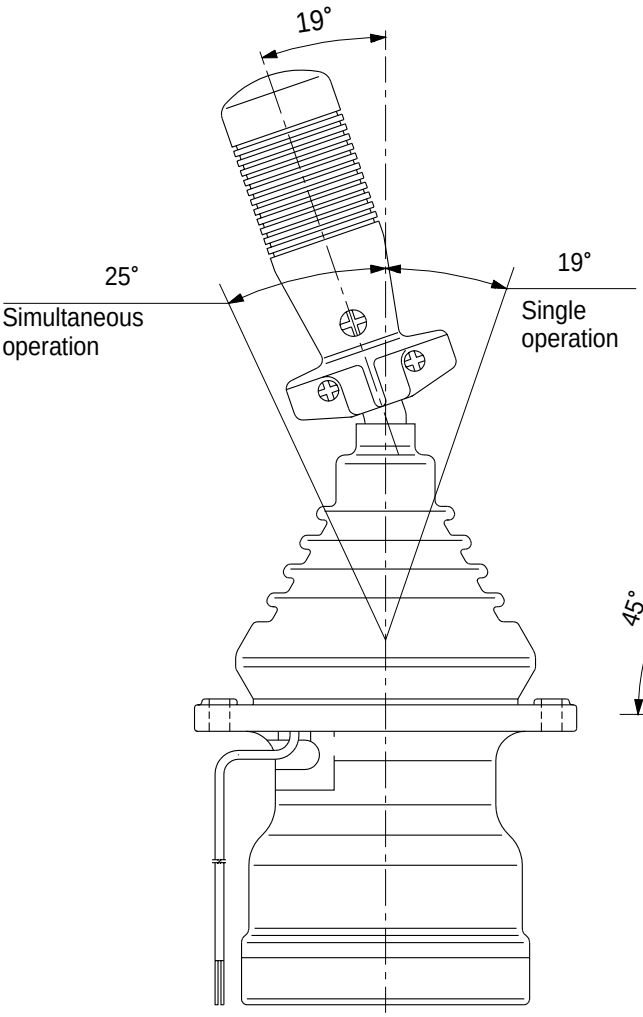
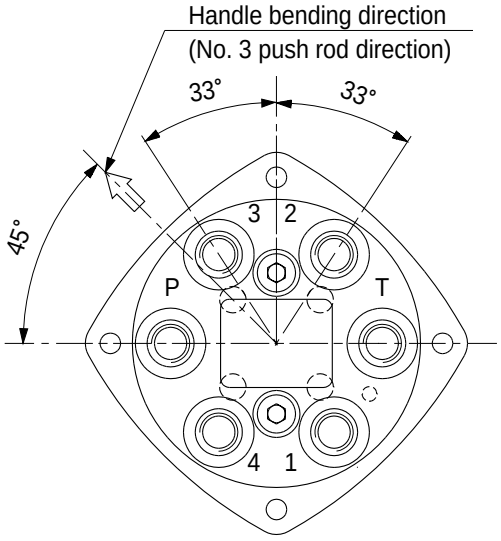
GROUP 5 RCV LEVER

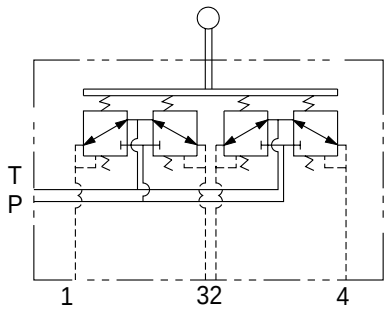
1. STRUCTURE

The casing has the oil inlet port P(primary pressure) and the oil outlet port T(tank). In addition the secondary pressure is taken out through ports 1,2,3 and 4 provided at the bottom face.





VIEW A



Hydraulic circuit

Port	LH	RH	Port size
P	Pilot oil inlet port	Pilot oil inlet port	PF 1/4
T	Pilot oil return port	Pilot oil return port	
1	Left swing port	Bucket out port	
2	Arm in port	Boom down port	
3	Right swing port	Bucket in port	
4	Arm out port	Boom up port	

CROSS SECTION

The construction of the pilot valve is shown in the attached cross section drawing. The casing has vertical holes in which reducing valves are assembled.

