NO" condition .
- Test the brake for few number of "ON-OFF" operation for ensuring micro switch setting doesn't gets disturbed.

4.3 Electrical Connection

**Warning!**

The Electrical connection of the brake must only be carried out when no voltage is applied.

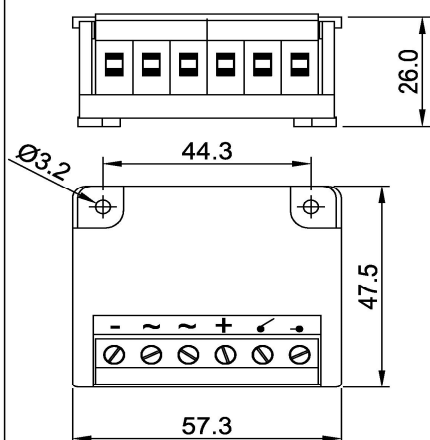
Solid State Rectifier EH 720 Series Mounting Dimension & Connection Diagram

Salient Features :-

- Compact In Size
- Based on German designs.
- Use of High quality components.
- 6 - Terminals as standard for connections.
- Suitable to mount in standard motor terminal box.
- Standard excitation.
- Available in half wave or full wave configuration.
- Suitable for carrying out AC side switching & DC side switching.
- DC side switching protection included.
- Maximum allowable ambient temperature 85 degree C.
- Current rating :- 2 Amps.

- Type EH 720 Series brake rectifier is used to supply DC voltage to DC operated brakes on electric motors, where standard release reaction time of the brake is required.

Solid State Rectifier EH 720 Series Mounting Dimension



EH Series	Full Wave and Half Wave Rectifiers for 50 / 60 Hz VAC Input	
Model	Input	Output
EH 720 AD	208 / 230 VAC	190 / 205 VDC, 2 Amp.
EH 720 BD	115 VAC	103 VDC, 2 Amp.
EH 720 CD	208 / 230 VAC	96 / 103 VDC, 2 Amp.
EH 720 HHD	415 VAC	190 VDC, 2 Amp.
EH 720 HHD - AV	415 / 460 VAC	190 / 205 VDC, 2 Amp. max
EH 720 HHD - AVH	480 VAC	215 VDC, 2 Amp. max

Note :- 103 DC output also suitable for 96 VDC Brakes

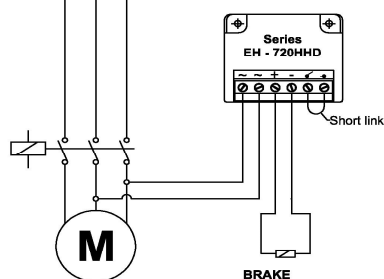
Solid State Rectifier " EH 720 HHD / HHD - AV / HHD - AVH " Connection Diagram

