

国家级高新技术企业
浙江省级液压马达技术研发中心
浙江省博士后工作站
ISO9001质量体系认证
ISO14001环境体系认证
OHSAS18001职业健康安全体系认证

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本产品资料如有修改，恕不另行通告

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A FULL RANGE OF PRODUCT MANUALS

全液压转向器产品手册
Hydraulic Steering Control Units



芜湖中意液压科技股份有限公司
WUHU ZHONGYI HYDRAULIC TECHNOLOGY CO.,LTD.

THOTH
萨奥思

2018年10月版



我们愿以“诚信、合作、互利、共赢”的原则，与国内外各界朋友真诚合作，共同创造；以先进的技术、卓越的品质、优良的服务竭尽全力成为广大用户值得信赖的合作伙伴。

We would like to sincerely cooperate with all the friends, domestic and overseas, on the principle of "good faith, cooperation, mutual benefits and co-winning", and jointly create the future. We will try our best to become your reliable partner with our leading technology, outstanding quality and best services.

蔡国定
Cai Guoding

COMPANY INTRODUCTION 企业简介

芜湖中意液压科技股份有限责任公司创于2011年，由宁波中意液压马达有限公司投资建设。自成立以来，公司就秉持“诚信、合作、互利、共赢”的企业宗旨，努力打造业内知名的品牌。

公司位于安徽省芜湖市新芜经济开发区，厂区占地面积8万平方米，将发展成为国内目前规模最大的专业生产液压马达的企业之一。

公司主要生产：全液压转向器、摆线液压分度马达、摆线转子泵、摆线液压马达、曲轴连杆径向柱塞液压马达、径向钢球液压马达、液压回转传动装置、液压绞车绞盘等产品。目前预计年产各类液压马达200000台，出口至德国、意大利、美国等几十个国家和地区。

产品可广泛应用于工程机械、矿山器械、起重运输、重型冶金、煤矿机械、船舶甲板、塑料机械、农林机械等各种机械液压系统。

不断进取的中意公司愿以先进的技术、卓越的品质、优良的服务竭尽全力成为广大用户值得信赖的合作伙伴。

Wuhu zhongyi hydraulic technology co.,ltd was founded in 2011,was invested by Ningbo Zhongyi Hydraulic Motor co.,ltd. Since founded, we insist on the tenet of "good faith, cooperation, mutual benefits and co-win" and aim to create a world famous brand.

The company is situated at Wuhu new economic development zone of Anhui province. The factory area covers an area of 80000m², and aims to be one of the largest hi-tech enterprises in china that specializes in production of hydraulic motors.

The main products are: hydraulic steering control unit, orbital index motor, orbital pump, orbital hydraulic motor, radial piston hydraulic motor, sphere piston hydraulic motor, hydraulic transmission and hydraulic slewer, hydraulic winch etc. Estimated annual output is 200, 000 sets of different kinds of hydraulic motors. The products are exported to more than 40 countries and areas, including Germany, Italy, America etc.

The products can be widely applied in the hydraulic drive systems of construction machinery, mining machinery, lifting transport equipment, heavy-type metallurgic machinery, coal mine machinery, vessel deck machinery, plastic machinery, agricultural and forest machinery.

The company will try best to become your reliable partner with leading technology, outstanding quality and best service.



生产现场



美国高精度双端面磨床



德国四轴联动定子磨床



德国四轴联动转子磨床



中意办公楼



中意厂区



芜湖厂房



COMPANY INTRODUCTION 企业简介

宁波中意液压马达有限公司成立于1971年，是中国目前规模最大的专业生产液压马达的国家级高新技术企业之一，公司目前在国内设有两大生产基地，其中宁波厂区占地面积44000多平方米，企业总资产达2亿元；安徽芜湖厂区占地面积80000多平方米，一期投资1.5亿元。公司不仅具有国际标准化的加工车间，更拥有国际、国内领先技术的制造、检测设备。中意人将与您携手打造一流的产品、一流的服务、一流的品牌。

公司位于中国经济最发达和最具潜力的长江三角洲，浙江省的东部——宁波镇海经济开发区，海陆空交通发达。公司距离宁波栎社国际机场20公里，距国际四大深水良港之一的北仑港10公里。宁波杭州湾跨海大桥的贯通，使宁波融入上海2小时交通圈。

Ningbo Zhongyi Hydraulic Motor Co., Ltd. was founded in 1971, and is one of the largest National Hi-Tech Enterprise in China that specializes in production of hydraulic motors. At present the company owns two manufacturing bases, one is in Ningbo covering an area of 44,000 m², with total asset of RMB 200 million. The other is in Wuhu Anhui province with an area of 80,000m². First phase investment will be RMB 150 million. The company has manufacturing workshop meeting the international standards and the manufacture and test equipments that are leading technologically home and abroad. We sincerely hope to create a better future with the new and old customers by our first class products, first class services, first class brand.

The company is situated in Zhenhai Economic Development Zone in the east of Zhejiang Province in the Yangtze River Delta that is the most developed and has the greatest potential in economy in China, with convenient sea, land and air transportation conditions. The Company is 20km away from Ningbo Lishe International Airport, and 10km away from Beilun Seaport (one of four largest deep-water seaports in the word). The completed Ningbo Hangzhou Bay Crossing-sea Bring merges Ningbo into the Shanghai 2-hour traffic circle.

2015年，获得浙江省宁波市“政府质量奖”

2015年，8月，授牌通过建立“浙江省博士后工作站”

2014年，获得宁波市“重大科技攻关项目”成功验收

2013年，“芜湖中意液压科技股份有限责任公司”厂房落成正式投产

2012年，被认定为宁波市企业技术创新团队

2012年，1月，获得“浙江省著名商标”

2011年，建立多功能马达寿命测试中心

2010年，获得“浙江省名牌产品”

2010年，中意工程技术中心被认定为浙江省高新技术企业研发中心

2009年，中意全面启用“THOTH”萨奥斯品牌

2008年，被评为国家级高新技术企业

2008年，获得宁波市名牌产品

2006年，国家塑料机械产品质量监督检验中心液压马达检测科研基地在中意挂牌成立

2005年，评为浙江省高新技术企业

2005年，与浙江大学共建“浙大宁波中意液压马达工程技术研发中心”，研制生产全液压转向器

2004年，工程技术中心被镇海科技创新“10+1”工程评为镇海区重点“工程技术中心”

2004年，评为宁波市高新技术企业，新厂房落成投入使用

2003年，自主研发ZYH型液压回转装置被列入“国家火炬计划项目”

2003年，与国家塑料机械产品监督检验中心合作建立国家级的液压马达实验室

2001年，与上海大学合作建立“中意液压工程技术中心”

2000年，公司完成股份制改造

2000年，开发生产回转装置和液压绞车，同年公司通过ISO9001国际质量管理体系认证

1996年，正是更名为宁波中意液压马达有限公司

1995年，兼并镇海不锈钢自行车厂

1991年，研究开发JMDG系列曲轴连杆液压马达

1989年，建立煤炭科学研究总院上海分院镇海液压研究所，合作开发生产BM系列摆线液压马达

1980年，更名为宁波市液压马达二厂

1978年，建立宁波镇海液压机械厂，QJM系列钢球马达研制成功

1971年，10月建厂，厂名为宁波镇海城关农机厂

In 2015, Government Quality Award of Ningbo City was received.

In 2015, Postdoctoral Workstation of Zhejiang Province was established.

In 2014, Ningbo major scientific and technological projects successful acceptance.

In 2013, Anhui Wuhu Zhongyi Hydraulic Technology Co., Ltd was put into operation officially.

In 2012, the company was identified as the technology innovation team in Ningbo City.

In 2012, the company was evaluated as Zhejiang provincial Famous Trademark.

In 2011, multifunctional endurance test center for motor was established.

In 2010, the company was prized for Zhejiang Provincial Brand-Name Products Title.

In 2010, Zhongyi engineering technology center was evaluated as Zhejiang Hi-tech Enterprise Research Center.

In 2009, the company launched new brand “THOTH”.

In 2008, the company was evaluated National Hi-tech Enterprise.

In 2008, the company was prized for Ningbo Brand-Name Products Title.

In 2006, the Company established hydraulic motor test and research base of National Plastic Machinery Product Supervision and Inspection Center.

In 2005, the company was evaluated Zhejiang Hi-tech Enterprise.

In 2005, the company established Zhongyi Hydraulic motor Engineering Technology Center through cooperation with Zhejiang University.

In 2004, the Engineering Technology Center was evaluated as major engineering technology center by Zhenhai Technological Innovation “10+1” Project.

In 2004, the Company was evaluated Ningbo Hi-tech Enterprise, new plant was put into operation.

In 2003, ZYH series hydraulic sewer was listed in national Torch Program Projects.

In 2003, the Company established hydraulic motor laboratory through cooperation with National Plastic Machinery Product Supervision and Inspection Center.

In 2001, the Company established Zhongyi Hydraulic Engineering Technology Center through cooperation with Shanghai University.

In 2000, the joint stock system transformation was executed in the Company.

In 2000, the company developed and manufactured hydraulic sewer and hydraulic winch. and passed ISO9001 system certification.

In 1996, the factory renamed Ningbo Zhongyi Hydraulic Motor Co., Ltd

In 1995, the factory merged Zhenhai Stainless Steel bicycle Parts Factory.

In 1991, the factory researched and developed JMDG Series Radial Piston hydraulic motor.

In 1989, the factory developed and produced BM series Orbit hydraulic motor through cooperation with Shanghai Coal Science Research Institute, and Coal Science Research Academy of Shanghai Branch Zhenhai Hydraulic Research Institute was established.

In 1980, the factory was renamed Ningbo Hydraulic Motor No.2 Factory.

In 1978, the factory research and developed QJM series steel sphere radial piston hydraulic motor, and meanwhile Ningbo Zhenhai Hydraulic Machinery Factory was established.

The original factory name was Ningbo Zhenhai Chengguan Agricultural Machinery Factory when the factory was set up in October 1971.

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	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		BPBS5 型液压转向器+VLSA60型优先阀 BPBS5 Type Hydraulic Steering Unit and VLSA60 Type Priority Valve
	BPBS5 型液压转向器+VLSA40/VLSA80型优先阀 BPBS5 Type Hydraulic Steering Unit and VLSA40/VLSA80 Type Priority Valve		BHF5 流量放大型液压转向器+VB组合阀块 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		BPBS 型液压转向器+VSFA型流量放大阀 BPBS Type Hydraulic Steering Unit and VSFA Type Flow Amplifier

■ 产品概述 INTRODUCTION

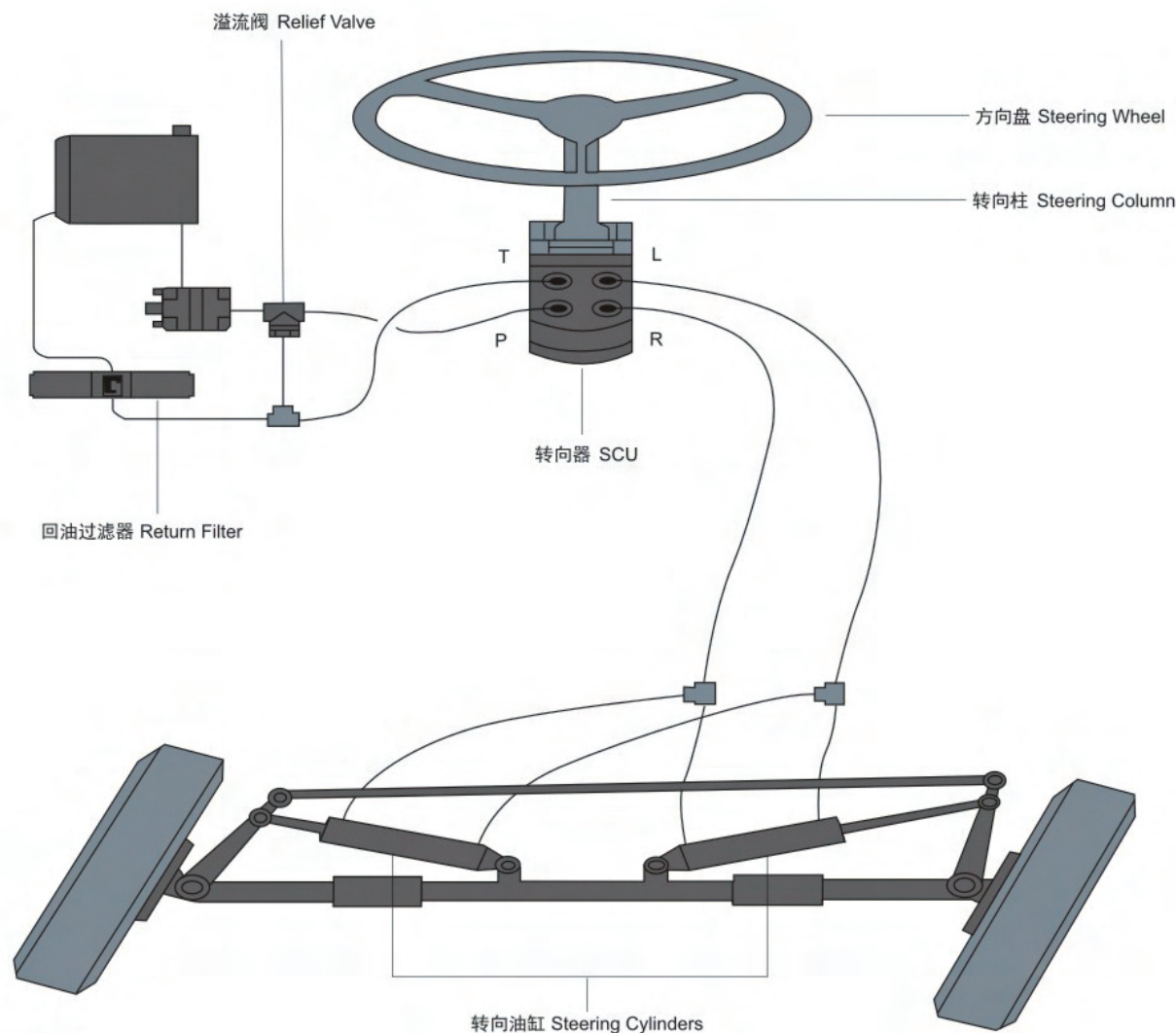
全液压转向器是由一对转阀和一对转定子计量装置组成。通过转向柱使转向器连接到车辆的方向盘上，当方向盘转动时，从油泵来的油经转阀和转定子计量装置流到油缸的左或右腔（取决于转动方向）。定子副排除的油与方向盘的转角成正比。它广泛用于工程机械、叉车、拖拉机、联合收割机等低速重载车辆的液压转向和船舶操舵。其与传统转向装置相比具有下列优点：



- 降低成本，结构可靠轻便。
- 转向负载不直接作用于方向盘，操作舒适。
- 在油泵不工作时，可实现应急人力转向。
- 可用很小的力矩进行连续无级控制转动。
- 根据系统需要，可以安装不同功能和压力级别的组合阀块。

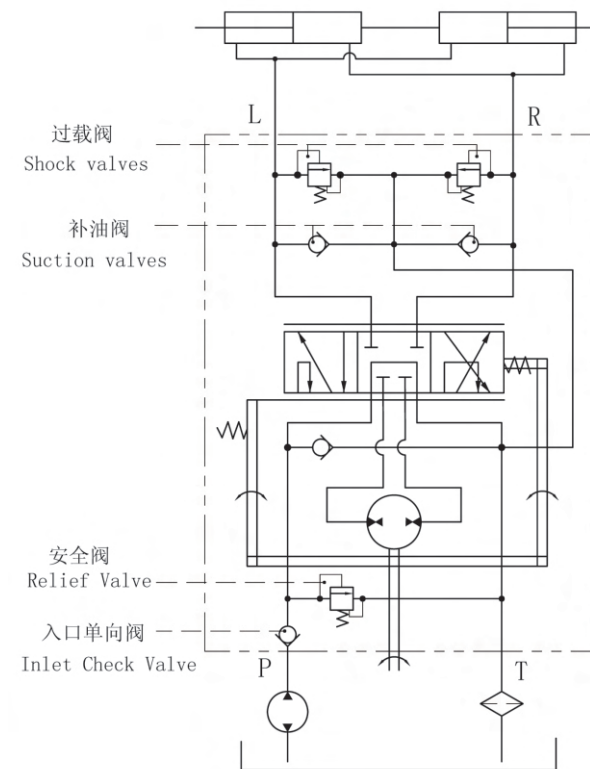
The Hydraulic Steering Control Units consists of a rotary and a rotary meter. Via a steering column the steering unit is connected to the steering wheel of vehicle. When the steering wheel is turned, oil is directed from the steering system pump via the rotary valve and rotary meter to the cylinder ports 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.

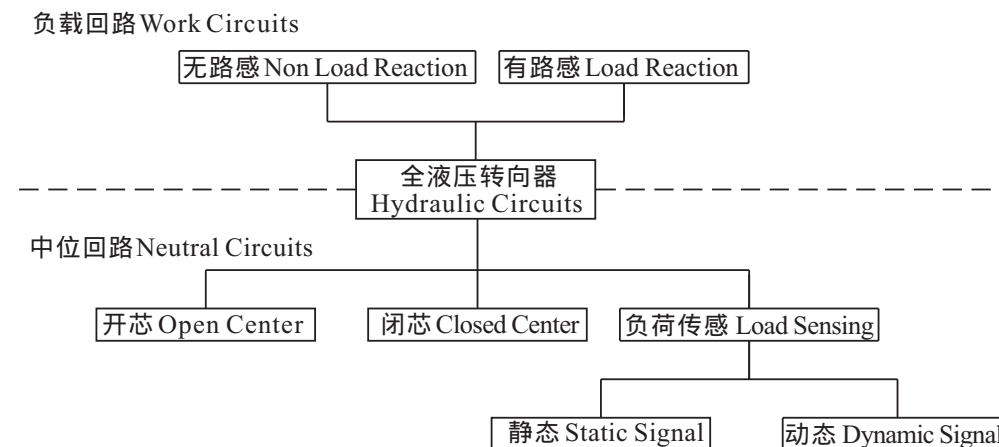


集成功能阀功能 Integrated valves Function

- 入口单向阀：防止较高的负载压力油倒流而造成方向盘抖动现象。
- 过载阀：当转向油缸受到外部冲击时,当油缸内的压力升高至过载阀设定压力时过载阀开启,保护油缸及油管。
- 补油阀：当过载阀开启时系统产生瞬间的负压，补油阀开启补油，及时将压力油补充到转向油缸的左（或右）油腔，防止油液发生气蚀现象。
- 安全阀：当转向系统油液压力到达安全阀设定压力时，安全阀开启卸荷，提供转向系统压力的安全保护作用。
- LS安全阀：当负荷传感转向系统油液压力到达安全阀设定压力时，安全阀开启卸荷，提供转向系统压力的安全保护作用(仅负荷传感型全液压转向器)。
- 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).



全液压转向器分类 Hydraulic Circuit Explanation



开芯系统

当外力不作用方向盘时，液压油从油泵经过转向器内部直接回油箱，油泵一般使用定量油泵。

闭芯系统

当外力不作用于方向盘时，液压油被转向器截止，因此转向器的P口会有较高的压力，所以油泵必须使用压力补偿变量油泵。

温度

- 全液压转向器正常工作温度在30℃~60℃
- 最低工作温度-30℃
- 最高工作温度90℃
- 长时间工作在温度60℃以上将会缩短转向器寿命。

油液清洁度等级

- 全液压转向器使用油液的固体颗粒污染等级代号不得高于GB/BT14039-2002规定的
- 开芯系统不得高于22/20/17
- 闭芯系统不得高于21/19/16
- 在转向器回油管中推荐安装25 μ m的回油滤清器,在恶劣的工作环境下应安装更高精度的回油滤清器。

油的运动粘度

- 全液压转向器推荐使用油液运动粘度20mm²/s-80 mm²/s
- 最低使用油液运动粘度10 mm²/s
- 最高使用油液运动粘度300 mm²/s

安装

- 转向器应安装于容易装卸的地方，建议安装在驾驶室外面。
- 建议转向系统的油箱位应高于转向器的安装位置，回油管插入油面下。
- 转向油缸的油口应朝上。
- 转向柱安装后和在操作方向盘时无径向和轴向负载作用于转向器输入轴上。
- 在安装转向器时，应保证转向器的清洁，转向器油口螺堵在安装油管前不要拆下。

试运转

- 在运转前，应注入油液至最高液面。
- 低速运转油泵，将转向油缸螺纹接头旋松，直到出来的油不含泡沫为止。
- 左右转动方向盘，直到出来的油不含泡沫为止。
- 再次检查油位，有必要的话再往油箱中加油至最高油面。
- 拧紧所有螺纹连接处，检查转向系统是否工作正常。

维护

- 应经常检查滤清器滤芯和油液的情况，如必要时应更换。
- 在正常条件下，方向盘的最大输入扭矩不会超过5 N.m,如果在转向油泵不工作或供油量少时，方向盘的输入扭矩会超过5 N.m,但最大输入扭矩请勿超过130 N.m,否则导致转向器零件损坏。

OPEN CENTER STEERING SYSTEM

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

CLOSED CENTER STEERING SYSTEM

Due to the high pressure resulted form 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.

