LeTourneau TECHNOLOGIES™ DRILLING SYSTEMS

Parts Catalogue

Rowan
Rig 84
WH1612-206
Triplex Pump

Read this manual completely before ordering spare parts for this pump

Caution

Pumps are shipped dry.
Fill with proper lubricant before operating.
See Maintenance Manual.

6500 Brittmoore, Houston, Texas 77041 PO Box 41343, Houston, Texas 77241-1343
832-872-6500 1-866-946-5333 FAX: 832-782-6627
www.letourneau-inc.com/drilling pumps@let-tech.com

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Introduction

Serial Number and Ordering Information

Drawings

Drawing	Number	Revision Level
Unitization	WH1612-206	1
Bareshaft Pump Assembly	D186006	2
Crankshaft Assembly	D186200	1
Pinion Shaft Assembly	D186300	1
Crosshead Assembly	D186400	7
Fluid End Assembly	D105410	3
Frame Assembly	D186100	3
Lube Oil Schematic	D105362	6

Introduction

This manual is intended to be a valuable service tool. Before placing the mud pump in service, study this manual thoroughly. Your familiarity with the contents will help to complete any service work quickly and correctly.

Qualified personnel should immediately check all equipment shipped. Pay particular attention to those parts that were unprotected in shipment and susceptible to damage. Inspect all surfaces and immediately correct any damage prior to installing the equipment. Small, separately packed items should be inspected for damage and missing parts. After inspection, these items should be safely repacked until needed.

Serial Number

Model: ***WH1612***

Serial Number: ***206***

Ordering Information

When ordering parts for a machine, be sure to furnish both the model and serial number of the pump.

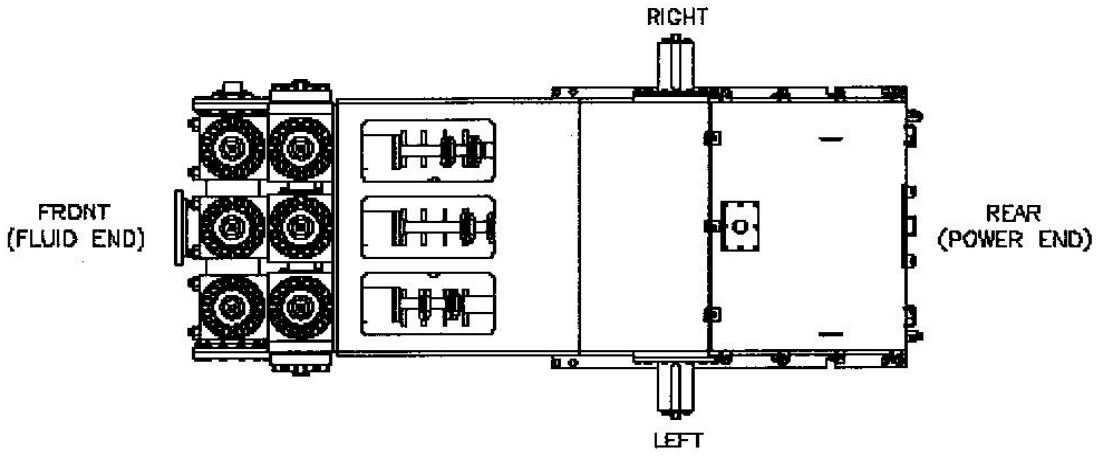
Please provide the following information:

- the name and number of the part,
- the number of the assembly drawing where the part is listed,
- the quantity of parts required,
- complete shipping instructions including destination and carriers.

We strive to give the best possible service to you, our customer. Should you encounter some difficulty, a clear statement of facts will enable us to analyze the problem and make a helpful recommendation about parts and servicing.

Contact: partsales@letourneautechnologies.com, or partsales@let-tech.com

For the sake of clarification of terminology in service work or parts ordering, use the diagram provided below to differentiate between RIGHT, LEFT, FRONT, and REAR of the pump.



Parts list for :

WH1612-206



PUMP-MUD, WH1612 ROWAN

SEQ	PART	QUANTITY	DESCRIPTION
1	D186006	1.00	PUMP-BARESHAFT, WH1612 12P SW
2	D186574	1.00	SKID-MASTER, WH1612 REAR MOUNT
3	002-1670	20.00	BOLT HX 1.000 8NC 4.00 G8
4	943-3576	16.00	NUT-HEX,HVY 1.000 8 NC A194-2H
5	002-1553	16.00	WASHER-FLAT, 1.00" WIDE
6	002-1544	20.00	WASHER-LOCK, 1.000"
7	108-0111	1.00	FLANGE-BLIND, 5-1/8" 5000 PSI
8	M43H01822X4002000	1.00	MOTOR ASSY,1600HP,BULLSHAFT
9	D186577	1.00	GUARD-BELT, RH WH1600 SNGL DRV
10	108-1205	1.00	BELT KEVLAR 14 RIB 8V 3000
11	B107003	1.00	SHEAVE-V BELT, 14-8V 4150 W
12	B107028	1.00	BUSHING-QD, 8.5 W
13	B107033	1.00	SHEAVE-V BELT, 14-8V 2400
14	EC208	12.00	CSCR SK 1-14 UNS 2.50 G8
15	B105115	2.00	BRACKET MOTOR ADJ #1
16	B105116	2.00	BRACKET MOTOR ADJ #2
17	A106010	2.00	MOTOR BACK-UP PLATE 752
18	002-5784	8.00	NUT-HEX,HVY 1.500 6 NC A194-2H
19	ES177	2.00	STUD 1.500 6NC 16.00 B7
20	400-9523	4.00	BOLT HX .750 10NC 1.50 G8
21	EB458	4.00	CSCR HEX 1.500 6NC 3.50 G8
22	002-5776	4.00	WASHER-LOCK, 1.500"
23	B106090	1.00	PLATE-MOTOR, WH-1600 REAR MNT
24	B106041	1.00	TANK-LINER WASH
25	B164717	2.00	LID-LINER WASH TANK, W-2200
26	EP225	1.00	PUMP-LINER WASH, 1X1-1/2C 3HP

Parts list for :

WH1612-206

PUMP-MUD, WH1612 ROWAN

SEQ	PART	QUANTITY	DESCRIPTION
27	B106024	2.00	BRACKET-LUBE OIL PUMP
28	B167545	1.00	STRAINER-CAGE,SS 5K & 10K 1700
29	C105007	1.00	CROSS-STRAINER,5K 5 1/8"
30	ES407	24.00	STUD 1.125 12UNF 6.00 1.50 B7
31	ES178	40.00	STUD 1.500 12NF 7.00 B7
32	050-8321	40.00	NUT-HEX,HVY 1.500 12NF A194-2H
33	EN143	24.00	NUT-HEX,HVY 1.125 12 NF A194-2
34	B105002	1.00	SPOOL 5K PSI 5 1/8X4 1/16
35	EG108	5.00	GASKET-RING,R-44 S
36	108-0100	2.00	GASKET-RING,BX-169S
37	C305014	1.00	DAMPENER-PULSATION, L20 5K
38	108-0618	1.00	BLADDER L-20 DIAPHRAGM 20 GAL
39	A305015	1.00	NAMEPLATE, DAMPENER SERIAL NO.
40	B105102	1.00	DAMPENER-SUCTION, W-2200
41	B105062	1.00	FLANGE-SUCTION DAMPENER, 10"
42	EG162	2.00	GASKET 150# RF FLANGE 10"
43	002-1664	24.00	BOLT HX .875 9NC 4.00 G8
44	002-1543	24.00	WASHER-LOCK, 0.875"
45	002-1529	24.00	NUT-HEX, .875 9 NC G8
46	D105481	1.00	CRANE-JIB, WH1612
47	108-1041	1.00	TROLLEY, ½TON F/6" WIDE BEAM
48	108-1040	1.00	HOIST-CHAIN, 1/2 TON 12' LIFT
49	002-1644	12.00	BOLT HX .750 10NC 2.00 G8
50	002-1542	16.00	WASHER-LOCK, 0.750" ZINC
51	EG173	1.00	GAUGE 2" 6K UNION M#8 OTECO
52	108-1119	1.00	VALVE-RELIEF, 5K 3" 1502 TITAN

Parts list for :

WH1612-206

PUMP-MUD, WH1612 ROWAN

SEQ	PART	QUANTITY	DESCRIPTION
53	B105512	1.00	MOUNT-OIL FILTER
54	108-0084	1.00	NAMEPLATE, ROTATION CCW 2¼X6
55	108-0776	1.00	NAMEPLATE, OP/SERVICE WARNING
56	108-0089	1.00	NAMEPLATE, "LTI" 3" X 5"
57	108-1196	1.00	NAMEPLATE, HIGH VOLTAGE WARN
58	108-1197	1.00	NAMEPLATE, DISCONNECT SERVICE
59	A105510	1.00	NAMEPLATE, MAIN LUBE MANIFOLD
60	A105511	1.00	NAMEPLATE, XHEAD LUBE MANIFOLD
61	108-0235	1.00	FLANGE-BLIND, 10" 150 LB RF
62	B167308	1.00	COVER-PINION SHAFT EXTENSION
63	B105363	1.00	SPOOL 5K PSI 5 X 5 12P
64	B106044	1.00	ASSEMBLY-LUBE PUMP, #3
65	002-1544	4.00	WASHER-LOCK, 1.000"
66	ES261	8.00	STUD 1.500 12NF 10.00 2.25 B7
67	108-0109	1.00	FLANGE-W/N, 5-1/8 5XXH 5K
68	108-1118	1.00	FLANGE-W/N, 5-1/8 3XXH 5K
69	B105257	1.00	ELBOW-FLANGED, 5-1/8 10 KSI
70	A105245	2.00	PAD-MOUNTING
71	A105246	2.00	PAD-TAPPED
72	500-2568	1.00	PAD-TAPPED
73	080-1181	2.00	WASHER-LOCK, 0.500"
74	082-7222	2.00	BOLT HX .500 13NC 2.00 G8
75	B105658	1.00	PLATE-STRAINER CROSS SUPPORT
76	108-0081	1.00	FLANGE-THREADED, 1" 150 LB
77	EF124	1.00	PIPE STRAINER WATTS 1-1/4"
78	EG130	1.00	GAUGE 2.5 LIQ 0-60 SS BTM MNT

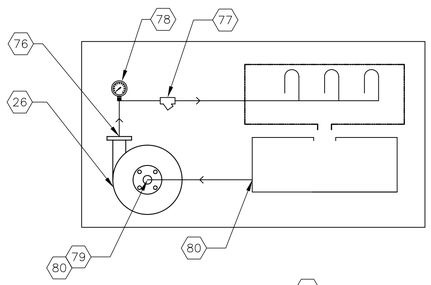
Parts list for :

