



PARTS HEADQUARTERS INC.

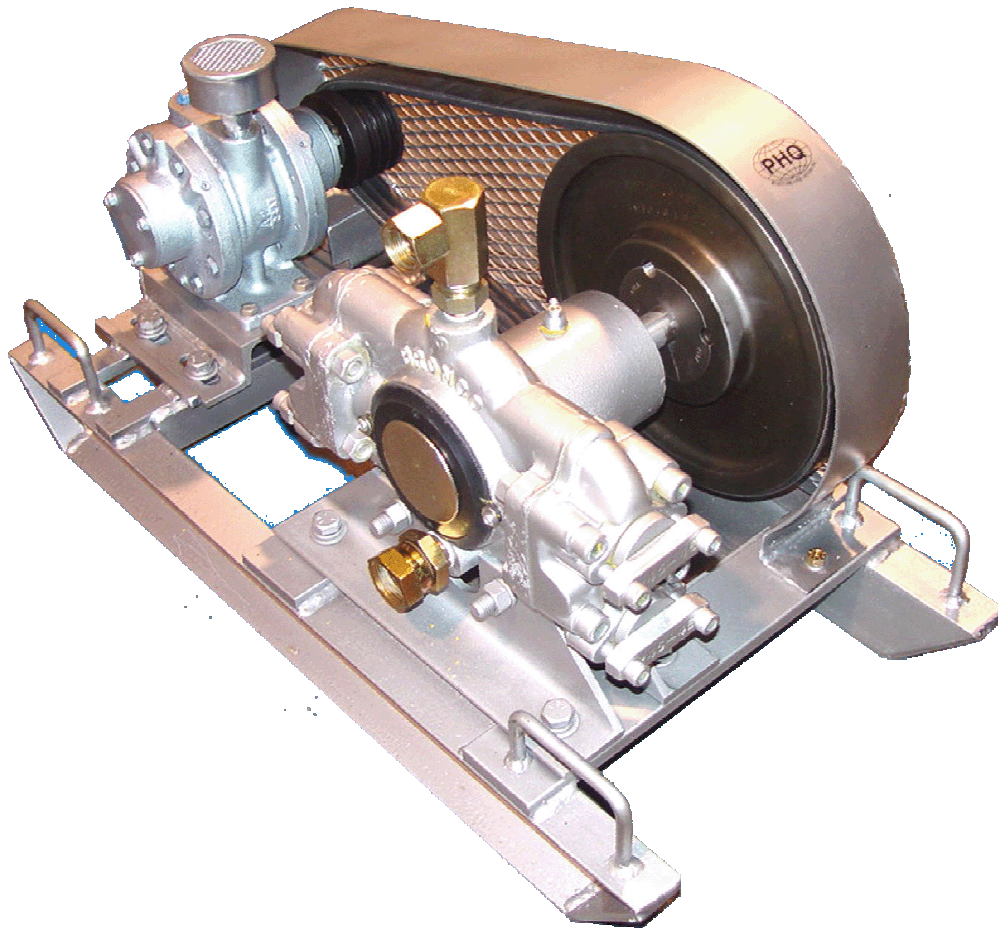
1175 APPLEBY LINE, UNIT C2, BURLINGTON, ONTARIO L7L 5H9
TEL: 905-332-3271 FAX: 905-332-9497 TOLL FREE: 1-800-267-2082
INTERNET: www.partshq.com

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BRONCO PNEUMATIC WATER PRESSURE PUMP

PARTS, SERVICE & OPERATING

MANUAL



Part Number 4070500A

11/4/2005



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GENERAL INFORMATION

HOW TO ORDER

A formal purchase order on company letterhead mailed or faxed is satisfactory. Email orders are satisfactory if full company details are provided. Telephone orders should be confirmed in writing through mail, fax or Email.

The purchase order should contain: the full company name, address, phone and fax numbers (for quick reference or clarification) as well as details to contact the authorizing purchasing personnel.

Please list on the purchase order: quantity, part number, item description, price, shipping address and preferred routing for shipments

When ordering complete machines or major assemblies please furnish complete descriptions of the power unit required, sprocket ratios preferred, swivelhead type, chuck jaws sizes, and other relative information of standard optional equipment preferred.

When ordering pumps please furnish complete description of the power unit required, the sprocket size preferred, the bore size, if a transmission, chain or belt drive is preferred and if gear reduction is required.

WHERE TO SEND THE ORDER

Mail or fax orders to:



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TERMS AND CONDITIONS

TERMS

NORTH AMERICA: Net 30 days on approved credit
Overdue payment of invoices incur monthly interest charges of 1.5%)

EXPORT SALES : Confirmed irrevocable letter of credit drawn on Canadian Bank
Net 30 days credit terms available through Canadian EDC guarantees
If purchasing company has an acceptable EDC credit rating
Visa or MasterCard acceptable for payment with references
Payment in advance of shipment by wire transfer to Canadian Bank

DELIVERY

Most items are available from stock and you will receive a confirmed order acknowledgement specifying shipment date. Shipments will be routed by the most direct and economical means of transportation unless otherwise specified and your order should indicate if partial orders are acceptable.

RETURN OF GOODS

Goods may be returned with the advance express written permission of Parts HeadQuarters Inc. Goods returned are subject to 25% restocking charges. Special equipment is not returnable. Only new drilling material is returnable. No credit will be issued for used drill material or tools. Parts HeadQuarters Inc. retains the right to inspect and reject any material returned for credit and to deny credit for any goods judged not to be suitable for resale.

GENERAL INFORMATION

Prices and specifications listed are subject to change at any time without notice. Quotations for products are dated and valid for no more than 60 days from the date shown. All prices are F.O.B. Parts HeadQuarters Inc warehouse, Burlington, Ontario, Canada, L7L 5H9. Federal and Provincial taxes where applicable are extra and charged on PHQ invoices. The cost of exporting documents and insurance may be added and shown on PHQ invoices. Prepaid freight and handling charges may be added and shown on PHQ invoices.



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STANDARD TERMS OF SALE

CONDITIONS OF SALE

All sales by JKS/Parts HeadQuarters of products offered and sold by them shall be subject to the following conditions which shall be deemed incorporated into all orders and offers to purchase submitted to JKS/Parts HeadQuarters, for acceptance and into all their acceptances and contracts of sale.

1. Disclaimer of Liability for Consequential Damage

JKS/Parts HeadQuarters shall not be liable in any event for any loss of income, goodwill, increased costs or any special, indirect, incidental or consequential damages arising out of or in connection with this sale.

