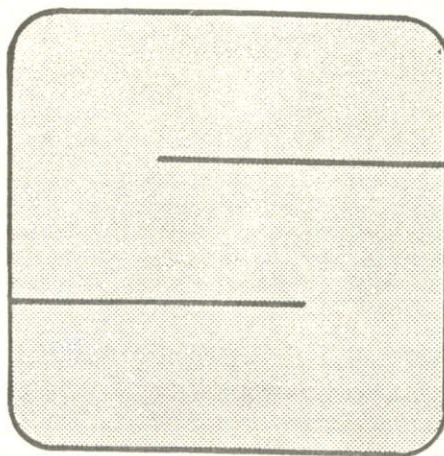


211029

PMP
4/12/86



ERECTION AND OPERATING INSTRUCTIONS

SERIAL NO. X 15211A

PRESS DRG. EHCL 36281A

D. R. SPERRY & CO.

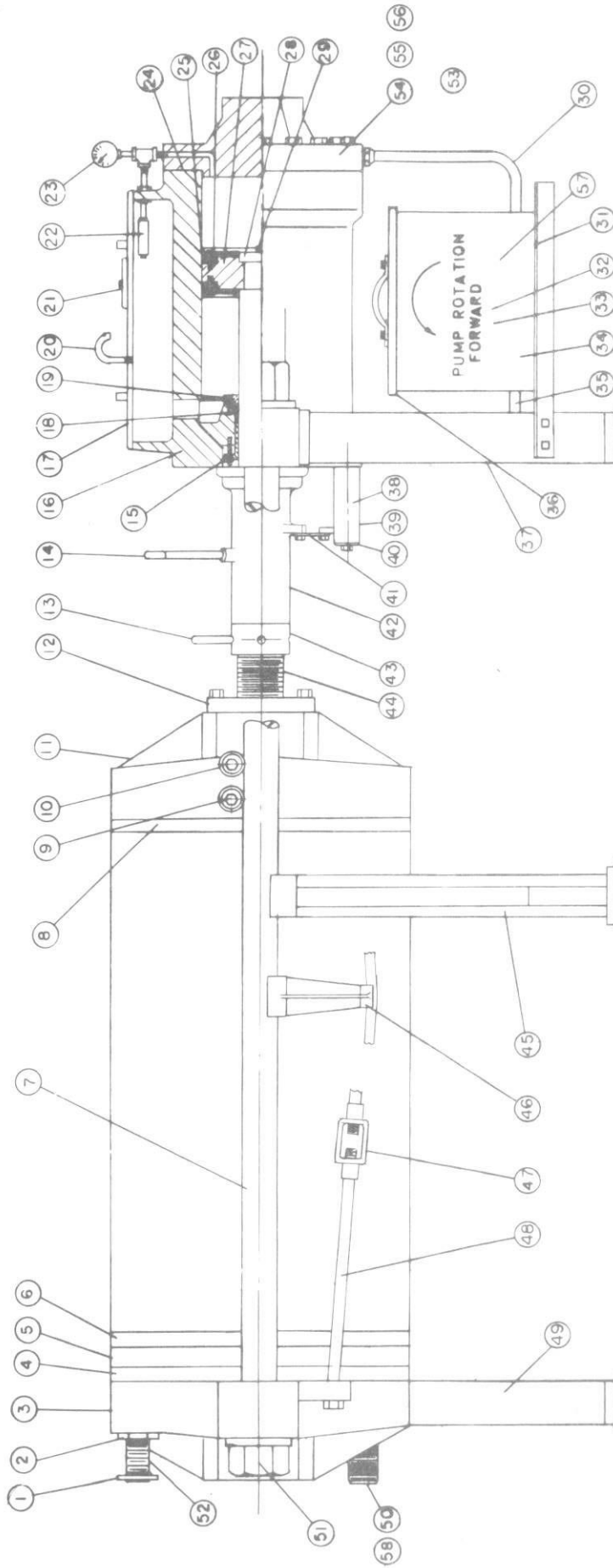
112 N. Grant Street

North Aurora, Illinois 60542

FILTRATION ENGINEERS

Phone 312/892-4361

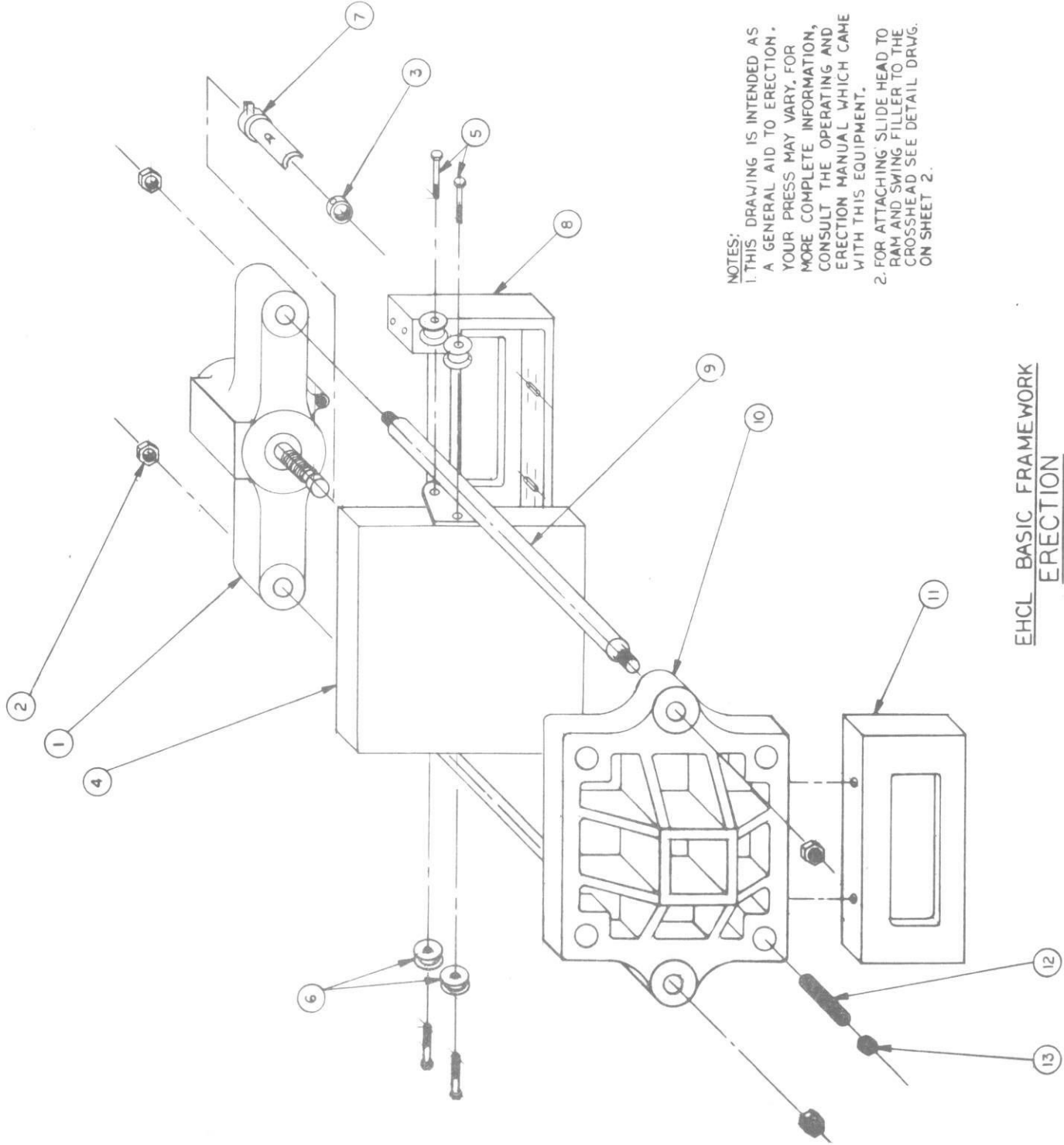
EHCL PARTS LISTS



ITEM NO	PART NO	DESCRIPTION	ITEM NO	PART NO	DESCRIPTION	ITEM NO	PART NO	DESCRIPTION	ITEM NO	PART NO	DESCRIPTION
1	17-	FLANGE	19	24-	INSIDE GLAND (L-71)	37	15-	CYLINDER LEG (L-12)	55	24-	SIGHT GLASS (E-56)
2	17-	LOCKNUT	20	24-	BREATHER (E-58)	38	8-	FILLER PIVOT SHAFT (L-14D)	56	9-	TRUSS ROD PLATE
3	4-	FIXED HEAD	21	5-	VLV COVER (L-55-A)	39	14-	FILLER PIVOT (L-14C)	57	24-	FLEX COUPLING
4	48-	FIXED HEAD PLATE	22	24-	RELIEF VLV (E-72)	40	28-	PIVOT WASHER (L-14-1)	58	17-	LOCKNUT
5	53-	FRAME	23	36-	GUAGE (E-59)	41	14-	FLEX JOINT (L-14B)			