BHR1、BHR2、BHR3、BHR5系列全液压转向器是在保持原有BZZ外形和安装尺寸的基础上，对其阀体内部的结构做了优化设计，使其性能更加优越。它广泛用于工程机械、叉车、拖拉机、联合收割机等低速重载车辆的液压转向和船舶操舵。

BHR5型负荷传感转向器与YXL等类型的优先阀配套使用于负荷传感液压转向系统

特点:

- 对转向负载的变化有良好的压力补偿；
- 转向回路流量、压力保持优先，转向性能可靠；
- 转向回路与其他工作回路互不影响，从而提高了系统效率；
- 转向灵敏度高，响应快，寒冷条件下的启动特性良好；

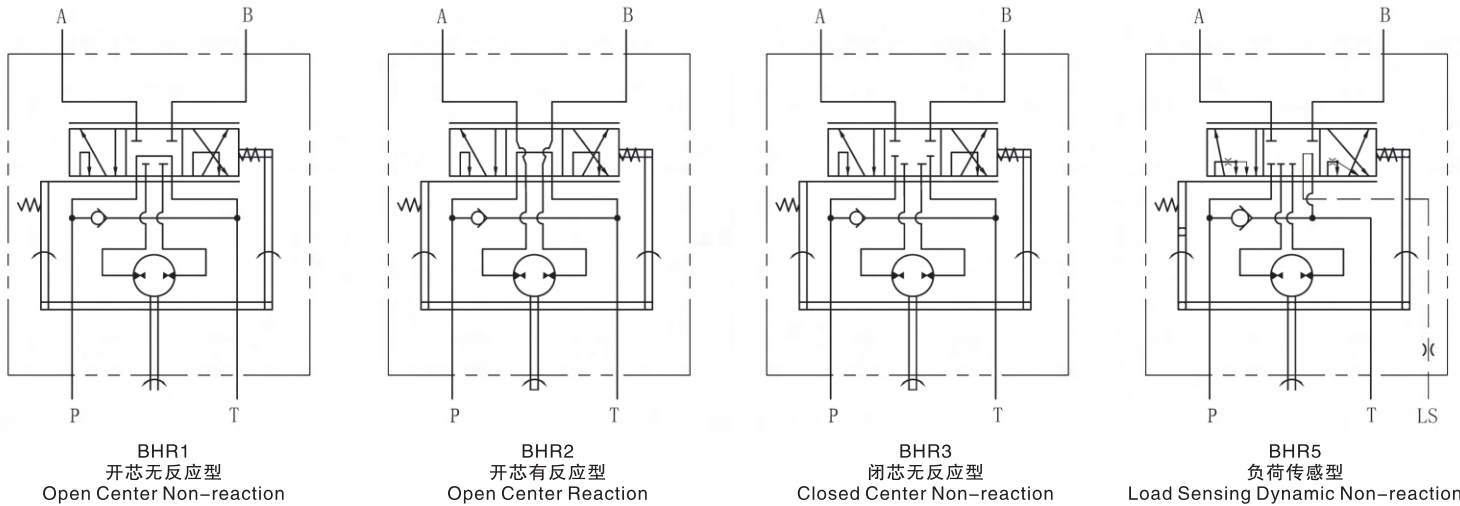
BHR1,BHR2,BHR3,BHR5 Hydraulic steering control units（SCU），new design, better performance.Widely applied to low speed and heavy loadvehicles E.g.construction machinary.forklift,tractor,harvester and helm contrlo etc.

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.

■ 液压原理图HYDRAULIC CIRCUIT



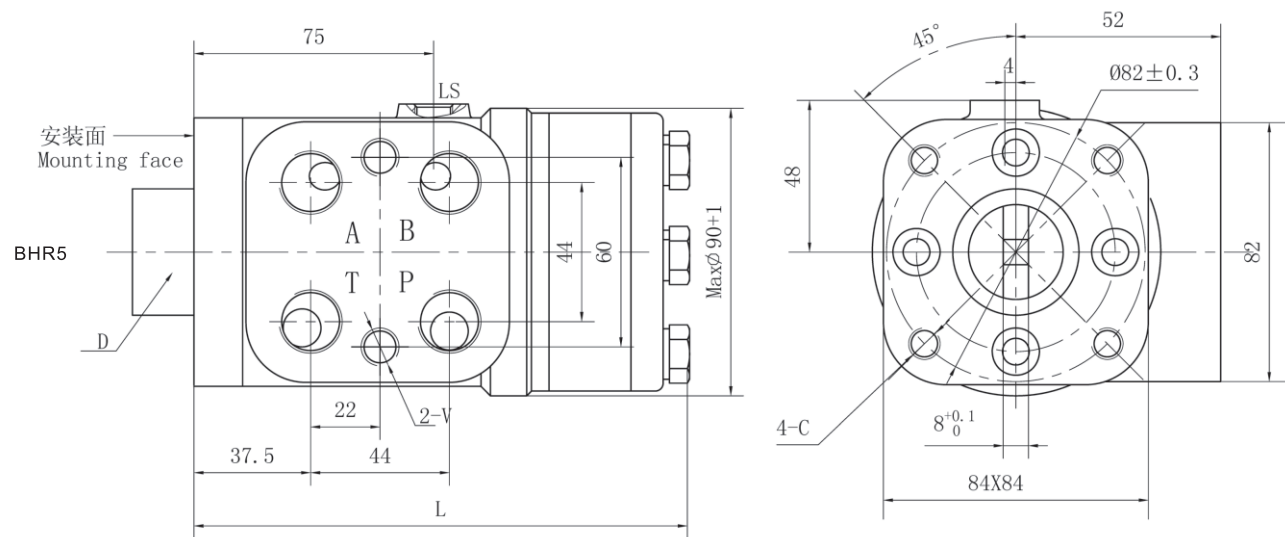
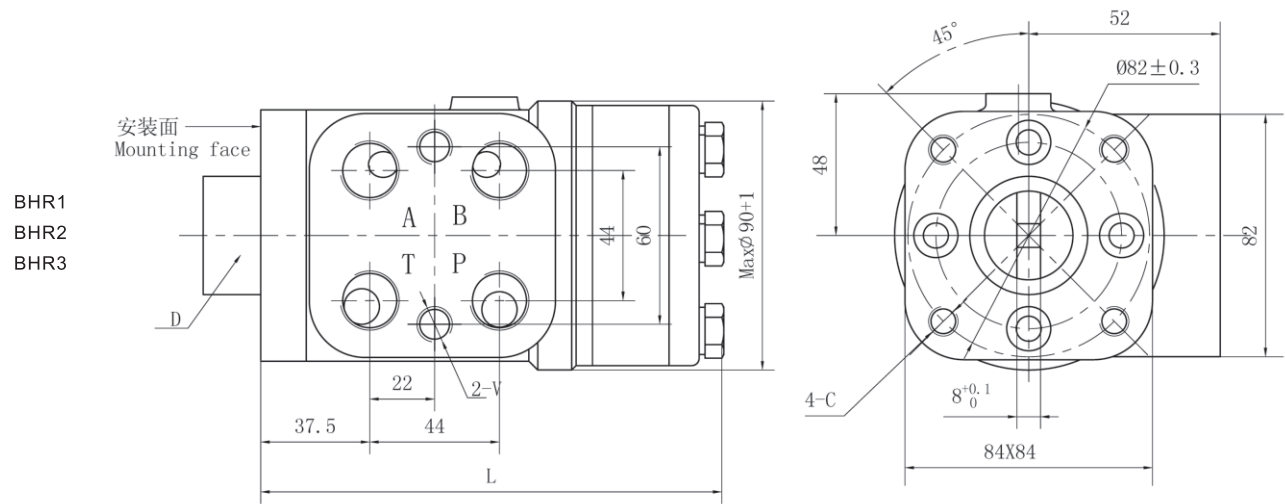
■ 主要性能参数MAIN SPECIFICATION DATA

性能参数 Parameters			型号 Type																	
			BHR1, BHR2,BHR3, BHR5							BHR1, BHR3, BHR5										
排量 Displacement			mL/r	50	63	80	100	125	160	200	250	280	315	400	500	630	800	1000		
公称流量① Rated Flow①			L/min	5	6	8	10	12.5	16	20	25	28	31.5	40	42.5	53.5	60	75		
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												1.7 ~ 2.8				
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	198	216	237	263	
重量 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		

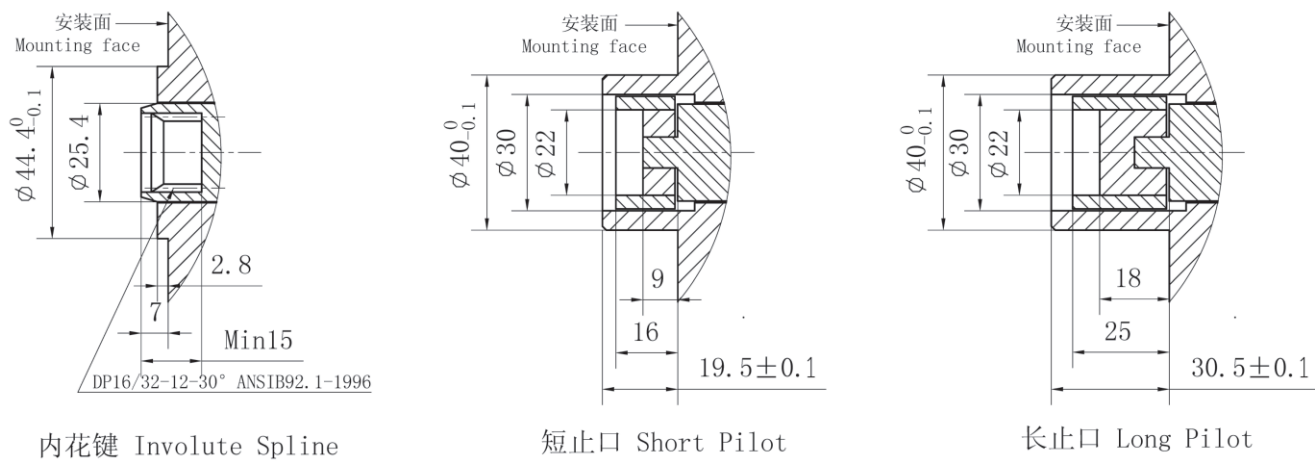
注①:50~400mL/r转向器的公称流量为转速100rpm时转向器所需流量，500~630mL/r转向器的公称流量为转速85rpm时转向器所需流量，800~1000mL/r转向器的公称流量为转速75rpm时转向器所需流量。

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.

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	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.

型号说明 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

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)

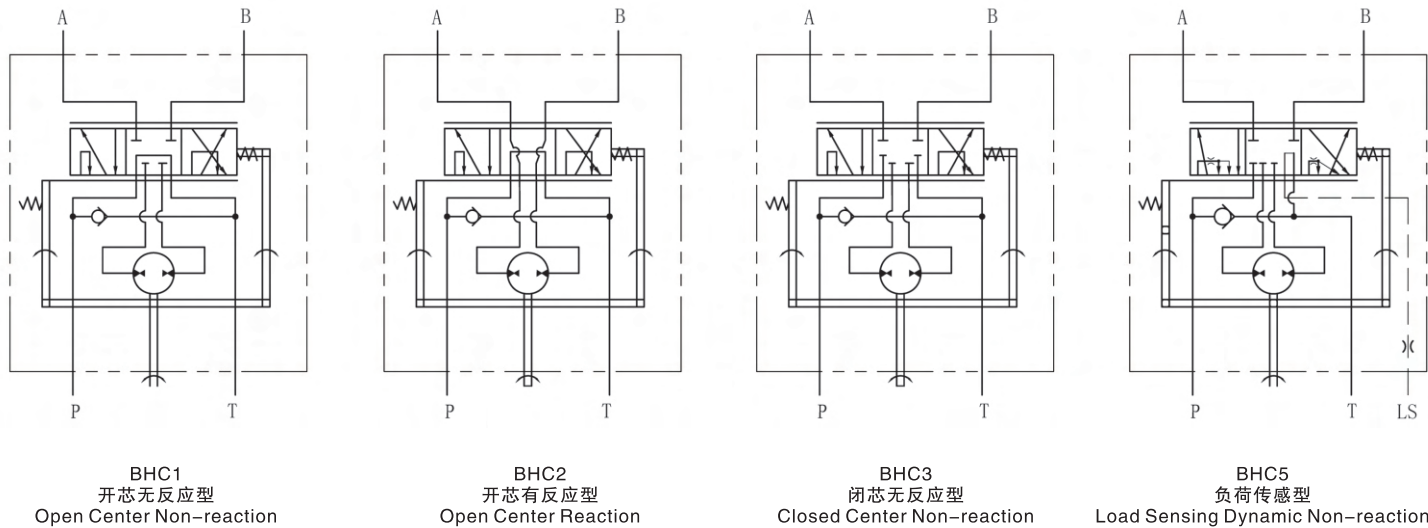
POS.4	安装止口连接方式
省略Omit	内花键 Involute Spline
S	短止口 Short Pilot
L	长止口 Long Pilot

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

BHC1, BHC2, BHC3, BHC5系列是一种在BHR系列基础上开发的侧面油口型全液压转向器，具有和BHR系列转向器完全一样的产品性能，可满足用户在安装过程中油口方位需求。可广泛应用与拖拉机、叉车、工程机械等车辆的液压转向系统。

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

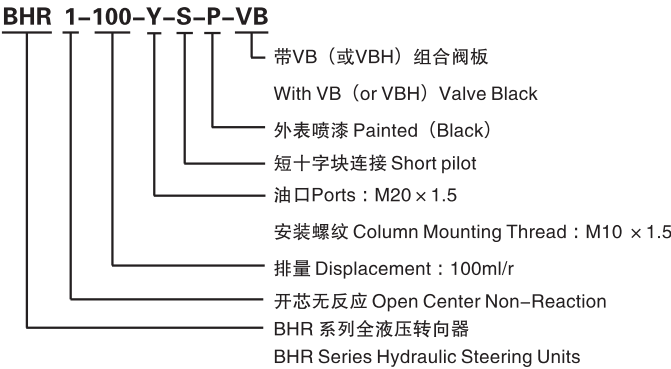
性能参数 Parameters		型号 Type											
		BHC1, BHC2,BHC3, BHC5								BHC1, BHC3, BHC5			
排量 Displacement	mL/r	50	63	80	100	125	160	200	250	280	315	400	
公称流量① Rated Flow①	L/min	5	6	8	10	12.5	16	20	25	28	31.5	40	
最大入口压力 Max.Input Pressure	MPa	16											
T口最大连续背压 Max.Cont.Pressure in Line T	MPa	1.6											
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.

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



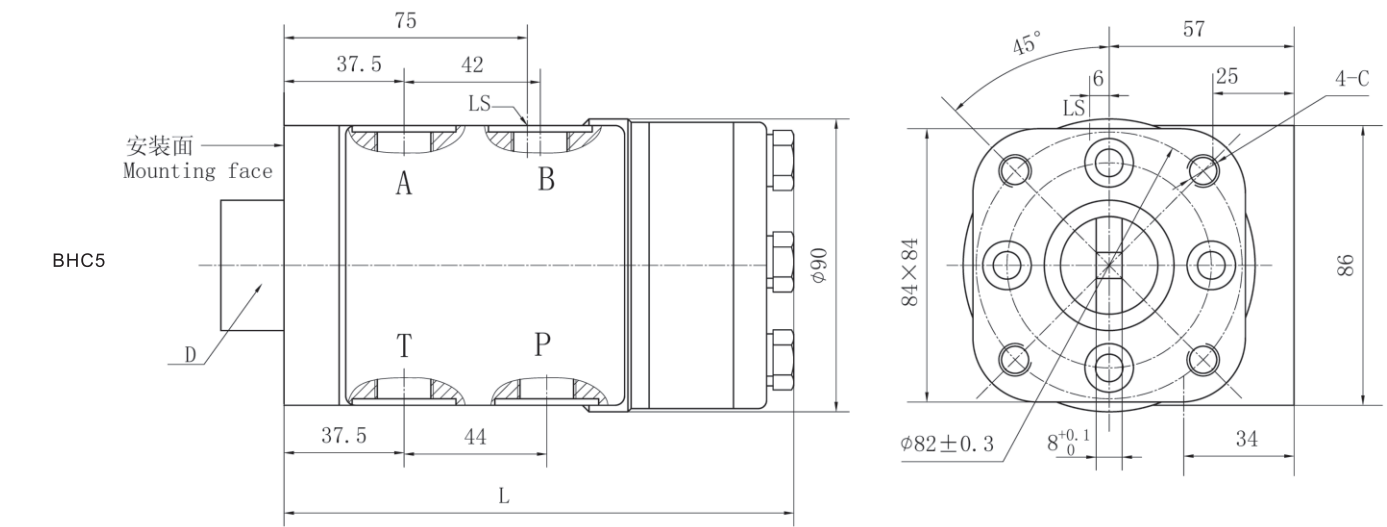
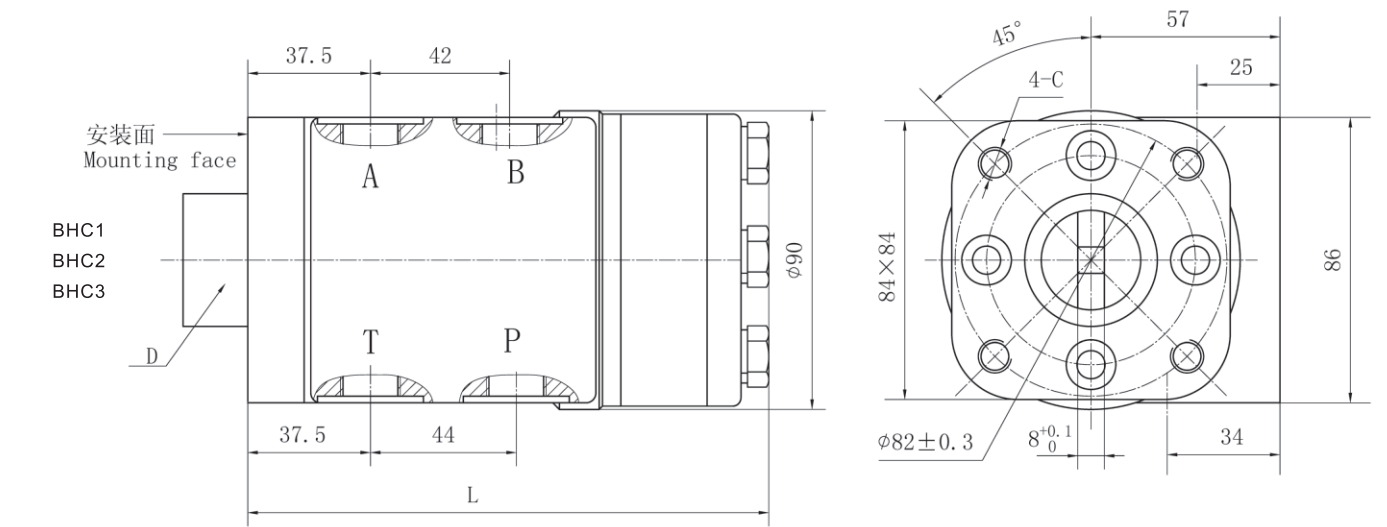
应用举例2 For Example 2:

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。

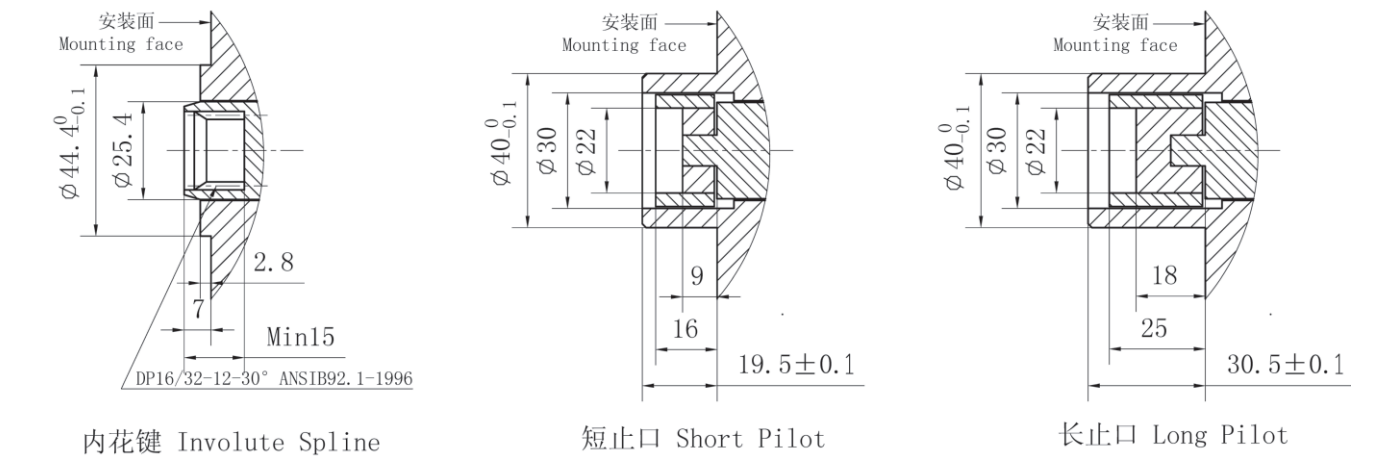
转向器编号为：BHR5-125-Y-P



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



BPB1, BPB2, BPB3, BPB5系列全液压转向器其内部结构与BHR1、2、3、5系列相似，连接尺寸比较紧凑，符合国外标准，与国外产品有较强的竞争力。

BPB5型负荷传感转向器与YXL型等类型的优先阀配套使用于负荷传感液压转向系统。

特点：

- 对转向负载的变化有良好的压力补偿；
- 转向回路流量、压力保持优先，转向性能可靠；
- 转向回路与其他工作回路互不影响，从而提高了系统效率；
- 转向灵敏度高，响应快，寒冷条件下的启动特性良好。

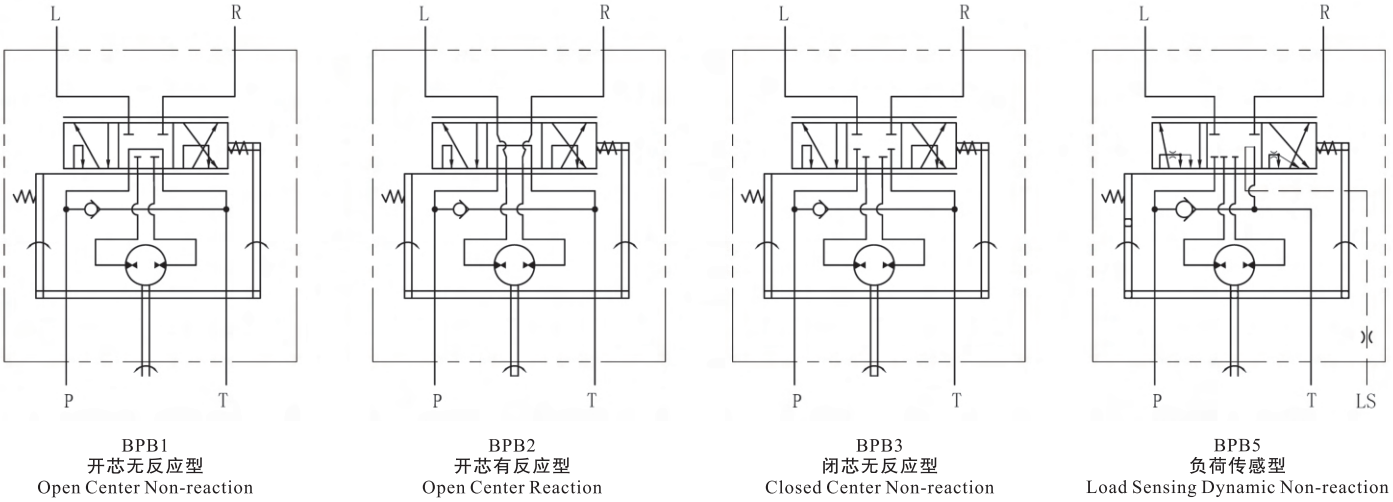
BPB1, BPB2, BPB3, BPB5 Hydraulic steering control units(SCU)has similar structure with BHR1,BHR2,BHR3,BHR5,connecting dimension a little different,according to most European and US standard.

