NATIONAL OILWELL VARCO

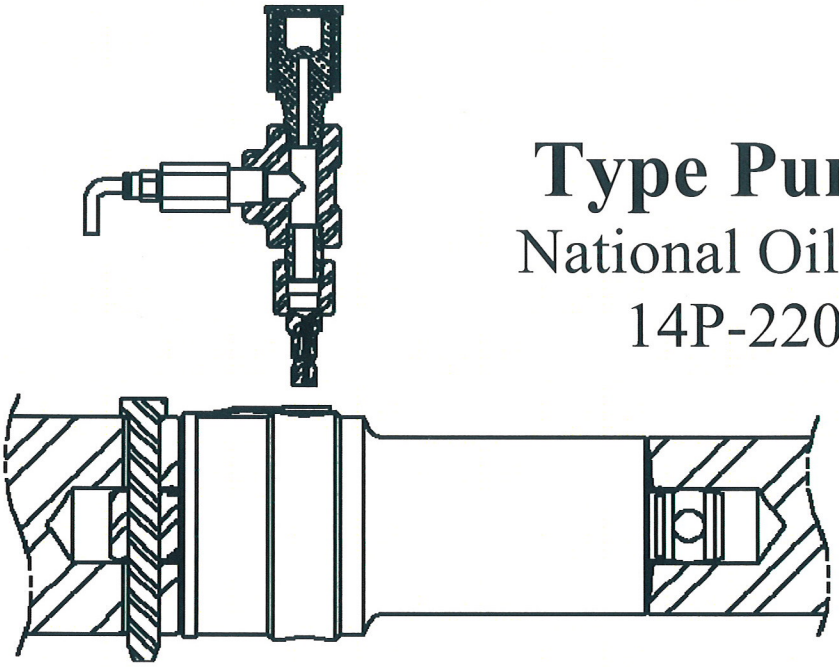


PATENT-PENDING

Blak-JAK™

HydrA-LIGN ROD™

Hydraulic Self Aligning Piston Rod Retention System



Type Pump

National Oilwell

14P-220

NATIONAL OILWELL VARCO
P.O Box 4638
Houston, Texas 77210-4638

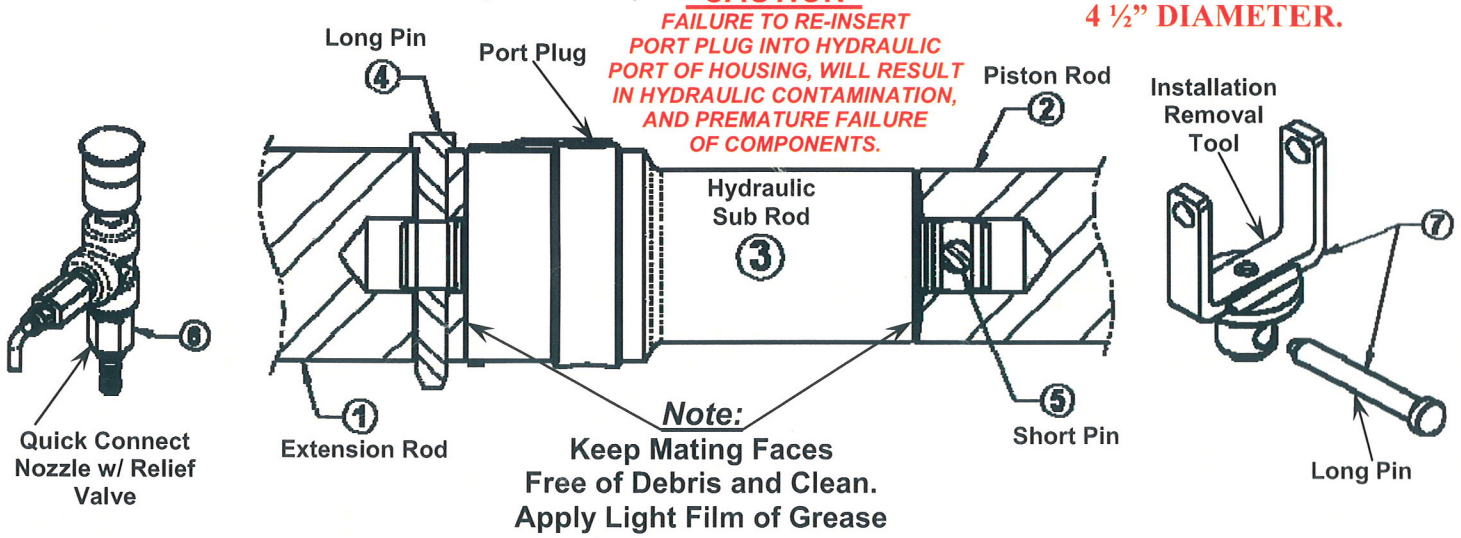
MANUAL: 80-600-209

NATIONAL OILWELL VARCO

HydrA-LIGN ROD: NATIONAL (14P-220)

"WARNING"
DO NOT USE THIS PRODUCT ON LINERS SMALLER THAN 4 ½" DIAMETER.

"CAUTION"
FAILURE TO RE-INSERT PORT PLUG INTO HYDRAULIC PORT OF HOUSING, WILL RESULT IN HYDRAULIC CONTAMINATION, AND PREMATURE FAILURE OF COMPONENTS.



NOTE:
DO NOT EXCEED 3,000 PSI WITH HYDRAULIC PUMP
RELIEF VALVE IS FACTORY SET TO RELIEVE PRESSURE IN EXCESS OF 3,000 PSI.

"CAUTION"
READ OPERATING MANUAL FOR HYDRAULIC PUMP PRIOR TO CONNECTING.

Installation Instructions

1. Replace OEM Extension Rod With Extension Rod (Item 1).
2. Install Piston (Not Supplied) Onto Piston Rod (Item 2). Tighten Hex Nut Securely, Utilizing The Flats On Piston Rod. Maximum Torque When Lubricated: 750 Ft. Lb's.
3. Insert Installation Tool (Item 7) Into Front End Of Ext-Rod (Item 1). Use Long Pin Supplied.
4. Insert Assembled Piston Rod W/ Piston In Between Installation Tools (Item 7) Yoke. Insert Long Pin Supplied Through Yoke And Piston Rod.
5. Align Piston With Liner Bore, Rotate Pump (BY HAND ONLY) Until Piston Is In Liner Bore, Rotate Pump To The Full Forward Position. Pin Through Piston Rod Can Now Be Removed.
6. Rotate Pump In The Reverse Direction (BY HAND ONLY) To The Full Back Position. Remove Installation Tool (Item 7).
7. Insert Hydraulic Sub-ROD (Item 3) Into The Piston Rod (Item 2).
8. Insert Short Pin (Item 5) Through Both Piston Rod And Sub Rod.
9. Rotate Pump (BY HAND ONLY) Until Rods Are Mated.
   Note: Make Note Of Hole Position And Align Before Inserting.