6	49-	REGULAR PLATE	24	28-	GASKET HI PRESS (E-3-1)	42	14-	FILLER (L-14)			
7	8-	SIDE BAR	25	24-	CUP LEATHER (E-1)	43	17-	LOCKNUT (L-17)			
8	48-	SLIDE HEAD PLATE	26	24-	PISTON RING (E-68)	44	19-	PISTON ROD (L-5)			
9	8-	ROLLER SHAFT	27	24-	PISTON (E-6)	45	9-	FLOOR SUPPORT			
10	12-	ROLLER	28	24-	PISTON WASHER (L-5-2)	46	9-	TRUSS PROP			
11	11-	SLIDE HEAD (L-11)	29	27-	PISTON SCREW (E-5-3)	47	9-	TURNBUCKLE			
12	14-	PULL BACK PLT (L-25)	30	61-	HOSE CAP END (E-61)	48	8-	TRUSS ROD			
13	29-	HANDLE (L-17-1)	31	34-	PUMP AND MTR BASE (E-60-9)	49	6-	SHORT LEG			
14	29-	HANDLE FILLER (L-14A)	32	24-	PUMP BRACKET	50	1-	HEAD CONNECTION			
15	24-	GLAND OUTSIDE (E-67)	33	61-	PUMP (E-60-1)	51	2-	SHAFT NUT			
16	24-	CYLINDER (L-13)	34	60-	MOTOR (E-60-2)	52	1-	HEAD CONNECTION			
17	5-	COVER (L-55)	35	61-	HOSE-ROD END (E-61)	53	60-	CONTROLLER (E-57)			
18	28-	PACKING (L-5-1)	36	3-	BOX COVER	54	24-	HI PRESS END (E-3)			

