O'DRILL
MCM
A Pump & Valve Mfg. Company

2" & 3" TYPE 'B' RESET RELIEF VALVE

Engineered for High Performance...

QUALITY ASSURANCE APPROVED!

Established 1982

O'DRILL USA



2"



3"

Heavy Duty Valves

100% Interchangeable with Cameron® and Retsco® 2" & 3" Reset Relief Valves and Parts

★ MAINTENANCE MANUAL ★

2" & 3" TYPE 'B' RESET RELIEF VALVE

(O'DRILL ★ MCM IS A VALVE & PUMP MFG. COMPANY)

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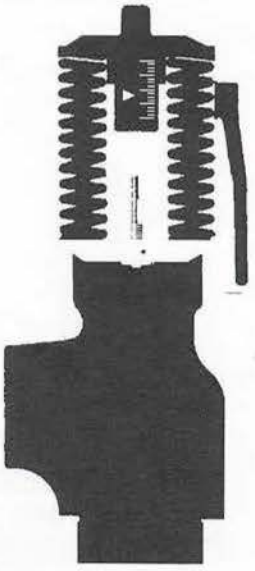
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When you need a high performance valve...

...You can count on O'Drill, Inc.



★*All valves and parts come with complete material certification and traceability* ★

2" & 3" TYPE 'B' RESET RELIEF VALVE

O'DRILL TYPE 'B' - 2" & 3" RESET RELIEF VALVE

A. INTRODUCTION

O'DRILL'S 2" & 3" Type 'B' RESET RELIEF VALVES are built to provide accurate and reliable protection from extreme pressures. The valve is designed primarily for drilling mud use,but it works equally well on any liquid or gas. **O'DRILL'S Type 'B' Reset Relief Valves** are fully enclosed for maximum protection of all moving parts and provides the following design features:

- Valve automatically snaps open to discharge dangerous pressures when maximum pressure setting is exceeded.
- Pressure rating can be changed by merely turning a nut.
- Pressure setting is indicated by a pointer.
- Once the valve releases the pressure, it can be reset within seconds by moving the reset handle.
- Valve can be opened at any time by pressing the release button. The main parts such as the piston are manufactured from 17-4 PH corrosive-resistant material and the seals are made of BUNA-N or Hycar,designed to be out of the direct path of flow, for extra long life.

- Pressure rating can be changed by merely turning a nut.

B. REGULAR MAINTENANCE 'CHECKLIST'

Like all mechanical products the Type 'B'- 2" & 3" Reset Relief Valve needs periodic check up and maintenance.

CHECKLIST

- Once a week check the valve assembly.
- Once a month or as required check the link mechanism.
- As the valve comes into the shop for minor or major repairs- clean out and change grease inside the bonnet assembly.
- Also check visually for worn out parts; such as upper and lower links; top crank pin and lower pin.
  (occassionally under extreme pressures crank assembly may bend there by throwing the calibration off.)

Note: *The above maintenance checklist covers normal service. More frequent maintenance would be required for extreme pressures and adverse coditions.*

DESCRIPTION:

The 2" & 3" Type 'B' Reset Relief Valve is entirely mechanical. When the pressure is released and the handle is pulled, the valve is then set. Once the valve is 'set' the pressure is mainly confined by a pointer and is adjustable over the entire operating range by merely turning the adjusting nut on top of the valve. The 'setting' is not affected by vibration of the valve operation or the slush pump.

SAFETY STEPS:

O'DRILL Type 'B' Reset Relief Valve should only be used in the upright position. Before operating the unit ascertain proper rated piping is used and discharged into the mud tank. Inlet and outlet piping should be rated to the maximum working pressure of the type 'B' Reset Valve. Proper weld procedures need to be followed to weld the end flanges to the piping. Under no circumstances should heat be applied to any part of the valve other than the companion flange.

