Warranty

ALFA LAVAL ASHBROOK SIMON-HARTLEY INC., 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 Alfa Laval. Alfa Laval'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 Alfa Laval'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 Alfa Laval's factory without prior written approval. Alfa Laval 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.

Alfa Laval 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.

Commencement of Warranty Period

The warranty period as offered by Alfa Laval 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) year 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) year against failure of the roller coating or the rollers themselves. Alfa Laval 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) year 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

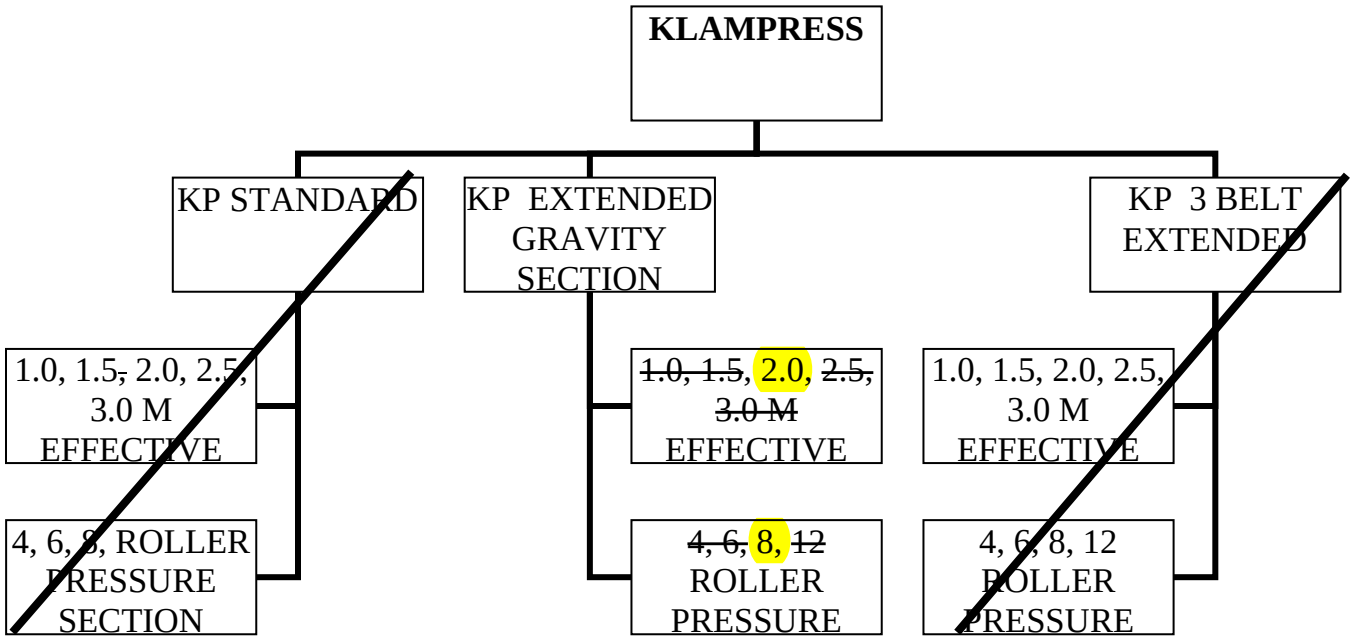
ALFA LAVAL ASHBROOK SIMON-HARTLEY INC. , warrants that the belts furnished with our slurry dewatering equipment are free from defects in material and workmanship. Should there be a defect in material or workmanship, Alfa Laval will replace such defective belts on a pro-rated basis on a normal usage rate 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.

KLAMPRESS®

GENERAL MECHANICAL DESCRIPTION

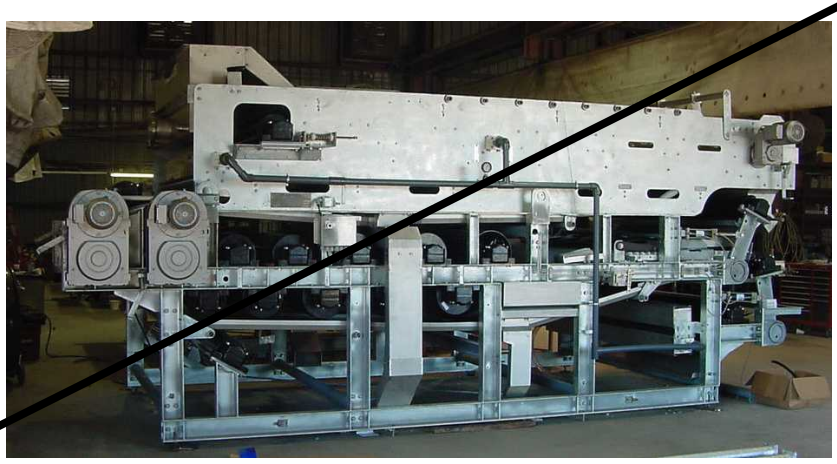
INTRODUCTION: The Klampress® is considered the industry standard for superior value, performance, and durability. The Klampress® is designed for low polymer consumption, high throughput rates, and high cake solids. Alfa Laval manufactures the Klampress® from quality materials with tough, corrosion-resistant 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®: Klampress®-Standard, Klampress® Extended, and Klampress®-3 Belt Extended. The Klampress®-Standard is designed for normal applications. The Klampress®-Extended is designed for slow gravity separation sludge applications and for high cake solids requirement applications. The Klampress® 3 Belt Extended is for thin and difficult sludge applications.
The following chart is a list of different of Klampress® options:



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

A. Main Frame
B. Rollers
C. Bearings
D. Steering Assemblies
E. Tensioning Assemblies
F. Hydraulic Power Unit
G. Feed System
H. Gravity Drain Section
I. Wash Stations
J. Scrapers
K. Drive Train
L. Dewatering Belts
M. In-Line Mixer
N. ~~Optional AB Conversion~~
O. ~~3 Belt Extended Option~~

KLAMPRESS Extended with 8 pressure rollers

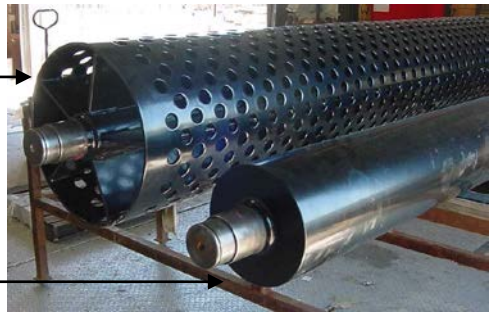


~~KLAMPRESS Extended with 12 pressure rollers and 3-Belt option~~

A. Main Frame: A 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.

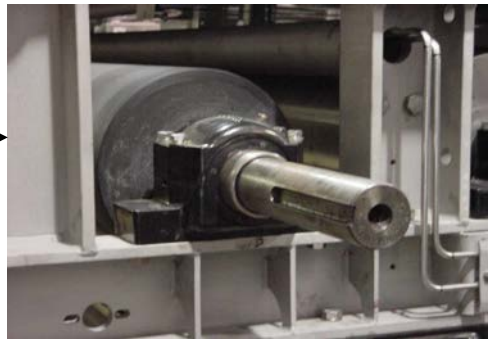
B. Rollers: Fabricated assemblies, typically of forged end stub shaft construction, which provide a bearing surface for the belts. The roller shafts (journals) are machined on both ends to accept the roller bearings. All rollers are coated externally for corrosion resistance. Perforated rollers are also coated internally. The rollers may be any of the following types:

(1) Perforated Roller: Roller with a perforated shell with open ends to allow the water to be drained away quickly.



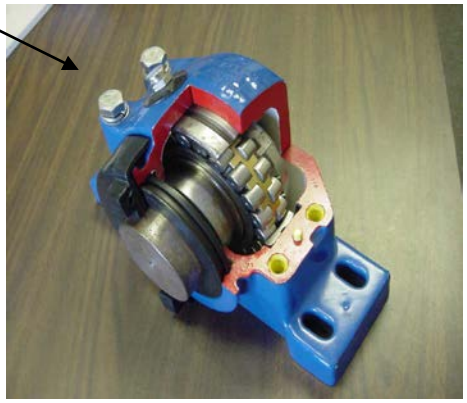
(2) Plain Roller: Any non-perforated roller of varying diameter with the job specified covering. Used as steering rollers, tensioning rollers, pressure rollers, nip rollers, or as idler rollers to change belt direction.

(3) Drive Roller: Typically covered with ¼" Buna-N rubber; rollers used to pull the dewatering belts through the press.



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 fitting for maintenance purposes. The steering bearings are direct mount, straight bore, cylindrical roller bearings. All other bearings are direct mount, double row spherical roller bearings. The bearing shaft seal is a triple seal comprised of the labyrinth, an electrometric face seal and quad ring. For additional moisture protection, the seal is covered by a shaft-mounted splashguard.

D. Steering Assemblies: The Klampress® has two hydraulic steering assemblies each comprised of a steering roller and a hydraulic positioning unit. The steering assemblies monitor the positions of the two dewatering belts that go through the pressure zone of the press and make adjustments to maintain belt alignment in the center of the machine. In the three-belt option the

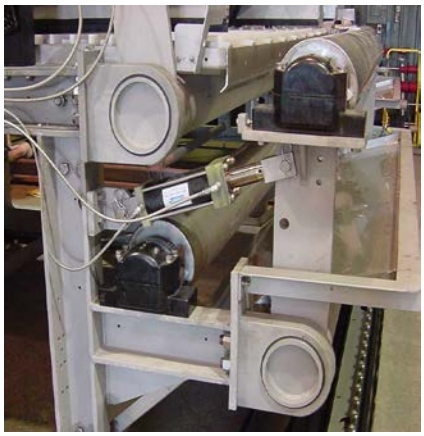


independent gravity section belt is maintained in its central position by flanges on the gravity belt tension roller. The steering assemblies work by moving one end of the steering roller so that the steering roller is turned to a small angle relative to the belt direction. The belt responds to this change in angle by moving toward the end of the roller it touches first. The components of the steering assemblies 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.

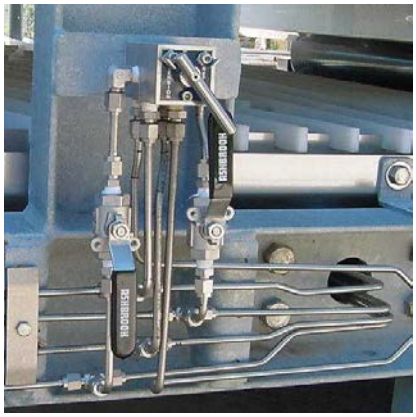
E. Tensioning Assemblies: The two belts that do the pressing each have a hydraulic tensioning assembly that consists of two hydraulic cylinders, a tensioning yoke and a two-position, four-way control valve. In the three-belt option the independent gravity section belt has tension applied by compressed springs. There are adjusting screws on each end of the gravity deck tension roller. 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 regulator knob on the head of the hydraulic pump controls the upper belt tension. The regulator in the end of the hydraulic control manifold controls the lower belt tension. 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.

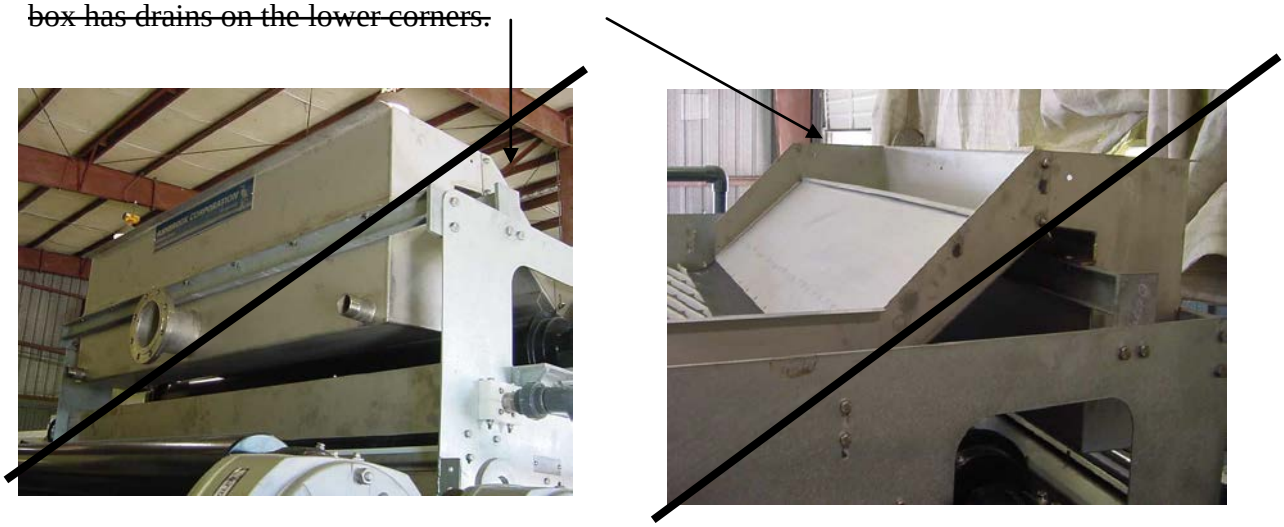
F. Hydraulic Power Unit: An assembly of press mounted components that provide all hydraulic power for operation of the steering and tensioning assemblies. The unit consists of a 1-gallon reservoir suction strainer, pump-motor assembly and control valves.

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 suction 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.

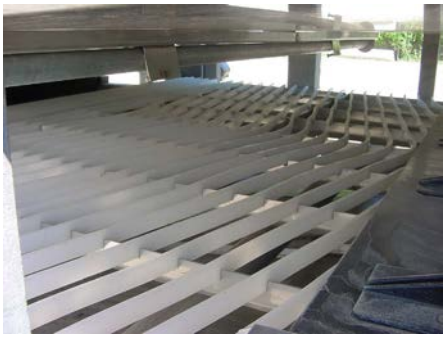
G. Feed Assembly: PVC feed pipe assembly that has a standard flange for connecting to the sludge feed line.

~~The three-belt option uses a flooded bottom feed box with an overflow weir. The feed box has drains on the lower corners.~~



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

(1) Drainage Grids: (At left below) 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.

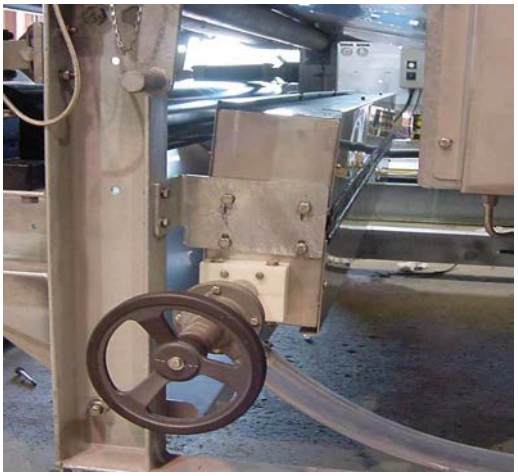


(2) Chicanes: (At right above) The Companies patented plows that turn the sludge and provide clear openings for the free water to drain into the drain pans. The chicanes pivot independently on the support bar that allows them to float directly on the belt and ride smoothly over the belt seam. This minimizes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

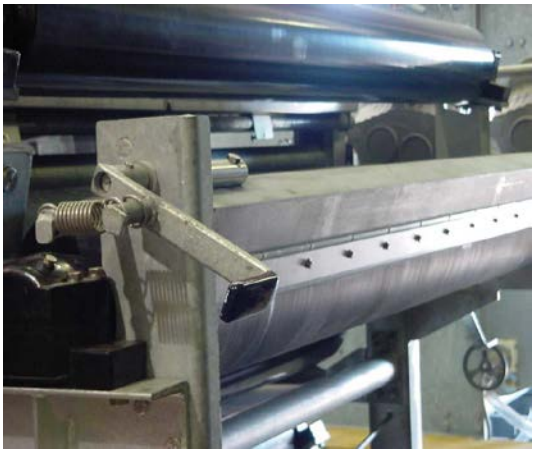
(3) Drainage Trays: Assortment of stainless steel pans that collect the filtrate for piping to the machine sump. The piping is designed to be self-venting to provide maximum drainage flow.

(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.

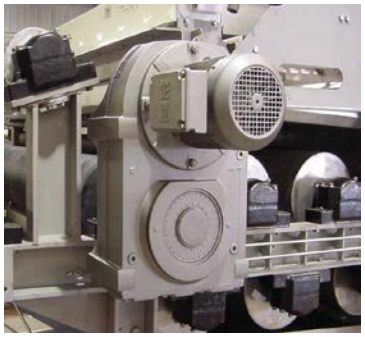
I. Wash Stations: There is a slotted stainless steel box containing the wash spray tube for each belt. The wash spray tube generates an overlapping spray pattern from the jet nozzles to blast embedded and surface particles from the belt. The wash tube has an internal brush for cleaning the nozzles while 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.



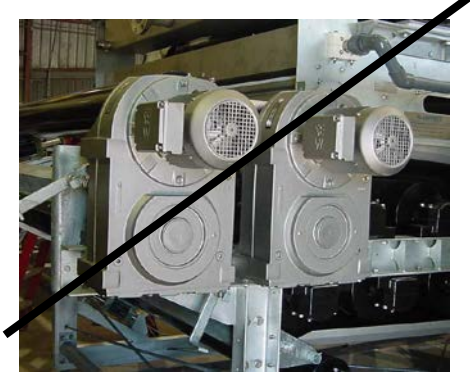
J. Scraper (Doctor) Blades: Each belt has a scraper assembly fitted with polyethylene blades mounted in pivoted steel blade holders. The scraper blades remove the dewatered sludge cake from the dewatering belts. The scrapers are held against the belt by patented over-center spring-loaded levers. The spring preload is set at the factory at the time of assembly and does not require any field adjustment.



K. Drive Train: The base model Klampress® has a single drive roller with a shaft mounted gear motor. This is a self-contained helical gearbox with its own splash lubrication system.



~~There are options for dual drives and a three-belt arrangement with its own drive assembly. The shaft-mounted belt drive gear motor(s) pull the belts through the dewatering press by rotating the drive roller(s).~~



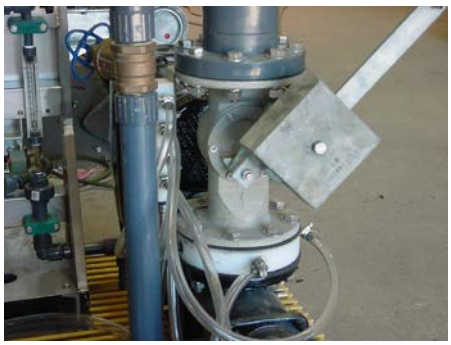
~~The drive on the independent gravity belt in the three-belt option provides belt speeds up to 40 meters per minute. The operating belt speeds will be set by the operator depending on the dewatering conditions~~.

All the above drives use an electronic variable frequency drive for speed control.

See the Drive Train details in section 10 for more information on the motors and gear reducers. 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. With the Aquabelt conversion the belt drive(s) use higher horsepower motor(s) for the necessary increased speed.

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

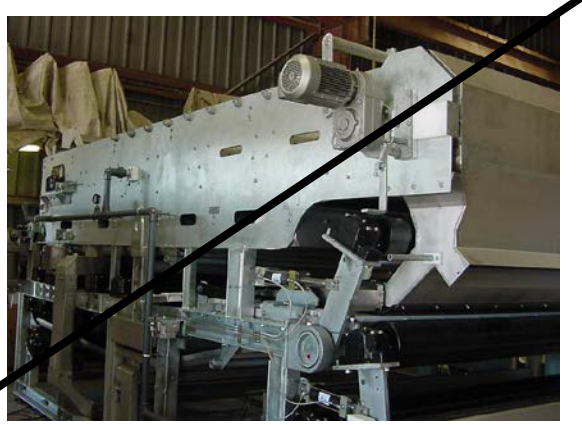
M. In-Line Mixer: Self-cleaning variable orifice venturi mixer used to condition the sludge prior to dewatering. The mixing energy may be varied independently of the flocculation by moving the mixer arm and counterweight.



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.~~

~~At the discharge end of the gravity deck is The Companies patented sludge retarding ramp assembly. (Patent No. 4,731,188) The adjustable ramp is provided to cause additional dewatering of the sludge before it is discharged from the gravity deck. This is accomplished by creating a dam across the discharge end of the gravity deck forcing the sludge to be pushed up the ramp, turning and tumbling on itself, while additional water is caused to separate from the solids. The operator may adjust the angle of the ramp by turning the crank on the ramp support assembly. For drier sludge the ramp will be raised to a steeper angle. It is also possible to retract the ramp away from the belt and allow the sludge to pass under it when no further dewatering is desired.~~

~~O.~~3 Belt Option: ~~For special applications where a wide range of operating conditions exist the 3-belt option allows considerable flexibility in the dewatering process. The 3-belt option allows the gravity drainage deck belt to be operated at a higher speed than the press belts allowing the thickening of thin sludges prior to introducing it to the pressing in the lower sections the Klampress. The 3 belt Klampress® may be operated as a thickener alone or as a versatile belt press capable of accepting thinner sludge feed than is normally possible on a belt filter press. 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~~.

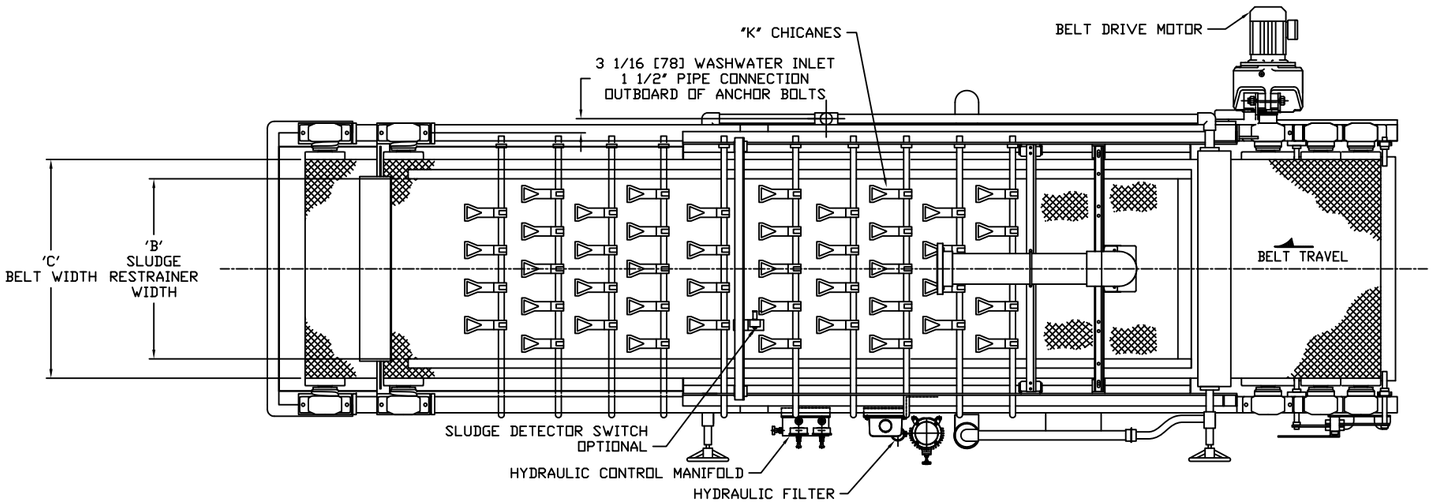


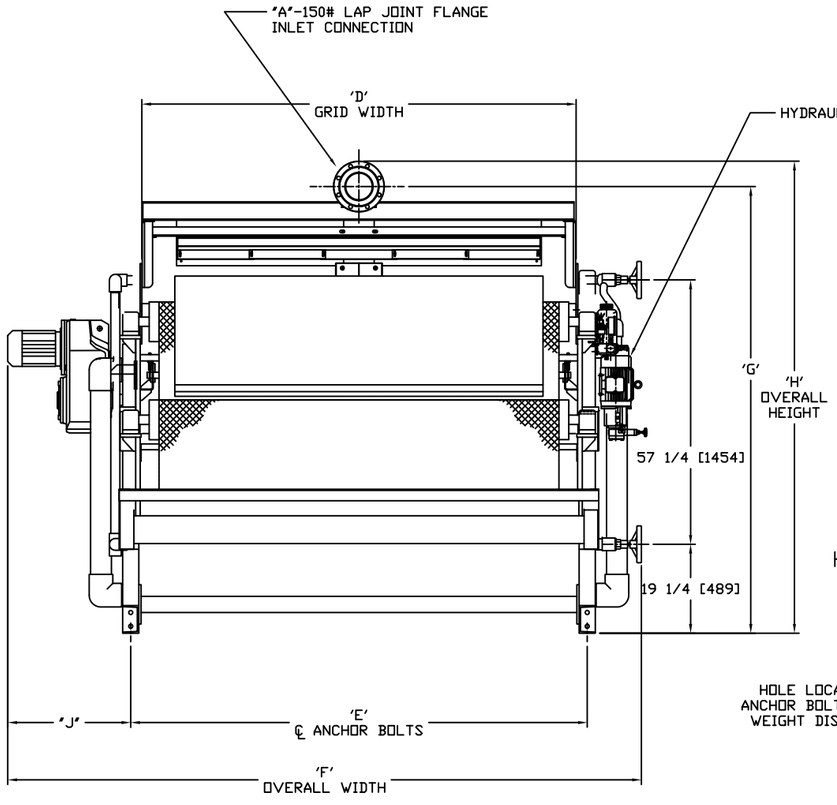
KLAMPRESS with the 3 belt option installed

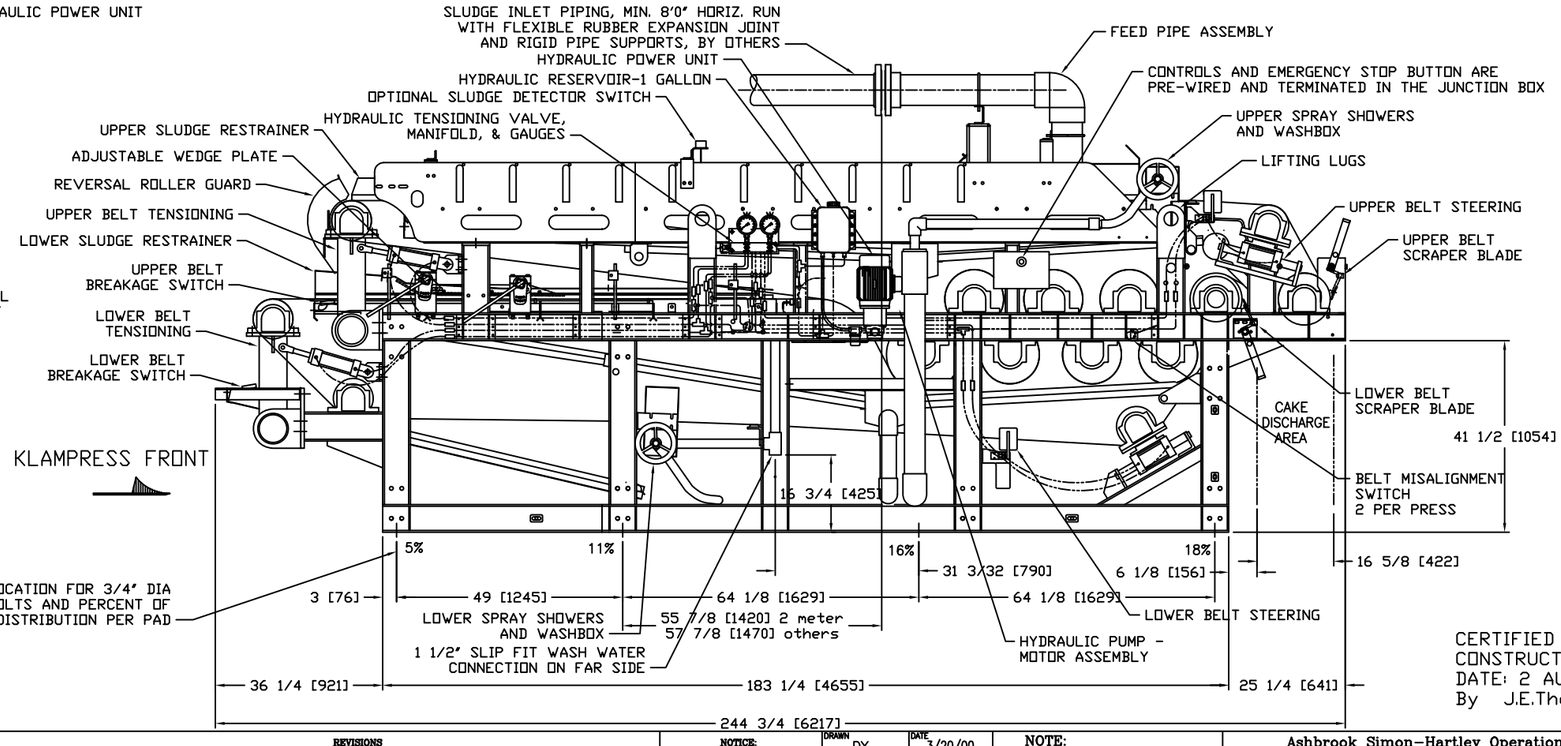
REV. 7

B4MATR7.DWG

KLAMPRESS	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'J'	'K' No. OF CHICANES STD/OPT	STATIC WEIGHT	DYNAMIC WEIGHT
1 METER	4"	39" (1.0 M)	47 1/4" (1.2 M)	53 7/8" (1368 mm)	58 7/8" (1495 mm)	94 3/4" (2407 mm)	95 3/4" (2432 mm)	100 1/4" (2546 mm)	23" (584 mm)	25/45	13,500 lbs (6,136 kg)	16,000 lbs (7,273 kg)
1.5 METER	4"	59" (1.5 M)	67 1/2" (1.7 M)	73 7/8" (1876 mm)	78 7/8" (2003 mm)	116 11/16" (2964 mm)	95 3/4" (2432 mm)	100 1/4" (2546 mm)	24 15/16" (633 mm)	35/65	16,700 lbs (7,591 kg)	20,600 lbs (9,364 kg)
2 METER	6"	79" (2.0 M)	86 5/8" (2.2 M)	93 7/8" (2384 mm)	98 7/8" (2511 mm)	138 7/16" (3516 mm)	96 3/4" (2457 mm)	102 1/4" (2597 mm)	26 9/16" (675 mm)	55/85	19,650 lbs (8,932 kg)	24,800 lbs (11,273 kg)
2.5 METER	6"	98" (2.5 M)	106 1/4" (2.7 M)	115 7/8" (2942 mm)	120 7/8" (3070 mm)	158 5/8" (4030 mm)	96 7/8" (2461 mm)	102 3/8" (2600 mm)	24 15/16" (633 mm)	70/105	23,500 lbs (10,660 kg)	28,500 lbs (12,927 kg)
3 METER	6"	118" (3.0 M)	126" (3.2 M)	133 7/8" (3400 mm)	138 7/8" (3527 mm)	180" (4572 mm)	98 3/4" (2508 mm)	105 1/2" (2680 mm)	29 1/8" (740 mm)	90/145	27,300 lbs (12,383 kg)	34,300 lbs (15,558 kg)







CERTIFIED FOR
CONSTRUCTION USE.
DATE: 2 AUG 2002
By J.E.Thompson

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

REVISIONS

REV	DATE	DESCRIPTION	BY	APP'D
1	6/00	CORRECTED CHICANE QUANITIES	DY	JET
2	10/00	ADDED IMPERIAL UNITS IN TABLE AND DIMS.	DG	JET
3	3/01	CORRECTED LB TO KG CONVERSION	JET	JET
4	11/7	ADDED DIM TO LOCATE INLET FLANGE.	JET	JET
5	1/17	LOCATED WASHWATER CONN IN PLAN VIEW.	JET	JET
6	2/02	REVISED WITH NEW SCRAPER CONFIGURATION	JET	JET
7	6/02	ADD MANUFACTURING NOTE. UPDATE DIM BLOCK.	MM	JET
8	8/03	MADE CORRECTIONS TO IN TO MM CONVERSIONS.	JET	JET
9	2/07	REVISED FEED ASSEMBLY	MM	JET
10	2/12	ADDED 2.0m & 3.0m DIMENSIONS	MCA	MCA
11				
12				

DRAWN	DY	DATE 3/20/00
CHECKED	DY	DATE 3/20/00
APPROVED	JET	DATE 3/20/00
NEXT ASSY	N/A	WEIGHT SEE TABLE

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

Ashbrook Simon-Hartley

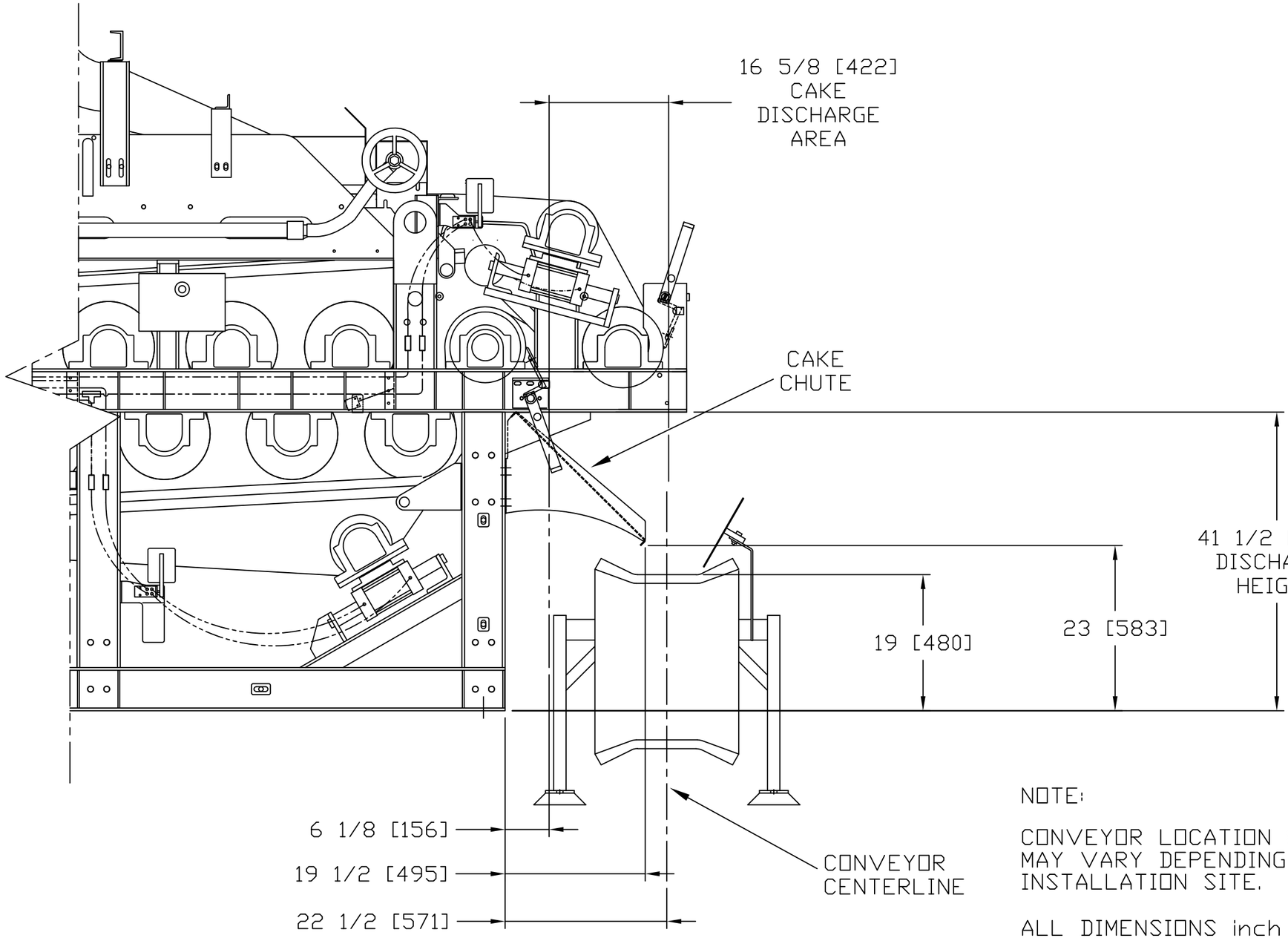
Ashbrook Simon-Hartley Operations LP.
11600 East Hardy Road
Houston, Texas 77093
Phone: 281-449-0322
FAX: 281-449-1324

TITLE
GENERAL ARRANGEMENT
KLAMPRESS - EXTENDED GRAVITY
8 ROLLER CONFIGURATION

SCALE	DWG. NO.	REV
1/32	SK001984	10

CUSTOMER ASHBROOK

B4MATR7.DWG REV. 7



KLAMPRESS FRONT

NOTE:
DRAWING NOT FOR
CONSTRUCTION USE
UNLESS STAMPED
CERTIFIED BY ASHBROOK.

NOTE:

CONVEYOR LOCATION & MODEL
MAY VARY DEPENDING ON
INSTALLATION SITE.

ALL DIMENSIONS inch [mm]

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

REVISIONS

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

REVISIONS

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

DRAWN	MCA	DATE	8/18/04
CHECKED	MCA	DATE	8/18/04
APPROVED	JET	DATE	8/18/04
NEXT ASSY	N/A	WEIGHT	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

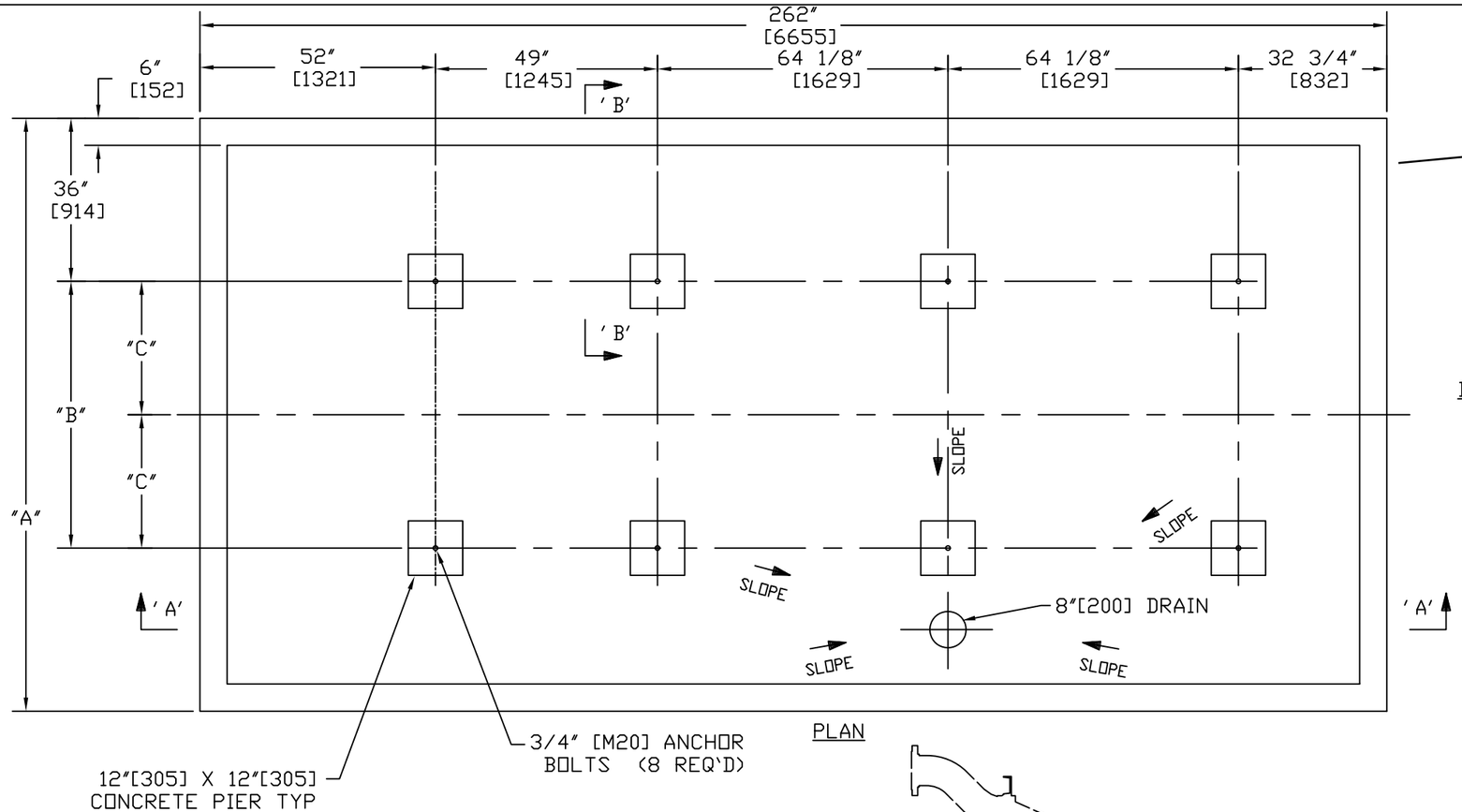
TITLE
GENERAL ARRANGEMENT
KP94 BELT PRESS
WITH 18" x 18" CAKE CHUTE

SCALE	DWG. NO.	REV
1/16	SK002825	0

CUSTOMER
GENERAL USE

B4MATR7.DWG REV. 7

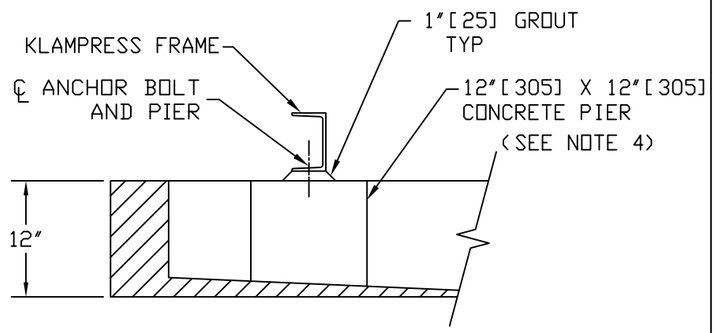
TABULATED DIMENSIONS inches/mm			
KLAMPRESS	'A'	'B'	'C'
1 METER	130 7/8" / 3325	58 7/8" / 1495	29 7/16" / 748
1.5 METER	150 7/8" / 3832	78 7/8" / 2003	39 7/16" / 1002
2 METER	170 7/8" / 4340	98 7/8" / 2511	49 7/16" / 1256
2.5 METER	192 7/8" / 4899	120 7/8" / 3070	60 7/16" / 1535
3.0 METER	210 7/8" / 5356	138 7/8" / 3527	69 7/16" / 1713



PLAN

DISCHARGE END

SECTION "A-A"



SECTION "B-B"

NOTES:

1.) THIS PIECE OF EQUIPMENT OPERATES IN A WET/WASHDOWN AREA. ASHBROOK 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 ASSUMES NO RESPONSIBILITY FOR STRUCTURAL DESIGN AND/OR LAYOUT OF SUPPORTING STRUCTURE OR SUMP.

4.) POINT LOADING AT ANCHOR BOLTS SHALL BE DESIGNED TO ACCEPT 8,000 LBS. [3,635,Kg] PER PIER FOR ALL PRESS SIZES.

CERTIFIED FOR CONSTRUCTION USE.
DATE: 2 AUG 2002
By J.E.Thompson

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

REVISIONS						REVISIONS					
REV	DATE	DESCRIPTION	BY	APP'D	REV	DATE	DESCRIPTION	BY	APP'D
1	1/98	ADD POINT LOADING	DT		7				
2	10/98	UPDATED TITLE BLOCK TO NEW STYLE	SAC		8				
3	6/02	ADD MANUFACTURING NOTE	MM		9				
4	12/04	ADD METRIC DIMS	JET		10				
5	6/05	ADD 2.5 METER DIMENSIONS	MAC		11				
6	7/06	ADD 3.0 METER, UPDATE TITLE BLOCK	DY		12				

DRAWN	DY	DATE 3/26/96
CHECKED	DY	DATE 3/26/96
APPROVED		DATE 10/22/98
NEXT ASS'Y	N/A	WEIGHT 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
SUMP LAYOUT
KLAMPRESS 94
EXTENDED GRAVITY

SCALE	DWG. NO.	REV
1/32	SK001228	6

CUSTOMER GENERAL USE

2.2 GENERAL PROCESS DESCRIPTION

2.2.1 Introduction: Alfa Laval'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 t~~wo or~~ three 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 greatly increased solids content. When equipped with the three-belt option the Klampress can be operated as a gravity belt thickener or belt filter press.

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 polyelectrolyte, 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 Alfa Laval 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 Alfa Laval system of polymer injection and in-line mixing is designed for maximum flexibility. Alfa Laval 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 and 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. When equipped with the 3-belt option the flocculated sludge is fed into a feed tank spreader assembly at the beginning of the gravity deck. 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 Alfa Laval'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. ~~With the Aquabelt® conversion or three-belt option the thickened sludge can be discharged and not be passed through the pressure zone of the belt filter press. If further dewatering in the Aquabelt mode is desired the Alfa Laval's adjustable sludge retarding ramp may be employed. The ramp creates a dam across the discharge end of the gravity deck and forces the sludge to be pushed up the ramp, turning and tumbling on itself, while additional water is caused to separate from the solids. The operator may adjust the angle of the ramp by turning the crank on the ramp support assembly. For drier cake the ramp will be raised to a steeper angle. It is also possible to retract the ramp away from the belt and allow the sludge to pass under it when no further dewatering is desired.~~

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 radius grid. 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 16" diameter perforated roller. This perforated 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.

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.

Alfa Laval 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 Alfa Laval 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, Alfa Laval will not assume liability for any missing spare parts.

Alfa Laval will assist your efforts to collect claims for loss or damage in transit. Should there be any loss or damages please notify Alfa Laval within three (3) working days of delivery. Alfa Laval'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 Alfa Laval’s 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.