*PART NOT SHOWN

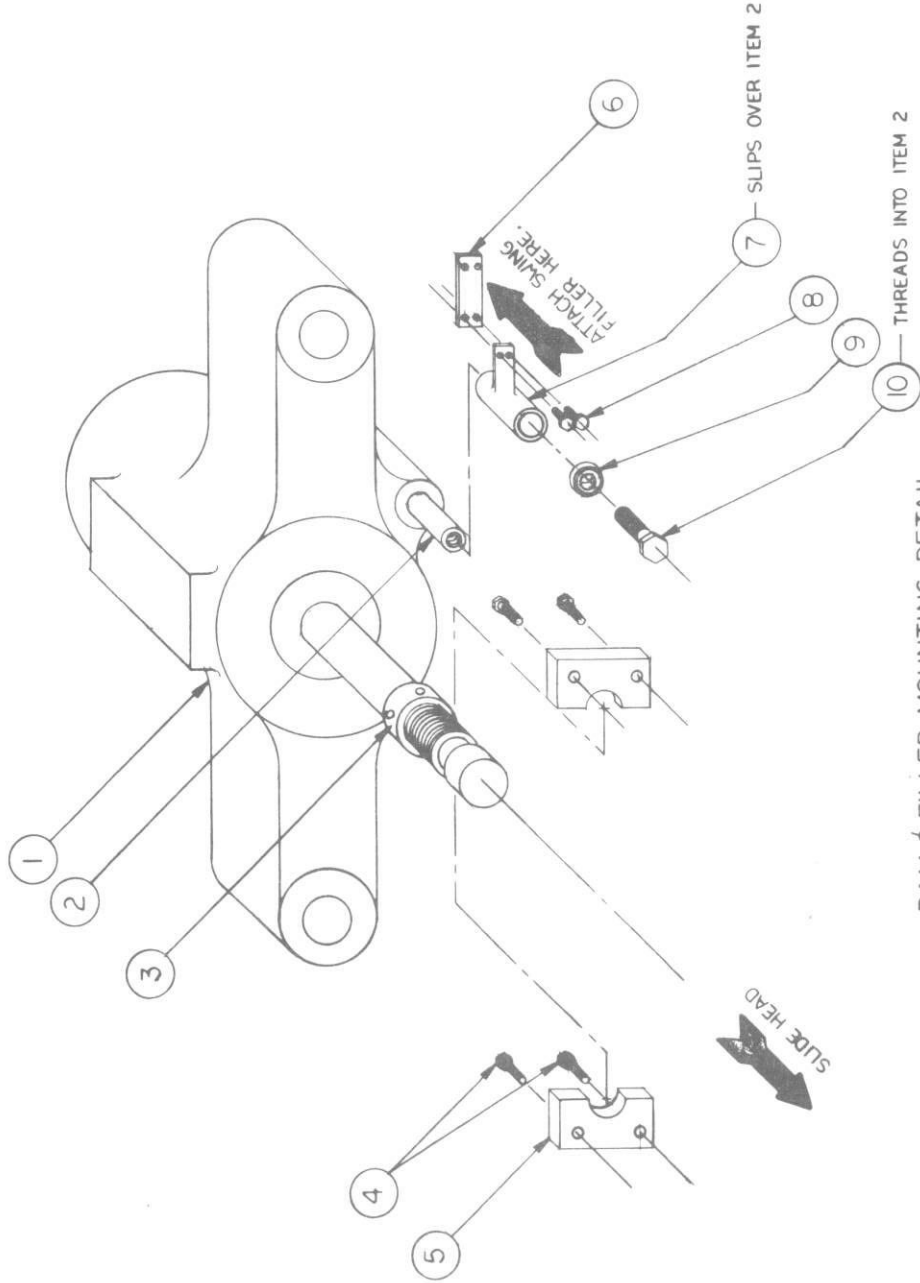
ITEM NO.	DESCRIPTION
1	EHCL CYLINDER CROSSHEAD 1 REQ'D.
2	SIDEBAR NUT 4 REQ'D.
3	LOCKNUT 1 REQ'D.
4	SLIDE HEAD 1 REQ'D.
5	ROLLER SHAFT 4 REQ'D.
6	ROLLER 4 REQ'D.
7	SWING FILLER 1 REQ'D.
8	CROSSHEAD LEG 1 REQ'D.
9	SIDEBAR 2 REQ'D.
10	STATIONARY HEAD 1 REQ'D.
11	STATIONARY HEAD LEG 1 REQ'D.
12	HEAD CONNECTION
13	LOCKNUT