UNDERSTANDING THE MECHANISM:

The principle of the Type 'B' Reset Valve mechanism is very simple. The piston extends through the valve body where it is joined with two lower links and lower pin. (See attached isometric) The lower links are connected to the upper link with a lower pin P/N 23545. The narrow end of the upper link is then connected to the crank assembly and bonnet by passaing a top crank pin through the crank assembly and bonnet.
When the valve is reset the upper and lower links are vertically aligned. In this position they transmit any force or pressure exerted on the piston directly to the crank assembly. In the event the upper and lower links are not vertically aligned, then any pressure would buckle or collapse the upper and lower links allowing the piston to move up in the body thereby allowing the valve to 'open'and dicharge the line pressure.
In order for the valve to actuate, the line pressure on the piston should be greater than the 'set' pressure, thus overcoming the opposing force against the crank assembly from the two load springs p/n 20805.

Once the set pressure is reached and the valve snaps open and the pressure is discharged through the discharge port, the valve can be reset by merely resetting the handle. This action puts the piston down thereby sealing in two places,by the inner seal (P/N30831) and outer seal (P/N30833).

C. BUILT-IN SAFETY FEATURES

The Type 'B' Flanged Reset Valves guarantees greater safety in operation.Should a malfunction of the mechanism occur due to whatever reason there is a built in feature in both the type "B" &"C" valves. The top crank pin is designed to bend and then break at 5300psi. Thereby automatically, the piston with the links would move up causing the relief of the built up pressures in the piston and sub area. This safety feature is a great deterrent to mishaps occurring due to excessive built up internal pressures.

CAUTION: ***DO NOT ATTEMPT TO RESET VALVE WITH PRESSURE STILL ON.***

2" & 3" TYPE 'B' RESET RELIEF VALVE

D. INSTALLATION AND OPERATION

It is recommended that Type 'B' Reset Relief Valve be installed in a vertical position. The installation of the 2" & 3" valve dependence on the valve size.The piping will have to be done accordingly using 2" or 3" threaded piping as end connections.

E. CALIBRATION

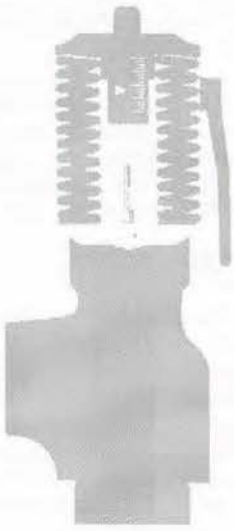
The valve may occasionally need calibration. This is achieved by taking the locking pin (spirol pin) out of the lower ratainer and turning the load screw clockwise to add counter-clockwise to substract pressure in order to set the valve to snap open at the preset pointer position on the calibration plate. This procedure is a must after every major repair.

F. MAINTENANCE

The Type 'B' Reset Relief Valve is a sturdy and well-designed valve, which requires a minimum amount of maintenance. However, before resetting the valve, one should check the valve mechanism, and the pushing on the release button to assure the valve closes and opens without mechanism having any obstruction.

G. TOOLS REQUIRED FOR SERVICING THE VALVE

- small hammer
- 1/8" x 1" long straight shank punch
- 1/4" x 1½" long straight shank punch
- standard pliers
- needle nose pliers
- 3/8" hex wrench
- flat-head screwdriver
- #2 Phillips screwdriver
- 12 point sockets
- sub wrench



H. VALVE REPAIR

In the event the valve needs to be repaired, the following parts need to be visually inspected for wear and tear:

PISTON: Check the piston OD at the seal area for galling, also check inside the piston where the inner seal seats for gauling of the metal or wash out. If the surfaces are rough in the sealing area then it is recommended you change the piston.

OUTER SEAL: Rubber Seals are the first parts to wear out on valves with pressure. It is always a good idea to replace the seals whenever a repair is being conducted.

