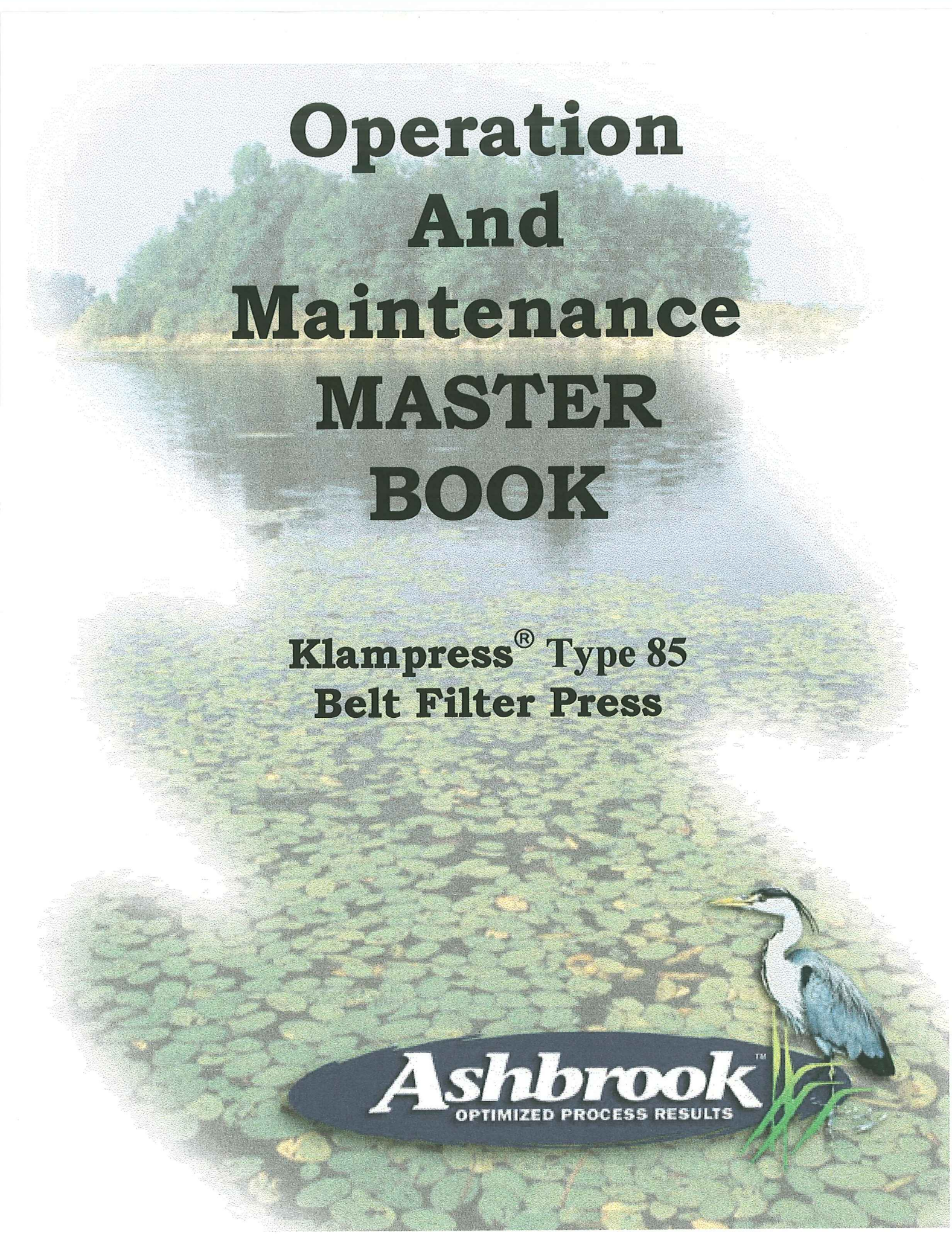
Operation And Maintenance MASTER BOOK

Klampress® Type 85 Belt Filter Press



Ashbrook Simon-Hartley®
WATER AND WASTEWATER TREATMENT SOLUTIONS

Ashbrook Klampress®
Operation & Maintenance Manual

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Ashbrook Simon-Hartley
11600 East Hardy, Houston, TX 77093 - Phone 800-362-9041 - Fax 281-449-1324
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Warranty

ASHBROOK SIMON-HARTLEY, warrants for a period of twelve (12) months from the date of start-up, not to exceed eighteen (18) months from the date of shipment, the new equipment of its own manufacture to be free from defects in materials and workmanship under normal use and service when used and maintained in accordance with instructions supplied by Ashbrook. Ashbrook's obligation under this warranty being limited to repairing or replacing, at its option, any part found to its satisfaction to be defective, provided that such part is, upon request, returned to Ashbrook's factory, freight prepaid. This warranty does not cover parts damaged by decomposition from chemical action or wear caused by abrasive materials, nor does it cover damage resulting from misuse, accident, neglect or from improper operation, maintenance, installation, modification or adjustment. This warranty does not cover parts required outside Ashbrook's factory without prior written approval. Ashbrook makes no warranty as to starting equipment, electrical apparatus or other material not of its manufacture, since the same are covered by warranties of the respective manufacturer thereof.

This warranty excludes consumable parts, specifically chicane blades, seal strips, and scraper blades. These items are warranted for a period of thirty days from startup. Start up for the purpose of this agreement shall be the date when the equipment is first placed into operation regardless of the status of the other items, i.e. sludge feed systems, polymer feed systems, conveyors, etc. at that time.

Ashbrook shall not be liable for consequential damages, whether or not caused by seller's negligence. Consequential damages for the purposes of this agreement shall include, but not be limited to, loss or use, income or profit, or loss of or damage to property occasioned by or arising out of the operation, use, installation, repair or replacement of the equipment or otherwise.

All parts repaired or replaced under this warranty will continue coverage on a pro rated basis of the original contract.

Ashbrook Simon-Hartley®

Commencement of Warranty Period

The warranty period as offered by Ashbrook for this project will begin on the date in which the end-user (Owner) receives first beneficial use of the equipment. This may or may not coincide with the final acceptance of the equipment.

Five Year Warranty

Bearings

All roller bearing housings and their coatings shall be warranted for a period of five (5) years against failure. This warranty shall include all parts and labor for repairing or replacing any bearing which fails during this period proving that the Owner lubricated said bearing with the recommended lubricant at the specified interval.

Three Year Warranty

Rollers and Roller Coatings

All rollers and coatings shall be warranted for a period of three (3) years against failure of the roller coating or the rollers themselves. Ashbrook shall repair or replace any roller coating which fails during this period.

Frame and Component Coatings

The frame work and hot dipped galvanized coating shall be warranted for a period of three (3) years against all manufacturing defects. Any defects or corrosion of components shall be repaired or replaced at no additional cost to the Owner. Corrosion that may occur at places where the frame has been drilled or welded in the field is not covered.

Limited Belt Warranty

ASHBROOK SIMON-HARTLEY, warrants that the belts furnished with our slurry dewatering equipment are free from defects in material and workmanship. Should there be a defect in material or workmanship, Ashbrook will replace such defective belts on a pro-rated basis on a normal usage rate of 2,000 operating hours per belt. This warranty covers the belts only and does not include installation.

The life of a belt is primarily dependent upon the nature of the slurry and the experience and the competency of the operator. Therefore, this warranty does not cover belts damaged by decomposition from chemical action or wear caused by abrasive materials, nor does it cover damage resulting from nuisance, accident, neglect or from improper operation, maintenance, installation, modification or adjustment.

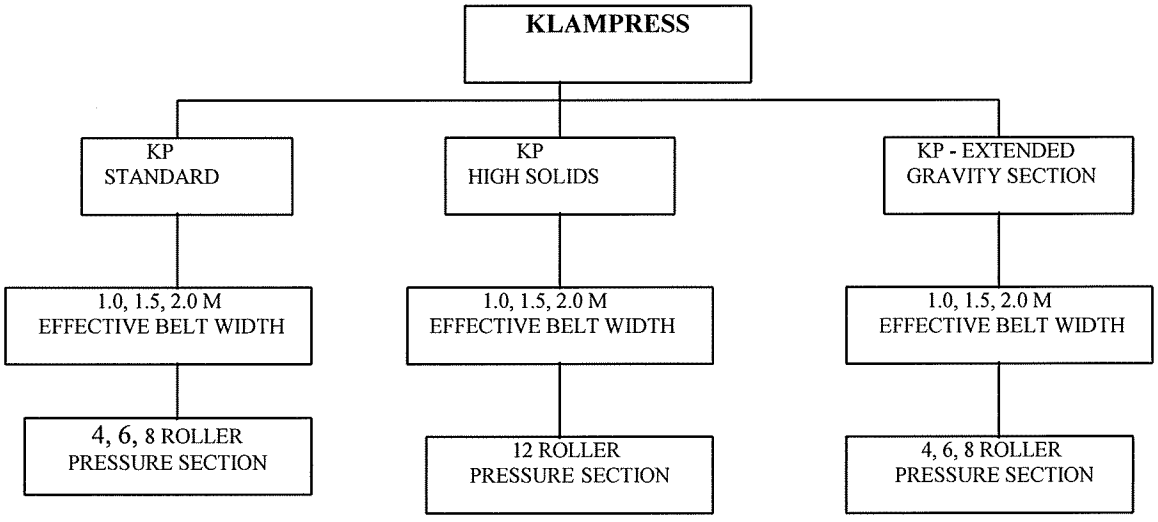
Ashbrook Simon-Hartley®
WATER AND WASTEWATER TREATMENT SOLUTIONS

ASHBROOK KLAMPRESS®

2.0 GENERAL INFORMATION

2.1 GENERAL MECHANICAL DESCRIPTION

2.1.1 INTRODUCTION The Klampress® is considered the industry standard for superior value, performance, and durability. The Klampress® is designed for low polymer consumption, high throughput rates, and high cake solids. Ashbrook manufactures the Klampress® from quality materials with tough, corrosion-resistant coatings, which results in years of dependable service and minimal maintenance. The Klampress® is offered in several configurations and sizes. There are three typical options of Klampress® : KP-Standard, KP-High Solids and KP-Extended. The KP-Standard is designed for normal applications. The KP-High Solids is designed for high cake solids requirement applications. The KP-Extended is designed for slow gravity separation sludge applications. The following chart is a list of different options of Klampress®:



2.1.2 MECHANICAL DESCRIPTION For description purposes, the Klampress® is broken down into functional groups as indicated below:

A. Main Frame
B. Rollers
C. Bearings
H. Gravity Drain Section
I. Wash Stations
J. Scrapers

D. Steering Assemblies
E. Tensioning Assemblies
F. Hydraulic Power Unit
G. Feed System
K. Drive Train
L. Dewatering Belts
M. In-Line Mixer
N. Optional AB Conversion

a. Main Frame: A semi-rigid, self-contained, steel structure consisting of side frames and cross members. The frame resolves the dewatering pressures into vertical loads that are transferred to the foundation. While the frame maintains the structural integrity of the machine, it relies on the foundation to hold the machine level and preserve the alignment.

b. Rollers: Fabricated assemblies that provide a bearing surface for the belts. The roller shafts (journals) are machined on both ends to accept the roller bearings. The rollers may be any of the following types:

(1) Dandy Roller: roller with a perforated shell and internal scoops to direct the water to outlet ports at the ends of the roller so the water can be drained away quickly.

(2) Drive Roller: rubber coated roller used to pull the dewatering belts through the press.

(3) Plain Roller: any non-perforated roller of varying diameter with the job specified covering. Used as steering rollers, tensioning rollers, pressure rollers, nip rollers, or as idler rollers.

c. Bearings: Support the rollers on both ends and maintain parallel roller alignment. The cast iron bearing housing is split horizontally to allow access to the bearing without disturbing the bearing alignment. All bearing housings incorporate button-head grease fittings for maintenance purposes. The steering bearings are taper adapter mounted straight bore, cylindrical roller bearings. All other bearings are taper adapter mounted double row spherical roller bearings. The bearing shaft seal is a triple seal comprised of the labyrinth, an elastomeric face seal and quad ring. For additional moisture protection, the seal is covered by a shaft-mounted splash guard.

d. Steering Assembly: Monitors the position of the dewatering belts and makes adjustments to maintain belt alignment in the center of the machine. The Klampress® has one steering assembly per belt, comprised of a steering roller and a hydraulic positioning unit. The assembly works by moving one end of the steering roller so that the steering roller is turned to a small angle relative to the belt direction. The belt responds to this change in angle by moving toward the end of the roller it touches first. The components of the steering assembly are:

(1) Hydraulic Positioning Unit: The unit has a belt position-sensing paddle that is constantly in contact with the belt. This paddle turns a hydraulic valve that adjusts the flow of hydraulic fluid to a hydraulic steering cylinder. As the cylinder responds, the steering roller position is altered. The stainless steel sensing paddle has a ceramic wear plate to protect the belt edge.

(2) Steering Roller: The steering roller is a smooth faced roller with cylindrical roller bearings. The bearing housings are attached to swivel plates to accommodate the roller movement. This arrangement avoids seal misalignment when the steering roller moves.

e. Tensioning Assembly: Consists of a hydraulic cylinder, a tensioning yoke and a two-position, four-way control valve. (See Fig.1) The belts may be tensioned or retracted at the control valve on the belt press. The amount of belt tension is regulated at the pressure regulator on the pump head. An optional dual control manifold regulates the upper and lower belt tensions independently. The upper belt tension is controlled by the regulator knob on the head of the hydraulic pump. The lower belt tension is controlled by the regulator in the end of the hydraulic control manifold. Tension indicating pressure gauges are provided for each belt. The individual tensioning components are as follows:

(1) Hydraulic Cylinders: Respond to changes in pressure from the hydraulic pump and pushes or pulls on the tensioning yoke to increase or decrease belt tension. There is one hydraulic cylinder on each end of both tensioning yokes.

(2) Tensioning Yoke: A fabricated steel assembly supporting the tensioning roller. The tensioning yoke has a hydraulic cylinder on each end of the yoke that transfers the force from the cylinders to the belt by moving the tensioning roller closer to or further away from the frame. The tension yoke maintains absolute equal belt tension across the entire width of the machine.

(3) Control Valve: A two-position, four-way valve which regulates the flow of hydraulic fluid to the hydraulic cylinders in the tensioning and steering assemblies. The hydraulic lines connecting the valve to the tensioning cylinders have independent shutoffs to isolate the individual belts.

On the Klampress® with the optional independent belt tension control manifold, two control valves are provided in the manifold, one for each belt and the isolation valves are deleted.

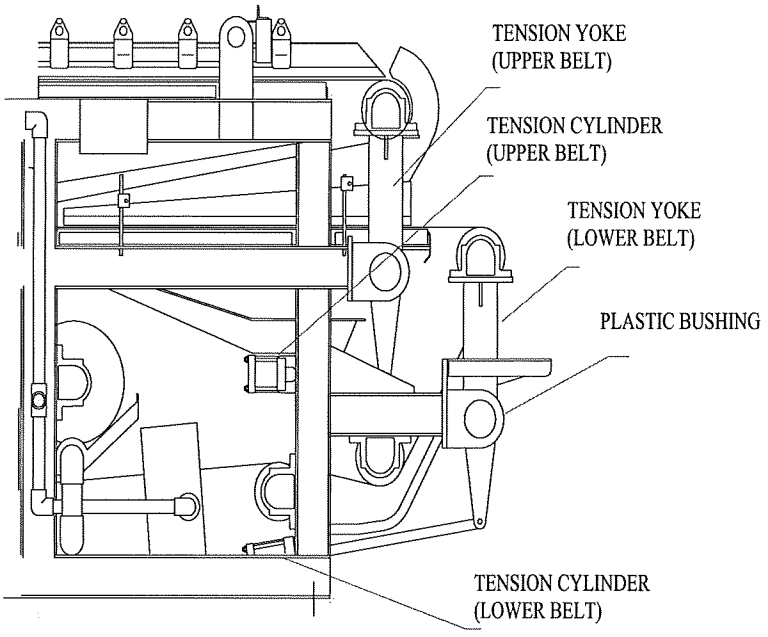


Figure 1. Tension Yoke Arrangement

f. Hydraulic Power Unit: an assembly of press mounted components that provide all hydraulic power for operation of the steering and tensioning assemblies. The unit consists of a 1 gallon reservoir suction strainer, pump-motor assembly and control valves. The pressure gauge is dual scaled for hydraulic pressure in pounds per square inch (psi) and dewatering pressure in pounds per linear inch (pli), (See Figure 2). The normal operating limits shall not be exceeded any time during the operation. The operation shall be in the green area of the gauge.

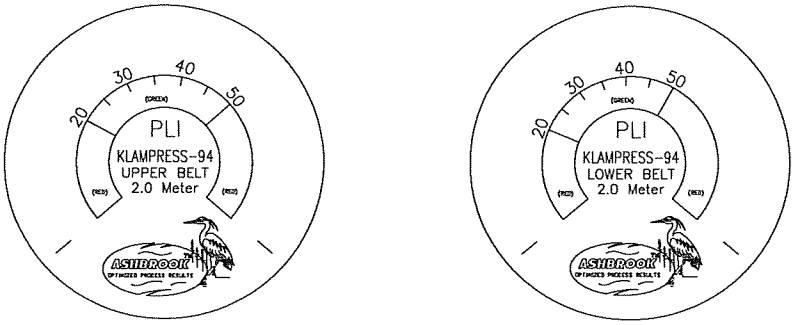


Figure 2. Hydraulic Gauge Face Decals

A constant speed motor powers the variable displacement hydraulic pump. The hydraulic pressure is adjusted by regulating the pressure regulator on the pump. Hydraulic oil is filtered through the externally mounted return filter.

Depending upon the specific site installation, an optional manifold may be installed after the hydraulic pump. This contains the valves and pressure regulators to provide independent belt tension control.

g. Feed Assembly: Stainless steel assembly that distributes the flocculated sludge across the belt to begin gravity dewatering. The feed distribution assembly has a standard ANSI flange for connecting to the sludge feed line.

h. Gravity Drain Section: Consists of the horizontal drainage grids, the Ashbrook patented chicanes, the drainage trays and piping, and the sludge restrainers.

(1) Drainage Grids: Series of polyethylene strips arranged in a chevron pattern that support the dewatering belts. The strips are installed on a steel grid above the drainage trays. The polyethylene provides low friction wiper bars for removing excess water from belts.

(2) Chicanes: Ashbrook Corporation's patented plows that turn the sludge and provide clear openings for the free water to drain into the drain pans. The chicanes pivot independently on the support bar that allows them to float directly on the belt and ride smoothly over the belt seam. This minimizes belt wear and prevents obstructions from blocking the sludge flow.

(3) Drainage Trays: Assortment of stainless steel pans that collect the filtrate for piping to the machine sump. The piping is designed to be self-venting to provide maximum drainage flow.

(4) Sludge Restrainers: Stainless steel guides that prevent sludge from running off the sides of the dewatering belts. The sludge restrainers are fitted with a neoprene strip seal at the bottom to maintain the seal between the belt and the sludge restrainer.

i. Wash Stations: Two slotted stainless steel boxes containing the wash tube. The wash tube generates an overlapping spray pattern from the jet nozzles to blast embedded and surface particles from the belt. The wash tube has an internal brush for cleaning the nozzles while the machine is running. The wash station entry and exit slots are covered with seals to protect the belt and to prevent over spray escaping from the wash box.

j. Scraper (Doctor) Blades: Steel assemblies fitted with polyethylene blades which remove the dewatered sludge cake from the dewatering belts. The scrapers are spring tensioned for pre-load adjustment.

k. Drive Train: Powers the Klampress® by turning the drive rollers that pull the dewatering belts through the press. The drive train components consist of the motor and gear box. See the Drive Section for more detailed information on the drive motor and gear box provided with this unit. The drive train receives its initial input from a variable speed drive unit. This allows the speed of the belts to be varied from approximately one to 5 1/2 meters per minute. Belt speed will depend upon the type of dewatering process desired. The drive motor input shaft speed is reduced and its torque amplified in the speed reducer. This is a self-contained helical bevel gear box with its own splash lubrication system.

l. Dewatering Belts: Polyester woven mesh joined by a stainless steel clip to form an endless band.

m. In-Line Mixer: Self-cleaning variable orifice venturi mixer used to condition the sludge prior to dewatering. The mixing energy may be varied independently of the flocculation by moving the mixer arm and counterweight.

n. Optional AB (Aquabelt) Conversion Kit: For those installations where it is desirable to operate the Klampress as a gravity belt thickener the AB Conversion provides a means to select between operation as a belt filter press and a gravity belt thickener. By changing the position of the selector lever at the end of the gravity deck the thickened sludge will be either directed onto the lower belt ahead of the wedge in the belt press mode or off into another discharge receptacle in the thickener mode. The higher horsepower drive for the Klampress with the AB Conversion is capable of much higher speeds for operating in the gravity thickener mode.

2.2 GENERAL PROCESS DESCRIPTION

2.2.1 INTRODUCTION.

Ashbrook's dewatering equipment is designed for use in municipal, industrial or specialized applications where removal of a liquid (usually water) from a solid-liquid suspension, slurry, is desirable. The Klampress ® Belt Filter Press does this through the use of two porous belts which allow both gravity and pressurized dewatering. In the gravity stage, the sludge is allowed to thicken and most of the filtrate, water, is removed. During the pressure filtration stage, the sludge is also exposed to shear forces that greatly increase filtration. The filtrate removed is captured and piped to the base of the machine. This water which has a very low solids content due to the superior capture rate of the Klampress®, is often drained back to the head of the plant. In some instances, the filtrate may be recycled as belt wash water. The discharge of the machine is a friable cake with a greatly increased solids content.

2.2.2 DEWATERING PROCESS

Prior to filtration, the sludge must be conditioned to cause solid particle agglomeration or clumping. This process, called flocculation, is accomplished by injecting a poly-electrolyte, or polymer, into the slurry. Since most slurries are charged, it is important to select the proper type of polymer to neutralize the charge. As the nature of flocculated sludge controls to some extent the dewatering characteristics of that slurry, polymers of varying charge, strength, and molecular weight should be tested. The Ashbrook laboratory can assist by analyzing individual slurries and recommending the optimum polymer and dosage. Along with the type of polymer, mixing energy and retention time play a major role in the flocculation process. For this reason, the Ashbrook system of polymer injection and in-line mixing is designed for maximum flexibility. Ashbrook typically supplies one in-line variable orifice mixer and polymer injection ring per machine. We recommend that three polymer injection locations in the sludge feed line be established. The locations should be selected to allow 15, 30 and 45 seconds retention time before the polymer sludge mixture enters the Klampress ®. These locations allow the mixer/polymer injection ring to be relocated easily should more or less retention time be required for optimum dewatering. To remix flocculated sludge is counter-productive, so the unused locations should be fitted with spool pieces of nominal size.

The flocculated sludge is discharged from the feed line onto the Klampress® through a sludge chute. The sludge first hits a hinged baffle. The baffle dissipates the energy of incoming sludge. The opening of the baffle varies automatically with sludge flow. If an impurity stays between the baffle and the upper belt, the upcoming sludge will push the baffle up around the hinge and let the impurity pass through. This baffle is a non-plugging energy-dissipating device. The chute expands to the whole width of the press at the beginning of the gravity separation zone. The sludge distributes evenly to the whole width of the press and the gravity separation starts. The dewatering process sludge is conveyed on a porous weave belt. The belt allows the free water to pass through where it

is captured by drain pans and piped to the machine base. The sludge is prevented from running off of the sides of the Klampress® by sludge restrainers and rubber seals. As the sludge is moved through the gravity section, it is turned over by Ashbrook's patented chicanes. These plow-like devices greatly increase the gravity dewatering by clearing places for the water to drain as they turn the sludge mass. At the end of the gravity section, the sludge is loosely structured cake ready for the pressure dewatering.

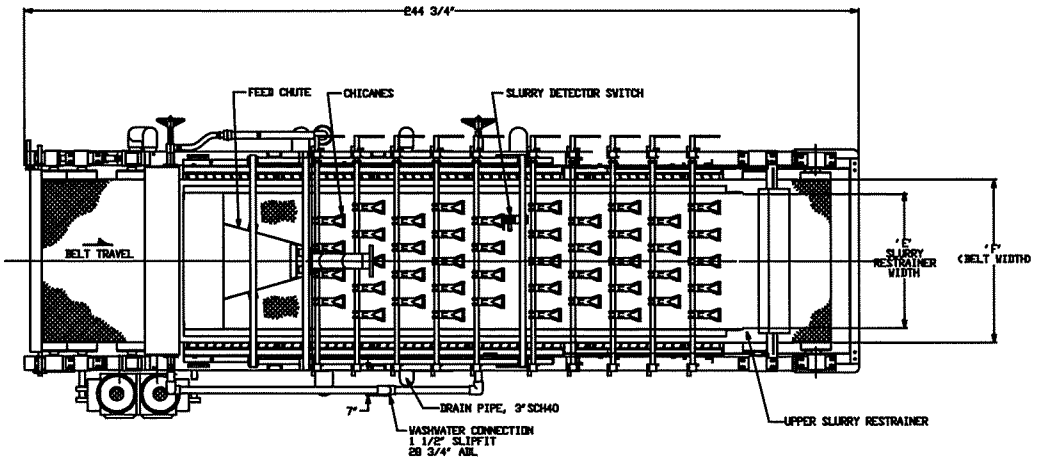
The horizontal wedge section uses the natural effects of gradually increasing pressure imposed by an adjustable wedge plate. After the wedge the two belts further converge at the dandy roller. This zone further reduces the volume of sludge in preparation of pressing. Then the sludge enters the roller compression zone. The first roller encountered in this stage is a 24" diameter perforated dandy roller. This roller has axial vanes to channel captured filtrate out the ends of the roller and away from the sludge. As the belts travel past the perforated roller, they take an S-shaped path around various diameter rollers, decreasing in diameter toward the discharge. This increases both the pressure and the shear-action to the sludge. The sets of rollers are sized to give optimum performance in the high-pressure section of the dewatering press. The shearing action in the high pressure section turns the sludge mass between the belts exposing the wet inner cake to the belts and expelling the free water. At the end of these rollers the belts separate and the sludge cake is discharged from the machine.

The belts continue past scrapers that remove any residual cake and prepare the belts for cleaning. The belts are washed in separate wash stations that remove particles that may have embedded in the porous belt. The belts must be continually cleaned to prevent belt blinding and a loss of dewatering ability. The clean belts exit the wash stations to begin the process again.

BAHAUTR7.DWG REV. 7

NUMBER OF CHICANES			UPPER GRID AREA (SQ FT)	LOWER GRID AREA (SQ FT)
1 METER	5 ROWS OF 4 CHICANES 5 ROWS OF 5 CHICANES	45	46.75	37.25
1.5 METER	5 ROWS OF 5 CHICANES 5 ROWS OF 6 CHICANES	55	70.13	55.88
2 METER	5 ROWS OF 8 CHICANES 5 ROWS OF 9 CHICANES	85	93.50	74.50

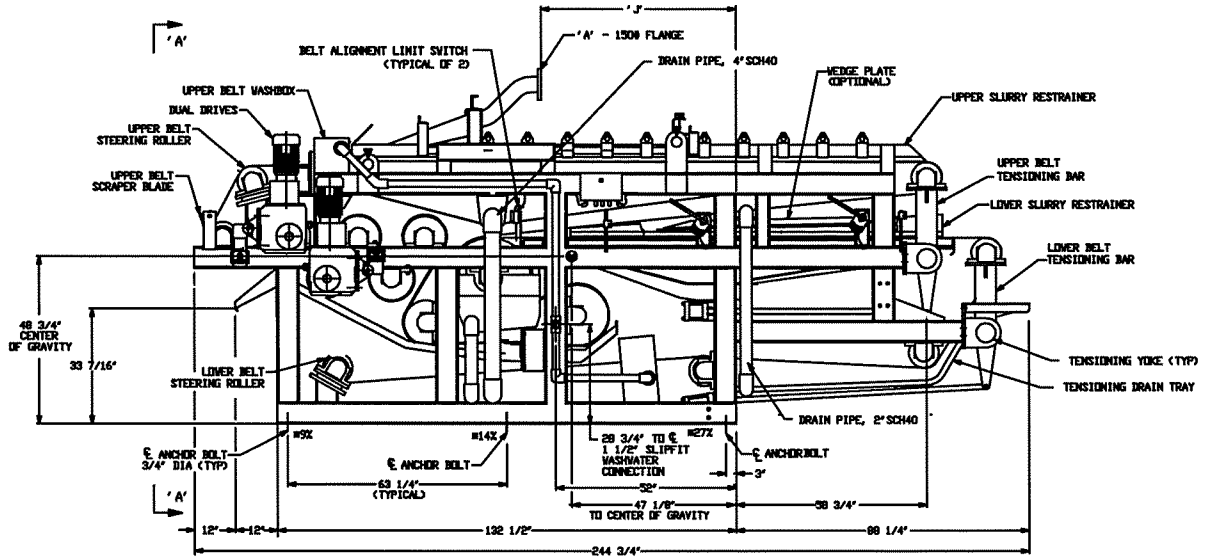
TABULATED DIMENSIONS										
KP	'A'	'B'	'C'	'D'	'E'	'F'	'H'	'J'	'K'	STATIC WEIGHT
1 METER	4'	55 5/8"	61 7/8"	63 5/8"	39"	47 1/4"	31 13/16"	56 3/8"	98 13/16"	16,600
1.5 METER	4'	75 7/8"	82 1/8"	83 7/8"	59 1/4"	67 1/2"	41 15/16"	56 3/8"	98 13/16"	20,600
2 METER	6'	94 7/8"	101 1/8"	102 7/8"	79"	86 5/8"	51 7/16"	54 3/8"	99 13/16"	24,300



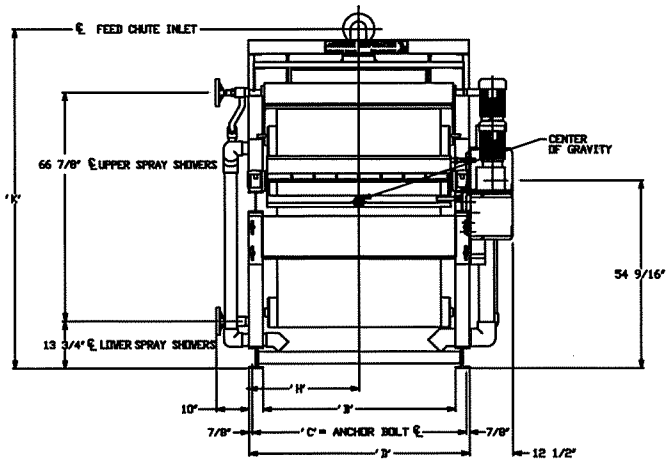
TOP PLAN

NOTE:
▼ 1.) MAIN FRAME LIFTING LUGS
2.) ELECTRICAL PARTS ARE PRE-WIRED AND TERMINATED AT THE JUNCTION BOX
3.) PRESS DEVICES ARE PRE-WIRED

(##) - PERCENT OF WEIGHT DISTRIBUTION



ELEVATION



VIEW 'A-A'

TOLERANCE UNLESS NOTED		
	INCHES	MILLIMETERS
FRACTION	+/- 1/32	N/A
X.	+/-0.100	+/-3.0
X.X	+/-0.030	+/-1.0
X.XX	+/-0.015	+/-0.5
X.XXX	+/-0.005	+/-0.1

REV	DATE	DESCRIPTION	BY	APP'D
2	0/94	ADD TABULATION	DY	
3	3/07	ADDED BELT SLIDE ASSEMBLIES	DY	
4				
5				
6				
8				
9				
10				
11				
12				

DRAWN	DY	9/25/94
CHECKED	DY	9/25/94
APPROVED	Chet	9/98
QUAL. APP'D	N/A	N/A

NOTE:
1)DEBURR ALL SHARP EDGES.
2)MARK WITH PART NUMBER PER WORK OR PURCHASE ORDER

Ashbrook Simon-Hartley

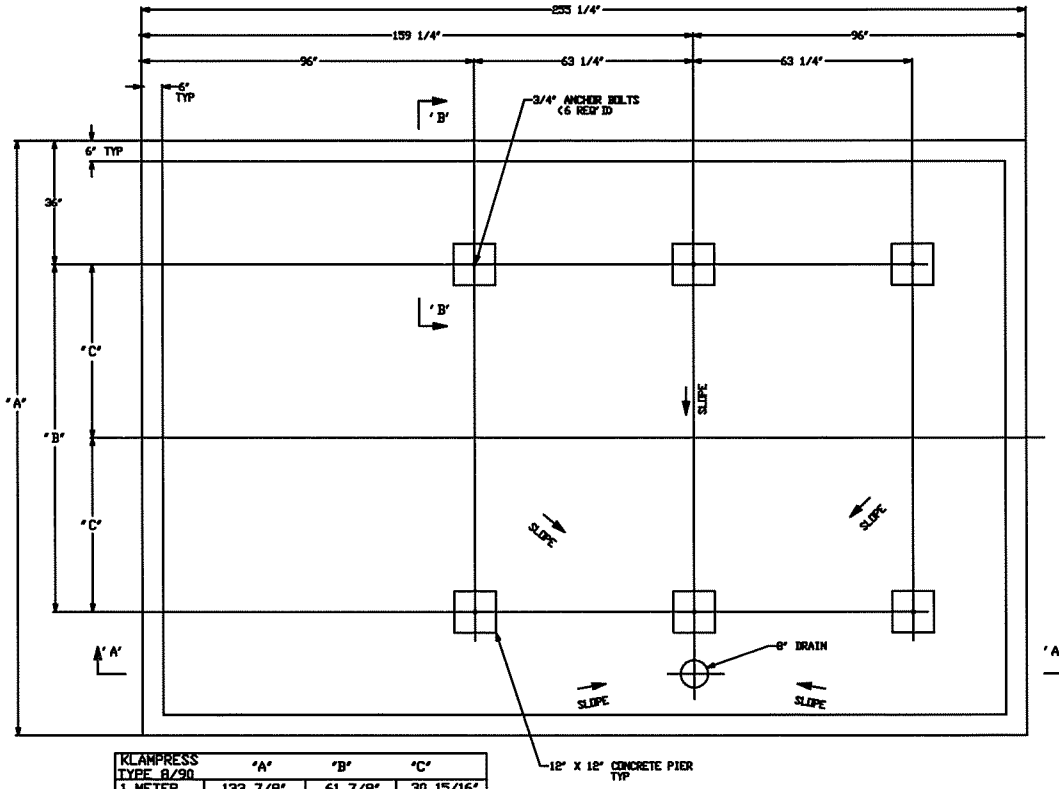
Ashbrook Simon-Hartley Operations LP.
11600 East Hardy Road Phone: 281-449-0322
Houston, Texas 77093 FAX: 281-449-1324

TITLE: GENERAL ARRANGEMENT
1.0 METER, 1.5 METER, 2.0 METER
KLAMPRESS 85, 8/90

SCALE	DWG. NO.	REV
1/36	BK0004	3

CUSTOMER: GENERAL USE

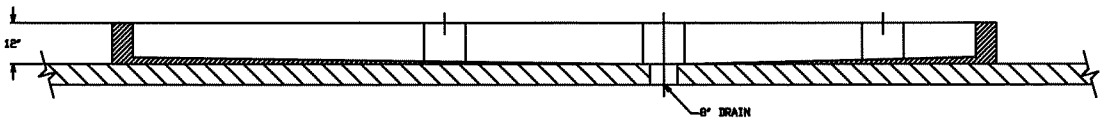
B4MATR7.DWG REV. 7



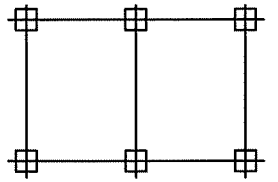
DISCHARGE SIDE

PLAN

KLAMPRESS TYPE 8/90	'A'	'B'	'C'
1 METER	133 7/8"	61 7/8"	30 15/16"
1.5 METER	154 1/8"	82 1/8"	41 1/16"
2 METER	173 1/8"	101 1/8"	50 9/16"

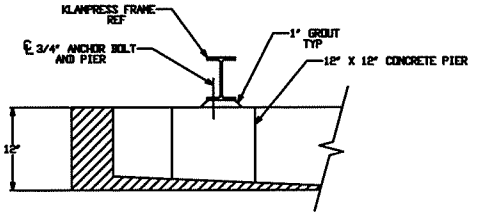


SECTION 'A-A'



POINT LOADING @ ANCHOR BOLTS

NOTE: ALL PIERS SHALL BE DESIGNED TO ACCEPT 8000 LB. POINT LOAD



SECTION 'B-B'

NOTES:

1.) THIS PIECE OF EQUIPMENT OPERATES IN A WET/WASHDOWN AREA. ASHBROOK CORPORATION RECOMMENDS THAT GRATING, PLATFORMS, ETC. BE INCLUDED IN THE INSTALLATION DESIGN TO LIMIT FOOT TRAFFIC IN AND AROUND THE SUMP.
2.) THIS DRAWING IS ISSUED FOR DIMENSIONAL PURPOSES ONLY.
3.) ASHBROOK CORPORATION ASSUMES NO RESPONSIBILITY FOR STRUCTURAL DESIGN AND/OR LAYOUT OF SUPPORTING STRUCTURE AND SUMP.

TOLERANCE UNLESS NOTED	INCHES	MILLIMETERS
FRACTION	+/- 1/32	N/A
X	+/-0.100	+/-3.0
X.X	+/-0.030	+/-1.0
X.XX	+/-0.015	+/-0.5
X.XXX	+/-0.005	+/-0.1

REV	DATE	DESCRIPTION	BY	APP'D
1				
2				
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6				

REV	DATE	DESCRIPTION	BY	APP'D
7				
8				
9				
10				
11				
12				

DRAWN	DY	9/25/96
CHECKED	DY	9/25/96
APPROVED	JET	9/1/96
ENG APPR.	N/A	N/A

NOTE:
1)DEBURR ALL SHARP EDGES.
2)MARK WITH PART NUMBER PER WORK OR PURCHASE ORDER

Ashbrook Simon-Hartley

Ashbrook Simon-Hartley Operations LP.
11600 East Hardy Road
Houston, Texas 77093
Phone: 281-449-0322
FAX: 281-449-1324

TITLE: STANDARD SUMP LAYOUT
KLAMPRESS TYPE 85, 8/90
1 METER, 1.5 METER & 2.0 METER

SCALE	DWG. NO.	REV
NTS	BK00005	3

CUSTOMER: GENERAL USE

ASHBROOK KLAMPRESS®

3.0 RECEIVING INSTRUCTIONS.

Thoroughly inspect the equipment before accepting shipment from the transportation company. If any item on the Bill of Lading is damaged or missing, ensure an annotation is made on the Freight Bill or Express Receipt. If any concealed damage is discovered after unloading, notify the transportation company and request an inspection.

Ashbrook inventoried and packaged the spare parts required for your order prior to shipment. To ensure inventory accuracy, we request the package labeled "Spare Parts" not be opened until the Ashbrook Service Technician arrives. The box of spare parts needs to be stored in a dry location and protected from damage. If the box is opened prior to our arrival, Ashbrook will not assume liability for any missing spare parts.

Ashbrook will assist your efforts to collect claims for loss or damage in transit. Should there be any loss or damages please notify Ashbrook within three (3) working days of delivery. Ashbrook's assistance does not relieve the transportation company of any responsibility for reimbursement on your claim and in no instance assumes liability on the part of Ashbrook for the claim.

Claims for loss or damage in transit do not alter the payment terms for your order and payment should not be withheld or delayed because of a claim.

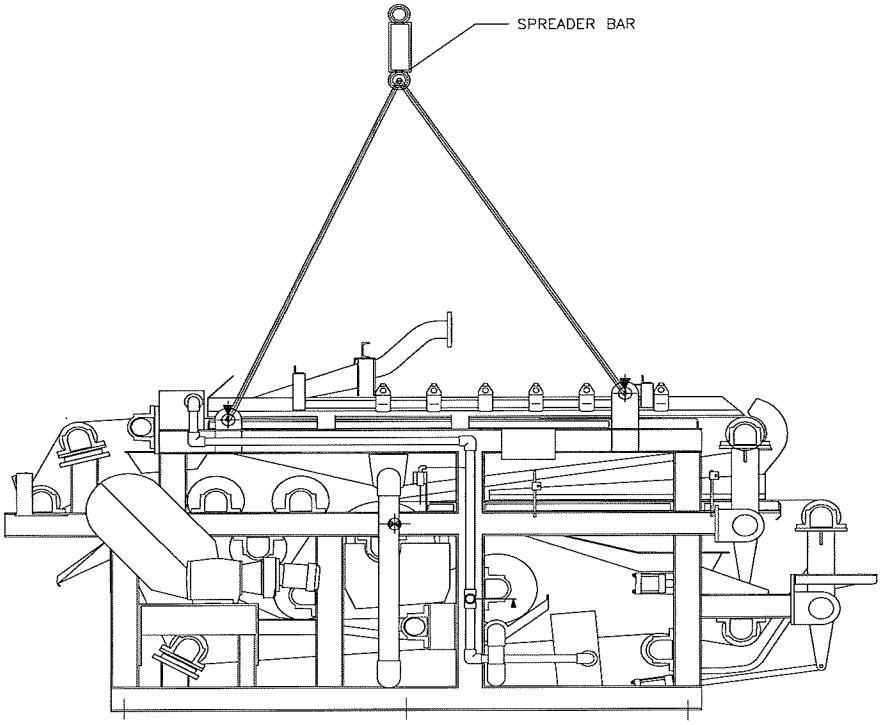
ASHBROOK KLAMPRESS®

4.0 HANDLING INSTRUCTIONS: Your Ashbrook Klampress is designed to be lifted by a spreader bar and cable slings or chains. Accordingly, lifting brackets have been provided on each side of the machine. Attempts to use other lifting arrangements such as fork lifts, could result in frame distortion not covered by the manufacturer's warranty. The recommended lifting procedures are as follows:

1. Attach 8 foot long chains or cables as indicated in the diagram to the two lifting brackets and to the ends of a spreader bar.

2. Apply lifting force steadily and gradually to the spreader bar to ease the machine into the air. It may be necessary to adjust the lengths of the chains to ensure that the machine remains level while suspended.

3. Lower the machine carefully to rest on level surfaces with the weight evenly distributed on the supports.



5.0 STORAGE INSTRUCTIONS.

Ashbrook recommends indoor storage for all items, however we recognize this may not be possible. If limited indoor storage is available, we recommend storing the control panel and the loose ship items, including the box of spare parts and the drive motor if not installed on the press, indoors. Additionally the following steps should be taken for all storage locations:

5.1 Store the press in a level position supported on wooden dunnage.

5.2 Completely cover the press with a well secured waterproof tarpaulin in an area free of extreme temperatures, moisture, shock and vibrations.

5.3 Do not store items on top of the press.

5.4 Periodically inspect the roller spindles, gears, etc. for rust. Keep these items well lubricated to prevent rusting.

5.5 Bearings are greased when they leave the factory. No additional greasing is necessary for storage.

5.6 The gearboxes are shipped completely filled with oil. No additional oil is required for storage. However, they must be drained to the proper level before starting.

5.7 The electric control panel, hydraulic power unit and drive motor (if shipped loose) should be stored in a clean, dry area protected from extreme temperatures, moisture, shock and vibration.

5.8 Rotate all rollers two or three revolutions by hand every thirty (30) days.

5.8 The box labeled "Spare Parts" should be stored unopened.

6.0 INSTALLATION INSTRUCTIONS

6.1 GENERAL: The proper design and construction of the foundation, sump, piping, pumps and other ancillary equipment operated with the Klampress® are the responsibilities of the owner, engineer or contractor unless arranged otherwise at the time of purchase. These instructions are intended as a guide based on sites with configurations similar to those recommended by Ashbrook. Since they are general, some modifications may be required to solve your unique requirements. Should assistance be required, please contact Ashbrook's Engineering or Service Department.

6.2 INSTALLING THE KLAMPRESS®:

6.2.1 Study applicable plans to verify location of press. Confirm the machine orientation in this manual matches the hook up locations in the plans including wash water connection, wash water valve handles, chicane handles, electrical power, sludge feed and polymer feed.

6.2.2 Verify cast in place anchor bolt locations from the General Arrangement Drawings. If anchor bolts are expansion anchors, they will be installed after press is set on piers.

6.2.3 Lift press according to Handling Instructions and carefully set it in place.

CAUTION: Ensure lifting safety is observed during all hoisting operations

6.2.4 Loosely secure anchor bolts. If expansion anchors are to be used:

a. Mark their locations while Klampress® is in place.
b. Remove Klampress® following Handling Instructions.
c. Drill and install expansion bolts.

Note: Drilling the anchor bolts while the Klampress® is in place could damage the frame's protective coating or cause alignment problems.

d. Replace the Klampress® following Handling Instructions.
e. Loosely secure the anchor bolts.

6.2.5 Level the Klampress®:

a. Using a precision level, check across the frame to ensure the machine is level.
b. Shim the Klampress® around the anchor bolts until all of the rollers are level.

Note: Do NOT shim any roller. Shimming the roller could cause premature bearing failures or belt alignment problems and void the Ashbrook warranty.

c. Tighten the anchor bolts.

6.2.6 Verify rollers remained level by checking the same rollers again. Check machine for level lengthwise by taking an elevation at the four corners.

6.2.7 Relevel the machine as required.

6.2.8 Grout the machine as applicable using a non shrink, non metallic grout.

6.3 Connect Wash Water: Water should be provided to the wash boxes at 85 psi and the following flow rates: One Meter, 40 gpm; One and One-Half Meter, 60 gpm; Two Meter, 80 gpm. If the water pressure or flow is not sufficient for the above requirements, then a booster pump is required. The wash water connection will be a 1.5 inch diameter Schedule 80 PVC unless otherwise specified. Ashbrook recommends a ball valve be installed prior to any booster pump required and a pressure gauge be installed prior to the press to verify pressure requirements.

6.4 Connect Sludge Feed Line: The sludge feed line will be connected to the Klampress® feed box as shown on the General Arrangement Drawing in this manual. Use a flexible connection to allow for adjustment of the feed box. The feed box is supplied with a standard ANSI 150 lb. raised face flange unless otherwise specified. The Two Meter Klampress® has a six inch diameter feed inlet, and on all other sizes, a four inch diameter feed inlet will be supplied (standard, unless otherwise noted). Ensuring the sludge is fed evenly across the belt width is critical to the performance and maintenance of the belt press. Because of this, Ashbrook recommends eight feet of straight feed piping prior to the feed box. The feed piping must be adequately supported prior to the connection to the press to not place external loads on the feed inlet assembly. The feed inlet assembly must be adjusted to be exactly level for proper press performance. Additionally, sharp turns in the feed line should be avoided by using long radius elbows.

6.5 Install In Line Mixer: The Ashbrook In Line Mixer should be installed initially at the location that will allow 30 seconds retention time or as recommended by Ashbrook's Process Engineers. Ensure the directional arrow on the mixer points in the direction of the sludge flow. The polymer injection ring must be installed between the inlet flange of the mixer and the sludge feed pipe. Connect the injection ring to the splitter manifold via four lengths of clear hose. Connect the splitter manifold to the polymer system according to the polymer system manufacturer's instructions. If the sludge feed piping is elevated above the mixer and polymer system a check valve should be installed at the inlet to the splitter manifold to prevent sludge back flowing into the polymer system when shut down. Contact Ashbrook Spare Parts to obtain the valve. See Section 14 in this book.

6.6 Electrical Hook-Ups: Electrical interconnection of the Klampress® is always through a dedicated control panel. It is often the case that all required motor starters and or drives are integrated with the operating logic into a single panel. In this case, it will only be necessary to perform all interconnection wiring between the press and the panel as described by the terminal strip diagrams found in the as built control panel drawings. (See Electrical Control Panel Portion of the O&M) It is also possible that the control panel may contain only operating logic and all starters are at a motor control center or that other equipment must be interlocked with this panel. Once again, the as built drawings will provide interconnection guidance. On the Klampress®, all control wiring is terminated in the junction box on the machine. To complete the installation, the following connections are required:

> *WARNING*: Electrical connections should only be attempted by a qualified electrician. All electrical work must be in compliance with NEC, NEMA, OSHA and other local codes. Serious personal injuries, fatalities or equipment damage could result from improper electrical connections.

6.6.1 Klampress® Junction Box: The machine is shipped pre-wired. The installing contractor is responsible for interconnecting the junction box and the control panel as indicated on the as-built electrical drawings. Be certain to seal the conduit entry point to the junction box to prevent water entry. The conduit entry should always be in the bottom of the junction box when possible.