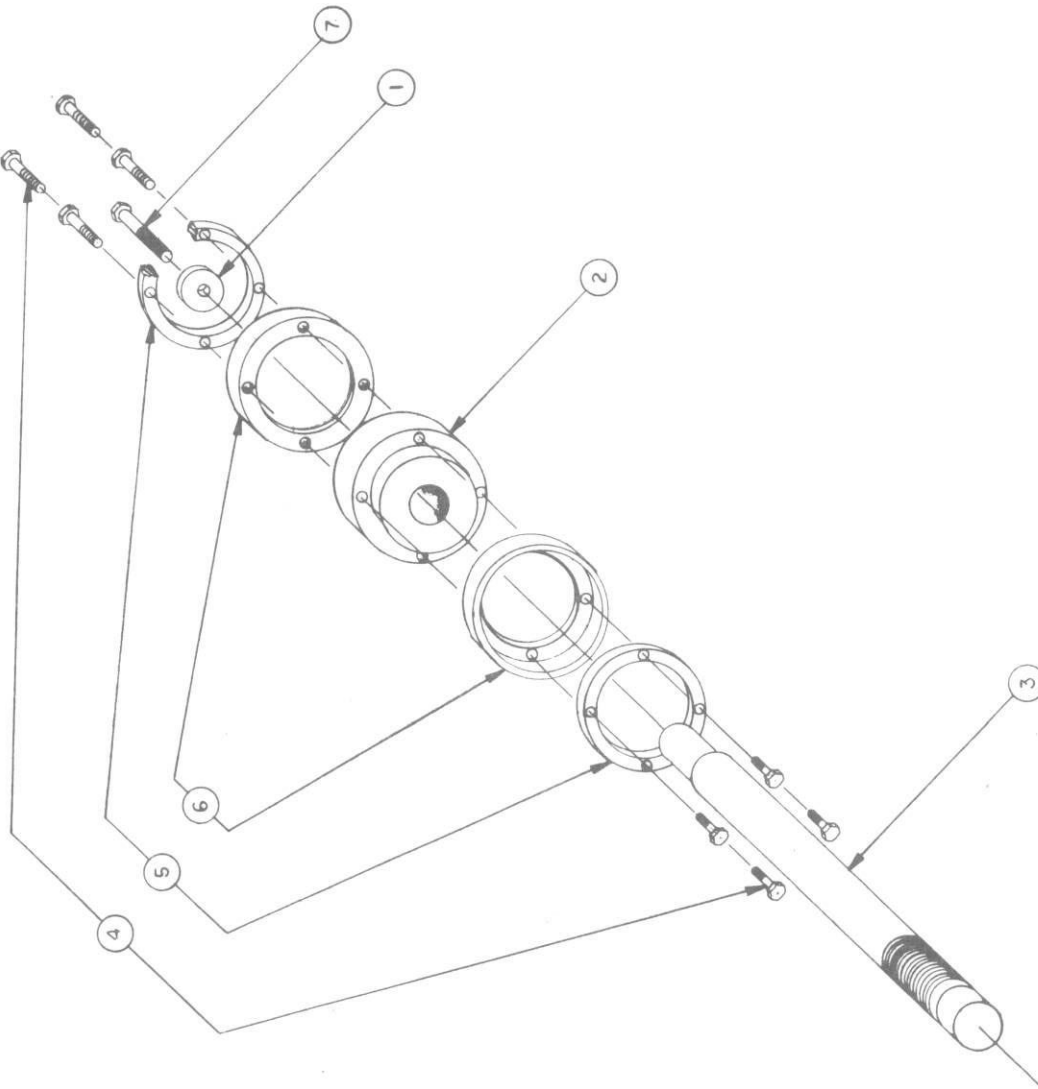
NOTES:
 1. THIS DRAWING IS INTENDED AS A GENERAL AID TO ERECTION. YOUR PRESS MAY VARY. FOR MORE COMPLETE INFORMATION, CONSULT THE OPERATING AND ERECTION MANUAL WHICH CAME WITH THIS EQUIPMENT.
 2. FOR ATTACHING SLIDE HEAD TO RAM AND SWING FILLER TO THE CROSSHEAD SEE DETAIL DRWG. ON SHEET 2.

EHCL BASIC FRAMEWORK ERECTION

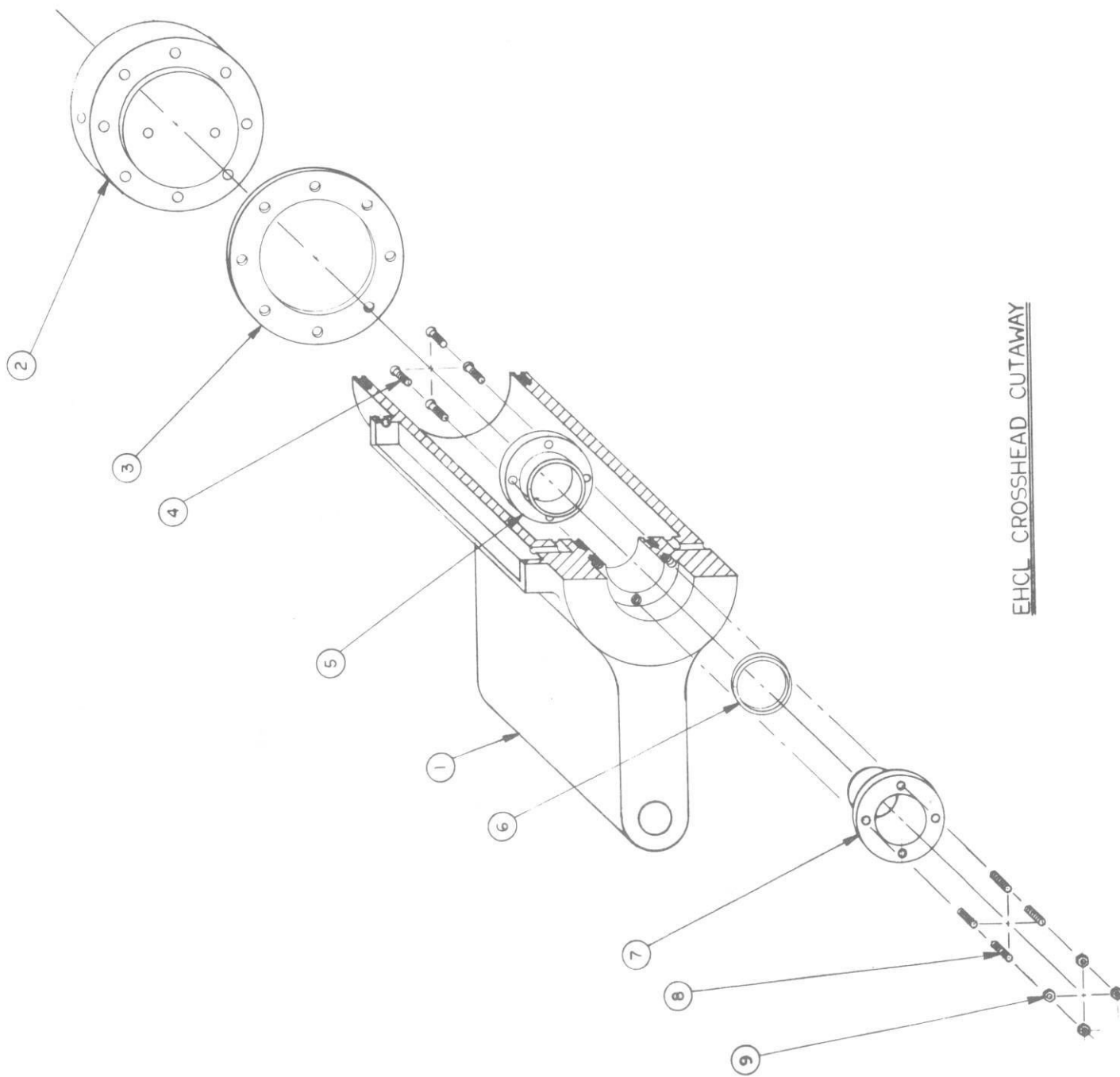
ITEM NO	DESCRIPTION
1	EHCL CYLINDER CROSSHEAD 1 REQ'D.
2	FILLER PIVOT SHAFT 1 REQ'D.
3	RAM LOCKNUT 1 REQ'D.
4	PULLBACK PLATE BOLT 4 REQ'D.
5	PULLBACK PLATE 1 REQ'D.
6	FLEX JOINT 1 REQ'D.
7	PIVOT SLEEVE 1 REQ'D.
8	FLEX JOINT SCREWS 2 REQ'D.
9	PIVOT WASHER 1 REQ'D.
10	MOUNTING BOLT 1 REQ'D.