Operating Instructions

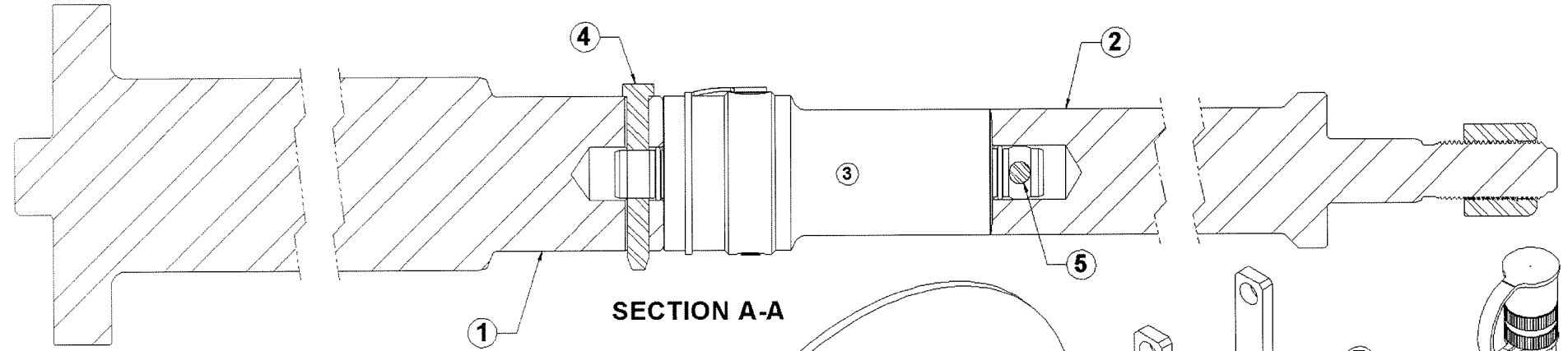
1. After Installation Is Complete, Attach Hand Pump To Quick Connect Nozzle (Item 6).
2. Remove Port Plug From Hydraulic Sub-ROD (Item 3). Insert Quick Connect Nozzle (Item 6) Into Female Port In Hydraulic Sub-ROD (Item 3).
3. Pressurize Hydraulic Sub-Rod (Item 3) To #3,000 P.S.I. Maximum.
4. Insert Long Pin (Item 4) Through Both Ext- Rod And Sub Rod. Tapping On Top Of Pin (Item 4) Is Permissible. As Log As 3,000 PSI Is Maintained.
5. After Pin (Item 4) Is Seated, Release Pressure From Hand Pump.
6. With Hydraulic Pressure Released, Remove Quick Connect Nozzle (Item 6). And Replace Port Plug.
7. To Remove HydrA-LIGN ROD, Pressurize As Per Line 3, Remove Pins (Item 4 & 5).
8. Release Pressure From Hand Pump. Remove Hydraulic Sub-Rod (Item 3)
9. Remove Piston Rod (Item 2) Using Installation / Removal Tool (Item 7).

Note: (BY HAND ONLY) Rotate Mud Pump as necessary to remove Components.

