

Technical Memorandum

To: **Kamren Moen, Washington Department of Ecology
(WDOE)**

File Number:
1029.12302023

From: **Rick Fuller, Trendline Environmental Chemistry, Inc.**

Date: February 23, 2024

Re: **Response to Ecology Comments – Safe Coast Seafoods (SCS), Ilwaco**

RECEIVED

MAR 04 2024

**WA State Department
of Ecology (SWRO)**

Mr. Moen,

Listed below are the responses to the questions you are asking:

1. State the type and model of the treatment unit(s) and the operational condition of the unit that is proposed for to be used.

Essentially, the proposal consists of removing the DAF unit (in place) and reverting to the system successfully used at the site before any surimi was processed. After removal of the DAF, the proposed system will consist of the following:

- Raw waste stream enters the treatment system in the first cell of a 9000 gallon sump which is divided into two cells.
- The waste is pumped into a rotary screen, where solids are removed into a dumpster for disposal, and liquids are discharged into the second cell of the sump.
- Ascorbic acid is added to the contents of the second cell automatically.
- Treated waste water from the second cell then gravity flows into a third sump which is the effluent wet well, where it is finally pumped into receiving water in batches.

The screens are maintained in good working order by having plant personnel inspect and power wash the screens as needed. Refer to the Solid Waste Control Plan for the disposal of the screenings and other solid waste generated in the seafood processing operations. Please refer to the "HYCOR ROTOSHEAR UNIT" HRS3600DV series operation and maintenance manual for specific instructions (attached PDF)

2. Ecology must approve any production increase in the future.

Assuming the increase in production approval request addresses any new species and processing that is not already covered in the existing permit. If so, SCS does not have an issue with this as long as the request is addressed within 7 days of receipt of the production increase request. Seasonal processing that varies due to the species and date available causes daily production variability, this is a common occurrence, and is approved under current permitting.

3. How will the DAF be maintained to be brought online if surimi will be processed again?

The DAF will be heat shrink wrapped to keep rainwater and other atmospheric waters from entering the unit as it will be kept at the current location. Typical liquid blocking banjos will be placed inline before and after the DAF unit to isolate this unit. To bring back to operational use the banjos will be removed to allow

liquid flow into and out of this unit. The chemical pumps and flocculator can be reenergized using the existing tubing and electrical, these will be flushed and turned back on. The Operation and Maintenance Manual will be followed to bring this unit back on line.

4. Identify a schedule of implementation

A tentative example schedule is provided below:

1. Submit Increase Production to DOE	April 1
2. Receive Comments from DOE	April 8
3. Resubmit Engineering Report to DOE	April 14
4. Receive Approval from DOE	April 21
5. Begin Installation of Treatment System	April 22
6. Treatment System in Normal Operation	April 24

5. Provide proof that the rotary screen could meet permit limits with the average 155 gpd flow?

Hycor Rotorshear HRS3600DV can handle very large volumes of wastewater passing through the 0.025" screen with good removal results (see attached screen document). There is no data available to show performance at this low flow (150 gpd) other than the self reporting data captured at Ecology's Paris system for this site (WA0000361) before the DAF was added in 2016. Sampling can show process control and discharge limit requirements being met using the existing rotary screen. If these data show that the permit requirements are exceeded two different solutions can happen;

- A. Reduce the flow, increase the water spray, adjust the rotary screen process controls to meet discharge limits.
- B. Reduce the screen porosity and downsize the screen openings to the next available size (0.010" being the smallest orifice)

6. What is the maximum flow and how is the 155 gpd average flow calculated?

		<u>Production- pounds</u>	<u>Temp</u>	<u>Flow- gallons</u>
2023 year end	AVG:	7,964	11	151
	STD Dev:	19,742	3	207

These data collected from the reported data for this site (WA0000361) for the entire 2023 calendar year, 360 data points. The maximum flow permitted is 750,000 gallon/day.

7. What fish types of processing will be occurring at this low flow?

The permit issued lists Shrimp, Crab, Salmon, Tuna, Sardines, Conventional Bottom Fish, and Mechanized Bottom Fish. These are not expected to change.

8. In the schematic diagram, the outfall is "x"-ed out. Are you eliminating the discharge to the outfall?

No. The discharge point and flow will remain the same

9. Please provide production estimates for crab and shrimp, separately?

For the entire 2023 year there was no production of shrimp. The production of crab was : average 27,704 pounds/day when crab was being processed.

Rick Fuller

Rick Fuller, Chemist/Owner

Trendline Environmental Chemistry, Inc.

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Approved by:



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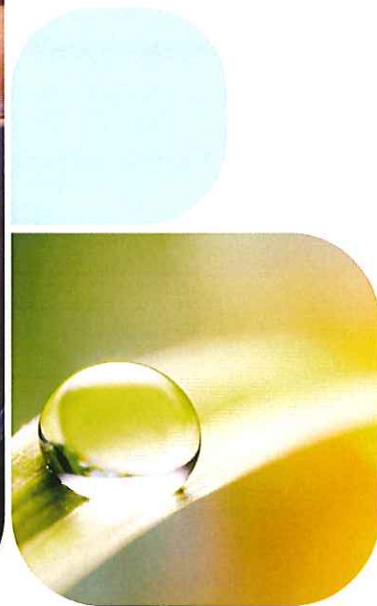
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CASE STUDY

Rotoshear®

J. R. Simplot



Rotoshear® screen keeps up with potato processor's cutting line waste

Problem

There is more waste generated in the cutting of curly potato fries than any other type of potato processing. This creates special problems handling the waste stream from the cutting line. Liquid/solid separation equipment must: 1) handle a large hydraulic throughput, 2) capture solids for by-product recovery, and 3) remove solids efficiently to prevent nuisance clogging in the starch recovery system.

The Caldwell, Idaho plant of J. R. Simplot, one of the nation's largest potato processors, recently installed two new, highly efficient closed loop cutting line systems. In each, coarse potato cuttings are screened out and used for alcohol plant feed stock and in the production of ethyl alcohol.

The remaining liquid is recirculated as flume water and reduces fresh water make-up requirements of the system. Suspended potato solids are processed further in a starch recovery line. The entire operation is highly efficient with little waste. However, in order to make the process work, Simplot first had to secure reliable screening equipment capable of capturing huge volumes of solids to prevent system clogging.

Solution

Parkson Rotoshear® equipment was selected for its large hydraulic throughput and for its compact design. One Rotoshear® unit handles the load of four stationary screens and occupies only 25% of the space.

A Parkson Rotoshear®, Model HRS3672 x .040" (1.0 mm), was selected for the smaller cutting line. The HRS3672 screen with a 1/2 HP motor is a small yet efficient unit.

Equipped with large .040" openings and a 7" (177.8 mm) discharge head, it can easily handle the peak influent flow of 1,200 GPM (273 M3/H) and remove up to 1 yd3 (24 meters) of solids per hour.

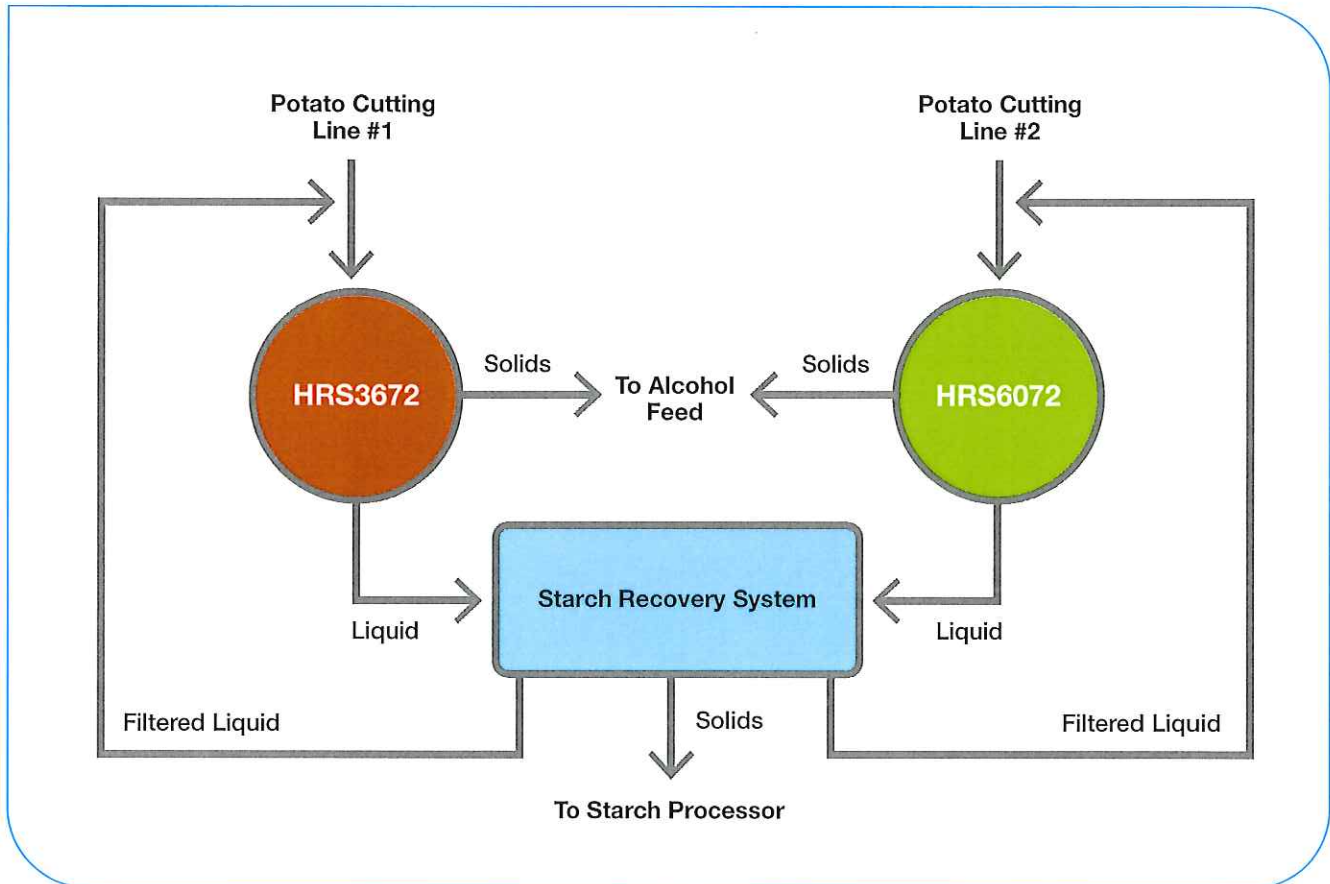
The Rotoshear® screen has a manual spray bar that allows cleaning to be performed as required using flume water.

The second cutting line is equipped with a Rotoshear® screen, Model HRS6072 x .040". This Rotoshear® screen handles up to 2,500 GPM (568 M3/H).

Results

Both Rotoshear® screens effectively remove the coarse potato chunks and prevent solids from plugging the system. Solids are removed at 20% dry weight. No further dewatering of solids is required in this application. Potato water and suspended potato solids, technically called "potato whitewater," pass through starch cyclones where they

become a highly concentrated solution of water and starch. The filtered water is returned to the closed loop system while the starch concentrate proceeds through additional processing steps to make it suitable for sale to the starch processor. This with the purchase of another screen for their newest plant. ■



DESIGN DATA

Potato Cutting Line

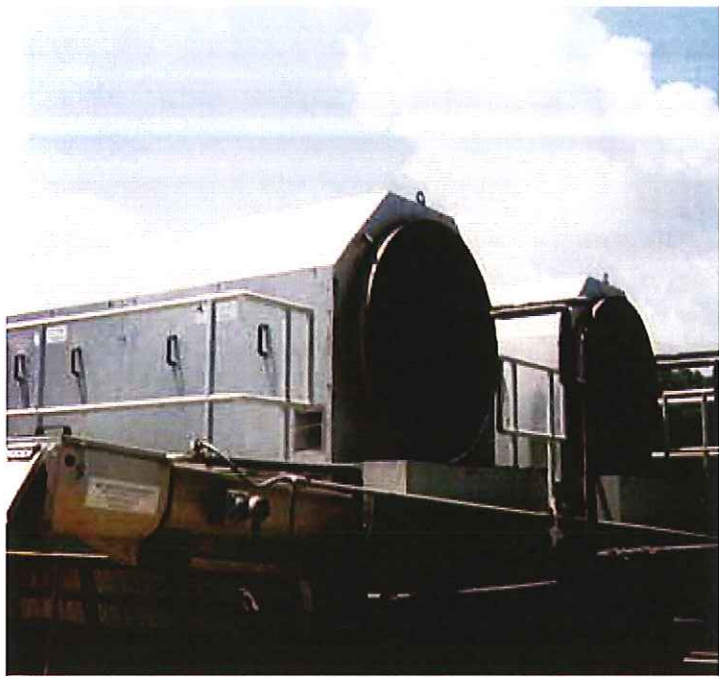
Rotoshear®, Model HRS3672 x .040" - Peak flow 1,200 GPM

Rotoshear®, Model HRS6072 x .040" - Peak flow 2,500 GPM

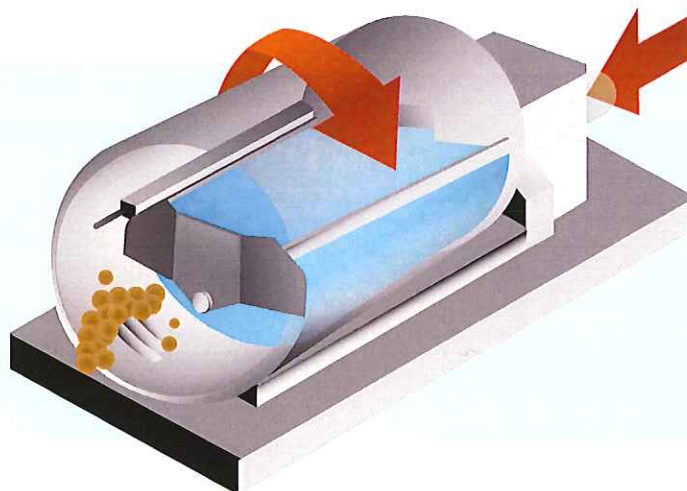


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Wedgewire construction maximizes capture



Hycor® Rotoshear®

Internally-fed Rotary Wedgewire Screens

The Hycor® Rotoshear® screen is a high capacity fine screen that was developed over two decades ago. It has been continually updated with new design enhancements; and today, is represented by a complete family of screens. There are ten models with many application specific custom features. Opening sizes range from 0.010" to 0.100" (.25 to 2.5 mm) and hydraulic capacities from 450 to over 13,000 GPM (102 to 2955 m³/h). The material standard is 304 stainless, but 316 and L grades are available as well.

Because the Rotoshear® screen is a high capacity screen with many user-friendly options, it is the choice for efficient wastewater screening and improved by-product recovery in a multitude of applications. Heavy-duty models are available for heavy solids loadings. One, in fact, handles 25 wet tons per hour in a slaughterhouse application.

In wastewater treatment plants, the Rotoshear® unit is

respected as a fine screen for pretreatment and primary treatment as alternative technology to replace clarifiers. Meat processors, food processors, tanneries, textile mills, petrochemical plants, and recyclers rely on it for product recovery and wastewater treatment. Pulp and paper mills use it for fiber recovery and rejects handling.

Highly efficient operation

The Rotoshear® unit is an internally-fed rotary wedgewire cylindrical screen that operates with minimal attendance. Influent enters through the inlet and flows into a headbox. The headbox fills and the influent cascades over the weirs and contacts two sides of the rotating cylinder screen. As the influent hits the turning screen, the solids are caught inside the cylinder and the liquid passes through the screen into the process or on for further treatment. Diverters on the cylinder move the solids along the length of the screen to discharge. The unit is equipped with spray bar(s) to clean the screen.

Wedgewire construction maximizes capture

The Rotoshear® screen is constructed of quality 304 stainless steel wedgewire, recognized for its ability to handle stringy fibers, greasy solids and high concentrations of suspended solids without blinding. It is corrosion-resistant, durable, and will give years of trouble-free service. The entire wedgewire cylinder is surrounded by stainless ribbing for stability and long life. But wedgewire for high capacity capture is only part of the story. The Rotoshear® unit is created with a precise relationship of headbox size to cylinder length which creates a drying zone to allow free drainage of screenings as they travel along to discharge.

Built for high capacity

The standard municipal Rotoshear® unit headbox is an open tub style with a double weir that easily handles high flows while minimizing surging. There is also a “medlow” headbox style, with a flatter bottom, designed to handle heavy or large solids in medium to low flows in industrial applications.

Sprocket and chain drive designed for long years of service

The Rotoshear® unit employs positive drive operation, with the chain driving the screen. The chain is durable steel with stainless available as an option. An auto-lube pump chain lubrication system with guide track applicator, is an option which provides consistent chain performance with minimal operator attention. The entire operation is driven by an efficient gearmotor – in sizes from ½ to 5 HP. Explosion-proof motors are also available.

Automatic options

The Rotoshear® screen requires very little operator attention, and with optional control panels and solenoid valves, the unit can be equipped for automatic on and off operation. Sprays can be set to perform automatic washdown at timed intervals.

Fast, easy installation

Standard Hycor® Rotoshear® units are shipped assembled – only piping, power and water require on-site connections. Rotoshear® screens are available with custom options to simplify installation. These include flanges, support legs, and drain pans to make the unit free standing, and end enclosures are available to control odors.

Automatic spray cleaning

The Rotoshear® unit has two separate spray systems: an internal spray to clean the screening surface of the cylinder, and an external spray system to keep the screen openings clear. The spray system is designed for easy nozzle cleaning. Spray bars in many units have snap-action connectors that automatically lock in place for easy access and placement.

Protected and operator friendly

Hycor® equipment is designed to be safe and protect the operator. All rotating parts, such as trunnion wheels and chains, are completely enclosed. Screen covers protect the rotating screen and interlock switches disengage the motor if covers are lifted while the equipment is in operation. Strategically positioned lube ports provide easy access for greasing trunnion wheels and stabilizer pads. A cleanout port allows the headbox to be thoroughly cleaned and drained.

