



HAYWARD GORDON LTD.

**INLINER Mixer Drive
Maintenance Instructions**

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GENERAL INSTRUCTIONS

1. Any apparent or suspected damage sustained by equipment manufactured or furnished by Hayward Gordon Inc. during transport from the factory to the user should be reported immediately to both Hayward Gordon and the Carrier.
2. Upon delivery, all equipment furnished must be carefully inventoried against shipping papers to determine whether any shortages exist in delivered material. Any such shortages must be immediately reported to both Hayward Gordon and the Carrier, if a timely claim is to be made.
3. The installation of this equipment does not normally require the services of a factory engineer. These services are not included in the selling price of the equipment, unless specifically agreed upon in writing between the seller and the purchaser. In applications requiring a more complex arrangement of components, consideration should be given to the use of a factory engineer for construction supervision or check out the installation. These services are available from Hayward Gordon by contacting the Service Department.
4. The Seller's Warranty applies insofar as the unit is operated within the rating and service conditions for which it was specifically sold. The Purchaser must prevent the existence of any destructive external conditions that might typically include vibratory loads, severe shock loading, mechanical or thermal overloads or other conditions that may adversely affect the operation. The gear drive must be installed and maintained in accordance with instructions and provided in this manual.
5. In the event of malfunction within the warranty period, Hayward Gordon must be notified promptly, within thirty (30) days, if it is intended that the warranty is to cover the incident.
6. Adequate installation, maintenance and safety instructions must be given by the User to personnel directly responsible for the operation of the drive and accessory equipment. In addition, the procedures set forth in the operating instructions must be carefully followed.
7. Guards, alarms, heaters and other safety devices which may be furnished by Hayward Gordon must be installed by the User.
8. The User is also responsible for furnishing and installing any guards or other safety equipment needed to protect operating personnel as required by Occupational Safety and Health Administration standards (OSHA) or other applicable safety regulations. This equipment normally is not furnished by Hayward Gordon except when specified as part of the order. In all cases, however, the User has the responsibility of complying with all safety regulations when installing the equipment.



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9. All unauthorized personnel must be required to remain a safe distance from rotating shafts, couplings, etc.

SAFETY INFORMATION

WARNING

In the installation, operation and maintenance of the mixer drives, SAFETY comes first. Use proper clothing, tools and methods of handling to prevent serious accidents. The safety precautions listed in this manual **MUST** be followed by all personnel working on or with the equipment if serious injury is to be avoided.

All service personnel **MUST** be knowledgeable relative to the equipment before performing any repair work.

Adequate installation, maintenance and safety instructions must be given by the user to personnel directly responsible for the operation of the equipment.

Guards, alarms, heaters, and other safety devices furnished by the manufacturer must be connected and/or installed by the user. In addition, the procedures set forth in this technical manual must be carefully followed.

The user is also responsible for furnishing and installing any guards or other safety equipment needed to protect operating personnel even though such safety equipment may not have been furnished by the seller with the purchased equipment. All heavy parts must be handled using properly applied hoisting equipment. Where lifting lugs or tops for lifting eyebolts are provided, these devices must be used.

Particular care must be taken during assembly to ensure that all pieces are guided smoothly into place and are blocked against sudden shifting or movement.

All personnel must remain a safe distance away from rotating shafts, couplings, clutches, etc.



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INTRODUCTION

Your Hayward Gordon In-line Mixer or Aerator is designed and guaranteed to achieve the process results for which it was recommended. Whether your needs are surface aeration, submerged turbine aeration, solids suspension, blending, or any other mixing application, you are assured that the industry's highest technology went into the design of your aerator or Mixer.

This manual is designed to facilitate installation and maintenance of your Aerator or Mixer. We urge that you follow the instructions included in it, and keep a record of all scheduled and nonscheduled maintenance performed on the equipment. Because of the high level of quality built into every Hayward Gordon product, you can expect many years of trouble-free operation if proper maintenance procedures, as outlined in this manual, are followed.

Should you need parts or service, a Hayward Gordon Sales and Service Office is as near as your phone. Located in Toronto, Calgary, Vancouver and Montreal, our sales engineers are able to assist you if a problem develops. To minimize down time, we suggest that you keep an adequate stock of spare parts on hand. Contact your local Hayward Gordon Sales Office for a quotation or call or write us direct (Telephone 905-567-6116, FAX 905-567-1706).

All inquiries should be accompanied by the following information from the unit nameplate:

1. Unit size and type
2. Hayward Gordon serial number

Orders for renewal parts should include the above information plus the part description and number shown on the parts list in this manual.

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SECTION I
Storage & Handling

Factory Preparation

All internal parts of the mixer drive are protected against rust at the factory.

