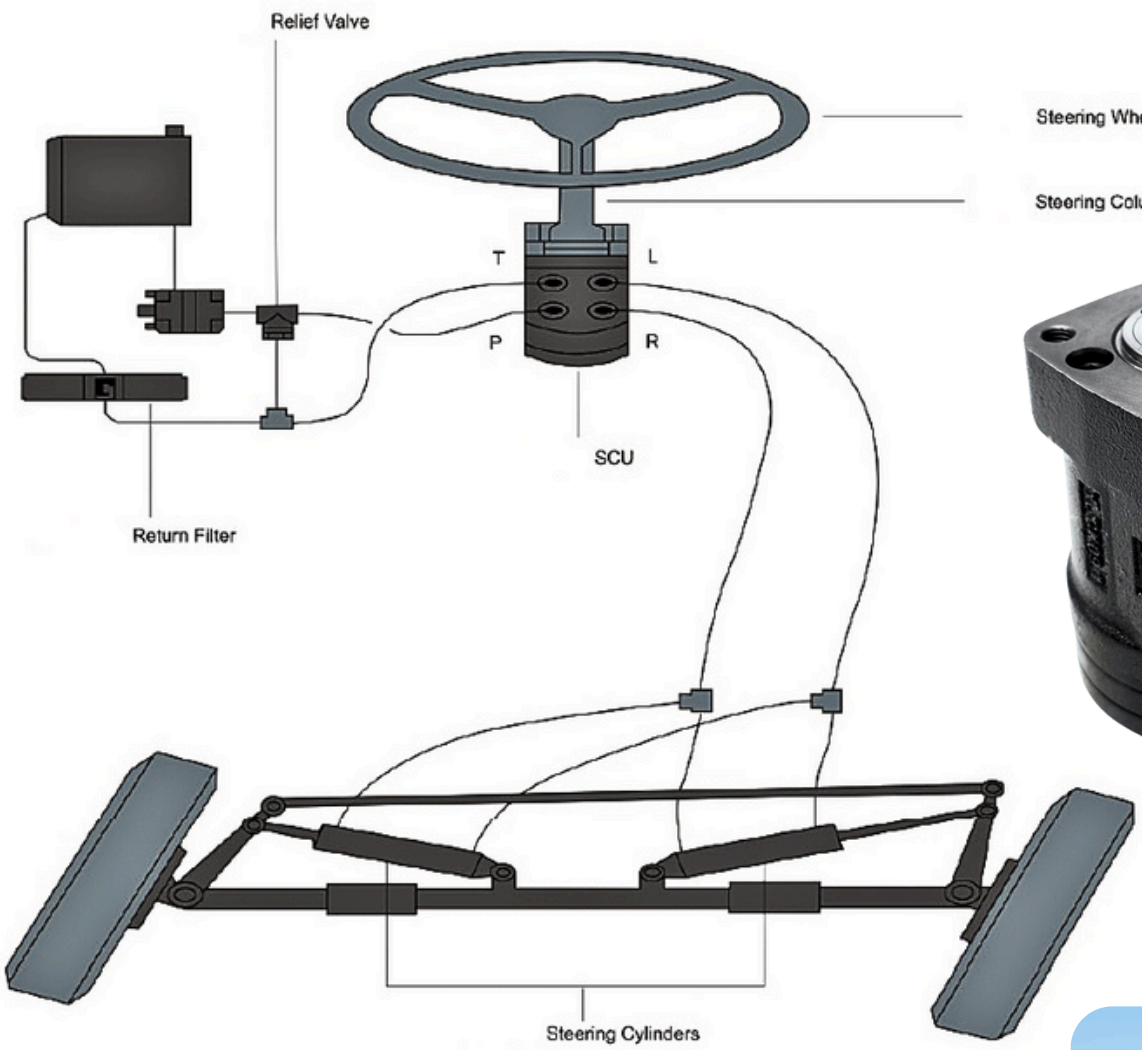
FLOWFIT® HYDRAULIC STEERING UNITS

The **hydraulic steering control** unit is composed of a rotary valve and a rotary meter. It connects to the vehicle's steering wheel via a **steering column**. When the steering wheel is turned, hydraulic oil is directed from the system's pump through the rotary valve and meter to either port L or R, depending on the direction of rotation.

The rotary meter delivers oil to the steering cylinder in proportion to the angular movement of the steering wheel, ensuring precise and responsive steering control.



These units are ideally suited for **low-speed, heavy-duty vehicles** particularly in the **agricultural** and **construction** sectors such as: such as **excavators, loaders**, and **bulldozers**, as well as agricultural machinery like **tractors**, **harvesters** and **sprayers**.