• A.C SWITCHING

3 - Phase
415 / 460 / 480 Volts

L1
L2
L3

**Normal Dis-Engagement
Slower Engagement**

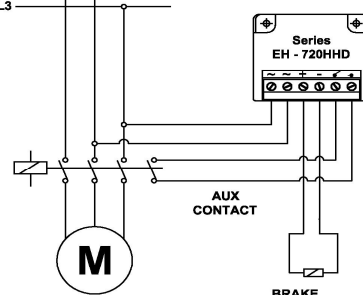


• D. C. SWITCHING

3 - Phase
415 / 460 / 480 Volts

L1
L2
L3

**Faster Dis-Engagement
Fast Engagement**

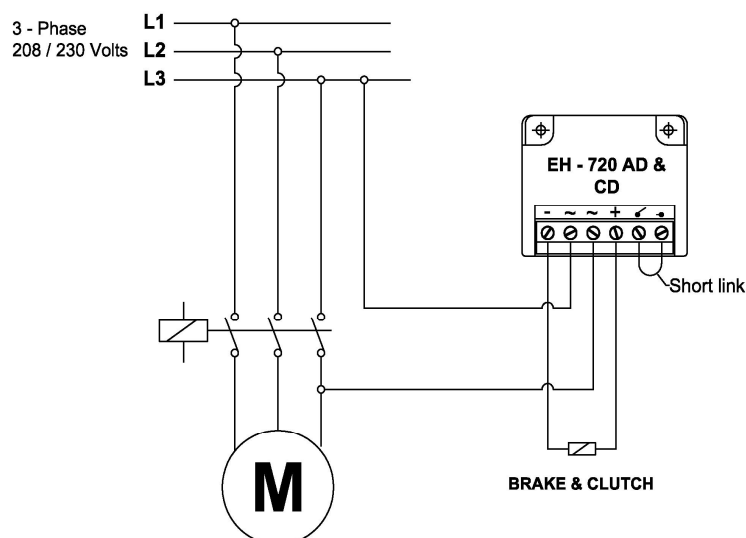


Solid State Rectifier EH 720 Series Mounting Dimension & Connection Diagram

Solid State Rectifier " EH 720 AD / BD / CD " Connection Diagram

• A.C. SWITCHING

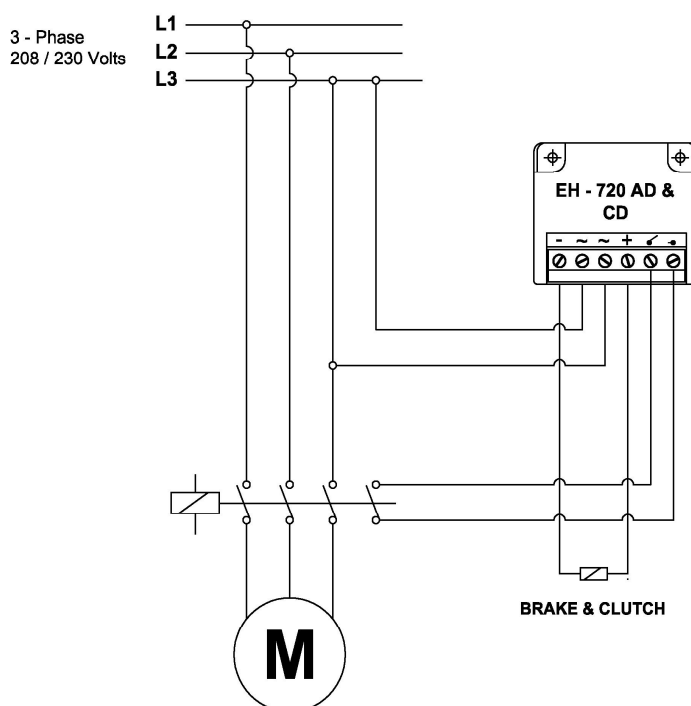
Normal Dis-Engagement
Slower Engagement



Note :- For EH 720 BD input voltage 115 VAC (line to neutral)

• D.C. SWITCHING

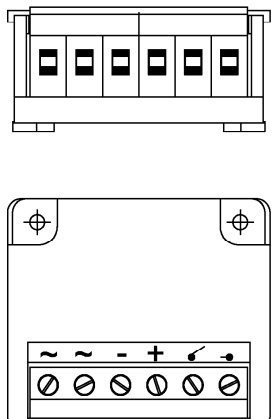
Faster Dis-Engagement
Fast Engagement



Note :- For EH 720 BD input voltage 115 VAC (line to neutral)

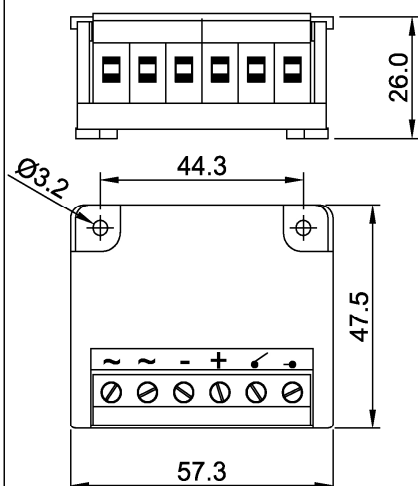
Solid State Rectifier UM-101 Series Mounting Dimension & Connection Diagram

Salient Features :-



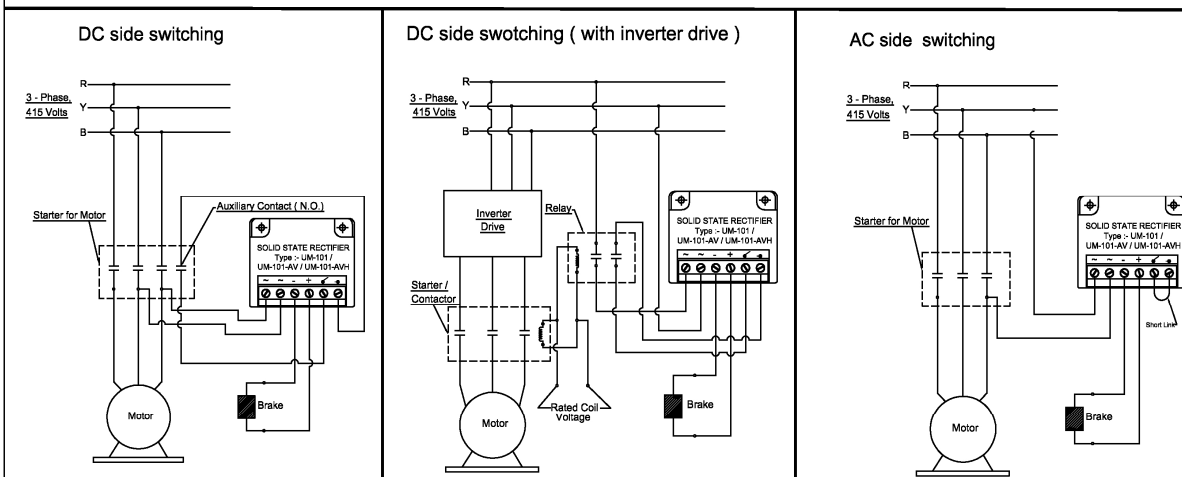
- Compact In Size
- Based on German designs.
- Use of High quality components.
- 6 - Terminals as standard for connections.
- Double voltage over excitation for 300 m.sec.
- Recommended for brakes size **18 to 31**, for quick dis-engagement.
- Available in half wave configuration.
- Suitable for carrying out AC side switching & DC side switching.
- DC side switching protection included.
- Maximum allowable ambient temperature 70 degree C.
- Current rating :- 2 Amps.
- Type UM - 101 Series brake rectifier is used to supply DC voltage to DC operated brakes on electric motors, where quick release reaction time of the brake is required.

