STERLING ELECTRIC, INC.

Responding with equipment that performs.

SLO-SPEED®

2000SM

INSTALLATION & MAINTENANCE
M040 through M080

WHERE QUALITY IS IN CONTROL

STERLING ELECTRIC, INC.

PRODUCT SAFETY - WARRANTY

Product Safety Information

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 manufactures 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 back-up 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

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

All drives are tested and checked prior to dispatch, 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.

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

The input or output shaft extension diameter tolerance is to ISO tolerance k6 (for shaft diameter < 50mm) and M6 (for shaft diameter > 50mm) and the fitted components should be to ISO tolerance H7.

- 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 maybe heated to 176/212°F to aid assembly further.

THREADED HOLE DETAILS

UNIT SIZE	INPUT SHAFT	OUTPUT SHAFT
0420/0430	1/4" UNF X 0.49 DEEP	7/16" UNF X 0.87 DEEP
0620 0630	1/4" UNF X 0.63 DEEP 1/4" UNF X 0.49 DEEP	5/8" UNF X 1.42 DEEP
0720 0730	5/16" UNF X 0.63 DEEP 1/4" UNF X 0.63 DEEP	5/8" UNF X 1.42 DEEP
0820 0830	3/8" UNF X 0.87 DEEP 5/16" UNF X 0.63 DEEP	3/4" UNF X 1.65 DEEP

2.0 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

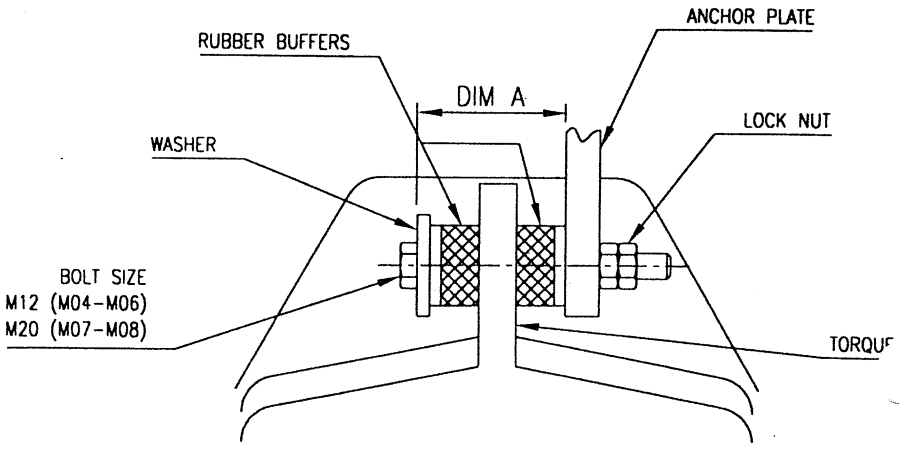
TO MAINS

Connection of the electric motor to the mains supply should be made by a qualified person.

The current rating of the motor will be identified on the motor plate, and correct sizing of the cables to electrical regulations is essential.

2.3 TORQUE ARM FOR SHAFT MOUNTING

UNIT SIZE	DIM. 'A' INCHES
M04	1-15/16
M06	2-1/16
M07	3-1/32
M08	3-1/4



Note: 1) Tighten bolt to acheive dim. 'A'. This will pre compress the rubber buffers.

2) Sterling Electric torque arm kits consists of two rubber buffers. The customer must supply the other components shown in the diagram.

3.0 LUBRICATION AND MAINTENANCE

3.1 LUBRICATION CHANGE PERIOD

PERIODIC INSPECTION

All 2000SM Drives are oil filled by client. See Appendix 1 for filling levels.

a. Check oil level weekly and if necessary, top up with the recommended grade of lubricant.
b. Add two shots of grease monthly to drives having grease lubricated bearings.

OIL CHANGES

Regular oil changes are essential and the following factors should be used to determine the frequency at which these are carried out.

a. Oil temperature - unit operating under load.
b. Type of oil.
c. Environment - humidity, dust, etc.
d. Operating conditions - shock, loading, etc.

