



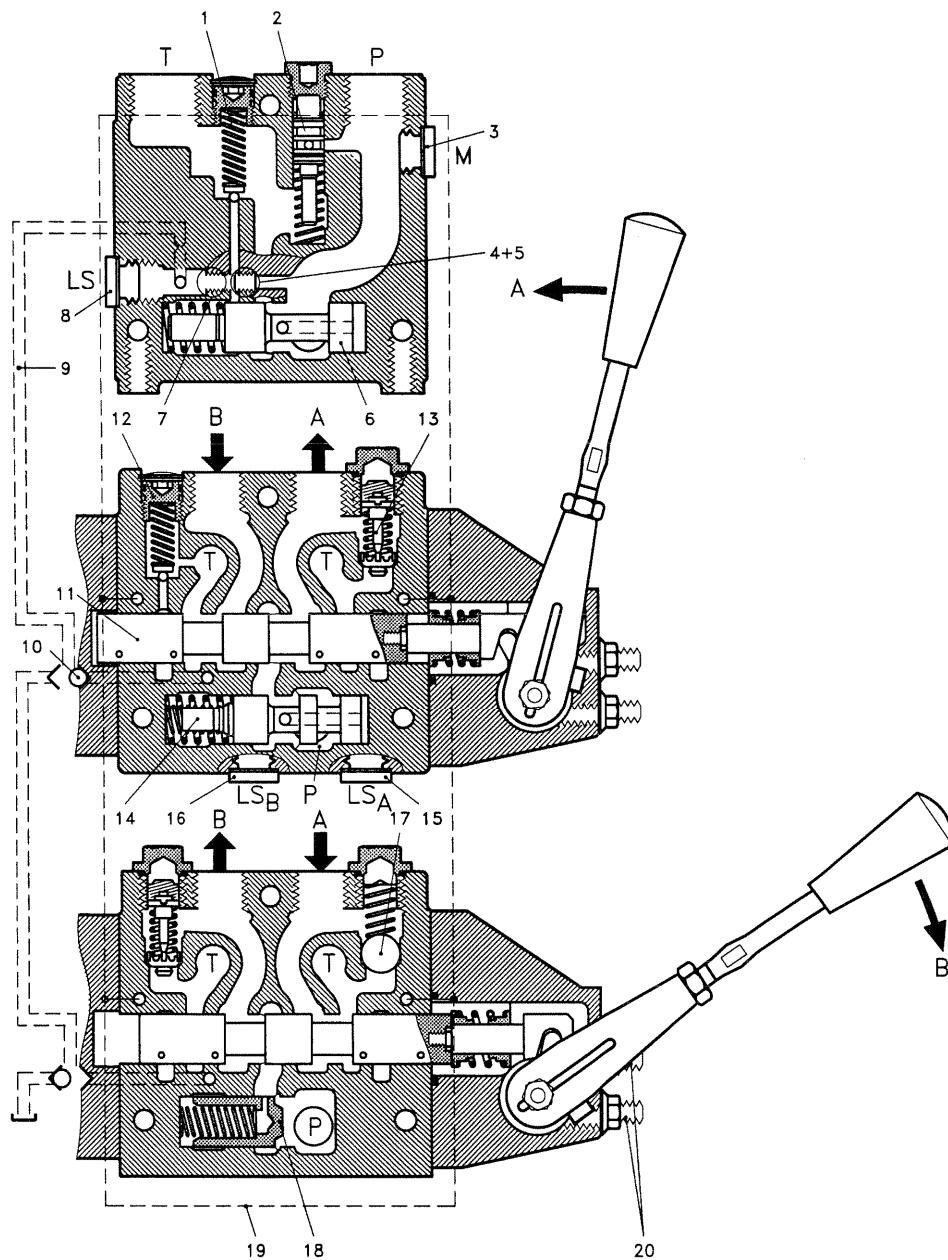
Proportional Control Valve Service (PVG Series)

Hydraulic Valve Service

1. General Description

The PVG Series valves combine directional and flow-control functions. It is a modular, open center system with proportional, load sensing and pressure compensation features.

1. Pressure relief valve
2. Pressure reduction valve for pilot supply
3. Pressure gauge connection
4. Plug, open center
5. Orifice, closed center
6. Pressure adjustment spool
7. Plug, closed center
8. LS connection
9. LS signal
10. Shuttle valve
11. Main spool
12. LS pressure relief valve
13. Shock and suction valve, PVLP
14. Pressure compensator
15. LS connection, Port A
16. LS connection, Port B
17. Suction valve, PVLA
18. Load drop check valve
19. Pilot supply



2. Special Instructions



CAUTION

CAUTION: DUE TO THE COMPLEXITY OF THIS VALVE, IT IS MANDATORY THAT FIELD SERVICE BE LIMITED TO PREVENTIVE MAINTENANCE, BASIC TROUBLESHOOTING AND GENERAL REPAIR PROCEDURES AS OUTLINED IN THIS MANUAL.

