

Technical Drawing Package

TDS-9SA

TOP DRIVE SYSTEM

Standard Manual Set

60 Hz Siemens VFD with PH-50

REFERENCE	REFERENCE DESCRIPTION	
	<p>This document contains proprietary and confidential information which is the property of National Oilwell Varco, L.P., its affiliates or subsidiaries (all collectively referred to hereinafter as "NOV"). It is loaned for limited purposes only and remains the property of NOV. Reproduction, in whole or in part, or use of this design or distribution of this information to others is not permitted without the express written consent of NOV. This document is to be returned to NOV upon request or upon completion of the use for which it was loaned. This document and the information contained and represented herein is the copyrighted property of NOV.</p> <p>© National Oilwell Varco</p>	<p>National Oilwell Varco RIG SOLUTIONS 12950 West Little York Houston, TX 77041</p>
DOCUMENT NUMBER D811000051-DOS-001		REV 01



REVISION HISTORY

Rev	Date (dd.mm.yyyy)	Reason for issue	Prepared	Checked	Approved
01	26.03.2007	First Issue	J. Kellstrom	J. Moffitt	H. Lim

CHANGE DESCRIPTION

Revision	Change Description
01	First issue

TECHNICAL DRAWING PACKAGE

This document provides a list of drawings for the TDS-9SA. The actual drawings are arranged in the binder, in numerical order.

Drawings by Assembly

General

Customer Configuration.....	Rig Specific
General Arrangement.....	30170540
Schematic, Electrical.....	124222
A/C Drive Parameters, TDS-9SA.....	30177529
Schematic, Hydraulic.....	109550
Rig Cabling Diagram.....	30175893

Top Drive Assembly

Bail Package.....	121442-88
Carriage Package.....	30124540
Carriage Assembly (Left).....	124538
Carriage Assembly Right).....	124539
Counterbalance Package.....	112190-120
Cylinder Assembly.....	110703
Cylinder Assembly.....	110704
Motor Housing Assembly.....	119100-UL
Lube Pump Assembly.....	117603-1
Hydraulic Oil Reservoir Assembly.....	110068-2
Rotating Link Adapter Assembly.....	30118150
Shot Pin Assembly.....	30151875-504
S-Pipe Package.....	30156835-R75-1
Motor Guard Package.....	120917
Hydraulic Plumbing Package.....	110138
Pre-fill Valve Assembly.....	111712
Washpipe Assembly.....	30123290
Electrical Package.....	128923-A-60-R
Pump/Motor Assembly.....	114113-2
Manifold Assembly.....	114174
J-Box Assembly.....	124994

Pipe Handler

Pipe Handler Package PH-50.....	117820-35-NC50-B
Hydraulic Cylinder Assembly.....	30119592
IBOP, Lower.....	114706
IBOP, Upper.....	110103
IBOP (External) Crank Assembly	98898
Link Tilt Crank Assembly	30158189
Manifold Link Tilt Cylinder.....	118463
Torque Arrestor Assembly.....	30157288
Cylinder Assembly, IBOP Actuator	125594
Cylinder Assembly, Clamp.....	30157287
Stabbing Guide Assembly (6.25-7.50" OD Tool Joint).....	125158
Jaw Assembly (6.25-7.50" OD Tool Joint)	30125052
Clamp Cylinder Manifold Assembly	118511
PH-50 Adapter Kit.....	122747-NC38B

Control System

Control House Assembly	124221-2S2D0
Varco Drillers Console Assembly	120546-60-3-UL
VDC Purge Kit	88550
VDC Cable.....	122443-200-B

Rigging

Guide Beam Kit.....	30154688-50
Guide Beam Tieback Kit.....	30154685-100
Guide Beam Shipping Package with Skid	30171423-PH-50
Derrick Termination Kit	30126815

Kits

Lubrication Kit	92643-15
Counterbalance Attachment Kit.....	118244-HOOK
Pipe handler Kit.....	119054-NC50B
Ground Rod Kit.....	30116004

Cable Requirements

Service Loop Kit.....30175884-86-200
Derrick Loop Assembly, Power with Connections.....124975-135-25-4-B
UL Jumper Cable Kit.....124977-100

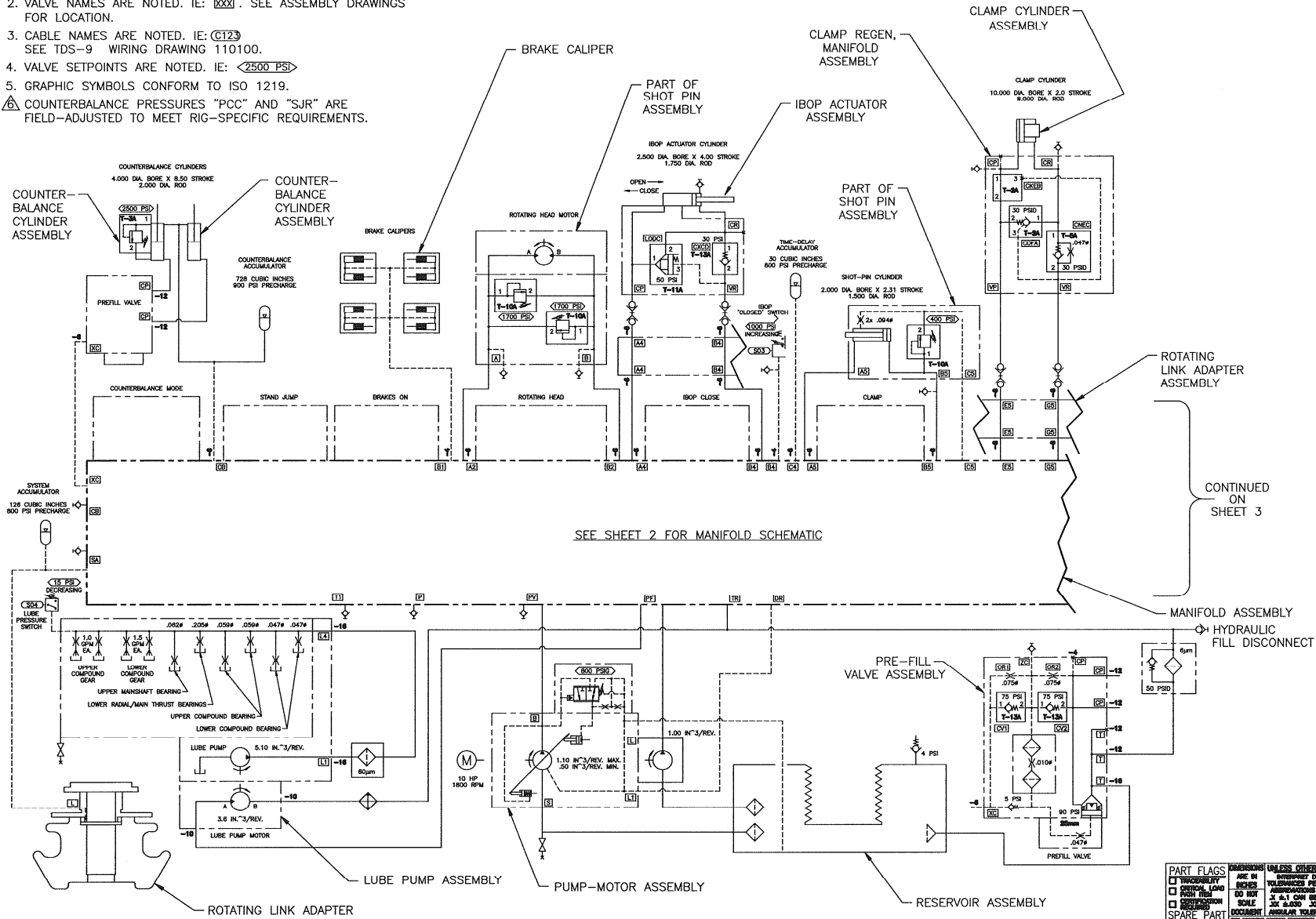
Drawings in Numerical Order

Customer Configuration.....Rig Specific
Schematic, Hydraulic..... 109550
Hydraulic Oil Reservoir Assembly 110068-2
IBOP, Upper..... 110103
Hydraulic Plumbing Package..... 110138
Cylinder Assembly 110703
Cylinder Assembly 110704
Pre-fill Valve Assembly 111712
Counterbalance Package 112190-120
Pump/Motor Assembly..... 114113-2
Manifold Assembly..... 114174
IBOP, Lower..... 114706
Lube Pump Assembly..... 117603-1
Pipe Handler Package PH-50..... 117820-35-NC50-B
Counterbalance Attachment Kit..... 118244-HOOK
Manifold Link Tilt Cylinder..... 118463
Clamp Cylinder Manifold Assembly..... 118511
Pipe handler Kit..... 119054-NC50B
Motor Housing Assembly..... 119100-UL
Varco Drillers Console Assembly 120546-60-3-UL
Motor Guard Package 120917
Bail Package..... 121442-88
VDC Cable..... 122443-200-B
PH-50 Adapter Kit..... 122747-NC38B
Control House Assembly..... 124221-2S2D0
Schematic, Electrical 124222
Carriage Assembly (Left)..... 124538
Carriage Assembly Right)..... 124539
Derrick Loop Assembly, Power with Connections..... 124975-135-25-4-B
UL Jumper Cable Kit..... 124977-100
J-Box Assembly..... 124994
Stabbing Guide Assembly (6.25-7.50" OD Tool Joint)..... 125158
Cylinder Assembly, IBOP Actuator..... 125594
Electrical Package..... 128923-A-60-R

Ground Rod Kit.....	30116004
Rotating Link Adapter Assembly.....	30118150
Hydraulic Cylinder Assembly.....	30119592
Washpipe Assembly.....	30123290
Carriage Package.....	30124540
Jaw Assembly (6.25-7.50" OD Tool Joint).....	30125052
Derrick Termination Kit.....	30126815
Shot Pin Assembly.....	30151875-504
Guide Beam Tieback Kit.....	30154685-100
Guide Beam Kit.....	30154688-50
S-Pipe Package.....	30156835-R75-1
Cylinder Assembly, Clamp.....	30157287
Torque Arrestor Assembly.....	30157288
Link Tilt Crank Assembly.....	30158189
General Arrangement.....	30170540
Guide Beam Shipping Package with Skid.....	30171423-PH-50
Service Loop Kit.....	30175884-86-200
Rig Cabling Diagram.....	30175893
A/C Drive Parameters, TDS-9SA.....	30177529
VDC Purge Kit.....	88550
Lubrication Kit.....	92643-15
IBOP (External) Crank Assembly.....	98898

NOTES UNLESS OTHERWISE SPECIFIED

1. ALL INFORMATION ON THIS DRAWING IS FOR REFERENCE ONLY. SEE NOTED ASSEMBLY NUMBERS FOR CONTROLLED BILL OF MATERIAL.
 2. VALVE NAMES ARE NOTED. IE: $\langle 2500 \text{ PSI} \rangle$. SEE ASSEMBLY DRAWINGS FOR LOCATION.
 3. CABLE NAMES ARE NOTED. IE: $\langle C12 \rangle$ SEE TDS-9 WIRING DRAWING 110100.
 4. VALVE SETPOINTS ARE NOTED. IE: $\langle 2500 \text{ PSI} \rangle$
 5. GRAPHIC SYMBOLS CONFORM TO ISO 12119.
- \triangle COUNTERBALANCE PRESSURES "PCC" AND "SJR" ARE FIELD-ADJUSTED TO MEET RIG-SPECIFIC REQUIREMENTS.



SEE SHEET 2 FOR MANIFOLD SCHEMATIC

CONTINUED ON SHEET 3

PART FLAGS		DIMENSIONS UNLESS OTHERWISE SPECIFIED		SURFACE FINISHES UNLESS OTHERWISE SPECIFIED		TITLE	
<input type="checkbox"/> TRACEABILITY	AS PER INCHES	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	HYDRAULIC SCHEMATIC, TDS-9S/11S	
<input type="checkbox"/> OPTICAL LEAD	AS PER INCHES	TOLERANCES PER ASME Y14.5 & UNLESS OTHERWISE SPECIFIED	TOLERANCES PER ASME Y14.5 & UNLESS OTHERWISE SPECIFIED	ROUGHNESS PER ASME Y14.36 & UNLESS OTHERWISE SPECIFIED	ROUGHNESS PER ASME Y14.36 & UNLESS OTHERWISE SPECIFIED	TDS-11	
<input type="checkbox"/> FINISH	AS PER INCHES	SCALE 3/4" = 1'-0" UNLESS OTHERWISE SPECIFIED	SCALE 3/4" = 1'-0" UNLESS OTHERWISE SPECIFIED	SCALE 3/4" = 1'-0" UNLESS OTHERWISE SPECIFIED	SCALE 3/4" = 1'-0" UNLESS OTHERWISE SPECIFIED	TDS-9S	
<input type="checkbox"/> SPARE PART	AS PER INCHES	DATE 11/19/03	DATE 11/19/03	DATE 11/19/03	DATE 11/19/03	SIZE D	DOCUMENT NO. 109550
<input type="checkbox"/> DIMENSIONS	AS PER INCHES	PREPARED BY H. S. DO	CHECKED BY D. SENEVIRATNE	APPROVED BY D. SENEVIRATNE	DATE 7/95	SCALE 1/1	WEIGHT LB 1
<input type="checkbox"/> FINISHES	AS PER INCHES	PREPARED BY K. WIEN	CHECKED BY K. WIEN	APPROVED BY D. SENEVIRATNE	DATE 7/95	SCALE 1/1	WEIGHT LB 1
<input type="checkbox"/> TOLERANCES	AS PER INCHES	PREPARED BY LJR	CHECKED BY	APPROVED BY	DATE	SCALE 1/1	WEIGHT LB 1

D

D

C

C

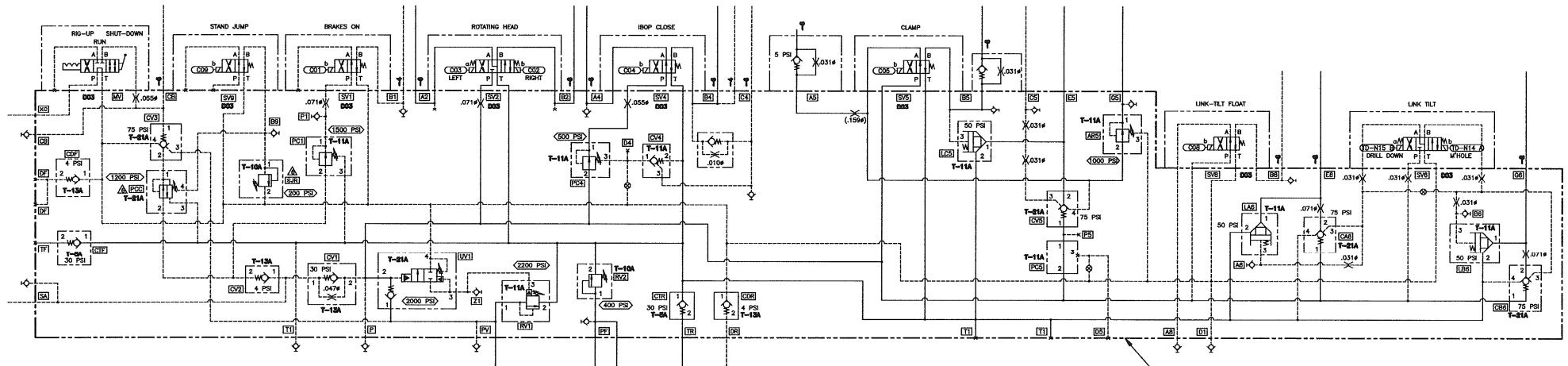
B

B

A

A

SEE SHEET 1 FOR CONNECTED EQUIPMENT



SEE SHEET 1 FOR CONNECTED EQUIPMENT

MANIFOLD ASSEMBLY

THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION, AND SUCH INFORMATION MAY BE RELEASED TO OTHERS FOR ANY PURPOSES EXCEPT AS AUTHORIZED BY WRITING FROM VESCO INTERNATIONAL, INC.



TITLE HYDRAULIC SCHEMATIC
TDS-9S/11S

SIZE D	DOCUMENT NO. 109550	REVISION H
SCALE 1/1	SHEET 2	OF 3

D

D

C

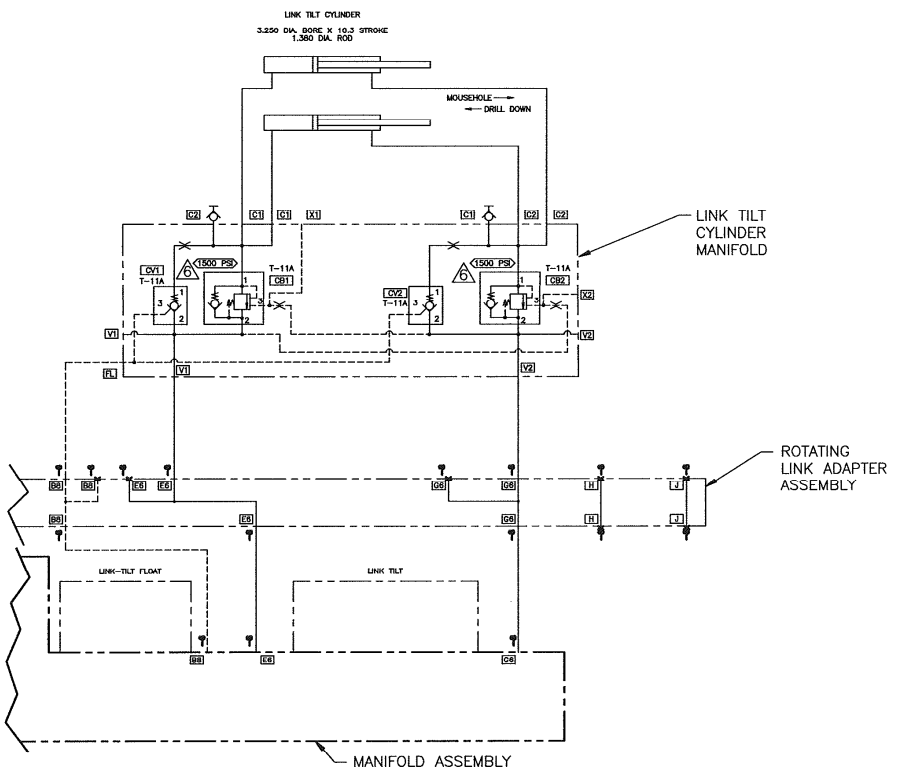
C

B

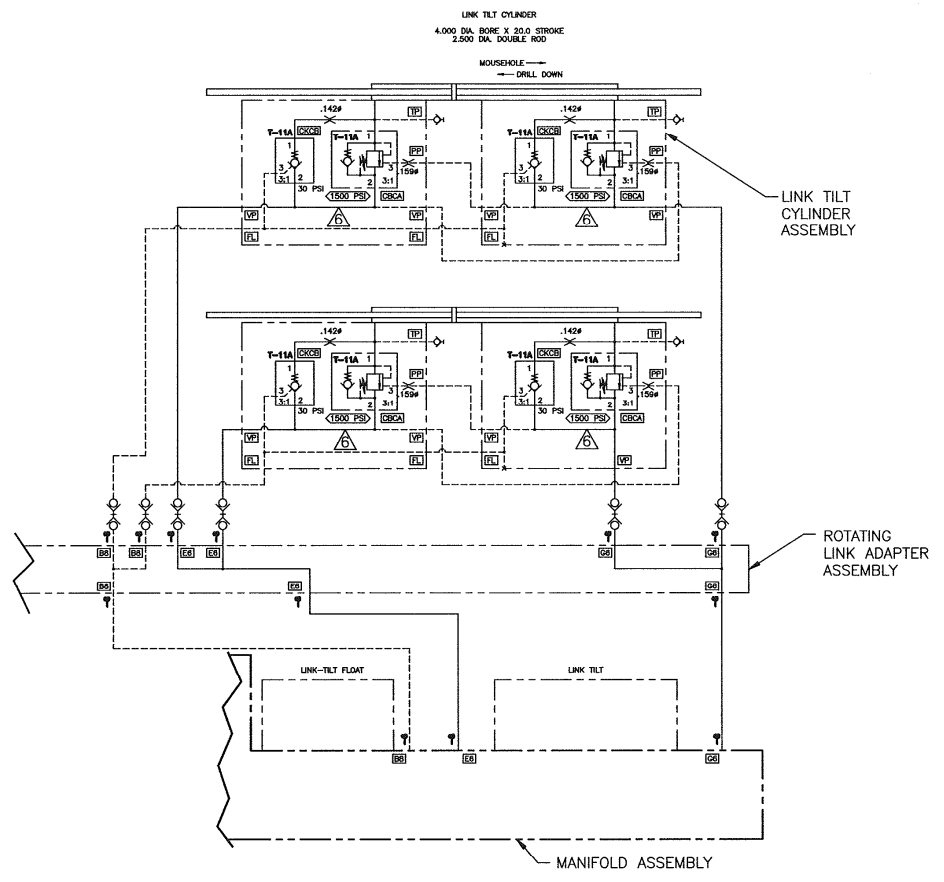
B

A

A



LINK TILT FOR ALL TDS-11S, & TDS-9S STARTING W/SERIAL NUMBER 53 (NOV. 97)



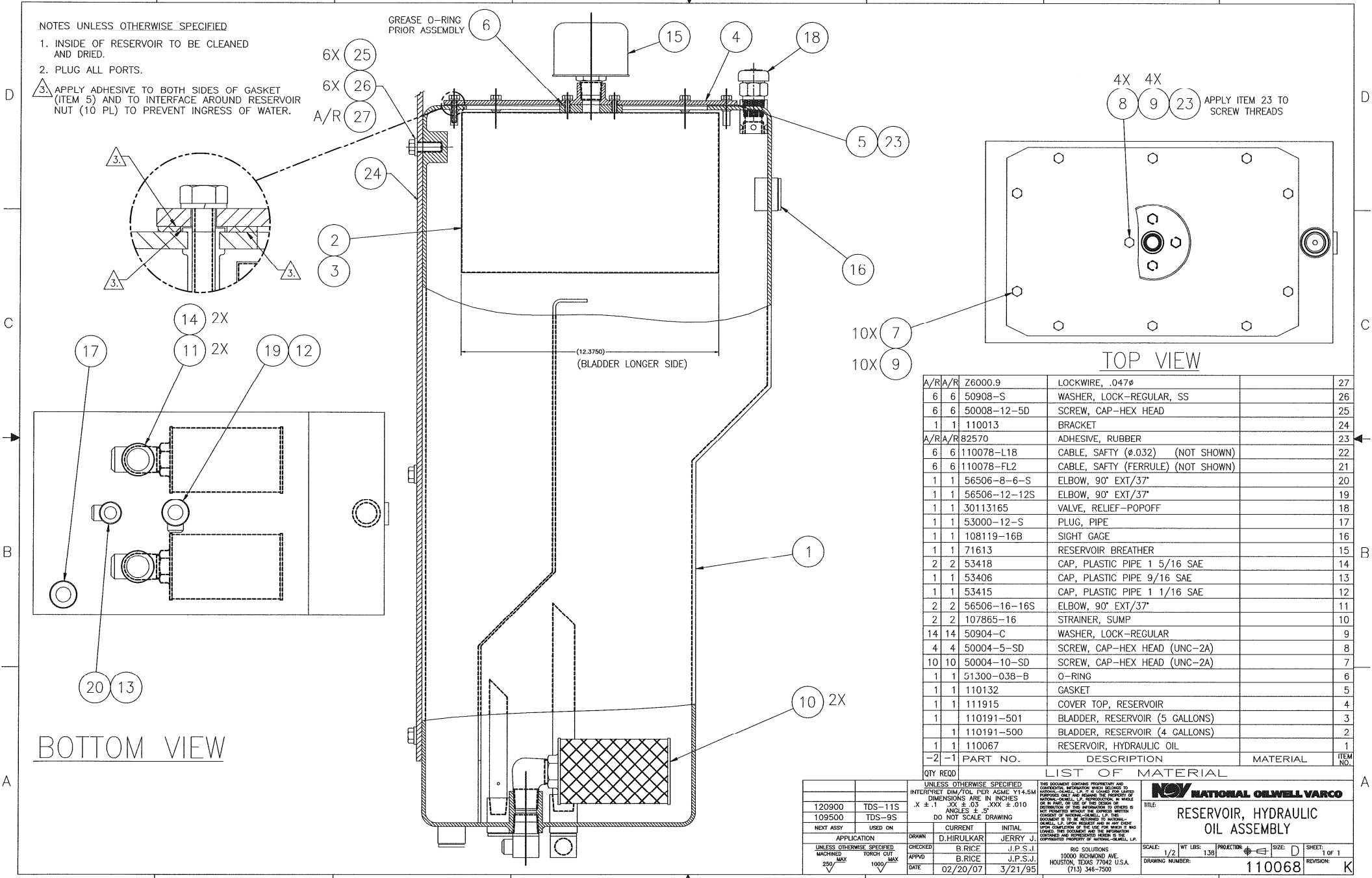
LINK TILT FOR ALL TDS-9S SERIAL NUMBERS 1 THRU 52

<small>THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION AND IS UNCLASSIFIED AND CONTROLLED BY THE U.S. GOVERNMENT UNDER EXECUTIVE ORDER 12958, WHICH PERMITS RELEASE OF INFORMATION TO THE EXTENT THAT IT DOES NOT RELATE TO DEFENSE OR THE NATIONAL DEFENSE. ANY USE OF THIS INFORMATION IS AT THE USER'S RISK.</small>		TITLE	HYDRAULIC SCHEMATIC	SIZE	D	DOCUMENT NO.	109550	REVISION	H
			TDS-9S/11S	SCALE	1/1	SHEET	3	OF	3

NOTES UNLESS OTHERWISE SPECIFIED

1. INSIDE OF RESERVOIR TO BE CLEANED AND DRIED.
2. PLUG ALL PORTS.
3. APPLY ADHESIVE TO BOTH SIDES OF GASKET (ITEM 5) AND TO INTERFACE AROUND RESERVOIR NUT (10 PL) TO PREVENT INGRESS OF WATER.

GREASE O-RING PRIOR ASSEMBLY



TOP VIEW

BOTTOM VIEW

A/R/A/R	QTY	DESCRIPTION	MATERIAL	ITEM NO.	
Z6000.9		LOCKWIRE, .047Ø		27	
6 6	50908-S	WASHER, LOCK-REGULAR, SS		26	
6 6	50008-12-5D	SCREW, CAP-HEX HEAD		25	
1 1	110013	BRACKET		24	
A/R/A/R	Ø82570	ADHESIVE, RUBBER		23	
6 6	110078-L18	CABLE, SAFTY (Ø.032) (NOT SHOWN)		22	
6 6	110078-FL2	CABLE, SAFTY (FERRULE) (NOT SHOWN)		21	
1 1	56506-8-6-S	ELBOW, 90° EXT/37°		20	
1 1	56506-12-12S	ELBOW, 90° EXT/37°		19	
1 1	30113165	VALVE, RELIEF-POPOFF		18	
1 1	53000-12-S	PLUG, PIPE		17	
1 1	108119-16B	SIGHT GAGE		16	
1 1	71613	RESERVOIR BREATHER		15	
2 2	53418	CAP, PLASTIC PIPE 1 5/16 SAE		14	
1 1	53406	CAP, PLASTIC PIPE 9/16 SAE		13	
1 1	53415	CAP, PLASTIC PIPE 1 1/16 SAE		12	
2 2	56506-16-16S	ELBOW, 90° EXT/37°		11	
2 2	107865-16	STRAINER, SUMP		10	
14 14	50904-C	WASHER, LOCK-REGULAR		9	
4 4	50004-5-SD	SCREW, CAP-HEX HEAD (UNC-2A)		8	
10 10	50004-10-SD	SCREW, CAP-HEX HEAD (UNC-2A)		7	
1 1	51300-038-B	O-RING		6	
1 1	110132	GASKET		5	
1 1	111915	COVER TOP, RESERVOIR		4	
1	110191-501	BLADDER, RESERVOIR (5 GALLONS)		3	
1	110191-500	BLADDER, RESERVOIR (4 GALLONS)		2	
1 1	110067	RESERVOIR, HYDRAULIC OIL		1	
-2	-1	PART NO.	DESCRIPTION	MATERIAL	ITEM NO.

UNLESS OTHERWISE SPECIFIED
 INTERPRET DIM/TOL PER ASME Y14.5M
 DIMENSIONS ARE IN INCHES
 .X ± .1 .XX ± .03 .XXX ± .010
 ANGLES ± 5°
 DO NOT SCALE DRAWING

THIS DOCUMENT CONTAINS PROPRIETARY AND CONFIDENTIAL INFORMATION WHICH BELONGS TO NATIONAL OILWELL VARCO. IT IS TO BE USED ONLY FOR THE PROJECT AND PURPOSES SPECIFICALLY IDENTIFIED HEREIN. IT IS TO BE RETURNED TO NATIONAL OILWELL VARCO UPON COMPLETION OF THE PROJECT AND IN ANY EVENT SHALL NOT BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM. THE COMPANY AND OPERATIONS HEREIN IS THE REGISTERED PROPERTY OF NATIONAL OILWELL VARCO.