KLAMPRESS ®

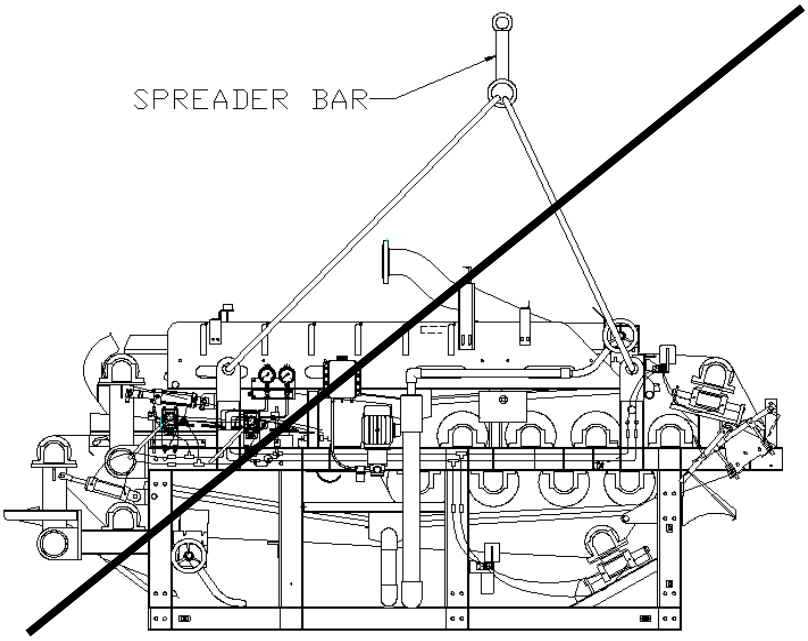
4.0 HANDLING INSTRUCTIONS

Your Alfa Laval 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:

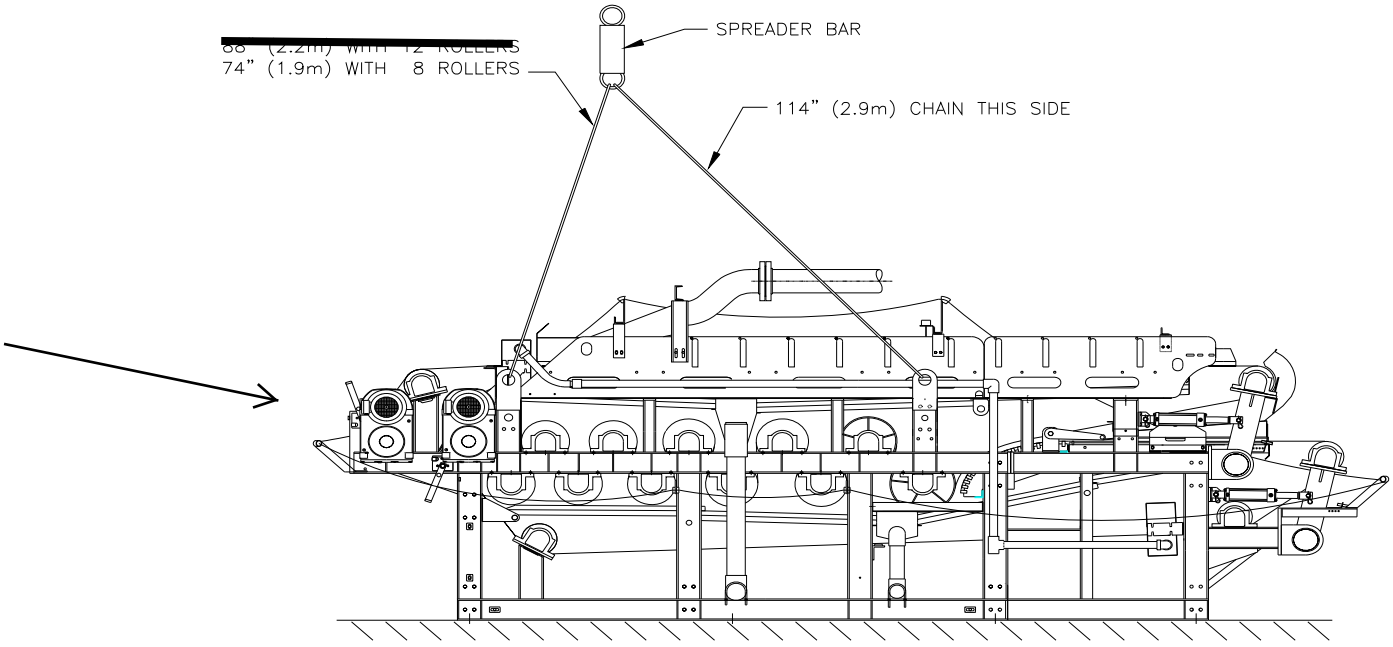
1. Attach chains or cables of the lengths indicated in the diagram to the two lifting brackets and to the ends of a spreader bar.

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.

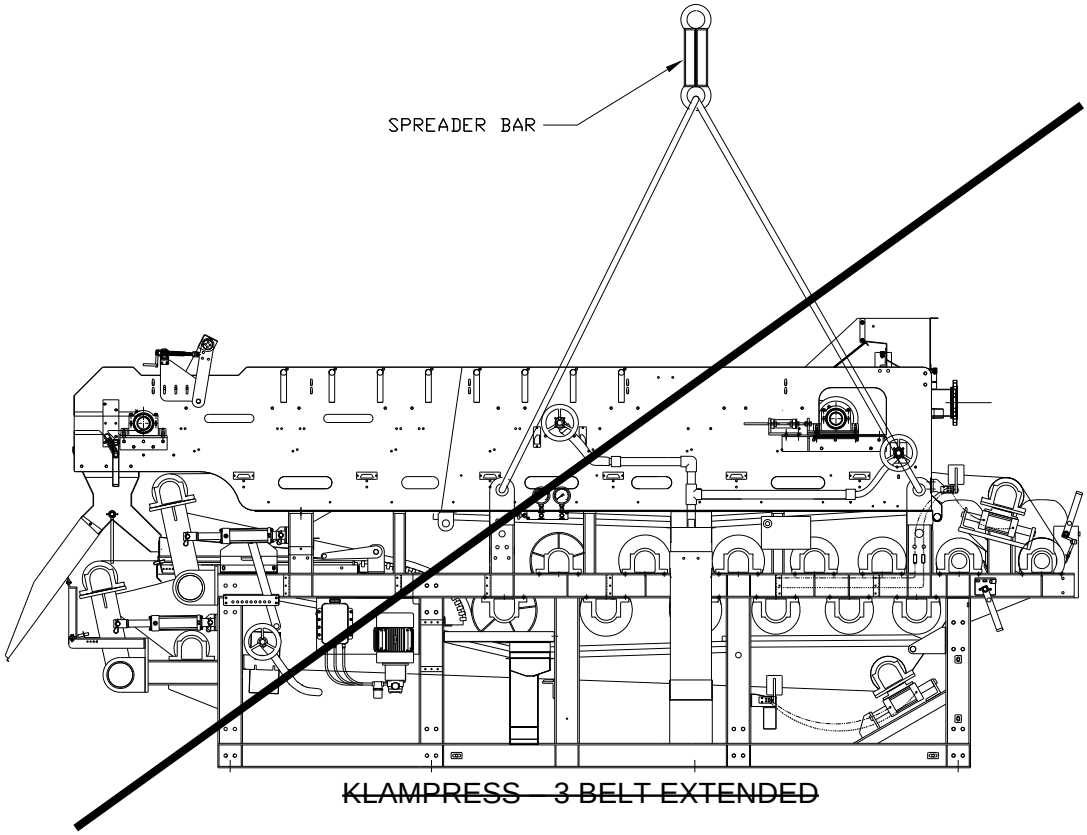
3. Lower the machine carefully to rest on level surfaces with the weight evenly distributed.



~~KLAMPRESS - STANDARD~~



KLAMPRESS – EXTENDED



~~KLAMPRESS – 3 BELT EXTENDED~~

KLAMPRESS®

5.0 STORAGE INSTRUCTIONS

Alfa Laval 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.

5.9 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 Alfa Laval. Since they are general, some modifications may be required to solve your unique requirements. Should assistance be required, please contact Alfa Laval'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.
d. Replace the Klampress® following Handling Instructions.
e. Loosely secure the anchor bolts.

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

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 Alfa Laval Ashbrook Simon Hartley 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 equipped with the three belt option the water flow rates will be increased to 60, 90 and 120 gpm respectively. 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. Alfa Laval 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, Alfa Laval recommends eight feet of feed piping in the central vertical plane of the press 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.

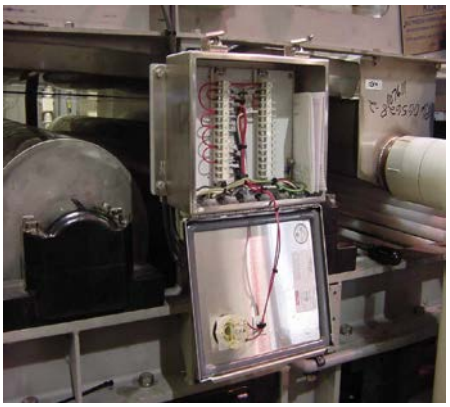
6.5 INSTALL IN LINE MIXER

The Alfa Laval In Line Mixer should be installed initially at the location that will allow 30 seconds retention time or as recommended by Alfa Laval'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 Alfa Laval Spare Parts to obtain the valve. See Section 14 for spare parts ordering information.

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. A wiring diagram is packed in the junction box. 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 Units: Consult the Drive Section of this manual for the electrical requirements of the specific drive motors provided. The connection will be made at the junction boxes on the drive motor.

6.6.3 Hydraulic Power Unit: The motor is a 1,200 rpm, 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 Alfa Laval 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.
(f) Check the adjustable ramp by lowering the blade down against the belt. The blade should touch the belt all the way across. If adjustments are needed see section 10 of this manual.
(g) Check the adjustable ramp for proper belt engagement at all other positions by turning the crank both directions to its extreme of travel. The leading edge of the blade where it contacts the belt should remain stationary. If it moves, either digging into the belt or pulling away from the belt adjustment is required before beginning operations. See section 10 of this manual for the adjustment and alignment method.

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. The direction of rotation is indicated on the motor housing also observe the hydraulic pressure gauge to see that there is a positive increase in pressure to indicate the pump is delivering oil into the belt steering and tension circuits.

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. The drive must cause the gravity deck belt to travel away from the feed tank and toward the adjustable ramp assembly.

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:

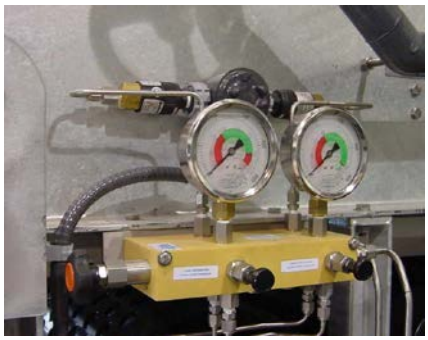
(a) Total Shut Down: All machine functions, sludge and polymer feed systems, hydraulic power unit and wash water system are stopped if not in the Bypass Mode. This results from the following alarm conditions:

(1) Belt Breakage: For each belt there is a proximity switch which detects a Broken belt. (At left below)

(2) Belt Misalignment: There are two proximity switches which detect gross misalignment of the belts on either side. (At right above)

(3) Low Wash Water Pressure: a pressure switch which detects water pressure below the owner specified setting, typically 60 psig. (Shown at right)

(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. (Shown at left; above and behind the pressure gauges)

(6) Emergency Stop: a push button on the machine and other optional location(s) to manually stop all functions. (Shown at right

(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.

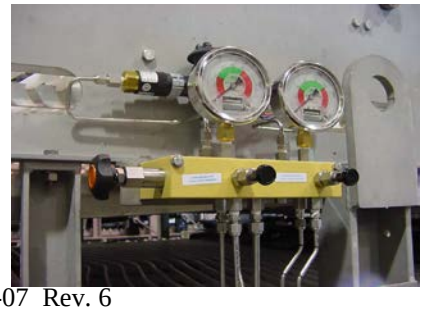
7.4.2 Put the control valves on the Klampress® in the retract position. If you have this style of extend/retract valve instead of the hydraulic manifold the tension for both belts will be set at the same for for both belts by turning the adjusting knob on the head of the hydraulic pump.

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.



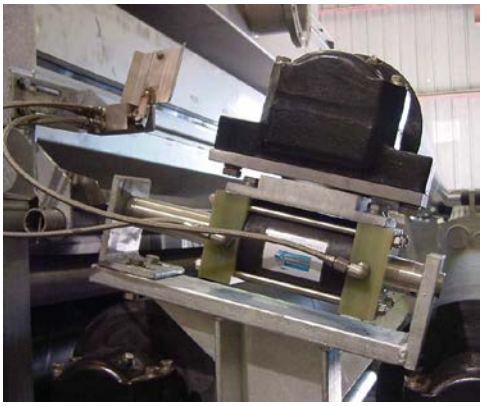
7.4.6 Adjust the lower belt tension by turning the knob of the valve in the end of the manifold block. Observe the gauge for the lower belt and set the pressure to around 300 psi. By design, the lower belt tension pressure cannot be set higher than the upper belt tension.

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 Alfa Laval Service Department.



7.4.11 Manipulate the steering 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.

7.5 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!**

Alfa Laval has developed a belt installation tool that greatly simplifies the installation of belts on all types of belt filter presses. The amount of time and labor involved to install the belts is greatly reduced by the use of the Alfa Laval Belt Installation Tool and the belt installation operation will also be safer.

The Alfa Laval Belt Installation Tool comes in various widths to match the size of belts on your machine. The tool has a triangular shaped section of belt with a seam on its straight edge and there are two long straps attached to the opposite edge. The tool is used by attaching the seam of the tool to the seam of the new belt and pulling and guiding the belt into and through the belt filter press with the two long straps.

The Alfa Laval Belt Installation Tool is most helpful when belts are being installed for the first time on a new press. When replacing worn belts on a press the new belt may be attached to the old belt and be pulled into the press while the old belt is fed out. But, when the belt being replaced is damaged and cannot be used to install the new belt then the Alfa Laval Belt Installation Tool may be used to great advantage. (~~See Drawings SK001908~~ or SK001935)

The Alfa Laval Belt Installation Tool is made in 5 widths for all belt presses. Select the part number of the tool you need from this table.

Belt Width	Tool Part Number
~~1.0 meter~~	~~039739~~
~~1.5 meter~~	~~039899~~
2.0 meter	039330
~~2.5 meter~~	~~034902~~
~~3.0 meter~~	~~034111~~

Detailed Instruction for Use on a Klampress

a. Install the lower belt first. See Drawing SK001935, Belt Installation Instructions for two belt Klampresses. ~~See Drawing SK002924 if the 3 belt option is installed.~~

b. Place the new lower belt roll at the tension end of the Klampress with the cake (smooth) side up and the loose end toward the press.

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

c. Place the new upper belt roll at the discharge end of the Klampress with the cake (smooth) side up and the loose end toward the press.

d. ~~Place the new top (3rd) belt at the discharge end of the Klampress with the cake (smooth) side up and the loose end toward the press~~.

Warning: Lock out the machine while performing steps e through p, threading the belt installation tool through the machine. Failure to observe this precaution could result in severe personal injury or death.

e. The tension cylinders are to be retracted. Open the seals on the wash boxes and retract the scraper blades from the drive rollers. Retract the scraper blade from the upper tension roller. Raise the sludge restrainers on the gravity deck. Raise the chicanes off the gravity grids.

f. ~~If the 3 belt option is installed back off the belt tension adjusting nuts to release the pressure on the tension springs and allow the tension roller to slide back to allow space to connect the ends of the new top (3rd) belt. Raise the feed chute.~~

g. The rolled up belt should be supported on a pipe passed through the roll and supported on each end on jack stands or saw horses so the belt roll can turn freely.

h. Attach the Alfa Laval Belt Installation Tool to the leading edge of the new lower belt using one seam wire.

i. Unroll enough of the lower belt to lift it up over the lower tension roller at the end of the press.

j. Thread the two straps down under the wedge plate, over the curved grid and under the perforated roller. Be careful to not leave any slack in the straps between the tool and the press. Both straps should be threaded through the machine with the same approximate tension.

k. Thread the two straps around the pressure rollers alternately over and under being sure to not skip any rollers.

l. Be sure the straps are on the roller about 6 to 12 inches from the end and not around the shafts on the ends.

m. After passing the straps over the drive roller pass the straps down under the lower steering roller and back through the lower wash box.

n. After the lower wash box pass the straps under the lower rear guide roller and then under the lower tension roller back to the point where you started.

o. The operator shall control the press drive while two assistants pull on the straps to guide the new lower belt into the press.

p. Run the press slowly and observe the belt tracking while it is being pulled into the press. It may be necessary to stop and guide the belt installation tool into the wash box to keep it from catching on the seals.

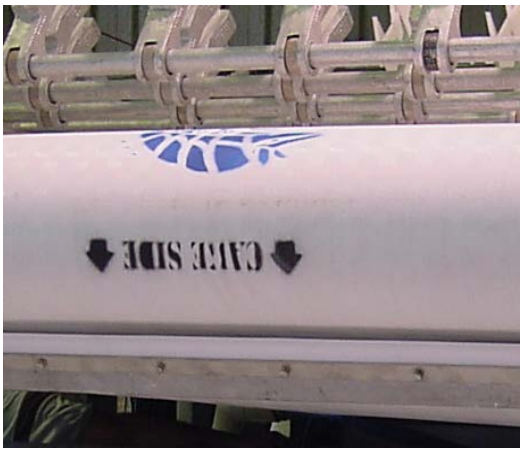
Caution: Ensure the belt is feeding without kinks or wrinkles. If a wrinkle develops that cannot be straightened, back the belt out and start again. Failure to keep the belt straight and square will cause kinks and prolonged operation of the kinked belt will cause it to fail prematurely.

q. When the end of the belt emerges from under the lower tension roller, stop the press, remove the tool from the end of the belt and seam the ends of the new lower belt together with two seam wires.

r. Next attach the tool to the leading edge of the new upper belt and thread the straps through the upper wash box and down the length of the gravity deck. Be careful to not leave any slack in the straps between the tool and the press. Both straps should be threaded through the machine with the same approximate tension.

Warning: Lock out the machine while performing steps s through y, threading the belt installation tool through the machine. Failure to observe this precaution could result in severe personal injury or death.

s. Thread the two straps between the upper tension roller and the scraper blade, down ***over*** the wedge plate, over the curved grid and under the perforated roller inside the lower belt that was just installed.



t. ***Important***: Be sure the straps are next to the upper tension roller between the tension roller and the wedge scraper blade and do not run the straps for the upper belt installation under the wedge plate. Only the lower belt passes under the wedge plate.

u. Thread the two straps around the pressure rollers alternately over and under being sure to not skip any rollers. Place the straps between the lower belt and every other roller following the path of the lower belt with the straps on top of the belt.

v. Be sure the straps are on the rollers about 6 to 12 inches from the end and not around the shafts on the ends.

w. After passing the straps over the drive roller and under the scraper roller pass the straps upward and over the upper steering roller toward the upper wash box back to the point where you started with the new upper belt roll.

x. The operator shall control the press drive while two assistants pull on the straps to guide the new upper belt into the press.

y. Run the press slowly and observe the belt tracking while it is being pulled into the press. It may be necessary to stop and guide the belt installation tool into the wash box to keep it from catching on the seals.

Caution: Ensure the belt is feeding without kinks or wrinkles. If a wrinkle develops that cannot be straightened, back the belt out and start again. Failure to keep the belt straight and square will cause kinks and prolonged operation of the kinked belt will cause it to fail prematurely.

z. When the end of the belt emerges from under the scraper roller at the discharge end of the press, stop the press, remove the tool from the end of the belt and seam the ends of the new upper belt together with two seam wires.

Warning: Lock out the machine while performing steps aa through kk, threading the belt installation tool through the machine. Failure to observe this precaution could result in severe personal injury or death.

aa. ~~Next attach the tool to the leading edge of the new top (3rd) belt and thread the straps under the feed tank and down the length of the gravity deck. Be careful to not leave any slack in the straps between the tool and the press. Both straps should be threaded through the machine with the same approximate tension.~~

~~bb. Thread the two straps over the top deck drive roller and under the ramp blade and then between the wedge scraper blade and the drive roller.~~

~~cc. ***Important***: Be sure the straps are next to the top deck drive roller under the ramp blade and over the wedge scraper blade. Do not run the straps on the outside of either the ramp blade or the wedge scraper blade.~~

~~dd. By reaching through the access ports in the side of the top deck side plates thread the straps over the tops of the plastic lined belt support guide crossmembers.~~

~~ee. Use a length of seam wire to fish the straps through the upper deck wash box.~~

~~ff. Be sure the straps are on the rollers about 6 to 12 inches from the end and not around the shafts on the ends.~~

~~gg. Pass the straps over the remaining belt guide crossmembers and under the feed tank back to the point where you started with the new top (3rd) belt roll.~~

~~hh. The operator shall control the press drive while two assistants pull on the straps to guide the new upper belt into the press.~~

ii. ~~Run the press slowly and observe the belt tracking while it is being pulled into the press. It may be necessary to stop and guide the belt installation tool into the wash box to keep it from catching on the seals.~~

jj. ~~When the end of the belt emerges from under the tension roller at the feed tank end of the gravity deck, stop the press, remove the tool from the end of the belt and seam the ends of the new top (3rd) belt together with two seam wires.~~

kk. ~~Finish the belt installation by adjusting the gravity deck sludge restrainers down against the upper belt and put the wash box seals and the upper tension roller scraper blade back in place.~~

7.7 RUN-IN PERIOD

A new belt should always be broken in at low speed for about 4 hours 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 pressure dewatering 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 pressure dewatering belt tracks 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 To run in the independent gravity belt, set the tension initially at the maximum setting. After 4 hours readjust to the proper operating setting. Check and readjust after the first week of operation.

7.7.7 Proceed to Process Start Up.

REV. 7

B4MATR7.DWG

NO.	QTY.	PART NO.	DESCRIPTION

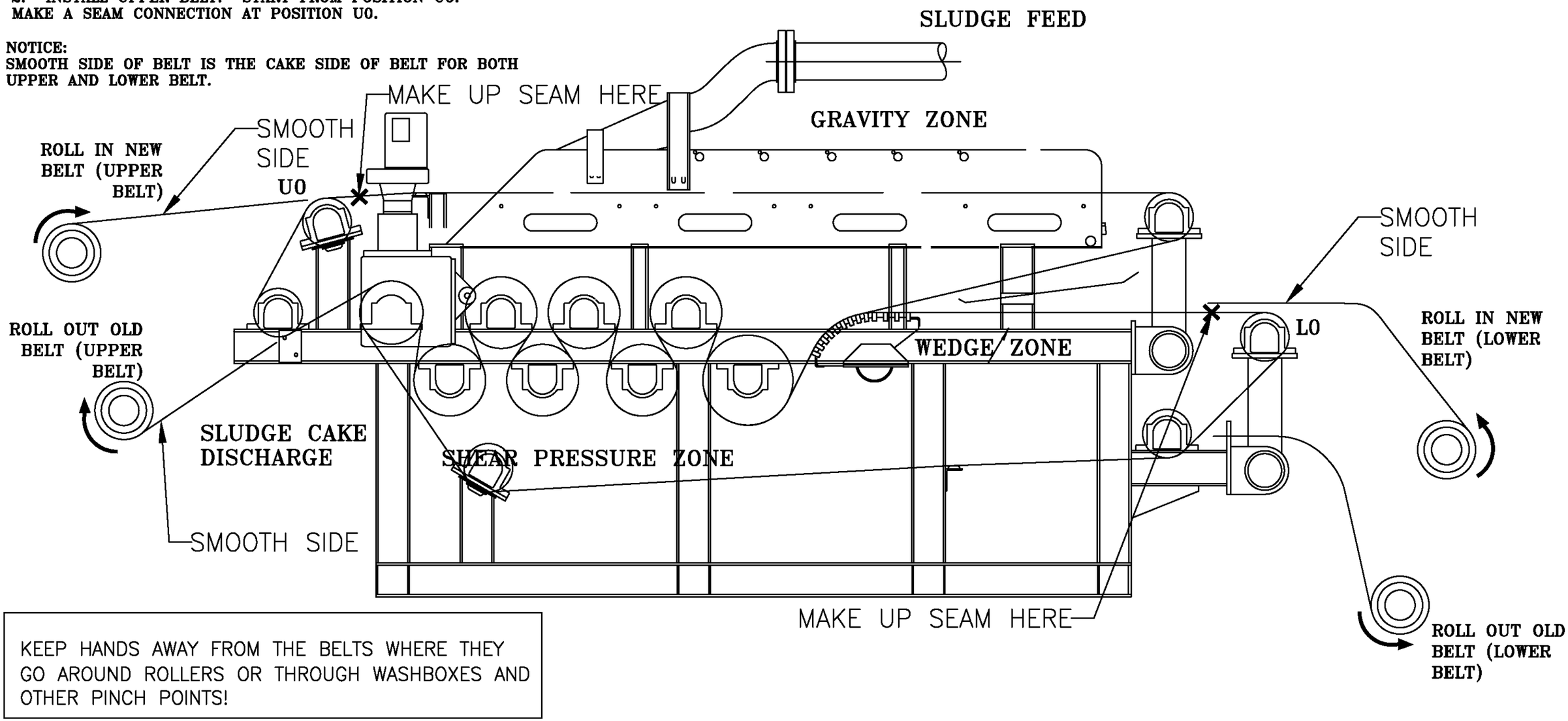
KLAMPRESS BELT INSTALLATION DIAGRAM

BELT REPLACEMENT PROCEDURES:

1. INSTALL LOWER BELT FIRST. FIRST RETRACT LOWER BELT CYLINDER. PART THE BELT SEAM AT POSITION LO. CONNECT NEW BELT TO OLD BELT WITH SEAM SLOWLY. CAREFULLY DRIVE PRESS TO PULL IN THE NEW BELT. ROLL UP OLD BELT AS IT COMES OUT.

2. INSTALL UPPER BELT. START FROM POSITION U0. MAKE A SEAM CONNECTION AT POSITION U0.

NOTICE:
SMOOTH SIDE OF BELT IS THE CAKE SIDE OF BELT FOR BOTH UPPER AND LOWER BELT.



KEEP HANDS AWAY FROM THE BELTS WHERE THEY GO AROUND ROLLERS OR THROUGH WASHBOXES AND OTHER PINCH POINTS!

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

REVISIONS

REV	DATE	DESCRIPTION	BY	APP'D
1	2/04	REV INSTRUCTIONS AND CORRECTED ILLUSTRATION	DG	JET
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

DRAWN	XIA	DATE	1/17/00
CHECKED	XIA	DATE	1/17/00
APPROVED	JET	DATE	1/17/00
NEXT ASSY	N/A	WEIGHT	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: BELT INSTALLATION DIAGRAM KLAMPRESS

SCALE	DWG. NO.	REV
NTS	SK001935	1

CUSTOMER: ASHBROOK

KLAMPRESS®

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, ramp angle 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)**			
	~~**Klampress 2 Belt**~~		~~**Klampress 3 Belt**~~	
	~~**Std Deck**~~	**Ext Deck**	~~**Std Deck**~~	~~**Ext Deck**~~
Primary, 100% Domestic	~~70 - 90~~	75 - 110	~~110 - 180~~	~~140 - 300~~
Secondary, 100% Domestic	~~50 – 80~~	60 - 90	~~110 - 180~~	~~140 - 300~~
Brewery Waste	~~50 – 90~~	60 - 90	~~110 - 180~~	~~140 - 300~~
Paper, 100% primary, virgin fibers	~~80 – 160~~	100 – 200	~~110 - 180~~	~~140 - 300~~
Paper, 100% primary, secondary fibers	~~80 – 160~~	100 - 200	~~110 - 180~~	~~140 - 300~~
Alum	~~50 – 85~~	60 - 90	~~110 - 200~~	~~140 - 300~~
Blend of Primary/Secondary	~~50 – 80~~	60 – 90	~~110 - 200~~	~~140 - 300~~
Anaerobically Digested	~~50 – 80~~	60 - 90	~~110 - 200~~	~~140 - 300~~

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 ranges 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 degradation problems, solution storage times of organic polymers should be limited to 4-6 hours. Higher solution strengths are less susceptible to polymer degradation 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 conjunction 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 cationic 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; i.e. the lower the percent feed 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 activated	10-16
Aerobically digested	10-16

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

8.2.3 <u>Mixing Energy</u>: 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 <u>Retention Time:</u> 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 <u>Belt Speed</u>: There are two basic considerations with belt speed. The slower the belt speed, the greater the effects of the pressure section which

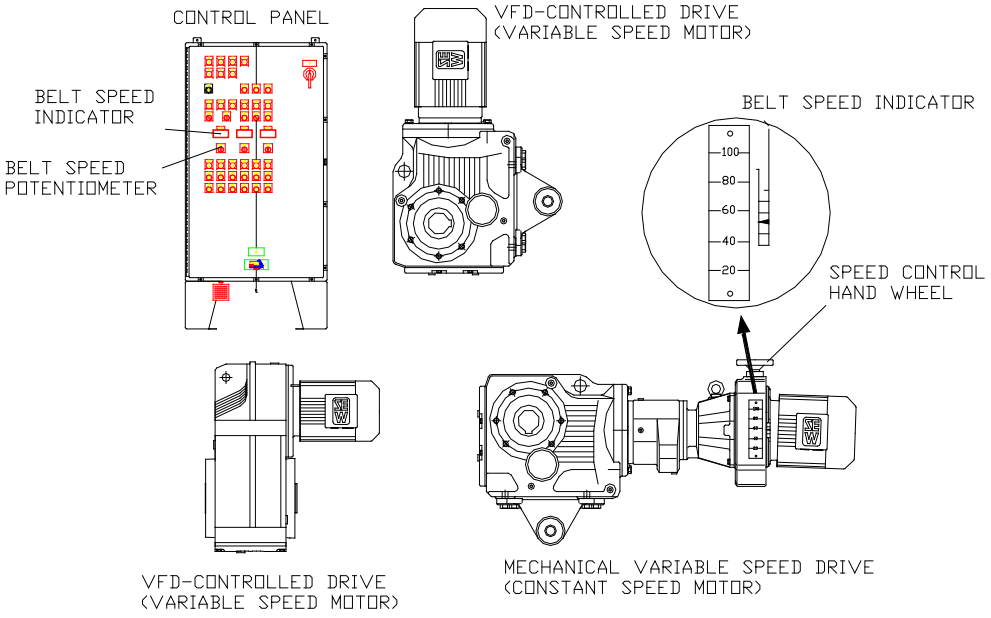


Figure 3 - Belt Speed Control

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.

~~On the 3 belt version of the Klampress, there will be two independent speed adjustments; one for the lower two dewatering belts and one for the independent gravity thickening belt. The upper belt will generally be run faster than the lower belts. This belt should be adjusted along with the ramp (listed below) so that the thickened solids discharging into the press section are approximately five to six percent solids.~~

8.3.2 Belt Tension: 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 Alfa Laval 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.

8.3.4. Wedge Section: On the lower gravity deck, there will generally be an adjustable wedge plate. The inlet side of the wedge plate should be adjusted so that the opening on the inlet side is approximately two inches measured from the belt. When the wedge plate and belt speed are optimized, there should be enough solids between the belt and the wedge plate so as the solids come out from the wedge plate, they are actually extruded. If the solids are backing up excessively, either increase the belt speed or slightly open the wedge plate.

8.3.5. Ramp Angle (3 Belt Version Only): ~~At the discharge end of the gravity deck is the Ashbrook patented sludge retarding ramp assembly. (Patent No. 4,731,188) The adjustable ramp is provided to cause additional dewatering of the sludge before it is discharged from the gravity deck. This is accomplished by creating a dam across the discharge end of the gravity deck forcing the sludge to be pushed up the ramp, turning and tumbling on itself, while additional water is~~

~~caused to separate from the solids. The operator may adjust the angle of the ramp by turning the crank on the ramp support assembly. For drier sludge the ramp will be raised to a steeper angle. It is also possible to retract the ramp away from the belt and allow the sludge to pass under it when no further dewatering is desired.~~

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%. Alfa Laval 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 Wash water Characteristics: The wash water 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 $\leq$ 50 mg/l
- The total dissolved solids (TDS) concentration should be $\leq$ 1,000mg/l
- The pH of water should be 6-8
- The temperature should be 10-50°C.
- The wash water pressure should be $\geq$ 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 wash water 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

$$SL = (SFR \times BDS \times STSC \times 60) \div BW$$

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 = 1.19×10^{-3} or 0.00119
To convert to percent concentration, multiply by 100%
0.0012= 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~~. If the unit has the optional 3rd belt, the thickener belt should be adjusted so that the solids are in the range of 5 -6% at the discharge of this belt.~~
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, Alfa Laval 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 on one or both drives as appropriate.
8.7.4 ~~Adjust the ramp on the 3rd belt as appropriate.~~
8.7.5 Adjust the wedge plate.
8.7.6 Fine tune the performance by adjusting the belt tension, mixer, chicanes, discharge ramp, etc.

8.8 HOUSE KEEPING AND CLEAN UP

Refer to the detailed information in the Daily Operation Section 9.0 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 <u>Low Cake Solids:</u> When this instance occurs, the following corrective measures are recommended:

1) <u>Adjust belt speed</u>
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.

5) ~~Adjust the discharge ramp angle~~
~~The ramp at the end of the gravity deck can be used in either the press mode or gravity thickener mode to increase cake solids. Raising the blade to a higher angle will cause more water to be removed from the sludge before it goes off the end of the gravity deck. The ramp may be retracted out of the sludge flow if desired and when placed on the belt it may be adjusted between the angles of 10 and 45 degrees above the horizontal.~~

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 Alfa Laval 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 to be sure the pipe is free of obstructions 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

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 b. Belt speed too fast c. Improperly dosed polymer d. Incorrect polymer for application e. Incorrect belt tension f. Incorrect polymer/sludge mixing action g. Plant process upset h. Ramp angle too low	a. Lower sludge loading b. Reduce belt speed c. Adjust polymer rate d. Screen for optimum polymer. Arrange on site jar test with your poly representative e. Increase belt tension f. Adjusting mixing action at in-line polymer mixer g. Check plant process for trouble h. Increase ramp angle
2) Puddling or ponding in the gravity section	a. Incorrect polymer dosage b. Incorrect polymer/sludge mixing action c. Inadequate polymer concentration d. Belt not cleaning properly	a. Adjust polymer feed rate b. Adjust mixing action at in-line polymer mixer c. Try various concentrations. Use post dilution H_2O if available d. Check if belt is blinded Operate brush in wash tube
3) Low Capture rate (Solids recovery)	a. Incorrect polymer dosage b. Sludge solids squeezing from between belts c. Belt tension (pli) too high	a. Use jar test to determine optimum dose b. Reduce sludge pumping rate or increase polymer feed rate c. Reduce tension accordingly
4) Sludge squeezing from between belts and into the sump	a. Insufficient polymer b. Large weak flocculation of sludge particles in the gravity section c. Sludge loading or belt speed incorrect	a. Increase accordingly b. Increase mixing action at sludge/poly mixer to decrease floc size 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

8.12 SLUDGE DEWATERING LOG SHEET

CUSTOMER: _____ PRESS NUMBER: _____ SLUDGE MIXTURE: _____

SITE: _____ TEST DATE: _____ POLYMER TYPE: _____

CITY, STATE: _____ TEST DURATION: _____ POLYMER COST/LB: _____

PLANT PHONE: _____ RUN#: _____ BELT TYPE: _____

TYPE & SIZE PRESS: _____ SLUDGE TYPE: _____ LAB PHONE: _____

DATE TIME / SAMPLE NO	BELT SPEED (M/MIN)	BELT TENSION (PLI)	SLUDGE FLOW RATE (GPM)	SOLIDS LOADING (LB/HR)	SLUDGE PH	SLUDGE TEMP. °F	WASH WATER (PSI)	WASH WATER (GPM)	TOTAL FILTRATE FLOW RATE (GPM)	FILTRATE SOLIDS (MG/L)	CAKE SOLIDS (%)	CAPTURE RATE (%)	CAKE THICKNESS INCH)	POLYMER FLOW RATE (GPM)	POLYMER CONC. (%)	POLYMER USAGE (LBS/TON/DS)	POLYMER COST/TON/DS

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 the belt press. These steps help ensure the safety of the operators as well as protect 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) Inspect the ramp blade for proper contact with the top surface of the belt. The blade shall be in contact with the belt but must not dig into the belt. See section 10 for proper adjustment method.
(e) Ensure doctor blades are functioning correctly. Inspect blades for wear and replace as required.
(f) Inspect gravity drainage grids for wear. Replace wiper bars before belt contacts metal support grids.
(g) Ensure belt wash system is completely cleaning all of the belts. 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.
(h) Inspect wash box seals for wear. Replace as required.
(i) Inspect dewatering belts for wear. Repair holes per maintenance instructions. Repair or replace broken belt seam wires.
(j) Ensure steering sensing paddles are in contact with the belts and correcting belt steering as required. For the optional 3rd belt, there are no steering sensing paddles.
(k) Ensure there are no leaks from any of the systems.
(l) Inspect roller coatings for wear and ensure flingers are in place on the bearings.
(m) 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 speeds 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.
(f) Check angle of adjustable ramp. Increase the angle of the ramp blade for drier cake; lower the blade for less drying.
(g) Adjust wedge plate.

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 and discharge ramp 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.

KLAMPRESS®

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 fluid 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, ramp blade, dewatering belts, rubber seals on the sludge restrainers and the wash stations. Replace as required.
10.3.2 Inspect frame and roller coatings for wear.
10.3.3 Inspect belt guides and wiper bars for cleanliness/wear. Clean as required.
10.3.4. Check for any loose bolts.
10.3.5 ~~Check and adjust the belt tension in 3 belt option, if so equipped.~~

10.4 MONTHLY MAINTENANCE ITEMS

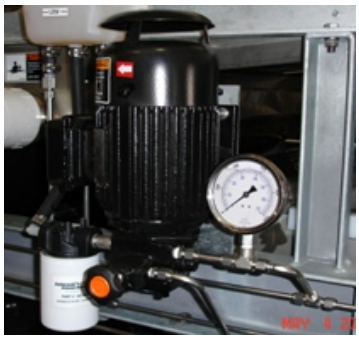
10.4.1 Verify daily and weekly items have been completed
10.4.2 Clean belts with a soap/bleach mixture. To prepare the soap/bleach mixture, use 1-cup detergent and 3-cups bleach to mix with 5 gallons water. The soap can be any laundry type liquid detergent and the bleach can be any generic brand bleach 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 1,500 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. Worn belt seam wires can break and cause the belts to be damaged.

2 gal. SS Reservoir

1 gal. H.P.D.E. Reservoir



Hydraulic Pump Assembly

Keep oil level between the high and low marks. Change the oil if it changes color. The oil tank is drained by removing the filter bowl and catching the oil in a bucket. The tank holds one gallon of oil. See Section 13 for the correct oil. Always use a hydraulic oil with wear additives and a low pour point.

10.6 FRAME

10.6.1 Inspection Items:

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

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 Alfa Laval for recoating worn out coatings.

10.7.2 Roller Alignment:

Roller alignment can be checked and corrected in the field using simple tools. This would only need to be done if rollers were replaced or the bearing base was removed from the frame.

a. The basis of proper roller alignment is a square and level frame. Check the frame for square by measuring diagonally from the same points on both sides.

b. Use the drive roller as the primary alignment reference and check it and the frame to be level using a machinist's level.
c. Wrap a plumb line around the drive roller and measure from the line to the base of the tension yoke bearing. The measurement must be equal on both ends of the roller.

d. Check each roller to be parallel to the drive roller by measuring to plumb lines wrapped around it and the drive roller at both ends. The difference must be less than 1/32 inch.
e. Slide the bearing housing to align each roller to the drive roller.
f. Check each roller with the machinist's level and shim under the bearing housing as needed.
g. Torque all bearing base bolts to 115 ft-lb.

10.8 BEARINGS

10.8.1 Bearing Cut Sheets: See attached

10.8.2 Pillow block 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.
d. Listen for unusual sounds.

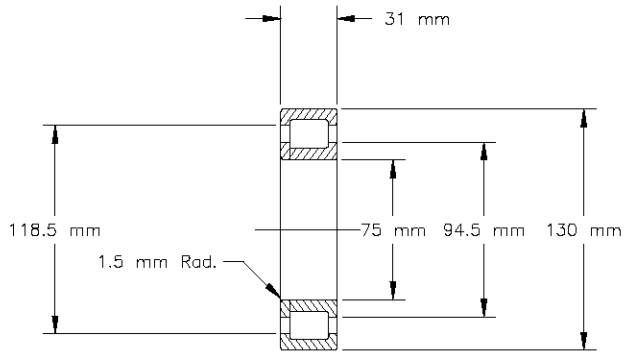
10.8.3 Lubrication Procedures:

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.

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.
e. If the grease displaced from a bearing is rust colored this is an indication this bearing has been damaged by water and must be replaced.

10.8.4 Bearing Replacement: Do not remove the bearing housing from the frame unless it is damaged. The roller alignment will be retained if the bolts holding the bearing on to the frame are not disturbed.

a. Provide a sling and hoist to raise and hold the end of the roller where the bearing is being replaced.
b. Support the roller and remove the shaft flinger (rubber splash guard) and the bearing cap.
c. Lift (or lower) the roller to get the bearing clear of the bearing base housing.
d. Remove the snap ring from the end of the shaft. Use a bearing puller to remove the bearing from the end of the shaft.
e. Remove and discard the old shaft seal assembly, but save the bearing spacer rings, if any. Spacer rings are only used in the bearings on the same side of the machine as the belt drive motor.
f. Thoroughly clean the bearing base housing and the cap. Clean and polish the journal of the roller in preparation for the new bearing. If the roller journal has been damaged, do not install a new bearing. Call Alfa Laval Service for assistance.
g. Install the new seal assembly before installing the new bearing.
h. Heat the new bearing in an oven or in hot oil to 300 degrees F.
i. Immediately slide the heated bearing onto the cold shaft of the roller journal being certain to press it all the way to the shoulder.
j. Install a new snap ring on the end of the roller shaft.
k. Install the bearing spacer rings if the bearing is on the same side of the machine as the drive motor. If on the opposite side, do not install the spacer rings. This side must be free to float.
l. Move the roller with the new bearing installed back into the bearing base housing.
m. Coat the surface of the bearing cap that comes in contact with the bearing housing base with an RTV gasket sealant.
n. Reinstall the bearing cap and torque the bolts to 75 ft-lb.
o. Snap the seal assembly into the bearing housing.
p. Install the two piece rubber flinger (splash guard) around the shaft.
q. Grease the bearing while rotating the roller until grease flows out from under the flinger.