For information on adjusting, testing, troubleshooting and repair procedures not covered here, contact the Allied Systems Company Service Department or Danfoss. Cost-free repairs, as mentioned in the Danfoss General Conditions of Sale, are carried out only at Danfoss Nordborg or at service shops authorized by Danfoss (see page 6).

3. Preventive Maintenance

3.1 Periodic Checks

- Make certain circuit fluid connections are tight to prevent leaks or entry of air into system.
- Check reservoir fluid level to assure an adequate supply. When adding fluid, always pour it through a 200 mesh or finer screen.
- Inspect the filter element and replace it if necessary. Continual filtration should be done using a 25 micron full flow filter or a 10 micron bypass filter.
- Look for fluid contamination. If it is contaminated, drain the system and thoroughly clean the reservoir. Change the filters and flush the system. Drain it and refill with clean fluid.
- The reservoir air breather should be replaced if it is dirty.

NOTE: NO PERIODIC ADJUSTMENTS ARE REQUIRED. ALL LUBRICATION IS PROVIDED BY SYSTEM FLUID FLOW.

4. General Repair



CAUTION

WARNING: ALWAYS TURN OFF THE POWER SUPPLY AND RELIEVE THE SYSTEM OF TRAPPED PRESSURE BEFORE OPENING ANY CIRCUIT CONNECTIONS. DISCHARGE ACCUMULATORS AND BLOCK ANY LOAD WHERE MOVEMENT COULD CAUSE PRESSURE TO BE CREATED.

Although pressure controls are usually very reliable, they should be checked as part of a regular maintenance schedule.

Foreign matter in a system fluid is perhaps the greatest cause of improper ball or poppet seating and erratic operation. It can also result in clogged or restricted passages and even parts scoring.

Cleanliness is extremely important in the care of hydraulic systems. Only a clean, lint-free work surface should be used. Areas around openings to be made in the system should be carefully cleaned to keep dirt from entering. All exposed ports of the system should be capped or covered.

Wash metal parts in a clean mineral solvent and blow them dry with filtered compressed air. Place them on a clean surface for inspection.

Disassemble only as far as necessary to correct or prevent future trouble. Problems often can be corrected without removing the valve from its mounting. Usually disassembly and thorough cleaning is sufficient to restore it to normal. If, however, inspection of parts such as the pilot ball and seat or main piston reveals wear or evidence of binding, they should be replaced with new ones.

5. Troubleshooting

General

These troubleshooting tables list malfunctions which might be encountered during operation. They include possible causes and necessary corrective steps

required to bring the equipment up to operating standards.

NOTE: ALWAYS CHECK THE POSSIBLE CAUSE OF TROUBLE IN THE SEQUENCE GIVEN.

Electrical Remote Troubleshooting Table (Continued on next page)

SYMPTOM	CAUSE	REMEDY
No spool (handle) movement when PVB actuated via electrical remote.	No system pressure.	1. Check pump. 2. Check filter.
	Seized or jammed main spool in PVB.	Test spool manually, checking for mechanical resistance and proper operation. If handle movement feels rough or gritty, check for system contamination and contact authorized Danfoss service shop (see page 6).
	Mechanical stroke limiters preventing spool travel.	Check stroke control adjustment.
	No power applied to PVE.	1. Check for blown fuse. 2. No controller output: a. If more than one function available, swap cables to prove controller fault. b. Test controller and wiring. c. Check PVE pin 2 for correct Proportional Controller signal value. d. Check safety switch wiring. If switch found bad, replace controller.
	No or low standby pilot pressure in open center inlet (PVP).	Check system pressure setting and adjust accordingly at pump control first, then PVP (85 PSI minimum stand-by).
	No or low external pilot supply to PVE (external pilot supply only).	Check external pilot pressure (85 PSI minimum)
	PVE relief valve failure.	1. Check PVE last chance filter for signs of contamination. 2. Replace PVE and contact authorized Danfoss service shop (see page 6).
	PVE internal filter blocked.	
	PVE pressure reducing valve damaged.	
	PVE solenoid failure.	
	PVE transducer position feedback failure.	
	Blocked PVE last chance filter.	1. Clean or replace filter. 2. Check system filtration/contamination.