NATIONAL OILWELL VARCO

TITLE: **RESERVOIR, HYDRAULIC OIL ASSEMBLY**

SCALE: 1/2" = 1" WT LBS: 138 PROJECTION: FIRST ANGLE SIZE: D SHEET: 1 of 1
 DRAWING NUMBER: **110068** REVISION: K

APPROVALS:
 CHECKED: B. RICE J.P.S.J.
 APPVD: B. RICE J.P.S.J.
 DATE: 02/20/07 3/21/95

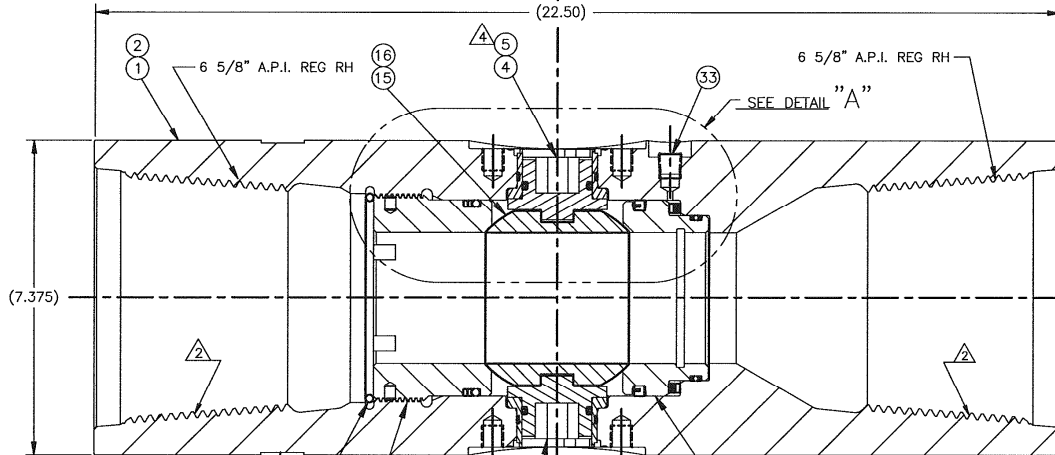
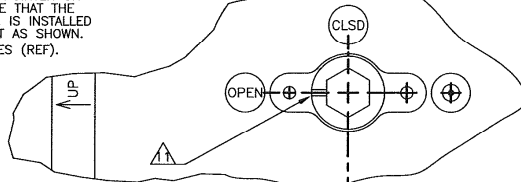
RG SOLUTIONS
 19000 REICHMUND AVE.
 HOUSTON, TEXAS 77042 U.S.A.
 (713) 346-7500

NOTES: UNLESS OTHERWISE SPECIFIED

REFERENCE INFORMATION

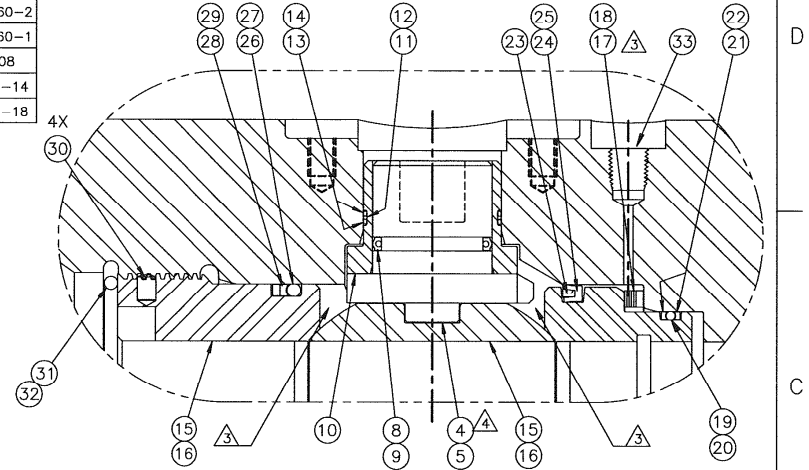
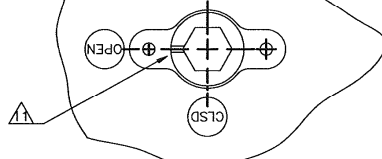
DESCRIPTION	-500, STD, 15 KSI		-501, NAM, 15 KSI		-502, H2S, 15 KSI	
	BEST NO.	VARCO NO.	BEST NO.	VARCO NO.	BEST NO.	VARCO NO.
VALVE ASSY.	N/A	110103-500	N/A	110103-501	N/A	110103-502
REPAIR KIT- COMPLETE	N/A	114859	N/A	114859	N/A	114860-2
REPAIR KIT- SOFT SEALS	N/A	114859-1	N/A	114859-1	N/A	114860-1
WRENCH- CRANK	65021520	77408	65021520	77408	65021520	77408
PULLER- SEAT	65021523	79489-14	65021523	79489-14	65021523	79489-14
WRENCH- NUT	65060325	89141-18	65060325	89141 18	65060325	89141-18

- CLEAN AND LUBRICATE ALL PARTS BEFORE ASSEMBLY.
- CONNECTION THREADS SHALL REMAIN PROTECTED PRIOR TO INSTALLATION.
- PACK WAVE SPRING CAVITY & BALL CAVITY 100% WITH 56003 GREASE DURING ASSEMBLY.
- INSPECT THE OPERATING CRANK AND BALL TO ENSURE A SMOOTH SLIDING FIT BETWEEN THE TWO PARTS.
- RECORD MATERIAL TRACEABILITY INFORMATION PER TS000205.
- INCLUDED WITH "REPAIR KIT-COMLETE".
- INCLUDED WITH "REPAIR KIT- SOFT SEALS".
- TEST PER TS000205.
- MAXIMUM WORKING TEMPERATURE: 200°F (93°C)
- MAXIMUM WORKING PRESSURE: 15,000psi (1034 bar)
- ORIENTATION OF INTERNAL HEX AND POINTER ON CRANK MUST BE AS SHOWN. ENSURE THAT THE "RIGHT HAND" CRANK, ITEM 4 OR 5, IS INSTALLED ADJACENT TO THE LUBRICATION PORT AS SHOWN.
- MINIMUM BORE DIAMETER 3.06 INCHES (REF).



VARCO 15,000 PSI IBOP
PART NO. 110103-XXX S/N XXXXXX
6 5/8" REG. R.H. 6 5/8" REG. R.H. CW

LOW STRESS STAMP USING 1/4" HIGH LETTERS AS SHOWN. SEE REF. INFO. TABLE ABOVE FOR PART NO. STAMP "CW" IN CIRCLE AS SHOWN



DETAIL "A"

QTY	REQD	PART NO.	DESCRIPTION	BEST PART NUMBER	ITEM NO.	
2	2	2	65020193	THREAD PROTECTOR-6 5/8" (NOT SHOWN)	77369-5	34
1	1	1	65021080	PLUG, PRESSURE	91137-10	33
1	1	1	65060192	RETAINING RING (H2S)	89453-1	32
1	1	1	65060191	RETAINING RING	89141-1	31
4	4	4	65060492	NYLON PLUG	91137-12	30
2	2	2	65060199	BACK-UP RING	89453-17	29
2	2	2	65060197	BACK-UP RING	90441-10	28
1	1	1	65060198	O-RING	89453-16	27
1	1	1	65060196	O-RING	90441-9	26
1	1	1	65060696	SEAL, U-CUP	96439-1	25
1	1	1	65060695	SEAL, U-CUP	96439	24
1	1	1	98438	STABILIZER SEAL RING	65060625	23
2	2	2	65021193	BACK-UP RING	89453-13	22
2	2	2	65021191	BACK-UP RING	89141-13	21
1	1	1	65021192	O-RING	89453-3	20
1	1	1	65021190	O-RING	89141-3	19
1	1	1	65021491	SPRING, WAVE	89453-9	18
1	1	1	65021490	SPRING, WAVE	89141-9	17
1	1	1	30177893	SET, SEAT/BALL		16
1	1	1	30177204	SET, SEAT/BALL		15
4	4	4	65060794	BACK-UP RING	89453-12	14
4	4	4	65060792	BACK-UP RING	89141-12	13
2	2	2	65060793	O-RING	89453-11	12
2	2	2	65060791	O-RING	89141-11	11
2	2	2	98895	SLEEVE, CRANK		10
2	2	2	65060691	SEAL, CROWN	89453-8	9
2	2	2	65060690	SEAL, CROWN	89141-8	8
1	1	1	114901	CRANK, OPER-L.H.		7
1	1	1	110128	CRANK, OPER-L.H.		6
1	1	1	30114902	CRANK, OPER-R.H.		5
1	1	1	110118	CRANK, OPER-R.H.		4
1	1	1		BODY, IBOP		3
1	1	1	110102	BODY, IBOP		2
1	1	1				1

110050	PH-50	UNLESS OTHERWISE SPECIFIED INTERPRET DIM/TOL PER ASME Y14.5M DIMENSIONS ARE IN INCHES .X ±.1 .XX ±.03 .XXX ±.010 ANGLES ±.5° DO NOT SCALE DRAWING	THIS DOCUMENT CONTAINS PROPRIETARY AND CONFIDENTIAL INFORMATION. ANY DISCLOSURE OR REPRODUCTION OF THIS DOCUMENT WITHOUT THE WRITTEN PERMISSION OF NATIONAL OILWELL VARCO IS STRICTLY PROHIBITED. © 2007 NATIONAL OILWELL VARCO, L.P. ALL RIGHTS RESERVED.	
NEXT ASSY	USED ON	DRAWN D.HIRULKAR	CHECKED B.RICE	DATE 11/21/06
APPLICATION	DATE	DATE	DATE	DATE
UNLESS OTHERWISE SPECIFIED MACHINED TOUGH CUT MAX 250	UNLESS OTHERWISE SPECIFIED TORCH CUT MAX 1000	DATE 11/21/06	DATE 2/6/95	DATE 2/6/95
TITLE: ASSEMBLY, UPPER IBOP 6 5/5" X 6 5/8", PH-50			SCALE: 2/3 WT LBS: 250 PRODUCTION: SIZE: D SHEET: 1 OF 1	
DRAWING NUMBER: 110103			REVISION: F	

NOTES: UNLESS OTHERWISE SPECIFIED

- 1. USE SEALING COMPOUND ON ALL PIPE THREADS.
- 2. LUBRICATE ALL BOLTS WITH ANTI-SEIZE COMPOUND. TORQUE ALL BOLTS PER VARCO DS00008 AND LOCKWIRE.
- 3. REPLACEMENT FILTER ELEMENT: 111013-1 (ITEM 6).
- 4. REPLACEMENT FILTER ELEMENT: 114416-1 (ITEM 7).
- 5. FOR MAIN MANIFOLD SEE ELECTRICAL DRAWING.
- 6. WELD ITEMS 109527-9 AND 109527-10 AS SHOWN & RELOCATE FILTER (ITEM 7).

D

C

B

A

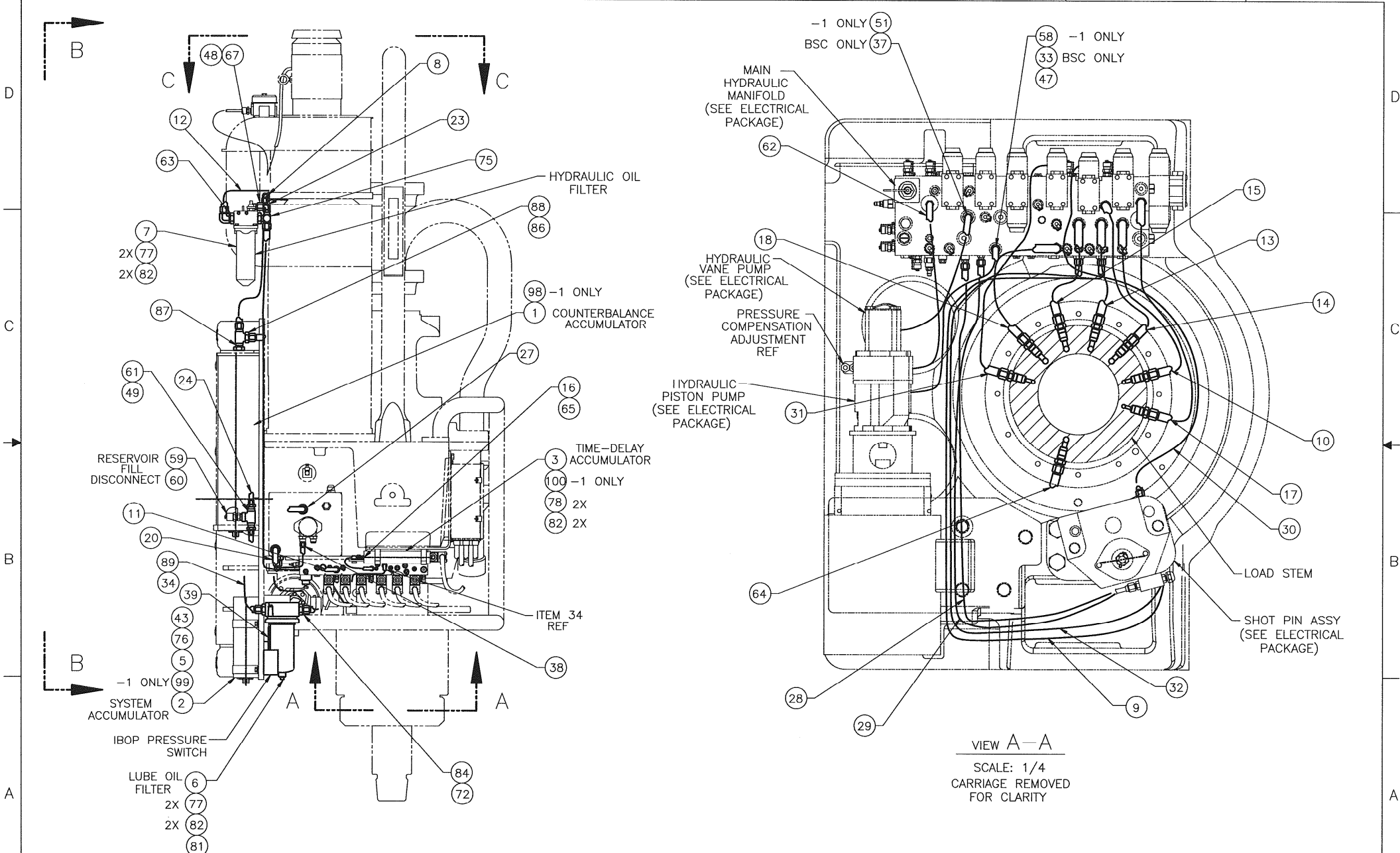
QTY	BSC	PART NO.	DESCRIPTION	ITEM NO.
1	-	110564-1SEP	ACCUMULATOR, HYDRO-PNEUMATIC 2"	100
1	-	110563-1CE	ACCUMULATOR, HYDRO-PNEUMATIC 4"	99
1	-	110562-1CE	ACCUMULATOR, HYDRO-PNEUMATIC 6"	98
2	2	940315-20	CONNECTOR, STAUFF #TCM20	97
2	2	94270-6	CLAMP, DBL 1/2" TUBE (NOT SHOWN)	96
3	3	94270-4	CLAMP, DBL 3/8" TUBE (NOT SHOWN)	95
1	1	94269-2	CLAMP, SINGLE 1/4" TUBE (NOT SHOWN)	94
1	1	56524-4-4-S	ELBOW, 90° EXT PIPE/37" LONG	93
2	2	56162-4-4-S	TEE, PIPE, EXT/INT/INT	92
1	1	53002-12 S	PLUG, PIPE SQUARE HEAD	91
1	1	108216-12	BALL VALVE	90
1	1	56501-24-16S	CONNECTOR, EXT PIPE 37"	89
1	1	56530-12-12S	TEE, 37"/37"/O-RING BOSS	88
1	1	56556-16-12S	REDUCER, O-RING BOSS	87
1	1	56517-12-6-S	REDUCER, INT 37"/37"	86
			DELETED	85
1	1	56700-24-16S	REDUCER, PIPE EXT/INT	84
			DELETED	83
6	6	50906-C	WASHER, LOCK-REGULAR	82
1	1	TBD	BRACKET, FILTER	81
			DELETED	80
			DELETED	79
2	2	50006-28-C5D	SCREW, CAP-HEX HEAD	78
4	4	50006-06-C5D	SCREW, CAP-HEX HEAD	77
1	1	56519-8-6-S	ELBOW, O-RING BOSS/37"	76
1	1	56519-16-12-S	ELBOW, O-RING BOSS/37"	75
3	3	56501-4-4-S	CONNECTOR, EXT PIPE/37"	74
2	2	56506-4-4-S	ELBOW, 90° EXT PIPE/37"	73

QTY	BSC	PART NO.	DESCRIPTION	ITEM NO.
3	3	56506-16-16S	ELBOW, 90° EXT PIPE/37"	72
1	1	56555-4-4-S	TEE, 37"/37"/O-RING BOSS	71
1	1	TBD	TUBE ASSY, IBOP PRESS SW/MANIFOLD(1/4")	70
1	1	121512	TUBE ASSY, QD/MANIFOLD (3/4")	69
2	2	56519-6-6-S	ELBOW, O-RING BOSS/37"	68
2	2	56519-8-8-S	ELBOW, O-RING BOSS/37"	67
1	1	TBD	TUBE ASSY, ACCUMULATOR/MANIFOLD (3/8")	66
1	1	56556-12-6-S	REDUCER, O-RING BOSS	65
1	1	125100	TUBE ASSY, LINK ADAPTER LIFT	64
1	1	56551-16-12S	CONNECTOR, O-RING BOSS/INT PIPE	63
1	1	124191	HOSE ASSY, PUMP PRESSURE/MANIFOLD	62
1	1	56160-12-12-S	TEE, 37"/ 37"/ INT PIPE	61
1	1	55915-12	CAP, DUST-PLASTIC (QD)	60
1	1	55909-12-12	VALVED NIPPLE, QD/INT PIPE	59
1	-	121726	TUBE ASSY, PUMP DRAIN/MANIFOLD	58
			DELETED	57
1	1	56513-12-S	TEE, BULKHEAD UNION 37"	56
1	1	56522-6-6-S	ELBOW, BULKHEAD 37"/37"	55
1	1	115918	ADAPTER, PUMP INLET/DRAIN	54
			DELETED	53
1	1	56529-16-16S	CONNECTOR, O-RING BOSS/37"	52
1	-	121724	TUBE ASSY, PUMP PRESSURE/MANIFOLD	51
1	1	125103	TUBE ASSY, LUBE PUMP/FILTER	50
1	1	56702-12-12-S	ELBOW, 90° EXT. PIPE	49
1	1	56529-8-8-S	CONNECTOR, O-RING BOSS/37"	48
2	2	56529-6-6-S	CONNECTOR, O-RING BOSS/37"	47
			DELETED	46
1	1	56519-4-4-S	ELBOW, O-RING BOSS/37"	45
			DELETED	44
1	1	56556-16-8-S	REDUCER, O-RING, BOSS	43
1	1	56541-12	KIT, FLANGE	42
1	1	56541-16	KIT, FLANGE	41

QTY	BSC	PART NO.	DESCRIPTION	ITEM NO.
1	1	114090	TUBE ASSY, ACCUMULATOR/C'BAL BULKHEAD	40
1	1	30172006	TUBE ASSY. (DIA .250)	39
1	1	118409	TUBE ASSY, LUBE /HEAT EXCHANGER	38
-	1	114087	TUBE ASSY, MANIFOLD/PUMP	37
1	1	114086	TUBE ASSY, PISTON PUMP/RESERVOIR	36
1	1	114085	TUBE ASSY, PRE-FILL BULKHD/MANIFOLD	35
1	1	121511	TUBE ASSY, FILTER/QD	34
-	1	114083	TUBE ASSY, MANIFOLD/CASE DRAIN	33
1	1	125095	TUBE ASSY, MANIFOLD/SHOT PIN	32
1	1	115426	TUBE ASSY, MANIFOLD/LOAD STEM	31
1	1	125099	TUBE ASSY, MANIFOLD/SHOT PIN	30
1	1	125101	TUBE ASSY, MANIFOLD/SHOT PIN	29
1	1	125102	TUBE ASSY, MANIFOLD/SHOT PIN	28
1	1	125104	TUBE ASSY, LUBE PUMP/FILTER	27
1	1	117091	TUBE ASSY, RESERVOIR/VANE PUMP	26
2	2	113988	TUBE ASSY, PRESS. SWITCH/AIR DUCT	25
1	1	117020	TUBE ASSY, OIL FILTER/MANIFOLD	24
1	1	119029	TUBE ASSY, OIL FILTER/PRE-FILL VALVE	23
1	1	113985	TUBE ASSY, RESERVOIR/PRE-FILL MANIFOLD	22
1	1	113984	TUBE ASSY, PRE-FILL/BULKHEAD	21
1	1	116690	TUBE ASSY, C'BAL ACCUM/MANIFOLD	20
1	1	113982	TUBE ASSY, CASE DRAIN/RESERVOIR	19
1	1	115425	TUBE ASSY, MANIFOLD/LOAD STEM	18
1	1	117570	TUBE ASSY, MANIFOLD/LOAD STEM	17
1	1	118410	TUBE ASSY, ACCUMULATOR/LOAD STEM	16
1	1	115423	TUBE ASSY, MANIFOLD/LOAD STEM	15
1	1	115422	TUBE ASSY, MANIFOLD/LOAD STEM	14
1	1	115421	TUBE ASSY, MANIFOLD/LOAD STEM	13
1	1	119028	TUBE ASSY, HEAT EXCHANGE/FILTER	12
1	1	113974	TUBE ASSY, LUBE MOTOR/MANIFOLD	11
1	1	118405	TUBE ASSY, MANIFOLD/LOAD STEM	10
1	1	125096	TUBE ASSY, MANIFOLD/SHOT PIN	9
1	1	118408	TUBE ASSY, MANIFOLD/BREAK	8
1	1	114416	FILTER, HYDRAULIC	7
1	1	111013	FILTER, ASSY, 60 MICRON, GEAR OIL	6
1	1	30172005	TUBE ASSY, ACCUMULATOR/MANIFOLD	5
1	1	111712	PRE-FILL VALVE ASSEMBLY	4
-	1	110564-1	ACCUMULATOR, HYDRO-PNEUMATIC 2"	3
-	1	110563-1	ACCUMULATOR, HYDRO-PNEUMATIC 4"	2
-	1	110562-1	ACCUMULATOR, HYDRO-PNEUMATIC 6"	1

TABULATION	
DASH NO.	DESCRIPTION
-BSC	"UL" ELECTRICAL PACKAGE
-1	"EEX" ELECTRICAL PACKAGE

UNLESS OTHERWISE SPECIFIED		LIST OF MATERIALS	
INTERPRET DIM/TOL PER ASME Y14.5M		THIS DOCUMENT CONTAINS PROPRIETARY AND CONFIDENTIAL INFORMATION WHICH IS THE PROPERTY OF NATIONAL OILWELL VARCO. IT IS TO BE KEPT UNCLASSIFIED AND UNCONTROLLED EXCEPT AS PART OF THE OILWELL VARCO INFORMATION SYSTEM. IT IS TO BE RELEASED TO THE PUBLIC ONLY AS PART OF THE OILWELL VARCO INFORMATION SYSTEM. IT IS TO BE KEPT UNCLASSIFIED AND UNCONTROLLED EXCEPT AS PART OF THE OILWELL VARCO INFORMATION SYSTEM. IT IS TO BE RELEASED TO THE PUBLIC ONLY AS PART OF THE OILWELL VARCO INFORMATION SYSTEM.	
DIMENSIONS ARE IN INCHES		TITLE	
.X ± .1		HYDRAULIC KIT- TDS-9S	
XX ± .03		TDS-9S	
XXX ± .010		SCALE: 1/8" = 1" WT LBS: 500	
ANGLES ± .5°		PROJECTION: 1st ANGLE	
DO NOT SCALE DRAWING		SIZE: D	
CURRENT INITIAL		SHEET: 1 of 5	
DRAWN: D.LUCERO H.OLSTYNSKI		DRAWING NUMBER: 110138	
CHECKED: B.KRUEGER		REVISION: V	
APPROVED: B.KRUEGER		DATE: 09/20/06	
UNLESS OTHERWISE SPECIFIED		RIG SOLUTIONS	
MACHINED TOUGH CUT		10000 RICHMOND AVE.	
MAX 200		HOUSTON, TEXAS 77042 U.S.A.	
MAX 1000		(713) 346-7500	

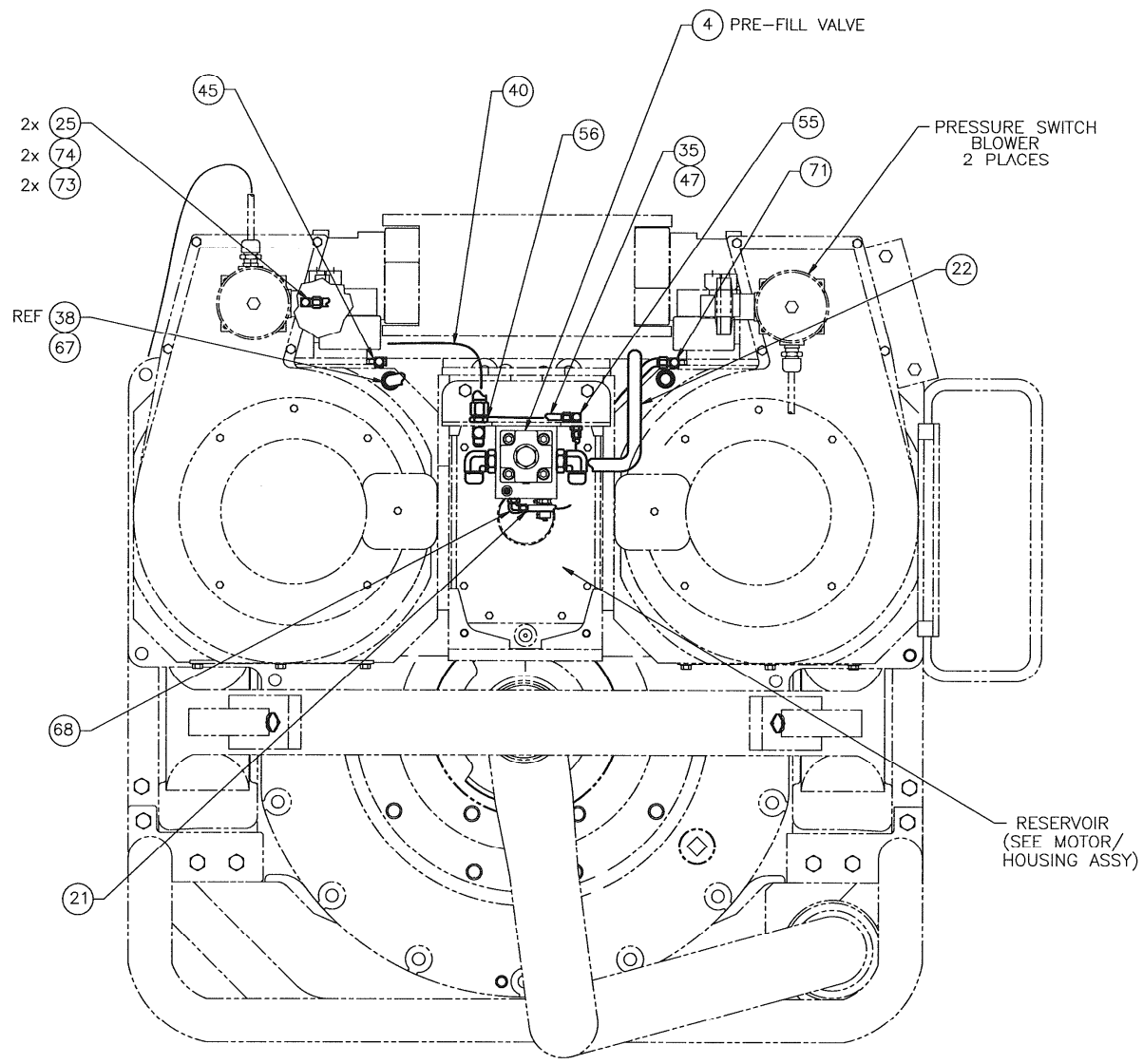


VIEW A-A
SCALE: 1/4
CARRIAGE REMOVED FOR CLARITY

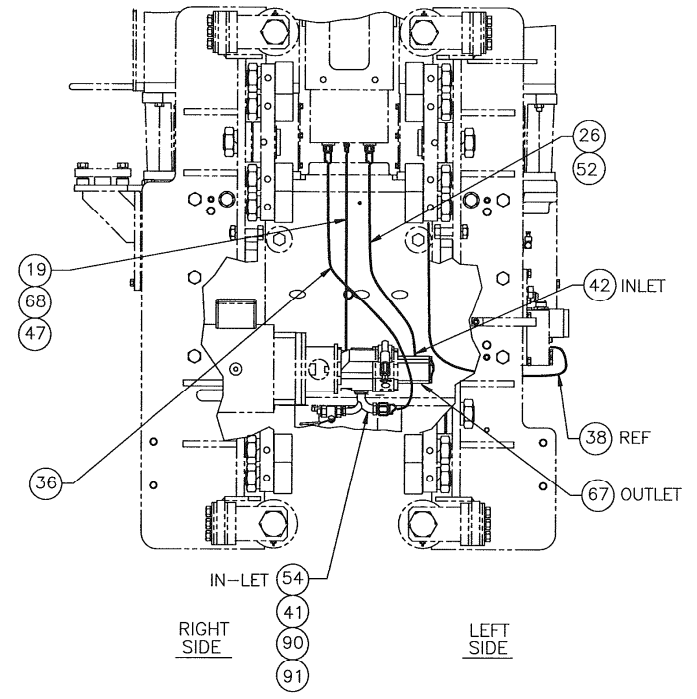
SIZE	DWG NO	REV
D	110138	V
SCALE	1/8" WT LBS	900 SHEET
		2 OF 5

D
C
B
A

D
C
B
A



VIEW C-C
SCALE: 1/4



VIEW B-B
REAR VIEW

SIZE	DWG NO	REV
D	110138	V
SCALE	1/8" WT LBS	900 SHEET 3 OF 5

D

C

B

A

D

C

B

A

WAS ITEM 25, RE-ROUTE

WAS ITEM 25, RE-ROUTE

(24.0)

