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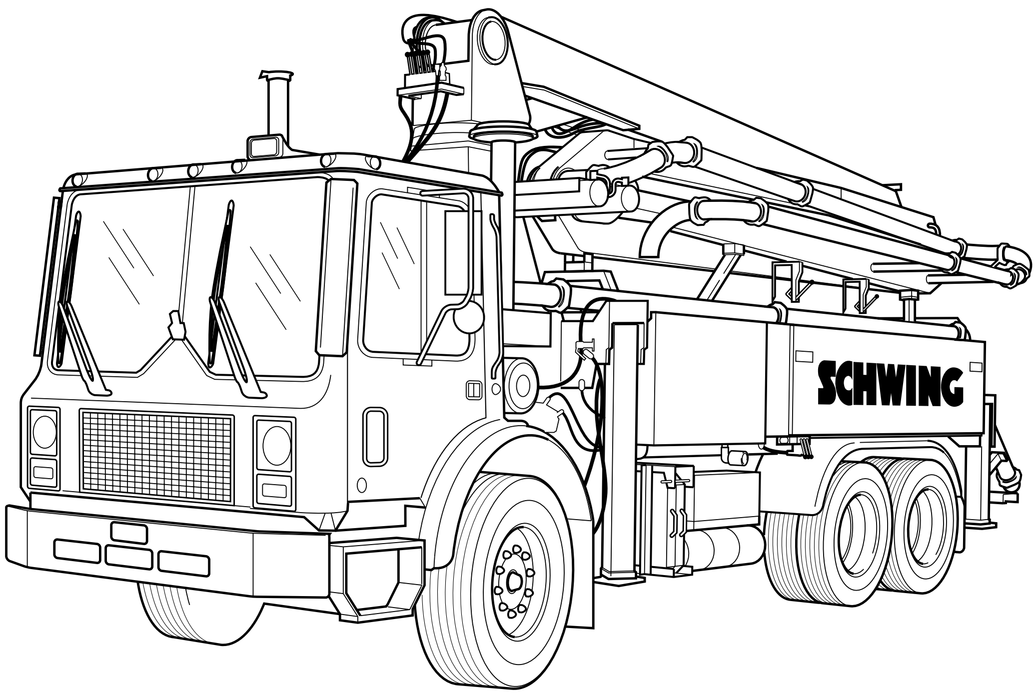
SCHWING
AMERICA INC.

GUIDE FOR TROUBLESHOOTING CONCRETE PUMPS



BPL 600 - 800

DOCUMENT #699000

5900 Centerville Road
St.Paul, MN 55127
Tel 651-429-0999
Fax 651-429-3464
www.schwing.com

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THIS MANUAL IS INTENDED TO ASSIST AUTHORIZED PERSONNEL WITH REPAIR OF CONCRETE PUMP EQUIPMENT. SCHWING AMERICA, INC. IS NOT RESPONSIBLE FOR DAMAGE OR ACCIDENTS CAUSED BY MISUSE, IMPROPER MAINTENANCE, OR NEGLECT OF THIS EQUIPMENT. THE EXISTENCE OF THIS GUIDE AND ITS CONTENTS DOES NOT NEGATE THE NEED TO USE COMMON SENSE WHEN WORKING WITH HYDRAULICALLY POWERED AND ELECTRICALLY CONTROLLED EQUIPMENT.

BPL 600 - 800

Introduction......3
SCHWING America Service Department:......3

Pressure Gauge......4
Basic Rule......4

Oil TEMPERATURE......5

Number of Strokes......6
Basic Rules......6

Compensating Oil......8

Adjustment of Throttle Valves......9

Freeing Seized Gate Valves......10

Checking Safety Valves......11

Selection and Changeover Operations......12

First Working Stroke......14

End of First Working Stroke......15

Control Stroke......16

Second Working Stroke and Second Control Stroke......17

Third Working Stroke......18

End of Third Working Stroke......19

Third Control Stroke......20

Fourth Working Stroke and Control Stroke......21

1 Concrete pump does not work, although it is switched on. 22

2 Concrete pump runs very slowly (few strokes) at very low pressure. 24

3 Concrete pump runs but with unexpectedly high hydraulic pressure. The oil is also heating more quickly than is normal. 25

4 Concrete pump runs with normal number of strokes. The output is only half as it would correspond to the number of strokes. The gauge alternatively shows one stroke with normal pressure and another stroke with a very high pressure. The water level in the water box is rising and falling in the same sequence. 25

5 The concrete pump runs with normal number of strokes. The output is less than would corresponding to the number of strokes. 26

6 After every 2nd stroke, the concrete pump stops for a short while. At this time, the gauge indicates safety pressure. On the other stroke, there is no interruption or delay. 27

7 The concrete pump stops. The gauge indicates safety pressure. One differential cylinder is in

the rear end position, i.e., the piston fixture is close to the rear wall of the water box. 28

8 The concrete pump runs with an excessive number of strokes. It looks as if it is running faster. In fact, it is running at constant speed, but with a shorter stroke. Check the movement of the piston rods in the water box. 30

9 After each stroke, the pressure increases in jerks up to maximum safety pressure. The start of the next stroke is retarded for a fraction of a second. Also the hydraulic oil is heated more rapidly than normal. 31

Defects With the Concrete Pump 32

10 Flushing containers overflow, consequently much higher consumption of flushing agent. ...32

11 The hydraulic oil tends to overheat - in excess of 80˚ C. 32

- ❑ Check operation of safety valve (see H 4), replace where necessary. 32
- ❑ Check position of the piston in the valve body, i. e., where the piston reaches its stop position or where it passes stop position due to damaged circlip. Both conditions will cause a reduction in oil flow apertures. 32
- ❑ Check under 8b. Furthermore, check control rods for deflection or damage. 32
- ❑ Also check valve S3. 32
- ❑ Reduce pumping speed to reduce the working pressure requirement. 32

Defects With the Placing Boom, Remote Control, and Hydraulic Outriggers..........32

Defects With the Remote Control..........32

Defects With the Remote Control (cont’d) 33

Defects With the Placing Boom 33

Defects With the Placing Boom (cont’d)..........34

R1 The agitator stops frequently and can only be set in motion again after reversing briefly. 35

R2 The agitator runs with unexpectedly high pressure. 36

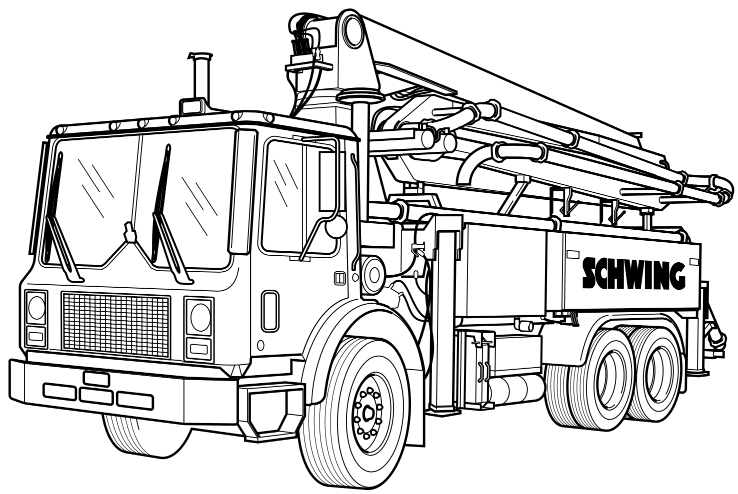
W1 The water pump does not work, although the tank is filled and the input is unobstructed. 37

W2 Insufficient water is pumped by the pump and the pressure is low. 38

BPL 600-800 T.S.G.

Introduction

We try to manufacture our machines to be as reliable as is possible in service. With the new concrete pumps of the BPL series, modifications to the hydraulic control system and operation of the gate valves, the reliability has been improved still further in service. If, however, problems are experienced, these can usually be very quickly recognized and dealt with. This booklet has been compiled to allow you to check quite quickly and easily the probable cause of the failure or failures. We recommend that you read this booklet before the machine is put into service and that you thoroughly acquaint yourself with its contents enabling you not only to understand the machine's function, but even better, to allow you to anticipate a failure by a typical or intermittent malfunction, preventing expensive and the possibility of embarrassing breakdowns on site. In the following pages, we will endeavor to explain initial function checks, maintenance hints and tips and testing procedures which ought to be known by concrete pump operators as well as maintenance people. We have also reproduced the stage by stage operation of the hydraulic circuit with multicolor diagrams which you will find in the section after "switching operations".



If you have attempted to correct faults or troubleshoot a malfunction in the machine and you have been unable to solve the problem, we recommend that you contact our After Sales Service Department.

SCHWING America Service Department:

- TEL: 1-888-292-0262
- TEL: (651) 653 2299
- FAX: (651) 429 2112

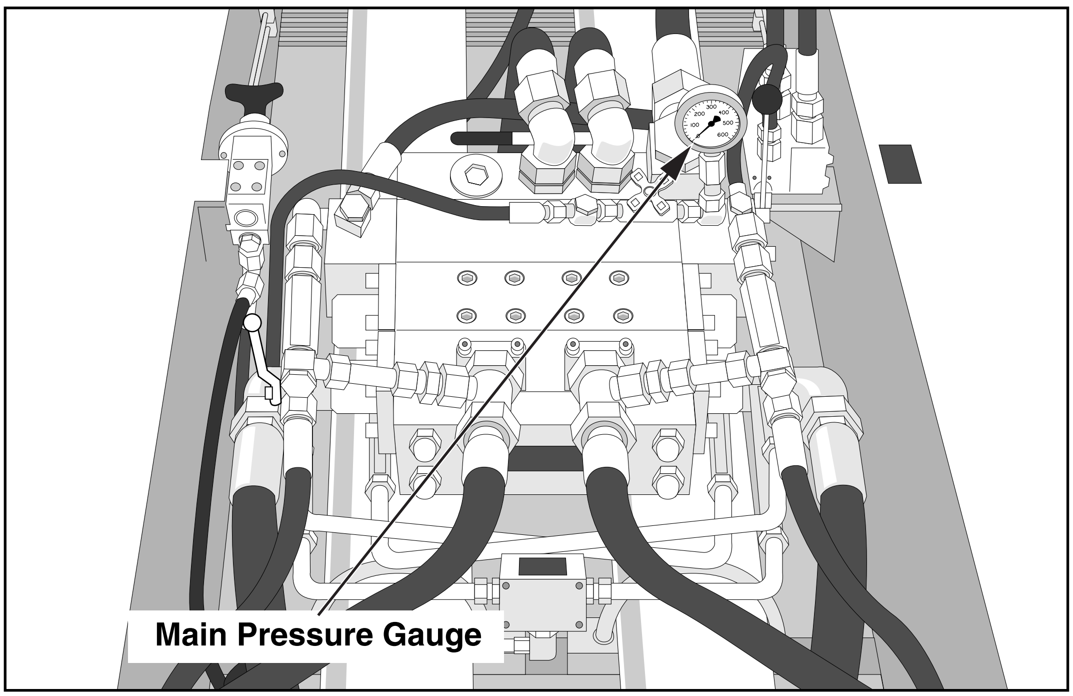
BEFORE YOU CALL please make note of the following information so that our Service Technicians will be better able to help you:

1. Machine model and serial number (stamped on the machine serial plate on the left side of the subframe, behind the truck cab).
2. The hydraulic working pressure at the time the failure occurred.
3. Strokes per Minute of the concrete pump and engine rpm at the hydraulic working pressure time.
4. Pressure at which the main safety valve opens.
5. Length and diameter of the delivery pipeline including position, number and type of any bends used.
6. Quality and slump of concrete and if known, the mix design.

With the above information our experienced Service Technicians should be able to advise you by telephone what the trouble may be and the best way to correct the problem.

Pressure Gauge

The most important instrument for not only checking the concrete pump during operation but also for indication of possible defects, is the main pressure gauge. The safety pressure is the pressure at which the safety valve opens. The working pressure is the pressure in each situation that the concrete pump is operating. We would explain the pressure differs from job to job and it is not necessary to adjust the working pressure. On the contrary, the working pressure automatically increases enabling resistance of the concrete in the pipeline to be overcome. This resistance and, therefore, the working pressure is a direct result of the stiffness and coarseness of the concrete plus the length of the pipeline being used and finally the speed at which the concrete is being pumped. It is possible in extreme cases that the working pressure may increase up to 250 bar depending of course on the pump model. Working pressures obviously cannot be higher than the pre-set safety pressure on the safety valves as these will open and relieve pressure. All safety pressures for the differing concrete pump models are shown in the relevant machines' operating instructions books.



Basic Rule

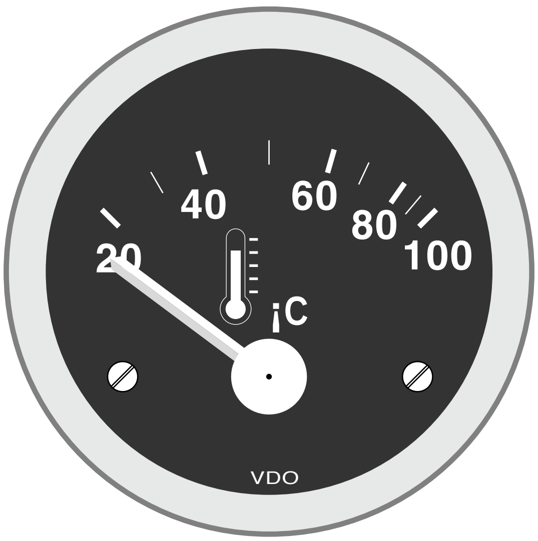
The working pressure should never be in excess of 90% of the pre-set safety pressure (not applicable for system III).

Where the working pressure exceeds 90%, either the pumping speed should be reduced or an alternative and larger diameter pipeline should be used or finally the "pumpability" of the concrete should be improved prior to pumping. On each occasion, the safety pressure must be checked.

As a pump operator, you should automatically check the working pressure several times during operation. After some weeks experience, you will no doubt be able to assess before starting any pumping operations how high the pumping or working pressure will be. Pressure checks are most important. You should always carry a spare gauge so you are able to quickly replace this very important instrument on the job.

Oil Temperature

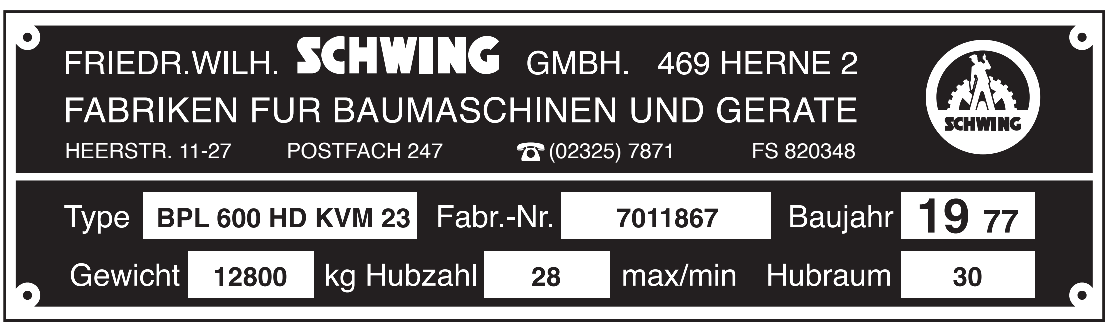
It is also very important to check operating oil temperatures during pumping especially on extended pours. Temperatures between 40˚ and 60˚ C after approximately two hours pumping are quite normal. Temperatures of 80˚ C will not harm either the oil or the concrete pump, but there is an indication of an irregularity within the hydraulic system because normal oil temperatures should not be as high as this. Try and establish the cause of this heat increase. NOTE: If the pump is operating within an enclosed building or confined space, it is most important to provide adequate ventilation.