Electrical Remote Troubleshooting Table (Continued from previous page)

SYMPTOM	CAUSE	REMEDY
Erratic movement of main spool via remote controllers.	PVE transducer feedback interference or failure.	<ol style="list-style-type: none"> 1. Oil contamination too high; change oil, and fit high pressure filter without bypass. 2. Replace PVE and contact authorized Danfoss service shop (see page 6).
<p>Main spool moves in one direction only via remote controllers.</p> <p>Either A or B port direction:</p> <p>A port direction only:</p>	<ol style="list-style-type: none"> 1. Mechanical stroke limiters preventing spool movement. 2. PVE direction solenoid failure <ol style="list-style-type: none"> 1. "On/Off" PVE wired as proportional PVE. 2. Proportional PVE wired as "on/off" PVE. 3. Broken wire in PVE to feedback transducer (proportional). 	<ol style="list-style-type: none"> 1. Check stroke control adjustment. 2. Replace PVE and contact authorized Danfoss service shop (see page 6). <ol style="list-style-type: none"> 1. Correct "on/off" PVE wiring. 2. Correct proportional PVE wiring. 3. Replace PVE and contact authorized Danfoss service shop (see page 6).
Main spool moves at slow speed in either direction via remote controllers.	Failure of high speed solenoid in PVE.	Replace PVE and contact authorized Danfoss service shop (see page 6).
Main spool moves at partial level in one or both directions when remote controller is moved full travel.	Normal function when using EHF or PVRES with electronic flow control.	Re-adjust EHF or PVRES flow control.
	Electrical failure on PVE.	Replace PVE and contact authorized Danfoss service shop (see page 6).
	Mechanical stroke limiters preventing spool travel.	Adjust stroke control.
Main spool moves in large steps via remote control (proportional only).	Absence or failure of pulse width modulator board in PVE plug.	Repair or replace pulse width modulator board.
Main spool drifts in neutral with no power applied to PVE.	Damaged/worn pilot block check valves in PVE.	Replace PVE and contact authorized Danfoss service shop (see page 6).
	Presence of contamination in PVE.	<ol style="list-style-type: none"> 1. Replace PVE and contact authorized Danfoss service shop (see page 6). 2. Fit high pressure filter without bypass.
Main spool drifts when PVE is electrically centered in neutral.	PVE transducer plunger worn or damaged.	Replace PVE and contact authorized Danfoss service shop (see page 6).

Hydraulic Remote Troubleshooting

SYMPTOM	CAUSE	REMEDY
Erratic movement of main spool via hydraulic controller.	Centering spring broken or damaged on main spool.	Remove PVM, check spring and contact authorized Danfoss service shop (see page 6).
	Pilot lines too long.	Reduce line length or change to hard pipe to reduce accumulator effect.
	Pilot supply inadequate.	Check pressure and flow of pilot supply (300 PSI min., 1450 PSI max.).

Manual Activation Troubleshooting

SYMPTOM	CAUSE	REMEDY
Main spool moves but LS/PC pump fails to activate on stroke.	Worn or damaged ball and seat in PVB shuttle valve.	Replace PVB and contact authorized Danfoss service shop (see page 6).
Main spool moves with no resultant oil from working ports.	Damaged or faulty compensator.	Inspect oil for contamination and contact authorized Danfoss service shop (see page 6).
	1. Maximum load pressure matched with PVB load sense relief setting. 2. PVB load sense relief valve damaged.	Adjust PVB load sense relief.
	Working pressure has exceeded main relief valve setting.	1. Reduce working load pressure. 2. Increase PVP relief setting and contact authorized Danfoss service shop (see page 6).
Main spool moves oil from working ports but no movement at working function.	PVLP shock valve setting too low.	Re-adjust shock valve.
	Anti-cavitation check valve leaking.	Inspect for contamination and contact authorized Danfoss service shop (see page 6).

Danfoss Authorized Service Shops

Australia	Danfoss (Australia) Pty. Ltd., Melbourne
Austria	Hainzl Industriesysteme, Gesellschaft m.b.H., Linz
Belgium	N.V. Danfoss S.A., Bruxelles
Canada	Danfoss Mfg. Co. Ltd., Mississauga
Denmark	Danfoss Hydraulik A/S, Stenløse
Finland	OY Danfoss AB, Espoo
France	Danfoss S.a.r.l., Trappes (Paris)
Germany	Danfoss GmbH, Offenbach/Main
Great Britain	Danfoss Limited, Greenford (London)
Iceland	HEDINN VERSLUN H/F, Reykjavik
India	DANTAL HYDRAULICS PVT Ltd., New Delhi
Italy	Danfoss s.r.l. Division Sordella, Torino
Japan	Danfoss K.K., Gotemba
Korea	UNITEK Corporation, Seoul
Netherlands	ITHO B.V., Schiedam
New Zealand	Danfoss (New Zealand) Limited, Auckland
Norway	Danfoss A/S, Skui
Republic of South Africa	Danfoss (Pty) Ltd., Johannesburg
Singapore	Danfoss Industries PTE. Ltd., Singapore
Sweden	Danfoss AB, Mjölby
Switzerland	Danfoss Werner Kuster AG, Frenkendorf
Turkey	Mert Teknik A.S., Istanbul
U.S.A.	Danfoss Fluid Power Division, Racine, Wisconsin