6.6.2 Klampress® Drive Unit: Consult the Drive Section of this manual for the electrical requirements of the specific drive motor provided. The connection will be made at the junction boxes on the drive motor.

6.6.3 Hydraulic Power Unit: The motor is a 230/460 volt, 60 Hz, 3 phase, 1.0 horsepower unit unless otherwise indicated in the hydraulic unit section of this manual. Electrical connection will be at the motor junction box. The connection information is on the inside cover of this box. The hydraulic unit will also have one or two low pressure switches which have been pre wired to the press junction box.

7.0 MECHANICAL START-UP PROCEDURES:

7.1 GENERAL: Prior to attempting dewatering for the first time, the Klampress® must be inspected and prepared for operation. This section addresses the procedures which will prepare the machine for operation.

7.2 MECHANICAL CHECKOUT:

7.2.1 Visually inspect anchor bolts and verify they are tightened.
7.2.2 Verify the machine is level.
7.2.3 Inspect the rollers:

(a) Verify rollers are level across the machine width.
(b) Check for cleanliness. Remove any construction materials, packing materials, dirt, grease, etc.
(c) Turn each roller by hand two or three revolutions.

Note:	The seals should drag slightly and the drive rollers should not turn.

(d) If any roller turns roughly or sticks, inspect the roller for external obstructions. If no obstructions exist, disassemble the bearing housings and inspect the bearings. If damaged, notify Ashbrook for repair or replacement.
(e) Inspect the roller coatings. All coatings should be intact.

7.2.4 Inspect the gravity drainage grids:

(a) Grids should be level and free from any sharp edges or protrusions.
(b) Grids should be free of embedded materials and all bolt heads should be well below plastic wear surface.
(c) Sludge restrainers should be in place and the rubber seal should be intact. Remove any sharp edges. Rubber seals will wear with use. As they wear, adjust them to maintain adequate sealing and if necessary replace them.
(d) Chicanes blades should be resting on the grids. No metal portion of the chicane assembly should be touching the grids.
(e) Verify the scrapers pivot freely and that the plastic blades are not chipped, cracked, or broken.

7.2.5 Inspect wash boxes and verify rubber seals are in place:

(a) The rubber seals located at the wash boxes will wear with use. As they wear, adjust them to maintain adequate sealing and if necessary replace them.

7.3 ELECTRICAL CHECK OUT:

WARNING: Electrical connections should only be checked by a qualified electrician. Failure to follow federal, state or local codes could cause severe personal injuries, fatalities or severe equipment damage.

7.3.1 Hydraulic Power Unit: Bump the motor circuit to ensure motor is turning in the correct direction.

Caution: Ensure unit is filled with hydraulic fluid. Severe equipment damage could result if unit is operated without oil.

7.3.2 Drive Unit Inspection: Bump the drive unit circuit to ensure drive rollers turn in the correct directions.

Caution: Ensure gear box is drained to operating level before operating drive unit. Damage to the drive unit could occur if unit is operated before being drained to the correct level.

7.3.3 Wash Water Booster Pump: Bump the motor circuit to ensure motor is turning in the correct direction.

Caution: Ensure pump is primed or is self-priming. The pump could be damaged if operated without being primed.

7.3.4 Electrical Sensors: Inspect all sensors to ensure they shut down the appropriate machine functions. Depending on your particular installation, some of the following machine sensors and alarms may not be present. However, they are included as an indication of the full capability of the machine. When triggered, the sensors will cause the Klampress® to have a total or a partial shut down as indicated below:

(a) Total Shut Down: All machine functions, sludge and polymer feed systems, hydraulic power unit and wash water system are stopped if not in the Bypass Mode. This results from the following alarm conditions:

(1) Belt Breakage: proximity switch which detects a broken belt.

(2) Belt Misalignment: two limit switches which detect gross misalignment of the belts on either side.
(3) Low Wash Water Pressure: a pressure switch which detects water pressure below the owner specified setting, typically 60 psig.
(4) Hydraulic Temperature: a temperature switch that detects hydraulic fluid temperature above 175°F at the hydraulic power unit.
(5) Hydraulic Pressure: pressure switches which detect hydraulic pressure too low to maintain drive traction and belt alignment.
(6) Emergency Stop: a push button on the machine and other optional location(s) to manually stop all functions.
(7) Emergency Trip Cord: a pull cord circling the machine which functions as an emergency stop.

(b) Partial Shut Down: shuts down sludge and polymer feed and continues to operate the belt drive, hydraulic power unit and wash water system for a period of one hour. This results from:
(1) High Sludge Level: a level sensor which detects sludge about to overflow the edge of restrainers in the gravity section.
(2) Lack of Cake: a level sensor which detects a lack of sludge in the gravity section.

Caution: Alarms and sensors are on the machine to protect personnel and the equipment. Operating the machine with sensors not functioning properly places the operator and equipment in danger.

7.4 HYDRAULIC SYSTEM CHECK OUT:

7.4.1 Verify all hydraulic lines between hydraulic power unit and the Klampress® are in place.
7.4.2 Put the control valves on the Klampress® in the retract position.
7.4.3 Energize the hydraulic power unit. The pump may take up to 90 seconds to reach full pressure which will register on the pressure gauge.

Note: If the pump has not picked up pressure within 90 seconds, turn off pump motor and check for correct pump rotation and fluid level.

7.4.4 With the pump operating, turn the regulator knob on the pump until the pressure is in the range of 300 to 350 psig. Lock the pressure regulator lock nut at this setting.
7.4.5 Adjust the upper belt tension by turning the knob on the pump head. Observe the gauge for the upper belt and set the pressure to around 350 psi.
7.4.6 Adjust the lower belt tension by turning the knob of the valve in the end of the manifold block. Observe the gauge for the lower belt and set the pressure to around 300 psi. By design, the lower belt tension pressure cannot be set higher than the upper belt tension.
7.4.7 Push in both control valve knobs on the manifold to extend the belt tensioning cylinders.

7.4.8 Check the belt press hydraulic power unit for leaks. Repair if required.

7.4.9 Cycle both rollers through the tension/retract cycle several times to ensure they function correctly and to purge air from the system.

7.4.10 Inspect steering sensing paddle for damage, and freedom of movement. If its movement is stiff, notify the Ashbrook Service Department.

7.4.11 Manipulate the valve by manually moving the sensing paddle off center in one direction. The hydraulic positioning unit should move fully in one direction in response to the sensing paddle. Move the paddle off center in the other direction and note the movement of the hydraulic positioning unit in the other direction.

7.4.12 If equipped with the Nip Roller option, verify that both cylinders are operating correctly and uniformly to move the nip roller toward the bottom pressure roller. There must be a uniform space of 3/8 inch between the nip roller and the bottom pressure roller. The hydraulic pressure for the nip roller should be initially set at 100psi. The normal operating pressure range for the nip roller is from 100 to 350 psi.

7.5 WASH WATER: Inspect the following items:

7.5.1 Verify the wash water is being delivered to the wash boxes at 85 psig or higher and at the correct flow rates. If a booster pump is installed, ensure pump is functioning correctly.

7.5.2 Verify all valves in the water line are open.

7.5.3 Verify hand wheels on both wash tubes are fully closed. Rotate completely in the counter clockwise direction and then back fully in the clockwise direction. This action rotates the brush inside the wash tube and cleans the spray nozzles.

NOTE: Do NOT over tighten hand wheel. This could damage the internal seals causing a loss of wash water pressure. Should water continue to drain from the bypass hose it is likely that gravel or trash is preventing the valve from closing. In this case repeat the opening and closing cycle of the valve to clear it.

7.6 DEWATERING BELT INSTALLATION: The dewatering belt is one of the most easily damaged items on the Klampress®. Because of this, it is important to know how to handle the belt prior to attempting installation.

7.6.1 Handling and Storage:

(a) Always store belts in their protective wrappers or containers standing on end.
(b) Do not smash, stack or store items on the rolled belts.
(c) Do not allow the belt to become kinked or folded.
(d) Keep foreign substances off the belts as much as possible.
(e) Never attempt to dewater sludge with a new belt before performing the run-in on the press as described in Section 7.7.

7.6.2 Belt Safety: Installing belts on a new machine where there are no belts being replaced is a job that requires two people working together using much care and patience.

WARNING: ATTEMPTING TO USE THE PRESS BELT DRIVE TO INSTALL A NEW BELT IS EXTREMELY DANGEROUS. DO NOT ENERGIZE THE DRIVES TO TRY TO MAKE THE BELT INSTALLATION GO FASTER. TO DO SO CAN RESULT IN SERIOUS INJURY OR DEATH. LOCK OUT THE DRIVE WHEN INSTALLING BELTS ON A NEW MACHINE.

The first belts to be installed on the Klampress® **MUST BE** fed by hand. Two people working together can work the belt around the rollers by pulling the slack from one roller to the next. But, when old belts are being replaced it is acceptable to part the old belt and attach the new belt to the old at the clipper seam and then use the press drive at low speed to pull in the new belt while the old belt is fed out. (See SK001935)

In either case, keep your hands away from the belts where they go around rollers or through wash boxes and other pinch points.

To ensure safe operation observe the following:

(a) Stop Switches: Ensure location and operation of the stop switches for the drive and hydraulic unit are known and that all switches function properly

(b) Remember, even though the belt moves slowly it can catch clothing, hands, jewelry, etc. Remove jewelry and fasten clothes to protect yourself.

(c) The hydraulic system also moves slowly, but with bone crushing force. DO NOT ever place body parts between the moving machine parts.

7.6.3 Belt Installation: **READ THE PROCEEDING SECTION FIRST!**

(a) Lift the chicanes off the grid bars by rotating their lifting handles and retract the scraper blades from the rollers. Raise the sludge restrainers to make clearance between the seals and the grid bars.

(b) Loosen the upper and lowers wash box seal panels and retract to make a larger opening.

(c) Unwrap the belts and record the serial numbers on the Belt Record Sheet.

(d) Remove the joining wire from the belt seam.

(e) Position the belts at the wedge end of the machine.

Note: The smooth (flattened) side of the belt faces the sludge. Turn the rough side toward the rollers. The Ashbrook warranty does not cover belts that have been installed improperly.

(f) Feed the lower belt over the top of the tensioning roller under the wedge plate, over the radius grid, toward the perforated roller.
(g) Ensure the belt is feeding squarely. Any kink, crease or wrinkle in the belt must be avoided or the belt could be damaged when placed in service under tension.
(h) After straightening the belt, continue the belt through the pressure rollers and down around the lower steering roller through the lower wash box.
(i) At this point it is allowed to energize the drive momentarily to bring the belt through the machine so the ends can be joined at the wedge end of the machine where the belt is horizontal.
(j) Observe the safety precautions above and lock out the drive once the belt is in position for seaming.
(k) Join the two ends of the belt and thread the splice wire through the loops. Ensure the thread wire does not miss any loops and catches each loop alternately. Ensure the belt edges are in line and do not form a step at the joint.
(l) Bend the wire into a loop and feed it back into the belt loops. Cut off the excess wire.
(m)Begin feeding the upper belt over the lower tensioning roller **over** the wedge plate and over the radius grid toward the perforated roller.
(n) Work the belt through the pressure section by pulling the slack from roller to roller.
(o) Pass the belt over the upper steering roller through the upper washbox.
(p) Pull the upper belt down the length of the gravity deck stopping about one foot from the end of the grid.
(q) Thread the loose lower end of the top belt up from below and pass it between the scraper blade and the upper tension roller. The belt must not go around the outside of the scraper blade assembly.
(r) Pull the other end of the belt up to where the ends come together on top of the upper tensioning roller where it will be accessible for seaming.
(s) Join the two ends of the belt and thread the splice wire through the loops. Ensure the thread wire does not miss any loops and catches each loop alternately. Ensure the belt edges are in line and do not form a step at the joint.
(t) Bend the wire into a loop and feed it back into the belt loops. Cut off any excess wire.
(u) Readjust the wash box seals, the restrainers and rotate the chicanes down onto the belt.

7.7 Run-In Period: A new belt should always be broken in at low speed for about 30 minutes prior to being loaded with sludge. This ensures that the new belt will track properly and pre-stretches the belt. Always monitor the machine closely during this time.

The process for belt run in is:

***NOTE*:** Never attempt dewatering until the new belt has been pre-stretched.

7.7.1 Adjust the tensioning pressure to 30 pli on both belts.
7.7.2 Start the belt wash water flow and energize the belt drive.
7.7.3 Follow the chart below to increase the belt tension during the break in cycle.

TIME PERIOD	BELT TENSION
First Hour	30 pli
Second Hour	40 pli
Third Hour	50 pli
Fourth Hour	40 pli

7.7.4 Set the belt tension to the desired setting for running the process stream. Generally, both belts will be operated at the same pli setting, not the same hydraulic pressure (psi). Tighten the jam nut on the pressure adjusting knobs when the desired belt tension has been set to prevent accidental changes due to vibration or other influence.
7.7.5 Adjust the steering sensing paddle by moving the valve mounting bracket so the dewatering belt tracks on in the center of the machine.

Note: Fine adjustment of the steering circuit is best done with the belts moving.

CAUTION: Use extreme caution when working around the moving belt. Avoid loose clothing that might become caught in the belt.

7.7.6 Proceed to Process Start Up.

8.0 PROCESS START UP:

8.1 General: Knowing how to correctly and safely operate the belt press is important to accomplish optimum dewatering performance and minimum operating costs. After the Klampress® is on line, operators can begin to adjust the following: sludge feed rate, polymer, feed rate and concentration, mixing energy, belt speed, and belt tension. The procedures for process start up and optimization are covered in the following section.

8.2 Process Variables:

8.2.1 Sludge Feed: The sludge flow rate can be determined by the desired solids loading, the amount of feed solids per hour per meter of belt width (lbs/hr/m) and the feed slurry solids concentration (%). See Formula 8.1 for the formula. The feed solids should be characterized to determine inorganic (ash) content, biosolids content and solids chemistry. For a quick reference the following sludge hydraulic limits are applicable for most of the municipal and industrial sludges:

Sludge Type	Hydraulic Limit (GPM/Meter)
Primary, 100% domestic	80-100
Secondary, 100% domestic	50-80
Brewery waste from extended air	60-90
Paper, 100% primary, virgin fibers	100-200
Paper, 100% primary, secondary fibers	150-250
Alum	60-90
Blend of Primary, Secondary	60-90
Anaerobically digested	60-90

8.2.2 Polymer: Polymers are water-soluble long-chain organic molecules which function in several ways to coagulate and flocculate solid particles. Sludge dewatering on a belt filter press is made possible to a great extent through the addition of a polyelectrolyte or polymer to the sludge. The primary duty of the polymer is to cause the sludge solids to flocculate. To do this, the polymer must neutralize the sludge charge, cause a rapid desorption of the sludge particles which unbinds surface water and cause the sludge particles to agglomerate along the polymer chains. To accomplish the optimum dewatering, it is important to select the proper polymer type, molecular weight charge density and electrical properties. The most common types of polymers used in the dewatering market today are the following:

1. Forms of Polymers:

- Dry Polymers (95-100% active)

  Dry polymers are manufactured as powder, granules, beads, or flakes. Dry polymers have a high active content. Dry polymer have proven to be very effective for biosolids conditioning, however, solution making of dry polymers is more difficult than that of liquids and emulsions.

- Emulsion/Dispersion Polymers (20-67% active)

  Emulsions are dispersions of polymer particles in hydrocarbon oil. They are high molecular weight polymers with high solids. Emulsions are pourable, clear to white milky liquids with viscosity ranging from 300-5,000 centipoise. Emulsions are stored in drums or tanks and transported with pumps, therefore, many operators prefer emulsions to dry polymers.

- Mannich Polymers (3-7% active)

  Mannich polymers have a high molecular weight and very high viscosity, typically ranging from 45,000-60,000 cps. The pH of Mannich polymers can be as high as 12. Mannich polymers are usually less expensive and have a relatively short shelf life.

- Liquid Polymers (10-60% active)

  There is a wide range of liquid polymer types available. Liquid polymers have low to medium molecular weight, viscosity ranging from 1 to 6,000 cps. The pH of liquid polymers is generally neutral to acidic. Shelf life can be from two months to one year depending on the manufacturer.

Regardless of the type of polymer selected, the plant personnel should verify that the polymer system specified can handle the type of polymer selected for the application. The recommended final polymer solution concentration range to condition the slurry are the following:

- Dry Polymers (0.05-0.5% by wt.)
- Emulsion/Dispersion Polymers (0.1-0.5% by vol.)
- Mannich Polymers (1-3% by vol.)

To avoid polymer activity degredation problems, solution storage times of organic polymers should be limited to 4-6 hours. Higher solution strengths are less susceptible to polymer degredation than low concentrations. Some polymers, especially higher molecular weight polymers, need "aging" time to develop full product activity in application.

NOTE: If the polymer solution is prepared at concentrations that are considerably higher than the solution concentrations recommended then polymer dewatering costs will increase because the polymer cannot be dispersed efficiently into the slurry. Polymer overdosing will deteriorate the sludge dewatering process as well.

2. Polymer Charge: A polymer should be chosen which neutralizes the sludge charge, and works within the pH range of the treatment plant's process. The three basic types of polymer (relating to charge) are:

- Cationic: a positively charged polymer used with negatively charged sludges. This is the most common polymer for conditioning wastewater biosolids.

- Non-ionic: a neutrally charged polymer used for some biosolids either independently or in conjuction with cationic polymers

- Anionic: a negatively charged polymer used for some biosolids and positively charged sludges such as alum sludge either independently or in conjunction with cationinc polymers.

3. Molecular Weights of Polymers:
Polymer is composed of many monomer units joined together. Molecular weight of a polymer is a rough indication of the length of the polymer chain that holds the charged sites apart. Molecular weight affects polymer solubility, viscosity and charge density in aqueous solution.

Molecular Weight Range	Description of MW
10,000,000 and higher	"very high"
1,000,000 to 10,000,000	"high"
200,000 to 1,000,000	"medium"
100,000 to 200,000	"low"
50,000 to 100,000	"very low"
Less than 50,000	"very very low"

Low and very low molecular weight polymers are very water- soluble. They are usually described as "primary coagulants" and sometimes are used as the first part of a two-polymer program where very high charge density is required to "break" the suspension. Most of the sludge conditioning polymers fall into "medium" "high" and very "high" ranges. Higher molecular weight polymers have a broader dosage range.

4. Polymer Dosage: For a given type of sludge, polymer dosage is generally solids dependent, the lower the percent solids the higher the chemical dosage required. Polymer should be injected into the sludge at the minimum amount required for dewatering. All excess polymer is wasted and goes down the drain with filtrate. This is not cost or process effective. See the process diagnostic chart at the end of this section. It is furnished to help the plant operators determine if too little or too much polymer is being used.

Typical Polymer Dosage for Belt Filter Press Process

Sludge Type	Polymer Dosage(lbs/T d.s.)
Raw primary	4-8
Primary plus waste activated	6-10
Waste activated	8-16
Anaerobically digested waste activated	12-18
Anaerobically digested 50% primary plus 50% waste actvated	10-16
Aerobically digested	10-16

Polymer selection and dosage should be determined by jar and bench-scale simulation test.

8.2.3 Mixing Energy: This is the energy required to instantaneously mix the polymer with the suspended solids of the slurry. The optimum mixing energy is usually determined on site by adjusting the throat opening inside the variable orifice mixer. For example, to increase the mixing energy, reduce the throat opening of the mixer by increasing the adjustable counterweight and turn up the adjustable bolt on the valve stop handle to allow the weight arm to move further down. Too little or too much mixing energy results on less than optimum floc formation that adversely affects dewatering action. The diagram at the end of this section illustrates the detrimental effects of these conditions.

8.2.4 Retention Time: This is the time required for the polymer reacting with the biosolids/residuals suspended in the slurry to complete the flocculation process. Most dewatering applications require 15-20 seconds to complete the flocculation process. With too little time, it generates small pin flocs. Both of these lead to reduced dewatering. For ideal dewatering, small strong flocs are desired. If room permits the pipeline design should include three spool locations that can accommodate the variable orifice mixer in order to change the retention time, if necessary, to improve the dewatering process. See the diagram at the end of this section. The spool pieces should be placed at 15, 30, and 45 seconds away from the belt filter press inlet at maximum flow.

8.3 Klampress® Adjustments:

8.3.1 Belt Speed: There are two basic considerations with belt speed. The slower the belt speed, the greater the effects of the pressure section which translates into increased cake dryness. This works because as the belt slows, the cake trapped between the belts is allowed to thicken which increase the shear-action produced by the pressure rollers. Conversely, the faster the belt speed, the greater the process throughput (assuming sludge feed rate is increased). The belt speed should be slowly adjusted until the

optimal balance between process throughput and cake dryness is achieved. The belt speed range is 1 to 5 1/2 m/min. There are two different belt drives, VFD controlled drive and mechanical variable speed drive constant speed motor. Typically, the VFD controlled drive, the belt speed can be adjusted by a belt drive speed potentiometer located on the control panel. A belt drive indicator shows the belt speed in % (0-100%) For the mechanical variable speed drive, turn the speed control handwheel to adjust belt speed.

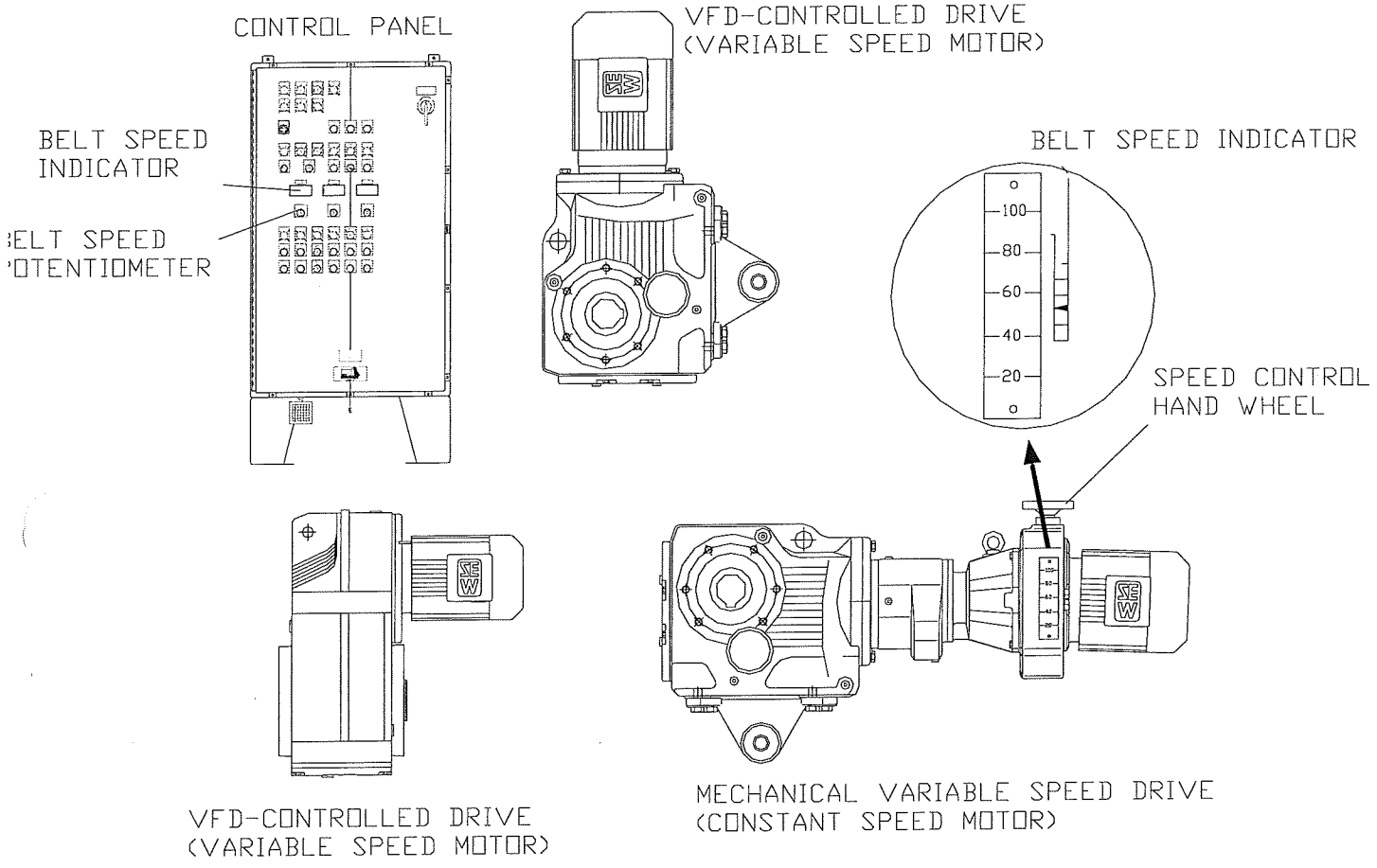


Figure 3 Belt Speed Control

8.3.2 <u>Belt Tension</u>: The belt tension should be set at 350 psig initially by adjusting the pressure valve on the hydraulic power unit. Since the sludges vary from plant to plant, the optimum pressure should be determined once the belt press is operating. An increase in the belt tension will increase the cake compression forces at the pressure rollers resulting in a dryer cake. However, it could cause the negative effect of belt blinding or pushing solids through the belts which will result in an unacceptable amount of solids lost to the filtrate. High belt tension will also decrease belt life.

Ideally the pressure should be just below the point where the solids start adhering to the belt.

8.3.3. Belt Type: The opening size weave of the belt and belt material determine the dewatering characteristics of that belt. The initial belt supplied by Ashbrook with your machine as been selected based on our experience with processes similar to your own. The information on the belt supplied with this machine is in Section 10 of this manual. Each belt and connecting splice are designed for a minimum tensile strength equal to five times the normal maximum dynamic tension to which the belt shall be subjected. The splice is designed to fail before the belt and is constructed of type 316 stainless steel.

8.4 Upstream Variables: There are other items upstream of the belt press that can affect the performance of the press. The information here is to illustrate some of the variables that may affect the overall dewaterability of the plant slurry:

8.4.1 Slurry Pump Selection: For sludge dewatering applications, the use of positive displacement pumps is recommended. The preferred pumps for these applications include the following: Progressive Cavity, Rotary Lobe, and Gear pumps. These pumps allow even flow of the slurry along the pipeline to allow good dispersion of the polymer with the suspended solids of the slurry and a constant pressure drop across the variable orifice mixer.

8.4.2 Slurry Characteristics: Slurry characteristics shall be considered in sludge dewatering process.

1. Solids Concentration

Solids concentration level influences the selection of a slurry condition program. Increasing feed solids concentration will cause lower polymer conditioning requirement. It is extremely important that the characteristics of the slurry being dewatered remain relatively constant in order to maintain good process control of the belt filter press. For example, if the feed solids concentration increases by 30% (i.e. from 2% to 2.6%), one of the following variables has to be adjusted in order to keep the press running satisfactorily:

- Polymer Dosage
- Belt Speed
- Slurry Flow Rate (to maintain constant solids loading)

2. Biological Sludge Content

Usually biological sludges have high cationic polymer requirement. When dewatering waste activated biosolids, it is

critical to understand that the specific resistance for activated sludge increases when the biological process is experiencing short mean cell residence time, low dissolve oxygen, low temperature and high F/M(food to microbe ratio) to control the population of filamentous bacteria in the aeration basin(s) to prevent poor belt filter press performance. Blooms of filamentous bacteria increase the polymer dosage, reduce the solids loading, and the cake solids during the dewatering process because water is stored inside the cells of the bacteria. Higher polymer requirements usually result from high dissolved solids in sludge.

3. Inorganic (Ash) Content

Usually higher ash content yields higher dry cake solids. Biological sludges have ash contents ranging 15-35%. Ash contents of digested biological sludge can increase to 30-50%. Higher ash contents are occasionally encountered from lime stabilized sludges or chemical treatment waste sludges. In these cases it is not unusual to have an anionic or nonionic conditioning program work best with the sludge.

4. Sludge Storage Time

Extended storage of raw primary and waste biological sludges before polymer conditioning increases conditioning requirements. Aeration improves the sludge dewatering characteristics.

8.4.3 Washwater Characteristics: The washwater used to clean the belts needs to have the following quality to prevent poor performance of the belt filter press:

- The total suspended solids (TSS) concentration should be ≤ 50 mg/l
- The total dissolved solids (TDS) concentration should be ≤ 1,000mg/l
- The pH of water should be 6-8
- The temperature should be 10-50°C.
- The washwater pressure should be ≥ 85 psig

Occasionally if the TSS concentration reaches 200 mg/l, the unit can operate marginally if the nozzles in the spray tubes are cleaned frequently with the wire brushes (these are actuated by opening and closing the manual valve). If the washwater pressure drops considerably, the solids that are embedded in the belts during the filtration process cannot be dislodged, causing belt blinding after a certain period of time.

8.5 Process Calculations: To evaluate the Klampress ® performance, it is important to understand the basic calculations involved. The governing process variables of the dewatering process are the following:

- *Solids Loading (lbs/hr processed, dry basis)*
- *Cake Solids (%TS, % total solids in the cake)*
- *Polymer Dose (lbs of dry or neat polymer/ton of dry solids dewatered)*
- *Capture (% of dry solids of the feed retained in the cake after the dewatering process)*

8.5.1 Cake Solids: This is determined by conducting a total solids test (see Standard Methods For the Examination of Water and Wastewater19th edition)

8.5.2. Solids Loading Rate: The amount of solids loading dewatered in the press is determined by the following equation:

Formula 8.1:

$$SL = \frac{SFR \times BDS \times STSC \times 60}{BW}$$

where, SL = solids loading (lbs/hr)
SFR = slurry flow rate (gpm)
BDS = bulk density of the slurry
STSC = slurry total solids concentration (%TS)
BW=belt width (m)
60=conversion factor (min/hr.)

In order to determine the solids loading, the slurry flow rate (usually measured by a magnetic flow meter or a calibration tank), the total solids concentration of the slurry and belt width must be known.

8.5.3 Polymer Concentration:

a. Liquid Polymer:

Formula 8.2

Percent Concentration = (Gallons Polymer/Gallons Water) x 100%

Example: Determine polymer percent concentration using 2.5 gallons polymer and 1000 gallons of water

Percent Concentration:
2.5/1000 = 0.0025 Multiply by 100% to convert to percentage
0.0025 x 100% = .25%

b. Dry Polymer:

Formula 8.3

Percent Concentration = [Pounds Polymer/(Gallons Water x 8.34)] x 100%

Example: Determine polymer concentration using 10 pounds dry polymer and 1000 gallons water.

Convert 1,000 gallons of water to pounds - 1 gallon = 8.34 pounds
1,000 X 8.34 = 8340 pounds

Polymer Concentration:
10/8340 = 1.19
To convert to percent concentration, multiply by 100%
1.19 X 100% = 0.12%

8.5.4 Polymer Usage: The polymer dose required for the dewatering process is determined by the following equation:

Formula 8.4

PD = (PSFR x PSC x PSBD x 2000) ÷ (SFR x BDS x STSC)

where, PD = polymer dose (dry or neat lbs/ton dry solids)
PSFR = polymer solution flow rate to variable orifice mixer (gpm)
PSC = polymer solution concentration (% wt. for dry polymers, % vol. for emulsion/dispersion and mannich polymers)
PSBD = polymer solution bulk density (usually 8.34 lbs/gal)
SFR, BDS, STSC = as described previously

8.5.5 Capture Rate: The capture of the dewatering process is determined by the following equation:

Formula 8.5

CR= 100 [(CS/ FS)] [(FS- FTS)/CS-FTS)]

where, CR = capture rate (%)
CS = cake solids (%TS)
FS = feed solids (%TS)
FTS = filtrate solids (%TSS)

8.6 Process Start Up:

8.6.1 Start wash water.
8.6.2 Start hydraulic power unit and set pressure at 350 psig.
8.6.3 Ensure hydraulic control valves are in tension position and belt is tensioned.

8.6.4 Start belt drive and run for approximately two minutes to pre-wet the belt. The belt speed should be approximately fifty percent of its maximum.
8.6.5 Start the polymer pump; make sure that the polymer system is operational and is providing the adequate flow rate and polymer solution concentration (Calibrate the polymer system to provide the appropriate polymer dose (lbs/ton) for the biosolids/residuals loading specified.
8.6.6 Start sludge pump, after allowing the polymer solution to flow for a period of 30 seconds. Adjust the flow rate per the specifications (conduct a total feed solids concentration test prior to pumping the biosolids/residuals to the press) to determine the flow rate required to match the solids loading specified. Look on top of the gravity zone of the press to determine if the polymer solution flow rate being fed to the variable orifice mixer is sufficient to flocculate the biosolids/residuals effectively (adjust the polymer pump until this condition is achieved). Adjust the belt speed to prevent thickened biosolids/residuals from overflowing the gravity zone. **The operational belt speed range recommended for the press is between 1-3 m/min (3.3-10 fpm)**. The optimum belt speed depends upon the type of biosolids/residuals being dewatered and the expected performance of the press.
8.6.7 Adjust side sludge restrainers until most solids are retained inside the restrainers. Water seeping under the seals is common and will not hurt the dewatering process. Most of the presses have AUTO MODE operation option on its control panel. The press can be start up automatically or manually.

For the automatic start up, place the mode Select HAND/OFF/AUTO selector in the Auto position, the Auto pilot light illuminates. Press the AUTO START push-button, the press starts up following the above procedure automatically. The operator need to adjust the potentiometer dials of sludge pump, polymer pump, hydraulic pressure, belt speed to the optimum settings before the start up. Those settings need to adjust accordingly after the start up to reach the optimum performance.

For the manual to start up, place the Mode Select HAND/OFF/AUTO selector in the HAND position, then start the press follow the start up procedure.

To start up the press without AUTO MODE operation option, press the push-buttons and follow the start up procedure.

8.7 Process Adjustments: Because the dewatering process is dependent on numerous variables, it is important to understand how changes in the process will affect the end result. All of the process variables have an optimum point depending on the other variables. Because of this, Ashbrook recommends adjusting the process slowly by

changing one variable at a time and logging the results. A suggested order for adjusting the process is:

8.7.1 Adjust sludge feed rate to achieve the throughput desired.
8.7.2 Adjust polymer flow for proper flocculation.
8.7.3 Adjust belt speed.
8.7.4 Adjust the wedge plate.
8.7.5 Fine tune the performance by adjusting the belt tension, mixer, and chicanes, etc.

8.8 House Keeping and Clean Up: Refer to the detailed information in the Daily Operation Section of this manual for the house keeping and clean up required prior to shutting down the machine.

NOTE: Never shut down the press with sludge between the belts.

8.9 Process Trouble Shooting: There are several circumstances that can cause poor dewatering performance in a belt filter press:

- Low Cake Solids
- Low Capture
- Low Solids Loading

8.9.1 Low Cake Solids: When this instance occurs, the following corrective measures are recommended:

1) Adjust belt speed
Measure the current belt speed and the cake thickness. If the belt speed is greater than 3 m/min and the cake thickness is less than 3/8", reduce the belt speed in 10% increments allowing enough time before cake samples are taken to determine if the reduced belt speeds improve the cake solids concentration.

2) Adjust the polymer dose
Sometimes, the slurry solids concentration can increase creating a starved polymer condition. This can be resolved by increasing the polymer solution flow rate to the variable orifice mixer. Take samples to determine if changes in polymer dose settings improve cake solids concentration.

3) Adjust the mixing energy
If the slurry characteristics vary, it may require an increase or a decrease in mixing energy by adjusting the throat of the variable orifice mixer (see diagram at the end of this section). Take

samples to determine if changes in mixer settings improve cake solids concentration.

4) Adjust hydraulic pressure
Increase the hydraulic pressure in 50 psig increments (do not exceed hydraulic pressures of 550 psig, 750 psig, and 1,000 psig for the 1.0-m, 1.5-m, and 2.0-m unit respectively to prevent irreversible belt damage). Caution has to be taken when this procedure is executed to prevent blinding the belts with solids.

8.9.2 Low Capture: when this instance occurs, the following corrective measures are recommended:

1) Adjust belt speed:
Measure the current belt speed. If the belt speed is greater than 3 m/min, reduce the belt speed in 10% increments allowing enough time before filtrate samples are taken to determine if the reduced belt speeds improve the capture.

2) Adjust polymer dose:
Sometimes, the slurry solids concentration can increase creating a starved polymer condition, allowing extra solids to pass through the belts. This can be resolved by increasing the polymer solution flow rate to the variable orifice mixer. Take samples to determine if changes in polymer dose settings improve cake solids concentration.

3) Adjust doctor blades:
Check the doctor blades to make sure they are touching the surface of the belts. If there is a small gap, extra solids will remain on the belts which will enter the wash boxes, and show up in the filtrate. If the blades are worn out, contact the Ashbrook Retrofit and Spares Parts Department to order new ones.

4) Inspect slurry restrainer seals in the gravity zone and the wedge zone:
Verify that the slurry restrainer seals in the gravity zone do not allow the slurry to pass underneath them. Otherwise, the slurry will fall into the filtrate pan in the gravity zone causing an increase of the suspended solids concentration in the filtrate. In addition, the restraining seals in the wedge zone should not allow any thickened slurry to exit from the edges of the wedge; if they are loose, adjust the external wall of the wedge zone until the seals prevent thickened slurry from migrating to the filtrate stream.

8.9.3 Low Throughput: When this instance occurs, the press cannot meet the hydraulic or solids throughput requirements. The following corrective measures are recommended:

1) Verify the slurry solids concentration

2) Inspect the slurry pipeline upstream of the belt filter press is free of obstruction and debris. If the slurry solids concentration is decreased, the solids loading to the press will be decreased by the same amount. Adjust the slurry flow rate to make up for the reduced solids concentration.

8.10 Process Diagnostic Chart

8.11 Klampress Process Trouble Shooting Chart

8.12 Sludge Dewatering Log Sheet

8.10 PROCESS DIAGNOSTIC CHART

Insufficient Polymer

Sludge squeezing from the belts
Large weak flocs
Poor gravity dewatering
Gravity section overflows
Poor capture rates
Wet cake

Excessive Polymer

Foaming at sludge inlet
Sludge feels "slimy"
Filtrate is foamy and slimy
Puddling in the gravity section
High polymer bills
Cake sticks on belts at discharge

Insufficient Mixing

Large clumpy flocs
Filtrate in sludge inlet is cloudy
High filtrate solids
Low cake dryness
Cake sticks to belts

Excessive Mixing

Sheared flocs
Poor gravity drainage
High filtrate solids
Sludge squeezes from belts

Proper Polymer Dosing & Sludge Polymer Mixing

Small strong Flocs
Clear Filtrate
Little or no foaming
Good drainage in the gravity section
Plowed rows of loosely structured cake at the end of the gravity section
Cake discharge falling freely
Dry cakes
High throughput

8.11 KLAMPRESS PROCESS TROUBLESHOOTING CHART

Problem	Probable Cause	Recommended Solution
1) Wet Cakes	a. Sludge rate too high	a. Lower sludge loading
	b. Belt speed too fast	b. Reduce belt speed
	c. Improperly dosed polymer	c. Adjust polymer rate
	d. Incorrect polymer for application	d. Screen for optimum polymer. Arrange on site jar test with your poly representative
	e. Incorrect belt tension	e. Increase belt tension
	f. Incorrect polymer/sludge mixing action	f. Adjusting mixing action at in-line polymer mixer
	g. Plant process upset	g. Check plant process for trouble
2) Puddling or ponding in the gravity section	a. Incorrect polymer dosage	a. Adjust polymer feed rate
	b. Incorrect polymer/sludge mixing action	b. Adjust mixing action at in-line polymer mixer
	c. Inadequate polymer concentration	c. Try various concentrations. Use post dilution H_2O if available
	d. Belt not cleaning properly	d. Check if belt is blinded Operate brush in wash tube
3) Low Capture rate (Solids recovery)	a. Incorrect polymer dosage	a. Use jar test to determine optimum dose
	b. Sludge solids squeezing from between belts	b. Reduce sludge pumping rate or increase polymer feed rate
	c. Belt tension (pli) too high	c. Reduce tension accordingly
4) Sludge squeezing from between belts into sump	a. Insufficient polymer	a. Increase accordingly
	b. Large weak flocculation of sludge particles in the gravity section	b. Increase mixing action at sludge/poly mixer to decrease floc size
	c. Sludge loading or belt speed incorrect	c. Decrease sludge flow or increase belt speed
5) Uneven cake dryness at machine discharge	a. Poorly distributed sludge at machine inlet	a. Use the level baffle and belt speed to properly distribute the sludge across the entire effective belt width

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PERFORMANCE TEST DATA SHEET

Customer:	Contact Name:	Sludge Type:
Site:	Telephone Number:	Sludge Mixture:
City and State:	Test Date:	Polymer Used:
Run #:	Type and Size of Press:	Polymer Cost:

Sludge pH:	Type of Polymer System:
Sludge Temperature:	Polymer Type (Dry, Liquid, Mannich):

									Specified	Average
Date:										
Time:										
Belt Speed (m/min):										
Belt Pressure (psig):										
Sludge pH:										
Sludge Feed (%TS):										
Sludge Feed (%TVS):										
Sludge Flow Rate (gpm):										
Sludge Throughput (lbs/hr):										
Polymer Pump Capacity (gph):										
Stroke Length (%):										
Stroke Frequency (%):										
Polymer Flow Rate (gpm):										
Polymer Dosage (lbs/ton):										
Polymer Sol. (%):										
Polymer Sol. Flow Rate (gpm):										
Polymer Dosage (lbs/ton):										
Washwater Pressure (psig):										
Washwater Flow Rate (gpm):										
Filtrate TSS (mg/l):										
Thickened/Cake Solids (%TS):										
Capture A (%):										
Capture B (%):										

Capture A refers to compact polymer units and Capture B refers to batch tank polymer systems. NOTE: only one capture formula will be valid, even though both will show numerical values.

9.0 DAILY OPERATION PROCEDURES:

9.1 General: These procedures cover the routine operation of the Klampress® and should be used as a model for a plant's customized procedures.

9.2 Pre-Operation: This covers the steps which should be followed prior to starting any of the belt press functions. These steps help ensure the safety of the operators as well as the equipment.

9.2.1 Pre-Start Inspection:

(a) Verify no foreign objects are on the belt or in an area that will interfere with the belt press operation.
(b) Ensure chicanes are positioned on belt.
(c) Verify tensioning control valve is in the tension position and that the belt is ready for tensioning.
(d) Ensure all feed pumps are ready for operation and all valves are open.
(e) Ensure the scraper blades are in position against the belts.
(f) Verify panel and machine have not been locked-out due to a prior alarm or maintenance condition.
(g) Inspect hydraulic power unit and verify the oil level is adequate for operation.

9.2.2 Start-Up: The sequence detailed is for a completely manual start up. Depending on the installation, the electrical controls may have the capacity to completely automate the start up. However, it is important to know the manual start up process to evaluate the effectiveness of the control system.

(a) Start belt wash system.
(b) Start hydraulic system and allow two minutes for belts to completely tension.
(c) Start belt drive system and allow the belts to be completely pre wetted prior to adding sludge.
(d) Start sludge and polymer feed pumps.

9.3 Operation: The routine practice of inspecting the belt press during the operation phase will minimize down time. The inspection instructions are divided into mechanical and process checklists for the aid of the operators and mechanics.

9.3.1 Mechanical Inspection:

(a) Ensure feed assembly is evenly loading the belt.
(b) Ensure chicanes are turning sludge mass and inspect them for wear. Replace chicanes as required.
(c) Ensure edge restrainer seals are contacting the belt and seals are not worn. Replace or adjust seals as required.
(d) Ensure doctor blades are functioning correctly. Inspect blades for wear and replace as required.
(e) Inspect gravity drainage grids for wear. Replace wiper bars before belt contacts metal support grids.
(f) Ensure belt wash system is completely cleaning belt. Look for streaking or striping on the belt. If present, rotate the wash water hand wheel fully counter clockwise and then fully clockwise to clean the spray nozzles.
(g) Inspect wash box seals for wear. Replace as required.
(h) Inspect dewatering belts for wear. Repair holes per maintenance instructions. Repair or replace broken belt seam wires.
(i) Ensure steering sensing paddles are in contact with the belts and correcting belt steering as required.
(j) Ensure there are no leaks from any of the systems.
(k) Inspect roller coatings for wear and ensure flingers are in place.
(l) Ensure all electrical controls are functional.

9.3.2 Process Inspection:

(a) Adjust sludge feed rate for process throughput requirements.
(b) Adjust polymer feed rate until flocculation is correct.
(c) Adjust belt speed and tension for above conditions.
(d) Ensure mixing energy is in the correct range.
(e) Adjust belt tension and nip roller pressure if available as required for optimum dewatering.

9.4 Normal Shut Down & Clean Up: The key to minimal down time and reduced maintenance costs is housekeeping. If the belt press is inspected and maintained daily it can be counted on for years of service. The following guideline should be used for daily machine shut down and cleaning:

9.4.1 Shut down the sludge and polymer feed systems.
9.4.2 Allow the belt wash station to run for 45 minutes without any sludge or polymer feeding onto the belt press. During this time period:

(a) Lift the chicanes off the belt.
(b) Wash down the Klampress® from top to bottom using a water hose.
(c) Rotate the scraper blades away from the belt and hose down the scraper assembly, especially behind and under the blades.
(d) Wash out the drain pans.
(e) When the machine is completely washed down and free from sludge, return the chicanes and scrapers to their operating position. Clean the wash water spray tube by rotating the wash water hand wheel completely in the counter clockwise direction and then completely in the clockwise direction.

9.4.3 Shut down the belt wash water system.
9.4.4 Shut down the drive unit.
9.4.5 Move the tension control valve on Klampress® to the retract position. Allow the belt to completely retract to clean and oil the cylinder rods.
9.4.6 Shut down the hydraulic power unit.
9.4.7 Move the tension valve to the tension position.

9.5 Emergency Shut Down: The machine could be stopped without going through the normal shut down sequence due to a mechanical failure or other emergency. While the machine will not be damaged due to this type of shutdown, the life of components could be shortened by not cleaning the belt press. If the machine is shut down because of an emergency, the following steps should be taken:

9.5.1 Identify the problem and estimate the down time.
9.5.2 If the machine will be down for more than one shift then:

(a) Wash the machine down to prevent sludge from drying on both belts. The area where both belts are in contact with the sludge (pressure section) should be given extra effort.
(b) If possible, relax the belt tension.
(c) Correct the emergency condition.
(d) Start hydraulic power unit and reduce belt tension to 25 pli by adjusting the pressure control valve on the hydraulic power unit.
(e) Place the tension valve in the tension position and allow the belt to tension.

CAUTION: Starting the belt drive at full tension with cake between the belts places unnecessary stress on the belts, belt drive motor, and rollers. This could lead to premature mechanical failure.

(f) Start wash water and allow belt to pre-wet.
(g) Start belt drive. If belt is not clean, allow the machine to run for 45 minutes to complete a belt wash down cycle.
(h) Increase the belt tension to the normal setting.
(i) Start the sludge and polymer feed systems and begin operation of the press.

9.5.3 If possible, relax the belts by placing the control valve in the retract position.
9.5.4 Correct the emergency condition.
9.5.5 Start the hydraulic power unit and reduce the pressure to 15 pli.
9.5.6 Place the hydraulic control valve in the tension position and allow the belt to tension.
9.5.7 Start the belt wash system and allow the belt to pre-wet.
9.5.8 Start the belt drive.
9.5.9 Increase hydraulic pressure to normal setting (25 pli).
9.5.10 Start sludge and polymer feed systems.
9.5.11 Continue dewatering process as normal.

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10.0 MAINTENANCE PROCEDURES

10.1 GENERAL: Maintenance instructions will be divided into the same functional groups as indicated in the General Mechanical Description of this manual. Drawings, cut sheets or schematics, if applicable, will be indicated in the appropriate section. The intervals indicated are based on a normal work or operating schedule of forty hours per week.

10.2 DAILY MAINTENANCE ITEMS:

10.2.1 Clean belts by running belt drive and wash system without sludge or polymer for a minimum period of 45 minutes.
10.2.2 Clean spray nozzles on wash boxes.
10.2.3 Check oil level in hydraulic unit. Fill as required.
10.2.4 Manually extend and retract the tension cylinders to clean and oil the rods. This will greatly extend the life of the seals.
10.2.5 Cycle the steering cylinder in both directions by holding the steering paddle first one way and then the other. This will clean and oil the rods and greatly extend the life of the seals.
10.2.6 Inspect alarm sensors.
10.2.7 Check emergency trip cord by manually tripping circuit and resetting.

