

**STERLING
ELECTRIC, INC.**

Responding with equipment that performs.

SLO-SPEED® 2000HG

**INSTALLATION & MAINTENANCE
H030 through H140**

WHERE QUALITY IS IN CONTROL

General - Sterling Electric power transmission equipment will operate safely provided it is selected, installed, used and maintained properly. As with any power transmission equipment, proper precautions must be taken as indicated in the following paragraphs to ensure safety.

Potential Hazards - These are not necessarily listed in any order of severity as the degree of danger varies in individual circumstances. It is important therefore that the list is studied in its entirety:

- 1) Fire/Explosion
 - (a) Oil mists and vapor are generated within gear units. It is therefore dangerous to use naked lights in the proximity of gearbox openings, due to the risk of fire or explosion.
 - (b) In the event of fire of serious overheating (over 570°F), certain materials (rubber, plastics, etc.) may decompose and produce fumes. Care should be taken to avoid exposure to the fumes, and the remains of burned or overheated plastic/rubber materials should be handled with rubber gloves.
- 2) Guards - Rotating shafts and couplings must be guarded to eliminate the possibility of physical contact or entanglement of clothing. It should be of rigid construction and firmly secured.
- 3) Noise - High speed gearboxes and gearbox driven machinery may produce noise levels which are damaging to the hearing with prolonged exposure. Ear defenders should be provided for personnel in these circumstances. Reference should be made to the Department of Employment Code of Practice for reducing exposure of employed persons to noise.
- 4) Lifting - Where provided (on larger units) only the lifting points or eyebolts must be used for lifting arrangement drawing or lifting point positions). Failure to use the lifting points provided may result in personal injury and/or damage to the product or surrounding equipment. Keep clear of raised equipment.
- 5) Lubricants and Lubrication
 - (a) Prolonged contact with lubricants can be detrimental to the skin. The manufacturer's instruction must be followed when handling lubricants.
 - (b) The lubrication status of the equipment must be checked before commissioning. Read and carry out all instructions on the lubricant plate and in the installation and maintenance literature. Heed all warning tags. Failure to do so could result in mechanical damage and in extreme cases risk of injury to personnel.
- 6) Electrical Equipment - Observe hazard warnings on electrical equipment and isolate power before working on the gearbox or associated equipment, in order to prevent the machinery being started.
- 7) Installation, Maintenance and Storage
 - (a) In the event that equipment is to be held in storage, for a period exceeding 6 months, prior to installation or commissioning, Sterling Electric, Inc. must be consulted regarding special preservation requirements. Unless otherwise agreed, equipment must be stored in a building protected from extremes of temperature and humidity to prevent deterioration. The rotating components (gears and shafts) must be turned a few revolutions once a month (to prevent bearing brinelling).
 - (b) External gearbox components may be supplied with preservative materials applied, in the form of a "waxed" tape overwrap or wax film preservative. Gloves should be worn when removing these materials. The former can be removed manually, the latter using white spirit as a solvent. Preservatives applied to the internal parts of the gear units do not require removal prior to operation.
 - (c) Installation must be performed in accordance with the manufacturer's instructions and be undertaken by suitably qualified personnel.
 - (d) Before working on a gearbox or associated equipment, ensure that the load has been removed from the system to eliminate the possibility of any movement of the machinery and isolate power supply. Where necessary, provide mechanical means to ensure the machinery cannot move or rotate. Ensure removal of such devices after work is complete.
 - (e) Ensure the proper maintenance of gearboxes in operation. Use only the correct tools and Sterling Electric, Inc. approved spare parts for repair and maintenance. Consult the Maintenance Manual before dismantling or performing maintenance work.
- 8) Hot Surfaces and Lubricants
 - (a) During operation, gear units may become sufficiently hot to cause skin burns. Care must be taken to avoid accidental contact.
 - (b) After extended running the lubricant in gear units and lubrication systems may reach temperatures sufficient to cause burns. Allow equipment to cool before servicing or performing adjustments.
- 9) Selection and Design
 - (a) Where gear units provide a holdback facility, ensure that backup systems are provided if failure of the holdback device would endanger personnel or result in damage.
 - (b) The driving and driven equipment must be correctly selected to ensure that the complete machinery installation will perform satisfactorily, avoiding system critical speeds, system torsional vibration, etc.
 - (c) The equipment must not be operated in an environment or at speeds, powers, torques or with external loads beyond those for which it was designed.
 - (d) As improvements in design are being made continually, the contents of this catalogue are not to be regarded as binding in detail, and drawings and capacities are subject to alterations without notice.