INTRODUCTION

OPEN CENTRE STEERING SYSTEM

In an open center steering system, oil from the pump returns to the tank when in the neutral position. A fixed displacement pump is recommended for this configuration.

CLOSED CENTRE STEERING SYSTEM

Due to the high pressure caused by the blocked flow path between ports P and T in the neutral position, a pressure-compensated pump is incorporated into the system.

TEMPERATURE

- Normal operating temperature range from +30°C to 60 °C
- Minimum operating temperature - 30°C
- Maximum operating temperature 90°C
- Prolonged operation at temperatures of 60°C or higher will significantly accelerate oxidation and reduce the product's lifespan.

FILTRATION

- The maximum degree of contamination per ISO 4406 is
- For open center units 22/20/17
- For closed center units 21/19/16
- A return line filter with 25µm nominal (40–50µm absolute) rating is recommended. In extremely dusty environments, a 10µm absolute filter should be used for optimal protection.

VISCOSITY

- Normal operating viscosity range from 200 mm^2/s-80 mm^2/s
- Minimum operating viscosity 10 mm^2/s
- Maximum operating viscosity 300 mm^2/s

MOUNTING

- All hydraulic steering units should be installed in an accessible location. It is recommended to position the steering unit outside the vehicle cabin for ease of maintenance and service.
- Ports on the steering cylinder (S) should face upward to prevent damage.
- It is essential that no radial or axial loads are applied to the input shaft of the hydraulic steering unit.
- Cleanliness is critical during installation of the hydraulic steering unit. Protective plugs should remain in place during mounting and be removed only when the hydraulic lines are ready to be connected.

START UP

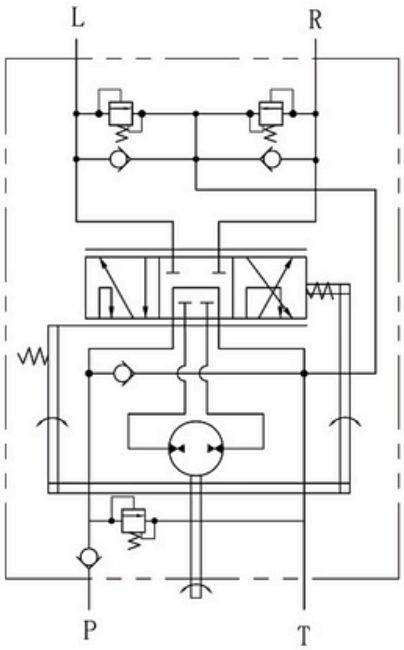
- Before start up, fill the steering unit with oil to its maximum level.
- Start the pump at low speed and slightly loosen the fitting connecting the pipe to the cylinder to allow air to escape. Ensure no air bubbles are present at the ports before tightening.
- Turn the steering wheel fully left and right until all air is purged and no bubbles are visible at the ports.
- Check the oil, refill if necessary,
- Tighten all fittings securely, then inspect and test the system to ensure it is operating correctly.

MAINTENANCE

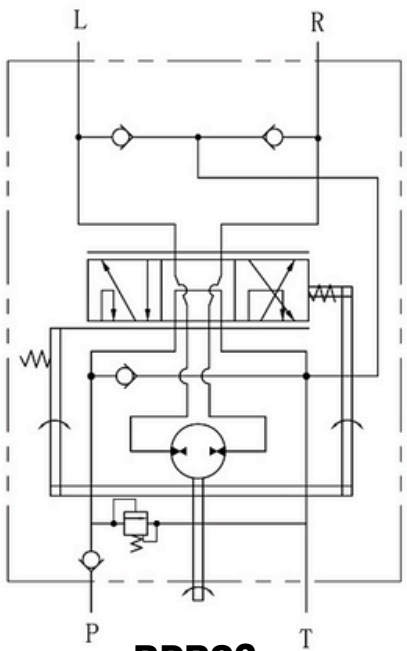
- Regularly inspect the filter and hydraulic oil, and replace them as needed to maintain optimal system performance.
- Under normal conditions, the maximum operating torque on the steering wheel should not exceed 5 N·m. If the pump is not operating or system pressure is low, torque may rise above this value. However, the maximum input torque must not exceed 130 N·m, as this may cause damage to the steering unit.