Rotoshear® Screen Dimensions (in inches)

Model	Length	Width	Height	Hp
HRS2448DV	91½	50½	41½	½ (.37)
HRS3648DV	95	58½	53½	½ (.37)
HRS3672DV	119	58½	53½	½ (.37)
HRS4860	See Engineering			
HRS4872	See Engineering			
HRS6072DV	145	82	81	1 (.75)
HRS6096DV	174	82	81	1½ (1.11)
HRS60120DV	194½ (4940)	90 (2286)	80½ (2045)	2 (1.5)
HRS60160DV	235¾ (5988)	87 (2210)	80½ (2045)	2 (1.5)
HRS80160DV	247½ (6287)	107 (2718)	100½ (2553)	3 (2.2)



Fort Lauderdale
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05/04

HYCOR® ROTOSHEAR® UNIT

HRS3600DV Series

INSTALLATION, OPERATION AND MAINTENANCE MANUAL



PARKSON CORPORATION

HYCOR® PRODUCTS
562 BUNKER COURT
VERNON HILLS, IL 60061-1831 • U.S.A.
847-816-3700 FAX: 847-816-3707
SERVICE: 1-888-PARKSON
PARTS (TOLL FREE): 1-800-249-2140

Dated: December 8, 2004

PREFACE

THE OPERATING AND MAINTENANCE PROCEDURES OUTLINED IN THIS MANUAL ARE INTENDED AS GUIDELINES TO ASSIST THE OPERATING PERSONNEL IN THE DAY-TO-DAY OPERATION AND MAINTENANCE OF THE PARKSON UNIT OR EQUIPMENT. OPERATING PERSONNEL SHOULD ALWAYS FOLLOW PROPER SAFETY PROCEDURES IN ACCORD WITH BOTH INDUSTRY SAFETY STANDARDS AND THEIR OWN COMPANY SAFETY POLICIES WHEN PROCEEDING WITH OPERATION, MAINTENANCE AND REPAIR OF THE EQUIPMENT. THIS MANUAL IS NEITHER DESIGNED NOR INTENDED AS A SUBSTITUTE FOR SAFE OPERATING PROCEDURES WHICH MUST BE FOLLOWED WHILE IMPLEMENTING THE MAINTENANCE/OPERATION PROCEDURES OUTLINED IN THIS MANUAL. IT IS ASSUMED THAT OPERATION AND MAINTENANCE PERSONNEL ARE QUALIFIED AND EXPERIENCED. THE PRIMARY RESPONSIBILITY FOR SAFETY IN THE OPERATION AND MAINTENANCE OF THE PARKSON UNIT IS WITH THE OWNER-OPERATOR AND THE PERSONNEL CONDUCTING THE MAINTENANCE AND OPERATION.

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SECTION ONE

Hycor® Rotoshear® Unit GENERAL INFORMATION

Safety Practices



MACHINE MAY START AUTOMATICALLY.

TO PREVENT SERIOUS INJURY OR DEATH:

- **CONSULT OPERATOR'S MANUAL BEFORE SERVICING.**
- **KEEP AWAY FROM ALL MOVING PARTS, BLADES AND DISCHARGE CHUTES DURING OPERATION.**
- **DO NOT OPERATE MACHINE WITHOUT GUARDS AND COVERS IN PLACE.**
- **FOLLOW LOCK OUT PROCEDURES BEFORE SERVICING: LOCK OUT POWER WITH PADLOCK FOR WHICH ONLY YOU HAVE THE KEY.**

IN ADDITION TO THE ABOVE, IN ORDER TO AVOID UNSAFE OR HAZARDOUS CONDITIONS, THE FOLLOWING MINIMUM PROVISIONS MUST BE STRICTLY OBSERVED:

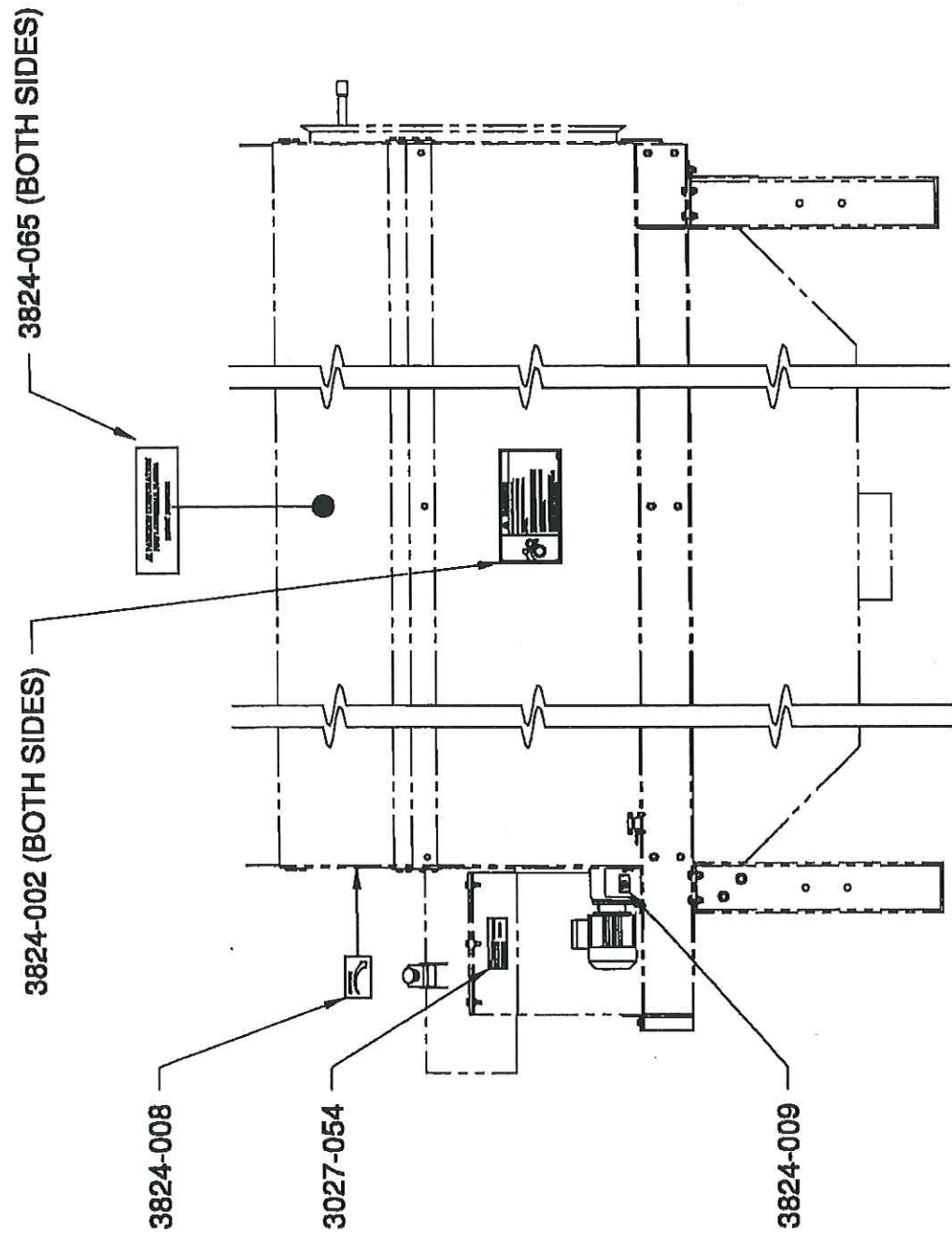
- **THIS EQUIPMENT MUST BE OPERATED AND MAINTAINED ONLY BY AUTHORIZED PERSONNEL WHO HAVE READ AND UNDERSTAND THE OPERATOR'S MANUAL, HAVE BEEN TRAINED IN ITS USE, AND FOLLOWING ANY AND ALL APPLICABLE SAFETY PROCEDURES.**
- **WHEN INSTALLING OR MAINTAINING THE SCREEN OR ASSOCIATED HARDWARE, BE SURE THAT ANY LIFTING EQUIPMENT IS OF SUFFICIENT CAPACITY BEFORE LIFTING OR MOVING THE ROTOSHEAR UNIT OR ASSOCIATED HARDWARE.**

- **MAKE SURE ANY ELECTRICAL CONNECTIONS ARE DONE BY QUALIFIED PERSONNEL AND ARE IN ACCORDANCE WITH ALL APPLICABLE CODES AND REQUIREMENTS.**
- **DO NOT OPERATE A DAMAGED OR MALFUNCTIONING MECHANISM UNTIL NECESSARY ADJUSTMENTS OR REPAIRS HAVE BEEN MADE.**
- **OVERLOAD AND/OR INTERLOCK SWITCHES ARE EMERGENCY DEVICES. DO NOT USE THE OVERLOAD OR INTERLOCK SWITCHES TO STOP THE MACHINE DURING NORMAL OPERATION.**
- **DO NOT OVERLOAD THE SCREEN OR USE IT FOR ANYTHING BUT THE INTENDED USE.**
- **DO PRACTICE GOOD HOUSEKEEPING. ALWAYS INSURE THE UNIT IS KEPT CLEAN AND THE AREA AROUND THE UNIT FREE OF POSSIBLE HAZARDS.**
- **ALWAYS OPERATE AND PERFORM MAINTENANCE IN A MANNER THAT PROMOTES SAFE CONDITIONS. ALWAYS USE THE PROPER TOOLS, WEAR THE PROPER CLOTHING, ETC. FOR THE TASK AT HAND.**
- **WHEN INSTALLING THIS UNIT, ALWAYS INSURE THERE IS A LOCKABLE DISCONNECT WITHIN SIGHT OF THE UNIT.**
- **CONTACT WITH OR EXPOSURE TO MATERIAL PROCESSED OR LUBRICANTS AND OTHER FLUIDS MAY CAUSE INFECTION OR ADVERSE REACTIONS. REPORT ANY CUTS, INJURIES OR EXPOSURE TO YOUR SUPERVISOR IMMEDIATELY AND SEEK APPROPRIATE MEDICAL ATTENTION.**

- **THIS PRODUCT HAS BEEN SUPPLIED WITH WARNING LABELS, SHOULD THEY BECOME DAMAGED, REMOVED OR ILLEGIBLE, PLEASE CONTACT PARKSON CORPORATION FOR NO-COST REPLACEMENT LABELS.**

WARNING LABEL PART NUMBER FOR THIS PRODUCT IS 3824-002. SEE FIGURE ON PAGE 1-3A FOR PROPER LOCATION.

**CALL TOLL FREE: 1-800-249-2140 OR
FAX: (847) 837-4996
PARKSON CORPORATION
HYCOR® CORPORATION
ATTENTION: PARTS DEPARTMENT
562 BUNKER COURT
VERNON HILLS, IL 60061-1831**



LABEL PART NUMBER AND PLACEMENT

Delivery and Inspection

The Rotoshear® unit is shipped as a completely assembled unit, ready for installation.

After the unit has been unloaded, conduct a visual inspection and count of the shipping containers to determine if any shipping damage or material shortage occurred in transit. Be careful not to jar crates and/or to puncture crated materials with lifting forks.

NOTE: **You must report, in writing, any damaged or missing parts to the shipping carrier and Parkson Corporation within 48 hours of receipt of the unit. Purchaser shall bear the responsibility for the replacement of equipment which is determined to be missing after this period.**

To assist in identifying correct quantities and parts, reference the attached packing list on the shipping crate. A purchase order shall accompany any order to Parkson Corporation for replacement of parts which were damaged during shipment. The purchaser shall direct all shipment damage back charges to the carrier.

Storage

For storage under 30 days, the equipment should be covered to be protected from the environment and well ventilated to prevent moisture build-up on surfaces. The unit should be operated for 15 minutes once a week, if power is available, or rotated manually at least one full revolution. Upon completion of unit rotation or operation, the unit should be stopped on a different head location and trunnion location to avoid developing flat spots in trunnions or heads. The units should be isolated from passage of electrical current, shock loads or vibrations during periods of non-operation in order to avoid false brinelling and damage to bearings or other contact surfaces. For extended storage, consult Parkson.

CAUTION

STAINLESS STEEL MATERIAL WILL APPEAR TO RUST IF CONTAMINATED WITH WELD SPATTER, CARBON STEEL DUST FROM A GRINDING WHEEL, OR OTHER AIRBORNE OR WATERBORNE CONTAMINANTS. SPECIAL CARE MUST BE TAKEN TO PROTECT THE UNIT AT ALL TIMES.

SECTION TWO

Hycor® Rotoshear® Unit TECHNICAL DESCRIPTION



DANGER



REVIEW ALL SAFETY PRACTICES LISTED IN SECTION ONE BEFORE PROCEEDING.

Application

Designed as an internally fed rotating screen cylinder, the screen element performs two functions. The first function channels the liquid through the wedgewire screen cylinder and on to the next process. The second function removes the separated solids to a collection device using spiral flights on the inside of the rotating cylinder to transport solids to the discharge end of the cylinder.

Unit Description

The Rotoshear unit consists of these major components: screen cylinder, headbox and distribution system, drive system, frame, trunnions, stabilizers and spray wash system. (See page 2-1A.)

The screen cylinder separates the solids and transports them to the solids discharge via a helical flight arrangement.

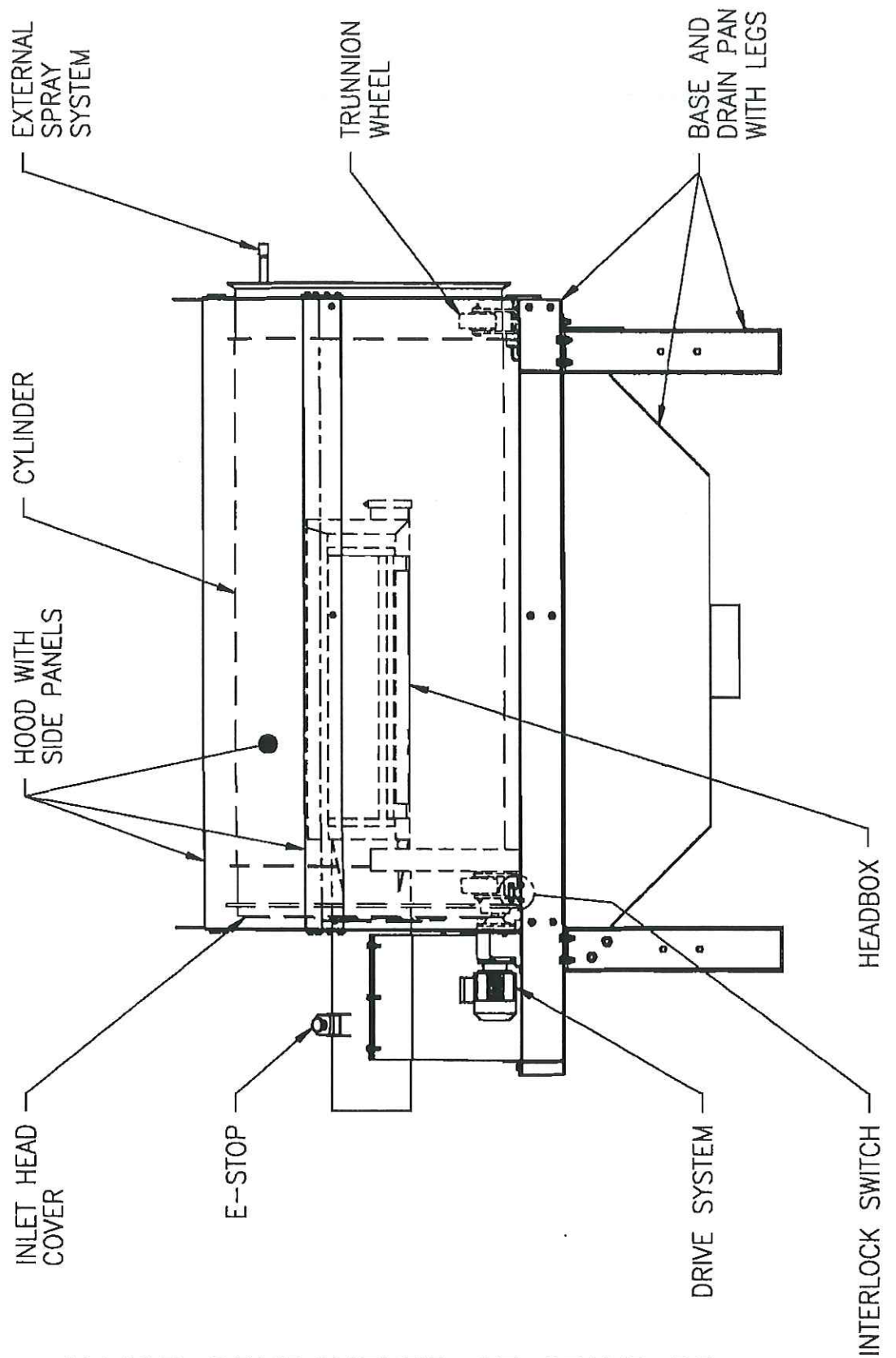
The headbox and distribution system receives the influent and directs it to the screen cylinder for separation. In most cases, the distribution system distributes the flow to both sides of the screen surface. In some cases (special headboxes), the flow is channeled over one side of the headbox following the direction of screen travel. The flow is never directed solely on the side opposing screen travel.

The drive system rotates the screen cylinder by utilizing a chain and sprockets.

The frame acts as the main support system for the headbox and screen cylinder. Parallel to the cylinder screen axis, the bottom of the frame provides the mounting surface.

The trunnions are rollers that support the screen cylinder on both ends and allow for cylinder rotation.

The stabilizers limit the horizontal movement of the cylinder and are fitted to the frame on the discharge end of the cylinder.



MAJOR COMPONENTS OF STANDARD
MEDLOW STYLE ROTOSHEAR UNIT

The spray wash system consists of one header pipe with spray nozzles on the exterior of the cylinder. The spray wash is used to clear the screen of residual solids during the shutdown procedure, or on a continuous or timed basis for specific applications. Depending on the particular application at your site, the spray wash system can be used on an intermittent, timed or continuous basis.

The Rotoshear® unit is available in several sizes based on diameter and length of the cylinder. The unit model designation is made up of a hardware identifier - HRS for Rotoshear, 36 for cylinder diameter and a number for length of cylinder. Example: HRS3648 - Rotoshear unit with 36" diameter cylinder, 48" long.

Operation

The headbox receives the influent, or liquid solid mixture entering the unit, and directs the flow onto the screen for separation. Designed to minimize the turbulence generated by the inrush of influent, the headbox and distribution pan insure proper flow distribution to the screen. As the screen separates the solids, the liquid continues downward through an opening in the base frame. The drive system turns the screen, and assisted by the helical flight arrangement in the screen cylinder, transports the solids to the solids discharge point.

Inlet configuration available for the Rotoshear Unit:

MEDLOW STYLE INLET: This inlet configuration is utilized when low influent flow with large and/or heavy concentrations of solids are distributed onto the screen.