NOTES:

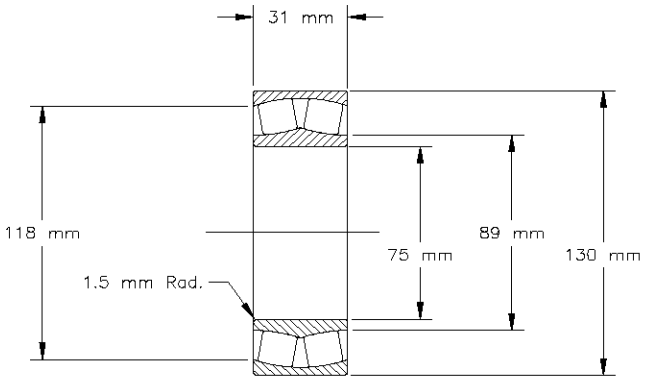
1. AFBMA SIZE No. NUP2215
2. DYNAMIC RADIAL CAPACITY = 36,500 LB.
3. STATIC RADIAL CAPACITY = 46,500 LB.
4. REF. ROCKWELL AUTOMATION/DODGE DWG. No. 040266

ITEM	PART NO.	QTY	DESCRIPTION
1	040266	1	75 mm BEARING
2			
3			
4			
5			

TITLE: BEARING, STEERING ROLLER
75 mm CYLINDRICAL

DRAWN	REV. BY	APPROVED
JET	JET	
DATE 4/11/97	DATE REV. 9/16/98	DATE 9/16/98

P:\VENDOR\DODGE\75MMCYL.DWG



NOTES:

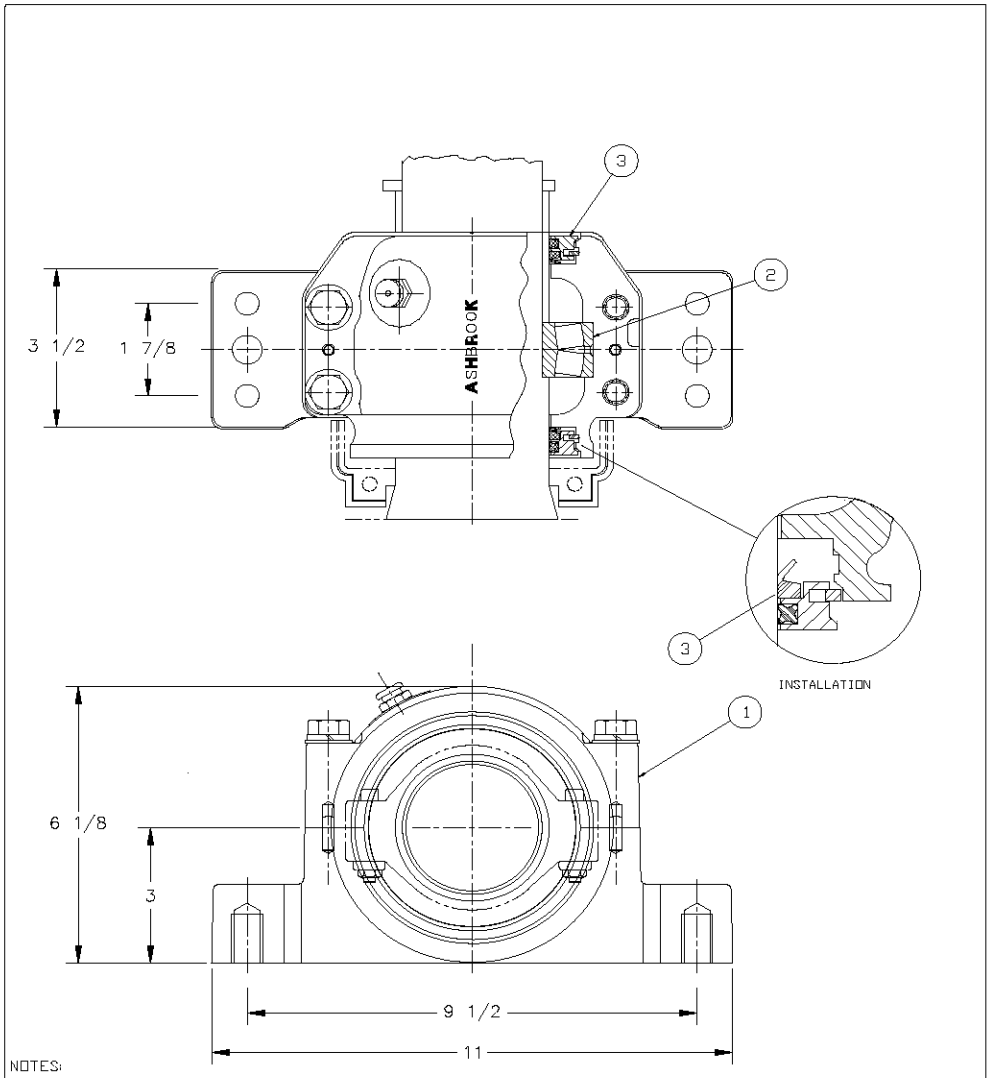
1. AFBMA SIZE No. 22215
2. DYNAMIC RADIAL CAPACITY = 41,500 LB.
3. STATIC RADIAL CAPACITY = 53,000 LB.
4. REF. ROCKWELL AUTOMATION/DODGE DWG. No. 421265

ITEM	PART NO.	QTY	DESCRIPTION
1	421265	1	75 mm BEARING
2			
3			
4			
5			

TITLE: BEARING, PRESS ROLLER
75 mm SPHERICAL

DRAWN	REV. BY	APPROVED
JET	JET	
DATE 4/11/97	DATE REV. 9/16/98	DATE 9/16/98

P:\VENDOR\DODGE\75MMSPH.DWG



NOTES:

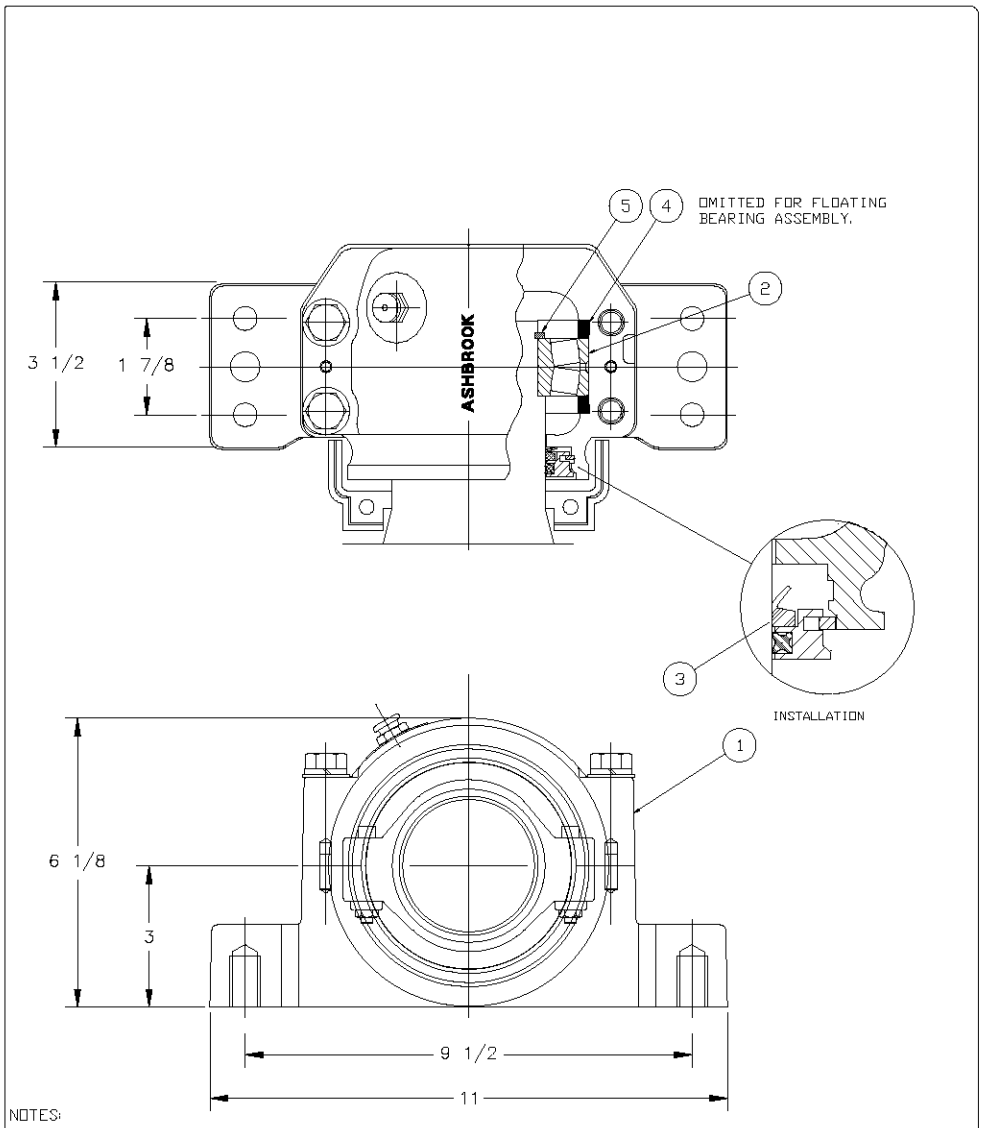
1. HOUSING NYLON COATED BLACK
2. HOUSING BASE AND CAP ARE MACHINED AS ASSEMBLIES; DO NOT INTERCHANGE WITH OTHER HOUSINGS
3. BOLTS, WASHERS, LOCKWASHERS AND LUBE FITTING ARE 316 STAINLESS STEEL OR MONEL.
4. REF. ROCKWELL AUTOMATION/DODGE DWG. No. 054490

ITEM	PART NO.	QTY	DESCRIPTION
1	054492	1	BEARING HOUSING
2	421265	1	75 mm BEARING
3	040267	2	ASHBROOK SEAL ASSY

TITLE: UNIVERSAL BEARING BLOCK
75 mm SPHERICAL ROLLER

DRAWN	REV. BY	APPROVED
JET		
DATE 2/28/97	DATE REV. 9/16/98	DATE 9/16/98

P: \VENDOR\DODGE\OMBRG75R. DWG



NOTES:

1. HOUSING NYLON COATED BLACK
2. HOUSING BASE AND CAP ARE MACHINED AS ASSEMBLIES; DO NOT INTERCHANGE WITH OTHER HOUSINGS
3. BOLTS, WASHERS, LOCKWASHERS AND LUBE FITTING ARE 316 STAINLESS STEEL OR MONEL.
4. REF. ROCKWELL AUTOMATION/DODGE DWG. No. 054488

ITEM	PART NO.	QTY	DESCRIPTION
1	054491	1	BEARING HOUSING
2	421265	1	75 mm BEARING
3	040267	1	ASHBROOK SEAL ASSY
4	040512	2	BEARING SPACER
5	030330	1	RETAINING RING

TITLE: UNIVERSAL BEARING BLOCK 75 mm SPHERICAL ROLLER

DRAWN	REV. BY	APPROVED
JET	CET	CET
DATE 4/3/97	DATE REV. 9/16/97	DATE 9/16/97

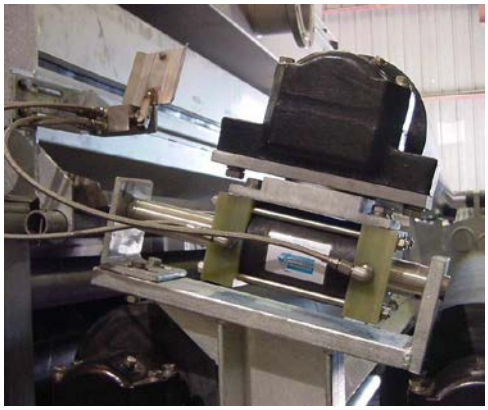
P:\VENDOR\DODGE\DMBRG75U.DWG

**** This bearing used on all rollers except steering & drive side of the Drive roller.**

10.9 STEERING ASSEMBLY

10.9.1 Drawings:

a. SK001195 Steering Assembly
b. Hydraulic Steering Cylinder Data



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

This is a view of one of the belt misalignment switches looking up from the bottom of the press on the RH side. The roller touch bar will be pushed over to the proximity switch by the edge of the belt if the belt moves too far from center. The proximity switch will signal the alarm condition and shut down the press to prevent damage to the belts.

10.9.3 Cylinder Replacement

a. Shut down belt press and lock out controls.
b. Disconnect the two hoses from the cylinder.
c. Remove and save the fittings from the cylinder ports.
d. Rig a support sling for the steering roller.
e. Gently lift the weight of the steering roller off the cylinder.
f. Remove the 4 bolts holding the pivot bracket to the cylinder.
g. Remove the angle bracket at the end of the cylinder rod.
h. Lift the cylinder out of the support brackets and lay aside.
i. Install the fittings into the new cylinder being careful to not over tighten the fittings.
j. Place the cylinder rod into the support bracket and install the

angle bracket for the other end of the rod.

k. Set the steering roller with the pivot bracket onto the cylinder align the holes in the bracket with the holes in the cylinder.
l. Install the bolts that hold the pivot bracket to the cylinder body.
m. Do not over tighten the bolts in the cylinder.
n. Connect the hoses to the cylinder fittings.
o. Start the hydraulic pump and cycle the steering cylinder through the full stroke in both directions by holding the steering valve paddle in one direction and then the other. Three cycles should be sufficient to purge all the air from the cylinder.
p. Inspect for leaks and repair as needed.

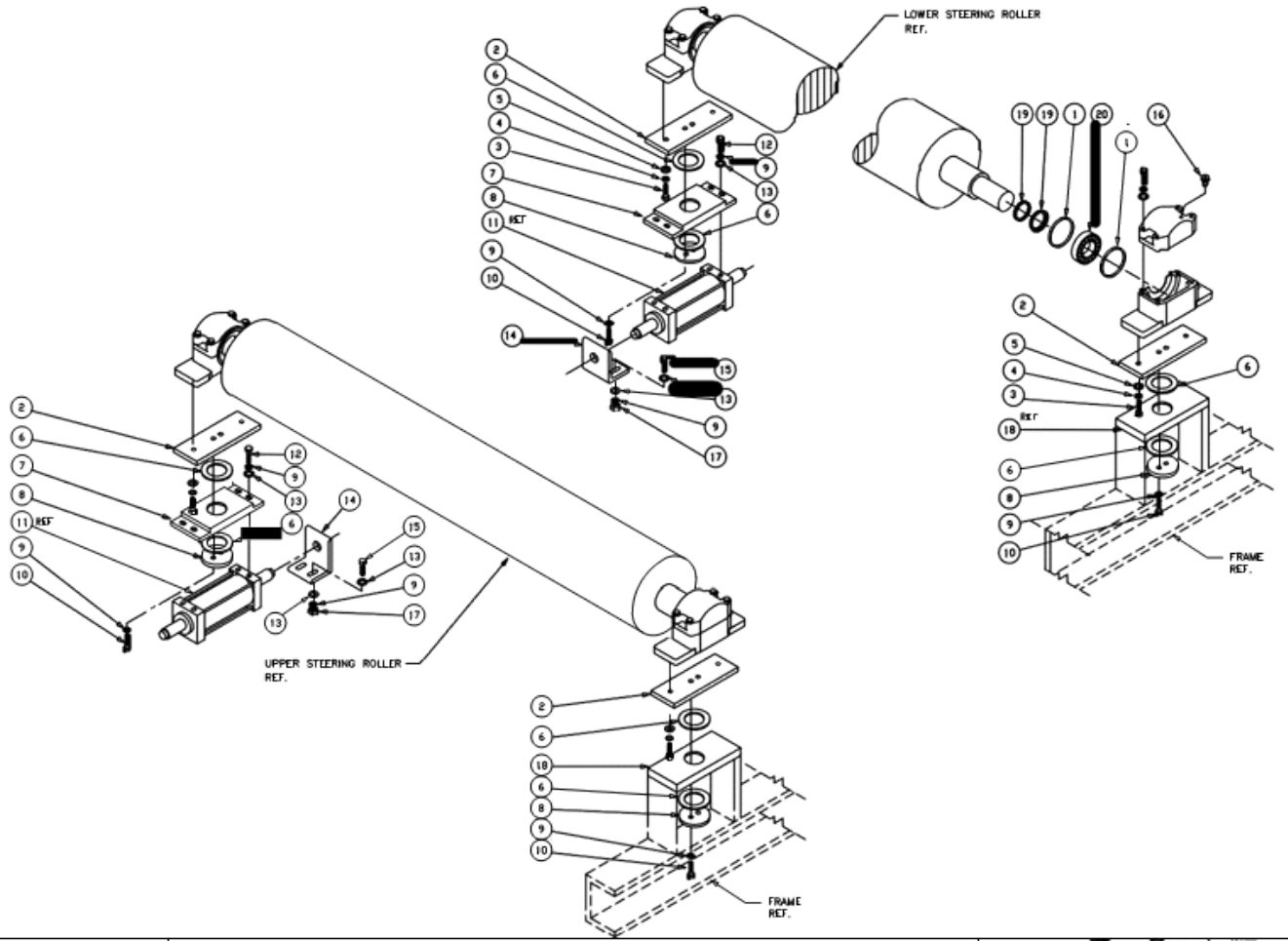
10.9.4. Cylinder repair or rebuild

a. Obtain a cylinder repair kit from Alfa Laval Spare parts.
b. Remove the cylinder as described above.
c. Prepare a clean area for assembling the cylincer.
d. Dismantle the cylinder by removing the tie rods.
e. Thoroughly clean and dry all the parts.
f. Identify the parts to be replaced by new parts in the repair kit.
g. Wet all the parts in clean oil and assemble with new parts.
h. If the cylinder is not to be installed immediately, plug the ports and wrap the cylinder in clean paper and store in a clean, dry place where the cylinder will not be exposed to heat.
i. If the cylinder will be stored for an extended period store it standing on end to avoid a side load on the seals which may flatten the seals and cause a leak when put in service.
j. Install the cylinder as described above.

10.9.5 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.

KR#10 Rev#16



ITM	PART NO.	DESCRIPTION	QTY
1	(SEE BOM)	STABILIZER RING	4
2	–	PIVOT BEARING MOUNTING PLATE	4
3	–	BOLT, HEXHEAD 5/8" X 2" LG	–
4	–	WASHER, LOCK 5/8"	–
5	–	WASHER, FLAT 5/8" X 1/8" THICK	–
6	–	RETAINER RING	8
7	–	STEERING PIVOT MOUNTING PLATE	2
8	–	STEERING RETAINER PLATE	4
9	–	WASHER, LOCK 1/2"	20
10	–	BOLT, HEXHEAD 1/2" X 1" LG	8
11	–	HYDRAULIC STEERING CYLINDER	–
12	–	BOLT, HEXHEAD 1/2" X 1 1/2" LG	8
13	–	WASHER, FLAT 1/2"	16
14	–	UPPER STEERING BRACKET	2
15	–	BOLT, HEXHEAD 1/2" X 2 1/2" LG	4
16	–	1/2" NPT GREASE FITTING	–
17	–	NUT, HEX 1/2"	4
18	–	STEERING PIVOT MOUNTING PLATE	–
19	–	SEAL ASSEMBLY – 75 mm BEARING	4
20	–	CYLINDRICAL ROLLER BEARING – 75 mm	4

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

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

Ashbrook Simon-Hartley Operations LP.
11000 East Hardy Road
Houston, Texas 77093
Phone: 281-449-0322
FAX: 281-449-1324

TITLE: STEERING ASSEMBLY
75mm DIRECT MOUNT BEARINGS
KLAMPRESS

SCALE	DWG. NO.	REV
1/16	SK001195	1

CUSTOMER: ASHBROOK

10.10 TENSIONING ASSEMBLY

10.10.1 Drawings/Photos:

a. Upper and Lower Tensioning Assembly: SK001198
b. Hydraulic Tensioning Cylinder Data
   The tension cylinders are double acting cylinders with a 3 1/4" bore and ~~either 6" or~~ 7 1/2" stroke. The same repair kit fits both lengths of the composite cylinders. ~~The painted steel cylinders are non-repairable.~~
c. Tension Cylinder Parts Drawing: SK002356
d. Tension Assembly, 3 Belt Option

The belt tensioning for the ~~optional~~ 3rd belt does not use hydraulic cylinders. The belt tension is applied by turning the adjusting screws and compressing the springs.

10.10.2 Inspection Items:

a. Inspect tension cylinders for leaks.
b. Check tension adjustment on 3 belt option, if so equipped.

10.10.3 Tension Yoke Cylinder Replacement:

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

10.10.4 Cylinder repair or rebuild

a. Obtain a cylinder repair kit from Ashbrook Spare parts.
b. Remove the cylinder as described above.
c. Prepare a clean area for assembling the cylinder.
d. Dismantle the cylinder by removing the tie rods.
e. Thoroughly clean and dry all the parts.
f. Identify the parts to be replaced by new parts in the repair kit.
g. Wet all the parts in clean oil and assemble with new parts.
h. If the cylinder is not to be installed immediately, plug the ports and wrap the cylinder in clean paper and store in a clean, dry place where the cylinder will not be exposed to heat.
i. If the cylinder will be stored for an extended period store it standing on end to avoid a side load on the seals which may flatten the seals and cause a leak when put in service.
j. Install the cylinder as described above.

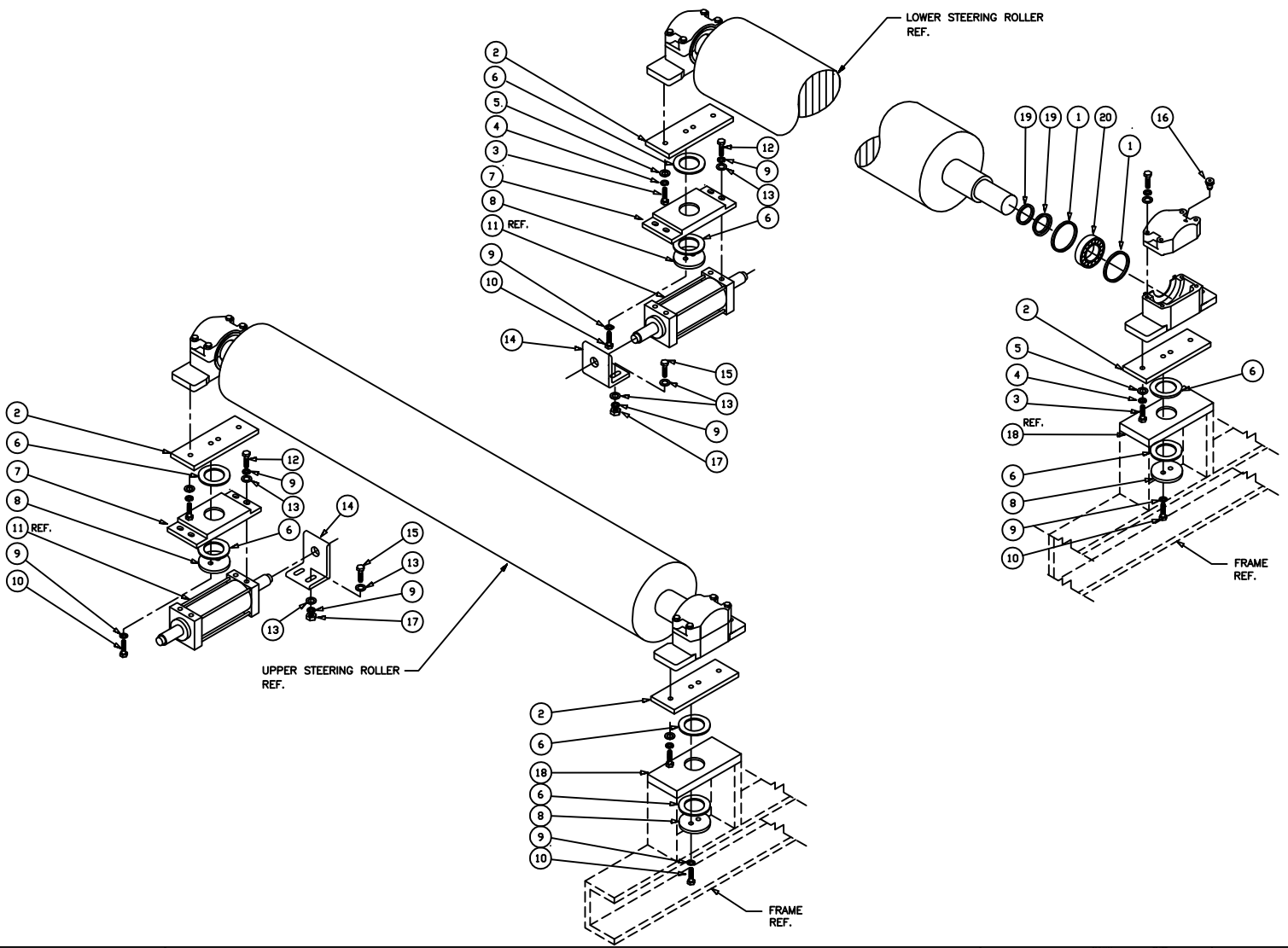
10.10.5 Hydraulic Manifold Repair:

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.

B4MATR7.DWG REV. 7



ITM	PART NO.	DESCRIPTION	QTY
1	(SEE BOM)	STABILIZER RING	4
2	–	PIVOT BEARING MOUNTING PLATE	4
3	–	BOLT, HEXHEAD 5/8" X 2" LG	–
4	–	WASHER, LOCK 5/8"	–
5	–	WASHER, FLAT 5/8" X 1/8" THICK	–
6	–	RETAINER RING	8
7	–	STEERING PIVOT MOUNTING PLATE	2
8	–	STEERING RETAINER PLATE	4
9	–	WASHER, LOCK 1/2"	20
10	–	BOLT, HEXHEAD 1/2" X 1" LG	8
11	–	HYDRAULIC STEERING CYLINDER	–
12	–	BOLT, HEXHEAD 1/2" X 1 1/2" LG	8
13	–	WASHER, FLAT 1/2"	16
14	–	UPPER STEERING BRACKET	2
15	–	BOLT, HEXHEAD 1/2" X 2 1/2" LG	4
16	–	1/2" NPT GREASE FITTING	–
17	–	NUT, HEX 1/2"	4
18	–	STEERING PIVOT MOUNTING PLATE	–
19	–	SEAL ASSEMBLY – 75 mm BEARING	4
20	–	CYLINDRICAL ROLLER BEARING – 75 mm	4

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

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				

DRAWN	ADIN	7/31/95
CHECKED	JET	8/3/99
APPROVED	JET	8/3/99
NEXT ASSY	N/A	WEIGHT N/A

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

ALFA LAVAL
ASHBROOK SIMON-HARTLEY

ALFA LAVAL ASHBROOK SIMON–HARTLEY INC
11600 East Hardy Road Houston, Texas 77093
Phone: 281–449–0322
FAX: 281–449–1324

TITLE: STEERING ASSEMBLY
75mm DIRECT MOUNT BEARINGS
KLAMPRESS

SCALE	DWG. NO.	REV
1/16	SK001195	1

CUSTOMER: ASHBROOK

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 Alfa Laval Service Department.

10.11.1 Drawings:

a. Hydraulic Pump/Motor Assembly Drawing: 0310030
b. Manifold Assembly Drawing: 029868
c. Hydraulic Reservoir Drawing: 029837
d. Hydraulic Filter Cutsheet 037939
e. Pressure Switch Data - See Section 12
f. Hydraulic Filter Drawing: SK003740
g. Pressure Gauge Data
h. Hydraulic Pump Cut Sheet
i. Hydraulic Motor

10.11.2 Filter Screen Cleaning or Replacement:

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

a. Unscrew the filter; catch the oil in a bucket.
b. Remove and discard old filter. Replace with new filter.
c. Refill the hydraulic reservoir to the high level mark.

10.11.3 Hydraulic Oil:

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

a. Check the oil level when the tension cylinders are retracted. If the oil is too low, add sufficient oil to restore the proper level. Find and repair any leaks which caused the oil level to decrease.

b. Inspect the level of the oil and its color. If the oil is discolored or cloudy, 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 the 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.

10.11.4 Hydraulic Pressure Gauges:

The hydraulic pressure gauges are 0 - 1,000 psi glycerin filled stainless steel 4 inch case bourdon tube gauges. The gauges are either mounted to the hydraulic manifold with gauge snubbers or if there is no manifold the gauge will be mounted in the pressure line coming from the hydraulic pump. The operating range decal is put on the gauge at the factory. The preferred operating range for the belt tension is the region indicated by the green band. The red regions are either too low for good belt tracking or too high for optimum dewatering.

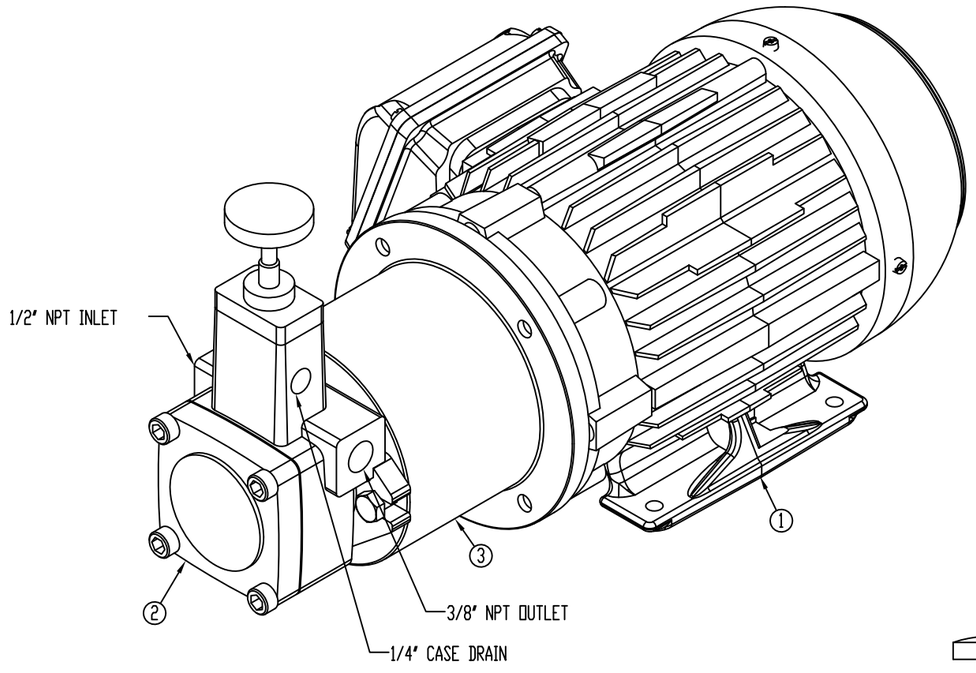
Order part number 029482 for replacement. Give your Klampress serial number with your order for new gauges. See Section 14 for Spare Parts.

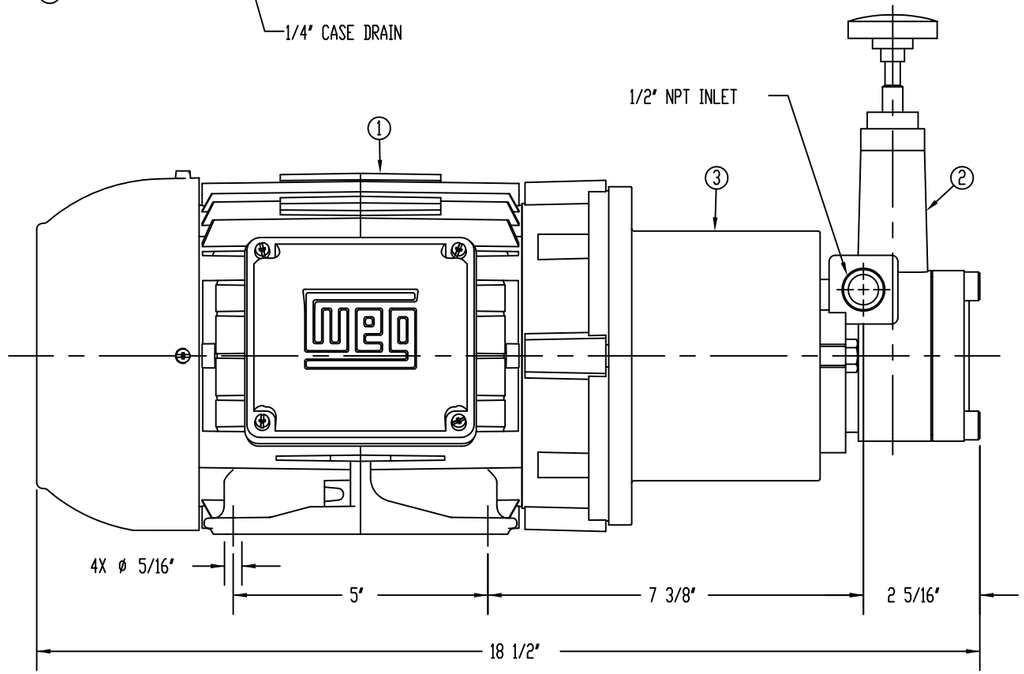
B4MATSVRev12

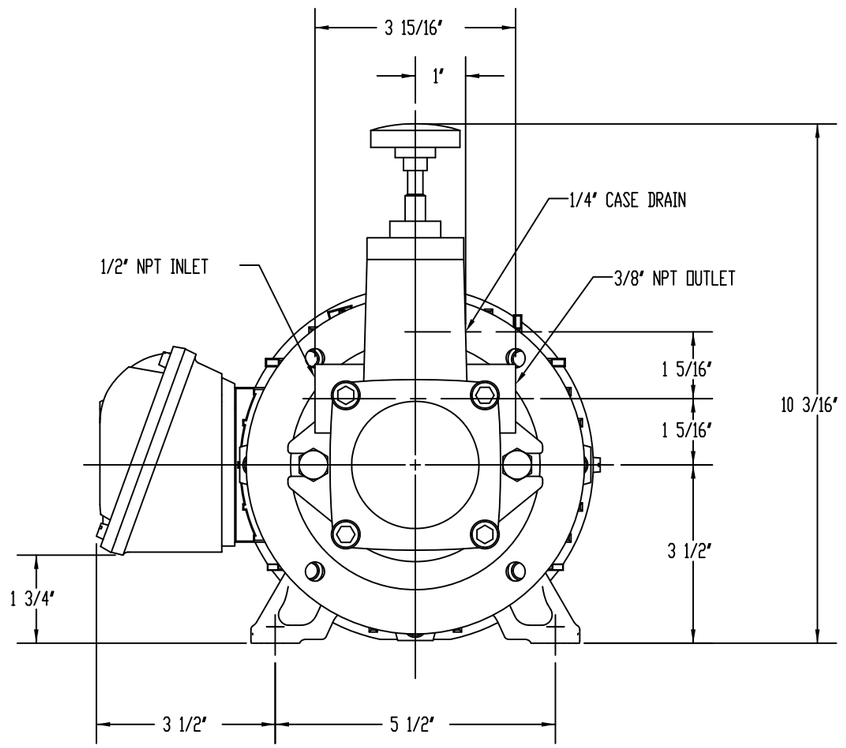
NO.	QTY.	PART NO.	DESCRIPTION
1	1	039244-CNPY	MOTOR, 1hp WEG WITH CONOPY
2	1	029866	HYDRAULIC PUMP
3	1	029864	PUMP ADAPTER

NOTES:

MOTOR: 1hp 145TC FRAME, 1150 RPM, 208-230/460V, 3ph, PREMIUM EFFICIENCY, SEVERE DUTY
HYDRAULIC PUMP: 2.1gpm @ 1200 RPM, 1000psi MAX SETTING







TOLERANCE, UNLESS NOTED			REV	DATE	SUMMARY DESCRIPTION OF CHANGES	BY	APP	REV	DATE	SUMMARY DESCRIPTION OF CHANGES	BY	APP
	INCH	MILLIMETER	1					7				
FRACTION	+/- 1/32"	N/A	2					8				
X.	+/- 0.100	+/- 3.0	3					9				
X.X	+/- 0.030	+/- 1.0	4					10				
X.XX	+/- 0.015	+/- 0.5	5					11				
X.XXX	+/- 0.005	+/- 0.1	6					12				

DRAWN	MCA	DATE 1/11/11
CHECKED	MCA	DATE 1/11/11
APPROVED	MCA	DATE 1/11/11
NEXT ASSY	N/A	WEIGHT 60 lb

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

ALFA LAVAL
ASHBROOK SIMON-HARTLEY

ALFA LAVAL ASHBROOK SIMON-HARTLEY INC
11600 East Hardy Rd.
Houston, Texas 77093
Phone: 281-449-0322
Fax: 281-449-1324

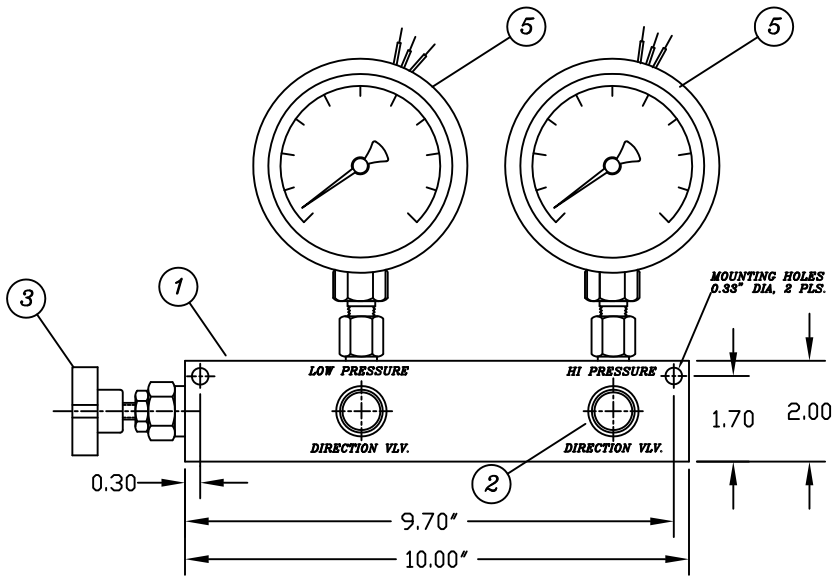
TITLE
HYDRAULIC PUMP / MOTOR ASSEMBLY
145TC 208-230/460VAC-3ph-60Hz
PREMIUM EFFICIENCY WITH CANOPY

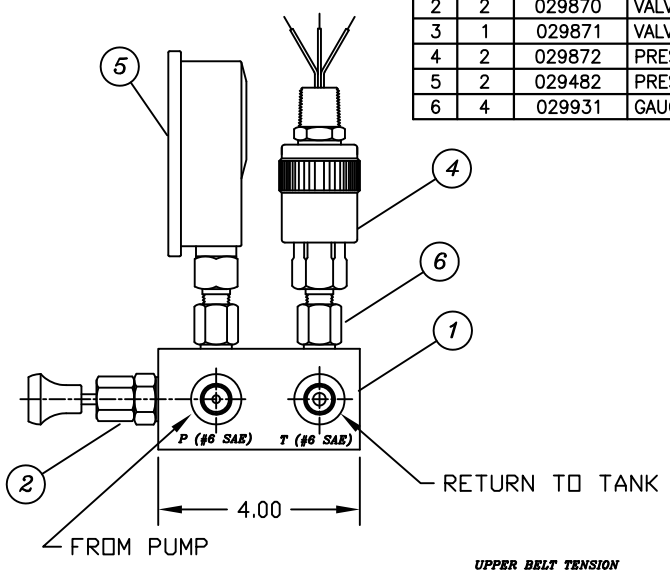
SCALE	DWG NO.	REV
1:3	0310030	0

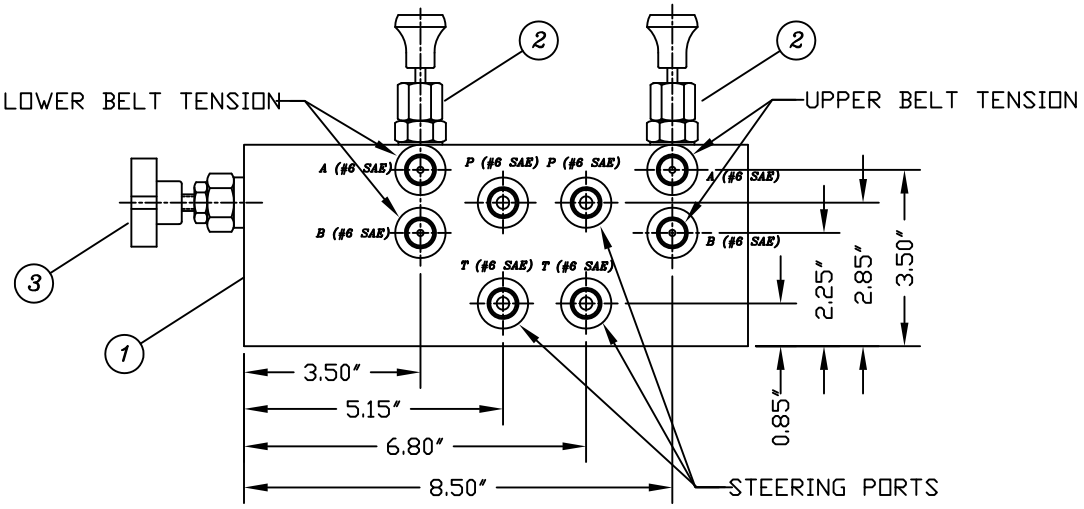
CUSTOMER ASHBROOK

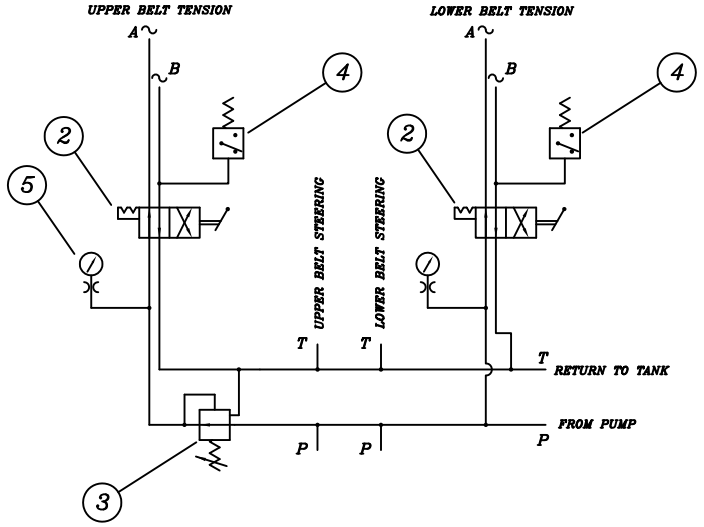
B4MATR7.DWG REV. 7

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 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

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						

DRAWN	JET	10/31/96
CHECKED	JET	2/5/04
APPROVED	JET	2/5/04
NEXT ASSY	N/A	N/A

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

ALFA LAVAL
ASHBROOK SIMON-HARTLEY

ALFA LAVAL ASHBROOK SIMON-HARTLEY INC
11600 East Hardy Road
Houston, Texas 77093
Phone: 281-449-0322
FAX: 281-449-1324

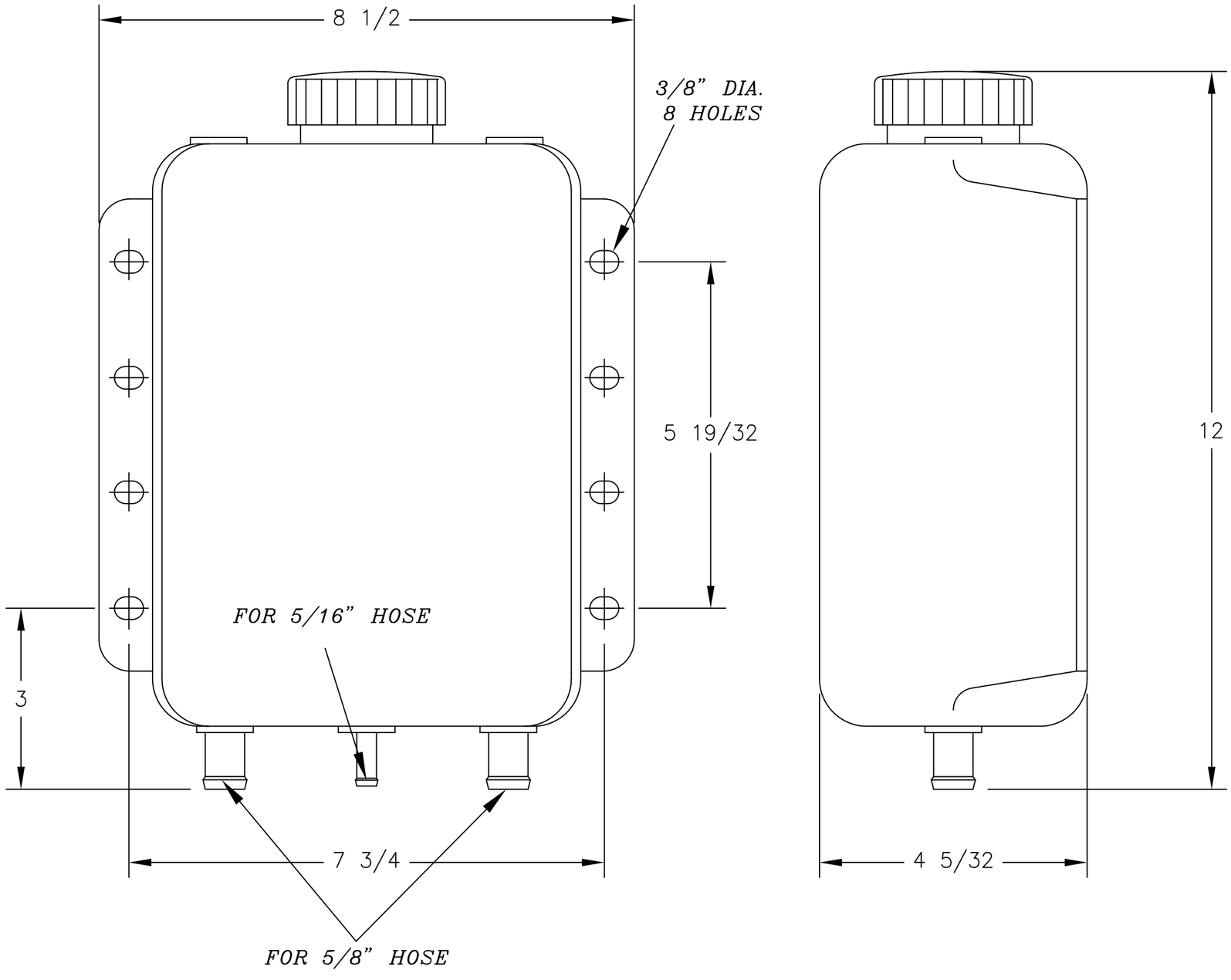
TITLE
MANIFOLD ASSEMBLY
HYDRAULIC SYSTEM
INDEPENDENT BELT TENSIONS

SCALE	DWG. NO.	REV
1/2.5	029868	3

CUSTOMER: GENERAL USE

B4MATR7.DWG REV. 7

NO.	QTY.	PART NO.	DESCRIPTION



PLASTIC RESERVOIR

CAPACITY	4 QUARTS
MATERIAL	HIGH DENSITY POLYETHYLENE
COLOR	TRANSLUSCENT WHITE

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

REVISIONS

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

REVISIONS

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

DRAWN	JET	DATE 10/28/96
CHECKED	JET	DATE 10/28/96
APPROVED	JET	DATE 8/10/98
NEXT ASS'Y	N/A	WEIGHT N/A

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

ALFA LAVAL
ASHBROOK SIMON-HARTLEY

ALFA LAVAL ASHBROOK SIMON-HARTLEY INC
11600 East Hardy Road
Houston, Texas 77093
Phone: 281-449-0322
FAX: 281-449-1324

TITLE
HYDRAULIC RESERVOIR
ONE GALLON CAPACITY
ATMOSPHERIC PRESSURE

SCALE	DWG. NO.	REV
1/2	029837	0

CUSTOMER GENERAL USE

Alfa Laval Ashbrook Part No. 037939

LENZ

CANISTER FILTERS
DISPOSABLE TYPE

SUCTION OR RETURN LINE APPLICATION

MODEL SERIES-CP (N.P.T. & S.A.E. PORTS)

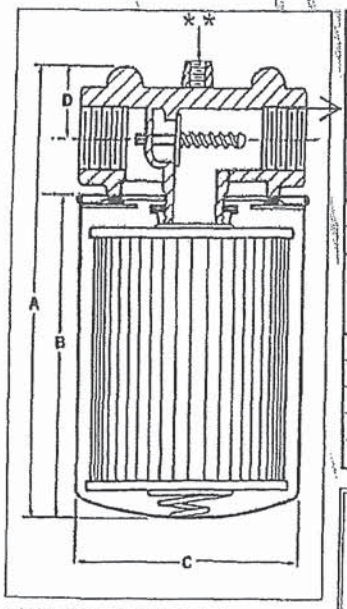
Lenz Canister Filters are designed for fluid power units where return line pressures do not exceed 100 P.S.I. These in-line filters offer exceptional protection to the entire hydraulic system. . .perfect for in plant use, especially good on mobile equipment. Designed for flows up to 20 GPM for return line and 5 GPM for suction line. The filter element is sealed in a sturdy, disposable canister.

The Relief Valve is rated at 5 P.S.I. for suction line applications and at 15 P.S.I. for return line use (25 P.S.I. optional). Specify 10 or 30 micron spin-on filter. ***Optional media available. (See below)***

The Indicating Gauge shown on the canister is optional at extra cost and must be ordered as part of the assembly in order to assure proper tapping of the filter head. It indicates when replacement of disposable canister is necessary. (See page 6)

Replacement Canisters are available from Lenz.