Solid State Rectifier UM-101 Series Mounting Dimension



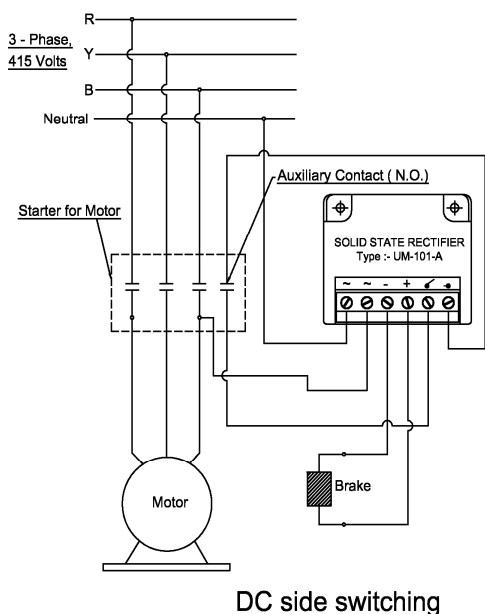
UM-101 Series	With over-excitation for fast release of normally on brake or fast engagement of normally off brake or clutch, 50/60 Hz VAC input	
Model	Input	Output
UM-101	415 VAC	190 VDC, 2 Amp.
UM-101-AV	415 / 460 VAC	190 / 215 VDC, 2 Amp. max
UM-101-AVH	480 VAC	215 VDC, 2 Amp. max
UM-101 - A	230 VAC	103 VDC, 2 Amp.

Solid State Rectifier " UM-101 / UM-101-AV / UM-101-AVH " Connection Diagram



Solid State Rectifier UM-101-A Connection Diagram

**Solid State Rectifier "UM-101-A"
Connection Diagram**



Please read the instructions before using the rectifier

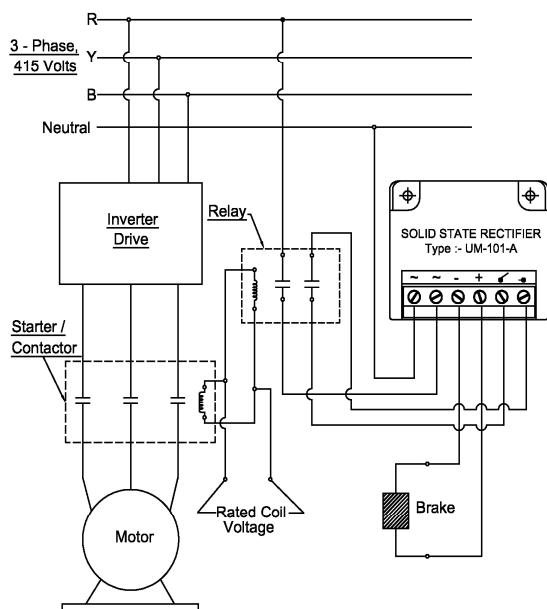
- Rectifier UM-101, UM-101-AV & UM-101-A is a fast acting rectifier which initially gives higher dc voltage for a few milliseconds. By using this rectifier the spring loaded brakes are disengaged much faster. For fast engagement of the brake dc switching (option provided) should also be used.

IMPORTANT :- With switching on DC side, switching must also be done on the AC side, otherwise no over - excitation can take place when the brake is switched on again and fast disengagement of brake will not take place.

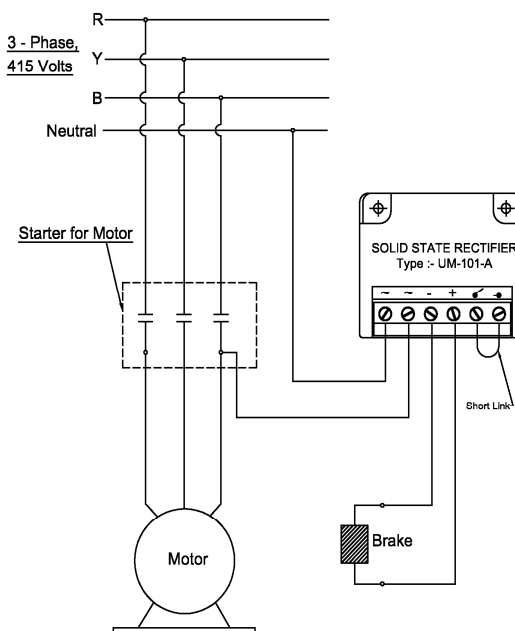
Note :- As per the circuit diagram connection must be made so that AC input to the rectifier is from the load side. Reason being after AC is applied to the rectifier with in 200 ms the rectifier cuts out over excitation by output getting converted from full wave to half wave DC. Caution: Applying from line side would only operate as half wave to function without over excitation.

- Above schematics are with AC and DC switching for fast disengagement and fast engagement of the brake.