10.3 WEEKLY MAINTENANCE ITEMS:

10.3.1 Inspect wear items specifically chicanes, scraper blade, gravity drainage grids, dewatering belts, rubber seals on the sludge restrainers and the wash stations. Replace as required.
10.3.2 Check the hydraulic reservoir level and the condition of the oil. Change the oil if it has darkened or turned cloudy.
10.3.3 Inspect the filter screen for visible contamination or debris.
10.3.4 Inspect frame and roller coatings for wear.
10.3.5 Inspect belt guides and wiper bars for cleanliness/wear. Clean as required.
10.3.6. Check for any loose bolts.

10.4 MONTHLY MAINTENANCE ITEMS:

10.4.1 Verify daily and weekly items have been completed

10.4.2 Clean belts with a soap/bleach mixture. To prepare the soap/bleach mixture, use 1-cup detergent and 3-cups bleach to mix with 5 gallons water. The soap can be any laundry type liquid detergent and the bleach can be any generic brand bleach containing 5.25% sodium hypochlorite. The water can be tap water. Use power wash system to spray the soap/bleach mixture on belt surface for cleaning. The spray pressure shall be about 1,000 psig and not to exceed 2,000 psig.

10.4.3 Check belt seam wires for breaks. Replace if broken.

10.5 SEMI-ANNUALLY MAINTENANCE ITEMS:

10.5.1 Verify monthly items have been completed.

10.5.2 Clean hydraulic filter screen.

10.5.3 Check oil level in drive unit gear box and lubricate bearings. See lubrication schedule in Section 13.

10.5.4 Inspect polymer mixer/injection ring assembly and clean as required. (See Section 10.17.2)

10.5.5 Replace belt seam wires.

10.6 FRAME:

10.6.1 Inspection Items:

SK000947 Frame Assembly Drawing

a. Inspect frame and anchor bolts and tighten as required.
b. Inspect frame coating and repair corrosion as required.

10.6.2 Coating Repair Procedures: (Galvanized Frame only)

Note: The frame may be under warranty. Contact Ashbrook before repairing the frame.

a. Clean corroded area with wire brush until base metal is exposed.
b. Coat area with spray or liquid galvanizing solution.

10.6.3 Hot Dip Galvanizing Process Description

All carbon steel surfaces shall be hot dipped galvanized in accordance with ASTM A123/A 123M-97a, with a minimum coating of Grade 100.

The general procedure is as follows:

1. The components to be galvanized are first dipped in a 180 degree F caustic bath to remove any lacquers, oils or other foreign material from the steel.
2. The components are pickled in a hydrochloric acid solution to remove any residual mill scale and aid in zinc adherence.
3. If corrosion exists on any of the parts after acid dipping, the parts are sandblasted to white metal where required.
4. The components are submerged in an 850 degree F zinc bath for not more than 5 minutes. The zinc bath uses a sal ammoniac surface froth for fluxing the components.
5. The components are removed from the zinc bath and checked for zinc thickness build-up. Acceptable zinc thickness is between 4 and 7 mils.
6. The galvanized surface shall be cleaned of all runs, sags, excessive deposits and other deformities.

10.7 ROLLERS:

SK00973 Standard Rollers Assembly Drawing

10.7.1 Inspection Items:

a. Inspect roller coating for damages.
b. Minor chips and scratches can be repaired using a touch up kit.
c. Contact Ashbrook for recoating worn out coatings.

10.8 BEARINGS:

10.8.1 Bearing Cut Sheets: See attached

10.8.2 Pillowblock Dimensional Data: See attached

a. Spherical Roller Bearing Dimensional Data
b. Cylindrical Roller Bearing Dimensional Data

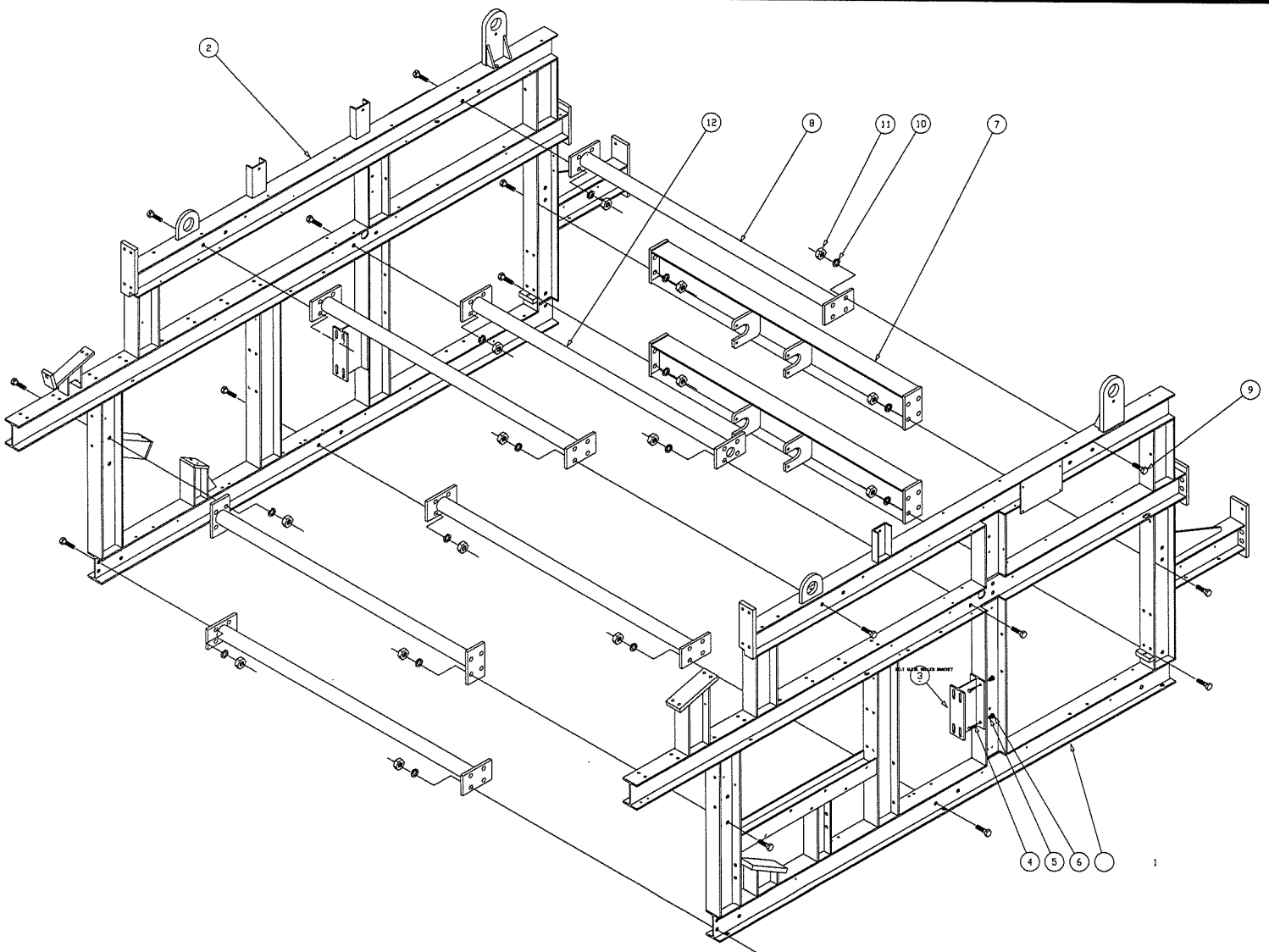
10.8.2 Inspection Items:

a. Ensure grease is visible on bearing/shaft seal.
b. Check bolts.
c. Ensure roller flinger is in place.

10.8.3 Lubrication Procedures:

Note: Lubricate bearings every six months with 3 to 5 ounces of grease per bearing. Use only the lubricants contained in the lubrication cross reference in this manual. Failure to lubricate the bearings will invalidate the bearing warranty.

B4MATR3.DWG REV. 3



ITEM	PART NO.	DESCRIPTION	QTY.
12		CROSSMEMBER TYPE 'D'	
11		NUT, HEX 3/4"	
10		WASHER, LOCK 3/4"	
9		BOLT, HEXHEAD 3/4" X 2"LG	
8		CROSSMEMBER TYPE 'C'	
7		CROSSMEMBER TYPE 'B'	
6		NUT, HEX 1/2"	
5		WASHER, LOCK 1/2"	
4		BOLT, HEXHEAD 1/2" X 1 3/4"LG	
3		BELT GUIDE ROLLER BRACKET	
2		MAIN FRAME (NDS)	
1		MAIN FRAME (DS)	

REVISIONS						REVISIONS				
REV	DATE	DESCRIPTION	BY	APP'D	REV	DATE	DESCRIPTION	BY	APP'D
1					7				
2					8				
3					9				
4					10				
5					11				
6					12				

TOLERANCE UNLESS NOTED:
ALL DIMENSIONS IN INCHES.
BREAK ALL SHARP EDGES
FRACTIONAL = ± 1/32"
ANGLES = ± 1/2°
DECIMAL .XX = ± .03
X. = ± .1, .XXX = ± .015
MACH. SURFACE 125√ MAX.

DRAWN	KEVIN	DATE 9/92
CHECKED	UNK	DATE 9/92
APPROVAL	JET	DATE 9/98
NEXT ASS'Y	N/A	WEIGHT N/A

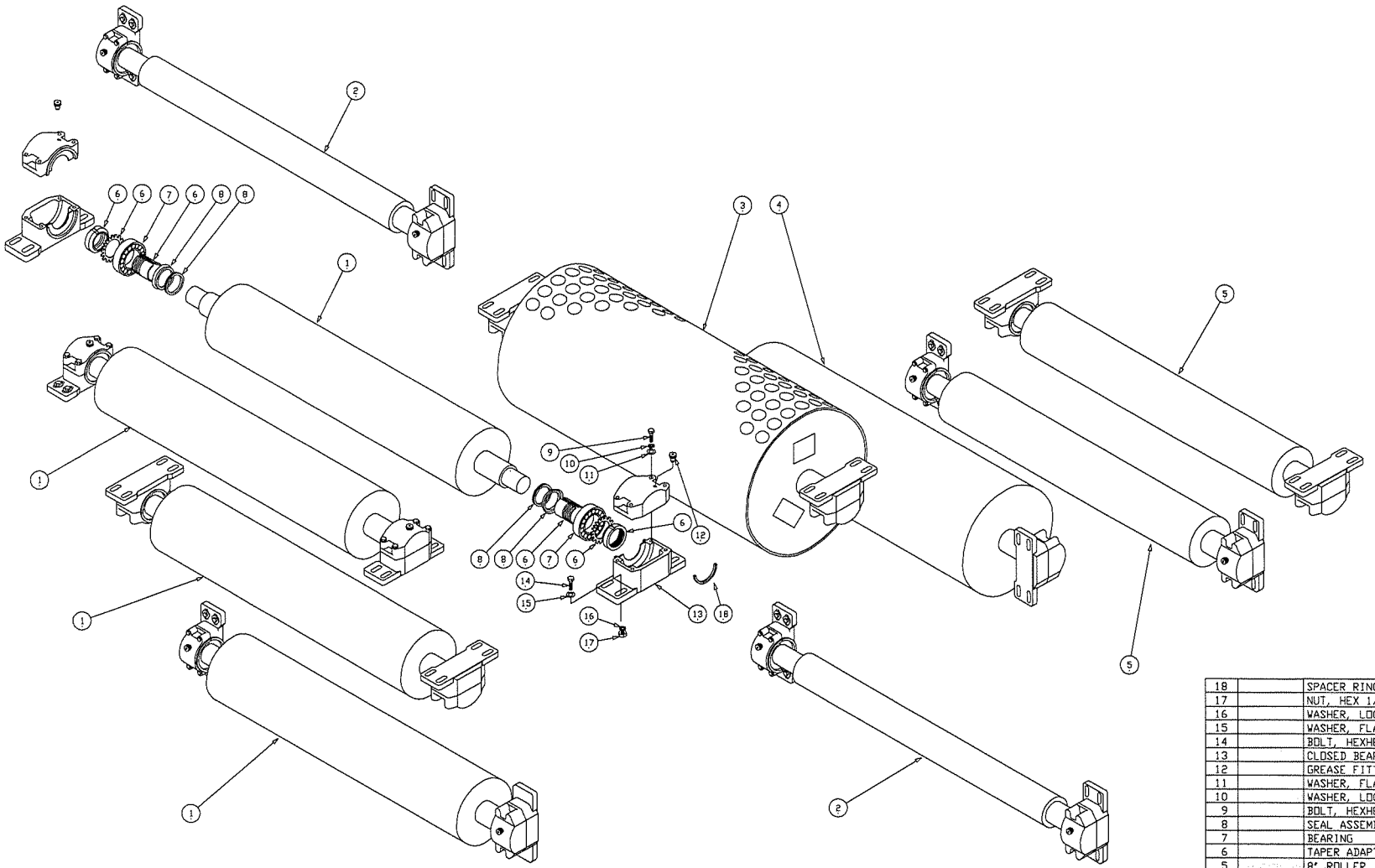
ASHBROOK
OPTIMIZED PROCESS RESULTS

Ashbrook Corporation
11600 East Hardy Road
Houston, Texas 77093
Phone: 281-449-0322
FAX: 281-449-1324

TITLE
FRAME ASSEMBLY
KLAMPRESS
MODEL 1985

SCALE	DWG. NO.	REV
NTS	SK000947	0

CUSTOMER NA/



ITEM	PART NO.	DESCRIPTION	QTY.
18		SPACER RING	
17		NUT, HEX 1/2"	
16		WASHER, LOCK 1/2"	
15		WASHER, FLAT 1/2" X 1/8" THICK	
14		BOLT, HEXHEAD 1/2" X 2 1/2" LG	
13		CLOSED BEARING HOUSING	
12		GREASE FITTING 1/8"	
11		WASHER, FLAT 1/2"	
10		WASHER, LOCK 1/2"	
9		BOLT, HEXHEAD 1/2" X 2 1/4" LG	
8		SEAL ASSEMBLY 2 3/4"	
7		BEARING	
6		TAPER ADAPTER	
5		8" ROLLER	
4		18" ROLLER	
3		24" DANDY ROLLER	
2		6" BELT GUIDE ROLLER	
1		12" ROLLER	

REVISIONS									
REV	DATE	DESCRIPTION	BY	APP'D	REV	DATE	DESCRIPTION	BY	APP'D
1					7				
2					8				
3					9				
4					10				
5					11				
6					12				

TOLERANCE UNLESS NOTED:
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BREAK ALL SHARP EDGES
FRACTIONAL = ± 1/32"
ANGLES = ± 1/2°
DECIMAL .XX = ± .03
.X = ± .1, .XXX = ± .015
MACH. SURFACE 125√ MAX.

DRAWN	KEVIN	DATE 9/92
CHECKED	UNK	DATE 9/92
APPROVED	JEI	DATE 9/98
NEXT ASS'Y	N/A	WEIGHT N/A

ASHBROOK™ OPTIMIZED PROCESS RESULTS

Ashbrook Corporation
11600 East Hardy Road
Houston, Texas 77093
Phone: 281-449-0322
FAX: 281-449-1324

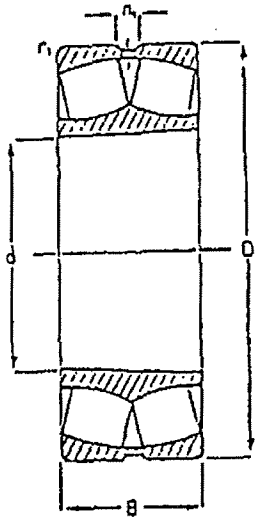
TITLE: STANDARD ROLLER ASSEMBLY
KLAMPRESS
MODEL 1985

SCALE	DWG. NO.	REV
NTS	SK000973	0

CUSTOMER: N/A

BEARING DATA

Spherical Roller Bearing Dimensional Data



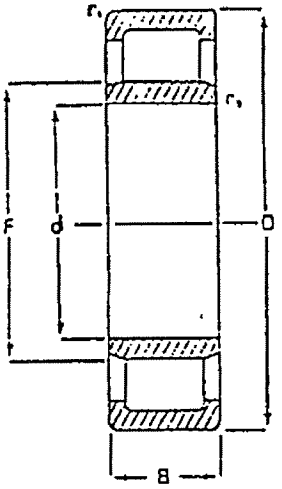
22215EASMKC3
Tapered Bore
(Taper 1:12)

d:	75
D:	130
B:	31
r_{min}:	1.5
n:	6.5

All dimensions in millimeters.

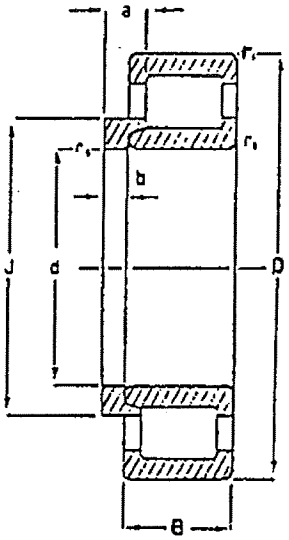
BEARING DATA

Cylindrical Roller Bearing Dimensional Data



NU312
Expansion

d:	60
D:	130
B:	31
r_{min}:	2.1
F:	77



NJ312E
Non-Expansion

d:	60
D:	130
B:	31
r_{min}:	2.1
a:	14.5
b:	9
F:	77
J:	84.5

All dimensions in millimeters.

a. Attach grease gun to button grease fitting.
b. Inject three to five ounces of grease. Grease should be seen.
c. Disconnect grease gun and continue with remaining bearings.
d. Repeat until all bearings are lubricated.

10.9 STEERING ASSEMBLY:

10.9.1 Drawings:

a. SK000945 Steering Assembly Drawing
b. Hydraulic Steering Cylinder Data
   026520 Steering Cylinder Drawing

10.9.2 Inspection Items:

a. Ensure sensing paddle is moving with belt.
b. Ensure steering cylinder is responding to sensing paddle.
c. Ensure belt is tracking in approximately the center of the belt press.
d. Ensure belt misalignment limit switches are functioning.

10.9.3 Wear Strip Replacement:

a. Shut down belt press and lock out controls.
b. Unbolt wear strip from paddle.
c. Position new wear strip on paddle and replace bolts.

10.10 TENSIONING ASSEMBLY:

10.10.1 Drawings/Photos:

a. Upper and Lower Tensioning Assembly: SK000927
b. Hydraulic Tensioning Cylinder Data
c. Tension Cylinder Drawing: 026521

10.10.2 Inspection Items:

a. Inspect tension cylinders for leaks.

10.10.3 Tension Yoke Cylinder Replacement:

a. Shut down press and lock out controls.
b. Disconnect hydraulic lines from cylinder.
b. Remove trunnion clamps and detach cylinder rod from actuator rod.
c. Reverse process to install new cylinder.
d. Replace hydraulic lines.
e. Check for proper belt tensioning operation before starting belt drive.

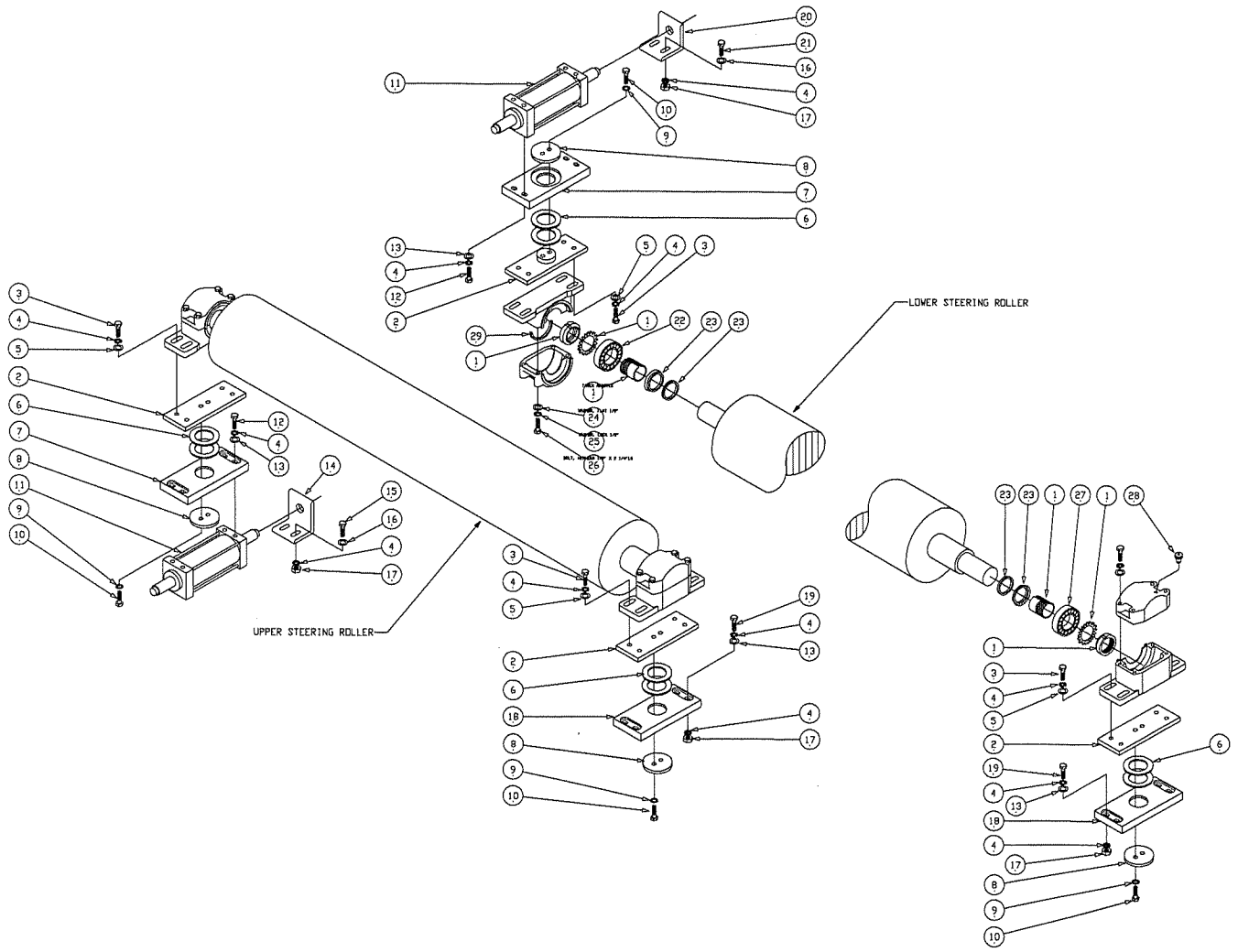
10.10.4 Hydraulic Manifold Repair:
029868 Hydraulic Manifold Drawing

a. Tension valve replacement
   (1) Turn off pump.
   (2) Screw out defective valve.
   (3) Wash out port.
   (4) Screw in new valve.
b. Pressure reducing valve replacement.
   (1) Turn off pump
   (2) Screw out defective pressure reading valve.
   (3) Wash out port.
   (4) Screw in new pressure reducing valve.
c. Pressure gauge replacement.
   (1) Turn off pump.
   (2) Screw out defective pressure gauge while holding the gauge snubber with a wrench to prevent it from turning in the manifold block.
   (3) Wash out the port.
   (4) Screw in new pressure gauge while holding the gauge snubber with a wrench to prevent it from turning in the manifold block.

d. Pressure switch replacement.
   (1) Turn off pump.
   (2) Screw out defective pressure switch while holding the gauge snubber with a wrench to prevent it from turning in the manifold block.
   (3) Wash out the port.
   (4) Screw in new pressure switch while holding the gauge snubber with a wrench to prevent it from turning in the manifold block.

B4MATR3.DWG REV. 3

NO.	QTY.	PART NO.	DESCRIPTION



ITEM	PART NO.	DESCRIPTION	QTY.
29		SPACER RING	
28		1/8" NPT GREASE FITTING	
27		EXPANSION BEARING	
26		BOLT, HEXHEAD 1/2" X 2 1/4"LG	
25		WASHER, LOCK 1/2"	
24		WASHER, FLAT 1/2"	
23		SEAL ASSEMBLY 2 3/4"	
22		NON EXPANSION BEARING	
21		BOLT, HEXHEAD 1/2" X 1 3/4"LG	
20		LOWER STEERING BRACKET	
19		BOLT, HEXHEAD 1/2" X 2 1/2"LG	
18		STEERING PIVOT MOUNTING PLATE	
17		NUT, HEX 1/2"	
16		WASHER, FLAT 1/2"	
15		BOLT, HEXHEAD 1/2" X 2 1/2"LG	
14		UPPER STEERING BRACKET	
13		WASHER, FLAT 1/2"	
12		BOLT, HEXHEAD 1/2" X 1 1/2"LG	
11		HYDRAULIC STEERING CYLINDER	
10		BOLT, HEXHEAD 1/2" X 1/4"LG	
9		WASHER, LOCK INNER TOOTH	
8		STEERING RETAINER PLATE	
7		STEERING PIVOT MOUNTING PLATE	
6		RETAINER RING	
5		WASHER, FLAT 1/2" 1/8" THICK	
4		WASHER, LOCK 1/2"	
3		BOLT, HEXHEAD 1/2" X 2"LG	
2		PIVOT BEARING MOUNTING PLATE	
1		TAPER ADAPTER	

REVISIONS						REVISIONS				
REV	DATE	DESCRIPTION	BY	APP'D	REV	DATE	DESCRIPTION	BY	APP'D
1					7				
2					8				
3					9				
4					10				
5					11				
6					12				

TOLERANCE UNLESS NOTED:
ALL DIMENSIONS IN INCHES.
BREAK ALL SHARP EDGES
FRACTIONAL = ± 1/32"
ANGLES = ± 1/2°
DECIMAL .XX = ± .03
X. = ± .1, .XXX = ± .015
MACH. SURFACE 125√ MAX.

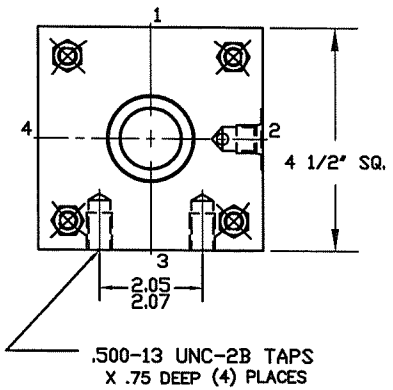
DRAWN	KEVIN	DATE 9/92
CHECKED	UNK	DATE 9/92
APPROVED	JEI	DATE 9/98
NEXT ASSY	N/A	WEIGHT N/A

ASHBROOK
OPTIMIZED PROCESS RESULTS

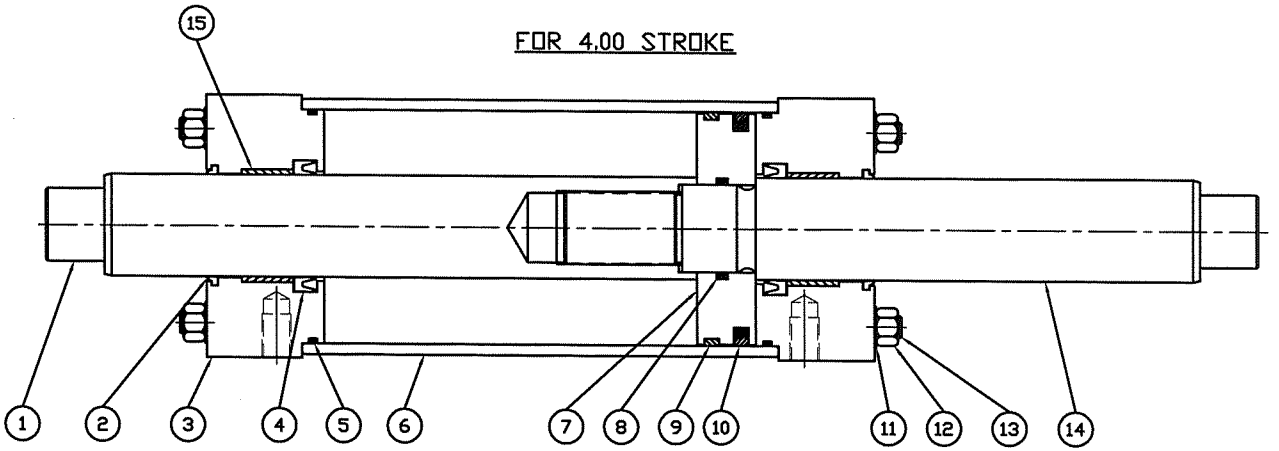
Ashbrook Corporation
11600 East Hardy Road
Houston, Texas 77093
Phone: 281-449-0322
FAX: 281-449-1324

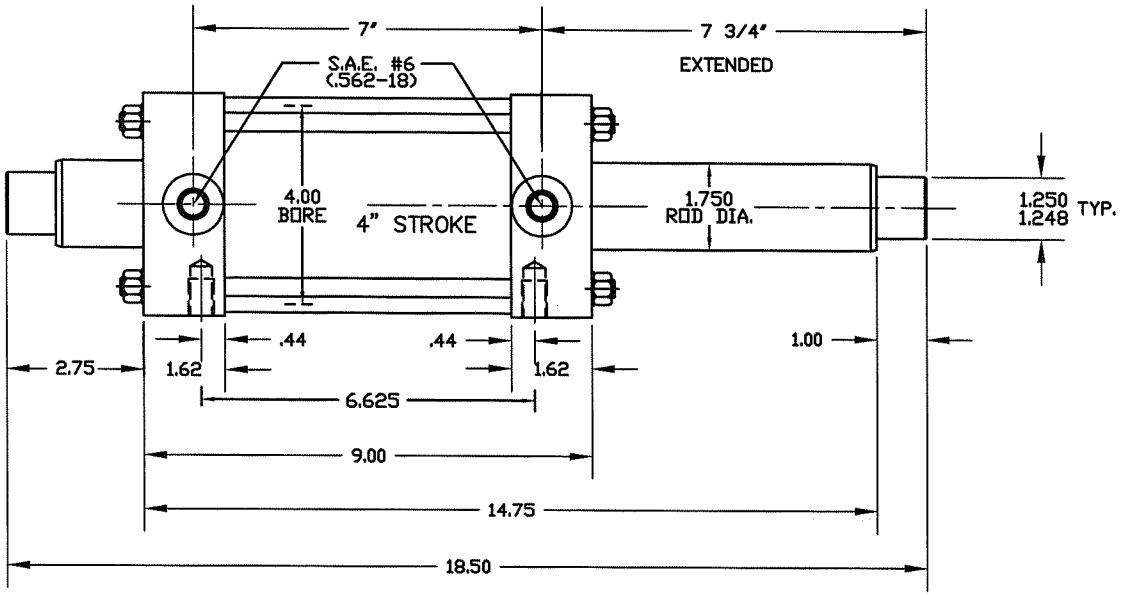
TITLE
STEERING ASSEMBLY
KLAMPRESS
MODEL 1985

SCALE	DWG. NO.	REV
NTS	SK00945	0
CUSTOMER N/A		



FOR 4.00 STROKE





NO.	PART NAME	QTY	MATERIAL
1	PISTON ROD	1	316 STAINLESS STEEL HARD SURFACE BURNISHED
2	ROD WIPER	2	POLYURETHANE
3	FRONT HEAD	2	RYERTEX "G-10"
4	ROD PACKING	2	POLYURETHANE
5	O-RING (TUBE)	2	BUNA "N"
6	TUBE	1	FIBER REINFORCED PLASTIC
7	PISTON	1	ALUMINUM
8	O-RING (P/R)	1	BUNA "N"
9	WEAR STRIP	1	TEFLON/BRONZE
10	GLYD RING	1	BUNA "N", TEFLON
11	TIE ROD WASHER	8	316 STAINLESS STEEL
12	TIE ROD NUT	8	316 STAINLESS STEEL
13	TIE ROD	4	316 STAINLESS STEEL
14	PISTON ROD	1	316 STAINLESS STEEL HARD SURFACE BURNISHED
15	ROD BEARING	1	DURALON

TOLERANCE UNLESS OTHERWISE NOTED:
BREAK ALL SHARP EDGES
FRACTIONAL = ± 1/32"
DECIMAL .XX = ± .03
X. = ± .1, .XXX = ± .015
ANGLES = ± 1/2°
MACH. SURFACE 125√ MAX.
ALL DIMENSIONS IN INCHES.

Ashbrook Corporation
11600 East Hardy
Houston, Texas 77093
Phone: 713 449-0322
Fax: 713 449-1324

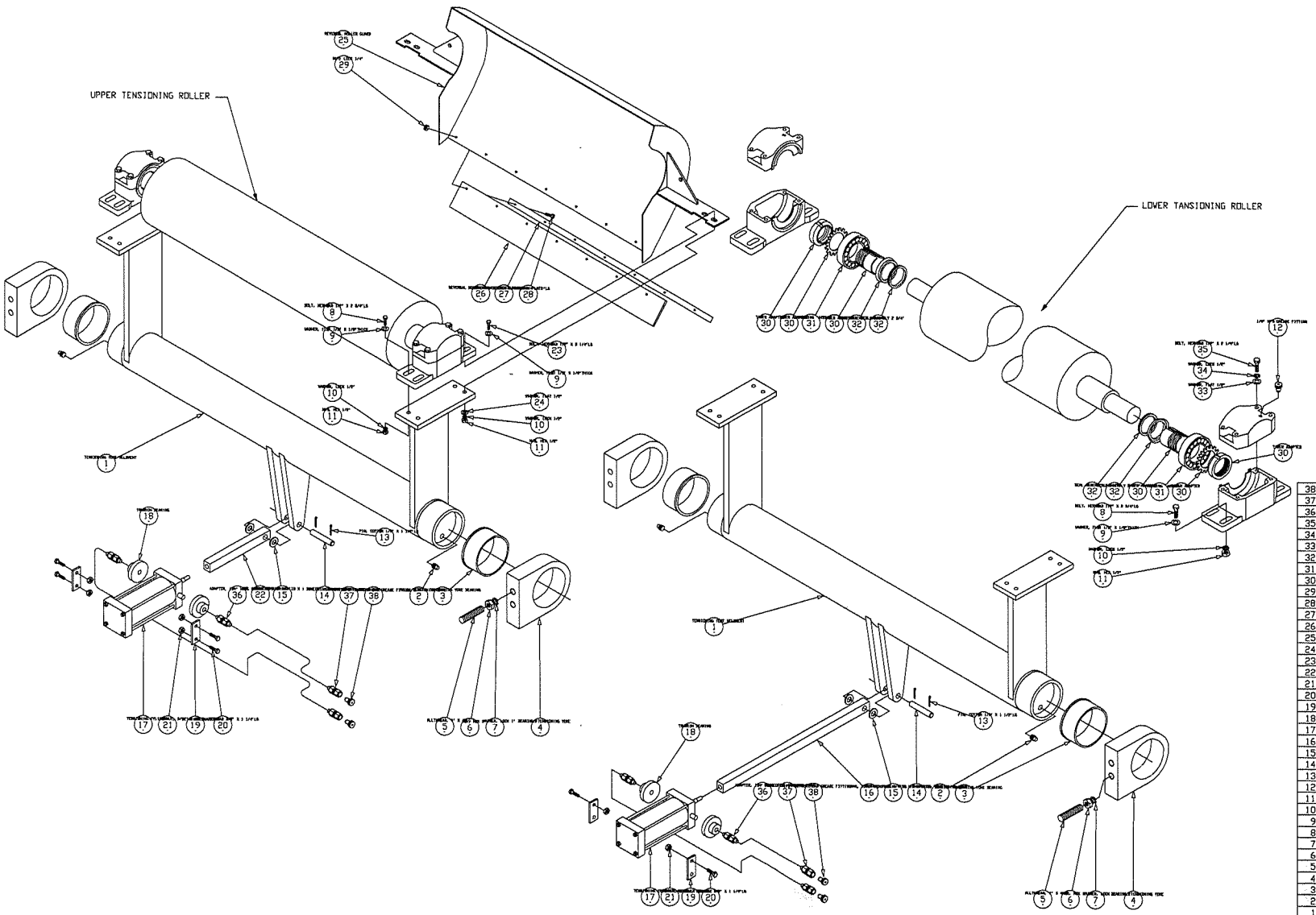
ASHBROOK
SOLID/LIQUID SEPARATION

DRAWN / DATE	CHECKED / DATE	APPR'D / DATE
RAL		
REVISED / DATE	CHECKED / DATE	APPR'D / DATE
JET 6/3/97		08/98

HYDRAULIC STEERING CYLINDER
F.R.P CONSTRUCTION 1000 PSIG
4" BORE – 4" STROKE

CUSTOMER:

SCALE: 1=1 | 026520 | 3



ITEM	DWG. NO.	DESCRIPTION	QTY.
38		1/8" BUTTON HEAD GREASE FITTING	4
37		CONNECTER, SS4-IMC-2 MALE	4
36		ADAPTER, 1/4" HOSE X 1/4" MPT	4
35		BOLT, HEXHEAD 1/2" X 2 1/4"LG	16
34		WASHER, LOCK 1/2"	16
33		WASHER, FLAT 1/2"	16
32		SEAL ASSEMBLY 2 3/4"	4
31		BEARING 422146	4
30		TAPER ADAPTER	4
29		NUT, LOCK 1/4"	7
28		SHMS 1/4" X 1"LG	7
27		REVERSAL ROLLER GUARD BACK PLATE	1
26		REVERSAL ROLLER GUARD RUBBER FLAP	1
25		REVERSAL ROLLER GUARD	1
24		WASHER, FLAT 1/2"	4
23		BOLT, HEXHEAD 1/2" X 3 1/4"LG	4
22		BAR, UPPER TENSIONING	1
21		LOCKNUT, 3/8"	8
20		BOLT, HEXHEAD 3/8" X 1 1/4"LG	8
19		RETAINER BRACKET	4
18		TRUNION BEARING	4
17		TENSIONING CYLINDER	2
16		BAR, LOWER TENSIONING	1
15		WASHER, FLAT 3/4" ID X 1 3/4" OD	4
14		PIN, TENSIONING YOKE	2
13		PIN, COTTER 1/8" X 1 1/2"LG	4
12		1/8" NPT GREASE FITTING	4
11		NUT, HEX 1/2"	16
10		WASHER, LOCK 1/2"	16
9		WASHER, FLAT 1/2" X 1/8" THICK	16
8		BOLT, HEXHEAD 1/2" X 2 3/4"LG	12
7		WASHER, LOCK 1"	8
6		NUT, HEX 1"	8
5		ALLTHREAD, 1" X 4"LG	8
4		BEARING, TENSIONING YOKE	4
3		SLEEVE, TENSIONING YOKE BEARING	4
2		PLUG, TENSIONING YOKE	4
1		TENSIONING YOKE WELDMENT	2

TOLERANCE UNLESS NOTED:
ALL DIMENSIONS IN INCHES.
BREAK ALL SHARP EDGES
FRACTIONAL = ± 1/32"
ANGLES = ± 1/2°
DECIMAL .XX = ± .03
.X = ± .1, .XXX = ± .015
MACH. SURFACE 125 MAX.

ASHBROOK
LEADERS IN LIQUID/SOLID SEPARATION

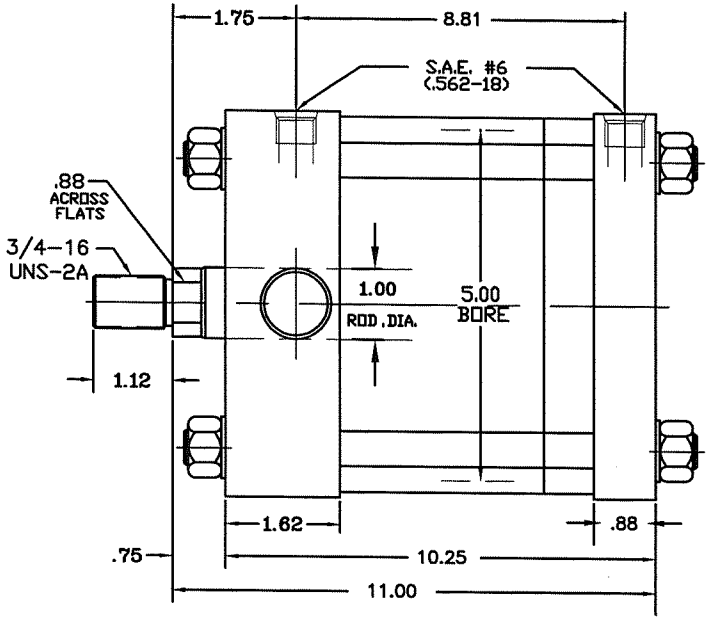
MK.	DCN	DESCRIPTION	DATE	BY	CHK.	MK.	DCN	DESCRIPTION	DATE	BY	CHK.

KEVIN 7/10

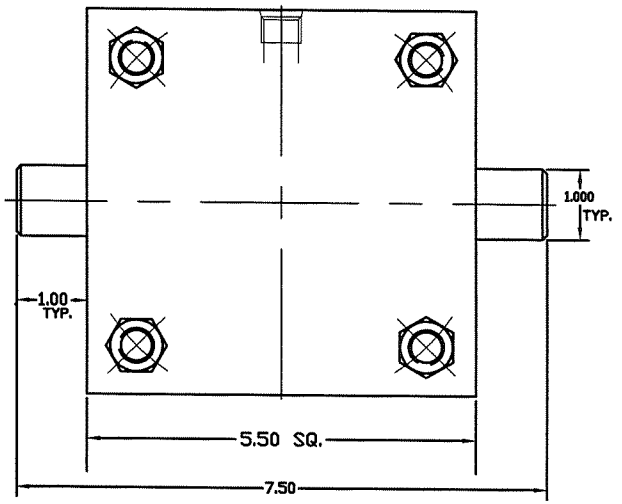
SCALE

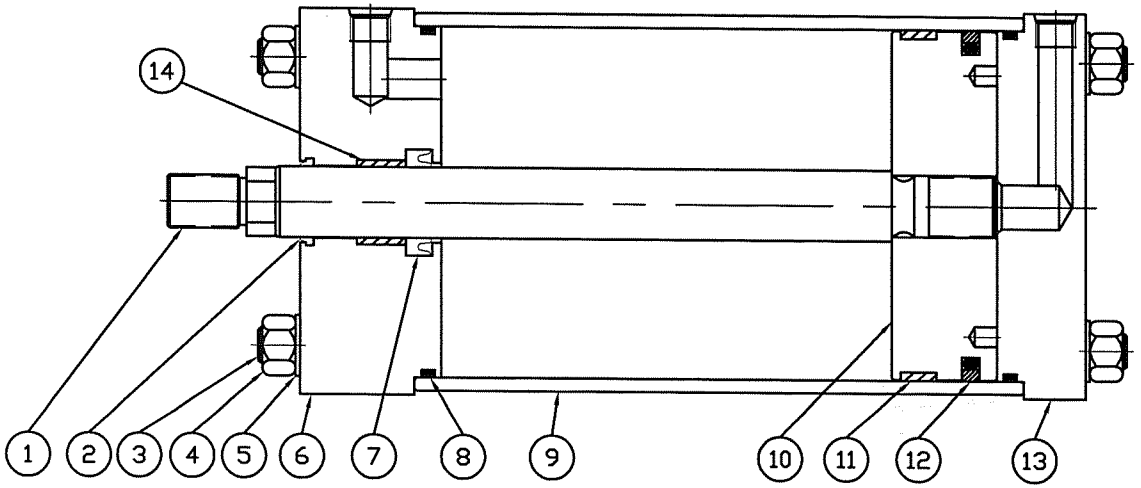
TENSIONING GROUP ASSEMBLY KLAMPRESS TYPE 85

CUSTOMER SK000927 0



FOR 6.00 STROKE





NO.	PART NAME	QTY	MATERIAL
1	PISTON ROD	1	316 STAINLESS STEEL HARD SURFACE BURNISHED
2	ROD WIPER	1	POLYURETHANE
3	TIE ROD	4	316 STAINLESS STEEL
4	TIE ROD NUT	8	316 STAINLESS STEEL
5	TIE ROD WASHER	8	316 STAINLESS STEEL
6	FRONT HEAD	1	RYERTEX "G-10"
7	ROD PACKING	1	POLYURETHANE
8	O-RING (TUBE)	2	BUNA "N"
9	TUBE	1	FIBERGLASS
10	PISTON	1	ALUMINUM
11	WEAR STRIP	1	TEFLON/BRONZE
12	GLYD RING	1	BUNA"N, TEFLON
13	BACK HEAD	1	RYERTEX "G-10"
14	ROD BEARING	1	DURALON

TOLERANCE UNLESS OTHERWISE NOTED:
BREAK ALL SHARP EDGES
FRACTIONAL = ± 1/32"
DECIMAL .XX = ± .03
X. = ± .1, .XXX = ± .015
ANGLES = ± 1/2°
MACH. SURFACE 125√ MAX.
ALL DIMENSIONS IN INCHES.

Ashbrook Corporation
11600 East Hardy
Houston, Texas 77093
Phone: 713 449-0322
Fax: 713 449-1324

ASHBROOK
SOLID/LIQUID SEPARATION

DRAWN / DATE	CHECKED / DATE	APPR'D / DATE
D. YATES/ 11/ 94		
REVISED / DATE	CHECKED / DATE	APPR'D / DATE
JET 6/3/97		08/98

HYDRAULIC CYLINDER
F.R.P. CONSTRUCTION 1000 PSIG
5" BORE – 6" STROKE

CUSTOMER:

SCALE: 1=1 | 026521 | 2

10.11 HYDRAULIC POWER UNIT: The hydraulic pump and motor do not have parts that are maintainable in the field. If maintenance on these items is required, please call Ashbrook.

10.11.1 Drawings:

a. Hydraulic Pump/Motor Assembly Drawing: 029838
b. Manifold Assembly Drawing: 029868
b. Hydraulic Reservoir Drawing: 029837
c. Hydraulic Filter Drawing: 029836
d. Pressure Switch Data Sheet
e. Pressure Gauge Data Sheet
f. Teco Motor Data Sheet
g. Hydraulic Assembly Drawing: SK000951

10.11.2 Filter Screen Cleaning or Replacement:

Note: Clean filter screen semi annually (every six months). Retract the tension cylinders to return most of the oil to the reservoir. This will help purge most of the old oil and prevent over filling the reservoir.

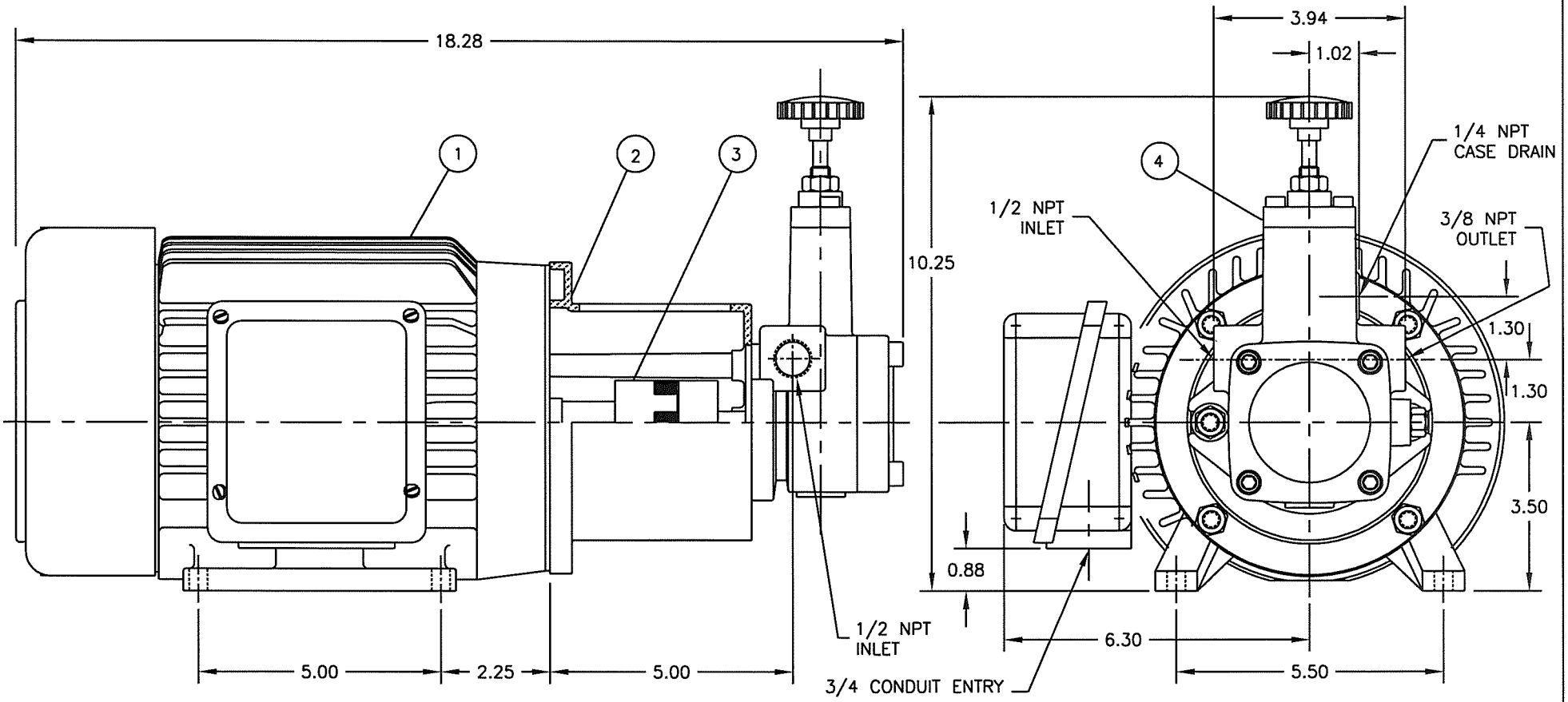
a. Unscrew the bowl from filter body, catch the oil in a bucket.
b. Remove and wash the suction screen. Be careful not to damage the screen.
c. Reinstall the screen in the filter bowl. Do not operate without a filter screen installed.
d. Screw the filter bowl back onto the filter body.
e. Refill the hydraulic reservoir to the high level mark.

