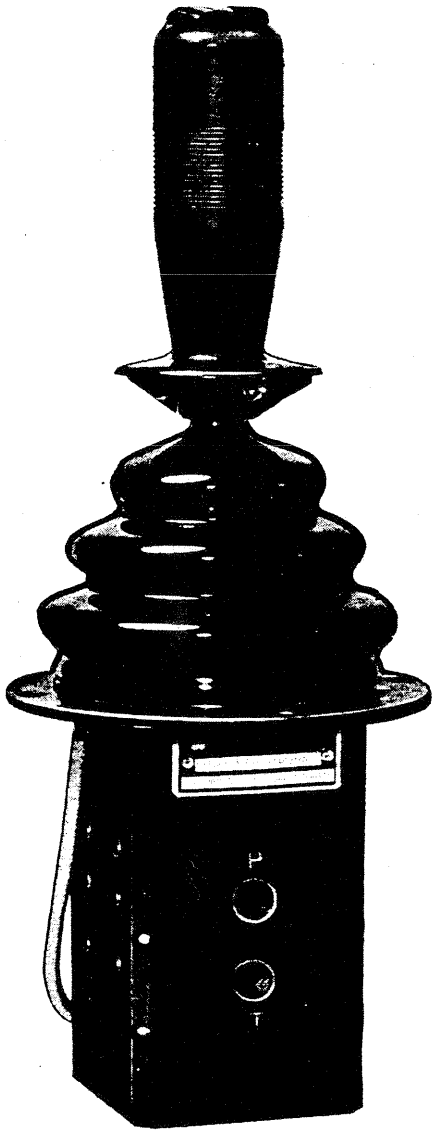
REMOTE CONTROL VALVE SERVICE INSTRUCTIONS



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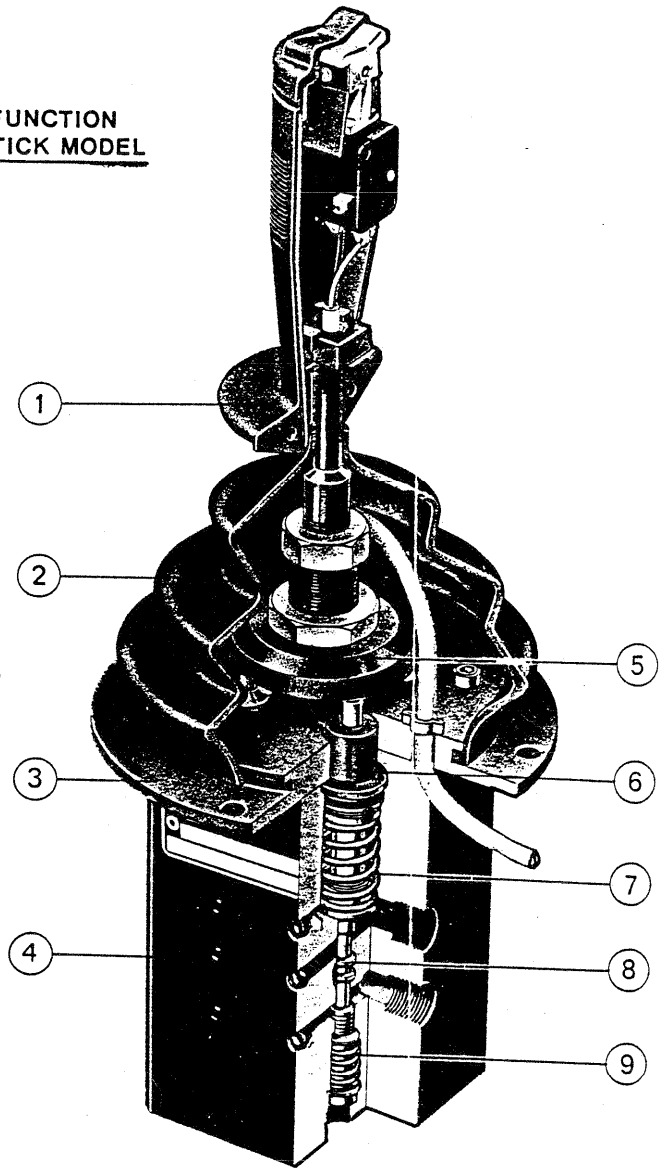
GENERAL

This is an extremely adaptable and versatile design of remote control valve for hydraulic pilot operation of e.g. main valve spools or pump displacement servos.