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

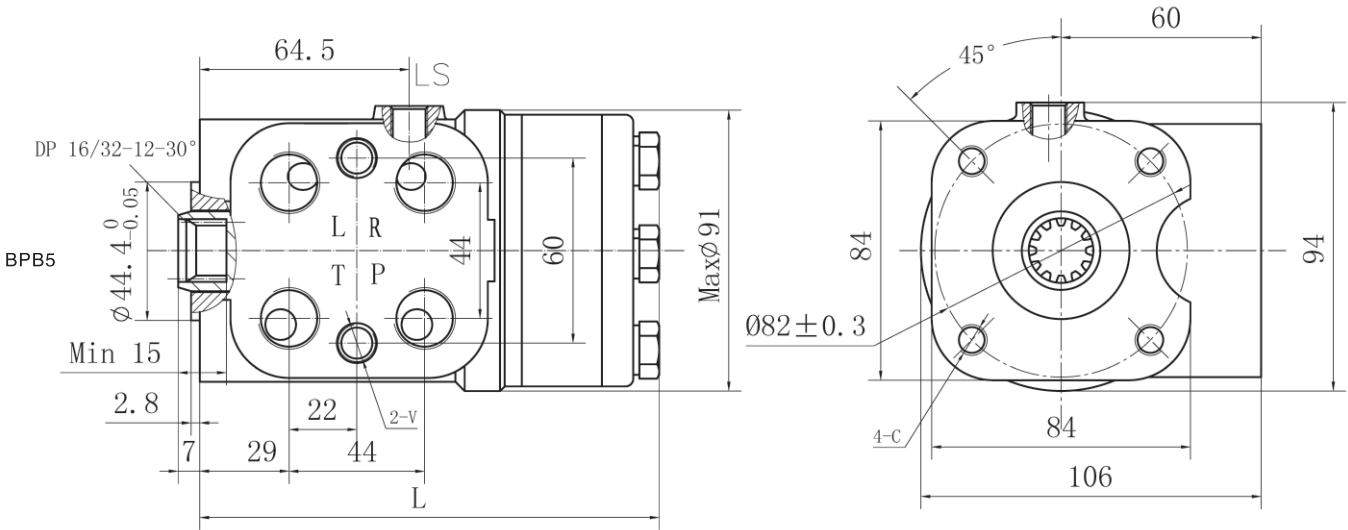
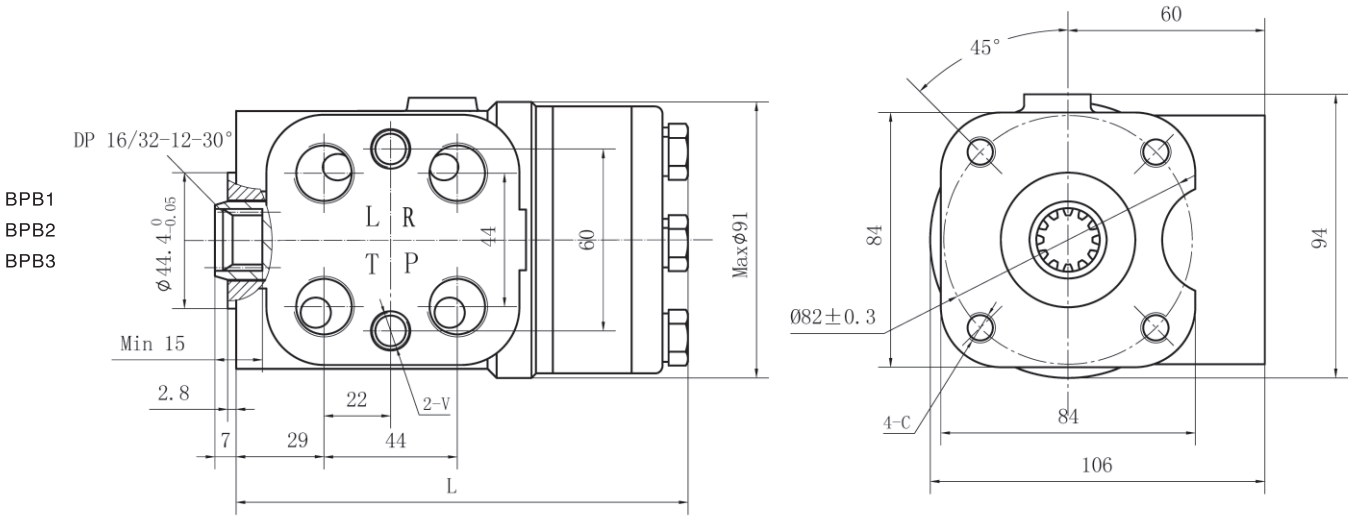


■ 主要性能参数 MAIN SPECIFICATION DATA

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.

■ 外形连接尺寸 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.

型号说明 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

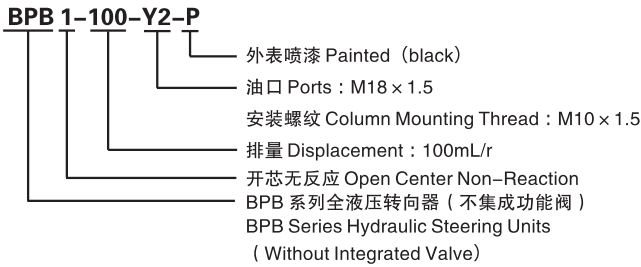
POS.4	外观喷漆 Paint
省略Omit	不喷漆 No Paint
P	喷漆 (黑) Painted (Black)

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



BPB3X、BPB5X是两种不同的负载平衡型液压转向器，转向器中位状态时，L，R口压力平衡并且和T口相通。BPB3X、BPB5X一般和相应的流量放大阀配套使用，主要应用于低速，非道路的大型轮式工程车辆的液压转向系统。

BPB3X是闭芯负载平衡型液压转向器；

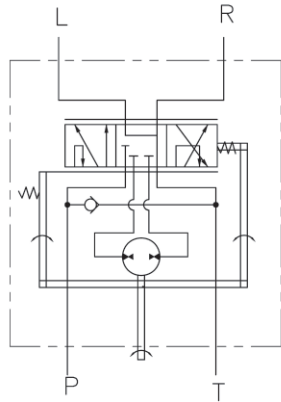
BPB5X是负荷传感，负载平衡型液压转向器，分动态信号和静态信号两种。

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.

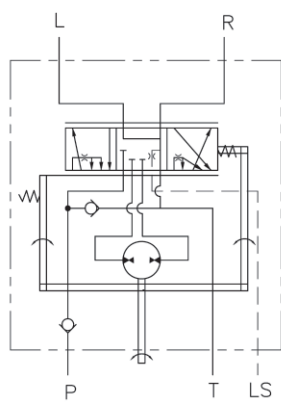
BPB3X is closed center, load balance hydraulic steering unit.

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

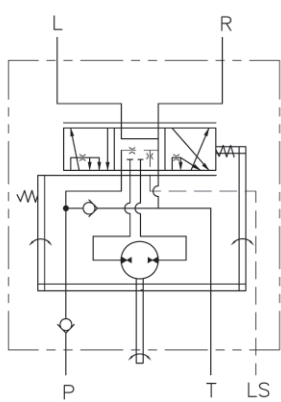
液压原理图 HYDRAULIC CIRCUIT



BPB3X
闭芯式负载平衡型
Closed Center ,Load Balance



BPB5X
动态信号负荷传感、负载平衡型
Load Sensing Dynamic ,Load Balance



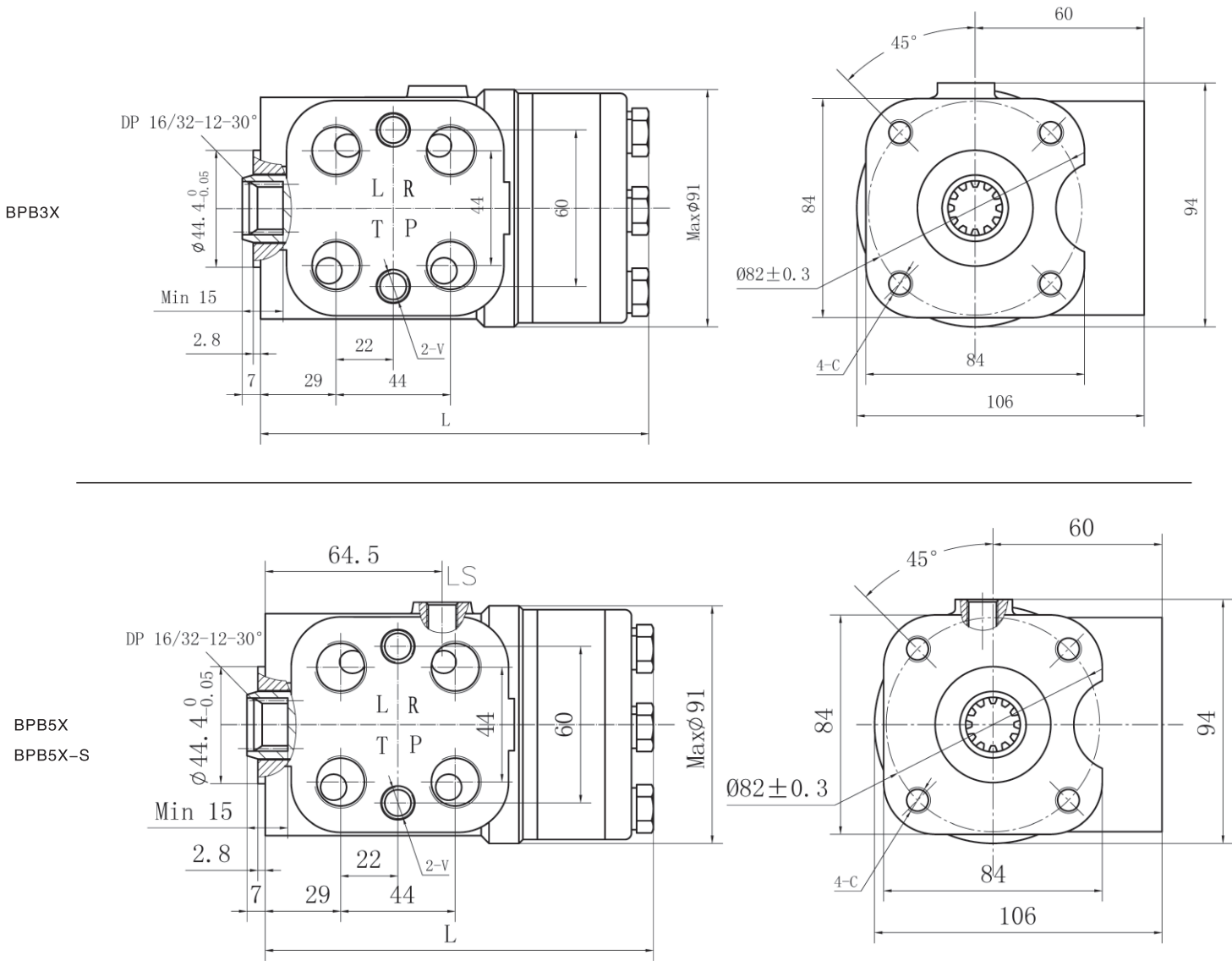
BPB5X-S
静态信号负荷传感、负载平衡型
Load Sensing Signal ,Load Balance

主要性能参数 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.

外形连接尺寸 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 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BPB5X型转向器。
Note①：Port LS is only fit for BPB5X type hydraulic steering unit.

型号说明 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
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.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，外表喷黑漆。

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

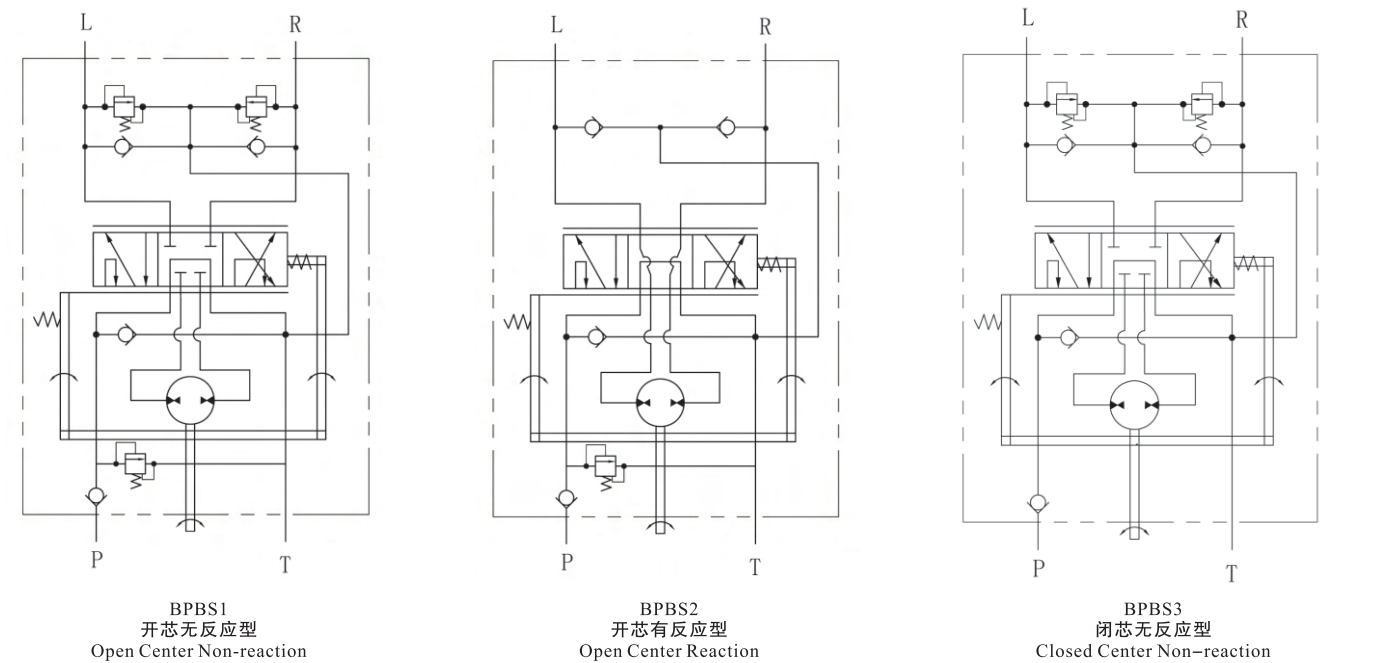
BPB 5X-160-Y4-P

- 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系列全液压转向器其安装尺寸与BPB1、2、3系列相似，但在转向器内部集成了安全阀、过载阀、补油阀、入口单向阀，可根据不同要求任意组合，结构紧凑，体积小，使用方便，符合国外标准，与国外产品有较强的竞争力。

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.

■ 液压原理图HYDRAULIC CIRCUIT

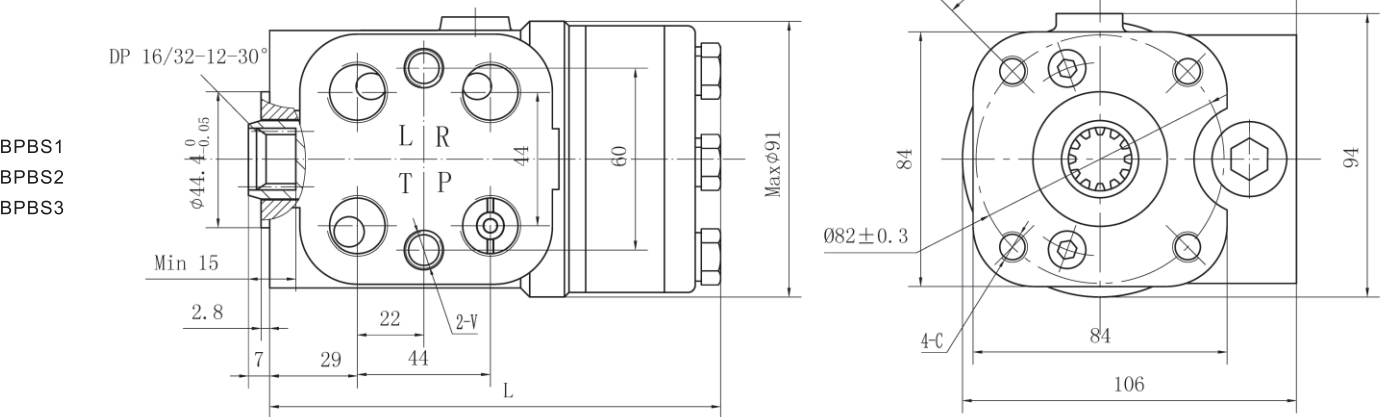


■ 主要性能参数MAIN SPECIFICATION DATA

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	Lmm	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.

■ 外形连接尺寸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
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

■ 型号说明ORDER CODE

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

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.

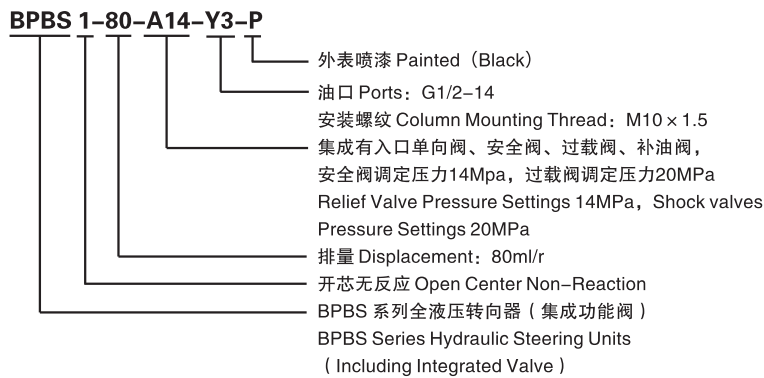
POS.4	油口Ports	POS.5	外观喷漆Paint
Y, Y1, Y2	JB/T7912-1999 (ISO 262)	省略Omit	不喷漆No Paint
Y3	GB/T707-1987 (ISO228/1)	P	喷漆(黑)Painted (Black)
Y4	ANSI B1.1-1982		

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:

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。

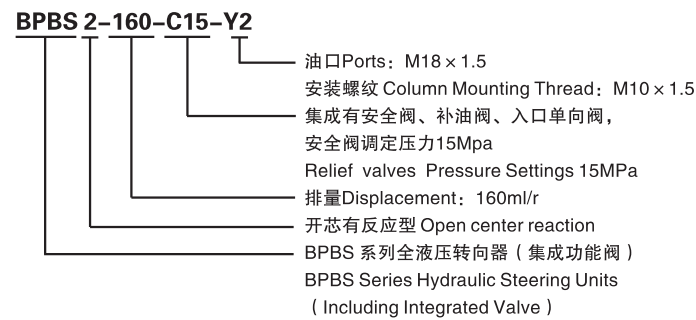
转向器编号为：BPBS1-80-A14-Y3-P



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。

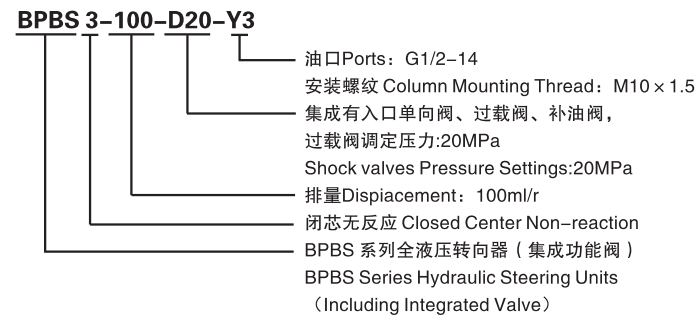
转向器编号为：BPBS2-160-C15-Y2



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负荷传感全液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。

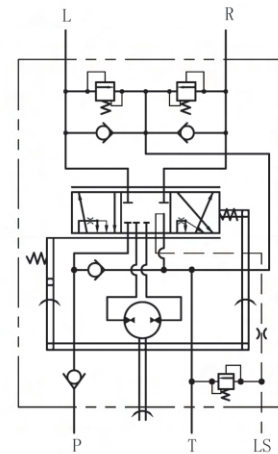
BPBS5,BPBS5E,BPBS5L,BPBS5T,BPBS5TE series load sensing hydraulic steering control units are an important element in the load sensing steering system.Together with fixed displacement pump, various displacement pump with constant pressure or load sensing pump (variable displacement pump with flow, pressure 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.