STANDARD FILTERS FOR IN-LINE USE



MODEL NUMBER		N.P.T. PORT SIZE	ELEMENT	DIMENSIONS				REPLACEMENT CANISTER
RETURN LINE	SUCTION LINE			A	B	C	D	
CP-500-10P	CP-500-10V	1/2"	10 Mic.	7 3/16"	5 7/16"	3 3/4"	3/4"	CP-752-10
CP-500-30P	CP-500-30V	1/2"	30 Mic.	7 3/16"	5 7/16"	3 3/4"	3/4"	CP-752-30
CP-750-10P	CP-750-10V	3/4"	10 Mic.	7 3/16"	5 7/16"	3 3/4"	3/4"	CP-752-10
CP-750-30P	CP-750-30V	3/4"	30 Mic.	7 3/16"	5 7/16"	3 3/4"	3/4"	CP-752-30
CP-1000-10P	CP-1000-10V	1"	10 Mic.	7 5/16"	5 7/16"	3 13/16"	7/8"	CP-1002-10
CP-1030-10P	CP-1030-10V	1"	10 Mic.	12 5/16"	10 5/16"	4 1/4"	7/8"	CP-1032-10

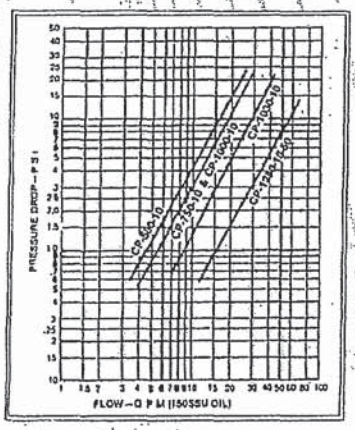
MODEL NUMBER		S.A.E. PORT SIZE	ELEMENT	DIMENSIONS				REPLACEMENT CANISTER
RETURN LINE	SUCTION LINE			A	B	C	D	
CPA-500-10P	CPA-500-10V	3/4"-16	10 Mic.	7 3/16"	5 7/16"	3 3/4"	3/4"	CP-752-10
CPA-500-30P	CPA-500-30V	3/4"-16	30 Mic.	7 3/16"	5 7/16"	3 3/4"	3/4"	CP-752-30
CPA-750-10P	CPA-750-10V	1 1/16"-12	10 Mic.	7 3/16"	5 7/16"	3 3/4"	3/4"	CP-752-10
CPA-750-30P	CPA-750-30V	1 1/16"-12	30 Mic.	7 3/16"	5 7/16"	3 3/4"	3/4"	CP-752-30
CPA-1030-10P	CPA-1030-10V	1 5/16"-12	10 Mic.	12 5/16"	10 5/16"	4 1/4"	7/8"	CP-1032-10

**Head casting has two mounting posts with threads.

On CP-500 & CP-750:
1/4"-20 thread 1 1/2" apart.

On CP-1000 & CP-1030:
3/8"-16 thread 1 7/8" apart.

On CP-501B
No Bypass
Coated w/ Lectrolluor 954



Optional Replacement Canisters:

CP-752-100M (100 MESH/140 MICRON STAINLESS STEEL)
CP-752-10-WR (10 MICRON WATER REMOVAL ELEMENT)
CP-752-03 (3 MICRON CELLULOSE)
CP-752-10SYN (BETA 10 MICRON SYNTHETIC)
CP-752-03SYN (BETA 3 MICRON SYNTHETIC)

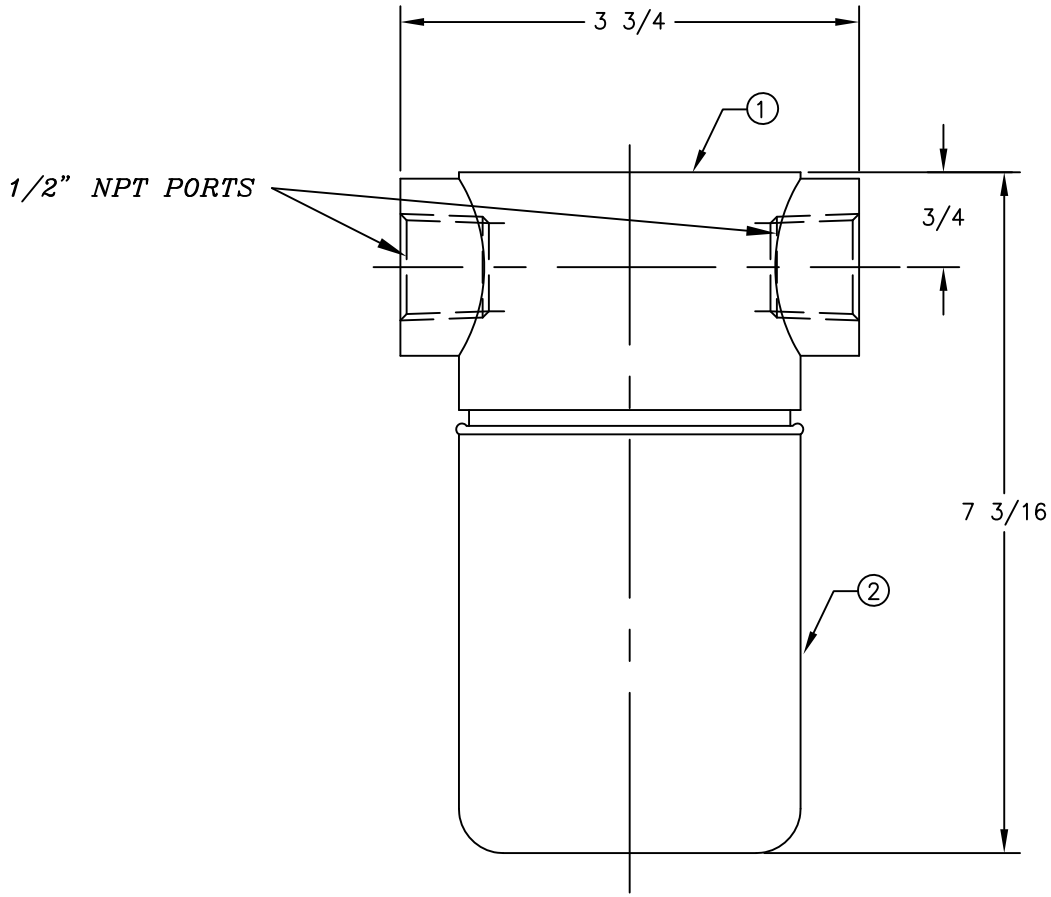
Example to order complete assembly:
CP-750-100M-P
CP-750-10WR-P
CP-750-03-P
CP-750-10SYN-P
CP-750-03SYN-P

LENZ

LENZ • P.O. BOX 1044 • DAYTON, OHIO 45401-1044 • PHONE: 937/277-9364 • FAX: 937/277-6516
OFFICE & FACTORY • 3301 KLEPINGER ROAD • DAYTON, OHIO 45406-1842
INTERNET: http://www.lenzinc.com

B4MATR7.DWG REV. 7

NO.	QTY.	PART NO.	DESCRIPTION
1	1	037938	FILTER HEAD, 1/2" NPT INLET/OUTLET
1	1	037939	SPIN-ON FILTER, 10 MICRON



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

REVISIONS

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

REVISIONS

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

DRAWN	MCA	DATE 3/5/10
CHECKED	MCA	DATE 3/5/10
APPROVED	MCA	DATE 5/5/10
NEXT ASSY	N/A	WEIGHT N/A

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

ALFA LAVAL
ASHBROOK SIMON-HARTLEY

ALFA LAVAL ASHBROOK SIMON-HARTLEY INC
11600 East Hardy Road
Houston, Texas 77093
Phone: 281-449-0322
FAX: 281-449-1324

TITLE
HYDRAULIC FILTER
10 MICRON NOMINAL
SPIN-ON FILTER ELEMENT

SCALE	DWG. NO.	REV
1/1	SK003740	0

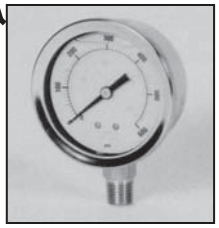
CUSTOMER GENERAL USE

INSTRUMENTATION/ ELECTRONICS

PRESSURE GAUGES

General Hydraulic Service

Stainless Steel Case, Brass Internals, Glycerin-Filled, 1/8" 1/4" & 1/2" NPT Ports, Vacuum to 15,000 PSI



BM-Bottom Ports
Crimped Case- Standard

TB- Twist on Bezel
(Optional)

LB- Lower Back Ports
U- Mounting Clamp

CB- Center Back Ports
P- Panel Mounting

W- Wall Mounting
TB- Twist on Bezel

Brass Pressure Snubber:
1/4" Female NPT
x 1/4" Male NPT

Model Number
602

Model 602: we recommend the "green striped" element (porosity 20) for most hydraulic applications.

316SS Pressure Snubber:
1/4" Female NPT
x #4" Male SAE

Model Number:
D-SN1-4FP-4MS

Steel Pressure Snubber:
1/4" Female NPT
x #6" Male SAE

Model Number:
S-SN1-4FP-6MS

Gauge Isolator:
Isolates and holds gauge's last pressure- no drain

#6 SAE	1/4" NPT
Model Number	Model Number
GI1-6FS	GI1-4FP

Ordering Information

HYV - 1K - 4 - 4 - N - BM - M - C - D - G

Pressure Range- Zero to: (psig)

-30 Vac	160	800	6k
15	200	1k	10k
30	300	1.5k	15k
60	400	2k	20k
100	500	3k	25k
	600	4k	30k
		5k	35k
Available Dry or Filled		Available Filled Only	

Gauge Size- Dia.
1.5
2
2.5
4
6

Port Size
2- 1/8" MP
4- 1/4" MP
8- 1/2" MP
4F- 1/8" MP
4MS- 4MS
4A- 9/16-18 Aminco
6A- 3/4-16 Aminco

Mounting
N- None
P- Panel
U- U-Clamp
W- Wall

Port Location
BM- Bottom
CB- Center/ Back
LB- Lower/ Back

Series
O- Hyd. Service; Glyc. Filled, 304SS Case, Brass Internals
U- Air Service; Dry, Non-Filled, Steel Case, Brass Internals
M- Mfg Code- must be in place to continue options
H- same as series U but with black face & Hyvair logo

Example: 0-2000 psig, 2.5" Dia., 1/4" Male NPT, U- Clamp Mounting, Center Back Ports, OEM Series- Glycerin Filled

Case
B- Brass
C- 304SS
D- 316SS
P- Polyamid
S- Steel

Internals
B- Brass
C- 304SS
D- 316SS
M- Monel
S- Steel

Fill Fluid
D- Dry
F- Fillable
G- Glycerin
S- Silicon

Options (Listed Alphabetically)
A- Adapter Ring 4-1/2"
B- Bar/ Psi
C- Calibrated
G- Glass Lens
K- kPa/ Psi
K2- kg/sq-cm
MD- Mirror Dial w/ Knife Edge Pointer
MM- Min/ Max Pointers
MP- Max Press. Pointer
P- Plastic Lens
R- Red Stationary Pointers
RS- Restrictor Screw
SB- Solid Front/ Blow-Out Back
T- High Temp Service
Z- Special/ Write Out

Alfa Laval Ashbrook
Part No. 029482

31341 Friendship Drive, Magnolia, TX 77355 • Tel.: 281-259-7768 Fax: 281-259-7249 • www.hyvair.com

ASHBROOK PART # 029866

VANE PUMPS

PCV3/~~5~~ SERIES- SAE A VANE PUMPS

SAE A, 2-Bolt

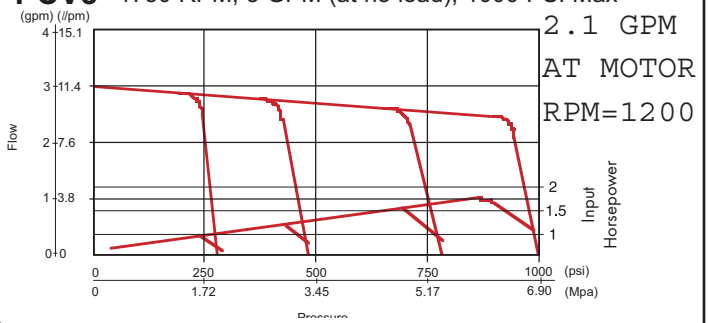
Series PCV3/ ~~PCV5~~ Vane Pumps

Features

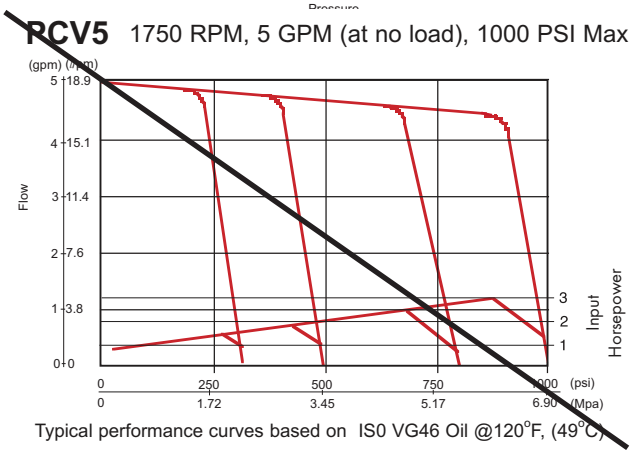
1. **Variable Volume, Pressure Compensated Design:** Reduces heat, noise and horsepower requirements. Pump maintains constant pressure while matching system flow demands.
2. **Simplified Circuit Design:** Direct spring operated compensator, no safety relief valve required.
3. **Quiet Operation:** Noise levels as low as 67 dBa.
4. **Compact and Simple Design:** Dependable operation- compensator not prone to contamination.
5. **Long Service Life:** Sturdy construction, precise machining ensures durability.
6. **Volume Adjustment Standard:** Pumps can be reduced as much as 50% of total maximum displacement.

Specifications

PCV3 1750 RPM, 3 GPM (at no load), 1000 PSI Max

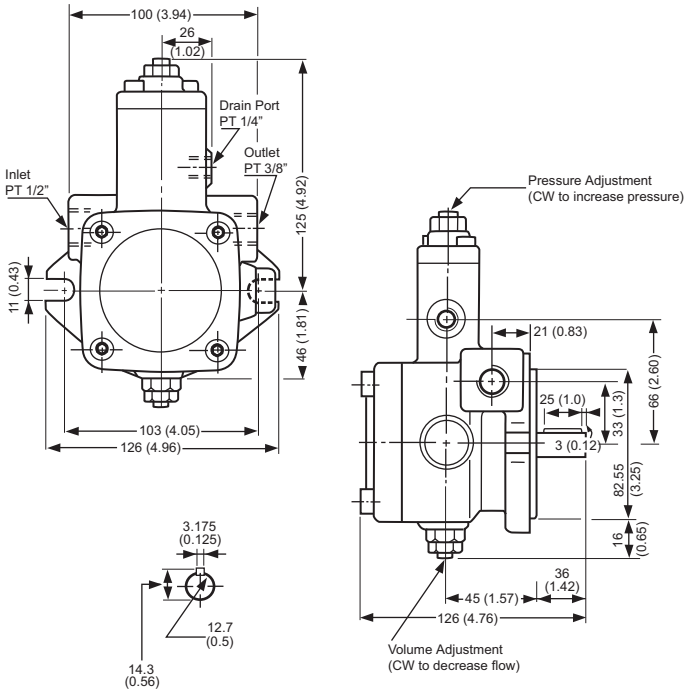


~~PCV5~~ 1750 RPM, 5 GPM (at no load), 1000 PSI Max



Typical performance curves based on ISO VG46 Oil @120°F, (49°C)

Dimensional Data



Units: mm/ (Inch)

Weight: PCV3: 9.9 lbs/ 4.5 kgs ~~PCV5: 10.6 lbs/ 4.8 kgs~~

Ordering Information

PCV3 - 1K - 2AK - 1 Note: Available right hand rotation (only)- viewed facing pump shaft

Size (GPM)
3
~~5~~

Code	Press Range
300	150-300 PSI
600	200-600 PSI
~~800~~	~~400-800 PSI~~
1K	400-1000 PSI

Mounting Style
2-Bolt, SAE A, 1/2" Dia. Keyed Shaft x 1.42" Long w/ 1/8" Key, Flow Adj. Std.

Series 1 Porting
1/2" inlet, 3/8" outlet, 1/4" case all female NPT

31341 Friendship Drive, Magnolia, TX 77355 • Tel.: 281-259-7768 Fax: 281-259-7249 • www.hyvair.com

	ASHBROOK SIMON-HARTLEY	No.:
		Date: 10/11/2011

Customer : HYDRAULIC POWER UNIT DRIVE MOTOR

TECHNICAL PROPOSAL

Three-phase induction motor - Squirrel cage rotor

Product line : W22 NEMA Premium - Ball Bearings

Catalog Number : 00112ET3E145TC-W22

Notes:
W22 NEMA Premium - Ball Bearings

Performed by:	Checked:

ASHBROOK SIMON-HARTLEY

No.:

Date: 10/11/2011

DATA SHEET
Three-phase induction motor - Squirrel cage rotor

Customer	: HYDRAULIC POWER UNIT DRIVE MOTOR
Product line	: W22 NEMA Premium - Ball Bearings

Frame	: 145T
Output	: 1 HP
Frequency	: 60 Hz
Poles	: 6
Full load speed	: 1150
Slip	: 4.17 %
Voltage	: 208-230/460 V
Rated current	: 3.82-3.45/1.73 A
Locked rotor current	: 21.4/10.7 A
Locked rotor current (Il/In)	: 6.2
No-load current	: 2.18/1.09 A
Full load torque	: 4.51 lb.ft
Locked rotor torque	: 300 %
Breakdown torque	: 300 %
Design	: B
Insulation class	: F
Temperature rise	: 80 K
Locked rotor time	: 28 s (hot)
Service factor	: 1.25
Duty cycle	: S1
Ambient temperature	: -20°C - +40°C
Altitude	: 1000 m
Degree of Protection	: IP55
Approximate weight	: 53 lb
Moment of inertia	: 0.15947 sq.ft.lb
Noise level	: 49 dB(A)

	D.E.	N.D.E.
Bearings	6205 ZZ	6204 ZZ
Regreasing interval	---	---
Grease amount	---	---

Load	Power factor	Efficiency (%)
100%	0.66	82.5
75%	0.57	82.0
50%	0.45	77.0

Notes:
HPU MOTOR
ASH PART # 039244-CNPY

Performed by:	Checked:

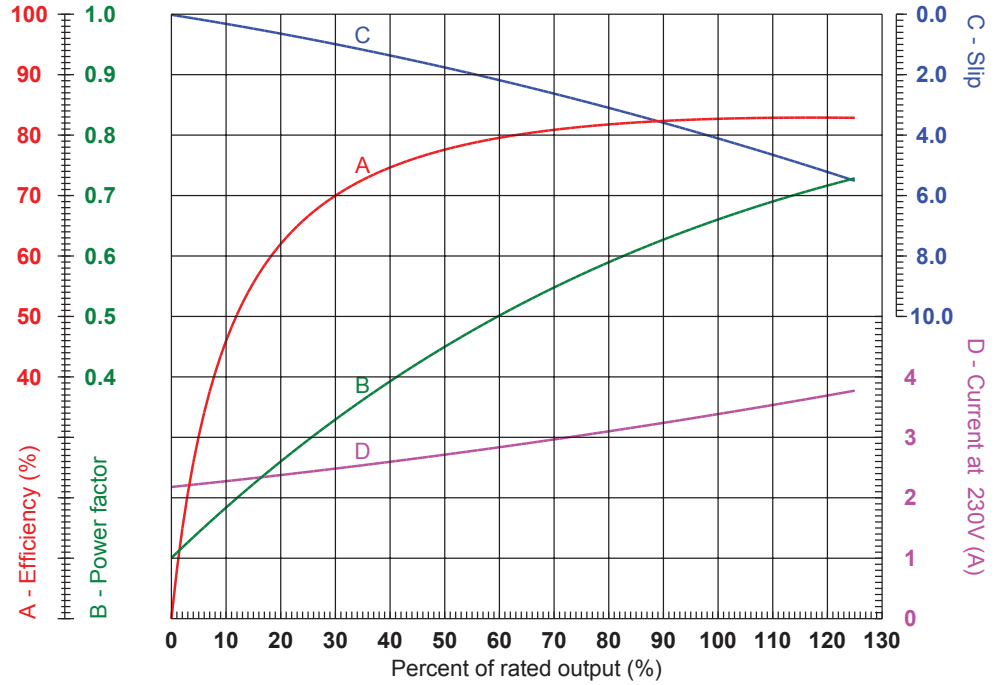
ASHBROOK SIMON-HARTLEY

No.:

Date: 10/11/2011

PERFORMANCE CURVES RELATED TO RATED OUTPUT

Three-phase induction motor - Squirrel cage rotor



Customer	:	HYDRAULIC POWER UNIT DRIVE MOTOR
Product line	:	W22 NEMA Premium - Ball Bearings

Output	:	1 HP	Locked rotor current (Il/In)	:	6.2
Frame	:	145T	Duty cycle	:	S1
Full load speed	:	1150	Service factor	:	1.25
Frequency	:	60 Hz	Design	:	B
Voltage	:	208-230/460 V	Locked rotor torque	:	300 %
Insulation class	:	F	Breakdown torque	:	300 %
Rated current	:	3.82-3.45/1.73 A			

Notes:
HPU MOTOR
ASH PART # 039244-CNPY

Performed by:	Checked:

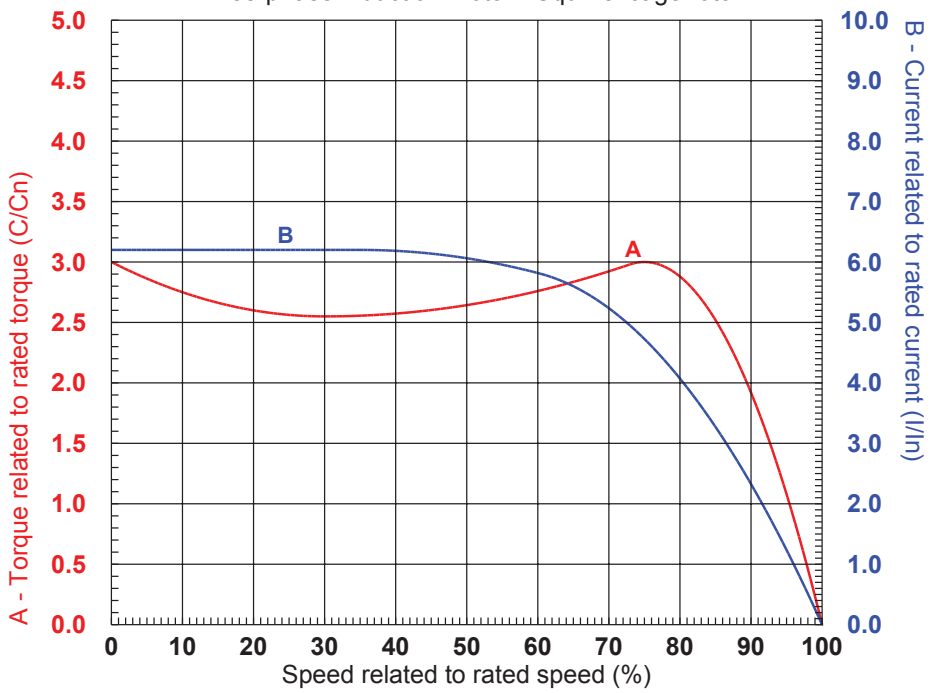
ASHBROOK SIMON-HARTLEY

No.:

Date: 10/11/2011

CHARACTERISTIC CURVES RELATED TO SPEED

Three-phase induction motor - Squirrel cage rotor

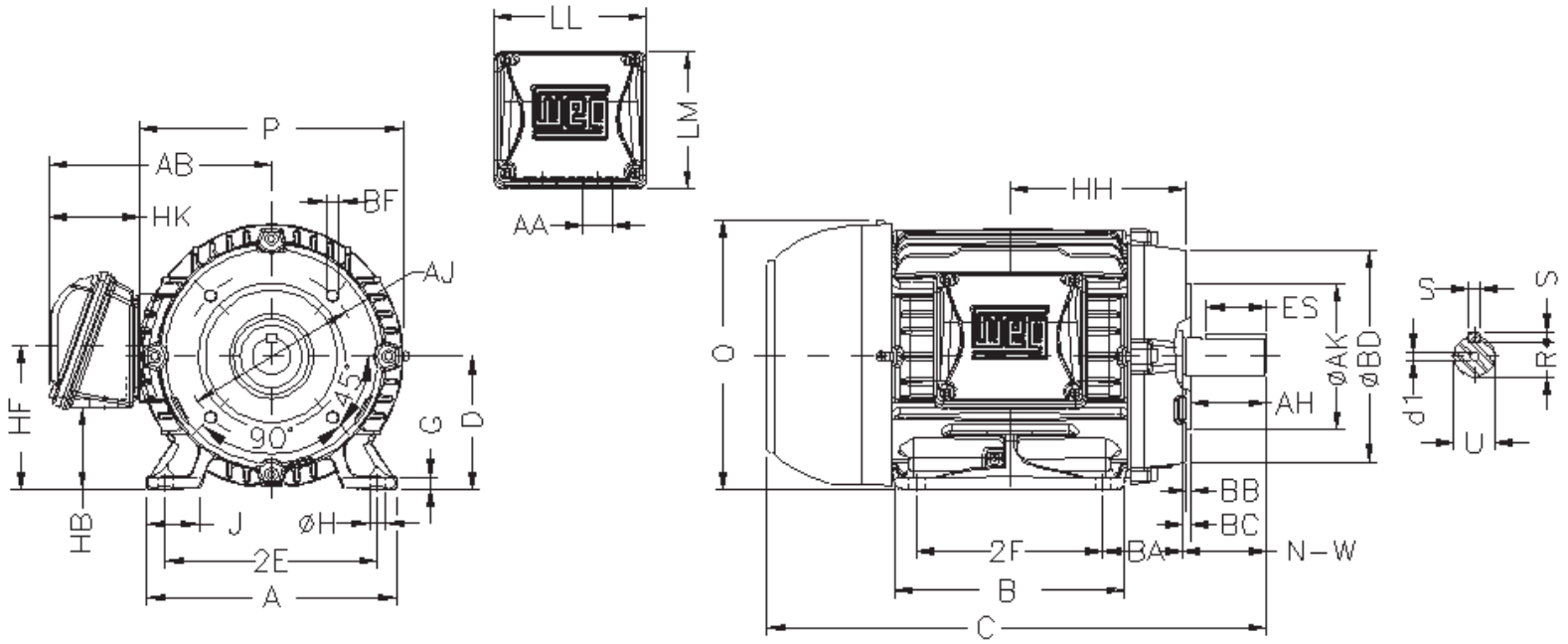


Customer	:	HYDRAULIC POWER UNIT DRIVE MOTOR
Product line	:	W22 NEMA Premium - Ball Bearings

Output	:	1 HP	Locked rotor current (Il/In)	:	6.2
Frame	:	145T	Duty cycle	:	S1
Full load speed	:	1150	Service factor	:	1.25
Frequency	:	60 Hz	Design	:	B
Voltage	:	208-230/460 V	Locked rotor torque	:	300 %
Insulation class	:	F	Breakdown torque	:	300 %
Rated current	:	3.82-3.45/1.73 A			

Notes:
HPU MOTOR
ASH PART # 039244-CNPY

Performed by:	Checked:



2E 5.500	J 1.437	A 6.457	P 7.047	AB 6.181
2F 5.000	B 6.142	BA 2.250	U 0.875	N-W 2.250
ES 1.575	S 0.187	R 0.765	depth 0.187	D 3.500
G 0.354	HB 1.728	O 7.122	HF 3.500	HH 4.750
HK 2.638	H 0.344	C 13.346	LL 4.527	LM 4.094
AA NPT 3/4"	d1 A 4	d2 A 4	Flange FC-149	AJ 5.875
AK 4.500	BD 6.500	BF UNC 3/8"x16	BB 0.156	BC 0.125
AH 2.125				

Notes: HPU MOTOR
ASH PART # 039244-CNPY

Performed by:

Checked:

Customer: HYDRAULIC POWER UNIT DRIVE MOTOR

W22 NEMA Premium - Ball Bearings

Three-phase induction motor

Frame 145T - IP55

10/11/2011

10.12 FEED ASSEMBLY

10.12.1 General Arrangement, Feed Pipe and Supports: SK003498

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 Alfa Laval Service department.

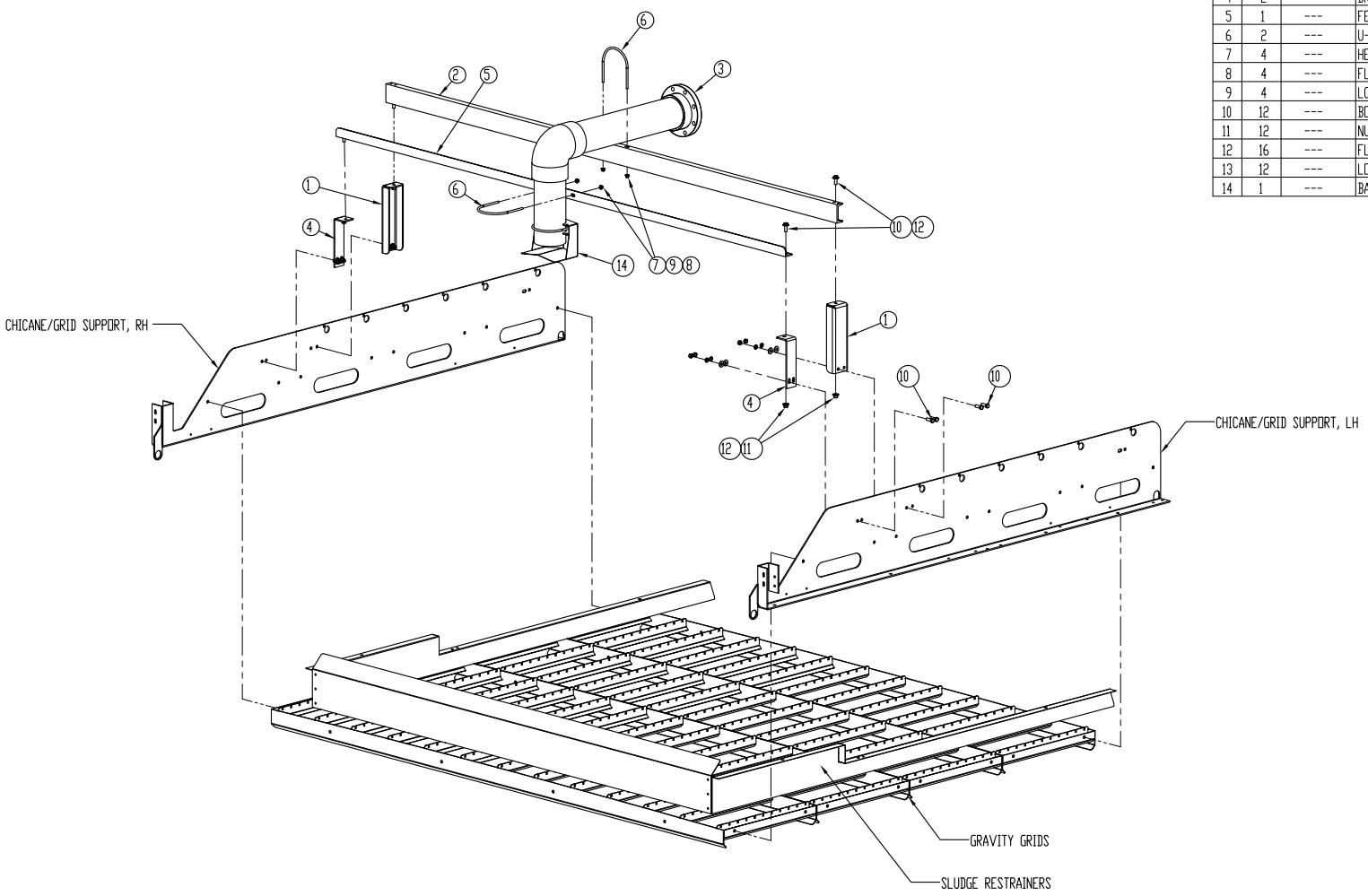
10.12.2 ~~Photograph: Klampress® 3 Belt Option Feed Tank~~

~~a. Inspect the feed tank to see that the over flow weir formed by the upper end of the feed chute is level. Adjust as needed. This is important for proper sludge distribution and correct operation of the Klamrpess®.~~
~~b. Check periodically for the accumulation of debris in the tank that could affect the even flow of sludge onto the gravity deck.~~
~~c. Flush out the feed tank when shutting down over night or longer.~~

~~This is a view of the over flow weir in the feed tank that must be level for proper operation. The entire Klampress, the gravity deck and the weir will be leveled together.~~

~~This is the view of the 3 belt option feed tank looking at the inlet flange and drain outlets. A valved drain line must be connected to the drains to empty the tank when the press is shut down to prevent solids build up in the lower corners of the tank.~~

NO.	QTY.	PART NO.	DESCRIPTION
1	2	---	BRACKET, FEED PIPE SUPPORT CHANNEL
2	1	---	FEED PIPE SUPPORT CHANNEL
3	1	---	FEED PIPE ASSEMBLY, PVC, KLAMPRESS 94
4	2	---	BRACKET, FEED PIPE SUPPORT ANGLE
5	1	---	FEED PIPE SUPPORT ANGLE
6	2	---	U-BOLT, 3/8"-16 x 6 3/4" ID x 8" LG x 2 1/2" THD
7	4	---	HEX NUT, 3/8"-16
8	4	---	FLAT WASHER, 3/8"
9	4	---	LOOK WASHER, 3/8"
10	12	---	BOLT, HEX HEAD 1/2"-13 x 1 1/2" LG
11	12	---	NUT, HEX 1/2"-13
12	16	---	FLAT WASHER, 1/2"
13	12	---	LOCK WASHER, 1/2"
14	1	---	BAFFLE, FEED INLET



TOLERANCE, UNLESS NOTED		
	INCH	MILLIMETER
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	SUMMARY DESCRIPTION OF CHANGES	BY	APP
1				
2				
3				
4				
5				
6				

REV	DATE	SUMMARY DESCRIPTION OF CHANGES	BY	APP
7				
8				
9				
10				
11				
12				

DRAWN	MCA	10/31/08
CHECKED	MCA	10/31/08
APPROVED	MCA	10/31/08
NEXT ASS'Y	N/A	WEIGHT N/A

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

ALFA LAVAL
ASHBROOK SIMON-HARTLEY

Alfa Laval Ashbrook Simon-Hartley Operations Inc
11600 East Hardy Rd.
Houston, Texas 77093
Phone: 281-449-0322
Fax: 281-449-1324

TITLE
GENERAL ARRANGEMENT
FEED PIPE AND SUPPORTS
KLAMPRESS 94

SCALE	DWG. NO.	REV
1:24	SK003498	0

CUSTOMER: ASHBROOK

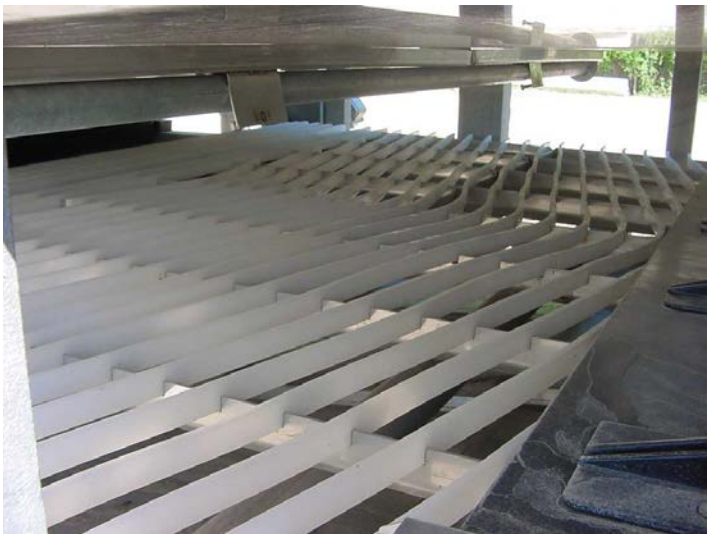
10.13 GRAVITY DRAINAGE SECTION

10.13.1 Drawings:

a. SK001191 Upper Grid Assembly
b. SK001192 Lower Grid Assembly
c. SK001200 Drain Tray Assembly
d. SK001193 Chicane Group Assembly
e. SK003317 General Arrangement Wedge Assembly – All Sizes
f. SK001204 Lower Sludge Restrainer Assembly
g. SK001202 Drain Piping Assembly
h. ~~SK003443- General Arrangement Drain Pans and Troughs- High Solids~~
i. ~~SK003445- General Arrangement Gravity Drain & Troughs- Extended 3 Belt- All Sizes~~

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 restrainer into place.

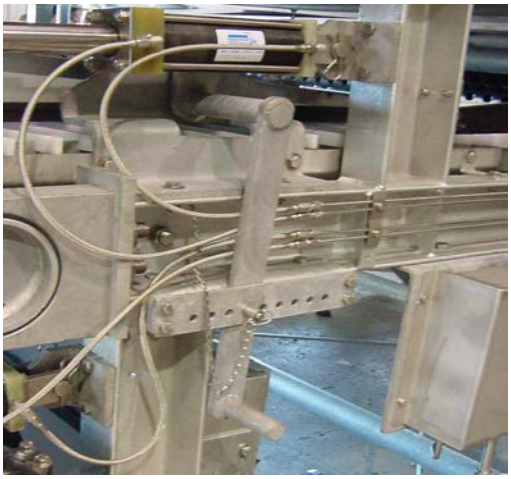
10.13.3 Sludge Restrainer Adjustment:

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

10.13.4 Sludge Restrainer Seal Replacement:

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

10.13.8 ~~Adjustable Sludge Retarding Ramp Adjustments & Repairs: When working on the Klampress be sure the power is turned off. Do not attempt to adjust or repair the ramp when the machine is in operation.~~

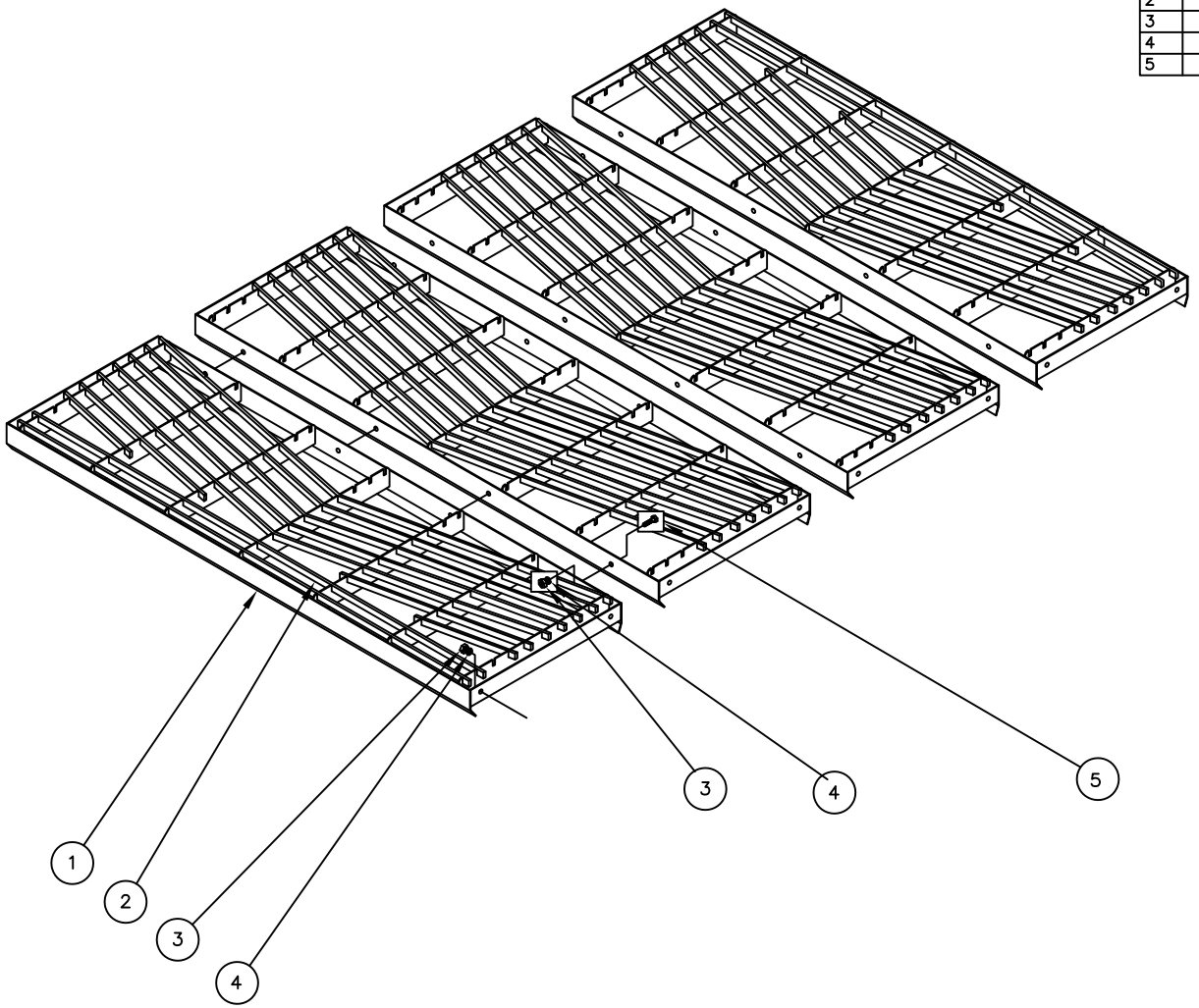
~~a. Alignment adjustment is required to place the leading edge of the blade exactly on top of the belt in line with the pivots on either side of the Klampress. The pivot bolts on which the ramp assembly rotates when the blade angle is changed by turning the crank are drilled through their centers.~~

To align the blade pass a string through the holes in the two bolts and draw it tight. Loosen the bolts that hold the ramp brackets to the frame and move the brackets so the string lays lightly on top of the belt directly over the center of the drive roller. The plastic ramp blade insert can be adjusted, due to it having slotted holes, so that the leading edge of the blade contacts the string. In the event that the ramp blade begins to wear too quickly or it tends to catch on the belt seam recheck this adjustment and move the ramp assembly back to the correct position.

b. Blade replacement. The plastic ramp blade insert is attached to the bottom of the ramp blade carrier. It is necessary to raise the ramp blade assembly clear of the belt to gain access to the bottom of the ramp blade. Notice in the photo there are plastic blocks bolted to the bottom of the assembly. These are skid blocks to prevent damage to the belt in the event the blade is adjusted incorrectly. The skid blocks will prevent the blade attaching hardware from contacting the belt surface. When the nuts are removed from the retaining screws the blade, the cover plate and the skid blocks will be removed together. Remove the old blade and install the new with the cover plate and the skid blocks as shown in the photo. The blade has slotted holes that will allow you to adjust the blade's position above the belt. Loosely tighten the nuts to hold the blade, but still allowing it to be moved. Lower the ramp back onto the belt and move the blade so that it just contacts the surface of the belt. Lift the ramp assembly back up to its fully retracted position and tighten the nuts holding the ramp blade assembly together. Lower the ramp back to the belt and check to see that the blade is still in the proper position.

