

CONTENT

THOOTH 萨奥思

Perfection in motion

P01

Introduction

P04

BHR1, BHR2, BHR3, BHR5 Series Hydraulic Steering Unites

P08

BHC1, BHC2, BHC3, BHC5 Series Hydraulic Steering Unites

P11

BPB1, BPB2, BPB3, BPB5 Series Hydraulic Steering Unites

P14

压转向器
BPB1, BPB2, BPB3, BPB5 Series Load Balance Hydraulic Steering Unites

P17

BPBS1、BPBS2、BPBS3 Series Hydraulic Steering Unites

P20

向器
BPBS5, BPBS5E, BPBS5L, BPBS5T, BPBS5TE Series Hydraulic Steering Unites

P25

器
BSR1, BSR2, BSR3, BSR5 Series Hydraulic Steering Unites

P28

器
BSM1, BSM5 Series Hydraulic Mnni-steering Unites

P33

转向器
BQAS1 Type Flow Servo-amplified Hydraulic Steering Units

P37

转向器
BHA5、BHA55 Series Coaxial Flow Amplifying Hydraulic Steering Units

P42

BFS1 Type Torque Generator (Torque Amplifier)

P45

DYXL、YXL Type Priority Valves

P48

VLSA Type Priority Valves

P50

VSFA1, VSFA5 Type Flow Amplifiers

P54

VB, VBH Type Combinatory Valve Blocks

P56

SC Type Steering Column

P58

Appendix



BHR1 型液压转向器
BHR1 Type Hydraulic Steering Unit



BSR2 型液压转向器
BSR2 Type Hydraulic Steering Unit

BPB1 型液压转向器
BPB1 Type Hydraulic Steering Unit



BPBS1 型液压转向器
BPBS1 Type Hydraulic Steering Unit



BPBS5T 液压转向器
BPBS5T Type Hydraulic Steering Units



阀
BPBS5 Type Hydraulic Steering Unit and VLSA60 Type Priority Valve

先阀
BPBS5 Type Hydraulic Steering Unit and VLSA40 /VLSA80 Type Priority Valve



组合阀板
BHF5 Type Flow Amplifying Hydraulic Steering Unit and Combinatory Valve Block



BFS1 型扭矩发生器
BFS1 Type Torque Generator (Torque Amplifier)



YXL型优先阀
YXL Type Priority Valve

BQAS1 型液压转向器
BQAS1 Type Hydraulic Steering Unit



放大阀
BPBS Type Hydraulic Steering Unit and VSFA Type Flow Amplifier

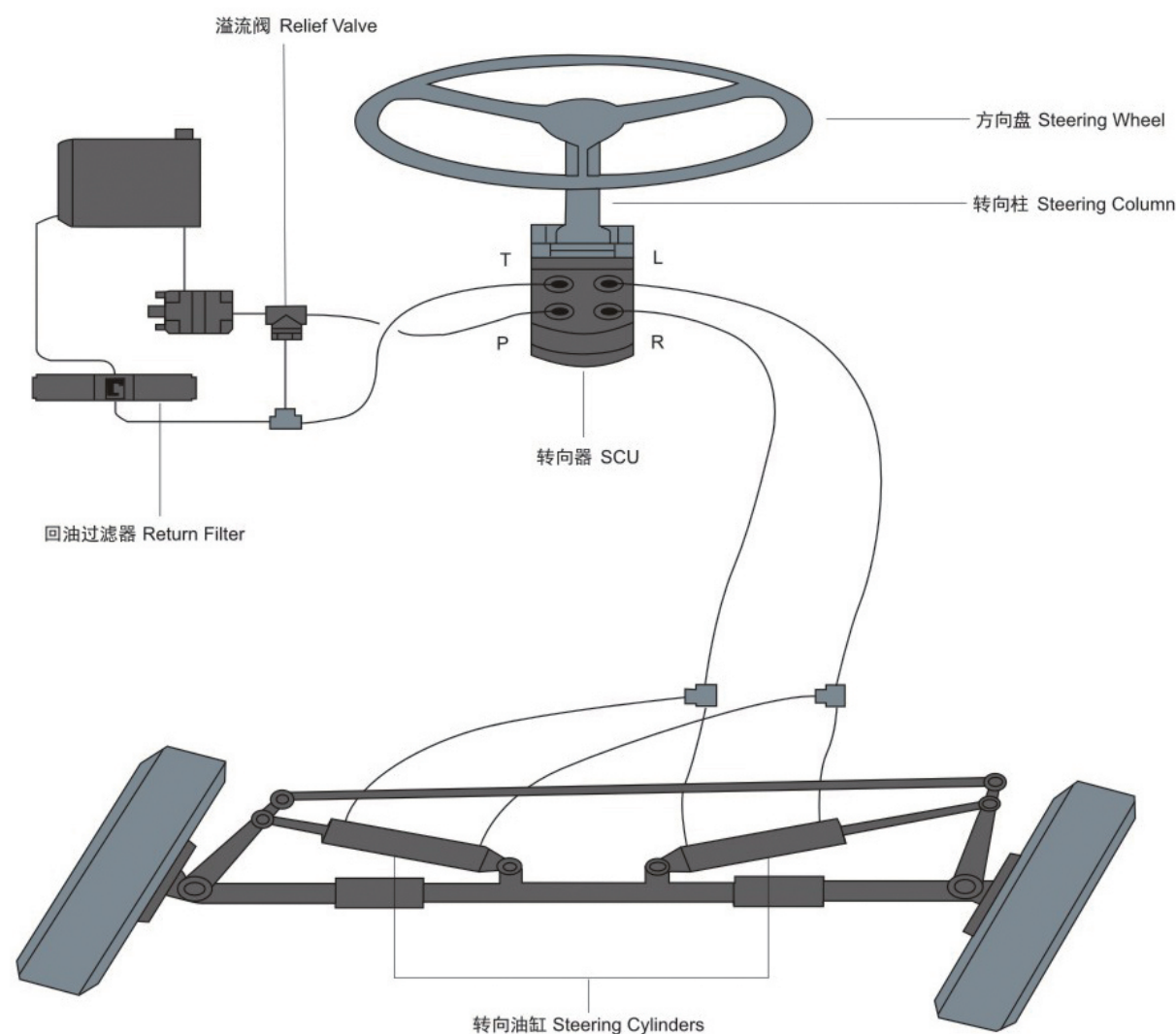


INTRODUCTION



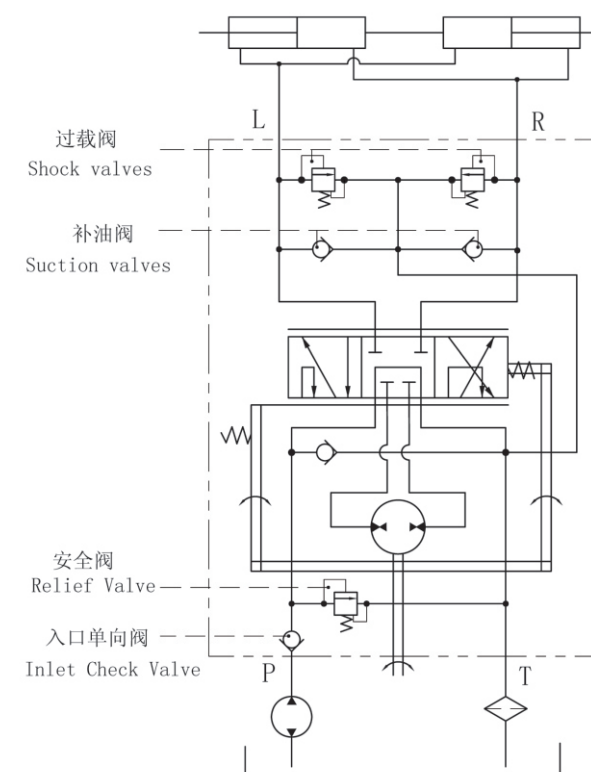
The Hydraulic Steering Control Units consists of a rotary and a rotary meter. Via a steering column the steering unit is connected to the steering wheel of vehicle. When the steering wheel is turned, oil is directed from the steering system pump via the rotary valve and rotary meter to the cylinder ports L or R (depend on the direction of turn). The rotary meter the oil flow to the steering cylinder in proportion to the angular rotation of the steering wheel. The is used in steering low speed and heavy duty vehicles, such as engineering machinery, forklift, tractor, combine harvester and hydraulic rudder of ships. The advantages of the hydraulic steering control units:

- Low cost, reliable.
- No load reaction on the steering wheel comfortable.
- Manual operation the steering wheel the pump doesn't work.
- Low control torque, continuous operation.
- According to the system, different function and pressure level valves available.

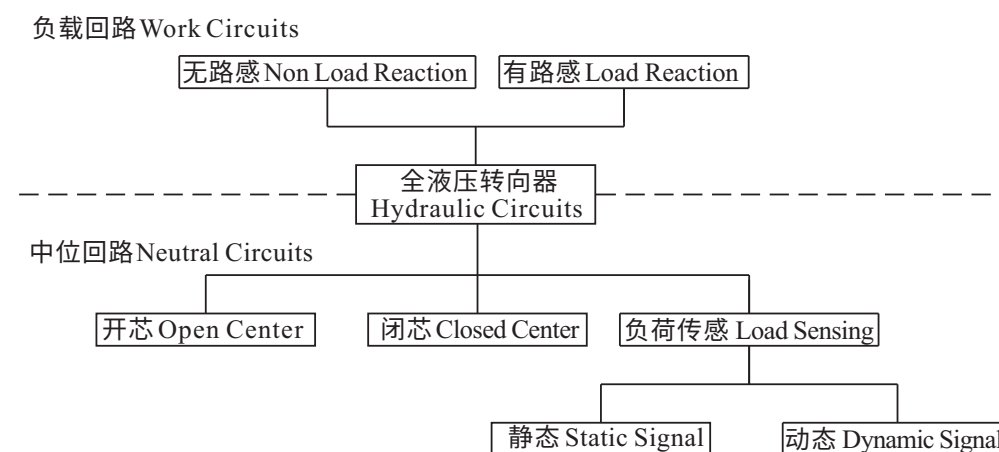


Integrated valves Function

- Inlet Check Valve—prevents oil from returning through the steering unit when pressure on the cylinder side is greater than pressure on the inlet side to prevent steering wheel kick.
- Shock valves—(R&L) protects hoses against pressure surge created by ground forces on the steered axle.
- Suction valves—(R&L) protects steering circuit against vacuum (cavitation) conditions.
- Relief Valve—limits maximum pressure drop across the steering unit protecting the steering circuit.
- LS-Relief Valve—Limits maximum pressure in the steering circuit (Load Sensing Series Hydraulic Steering Units only).



Hydraulic Circuit Explanation



OPEN CENTER STEERING SYSTEM

In the open center steering system, the oil from the pump returns to tank in neutral position, a fix-ed displacement pump recommended.

CLOSED CENTER STEERING SYSTEM

Due to the high pressure resulted from the blocking of the path between P and T in neutral position, a pressure compensation pump is incorporated.

TEMPRATURE

- Normal operating temperature range form+30℃to60℃.
- Minimum operating temperature-30℃
- Maximum operating temperature 90℃
- Extended periods operation at temperature of 60℃and above will greatly reduce life of due to oxidation and shorten life of product.

FILTRATION

- The maximum degree of contamination per ISO 4406 is
- For open center units 22/20/17
- For closed center units 21/19/16
- Return line filtration of 25μm nominal(40-50μm absolute)is recommended. In extremely dusty conditions filtration 10μm absolute should be used.

VISCOSITY

- Normal operating viscosity range form 20 mm²/s-80 mm²/s
- Minimum operating viscosity 10 mm²/s
- Maximum operating viscosity 300 mm²/s

MOUNTING

- All hydraulic steering units should be installed for ease of access It is recommend that the steering unit be located outside the vehicle cabin.
- Ports on the steering cylinder (S) should face upward to prevent damage.
- It is important that no radial axial load be applied to the hydraulic steering unit input shaft.
- During installation of the hydraulic steering unit cleanliness is of the utmost importance. Pie plugs should be left in place during mounting and only removed when hydraulic lines are to be connected.

START UP

- Before starting, fulfill oil into the steering unit to maximum level.
- Start the pump at a low speed , loosing the fittings which connecting the pipe and the cylinder, ensure that no bubbles out from the ports.
- Turn the steering wheel left and right, till no bubbles out form the ports too.
- Check the oil, fulfill oil again if necessary.
- Tighten the fittings, check the system to ensure the system working normally.

MAINTENANCE

- Check the filter and oil often, change if necessary.
- Normally the maximum operating torque on the wheel is no more than 5N.m. The operating torque may be more than 5N.m if when the pump not work or low, but the maximum input torque should not be higher than 130N.m, otherwise, the steering unit can be damaged.

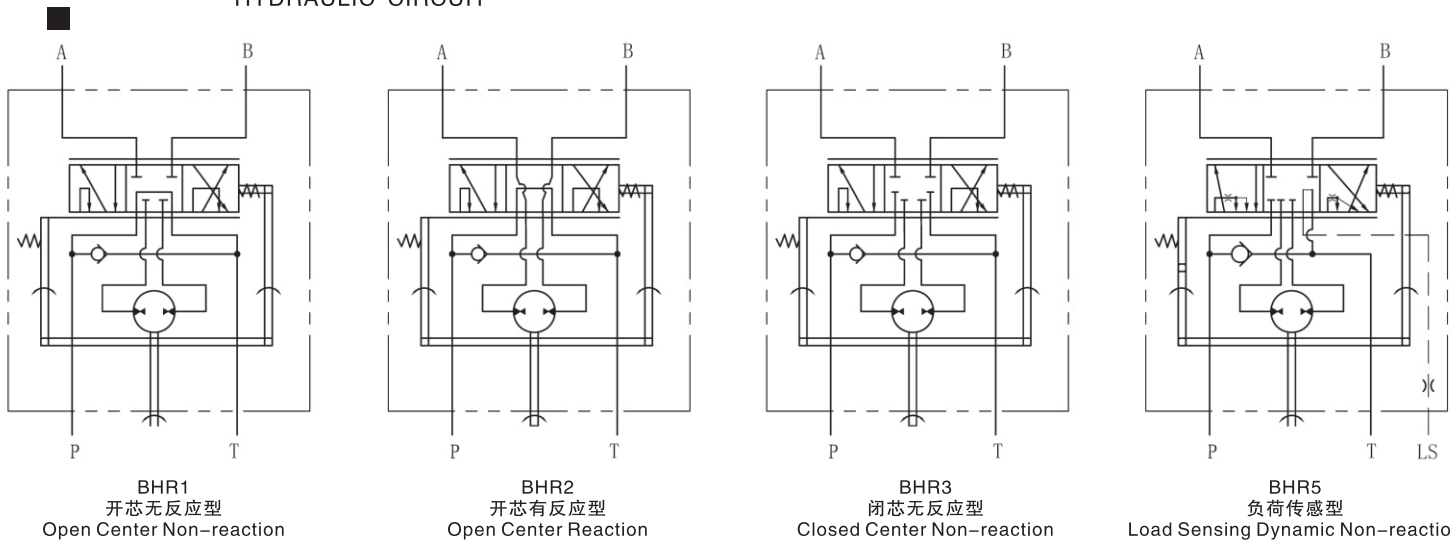
HR1,BHR2,BHR3,BHR5 Hydraulic steering control units (SCU) , new design, better performance.Widely applied to low speed and heavy loadvehicles E.g.construction machinary.forklift,tractor,harvester and helm contrlo etc.

BHR5 series is load sensing hydraulic steering control unit, it can be used with YXL priority valve for the load sensing hydraulic system.

Characteristics:

- With good pressure compensation to the change of steering load.
- The flow and pressure of steering unit keep prior, steering function is reliable.
- The steering circuit and other circuits work independently of each other , thereby increasing the efficiency of the system ;
- With high steering sensitivity, quick response, staring function is good in cold condition.

HYDRAULIC CIRCUIT



BHR1 开芯无反应型 Open Center Non-reaction
BHR2 开芯有反应型 Open Center Reaction
BHR3 闭芯无反应型 Closed Center Non-reaction
BHR5 负荷传感型 Load Sensing Dynamic Non-reaction

MAIN SPECIFICATION DATA

主要性能参数

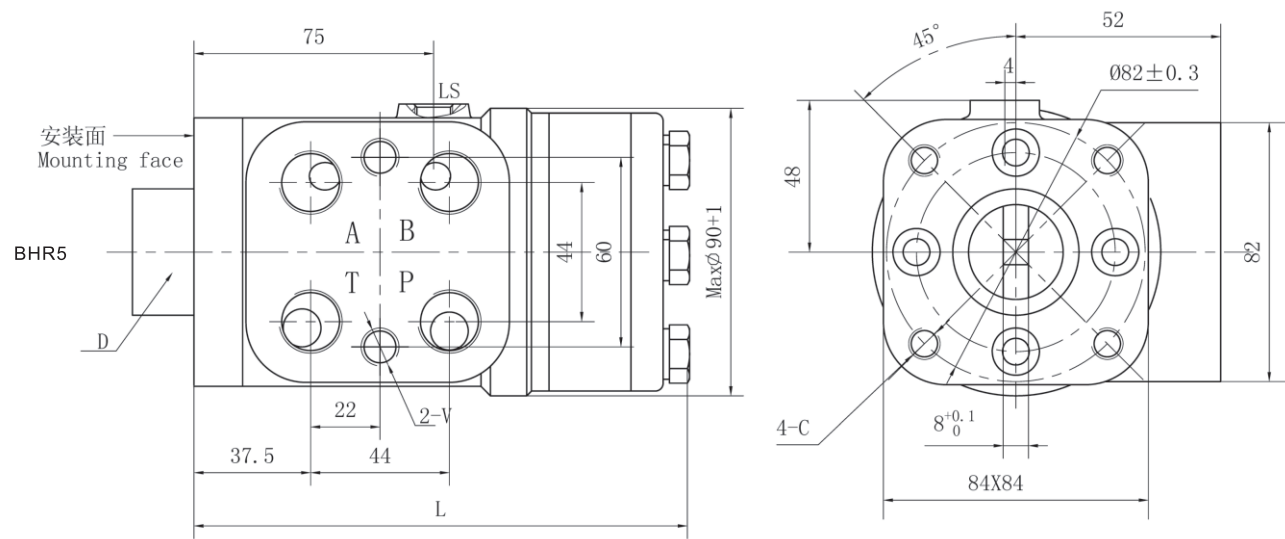
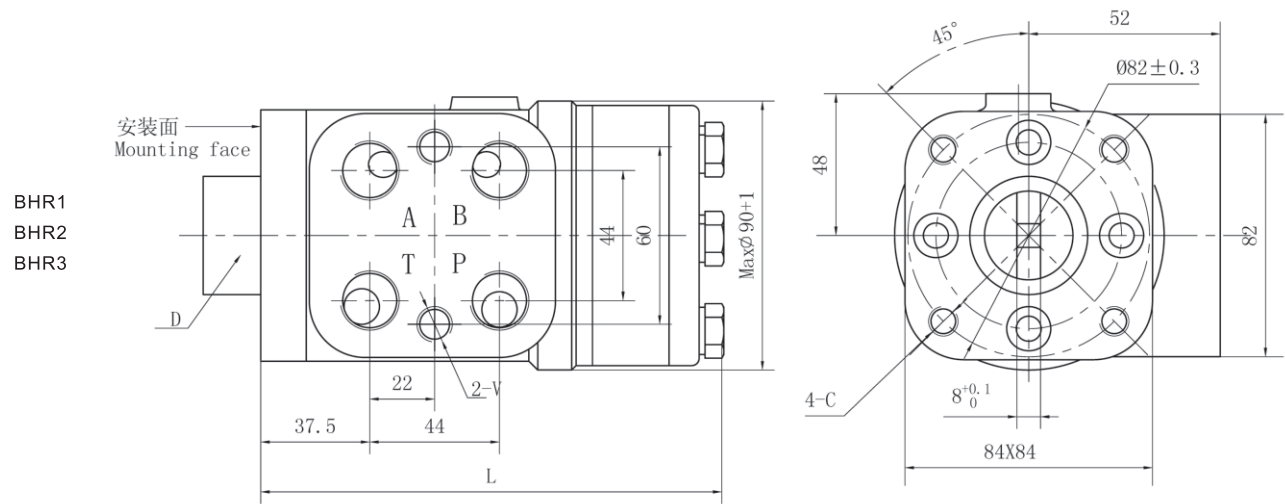
Parameters		型号 Type															
		BHR1, BHR2,BHR3, BHR5								BHR1, BHR3, BHR5							
Displacement	mL/r	50	63	80	100	125	160	200	250	280	315	400	500	630	800	1000	
Rated Flow①	L/min	5	6	8	10	12.5	16	20	25	28	31.5	40	42.5	53.5	60	75	
Max.Input Pressure	MPa	16															
Max.Cont.Pressure in Line T	MPa	1.6															
Power Steering Torque	N.m	1.6 ~ 2.4												1.7 ~ 2.8			
Max.Manual Steering Torque	N.m	130															
Dimension	L	mm	140	142	143	146	149	154	159	165	170	175	185	198	216	237	263
Weight	kg	5.9	6	6.1	6.2	6.3	6.5	6.6	6.8	7.1	7.3	7.5	7.9	8.5	9.3	10.3	

注①:50~400mL/r转向器的公称流量为转速100rpm时转向器所需流量, 500~630mL/r转向器的公称流量为转速85rpm时转向器所需流量, 800~1000mL/r转向器的公称流量为转速75rpm时转向器所需流量。

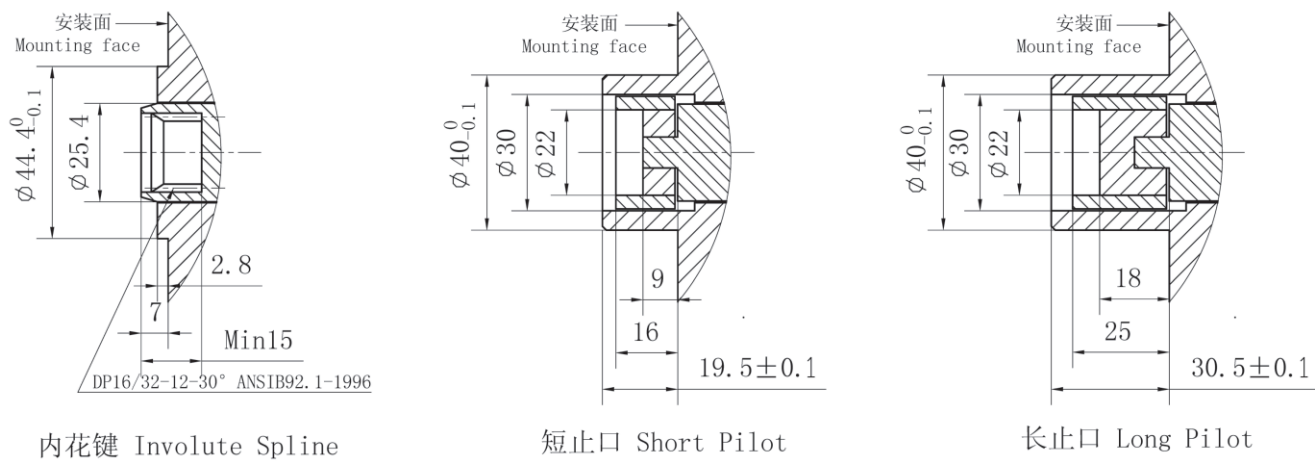
Note①:Rated Flow providing maximum speed of rotation:

From 50mL/r to 400mL/r at 100rpm,Form 500mL/r t0 630mL/r at 85rpm,Form 800mL/r to 1000mL/r at 75rpm.

DIMENSION AND MOUNTING DATA



PORT D MOUNTING DATA



PORTS THREAD

代 号 CODE	油口P,T,A,B螺纹 Ports P,T,A,B	转柱安装螺纹C Column Mounting C	安装螺纹V Valve Mounting V	LS口螺纹① Port LS①
Y	M20 × 1.5 Deep15mm	M10 × 1.5 Deep17mm	M12 Deep16mm	M12 × 1.5 Deep12mm
Y1	M22 × 1.5 Deep15mm	M10 × 1.5 Deep17mm	M12 Deep16mm	M12 × 1.5 Deep12mm
Y2	M18 × 1.5 Deep15mm	M10 × 1.5 Deep17mm	M12 Deep16mm	M12 × 1.5 Deep12mm
Y3	G1/2-14 Deep15mm	M10 × 1.5 Deep17mm	M12 Deep16mm	G1/4-19 Deep12mm
Y4	3/4-16UNF O-ring Deep15mm	3/8-16UNC Deep17mm	3/8-24UNF Deep16mm	7/16-20UNF O-ring Deep12mm
Y5	M20 × 1.5 O-ring Deep15mm	M10 × 1.5 Deep17mm	M12 Deep16mm	M12 × 1.5 O-ring Deep12mm
Y6	M18 × 1.5 O-ring Deep15mm	M10 × 1.5 Deep17mm	M12 Deep16mm	M12 × 1.5 O-ring Deep12mm

注①，LS油口仅适合BHR5型转向器。
Note①：Port LS is only fit for BHR5 type hydraulic steering unit.