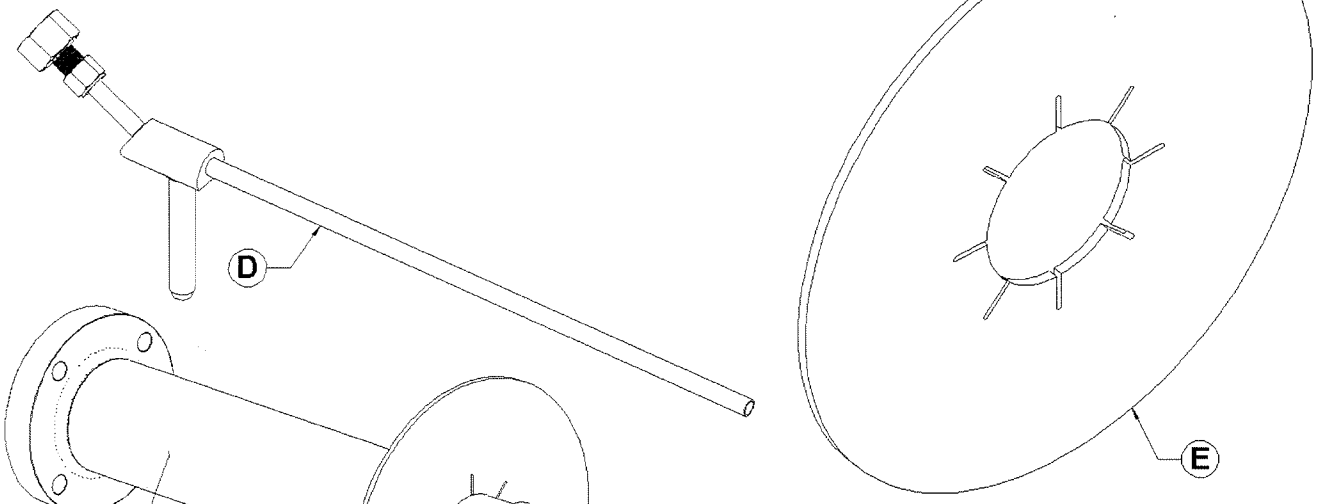
QTY.	PART NO.	DESCRIPTION / MATERIAL / SPECIFICATION	ITEM NO.
		LIST OF MATERIAL	
1	80-600-109	***HydrA-LIGN ROD***, ASSEMBLY 14P-220 MUD PUMP (INCLUDES ITEMS 1 - 7)	9
1	80-600-109S	***HydrA-LIGN ROD***, ASSEMBLY 14P-220 MUD PUMP (INCLUDES ITEMS 1 - 5)	8
1	80-600-055	INSTALLATION / REMOVAL TOOL W/ PIN	7
1	80-600-049	QUICK CONNECT NOZZLE W/ RELIEF VALVE ASSEMBLY	6
1	80-600-048	PIN, RETAINER (PISTON ROD END) SHORT	5
1	80-600-047	PIN, RETAINER (EXT. ROD END) LONG	4
1	80-600-103	SUB ROD, HYDRAULIC ASSEMBLY	3
1	80-600-075	PISTON ROD (***HydrA-LIGN ROD***) w / Rod Nut (P/N: 005402052)	2
1	80-600-076	EXTENSION ROD (***HydrA-LIGN ROD***)	1