INNER RETAINER: A visual inspection of the OD and flat surface should be made, the thread area will determine if the inner retainer needs to be changed. Sometimes a wash out of the inner retainer does occur when the slush pump generates excessive surge pressures. This in turn, may cause parts to wear out prematurely.

SUB: The stem area around the 3" sub where the inner seal and inner retainer sits is prone to wash outs. A visual inspection is required for an evaluation.

I. BONNET ASSEMBLY REPAIR

In the event the parts of the bonnet assembly such as linkages, crank assembly, or top crank pin require replacements, then it is better to take the old bonnet assembly and replace with a new or rebuilt one.

PARTS REQUIRED FOR:

MINOR *REPAIR KIT*		2"	3"
INNER SEAL	P/N	N/A	30831
OUTER-SEAL	P/N	20788	30833
INNER-RETAINER	P/N	N/A	30826
CUSHION-RING	P/N	20795	30834
GASKET / O-RING	P/N	21792-15	6230-21-13-85

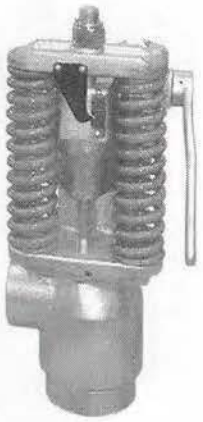
PARTS REQUIRED FOR:

MAJOR *REPAIR KIT*		2"	3"
PISTON	P/N	20784	30829
OUTER-RETAINER	P/N	20790	30827
INNER-RETAINER	P/N	N/A	30826
OUTER-SEAL	P/N	20788	30833
INNER SEAL	P/N	N/A	30831
CUSHION RING	P/N	20795	30834
GASKET / O-RING	P/N	21792-15	6230-21-13-85
* OPTIONAL SUB	P/N	20793	30834

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2" TYPE 'B' *Heavy Duty* RESET RELIEF VALVE

Schematic diagram for complete 2" valve or bonnet assembly repair.