2. Warranties

There are no warranties Express or implied made by JKS/Parts HeadQuarters except for their following standard warranty; JKS/Parts HeadQuarters warrants new and unused core drilling machines and accessory equipment of our own manufacture against defects in material and workmanship caused by normal use and service, for a period of 90 days from date of original use, but not to exceed 6 months from the date of shipment from our premises. The obligation under this warranty is limited to the replacement or repair of such parts deemed by us to have been defective at the time of sale. Any alterations or changes to the product design by the customer invalidates any warranty claims. We reserve the right to inspect any defective part claims. Before such parts are returned to our premises, our written approval must be obtained and the parts then returned at the customer's expense. Product not manufactured by us are subject to the original manufacturer's warranty only.

4. Prices

Prices apply to quantities and specifications requested by the buyer or as outlined in price lists published by JKS/Parts HeadQuarters. JKS/Parts HeadQuarters reserves the right to change their prices without notice. Prices on written quotations will remain firm within the validity period specified in each quotation.

5. Delivery

JKS/Parts HeadQuarters are not liable for any delay in manufacturing or delivering any of the products, if such delay shall be due to one or more of the following causes:
fire; destruction of premises; strike; lockout; acts of God; accident; delay in transportation war (whether declared or undeclared); riot; insurrection;

blockade; embargo; acts; demands; or requirements of Canada or the country in which or through which delivery is to be made; or of any province, state or territory thereof or of any governmental subdivision thereof; decrees or restraining orders of any court or judge; or any other cause whether similar or dissimilar to those herein before enumerated, beyond the reasonable control of JKS/Parts HeadQuarters.

6. Terms of Payment

Standard terms are net 30 days from date of invoice unless otherwise stated. Products are sold F.O.B. JKS/Parts HeadQuarters premises unless otherwise stated. JKS/Parts HeadQuarters reserve the right to apply finance charges to overdue accounts at 2 % above the prime rate charged by the chartered banks in Canada.

7. Title and Risk of Loss

Full risk of loss (including transportation delays and losses) shall pass to the buyer upon delivery of products there under to the F.O.B. point. However, JKS/Parts HeadQuarters, retain title, for security purposes only to all products until payment in full is received.

8. Taxes

Any sales, use, or similar taxes imposed on this sale or on the transaction are not included in the price. Such taxes shall be shown separately on applicable invoices and paid for by the buyer. If applicable, JKS/Parts HeadQuarters, Inc., will accept a valid exemption certificate from the buyer, however, if an exemption certificate previously accepted is not recognized by the government taxing authority, and JKS/Parts HeadQuarters, is required to pay the taxes covered by such exemption certificate, buyer agrees to promptly reimburse JKS/Parts HeadQuarters for the taxes paid on the buyer's behalf.

9. Claims by Buyer

Claims for any shortages or product quality made by the buyer against JKS Parts HeadQuarters, shall be made in writing to JKS Boyles International Inc., within ten (10) days after receipt of the shipment. Claims covered under warranty will be reported as outlined in paragraph 2.

10. Return of Saleable Product

No product may be returned to JKS/Parts HeadQuarters, without their prior authorization. Product authorized for return must be shipped "PREPAID" and will be subject to a restocking charge.

Setting charges on unused products are non-refundable.

11. Cancellation of Orders

After an order has been accepted, no cancellation by the buyer shall be binding on JKS/Parts HeadQuarters without their prior written consent and subject to such conditions as will indemnify JKS/Parts HeadQuarters, Inc., against loss for commitments made and in process and completed custom work.



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Water Pumps

(Reference: Plate 1586e)

General Instructions

DRIVE

JKS Bronco pumps operate well in either direction of rotation. The main bearings are designed to withstand any loads that may be imposed on the shaft through a flexible coupling, V-belt or roller chain drive. Solid couplings are too rigid and are not acceptable.

LUBRICATION

New pumps are lubricated prior to testing and shipping. Re-lubricate according to instructions on the pump body.

COLD WEATHER

Freezing can damage your pump. Pour anti-freeze into pump inlet and turn pump a few revolutions to circulate it. Always turn pump by hand before operating in cold weather to check for ice behind pistons before operation.

CAUTION – *If the pump is frozen do not attempt to thaw it out by pouring boiling hot water over the pump body. Sudden temperature fluctuations could cause further damage and could crack the ceramic cylinder liners.*

STORAGE

Before placing the Bronco pump into extended storage, always flush pump out with lubricant and seal openings.

MATERIAL HANDLED

JKS Bronco pumps are not recommended for the pumping of fluids at temperatures in excess of 150° Fahrenheit. Aluminium pump models are not recommended for use with caustic fluids, due to possible chemical reactions. When pumping caustic solutions cast iron pumps are recommended. Generally, when in doubt, you should check with PHQ and your chemical manufacturer to ascertain compatibility of chemical fluids and pump materials.

Solid particles larger than 1/16 inch can hamper valve action. Particles larger than 1/4 inch can lodge in pump passageways. A suction strainer is provided with the pump to prevent coarse particles from entering the pump.

Sudden temperature fluctuations of greater than 100-Fahrenheit degrees in any fluid being pumped will crack the ceramic cylinder liners in the Bronco pump.

LEAKAGE

Heavy-duty piston cups may leak during the first few hours of operation until properly seated. If available, use Teflon lubricant when installing new cups. Otherwise keep cylinders and piston components clean and free of grease or other deposits. (Remove excess grease from the front bearing cavity). Pump cups running on hot water will leak if subjected to cold water, but will dry up again when returned to hot operation.



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INSTALLATION OF PUMP

Cavitations due to undersized or long suction lines are a leading cause of premature pump failure. If the new pump is noisy or performs below stated volume, the pump may be cavitating. PHQ staff will be pleased to assist you through any problems encountered during pump installation and start up.

For best pump performance:

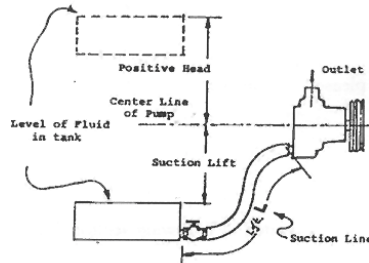
1. Install a relief valve in the discharge piping.
2. Use the shortest possible suction lines and make sure a strainer prevents particle entry.
3. Use adequate bore size in the suction hose and fittings, as calculated in following section "Sizing Suction Lines". Pipe or hose that is larger than the pump inlet may be required.
4. Provide a positive head on suction where possible.
5. Use the lowest pump speed that will give the required output volume for your requirements.
6. Avoid the use of chemicals that will deposit in suction lines.
7. Avoid high temperatures. If hot fluid is required, it should be heated after passing through the pump.
8. Avoid high-pressure settings if a lower pressure will do the job.
9. Scale deposits resulting from pumping heated hard water will cause premature wear of the piston cups and valve seats. In this instance water-softening agent is recommend.



