



INSTRUCTIONS

BULLETIN 947501C

OILGEAR DIRECT AND REMOTE OPERATED TYPE "P" AUTOMATIC PRESSURE UNLOADING CONTROL FOR TYPE "D" & "DC" UNITS

REFERENCE INSTRUCTION BULLETINS

Type "D" Variable Delivery Pumps w/o Controls----- 947000

Type "DC" Any-Speed Transmission w/o Controls----- 967900

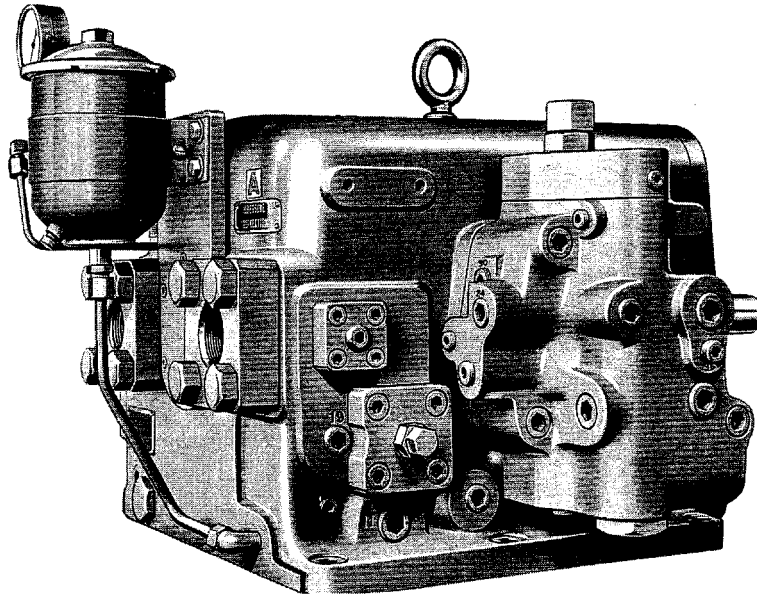


Figure 1. Typical Type "P" Direct Operated Pressure Unloading Control. (53270).

TO THE USER AND OPERATOR OF OILGEAR "P" CONTROLLED UNITS:

These instructions are printed to simplify and minimize your work of operating and maintaining Oilgear "P" controlled units. Your acquaintance with the construction, principle of operation and characteristics of these units will help you obtain optimum performance, reduce shutdowns and increase service life. We feel confident the unit will operate to your satisfaction if these instructions are adhered to. Some controls have been modified for specific applications from those described in this bulletin. NOTE: Systems must be arranged to prevent starting or stopping the unit under load. See recommended circuit (Figure 8).

I. TYPES & MOUNTING.

Four basic types of pressure unloading controls are available for "D" type units: (1) direct operated controls of the standard type are made for size 4 thru 100 units; (2) the IPR (initial pressure reducing) type is made for size 100 and 150 units; (3) remote operated controls of the standard type are made for size 4 thru 100 units; (4) the IPR remote operated type is made for size 100 and 150 units. Remote pressure adjusting valves, while functionally part of the remote operated controls, are usually mounted separately and piped to the control. It is recommended that all lines to the control and valves be as short as possible for optimum control characteristics.

Type "P" controls on single controlled one-way units are opposed by type "J" or "K" operators. On dual controlled units, the "P" control is opposed by controls such as A, M, H, V, X, etc. When A, M, H & V controls are used, they must be equipped with a check valve for free flow from the area behind their control piston to gear pump pressure.

II. PRINCIPLE OF OPERATION.

See instructions on basic unit for its principle of operation. The type "P" automatic pressure unloading control positions the unit's slideblock to maintain a preset pressure within the system. When the preset pressure is reached, the control automatically reduces the slideblock eccentricity to a position just sufficient to maintain the preset pressure in the system (to a position where volume pumped is just enough to make up system leakage losses).

The illustrations show single controlled one-way units where the "P" control is opposed by a type "J" spring operator. The "P" control varies the slideblock position only on the "P" control side of neutral. When the "P" control is used opposite another control (dual controlled units), it is normally mounted on the side opposite that shown, and an adapter is used to reduce effective area of "P" control piston. Then, the "P" control usually operates as an unloading control, overriding the other control when the opposing control is stroking the unit on the "P" control side

CIRCUIT SHOWS SINGLE CONTROLLED UNIT. ALTERATIONS FOR DUAL CONTROLLED UNITS ARE NOTED. MOST DUAL CONTROLLED UNITS ARE FURNISHED WITH "P" CONTROL ON THE OPPOSITE SIDE FROM THAT SHOWN.

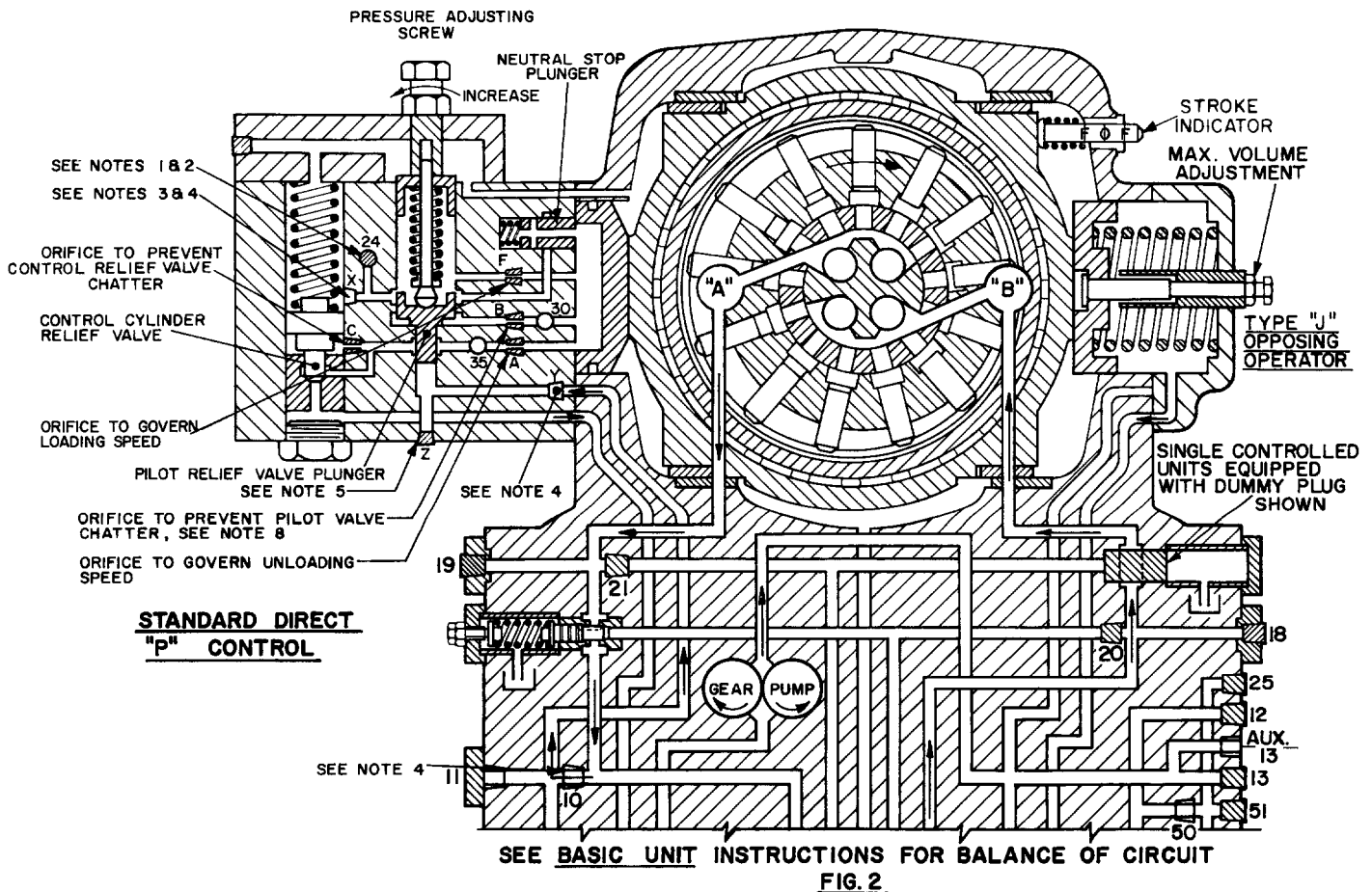


Figure 2. Fluid Circuit for Direct, Standard Type "P" Control. (5V-10110-L). Circuit notes on page 4.

of neutral. This would mean that if the "P" control is mounted on the right side (facing the input shaft and rotation is clockwise) and the other control is on the opposite side, only the volume delivered from port "B" is subject to automatic pressure compensation (unloading) control. When the "P" control is used with some controls (such as A, M, H, and V), those controls must have a check valve for free flow from the area directly behind their control pistons to gear pump pressure port so this fluid can escape when "P" control over rides it.