ORDER CODE

	POS.1	POS.2	POS.3	POS.4	POS.5	POS.6
BHR		-		-		-

POS.1	型式功能 Function Code
1	开芯无反应型 Open Center Non-reaction
2	开芯有反应型 Open Center Reaction
3	闭芯无反应型 Closed Center Non-reaction
5	负荷传感型、管式优先阀连接形式 Load Sensing Dynamic Non-reaction , Pipe Mounting Type Priority Valve Connection

POS.2	排量 Displacement mL/r
	50, 63, 80, 100, 125, 160, 200, 250, 280, 315, 400, 500, 630, 800, 1000

POS.3	油口 Ports
Y、Y1、Y2	JB/T7912-1999 (ISO 262)
Y3	GB/T707-1987 (ISO228/1)
Y4	ANSI B1.1-1982

Note：other code of ports can be according to the user demand protocol

POS.5	外观喷漆 Paint
省略Omit	不喷漆 No Paint
P	喷漆（黑）Painted (Black)

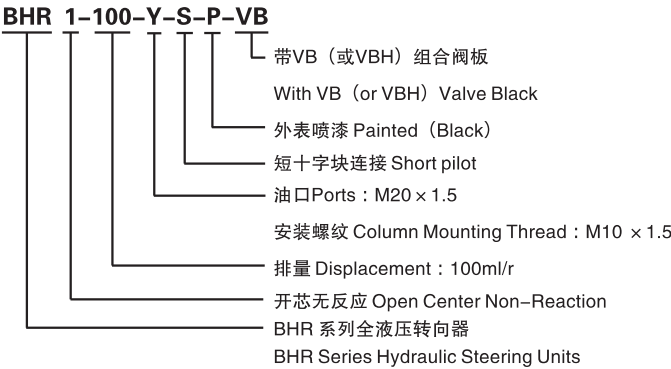
POS.4	安装止口连接方式
省略Omit	内花键 Involute Spline
S	短止口 Short Pilot
L	长止口 Long Pilot

POS.6	设计标识 Design Code
省略Omit	不带阀板 Without Valve Block
VB	带VB（或VBH）组合阀板With VB (or VBH) Valve Block

应用举例1 For Example 1:

BHR系列全液压转向器，开芯无反应；排量100ml/r；P、T、A、B油口螺纹为M20×1.5，转向柱安装螺纹M10×1.5；外表喷黑漆；短十字块连接；带VB阀板。

转向器编号为：BHR1-100-Y-S-P-VB



应用举例2 For Example 2:

BHR系列全液压转向器，负荷传感型；排量125mL/r；P、T、A、B油口螺纹为M20×1.5，LS：M12×1.5，转向柱安装螺纹M10×1.5；外表喷黑漆；渐开线花键连接。

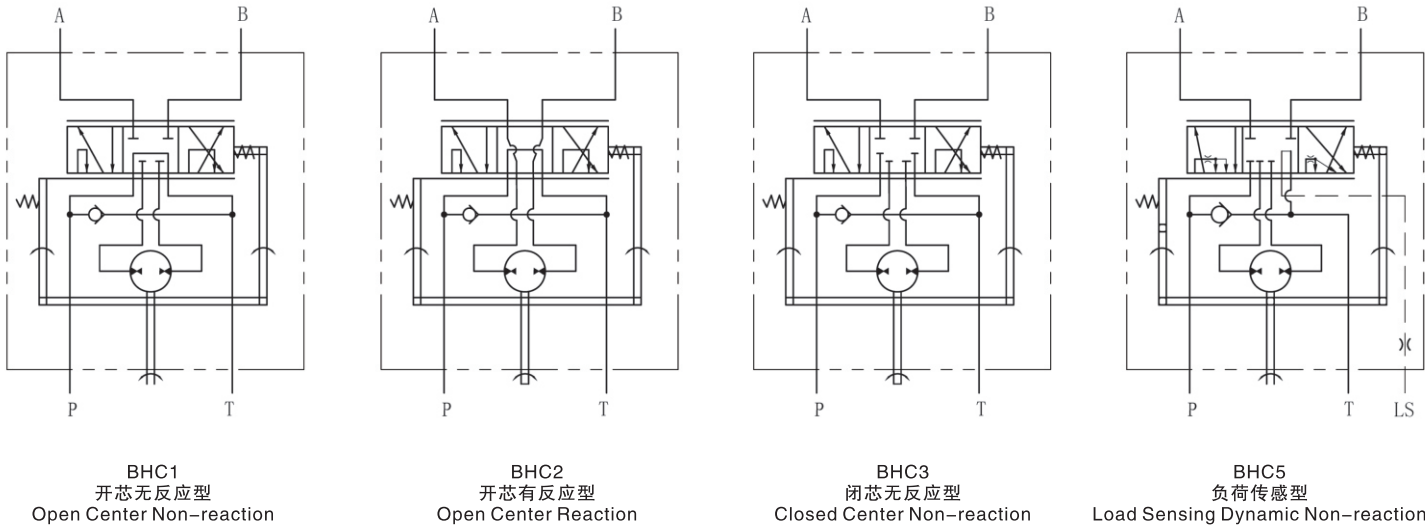
转向器编号为：BHR5-125-Y-P



转向系统。

BHC1, BHC2, BHC3, BHC5 series is with side ports hydraulic steering control units basing on the BHR series, same performance as BHR series, which can meet the needs of different installation in the ports position. It can be widely applied to hydraulic control system of tractor, construction machinery, forklift, etc.

■ 液压原理图 HYDRAULIC CIRCUIT

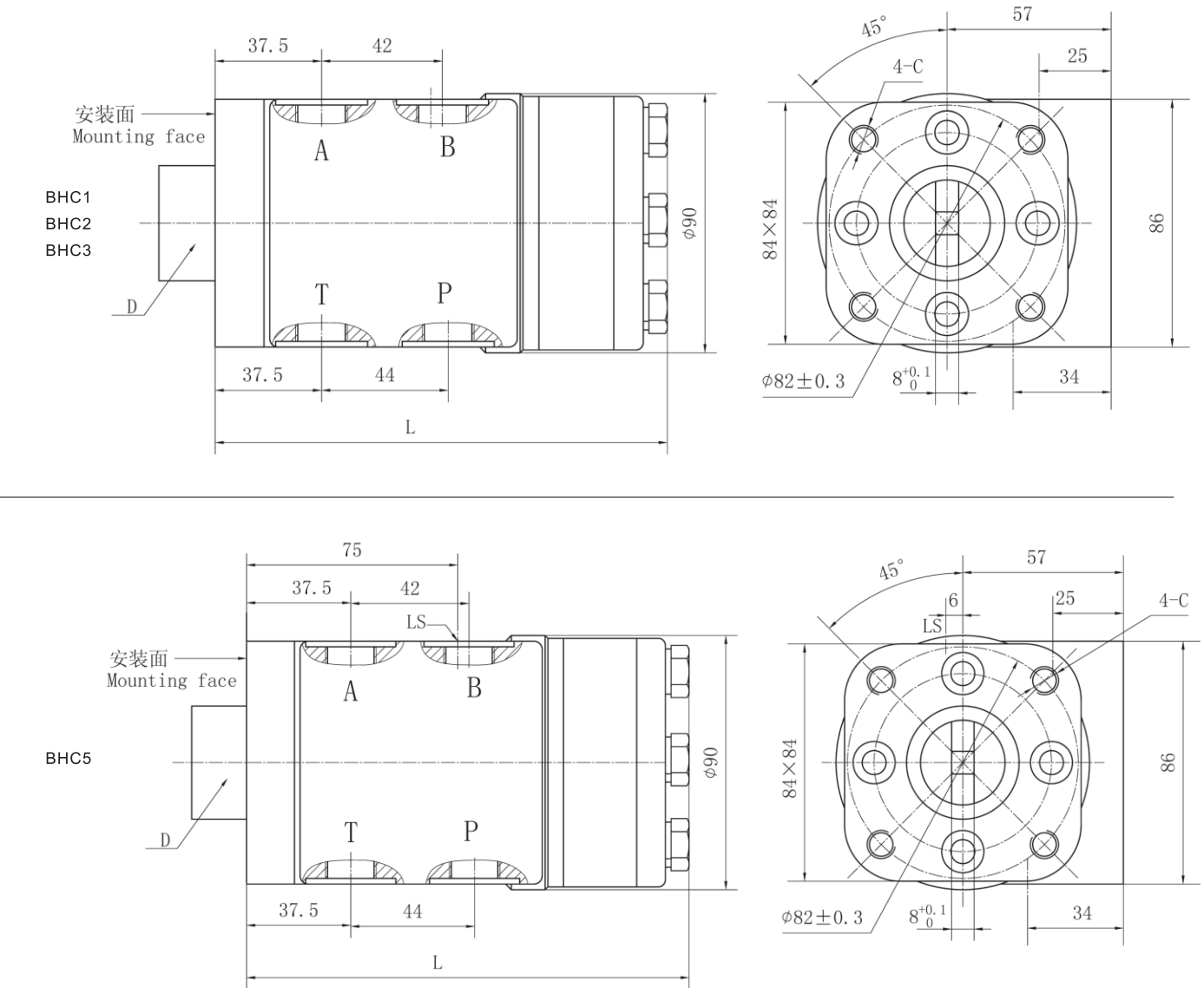


■ 主要性能参数 MAIN SPECIFICATION DATA

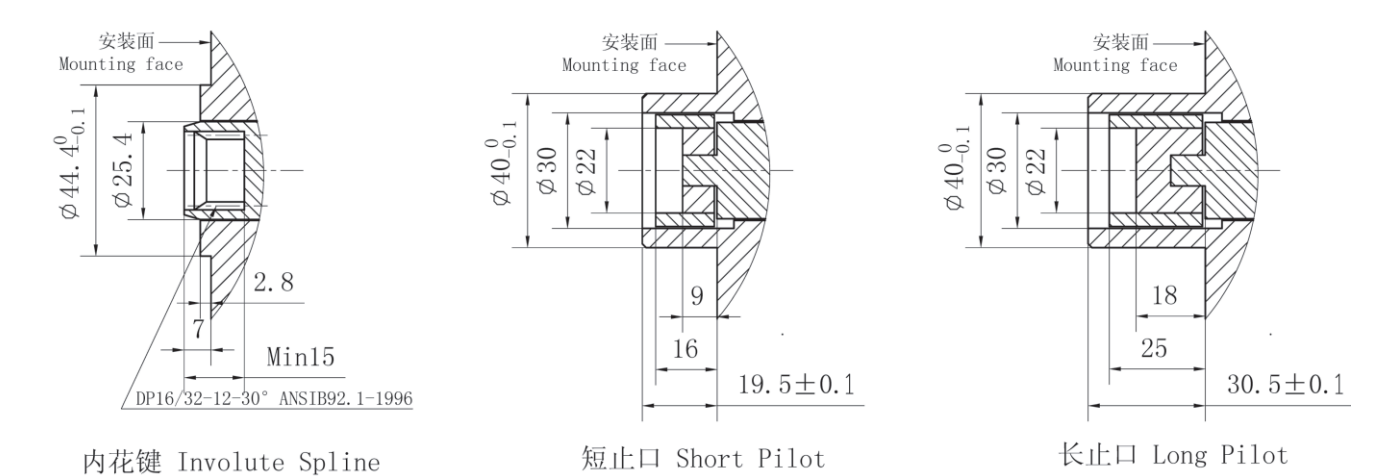
性能参数 Parameters		型号 Type											
		BHC1, BHC2,BHC3, BHC5								BHC1, BHC3, BHC5			
排量 Displacement	mL/r	50	63	80	100	125	160	200	250	280	315	400	
公称流量① Rated Flow①	L/min	5	6	8	10	12.5	16	20	25	28	31.5	40	
最大入口压力 Max.Input Pressure	MPa	16											
T口最大连续背压 Max.Cont.Pressure in Line T	MPa	1.6											
动力转向扭矩 Power Steering Torque	N.m	1.6~2.4											
最大输入扭矩 Max.Manual Steering Torque	N.m	130											
长度 Dimension	L	mm	140	142	143	146	149	154	159	165	170	175	185
重量 Weight	kg	6.4	6.5	6.6	6.7	6.8	7.0	7.1	7.3	7.6	7.8	8.0	

注①:公称流量为转速100rpm时转向器所需流量。
Note①:Rated flow for steering wheel that rotates at 100rpm.

外形连接尺寸 DIMENSION AND MOUNTING DATA



止口D连接尺寸 PORT D MOUNTING DATA



油口螺纹 PORTS THREAD

代号 CODE	油口P,T,A,B螺纹 Ports P,T,A,B	转柱安装螺纹C Column Mounting C	LS口螺纹① Port LS①
Y	M20×1.5 Deep15mm	M10×1.5 Deep17mm	M12×1.5 Deep12mm
Y1	M22×1.5 Deep15mm	M10×1.5 Deep17mm	M12×1.5 Deep12mm
Y2	M18×1.5 Deep15mm	M10×1.5 Deep17mm	M12×1.5 Deep12mm
Y3	G1/2-14 Deep15mm	M10×1.5 Deep17mm	G1/4-19 Deep12mm
Y4	3/4-16UNF O-ring Deep15mm	3/8-16UNC Deep17mm	7/16-20UNF O-ring Deep12mm
Y5	M20×1.5 O-ring Deep15mm	M10×1.5 Deep17mm	M12×1.5 O-ring Deep12mm
Y6	M18×1.5 O-ring Deep15mm	M10×1.5 Deep17mm	M12×1.5 O-ring Deep12mm

注①，LS油口仅适合BHC5型转向器。
Note①：Port LS is only fit for BHC5 type hydraulic steering unit.

型号说明 ORDER CODE

	POS.1		POS.2		POS.3		POS.4		POS.5
BHC		-		-		-		-	

POS.1	型式功能 Function Code
1	开芯无反应型 Open Center Non-reaction
2	开芯有反应型 Open Center Reaction
3	闭芯无反应型 Closed Center Non-reaction
5	负荷传感型、管式优先阀连接形式 Load Sensing Dynamic Non-reaction , Pipe Mounting Type Priority Valve Connection

POS.2	排量 Displacement mL/r
	50, 63, 80, 100, 125, 160, 200, 250, 280, 315, 400

POS.3	油口 Ports	POS.4	安装止口连接方式
Y、Y1、Y2	JB/T7912-1999 (ISO 262)	省略Omit	内花键 Involute Spline
Y3	GB/T707-1987 (ISO228/1)	S	短止口 Short Pilot
Y4	ANSI B1.1-1982	L	长止口 Long Pilot

注：其它油口连接方式可按用户需求协议确定
Note：other code of ports can be according to the user demand protocol

POS.5	外观喷漆 Paint
省略Omit	不喷漆 No Paint
P	喷漆（黑）Painted (Black)

应用举例 For Example:

BHC系列全液压转向器，开芯无反应；排量125mL/r；P、T、A、B油口螺纹为M18×1.5，转向柱安装螺纹M10×1.5；外表喷漆；短十字块连接。

转向器编号为：BHC1-125-Y2-S-P



- 结构简单，体积小，重量轻。
- 使用寿命长。
- 性能可靠。
- 寒冷条件下的启动特性良好。

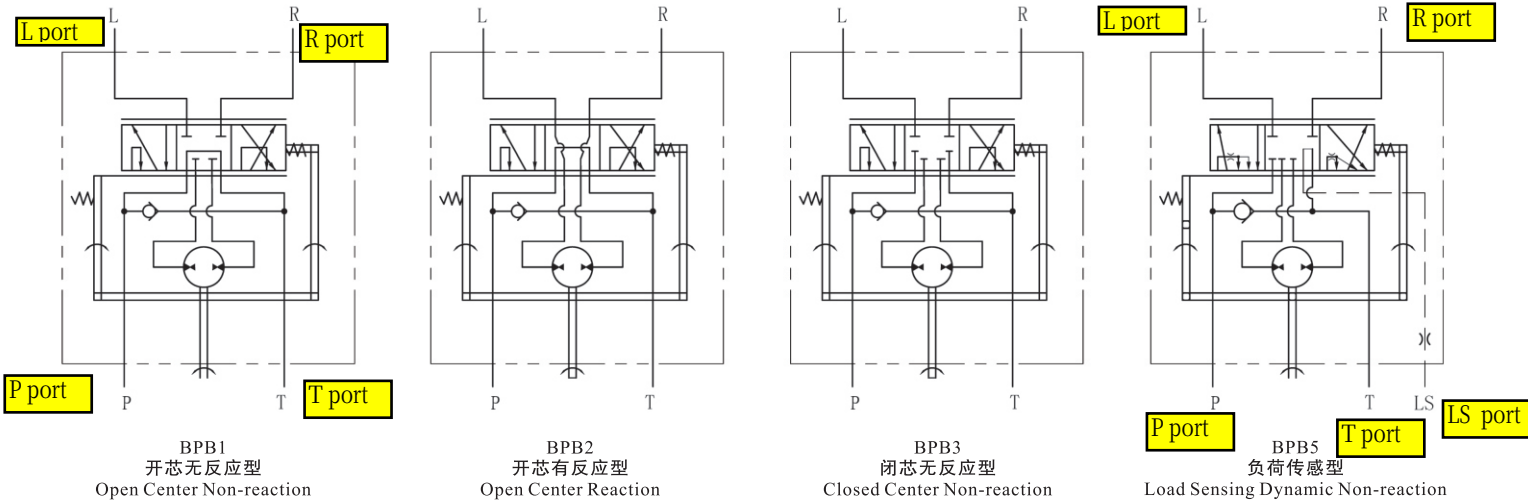
BPB1, BPB2, BPB3, BPB5 Hydraulic steering control units(SCU)has similar structure with BHR1,BHR2,BHR3,BHR5,connecting dimension a little different,according to most European and US standard.

BPB5 series is load sensing hydraulic steering control unit, it can be used with YXL priority valve for the load sensing hydraulic system.

Characteristics:

- With good pressure compensation to the change of steering load;
- The flow and pressure of steering unit keep prior, steering function is reliable;
- The steering circuit and other circuits work independently of each other , thereby increasing the efficiency of the system ;
- With high steering sensitivity, quick response, staring function is good in cold condition.

■ 液压原理图 HYDRAULIC CIRCUIT

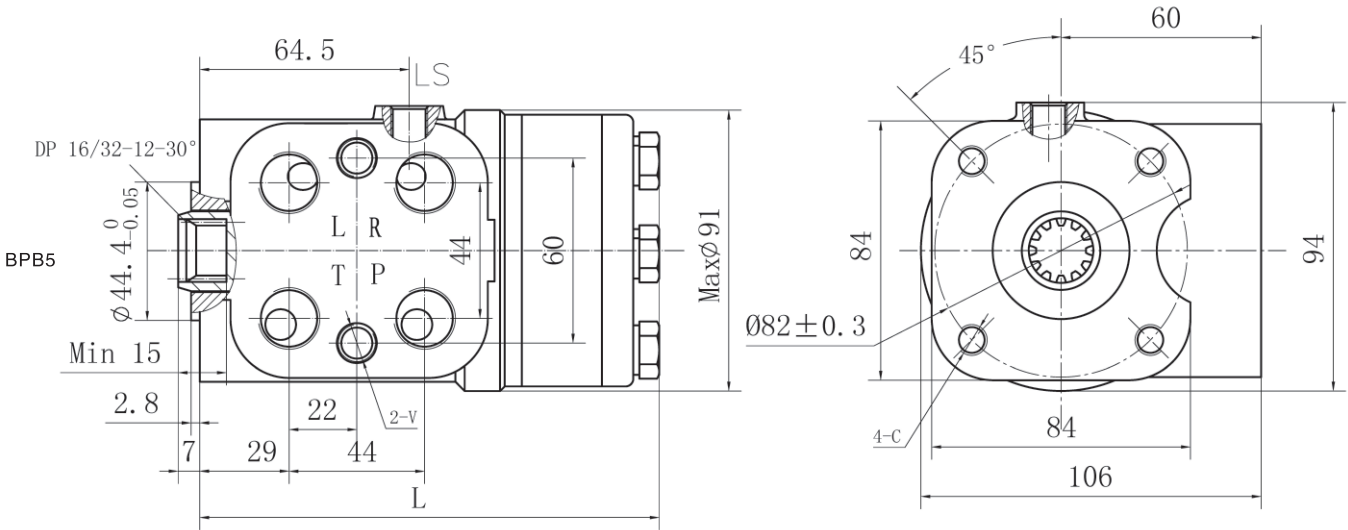
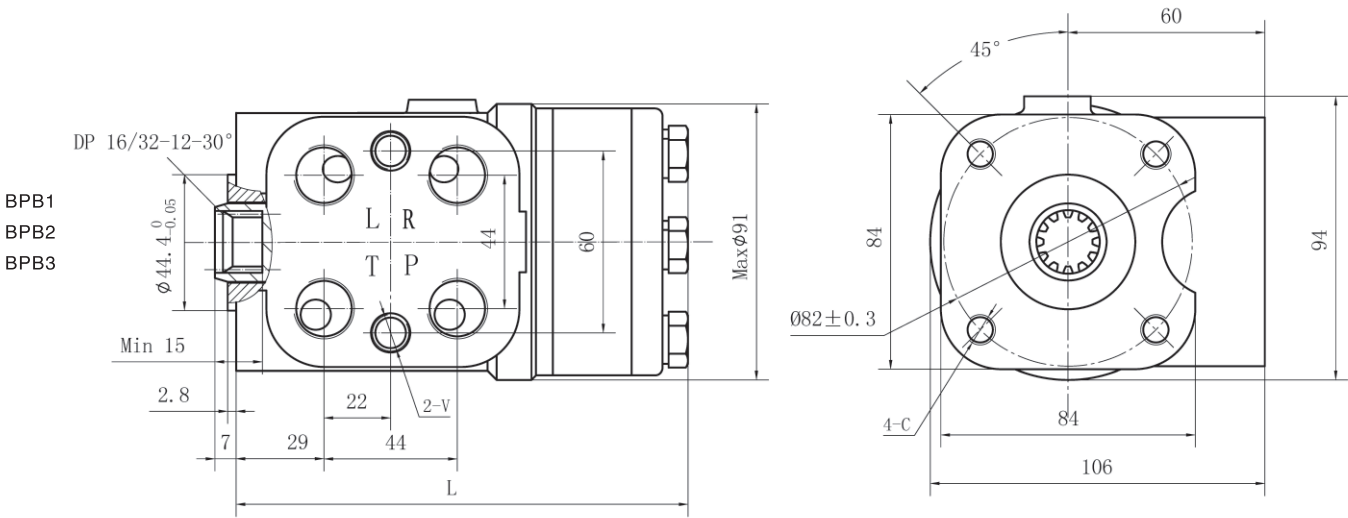


■ MAIN SPECIFICATION DATA

性能参数 Parameters		型号 Type											
		BPB1, BPB2,BPB3, BPB5								BPB1, BPB3, BPB5			
排量 Displacement	mL/r	50	63	80	100	125	160	200	250	280	315	400	
公称流量① Rated Flow①	L/min	5	6	8	10	12.5	16	20	25	28	31.5	40	
最大入口压力 Max.Input Pressure	MPa	17.5											
T口最大连续背压 Max.Cont.Pressure in Line T	MPa	2.5											
动力转向扭矩 Power Steering Torque	N.m	1.6~2.4											
最大输入扭矩 Max.Manual Steering Torque	N.m	130											
长度 Dimension	L	mm	130	132	133	136	139	144	149	155	160	165	175
重量 Weight	kg	5.8	5.9	6	6.1	6.2	6.4	6.5	6.7	7	7.2	7.4	

注①:公称流量为转速100rpm时转向器所需流量。
Note①:Rated flow for steering wheel that rotates at 100rpm.

■ DIMENSION AND MOUNTING DATA



■ PORTS THREAD

代 号 CODE	油口P,T,L,R螺纹 Ports P,T,L,R	转柱安装螺纹C Column Mounting C	安装螺纹V Valve Mounting V	LS口螺纹① Port LS①
Y	M20×1.5 Deep15mm	M10×1.5 Deep17mm	M12 Deep16mm	M12×1.5 Deep12mm
Y1	M22×1.5 Deep15mm	M10×1.5 Deep17mm	M12 Deep16mm	M12×1.5 Deep12mm
Y2	M18×1.5 Deep15mm	M10×1.5 Deep17mm	M12 Deep16mm	M12×1.5 Deep12mm
Y3	G1/2-14 Deep15mm	M10×1.5 Deep17mm	M12 Deep16mm	G1/4-19 Deep12mm
Y4	3/4-16UNF O-ring Deep15mm	3/8-16UNC Deep17mm	3/8-24UNF Deep16mm	7/16-20UNF O-ring Deep12mm
Y5	M20×1.5 O-ring Deep15mm	M10×1.5 Deep17mm	M12 Deep16mm	M12×1.5 O-ring Deep12mm
Y6	M18×1.5 O-ring Deep15mm	M10×1.5 Deep17mm	M12 Deep16mm	M12×1.5 O-ring Deep12mm

注①, LS油口仅适合BPB5型转向器。
Note①: Port LS is only fit for BPB5 type hydraulic steering unit.