RAM & FILLER MOUNTING DETAIL
EHCL ONLY



ITEM NO.	DESCRIPTION
1	RETAINING WASHER 1 REQ'D
2	PISTON 1 REQ'D
3	RAM 1 REQ'D
4	SCREWS AS REQ'D
5	PISTON RING 2 REQ'D
6	CUP SEAL 2 REQ'D
7	HEX BOLT 1 REQ'D



ITEM NO	DESCRIPTION
1	CROSSHEAD 1 REQ'D.
2	HIGH PRESSURE HEAD 1 REQ'D.
3	GASKET 1 REQ'D.
4	MOUNTING SCREWS 4 REQ'D.
5	INSIDE GLAND 1 REQ'D.
6	PACKING 1 REQ'D.
7	OUTSIDE GLAND 1 REQ'D.
8	GLAND STUDS 4 REQ'D.
9	HEX NUTS 4 REQ'D.

NOTES

1. HEAD MOUNTS WITH HEX NUTS & STUDS NOT SHOWN
2. FOR PISTON DETAIL SEE SHEET 3.

EHCL CROSSHEAD CUTAWAY

$\frac{3}{4}$ - 14 NPT. X $\frac{1}{2}$ NPSM

SWIVEL 61-46

TO CYL.
ROD END

TO CYL CAP END

$\frac{7}{8}$ - 14 ST. THD TO 37°
 $\frac{5}{8}$ TUBE O RING CONN.
61-46

61-3

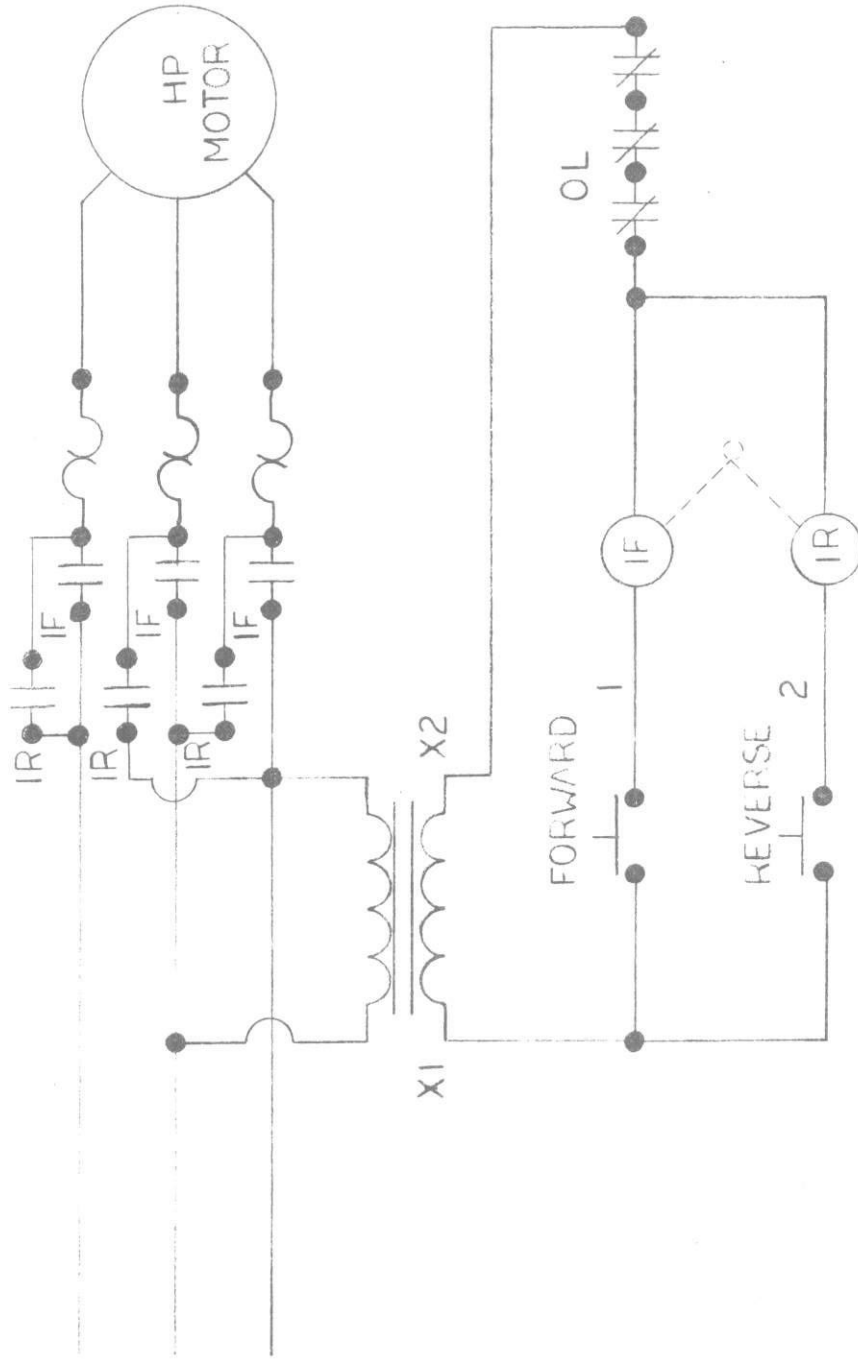
D. R. SPERRY & CO., BATAVIA, ILL.