OIL TEMPERATURE

Number of Strokes

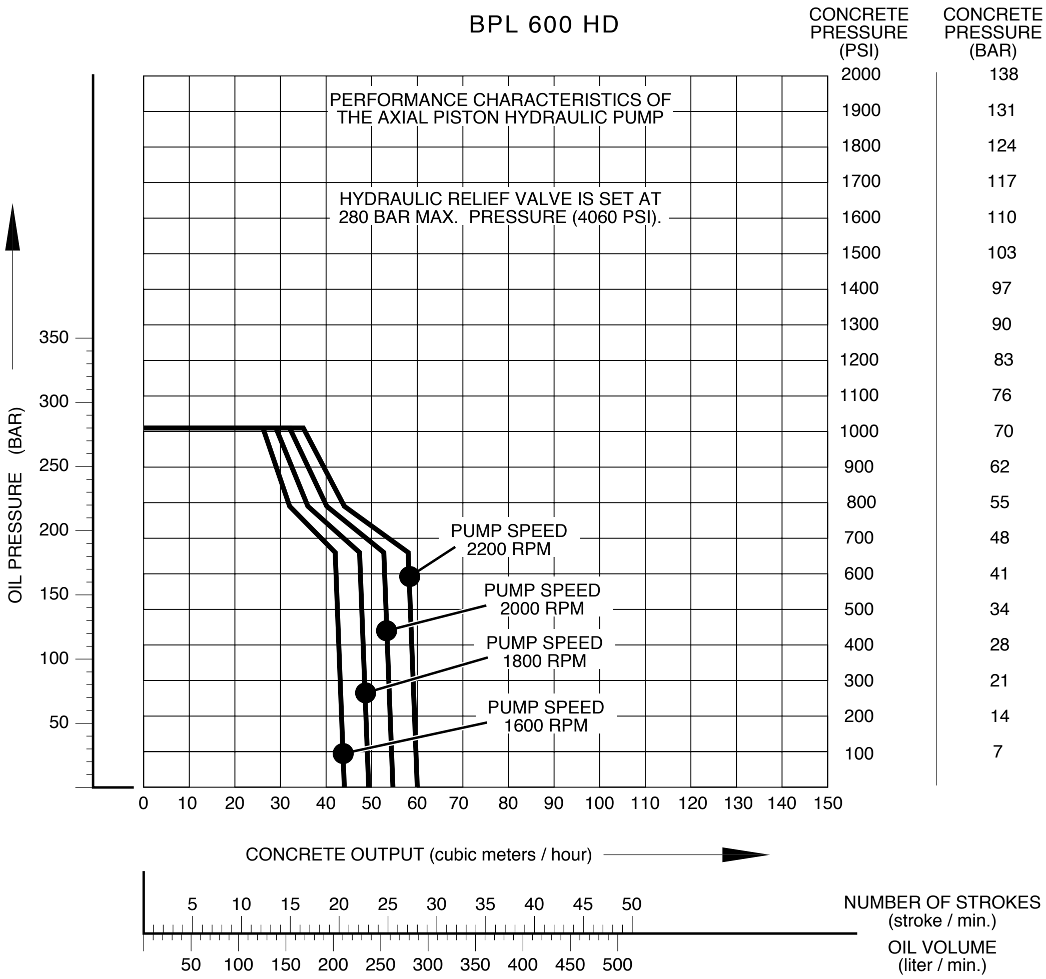
The technical term "strokes" simply means the piston travel from one end of the cylinder to the other. Therefore, when 21 strokes occur within one minute, this will be the operating speed. The maximum design number of strokes per minute is 28. We recommend that you check the operating speed by a watch equipped with a second hand. If pumping is required at any speed less than the maximum, the engine should be slowed down, but not less than 1500 rpm. At this speed damage could possibly be caused. Secondly, if you have to pump even more slowly than this, we suggest you engage a lower gear so that the engine will be working above 1500 rpm giving the desired number of strokes per minute. The maximum number of strokes possible to obtain are indicated on the build plate of your individual machine, and they are also repeated in the operating instruction book under "technical data". The maximum number of strokes mentioned should be obtainable when the vehicle gear box is engaged in top or direct drive (generally 5th or 6th gear) and when the vehicle engine is running at maximum governed revolutions provided that the pumping operation and the working pressure are lower than 90 bar (for BPL 800 with 130 hp engine and other models see technical data). At higher pressures, the main hydraulic pump automatically reduces its output. This has been purposely designed preventing overload of prime movers. However, do not misunderstand that the working pressure can be much higher. In this case, it will be impossible to reach the maximum number of strokes simply because the hydraulic pump can now only deliver a reduced volume of oil in spite of the same input rpm. This is quite clearly explained on the output diagram where you will see the number of strokes and the corresponding output in relation to the working pressures. If the output diagram is not available in the instruction book, please request same either from the manufacturer or your distributor. It should also be your discipline to check as often as possible the number of strokes during your working day. Then you will see for yourself the direct relationship between the working pressure required and the number of strokes possible. The high working pressure also has an effect on the hydraulic pump automatically reducing its output and the number of strokes possible. Conversely, a lower number of strokes intentionally produced by you will also reduce the working pressure. With a low number of strokes per minute the concrete will flow more slowly through the pipeline. For less concrete velocity the pistons absorb less power which means less pressure. Please pay due attention to these interconnected points. Then you will get a better appreciation about the lay-in parts and life of the concrete pump.



Basic Rules

1. At working pressures below 90 bar (BPL 800130 hp) the number of strokes directly influences the working pressure. The lower or higher the number of strokes, the lower or higher the pressure will be as previously explained. Lower speeds of concrete flow will require lower operating pressures.
2. At working pressures above 90 bar (BPL 800) the working pressure directly influences the number of strokes. The higher the pressure, the lower the number of strokes because the hydraulic pump will automatically reduce its output.

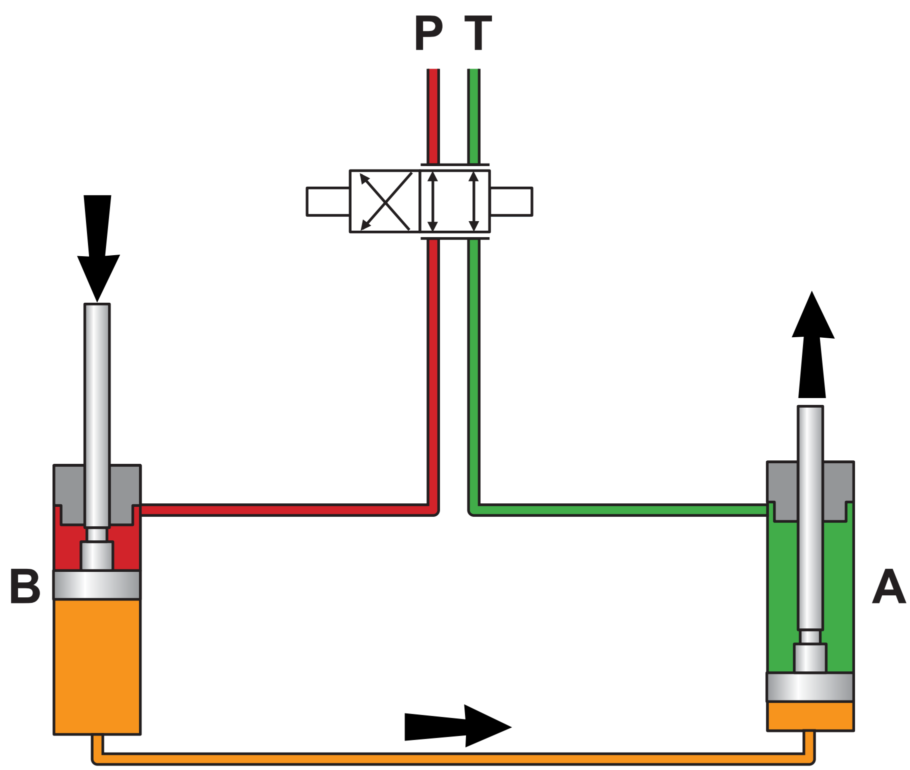
In general, try to avoid pumping with the maximum number of strokes, only doing so when it is absolutely necessary. There is no advantage whatsoever if you are able to empty a ready mix truck of 5 m3 capacity within 5 minutes, then leaving you to wait a further 10 minutes for the arrival of the next ready mix truck. It is much better to pump slowly from the outset thus preserving the machine and your nerves and not forgetting the considerable decrease in working costs - your chief will be grateful.



Differential Hydraulic Cylinder Bore dia. / Rod dia. x Stroke length	Material Cylinders Bore dia. x Stroke length	Hydraulic Pumps Type / KW
110 mm / 63 mm x 1400 mm	180 mm x 1400 mm	96 KW

Compensating Oil

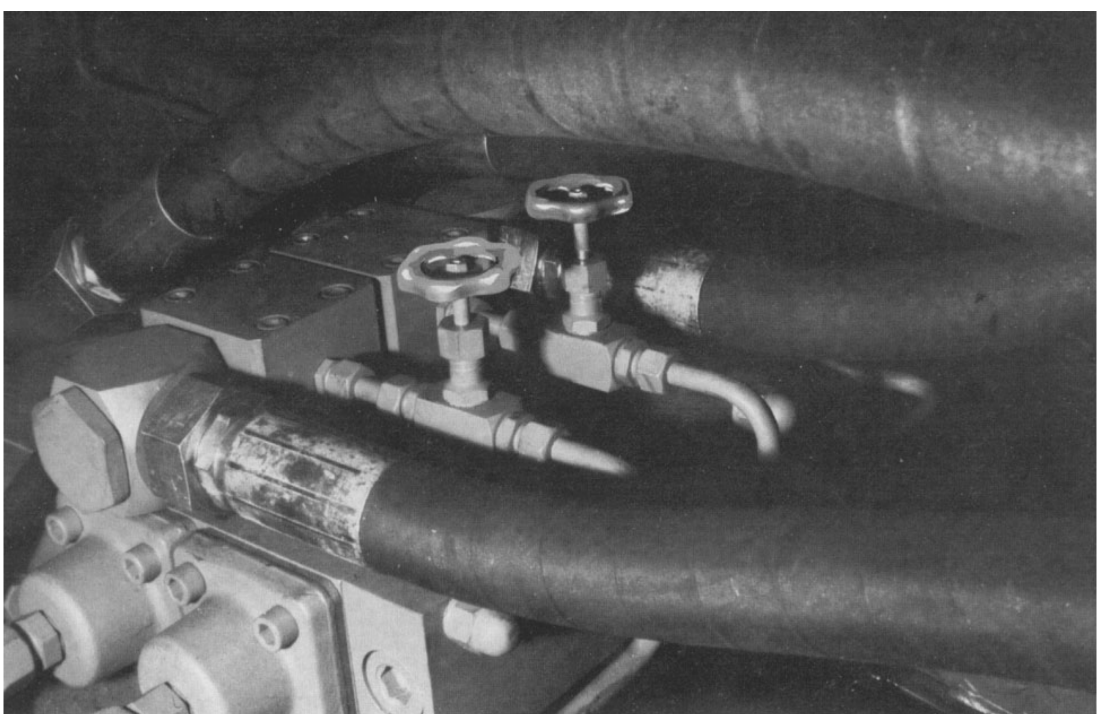
The differential cylinders of BPL pumps are actuated at the rod end. In order to push cylinder (a) forward, pressure oil must be conveyed to the rod end (in front of piston cylinder [b]). The piston of cylinder (b) then travels backward to the cylinder extremity. The ends of the two cylinders are interconnected with a hydraulic line allowing the oil to be displayed by piston (b) as it travels backwards through the line into cylinder (a) which forces its piston forward. On the alternate cycle, the oil between the two pistons will then be pushed back from (a) to (b), the same quantity of oil prevailing which is termed compensating oil, obviously transmitting power and movement from one differential to the Other.



Adjustment of Throttle Valves

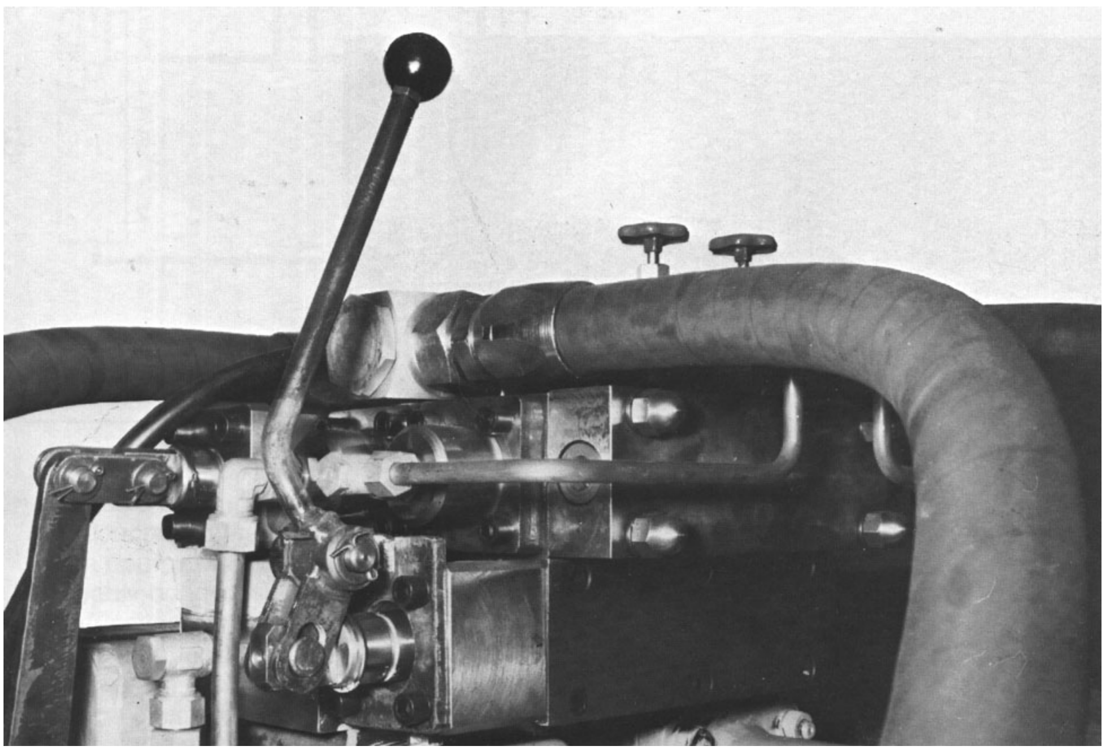
a. With cold oil - up to 30˚ C temperature. With the engine set to run on half speed and the concrete pump selected to neutral, shut both throttle valves completely and open them approximately 1π turns, and then select concrete pump to pumping. There will most probably be insufficient opening of the throttle valves at this setting and there will be a delay caused at the end of each stroke because the impulse oil flow is restricted and will consequently take more time to complete a cycle. It will also be noted that the pressure on the gauge will rise up to the maximum safety pressure each time the changeover takes place. Then open both throttle valves another π of a turn simultaneously, and progressively open the throttle valves until such times as the changeover time becomes almost 0 between one gate valve and another. While this is happening the gauge will still indicate an increase in pressure at the conclusion of each stroke. However, when the oil obtains its correct working temperature, the gate valve changeover will become smoother and peak pressures should not be recorded when the changeover takes place. Having gone through this procedure, any necessary corrections or fine tuning of the settings could take place during pumping operations at any convenient time. Do not forget to finally tighten the lock screw once you have completed adjustment.

b. With warm oil - 30˚ C and above. Again halve the number of rated engine revolutions and proceed progressively as with cold oil with opening the throttle valves at approximately1 turn. Continue adjusting the throttle valves until the peak pressures during changeover have virtually disappeared. However, you will notice that the gate valves will still traverse quite strongly and reach their stop limits audibly. In the text above, referring to engine speed being halved, obviously in the case of concrete pumps with electric motor drive the hydraulic pump output will have to be proportionately reduced using the output hand wheel for this purpose.



Freeing Seized Gate Valves

In service gate valve rods have been known to seize in their housings by progressive buildup of grout and concrete. They can quite easily be freed by closing the locking valve and selecting the concrete pump alternately to pumping and reverse. This means that the differential cylinders are blocked by closure of the valve. The total available hydraulic power will be concentrated into the plungers which are the gate valve operating cylinders, and the gate valves should break free. If the above recommendation fails to free the gate valves or jamming occurs at a later time, it would help the gate valve assemblies to free themselves if the throttle valves were closed partially. When freely operating, do not forget to readjust the throttle valves as mentioned earlier. If persistent jamming takes place and also occurs where other concrete design mixes are being used and particularly when operating pressures are low, the gate valve assemblies should be checked for mechanical faults such as cracked housings, bowed rods, and finally grout intrusion into the plunger cylinders. Evidence of this should be present in the separator pots adjacent to the plunger cylinders on both sides of the machine.



Checking Safety Valves

When investigating defects in a hydraulic system, it is important to check that the safety valve itself is functioning properly. First of all you should block the system.

To explain:

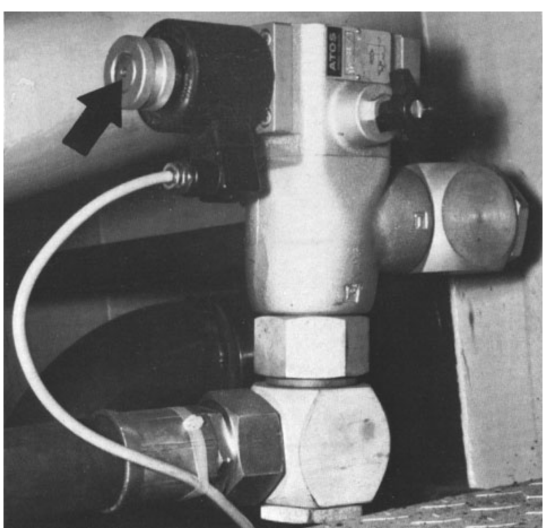
System I (concrete pump)
Shut the locking valve. Subsequently close both throttle valves.