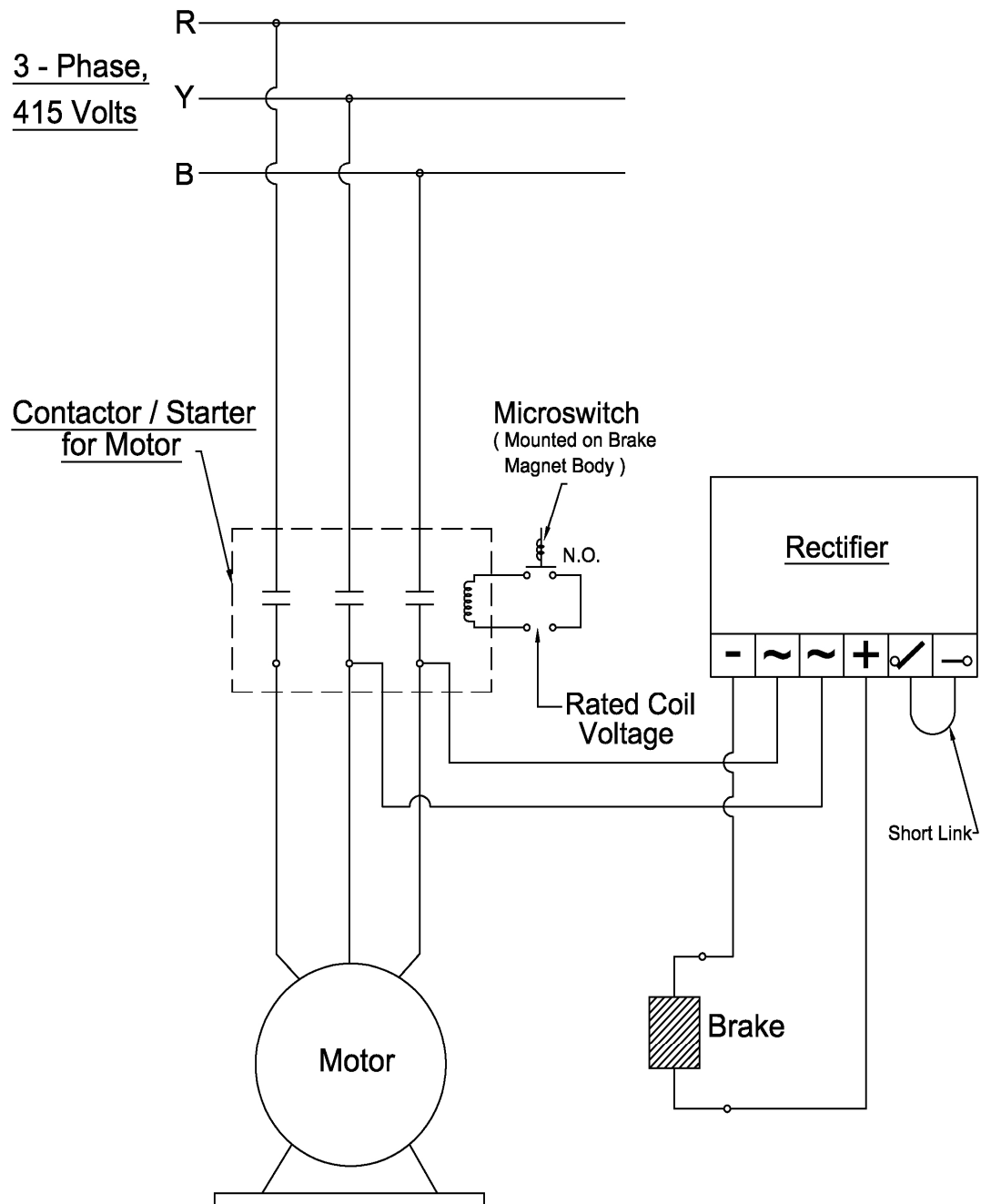
Model	Input	Output
UM-101 - A	230 VAC	103 VDC, 2 Amp.



DC side switching (with inverter drive)