UP-FLOW TUB STYLE INLET: When high flow conditions exist, this configuration is used.

SECTION THREE

Hycor® Rotoshear® Unit INSTALLATION



DANGER



REVIEW ALL SAFETY PRACTICES LISTED IN SECTION ONE BEFORE PROCEEDING.

Mechanical Work

The Rotoshear unit is shipped completely assembled, skid mounted with protective crating, and ready for site installation. Prior to starting installation, check the following items:

Verify wall openings and transport routes into the building are sufficiently large to allow the unit to be placed in location.

Verify that lifting and transport equipment of suitable capacity is available. The unit is most often lifted from underneath with a forklift. Please note that units with a drain pan require special lifting braces when lifted by a forklift (see page 3-1A). (See Table 3-1 for standard unit weights.) If the unit is to be lifted from above, use the lifting lugs on the base frame, a sling with spreader bars, etc. must be used.

Table 3-1

MODEL NO.	APPROXIMATE DRY WEIGHT (LBS.)
HRS3648DV	1410 lbs.
HRS3672DV	1698 lbs.

Weights of optional equipment are not included.

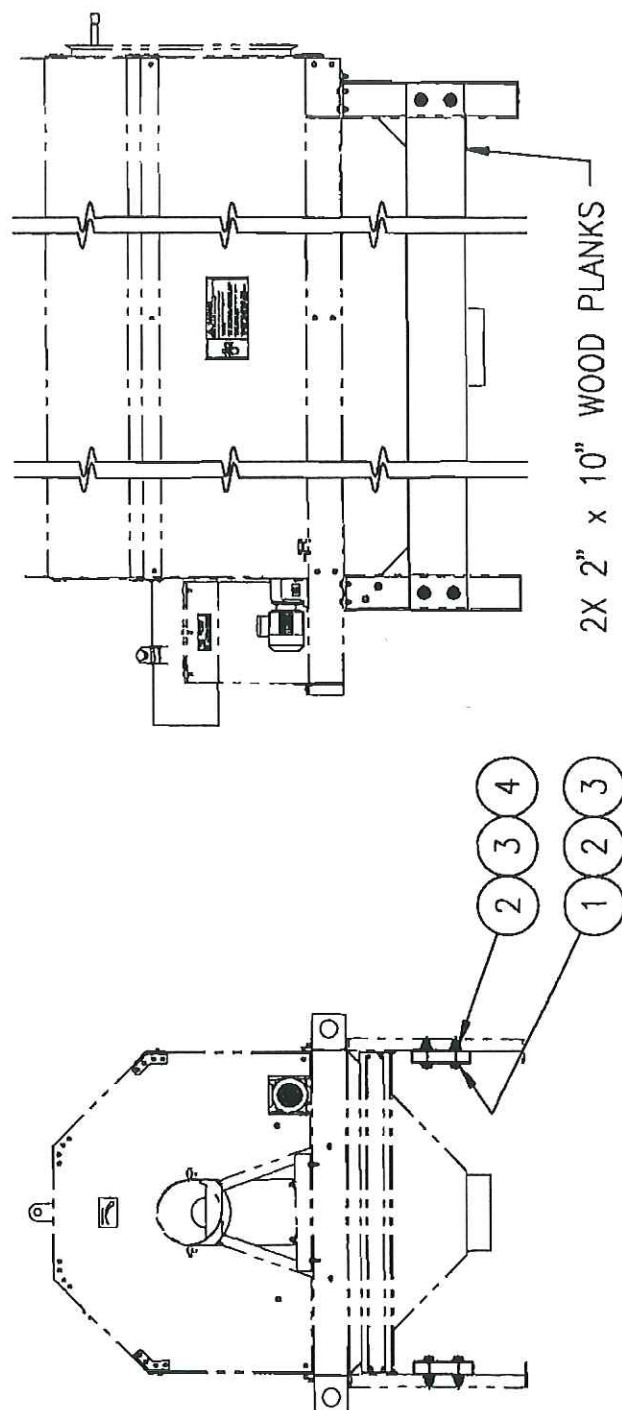


DANGER



WHEN INSTALLING OR MAINTAINING THE SCREEN OR ASSOCIATED HARDWARE, BE SURE THAT ANY LIFTING EQUIPMENT IS OF SUFFICIENT CAPACITY BEFORE LIFTING OR MOVING THE ROTOSHEAR UNIT OR ASSOCIATED HARDWARE.

OPTIONAL LIFTING INSTRUCTIONS FOR UNITS WITH DRAIN PAN



FASTENERS:

- ① = 3/4"-10UNC x 4" LG HEX HD CAP SCREW, QTY 8
- ② = 3/4" FLAT WASHER, QTY 16
- ③ = 3/4" SPLIT LOCK WASHER, QTY 8
- ④ = 3/4"-10UNC HEX NUT, QTY 8

FIT THE SLING TO THE LIFTING LUGS ON THE BASE FRAME AND NOT TO THE CABINET STRUCTURE, MOTOR OR OTHER MOVING PARTS OF THE UNIT.

Check to ensure that the Rotoshear® unit is correctly positioned. Using a carpenter's level across the top of the frame, verify the unit is level and adjust or shim support structure as necessary. Because the frame is parallel with the axis of the Rotoshear unit, leveling of the frame is all that is required.

Once the unit is lined up with your attaching devices and level, it can be grouted and secured to its mounting using standard concrete anchors.

The unit, unless otherwise specified, is supplied with plain pipe connections that connect with a flexible connector. (See customer drawing for actual type and location.) Connect the influent piping. Standard pipe thread connections are provided (located on the side of the headbox for draining the unit). The spray bar piping also uses standard pipe NPT female thread connections. (See Table 3-2.) Connect the water spray piping and, if necessary, the drain piping.

Table 3-2

SPRAY SYSTEM

MODEL NO.	STANDARD PIPE SIZE	Total Flow Rate (USGPM at 40 psi) EXTERNAL
HRS3648DV	3/4" NPT	13
HRS3672DV	3/4" NPT	20

CAUTION

ALL PIPING AND VALVES MUST BE SUPPORTED INDEPENDENTLY OF THE UNIT.

Electrical Work

Complete the installation by connecting the electrical power to the drive motor and system control circuits. Verify that the power source supplied and the motor wiring connections are in agreement. Be sure that the unit is well grounded and that all work is in accordance with the National Electrical Code and local wiring code requirements.

Gearmotor: 230/460 Volt, 3 Phase, 60 Hertz



MAKE SURE ANY ELECTRICAL CONNECTIONS ARE DONE BY QUALIFIED PERSONNEL AND ARE IN ACCORDANCE WITH ALL APPLICABLE CODES AND REQUIREMENTS.

WHEN INSTALLING THIS UNIT, ALWAYS INSURE THERE IS A LOCKABLE DISCONNECT WITHIN SIGHT OF THE UNIT.

IN ADDITION TO THE GROUNDING CONNECTION FOUND IN THE TERMINAL BOX OF THE MOTOR, AN ADDITIONAL GROUNDING LUG MAY BE LOCATED ON THE DRIVE SIDE OF THE UNIT. SEE FIGURE 2-1A FOR LOCATION OF THE GROUNDING LUG. IF SUPPLIED, THIS LUG AND THE GROUND CONNECTION IN THE MOTOR TERMINAL BOX SHOULD BE SECURELY GROUNDED TO PREVENT HAZARDOUS CONDITIONS.

THE UNIT IS EQUIPPED WITH AN EMERGENCY STOP PUSH BUTTON AND TWO HOOD INTERLOCK SWITCHES. SEE FIGURE 2-1A FOR LOCATION OF THE E-STOP PUSH BUTTON. SEE FIGURE 3-4A FOR LOCATION OF THE HOOD INTERLOCK SWITCHES. THIS PUSH BUTTON AND THE INTERLOCK SWITCHES MUST BE WIRED INTO THE CONTROL SYSTEM TO OVERRIDE ALL MODES OF CONTROL, IN ORDER TO STOP THE UNIT. UPON RESETTING THE E-STOP PUSH BUTTON AND/OR RELATCHING THE HOOD INTERLOCK SWITCHES, THE MACHINE SHOULD NOT RESTART UNTIL A MANUAL SIGNAL IS GIVEN TO RESTART FROM THE CONTROL SYSTEM.

TO PREVENT SERIOUS INJURY OR DEATH:

- **DO NOT OPERATE MACHINE WITHOUT GUARDS AND COVERS IN PLACE.**

Carry out the following checks before starting the unit for the first time.

Is the unit installed in accordance with the drawings?

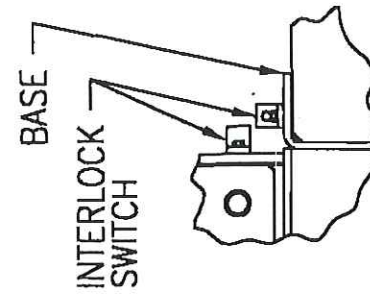
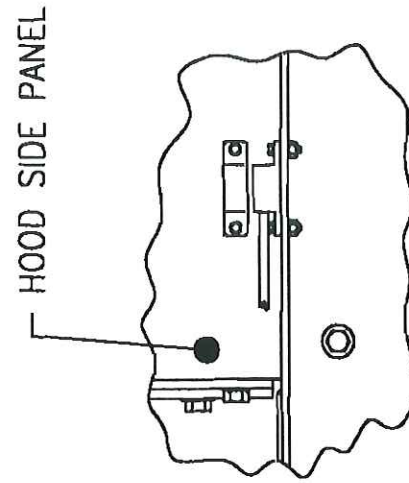
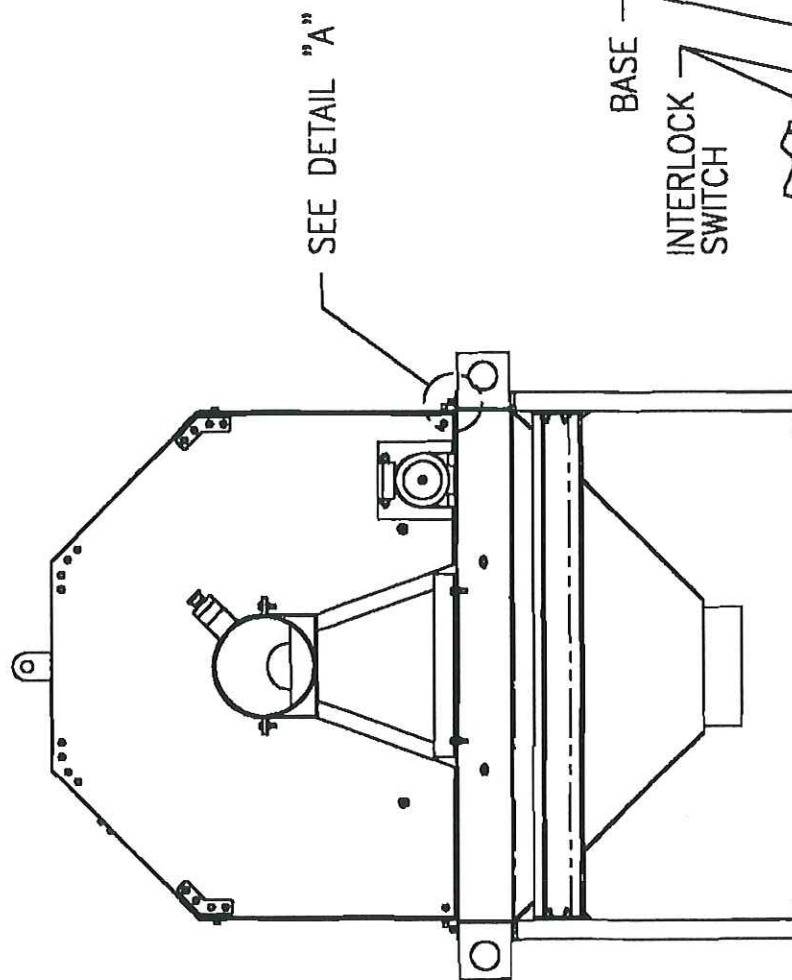
Has the unit been securely anchored to the foundation?

Is the electrical power supply to the motor and the motor wiring terminations in agreement and correct?

Have all other electrical connections been made in accordance with the circuit and wiring diagrams?

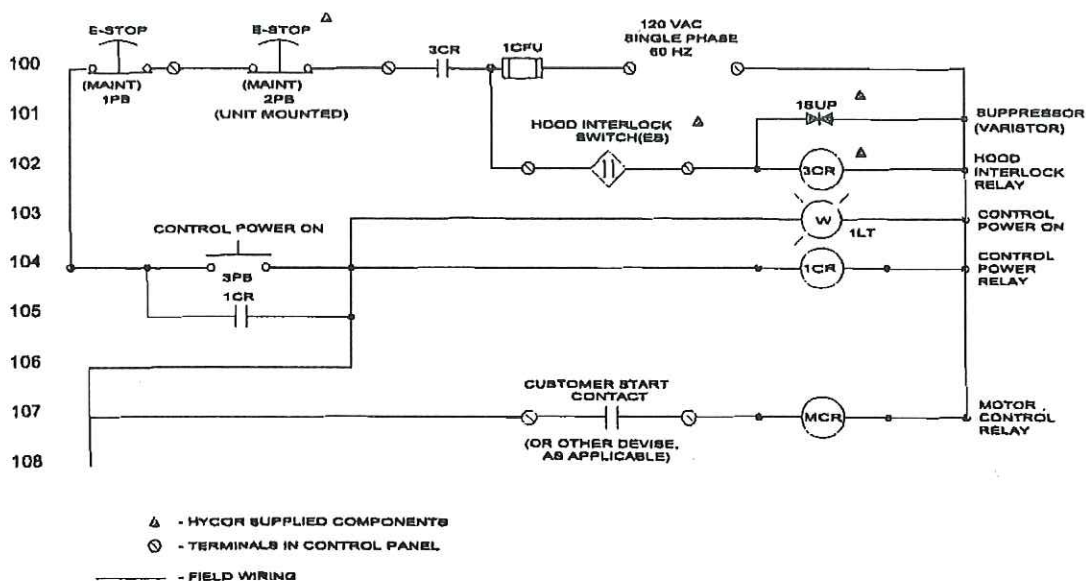
Has all packaging material been removed and is the cylinder free to rotate and in the proper position? Check to see that no construction debris or dry solids were left on or in the screen cylinder, headbox or distribution pan.

Check lubrication of unit before start up.



DETAIL "A"
TYPICAL BOTH SIDES

INTERLOCK SWITCHES HOOD SIDE PANELS/BASE



This schematic is to provide a recommended interface between the control panel and the unit mounted hood interlock switches and E-stop only. Other items are shown for reference only and are typically supplied by others, unless Parkson Corporation provides complete system controls. The hood interlock switches shall be wired in series into the control panel, as shown above, using the relay and varistor supplied with the IOM that is attached to the unit. Either hood interlock switch is to completely and immediately shut down the Rotoshear unit in the event that the hood is opened or removed. The E-stop, when depressed, is to completely and immediately shut down the unit. The E-stop and the interlock switches must override all modes of operation and the unit must not restart unless a control signal is given at the control panel by the operator (i.e. the operator presses a START push button or CONTROL PANEL ON push button, as applicable). It is recommended that this 3-wire control logic be used to prevent the unit from restarting unexpectedly after a shutoff caused by E-stop activation, interlock switch activation, overload or power outage. Proper wiring from the interlock switches and the E-stop to the control panel will be the responsibility of others. This system should be tested by a qualified electrician to insure all safety related components are fully functional. In addition to the Parkson supplied components, the customer must provide a lockable power disconnect on all power sources in clear sight of operator/service area.

ELECTRICAL SCHEMATIC (recommended control panel interface)

3-4B

SECTION FOUR

Hycor® Rotoshear® Unit OPERATING INSTRUCTIONS



DANGER



REVIEW ALL SAFETY PRACTICES LISTED IN SECTION ONE BEFORE PROCEEDING.

THIS EQUIPMENT MUST BE OPERATED AND MAINTAINED ONLY BY AUTHORIZED PERSONNEL WHO HAVE READ AND UNDERSTAND THE OPERATOR'S MANUAL, HAVE BEEN TRAINED IN ITS USE, AND FOLLOWING ANY AND ALL APPLICABLE SAFETY PROCEDURES.

Start Up Procedures

The first step is to check for proper cylinder rotation. When viewed from the solids discharge end, the screen cylinder should rotate in a counter-clockwise direction when the motor is jogged (see page 4-1A), or clockwise if ordered with right-hand drive.

If the cylinder is turning in reverse, **TURN OFF ALL POWER** to the Rotoshear unit and switch any two of the incoming power leads to the motor. Jog motor again to insure proper rotation.

The second step is to test the spray bar for proper operation and spray pattern. (See page 4-1B.)

After the spray bar is tested, the Rotoshear unit can be run to verify proper mechanical operation. If there are no problems with the mechanical operations of the machine, it is ready to accept the influent flow.