DIRECT, STANDARD TYPE. See figure 2. Circuit depicts a single controlled unit. For dual controlled units, gear pump pressure is piped externally from unit port 11, or 13, or 27 to control port 24; port 10 is blocked; high pressure is piped externally from unit auxiliary pressure port (18 or 19, depending upon control side) to the pilot relief valve (port "Z" on circuit); and ports "X" and "Y" are plugged.

In operation, when the preset pressure is reached, the pilot relief valve opens, porting fluid thru control port "A" to the area behind the control piston. The force generated overcomes the spring force (or opposing control) and the slideblock is moved toward neutral. As the slideblock moves, the spring loaded neutral stop plunger follows the control piston, and

when the slideblock reaches its predetermined minimum stroke position (slip stroke) the neutral stop plunger permits any additional fluid which enters the control piston chamber to be exhausted to drain by way of port "X" and thru the control relief valve spring chamber. Thus, the neutral stop plunger prevents hunting (oscillation) that would occur if slideblock went past slip stroke position to absolute neutral.

DIRECT, IPR (initial pressure reducer) TYPE. See figure 3. Circuit depicts a single controlled unit. For dual controlled units port "W" is open, ports "U" and "V" are plugged.

Somewhat similar to the standard "P" control, the IPR uses an additional mechanism that operates on the pilot relief valve. A pilot relief valve piston is located on top of the pilot relief valve springs and moves thru 1/8" stroke to automatically increase or decrease spring compression. The piston is operated by the IPR plunger which connects the top of the pilot relief valve piston to either gear pump pressure or to drain, thereby moving the piston between two stops located on the pressure adjusting screw. When there is no line pressure, pilot relief valve springs are expanded and the top of the pilot relief valve piston is open thru the IPR plunger to drain.

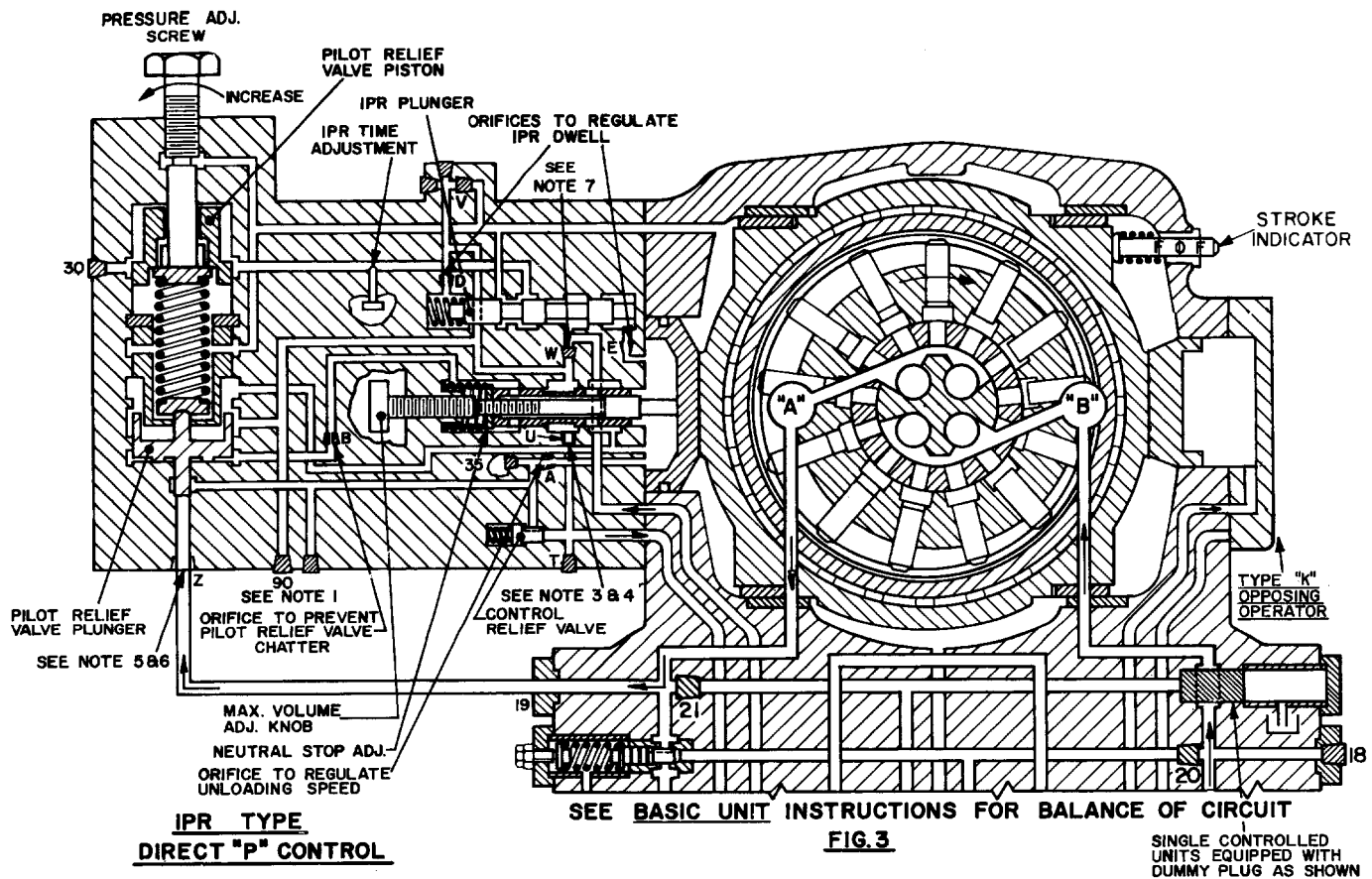


Figure 3. Fluid Circuit for Direct IPR Type "P" Control. (5V-10110-L). Circuit notes on page 4.

When high pressure from the pump reaches the control thru port "Z," the pilot relief valve opens and ports fluid to the control piston chamber thru port "A" and reduces pump stroke. This pressure is also directed thru orifice "E" to the plunger end of the IPR valve, shifting it and compressing the IPR valve spring. The fluid from this spring chamber is throttled thru the IPR dwell orifice "D" which restrains the IPR valve plunger movement so approximately one second dwell is required for the plunger to reach the position where gear pump pressure is applied thru the IPR valve, past the time adjustment needle valve, to the area above the pilot valve piston and increase the compression on the spring. Note: The initial pressure at which the pilot relief valve opens is lower than that at which it holds. Thus, the initial peak pressure is reduced.

As the slideblock moves, the spring loaded neutral stop plunger follows the control piston, and when the slideblock reaches its predetermined minimum stroke position (slip stroke) the neutral stop plunger permits any additional fluid which enters the control piston chamber to be exhausted to drain thru port "U." Thus, the neutral stop plunger prevents hunting (oscillation) that would occur if slideblock went past slip stroke position to absolute neutral.

At the end of the pressure cycle, or when pressure has been reduced, the slideblock returns toward full

stroke. The IPR plunger moves toward its original position with IPR valve spring extended. The dash-pot action in this direction thru dwell orifice "E" requires approximately two seconds before the pressure on top of the pilot relief valve piston is released.

The IPR time adjustment located between the IPR valve and pilot relief valve piston governs the rate at which the gear pump fluid enters behind the piston. Thus, the adjustment governs the length of time required to build the minimum pressure setting at which the valve opens and starts to unload the unit.

In the event excessive pressure passes thru the pilot relief valve, a control relief valve is included in the control for protection.

REMOTE OPERATED CONTROLS.

Functionally, these controls operate like the direct controls previously described. The difference is in the physical location of the valves - they are not an integral part of the control - thus permitting remote mounting. The neutral stop plunger is combined with the maximum stroke adjusting screw assembly (an adjusting screw on the spring operator side is not necessary). Like the direct type, the remote controls can be used in combination with other controls.