AC side switching

4.4 Microswitch Connection diagram for release / wear monitoring

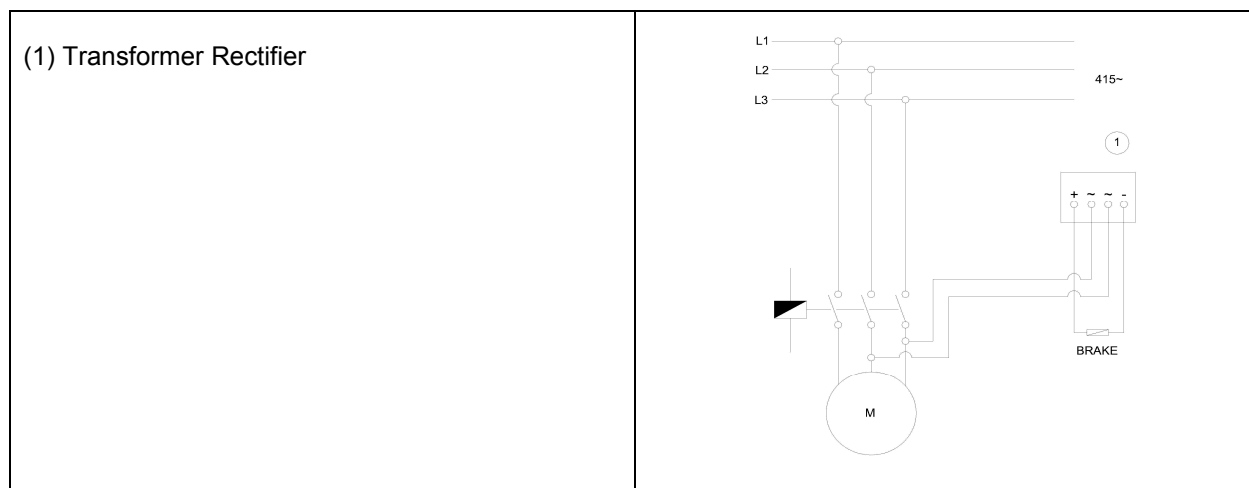


Figure 20: Separate DC voltage- Switching on the AC side extremely delayed disengagement.

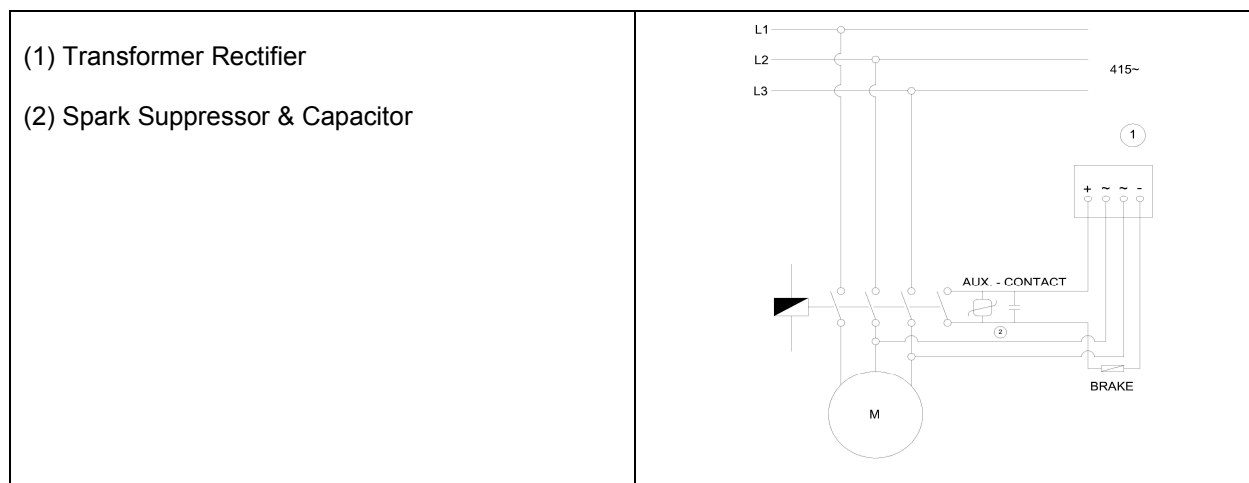


Figure 21: Separate DC voltage- Switching on DC Side – fast engagement, slightly delayed disengagement

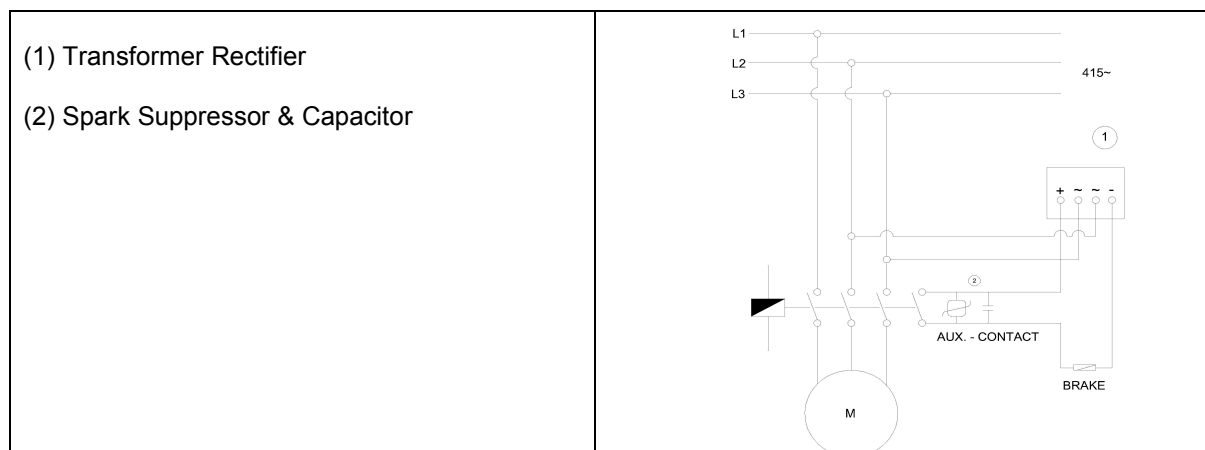


Figure 22: Separate DC voltage: Switching on DC side- fast engagement, fast disengagement

Note!