DATE 12/5/74 APPROX. SCALE Full

DRAWING No. BY WLB

EHCL PUMP CONNECTIONS

VOLT
HZ.
3 PH.



SERIAL NO. X

D. R. SPERRY & CO., BATAVIA, ILL.

DATE 21 DEC 79

APPROX. SCALE

DRAWING No. B121379

BY C ROGERS

EHCL MOTOR STARTER
CIRCUIT

HYDRAULIC OIL MAINTENANCE
SECTION HO

D. R. SPERRY & CO.
112 NORTH GRANT STREET
NORTH AURORA, ILLINOIS 60542

D. R. SPERRY & CO.
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HYDRAULIC OIL MAINTENANCE

The hydraulic power unit has been factory filled with necessary oil filtration. Filter maintenance is described on accompanying instruction sheets. Refer to proper sheet.

An effective maintenance program must necessarily be established by final user of equipment. The hydraulic components will provide long and trouble free service if properly maintained.

The following may be of assistance in establishing a comprehensive oil maintenance program.

- A. Set up a filter maintenance program and follow it diligently.
- B. Inspect filter elements that have been removed from system for signs of failure which may indicate that service intervals should be shortened.
- C. Do not return to system any fluid which has leaked out of filter housing or internal components.
- D. Always keep the fresh supply of oil sealed tightly in container.
- E. Use clean containers, hoses and funnels when filling reservoir.
- F. Use common sense precautions too prevent entry of dirt into components that have temporarily been removed from circuit.
- G. Make sure that all clean out holes, filler caps and breather cap fillers are properly filled to reservoir.
- H. Maintain proper oil level in reservoir and observe and record color changes in hydraulic oil.

Both intake and return lines should be submerged in oil. Insufficient oil in the reservoir, loose intake or suction lines, or a clogged filter will cause reduction in delivery and considerable pump noise. Whitish oil color is the warning signal of these troubles. Continued operation under such unfavorable conditions will produce quick wear or damage of the pump parts.

The average user can make only a few simple tests to eliminate condition of the oil while the system is running, a sample should be drawn from their reservoir and placed in a clean glass bottle. Any foam present should disappear in a minute or so. If the oil is a good grade in good condition, practically all of the moisture should quickly separate and settle. Large dirt should also quickly precipitate but microscopic dirt may require several days to entirely settle. When the sample has become reasonably clear its color should be compared to a new sample of the same oil. Actual color of new oil means very little, but the change in color is

very significant. Any oil will darken with age, and a slight darkening is not important. But as severe darkening, to color of dark molasses may indicate a high level of soluble chemical contamination, and a sample should be chemically checked. In the event chemical analysis is not available it is recommended that system should be cleaned and flushed and new oil be placed in system. On a relatively small system the cost of the new oil would be much less than replacement of valves, pump and cylinder parts.

When replacing or adding oil to system care should be taken to use proper oil. Addition of oil that is not compatible with existing oil can cause severe problems along with the oil viscosity being drastically changed.

The following hydraulic fluid properties and filter specifications are recommended to be used.

A. Petroleum Base Fluids

Viscosity

Operating pressure 1000 PSI or over
225-320 SSU at 100°F

Viscosity Index 90 or over range of
recommended oil temperature 59° through 140°F

Phosphate ester base fluids, chlorinated hydrocarbon fluids, water-glycols and water-oil emulsions should not be used. Consult factory for further information.

B. Filtration

Inlet line - 70 microns

Pressure or return line - 25 microns

HYDRAULIC OIL

Recommended Specifications

ASTM

Test Method

D 287	Gravity	29.5
D 92	Flash Point, °F	420
D 92	Fire Point, °F	450
D 444	Viscosity, SUS at 100°F	200-215
	Viscosity, SUS at 210°F	49.3
	Brookfield viscosity, cP at 0°F, No. 4 spindle, 60 rpm	1800
D 2270	Viscosity Index	127
D 97	Pour Point, °F	-35
D 1500	Color	2.0
D 943	Oxidation, hours to 2.0 NN	+2000
D 1401	Demulsibility, minutes to 3 ml cuff	30 max
D 892	Foam Stability, ml after 5 min, setting	0
D 665	Rust Test	Pass Proc. A & B
Compatibility with rubber - Buna N, 70 hours, 212°F		+2.39
- Polyurethane, 168 hours, 158°F		+2.47
Viscosity grade - ISO VG		46

FILTER OPERATION AND FILTER OPERATING PROBLEMS
SECTION FO

D. R. SPERRY & CO.
112 NORTH GRANT STREET
NORTH AURORA, ILLINOIS 60542

FILTER OPERATION AND FILTER OPERATING PROBLEMS

LEAKAGE

It is practically impossible to prevent a small amount of leakage between the plates and the frames when handling clear liquids. The leakage is the result of wicking through the filter media. Leakage resulting from pumping clear water through a filter is not a cause for alarm. Gradual accumulation of solids will reduce the major portion of the leakage. Special leakproof plates are available to prevent leakage.