WH1612-206

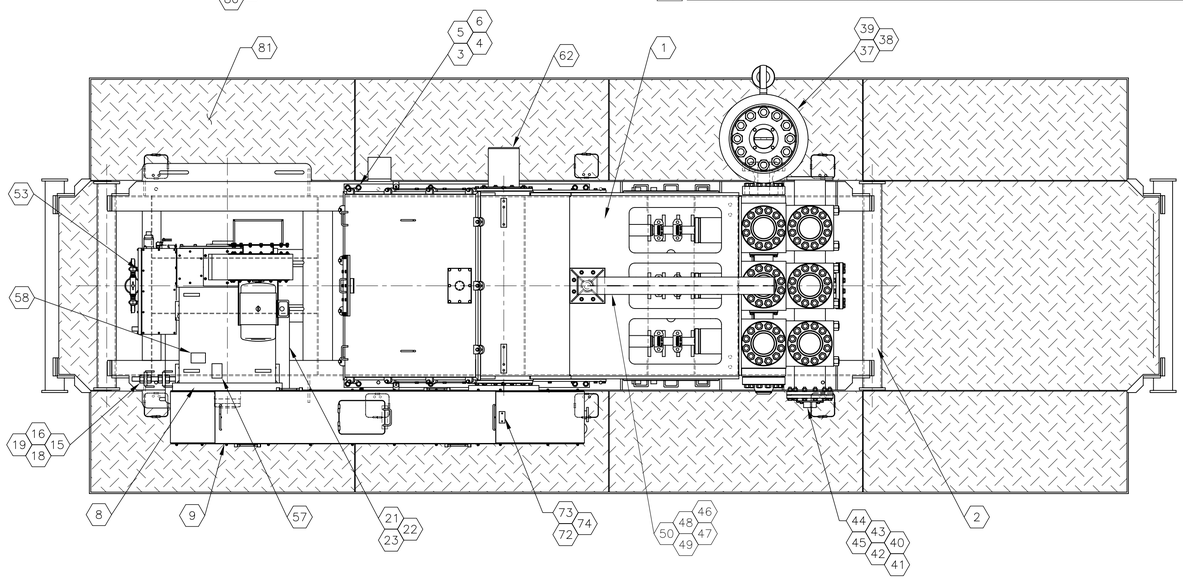
PUMP-MUD, WH1612 ROWAN

SEQ	PART	QUANTITY	DESCRIPTION
79	108-0080	1.00	FLANGE-THREADED, 1-1/2" 150 LB
80	108-0760	2.00	NIPPLE-HOSE, 1-1/2" NPT KING
81	D186576	1.00	SKID-MAT, WH1612
82	108-0609	1.00	COUNTER-STROKE, MAG MD TOTCO

DWG NO. WH1612-206



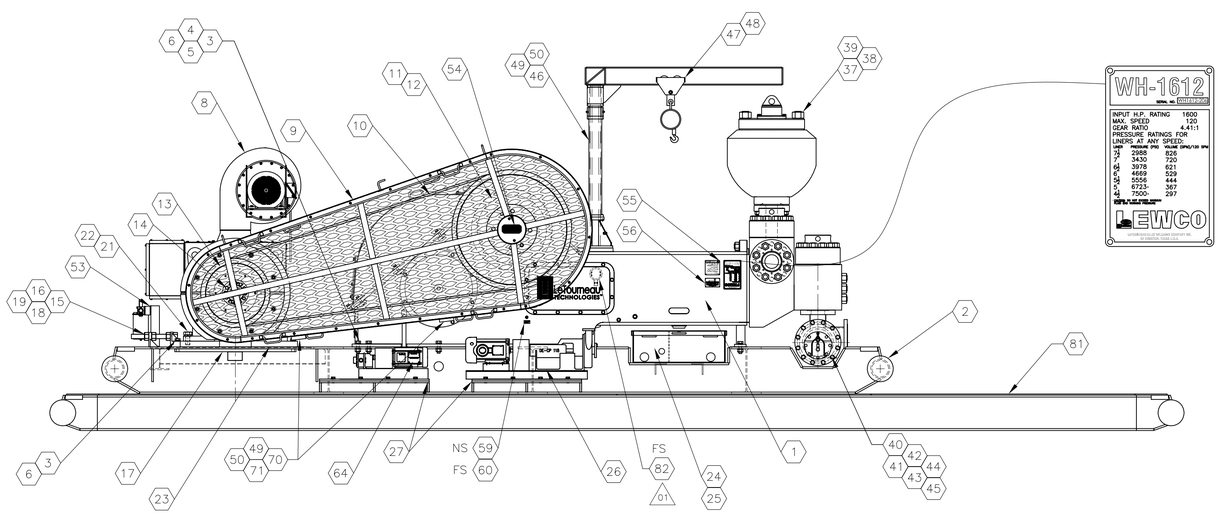
ITEM	QTY	PART NO.	DESCRIPTION
71	2	A105246	PAD – TAPPED
72	1	500-2568	PAD – TAPPED
73	2	080-1181	WASHER – LOCK, .500"
74	2	082-7222	BOLT HX .500 13NC 2.00 G8
75	1	B105658	PLATE – STR. CROSS SUPPORT
76	1	108-0081	FLANGE-THREADED, 1" 150 LBS
77	1	EF124	PIPE STRAINER WATTS 1-1/4"
78	1	EG130	GAUGE 2.5 LIQUID 0-60 SS BTM MNT
79	1	108-0080	FLANGE-THREADED 1-1/2" 150 LBS
80	2	108-0760	NIPPLE-HOSE, 1-1/2" NPT KING
81	1	D186576	SKID-MAT, WH1612
01 82	1	108-0609	STROKE COUNTER



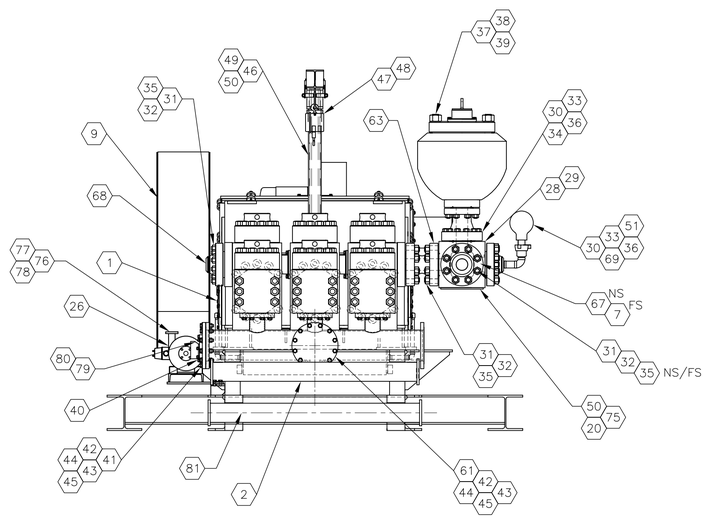
ITEM	QTY	PART NO.	DESCRIPTION
36	2	108-0100	GASKET – RING, BX-169S
37	1	C305014	DAMPENER – PULSATION, L20 5K
38	1	108-0618	BLADDER – BUNA N
39	1	A305015	ENGLISH SERIAL NUMBER PLATE
40	1	B105102	DAMPENER – SUCTION, W-2200
41	1	B105062	FLANGE – SUCTION DAMPENER, 10"
42	2	EG162	GASKET 150# RF FLANGE 10"
43	24	002-1664	BOLT HX .875 9NC 4.00 G8
44	24	002-1543	WASHER – LOCK, ø.875
45	24	002-1529	NUT – HEX, .875 9NC G8
46	1	D105481	CRANE – JIB, WH1612
47	1	108-1041	TROLLEY, 1/2 TON F/6" WIDE BEAM
48	1	108-1040	HOIST – CHAIN, 1/2 TON 12' LIFT
49	12	002-1644	BOLT HX .750 10NC 2.00 G8
50	16	002-1542	WASHER – LOCK, ø.750
** 51	1	EG173	GAUGE 2" 6K UNION M #8 OTECO
** 52	1	108-1119	VALVE – RELIEF, 5K 1502
53	1	B105512	MOUNT – OIL FILTER
54	1	108-0084	NAMEPLATE ROTATION CCW 2-1/4 X 6
55	1	108-0776	NAMEPLATE OP/SERVICE WARNING
56	1	108-0089	NAMEPLATE (LEWCO) 3 X 5
57	1	108-1196	NAMEPLATE HIGH VOLTAGE WARNING
58	1	108-1197	NAMEPLATE DISCONNECT SERVICE
59	1	A105510	NAMEPLATE MAIN LUBE MANIFOLD
60	1	A105511	NAMEPLATE XHEAD LUBE MANIFOLD
61	1	108-0235	FLANGE – BLIND, 10" 150# RF
62	1	B167308	EXTENSION COVER, PINION SHAFT
63	1	B105363	SPOOL 5K PSI 5 X 5 12P
64	1	B106044	LUBE PUMP ASSEMBLY
65	4	002-1544	WASHER – LOCK, ø1.000
66	8	ES261	STUD 1.500 12NF 10.00 2.25 B7
67	1	108-0109	FLANGE – W/N, 5-1/8 5XXH 5K
68	1	108-1118	FLANGE – W/N, 5-1/8 3XXH 5K
69	1	B105257	ELBOW – FLANGED, 5-1/8 10 KSI
70	2	A105245	PAD – MOUNTING

ITEMS 51 (GAUGE) & 52 (RELIEF VALVE) SHIPPED LOOSE

ITEM	QTY	PART NO.	DESCRIPTION
1	1	D186006	PUMP – BARESHAFT, WH1612
2	1	D186574	SKID – MASTER, WH1612 REAR MOUNT
3	20	002-1670	BOLT HX 1.000 8NC 4.00 G8
4	16	943-3576	NUT – HEX, HVY 1.000 8NC A194-2H
5	16	002-1553	WASHER – FLAT, ø1.00 WIDE
6	20	002-1544	WASHER – LOCK, ø1.00
7	1	108-0111	FLANGE – BLIND, 5-1/8" 5000 PSI
8	1	M43H01822X4002000	MOTOR ELEC., OEM TT1600 R.H.
9	1	D186577	GUARD – BELT, RH WH1600 SINGLE DRIVE
10	1	108-1205	BELT KEVLAR 14 RIB 8V 3000
11	1	B107003	SHEAVE – V BELT, 14-8V 4150 W
12	1	B107028	BUSHING – QD, 8.5 W
13	1	B107033	SHEAVE – V BELT, 14-8V 2400
14	12	EC208	CSCR SK 1-14UNS 2.50 G8
15	2	B105115	BRACKET MOTOR ADJ #1
16	2	B105116	BRACKET MOTOR ADJ #2
17	2	A106010	MOTOR BACK-UP PLATE 752
18	8	002-5784	NUT – HEX, HVY 1.500 6NC A194-2H
19	2	ES177	STUD 1.500 6NC 16.00 B7
20	4	400-9523	BOLT HX .750 10NC 1.50 G8
21	4	EB458	CSCR HEX 1.500 6NC 3.50 G8
22	4	002-5776	WASHER – LOCK, ø1.500
23	1	B106090	PLATE – MOTOR, WH1612 REAR MNT, OEM 1600
24	1	B106041	TANK – LINER WASH
25	2	B164717	LID – LINER WASH TANK, W-2200
26	1	EP225	PUMP – LINER WASH, 1 X 1-1/2C 3HP
27	2	B106024	BRACKET – LUBE OIL PUMP
28	1	B167545	STRAINER – CAGE, SS 5K & 10K 1700
29	1	C105007	CROSS – STRAINER, 5K 5-1/8"
30	24	ES407	STUD 1.125 12UNF 6.00 1.50 B7
31	40	ES178	STUD 1.500 12UNF 7.00 B7
32	40	050-8321	NUT – HEX, HVY 1.500 12UNF A194-2H
33	24	EN143	NUT – HEX, HVY 1.125 12UNF A194-2H
34	1	B105002	SPOOL 5K PSI 5-1/8 X 4-1/16
35	5	EG108	GASKET – RING, R-44S



