

# JUNJIN CONCRETE PUMP

## SERVICE INFORMATION



JSI - EN - 05 - 2A - 001		Date	Feb 1st, 2005
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Subject	Specification of hyd. pump		

### ■ Specification of hyd. pump

	Model	Domestic / Export	Main pump	Boom pump	Accum. pump	Gear pump (double)	Remark
1	JFS-12H	Domestic	KAWASAKI	X	REXROTH	BOSCH	
			RB642	X	RB00102	RB650	
			K3V140DT(TD)	X	A10VO28(24cc)	19cc	
		Export	REXROTH	X	REXROTH	BOSCH	
			A4VSO250	X	RB00102	RB650	
			RB00101	X	A10VO28(24cc)	19cc	
2	JM-2100HP	Domestic	KAWASAKI	X	REXROTH	BOSCH	
			RB953	X	RB00102	RB650	
			K3V180DTH(TD)	X	A10VO28(24cc)	19cc	
		Export	REXROTH	X	REXROTH	BOSCH	
			RB780	X	RB00102	RB650	
			A20VLO190(TD)	X	A10VO28(24cc)	19cc	
3	JJ-M2009	Export	KAWASAKI	REXROTH	REXROTH	BOSCH	
			RB644	RB800	RB00102	RB650	
			K3V140S	KFA2FO23	A10VO28(24cc)	19cc	
4	JJ-M2812	Export	REXROTH	REXROTH	REXROTH	BOSCH	
			MS043	RB800	RB00102	RB650	
			A11VO145	KFA2FO23	A10VO28(24cc)	19cc	
5	JX-H3315	Domestic	KAWASAKI	REXROTH	REXROTH	BOSCH	
			RB642	RB800	RB00102	19cc	
			K3V140DT(TD)	KFA2FO23	A10VO28(24cc)	RB650	
	JX-M3315	Export	REXROTH	REXROTH	REXROTH	BOSCH	
			A4VSO250	RB274	RB00102	19cc	
			RB00101	A2FO23	A10VO28(24cc)	RB650	

	Model	Domestic / Export	Main pump	Boom pump	Accum. pump	Gear pump (Double)	비고
6	JX-H3717	Domestic	KAWASAKI	REXROTH	REXROTH	BOSCH	
			RB642	RB274	RB00102	19cc	
			K3V140DT(TD)	A2FO23	A10VO28(24cc)	RB650	
	JX-M3717	Export	REXROTH	REXROTH	REXROTH	BOSCH	
			RB00101	RB274	RB00102	19cc	
			A4VSO250	A2FO23	A10VO28(24cc)	RB650	
7	JX-H4170	Domestic	KAWASAKI	REXROTH	REXROTH	BOSCH	
			RB642	MS006	RB00102	RB650	
			K3V140DT(TD)	KFA2FO32	A10VO28(24cc)	19cc	
	JX-M4015	Export	REXROTH	REXROTH	REXROTH	BOSCH	
			RB00101	KFA2FO32	RB00102	RB650	
			A4VSO250	MS006	A10VO28(24cc)	19cc	
8	JJ-H4215	Domestic	KAWASAKI	KAWASAKI	REXROTH	BOSCH	
			RB642	RB861	RB00102	RB650	
			K3V140DT(TD)	K3VL45(var.)	A10VO28(24cc)	19cc	
	JJ-M4215	Export	REXROTH	KAWASAKI	REXROTH	BOSCH	
			RB00101	RB861	RB00102	RB650	
			A4VSO250	K3VL45(var.)	A10VO28(24cc)	19cc	
9	JJ-H4315	Domestic	KAWASAKI	KAWASAKI	REXROTH	BOSCH	
			RB642	RB861	RB00102	RB650	
			K3V140DT(TD)	K3VL45(var.)	A10VO28(24cc)	19cc	
	JJ-M4315	Export	REXROTH	KAWASAKI	REXROTH	BOSCH	
			RB00101	RB861	RB00102	RB650	
			A4VSO250	K3VL45(var.)	A10VO28(24cc)	19cc	

	Model	Domestic / Export	Main pump	Boom pump	Accum. pump	Gear pump (Double)	Remark
10	JJ-H5015	Domestic	KAWASAKI	KAWASAKI	REXROTH	BOSCH	
			RB642	RB861	RB00102	RB650	
			K3V140DT(TD)	K3VL45(Var.)	A10VO28(24cc)	19cc	
	JJ-M5015	Export	REXROTH	KAWASAKI	REXROTH	BOSCH	
			RB00101	RB861	RB00102	RB650	
			A4VSO250	K3VL45(Var.)	A10VO28(24cc)	19cc	
11	JJ-H5717	Domestic	REXROTH	KAWASAKI	REXROTH	BOSCH	
			RB780	RB861	RB00102	RB650	
			A20VLO190(TD)	K3VL45(Var.)	A10VO28(24cc)	19cc	
	JJ-M5717	Export	REXROTH	KAWASAKI	REXROTH	BOSCH	
			RB780	RB861	RB00102	RB650	
			A20VLO190(TD)	K3VL45(Var.)	A10VO28(24cc)	19cc	

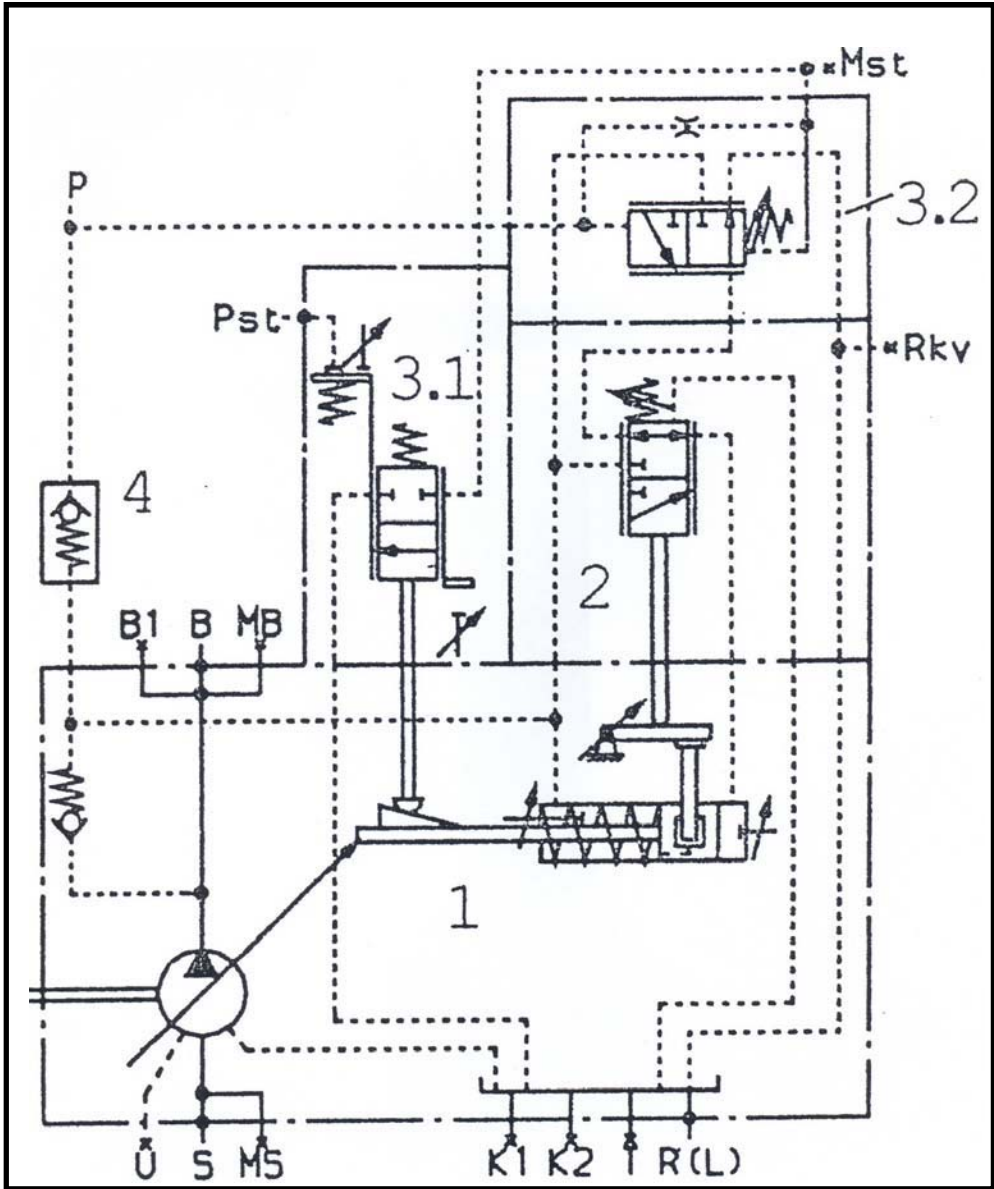


Fig. 1 Hyd. schematic(REXROTH A4VSO250)