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CONSIDER CONDITIONS SHOWN IN FIG 1 FOR SIZING OF SUCTION LINES



(Minimum number of fittings recommended) ADD THE FOLLOWING TO "L",
 LENGTH OF SUCTION HOSE:

For each 90 degree Elbow	2
For each 45 degree Elbow	1.5
For a Gate Valve	1

FIG 1

For domestic water supplies (typical arrangement FIG 2) make certain that the volume is ample for the pump
 About 10% reserve volume at the pump is recommended.

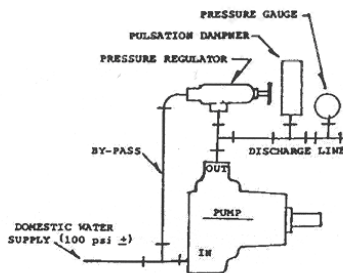


FIG 2

Trouble Shooting

A. Decreased Delivery Accompanied By Rough Operation.

Possible Causes:

1. Air entering suction piping
2. Air leaking past piston cups
3. Pump valve malfunction
4. Plugged or restricted pump suction passages
5. Plugged or constricted suction piping (suction valve not fully open)
6. Collapsed suction hose.

Checking Procedure:

1. Examine the valve seats for wear and pitting.
2. Arrange a barrel or tank and a hose from pump outlet or regulating relief valve by-pass outlet to collect the entire pump discharge. Measure the time to collect a predetermined volume or, with the barrel or tank on a weigh scale, weigh the results of three or four minutes of pumping. Comparing the measured flow in gallons per minute with the rated capacity for the pump speed
3. Examine the water in the barrel or tank for air bubbles while the pump is discharging. If no bubbles are seen and the discharge has definitely decreased, look for plug-ups, worn valve seats or collapsed suction hose. If bubbles are seen, look for air leaks in the suction piping or for air leaking past the piston cups. These leaks are hard to find because they are leaking 'in' rather than 'out', however, if arrangements are made to put pressure into the suction piping or if new cups smooth out the pump operation, the problem is solved.



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B. Decreased Delivery Accompanied By Smooth Operation.

Possible Causes:

1. Worn Valve Seats.
2. Slipping belts

Checking Procedure:

1. Look for worn or pitted valve seats.
2. Measure clearance between outer surface of eccentric roller bearing and yoke pads with a feeler gauge. This should not exceed .010"
3. Measure pump speeds with a tachometer.

Corrective Action

1. Renew Worn Valve Seats
2. Replace badly worn belts.

NOTE. Worn yoke pads will give very noisy operation. Worn yokes or pads should be replaced.

C. Excessive Leakage.

1. Worn piston cups.
2. Loose piston bolts.
3. Damaged 'O' Rings.
4. Cracked ceramic liners
5. Faulty Gaskets.
6. Loose Valve caps.
7. Loose cylinder head bolts.

Checking Procedure and Corrective Action

Examine pistons and cups for wear. Generally a cup will not leak severely until it is torn. The piston should not be more than .020" out of round.

2,6 & 7. Tighten loose piston bolts, cylinder head bolts and valve caps.

3&5. Check 'O' Rings and gaskets for breaks.

Remove cylinder blocks or cylinder heads and examine ceramic liners for cracks.

REPLACE ALL WORN AND DAMAGED PARTS

D. Mechanical Trouble.

NOTE. Excessive grease leakage results from beat or dented Nylons seals. Damaged seals should be replaced.

1. Excessive crankshaft endplay.
2. Slack eccentric bearings.

Checking Procedure

1. Measure crankshaft endplay with a dial indicator, micrometer or feeler gauge. It should be set between .003 inches and .005 inches.
2. With end play corrected, turn crankshaft by hand and "feel" for tough main bearings. Check eccentric beating wear by measuring side play with a dial indicator, micrometer or feeler gauges. It should not exceed .005 inches (Replace worn bearings)



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Suction Pipe Sizing

Use the following formulas to solve for the maximum allowable mean velocity in the suction line, then from the velocity table choose a pipe size in which the mean velocity will not exceed the calculated value.

Assuming that the fluid is water, solve for maximum allowable mean velocity, **V**, in the suction line as follows:

1. BRONCO, MUSTANG

$$v = \frac{225}{L_n} (P_{At} - P_v - P_s - P_L)$$

2. PINTO, BRAHMA

$$v = \frac{392}{L_n} (P_{At} - P_v - P_s - P_f - P_L^*)$$

* If there is a positive head, then its value should be added rather than subtracted.

where P_{At} = Atmospheric Pressure at Location (Table 2)

P_v = Vapor Pressure at Operating Temperature (Table 1)

P_s = Head to Lift Suction Valve
 (6 ft. for Brahma, Mustang & Bronco)
 (7 ft. for PINTO)

P_f = Loss due to Internal Friction within the Pump
 (for Brahma only) (Chart 1)

P_L = Suction Lift

L_n = Length of suction line in feet

n = Pump speed rev./minute

Select a pipe size from Table 3 to give a velocity less than or equal to the above calculated "v". Suction lines larger than the pump inlet may be required.

TABLE 1		TABLE 2	
WATER VAPOUR PRESSURE	ABSOLUTE	ATMOSPHERIC PRESSURE	ABSOLUTE
TEMP.	PRESSURE FT.	ALTITUDE	PRESSURE FT.
°F	WATER	(FT.)	WATER
30	0	Sea Level	33
50	0	1000	31.8
70	1	1500	31.1
90	2	2000	30.5
110	3	4000	28.2
130	5.5	6000	26.2
150	8	8000	24.2
170	13.5	10000	22.4
190	23		
210	34		

* 1 ft. Deducted from normal values to allow for deviations



TABLE 3
Mean Velocity Table
(Feet / Second)