The above guidance is based on the current state of knowledge and our best assessment of the potential hazards in the operation of the gear units.

GENERAL INFORMATION

The following instructions will help you achieve a satisfactory installation of your Sterling Electric 2000HG unit, ensuring the best possible conditions for a long and trouble free operation.

All units are tested and checked prior to shipment; a great deal of care is taken in packing and shipping arrangements to ensure that the unit arrives at the customer in the approved condition.

1 FITTING OF COMPONENTS TO EITHER THE UNIT INPUT OR OUTPUT SHAFT

The input or output shaft extension diameter tolerance is +0 to -.00005 inch for shafts up to 1 inch in diameter, and +0 to -.001 inch for shafts larger than 1 inch in diameter. The fitted component should be machined to ensure a proper fit.

- Items (such as gears, sprockets, couplings, etc.) should not be hammered onto these shafts since this would damage the shaft support bearings.
- The item should be pushed onto the shaft using a screw jack device fitted into the threaded hole provided in the end of the shaft.
- Items being fitted may be heated to 176/212°F (80/100°C) to aid assembly further.

THREADED HOLE DETAILS

| Unit Size | Input Shaft | Output Shaft |
|-----------|----------------------|----------------------|
| H03 / H04 | 1/4" UNF x .50 deep | 1/4" UNF x .63 deep |
| H06 | 1/4" UNF x .50 deep | 3/8" UNF x .87 deep |
| H0702 | 5/16" UNF x .63 deep | 5/8" UNF x 1.42 deep |
| H0703 | 1/4" UNF x .63 deep | |
| H0802 | 3/8" UNF x .87 deep | 5/8" UNF x 1.42 deep |
| H0803 | 5/16" UNF x .63 deep | |
| H0902 | 1/2" UNF x 1.10 deep | 3/4" UNF x 1.65 deep |
| H0903 | 3/8" UNF x .87 deep | |
| H1002 | 5/8" UNF x 1.42 deep | 3/4" UNF x 1.65 deep |
| H1003 | 1/2" UNF x 1.10 deep | |
| H13 / H14 | 3/4" UNF x 1.65 deep | 1" UNF x 1.97 deep |

2 INSTALLATION

2.1 GENERAL

Drives must be installed on rigid, flat and vibration free beds. Align the driving and driven units carefully to avoid any increased loads on the shafts and bearings due to misalignment.

2.2 MOTOR CONNECTIONS

TO MAINS

Connection of the electric motor to the electrical supply should be made by a qualified person. The current rating of the motor will be identified on the motor plate; correct sizing of the cables to electrical regulations is essential.

MOTOR TERMINAL CONNECTION

Circuit diagrams for the correct wiring of the motor terminal box are included with the Sterling Electric Motor. Alternatively if the motor is supplied separately or if the unit is fitted with a motor from a different manufacturer, then appropriate documentation should be provided with that motor.

3 LUBRICATION AND MAINTENANCE

3.1 LUBRICATION CHANGE PERIOD

2000HG sizes H030 - H090 are factory filled with the correct grade of lubricant and quantity relating to the mounting position given at the time of order. Sizes H100 - H140 are filled by the customer.

Units H030 - H040 require an oil change after 15,000 hours of operation while units H060 - H140 require an oil change after 10,000 hours of operation for mineral oil or 20,000 hours of operation for synthetic oil.