■ Exploded view of the pump

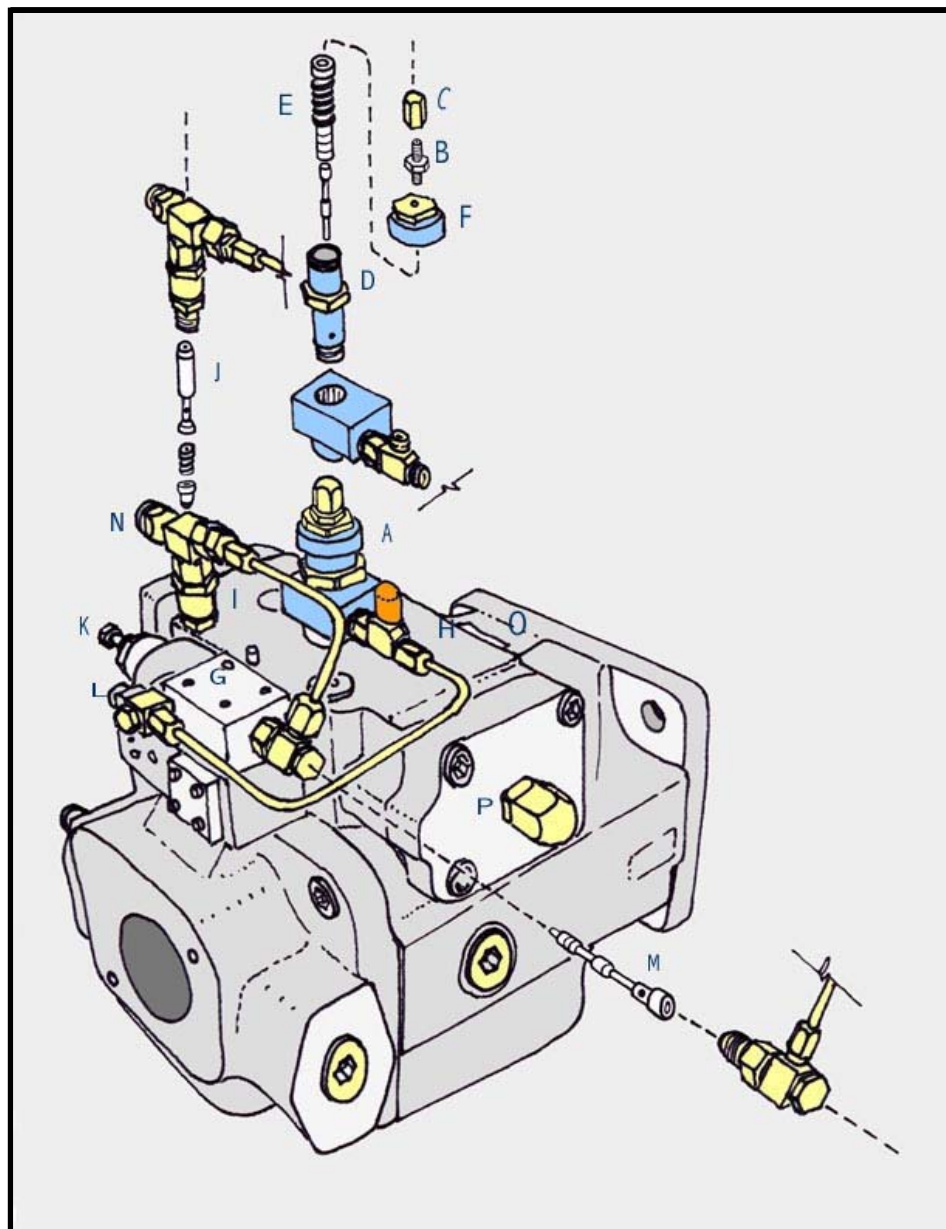


Fig. 2 Exploded view

## ■ Explanation of each area

Letters A P are assigned to areas of concern, some of which are depicted in an exploded view as they appear when removed from the assembly.

① A – PST Controller. This component maintains desired pump volume output and has adjustment and settings critical to required pump operation. Refer to the exploded views displayed in order of disassembly.

② B – PST Pump Volume Setting. Loosening the jam nut and turning the set screw inwards reduces the main pump "full" volume of cc's per revolution, which in turn reduces the number of product cylinder pumping strokes per minute. On the 15 series pump cell 29 strokes per minute is desired at full engine/ pump rpm. Conversely, turning the setscrew outwards increases the volume and pumping strokes per minute.

For our purposes, this setting is already at the maximum volume setting.

③ C – PST "Acorn". This blind thread-sealing nut protects the exposed end of the adjusting set screw, utilizing a small metal with rubber encapsulated sealing washer for leakage control. Use care not to loose this washer when performing adjustments.

NOTE : During installation of pump subframes onto chassis, it is a good idea to remove both items B and C from the PST housing, due to lack of frame space and the possibility of breaking these items off.

It is normal for oil to drip from the exposed cap (F) while the cap/setscrew is removed and a small container may be hung from the PST to catch the drips.

How to set the adjustment screw "B" – Loosening the jam nut and turning the set screw inward until this screw touch the spool inside, then turning the set screw 180 degree outward.

④ D – PST Mounting. The PST housing may be removed from the main pump by loosening the large nut and threading the large round body outwards, being careful not to loose seals. Take note of the position of this large nut in relation to the threads on the round body it is located on. It is desirable to have "One" full thread showing above the nut, which indicates that the assembly is located in correct relationship to the components within the main pump housing. If more than one thread is showing, the pump may not achieve its low volume performance, and conversely if less than one full thread is exposed the pump may not achieve its maximum output. During pump volume troubleshooting endeavors, this should be inspected, and may be adjusted in the attempt to correct improper operation.

⑤ E – PST Spools & Spring. The spools move within the PST housing bore, full outward travel of the upper portion controlling maximum pump volume, and limited by contact with the set screw B in conjunction with movement of the smaller/ lower stem, both operated by pilot pressure (0–45 bar circuit).

It is essential that all items slide freely within their respective bores; as an example having interference between the upper spring stem within the large bore can create erratic pump volume control and lack of full volume.

⑥ F – PST Cap. This cap is easily damaged, especially if the set screw/ acorn nut are knocked off during installation. If damaged, the thin threaded hole may be welded solid, leaving the adjuster off (B/ C) Normally the adjustment is at maximum and will not effect the pump by not being in place.

⑦ G – MST Controller

⑧ H – 45 Bar Circuit. Locate the test port, or gauge port at the passenger side of the 4-way valve hydraulic block. This circuit, part of the PST controller is normally set using the radio remote controller programming functions. Which controls RB43170. Full 45 bar pressure brings the main pump to its minimum delivery volume setting, and 0 bar (0–5) will bring the main pump to its maximum delivery volume setting. Located between the PST and RB43170 is a 1.2mm orifice.

⑨ I – Check Valve (exterior on MST circuit). Damage at the check valve affects pump operation. If this check valve sticks closed, then the main pump volume stays on "maximum". If the check valve leaks, then the main pump output reduces and pressure will increase over the 75 bar setting on that circuit.



This check valve is opposed in direction of flow to the internal check valve (J). If this check valve is damaged, the output volume reduces and main pressure is about 200–250bar

⑩ J – Check Valve (interior on MST circuit). Damage to the small spring, or between the sealing faces of this internal check spool lead to reduced main pump pressure, perhaps down to 250 bar maximum in some cases. Note orientation of installed parts.

If this check valve is damaged, you can not control output volume and the 75bar circuit pressure will be reduced. (NOT main pressure down)

⑪ K – MST Set Screw. Adjustment for 45 bar control.

⑫ L – Horse Power Adjustment. The A4VSO pump has horse power controls that operate in nature with a "hyperbolic curve", where control initiates over 200 bar with "P" (pressure) inverse to " Q"(flow). One full turn clockwise of the adjusting screw (inward) provides a 52 bar increase to the pressure setting, beginning of control. The JunJin adjustments may be checked by the following procedure: Run pump with the relief valve RB07925 manually closed for maximum pump pressure (350 bar) and pump volume at maximum setting (0 bar, or HBC max.) starting at a higher rpm such as 1500. While viewing the engine tachometer, the speed should be able to be reduced (use the HBC) down to "1000 rpm" without the engine stalling.

⑬ M – MST Spool. This small spool contains a 0.8mm orifice, which if plugged causes the main pump volume to fail to minimum. This can be compensated for (prior to repairing, or cleaning) by closing a small gate valve found on the 75 bar circuit, adjacent to the 75 bar test or gauge port. In addition the A4VSO pump has an internal 0.8mm orifice located within a piston on the "P"side of the housing. If this orifice is missing, then full pilot pressure will not be available in the 75 bar circuit. If the same orifice is plugged, then horsepower control will be lost.

NOTE: There are three other small "lubrication" orifices within the A4VSO pump assembly critical to providing lubrication for shell bearings, keep contamination out of the system.

⑭ N – 75 Bar Circuit. Locate the test or gauge port adjacent to the accumulator bladder and pressure gauge. Adjust this value @ RB17901 reducing valve.

⑮ O – Pump Volume (Swash Plate Angle) Indicator. This is an exterior pump volume or delivery indicator useful in troubleshooting procedures. The indicator needle travels between 15 & 0 degrees, the static or system off position being 15 degrees (full volume). This is to the left of 0 (zero), and the pump does not operate to the right, or "reversed" swash plate angle for our purposes.

⑯ P – SetScrews. These large external acorn nuts and setscrews control the internal control piston travel, and are factory set. They do not impact on our operation (small chance of problems) and should not be adjusted.

## ■ Pst controller



Fig. 3 Pst controller O/H

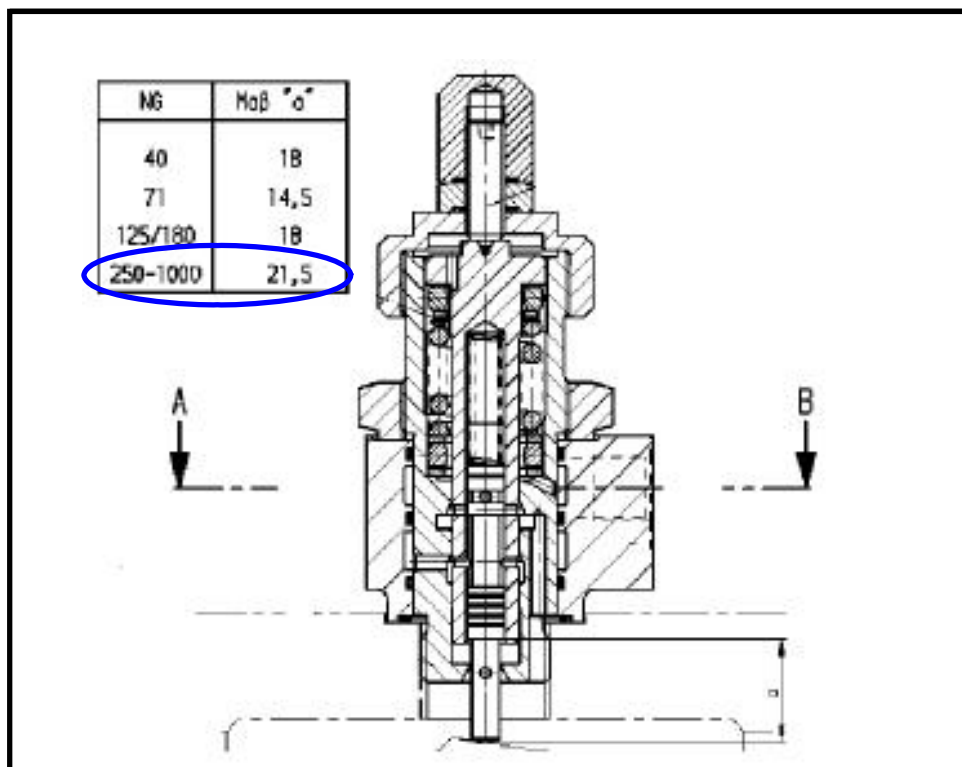


Fig. 4 Checking the length of spool

## ■ Modification of boom pump

This service bulletin shows how to install a new boom pump(K3V45L, variable displacement 45cc/rev, RB861), required parts and proper pressure setting procedures on M43, M50, M55.

After removing old pump(Inline pump), perform the modification according to the following procedure.