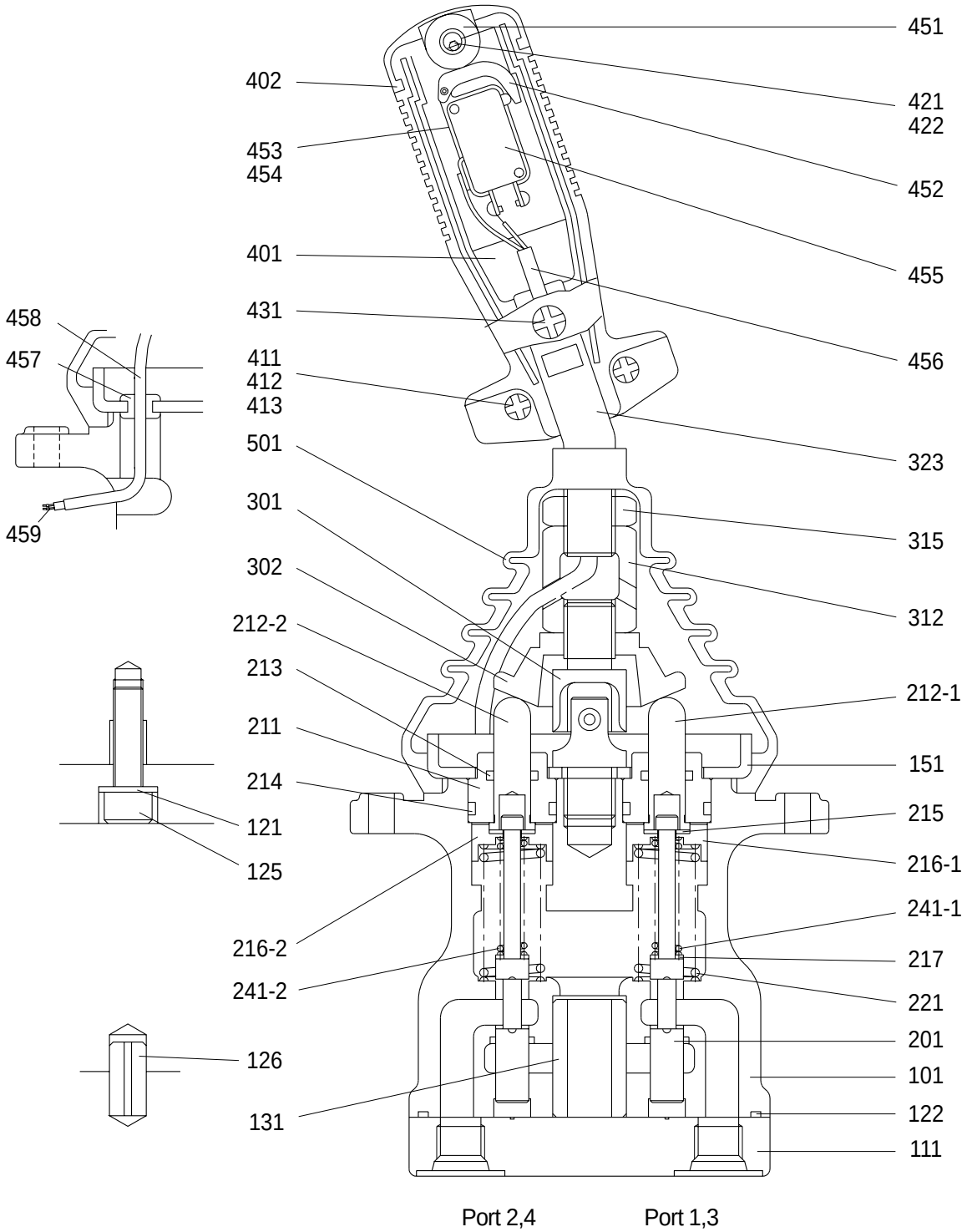
The pressure reducing section is composed of the spool(201), spring(241) for setting secondary pressure, return spring(221), washer(215), spring seat(216) and washer(217). The spring for setting the secondary pressure has been generally so preset that the secondary pressure is 5 to 19 kgf/cm^2 (depending on the type). The spool is pushed against the push rod(212) by the return spring.

When the push rod is pushed down by tilting the handle, the spring seat comes down simultaneously and changes setting of the secondary pressure spring.

In case of the two point type electric switch is fitted, as shown in the attached cross section drawing, the roller(451), switch lever(452) and switch(455) are built in the inside of the handle(401). When the center of the handle cap(402) provided at the handle head is pushed, the roller is come down, and the switch lever contacted with the roller tilts to make the switch function. The cord(456), connected to the switch, is led through the handle section and casing to the outside.