This valve is principally based on the pressure reducing valve concept, and will from a fixed input pressure create control pressures that vary proportionally with the lever or pedal stroke. Because this valve is equipped with a pre-set spring package containing one or two springs, the control pressure characteristics can be varied within a very large range.

1. Lever with toggle switch handle
2. Bellows
3. Mounting plate
4. Housing
5. Cardan-mounted swashplate
6. Plunger/bushing assembly
7. Control spring cartridge
8. Pressure reducer spool
9. Centering spring

DUAL FUNCTION
JOY-STICK MODEL



MAINTENANCE

Like everything else, this system also demands a certain amount of attention and maintenance if unnecessary breakdowns in operation are to be avoided.

General

1. The pilot lines must always be flushed through before the equipment is started up for the first time. The reason for this is to get rid of "mounting dirt" in the lines. After flushing, make a thorough de-aeration of the system. Air remaining in the valve can cause oscillation of the pilot pressure and noise!

2. Remember to check the filter of the pilot system regularly. This can be done easily if a filter with an indicator is installed.

   It is particularly the first hours of operation after installation which are critical since it is very difficult to carry out an installation without admitting a certain amount of impurities at pipe couplings etc, even if the lines have been flushed.

3. Inspect pipe lines and hoses. Leaks in couplings and similar parts have an annoying tendency to collect dirt. If a hose appears damaged, do not delay replacing it until it begins to leak. Once damage can be seen on the outside, there is a great risk that the rubber coating has also been damaged on the inside. Loose pieces of rubber have given rise to many instances of valve blockage with peculiar fault symptoms, and may be difficult to remove from the system.

Remote Control Valve

Normally, these valves have at least the same life as other hydraulic components. Very little actual maintenance is necessary on the hydraulic parts of the valve.

This valve has U-ring type plunger seals with high wear resistance and very low leakage. If a leakage occurs, due to damaged plunger surfaces or long service life, the seals are replaceable. See the spare parts list! This list is also instructive regarding disassembly/assembly of the valves. When taking the valve apart, take care not to exchange any details from one port to another, and do not lose any shims!

Never take this valve apart unless absolutely necessary, and never dismount more details than necessary!

The mechanical actuation details are exposed to wear and tear, and should be greased now and then.

TROUBLESHOOTING

Equipment

This leaflet
Precision gages 0-100 bar, 0-350 bar
Suitable tools

Procedure

1. Check the input to the valve, so that correct input pressure is really available. The input pressure should read at least 5-10 bars above the necessary "final pressure" required for full stroke of the control object, and should remain at that value also when actuating several functions simultaneously. If not, there is either something wrong with the pilot pump or the pressure control valve. Or, in the case of pilot supply from the main system, check that the initial restriction creates pressure enough, and that the pressure reducer and the eventual accumulator is working correctly.

   NOTE! In the case of an accumulator in the pilot circuit, the accumulator must be charged with oil before a correct pilot pressure can be obtained. Don't forget to check also the gas charging of the accumulator!

2. Now you can check the valve. Connect your gage to the control lines between valve and control object and check the output control pressure vs lever/pedal stroke as close to the control object as possible. Compare to the theorethical setting. A correct output pressure curve should look as follows:

- At zero lever stroke the output pressure should equal the pilot tank line pressure T. All subsequent readings should be measured "above T". T should not be above 1 - 1,5 bar.

- At approx. 3,5° lever stroke, or 1,25 mm plunger stroke the output pressure should equal "start pressure" on the order form within ±0,5 bar. The start pressure may be zero, but usually there is a step to a positive value.

- For increasing stroke, the output control pressure should follow the lever (plunger) movement smoothly, up to "final pressure". Check your order form for the shape of curve your valve should follow! Note that there are four principally different types;

  + Straight line curve
  + Straight line curve plus final step to input pressure
  + Broken line curve (two straight lines)
  + Broken line curve plus final step to input pressure

- There should be no big hysteresis, i.e. no big difference between pressure curves for increasing resp. decreasing stroke. Max 1 bar is normal.

If the output is not correct, the entire valve is best exhanged and returned to your nearest Wagner representative for repair!