## ■ Appearance of K3V45L



Fig 1. Pictures of K3VL45

## ■ K3VL boom pump assembly

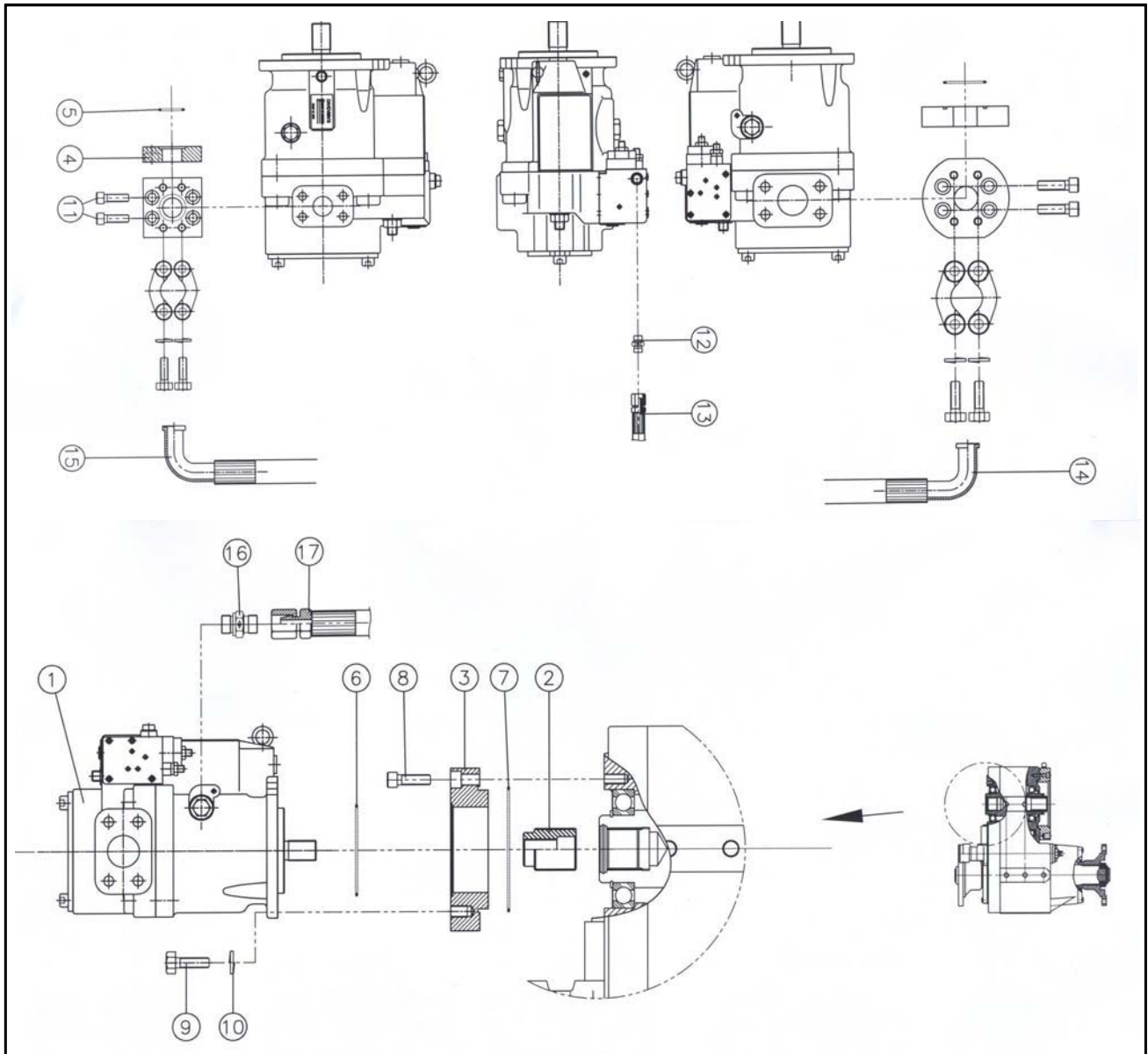


Fig. 2 K3VL boom pump assembly

## ■ Required parts for the modification

	Part Number	Part	Spec.	Q' ty	Remark
1	RB86100	Boom pump	K3VL45	1	Variable displacement, 45cc
2	RB86170	Sleeve		1	Spline
3	RB86171	Flange		1	Between PTO box and Pump
4	RB86172	Adapter flange		1	Pump discharge port
5		O-ring	P28 Hs90	1	
6		O-ring	G105 Hs70	1	
7		O-ring	G140 Hs70	1	
8		W. bolt	M12*40(10.9T)	4	
9		H. bolt	M14*30(10.9T)	2	
10		Spring washer	M14	2	
11		W. bolt	M10*25(10.9T)	4	
12	THUF08716	Fitting	∅8×7/16	1	Regulator LS line
13	H2W080000	Hyd. Hose	M14×2W×800	1	Regulator LS line
14	L2W0730F0	Hyd. Hose	M42×2W×730 90F(51)	1	Pump suction hose
15	D140650F0	Hyd. Hose	M26×R13×650 90F(44)	1	Pump discharge hose
16	TCG1605W0	Fitting	∅18×3/4	1	Pump case drain line
17	F2W145000	Hyd. Hose	M22×2W×1450	1	Pump case drain line

Hyd. hoses(13,14,15,17) should be used from the original pump when modification. K3VL45 pump has 2 O-rings at LS line and case-drain line, those O-rings should be used, too.



Fig. 3 Major parts for the modification

## ■ K3VL regulator and hydraulic circuit

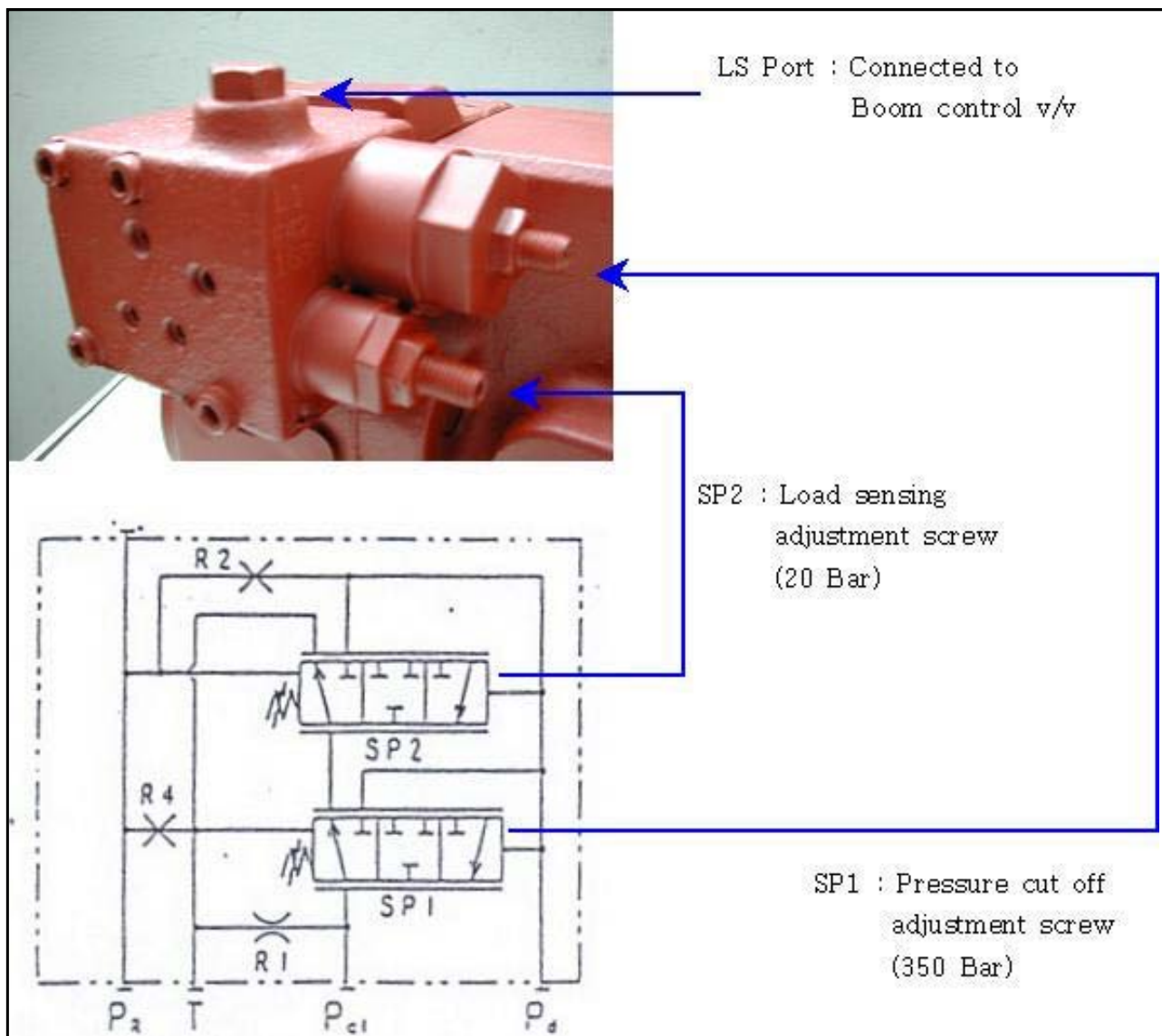


Fig. 4 Regulator and hydraulic circuit

## ■ Pressure setting procedure

1) 3 pressures are required to set for proper modification

- Main system pressure : 370Bar

(This main relief v/v is located on the boom control v/v)

- Cut off Pressure(SP2) : 350Bar

(Approx. pressure change per revolution of screw – 80Bar)

- Differential pressure(SP1, pilot control) : 20Bar

(Approx. pressure change per revolution of screw – 13Bar)

2) Recommended procedure

① Raising the main system pressure(Relief v/v located on the boom control v/v)

Loosen the jam nut and turn the set screw inward to the limit(max. pressure) to be able to set the cut off pressure of boom pump regulator.

② Set the screw(SP1) outward to the limit(min. pressure)

③ Set the pressure(SP2) to 20Bar at idle RPM without boom operation.

④ Set the pressure(SP1) to 370Bar at max. RPM with folding the 2nd boom.(max. loaded)

⑤ Set the main relief pressure(Relief v/v located on the boom control v/v) to 370Bar. Set the pressure(SP1) to 350Bar by setting the screw outward.



## ■ Inline boom pump regulator

This service bulletin shows how to set the pressure of Inline boom pump regulator. There are 2 kinds of regulators. (Old & New type)