BPBS STEERING UNITS

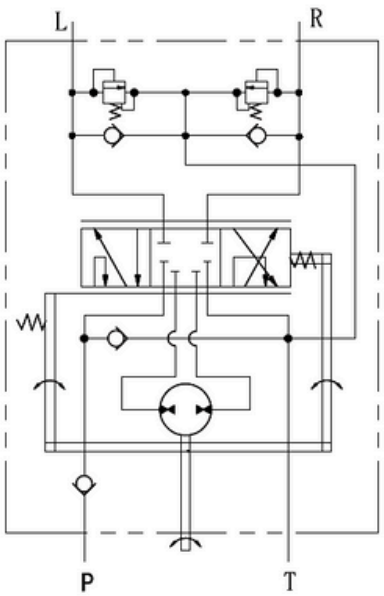
HYDRAULIC CIRCUITS



BPBS1
Open Center
Non-Reaction



BPBS2
Open Center
Reaction



BPBS3
Closed Center
Non-Reaction

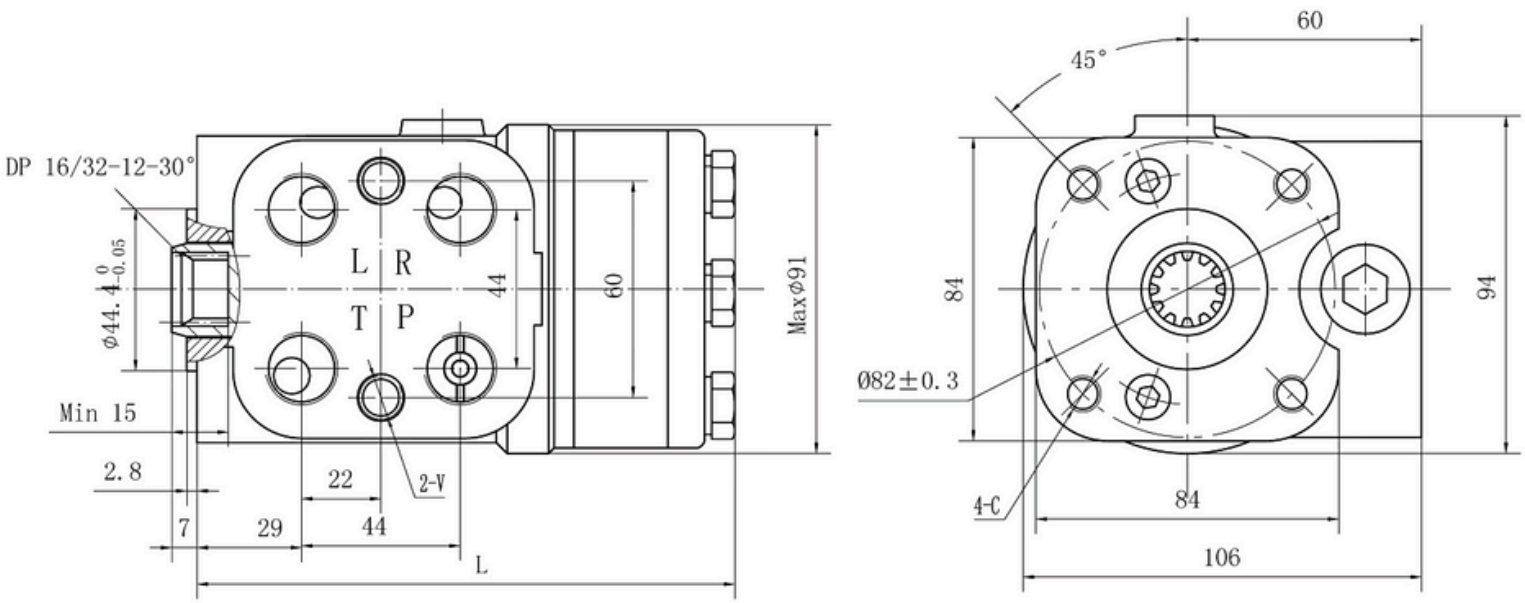
SPECIFICATION DATA

Parameters	BPBS1, BPBS2, BPBS3							BPBS1, BPBS3			
Displacement - CC/REV	50	63	80	100	125	160	200	250	280	315	400
Rated Flow - L/min	5	6	8	10	12.5	16	20	25	28	31.5	40
Max Input Pressure - Bar	175										
Max. Cont. Pressure in Line T - Bar	25										
Relief Valve Pressure Settings - Bar	60, 80, 100, 120, 140, 160, 175										
Shock Valves Pressure Settings - Bar	120, 140, 160, 180, 200, 220, 235										
Power Steering Torque - N.m	1.6 - 2.4										
Max. Manual Steering Torque - N.m	130										
Weight (Kg)	5.8	5.9	6	6.1	6.2	6.4	6.5	6.7	7	7.2	7.4

Note: Rated flow is based on a steering wheel speed of 100 RPM.

