



Model SR48P Shown

## Model SR48P Power Slip Roll

### Operation, Parts and Maintenance Manual

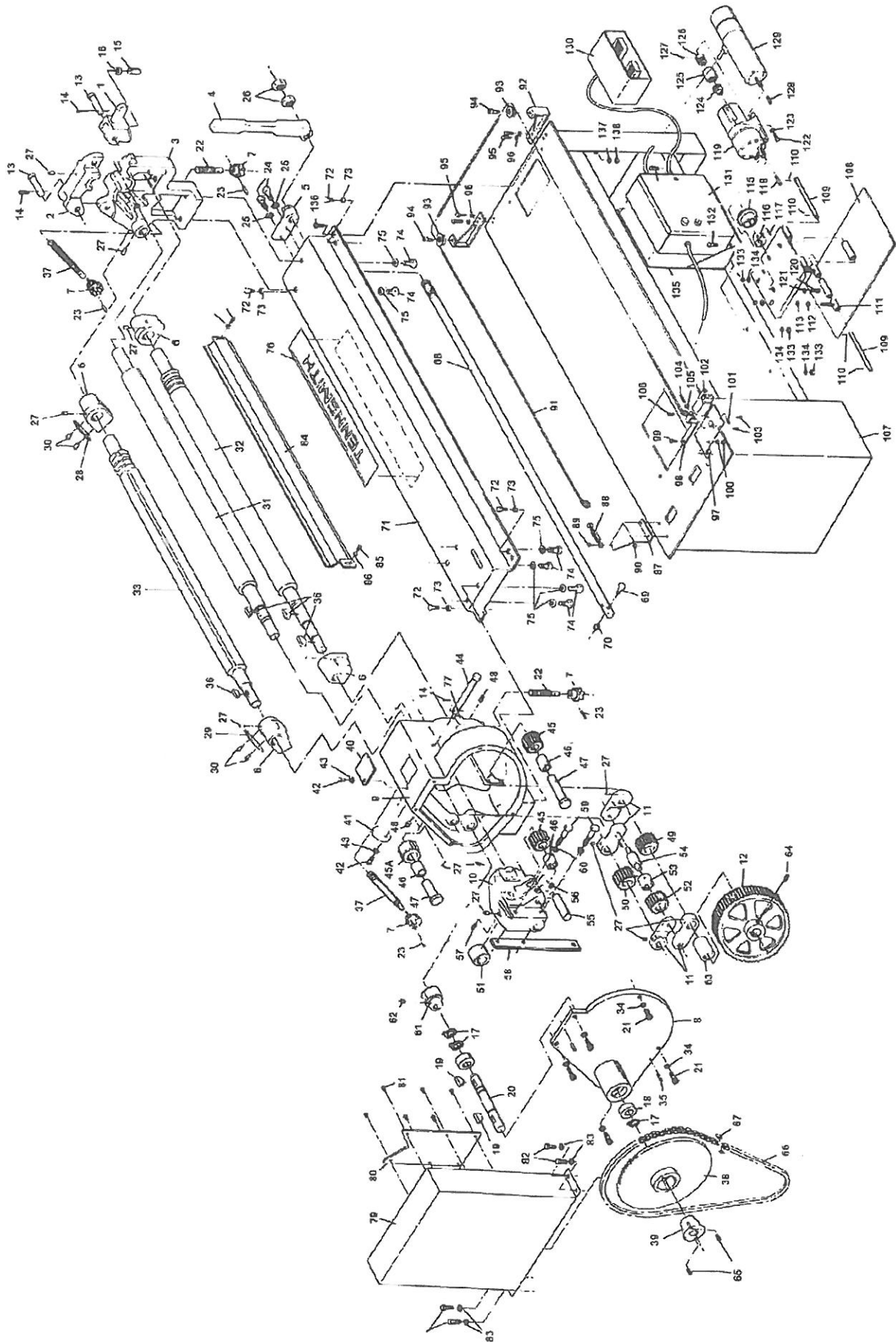
<b>Model:</b>	<b>Purchased From:</b>
<b>Serial #:</b>	<b>Date Received:</b>



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## SR48P / Parts List

PART #	DESCRIPTION	REQ'D #	PART #	DESCRIPTION	REQ'D #
1 SR48-401	LOCK, TOP LATCH	1	57 SR48-457	SCREW, SWIVEL BLOCK	1
2 SR48-402	TOP LATCH	1	58 SR48-458	LEVER, LIFTING	1
3 SR48-403	RIGHT HAND SIDE FRAME	1	59 SR48-459	SCREW, LIFTING LEVER	2
4 SR48-404	LIFT HANDLE	1	60 SR48-460	WASHER, SCREW LOCK	2
5 SR48-405	LIFT CAM	1	61 SR48-461	GEAR, CRANK SHAFT	1
6 SR48-406	BLOCK, ROLL ADJ.	4	62 SR48-462	SET SCREW, GEAR	1
7 SR48-407	HANDKNOB, ROLL ADJ.	4	63 SR48-463	SPACER	1
8 SR48P-4008	COVERPLATE	1	64 SR48-464	SET SCREW, 12" GEAR	1
9 SR48-409	LEFT HAND HOUSING	1	65 SR48P-490	SCREW, LOCK HUB	2
10 SR48-410	BLOCK, TOP ROLL SWIVEL	1	66 SR48P-491	CHAIN, DRIVE	1
11 SR48-411	LINKS	4	67 SR48P-492	LINK, CHAIN CONNECTING	1
12 SR48-412	12" GEAR	1	68 SR48-468	ROD, LIFTING	1
13 SR48-413	CLEVIS PIN, TOP LATCH	2	69 SR48-469	SCREW, LIFTING ROD	1
14 SR48-414	COTTER PIN	3	70 SR48-470	NUT, SCREW LOCK	1
15 SR48-415	SET SCREW, LOCK	1	71 SR48-471	BASE	1
16 SR48-416	NUT, SET SCREW LOCK	1	72 SR48-472	SCREW, BASE LEVELING	4
17 SR48P-481	RETAINER RING	2	73 SR48-473	NUT, SCREW LOCK	4
18 SR48P-482	BALL BEARING	2	74 SR48-474	SCREW, MOUNTING	6
19 SR48P-483	WOODRUFF KEY	2	75 SR48-475	WASHER, SCREW LOCK	6
20 SR48P-484	SHAFT, DRIVE	1	76 SR48-476	DECAL, BASE	1
21 SR48P-485	SCREW, COVER PLATE	5	77 SR48-477	SERIAL PLATE	1
22 SR48-422	SCREW, LOWER ROLL ADJ.	2	78 SR48-478	STAND, OPTIONAL	1
23 SR48-423	SPLIT PIN, ROLL ADJ. HANDKNOB	4	79 SR48P-493	GUARD, CHAIN	1
24 SR48-424	SCREW, LIFT CAM	2	80 SR48P-494	GUARD, SPROCKET	1
25 SR48-425	WASHER, LIFT CAM SCREW LOCK	2	81 SR48P-495	SCREW, SPROCKET GUARD MTG.	6
26 SR48-426	NUT, LIFT HANDLE LOCK	2	82 SR48P-496	SCREW, CHAIN GUARD MTG.	4
27 SR48-427	GREASE FITTING	13	83 SR48P-497	WASHER, SCREW LOCK	4
28 SR48-428	SCALE, RIGHT HAND	1	84 SR48P-498	GUARD, FRONT ROLL	1
29 SR48-429	SCALE, LEFT HAND	1	85 SR48P-499	SCREW, FRONT ROLL GUARD MTG.	2
30 SR48-430	DRIVE SCREW, SCALE	4	86 SR48P-500	WASHER, SCREW LOCK	2
31 SR48-431	ROLL, TOP	1	87 SR48P-501	BRKT., STOP WIRE MTG.	1
32 SR48-432	ROLL, LOWER FRONT	1	88 SR48P-502	CLEVIS, STOP WIRE	1
33 SR48-433	ROLL, BACK	1	89 SR48P-503	SCREW, CLEVIS MTG.	1
34 SR48P-486	WOODRUFF KEY	5	90 SR48P-504	NUT, CLEVIS MTG. SCREW	1
35 SR48P-484	PIN, COVER PLATE LOCATING	2	91 SR48P-505	WIRE, STOP	1
36 SR48-436	WOODRUFF KEY	5	92 SR48P-506	BRKT., STOP WIRE PULLEY MTG.	2
37 SR48-437	SCREW, BACK ROLL ADJ.	2	93 SR48P-506A	PULLEY, STOP WIRE	2
38 SR48P-488	SPROCKET, DRIVE SHAFT	1	94 SR48P-506B	BOLT, PULLEY MTG.	2
39 SR48P-489	HUB, SPROCKET LOCK	1	95 SR48P-507	SCREW, GUIDE MTG.	4
40 SR48-440	COVER PLATE, TOP L.H. HOUSING	1	96 SR48P-508	WASHER, SCREW LOCK	4
41 SR48-441	COVER PLATE, TOP R.H. HOUSING	1	97 SR48P-509	BRKT., STOP SWITCH MTG.	1
42 SR48-442	SCREW, COVER PLATE	2	98 SR48P-510	TRIP, SWITCH	1
43 SR48-443	WASHER, SCREW LOCK	2	99 SR48P-511	SCREW, SWITCH TRIP MTG.	1
44 SR48-444	PIN, SWIVEL BLOCK	1	100 SR48P-512	NUT, TRIP SWITCH	2
45 SR48-445	IDLER GEAR-16T	3	101 SR48P-513	SPRING, TRIP SWITCH	1
45A SR48-445A	IDLER GEAR-18T	1	102 SR48P-514	SWITCH, STOP	1
46 SR48-446	BUSHING, IDLER GEAR	3	103 SR48P-515	SCREW, SWITCH MTG.	2
47 SR48-447	PIN, IDLER GEAR	2	104 SR48P-516	SCREW, STOP	1
48 SR48-448	SET SCREW, IDLER PIN	2	105 SR48P-517	NUT, STOP SCREW	1
49 SR48-449	GEAR, LOWER FRONT ROLL	1	106 SR48P-518	SCREW, WIRE MTG.	1
50 SR48-450	GEAR, BACK ROLL	1	107 SR48P-519	STAND	1
51 SR48-451	GEAR, TOP ROLL	1	108 SR48P-520	BRKT., MOTOR ADJ.	1
52 SR48-452	GEAR, LOWER IDLER	1	109 SR48P-521	PIN, MOTOR ADJ. BRKT.	2
53 SR48-453	BUSHING, LOWER IDLER GEAR	1	110 SR48P-522	KEY, MOTOR ADJ. BRKT.	4
54 SR48-454	SPACER PIN, GEAR	1	111 SR48P-523	ADJUSTMENT, MOTOR	2
55 SR48-455	PIN, SWIVEL BLOCK IDLER	1	112 SR48P-524	NUT, MOTOR ADJUSTMENT LOCK	4
56 SR48-456	SET SCREW, PIN	1	113 SR48P-525	WASHER, ADJUSTMENT LOCK	4
			114 SR48P-526	PLATE, GEAR REDUCER	1
			115 SR48P-527	SPROCKET, MOTOR	1
			116 SR48P-528	HUB, MOTOR SPROCKET LOCK	1
			117 SR48P-529	SCREW, HUB	2
			118 SR48P-530	KEY, SPROCKET MTG.	1
			119 SR48P-531	GEAR REDUCER	1
			120 SR48P-532	SCREW, GEAR REDUCER MTG.	4
			121 SR48P-533	WASHER, REDUCER MTG. SCREW	4
			122 SR48P-534	SCREW, MOTOR MTG.	4