## ■ New type regulator

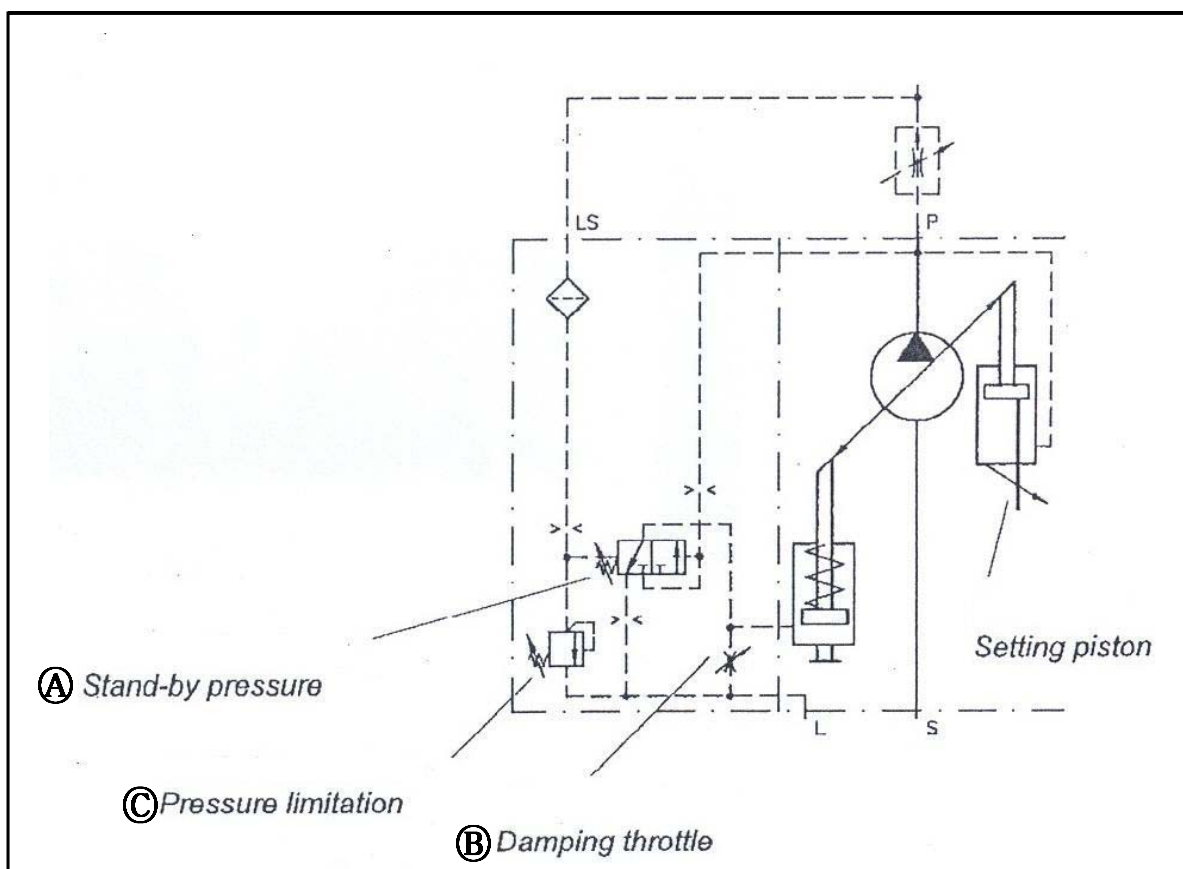


Fig 1. Hydraulic schematic of new-type regulator

■ Figures of new-type regulator

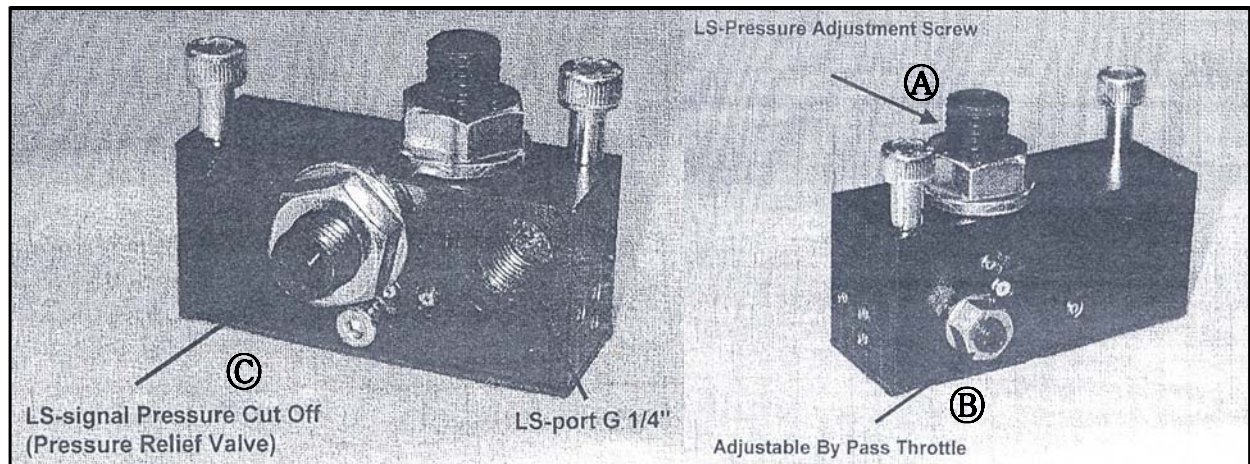


Fig. 2 V60N-LSN-Controller

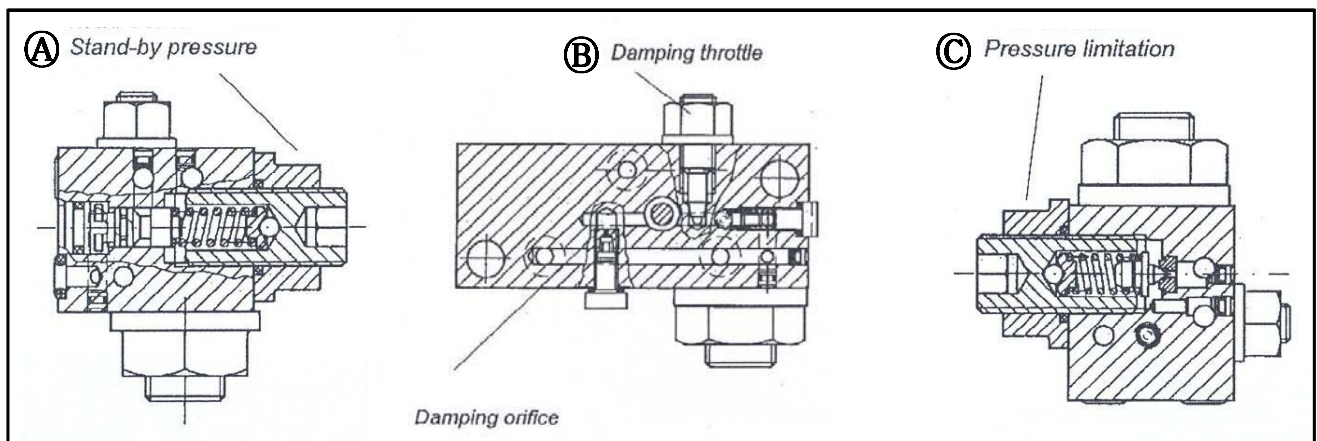


Fig. 3 Sections of V60N-LSN-Controller

## ■ How to set the pressure(new-type)

- ① Set the pressure ① to 20Bar at idle RPM
- ② Set the pressure ② to 32Bar at idle RPM by turning the adjustment screw out. (about 1/4 turn out when install a new regulator)
- ③ Set the maximum pressure ③ to 350bar.

## ■ Old type regulator

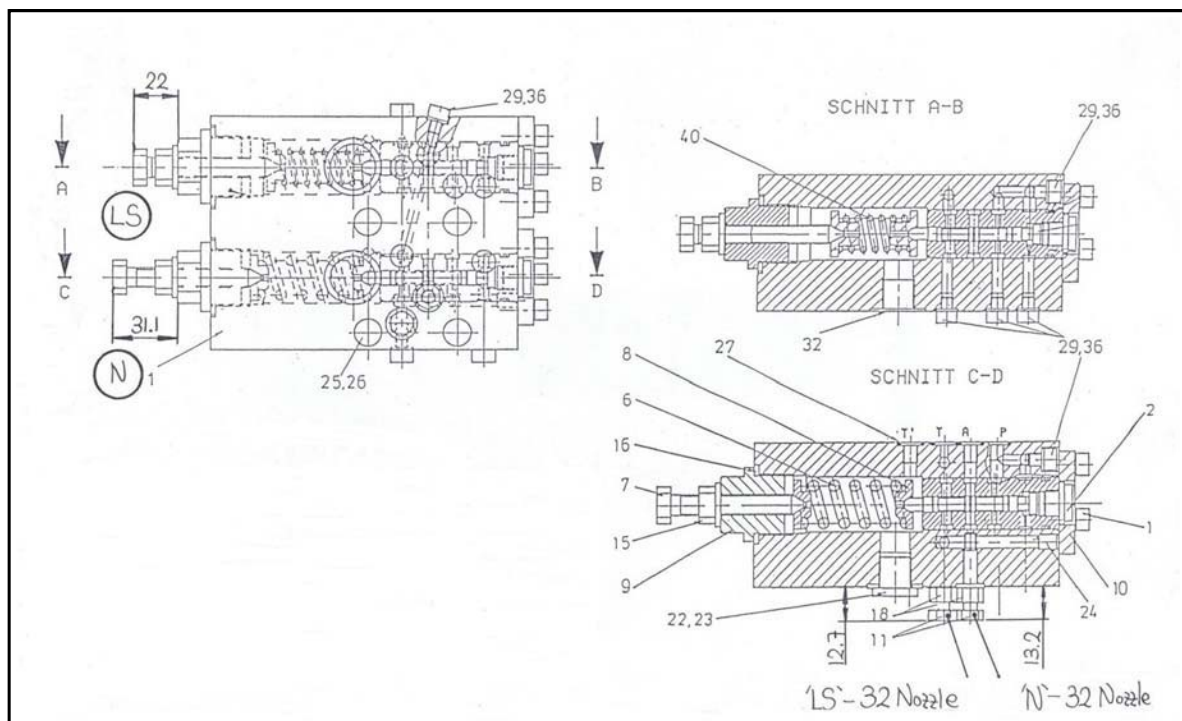


Fig 4. Drawings of regulator(old-type)

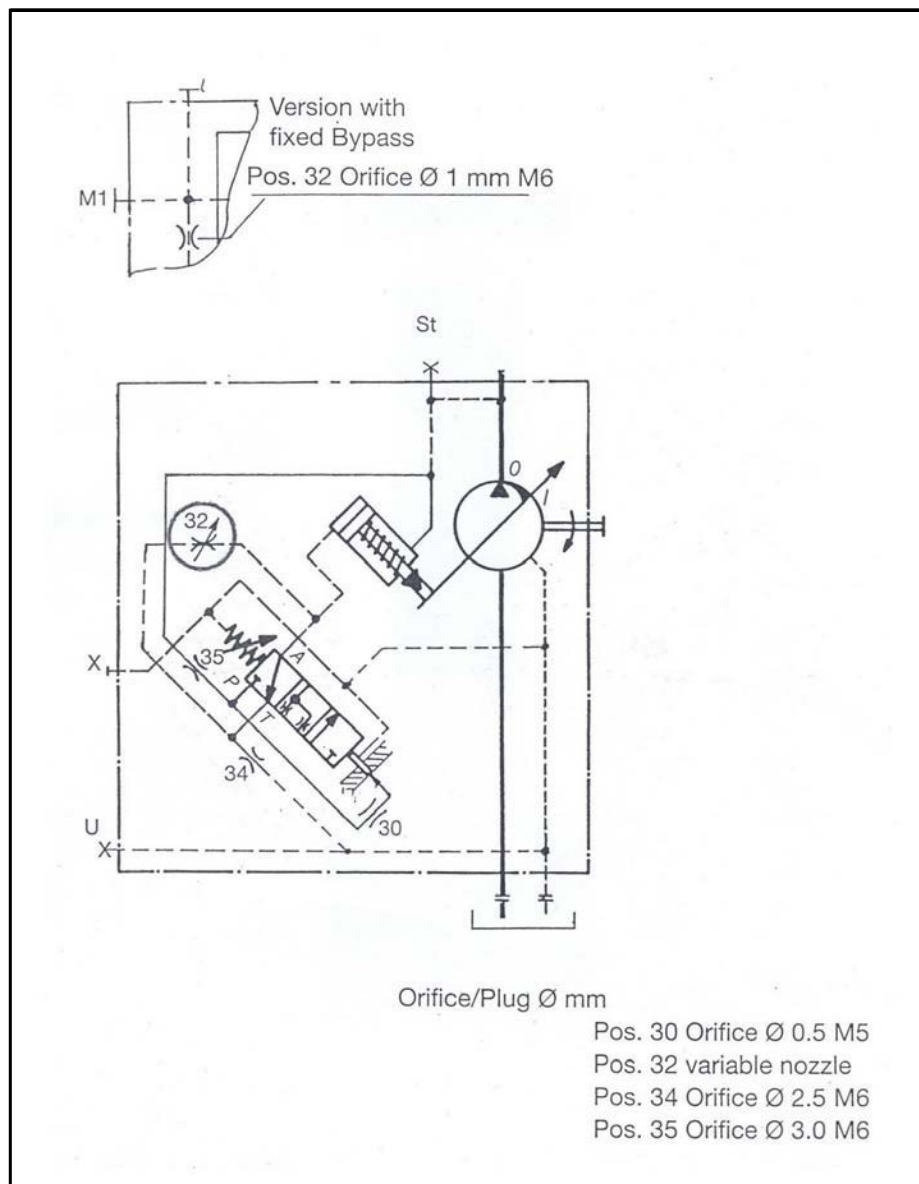


Fig 5. Hydraulic circuit of "Pressure Regulator N"