WAS ITEM 12, RE-ROUTE

WAS ITEM 38, RE-ROUTE

2

7

77 2X

82 2X

RIGHT SIDE

REAR VIEW OF TDS-9SA

LEFT SIDE

ITAG CONFIGURATION ONLY

SIZE	DWG NO	REV
D	110138	V
SCALE	1/8" WT LBS	900 SHEET
		4 OF 5

D

C

B

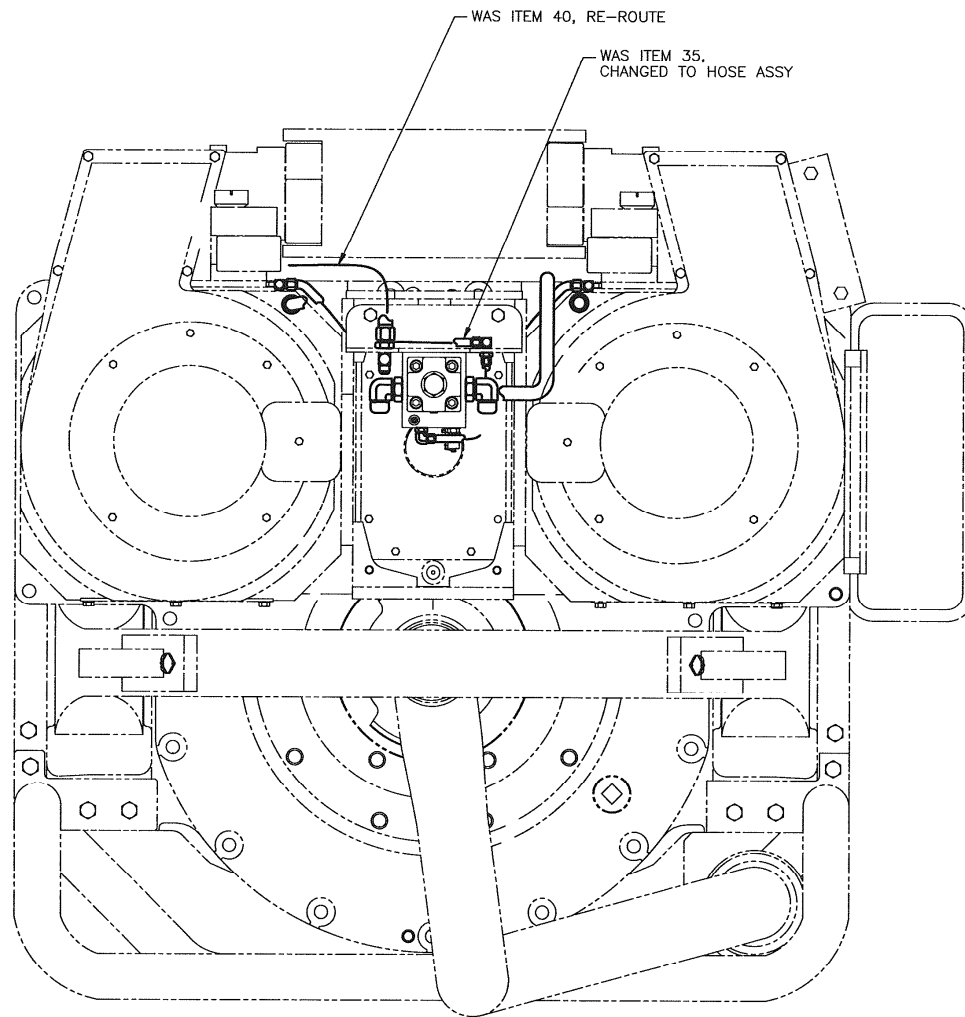
A

D

C

B

A



ITAG CONFIGURATION ONLY

SIZE	DWG NO	REV
D	110138	V
SCALE	1/8" WT LBS	900 SHEET 5 OF 5

NOTES UNLESS OTHERWISE SPECIFIED

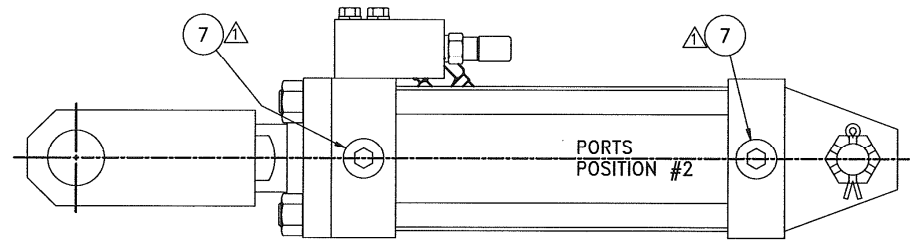
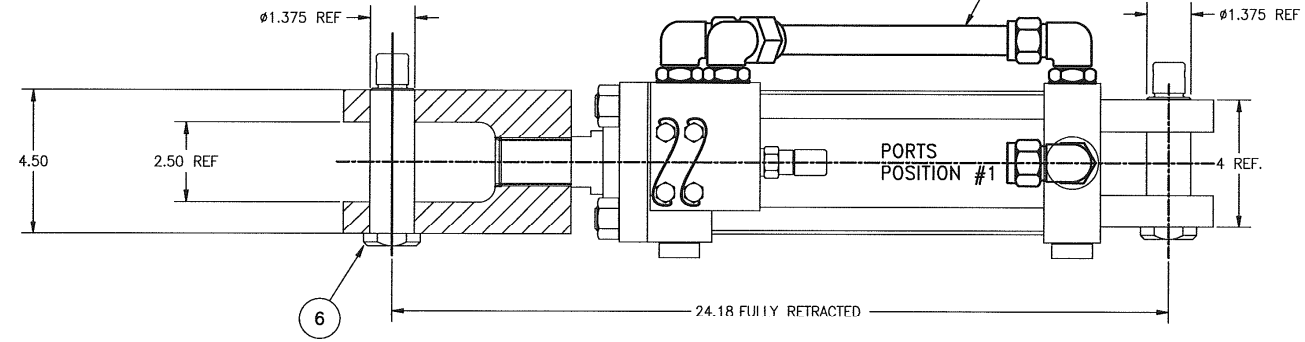
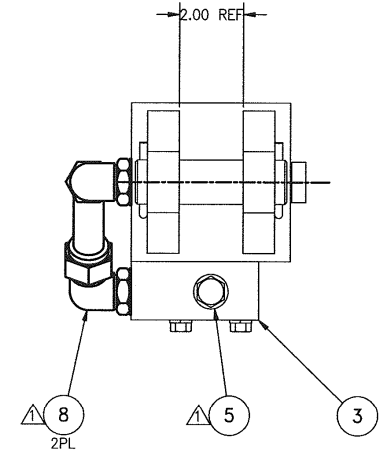
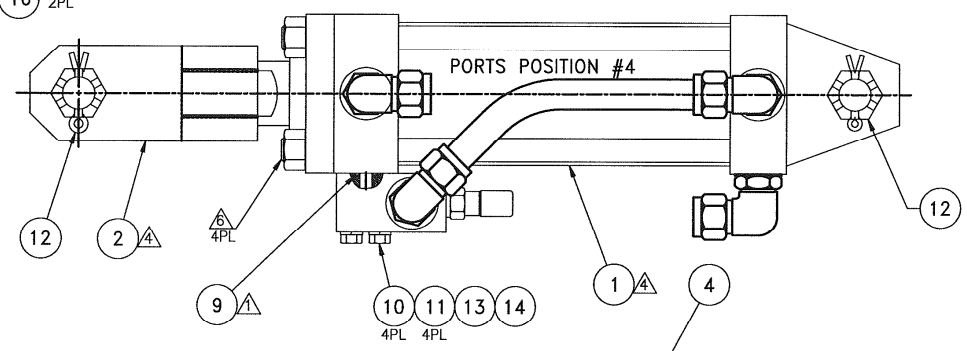
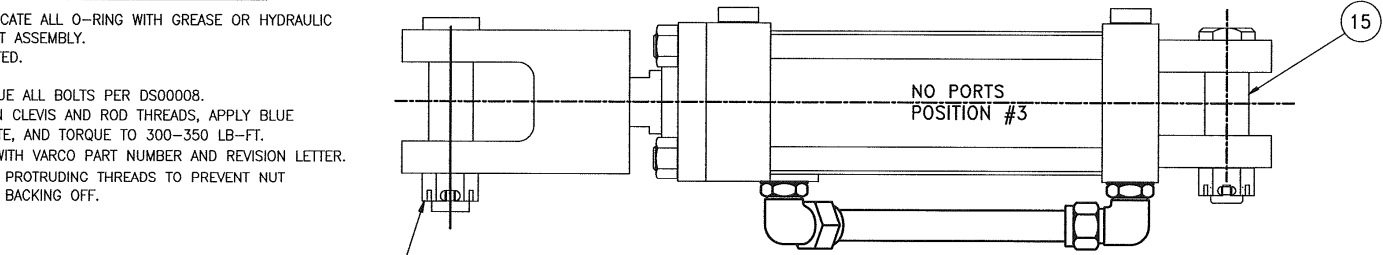
- 1. LUBRICATE ALL O-RING WITH GREASE OR HYDRAULIC OIL AT ASSEMBLY.
- 2. DELETED.
- 3. TORQUE ALL BOLTS PER DS00008.
- 4. CLEAN CLEVIS AND ROD THREADS, APPLY BLUE LOCTITE, AND TORQUE TO 300-350 LB-FT.
- 5. TAG WITH VARCO PART NUMBER AND REVISION LETTER.
- 6. PEEN PROTRUDING THREADS TO PREVENT NUT FROM BACKING OFF.

D

C

B

A

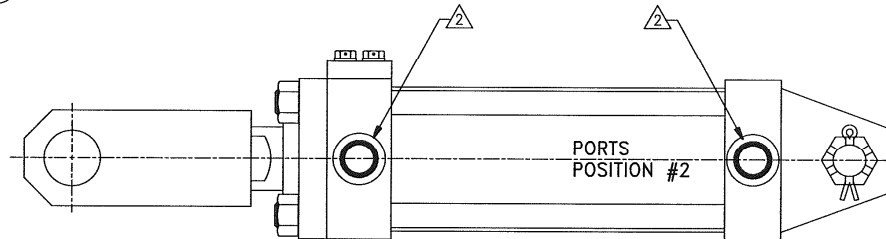
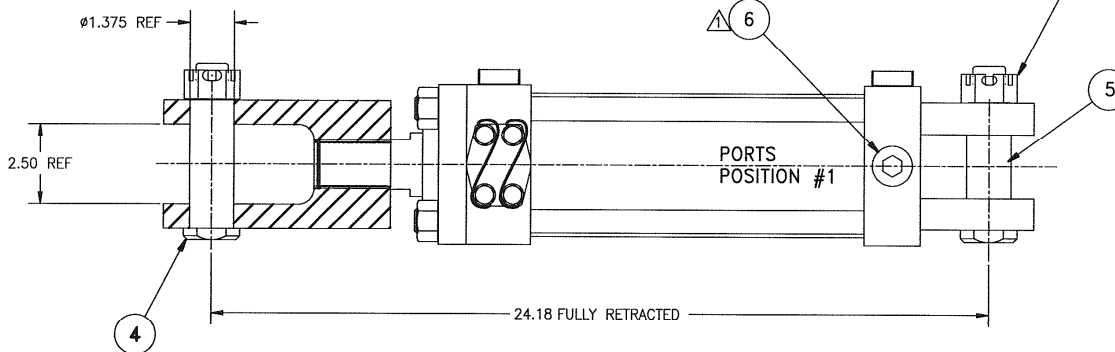
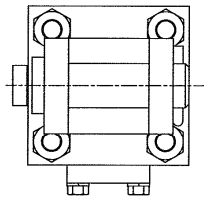
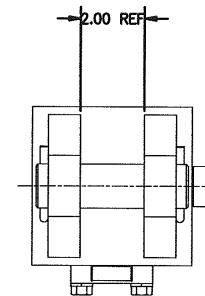
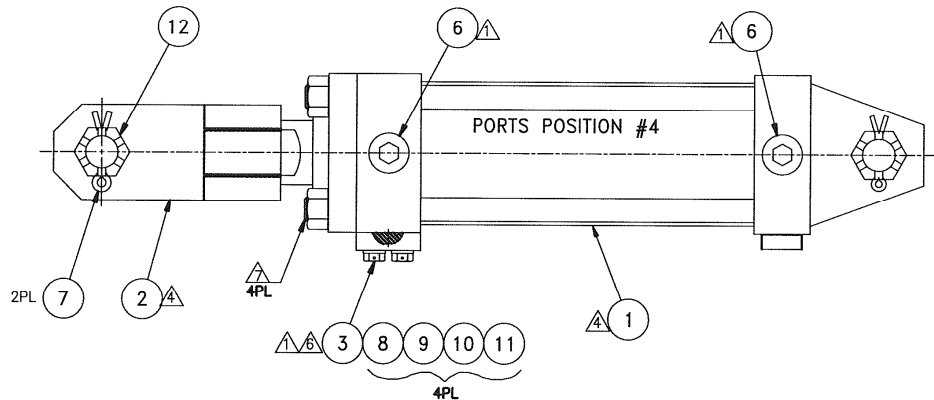
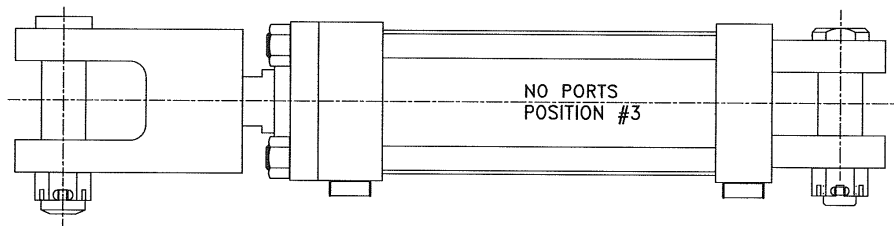


QTY REQD	PART NO.	DESCRIPTION	MATERIAL	ITEM NO.
17	A/R 26001	LOCKWIRE #.051		17
2	50516-C	NUT, HEX SLOTTED		16
1	30172176-502	PIN, CLEVIS, CYLINDER COUNTERBALANCE		15
1	110078-FL2	CABLE, SAFETY, FERRULE #.032		14
1	110078-L36	CABLE, SAFETY, #.032		13
2	51437-16-S	PIN, COTTER		12
4	50806-N-C	WASHER, FLAT		11
4	50006-20-C5D	SCREW, CAP-HEX HEAD (UNC-2A)		10
1	51300-214B	O-RING		9
4	56519-12-12S	ELBOW, O-RING BOSS / 3/7"		8
2	87196-12-S	PLUG, SAE-12 HEX SOCKET		7
1	30172176-BSC	PIN, CLEVIS, CYLINDER COUNTERBALANCE		6
1	94522-21N	VALVE CARTRIDGE, PRESSURE RELIEF, DIRECT ACTING		5
1	111936	TUBE, CYLINDER, COUNTERBALANCE		4
1	110716-2	MANIFOLD, RELIEF COUNTERBALANCE		3
1	111935	CLEVIS, ROD END, CYLINDER, COUNTERBALANCE		2
1	110687	CYLINDER, 4", C'BAL		1

PART FLAGS		DIMENSIONS (UNLESS OTHERWISE SPECIFIED)		SURFACE FINISHES		TOLERANCES		TITLE	
<input type="checkbox"/> TRACEABILITY	ARE IN	INTERPRET DIMENSIONS & FINISHES	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	Varco Systems	
<input type="checkbox"/> CUSTOM LOAD	DO NOT SCALE	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	CYLINDER ASSEMBLY, COUNTERBALANCE	
<input type="checkbox"/> CONFIGURATION	DO NOT SCALE	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	110703	
<input type="checkbox"/> SPARE PART	DO NOT SCALE	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	1 OF 1	
<input type="checkbox"/> COMMERCIAL	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	1 OF 1	
<input type="checkbox"/> OPERATIONAL	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	1 OF 1	
<input type="checkbox"/> INSPECTION	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	1 OF 1	
<input type="checkbox"/> NEW ITEM PROPOSED	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	1 OF 1	

NOTES UNLESS OTHERWISE SPECIFIED

- 1. LUBRICATE ALL O-RING WITH GREASE OR HYDRAULIC OIL AT ASSEMBLY.
- 2. THESE PLASTIC PLUGS ARE REMOVED AT THIS LEVEL AND REPLACED WITH ITEM 14 #56519-12-12S
- 3. TORQUE ALL BOLTS PER DS00008.
- 4. CLEAN CLEVIS AND ROD THREADS, APPLY BLUE. LOCTITE, AND TORQUE TO 300-350 LB-FT.
- 5. TAG WITH VARCO PART NUMBER AND REVISION LETTER.
- 6. REPLACE BOLTS INCLUDED IN ITEM 3 WITH ITEM 10.
- 7. PEEN PROTRUDING THREADS TO PREVENT NUTS FROM BACKING OFF.



QTY REQD	PART NO.	DESCRIPTION	MATERIAL	ITEM NO.
2	56519-12-12-S	ELBOW, O-RING BOSS/37		14
A/R	Z6001	LOCKWIRE ϕ .051		13
2	50516-C	NUT, HEX SLOTTED		12
4	50906-C	LOCK WASHER		11
4	50006-12-C5D	SCREW		10
1	110078-FL2	CABLE, SAFETY, FERRULE ϕ .032		9
1	110078-L36	CABLE, SAFETY, ϕ .032		8
2	51437-16-S	PIN, COTTER		7
3	87196-12-S	PLUG, SAE-12 HEX SOCKET		6
1	30172176-502	PIN, CLEVIS, CYLINDER, COUNTERBALANCE		5
1	30172176-BSC	PIN, CLEVIS, CYLINDER, COUNTERBALANCE		4
1	94681-12	BLIND FLANGE KIT, CODE 61		3
1	111935	CLEVIS, ROD END, CYLINDER, COUNTERBALANCE		2
1	110687	CYLINDER, 4", C'BAL		1

PART FLAGS		DIMENSIONS (UNLESS OTHERWISE SPECIFIED)		SURFACE FINISHES		VARCO SYSTEMS	
<input type="checkbox"/> TENSILE	ARE IN	INTERPRET DIMENSIONS & TOLERANCES PER ANSI Y14.5	FINISHES	FINISHES	FINISHES		
<input type="checkbox"/> CIRCULAR LOAD	DO NOT	ANGLES PER ANSI Y14.5	DO NOT	DO NOT			
<input type="checkbox"/> DISTORTION	SCALE	3" & 1" CAN BE "FINISH CUT"	DO NOT	DO NOT	TITLE		
<input type="checkbox"/> SPARE PART	DOCUMENT	ANGULAR TOLERANCE \pm 30'	DO NOT	DO NOT	CYLINDER ASSEMBLY, COUNTERBALANCE		
<input type="checkbox"/> COMMISSIONING	OPERATIONAL	FOR CONSTRUCTION AND OPERATIONAL PURPOSES, ALL DIMENSIONS AND TOLERANCES ARE TO BE INTERPRETED AS UNLESS OTHERWISE SPECIFIED	DO NOT	DO NOT	110131	TDS-9S	SIZE
<input type="checkbox"/> ENDORSEMENT	PREPARED BY	K. WOUTEN	CHECKED BY	D. STEPHENS	DATE	5/19/03	DOCUMENT NO.
<input type="checkbox"/> NEW PART	DATE	JERRY J	DATE	D. STEPHENS	DATE	2/15/03	110704
	WEIGHT LB		WEIGHT LB		SCALE	1/2	OF
							1

NOTES UNLESS OTHERWISE SPECIFIED

1. THE VALVE BODY AND ALL COMPONENTS MUST BE CLEAN AND FREE OF ALL CONTAMINATION. ALL INTERNAL SURFACES SHALL HAVE A LIGHT COATING OF PETROLEUM-BASE HYDRAULIC FLUID PRIOR TO ASSEMBLY.

2. LUBRICATE ALL O-RINGS WITH CLEAN PETROLEUM-BASE HYDRAULIC FLUID PRIOR TO ASSEMBLY.

③ INSTALL ORIFICE PLUGS WITH ANAEROBIC ADHESIVE, ITEM 22.

4. DO NOT USE ANAEROBIC ADHESIVE OR TEFLON PASTE ON SAE O-RINGS BOSS PLUGS OR FITTINGS.

③ TORQUE CAP ON TEST FITTING FINGER-TIGHT.

6. CAP ALL OPEN PORTS.

7. PAINT COMPLETE ASSEMBLY PER VPS00001. CLEAN WITH SOLVENT PER SECTION 2.3

DO NOT CLEAN BY ANY MECHANICAL METHOD SUCH AS WIRE BRUSH OR SANDBLAST. COLOR: YELLOW.

③ ITEM 10 AND 11 SHALL BE INSTALLED PER LEE COMPANY PROCESS SPECIFICATION PS187 USING TOOL KIT: VARCO PART NUMBER 93183. THE TAPERED PIN HAS BEEN TREATED WITH A SOLID-FILM LUBRICANT. DO NOT REMOVE THIS COATING, OR ADD ADDITIONAL LUBRICANT. AVOID EXCESSIVE HANDLING OF PINS.

INSTALLATION PROCEDURE:

- 1.THREAD THE INSERT BODY ONTO THE BODY TOOL.
- 2.PUSH THE INSERT FIRMLY INTO THE REAMED HOLE UNTIL IT IS SEATED AGAINST THE 45° SHOULDER. REMOVE THE BODY TOOL.
- 3.THREAD THE PIN COMPLETELY ONTO THE PIN INSTALLATION TOOL.
- 4.DRIVE THE PIN INTO THE BODY UNTIL THE PIN IS FLUSH WITH THE BODY TO WITHIN ±.005".

③ ITEM 6 CONSISTS OF (1) CAGE, (1) POPPET, (1) SPRING, SEALS AND BACK-UP RINGS. SPRING IS TO BE RELOCATED AS SHOWN IN SECTION A-A ON SHEET 3.

10. ALL DIMENSIONS ARE REFERENCE.

11. SAFETY WIRE ITEM 15 AFTER TORQUED PER DS00008.

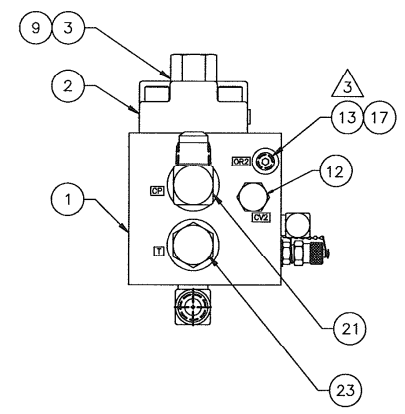
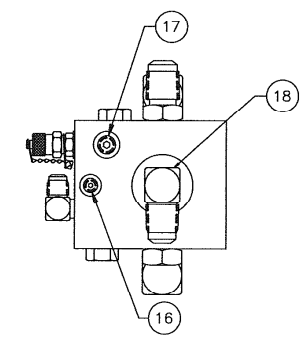
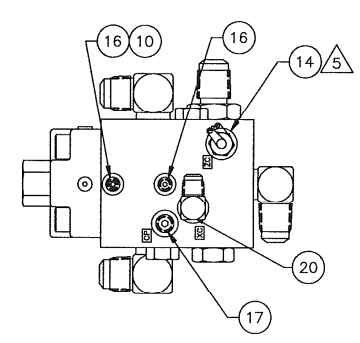
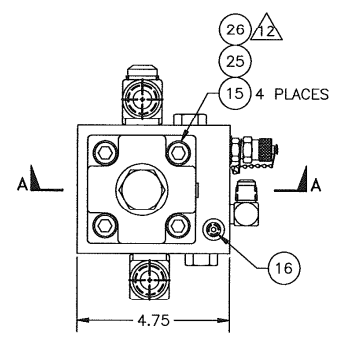
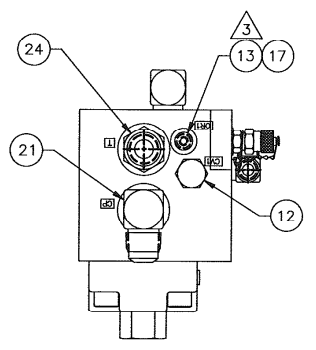
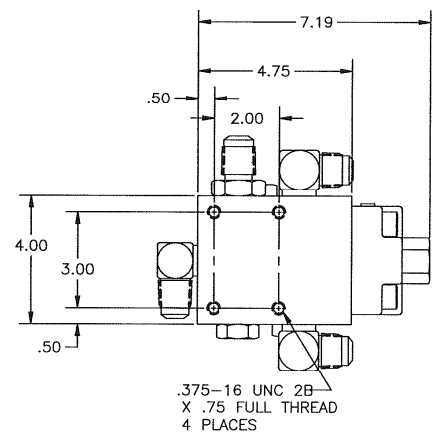
12. USE TOOL 110078-T1 (OR EQUIVALENT) TO CRIMP FERRULE TO SAFETY CABLE.

QTY REQD	PART NO.	DESCRIPTION	MATERIAL	ITEM NO.
1	110078-FL2	FERRULE, SAFETY		26
1	110078-L24	TOOL, SAFETY CABLE		25
1	56529-12-12S	CONN., O-RING BOSS/37"		24
1	56531-12-S	PLUG, O-RING BOSS		23
M/R	53200-242	LOCKTITE, BLULOCK		22
2	56519-12-12S	SAE -12 ELBOW, O-RING BOSS/37"		21
1	56519-6-6-S	SAE 6 ELBOW, O-RING BOSS/37"		20
		NOT USED		19
1	56519-16-12S	SAE -16 ELBOW, O-RING BOSS/37"		18
4	87196-4-S	SAE J514-4 HEX SOCKET PLUG		17
4	87196-2-S	SAE J514-2 HEX SOCKET PLUG		16
4	50108-14-BD	SOCKET CAP SCREW .50-13 X 1.75		15
1	93024-4SAE	SAE -4 TEST FITTING		14
2	93019-19	ORIFICE PLUG, .25-28 X .075 DIA.		13
2	94536-175N	CHECK VALVE, T-13A, 75 PSID		12
③	1 92654	CHECK VALVE, .187 DIA.		11
③	1 109498-800D	LEE JET, 8000 LOHM		10
1	105643-12	O-RING, 3-912		9
2	53600-40	RETAINING RING, EXTERNAL		8
1	53500-68	RETAINING RING, INTERNAL		7
③	1 112825	VALVE, MODIFIED-LOGIC CARTRIDGE INSERT		6
2	111711	GUIDE DISC		5
1	111710	GUIDE ROD		4
1	111709	PLUG, SAE J514-12 SPECIAL		3
1	111708	COVER, 25 mm MODIFIED		2
1	111707-2	VALVE BODY		1

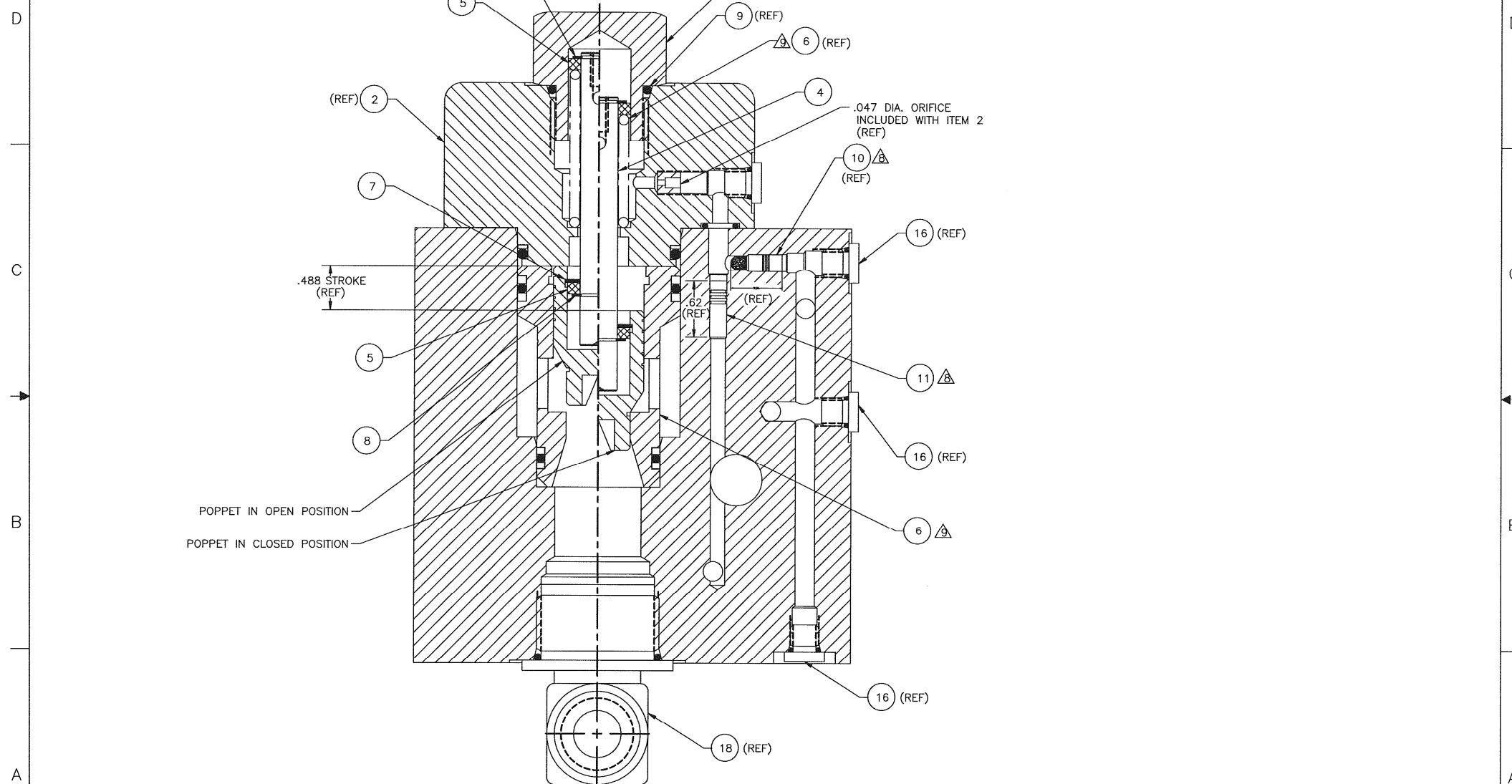
PART FLAGS <input type="checkbox"/> TRACEABILITY <input type="checkbox"/> CRITICAL LOAD PATH ITEM <input type="checkbox"/> CERTIFICATION REQUIRED		UNLESS OTHERWISE SPECIFIED INTERPRET DIM/TOL PER ASME Y14.5M DIMENSIONS ARE IN INCHES .X ± .1 .XX ± .03 .XXX ± .010 ANGLES ± .5° DO NOT SCALE DRAWING		COPYRIGHT © VARCO INTERNATIONAL, INC. ALL RIGHTS RESERVED THE DOCUMENT AND THE DATA HEREON ARE RETURNED TO THE USER WITHOUT ANY WARRANTY OR GUARANTEE. VARCO ASSUMES NO LIABILITY FOR THE USER'S USE OF THIS DOCUMENT OR THE DATA HEREON UNDER THE COPYRIGHT LAWS AS A PUBLISHED WORK.	
SPARE PART <input type="checkbox"/> COMMISSIONING <input type="checkbox"/> OPERATIONAL <input type="checkbox"/> INSURANCE		APPLICATION UNLESS OTHERWISE SPECIFIED MACHINED TORCH CUT 250 MAX 1000 MAX		LIST OF MATERIALS DRAWN: S.SIFTON, CURRENT: S.SIFTON, INITIAL: N.WAGNER CHECKED: B.RICE, K.WIEN APP'D: B.RICE, K.WIEN DATE: 05/18/05, 3/95	
TITLE: VALVE, ASSY, PRE-FILL		SIZE: D, DWG NO: 111712, REV: E		SCALE: 1/2" WT LBS, SHEET: 1 OF 3	

D
C
B
A

D
C
B
A



SIZE D	DWG NO 111712	REV E
SCALE 1/2" WT LBS	- SHEET 2 OF 3	



POPPET IN OPEN POSITION
 POPPET IN CLOSED POSITION

.047 DIA. ORIFICE
 INCLUDED WITH ITEM 2
 (REF)

.488 STROKE
 (REF)

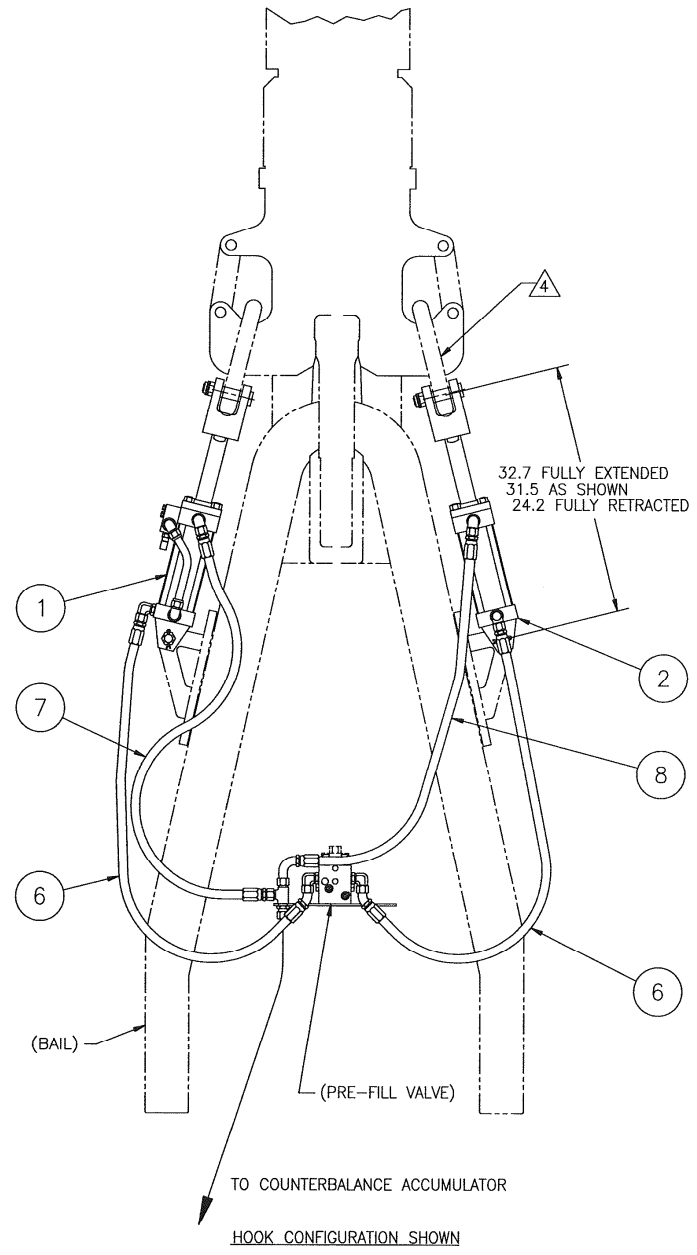
.62
 (REF)

SECTION A-A
 SCALE: 2/1

SIZE D	DWG NO 111712	REV E
SCALE 1/2 WT LBS	- SHEET 3 OF 3	

NOTES UNLESS OTHERWISE SPECIFIED.