U.S. Gal/Min	Inside Diameter of Suction Pipe (inches)							
	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Flow Rate								
1	1.6	0.7	0.4	0.3	0.2	0.1	-	-
2	3.3	1.4	0.8	0.5	0.4	0.2	0.1	0.1
3	4.9	2.2	1.2	0.8	0.5	0.3	0.2	0.1
4	6.5	2.9	1.6	1.0	0.7	0.4	0.3	0.2
5	8.2	3.6	2.0	1.3	0.9	0.5	0.3	0.2
6	9.8	4.3	2.4	1.6	1.1	0.6	0.4	0.3
7	11.4	5.1	2.9	1.8	1.3	0.7	0.5	0.3
8	13.1	5.8	3.3	2.1	1.4	0.8	0.5	0.4
9	14.7	6.5	3.7	2.3	1.6	0.9	0.6	0.4
10	16.3	7.2	4.1	2.6	1.8	1.0	0.7	0.5
11	17.9	8.0	4.5	2.9	2.0	1.1	0.7	0.5
12	19.6	8.7	4.9	3.1	2.2	1.2	0.8	0.5
13	21.2	9.4	5.3	3.4	2.4	1.3	0.8	0.6
14	22.8	10.1	5.7	3.6	2.5	1.4	0.9	0.6
15	24.5	10.9	6.1	3.9	2.7	1.5	1.0	0.7
16		11.6	6.5	4.2	2.9	1.6	1.0	0.7
17		12.3	6.9	4.4	3.1	1.7	1.1	0.8
18		13.1	7.3	4.7	3.3	1.8	1.2	0.8
19		13.8	7.7	5.0	3.4	1.9	1.2	0.9
20		14.5	8.2	5.2	3.6	2.0	1.3	0.9
21		15.2	8.6	5.5	3.8	2.1	1.3	1.0
22		16.0	9.0	5.7	4.0	2.2	1.4	1.0
23		16.8	9.4	6.0	4.2	2.3	1.4	1.0
24		17.4	9.8	6.3	4.4	2.4	1.5	1.1
25		18.1	10.4	6.6	4.5	2.5	1.6	1.1
26		18.9	10.6	6.8	4.7	2.6	1.7	1.2
27		19.6	11.0	7.0	4.9	2.8	1.8	1.2
28		20.3	11.4	7.3	5.1	2.9	1.8	1.3
29		21.0	11.8	7.6	5.3	3.0	1.9	1.3
30		21.8	12.2	7.8	5.4	3.1	2.0	1.4



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Examples of Suction Pipe Sizing

Suction Line length should be as short as possible having the least number of fittings. If a shut-off valve is required in the line it should be the gate type.

EXAMPLE NO. 1

NEGATIVE HEAD VALUES

Pump to be a Brahma 24 - Calculated for 16 GPM $n = 308$

Suction Hose Length (7 ft. + 1 ft. for gate valve) $L = 8$

Atmospheric Pressure is (4000 ft., - Alt. Table 2) $PAT = 28.2$

Vapour Pressure (70° Table 1) $PV = 1$

Head to lift Suction Valve $PS = 6$

Internal Friction (Chart 1, at 310 RPM Page 7 for Brahma 24) $PI = 6.2$

Suction Lift 2 ft $PL = 2$

Solve Example No. 1 for mean velocity V using constant 392

$$V = PAT - PV - PS - PI - PL \times 392 =$$

$$\frac{L n}{(9 \times 308) 2464}$$

$$28.2 - 1 - 6 - 6.2 - 2 \times \frac{392}{(9 \times 308) 2464} = \frac{5096}{2464} = 2.07$$

Note that velocity 2.1 appears in column headed 2" PIPE in TABLE 3. The 2" pipe should be ample at a flow rate of 21 GPM.

EXAMPLE NO. 2

POSITIVE HEAD VALUES

Pump to be a Bronco 8 Calculated for 5 GPM Page 4 $n = 370$

Suction Hose Length 5 ft. plus 45° Elbow & gate valve, Fig. 1, Page 2) $L = 7.5$

Atmospheric Pressure (1000 ft. Alt. Table 2 Page 4) $PAT = 31.8$

Vapour Pressure (70° Table 1 Page 4) $PV = 1$

Head to Lift Suction Valve Page 4 $PS = 6$

Positive Head 1 ft. = PL^* which is additive $PL^* = 1$

Solve Example No. 2 for mean velocity V using constant 225

$$V = PAT - PV - PS + PL^* \times 225 =$$

$$\frac{L n}{7.5 \times 370 2775}$$

$$31.8 - 1 - 6 + 1 \times \frac{225}{7.5 \times 370 2775} = \frac{5805}{2775} = 2.09$$

Note in Table 3 that velocity nearest to 2.09 at flow rate of 5 gpm appears in column headed 1" pipe and should be acceptable.

Volumes, Pressure and Horsepower

CALCULATING VOLUME FOR OTHER SPEEDS OTHER THAN THOSE SHOWN IN THE PUMP BROCHURE TABLES.

(Volume = Actual pump speed X Rated Volume ÷ 500)

TABLE 4

(Recommended Max. Pressure in brackets)	RATED VOLUME AT 500 RPM & 300 PSI (U.S. Gallons/min)
PUMP MODELS	
BRONCO 2 (1,000)	3.5
BRONCO 8 (800)	6.8
BRAHMA 23 (800)	20.6
BRAHMA 24 (800)	26.4



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TABLE 5

PUMP MODEL	FACTOR 'F' AT VARIOUS PRESSURES P.S.I.							
	100-140	160-240	260-340	360-440	460-540	560-640	660-740	760-840
BRONCO 2		.30	.26	.24	.23	.21	.19	.17
BRONCO 8		.60	.52	.47	.42	.40	.35	.32

Factor 'F' embodies load on the pump and friction loss including the friction loss of the V belt drive. The above table can be used for any speed and pressure within range of the pump model.

Tables Of Volume And Horsepower For All Pump Models

Horsepower Requirements and Capacity* in U.S. gallons/minute (Multiply capacity by .833 for Imp. gallons/minute)															
Model	Speed rpm	200 psi		300 psi		400 psi		500 psi		600 psi		700 psi		800 psi	
		U.S. gpm	hp	U.S. gpm	hp	U.S. gpm	hp	U.S. gpm	hp	U.S. gpm	hp	U.S. gpm	hp	U.S. gpm	hp
Bronco 2 (1/2" stroke x 1-1/2" bore)	300	2.1	.5	2.1	.7	2.1	.9	2.1	1.0	2.1	1.1	2.1	1.2	2.1	1.3
	400	2.8	.7	2.8	.9	2.8	1.1	2.8	1.3	2.8	1.5	2.8	1.6	2.8	1.7
	500	3.5	.9	3.5	1.2	3.5	1.4	3.5	1.6	3.5	1.8	3.5	2.0	3.5	2.1
	600	4.2	1.1	4.2	1.4	4.2	1.7	4.2	2.0	4.2	2.2	4.2	2.4	4.2	2.6
Bronco 8 (7/8" stroke x 1-1/2 bore)	300	4.2	1.1	4.1	1.4	4.1	1.7	4.1	1.9	4.1	2.2	3.9	2.2	3.8	2.3
	400	5.7	1.4	5.5	1.8	5.4	2.2	5.4	2.5	5.4	2.8	5.3	3.0	5.1	3.1
	500	7.1	1.7	6.9	2.3	6.8	2.8	6.8	3.2	6.8	3.6	6.6	3.8	6.3	3.9
	600	8.5	2.1	8.3	2.8	8.2	3.4	8.2	3.9	8.2	4.3	7.9	4.5	7.6	4.6



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SEE PUMP ASSEMBLY SHEETS FOR BRAHMA, MUSTANG AND BRONCO PARTS RESPECTIVELY.