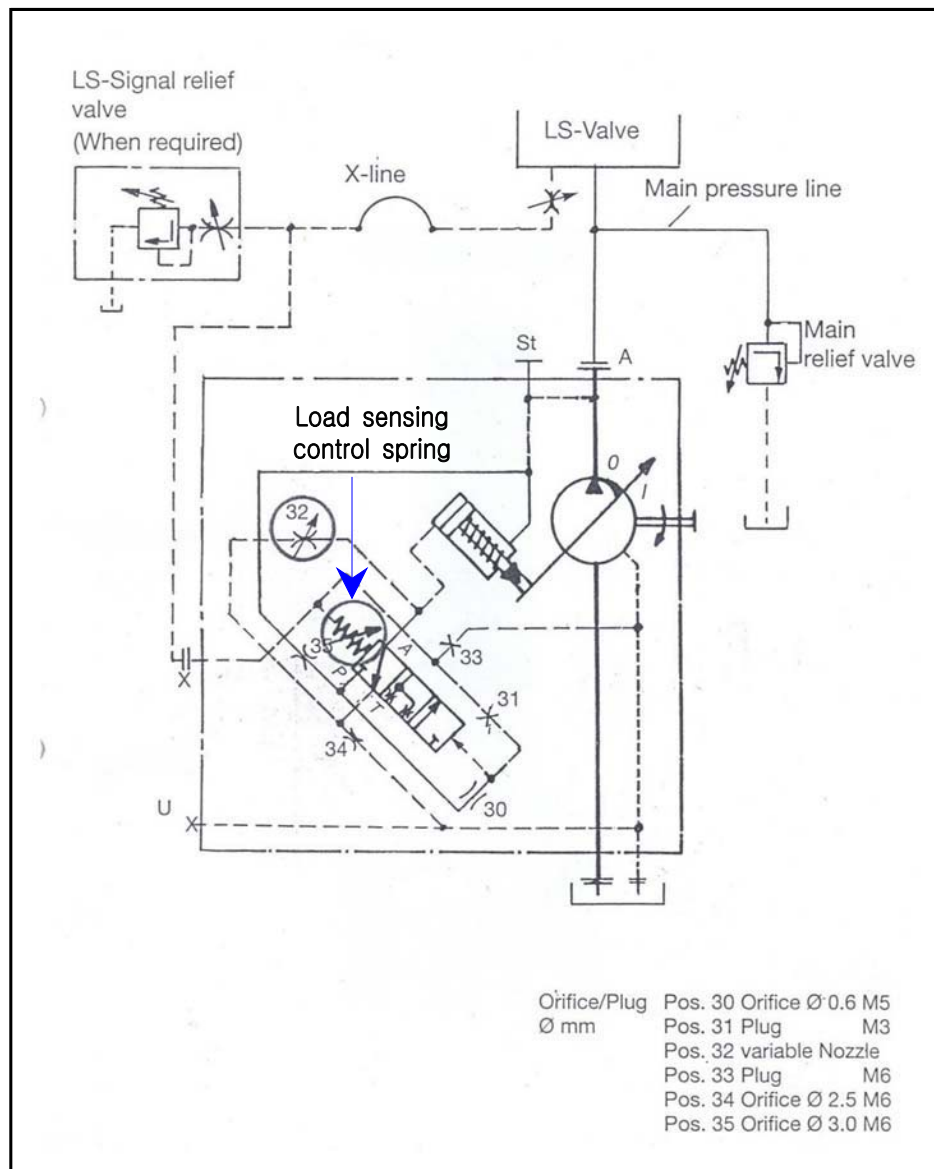


Fig 6. Hydraulic circuit of "Control Valve LS"

## ■ How to set the pressure(old-type)

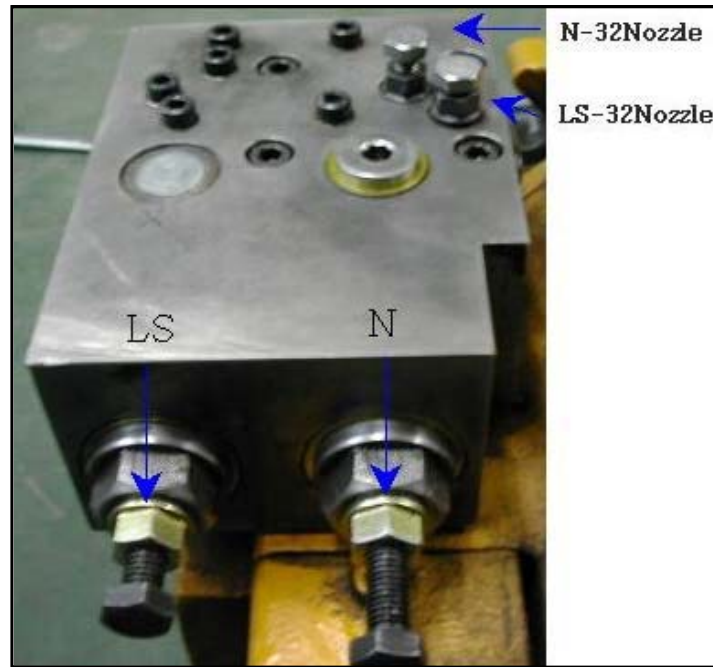


Fig 6. Old-type regulator

- ① Set "LS-32 nozzle" and "N-32 nozzle".(Refer to Fig. 5)
- ② Set the pressure(LS, load sensing) to 20–30Bar. (about 22mm, Fig. 4)
- ③ Set the pressure(N, max pressure) to 350Bar. (about 31.1mm, Fig. 4)



## ■ Kawasaki main pump(Swash-plate type axial piston pump)

Two kinds of Kawasaki hyd. pumps(RB642, RB644) are used for the main pump.

	Part number	Specification	Remark
1	RB642	K3V140DT(140×2, Tandem)	M33, M37, M40, M43, M50 in Korea
2	RB644	K3V140S(140, Single)	M20 for overseas market