101	Casing	216-1	Spring seat(port 1,3)	413	Plain washer
111	Port plate	216-2	Spring seat(port 2,4)	421	Screw 2
121	Seal washer	217	Washer 2	422	Nut
122	O-ring	221	Spring	431	Screw 3
125	Hex socket screw	241-1	Spring(port 1,3)	451	Roller
126	Spring pin	241-2	Spring(port 2,4)	452	Laever
131	Bushing	301	Universel joint	453	Switch seat 1
151	Plate	302	Plate	454	Switch seat 2
201	Spool	312	Adjust nut	455	Switch
211	Plug	314	Lock nut	456	Cord
212-1	Push rod(port 1,3)	323	Handle bar	457	Bushing
212-2	Push rod(port 2,4)	401	Handle	458	Tube
213	Seal	402	Handle cap	459	Terminal
214	O-ring	411	Screw 1	501	Bellows
215	Washer 1	412	Nut		

CROSS SECTION



2. FUNCTIONS

1) FUNDAMENTAL FUNCTIONS

The pilot valve is a valve that controls the spool stroke, direction, etc of a main control valve. This function is carried out by providing the spring at one end of the main control valve spool and applying the output pressure(=secondary pressure) of the pilot valve to the other end.

For this function to be carried out satisfactorily, the pilot valve is composed of the following elements.

(1) Inlet port(P) where oil is supplied from hydraulic pump.

(2) Output ports(1,2,3 & 4) to apply pressure supplied from inlet port to ends of control valve spools.

(3) Tank port(T) necessary to control the above output pressure.

(4) Spool to connect output port to inlet port or tank port.

(5) Mechanical means to control output pressure, including springs that work on the above spools.

2) FUNCTIONS OF MAJOR SECTIONS

The functions of the spool(201) are to receive the supply oil pressure from the hydraulic pump at its port P, and to change over oil paths to determine whether the pressure oil of port P is led to output ports 1,2,3 & 4 or the output port pressure oil to tank port T.

The spring(241) works on this spool to determine the output pressure.

The change the deflection of this spring, the push rod(212) is inserted and can slide in the plug(211).

For the purpose of changing the displacement of the push rod through the plate(302) and adjusting nut(312) are provided the handle(401) that can be tilted in any direction around the fulcrum of the universal joint(301) center.

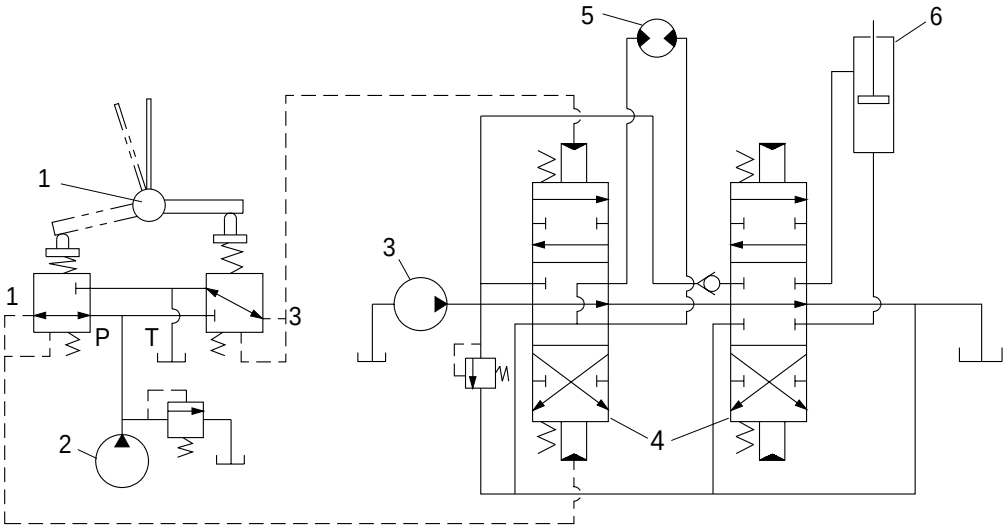
The spring(221) works on the casing(101) and spring seat(216) and tries to return the push rod(212) to the zero-displacement position irrespective of the output pressure, securing its resetting to the center position.