10.11.3 Hydraulic Oil:

Note: Change the hydraulic oil after the first 500 hours of use and anytime the oil appears discolored, darkened or cloudy. The hydraulic oil can absorb moisture from the atmosphere.

a. Check oil level when tension cylinders are retracted. If oil is too low, add sufficient oil to restore proper level. Find and repair any leaks which caused oil level to decrease.
b. Inspect the level of the oil and its color. If oil is discolored, drain and replace.
c. Hydraulic oil is drained by removing the filter bowl and catching the oil in a bucket.
d. Properly dispose of any waste oil.
e. Start hydraulic unit and allow belts to tension.
f. Retract the cylinders and check the level of the hydraulic oil in the reservoir and add oil as required.

NO.	QTY.	PART NO.	DESCRIPTION
1	1	029863	MOTOR, 1 HP 145TC FRAME, TEFC, 1200 RPM
			460 VAC, 3 PHASE, SEVERE DUTY WASH DOWN
2	1	029864	ADAPTER, PUMP MOTOR, EPOXY COATED ALUMINUM
			SAE 2/4 BOLT
3	1	029865	COUPLING ASSY, HUBS W/ 1/2" AND 7/8" BORES
			INCLUDES SPIDER AND SET SCREWS
4	1	029866	HYDRAULIC PUMP,
			2.1 GPM @ 1200 RPM, 1000 PSI MAX SETTING



TOLERANCE UNLESS OTHERWISE NOTED:
BREAK ALL SHARP EDGES
FRACTIONAL = ± 1/32"
DECIMAL .XX = ± .03
X. = ± .1, .XXX = ± .015
ANGLES = ± 1/2°
MACH. SURFACE 125√ MAX.
ALL DIMENSIONS IN INCHES.

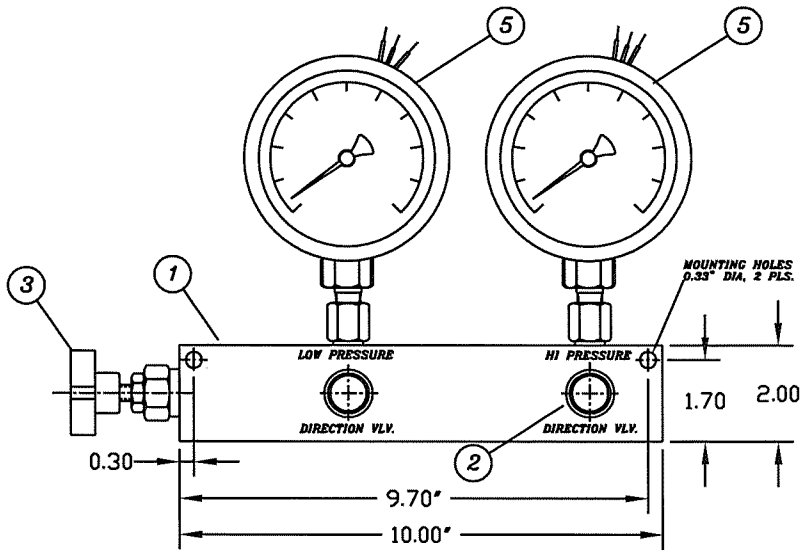
DRAWN	JET	APPROVED	DET	SCALE 1/2
DATE	10/29/96	DATE	10/29/96	WEIGHT
REV. BY	JET	APPROVED	DET	NEXT ASSY
DATE REV.	10/14/05	DATE	10/14/05	CUSTOMER

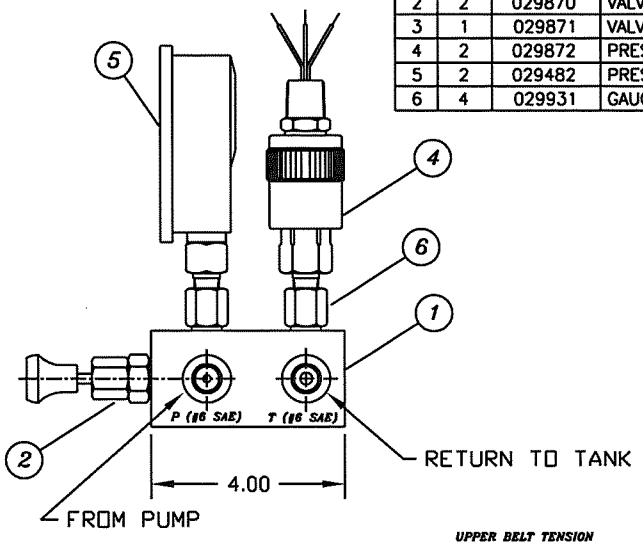
Ashbrook Corporation
11600 East Hardy Road
Houston, Texas 77093
Phone: 713-449-0322
FAX: 713-449-1324

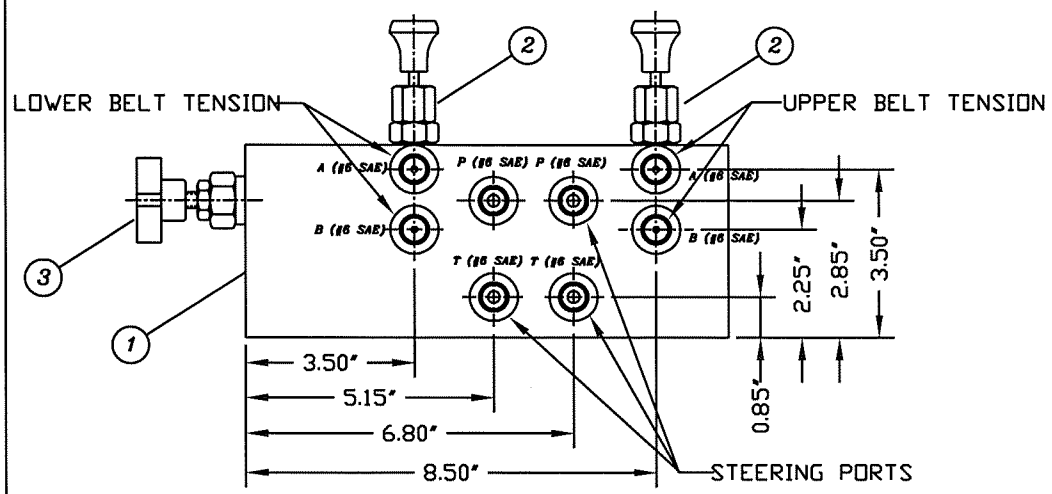
TITLE: HYDRAULIC PUMP-MOTOR ASSEMBLY
145TC TEFC 460 VAC-3 PHASE
2.1 GPM PRESS COMPENSATED PUMP

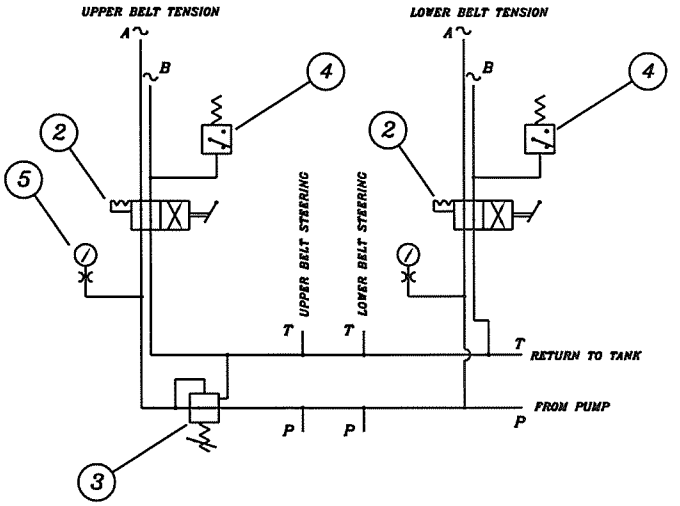
DRAWING FILE NAME:	DWG. NO.	REV.
029838R3.DWG	029838	3

NO.	QTY.	PART NO.	DESCRIPTION
1	1	033529	MANIFOLD
2	2	029870	VALVE, 4-WAY
3	1	029871	VALVE, PRESS. REDUCING
4	2	029872	PRESSURE SWITCH
5	2	029482	PRESSURE GAUGE, 4" DIA. 1,000 PSI
6	4	029931	GAUGE SNUBBER, 316 SS









TOLERANCE UNLESS OTHERWISE NOTED:
BREAK ALL SHARP EDGES
FRACTIONAL = ± 1/32"
DECIMAL .XX = ± .03
X. = ± .1, .XXX = ± .015
ANGLES = ± 1/2°
MACH. SURFACE 125√ MAX.
ALL DIMENSIONS IN INCHES.

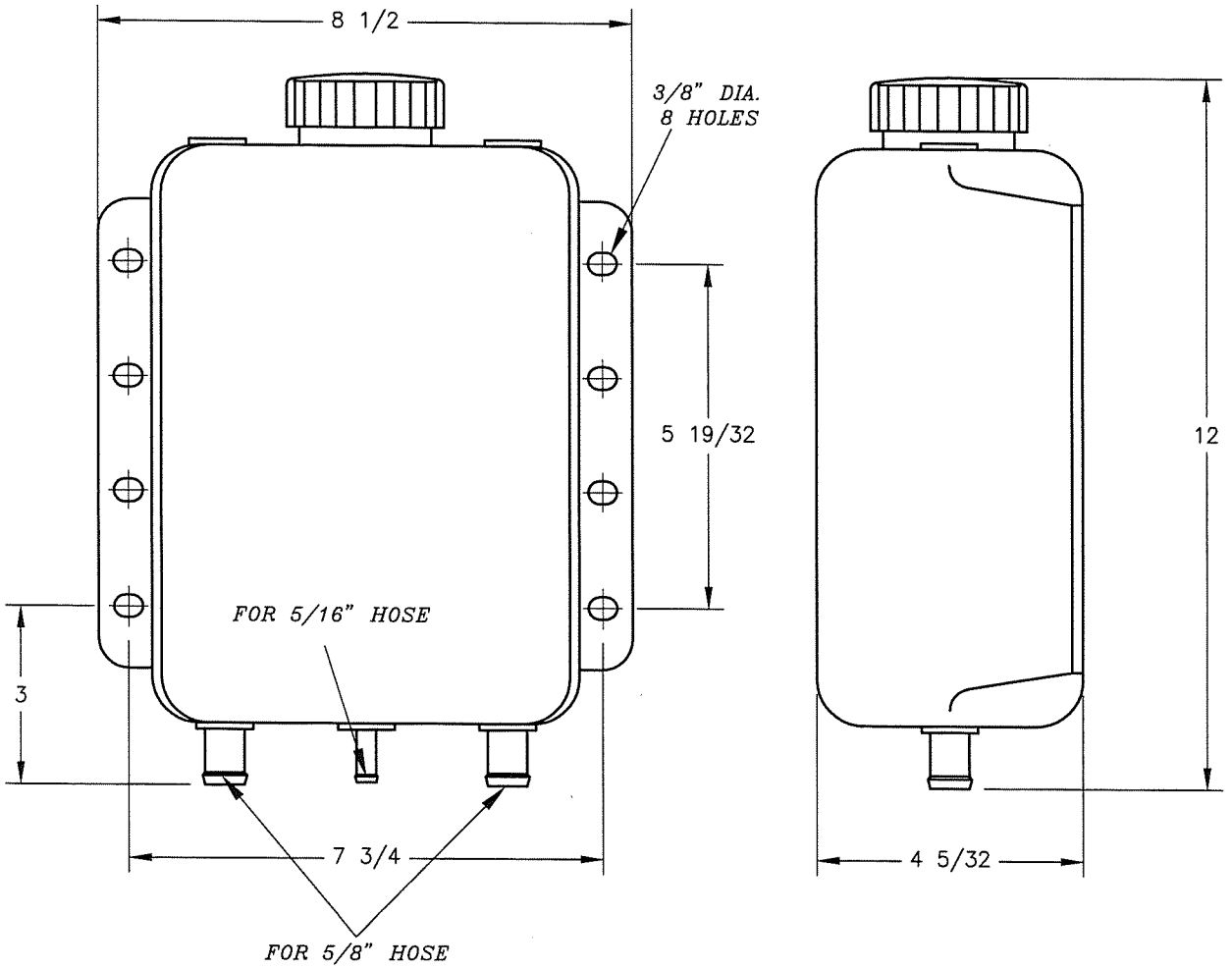
DRAWN	JET	APPROVED		SCALE .4
DATE	10-31-96	DATE	1/6/98	WEIGHT
REV. BY	JET	APPROVED	JET	NEXT ASSY
DATE REV.	2/5/04	DATE	2/5/04	CUSTOMER N/A

Ashbrook Corporation
11600 East Hardy Road
Houston, Texas 77093
Phone: 713-449-0322
FAX: 713-449-1324

TITLE
MANIFOLD ASSEMBLY HYDRAULIC SYSTEM INDEPENDENT BELT TENSIONS

DRAWING FILE NAME:	DWG. NO.	REV
029868R3.DWG	029868	3

NO.	QTY.	PART NO.	DESCRIPTION



PLASTIC RESERVOIR

CAPACITY	4 QUARTS
MATERIAL	HIGH DENSITY POLYETHYLENE
COLOR	TRANSLUSCENT WHITE

TOLERANCE UNLESS OTHERWISE NOTED:
BREAK ALL SHARP EDGES
FRACTIONAL = ± 1/32"
DECIMAL .XX = ± .03
X. = ± .1, .XXX = ± .015
ANGLES = ± 1/2°
MACH. SURFACE 125√ MAX.
ALL DIMENSIONS IN INCHES.

DRAWN: JET	APPROVED:	SCALE: 1/2	
DATE: 10/28/96	DATE:	WEIGHT:	
REV. BY:	APPROVED: DEF	NEXT ASS'Y: HPU-2	
DATE REV.:	DATE: 08/10/98	CUSTOMER:	

Ashbrook Corporation
11600 East Hardy Road
Houston, Texas 77093
Phone: 713-449-0322
FAX: 713-449-1324

ASHBROOK
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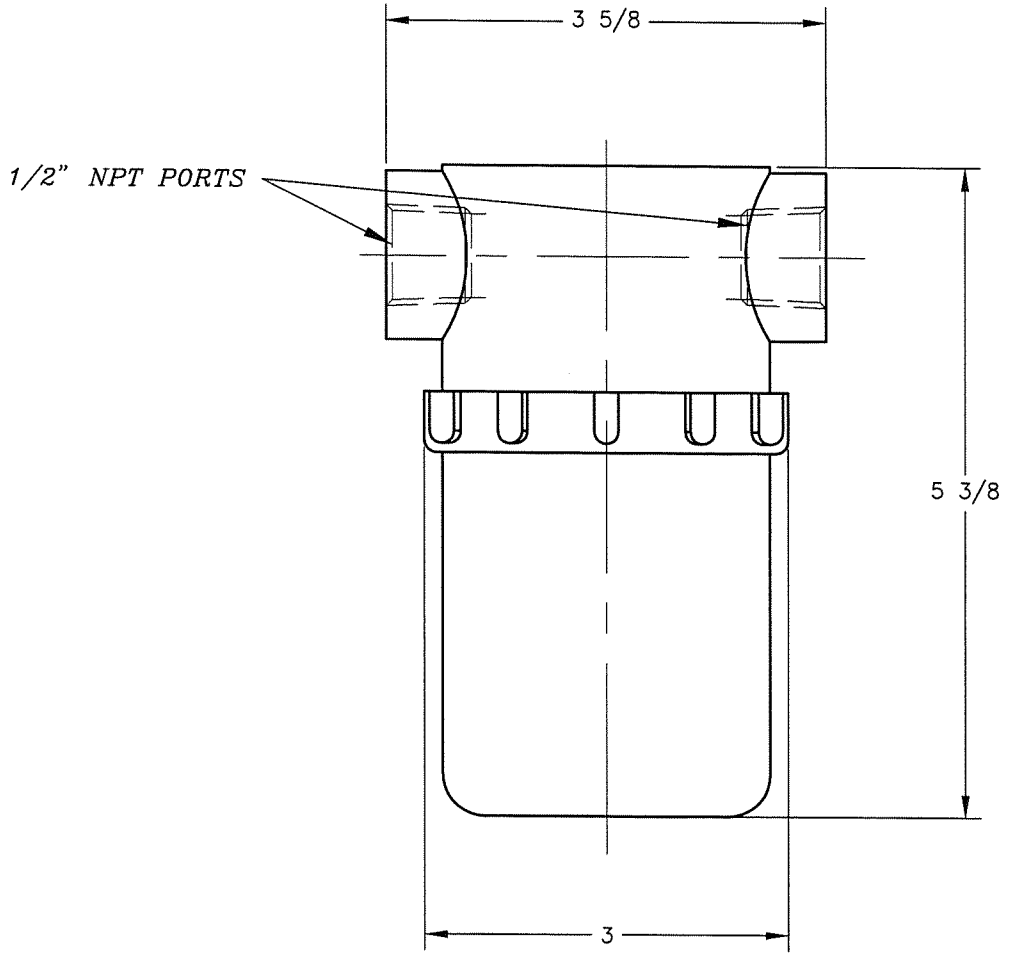
TITLE: RESERVOIR, HYDRAULIC
1 GALLON CAPACITY
ATMOSPHERIC PRESSURE

DRAWING FILE NAME:	DWG. NO.	REV
029837R0.DWG	029837	0

NO.	QTY.	PART NO.	DESCRIPTION



HYDRAULIC FILTER

SCREEN AREA	7.7 Sq. In.
BOWL MATERIAL	POLYAMIDE
ELEMENT:	10 MICRON

TOLERANCE UNLESS OTHERWISE NOTED:
BREAK ALL SHARP EDGES
FRACTIONAL = ± 1/32"
DECIMAL .XX = ± .03
X. = ± .1, .XXX = ± .015
ANGLES = ± 1/2°
MACH. SURFACE 125√ MAX.
ALL DIMENSIONS IN INCHES.

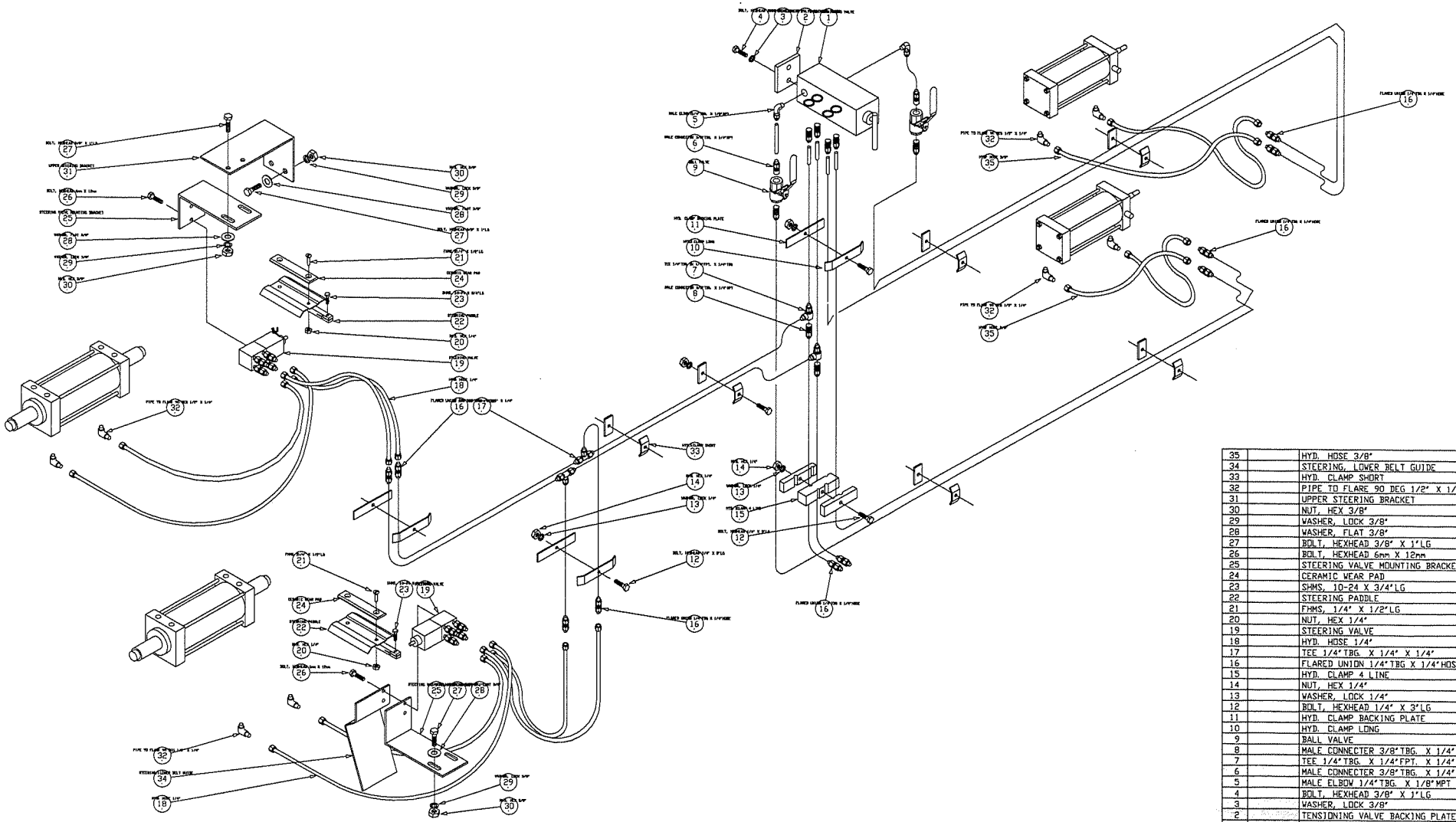
DRAWN JET	APPROVED	SCALE FULL	
DATE 10/28/96	DATE	WEIGHT	
REV. BY	APPROVED JET	NEXT ASS'Y HPU-2	
DATE REV.	DATE 08/10/98	CUSTOMER	

Ashbrook Corporation
11600 East Hardy Road
Houston, Texas 77093
Phone: 713-449-0322
FAX: 713-449-1324

ASHBROOK
LEADERS IN LIQUID/SOLID SEPARATION

TITLE: FILTER, HYDRAULIC
10 MICRON NOMINAL
WASHABLE ELEMENT

DRAWING FILE NAME:	DWG. NO.	REV
029836R0.DWG	029836	0



ITEM	DWG. NO.	DESCRIPTION	QTY.
35		HYD. HOSE 3/8"	4
34		STEERING, LOWER BELT GUIDE	1
33		HYD. CLAMP SHORT	6
32		PIPE TO FLARE 90 DEG 1/2" X 1/4"	8
31		UPPER STEERING BRACKET	1
30		NUT, HEX 3/8"	6
29		WASHER, LOCK 3/8"	6
28		WASHER, FLAT 3/8"	6
27		BOLT, HEXHEAD 3/8" X 1"LG	6
26		BOLT, HEXHEAD 6mm X 12mm	4
25		STEERING VALVE MOUNTING BRACKET	2
24		CERAMIC WEAR PAD	2
23		SHMS, 10-24 X 3/4"LG	2
22		STEERING PADDLE	2
21		FHMS, 1/4" X 1/2"LG	4
20		NUT, HEX 1/4"	4
19		STEERING VALVE	2
18		HYD. HOSE 1/4"	8
17		TEE 1/4"TBG. X 1/4" X 1/4"	2
16		FLARED UNION 1/4"TBG X 1/4"HOSE	10
15		HYD. CLAMP 4 LINE	1
14		NUT, HEX 1/4"	10
13		WASHER, LOCK 1/4"	10
12		BOLT, HEXHEAD 1/4" X 3"LG	10
11		HYD. CLAMP BACKING PLATE	3
10		HYD. CLAMP LONG	3
9		BALL VALVE	2
8		MALE CONNECTER 3/8"TBG. X 1/4"MPT	2
7		TEE 1/4"TBG. X 1/4"FPT. X 1/4"TBG	2
6		MALE CONNECTER 3/8"TBG. X 1/4"MPT	4
5		MALE ELBOW 1/4"TBG. X 1/8"MPT	2
4		BOLT, HEXHEAD 3/8" X 1"LG	2
3		WASHER, LOCK 3/8"	2
2		TENSIONING VALVE BACKING PLATE	1
1		HYD. TENSIONING VALVE	1

TOLERANCE UNLESS NOTED:
ALL DIMENSIONS IN INCHES.
BREAK ALL SHARP EDGES
FRACTIONAL = ± 1/32"
ANGLES = ± 1/2
DECIMAL .XX = ± .03
X = ± .1 .XXX = ± .010
MACH. SURFACE 125 MAX.

ASHBROOK
LEADERS IN LIQUID/SOLID SEPARATION

MK.	DCN	DESCRIPTION	DATE	BY	CHK.	MK.	DCN	DESCRIPTION	DATE	BY	CHK.

KEVIN 09/98

SCALE

HYDRAULIC ASSEMBLY
KLAMPRESS TYPE 85

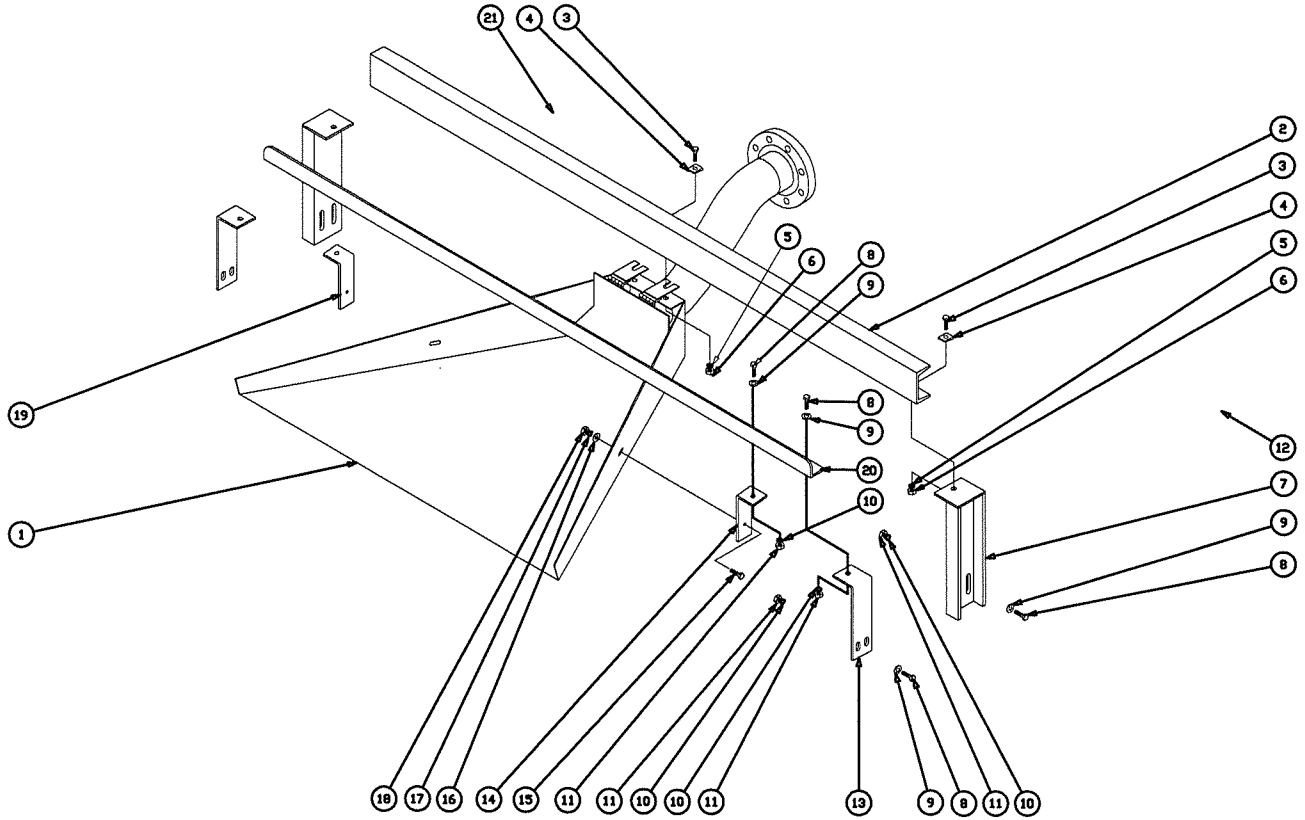
CUSTOMER

SK000951 | 0

10.12 FEED ASSEMBLY:

10.12.1 Drawings: Feed Assembly: SK000934

a. Inspect the feed chute to see that the lower edge is level.
b. The lower edge of the feed chute must be equidistant above the belt across its width.
c. If the feed chute is not level the sludge will not be evenly distributed on the belt.
d. Uneven sludge distribution will cause belt problems such as poor tracking and wrinkling and subsequent damage to the seams and belt fabric.
e. If you continue to have problems with your belts after leveling the feed chute contact your Ashbrook Service department.



TOLERANCE UNLESS OTHERWISE NOTED:
BREAK ALL SHARP EDGES
FRACTIONAL = ± 1/32"
DECIMAL .XX = ± .03
X. = ± .1, .XXX = ± .015
ANGLES = ± 1/2°
MACH. SURFACE 125√ MAX.
ALL DIMENSIONS IN INCHES.

Ashbrook Corporation
11600 East Hardy
Houston, Texas 77093
Phone: 713 449-0322
Fax: 713 449-1324

THAMES WATER PRODUCTS & SERVICES
ASHBROOK
SOLID/LIQUID SEPARATION

DRAWN / DATE	CHECKED / DATE	APP'D / DATE
		09/98
REVISED / DATE	CHECKED / DATE	APP'D / DATE

CUSTOMER:

SCALE: 1/16 | SK000934 | 0

10.13 GRAVITY DRAINAGE SECTION:

10.13.1 Drawings:

a. SK000906 Upper Grid Assembly
b. SK000907 Lower Grid Assembly
c. SK000913 Drain Tray Assembly
d. SK000929 Chicane Group Assembly
e. SK000935 Upper Sludge Restrainer Assembly
f. SK000952 Lower Sludge Restrainer Assembly
g. SK000936 Wedge Plate Assembly
h. SK000960 Drain Piping Assembly

10.13.2 Wear Strip Replacement:

Note: Replace grid strips before belt contacts metal support grid.

a. Shut down belt press drive.
b. De-tension belts and shut down all belt functions.
c. Lock out machine controls.
d. Raise sludge side restrainers.
e. Pull out and dispose of worn wear strip.
f. Insert new wear strip and tap into place with rubber mallet.
g. Unlock controls and start hydraulic unit, tension belts.
h. Lower sludge restrainers into place.

10.13.3 Sludge Restrainer Adjustment:

a. Loosen side bolts in supporting brackets.
b. Raise or lower restrainers until seals are touching the belt.
c. Tighten bolts.

10.13.4 Seal Replacement:

a. Raise side restrainers.
b. Remove old seals and discard.
c. Install new seals on restrainers.
d. Lower side restrainers and tighten bolts.

10.13.5 Wedge Plate Adjustment: This is an optional machine attachment and may not be present.

a. Remove locking pin and lower/raise plate.
b. Replace locking pins.
c. If sludge is pressing out between the belts, the plate is too low.

10.13.6 Chicane Adjustment:

a. Horizontal Adjustment:

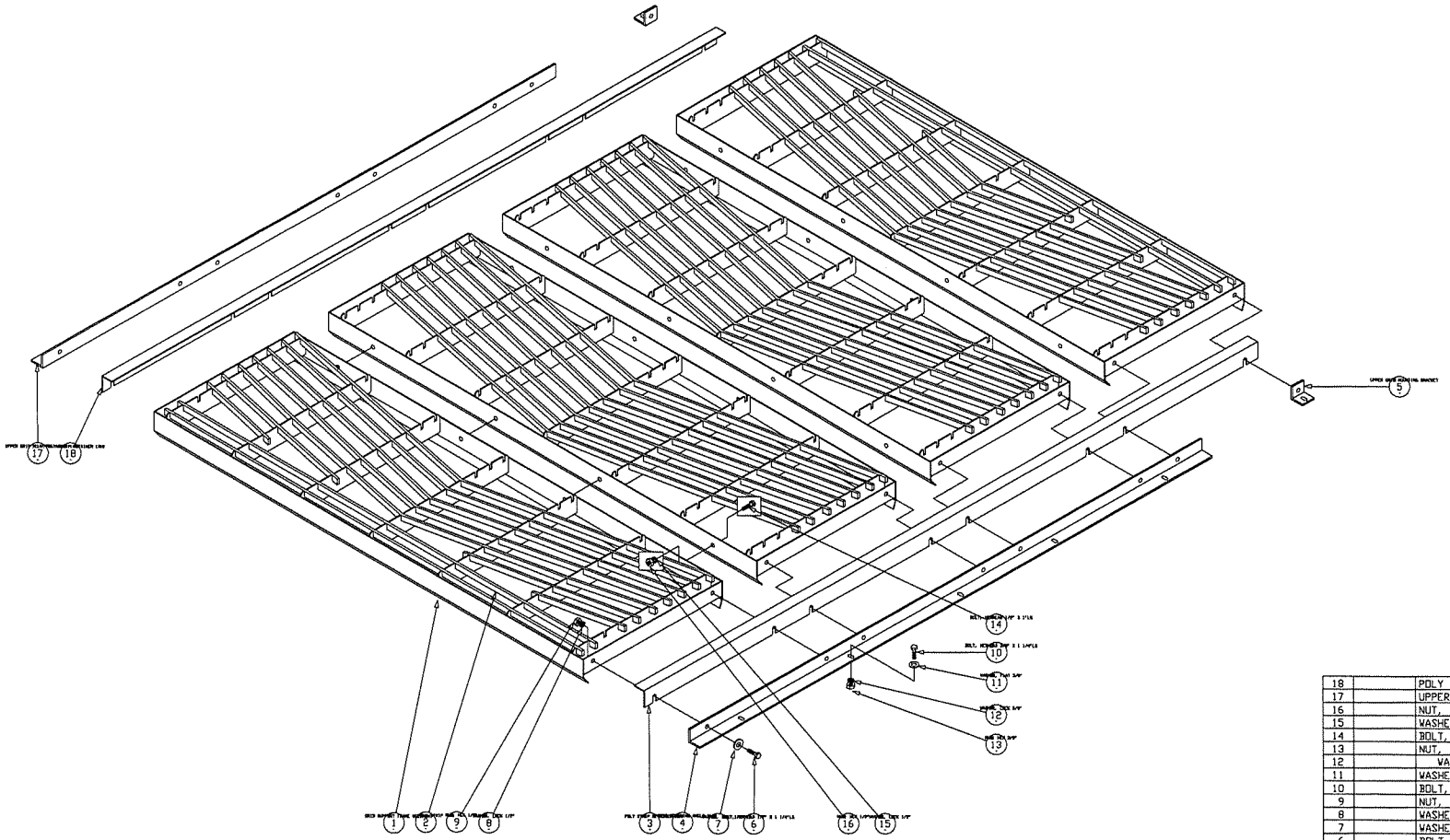
(1) Loosen bolt.
(2) Slide chicane to desired position.
(3) Tighten bolt.

b. Vertical Adjustment:

(1) Loosen bolt.
(2) Rotate retaining ring until chicane is resting on belt.
(3) Tighten bolt.

10.13.7 Chicane Replacement:

a. Stop belt press and lock out controls.
b. Rotate chicanes off belt.
c. Knock out roll pin.
d. Remove old blade.
e. Insert new blade.
f. Install roll pin.
g. Rotate chicanes onto belt.
h. Resume operations



ITEM	PART NO.	DESCRIPTION	QTY.
18		POLY STRIP RETAINER (RH)	
17		UPPER GRID MOUNTING ANGLE (RH)	
16		NUT, HEX 1/2"	
15		WASHER, LOCK 1/2"	
14		BOLT, HEXHEAD 1/2" X 1"LG	
13		NUT, HEX 3/8"	
12		WASHER, LOCK 3/8"	
11		WASHER, FLAT 3/8"	
10		BOLT, HEXHEAD 3/8" X 1 1/4"LG	
9		NUT, HEX 1/2"	
8		WASHER, LOCK 1/2"	
7		WASHER, FLAT 1/2"	
6		BOLT, HEXHEAD 1/2" X 1 1/4"LG	
5		UPPER GRID MOUNTING BRACKET	
4		GRID MOUNTING ANGLE (LH)	
3		POLY STRIP RETAINER (LH)	
2		POLY STRIP	
1		GRID SUPPORT FRAME WELDMENT	

TOLERANCE UNLESS NOTED:
ALL DIMENSIONS IN INCHES.
BREAK ALL SHARP EDGES
FRACTIONAL = ± 1/32"
ANGLES = ± 1/2°
DECIMAL .XX = ± .03
X = ± .1 .XXX = ± .015
MACH. SURFACE 125 MAX.

ASHBROOK
LEADERS IN LIQUID/SOLID SEPARATION

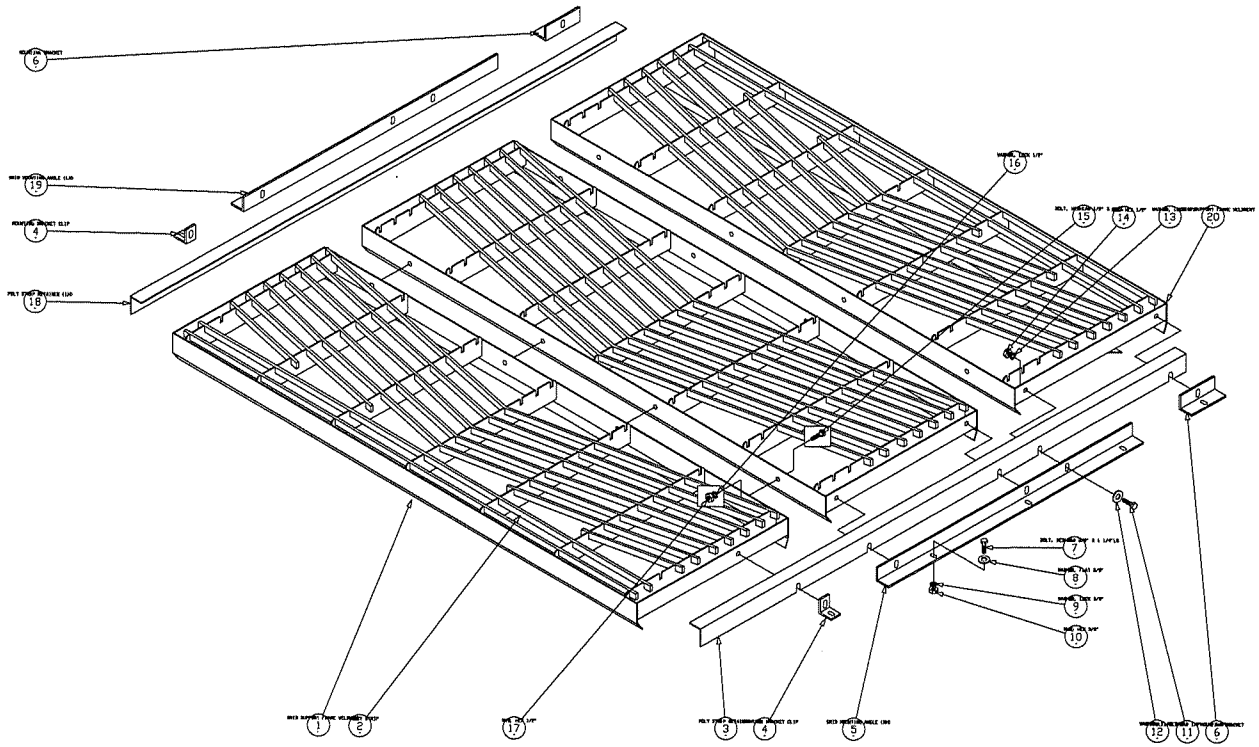
MK.	DCN	DESCRIPTION	DATE	BY	CHK.	MK.	DCN	DESCRIPTION	DATE	BY	CHK.

09/98
KEVIN

SCALE

UPPER GRID ASSEMBLY
KLAMPRESS TYPE 85

CUSTOMER SK000906 0



ITEM	PART NO.	DESCRIPTION	QTY.
20		GRID SUPPORT FRAME WELDMENT	
19		GRID MOUNTING ANGLE (LH)	
18		POLY STRIP RETAINER (LH)	
17		NUT, HEX 1/2"	
16		WASHER, LOCK 1/2"	
15		BOLT, HEXHEAD 1/2" X 1"LG	
14		NUT, HEX 1/2"	
13		WASHER, LOCK 1/2"	
12		WASHER, FLAT 1/2"	
11		BOLT, HEXHEAD 1/2" X 1 1/4"LG	
10		NUT, HEX 3/8"	
9		WASHER, LOCK 3/8"	
8		WASHER, FLAT 3/8"	
7		BOLT, HEXHEAD 3/8" X 1 1/4"LG	
6		MOUNTING BRACKET	
5		GRID MOUNTING ANGLE (RH)	
4		MOUNTING BRACKET CLIP	
3		POLY STRIP RETAINER (RH)	
2		POLY STRIP	
1		GRID SUPPORT FRAME WELDMENT	

TOLERANCE UNLESS NOTED:
ALL DIMENSIONS IN INCHES.
BREAK ALL SHARP EDGES
FRACTIONAL = ± 1/32"
ANGLES = ± 1/2°
DECIMAL .XX = ± .03
X. = ± .1, .XXX = ± .015
MACH. SURFACE 125 MAX.

ASHBROOK
LEADERS IN LIQUID/SOLID SEPARATION

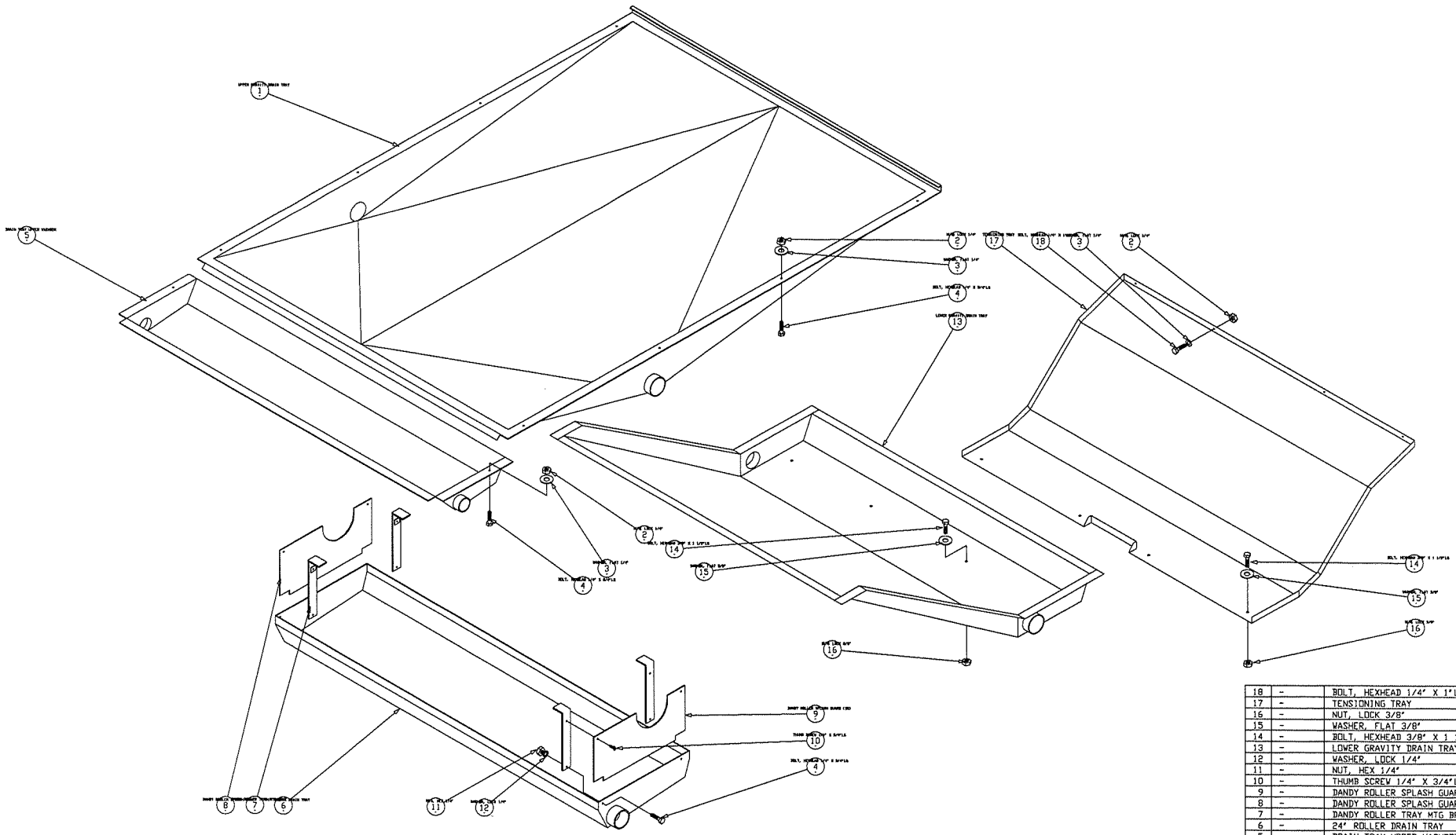
MK.	DCN	DESCRIPTION	DATE	BY	CHK.	MK.	DCN	DESCRIPTION	DATE	BY	CHK.

05/98
KEVIN

SCALE

LOWER GRID ASSEMBLY
KLAMPRESS TYPE 85

CUSTOMER | SK000907 | 0



ITEM	DWG. NO.	DESCRIPTION	QTY.
18	-	BOLT, HEXHEAD 1/4" X 1"LG	4
17	-	TENSIONING TRAY	1
16	-	NUT, LOCK 3/8"	8
15	-	WASHER, FLAT 3/8"	8
14	-	BOLT, HEXHEAD 3/8" X 1 1/2"LG	8
13	-	LOWER GRAVITY DRAIN TRAY	1
12	-	WASHER, LOCK 1/4"	4
11	-	NUT, HEX 1/4"	4
10	-	THUMB SCREW 1/4" X 3/4"LG	4
9	-	DANDY ROLLER SPLASH GUARD (DS)	1
8	-	DANDY ROLLER SPLASH GUARD	1
7	-	DANDY ROLLER TRAY MTG BRKT	4
6	-	24" ROLLER DRAIN TRAY	1
5	-	DRAIN TRAY UPPER WASHBOX	1
4	-	BOLT, HEXHEAD 1/4" X 3/4"LG	14
3	-	WASHER, FLAT 1/4"	14
2	-	NUT, LOCK 1/4"	14
1	-	UPPER GRAVITY DRAIN TRAY	1

TOLERANCE UNLESS NOTED:
ALL DIMENSIONS IN INCHES.
BREAK ALL SHARP EDGES
FRACTIONAL = ± 1/32"
ANGLES = ± 1/2°
DECIMAL .XX = ± .03
.X = ± .1, .XXX = ± .015
MACH. SURFACE 125 MAX.