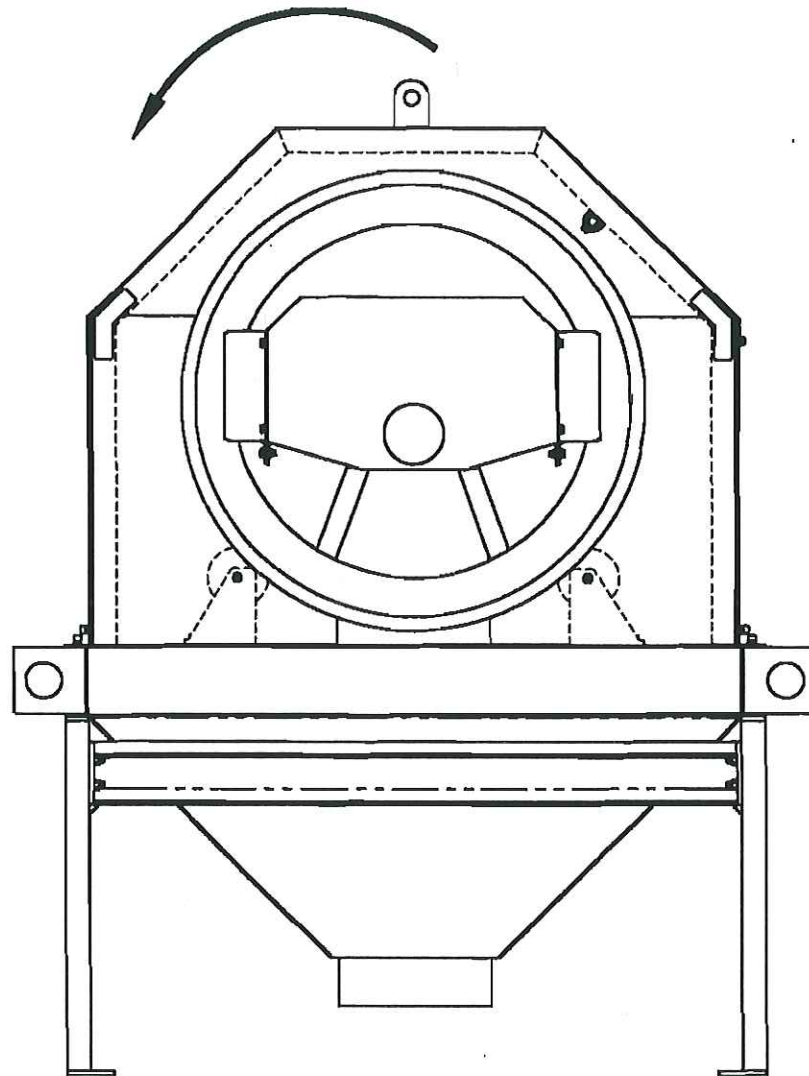
DANGER



TO PREVENT SERIOUS INJURY OR DEATH:

- **KEEP AWAY FROM ALL MOVING PARTS, BLADES AND DISCHARGE CHUTES DURING OPERATION.**
- **DO NOT OPERATE MACHINE WITHOUT GUARDS AND COVERS IN PLACE.**

CYLINDER
ROTATION



EFFLUENT END VIEW

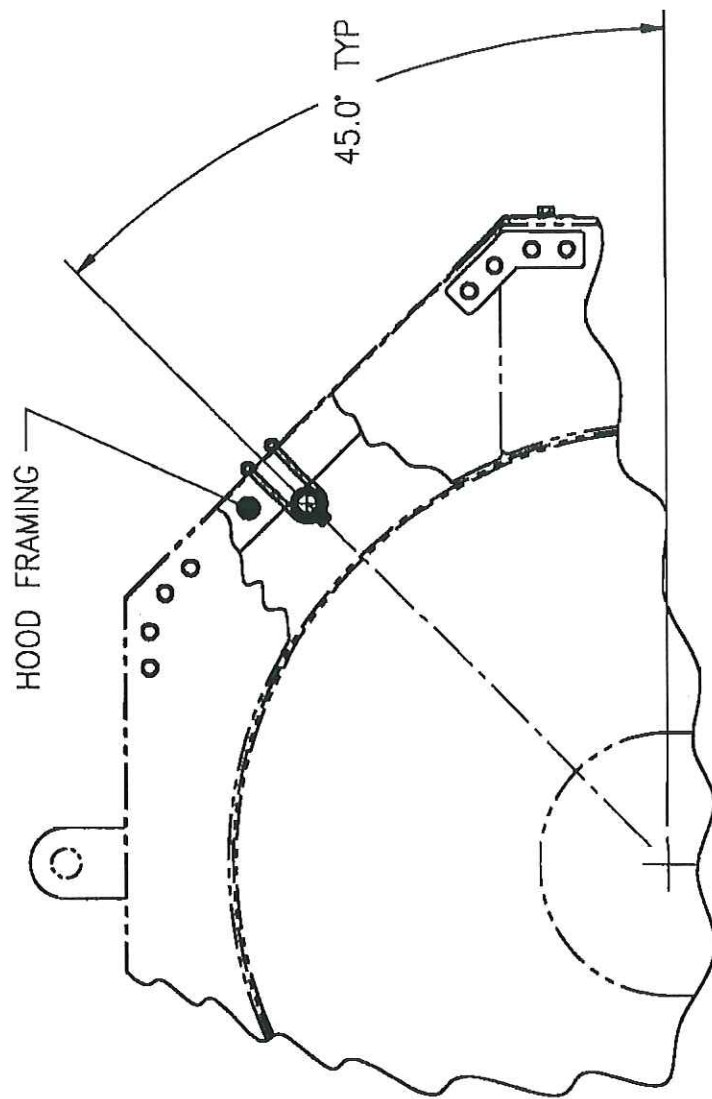
CYLINDER ROTATION
(LH DRIVE)

4-1A



NOZZLE ORIENTATION

EXTERNAL WATER SPRAY



DISCHARGE END VIEW
SPRAY PIPE ORIENTATION

- **FOLLOW LOCK OUT PROCEDURES BEFORE SERVICING:
LOCK OUT POWER WITH PADLOCK FOR WHICH ONLY
YOU HAVE THE KEY.**

**MAKE SURE ANY ELECTRICAL CONNECTIONS ARE DONE BY
QUALIFIED PERSONNEL AND ARE IN ACCORDANCE WITH ALL
APPLICABLE CODES AND REQUIREMENTS.**

**DO NOT OPERATE A DAMAGED OR MALFUNCTIONING MECHANISM
UNTIL NECESSARY ADJUSTMENTS OR REPAIRS HAVE BEEN MADE.**

**OVERLOAD AND/OR INTERLOCK SWITCHES ARE EMERGENCY
DEVICES. DO NOT USE THE OVERLOAD OR INTERLOCK SWITCHES
TO STOP THE MACHINE DURING NORMAL OPERATION.**

**NOTE: If you should notice any mechanical difficulties or have any
questions, be sure to contact your Hycor representative.**

Operating Modes and Adjustments

When starting the unit up, make sure all personnel in the area are informed. Check machine once again for obstructions and have a container ready to accept the screenings.

Now you can turn the unit on.

If chain oil pump has been supplied set up program as described in the component data section number nine. The pump should be initially programmed to run 15 seconds of every hour. In addition the pump should be wired so that it only has power when the Rotoshear unit is in operation.

Lubricate the chain and both sprockets at initial start-up. This should be accomplished by using the recommended spray lubricant (see Lubrication Chart page 5-5).

Have the spray bar ready to activate in the event the screen should become clogged with the first rush of influent.

When introducing the flow upon start up, add the flow in increments of 25%, if possible, to prevent shock loading.

Observe the separation process as the flow is introduced.

Solids separation should be immediate and should begin to collect on the bottom right-hand quarter of the screen (lower left-hand quarter for right-hand drive unit), forming balls, rings, rolls, etc. The solids should start moving toward the discharge end of the screen cylinder and into the collection device.

The spray bar(s) can be controlled by electronic valves and timers (not supplied with standard Rotoshear® unit). Listed in Table 4-1 are some time ranges for intermittent spray operation. Times will vary due to variations in processes, and will need to be optimized for each location to minimize water usage while keeping the screen clean.

Table 4-1

TIME RANGES FOR SPRAY BAR INTERMITTENT OPERATION

APPLICATION	On Time (minutes)		Off Time (minutes)	
	Internal*	External	Internal*	External
Sewage	1	1	10	10
Pulp & Paper	1	1	7	7
Tanning	1	1	7	7
Food Processing	1	1	5	5
Storm Overflow	10 min./hr.	10 min./day	5 min./hr.	5 min./day

* Internal water spray is optional.

Each standard nozzle requires 1 GPM at 40 psi.

Shutdown and Cleaning Procedures

CAUTION

DO NOT APPLY HOT STEAM DIRECTLY TO PLASTIC OR RUBBER SURFACES, AS IT CAN CAUSE DAMAGE OR DEFORMATION OF THESE SURFACES.

When taking the Rotoshear unit off-line for a short term shutdown period of time for maintenance or any other reason, follow the procedures below to save time and help prevent premature "wear" or service requirements.

When turning the influent flow off, the screen cylinder should be left turning and the spray bar(s) should be left on until they have rinsed the screen cylinder down. This process insures that no solids are left on to harden and blind the screen.

The next step is to rinse the accumulated solids from the headbox, guards and the spray bar(s).

Once the machine is thoroughly rinsed down, the spray bar(s) can be turned off and the screen cylinder rotation stopped.

Once the machine is thoroughly rinsed down, the spray bar can be turned off and the screen cylinder rotation stopped.

Open the drain on the headbox and rinse the headbox to thoroughly remove all residual solids.

The next step is to clean the screen thoroughly. The best method is to steam/pressure clean the screen, with an approved, safe cleaning agent. This would also be an opportune time to steam clean the entire machine.

Once the Rotoshear[®] unit has been cleaned, it is very important to again check the lubrication points. Steam cleaning not only removes the grease and oils you don't want on the machine but it also removes the grease and oils you do want for lubrication.

Relubricate the trunnion wheels, stabilizer and chain. Check the gearmotor for proper lubrication level and any water intrusion.

SECTION FIVE

Hycor® Rotoshear® Unit MAINTENANCE



REVIEW ALL SAFETY PRACTICES LISTED IN SECTION ONE BEFORE PROCEEDING.

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TO PREVENT SERIOUS INJURY OR DEATH:

- **FOLLOW LOCK OUT PROCEDURES BEFORE SERVICING: LOCK OUT POWER WITH PADLOCK FOR WHICH ONLY YOU HAVE THE KEY.**

Follow the maintenance schedule below to extend the lifetime of your machine and decrease overall operating costs at your plant.

Frequent visual inspections of the liquid/solid separation process and mechanical operation of the Rotoshear unit should be performed on a regular basis. A visual check for proper liquid/solid separation should be conducted once per operating shift. More frequent observation may be needed, depending on the specific application.
(See page 5-1A.)

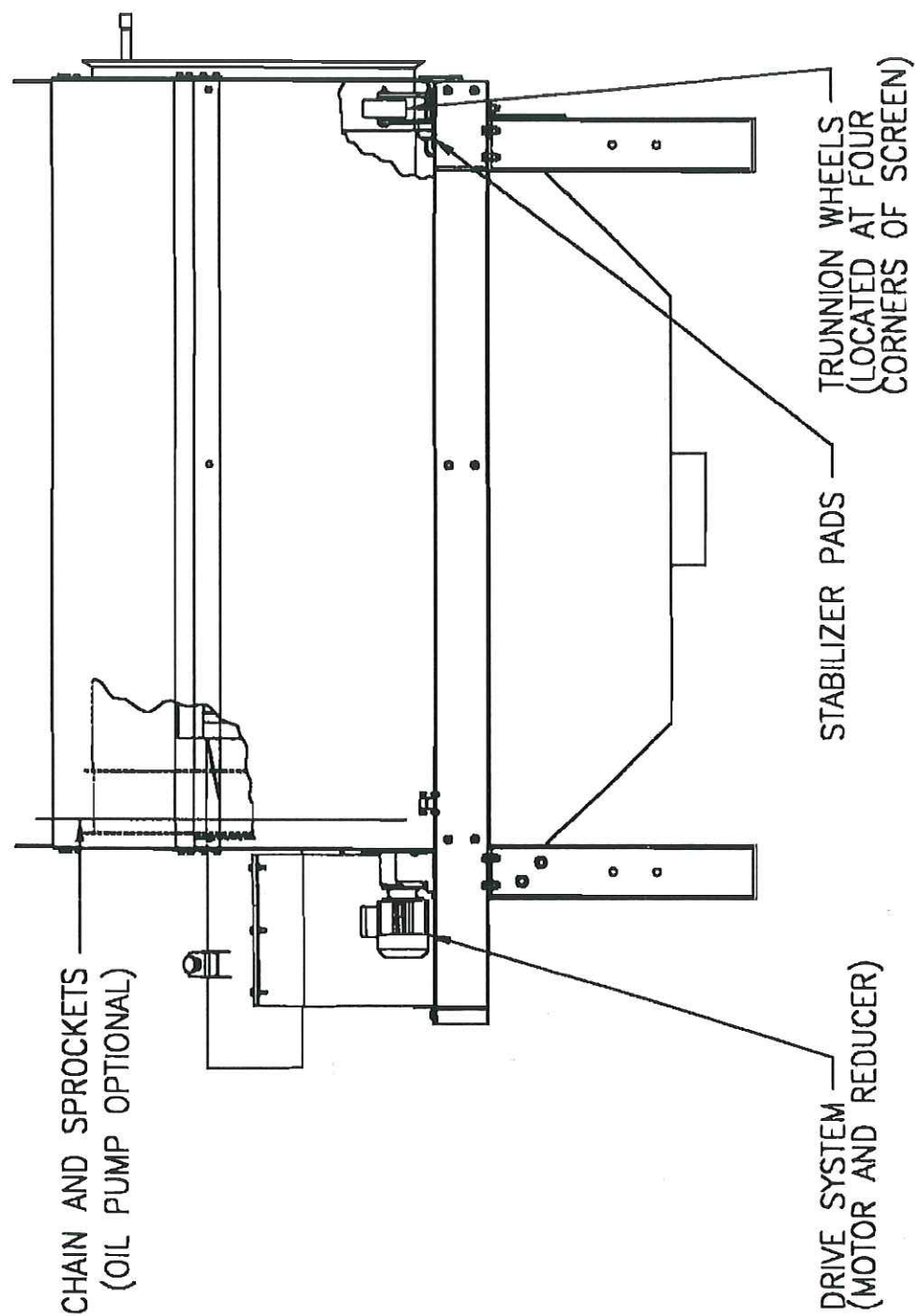
Daily

General Visual Inspection -

Verify proper flow distribution to the screen cylinder and that no obstructions are present. Check that liquid/solid separation is taking place and that the solids are being transported to the solids discharge point. Confirm rotation of screen is smooth and no flat spots on trunnion wheels or cylinder heads exist.

Inspect and Lubricate Chain -

Inspect the operation of the chain relative to the drive and driven sprocket. It is recommended that the chain be lubricated once every 24 hours of operation if manual lubrication is utilized*.



LUBRICATION OF THE ROTOSHEAR UNIT

Inspect Trunnion Wheels -

Check to verify trunnion wheels are rotating smoothly.

Cleaning -

Rinse accumulated solids off of headbox and internal spray guard. Clean other components as needed.

Inspect Spray Nozzles -

Visually check to confirm that nozzles are clear and produce proper spray pattern on screen.

Weekly

Lubricate Trunnion Wheels -

Reference Lubrication Chart (page 5-5) for recommended lubricant. Worn bearings should be replaced immediately to prevent damage to the trunnion shafts.

Inspect and Lubricate Stabilizer Assembly -

Visually check stabilizer pads and replace if necessary. A unit that is not level will accelerate pad wear. Reference Lubrication Chart (page 5-5) for recommended lubricant.

Monthly

Check Gearmotor Oil Level -

Remove the oil level plug in reducer (typically the red plug) and check oil level. If necessary, add oil to bring to proper level.

Inspect Cylinder -

Visually check for any damage or holes in the screen cylinder.

Inspect Drive and Driven Sprockets -

Verify proper engagement of chain to sprockets and check for wear of sprockets.

* If an oil pump option has been purchased look at the reservoir and fill as required so that the pump does not run dry.

Semi-Annually

Check Gear Reducer Output Shaft -

Annually

Change Oil in Gearmotor -

Reference Lubrication Chart (page 5-5) for proper lubricant and Section Nine for further drive information.

Inspect and Clean Unit -

Drain the headbox, flush and clean unit as required. Inspect the unit thoroughly and repair or replace damaged or worn parts as necessary.

Clean and Relubricate Chain -

Remove all excess lubrication and debris from the chain and relubricate. Inspect drive and driven sprockets for wear and possible replacement.

Repack Motor Bearings -

Repack motor end bearings to one-third capacity. Overpacking may cause overheating. Reference Lubrication Chart (page 5-5) for proper lubricant.

MAINTENANCE SCHEDULE

PROCEDURE	DAILY	WEEKLY	MONTHLY	SEMI-ANNUALLY	ANNUALLY
General visual inspection.	•				
Lubricate Chain.	•				
Inspect chain oiler reservoir and chain. (if oil pump supplied)	•				
Inspect trunnion wheels.	•				
Rinse accumulated solids off of headbox and internal spray guard.	•				
Inspect spray nozzles.	•				
Lubricate trunnion wheels.		•			
Inspect and lubricate stabilizer assembly.		•			
Check gear motor oil level.			•		
Inspect cylinder.			•		
Inspect drive and driven sprockets.			•		
Check gear reducer output shaft for abnormal play.				•	
Change oil in gear motor.					•
Thoroughly inspect and clean unit.					•
Clean and relubricate chain.					•
Repack motor bearings.					•

LUBRICATION CHART

APPLICATION	LUBRICATION
Chain	<ol style="list-style-type: none">1. Bel-Ray: Waterproof Chain Lubricant2. Hydrotex: #104 Chain and Cable Lubricant3. Jax: Magna-Plate 78 (food applications)
Oil Pump (if supplied)	Castrol Molub-Alloy® MWO 10/46
Motor	Refer to Drive Data in Section Nine for specific instructions.
Gear Reducer	<ol style="list-style-type: none">1. Mobil Oil Corp.: Mobilgear 630 (mineral)2. Shell Oil Co.: Omala Oil 220 (mineral)3. Mobil Oil Corp.: Mobilgear 629 (mineral)4. Mobil Oil Corp.: Mobil SHC 630 (synthetic)
Trunnion Wheels and Stabilizer	<ol style="list-style-type: none">1. Lubriko: T-723-B Lubricant2. Hydrotex: MT55 NLGI Grade 2



WHEN INSTALLING OR MAINTAINING THE SCREEN OR ASSOCIATED HARDWARE, BE SURE THAT ANY LIFTING EQUIPMENT IS OF SUFFICIENT CAPACITY BEFORE LIFTING OR MOVING THE ROTOSHEAR® UNIT OR ASSOCIATED HARDWARE.

DO NOT OPERATE A DAMAGED OR MALFUNCTIONING MECHANISM UNTIL NECESSARY ADJUSTMENTS OR REPAIRS HAVE BEEN MADE.

DO PRACTICE GOOD HOUSEKEEPING. ALWAYS INSURE THE UNIT IS KEPT CLEAN AND THE AREA AROUND THE UNIT FREE OF POSSIBLE HAZARDS.

ALWAYS OPERATE AND PERFORM MAINTENANCE IN A MANNER THAT PROMOTES SAFE CONDITIONS. ALWAYS USE THE PROPER TOOLS, WEAR THE PROPER CLOTHING, ETC. FOR THE TASK AT HAND.

CONTACT WITH OR EXPOSURE TO MATERIAL PROCESSED OR LUBRICANTS AND OTHER FLUIDS MAY CAUSE INFECTION OR ADVERSE REACTIONS. REPORT ANY CUTS, INJURIES OR EXPOSURE TO YOUR SUPERVISOR IMMEDIATELY AND SEEK APPROPRIATE MEDICAL ATTENTION.