1. CLEAN OUT ALL HOSES PRIOR TO ASSEMBLY.
2. CYCLE CYLINDERS AFTER INSTALLATION OF HOSES AND PRIOR TO ATTACHING TO HOOK.
3. FOLLOW ADJUSTMENT PROCEDURES IN SERVICE MANUAL.
4. SEE DRAWING 118244 OR 115924 FOR BALANCE OF COUNTERBALANCE COMPONENTS TO BE SPECIFIED.
5. WARNING TAGS (ITEM #9) TO BE ATTACHED TO BOTH END OF HOSE ASSEMBLIES.



CONFIGURATION TABLE		STATUS
BSC	USE WITH 98.5" & 84" BAILS ATTACHING TO HOOKS	OBS
-120H	USE WITH 120" BAILS ATTACHING TO HOOKS	OBS
-120B	USE WITH 120" BAILS ATTACHING TO BLOCKS	OBS
-120	USE WITH UP TO 120" BAILS FOR BOTH HOOKS & BLOCKS	4

QTY	RECD	QTY	RECD	PART NO.	DESCRIPTION	MATERIAL	ITEM NO.
8	8	-	-	81560	TAG, WARNING		12
1	1	1	1	59144P290099	HOSE ASSY, HYDRAULIC-HIGH PRESSURE		11
1	1	1	1	59124P290093	HOSE ASSY, HYDRAULIC-HIGH PRESSURE		10
2	2	2	2	59143P290086	HOSE ASSY, HYDRAULIC-HIGH PRESSURE		9
					DELETED		8
-	-	-	-	76717	LINK, PEAR		7
1	1	1	1	110704	CYLINDER ASSEMBLY, COUNTERBALANCE		6
1	1	1	1	110703	CYLINDER ASSEMBLY, COUNTERBALANCE		5
-120	-120H	-120H	BSC				4
							3
							2
							1

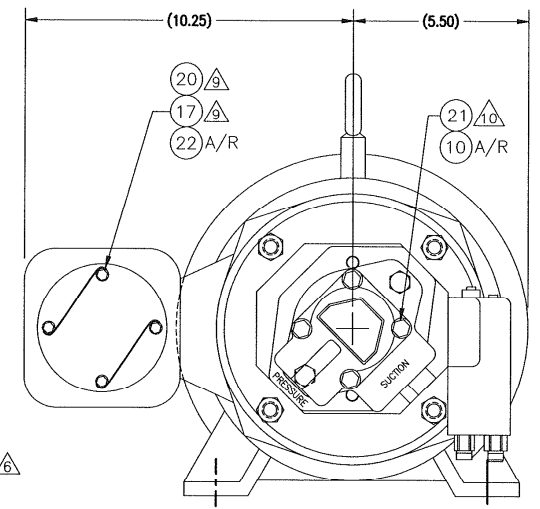
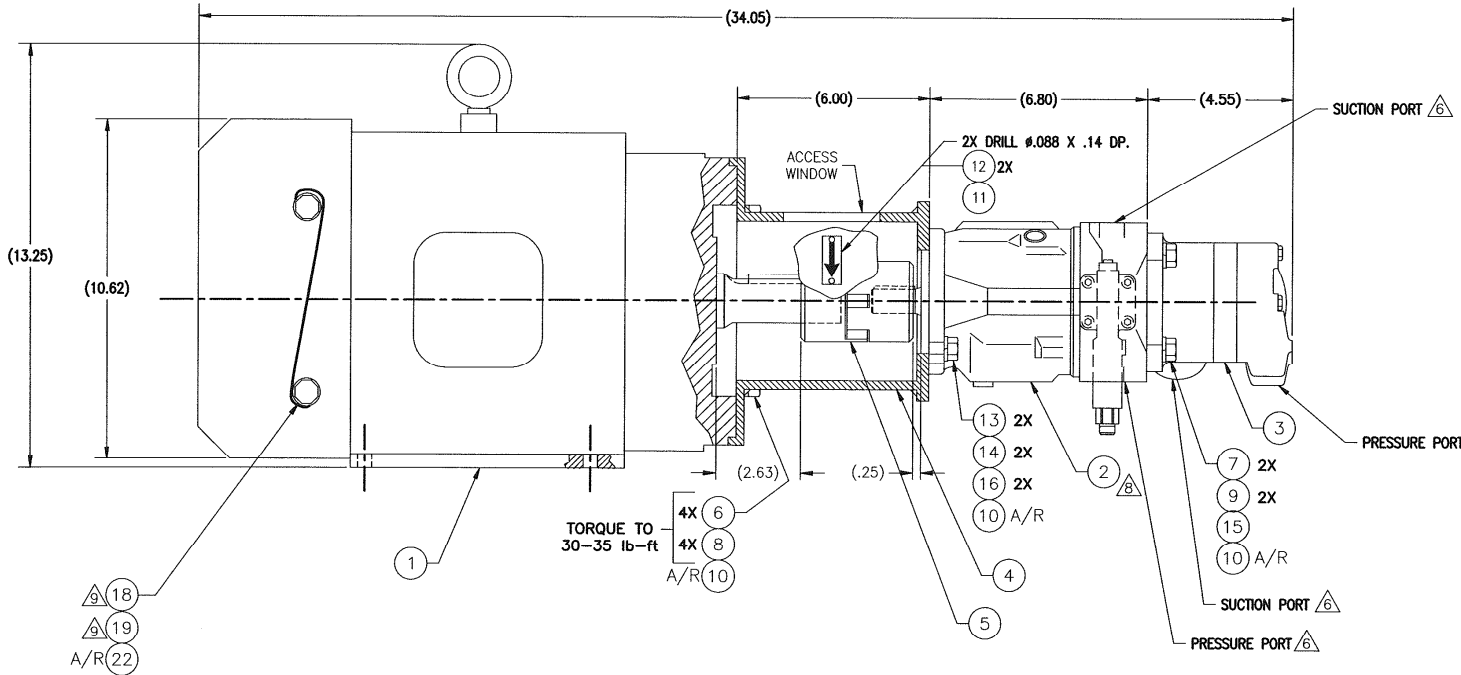
5

PART FLAGS		SURFACE FINISHES		Varco Systems	
<input type="checkbox"/> TOLERABILITY	ARE IN EXCESS	<input type="checkbox"/> POLISHED	TO 125 RA	TITLE PACKAGE COUNTERBALANCE 9S	
<input type="checkbox"/> CONTROL LOAD FROM TIE	DO NOT SCALE	<input type="checkbox"/> ANODIZED	TO 125 RA		
<input type="checkbox"/> SPARE PART	DOCUMENT	<input type="checkbox"/> POLISHED	TO 125 RA	SIZE D DOCUMENT NO. 112190 REVISION K	
<input type="checkbox"/> COMMERCIAL	OPERATIONAL	<input type="checkbox"/> POLISHED	TO 125 RA	SCALE 1/8 WEIGHT LB 770 SHEET 1 OF 1	
<input type="checkbox"/> OPERATIONAL	OPERATIONAL	<input type="checkbox"/> POLISHED	TO 125 RA	DATE 3/15/06	
<input type="checkbox"/> OPERATIONAL	OPERATIONAL	<input type="checkbox"/> POLISHED	TO 125 RA	DATE 4/21/95	
<input type="checkbox"/> OPERATIONAL	OPERATIONAL	<input type="checkbox"/> POLISHED	TO 125 RA	DATE	
<input type="checkbox"/> OPERATIONAL	OPERATIONAL	<input type="checkbox"/> POLISHED	TO 125 RA	DATE	

NOTES - UNLESS OTHERWISE SPECIFIED:

1. APPLY ANTI-SEIZE COMPOUND TO ALL FASTENERS, PUMP SHAFT AND MOTOR SHAFT.
2. LOCKWIRE ALL FASTENERS FOR PUMP/MOTOR ADAPTER.
3. PAINT ASSEMBLY PER VARCO SPEC VPS00001, COLOR - YELLOW.
4. TAG ASSEMBLY WITH VARCO PART NO.
5. ALL DIMENSIONS ARE FOR REFERENCE ONLY.

6. CAP ALL PORTS ON HYDRAULIC PUMPS.
7. APPLY ANTI-SEIZE TO ALL SCREWS AND TORQUE PER DS00008.
8. "O"-RING SUPPLIED WITH ITEM 2.
9. REPLACE EXISTING J-BOX AND FAN SHROUD BOLTS WITH ITEMS 17 & 18 AND LOCKWIRE IN PLACE.
10. REPLACE EXISTING SCREWS (ONE AT A TIME) WITH ITEM 21 AND LOCKWIRE.



TORQUE TO 30-35 lb-ft

TABULATION CHART			
VARCO DASH NO.	ITEM NO.	PART NO.	VOLTAGE, FREQUENCY & PHASE
BASIC	1	109755	460, 60Hz, 3Ø
-1	1	109755-1	550, 60Hz, 3Ø
-2	1	109755-2	575, 60Hz, 3Ø

QTY	REQD	PART NO.	DESCRIPTION	MATERIAL	ITEM NO.
		A/R	Z6000.8	LOCKWIRE, .032#	22
4		50006-24-C8D	SCREW, CAP HEX-HEAD		20
4		50905-C	WASHER, LOCK REGULAR		21
4		50904-C	WASHER, LOCK REGULAR		19
4		55004-4-C5D	SCREW, CAP HEX-HEAD		18
4		50005-10-C5D	SCREW, CAP HEX-HEAD		17
2		50806-N-C	WASHER, FLAT, 3/8"		16
REF		51300-152-B	"O"-RING		15
2		50906-C	WASHER, LOCK, 3/8"		14
2		50006-10-C5D	SCREW, CAP, HEX. HD., 3/8-16 x 1.50		13
2		53301-4-4	DRIVE SCREWS		12
1		15230	ROTATION ARROW		11
A/R		Z6001	LOCKWIRE, .051 DIA.		10
2		51007-C	WASHER, LOCK, HEAVY, 7/16"		9
4		51008-C	WASHER, LOCK, HEAVY, 1/2"		8
2		50070-025F06	SCREW, HEX. HD., M10x1.5 x 25mm		7
4		50008-10-C5D	SCREW, HEX. HD., 1/2-13 x 1.25		6
1		110023	FLEX COUPLING		5
1		112640	ADAPTOR, PUMP/MOTOR		4
1		107783-5C11R	PUMP, HYD. VANE, 1.0 CU. IN./MIN.		3
1		109542	PUMP, HYD. PISTON, PRES. COMP.		2
1		SEE CHART	AC-MOTOR, 10HP (EXPLOSION PROOF)		1

PART FLAGS <input type="checkbox"/> TRACEABILITY <input type="checkbox"/> CRITICAL LOAD PART ITEM <input type="checkbox"/> CERTIFICATION REQUIRED <input type="checkbox"/> SPARE PART <input type="checkbox"/> COMMISSIONING <input type="checkbox"/> OPERATIONAL <input type="checkbox"/> INSURANCE <input type="checkbox"/> THIS PART IS REQUIRED		UNLESS OTHERWISE SPECIFIED ARE IN INCHES DO NOT SCALE ANGULAR TOLERANCE $\pm 30^\circ$ THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION AND IS THE PROPERTY OF VARCO. IT IS TO BE USED ONLY FOR THE PROJECT AND FOR THE SPECIFIC EQUIPMENT IDENTIFIED THEREIN. IT IS NOT TO BE REPRODUCED, COPIED, OR DISTRIBUTED IN ANY MANNER WITHOUT THE WRITTEN PERMISSION OF VARCO.		LIST OF MATERIALS SURFACE FINISHES MACHINED TO DIM FROTH CUT TO DIM		Varco Systems An Ingersoll Rand Company TITLE: PUMP/MOTOR ASSY (UL-DIV I) PRODUCT: TDS-9S NEXT ASSY: 114114 DATE: 11/8/03 SCALE: 8/1/95 WEIGHT LB SHEET: 230 OF: 1	
DIMENSIONS PREPARED BY: H. SEITH CHECKED BY: P. BRAUN LTR	DIMENSIONS PREPARED BY: B. RICE CHECKED BY: JPSJ	DIMENSIONS PREPARED BY: B. RICE CHECKED BY: JPSJ	DATE: 11/8/03 DATE: 8/1/95	SCALE: 1/2 DATE: 11/11/2003	REVISION: 1 OF: 1	REVISION: K OF: 1	

NOTES UNLESS OTHERWISE SPECIFIED

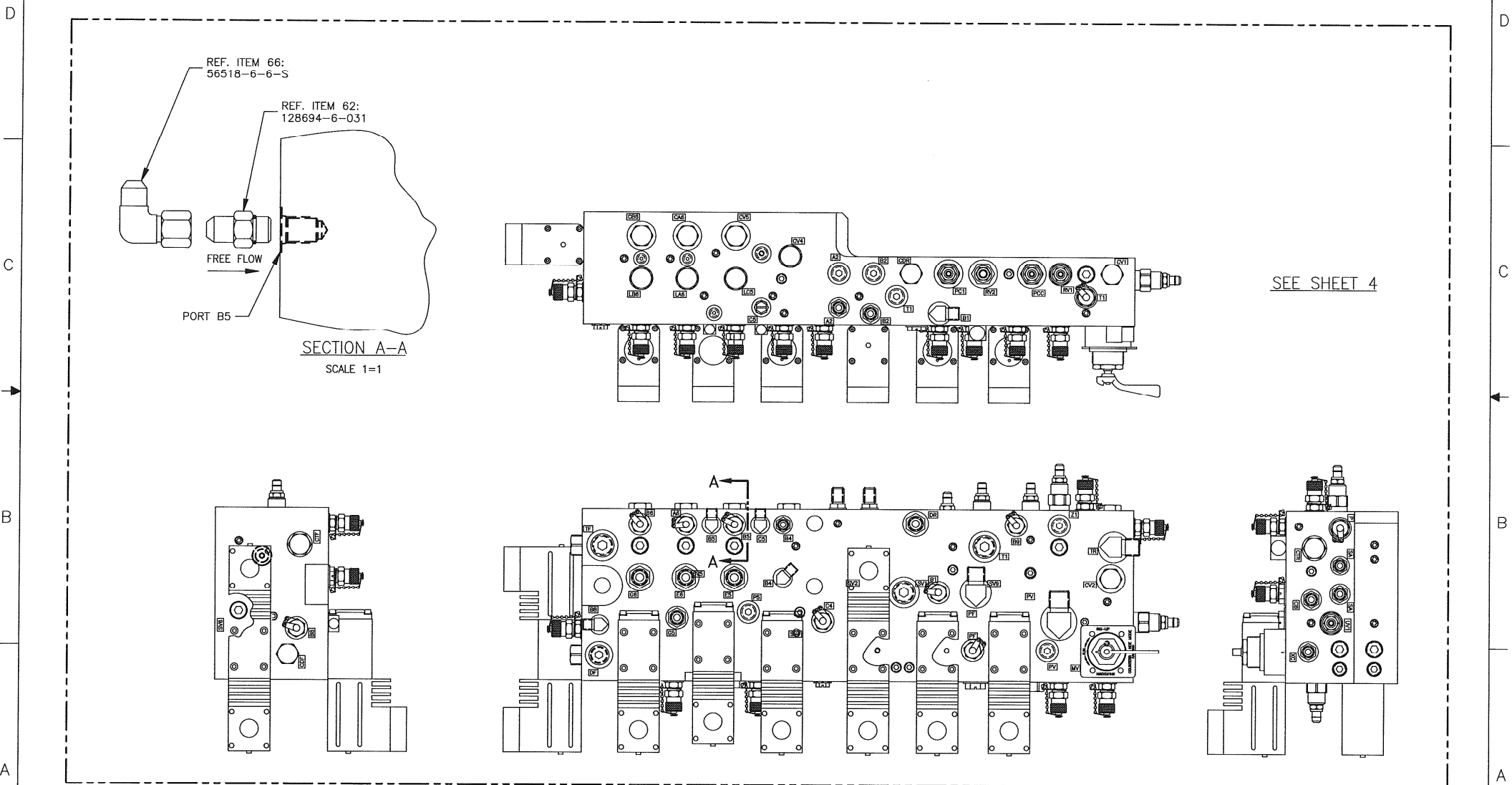
1. THE MANIFOLD AND ALL COMPONENTS MUST BE CLEAN AND FREE OF ALL CONTAMINATION. ALL INTERNAL SURFACES SHALL HAVE A LIGHT COATING OF PETROLEUM-BASE HYDRAULIC FLUID PRIOR TO ASSEMBLY, EXCEPT THE HOLE WHERE ITEM 11 IS INSTALLED SHALL BE DRY DURING ASSEMBLY.
 2. LUBRICATE ALL O-RINGS WITH CLEAN PETROLEUM-BASE HYDRAULIC FLUID PRIOR TO ASSEMBLY.
 - ⚠️ INSTALL ALL FASTENERS AND ORIFICE PLUGS WITH ANAEROBIC ADHESIVE, ITEM 50.
 - ⚠️ INSTALL NPT PLUGS WITH THREAD SEALANT W/PTFE, ITEM 49. USE ACTIVATOR (ITEM 47) PRIOR TO ASSEMBLY. DO NOT USE TEFLON TAPE.
 - ⚠️ DO NOT USE ANAEROBIC ADHESIVE OR TEFLON PASTE ON SAE O-RING BOSS PLUGS OR FITTINGS.
 6. ALL PLUGS THAT ARE LOCATED BELOW SURFACE-MOUNTED VALVES MUST BE AT LEAST .020 BELOW MANIFOLD SURFACE WHEN FULLY TORQUED.
 - ⚠️ TORQUE CAPS ON TEST FITTINGS FINGER-TIGHT.
 - ⚠️ CAP ALL OPEN PORTS.
 9. DELETED
 - ⚠️ ITEM 11 SHALL BE INSTALLED IN A CLEAN, DRY CAVITY PER LEE COMPANY PROCESS SPECIFICATION PS187 USING TOOL KIT: VARCO PART NUMBER 98479. THE TAPERED PIN HAS BEEN TREATED WITH A SOLID-FILM LUBRICANT. DO NOT REMOVE THIS COATING, OR ADD ADDITIONAL LUBRICANT. AVOID EXCESSIVE HANDLING OF PINS.
- INSTALLATION PROCEDURE:
1. THREAD THE INSERT BODY ONTO THE BODY TOOL.
 2. PUSH THE INSERT FIRMLY INTO THE REAMED HOLE UNTIL IT IS SEATED AGAINST THE 45° SHOULDER. REMOVE THE BODY TOOL.
 3. THREAD THE PIN COMPLETELY ONTO THE PIN INSTALLATION TOOL.
 4. DRIVE THE PIN INTO THE BODY UNTIL THE PIN IS FLUSH WITH THE BODY TO WITHIN ±.005".
11. ALL DIMENSIONS ARE REFERENCE.
 - ⚠️ TORQUE ITEM 44 TO 7.5 FT-LB.
 - ⚠️ ITEM 46 SHALL BE INSTALLED AFTER THE MANIFOLD ASSEMBLY HAS BEEN TESTED AND THE VALVES HAVE BEEN ADJUSTED TO SPECIFIED SETPOINTS.
 - ⚠️ DISCARD SUPPLIED SPACER.
 - ⚠️ VALVE HAS ECCENTRIC MOUNTING PATTERN. DO NOT MODIFY MOUNTING HOLES. ROTATE HANDLE 180° AFTER INSTALLATION.
 16. COVER ALL OPEN FITTINGS WITH STEEL CAPS USING ITEMS 37, 38, 39, 63.
 17. TEST MANIFOLD AFTER ASSEMBLY PER 3TS00624
 - ⚠️ EFFECTIVE 1 APRIL 1999, PREVIOUS PART NUMBERS WERE 89771-12-U24 (ITEM 2) & 89771-10-U24 (ITEM 3).
 - ⚠️ INSTALL PER 3ASPO0034

CONFIGURATION DESCRIPTION	
BSC	STANDARD MANIFOLD ASSY FOR TDS-9S
-1	STANDARD MANIFOLD LESS "STAND JUMP" SOLENOID

REF	REF	50103-10-B	SOCKET CAP SCREW 10-24 X 1 1/4	67
2	2	56518-6-6-S	-6 FJIC / -6 MJIC, ELBOW	66
2	2	93018-18	ORIFICE PLUG, 10-32 X .071	65
2	2	56529-4-6-S	CONNECTOR	64
5	5	56544-8-S	CAP	63
2	2	128694-6-031	FLOW CONTROL, -6 MORB/MJIC, Ø.031 ORIFICE	62
1	1	56519-4-6-S	ELBOW	61
1	1	56519-6-4-S	ELBOW	60
1	1	56519-4-4-S	ELBOW	59
3	3	56529-8-8-S	CONNECTOR	58
1	1	56519-12-12-S	ELBOW	57
1	1	56519-10-8-S	ELBOW	56
1	1	56519-10-12-S	ELBOW	55
1	1	56529-8-6-S	CONNECTOR	54
5	6	56529-6-6-S	CONNECTOR	53
1	1	56529-10-8-S	CONNECTOR	52
3	3	56519-6-6-S	ELBOW	51
-1	BSC			
QTY REQD	PART NO.	DESCRIPTION	MATERIAL	ITEM NO.

A/R/A/R	53200-242	LOCTITE, BLULOCK		50	
A/R/A/R	82226	SEALANT, THREAD W/PTFE		49	
1	1	110181	NAMEPLATE, C'BALANCE MODE	48	
A/R/A/R	53200-7471	LOCTITE, ACTIVATOR		47	
6	6	99838-1	COVER, SUN CARTRIDGE, SERIES 1	46	
1	-	96079-A	COVER, PLATE, D03	45	
28	28	50103-16-B	SOCKET CAP SCREW 10-24 X 2.00	44	
				43	
		DELETED		42	
		DELETED		41	
				40	
2	2	56544-12-S	CAP, FEMALE 37° SEAT	39	
15	16	56544-6-S	CAP, FEMALE 37° SEAT	38	
2	2	56544-4-S	CAP, FEMALE 37° SEAT	37	
11	11	53000-6-S	3/8 NPT HEX SOCKET PLUG	36	
4	4	53000-4-S	1/4 NPT HEX SOCKET PLUG	35	
13	13	53000-2-S	1/8 NPT HEX SOCKET PLUG	34	
49	49	53000-1-S	1/16 NPT HEX SOCKET PLUG	33	
				32	
3	3	87196-10-S	SAE J514-10 HEX SOCKET PLUG	31	
2	2	87196-8-S	SAE J514-8 HEX SOCKET PLUG	30	
6	5	87196-6-S	SAE J514-6 HEX SOCKET PLUG	29	
7	7	87196-4-S	SAE J514-4 HEX SOCKET PLUG	28	
4	4	87196-2-S	SAE J514-2 HEX SOCKET PLUG	27	
				26	
2	2	110844-18	ORIFICE PLUG, 1/4 NPT X .071	25	
2	2	93018-14	ORIFICE PLUG, 10-32 X .055	24	
7	7	93018-08	ORIFICE PLUG, 10-32 X .031	23	
		DELETED		22	
5	5	93024-6SAE	TEST FITTING, SAE-6	21	
13	13	93024-4SAE	TEST FITTING, SAE-4	20	
				19	
-	1	111664-1EN	RELIEF VALVE, LOW FLOW	RBAC-LEN	18
4	3	109858-1AN	REDUCING/RELIEVING VALVE	PRDB-LAN	17
1	1	93667 M13	CAVITY PLVC, T-13A SHORT	XFOA-XXN	16
1	1	107031-1AN	RELIEF VALVE, VENTABLE	RVCA-LAN	15
4	4	107029-175N	PILOT-TO-OPEN CHECK VALVE	CVCV-XEN	14
1	1	107028-1ANB	DIFFERENTIAL UNLOADING VALVE	QCDB-LAN	13
1	1	99353-1AN	REDUCING/RELIEVING VALVE	PVDA-LAN	12
1	1	98402-800D	FLOW CONTROL VALVE	FCFA2810800D	11
1	1	94537-130N	PILOT-TO-CLOSE CHECK VALVE	CODA-XCN	10
2	2	94536-230N	CHECK VALVE	CXFA-XCN	9
3	3	94536-14N	CHECK VALVE	CXDA-XAN	8
3	3	94534-1CXN	LOGIC CARTRIDGE	LODC-XDN	7
1	1	94520-1NN	RELIEF VALVE	RPEC-LNN	6
1	1	93667-M11	CAVITY PLUG, T-11A SHORT	XEOA-XXN	5
1	1	30171921	REWORK MANUAL VALVE, 3-POS.	8453E6D2P	4
4	5	127908-D2	SOLENOID VALVE, 2-POS., 24 VDC	DHA/UL-0631/2/M 24DC/20	3
2	2	127908-J2	SOLENOID VALVE, 3-POS., 24 VDC	DHA/UL-0713/M 24DC/20	2
1	1	109547-2	MANIFOLD, TDS-9 (MACHINING)		1
-1	BSC				
QTY REQD	PART NO.	DESCRIPTION	MATERIAL	ITEM NO.	