NOTE! If your pilot system is equipped with a separate by-pass restriction between the pilot lines leading to the control object (or a tank line by-pass restriction) for reasons of oil exchange and circulation in the pilot lines, do not forget to check that the by-pass flow is less than 0,5 - 1,0 l/min. If not, the incorrect pilot pressure output can be due to excess flow through the valve and the control lines.

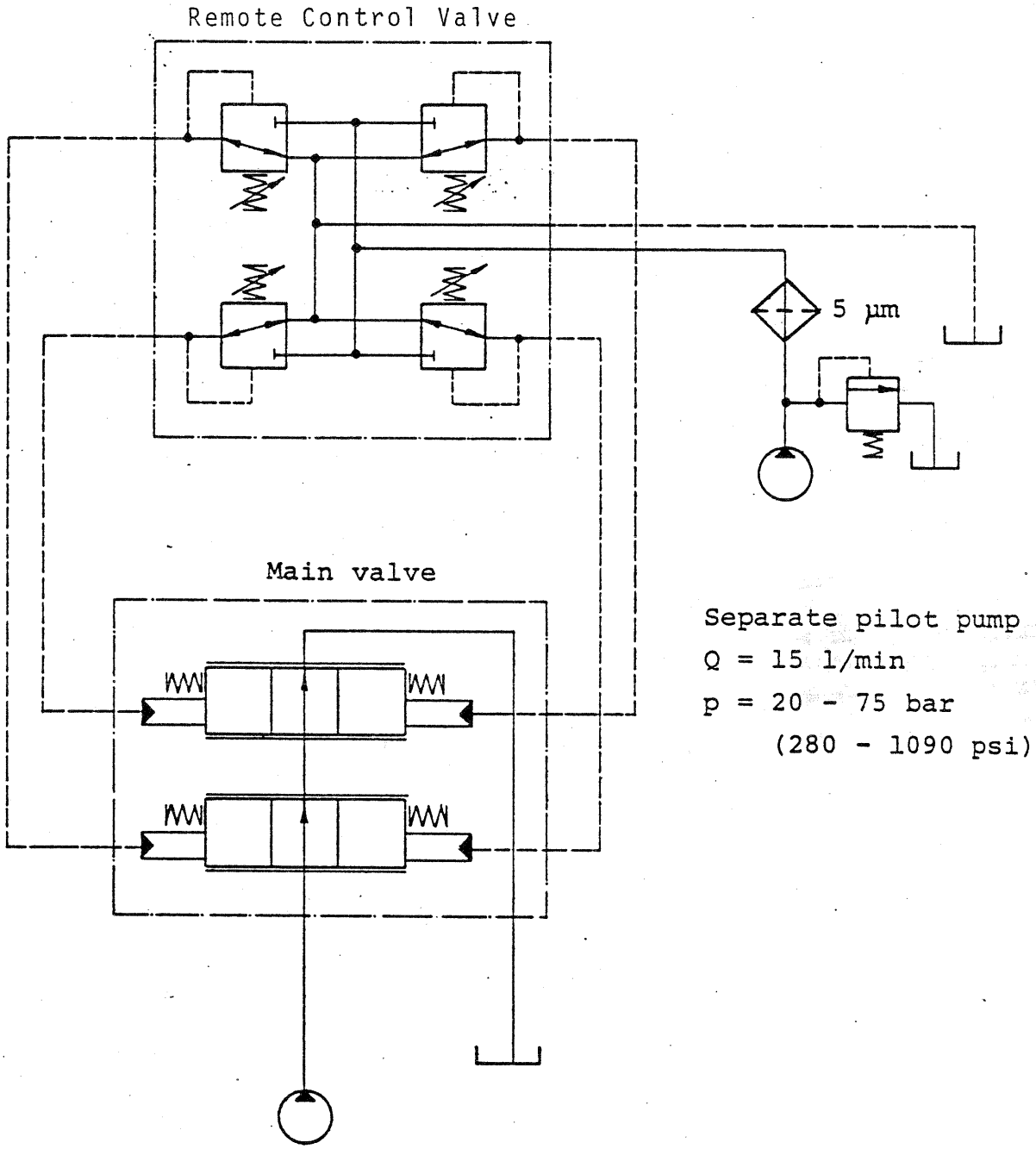
3. If the output control pressure to one side of a servo piston (or one main valve cap) is in order, the next step is to check the pressure on the other side of the servo piston (or the opposite valve cap), while varying the control pressure on the first mentioned side.