THIS PRODUCT HAS BEEN SUPPLIED WITH WARNING LABELS, SHOULD THEY BECOME DAMAGED, REMOVED OR ILLEGIBLE, PLEASE CONTACT PARKSON CORPORATION FOR NO-COST REPLACEMENT LABELS. WARNING LABEL PART NUMBER FOR THIS PRODUCT IS 3824-002. SEE FIGURE ON PAGE 1-3A FOR PROPER LOCATION.

**CALL TOLL FREE: 1-800-249-2140 OR
FAX: (847) 837-4996
PARKSON CORPORATION
HYCOR® CORPORATION
ATTENTION: PARTS DEPARTMENT
562 BUNKER COURT
VERNON HILLS, IL 60061-1831**

SECTION SIX

Hycor® Rotoshear® Unit REPAIR AND REPLACEMENT



REVIEW ALL SAFETY PRACTICES LISTED IN SECTION ONE BEFORE PROCEEDING.

TO PREVENT SERIOUS INJURY OR DEATH:

- **FOLLOW LOCK OUT PROCEDURES BEFORE SERVICING: LOCK OUT POWER WITH PADLOCK FOR WHICH ONLY YOU HAVE THE KEY.**

Chain Repair

The chain drive, like all other chain drives, needs periodic tightening. As the chain wears it becomes longer, so to keep the final drive running smoothly we will outline a procedure for tensioning the chain.

NOTE: Before tightening the chain, check each trunnion wheel diameter to be certain the wheels are within wear limits. The trunnion wheels have a scribe line to indicate when replacement is needed. Decreases in trunnion diameter will effect chain tension and over-tightening of the chain will effect trunnion wear.

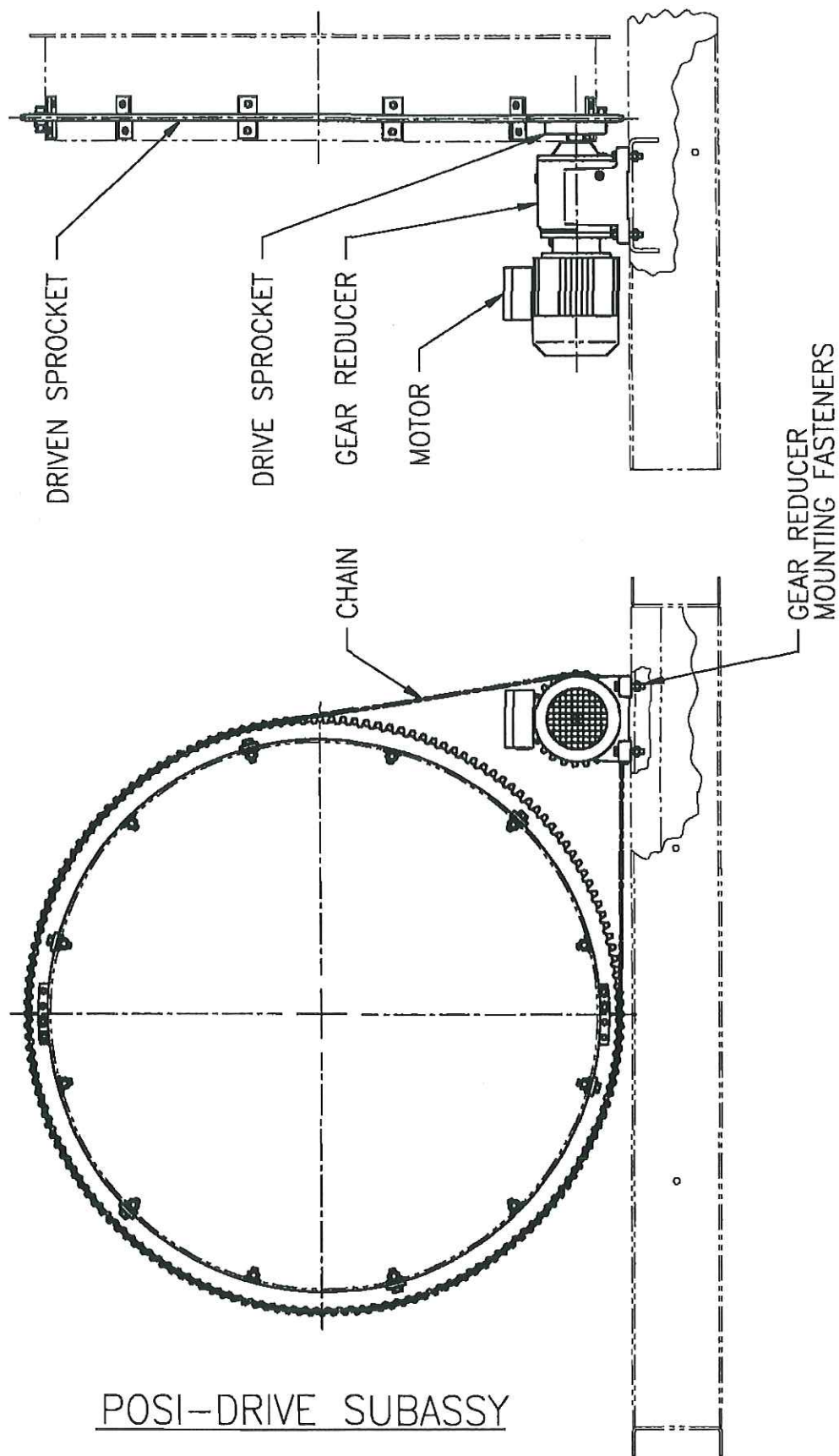
The chain may be adjusted as follows (see page 6-1A):

Chain tension may be adjusted on the Rotoshear unit by simply loosening the motor mounting bolts slightly and turning the three (3) adjusting screws evenly.

One (1) link may be removed before the chain must be replaced.

Chain and Sprocket Replacement (See page 6-1A.)

Two sprockets are used to drive the screen cylinder: a small keyed hub sprocket (drive sprocket) is found on the output shaft of the reducer and a large two-piece sprocket (driven sprocket) is found on the screen cylinder.



To disassemble the chain drive, release chain tension (loosen motor mounting bolts slightly), remove master chain link, and remove chain.

The smaller sprocket, or drive sprocket, can be removed for replacement by loosening the set screw in the hub and pulling it off the output shaft with a puller. For alignment purposes when reassembling, you may want to scribe a line for reference on the reducer shaft before the hub is removed.

CAUTION

DO NOT HAMMER ON THE SPROCKET OR HUB. HAMMERING ON THESE PARTS WILL DAMAGE THE BEARINGS IN THE REDUCER.

When replacing the hub on the shaft, apply an anti-seize compound between the hub and the shaft to prevent corrosion.

The larger or driven sprocket is bolted to the head of the screen cylinder and because it is a two-piece sprocket, assembles easily. The sprocket is shimmed out from the head with spacers. Keep all the spacers in place for reassembly.

Remove the sprocket sections by removing the bolts and carefully maneuvering the sprocket sections out of the machine. When reassembling the sprocket, tighten all the bolts "finger tight" and align the sprocket teeth at the split, using a section of chain for a gauge.

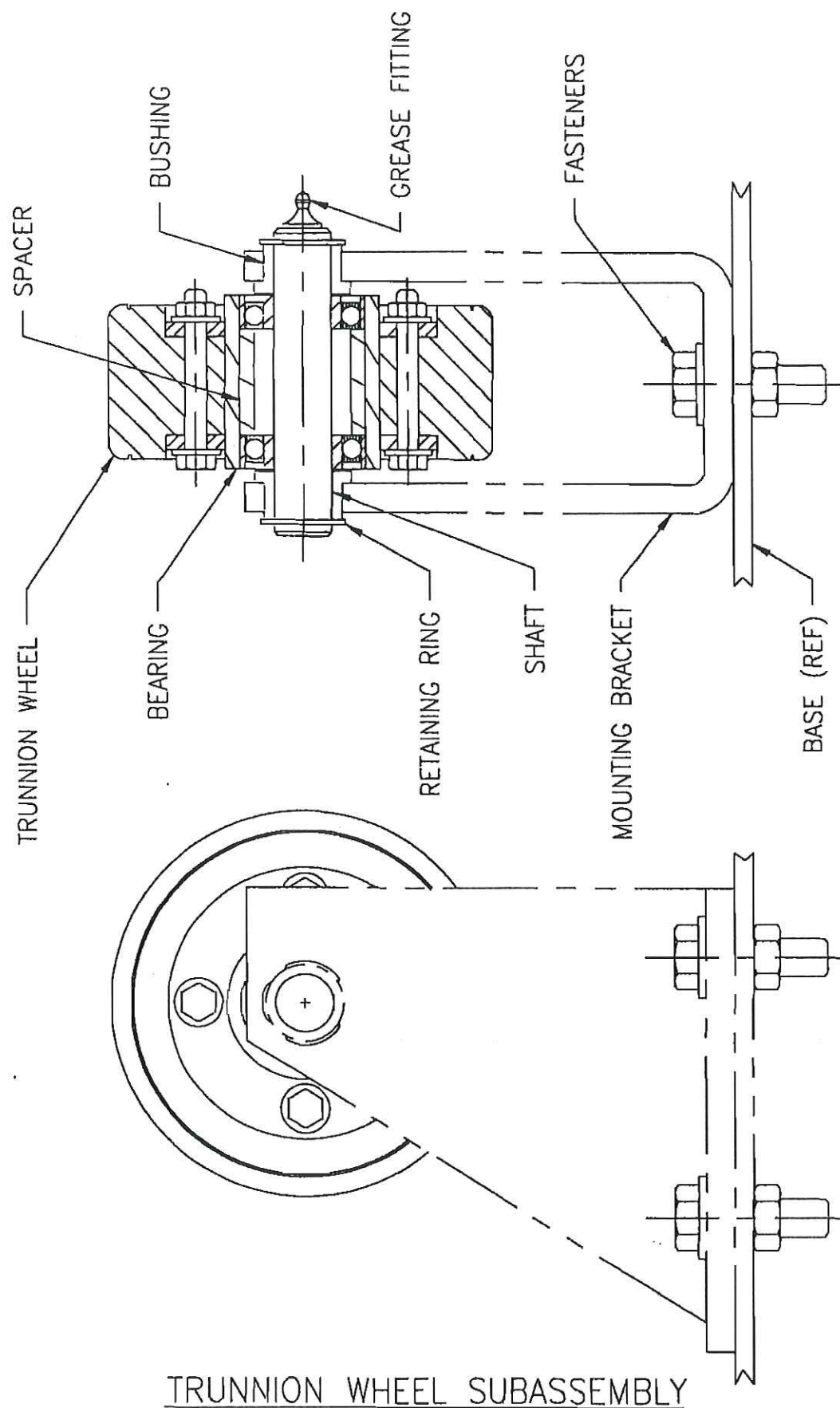
If the drive hub has been lined up with the scribe mark you made before taking it off and the correct spacers have been replaced behind the driven sprocket, the alignment should remain as it was before disassembly.

To check the alignment, lay a good steel straightedge across the faces of the two sprockets. You will be able to see which way the drive sprocket must be moved to be in line with the driven sprocket.

Trunnion Wheel Replacement (See page 6-2A.)

The trunnions support the screen cylinder and allow the screen to rotate freely. The trunnion wheels are 5" in diameter and are sized according to screen cylinder weight and diameter. Trunnion wheels are made of a wear resistant, high-density polyethylene. They should be replaced if they are worn beyond limits. For convenience, scribe lines are provided on the sides of the wheels indicating wear limits. (4.5" on the 5" diameter wheels.)

When removing the trunnions, raise and block the screen cylinder up above the wheels. Remember that the diameter of new wheels will be larger than worn wheels, so block up the screen cylinder high enough to provide clearance for any new installed wheels.



ITEMS SHOWN IN PHANTOM ARE NOT PART OF TRUNNION WHEEL SUBASSEMBLY

While replacing the trunnions at the discharge end of the Rotoshear[®] unit **does not** require removal of the drive chain, replacing the wheels at the driven end **does** require drive chain removal.

Trunnions are shaft-mounted on steel supports that are bolted to the frame. The shaft can be withdrawn after the retainers have been removed from its ends.

The trunnion hubs are a two-piece assembly for ease of wheel replacement. Bearings are pressed into the hub and are replaceable. Trunnion shafts and bearings should be checked for abnormal wear and replaced if necessary. Trunnions can be ordered as sub-assemblies or as separate components.

Stabilizer Replacement (See page 6-3A.)

The stabilizer assembly (part of overall base subassembly) limits the axial, horizontal movement of the cylinder to plus or minus 1/8". A simple arrangement of two pads is designed for this purpose.

Stabilizer repair usually involves no more than replacement of the wear blocks, which are bolted to brackets attached to the frame near the discharge end of the machine. Removal of entire assembly provides an unrestricted access to stabilizer pads.

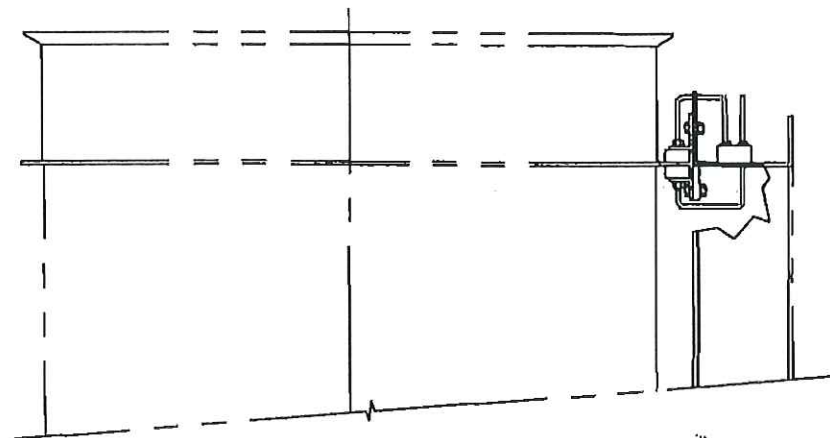
After replacing and adjusting stabilizers, make sure that the trunnions stay centered on their tracking surfaces and that the drive chain is still in alignment.

Spray Bar Removal (See page 4-1B.)

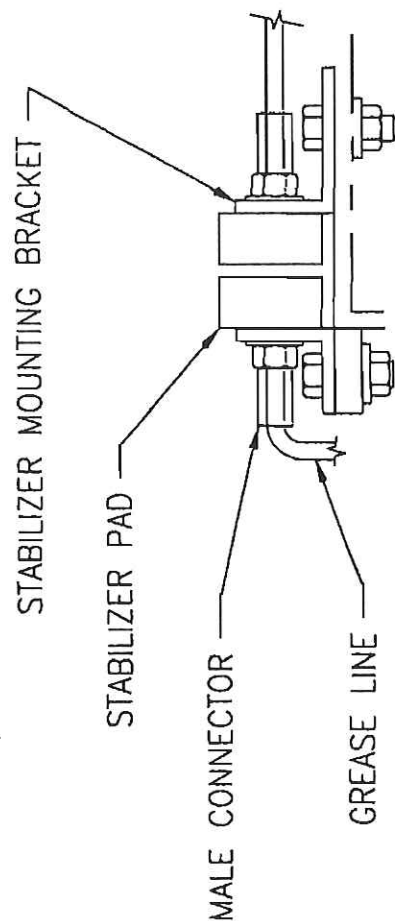
To remove the spray bar, disconnect the plumbing and pull the bar out of the discharge end of the machine. Flush the spray bar and supply line before reconnecting.

Nozzle Replacement

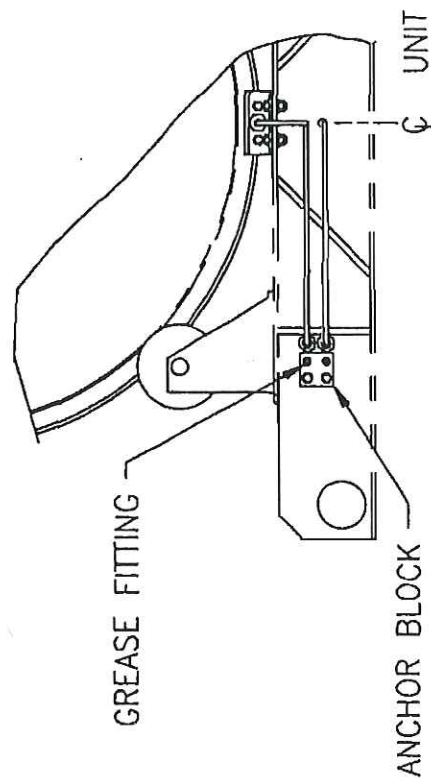
Before removing spray bar, identify faulty nozzle. Remove spray bar and remove nozzle. When replacing with new nozzle, wrap threads in teflon tape (or acceptable substitute) to provide sealing. Verify that nozzle orifice is in alignment with other nozzles and replace spray bar.



TRUNNION WHEEL NOT SHOWN FOR CLARITY



STABILIZER DETAIL



DISCHARGE END VIEW

STABILIZER ASSEMBLY

Cylinder Replacement

Should a cylinder require replacement, replace it according to the following procedures:

CYLINDER REMOVAL

Stop the Rotoshear unit and influent.

Disconnect the electrical power to the Rotoshear® unit.

Disconnect the external water spray piping.

Remove the hood framing and panels by unbolting the fasteners that hold it in place.

Remove the four weir guards and the two adjustable weirs on the distribution pan inside the cylinder.

Disassemble the chain and driven sprocket from the inlet head of the cylinder as follows: (reference Chain and Sprocket Replacement)

Carefully lift the cylinder from the base making sure not to damage the cylinder. Cylinder may be lifted with a fork truck using extensions on the fork (use one fork only - in the center of the cylinder) or use a sling if overhead hoist or such suitable equipment is available. Lift cylinder vertically until rear flange on inlet head clears the trunnion wheels. Verify flanges on the discharge head are off of the stabilizer pads. Pull cylinder straight off the unit horizontally. Place the cylinder on a wooden skid.

CYLINDER INSTALLATION

Before installation of the cylinder, check the trunnion wheels and stabilizer pads for wear. This would be an ideal time for replacement. Push the stabilizer pads apart to easily accept the flange on the discharge head of the cylinder (see page 6-3A). Carefully lift the cylinder into position on the base.