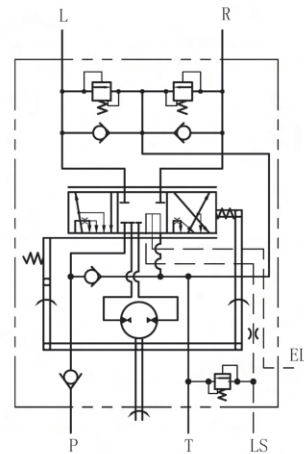
BPBS5E、BPBS5TE load sensing steering control units has EL electrical control port, and it is connected with L or R line. EL port is equipped with and electro-hydraulic relay to achieve hydraulic control system.

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

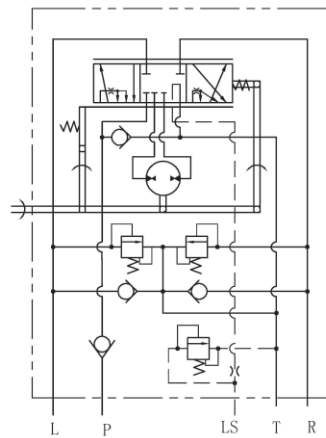


BPBS5T

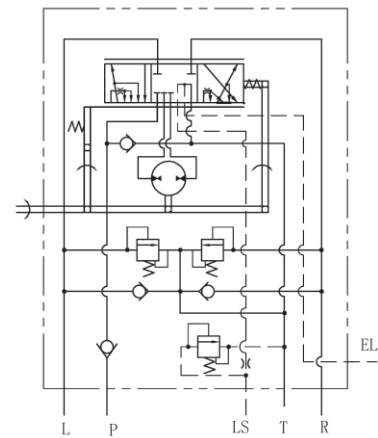


BPBS5TE

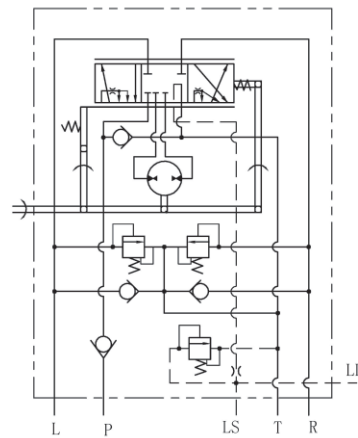
负荷传感型,管式优先阀连接
Load Sensing Dynamic Non-reaction, Pipe Mounting



BPBS5



BPBS5E



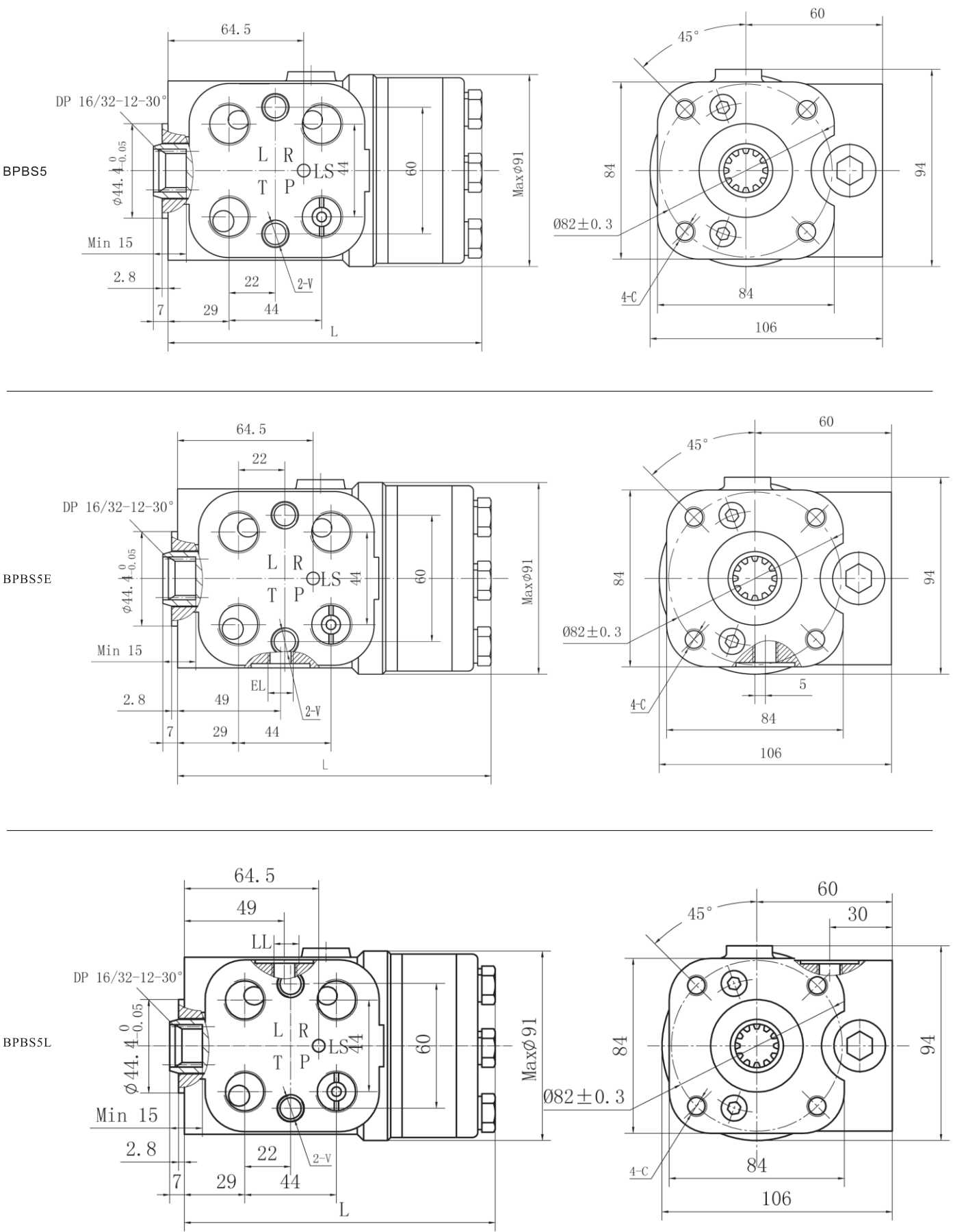
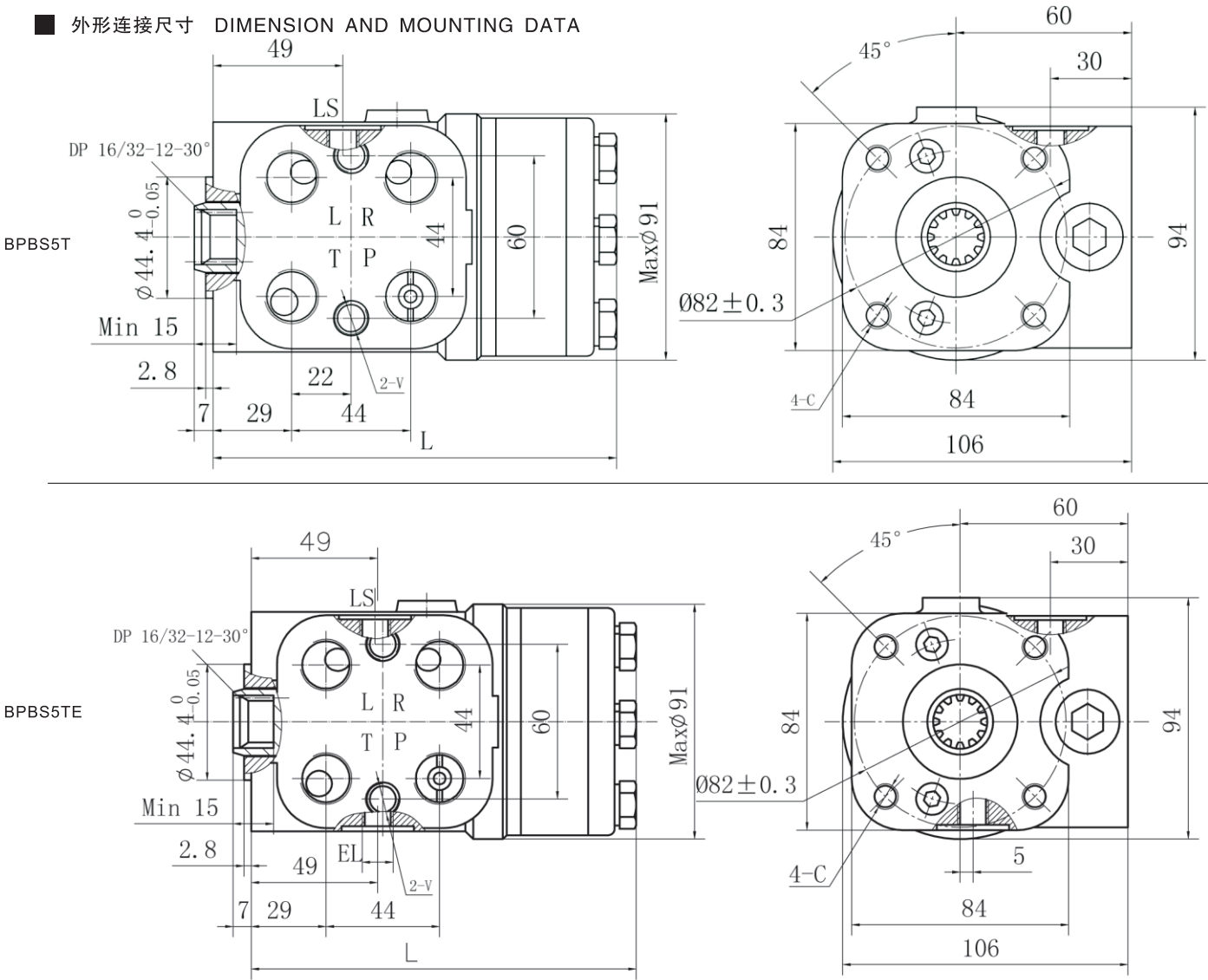
BPBS5L

主要性能参数 MAIN SPECIFICATION DATA

性能参数 Parameters	型号Type											
	BPBS5, BPBS5E, BPBS5L,BPBS5T, BPBS5TE								BPBS5T, BPBS5TE			
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										
LS安全阀压力设定值 LS 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	175
重量 Weight	kg		5.8	5.9	6	6.1	6.2	6.4	6.5	6.7	7	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.

外形连接尺寸 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	LL、EL口螺纹③ Port Ls③
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.

型号说明 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 , Modulary 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					
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	*	*	*	*		—
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)

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.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 , Modulary 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 , Modulary 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

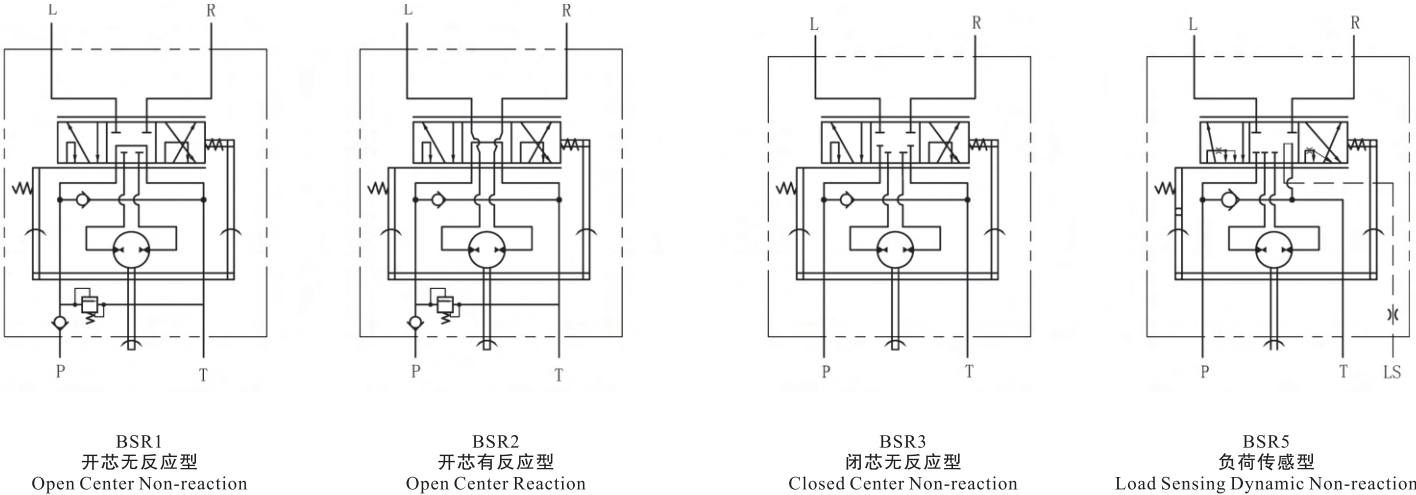
BPBS 5TE-100-A10-Y3-P

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系列全液压转向器内部装有安全阀、入口单向阀、其结构紧凑，适合安装于狭窄空间，广泛用于工程机械、叉车、农用机械等低速车辆的液压转向。操作上轻便、灵活、可靠。符合国外标准，与国外产品有较强的竞争力。

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.

■ 液压原理图 HYDRAULIC CIRCUIT

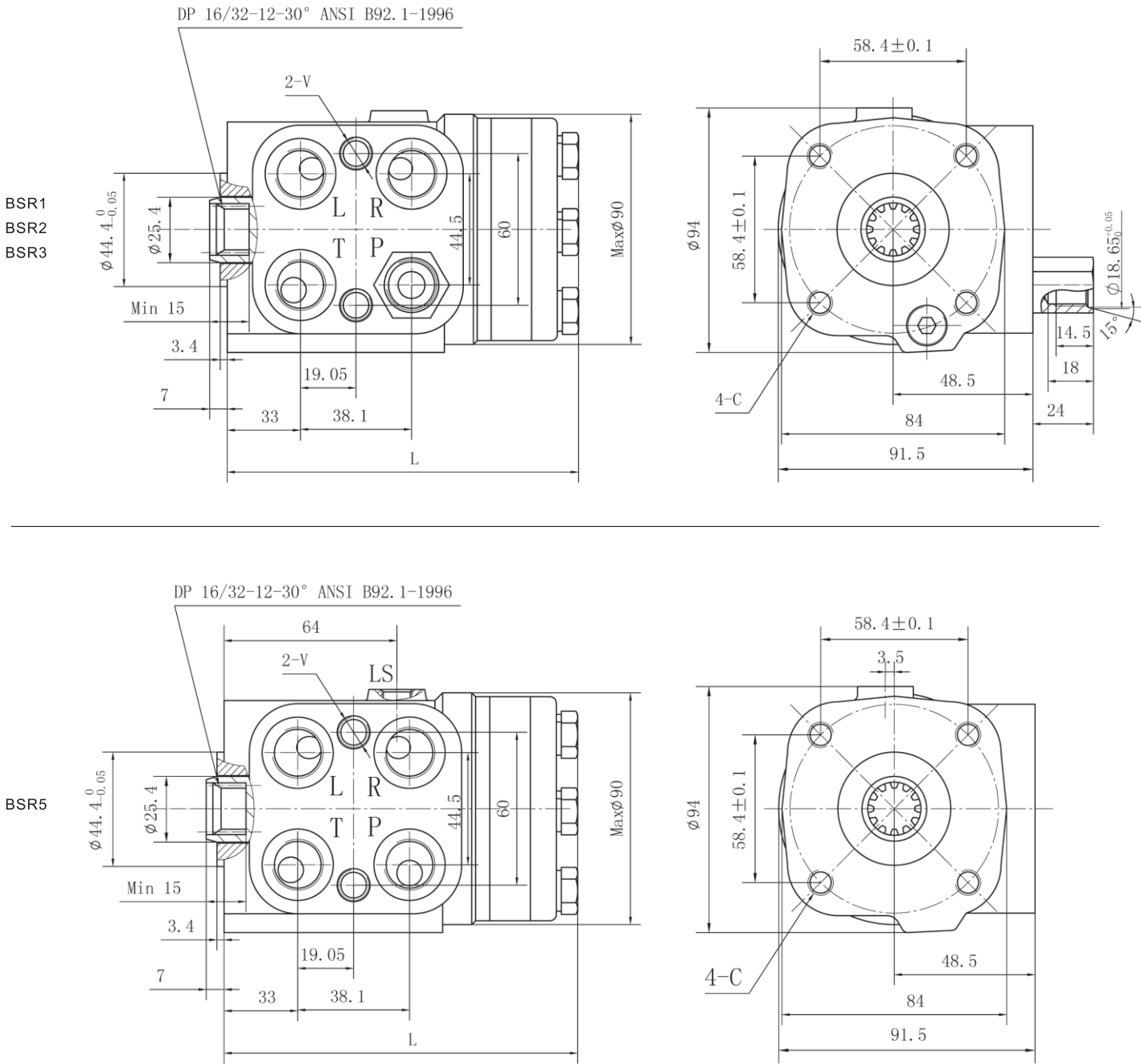


■ 主要性能参数 MAIN SPECIFICATION DATA

性能参数 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.

■ 外形连接尺寸 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

注①, LS油口仅适合BSR5型转向器。
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。

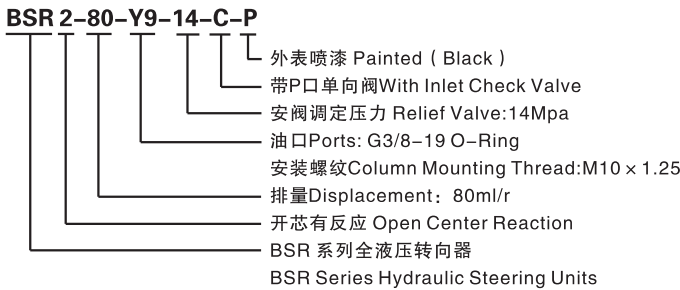
转向器编号为：BSR1–100–Y9–10–P



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



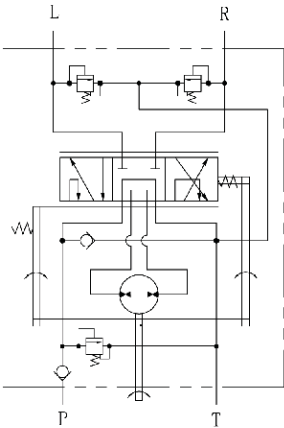
BSM系列是一款小巧轻便的微型液压转向器，适用于小
型拖拉机，割草机，叉车，市政车辆，园艺设备等轻型车辆。
可以根据用户的不同需求，集成包括：安全阀，过载阀，入口
单向阀等不同的功能阀。

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

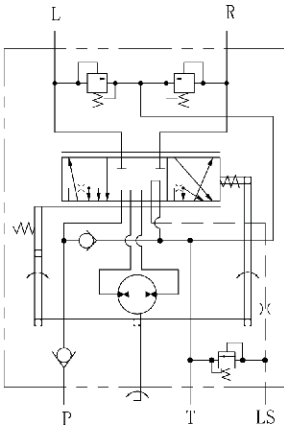
■ 液压原理图

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

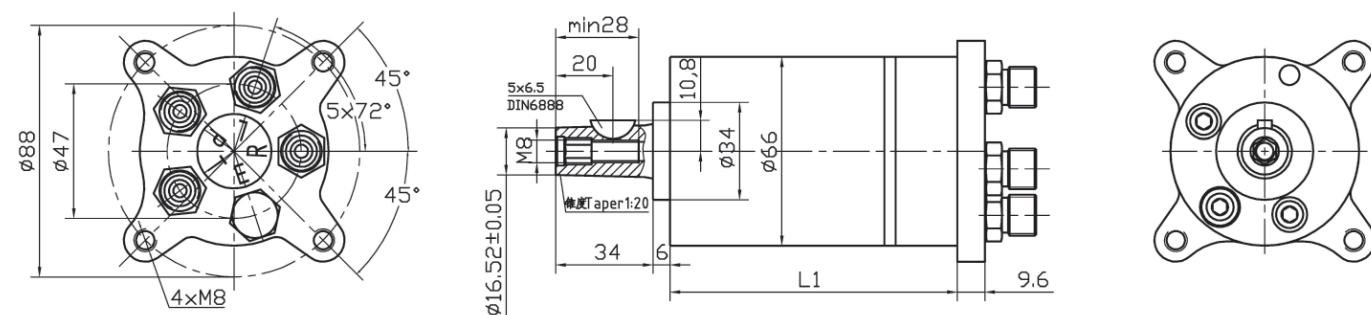
■ 主要性能参数

MAIN SPECIFICATION DATA

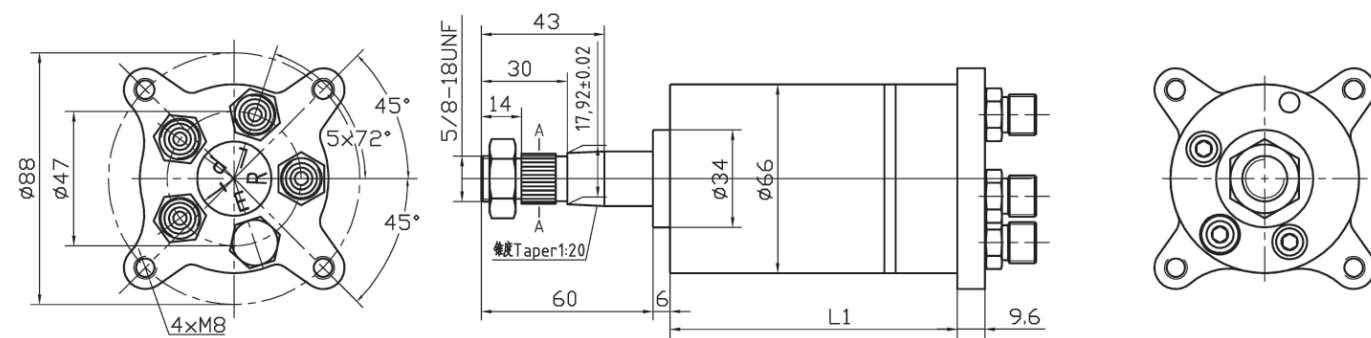
性能参数 Parameters			型号Type						
			BSM1,BSM5						
排量 Displacement			mL/r	32	40	50	63	80	100
推荐流量（仅BSM1） Recomended flow（only for BSM1）			L/min	3–9	4–12	5–15	6–18	7–20	7–20
公称流量（仅BSM5） ^① Rated Flow（only for BSM5） ^①			L/min	3	4	5	6	8	10
最大入口压力 Max.Input Pressure			MPa	14					
T口最大连续背压 Max.Cont.Pressure 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.