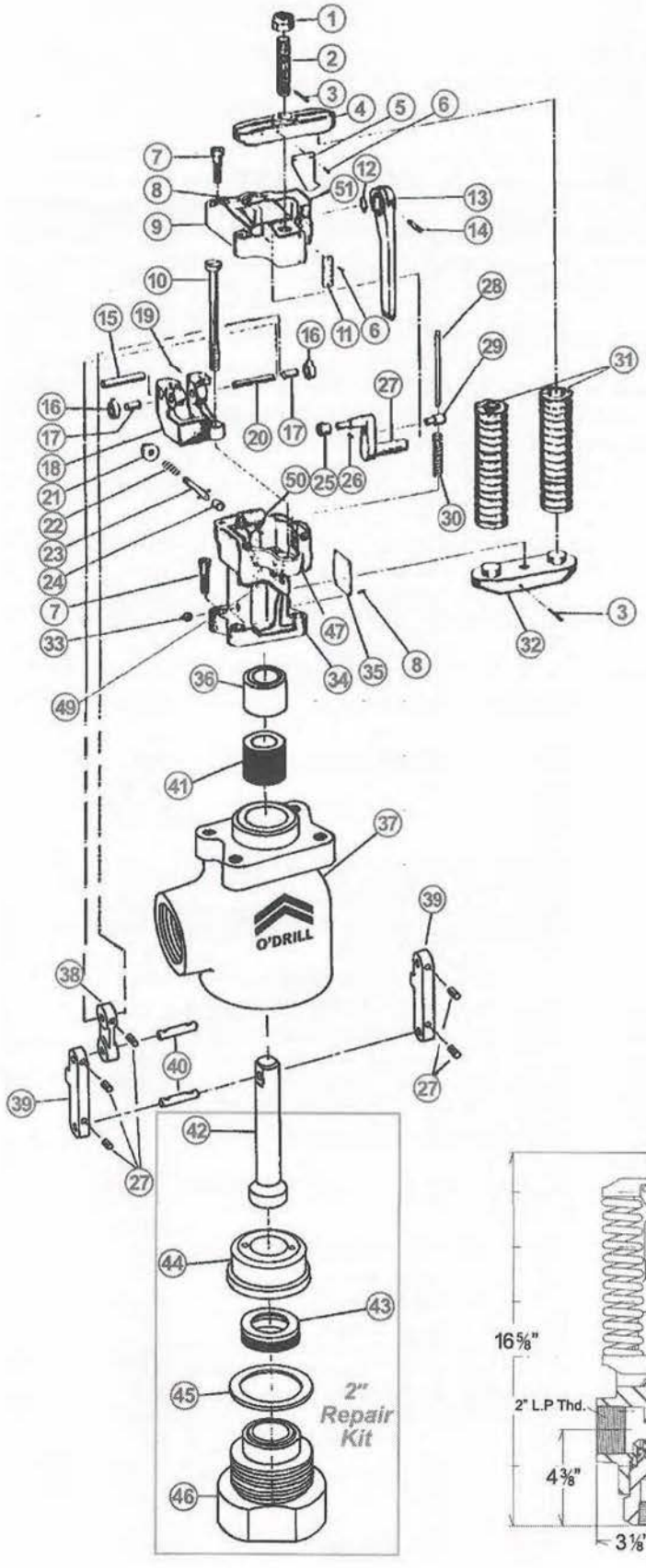


2"

Hydraulic use: 1500 -6200 PSI W.P.
Gas Use: 1500 - 2500 PSI W.P.

2" PART NUMBER 30400

Complete Valve P/N	Pressure Range
30400-3	400 - 1500 PSI
30400-1	750 - 2500 PSI
30400-2	**1500 - 5000 PSI**
30400-4	1500 - 6200 PSI
30418	Bonnet Assy.

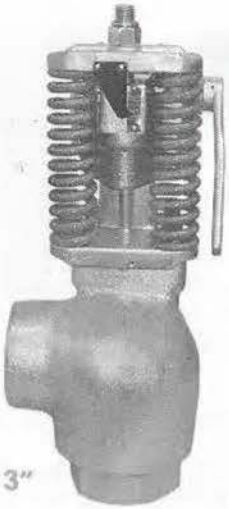


PARTS LIST

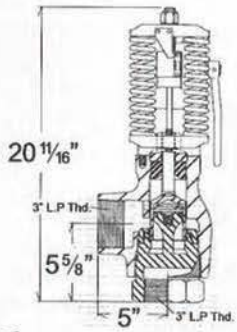
#	QTY.	DESCRIPTION	PART NO.
1	1	Nut, Elastic Stop	5953-34
2	1	Stud, Adjusting	20798
3	2	Pin, Spirol 1/4" x 1 1/2"	20712-04
4	1	Retainer, Upper Spring	30385
5	1	Indicator	30379
6	12	Screw, Self Tap	2975-03
7	8	Screw, Socket-Head Cap	204044-10-00-14
8	1	Plate, Name	30170
9	1	Assy. Cover	38159
10	1	Screw, Load	30389
11	1	Plate, Calibration	21048
12	1	O-Ring	6227-15-01-70
13	1	Handle, Reset	30377
14	1	Pin Spirol 1/8" x 7/8"	20712-13
15	1	Pin, Crank Pivot	30381