High discharge heads on closed delivery presses should be avoided.

Plates and frames of Sperry filter presses are machined to give accurate parallel joint surfaces. Should any joint on a Sperry filter press leak to a serious extent, check for a wrinkle in the filter cloth, or other filter media, or for a small amount of cake in the joint surface which has not been properly cleaned. Serious leakage, except for special cases, is almost invariably due to carelessness of operation.

CLOUDY FILTRATES

At the start of the filtration cycle, the filtrate usually runs cloudy for a short time until the deposit on the filter media builds up an effective filter cake. When a precoat of filter aid is used, there should be very little cloudiness.

If cloudiness persists, it may be due to a number of things. The pressure may be too high or may be fluctuating too much, leading to a pulsating effect which disturbs the filter cake on the filter media. The filter media may be torn. If cloudiness persists in the filtration, the need for a filter aid in the main batch, a precoat of filter aid or both is indicated.

If the filter media is torn, or if for any other reason, an individual filter chamber runs cloudy, the entire filtrate is effected. In open delivery filter presses, these chambers can be determined and cut off at once by closing the outlet cock. Open delivery filter presses with plain bibb outlets which cannot be easily cut off are not suitable for use on any material where cloudiness would lead to a loss of valuable filter cake or to a

reduction in the clarification efficiency of the filter press. Continued cloudiness from certain chambers of a filter press calls for a careful inspection of these chambers to determine the cause.

On closed delivery filter presses, there is no way of determining which chamber is delivering a cloudy filtrate unless a visible closed discharge fitting is used. This equipment is available on specially designed plates and makes it possible to identify the chamber that is leaking and to shut it off.

UNEVEN FILTER CAKES

If any chambers show evidence of uneven cakes when the filter press is opened, the cause is usually a clogged feed port in the frame of that chamber. This condition, unless corrected, can cause plate breakage.

Uneven filter cakes may result from the use of a pump of inadequate capacity or too low a discharge pressure. On some types of free filtering materials with granular or crystalline solid content, bottom discharge types of plates may lead to uneven filter cakes, because of the rapid filtration of material at the bottom section of the chamber before a solid, uniform cake is built up on the entire surface of the filter media. In such cases a top discharge type of filter is often desirable. Uneven filter cakes are not likely to lead to cloudy filtrates where there is any possibility of pressure fluctuation in the feed line, but make it difficult to get good washing of the cake in any chamber where the cakes are uneven.

SLOW FILTRATION RATES

The nature of many materials makes a slow filtration rate inevitable. If laboratory tests have been made and the rate of filtration is found to be slow, in spite of due consideration of filter aids, heating and other factors which might increase the rate, there is little that can be done to speed it up.

On the other hand, if the product filters at a slow rate, it may be advisable to investigate the possibility of speeding up the rate by the use of filter aid in the batch, of heating the material or of making possible changes in processing prior to filtration which would change the character of the material so as to make speedier filtration possible.

On filter presses that have been in use for a considerable period, corrosion may have removed part of the pyramids of the draining surface to the extent of handicapping the filtration rate by providing inadequate drainage from behind the filter cloth.

CHECK LIST FOR OPERATIONAL DIFFICULTIES

- (1) Pressure instantly increases to a high value.

Check to see that there are no valves closed in the feed line.

Check plates and frames for proper location, making certain that all the "V" handles are on the same side bar.

Check cloths to see that all necessary holes have been provided and that there are no turned corners which block off a port. Holes in the cloths must match the holes in the plates.

- (2) Filtration rate decreases rapidly so only a thin cake can be obtained.

Suitable filter aid can be used as a precoat and in the slurry being filtered to improve the filtration rate.

- (3) Pump does not deliver material to filter.

Check suction line to make certain that there is no obstruction in it.

If pump is centrifugal or turban type, make certain that pump is not air bound.

If pump is diaphragm type, open all valves and check for solids that may lodge under balls. Remove ends and check diaphragms.

- (4) Material flows through filters, but no pressure develops.

Material is very free filtering and the pump is under size.

- (5) Wash water rate increases rapidly with continuing wash and analysis of final cake shows poor washing.

Cake contains soluble solids which are not completely in solution or cake itself is partially soluble. Dilute or heat feed to insure complete solution of soluble matter, or if cake is slightly soluble, use a wash solution that has first been saturated with the cake forming material.

POOR PRECOATS OF FILTER AID

If a filter aid precoat for the material is required and if there is difficulty in getting uniform coating, the reason is probably the use of a type filter not adapted to the precoating operation. Frequently a filter press is installed without thought being given to the possible need for precoating. Later the need for precoating arises and unless the type of filter press originally installed is suitable for the precoating operation, much trouble may be experienced.

PLATE BREAKAGE

THE FOLLOWING CONDITIONS ARE SOURCES THAT CAN LEAD TO UNBALANCED PRESSURES CAUSING PLATE BREAKAGE IN A PLATE AND FRAME TYPE FILTER PRESS. THESE CONDITIONS CAN SOMETIMES BE OBSERVED WHEN CLEANING THE FILTER PRESS, IN THE FORM OF THICK AND THIN CAKES, PARTIALLY FILLED CHAMBERS AND ALTERNATE FIRM AND SLOPPY CAKES. THESE CONDITIONS MUST BE CORRECTED BEFORE FILTRATION CAN CONTINUE.