ORDER CODE

POS.1		POS.2		POS.3		POS.4	
BPB		-		-		-	
POS.1	型式功能 Function Code						
1	开芯无反应型 Open Center Non-reaction						
2	开芯有反应型 Open Center Reaction						
3	闭芯无反应型 Closed Center Non-reaction						
5	负荷传感型、管式优先阀连接形式 Load Sensing Dynamic Non-reaction , Pipe Mounting Type Priority Valve Connection						
POS.2	排量 Displacement mL/r						
50, 63, 80, 100, 125, 160, 200, 250, 280, 315, 400							
POS.3	油口 Ports						
Y、Y1、Y2	JB/T7912-1999 (ISO 262)						
Y3	GB/T707-1987 (ISO228/1)						
Y4	ANSI B1.1-1982						
POS.4	外观喷漆 Paint						
省略Omit	不喷漆 No Paint						
P	喷漆 (黑) Painted (Black)						

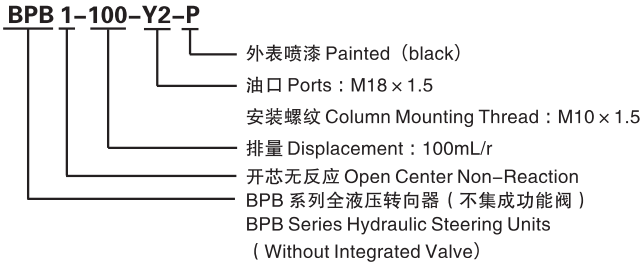
注：其它油口连接方式可按用户需求协议确定

Note：other code of ports can be according to the user demand protocol

应用举例1 For Example1:

BPB系列转向器，开芯无反应；排量100mL/r；P、T、L、R油口螺纹为M18×1.5，转向柱安装螺纹M10×1.5，外表喷黑漆。

转向器编号为：BPB1-100-Y2-P



应用举例2 For Example2:

BPB系列转向器，闭芯无反应；排量125mL/r；P、T、L、R油口螺纹为G1/2-14，转向柱安装螺纹M10×1.5，外表喷黑漆。

转向器编号为：BPB3-125-Y3-P



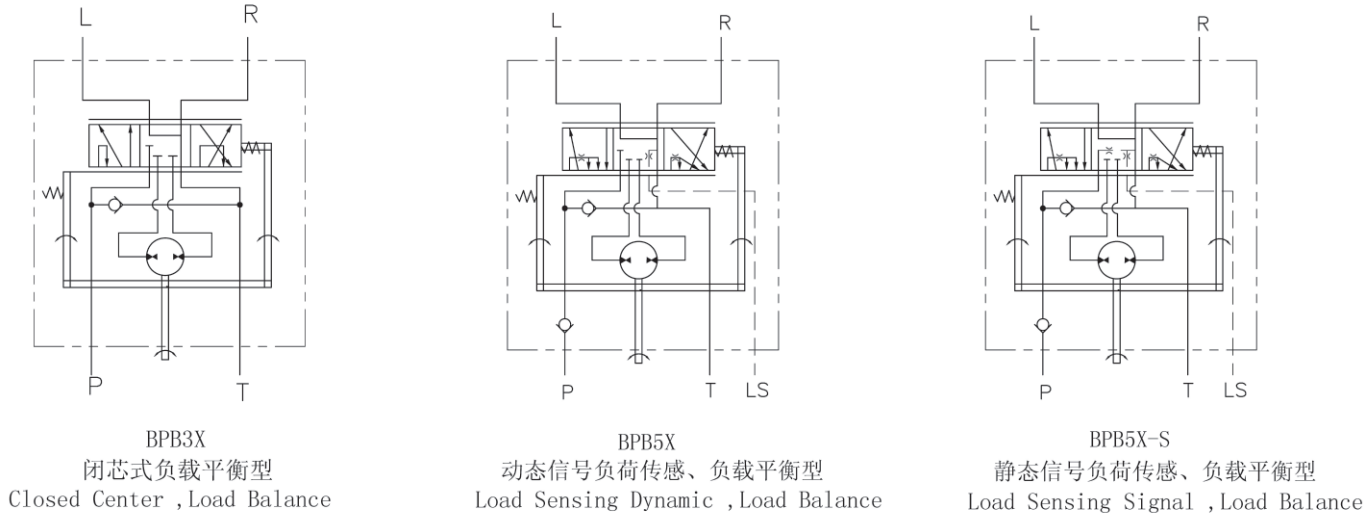
种。

BPB3X and BPB5X are two different types of Load Balance Hydraulic Steering Units. When it is under neutral position, L and R are pressure balanced and connected to the drain line T. These steering units do not drive directly the steering cylinders, but they are usually connected with flow amplifier. It is widely used for hydraulic steering system Of low-speed, non-road large wheeled construction vehicles.

BPB3X is closed center, load balance hydraulic steering unit.

BPB5X is load sensing, load balance hydraulic steering unit with Dynamic Signal or Static Signal.

HYDRAULIC CIRCUIT

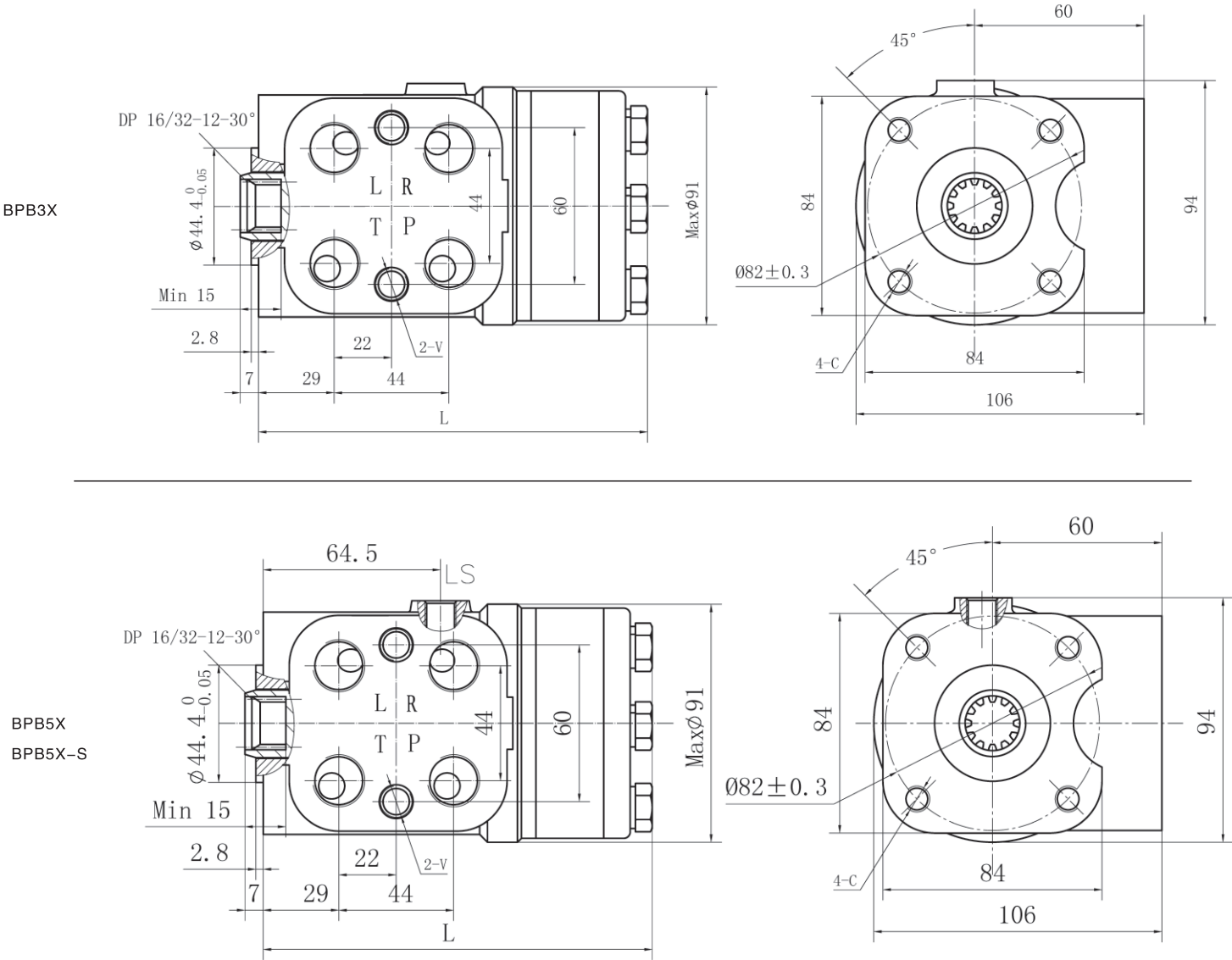


MAIN SPECIFICATION DATA

性能参数 Parameters			型号 Type						
			BPB3X, BPB5X, BPB5X-S						
排量 Displacement	mL/r	50	63	80	100	125	160	200	
公称流量① Rated Flow①	L/min	5	6	8	10	12.5	16	20	
最大入口压力 Max.Input Pressure	MPa	17.5							
T口最大连续背压 Max.Cont.Pressure in Line T	MPa	2.5							
动力转向扭矩 Power Steering Torque	N.m	1.6 ~ 2.4							
最大输入扭矩 Max.Manual Steering Torque	N.m	130							
长度 Dimension	L	mm	130	132	133	136	139	144	149
重量 Weight	kg	5.8	5.9	6	6.1	6.2	6.4	6.5	

注①:公称流量为转速100rpm时转向器所需流量。
Note①:Rated flow for steering wheel that rotates at 100rpm.

DIMENSION AND MOUNTING DATA



油口螺纹 PORTS THREAD

代 号 CODE	油口P,T,L,R螺纹 Ports P,T,L,R	转柱安装螺纹C Column Mounting C	安装螺纹V Valve Mounting V	LS口螺纹Ⓢ Port LSⓈ
Y	M20×1.5 Deep15mm	M10×1.5 Deep17mm	M12 Deep16mm	M12×1.5 Deep12mm
Y1	M22×1.5 Deep15mm	M10×1.5 Deep17mm	M12 Deep16mm	M12×1.5 Deep12mm
Y2	M18×1.5 Deep15mm	M10×1.5 Deep17mm	M12 Deep16mm	M12×1.5 Deep12mm
Y3	G1/2-14 Deep15mm	M10×1.5 Deep17mm	M12 Deep16mm	G1/4 Deep12mm
Y4	3/4-16UNF O-ring Deep15mm	3/8-16UNC Deep17mm	3/8-24UNF Deep16mm	7/16-20UNF O-ring Deep12mm
Y5	M20×1.5 O-ring Deep15mm	M10×1.5 Deep17mm	M12 Deep16mm	M12×1.5 O-ring Deep12mm
Y6	M18×1.5 O-ring Deep15mm	M10×1.5 Deep17mm	M12 Deep16mm	M12×1.5 O-ring Deep12mm

注Ⓢ：LS油口仅适合BPB5X型转向器。
NoteⓈ：Port LS is only fit for BPB5X type hydraulic steering unit.

ORDER CODE

	POS.1		POS.2		POS.3		POS.4
BPB		-		-		-	

POS.1	型式功能 Hydraulic Circuit Explanation
3X	闭芯负载平衡型 Closed Center ,Load Balance
5X	动态信号负荷传感、负载平衡型、管式连接型式 Load Sensing Dynamic, Load Balance, Pipe Mounting Type Priority Valve Connection
5X-S	静态信号负荷传感、负载平衡型、管式连接型式 Load Sensing Signal, Load Balance, Pipe Mounting Type Priority Valve Connection

POS.2	排量 Displacement mL/r
	50, 63, 80, 100, 125, 160, 200

POS.3	油口代码 Ports Code
	Y、Y1、Y2、Y3、Y4、Y5、Y6
协议确定 Note: other code of ports can be according to the user demand protocol	

POS.4	外观喷漆 Paint
缺省Omit	不喷漆 No Paint
P	喷漆（黑）Paint（Black）

应用举例 For Example:

BPB型液压转向器，闭芯负载平衡型；排量125mL/r；P、T、A、B油口螺纹为G1/2-14，转向柱安装螺纹M10×1.5，外表喷漆。

转向器编号：BPB3X-125-Y3-P

BPB 3X-125-Y3-P

- 外表喷漆 Painted (black)
- 油口 Ports: G1/2-14
- 安装螺纹 Column Mounting Thread:M10 × 1.5
- 排量 Displacement: 125mL/r
- 闭芯负载平衡型Closed Center ,Load Balance
- BPB 系列全液压转向器（不集成功能阀）
- BPB Series Hydraulic Steering Units
- (Without Integrated Valve)

应用举例2 For Example2:

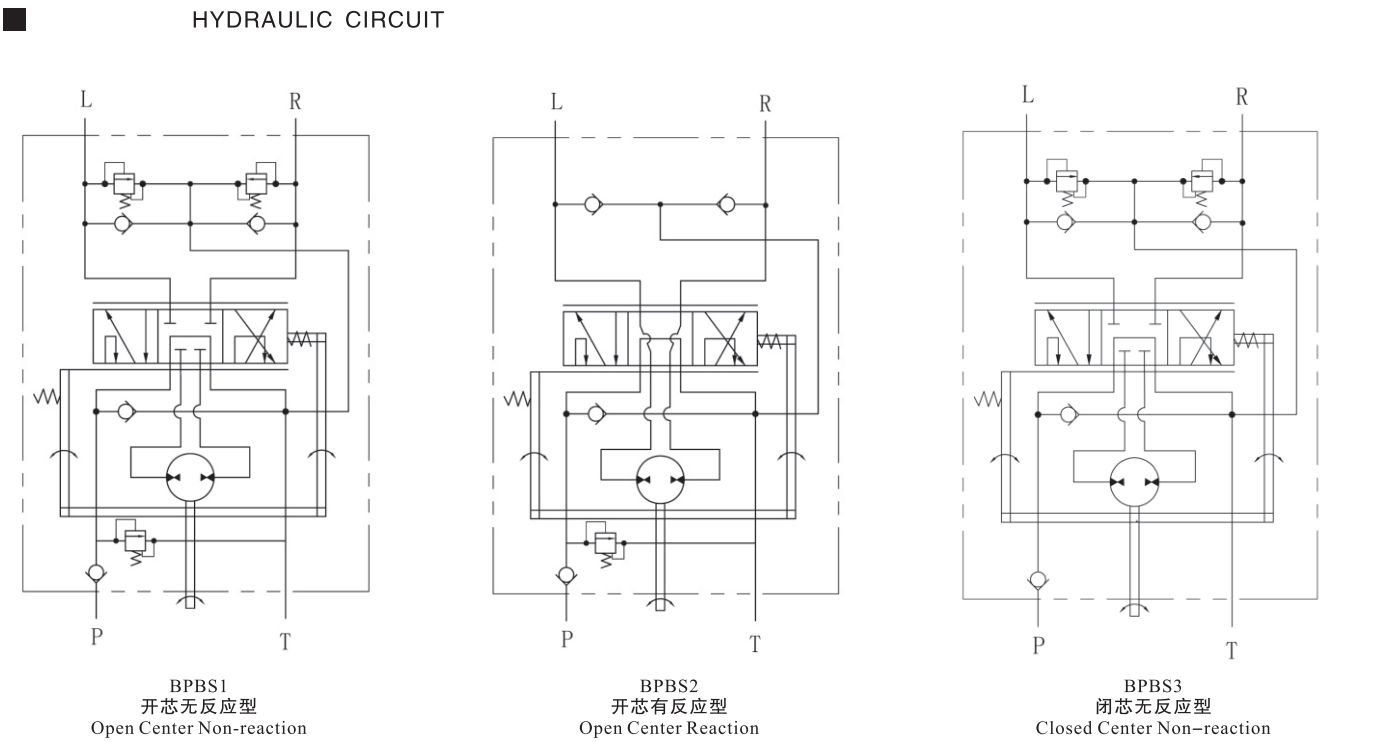
BPB型转向器，动态信号负荷传感、负载平衡型、管式优先阀连接型式；排量160mL/r；P、T、A、B油口螺纹为3/4-16UNF O-ring，转向柱安装螺纹3/8-16UNC，外表喷黑漆。

转向器编号：BPB5X-160-Y4-P

BPB 5X-160-Y4-P

- 外表喷漆 Painted (black)
- 油口 Ports: 3/4-16UNF O-ring
- 安装螺纹 Column Mounting Thread:3/8-16UNC
- 排量 Displacement: 160mL/r
- 动态信号负荷传感、负载平衡型
- Load Sensing Dynamic,Load Balance
- BPB 系列全液压转向器（不集成功能阀）
- BPB Series Hydraulic Steering Units
- (Without Integrated Valve)

BPBS1,BPBS2,BPBS3 series hydraulic steering units has similar dimension with BPB1,BPB2,BPB3with relief valve,suction valve,inlet check valve integrated,and different valves can be assembled freely,compact,more convenient,according to European and US standards.



MAIN SPECIFICATION DATA

性能参数 Parameters	型号 Type											
	BPBS1, BPBS2, BPBS3								BPBS1, BPBS3			
排量 Displacement	mL/r	50	63	80	100	125	160	200	250	280	315	400
公称流量① Rated Flow①	L/min	5	6	8	10	12.5	16	20	25	28	31.5	40
最大入口压力 Max.Input Pressure	MPa	17.5										
T口最大连续背压 Max.Cont.Pressure in Line T	MPa	2.5										
安全阀压力设定值 Relief Valve Pressure Settings	MPa	6, 8, 10, 12, 14, 16, 17.5										
过载阀压力设定值 Shock Valves Pressure Settings	MPa	12, 14, 16, 18, 20, 22, 23.5										
动力转向扭矩 Power Steering Torque	N.m	1.6 ~ 2.4										
最大输入扭矩 Max.Manual Steering Torque	N.m	130										
长度 Dimension	L mm	130	132	133	136	139	144	149	155	160	165	175
重量 Weight	kg	5.8	5.9	6	6.1	6.2	6.4	6.5	6.7	7	7.2	7.4

注①:公称流量为转速100rpm时转向器所需流量。
Note①:Rated flow for steering wheel that rotates at 100rpm.

DIMENSION AND MOUNTING DATA

BPBS1
BPBS2
BPBS3

PORTS THREAD

代 号 CODE	油口P,T,L,R螺纹 Ports P,T,L,R	转柱安装螺纹C Column Mounting C	安装螺纹V Valve Mounting V
Y	M20 × 1.5 Deep15mm	M10 × 1.5 Deep17mm	M12 Deep16mm
Y1	M22 × 1.5 Deep15mm	M10 × 1.5 Deep17mm	M12 Deep16mm
Y2	M18 × 1.5 Deep15mm	M10 × 1.5 Deep17mm	M12 Deep16mm
Y3	G1/2-14 Deep15mm	M10 × 1.5 Deep17mm	M12 Deep16mm
Y4	3/4-16UNF O-ring Deep15mm	3/8-16UNC Deep17mm	3/8-24UNF Deep16mm
Y5	M20 × 1.5 O-ring Deep15mm	M10 × 1.5 Deep17mm	M12 Deep16mm
Y6	M18 × 1.5 O-ring Deep15mm	M10 × 1.5 Deep17mm	M12 Deep16mm

ORDER CODE

BPBS	POS.1	POS.2	POS.3	POS.4	POS.5
		-		-	

POS.1	型式功能 Hydraulic Circuit Explanation	POS.2	排量 Displacement mL/r
1	开芯无反应型 Open Center Non-reaction	50, 63, 80, 100, 125, 160, 200, 250, 280, 315, 400	
2	开芯有反应型 Open Center Reaction		
3	闭芯无反应型 Closed Center Non-reaction		

POS.3	集成阀参数 Integrated Valve Paramete					
序号 Code	入口单向阀 Inlet Check Valve	安全阀 Relief Valve	过载阀 Shock valves	补油阀 Suction valves	安全阀设定压力 Relief Valve Pressure Settings (MPa)	过载阀设定压力 Shock valvesPressure Settings (MPa)
A	*	*	*	*	6,8,10,12, 14,15,16,17.5	—
B	*	*	*			—
C	*	*		*		—
F	*	*			—	—
D	*		*	*		20,22
E	*			*		—

注：序号A、B过载阀压力设定值高于安全阀压力6MPa；序号D为过载阀设定压力值，亦可按用户需求协议设定。
Note: CodeA,B shock valves pressure setting is 6 Mpa higher than relief valve; code D is the setting data of shock valve, it can be setting according to user' s requirement.

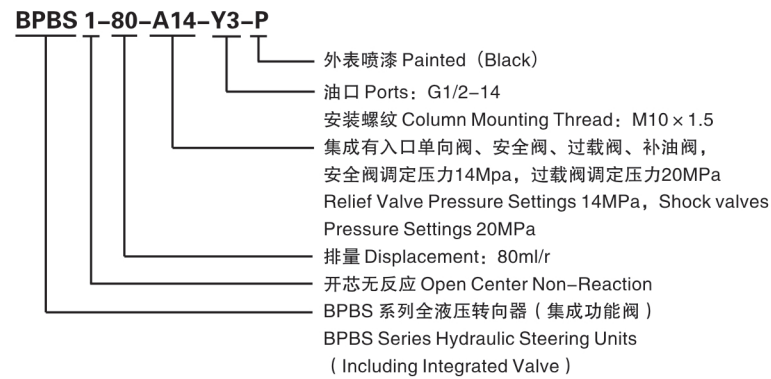
POS.4	油口 Ports	POS.5	外观喷漆 Paint
Y、Y1、Y2	JB/T7912-1999 (ISO 262)	省略Omit	不喷漆 No Paint
Y3	GB/T707-1987 (ISO228/1)	P	喷漆 (黑) Painted (Black)
Y4	ANSI B1.1-1982		

协议确定
Note： other code of ports can be according to the user demand protocol

应用举例1 For Example1:

BPBS系列转向器，开芯无反应；排量80ml/r；集成有入口单向阀、安全阀、过载阀、补油阀等功能阀，安全阀调定压力14MPa，过载阀调定压力20MPa；P、T、L、R油口螺纹为G1/2-14，转向柱安装螺纹M10×1.5；外表喷黑色油漆。

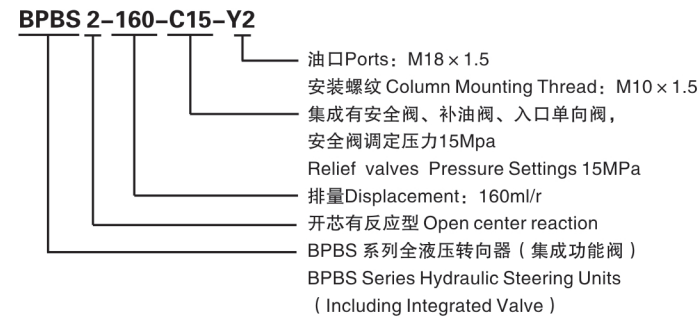
转向器编号为：BPBS1-80-A14-Y3-P



应用举例2 For Example2:

BPBS系列转向器，开芯有反应；排量160mL/r；集成有入口单向阀、安全阀、补油阀等功能阀，安全阀调定压力15MPa；P、T、L、R油口螺纹M18×1.5，转向柱安装螺纹M10×1.5；外表不喷漆。

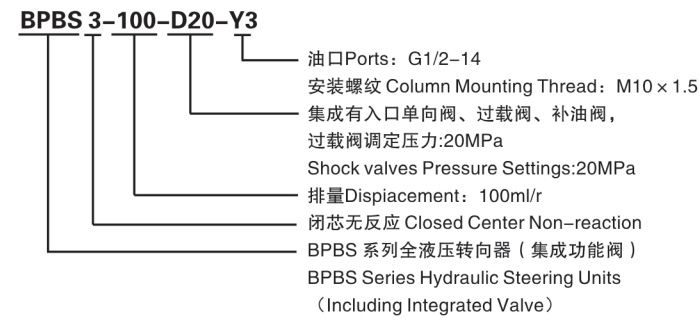
转向器编号为：BPBS2-160-C15-Y2



应用举例3 For Example3:

BPBS系列全液压转向器，闭芯无反应；排量100mL/r；集成有入口单向阀、过载阀、补油阀等功能阀，过载阀调定压力20MPa；P、T、L、R油口螺纹G1/2-14，转向柱安装螺纹M10×1.5；外表不喷漆。

转向器编号为：BPBS3-100-D20-Y3



BPBS5、BPBS5E、BPBS5L、BPBS5T、BPBS5TE负荷传感全型液压转向器是负荷传感转向系统中的重要组成元件，可与定量油泵、恒压变量油泵或负荷传感油泵（流量、压力联合补偿变量油泵）供油，组成不同的负荷传感液压转向系统。

BPBS5、BPBS5E、BPBS5L负荷传感型全液压转向器为板式优先阀连接形式，需与VLSA*型板式优先阀配套使用。

BPBS5T、BPBS5TE负荷传感型全液压转向器为管式优先阀连接形式，需与DYXL, YXL型管式优先阀配套使用。

BPBS5E、BPBS5TE负荷传感型全液压转向器带有EL电气控制油口，与转向器内部L或R油路相通，EL口连接电液继电器来实现对液压系统的电气控制。

BPBS5L负荷传感型全液压转向器带有LL电气控制油口，与转向器内部LS油路相通，LL口连接电液继电器来实现对液压系统的电气控制。

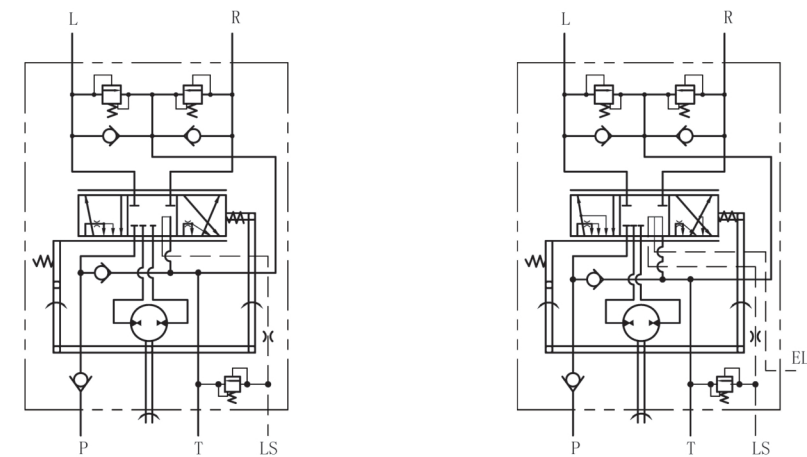
BPBS5,BPBS5E,BPBS5L,BPBS5T,BPBS5TE series load sensing hydraulic steering control units are an important element in the load sensing steering system.Together with fixed displacement pump, various displacement pump with constant pressure or load sensing pump (variable displacement pump with flow, pressure joint compensated) supplying oil, it can make up different loading sensing hydraulic steering systems. BPBS5、BPBS5E、BPBS5L series load sensing steering control units adopt modulary mounting type, which can be used with VLSA* type priority valve via modulary mounting.

BPBS5T、BPBS5TE series load sensing steering control units adopt pipe mounting type, which can be used with DYXL, YXL type priority valve.

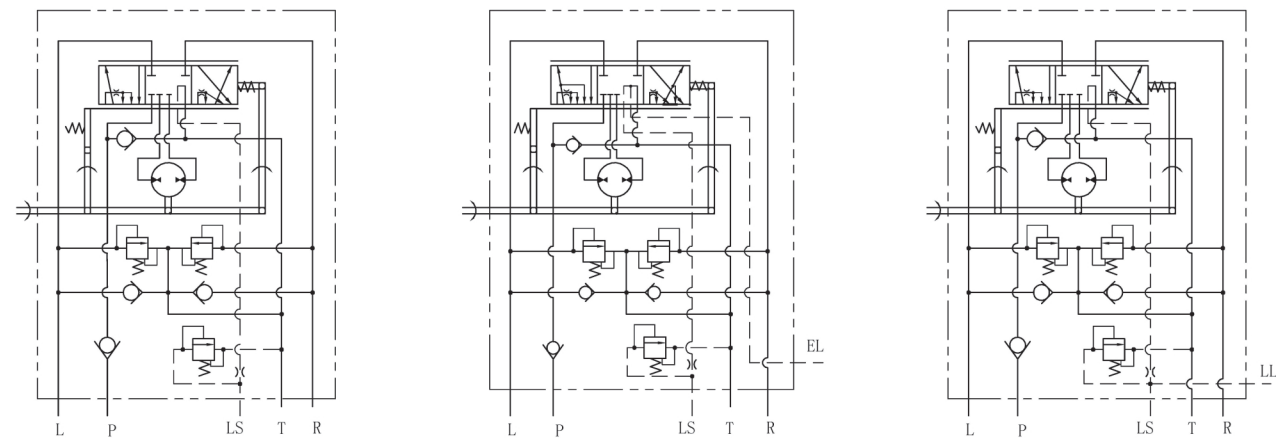
BPBS5E、BPBS5TE load sensing steering control units has EL electrical control port, and it is connected with L or R line. EL port is equipped with and electro-hydraulic relay to achieve hydraulic control system.