## ■ Hyd. schematic of K3V140

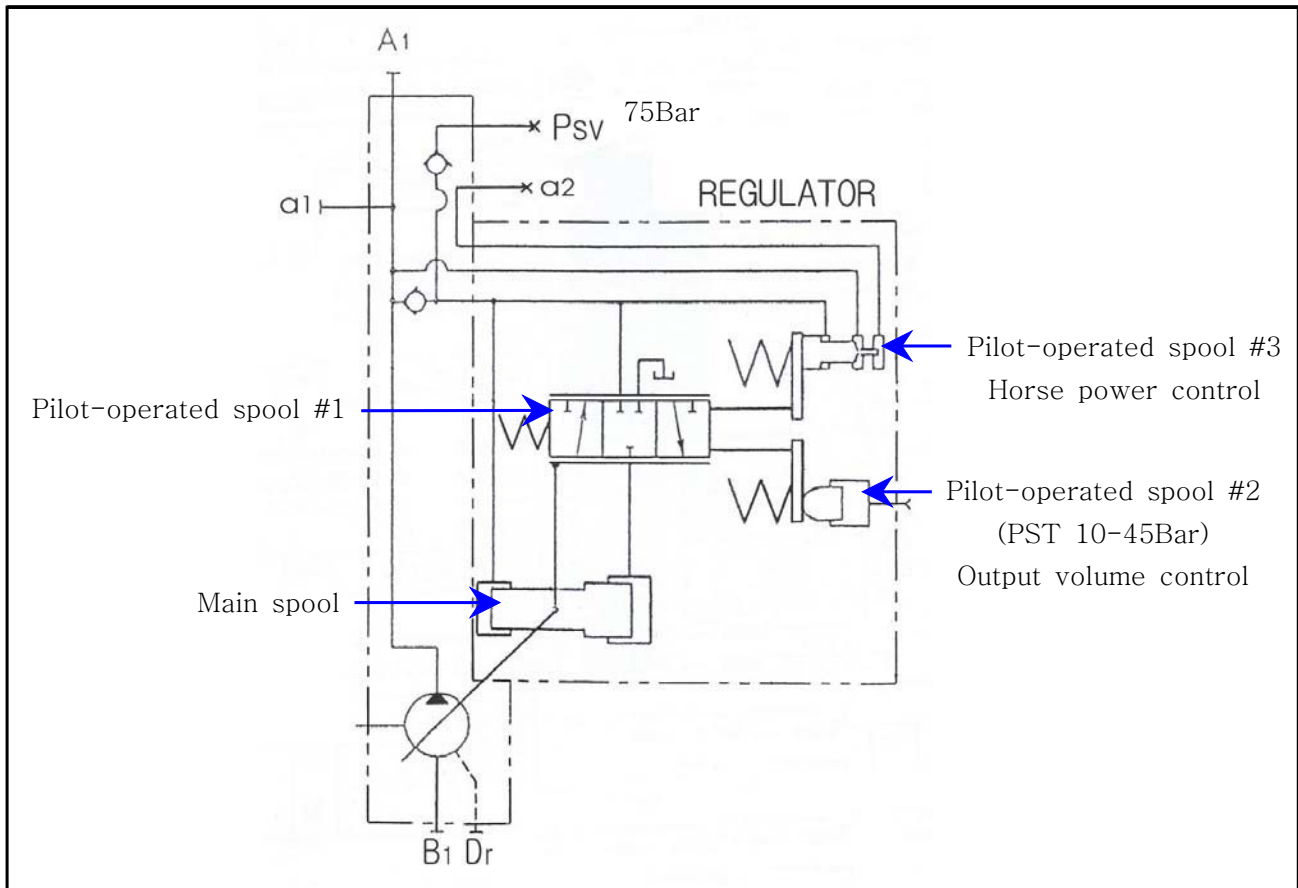


Fig. 1 Hyd. schematic of K3V

## ■ Spools inside the regulator

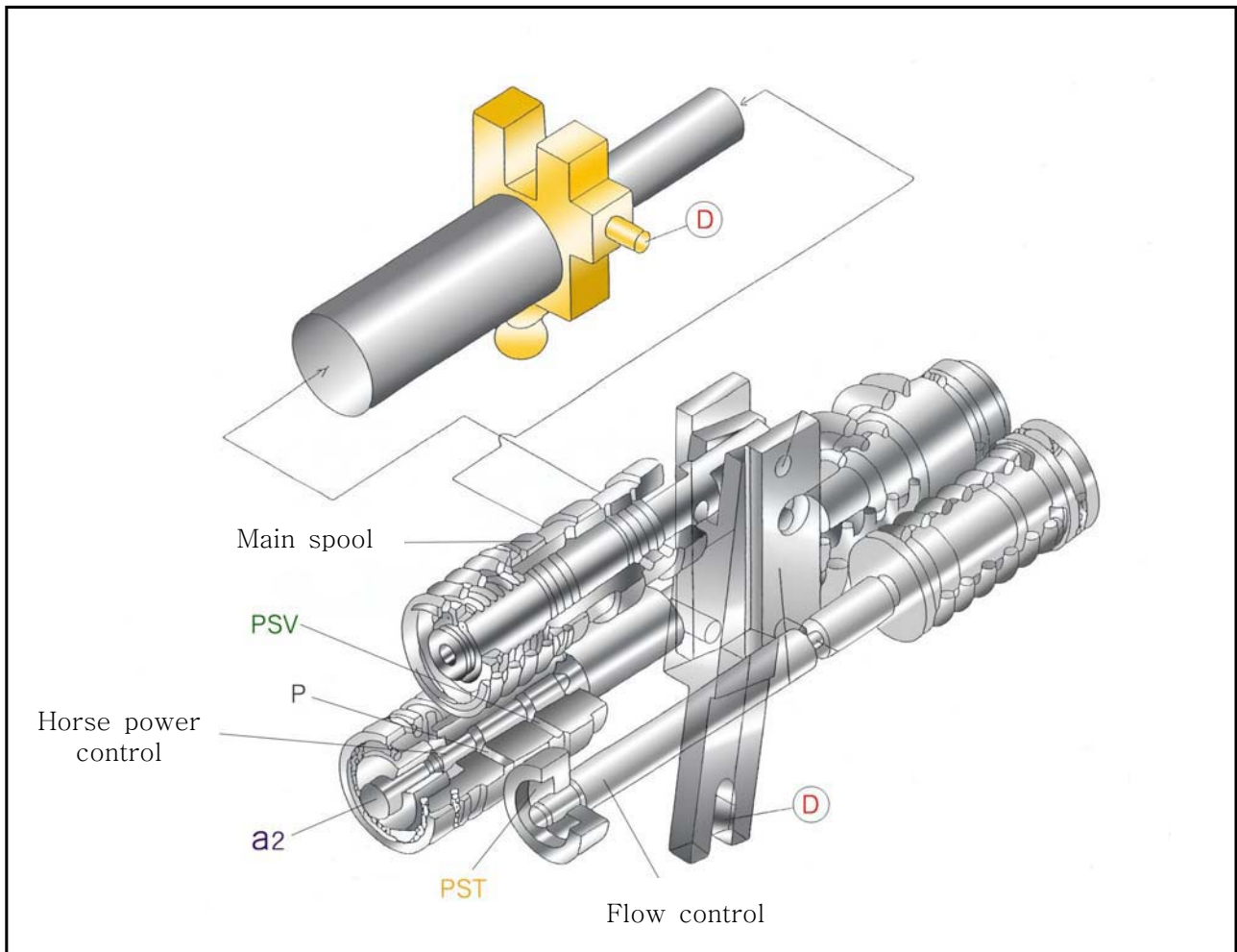


Fig. 2 Spools and link connection inside the regulator



## ■ Major function of K3VL

- Flow control(PST)

The concrete output volume is controlled by the pilot pressure(10–45bar) which comes from the accumulator pump. Maximum output volume is gained at 0–10Bar and minimum output volume at 45Bar.(Negative control)

※ The spring tension can be adjusted by loosening and tightening the screw.(minimum setting : 10Bar) Too strong spring tension setting could cause a problem of outvolume control.

- Horse power control

According to the rise of discharge pressure(about 200Bar), the discharge flow is automatically decreased, and constant torque control is achieved.

## ■ Figures of K3VL regulator

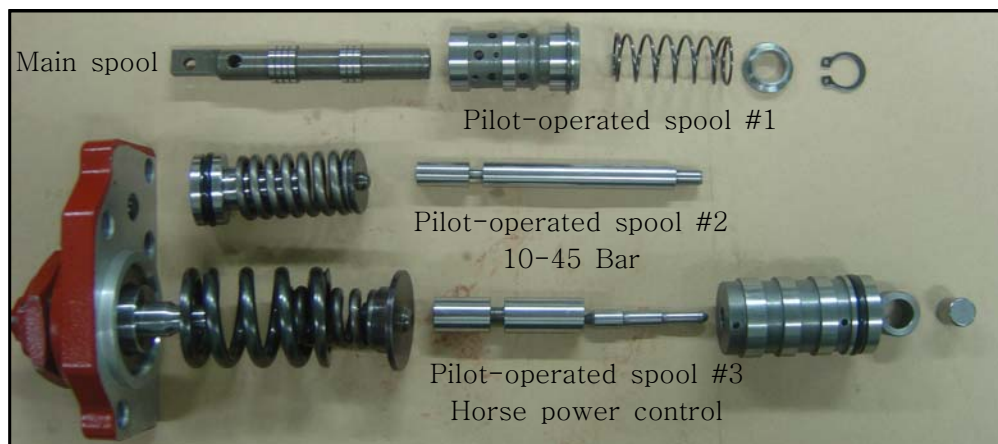


Fig. 3 Spools and link connection inside the regulator



Fig. 4 Link connection inside the regulator

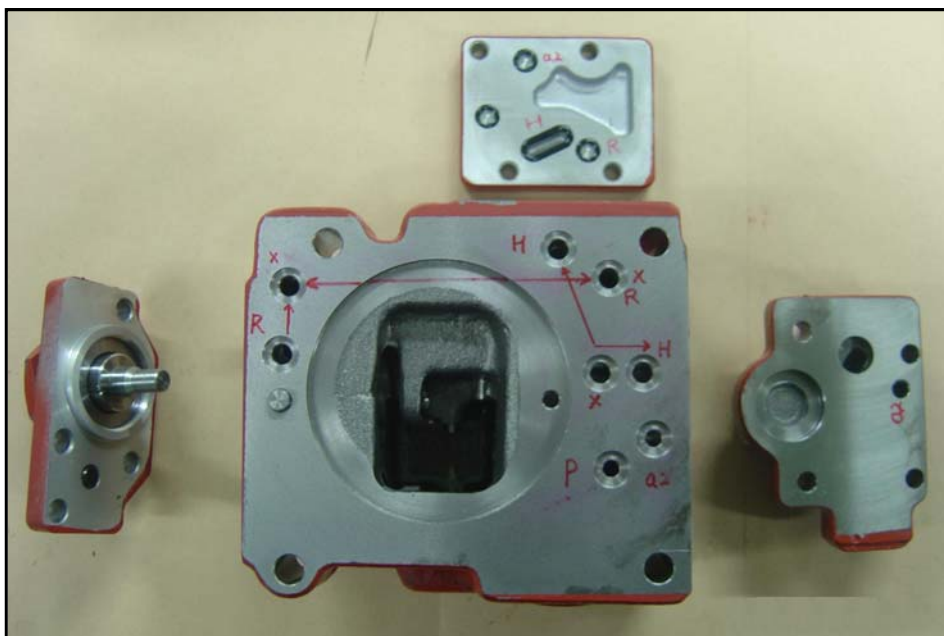
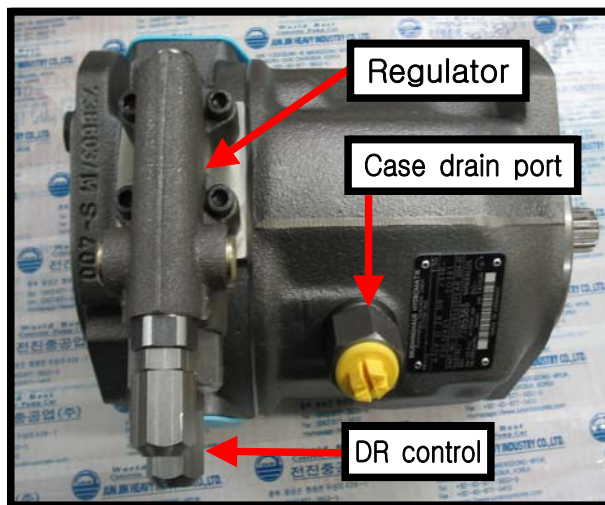


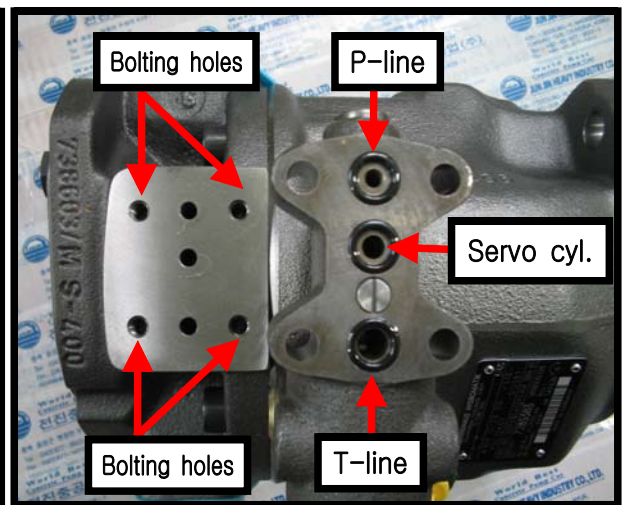
Fig. 5 Covers of the regulator

## ■ Accumulator system

The pressure control serves to maintain a constant pressure(190Bar) in the system. The pump therefore supplies only the amount of hyd. oil required by the plunger cylinders.