B4MATR7.DWG REV. 7

ITM	PART NO.	DESCRIPTION	QTY
1		GRID SUPPORT FRAME WELMENT	4
2		POLY STRIP	–
3		WASHER, FLAT 3/8"	6
4		WASHER, LOCK 1/2"	28
5		BOLT, HEXHEAD 1/2" X 1" LG	1



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

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				

DRAWN	ADIN	DATE	7/26/95
CHECKED	ADIN	DATE	7/26/95
APPROVED	JET	DATE	2/2/00
NEXT ASSY	N/A	WEIGHT	N/A

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

ALFA LAVAL
ASHBROOK SIMON-HARTLEY

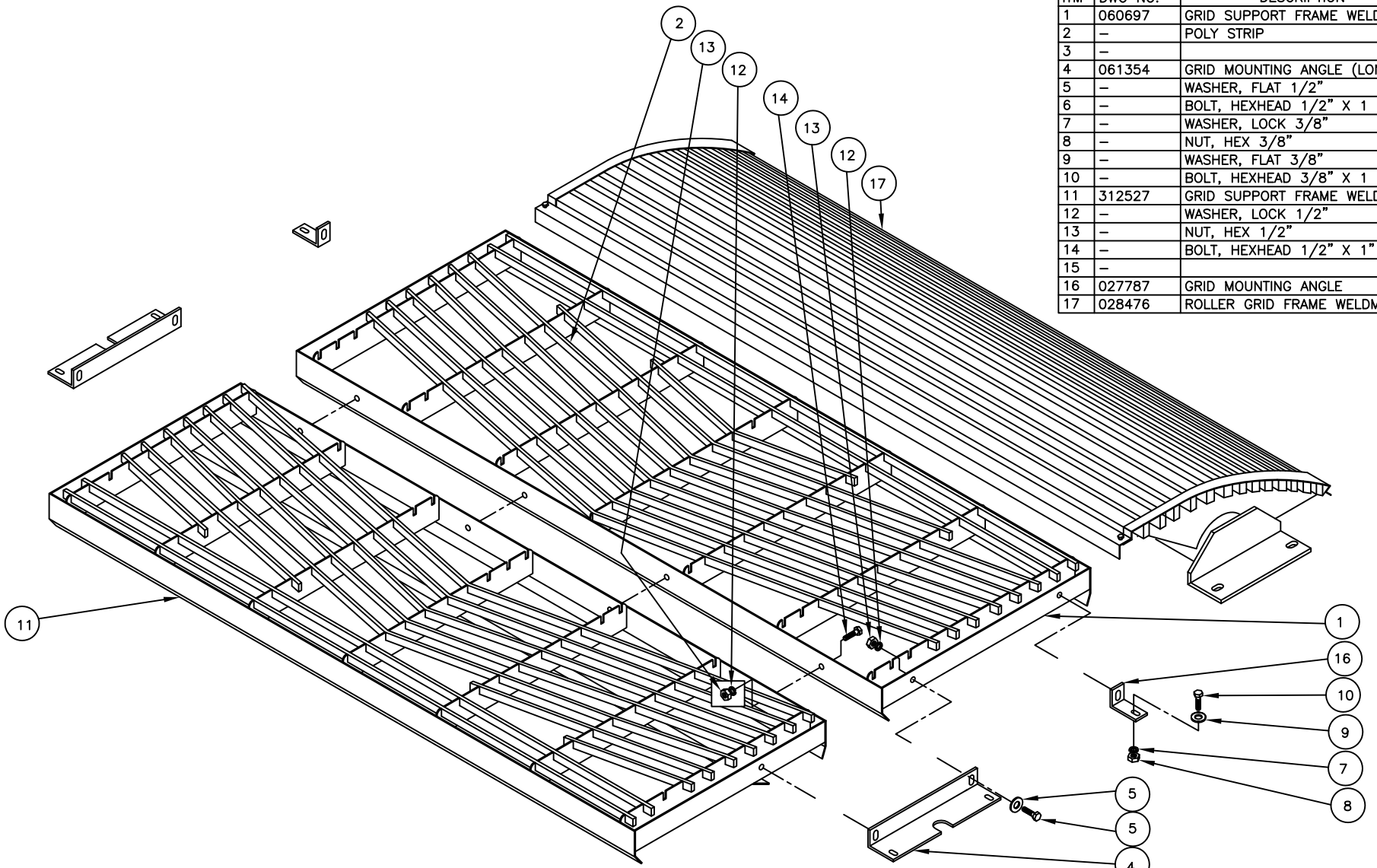
ALFA LAVAL ASHBROOK SIMON–HARTLEY INC
11600 East Hardy Road Houston, Texas 77093
Phone: 281–449–0322
FAX: 281–449–1324

TITLE
UPPER GRID ASSEMBLY
KLAMPRESS

SCALE	DWG. NO.	REV
1/20	SK001191	1

CUSTOMER ASHBROOK

B4MATR7.DWG REV. 7



ITM	DWG NO.	DESCRIPTION	QTY
1	060697	GRID SUPPORT FRAME WELDMENT	1
2	–	POLY STRIP	–
3	–		
4	061354	GRID MOUNTING ANGLE (LONG)	2
5	–	WASHER, FLAT 1/2"	–
6	–	BOLT, HEXHEAD 1/2" X 1 1/4" LG	6
7	–	WASHER, LOCK 3/8"	6
8	–	NUT, HEX 3/8"	6
9	–	WASHER, FLAT 3/8"	6
10	–	BOLT, HEXHEAD 3/8" X 1 1/4" LG	6
11	312527	GRID SUPPORT FRAME WELDMENT	1
12	–	WASHER, LOCK 1/2"	10
13	–	NUT, HEX 1/2"	10
14	–	BOLT, HEXHEAD 1/2" X 1" LG	4
15	–		
16	027787	GRID MOUNTING ANGLE	2
17	028476	ROLLER GRID FRAME WELDMENT	1

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

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						

DRAWN	ADIN	DATE 1/27/95
CHECKED	JET	DATE 1/31/00
APPROVED	JET	DATE 1/31/00
NEXT ASSY	N/A	WEIGHT N/A

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

ALFA LAVAL
ASHBROOK SIMON-HARTLEY

ALFA LAVAL ASHBROOK SIMON-HARTLEY INC
11600 East Hardy Road Houston, Texas 77093
Phone: 281-449-0322
FAX: 281-449-1324

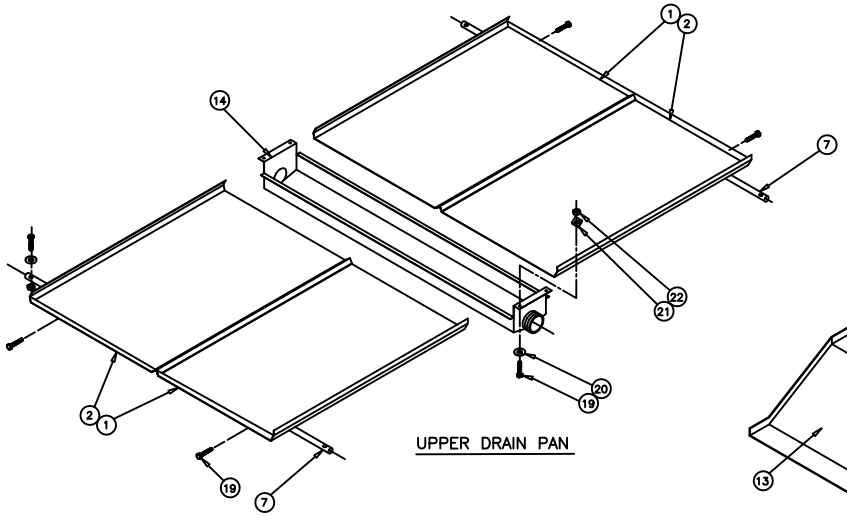
TITLE: LOWER GRID ASSEMBLY
KLAMPRESS

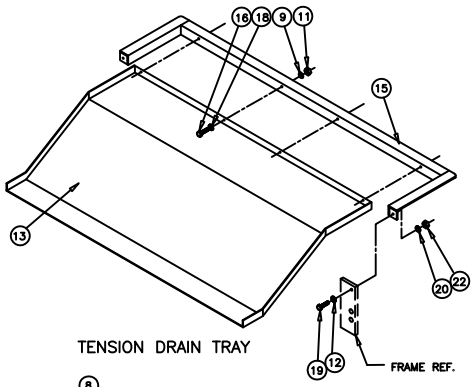
SCALE	DWG. NO.	REV
3/32	SK001192	1

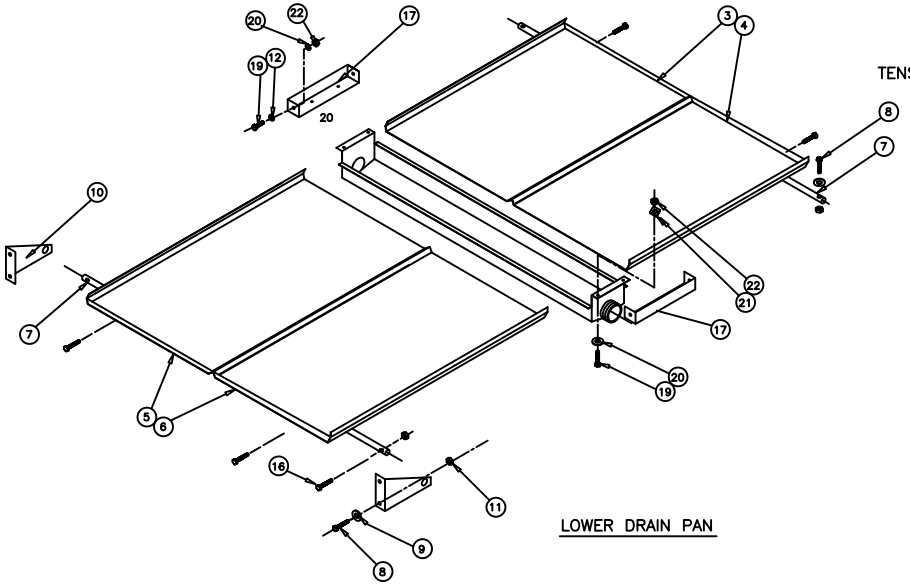
CUSTOMER: ASHBROOK

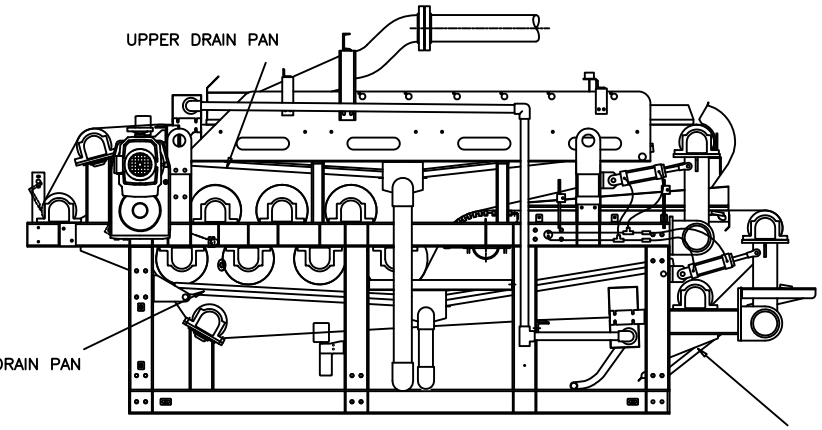
B4MATR7.DWG REV. 7

ITM	PART NO.	DESCRIPTION	QTY
1		UPPER DRAIN PAN HALF (L.H)	2
2		UPPER DRAIN PAN HALF (R.H)	2
3		LOWER DRAIN PAN SHORT(L.H)	1
4		LOWER DRAIN PAN SHORT(R.H)	1
5		LOWER DRAIN PAN LONG (L.H)	1
6		LOWER DRAIN PAN LONG (R.H)	1
7		TRAY SUPPORT PIPE, 1" SCH. 40	4
8		BOLT, HEXHEAD 1/4" X 1" LONG	12
9		WASHER, FLAT 1/4"	12
10	029097	DRAIN PAN REAR SUPPORT	2
11		NUT, HEX 1/4"	12
12		WASHER, FLAT 3/8"	4
13		TENSIONING DRAIN TRAY WELDMENT	1
14		GRAVITY DRAIN TRAY WELDMENT	2
15		TENSIONING TRAY SUPPORT WELDMENT	1
16		BOLT, HEXHEAD 1/4" X 3/4" LONG	4
17	029096	DRAIN TRAY BRACKET	2
18		WASHER, LOCK 1/4"	8
19		BOLT, HEXHEAD 3/8" X 1 1/2" LONG	6
20		WASHER, LOCK 3/8"	6
21		WASHER, BEVEL 3/8"	4
22		NUT, HEX 3/8"	6









DRAIN TRAY ARRANGEMENT

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				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

NOTICE: THIS DRAWING HAS NOT BEEN PUBLISHED AND IS THE SOLE PROPERTY OF ALFA LAVAL ASHBROOK SIMON-HARTLEY INC IS LENT TO THE BORROWER FOR HIS CONFIDENTIAL USE ONLY. IN CONSIDERATION OF THIS LOAN, THE BORROWER PROMISES TO RETURN IT UPON REQUEST AND AGREES THAT IT SHALL NOT BE REPRODUCED, COPIED, LENT, OR OTHERWISE DISPOSED OF, DIRECTLY OR INDIRECTLY, NOR USED FOR ANY PURPOSE OTHER THAN THAT FOR WHICH IT IS SPECIFICALLY FURNISHED.

DRAWN	ADIN	DATE 8/16/95
CHECKED	ADIN	DATE 8/16/95
APPROVED	JET	DATE 2/28/00
NEXT ASSY	N/A	WEIGHT N/A

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

ALFA LAVAL
ASHBROOK SIMON-HARTLEY

ALFA LAVAL ASHBROOK SIMON-HARTLEY INC
11600 East Hardy Road Houston, Texas 77093
Phone: 281-449-0322
FAX: 281-449-1324

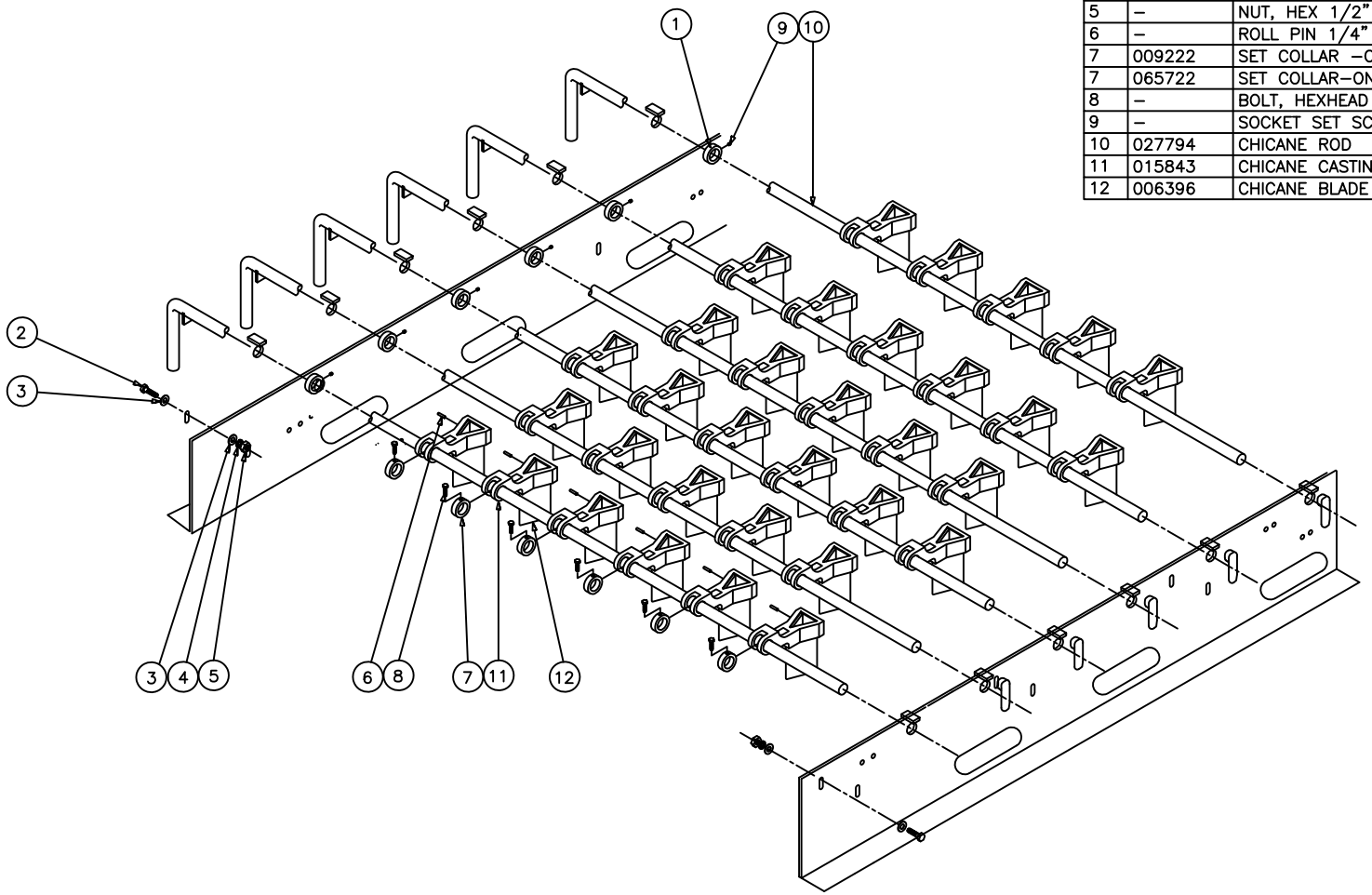
TITLE: DRAIN TRAY ASSEMBLY KLAMPRESS - STANDARD

SCALE	DWG. NO.	REV
1/22	SK001200	1

CUSTOMER: ASHBROOK

B4MATR7.DWG REV. 7

ITM	PART NO.	DESCRIPTION	QTY
1	064121	SET COLLAR –2 BOLT–3/8 NC	/
1	066321	SET COLLAR–2 BOLT M10	/
2	–	BOLT, HEXHEAD 1/2" X 1 1/2" LG	4
3	–	WASHER, FLAT 1/2"	8
4	–	WASHER, LOCK 1/2"	4
5	–	NUT, HEX 1/2"	4
6	–	ROLL PIN 1/4" X 1" LG	33
7	009222	SET COLLAR –ONE BOLT 3/8 NC	/
7	065722	SET COLLAR–ONE BOLT M10	/
8	–	BOLT, HEXHEAD 3/8" X 1 1/4" LG	33
9	–	SOCKET SET SCREW 3/8" X 1/2" LONG	6
10	027794	CHICANE ROD	6
11	015843	CHICANE CASTING	33
12	006396	CHICANE BLADE	33



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

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				

DRAWN	ADIN	DATE 7/26/95
CHECKED	JET	DATE 2/14/00
APPROVED	JET	DATE 2/14/00
NEXT ASSY	N/A	WEIGHT N/A

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

ALFA LAVAL
ASHBROOK SIMON-HARTLEY

ALFA LAVAL ASHBROOK SIMON–HARTLEY INC
11600 East Hardy Road Houston, Texas 77093
Phone: 281–449–0322
FAX: 281–449–1324

TITLE: CHICANE ASSEMBLY KLAMPRESS

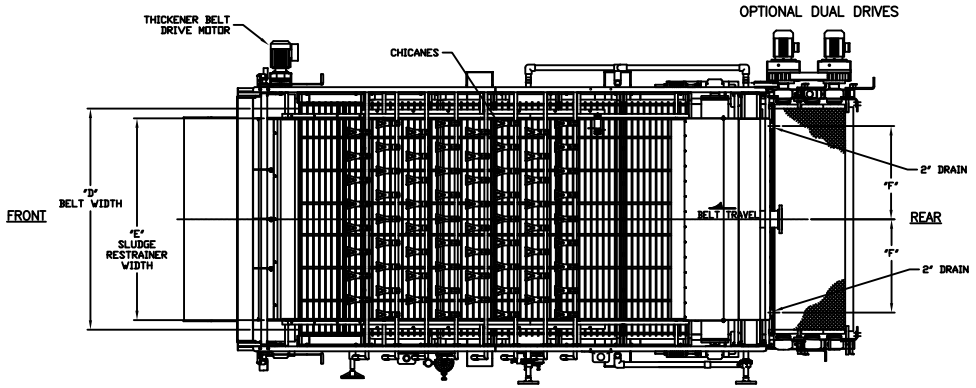
SCALE	DWG. NO.	REV
1/16	SK001193	1

CUSTOMER: ASHBROOK

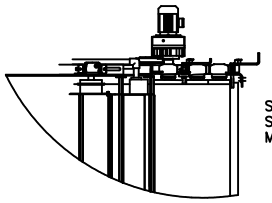
REV. 7

B4MATR7.DWG

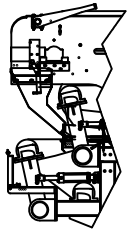
MACHINE SIZE	DIMENSION "A"	DIMENSION "B"	DIMENSION "C"	DIMENSION "D"	DIMENSION "E"	DIMENSION "F"	ESTIMATED WT.
1.5 METER	117 3/8" (2981)	78 7/8" (1978)	80 3/8" (2042)	67" (1700)	60 1/4" (1530)	26 3/4" (680)	19,000 lb
2.0 METER	137 3/8" (3490)	98 7/8" (2511)	100 3/8" (2550)	86 5/8" (2200)	80 1/4" (2038)	36 7/8" (937)	22,500 lb
2.5 METER	159 3/8" (4049)	120 7/8" (3070)	122 3/8" (3118)	106 3/8" (2700)	102 1/4" (2600)	46" (1168)	26,500 lb



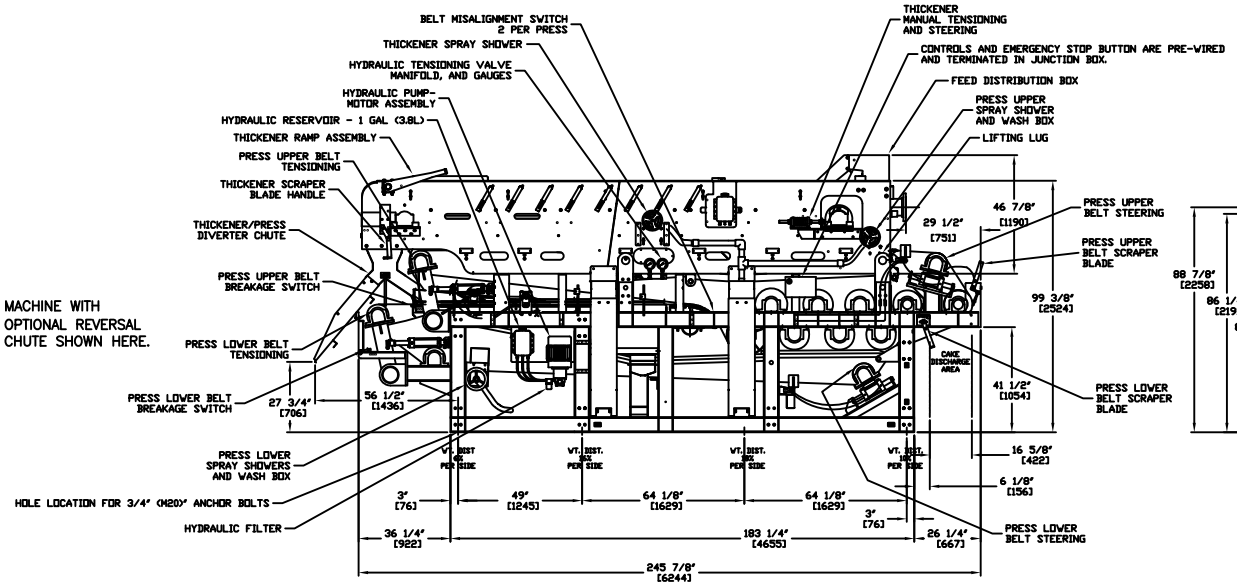
TOP VIEW



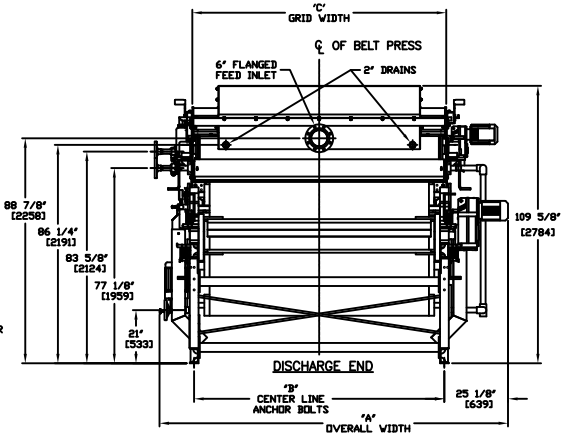
SINGLE DRIVE STANDARD ON 8 ROLL MACHINE.



MACHINE WITH OPTIONAL REVERSAL CHUTE SHOWN HERE.



8 ROLLER CONFIGURATION



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

REVISIONS							REVISIONS					
REV	DATE	DESCRIPTION	BY	APP'D	REV	DATE	DESCRIPTION	BY	APP'D
1	9/06	GBT DISCHARGE DIMENSIONS CORRECTED	DY		7				
2	10/08	ADDED 2.5m DIMENSIONS	MCA	DY	8				
3					9				
4					10				
5					11				
6					12				

DRAWN	MM	9/8/06
CHECKED	MM	9/8/06
APPROVED		9/8/06
NEXT ASSY	N/A	WEIGHT: SEE TABLE

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

ALFA LAVAL
ASHBROOK SIMON-HARTLEY

ALFA LAVAL ASHBROOK SIMON-HARTLEY INC
11600 East Hardy Road
Houston, Texas 77093
Phone: 281-449-0322
FAX: 281-449-1324

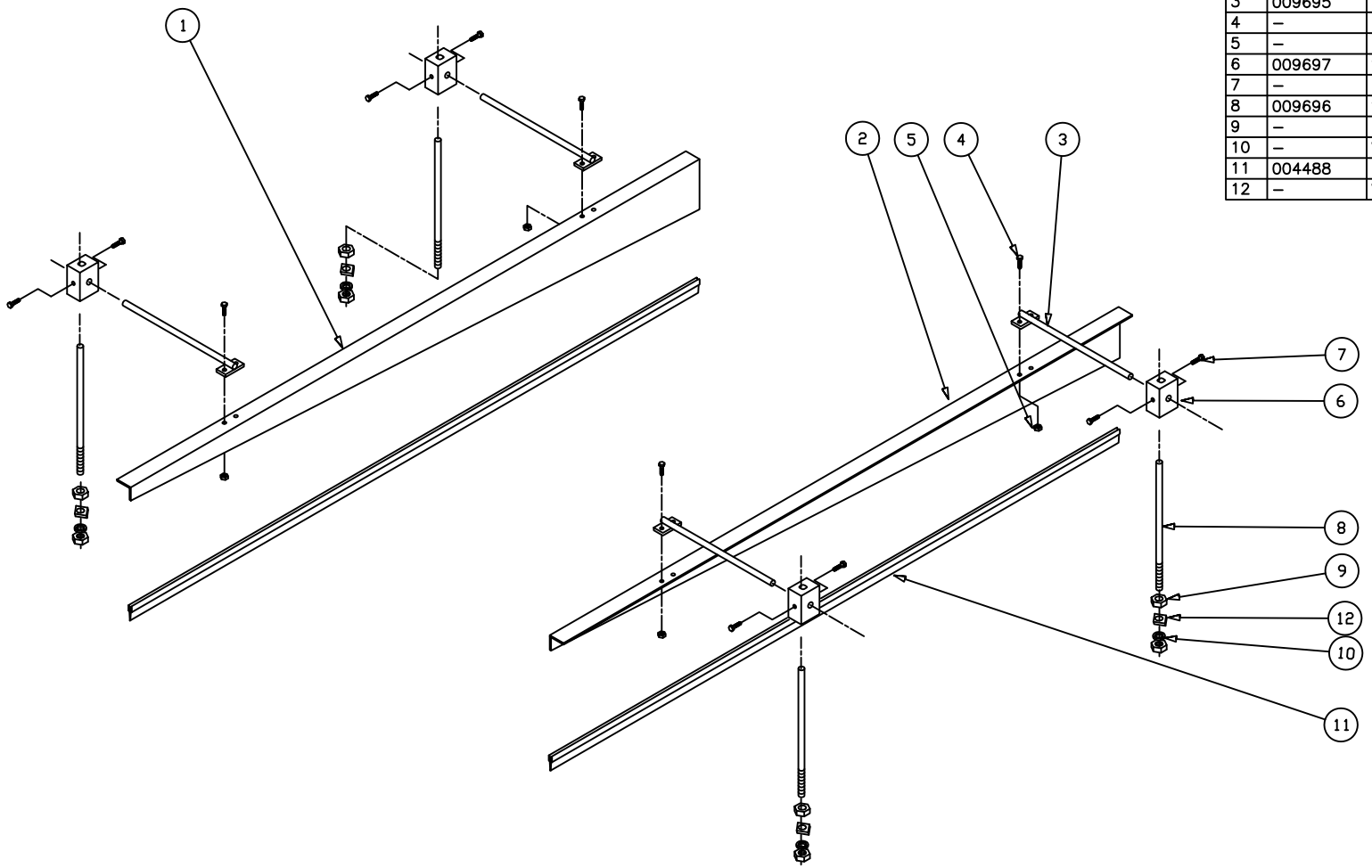
TITLE: GENERAL ARRANGEMENT
KLAMPRESS, 3 BELT OPTION
1.5, 2.0, 2.5 METER, 8 ROLL CONFIG.

SCALE	DWG. NO.	REV
1/50	SK003117	2

CUSTOMER: N/A

B4MATR7.DWG REV. 7

ITM	PART NO.	DESCRIPTION	QTY
1	060990-01	LOWER SLUDGE RESTRAINER (R.H)	1
2	060990-02	LOWER SLUDGE RESTRAINER (L.H)	1
3	009695	SLUDGE RESTRAINER ADJUSTMENT ROD	4
4	–	BOLT, HEXHEAD 1/4" X 3/4" LONG	8
5	–	NUT, NYLOCK 1/4"	8
6	009697	SLUDGE RESTRAINER ADJUSTMENT BLOCK	4
7	–	BOLT, HEXHEAD 3/8" X 3/4" LONG	8
8	009696	SLUDGE RESTRAINER ADJUSTMENT ROD	4
9	–	NUT, HEX 1/2"	8
10	–	WASHER, LOCK 1/2"	4
11	004488	RUBBER SEAL	2
12	–	WASHER, BEVEL 1/2"	4



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

REVISIONS

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

REVISIONS

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

DRAWN	ADIN	DATE 8/17/95
CHECKED	ADIN	DATE 8/17/95
APPROVED	JET	DATE 2/28/00
NEXT ASSY	N/A	WEIGHT N/A

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

ALFA LAVAL
ASHBROOK SIMON-HARTLEY

ALFA LAVAL ASHBROOK SIMON-HARTLEY INC
11600 East Hardy Road Houston, Texas 77093
Phone: 281-449-0322
FAX: 281-449-1324

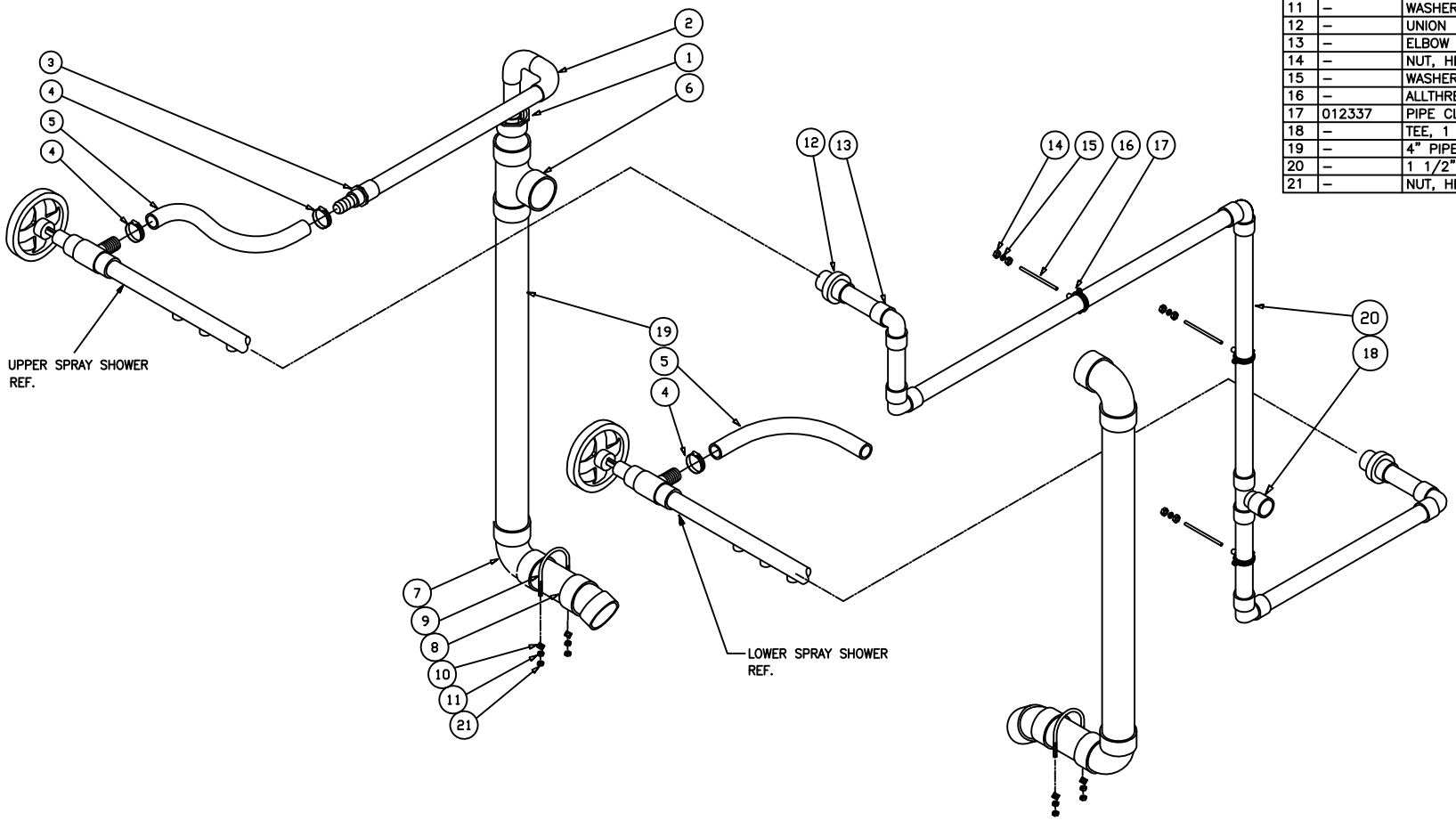
TITLE: LOWER SLUDGE RESTRAINER KLAMPRESS TYPE 94

SCALE	DWG. NO.	REV
3/32	SK001204	0

CUSTOMER: ASHBROOK

B4MATR7.DWG REV. 7

ITM	PART NO.	DESCRIPTION	QTY
1	–	REDUCER BUSHING 4" X 2" SCH. 40	–
2	–	ELBOW, 1 1/2" 90° SCH. 40	–
3	–	ADAPTER, 1 1/2" X 1 1/4" HOSE BARB	–
4	–	HOSE CLAMP	–
5	–	CLEAR HOSE	–
6	–	TEE, 4" SCH. 40 SOC..	–
7	–	ELBOW, 4" 90° SCH. 40	–
8	–	ELBOW, 4" 45° SCH. 40	–
9	–	U-BOLT 3/8" X 5 1/2"	–
10	–	WASHER, BEVEL 3/8"	–
11	–	WASHER, LOCK 3/8"	–
12	–	UNION 1 1/2" SCH. 80	–
13	–	ELBOW 1 1/2" SCH. 80	–
14	–	NUT, HEX 1/2"	–
15	–	WASHER, LOCK 1/2"	–
16	–	ALLTHREAD 1/2" X 5" LONG	–
17	012337	PIPE CLAMP 1 1/2"	7
18	–	TEE, 1 1/2" SCH. 80	–
19	–	4" PIPE SCH. 40	–
20	–	1 1/2" PIPE SCH. 80	–
21	–	NUT, HEX 3/8"	–



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

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			

DRAWN	ADIN	DATE 8/16/95
CHECKED	JET	DATE 8/16/95
APPROVED	JET	DATE 8/16/95
NEXT ASSY	N/A	WEIGHT N/A

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

ALFA LAVAL
ASHBROOK SIMON-HARTLEY

ALFA LAVAL ASHBROOK SIMON-HARTLEY INC
11600 East Hardy Road
Houston, Texas 77093
Phone: 281-449-0322
FAX: 281-449-1324

TITLE: DRAIN PIPING ASSEMBLY KLAMPRESS

SCALE	DWG. NO.	REV
1/16	SK001202	0

CUSTOMER: ASHBROOK

10.14 SCRAPERS

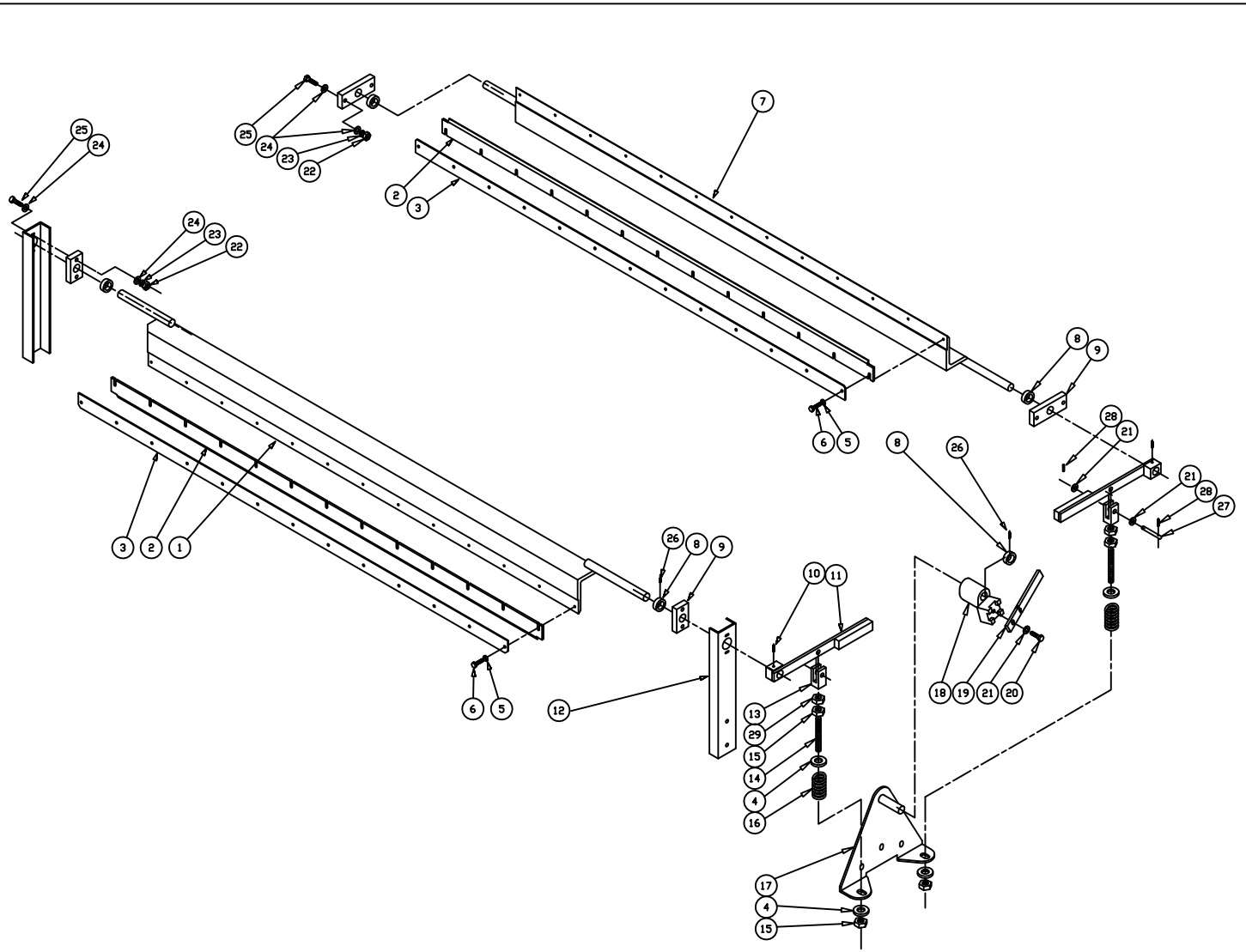
10.14.1 Scraper Assembly Drawing:

a. SK001197 Upper and Lower Scraper Blade Assembly
b. SK003444 General Arrangement Scraper Assembly – All Sizes

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.

B4MATR7.DWG REV. 7



ITM	DWG NO.	DESCRIPTION	QTY
1	060691	UPPER SCRAPER ANGLE WELDMENT	1
2	027772	SCRAPER BLADE	2
3	027773	SCRAPER BLADE COVER PLATE	2
4	–	WASHER, FLAT 5/8"	4
5	–	WASHER, LOCK 1/4"	28
6	–	BOLT, HEXHEAD 1/4" X 3/4" LG	28
7	060692	LOWER SCRAPER ANGLE WELDMENT	1
8	008059	SET COLLAR	5
9	009580	SCRAPER ANGLE BUSHING	4
10	–	ROLL PIN 5/16" X 2" LG	2
11	021136	SCRAPER LEVER WELDMENT	2
12	027786	UPPER SCRAPER MOUNTING CHANNEL	2
13	312317	CLEVIS	2
14	–	ALLTHREAD, 5/8" X 8 1/2" LONG	2
15	–	NUT, HEX 5/8"	4
16	009134	SPRING	2
17	027798	SCRAPER HANDLE MTG BRACKET	1
18	019312	RELEASE CAM	1
19	312622	SCRAPER RELEASE HANDLE	1
20	–	BOLT, HEXHEAD X 1/2" X 1 1/4" LONG	1
21	–	WASHER, FLAT 1/2"	5
22	–	NUT, HEX 3/8"	8
23	–	WASHER, LOCK 3/8"	8
24	–	WASHER, FLAT 3/8"	16
25	–	BOLT, HEXHEAD 3/8" X 1 3/4" LG	8
26	–	SOCKET SET SCREW 5/16" X 1/2"	5
27	312325	SCRAPER CLEVIS PIN	2
28	–	COTTER PIN 1/8" X 1 1/4" LONG	4
29	–	JAM NUT, HEX 5/8"	2

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

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			

DRAWN	ADIN	DATE 8/11/95
CHECKED	ADIN	DATE 8/11/95
APPROVED	JET	DATE 2/18/00
NEXT ASSY	N/A	WEIGHT N/A

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

ALFA LAVAL
ASHBROOK SIMON-HARTLEY

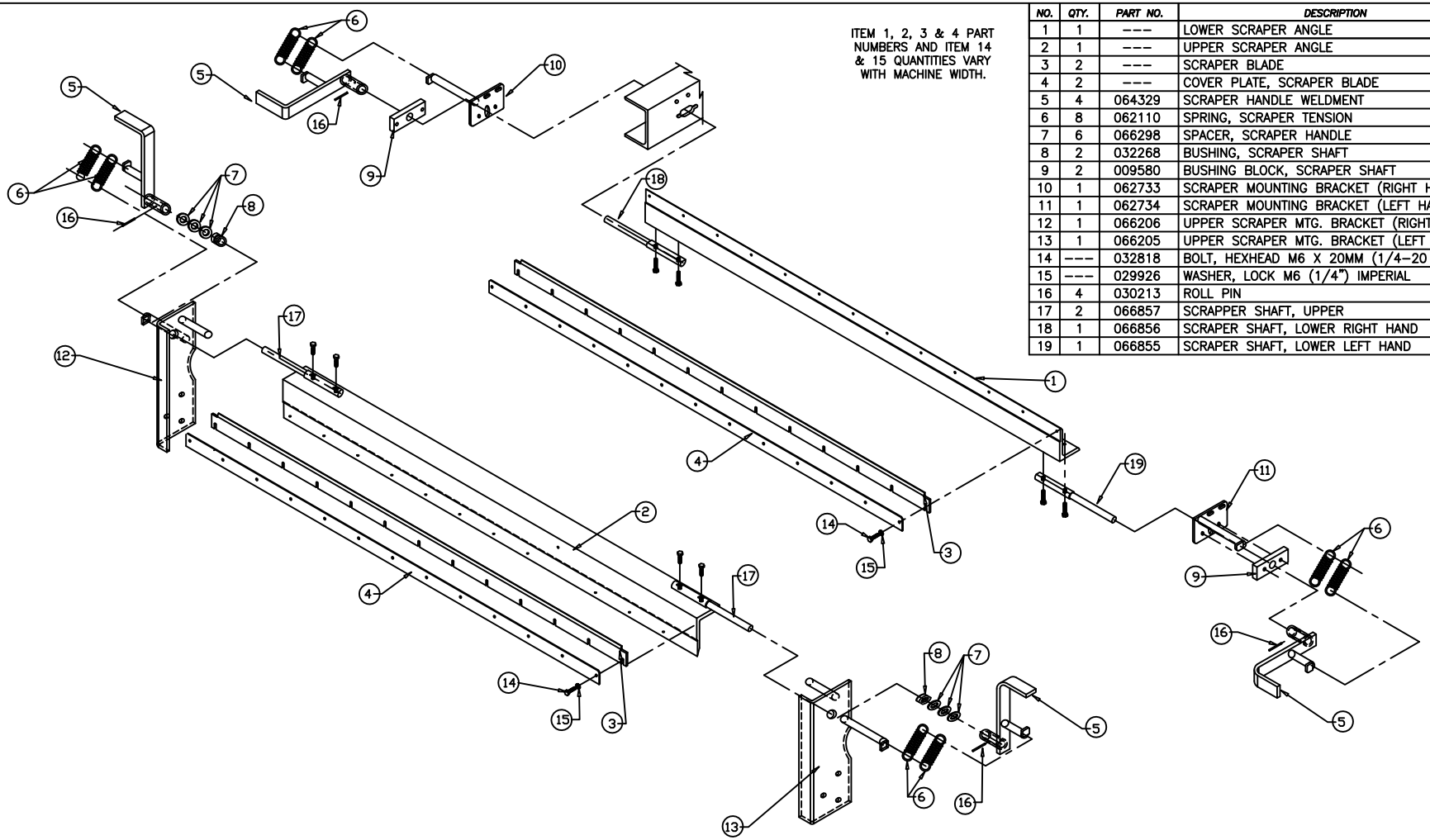
ALFA LAVAL ASHBROOK SIMON-HARTLEY INC
11600 East Hardy Road Houston, Texas 77093
Phone: 281-449-0322
FAX: 281-449-1324

TITLE: SCRAPER BLADE ASSEMBLY
UPPER AND LOWER
KLAMPRESS TYPE 94

SCALE	DWG. NO.	REV
1/16	SK001197	0

CUSTOMER: ASHBROOK

B4MATR7.DWG REV. 7



ITEM 1, 2, 3 & 4 PART NUMBERS AND ITEM 14 & 15 QUANTITIES VARY WITH MACHINE WIDTH.

NO.	QTY.	PART NO.	DESCRIPTION
1	1	---	LOWER SCRAPER ANGLE
2	1	---	UPPER SCRAPER ANGLE
3	2	---	SCRAPER BLADE
4	2	---	COVER PLATE, SCRAPER BLADE
5	4	064329	SCRAPER HANDLE WELDMENT
6	8	062110	SPRING, SCRAPER TENSION
7	6	066298	SPACER, SCRAPER HANDLE
8	2	032268	BUSHING, SCRAPER SHAFT
9	2	009580	BUSHING BLOCK, SCRAPER SHAFT
10	1	062733	SCRAPER MOUNTING BRACKET (RIGHT HAND)
11	1	062734	SCRAPER MOUNTING BRACKET (LEFT HAND)
12	1	066206	UPPER SCRAPER MTG. BRACKET (RIGHT HAND)
13	1	066205	UPPER SCRAPER MTG. BRACKET (LEFT HAND)
14	---	032818	BOLT, HEXHEAD M6 X 20MM (1/4–20 X 3/4")
15	---	029926	WASHER, LOCK M6 (1/4") IMPERIAL
16	4	030213	ROLL PIN
17	2	066857	SCRAPPER SHAFT, UPPER
18	1	066856	SCRAPER SHAFT, LOWER RIGHT HAND
19	1	066855	SCRAPER SHAFT, LOWER LEFT HAND

DRAWING NOT FOR CONSTRUCTION OR MANUFACTURING USE

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

REVISIONS

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

REVISIONS

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

DRAWN	MCA	DATE 6/12/08
CHECKED	MCA	DATE 6/12/08
APPROVED	DY	DATE 6/12/08
NEXT ASSY	N/A	WEIGHT N/A

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

ALFA LAVAL
ASHBROOK SIMON-HARTLEY

ALFA LAVAL ASHBROOK SIMON–HARTLEY INC
11600 East Hardy Road Houston, Texas 77093
Phone: 281–449–0322
FAX: 281–449–1324

TITLE
GENERAL ARRANGEMENT
SCRAPER ASSEMBLY
KLAMPRESS 94 – ALL SIZES

SCALE	DWG. NO.	REV
1/16	SK003444	0

CUSTOMER GENERAL USE

10.15 DRIVE TRAIN

10.15.1 Drive Data:

At the end of Section 10 you will find motor and gear box data for all the gear motors used on the Klampress. Spare parts and complete replacement units may be ordered from Alfa Laval. See Section 14 for Spare Parts ordering information.