16	2	Spring, Reset	20791
17	2	Bearing, Crank Assy.	13229-10
18	1	Crank Assy.	38161
19	1	Pin Spirol	20712-03
20	1	Pin, Top Crank	20802
21	1	Button, Release	30396
22	1	Spring, Button Release	30390
23	1	Shaft Release	30397
24	1	Bushing, Release Button	30368
25	1	Roller, Reset Crank	30388
26	7	Pin Spirol 5/16" x 1 3/8"	20712-02
27	1	Crank, Reset	30373
28	1	Rod, Spring Guide	30387
29	1	Keeper, Spring	30380
30	1	Spring, Reset Crank	30391
31	2	Spring, Load	20805-01
32	1	Retainer, Lower Spring	30382
33	1	Fitting, Grease	5929-02
34	1	Sub Assy. Bonnet	38160
35	1	Plate, Instruction	30178
36	1	Bushing, Stem	30369
37	1	Body	20780
38	1	Link, Upper	20787
39	2	Link, Lower	20786
40	2	Pin, Lower	23545
41	1	Ring, Cushion	20795
42	1	Piston	20784
43	1	Outer Seal	20788
44	1	Retainer, Outer	20790
45	1	Gasket	21792-15
46	1	Sub	20793
47	1	Plug, Grease	20750