UNLESS OTHERWISE SPECIFIED		LIST OF MATERIALS	
INTERPRET DIM/TOL PER ASME Y14.5M		THIS DOCUMENT CONTAINS PROPRIETARY AND CONFIDENTIAL INFORMATION BELONGING TO NATIONAL OILWELL VARCO, L.P. IT IS LOANED TO YOU FOR LIMITED PURPOSES ONLY AND IS NOT TO BE REPRODUCED OR IN ANY MANNER DISSEMINATED OUTSIDE THE SCOPE OF THE PROJECT OR USE OF THE OBJECT OR WHERE REQUIRED BY THE PROJECT OR USE OF THE OBJECT OR WHERE REQUIRED BY THE PROJECT OR USE OF THE OBJECT.	
DIMENSIONS ARE IN INCHES		NATIONAL OILWELL VARCO	
.X ± .1 .XXX ± .03 .XXX ± .010		ASSY, MANIFOLD, UL	
ANGLES ± .5°		SCALE: 1/2	
DO NOT SCALE DRAWING		WT (LBS): 175	
NEXT ASSY USED ON		PROJECTION:	
APPLICATION		SIZE: D	
DRAWN: R. HERREN P. BRAUN		SHEET: 1 of 5	
CHECKED: H. LIM JPSJ		DRAWING NUMBER: 114174	
APPROVED: H. LIM JPSJ		REVISION: W	
DATE: 15 JUN 05 08/95		REG SOLUTIONS 10000 RICHMOND AVE. HOUSTON, TX 77042 (713) 346-7500	

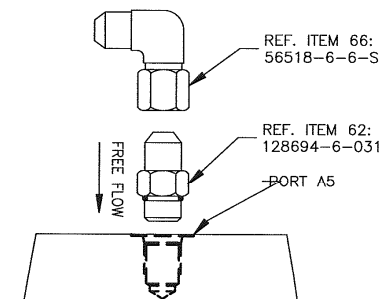


SEE SHEET 4

SIZE	DWG NO	REV
D	114174	W
SCALE	WT LBS	SHEET
1/2	175	2 of 5

D

D



SECTION B-B

SCALE 1=1

C

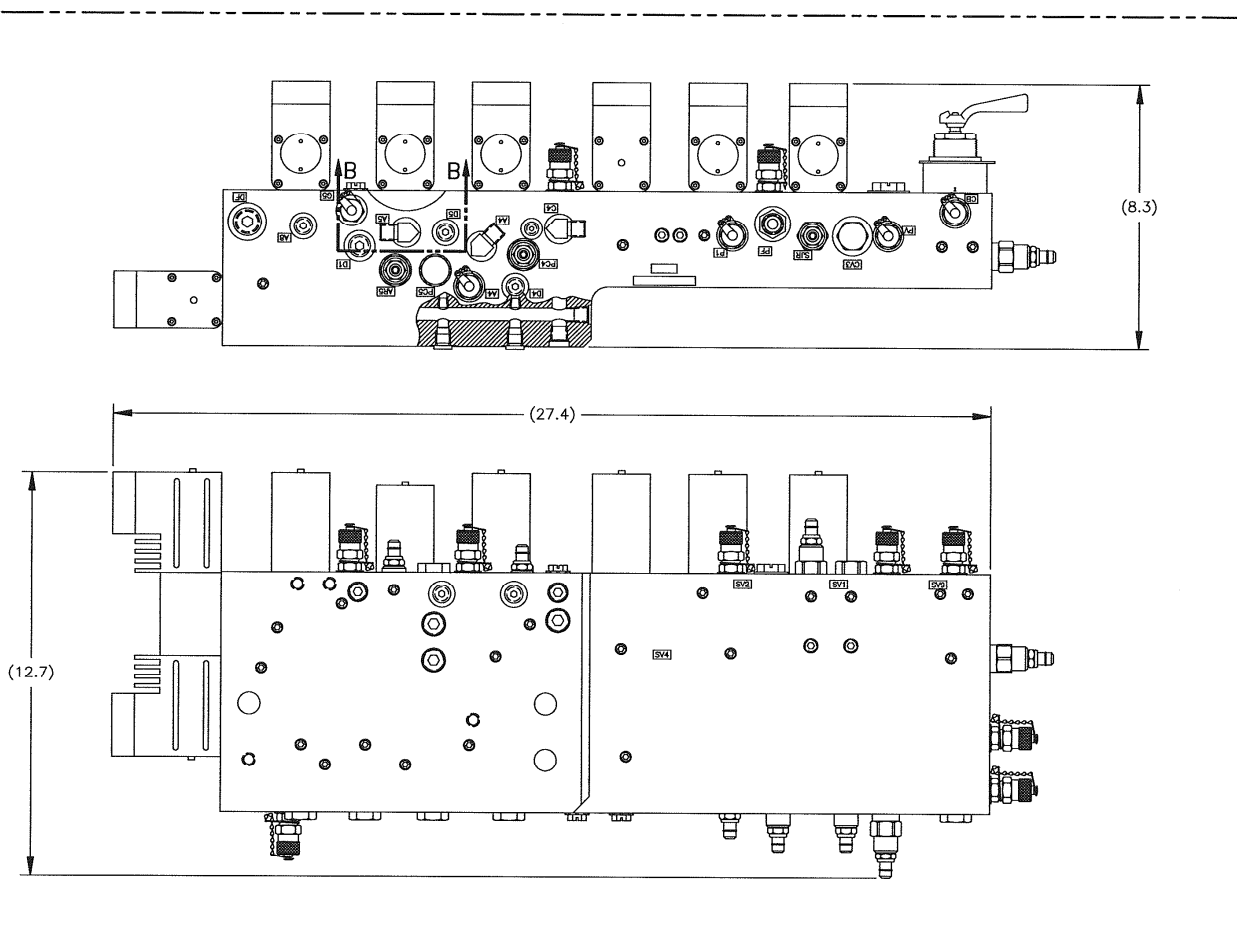
C

B

B

A

A



SEE SHEET 5

SIZE	DWG NO	REV
D	114174	W
SCALE 1/2	WT LBS 175	SHEET 3 of 5

D

C

B

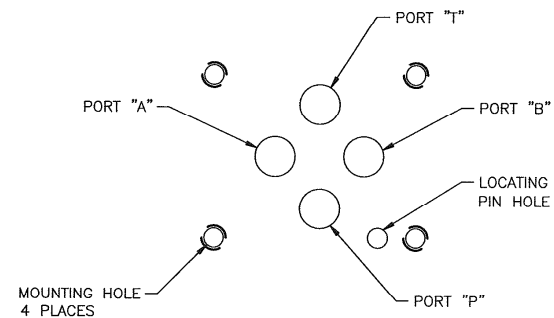
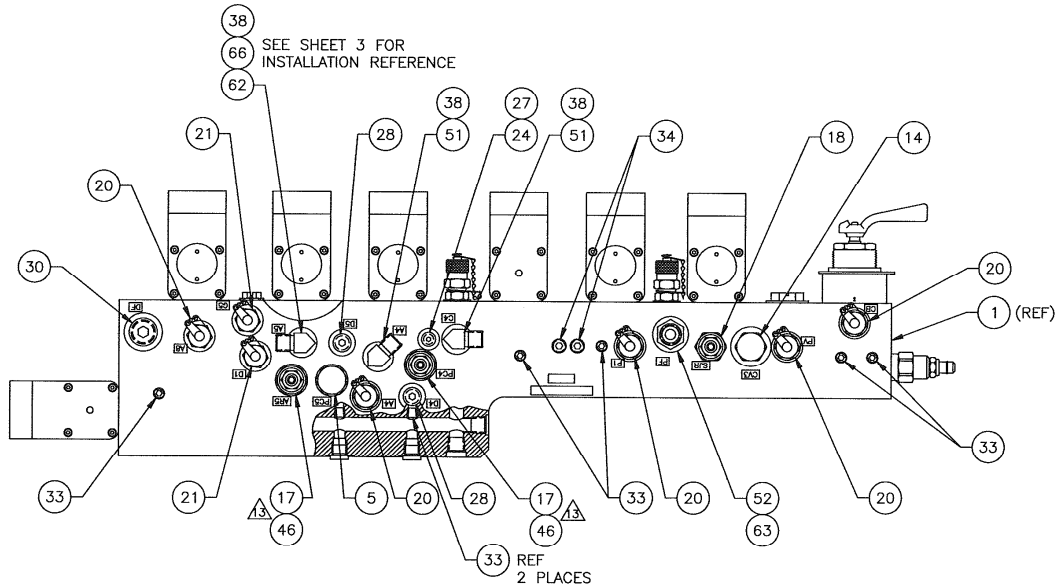
A

D

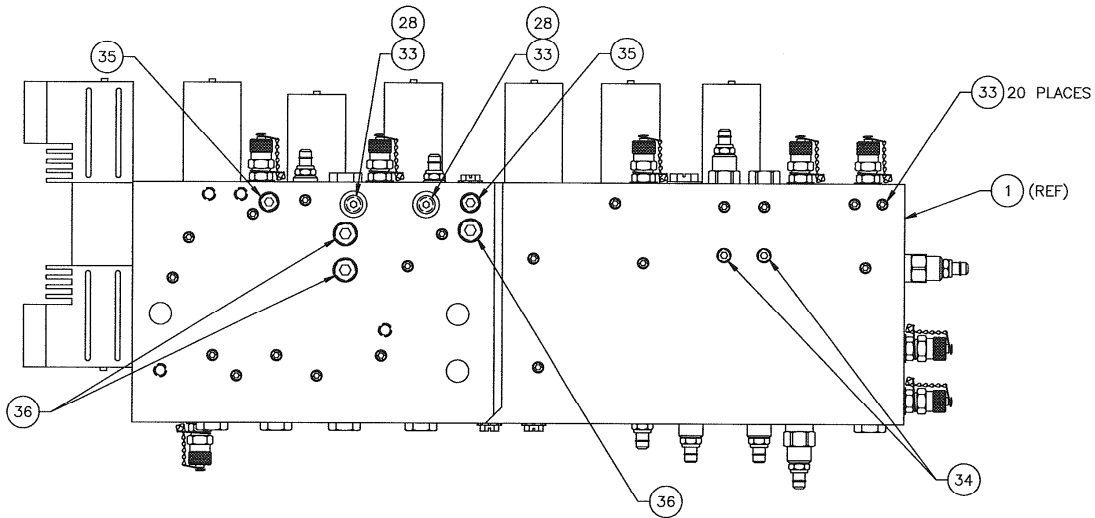
C

B

A



DETAIL "A"
PORT LOCATIONS
SCALE: 4/1



SEE SHEET 1 FOR LIST OF MATERIALS

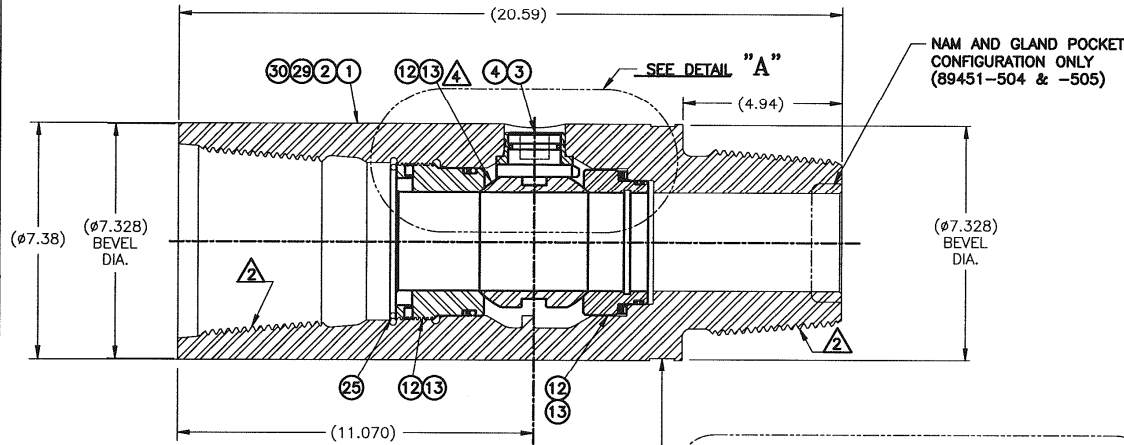
SIZE D	DWG NO 114174	REV W
SCALE 1/2	WT LBS 175	SHEET 5 OF 5

NOTES: UNLESS OTHERWISE SPECIFIED.

1. CLEAN AND LUBRICATE ALL PARTS BEFORE ASSEMBLY.
- ▲ CONNECTION THREADS SHALL REMAIN PROTECTED PRIOR TO INSTALLATION.
- ▲ PACK WAVE SPRING CAVITY & BALL CAVITY 100% WITH 56003 GREASE DURING ASSEMBLY.
- ▲ INSPECT THE OPERATING CRANK AND BALL TO ENSURE A SMOOTH SLIDING FIT BETWEEN THE TWO PARTS.
5. RECORD MATERIAL TRACEABILITY INFORMATION PER TS000205.
- ▲ INCLUDED WITH "REPAIR KIT-COMplete".
- ▲ INCLUDED WITH "REPAIR KIT- SOFT SEALS".
8. TEST PER TS000205.
- ▲ ITEM -504 REQUIRES FULL N.A.M. CERTIFICATION, SPECIAL MATERIAL AND GLAND POCKETS.
- ITEM -505 REQUIRES GLAND POCKET ONLY, WITHOUT N.A.M. CERTIFICATION REQUIREMENT AND SPECIAL MATERIAL.

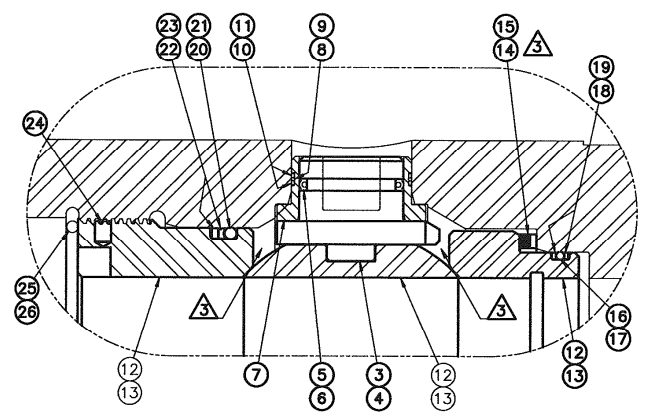
REFERENCE INFO.

DESCRIPTION	-500 15 KSI, STD		-501 15 KSI, NAM ▲9		-502 15 KSI, H2S		-503 15 KSI, GLAND POCKETS ▲9	
	BEST NO.	VARCO NO.	BEST NO.	VARCO NO.	BEST NO.	VARCO NO.	BEST NO.	VARCO NO.
VALVE ASSY.	N/A	114706-500	N/A	114706-501	N/A	114706-502	N/A	114706-503
REPAIR KIT- COMPLETE	N/A	99498-2	N/A	99498-2	N/A	99503-2	N/A	99498-2
REPAIR KIT- SOFT SEALS	N/A	99498-1	N/A	99498-1	N/A	99503-1	N/A	99498-1
WRENCH- CRANK	65021520	77408	65021520	77408	65021520	77408	65021520	77408
PULLER- SEAT	65021523	79489-14	65021523	79489-14	65021523	79489-14	65021523	79489-14
WRENCH- NUT	65060325	89141-18	65060325	89141-18	65060325	89141-18	65060325	89141-18



VARCO XX,000 PSI IBOP
PART NO. 114706-XXX S/N XXXXXX
6 5/8" REG. R.H. 6 5/8" REG. R.H.

LOW STRESS STAMP AS SHOWN. SEE REF. INFO. TABLE ABOVE FOR PART NO. AND WORKING PRESSURE. STAMP "CW" IN A CIRCLE AS SHOWN.



DETAIL "A"

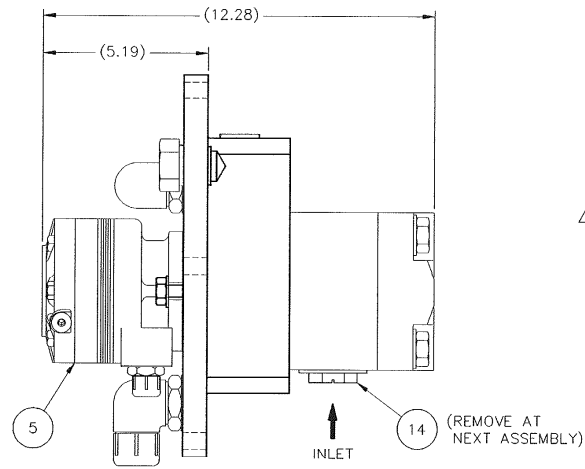
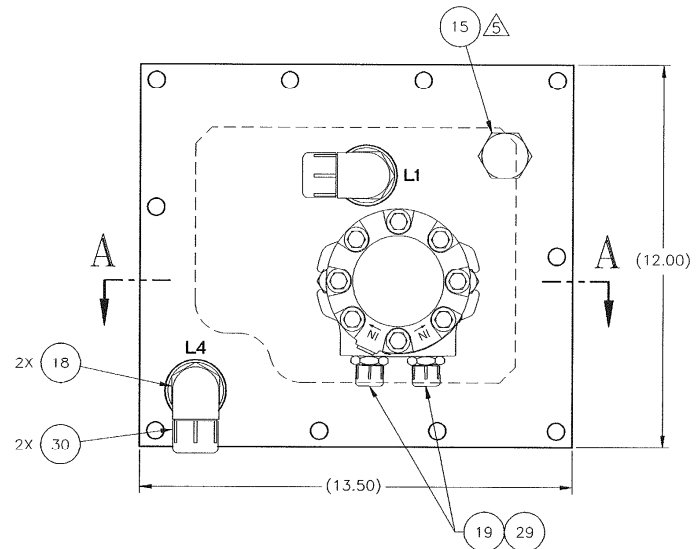
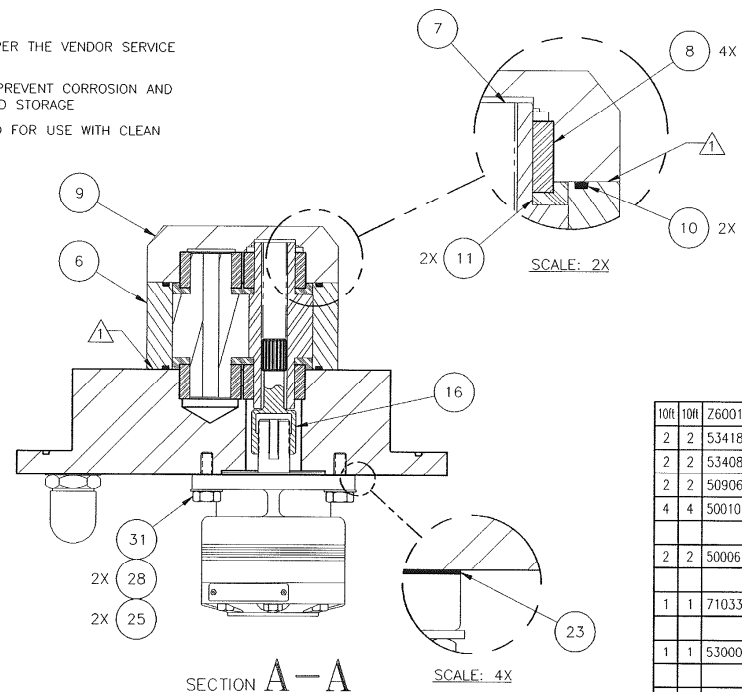
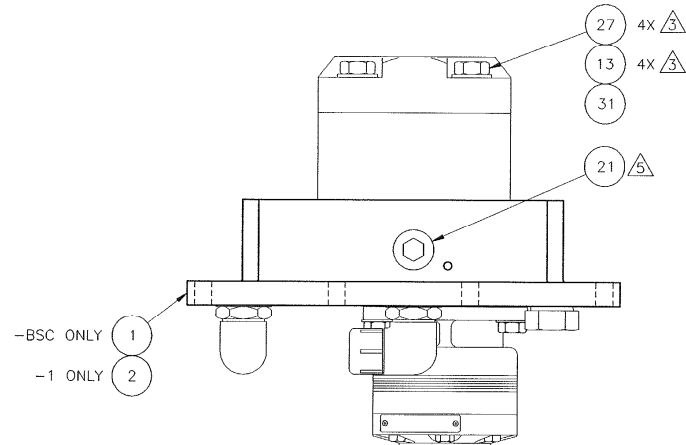
1	-	-	-	114791	BODY, IBOP (GLAND POCKETS ONLY) ▲9		30	
-	-	1	-	114792	BODY, IBOP (NAM) ▲9	-	29	
REF	REF	REF	REF	77369-6	THREAD PROTECTOR-PIN (NOT SHOWN)	-	28	
REF	REF	REF	REF	77369-5	THREAD PROTECTOR-BOX (NOT SHOWN)	-	27	
-	1	-	-	89453-1	RETAINING RING (H2S)	65060192	26	
1	-	1	1	89141-1	RETAINING RING	65060191	25	
2	2	2	2	91137-12	NYLON PLUG	65060492	24	
-	2	-	-	89453-17	BACK-UP RING	65060199	23	
2	-	2	2	90441-10	BACK-UP RING	65060197	22	
-	1	-	-	89453-16	O-RING	65060198	21	
1	-	1	1	90441-9	O-RING	65060196	20	
-	2	-	-	89453-13	BACK-UP RING	65021193	19	
2	-	2	2	89141-13	BACK-UP RING	65021191	18	
-	1	-	-	89453-3	O-RING	65021192	17	
1	-	1	1	89141-3	O-RING	65021190	16	
-	1	-	-	89453-9	SPRING, WAVE	65021491	15	
1	-	1	1	89141-9	SPRING, WAVE	65021490	14	
-	1	-	-	99501	SET, SEAT/BALL (H2S)	-	13	
1	-	1	1	99497	SET, SEAT/BALL	-	12	
-	2	-	-	89453-12	BACK-UP RING	65060794	11	
2	-	2	2	89141-12	BACK-UP RING	65060792	10	
-	1	-	-	89453-11	O-RING	65060793	9	
1	-	1	1	89141-11	O-RING	65060791	8	
1	1	1	1	90441-7	SLEEVE, CRANK	65060722	7	
-	1	-	-	89453-8	SEAL, CROWN	65060691	6	
1	-	1	1	89141-8	SEAL, CROWN	65060690	5	
-	1	-	-	89453-7	CRANK, OPER.-RH	650606B1	4	
1	-	1	1	89141-7	CRANK, OPER.-RH	650606B0	3	
-	-	-	-	-	-	-	2	
-	1	-	1	114705	BODY, IBOP	-	1	
QTY REQD	-503	-502	-501	-500	PART NO.	DESCRIPTION	CROSS REF	ITEM NO.

LIST OF MATERIALS

PART FLAGS	UNLESS OTHERWISE SPECIFIED	SURFACE FINISHES	VARCO SYSTEMS
<input type="checkbox"/> DIMENSIONAL TOLERANCES	ARE IN UNITS OF INCHES	UNLESS OTHERWISE SPECIFIED	
<input type="checkbox"/> DIMENSIONAL TOLERANCES	ARE IN UNITS OF MILLIMETERS	UNLESS OTHERWISE SPECIFIED	
<input type="checkbox"/> DIMENSIONAL TOLERANCES	ARE IN UNITS OF MILLIMETERS	UNLESS OTHERWISE SPECIFIED	TITLE: ASSY, LOWER IBOP 6-5/8 w/RELIEF GROOVE REGION: B
<input type="checkbox"/> DIMENSIONAL TOLERANCES	ARE IN UNITS OF MILLIMETERS	UNLESS OTHERWISE SPECIFIED	SIZE: D DOCUMENT NO.: 114706 SCALE: 1/2 SHEET NO.: 1 OF 1
<input type="checkbox"/> DIMENSIONAL TOLERANCES	ARE IN UNITS OF MILLIMETERS	UNLESS OTHERWISE SPECIFIED	DATE: 05/08/04 PREPARED BY: J. SETH CHECKED BY: B. RICE APPROVED BY: B. RICE

NOTES: UNLESS OTHERWISE SPECIFIED

- 1. STONE OFF MACHINED SURFACES WITH A MEDIUM GRIT CARBOUNDM STONE
- 2. GREASE BEARINGS AND GASKETS PRIOR TO INSTALLATION. PRESS BEARINGS WITH AN ARBOR PRESS, DO NOT USE A HAMMER
- 3. AFTER TIGHTENING FASTENERS, CHECK FOR INTERNAL BINDING
- 4. TORQUE ALL BOLTS IN ACCORDANCE WITH DS 00008
- 5. APPLY SEALING COMPOUND TO NPT THRUFADS
- 6. TAG WITH VARCO PART NUMBER
- 7. THESE PARTS SHALL BE ASSEMBLED PER THE VENDOR SERVICE INSTRUCTIONS HS15
- 8. ALL PARTS SHALL BE PACKAGED TO PREVENT CORROSION AND CONTAMINATION DURING SHIPPING AND STORAGE
- 9. THE PUMP AND ITS SEALS ARE RATED FOR USE WITH CLEAN PETROLEUM-BASE LUBRICATING OILS



WEIGHT TABLE		
-BSC	APPROX 145 LBS	STEEL
-1	APPROX 75 LBS	ALUM

QTY REQD	10R	10H	PART NO.	DESCRIPTION	MATERIAL	ITEM NO.
			Z6001	LOCKWIRE (#.051)		31
	2	2	53418	PLUG, PLASTIC PIPE CLOSURE		30
	2	2	53408	PLUG, PLASTIC PIPE CLOSURE		29
	2	2	50906-C	WASHER, LOCK-REGULAR		28
	4	4	50010-40-C5D	SCREW, CAP-HEX HEAD		27
						26
	2	2	50006-10-C5D	SCREW, CAP-HEX HEAD		25
						24
	1	1	71033	GASKET		23
						22
	1	1	53000-16-C	PLUG, EXT PIPE-C/SUNK HEX		21
						20
	2	2	56529-10-8-S	CONNECTOR, O-RING BOSS /37		19
	2	1	56519-16-16-S	ELBOW, O-RING BOSS /37		18
						17
	1	1	109579	ADAPTER, MOTOR/PUMP		16
	1	1	108119-16B	SIGHT GAGE		15
	1	1	108465-24	PLUG, SHIPPING SAE O-RING PORT		14
	4	4	50910-C	WASHER, LOCK-REGULAR		13
						12
	2	2	109567-T	P50 PUMP (THRUST PLATE)		11
	2	2	109567-S	P50 PUMP (BODY SEAL)		10
	1	1	109567-E	P50 PUMP (END COVER)		9
	4	4	109567-B	P50 PUMP (ROLLER BEARING)		8
	1	1	109567-G20	P50 PUMP (GEAR SET)		7
	1	1	109567-H203	P50 PUMP (GEAR HOUSING)		6
	1	1	30156326-36S	MOTOR, HYDRAULIC, LOW-SPEED/HIGH-TORQUE		5
						4
						3
	1		117575-1	ADAPTER PLATE, LUBE PUMP	(ALUM. ALLOY)	2
	-	1	117575	ADAPTER PLATE, LUBE PUMP	(STEEL)	1
	-1	-BSC	PART NO.	DESCRIPTION	MATERIAL	ITEM NO.

PART FLAGS		DIMENSIONS UNLESS OTHERWISE SPECIFIED		SURFACE FINISHES		TITLE	
<input type="checkbox"/> TRACEABILITY	ARE BY	INCHES	INTERPRET DIMENSIONS & TOLERANCES PER ANSI Y14.5 & ABBREVIATIONS PER ANSI Y11.1	MACHINED	TORQUE CUT	PUMP ASSEMBLY, GEARBOX LUBRICATION	
<input type="checkbox"/> CRITICAL LOAD	DO NOT	SCALE	± .030 CAN BE TROUGH CUT ± .030 ± .010	115.000	TDS-95	SIZE	DOCUMENT NO. 117603
<input type="checkbox"/> CERTIFICATION REQUIRED	SCALE	SCALE	± .030 ± .010	NEXT ASST	PRODUCT	DATE	REVISION B
<input type="checkbox"/> COMMISSIONING	DOCUMENT	ANGULAR TOLERANCE	REF 30			SCALE	WEIGHT LB SHEET 1
<input type="checkbox"/> OPERATIONAL	FOR SIGNATURE	ANGULAR TOLERANCE	REF 30			DATE	SEE TAB
<input type="checkbox"/> INSURANCE	B	D. HAIST	IL LIM	9/5/01		1/2	1
<input type="checkbox"/> THIRD ANGLE PROJECTION	-	J. POPE	JPSJ	JPSJ	5/20/96		
	PREPARED BY	CHECKED BY	APPROVED BY				

NOTES: (UNLESS OTHERWISE SPECIFIED)

1. INSTALL ACTUATOR SHELL (ITEM 13) ON IBOP (ITEM 49 OR 51) BEFORE RIGGING PIPE HANDLER
2. CRANK ASSEMBLY (ITEM 16) TO BE INSTALLED THRU WINDOW IN ACTUATOR SHELL (ITEM 13) WITH IBOP VALVE (ITEM 49 OR 51) IN 50% OPEN POSITION. TIGHTEN SCREWS (ITEM 18) TO 30-35 FT LBS. BEND LOCK TAB (ITEM 17) AGAINST CRANK ASSEMBLY AND HEX HD SCREWS
USE 7/8" HEX WRENCH TO OPEN AND CLOSE VALVE SEVERAL TIMES TO ASSURE SMOOTH OPERATION
3. SPECIFY KIT 119054-XX WITH THIS PH-50
4. CHECK IF TOOL JOINT LOCK SCREW THREADS, SCREW HEAD BEARING AREA AND THE TAPERS OF THE INNER RINGS ARE LUBRICATED. IF NOT, LUBRICATE THEM WITH MOLYBDENUM DISULFIDE GREASE
5. LOCATE TOOL JOINT LOCK SYMMETRICALLY AT EACH JOINT. SNUG UP 3 OR 4 EQUALLY SPACED LOCKING SCREWS, MAKING SURE THAT TOOL JOINT LOCK IS SQUARE. TIGHTEN ALL LOCKING SCREWS GRADUALLY AND ALL THE WAY AROUND IN CLOCKWISE OR COUNTER CLOCKWISE SEQUENCE NOT IN DIAMETRICALLY OPPOSITE SEQUENCE. SEVERAL PASSES ARE REQUIRED UNTIL ALL SCREWS ARE TORQUED TO 185 FT LBS
6. GREASE ALL LUBRICATION PORTS AFTER ASSY
7. SEE LINK OPTIONS (TABLE 1, SHT 1), TOOL JOINT AND IBOP OPTIONS (TABLE 2, SHT 2) FOR DIFFERENT CONFIG.
8. SOME ITEMS ARE OMITTED FOR CLARITY
9. CHECK VALVE "BALL" POSITION TO INSURE PROPER OPERATION
10. ADJUST SHIMS TO PROPERLY POSITION TORQUE WRENCH ON TOOL JOINT
11. TORQUE ALL BOLTS IN ACCORDANCE WITH DS00008.
12. LOCKWIRE ALL DRILLED HEAD BOLTS IN ACCORDANCE WITH ASP00019.
13. COVER EACH ITEM 4 AND 5 USING 6' OF SLEEVE, NYLON (ITEM 94). FASTEN USING ITEM 93 AT TOP OF EACH HOSE ASSEMBLY ONLY.

117820-XX-XXXX X

IBOP OPTIONS (TABLE 2, SHT 2)
 A = STANDARD UPPER IBOP, NO LOWER IBOP
 B = STANDARD UPPER IBOP, STANDARD LOWER IBOP
 C = H2S UPPER IBOP, NO LOWER IBOP
 D = H2S UPPER IBOP, H2S LOWER IBOP

TOOL JOINT SIZE (TABLE 2, SHT 2)
 NC50 = NC50 TOOL JOINT
 NC46 = NC46 TOOL JOINT
 NC40 = NC40 TOOL JOINT
 HT40 = HT40 TOOL JOINT
 NC38 = NC38 TOOL JOINT
 NC31 = NC31 TOOL JOINT
 NC26 = NC26 TOOL JOINT
 HT554 = HT55-400 TOOL JOINT
 HT553 = HT55-375 TOOL JOINT

LINK OPTION (TABLE 1, SHT 1)
 25 = 250 TON
 35 = 350 TON
 50 = 500 TON

BASIC P/N

LINK OPTION	PART NO.	DESCRIPTION	ITEM NO.
- 4 -	120162(TBD)	U-BOLT, 250 TON	47
- 4 -	119139	U-BOLT, 350 TON	46
4 -	122367	U-BOLT, 500 TON	45
- 2 -	120164(TBD)	CLAMP, LINK TILT, 250 TON	44
- 2 -	119122	CLAMP, LINK TILT, 350 TON	43
2 -	120165	CLAMP, LINK TILT, 500 TON	42
50 35 25 00			
LINK OPTION	PART NO.	DESCRIPTION	ITEM NO.