STAMP WH1612-206 UNDER THE NAME PLATE BEFORE MOUNTING THE PLATE



REVISIONS	ZONE	REV	DESCRIPTION	ECN	DATE	CHG	CHK	APP
		00	RELEASE	7-0990	10/3/07	SWN	CRS	JLS
		01	TO ADD STROKE COUNTER	7-1113	12/26/07	SWN	WMA	JLS

LeTourneau TECHNOLOGIES™
HOUSTON, TEXAS

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UNLESS OTHERWISE SPECIFIED:
- DIMENSIONS ARE IN INCHES & APPLY BEFORE PLATING OR FINISH COATINGS.
- TOLERANCES ON: ANGLES ±1°, FRACTIONS ±1/16, .XX DECIMAL ±.03, .XXX DECIMAL ±.015
- MACHINED CORNERS 1/64 X 45°
- WELD PROPERTIES SHALL MEET THE MINIMUM REQUIREMENTS OF THE BASE MATERIAL.

USED ON

		DATE
DWN	SWN	10/3/07
CHK	CRS	10/4/07
ENGR	JBG	10/4/07
MATL	SEE BOM	

THIRD ANGLE PROJECTION

WH1612 UNITIZATION, RH

SIZE D | DO NOT SCALE | DWG NO. WH1612-206 | REV 01

SCALE 1:26 | EST WT | SHEET 1 OF 1

DWG NO. D186006

REVISIONS

ZONE	REV	DESCRIPTION	ECN	DATE	CHG	CHK	APP
	00	RELEASE	4-0039RL	2/25/04	RJP	JBP	JLS
	01	REVISED PER ECN	4-0242	3/10/04	RJP	WMA	JLS
	02	CHANGED ITEM 7 FROM: B186500 TO: B186517	5-0310	4/12/05	DY	JBP	JLS

02

ITEM	QTY	PART NO.	DESCRIPTION
10	3	B186406	PONY ROD
9	3	B150118	PISTON ROD
8	3	B186401	SUB ROD
7	2	B186517	NAMEPLATE
6	1	D105362	LUBRICATION ASSEMBLY
5	1	D105410	FLUID END ASSEMBLY
4	1	D186400	CROSSHEAD ASSEMBLY
3	1	D186300	PINION SHAFT ASSEMBLY
2	1	D186200	CRANKSHAFT ASSEMBLY
1	1	D186100	FRAME ASSEMBLY

LEWCO
HOUSTON, TEXAS

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UNLESS OTHERWISE SPECIFIED:
- DIMENSIONS ARE IN INCHES & APPLY BEFORE PLATING OR FINISH COATINGS.
- TOLERANCES ON: ANGLES ±1° FRACTIONS ±1/16 .XX DECIMAL ±.03 .XXX DECIMAL ±.015
- MACHINED CORNERS 1/64 X 45°
- WELD PROPERTIES SHALL MEET THE MINIMUM REQUIREMENTS OF THE BASE MATERIAL.
- ALL MACHINED SURFACES TO HAVE A FINISH OF 125 UNLESS OTHERWISE NOTED

USED ON WH-1612

		DATE
DWN	RJP	1/26/04
CHK	JBP	2/25/04
ENGR	JBP	2/25/04
MATL		

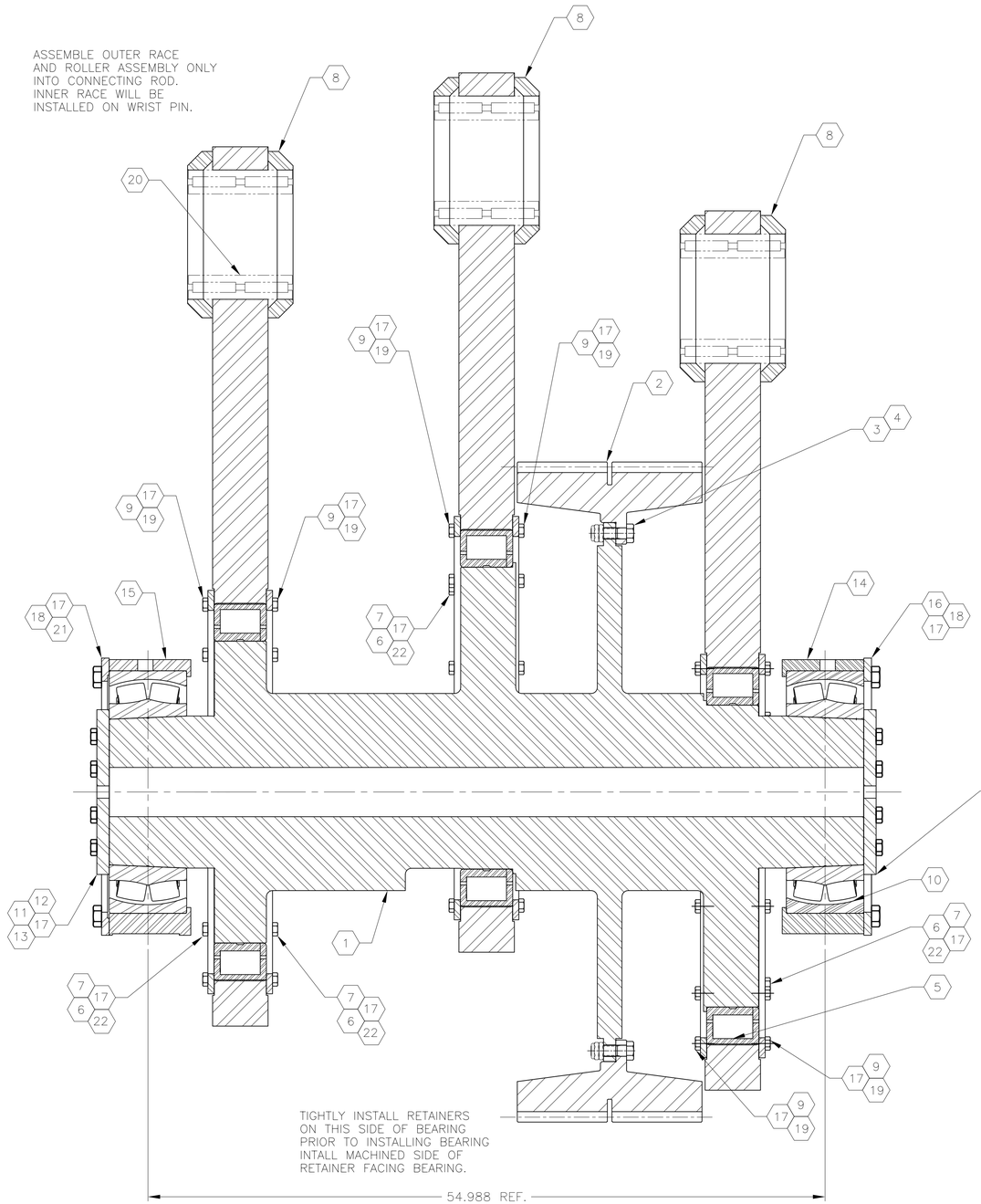
THIRD ANGLE PROJECTION

WH-1612 BARESHAFT PUMP ASSEMBLY

SW STYLE 12P FLUID END - 5000 PSI

SIZE		DWG NO.	REV
A	DO NOT SCALE	D186006	02
SCALE N.T.S.	EST WT	SHEET 1 OF 1	

DWG NO. D186200



ITEM	QTY	PART NO.	DESCRIPTION
1	1	D186201	CRANCKSHAFT-MACHINED
2	1	C186207	GEAR
3	12	002-7583	BOLT HX .875 9NC 3.00 G8
4	12	A150227	NUT LOCK NYL INS .875 NC
5	3	EB184	BRG ECCENTRIC
6	16	A162224	RETAINER INNER BRG ECCENTRIC
7	32	EB403	BOLT HX .750 10NC 1.50 G8 DH
8	3	B186209	CONNECTING ROD
9	12	C150297	RETAINER OUTER BRG ECCENTRIC
10	2	EB182	BRG MAIN
11	2	B167204	SHIM SET BRG MAIN
12	2	B167203	INNER RACE RETAINER MAIN BEARING
13	16	A300212	BOLT HX 1.000 8NC 2.50 G8 DH
14	1	B167206	MAIN BEARING CARRIER, LH
15	1	B167205	MAIN BEARING CARRIER, RH
16	1	B167202	MAIN BEARING OUTER RACE RETAINER RH
17	AR	EW109	WIRE SAFETY .047
18	16	A167233	BOLT HX .750 10NC 1.75 G8 DH
19	72	413-8337	BOLT HX .625 11NC 1.50 G8 DH
20	REF	EB185	BRG WRIST PIN
21	1	B167240	MAIN BEARING OUTER RACE RETAINER LH
22	AR	A162259	SHIM SET ECCENTRIC INNER

01

* RETAINERS (ITEM 9) MUST BE INSTALLED AND TORQUED ON THIS SIDE OF ROD PRIOR TO INSTALLING BEARING IN ROD

MAIN BEARING INSTALLATION PROCEDURE:
1.) PLACE MAIN BEARING ON SHAFT WITH HAND-TIGHT FIT (NO LOOSENESS AND NO PRESS)
2.) MEASURE DISTANCE FROM END OF SHAFT TO FACE OF BEARING.
3.) SUBTRACT .085 FROM MEASUREMENT FOR SHIMPACK THICKNESS.
4.) INSTALL SHIMPACK (ITEM 11) TO THICKNESS DETERMINED ABOVE +/- .005.
5.) PRESS BEARING ONTO SHAFT UNTIL END OF BEARING IS FLUSH WITH SHIMPACK. FINAL DIAMETRAL CLEARANCE OF BEARING MUST BE .0024 TO .0080.