ASHBROOK
LEADERS IN LIQUID/SOLID SEPARATION

MK.	DCN	DESCRIPTION	DATE	BY	CHK.	MK.	DCN	DESCRIPTION	DATE	BY	CHK.

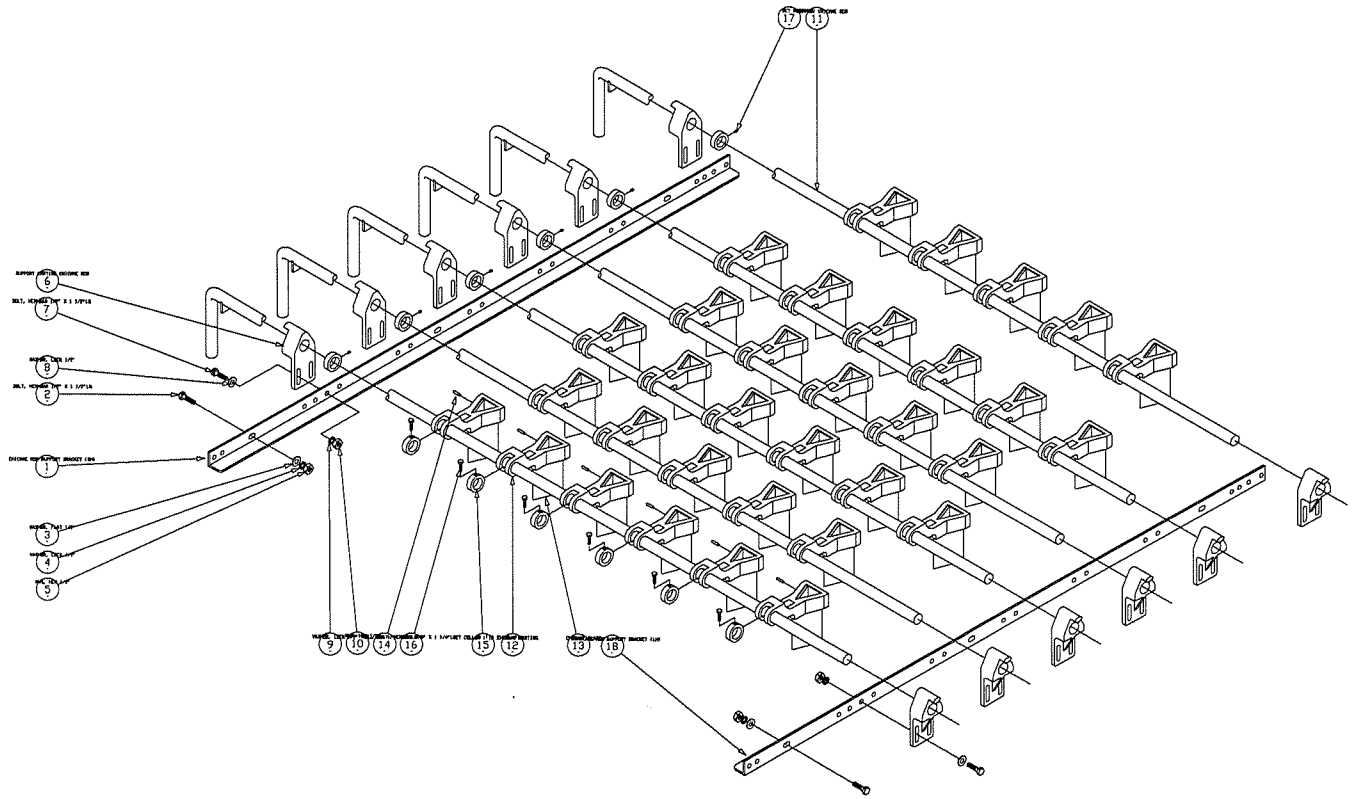
KEVIN

SCALE

DRAIN TRAY ASSEMBLY KLAMPRESS TYPE 85

CUSTOMER

SK000913 | 0



ITEM	PART NO.	DESCRIPTION	QTY.
18		CHICANE ROD SUPPORT BRACKET (LH)	1
17		SET SCREW	6
16		BOLT, HEXHEAD 3/8" X 1 1/4"LG	33
15		SET COLLAR 1"ID X 1 5/8"OD	39
14		ROLL PIN 1/4" X 1"LG	33
13		CHICANE BLADE	33
12		CHICANE CASTING	33
11		SUPPORT CHICANE ROD	6
10		NUT, HEX 1/2"	24
9		WASHER, LOCK 1/2"	24
8		WASHER, LOCK 1/2"	24
7		BOLT, HEXHEAD 1/2" X 1 1/2"LG	24
6		SUPPORT CASTING CHICANE ROD	12
5		NUT, HEX 1/2"	6
4		WASHER, LOCK 1/2"	6
3		WASHER, FLAT 1/2"	6
2		BOLT, HEXHEAD 1/2" X 1 1/2"LG	6
1		CHICANE ROD SUPPORT BRACKET (RH)	1

TOLERANCE UNLESS NOTED:
ALL DIMENSIONS IN INCHES.
BREAK ALL SHARP EDGES
FRACTIONAL = ± 1/32"
ANGLES = ± 1/2°
DECIMAL .XX = ± .03
X = ± .1 .XXX = ± .015
MACH. SURFACE 125 MAX.

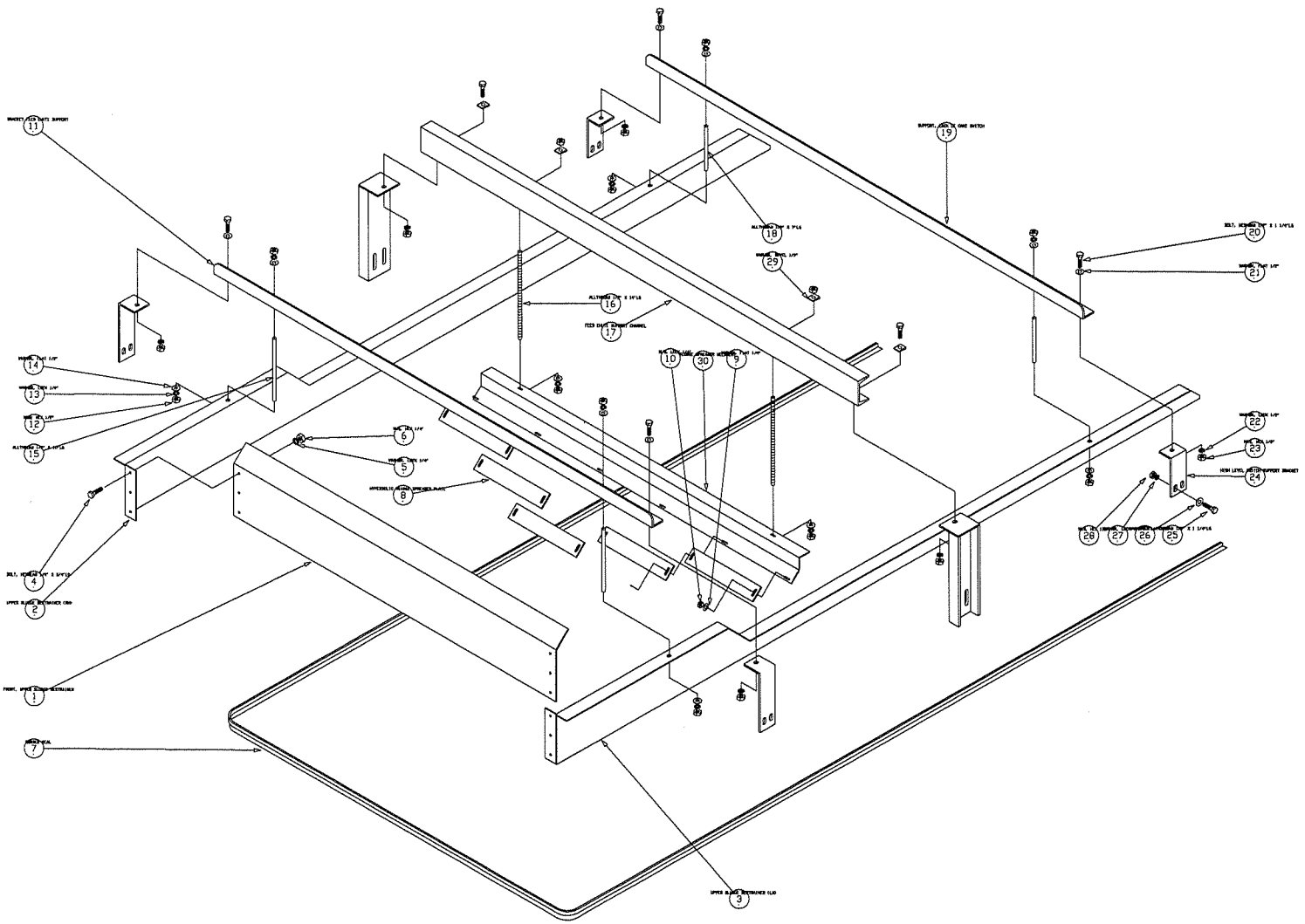
ASHBROOK
LEADERS IN LIQUID/SOLID SEPARATION

MK.	DCN	DESCRIPTION	DATE	BY	CHK.	MK.	DCN	DESCRIPTION	DATE	BY	CHK.

DFT 09/09
KEVIN 7/98
SCALE

CHICANE GROUP ASSEMBLY
KLAMPRESS TYPE 85

CUSTOMER | SK000929 | 0



ITEM	PART NO.	DESCRIPTION	QTY.
30		SLUDGE SPREADER WELDMENT	
29		WASHER, BEVEL 1/2"	
28		NUT, HEX 1/2"	
27		WASHER, LOCK 1/2"	
26		WASHER, FLAT 1/2"	
25		BOLT, HEXHEAD 1/2" X 1 1/4"LG	
24		HIGH LEVEL SWITCH SUPPORT BRACKET	
23		NUT, HEX 1/2"	
22		WASHER, LOCK 1/2"	
21		WASHER, FLAT 1/2"	
20		BOLT, HEXHEAD 1/2" X 1 1/4"LG	
19		SUPPORT, LACK OF CAKE SWITCH	
18		ALLTHREAD 1/2" X 7"LG	
17		FEED CHUTE SUPPORT CHANNEL	
16		ALLTHREAD 1/2" X 14"LG	
15		ALLTHREAD 1/2" X 10"LG	
14		WASHER, FLAT 1/2"	
13		WASHER, LOCK 1/2"	
12		NUT, HEX 1/2"	
11		BRACKET FEED CHUTE SUPPORT	
10		NUT, LOCK 1/4"	
9		WASHER, FLAT 1/4"	
8		HYPERBOLIC SLUDGE SPREADER PLATE	
7		RUBBER SEAL	
6		NUT, HEX 1/4"	
5		WASHER, LOCK 1/4"	
4		BOLT, HEXHEAD 1/4" X 3/4"LG	
3		UPPER SLUDGE RESTRAINER (LH)	
2		UPPER SLUDGE RESTRAINER (RH)	
1		FRONT, UPPER SLUDGE RESTRAINER	

TOLERANCE UNLESS NOTED:
ALL DIMENSIONS IN INCHES.
BREAK ALL SHARP EDGES
FRACTIONAL = ± 1/32"
ANGLES = ± 1/2°
DECIMAL .XX = ± .03
X = ± .1, .XXX = ± .015
MACH. SURFACE 125 MAX.

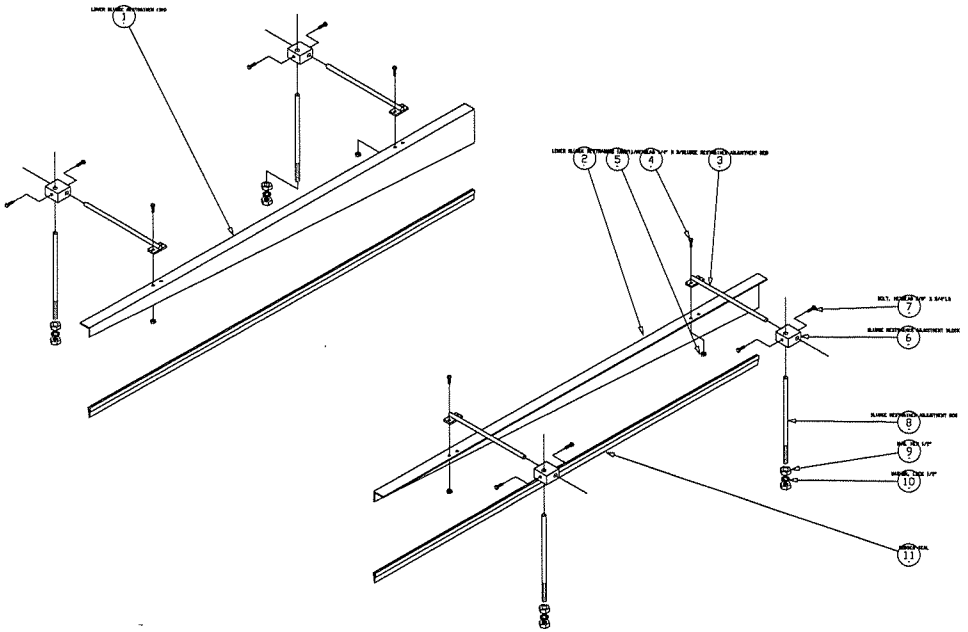
ASHBROOK
LEADERS IN LIQUID/SOLID SEPARATION

MK.	DCN	DESCRIPTION	DATE	BY	CHK.	MK.	DCN	DESCRIPTION	DATE	BY	CHK.

DEF 05/98
KEVIN
SCALE

UPPER SLUDGE RESTRAINER ASSEMBLY KLAMPRESS TYPE 85

CUSTOMER | SK000935 | 0



ITEM	PART NO.	DESCRIPTION	QTY.
11		RUBBER SEAL	
10		WASHER, LOCK 1/2"	
9		NUT, HEX 1/2"	
8		SLUDGE RESTRAINER ADJUSTMENT ROD	
7		BOLT, HEXHEAD 3/8" X 3/4"LG	
6		SLUDGE RESTRAINER ADJUSTMENT BLOCK	
5		NUT, LOCK 1/4"	
4		BOLT, HEXHEAD 1/4" X 3/4"LG	
3		SLUDGE RESTRAINER ADJUSTMENT ROD	
2		LOWER SLUDGE RESTRAINER (LH)	
1		LOWER SLUDGE RESTRAINER (RH)	

TOLERANCE UNLESS NOTED:
ALL DIMENSIONS IN INCHES.
BREAK ALL SHARP EDGES
FRACTIONAL = ± 1/32"
ANGLES = ± 1/2°
DECIMAL .XX = ± .03
X. = ± .1, .XXX = ± .015
MACH. SURFACE 125 MAX.

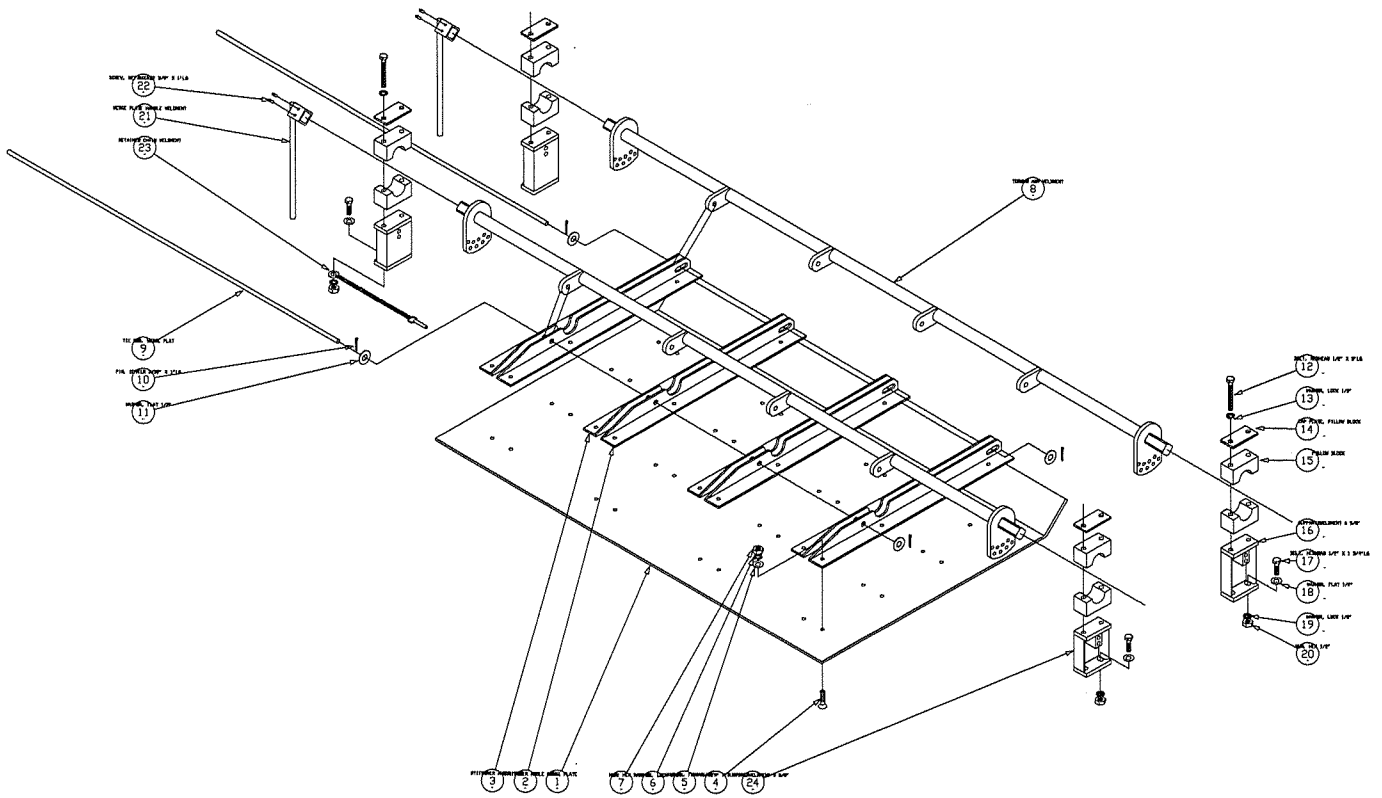
ASHBROOK
LEADERS IN LIQUID/SOLID SEPARATION

MK.	DCN	DESCRIPTION	DATE	BY	CHK.	MK.	DCN	DESCRIPTION	DATE	BY	CHK.

DET 09/98
KEVIN 10/98
SCALE

LOWER SLUDGE RESTRAINER KLAMPRESS TYPE 85

CUSTOMER SK000952 0



ITEM	PART NO.	DESCRIPTION	QTY.
24		SUPPORT WELDMENT 5 5/8"	
23		RETAINER CHAIN WELDMENT	
22		SCREW, SET SOCKET 3/8" X 1"LG	
21		WEDGE PLATE HANDLE WELDMENT	
20		NUT, HEX 1/2"	
19		WASHER, LOCK 1/2"	
18		WASHER, FLAT 1/2"	
17		BOLT, HEXHEAD 1/2" X 1 3/4"LG	
16		SUPPORT WELDMENT 6 5/8"	
15		PILLOW BLOCK	
14		CAP PLATE, PILLOW BLOCK	
13		WASHER, LOCK 1/2"	
12		BOLT, HEXHEAD 1/2" X 5"LG	
11		WASHER, FLAT 1/2"	
10		PIN, COTTER 3/32" X 1"LG	
9		TIE ROD, WEDGE PLAT	
8		TORQUE ARM WELDMENT	
7		NUT, HEX 3/8"	
6		WASHER, LOCK 3/8"	
5		WASHER, FLAT 3/8"	
4		FHMS, 3/8" X 1 1/4"LG	
3		STIFFENER ANGLE (LH)	
2		STIFFENER ANGLE (RH)	
1		WEDGE PLATE	

TOLERANCE UNLESS NOTED:
ALL DIMENSIONS IN INCHES.
BREAK ALL SHARP EDGES
FRACTIONAL = ± 1/32"
ANGLES = ± 1/2°
DECIMAL .XX = ± .03
X = ± .1 .XXX = ± .015
MACH. SURFACE 125 MAX.

ASHBROOK
LEADERS IN LIQUID/SOLID SEPARATION

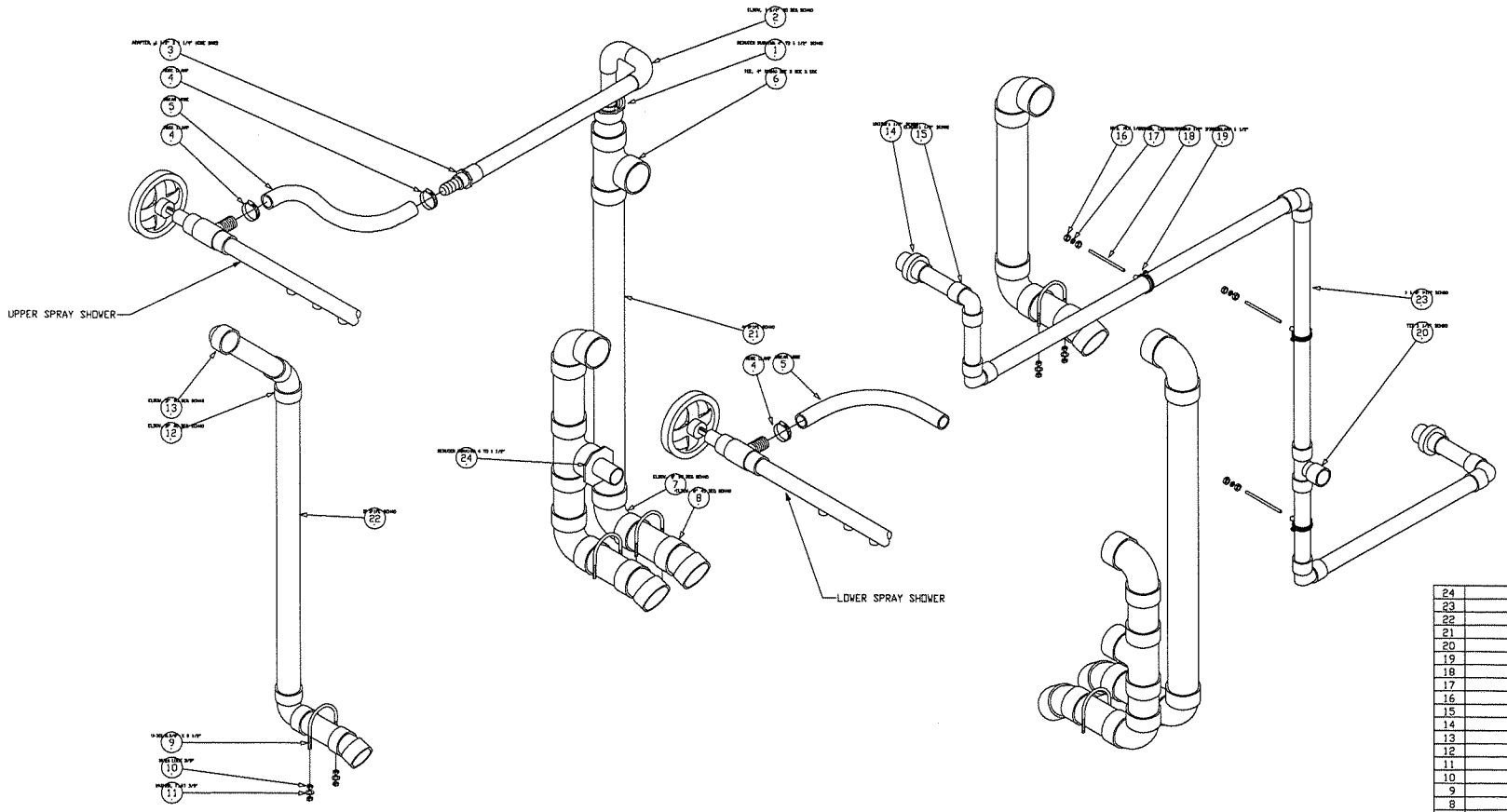
MK.	DCN	DESCRIPTION	DATE	BY	CHK.	MK.	DCN	DESCRIPTION	DATE	BY	CHK.

KEVIN 09/98

SCALE

WEDGE PLATE ASSEMBLY
KLAMPRESS TYPE 85

CUSTOMER SK000936 0



ITEM	PART NO.	DESCRIPTION	QTY.
24		REDUCER BUSHING 3 TO 1 1/2"	
23		1 1/2" PIPE SCH80	
22		3" PIPE SCH40	
21		4" PIPE SCH40	
20		TEE 1 1/2" SCH80	
19		PIPE CLAMP 1 1/2"	
18		ALLTHREAD 1/2" X 5"LG	
17		WASHER, LOCK 1/2"	
16		NUT, HEX 1/2"	
15		ELBOW 1 1/2" SCH80	
14		UNION 1 1/2" SCH80	
13		ELBOW, 3" 90 DEG SCH40	
12		ELBOW, 3" 45 DEG SCH40	
11		WASHER, FLAT 3/8"	
10		NUT, LOCK 3/8"	
9		U-BOLT 3/8" X 5 1/2"	
8		ELBOW, 4" 45 DEG SCH40	
7		ELBOW, 4" 90 DEG SCH40	
6		TEE, 4" SCH40 SOC X SOC X SOC	
5		CLEAR HOSE	
4		HOSE CLAMP	
3		ADAPTER, 1 1/2" X 1 1/4" HOSE BARB	
2		ELBOW, 1 1/2" 90 DEG SCH40	
1		REDUCER BUSHING 4" TO 2" SCH40	

TOLERANCE UNLESS NOTED:
ALL DIMENSIONS IN INCHES.
BREAK ALL SHARP EDGES
FRACTIONAL = ± 1/32"
ANGLES = ± 1/2°
DECIMAL .XX = ± .03
.X = ± .1 .XXX = ± .015
MACH. SURFACE 125 MAX.

ASHBROOK
LEADERS IN LIQUID/SOLID SEPARATION

MK.	DCN	DESCRIPTION	DATE	BY	CHK.	MK.	DCN	DESCRIPTION	DATE	BY	CHK.

09/98
KEVIN 10/98
SCALE

DRAIN PIPEING ASSEMBLY KLAMPRESS TYPE 85

CUSTOMER SK000960 0

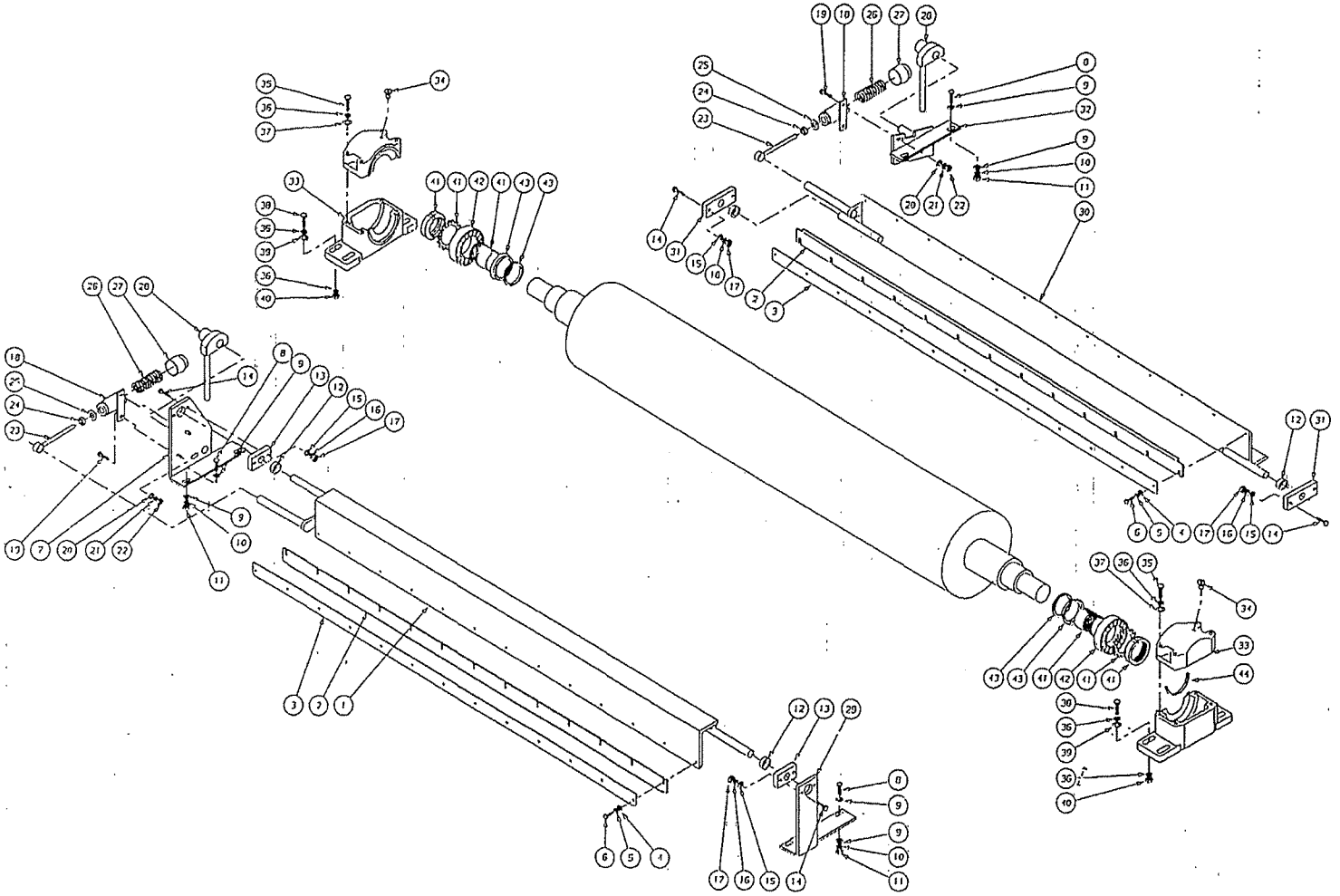
10.14 SCRAPERS:

10.14.1 Scraper Assembly Drawing:

a. Upper and Lower Scraper Blade Assembly: SK000948

10.14.2. Scraper Blade Replacement:

a. Shut down the press and lock out drive controls.
b. Rotate the blade away from the belt.
c. Remove the cover plate. Save the plate and bolts.
d. Remove and replace the scraper blade with new blade.
e. Replace the cover plate and bolts.
f. Resume operations.



ITEM	PART NO.	DESCRIPTION	QTY
44		SPACER RING	
43		SEAL ASSEMBLY 2 3/4"	
42		BEARING	
41		TAPER ADAPTER	
40		NUT, HEX 1/2"	
39		WASHER, FLAT 1/2"	
38		BOLT, HEXHEAD 1/2" X 2 1/2" LG	
37		WASHER, FLAT 1/2" X 1/8" THICK	
36		WASHER, LOCK 1/2"	
35		BOLT, HEXHEAD 1/2" X 2 1/4" LG	
34		GREASE FITTING 1/8"	
33		CLOSED BEARING HOUSING	
32		SCRAPER BLADE SUPPORT BRACKET	
31		LOWER SCRAPER BLADE BUSHING	
30		LOWER SCRAPER BLADE WELDMENT	
29		BRACKET WELDMENT, UPPER SCRAPER	
28		SCRAPER BLADE CAM WELDMENT	
27		OUTER TUBE WELDMENT	
26		SPRING	
25		WASHER, FLAT 5/8"	
24		NUT, HEX 5/8"	
23		SCRAPER TENSIONING ROD WELDMENT	
22		NUT, HEX 5/8"	
21		WASHER, LOCK 5/8"	
20		WASHER, FLAT 5/8"	
19		BOLT, HEXHEAD 5/8" X 1 1/2" LG	
18		TENSIONER INNER TUBE WELDMENT	
17		NUT, HEX 3/8"	
16		WASHER, LOCK 3/8"	
15		WASHER, FLAT 3/8"	
14		BOLT, HEXHEAD 3/8" X 1 3/4" LG	
13		SCRAPER BLADE, UPPER BUSHING	
12		SET COLLER	
11		NUT, HEX 1/2"	
10		WASHER, LOCK 1/2"	
9		WASHER, FLAT 1/2"	
8		BOLT, HEXHEAD 1/2" X 1 1/2" LG	
7		UPPER SUPPORT BRACKET WELDMENT	
6		BOLT, HEXHEAD 1/4" X 3/4" LG	
5		WASHER, LOCK 1/4"	
4		WASHER, FLAT 1/4"	
3		SCRAPER BLADE COVER PLATE	
2		SCRAPER BLADE	
1		UPPER SCRAPER BLADE WELDMENT	

29 MAR 1993

REVISIONS

INC.	DCN	DESCRIPTION	DATE	BY	CHK.	INC.	DCN	DESCRIPTION	DATE	BY	CHK.

NOTICE

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TOLERANCE UNLESS OTHERWISE NOTED.
BREAK ALL SHARP EDGES
FRACTIONAL ± 1/32"
DECIMAL .XX ± 1.02, ANGLES ± 1 1/2°
.X ± 1, .XXX ± 1.015 FINISH, SURFACE 125 √ MAX.
ALL DIMENSIONS IN INCHES.

ASHBROOK-SIMON-HARTLEY
P.O. BOX 16327
HOUSTON, TEXAS 77222

DRAWN	JET	DATE	
DESIGNED			
TRACED			
CHECKED	KEVIN		
SCALE	SCALE		

TITLE: UPPER & LOWER SCRAPER BLADE ASSEMBLY
KLAMPRESS TYPE 85

CUSTOMER

DWG. NO. SK000948 REV 0

REDUCED DRAWING NOT TO SCALE

10.15 DRIVE TRAIN:

10.15.1 Drawings:

SK000905 Drive Assembly Drawing
SK000910 Drive Roller Assembly Drawing

a. Motor Technical Data
b. Motor Data
c. Electrical Motor Data
d. Electrical Motor Dimensional Data
e. Manufacturer's Instructional Data

10.15.2 Lubrication:

Note: Lubrication frequency - Primary Gear Box 10,000 hours.

a. Primary Gear Box:

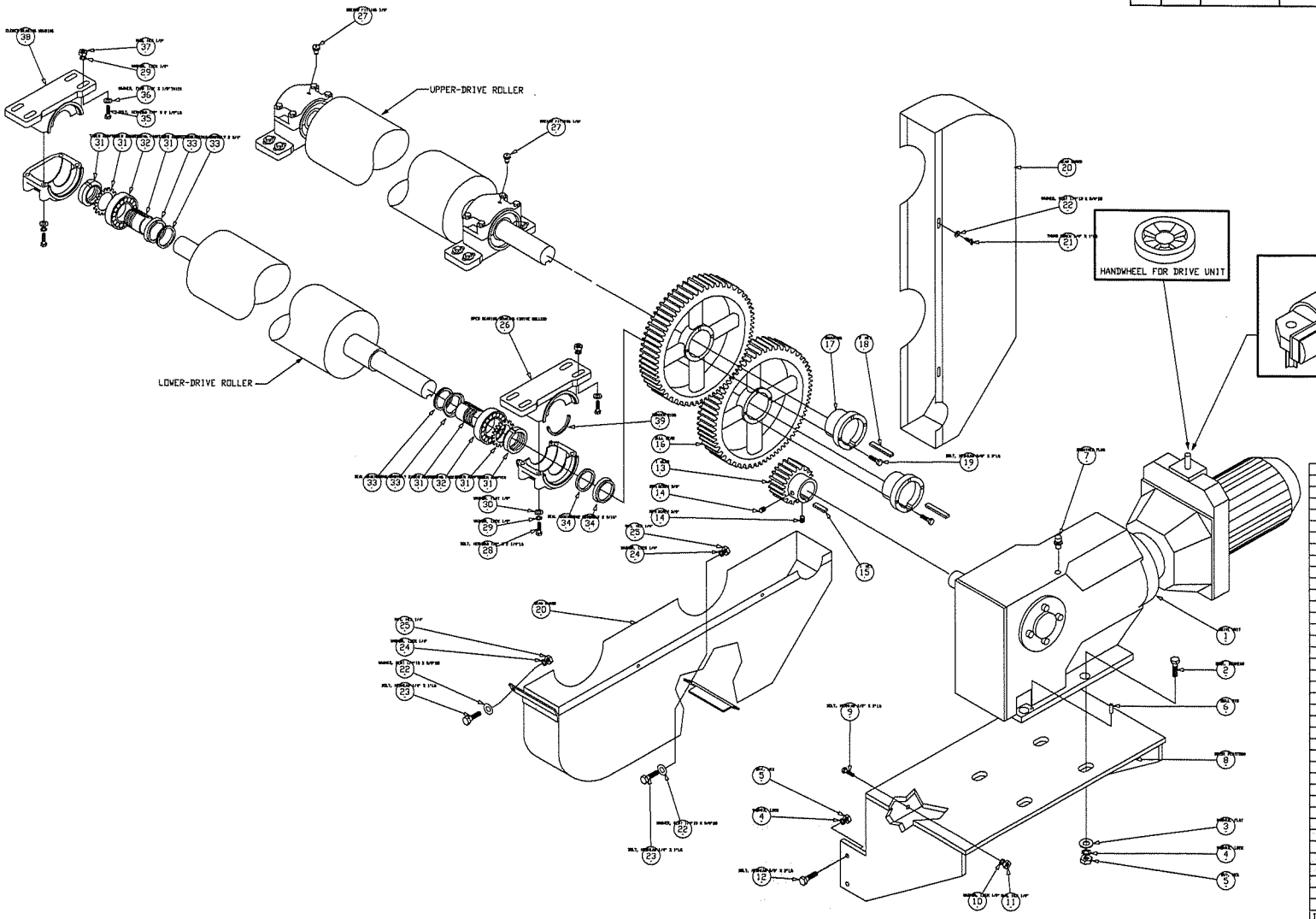
(1) Check oil level every 6 months.
(2) Replace oil every 10,000 hours or annually.
(3) Should oil be observed leaking from the gear reducer the seals must be replaced immediately to prevent serious damage to the gearing.

c. Secondary Gearing

(1) Check for unusual wear patterns on gear tooth faces. Adjust alignment of pinion and bull gear as needed.
(2) Relubricate with open gear lube monthly.

B44MATR2.DWG REV. 2

NO.	QTY.	PART NO.	DESCRIPTION



ITEM	PART NO.	DESCRIPTION	QTY.
39		SPACER RING	
38		CLOSED BEARING HOUSING	
37		NUT, HEX 1/2"	
36		WASHER, FLAT 1/2" X 1/8" THICK	
35		BOLT, HEXHEAD 1/2" X 2 1/2" LG	
34		SEAL ASSEMBLY 2 9/16"	
33		SEAL ASSEMBLY 2 3/4"	
32		BEARING (422146)	
31		TAPER ADAPTER	
30		WASHER, FLAT 1/2"	
29		WASHER, LOCK 1/2"	
28		BOLT, HEXHEAD 1/2" X 2 1/4" LG	
27		GREASE FITTING 1/8"	
26		OPEN BEARING HOUSING (DRIVE ROLLER)	
25		NUT, HEX 1/4"	
24		WASHER, LOCK 1/4"	
23		BOLT, HEXHEAD 1/4" X 1" LG	
22		WASHER, FLAT 1/4" ID X 5/8" OD	
21		THUMB SCREW 1/4" X 1" LG	
20		GEAR GUARD	
19		BOLT, HEXHEAD 5/8" X 3" LG	
18		KEY	
17		BUSHING	
16		BULL GEAR	
15		KEY	
14		SET SCREW 3/8"	
13		GEAR	
12		BOLT, HEXHEAD 5/8" X 2" LG	
11		NUT, HEX 1/2"	
10		WASHER, LOCK 1/2"	
9		BOLT, HEXHEAD 1/2" X 2" LG	
8		DRIVE PLATFORM	
7		BREATHER PLUG	
6		ROLL PIN	
5		NUT, HEX	
4		WASHER, LOCK	
3		WASHER, FLAT	
2		BOLT, HEXHEAD	
1		DRIVE UNIT	

REVISIONS				
REV	DATE	DESCRIPTION	BY	APP'D
1				
2				
3				
4				
5				
6				

TOLERANCE UNLESS NOTED:
ALL DIMENSIONS IN INCHES.
BREAK ALL SHARP EDGES
FRACTIONAL = ± 1/32"
ANGLES = ± 1/2°
DECIMAL .XX = ± .03
.X = ± .1 .XXX = ± .015
MACH. SURFACE 125 MAX.

DRAWN	JET	DATE 9/17/98
CHECKED	JET	DATE 9/17/98
APPROVED	JET	DATE 9/17/98
NEXT ASS'Y	N/A	WEIGHT N/A

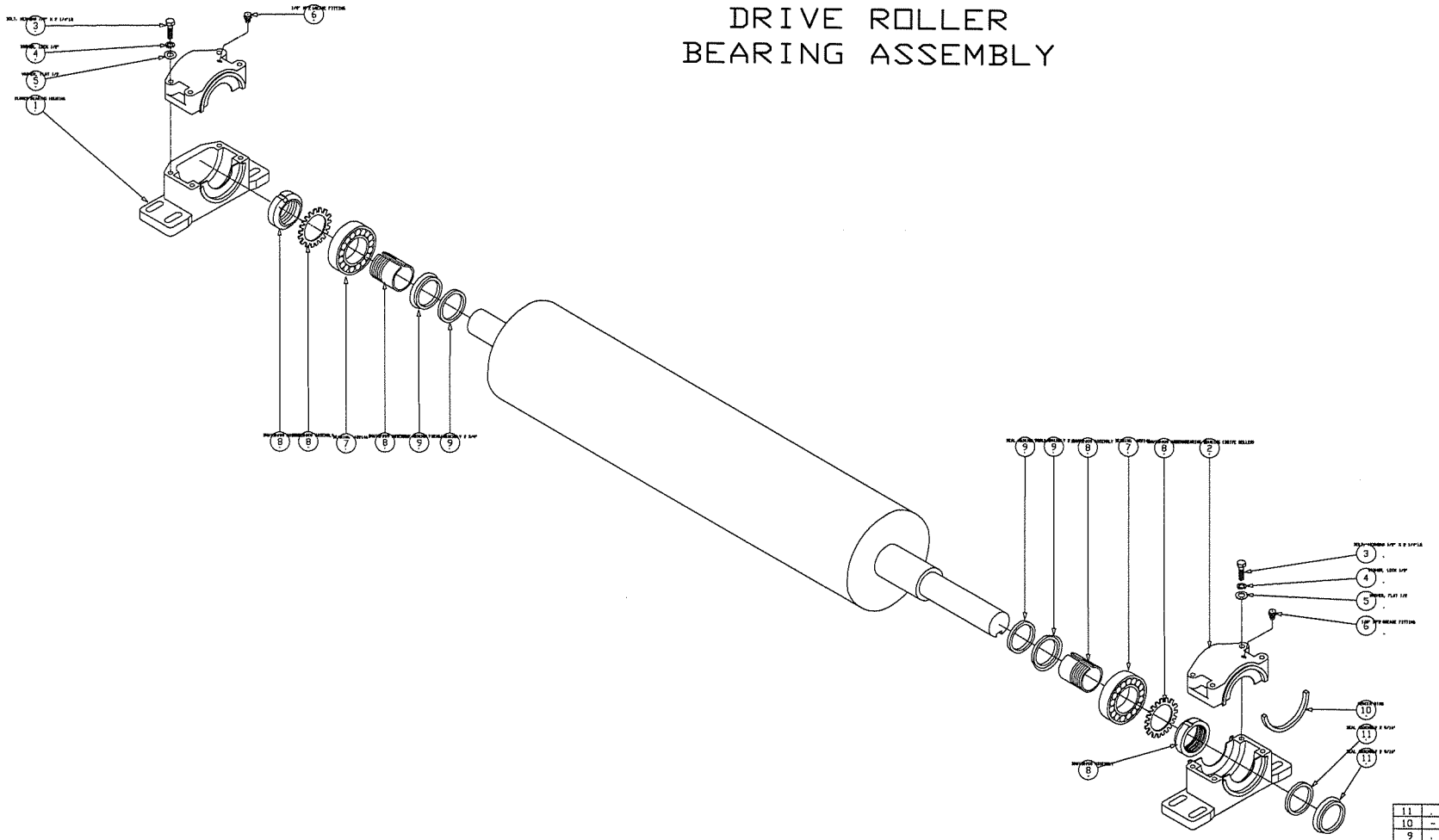
ASHBROOK
LEADERS IN LIQUID/SOLID SEPARATION

Ashbrook Corporation
11600 East Hardy Road
Houston, Texas 77093
Phone: 281-449-0322
FAX: 281-449-1324

TITLE
DRIVE ASSEMBLY
KLAMPRESS TYPE 85
PLATFORM, SPUR GEAR DRIVE

SCALE	DWG. NO.	REV
1/18	SK000905	0
CUSTOMER N/A		

DRIVE ROLLER
BEARING ASSEMBLY



ITEM	DWG. NO.	DESCRIPTION	QTY.
11	-	SEAL ASSEMBLY 2 9/16"	2
10	-	SPACER RING	2
9	-	SEAL ASSEMBLY 2 3/4"	4
8	-	SNW15-209 ASSEMBLY	4
7	-	BEARING 422146	2
6	-	1/8" NPT GREASE FITTING	4
5	-	WASHER, FLAT 1/2	16
4	-	WASHER, LOCK 1/2"	16
3	-	BOLT, HEXHEAD 1/2" X 2 1/4"LG	16
2	-	OPEN BEARING HOUSING (DRIVE ROLLER)	2
1	-	CLOSED BEARING HOUSING	2

TOLERANCE UNLESS NOTED:
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FRACTIONAL = ± 1/32"
ANGLES = ± 1/2°
DECIMAL .XX = ± .03
X. = ± .1, .XXX = ± .015
MACH. SURFACE 125 MAX.

ASHBROOK
LEADERS IN LIQUID/SOLID SEPARATION

MK.	DCN	DESCRIPTION	DATE	BY	CHK.	MK.	DCN	DESCRIPTION	DATE	BY	CHK.

09/98
KEVIN

10° DRIVE ROLLER ASSEMBLY
KLAMPRESS TYPE 85

SCALE

CUSTOMER SK000910 0

Gearmotors and Gear Reducers

OPERATING INSTRUCTIONS

01 805 52 US

GENERAL

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

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

LUBRICANTS

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

LONG TERM STORAGE

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

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

INSTALLATION OF COMPONENTS ON DRIVE SHAFTS

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

Table 1. Standard Shaft Tolerances

Diameter (inch)	Solid Shaft Tolerances (inch)	Hollowshaft Tolerances (inch)
1.500 and smaller	+0.0000/-0.0005	+0.0005/-0.0000
Larger than 1.500	+0.000/-0.001	+0.001/-0.000

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

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

SHAFT MOUNTED REDUCERS

SEW-Eurodrive recommends the use of a light coating of Never-Seez® (or equivalent) on the keyed output shaft. The Never-Seez® lubricant may prevent rusting and fretting corrosion between the reducer hollowshaft and the shaft of the driven machine. The lubricant will aid in shaft removal when necessary.

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

INSTALLATION AND OPERATION

The drive installation site should be selected to ensure:

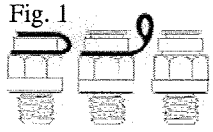
- Ambient temperatures below 40°C (104°F).
- Unimpeded flow of air to the motor and variable speed units.
- Accessibility to the drain, level and breather plugs.
- Adequate space for removal of brakemotor fanguard for brake adjustment and maintenance.

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

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

For transportation, the units are supplied with the breather plug already mounted. After the unit is installed, the black rubber seal located on the breather MUST BE REMOVED (Fig. 1). In addition, the oil level should be checked. Remove the plated (non-painted) oil level plug. The oil level is correct when the surface of the oil is level with the lowest point of that tapped hole, the exception is S37. Units W20 and W30 are sealed in any position.