Reinstall the driven sprocket. Replace the spacers on the driven sprocket. Check the alignment by laying a good steel straightedge across the faces of the two sprockets. If necessary, move the drive sprocket until it is in line with the driven sprocket.

Replace the drive chain. Adjust the chain by loosening the gear motor mounting bolts slightly.

Adjust stabilizer pads. The stabilizer assembly (part of base subassembly) limits the axial movement of the cylinder assembly. Adjusting the axial movement of the cylinder is accomplished by moving the two blocks together to limit the total movement of the cylinder to plus or minus 1/8". (See page 6-3A.)

Reinstall the weirs and weir guards inside the cylinder.

Reinstall the hood framing.

Reconnect the external water spray piping.

Reinstall the hood panels.

Restore power to the unit.

Start the Rotoshear® unit and check for any areas that might be rubbing or binding. Make slight adjustments by moving stabilizers on adjusting guards to correct any problems and restart influent.

Gear Reducer/Motor Replacement

Remove side panel.

Release chain tension, remove master chain link and remove chain from drive sprocket. The drive sprocket is removed by loosening the set screw in the hub and pulling it off the output shaft of the reducer.

Unbolt gear reducer and remove.

Replace gear reducer and refer to Chain and Sprocket Replacement for reassembly instructions.

NOTE: When replacing a motor, verify orientation of drain hole is proper to preclude trapping condensation in the motor housing.



DANGER



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- **DO NOT OPERATE MACHINE WITHOUT GUARDS AND COVERS IN PLACE.**
- **MAKE SURE ANY ELECTRICAL CONNECTIONS ARE DONE BY QUALIFIED PERSONNEL AND ARE IN ACCORDANCE WITH ALL APPLICABLE CODES AND REQUIREMENTS.**
- **DO NOT OPERATE A DAMAGED OR MALFUNCTIONING MECHANISM UNTIL NECESSARY ADJUSTMENTS OR REPAIRS HAVE BEEN MADE.**
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WARNING LABEL PART NUMBER FOR THIS PRODUCT IS 3824-002. SEE FIGURE ON PAGE 1-3A FOR PROPER LOCATION.

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SECTION SEVEN

Hycor® Rotoshear® Unit TROUBLE-SHOOTING GUIDE



DANGER



REVIEW ALL SAFETY PRACTICES LISTED IN SECTION ONE BEFORE PROCEEDING.

PROBLEM	PROBABLE CAUSE	REMEDY
SCREEN CYLINDER DOES NOT TURN	No power to motor.	Check circuit breakers. Check connections.
	Broken drive chain.	Replace chain.
	Obstructed drum.	Remove obstruction.
	Zero motion switch turns off power.	Find obstruction or overload condition. Clear machine, restart.
SCREEN CYLINDER TURNS ERRATICALLY	Chain stretched.	Adjust chain tension. Replace chain.
	Sprocket stripped.	Replace sprocket.
	Frozen or broken trunnion.	Replace trunnion or parts of trunnion assembly affected.
	Screen overload.	Clear screen.
	Broken gear.	Check reducer output shaft. Repair gear reducer.
NOZZLES OBSTRUCTED	Solids dried on outside surface of nozzles.	Rinse spray bar thoroughly and clean with soft wire brush.
AFTER CLEANING NOZZLES STILL OBSTRUCTED	Nozzle orifice plugged.	Remove spray bar, remove nozzles, clean nozzles, flush spray bar and supply lines. Reassemble and test.

TROUBLE-SHOOTING GUIDE (cont'd.)

PROBLEM	PROBABLE CAUSE	REMEDY
UNEVEN INFLUENT FLOW TO SCREEN	Weirs out of adjustment or covered with solids.	Clean headbox assembly. Adjust weirs if needed.
	Erratic feed condition.	Check supply pumps or plumbing.
INFLUENT ESCAPING ROTOSHEAR UNIT	Guards loose or out of adjustment.	Tighten or readjust guards.
	Screen plugged or overloaded with solids.	Clear solids from drum. Rinse screen completely. Steam clean screen.
TRUNNION NOT TURNING	Lack of lubrication.	Lubricate bearings.
	Frozen bearing.	Replace bearing.
OVERFLOWS DURING NORMAL OPERATION	Spray cleaning not frequent enough.	Change spray cleaning cycle.
	Solids composition or flow changed.	Review system process and adjust operation of unit.

MOTOR

Since any number of reasons could be responsible for the failure, the following guide lists usual conditions that can lead to difficulties with a motor. Should there be any indication of a premature failure, care must be taken to make certain that:

1. The motor was installed correctly, particularly the electrical connections.
2. The power supply was correct.
3. The motor was of the proper size (speed and horsepower) to do the job.

Verify the above conditions have been completed. Use of the following guide in pinpointing the difficulty will lead to long service life and complete satisfaction.

PROBLEM	PROBABLE CAUSE	REMEDY
MOTOR FAILS TO START	Blown fuses.	Replace fuses. Should be at least 125% of nameplate amperes.
	Overload trips.	Check and reset overload in starter.
	Improper line connections.	Check connections with diagram supplied with motor.
	Improper power supply.	Check to see that power supplied agrees with motor nameplate and load factor.
	Open circuit in winding or starting switch.	Indicated by humming sound when switch is closed. Check for loose wiring connections, also see if starting switch inside motor is closed.
	Mechanical failure.	Check to see if motor and drive turn freely. Check bearings and lubrication.
	Short circuited stator.	Indicated by blown fuses, tripped circuit breakers or heaters. Motor must be rewound.
	Motor may be overloaded.	Reduce load.

TROUBLE-SHOOTING GUIDE (cont'd.)

PROBLEM	PROBABLE CAUSE	REMEDY
MOTOR FAILS TO START (cont'd.)	If 3 phase, one phase may be open.	Check lines for open phase.
	Low motor voltage.	See that nameplate voltage is maintained. Check connection.
MOTOR RUNS AND THEN STOPS	Power failure.	Check for loose connections to line, to fuses and to control.
MOTOR DOES NOT COME UP TO SPEED	Voltage too low at motor terminals because of line drop.	Verify proper electrical wire size for power draw.
	Open primary circuit.	Locate fault with testing device and repair.
MOTOR TAKES TOO LONG TO ACCELERATE	Poor circuit.	Check for high resistance.
	Applied voltage too low.	Get power company to increase power tap.
WRONG ROTATION	Wrong sequence of phases.	Reverse connections at motor or at switchboard.
MOTOR OVERHEATS WHILE RUNNING UNDER LOAD	Frame or bracket vents may be clogged with dirt and prevent proper ventilation of motor.	Open vent holes and check for a continuous stream of air from the motor.
	Motor may have one phase open.	Check for voltage and make sure that all leads are well connected.
	Unbalanced terminal voltage.	Check for faulty leads, connections and transformers.

TROUBLE-SHOOTING GUIDE (cont'd.)

PROBLEM	PROBABLE CAUSE	REMEDY
MOTOR OVERHEATS WHILE RUNNING UNDER LOAD (cont'd.)	Shorted stator.	Rewind or replace stator.
	Faulty connection.	Indicated by high resistance.
	High voltage. Exceeds +10% of nameplate volts.	Check terminals of motor with a voltmeter.
	Low voltage. Exceeds - 10% of nameplate volts.	Check terminals of motor with a voltmeter.
	Rotor rubs stator bore.	If not poor machining on brackets, replace worn bearings.
MOTOR VIBRATES AFTER CORRECTIONS HAVE BEEN MADE	Motor misaligned.	Realign.
	Weak support.	Strengthen base.
	Coupling out of balance.	Balance coupling.
	Defective bearing.	Replace bearing.
	Bearings not in line.	Line up properly.
	Excessive end play.	Adjust bearing or add washer.
UNBALANCED LINE CURRENT ON POLY- PHASE MOTORS DURING NORMAL OPERATION	Unequal terminal volts.	Check leads and connections.
SCRAPING NOISE	Fan rubbing.	Remove interference.

TROUBLE-SHOOTING GUIDE (cont'd.)

PROBLEM	PROBABLE CAUSE	REMEDY
NOISY OPERATIONS	Air gap not uniform.	Check and correct bracket or bearing.
	Rotor unbalance.	Rebalance.
HOT BEARINGS GENERAL	Insufficient grease.	Maintain proper quantity of grease in bearing.
	Deterioration of grease or lubricant contaminated.	Remove old grease, wash bearings thoroughly in kerosene and replace with new grease.
	Excess lubricant.	Reduce quantity of grease, bearing should not be more than 1/2 filled.
	Overloaded bearing.	Check alignment, side & end thrust.
	Badly worn bearing.	Replace bearing.
	Broken ball or rough races.	Replace bearing, first clean housing thoroughly.
	Bent or sprung shaft.	Straighten or replace shaft.
	Misalignment.	Correct by alignment of drive.

SECTION EIGHT

Hycor® Rotoshear® Unit REPLACEMENT PARTS



DANGER



REVIEW ALL SAFETY PRACTICES LISTED IN SECTION ONE BEFORE PROCEEDING.

THIS PRODUCT HAS BEEN SUPPLIED WITH WARNING LABELS, SHOULD THEY BECOME DAMAGED, REMOVED OR ILLEGIBLE, PLEASE CONTACT PARKSON CORPORATION FOR NO-COST REPLACEMENT LABELS.

Replacement parts can be ordered either through your Hycor Products Representative or by contacting the Hycor Products Parts Coordinator toll free at **1-800-249-2140**.

Please have the unit's project number, serial number and model number as shown on the front cover, available. This will ensure the accuracy of the part identification.

Accurate part identification will be verified prior to processing your order.

Replacement Parts List

Hycor® Rotoshear® Unit
Model HRS3648DV

NOTE: Please give the project number (340328), serial number (34032802) and model number (HRS3648DV), when ordering replacement parts. This will ensure accurate part identification.

DESCRIPTION	QTY. PER UNIT	PART NO.
See page 6-1A		
Gearmotor	1	3702-304
Chain (92 pitches)	1 (12 ft.)	3039-024
Connecting Link	1	3388-007
Drive Sprocket	1	3038-025
See page 6-2A		
Trunnion Sub-Assembly	4	4025-009
Trunnion Wheel	4	1438-003
Trunnion Bearing	8	3357-010
Snap Rings	8	3382-002
See page 4-1B		
External Spray Nozzles - HRS3648DV	13	3035-001
See page 6-3A		
Stabilizer Pads	2	1415-004
See page 1-3A		
Warning Labels	2	3824-002

SECTION NINE

Hycor[®] Rotoshear[®] Unit
COMPONENT DATA



DANGER

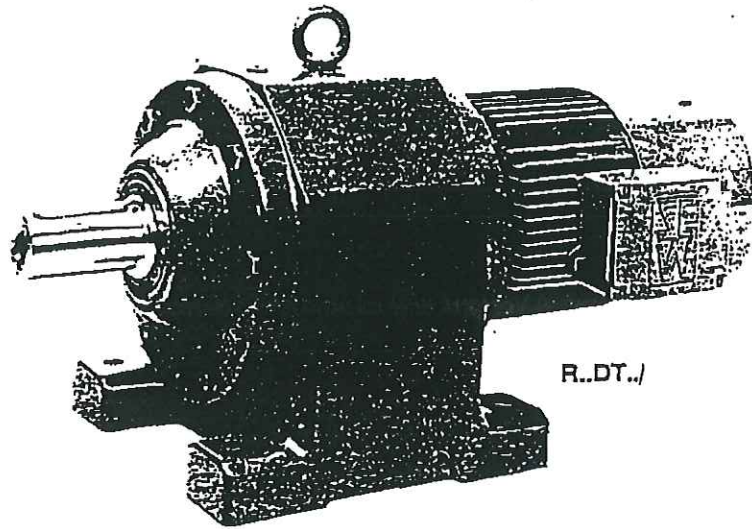


**REVIEW ALL SAFETY PRACTICES LISTED IN SECTION ONE BEFORE
PROCEEDING.**

DRIVE SYSTEM DATA

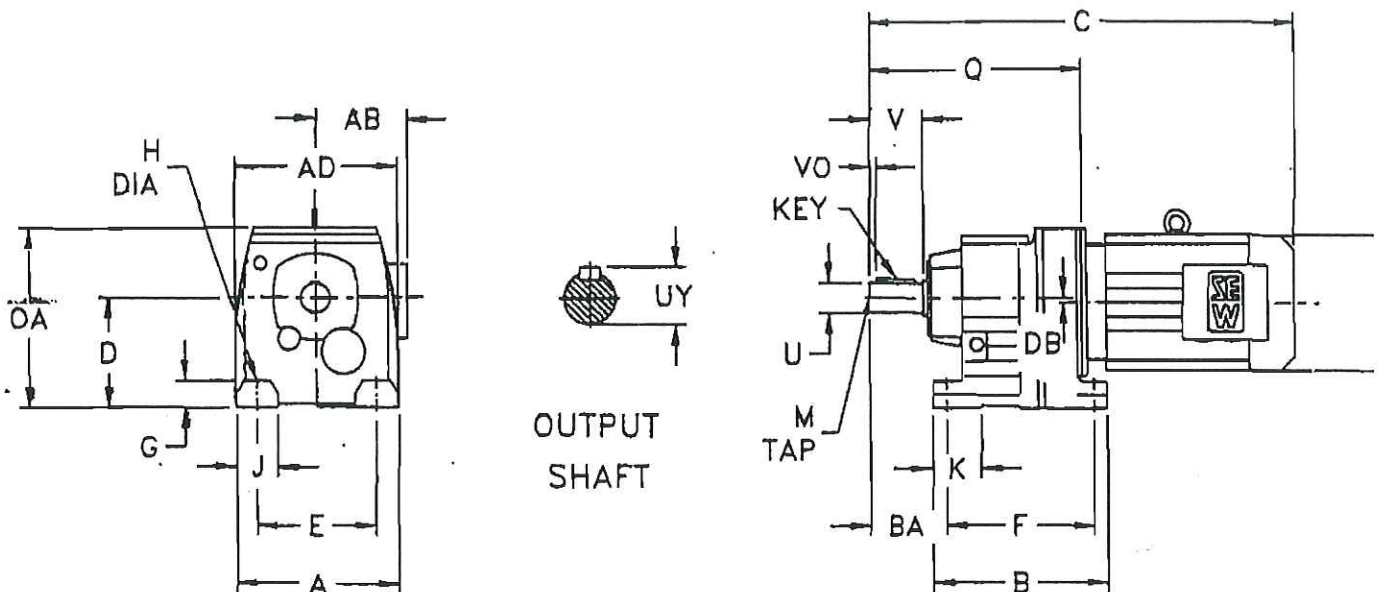
SEW
EURODRIVE

Parallel Helical Gear Units



R..DT../

Dimensions Type R Gearmotors - Foot Mounted



Gearcase

Model	A	AD	B	BA	D	DB	E	F	G	H	J	K	OA	Q
R37	5.71	6.34	6.30	2.95	3.54 ⁺⁰ _{-.02}	0.40	4.33	5.12	0.71	0.35	1.38	1.57	5.94	7.9
	145	161	160	75	90 ⁺⁰ _{-.5}	10.1	110	130	18	9	35	40	151	20

Output Shaft Inch Series

Model	U	UY	V	VO	Key	M
R37	1.000 ⁺⁰ _{-.0005}	1.11	1.97	0.32	$\frac{1}{8} \times \frac{1}{8} \times 1\frac{1}{16}$	$\frac{3}{8} - 16 \times 0.87$

Motor

Model	DT	
	71	
	AB	5.43 138
	P	5.71 145
R37	C	15.98 406

Dimensions are $\frac{\text{inch}}{\text{mm}}$

Dimension AB is to motor conduit box

Eye bolts are removable

Motor Power P_n HP	Output Speed n_a rpm	Service Factor	Torque T_s lb-in	OHL F_{Re}	Ratio i	Gear Stages	Model Gear	Model Motor
0.50	52	3.0	600	1060	32.40	3	R37	DT71D4



Dual Voltage Motors

FRAME	LOW VOLTAGE YY	HIGH VOLTAGE Y
DT71 thru DV180	230V - 60Hz	460V - 60Hz
SINGLE SPEED		

FRAME	LOW VOLTAGE Δ	HIGH VOLTAGE Y
DT71 thru DV225	200V - 50Hz	346V - 50Hz
	208V - 60Hz	360V - 60Hz
	220V - 50Hz	380V - 50Hz
	230V - 50Hz	400V - 50Hz
	240V - 50Hz	415V - 50Hz
	330V - 60Hz	575V - 60Hz
SINGLE SPEED		

AC Motors

Synchronous Speed 1800 rpm @ 60Hz

NEMA Design B, 40°C Ambient

Continuous Duty, up to 3300 ft Elevation

Frame	P _n		n _n	I _n Amp			I _s /I _n	T _n	T _s /T _n	T _b /T _n	cos	η	Code	J _m	Z ₀	T _a	Weight	
Size	hp	kW	rpm	230V	460V	575V	%	lb-in.	%	%	φ	%	Letter	lb-ft ²	Starts/hr. BG ²⁾	BGE ³⁾	lb-in.	lbs.
DT71D4	0.5	0.37	1700	2.15	1.08	0.86	400	18.4	210	230	0.70	62	H	.0104	5200 9000	44	15	

208V = 2.39 Amps

Abbreviations

P_n Rated Power
n_n Full Load Speed
I_n Full Load Current
I_s/I_n Starting Current Ratio (Locked Rotor)
T_n Full Load Torque
T_s/T_n Starting Torque Ratio

T_b/T_n Breakdown Torque Ratio
cos φ Power Factor
η Motor Efficiency
J_m Motor Inertia
Z_s Permissible no-load starting frequency at 50% ED

²⁾ Values with BG rectifier (standard for frame size 100L and smaller)

³⁾ Values with BGE rectifier (standard for frame size 132S and larger)

Motors

OPERATING INSTRUCTIONS

09 793 07A US

GENERAL

Before shipment every SEW-Eurodrive motor is thoroughly tested, checked, and properly packed. 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. Additionally, 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
- Accessibility to gear unit, oil plugs.

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. Additionally, in the center of the motor shaft there is a metric tapped hole that can be utilized with a tool to press on 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 $V_N = 230VAC$: $R_{insul} \geq 230000 \text{ ohms} \approx 0.23M \text{ ohms}$). 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 $500000 = 0.5M \text{ ohms}$.

SEVERE DUTY UNITS

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 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.

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

The motor bearings are sealed and the grease content is adequate for the life of the bearing.