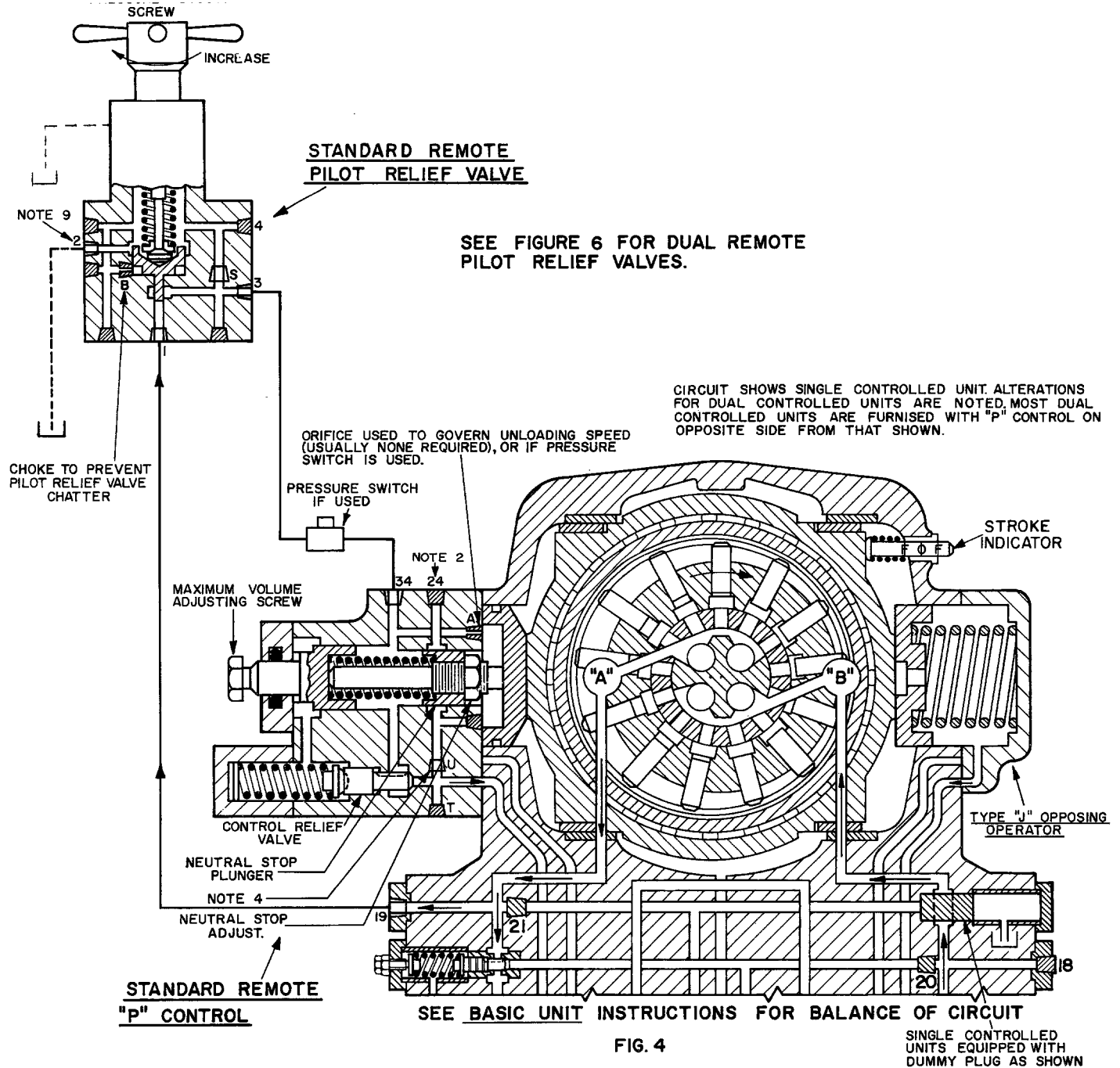


Figure 4. Fluid Circuit for Remote, Standard Type "P" Control. (5V-10110-L).

CIRCUIT NOTES

NOTE 1. When using recommended circuit for starting or stopping unit under load (Figure 8), this port is connected to 3-way valve.

NOTE 2. When used on dual controlled units, control port 24 is connected to units port 11 or 13 (gear pump pressure).

NOTE 3. When using recommended circuit for starting or stopping unit under load (Figure 8), this port is plugged.

NOTE 4. When used on dual controlled units, this port is plugged.

NOTE 5. When used on dual controlled units, this port is connected to port 19 (if control is on left side, as shown) or port 18 (if control is on right side).

NOTE 6. When used on single controlled units (as illustrated), this port is connected to port 19 (if control is on left side), or port 18 (if on right side).

NOTE 7. When used on dual controlled units, this port is open.

NOTE 8. Size 60 and 100 units may have an adjustable choke in addition to this orifice.

NOTE 9. When used on dual controlled units, valve port 2 is connected to port 11 or 13.

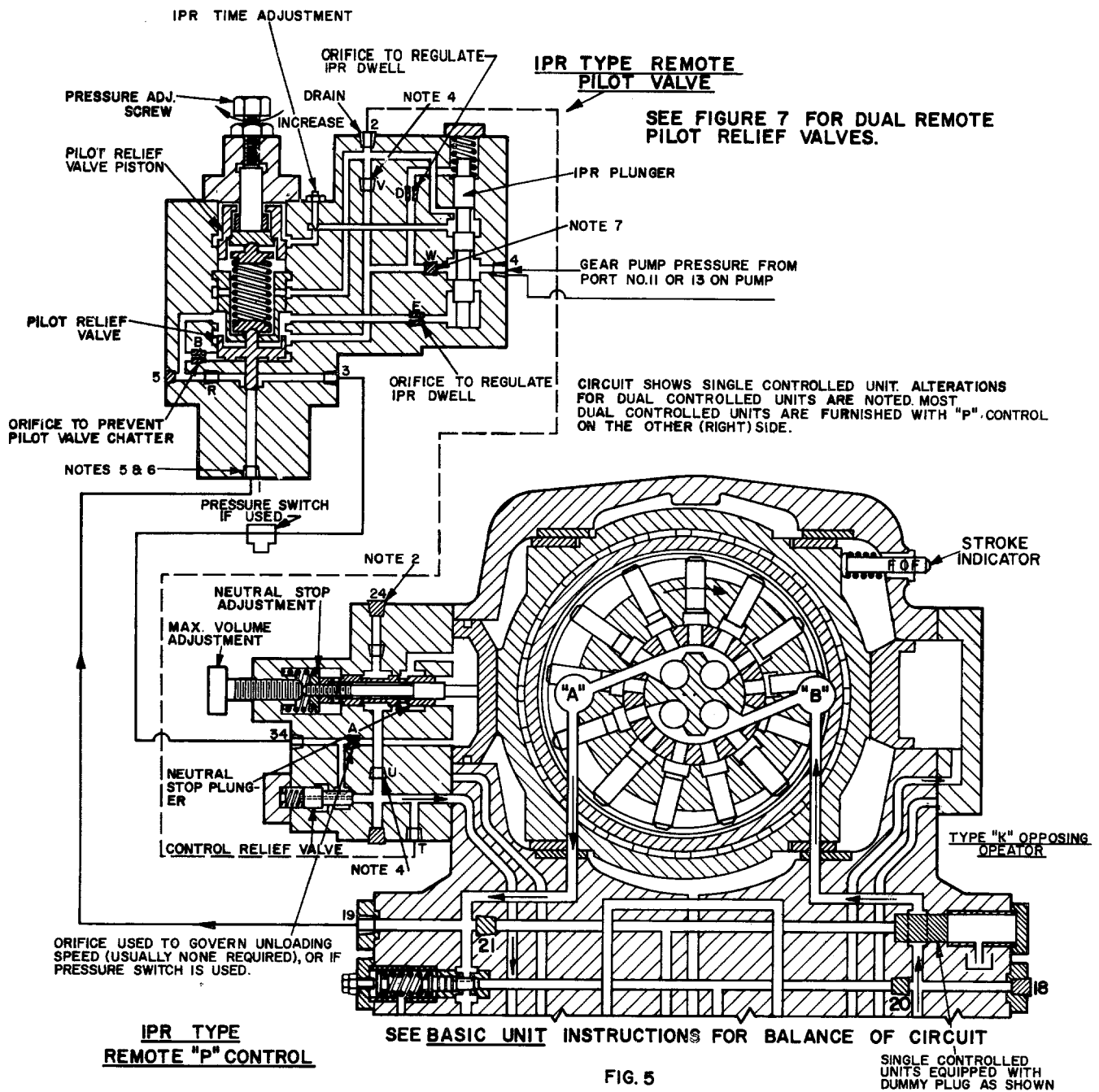


FIG. 5

Figure 5. Fluid Circuit for Remote, IPR Type "P" Control. (5V-10110-L). Circuit notes on page 4.