Fig. 1



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

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

MAINTENANCE

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

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

SEW EURODRIVE

SOUTHEAST MANUFACTURING & ASSEMBLY CENTER
1295 Old Spartanburg Hwy/Lyman SC 29365
(864) 439-7537 Fax: (864) 439-7830

SOUTHWEST ASSEMBLY CENTER
3950 Platinum Way/Dallas TX 75237
(214) 330-4824 Fax: (214) 330-4724

MIDWEST ASSEMBLY CENTER
2001 West Main Street/Troy OH 45373
(937) 335-0036 Fax: (937) 222-4104

EAST COAST ASSEMBLY CENTER
200 High Hill Road/Bridgeport NJ 08014
(856) 467-2277 Fax: (856) 845-3179

WEST COAST ASSEMBLY CENTER
30599 San Antonio Road/Hayward CA 94544
(510) 487-3560 Fax: (510) 487-6381

LUBRICANTS

LUBRICATION SCHEDULE FOR SEW-EURODRIVE GEAR UNITS									
Gear Reducer Type[1)]	**Lubrication Type**	**Ambient air temperature range ° F**	**kin viscosity at 40°C (cSt) approx.**	**Mobil Oil Co.**	**CHEVRON Oil Co.**	**Shell Oil Co.**	**Texaco Oil Co.**	**BP Oil Co.**	**Kluber Oil Co.**
R F K	Oil	+32 to +104	VG220	Mobilgear 630	Chevron Non-Leaded Gear Compound 220	Shell Omala Oil 220	Meropa 220	BP Energol GR-XP 220	Kluberoil GEM 1-220
		+5 to +77	VG150 VG100	Mobilgear 629	Chevron Non-Leaded Gear Compound 150	Shell Omala Oil 100	Meropa 150	BP Energol GR-XP 100	Kluberoil GEM 1-150
S	Oil	+32 to +104	VG680	Mobilgear 636	Chevron Non-Leaded Gear Compound 680	Shell Omala Oil 680	Meropa 680	BP Energol GR-XP 680	Kluberoil GEM 1-680
		+5 to +77	VG220	Mobilgear 630	Chevron Non-Leaded Gear Compound 220	Shell Omala Oil 220	Meropa 220	BP Energol GR-XP 220	Kluberoil GEM 1-220
General	**Synth. Oil**	+176 to +5	Consult Factory For Use of Synthetic Oils						
	Synth. Grease	+200 to -40	Consult Factory For Use of Grease Filled Reducers						
Ball & Roller Bearings	**Grease** Used for normal application Temp. range—20°F to 250°F			**Mobilux EP 2**	**Chevron Dura-Lith EP2**	**Shell Alvania Grease R 3**	**Multifak EP2**	**BP Energrease LS 3**	**CEN-TOPLEX 2EP**

[1)]Applies to all reducers with or without motor and input shaft.

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

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

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

ATTENTION

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

LUBRICANTS

Oil Capacities

Parallel Helical Gear Units - "R"

U.S. Gallons

Gear Unit	Mounting Position											
	B3 [1]	B5 [1]	B5I	B5II	B5III	B6 [2]	B7 [2]	B8 [1],[2]	V1	V3[1]	V5	V6[1]
RX/RXF 57	0.16	0.13	0.18	0.29	0.18	0.24	0.24	0.34	0.29	0.21	0.34	0.21
RX/RXF 67	0.21	0.18	0.26	0.40	0.26	0.29	0.29	0.45	0.45	0.21	0.50	0.21
RX/RXF 77	0.29	0.24	0.42	0.63	0.42	0.42	0.42	0.69	0.66	0.40	0.71	0.40
RX/RXF 87	0.45	0.42	0.77	1.29	0.77	0.77	0.77	1.27	1.24	0.66	1.27	0.66
RX/RXF 97	0.55	0.55	1.27	1.87	1.27	1.27	1.27	1.95	1.85	0.95	1.85	0.90
RX/RXF 107	1.03	0.82	1.90	2.96	1.90	2.03	2.03	3.06	2.77	1.56	3.14	1.48
R..17	0.07	0.07	0.09	0.09	0.09	0.09	0.09	0.09	0.16	0.16	0.16	0.16
R..27	0.07 (0.11)	0.07 (0.11)	0.11	0.11	0.11	0.11	0.11	0.11	0.18	0.18	0.18	0.18
R..37	0.08 (0.26)	0.11 (0.26)	0.21	0.26	0.26	0.21	0.26	0.26	0.29	0.24	0.29	0.24
R..47	0.18 (0.40)	0.18 (0.40)	0.40	0.40	0.40	0.40	0.40	0.40	0.45	0.42	0.45	0.42
R..57	0.21 (0.55)	0.21 (0.55)	0.58	0.45	0.45	0.45	0.45	0.45	0.53	0.48	0.55	0.50
R..67	0.29 (0.61)	0.32 (0.66)	0.50	0.71	0.55	0.48	0.53	0.74	0.82	0.71 (0.95)	0.84	0.69 (0.92)
R..77	0.32 (0.79)	0.32 (0.69)	0.63	0.87	0.79	0.66	0.90	1.0	0.98	1.0 (1.1)	1.2	1.0 (1.3)
R..87	0.61 (1.6)	0.63 (1.6)	1.7	1.9	1.7	1.7	1.7	1.9	2.1	1.8 (2.1)	2.1	1.8 (2.4)
R..97	1.2 (2.6)	1.3 (2.7)	3.0	3.0	3.1	3.0	3.1	3.1	3.7	3.1 (3.9)	3.5	3.1 (3.9)
R..107	1.6 (3.6)	1.7 (3.9)	3.5	4.5	4.2	3.5	4.2	4.5	5.1	4.2 (5.3)	5.1	4.3 (5.4)
R..137	2.6 (6.6)	2.5 (6.6)	6.6	7.7	6.6	6.6	6.6	7.8	8.6	7.1 (8.6)	8.3	7.4 (8.6)
R..147	4.1 (11)	4.3 (11)	11	13	11	10	11	13	14	12 (14.5)	14	12 (14.5)
R..167	7.1 (18.5)	6.9 (18.5)	17.2	20	18.7	17.4	18.2	20.6	23.2	21.6 (24)	23.2	21.7 (24)

[1]On compound gear units the larger gear unit is to be provided with the oil quantity in parenthesis.

[2]On compound gear units having mounting positions B6, B7, or B8 the smaller gear unit is to be provided with the oil filling of the B5 mounting position.

Refer to the SEW Catalog or request Document #2111 for R-Series mounting position diagrams.

Right Angle Helical-Worm Gear Units - "S"

U.S. Gallons

Gear Unit	Mounting Position															
	B3, B8II B6I	B3I B6II	B5	B5I	B5II	B5III[1]	B6 B8I	B8[1] B3II	V1A V1IB	V1B V1IA	V5, V5I V5II, V6 V6I	H1	H2[1]	H3	H4	H5 H6
S..37	0.07	0.16	0.11	0.07	0.16	0.13	0.11	0.13	0.11	0.11	0.11	0.07	0.13	0.16	0.11	0.11
S..47	0.09	0.29	0.24	0.11	0.32	0.24	0.21	0.18	0.24	0.26	0.21	0.11	0.18	0.29	0.21	0.21
S..57	0.13	0.40	0.32	0.13	0.40	0.26	0.32	0.26	0.37	0.37	0.34	0.13	0.26	0.42	0.29	0.32
S..67	0.26	0.84	0.58	0.26	0.84	0.61 (0.79)	0.58	0.58 (0.82)	0.69	0.71	0.69	0.26	0.48 (0.69)	0.77	0.53	0.66
S..77	0.50	1.6	1.08	0.5	1.72	1.0 (1.5)	1.11	0.98 (1.43)	1.3	1.2	1.2	0.5	0.95 (1.32)	1.56	1.03	1.2
S..87	0.87	3.2	2.11	1.0	3.17	1.87 (2.67)	2.14	1.8 (2.75)	2.16	2.40	2.2	1.0	1.6 (2.3)	3.0	2.0	2.1
S..97	1.8	5.9	3.96	1.95	6.23	3.64 (4.96)	3.96	3.54 (4.75)	4.75	4.49	4.49	1.85	3.0 (4.22)	5.54	3.70	4.14

[1]On compound gear units, the larger unit is to be filled with the quantity in parenthesis.

Refer to the SEW Catalog or request Document #2114 for S-Series mounting position diagrams.

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

LUBRICANTS

Oil Capacities

Right Angle Helical-Bevel Gear Units - "K"

U.S. Gallons

Gear Unit	Mounting Position							
	B3, H1, B5I	B3I, B6II	B5	B5II	B5III	B6, B8I	B6I	B8
K..37	0.13	0.34	0.29	0.40	0.29	0.26	0.16	0.26
K..47	0.21	0.53	0.34	0.58	0.45	0.34	0.21	0.40
K..57	0.29	0.84	0.61	0.92	0.69	0.63	0.40	0.63
K..67	0.29	0.90	0.63	0.95	0.74	0.63	0.40	0.69
K..77	0.58	1.56	1.08	1.58	1.16	1.08	0.74	1.16
K..87	0.98	2.88	2.16	3.14	2.38	2.11	0.98	2.30
K..97	1.85	5.28	3.88	5.68	4.57	3.70	1.85	4.14
K..107	2.64	8.45	5.81	9.24	6.86	5.54	2.64	6.73
K..127	5.54	14.26	10.96	14.52	12.14	10.96	5.54	11.62
K..157	8.18	23.76	17.42	24.29	18.22	16.37	8.18	17.16
K/KH..166	8.18	31.15	—	31.15	—	—	—	—
K/KH..186	15.05	51.22	—	51.22	—	—	—	—

Gear Unit	Mounting Position						
	V1, V1I	V5, V5I	V6/V6I	H2	H3	H4	H5, H6
K..37	0.26	0.26	0.26	0.26	0.37	0.26	0.26
K..47	0.42	0.42	0.42	0.42	0.55	0.34	0.42
K..57	0.77	0.69	0.63	0.74	0.95	0.69	0.77
K..67	0.71	0.69	0.69	0.71	0.95	0.63	0.69
K..77	1.19	1.11	1.16	1.21	1.58	1.08	1.16
K..87	2.22	2.06	2.11	2.32	2.93	2.16	2.11
K..97	4.14	4.14	4.09	4.14	5.28	3.88	4.14
K..107	6.60	6.34	6.34	6.34	8.45	5.41	6.34
K..127	10.82	10.56	10.82	11.35	13.73	10.96	10.56
K..157	16.37	15.31	16.37	17.69	22.97	17.42	16.37
K/KH..166	25.08	—	—	—	—	—	—
K/KH..186	40.92	—	—	—	—	—	—

Refer to the SEW Catalog or request Document #2113 for K-Series mounting position diagrams.

the SNUGGLER® Helical Gear Units - "F"

U.S. Gallons

Gear Unit	Mounting Position										
	H1	B5	B6	H2, B5II, B6II	H3, B5III, B3I, B8I	H4, B3, B8	B5I	H5	V1	V5	H6, V3, V6
F..37	0.26	0.26	0.26	0.18	0.29	0.26	0.26	0.34	0.32	0.32	0.32
F..47	0.40	0.42	0.40	0.29	0.45	0.40	0.40	0.50	0.50	0.50	0.50
F..57	0.71	0.73	0.69	0.55	0.79	0.77	0.77	1.08	1.08	1.06	1.00
F..67	0.71	0.71	0.71	0.50	0.84	0.77	0.77	1.00	1.00	1.00	1.00
F..77	1.32	1.35	1.32	1.14	1.66	1.59	1.59	2.11	2.14	2.11	1.93
F..87	2.64	2.72	2.64	2.06	2.96	2.85	2.91	3.65	3.72	3.65	3.49
F..97	4.89	5.02	4.89	3.33	5.42	4.89	4.99	6.65	6.74	6.65	5.94
F..107	6.47	6.74	6.47	5.15	7.40	7.13	7.26	9.91	10.17	9.91	8.45
F..127	10.30	10.96	10.70	8.98	12.94	12.28	12.28	16.11	16.64	16.11	14.79
F..157	17.95	19	18.22	16.9	20.86	22.18	22.97	27.46	27.98	27.72	27.72

Refer to the SEW Catalog or request Document #2112 for F-Series mounting position diagrams.

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

10.16 DEWATERING BELTS

10.16.1 Belt Data Sheet: Attached

10.16.2 Belt Use Record Sheet: Attached

10.16.3 Belt Cleaning Instructions:

a. Run wash water and belt drive (no sludge or polymer) for a minimum of 45 minutes per day of dewatering.
b. If additional cleaning is desired, Apply mild soap directly onto the belts or inject into the spray wash system for one hour.

Note: Do NOT steam clean the belts. Steam cleaning will damage the belts. Use a maximum of 1,500 psi water at a maximum of 130 degrees F. Do not wash belts with hot water while they are under tension as this will cause stretching.

10.16.4 Belt Repair Procedures:

a. Belt Puncture:

(1) Clean around the puncture and allow belt to dry.
(2) Using scrap belt material, cut a patch to size.
(3) Coat area with marine epoxy and apply patch.
(4) Allow epoxy to dry before operating press.

Note: When using marine epoxy, ensure belt is clean and dry before applying epoxy. Apply epoxy to both belt and patch as evenly as possible. Let epoxy thoroughly dry before operating. Dewatering will not occur in an area coated with marine epoxy.

b. Belt Edge Fraying:

(1) Clean belt edge and allow belt to dry.
(2) Cut off excess strands.
(3) Apply marine epoxy and allow epoxy to dry.

10.16.5. Belt Installation: See Section 7.6.3 for belt installation and safety.

a. For belt installation when there are no belts on the machine see Section 7.6.3 for belt installation and safety.
b. Follow these instructions for replacing existing belts on the machine.

WARNING: Do not disable any alarms on the machine by disconnecting wires at the control panel or the junction box. The alarms exist to protect yourself and the equipment

1. See Section 7.6.3 for belt installation safety.
2. Energize the belt drive and run the belts until the clipper seam is at the tensioin yoke.
3. Stop the belt drive and retract the tension cylinders to remove tension from the belts.
4. Remove the belt seam wire and then connect the new belt onto the trailing edge of the old belt. Ensure the seams are properly meshed together and reinstall the belt seam wire.
5. Loosen the broken belt sensor proximity switches and move them back away from their original position by about ¼ to ½ inch.

WARNING: The belt drive will not operate unless the hydraulic pump is running and the belts are tensioned. The tension yoke will move to its fully extended position when the tension valve is placed in the tension position. Ensure no personnel or equipment is in the path of the tension yoke as it extends.

6. Place the tension control valve in the belt tension position and allow the tension cylinders to extend to their full stroke.
7. Energize the belt drive and allow the old belt to pull the new belt into the machine.
8. Roll up the old belt as it comes out of the machine.
9. Retract the tension cylinders and seam the ends of the new belt together with a new seam wire.
10. Repeat with the second belt.
11. Replace the broken belt sensor proximity switches and adjust to their original positions.

10.16.6 **Possible Causes for Belt Tracking Problems**

Occasionally a problem will arise where one or both belts of a belt filter press will not track properly. When this happens look for these possible causes.

When both belts wander off track:

Uneven sludge distribution across the width of the machine will make the belts steer away from the heavy side because the higher sludge load between the belts makes the belt on the outside behave as though it were on a steering roller turned away from the heavy side. This occurs to both belts alternately as they go around the rollers. When the belt is on the inside against the roller it does not see the uneven sludge thickness, but when it is on the outside it will be steered "down hill" away from the heavy side. Correct the sludge distribution at the inlet spreader. In extreme cases of off center sludge loading the steering system will not be able to compensate and the belt will go into the over travel limit switches. Also, serious cases will cause diagonal creasing and destruction of the belts. If the belt seam is not straight across the machine this is evidence that the sludge loading has not been correct in the recent past. The seam will lag behind on the heavier loaded side and, if run this way long enough, will not recover even if the sludge distribution is corrected.

A pressure roller bearing that has come loose from its mounting to the frame will allow the roller to get out of alignment and it will act like a steering roller and cause both belts to track toward one side. This may be detected by observing that the steering cylinders are staying off center or are hunting for their balance point. If the bearing housing has moved enough to cause this problem you should see the mark on the frame showing it has moved from its original place. Put the bearing back where it was and check all the bearing mounting bolts for tightness. Observe for correct tracking without hunting.

Check for bearings that have been moved in an attempt to "realign" the rollers. Sometimes this is done in the field by persons attempting to make a damaged or irregular belt track straight. When the belt wears or is later replaced, then tracking problems will begin. Put all the rollers back in their original places so they are parallel. Be sure to check that all the bearing bolts are tight.

When one belt wanders off track:

Uneven sludge distribution across the width of the machine will make the belts steer away from the heavy side because the higher sludge load between the belts makes the belt on the outside behave as though it were on a steering roller turned away from the heavy side. Uneven sludge distribution usually affects both belts, but in mild cases or if the belts have been stretched only one belt may be affected. Look for creases in the belts or belt seams that have been pulled in a diagonal. See the paragraph above.

An idler roller bearing that has come loose from its mounting to the frame will allow the roller to get out of alignment and it will act like a steering roller and cause one belt to track toward one side. This may be detected by observing that its steering cylinder is staying off center or is hunting for its balance point. If the bearing housing has moved enough to cause this problem you should see the mark on the frame showing it has moved from its original place. Put the bearing back where it was and check all the bearing mounting bolts for tightness. Observe for correct tracking without hunting.

Check for bearings that have been moved in an attempt to "realign" the rollers. Sometimes this is done in the field by persons attempting to make a damaged or irregular belt track straight. When the belt wears or is later replaced, then tracking problems will begin. Put all the rollers back in their original places so they are parallel. Be sure to check that all the bearing bolts are tight.

It is possible for the tension equalizing rack and pinion to get out of time. If the rack is clogged with dried sludge or there is any looseness in the assembly the pinion can jump a tooth and make the tension roller be out of line. Uneven sludge distribution can provide the force to cause this to happen. Observe when you fully retract the tension cylinders if one side hits bottom first; or you can measure the distance between rollers or count the teeth. Clean the rack and reset the timing.

Intermittent steering problems, those that return after you have "fixed" the problem and watched the machine run fine for hours, can be the result of trash in the hydraulic lines. Take off the steering valves and flush the lines. Try swapping the steering valves between the upper and lower belts to see if the problem goes with the valve. If the filters in the fittings on the valve are clogged with dirt it may not be obvious and you may not be able to clean them. Replace the fittings or the entire valve.

A dirty or damaged steering valve will not respond to the movement of the belt and the steering cylinder may stay at one end of its travel for too long and then switch completely to the other end. Clean or replace the steering valve. Also, look for a broken spring on the paddle arm. If the arm is damaged or loose on its shaft the same effect may be observed.

The early steering cylinders had chrome plated steel rods that can rust where there are microscopic pores in the plating. After a long time in service the rod can become so rough that it will stick in the rod seal or bushing and the cylinder action will be erratic, not responding immediately to movement of the steering paddle. Look for leaking seals and rough spots on the cylinder rod. Replace the cylinder. The new steering cylinders have solid stainless steel rods that will not rust and there is no plating to flake off.

Wear or damage to the steering bearing pivot assemblies can cause irregular tracking action. Make sure the pivots are in good condition and there is no looseness.

Sometimes a new belt gets stretched on one side by uneven sludge loading. When the belt tension is applied the belt will be tight like a drum head on one side of the machine and slightly slack on the other. A stretched belt will not track straight. Sometimes the belt can be straightened

by running it for a while at maximum belt tension with only the wash water on. Apply hot water if it is available and the straightening will happen faster, but don't over do it.

The basic steps in recovering from a belt tracking accident

1. turn off the power and disconnect the belt misalignment switches
2. turn on the power and start the hydraulic unit
3. retract the tension cylinders to loosen the belts.
4. turn off the power
5. manually pull the belts back to center
6. start the press and allow it to run without sludge until clean
7. observe the belt tracking
8. watch for proper operation of the belt steering
9. if belt tracks OK and steering is working, shut down the press
10. turn off the power and reconnect the misalignment switches
11. place the press back in service
12. watch for tracking problem to reappear
13. determine and correct the cause

ASHBROOK KLAMPRESS®

BELT DATA SHEET

1.	**Fiber:**	**Polyester Monofilament**
2.	**Type:**	**8065**
3.	**Weave:**	**Mod. Satin**
4.	**Weight:**	**35.25 oz/sq.yd.**
5.	**Mesh Opening in Microns:**	**Warp-0** **Weft-350**
6.	**Tensile Strength (Warp):**	**>1560 pli**
7.	**Tensile Strength of Seam:**	**502.8 pli**
8.	**Safety Factor of Belt:**	**31 (@ 50 pli)**
9.	**Safety Factor of Seam:**	**10 (@ 50 pli)**
10.	**Belt Edge Coating:**	**Acetone Based Plastic Resin** **(Heat Sealed)**

Belt Usage Log

Machine Type:	Size: Meter	Serial Number:	
Date: **Belt Number:** **Belt Type:** **Why Replaced:**		**Date:** **Belt Number:** **Belt Type:** **Why Replaced:**	
Date: **Belt Number:** **Belt Type:** **Why Replaced:**		**Date:** **Belt Number:** **Belt Type:** **Why Replaced:**	
Date: **Belt Number:** **Belt Type:** **Why Replaced:**		**Date:** **Belt Number:** **Belt Type:** **Why Replaced:**	
Date: **Belt Number:** **Belt Type:** **Why Replaced:**		**Date:** **Belt Number:** **Belt Type:** **Why Replaced:**	
Date: **Belt Number:** **Belt Type:** **Why Replaced:**		**Date:** **Belt Number:** **Belt Type:** **Why Replaced:**	
Date: **Belt Number:** **Belt Type:** **Why Replaced:**		**Date:** **Belt Number:** **Belt Type:** **Why Replaced:**	

10.17 IN-LINE VENTURI MIXER & POLYMER INJECTION RING

10.17.1 Drawing No. SK000377 Polymer Mixer.
In-Line Mixer with manifold and Injection Ring

Drawing No. SK002081 Polymer Back Flow Preventer
PVC Swing Check Valve to prevent sludge backing up into the polymer system.

10.17.2 Mixer Cleaning Procedures:

a. Remove side plate.
b. Clean internals.
c. Replace side plate and tighten bolts.

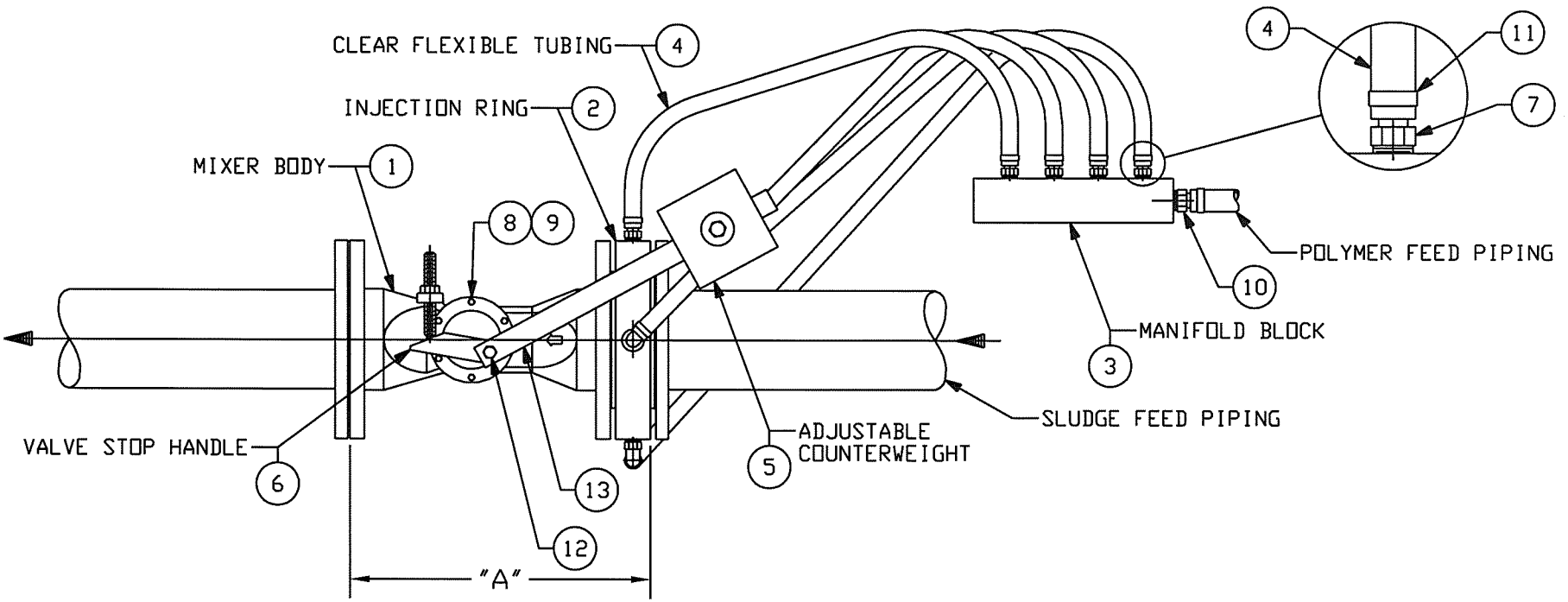
:

B4MATR3.DWG REV. 3

NOTE:

MIXER MAY BE MOUNTED IN A HORIZONTAL OR VERTICAL ATTITUDE. ARRANGE THE WEIGHT ARM TO PROVIDE THE NECESSARY CLOSING FORCE. THE FLOW THROUGH THE MIXER MUST ENTER THROUGH THE INJECTION RING. IF MOUNTED VERTICALLY THE FLOW SHOULD BE UPWARD.

STAINLESS STEEL MIXER PART NO.			ALUMINUM MIXER PART NO.					
4" X 6" MIXER	4" MIXER	6" MIXER	4" X 6" MIXER	4" MIXER	6" MIXER	NO.	QTY.	DESCRIPTION
017906	006909	015753	016642	006907	006908	1	1	MIXER BODY
009510	009509	009510	009510	009509	009510	2	1	INJECTION RING
006961	006961	006961	006961	006961	006961	3	1	POLYMER MANIFOLD BLOCK
007039	007039	007039	007039	007039	007039	4	A/R	CLEAR FLEXIBLE TUBING, 3/4" OD X 1/2" ID
007004	007004	007004	007004	007004	007004	5	1	COUNTER WEIGHT
007046	007046	029874	007046	007046	009137	6	1	VALVE STOP HANDLE
006960	006960	006960	006960	006960	006960	7	8	BARBED HOSE CONNECTOR, 3/8" NPT X 1/2" HOSE
015779	015779	015752	006905	006905	006906	8	1	COVER PLATE
006542	006542	006453	006542	006542	006453	9	1	GASKET
006763	006763	006763	006763	006763	006763	10	1	BARBED HOSE CONNECTOR, 3/4" NPT X 3/4" HOSE
007952	007952	007952	007952	007952	007952	11	9	SS HOSE CLAMP, 1/2" TO 7/8" RANGE
017026	017026	021398	017026	017026	021398	12	1	VALVE FLAP
018444	018444	100448	018444	018444	100448	13	1	COUNTER WEIGHT ARM



SIZE	"A"
4"	13 7/8" / 352
6"	19 1/16" / 484
4X6	19 1/16" / 484

CERTIFIED FOR CONSTRUCTION USE.
DATE: 4 SEPT 2003
By J.E.THOMPSON

REV	DATE	DESCRIPTION	BY	APP'D
1				
2				
3	12/98		AMC	
4	10/98	UPDATED TITLE BLOCK TO NEW STYLE	SAC	
5	7/00	REMOVED PICTURE, ADDED NOTE	JET	
6	6/02	ADDED MANUFACTURING NOTE	MM	
7	5/04	ADDED PARTS LIST FOR ALUM & SS MIXERS	JET	
8				
9				
10				
11				
12				
13				

TOLERANCE UNLESS NOTED: ALL DIMENSIONS IN INCHES. BREAK ALL SHARP EDGES FRACTIONAL ± 1/32" ANGLES ± 1 1/2° DECIMAL .XX ± .03 X. ± .1 .XXX ± .015 MACH. SURFACE 125√ MAX.

DRAWN	WOLF	DATE 1/90
CHECKED	JET	DATE 11/7/97
APPROVED	CLIENT	DATE 11/7/97
HEAT ASS'Y	N/A	WEIGHT N/A

ASHBROOK OPTIMIZED PROCESS RESULTS

Ashbrook Corporation
11600 East Hardy Road
Houston, Texas 77093
Phone: 281-449-0322
FAX: 281-449-1324

TITLE: GENERAL ARRANGEMENT AND PARTS LIST POLYMER MIXER ASSEMBLY

SCALE	DWG. NO.	REV
NTS	SK000377	7

CUSTOMER: GEN USE

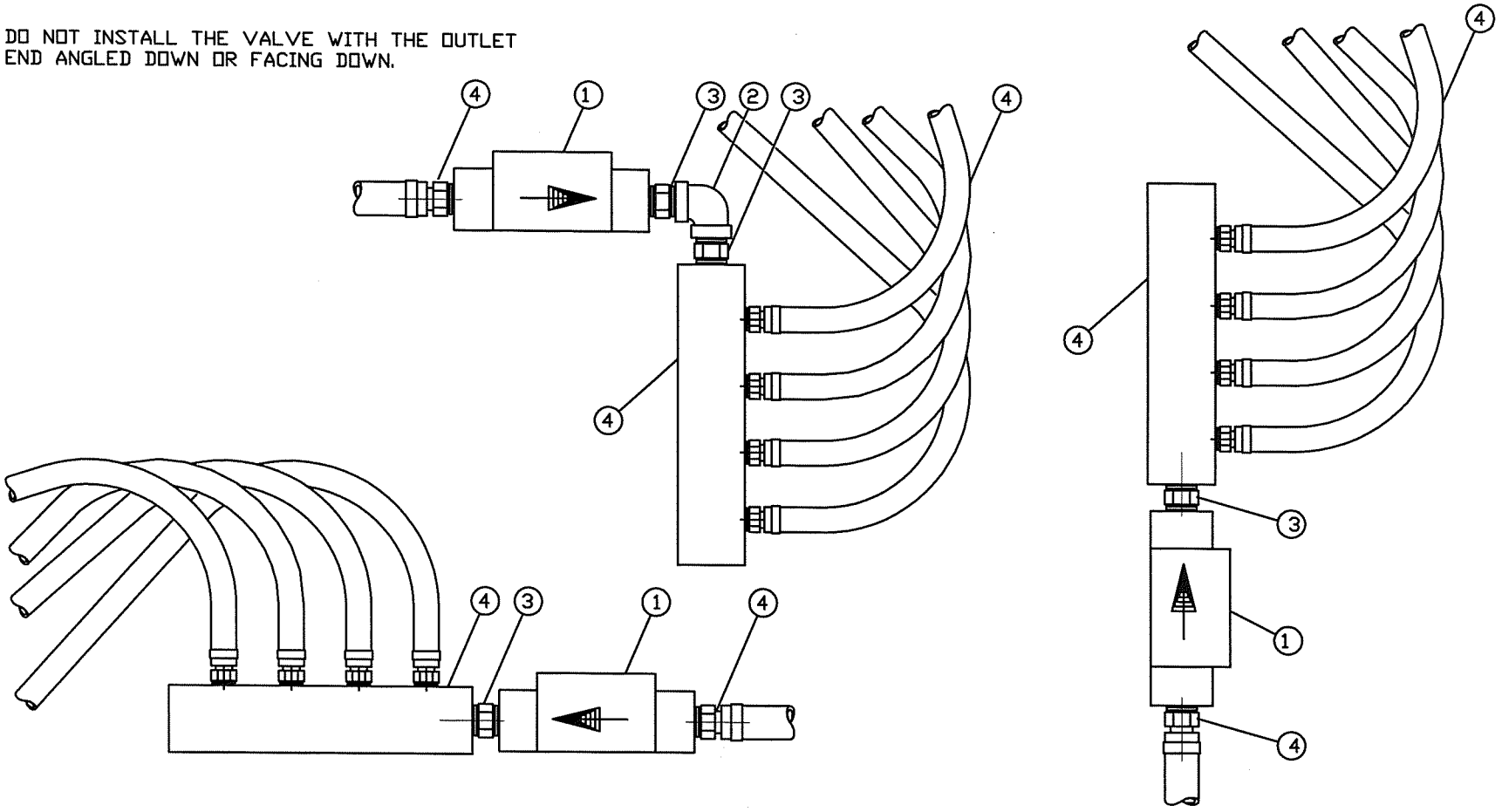
B4MATR3DWG REV. 3

ACCEPTABLE MOUNTING POSITIONS:

FLOW THROUGH THE VALVE MUST
BE HORIZONTAL OR UPWARD.

DO NOT INSTALL THE VALVE WITH THE OUTLET
END ANGLED DOWN OR FACING DOWN.

NO.	QTY.	PART NO.	DESCRIPTION
1	1	033020	SWING CHECK VALVE, 3/4 NPT
2	1	N/A	ELBOW, 3/4 NPT
3	A/R	N/A	ADAPTER, 3/4 NPT X 3/4 NPT MALE
4	N/A	N/A	EXISTING POLYMER MANIFOLD, HOSES, FITTINGS



REVISIONS						REVISIONS				
REV	DATE	DESCRIPTION	BY	APP'D	REV	DATE	DESCRIPTION	BY	APP'D
1					7				
2					8				
3					9				
4					10				
5					11				
6					12				

TOLERANCE UNLESS NOTED:
ALL DIMENSIONS IN INCHES.
BREAK ALL SHARP EDGES
FRACTIONAL = ± 1/32
ANGLES = ± 1/2°
DECIMAL .XX = ± .03
X. = ± .1, .XXX = ± .015
MACH. SURFACE 125√ MAX.

DRAWN	JER	DATE 9/7/00
CHECKED	JET	DATE 9/7/00
APPROVED		DATE 9/7/00
NEXT ASSY	N/A	WEIGHT N/A

ASHBROOK™ OPTIMIZED PROCESS RESULTS

Ashbrook Corporation
11600 East Hardy Road
Houston, Texas 77093
Phone: 281-449-0322
FAX: 281-449-1324

TITLE: POLYMER BACK FLOW PREVENTER
PVC SWING CHECK VALVE
3/4 NPT BOTH ENDS

SCALE	DWG. NO.	REV
1/3	SK002081	0

CUSTOMER: N/A

ASHBROOK KLAMPRESS®

11.0 WASHWATER SYSTEM

11.1 GENERAL: Each Klampress® is equipped with two individual belt wash stations for both the upper and lower belt. Each station consists of a spray tube, fitted with spray nozzles, contained within a fabricated housing which encapsulates a section of each belt. The housing and nozzle assembly can be readily removed.

The nozzle spacing and spray pattern are such that the sprays from adjacent nozzles overlap at the belt surface. The individual nozzle is replaceable. The housing is sealed against the belt with adjustable rubber seals.

Each belt wash station is furnished with an external hand wheel that is mounted to a stainless steel cleansing brush located inside the spray pipe. One full turn the hand wheel shall cause the brush bristles to enter each spray nozzle, and dislodge any solid particles, which have accumulated, open a valve and allow the solid particles to be flushed into the drainage system.

11.2 NOZZLE REPLACEMENT INSTRUCTIONS:

a. Shut down belt press and de-tension belts.
b. Lock out control panel.
c. Loosen thumbscrew and remove or lower the adjustable seal panel.
d. Remove old seals and discard.
e. Press new seals onto wash box edge. Cut seal so that the edge of seal flares out from the box edge at a 45 degree angle to the belt. This flare helps reduce the over-spray.
f. Reposition or replace the adjustable seal panel and tighten screws.

11.3 DRAWINGS AND CUT SHEETS:

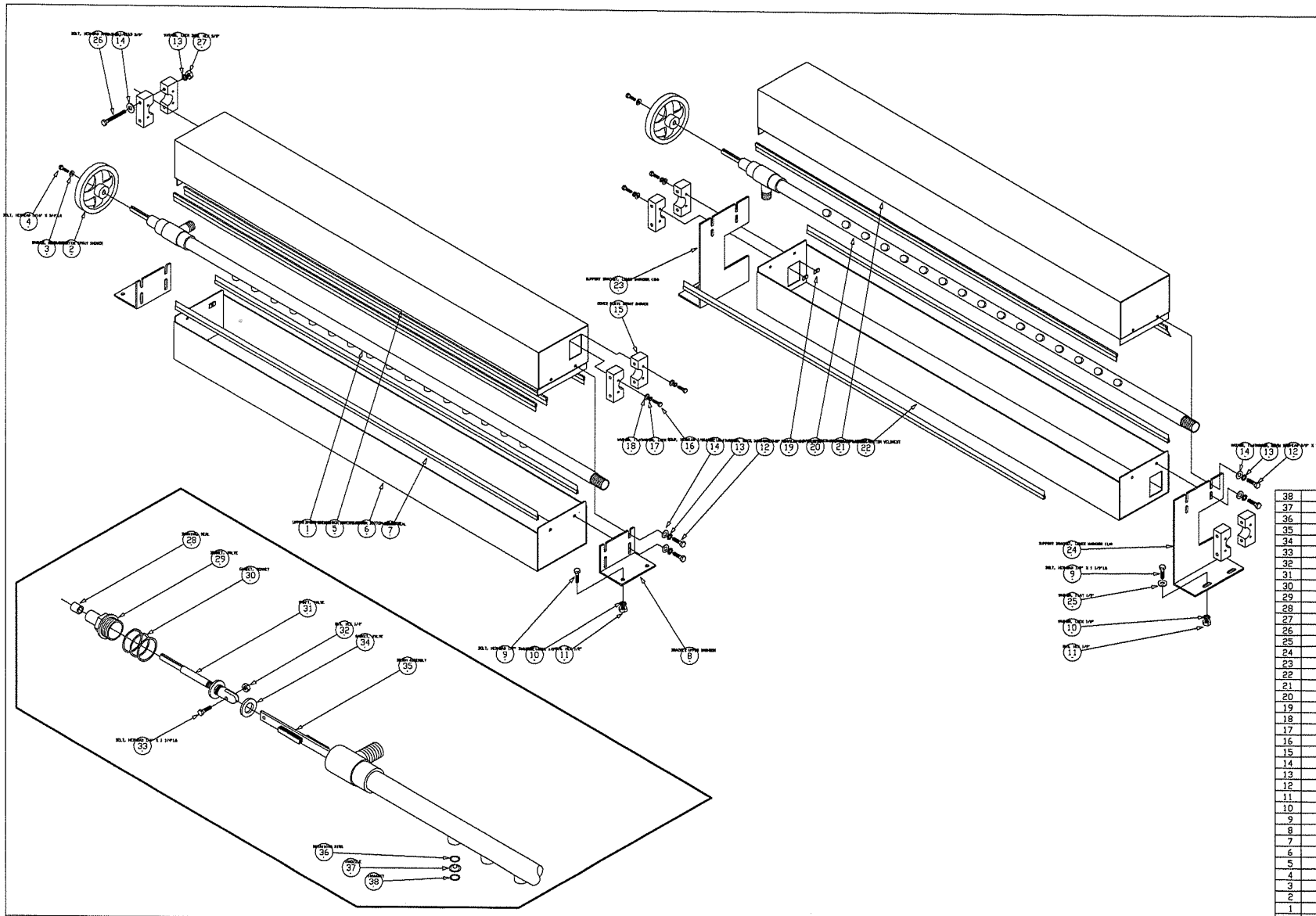
a. Washbox Assembly Drawing: SK000938
b. 1.0M Spray Shower Drawing: 119836
c. 1.5M Spray Shower Drawing: 119835
d. 2.0M Spray Shower Drawing: 119834
e. Spray Angle Setting Drawing: 119844
f. Spraypipe Brush Service Drawing: 119840
g. Valve Gasket Service Drawing: 119843
h. Nozzle Replacement Instructions
j. Adjustable Shower Service Instructions

11.4 SPAN PRESSURE GAUGE DATA

11.5 PRESSURE SWITCH DATA (LOW-WATER PRESSURE)

11.6 OPTIONAL EQUIPMENT DATA (When Furnished)

A. Wash Water Booster Pump
B. Motorized Water Valve
C. Rotometer
D. Strainer
E. Globe and Gate Valves
F. Misc.



ITEM	PART NO.	DESCRIPTION	QTY.
38		GASKET	
37		NOZZLE	
36		RETAINING RING	
35		BRUSH ASSEMBLY	
34		GASKET, VALVE	
33		BOLT, HEXHEAD 1/4" X 1 1/4"LG	
32		NUT, HEX 1/4"	
31		SHAFT, VALVE	
30		GASKET, BONNET	
29		BONNET, VALVE	
28		BUSHING, SEAL	
27		NUT, HEX 3/8"	
26		BOLT, HEXHEAD 3/8" X 4 1/2"LG	
25		WASHER, FLAT 1/2"	
24		SUPPORT BRACKET, LOWER WASHBOX (LH)	
23		SUPPORT BRACKET, LOWER WASHBOX (RH)	
22		LOWER WASHBOX BOTTOM WELDMENT	
21		LOWER WASHBOX TOP WELDMENT	
20		LOWER SPRAY SHOWER	
19		BACK UP PLATE SPRAY SHOWERS	
18		WASHER, FLAT 1/4"	
17		WASHER, LOCK 1/4"	
16		BOLT, HEXHEAD 1/4" X 2"LG	
15		COVER PLATE SPRAY SHOWER	
14		WASHER, FLAT 3/8"	
13		WASHER, LOCK 3/8"	
12		BOLT, HEXHEAD 3/8" X 1"LG	
11		NUT, HEX 1/2"	
10		WASHER, LOCK 1/2"	
9		BOLT, HEXHEAD 1/2" X 1 1/2"LG	
8		BRACKET UPPER WASHBOX	
7		RUBBER SEAL	
6		UPPER WASHBOX BOTTOM WELDMENT	
5		UPPER WASHBOX TOP WELDMENT	
4		BOLT, HEXHEAD 5/16" X 3/4"LG	
3		WASHER, FLAT 5/16"	
2		HANDWHEEL FOR SPRAY SHOWER	
1		UPPER SPRAY SHOWER	

TOLERANCE UNLESS NOTED:
ALL DIMENSIONS IN INCHES.
BREAK ALL SHARP EDGES
FRACTIONAL = ± 1/32"
ANGLES = ± 1/2°
DECIMAL .XX = ± .03
X. = ± .1, .XXX = ± .015
MACH. SURFACE 125 MAX.

ASHBROOK
LEADERS IN LIQUID/SOLID SEPARATION

MK.	DCN	DESCRIPTION	DATE	BY	CHK.	MK.	DCN	DESCRIPTION	DATE	BY	CHK.

KEVIN 09/98

WASHBOX ASSEMBLY
KLAMPRESS TYPE 85

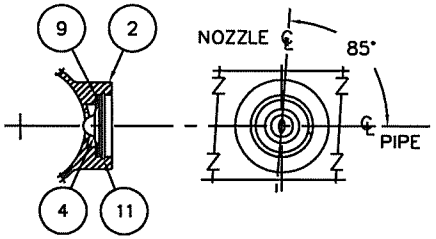
SCALE

CUSTOMER SK000938 0

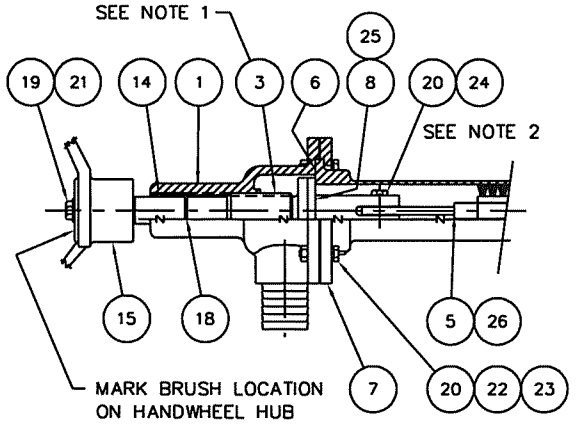
B4MATR2.DWG REV. 2

NOTE:

1. LUBRICATE VALVE SHAFT THREAD (ITEM 3) WITH AN ANTI-SEIZE COMPOUND
2. AFTER ATTACHING VALVE SHAFT (ITEM 3) TO BRUSH (ITEM 5), STAKE (2 PLACES) END OF CAP SCREW (ITEM 20) TO NUT (ITEM 24)
3. DISCHARGE HOSE ADAPTER MUST BE LOCATED VERTICALLY DOWNWARD TO DRAIN VALVE



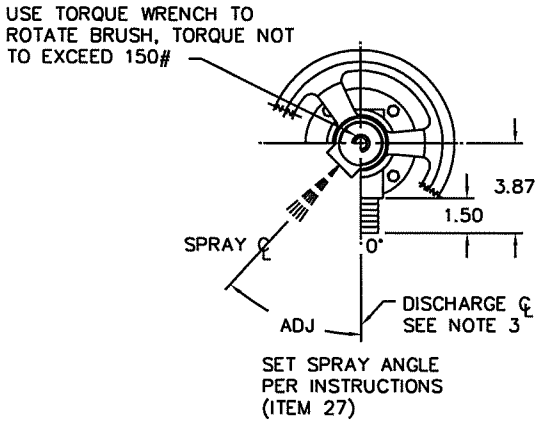
NOZZLE DETAIL
.099 ORIFICE

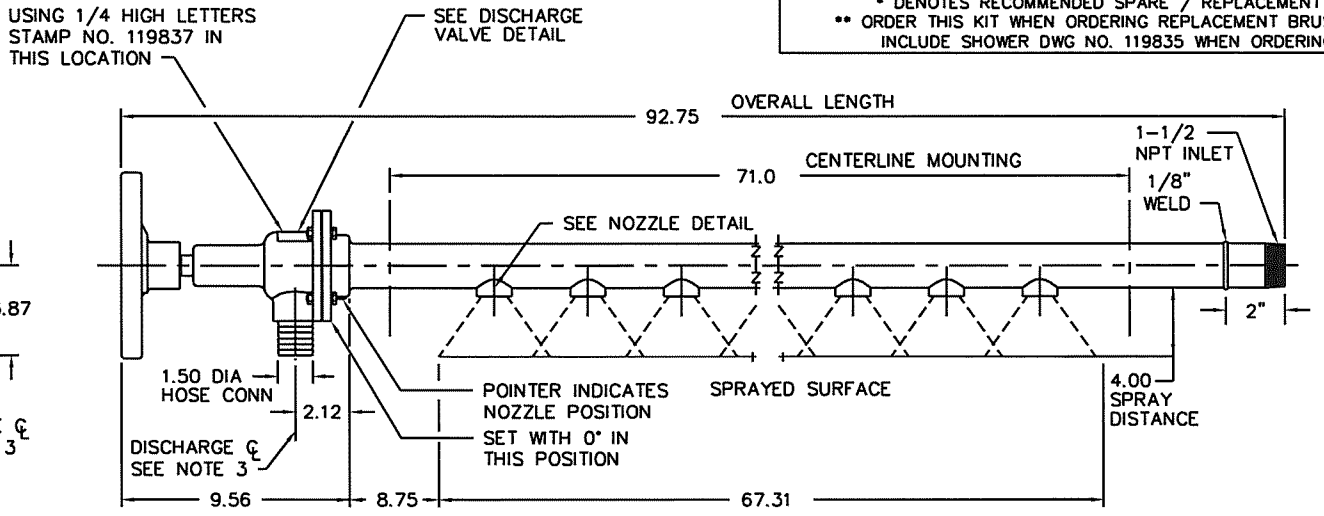


DISCHARGE VALVE DETAIL

ITEM	PART/DWG	LOC	DESCRIPTION	QTY
1	119407	C	BODY,VALVE,316,1-1/2 & 2 ADJ SHR	1
2	120650	B	WELDT,PIPE,316L,1-1/2 ADJ SHR	1
3	104754	B	SHAFT,VALVE,316,1-1/2 SHR	1
4	100945	B	NOZ,FAN,SM,.099	17
5 *	105783	B	ASSY,BRUSH,1-1/2 SHR	1
6	119745	A	GASKET,PIPE,1-1/2 & 2 ADJ SHR	3
7	119403	B	RING,LOCK,316,1-1/2 OR 2 SHR	1
8	102397	A	GASKET,VALVE,1-1/2 & 2 SHR	1
9	104756	A	GASKET,NOZ,NEOP,1-1/2 GROOVED SADDLE	17
10				
11	105229		RING,RETAINING,316,INT,1-1/16	17
12				
13				
14	100538		BUSH,SEAL,1-1/2 & 2 SHR	1
15	105034		HANDWHEEL,8,5/8 B,1/4 x 1/8 KW	1
16				
17				
18	120167		RING,O TYPE,7/8 ID x 1/8 CS	1
19	105253		SCR,HEX HD CAP,316,5/16-18 x 3/4	1
20	104481		SCR,HEX HD MACH,316,1/4-20 x 1-1/4	5
21	105180		WASHER,FLAT,316,5/16	1
22	111050		WASHER,LOCK,316,1/4	4
23	107655		NUT,HEX,316,1/4	4
24	104484		NUT,HEX JAM,316,1/4-20	1
25 *	119843	B	KIT,VALVE REPAIR,1-1/2 & 2 ADJ SHR	AS REQD
26**	119840	B	KIT,BRUSH REPLACE,1-1/2 & 2 ADJ SHR	AS REQD
27	119844	B	INSTRUCTION,SHR SET UP,1-1/2 & 2 ADJ SHR	AS REQD

* DENOTES RECOMMENDED SPARE / REPLACEMENT PARTS
** ORDER THIS KIT WHEN ORDERING REPLACEMENT BRUSH (ITEM 5)
INCLUDE SHOWER DWG NO. 119835 WHEN ORDERING KITS





APPLICATION:	1.5m BELT PRESS OR GBT
POSITION:	UPPER & LOWER
OPERATING PRESSURE:	125 P.S.I.
OPERATING FLOW RATE:	33 G.P.M.