SEW
EURODRIVE

SOUTHEAST MANUFACTURING
& ASSEMBLY CENTER
1295 Spartanburg Highway/Lyman SC 29365
(803) 439-7537

SOUTHWEST ASSEMBLY CENTER
3950 Platinum Way/Dallas TX 75237
(214) 330-4824

MIDWEST ASSEMBLY CENTER
2001 West Main Street/Troy OH 45373
(513) 335-0038

EAST COAST ASSEMBLY CENTER
200 High Hill Road/Bridgewater NJ 08014
(509) 467-2277

WEST COAST ASSEMBLY CENTER
30599 San Antonio Road/Hayward CA 94544
(510) 467-3580

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 thoroughly tested, checked, and properly packed. However, please check 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. Additionally, 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.

If the drive is not installed immediately, the drive should be stored in a dry, protected area. To the standard lubricating oil add a rust preventative such as Mobil Oil Vaprotect 60032. The rust preventative will need replenished at intervals as specified by the manufacturer. After removal from storage, the gear unit should be drained and refilled with a lubricating oil as prescribed.

Drives which are used for standby service should also have Vaprotect 60032 added to the lubricating oil and should be nonvented.

INSTALLATION OF COUPLINGS, SPROCKETS, SHEAVES, ETC.

Do not hammer on the shafts. 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.

The shaft diameters have tolerances of $+0.000$ " - $-.0005$ " for diameters 1.500" and smaller, and $+0.000$ " - $-.001$ " for diameters larger than 1.500". Tolerances for metric shafts and hollow shafts are listed in SEW-Eurodrive's catalogs.

To prevent the output shaft and bearings from being subjected to excessive loads, the maximum overhung load, as shown in SEW-Eurodrive's catalogs, should not be exceeded. Please consult our technical 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 recommends the use of a light coating of Never-Seez® (or equivalent) on the output shaft. The Never-Seez® lubricant may prevent a rusting and fretting corrosion between the reducer hollow shaft and the shaft of the driven machine. The lubricant will allow the shafts to be disassembled when necessary.

INSTALLATION AND OPERATION

The gear unit must be mounted on a level, firm, vibration free base and should be accurately aligned with the driven unit.

For transportation the units are supplied nonvented, i.e. in place of the breather plug, a standard socket head plug is installed and marked by a plastic cap. The breather plug accompanies the unit in a poly bag. After final installation, please install the breather plug in place of the plastic capped plug. In addition, the oil level should be checked by removing the red painted oil level plug, the correct oil level is when the surface of the oil is

level with the lowest point of the tapped hole.

After installation, the actual mounting position should be confirmed with the diagrams on page 8 against the mounting position shown on the gear reducer nameplate. Additionally, the locations of the breather plug and oil level plug must agree with these diagrams for the specified mounting position. Adequate lubrication is only guaranteed if the unit is mounted in the specified mounting position.

SEVERE DUTY UNITS

Severe Duty motors have drain holes drilled in the stator end shields at the lowest points to allow condensation to drain out of the motor. The same applies to the conduit box, and variable speed housings.

CAUTION: The drain holes are installed for the mounting position listed on the nameplate. Changing the mounting position will also relocate the drain holes in which case water may not be able to drain off and premature motor failure may occur.

ELECTRICAL CONNECTION

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

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

Please refer also to the operating instructions for the motors.

MAINTENANCE

All SEW-Eurodrive units require only a minimum of maintenance. Oil levels and oil quality should be checked at frequent intervals, depending on usage. Oil changes are due at intervals of 10,000 operating hours or every two years. If, however, a synthetic lubricant is used then this period can be extended to 20,000 operating hours or every four years. In applications where arduous operating conditions exist, such as high humidity, corrosive environment, or large temperature changes, the lubricant should be changed at more frequent intervals.

Grease packed bearings should be cleaned and regreased every 10,000 hours, care being taken on input bearings that only 1/3 of the free volume of the bearing is filled with grease in order to avoid overheating of the bearing. For output bearings and bearings with replaceable grease shields, fill to 2/3 of the free volume.

To ensure adequate cooling, deposits of dirt and dust on the surfaces of the units must be removed at frequent intervals. Particular attention should be paid to the motor by removing all deposits from between the motor cooling fins and also from the air intake on the fan guard.

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.

SEW EURODRIVE

SOUTHEAST MANUFACTURING & ASSEMBLY CENTER

498 Spartanburg Highway/Lyman, SC 29365
(803) 438-7537

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200 High Hill Road/Bridgewater, NJ 08014
(609) 467-2277

WEST COAST ASSEMBLY CENTER

30599 San Antonio Road/Hayward, CA 94544
(415) 487-3580

Technical Data Lubrication

Each gear unit is supplied from the factory with the correct grade and quantity of lubricant for the specified mounting position. The following lubricants are supplied from our North American Facilities. Under special circumstances such as high or low ambient temperatures optional oils should be used.

Standard Oil

USA			
Gear Units	Type	Manufacturer	Ambient Temperature °C
R..37 - 167	Mobilgear 630 [M]	Mobil Oil Corp.	0 to +40
R..32	Mobil SHC 630 [S]		-25 to +60
CANADA			
R..37 - 167	Omala 220 [M]	Shell Oil Co.	0 to +40
R..32	Tribol 800/220 [S]	Tribol	-25 to +80

[M] Mineral Oil

[S] Synthetic Oil

Optional Oil

USA			
Gear Units	Type	Manufacturer	Ambient Temperature °C
R..37 - 167	Mobilgear 629 [M]	Mobil Oil Corp.	-15 to +25
R..37 - 167	Mobil SHC630 [S]		-25 to +60
R..32 - 167	Mobil SHC629 [S]		-30 to +50
CANADA			
R..37 - 167	Tivela SD480 [S]	Shell Oil Co.	-30 to +80

[M] Mineral Oil

[S] Synthetic Oil

For ball and roller bearings of gear units the following greases are recommended:

Mineral Grease

Type	Manufacturer	Ambient Temperature °C
Mobilux EP2	Mobil Oil Corp.	-20 to +40
Alvania Grease R3	Shell Oil Co.	-30 to +60

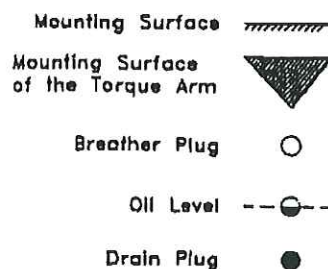
Synthetic Grease

Type	Manufacturer	Ambient Temperature °C
Mobiltemp SHC 32	Mobil Oil Corp.	-45 to +60

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

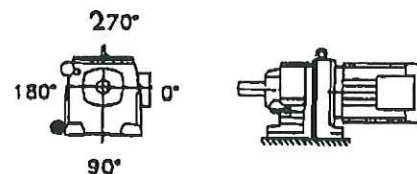
GEAR UNIT	MTG POS
	M 1
R37	0.8/0.3

The mounting positions show the following (when applicable):



Mounting Position

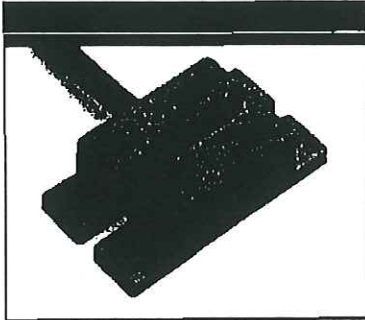
M 1



INTERLOCK SWITCH DATA

GuardSwitch Level I Series

Safety Interlock/Position Switch from Sentrol



MODEL 115 Safety Interlock Switch

- Defeat Resistant
- Non-Contact Actuation
- Nylon 6/6 Enclosure
- Made in USA

DESCRIPTION Level I Series

Designed for safety interlock applications in which risk of minor injury is present. Provides superior defeat protection over mechanical, proximity, and limit switches. Level I interlocks cannot be defeated by the operator's hands, tape, wire or metal. For a higher level of protection, see the product information on the GuardSwitch Level III series.

DESCRIPTION Model 115

The Model 115 GuardSwitch safety interlock switch is a two piece device, consisting of a hermetically sealed switch suitable for the industrial environment housed in a nylon 6/6 enclosure with an actuator housed in a matching enclosure. When the actuator is brought into proximity of the switch (from .5" to 1" depending on the model) the normally open switch will close. No physical contact is required. When the actuator is removed, the switch opens. In typical applications, the switch is mounted on the frame of the machine and the actuator is mounted on the movable safety guard, gate or access door.

Part Number	Load Rating†	Switching Voltage†		Switching Current†		Sense† Range
	Maximum VA	Maximum Volts		Maximum Amps		
	AC & DC	AC	DC	AC	DC	
115-6Y-06K	25	120	100	.7	1.0	1"
115-7Y-06K	100	120	28	3	3	0.5"
115-8Y-06K	150	120	N/A	1.25*	1.25*	1"

† **Warning:** All electrical ratings are individual maximums. Exceeding any one specification (including inrush) may result in switch failure. In selecting a part number, the transient surges from coils, contactors, motors, solenoids, and tungsten loads must be considered.

‡ As measured on a non-ferrous surface.

* 115-8Y can withstand inrush surge up to 4 amps.

GENERAL SPECIFICATIONS

Enclosure	Nylon 6/6
Electrical Configuration	Normally open
Temperature Range	-40° to 180°F
Environmental	Hermetically sealed
NEMA Standards	4, 4X, 5, 6, 12, 13
Response Time	1 msec.
Lead type	Six feet 18/2 SJTOW-A
For additional options and alternate specifications, consult factory.	

ELECTRICAL RATINGS

In selecting a part number, particular care must be taken in determining the actual load of the interlock circuit. Surges from coils, motors, contactors, solenoids and tungsten filaments must be considered in determining the load. Transient protection such as back-to-back zener diodes (Tranzorbe®) or an RC network is recommended for such loads.

Please see the Sentrol Industrial Applications Bulletin on Electric Ratings for more specific information.

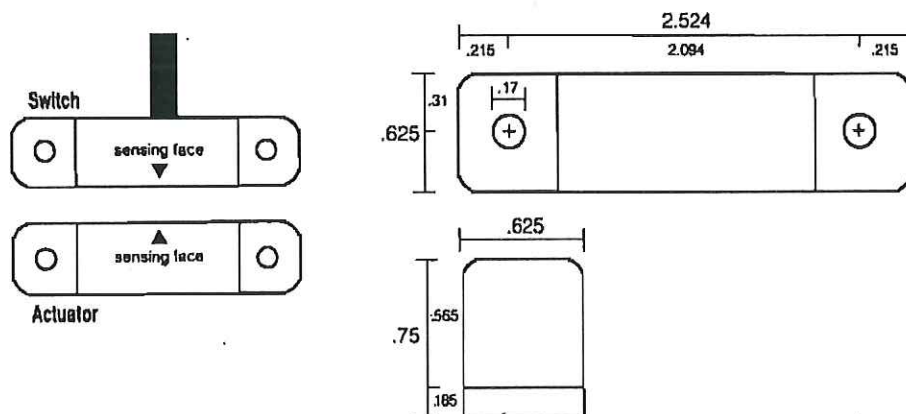
All model 115 GuardSwitches incorporate a hermetically sealed reed switch rated for industrial applications. The model 115-8Y-06K is the highest rated electrically because it also incorporates a triac and a transient protection device. This model is for AC loads only, and cannot be accurately tested using DC voltage meters. The 115-8Y-06K has a voltage drop of up to 2 volts across the switch, which must be considered if wiring in series.

MOUNTING

Note: To insure correct operation, the switch and actuator must be positioned with the sensing faces opposite each other and the labels reading in the same direction (see Figure 1).

Any safety interlock, including a GuardSwitch, is subject to defeat with its own actuator or by rewiring the switch. For best protection against operator defeat, the actuator should be mounted using non-removable screws, bolts or nuts. This prevents a machine operator from attempting to defeat the interlock with its own actuator. The switch should be mounted in an inaccessible location and preferably hidden.

FIGURE 1



**SENTROL
INDUSTRIAL**
The Safety Interlock Company

10575 S.W. Cascade Boulevard
Portland, Oregon 97223

Toll Free (800) 247-9447
From Canada (800) 253-5600 x405
In Oregon (503) 684-3324
FAX (503) 620-2130

Application and engineering assistance is available factory direct. Call toll free 1-800-247-9447 (in Oregon 503-684-3324).

Specifications subject to change without notice as Sentrol Industrial continually strives to improve products.

All products of Sentrol Industrial are sold with a limited warranty.

All GuardSwitches are made in the U.S.A.

OIL PUMP DATA



OIL LUBRICATION PUMPS
For Orifice and Injector Lubrication Systems (01 & 06).
INSTRUCTION AND PRODUCT DATA SHEET

3600100 3600200
3600101 3600201
3600102 3600202
3600103 3600203

ENGLISH

1. DESCRIPTION:

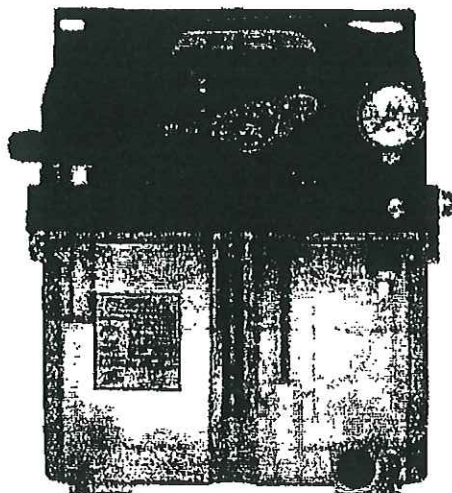
The SMART range of oil lubrication pumps provide innovative pump packages for the Machine Tool Industry. All units are fitted as standard with built in Pressure Switch, New Low Level Switch and Pressure Gauge.

The SMART_E Electromagnetic Pump is a low pressure pumping station for Orifice Lubrication Systems.

The SMART_G Electric Gear Pump has been designed for systems with a working pressure of up to 30 Bar.

The pumps are available either with a built in controller card which controls the entire system or the manual version can be connected a separate control device.

The controlled version contains the Dropsa 'VIP' controller offering all the benefits of an advanced lubrication controller and infra-red programming.



2. SPECIFICATION:

2.1 SMART_G (Electric Gear Pump):

Pump (for mineral oil)

Pump output :	100 cc/min (6 cu.inch/min)
Max pressure:	25 bar (362 psi)
Reservoir Size:	3 Ltr. (0.79 US gallons)
Bypass with external regulating screw.:	Set to 25 bar (default).
Pressure Switch:	Diaphragm type, set to 18 bar.
Max. Operating time:	2 minutes (corresponding to a minimum pause time of 15 minutes)
Lubricant:	Oil 100-250 cSt 463 - 1157 SUS
Operating temperature:	-5° C to + 40°C

Gear Pump Module:

Single phase motor:	110V 50/60Hz or 230V 50/60Hz
Power Consumption:	50 W
Insulation (Internal motor) :	Class F

2.3 ALL MODELS:

Minimum oil level switch

Reversible Operation

Max. Commutable power :	50W - 50VA
Max. Voltage:	220V a.c. - 150V d.c.
Max current:	1 A

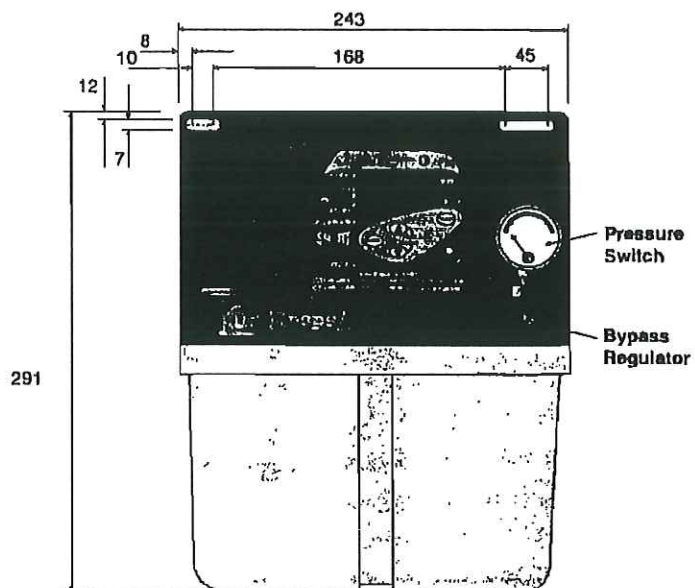
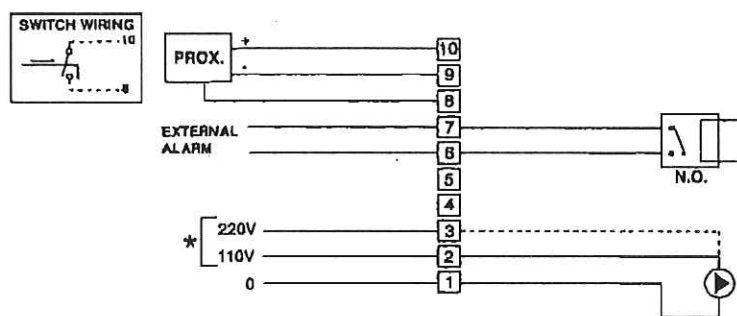


Fig. 1. Fixing Details.











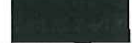





* Check voltage of pump and wire accordingly.

Fig. 2. Wiring for models with integral VIP Controller

TABLE 1. MENU OPERATION:

System Menu: The System Menu is used to configure pump and the Lubrication System.

* = Default setting.











Parameter	Screen Display	Description	Operation	
To access the <i>System Menu</i> press the UP and DOWN buttons together and hold for two seconds.   				
Alarm Contact.		Alarm Contact will close on alarm Alarm Contact will open on alarm		Press the UP button to change between the two options.
Lubrication System Type		Progressive System - Monitors switch on progressive divider. Contact has to change state twice to complete cycle and switch off the pump.		(Note: SMART _E Electromagnetic Pumps are not suitable for progressive systems.)
	* 	Monitors a pressure switch on Single Line Systems.		Press the UP button to switch between the three options.
		No monitoring, just timer.		
Press the MODE button to go to the next option.				
Pause Interval Selection	*  	The Pause between the <i>Pump ON</i> cycle is determined by a timer. The Pause between Pump cycles is determined by the cycle switch input connected to pulse		Press the UP button to switch between the three options.

Operator Menu:

The *Operator Menu* is used to adjust the *Pump ON* cycle and the (timer/impulse) pause interval.

To access the *Operator Menu* press and hold the **MODE** button for two seconds.