III. SPECIFICATIONS.

- A. Maximum holding pressure in psi.
- B. Minimum holding pressure in psi for single controlled units.
- C. Minimum holding pressure in psi for dual controlled units.
- D. Neutral stop plunger setting % of eccentricity.
- E. Approx. control relief valve setting, in psi (single control units only). Dual controlled units may be set as high as 350 psi.

Pressure Series	A	B	C	D*	E
1100	1225	200	350	8	170
1700	1850	350	550	11	170
2500	2750	350	550	15	170

*Neutral stop plunger for all IPR control series should be set for 18% of eccentricity.

F. Size Unit	Max. Eccentricity, inches
4	0.198
8	0.187
12 & 20	0.250
35 & 60	0.375
100	0.406
150	0.531

IV. MALFUNCTIONS & CAUSES.

- A. CONTROL HUNTS (OSCILLATES).
 1. Incorrect adjustment of neutral stop plunger.
 2. Broken neutral stop plunger spring.
 3. Sticking pilot relief valve or spring guide.

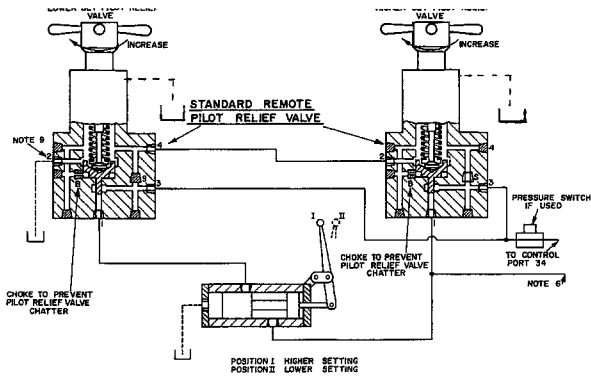


Figure 6. Fluid Circuit for Remote Two Pressure Standard Type Valves (5V-10110-L). Circuit Notes on Page 4.

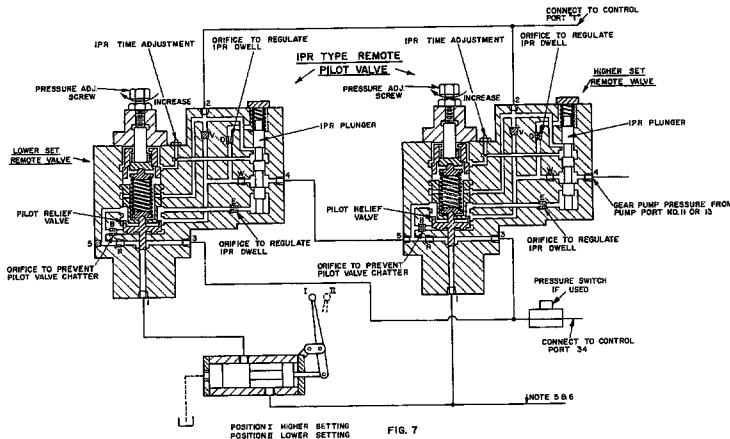


Figure 7. Fluid Circuit for Remote Two Pressure IPR Type Valves (5V-10110-L). Circuit Notes on Page 4.

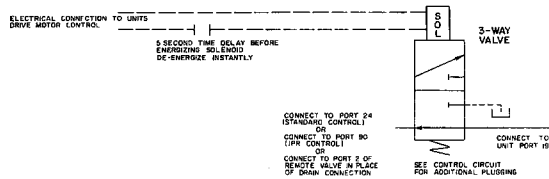


Figure 8. Recommended Circuit to Prevent Starting, Stopping Under Load. (5V-10110-L).

B. CONTROL UNLOADS TOO FAST.

1. Control relief valve set too high or binding.
2. Clogged control relief valve orifice "C."
3. Control unloading speed orifice "A" is needed or is too large.
4. Defective opposing operator or basic unit.

C. CONTROL UNLOADS TOO SLOW (EXCESSIVE PEAKS).

1. Unloading speed orifice "A" is clogged or too small.
2. Binding pilot relief valve plunger or spring guide.
3. Control relief valve set too low or leaking.
4. Broken control cylinder piston ring.
5. Defective opposing operator or basic unit.

D. CONTROL DOES NOT UNLOAD UNIT.

1. Units high pressure relief valve set lower than control's pilot relief valve.
2. Control relief valve set too low.
3. Sticking pilot relief valve or spring guide.
4. Leaking control housing gaskets.
5. Defective opposing operator or basic unit.

V. ADJUSTING & TESTING

A. MAXIMUM DELIVERY. If maximum volume (pump) or speed (transmission) adjustment is made by a screw in the opposing spring operator, turn the screw clockwise to increase. If adjustment is made by knob on "P" control, turn counter-clockwise to increase.

B. PRESSURE ADJUSTMENT. Pressure can be tested by observing pressure gage in pump high pressure port or system during the holding cycle. Unloading pressure is increased by turning the adjusting screw clockwise and decreased by turning counter-clockwise. On late model units, maximum holding pressure is set at the factory by a nut pinned to the adjusting screw. Early models lack this feature, so care must be exercised to prevent exceeding maximum holding pressure. For minimum and maximum holding pressure recommendations, see III-A, B and C. **NOTE:** the control's pilot relief valve must be set lower than units high pressure relief valve. If more than one remote pilot relief valve is used, the pilot relief valve with port 1 connected directly to the unit (rather than thru the selector valve) must be set for the higher operating pressure.

C. **NEUTRAL STOP.** Neutral stop position can be tested by measuring slideblock distance between full stroke "F" indicator and boss during holding cycle. Subtract this distance from full eccentricity given in III-F and compute what percentage the result is of full eccentricity. Compare with III-D. Adjust for setting in III-D. On direct standard controls, turning screw (334) counter-clockwise decreases eccentricity setting. On remote standard controls, turning nut (322) and plunger (314) counter-clockwise on screw (315) increases setting. On IPR controls, turning nut (322) and plunger (314) counter-clockwise on screw (315) decreases setting.

D. **CONTROL RELIEF VALVE.** For direct controls, screw a gage in port 35. For remote controls, place a "T" fitting in port (34), connect pressure line from control valve to one leg, the other leg to port 34 and a pressure gage in the remaining leg. Remove orifice "A" (if used) screw plug in control port "A." Then by starting unit and throttling delivery (pump) or placing a load on output shaft (transmission) the pressure at which the control relief valve blows can be read. Add shims to raise pressure, remove to lower. Be sure to remove plug and replace orifice "A" (if used) when done.

E. **IPR TIME ADJUSTMENT.** Clockwise adjustment increases time delay and counterclockwise decrease it.

VI. DISASSEMBLY.

Disconnect any external piping to the control. Remove control housing screws and pull housing (300) from unit as an assembly. Remove piston screws (301A) and piston (301) with piston ring (302) from bore. Remove spacer (354) if used. During the rest of disassembly, observe and tag all O-rings, seals, orifices and plugs so they will be returned to their original positions upon assembly. If orifices are removed for inspection, take them out one at a time, clean, inspect and screw them back in to prevent mixing them. Some type "P" controls may vary from those described and illustrated so observe parts and their positions carefully during disassembly.

DIRECT, STANDARD TYPE (Sizes 4 thru 100). See figure 9. Remove neutral stop assembly (331, 334 and 332). DO NOT turn screw (334) or readjustment will be necessary (Section V-C). Unscrew socket head cap screws (320A) and remove spring cover (320) with pressure adjusting screw (315). Withdraw pilot relief valve guide piston (311), shims (319) if used, spring (309), spring guide (310), spring seat (308) and plunger (307). If plunger binds, remove plug below pilot relief valve, and tap out with a brass rod. Remove control relief valve spring (328), shims (321, 321A) and plunger (323). Remove cap and plug (327) at bottom of control housing and withdraw bushing (324), spacer (325) and seat (329). Remove pipe plugs so orifices can be removed (one at a time), inspected, cleaned and reinstalled.