1. Install the rectifier in the terminal box (not applicable to Transformer Rectifier). For motors with insulation class H, the rectifiers must be installed in the control cabinet. The permissible ambient temperature for the rectifier should not exceed 60° c.
2. Compare the coil voltage of the stator (1.1) to the DC voltage of installed rectifier.
3. Select the suitable circuit diagram considering input & output of Rectifier & Brake coil operating voltage.
4. Motor and brake must be wired according to the requirements of engagement time.



Warning!

The live connections and the rotating rotor must not be touched! The rotor must not rotate while checking the brake operation.

5.1 Operation Test.

For Faults see chapter 7 - Trouble shooting and Fault Elimination

Release/ voltage check.

Only for brakes without microswitch.



Warning!

Live connection must not be touched.

1. Remove two of the links to the motor terminals. Do not switch off the voltage for the brake.
2. Connect the main supply.
3. Measure the Dc voltage at the brake
4. Compare the measured DC voltage indicated on the name plate. A deviation of max 10% is permissible.
5. Check the air gap 'a'. It must be zero and the rotor must rotate freely.
6. Disconnect the mains supply.
7. Bolt the links to the motor terminals

5.1.2 Manual Release

This operational test is to be carried out additionally.



Warning!

Disconnect the mains supply. The motor must not rotate

1. Pull the manual release lever towards you until the resistance increases strongly.
2. The rotor must rotate freely by hand. Small residual torque is permissible.
3. Release the lever.

5.3 During Operation

Check your brake regularly during operation. Please pay attention to

- unusual noises or temperature
- Loose fixing elements.
- The cables

In the event of faults, read the chapter 7. "Trouble shooting & Faults Elimination"
If the faults cannot be eliminated contact –Emco Dynatorq.

6. Maintenance/ repair

Inspection intervals

The wear of the rotor friction lining depends upon the operating conditions. The Time until readjustment, does not only depends on the friction work. The friction work per operation decreases steadily until readjustment takes place. High speed differences additionally reduce the friction work until readjustment. The inspection intervals must be adapted to the operating conditions and can be prolonged if the wear is small.

6.2 Inspection

6.2.1 Rotor thickness



Warning !

The motor must not rotate while checking the rotor thickness. The rotors may rust up and block in corrosive ambient conditions and/or after long periods of storage.

1. Remove the motor cover and the rubber seal of the brake.
2. Measure the rotor thickness by using a vernier caliper.
3. Compare the measured rotor thickness to the minimum permissible rotor thickness (for values refer rated data table chapter 3.2)
4. If necessary, replace the rotor. For Description see chapter 6.3.2.

6.2.2 Air gap



Warning!

The motor must not rotate while checking

1. Measure the air gap between the armature plate and stator by means of a feeler gauge.
2. Compare the measured air gap to the maximum permissible air gap (for values refer rated data table chapter 3.2).
3. If necessary, adjust the air gap to the rated air gap. For description on how to re-adjust the air gap chapter 6.3.1

6.2.3 Release/ voltage



Warning !

The rotating rotor must not be touched.



Warning!

The live connections must not be touched.

1. Observe the air gap "a" during operation. It must be zero .
2. Measure the DC voltage at the brake during operation. It must be the same as the voltage indicated on the name plate. A deviation of maximum 10% is permissible.

6.3 Maintenance

6.3.1 Readjustment of Air gap



Warning!

Disconnect the brake from Mains. The motor must not rotate.

1. Loosen the allen screws.
2. Turn the threaded adjustment tubes by means of a spanner.
 - Screw the adjustment tubes into the stator if the air gap is too large.
 - Screw the adjustment tubes out of the stator if air gap is too small.
 - The width of the air gap changes by approx. 0.15 mm when turning the sleeve by 1/6 revolution.
3. Tighten the screws.
4. Check the air gap again and repeat the adjustment if necessary.

6.3.2 Replacement of rotor



Warning!

Disconnect the brake from Mains. The motor must not rotate.

1. Disconnect the supply cable.
2. Loosen the allen screws evenly and remove them.
3. Completely remove the stator from the end shield. Take necessary precaution to avoid damages to lead wire.
4. Pull the rotor from the hub.
5. Check the splines of the hub. In case of wear, the hub must also be replaced.
6. Check the flange. In case of strong scoring at flange, replace flange.
7. Measure the rotor thickness (new) and head height of the threaded wear adjustment tubes by means of vernier caliper.
8. Calculate the distance between stator and armature plate as follows:

$$\text{Distance} = \text{Rotor thickness} + \text{Rated air gap} - \text{head height}$$
 (for rated air gap see rated data table chapter 3.2)
9. Loosen the threaded adjustment tubes until the calculated distance between stator and armature plate is reached.
10. Install and adjust the new rotor and brake (see Chapter 4.2.3)
11. Reconnect the mains supply cable.

6.3.3 Replacement of Armature Plate



Warning!

Disconnect the brake from Mains. The motor must not rotate.