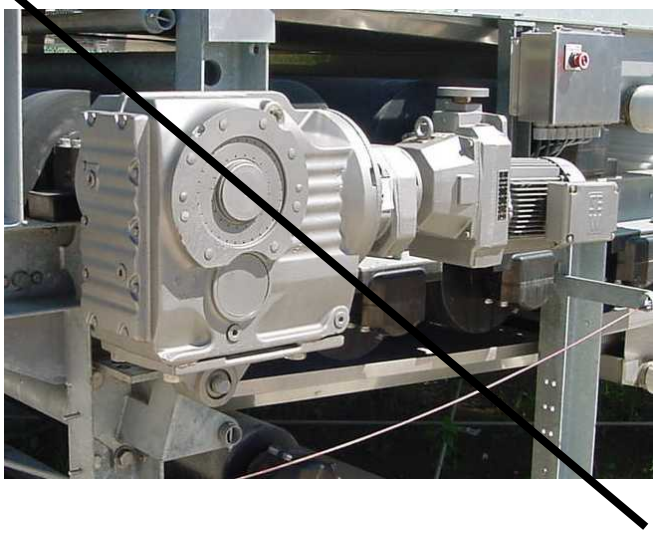
10.15.2 Lubrication:

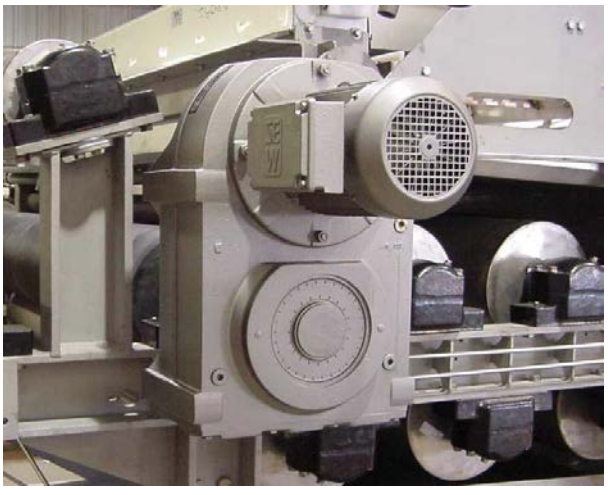
***Note*:** Lubrication frequency - Primary Gear Box 10,000 hours.

(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.

10.15.3 Gear Motor Types:

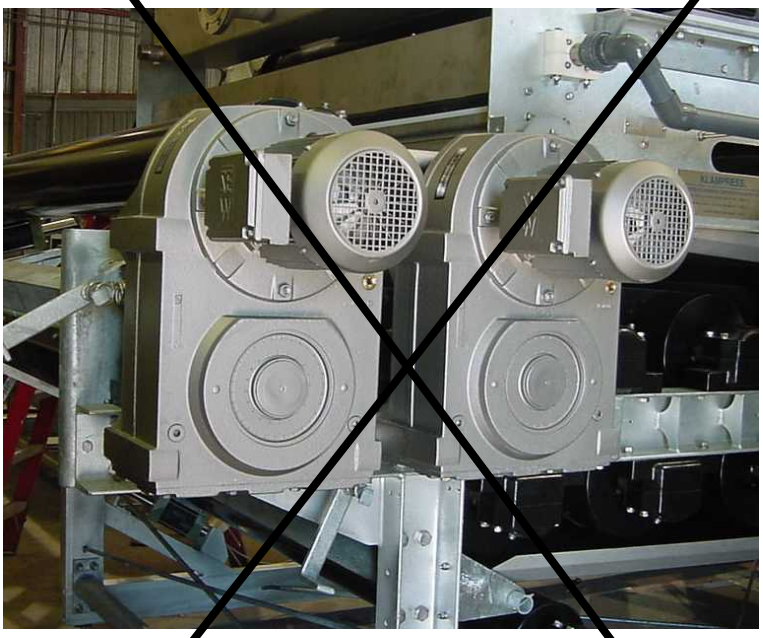
a. The standard and extended Klampress® may be fitted with either a single mechanical variable drive or a single electronically variable frequency drive. The standard drive arrangement is a single belt drive gear motor shaft mounted on a single drive roller. This is the preferred arrangement for municipal sludge applications. The standard drive speed range is approximately 1 to 5 meters/minute.





b. An optional dual drive gear motor and drive roller may be fitted on the extended Klampress® with 8 or 12 pressure

rollers when the dewatering loads are high due to special process variables. This arrangement would be more likely to be used on industrial and fibrous sludge applications. The speed range with dual drive is also approximately 1 to 5 meters/minute.



c. The Aquabelt® conversion will use a higher horsepower belt drive gear motor with a higher speed gear ratio. This is always fitted with the electronic variable frequency (VFD) drive so that a broader speed range can be attained. The speed range of the Klampress® with the Aquabelt® conversion is approximately from 1.5 to 15 meters/min.

ALFA LAVAL ASHBROOK SIMON-HARTLEY, INC.
BELT PRESS DRIVE DATA

Technical Data for Klampress Type 94
Single Drive Unit
2.0 Meter with a VFD

Motor Data:

Manufacturer:	SEW Eurodrive
Nameplate Horsepower:	3.0
Frame Size:	DRE100L4
Power Requirement:	230/460 Volt,Three Phase, 60 Hertz
Full Load Speed:	1735 rpm
NEMA Design:	A
Ambient Temp:	40 Degrees C
Insulation Class:	F
Service Factor:	1.15 (1.0 Per NEMA when used with an inverter/VFD drive)
Time Rating:	Continuous
Enclosure:	TEFC, IP65

Primary Gear Reducer:

Manufacturer:	Eurodrive
Model	FA97
Reduction Ratio:	276.77:1
Output Speed:	6.3 RPM
Lubrication:	Oil Splash
Mounting:	H1 Position
Service Factor:	1.3
Shaft Size:	70mm

Special Features:

[X] Severe Duty Protection
[X] Inverter Duty

5 DR Series AC Motors/Brakemotors

5.1 Notes on the data of energy-efficient motors

The following table lists the short symbols used in the "Technical Data" tables.

P_N	Rated power
T_N	Rated torque
n_N	Rated speed
I_N	Rated current
cosφ	Power factor
$\eta_{100\%}$	Efficiency at 100% of the rated power
I_A/I_N	Starting current ratio
T_A/T_N	Starting torque ratio
T_H/T_N	Ramp-up torque ratio
Code Letter	NEMA code letter
J_{Mot}	Mass moment of inertia of the motor
J_{Mot_BE}	Mass moment of inertia of the brakemotor
BE..	Standard brake size
Z_0 BG	Switching frequency for operation with BG brake controller
Z_0 BGE	Switching frequency for operation with BGE brake controller
T_B	Standard brake torque
m	Mass of the motor
m_{BE}	Mass of the brakemotor

BELT DRIVE MOTOR

P_m [HP]	n_a [rpm]	T_a [lb-in]	i	F_{Ra} [1)] [lb]	SEW f_B					m [lbs]	
3.0	6.3	29600	276.77	7300	1.30						
	~~6.8~~	~~27100~~	~~253.41~~	~~7450~~	~~1.40~~						
	7.8	23900	223.88	7630	1.60	FA	97	DRE	100L4	400	393
	9.1	20300	189.92	7820	1.85	~~FAF~~	~~97~~	~~DRE~~	~~100L4~~	~~430~~	~~392~~
	9.9	18700	174.87	7900	2.0	F	97	DRE	100L4	420	391
	11	16700	156.30	8000	2.3	FF	97	DRE	100L4	490	392
	12	15000	140.71	8070	2.5						
	14	13600	127.42	8130	2.8						
	7.6	24500	228.93	5350	1.10						
	8.8	21100	197.20	5660	1.25						
	9.6	19200	179.97	5820	1.40						
	11	17000	159.61	5990	1.55	FA	87	DRE	100L4	260	388
	13	14300	134.16	6180	1.85	FAF	87	DRE	100L4	290	387
	14	13200	123.29	6260	2.0	F	87	DRE	100L4	275	386
	16	11700	109.49	6350	2.3	FF	87	DRE	100L4	310	387
	18	10400	97.89	6310	2.5						
	20	9420	88.01	6160	2.8						
	15	12200	114.45	3700	1.10						
	16	11600	108.46*	3790	1.15						
	18	10100	94.93	3970	1.30						
	20	9160	85.52	4080	1.45						
	23	8030	75.02	4190	1.65	FA	77	DRE	100L4	175	383
	24	7760	72.50	4210	1.70	FAF	77	DRE	100L4	190	382
	26	7110	66.46	4260	1.85	F	77	DRE	100L4	180	381
	30	6240	58.32	4330	2.1	FF	77	DRE	100L4	205	382
	31	5920	55.27	4350	2.2						
	36	5180	48.37	4390	2.6						
	40	4660	43.58	4410	2.8						
	47	3910	36.58	4450	2.5	FA	77	DRE	100L4	170	383
						FAF	77	DRE	100L4	185	382
						F	77	DRE	100L4	180	381
						FF	77	DRE	100L4	205	382
	26	7240	67.65	2320	1.00						
	28	6540	61.07	2470	1.10						
	32	5750	53.73	2610	1.25	FA	67	DRE	100L4	125	378
	34	5430	50.74	2660	1.35	FAF	67	DRE	100L4	135	377
	40	4620	43.20	2760	1.55	F	67	DRE	100L4	130	376
	44	4200	39.26	2810	1.65	FF	67	DRE	100L4	145	377
	51	3640	34.01	2870	1.80						
	54	3430	32.08	2890	2.1	FA	67	DRE	100L4	120	378
	63	2930	27.41	2920	2.5	FAF	67	DRE	100L4	135	377
	69	2690	25.13	2920	2.7	F	67	DRE	100L4	125	376
						FF	67	DRE	100L4	140	377
	39	4790	44.73	1940	1.10	FA	57	DRE	100L4	115	373
	45	4090	38.21	1910	1.30	FAF	57	DRE	100L4	125	372
	48	3830	35.79	1890	1.40	F	57	DRE	100L4	115	371
	58	3220	30.15	1850	1.60	FF	57	DRE	100L4	130	372
	70	2670	24.96	1790	1.90	FA	57	DRE	100L4	115	373
	82	2260	21.17	1730	2.3	FAF	57	DRE	100L4	125	372
	91	2040	19.11	1700	2.6	F	57	DRE	100L4	115	371
	103	1800	16.81	1650	3.0	FF	57	DRE	100L4	130	372
	60	3090	28.88	1250	1.15	FA	47	DRE	100L4	98	368
						FAF	47	DRE	100L4	105	367
						F	47	DRE	100L4	100	366
						FF	47	DRE	100L4	105	367
	67	2750	25.72	1240	1.30						
	80	2330	21.82	1220	1.50						
	88	2110	19.70	1200	1.70	FA	47	DRE	100L4	96	368
	100	1850	17.33	1180	1.90	FAF	47	DRE	100L4	100	367
	106	1750	16.36	1170	2.0	F	47	DRE	100L4	98	366
	125	1490	13.93	1140	2.4	FF	47	DRE	100L4	105	367
	137	1350	12.66	1120	2.6						

5.4 Technical data of 4-pole high efficiency motors

1800 rpm - S1

Motor type	P_N T_N [HP] [lb-in]	n_N [rpm]	I_N 230V [A]	I_N 460V [A]	I_N 575V [A]	cosφ	$\eta_{100\%}$ [%]1)	I_A/I_N	T_A/T_N T_H/T_N	Code Letter	J_{Mot} [10^{-3} lb-ft^2]	m [lb]2)
DRS71S4[3)]	0.25 8.93	1700	0.9	0.45	0.36	0.69	72.0	4.2	1.9 1.9	G	11.6	17.2
DRS71S4[3)]	0.33 12.3	1700	1.24	0.62	0.49	0.69	72.0	4.2	1.9 1.9	G	11.6	17.2
DRS71S4[3)]	0.5 18.5	1700	1.84	0.92	0.74	0.69	72.0	4.2	1.9 1.9	G	11.6	17.2
DRS71M4[3)]	0.75 27.4	1690	2.5	1.25	1.0	0.71	74.0	4.3	2.2 2.1	G	16.8	20.1
DRE80M4	1 36.2	1740	2.9	1.44	1.15	0.78	82.5	7.1	3 2.1	K	51	31.5
DRE90M4	1.5 53.1	1740	4.5	2.25	1.8	0.73	84.0	7.7	3.6 2.9	L	84.3	40.6
DRE90L4	2 72.5	1740	5.7	2.85	2.3	0.77	85.5	7.5	3.4 3.0	K	103	47.4
DRE100L4	3 107	1735	8.0	4.0	3.2	0.79	87.5	8.1	4 3.3	K	161	63.9
DRE100LC4	5 177	1750	12.9	6.5	5.2	0.83	87.5	7.6	2.5 2.3	J	213	68.4
	5.4 190	1765	13.8	6.9	5.5	0.81	88.5	8.7	2.9 2.5	K	451	102
DRE132M4	7.5 265	1755	18	9	7.2	0.85	89.5	8.1	2.5 1.6	J	605	132
DRE132MC4	10 358	1770	24.5	12.3	9.8	0.82	89.5	8.7	2.1 1.6	K	807	138
DRE160M4	12.5 438	1770	31	15.4	12.3	0.82	91.0	8	3 2.2	J	1068	196
DRE160MC4	15 522	1780	36.5	18.3	14.6	0.82	91.7	8.2	2.9 2	J	1401	207
DRE180M4	20 716	1775	47.5	24	19	0.86	91.7	7.4	2.6 1.9	H	2636	304
DRE180L4	25 885	1775	60	30	24	0.84	93.0	8.1	2.9 2.2	J	3087	335
DRE180LC4	30 1044	1780	71	35.5	28.5	0.84	93.0	7.6	2.4 1.8	J	3990	355
DRE200L4	40 1424	1780	99	49.5	39.5	0.82	93.0	7.4	2.6 2.1	J	5605	573
DRE225S4	50 1761	1775	119	59	47.5	0.84	93.0	7.2	2.7 2.0	H	6958	650
DRE225M4	60 2124	1780	142	71	57	0.85	93.6	7.3	2.8 1.9	H	8146	694

BELT DRIVE MOTOR

1) Efficiency levels according to IEC 60034-2-1 Ed. 1 (2007) / PLL from Residual Losses, NEMA MG1 and/or DoE
2) Applies for foot-mounted motor (DRS and DRE.../FL..)
3) Standard efficiency motor

US DoE CC056A applies to DRE, DRP and DVE motors

Motor type	P_N T_N [HP] [lb-in]	n_N [rpm]	BE..	T_B [lb-in][3]	Z0 BG[1] BGE[2] [1/h]	J_{Mot_BE} [10^{-3} lb-ft^2]	$m_{\_BE}$ [lb][4]
DRS71S4[5]	0.25 8.93	1700	BE05	22	4800 7600	14.7	22.5
DRS71S4[5]	0.33 12.3	1700	BE05	31	4800 7600	14.7	22.5
DRS71S4[5]	0.5 18.5	1700	BE05	44	4800 7600	14.7	22.5
DRS71M4[5]	0.75 27.4	1690	BE1	88	3300 8800	19.9	25.8
DRE80M4	1 36.2	1740	BE1	88	2800 7200	54.6	38.1
DRE90M4	1.5 53.1	1740	BE2	124	2400 6400	95	50.7
DRE90L4	2 72.5	1740	BE2	177	2400 6400	115	57.3
DRE100L4	3 107	1735	BE5	248	- 3000	175	77.2
DRE100LC4	5 177	1750	BE5	354	- 3000	228	81.6
DRE132S4	5.4 190	1765	BE5	487	- 2200	463	121
DR	.5 65	1755	BE11	708	- 1600	629	165
DRE132MC4	10 358	1770	BE11	974	- 1200	843	172
DRE160M4	12.5 438	1770	BE20	1328	- 1000	1187	253
DRE160MC4	15 522	1780	BE20	1328	- 900	1520	264
DRE180M4	20 716	1775	BE20	1770	- 800	2778	374
DRE180L4	25 885	1775	BE30	2655	- 590	3420	423
DRE180LC4	30 1044	1780	BE30	2655	- 520	4322	441
DRE200L4	40 1424	1780	BE30 BE32	2655[6] 3540[7]	- 550	5938 6151	661 695
DRE225S4	50 1761	1775	BE30 BE32	2655[6] 4425[7]	- 320	7291 7505	738 771
DRE225M4	60 2124	1780	BE30 BE32	2655[6] 5310[7]	- 270	8479 8692	782 815

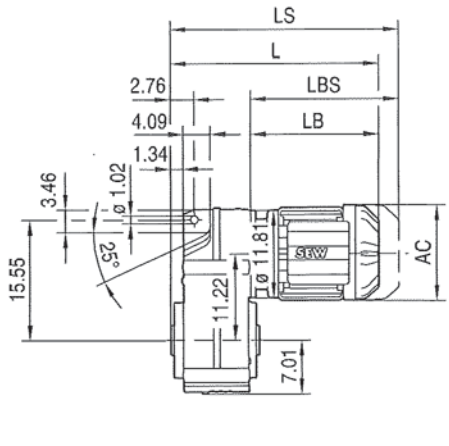
BELT DRIVE MOTOR

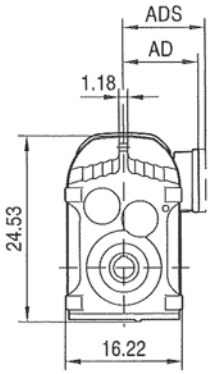
1) Operation with BG brake control system
2) Operation with BGE brake control system
3) Standard braking torque for IEC brakemotor
4) Applies for foot-mounted motor (DRS and DRE..BE../FI..)
5) Standard efficiency motor
6) Alternate reduced brake torque
7) Double-disc brake

US DoE CC056A applies to DRE, DRP and DVE motors

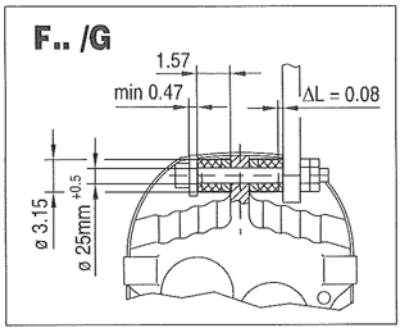
42 068 00 09

FA97..

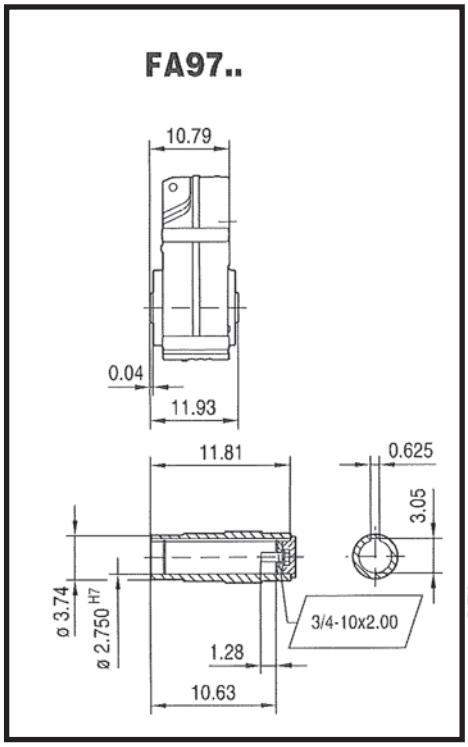




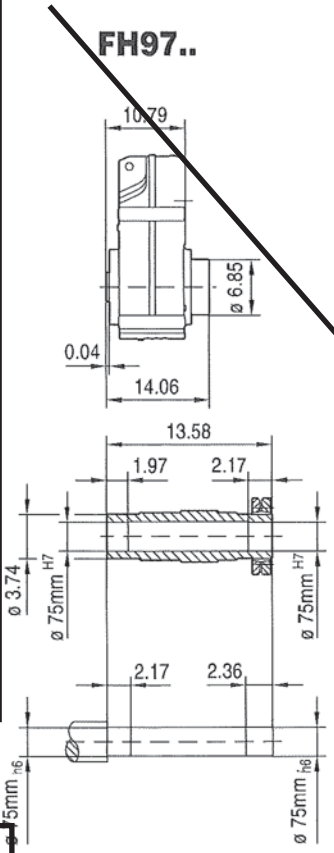
F.. /G



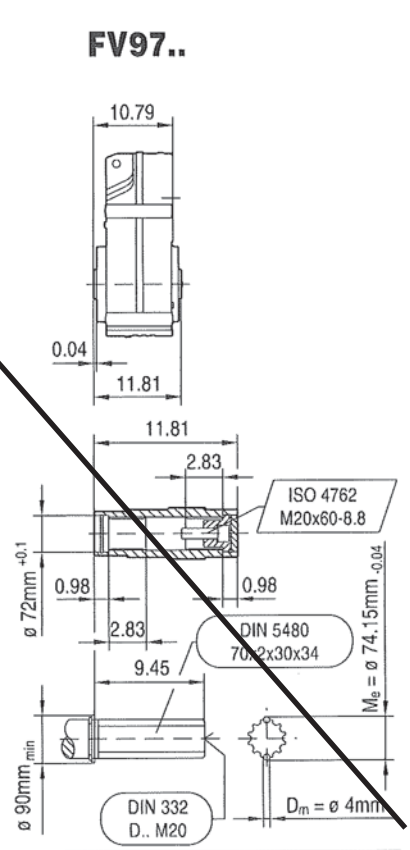
FA97..



FH97..



FV97..



(→ 125)	DR90L	DR100M	DR100L/LC	DR132S	DR132M/MC	DR160..	DR180S/M	DR180L/LC	DR200	DR225S	DR225M/MC
AC	7.05	7.76	7.76	8.70	8.70	10.63	12.44	12.44	15.51	15.51	15.51
AD	5.51	6.18	6.18	6.69	6.69	8.98	9.96	9.96	11.14	11.14	11.14
ADS	5.91	6.22	6.22	6.77	6.77	8.98	9.96	9.96	11.14	11.14	11.14
L	21.26	22.44	23.62	25.31	27.28	28.90	31.61	33.98	36.85	36.85	38.82
LS	24.92	26.10	27.28	29.72	31.69	34.29	39.06	41.42	44.92	44.92	46.89
LB	10.47	11.65	12.83	14.53	16.50	18.11	20.83	23.19	26.06	26.06	28.03
LBS	14.13	15.31	16.50	18.94	20.91	23.50	28.27	30.63	34.13	34.13	36.10

6 Project Planning

6.1 Electrical characteristics

Suitable for inverter operation

DR series AC (brake) motors can be operated on inverters due to the high quality winding with which they are equipped as standard.

Frequency

On request, AC motors from SEW-EURODRIVE are designed for a supply frequency of 50 Hz or 60 Hz. As standard, the technical data in this motor catalog is based on a supply frequency of 60 Hz.

There are also special DRS and DRE motor variants that can be operated on both 50 Hz and 60 Hz supply systems. Different regional electrical regulations can be met by one motor. Especially the different national regulations about minimum efficiency levels (see chapter "Energy-efficient motors of the DR motor series" on page 13) are combined in an ideal way. Please contact SEW-EURODRIVE for these motors.

Motor voltage

AC motors in standard and energy efficient designs are available in a wide range of voltages. The standard voltages are 230V, 460V, and 575V. Other voltages are available on request.

6.2 Thermal characteristics - DR

Thermal classification according to IEC 60034-1 (EN 60034-1)

Single-speed AC motors/AC brakemotors are designed in thermal class 130 (B) as standard. Thermal classes 155 (F) or 180 (H) are available on request.

The table below lists the overtemperatures to IEC62114 and IEC 60034-1 (EN 60034-1).

Thermal classification		Overtemperature limit [K]
New	Old	
~~130~~	~~B~~	~~80 K~~
155	F	105 K
180	H	125 K

Power reduction

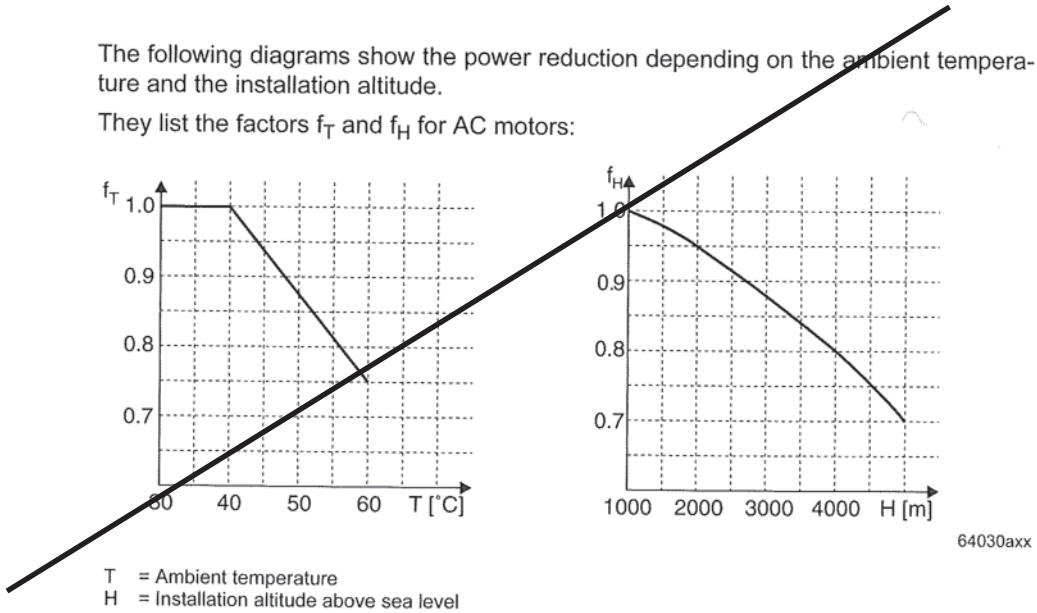
The rated power P_N of a motor depends on the ambient temperature and the altitude. The rated power stated on the nameplate applies to an ambient temperature of 40 ûC and a maximum altitude of 1,000 m above sea level. The rated power must be reduced according to the following formula in the case of higher ambient temperatures or altitudes:

$$P_{Nred} = P_N \times f_T \times f_H$$

AC motors

The following diagrams show the power reduction depending on the ambient temperature and the installation altitude.

They list the factors f_T and f_H for AC motors:



T = Ambient temperature
H = Installation altitude above sea level

Operating modes

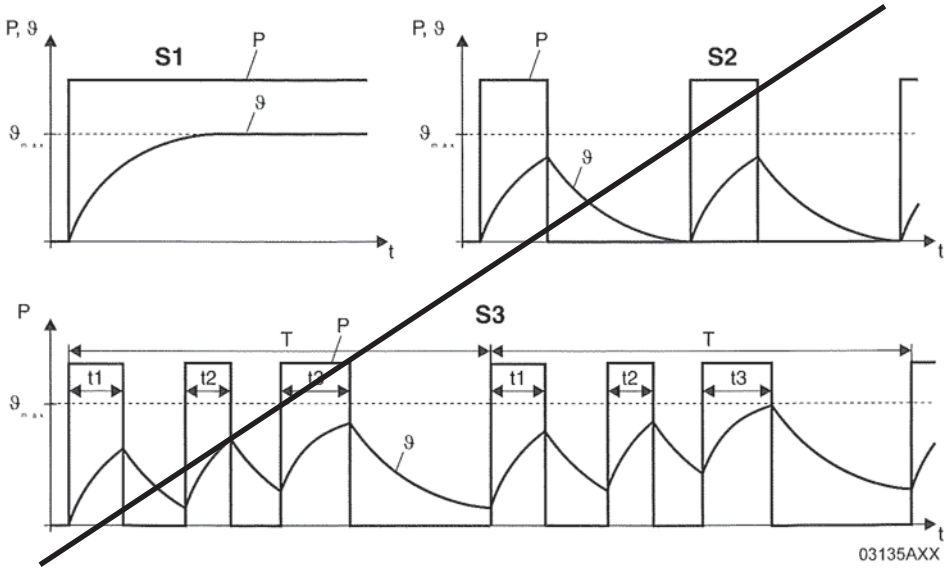
According to IEC60034-1 (EN60034-1), the following duty types are defined:

Operating mode	Explanation
S1	**Continuous duty:** Operation at a constant load; the motor reaches thermal equilibrium.
S2	**Short-time duty:** Operation at constant load for a given time followed by a time at rest. The motor returns to ambient temperature during the rest period.
S3	**Intermittent periodic duty:** The starting current does not significantly affect the temperature rise. Characterized by a sequence of identical duty cycles, each including a time of operation at constant load and a time at rest. Described by the "cyclic duration factor (cdf)" in %.
S4-S10	**Intermittent periodic duty:** The switch-on sequence affecting the temperature rise. Characterized by a sequence of identical duty cycles, each including a time of operation at constant load and a time at rest. Described by the "cyclic duration factor (cdf)" in % and the number of cycles per hour.

TIP

S1 continuous duty is usually assumed for inverter operation. In the case of a high number of cycles per hour, it might be necessary to assume S9 intermittent duty.

The following figure shows the duty types S1, S2, S3.



Cyclic duration factor (cdf)

The cyclic duration factor (cdf) is the ratio between the period of loading and the duration of the duty cycle. The duration of the duty cycle is the sum of times of operation and times at rest and de-energized. A typical value for the duration of the duty cycle is ten minutes.

$$\text{CDF} = \frac{\text{sum of times of operation (t1 + t2 + t3)}}{\text{duty cycle duration (T)}} \bullet 100\ [\%]$$

6.4 Mechanical characteristics

Degrees of protection to EN 60034 (IEC 60034-5)

AC motors and AC brakemotors are available with degree of protection IP54 as standard. Enclosures ~~IP55, IP56~~, IP65 ~~or IP66 are available upon request.~~

SEVERE DUTY PROVIDED

IP	1. digit		2. digit
	Touch guard	Protection against foreign objects	Protection against water
0	No protection	No protection	No protection
1	Protected against access to hazardous parts with the back of your hand	Protection against solid foreign objects ∅ 50 mm and larger	Protection against dripping water
2	Protected against access to hazardous parts with a finger	Protection against solid foreign objects ∅ 12 mm and larger	Protection against dripping water if the housing is tilted by up to 15°
3	Protected against access to hazardous parts with a tool	Protection against solid foreign objects ∅ 2.5 mm and larger	Protection against spraying water
4	Protected against access to hazardous parts with a wire	Protection against solid foreign objects ∅ 1 mm and larger	Protection against splashing water
5		Dust-proof	Protection against water jets
6		Dust-proof	Protection against powerful water jets
7	-	-	Protected against temporary immersion in water
8	-	-	Protected against permanent immersion in water

Vibration class of motors

The rotors of AC motors are dynamically balanced with a half key. The motors are in vibration class "A" according to IEC 60034-14:2003 or vibration level "N" according to DIN ISO 2373 (EN60034-14:1997). For special requirements on the mechanical running smoothness, single-speed motors without options installed (without brake, forced cooling fan, encoder, etc.) are available in a low-vibration design, vibration class "B" according to IEC 60034-14:2003 or vibration level "R" according to DIN ISO 2373.

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

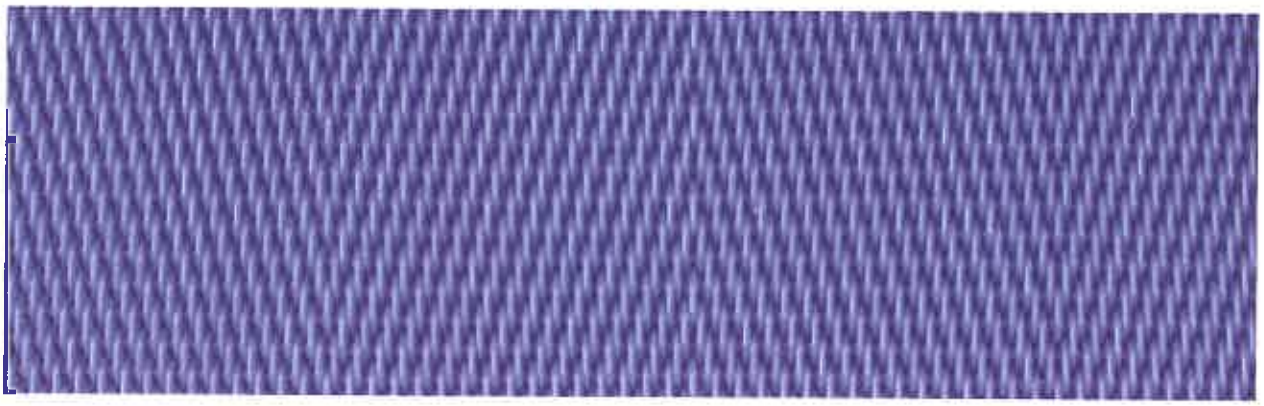
WEAVE**inMotion**

transport processing solution

03.01.07

Kunstostoffgewebe-Prozessband

Technical Data Sheet



Article No.:		43568065
Type:		8065
Mesh count warp	per cm	24
Mesh count weft	per cm	10
Diameter warp wire	mm	0.5
Diameter weft wire	mm	0.7
Material warp		Polyester
Material weft		Polyester
Weave pattern		6/2
Glas bead test - mesh opening	µm	300
Thickness of mesh	mm	1.75
Weight of mesh	kg/m²	1.36
Air Permeability dp=200 Pa DIN EN 9237	l/m²s	2300
CFM dp=127 Pa ISO 4022	cfm	340

-alle Angaben sind ohne Gewähr - all figures are without engagement

GKD - Gebr. Kufferath AG
Business Unit WEAVEinMotion
Metallweberstraße 46
D-52353 Düren
Germany

fon: +49 (0) 2421 - 803-0
fax: +49 (0) 2421 - 803-182
e-mail: weaveinmotion@gkd.de
www.weaveinmotion.de

GKD
WORLD WIDE WEAVE

Belt Usage Log

Machine Size:	Machine S/N:
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:

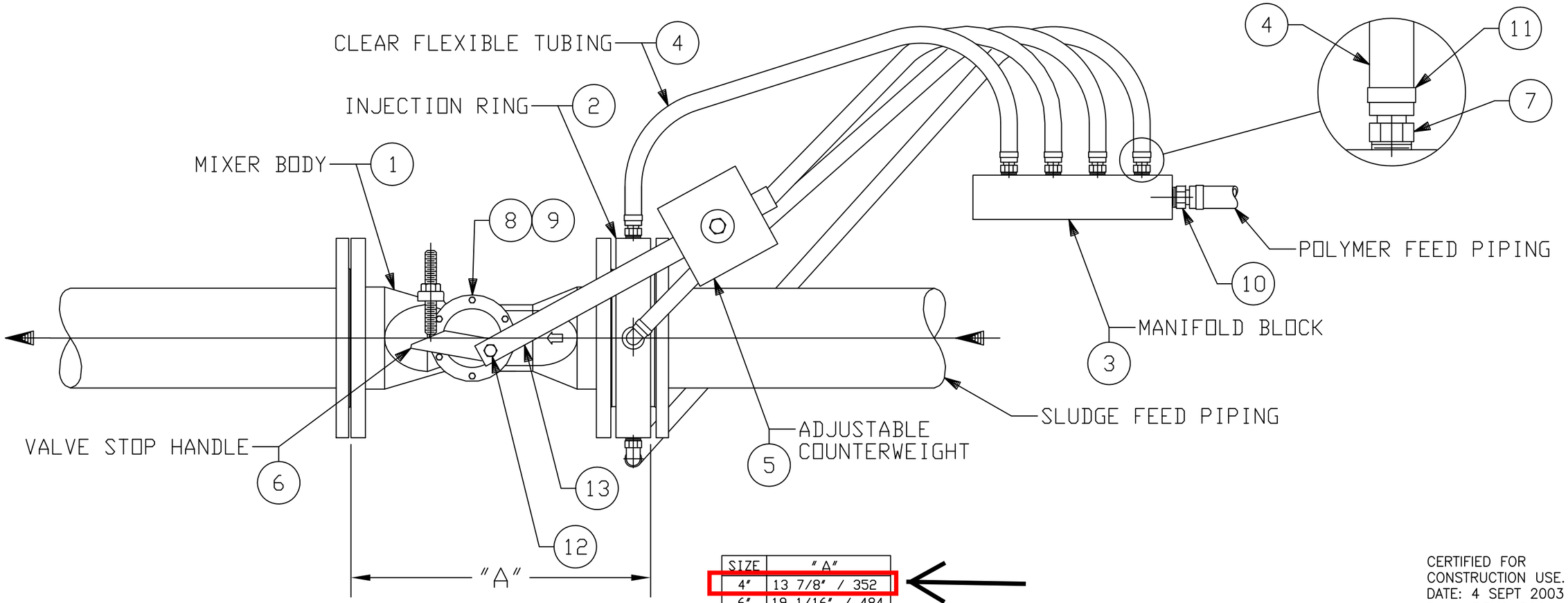
a. Remove side plate.
b. Clean internals.
c. Replace side plate and tighten bolts.

B4MATR7.DWG REV. 7

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

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

REVISIONS

REV	DATE	DESCRIPTION	BY	APP'D
1				
2				
3	12/98		AMC	JET
4	10/98	UPDATED TITLE BLOCK TO NEW STYLE	SAC	JET
5	7/00	REMOVED PICTURE, ADDED NOTE	JET	JET
6	6/02	ADDED MANUFACTURING NOTE	MM	JET

REVISIONS

REV	DATE	DESCRIPTION	BY	APP'D
7	5/04	ADDED PARTS LIST FOR ALUM & SS MIXERS	JET	JET
8				
9				
10				
11				
12				

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

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

ALFA LAVAL
ASHBROOK SIMON-HARTLEY

ALFA LAVAL ASHBROOK SIMON-HARTLEY INC
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

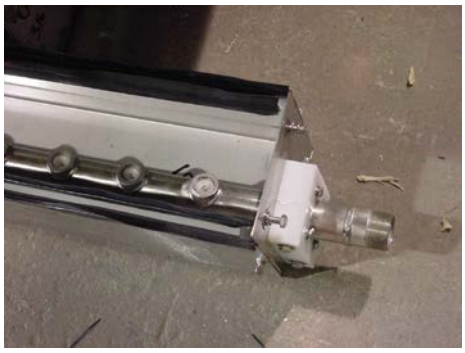
CUSTOMER GEN USE

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 rotates the brush causing the bristles to enter each spray nozzle, and dislodge any solid particles, which have accumulated. This same rotation opens a valve and allows the solid particles to be flushed into the drainage system.

11.2 WASH BOX SEAL 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. Lower Washbox Drawing: SK001933
b. Upper Washbox Drawing: SK001934
~~c. 1.0M Spray Shower Drawing: 119836~~
~~d. 1.5M Spray Shower Drawing: 119835~~
e. 2.0M Spray Shower Drawing: 119834
f. Spray Angle Setting Drawing: 119844
g. Spraypipe Brush Service Drawing: 119840
h. Valve Gasket Service Drawing: 119843
i. Adjustable Shower Service Instructions

11.4 WATER PRESSURE GAUGE DATA

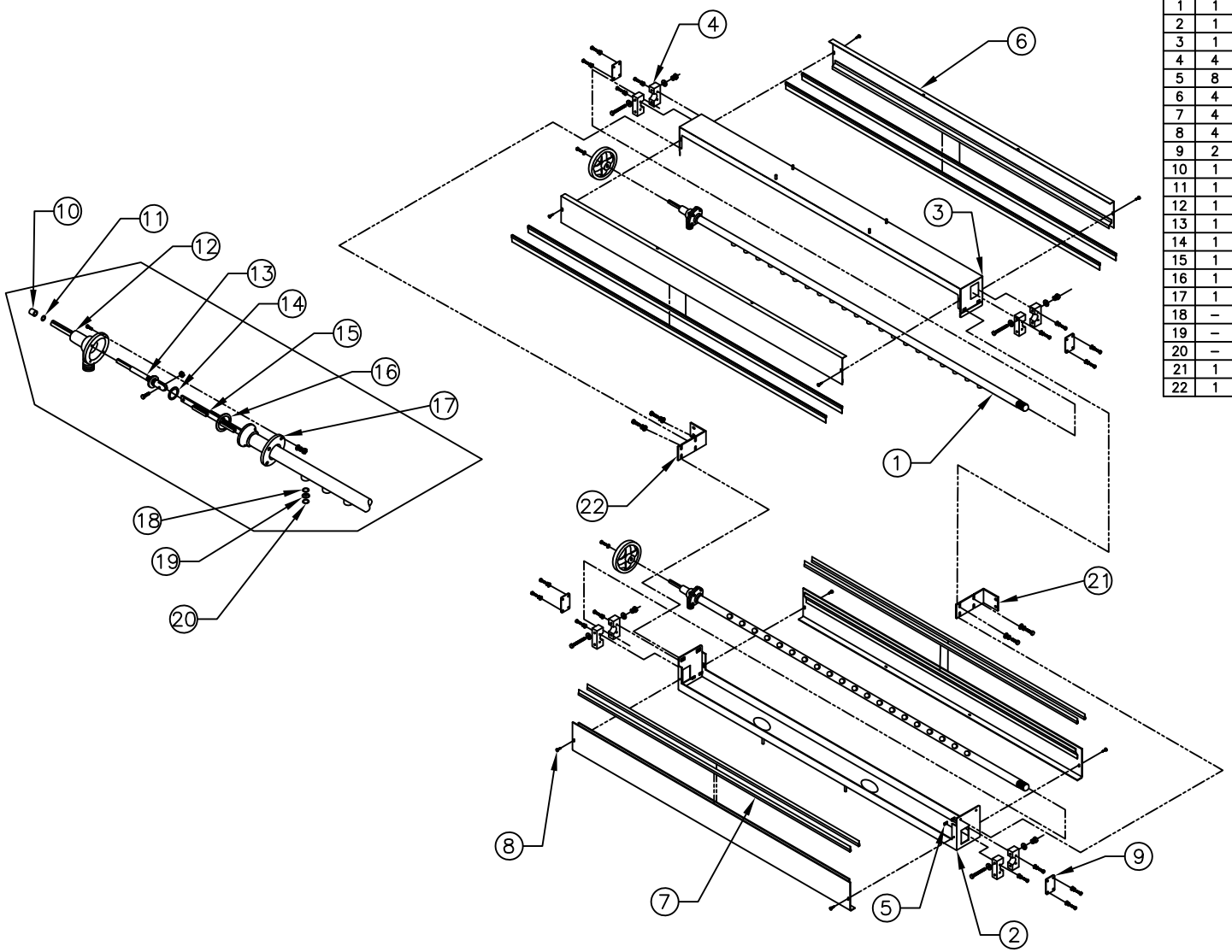
The water pressure gauge is a 0 – 160 psi, glycerin filled plastic bodied gauge for indicating the pressure of the wash water supply. Without sufficient water pressure the belts may not be washed well enough to function. Order part number 009273 for replacement. See Section 14 for spare parts.

11.5 PRESSURE SWITCH DATA (LOW-WATER PRESSURE)

The water pressure gauge is an adjustable pressure switch for sensing low water pressure. The water pressure switch is internally grounded. Order part number 031869 for replacement. See Section 14 for spare parts.

Adjustment Instructions: Turn the self locking adjustment nut clockwise to raise and counter clockwise to lower the actuation point. The dial is calibrated for increasing settings.

B4MATR7.DWG REV. 7



NO.	QTY.	PART NO.	DESCRIPTION
1	1	–	SPRAY SHOWER ASSEMBLY
2	1	–	BOTTOM WELDMENT
3	1	–	UPPER WELDMENT
4	4	–	COVER PLATE, (UHMWPE)
5	8	–	BACK UP PLATE, SPRAY SHOWER
6	4	–	PANEL, REMOVABLE SEAL
7	4	–	SEAL, RUBBER
8	4	–	SCREW, THUMB
9	2	–	COVER PLATE, SPRAY SHOWER
10	1	–	BUSHING, SEAL
11	1	–	RING, O
12	1	–	BODY, VALVE
13	1	–	SHAFT, VALVE
14	1	–	GASKET, VALVE
15	1	–	BRUSH ASSEMBLY
16	1	–	GASKET, PIPE
17	1	–	RING, LOCK
18	–	–	GASKET
19	–	–	NOZZLE
20	–	–	RETAINING RING
21	1	–	MOUNTING BRACKET, LEFT HAND
22	1	–	MOUNTING BRACKET, RIGHT HAND

NOTE: DEPENDING ON THE APPLICATION, THE SPRAY SHOWER ASSEMBLY CAN BE PLACED TO WASH OVER THE BELT OR UNDER THE BELT. CONSEQUENTLY, THE OTHER APPETURE IS SEALED WITH COVER PLATE (9).