DIRECT, IPR TYPE (Sizes 100 & 150). See figure 9. Back out screws (337A) of stroke adjusting head (337) evenly so the spring, which is under tension, will not cock assembly components. Remove head (337), spring (332), neutral stop screw (315) and neutral stop plunger (314). DO NOT turn adjusting

nut (322) or readjustment will be necessary (Section V-C). Remove cover (342), spring (344) and IPR plunger (341). Remove control relief valve cover (327), spring (328), spring seats (333 & 329), shims (321) and plunger (323). If plunger is stuck or bushing (324) must be removed, they can be driven out from the opposite side by tapping with a brass rod. Back out pilot relief valve head screws (320A) evenly so spring, under compression, does not cock assembly. The pilot relief valve head (320), adjusting screw (334), pilot relief valve piston (311) will come off as an assembly. Do not disassemble further unless necessary. Pilot valve springs (309 and 310) can be removed as well as spring seats (308 and 331). Remove segment holding screws (325A) and segments (325). Plunger guide (326) can be withdrawn and pilot relief valve cup (335) with plunger (307) pressed in it can be withdrawn. If plunger is stuck, remove flange (304) and tap plunger out using a brass rod. Remove bushing (306). Remove choke assembly (340). Remove pipe plugs so orifices can be removed (one at a time), inspected, cleaned and reinstalled.

REMOTE, STANDARD TYPE (Sizes 4 thru 100). See figure 10. Neutral stop screw (315) with neutral stop plunger (314) and spring (316) can be withdrawn from the housing. DO NOT turn plunger or adjusting nut (322) or readjustment will be necessary (Section V-C). If necessary, screws (319A) can be removed and full stroke adjusting screw can be removed from the control as an assembly. Remove control relief valve head (311) carefully as spring (308) is under compression. Withdraw spring (308) and spring seat (306). Leave shims (310) and seat (309) in head (311) unless reshimming of relief valve to adjust its pressure is necessary. Control relief valve plunger (304) can be pulled out.

To disassemble the remote control valve, refer to figure 11. Back out screws (6) evenly to avoid cocking spring (25) that is under compression. Remove cover assembly with adjusting screw (5). Withdraw pilot relief valve guide piston (11), shims (30) if used, spring (25), spring guide (24) and spring seat (13). Pull out plunger (27), if it binds remove flange (15) and tap out plunger with a brass rod. Remove pipe plugs in remote valve and control so orifices can be removed (one at a time), inspected, cleaned and reinstalled.

REMOTE, IPR TYPE (Sizes 100 and 150). See figure 10. Back out screws (319A) of stroke adjusting head (319) evenly so spring (316) under compression does not cock assembly. Remove head (319), spring (316) and withdraw neutral stop adjusting screw with lock nut (322) and plunger (314). DO NOT turn plunger or lock nut or readjustment will be necessary. (Section V-C). Remove control relief valve cover (311), spring (308), spring seat (306). Leave seat (309) in head with shims (310) unless reshimming to change control relief valve setting is necessary. Remove plunger (304). If plunger is stuck or bushing has to be removed, tap out from flange side with a brass rod.

See figure 12 for disassembly of remote valve. Back out screws (43) of head (42) evenly to avoid cocking spring (44) which is under compression. Remove head (42), spring (44) and IPR plunger (45). Back

(Continued on page 10)

PARTS LIST (Figure 9)

DIRECT STANDARD (Size 8 thru 100)

Part No.	Description	Part No.	Description	Part No.	Description
300.	Housing, Control	313A.	Screw, Drive	331.	Plunger, Neutral Stop
300A.	Screw, Sock. Hd. Cap	314.	Nut, Lock	332.	Spring, Plunger
300B.	Screw, Sock. Hd. Cap	315.	Screw, Press. Adj.	333.	Nut, Lock
300C.	Screw, Sock. Hd. Cap	316.	Nut, Limit	334.	Screw, Neutral Stop
300D.	Screw, Sock. Hd. Cap	317.	Pin, Dowel	335.	Screw, Hol. Hd. Set
301.	Piston, Control	(S)318.	Packing	336.	Orifice "C"
301A.	Screw, Control Piston	319.	Shim	337.	Orifice "B"
(S)301B.	Gasket, Screw	320.	Cover	338.	Orifice "F"
302.	Ring, Piston	320A.	Screw, Sock. Hd. Cap	339.	Cap, Spring
303.	Shim	320B.	Screw, Sock. Hd. Cap	340.	Nut, Lock
304.	Bushing, Open	321.	Shim, 3/32"	(S)341.	Gasket
**304A.	Bushing, Closed	321A.	Shim, 1/4"	342.	Tubing, Assembly
305.	Spacer, Bushing	322.	Shim, 5/32"	**343.	Tubing, Assembly
306.	Bushing, Pilot R. V.	*323.	Plunger, Control R. V.	**344.	Tubing, Assembly
307.	Plunger, Pilot R. V.	*324.	Bushing, Control R. V.	**345.	Plug, Pipe
308.	Seat, Spring	##325.	Spacer, Bushing	(S)346.	Packing
309.	Spring, Pilot R. V.	#326.	Spacer, Piston	347.	Screw, Adj. Choke
310.	Guide, Spring	327.	Cap, Control R. V.	**354.	Spacer, Control Piston
311.	Piston, Guide	328.	Spring, Control R. V.	(S)**354B.	Gasket, Spacer
(S)312.	Gasket, Cover	*329.	Seat, Plunger	355.	Orifice "A"
313.	Screw, Drive	(S)330.	Gasket, Cap	356.	Orifice "X"

DIRECT IPR (Size 100 and 150)

Part No.	Description	Part No.	Description	Part No.	Description
300.	Housing, Control	318.	Nut, Bearing, Lock	334C.	Nut, Lock
300A.	Screw, Sock Hd. Cap	318A.	Washer, Lock	335.	Cup, Pilot R. V.
301.	Piston, Control	(S)319.	Gasket, Cap	336.	Orifice
301A.	Screw, Control Piston	320.	Cover, Pilot R. V.	337.	Head, Stroke Adj.
(S)301B.	Gasket, Screw	320A.	Screw, Sock. Hd. Cap	337A.	Screw, Sock. Hd. Cap
(S)303.	Gasket, Head	321.	Shim, 1/4"	338.	Gland, Adj. Screw
304.	Flange, Pilot R. V.	321A.	Shim, 1/16"	338A.	Screw, Sock. Hd. Cap
304A.	Screw, Sock. Hd. Cap	321B.	Shim, 1/32"	(S)339.	Seal, Assemb.
305.	Shims, .003"	322.	Nut, Neutral Stop	340.	Screw, Choke
305A.	Shims, .005"	*323.	Plunger, Control R. V.	341.	Plunger, IPR
306.	Bushing, Pilot R. V.	*324.	Bushing, Control R. V.	342.	Cover, Spring
307.	Plunger, Pilot R. V.	325.	Segment	342A.	Screw, Sock. Hd. Cap
308.	Seat, Spring	325A.	Screw, Sock. Hd. Cap	(S)343.	Gasket, Cover
309.	Spring, Outer	326.	Guide, Plunger	344.	Spring, IPR
310.	Spring, Inner	327.	Cap, Control R. V.	345.	Sleeve, Choke Screw
311.	Piston, Pilot R. V.	327A.	Screw, Sock. Hd. Cap	346.	Nut, Seal
(S)312.	Gasket	328.	Spring, Control R. V.	347.	Plate, Instruction
313.	Plate, Name	329.	Seat, Spring	348.	Plug, Pipe
313A.	Screw, Drive	(S)330.	Gasket, Cap	349.	Screw, Stroke Adj.
314.	Plunger, Neutral Stop	331.	Seat, Spring	350.	Knob, Stroke, Adj.
315.	Screw, Neutral Stop	332.	Spring, Neutral Stop	350A.	Pin, Knob
316.	Nut	333.	Seat, Spring	**351.	Tubing, Assemb.
316A.	Shim, 1/32"	334.	Screw, Adjusting	**354.	Spacer, Control Piston
317.	Bearing	334A.	Pin, Adj. Screw	(S)**354B.	Gasket, Spacer
		334B.	Nut, Limit		

*Parts numbered 323, 324 and 329 are furnished only as assemblies.