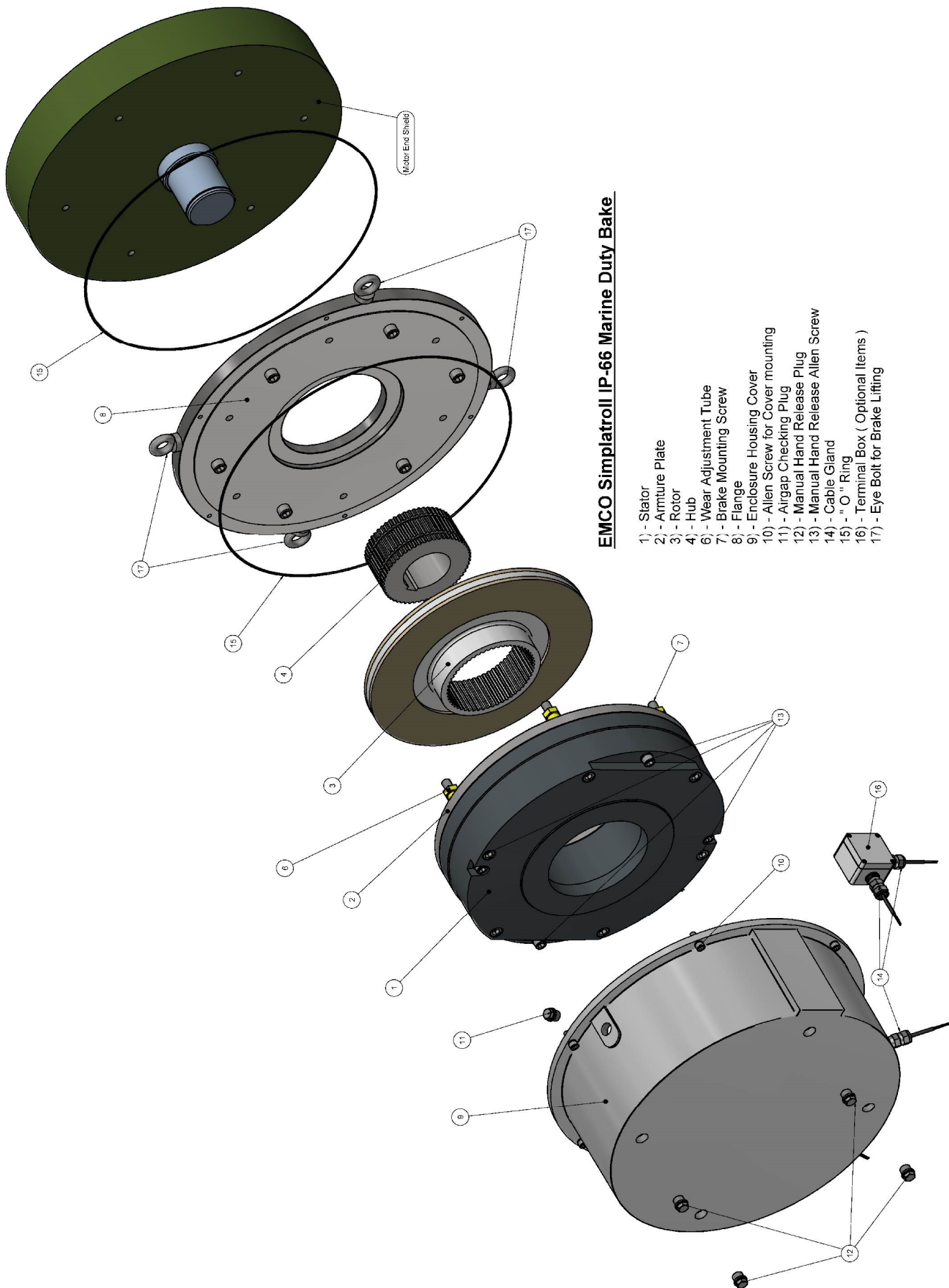
1. Disconnect the supply Cable.
2. Loosen the allen screws evenly and remove them.
3. Completely remove the complete stator (1.0) from the end shield. Observe the supply cable.
4. Completely unscrew the threaded adjustment tubes from the stator assembly (1.0).
5. Also remove the manual hand release.
6. Remove the armature plate.
7. Check the compression springs. If any are broken or damaged replace.
8. Insert the compression spring into the outer bore holes of the outer stator pole.
Insert the compression parts and compression spring into the inner pole of the stator.
9. Put the new armature plate on the compression spring. Observe the pitch circle of stator and armature plate and ensure tapped holes of stator are matched with armature plate holes.
10. Mount the Hand release in the same way as it was removed.
11. Measure the rotor thickness and head height of the threaded wear adjustment tubes by means of a vernier caliper.
12. Calculate the distance between stator and armature plate as follows:
Distance= Rotor thickness + Rated air gap – head height.
(For rated air gap see rated data table chapter 3.2)
13. Loosen the threaded adjustment tubes until the calculated distance between stator and armature plate is reached.
14. Install and adjust the new rotor and brake (see chapter 4.2.3)
15. Reconnect the mains supply cable.

6.4 Spare- parts list

Only parts with order numbers are available.

The order numbers are valid only for the standard design.