BPBS5L load sensing steering control units has LL electrical control port, and it is connected with LS line. LL port is equipped with and electro-hydraulic relay to achieve hydraulic control system.

■ 液压原理图 HYDRAULIC CIRCUIT



BPBS5T BPBS5TE
负荷传感型, 管式优先阀连接
Load Sensing Dynamic Non-reaction, Pipe Mounting



BPBS5 BPBS5E BPBS5L

PORTS THREAD

CODE	Ports P,T,L,R	Column Mounting C	Valve Mounting V	Port LS	Port LsⓈ
Y	M20×1.5 Deep15mm	M10×1.5 Deep17mm	M12 Deep16mm	M12×1.5 Deep12mm	M12×1.5 Deep12mm
Y1	M22×1.5 Deep15mm	M10×1.5 Deep17mm	M12 Deep16mm	M12×1.5 Deep12mm	M12×1.5 Deep12mm
Y2	M18×1.5 Deep15mm	M10×1.5 Deep17mm	M12 Deep16mm	M12×1.5 Deep12mm	M12×1.5 Deep12mm
Y3	G1/2–14 Deep15mm	M10×1.5 Deep17mm	M12 Deep16mm	G1/4–19 Deep12mm	M10×1 Deep12mm
Y4	3/4–16UNF O–ring Deep15mm	3/8–16UNC Deep17mm	3/8–24UNF Deep16mm	7/16–20UNF O–ring Deep12mm	7/16–20UNF O–ring Deep12mm
Y5	M20×1.5 O–ring Deep15mm	M10×1.5 Deep17mm	M12 Deep16mm	M12×1.5 O–ring Deep12mm	M12×1.5 O–ring Deep12mm
Y6	M18×1.5 O–ring Deep15mm	M10×1.5 Deep17mm	M12 Deep16mm	M12×1.5 O–ring Deep12mm	M12×1.5 O–ring Deep12mm
Y7①	φ18.5	M10×1.5 Deep17mm	M10×1.5 Deep16mm	–	M12×1.5 Deep12mm
Y70②	φ18.5	3/8–16UNC Deep17mm	M10×1.5 Deep16mm	–	7/16–20UNF O–ring Deep12mm

注①②: Y7、Y70油口仅适合BPBS5、BPBS5L、BPBS5E型转向器。
Note①②: Ports Y7, Y70 are only fit for BPBS5, BPBS5L, BPBS5E type hydraulic steering units.
注③: EL、LL油口仅适合BPBS5TE、BPBS5L、BPBS5E型转向器。
Note③: Ports EL, LL are only fit for BPBS5TE, BPBS5L, BPBS5E type hydraulic steering units.

ORDER CODE

	POS.1	POS.2	POS.3	POS.4	POS.5	POS.6
BPBS			-		-	

POS.1	型式功能 Hydraulic Circuit Explanation
5	负荷传感型、板式优先阀连接形式 Load Sensing Dynamic Non–reaction , Modularly Mounting Type Priority Valve Connection
5T	负荷传感型、管式优先阀连接形式 Load Sensing Dynamic Non–reaction , Pipe Mounting Type Priority Valve Connection

POS.2	电液控制信号连接形式 Electro–hydraulic Control Signal Connection
缺省Omit	不带电液控制信号Without Electro–hydraulic Control Signal
L	LL口连接LS口压力信号 LL port is connected with LS port pressure signal
E	EL口连接L或R口压力信号 EL port is connected with L or R port pressure signal

POS.3	排量 Displacement mL/r
	50, 63, 80, 100, 125, 160, 200, 250, 280, 315, 400

POS.4	集成阀参数 Integrated Valve Paramete					
Code	Inlet Check Valve	Relief Valve	Shock valves	Suction valves	Relief Valve Pressure Settings (MPa)	Shock valvesPressure Settings (MPa)
A	*	*	*	*		–
B	*	*	*			–
C	*	*		*	6,8,10,12,	–
F	*	*			14,15,16,17.5	–
D	*		*	*	–	20,22
E	*			*	–	–

注: 序号A, B过载阀压力设定值高于安全阀压力6MPa; 序号D为过载阀设定压力值, 亦可按用户需求协议设定。
Note: CodeA,B shock valves pressure setting is 6 MPa higher than relief valve; code D is the setting data of shock valve, it can be setting according to user's requirement.

POS.5	油口代码 Ports Code	POS.6	外观喷漆 Paint
	Y、Y1、Y2、Y3、Y4、Y5、Y6、Y7、Y70	缺省Omit	不喷漆 No Paint
		P	喷漆 (黑) Painted (Black)

POS.7	优先阀标识 Valve Code
缺省Omit	不自带优先阀 Without Priority Valve
VLSA	带VLSA型优先阀 With VLSA Type Priority Valve

应用举例1 For Example 1:

BPBS系列转向器, 负荷传感型, 管式优先阀连接; 排量125mL/r; 集成有入口单向阀、安全阀、过载阀、补油阀等功能阀, 安全阀调定压力12MPa, 过载阀调定压力18Mpa; P、T、L、R油口螺纹为G1/2–14, LS油口螺纹: G1/4–19, 转向柱安装螺纹M10×1.5。

转向器编号为: BPBS5T–125–A12–Y3

BPBS 5T–125–A12–Y3

油口 Ports P,T,L,R: G1/2–14, LS: G1/4–19
安装螺纹 Column Mounting : M10×1.5
集成有入口单向阀、安全阀、过载阀、补油阀, 安全阀调定压力12MPa, 过载阀调定压力:18MPa
Relief Valve Pressure Settings:12MPa, Shock valves Pressure Settings:18MPa
排量 Displacement : 125mL/r
负荷传感型, 管式优先阀连接
Load Sensing, Pipe Mounting
BPBS 系列全液压转向器 (集成功能阀)
BPBS Series Hydraulic Steering Units (Including Integrated Valve)

应用举例2 For Example 2:

BPBS系列转向器, 负荷传感型, 板式优先阀连接; 排量: 80mL/r; 集成有入口单向阀、安全阀、过载阀、补油阀等功能阀, 安全阀调定压力9MPa, 过载阀调定压力15MPa; P、T、L、R油口为 φ18.5, 转向柱安装螺纹M10×1.5; 外表喷黑色油漆; 自带VLSA型优先阀。

转向器编号为: BPBS5–80–A9–Y7–P–VLSA

BPBS 5–80–A9–Y7–P–VLSA

带VLSA型优先阀 With VLSA Type Priority Valve
外表喷漆 Painted (Black)
油口Ports P, T, L, R : φ18.5
安装螺纹 Column Mounting : M10×1.5
集成有入口单向阀、安全阀、过载阀、补油阀, 安全阀调定压力:9MPa, 过载阀调定压力:15MPa
Relief Valve Pressure Settings:9MPa, Shock valves Pressure Settings:15MPa
排量 Displacement:80mL/r
负荷传感型, 板式优先阀连接
Load Sensing , Modularly Mounting
BPBS 系列全液压转向器 (集成功能阀)
BPBS Series Hydraulic Steering Units (Including Integrated Valve)

应用举例3 For Example 3:

BPBS系列转向器, 负荷传感型, 板式优先阀连接,带LL电液控制信号口; 排量: 63mL/r; 集成有入口单向阀、安全阀、过载阀、补油阀等功能阀, 安全阀调定压力9MPa, 过载阀调定压力15MPa; P、T、L、R油口为 φ18.5, 转向柱安装螺纹M10×1.5; LL 油口螺纹:M12×1.5, 外表喷黑色油漆; 自带VLSA型优先阀。

转向器编号为: BPBS5L–63–A9–Y7–P–VLSA

BPBS 5L–63–A9–Y7–P–VLSA

带VLSA型优先阀 With VLSA Type Priority Valve
外表喷漆 Painted (Black)
油口Ports P, T, L, R : φ18.5,Port LL:M12×1.5,
安装螺纹 Column Mounting : M10×1.5
集成有入口单向阀、安全阀、过载阀、补油阀, 安全阀调定压力:9MPa, 过载阀调定压力:15MPa
Relief Valve Pressure Settings:9MPa, Shock valves Pressure Settings:15MPa
排量 Displacement:63mL/r
负荷传感型, 板式优先阀连接, 带LL电液控制口
Load Sensing , Modularly Mounting
Electro–hydraulic Control Port LL
BPBS 系列全液压转向器 (集成功能阀)
BPBS Series Hydraulic Steering Units (Including Integrated Valve)

应用举例4 For Example 4:

BPBS系列转向器, 负荷传感型, 管式优先阀连接, 带EL电液控制信号口; 排量100mL/r; 集成有入口单向阀、安全阀、过载阀、补油阀等功能阀, 安全阀调定压力10MPa, 过载阀调定压力16Mpa; P、T、L、R油口螺纹为G1/2–14, LS油口螺纹: G1/4–19, EL油口螺纹M10×1, 转向柱安装螺纹M10×1.5; 外表喷黑色油漆。

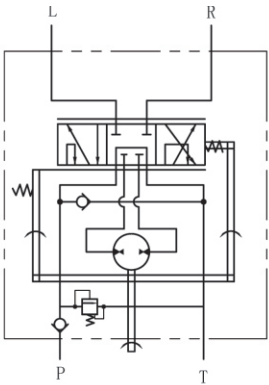
转向器编号为: BPBS5TE–100–A10–Y3–P

BPBS 5TE–100–A10–Y3–P

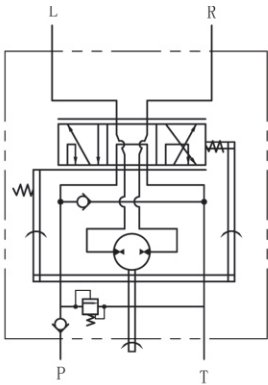
外表喷漆 Painted (Black)
油口 Ports P,T,L,R:G1/2–14,LS:G1/4–19, EL:M10×1,安装螺纹Column Mounting:M10×1.5
集成有入口单向阀、安全阀、过载阀、补油阀, 安全阀调定压力10MPa, 过载阀调定压力:16MPa
Relief Valve Pressure Settings:10MPa, Shock valves Pressure Settings:16MPa,
排量 Displacement : 100mL/r
负荷传感型,管式优先阀连接,带EL电液控制口
Load Sensing , Pipe Mounting , with Electro–hydraulic Control Port EL
BPBS 系列全液压转向器 (集成功能阀)
BPBS Series Hydraulic Steering Units (Including Integrated Valve)

BSR1、BSR2、BSR3、BSR5 Hydraulic steering control units(SCU)with relief valve and inlet check valve inside,compact,suitable for narrow space,light control,flexible,reliable.Widely apply to low speed vehicles,E.g.construction machine,forklift,agricultural machine etc.According to European and US standard.

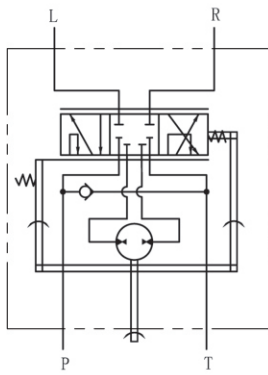
HYDRAULIC CIRCUIT



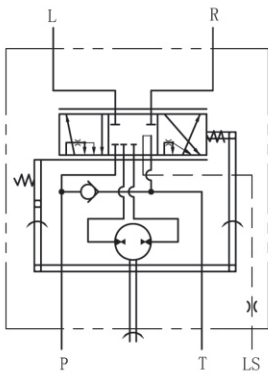
BSR1
开芯无反应型
Open Center Non-reaction



BSR2
开芯有反应型
Open Center Reaction



BSR3
闭芯无反应型
Closed Center Non-reaction



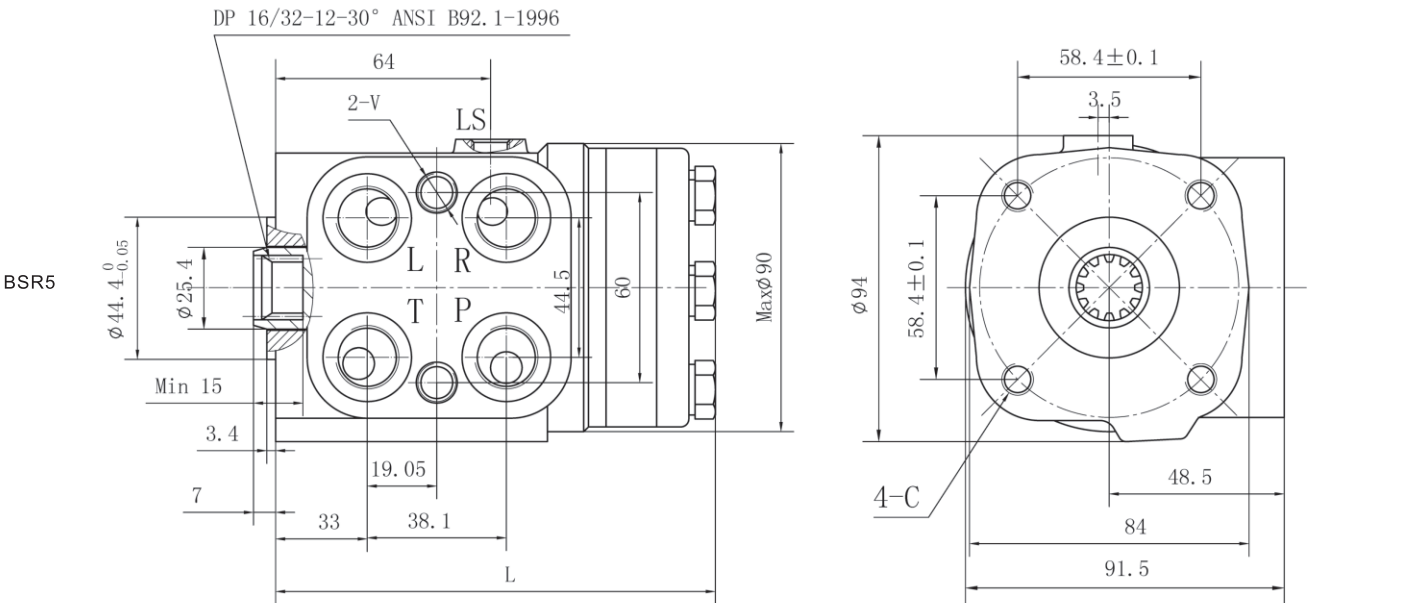
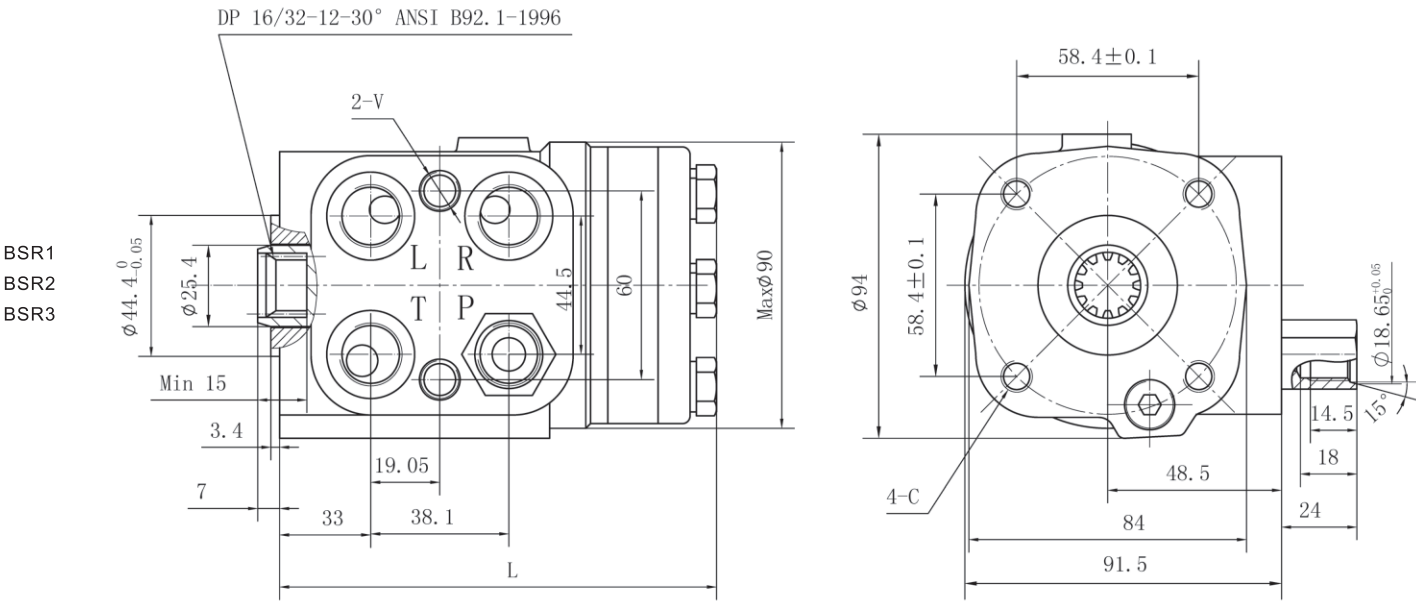
BSR5
负荷传感型
Load Sensing Dynamic Non-reaction

MAIN SPECIFICATION DATA

Parameters		型号 Type											
		BSR1,BSR2,BSR3,BSR5								BSR1,BSR3,BSR5			
排量 Displacement	mL/r	50	63	80	100	125	160	200	250	280	315	400	
公称流量① Rated Flow①	L/min	5	6	8	10	12.5	16	20	25	28	31.5	40	
最大入口压力 Max.Input Pressure	MPa	17.5											
T口最大连续背压 Max.Cont.Pressure in Line T	MPa	2.5											
安全阀压力设定值 Relief Valve Pressure Settings	MPa	6, 8, 10, 12, 14, 16, 17.5											
动力转向扭矩 Power Steering Torque	N.m	1.6~2.4											
最大输入扭矩 Max.Manual Steering Torque	N.m	130											
长度 Dimension	L	mm	127	129	130	133	136	141	146	152	157	162	172
重量 Weight		kg	5.1	5.2	5.3	5.4	5.5	5.7	5.8	6	6.3	6.5	6.7

注①:公称流量为转速100rpm时转向器所需流量。
Note①:Rated flow for steering wheel that rotates at 100rpm.

DIMENSION AND MOUNTING DATA



PORTS THREAD

CODE	Ports P,T,L,R	Column Mounting C	Valve Mounting V	① Port LS①
Y4	3/4-16UNF O-ring Deep15mm	3/8-16UNC Deep17mm	3/8-24UNF Deep16mm	7/16-20UNF O-ring Deep12mm
Y8	G1/2-19 O-ring Deep15mm	M10×1.25 Deep17mm	M10×1.5 Deep16mm	G1/4-19 O-ring Deep12mm
Y9	G3/8-19 O-ring Deep15mm	M10×1.25 Deep17mm	M10×1.5 Deep16mm	G1/4-19 O-ring Deep12mm

Note① : Port LS is only fit for BSR5 type hydraulic steering unit.

■ 型号说明 ORDER CODE

	POS.1		POS.2		POS.3		POS.4		POS.5		POS.6
BSR		-		-		-		-		-	

POS.1	型式功能 Hydraulic Circuit Explanation
1	开芯无反应型 Open Center Non-reaction
2	开芯有反应型 Open Center Reaction
3	闭芯有反应型 Closed Center Non-reaction
5	负荷传感型、管式优先阀连接形式 Load Sensing Dynamic Non-reaction , Pipe Mounting Type Priority Valve Connection

POS.2	排量 Displacement mL/r	POS.3	油口代码 Ports
	50, 63, 80, 100, 125, 160, 200, 250, 280, 315, 400		Y4, Y8, Y9

注：其它油口螺纹及安装连接方式可按用户需求协议确定
Note : other code of ports can be according to the user demand protocol

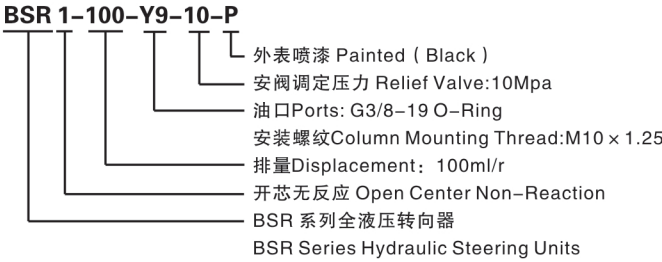
POS.4	安全阀设定压力 Relief Valve Pressure Setting (MPa)
	6、8、10、12、14、16

POS.5	P口单向阀 Inlet Check Valve	POS.6	外观喷漆 Paint
省略Omit	不带 Without	省略Omit	不喷漆 No Paint
C	带 With	P	喷漆（黑）Painted（Black）

应用举例1 For Example1:

BSR系列转向器，开芯无反应，排量100mL/r；
P、T、L、R油口螺纹为G3/8-19 O-Ring，转向柱安装螺纹M10×1.25，安全阀调定压力10MPa；不带P口单向阀；喷黑漆。

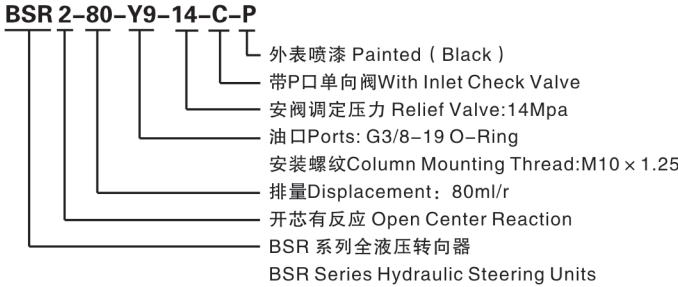
转向器编号为：BSR1-100-Y9-10-P



应用举例2 For Example2:

BSR系列转向器，开芯有反应，排量80mL/r；
P、T、L、R油口螺纹为G3/8-19 O-Ring，转向柱安装螺纹M10×1.25，安全阀调定压力14MPa；带P口单向阀；喷黑漆。

转向器编号为：BSR2-80-Y9-14-C-P

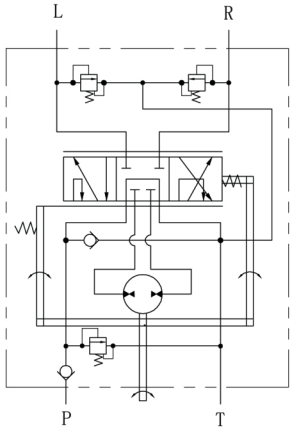


BSM系列是一款小巧轻便的微型液压转向器，适用于小型拖拉机，割草机，叉车，市政车辆，园艺设备等轻型车辆。可以根据用户的不同需求，集成包括：安全阀，过载阀，入口单向阀等不同的功能阀。

BSM1开芯无反应型和BSM5动态信号负荷传感型两种不同的功能型式的液压转向器可选择。

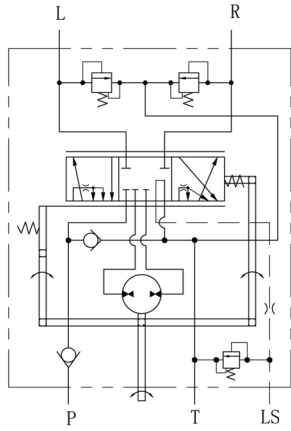
- 优点特性：
- 可集成转向柱单元
 - 便于安装
 - 体积小，重量轻
 - 低转向扭矩
 - 低噪声水平
 - 低压降

■ 液压原理图 HYDRAULIC CIRCUIT



BSM1

开芯无反应型
Open Center Non-reaction



BSM5

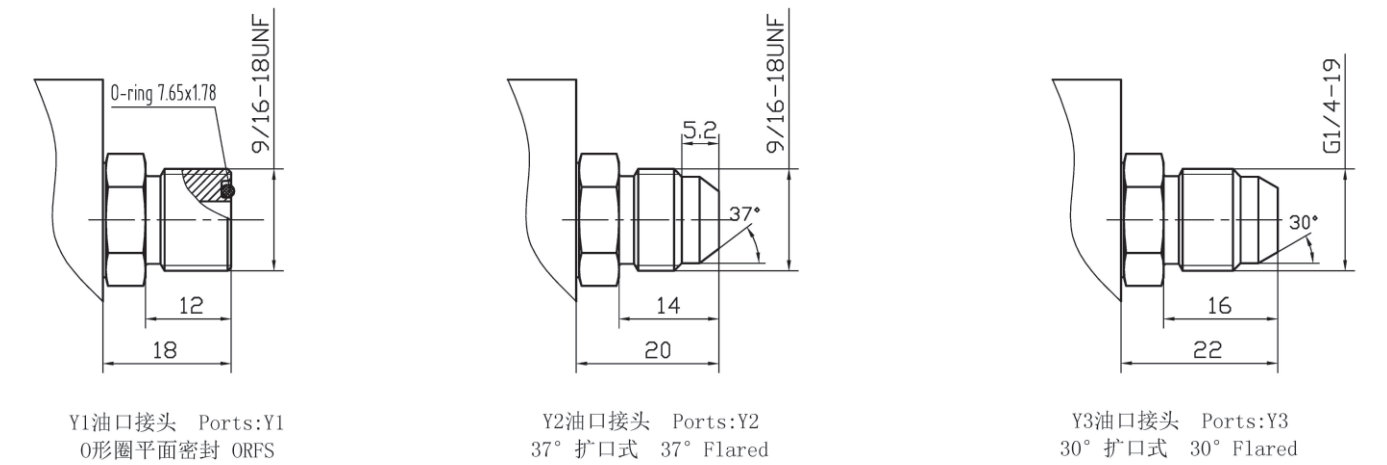
负荷传感型, 管式优先阀连接
Load Sensing Dynamic Non-reaction

■ 主要性能参数 MAIN SPECIFICATION DATA

性能参数 Parameters		型号 Type						
		BSM1,BSM5						
排量 Displacement	mL/r	32	40	50	63	80	100	
推荐流量 (仅BSM1) Recommended flow (only for BSM1)	L/min	3-9	4-12	5-15	6-18	7-20	7-20	
公称流量 (仅BSM5) ^① Rated Flow (only for BSM5) ^①	L/min	3	4	5	6	8	10	
最大入口压力 Max.Input Pressure	MPa	14						
T口最大连续背压 Max.Cont.Pressure in Line T	MPa	2						
安全阀压力设定值 Relief Valve Pressure Settings	MPa	6, 7, 8, 9, 10, 12.5						
过载阀压力设定值 Shock valves Pressure Settings	MPa	12, 13, 14, 15, 16, 18.5						
动力转向扭矩 Power Steering Torque	N.m	≤1.8						
最大输入扭矩 Max.Manual Steering Torque	N.m	80						
长度 Dimension	L	mm	92.5	96	100.5	105.5	113	121.5
重量 Weight	kg	2.7	2.8	2.9	3	3.1	3.2	

注①:公称流量为转速100rpm时转向器所需流量。
Note①:Rated flow for steering wheel that rotates at 100rpm.