A10V regulator



Regulator-removed view

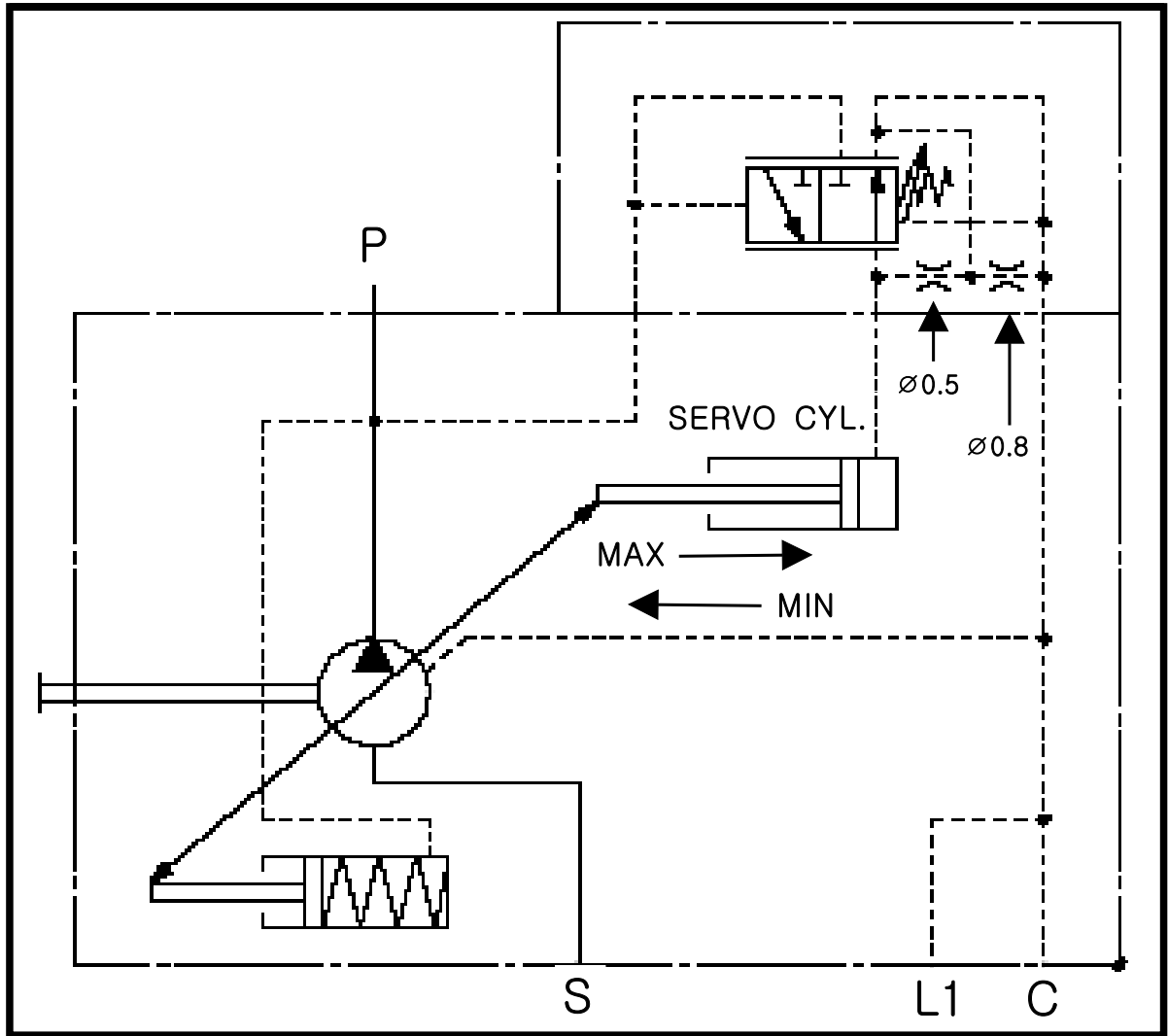


Regulator O/H



Orifices

○ Hyd. Schematic of A10V regulator



S : Suction port

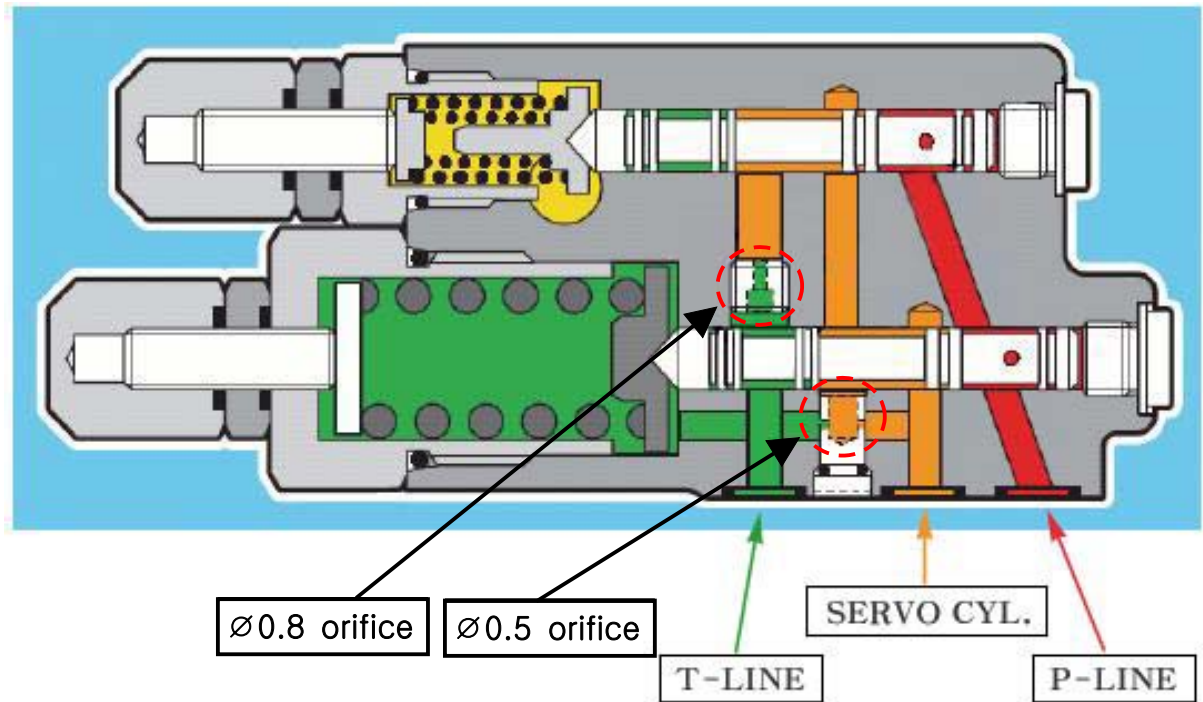
P : Pressure port

C : Case drain port

L1 : Plugged

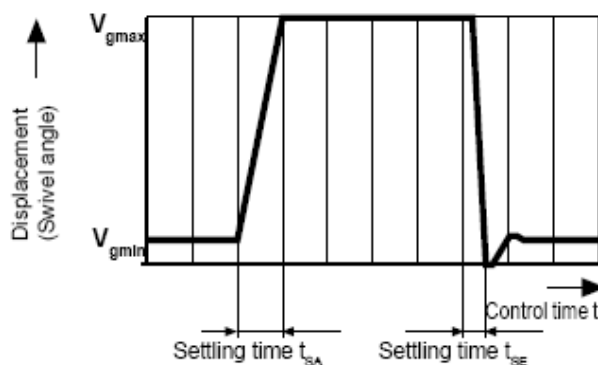
When the P-LINE pressure reached at 190 Bar, the pilot pressure supplies the oil to the piston side of servo cylinder through the regulator. Then, discharging volume is reduced as the swash plate moves to the min. side.

○ A10V regulator section drawing



DR pressure control

When the P-Line pressure (red area) reaches at 190Bar, the lower spool against the spring moves inward. The P-LINE pressure is supplied to the servo cylinder by the spool's movement.



$t_{SA}$  : Interval time (Swash plate : Min  $\rightarrow$  Max)  
 $t_{SE}$  : Interval time (Swash plate : Max  $\rightarrow$  Min)  
 ms : 1 / 1000 sec.

Size	$t_{SA}$ (ms) against 50 bar	$t_{SA}$ (ms) against 220 bar	$t_{SE}$ (ms) zero stroke 280 bar
28	60	30	20
45	80	40	20
71	100	50	25
100	125	90	30
140	130	110	30

Remark ① : The function of the orifices ( $\varnothing 0.8$ ,  $\varnothing 0.5$ ) is to delay the interval time. These orifices have the effect of “slowing down” the rate that the swash plate recovers to full angle.

## ■ Major features of A20V190 tandem main pump

- ① Horse power control (LR control)
- ② Pressure cut off function(LRD control)
- ③ Hydraulic stroke limiter(LRH1 control)

## ■ Hyd. schematic of A20V190

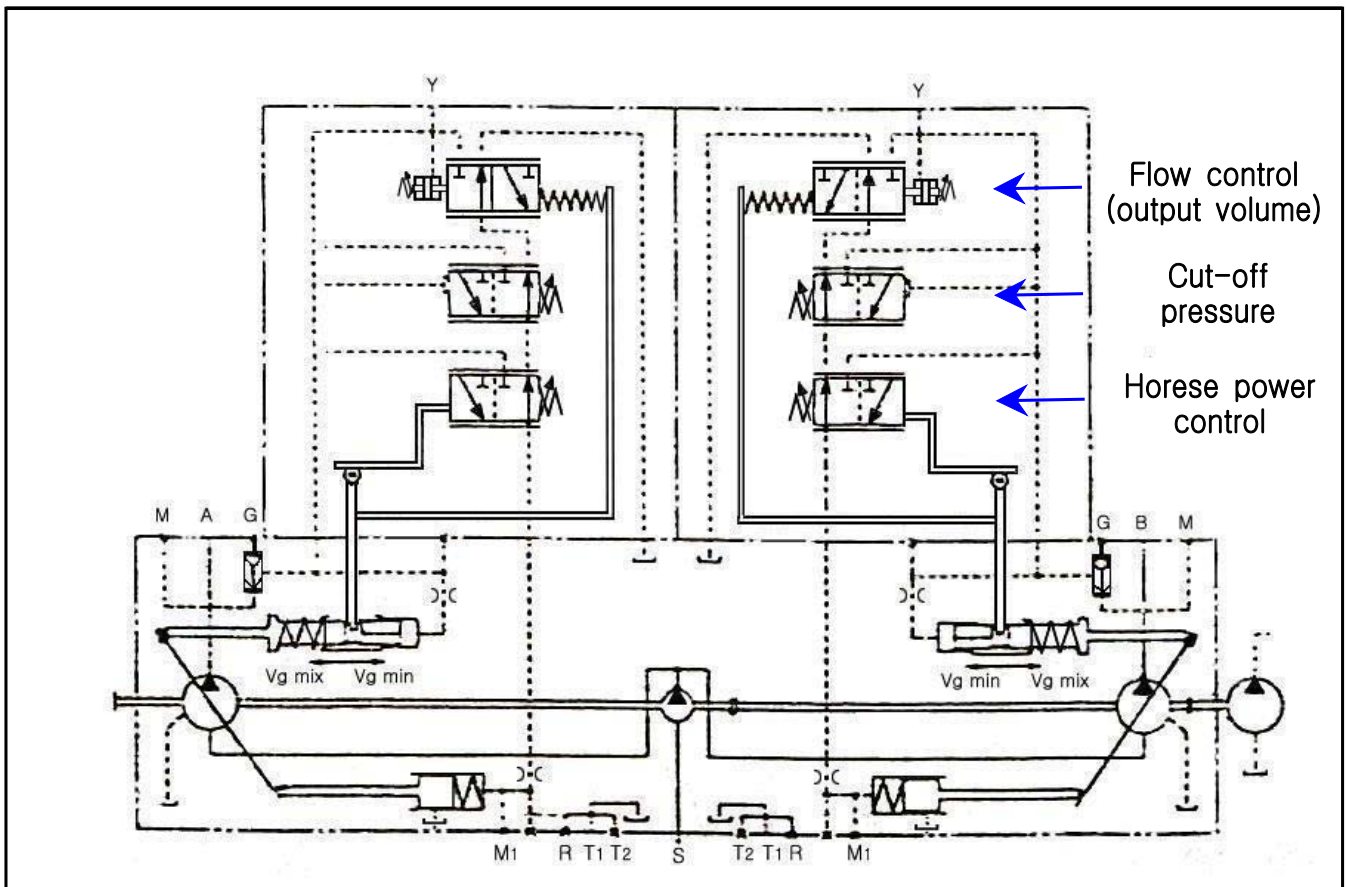


Fig. 1 Hyd. schematic of A20V190(tandem)



## ■ Horse power control (LR control)

Horse power control regulates the pump displacement as a function of operating pressure so that a preset pressure is not exceeded at constant drive speed.