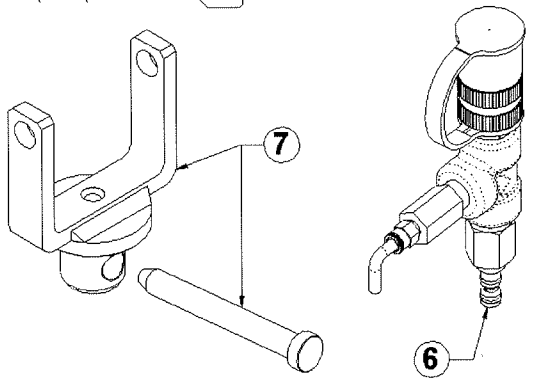
PATENT-PENDING

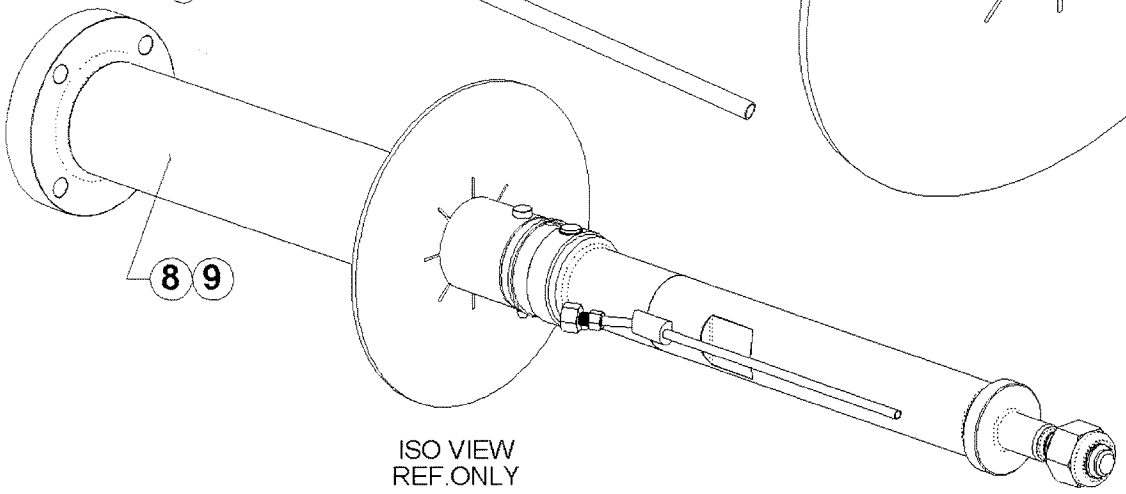
LTR	DESCRIPTION OF CHANGE	SHOP	CHK'D	DATE	APPD



SECTION A-A







ISO VIEW
REF.ONLY

QTY	PART NO	DESCRIPTION / MATERIAL / SPECIFICATION	ITEM NO
		LIST OF MATERIAL	
1	80-600-109	Blak-JAK HydrAlign-ROD, 14P-220 MUD PUMPS (INCLUDES ITEMS 1 - 7)	9
1	80-600-109S	Blak-JAK HydrAlign-ROD, 14P-220 MUD PUMPS (INCLUDES ITEMS 1 - 5)	8
1	80-600-055	INSTALLATION / REMOVAL TOOL W/ PIN	7
1	80-600-049	QUICK CONNECT NOZZLE W/ RELIEF VALVE ASSEMBLY	6
1	80-600-048	PIN, RETAINER (PISTON ROD END) SHORT	5
1	80-600-047	PIN, RETAINER (EXT. ROD END) LONG	4
1	80-600-103	SUB ROD, HYDRAULIC ASSEMBLY	3
1	80-600-075	PISTON ROD (HydrAlign-ROD) W/ ROD NUT (P/N 005402052)	2
1	80-600-076	EXTENSION ROD (HydrAlign-ROD)	1

QTY	PART NO	DESCRIPTION / MATERIAL / SPECIFICATION	ITEM NO
		OPTIONAL EQUIPMENT: B/M (NOT SHOWN)	
1	80-600-061	SPLASH GUARD (SHOWN)	E
1	80-600-060	FLUSHING TUBE ASSEMBLY (SHOWN)	D
1	80-500-040	GAGE, PRESSURE #10,000 (GP-10S)	C
1	45-804-097	HOSE, 1/4" I.D X 15' LG. W/ 3/8" NPT (M) ENDS	B
1	80-500-039	HAND PUMP, HYDRAULIC #10,000 (P-392)	A
1	80-500-112	ASSEMBLY INCLUDES ITEMS A, B, & C	

PROPRIETARY INFORMATION

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APPLICABLE SPECS

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN INCHES — DIMENSIONAL TOL.
BREAK SHARP CORNERS 1/32" — FRACTIONS ± 1/64"
FILLET RADII 1/32" — XXX ± .005
CONCENTRICITY .010 — XX ± .010
SQUARENESS .010 — X ± .030
PARALLELISM .010 FOR EXCEPT WHEN (M) MODIFIED — ANGLE ± 30 DEGREES
SURFACE FINISH 125
SIMILAR TO — SUPERSEDES
NEXT ASSY — SUPERSEDED BY

MATERIAL SPEC

DESIGNED BY — DATE
DRAWN BY — DATE 02/27/06
CHECKED BY — DATE
P.E. APPROVAL — DATE
Q.A. REVIEW — DATE

SEE LIST

RFW

NATIONAL OILWELL VARCO

TITLE: Blak-JAK, HydrAlign-ROD 14P-220

SIZE C — REFERENCE No. — DRAWING No. 80-600-109 — REV

SCALE — WT. #228. — SHEET

LAYOUT No.

80-600-109

A
B
C
D

NATIONAL OILWELL VARCO

PRODUCT INFORMATION BULLETIN

NUMBER: 07-05-21-MP

McAlester Engineering

PRODUCT: Mud Pump HydrA-LIGN ROD

SUBJECT: Assembly's: 80-600-1XX

It has come to our attention that the pins for the HydrA-LIGN ROD are being installed incorrectly. They must be installed correctly to benefit from its unique design.