This also has the effect of a reaction spring to give appropriate control feeling to the operator.

3) OPERATION

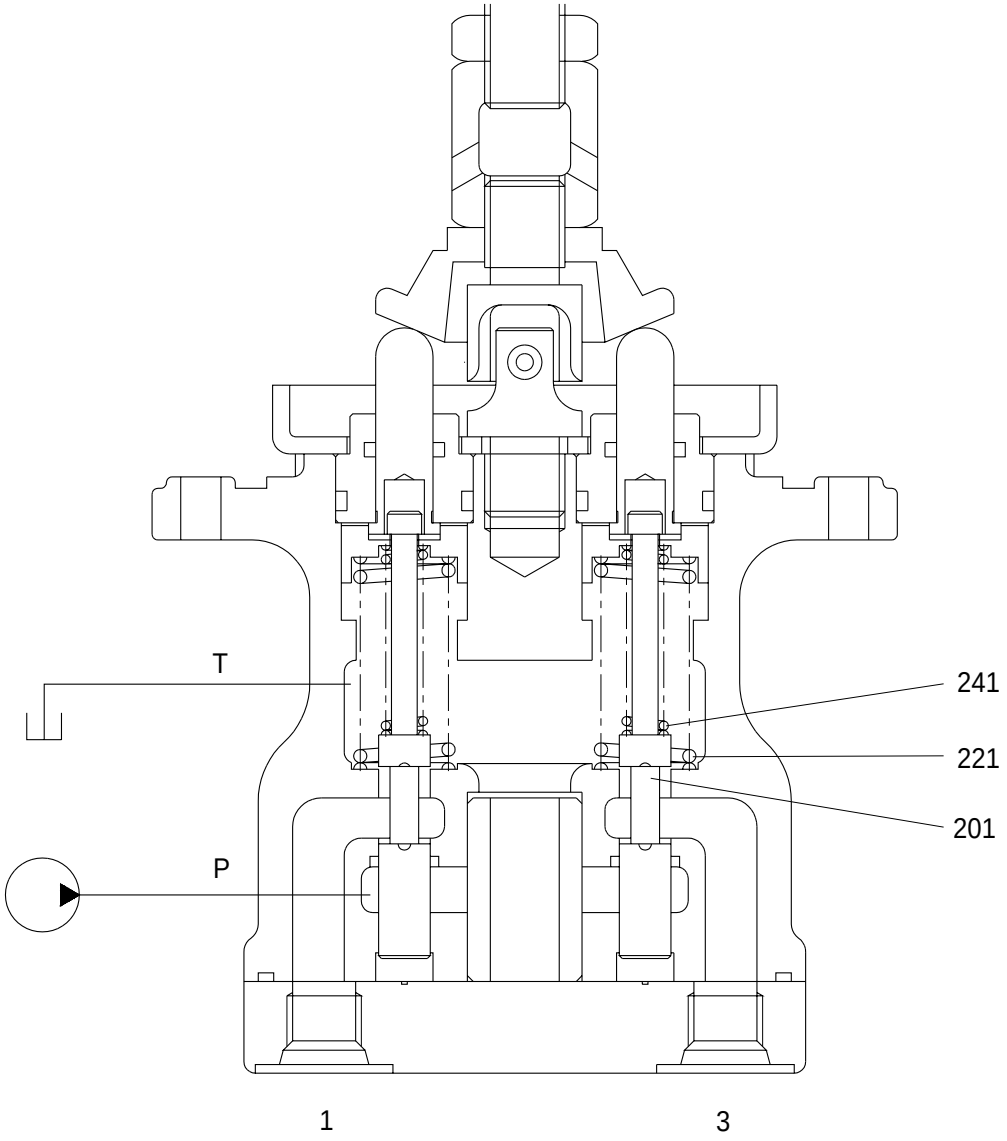
The operation of the pilot valve will be described on the basis of the hydraulic circuit diagram shown below and the attached operation explanation drawing.

The diagram shown below is the typical application example of the pilot valve.