Yokes & Pistons

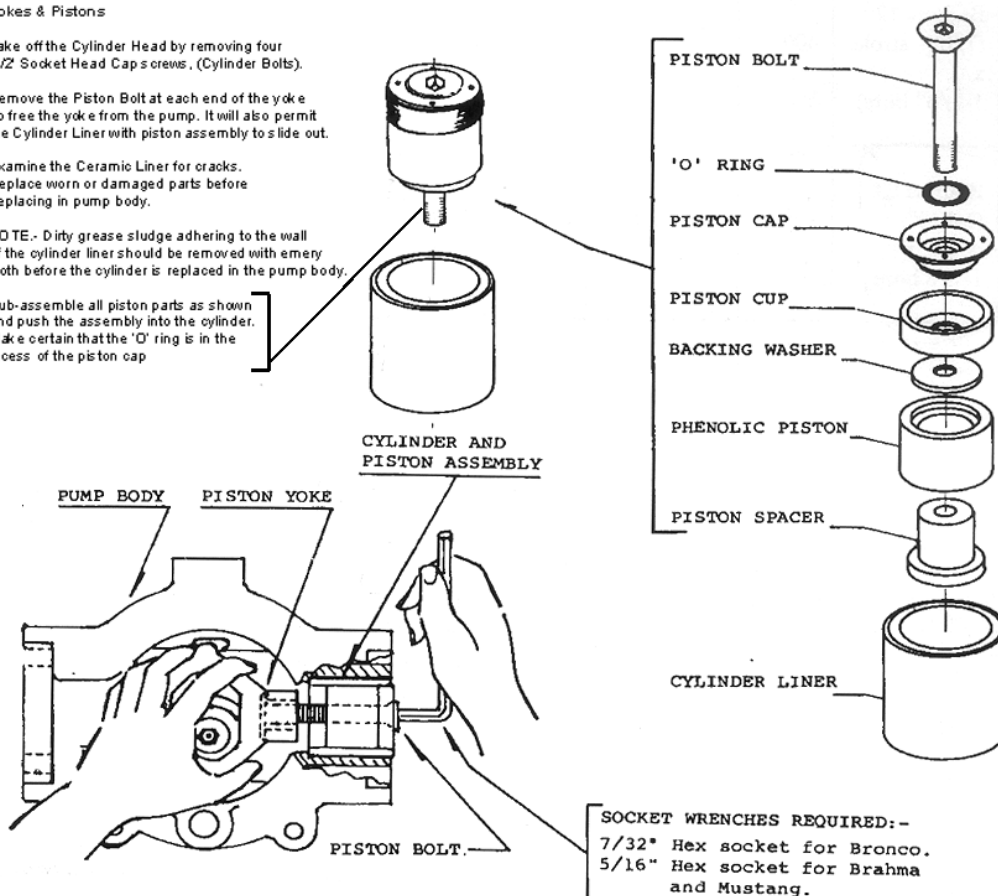
Take off the Cylinder Head by removing four 1/2" Socket Head Cap screws, (Cylinder Bolts).

Remove the Piston Bolt at each end of the yoke to free the yoke from the pump. It will also permit the Cylinder Liner with piston assembly to slide out.

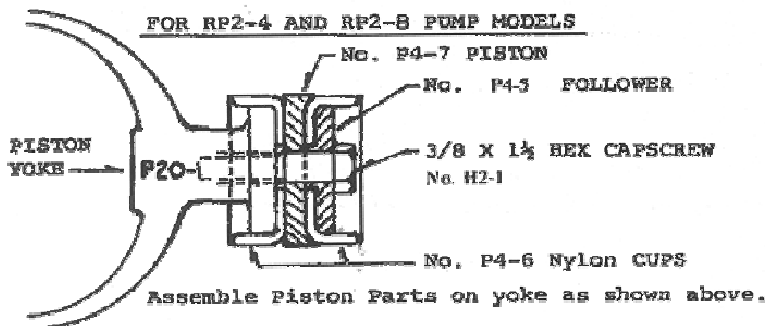
Examine the Ceramic Liner for cracks. Replace worn or damaged parts before replacing in pump body.

NOTE:- Dirty grease sludge adhering to the wall of the cylinder liner should be removed with emery cloth before the cylinder is replaced in the pump body.

Sub-assemble all piston parts as shown and push the assembly into the cylinder. Make certain that the 'O' ring is in the recess of the piston cap



SOCKET WRENCHES REQUIRED:-
 7/32" Hex socket for Bronco.
 5/16" Hex socket for Brahma and Mustang.



TO REPLACE YOKE AFTER THE LINERS WITH PISTON ASSEMBLIES SLID BACK INTO THE BODY:

1. Note that the yoke will go into place only when the eccentric bearing crank is either top dead centre or bottom dead centre.
2. Guide the yoke to permit entry of the piston bolt, as shown in the sketch.

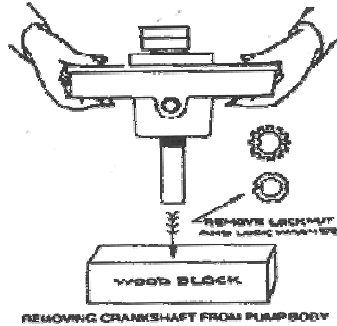
Use thread locking compound on piston bolt, Stud lock or as we prefer Loctite 262.

Read directions on the containers.



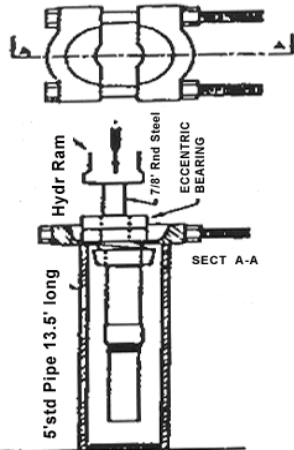
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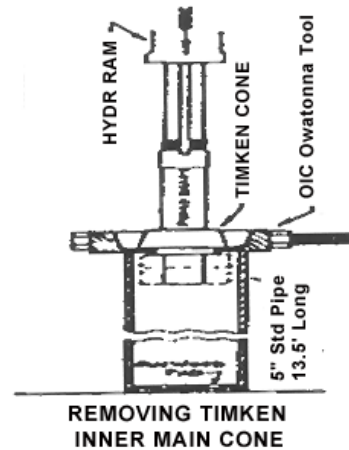


Crankshaft can be bumped out of pump body on a wood block, as shown above, after removal of the piston yokes, as follows:

1. Remove the cylinder heads to expose the piston bolts loosen the piston bolts in order to free the yokes.
2. Remove the Timken lockout and lock washer. (RP2-4 has solid set collar to be removed). Use Timken TNO6 & TNO8 lock nut wrenches.