OIL PORTS



ORDER CODE

	POS.1		POS.2		POS.3		POS.4		POS.5		POS.6
BSM		-		-		-		-		-	

POS.1	型式功能 Hydraulic Circuit Explanation	POS.2	排量 Displacement mL/r
1	开芯无反应型 Open Center Non-reaction	32, 40, 50, 63, 80, 100	
5	负荷传感型 Load Sensing Dynamic Non-reaction		

POS.3	集成阀参数 Integrated Valve Paramete				
序号 Code	入口单向阀 Inlet Check Valve	安全阀 Relief Valve	过载阀 Shock valves	安全阀设定压力 Relief Valve Pressure Settings (MPa)	过载阀设定压力 Shock valvesPressure Settings (MPa)
B	*	*	*	6, 7, 8, 9, 10, 12.5	—
F	*	*			—
K		*			—
省略Omit	不集成功能阀 Without Integrated Valve			—	—

注：序号B过载阀压力设定值高于安全阀压力6MPa。
Note: CodeB shock valves pressure setting is 6 Mpa higher than relief valve.

POS.4	输入轴连接形式 Input shaft options	POS.5	油口接头 Oil Ports
K1	半圆键 Tapered 1:20, key 5x6,5 DIN 6888	Y1	9/16-18UNF (O形圈平面密封 ORFS) ISO 8434-3
K2	三角花键 Tapered 1:12, serrations 11/16in-40	Y2	9/16-18UNF (37° 扩口式 37° Flared) SAE J514
K3	渐开线花键 Splined B17x14 DIN 5482	Y3	G1/4-19 (30° 扩口式 30° Flared) JIS B3863

POS.5	外观喷漆 Paint
省略Omit	不喷漆 No Paint
P	喷漆 (黑) Painted (Black)

注：其它油口连接方式可按用户需求协议确定
Note：other code of ports can be according to the user demand protocol

应用举例1 For Example1:

BSM系列液压转向器，开芯无反应；排量50mL/r；集成有入口单向阀、安全阀、过载阀、功能阀，安全阀调定压力8MPa，过载阀调定压力14MPa；K1型输入轴连接形式；P、T、L、R油口接头螺纹为9/16-18UNF(37° 扩口式)；外表喷黑漆。

转向器编号：BSM1-50-B8-K1-Y2-P

应用举例2 For Example2:

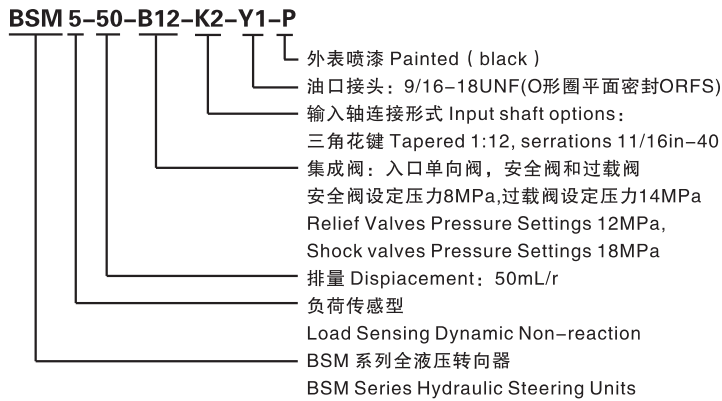
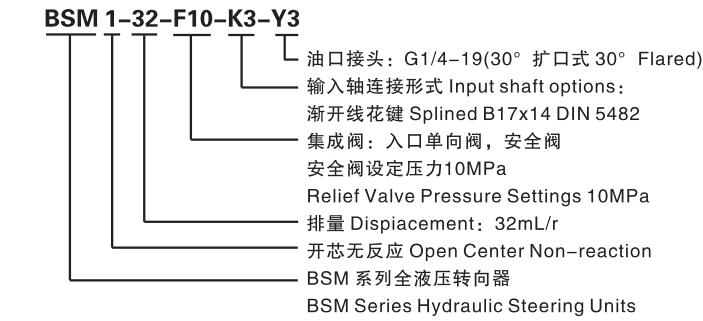
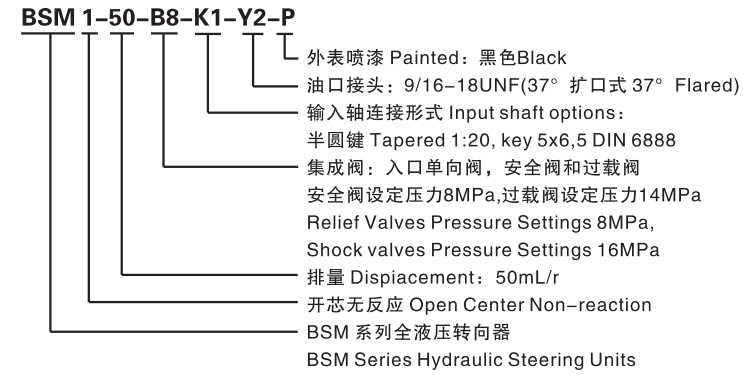
BSM型转向器，开芯无反应；排量32mL/r；集成有入口单向阀、安全阀等功能阀，安全阀调定压力8MPa；K3型输入轴连接形式,转向柱安装螺纹M6；P、T、L、R油口接头螺纹为G1/4-19(30° 扩口式)；外表不喷漆。

转向器编号：BSM1-32-F10-K3-Y3

应用举例3 For Example3:

BSM型转向器，负荷传感型；排量50mL/r；集成有入口单向阀、安全阀、过载阀、功能阀，安全阀调定压力12MPa，过载阀调定压力18MPa；K2型输入轴连接形式；P、T、L、R、LS(E)油口接头螺纹为9/16-18UNF (O形圈平面密封)；外表喷黑漆。

转向器编号：BSM5-50-B12-K2-Y1-P



的液压转向系统。

BQAS1 is a new series of an “Open Center Non-reaction” hydraulic steering unit with an increased flow built-in. It has an unique servo-amplified mode and can realize amplifying factor with 1:1.3, 1:1.5, 1:2, 1:2.5. The displacement-with servo-amplifying won’t be affected by the rotation speed of the hydraulic steering unit wheel.

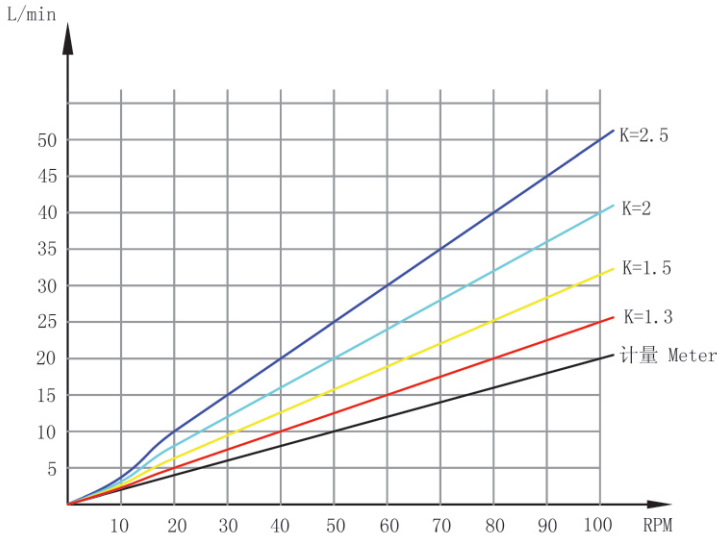
For power steering mode, it has the total flow amplifying function with the displacements from 100 ml/r to 500 ml/r. But for manual steering mode, it has emergency operation function with the displacements from 80 ml/r to 200 ml/r (without servo-amplifying) .

BQAS1 hydraulic steering unit has the advantages of compact size, stability steering performance and emergency manual steering with small displacements. It is widely used for the hydraulic steering system of tractors, combine-harvester, wheel loaders and other wheeled vehicles.

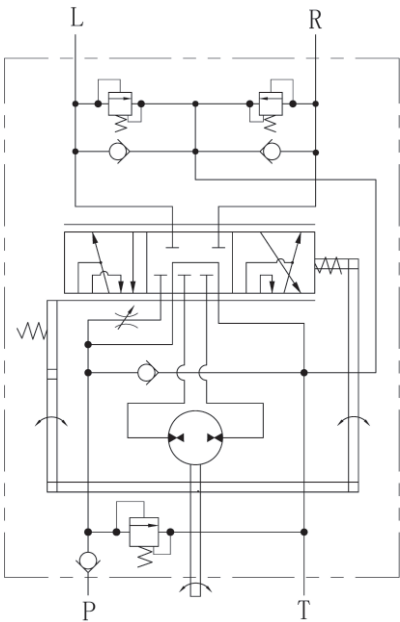
放大特性曲线 Amplification Characteristic Curve

以BQAS1-200/*型液压转向器为例，在不同的放大倍数（K=1.3、K=1.5、K=2、K=2.5）时的放大特性曲线：

AS BQAS1-200/*Type for example, Amplification characteristic Curve under Variable Amplifying Factor (K=1.3, K=1.5, K=2, K=2.5) :



HYDRAULIC CIRCUIT



开芯无反应型
Open Center Non-reaction

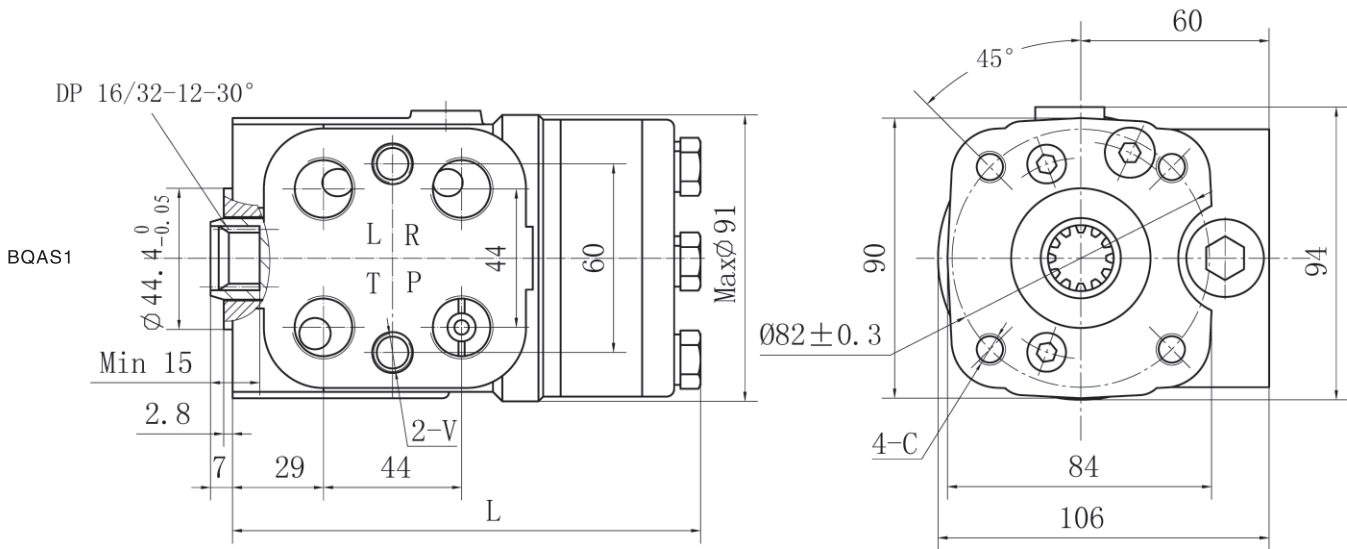
主要性能参数 MAIN SPECIFICATION DATA

Parameters			型号 Type																			
			BQAS1																			
计量排量 Displacement-without servo-amplifying mL/r			80				100				125				160				200			
当量排量 Displacement-with servo-amplifying mL/r			100	125	160	200	125	160	200	250	160	200	250	315	200	250	315	400	250	315	400	500
放大倍数① Amplifying Factor①			1.3	1.5	2.0	2.5	1.3	1.5	2.0	2.5	1.3	1.5	2.0	2.5	1.3	1.5	2.0	2.5	1.3	1.5	2.0	2.5
公称流量② Rated Flow②																						

注①:在转速超过 20 rpm时;
Note①:at shaft revolution over 20 rpm;

注②:公称流量为转速100rpm时转向器所需流量;
Note②:Rated flow for steering wheel that rotates at 100 rpm.

DIMENSION AND MOUNTING DATA



PORTS THREAD

CODE	Ports P,T,L,R	Column Mounting C	Valve Mounting V
Y	M20×1.5 Deep15mm	M10×1.5 Deep17mm	M12 Deep16mm
Y1	M22×1.5 Deep15mm	M10×1.5 Deep17mm	M12 Deep16mm
Y2	M18×1.5 Deep15mm	M10×1.5 Deep17mm	M12 Deep16mm
Y3	G1/2–14 Deep15mm	M10×1.5 Deep17mm	M12 Deep16mm
Y4	3/4–16UNF O–ring Deep15mm	3/8–16UNC Deep17mm	3/8–24UNF Deep16mm
Y5	M20×1.5 O–ring Deep15mm	M10×1.5 Deep17mm	M12 Deep16mm
Y6	M18×1.5 O–ring Deep15mm	M10×1.5 Deep17mm	M12 Deep16mm

ORDER CODE

	POS.1		POS.2		POS.3		POS.4		POS.5		POS.6
BQAS		-		/		-		-		-	

POS.1	型式功能 Hydraulic Circuit Explanation
1	开芯无反应，流量伺服放大型 Open center Non–reaction, Servo–amplifying

POS.2/POS.3	计量排量/当量排量 Displacement –without servo–amplifying/Displacement –with servo–amplifying （mL/r）				
计量排量 Displacement–without servo–amplifying mL/r	80 100 125 160 200				
当量排量 Displacement–with servo–amplifying mL/r (放大倍数Amplifying Factor)	100 125 160 200 (1.3)(1.5)(2.0)(2.5)	125 160 200 250 (1.3)(1.5)(2.0)(2.5)	160 200 250 315 (1.3)(1.5)(2.0)(2.5)	200 250 315 400 (1.3)(1.5)(2.0)(2.5)	250 315 400 500 (1.3)(1.5)(2.0)(2.5)

POS . 4	集成阀参数 Integrated Valve Parameter					
序号 Code	入口单向阀 Inlet Check Valve	安全阀 Relief Valve	过载阀 Shock valves	补油阀 Suction valves	安全阀设定压力 Relief Valve Pressure Settings （MPa）	过载阀设定压力 Shock valves Pressure Settings （MPa）
A	*	*	*	*	6,8,10,12,14,15,16,17.5	—
B	*	*	*			
C	*	*		*		
F	*	*				
D	*		*	*	—	20,22
E	*			*	—	—
省略Omit	不集成功能阀 Without Integrated Valve					

注：序号A, B过载阀压力设定值高于安全阀压力6MPa；序号D为过载阀设定压力值，亦可按用户需求协议设定。
Note: CodeA,B shock valves pressure setting is 6 Mpa higher than relief valve; code D is the setting data of shock valve, it can be setting according to user' s requirement.

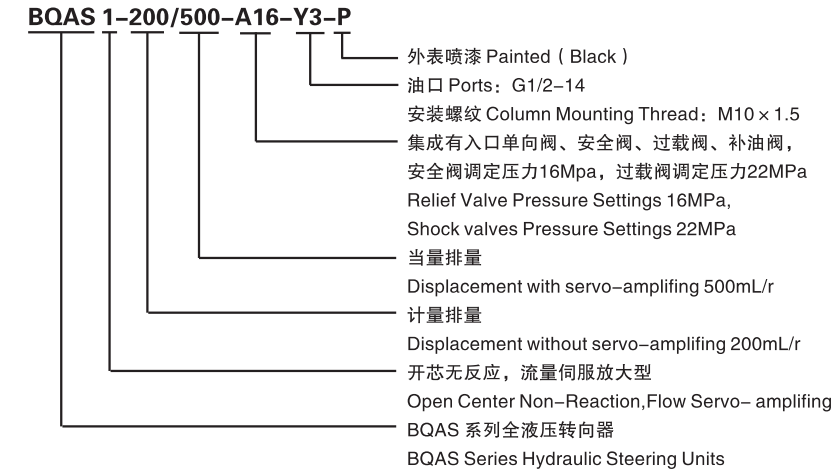
POS.5	油 口 Ports	POS.6	外观喷漆 Paint
Y、Y1、Y2	JB/T7912–1999（ISO 262）	缺省Omit	不喷漆 No Paint
Y3	GB/T707–1987（ISO228/1）	P	喷漆（黑）Painted（Black）
Y4	ANSI B1.1–1982		

注：其它油口连接方式可按用户需求协议确定
Note: other code of ports can be according to the user demand protocol

应用举例 For Example:

BQAS系列液压转向器，开芯无反应，流量伺服放大型；计量排量200ml/r,当量排量500ml/r；集成有入口单向阀、安全阀、过载阀、补油阀等功能阀，安全阀调定压力16MPa，过载阀调定压力22MPa；P、T、L、R油口螺纹为G1/2–14，转向柱安装螺纹M10×1.5；外表喷黑色油漆。

转向器编号为：BQAS1–200/500–A16–Y3–P



BHA5、BHAS5型是一种具有同轴流量放大功能的负荷传感型全液压转向器，与定量泵（或恒压变量泵、负荷传感油泵）、优先阀等组成流量放大负荷传感液压转向系统。广泛应用于各种大、中型装载机、拖拉机、叉车矿用汽车以及船舶等机械的液压转向系统。

BHA5型需和VB组合阀块配套使用。可以代替同等排量的BHR5、BPB5型液压转向器。
BHAS5型可集成包括：过载阀、补油阀、入口单向阀等功能阀。可以代替同等排量的BPBS5T型液压转向器。
分为动态信号和静态信号两种功能型式，其分别与动态信号和静态信号的(D)YXL型优先阀配套使用。

- 特点：
- 优良流量放大特性原理：快速转向时，实现放大功能的当量排量；低速转向时，保持转定子副的计量排量；
 - 特殊的转阀结构设计：实现大排量下转向灵敏可靠，具有较小的压力损失和较低的液压噪音；
 - 使用负荷传感原理设计：具有转向性能稳定、系统能耗小、启动特性良好等优点。

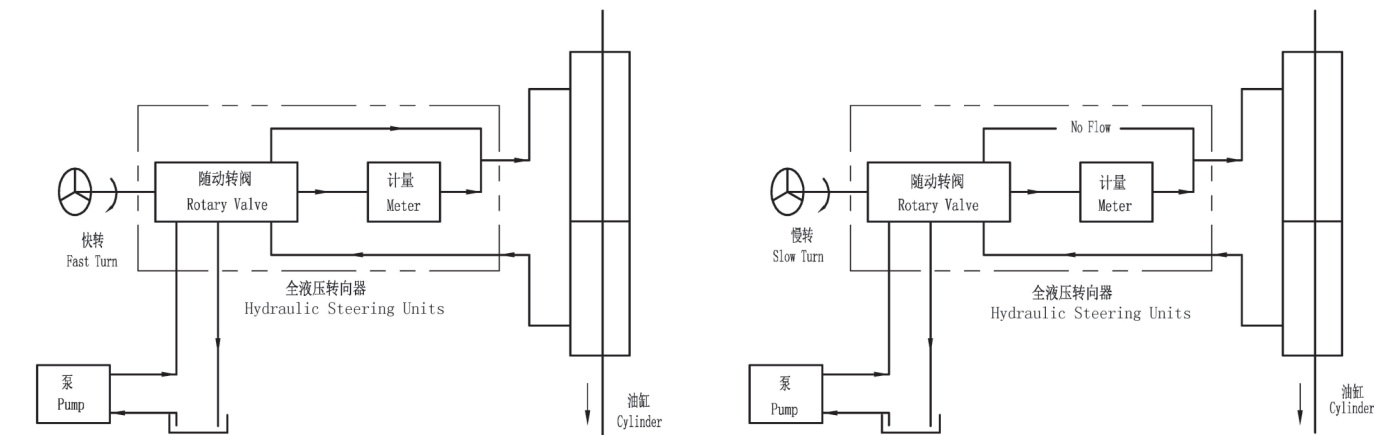
BHA5, BHAS5 type coaxial flow amplifying steering units is a load sensing steering control unit with coaxial flow amplifying ability. But it needs to be used together with fixed displacement pump(or fix pressure variable pump, load sensing pump), priority valves to be the flow amplifying steering system. It could be widely used in the steering systems of large and medium loaders, tractors, mining vehicles and shipping machines, etc.

BHA5 type needs to be used together with VB valve block, and it can replace the BHR5 or BPB5 type steering control units with the same displacement.

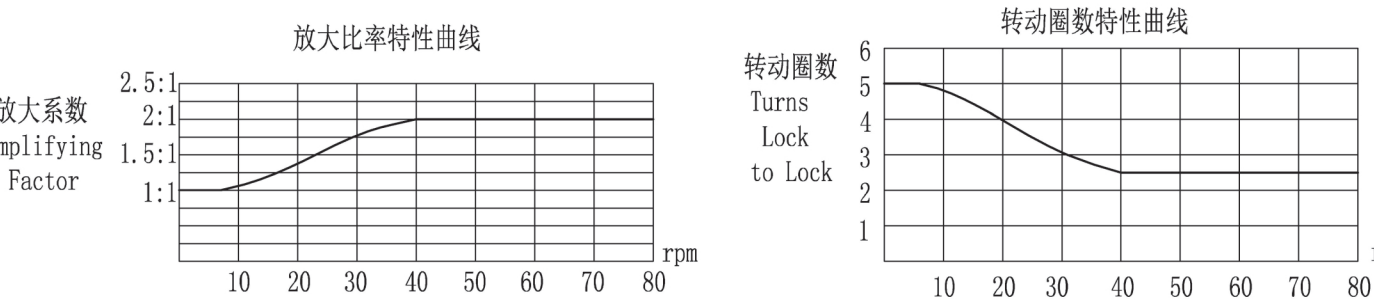
BHAS5 type could be built in shock valve, suction valve, inlet check valve and other functional valves. It can replace the BPBS5T type of steering control units with the same displacement.

It is divided into two function types: dynamic signal and static signal, which are respectively used with dynamic and static signal (D)YXL type priority valves.

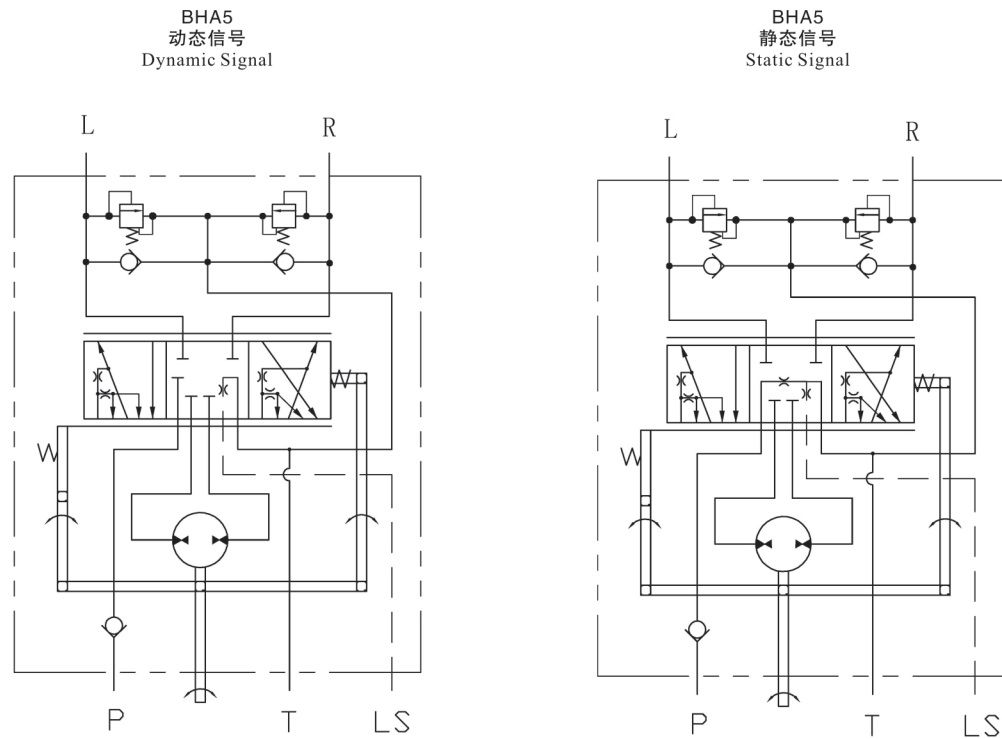
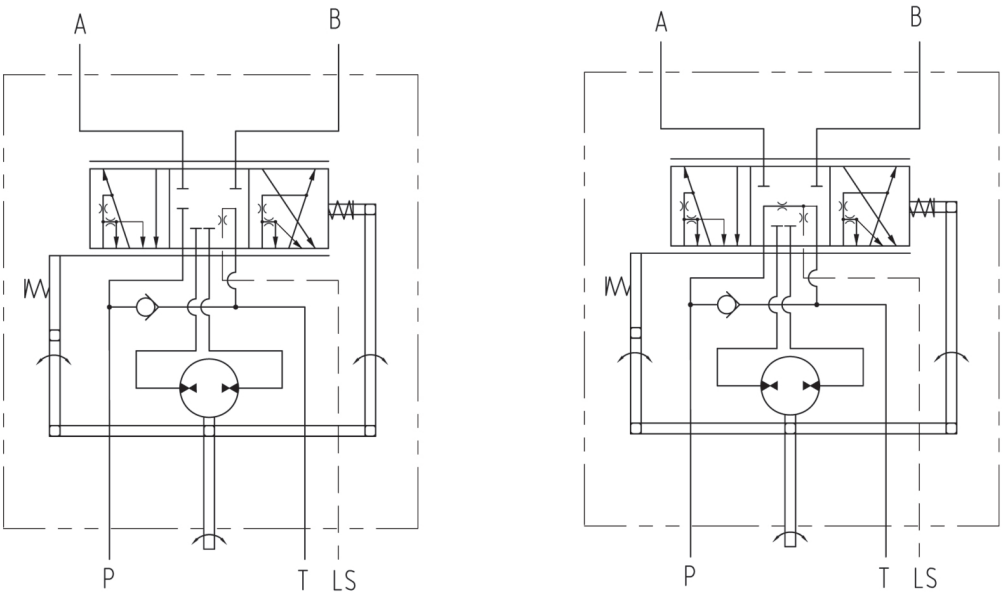
- Features:
- Excellent flow amplification principle: when turning quickly, the equivalent displacement of amplification function is realized. When turning at low speed, the steering unit's metering displacement is maintained. That means quicker response and better control on turning speed.
 - Special design of rotary valve: under large displacement, it can turn sensitively and reliably. It has less pressure loss and lower hydraulic noise.
 - Principle design of load sensing: steering stability, low power consumption, and good start-up performance.