WHAT CAN CAUSE BREAKAGE

<u>CAUSE</u>	<u>CORRECTION</u>
1. CLOGGED FEED PORTS	1. CLEAN FEED PORTS THOROUGHLY IN FRAMES. IN RECESS PLATES REMOVE PLUGS LEFT IN FEED EYES.
2. INTERMITTENT PUMPING OF FEED PUMPS	2. ELIMINATE CAUSE OF INTERMITTENT PUMPING. IF PUMPS ARE TO BE RESTARTED, START THEM AT A VERY LOW PRESSURE AND GRADUALLY BUILD PRESSURE.
3. SHORT BATCHES WITH INSUFFICIENT SOLIDS	3. HAVE ENOUGH SLUDGE AVAILABLE TO COMPLETE THE FILTER CYCLE OR OBTAIN A DUMMY PLATE TO SHORTEN CHAMBER SIZE.
4. SOLIDS BUILD-UP IN PLATE DRAINAGE AREAS REDUCING FLOW TO OUTLET. PLUGGED OR PARTIALLY PLUGGED OUTLET.	4. INSPECT PLATE DRAINAGE AREAS BEHIND CLOTHS PERIODICALLY. SOME CLOTHS MAY ALLOW MORE SOLIDS TO PASS THROUGH THAN OTHER STYLE CLOTH UNPLUG AND CLEAN OUTLET.
5. HIGH VELOCITY CONSTANT PRESSURE/FLOW PUMPS SUCH AS PROGRESSIVE CAVITY PUMPS USED FOR FEEDING-SLUDGE TO PRESS-MAY CAUSE BREAKAGE DUE TO VELOCITY SHOCK ON ONE SIDE OF THE PLATE.	5. USE PUMPS WITH A PRESSURE/FLOW CURVE CORRESPONDING TO THE FILTRATION CURVE OF THE MATERIAL FILTERED.
6. IMPROPER USE OF DUMMY PLATES	6. PLACE DUMMY PLATE DIRECTLY BEHIND SLIDE HEAD PLATE. DO NOT USE SLIDE HEAD PLATE ONLY TO SHORTEN PRESS CHAMBER SIZE.
7. DYNAMITING OF PLATES. FEED VALVE CLOSED WHEN FEED PUMP STARTED OR OUTLET VALVES CLOSED WHEN FEED PUMP STARTED.	7. OPEN ALL VALVES BEFORE STARTING FEED PUMPS.
8. CARELESS HANDLING OF PLATE	8. HANDLE PLATES CAREFULLY

AN EXAMPLE OF THE MAGNITUDE OF UNBALANCED PRESSURE CAN BE SEEN ON A 48" FILTER PRESS. IF THE PRESS PRESSURE WAS 60 PSI ON ONE SIDE OF THE PLATE AND ZERO ON THE OTHER SIDE, THE RESULTANT FORCE WOULD BE 138,240 LBS. ON THE PLATE.

ERECTION AND OPERATION

EHCL Presses

The erection of this filter press is basic and straight forward. The filter press is shipped partially assembled for ease of erection. Use the blue print of the press supplied and the basic EHCL parts lists illustration for guidance. Assemble the press per the following steps:

1. Attach fixed head leg, Item 49 to fixed head Item 3.
2. Assemble the cylinder with its components Item 16 to cylinder leg Item 37.
3. Insert the sidebars Item 8 into the fixed head Item 3. Support the bars in a horizontal position in order to loosely assemble the sidebar nuts Item 51.
4. Slide the cylinder and leg assembly onto the sidebars, lining up the holes in cylinder Item 16 with the bars Item 7. Assemble the shaft nuts Item 51 and tighten the nuts on both ends of the press. NOTE: If truss rod plate or plate shifter supports are provided these items must be assembled onto the shafts before tightening the shaft nuts.
5. Assemble truss rods and truss rod props or position floor supports if provided.
6. Assemble the pump and motor box along with the pump and motor base onto the angles that are attached to the cylinder leg Item 37. Position the pump and motor so that the pump is to the right hand side when facing the cap end of the cylinder.
7. Connect hydraulic hoses Item 30, cap end, and Item 35 rod end to cylinder and pump. Mount the electrical control box and bracket on the side of the cylinder. Install pressure gauge Item 23.
8. Remove valve cover Item 21 and fill cylinder reservoir with the non-detergent hydraulic oil supplied (AMOCO All Weather or equal). Push "Forward" button on controller Item 53 and check pump rotation. (NOTE: Pump rotation should be counter-clockwise). Cycle cylinder back and forth to expend any air present in the system and checking cylinder operation.

9. Install filler Item 42 along with its related parts, pivot shaft Item 38, pivot Item 39, washer Item 40, and flex joint Item 41. Insure that the filler swings freely after installation.
10. Install the slide head Item 11 with rollers attached over the sidebars. Connect this head to the piston rod of the cylinder Item 44 by means of the split pull back plate Item 12. Again cycle cylinder forward and reverse to insure no binding occurs.
11. Install the head plates Items 4 and 8 along with head connections Item 52. Install balance of plates and frames along with the filter media.
12. To close press for operation activate forward on controller Item 53. This will move slide head Item 11 forward until relief valve Item 22 opens under set pressure. At this time swing up filler Item 42 over rod Item 43 and tighten lock nut Item 43 against it. Release forward button. (NOTE: Do not run motor continuously after locking press).
13. To open press for cleaning depress forward on controller and unlock nut Item 43 and swing back filler Item 42. Release forward and depress reverse. Retract ram until it stops and release reverse button.
14. The relief valve Item 22 has been factory preset for specific or typical conditions. NO ATTEMPT SHOULD BE MADE TO SET THE RELIEF VALVE ABOVE 2,000 PSI READING ON GAUGE ITEM 23.