If not tagged the drive has been prepared for "short term" internal rust protection, it should be safe from corrosion for one to three months.

If drive is tagged for "limited term" internal rust protection, it should be safe from corrosion for six to eight months.

All unpainted external surfaces of the drive are coated with Houghton Rust-Veto 342 or equivalent which can be removed with commercial solvents, paint thinner, or kerosene.

Customer Storage

The mixer drive must be stored indoors in a dry area with relatively constant temperature

If mixer drive is stored longer than term of factory preservation, repeat the limited term preservation procedure described in "Factory Preparation."

Output shaft bearings are grease lubricated through pressure fittings and are isolated from those areas protected by internal rust preventive coating. Check grease supply in both upper and lower output shaft bearings whenever internal protective coating is renewed.

For brief storage periods after unit has been placed in operation, follow the instructions for shutdown periods in Section IV.

Belt Drive

Belt Drive units should be stored in a clean, dry location free from direct light. The shelf life of standard belts vary; but they should be replaced before placing the unit in operation If stored longer than four months.

HANDLING

WARNING

Use proper clothes, tools and methods of handling; otherwise serious injury may result.

When handling or transporting the mixer unit, care must be taken to avoid supporting or lifting in a manner that stresses parts not designed to support the unit weight. The unit should be lifted only by the means provided for this purpose. Slings should be used to distribute the load evenly between the lifting holes. Never attempt to lift the unit by eyebolts fixed into covers or motors. Use only the lifting holes provided.



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The following additional precautions should be observed in handling the mixer drive.

1. Never drag the unit. This will mar machined mounting surfaces and may overstress the housing.
2. Never allow the output shaft to support the entire weight of drive assembly.
3. When attaching slings to the unit, consider the behavior of the sling under load. Do not attach sling in a manner that will cause it to crush or rip loose any exterior protrusions (pipes, gauges, etc.) when it is placed under load. If necessary, use wooden blocks to keep slings away from mixer unit.
4. Particular care must be taken during installation to ensure that all pieces are guided smoothly into place and are blocked against sudden shifting or movement.

STORAGE (FOR LONG TERM)

Drives prepared for limited term storage are filled completely with Houghton Cosmoline 1102. Each shaft is then rotated at least twice and the Cosmoline 1102 is drained. Cosmoline 1102 coating need not be removed before mixer is filled with oil and placed in operation.

SECTION II INSTALLATION

GENERAL

Unpacking. Remove all protective shipping covers from unit. After unpacking and before installing carefully inspect unit for any apparent or suspected damage sustained during transportation. If any is found, it should be reported immediately to both Hayward Gordon and the Carrier. Also, carefully inventory all equipment received against the shipping papers to determine if any shortages exist in delivered equipment. If a claim is to be made, any such shortages must be reported within one week to Hayward Gordon and to the Carrier.

Note. The mixer drive is shipped from the factory completely assembled.

INSTALLATION

The installation of mixer drives and in-tank mixing equipment does not normally require the service of a factory engineer. Such service is not included in the equipment sell price unless stipulated in a written agreement between purchaser and seller. However, consideration should be given to employing a factory engineer for mixer applications requiring complex component arrangements or mixing results analysis.

The mixer must be securely bolted to a rigid support with bolts of the proper diameter for the mounting holes. Bolts should be S.A.E. Grade 2 or better. Shear blocks should be used if the unit has a heavy overhung load which might place bolts in shear. Bolts should be torqued to the following values.



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TABLE 1

Mounting Bolt Torque Requirements

Bolt Diameter (inches)	Torque Value (foot-pounds)
.500	45
.625	95
.750	150
.875	200
1.000	300
1.250	660
1.500	1060

Belt Installation

Belt driven mixers are shipped with the belts installed under proper tension, ready to operate. No attention is required until the belts seat themselves in the sheave grooves. The drive centre distance should then be adjusted for proper belt tension. Avoid installing the unit where proper ventilation of the drive is blocked. Belts generate heat during operation where proper circulation of air is necessary. If belts slip, they require adjustment. If the belts are dirty, wipe clean with a clean dry cloth. NEVER USE A BELT DRESSING. During maintenance and lubrication be careful not to drip oil on the belts.

SECTION III LUBRICATION

RECOMMENDED GREASE

The recommended grease for bearings in agitator shaft support systems is high-grade ball bearing grease of N.L.G.I. No. 2 consistency suitable for operating temperatures to 200°F.

Grease should be non-reactive, oxidation-resistant, non-corrosive to ball or roller bearings and should not separate below 300°F. It should not be precipitative or contain grit, abrasives or fillers.