Units operating in ambient temperatures in excess of 122°F (50°C) should be referred to Sterling Electric for oil change period.

3.2 RE-LUBRICATION INSTRUCTIONS

Unit sizes H060 - H140 have an oil fill, level and drain hole. Sizes H030 - H040 are "sealed for life" but may be re-lubricated using the following procedure:

- a) Remove gearmotor from application.
- b) Remove motor from reducer.

- d) Tip the unit so the input side is facing upward and support with wooden blocks if available.
- e) Loosen the mounting bolts that hold the input flange or shaft housing to the reducer body.
- f) CAREFULLY remove the input housing making sure not to bang the pinion gear or tip the unit in the process. Once the housing is removed, you may dump the used oil into a container for proper disposal.
- g) Once the reducer is clear of oil, the mounting surfaces of the input housing and the reducer body must be cleaned of all residual gasket material.
- h) After complete cleaning, tip the reducer body as in step (d) above and fill with new oil. See Appendix 1 and 2 for specified oils and quantities depending on mounting position.
- i) Once unit is full, place a bead of liquid gasket material (LOCTITE 518, PERMATEX SILICON FORM-A-GASKET or equivalent) on the two mating surfaces of the reducer.
- j) Replace the input flange or shaft housing to the reducer body and tighten bolts using the torque table.

| Bolt Size | Tightening Torque (in. lb.) | Tightening Torque (ft. lb.) |
|-----------|-----------------------------|-----------------------------|
| M6 | 88.5 | 7.37 |
| M8 | 159 | 13.25 |
| M10 | 327 | 27.25 |
| M12 | 566 | 47.16 |
| M16 | 1328 | 110.67 |

NOTE:

| Shaft-in Input Seals | | |
|----------------------|-----------------|-----------------|
| Unit Size | Dimensions (mm) | Chicago Rawhide |
| H03 H04 | 20 x 32 x 7 | CR7918 |
| H0602 | 24 x 35 x 7 | CR9500 |
| H0603 | 20 x 32 x 7 | CR7918 |
| H0702 | 30 x 40 x 7 | CR11604 |
| H0703 | 24 x 35 x 7 | CR9500 |
| H0802 | 35 x 50 x 7 | CR13933 |
| H0803 | 30 x 40 x 7 | CR11604 |
| H0902 | 45 x 60 x 8 | CR17740 |
| H0903 | 35 x 50 x 7 | CR13933 |
| H1002 | 50 x 65 x 8 | CR19600 |
| H1003 | 45 x 60 x 8 | CR17740 |

| Output Seals | | |
|--------------|-----------------|-----------------|
| Unit Size | Dimensions (mm) | Chicago Rawhide |
| H03 | 23 x 40 x 6 | CR8551 |
| H04 | 30 x 52 x 7 | CR11638 |
| H06 | 42 x 72 x 7 | CR16558 |
| H07 | 55 x 85 x 8 | CR21661 |
| H08 | 55 x 70 x 8 | CR21612 |
| H09 | 63 x 85 x 10 | CR24758 |
| H10 | 78 X 100 x 10 | CR30725 |

| C-face Input Seals | | |
|----------------------------|-----------------|-----------------|
| Motor Input/Unit Size | Dimensions (mm) | Chicago Rawhide |
| (56C-140TC) H03-H07 | 45 x 60 x 8 | CR17752 |
| (56C-140TC) H08 & larger | 68 x 90 x 10 | CR26648 |
| (180TC-210TC) H03-H08 | 68 x 90 x 10 | CR26648 |
| (180TC-210TC) H09 & larger | 60 x 95 x 12 | CR23468 |
| (250TC) H03-H08 | 68 x 90 x 10 | CR26648 |

LUBRICANT AND QUANTITY

Sizes H030 and H040 will be, if supplied assembled, filled with a quantity of EP mineral oil (unless otherwise specified). However if, as requested, the unit is supplied without lubricant then the oil quantity required is obtained from Table 1. Recommended lubricants are listed in Table 2. See below for ambient temperature limitations.