BEARING FITS AND BEARING ASSEMBLY TEMPERATURE DIFFERENTIALS

ITEM NO.	BEARING DESC & TYPE	RACE	MATING PART	FIT*	NOMINAL FIT DIAMETER	MINIMUM ΔT REQD FOR SLIP FIT ASSY	REQD RADIAL BRG CLEARANCE AFTER INSTALLATION
5	ECCENTRIC (CYLINDRICAL ROLLER)	INNER OUTER	SHAFT ECCENTRIC CONNECTING ROD	.0040T-.0070T .0020T-.0060T	24.500 30.500	45°F 25°F	.002 .009
20	WRIST PIN (NEEDLE ROLLER)	INNER OUTER	WRIST PIN CONNECTING ROD	.0020T-.0040T .0007T-.0025T	7.375 10.500	85°F 40°F	.0010 .0069
14	MAIN (SPHERICAL ROLLER)	INNER OUTER	CRANKSHAFT BEARING CARRIER	N/A .0000L-.0043L	N/A 19.687	N/A 0°F	.0024 .0080

* FIT ON DIAMETER IS SHOWN. T=TIGHT, L=LOOSE
BEARINGS MAY BE HEATED IN OIL BATH, OVEN, OR WITH INDUCTION HEATER, BUT NOT WITH TORCH.
NEVER ALLOW BEARING TEMPERATURE TO EXCEED 250°F.

REVISIONS	ZONE	REV	DESCRIPTION	ECN	DATE	CHG	CHK	APP
		00	RELEASE	RL5616-01	10/22/03	DY	WMA	JLS
		01	CHANGED QTY TO ITEM 22 FROM: 1 TO: AR	5-0838	11/30/05	DY	WMA	JLS

LEWCO HOUSTON, TEXAS

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- DIMENSIONS ARE IN INCHES & APPLY BEFORE PLATING OR FINISH COATINGS.
- TOLERANCES ON: ANGLES ±1°, FRACTIONS ±1/16, .XX DECIMAL ±.03, .XXX DECIMAL ±.015
- MACHINED CORNERS 1/64 X 45°
- WELD PROPERTIES SHALL MEET THE MINIMUM REQUIREMENTS OF THE BASE MATERIAL.
- ALL MACHINED SURFACES TO HAVE A FINISH OF 125 UNLESS OTHERWISE NOTED

USED ON D186000

		DATE
DWN	DY	10/22/03
CHK	WMA	10/28/03
ENGR	JBP	10/28/03
MATL	SEE BOM	

THIRD ANGLE PROJECTION

CRANKSHAFT ASSEMBLY

WH-1600

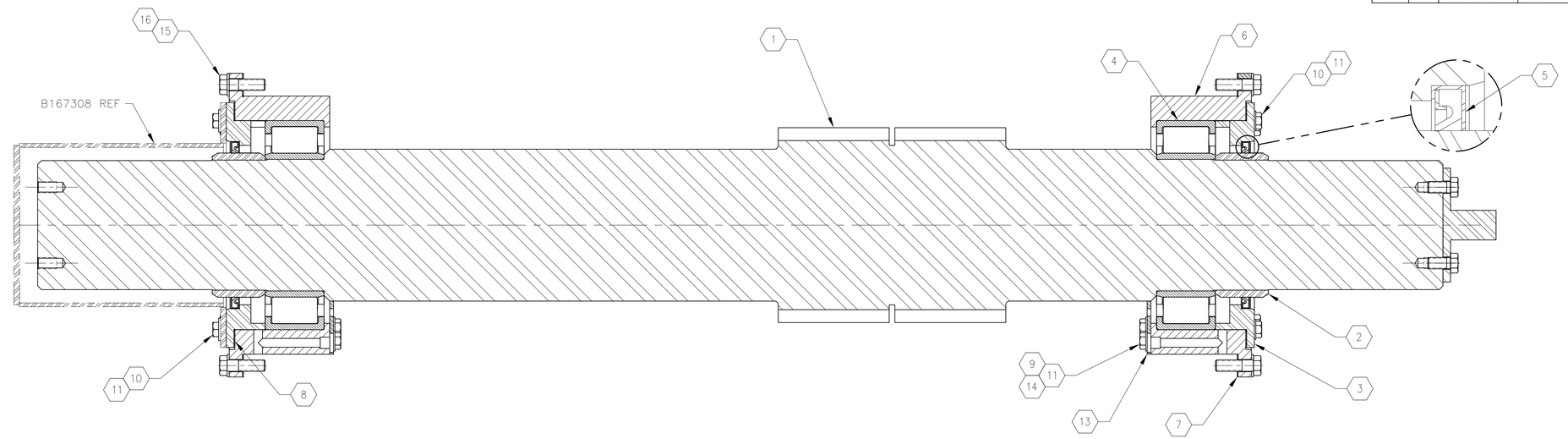
SIZE D | DO NOT SCALE | DWG NO. D186200 | REV 01

SCALE NTS | EST WT | SHEET 1 OF 1

DWG NO. D186300

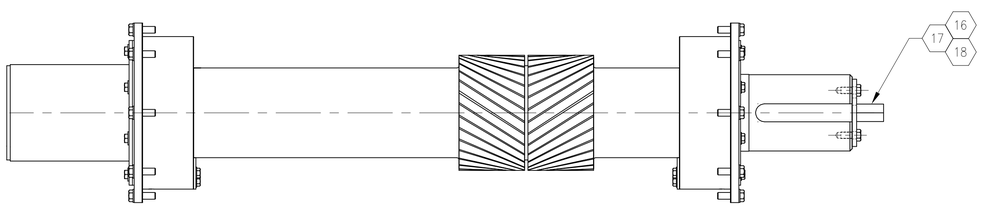
ITEM	QTY	PART NO.	DESCRIPTION
1	1	D186301	PINION SHAFT
2	2	A167303	PINION SHAFT SPACER
3	2	B167304	SEAL PLATE
4	2	EB129	PINION BEARING
5	2	E0122	OIL SEAL
6	2	C167302	PINION BEARING CARRIER
7	2	A167305	PINION BEARING CARRIER GASKET
8	2	A167306	SEAL PLATE GASKET
9	4	EW109	SAFETY WIRE
10	16	002-1629	BOLT HX 5/8-11 UNC X 1 3/4 LG
11	24	002-1541	LOCKWASHER 5/8
12			DELETED
13	2	A167307	OIL RETAINER PLATE
14	8	A167242	BOLT HX 5/8-11 UNC X 1 1/4 LG
15	16	002-1646	BOLT HX 3/4 NC X 2 1/2
16	20	002-1542	LOCKWASHER 3/4
17	1	A167314	PINION TURNING PLATE
18	2	400-9523	BOLT HX .750 NC X 1.50 G8

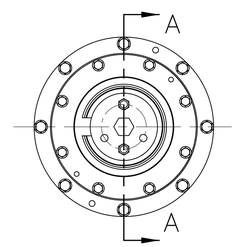
01



SECTION "A-A"

SCALE: 2X





REVISIONS	ZONE	REV	DESCRIPTION	ECN	DATE	CHG	CHK	APP
		00	RELEASE	RL5616-01	10/28/03	DBJ	WMA	JLS
		01	DELETED ITEM 12 (KEY)	6-0281	5/4/06	WMA	JLS	JLS

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- TOLERANCES ON: ANGLES ±1°
  FRACTIONS ±1/16
  .XX DECIMAL ±.03
  .XXX DECIMAL ±.015
- MACHINED CORNERS 1/64 X 45°
- WELD PROPERTIES SHALL MEET THE MINIMUM REQUIREMENTS OF THE BASE MATERIAL.

USED ON D186000

		DATE
DWN	DBJ	10-17-03
CHK	WMA	10-28-03
ENGR	JBP	10-28-03
MATL	SEE BOM	

THIRD ANGLE PROJECTION

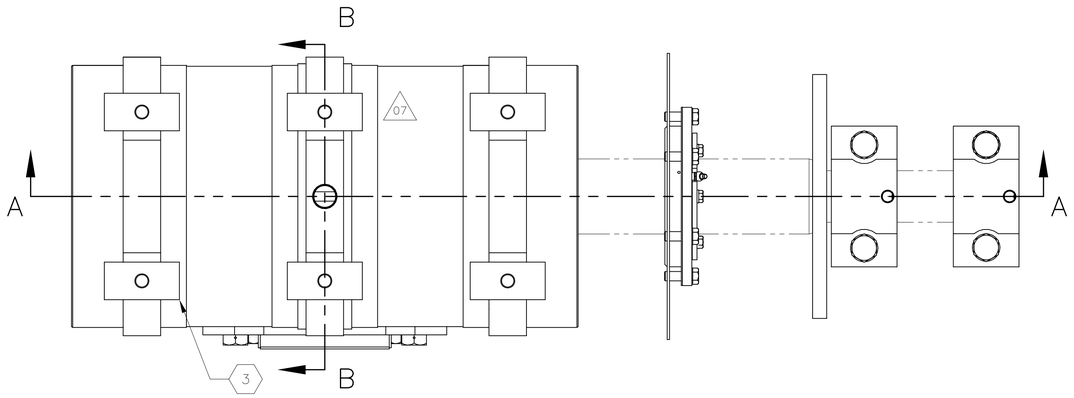
PINION SHAFT ASSEMBLY

WH-1600

SIZE	DO NOT SCALE	DWG NO.	REV
D		D186300	01

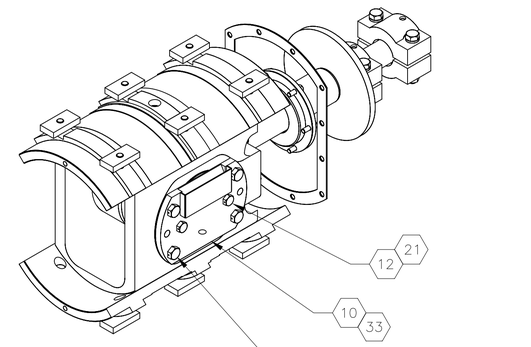
SCALE 1:8 | EST WT 2400 LBS | SHEET 1 OF 1