The picture below illustrates the properly installed orientation of the pins.

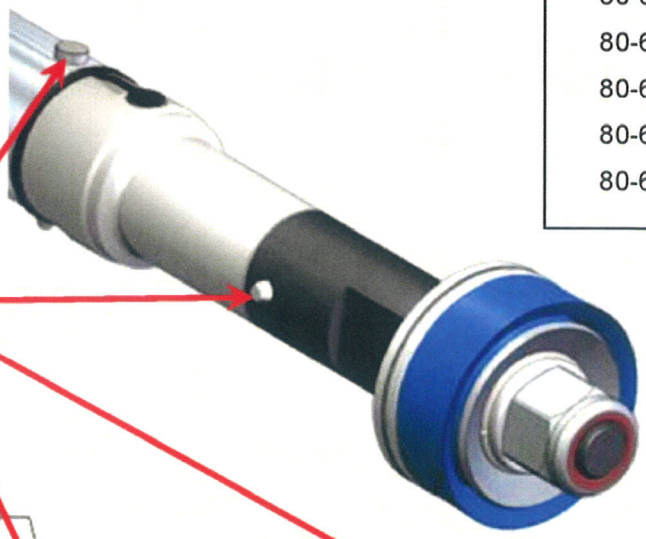
It is easy to use our installation / removal tool to install the piston rod into the liner and in so giving the correct orientation between the Extension and piston rod retaining pins.

"CAUTION"

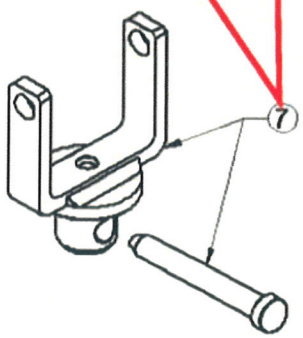
Failure to Orient the Pins 90° From One Another will Result in premature failure of components.

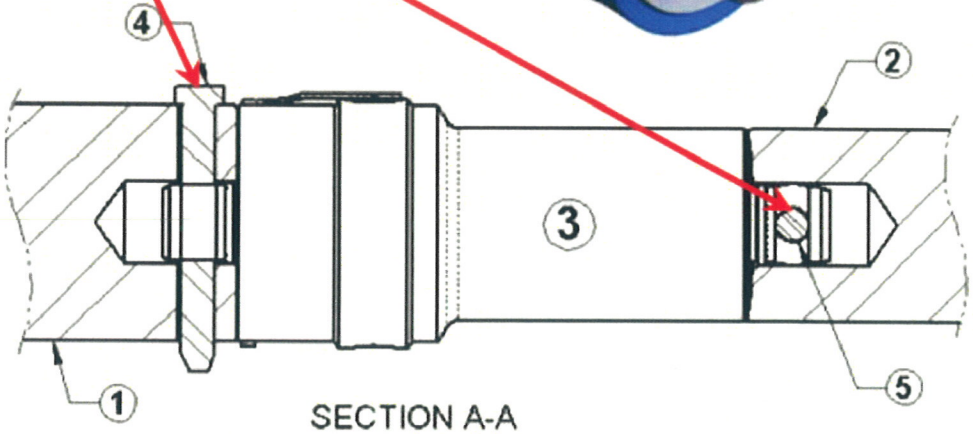
AFFECTED ASSEMBLIES:
80-600-100
80-600-101
80-600-105
80-600-109
80-600-111

PINS MUST BE ORIENTED 90° FROM ONE ANOTHER TO ALLOW FLEXIBILITY IN ALL AXIS.



USE OF INSTALLATION / REMOVAL TOOL WILL ENSURE CORRECT ORIENTATION.





SECTION A-A

RFW

501 N. GEORGE NIGH EXPRESSWAY McALESTER, OK 74501 (918) 423-8000