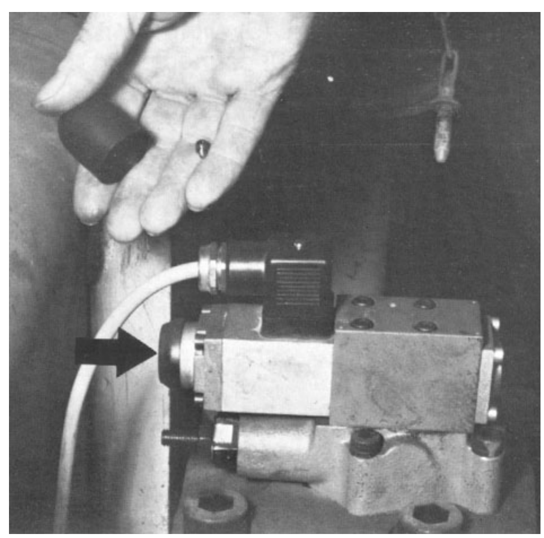
System II (agitator)
Jam the agitator shaft with either suitable sized timber or similar.

System III (water pump and compressor circuit)
Shut both water and vent cocks.

System IIII (placing boom)
Close shut-off valve on the jacking cylinders.

With engine revolutions at maximum or maximum output of the hydraulic pump respectively, the concrete pump, the agitator, the compressor, and the jacking cylinders have to be engaged. Read off and note the safety pressures recorded. Then repeat the tests at half speed or half hydraulic pump output, whichever applies. If the gauge now indicates a pressure which is more than 10% below the pressure read at maximum revolutions or output, you can be sure that the safety valve is malfunctioning and/or contaminated and has to be replaced.



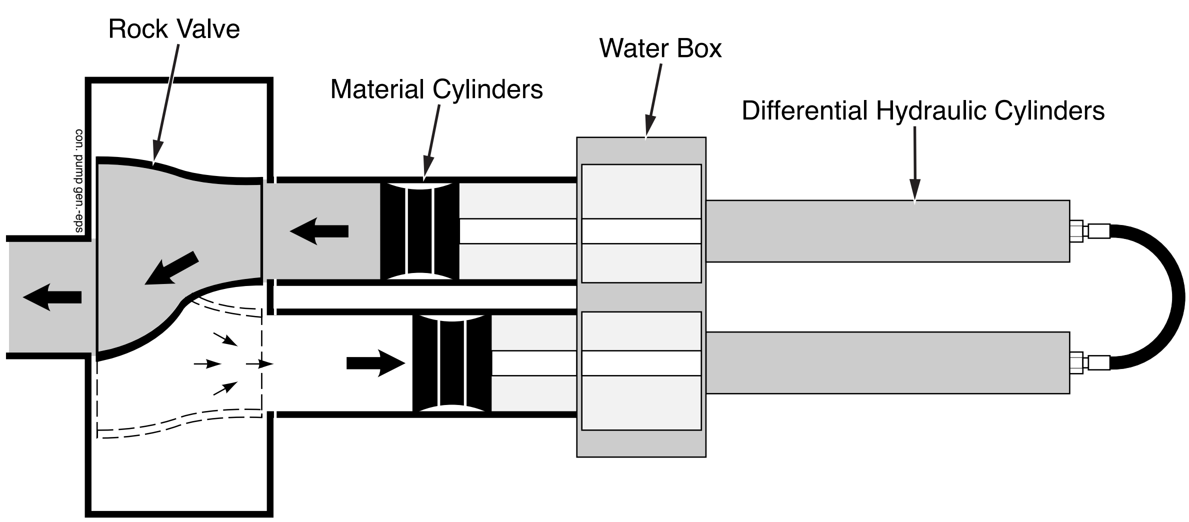


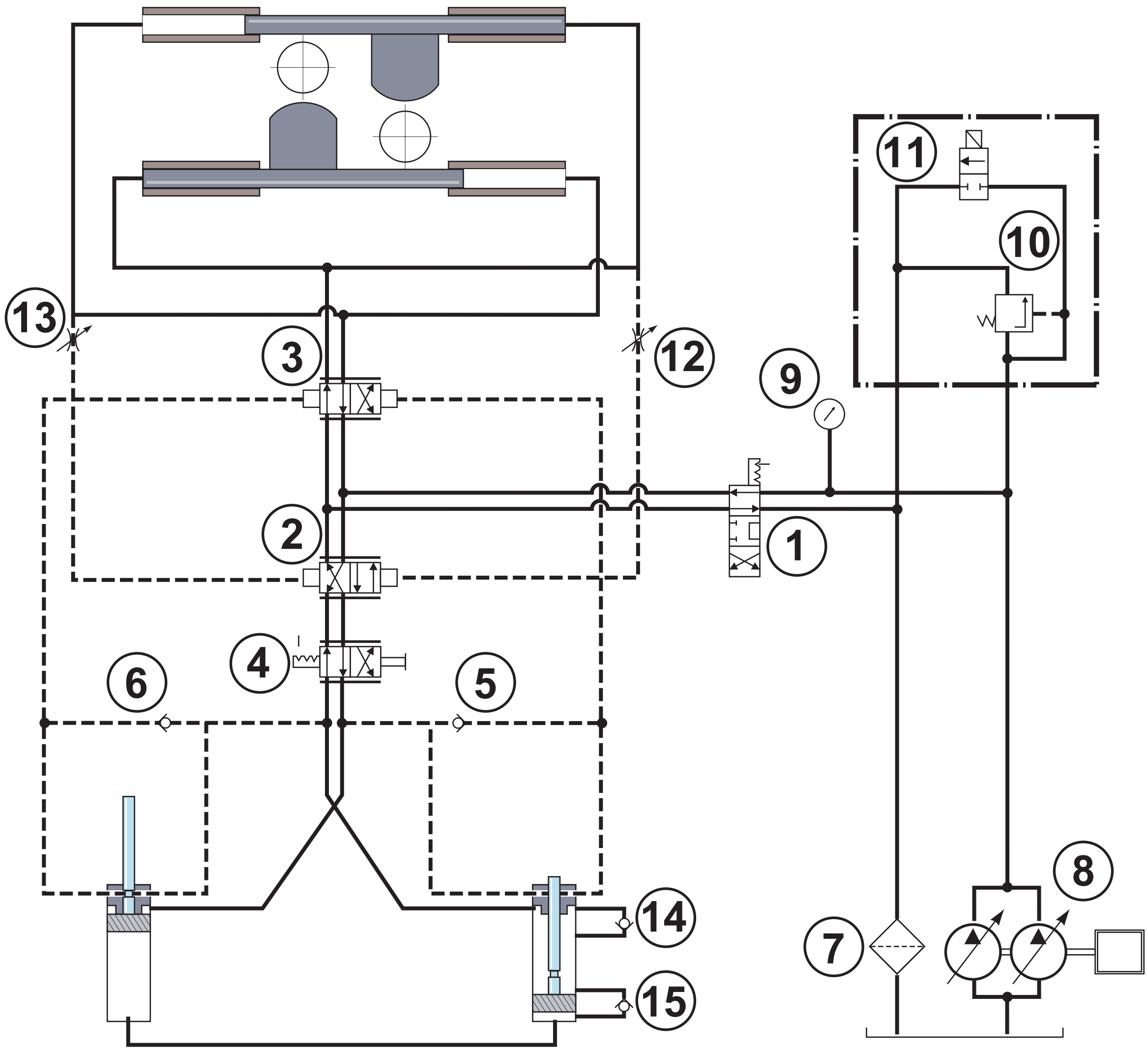
Selection and Changeover Operations

When the concrete pump has been selected to pumping (or reversing), all changeover operations are completed automatically, i.e., the valve S2 (serving the differential cylinders) and S3 (serving the plungers) are changed over automatically alternately once from the left and once from the right. The oil flows through the control line to the valve and pushes the selector piston in the valve to opposite sequence - the valve then has been changed over. This flow of oil has a technical term "changeover impulse". For each additional pumping stroke and movement of the gate valve, it is necessary that the corresponding relevant valve switches over. One cycle of the concrete pump consists of four different strokes, they are left-hand pumping stroke, one gate valve stroke, right-hand pumping stroke, and the other gate valve stroke. This means that there are four changeover operations; each of them caused by a changeover impulse. Two of these impulses arise when the left or right-hand cylinder has reached its full stroke position. These impulses changeover the valve S3. When this valve changes over, the impulse for changing over the valve will simultaneously be sent. The impulse transmitters within any one cycle are one from the right-hand differential cylinders and one from the left-hand differential cylinders (to be precise the cylinder heads) and two from the valve S3. Finally the impulse receivers are the S2 and S3 valves respectively.

Check this against the changeover diagrams in the following pages and also the large size multicolor illustration "the hydraulic twin cylinder system" (available on request). The hydraulic circuit described in the following pages in eight phases applies to all modem SCHWING concrete pumps in the model groupings BPL 450, 600, 800, BP 250, 350, 550 and BP 800 with full hydraulic operation. The eight phases show the four working strokes and the four changeover strokes of the SCHWING concrete pumps. The heavy color lines represent the working or power lines. The dotted color lines represent the changeover or impulse lines. The valve S1 is illustrated in the pumping position and the pressure line of the pump is connected to a pressure gauge (9) with a working range of 0 to 400 bar for pressure checks. There is also a safety valve (10) connected to the pressure line for protecting the hydraulic assemblies. From the safety valve exhaust, the escaping oil flows into the return line and filter (7) back to tank.

It is possible to install a bypass valve in the safety valve (10). This valve can be actuated electromagnetically either by direst or remote control. By switching on the valve (11), the hydraulic system will be without pressure, and the concrete pump will be inoperable.





The red lines indicate pressure.

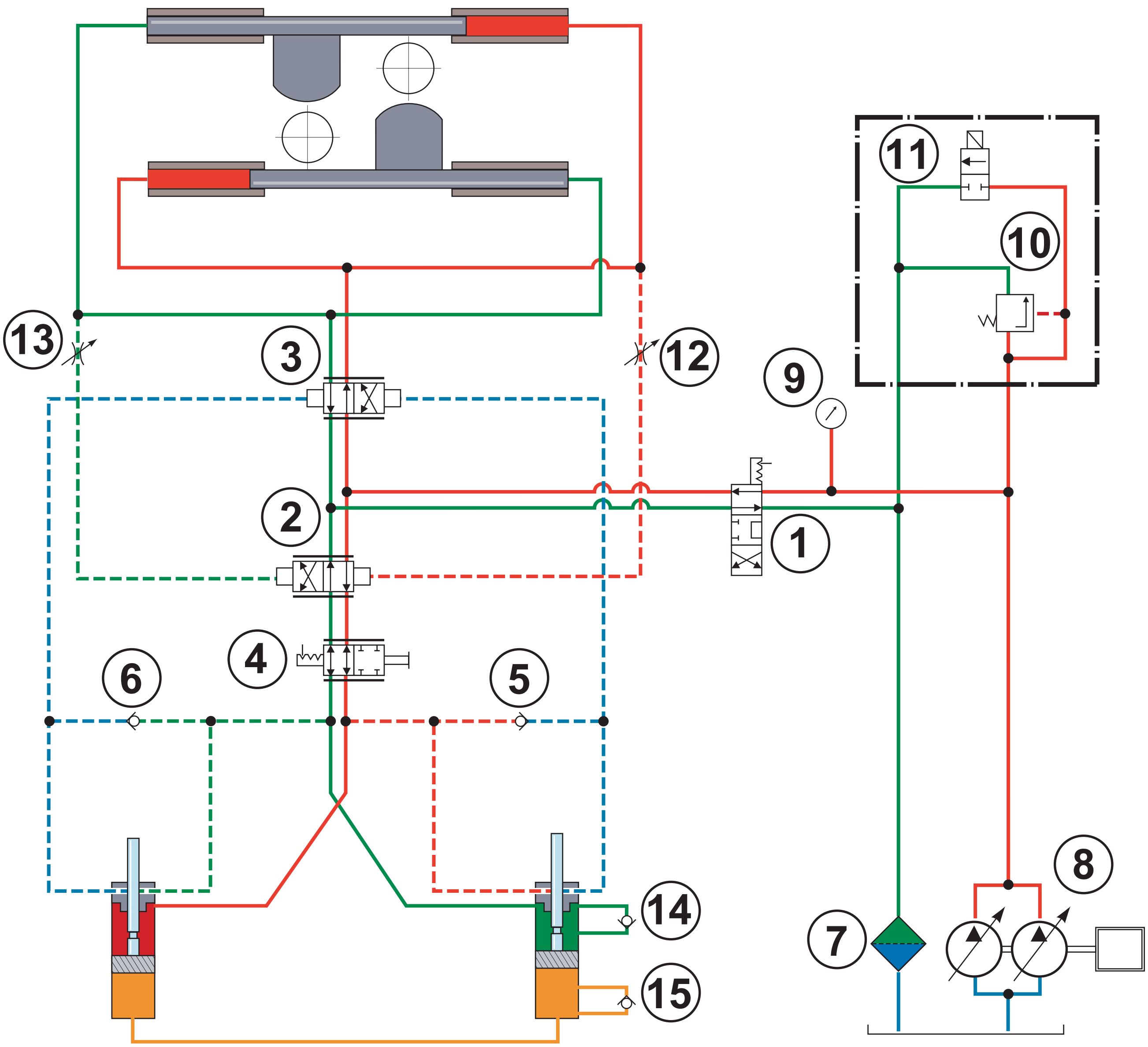
The green lines indicate return flow (tank).

The blue lines indicate oil on piston side (compensating oil).

1 Switching valve S1
2 Switching valve S2
3 Switching valve S3
4 Locking valve
5 Check valve
6 Check valve
7 Return flow filter
8 Hydraulic twin pump
9 Gauge
10 Safety valve
11 Solenoid valve
12 Throttle valve
13 Throttle valve
14 Bypass with check valve for
15 Maintaining constant stroke

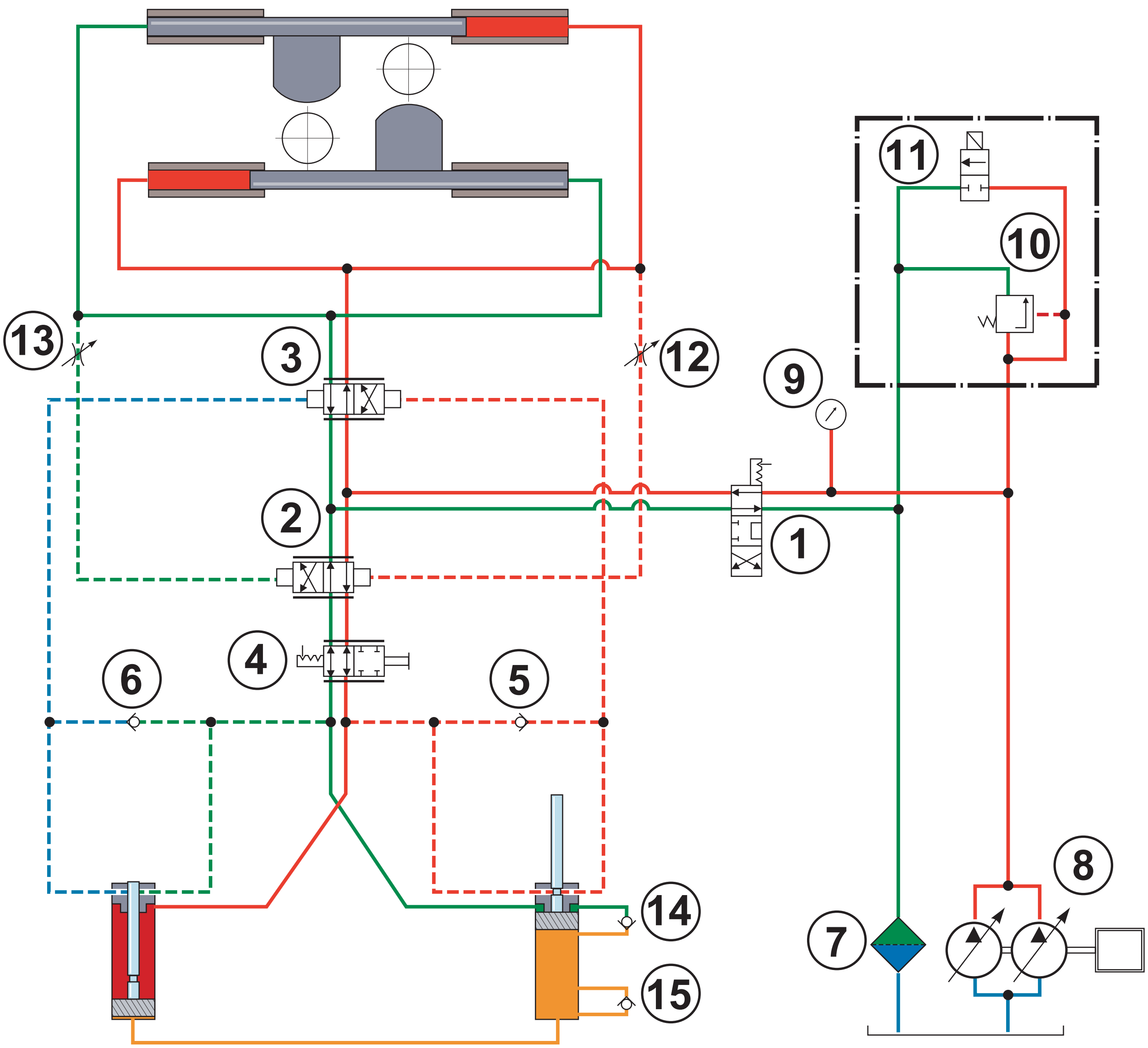
First Working Stroke

Through the valves 1 and 2 in the left position and valve 4, the pressure oil flows to the left-hand differential cylinder acting on the piston rod side. From the piston side of the left-hand differential cylinder, the oil is passed into the right-hand differential cylinder. The oil displaced from the piston rod side of the right-hand differential cylinder is fed back to the tank via valves 4, 2 and 1, and filter 7. The position of the siamese gate valve will then be left-hand and the hopper gate valve in the right-hand position so that the right pumping cylinder is pushing concrete into the delivery pipeline and oppositely the left-hand pumping cylinder is sucking concrete from the hopper.