REMOVING ECCENTRIC BEARINGS



REMOVING TIMKEN
INNER MAIN CONE

Eccentric bearings and inner main bearings are removed, preferably on a hydraulic press, with minimum amount of tooling shown above. (RP2-4 Model Pump requires conventional ball bearing or gear puller to remove bearings from pump body).

REPLACING BEARINGS ON CRANKSHAFT

Main bearings will be complete with integral seal or have separate NILOS metal seal. Metal seals may be damaged in disassembly and must be replaced.

1. After Inner Main Bearing and Eccentric Bearings are mounted the shaft is placed into the pump body.
2. Drive outer main bearing on shaft using a suitable diameter and pipe as a drift. The drift should come against the inner race of the bearing to avoid damaging the cage.



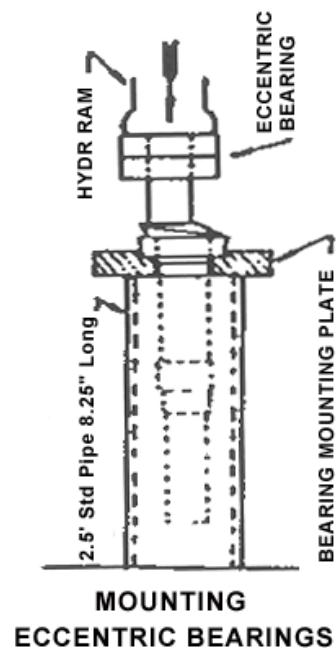
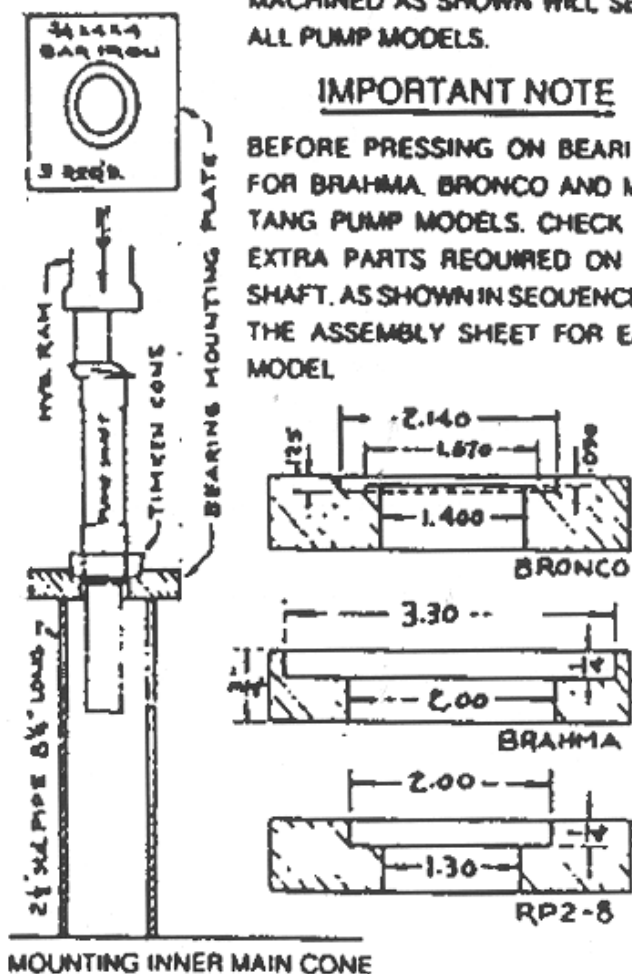
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ONE 8 1/2 Lgt OF 2 1/2 Std PIPE AND THREE BEARING MOUNTING PLATES MACHINED AS SHOWN WILL SERVE ALL PUMP MODELS.

IMPORTANT NOTE

BEFORE PRESSING ON BEARINGS FOR BRAHMA, BRONCO AND MUSTANG PUMP MODELS. CHECK FOR EXTRA PARTS REQUIRED ON THE SHAFT, AS SHOWN IN SEQUENCE ON THE ASSEMBLY SHEET FOR EACH MODEL.



Adjusting for endplay is similar to the procedure for the front wheels of an auto. The end play clearance allowance, for JKS Pumps is .003" to .005". The Timken Lock nut on Timken equipped pumps may be tightened until the shaft will not turn. The nut is then backed off slightly. Following this the pump shaft is bumped on a suitable block until it turns freely, as shown above for removing shaft. A method of prying the body while held in a vice at the shaft end can be arranged. The jaws of die vice must have soft metal shields to protect the shaft from being damaged. A dial indicator bracketed to the pump body with feeler resting on the crankpin will reveal the clearance while prying.

After the instructions shown above have been accomplished select the nearest tongue of the lock washer to the groove of the locknut and bend it into same groove.

THE PUMP IS NOW READY FOR ALL OTHER ASSEMBLIES. (SEE THE PUMP ASSEMBLY SHEETS).

All bolting should be reasonably snug to avoid leakage.



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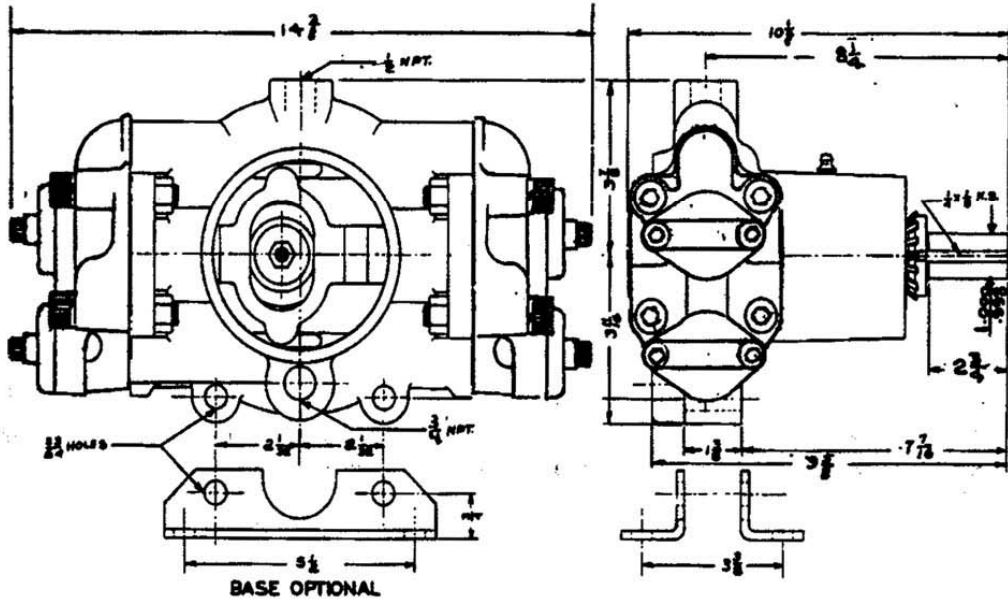
PARTS LIST