3" TYPE 'B' *Heavy Duty* RESET RELIEF VALVE

Schematic diagram for complete 3" valve or bonnet assembly repair.

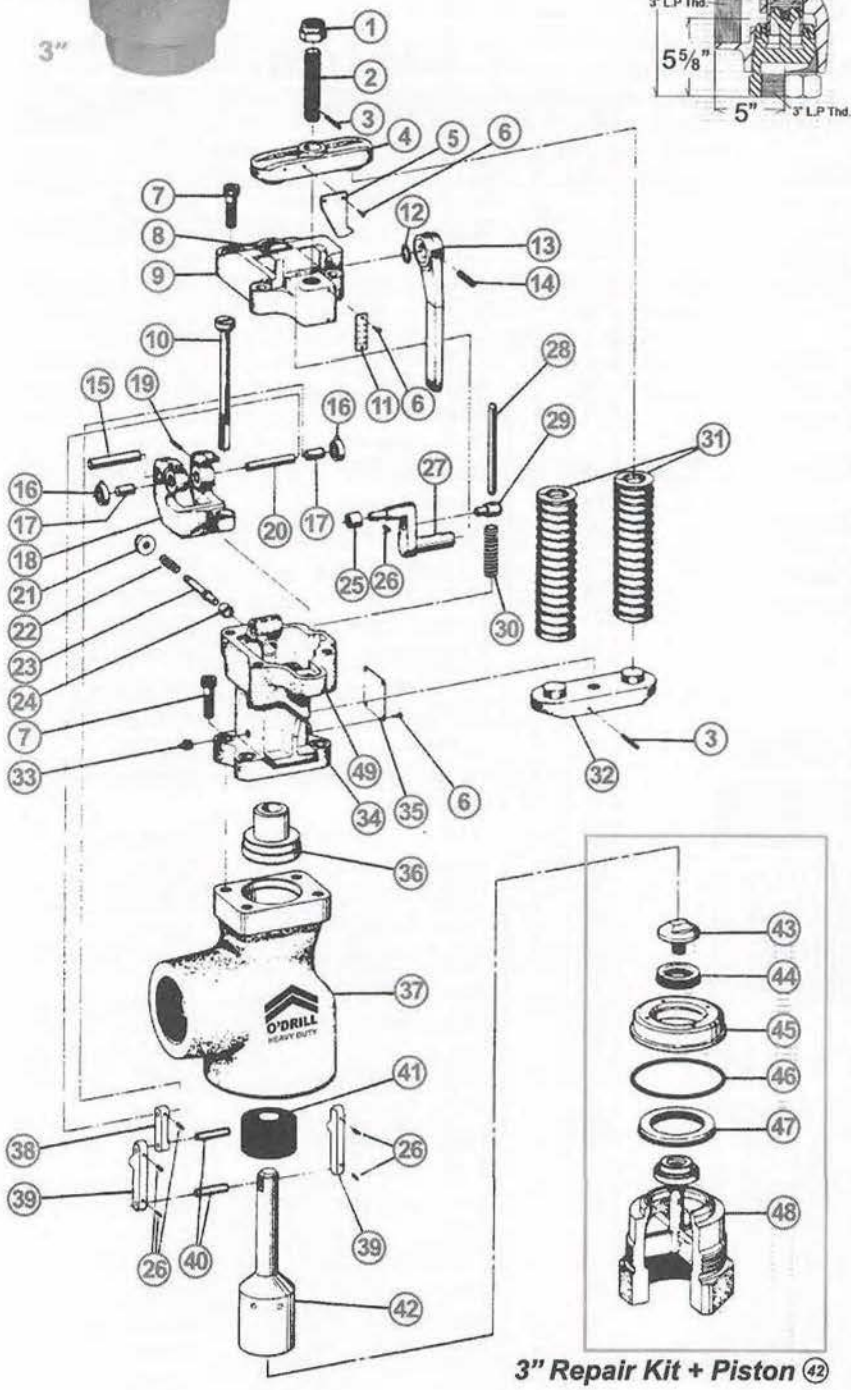


Good for H_2S *Service*



3" PART NUMBER 30825

Complete Valve P/N	Pressure Range
30825-03	400 - 1500 PSI
30525-01	750 - 2500 PSI
30825-02	**1500 - 5000 PSI**
30825-04	1500 - 6200 PSI
30820	Bonnet Assy.



3" Repair Kit + Piston (42)

PARTS LIST

#	QTY.	DESCRIPTION	PART NO.
1	1	Nut, Elastic Stop	5953-34
2	1	Stud, Adjusting	20798
3	2	Pin, Spirol 1/4" x 1 1/2"	20712-04
4	1	Retainer, Upper Spring	30385
5	1	Indicator	30379
6	12	Screw, Self Tap	2975-03
7	8	Screw, Socket-Head Cap	204044-10-00-14
8	1	Plate, Name	30170
9	1	Assy. Cover	38159
10	1	Screw, Load	30389
11	1	Plate, Calibration	21048
12	1	O-Ring	6227-15-01-70
13	1	Handle, Reset	30377
14	1	Pin Spirol 1/8" x 7/8"	20712-13
15	1	Pin, Crank Pivot	30381
16	2	Spring, Reset	20791
17	2	Bearing, Crank Assy.	13229-10
18	1	Crank Assy.	38161
19	1	Pin Spirol	20712-03
20	1	Pin, Top Crank	20802
21	1	Button, Release	30396
22	1	Spring, Button Release	30390
23	1	Shaft Release	30397
24	1	Bushing, Release Button	30368
25	1	Roller, Reset Crank	30388
26	7	Pin Spirol 5/16" x 1 3/8"	20712-02
27	1	Crank, Reset	30373
28	1	Rod, Spring Guide	30387
29	1	Keeper, Spring	30380
30	1	Spring, Reset Crank	30391
31	2	Spring, Load	20805-01
32	1	Retainer, Lower Spring	30382
33	1	Fitting, Grease	5929-02
34	1	Sub Assy. Bonnet	38160
35	1	Plate, Instruction	30178
36	1	Bushing, Stem	30828
37	1	Body	30822
38	1	Link, Upper	20787
39	2	Link, Lower	20786
40	2	Pin, Lower	23545
41	1	Ring, Cushion	30834
42	1	Piston	30829
43	1	Retainer, Inner	30826
44	1	Seal, Inner	30831
45	1	Retainer, Outer	30827
46	1	O-Ring	6230-21-13-85
47	1	Seal, Outer	30833
48	1	Sub	30824
49	1	Plug, Grease	20750