Parameters	Screen Display	Description	Operation	
Pump On Time		Indicates the Minimum <i>Pump ON</i> time in minutes and seconds	 	Use the UP and DOWN buttons to adjust the setting.
		Exit and go the next option.		Press the MODE button and hold for two seconds.
Pause Timer or Impulse Counter		Indicates <i>Pause Interval</i> in hours and minutes.	 	Use the UP and DOWN buttons to adjust the setting. 
		Indicates number of impulses between cycles. If set to 0 will cycle every time an impulse is received.		
Press the MODE button and hold for two seconds.		Return to normal operating mode		

DEFAULT ON TIME 30 SECONDS / PAUSE TIME 10 MINUTES.

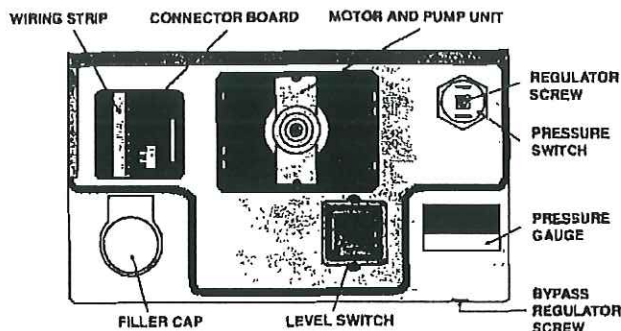


Fig. 4. View of pump with cover removed.

Max On Time:

2 minutes (1 second increments)

Max Pause Time:

99 hours 56 minutes (1 minute increments)

Max Pause Counter:

Up to 1 - 2500 impulses (10 impulse increments)

Monitoring:

Pressure switch (standard), Proximity switch for progressive systems (NPN/PNP) or disabled.

Suspend function:

Allows user to suspend operation of controller.

Infra-red receiver:

For remote programming of settings.

3. INSTALLATION/OPERATION:

Installing the pump

- Unpack and inspect the pump for damage. Do not attempt to operate the pump if it has been damaged.
- The pump must be fixed into place using the two fixing slots indicated in Fig. 1.. Wire the pump as indicated in Fig. 3.

c) Fill the reservoir with a suitable oil. Never run the pump dry; this may cause damage to the pump.

d) Connect the output of the pump to the lubrication system using an appropriate fitting.

If you do not have a pump with a VIP Controller you are ready to run the system.

If you have a VIP controller in your pump you must proceed to the programming section.

Follow the usual priming instruction for your system.

Adjust the Working Pressure

You may adjust the working pressure by turning the Bypass Screw clockwise to increase or anti-clockwise to decrease. If pressure is set to below 20 bar you will need to reset the pressure switch externally to an appropriate (lower) setting.

Setting the control parameters from the front panel (Models containing 'VIP' controller only).

To set all parameters apply power to the pump unit and press + for 2 seconds. Then follow the instructions in Table 1.

To modify the Pump ON and Pause value only, press the button for 2 seconds.

Setting the control parameters from the remote programmer

To download the control parameters via infra-red you should:

- 1.) Apply power to the pump
- 2.) Press reset button on the pump
- 3.) Point the programmer at the symbol and press transmit on the programmer.

The pump controller will flash lights sequentially for approx. 5 seconds to confirm that the data has been received correctly.

4. TEST PROCEDURES:

Pump test procedures

Connect a tube to the outlet and check that oil is coming out when the pump light is ON

Block the pump outlet and check that the pump is achieving the desired pressure.

If the above is successful then the pump is in a proper working condition.

VIP test procedures

The integrated 'VIP' performs a self-test on power-up. No testing is required. If an alarm condition occurs you should check the Diagnostic Table 9.2

5. ORDERING INFORMATION:

SMART_G (Electric Gear Pump):

Part No.	Description
3600202	SMART _G Pump 110V with integrated 'VIP' controller

6. SPARES

Pressure Switch: **Part No. 3291022**

Level switch: **Part No. T.B.A.**

Pressure Gauge: **Part No. 3292053**

Generally it is advisable to replace the whole unit and return failed unit for investigation.

7. SAFETY REQUIREMENTS

SMART_G Electric Gear Pumps must be installed and operated in accordance with the requirements of this Instruction Sheet and should not be used for any purpose other than that specified without the agreement of the suppliers.

In addition to the need to observe general safety requirements the following specific hazards apply:

Before installing or removing SMART_G Electric Gear Pumps from the system disconnect and isolate all power supplies and ensure all pressure is removed from the system.

8. OPERATING ENVIRONMENT

SMART_G Electric Gear Pumps must not be operated in excessively corrosive or aggressive environments.

They have been designed for use on normal indoor light and medium industrial machining applications.

If in doubt, please contact our Technical Office.

9. DIAGNOSTIC TABLES:

9.1 Pump Diagnostic

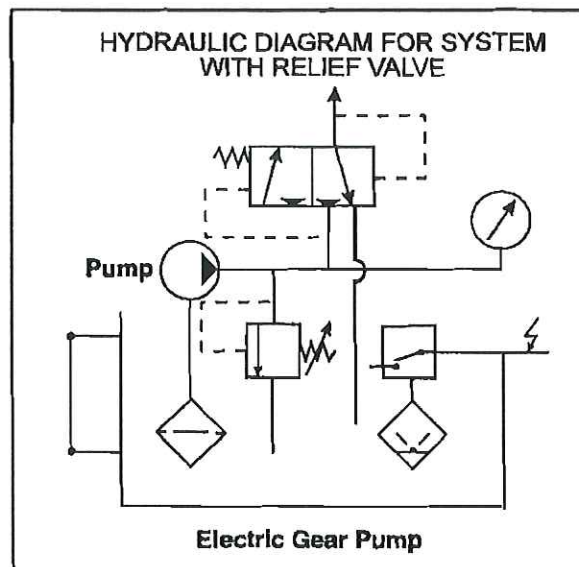
FAILURES	PROBABLE CAUSE	REMEDY
Pump discharges little or no lubricant	Lubricant in the reservoir below the minimum level.	Re-fill the reservoir.
	Loose fittings inside the system.	Check fittings for leakages.
	Pump damaged	Replace the pump.
Wrong operating pressure	Wrong setting of pressure adjustment valve (by-pass)	Fit pressure gauge and set the pressure adjustment valve to the correct pressure.
No pressure relief in the line at the end of lubrication cycle	Relief valve damaged.	Inspect the relief valve and replace if necessary.
	Irregular operation of relief valve	Inspect the relief valve and replace if necessary.

9.2 'Vip' diagnostics

ALARM CODES	DESCRIPTION OF FAULT	ACTION
AO1	No parameters set	Set parameters.
AO2	Low Level alarm	Add lubricant to the system
AO3	The change-over contact (in SEP mode) has not cycled within the specified 'Pump ON' times.	Check for loose fittings and blockages in progressive system and rectify.
AO4	PS Mode: Pressure was already high before the start of the cycle.	Check pressure switch and replace if necessary.
AO5	PS Mode: The system did not achieve pressure during the specified cycle times.	Check for leakage from loose fitting and rectify.

10. Related Products.

Dropsa Lubrication Systems 01 and 06
VIP Remote Programmer Module.



AN ISO 9001 APPROVED COMPANY

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SECTION TEN

Hycor[®] Rotoshear[®] Unit
DRAWINGS



DANGER



**REVIEW ALL SAFETY PRACTICES LISTED IN SECTION ONE BEFORE
PROCEEDING.**

NOTE:

1. ALL 304 STAINLESS STEEL CONSTRUCTION EXCEPT FOR BASE, HEADBOX STAND, TRUNNIONS, CLEANOUT PLUG, E-STOP, TRUNNION MOUNTING BRACKETS, DRIVE CHAIN, SPROCKETS, INLET HEAD SEAL, HANDLES, INTERLOCK SWITCH, CYLINDER STABILIZERS, GEARMOTOR, SEALS, HEADBOX WEIRS, INLET HEAD COVER, HOOD SIDE & END PANELS AND CHAIN OILER.

2. GEARMOTOR: 1/2 HP [0.37 kW], 1800 RPM, 230/460 V, 3 PH, 60 HZ, TEFC, SEVERE DUTY.

3. CYLINDER SPEED: 8 RPM.

4. CYLINDER SCREEN OPENING: .060 [1.5]

5. RECOMMENDED CLEARANCE TO BE 24.00 [609.6] AROUND UNIT AND 36.00 [914.4] ABOVE UNIT.

6. ALL EXTERNAL PIPING TO BE SUPPORTED INDEPENDENTLY OF THE ROTOSHEAR UNIT.

7. HOOD INTERLOCK SWITCH: 1: 72.00 [1828.8] LG).

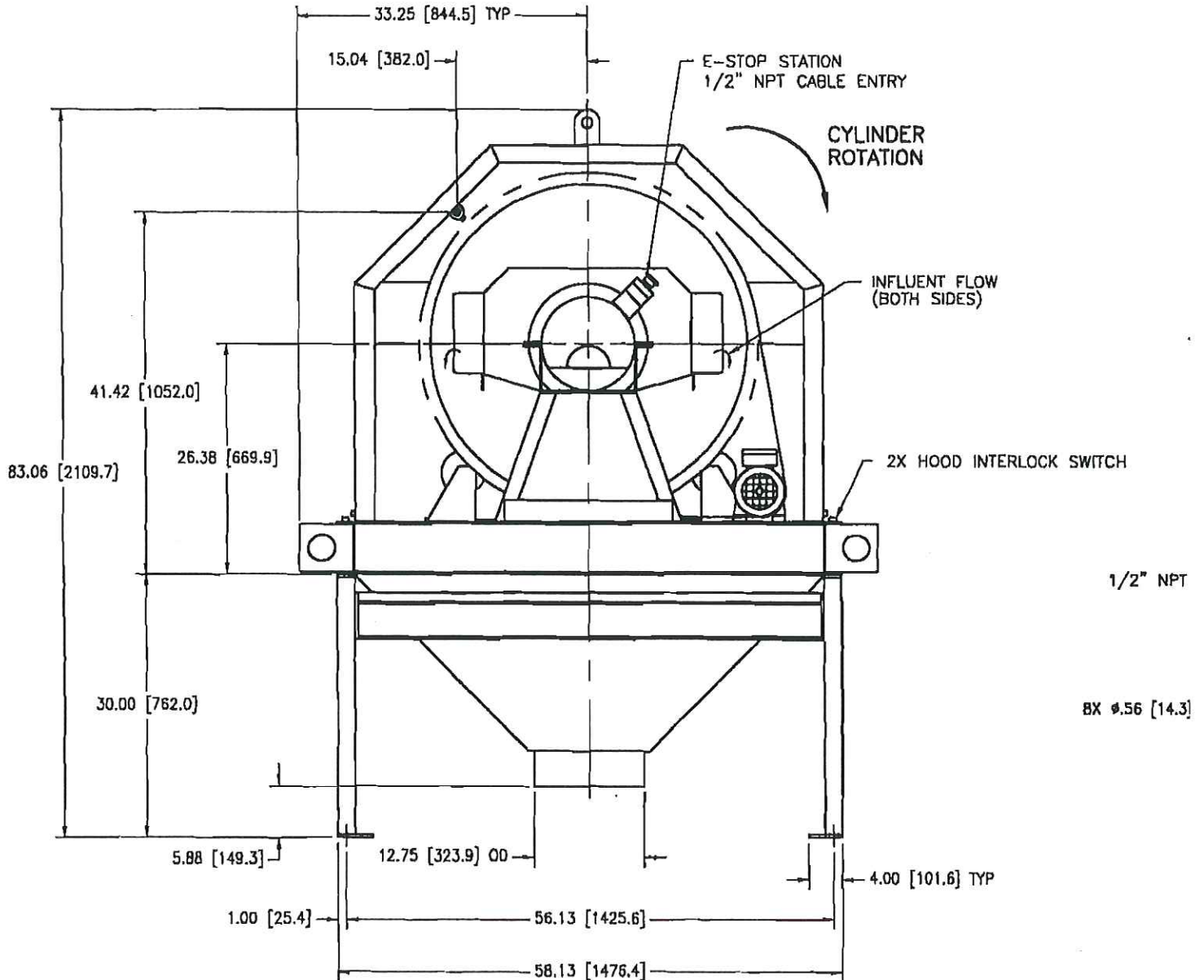
8. DRY WEIGHT: 1410 LB [640

9. TOTAL SPRAY WATER USAGE E [2.8 BAR]: 13 GPM [0.8 L/s].

10. WEIR LENGTH PER SIDE: 24.1

11. DIMENSIONS WRITTEN AS INCH

12. ONE UNIT WILL BE SUPPLIED.



FRONT VIEW
INLET HEAD SUBASSY AND FRONT PANEL OF
HOOD SUBASSY NOT SHOWN THIS VIEW FOR CLARITY

PARKSON CORPORATION

The Designer, Project Engineer, and all others involved with the project design must implement and follow all safety standards required by local, state and federal laws when incorporating Parkson Corporation equipment into the overall project design. Parkson Corporation will not be responsible for location and/or placement of equipment in the plant design, nor is Parkson Corporation responsible for plant safety design and for the failure to follow appropriate safety precautions in the operation and maintenance of Parkson Corporation equipment.

DRAWN BY	DATE	REFERENCE
KHB	12/6/04	
CHECKED BY	DATE	
MRS	12/13/04	
SCALE	1/16" = 1"	

DIN

VITCH: 120V, 1 PH, 60 HZ OR 100 V DC, LEAD TYPE - 18/2,

LB [640 kg]; WET WEIGHT: 1909 LB [867 kg],

USAGE BASED ON 1 GPM [0.06 L/s] PER NOZZLE AT 40 PSI L/s],

IDE: 24.00 [609.6].

AS INCH [mm] UNLESS OTHERWISE SPECIFIED.

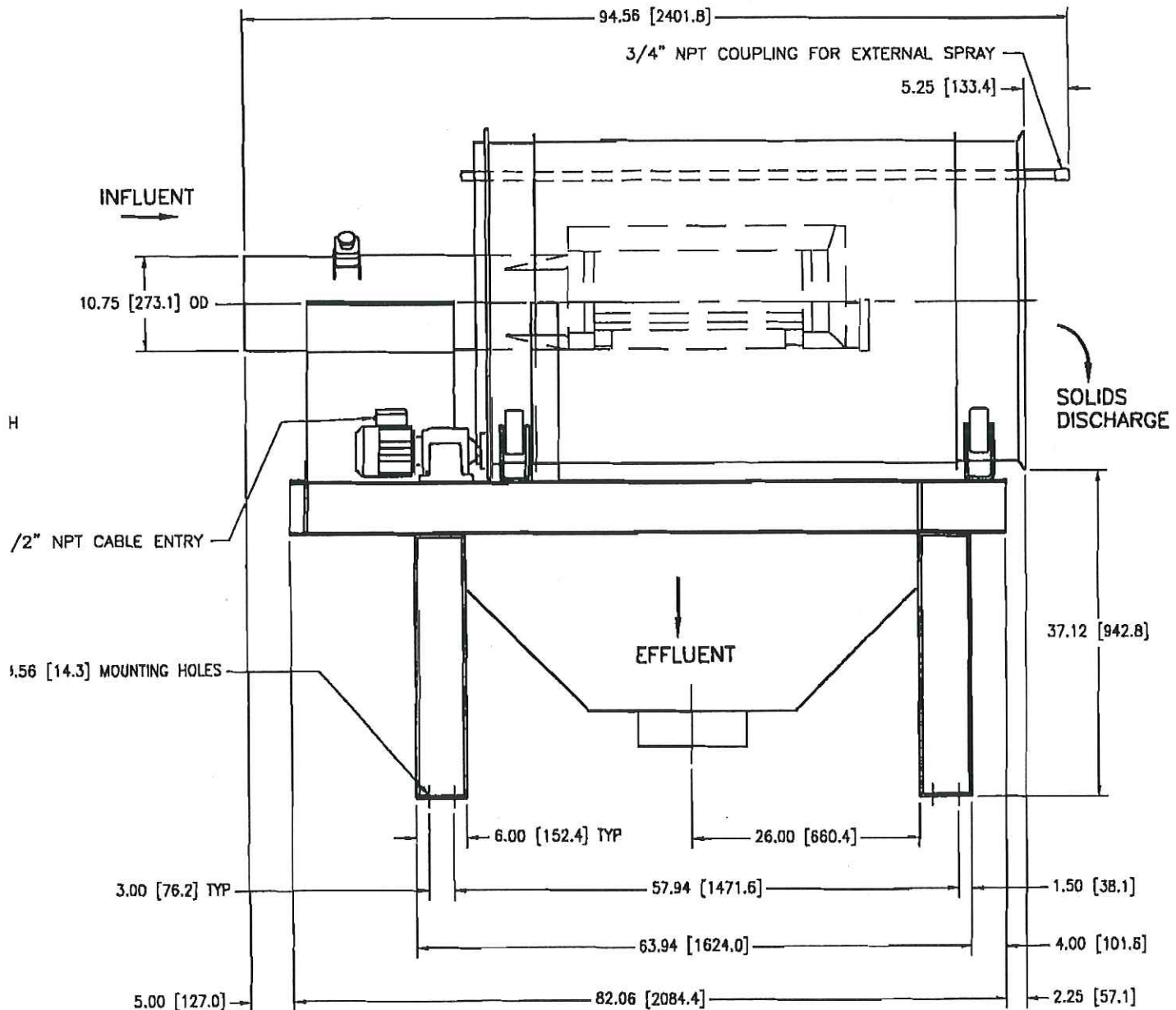
SUPPLIED.

13. ELECTRICAL DEVICES:

CHAIN OIL PUMP: NEMA 12, 110V, 1 PH, 60 HZ (FIELD INSTALLED).

HOOD INTERLOCK SWITCH: 120V, 1 PH, 60 HZ OR 100 V DC,
LEAD TYPE - 18/2, 72.00 [1828.8] LG).

14. ALL WIRING BETWEEN ELECTRICAL DEVICES AND CONTROL PANEL AND/OR JUNCTION BOX TO BE BY OTHERS.



LEFT SIDE VIEW

HOOD SUBASSY NOT SHOWN THIS VIEW FOR CLARITY

REFERENCE INFORMATION		PROJECT NAME	TITLE
14		PROJECT NUMBER 340328	HRS3648DV
04		TYSON FRESH MEATS	HYCOR® ROTOSHEAR® UNIT
		KUNA, ID	
DIMENSIONS CERTIFIED		DRAWING NO	REV
		34032801	
		SHEET 1 OF 1	