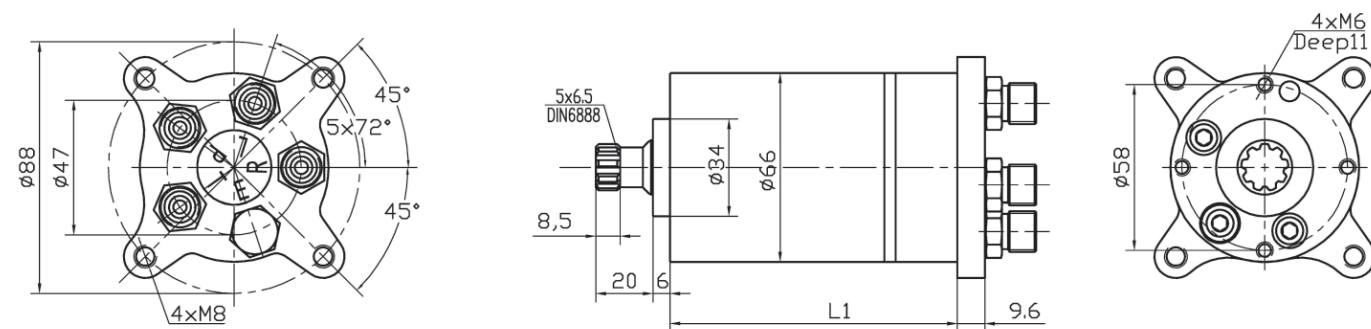
■ BSM1外形连接尺寸 DIMENSION AND MOUNTING DATA FOR BSM1



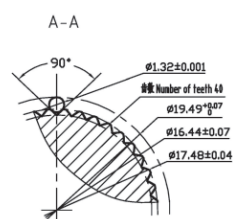
K1型输入轴连接形式 K1 type Input shaft option



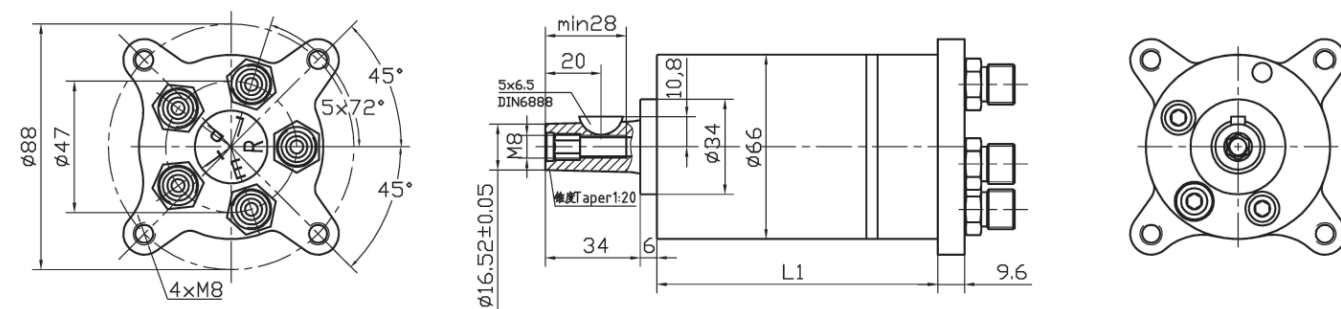
K2型输入轴连接形式 K2 type Input shaft option



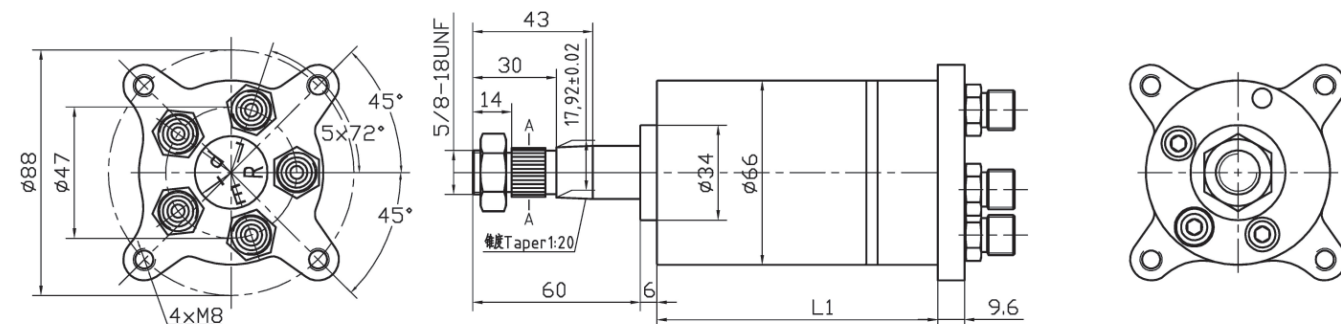
K3型输入轴连接形式 K3 type Input shaft option



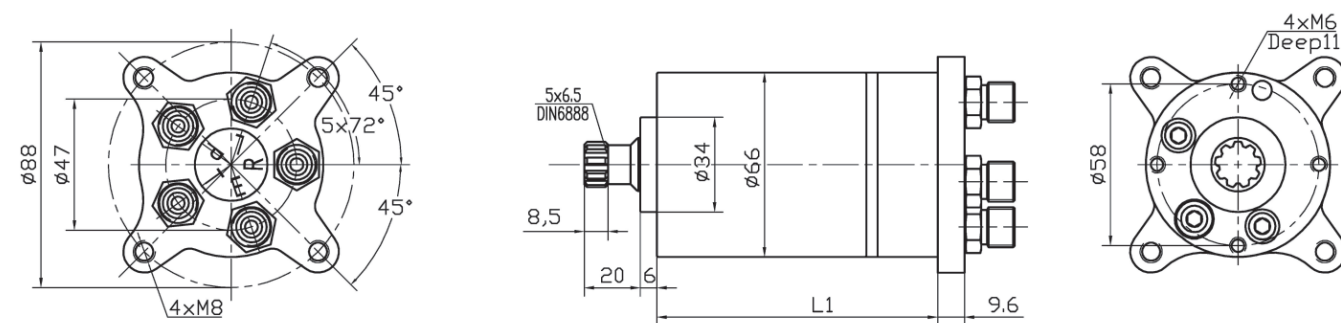
■ BSM5外形连接尺寸 DIMENSION AND MOUNTING DATA FOR BSM5



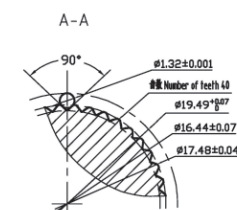
K1型输入轴连接形式 K1 type Input shaft option



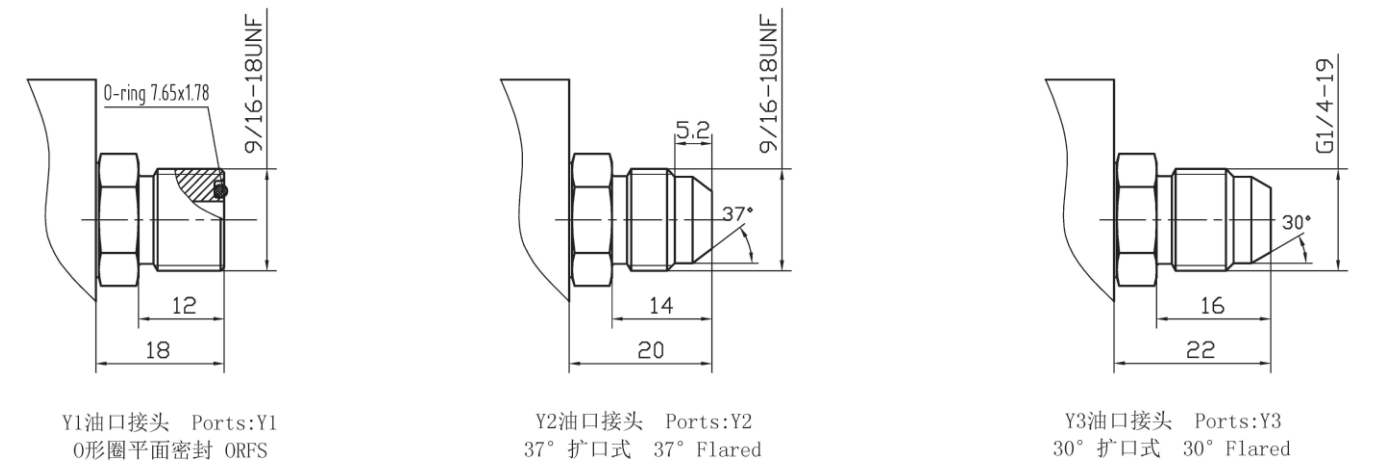
K2型输入轴连接形式 K2 type Input shaft option



K3型输入轴连接形式 K3 type Input shaft option



油口接头 OIL PORTS



型号说明 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:

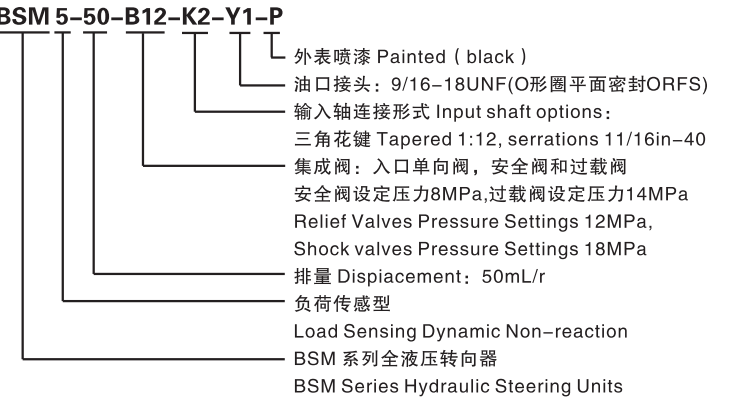
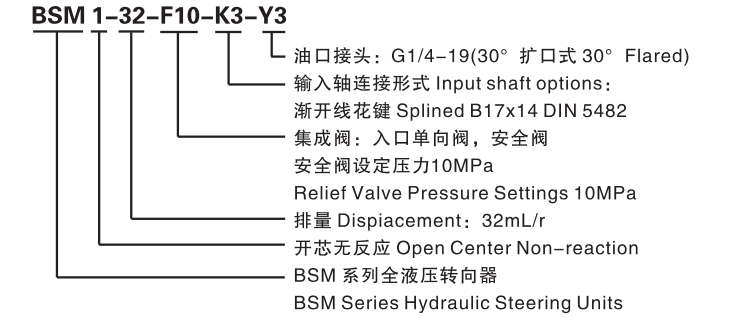
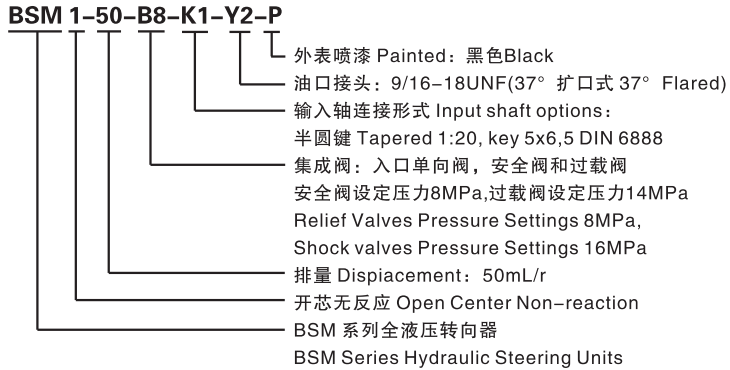
BSM型转向器，开芯无反应；排量32mL/r；集成有入口单向阀、安全阀等功能阀，安全阀调定压力8MPa；K3型输入轴连接形式,转向柱安装螺纹M6；P、T、L、R油口接头螺纹为G1/4-19(30° 扩口式)；外表不喷漆。

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



BQAS1是一种新型的开芯无反应型液压转向器，其内置有流量补偿装置，具有独特伺服放大原理，可实现放大倍数：1:1.3、1:1.5、1:2、1:2.5的流量放大功能，当量排量基本不受液压转向器方向盘转速的影响。

在动力转向模式下，具有100mL/r ~ 500mL/r排量的伺服放大转向功能；而在人力转向模式下，可实现80mL/r ~ 200mL/r排量应急转向功能，无伺服放大转向功能。

BQAS1型液压转向器具有安装体积小，转向性能稳定，以及实现小排量应急人力转向等优点，广泛应用于拖拉机、联合收割机、轮式装载机等轮式车辆的液压转向系统。

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.

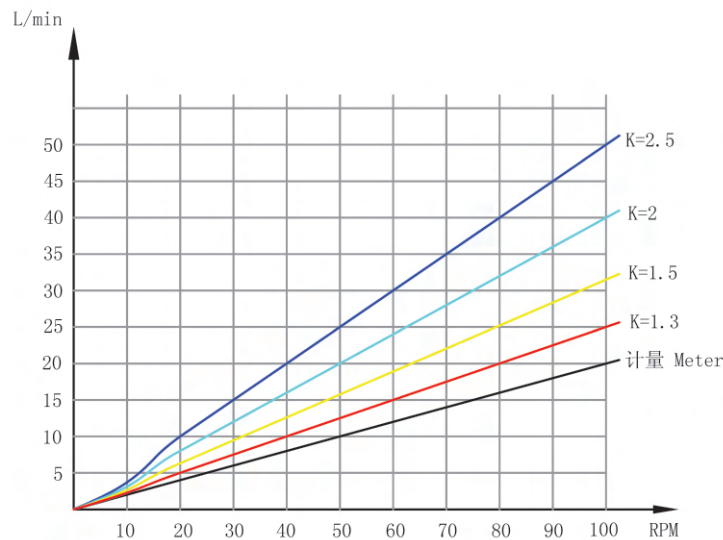
For power steering mode, it has the total flow amplifying function with the displacements from 100 ml/r to 500 ml/r. But for manual steering mode, it has emergency operation function with the displacements from 80 ml/r to 200 ml/r (without servo-amplifying) .

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.

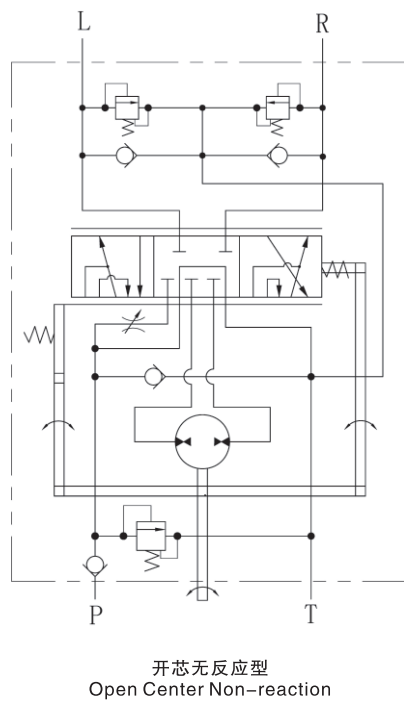
放大特性曲线 Amplification Characteristic Curve

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）：



液压原理图 HYDRAULIC CIRCUIT



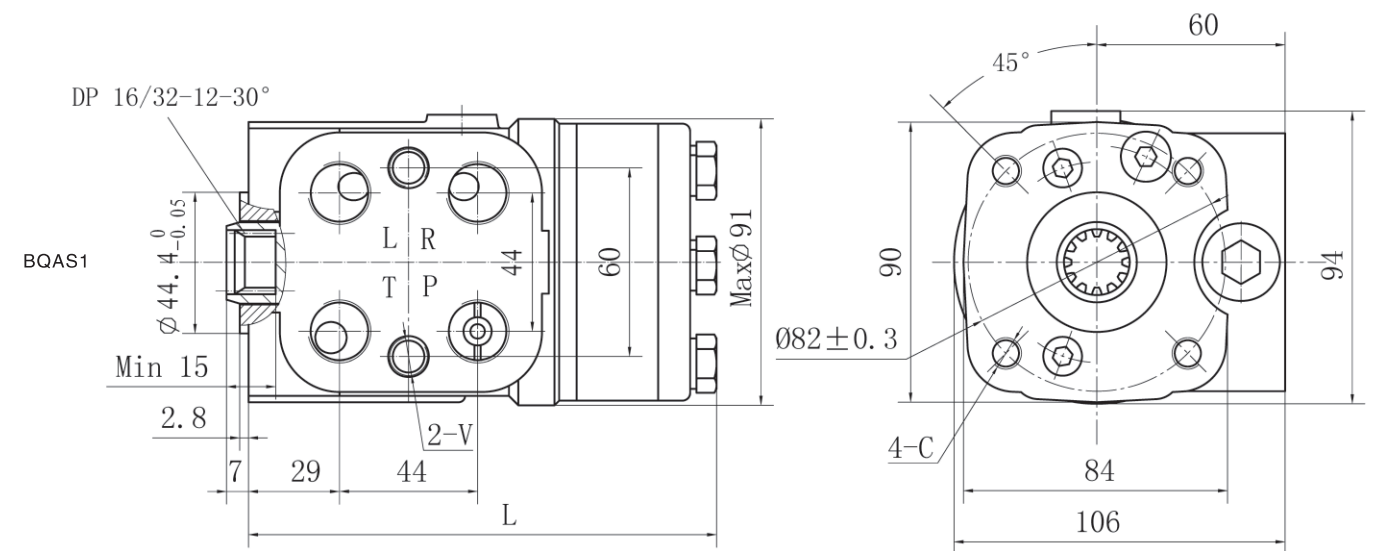
主要性能参数 MAIN SPECIFICATION DATA

性能参数 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 L/min		10	12.5	16	20	12.5	16	20	25	16	20	25	31.5	20	25	31.5	40	25	31.5	40	50
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, 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			
重量 Weight kg	kg	6				6.1				6.2				6.4				6.5			

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.

外形连接尺寸 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
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

型号说明 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	
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.

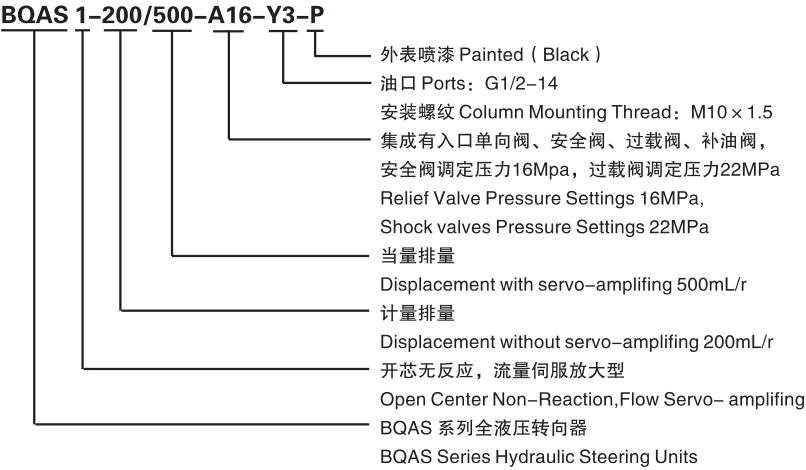
POS.5	油 口 Ports	POS.6	外观喷漆 Paint
Y、Y1、Y2	JB/T7912–1999（ISO 262）	缺省Omit	不喷漆 No Paint
Y3	GB/T707–1987（ISO228/1）	P	喷漆（黑）Painted（Black）
Y4	ANSI B1.1–1982		

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.

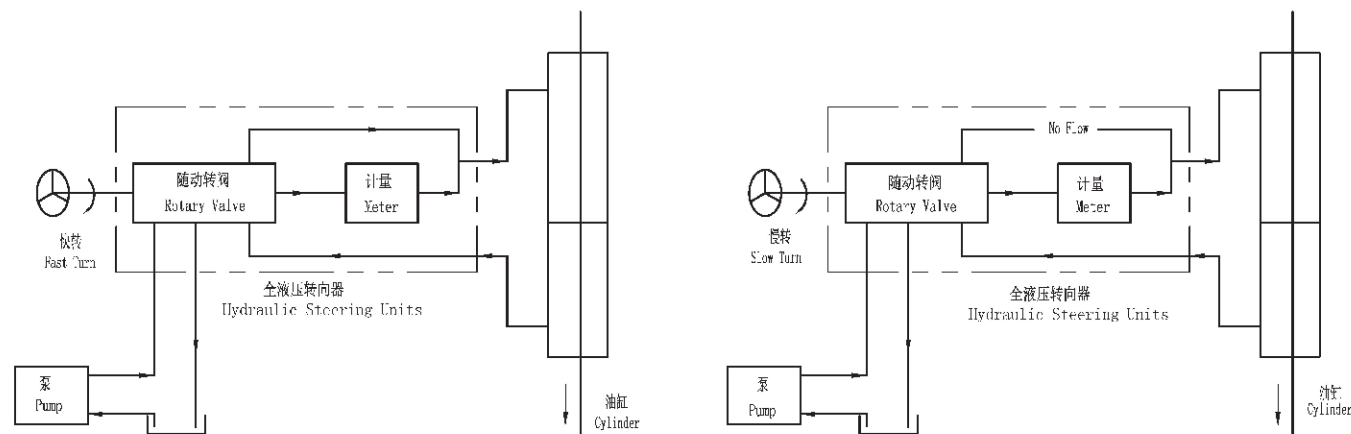
It is divided into two function types: dynamic signal and static signal, which are respectively used with dynamic and static signal (D)YXL type priority valves.