For Assistance... Call
O'Drill/MCM
(713) 541-2020

2" & 3" TYPE 'B' RESET RELIEF VALVE

DISASSEMBLY OF BONNET AND LINKAGE ASSEMBLY

1. Remove adjusting nut (1) and lift off upper spring retainer (4) and two load springs (31).
2. If adjusting stud (2) must be replaced, drive out 1/4" Spirol pin (3) in bonnet cover (9) and unscrew stud.
3. Remove four cap screws (7) from bonnet cover (9) and lift off cover.
4. If reset roller (25) must be replaced, drive out 1/8" Spirol pin (26) and slide roller of reset crank(27).
5. If reset crank(27) or reset handle (13) must be replaced,drive out 5/16" Spirol pin (14). Slide reset handle off reset crank, remove O-Ring (12) and pull reset crank out of bonnet cover.
6. Oilite bearing (13229-13) may be driven out of bonnet cover with 7/8" drift.
7. Lift spring guide rod (28) and reset spring (16) out of bonnet (34).
8. Pry off two Spirol springs (26).
9. Using pliers grasp and pull out Spirol pin (26) in upper link. Remove top crank pin (20).
10. If crank assy. (18) must be removed, lift lower spring retainer (32) and turn so that 1/4" spirol pin (3) can be driven out from side next to bonnet. Turn load screw(10) out of spring retainer, and lift screw out of crank. Drive out 1/8" Spirol pin (19), remove crank pivot pin (15) and lift crank out of bonnet.
11. The two bearings(13229-10) may be driven out of crank with 3/8" drift.
12. Two bearings (13229-8) may be driven out of bonnet with 5/8" drift.
13. If it is necessary to remove the release shaft (23), it can be driven out of the bonnet from the inside after removing. Bushing (24) and spring (22) may be removed from shaft after screwing off button(21)
14. Remove four socket head caps screws (7) and lift bonnet out of body. Linkage will be pulled out of bonnet with piston.
15. Piston (42) and cushion ring (40) may be pulled out of body.
16. Disassemble upper link (38) and two lower links (39) by punching out four 1/8" spirol pins (26) and removing the two lower link pins (40).
17. Remove Stem bushing (36) off piston stem (42).
18. Bearings (13229-13) may be removed from upper link and piston with 1/2" drift.

Replace all defective parts.
Clean all remaining parts and examine as follows:

1. Check lower links (26) for straightness by laying a straight edge against the end flats on each side of the link. Always replace both lower links-never just one, even though only one link may appear to be defective.
2. Check upper and lower links and crank pin.If the top crank pin is not straight or shows signs of wear it should be replaced. A worn pin will show spots where the base metal shows through the hard chrome external plating. Should the top crank pin be bent or worn, the valve will not calibrate accurately. ***This step is very important.***
3. Check all pressed-in pin bushings. If a bushing is loose, has chipped or broken edges, or is wallowed or 'belled out' at the ends, it should be replaced.In the event that a bushing is defective, the hole in which the bushing is contained should be examined for distortion in which case the affected part should be replaced also.
4. Examine the O.D. of the piston and piston stem for signs of excessive wear, galling, or corrosion.If such a condition exists, examine the bore of the piston stem bushing for a similar condition. Replace either or both parts as required.
5. Examine the two Loads springs "set" or yielding. The nominal free length of the load springs is 7-1/4". If the free length of either spring is less than 7 inches, both springs should be replaced and the valve should be recalibrated when reassembled. If the free length of the springs is less than 7-3/16" it is likely that the valve will require recalibration.
6. Examine the two Spirol springs for yielding.In the free position the two tabs which hold the spring should be in approximate alignment. If the outside tab is more than 30 degrees from alignment with the inside tab, the spring should be replaced.

Re-assemble the bonnet and linkage assembly in the reverse order that the parts were disassembled. Proceed as follows using new Spirol pins.