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SECTION IV
OPERATION

PRELIMINARY STARTUP CHECKS

When starting up any new equipment, proceed cautiously. Even when the best installation instructions and practices are followed, mistakes or oversights are always possible. Therefore, before initial startup, perform the following checks.

1. Check to see that external preservative coating has been removed from the mixer
2. Check all gauges, switches, etc., for proper and secure mounting.
3. Check all mounting bolts for proper torque.
4. Check all external bolts to make sure they have not loosened during shipping or handling.
5. Check all couplings, coupling guards, and safety devices for proper and secure installation.
6. Check installation of all inspection covers.
7. For Mechanical seal units check lubrication for proper installation and operation

WARNING

**DO NOT BEGIN INITIAL STARTUP PROCEDURE UNLESS ALL
PRELIMINARY STARTUP CHECKS HAVE BEEN COMPLETED.**

Initial Startup

The mixer drive has been test-run at the factory; however, during initial startup the following steps should be performed:

1. Add grease to fittings at bearings and couplings until grease appears at relief fitting or half of the specified capacity, whichever occurs first. Where pipe plugs are used instead of relief fittings, remove plug and add grease until it flows from plug hole. Replace pipe plug.
2. If mixer drive is equipped with heaters, and ambient temperature is below oil pour point, turn on heaters until oil temperature reaches 60°F.
3. For startup instructions at excessively low temperatures, without heaters - see Section IV for correct oil for low temperature operation. If no such oil is available, fill drive with best oil on hand, then pour enough oil from sump onto upper bearing support plate to ensure lubrication of upper bearings at startup.
4. Start drive slowly, under as light a load as possible. If shaft rotation is limited to one direction, a tag on the housing block will indicate which direction, If necessary, reverse electrical leads on motor to obtain correct shaft rotation.



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Section VI

OPERATION (continued)

5. Motor starting equipment should be arranged for slow speed starts, if possible, to avoid severe impact loads.
6. As drive is brought up to normal operating speed, check for unusual sounds, excessive vibration or heat, and oil leakage. If any of these symptoms develop, shut down the mixer or aerator immediately, determine the cause, and correct it. Operating temperature should not exceed 200 degrees F. If the temperature of the gear reducer does exceed 200 degrees F, because of high ambient temperatures, we suggest the use of synthetic lubricants.
7. Run mixer drive until operating temperatures stabilize, shut down, and check alignments through couplings. Correct any misalignment.
8. If possible, operate the mixer under a light load (approximately half load) for one or two days to allow final break-in of belts. After this period, mixer can be operated under normal load.
9. After two or three weeks of operation, alignment should be checked again and corrected if necessary.

**OPERATIONAL STARTUPS
(SHUTDOWN PERIODS)**

After mixer is operational, for startup after any shutdown of more than three (3) days (without having drained the oil), the following steps should be performed:

1. If mixer drive is equipped with heaters, and ambient temperature is below oil pour point, turn on heaters until oil temperature reaches 60 degrees F.
2. For startup instructions at excessively low temperatures, without heaters - see Section IV for correct oil for low temperature operation. Repeat initial oil-fill procedure using only enough oil from sump to ensure lubrication of upper bearings. If no such oil is available, use oil already in drive, but pour enough oil from sump onto upper bearing support plate to ensure lubrication of upper bearings at startup.



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Installation V-Belt Drive:

If motor is being supplied by others and mounted at installation, use the following procedure.

1. Remove belt guard and mount motor. Motor shaft must be parallel with the agitator shaft.
2. Install driver sheave on motor shaft. Align sheaves with a straight edge to insure proper tracking of belts.
3. Inspect sheaves carefully. Wipe off dust and smooth rusted spots. Sheave grooves must be free of burrs and rough places, which will greatly accelerate belt wear.
4. Shorten center distance until belts can be installed easily. Never pry or stretch belts to get them into sheave grooves.
5. Install belts and adjust center distance for proper belt tension. Tension is correct when a slight bow is observed on the slack side with unit running. Another way of testing belt tension is to turn unit off and deflect each belt inward with the thumb. Tension is correct when each belt deflects approximately one belt thickness under thumb pressure.

Sleeve mounted Mechanical seal disassembly procedure

1. Remove cap screw (24) from shaft sleeve (6)
2. Remove Hex Hd Capscrews (22) and upper bearing cap (8)
3. Attach a bearing puller to mechanical seal housing (13) and remove bearing (9) and bearing spacer (21)
4. Remove Soc. Hd Capscrew (11) and Hex Hd capscrew (12)
5. Slide mechanical seal housing (13) off of shaft sleeve (6)
6. Loosen set screws in internal seal assembly and carefully slide off shaft sleeve (6)
7. To assemble, reverse above procedure
- 8.