TABLE 1 - LINK OPTION

QTY REQD	PART NO.	DESCRIPTION	ITEM NO.
12	131085-024	SLEEVE, NYLON	94
2	53300-525	TIE, CABLE	93
2	50006-36-C5D	SCREW, CAP, HEX HD.	92
QTY REQD	PART NO.	DESCRIPTION	ITEM NO.

LIST OF MATERIALS

8	51402-12-S	PIN, COTTER	91
1	59043P170038	HOSE ASSY, HYDRAULIC CYL.-CRANK ASSY	90
-	DELETED		89
1	50520-C	NUT, HEX-SLOTTED	88
1	50820-N-C	WASHER FLAT	87
1	51403-20	PIN, COTTER	86

4	56519-12-125	ELBOW O-RING BOSS/37"	41
1	123059-2-9	WIRE ROPE ASSY	40
6	50514-C	NUT, HEX-SLOTTED	39
1	59044P170042	HOSE ASSY, HYDRAULIC CYL.-CRANK ASSY	38
1	30125094	TUBE ASSY, LINK ADAPTER/MANIFOLD	37
1	30125097	TUBE ASSY, LINK ADAPTER/MANIFOLD	36
1	59046P17N026	HOSE ASSY, HYDRAULIC CYL.-CRANK ASSY	35
6	51435-20	PIN, COTTER	34
6	50906-C	WASHER, LOCK, REG	33
4	50006-08-C5D	SCREW, CAP, HEX HD.	32
1	123685	BRACKET-MOUNTING, LINK TILT MANIFOLD	31
1	118463-2	MANIFOLD, LINK TILT CYLINDER	30
8	51012-C	WASHER, LOCK-HEAVY	29
8	50412-C	NUT, HEX-HEAVY	28
1	125098	TUBE ASSY, LINK ADAPTER/MANIFOLD	27
4	50814-N-C	WASHER, FLAT	26
4	51008-C	WASHER, LOCK-HEAVY	25
6	30170045	PIN, RETAINER, COLLAPSIBLE LINK	24
2	30170445	LINK 1, COLLAPSIBLE	23
4	50008-11-C5D	SCREW, CAP-HEX HEAD	22
2	118947	BAR, RETAINING	21
4	51108-C	WASHER, HI-COLLAR	20
2	16532	KEY	19
4	50008-14-C5D	SCREW, CAP, HEX HD, 1/2-13 X 1 3/4	18
4	107052	LOCK TAB	17
2	98898	CRANK ASSEMBLY, IBOP	16
7	50912-C	WASHER, LOCK	15
7	50012-16-C5D	CAP SCREW, HEX HD DRILLED	14
1	110042	SHELL, ACUTATOR, IBOP	13
AR	Z6001	SAFETY WIRE (Ø.051)	12
1	118868-6	SHACKLE, ANCHOR	11
1	59043P170023	HOSE ASSY, IBOP CYL, CLOSE	10
1	59024P170023	HOSE ASSY, IBOP CYL, OPEN	9
2	119387	PIN, PIPE HANDLER	8
2	30119592	CYLINDER, HYDRAULIC ASSEMBLY	7
2	30170446	LINK 2, COLLAPSIBLE	6
1	59044P230074	HOSE ASSY, CLAMP, ROD	5
1	59044P230073	HOSE ASSY, CLAMP, PISTON	4
1	30158164	PIN, CRANK	3
1	30158189	CRANK ASSEMBLY, LINK TILT	2
1	117821	TORQUE WRENCH ASSEMBLY	1
BSC	PART NO.	DESCRIPTION	ITEM NO.
QTY REQD			

NATIONAL OILWELL VARCO

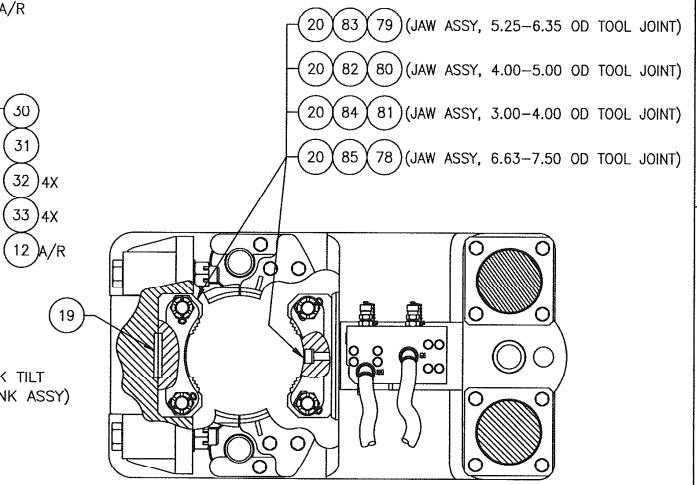
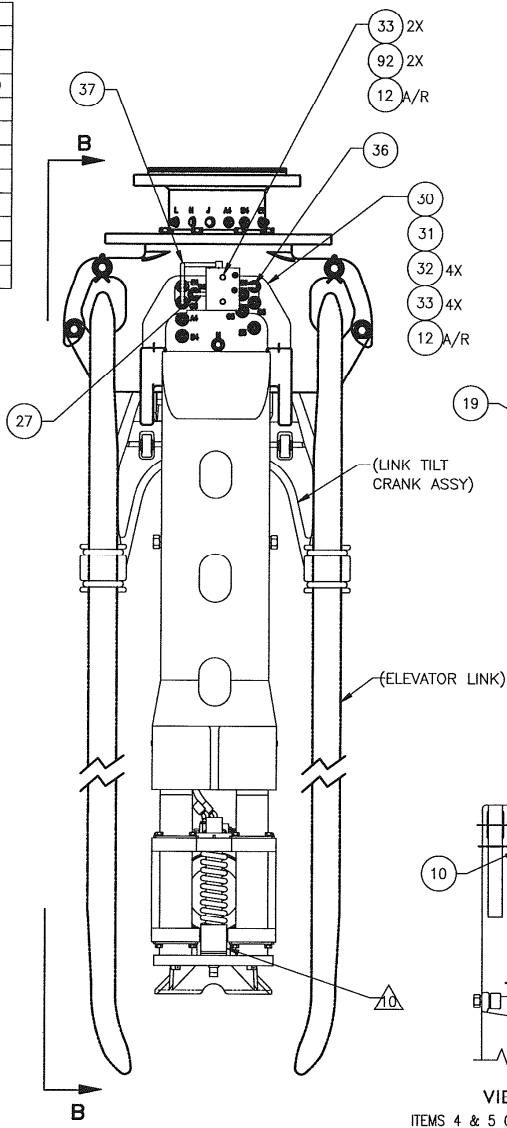
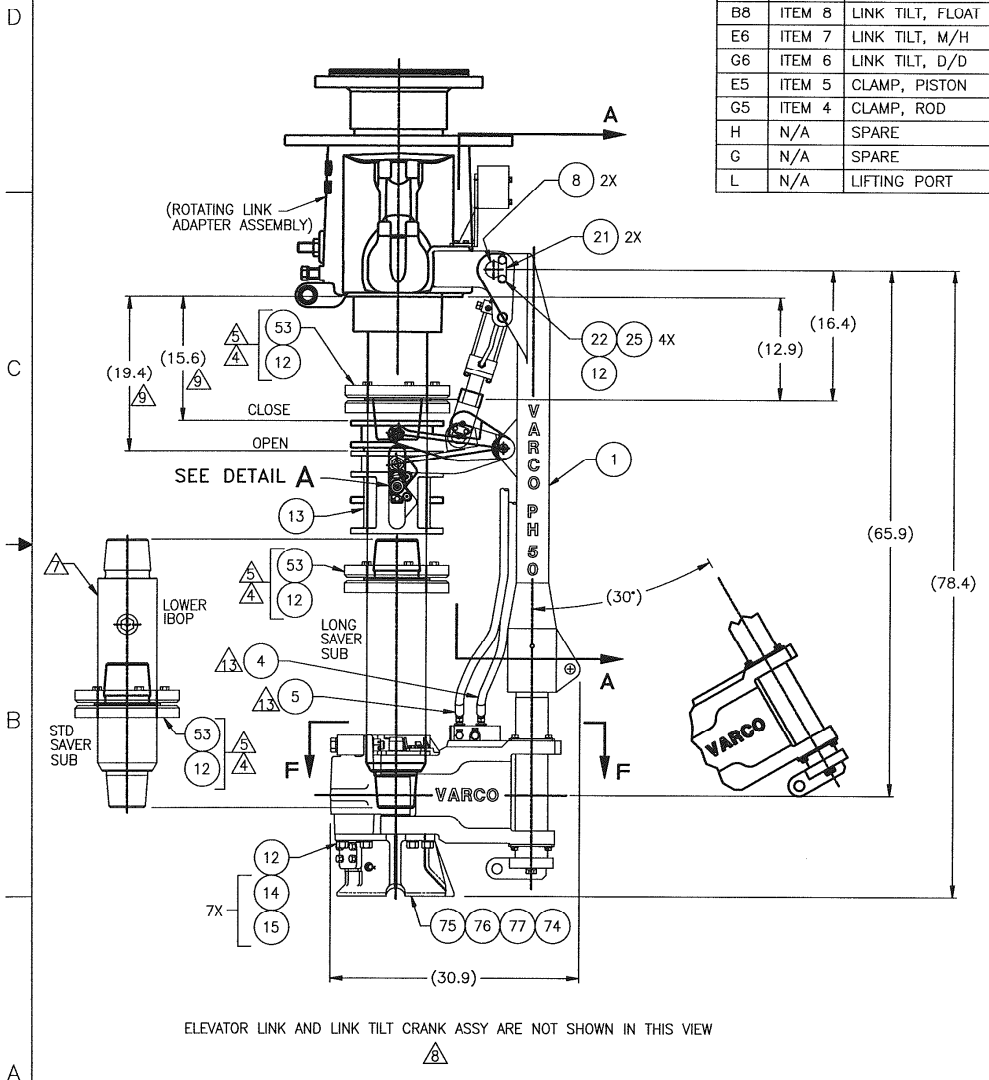
PIPE HANDLER PACKAGE, PH-50

SCALE: 1/8" = 1' (3700) PROJECTION: SIZE: D SHEET: 1 of 4

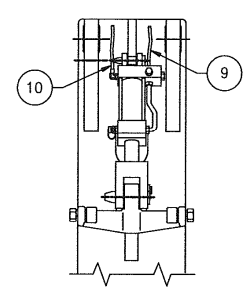
DRAWING NUMBER: **117820** REVISION: W

UNLESS OTHERWISE SPECIFIED		CURRENT		INITIAL	
INTERPRET DIM/TOL PER ASME Y14.5M		S.SIFTON		T.NGIUYEN	
DIMENSIONS ARE IN INCHES		B.RICE		H.S.L.	
.X ± .1 .XX ± .03 .XXX ± .010		B.RICE		JSPJ	
ANGLES ± 5°		DATE	12/22/05	1/97	
DO NOT SCALE DRAWING					
APPLICATION	DRAWN	CHECKED	APPROV	DATE	
UNLESS OTHERWISE SPECIFIED					
MACHINED					
TORCH CUT					
250 MAX					
1000 MAX					

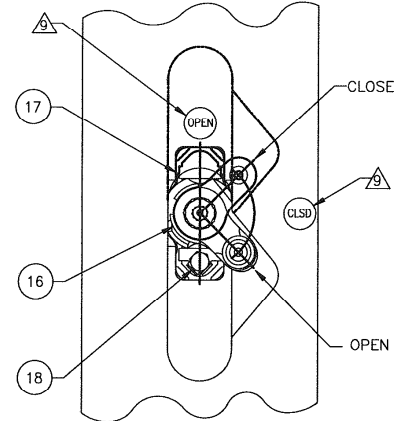
PORT & HOSE IDENTIFICATION		
PORT	HOSE NO	OPERATION
A4	ITEM 9	IBOP OPEN, PISTON
B4	ITEM 10	IBOP CLOSE, ROD
B8	ITEM 8	LINK TILT, FLOAT
E6	ITEM 7	LINK TILT, M/H
G6	ITEM 6	LINK TILT, D/D
E5	ITEM 5	CLAMP, PISTON
G5	ITEM 4	CLAMP, ROD
H	N/A	SPARE
G	N/A	SPARE
L	N/A	LIFTING PORT



VIEW F-F
SCALE: 1/4



VIEW A-A
ITEMS 4 & 5 OMITTED FOR CLARITY



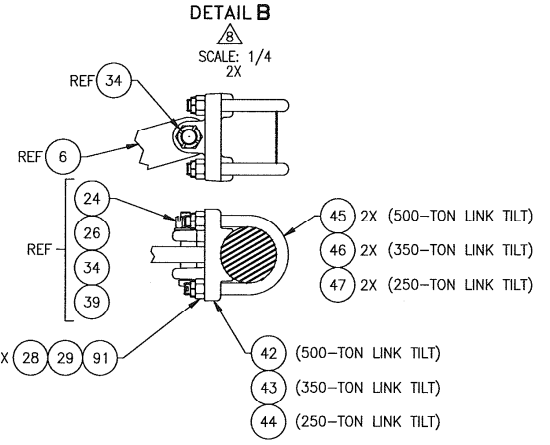
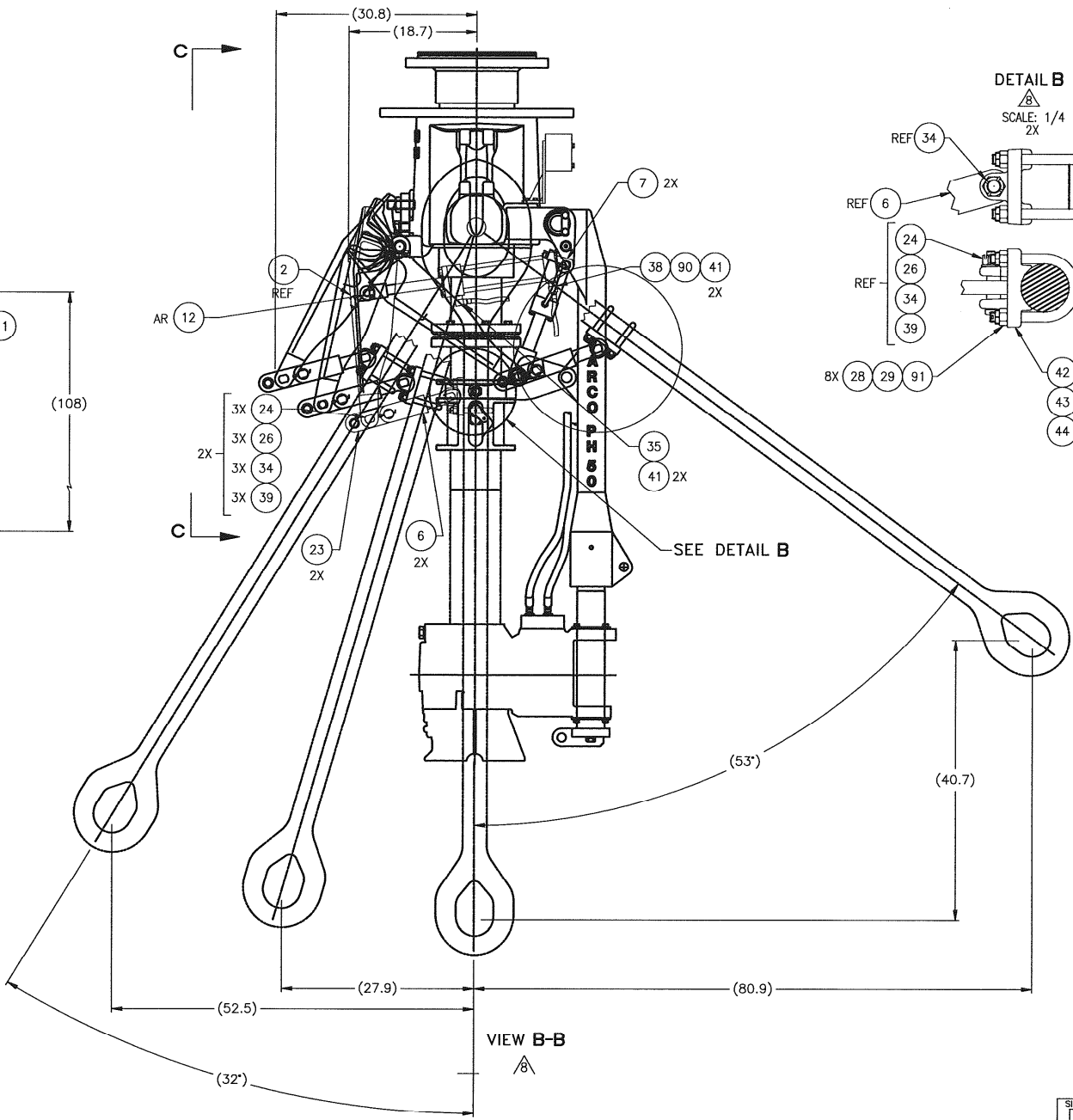
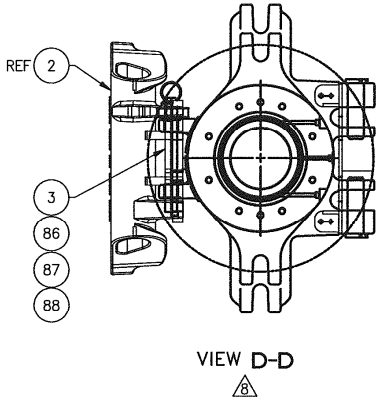
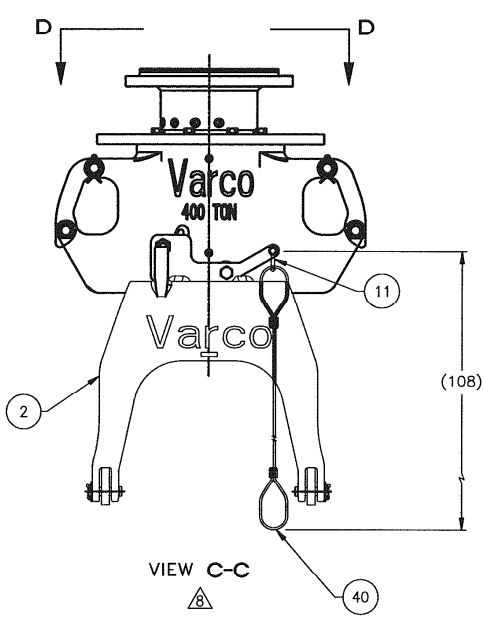
DETAIL A
ITEM 13 OMITTED FOR CLARITY
SCALE: 1/2

SIZE	DWG NO	REV
D	117820	W
SCALE	1/8" WT LBS	3700 SHEET 3 OF 4

5 4 3 2 1

D C B A

D C B A



SIZE	DWG NO	REV
D	117820	W
SCALE	1/8 WT LBS	3700 SHEET
		4 OF 4

5 4 3 2 1


NOTES: UNLESS OTHERWISE SPECIFIED

1. CLEAN OUT ALL HOSES PRIOR TO ASSEMBLY.
2. CYCLE CYLINDERS AFTER INSTALLATION OF HOSES AND PRIOR TO ATTACHING TO HOOK.
3. FOLLOW ADJUSTMENT PROCEDURES IN SERVICE MANUAL.

△ SEE DRAWING 112190 FOR ADDITIONAL COUNTERBALANCE COMPONENTS.

CONFIGURATION TABLE △	
-HOOK	CONFIGURED FOR USE WITH HOOKS.
-BLOCK	CONFIGURED FOR USE WITH BLOCKS
-BECKET	CONFIGURED FOR USE WITH BECKET

BECKET	BLOCK	HOOK	QTY	RECD	PART NO.	DESCRIPTION	MATERIAL	ITEM NO.
			1		95030-DWG	DRAWING, COUNTERBALANCE PACKAGE (BECKET)		9
			2		88484	SHACKEL (13.5 TON)		8
			2		80392	LINK CONNECTING		7
			2		80390	CHAIN 9 LINK		6
			1	1	112190-DWG	DRAWING, COUNTERBALANCE PACKAGE		5
								4
			1		117076	BEAM, COUNTERBALANCE		3
			2		76717	PEAR LINK		2
			2		51405-18-S	PIN, COTTER		1

PART FLAGS		DIMENSIONS UNLESS OTHERWISE SPECIFIED		SURFACE FINISHES		TITLE	
<input type="checkbox"/> TRACEABILITY	ARE IN INCHES	INTERPRET DIMENSIONS & TOLERANCES PER ANSI Y14.5 & ABBREVIATIONS PER ANSI Y14.1	MACHINER 250/MAX	1000/CUT	 KIT, TRAVELING EQUIPMENT ATTACHMENT		
<input type="checkbox"/> CRITICAL LINK	DO NOT SCALE	±.000 XXX ±.010			114661 TDS-9S NEXT ASSY PRODUCT DATE 02/19/02		
<input type="checkbox"/> CERTIFICATION REQUIRED	SCALE ANGULAR TOLERANCE 30'				SIZE D DOCUMENT NO 118244 REVISION A		
<input type="checkbox"/> SPARE PART	THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION AND SUCH INFORMATION MAY BE RELEASED TO OTHERS AND NOT BE USED FOR MANUFACTURING PURPOSES WITHOUT WRITTEN PERMISSION FROM VARCO INTERNATIONAL, INC.				PREPARED BY JRM B.SHUMSKI T. CLARK CHECKED BY B.SHUMSKI T. CLARK APPROVED BY B.SHUMSKI T. CLARK DATE 7/96		
<input type="checkbox"/> OPERATIONAL					SCALE 1/10 WEIGHT LB 125 SHEET 1 OF 2		
<input type="checkbox"/> INSURANCE THIS MODEL TRADEMARK					20020219.09070623		

D

C

B

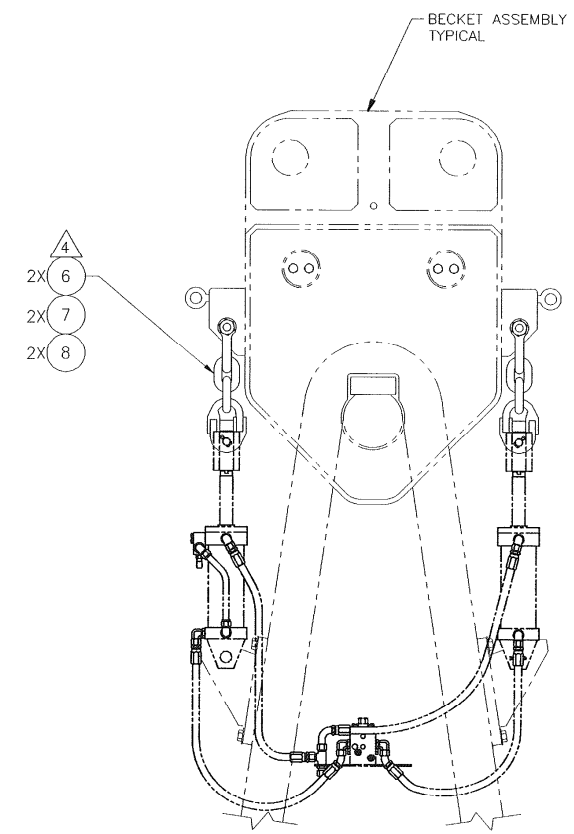
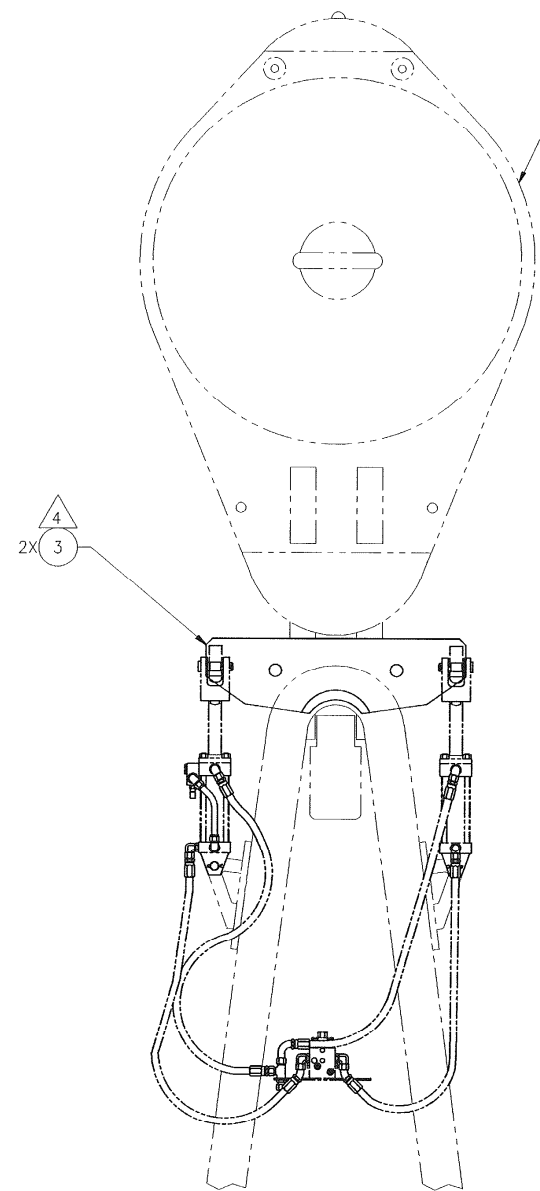
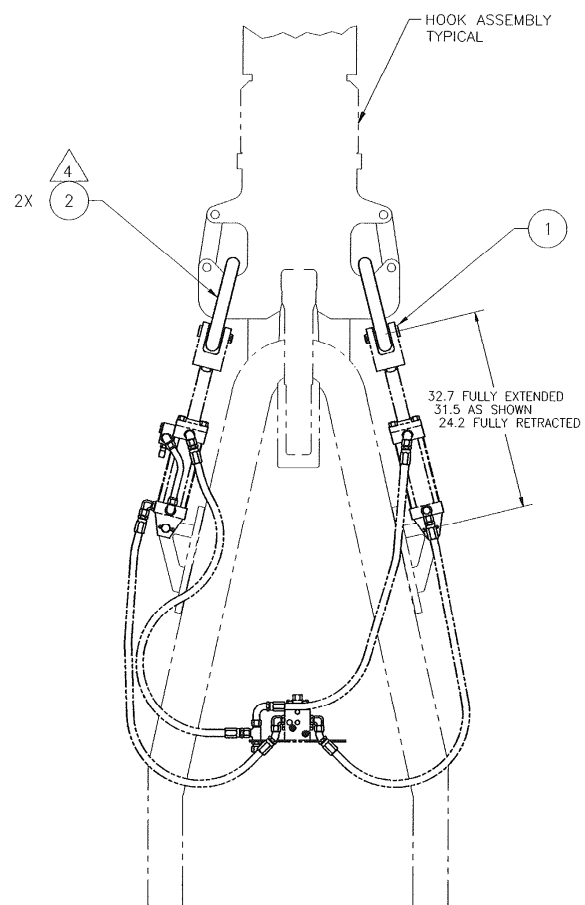
A

D

C

B

A



THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION, AND SUCH INFORMATION MAY NOT BE DISCLOSED TO OTHERS FOR ANY PURPOSE NOR USED FOR MANUFACTURING PURPOSES WITHOUT PERMISSION FROM VARCO INTERNATIONAL, INC.



TITLE
KIT, TRAVELING EQUIPMENT ATTACHMENT

SIZE D	DOCUMENT NO. 118244	REVISION A
SCALE 1/10	SHEET 2	OF 2

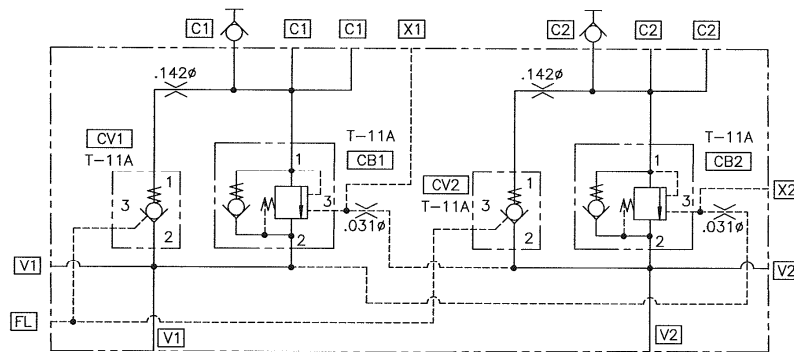
20020219.09070623

DCF0022 (REV B)

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL COMPONENTS MUST BE CLEAN AND FREE OF ALL CONTAMINATION. ALL INTERNAL SURFACES SHALL HAVE A LIGHT COATING OF CLEAN PETROLEUM-BASE HYDRAULIC FLUID PRIOR TO ASSEMBLY.
2. LUBRICATE ALL O-RINGS WITH CLEAN PETROLEUM-BASE HYDRAULIC FLUID PRIOR TO ASSEMBLY.
3. DO NOT USE ANAEROBIC ADHESIVE OR TEFLON PASTE ON SAE O-RING BOSS PLUGS OR FITTINGS (ITEMS 4, 8, 9, 10 & 14).
4. SECURE CAP ON ITEM 5, WITH FINGER PRESSURE.
5. APPLY LOCTITE (ANAEROBIC ADHESIVE) ITEM 12 TO INSTALL ITEMS 6 & 7 ORIFICE PLUGS .
6. CAP ALL EXTERNAL FITTINGS AND OPEN PORTS DURING HANDLING AND STORAGE.