REV	DATE	DESCRIPTION	BY	APP'D
1	10/00	ITEM 2 WAS 129369, ITEM 5 WAS 105630	JDW	
2	4/01	ADDED 2" DIM FOR 1 1/2" NIPPLE ON INLET	ARC	
3				
4				
5				
6				

TOLERANCE UNLESS NOTED: ALL DIMENSIONS IN INCHES. DECIMALS: .X = ± 1/32" .XX = ± .03 .XXX = ± .010 ANGLES = ± 1/2° MACH. SURFACE 125 µ" MAX.

DRAWN	DY	8/13/98
CHECKED	DY	8/13/98
APPROVED		08/13/98
NEXT ASSY	N/A	WEIGHT N/A

ASHBROOK
CASTING AN UNDERSTANDING

Ashbrook Corporation
11600 East Hardy Road
Houston, Texas 77093
Phone: 281-449-0322
FAX: 281-449-1324

TITLE: 1.5 M SPRAY SHOWER
1 1/2" NPT PIPE - 316LSS
NOMINAL 20 GPM/METER

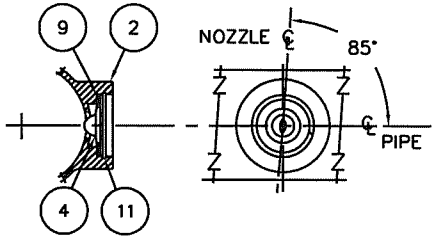
SCALE	DWG. NO.	REV
NONE	119835	2

CUSTOMER: ASHBROOK

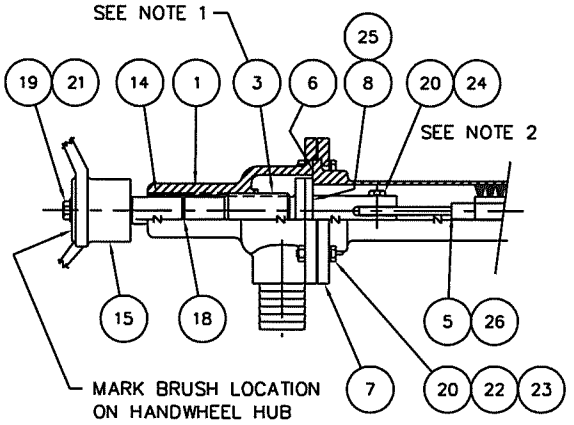
B4MATR2.DWG REV. 2

NOTE:

1. LUBRICATE VALVE SHAFT THREAD (ITEM 3) WITH AN ANTI-SEIZE COMPOUND
2. AFTER ATTACHING VALVE SHAFT (ITEM 3) TO BRUSH (ITEM 5), STAKE (2 PLACES) END OF CAP SCREW (ITEM 20) TO NUT (ITEM 24)
3. DISCHARGE HOSE ADAPTER MUST BE LOCATED VERTICALLY DOWNWARD TO DRAIN VALVE



NOZZLE DETAIL
.099 ORIFICE

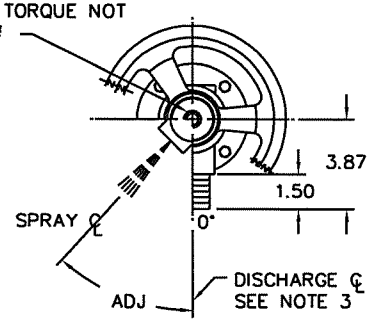


DISCHARGE VALVE DETAIL

ITEM	PART/DWG	LOC	DESCRIPTION	QTY
1	119407	C	BODY,VALVE,316,1-1/2 & 2 ADJ SHR	1
2	119850	B	WELDT,PIPE,316L,1-1/2 ADJ SHR	1
3	104754	B	SHAFT,VALVE,316,1-1/2 SHR	1
4	100945	B	NOZ,FAN,SM,.099	12
5 *	105795	B	ASSY,BRUSH,1-1/2 SHR	1
6	119745	A	GASKET,PIPE,1-1/2 & 2 ADJ SHR	3
7	119403	B	RING,LOCK,316,1-1/2 OR 2 SHR	1
8	102397	A	GASKET,VALVE,1-1/2 & 2 SHR	1
9	104756	A	GASKET,NOZ,NEOP,1-1/2 GROOVED SADDLE	12
10				
11	105229		RING,RETAINING,316,INT,1-1/16	12
12				
13				
14	100538		BUSH,SEAL,1-1/2 & 2 SHR	1
15	105034		HANDWHEEL,8,5/8 B,1/4 x 1/8 KW	1
16				
17				
18	120167		RING,O TYPE,7/8 ID x 1/8 CS	1
19	105253		SCR,HEX HD CAP,316,5/16-18 x 3/4	1
20	104481		SCR,HEX HD MACH,316,1/4-20 x 1-1/4	5
21	105180		WASHER,FLAT,316,5/16	1
22	111050		WASHER,LOCK,316,1/4	4
23	107655		NUT,HEX,316,1/4	4
24	104484		NUT,HEX JAM,316,1/4-20	1
25 *	119843	B	KIT,VALVE REPAIR,1-1/2 & 2 ADJ SHR	AS REQD
26**	119840	B	KIT,BRUSH REPLACE,1-1/2 & 2 ADJ SHR	AS REQD
27	119844	B	INSTRUCTION,SHR SET UP,1-1/2 & 2 ADJ SHR	AS REQD

* DENOTES RECOMMENDED SPARE / REPLACEMENT PARTS
** ORDER THIS KIT WHEN ORDERING REPLACEMENT BRUSH (ITEM 5)
INCLUDE SHOWER DWG NO. 119836 WHEN ORDERING KITS

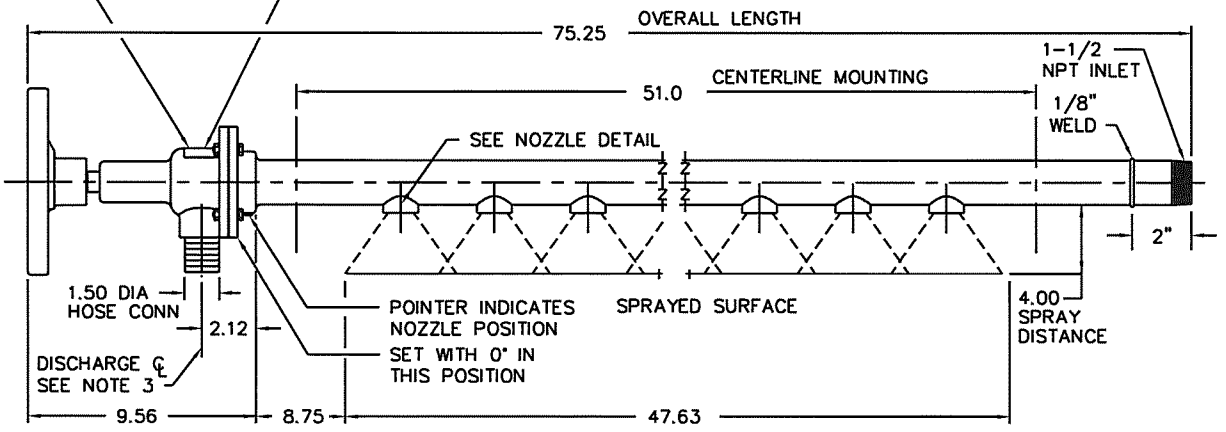
USE TORQUE WRENCH TO ROTATE BRUSH, TORQUE NOT TO EXCEED 150#



SET SPRAY ANGLE PER INSTRUCTIONS (ITEM 27)

USING 1/4 HIGH LETTERS STAMP NO. 119836 IN THIS LOCATION

SEE DISCHARGE VALVE DETAIL



APPLICATION:	1.0 m BELT PRESS OR GBT
POSITION:	UPPER & LOWER
OPERATING PRESSURE:	125 P.S.I.
OPERATING FLOW RATE:	22 G.P.M.

REV	DATE	DESCRIPTION	BY	APPD
1	10/00	ITEM 2 WAS 120639, ITEM 5 WAS 105630	JDW	
2	4/01	ADDED 2" DIM FOR 1 1/2" NIPPLE ON INLET	ARC	
3	7/01	ADDED 2" TO LENGTH, 77.25 WAS 75.06	DY	
4	11/01	REV 3 ADD 2" WAS 4", CORRECT TO 75.25	DY	
5	7/05	STAMP NOTE WAS 119837	DY	
6				

TOLERANCE UNLESS NOTED: ALL DIMENSIONS IN INCHES. ROUND ALL 3 PLACE DECIMALS. FRACTIONS ± 1/32" ANGLES ± 1/2° DECIMAL .XX = ± .03 .X = ± .1 .XXX = ± .015 MACH. SURFACE 125 µ" RMS

DRAWN	DY	8/13/98
CHECKED	DY	8/13/98
APPROVED		08/13/98
NEXT ASSY	N/A	WEIGHT N/A

Ashbrook Corporation
11600 East Hardy Road
Houston, Texas 77093
Phone: 281-449-0322
FAX: 281-449-1324

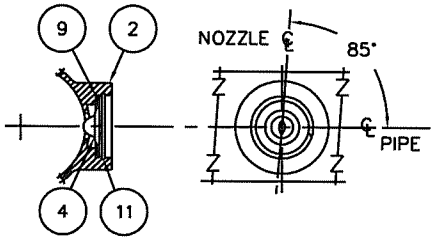
TITLE: 1.0 M SPRAY SHOWER
1 1/2" NPT PIPE - 316LSS
NOMINAL 20 GPM/METER

SCALE	DWG. NO.	REV
NONE	119836	5
CUSTOMER: N/A		

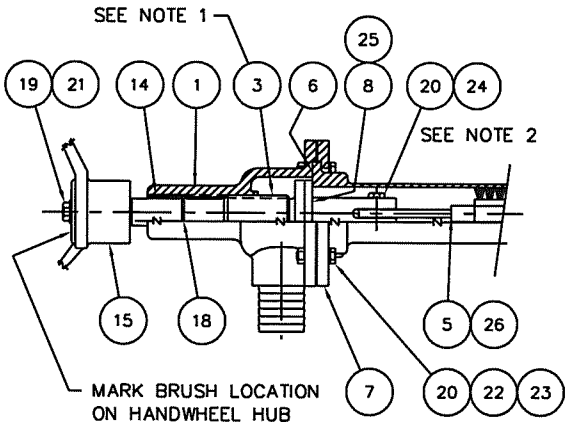
REV. 2
BAMATR2.DWG

NOTE:

1. LUBRICATE VALVE SHAFT THREAD (ITEM 3) WITH AN ANTI-SEIZE COMPOUND
2. AFTER ATTACHING VALVE SHAFT (ITEM 3) TO BRUSH (ITEM 5), STAKE (2 PLACES) END OF CAP SCREW (ITEM 20) TO NUT (ITEM 24)
3. DISCHARGE HOSE ADAPTER MUST BE LOCATED VERTICALLY DOWNWARD TO DRAIN VALVE



NOZZLE DETAIL
.099 ORIFICE

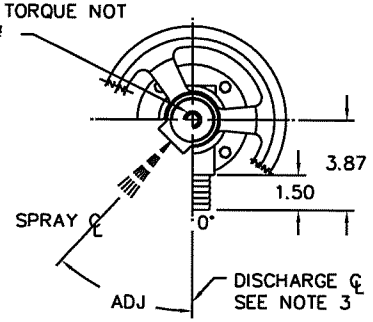


DISCHARGE VALVE DETAIL

ITEM	PART/DWG	LOC	DESCRIPTION	QTY
1	119407	C	BODY,VALVE,316,1-1/2 & 2 ADJ SHR	1
2	120369	B	WELDT,PIPE,316L,1-1/2 ADJ SHR	1
3	104754	B	SHAFT,VALVE,316,1-1/2 SHR	1
4	100945	B	NOZ,FAN,SM,.099	22
5 *	105630	B	ASSY,BRUSH,1-1/2 SHR	1
6	119745	A	GASKET,PIPE,1-1/2 & 2 ADJ SHR	3
7	119403	B	RING,LOCK,316,1-1/2 OR 2 SHR	1
8	102397	A	GASKET,VALVE,1-1/2 & 2 SHR	1
9	104756	A	GASKET,NOZ,NEOP,1-1/2 GROOVED SADDLE	22
10				
11	105229		RING,RETAINING,316,INT,1-1/16	22
12				
13				
14	100538		BUSH,SEAL,1-1/2 & 2 SHR	1
15	105034		HANDWHEEL,8,5/8 B,1/4 x 1/8 KW	1
16				
17				
18	120167		RING,O TYPE,7/8 ID x 1/8 CS	1
19	105253		SCR,HEX HD CAP,316,5/16-18 x 3/4	1
20	104481		SCR,HEX HD MACH,316,1/4-20 x 1-1/4	5
21	105180		WASHER,FLAT,316,5/16	1
22	111050		WASHER,LOCK,316,1/4	4
23	107655		NUT,HEX,316,1/4	4
24	104484		NUT,HEX JAM,316,1/4-20	1
25 *	119843	B	KIT,VALVE REPAIR,1-1/2 & 2 ADJ SHR	AS REQD
26**	119840	B	KIT,BRUSH REPLACE,1-1/2 & 2 ADJ SHR	AS REQD
27	119844	B	INSTRUCTION,SHR SET UP,1-1/2 & 2 ADJ SHR	AS REQD

* DENOTES RECOMMENDED SPARE / REPLACEMENT PARTS
** ORDER THIS KIT WHEN ORDERING REPLACEMENT BRUSH (ITEM 5)
INCLUDE SHOWER DWG NO. 119834 WHEN ORDERING KITS

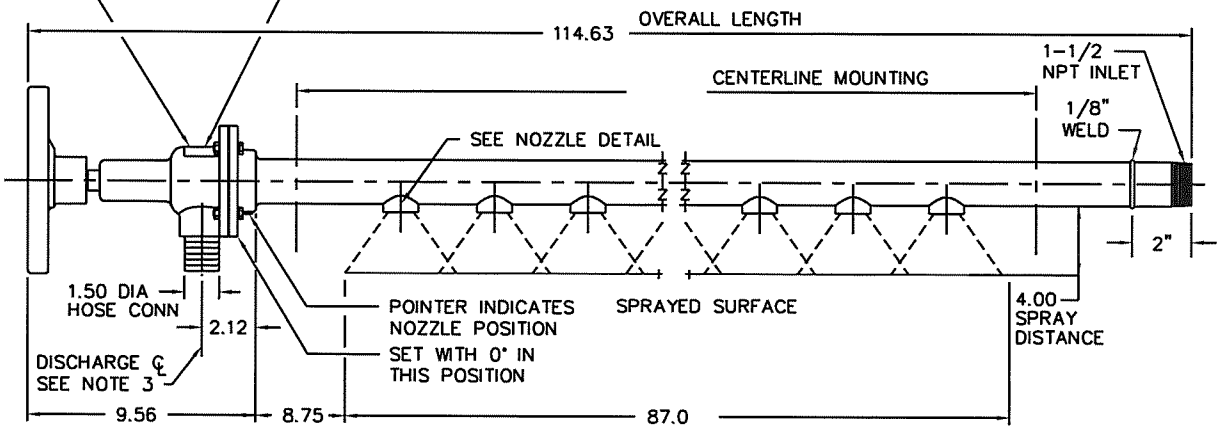
USE TORQUE WRENCH TO ROTATE BRUSH, TORQUE NOT TO EXCEED 150#



SET SPRAY ANGLE PER INSTRUCTIONS (ITEM 27)

USING 1/4 HIGH LETTERS STAMP NO. 119837 IN THIS LOCATION

SEE DISCHARGE VALVE DETAIL



APPLICATION:	2.0 m BELT PRESS OR GBT
POSITION:	UPPER & LOWER
OPERATING PRESSURE:	125 P.S.I.
OPERATING FLOW RATE:	44 G.P.M.

REV	DATE	DESCRIPTION	BY	APP'D
1	4/01	ADDED 2" DIM FOR 1 1/2" NIPPLE ON INLET	ARC	JET
2	7/01	114.63 WAS 112.43	MH	JET
3				
4				
5				
6				

TOLERANCE UNLESS NOTED:
ALL DIMENSIONS IN INCHES
ROUND ALL DIMEN EXCEPT FRACTIONS: ± .0 1/32
ANGLES ± 0 1/2°
DECIMAL .XX = ± .03
X = ± .1 .XXX = ± .015
MACH. SURFACE 125√ MAX.

DRAWN	JET	DATE 7/23/98
CHECKED	JET	DATE 7/23/98
APPROVED	JET	DATE 7/23/98
NEXT ASSY	N/A	WEIGHT N/A

ASHBROOK
LEADERS IN LIQUID/SOLID SEPARATION

Ashbrook Corporation
11600 East Hardy Road
Houston, Texas 77093
Phone: 281-449-0322
FAX: 281-449-1324

TITLE: 2.0 M SPRAY SHOWER
1 1/2" NPT PIPE - 316LSS
NOMINAL 20 GPM/METER

SCALE	DWG. NO.	REV
NONE	119834	2
CUSTOMER: N/A		

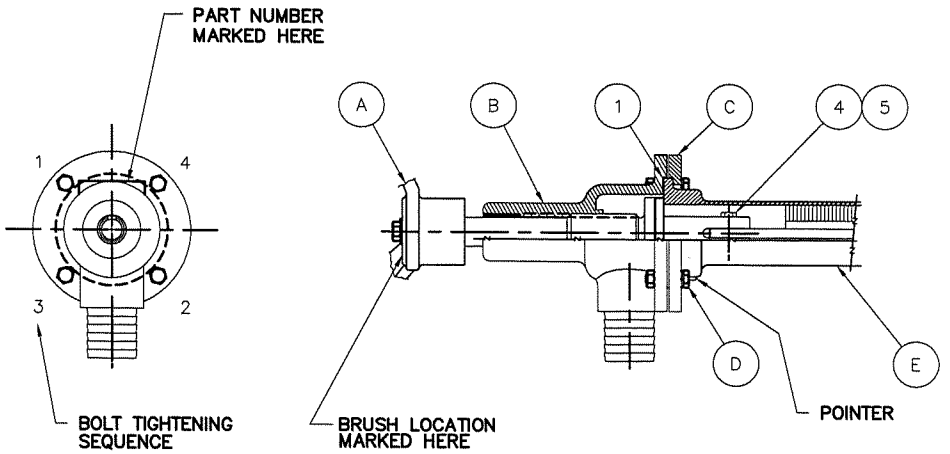
ITEM	PART/DWG	LOC	DESCRIPTION	QTY

TO SET SPRAY ANGLE

1. THE SHOWER IS ASSEMBLED WITH THE SPRAY ANGLE AND DISCHARGE HOSE ADPT. SET AT 0°.
2. TO CHANGE THE SPRAY ANGLE, LOOSEN FOUR (4) 1/4 SCREWS (ITEM D) ENOUGH TO ROTATE THE PIPE. USE THE LOCK RING (ITEM C) AS A DEGREE INDICATOR.
3. SET THE SPRAY ANGLE TO THE DESIRED DEGREE
4. TIGHTEN SCREWS TO LOCK THE VALVE ASSY AND PIPE TOGETHER.
5. USE A MAX. OF 78 IN LBS OF TORQUE AND TIGHTEN IN SEQUENCE SHOWN.

TO CHECK FOR BRUSH LOCATION

6. CLOSE VALVE COMPLETELY
7. CHECK BRUSH LOCATION TO MAKE SURE BRUSH DOES NOT INTERFERE WITH NOZZLE DISCHARGE.
8. IF BRUSH INTERFERES WITH NOZZLES, REMOVE FOUR (4) SCREWS (ITEM D) AND PULL THE VALVE BODY (ITEM B) AWAY FROM THE PIPE.
9. REMOVE BY TEARING IN HALF AND TAKING OUT ONE PIPE GASKET(ITEM #1).
10. SLIDE VALVE BODY TOWARD PIPE AND ALIGN SCREW HOLES. INSTALL SCREWS AND TIGHTEN TO LOCK THE VALVE ASSY AND PIPE TOGETHER.
11. USE A MAX. OF 78 IN LBS OF TORQUE AND TIGHTEN IN SEQUENCE SHOWN.



TOLERANCE UNLESS OTHERWISE NOTED:
BREAK ALL SHARP EDGES
FRACTIONAL = ± 1/32"
DECIMAL .XX = ± .03
X. = ± .1, .XXX = ± .015
ANGLES = ± 1/2°
MACH. SURFACE 125√ MAX.
ALL DIMENSIONS IN INCHES.

Ashbrook Corporation
11600 East Hardy
Houston, Texas 77093
Phone: 713 448-0322
Fax: 713 448-1324

PMT WORLDWIDE
ASHBROOK
SOLID/LIQUID SEPARATION

DRAWN / DATE	CHECKED / DATE	APPR'D / DATE
AMC 8/14/91	DEF 10/27/97	DEF 10/27/97
REVISED / DATE	CHECKED / DATE	APPR'D / DATE

SPRAY ANGLE SETTING

CUSTOMER:

SCALE: NONE | 119844 | 0

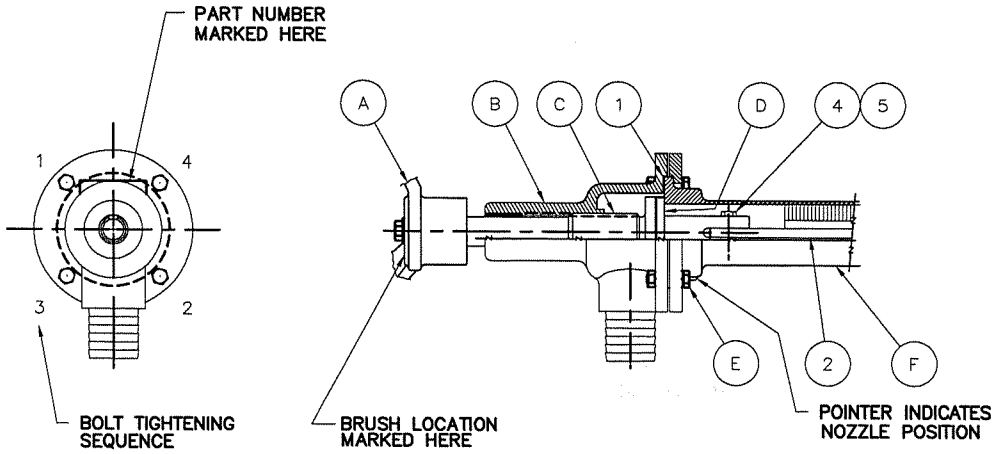
TO REMOVE BRUSH

1. REMOVE FOUR (4) 1/4 SCREWS (ITEM E) AND PULL VALVE SHAFT (ITEM C) AND BRUSH (ITEM D) OUT OF PIPE WELDMENT (ITEM F) FAR ENOUGH TO REMOVE SCREW (ITEM 4) AND NUT (ITEM 5) THAT CONNECT VALVE SHAFT TO BRUSH.
2. SEPARATE VALVE SHAFT FROM BRUSH. SCREW AND NUT ARE STAKED TOGETHER AND MAY HAVE TO BE SEPARATED BY GRINDING.
3. REMOVE WORM PIPE GASKET (ITEM 1) MATERIAL FROM END OF PIPE WELDMENT AND VALVE BODY.

TO INSTALL NEW BRUSH

4. SLIDE NEW BRUSH (ITEM 2) INTO PIPE WELDMENT (ITEM F), LEAVING ENOUGH EXPOSED TO ATTACH VALVE SHAFT.
5. PUT THREE (3) NEW PIPE GASKETS (ITEM 1) INTO VALVE BODY RECESS (ITEM B).
6. REATTACH VALVE SHAFT TO BRUSH WITH A NEW SCREW (ITEM 4) AND NUT (ITEM 5). THE NUT MUST NOT BE MORE THAN FINGER TIGHT, STAKE (2 PLACES) END OF SCREW TO NUT.
7. LUBRICATE VALVE SHAFT THREAD (ITEM C) WITH AN ANTI-SEIZE COMPOUND.
8. PUSH VALVE BODY, VALVE SHAFT AND BRUSH INTO THE PIPE WELDMENT. MAKE SURE VALVE BODY (ITEM B) CONTACTS PIPE WELDMENT BEFORE VALVE GASKET (ITEM D) TO ENSURE PROPER SEAL.
9. ROTATE HOSE CONNECTION ON VALVE BODY TO THE 0° POSITION.
10. ALIGN SCREW HOLES.
11. INSTALL SCREWS AND TIGHTEN TO LOCK THE VALVE ASSY AND PIPE TOGETHER.
12. USE A MAX. OF 78 IN LBS OF TORQUE AND TIGHTEN IN SEQUENCE SHOWN.
13. CLOSE VALVE COMPLETELY
14. CHECK BRUSH LOCATION TO MAKE SURE BRUSH DOES NOT INTERFERE WITH NOZZLE DISCHARGE.
15. IF BRUSH INTERFERES WITH NOZZLES, REMOVE FOUR (4) SCREWS (ITEM E) AND PULL THE VALVE BODY (ITEM B) AWAY FROM THE PIPE.
16. REMOVE BY TEARING IN HALF AND TAKING OUT ONE PIPE GASKET. ONE PIPE GASKET WILL ROTATE THE THE BRUSH APPROXIMATELY 45°.
17. SLIDE VALVE BODY TOWARD PIPE AND ALIGN SCREW HOLES. INSTALL SCREWS AND TIGHTEN TO LOCK THE VALVE ASSY AND PIPE TOGETHER.
18. USE A MAX. OF 78 IN LBS OF TORQUE AND TIGHTEN IN SEQUENCE SHOWN.

ITEM	PART/DWG	LOC	DESCRIPTION	QTY
1	119745	A	GASKET,VALVE,FIBRE,1-1/2 & 2 SHR	3
2			ASSY,BRUSH,1-1/2 & 2 SHR (SEE ASSY DWG)	REF
3				
4	104481		SCR,MACH,HEX HD,316,1/4-20 x 1-1/4	1
5	104484		NUT,HEX JAM,316,1/4-20	1
6			COPY OF THIS DWG	1



TOLERANCE UNLESS OTHERWISE NOTED:
BREAK ALL SHARP EDGES
FRACTIONAL = ± 1/32"
DECIMAL .XX = ± .03
X. = ± .1, .XXX = ± .015
ANGLES = ± 1/2°
MACH. SURFACE 125√ MAX.
ALL DIMENSIONS IN INCHES.

Ashbrook Corporation
11600 East Hardy
Houston, Texas 77093
Phone: 713 449-0322
Fax: 713 449-1324

PMT WORLDWIDE
ASHBROOK
SOLID/LIQUID SEPARATION

DRAWN / DATE	CHECKED / DATE	APPR'D / DATE
AMCII/15/92	DEF 10/27/97	DEF 10/27/97
REVISED / DATE	CHECKED / DATE	APPR'D / DATE

SPRAY PIPE BRUSH SERVICE

CUSTOMER:

SCALE: NONE | 119840 | 0

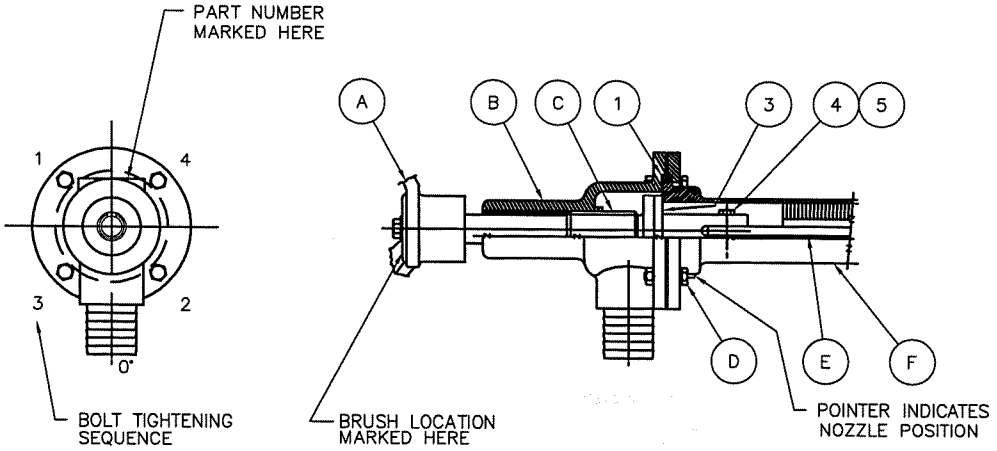
ITEM	PART/DWG	LOC	DESCRIPTION	QTY
1	119745	A	GASKET,PIPE,FIBRE,1-1/2 & 2 ADJ SHR	3
2				
3	102397	A	GASKET,VALVE,UHPE,1-1/2 & 2 SHR	1
4	104481		SCR,MACH,HEX HD,316,1/4-20 x 1-1/4	1
5	104484		NUT,HEX JAM,316,1/4-20	1
6			COPY OF THIS DWG	1

TO REMOVE VALVE GASKET

1. REMOVE FOUR (4) 1/4 SCREWS (ITEM D) AND PULL VALVE SHAFT (ITEM C) AND BRUSH (ITEM E) OUT OF PIPE WELDMENT (ITEM F) FAR ENOUGH TO REMOVE SCREW (ITEM 4) AND NUT (ITEM 5) THAT CONNECT VALVE SHAFT TO BRUSH.
2. SEPARATE VALVE SHAFT FROM BRUSH. SCREW AND NUT ARE STAKED TOGETHER AND MAY HAVE TO BE SEPARATED BY GRINDING.
3. REMOVE VALVE GASKET (ITEM 3).
4. REMOVE WORM PIPE GASKET (ITEM 1) MATERIAL FROM END OF PIPE WELDMENT AND VALVE BODY.

TO INSTALL NEW VALVE GASKET

5. SLIDE NEW VALVE GASKET (ITEM 3) ONTO VALVE SHAFT (ITEM C) UNTIL IT IS AGAINST FLANGE.
6. PLACE THREE (3) NEW PIPE GASKETS (ITEM 1) INTO VALVE BODY RECESS (ITEM B).
7. REATTACH VALVE SHAFT TO BRUSH WITH A NEW SCREW (ITEM 4) AND NUT (ITEM 5). THE NUT MUST NOT BE MORE THAN FINGER TIGHT, STAKE (2 PLACES) END OF SCREW TO NUT.
8. LUBRICATE VALVE SHAFT THREAD (ITEM C) WITH AN ANTI-SEIZE COMPOUND.
9. PUSH VALVE BODY, VALVE SHAFT AND BRUSH INTO THE PIPE WELDMENT. MAKE SURE VALVE BODY (ITEM B) CONTACTS PIPE WELDMENT BEFORE VALVE GASKET (ITEM 3) TO ENSURE PROPER SEAL.
10. ROTATE HOSE CONNECTION ON VALVE BODY TO THE 0° POSITION.
11. ALIGN SCREW HOLES.
12. INSTALL SCREWS AND TIGHTEN TO LOCK THE VALVE ASSY AND PIPE TOGETHER.
13. USE A MAX. OF 78 IN LBS OF TORQUE AND TIGHTEN IN SEQUENCE SHOWN.
14. CLOSE VALVE COMPLETELY
15. CHECK BRUSH LOCATION TO MAKE SURE BRUSH DOES NOT INTERFERE WITH NOZZLE DISCHARGE.
16. IF BRUSH INTERFERES WITH NOZZLES, REMOVE FOUR (4) SCREWS (ITEM D) AND PULL THE VALVE BODY (ITEM B) AWAY FROM THE PIPE.
17. REMOVE BY TEARING IN HALF AND TAKING OUT ONE PIPE GASKET. ONE PIPE GASKET WILL ROTATE THE THE BRUSH APPROXIMATELY 45°.
18. SLIDE VALVE BODY TOWARD PIPE AND ALIGN SCREW HOLES. INSTALL SCREWS AND TIGHTEN TO LOCK THE VALVE ASSY AND PIPE TOGETHER.
19. USE A MAX. OF 78 IN LBS OF TORQUE AND TIGHTEN IN SEQUENCE SHOWN.



TOLERANCE UNLESS OTHERWISE NOTED:
BREAK ALL SHARP EDGES
FRACTIONAL = ± 1/32"
DECIMAL .XX = ± .03
X = ± .1, .XXX = ± .015
ANGLES = ± 1/2°
MACH. SURFACE 125√ MAX.
ALL DIMENSIONS IN INCHES.

Ashbrook Corporation
11600 East Hardy
Houston, Texas 77093
Phone: 713 448-0322
Fax: 713 448-1324

PAT WORLDWIDE
ASHBROOK
SOLID/LIQUID SEPARATION

DRAWN / DATE	CHECKED / DATE	APPR'D / DATE
AMC 8/21/91	DET 10/27/97	DET 10/27/97
REVISED / DATE	CHECKED / DATE	APPR'D / DATE

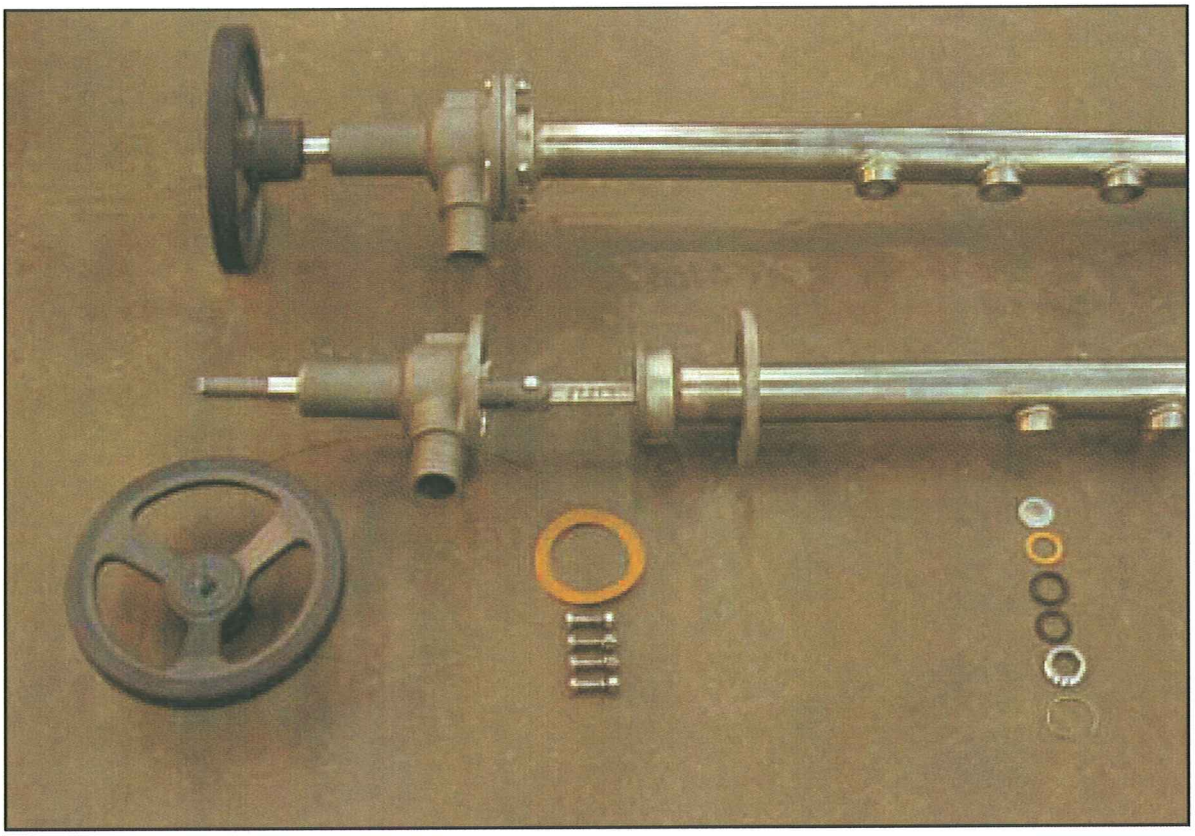
VALVE GASKET SERVICE

CUSTOMER

SCALE: NONE | 119843 | 0

ADJUSTABLE ANGLE SHOWER INSTRUCTIONS FOR 1-1/2" AND 2"

The Appleton Adjustable Angle Shower provides variable spray angle and brush position. This manual includes the information necessary to service the 1-1/2" and 2" showers.



Appleton adjustable angle shower

Disconnect the water source to the shower before disassembly. High pressure water can cause personal injury.

The following procedure will ensure that the shower is safe to disassemble:

1- Turn off and lock out the pump that supplies the shower.

2- Turn off and lock out the oscillator (if present).

3- Open the shower valve to discharge any water that may be present in the shower.

SECTION 1: SETTING SPRAY ANGLE

1- The shower is assembled with the spray angle and discharge hose adapter set at 0 degrees.

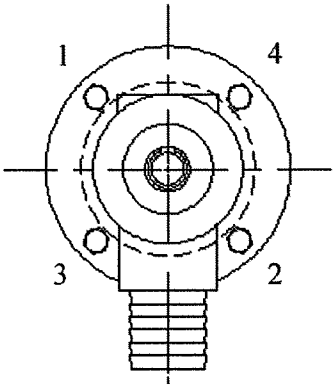
2- The spray angle can be changed by loosening four 1/4" screws (B), permitting pipe rotation. The lock ring (A) is marked in degrees to aid in determining the shower angle. The hose connection on the valve body should be oriented vertically downward to drain the valve.

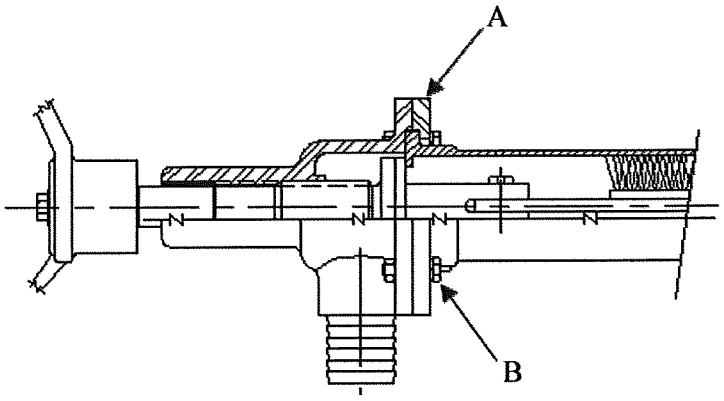
3- When the proper angle is reached, tighten the four screws (B) to lock the valve assembly in the new position. See the drawing below for the tightening pattern.

Do not apply a torsion force in excess of 78 in-lbs to the four screws (D). Excessive force will break the screws.

4- Check the location of the brush to ensure that it is not blocking the spray nozzles. If the nozzles are blocked adjust the brush position using the procedure outlined in section 2.

Bolt tightening sequence



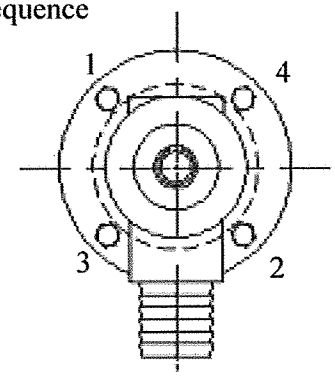


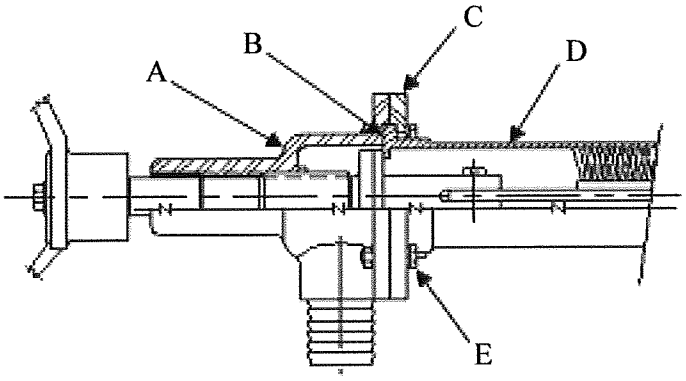
SECTION 2: SETTING BRUSH LOCATION

1- Close the valve completely.

2- Check the brush location to make sure that the brush does not interfere with nozzle discharge.

Bolt tightening sequence





Disconnect the water source to the shower before disassembly. High pressure water can cause personal injury.

3- If the brush blocks the nozzles, loosen the four screws (E) and pull the valve body (A) away from the pipe (D) providing access to the valve gaskets (B).

4- Remove a gasket (B) by tearing it in half and pulling it out of the gap, or add a gasket. Each gasket will rotate the brush about 45 degrees.

5- Re-assemble the valve by aligning the pipe pointer with the desired angle mark on the lock ring (C) and tightening the four screws (E). Tighten the screws as shown on bolt sequence above.

Do not apply a torsion force in excess of 78 in-lbs to the four screws (D). Excessive force will break the screws.

SECTION 3: INSTALLING NEW VALVE GASKET

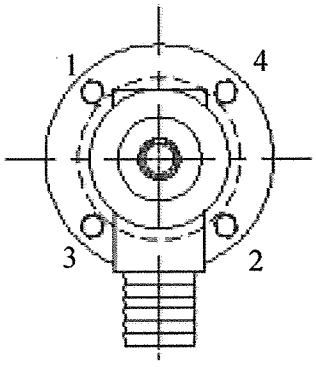
Disconnect the water source to the shower before disassembly. High pressure water can cause personal injury.

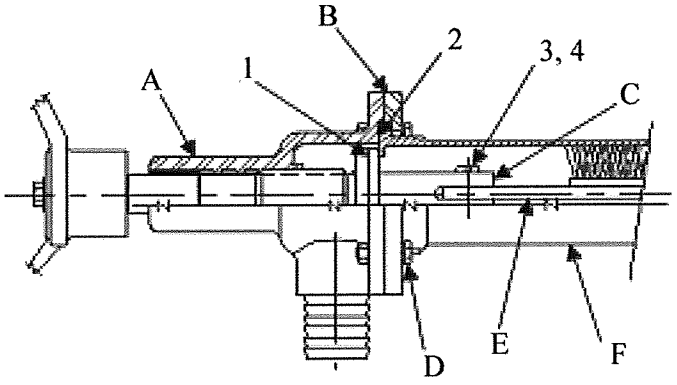
3.1. Service Parts Required

Valve repair kit 119843 includes:

Item	Part No.	Descriptio	Req'd
1	119745	Gasket, Pipe, Fibre, 1-1/2 & 2 Adj Shr	3
2	102397	Gasket, Valve, UHPE, 1-1/2 & 2 Shr	1
3	104481	Scr, Mach, Hex, HD, 316, 1/4-20 x 1-1/4	1
4	104484	Nut, Hex Jam, 316, 1/4-20	1

Bolt tightening sequence





3.2 Disassemble the Shower

3.2.1.Remove four screws (D) and pull the Valve Bonnet (A) away from the Pipe (F) and Lock Ring (B) until the Screw (3) that connects the Valve Shaft (C) to the Brush (E) is accessible.

3.2.2. Remove the Nut (3) from the Screw (4), disconnecting the Valve Shaft and Brush. The nut and screw are staked and may have to be separated by grinding. The Valve Bonnet is now detached from the Pipe.

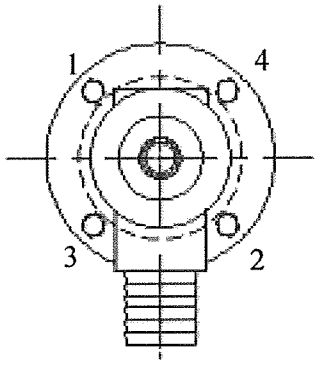
3.2.3. Remove the old valve gasket (2) by sliding it off the valve shaft.

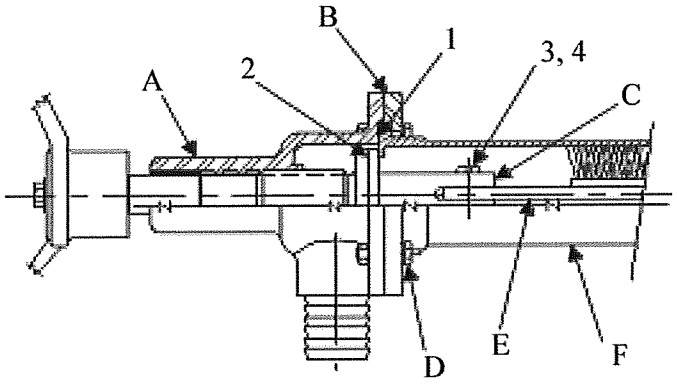
3.2.4. Remove the old pipe gasket (1) from the end of the pipe (F) and valve body (A). Take care not to scratch the cast gasket seats on the pipe weldment and valve body.

3.3. Assembly

3.3.1. Slide the new valve gasket(s) onto the valve shaft (C) until it is against the flange.

Bolt tightening sequence





3.3.2. Place three new pipe gaskets (1) into valve body recess (A).

3.3.3. Attach valve shaft (C) to brush (E) with a new screw (3) and nut (4). The nut should not be tightened more than finger tight. Stake the nut and screw in two places.

3.3.4. Lubricate the valve shaft threads (C) with an anti-seize compound.

3.3.5. Push the valve body, valve shaft and brush into the pipe weldment. Make sure the valve body contacts pipe weldment before valve gasket (2) to ensure proper seal. If the valve gasket contact first, screw the valve shaft out until the valve body contacts the pipe weldment.

3.3.6. Rotate the hose connection on the valve body to the desired angle.

3.3.7. Align the holes for the four screws (D) and install the four screws.

Do not apply a torsion force in excess of 78 in-lbs to the four screws (D). Excessive force will break the screws.

3.2.8. Close the valve completely.

3.2.9. Check the brush location to ensure that the nozzles are not blocked. Adjust per instructions 2.0 above, setting brush location.

SECTION 4: BRUSH MAINTENANCE

Disconnect the water source to the shower before disassembly. High pressure water can cause personal injury.

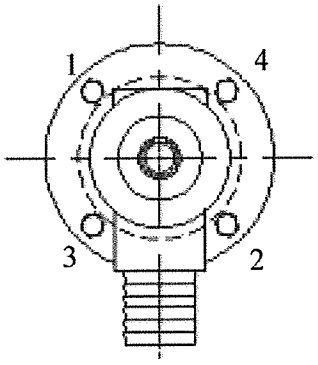
4.1. Service Parts Required

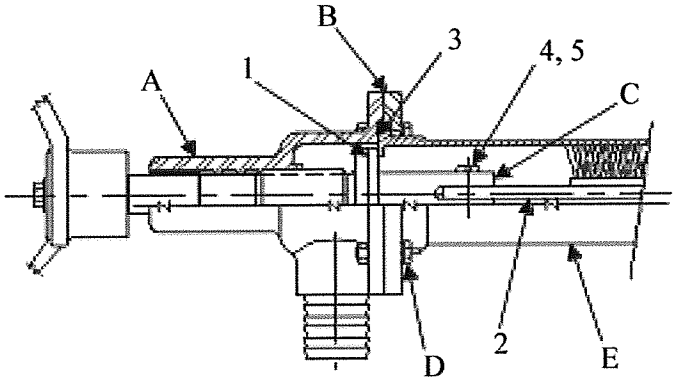
Brush replacement kit 119840 includes:

Item	Part No.	Description	Req'd
1	119745	Gasket, Pipe, Fibre, 1-1/2 & 2 Adj Shr	3
2		Ass'y, Brush, 1-1/2 & 2 Adj Shr	Ref
3	102397	Gasket, Valve, UHPE, 1-1/2 & 2 Shr	Ref
4	104481	Scr, Mach, Hex, HD, 316, 1/4-20 x 1-1/4	1
5	104484	Nut, Hex Jam, 316, 1/4-20	1

4.2. Brush Removal

Bolt tightening sequence





4.2.1. Disassemble the shower per 3.1 above.

4.2.2. Slide the old brush out of the shower.

4.3. Installation

4.3.1. Slide the new brush into the pipe weldment (E) leaving enough bush exposed to attach the valve shaft.

4.3.2. Place three new pipe gaskets (1) into valve body recess (A).

4.3.3. Attach valve shaft (C) to brush (2) with a new screw (4) and nut (5). The nut should not be tightened more than finger tight. Stake the nut and screw in two places.