MAINTENANCE AND TEMPERATURE LIMITATIONS

Sizes H030 and H040 require an oil change after 15,000 hours of operations. Other sizes require an oil change after 10,000 hours of operation. (Refer to maintenance manual.)

The standard lubricant is suitable for operation in ambient temperatures of 32°F (0°C) to 104°F (40°C), outside of this consult Table 2 or Sterling Electric.

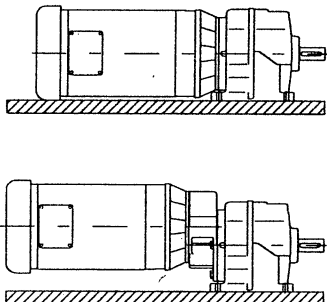
TABLE 1 LUBRICANT QUANTITY (Gallons)

| Unit Size | Mounting Position (See Appendix 2) | | | | | | | | |
|--------------|------------------------------------|-------|-------|-------|-------|-------|------|-------|-------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| H0302 | 0.15 | 0.150 | 0.210 | 0.210 | 0.210 | 0.260 | 0.16 | 0.210 | 0.260 |
| H0303 | 0.21 | 0.210 | 0.260 | 0.260 | 0.440 | 2.200 | 0.21 | 0.440 | 0.390 |
| H0402 | 0.15 | 0.150 | 0.290 | 0.290 | 0.360 | 4.200 | 0.16 | 0.360 | 0.420 |
| H0403 | 0.23 | 0.230 | 0.340 | 0.340 | 0.550 | 0.550 | 0.23 | 0.600 | 0.550 |
| H0602 | 0.31 | 0.310 | 0.570 | 0.570 | 0.750 | 0.830 | 0.31 | 0.750 | 0.830 |
| H0603 | 0.47 | 0.470 | 0.680 | 0.680 | 1.200 | 1.200 | 0.47 | 1.200 | 1.200 |
| H0702 | 0.65 | 0.650 | 1.200 | 1.200 | 1.600 | 1.800 | 0.65 | 1.600 | 1.800 |
| H0703 | 0.75 | 0.960 | 1.500 | 1.500 | 2.300 | 2.300 | 0.75 | 2.600 | 2.300 |
| H0802 | 1.17 | 2.340 | 2.340 | 1.300 | 2.600 | 2.600 | 1.04 | 2.340 | 2.340 |
| H0803 | 1.17 | 2.340 | 2.340 | 1.300 | 2.600 | 2.860 | 1.04 | 2.340 | 2.600 |
| H0902 | 1.82 | 3.640 | 3.640 | 2.600 | 3.640 | 4.940 | 1.56 | 4.160 | 4.680 |
| H0903 | 1.82 | 3.640 | 3.640 | 2.860 | 3.640 | 5.200 | 1.56 | 4.160 | 5.460 |
| H01002 | 2.86 | 5.720 | 5.720 | 4.940 | 8.320 | 6.760 | 2.08 | 5.720 | 7.280 |
| H01003 | 2.86 | 5.980 | 5.980 | 5.200 | 8.320 | 7.020 | 2.08 | 5.720 | 7.540 |
| H01302 | 4.42 | 8.060 | 8.060 | 7.280 | 12.22 | 9.880 | 3.64 | 11.70 | 11.18 |
| H01303 | 4.42 | 8.580 | 8.580 | 7.800 | 12.22 | 10.40 | 3.64 | 11.70 | 11.44 |
| H01402 | 6.24 | 12.74 | 12.74 | 10.66 | 18.72 | 16.90 | 5.20 | 16.90 | 16.90 |
| H01403 | 6.24 | 13.00 | 13.00 | 11.18 | 18.72 | 17.42 | 5.20 | 16.90 | 17.42 |