Features:

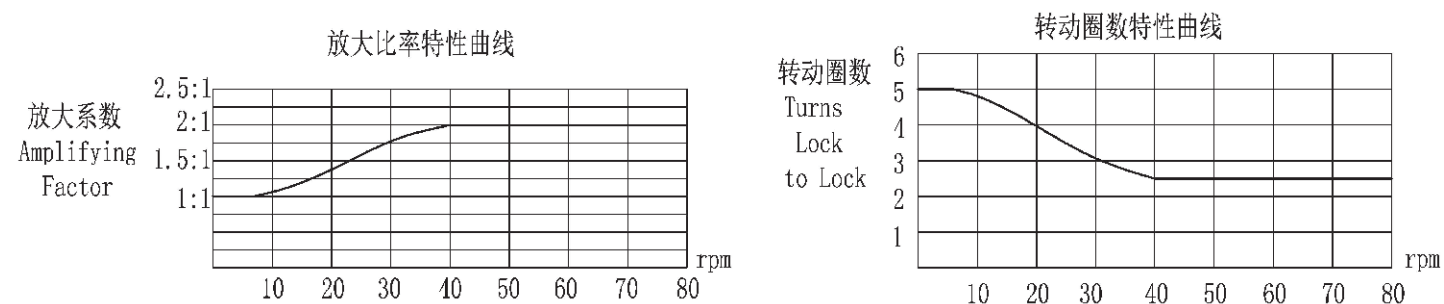
Excellent flow amplification principle: when turning quickly, the equivalent displacement of amplification function is realized. When turning at low speed, the steering unit's metering displacement is maintained. That means quicker response and better control on turning speed.

Special design of rotary valve: under large displacement, it can turn sensitively and reliably. It has less pressure loss and lower hydraulic noise.

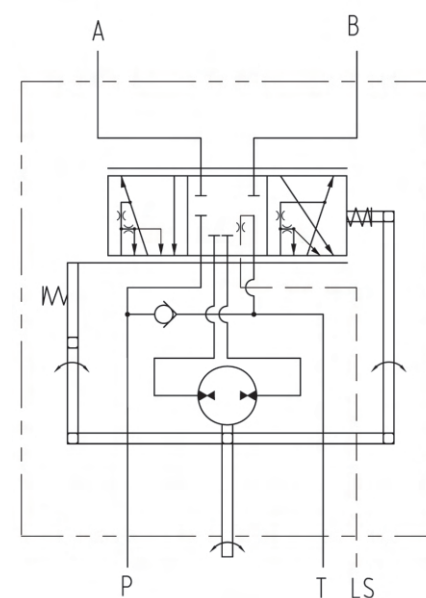
Principle design of load sensing: steering stability, low power consumption, and good start-up performance.



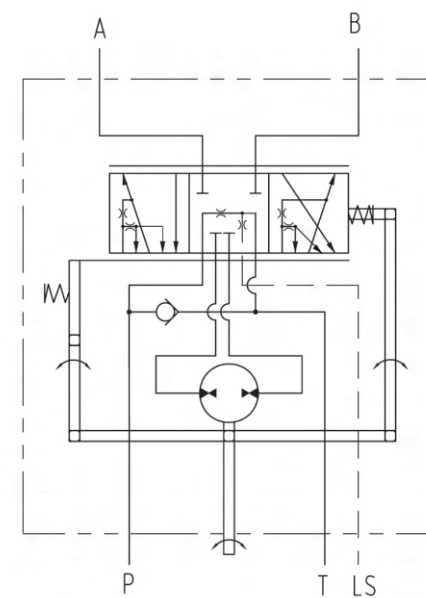
特性曲线 FUNCTION DIAGRAMS



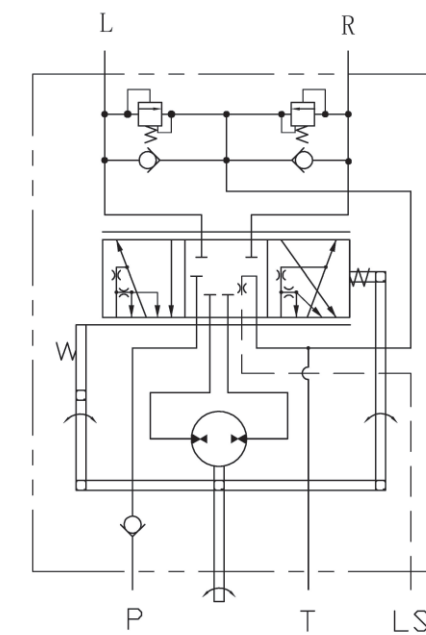
液压原理图 HYDRAULIC CIRCUIT



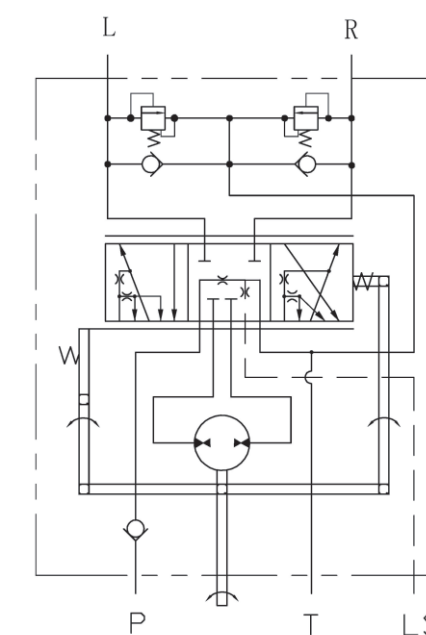
BHA5
动态信号
Dynamic Signal



BHA5
静态信号
Static Signal



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
BHAS	*	-	*	-	*	-	*	-	*	-	*

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		

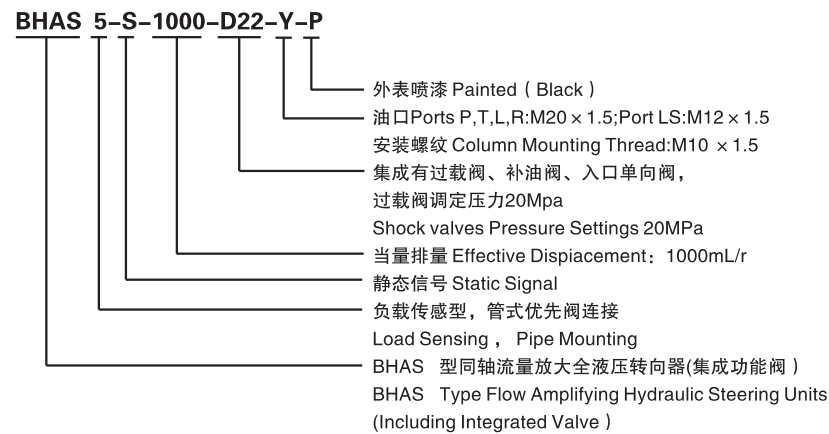
POS.4	集成阀代码及设定压力 Integrated Valve Code and Pressure Settings			
集成阀代码 Integrated Valve Code				集成阀设定压力 Integrated Valve Pressure Settings
代码 Code	入口单向阀 Inlet Check Valve	过载阀 Shock valves	补油阀 Suction valves	过载阀设定压力 Shock valves Pressure Settings (MPa)
D	*	*	*	20, 22, 23.5
H		*	*	20, 22, 23.5
省略Omit 不集成功能阀 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

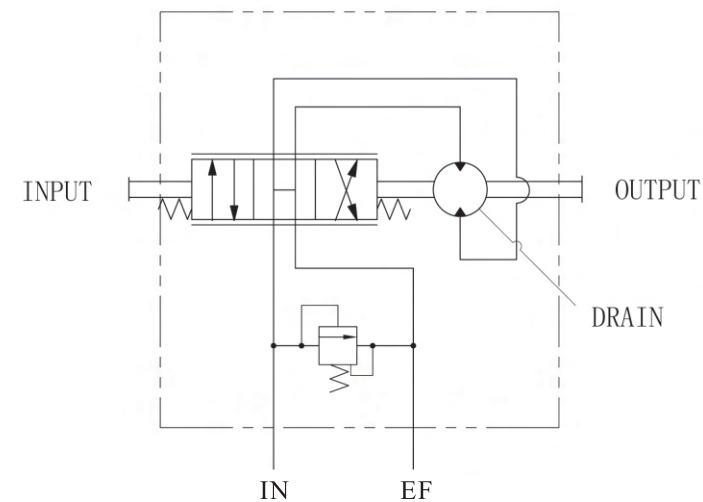


BFS扭矩发生器是由转阀和转定子副组成的开芯式液压转向元件，其集成保护液压转向回路的安全阀。扭矩发生器能够将液压能转化为机械能，输入较小扭矩就可以获得较大输出扭矩，其输出扭矩是输入扭矩和定子体副输出扭矩之和，输出转速和方向盘速度相同。它广泛用于轮式行走机械特别是高速水稻插秧机、大型手动闸门等。其转动灵活，操作省力，工作平稳，结构紧凑，紧急情况可实现人力转向。

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

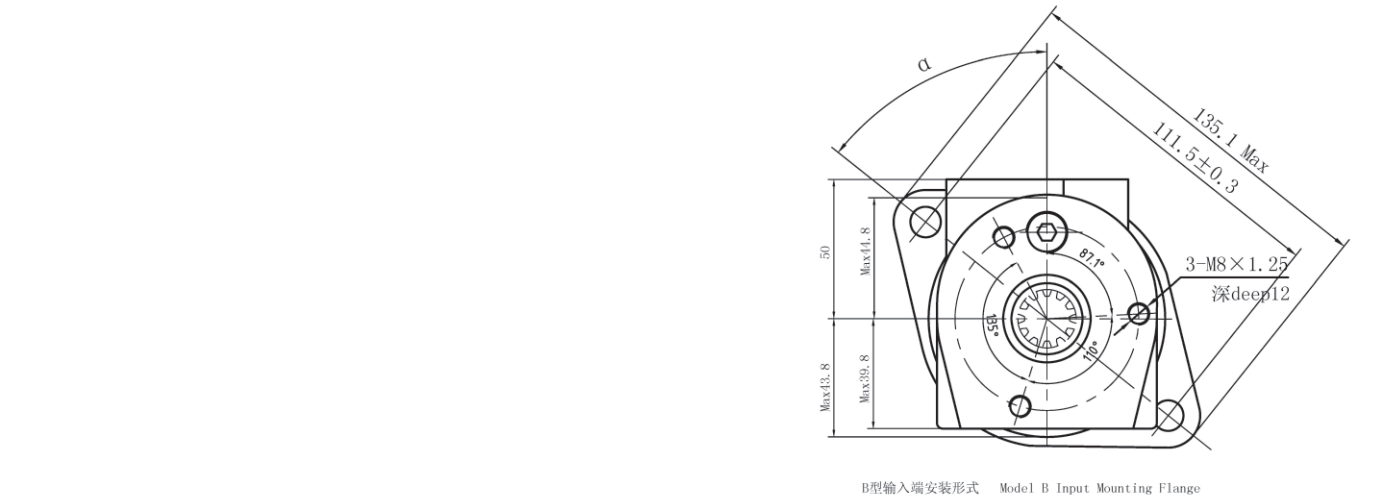
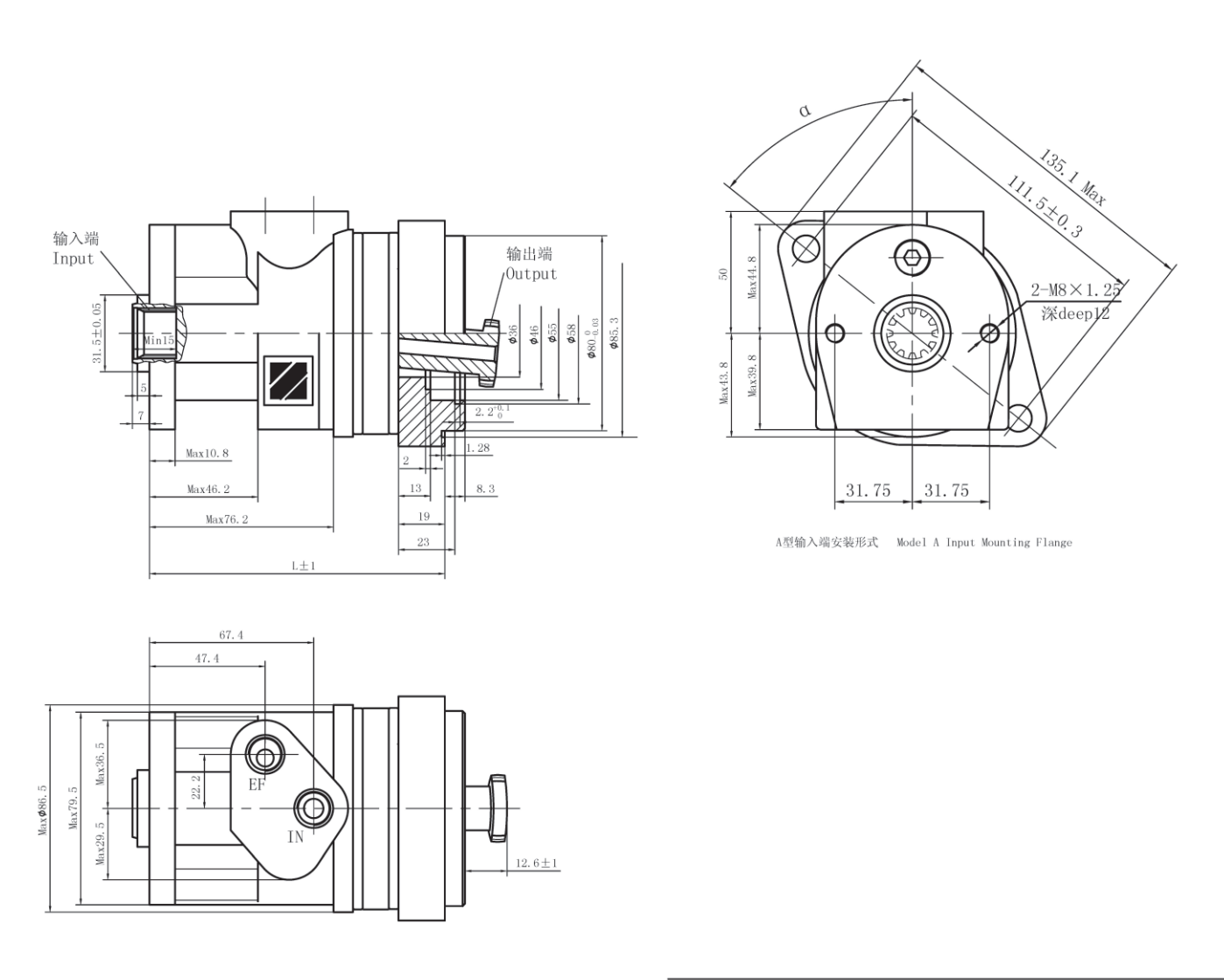


BFS1
开芯式 Open Center

■ 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 .Pressure 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

外形连接尺寸 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)					POS.4	输入端安装形式 Input Mounting Type				
5~12.5						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	α=0°				
Y2	IN, EF:G3/8-19 O-ring		深Deep 15			2	α=51.4°				
Y3	IN:G1/4-19, EF: G3/8-19 O-ring		深Deep 15			3	α=77.1°				

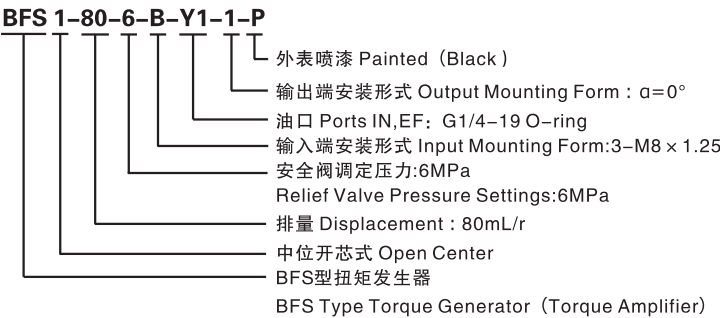
注：其它油口及连接方式可按用户需求协议确定
Note : other code of ports and mounting can be according to the user demand protocol

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

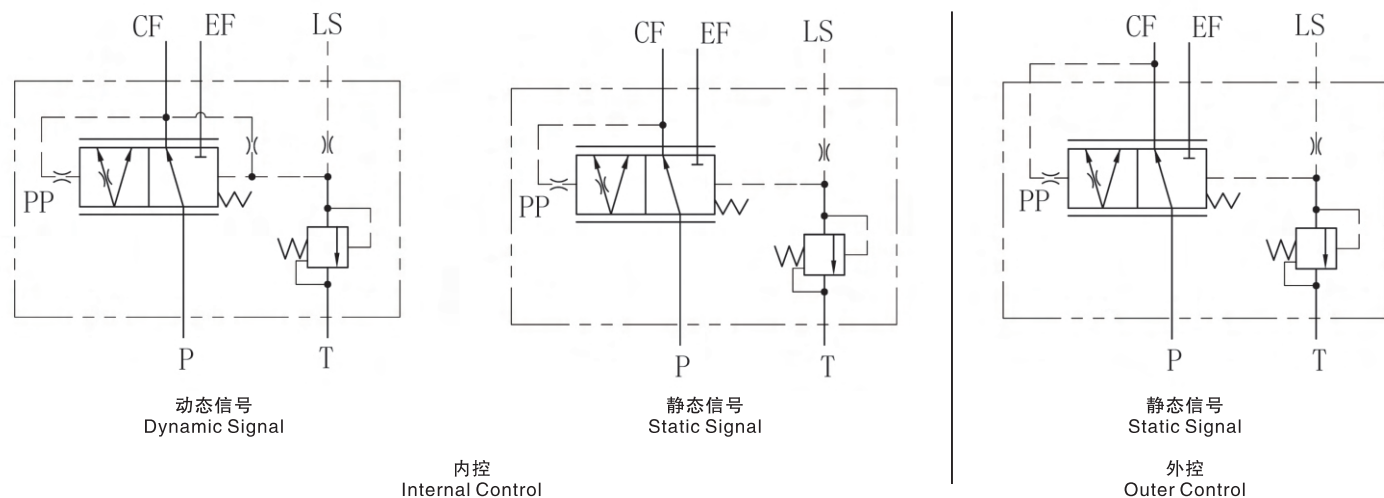


YXL型优先阀是一种定差减压液压元件,无论负荷传感转向系统负载压力和油泵供油量如何变化,优先阀均能保持供给转向器的流量始终等于方向盘转速与转向器排量的乘积,确保转向器所需流量。与BHR5、BPB5、BPBS5T等负荷传感型全液压转向器配套使用,广泛应用于农业机械,工程机械,叉车等领域。

分为动态信号和静态信号两种形式。

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.