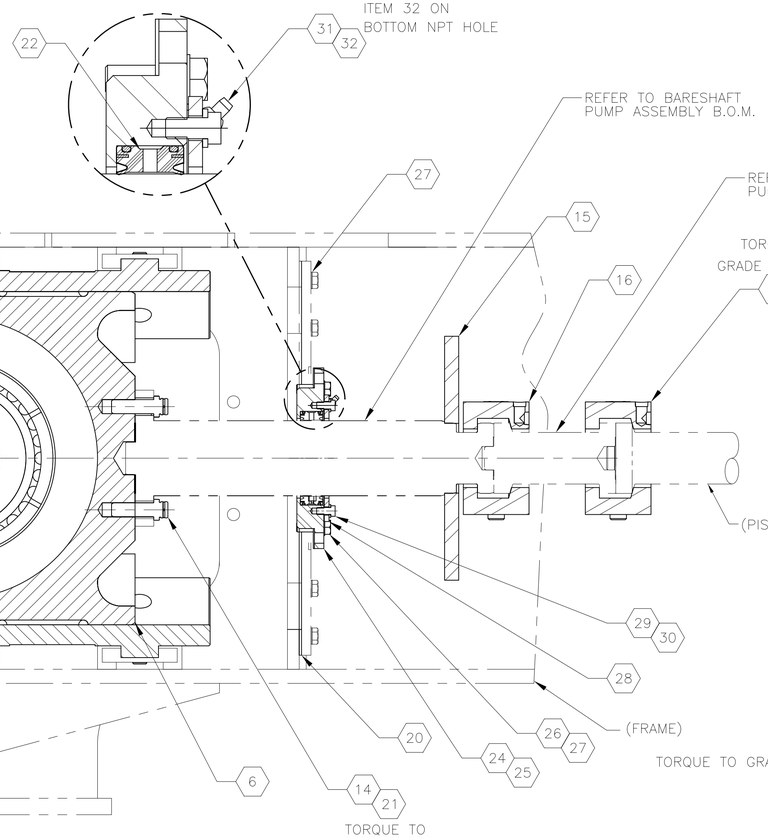
DWG NO. D186400



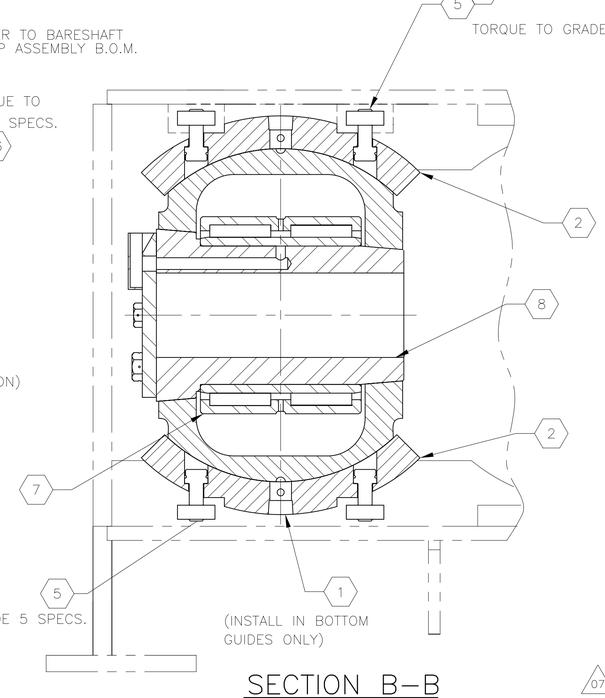
WRIST PIN SHIMMING PROCEDURE

1. INSERT WRIST PIN (ITEM 8 OR 9) INTO TAPERED BORE OF CROSSHEAD (ITEM 6)
2. INSTALL WRIST PIN RETAINER PLATE (ITEM 10) ONTO WRIST PIN USING BOLTS (ITEM 12). TORQUE BOLTS TO GRADE 8 SPEC (TORQUE ONLY THE BOLTS THAT THREAD INTO THE WRIST PIN).
3. INSTALL BOLTS (ITEM 11) THROUGH RETAINER PLATE INTO CROSSHEAD. TORQUE THE BOLTS TO 50 FT-LBS. BUMP THE WRIST PIN WITH A BRASS BAR TO SEAL IT AGAINST THE TAPER AND RE-TORQUE TO 50 FT-LBS.
4. WITH A FEELER GAUGE, MEASURE CLEARANCE BETWEEN WRIST PIN RETAINER PLATE AND FACE OF CROSSHEAD. THE CLEARANCE SHOULD BE APPROXIMATELY .125 INCH.
5. ASSEMBLE SHIMS FROM SHIMPACK (ITEM 33) TO THE THICKNESS MEASURED IN STEP 4, +.005/-.000. INSTALL SHIMS BETWEEN RETAINER PLATE AND CROSSHEAD.
6. TORQUE BOLTS HOLDING RETAINER PLATE TO CROSSHEAD TO GRADE 5 SPEC.
7. SAFETY WIRE ALL BOLTS.





SECTION A-A



SECTION B-B

ROTATE 90° CW

** USE ITEM 9 ON CENTER CROSSHEAD AND ITEM 8 ON TWO OUTSIDE CROSSHEADS.

BOM QUANTITY REFLECTS (3) CROSSHEAD ASSEMBLIES

ITEM	PART NO.	QTY	DESCRIPTION
33	ES167	6	SHIM SET WRIST PIN
32	EG131	3	VALVE GREASE RELIEF 15 PSI
31	018-4186	3	GREASE FITTING
30	075-3123	18	.375 LOCK WASHER
29	081-0970	18	BOLT HEX .375 .750 NC G8
28	A150317	3	RETAINER PACKING SEAL
27	EW107	54	.625 SEAL WASHER
26	002-5762	18	BOLT HEX .625 1.500 NC G8
25	A186408	3	STUFFING BOX GASKET
24	B186405	3	STUFFING BOX
23			
22	ES200	3	STUFFING BOX SEAL
21	EW109	AR	SAFETY WIRE
20	B150327	3	GASKET DIAPHRAM PLATE
19			
18			
17			
16	B162180	6	CLAMP PISTON ROD
15	A162203	3	BAFFLE
14	A150134	18	CSCR 12 PT .875 2.250 NC G8 DH
13			
12	415-6799	6	BOLT HEX .750 2.000 NC G8 DH
11	A150135	12	BOLT HEX .875 2.000 NC G8 DH
10	B150307	3	WRIST PIN RETAINER
** 9	D150326	1	WRIST PIN CENTER
** 8	D150322	2	WRIST PIN
7	EB185	3	WRIST PIN BRG
6	D150323	3	CROSSHEAD
5	400-1909	36	CSCR 12 PT .750 2.00 NC G8
07 4	EW111	18	3/4 LOCK WASHER INTERNAL
3	A160233	36	NUT PLATE CROSSHEAD
2	D150319	6	CROSSHEAD GUIDE
1	008-6881	3	PIPE PLUG 1

REVISIONS	ZONE	REV	DESCRIPTION	ECN	DATE	CHG	CHK	APP
		06	CHG ITEM 5 FROM: 400-1911 TO: 400-1909	6-0506	7/19/06	DY	WMA	JLS
		07	ITEM 3 QTY WAS 24; ITEM 4 QTY WAS 12; ITEM 5 QTY WAS 24	7-0997	10/5/07	WMA		

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- MACHINED CORNERS 1/64 X 45°
- WELD PROPERTIES SHALL MEET THE MINIMUM REQUIREMENTS OF THE BASE MATERIAL.

USED ON: WH-1600/1312

		DATE
DWN	RJP	11-12-03
CHK	WMA	11-12-03
ENGR	JBP	11-12-03
MATL	SEE BOM	

THIRD ANGLE PROJECTION

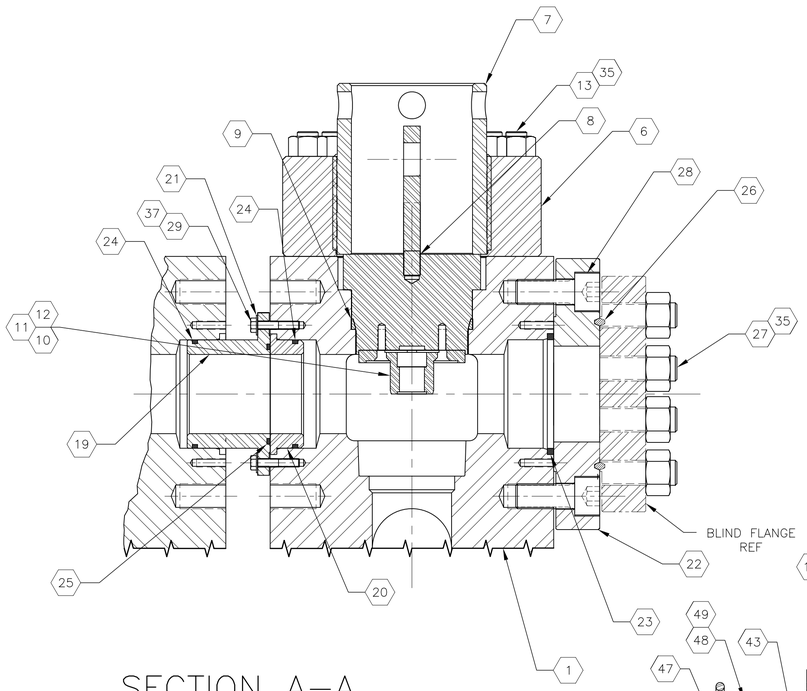
CROSSHEAD ASSEMBLY

W-1100, WH-1600/1312

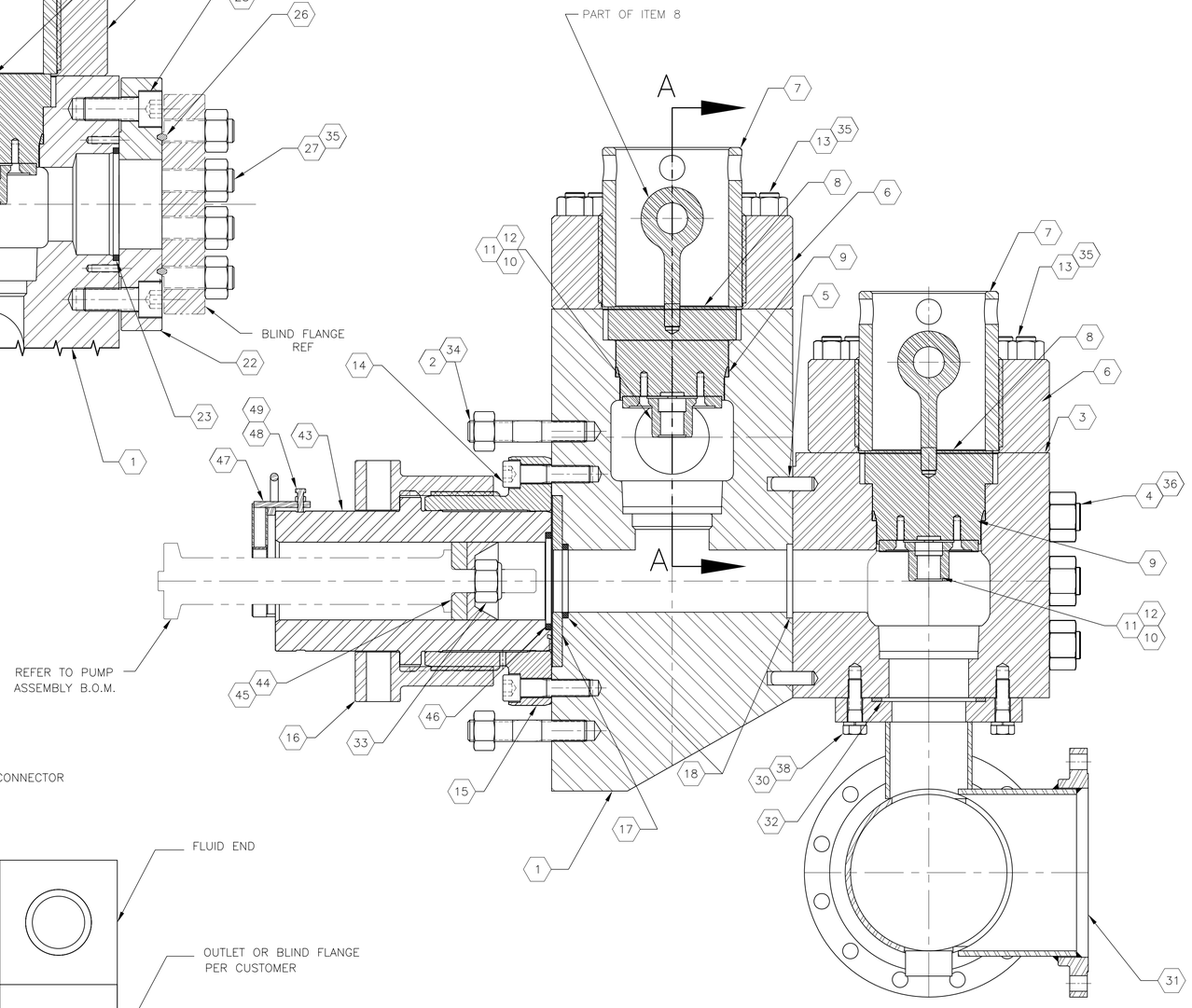
SIZE D | DO NOT SCALE | DWG NO. D186400 | REV 07.