特性曲线 FUNCTION DIAGRAMS



液压原理图 HYDRAULIC CIRCUIT



BHAS5-D 动态信号信号负荷传感 Load Sensing Dynamic Non-reaction
BHAS5-S 静态信号信号负荷传感 Load Sensing Signal Non-reaction

	POS.1		POS.2		POS.3		POS.4		POS.5		POS.6
BHAS5	*	-	*	-	*	-	*	-	*	-	*

POS.1	型式功能 Hydraulic Circuit Explanation
5	同轴流量放大负荷传感器型、管式优先阀连接 Flow Amplifying of Load sensing , Pipe Mounting Type Priority Valve Connection

POS.2	控制信号形式 Control Signal Type	POS.3	当量排量 Effective Displacement mL/r
D	动态信号 Dynamic Signal	500, 630, 800, 1000	
S	静态信号 Static Signal		

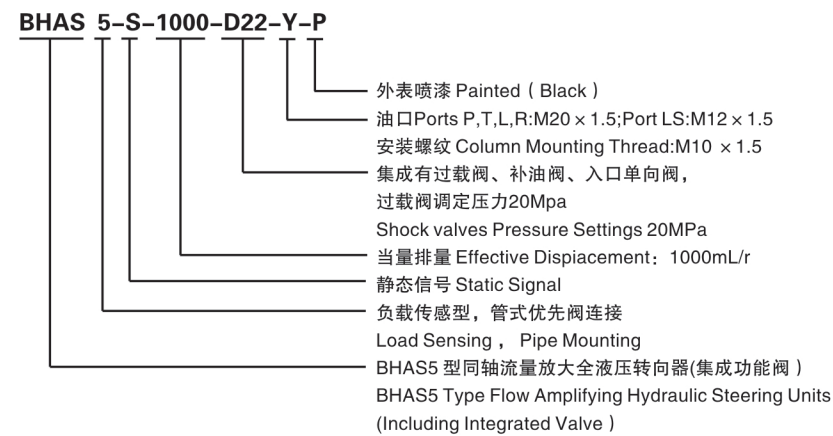
POS.4		集成阀代码及设定压力 Integrated Valve Code and Pressure Settings			
集成阀代码 Integrated Valve Code				集成阀设定压力 Integrated Valve Pressure Settings	
代码 Code	入口单向阀 Inlet Check Valve	过载阀 Shock valves	补油阀 Suction valves	过载阀设定压力 Shock valves Pressure Settings (MPa)	
D	*	*	*	20, 22, 23.5	
H		*	*	20, 22, 23.5	
省略Omit	不集成功能阀 Without Integrated Valve			-	
注：过载阀设定压力值可按用户需求协议设定。 Note:the setting data of shock valve can be setting according to user’ s requirement.					

POS.5	油口代码 Ports	POS.6	外观喷漆 Paint
Y、Y1、Y2、Y3、Y4、Y5、Y6		省略Omit	不喷漆 No Paint
注：其它油口连接方式可按用户需求协议确定 Note：other code of ports can be according to the user demand protocol		P	喷漆（黑） Painted（Black）

应用举例 For Example:

BHAS5型同轴流量放大全液压转向器，静态信号负荷传感，管式优先阀连接方式；排量:1000mL/r;集成有入口单向阀、过载阀、补油阀等功能阀,过载阀调定压力22MPa;P、T、L、R油口:M20×1.5，LS油口:M12×1.5，转向柱安装螺纹M10×1.5；外表面喷黑色漆。

转向器编号为：BHAS 5-S-1000-D22-Y-P

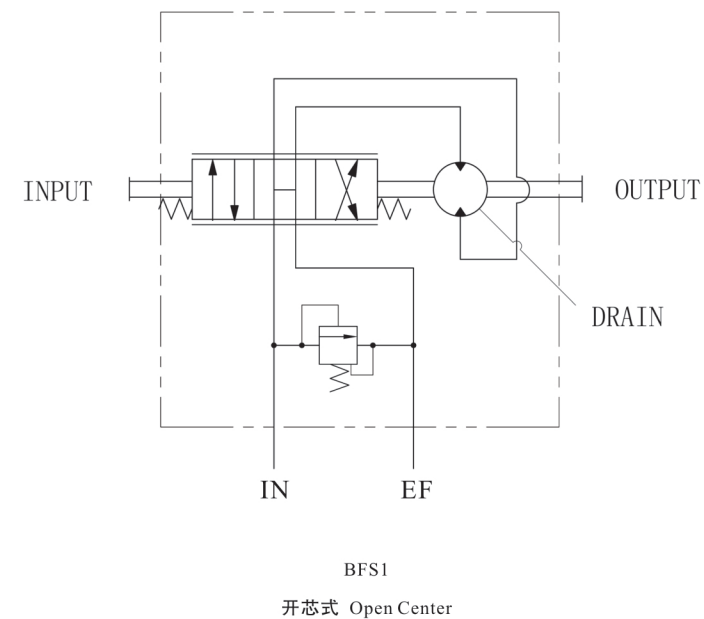


BFS扭矩发生器是由转阀和转定子副组成的开芯式液压转向元件，其集成保护液压转向回路的安全阀。扭矩发生器能够将液压能转化为机械能，输入较小扭矩就可以获得较大输出扭矩，其输出扭矩是输入扭矩和定子体副输出扭矩之和，输出转速和方向盘速度相同。它广泛用于轮式行走机械特别是高速水稻插秧机、大型手动闸门等。其转动灵活，操作省力，工作平稳，结构紧凑，紧急情况可实现人力转向。

BFS type Torque Generator（Torque Amplifier）is a type of open center hydraulic component，Consisted of control set and gerotor set and integated with relief valve for protection of hydraulic steering circuit.It makes hydraulic energy into mechanical energy and can get high output torque with low input torque.

The output torque is the sum of input torque form gerotor set.The speed is same as steering wheel speed.It’s widely used in the field of wheel travel machines like high speed rice transplanter、large manual valve，etc.With features of flexible rotation、comfortable and stable operation、compact volume and it can be steered by manual operation in an emergency.

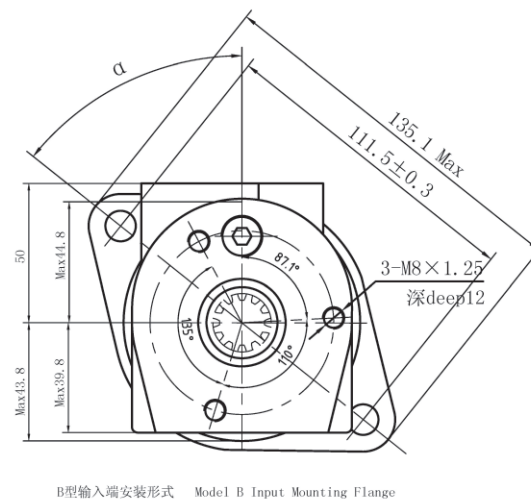
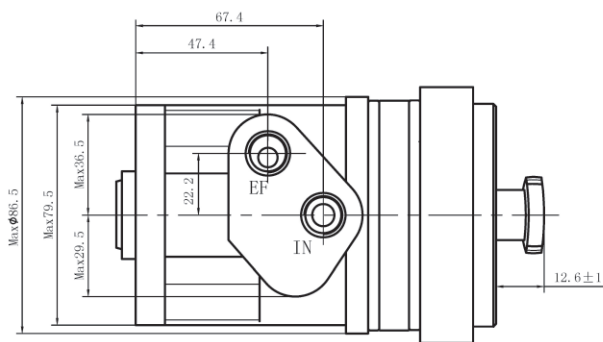
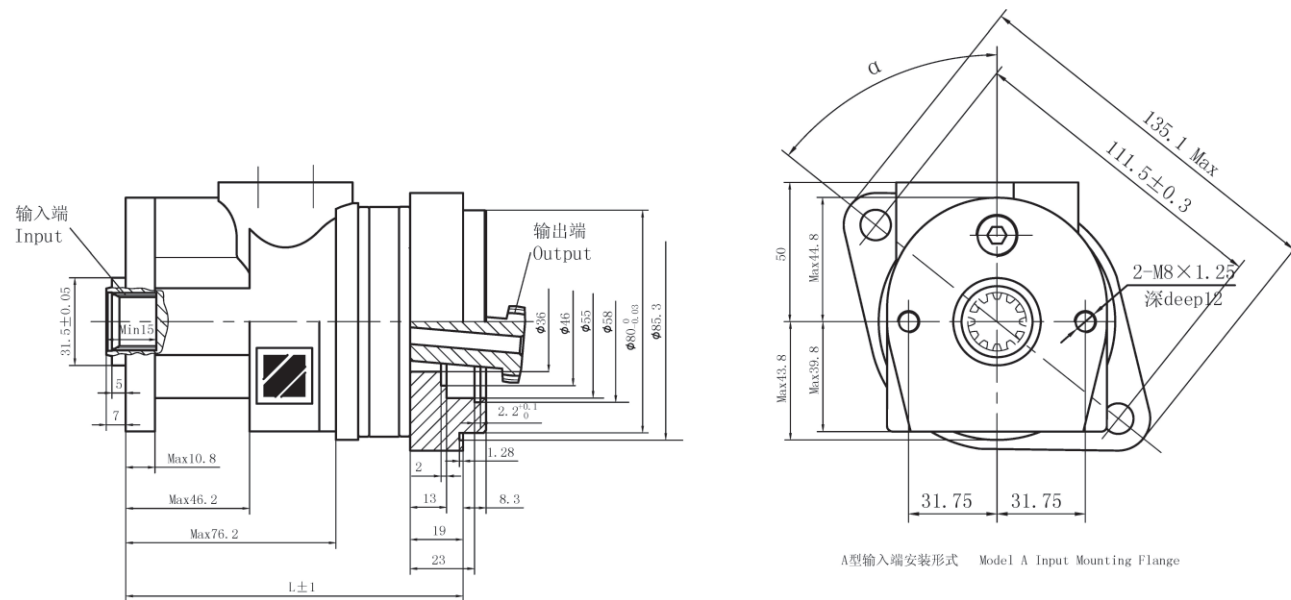
■ 液压原理图 HYDRAULIC CIRCUIT



■ 主要性能参数 MAIN SPECIFICATION DATA

型号 Type	排量 Displacement (mL/r)	推荐流量 Flow (L/min)	额定压力 Max .Presssure in Oil			动力转向扭矩 Power Steering Torque (N.m)	最大输入扭矩 Max.Manual Steering Torque (N.m)	安全阀压力设定值 Relief Valve Pressure Settings(MPa)	长度L Length (mm)	重量 Weight (Kg)
			IN	EF	DRAIN					
BFS1-63	63	9.5~15.1	17.2	10.3	0.3	1.6~2.4	60	5~10	122	4.3
BFS1-80	80	9.5~15.1	17.2	10.3	0.3	1.6~2.4	76	5~10	124	4.4
BFS1-100	100	9.5~15.1	17.2	10.3	0.3	1.6~2.4	96	5~10	126.5	4.5
BFS1-125	125	9.5~15.1	17.2	10.3	0.3	1.6~2.4	118	5~10	129.5	4.8

DIMENSION AND MOUNTING DATA



渐开线花键参数 Involved Spline

输入端		INPUT	输出端		OUTPUT
径节	PITCH	16/32	径节	PITCH	12/24
齿数	TEETH NUMBER	12	齿数	TEETH NUMBER	12
分度圆直径	PITCH DIA.	φ19.05	分度圆直径	PITCH DIA.	φ25.4
基准圆直径	BASE DIA.	16.498	基准圆直径	BASE DIA.	21.997
压力角	PRESSURE ANGLE	30°	压力角	PRESSURE ANGLE	30°
配合形式	TYPE OF ANGLE	齿侧配合SIDE FIT	配合形式	TYPE OF ANGLE	齿侧配合SIDE FIT
公差等级	CLASS OF FIT	5	公差等级	CLASS OF FIT	5
大径	MAJOR DIA.	φ20.29	大径	MAJOR DIA.	φ26.82
小径	MIN DIA.	φ17.70/17.58	小径	MIN DIA.	φ22.55/22.35
起始圆直径	FORM DIA.	φ20.726	起始圆直径	FORM DIA.	φ23.39
量棒直径	PIN DIA.	φ2.743	量棒直径	PIN DIA.	φ4.064
跨棒距	MAX. MEASUREMENT BETWEEN TWO PINS	MAX 15.128	跨棒距	MAX. MEASUREMENT BETWEEN TWO PINS	MAX 31.463

型号说明 ORDER CODE

	POS.1		POS.2		POS.3		POS.4		POS.5		POS.6	
BFS	*	-	*	-	*	-	*	-	*	-	*	

POS.1	型式功能 Function Code	POS.2	排量 Displacement mL/r
1	开芯式 Open Center		63,80,100,125

POS.3	安全阀设定压力 Relief Valve Pressure Setting(MPa)
5~12.5	

POS.4	輸入端安裝形式 Input Mounting Type
A	2-M8
B	3-M8

POS.5	油口代码 Ports		POS.6	输出端安装形式 Output Mounting Flange Type
Y1	IN, EF:G1/4-19 O-ring	深Deep 15	1	$\alpha=0^{\circ}$
Y2	IN, EF:G3/8-19 O-ring	深Deep 15	2	$\alpha=51.4^{\circ}$
Y3	IN:G1/4-19, EF: G3/8-19 O-ring	深Deep 15	3	$\alpha=77.1^{\circ}$

Note : other code of ports and mounting can be according to the user demand protocol

POS.7	外观喷漆 Paint
省略Omit	不喷漆 No Paint
P	喷漆 (黑) Painted (Black)

应用举例 For Example:

BFS型扭矩发生器，中位开芯式；排量：
80mL/r；安全阀调定压力6MPa；IN,EF油口螺纹：
G1/4-19 O-ring，转向柱安装螺纹3-M8×1.25；
输出端法兰和油口面垂直；表面喷黑漆。

扭矩发生器编号为：BFS1-80-6-B-Y1-1-P

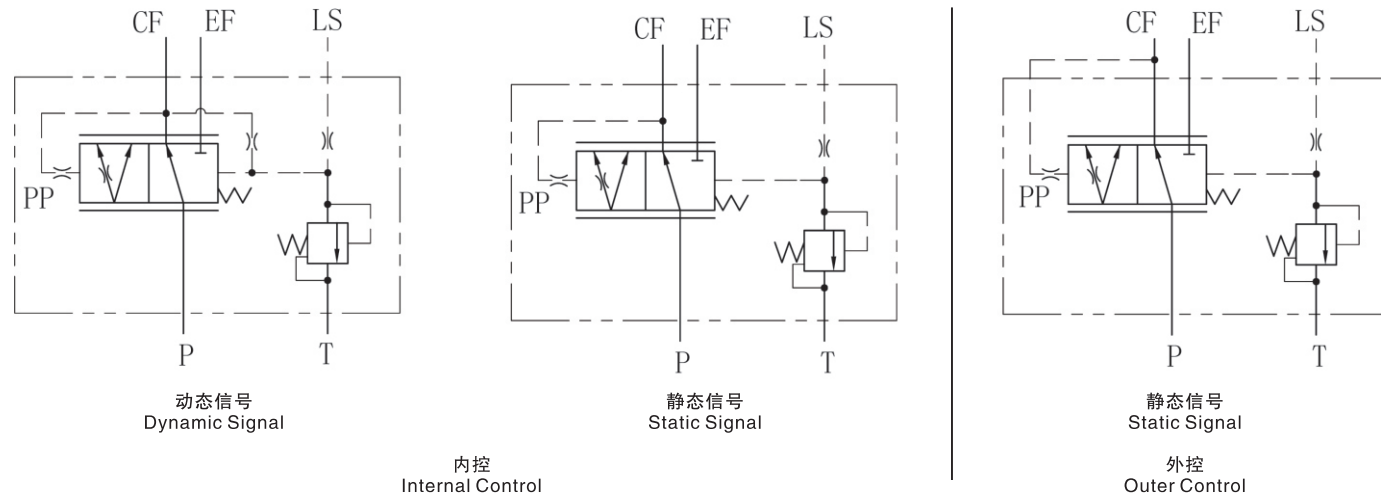
BFS 1-80-6-B-Y1-1-P

- 外表喷漆 Painted (Black)
- 输出端安装形式 Output Mounting Form : $\alpha=0^{\circ}$
- 油口 Ports IN,EF: G1/4-19 O-ring
- 输入端安装形式 Input Mounting Form: 3-M8 $\times$ 1.25
- 安全阀调定压力: 6MPa
Relief Valve Pressure Settings: 6MPa
- 排量 Displacement : 80mL/r
- 中位开闭式 Open Center
- BFS型扭矩发生器
BFS Type Torque Generator (Torque Amplifier)

信号两种形式。

YXL Type Priority Valve is a kind of fixed differential pressure reducing hydraulic unit, no matter how the LS steering system's load pressure and oil supply volum changes, YXL Type priority valve always could keep same flow to steering unit with the result of steering turning speed mutiply with displacement, in order to assure the flow needs of steering control uint. It is equipped with load sensing steering unit model BHR5,BPB5,BPBS5T, Widely applied on agriculture machinery, construction machinery, forklift, ect.

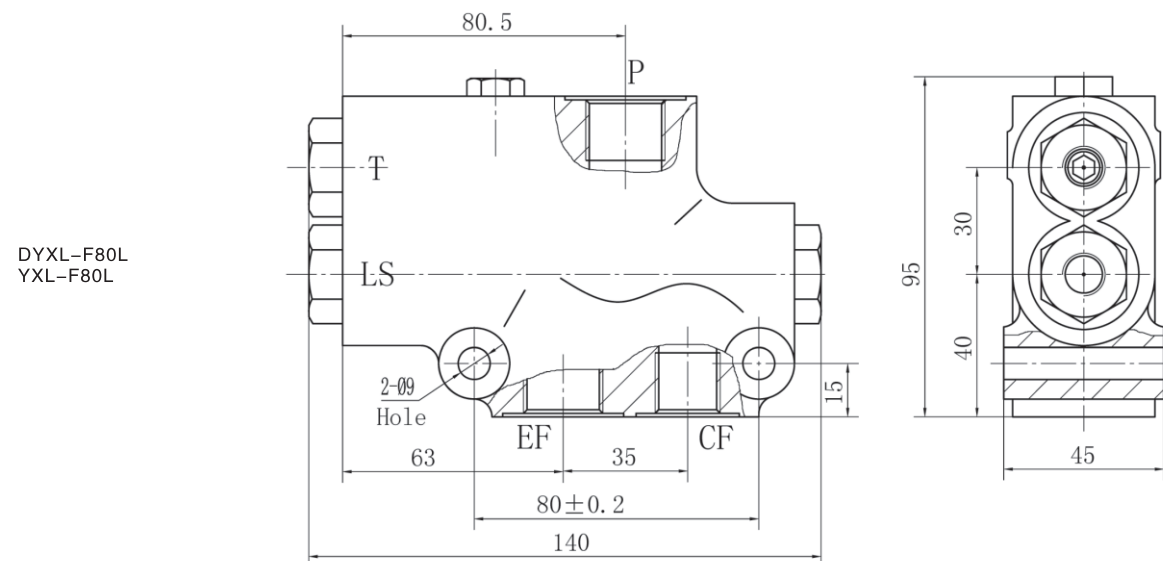
■ 液压原理图 HYDRAULIC CIRCUIT



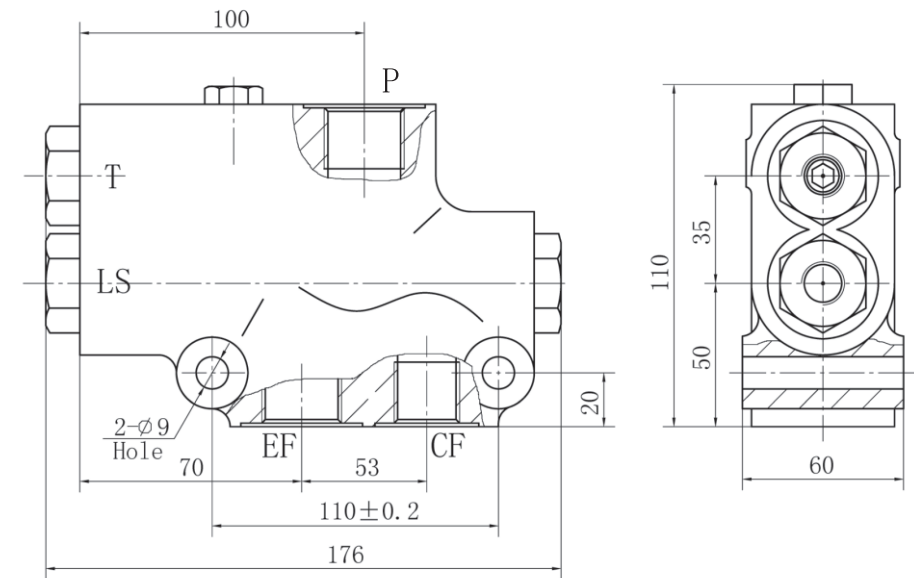
■ 主要性能参数 MAIN SPECIFICATION DATA

型号 Type	最大入口流量 Max.input flow (L/min)	弹簧控制压力 Spring Pressure Control (Bar)	额定压力 Max.Pressure in Oil Ports (MPa)		安全阀压力设定值 Relief Valve Pressure Settings (Mpa)	重量 Weight (Kg)
			P,EF	CF,LS		
YXL80,DYXL80	80	4.5, 7.0, 10.5	20	16	6.3~16	2.6
YXL160,DYXL160	160	4.5, 7.0, 10.5	20	16	6.3~16	4.1
YXL250,DYXL250	250	4.5, 7.0, 10.5	20	16	6.3~16	5.4