At elevated temperatures, the effective life of the oil is very much reduced. This is most pronounced with oils containing fatty and E.P. additives. To prevent damage to the unit through lubricant breakdown, the oil should be renewed as detailed in Appendix 1.

Note: For ambient temperatures between the range -22°F to 82°F, refer to Appendix 1. For oil viscosity selection for ambient temperatures outside this range, contact Sterling Electric, Applications Engineering.

3.2 CLEANING

With the drive stationary, periodically clean any dirt or dust from the gear unit and the electric motor cooling fins and fan guard to aid cooling.

4.0 NOISE

The range of 2000SM product satisfies a noise (sound pressure level) of 85dB(A) or less when measured at 1 meter from the unit surface. Measurements taken in accordance with BS 7676 Part 1: 1993 (ISO 85 79-1 : 1993)

(APPENDIX 1)

LUBRICATION

LUBRICANT QUANTITY (Gallons)

Unit Size	Mounting Position (see opposite page)					
	1	2	3	4	5	6
M0402	0.44	0.26	0.36	0.29	0.47	0.55
M0403	0.47	0.31	0.47	0.34	0.68	0.68
M0602	1.22	0.65	1.01	0.60	1.01	1.30
M0603	1.25	0.88	1.22	0.70	1.69	1.51
M0702	2.08	1.09	1.82	1.14	1.82	2.29
M0703	2.13	1.46	2.00	1.25	3.09	2.63
M0802	2.83	2.24	3.09	1.85	3.64	3.98
M0803	2.83	2.26	3.09	1.90	3.64	3.98

RECOMMENDED LUBRICANTS

Lubricant Supplier	Lubricant Range Name	ISO Viscosity / AGMA No.		
MINERAL OILS		220 / 5EP	320 / 6EP	460 / 7EP
		Ambient Temperature Range °C		
		-5 TO 25 (23 TO 77°F)	0 TO 40 (32 TO 104°F)	10 TO 50 (50 TO 122°F)
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
SYNTHETIC OILS		ISO Viscosity / AGMA No.		
		220 / 55	320 / 65	460 / 75
		Ambient Temperature Range °C		
		-10 TO 30 (14 TO 86°F)	0 TO 45 (32 TO 113°F)	10 TO 50 (50 TO 122°F)
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
SHELL LTD.	HYPERIA S	220	-	460
TRIBOL (ICI) LTD.	TRIBOL 1510	220	320	460

LUBRICANT CHANGE PERIOD

UNIT OPERATING TEMP. (F)	RENEWAL PERIOD	
	MINERAL OIL	SYNTHETIC OIL
49° or less	18,000 hours or 3 years	26,000 hours or 3 years
158°	12,000 hours or 3 years	26,000 hours or 3 years
167°	9,000 hours or 3 years	22,000 hours or 3 years
176°	6,000 hours or 2 years	15,000 hours or 3 years
185°	4,200 hours or 17 years	10,500 hours or 3 years
194°	3,000 hours or 12 years	7,500 hours or 2.5 years
203°	2,000 hours or 8 years	6,000 hours or 2 years
112°	1,500 hours or 6 years	4,500 hours or 1.5 years
NB: INITIAL FILL OF OIL SHOULD BE CHANGED IN A NEW GEAR UNIT AFTER 1000 HOURS OF OPERATION OR ONE YEAR OR HALF THE ABOVE LIFE, WHICHEVER IS THE SOONEST.		

NOTE: Figures quoted are for oil temperatures when the unit has attained normal running temperature when operating under load. These figures are based on normal running, but where conditions are particularly severe, it may be necessary to change the oil more frequently.

When changing lubricant, if same lubricant is not used, then unit must be flushed out and filled only with one type of lubricant.