**Parts are applicable only to combination type controls.

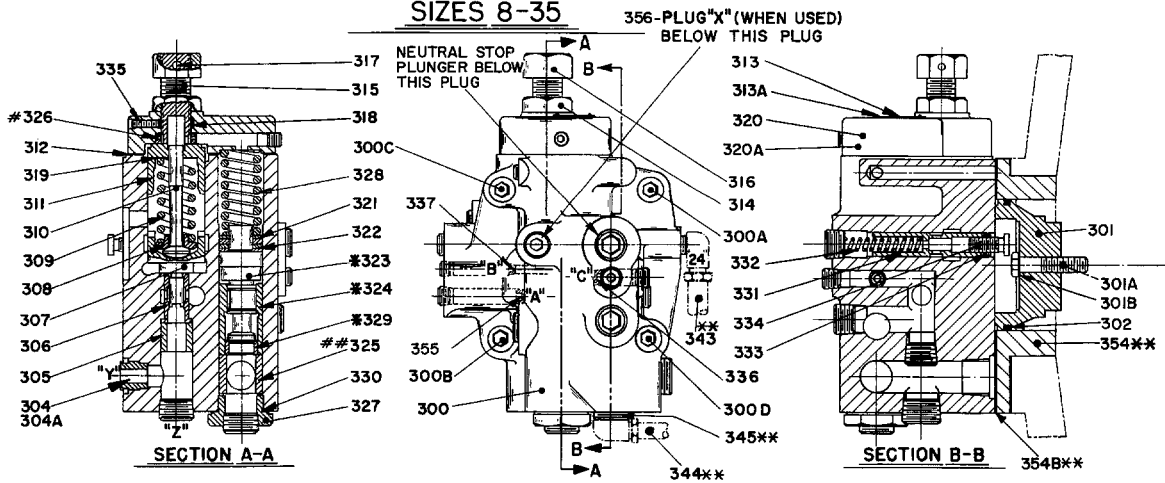
#Parts applicable to size 8 and 12 units only.

##Parts applicable to size 20 and 35 units only.

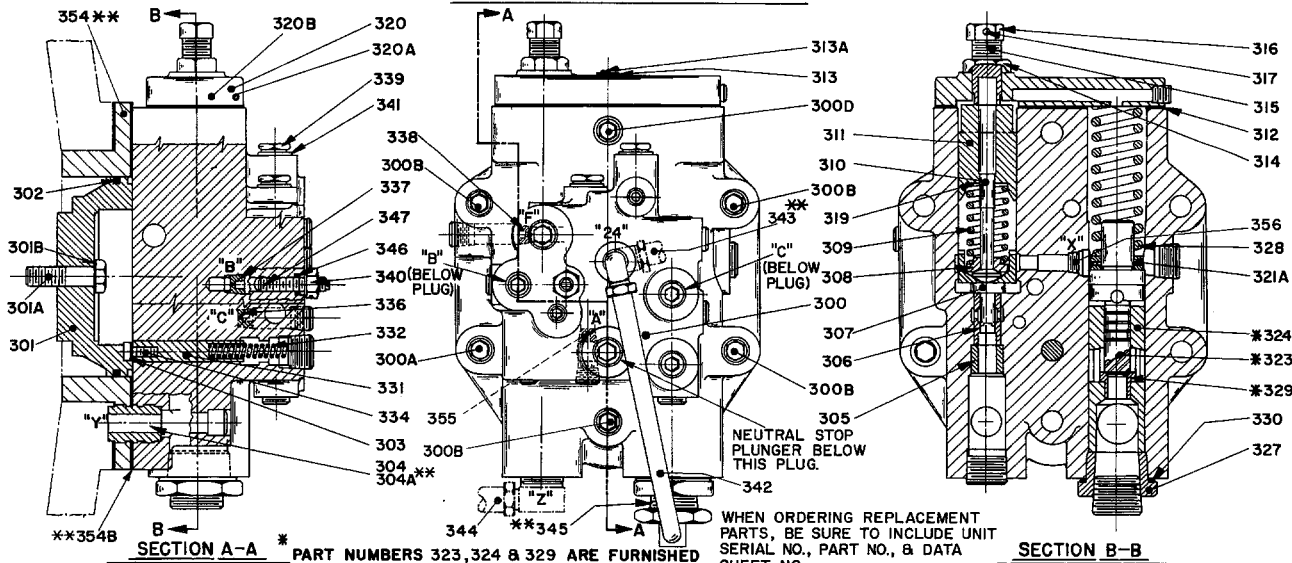
When ordering replacement parts be sure to include unit serial number, data sheet (DS) number and part number.

Specify type of hydraulic fluid for packings and seals.

SIZES 8-35



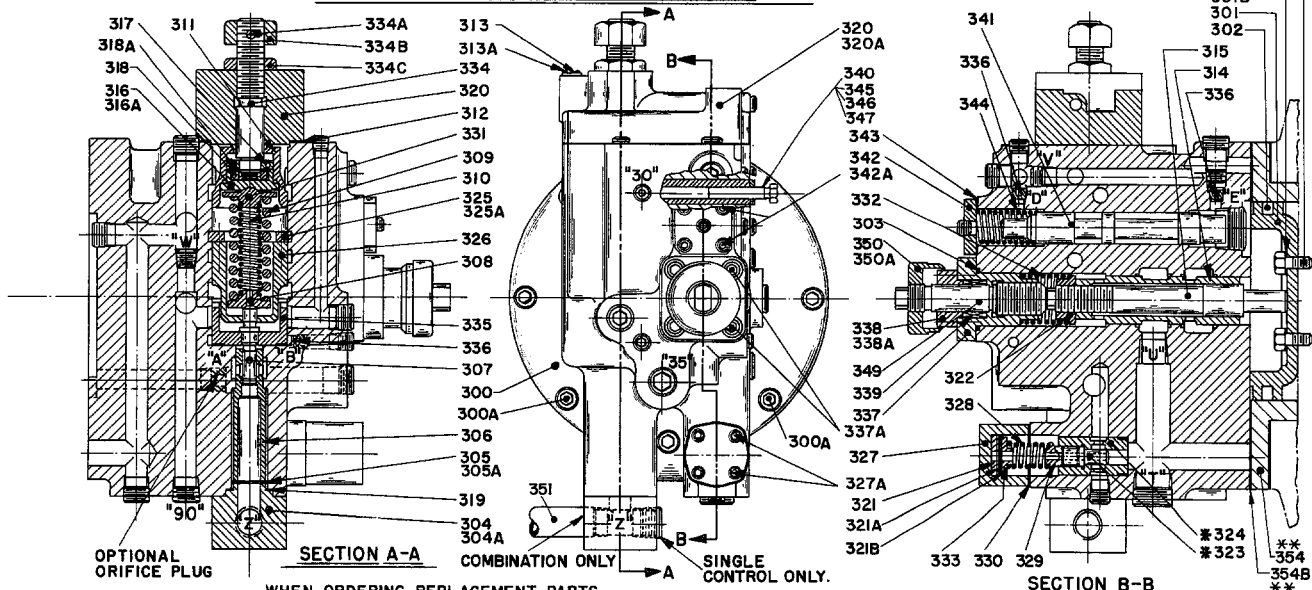
SIZES 60-100



*PART NUMBERS 323, 324 & 329 ARE FURNISHED AS AN ASSEMBLY ONLY.

SPECIFY TYPE OF HYDRAULIC FLUID FOR PACKINGS & SEALS.

I.P.R. FOR SIZES 100-150



WHEN ORDERING REPLACEMENT PARTS, BE SURE TO INCLUDE UNIT SERIAL NO., PART NO., & DATA SHEET NO.

*PART NUMBERS 323 AND 324 ARE FURNISHED AS AN ASSEMBLY ONLY. SPECIFY TYPE OF HYD. FLUID FOR PACKINGS & SEALS.

Figure 9. Parts Drawing, Direct, Standard and IPR Type Controls. DS-947504-C (503223-C) Page 9

PARTS LIST (Figure 10).

REMOTE, STANDARD (Size 8 thru 100)

Part No.	Description	Part No.	Description	Part No.	Description
300.	Housing, Control	311A.	Screw, Sock. Hd. Cap	323.	Orifice
300A.	Screw, Sock. Hd. Cap	312.	Spacer, Bushing	324.	Shim
301.	Piston, Control	(S)313.	Seal, O'ring 1/8 x 1-1/4 70	325.	Spacer, Screw
301A.	Screw, Control Piston	314.	Plunger, Neutral Stop	(S)326.	Gasket, Flange
(S)301B.	Gasket, Screw	315.	Screw, Neutral Stop	327.	Flange, Port 34
302.	Ring, Piston	316.	Spring, Neutral Stop	327A.	Screw, Sock. Hd. Cap
303.	Screw, Adj.	317.	Screw, Stroke Adj.	(S)328.	Packing Adj. Screw
*304.	Plunger, Control, R. V.	(S)318.	Gasket, Head	**329.	Tubing, Assembly
*305.	Bushing, Control, R. V.	319.	Head, Stroke Adj.	**330.	Plug, Pipe
306.	Seat, Spring Inner	319A.	Screw, Sock. Hd. Cap	331.	Head, Non-Adj.
(S)307.	Gasket, Cap	(S)320.	Seal, O'ring 1/8 x 1-1/4 70	331A.	Screw, Sock. Hd. Cap
308.	Spring, Control, R. V.	321.	Nut, Limit	332.	Handwheel
309.	Seat, Spring Outer	321A.	Pin, Adj. Screw	332A.	Pin
310.	Shim, 1/4"	321B.	Nut, Lock	**354.	Spacer, Control Piston
310A.	Shim, 1/32"	322.	Nut, Adjusting	(S)**354B.	Gasket, Spacer
311.	Cap, Control, R. V.				