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123	SR48P-535	WASHER, MOTOR MTG. SCREW LOCK	4
124	SR48P-536	COPLING, REDUCER	1
125	SR48P-537	SLEEVE, COUPLING	1
126	SR48P-538	COUPLING, MOTOR	1
127	SR48P-539	SCREW, COUPLING LOCK	1
128	SR48P-540	KEY, MOTOR	1
129	SR48P-541	MOTOR	1
130	SR48P-542	FOOT SWITCH	1
131	SR48P-543	CONTROL BOX	1
132	SR48P-544	SCREW, CONTROL BOX MTG.	2
133	SR48P-545	NUT, CONTROL BOX MTG. SCREW	2
134	SR48P-546	WASHER, SCREW LOCK	2
135	SR48P-547	BRKT.,CONTROL BOX	1
136	SR48P-548	SCREW, BASE MTG.	4
137	SR48P-549	WASHER, BASE MTG. SCREW LOCK	4
138	SR48P-550	NUT, BASE MTG. SCREW	4

## FORWARD

**This manual has been prepared for the owner and operators of the TENNSMITH Model SR48P Slip Roll. Its purpose, aside from operational instructions, is to promote safety through the use of accepted operating procedures. Read all instructions thoroughly before operating the slip roll.**

Also contained in this manual is the parts list for your slip roll. It is recommended that only TENNSMITH or factory authorized parts be used for replacement parts.

### 3-YEAR LIMITED WARRANTY

TENNSMITH machinery and component parts are carefully inspected at various stages of production and are tested and inspected prior to shipment. We agree that for a period of twelve (12) months from the date of delivery from our authorized distributor to replace, at our option, any machine (or component part thereof) proving defective within the above period. Additionally, we agree that for a period of thirty-six (36) months from date of delivery to replace component parts proving defective within the stated period. All warranty claims are made F.O.B. our plant, providing such machine (or component part) is returned freight prepaid to our plant, or a designated service center of the undersigned, for our examination. This warranty does not include repair or replacement required because of misuse, abuse, or because of normal wear and tear; or electrical components which are warranty by their manufacturer. Further, we cannot be responsible for the cost of repairs made or attempted outside our factory or designated service center without our authorization. No claims for defects will be honored if the name and data plate has been removed. This warranty is made expressly in place of all other warranties or guarantees express or implied, with respect to fitness, merchantability, quality or operative ness. This warranty becomes effective only when the accompanying warranty card is fully and properly filled out returned to the factory within ten (10) days from date of delivery.

### SAFETY PRECAUTIONS

1. Know the safety and operating instructions contained in the manual. Become familiar with and understand the hazards and limitations of your slip roll. Be certain that all personnel operating this machine know proper operation and safety procedures. Always practice safety.
2. This machine is equipped with numerous safety devices:
  - i. A point of operation guard across the front of the rolls (#84).
  - ii. A front and rear full length safety cable which acts as an emergency stop device (#91- #106).
  - iii. An electromagnetic brake on the drive motor.
  - iv. Foot pedal controls (#130).
  - v. (Optional) A photoelectric presence sensing device.

**Do not operate this machine with any of these safety devices removed, by passed or overridden.**

3. Be certain this machine is properly wired and grounded to conform to the National Electric Code.
4. Never leave this machine in a power on condition when unattended.
5. Always disconnect the machine from the power source before attempting maintenance, repairs or adjustments.
6. Wear approved eye protection such as safety glasses or goggles when operating the slip roll to protect your eyes.
7. Protective type footwear should be worn. Do not wear loose clothing. Do not wear gloves. Long hair should be contained by a hat or hair net. Jewelry, such as rings, bracelets and watches, should not be worn while operating this machine.
8. The machine should be bolted to the floor.
9. Always keep hands clear of the entry area to rolls while operating.
10. Use work holding devices such as tongs for handling small work pieces.
11. Do not exceed the capacity of the machine, which is 16 gauge (0.060 inch) mild steel. Do not use the machine for other than its intended purpose.
12. Keep the work area around this machine clear, clean and in proper order to avoid tripping or slipping.
13. Your machine should display a warning sign with a condensed version of these safety instructions. Do not remove it from the machine. New signs are available without charge by calling or emailing the factory.

**THESE INSTRUCTIONS MUST BE FOLLOWED OR SERIOUS INJURY OR PROPERTY DAMAGE COULD OCCUR.**

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	<p><b>! WARNING</b></p> <p>Read &amp; understand operators manual before using this machine.</p> <p>Failure to follow operating instructions could result in death or serious injury.</p>
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	<p><b>! WARNING</b></p> <p><b>Pinch Point Hazard</b></p> <p>Keep hands clear of rollers. Read instruction and safety information prior to operation.</p>
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	<p><b>! DANGER</b></p> <p><b>Hazardous voltage.</b></p> <p>Contact may cause electric shock or burn. Turn off and lock-out system power before servicing.</p>
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	<p> <b>WARNING</b></p> <p><b>PINCH POINT HAZARD</b> Moving parts can cause severe injury. Lock-out power before inspection or service.</p>	
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## **SAFETY INSTRUCTIONS**

- 1. Read and understand instruction manual before, operating, servicing, or maintenance of machine.**
- 2. Keep hands and fingers clear of forming rolls.**
- 3. Do not wear loose clothing near rolls.**
- 4. Provide all proper protective devices and guards that may be necessary or advisable for any particular use, operation, set-up, or service.**
- 5. Report any equipment malfunction to your supervisor.**
- 6. DO NOT REMOVE THIS INSTRUCTION SIGN.**

## **MACHINE GUARDING**

The machine must have point of operation guards to prevent bodily injury. A guard (#498) is installed on the machine at the factory. This guard can be adjusted up or down to compensate for varying thicknesses of material being formed. Different types of guards may be required for various kinds of forming work. For additional information on guarding roll bending and roll forming machines, contact the American National Standards Institute, New York, NY to request a copy of ANSI Standards B11.12, Roll Forming and Roll Bending Machinery Safety Standards.

## **RECEIVING THE MACHINE**

Remove the slip roll from its crate and inspect the unit for damage. Any loss or damage should be noted in detail on the delivery receipt and reported to your distributor immediately.

## **INSTALLING THE MACHINE**

Caution: The Model SR48 slip roll weighs nearly 1200 lbs.

Locate the slip roll in a well lighted area on a solid, level floor. Use lag screws or bolts with expandable shields or similar holding devices through the mounting holes located on the base of the machine to mount the machine to the floor. DO NOT operate the machine without bolting it to the floor.

The Model SR48P slip roll is equipped with four leveling screws (#72) and lock nuts (#73) to permit the leveling of the machine on the work bench, thereby eliminating any binding of the various gears or bearing. Use these leveling screws to remove any twist in the roll base (#71), thereby eliminating any binding of the various gears or bearings.

## **ELECTRICAL SPECIFICATIONS**

A wiring diagram is located inside the electrical enclosure (#131) and also included in this manual. The connection of this machine to the power source should be made and inspected by a qualified electrician. This machine must be properly grounded. Improper wiring may result in accidental shock which could cause grave injury or death. Motor rotation should match the directional indicators on the foot pedal control housing.

Your machine is normally equipped with a 3/4 hp. 220/440 volt, 3 phase, 60 Hz gear reduction motor. A single phase motor is available as an option. The manufacturer's data plate on the motor will specify this information. The gear motor is equipped with an electromagnetic brake which stops the motor rotation when without power. The brake is equipped with a manual locking lever which can prevent the motor from rotation even when powered. This lever is located on the side of the brake housing. This lever should NOT be used as a substitute for disconnecting the machine from the power supply when performing maintenance or repairs.

Standard electrical specifications include a reversing magnetic starter, on-off selector switch and pilot light, and foot pedal controls. A micro switch is connected to the operator safety cable. When in an open condition, this switch interrupts power to the motor and controls. This switch may be manually reset to a closed condition at the front left hand corner of the machine. The electrical panel must also be reset before the machine can be used. The reset button is located within the electrical enclosure (#131).

The selector switch, foot pedal controls and micro switch are on a low voltage transformed circuit which has its own low amp fuse.

## **SAFETY CABLE ADJUSTMENT**

The safety cable feature of your machine is important for operator safety. When tripped, the cable activates a stop switch (#102) mounted on the stop switch bracket (#97) at the left corner of the machine.

The stop wire (#91) should be kept in a tensioned condition so that when minimal pressure is placed on the cable, the arm on the stop switch will trip. The stop wire (#91) can be tensioned using the stop wire clevis (#88) which acts as a turn buckle. A fine adjustment to the action on the stop switch arm is possible by lengthening or shortening the length of the stop screw (#104) and locking it in place with the stop screw nut (#105).

Keep the stop wire pulleys (#93) lubricated with a good grade of light machine oil.



## OPERATING THE MACHINE

The full-length capacity of the Model SR48P powered slip roll is shown in the chart below. The chart (Figure 1) should be used as an approximate material conversion comparison to show equivalent capacities of material other than mild steel. Do not exceed the capacity of your slip roll as permanent damage to the machine may result.

**Figure 1**

MAXIMUM CAPACITIES	SR48P
Mild Steel	16 ga / .063
Stainless Steel	20 ga / .036
Cold Roll Steel	16 ga / .063
Aluminum, Soft	.120
Aluminum, Hard	.063
Brass, Soft Yellow	.075
Bronze, Phosphor Annealed	.075
Copper, Soft	.120
Copper, Hard	.075

The exact capacity of your slip roll depends on several factors including the nature and uniformity of the material being worked, the length and diameter of the cylinder or curved part being formed, and the number of passes through the rolls to obtain the desired diameter of cylinder or radius of bend. As a general rule, when your slip roll is overloaded there will be deflection at the center of the rolls resulting in a cylinder or curved part that is bulged in the center. The deflection can be minimized by progressively forming the work piece to the desired radius by making two or more passes through the rolls. DO NOT try to force the material through the machine as an unsatisfactory work piece and possible damage to the machine will result.