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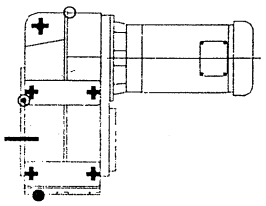
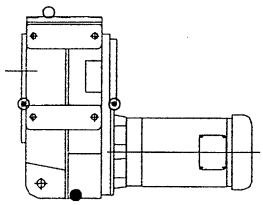
INSTALLATION AND MAINTENANCE

MOUNTING 1

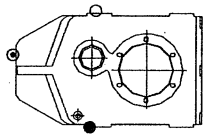


MOUNTING 2



FOR M08 UNITS FILL TO PLUG AT THIS SIDE OF CASE

MOUNTING 3



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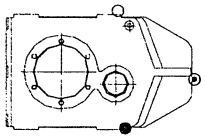

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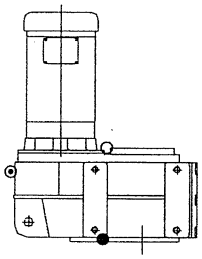
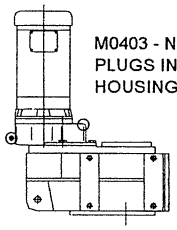
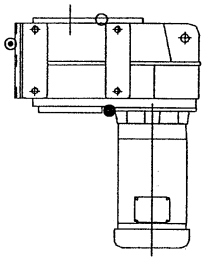


M0603/M0703 - OIL LEVELS TO HIGHER PLUG IN TRIPLE HOUSING



M0403 - NO OIL PLUGS IN TRIPLE HOUSING

MOUNTING 6



MOTOR MUST BE FITTED WITH SEAL FOR THIS MOUNTING POSITION

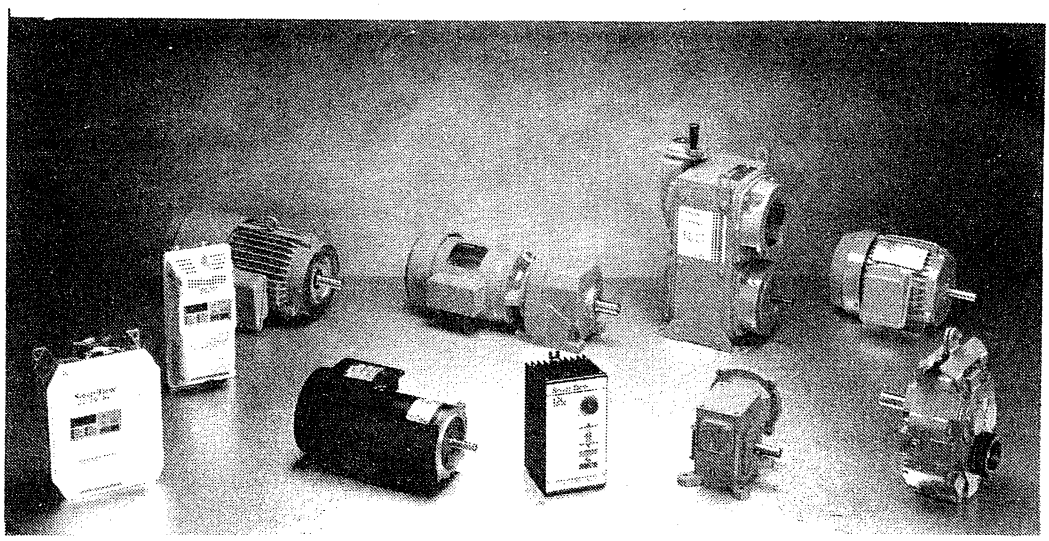
●	DRAIN POSITION
◉	LEVEL POSITION
○	VENTILATOR / FILLING POSITION

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.*

From the wet, harsh environment of food processing to the pounding of machine tools, Sterling drives have proven themselves worthy.

Sterling Electric – serving American industry since the turn of the century.

COMPLETE FAMILY OF PRODUCTS TO SERVICE YOUR REQUIREMENTS



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RESPONDING WITH EQUIPMENT THAT PERFORMS