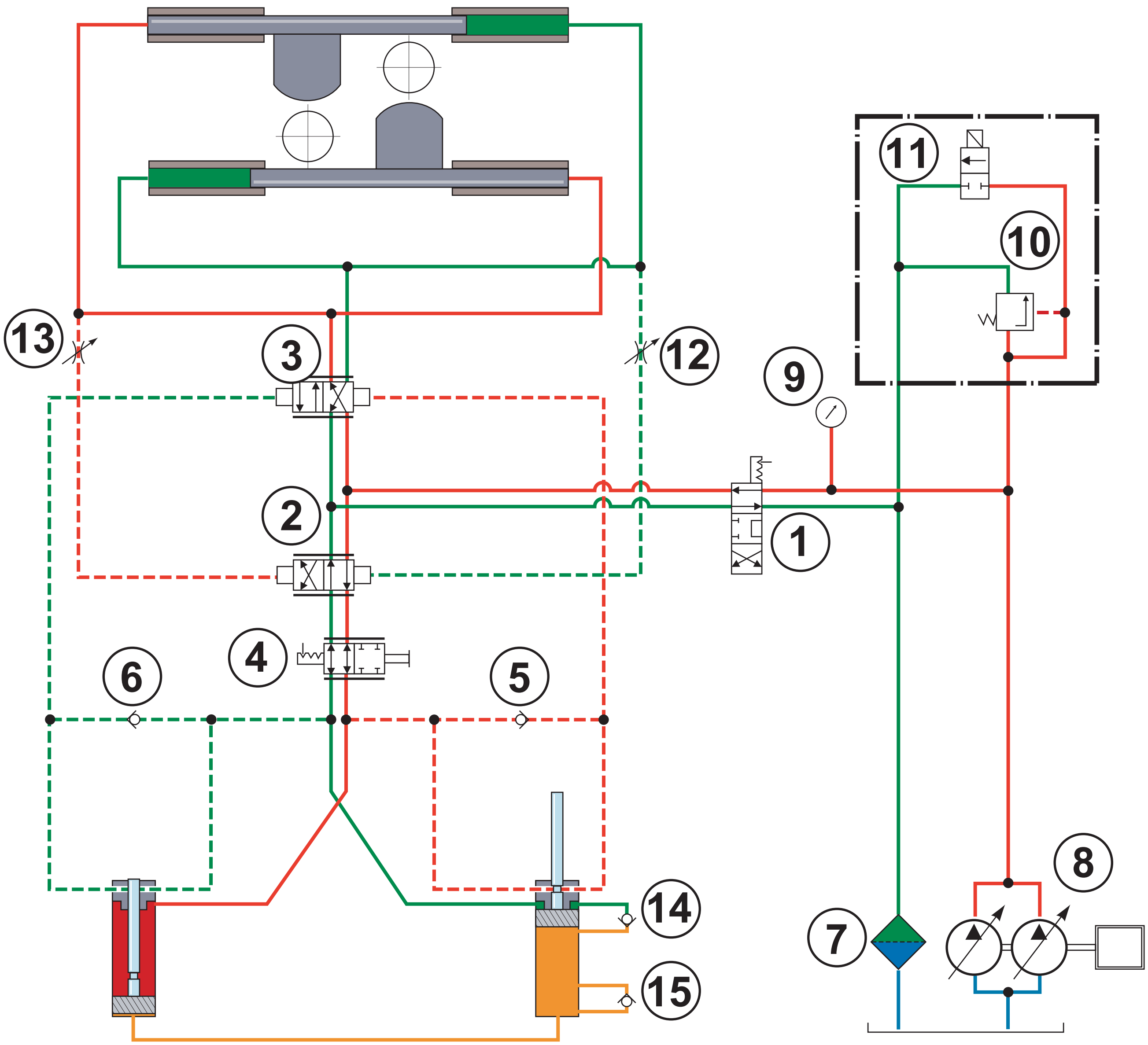
End of First Working Stroke

The differential cylinders have reached their end of stroke position. The left cylinder is fully closed and the right cylinder is fully extended. The right-hand differential cylinder releases in the extended condition pressure oil into the control lines allowing oil to reach the right side of the valve numbered 3.



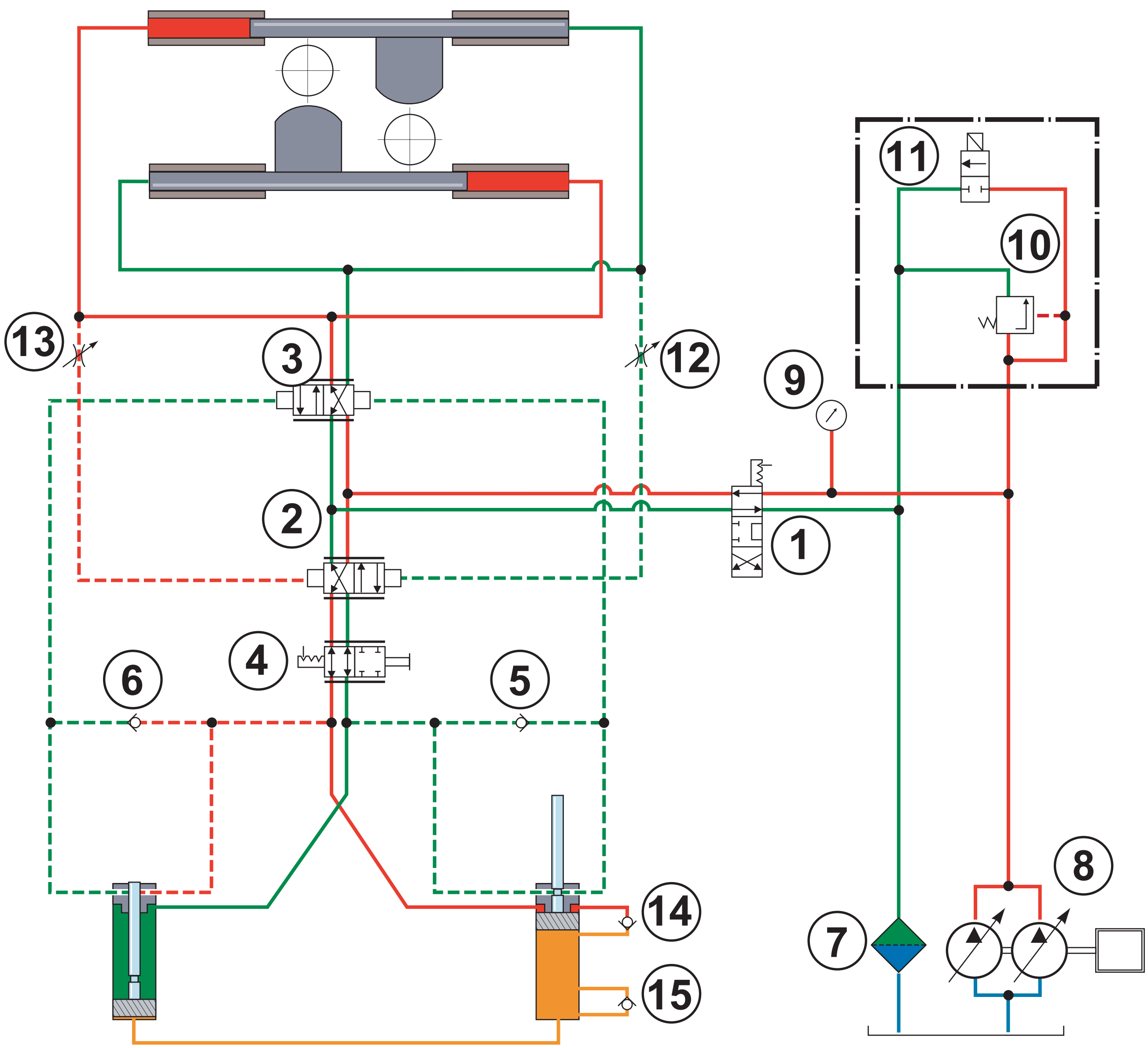
Control Stroke

Valve 3 is then moved from right to left. The oil displaced from the left-hand side of valve (3) flows through check valve 6 and also the valves 4, 2 and 1, and filter 7 back to tank.



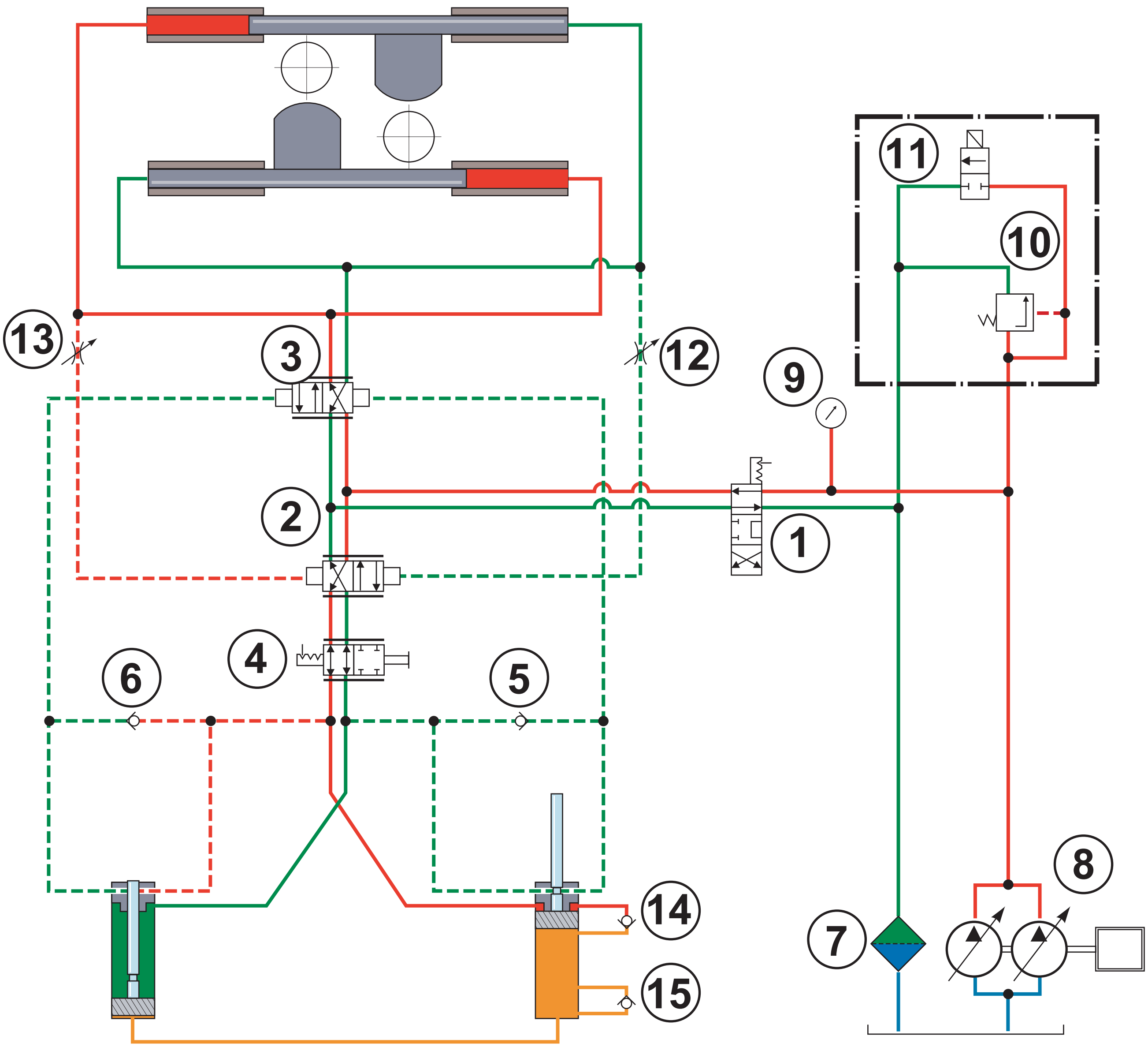
Second Working Stroke and Second Control Stroke

Valve 3 is now in the left-hand position. The pressure oil then flows to the left side of the siamese gate valve and simultaneously to the right-hand side of the hopper gate valve pushing the siamese gate valve to the right and the hopper gate valve to the left. From the pressure pipeline, the oil flows through the throttle valve 13 to the left-hand side of valve 2 and moves this valve to the right. The displaced oil on the right-hand side of the valve 2 and the right-hand side of the siamese gate valve together with the oil from the left side of the hopper gate valve now flows through an interconnected line through valve 3 and 1 and the filter 7 back to tank.



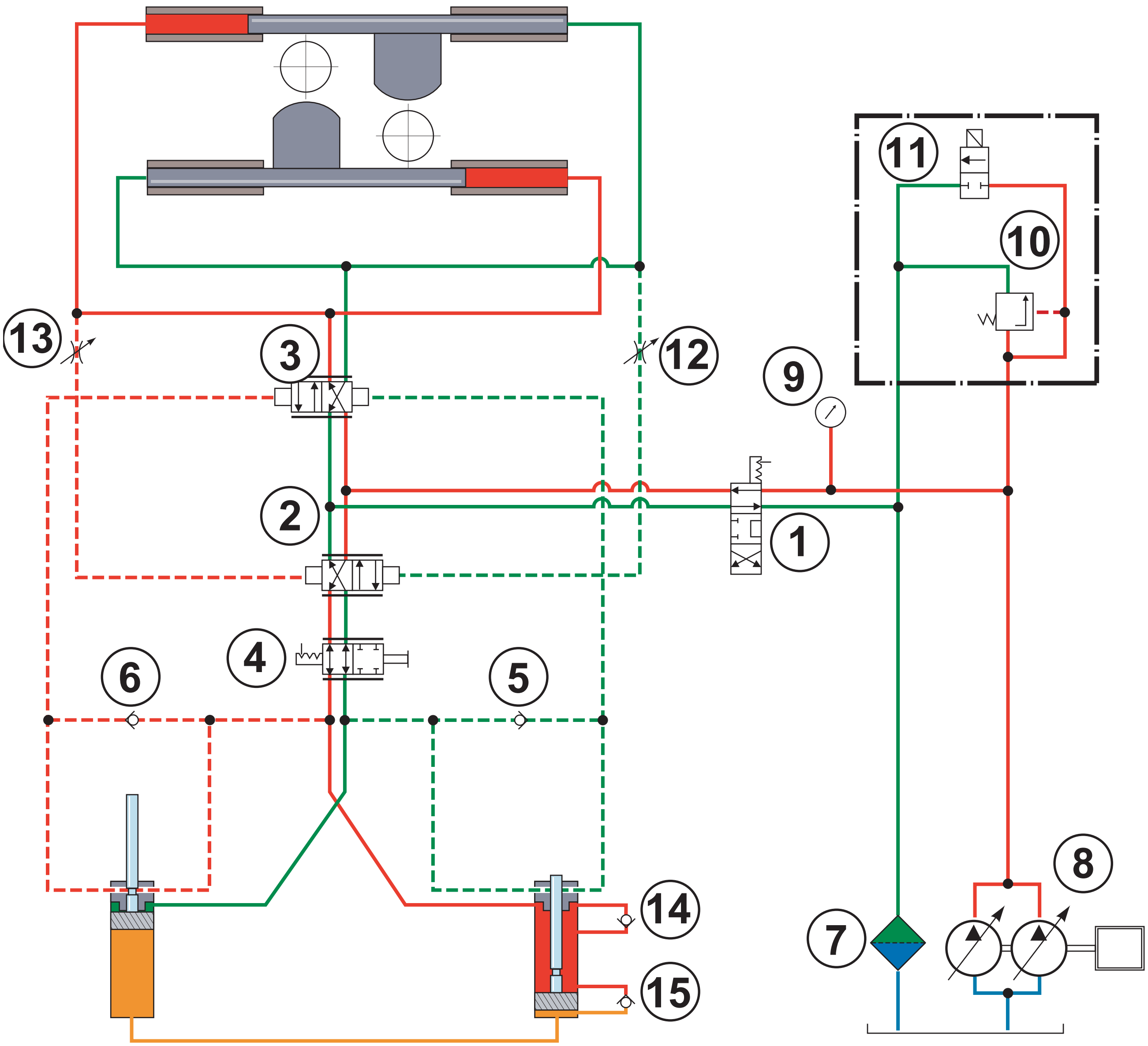
Third Working Stroke

Valve 2 is in a right-hand position. The pressure oil flows to the right-hand differential cylinder and acts on the piston rod side. On the piston side of this cylinder, the oil is pushed into the left-hand differential cylinder on its piston rod side, and oil flows back through the valves 2, 4 and 1, and filter 7 to tank. The position then of the siamese gate valve is right and the hopper gate valve left, so that the left pumping cylinder is pushing concrete into the pipeline and the right-hand pumping cylinder is sucking concrete from the hopper.