Brake parts Name	Brake size											
	06	08	10	12	14	16	18	20	25	31	40	50
1) Stator – armature assembly	1	1	1	1	1	1	1	1	1	1	1	1
2) Armature plate	1	1	1	1	1	1	1	1	1	1	1	1
3) Rotor	1	1	1	1	1	1	1	1	1	1	1	1
4) Hub	1	1	1	1	1	1	1	1	1	1	1	1
6) Wear adjustment tube	3	3	3	3	3	3	6	6	6	6	6	6
7) Brake mounting screw	3	3	3	3	3	3	6	6	6	6	6	6
8) Flange	1	1	1	1	1	1	1	1	1	1	1	1
9) Enclosure housing cover	1	1	1	1	1	1	1	1	1	1	1	1
10) Socket head cap screw	4	4	4	4	6	6	6	6	6	6	6	6
11) Airgap checking plug	1	1	1	1	1	1	1	1	1	1	1	1
12) Manual head release plug	2	2	2	2	2	2	2	2	2	2	4	4
13) Socket head cap screw	2	2	2	2	2	2	2	2	2	2	4	4
14) Cable gland	2	2	2	2	2	2	2	2	2	2	2	2
15) “ O “ ring	2	2	2	2	2	2	2	2	2	2	2	2
16) Terminal box (Optional items)	1	1	1	1	1	1	1	1	1	1	1	1
17) Eye bolt for brake lifting	Only for size – 40 & 50											



7. Troubleshooting and fault elimination

7. Troubleshooting

Problem	Cause	Remedy
Brake does not release, air gap is not zero	Coil open	• Measure coil resistance using a multimeter. If resistance is too large replace the entire stator.
	Coil has contact to ground or between the winding	• Measure coil resistance using a multimeter compare measured resistance to rated resistance for values see chapter 1.2. If resistance is too low replace. • Check the coil for contact to ground using a multimeter in case of contact to ground, replace entire stator. • Check the brake voltage-rectifier defectives/ voltage too low.
	Wiring wrong or defective	• Check wiring and correct it. • Check cable for continuity using a multimeter replace defective cable
	Rectifier defective or wrong	• Measure DC voltage at rectifier using multimeter. If voltage is zero. Measure AC voltage at rectifier. If AC voltage is zero, Apply voltage, check fuse, check wiring If AC voltage is okay: check rectifier, replace defective rectifier If DC voltage is too low : check rectifier use half wave rectifier instead of bridge rectifier if diode is defective use suitable new rectifier. • Check coil for contact to ground or between windings. • If a rectifier defect occurs several times replace entire stator, even if a contact to ground or between windings cannot be measured. The fault may occur only in warm state.
	Air gap too large	• Readjust the air gap.(chap. 6.3.1)
Rotor cannot rotate freely	Incorrect adjustment of manual release	• Check 'u' gap at manual release when current applied to brake. It should be same at both ends. Correct if necessary.
	Air gap too small	• Check and adjust if necessary. (chapter 6.3.1)
Rotor thickness too small	Rotor was not replaced in time	• Replace the rotor(Chapter 6.3.2)
Voltage too high	Brake voltage does not match with rectifier	• Match brake voltage and rectifier to each other.
Voltage too low	Brake voltage does not match with rectifier	• Match brake voltage and rectifier to each other.
	Diode in the rectifier is defective	• Replace rectifier by suitable new one.
AC voltage is not mains voltage	Fuse is missing or defective	• Select connection where fuse is not missing or defective.

7. Troubleshooting and fault elimination

	Air gap too large	Readjust the air gap.(chap. 6.3.1)
Rotor cannot rotate freely	Incorrect adjustment of manual release	Check 'u' gap at manual release when current applied to brake. It should be same at every manual releases screw(). Correct if necessary.
	Air gap too small	Check and adjust if necessary. (chapter 6.3.1)
Rotor thickness too small	Rotor was not replaced in time	Replace the rotor(Chapter 6.3.2)
Voltage too high	Brake voltage does not match with Brake Controllers Output	Match brake voltage and Brake Controllers to each other.
Voltage too low	Brake voltage does not match with Brake Controllers Output	Match brake voltage and Brake Controllers to each other.

Do's and Dont's to get an optimum performance of the Brakes

Do's	Dont's
1. Brake manual release should be free of the motor	Don't operate brake if manual release is not operating.
2. Air gap adjustment has to be done when armature plate touches washer of hand release because of excessive wear. Delay in engagement or disengagement time should be observed.	Don't operate the Brake without adjusting/resetting the Air gap.
3. Checking the Air gap at regular interval.	Don't operate the brake if specified air gap is not present or the gap is totally closed.
4. Adjust the air gap to rated air gap as per table 3.2.	Don't let armature plate to be uneven i.e. one side totally closed while another open beyond permissible limit.
5. Required DC supply voltage to be checked.	Don't operate the brake once DC supply is +10% or -10% of the rated voltage
6. Check the linear part of the brakes since they should run dry. Use only sealed Ball Bearing	Don't use any oil, grease, lubricant or any foreign material for lubrication. Friction surface should be free from all the above substances.

This image shows a full page of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page, typical of notebook paper. There are no margins, text, or other markings on the page.



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