S Included in Seal Kit

REMOTE, IPR (Size 100 & 150)

Part No.	Description	Part No.	Description	Part No.	Description
300.	Housing, Control	308.	Spring, Relief Valve	(S)318.	Gasket, Head
300A.	Screw, Sock. Hd. Cap	309.	Seat, Outer Spring	319.	Head, Stroke Adj.
301.	Piston, Control	310.	Shim, 1/4"	319A.	Screw, Sock. Hd. Cap
301A.	Screw, Control Piston	311.	Cap, Control R. V.	(S)320.	Packing
(S)301B.	Gasket, Screw	311A.	Screw, Sock. Hd. Cap	**321.	Tubing, Assembly
302.	Ring, Piston	312.	Gland	322.	Nut, Neutral Stop
303.	Knob, Adjust.	312A.	Screw, Sock. Hd. Cap	331.	Head, Non-Adjust.
303A.	Pin, Knob	313.	Orifice	331A.	Screw, Sock. Hd. Cap
*304.	Plunger, Control R. V.	314.	Plunger, Neutral Stop	332.	Shim, 1/16"
*305.	Bushing, Control R. V.	315.	Screw, Neutral Adj.	332A.	Shim, 1/32"
306.	Seat, Spring	316.	Spring, Neutral Stop	**354.	Spacer, Control Piston
(S)307.	Gasket, Cap	317.	Screw, Stroke Adj.	(S)**354B.	Gasket, Spacer

*Parts 304 and 305 furnished only as assemblies.

**Parts applicable only to dual controlled units.

O'ring sizes given in cross section x O.D. Duro + 5

When ordering replacement parts be sure to include unit serial number, data sheet number and part number.

out pilot relief valve head screws (3) evenly so spring under compression does not cock assembly. The pilot relief valve head (2), adjusting screw (8), pilot relief valve piston (9) will come out as an assembly. Do not disassemble further unless necessary. Pilot valve springs (15 and 16) can be removed, as well as spring guide (14 and 20). Remove segment holding screws (18), segment (17) and plunger guide (19) can be withdrawn. Pilot relief valve cup (22) with plunger (21) pressed in it can be withdrawn. If plunger is stuck in bushing (29), remove flange (31) and tap plunger out with a brass rod. Remove pipe plugs in remote valve and control so orifices can be removed (one at a time), inspected and reinstalled.

VII. INSPECTION.

Clean all parts thoroughly. Inspect parts for signs of undue wear, check all O'rings, seals and gaskets for signs of hardening or deterioration, replace if

necessary. Make certain that all orifices, passages, bores and bushings are clean. Test all plungers in their bores, bushings, or on their seats. Plunger assembly movement should be smooth and the components free of dirt and burrs. Lap fits and seals if necessary. Be sure to remove all lapping compound. Pay particular attention to the fit of the pilot relief valve plunger in its bushing, and spring guide (stem) in guide piston. Check control piston, its ring and bore for signs of wear.

VIII. ASSEMBLY.

Lubricate all parts with a light coating of hydraulic fluid just prior to assembly. Reassemble components in reverse order of disassembly. Be sure all orifices, chokes, plugs and shims are returned to their original positions. Mount control on unit, connect any external connections, test and adjust as described in Section V.

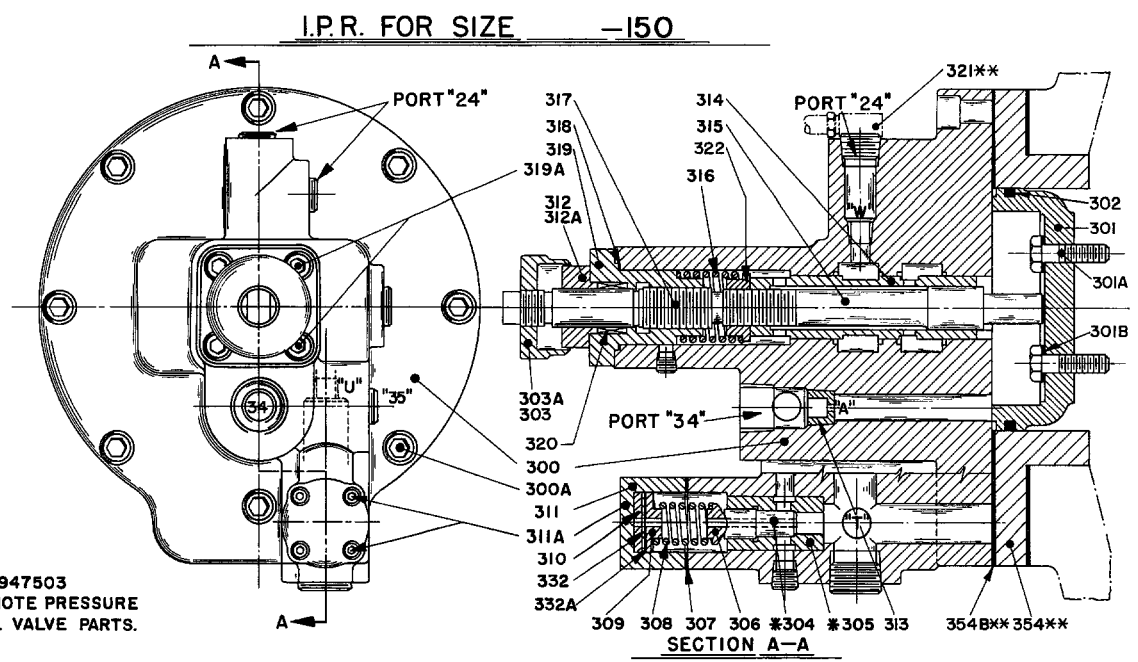
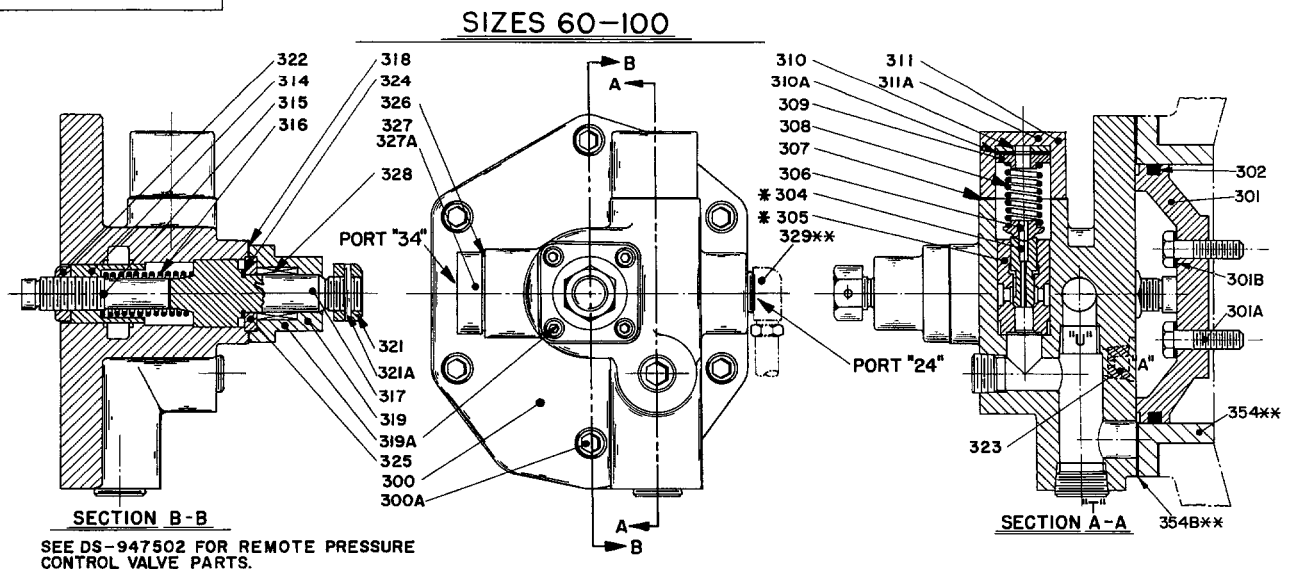
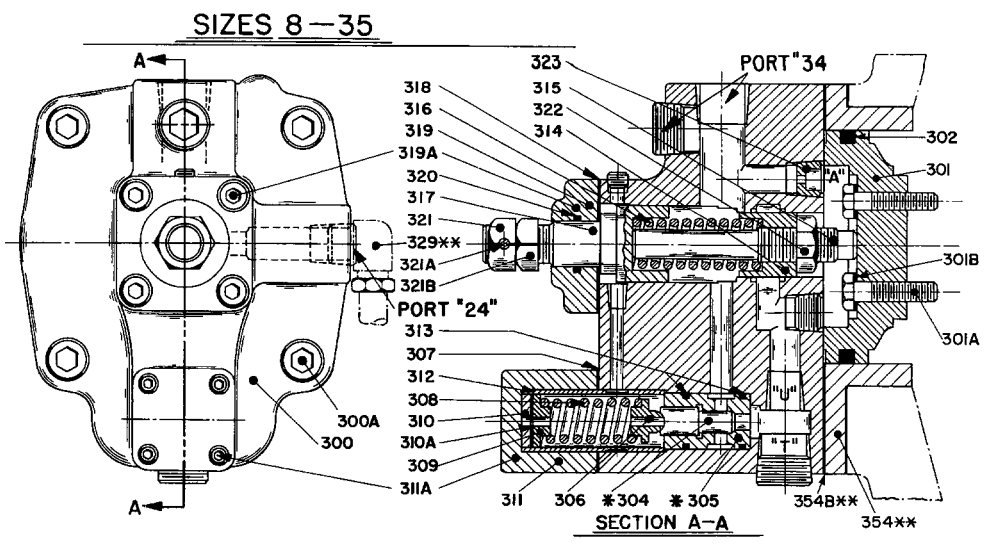
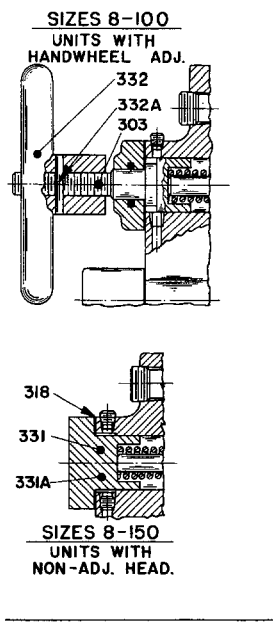
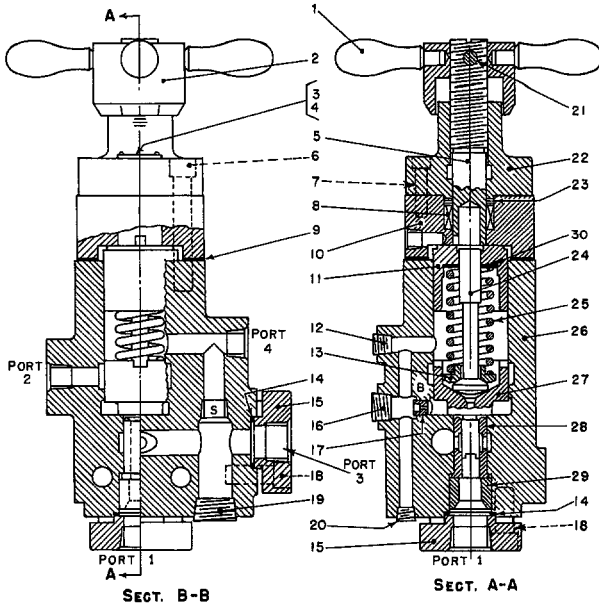