   This return side pressure should be only slightly in excess of the pilot tank line pressure if the HVP3 lever/pedal is held fixed in any position giving pressure as said above. If the return side pressure increases with increasing lever stroke, you have probably an excess leakage across an above-mentioned by-pass restriction!

   When moving the lever rapidly, you will read pressure surges on the return side. If these are grossly in excess of 5-10 bars and of fairly long duration, your trouble is probably thin control lines, and the system response time is unnecessarily long.

4. If you have not found anything wrong up to now, the error should be located in the main system! Look for

   Sticking main spools or spring packages
   Broken return springs
   Faulty shock valves or main relief valves
   Worn-out main pumps or motors
   Broken cylinder seals
   And so on...



Remote Control System, connection example.
Separate pilot pump.

SERVICE

A. Removal

1. Relieve hydraulic pressure by working the control lever several times with engine off.
2. Thoroughly clean the valve and surrounding area. Label the hydraulic lines for correct assembly. Disconnect and cap the lines. Plug the ports of the valve to help prevent entry of dirt.
3. Disconnect the electrical lead from the pushbutton switch in the control handle.
4. Remove the valve. Take the valve to a clean work area for disassembly.

B. Disassembly (see spare parts list)

Important: The internal spring assemblies are individually fitted to their bores and must be returned to the same bores from which they were removed. If the assemblies are interchanged between bores, full stroke on the main control valve may not be attained.

1. Clamp the valve lightly in a vise. Mark the position of the mounting plate relative to the valve housing.
2. Peel back the protective boot from mounting plate groove.
3. Use a 4 mm hex-key to remove the four (4) capscrews from the mounting plate. Remove the mounting plate.

Important: Before removing, note the position of each bushing/spring assembly relative to the valve housing. The assemblies are shimmed to match the individual spool/bore. If the bushing/spring assembly is being replaced, the shim pack must be transferred from the old assembly to the new assembly and returned to the same bore from which it was removed.

4. The internal spring assemblies can be removed as follows:
   a. Lift out the bushing spring assembly. (Refer to "seal replacement" for disassembly instructions.)
   b. Lift out the internal spring assembly. Do not disassemble.
   c. To remove the lower spring and retainer assembly, remove the snap ring from bottom side of housing.
   d. Push the spool out of the housing.

C. Inspection and Repair

Clean parts in non-flammable solvent and dry thoroughly. Spring assemblies can be rinsed in non-flammable solvent. Do not disassemble them for cleaning purposes.

Inspect the valve spool and housing bore for scoring. If any is noted, the entire valve must be replaced. The spools are matched to the corresponding housing bores and are not serviced separately.

Service kits are available for rebuilding the valve. The only seal that could be a problem is the lip seal in the bushing/spring assembly. The other seals are static seals. To replace the lip seal, refer to seal replacement instructions.

D. Assembly

Assembly valve in reverse order of disassembly. Be sure that the assemblies are returned to the same bores from which they were removed.

E. Seal Replacement-Bushing/Spring Assembly (Applies to both hand and foot operated valves.)

1. Remove the o-ring from bushing.
2. Remove the snap ring from bottom groove in pin. Remove the shim pack. Keep the shim pack together and retain for reassembly.

   Important: The shims in the bushing/spring assembly control the override feature of the modulator valve. Always install the same number of shims as was removed. Do not interchange shims between the individual assemblies. When installing a new bushing/spring assembly, transfer the shim pack from the assembly being replaced. The shims are not included in the repair kits.

3. To remove the split retainer ring, lay the bushing/spring assembly upside down. Fit a 13/16 inch open end wrench around the bushing, press down on wrench and remove the retainer ring.
4. Remove the spring guide pin, spring and snap ring. Remove and discard the lip seal.

   Important: The spring guide pin must be free of any surface scratches. If any are present replace the pin assembly. A kit is available. Also check the bushing for excessive wear and replace if necessary.