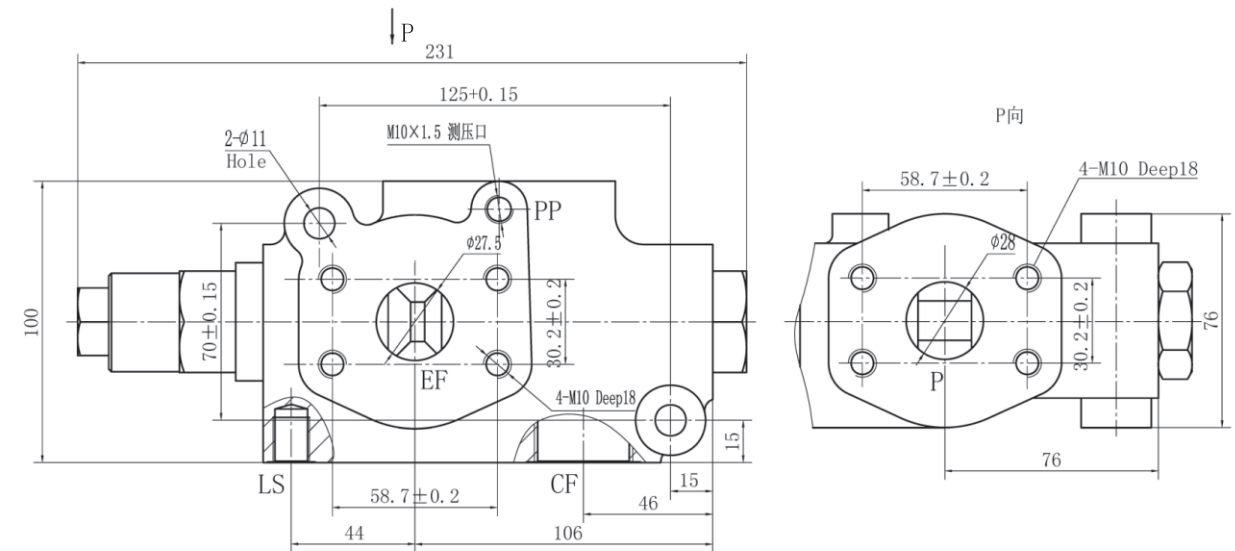
■ 外形连接尺寸 DIMENSION AND MOUNTING DATA



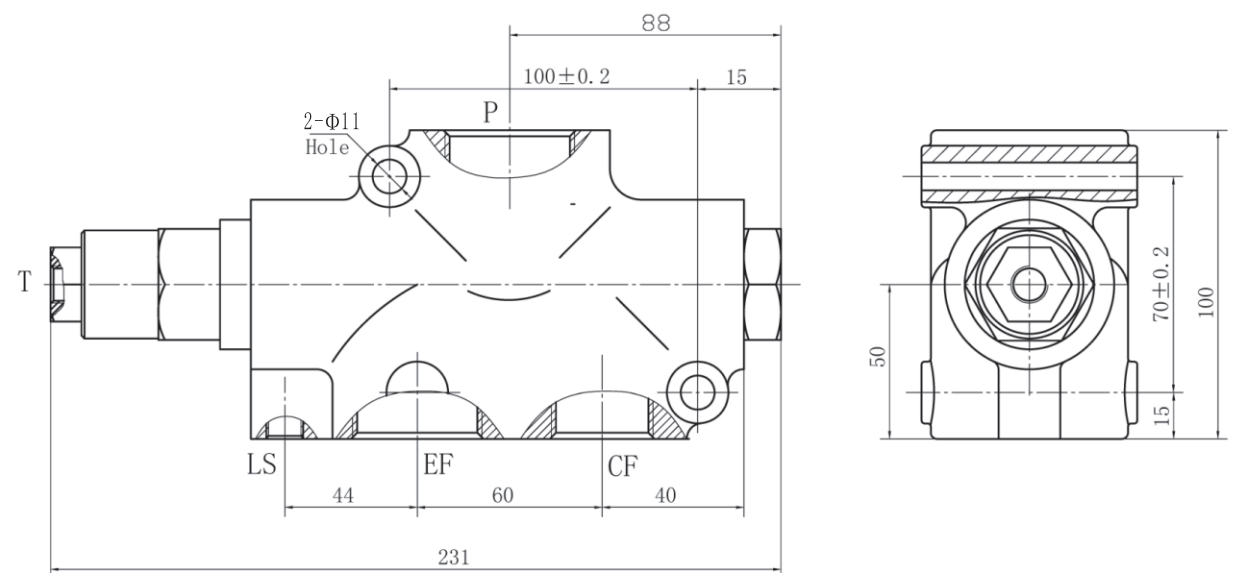
DYXL-F160L
YXL-F160L



DYXL-F250F
YXL-F250F



DYXL-F250L
YXL-F250L



PORTS THREAD				
型 号 Type	油口代号 Code	P、EF油口 Ports P,EF	CF 油口 Port CF	T, LS油口 Ports T, LS
YXL-F80L DYXL-F80L	A	M22×1.5 Deep16mm	M18×1.5 Deep16mm	M12×1.5 Deep14mm
	B	M22×1.5 O-ring Deep16mm	M18×1.5 O-ring Deep16mm	M12×1.5 O-ring Deep14mm
	C	7/8-14UNF O-ring Deep16mm	3/4-16UNF O-ring Deep16mm	7/16-20UNF O-ring Deep14mm
	D	G1/2-14 Deep16mm	G3/8-19 Deep16mm	G1/4-19 Deep14mm
YXL-F160L DYXL-F160L	A	M27×2 Deep22mm	M22×1.5 Deep18mm	M12×1.5 Deep14mm
	B	M27×2 O-ring Deep22mm	M22×1.5 O-ring Deep18mm	M12×1.5 O-ring Deep14mm
	C	1 1/16-12UN O-ring Deep22mm	3/4-16UNF O-ring Deep18mm	7/16-20UNF O-ring Deep14mm
	D	G3/4-14 Deep22mm	G1/2-14 Deep18mm	G1/4-19 Deep14mm
YXL-F250L DYXL-F250L	A	M42×2 Deep22mm	M33×2 Deep22mm	M12×1.5 Deep14mm
	B	M42×2 O-ring Deep22mm	M33×2 O-ring Deep22mm	M12×1.5 O-ring Deep14mm
YXL-F250F DYXL-F250F	A	φ 28	M33×2 Deep22mm	M12×1.5 Deep14mm
	B	φ 28	M33×2 O-ring Deep22mm	M12×1.5 O-ring Deep14mm

ORDER CODE													
POS.1		POS.2		POS.3		POS.4		POS.5		POS.6		POS.7	
	YXL	-	F			-				-			
POS.1		控制信号形式 Control Signal Type											
省略Omit:		静态信号 Static Signal											
D:		动态信号 Dynamic Signal											
POS.3		连接形式 Connection Type											
F:		法兰连接 Flange Connection											
L:		螺纹连接 Thread Conection											
POS.5		控制形式 Control Type											
N:		内控 Internal Control											
W:		外控 Outer Control											
POS.7		油口代码 Ports Code											
		A、B、C、D											

POS.2		公称流量 Rated Flow (L/min)	
80		80	
160		160	
250		250	
POS.4		安全阀设定压力 Relief Valve Pressure Settings (MPa)	
		6.3~16 Mpa	
POS.6		控制压力 Control Spring Pressure (Bar)	
4.5		4.5	
7.0		7.0	
10.5		10.5	

Note：other code of ports can be according to the user demand protocol

应用举例 For Example:

DYXL型优先阀，动态信号，最大入口流量160L/min。
安全阀压力12Mpa，控制压力7Bar（0.7Mpa），内控形
式，油口螺纹P、EF为G3/4-14，CF为G1/214，LS、T为
G1/4-19。

优先阀产品编号：DYXL-F160L-12N7-D

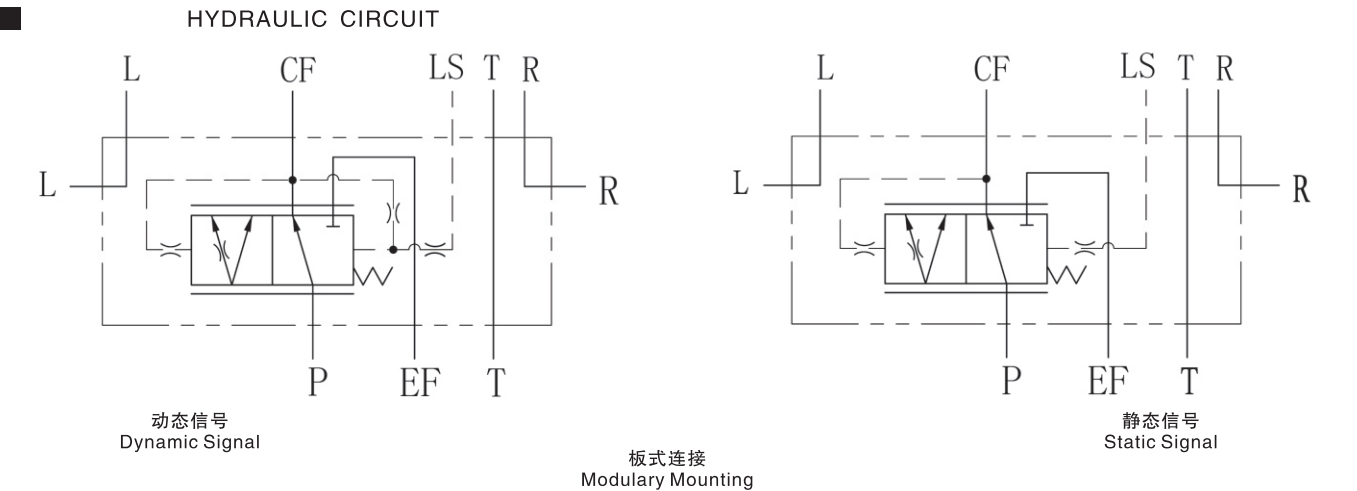
D YXL-F 160 L-12 N 7-D

油口Ports P,EF: G3/4;CF:G1/2;LS,T :G1/4
控制压力 Control Spring Pressure 7.0Bar
内控形式 Internal control
安全阀设定压力12MPa
Relief Valve Pressure Settings 12MPa
螺纹连接 Thread conection
公称流量 Rated Flow 160L/min
最大入口压力 Max.Input Pressure 20MPa
YXL型优先阀YXL Type Priority Valve
动态信号 Dynamic Signal

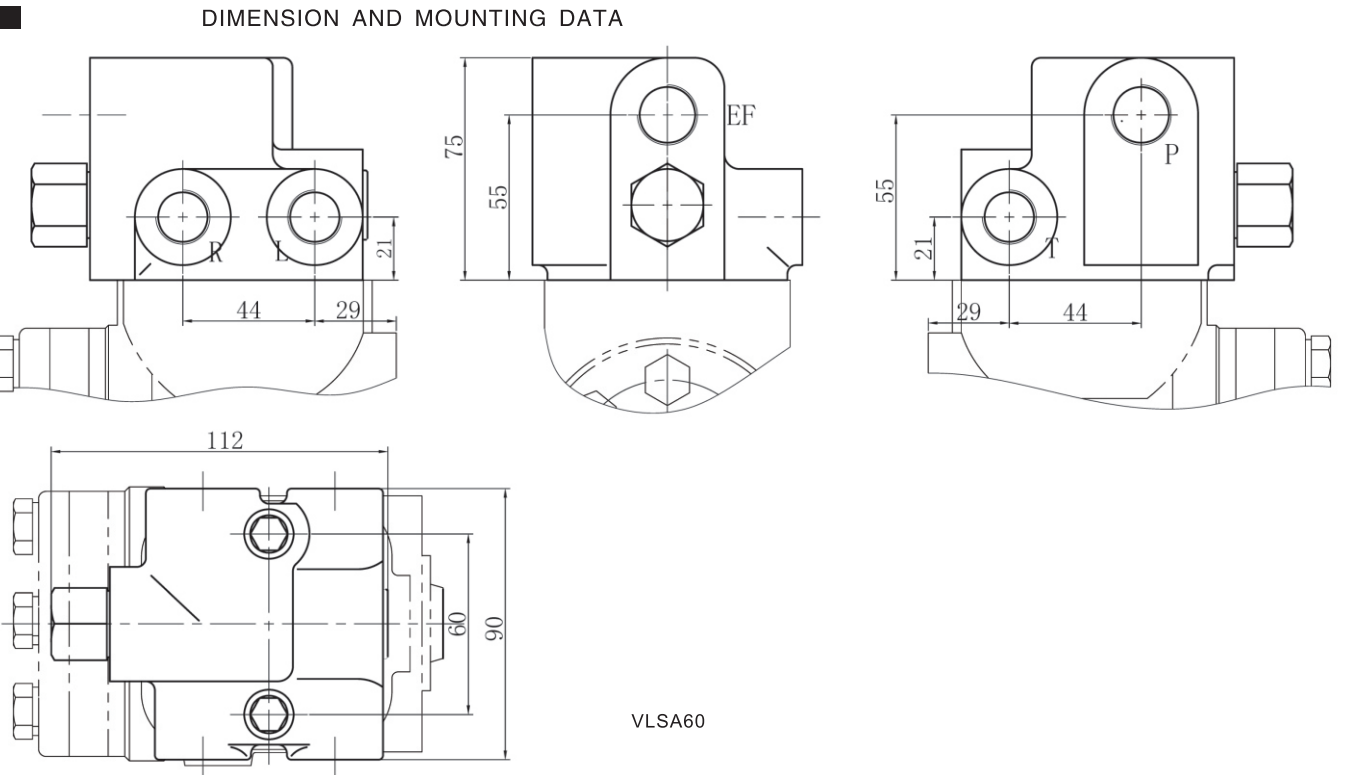
种信号控制型式；

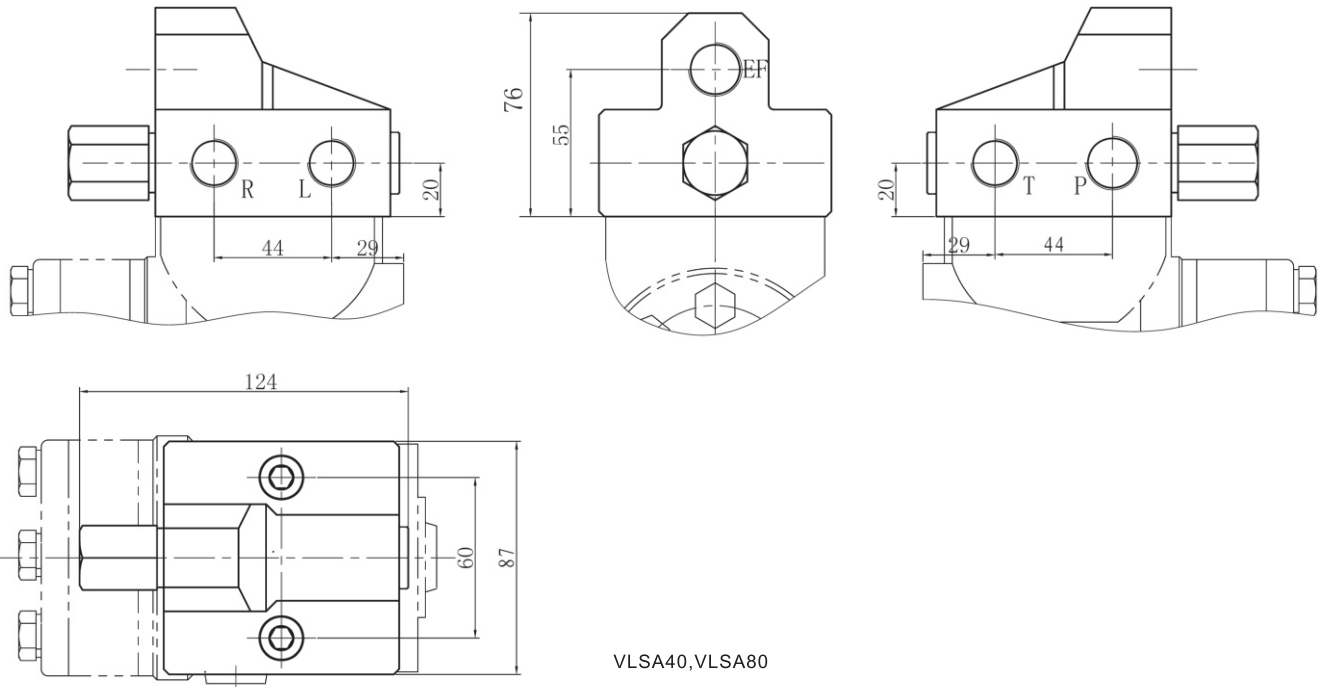
VLSA type Priority Valve is a fixed differential reducing hydraulic components, And supporting the use of load sensing steering units.Regardless of the load sensing steering system load pressure and pump flow changes, The Priority Valve can maintain supply steering flow is always equal to the product of steering wheel speed and steering displacement, To ensure the steering required flow.

VLSA type Priority Valve for the type of modularly connection, With the BPBS5,BPBS5L,BPBS5E type steering control units used in combination, Has dynamic signal and static signal control types.



MAIN SPECIFICATION DATA							
型号 Type	最大入口流量 Max.input pflow (L/min)	弹簧控制压力 Spring Pressure Control (Bar)	额定压力Max.Pressure in Oil Ports (MPa)				重量 Weight (Kg)
			P,EF	CF,LS	L,R	T	
VLSA40	40	4.5, 7.0, 10.5	20	17.5	20	1.6	2.2
VLSA60	60	4.5, 7.0, 10.5	20	17.5	20	1.6	2.5
VLSA80	80	4.5, 7.0, 10.5	20	17.5	20	1.6	2.2





VLSA40,VLSA80

PORTS THREAD

型 号 Type	油口代号 Code	P、EF油口 Ports P,EF	L、R、T油口 Ports L,R,T
VLSA40	Y	M20×1.5 Deep14mm	M18×1.5 Deep14mm
	Y1	G1/2-14 Deep14mm	G3/8-19 Deep14mm
VLSA60	Y2	M20×1.5 O-ring Deep14mm	M18×1.5 O-ring Deep14mm
VLSA80	Y3	7/8-14UNF O-ring Deep14mm	3/4-16UNF O-ring Deep14mm

ORDER CODE

POS.1	POS.2	POS.3	POS.4	POS.5
VLSA	-			

POS.1	公称流量 Rated Flow (L/min)
40	40
60	60
80	80

POS.3	控制信号形式 Control Signal Type
D:	动态信号 Dynamic Signal
S:	静态信号 Static Signal

POS.5	油口代码 Ports
	Y、Y1、Y2、Y3

注：其它油口连接方式可按用户需求协议确定
Note: other code of ports can be according to the user demand protocol

应用举例 For Example:

VLSA型优先阀，公称流量60L/min;动态信号，板式连接形式，控制压力7.0Bar;P、EF油口螺纹为G1/2，L、R、T油口螺纹为G3/8。

优先阀订货编号：VLSA60-FD7.0-Y1

VLSA 60-F D 7.0-Y1

- 油口螺纹 Ports P,EF: G1/2;L,R, T:G3/8
- 控制压力 Control Spring Pressure 7.0Bar
- 动态信号 Dynamic Signal
- 板式连接 Modular Connection
- 公称流量 Rated Flow 60L/min
- VLSA 型优先阀 VLSA Type Priority Valve

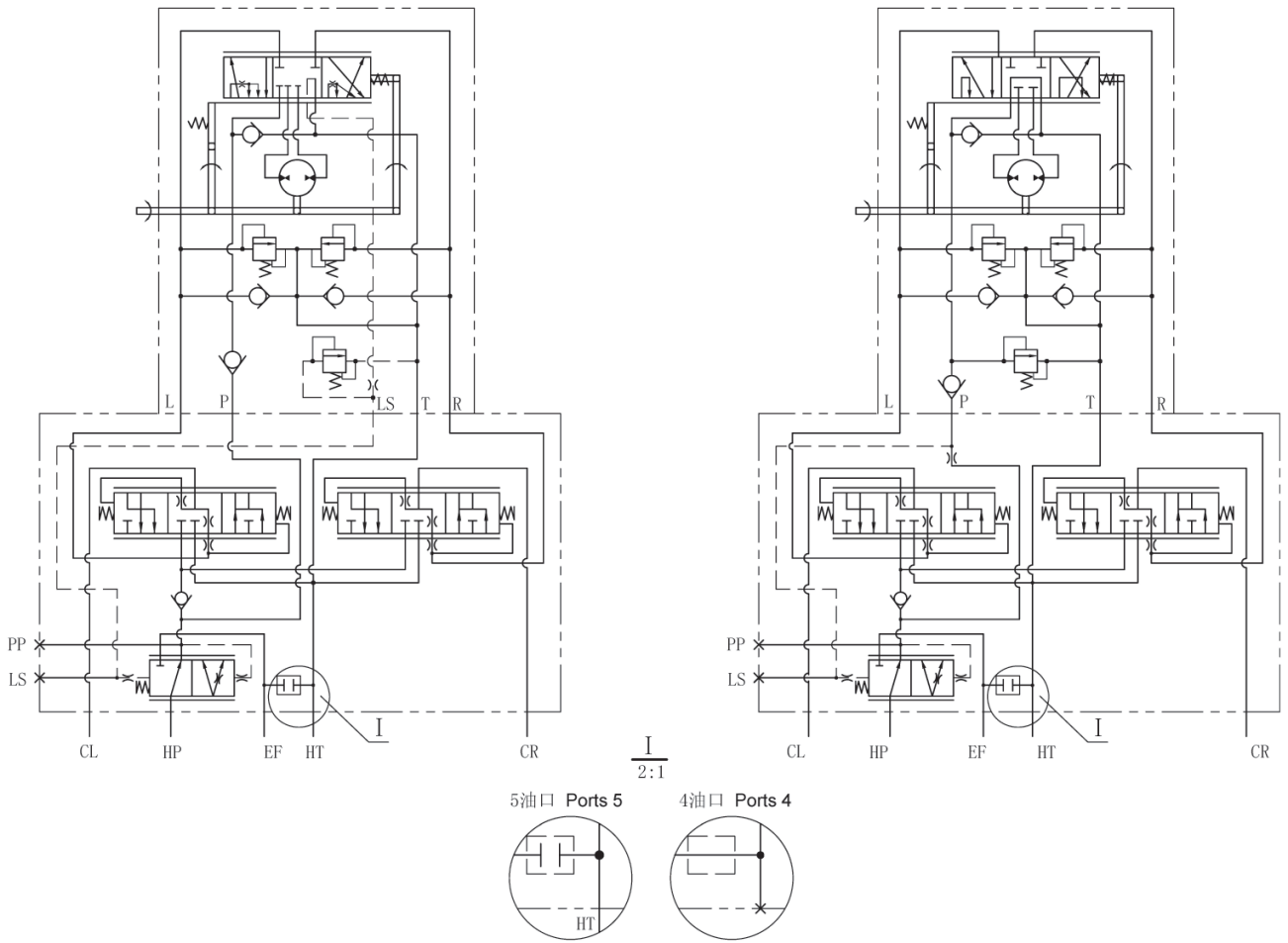
感型转向器配套使用。

The VSFA flow amplifier is used with a collaborative hydraulic steering, and combined into a Hydrostatic Steering Flow Amplifier. The VSFA flow Amplifier mianly consists of a priority valve, check valve, amplifier valves, etc. It performs a proportional increase in the flow of working fluid from the steering to the active area. The amplified flow is proportional to the revolution speed of steering wheel.

The VSFA flow amplifier has the features of high steering power, smoother and more reliable steering, manual steering in case of engine failure stops, energy saving effect and compactness of the steering system, can be widely used in large and medium tractors, large wheeled vehicles (loaders, dumpers...), as well as marine rudder.

According to application of different hydraulic steering units, there are VSFA1 and VSFA5 steering flow amplifier. VSFA1 steering flow amplifier can be used together with BPBS1 (open center non-reaction) hydraulic steering unit, while VSFA5 steering flow amplifier can be used together with BPBS5 (load sensing) hydraulic steering unit.

HYDRAULIC CIRCUIT



BPBS5 型液压转向器+VSFA5型流量放大阀
BPBS5 Type Hydraulic Steering Unit + VSFA5 Type Flow Amplifier

BPBS1 型液压转向器+VSFA1型流量放大阀
BPBS1 Type Hydraulic Steering Unit + VSFA1 Type Flow Amplifier

MAIN SPECIFICATION DATA

Parameters		型号Type					
		BPBS1+VSFA1 ^① , BPBS5+VSFA5 ^②					
转向器排量 Displacement of the Steering Unit	mL/r	80	100	125	160	200	250
当量排量 Displacement of the Flow Amplifier	mL/r	640	800	1000	1280	1600	2000
放大倍数 ^③ Amplifying Factor ^③		8					
额定流量 Rated Flow	L/min	160					
额定压力 Max.Input Pressure	MPa	21					
HT(或EF ^④)口最大连续背压 Max.Cont.Pressure in Line HT (or EF ^④)MPa		2.5					
中位压力损失 Pressure Drop in neutral position	MPa	0.7					
安全阀压力设定值 Relief Valve Pressure Settings	MPa	6, 8, 10, 12, 14, 16, 17.5					
过载阀压力设定值 Shock Valves Pressure Settings	MPa	12, 10, 14, 16, 18, 20, 23.5					
动力转向扭矩 Power Steering Torque	N.m	1.6 ~ 2.4					
最大输入扭矩 Max.Manual Steering Torque	N.m	130					
长度 Dimension	L mm	133	136	139	144	149	155
重量 Weight	kg	10.5	10.6	10.7	10.9	11.1	11.3

注①:BPBS1型液压转向器+VLSA1型流量放大阀。
Note①:BPBS1 type Hydraulic Steering Unit and VSFA1 type Flow Amplifier.

注②:BPBS5型液压转向器+VLSA5型流量放大阀。
Note②:BPBS5 type Hydraulic Steering Unit and VSFA5 type Flow Amplifier.

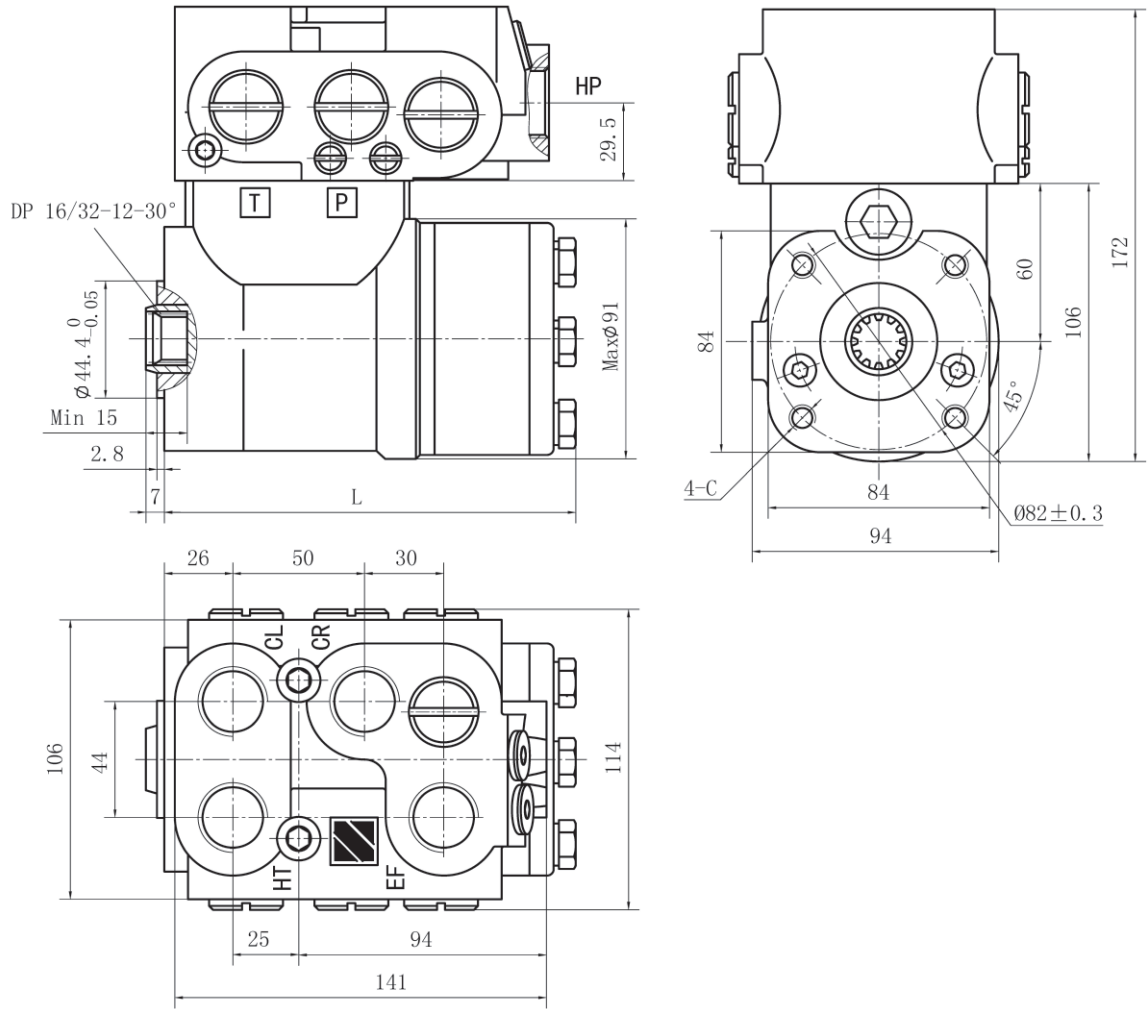
注③:根据客户的特殊需求，放大倍数可设定为 K=6。
Note③:Amplifying factor K=6, by special customer request.