To operate the machine, turn the electrical selector switch on the front of the electrical enclosure (#131) to the "on" position. The pilot light will illuminate to indicate a ready to operate condition. The foot pedal (#130) switch controls the rotation of the rolls. The shroud on the foot pedal (#130) is marked with an "F" for forward and an "R" for reverse. The two front rolls (#31, #32) feed the material through the machine as the right hand crank handle (#8) is turned in a clockwise direction. For forming capacity materials an additional left hand crank handle (#8) is provided for two person operation if necessary. NOTE: if the machine is being operated by only one person, the left hand crank handle should be removed from the machine for safety. The pinch roll adjustment screws (#22) up and down for a different gauge material clearance between the two front rolls. The gap between the two front rolls should be equal at both ends of the rolls to insure an even advancement of the material being worked.

The rear roll (#33) adjust to control the radius of bend of the material being worked by means of the back roll adjustment screws (#37). The gap between the rear roll and two front rolls should be equal at both ends of the roll to insure an equal radius at both ends of the material being worked. The scales (#28, #29) mounted at each side frame are helpful in maintaining an equal gap. The scales can also be used to record approximate rear roll settings for forming a particular radius in a particular gauge of material. The rear roll features three full length longitudinal grooves which assist in starting the work piece through the rolls.

The Model SR48P is an "initial pinch" type slip roll. One forming problem often encountered with any initial pinch type roll is a small flat spot on the leading edge of the sheet of material being worked. This problem can be minimized by a pre-bending operation prior to running the work piece through the rolls. With the machine in a non-rotating condition insert the work piece between the upper and lower rolls (#31, #32) and advance the material slightly by means of the crank handle(s) to the point where the work piece is held in place between the rolls. Bend the work piece by hand upwards and slightly around the upper roll approximating the bend radius desired in the finished piece. Crank the work piece through the machine. This pre-bending operation is also useful in reducing the number of rear roll (#39) adjustments required to form smaller radii in capacity materials.

Once the material being worked has been formed to the desired shape, removal is accomplished by raising the latch assembly (#1, #2) to its fully open resting position, and elevating the top roll (#31) by means of the roll lift handle (#4). The degree of roll lift can be adjusted by moving the handle (#26) in the desired location. The latch pressure can be adjusted by tightening or loosening the top latch set screw (#15) and locking the bolt in place by tightening the top latch nut (#16).

Wire grooves, 3/8", 1/2" and 5/8" are provided on the right hand end of the rolls for rolling cylinders with wired edges.

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## MOTOR and DRIVE CHAIN ADJUSTMENT

**CAUTION: Disconnect power form the machine before making any adjustments to the motor or drive chain.**

Power is transferred from the gear motor to the roll drive train by a loop of industrial roller chain (#66). Should tension on this chain require adjustment this can be accomplished by adjusting the position of the motor adjusting bracket (#108). This bracket is designed to allow the gear motor to pivot by positioning the motor adjustment lock nuts (#112). The drive chain should be tensioned so that there is approximately 1 inch of side play in the chain. Too much chain tension results in chain, sprocket and bearing wear.

The chain can be inspected by removing the sprocket and chain guards (#78), (#80) **DO NOT OPERATE THE MACHINE WITH THESE GUARDS REMOVED.** The chain can be removed from the machine by disassembling the chain connecting link (#67). Keep the drive chain well lubricated with a good grade of chain lubricant.

## MAINTENANCE

**CAUTION: Disconnect power form the machine before attempting any lubrication or maintenance.**

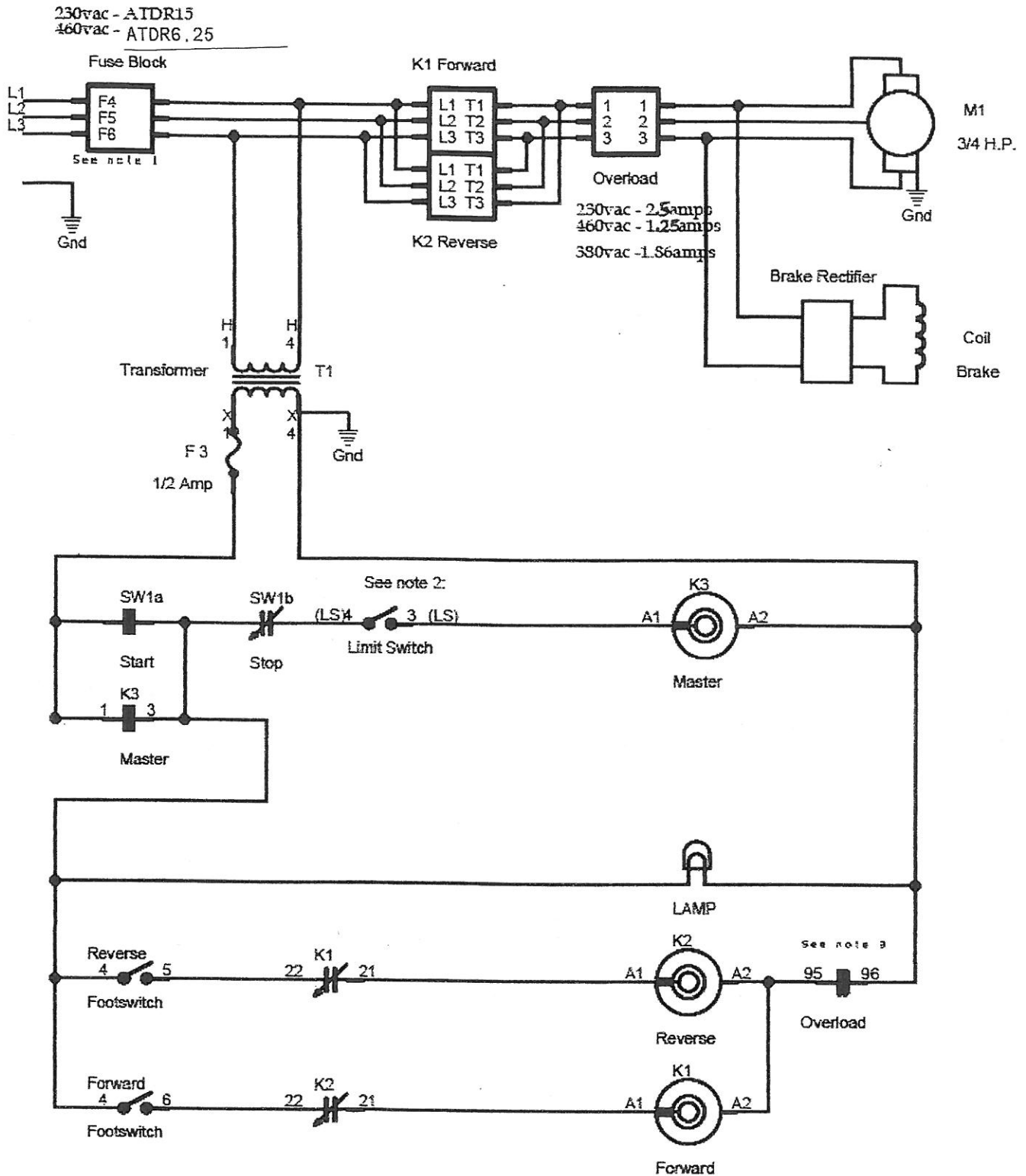
The gear motor unit (#199) has an internal oil bath for the lubrication of the gears. There is an threaded filler plug on the side of the housing which can be removed to check the oil level. This should be check every 30 days. The oil should be replaced after every 1500 hours of operation. Use a premium quality SAE 50 weight gear and spindle oil.

All roll and gear bearing surfaces are equipped with standard grease fittings (#27). Some of these grease fittings are only accessible by removing the top cover plate (#40) and the rear cover plate (#41). These areas should be lubricated using a grease gun once each week. We recommend a good of industrial lubricating grease. After every thirty days of operation, apply grease to the gears (#12, 45, 45A, 50, 51, 52 and #62)) by removing the top cover plate and main housing end plate. Inspect all bolts and set screws on a regular basis to insure that they are secure.

We recommend that the rolls be lightly oiled when not in use to prevent rusting.

Your Model SR48P slip roll is designed to require minimal upkeep. It is a good idea to practice periodic maintenance by checking all nuts, bolts and set screws for tightness; lubricating moving parts; and inspecting gears, chains and other moving parts for proper fit and signs of wear. Preventative maintenance will keep your machine in good running condition and prolong the life of your investment.

# SR48P 220/440vac 3 Phase



**Note:**

1. Fuses F1, F2, F3 – ½ amp 600 volt ATMR  
FUSES F4, F5, F6-230V 15AMP 460V 6.25AMP 600 ATDR
2. Normally open held closed by safety cable
3. Normally open. Held closed by reset

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## ORDERING PARTS

When ordering parts please furnish the model number and the serial number of your machine.



### Slip Roll Specification

Model	SR48
Maximum capacity, mild steel	16 ga / 1,6 mm
Maximum Forming Length	49 in / 1244 mm
Diameter of Rolls	3 in / 0.76 mm
Minimum Forming Radius	1 1/2 in / 0.38 mm
Wire Grooves	3/8, 1/2, 5/8 in 9.5, 12.7 , 15.8 mm
Gearing Ratio	4 : 1
Shipping Weight	1100 lbs / 500 kg



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# Motors and Brakemotors

## Type BM (G) Brakes

OPERATING INSTRUCTIONS

09 793 67 US

### General

Every SEW-Eurodrive motor is thoroughly tested, checked, and properly packed prior to shipment. However, please check immediately upon arrival for shortage of parts or transit damage. Note the damage or shortage on the freight bill of lading and file a claim with the carrier. Also, notify SEW-Eurodrive of the shortage or damage.

### Installation

For motors mounted integrally to a gear unit, please refer to the Operating Instructions for Gearmotors and Gear Reducers for proper installation of the drive. The drive installation site should be selected to ensure:

- Ambient temperatures below 40°C (104°F).
- Unimpeded flow of air to the motor and variable speed units.
- Accessibility to gear unit, oil plugs.
- Adequate space for the removal of the brakemotor fanguard for brake adjustment and maintenance.

The drive unit should be mounted on a flat, vibration damping, and torsionally rigid structure. The flatness tolerance of the supporting surface should not exceed:

For motor size 180 and smaller — 0.004 inch

For motor size above 180 — 0.008 inch

Do not hammer on the shafts to install couplings, sheaves, etc. Hammering can cause brinelling of the bearings and a reduction in bearing life. We recommend heating the components to approximately 175°F and sliding them on. This will reduce possible damage to the bearings. In addition, there is a metric tapped hole in the center of the motor shaft that can be utilized with a tool to press on or remove the coupling, sheaves, etc.

The motor shaft diameters are metric and have tolerances as listed in the SEW-Eurodrive catalogs. Shaft couplings should be properly aligned to prevent vibration, coupling wear and premature failure of the shaft bearings.

Maximum Parallel Offset — 0.003 inch

Maximum Angular Offset — 0.030°

To prevent the output shaft and bearings from being subjected to excessive loads, the maximum overhung loads, as shown in SEW-Eurodrive catalogs, should not be exceeded. Please consult our engineering department if the load may exceed the recommended figure given or where there are combined radial and axial loads. In such cases, the exact operating conditions must be stated including speed, direction of rotation, position, magnitude and direction of the external radial and axial loads being applied.