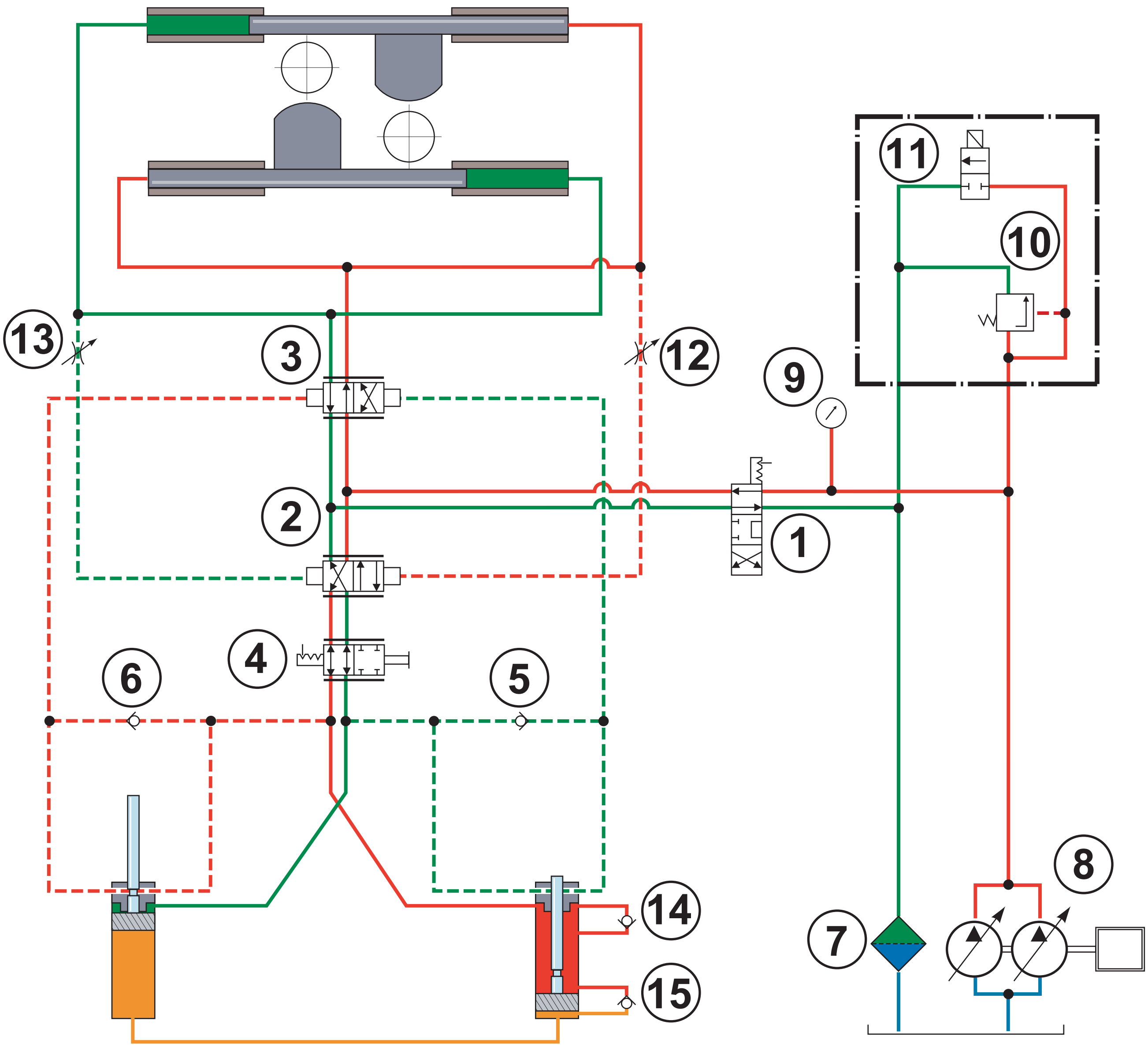
End of Third Working Stroke

The differential cylinders have reached their full stroke positions. The right-hand cylinder is fully closed, and the left-hand cylinder fully extended. The left-hand differential cylinder releases, in this condition, pressure oil through the control line, and the oil flows to the left side of the valve 3.



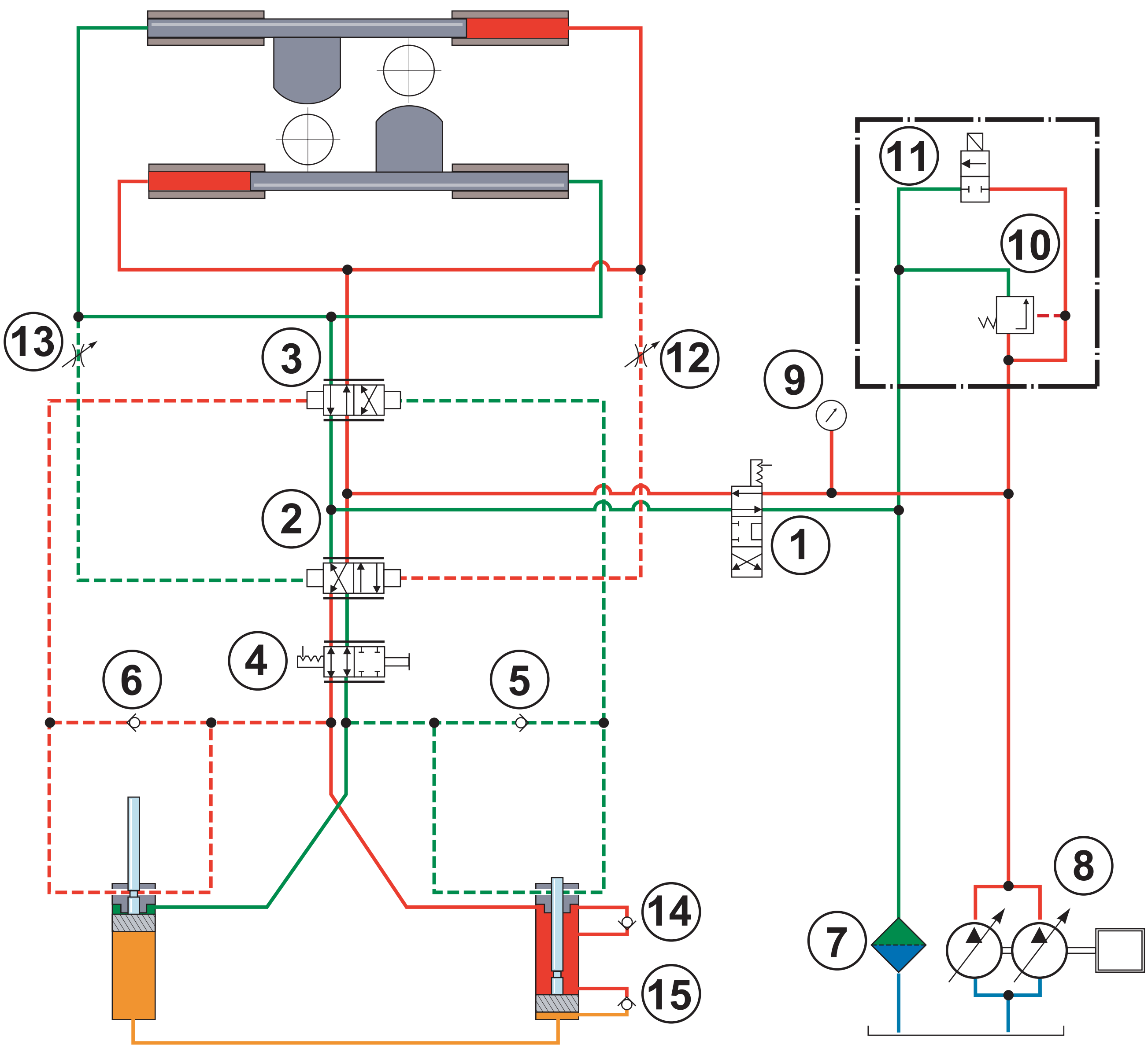
Third Control Stroke

Valve 3 is now selected from the left to right side. The oil which has been displaced from the right side of valve 3 now flows back to the tank via check valve 5 and valves 4, 2, and 1, and filter 7

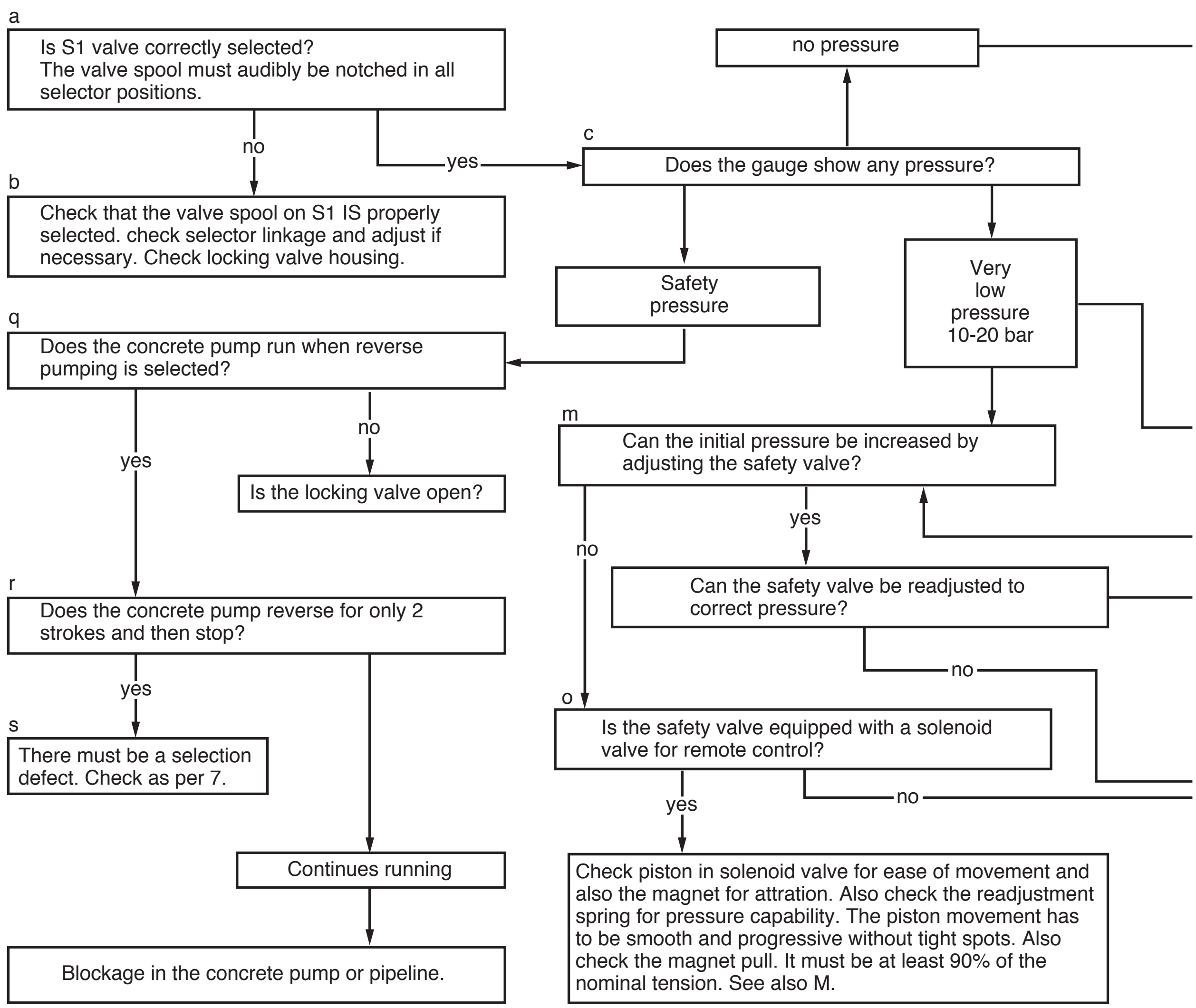


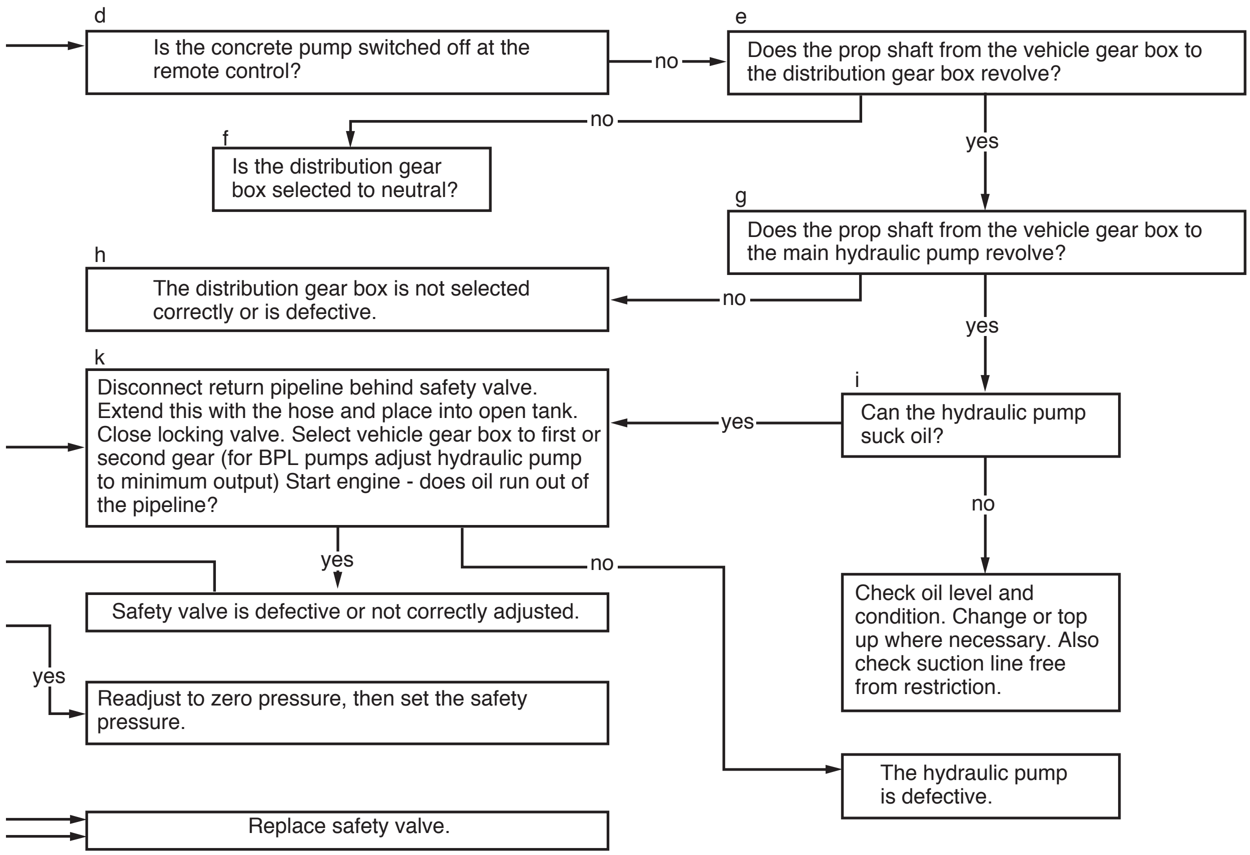
Fourth Working Stroke and Control Stroke

Valve 3 is in the right position. The pressure oil flows to the right side of the siamese gate valve and simultaneously to the left-hand side of the hopper gate valve pushing the siamese gate valve to the left and the hopper gate valve to the right. From the pressure line, the oil flows through throttle valve 12 to the right side of valve 2 and moves this valve to the left. The displaced oil from the left side of valve 2 and the left side of the siamese gate valve, as well as on the right side of the hopper gate valve, now flows back to the tank through an interconnected line through valves 3 and 1 and filter 7.