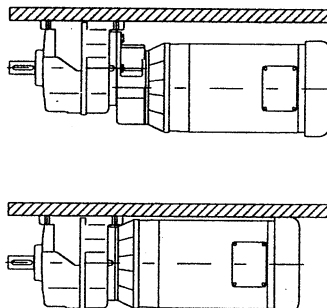
TABLE 2 RECOMMENDED LUBRICANTS

| Lubricant Supplier | | Lubricant Range Name | | | | |
|-----------------------|---------------------------|----------------------|-----|------------------------------|----------------------------|-----------------------------|
| <u>MINERAL OILS</u> | | | | ISO Viscosity / AGMA No. | | |
| | | | | 220 / 5EP | 320 / 6EP | 460 / 7EP |
| | | | | Ambient Temperature Range °F | | |
| | | | | 23 to 77°F (-5 to 25°C) | 32 to 104°F (0 to 40°C) | 50 to 122°F (10 to 50°C) |
| CHEVRON OIL CO. | CHEVRON GEAR COMPOUNDS EP | 220 | 320 | 460 | | |
| EXXON PETROLEUM CO. | SPARTAN EP | 220 | 320 | 460 | | |
| MOBIL OIL CO. LTD. | MOBIL GEAR 600 SERIES | 630 | 632 | 634 | | |
| SHELL LTD. | OMALA | 220 | 320 | 460 | | |
| TRIBOL (ICI) LTD. | MOLUB ALLOY GEAR OIL | 90 | 690 | 140 | | |
| | TRIBOL 1100 | 220 | 320 | 460 | | |
| <u>SYNTHETIC OILS</u> | | | | ISO Viscosity / AGMA No. | | |
| | | | | 220 / 55 | 320 / 65 | 460 / 75 |
| | | | | Ambient Temperature Range °F | | |
| | | | | 14 to 88°F (-10 to 30°C) | 32 to 113°F (0 to 45°C) | 50 to 122°F (10 to 50°C) |
| CHEVRON OIL CO. | SYNTHETIC DBH | 220 | 320 | 460 | | |
| EXXON PETROLEUM CO. | SPARTAN SEP | 220 | 320 | 460 | | |
| MOBIL OIL CO. LTD. | MOBIL GEAR SHC | 220 | 320 | 460 | | |