### Long Term Storage

If the motor must be stored for a long period of time without operating, the motor must be stored in a dry, protected area, and in the mounting position indicated on the unit nameplate. In order to ensure that the motor has not been damaged by moisture after a prolonged storage, the insulation resistance should be checked. An insulation tester with a measurement voltage of at least 500V (e.g. magneto generator) should be used for this purpose. The insulation resistance is sufficient if it has an ohmic

value of at least  $1000 \times V_N$  (e.g. at  $V_N = 230\text{VAC}$ :  $R_{\text{insul}} \geq 230000 \text{ ohms} = 0.23\text{M ohms}$ ). If the measured value is smaller, the motor should be dried before use (for example, with hot air up to a maximum of 90°C or by resistance heating with an auxiliary AC voltage of 10% of  $V_N$  via an isolating transformer). Care should be taken to ensure that the motor is heated with not more than 20% of its rated current and that the rise in temperature is not more than 90°C. The drying procedure can be stopped when the insulation resistance has reached  $500000 = 0.5\text{M ohms}$ .

### Severe Duty Units

Severe Duty Units are indicated with the letters “-KS” at the end of the motor type on the motor nameplate. Severe Duty units include drain holes in the motor end bells and conduit box at the lowest points allowing condensation to drain out of the motor.

### CAUTION!

**The drain holes are installed for the mounting position listed on the gearbox nameplate. Installing a unit in a mounting position other than what is shown on the nameplate will reposition the condensation drain holes. As a result, the drain holes may not be located at the lowest point and may not allow water to drain. This can cause premature drive failure.**

### Electrical Connection

The motor must be installed and connected by a qualified electrician who is knowledgeable with the NEC article 430 and local regulations. He must make sure that the voltage and frequency of the electrical supply correspond with the data stamped on the motor nameplate before connecting the motor in accordance with the wiring diagram, which can be found in the terminal box. For brake connections, see the following pages.

At installation the electrician must make sure that the terminal block jumpers are positioned correctly and that all electrical connections including the ground connection are secure. In order to effectively protect the motor from overloads, appropriate motor protection must be provided. Fuses do not always provide adequate motor protection. For motors which are required to operate with a very high start-stop frequency, the overload heater type motor protection is insufficient. It is advisable in such applications to provide the motor with temperature sensors (thermistors) in the windings. Monitor the thermistors by means of an external trip device. In this way, the motor will be fully protected against practically all possible overloads.

When using motors outdoors or in washdown applications the cable entries into the terminal box must be directed downward to prevent water from entering the conduit box. The unused cable entries must be closed off properly.

### Lubrication and Maintenance

**WARNING! Always ensure equipment is secure and electrical power is off before removing or performing maintenance on the drive assembly.** The motor bearings are sealed and the grease content is adequate for the life of the bearing.

# SEW EURODRIVE

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& ASSEMBLY CENTER  
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2001 West Main Street/Troy OH 45373  
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EAST COAST ASSEMBLY CENTER  
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WEST COAST ASSEMBLY CENTER  
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(510) 487-3560 Fax: (510) 487-6381



## Brake Coil Resistance

Motor Frame	DT71-80	DT80	DT90-100	DT100	DV112-132S	DV132M-160M	DV160L-225	
Brake Size	BM(G)05	BM(G)1	BM(G)2	BM(G)4	BM(G)8	BM15	BM30/31/32/62	
Brake Torque (lb-ft)	0.89 - 3.7	4.4 - 7.4	3.7 - 14.8	17.7 - 29.5	7.00 - 55.3	18.4 - 110.6	36.9 - 442.5	
BRAKE VOLTAGE		$R_b(\Omega)$	$R_b(\Omega)$	$R_b(\Omega)$	$R_b(\Omega)$	$R_b(\Omega)$	$R_b(\Omega)$	
AC (to rectifier $V_b$ )	DC	$R_r(\Omega)$	$R_r(\Omega)$	$R_r(\Omega)$	$R_r(\Omega)$	$R_r(\Omega)$	$R_r(\Omega)$	
	—	24	4.3 13.2	3.8 11.8	3.3 10.3	7 8.2	1.6 8.2	0.8 5.0
105-116	48	17.1 52.5	15.2 47.0	13.3 40.9	10.7 32.7	6.2 32.7	3.1 20.1	2.8 21.1
186-207	80	54.0 166	48.1 149	42.1 129	33.8 103	19.6 103	9.8 63.5	8.9 66.7
208-233	96	68.0 209	60.5 187	53.0 163	42.5 130	24.7 130	12.4 80.8	11.2 84.0
330-369	147	171 525	152 470	133 409	107 327	62 327	31.1 201	28.1 211
370-414	167	215 661	191 591	168 515	134 411	78.1 411	39.2 253	35.4 266
415-464	185	271 832	241 744	211 649	169 518	98.3 518	49.3 318	44.6 334
465-522	208	341 1047	303 937	266 817	213 652	110 577	62.1 401	56.1 421

Voltage AC - The voltage shown is the nameplate AC brake voltage supplied to the brake rectifier.

DC - The voltage shown is the effective DC voltage required by the brake coil. The measured voltage from the rectifier will be 10-20% lower than that shown.

Brake Coil Resistance - values must be measured with the brake coil disconnected from the rectifier.

$R_b$  - Accelerator coil resistance in  $\Omega$ , measured from the red to the white brake coil wire.

$R_r$  - Fractional coil resistance in  $\Omega$ , measured from the white to the blue brake coil wire.

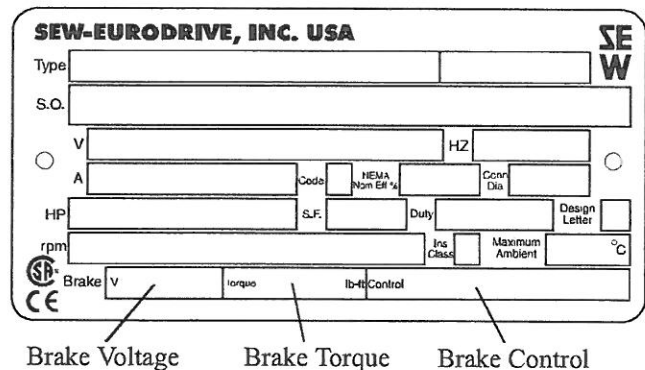
## Brake Connection (AC Voltage)

SEW-Eurodrive motor brakes can be connected in a number of different ways. In order to connect the brake for each application, it is important to refer to the data on the motor nameplate that describes the brake system. The brake fields are: brake voltage, brake torque and brake control.

This operating instruction covers AC brake voltages with the following brake control components. If the brake voltage is DC, or if the brake control components differ from those listed below, an additional operating instruction must be consulted for connection information.

SEW-Eurodrive fail-safe mechanical brakes are DC controlled. Standardly, a brake rectifier (halfwave) is provided to convert the AC line voltage to the DC voltage required to drive the brake. 24VDC brakes do not include a rectifier. When voltage ( $V_b$ ) is applied to the brake, it will release. When voltage ( $V_b$ ) is removed from the brake, it will set. The brake rectifier can be wired either for normal brake reaction time (setting, stopping) or fast brake reaction time. The fast brake reaction will set the brake more quickly which will provide a shorter and more repeatable stopping distance. There are two basic types of brake rectifiers, BG and

Brake Control (Rectifier)	Part Number
BG1.5	825 384 6
BG3.0	825 386 2
BGE1.5	825 385 4
BGE3.0	825 387 0



BGE. The BG brake rectifier is standard on motor sizes DT71 - DT100. The BGE rectifier is standard on motor sizes DV112 - DV225. The BGE rectifier can be ordered with motor sizes DT71 - DT100 and will provide faster brake release times allowing the motor to cycle more frequently.

The wiring diagrams for brake connections are located on the inside of the motor conduit box lid. The brake will release and allow the motor to rotate when the nameplate AC brake voltage  $V_b$  is supplied to the brake rectifier terminals. There are certain cases where the brake rectifier can receive its voltage from the motor's terminal block, meaning that when power is applied to the motor it will simultaneously release the brake and start the motor. See page 3 for this description.

## Brake Voltage Supplied from the Motor

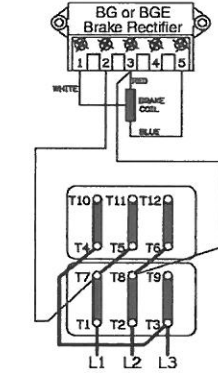
There are specific instances when the brake voltage can be tapped from the motor's terminal block. The advantage of brake systems wired in this way is when power is applied to the motor, the brake releases, (requiring no additional brake supply power wiring). The brake can be wired to the motor terminal block under the following conditions: a single speed motor; the motor is started and run across the line (i.e., no inverter or electronic soft start). The connections shown on this page are for normal brake reaction time. For rapid brake reaction time, incorporate the contact as shown on the brake diagram located on the inside of the motor conduit box lid.

### Brake Motor Connection

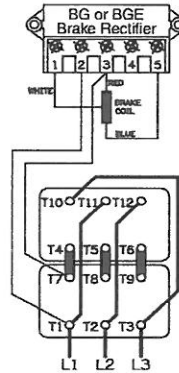
#### Single Speed Dual Voltage - Connection Diagram DT72

Example Motor Voltages:

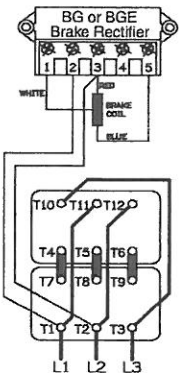
230 /460 Volts - 60 Hz



Motor wired for low voltage.  
Brake voltage matches low motor voltage.  
Example: 230/460V Motor  
Motor wired 230V  
Brake voltage 230V



Motor wired for high voltage.  
Brake voltage matches low motor voltage.  
Example: 230/460V Motor  
Motor wired 460V  
Brake voltage 230V



Motor wired for high voltage.  
Brake voltage matches high motor voltage.  
Example: 230/460V Motor  
Motor wired 460V  
Brake voltage 460V

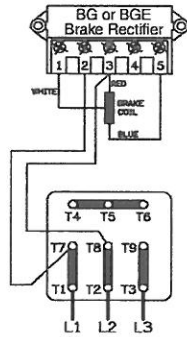
### Brake Motor Connection

#### Single Speed Dual Voltage - YYY Connection Diagram DT79

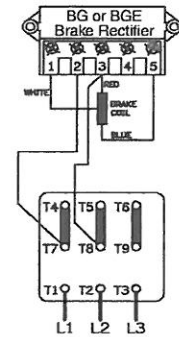
Example Motor Voltages:

230YY/460Y Volts - 60 Hz

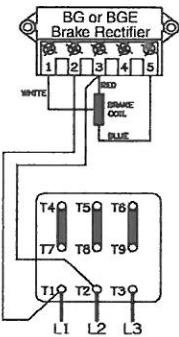
200YY/400Y Volts - 50 Hz



Motor wired for low voltage.  
Brake voltage matches low motor voltage.  
Example: 230/460V Motor  
Motor wired 230V  
Brake voltage 230V