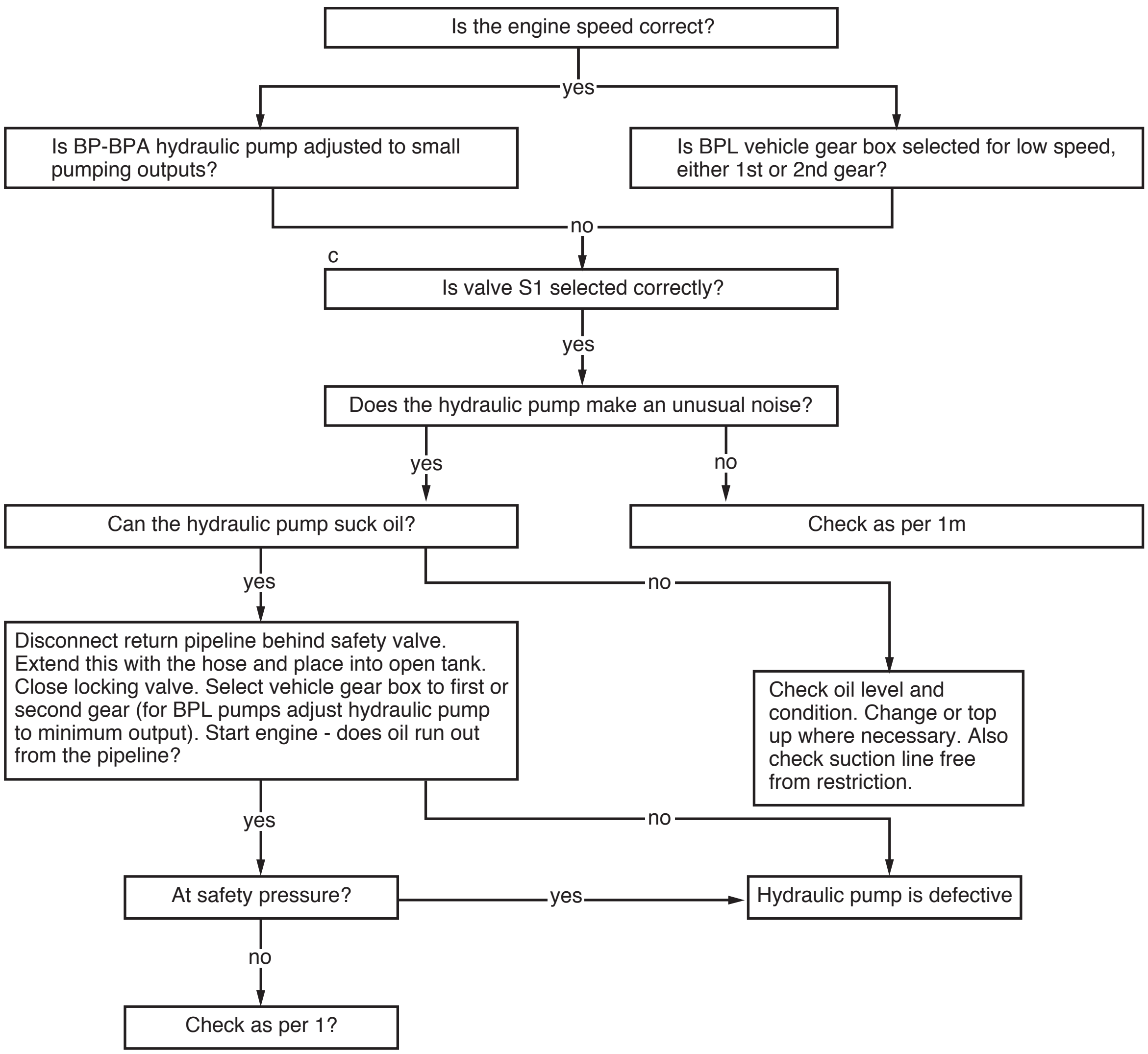


1 Concrete pump does not work, although it is switched on.




d
Is the concrete pump switched off at the remote control?
no
e
Does the prop shaft from the vehicle gear box to the distribution gear box revolve?
no
yes
f
Is the distribution gear box selected to neutral?
g
Does the prop shaft from the vehicle gear box to the main hydraulic pump revolve?
h
The distribution gear box is not selected correctly or is defective.
no
yes
k
Disconnect return pipeline behind safety valve. Extend this with the hose and place into open tank. Close locking valve. Select vehicle gear box to first or second gear (for BPL pumps adjust hydraulic pump to minimum output) Start engine - does oil run out of the pipeline?
yes
i
Can the hydraulic pump suck oil?
no
yes
no
Safety valve is defective or not correctly adjusted.
Check oil level and condition. Change or top up where necessary. Also check suction line free from restriction.
yes
Readjust to zero pressure, then set the safety pressure.
The hydraulic pump is defective.
Replace safety valve.

2 Concrete pump runs very slowly (few strokes) at very low pressure.



3 Concrete pump runs but with unexpectedly high hydraulic pressure. The oil is also heating more quickly than is normal.

Is valve S1 correctly selected?

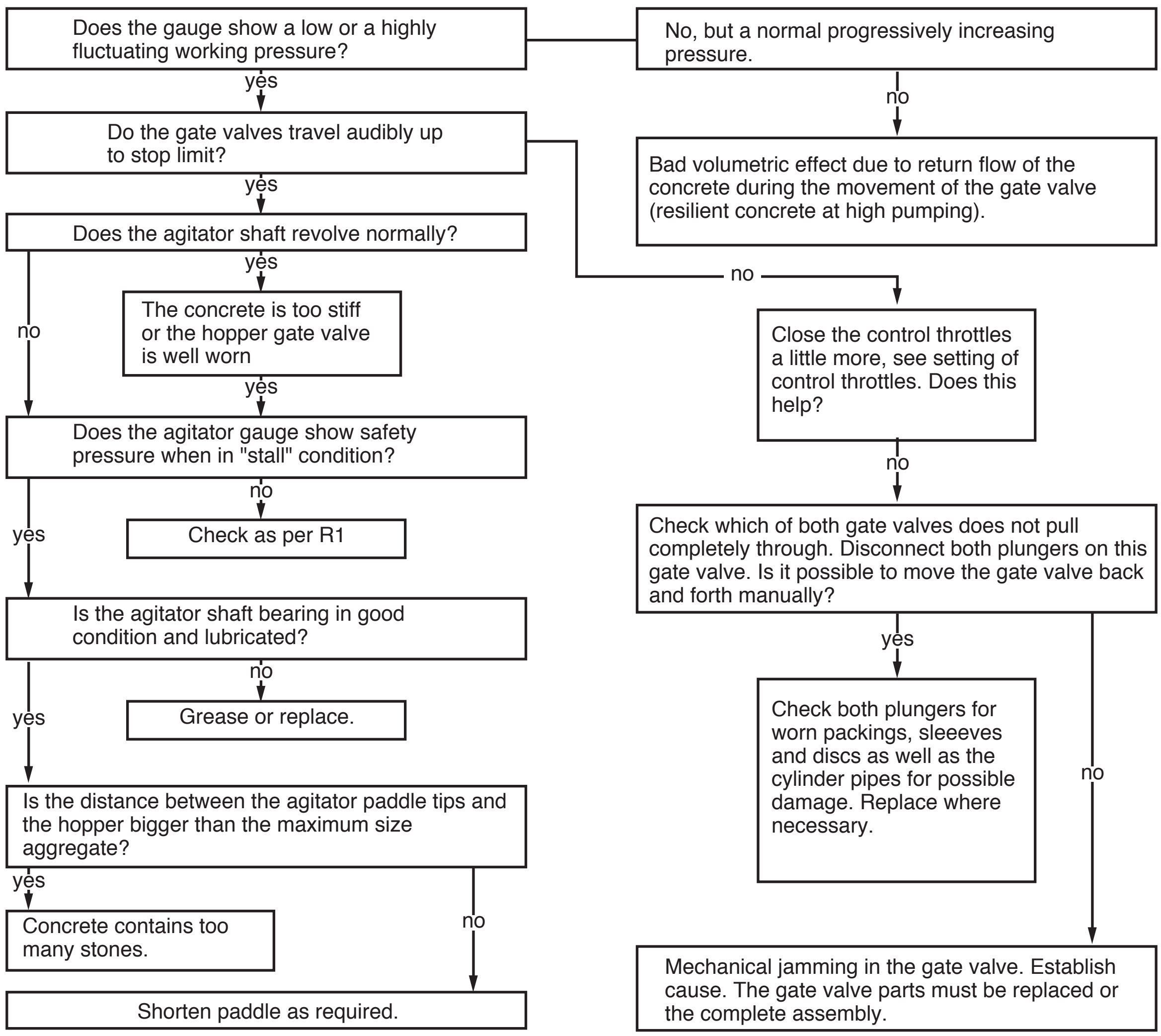
↓

Is the locking valve correctly selected?

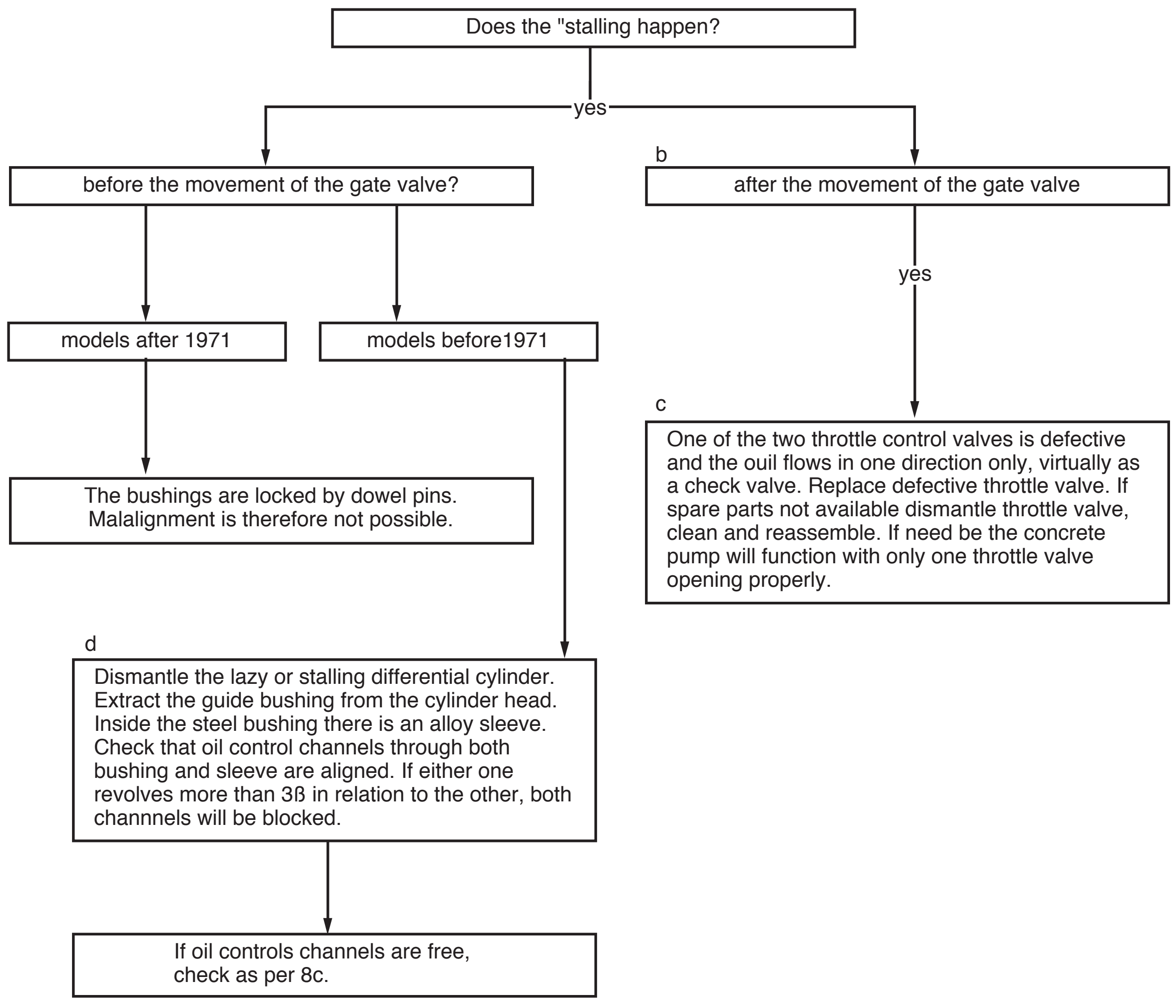
4 Concrete pump runs with normal number of strokes. The output is only half as it would correspond to the number of strokes. The gauge alternatively shows one stroke with normal pressure and another stroke with a very high pressure. The water level in the water box is rising and falling in the same sequence.

One ram has detached itself from the piston rod. When changing rams, new spring washers must be always used.

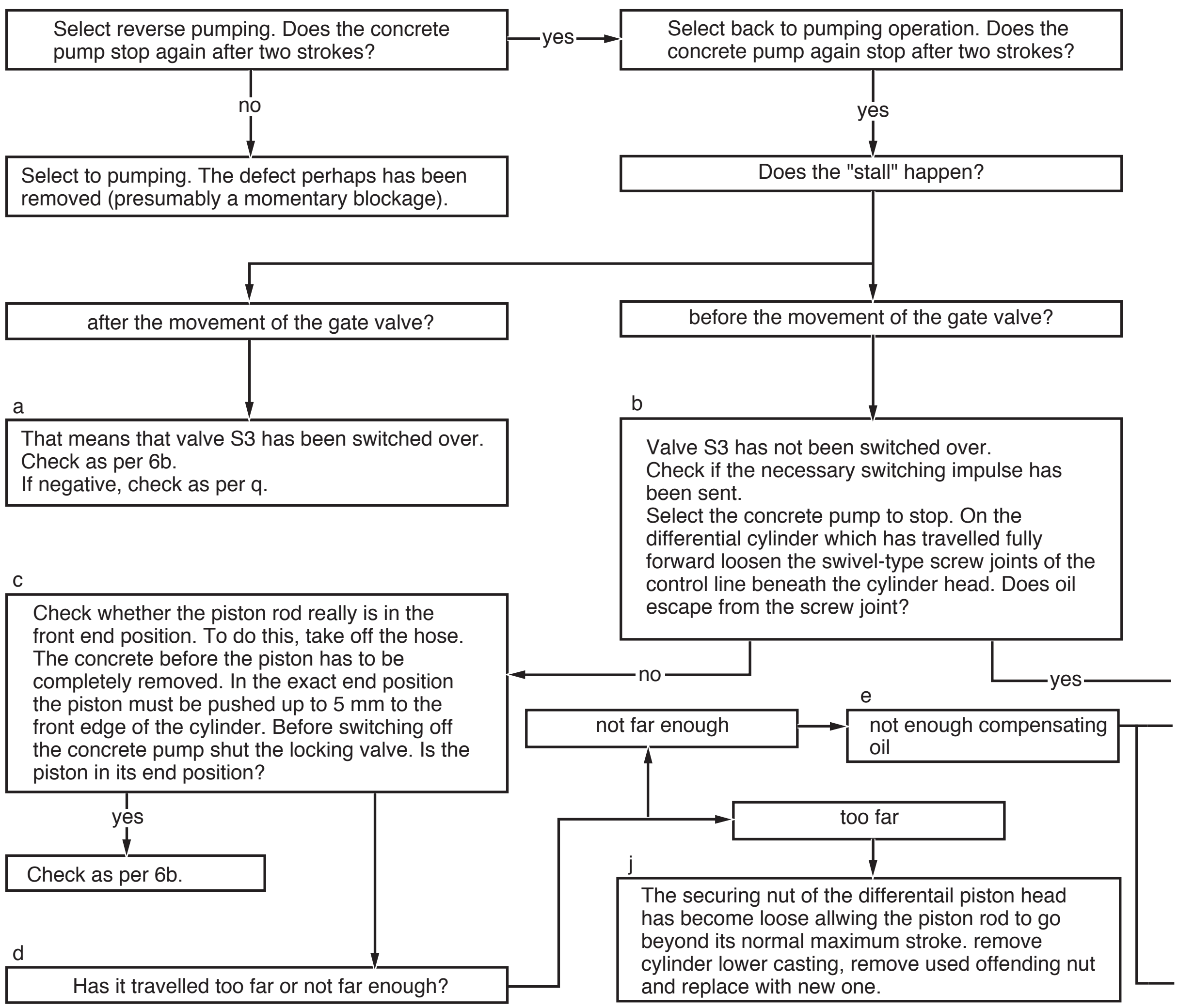
5 The concrete pump runs with normal number of strokes. The output is less than would corresponding to the number of strokes.