REASSEMBLY OF BONNET AND LINKAGE ASSEMBLY

1. Press in new bearings where replacement was necessary in piston, upper link, crank assy., bonnet and bonnet cover.
2. Place the piston stem bushing over the piston stem.
3. Assemble lower links to piston with lower link pin. Lower links should have side bosses facing the same direction.The two bosses on the lower link should be close to the upper link and facing the release button.**This is a very important step and should be done correctly or the valve will malfunction.** Secure link pin with 1/8" spirol pins.
4. Assemble upper link large end between lower links with link pin and secure pin with 1/8" spirol pins.
5. After greasing all surfaces of the cushion ring, place it around the piston stem and with beveled rubber side down.
6. Insert piston and cushion ring into top of body, keeping cushion ring square on piston stem. Use blunt-ended tool to push cushion ring into body, flush with stem bushing counterbore in 3" body.

2" & 3" TYPE 'B' RESET RELIEF VALVE

7. Insert lower links through bottom of bonnet with side bosses on lower links facing release button. ***This is a very important step and extra care should be taken in installing it correctly.*** Fasten bonnet to body with cap screws, after positioning bonnet so that reset handle will be opposite the discharge opening.
8. Install crank in top of bonnet with crank pivot pin and secure with long 1/8" spirol pin.
9. Install release mechanism by placing spring on the release shaft. Insert the assembly from inside the bonnet, then screw the release button on the release shaft.
10. Upper link should extend through crank assy. and fastened to crank with top crank pin and secured with 1/8" spirol pin.
11. With piston in raised position, insert 1/8" spirol pin though upper link and top crank pin.
12. Push linkage down toward closed position and install spirol springs in crank so that they resist upward movement of linkage.
13. Insert load screw through crank assy. arm and bonnet and screw into lower spring retainer. After calibration, secure with 1/4" spirol pin through lower retainer.
14. Attach reset roller to reset crank and secure with 1/8" spirol pin. Insert reset crank through bonnet cover from inside and place o-ring over reset crank from outside bonnet cover.
15. Place reset handle over reset crank with handle pointing downward and chamfered diameter facing o-ring and secure 5/16" spirol pin.
16. Screw adjusting stud into bonnet cover flush with inside surface and secure with 1/4" spirol pin.
17. Place reset spring around guide rod and insert rod in supporting hole in bonnet. Insert spring keeper in reset crank and turn reset lever so that spring guide rod engages spring keeper as bonnet cover is placed on bonnet.
18. Fasten bonnet cover with cap screws.
    Set load springs on lower spring retainer and place upper retainer over adjusting stud and springs. Screw locknut on stud.
19. If possible, operate the valve to determine the following:
    (1) Correct Calibration: The relief pressure indicator should accurately indicate the actual relief pressure.When new load springs have yielded considerably (become shorter) it will be necessary to recalibrate the valve.
    (2) Binding or interference between parts: All moving parts, especially the linkage assembly, should work freely. Interference between moving parts will cause the valve to operate inaccurately and should be remedied.

CALIBRATION INSTRUCTIONS

For calibration purposes, and accurate pressure gauge should be connected to read the line pressure. If O'DRILL pressure gauge is used, or any gauge with a built-in dampening device, the line pressure should be built up slowly to allow for the lag in the gauge reading. If possible, the line pressure should be built up with little or no pressure pulsations.

Remove bonnet cover (8) so that the lower spring retainer (32) can be lifted and turned.Drive out spirol pin (3) from back side of lower spring retainer.Replace bonnet cover.

Screw down the adjusting nut (1) until the indicator (5) is approximately mid-range on the calibration plate (11). Apply pressure until the valve operates, noting the actual line pressure as indicated by the pressure gauge. Using the 3/8" flats at the bottom of the load screw (10), turn the screw in to the lower spring retainer (32) if actual operating pressure is lower than calibration plate (11) reading, and turn the screw out if actual pressure is high.Operate valve again, and repeat adjustment until true calibration is attained. One-half turn of load screw is less than 100 psi change on the calibration plate. If there is any error remaining after calibration, it should be on low side so that the valve operates lower than calibration plate indication. Secure load screw with spirol pin(26). The valve is now ready.



5055 CRANSWICK ROAD * HOUSTON, TX 77041

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