Motor wired for high voltage.  
Brake voltage matches low motor voltage.  
Example: 230/460V Motor  
Motor wired 460V  
Brake voltage 230V



Motor wired for high voltage.  
Brake voltage matches high motor voltage.  
Example: 230/460V Motor  
Motor wired 460V  
Brake voltage 460V

### Brake Motor Connection

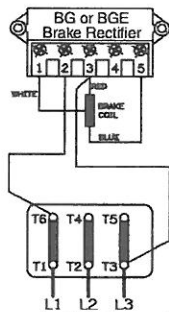
#### Single Speed Dual Voltage - /Y Connection Diagram DT13

Examples Motor Voltages:

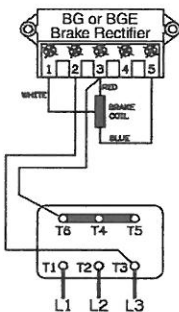
200 /346Y Volts - 60 Hz

330 /575Y Volts - 60 Hz

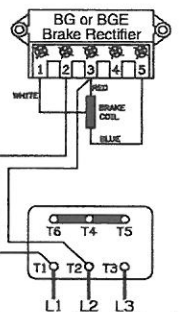
220 /380Y Volts - 50 Hz



Motor wired for low voltage.  
Brake voltage matches low motor voltage.  
Example: 200/346V Motor  
Motor wired 200V  
Brake voltage 200V



Motor wired for high voltage.  
Brake voltage matches low motor voltage.  
Example: 220/380V Motor  
Motor wired 380V  
Brake voltage 220V



Motor wired for high voltage.  
Brake voltage matches high motor voltage.  
Example: 220/380V Motor  
Motor wired 380V  
Brake voltage 380V

## Re-adjusting the Brake Air Gap

A properly adjusted brake air gap is critical for correct operation. The following table indicates the required air gap measurement.

Motor Size	Brake Size	Air Gap
DT71 - DT100	BM(G)05 - BM(G)4	0.010"-0.024" (0.25-0.6 mm)
DV112 - DV225	BM(G)8 - BM31	0.012"-0.047" (0.3-1.2 mm)
DV180-DV225	BM32-BM62 Double Disc	0.016"-0.047" (0.4-1.2 mm)

Prolonged use of the brake will wear the brake disc lining. This wear increases the air gap. When the air gap approaches its maximum value, the brake must be re-adjusted. To re-adjust the brake, follow the procedure below.

1. Remove the fan cover (14), fan snapping, fan (17), rubber seal (2), and any accessories at the fan end.
2. Insert a feeler gauge between the brake coil body (21) and the stationary disc (22), tighten the adjusting nuts (19) until the minimum value for the air gap is reached equally around the brake. With motor size 160L and up (brakes BM30 to BM62) first screw the threaded bushings (24) into the endshield. After setting the air gap, lock the bushings (24) against the coil body.
3. Ensure a play of 0.06" to 0.08" (1.5 to 2 mm) in the releasing arm. See "THE HAND RELEASE MECHANISM."

## Replacement of the Brake Disc (26)

Extended operation of the brake may wear the brake disc (26) beyond acceptable limits. The thickness of the brake disc can be measured to determine if this has occurred.

Motor Size	Brake Size	Min. Disc (26) Thickness
DT71 - DT100	BM05 - BM4	0.354" (9mm)
DV112 - DV225	BM8 - BM62	0.394" (10mm)

If the brake disc (26) is worn below the measurement given, it must be replaced. If the thickness is greater than the specification above, the brake disc is still usable and the brake can be re-adjusted.

## The Hand Release Mechanism

Most of our brakes are supplied with a hand-operated release lever. This allows opening of the brake without applying power, allowing for adjustments on the driven machinery.

There are two brake release mechanisms available:

The "BMHR" (4) type requires a lever to be inserted into the release arm. To open the brake, pull the lever away from the motor. It will re-engage automatically, once the lever is released. The lever, when not used, is attached to the motor's cooling fins with clamps.

The screw-type "BMHF" (5) arrangement requires a hexagon key which, when turned clockwise, opens the brake.

Since the stationary disc (22) will move away from the coil body during the brake's operation, it is vital that there is free play (floating clearance) on the release arm of 0.060"-0.080" (1.5-2.0 mm). The springs (11) should be placed between the arm (7) and the nuts (12) to eliminate noise.

**The brake release mechanism is not used to change the brake's torque setting. There must always be clearance on the lever.**

## Troubleshooting

**Fault: Motor does not run**

1. Check the motor and brake wiring for damage and proper connection.

2. At the motor, measure the line voltage, line current and motor resistance of all three phases.
3. If all three phases read a similar current value the following conditions may exist:

- The motor may be blocked by either an excessive external load, or problems in the reducer or the brake. In both cases, the motor should draw locked rotor (in-rush) current. Consult SEW-Eurodrive catalogs for these values. Release the brake mechanically, reset the air gap if needed, or disconnect the load from the output shaft.

- If the brake is at fault electrically see #4 below.

- If the current differs significantly from the rated locked rotor current, the motor is either an incorrect voltage, or it is jumpered for the wrong voltage.

4. If the brake can be released mechanically, but does not respond to voltage, check the brake for electrical problems.

- Make sure the wiring is according to the instructions. Pay special attention to the brake voltage.

- Energize the brake circuit and measure the AC voltage on the rectifier terminals 2 and 3 (BG/BGE rectifiers). The measured voltage should correspond to the nameplate inscription: "Brake V."

- Measure the DC voltage across terminals 3 and 5 of the brake rectifier which should be about 35% to 45% of the previously measured AC voltage.

- If there is no fault found to this point, measure the resistance of the brake coils. Disconnect the coil from the rectifier for this measurement. See the table on Page 2 for the brake coil resistance values.

- Measure the resistance of each brake coil lead to the brake coil body. This test should show an open circuit. If a short is found, the brake coil is damaged.

If the results of all these checks (electrical connection, mechanical checks and adjustments, and electrical tests) indicate that the brake should work, then the most likely cause of the brake's failure to release is a damaged brake rectifier.

**Fault: Brake stopping time is too slow**

If the brake has been operating well for some time and a gradual increase in stopping time has occurred, the release arm may have come in contact with the coil body. Verify that the brake release arm end play is correct, and check for excessive brake disc wear, (see previous instructions).

If the brake has been in operation for some time, and the stopping has become erratic, dust accumulation around the stationary disc guides may be the cause. Remove the brake's rubber sealing collar and clean with an air hose.

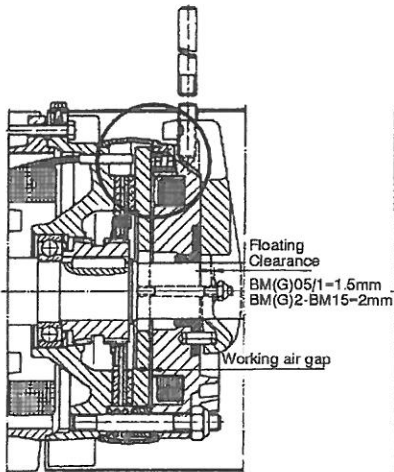
If the application is new, check the brake's wiring and air gap. If the brake is not wired for fast response, then changing the brake wiring to fast response will decrease the stopping time. Vertical motion and indexing applications may also require the fast response connection. Increasing the brake's torque may remedy the situation, but will also increase stress on the transmission.

On applications requiring excessive brake work, the lining's surface may become glazed due to extreme heat. The application of a BGE rectifier will improve this situation dramatically. BGE rectifiers are standard equipment on motors size DV 112 - DV225, but optional on the smaller sizes DT71-DT100. Contact SEW-Eurodrive for more information.

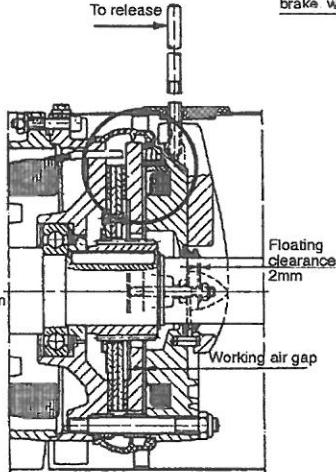


# BM(G) Brake Cross Section and Exploded Views

## BM(G) 05 - BM 15



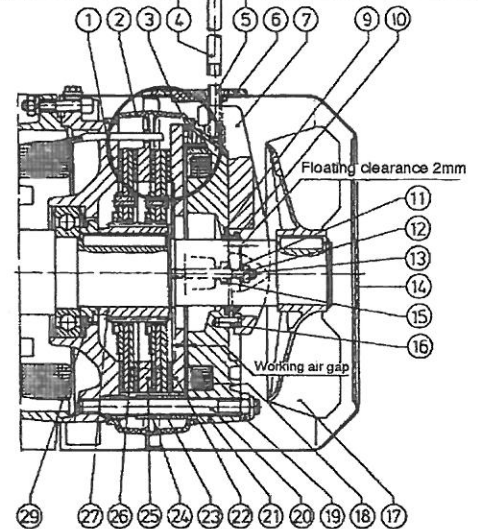
## BM 30/31



## BM 32/62

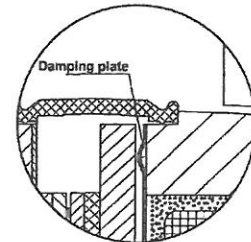
Hand lever for manually disengaging the brake will re-engage itself when released

Manual brake release screw for fixing brake in the dis-engaged position

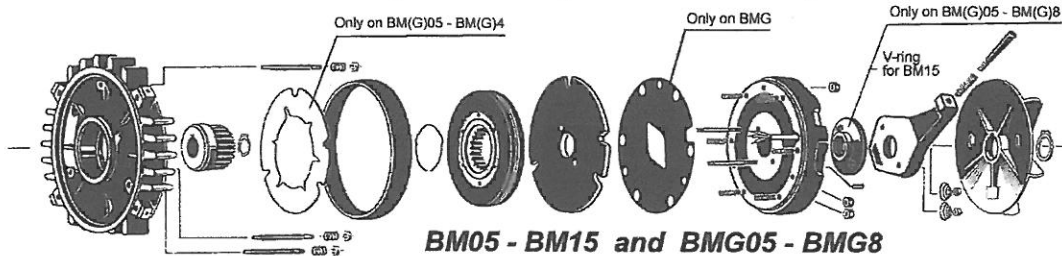


- (1) Brake end shield
- (2) Rubber sealing collar
- (3) Braking springs
- (4) Hand release lever
- (5) Releasing screw
- (6) Closing plate
- (7) Release arm
- (9) Sealing ring
- (10) V-ring
- (11) Conical spring
- (12) Release
- (13) Stud
- (14) Fanguard
- (15) Grommet