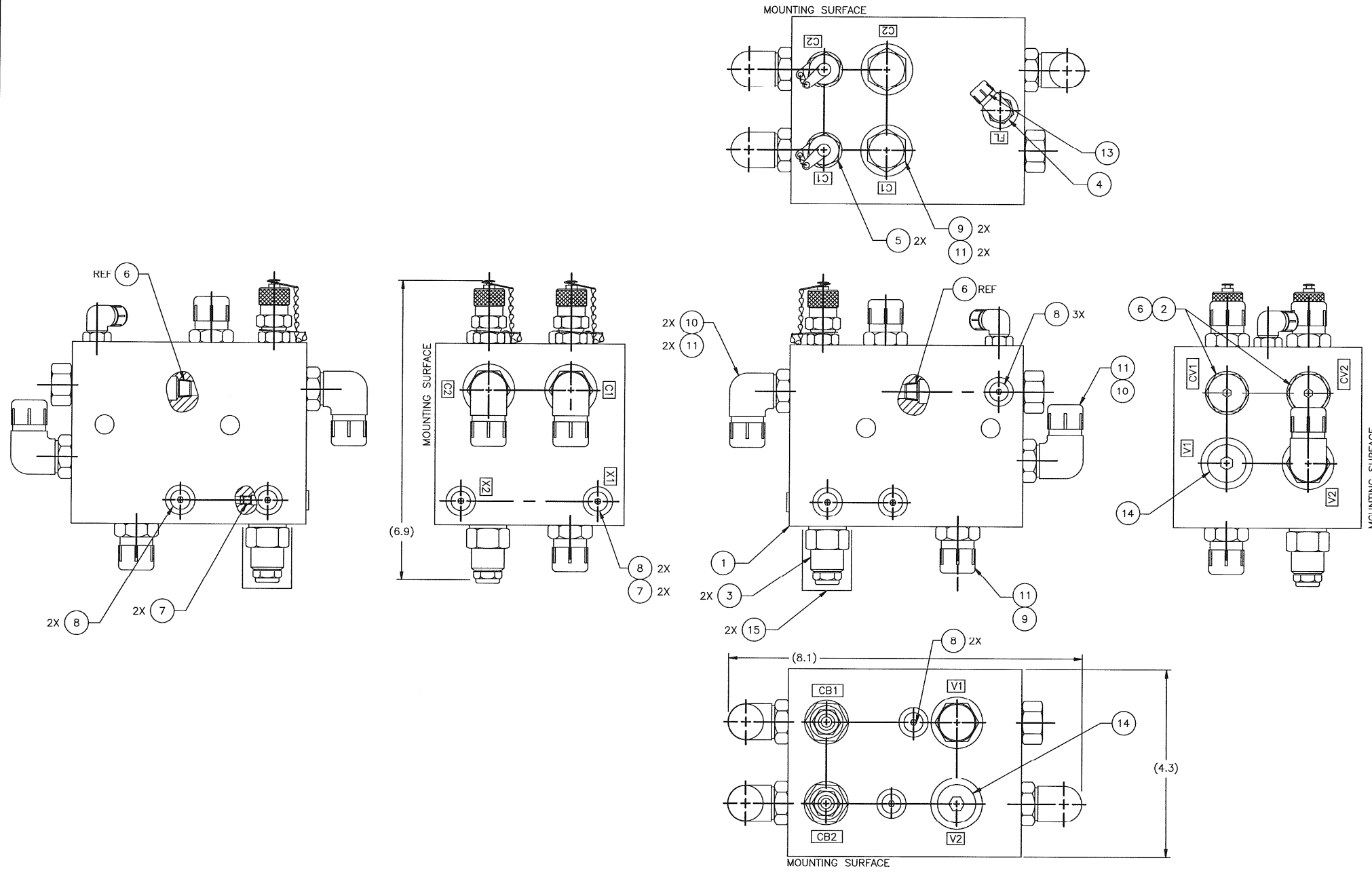
CONFIGURATION NO	PART NO	MANIFOLD MATERIAL	WEIGHT LB	DESCRIPTION	ITEM NO
118463-BSC	118172-BSC	STEEL	25		
118463-1	118172-1	S STEEL	25	MANIFOLD, LINK TILT CYLINDER	1
118463-2	118172-2	ALUMINUM	12		



HYDRAULIC SCHEMATIC
PER ISO 1219

CONFIG NO	QTY REQD	PART NO.	DESCRIPTION	MATERIAL	ITEM NO.
			DELETED		16
2		99838-1	COVER, SUN CARTRIDGE, SERIES 1		15
2		87196-8-S	PLUG, O-RING, -8		14
1		112809-04	CAP, SHIPPING, THREADED, -4		13
AR		53200-545	LOCTITE, HYDRAULIC		12
6		112809-08	CAP, SHIPPING, THREADED, -8		11
3		56519-8-8-S	ELBOW, O-RING BOSS/37', -8		10
3		56529-8-8-S	CONNECTOR, O-RING BOSS/37', 1/2"		9
9		87196-2-S	PLUG, O-RING, -2		8
2		93018-08	ORIFICE, #10-32UNF X 0.031		7
2		94042-36	ORIFICE, 1/8NPT X 0.142		6
2		93024-4SAE	TEST FITTING, SAE-4		5
1		56519-4-4-S	ELBOW, O-RING BOSS/37', -4		4
2		30173386	VALVE, COUNTERBALANCE (CBCA-LHN)		3
2		93547-1B30N	CHECK VALVE, PILOT TO OPEN (CKCB-XCN)		2
1		SEE TABLE	MANIFOLD, LINK TILT CYLINDER		1

PART FLAGS <input type="checkbox"/> TRACEABILITY <input type="checkbox"/> CRITICAL LOAD PART ITEM <input type="checkbox"/> CERTIFICATION REQUIRED		UNLESS OTHERWISE SPECIFIED INTERPRET DIM/TOL PER ASME Y14.5M DIMENSIONS ARE IN INCHES .X ± .1 .XX ± .03 .XXX ± .010 ANGLES ± .5° DO NOT SCALE DRAWING		COPYRIGHT © VARCO INTERNATIONAL, INC. ALL RIGHTS RESERVED. THIS DOCUMENT MAY NOT BE COPIED OR REPRODUCED IN ANY MANNER WITHOUT THE WRITTEN CONSENT OF VARCO. VARCO GRANTS ALL RIGHTS TO THIS WORK AND INTENDS TO ENFORCE ALL RIGHTS UNDER THE COPYRIGHT LAWS AS A PUBLISHED WORK.	
SPARE PART <input type="checkbox"/> COMMISSIONING <input type="checkbox"/> OPERATIONAL <input type="checkbox"/> INSURANCE		APPLICATION UNLESS OTHERWISE SPECIFIED MACHINED 250 MAX TORCH CUT 1000 MAX		LIST OF MATERIALS DRAWN: S. SIFTON, T. PHAM CHECKED: B. RICE, H. LIM APP'D: B. RICE, J. MORSE DATE: 02/10/05, 1/23/98	
TITLE: MANIFOLD ASSY LINK TILT CYLINDER		SIZE: D DWG NO: 118463 SCALE: 1/1 WT LBS SEE TABLE SHEET 1 of 2		REV: G	

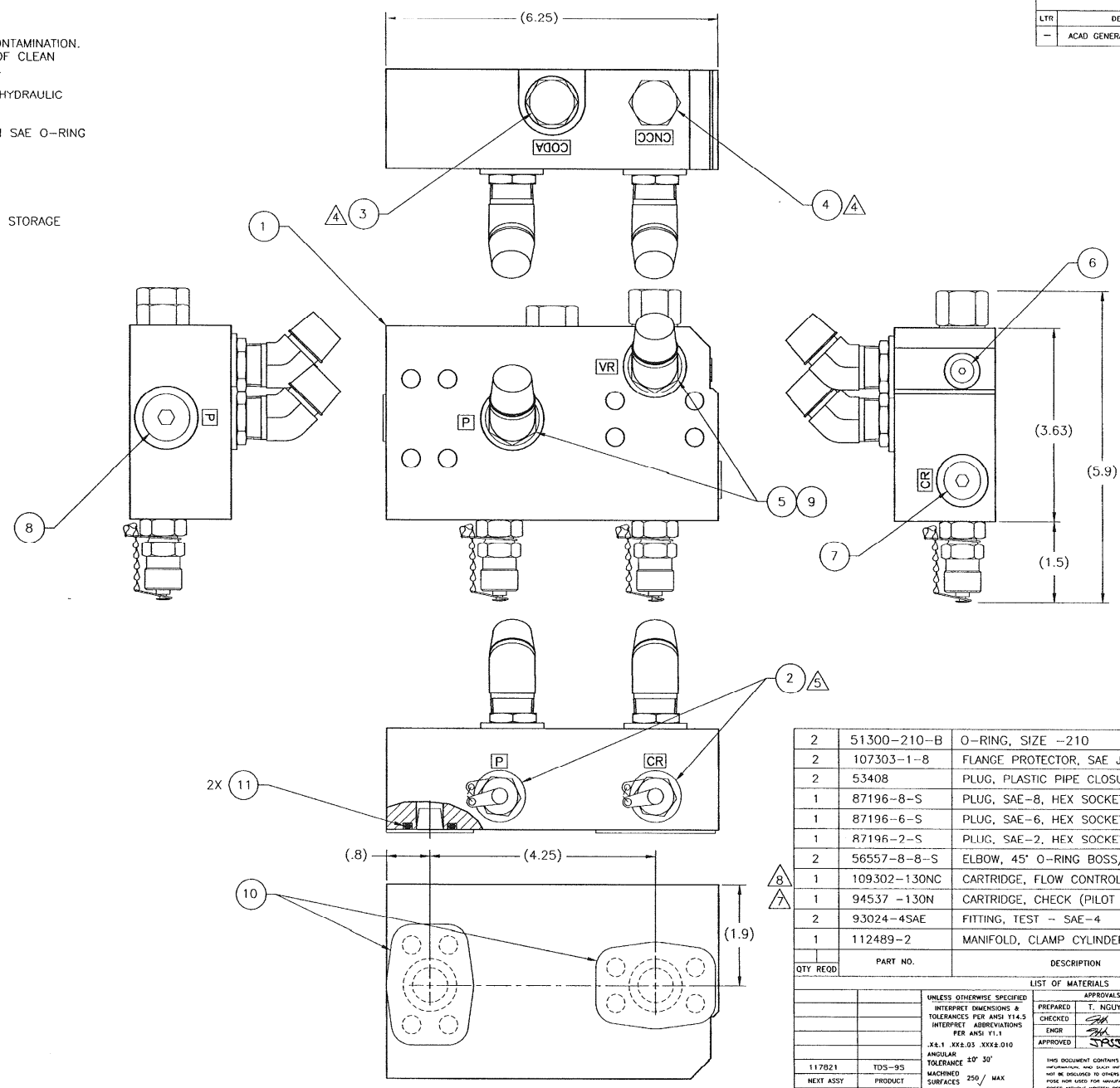


SIZE	DWG NO	REV
D	118463	G
SCALE	1/1	VT LBS SEE TABLE
SHEET		2 OF 2

NOTES: (UNLESS OTHERWISE SPECIFIED)

1. ALL COMPONENTS MUST BE CLEAN AND FREE OF ALL CONTAMINATION. ALL INTERNAL SURFACES SHALL HAVE A LIGHT COATING OF CLEAN PETROLEUM-BASE HYDRAULIC FLUID PRIOR TO ASSEMBLY.
2. LUBRICATE ALL O-RINGS WITH CLEAN PETROLEUM-BASE HYDRAULIC FLUID PRIOR TO ASSEMBLY.
3. DO NOT USE ANAEROBIC ADHESIVE OR TEFLON PASTE ON SAE O-RING BOSS PLUGS OR FITTINGS.
4. TORQUE NOTED COMPONENTS TO 30/35 LBS. FT.
5. TORQUE CAPS ON TEST FITTINGS FINGER TIGHT.
6. CAP ALL EXTERNAL FITTINGS AND OPEN PORTS PRIOR TO STORAGE OR SHIPMENT.
7. REF: SEAL KIT 98006-13N.
8. REF: SEAL KIT 98006-12N.
9. REF: HYDRAULIC SCHEMATIC 109550

D
C
B
A



LTR	DESCRIPTION	PREPARED	CHECKED	APVD
-	ACAD GENERATED DRAWING	T. NGUYEN	08/14/96	08/14/96

QTY REQD	PART NO.	DESCRIPTION	MATERIAL	ITEM NO.
2	51300-210-B	O-RING, SIZE -210		11
2	107303-1-8	FLANGE PROTECTOR, SAE J518		10
2	53408	PLUG, PLASTIC PIPE CLOSURE		9
1	87196-8-S	PLUG, SAE-8, HEX SOCKET		8
1	87196-6-S	PLUG, SAE-6, HEX SOCKET		7
1	87196-2-S	PLUG, SAE-2, HEX SOCKET		6
2	56557-8-8-S	ELBOW, 45° O-RING BOSS/37°		5
1	109302-130NC	CARTRIDGE, FLOW CONTROL (CNCC-XCN-.047)		4
1	94537-130N	CARTRIDGE, CHECK (PILOT TO CLOSE) (CODA-XCN)		3
2	93024-4SAE	FITTING, TEST - SAE-4		2
1	112489-2	MANIFOLD, CLAMP CYLINDER		1

UNLESS OTHERWISE SPECIFIED		APPROVALS	
INTERPRET DIMENSIONS & TOLERANCES PER ANSI Y14.5	INTERPRET ABBREVIATIONS PER ANSI Y1.1	PREPARED	T. NGUYEN 08/14/96
ANGULAR TOLERANCE ±0° 30'	MACHINED SURFACES 250 / MAX	CHECKED	08/14/96
DIMENSIONS ARE IN INCHES DO NOT SCALE DOCUMENT		ENGR	08/14/96
		APPROVED	08/14/96

THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION AND IS THE PROPERTY OF VARCO. IT IS TO BE USED FOR MANUFACTURING PURPOSES WITHOUT WRITTEN PERMISSION FROM VARCO INTERNATIONAL, INC.

117821 TDS-95
NEXT ASSY PRODUCT

Varco **BJ**
DRILLING SYSTEMS

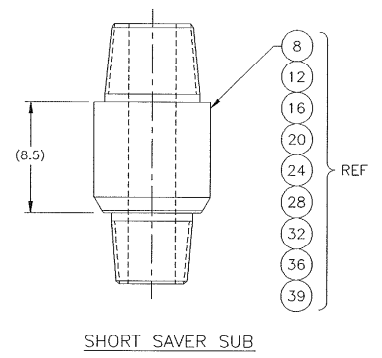
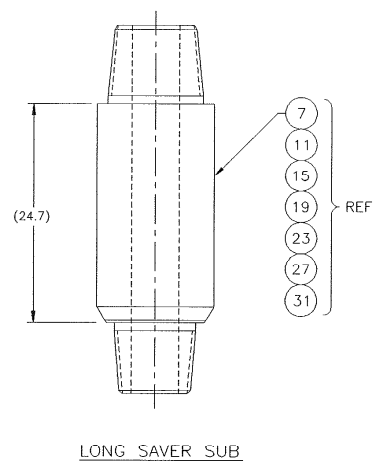
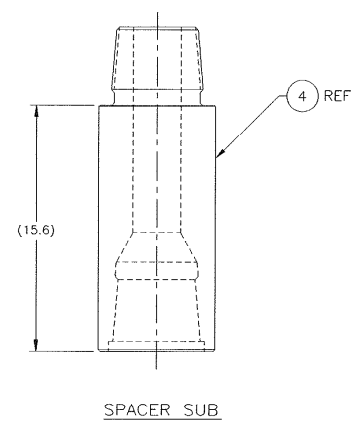
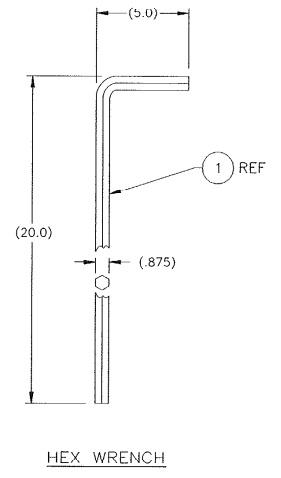
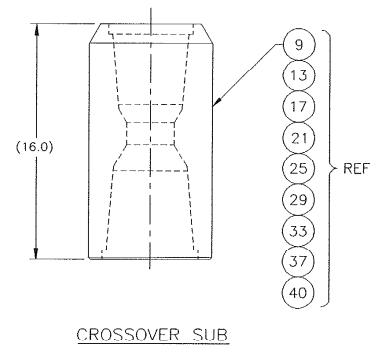
TITLE: MANIFOLD ASSEMBLY, CLAMP CYLINDER

SIZE: D1
SCALE: 1/1

DOCUMENT NO: 118511
WT LB: 15
SHEET 1 OF 1

7:00 AM '13 19:58:02 PGT 1396 V:\SERVIC\engin\Remote Document\Remote Document Remote

D
C
B
A



<small>THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION, AND SUCH INFORMATION MAY NOT BE DISCLOSED TO OTHERS FOR ANY PURPOSES. FOR USES FOR MANUFACTURING PURPOSES WITHOUT WRITTEN PERMISSION FROM VARECO INTERNATIONAL, INC.</small>		TITLE	SIZE	DOCUMENT NO.	REVISION
		KIT, PIPE HANDLER PH50	D	119054	B
		SCALE	1/1	SHEET	2 OF 2

NOTES - UNLESS OTHERWISE SPECIFIED:

- 1. REFERENCE DIMENSIONS OF SHAFT, SLEEVES, COVER AND MAIN BODY ARE NOMINAL SIZES. FIT DATA IS FOR ASSEMBLY PURPOSES. T = TIGHT FIT. L = LOOSE FIT.
- 2. PRIMARY GEAR MESH BACKLASH: .006 - .015 (NEW)
SECONDARY GEAR MESH BACKLASH: .008 - .020 (NEW)
- 3. TO INSTALL COMPOUND GEARS (ITEM 14) INTO COVER (ITEM 2), USE TOOL No. 110034.
- 4. TO REMOVE BRAKE HUB OR PINION GEAR FROM MOTOR SHAFT, USE TOOL No. 110026.
- 5. (CLP) = CRITICAL LOAD PATH (RP) = REPLACEMENT PART (1 YR SPARES) (NS) = NOT SHOWN
- 6. APPLY ANTI-SEIZE AND TORQUE ALL BOLTS PER DS00008 AND LOCKWIRE PER ASP00019.
- 7. TORQUE NUT TO 200-250 LB/FT AND BEND LOCKWASHER TABS.
- 8. CLEAN ALL OIL PASSAGES PRIOR TO ASSEMBLY.
- 9. ADJUST UPPER BEARING SHIMS SO THAT AXIAL MOVEMENT OF MAIN SHAFT IS .0005-.0020.
- 10. MAXIMUM T.I.R. OF MAIN SHAFT TO S-PIPE ADAPTER IS .002.
- 11. TEST MOTOR/HOUSING ASSEMBLY PER VARCO SPEC TS00259.
- 12. REFER TO ELECTRICAL PACKAGE FOR ENCODER MOUNTING ASSEMBLY AND BELT ADJUSTMENT PROCEDURE.
- 13. DELETED
- 14. ASSURE STATOR WINDINGS ARE PROTECTED FROM ABRASION.
- 15. CLEAN HEATER/THERMISTOR PER ASP00020
- 16. VERIFY MOTOR LEADS AND IDENTIFY ACCORDINGLY. EXAMPLE: L1 L2 L3 V1 V2 V3
- 17. INSTALL ITEM # 145 BEFORE MOTORS INSTALL.
- 18. BULL GEAR P/N 30158574 REPLACED P/N 117938 AND COMPOUND GEAR P/N 30158573 REPLACED P/N 117937 AS OF APRIL 2002. P/N 30158574 MUST BE USED WITH P/N 30158573 AS A SET. WHEN ORDERING SPARE PARTS, ORDER A GEAR SET P/N 30158575 (ONE BULL GEAR AND TWO COMPOUND GEARS).
- 19. TO ADJUST ENCODER BELT FOLLOW INSTRUCTIONS ON LABEL, ITEM 243, (P/N 120462).
- 20. ASSEMBLE SHAFT ADAPTER (ITEM 260) TO THE MOTOR SHAFT USING ITEMS 271 & 185. USE LOCKING COMPOUND (ITEM 192) AND TORQUE TO 9.3-10.2 ft-lbs, LOCKWIRE.
- 21. ASSEMBLE ENCODER (ITEM 264) TO ITEM 256 USING ITEMS 273 AND 266, TORQUE 3-4 ft-lbs.
- 22. ASSEMBLE SPRING (ITEM 259) AND SPACER (ITEM 270) INTO ITEM 258, MOUNT TO PLATE (ITEM 256) USING ITEMS 277, 280 AND 281.
- 23. ASSEMBLE TENSION PULLEY (ITEM 269) AS SHOWN IN DETAIL.
- 24. INSTALL ITEM 256 ASSEMBLY FROM NOTES 21, 22 AND 23 WITH ITEMS 257, 272 & 187.
- 25. ASSEMBLE PULLEY (ITEM 263) TO THE SHAFT ADAPTER. PULLEY TO BE LOCATED AS INDICATED.
- 26. SLIDE TIMING BELT (ITEM 261) OVER PULLEYS (ITEMS 262 & 263). PLACE PULLEY (ITEM 262) ON ENCODER SHAFT AS SHOWN, ENSURE LOCATION GAP IS MAINTAINED.
- 27. ROTATE THE MOTOR BY HAND APPROXIMATELY ONE REVOLUTION AND RE-CHECK ALIGNMENT OF BELT WITHIN THE TWO PULLEYS. RE-ADJUST HEIGHT OF ENCODER PULLEY AS REQUIRED. ADJUST BELT TENSION AS DESCRIBED ON LABEL (ITEM 267). DO NOT TENSION BELT BY HAND.
- 28. INSTALL ACCESS PANELS AND GASKETS WITH HARDWARE AND LOCKWIRE.
- 29. INSTALL INSTRUCTION LABEL (ITEM 267) TO EXTERIOR SIDE OF PANEL.

- 30. MOTOR HOUSING CONFIGURATIONS
119100-BSC OBSOLETE AT REV P. DRAWINGS RESTRUCTURED WITHOUT THE WASHPIPE AND ADDED THE BLOWER MOTOR AND ENCODER. WASHPIPE MOVED TO S-PIPE PACKAGE 30156835.
- 119100-UL = U.L. 575 VAC/60 HZ BLOWER MOTOR AND ENCODER.
- 119100-EX = EEX 575 VAC/60 HZ BLOWER MOTOR AND ENCODER.

31. FILL VOID OF APROX 9 CU-IN BFTWFN SEAL & BEARING RETAINER WITH GREASE, ITEM 282

A/R	ITEM NO.	DESCRIPTION	ITEM NO.
A/R	109586-5	SHIM, BEARING RETAINER	76
A/R	109586-4	SHIM, BEARING RETAINER	75
A/R	109586-3	SHIM, BEARING RETAINER	74
A/R	109586-2	SHIM, BEARING RETAINER	73
A/R	109586-1	SHIM, BEARING RETAINER	72
			71
1	119977	LABEL, WARNING	70
1	109523	ADAPTER, S-PIPE	69
1	109566-2	TUBE, UPPER BEARING LUBE	68
2	88990-10	NOZZLE, SPRAY - FLAT PATTERN	67
2	88990-9	NOZZLE, SPRAY - FLAT PATTERN	66
			65
1	108216-12	BALL VALVE	64
			63
			62
2	110116	GASKET, DUCT/ MOTOR	61
			60
2	110110	GASKET - BLOWER/ DUCT	59
2	110112	GASKET, BLOWER SCROLL	58
			57
			56
			55
8	110014	GASKET, BLOWER	54
1	110011	GASKET, ACCESS COVER	53
1	110010	COVER, ACCESS	52
			51
			50
			49
8	110001	COVER, BLOWER	48
1	109592-2	COVER, BLOWER SCROLL BRAKE	47
1	109592-1	COVER, BLOWER SCROLL BRAKE	46
1	109563-2	DUCT	45
1	109563-1	DUCT	44
			43
1	118217-35L60	ASSEMBLY, MOTOR - 575 VAC (L.H.)	42
1	118217-35R60	ASSEMBLY, MOTOR - 575 VAC (R.H.)	41
			40
			39
			38
			37
			36
			35
			34
			33
1	116661-1	MOUNTING PLATE, MOTOR	32
2	109553	ADAPTER PLATE, BRAKE	31
2	109555	ROTOR, BRAKE	30
4	109528	BRAKE, CALIPER DISC	29
2	122248	FASTENING BLOCK	28
1	109594-1	COVER, BEARING	27
1	109594	COVER, BEARING	26
1	109593	RETAINER, BEARING	25
1	30176112	RETAINER, BEARING - UPPER STEM	24
2	109522	BEARING, CYLINDRICAL ROLLER - COMPOUND UPPER	23
1	109521	BEARING, CYLINDRICAL ROLLER - MAIN LOWER	22
1	108319	BEARING, THRUST - TAPER ROLLER	21
1	109519	BEARING, TAPER ROLLER	20
2	117987	BEARING, SPHERICAL ROLLER - COMPOUND LOWER	19
1	91829-1	SLEEVE, STEM	18
1	109591	SLEEVE, WEAR	17
1	110040	SLEEVE, MAIN SHAFT	16
			15
2	30158573	GEAR, COMPOUND, HELICAL	14
1	30158574	GEAR, BULL, HELICAL	13
			12
1	30151875-504	ASSEMBLY, SHOT PIN	11
2	122249	BRACKET, HEAT EXCHANGER	10
1	30122104	HEAT EXCHANGER, OIL	9
		---DELETED---	8
1	110068-2	ASSEMBLY, RESERVOIR - HYDRAULIC OIL	7
1	117603-1	PUMP ASSEMBLY, LUBE (ALUM)	6
1	109531	BONNET	5
1	30118150	ASS'Y, ROTATING LINK ADAPTER - 400 TON (CLP)	4
1	117834	MAIN SHAFT W/LANDING COLLAR (CLP)	3
1	109518	MAIN BODY (CLP)	2
1	117922	BODY, MAIN - 400 TON (CLP)	1

QTY REQD	PART NO.	DESCRIPTION	ITEM NO.	
	1	113246	BRACKET, PRE-FILL VALVE	40
				39
				38
2	109561	IMPELLER, BLOWER	37	
1	115879	MOUNT, CABLE	36	
				35
				34
				33
1	116661-1	MOUNTING PLATE, MOTOR	32	
2	109553	ADAPTER PLATE, BRAKE	31	
2	109555	ROTOR, BRAKE	30	
4	109528	BRAKE, CALIPER DISC	29	
2	122248	FASTENING BLOCK	28	
1	109594-1	COVER, BEARING	27	
1	109594	COVER, BEARING	26	
1	109593	RETAINER, BEARING	25	
1	30176112	RETAINER, BEARING - UPPER STEM	24	
2	109522	BEARING, CYLINDRICAL ROLLER - COMPOUND UPPER	23	
1	109521	BEARING, CYLINDRICAL ROLLER - MAIN LOWER	22	
1	108319	BEARING, THRUST - TAPER ROLLER	21	
1	109519	BEARING, TAPER ROLLER	20	
2	117987	BEARING, SPHERICAL ROLLER - COMPOUND LOWER	19	
1	91829-1	SLEEVE, STEM	18	
1	109591	SLEEVE, WEAR	17	
1	110040	SLEEVE, MAIN SHAFT	16	
				15
2	30158573	GEAR, COMPOUND, HELICAL	14	
1	30158574	GEAR, BULL, HELICAL	13	
				12
1	30151875-504	ASSEMBLY, SHOT PIN	11	
2	122249	BRACKET, HEAT EXCHANGER	10	
1	30122104	HEAT EXCHANGER, OIL	9	
		---DELETED---		8
1	110068-2	ASSEMBLY, RESERVOIR - HYDRAULIC OIL	7	
1	117603-1	PUMP ASSEMBLY, LUBE (ALUM)	6	
1	109531	BONNET	5	
1	30118150	ASS'Y, ROTATING LINK ADAPTER - 400 TON (CLP)	4	
1	117834	MAIN SHAFT W/LANDING COLLAR (CLP)	3	
1	109518	MAIN BODY (CLP)	2	
1	117922	BODY, MAIN - 400 TON (CLP)	1	

LIST OF MATERIAL

LIST OF MATERIAL

UNLESS OTHERWISE SPECIFIED INTERPRET DIM/TOL PER ASME Y14.5M DIMENSIONS ARE IN INCHES X ± .1 XX ± .03 XXX ± .010 DO NOT SCALE DRAWING		UNLESS OTHERWISE SPECIFIED THE DRAWING CONTAINS INFORMATION ON CONSTRUCTION, MATERIALS, FINISHES, TOLERANCES, DIMENSIONS AND WEIGHTS. THE USER OF THIS DRAWING SHALL BE RESPONSIBLE FOR THE PROPER INTERPRETATION OF ALL INFORMATION CONTAINED HEREIN. THE USER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY INFORMATION FROM THE DRAWING AND THE INFORMATION CONTAINED HEREIN SHALL BE THE SOLE RESPONSIBILITY OF THE USER.	
PI 114661	TDS-9SA	SCALE: 1/1	WT LBS: 18,000
NEXT ASSY	USED ON	PROJECTION: 1st ANGLE	SIZE: D
APPLICATION	DRAWN: D.HIRULKAR	CHECKED: B.RICE	DATE: 03/12/07
UNLESS OTHERWISE SPECIFIED MACHINED TOUGH CUT 250 MAX 1000 MAX	APPROV: G.TRAEGER	DATE: 03/12/07	119100
			REVISION: 1 of 10