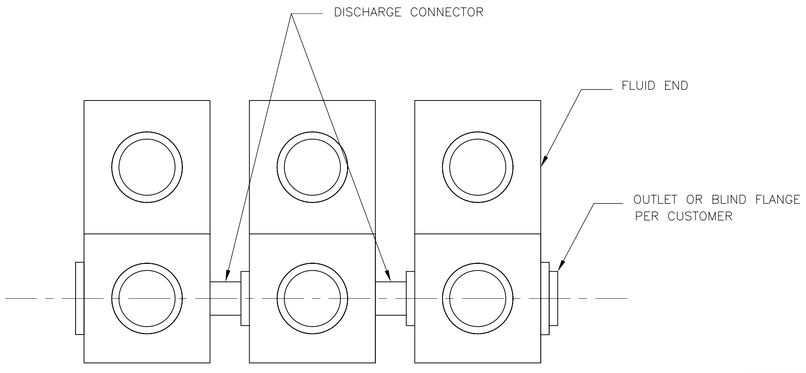
SCALE 1/4 | EST WT 1100 LBS. | SHEET 1 OF 1

DWG NO. D105410



SECTION A–A





TOP VIEW

ITEM	QTY	PART NO.	DESCRIPTION
1	3	D105364	DISCHARGE MODULE
2	30	ES222	STUD, 1.375 6NC V TPR LCK
3	3	D105365	SUCTION MODULE
4	18	ES223	STUD 1.750 8UN 21.00 V TPR LCK
5	6	A105409	PIN, .875 DIA X 2.75
6	6	C164435	FLANGE–VALVE COVER
7	6	B164436	LOCK–VALVE COVER
8	6	C164704	VALVE COVER
9	6	A164705	SEAL–VALVE COVER
10	6	C164718	VALVE GUIDE
11	6	A167708	BUSHING–VALVE GUIDE
12	12	EC220	VALVE GUIDE SCREW
13	72	108–0959	VALVE COVER STUD
14	18	EC199	LINER RETAINER SOCKET HEAD CAP SCREW
15	3	D167729	LINER LOCK FLANGE
16	3	C105368	LINER LOCK
17	3	108–0964	LINER WEAR PLATE
18	6	A164707	WEARPLATE AND MODULE GASKET
19	2	B105389	DISCHARGE CONNECTOR
20	2	B105390	DISCHARGE ADAPTER
21	4	B105388	BACK–UP RING
22	2	108–0531	DISCHARGE SPACER FLANGE
23	2	108–0674	DISCHARGE SPACER FLANGE SEAL
24	4	108–0861	DISCHARGE CONNECTOR / ADAPTER PACKING
25	2	108–0860	DISCHARGE CONNECTOR / ADAPTER PACKING
26	2	EG108	RING GASKET
27	16	108–0530	STUD, 1.500 6NC 7.500 V TPR LCK
28	16	108–1228	DISCHARGE SPACER FLANGE SOCKET HEAD CAP SCREW
29	16	400–1871	DISCHARGE CONNECTOR CAP SCREW
30	24	002–7583	BOLT HX .875 9NC 3.00 G8
31	1	D105036	SUCTION MANIFOLD, FRONT OR SIDE INLET
32	3	108–0234	SUCTION MANIFOLD GASKET
33	3	EN101	PISTON ROD, NUT
34	30	EN118	1.375 6NC HVY HX NUT
35	88	002–5784	1.500 6NC HVY HX NUT
36	18	EN111	1.750 8UN HVY HX NUT
37	16	080–1181	.500 LOCK WASHER
38	24	002–1543	.875 LOCK WASHER
* 39	6	EV116	VALVE SPRING
* 40	REF	EV142	VALVE INSERT
* 41	6	EV190	VALVE SEAT
* 42	6	EV178	VALVE COMPLETE
43	3	SEE CHART	LINER
44	3	SEE CHART	PISTON ASSEMBLIES
45	3	SEE CHART	PISTON RUBBER KITS
46	3	SEE CHART	LINER GASKETS
47	3	C167638	BAFFLE STRUCTURE
48	9	080–8476	BOLT HEX 3/8–16 NC x 1–1/4 GR. 8
49	9	EN125	NUT HEX 3/8–16 NC GR. 8

* THIS ITEMS NOT SHOWN

SIZE	LINER P/N	PISTON P/N	PISTON RUBBER	LINER GASKET
5 1/2	EL203	EP160	EP114	EG138
6	EL204	EP117	EP115	EG139
6 1/2	EL186	EP118	EP116	EG140
7	EL205	EP150	EP147	EG136
7 1/4	EL260	EP212	EP213	EG191

REVISIONS	ZONE	REV	DESCRIPTION	ECN	DATE	CHG	CHK	APP
		00	RELEASE	RL6318–01	8/23/04	MGD	WMA	JLS
		01	REVISED PER ECN	5–0313	4/12/05	DY	JBP	JLS
		02	ITEM–11 PART–# WAS EB320	6–0156	3.07.06	JKA	WMA	JLS
		03	ASSED ITEMS 47, 48 & 49	6–0300	5–15–06	RMR	JS	JLS

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USED ON D186006

		DATE
DWN	MGD	3/9/04
CHK	WMA	8/20/04
ENGR	JBP	8/20/04
MATL	SEE BOM	

THIRD ANGLE PROJECTION

FLUID END ASSEMBLY

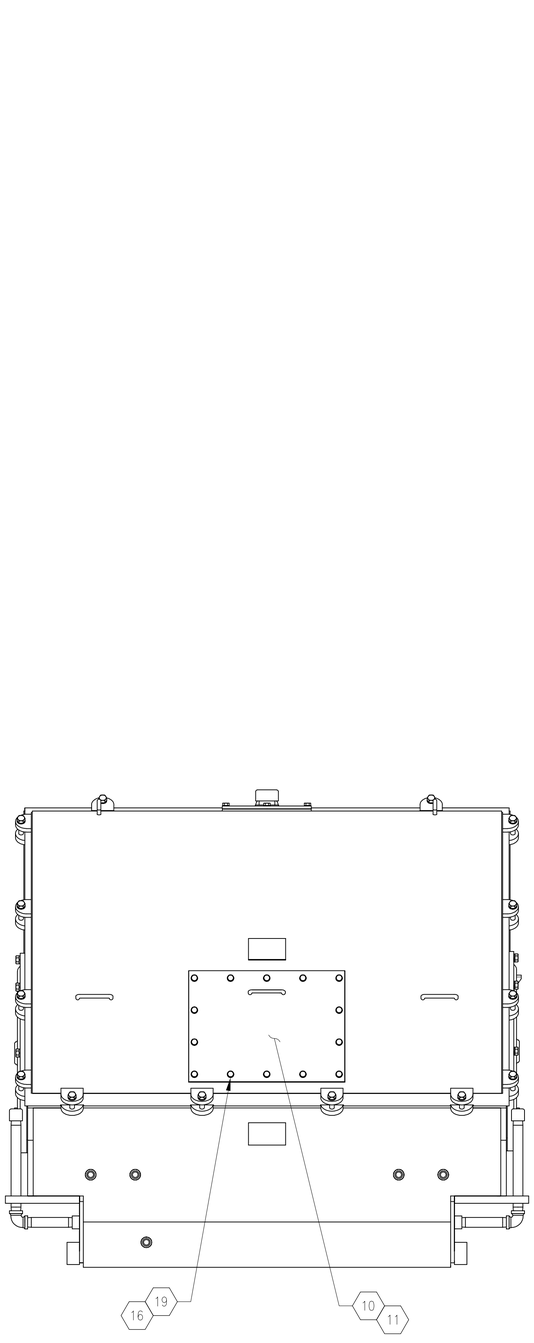
SW 12–P, 5000 PSI

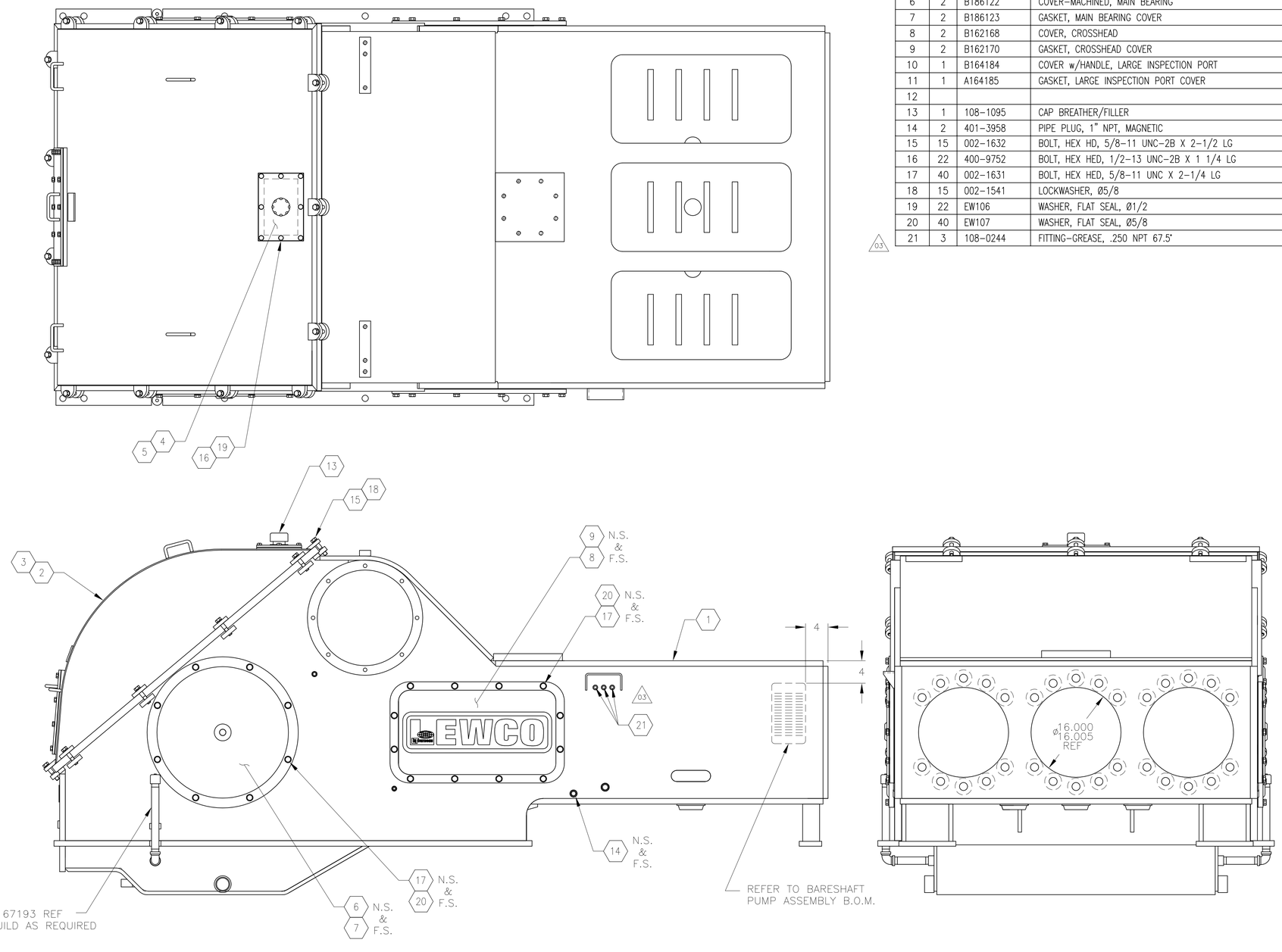
SIZE D | DO NOT SCALE | DWG NO. D105410 | REV 03