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

REVISIONS

REV	DATE	DESCRIPTION	BY	APP'D
1	7/09	CHANGED TITLE DESIGNATION TO "LOWER"	MM	MCA
2				
3				
4				
5				
6				

REVISIONS

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

DRAWN	JS	1/13/00
CHECKED	JS	1/13/00
APPROVED	JET	1/14/00
NEXT ASSY	N/A	WEIGHT N/A

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

ALFA LAVAL
ASHBROOK SIMON-HARTLEY

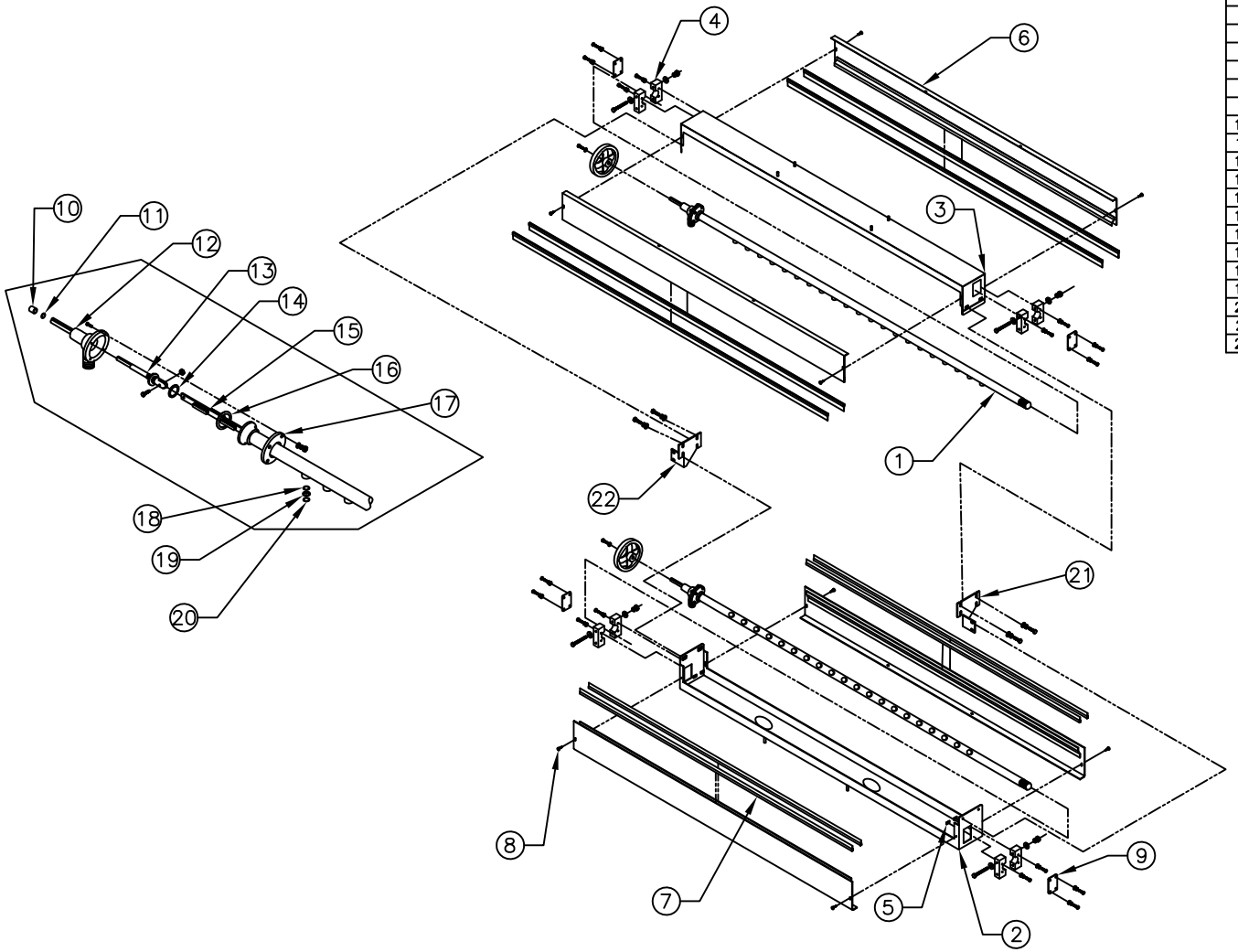
ALFA LAVAL ASHBROOK SIMON-HARTLEY INC
11600 East Hardy Road
Houston, Texas 77093
Phone: 281-449-0322
FAX: 281-449-1324

TITLE: LOWER WASHBOX ASSEMBLY
KLAMPRESS TYPE 94

SCALE	DWG. NO.	REV
1/30	SK001933	1

CUSTOMER: ASHBROOK

B44MATR7.DWG REV. 7



NO.	QTY.	PART NO.	DESCRIPTION
1	1	–	SPRAY SHOWER ASSEMBLY
2	1	–	BOTTOM WELDMENT
3	1	–	UPPER WELDMENT
4	4	–	COVER PLATE, (UHMWPE)
5	8	–	BACK UP PLATE, SPRAY SHOWER
6	4	–	PANEL, REMOVABLE SEAL
7	4	–	SEAL, RUBBER
8	4	–	SCREW, THUMB
9	2	–	COVER PLATE, SPRAY SHOWER
10	1	–	BUSHING, SEAL
11	1	–	RING, O
12	1	–	BODY, VALVE
13	1	–	SHAFT, VALVE
14	1	–	GASKET, VALVE
15	1	–	BRUSH ASSEMBLY
16	1	–	GASKET, PIPE
17	1	–	RING, LOCK
18	–	–	GASKET
19	–	–	NOZZLE
20	–	–	RETAINING RING
21	1	–	MOUNTING BRACKET, LEFT HAND
22	1	–	MOUNTING BRACKET, RIGHT HAND

NOTE: DEPENDING ON THE APPLICATION, THE SPRAY SHOWER ASSEMBLY CAN BE PLACED TO WASH OVER THE BELT OR UNDER THE BELT. CONSEQUENTLY, THE OTHER APPETURE IS SEALED WITH COVER PLATE (9).

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

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				

DRAWN	JS	1/13/00
CHECKED	JS	1/13/00
APPROVED	JET	1/14/00
NEXT ASSY	N/A	WEIGHT N/A

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

ALFA LAVAL
ASHBROOK SIMON-HARTLEY

ALFA LAVAL ASHBROOK SIMON-HARTLEY INC
11600 East Hardy Road
Houston, Texas 77093
Phone: 281-449-0322
FAX: 281-449-1324

TITLE: WASHBOX ASSEMBLY UPPER KLAMPRESS

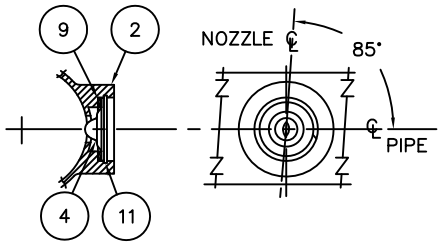
SCALE	DWG. NO.	REV
NTS	SK001934	0

CUSTOMER: ASHBROOK

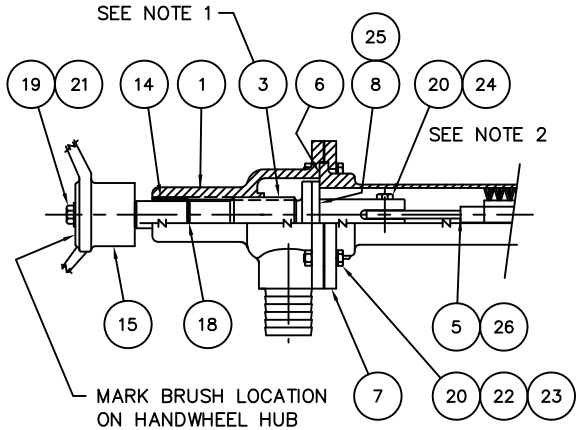
B4MATR7.DWG REV. 7

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

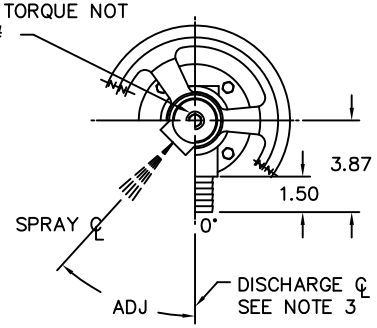


DISCHARGE VALVE DETAIL

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

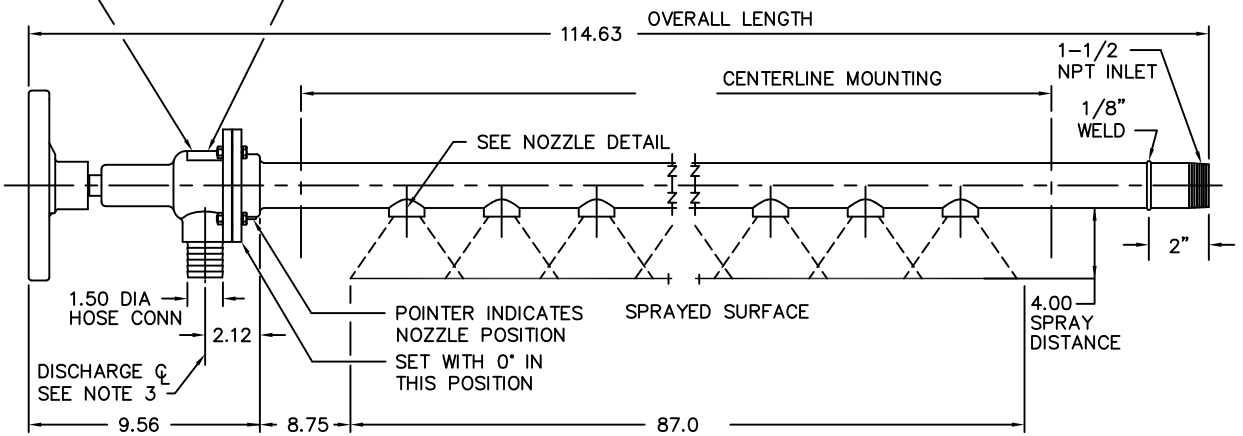
USE TORQUE WRENCH TO ROTATE BRUSH, TORQUE NOT TO EXCEED 150#



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.

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

REVISIONS

REV	DATE	DESCRIPTION	BY	APP'D
1	4/01	ADDED 2" FOR 1-1/2" NIPPLE ON INLET	MH	JET
2	7/01	114.63 WAS 112.43		
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

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

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

ALFA LAVAL
ASHBROOK SIMON-HARTLEY

ALFA LAVAL ASHBROOK SIMON-HARTLEY INC
11600 East Hardy Road
Houston, Texas 77093
Phone: 281-449-0322
FAX: 281-449-1324

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

SCALE	DWG. NO.	REV
NTS	119834	2

CUSTOMER: ASHBROOK

B4MATR7.DWG REV. 7

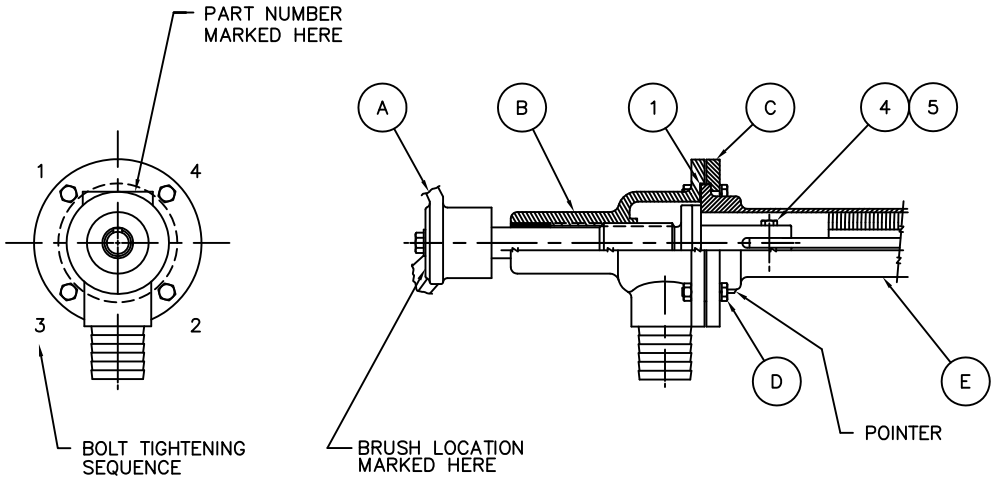
NO.	QTY.	PART NO.	DESCRIPTION

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 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

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			

DRAWN	AMC	8/14/91
CHECKED	JET	10/27/97
APPROVED	JET	10/27/97
NEXT ASSY	N/A	WEIGHT N/A

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

ALFA LAVAL
ASHBROOK SIMON-HARTLEY

ALFA LAVAL ASHBROOK SIMON-HARTLEY INC
11600 East Hardy Road
Houston, Texas 77093
Phone: 281-449-0322
FAX: 281-449-1324

TITLE: SPRAY ANGLE SETTING

SCALE	DWG. NO.	REV
NTS	119844	0

CUSTOMER: ASHBROOK

B4MATR7.DWG REV. 7

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

TO REMOVE BRUSH

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.

SEPARATE VALVE SHAFT FROM BRUSH. SCREW AND NUT ARE STAKED TOGETHER AND MAY HAVE TO BE SEPARATED BY GRINDING.

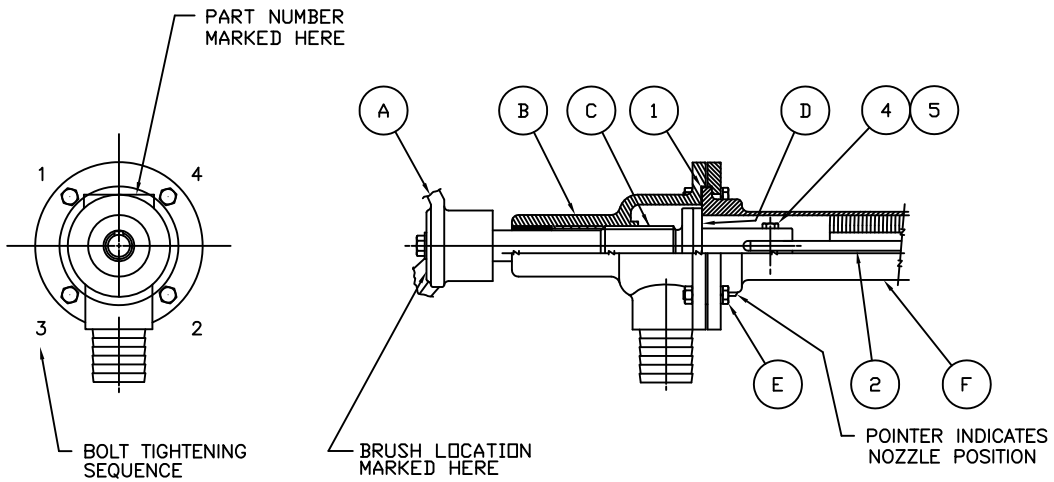
REMOVE WORM PIPE GASKET (ITEM 1) MATERIAL FROM END OF PIPE WELDMENT AND VALVE BODY.

TO INSTALL NEW BRUSH

SLIDE NEW BRUSH (ITEM 2) INTO PIPE WELDMENT (ITEM F), LEAVING ENOUGH EXPOSED TO ATTACH VALVE SHAFT.

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.



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

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				

DRAWN	AMC	11/19/92
CHECKED	JET	11/27/97
APPROVED	JET	11/27/97
NEXT ASSY	N/A	WEIGHT N/A

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

ALFA LAVAL
ASHBROOK SIMON-HARTLEY

ALFA LAVAL ASHBROOK SIMON-HARTLEY INC
11600 East Hardy Road Houston, Texas 77093
Phone: 281-449-0322
FAX: 281-449-1324

TITLE: BRUSH SERVICE SPRAY SHOWERS TYPICAL ALL SIZES

SCALE	DWG. NO.	REV
NTS	119840	0

CUSTOMER: ASHBROOK

B4MATR7.DWG REV. 7

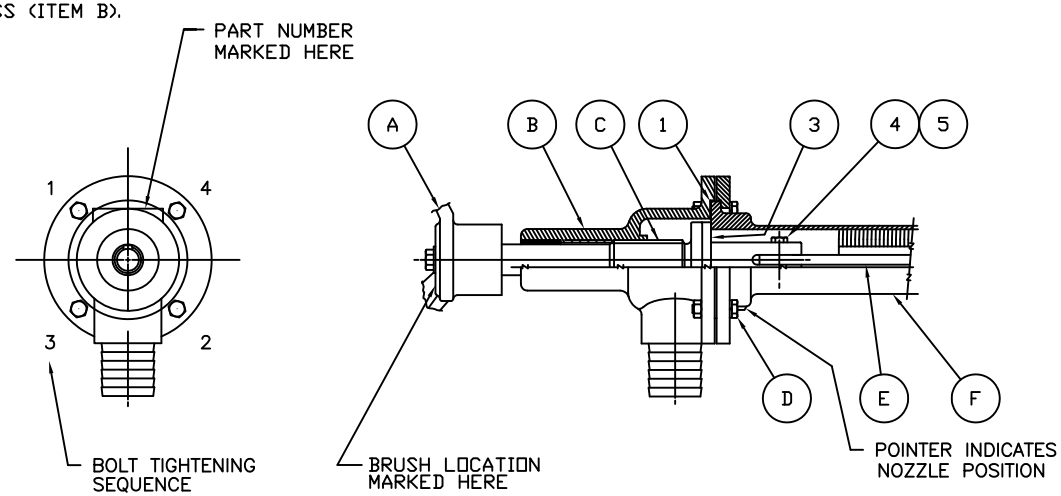
ITEM	PART/DWG	LOC	DESCRIPTION	QTY
1	119745	A	GASKET,PIPE,FIBRE,1-1/2 & 2 ADJ SHR	3
2				
3			GASKET,VALVE, UHPE, 1-1/2 & 2 SHR	1
4	104481		SCR,MACH,HEX HD, 316, 1/4-20 x 1-1/4	1
5	104484		NUT, HEX JAM, 316, 1/4-20	1
6			COPY OF THIS DWG	1

TO REMOVE VALVE GASKET

1. REMOVE FOUR (4) 1/4 SCREWS (ITEM 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 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 BRUSH (ITEM 2) INTO PIPE WELDMENT (ITEM F), LEAVING ENOUGH EXPOSED TO ATTACH VALVE SHAFT.
6. PUT 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 D) 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 E) 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 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

REVISIONS

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

DRAWN	AMC	8/21/92
CHECKED	JET	11/27/97
APPROVED	JET	11/27/97
NEXT ASSY	N/A	WEIGHT N/A

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

ALFA LAVAL
ASHBROOK SIMON-HARTLEY

ALFA LAVAL ASHBROOK SIMON-HARTLEY INC
11600 East Hardy Road
Houston, Texas 77093
Phone: 281-449-0322
FAX: 281-449-1324

TITLE: VALVE GASKET SERVICE
SPRAY SHOWERS
TYPICAL ALL SIZES

SCALE	DWG. NO.	REV
NTS	119843	0

CUSTOMER: ASHBROOK

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.

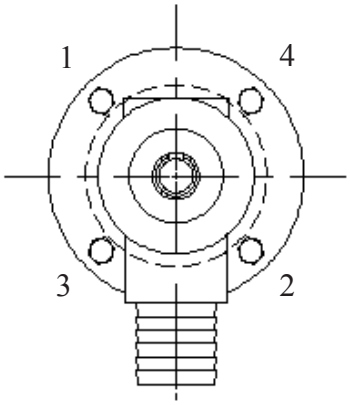
2- The spray angle can be changed by loosening four 1/4" screws (B), permitting pipe rotation. The lock ring (A) is marked in degrees to aid in determining the shower angle. The hose connection on the valve body should be oriented vertically downward to drain the valve.

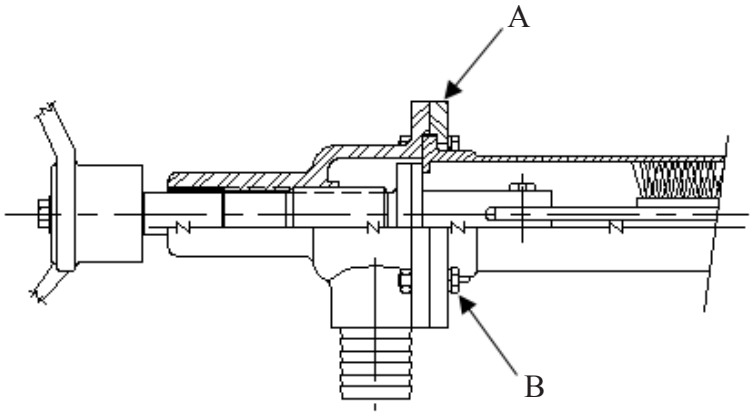
3- When the proper angle is reached, tighten the four screws (B) to lock the valve assembly in the new position. See the drawing below for the tightening pattern.

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



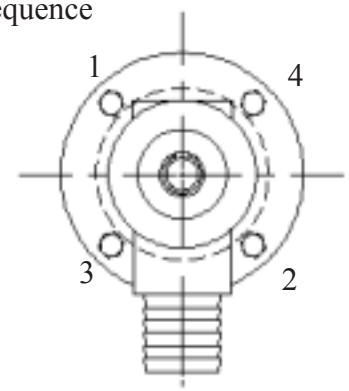


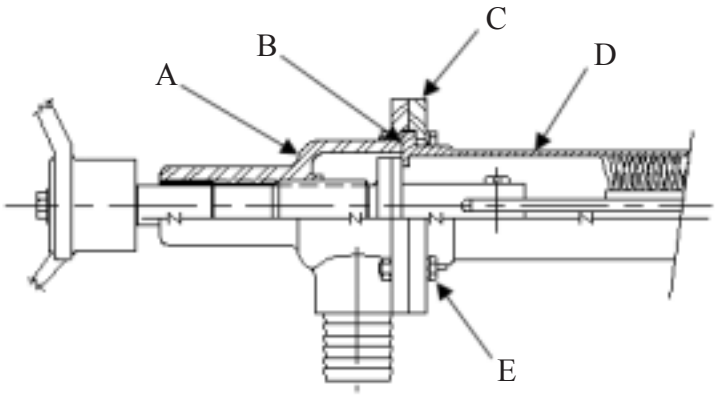
SECTION 2: SETTING BRUSH LOCATION

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

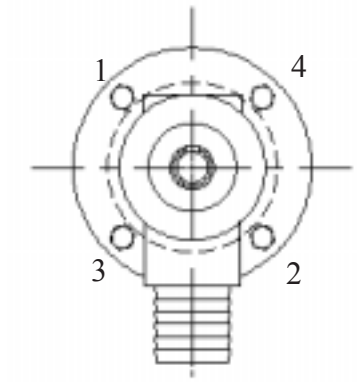
Disconnect the water source to the shower before disassembly. High pressure water can cause personal injury.

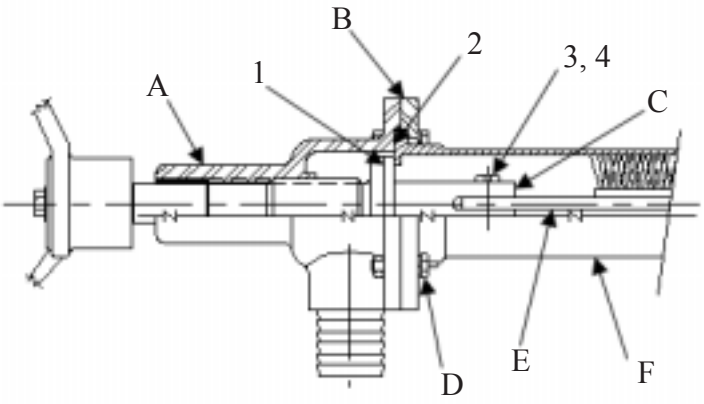
3.1. Service Parts Required

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.

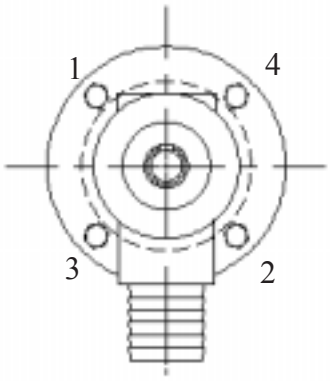
3.2.3. Remove the old valve gasket (2) by sliding it off the valve shaft.

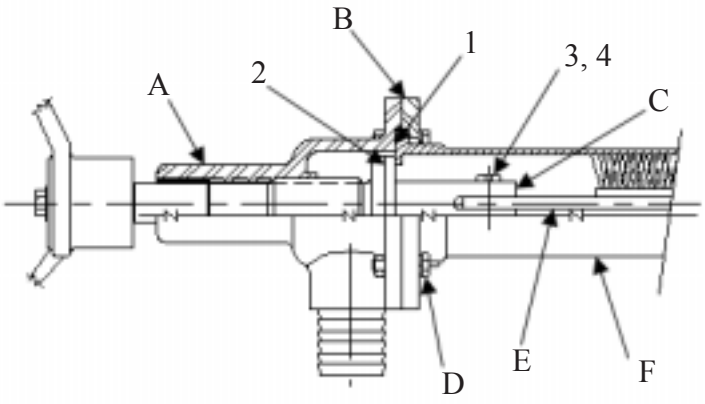
3.2.4. Remove the old pipe gasket (1) from the end of the pipe (F) and valve body (A). Take care not to scratch the cast gasket seats on the pipe weldment and valve body.

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.

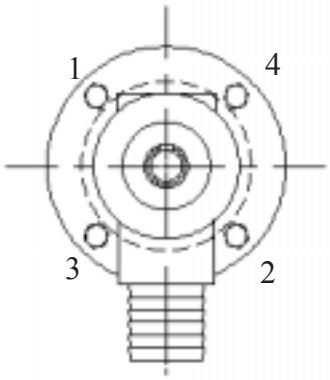
4.1. Service Parts Required

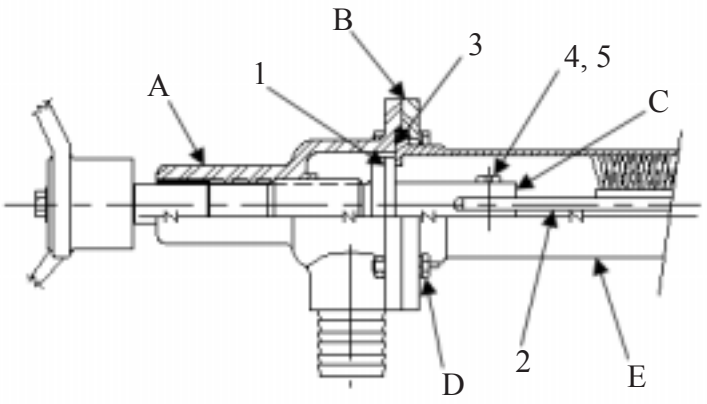
Brush replacement kit 119840 includes:

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.

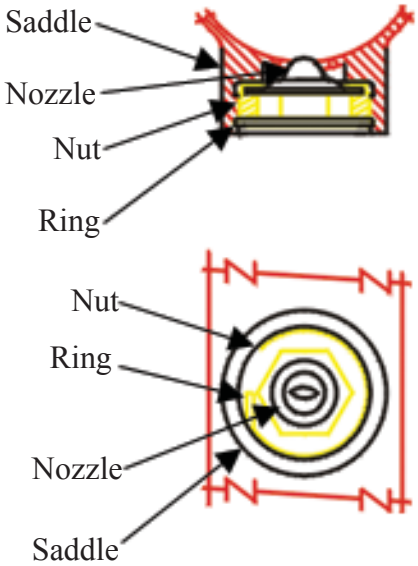
6.1. Nozzle Removal

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.

Bourdon Tube Pressure Gauges
Industrial Stainless Steel Gauge
Type 232.54 - Dry Case
Type 233.54 - Liquid-filled Case

Wash Water Pressure Gauge

Alfa Laval Ashbrook Part No. 009273

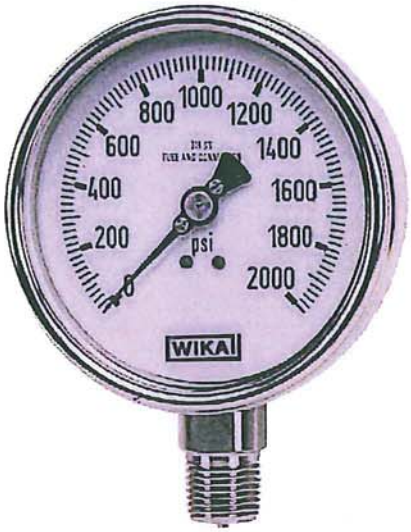
WIKA Datasheet 23X.54

Applications

- Intended for adverse service conditions where pulsating or vibration exists
- Process industry: chemical/petrochemical, power stations, mining, on and offshore, environmental technology, mechanical engineering and plant construction
- Suitable for gaseous or liquid media that will not obstruct the pressure system

Special features

- Vibration and shock resistant (with liquid filling)
- All stainless steel construction
- Pressure ranges up to 15,000 psi



Bourdon Tube Pressure Gauge Model 232.54

Standard Features

Design
ASME B40.100 & EN 837-1

Sizes
2½" & 4" (63 & 100 mm)

Accuracy class
2½": ± 2/1/2% of span (ASME B40.100 Grade A)
4": ± 1% of span (ASME B40.100 Grade 1A)

Ranges
Vacuum / Compound to 200 psi
Pressure from 15 psi to 15,000 psi
or other equivalent units of pressure or vacuum

Working pressure

2½":	Steady:	3/4 scale value
	Fluctuating:	2/3 full scale value
	Short time:	full scale value
4":	Steady:	full scale value
	Fluctuating:	0.9 x full scale value
	Short time:	1.3 x full scale value

Operating temperature
Ambient: -40°F to +140°F (-40°C to +60°C) - dry
-4°F to +140°F (-20°C to +60°C) - glycerine filled
-40°F to +140°F (-40°C to +60°C) - silicone filled
Medium: +212°F (+100°C) maximum

Temperature error
Additional error when temperature changes from reference temperature of 68°F (20°C) ±0.4% for every 18°F (10°C) rising or falling. Percentage of span.

Weather protection
Weather tight (NEMA 4X / IP 65)

Pressure connection
Material: 316L stainless steel
Lower mount (LM) or center back mount (CBM) - 2½"
Lower mount (LM) or lower back mount (LBM) - 4"
1/4" NPT or 1/2" NPT limited to wrench flat area

Bourdon tube
Material: 316L stainless steel
2" & 2½": ≤ 1,000 PSI: C-type,
≥ 1,500 PSI: helical type
4": ≤ 1,500 PSI: C-type,
≥ 2,000 PSI: helical type

Movement
300-series stainless steel

Dial
White aluminum with black lettering; 2½" size with stop pin

Pointer
Black aluminum, friction adjustable

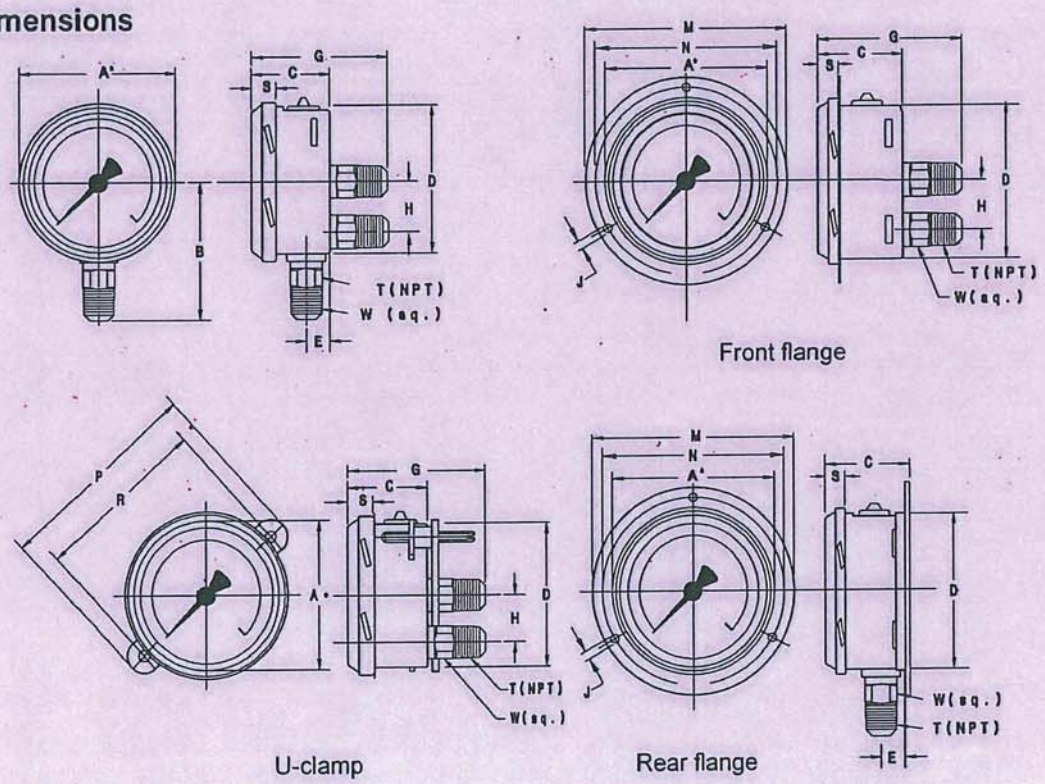
Case
'4 stainless steel with vent plug and polished stainless .eel bayonet ring. Suitable for liquid filling. Welded case/ socket connection

Window
Laminated safety glass with Buna-N gasket

Case fill
Glycerine 99.7% - Type 233.54

Optional extras
- 316SS restrictor
- Accuracy ±1.0% of full scale (2½" size)
- Stainless steel front or rear flange
- Zinc-plated steel or SS u-clamp bracket (field installable)
- Red drag pointer or mark pointer
- Silicone or fluorolube case filling
- Special connections limited to wrench flat area
- Custom dial layout
- Other pressure scales available
  bar, kPa, MPa, kg/cm² and dual scales

Dimensions



Size		A	B	C	D	E	G	H	J	M	N	P	R	S	T	W	Weight	
2.5"	mm	70	54	33.5	62	13	55.5	-	3.6	85	75	87	72	12		14	0.36 lb.	dry
	in	2.75	2.13	1.32	2.44	0.51	2.19	-	0.14	3.35	2.95	3.43	2.83	0.47	1/4"	0.55	0.44 lb.	filled
4"	mm	110	87	49.5	100	15.5	81	30	4.8	132	116	125	110	15		22	1.10 lb.	dry
	in	4.30	3.43	1.95	3.94	0.61	3.19	1.18	0.19	5.20	4.57	4.92	4.33	0.59	1/2"	0.87	1.76 lb.	filled

Recommended panel cutout is dimension D + 1 mm

Range: 0-160 psi

WIKA Datasheet 23X.54 07/2007

Ordering information
'essure gauge model / Nominal size / Scale range / Size of connection / Optional extras required
ecifications and dimensions given in this leaflet represent the state of engineering at the time of printing.
Modifications may take place and materials specified may be replaced by others without prior notice.

WIKA Instrument Corporation
1000 Wiegand Boulevard
Lawrenceville, GA 30045
Tel (770) 513-8200 Toll-free 1-888-WIKA-USA
Fax (770) 338-5118
E-Mail info@wika.com
www.wika.com

Low Water Pressure Switch

Alfa Laval Ashbrook Part # 031869

Econ-O-Trol Switch

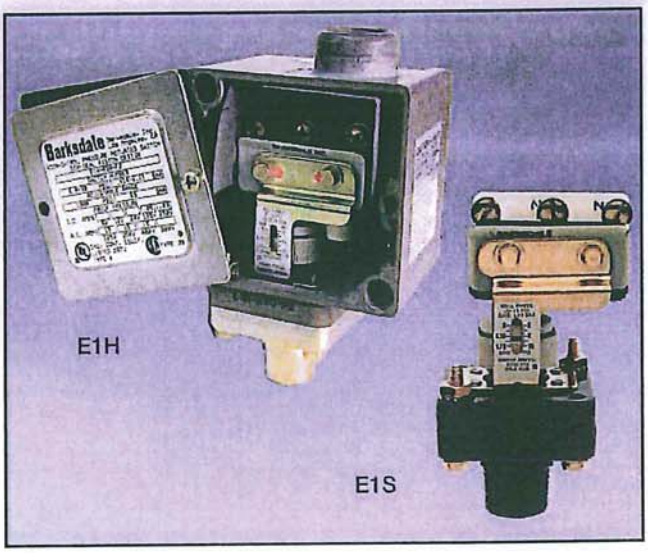
E1S, E1H Series

Features

- Superior resolution
- Long life
- Easy setpoint adjustment
- Ideal for pressure or vacuum applications
- NEMA 1, 3 & 4, IP65
- Stripped and housed versions available

Applications

- Medical equipment
- Pump & compressor monitoring
- Air proving in HVAC systems
- Irrigation systems
- Engine monitoring
- Machine tools
- General industrial applications
- Metal working
- Food & beverage



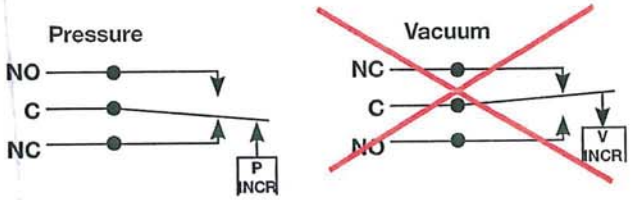
General Specifications*

Accuracy:	± 2% of the adjustable range
Switch:	
Type:	Single pole double throw (SPDT) snap action; single circuit
Rating:	Class H limit switch: 10 amps @ 125/250 VAC; 3 amps @ 480 VAC; 0.5 amps @ 24 VDC (standard).
Wetted Parts:	
Process Fitting:	Anodized aluminum (standard)
Seals & Diaphragms:	Buna-N (standard)
Enclosure:	Anodized aluminum (housed models)
Electrical Connection:	
Stripped Models:	Screw terminals
Housed models:	Screw terminals via 1/2" NPT female conduit connection
Enclosure Ratings:	
Stripped models:	NEMA 1
Housed models:	NEMA 4 & IP65
Pressure Connection:	
Stripped models:	1/2" NPT external with 1/8" NPT internal
Housed models:	1/4" NPT female
Approvals:	
UL:	Stripped models: UL recognized component (UR) Housed models: UL listed. File No. E42816
CSA:	All models and modifications shown are CSA listed under Guide 380-W-1.16, Class 3231, File LR22355
PED (European):	Compliant to PED 97/23/EC

Temperature Range:	
Operating:	-20° to +165°F (-29 to +74°C)
Adjustment Setpoint:	
Positive Pressure:	Turn self locking adjustment nut clockwise to increase setpoint; counterclockwise to decrease setpoint.
Vacuum:	Turn self locking adjustment nut counterclockwise to increase setpoint, clockwise to decrease setpoint (towards 30" Hg).
Adjustable Deadband (Optional):	Turn small self locking adjustment nut on limit switch counterclockwise to increase differential. As the differential is increased, the setpoint is also increased. Balance one adjustment against the other to obtain the desired setpoint.
Options:	-Plastic cover (stripped models only) -NEMA 4X enclosure (housed models only) -Cleaned for oxygen service -Manual reset -Adjustable deadband
Shipping Weight:	
Housed models:	1.5 lbs. approx.
Stripped models:	0.75 lbs. approx.

* See product configurator for additional options.

Wiring Diagram

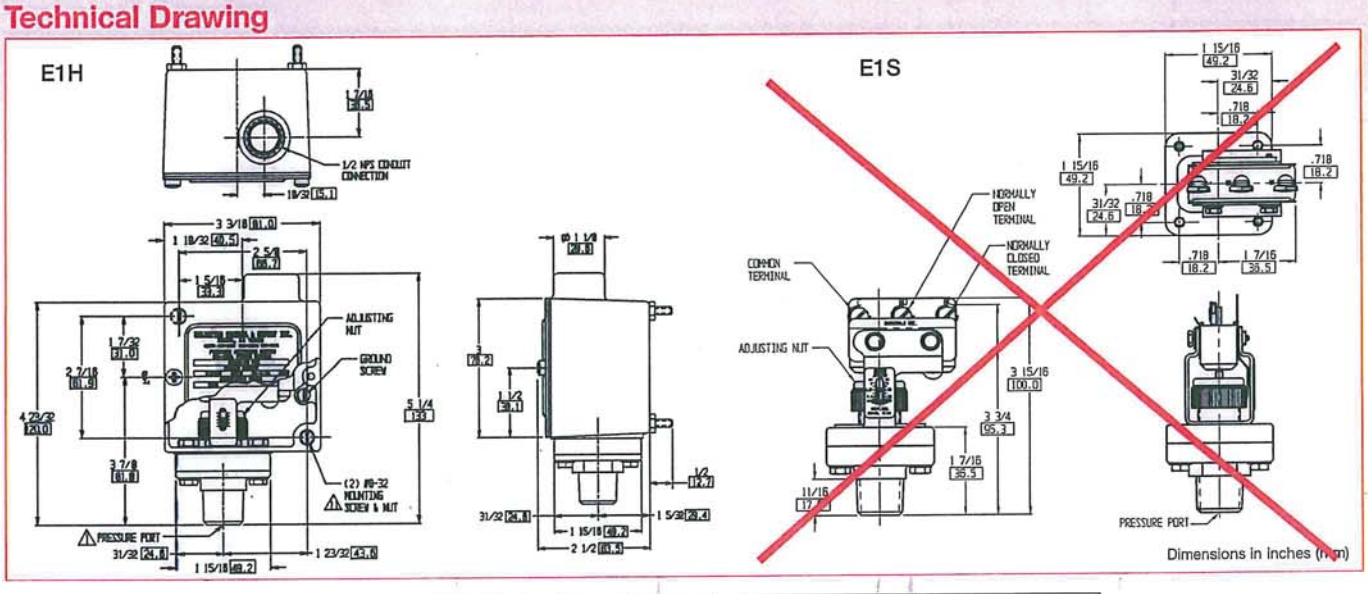


Barksdale CONTROL PRODUCTS
CRANE Barksdale, Inc./Barksdale GmbH A Subsidiary of Crane Co.

Econ-O-Trol Switch

E1S, E1H Series

Technical Drawing



Product Configurator

Example	E1H	-H	500	-P6		

Base Configuration

E1S	Stripped models
E1H	Housed models

Limit Switch[1]

-B	10 amps @ 125/250/480 VAC; 2 amps @ 600 VAC; 0.05 amps @ 125 VDC; 0.03 amps @ 250 VDC
-H	10 amps @ 125/250 VAC; 3 amps @ 480 VAC (standard)
-J	10 amps @ 125/250 VAC; 3 amps @ 480 VAC; (comes with an elastomer boot)
-M	10 amps @ 125/250 VAC; 3 amps @ 480 VAC; 0.5 amps @ 125 VDC; 0.25 amps @ 250 VDC
-R[7]	15 amps @ 125/250/480 VAC; 0.05 amps @ 125 VDC; 0.03 amps @ 250 VDC **ADJUSTABLE DEADBAND**
-G	10 amps @ 125/250/480 VAC; 2 amps @ 600 VAC; 0.4 amps @ 125 VDC; 0.2 amps @ 250 VDC **MANUAL RESET** (Available only with housed version)
-GH	1 amp @ 125 VAC; gold contact

Pressure Range

	Adjustable Range				Approx. Deadband[2] (Actuation Value) psi (bar)	Proof Pressure psi (bar)	
	Decreasing - psi (bar)		Increasing - psi (bar)				
	Min	Max	Min	Max			
VAC[3]	.5" Hg	29" Hg	3.0" Hg	30" Hg	.3 - 2.5" Hg	30 psi	Fixed Deadband
15	.5 (.03)	14.2 (.98)	.6 (.04)	15 (1)	.1 - 1.2 (.01 - .08)	1000 (67)	
90	3 (.2)	82 (5.5)	3.5 (.2)	90 (6)	.5 - 8 (.03 - .5)	1000 (67)	
250	10 (.7)	230 (15)	11 (.7)	250 (17)	1 - 20 (.07 - 1.3)	1000 (67)	
500	25 (1.7)	472 (31)	29 (2)	500 (33)	4 - 28 (.3 - 1.9)	1000 (67)	
VAC[3]	1" Hg	30" Hg	Must select class R limit switch. Consult sales drawing for deadband charts			30 psi	Adjustable Deadband
15	1 (.07)	15 (1)				1000 (67)	
90	6 (.4)	90 (6)				1000 (67)	
250	15 (1)	250 (17)				1000 (67)	
500	35 (2.3)	500 (33)				1000 (67)	

Options

-E1	Plastic cover (E1S models only)
-FX	NEMA 4X enclosure (E1H models only)
-RD	Manual reset (must select class G limit switch)
-Z1	Cleaned for oxygen service
-Sxxx	Factory preset (consult factory)

O-Ring Material

Blank	Buna-N
-E	Ethylene propylene (EPR)
-T	Teflon
-V	Viton® diaphragm

Pressure Connection

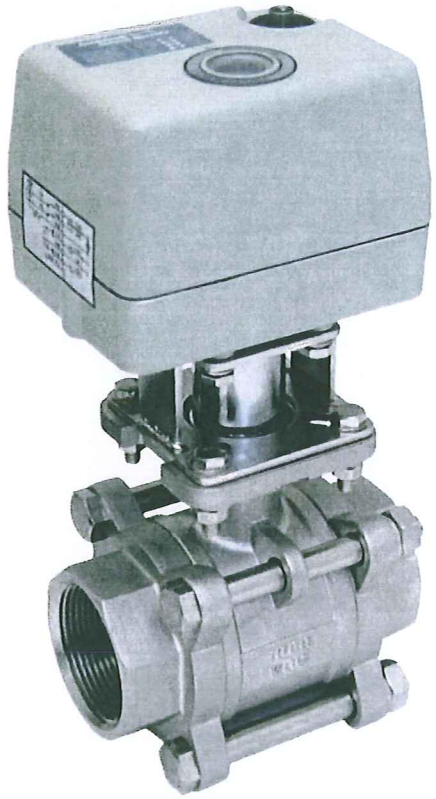
Blank	E1S version: 1/8" int & 1/2" ext NPT; E1H version: 1/4" NPT female
-P4	1/4" NPT female (avialable on E1S only - not available on PLS version)
-P6	1/8" int & 1/2" ext NPT (E1H models only)
-F1	Impregnated fitting (not UL or CSA approved)
-F2	Nickel plated fitting
-BR[4,6]	Brass fitting: 1/8" int & 1/2" ext NPT (for E1S models or with -P6 option)
-BR[4,6]	Brass fitting: 1/4" NPT (for E1H models or with -P4 option)
-P6-PLS[5,6]	Polysulfone 40% glass filled; 1/8" - 1/2" NPT (E1H Only). Max adjustable pressure: 250 psi.
-PLS[5,6]	Polysulfone 40% glass filled; 1/8" - 1/2" NPT (E1S Only). Max adjustable pressure: 250 psi.

NOTES:
[1] Consult sales drawing for specific deadband values
[2] Deadband values indicated when used with the "H" limit switch
[3] Vacuum models are provided with 1/2" NPT External, 1/8" NPT Internal "Combo" fitting only on E1S models
[4] Not available on vacuum models
[5] Plastic fittings have a proof pressure of 400 psi
[6] Not available in range 500
[7] To increase differential, turn small, self-locking adjusting nut counter-clockwise

Barksdale CONTROL PRODUCTS
3211 Fruitland Avenue • Los Angeles, CA 90058 • ☎ 800-835-1060 • Fax: 323-589-3463 • www.barksdale.com

HYVAIR ELECTRIC ACTUATED BALL VALVES

1-1/2"



037376

Features

1. Many Different Sizes Available
2. Visual Position Indicator On Top Standard
3. Double Acting
4. Metal Core, Reliable Quality and Super Torque
5. Manual Override is Easy and Convenient
6. Comes With a 10 Meter Cord
7. 110 AC Voltage standard, other voltage available.