BPBS STEERING UNITS

DIMENSION AND MOUNTING DATA

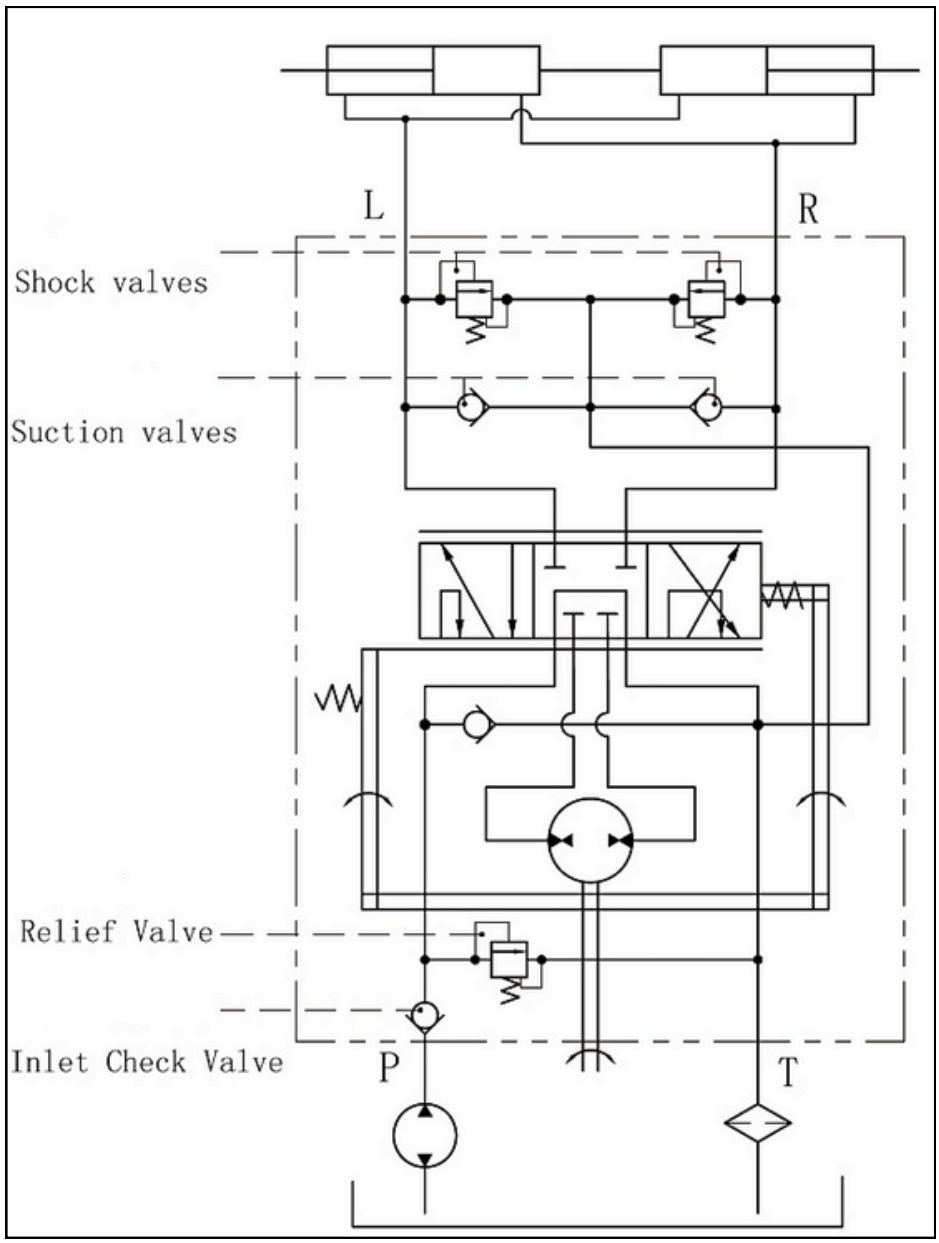


Parameters	BPBS1, BPBS2, BPBS3							BPBS1, BPBS3			
Displacement - CC/REV	50	63	80	100	125	160	200	250	280	315	400
Dimensions L (mm)	130	132	133	136	139	144	149	155	160	165	175