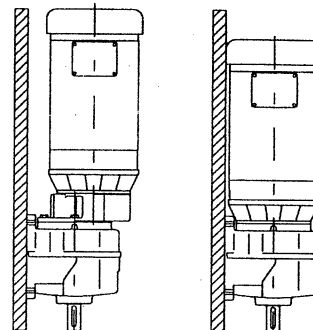
MOUNTING 1 3-F-1



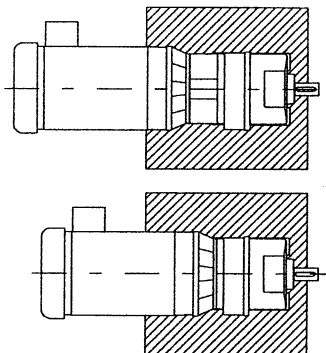
MOUNTING 4 3-C-1



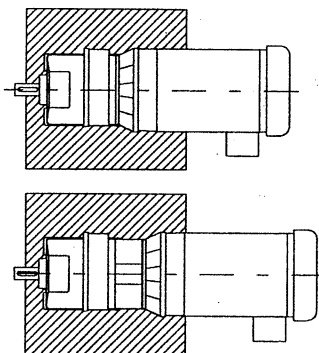
MOUNTING 5 3D-W-1



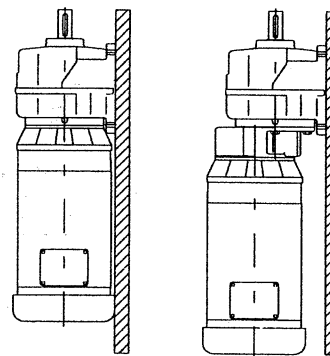
MOUNTING 3 3-RW-2



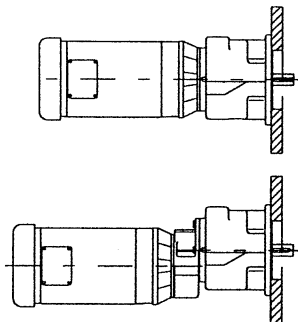
MOUNTING 2 3-LW-2



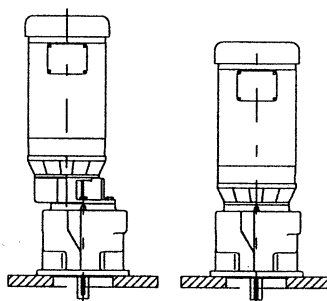
MOUNTING 6 3U-W-1



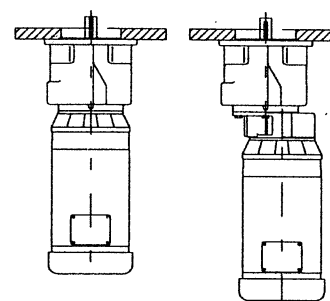
MOUNTING 7 3-FW-1



MOUNTING 8 3-FD-1



MOUNTING 9 3-FU-1



MOUNTING POSITIONS - SHOWN AS MOTORIZED - APPLIES ALSO FOR REDUCERS

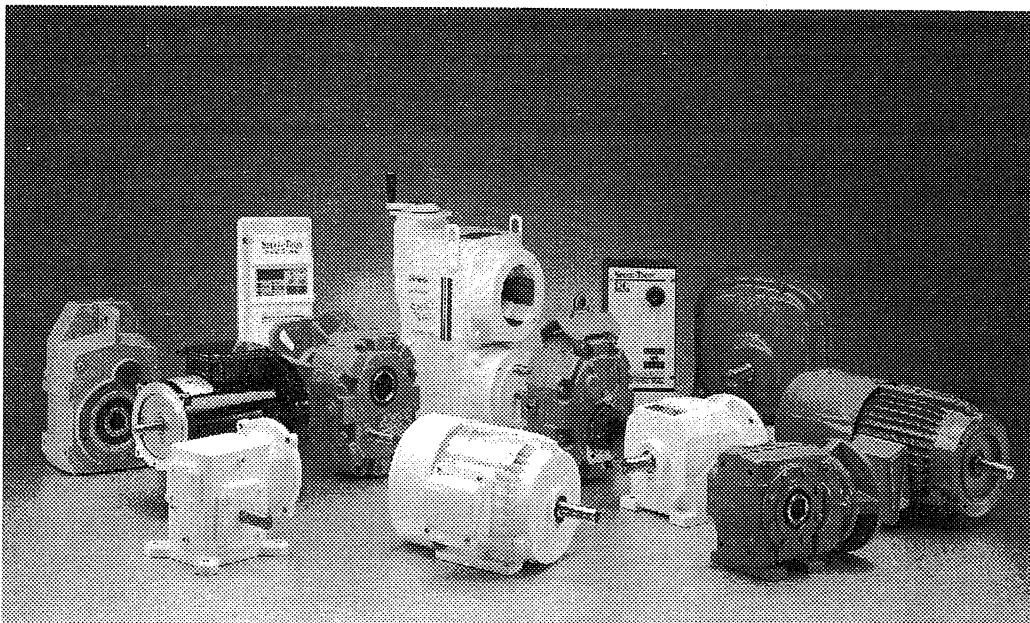
Since 1927, Sterling Electric has devoted years to the conception, design and manufacture of motorized drives to more *effectively* power the machines of American industry.

As we approach the twenty-first century, Sterling focuses on providing *high-efficiency*, motorized drives to meet the demanding requirements of today's customers across the globe.

Sterling Electric..... We are America's "**GO TO COMPANY**" for specialized application needs.



**COMPLETE FAMILY OF PRODUCTS TO SERVICE
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RESPONDING WITH EQUIPMENT THAT PERFORMS