注④:仅适合于4油口的VSFA流量放大阀（油口HT和EF合流）。
Note④:Valid for VSFA type Flow Amplifier with 4 Ports(HT line and EF line are united).

PORTS THREAD

CODE	HP、EF、CL、CR、HT油口 Ports HP,EF,CL,CR and HT Thread	Column Mounting Thread-C
Y	M24×1.5 Deep17mm	M10×1.5 Deep17mm
Y1	G3/4-14 Deep17mm	M10×1.5 Deep17mm
Y2	M24×1.5 O-ring Deep17mm	M10×1.5 Deep17mm
Y3	1 1/16-12UN O-ring Deep17mm	3/8-16UNC Deep17mm

DIMENSION AND MOUNTING DATA



BPBS 型液压转向器+VSFA型流量放大阀
BPBS Type Hydraulic Steering Units + VSFA Type Flow Amplifier

ORDER CODE

	POS.1	POS.2	POS.3	POS.4	POS.5
VSFA		-	/	-	

POS.1	型式功能 Hydraulic Circuit Explanation
1	开芯型，与BPBS1型转向器组合使用 Open Center , Built onto BPBS1 type Hydraulic Steering Unit
5	负荷传感型，与BPBS5型转向器组合使用 Load Sensing ,Built onto BPBS5 type Hydraulic Steering Unit

POS.2/POS.3	转向器排量/当量排量 Displacement of the Steering Unit /Displacement of the Flow Amplifier (mL/r)					
转向器排量 Displacement of the Steering Unit (mL/r)	80	100	125	160	200	250
当量排量 Displacement of the Flow Amplifier (mL/r) (放大倍数 amplifying factor k=8)	640	800	1000	1280	1600	2000

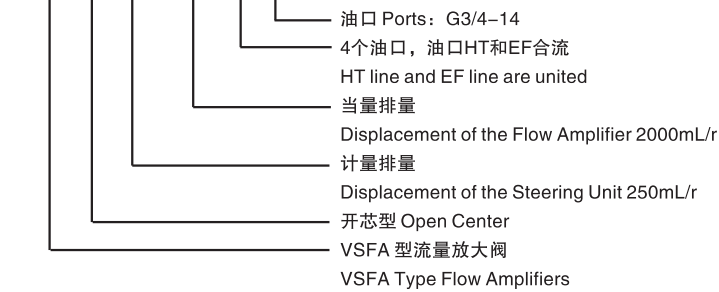
POS.4	油口数量 Mounting Ports	POS.5	油口 Ports
4	油口HT和EF合流 HT line and EF line are united	Y、Y1、Y2、Y3	
5	油口HT和EF分流 HT line and EF line are seperated		

应用举例1 For Example1:

VSFA型流量放大, 开芯型,与BPBS1型转向器配套使用; 转向器排量250mL/r,流量放大阀排量2000mL/r,8倍流量放大; 油口HT和EF合流; HP、EF、CL、CR油口螺纹为G3/4-14。

流量放大阀编号: VSFA1-250/2000-4-Y1

VSFA 1-250/2000-4-Y1

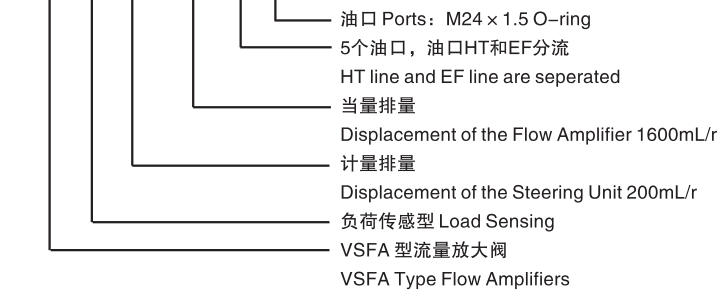


应用举例2 For Example2:

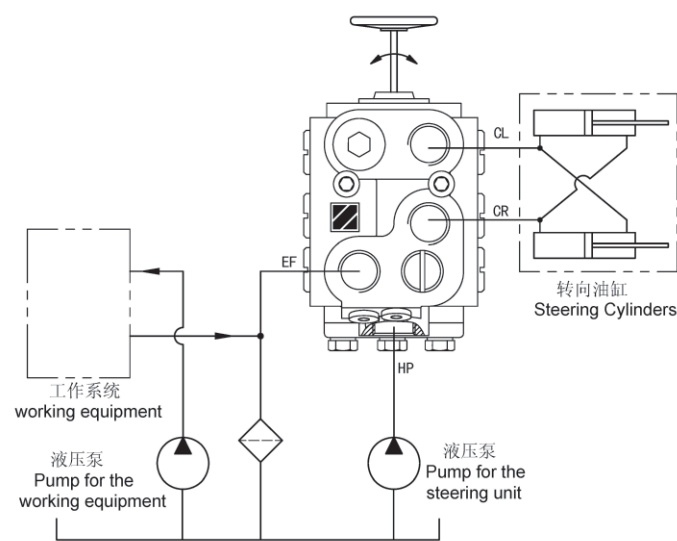
VSFA型流量放大, 负荷传感型,与BPBS5型转向器配套使用; 转向器排量200mL/r,流量放大阀排量1600mL/r,8倍流量放大; 油口HT和EF合流; HP、EF、CL、CR油口螺纹为M24×1.5 O-ring。

流量放大阀编号: VSFA1-250/2000-4-Y1

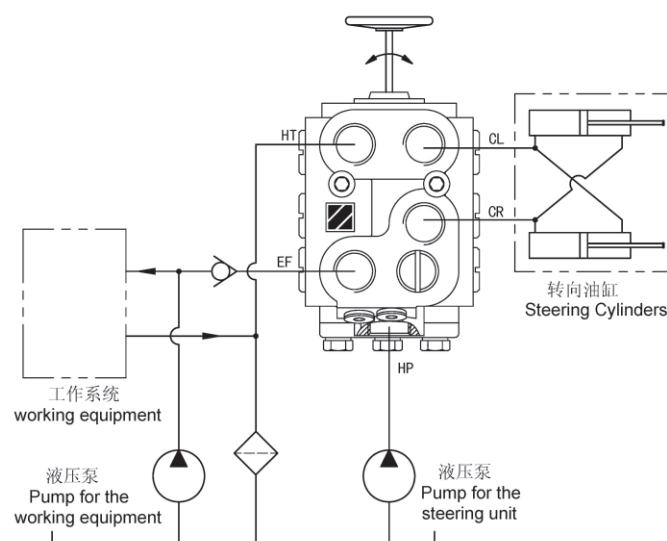
VSFA 5-200/1600-5-Y2



转向系统示意图 Mounting Scheme of Flow Amplifier



4油口（油口HT和EF合流）流量放大阀的转向系统示意图
Mounting Scheme of Flow Amplifier with 4 Ports

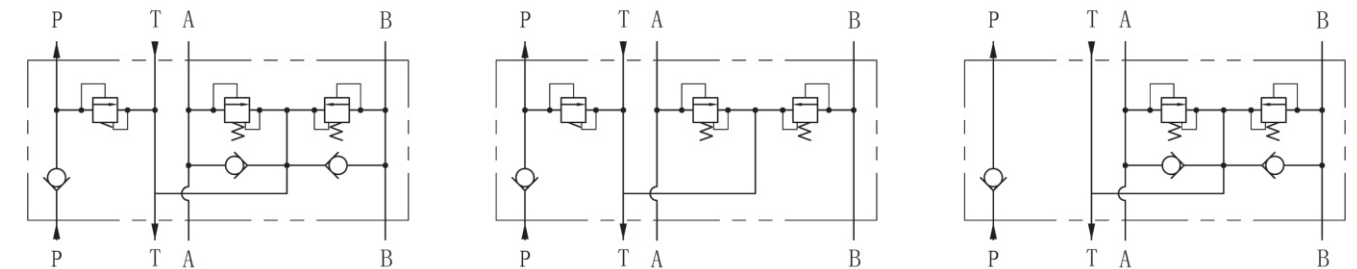


5油口（油口HT和EF分流）流量放大阀的转向系统示意图
Mounting Scheme of Flow Amplifier with 5 Ports

双向过载阀、双向补油阀。

VB/VBH multi-function valves can be used together with BHR series hydraulic steering unit,protecting the system.Very compact,small size,and be assembled directly to the port of the hydraulic steering unit.Inlet check valve,shock valve,suction valves inside.

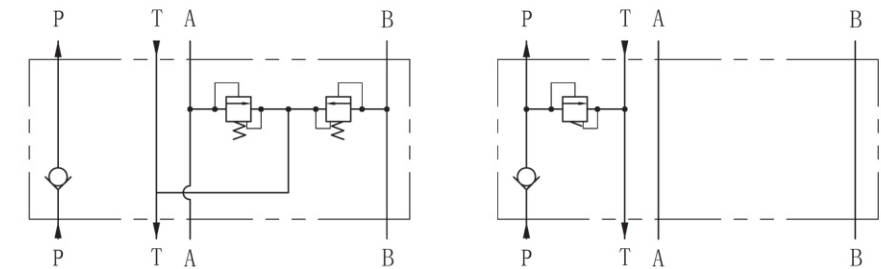
■ 液压原理图 HYDRAULIC CIRCUIT



VB1

VB2/VBH2

VB4



VB8/VBH8

VB6/VBH6

■ MAIN SPECIFICATION DATA

Parameters	型号 Type				
	VB1	VB2/VBH2	VB4	VB8/VBH8	VB6/VBH6
额定流量 Rated Flow (L/min)	70				
额定压力 Rated Pressure (MPa)	16				
安全阀设定压力 (MPa) Rated Valve Pressure Setting	6.3~16		—		6.3~16
过载阀设定压力 (MPa) Shock Valves Pressure Setting	12.5~22 —				
补油阀开启压力 (MPa) Suction Valves Open Pressure	0.05	—	0.05	—	
单向阀开启压力 (MPa) Inet Check Valve Open Pressure	0.1				

注: 1、安全阀设定压力是在流量30L/min、油的运动粘度为20mm²/s、油温50℃±5℃条件下设定值。

2、过载阀设定压力是在流量4L/min、油的运动粘度为20mm²/s、油温50℃±5℃条件下设定值。

3、根据用户要求可任意组合各种阀和设定压力。

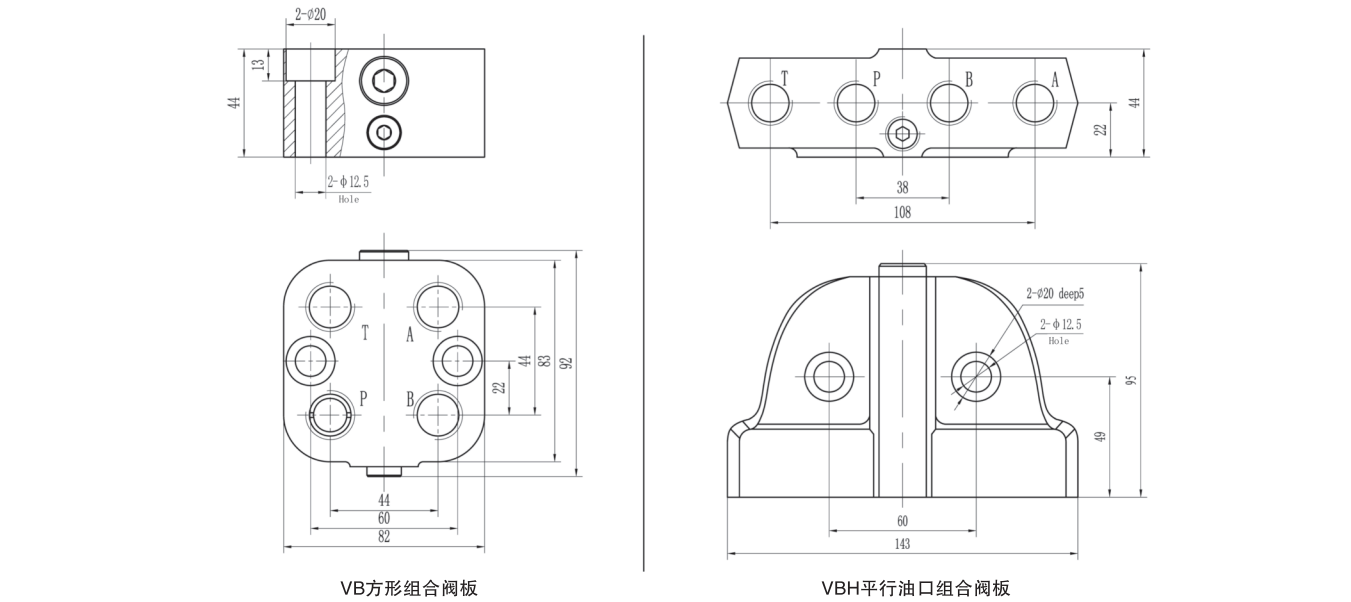
Note:

1.The pressure of relief valve is set under flow 30L/min, viscosity of oil 20 mm²/s, temprature of oil 50℃±5℃.

2.The pressure of double shock valve is set under flow 4L/min, viscosity of oil 20 mm²/s, temprature of oil 50℃±5℃.

3.The valves can be assembled and pressure can be set freely according to the requirement of customers.

DIMENSION AND MOUNTING DATA



ORDER CODE

POS.1	POS.2	POS.3	POS.4	POS.5
VB/VBH		-		-

POS.1	型号 Type
VB	方形组合阀板
VBH	平行油口组合阀板

POS.2	集成阀参数 Integrated Valve Parameter				POS.3	Relief Valve Pressure Settings (MPa)
Code	Inlet Check Valve	Relief Valve	Shock valves	Suction valves		
1	*	*	*	*		6,8,10,12,14,15,16
2	*	*	*			
4	*		*	*		
8	*		*			
6	*	*				14,15,16,18,20,22

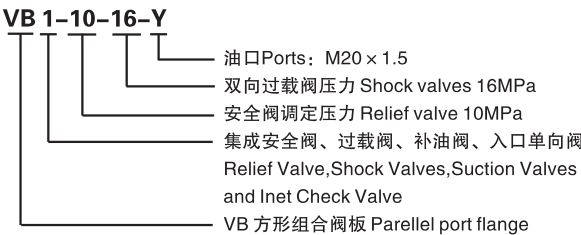
注：序号1，2，过载阀压力设定值高于安全阀压力6MPa；序号8为过载阀设定压力值，亦可按用户需求协议设定。
Note: Code1,2 shock valves pressure setting is 6 Mpa higher than relief valve; code 8 is the setting data of shock valve, it can be setting according to user's requirement.

POS.5	油口 Ports	说明 Description
Y、Y1、Y2、Y5、Y6	JB/T7912-1999（ISO 262）	与BHR或BHA5系列转向器配套，油口与BHR系列转向器一致。Equipped with BHR or BHF series, all ports dimension is same as BHR series.
Y3	GB/T707-1987（ISO228/1）	
Y4	ANSI B1.1-1982	

注：其它油口连接方式可按用户需求协议确定
Note：other code of ports can be according to the user demand protocol

应用举例 For Example:

VB方形组合阀板；集成有入口单向阀，安全阀，过载阀、补油阀，安全阀设定压力10MPa，过载阀压力16MPa；P,T，A，B油口螺纹M20×1.5。
组合阀板产品编号：VB1-10-16-Y



使用。

SC type Steering Column is the transition between the Hydraulic Steering Unit and the Steering Wheel. There are different connection forms and lengths for users selection.

MAIN SPECIFICATION DATA

Type	长度 Length (mm)		Max.permissible load (N.m)		
			Dynamic Load	Static Load	
SC1	L	135, 200, 250, 300, 350, 400,450,	75	280	
		500, 550, 600, 650, 700, 750,800,			
		850,900,950,1000,1100,1200			
SC2	L1	20: ¹ 与长止口转向器配套使用 Matched with the Hydraulic Steering Unit supporting of the long tongue			
		SC3			11: ¹ 与短止口转向器配套使用 Matched with the Hydraulic Steering Unit supporting of the short tongue
					L2

ORDER CODE

POS.1	POS.2	POS.3	POS.4	POS.5
SC		-		-

POS.1	功能 Function	POS.2	转向柱长度 Length of the steering column
1：	不带喇叭线 Without horn wire		135, 200, 250, 300, 350, 400,450,
2：	上端出喇叭线 With horn wire from top		500, 550, 600, 650, 700, 750,800,
3：	侧面出喇叭线 With horn wire from side		900,1000,1100,1200

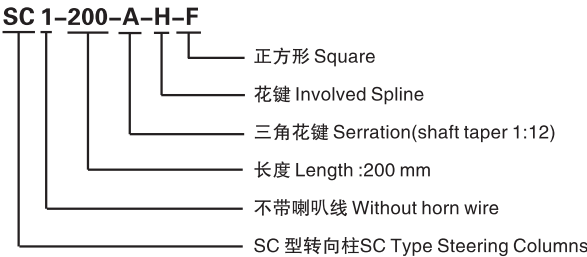
POS.3	方向盘连接形式 Steering-wheel linkage type	POS.4	输出端连接形式 Output end linkage type
A：	三角花键（轴锥1:12） Serration(shaft taper 1:12)	S:	短止口 Short Tongue
B：	单键（轴锥1:12） Woodruffkey Key(shaft taper1:12)	L:	长止口 Long Tongue
		H:	花键 Involved Spline

POS.5	法兰连接形式 Flange linkage type
F：	正方形 Square

应用举例 For Example:

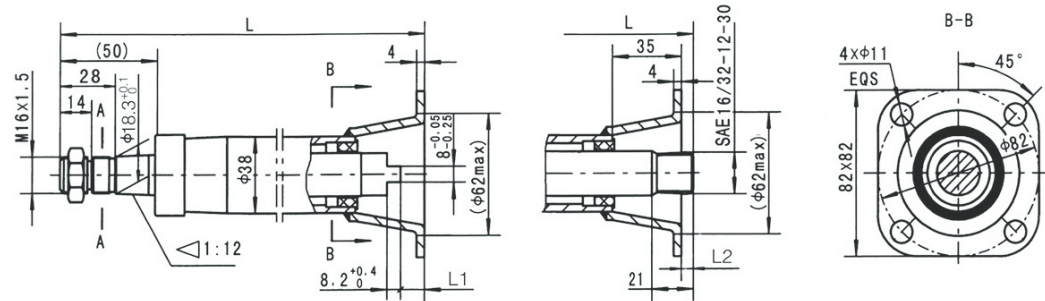
SC型转向柱，不带喇叭线；长度:200 mm；方向盘连接形式：三角花键；输出端连接形式：花键；法兰连接形式：正方形。

转向柱编号：SC1-200-A-H-F



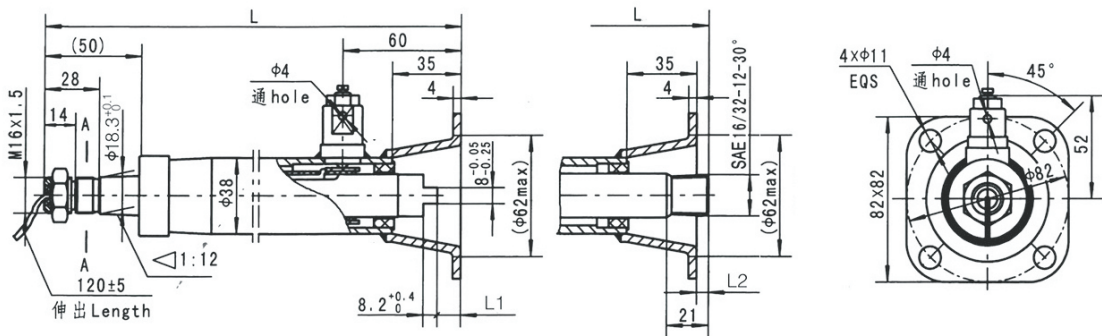
DIMENSION AND MOUNTING DATA

SC1



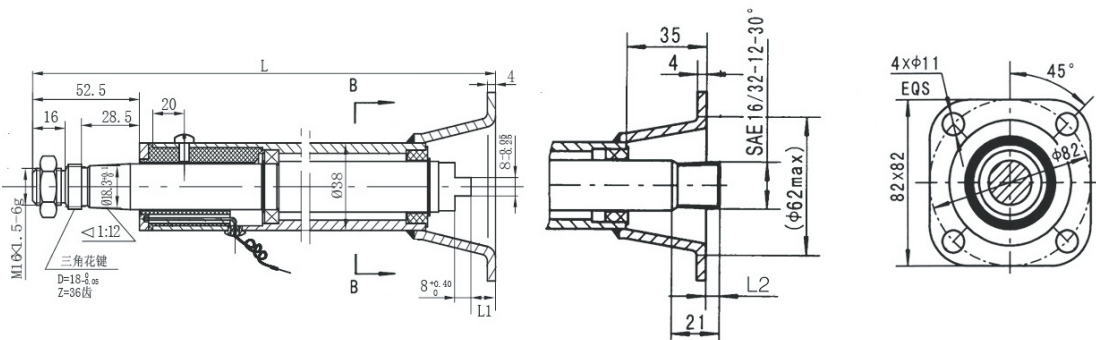
扁舌 Tongue SAE 花键 SAE Spline

SC2



扁舌 Tongue SAE 花键 SAE Spline

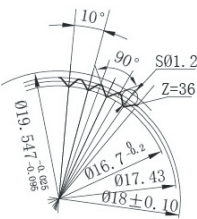
SC3



扁舌 Tongue SAE 花键 SAE Spline

A-A

三角花键齿形放大图



COMPARISON

中意 (ziHYD)	BPB1	BPB2	BPB3	BPB5	BPBS1	BPBS2	BPBS5	BPBS5T	VLSA	(D)YXL
Danfoss	OSPB ON	OSPB OR	OSPB CN	OSPB LS(OLS)	OSPC ON	OSPC OR	OSPC LS(OLSA)	OSPC LS(OLS)	OLSA	OLS
M+S	HKU.../4	HKU.../3	HKU.../7	HKU.../5T	HKUS.../4	HKUS.../3	HKUS.../5D	HKUS.../5DT	PRD(D)	PRT

PORTS THREAD

CODE	Ports P,T,L,R	Column Mounting C	Valve Mounting V	Port LS	备注
Y	M20×1.5 Deep14mm	M10×1.5 Deep16mm	M12×1.75 Deep17mm	M12×1.5 Deep12mm	
Y1	M22×1.5 Deep14mm	M10×1.5 Deep16mm	M12×1.75 Deep17mm	M12×1.5 Deep12mm	
Y2	M18×1.5 Deep14mm	M10×1.5 Deep16mm	M12×1.75 Deep17mm	M12×1.5 Deep12mm	
Y3	G1/2-14 Deep14mm	M10×1.5 Deep16mm	M12×1.75 Deep17mm	G1/4-19 Deep12mm	
Y4	3/4-16UNF O-ring Deep14mm	3/8-16UNC Deep16mm	3/8-24UNF Deep17mm	7/16-20UNF O-ring Deep12mm	
Y5	M20×1.5 O-ring Deep14mm	M10×1.5 Deep16mm	M12×1.75 Deep17mm	M12×1.5 O-ring Deep12mm	
Y6	M18×1.5 O-ring Deep14mm	M10×1.5 Deep16mm	M12×1.75 Deep17mm	M12×1.5 O-ring Deep12mm	
Y7	φ 18.5 Deep14mm	M10×1.5 Deep16mm	M10×1.5 Deep17mm	—	仅适合Only BPBS5
Y9	G3/8-19 O-ring Deep14mm	M10×1.25 Deep16mm	M10×1.5 Deep17mm	G1/4-19 O-ring Deep12mm	
Y70	φ 18.5 Deep14mm	3/8-16UNC Deep16mm	M10×1.5 Deep17mm	—	仅适合Only BPBS5
Y72	φ 18.5 Deep14mm	M10×1.5 Deep16mm	M12×1.75 Deep17mm	M12×1.5 Deep12mm	仅适合Only BHF5
Y73	φ 18.5 Deep14mm	3/8-16UNC Deep16mm	M12×1.75 Deep17mm	7/16-20UNF O-ring Deep12mm	仅适合Only BHF5
Y31	G1/2-14 Deep14mm	M10×1.5 Deep16mm	M10×1 Deep17mm	G1/4-19 Deep12mm	
Y40	3/4-16UNF O-ring Deep14mm	M10×1.5 Deep16mm	3/8-24UNF Deep17mm	7/16-20UNF O-ring Deep12mm	
Y41	3/4-16UNF O-ring Deep14mm	M10×1.5 Deep16mm	M12×1.75 Deep17mm	7/16-20UNF O-ring Deep12mm	
Y50	M20×1.5 O-ring Deep14mm	M10×1.5 Deep16mm	M12×1.75 Deep17mm	M12×1.5 O-ring Deep12mm	φ 22.5锥口, 国内叉车用户

注2：其它油口连接方式可按用户需求协议确定。
Note2： other code of ports can be according to the user demand protocol .

常用计量单位及其换算 COMMON UNIT AND CONVERSION

物理量 Size	单位 Unit	符号 Symbol	单位换算 Relation
力 Force	公斤力	kgf	1 kgf=9.81 N
	磅力	lbf	1 lbf=4.45 N
压力 Pressure	巴	bar	1 bar=0.1MPa=14.5 psi
	磅/英寸²	psi	1 psi=6.895 × 10 ⁻³ MPa
转矩 Torque	公斤力/厘米²	kgf/cm²	1 kgf/cm²=9.81 × 10 ⁻² MPa
	磅力·英寸	lb-in	1 lb-in=8.85 N.m
流量 Flow	公升/分钟	GPM	1 GPM=3.785 LPM=3.785 L/min
长度 Length	英寸	in	1 in=25.4 mm
质量 Weight	磅	lb	1 lb=0.45 Kg
运动粘度 Viscosity	厘斯	cSt	1 cSt=1 mm²/s