Figure 10. Parts Drawing, Remote, Standard and IPR Type Controls. DS-947505-A (503224-A).
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STANDARD REMOTE CONTROL VALVE



Part No.	Description	Part No.	Description
1.	Handle	16.	Plug, Pipe
2.	Knob, Adjusting	17.	Orifice
3.	Nameplate	18.	Screw, Sock. Hd. Cap
4.	Screw, Drive	19.	Plug, Pipe
5.	Screw, Adjusting	20.	Plug, Pipe
6.	Screw, Sock. Hd. Cap	21.	Pin, Taper
7.	Screw, Sock. Hd. Cap	22.	Cap, Valve
(S)8.	Packing, Adj. Screw	23.	Shims, Seal
(S)9.	Gasket	24.	Guide, Spring
10.	Head, Valve	25.	Spring
11.	Piston, Guide	26.	Body, Valve
12.	Plug, Pipe	27.	Plunger, Pilot Relief
13.	Seat, Spring	28.	Bushing, Guide
(S)14.	Gasket	29.	Sleeve
15.	Flange	30.	Shim

S Included in Seal Kit

When ordering replacement parts be sure to include unit "L" number, data sheet number and part number. Specify type of hydraulic fluid for O'rings and seals.

Figure 11. Parts Drawing, Remote Pilot Relief Valve, Standard Type. DS-947502-A (47272-A).

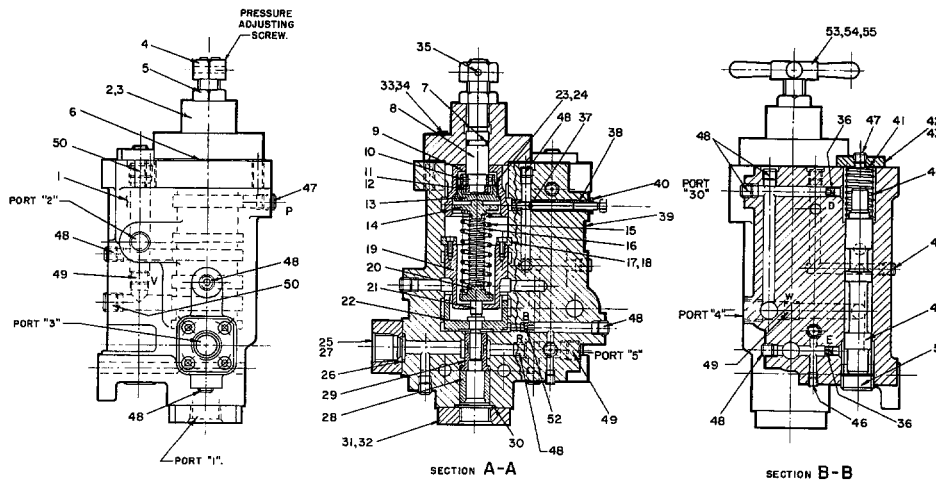


Figure 12. Parts Drawing, Remote Pilot Relief Valve, IPR Type. DS-947503-B (503271-B).

Remote Pilot Relief Valve, IPR Type

Part No.	Description	Part No.	Description	Part No.	Description
1.	Body, Valve	20.	Guide, Lower Spring	39.	Plate, Instructions
2.	Cap, Valve	21.	Plunger	40.	Nut, Choke Screw
3.	Screw, Sock. Hd. Cap	22.	Cup, Plunger	(S)41.	Gasket, Cover
4.	Nut, Adjusting	23.	Shim, 1/32"	42.	Cover, Spring
5.	Nut, Lock	24.	Shim, 1/16"	43.	Screw, Sock. Hd. Cap
(S)6.	Gasket	25.	Flange, Port 3	44.	Spring, IPR Plunger
(S)7.	Seal, O'ring, 1/8 x 1-5/16	90(S)26.	Seal, O'ring, 1/8 x 1-5/8 90	45.	Plunger, IPR
8.	Screw, Adjusting	27.	Screw, Sock. Hd. Cap	46.	Plug, 1/4" Pipe
9.	Piston, Pilot R. V.	28.	Sleeve, Anchor	47.	Plug, 3/8" Pipe
10.	Bearing, Adj. Screw	29.	Bushing, Guide	48.	Plug, 1/2" Pipe
11.	Locknut	(S)30.	Seal, O'ring, 3/16 x 2-1/4 90	49.	Plug, 3/4" Pipe
12.	Lockwasher	31.	Flange, Port 1	50.	Plug, 1" Pipe
13.	Nut, Adjusting Screw	32.	Screw, Sock. Hd. Cap	51.	Plug, 1-1/2" Pipe
14.	Guide, Top Spring	33.	Plate, Name	52.	Orifice
15.	Spring, Outer	34.	Screw, Drive	53.	Knob, Adjusting
16.	Spring, Inner	35.	Pin, Taper	54.	Handle, Adj. Knob
17.	Segment	36.	Orifice	55.	Pin Roll
18.	Screw, Sock. Hd. Cap	37.	Screw, Choke		
19.	Guide, Plunger	38.	Sleeve, Choke		

S Included in Seal Kit

When ordering replacement parts be sure to include unit "L" number, data sheet number and part number. Specify type of hydraulic fluid for O'rings and seals. O'ring sizes are given in cross section x O.D. duro \pm .5.