Applications

Water Treatment Industry

Process Control

Industrial Automation

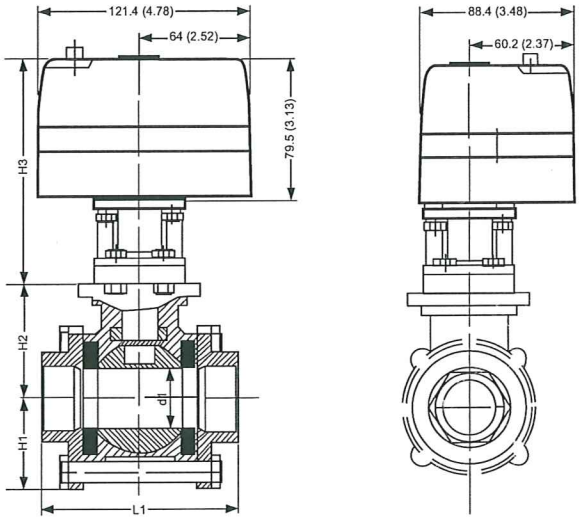
Pharmaceutical Equipment

Cleaning Equipment

Dimensional Data

SIZE	H1	H2	H3	L1	d1	Wt kg (lb)
1-1/2"	40.0(1.57)	70(2.75)	114.5(4.50)	113 (4.45)	38 (1.50)	3.8 (8.38)

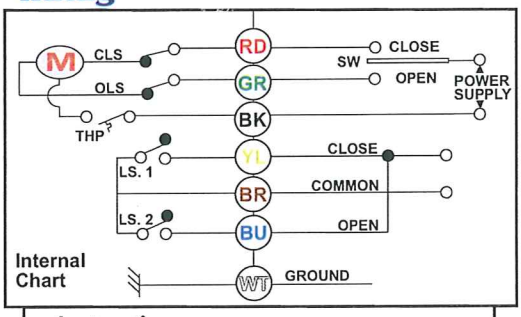
Units: mm (inches)



Construction

Parts	Material
Actuator Housing	Die-cast Aluminum
Coupling	Die-cast Metal
Bracket	Stainless Steel, Carbon Steel
Body	304, 316
Ball	304, 316
Stem	304, 316
Ball Seat	PTFE
Seal	EPDM

Wiring



Instructions:

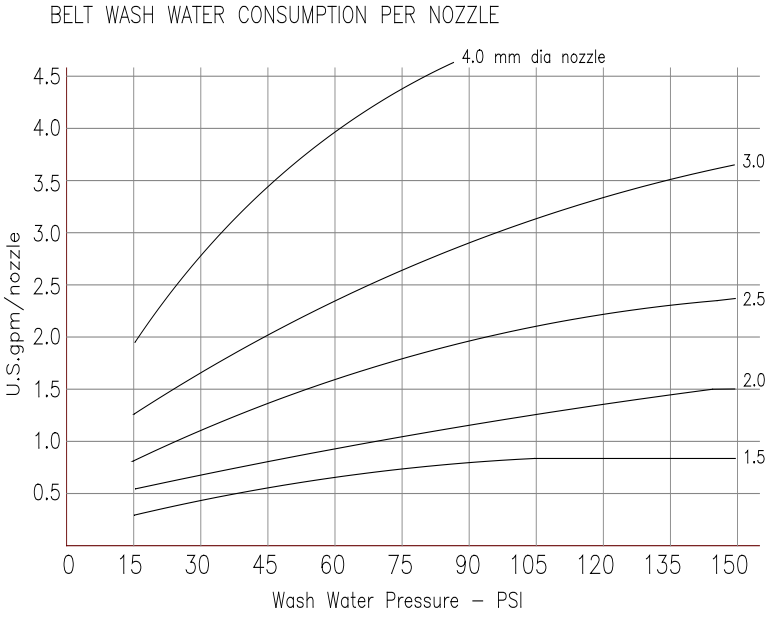
- If Power is connected with GR, the valve will open and keep on. At this time, LS.1 is opened, giving signal of opening totally.
- If Power is connected with RD, the valve will close and keep off. At this time, LS.2 is opened, giving signal of closing.

Technical Data

Control: On/ Off
Maximum Torque: 40Nm (354 in/lbs)
Angle of Rotation: 90°
Direction of Rotation: Double Acting
Operating Time: 10S
Ambient Temperature: -20°C to 45°C (-4°F to 113°F)
Housing: NEMA 4X
Housing Material: Die-cast Aluminum
Input Power: 40 Watts Max.
Duty Cycle: 25%

This chart is included to show the relationship between water pressure and water consumption. Your Klampress is equipped with the 2.5 mm nozzles unless specified to be otherwise in the purchase order. The 2.5 mm nozzles use a little less than 2 gpm at 85 psi. At 85 psi each spray shower on a 2.0 meter Klampress will require about 40 gpm to wash the belt. Under some favorable conditions smaller nozzles can be used to conserve water. Larger nozzles may be required for difficult to wash sludge conditions.

Contact Alfa Laval Spare parts for information on retrofitting spray systems for reduced water consumption.



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.

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, 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

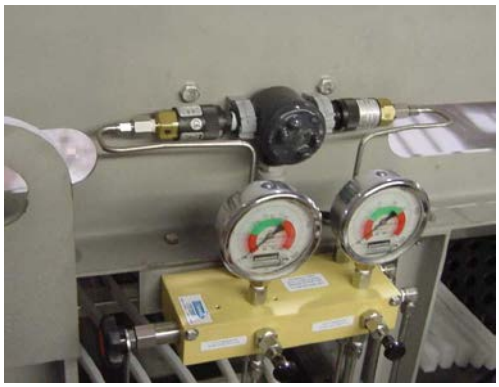
Each belt is fitted with a proximity switch to sense extreme travel of the tensioning arm. If one of the belts should break the tension cylinders will extend the tensioning arm to the limits of its travel where it will contact the belt breakage limit switch.

12.3 BELT MISALIGNMENT SWITCH

There are two proximity 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 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 LOW HYDRAULIC PRESSURE SWITCHES

The low hydraulic pressure sensing switches are mounted to a conduit hub and connected to the manifold by a ¼" dia. Stainless steel tube. On the base model Klampress there will be one pressure switch mounted in the pressure line going to the tension cylinders. Order part number 029872 for replacement. See Section 14 for spare parts.



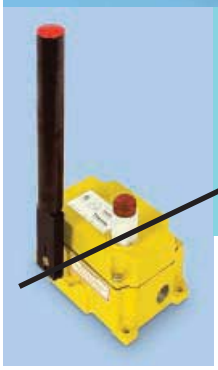
12.5DRAWINGS AND DATA SHEETS TO FOLLOW

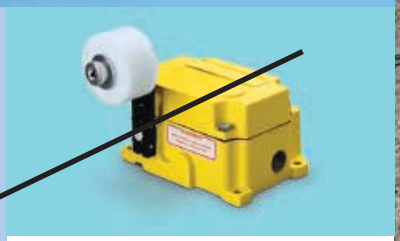
Trip Cord Switch Data
Proximity Switch – Belt Breakage or Belt Misalignment Data & Certificate
Hydraulic Pressure Switch Data Sheets

Product Specifications

Thermo Scientific Ramsey conveyor protection switches monitor your conveyors, equipment, and processes. Using our conveyor protection switches to prevent accidents, protect equipment, and reduce unscheduled shutdowns helps to keep your profits and production at their highest levels.

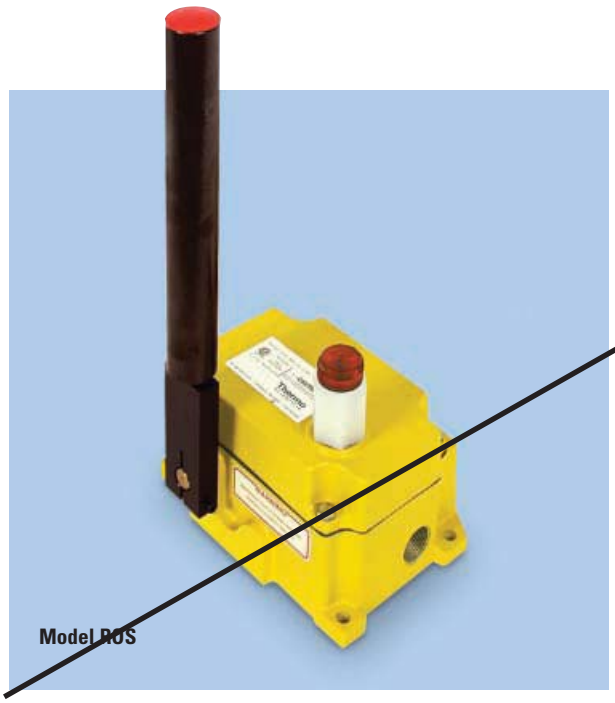
Thermo Scientific Ramsey Conveyor Protection Switches





Thermo Scientific Ramsey conveyor protection switches are used for position information, control signals, and to identify potentially hazardous situations with your process equipment. When hazardous situations occur they activate alarms to stop your equipment. This keeps your personnel safe and limits damage to your equipment.

These conveyor protection switches utilize a rugged heavy duty design. They are built to last, providing many years of dependable service. The modular design of the base unit provides added convenience for installation and maintenance. Numerous options allow you to pick the right switch to fit your applications. Use the conveyor protection switches to protect your business in even the most challenging applications.



Model ROS

Thermo Scientific Ramsey Belt Misalignment Switch

This belt misalignment switch is used to monitor the position and tracking of conveyor belts. It is mounted on the conveyor structure and adjusted so the roller arm is the proper distance and angle from the outside edge of the belt. When a belt drifts out of alignment it contacts the roller actuator arm which rotates the actuation shaft, causing the belt misalignment switch to send an alarm signal.

The actuation shaft has two cams inside the housing. Each cam actuates an independent SPDT micro-switch for alarm signals. The first micro-switch actuates with a 10° rotation of the actuation shaft for a warning alarm signal, allowing operators to address the situation before it becomes a problem. The second micro-switch actuates with a 20° rotation of the actuation shaft for a shut down alarm signal in order to prevent or minimize equipment damage. The roller arm has internal stainless steel bearings. This allows the switch to be used on conveyors with belt speeds up to 1250 feet per minute with outstanding service life.

Model SPS

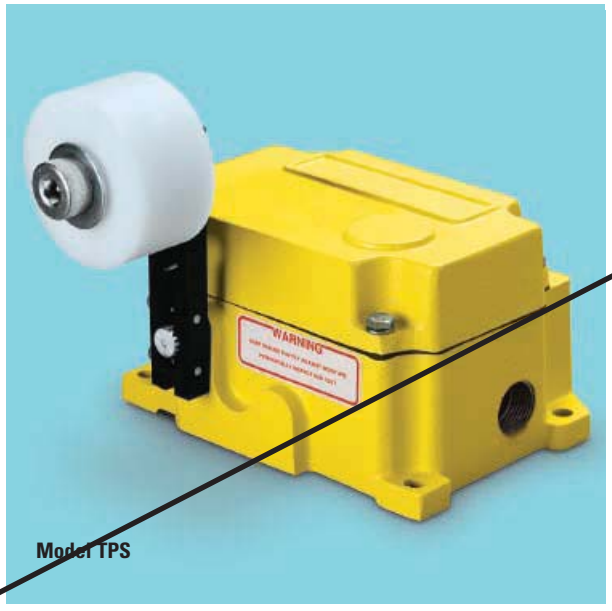
Thermo Scientific Ramsey Safety Cable Pull Switch

This safety cable pull switch is used as an emergency shutdown device for conveyors or other equipment. They meet OSHA and MSHA requirements for safety shutdown devices.

Safety pull cables are attached to the actuating arm of the switch. When force is applied to the pull cable it rotates the actuating arm and actuating shaft. At a 20° rotation the switch enters a tripped and locked position. The actuating shaft has two cams inside the housing. Each cam simultaneously actuates an independent SPDT micro-switch for shutdown and alarm signals.

The safety cable pull switch has one housing layout that may be used interchangeably in mid-run or end-run positions of the safety pull cables.

Standard safety cable pull switches include a manual reset lever. This lever keeps the switch locked in an alarm condition until it is manually reset by an operator.



Model TPS

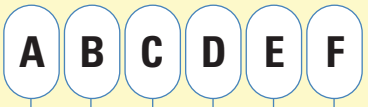
Thermo Scientific Ramsey Tripper Position Switch

This tripper position switch is a heavy duty limit switch. It is often used to indicate the position of a tripper on a conveyor with multiple discharge points. However, it can be used anywhere you need an extremely heavy duty limit switch with physical activation.

The actuating arm of the tripper position switch uses a large Acetal contact roller, 3 in diameter by 1.75 in wide. When the roller makes contact it rotates the actuation shaft which has two cams inside the housing. Each cam actuates an independent SPDT micro-switch for position or alarm signals.

The switch can be ordered with an option where one of the SPDT switches is actuated with clockwise rotation and the other SPDT switch is actuated with counter-clockwise rotation. This allows you to identify which direction the switch is activated from.

Nomenclature for ROS, SPS, & TPS



PRODUCT IDENTIFIER

SWITCH VERSION NUMBER

HAZARDOUS AREA APPROVALS

FINISH

NEMA RATING

OPTIONS

Nomenclature Examples

ROS-2D	*Standard Belt Misalignment Switch*
ROS-2D-4X	*Belt Misalignment Switch, CSA approved for NEMA 4X*
SPS-2D-3-4X	*Safety Pull Switch, CSA approved for Class II and NEMA 4X*
SPS-2D-3-LT	*Safety Pull Switch, CSA approved for Class II, with alarm light*
TPS-2D-NP	*Tripper Position Switch, nickel plated*

F. OPTIONS (add all that apply)

(blank)	Standard
LT	Alarm Light
RST	Manual reset lever (Standard on SPS)
FLG	Auxilliary flag alarm
SA	Short roller arm for tight areas (ROS only)
MTBR	Mounting bracket
CCW	Independent signals for CW/CCW (TPS only)
Met	Metric threads for conduit mounting holes

E. NEMA RATING

(blank)	Standard NEMA 4 rating
4X	CSA approved for NEMA 4X

D. FINISH

(blank)	Standard, yellow corrosion resistant urethane enamel
NP	Nickel plated

C. HAZARDOUS AREA APPROVALS

(blank)	Standard, no approvals
3	CSA approved for Class II, Div 1 & 2, Groups E,F, and G

B. SWITCH VERSION NUMBER

2D	2 SPDT contacts

A. PRODUCT IDENTIFIER

ROS	Belt Misalignment Switch
SPS	Safety Pull Switch
TPS	Tripper Position Switch

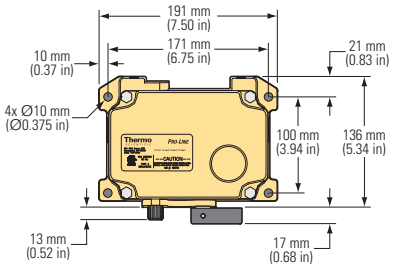
Model # SPS-2D-3-NP-4X

Thermo Scientific Ramsey Conveyor Protection Switches

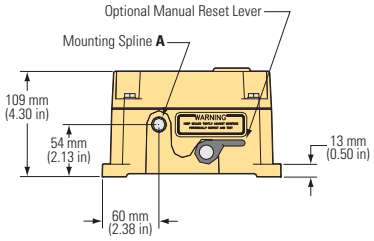
General Specifications	
Outputs	Two SPDT contacts rated for 10A 480V
Temperature	-45°C to +80°C (-50°F to +176°F)
Enclosure Rating	NEMA 4 weatherproof (Optional NEMA 4X)
Conduit Openings	Up to three, threaded ¾-14 NPT (optional Ø20 mm x 1.5 metric threads)
Actuating Arm Adjustments	+22.5° increments from vertical
Agency Approvals	Models with CSA approval for Class II, Division 1 & 2, Groups E, F, & G are available
Actuating Force (ROS)	2.27 kg (5 lb)
Spacing (SPS)	Recommended 30 m (100 ft) switch spacing and cable supports every 3 m (10 ft); maximum spacing of 60 m (200 ft) on horizontal conveyors and 45 m (150 ft) on inclined conveyors
Pull Force Rating (SPS)	3.63 kg (8 lb) to 8.16 kg (18 lb)

Enclosure dimensions

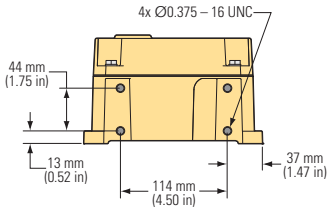
Top View



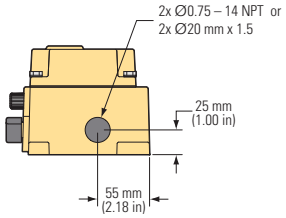
Front View



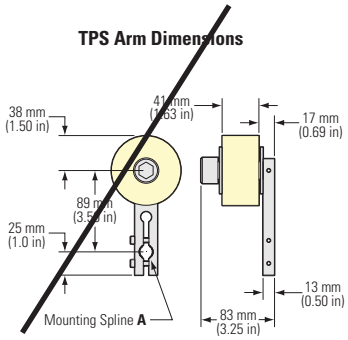
Back View



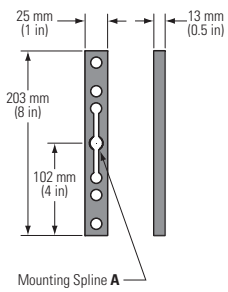
Side View



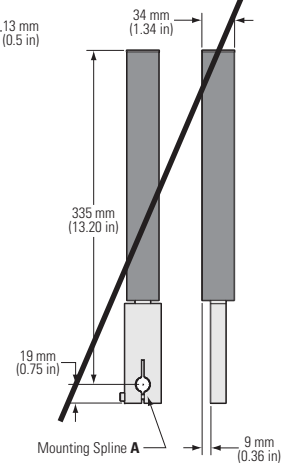
TPS Arm Dimensions



SPS Arm Dimensions



ROS Arm Dimensions



Australia
+61 (0) 8 8208 8200
+61 (0) 8 8234 3772 fax

Canada
+1 (905) 888-8808
+1 (905) 888-8828 fax

Chile
+56 (0) 2 378 8050
+56 (0) 2 370 1082 fax

China
+86 (0) 21 6865 4588
+86 (0) 21 6445 7830 fax

Germany
+49 (0) 208-824930
+49 (0) 208-852310 fax

India
+91 (20) 6626 7000
+91 (20) 6626 7001 fax

Italy
+39 02-959514-1
+39 02-953200-15 fax

Netherlands
+31 (0) 76-579-5555
+31 (0) 76-571-4958 fax

South Africa
+27 (0) 11-609-3101
+27 (0) 11-609-3110 fax

Spain
+34 (0) 91-484-5965
+34 (0) 91-484-3597 fax

United Kingdom
+44 (0) 1788-820300
+44 (0) 1788-820301 fax

United States
+1 (800) 445-3503
+1 (763) 783-2525 fax
+1 (763) 783-2500 direct

Process Instruments

www.thermo.com/bulk-handling

Thermo SCIENTIFIC

efector100

Inductive sensors

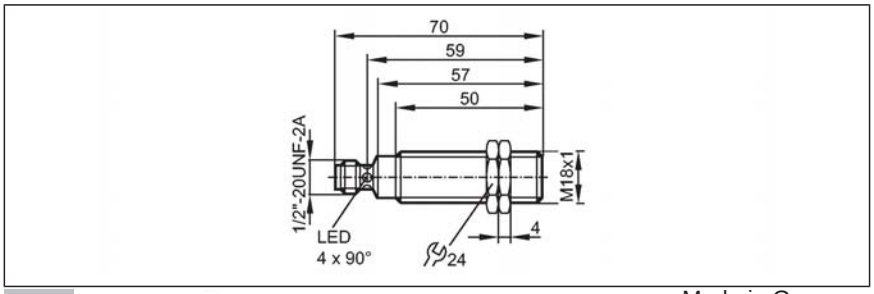
ASHBROOK PART # 039200
BELT BREAKAGE AND/OR ZERO SPEED
HIGH SLUDGE AND/OR LACK OF CAKE
BELT MISALIGNMENT

ifm electronic

IGT002

IGK2005-ARKA/M/V4A/LS
Inductive sensor
Metal thread M18 x 1
Quick disconnect

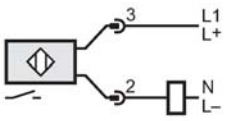
Sensing range 5 mm [f]
flush mountable



Made in Germany

Electrical design		AC/DC
Output		normally open
Operating voltage	[V]	20...140 AC/DC
Current rating (continuous)	[mA]	200 / 80 (> 80 °C)
Current rating (peak)	[mA]	î: 1.2 A (20 ms / 0.5 Hz)
Minimum load current	[mA]	5
Short-circuit protection		Yes (non-latching)
Reverse polarity protection		yes
Overload protection		yes
Voltage drop	[V]	< 5.5
Leakage current	[mA]	< 1
Power-on delay time [s]		approx. 1
Operating distance	[mm]	0...4.05
Hysteresis	[% of Sr]	1...20
Switching frequency	[Hz]	25 AC / 400 DC
Correction factors		mild steel = 1 / stainless steel approx. 0.7 / brass approx. 0.5 / Al approx. 0.4 / Cu approx. 0.3
Ambient temperature	[°C]	0...100
Protection		IP 68 / IP 69K *), II
EMC		EN 61000-4-2 ESD: 4 kV CD / 8 kV AD EN 61000-4-3 HF radiated: 10 V/m (80...1000 MHz) EN 61000-4-4 Burst: 2 kV EN 61000-4-5 Surge: 0.5 kV (line to line, Ri: 2Ohm) EN 61000-4-6 HF conducted: 10 V (0.15...80 MHz) EN 55011: class B
Housing materials		threaded sleeve: V4A (316S12); active face: PEEK (polyether ether ketone); lock nuts: high-grade stainless steel
Function display		
Switching status	LED	yellow (4 x 90°)
Connection		1/2" UNF-Connector
Weight	[kg]	0.068
Remarks		*) "COP"
Accessories (included)		2 lock nuts

Wiring



ecomat400

ASHBROOK PART # 039201
(CABLE FOR USE WITH PROXIMITY
SWITCH PART # 039200)

ifm electronic

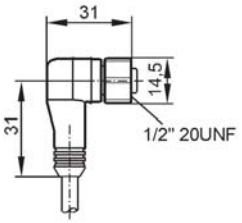
Connection technology

E18210

ifm electronic
Socket

For sensors with
1/2" connector

gold-plated contacts

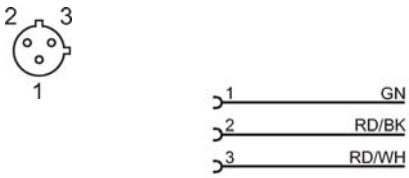


c UL us LISTED

Electrical design		AC/DC
Operating voltage	[V]	300 AC/DC
Design		angled
Ambient temperature	[°C]	-10...100
Protection		IP 68
Material body		PVC
Material nut		stainless steel 316Ti / 1.4571
Connection		PVC cable / 10 m; 3 x AWG 22 (3 x 0.34 mm²)
Sheath color		yellow

Wiring

Core colors
GN green
RD/BK red/black
RD/WH red/white



Low Hydraulic Pressure Switch

Alfa Laval
Ashbrook Part No.
029872

OPERATING CHARACTERISTICS • ORDERING DATA

FIELD ADJUSTABLE PRESSURE SWITCH — All values given in P.S.I. (Gauge)

Range	Pressure Setting Range				Approx. Actuation Value (Differential)	Proof Pressure	Catalog Number
	Decreasing		Increasing				
	Min.	Max.	Min.	Max.			
30" Hg (Vac)	**1" Hg**	28" Hg	6" Hg	**30" Hg**	1 - 6" Hg	30 psi	96221-BB1*
15	**2.5**	12.8	3	**15**	.5 - 2.2	1000	96211-BB1*
35	**5**	31	6	**35**	1.0 - 4.0	1000	96211-BB2*
50	**8.5**	44	10	**50**	1.5 - 6.0	1000	96211-BB3
125	**22.5**	112	25	**125**	2.5 - 13	1000	96211-BB4
250	**70.0**	220	80	**250**	10 - 30	1000	96211-BB5
500	**110**	440	130	**500**	20 - 60	1000	96211-BB6
600	**190**	450	250	**600**	60 - 150	7000	96201-BB1
1700	**360**	1450	430	**1700**	70 - 250	7000	96201-BB2
4400	**1450**	3900	1650	**4400**	200 - 500	7000	96201-BB3
7500	**3650**	6700	4000	**7500**	350 - 800	12000	96201-BB4
250	**70.0**	220	80	**250**	10 - 30	1000	96211-BB5-S0046
Approximate Shipping Weight: 0.95 lbs.							

*S0046 SPECIAL SET @ 150 PSI DECREASING To install, hand tighten then apply 180 in-lbs torque max.

General Description

The 96201 series switch utilizes a sealed piston sensor. The 96211 and 96221 series switches use a diaphragm piston sensor. These switches offer field adjustable set points. The differential is fixed and varies with pressure setting.

Electrical Connections include free leads as standard with optional spade terminals, DIN type connector or 1/2" NPT conduit connector, (male or female).

They are environmentally sealed and are resistant to shock and vibration. Designed to deliver millions of maintenance free cycles, the sealed piston and diaphragm piston designs are ideally suited for harsh environments.

WIRE CODE	PRESSURE		VACUUM	
Lead	Color	Pin	Color	Pin
Normally Closed	Blue	2	Red	3
Common	Purple	1	Purple	1
Normally Open	Red	3	Blue	2
Ground	Not used		Not used	

ELECTRICAL RATING			
Limit Switch Class	Voltage (Volts)	Maximum Continuous Current (Amps)	
		Resistive	Inductive
BB	125/250 VAC	5	5
CC	125/250 VAC	10	10

5 Amp @ 30 VDC maximum
All models incorporate Underwriters' Laboratories, Inc. listed and CSA approved single pole double throw snap-action switches.

Detail Data

Electrical Connection — Free leads approximately 12" long.

Pressure Connection — 1/4" NPT male.

Temperature Range — 96201 series = — 40° to 165°F.
96211 series = — 20° to 165°F.
(*0°F Min. as noted)
96221 series = 0° to 165°F.

Accuracy — ±2%

Wetted Materials
96201 series
Body — Brass
Seals — Buna N o'ring
Piston — Stainless steel

96211 & 96221 series
Body — Brass
Diaphragm — Buna N

Housing — Open type plastic housing.

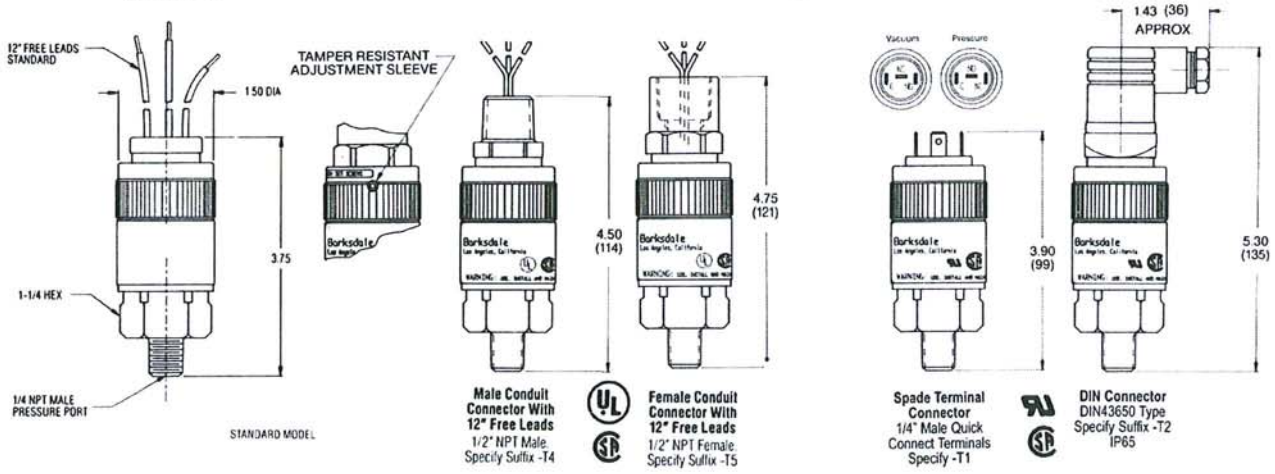
Approvals/Listings — UL and CSA recognized.

Optional Modifications
Electrical — See diagrams below for optional conduit connections.
Wetted Material — Body: Stainless steel. To specify, add suffix -SS to catalog number.
Diaphragm/Seal — Other compounds available. Consult factory.
Process Connection — 7/16-20 SAE type male straight threads with o'ring seal, add suffix -P1.
1/4" BSP male straight threads with o'ring seal, add suffix -P3.
Tamper Resistant Screw — Add prefix "T" to catalog number.

Adjustment Instructions
Positive Pressure — Secure hex body with open end wrench. Hand turn adjustment sleeve clockwise to increase, counterclockwise to decrease set point.
Vacuum Pressure — Secure hex body with open end wrench. Hand turn adjustment sleeve counterclockwise to increase, clockwise to decrease set point.

Ordering Instructions — To ensure correct switch is furnished, always specify full catalog number (including required modifications), set point (increasing or decreasing) and service. Example: 96211-BB2-SS-T2 set at 15 psi increasing. Service, Dry Nitrogen.

NEMA 4x



KLAMPRESS®

13.0 LUBRICATION INFORMATION

13.1 LUBRICATION SCHEDULE

DAILY	***No regular lubrication needed.*** ***Check the oil levels in the hydraulic reservoir and gear reducer.*** ***Inspect roller seals. Grease should be visible at the rubber seal flingers.***
WEEKLY	***Check hydraulic reservoir level and condition of the oil. Change the oil if it has darkened or turned cloudy.*** ***Inspect the filter screen for visible debris or contaminants.***
MONTHLY	***None***
SEMI - ANNUALLY	***Lubricate the press roller bearings.*** ***Check the condition of the oil in the hydraulic reservoir. Change the oil if it has darkened or turned cloudy.*** ***Replace the filter.***
ANNUALLY	***Change oil in belt drive gear box.***

13.2 Approved Lubricants Cross Reference

Point of Application	Texaco	Shell	Chevron	Exxon Mobil
Belt Drive Reducer	Meropa 220	Omala Oil 220	Non-Leaded Gear Compound 220	Mobilgear 600 XP 220
Press Roller Support Bearings*	Premium RB Or Multifak #2	Alvania #2	Ultra Duty Grease #2	Mobilith SHC 460 Or Unirex N2
Hydraulic** Reservoir	Rando Oil HO 32	Tellus 32	AW Oil 32	DTE 10 EXCEL 32 or Nuto 32

* A lithium 12-hydroxy state soap grease or a lithium complex soap grease conforming to NLGI-2 consistency may be used.

** The oil for the hydraulic system may be from various suppliers as long as the oil has a pour point of -40 degrees and contains anti-wear additives.

KLAMPRESS®

14.0 SPARE PARTS INFORMATION

14.1 RECOMMENDED SPARE PARTS LIST

SPARE PARTS LIST ON FOLLOWING PAGES FOR

- KLAMPRESS 2.0 METER
- ~~KLAMPRESS 1.5 METER~~
- ~~KLAMPRESS 1.0 METER~~
- ~~KLAMPRESS 3 BELT OPTION – ALL SIZES~~

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

For your convenience, spare parts may be ordered directly from Alfa Laval Ashbrook Simon-Hartley.

KLAMPRESS 2.0 METER
SPARE PARTS LIST

DESCRIPTION	PART No.	QTY/MACH	AVAILABILITY
~~UPPER BELT, 2.2M X 13.72M (Std KP)~~	~~038804~~	~~1~~	~~1 WEEK~~
UPPER BELT, 2.2M X 16.20M (Ext KP)	038853	1	1 WEEK
~~LOWER BELT, 2.2M X 13.82M (Std KP)~~	~~038805~~	~~1~~	~~1 WEEK~~
LOWER BELT, 2.2M X 16.36M (Ext KP)	038824	1	1 WEEK
RUBBER STRIP SEAL (100')	004488	1 Lot	ASH STOCK
SCRAPER BLADE – UHMW	027772	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	15	ASH STOCK
SPRAY NOZZLE, 2.5 MM	022319	22	1 WEEK
LOW WATER PRESSURE SWITCH	031869	1	ASH STOCK
WATER PRESSURE GAUGE	009273	1	ASH STOCK
BEARING, 75 MM SPHERICAL	421265	26	ASH STOCK
BEARING, 75MM CYLINDRICAL	040266	4	1 WEEK
RETAINER RING, 75 MM	030330	30	1 WEEK
BEARING SPACER RING	040512	30	1 WEEK
BEARING SEAL ASS'Y 3 ¼"	040267	31	1 WEEK
BEARING SPLASH GUARD	062788	30	ASH STOCK
STEERING VALVE	032680	2	1 WEEK
STEERING PADDLE ASSEMBLY	012986	2	ASH STOCK
CERAMIC WEAR PAD, STEERING PADDLE	008565	2	ASH STOCK
TORSION SPRING for STEERING VALVE	032681	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
4 X 4 PAINTED STEEL	032381		4 WEEKS
4 X 4 STAINLESS STEEL	029384		6 WEEKS
TENSION CYLINDER - 3 ¼ X 6 FRP	031038	4	ASH STOCK
3 ¼ X 7 ½ FRP	032265		4 WEEKS
3 ¼ X 6 PAINTED STEEL	030601		4 WEEKS
3 ¼ X 6 STAINLESS STEEL	031107		6 WEEKS
REPAIR KIT – FRP TENSION CYLINDER	033056	4	1WEEK
REPAIR KIT – FRP STEERING CYLINDER	026697	2	1 WEEK
PROXIMITY SWITCH – N.O.	039200	4	1 WEEK

OPTI-PRO℠

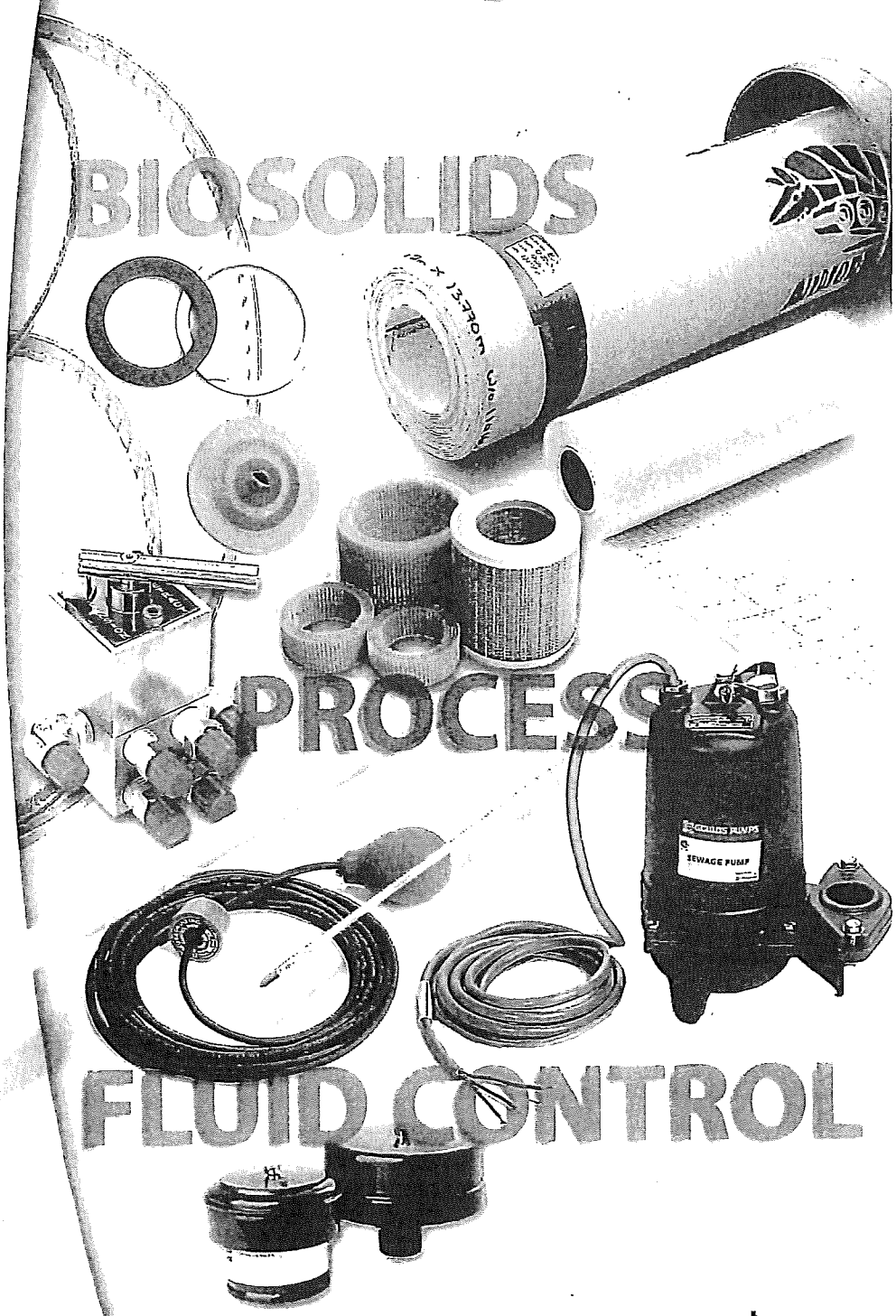
SPARES

A select stock of original equipment spares is an excellent way to ensure operational reliability and minimize downtime. **Opti-Pro℠** maintains a comprehensive stock of the spares that operators typically need to keep on hand.

Check your equipment manuals or ask us for a list of recommended spares for your specific make and model.

Plus, all **Opti-Pro℠** spares come with the application experience and engineering know-how of the Ashbrook Simon-Hartley team—readily available to assist you with your specific requirements.

Chicane Blades (Plows)	●
Scraper (Doctor) Blades	●
Washbox Seals	●
Wash Tubes	●
Spray Nozzles	●
Pumps	●
Air Filters	●
Air Diffusers	●
Belts	●
Belting	●
Valves	●
Repair Kits	●
UV Tubes	●



SPARES AVAILABLE FOR

All Makes

All Models

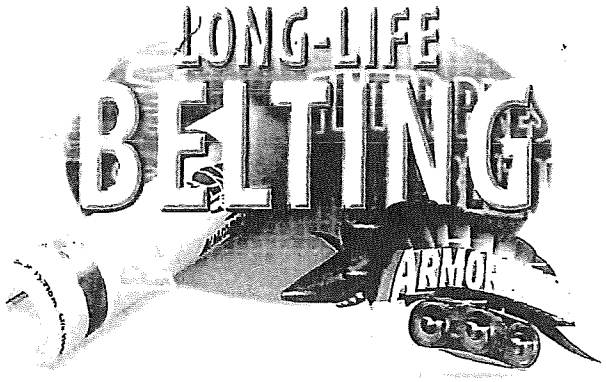
OF DEWATERING EQUIPMENT

OPTI-PRO℠: Increasing the Value and Performance of Your Capital Equipment

ASH

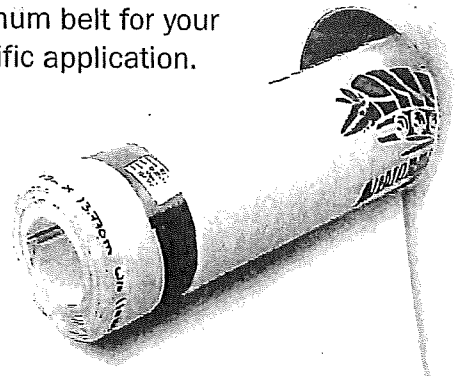
Featuring Ashbrook Simon-Hartley Expertise, Quality

OPTI-PRO℠



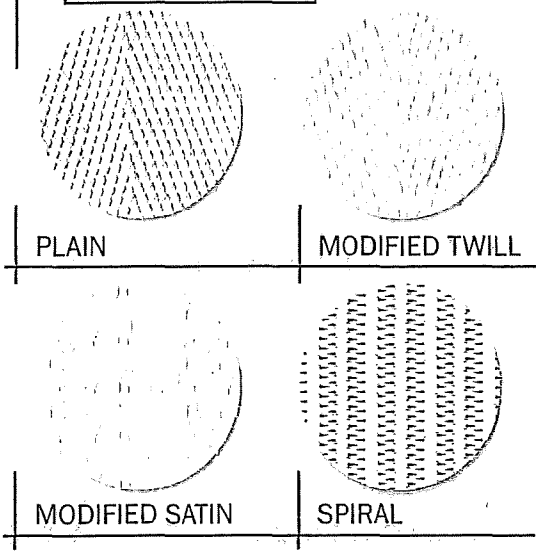
BELTING

Opti-Pro℠ provides longlife, high performance ARMORDILLO® Belt Filter Press Belting. ARMORDILLO® Belting features optimized meshcount weaves that produce an ultra-smooth mono-filiment surface. These ultra-smooth surfaces mean lower adhesion coefficients, which reduce sticking and make belt cleaning significantly easier. Let an **Opti-Pro℠** Belt Specialist guide you through the selection process to ensure that you receive the optimum belt for your specific application.

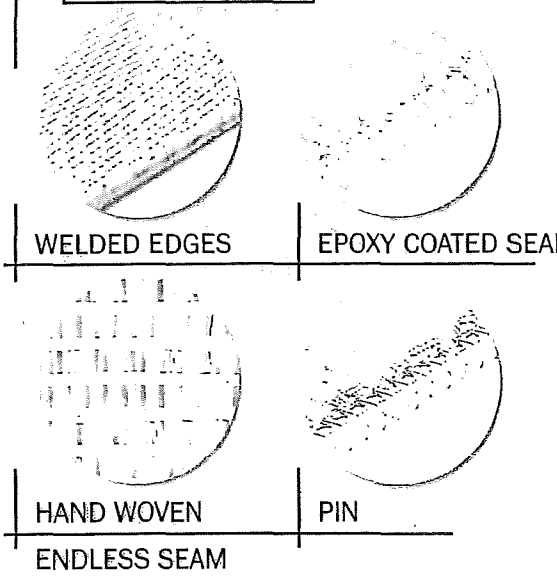


FILTER-PRESS BELTING

BELT WEAVES



BELT SEAMS



Belt Repair Products
Splice Pieces
Replacement Closures
Seam Wire
Swedges

BELTS AVAILABLE FOR
All Makes
All Models
OF DEWATERING EQUIPMENT

OPTI-PRO℠ Increasing the Value and Performance of Your Capital Equipment

Featuring Ashbrook Simon-Hartley® Expertise, Quality

Ashbrook Simon-Hartley®

WATER AND WASTEWATER TREATMENT SOLUTIONS

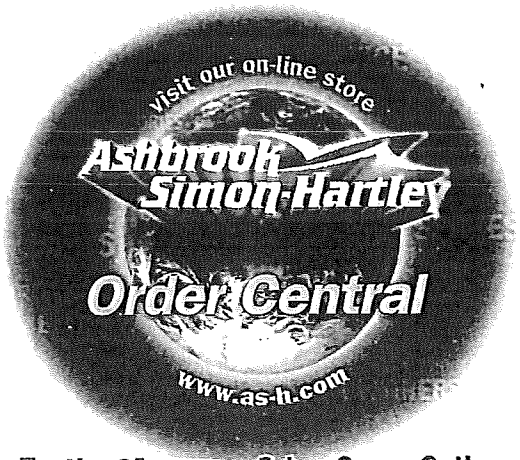
Featuring the Industry's Most Advanced and Fully Optimized Process Options, Including:

- Activated Sludge Technology
- Selector Technology
- Membrane Bioreactor
- Aerobic Digestion to achieve Class "B" Biosolids
- Nitrification/Denitrification
- Tertiary and Ultrafiltration
  Phosphorus Removal
  Disinfection Systems

Ashbrook Simon-Hartley Also Provides a Comprehensive Line of Fully Optimized Equipment and Systems, Including:

- Aeration Basins and Equipment, Including Diffused Aeration Systems
- Membrane Bioreactors
- Clarifiers
- Liquid/Solids Separation Technologies
  - Tertiary Filtration
    - Denitrification
    - Rapid Rate/Gravity Sand
    - Continuous Backwash
  - Ultrafiltration Membrane
  - High Performance Belt Filter Press Technologies
  - High Performance Belt Thickeners
  - Advanced Centrifuge Technologies
- Disinfection
  - Solution Feeders
  - Ultra-Violet
- Pasteurization and Digestion to Achieve Class "A" Biosolids
  Flow Equalization
  Primary Treatment
- Lift Stations
- Bar Screens and Grit Collection
- Electrical Controls & Automated Systems (PLC and SCADA)
- Ground Water Contamination Remediation
- Industrial Process Wastewater Treatment
- Advanced Flow Control Technologies
  - Sluice Gates and Weir Gates
  - Flap Valves (Rigid and Flexible)
  - Stop Logs and Gates
- Mobile Dewatering

Plus, Comprehensive Installation Services As Well As Optimized Rebuilds, Retrofits and Spare Parts.



Try the eAnswers Cyber-Space Option

For more information:
Visit our website at
www.as-h.com

In North America—
Contact Ashbrook Simon-Hartley
at 800-362-9041
Fax: 281-449-1324
Address: 11600 East Hardy
Houston, TX 77093-1098

In Europe, Asia, and the Africas—
Contact Ashbrook Simon-Hartley Ltd.
at +44 (0) 1782 578650
Fax: +44 (0) 1782 260534
Address: 10/11 Brindley Court
Lymedale Business Park
Newcastle-under-Lyme
Staffordshire
ST5 9QH UK

In South America—
Contact Ashbrook Chile S.A.
at +56 (2) 224 7858
Fax: +56 (2) 224 9525
Address: Avenida Presidente Kennedy 5757
Torre Oriente, Oficina 501
Comuna de Las Condes
Santiago, Chile

The products pictured, described, or listed in this publication are illustrative only and are subject to change as appropriate.

Ashbrook Simon-Hartley®

WATER AND WASTEWATER TREATMENT SOLUTIONS

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. 2. Motor starter overload protectors in “tripped” position.	1. Set breaker to “on” 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 Alfa Laval.
	5. Hydraulic pump worn or damaged.	5. Have pump serviced by a qualified hydraulic repair center. Contact Alfa Laval 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 Alfa Laval for service.

PROCESS TROUBLE SHOOTING

Problem	Probable Cause	Remedy
Sludge does not Flocculate	1. 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 Alfa Laval 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 Alfa Laval 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 Alfa Laval 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

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.

Tightening Torque
For
316 Stainless Steel Bolts

Metric	Inch	Torque Ft./lb.
M6	¼	5
M8	5/6	9
M10	3/8	15
M12	½	37
M16	5/8	74
M20	¾	120
M24	1	282

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.

Alfa Laval 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