NATIONAL OILWELL VARCO
TITLE: MOTOR/HOUSING ASSY.
TDS-9SA

RG SOLUTIONS
10000 RICHMOND AVE.
HOUSTON, TEXAS 77042 U.S.A.
(713) 346-7500

D

D

QTY	REQD	PART NO.	DESCRIPTION	ITEM NO.
1		50006-20-C5D	SCREW, HEX HEAD CAP	218
1		56526-4-4-S	FITTING, TEE, 37/37/ SWIVEL INT. 37"	217
32		50806-R-C	WASHER, FLAT 3/8"	216
1		56506-16-16-S	ELBOW, 90° EXT/ 37"	215
1		30171072	BRACKET, LUBE SWITCH	214
100		53300-526	TIE, CABLE (TY-RAP)	213
2		50008-14-C5D	SCREW, HEX HEAD CAP	212
8		50008-7-C5D	SCREW, HEX HEAD CAP	211
8		50008-12-C5D	SCREW, HEX HEAD CAP	210
6		50008-11-C5D	SCREW, HEX HEAD CAP	209
66		50008-10-C5D	SCREW, HEX HEAD CAP	208
				207
2		50008-8-C5D	SCREW, HEX HEAD CAP	206
42		50006-10-C5D	SCREW, HEX HEAD CAP	205
A/R		Z6000.8	LOCKWIRE, .031	204
4		50005-10-C5D	SCREW, HEX HEAD CAP	203
36		50006-6-C5D	SCREW, HEX HEAD CAP	202
14		50006-18-C5D	SCREW, HEX HEAD CAP	201
6		50005-8-C5D	SCREW, HEX HEAD CAP	200
2		94269-2	CLAMP, SINGLE - 1/4" TUBE, PHM-3i (NS)	199
6		50004-6-C5D	SCREW, HEX HEAD CAP	198
8		50004-12-C5D	SCREW, HEX HEAD CAP	197
		---DELETED---		196
		---DELETED---		195
A/R		Z6001.9	LOCKWIRE, .047	194
A/R		Z6001	LOCKWIRE, .051	193
A/R		53200-242	COMPOUND, LOCKING (BLUE)	192
14		50916-C	WASHER, LOCK - REGULAR	191
64		50912-C	WASHER, LOCK - REGULAR	190
16		50910-C	WASHER, LOCK - REGULAR	189
96		50908-C	WASHER, LOCK - REGULAR	188
78		50906-C	WASHER, LOCK - REGULAR	187
22		50905-C	WASHER, LOCK - REGULAR	186
10		50904-C	WASHER, LOCK - REGULAR	185
8		109557	WASHER	184
2		51217-18	LOCKWASHER, BEARING	183
2		51218-18	LOCKNUT, INTERNAL RETAINER	182
8		50506-C	NUT, HEX, SLOTTED	181
				180
8		50004-5-C5D	SCREW, HEX HEAD CAP	179
				178
10		50016-28-C5D	SCREW, HEX HEAD CAP	177
8		50012-22-C5D	SCREW, HEX HEAD CAP	176
4		50016-12-C5D	SCREW, HEX HEAD CAP	175
				174
9		50012-26-C5D	SCREW, HEX HEAD CAP	173
6		50012-24-C5D	SCREW, HEX HEAD CAP	172
27		50012-20-C5D	SCREW, HEX HEAD CAP	171
8		50012-18-C5D	SCREW, HEX HEAD CAP	170
8		50012-16-C5D	SCREW, HEX HEAD CAP	169
8		50012-12-C5D	SCREW, HEX HEAD CAP	168
8		50010-18-C5D	SCREW, HEX HEAD CAP	167
8		50010-10-C5D	SCREW, HEX HEAD CAP	166
				165
				164
				163
				162
				161
				160
				159
				158
				157
				156
				155
				154
				153
				152
				151
				150
				149
				148
				147
				146
				145
				144
				143
				142
				141
				140
				139
				138
				137
				136
				135
				134
				133
				132
				131
				130
				129
				128
				127
				126
				125
				124
				123
				122
				121
				120
				119
				118
				117
				116
				115
				114
				113
				112
				111
				110
				109
				108
				107
				106
				105
				104
				103
				102
				101
				100
				99
				98
				96
				95
				94
				93
				92
				91
				90
				89
				88
				87
				86
				85
				84
				83
				82
				81
				80
				79
				78
				77
				76
				75
				74
				73
				72
				71
				70
				69
				68
				67
				66
				65
				64
				63
				62
				61
				60
				59
				58
				57
				56
				55
				54
				53
				52
				51
				50
				49
				48
				47
				46
				45
				44
				43
				42
				41
				40
				39
				38
				37
				36
				35
				34
				33
				32
				31
				30
				29
				28
				27
				26
				25
				24
				23
				22
				21
				20
				19
				18
				17
				16
				15
				14
				13
				12
				11
				10
				9
				8
				7
				6
				5
				4
				3
				2
				1

C

C

B

B

A

A

QTY	REQD	PART NO.	DESCRIPTION	ITEM NO.
				165
				164
				163
				162
				161
				160
				159
				158
				157
				156
				155
				154
				153
				152
				151
				150
				149
				148
				147
				146
				145
				144
				143
				142
				141
				140
				139
				138
				137
				136
				135
				134
				133
				132
				131
				130
				129
				128
				127
				126
				125
				124
				123
				122
				121
				120
				119
				118
				117
				116
				115
				114
				113
				112
				111
				110
				109
				108
				107
				106
				105
				104
				103
				102
				101
				100
				99
				98
				96
				95
				94
				93
				92
				91
				90
				89
				88
				87
				86
				85
				84
				83
				82
				81
				80
				79
				78
				77
				76
				75
				74
				73
				72
				71
				70
				69
				68
				67
				66
				65
				64
				63
				62
				61
				60
				59
				58
				57
				56
				55
				54
				53
				52
				51
				50
				49
				48
				47
				46
				45
				44
				43
				42
				41
				40
				39
				38
				37
				36
				35
				34
				33
				32
				31
				30
				29
				28
				27
				26
				25
				24
				23
				22
				21
				20
				19
				18
				17
				16
				15
				14
				13
				12
				11
				10
				9
				8
				7

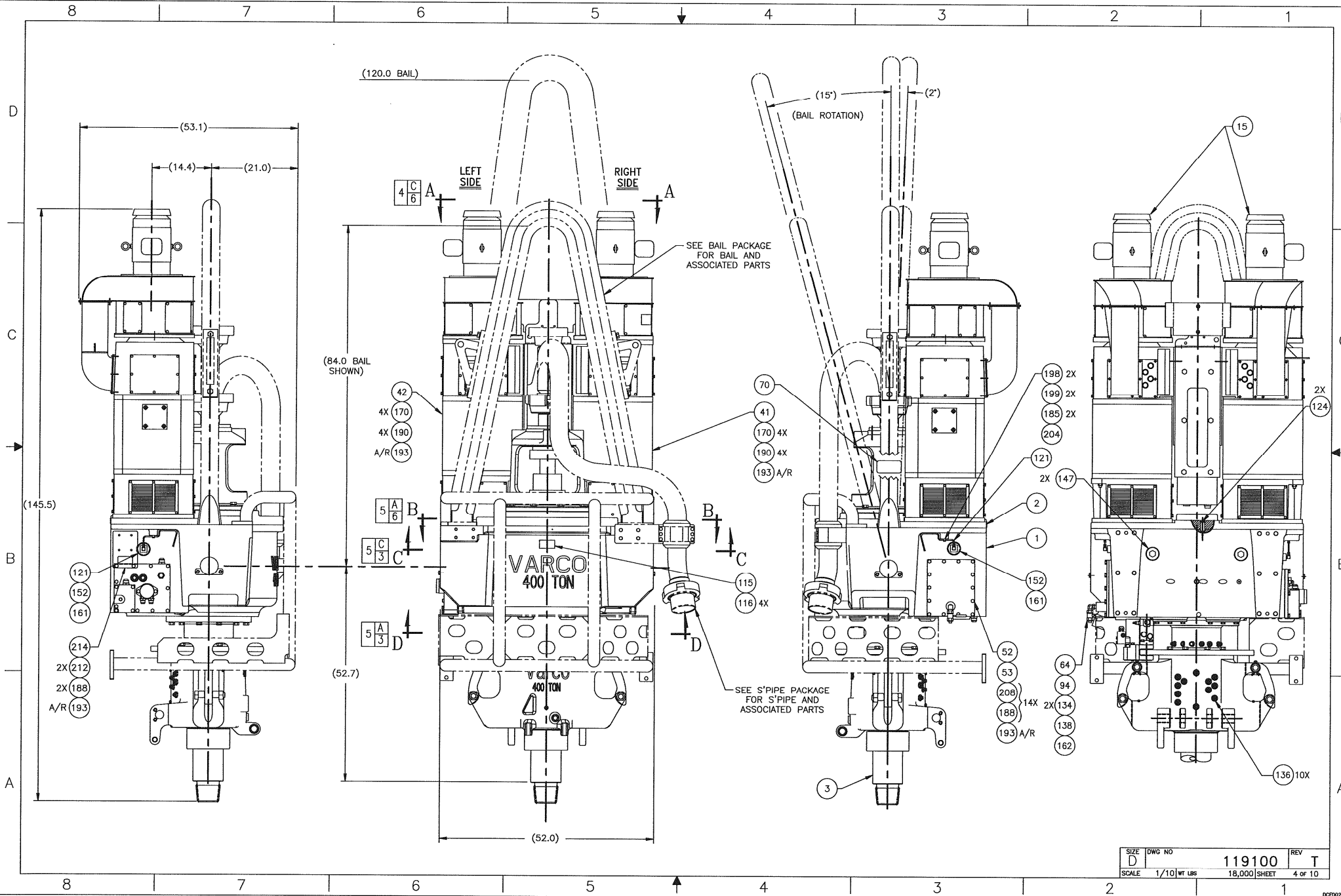
QTY REQD	UL	PART NO.	DESCRIPTION	ITEM NO.
				293
				292
				291
				290
				289
				288
				287
				286
				285
				284
				283
A/R		56003	GREASE, SEVERE SERVICE	282
1	-	50805-R-S	WASHER, FLAT	281
1	-	56405-10-C	PIN, CLEVIS	280
1	-	51604-8-S	PIN, ROLL	279
1	-	30177460	COVER, BLOWER	278
2	-	51433-6-S	PIN, COTTER	277
				276
1	-	122954-2	SPACER	275
1	-	122954-1	SPACER	274
6	-	50168-12-F06	SCREW, CAP-SOCKET HD (METRIC)	273
4	-	50006-12-C5D	SCREW, HEX HEAD	272
2	-	50104-8-C	SCREW, CAP-SOCKET HEAD	271
1	-	122954-3	SPACER	270
1	-	122947	PULLEY, TENSIONER	269
1	-	122952	RETAINING, RING	268
1	-	122949	LABEL, INSTRUCTIONS	267
5	-	Z6000.8	LOCKWIRE (#.032)	266
1	-	122948	BEARING, BALL DEEP GROOVE	265
1	-	122725	ENCODER, DIGITAL	264
1	-	120118	PULLEY, TIMING	263
1	-	122946	PULLEY, TIMING	262
1	-	120117-3	BELT, TIMING	261
1	-	122944	SHAFT, ADAPTER	260
1	-	122955	SPRING, TORSION	259
1	-	122953	SUPPORT ARM, TENSIONER	258
2	-	122956	SPACER	257
1	-	122943-500	PLATE, MOUNTING-ENCODER	256
				255
2	-	114017	MOUNTING PLATE, BLOWER MOTOR	254
8	-	50069-22-F08	SCREW, CAP-HEX HEAD (METRIC)	253
			REMOVED	252
2	-	88617-P16M20	BUSHING, REDUCING, ELECTRICAL	251
				250
				249
2	-	109561-4	BUSHING, SPLIT TAPER 28 mm	248
2	-	113965-1	BLOWER MOTOR, U.L. 575VAC/60HZ	247
-EX	-UL			

LIST OF MATERIAL

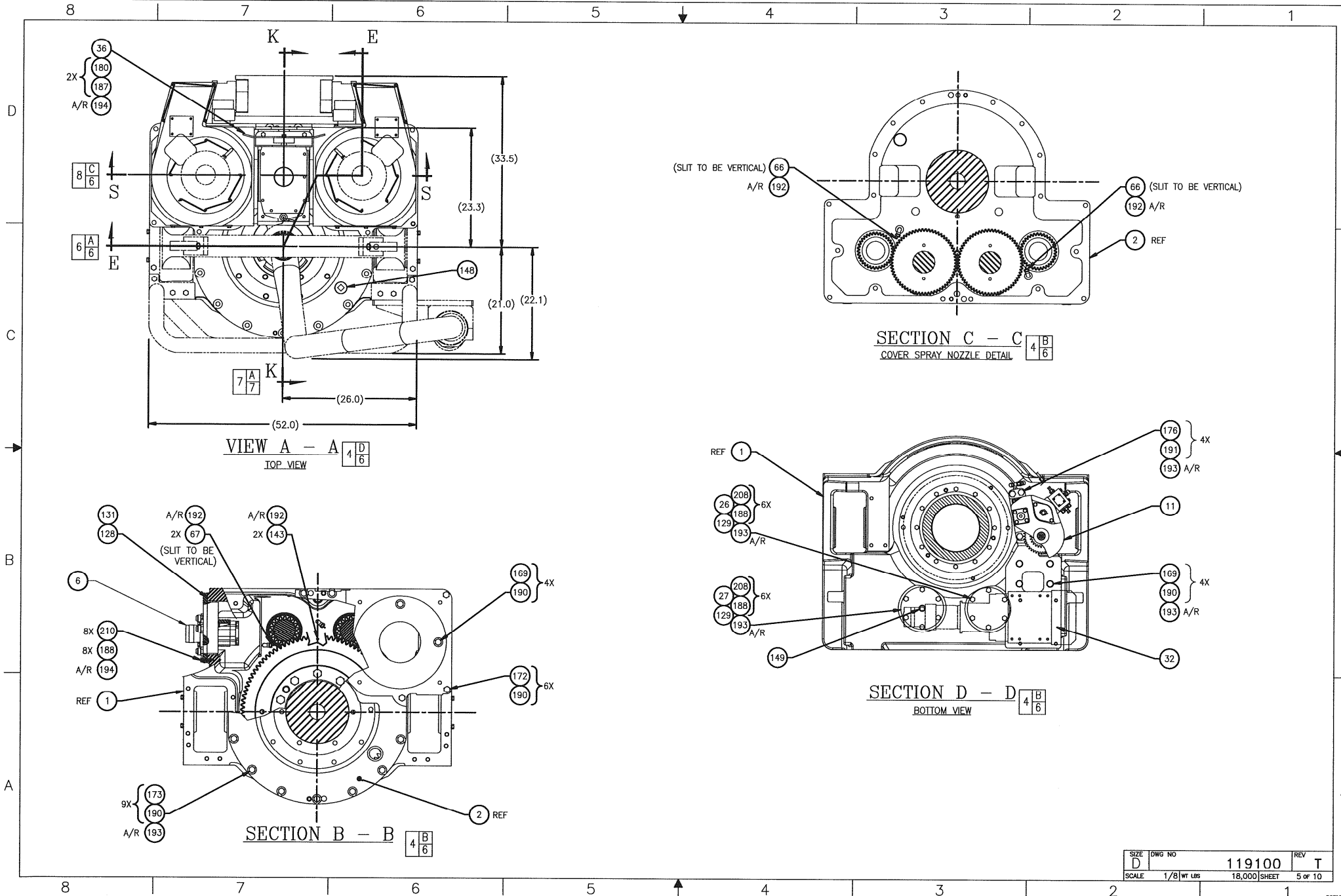
QTY REQD	UL	PART NO.	DESCRIPTION	ITEM NO.
				246
				245
				244
-	1	120462	LABEL, INSTRUCTIONS	243
-	2	83444-04	GLAND	242
-	4	50103-5-BD	SCREW, SOCKET HEAD CAP	241
-	2	50004-5-C5D	SCREW, HEX HEAD CAP	240
-	4	50004-4-C5D	SCREW, HEX HEAD CAP	239
-	2	50104-8-S	SCREW, SOCKET HEAD CAP	238
				237
				236
-	5	50804-N-S	WASHER, FLAT NARROW	235
-	1	120117	BELT, TIMING	234
-	4	50903-C	WASHER, LOCK REGULAR	233
-	1	120115	SPRING	232
-	1	120119-2	PULLEY, TIMING	231
-	1	120119-1	PULLEY, TIMING	230
-	1	120112	MOUNT, SLED	229
-	1	120113	MOUNT, ENCODER	228
-	1	120116	SHAFT ADAPTER	227
-	1	120114	MOUNTING BRACKET, ENCODER	226
-	2	30126111	MOUNTING PLATE, BLOWER MOTOR	225
6	6	56600-16-12	REDUCER, 1" NPT X 3/4" NPT	224
-	1	115299	ENCODER, DIGITAL, TDS-9S	223
90FT	90FT	110076	CABLE, 4/0-ARMORED & JACKETED	222
50FT	50FT	56625-1.5-07	CABLE, SHIPBOARD-MULTICORE	221
6	6	83444-06	GLAND, EExe ARMORED CABLE	220
-	2	30172028-1	BLOWER MOTOR, U.L. 575VAC/60HZ	219
-EX	-UL			

LIST OF MATERIAL

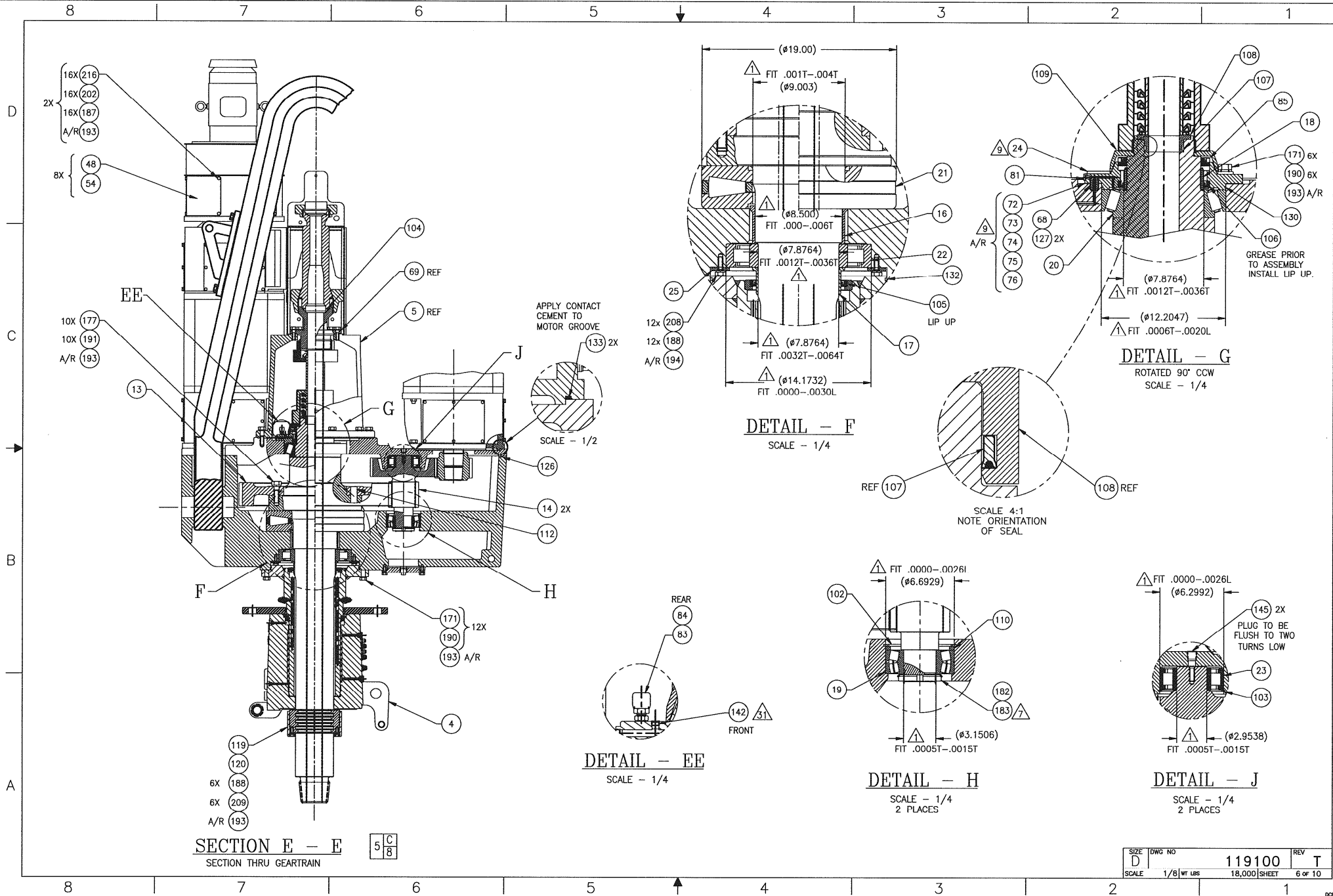
SIZE	D	DWG NO	119100	REV	T
SCALE	1/1	WT LBS	18,000	SHEET	3 of 10



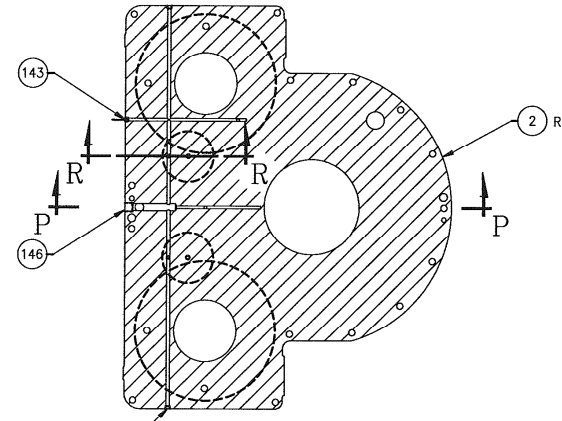
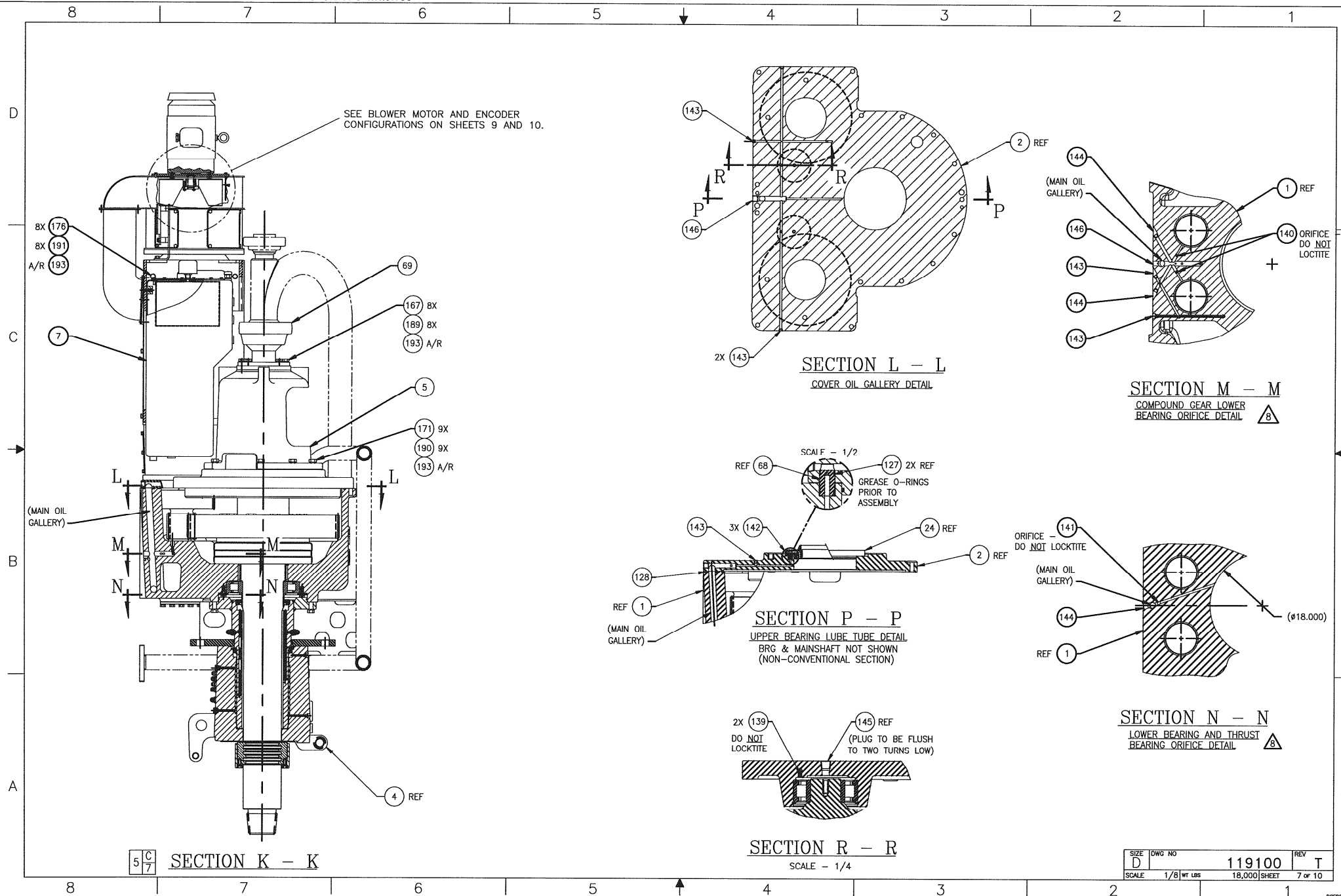
SIZE	DWG NO	REV
D	119100	T
SCALE	1/10 WT LBS	18,000 SHEET
		4 OF 10



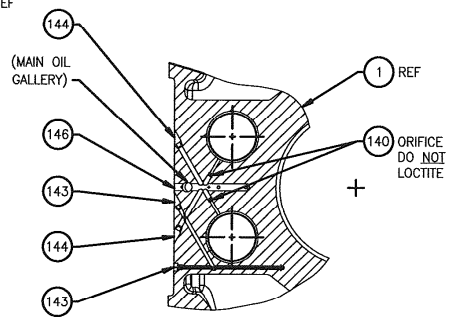
SIZE	DWG NO	REV
D	119100	T
SCALE	1/8" WT LBS	18,000 SHEET 5 OF 10



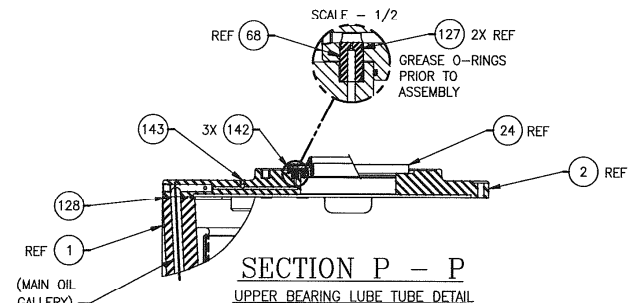
SIZE D	DWG NO 119100	REV T
SCALE 1/8" WT LBS	18,000 SHEET	6 OF 10



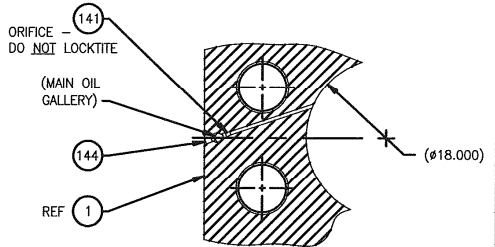
SECTION L - L
COVER OIL GALLERY DETAIL



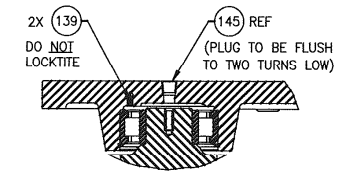
SECTION M - M
COMPOUND GEAR LOWER BEARING ORIFICE DETAIL



SECTION P - P
UPPER BEARING LUBE TUBE DETAIL
BRG & MAINSHAFT NOT SHOWN
(NON-CONVENTIONAL SECTION)



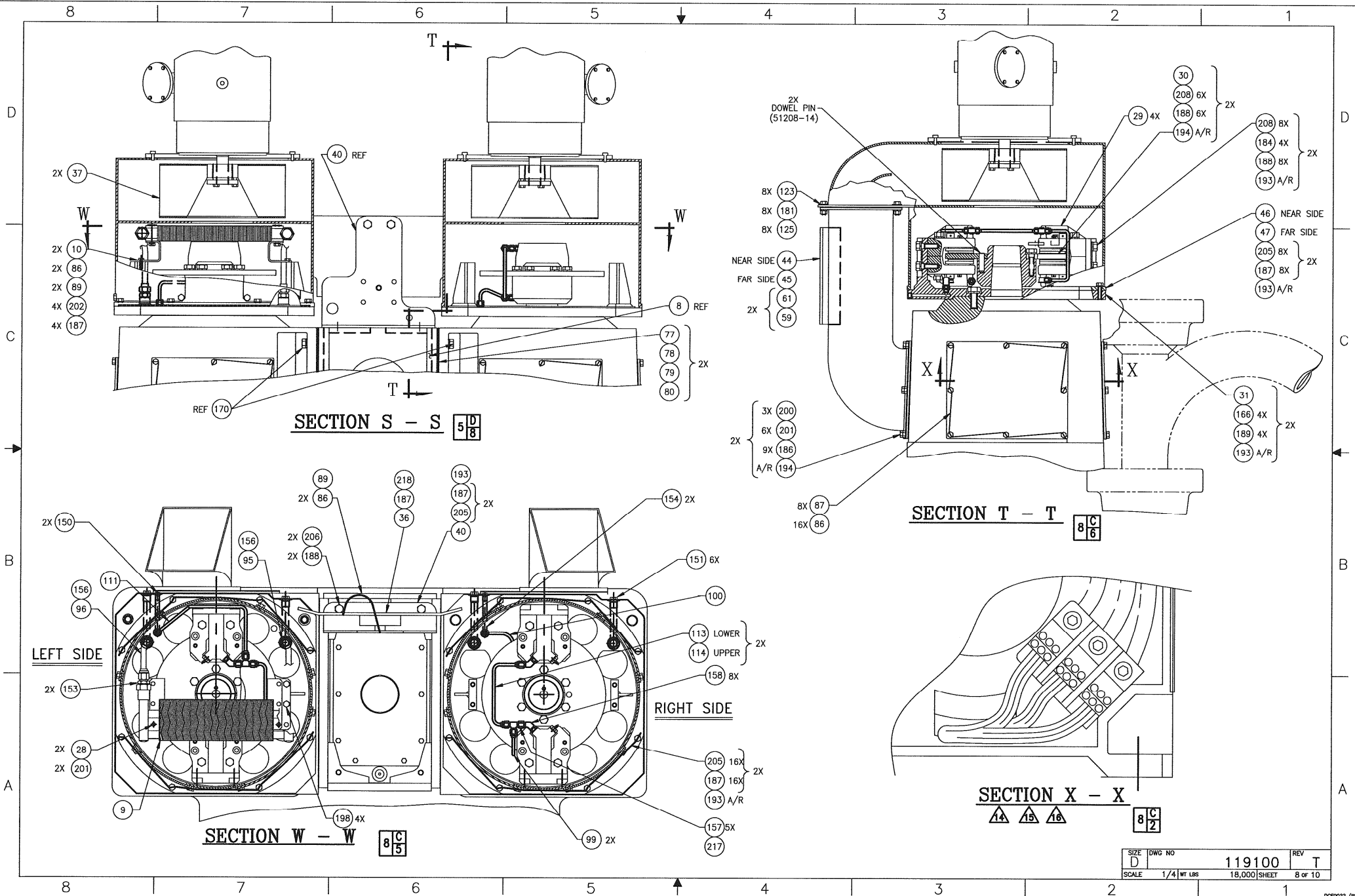
SECTION N - N
LOWER BEARING AND THRUST BEARING ORIFICE DETAIL



SECTION R - R
SCALE - 1/4

SECTION K - K

SIZE	DWG NO	REV
D	119100	T
SCALE	1/8 WT LBS	18,000 SHEET 7 of 10



SIZE	DWG NO	REV
D	119100	T
SCALE	1/4" WT LBS	18,000 SHEET
		8 OF 10