4.3.4. Lubricate the valve shaft threads (C) with an anti-seize compound.

4.3.5. Push the valve body, valve shaft and brush into the pipe weldment. Make sure the valve body contacts pipe weldment before valve gasket (3) to ensure proper seal. If the valve gasket contact first, screw the valve shaft out until the valve body contacts the pipe weldment.

4.3.6. Rotate the hose connection on the valve body to the desired angle.

4.3.7. Align the holes for the four screws (D) and install the four screws. Tighten the screws a shown on the bolt tightening sequence.

Do not apply a torsion force in excess of 78 in-lbs to the four screws (D). Excessive force will break the screws.

4.3.8. Close the valve completely.

4.3.9. Check the brush location to ensure that the nozzles are not blocked. If they are, adjust per instructions 2.0 above, setting the brush location.

5.0 Nozzles - Ring Retained

5.1. Appleton belt press showers utilize a stainless steel ring to hold the nozzle assembly in place. This section contains instructions on removing and replacing these nozzles.

5.2. Tools required:

- Soft Head Hammer
- 1-1/16" Punch (Appleton PN 105448)
- 1/8" Punch
- Tapered Collar (Appleton PN 105449)
- Small Needle Nose Pliers
- Small Awl

5.3. Nozzle Removal

Wear safety glasses while assemblying or disassembling nozzles. Metal chips or flying retaining rings could result in eye injury.

5.3.1. Use an awl or pointed tool to pry one end of the retaining ring out of the slot.

5.3.2. Grip the retaining ring with a needle nose pliers and pull the ring out with a twisting motion.

5.3.3. Remove the nozzle and itsgasket.

5.4. Nozzle Replacement

5.4.1. Clean the nozzle seat and the groove for retaining the ring.

5.4.2. Lay one nozzle gasket into the nozzle seat (ref. figure 1).

5.4.3. Place one nozzle on the gasket with the fan opening at 85 degrees to the pipe centerline (ref. figure 2). The nozzle should be placed so it protrudes into the pipe.

5.4.4. Set the tapered collar tool on the nozzle saddle with the recessed end over the saddle. (ref. figure 3).

5.4.5. Insert one retaining ring into the top of the tapered collar tool (ref. figure 4).

5.4.6. Drive the retaining ring into the recessed groove with the 1-1/16 diameter punch (ref. figure 4).

5.4.7. Remove the collar tool and seat the ring with the 1/8" diameter punch (ref. figure 5).

Fig. 1, place the gasket

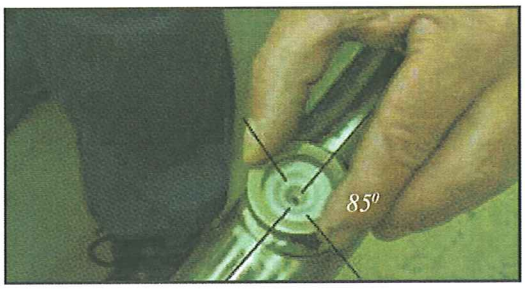


Fig. 2, place the nozzle

Fig. 3, place tapered collar

Fig. 4, drive ring in place

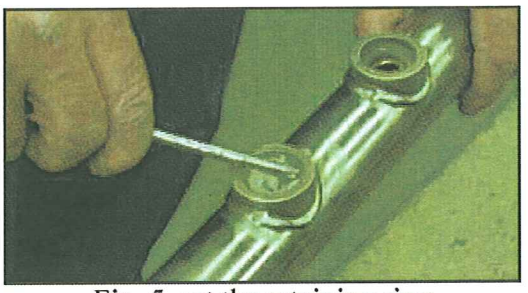


Fig. 5, set the retaining ring

6.0 Nozzles - Nut Retained

Paper machine showers utilize a retaining ring and a nut to hold the nozzle in place. These nozzles can be serviced as follows.

Wear safety glasses while assemblying or disassembling nozzles. Metal chips or flying retaining rings could result in eye injury.

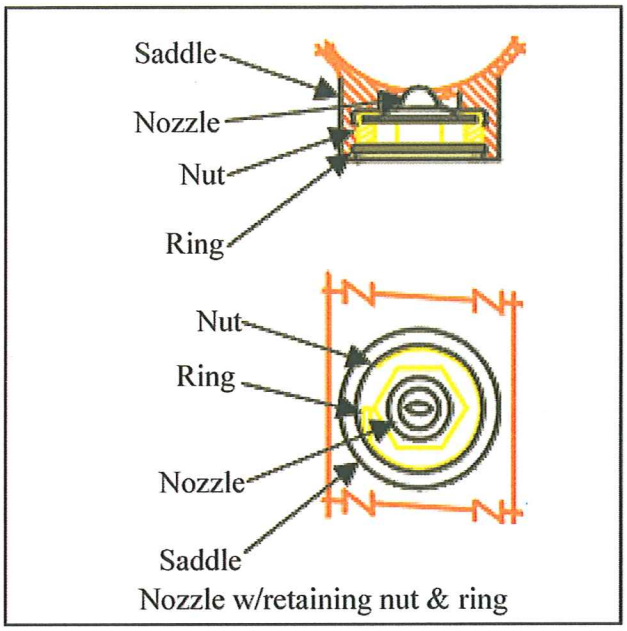
6.1. Nozzle Removal

6.1.1. Remove the retaining ring from the nozzle saddle.

6.1.2. Thread the retaining nut out of the nozzle saddle.

6.1.3. Remove the nozzle.

6.1.4. Remove the gasket taking care not to scratch the seat in the nozzle saddle.



Nozzle w/retaining nut & ring

6.2. Nozzle Replacement

6.2.1. Clean the nozzle seat, threads, and retaining slot.

6.2.2. Lay one nozzle gasket into the nozzle saddle.

6.2.3. Lay one nozzle on the gasket with the fan openning 85 degrees to the centerline of the shower pipe (ref. figure 6). The nozzle should be placed so that it protrudes into the pipe.

6.2.4. Thread the retaining nut into the saddle taking care not to rotate the nozzle.

6.2.5. Install the retaining ring.

PRODUCT INFORMATION

FEATURES:

ZYTEL NYLON CASE

Tough corrosion resistant, impact resistant, Zytel* nylon case (*Dupont trade name). Resilient and weather resistant.

NON-YELLOWING GLYCERINE FILL

Standard fill is non-yellowing, crystal clear glycerine. Special fills available.

TEMPERATURE COMPENSATED CASE

No need to vent case to atmosphere by activating a vent screw. 3.5" and 4.5" industrial gauges, and 4.5" process gauges feature "internal breathing diaphragms", to compensate the case for changes in internal case pressure build up. Temperature fluctuations cause the fill fluid to expand and contract. This causes internal pressure inside the case to build up, as the fill expands and the Bourdon tube senses this internal case pressure, unless the case is compensated for these changes. SPAN's "breathing diaphragm" compensates for internal case pressure build up to over 150°F, which allows the gauge to stay fully accurate.

UNRESTRICTED BLOW-OUT HOLE

One half inch, unrestricted blow out plug in all industrial models, and a blow out back in our process gauges give added safety protection.

NO AIR BUBBLE

SPAN's internal "breathing diaphragm" eliminates the need for an air bubble in the mid-range of the gauge, which could distort reading the gauge from a distance.

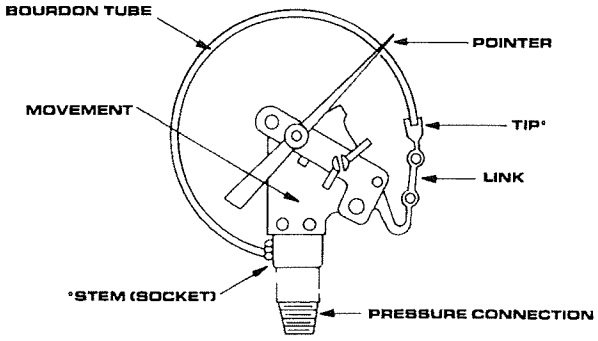
SPECIALS

Special dials, customer logos, stainless steel bezels, and special manufactured instrumentation available.

VARIETY OF CONNECTIONS

All models available in stem, center back, or panel mountings.

Span Instruments
P.O. Box 709
Plano, Texas 75074
214-423-5320



*PRESSURE ELEMENT ASSEMBLY

BOURDON GAUGE ILLUSTRATED

GENERAL ADVANTAGES OF LIQUID FILLED GAUGES:	A) Stops corrosion. B) Solves pulsation and vibration wear on gauges. C) Weather tight — no condensation. D) Lengthens gauge life. E) Lubricates internals.
LIQUID FILLED APPLICATIONS:	• High pressure washers • Steam cleaning equipment • Chemical plants and refineries • Agriculture equipment • Car wash systems • Oil field equipment • Shipboard applications • Hydraulic equipment
TEMPERATURE RANGES:	GENERAL: Liquid-filled gauges are generally rated to 150 F. At that point, internal case pressure build up due to expansion of the fill as temperature increases, causes loss of accuracy. Also, the lens and O Ring seals are limited to 175 F. maximum. CASE: Zytel; High temperature stabilized. FILL FLUID: Glycerine — · 150 F to · 20 F. Silicone — · 150 F to 40 F. SEALS: Buna N — · 150 F to 40 F. LENS: Acrylic — · 150 F to 40 F.
GUARANTEE:	SPAN INSTRUMENTS, INC. warrants products free from defects in material and workmanship under normal use and service for one year from date of delivery. All equipment requiring repair or replacement under this warranty, shall be returned to us at our factory or at such other location, as we may determine, transportation prepaid. This warranty shall not apply to any equipment which has been tampered with, or altered after leaving our control, or which has been subject to misuse, neglect, abuse, or improper use.
WARNING:	Misuse of this product may cause explosion and personal injury. Read ANSI-B40.1, and apparatus installation operating instructions before using. Glycerine can combine with strong oxydizing agents including (but not limited to) chlorine, nitric acid, and hydrogen peroxide, and result in an explosion, which can cause property damage and personal injury. Consult factory for proper filling medium in hazardous service.

ASHBROOK KLAMPRESS®

14.0 SPARE PARTS INFORMATION

14.1 SUPPLIED SPARE PARTS
14.2 RECOMMENDED SPARE PARTS LIST ON FOLLOWING PAGES FOR
KLAMPRESS 2.0 METER
KLAMPRESS 1.5 METER
KLAMPRESS 1.0 METER

If you need parts or have questions, please do not hesitate to call Ashbrook at 281) 449-0322 or (800) 547-7273.

For your convenience, spare parts may be ordered directly from Ashbrook.

KLAMPRESS 1.0 METER
SPARE PARTS LIST

DESCRIPTION	PART No.	QTY/MACH	AVAILABILITY
UPPER BELT, 1.2M X 18.27M	030xxx	1	1 WEEK
LOWER BELT, 1.2M X 18.90M	030xxx	1	1 WEEK
RUBBER STRIP SEAL	004488	1 Lot	ASH STOCK
SCRAPER BLADE – UHMW	003xxx	2	ASH STOCK
CHICANE BLADE – UHMW	006396	1 Lot	ASH STOCK
GRAVITY GRID STRIPS - UHMW	008718	1 Lot	ASH STOCK
HYDRAULIC PUMP – PRESS. COMP.	029866	1	1 WEEK
HYDRAULIC RESERVOIR - HDPE	029837	1	ASH STOCK
HYDRAULIC FILTER, COMPLETE	029836	1	ASH STOCK
HYDRAULIC PRESSURE SWITCH	029872	2	ASH STOCK
HYDRAULIC PRESSURE GAUGE	029482	2	ASH STOCK
SPRAY SHOWER BRUSH SEGMENT	030884	8	ASH STOCK
SPRAY NOZZLE, 2.5 MM	022319	12	1 WEEK
LOW WATER PRESSURE SWITCH	031869	1	ASH STOCK
WATER PRESSURE GAUGE	009273	1	ASH STOCK
ROLLER BEARING, 75 MM SPHERICAL	422001	26	ASH STOCK
STEERING BEARING, 75MM CYL, NON-EXP.	422147	4	I WEEK
STEERING BEARING, 75MM CYL, EXPANSION	422148	4	1 WEEK
STEERING VALVE	016408	2	1 WEEK
STEERING PADDLE ASSEMBLY	012986	2	ASH STOCK
CERAMIC WEAR PAD, STEERING PADDLE	008565	2	ASH STOCK
TORSION SPRING FOR STEERING VALVE	017038	2	1 WEEK
TENSION/SERVICE VALVE	012667	1	1 WEEK
HYDRAULIC MANIFOLD BLOCK ONLY	029869	1	1 WEEK
TENSION/RETRACT VALVE	029870	2	1 WEEK
PRESS. REDUCING VALVE	029871	1	1 WEEK
GAUGE SNUBBER	029931	2	1 WEEK
STEERING CYLINDER - 4 X 4 FRP	026520	2	ASH STOCK
REPAIR KIT, STEERING CYLINDER	026697	2	4 WEEKS
TENSION CYLINDER – 4 X 6 FRP	026521	2	ASH STOCK
REPAIR KIT, TENSION CYLINDER	026696	2	4 WEEKS
BULL GEAR, 64 TEETH	006651	2	4 WEEKS
HUB BUSHING, BULL GEAR	012771	1	4 WEEKS
PINION GEAR	012305	1	4 WEEKS

ASHBROOK KLAMPRESS®

12.0 ELECTRICAL COMPONENTS

12.1 TRIP CORD DATA

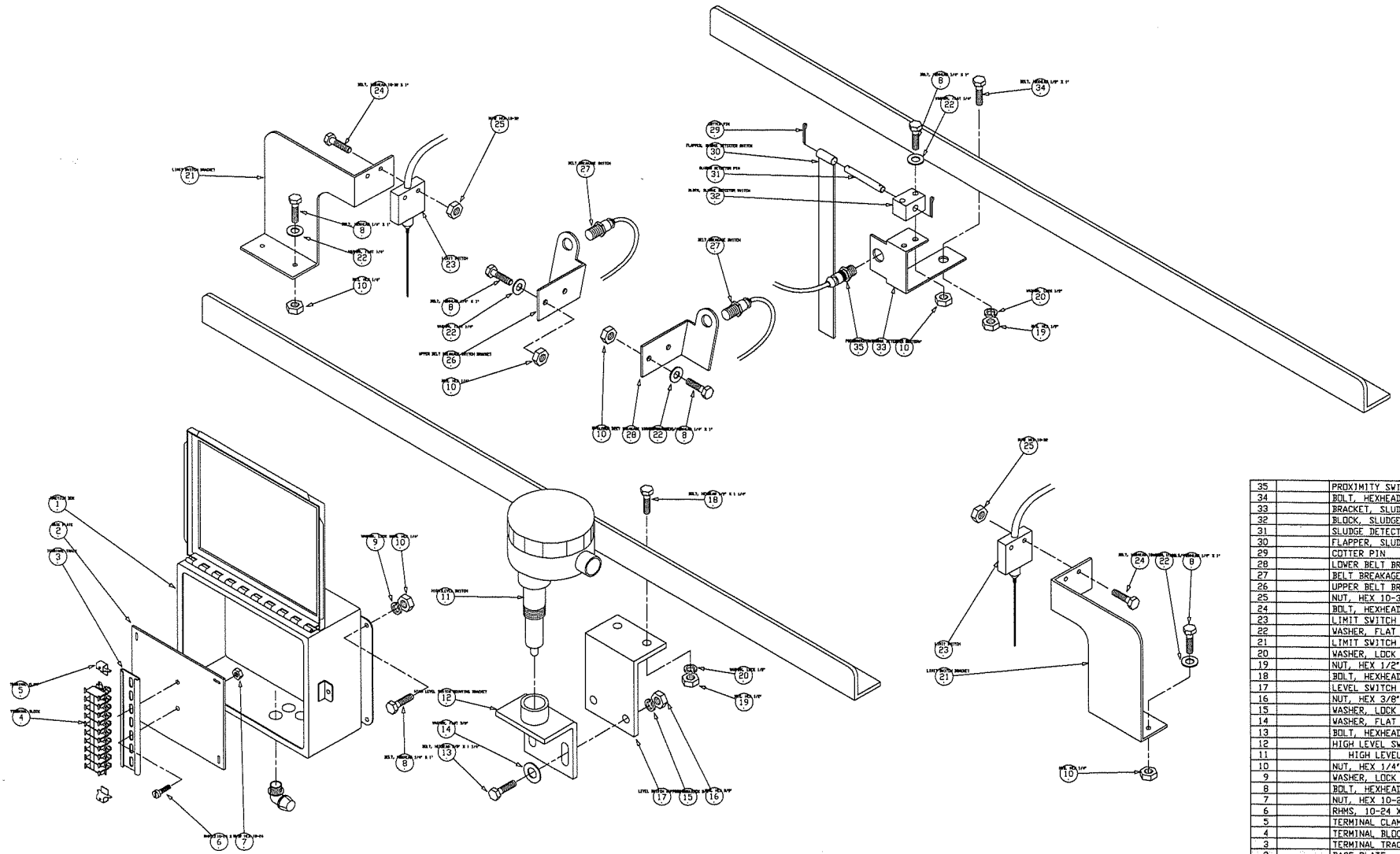
SAFETY PULL SWITCH, RAMSEY MODEL SPS-2D-3-NP
The safety pull switch shall be CSA approved for Class II Divisions 1 and 2, Groups E, F and G applications. The safety pull switch shall contain 2 SPDT, 10A, and 480V switch enclosed in a nickel-plated NEMA-4X weatherproof enclosure. Force applied to the pull cable at any position shall cause the actuating arm to rotate 20 degrees to a triple-locked position. Pull rating shall be 8-18 pounds. A spring loaded dog holds a cam detent in this position until manually reset. The safety pull switch shall meet OSHA requirements for safety shutdown.

12.2 BELT BREAKAGE SWITCH
Each belt is fitted with a proximity switch to sense extreme travel of the tensioning arm. If one of the belts should break the tension cylinders will extend the tensioning arm to the limits of its travel where it will contact the belt breakage limit switch.

12.3 BELT MISALIGNMENT SWITCH
There are two limit switches mounted inside the frame alongside the pressure rollers. If either belt wanders too close to the end of the pressure rollers it will trip the limit switch. Under no circumstance should you operate the press with these limit switches disabled. These switches are provided to avoid unnecessary damage to the belts in case the automatic belt tracking system cannot maintain the belts centered on the rollers.

12.4 DRAWINGS AND DATA SHEETS TO FOLLOW:

SK000995 Electric Assembly Drawing – Klampress Model '85
Ramsey Trip Cord Switch Data
Proximity Switch – Belt Breakage
Limit Switch – Belt Misalignment



ITEM	PART NO.	DESCRIPTION	QTY.
35		PROXIMITY SWITCH	
34		BOLT, HEXHEAD 1/2" X 1"	
33		BRACKET, SLUDGE DETECTER SWITCH	
32		BLOCK, SLUDGE DETECTOR SWITCH	
31		SLUDGE DETECTOR PIN	
30		FLAPPER, SLUDGE DETECTER SWITCH	
29		COTTER PIN	
28		LOWER BELT BREAKAGE SWITCH BRACKET	
27		BELT BREAKAGE SWITCH	
26		UPPER BELT BREAKAGE SWITCH BRACKET	
25		NUT, HEX 10-32	
24		BOLT, HEXHEAD 10-32 X 1"	
23		LIMIT SWITCH	
22		WASHER, FLAT 1/4"	
21		LIMIT SWITCH BRACKET	
20		WASHER, LOCK 1/2"	
19		NUT, HEX 1/2"	
18		BOLT, HEXHEAD 1/2" X 1 1/4"	
17		LEVEL SWITCH SUPPORT ANGLE	
16		NUT, HEX 3/8"	
15		WASHER, LOCK 3/8"	
14		WASHER, FLAT 3/8"	
13		BOLT, HEXHEAD 3/8" X 1 1/4"	
12		HIGH LEVEL SWITCH MOUNTING BRACKET	
11		HIGH LEVEL SWITCH	
10		NUT, HEX 1/4"	
9		WASHER, LOCK 1/4"	
8		BOLT, HEXHEAD 1/4" X 1"	
7		NUT, HEX 10-24	
6		RHMS, 10-24 X 1/2"	
5		TERMINAL CLAMP	
4		TERMINAL BLOCK	
3		TERMINAL TRACK	
2		BASE PLATE	
1		JUNCTION BOX	

TOLERANCE UNLESS NOTED:
ALL DIMENSIONS IN INCHES.
BREAK ALL SHARP EDGES
FRACTIONAL = ± 1/32"
ANGLES = ± 1/2°
DECIMAL .XX = ± .03
.X = ± .1 .XXX = ± .015
MACH. SURFACE 125 MAX.

ASHBROOK
LEADERS IN LIQUID/SOLID SEPARATION

MK.	DCN	DESCRIPTION	DATE	BY	CHK.	MK.	DCN	DESCRIPTION	DATE	BY	CHK.

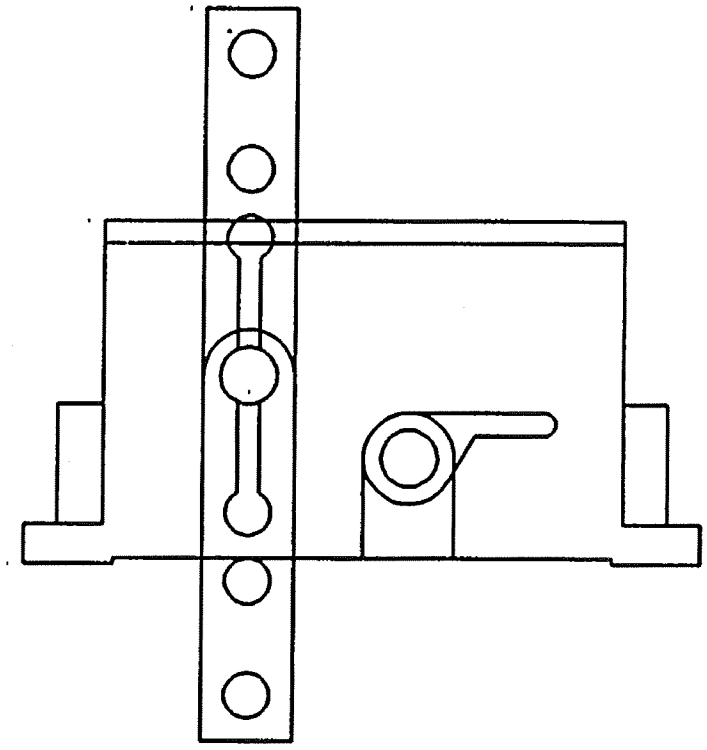
DEF 09/98
KEVIN 2/10
SCALE

ELECTRICAL ASSEMBLY KLAMPRESS TYPE 85

CUSTOMER | SK000995 | 0

RAMSEY
PRO-LINE

SAFETY PULL SWITCH



A01340

FM
Approved

Class II, Division: 1 & 2, Group E, F & G

MODEL SPS-2A-3-FM
(Double Switch)

INSTRUCTION MANUAL

PART NO. 056202 **REC 3992 REV B 1/98**

TABLE OF CONTENTS

CAUTION

THIS DEVICE SHOULD BE PERIODICALLY TESTED AND INSPECTED FOR PROPER MECHANICAL AND ELECTRICAL OPERATION.

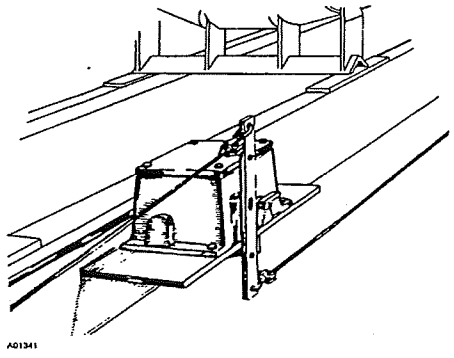
CHAPTER 1.0
SAFETY PULL SWITCH

1.1 INTRODUCTION

The Safety Pull Switch actuates when a force is applied to a pull cable at any position causing the actuator arm to rotate 20° to a "tripped locked" position. The switch stays in locked position until manually reset.

1.2 SPECIFICATIONS

1. Switch rating DPDT, 10 amps, 500 VAC
2. NEMA 4 weatherproof enclosure
3. Lock angle: 20 degrees
4. Pull rating: 25 inch/pounds = 7 to 17 lbs. depending on hole location
5. Two conduit opening, threaded 3/4" - 14 NPT
6. Recommended spacing between switches: 150 ft supported cable.
7. Recommended pull cable is a cable, aircraft, .094 diameter, 7 x 7 strand, with vinyl cover in a material type and color suitable for environment. Ramsey stocks a Part No. 0003676 galvanized, safety orange cable suitable for most applications.
8. FM approved for Class II, Division 1 & 2, Group E, F, & G
9. Adjustable Angle Actuator in 22-1/2° increments.



A01341

CHAPTER 2.0
INSPECTION AND INSTALLATION

2.1 INSPECTION

Inspect the package for external damage before opening, as often times the carrier can be held responsible for shipping damages. After unpacking, inspect the unit for damaged parts, etc.

2.2 INSTALLATION

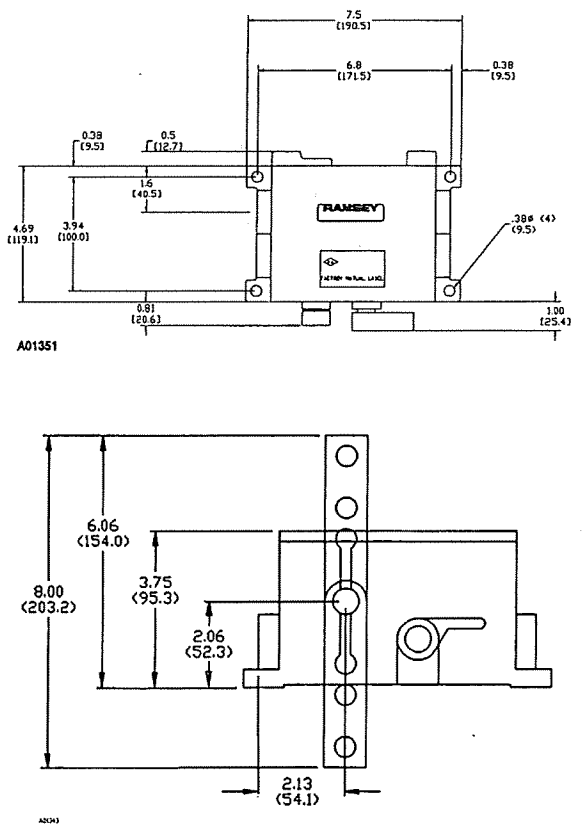
Refer to Figures 1-1 and 2-1 for installation methods or Figure 2-2 for an alternate mounting position.

NOTE: Cable should have sufficient play to allow switch to operate in two directions.

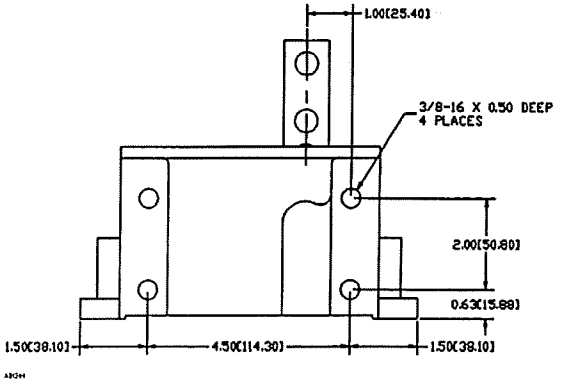
2.3 TESTING

After installation, test the Safety Pull Switch to ensure proper mechanical and electrical operation.

Make sure cover is tightly secured and conduit sealed to prevent water or moisture from entering switch housing.



INSTALLATION
FIGURE 2-1

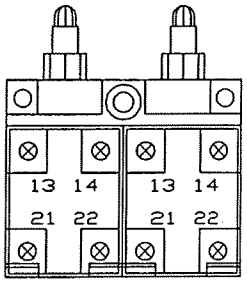


ALTERNATE MOUNTING
FIGURE 2-2

2.3 DESCRIPTION - ELECTRICAL

1. Each switch is supplied with 3/4" -14 NPT openings for conduit connections.

2. Two Switch - Figure 2-3 shows the terminal connections used in wiring a two switch unit. Two switch units are used for belt shutdown and alarm.



13--N.O.--14 13--N.O.--14
21--N.C.--22 21--N.C.--22

SWITCHES ARE RATED AT
10 AMP, 500 VAC
NON-INDUCTIVE.

SAFETY PULL SWITCH
TERMINAL CONNECTION
FIGURE 2-3

CHAPTER 3.0
THEORY OF OPERATION

3.1 GENERAL

Refer to Figure 2-1 while reading the following description.

3.2 OPERATION

The Safety Pull Switch must be mounted alongside the conveyor stringer. A pull cable is firmly fixed at one end and attached to the actuator arm of the Safety Pull Switch on the other end. This cable must have some play in it to ensure the switch will operate properly when cables are extended in opposite direction from the switch actuator arm.

When a force is applied in any position along the cable, the actuator will rotate 20°, then "tripped-locked" into position. A spring-loaded dog holds lever in detent position until actuating arm is manually reset.

At the time the arm is tripped, a switch is actuated which provides a DPDT circuit to interrupt the drive, thus stopping the conveyor. The second switch may be used to activate an alarm.

To reset the Safety Pull Switch, the reset lever must be depressed, thus placing the actuator arm in to operating position.

CHAPTER 4.0
SET-UP AND ADJUSTMENT

4.1 SET-UP

1. The recommended spacing between switches should not exceed 150 feet.
2. Cable lengths, if tied off at one end, should not exceed 75 feet.
3. Recommended pull cable is a cable, aircraft, .094 diameter, 7 x 7 strand, with vinyl cover in a material type and color suitable for environment. Ramsey stocks a Part No. 0003676 galvanized, safety orange cable suitable for most applications.
4. Eye bolts to support the cable should be spaced at 8 feet apart.
5. Safety Pull Switch is to be mounted alongside conveyor stringer.
6. Electrical hook-up should be completed as shown in Chapter 2.0.

4.2 ADJUSTMENT

All necessary adjustments are made at the factory. The unit does not require field adjustment.

CHAPTER 5.0
TROUBLESHOOTING

5.1 GENERAL

The Safety Pull Switch has been designed to operate in industrial environments.

5.2 TROUBLESHOOTING PROCEDURE

1. Check actuator lever to make sure it is in the normal position.
2. Check to see if terminal wires are connected properly and terminal screws are tight.
3. Check to see if the switch cams are not actuating the switch plunger. If so, reset cams.
4. Check switch contacts for proper operation. Replace when necessary.
5. If the above checks out all right, the problem is not with the Safety Pull Switch.

CHAPTER 6.0
MAINTENANCE, SPARES, AND REPAIRS

6.1 GENERAL

Except for the parts replacements mentioned below, Ramsey recommends that repairs not be attempted on this unit. Unauthorized repairs during the warranty period will void the warranty.

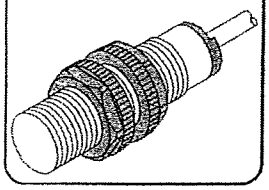
6.2 RECOMMENDED SPARES

(1) Switch: RTI Part No. 051020

Belt Breakage Switch
Lack of Cake Switch
Belt Misalignment Switch
Ashbrook Pt. #905981

TURCK
Inductive Sensors

S Barrel



Barrel, Plastic with Potted-In Cable
Not Threaded Full Length

2-Wire AC 
20-250 VAC
Normally Open (AZ3X) or Normally Closed (RZ3X)

NRTL/C

Sensor Selection

Part Number	Embeddable	Rated Operating Distance (mm)	Barrel Diameter (mm)	Normally Open	Normally Closed	Drawing #	Wiring Diagram	# of LEDs	High Temp (/S100) *	Switching Frequency (Hz)	ID Number
Bi 5-S18-AZ3X	•	5	18	•		1	A	1		20	43504 00
Bi 5-S18-AZ3X/S100	•	5	18	•		1	A	1	•	20	13734 00
Bi10-S30-AZ3X	•	10	30	•		2	A	1		20	43554 00
Bi10-S30-AZ3X/S100	•	10	30	•		2	A	1	•	20	13719 00
Ni 8-S18-AZ3X		8	18	•		1	A	1		20	43505 00
Ni 8-S18-AZ3X/S100		8	18	•		1	A	1	•	20	13718 00
Ni15-S30-AZ3X		15	30	•		2	A	1		20	43555 00
Ni15-S30-AZ3X/S100		15	30	•		2	A	1	•	20	13758 00
Bi 5-S18-RZ3X	•	5	18		•	1	B	1		20	43506 00
Bi10-S30-RZ3X	•	10	30		•	2	B	1		20	43556 00
Ni 8-S18-RZ3X		8	18		•	1	B	1		20	43507 00
Ni15-S30-RZ3X		15	30		•	2	B	1		20	43557 00

Cable/Conductor

Cable:	PVC Jacket; 2 and 7 Meter standard length PVC Jacket; 2 Meter standard for S100 style
Copper Conductor: (PVC insulated)	21 AWG

Material

Barrel:	PA 12-GF30 Plastic
End Cap:	PUR Plastic

Accessories

Accessories and mounting devices can be found on pages G1-G18.

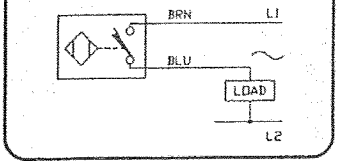
TURCK

Specifications

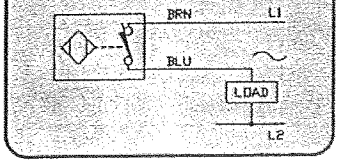
Line Frequency	40-60 Hz
Differential Travel (Hysteresis)	3-15% (5% typical)
Voltage Drop Across Conducting Sensor	≤7.0 V at 500 mA (100 mA for S100 style)
Continuous Load Current	≤500 mA (100 mA for S100 style)
Off-State (Leakage) Current	≤1.7 mA
Minimum Load Current	≥5.0 mA
Inrush Current	≤8.0 A (≤10 ms/5 Hz)
Time Delay Before Availability	≤25 ms
Power-On False Pulse Suppression	Incorporated
Transient Protection	5 kV, 10 ms, 10 kΩ
Operating Temperature	-25°C to +70°C (-13°F to +158°F)
Enclosure	Meets NEMA 1,3,4,6,13 and IEC IP 67
Shock	30 g, 11 ms
Vibration	55 Hz, 1 mm Amplitude in all 3 Planes
Repeatability	≤2% of Rated Operating Distance
LED Function	Red: Output Energized

Wiring Diagrams

A — Normally Open

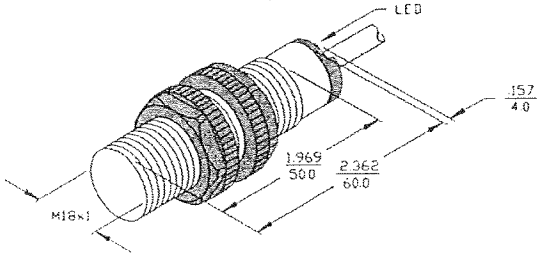


B — Normally Closed

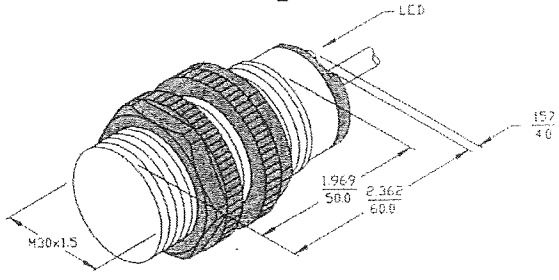


Dimensions

1



2

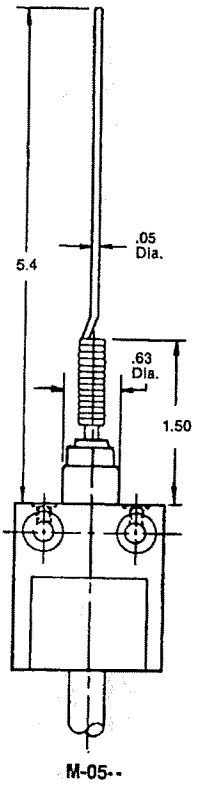


Belt Misalignment

Switch

Type	MS
Description	Miniature
Housing	Zinc die cast
Contact type	Epoxy encapsulated SPST Form C or SPDT snap action
Current rating	5A and 10A
Housing	NEMA 1,3,4,6,
Repeatability	6P,12,13
Temperature range: standard	
Temperature range: extended	-20°F to 200°F
Mechanical life	5 million
Plug-in	-
Rotary lever-spring return	Yes
Rotary lever - maintained	-
Rotary lever - 2 step	-
Top plunger	Yes
Top roller plunger	Yes
Side plunger	-
Side roller plunger	-
Omnidirectional	Yes
Special features	Prewired 3 SJTO cable Bushing mounted option
Applications	Machine tools, washing equipment Vehicles

Omnidirectional



M-05--

Interpretation of the catalog number

M	S	0	1	S	0	1	-	0	0

Mini Line M

Contact form
SPST Forms (standard) S
SPDT Form Za L

Actuator type

Top push plunger	0 1
Parallel roller plunger	0 2
Cross roller plunger	0 3
Rotary lever CW & CCW	0 4
Omnidirectional wire whisker	0 5
Bushing mounted top push plunger	0 6
Bushing mounted parallel roller plunger	0 7
Bushing mounted cross roller plunger	0 8
Adjustable top push plunger	0 9
Booted top push plunger	1 0
Booted parallel roller plunger	1 2
Booted cross roller plunger	1 3

Contact type

S	5 AWG silver contacts (Standard)
G	Gold crosspoint contacts

Conductor length options

0 1	3 feet standard
0 2	6 feet
0 3	9 feet
0 4	12 feet
0 5	18 feet
1 3	33 feet

General options

Option	Description
0 2	16-4 SJTO cable
0 6	Side entrance 18-4 SJTO cable
1 0	Gray 18-4 SJTO cable
1 1	#4-18 AWG idividual conductors
2 1	Low force (top plunger only) 18 oz

ASHBROOK KLAMPRESS®

13.0 LUBRICATION INFORMATION

13.1 LUBRICATION SCHEDULE

DAILY	**None**
WEEKLY	*Check hydraulic tank level and condition of oil.*
SEMI-ANNUALLY	*Lubricate press roller bearings.* *Lubricate hydraulic pump motor bearings.* *Change oil in hydraulic tank, wash and replace filter screen.*
ANNUALLY	*Change oil in belt drive gear box.*

13.2 Klampress Lubrication Cross Reference

Point of Application	Texaco	Exxon	Shell	Chevron	Mobil	Phillips	Frequency
Belt Drive Reducer	Meropa 220	N/A	Omala Oil 220	Non-Leaded Gear Compound 220	Mobilgear 630	N/A	Annually Drain & Refill
Press Roller Support Bearings	N/A	N/A	N/A	Ultra Duty Grease #2	Mobilith SHC 460	N/A	6 months Purge & refill
Hydraulic System Reservoir	Rando Oil HO 32	Nuto 32	Tellus 32	AW Oil 32	DTE 13M	Magnus 150	6 months or when necessary
Hydraulic Pump Motor	N/A	N/A	N/A	Ultra-Duty Grease #2	Mobilith SHC 460	N/A	6 months

Revised July 2000

15.0 REFERENCE

15.1 TROUBLESHOOTING CHARTS

Also see Section 8.10 Process Diagnostic Chart.

HYDRAULIC SYSTEM TROUBLE SHOOTING GUIDE

PROBLEM	PROBABLE CAUSE	REMEDY
Hydraulic power unit fails to energize when control pushbutton is depressed.	1. Control panel feeder circuit in "off " or "tripped position.	1. Set breaker to "on" position.
	2. Motor starter overload protectors in tripped position	2. Depress overload reset button on motor starter.
Belt steering erratically, requiring constant automatic correction.	Improper roller alignment, valve alignment, valve sensitivity or belt defects.	Carry out check and adjustment procedures which are appropriate.

HYDRAULIC SYSTEM TROUBLE SHOOTING GUIDE

PROBLEM	PROBABLE CAUSE	REMEDY
Hydraulic unit operational but fails to build pressure.	1. Incorrect motor rotation direction.	1. Insure that rotation is correct. If not have a qualified electrician revise motor wiring at motor starter.
	2. Pressure regulator, located on hydraulic pump, is not properly adjusted.	2. Correct adjustment.
	3. Pressure regulator clogged by foreign material causing fluid bypass back to reservoir.	3. Disassemble & clean valve. Check for worn or broken parts. If particles are found in valve, drain and clean reservoir, refill as recommended in lubrication schedule.
	4. Belt steering valve bypassing fluid directly back to power unit reservoir.	4. Remove and clean belt steering valve of any foreign material. If cleaning does not improve operation, contact a qualified hydraulic repair center or contact Ashbrook Corporation.
	5. Hydraulic pump worn or damaged.	5. Have pump serviced by a qualified hydraulic repair center. Contact Ashbrook if a replacement pump or part is required.

DRIVE SYSTEM TROUBLE SHOOTING GUIDE

PROBLEM	PROBABLE CAUSE	REMEDY
Main drive fails to start and drive the belt when energized.	1. Control panel interlocks prohibit belt drive energizing until appropriate ancillary equipment is operational.	1. See sequence of operations and control diagrams for design interlocks. Energize appropriate equipment.
	2. Belt drive speed potentiometer set at zero.	2. Increase pot setting to desired speed.
	3. VFD (Variable Frequency electronic drive controller) tripping chassis mounted overload protector or feeder voltage fuses burnt out.	3. Reset overload and check fuses for continuity, renew or reset as required. Check for dried sludge or other obstructions on the belt which would put unusual starting load on belt drive.
	4. If condition #3 is found to exist.	4. Turn off control panel main breaker. Release belt tension. Remove cover from reducer. Rotate motor/reducer by hand. If movement is not possible, remove gear guard and check for missing or broken teeth on pinion or bull gears. Replace gears as required.
	5. If check out fails to show problem and incoming voltage to VFD is proper. The VFD has failed.	5. Take VFD controller to repair center for reconditioning or replacement. Contact Ashbrook for service.

Process Trouble Shooting

Problem	Probable Cause	Remedy
Sludge does not Flocculate	Polymer is not flowing	Verify polymer system is on.
		Verify polymer is flowing through plastic hoses at mixer.
	Insufficient amount of polymer	Increase polymer dosage
	Wrong polymer type	Contact Ashbrook or polymer representative
	Insufficient polymer mixing	Increase polymer mixing energy
		Increase retention time in piping
Sludge does not dewater in gravity section	Belt is blinded	Clean belts
	Poor flocculation	Increase polymer
		Increase mixing energy
	Wrong polymer type	Contact Ashbrook or polymer representative
	Loading rate too high	Decrease sludge feed rate
Capture is poor	Seals are worn on restrainers	Replace seals
	Insufficient polymer	Increase polymer dosage
Low Cake Solids	Insufficient polymer	Increase polymer dosage
	Too much polymer	Decrease polymer dosage
	Wrong polymer type	Contact Ashbrook or polymer representative
	Low belt tension	Increase hydraulic pressure on belts
	Loading rate is too high	Decrease sludge feed rate.
	Belt speed is too fast	Decrease belt speed.
Cake adheres to belt	Belt tension is too high	Decrease belt tension
	Polymer dosage is too high	Decrease polymer dosage
	Insufficient mixing	Increase mixing energy
Sludge build up in pans	Upset process	Clean pans and optimize process

Belt Wash Water System Trouble Shooting guide

Problem	Probable Cause	Remedy
Water Pump Does Not Run	Pump Motor Not Running	Verify Switch is On
		Verify Power is On
		Motor is Burned Out or Needs Repaired
Low pump pressure	By Pass Valve at Press is Open	Close Handwheel Valve at Wash Box
	Impeller is Worn	Replace Impeller
	Suction pressure too low	Correct suction pressure problem
	Pressure Switch Fault	Restart System and verify pressure is above 50 psi
		Verify pressure switch is functioning by bypassing switch and restarting system
Low Pressure at Wash Box	Line is Blocked	Check piping and remove obstruction
	By Pass Valve at Press is Open	Close Handwheel Valve at Wash Box
	Nozzle is Missing	Replace Nozzle in Wash Tube
No Water at Wash Box	Valve is Closed	Open Valves
Water bypassing shower	Valve is open	Close handwheel valve
	Seals on washtube are worn	Replace seals

Belt Tracking Trouble Shooting guide

Problem	Probable Cause	Remedy
Belt Will Not Track	Poor distribution of sludge	Correct distribution on gravity section
	Wedge section opening is not even	Adjust top and bottom of wedge so that the opening is the same on both sides of the machine
	Sludge is built up on rollers	Clean rollers
	Steering Paddle not following belt	Spring on valve is worn or broken, replace spring
		Valve is sticking or frozen, repair or replace valve
		Paddle is out of adjustment, Adjust paddle.
	Belt is stretched out of square due to poor distribution	Run the machine without sludge for two hours at 700 psi pressure to correct uneven stretch. Correct distribution problem. If belts will not restretch to square, replace belts.
	Belt is cut out of square	Remove the belt from the machine. Rotate it 180 degrees and reinstall. If the belt is bad, it will go off on the opposite side. If it steers off the same side, the belt is not at fault.
	Roller has been knocked out of alignment	Check all rollers for parallel. Run a 100 foot flat tape along the belt path on both sides near the end of the roller. Each side should be the same (1/2" tolerance). If not, call Ashbrook
	Hydraulic pressure is low	Increase pressure
	Cylinder is stuck	Manually move steering paddle to see if cylinder responds. If not, repair/replace cylinder.

Klampress Trouble Shooting

Problem	Probable Cause	Remedy
Belt Press Does Not Run	Sludge Pump Not Operating	Check Sludge Pump
	Polymer System Not Operating	Check Polymer System
	Belt Drive Not Operating	See Drive System Trouble Shooting Guide
	Hydraulic Unit Not Operating	See Hydraulic System Trouble Shooting Guide
	Water Pump Not Operating	See Belt Wash Water System Trouble Shooting Guide
	Control System Problem	See Control System Trouble Shooting Guide
Belt tension slacks when sludge is applied	Hydraulic cylinder is by passing oil internally	Repair or replace cylinder
Scraper blade not cleaning belt	Blade is out of adjustment or requires replacement	Adjust or replace blades
	Build up of fibrous material, such as hair, at the knife edge of the blade	Open blade and clean
Scraper blade wears quickly	Blade tension too tight	Reduce blade tension. Optimize process for good belt release
	Belt speed too fast	Reduce belt speed
Roller sticking	Bearing is worn	Replace bearing
Bearing losing excessive grease	Bearing seals are blown	Replace seals
Machine runs in a jerky motion at roller bearings	Gear train is damaged	Inspect gear reducer and replace as required.

15.2 EQUIPMENT IDENTIFICATION

The plate pictured below is attached to the side of the frame on each filter press or gravity belt thickener. Prior to calling our service department for information, or when placing a parts or service order, please have the data from this plate available. This will help us to serve you better.

Ashbrook Simon-Hartley
11600 East Hardy
Houston, TX 77093

MPS No. _____

Serial No. _____

Part No. _____

15.3 CUSTOMER SERVICE DEPARTMENT INFORMATION

Our Customer Service department is comprised of four traveling technicians, two traveling pilot operators, the process manager, the customer service coordinator and customer service manager. The Customer Service department is headed by Vice-President of Operations, Mr. Pete Deaville. Operating hours are Monday through Friday from 8:00a.m. to 5:00p.m. (Central Time).

When calling, please use the direct numbers listed below. If you should get a recorded message, please do not hang up. State your name, Company name, phone number and the nature of you call and we will respond to you as soon as possible. If your needs are urgent, press "0" to return to the operator, who can page the requested party.

Customer Service Manager	Pat Everett	281-985-4465
Customer Service Coordinator	Danny Grant	281-985-4429
Spare Parts		800-547-7273
Vice-President, Operations	Pete Deaville	281-985-4443