SCALE 1:4.5 | EST WT | SHEET 1 OF 1

DWG NO. D186100

ITEM	QTY	PART NO.	DESCRIPTION
1	1	D186124	FRAME–FINAL MACHINED
2	1	D186116	CRANKCASE COVER
3	252"	EG170	GASKET–CLOSED CELL NEOPRENE 3/4 X 1–3/4
4	1	B167173	COVER PLATE, INSPECTION/FILLER PORT
5	1	A162209	GASKET, INSPECTION/FILLER PORT COVER
6	2	B186122	COVER–MACHINED, MAIN BEARING
7	2	B186123	GASKET, MAIN BEARING COVER
8	2	B162168	COVER, CROSSHEAD
9	2	B162170	GASKET, CROSSHEAD COVER
10	1	B164184	COVER w/HANDLE, LARGE INSPECTION PORT
11	1	A164185	GASKET, LARGE INSPECTION PORT COVER
12			
13	1	108–1095	CAP BREATHER/FILLER
14	2	401–3958	PIPE PLUG, 1" NPT, MAGNETIC
15	15	002–1632	BOLT, HEX HD, 5/8–11 UNC–2B X 2–1/2 LG
16	22	400–9752	BOLT, HEX HED, 1/2–13 UNC–2B X 1 1/4 LG
17	40	002–1631	BOLT, HEX HED, 5/8–11 UNC X 2–1/4 LG
18	15	002–1541	LOCKWASHER, Ø5/8
19	22	EW106	WASHER, FLAT SEAL, Ø1/2
20	40	EW107	WASHER, FLAT SEAL, Ø5/8
21	3	108–0244	FITTING–GREASE, .250 NPT 67.5°





REVISIONS	ZONE	REV	DESCRIPTION	ECN	DATE	CHG	CHK	APP
		00	RELEASE	RL5616–05	11–20–03	DBJ	WMA	JLS
		01	REVISED PER ECN	4–0073	1/26/04	MGD	WMA	JLS
		02	REVISED PER ECN	4–0258	3/15/04	RJP	WMA	JLS
		03	ADDED ITEM 21	6–0719	10/4/06	WMA	JBG	JLS

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  FRACTIONS ±1/16
  .XX DECIMAL ±.03
  .XXX DECIMAL ±.015
- MACHINED CORNERS 1/64 X 45°
- WELD PROPERTIES SHALL MEET THE MINIMUM REQUIREMENTS OF THE BASE MATERIAL.
- ALL MACHINED SURFACES TO HAVE A FINISH OF 125 UNLESS OTHERWISE NOTED

USED ON D186000

		DATE
DWN	DBJ	11–18–03
CHK	WMA	11–24–03
ENGR	JBP	12–1–03
MATL	SEE BOM	

THIRD ANGLE PROJECTION

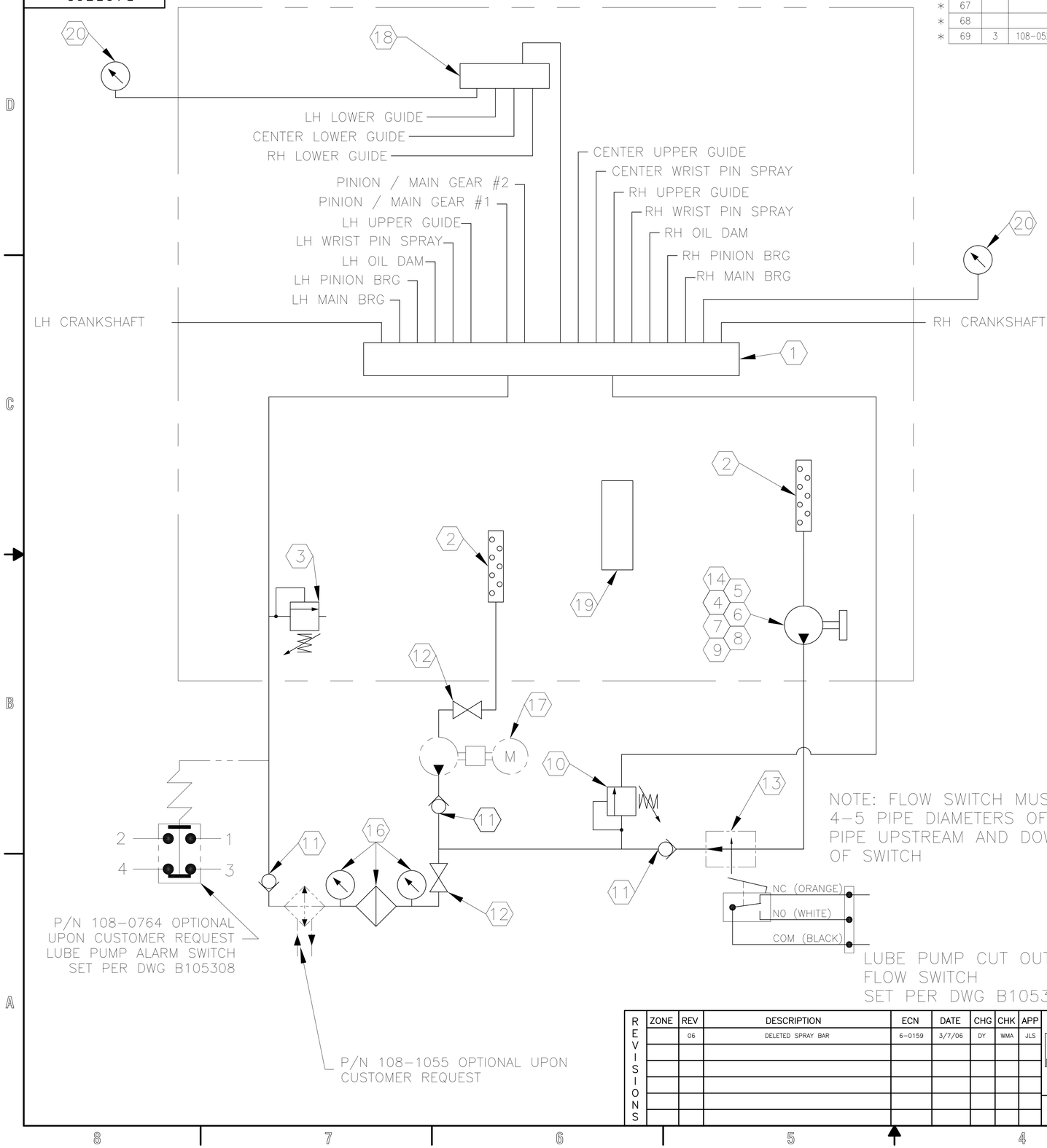
FRAME ASSEMBLY

WH–1600 FOR 12P FLUID END

SIZE D | DO NOT SCALE | DWG NO. D186100 | REV 03

SCALE NTS | EST WT 13,300 LBS | SHEET 1 OF 1

DWG NO. D105362



	ITEM	QTY	PART NO.	DESCRIPTION
*	67			DELETED
*	68			DELETED
*	69	3	108-0528	FITTING-GREASE, .125 NPT 0°

* ITEMS NOT SHOWN

NOTE:
LUBE OIL PUMP PART NO. IS CALLED OUT ON UNITIZATION B.O.M.