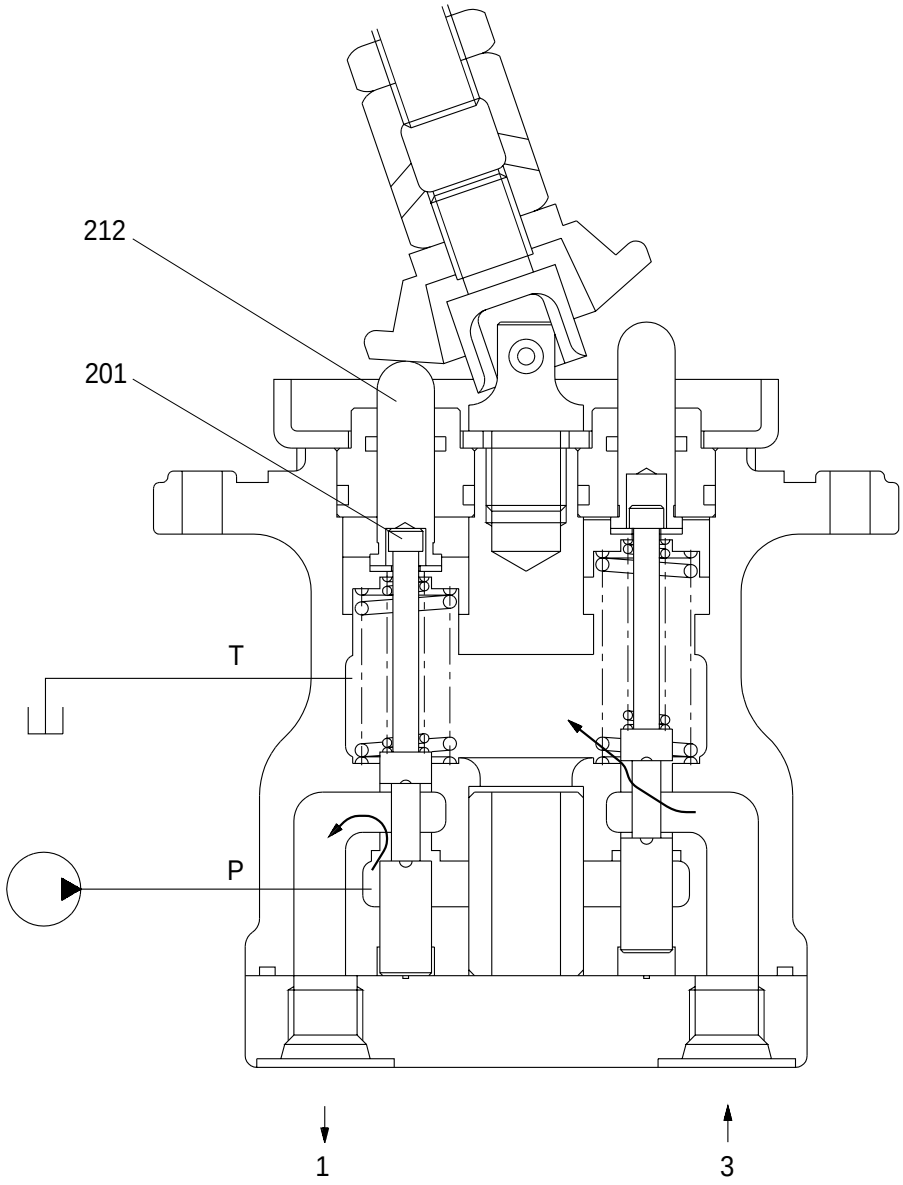
1	Pilot valve	3	Main pump	5	Hydraulic motor
2	Pilot pump	4	Main control valve	6	Hydraulic cylinder

(1) Case where handle is in neutral position



The force of the spring(241) that determines the output pressure of the pilot valve is not applied to the spool(201). Therefore, the spool is pushed up by the spring(221) to the position of port(1,3) in the operation explanation drawing. Then, since the output port is connected to tank port T only, the output port pressure becomes equal to tank pressure.

(2) Case where handle is tilted



When the push rod(212) is stroked, the spool(201) moves downwards.
Then port P is connected with port(1) and the oil supplied from the pilot pump flows through port(1) to generate the pressure.
When the pressure at port(1) increases to the value corresponding to the spring force set by tilting the handle, the hydraulic pressure force balances with the spring force. If the pressure at port(1) increases higher than the set pressure, port P is disconnected from port(1) and port T is connected with port(1). If it decreases lower than the set pressure, port P is connected with port(1) and port T is disconnected from port 1.
In this manner the secondary pressure is kept at the constant value.
Besides, in some type, when the handle is tilted more than a certain angle, the upper end of the spool contacts with the inside bottom of the push rod and the output pressure is left to be connected with port P.