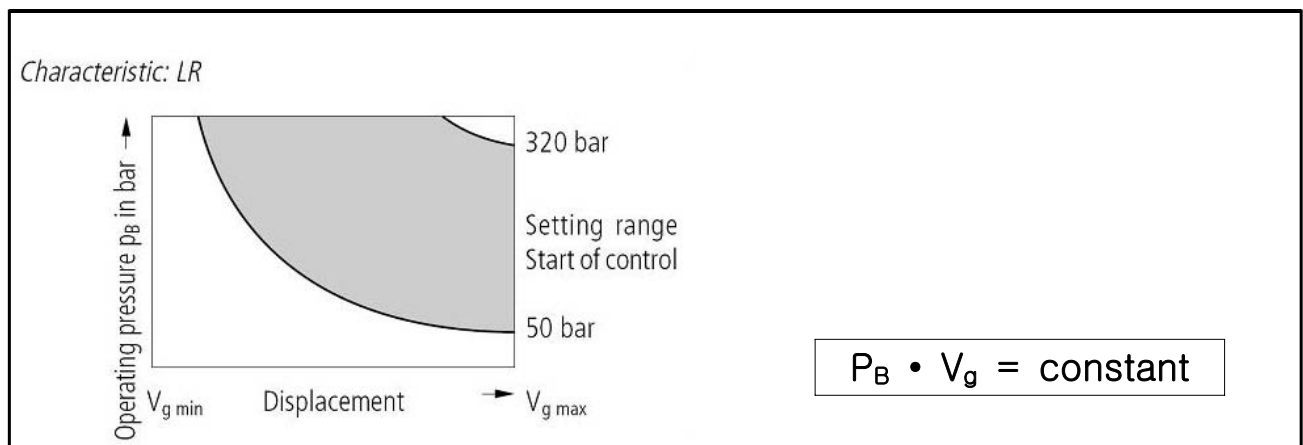


Fig. 2 Characteristic LR

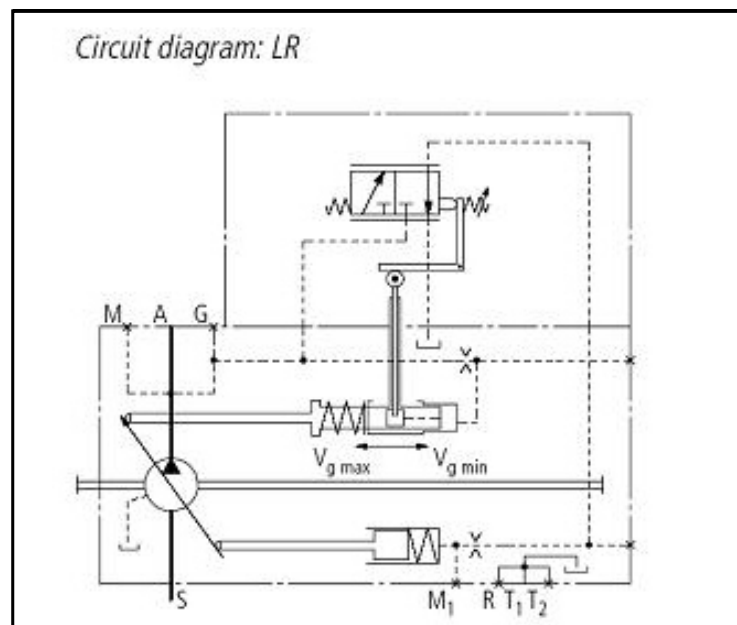


Fig. 3 Hyd. schematic of LR control

The operating pressure acts, via piston, on a fulcrum. This is countered by an externally adjustable spring force which determines the horse power setting. If the operating pressure exceeds the set spring force, the pilot valve is actuated via the fulcrum and the pump swivels back(direction  $V_{g \text{ min}}$ ). This shortens the lever length at the fulcrum and the operating pressure can increase in the same proportion as the displacement decreases. ( $P_B \cdot V_g = \text{constant}$ )

### ■ Cut-off function (LRD control)

Pressure cut-off corresponds to a pressure control which adjusts the pump displacement back to  $V_{g \text{ min}}$  when the set pressure signal value is reached. This function overrides the horse power control.(The power control function is performed below the pressure signal value)

☛ 350Bar setting in case of A20V190

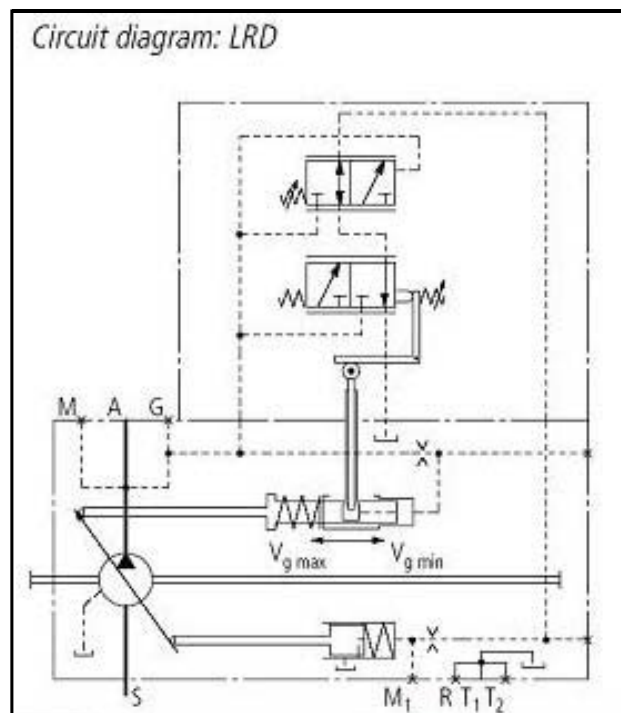


Fig. 4 Hyd. schematic of LRD control



## ■ Hydraulic stroke limiter(LRH1 control)

The stroke limiter enables the pump displacement to be infinitely varied or limited. The displacement set once proportionally by the pilot current applied at the pilot pressure at port Y.

☛ 0–30Bar volume control by the proportional reducing valve in case of A11V260

☛ In case that externally adjustable spring force is set too strong, the max. output volume can not be gained.

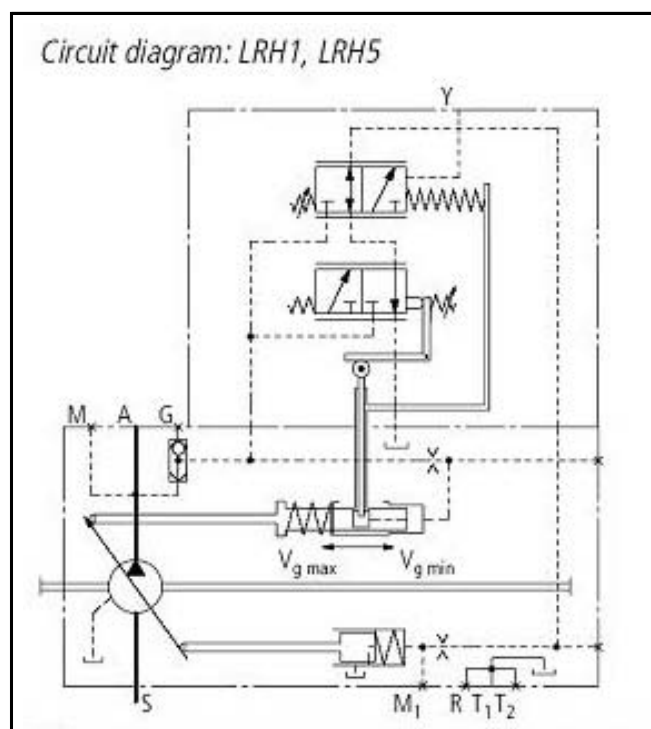


Fig. 1 Hyd. schematic of LRH1 control

■ Figure of A11V260 regulator

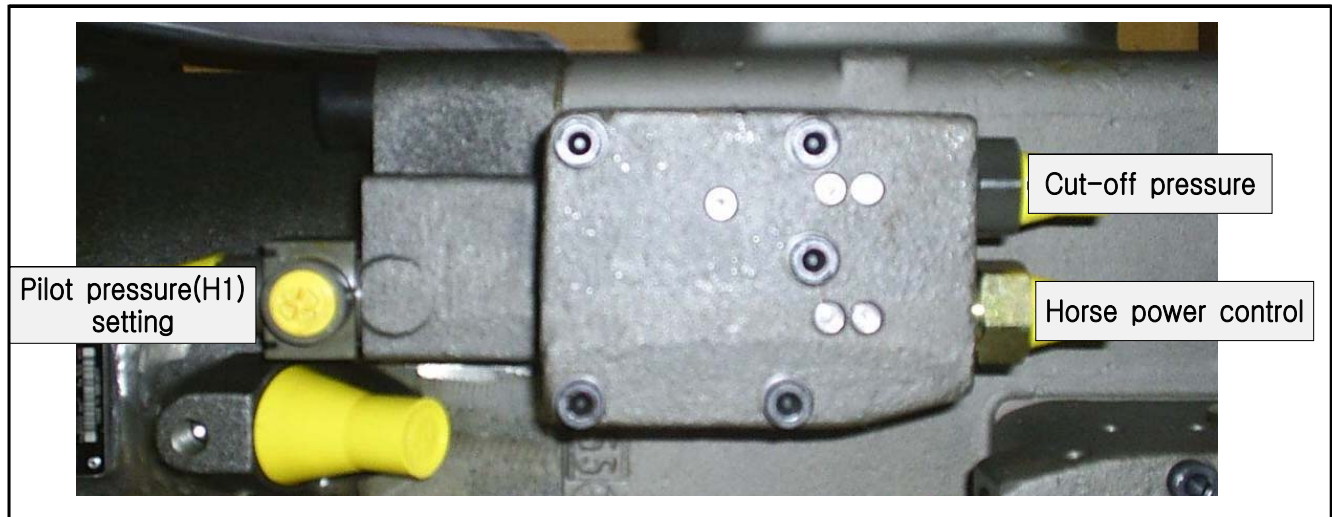


Fig. 5 A11V260 regulator