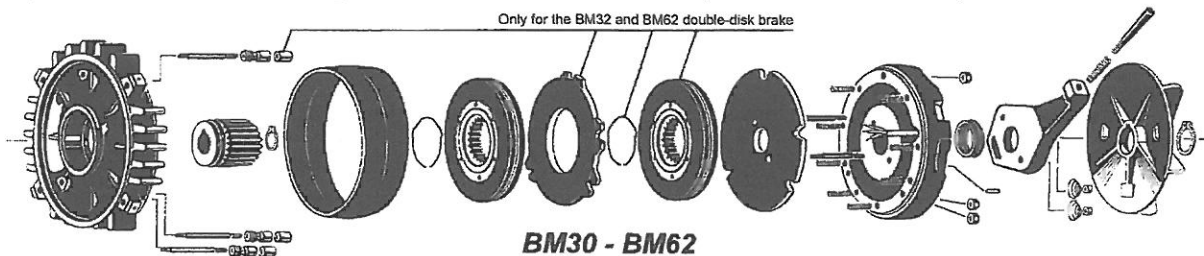
- (16) Dowel pin
- (17) Fan
- (18) N/A
- (19) Brake adjustment nut
- (20) Retaining stud
- (21) Brake coil body
- (22) Stationary disc
- (23) Pressure ring
- (24) Setting sleeve
- (25) Dual brake pad stationary disc
- (26) Brake disc complete
- (27) Carrier
- (29) Cup Spring



## Exploded view of the BM and BMG single-disk brake (motor sizes 71-160M)



## Exploded view of the BM single-disk and double-disk brake (motor sizes 160L-225)



## Troubleshooting Chart

PROBLEM	CAUSE	REMEDY
Motor Overheats (Check temperature with instrumentation)	Motor not connected for proper supply voltage	Check connection diagram on conduit box cover and correct the wiring.
	Supply voltage varies outside the allowable tolerance causing an undervoltage or overvoltage condition.	Assure correct supply voltage.
	Insufficient cooling air volume due to: a. Low frequency operation on variable frequency drive. b. Obstructed air flow.	Increase air flow: a. Continuous running auxiliary fan. b. Ensure unobstructed air flow.
	Ambient temperature is too high.	Ensure cool air gets to the motor. Ducting may be required.
	Overload at rated voltage. Unit will draw current in excess of nameplate rating and run below rated speed.	Select a larger unit.
	Motor's allowable duty cycle is exceeded (too many starts per hour required).	The problem may or may not be solved with a larger motor. Contact SEW-Eurodrive.
	Single phasing due to break or loose connection in supply line or blown fuse.	Repair supply lines. Replace fuses.
Motor does not run.	Blown fuse.	Determine and correct cause of failure and replace fuse.
	Motor protection device activated.	Reset protective device. Identify and correct cause for device activation.
	Motor protection device faulty or will not reset.	Check protection device for faults.
Motor will not start or starts sluggishly.	Motor not connected for proper voltage.	Check connection diagram in conduit box cover and correct the wiring.
	Large voltage and/or frequency fluctuation at starting.	Ensure stable power supply.
For reduced voltage starting, motor will not start in Star Connection but will start in Delta connection.	Insufficient torque in Star Connection.	Start motor directly in Delta Connection if possible. Otherwise use a larger motor.
	Faulty contact in Star/Delta starter.	Correct fault condition.
Motor hums and draws high current.	Faulty or defective winding.	Have motor repaired by qualified service shop.
	Rotor dragging.	
Fuses blow or motor overcurrent protection trips immediately.	Short circuit in power supply conductors or in the motor.	Correct the fault condition.
	Motor has ground fault or winding to winding short circuit.	Have motor repaired by qualified service shop.
	Motor improperly connected.	Check connection diagram in conduit box cover and correct the wiring.
Motor runs in wrong direction.	Motor supply leads misconnected.	Switch two supply leads.

Note: If, after proceeding through the Troubleshooting Chart, the motor is found to be defective, contact your nearest SEW-Eurodrive Assembly Center for warranty assistance or replacement parts.

# Gearmotors and Gear Reducers

OPERATING INSTRUCTIONS

01 805 52 US

## GENERAL


These operating instructions are intended to help you install and operate the drive. For trouble free service, proper installation and operation are essential. Additionally, these instructions contain important recommendations on maintenance.

Before shipment, every SEW-Eurodrive gear unit is tested, checked and properly packed. However, please inspect the drive immediately upon arrival for shortage or transit damage. Note the damage or shortage on the freight bill of lading and file a claim with the carrier. Also, notify SEW-Eurodrive of the shortage or damage.

## LUBRICANTS


All gearmotors and gear reducers are supplied with the correct grade and quantity of lubricating oil for the specified mounting position. Exceptions include reducers shipped without input assemblies. The recommended lubricants are found on page 2.


## LONG TERM STORAGE

If the drive is not installed immediately, it should be stored in a dry, protected area. If the drive is to be stored for an extended period of time and was not ordered from SEW for long term storage, contact your nearest SEW assembly plant for information on Long Term Storage or request  Document #2115.

Drives which are used for standby service should be stored as a sealed gearcase.

## INSTALLATION OF COMPONENTS ON DRIVE SHAFTS

Do not hammer on the shafts. Hammering can cause brinelling of the reducer's bearings shortening the bearing life. We recommend heating the components to approximately 175°F (when possible) and sliding them on the shaft. This will reduce possible damage to the reducer's bearings.  Document #2116.

For both standard and metric SEW shaft tolerances, refer to the SEW Catalog or request  Document #2154.


Shaft couplings should be properly aligned to prevent vibration, coupling wear, and premature failure of the shaft bearings.

To prevent the output shaft and bearings from being subjected to excessive loads, the maximum overhung load, as shown in SEW-Eurodrive catalogs, should not be exceeded. Please consult our engineering department if the load may exceed the recommended figure given or where there are combined radial and axial loads. In such cases, the exact operating conditions must be stated including speed, direction of rotation, position, magnitude and direction of the external radial and axial loads being applied.

## SHAFT MOUNTED REDUCERS

SEW-Eurodrive supplies the recommended hollowshaft mounting paste with every hollowshaft reducer. The mounting paste is to be applied on the keyed output shaft. The mounting paste is to aid in the prevention of rusting and fretting corrosion between the reducer hollowshaft and the shaft of the driven machine. The mounting paste will aid in shaft removal when necessary.

**Warning! Always ensure exposed, rotating parts are properly covered to ensure safety.**

For additional information on shaft mounted reducers, drive shaft configuration and tolerances, refer to the SEW-Eurodrive Catalog or request  Documents #2201 and #2202.

## INSTALLATION AND OPERATION

The drive installation site should be selected to ensure:

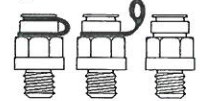
- Ambient temperatures below 40°C (104°F).
- Unimpeded flow of air to the motor and variable speed units.
- Accessibility to the drain, level and breather plugs.
- Adequate space for the removal of brakemotor fanguard for brake adjustment and maintenance.

The drive unit should be mounted on a flat, vibration damping, and torsionally rigid structure. Careful alignment is critical. Mounting to an uneven surface will cause housing distortion. The flatness tolerance of the supporting surface should not exceed:

- For gear units size 80 and smaller — 0.004 inch.
- For gear units above size 80 — 0.008 inch.


For transportation, the units are supplied with the breather plug already mounted. After the unit is installed, the black rubber seal located on the breather MUST BE REMOVED (Fig. 1).

Fig. 1



In addition, the oil level should be checked. Remove the plated (non-painted) oil level plug. The oil level is correct when the surface of the oil is level with the lowest point of that tapped hole, the exception is S37. Units W20 and W30 are sealed in any position.

After installation, the actual mounting position should be confirmed against the mounting position shown on the gear reducer nameplate. Adequate lubrication is only guaranteed if the unit is mounted in the specific nameplated mounting position.

Refer to the SEW Catalog or request  Document #2111, #2112, #2113, or #2114 (R, F, K, or S, respectively) if a specific mounting position diagram is needed.

## MAINTENANCE

**Warning! Always ensure equipment is secure and electrical power is off before removing or performing maintenance on the drive assembly.** Oil levels and oil quality should be checked at regular intervals, determined by usage and the environment. Grease and oil should be changed per the recommendations on page 2. Check coupling alignment, chain or belt tension, and mounting bolt torque periodically. Keep the drive relatively free of dust and dirt.



For additional information, call the SEW FAXline, 1-800-601-6195, and request document number shown.

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# LUBRICANTS

LUBRICATION SCHEDULE FOR SEW-EURODRIVE GEAR UNITS									
Gear Reducer Type <sup>1)</sup>	Lubrication Type	Ambient air temperature range °F	ISO Viscosity Grade	Mobil Oil Co.	CHEVRON Oil Co.	Shell Oil Co.	Texaco Oil Co.	BP Oil Co.	Kluber Oil Co.
R F K	Oil	+14 to +104	VG220	Mobilgear 630	Chevron Non-Leaded Gear Compound 220	Shell Omala Oil 220	Meropa 220	BP Energol GP-XP 220	Kluberol GEM 1-220
		-4 to +77	VG150 VG100	Mobilgear 629	Chevron Non-Leaded Gear Compound 150	Shell Omala Oil 100	Meropa 150	BP Energol GP-XP 100	Kluberol GEM 1-150
S	Oil	+32 to +104	VG680	Mobilgear 636	Chevron Non-Leaded Gear Compound 680	Shell Omala Oil 680	Meropa 680	BP Energol GP-XP 680	Kluberol GEM 1-680
		+5 to +77	VG220	Mobilgear 630	Chevron Non-Leaded Gear Compound 220	Shell Omala Oil 220	Meropa 220	BP Energol GP-XP 220	Kluberol GEM 1-220
General	Synth. Oil	+176 to -40	Consult Factory For Use of Synthetic Oils						
	Synth. Grease	+176 to -40	Consult Factory For Use of Grease Filled Reducers						
Ball & Roller Bearings	Grease Used for normal application Temp. Range: -22°F to 140°F			Mobilux EP2	Chevron Dura-Lith EP2	Shell Alvania Grease R3	Multifak EP2	BP Energrease LS3	CENTOPLEX 2EP

<sup>1)</sup> Applies to all reducers with or without motor and input shaft.

Oil levels and oil quality should be checked at frequent intervals, depending on usage. Oil changes are required at intervals of 10,000 operating hours or every two years, whichever comes first. If a synthetic oil lubricant is used, then this period can be extended to 20,000 operating hours or every four years, whichever comes first. In applications where hostile operating conditions exist, such as high humidity, corrosive environment, or large temperature changes, the lubricant should be changed at more frequent intervals.

The gear units W20 and W30 are supplied with a synthetic oil which is good for the life of the reducer, independent of the mounting position.

Grease packed bearings should be cleaned and regreased every 10,000 hours or 20,000 hours for synthetic grease. Input (high speed) bearings should not be overgreased. They should be filled with grease not to exceed 1/3 of the bearing's free volume. For output bearings and bearings with replaceable grease shields, fill to 2/3 of their free volume.