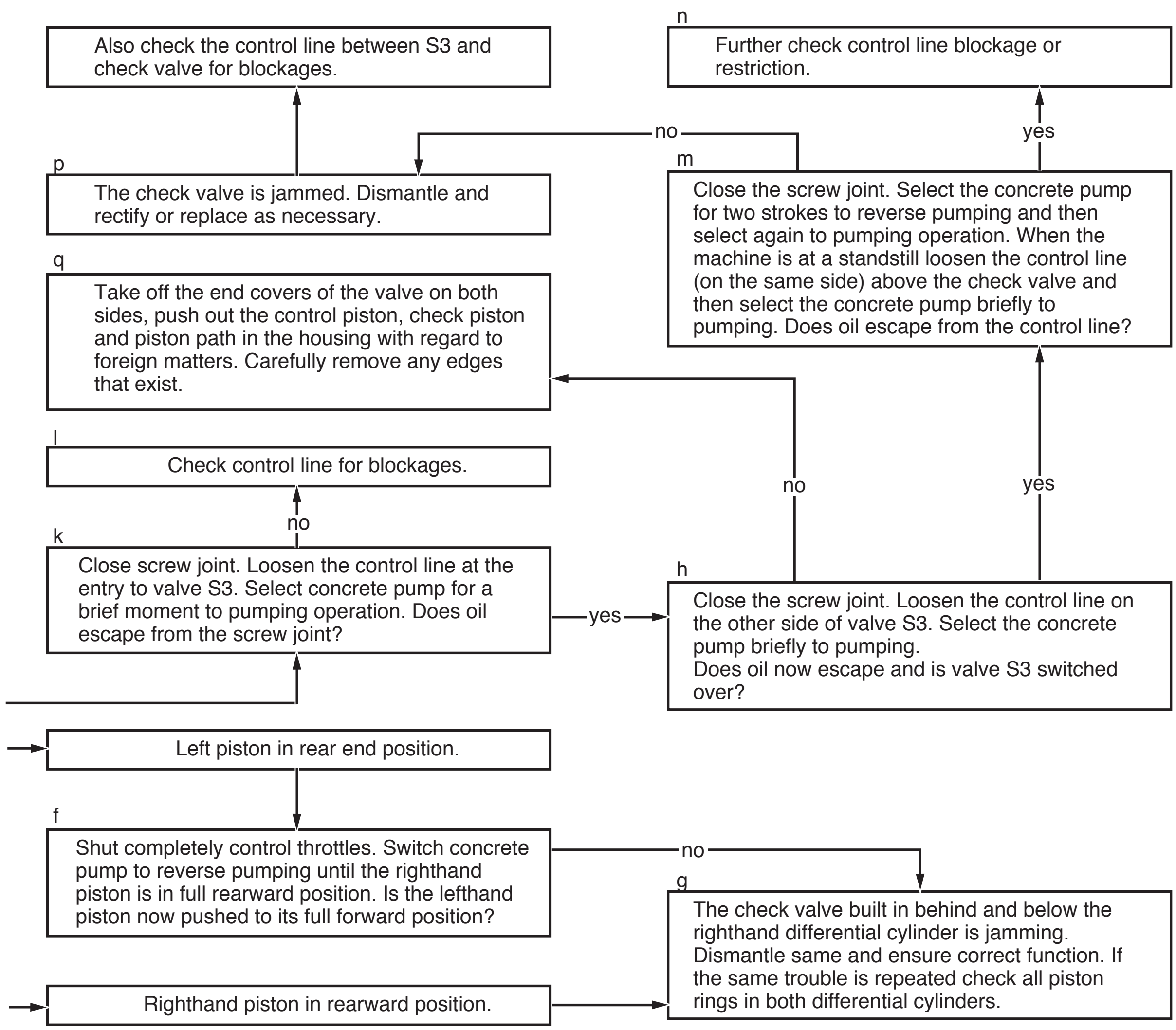


6 After every 2nd stroke, the concrete pump stops for a short while. At this time, the gauge indicates safety pressure. On the other stroke, there is no interruption or delay.



7 The concrete pump stops. The gauge indicates safety pressure. One differential cylinder is in the rear end position, i.e., the piston fixture is close to the rear wall of the water box.




n
Further check control line blockage or restriction.
yes
no
m
Close the screw joint. Select the concrete pump for two strokes to reverse pumping and then select again to pumping operation. When the machine is at a standstill loosen the control line (on the same side) above the check valve and then select the concrete pump briefly to pumping. Does oil escape from the control line?
Also check the control line between S3 and check valve for blockages.
p
The check valve is jammed. Dismantle and rectify or replace as necessary.
q
Take off the end covers of the valve on both sides, push out the control piston, check piston and piston path in the housing with regard to foreign matters. Carefully remove any edges that exist.
l
Check control line for blockages.
no
no
yes
k
Close screw joint. Loosen the control line at the entry to valve S3. Select concrete pump for a brief moment to pumping operation. Does oil escape from the screw joint?
yes
h
Close the screw joint. Loosen the control line on the other side of valve S3. Select the concrete pump briefly to pumping.
Does oil now escape and is valve S3 switched over?
Left piston in rear end position.
f
Shut completely control throttles. Switch concrete pump to reverse pumping until the righthand piston is in full rearward position. Is the lefthand piston now pushed to its full forward position?
no
g
The check valve built in behind and below the righthand differential cylinder is jamming. Dismantle same and ensure correct function. If the same trouble is repeated check all piston rings in both differential cylinders.
Righthand piston in rearward position.

8 The concrete pump runs with an excessive number of strokes. It looks as if it is running faster. In fact, it is running at constant speed, but with a shorter stroke. Check the movement of the piston rods in the water box.

Both pistons are working in the front parts of the cylinders. Fixtures for the piston are not appearing in the water box or only partly so - too much compensating oil. The check valve inthe lower part of the cylinder head of the right differential cylinder is jamming. Dismantle and free off. Check both cylinder piston rings, also the cylinder feed lines and internal bore surface.

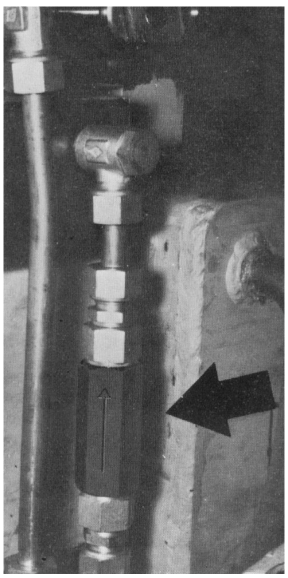
One piston operates in the front part of the cylinder, the other piston oppositely in the rear part. The cylinder whose piston is working in the rear operation is sending the switching or control impulse too early. The check valve in the control line of this cylinder (see fig.) does not seal or close properly. Dismantle same and rectify and if necessary replace. If this fails to cure problem:

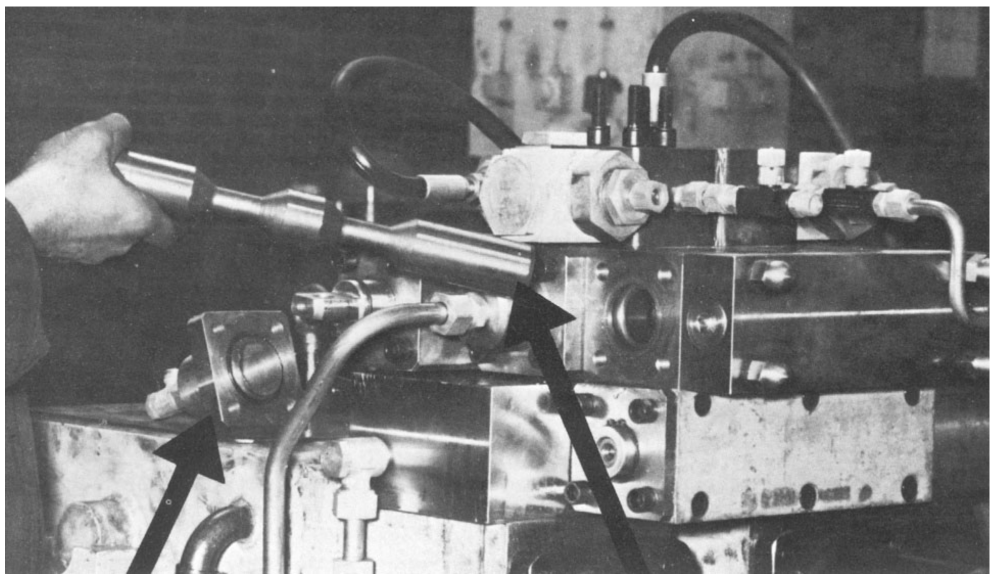
Close both throttle control valves, traverse the cylinder which was switching too early completely forward and then approximately 300 am backward. Loosen the cylinder head from the cylinder barrel and withdraw from the piston. Extract the guide bushing from the cylinder head using 2 x M8 screws. Replace the 3 O-rings in the bushing together with the backing rings.

9 After each stroke, the pressure increases in jerks up to maximum safety pressure. The start of the next stroke is retarded for a fraction of a second. Also the hydraulic oil is heated more rapidly than normal.

a. Both throttle valves, or perhaps one, are closed too much. This causes an insufficient quantity of oil to flow to the S 2 valve which tends to switch over late. Both throttle valves should be opened approximately π of a turn. For full procedure see E (adjustment of throttle valve).

b. Recommendations in (a) do not help - valve S 2 moves with difficulty probably because of foreign bodies between valve and control piston. Remove both end covers, push piston out, see figure Remove all foreign particles and de-burr all edges of piston and valve body.





Cover Removed **Control Spool Withdrawn**

Defects With the Concrete Pump

10 Flushing containers overflow, consequently much higher consumption of flushing agent.

The packings between the gate valve rods and plungers are worn. Renew packing immediately or wear will be accelerated.

11 The hydraulic oil tends to overheat - in excess of 80° C.

a. The safety valve is set too low and prematurely vents off oil back to tank.
   - ❏ Check operation of safety valve (see H 4), replace where necessary.
b. The lock valve is not fully open.
   - ❏ Check position of the piston in the valve body, i. e., where the piston reaches its stop position or where it passes stop position due to damaged circlip. Both conditions will cause a reduction in oil flow apertures.
c. The S1 valve does not change over properly.
   - ❏ Check under 8b. Furthermore, check control rods for deflection or damage.
d. As under K4.
   - ❏ Also check valve S3.
e. The working pressure is nearly as high as the safety pressure.
   - ❏ Reduce pumping speed to reduce the working pressure requirement.

In nearly all cases of excessive oil heating, the number of strokes will be found lower than normally obtained.

Defects With the Placing Boom, Remote Control, and Hydraulic Outriggers

M 1

All boom functions can be selected manually but not with the remote control. Therefore, check the following:

a. Is the main switch of the remote control on?
b. Is the cable plug fully pushed into the socket of the terminal box?
c. Is the ignition key of the vehicle fully pushed into the ignition lock?
d. Does the gauge for the pre-control pressure indicate a minimum of 6 bar? Where a lower pressure is found, the pre-control valve (spare parts list, boom control block, Pos. 12) has to be readjusted to 7 bar.
e. Is the fuse in the terminal box in tact?

Should these checks have a positive result, the electric feed line from the vehicle to the switches has to be checked by an electrician in relation to the circuit diagram for faults.

Defects With the Remote Control

M 2

One function can be controlled manually but not with the remote control.

a. An internal wire in the cable is loose at the terminal block of the distributor box.
b. An internal wire at the respective switch in the remote control unit is loose or possibly the switch is defective.
c. An internal wire in the cable is broken. Check with an AVO meter or similar.
d. The plug contact on the solenoid of the nonworking function is either loose or corroded.

For test purposes, the plug contacts on the solenoid valve of the nonworking motion can be changed using one from a known working motion. If this fails to effect a cure and the first motion still does not function, then the defect has to be traced through the respective solenoid valve or the pre-control valve.

M 3

No boom motion available whether operated manually or by remote control. While the motion is being operated, does the operating gauge register?

a. Full pressure
b. Lower pressure

a. The constant flow throttle valve belonging to the boom motion in the feed or return line is blocked. Alternatively, the oil from the opposite side of the cylinder cannot exhaust back because the HER safety valve does not open. The spindle of the check piston for the valve is either broken or jammed. Try to actuate the control piston, replace either the piston or the complete valve. (see also M 9)

b. The secondary safety valve relevant to the boom motion is maladjusted or defective Adjust the secondary safety valve (integrated with the HER safety valve) to a higher pressure. If half a turn of the setting pin does not provide a distinct pressure increase, the valve is defective.

M 4

One motion is very slow. Full pressure is available.

The oil from the opposite side of the cylinder can only flow very slowly into the return line. The constant flow throttle valve in the supply or return line of the relevant motion is blocked.

M 5

The gas actuation via remote control does not function. As under M 2. As the speed operation is hydraulically controlled utilizing the pre-control pressure, all hints as under M 1 (d) will apply analogously.

Defects With the Remote Control (cont'd)

M6

The concrete pump cannot be switched off with the remote control (applicable for machines without speed operation in remote control unit).

a. The switch on the remote control is defective.
b. The relay in the distribution box of the remote control is defective.
c. The cable connections to the switch relay or solenoid valve are loose or corroded.
d. The small piston pulled by the solenoid in the pre-control part of the safety valve system I - jams.

If a manual emergency device is installed, the piston can be pushed back manually (see photo). If the jamming happens frequently, the pre-control part, including the solenoid valve, should be replaced.

Defects With the Placing Boom

M7

The lowering movements of the boom or the flyer are jerky. There is then a danger of breaking the boom.

a. The return oil can escape too fast from the cylinder. The constant flow throttle valve in the return line can be oversized due to wear. Refer to the circuit diagram to obtain correct diameter of the throttle assembly.
b. The hydraulic pump is not fed in sufficient quantity and, therefore, the effected cylinder side cannot be replenished in the required time. Check the oil tank level and suction line.

Defects With the Placing Boom (cont'd)

M8

Boom or fly assembly creep down slowly even though the motion has not been selected.

The HER safety valve on the relevant cylinder side does not close fully or properly. It must be checked whether the leakage occurs on the check valve or on the secondary safety valve. To do this, the boom must be brought into a position where the weight of the boom produces pressure in the relevant cylinder side. Simply arrange that the boom can still be in a position to creep down slowly, but the HER valve is accessible for dismantling and assembly purposes. The pressure line of the leak line should be loosened. The leakage line is in fact where uniform flow of oil occurs when the boom is being lowered.

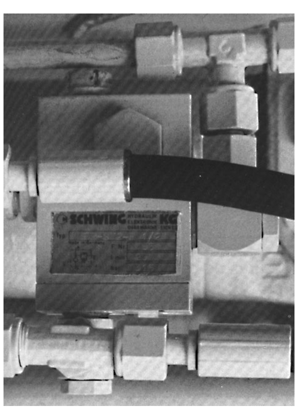
a. Oil seeps from high pressure connection. The check valve is no longer oil tight. Remove the HER safety valve from the cylinder. Having removed the locking screw, position 9, remove the pressure spring and ball. Clean the ball bearing, re-insert ball, and strike same fairly strongly using a copper drift and hammer. Reassemble and install the valve.

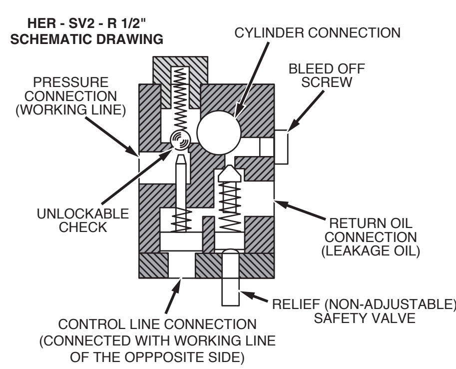
b. Oil seeps from the leakage oil pipe connection. This means a secondary safety valve is set too low. As soon as the pressure pin (Pos. 20) is screwed in by π to ∫ turn, the oil leakage and secondly the creeping of the boom should stop. However, if oil still seeps out, check the effectiveness of the cone in the seating. Before removal of the safety valve, the boom must be supported in order to depressurize the cylinder.