BRONCO - 2 AND BRONCO - 8 DUPLEX PISTON PUMPS

MAXIMUM OPERATING CAPACITY

	BRONCO 2	BRONCO 8
VOLUME:	4 U.S. GPM 15 L/min	8 U.S. GPM 30 L/min
PRESSURE:	1000 P.S.I. 6900 kPa	900 P.S.I. 5500 kPa

DIMENSIONS (INCHES)



WEIGHTS

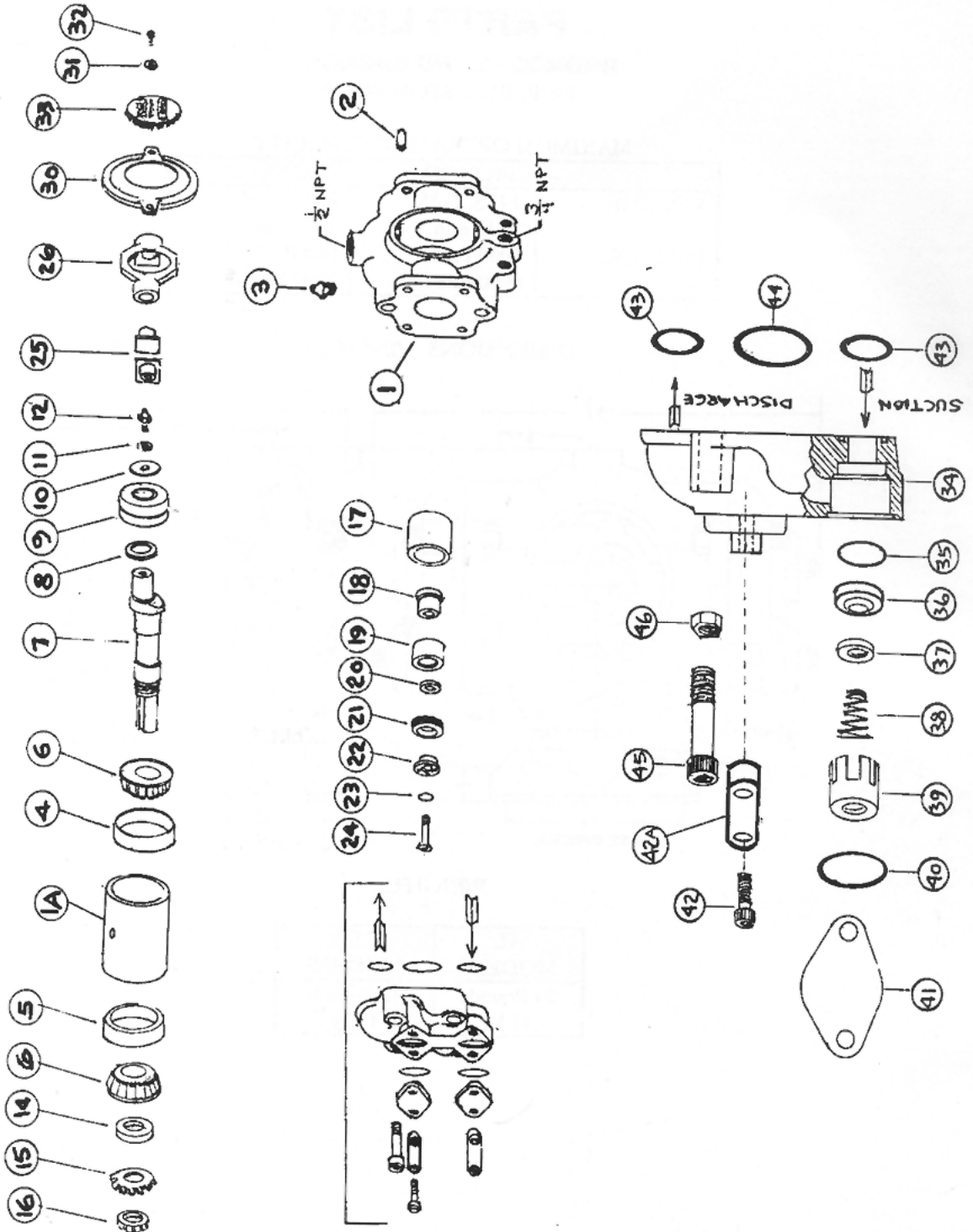
AL MODELS	C.I.B. MODELS
24 Pounds 11 kg	42 Pounds 19 kg