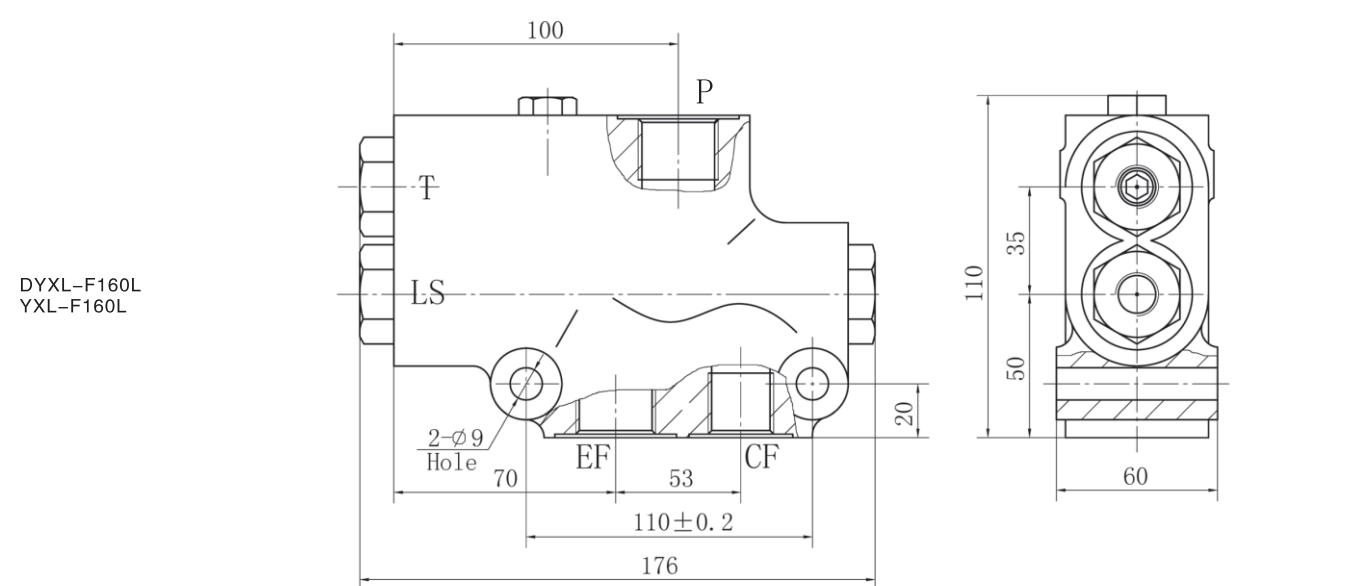
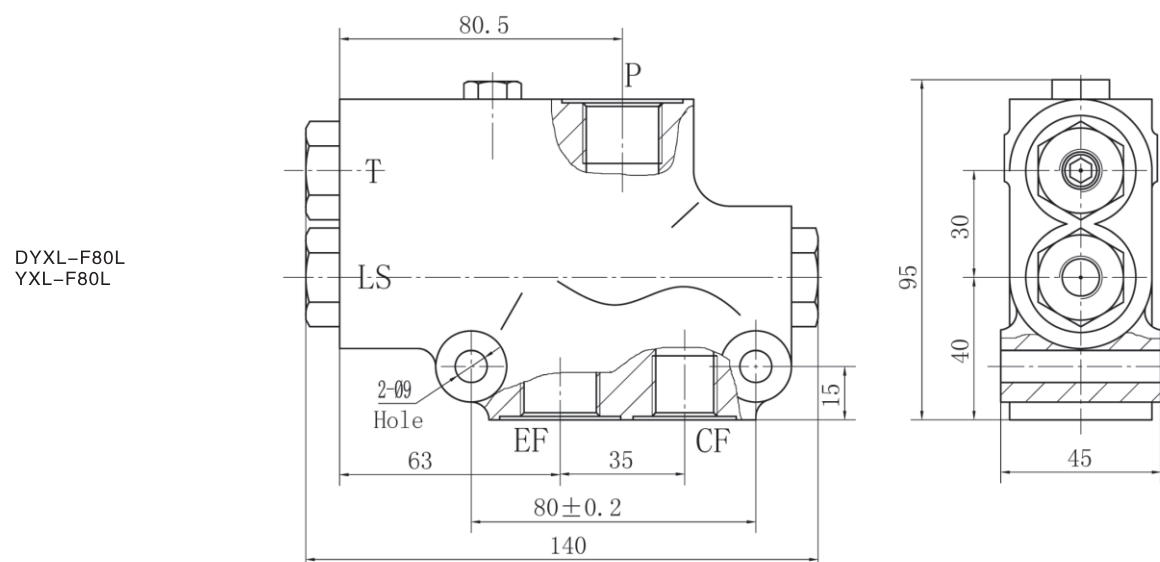
■ 液压原理图 HYDRAULIC CIRCUIT



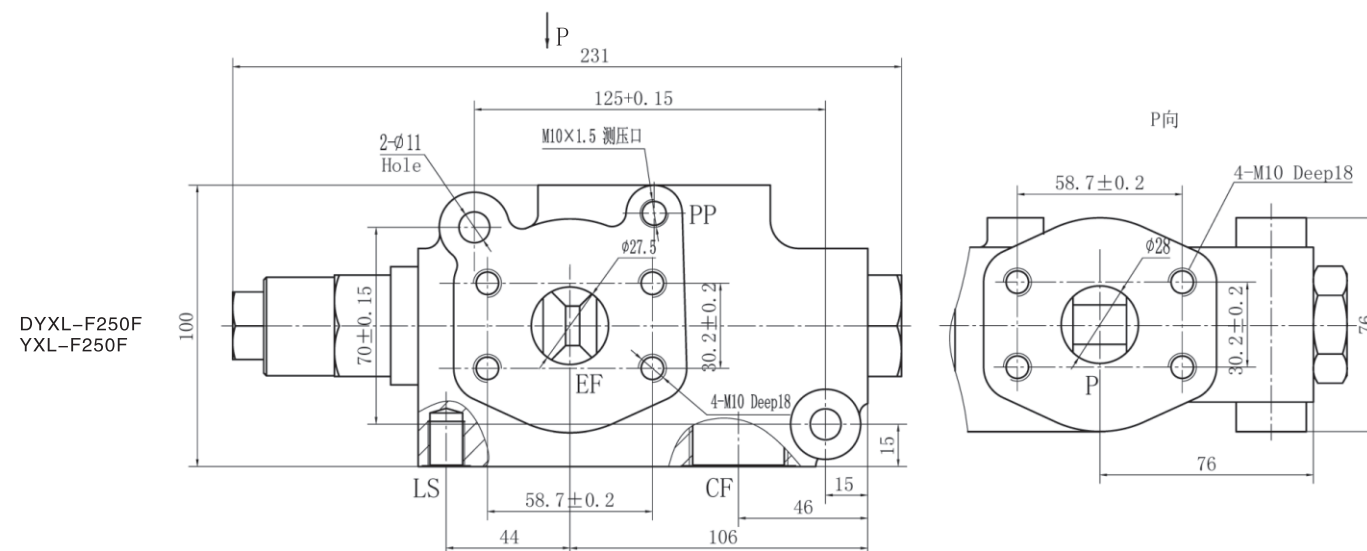
主要性能参数 MAIN SPECIFICATION DATA

型号 Type	最大入口流量 Max.input pflow (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

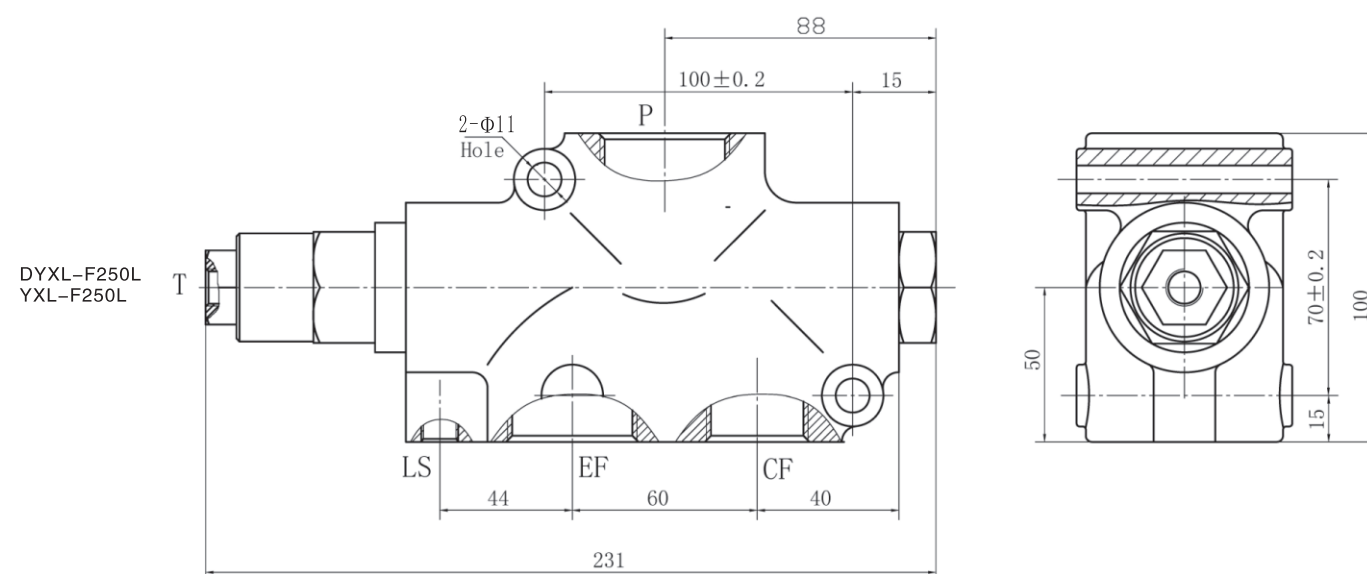
外形连接尺寸 DIMENSION AND MOUNTING DATA



DYXL-F160L
YXL-F160L



DYXL-F250F
YXL-F250F



DYXL-F250L
YXL-F250L

油口螺纹 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

型号说明 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	POS.2	公称流量 Rated Flow (L/min)
省略Omit:	静态信号 Static Signal	80	80
D:	动态信号 Dynamic Signal	160	160
		250	250

POS.3	连接形式 Connection Type	POS.4	安全阀设定压力 Relief Valve Pressure Settings (MPa)
F:	法兰连接 Flange Connection	6.3~16 Mpa	
L:	螺纹连接 Thread Conection		

POS.5	控制形式 Control Type	POS.6	控制压力 Control Spring Pressure (Bar)
N:	内控 Internal Control	4.5	4.5
W:	外控 Outer Control	7.0	7.0
		10.5	10.5

POS.7	油口代码 Ports Code
A、B、C、D	
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:

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

DYXL-F 160 L-12 N 7-D

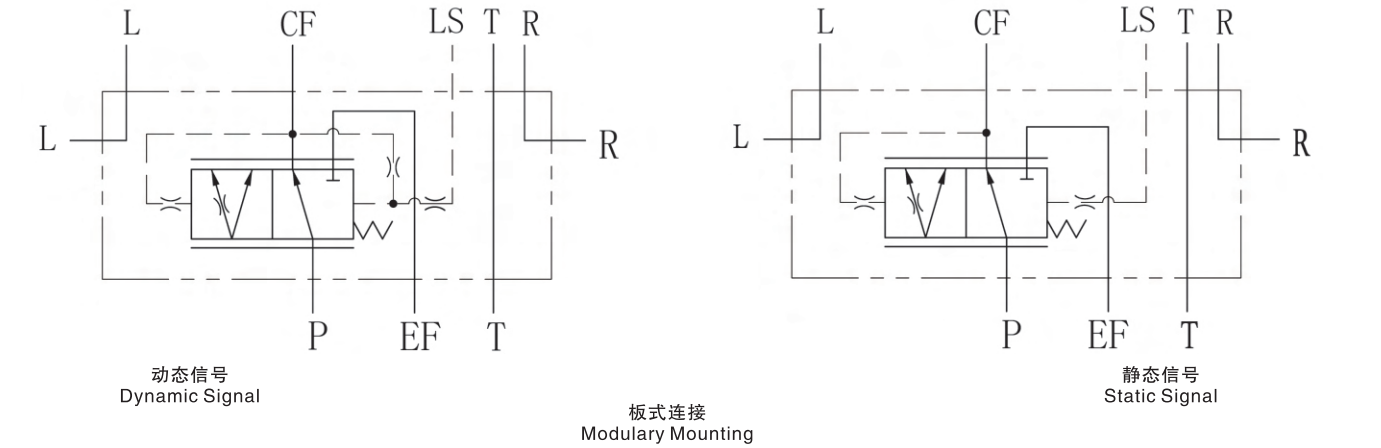
油口Ports P,EF: G3/4;CF:G1/2;LS,T :G1/4
控制压力 Control Spring Pressure 7.0Bar
内控形式 Internal control
安全阀设定压力12MPa
Relief Valve Pressure Settings 12MPa
螺纹连接 Thread conection
公称流量 Rated Flow 160L/min
最大入口压力 Max.Input Pressure 20MPa
YXL型优先阀YXL Type Priority Valve
动态信号 Dynamic Signal

VLSA型优先阀是一种定差减压液压元件，和负荷传感型全液压转向器配套使用。无论负荷传感转向系统负载压力和油泵供油量如何变化，优先阀均能保持供给转向器的流量始终等于方向盘转速与转向器排量的乘积,确保转向器所需流量。

VLSA型优先阀为板式连接方式，需要与BPBS5、BPBS5L、BPBS5E型转向器组合使用，分动态信号和静态信号两种信号控制型式；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 modulary connection，With the BPBS5,BPBS5L,BPBS5E type steering control units used in combination，Has dynamic signal and static signal control types.

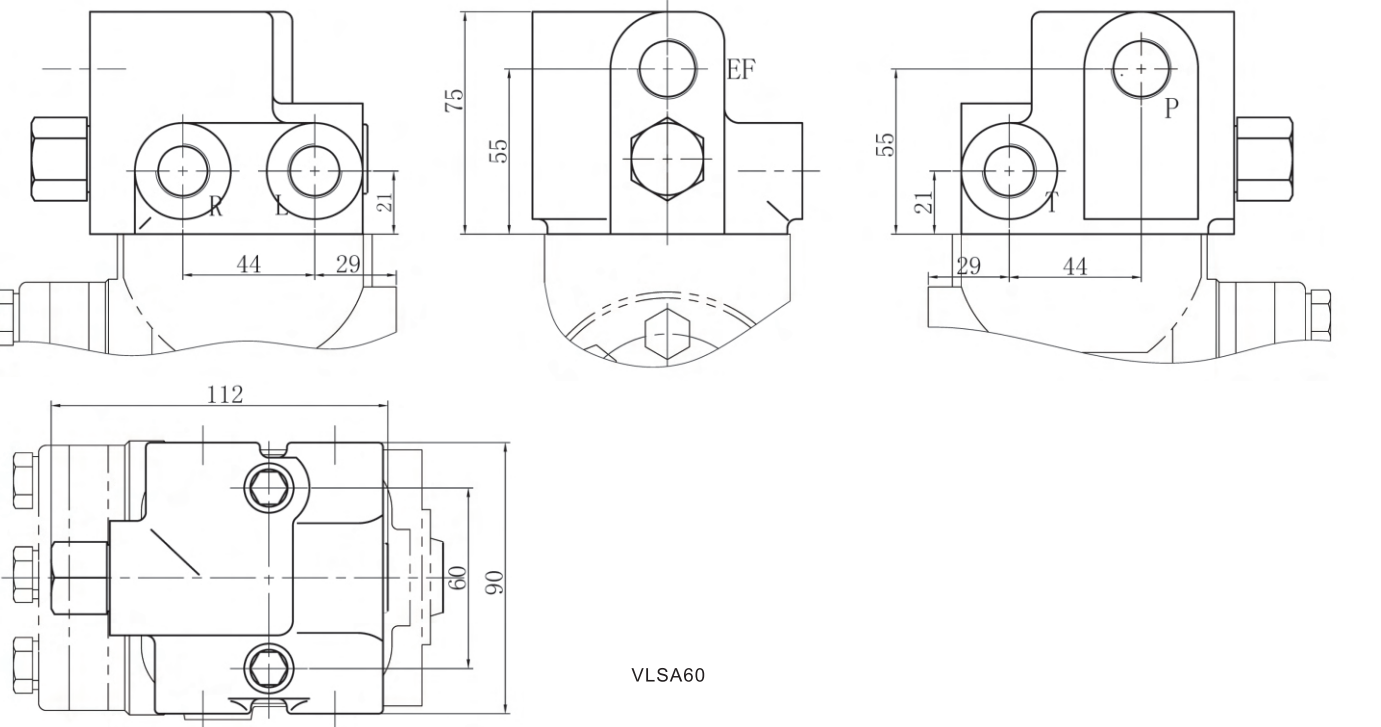
液压原理图 HYDRAULIC CIRCUIT

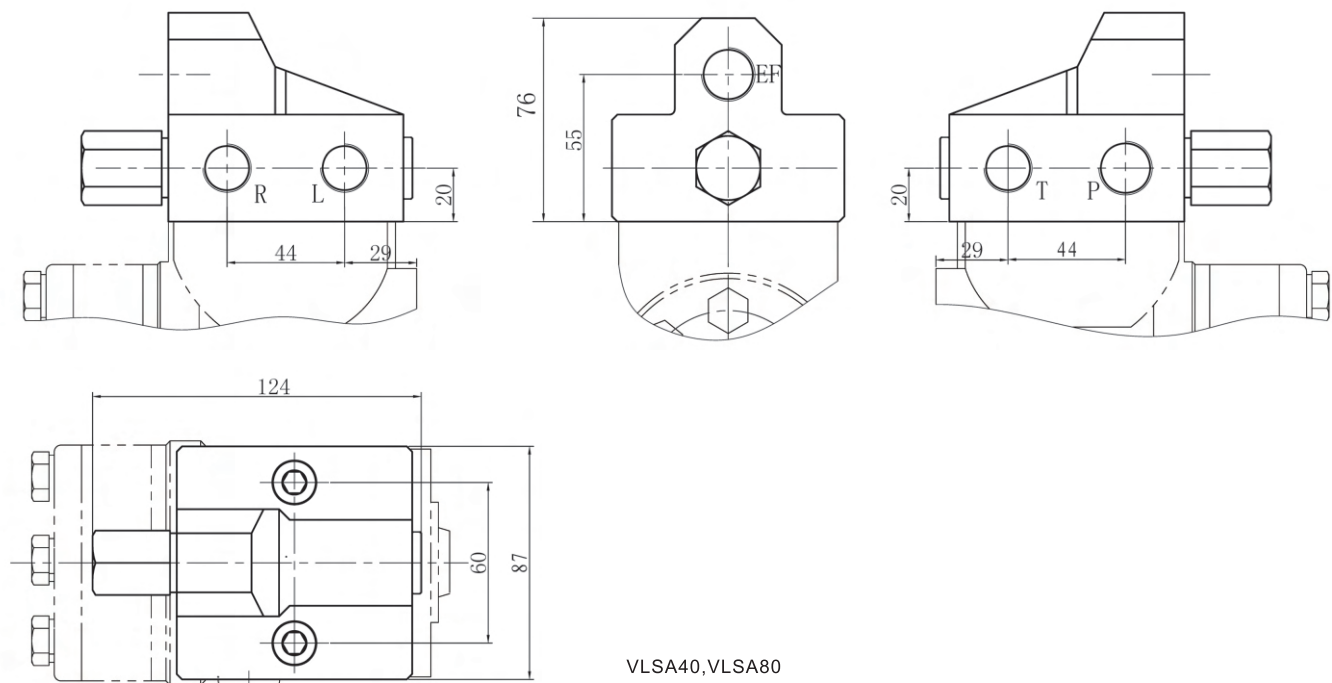


主要性能参数 MAIN SPECIFICATION DATA

型号 Type	最大入口流量 Max.input plow (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

外形连接尺寸 DIMENSION AND MOUNTING DATA





VLSA40,VLSA80

油口螺纹 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

型号说明 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 Modularly Connection
- 公称流量 Rated Flow 60L/min
- VLSA 型优先阀 VLSA Type Priority Valve

VSFA型流量放大阀和液压转向器配套使用，组成一种液压转向流量放大单元。其集成有优先阀、单向阀和比例放大阀等。该阀采用比例放大原理，放大倍数固定，对液压转向器的输出流量进行比例放大，放大流量和液压转向器的方向盘输入转速成正比，达到通过小流量控制大流量，实现较大的转向流量。

VSFA型流量放大阀具有转向功率大，操控平稳可靠，转向系统紧凑，节能效果明显，以及可提供应急人力转向等优点，广泛应用于大中拖拉机，装载机，自卸车等型轮式车辆和船舶舵机的液压转向系统。

VSFA型流量放大阀按照不同的转向器配套方式，分VSFA1和VSFA5两种类型:

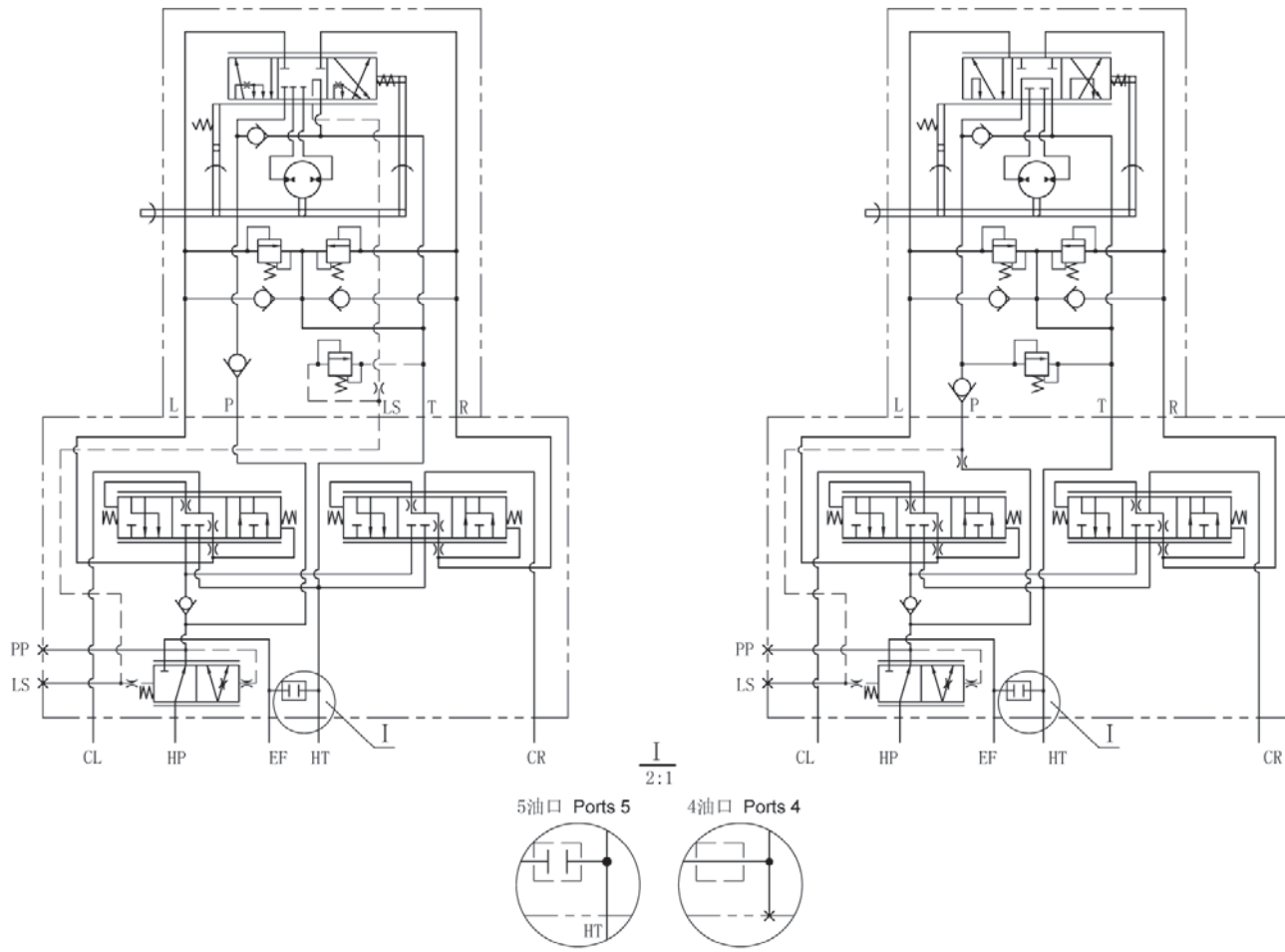
VSFA1型流量放大阀和BPBS1开芯无反应型转向器配套使用，VSFA5型流量放大阀和BPBS5负荷传感型转向器配套使用。

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.