## ATTENTION

When the recommended lubricant is not available, it is permissible to use a lubricant having equivalent characteristics but we do not recommend that lubricants of different brands be mixed. Under no circumstances should synthetic lubricants be mixed with one another or with one having a mineral base.

# LUBRICANTS

The approximate lubricant in US gallons and liters per mounting position is as follows:

Gear Unit	Mounting Position											
	M1 <sup>1)</sup>		M2 <sup>1)</sup>		M3 <sup>2)</sup>		M4		M5 <sup>2)</sup>		M6 <sup>2)</sup>	
	Gallons	Liters	Gallons	Liters	Gallons	Liters	Gallons	Liters	Gallons	Liters	Gallons	Liters
RX57	0.16	0.6	0.21	0.8	0.34	1.3	0.34	1.3	0.24	0.9	0.24	0.9
RX67	0.21	0.8	0.21	0.8	0.45	1.7	0.50	1.9	0.29	1.1	0.29	1.1
RX77	0.29	1.1	0.40	1.5	0.69	2.6	0.71	2.7	0.42	1.6	0.42	1.6
RX87	0.45	1.7	0.66	2.5	1.27	4.8	1.27	4.8	0.77	2.9	0.77	2.9
RX97	0.55	2.1	0.90	3.4	1.96	7.4	1.85	7	1.27	4.8	1.27	4.8
RX107	1.03	3.9	1.48	5.6	3.06	11.6	3.14	11.9	2.03	7.7	2.03	7.7
RXF57	0.13	0.5	0.21	0.8	0.29	1.1	0.29	1.1	0.18	0.7	0.18	0.7
RXF67	0.18	0.7	0.21	0.8	0.40	1.5	0.45	1.7	0.26	1	0.26	1
RXF77	0.24	0.9	0.40	1.5	0.63	2.4	0.66	2.5	0.42	1.6	0.42	1.6
RXF87	0.42	1.6	0.66	2.5	1.29	4.9	1.24	4.7	0.77	2.9	0.77	2.9
RXF97	0.55	2.1	0.95	3.6	1.88	7.1	1.85	7	1.27	4.8	1.27	4.8
RXF107	0.82	3.1	1.56	5.9	2.96	11.2	2.77	10.5	1.90	7.2	1.90	7.2
R17/R17F	0.07	0.25	0.16	0.6	0.09	0.35	0.16	0.6	0.09	0.35	0.09	0.35
R27/R27F	0.07 (0.11)	0.25 (0.4)	0.18	0.7	0.11	0.4	0.18	0.7	0.11	0.4	0.11	0.4
R37/R37F	0.08 (0.26)	0.3 (1)	0.24	0.9	0.26	1	0.29	1.1	0.21	0.8	0.26	1
R47/R47F	0.18 (0.40)	0.7 (1.5)	0.42	1.6	0.40	1.5	0.45	1.7	0.40	1.5	0.40	1.5
R57/R57F	0.21 (0.45)	0.8 (1.7)	0.50	1.9	0.45	1.7	0.55	2.1	0.45	1.7	0.45	1.7
R67/R67F	0.29 (0.61)	1.1 (2.3)	0.69 (0.92)	2.6 (3.5)	0.74	2.8	0.85	3.2	0.48	1.8	0.53	2
R77/R77F	0.32 (0.79)	1.2 (3)	1.00 (1.14)	3.8 (4.3)	0.95	3.6	1.14	4.3	0.66	2.5	0.90	3.4
R87/R87F	0.61 (1.59)	2.3 (6)	1.77 (2.22)	6.7 (8.4)	1.90	7.2	2.03	7.7	1.66	6.3	1.72	6.5
R97	1.22 (2.59)	4.6 (9.8)	3.09 (3.70)	11.7 (14)	3.09	11.7	3.54	13.4	2.99	11.3	3.09	11.7
R107	1.59 (3.62)	6 (13.7)	4.31	16.3	4.46	16.9	5.07	19.2	3.49	13.2	4.20	15.9
R137	2.64 (6.61)	10 (25)	7.40	28	7.79	29.5	8.32	31.5	6.61	25	6.61	25
R147	4.07 (10.57)	15.4 (40)	12.29	46.5	12.68	48	13.74	52	10.44	39.5	10.83	41
R167	7.13 (18.49)	27 (70)	21.66	82	20.61	78	23.25	88	17.44	66	18.23	69
RF17	0.07	0.25	0.16	0.6	0.09	0.35	0.16	0.6	0.09	0.35	0.09	0.35
RF27	0.07 (0.11)	0.25 (0.4)	0.18	0.7	0.11	0.4	0.18	0.7	0.11	0.4	0.11	0.4
RF37	0.11 (0.26)	0.4 (1)	0.24	0.9	0.26	1	0.29	1.1	0.21	0.8	0.26	1
RF47	0.18 (0.40)	0.7 (1.5)	0.42	1.6	0.40	1.5	0.45	1.7	0.40	1.5	0.40	1.5
RF/RM57	0.21 (0.45)	0.8 (1.7)	0.48	1.8	0.45	1.7	0.53	2	0.45	1.7	0.45	1.7
RF/RM67	0.32 (0.66)	1.2 (2.5)	0.71 (0.95)	2.7 (3.6)	0.71	2.7	0.82	3.1	0.50	1.9	0.55	2.1
RF/RM77	0.32 (0.69)	1.2 (2.6)	1.00 (1.08)	3.8 (4.1)	0.87	3.3	1.08	4.1	0.63	2.4	0.79	3
RF/RM87	0.63 (1.59)	2.4 (6)	1.8 (2.09)	6.8 (7.9)	1.88	7.1	2.03	7.7	1.66	6.3	1.69	6.4
RF/RM97	1.35 (2.69)	5.1 (10.2)	3.14 (3.70)	11.9 (14)	2.96	11.2	3.70	14	2.96	11.2	3.12	11.8
RF/RM107	1.66 (3.94)	6.3 (14.9)	4.20	15.9	4.49	17	5.07	19.2	3.46	13.1	4.20	15.9
RF/RM137	2.51 (6.61)	9.5 (25)	7.13	27	7.66	29	8.59	32.5	6.61	25	6.61	25
RF/RM147	4.33 (11.10)	16.4 (42)	12.42	47	12.68	48	13.74	52	11.10	42	11.10	42
RF/RM167	6.87 (18.49)	26 (70)	21.66	82	20.61	78	23.25	88	17.17	65	18.76	71

<sup>1)</sup> On compound gear units the primary (larger) gear unit is provided with the oil quantity in parenthesis.

<sup>2)</sup> On compound gear units having mounting positions M3, M5, or M6 the secondary (smaller) gear unit is provided with the oil filling of the M1 flanged mounting position.



For additional information on R-Series mounting positions, refer to the SEW Catalog or call the SEW FAXline, 1-800-601-6195, and request Document #2111.

# LUBRICANTS

The approximate lubricant in US gallons and liters per mounting position is as follows:

Gear Unit	Mounting Position											
	M1		M2		M3		M4		M5		M6	
	Gallons	Liters	Gallons	Liters	Gallons	Liters	Gallons	Liters	Gallons	Liters	Gallons	Liters
F27	0.16	0.6	0.21	0.8	0.18	0.7	0.18	0.7	0.16	0.6	0.16	0.6
F37	0.26	1	0.32	1.2	0.18	0.7	0.32	1.2	0.26	1	0.29	1.1
F47	0.40	1.5	0.48	1.8	0.29	1.1	0.50	1.9	0.40	1.5	0.45	1.7
F57	0.69	2.6	0.98	3.7	0.55	2.1	0.92	3.5	0.74	2.8	0.77	2.9
F67	0.71	2.7	1.00	3.8	0.50	1.9	1.00	3.8	0.77	2.9	0.85	3.2
F77	1.32	5	1.93	7.3	1.14	4.3	2.11	8	1.59	6	1.66	6.3
F87	2.64	10	3.43	13	2.03	7.7	3.65	13.8	2.85	10.8	2.91	11
F97	4.89	18.5	5.94	22.5	3.33	12.6	6.66	25.2	4.89	18.5	5.28	20
F107	6.47	24.5	8.45	32	5.15	19.5	9.91	37.5	7.13	27	7.13	27
F127	10.70	40.5	14.53	55	8.98	34	16.12	61	12.29	46.5	12.42	47
F157	18.23	69	27.48	104	16.64	63	27.74	105	22.72	86	20.61	78
FF27	0.16	0.6	0.21	0.8	0.18	0.7	0.18	0.7	0.16	0.6	0.16	0.6
FF37	0.26	1	0.32	1.2	0.18	0.7	0.34	1.3	0.26	1	0.29	1.1
FF47	0.42	1.6	0.50	1.9	0.29	1.1	0.50	1.9	0.40	1.5	0.45	1.7
FF57	0.74	2.8	1.00	3.8	0.55	2.1	0.98	3.7	0.77	2.9	0.79	3
FF67	0.71	2.7	1.00	3.8	0.50	1.9	1.00	3.8	0.77	2.9	0.85	3.2
FF77	1.35	5.1	1.93	7.3	1.14	4.3	2.14	8.1	1.59	6	1.66	6.3
FF87	2.72	10.3	3.49	13.2	2.06	7.8	3.73	14.1	2.91	11	2.96	11.2
FF97	5.02	19	5.94	22.5	3.33	12.6	6.74	25.5	4.99	18.9	5.42	20.5
FF107	6.74	25.5	8.45	32	5.15	19.5	10.17	38.5	7.27	27.5	7.40	28
FF127	10.96	41.5	14.80	56	8.98	34	16.64	63	12.29	46.5	12.95	49
FF157	19.02	72	27.74	105	16.91	64	28.01	106	22.99	87	20.87	79
FA/FH/FV27 FAF/FHF/FVF27 FAZ/FHZ/FVZ27	0.16	0.6	0.21	0.8	0.18	0.7	0.18	0.7	0.16	0.6	0.16	0.6
FA/FH/FV37 FAF/FHF/FVF37 FAZ/FHZ/FVZ37	0.26	1	0.32	1.2	0.18	0.7	0.32	1.2	0.26	1	0.29	1.1
FA/FH/FV47 FAF/FHF/FVF47 FAZ/FHZ/FVZ47	0.40	1.5	0.48	1.8	0.29	1.1	0.50	1.9	0.40	1.5	0.45	1.7
FA/FH/FV57 FAF/FHF/FVF57 FAZ/FHZ/FVZ57	0.71	2.7	1.00	3.8	0.55	2.1	0.95	3.6	0.77	2.9	0.79	3
FA/FH/FV67 FAF/FHF/FVF67 FAZ/FHZ/FVZ67	0.71	2.7	1.00	3.8	0.50	1.9	1.00	3.8	0.77	2.9	0.85	3.2
FA/FH/FV77 FAF/FHF/FVF77 FAZ/FHZ/FVZ77	1.32	5	1.93	7.3	1.14	4.3	2.11	8	1.59	6	1.66	6.3
FA/FH/FV87 FAF/FHF/FVF87 FAZ/FHZ/FVZ87	2.64	10	3.43	13	2.03	7.7	3.65	13.8	2.85	10.8	2.91	11
FA/FH/FV97 FAF/FHF/FVF97 FAZ/FHZ/FVZ97	4.89	18.5	5.94	22.5	3.33	12.6	6.61	25	4.89	18.5	5.28	20
FA/FH/FV107 FAF/FHF/FVF107 FAZ/FHZ/FVZ107	6.47	24.5	8.45	32	5.15	19.5	9.91	37.5	7.13	27	7.13	27
FA/FH/FV127 FAF/FHF/FVF127 FAZ/FHZ/FVZ127	10.30	39	14.53	55	8.98	34	16.12	61	11.89	45	12.29	46.5
FA/FH/FV157 FAF/FHF/FVF157 FAZ/FHZ/FVZ157	17.97	68	27.21	103	16.38	62	27.48	104	22.46	85	20.34	77



For additional information on F-Series mounting positions, refer to the SEW Catalog or call the SEW FAXline, 1-800-601-6195, and request Document #2112.