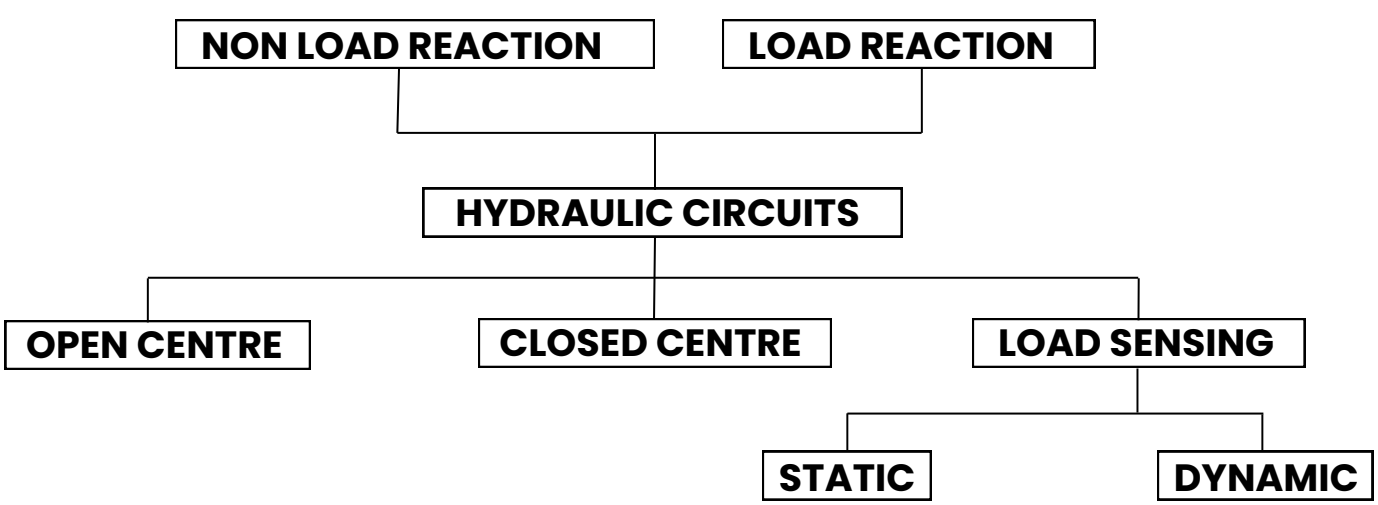
Code	Ports P, T, L, R	Column Mounting C	Valve Mounting V	Port LS
Y	M20 x 1.5mm	M10 x 1.5mm	M12	M12 X 1.5mm
Y1	M22 x 1.5mm	M10 x 1.5mm	M12	M12 X 1.5mm
Y2	M18 x 1.5mm	M10 x 1.5mm	M12	M12 X 1.5mm
Y3	G 1/2" - 14	M10 x 1.5mm	M12	G 1/4 - 19
Y4	3/4-16 UNF O'Ring	3/8-16 UNC	3/8-24 UNF	7/16-20 UNF O'Ring
Y5	M20 x 1.5mm O'Ring	M10 x 1.5mm	M12	M12 x 1.5mm O'Ring
Y6	M18 x 1.5mm O'Ring	M10 x 1.5mm	M12	M12 x 1.5mm O'Ring

INTEGRATED VALVES FUNCTION

- **Inlet Check Valve** – Prevents reverse oil flow when cylinder pressure exceeds inlet pressure, avoiding steering wheel kickback.
- **Shock Valves (R & L)** – Protects hoses from pressure surges caused by ground forces acting on the steered axle.
- **Suction Valves (R & L)** – Protects the steering circuit from vacuum conditions and prevent cavitation.
- **Relief Valve** – Limits maximum pressure across the steering unit to protect the steering circuit from overload.
- **LS Relief Valve** – Limits maximum pressure in the steering circuit; applicable only to Load Sensing series hydraulic steering units.



WORK CIRCUITS



BPBS ORDERING CODES

	1	2	3	4	5
BPBS					

Pos.1	**Function Code**

1	Open Center Non-Reaction
2	Open Center Reaction
3	Closed Center Non-Reaction

Pos.2	**Displacement code**

50	100	200	315
63	125	250	400
80	160	280	

Pos.3	**Integrated Valves**

Code	Inlet Check Valve	Relief Valve	Shock Valves	Suction Valves	Relief Valve Pressure Settings (Bar)	ShockValve Pressure Settings (Bar)
A	*	*	*	*	60, 80, 100, 120, 140, 150, 160, 175	-
B	*	*	*			-
C	*	*		*		-
F	*	*				-
D	*		*	*		202.2
E	*			*		-

BPBS ORDERING CODES

Pos.4	**Ports**
Y, Y1, Y2	JB/T7912-1999 (ISO 262)
Y3	GB/T707-1987 (ISO228/1)
Y4	ANSI B1.1- 1982

Pos.4	**Paint**
Omit	No paint
P	Painted Black

EXAMPLE

BPBS-1-80-A14-Y3-P