5. Press new seal into the bushing. The lip must face away from the bushing. Install the snap ring.

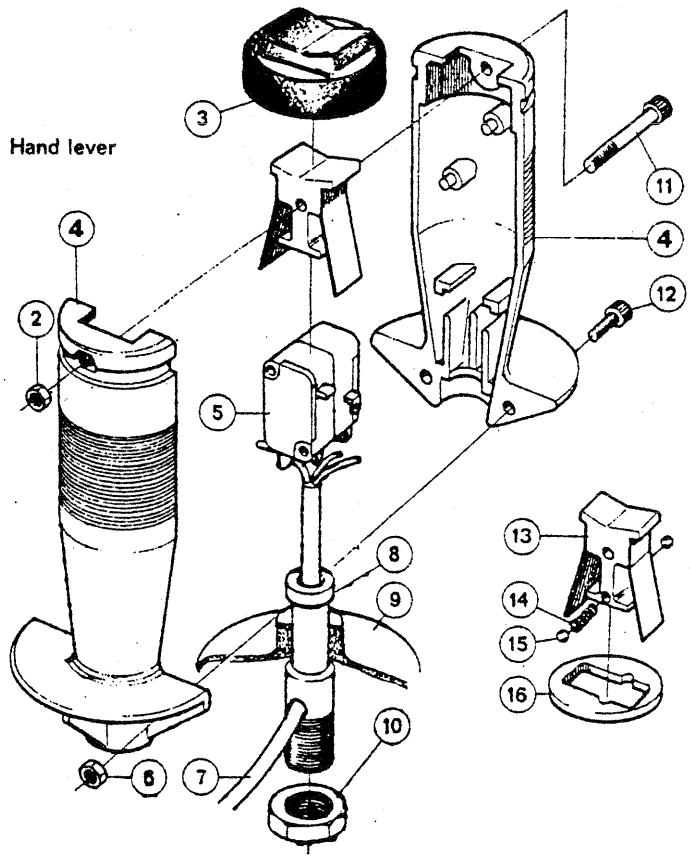
Important: When assembling the spring guide pin make sure that the seal is not allowed to slip back over the pin grooves. The seal is easily damaged. Prior to assembly, coat the moving parts with lubriplate or functional equivalent to prevent damage to the seal.

6. After lubricating slide the stem very carefully through the seal. Take care that the snap ring groove in the stem does not cut the seal. When the seal is past the lower snap ring groove, install the snap ring. Do not allow the seal to move past the snap ring groove a second time, or the seal will leak when the control valve is put back into service.

7. Assembly the same number of shims as were removed from the bushing/ spring assembly and install the bottom snap ring. Install o-ring on bushing. Assembly is ready for installation.

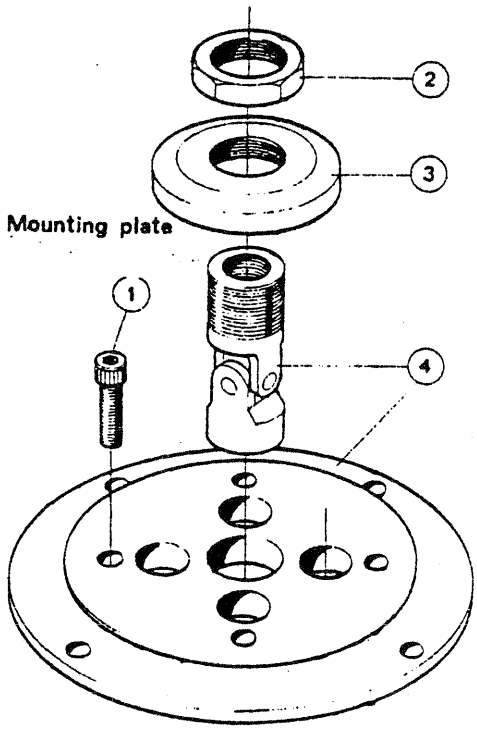
SPARE PARTS LIST

2	Nut
3	Cover
4	Hand grip
5	Micro-switch
6	Nut
7	Wire
8	Lever
9	Bellows
10	Nut
11	Screw
12	Screw
13	Push button
14	Spring
15	Steel ball
16	Detent

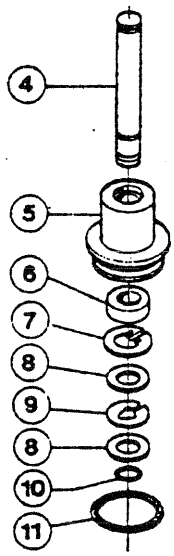


wagner
a division of allied systems company

1 Screw
2 Nut
3 Pressure disc
4 Mounting plate w/cardan joint



4 Guide stud
5 Guide bushing
6 Seal
7 Snap ring
8 Spacer
9 Snap ring
10 Snap ring
11 O-ring



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