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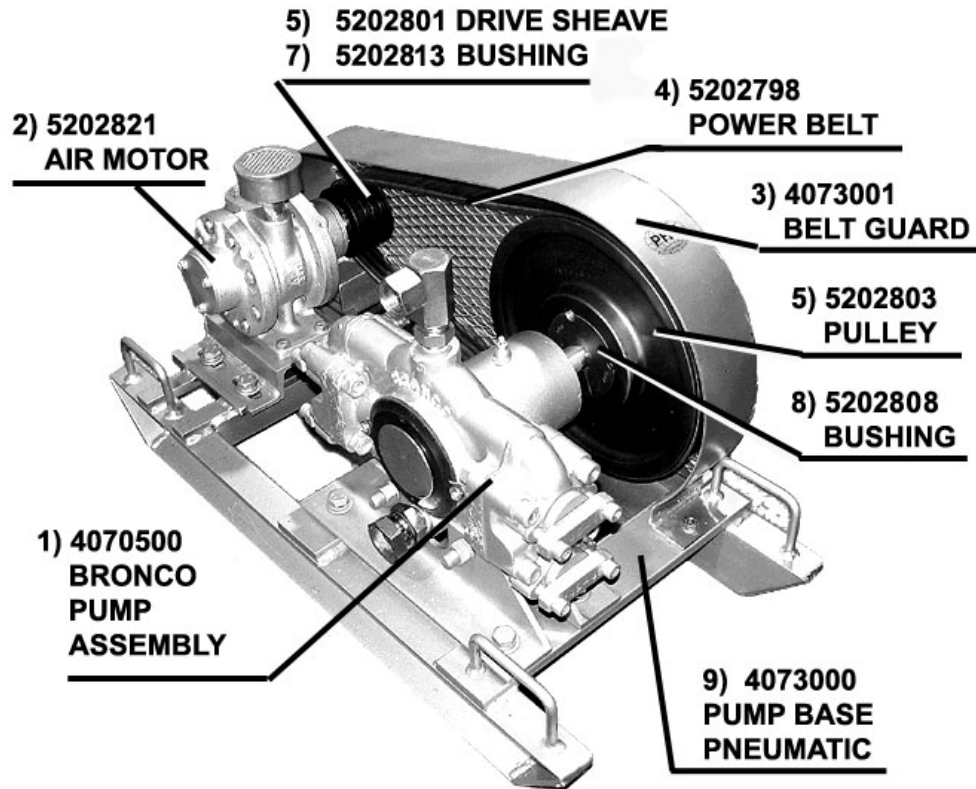
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REF. NO.	PART NO.	NO. REQ'D.	DESCRIPTION
1	P45-1AL	1	Pump Body
1A	P45-42	1	Bearing Sleeve
2	P45-26	2	Wear Pad
3	P1-2	1	Grease Fitting
4	5010187	1	Bearing Cup
5	5010187	1	Bearing Cup
6	5010189	2	Bearing Cone with Seal
7	P45-47	1	Crankshaft, Bronco 2 or,
7	P45-48	1	Crankshaft, Bronco 8
8	P68-25	1	Eccentric Bearing Spacer
9	5000237	1	Eccentric Bearing
10	P5-4	1	Bearing Retainer Washer
11	5180065	1	3/8" Lock Washer
12	P5-3	1	Grease Fitting
14	5180068	1	Keyed Bearing Washer
15	5180819	1	Lock Washer
16	5176306	1	Lock Nut
17	P45-36	2	Ceramic Cylinder Liner
18	P45-16	2	Piston Spacer
19	P45-17	2	Phenolic Piston
20	P45-18	2	Backing Washer
21	P46-7	2	Piston Cup
22	P45-33	2	Piston Cap
23	5030113	2	O Ring
24	5160335	2	Piston Bolt
25	P49-1	2	Hardened Yoke Pad
26	P49-2	1	Yoke
27	P49-3	1	Bearing Shield (Not Shown)
30	P45-37	1	Cover
31	5180063	2	3/16" SAE Flat Washer
32	5160331	2	10-24 X 3/8" Machine Screw
33	P43-37	1	Grease Cap
34	P45-40AL	2	Cylinder Head
35	5030117	4	O Ring
36	P43-11SS	4	Valve Seat (c/w o-ring 5030117)
37	P2-10	4	Valve Disc
38	Z28-1	4	Valve Spring
39	P43-9B	4	Valve Cage
40	5030127	4	O Ring
41	P45-49AL	4	Valve Cap
42	5113016	8	3/8" X 1-1/2" UNC Socket Head Capscrew
42A	P45-46	4	Retainer Bar
43	5030120	4	O Ring
44	5030030	2	O Ring
45	5115416	8	1/2" X 2 1/2" UNC Socket Head Capscrew
46	5160248	8	1/2" UNC Hex Nut



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4070500A BRONCO PNEUMATIC PUMP ASSEMBLY

REF NO.	PART NO.	NO.REQ'	DESCRIPTION
1.	4070500	1	BRONCO PUMP ASSEMBLY
2.	5202821	1	AIR MOTOR
3.	5202798	3	POWER BELT
4.	4073001	1	BELT GUARD
5.	5202803	1	PULLEY
6.	5202801	1	DRIVE SHEAVE
7.	5202813	1	BUSHING
8.	5202808	1	BUSHING
9.	4073000	1	PUMP BASE PNEUMATIC



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MAINTENANCE and SERVICING

CYLINDER HEAD AND VALVE ASSEMBLY:

1. Grease all 'O' Rings to hold them in place during assembly.
2. Install D9-117 O Ring in the groove provided in P43-11 Seat.
3. Assemble Parts in Cylinder Head in the sequence shown on the Parts List Drawing.
4. Mount the Cylinder Head Assemblies on the Pump as shown on Page 17 of this Manual.

DRAINING-PROTECT AGAINST FREEZE UP:

1. Remove all valve caps (P45-41) and run Pump for 10 seconds or pump a suitable Anti-Freeze mixture.

PISTON ASSEMBLY:

1. If available, use a small amount of Teflon Lubricant on the outer surface of New Piston Cups.
2. Assemble Piston Parts as Shown in the Drawing.
3. Push the Piston Assembly into the Cylinder Liner making sure that the head of the Piston Bolt is at the end of the Cylinder Liner where the Ceramic Liner is flush with the surrounding Steel jacket.
4. Coat the outside of the Cylinder Liner with a suitable Anti-Seize Compound.
5. Use a suitable Locking Compound on that end of the Piston Bolt that threads into the Yoke Assembly
6. Install Piston and Liner Assembly in Pump.

CRANKSHAFT AND MAIN BEARINGS:

1. Refer to Detailed Instructions in the Manual for JKS Piston Pumps". For Bronco Pumps keep the endplay clearance as low as is Possible.

PISTON CUPS:

1. Some minor seepage may occur when the temperature of the fluid pumped is reduced. This seepage will usually stop if the lower temperature is maintained for several hours or, the temperature of the fluid is returned to the higher level.
2. If severe leakage occurs, stop the pump and replace worn parts. Continued operation with excessive leakage will damage bearings.

LUBRICATION:

1. See Grease Instruction Decal on Pump Cover.

RECOMMENDED TORQUE FOR TIGHTENING:

	TORQUE FT./LBS.
HI-4 3/8" X 1-1/2" UNC Socket Head Cap Screw. Coat threads with an Anti-Seize Compound other than white Lead.	15
HI-3 1/2" X 2 1/2" UNC Socket Head Cap Screw.	30
P45-34 Piston Bolt - Use a Thread Locking Compound.	25
P5-3 Grease Fitting.	15



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PHQ was formed twenty years ago to supply pneumatic underground mining equipment, replacement parts and mining hardware.

PHQ grew into the manufacturing of complete percussion drills, drill feeds, drill centralizers, remote control panels, mufflers, diamond drills, high pressure pumps, diamond drilling rods, core barrels, adapters and accessories..

PHQ cooperates in the research of the use of water hydraulic drills, and is working with CANMET and the University of Sherbrooke in anti-vibration dampening for pneumatic drills.



PHQ continually strives toward excellence

PHQ up-graded our in-house quality system in year 2003 from ISO9002:94 to ISO9001:2000 passing the first audit of the up-graded system with no faults whatsoever the first time around.

PHQ passed our annual re-registration audit of our quality system this year in our Burlington shop with no faults for the fourth time in a row.



PHQ adopted the logo of a miner running a pneumatic hand held jackleg drill as the symbol of our company and in integral part of the Logo that we proudly display. It signifies our commitment to producing pneumatic drilling equipment for the mining industry.