# LUBRICANTS

The approximate lubricant in US gallons and liters per mounting position is as follows:

Gear Unit	Mounting Position											
	M1		M2		M3		M4		M5		M6	
	Gallons	Liters	Gallons	Liters	Gallons	Liters	Gallons	Liters	Gallons	Liters	Gallons	Liters
K37	0.13	0.5	0.26	1	0.26	1	0.34	1.3	0.26	1	0.26	1
K47	0.21	0.8	0.34	1.3	0.40	1.5	0.53	2	0.42	1.6	0.42	1.6
K57	0.32	1.2	0.61	2.3	0.66	2.5	0.79	3	0.69	2.6	0.63	2.4
K67	0.29	1.1	0.63	2.4	0.69	2.6	0.90	3.4	0.69	2.6	0.69	2.6
K77	0.58	2.2	1.08	4.1	1.16	4.4	1.56	5.9	1.11	4.2	1.16	4.4
K87	0.98	3.7	2.11	8	2.30	8.7	2.88	10.9	2.06	7.8	2.11	8
K97	1.85	7	3.70	14	4.15	15.7	5.28	20	4.15	15.7	4.10	15.5
K107	2.64	10	5.55	21	6.74	25.5	8.85	33.5	6.34	24	6.34	24
K127	5.55	21	10.96	41.5	11.62	44	14.27	54	10.57	40	10.83	41
K157	8.19	31	16.38	62	17.17	65	23.78	90	15.32	58	16.38	62
K/KH167	9.25	35	26.42	100	26.42	100	33.03	125	22.46	85	22.46	85
K/KH187	15.85	60	44.91	170	44.91	170	54.16	205	34.35	130	34.35	130
KF37	0.13	0.5	0.29	1.1	0.29	1.1	0.40	1.5	0.26	1	0.26	1
KF47	0.21	0.8	0.34	1.3	0.45	1.7	0.58	2.2	0.42	1.6	0.42	1.6
KF57	0.34	1.3	0.61	2.3	0.71	2.7	0.79	3	0.77	2.9	0.71	2.7
KF67	0.29	1.1	0.63	2.4	0.74	2.8	0.95	3.6	0.71	2.7	0.71	2.7
KF77	0.55	2.1	1.08	4.1	1.16	4.4	1.59	6	1.19	4.5	1.19	4.5
KF87	0.98	3.7	2.17	8.2	2.38	9	3.14	11.9	2.22	8.4	2.22	8.4
KF97	1.85	7	3.88	14.7	4.57	17.3	5.68	21.5	4.15	15.7	4.36	16.5
KF107	2.64	10	5.81	22	6.87	26	9.25	35	6.61	25	6.61	25
KF127	5.55	21	10.96	41.5	12.15	46	14.53	55	10.83	41	10.83	41
KF157	8.19	31	17.44	66	18.23	69	24.31	92	16.38	62	16.38	62
KA/KH/KV37 KAF/KHF/KVF37 KAZ/KHZ/KVZ37	0.13	0.5	0.26	1	0.26	1	0.37	1.4	0.26	1	0.26	1
KA/KH/KV47 KAF/KHF/KVF47 KAZ/KHZ/KVZ47	0.21	0.8	0.34	1.3	0.42	1.6	0.55	2.1	0.42	1.6	0.42	1.6
KA/KH/KV57 KAF/KHF/KVF57 KAZ/KHZ/KVZ57	0.34	1.3	0.61	2.3	0.71	2.7	0.79	3	0.77	2.9	0.71	2.7
KA/KH/KV67 KAF/KHF/KVF67 KAZ/KHZ/KVZ67	0.29	1.1	0.63	2.4	0.71	2.7	0.95	3.6	0.69	2.6	0.69	2.6
KA/KH/KV77 KAF/KHF/KVF77 KAZ/KHZ/KVZ77	0.55	2.1	1.08	4.1	1.22	4.6	1.59	6	1.16	4.4	1.16	4.4
KA/KH/KV87 KAF/KHF/KVF87 KAZ/KHZ/KVZ87	0.98	3.7	2.17	8.2	2.32	8.8	2.93	11.1	2.11	8	2.11	8
KA/KH/KV97 KAF/KHF/KVF97 KAZ/KHZ/KVZ97	1.85	7	3.88	14.7	4.15	15.7	5.28	20	4.15	15.7	4.15	15.7
KA/KH/KV107 KAF/KHF/KVF107 KAZ/KHZ/KVZ107	2.64	10	5.42	20.5	6.34	24	8.45	32	6.34	24	6.34	24
KA/KH/KV127 KAF/KHF/KVF127 KAZ/KHZ/KVZ127	5.55	21	10.96	41.5	11.36	43	13.74	52	10.57	40	10.57	40
KA/KH/KV157 KAF/KHF/KVF157 KAZ/KHZ/KVZ157	8.19	31	17.44	66	17.70	67	22.99	87	16.38	62	16.38	62



For additional information on K-Series mounting positions, refer to the SEW Catalog or call the SEW FAXline, 1-800-601-6195, and request Document #2113.

# LUBRICANTS

The approximate lubricant in US gallons and liters per mounting position is as follows:

Gear Unit	Mounting Position											
	M1		M2		M3 <sup>1)</sup>		M4		M5		M6	
	Gallons	Liters	Gallons	Liters	Gallons	Liters	Gallons	Liters	Gallons	Liters	Gallons	Liters
S37	0.07	0.25	0.11	0.4	0.13	0.5	0.16	0.6	0.11	0.4	0.11	0.4
S47	0.09	0.35	0.21	0.8	0.18 (0.24)	0.7 (0.9)	0.29	1.1	0.21	0.8	0.21	0.8
S57	0.13	0.5	0.32	1.2	0.26 (0.32)	1 (1.2)	0.40	1.5	0.34	1.3	0.34	1.3
S67	0.26	1	0.53	2	0.58 (0.82)	2.2 (3.1)	0.85	3.2	0.69	2.6	0.69	2.6
S77	0.50	1.9	1.11	4.2	0.98 (1.43)	3.7 (5.4)	1.59	6	1.16	4.4	1.16	4.4
S87	0.87	3.3	2.14	8.1	1.82 (2.75)	6.9 (10.4)	3.17	12	2.22	8.4	2.22	8.4
S97	1.80	6.8	3.96	15	3.54 (4.76)	13.4 (18)	5.94	22.5	4.49	17	4.49	17
SF37	0.07	0.25	0.11	0.4	0.13	0.5	0.16	0.6	0.11	0.4	0.11	0.4
SF47	0.11	0.4	0.24	0.9	0.24 (0.29)	0.9 (1.1)	0.32	1.2	0.26	1	0.26	1
SF57	0.13	0.5	0.32	1.2	0.26 (0.40)	1 (1.5)	0.42	1.6	0.37	1.4	0.37	1.4
SF67	0.26	1	0.58	2.2	0.61 (0.79)	2.3 (3)	0.85	3.2	0.71	2.7	0.71	2.7
SF77	0.50	1.9	1.08	4.1	1.03 (1.53)	3.9 (5.8)	1.72	6.5	1.29	4.9	1.29	4.9
SF87	1.00	3.8	2.11	8	1.88 (2.67)	7.1 (10.1)	3.17	12	2.40	9.1	2.40	9.1
SF97	1.96	7.4	3.96	15	3.65 (4.97)	13.8 (18.8)	6.24	23.6	4.76	18	4.76	18
SA/SH37 SAF/SHF37 SAZ/SHZ37	0.07	0.25	0.11	0.4	0.13	0.5	0.16	0.6	0.11	0.4	0.11	0.4
SA/SH47 SAF/SHF47 SAZ/SHZ47	0.11	0.4	0.21	0.8	0.18 (0.24)	0.7 (0.9)	0.29 <sup>2)</sup>	1.1 <sup>2)</sup>	0.21	0.8	0.21	0.8
SA/SH57 SAF/SHF57 SAZ/SHZ57	0.13	0.5	0.29	1.1	0.26 (0.40)	1 (1.5)	0.42	1.6	0.32	1.2	0.32	1.2
SA/SH67 SAF/SHF67 SAZ/SHZ67	0.26	1	0.53	2	0.48 (0.69)	1.8 (2.6)	0.77	2.9	0.66	2.5	0.66	2.5
SA/SH77 SAF/SHF77 SAZ/SHZ77	0.48	1.8	1.03	3.9	0.95 (1.32)	3.6 (5)	1.56	5.9	1.19	4.5	1.19	4.5
SA/SH87 SAF/SHF87 SAZ/SHZ87	1.00	3.8	1.96	7.4	1.59 (2.30)	6 (8.7)	2.96	11.2	2.11	8	2.11	8
SA/SH97 SAF/SHF97 SAZ/SHZ97	1.85	7	3.70	14	3.01 (4.23)	11.4 (16)	5.55	21	4.15	15.7	4.15	15.7

<sup>1)</sup> On compound gear units the primary (larger) gear unit is provided with the oil quantity in parenthesis.

<sup>2)</sup> When combined with a 2-pole motor at M4 mounting position, the oil quantity must be reduced to 0.28 gallons (1.05 liters).



For additional information on S-Series mounting positions, refer to the SEW Catalog or call the SEW FAXline, 1-800-601-6195, and request Document #2114.

For compound drives the R reducer requires its own oil filling as shown in the chart:

Gear Unit	Mounting Position					
	M1/M3/M5/M6		M2		M4	
	Gallons	Liters	Gallons	Liters	Gallons	Liters
R17	0.07	0.25	0.16	0.6	0.16	0.6
R37	0.11	0.4	0.24	0.9	0.29	1.1
R57	0.21	0.8	0.48	1.8	0.53	2
R77	0.32	1.2	1.00	3.8	1.08	4.1
R87	0.63	2.4	1.8	6.8	2.03	7.7
R97	1.35	5.1	3.14	11.9	3.70	14
R107	1.66	6.3	4.20	15.9	5.07	19.2