	ITEM	QTY	PART NO.	DESCRIPTION
	1	1	C155485	LUBE MANIFOLD
	2	2	108-0699	LUBE SUCTION SCREEN
	3	1	108-0054	RELIEF VALVE 15 PSI
	4	1	B155121	SUPPORT PLATE
	5	1	A155122	NUT PLATE
	6	1	EP194	PUMP B&S #3S WO/RELIEF FT MNT
	7	4	002-1609	BOLT HX 7/16-14 UN X 1-1/2
	8	1	401-6009	SET SCREW 1/4-20 X 3/4
	9	1	B167645	DRIVE GEAR
	10	1	108-1088	RELIEF VALVE 65 PSI
	11	3	108-0135	CHECK VALVE 3/4"
	12	2	108-0059	VALVE-BALL, 3/4" NPT BRASS
	13	1	108-1257	FLOW SWITCH
	14	1	B300536	QD BUSHING
*	15	2	018-2986	ELL-PIPE 3/4" X 45° STD BLK
	16	1	B105204	LUBE STRAINER ASSY
	17	REF.	SEE NOTE	LUBE PUMP ASSY
	18	1	108-1099	MANIFOLD-LUBE, CROSSHEAD
	19	1	EM106	MAGNET-DIP TANK 70#
	20	2	EG105	GAUGE 2.5 LIQ 0-60 SS STD MNT
*	21	14	EF115	FTG HYD 0° #6 COMP X 1/4 MP
*	22	8	108-0414	FTG HYD 90° #6 COMP X 3/8 MP
*	23	6	021-4976	ELL-PIPE, 3/4" X 90° STD BLK
*	24	6	EF117	FTG HYD 0° #12 COMP X 3/4 MP
*	25	3	401-3082	FTG HYD 90° #12 COMP X 3/4 MP
*	26	3	021-1916	TEE-PIPE, 3/8" STD BLACK
*	27	1	008-6881	PIPE PLUG 1" SOCKET HEAD
*	28	5	027-2969	PIPE PLUG 1/4" SOCKET HEAD
*	29	8	077-8728	CLAMP CONDUIT TYPE B 3/8"
*	30	3	EF116	FTG HYD 90° #6 COMP X 1/4 MP
*	31	5	EF162	FTG HYD 45° #6 COMP X 1/4 MPSS
*	32	3	008-3374	ELL-PIPE, 3/8" X 90° STD BLK
*	33	6	086-1795	CLAMP CONDUIT TYPE B 1/2"
*	34	4	027-5168	TEE-PIPE, 3/4" STD BLACK
*	35	6	027-5203	NIPPLE-PIPE 3/4" CLOSE SCH 40 BLK
*	36	4	021-4975	NIPPLE-PIPE 3/4" X 2" SCH 40 BLK
*	37	4	EF158	FTG HYD 0° #4 COMP X 1/4 MP
*	38	100FT	ET136	TUBE HYD .375 OD .035 WALL
*	39	1	018-7766	ELL-PIPE 2" 90° STD BLK
*	40	4	027-5187	PIPE UNION HEX 3/4"
*	41	7	108-0003	FTG HYD 0° 6# COMP X 3/8 MP
*	42	1	403-4910	FTG UNION 3/4" COMP
*	43	1	108-0061	VALVE BALL BRASS 2" NPT
*	44			DELETED
*	45	1	108-0228	PIPE PLUG 2.00 HX HD
*	46			DELETED
*	47			DELETED
*	48			DELETED
*	49			DELETED
*	50	1	400-2422	FTG HYD 0° #12 MJ X 3/4" MP
*	51	1	400-2441	FTG HYD 90° #12 MJ X 3/4" MP
*	52	3	EF409	FTG CRIMP 0° 12H X 12 FJ SWIV
*	53			DELETED
*	54	2	401-3796	BUSHING-PIPE, 1" X 3/4" FS
*	55			DELETED
*	56	2	078-2042	PLUG-PIPE, 3/4 SOCKET HD
*	57	2	EB187	BUSHING-PIPE, 1" X 3/8" HVY
*	58	40FT	152-1518	PIPE .750 SCH 40 A53 GB SMLS
*	59	1	419-3421	PIPE CROSS 3/4"
*	60	2	401-3958	PLUG-PIPE, 1" NPT MAGNETIC
*	61			DELETED
*	62	30FT	ET135	TUBE-HYD, .250 OD X .035 WALL
*	63	4	006-6769	PIPE FTG 90° STREET 3/4"
*	64			DELETED
*	65	1	EF422	FTG CRIMP 90° 12H X 12 FJ SWIV
*	66			DELETED

REVISIONS	ZONE	REV	DESCRIPTION	ECN	DATE	CHG	CHK	APP
		06	DELETED SPRAY BAR	6-0159	3/7/06	DY	WMA	JLS

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HOUSTON, TEXAS

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- DIMENSIONS ARE IN INCHES & APPLY BEFORE PLATING OR FINISH COATINGS.
- TOLERANCES ON: ANGLES ±1°, FRACTIONS ±1/16, .XX DECIMAL ±.03, .XXX DECIMAL ±.015
- MACHINED CORNERS 1/64 X 45°
- WELD PROPERTIES SHALL MEET THE MINIMUM REQUIREMENTS OF THE BASE MATERIAL.

USED ON		DATE
DWN	JBP	02/05/04
CHK	JDM	02/09/04
ENGR	JBP	02/09/04
MATL		

THIRD ANGLE PROJECTION

LUBE OIL SCHEMATIC

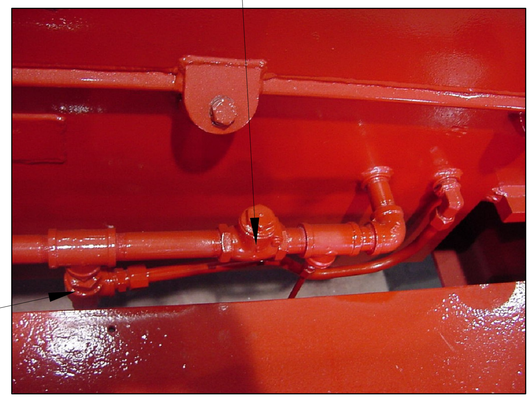
LUBE GEAR - 2.822P 20.00° 30.76°

SIZE	DO NOT SCALE	DWG NO.	REV
D		D105362	06

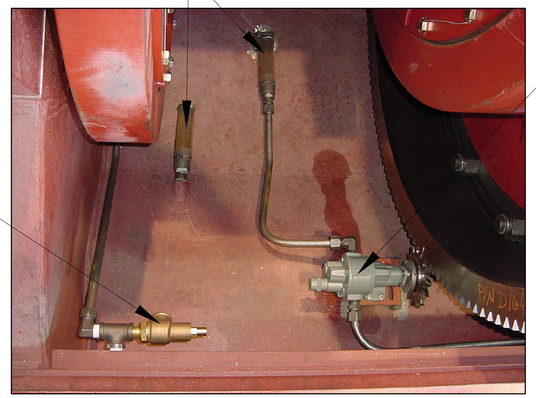
SCALE N.T.S. | EST WT | SHEET 1 OF 2

DWG NO. D105362

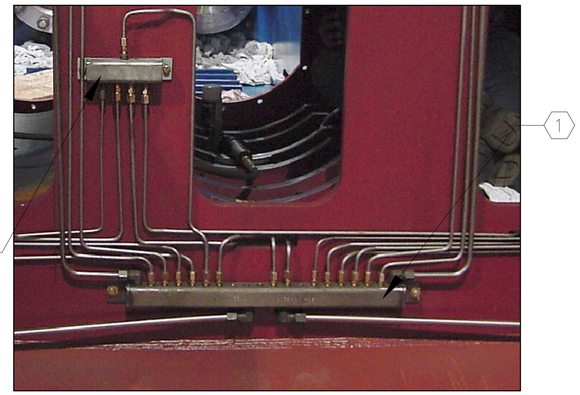
ITEM	QTY	PART NO.	DESCRIPTION



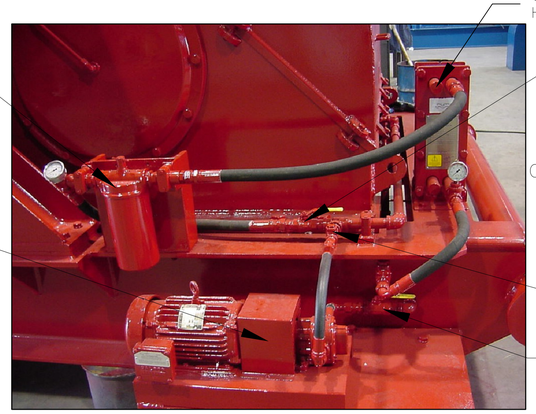
LUBE PIPING ON PUMP FRAME



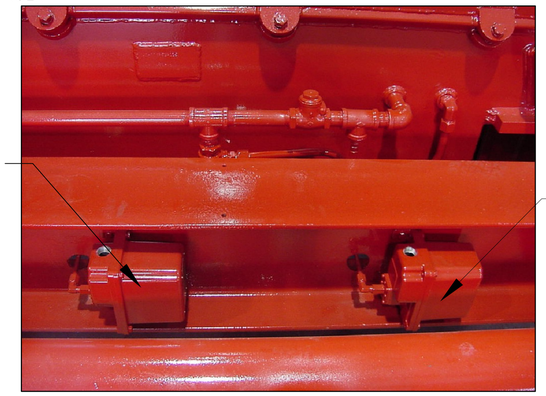
INTERNAL LUBE PUMP, SUCTION SCREENS AND RELIEF VALVE



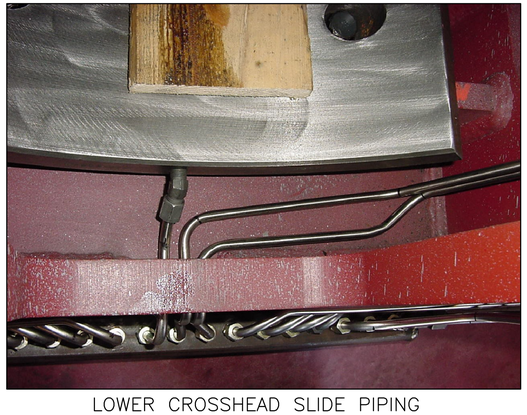
LUBE OIL DISTRIBUTION MANIFOLD



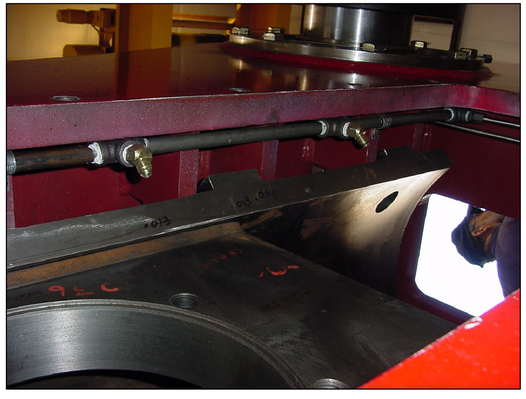
EXTERNAL LUBE PUMP, STRAINER AND HEAT EXCHANGER



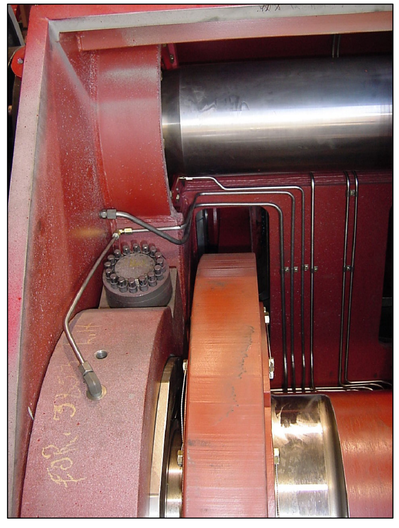
LUBE OIL PRESSURE SWITCHES (ALARM AND CUTOUT)



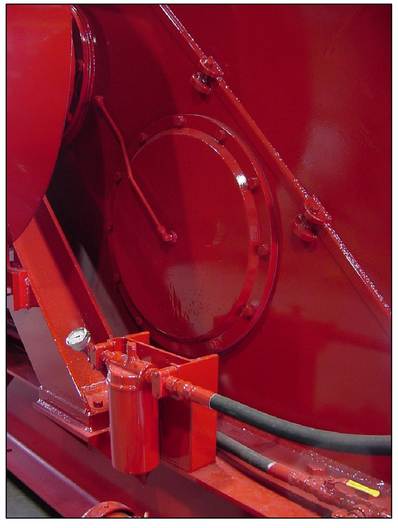
LOWER CROSSHEAD SLIDE PIPING



WRIST PIN SPRAY PIPING



MAIN BEARING, PINION BEARING PIPING



CRANKSHAFT LUBE PIPING

REVISIONS	ZONE	REV	DESCRIPTION	ECN	DATE	CHG	CHK	APP
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DO NOT SCALE

SCALE N.T.S. | EST WT | SHEET 2 OF 2