液压原理图 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

主要性能参数 MAIN SPECIFICATION DATA

性能参数 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.

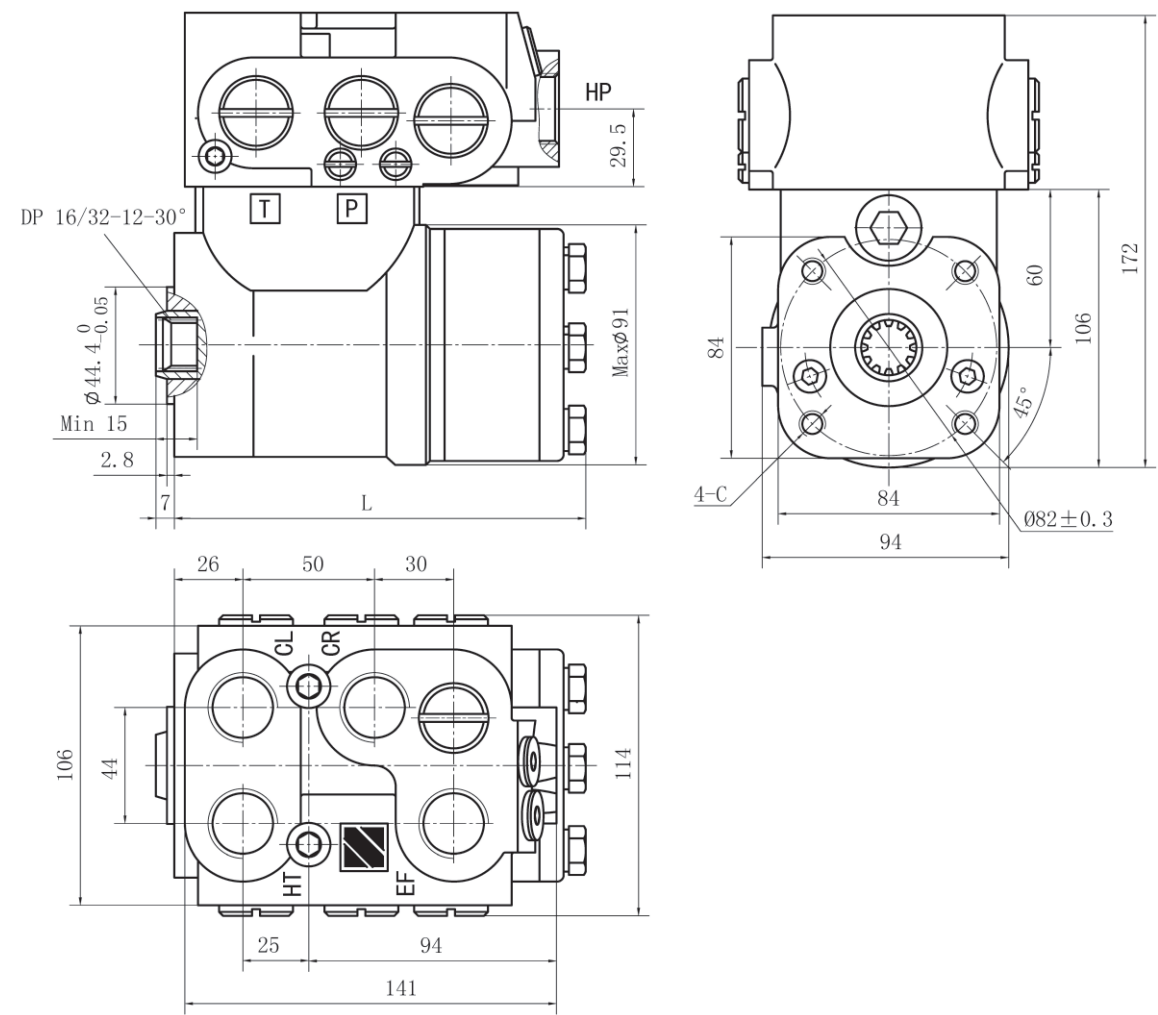
注③:根据客户的特殊需求，放大倍数可设定为 K=6。
Note③:Amplifying factor K=6, by special customer request.

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).

油口螺纹 PORTS THREAD

代 号 CODE	HP、EF、CL、CR、HT油口 Ports HP,EF,CL,CR and HT Thread	转柱安装螺纹C 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

外形连接尺寸 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

型号说明 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

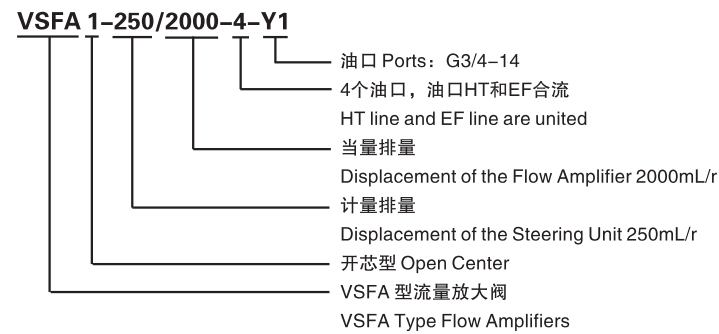
POS.2/POS.3	转向器排量/当量排量 Displacement of the Steering Unit /Displacement of the Flow Amplifier (mL/r)					
转向器排量 Displacement of the Steering Unit (mL/r)	80	100	125	160	200	250
当量排量 Displacement of the Flow Amplifier (mL/r) (放大倍数 amplifying factor k=8)	640	800	1000	1280	1600	2000

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。

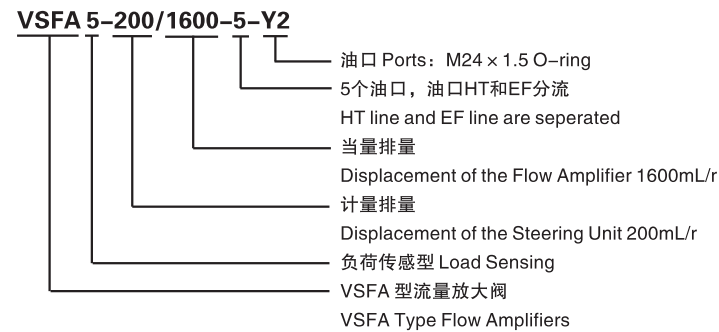
流量放大阀编号: VSFA1-250/2000-4-Y1



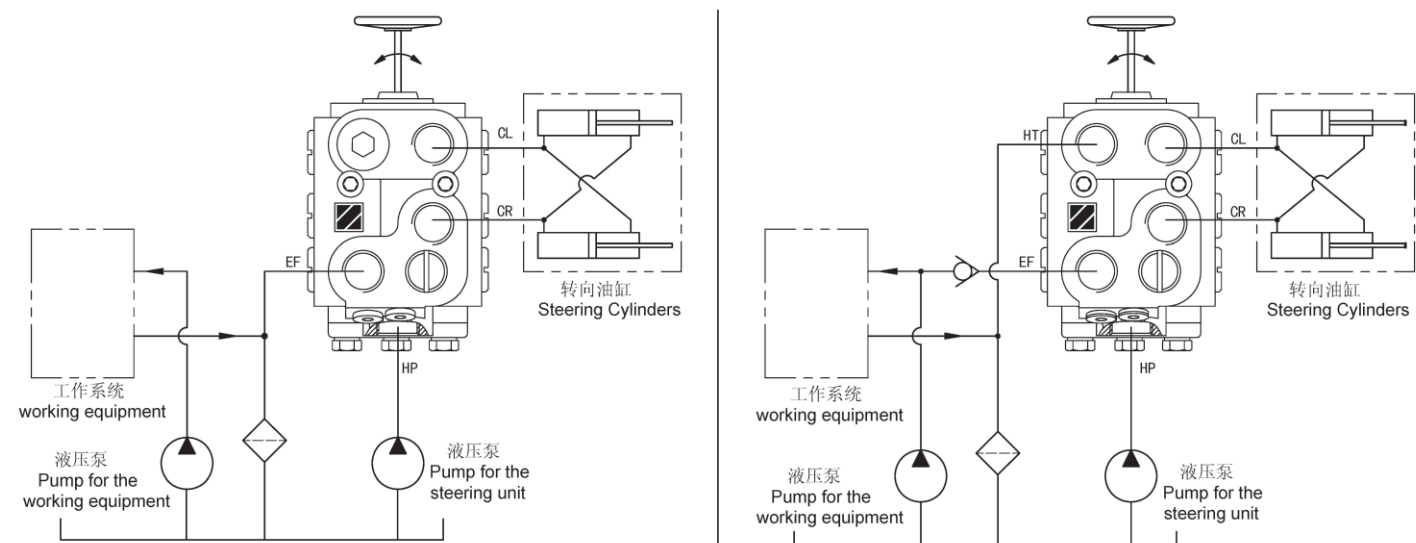
应用举例2 For Example2:

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 x 1.5 O-ring。

流量放大阀编号: VSFA1-250/2000-4-Y1



转向系统示意图 Mounting Scheme of Flow Amplifier



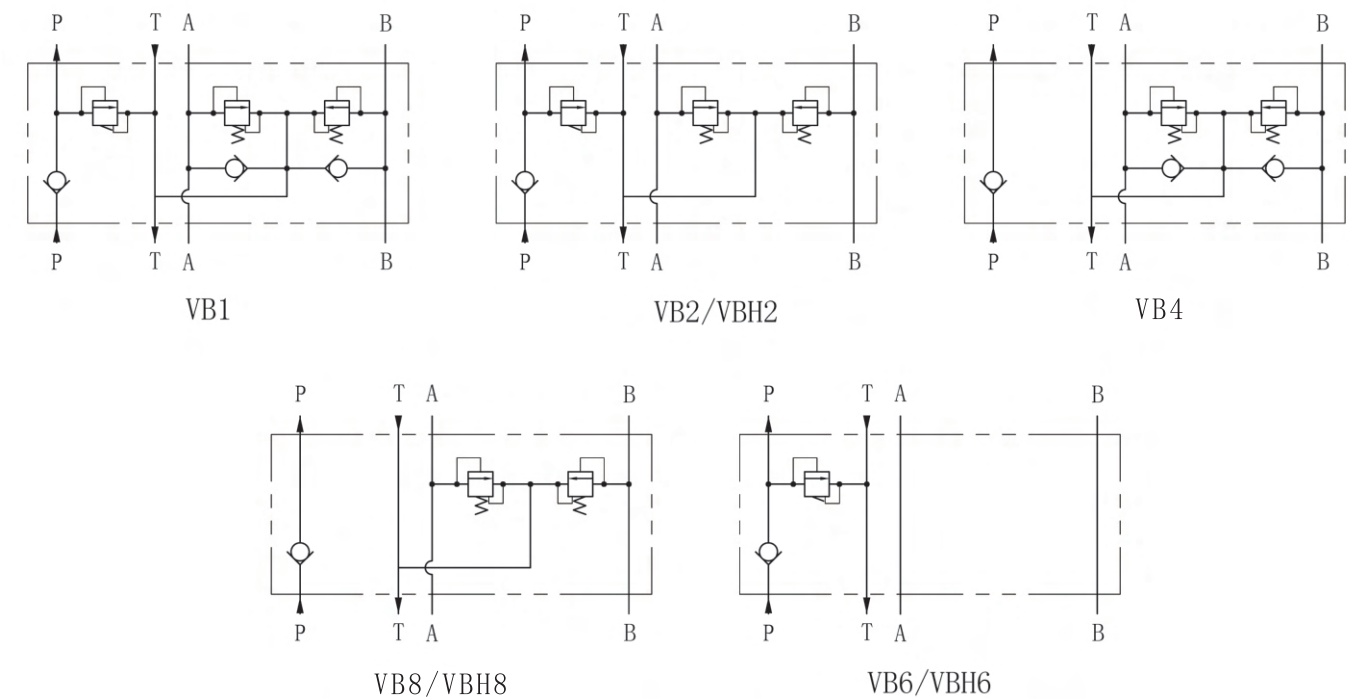
4油口（油口HT和EF合流）流量放大阀的转向系统示意图
Mounting Scheme of Flow Amplifier with 4 Ports

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

VB/VBH型组合阀板, 可以与BHR系列全液压转向器配套使用, 对液压转向系统起安全保护作用。该阀块设计紧凑, 体积小, 直接安装在转向器油口平面上。该阀块内安装有入口单向阀、安全阀、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



主要性能参数 MAIN SPECIFICATION DATA

性能参数 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。

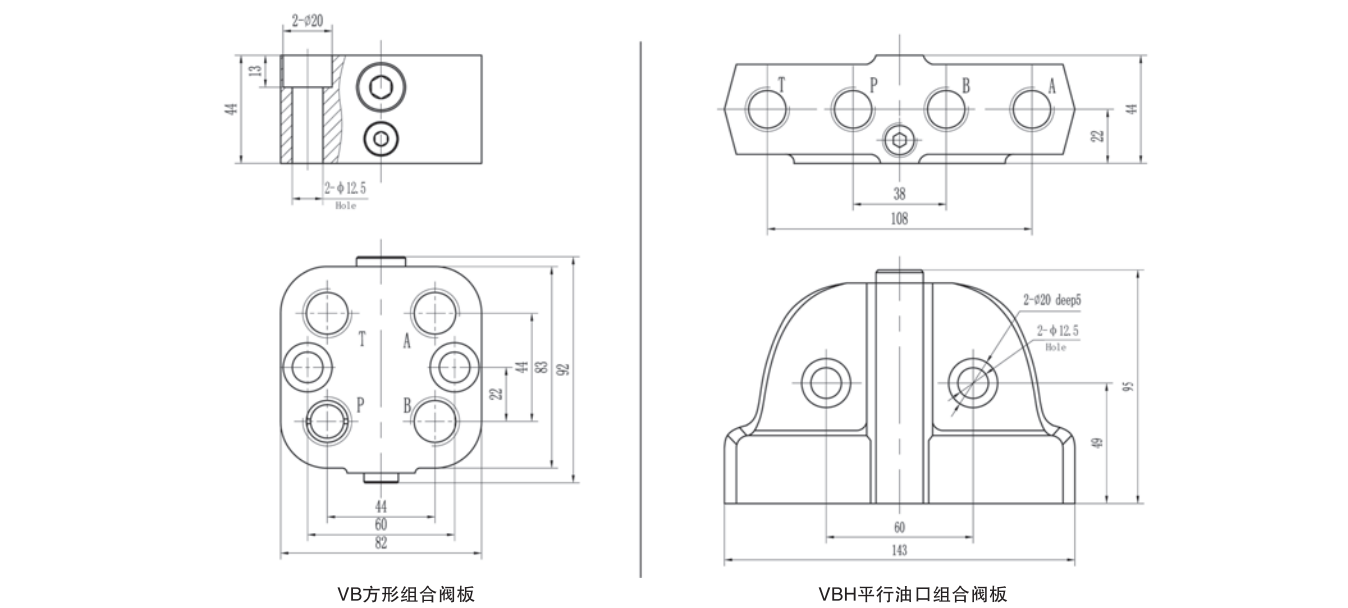
Note:

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.

外形连接尺寸 DIMENSION AND MOUNTING DATA



型号说明 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	安全阀设定压力 Relief Valve Pressure Settings (MPa)
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		
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



SC型转向柱是液压转向器和方向盘之间的过度联接元件，有不同的连接形式和长度供用户选择使用。
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.

主要性能参数 MAIN SPECIFICATION DATA

型 号 Type	长度 Length (mm)		最大许可载荷 Max.permissible load (N.m)	
			动载荷 Dynamic Load	静载荷 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		6:1 与内花键转向器配套使用 Matched with the Hydraulic Steering Unit supporting of the involved spline		

型号说明 ORDER CODE

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

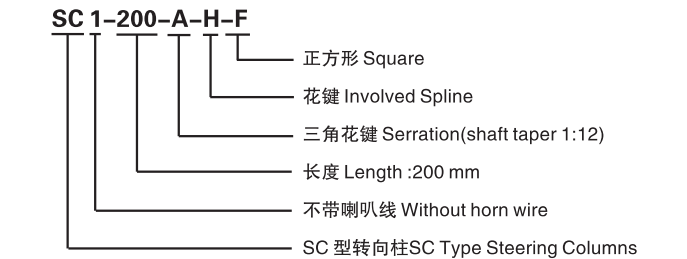
POS.1	功能 Function	POS.2	转向柱长度 Length of the steering column
1：	不带喇叭线 Without horn wire		135, 200, 250, 300, 350, 400,450,
2：	上端出喇叭线 With horn wire from top		500, 550, 600, 650, 700, 750,800,
3：	侧面出喇叭线 With horn wire from side		900,1000,1100,1200

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

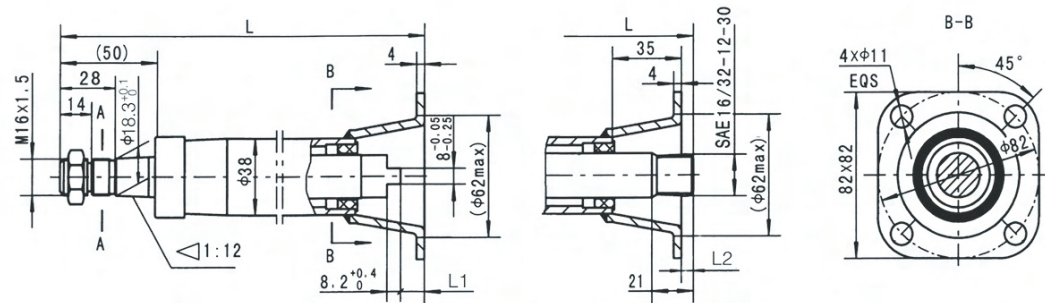
应用举例 For Example:
SC型转向柱，不带喇叭线；长度:200 mm；方向盘连接形式：三角花键；输出端连接形式：花键；法兰连接形式：正方形。

转向柱编号：SC1–200–A–H–F



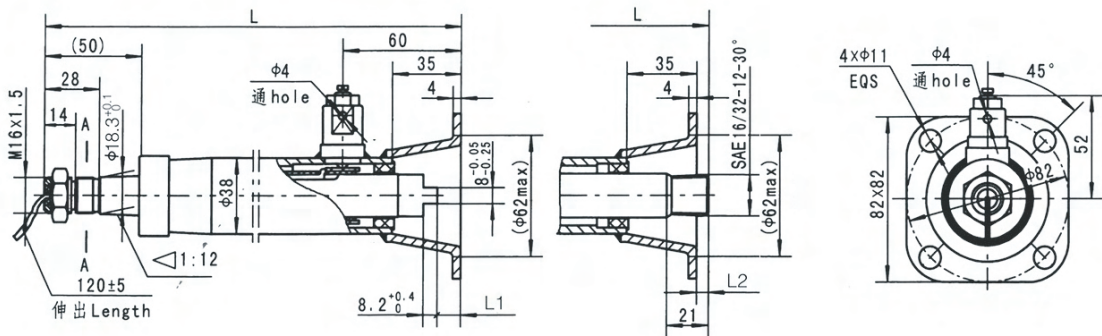
外形连接尺寸 DIMENSION AND MOUNTING DATA

SC1



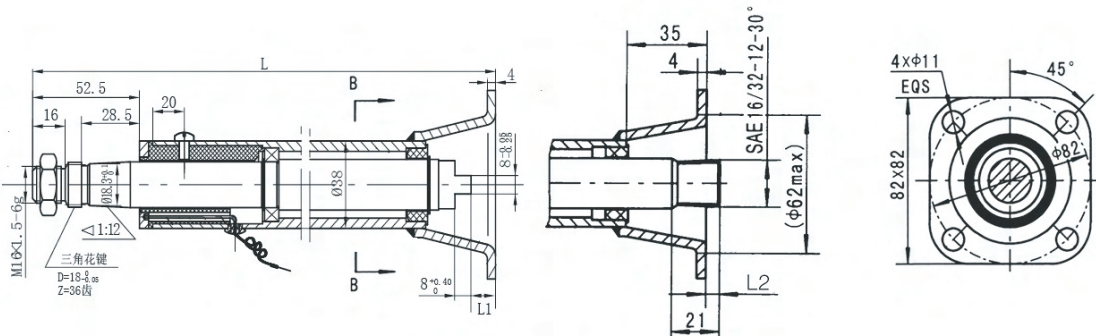
扁舌 Tongue SAE 花键 SAE Spline

SC2



扁舌 Tongue SAE 花键 SAE Spline

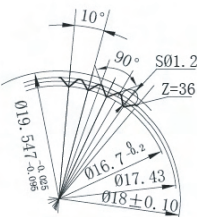
SC3



扁舌 Tongue SAE 花键 SAE Spline

A-A

三角花键齿形放大图



产品对照表 COMPARISON

中意 (ziHYD)	BPB1	BPB2	BPB3	BPB5	BPBS1	BPBS2	BPBS5	BPBS5T	VLSA	(D)YXL
Danfoss	OSP ON	OSP OR	OSP CN	OSP 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

油口螺纹 PORTS THREAD

油口代号 CODE	油口P,T,L(A),R(B) 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	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