The HER (hydraulically unlockable check valves) prevent the boom lowering in jerks should the high pressure line break. However, during the downward motion the oil must be able to flow from the cylinder. For this purpose, the check valve must be open, and this happens when oil is conveyed to the opposite side of the cylinder and this pressure (min. 30 bar) opens the check valve via a piston (Pos. 8).

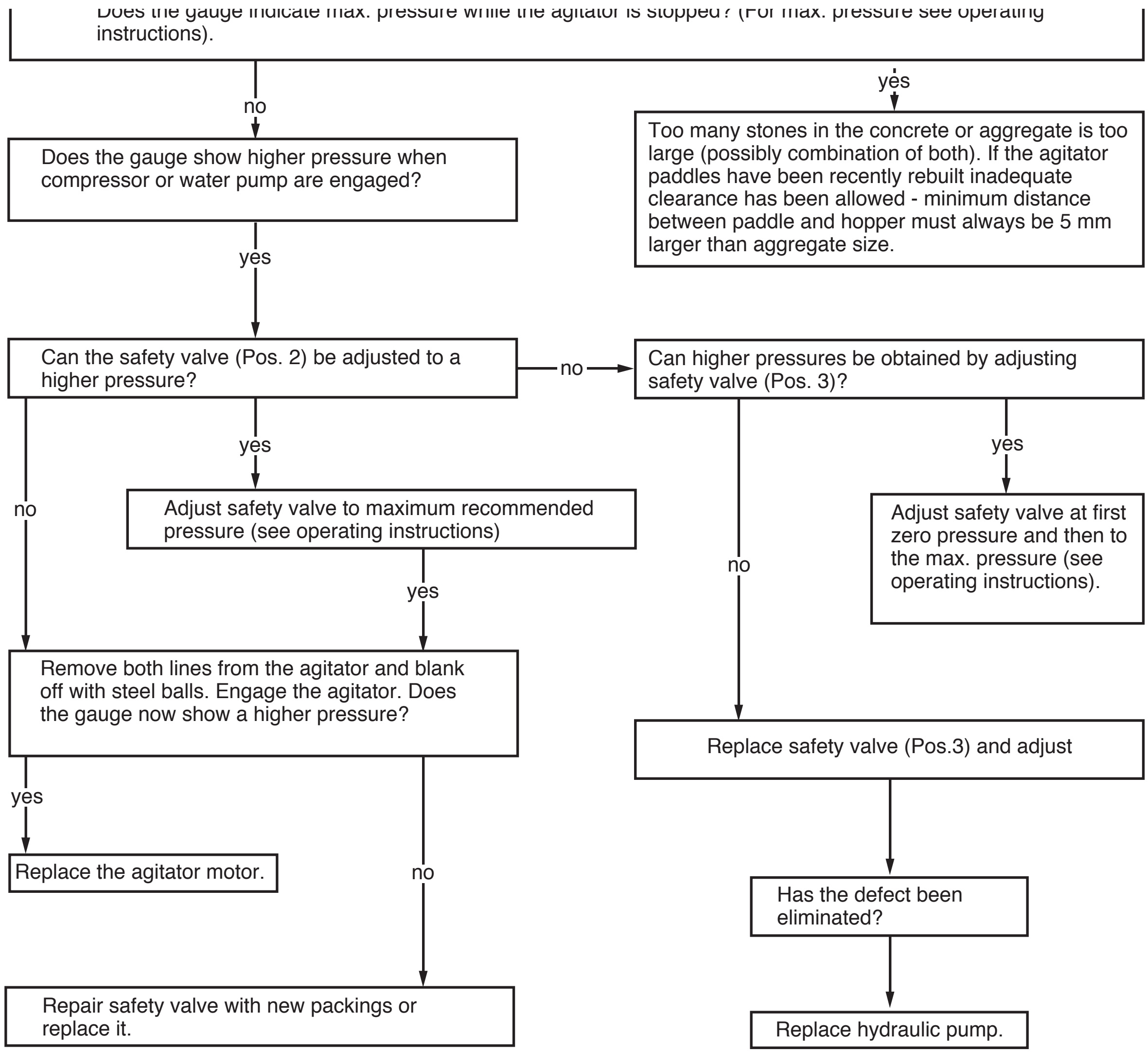
The secondary safety valves protect the cylinder against excess pressure, particularly when the oil pressure is added to the static pressure generated by the weight of the boom from the opposite cylinder side. Both pressures accumulate and would influence the efficiency and reliability of the cylinder and cylinder seals, if it were not for the secondary safety valves ability to absorb the excess pressure. Therefore, the secondary safety valves must not be set to any desired pressure.

For precise adjustment, remove the locking screw (Pos. 3) on HER safety valve and connect the pressure gauge. This gauge must show a measuring range of min. 400 bar. For the correct pressure setting see the circuit diagram.

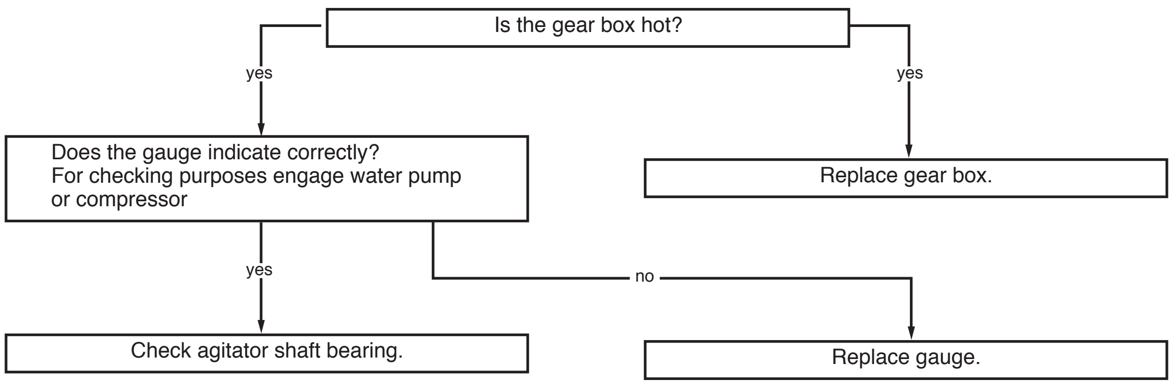




R1 The agitator stops frequently and can only be set in motion again after reversing briefly.

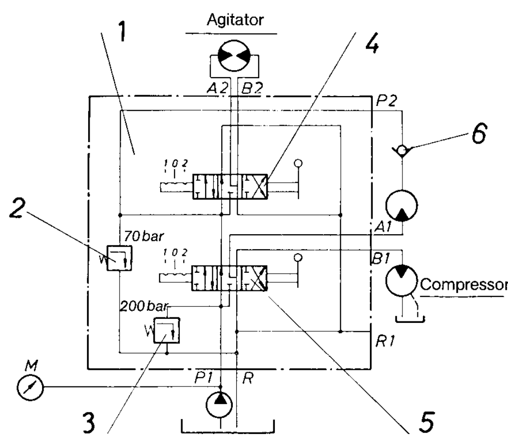


R2 The agitator runs with unexpectedly high pressure.

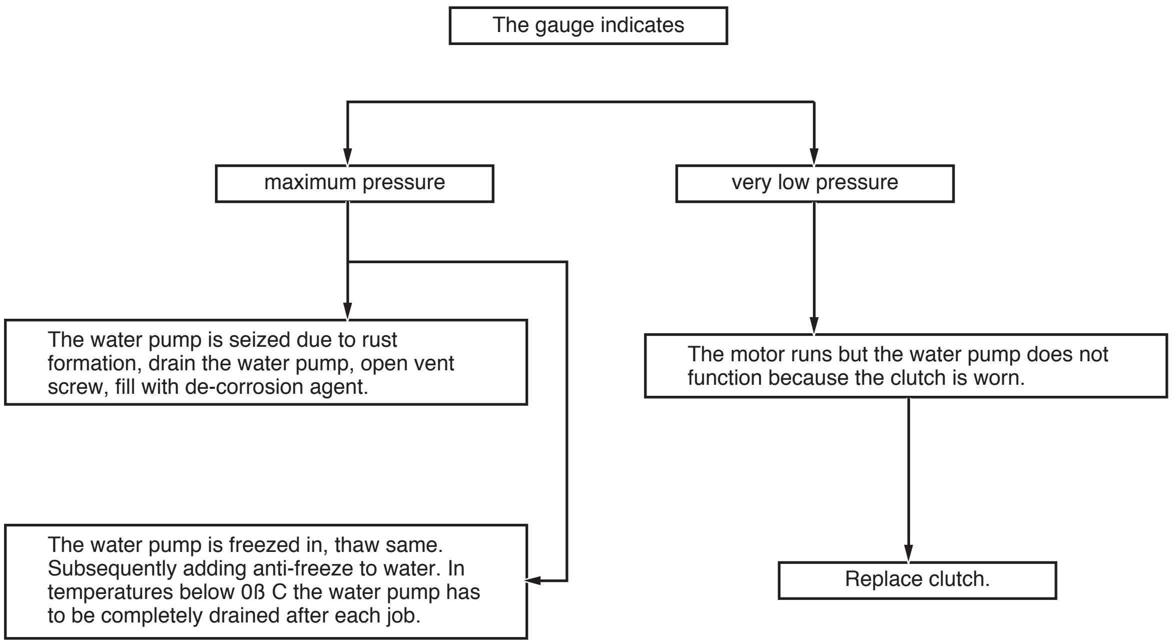


Hydraulic circuit diagram, agitator, compressor, water pump

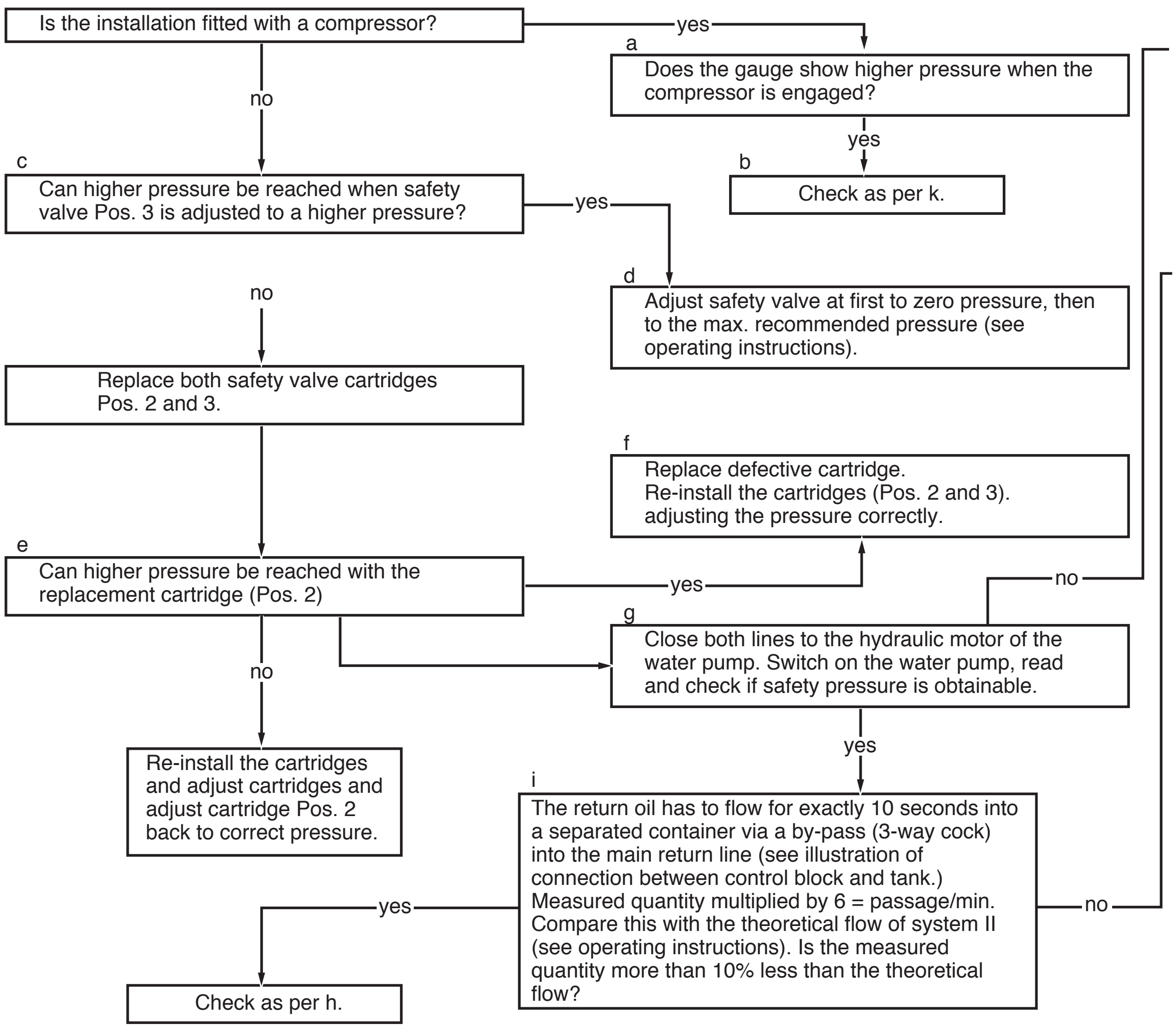
1 Base plate EV 192.001
2 Safety valve cartridge SVP-10
3 Safety valve cartridge SVP-10
4 Hand gate valve HSR 10632
5 Hand gate valve HSR 10632
6 Check valve

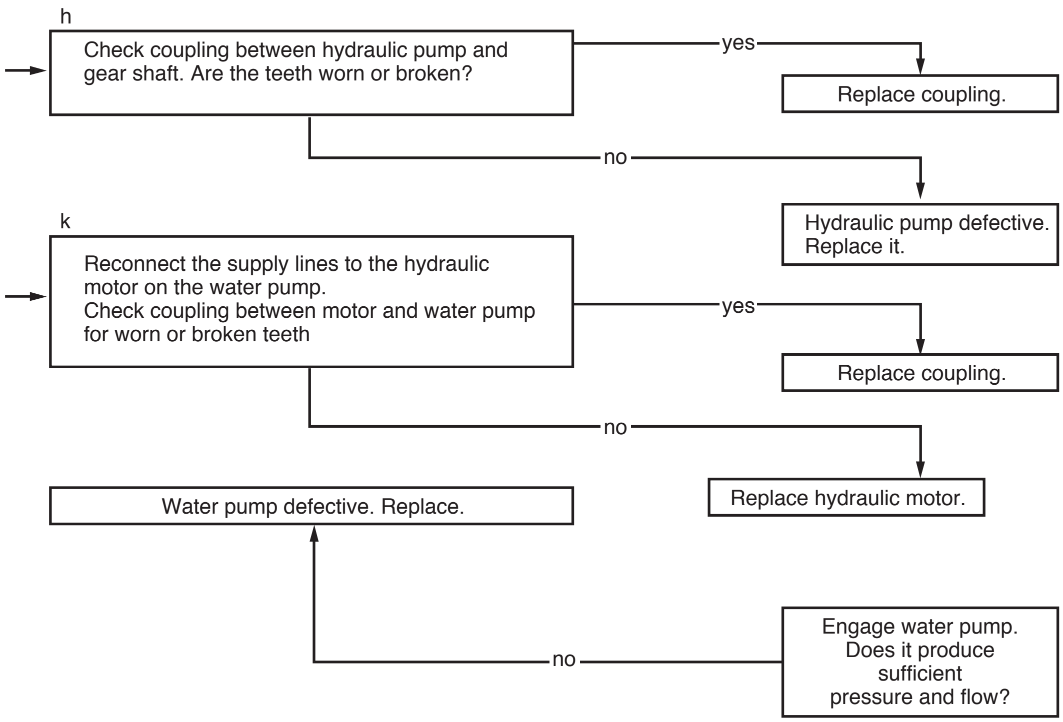


W1 The water pump does not work, although the tank is filled and the input is unobstructed.



W2 Insufficient water is pumped by the pump and the pressure is low.




h
Check coupling between hydraulic pump and gear shaft. Are the teeth worn or broken?
yes
Replace coupling.
no
Hydraulic pump defective. Replace it.
k
Reconnect the supply lines to the hydraulic motor on the water pump.
Check coupling between motor and water pump for worn or broken teeth
yes
Replace coupling.
no
Replace hydraulic motor.
Water pump defective. Replace.
no
Engage water pump. Does it produce sufficient pressure and flow?