HYDROLIC CONTROL

选 型 样 本

Hons D4 片式多路阀

Sectional Directional Control Valve



HYDROLIC CONTROL

产品概览与目录

Product overview and contents

D4 采用模块化片式结构，由进油片、工作片和回油片组成。可按执行机构数量、油路类型及控制方式组合配置。

D4 uses a modular sectional design comprising an inlet section, working sections and an outlet section. It can be configured for the required actuators, hydraulic circuit and control method.

典型应用

Typical applications

挖掘机（最大到 7 t）、随车吊、挖掘装载机和垃圾压缩车；亦可用于高空作业平台、轮式装载机、拉臂车、钻机及叉车等设备。

Excavators up to 7 t, truck-mounted cranes, backhoe loaders and refuse compactors. Other applications include aerial work platforms, wheel loaders, hook-lift trucks, drilling rigs and forklifts.

样册目录

Catalogue contents

03 技术规格 Technical specifications

04 工作介质 Hydraulic fluids

05 液压回路 Hydraulic circuits

06 外形尺寸 Overall dimensions

07 油口与螺纹 Ports and threads

08 特性曲线 Performance curves

09 订货示例 Ordering example

10 进油片 Inlet section

11 阀芯类型 Spool types

12 控制方式 Spool actuation

13 复位方式 Return arrangements

14 油口辅助阀 Port auxiliary valves

15 回油片与过桥 Outlet section and HPCO

16 中间片 Intermediate sections

17 装配与维护 Assembly and maintenance

18 选型信息 Selection information

19 技术注释 Technical notes

20 品牌信息 Brand information

尺寸单位为 mm，压力单位为 bar，另有说明除外。 / Dimensions in mm and pressure in bar unless otherwise stated.

技术规格

Technical specifications

项目 / Parameter	D4
工作片数量 Number of working sections	1–12
额定流量 Rated flow	80 L/min
最高工作压力 Maximum working pressure	350 bar
标准阀芯行程 Standard spool stroke	6 + 6 mm
浮动阀芯附加行程 Additional float stroke	5.5 mm
阀片间距 Section pitch	40 mm
回路类型 Circuit types	并联、串联、串并联 Parallel, series and tandem

标准工作条件

Standard working conditions

项目 / Parameter	范围 / Range
工作温度 Operating temperature	-20°C to +80°C
运动黏度 Kinematic viscosity	10–300 cSt
最大污染等级 Maximum contamination class	NAS 1638: 9 ISO 4406:1999: 20/18/15
推荐过滤精度 Recommended filtration	β10 > 75 (ISO 16889:2008)

直动电磁控制的阀芯行程为 2.8 + 2.8 mm，见第 12 页。 / Direct solenoid actuation has a spool stroke of 2.8 + 2.8 mm; see page 12.

工作介质与密封

Hydraulic fluids and seals

矿物油为标准应用介质。使用其他介质时，应同时核对温度、密封及整阀工作条件。

Mineral oil is the standard fluid for typical applications. For other fluids, check the fluid temperature, seals and operating limits of the complete valve.

介质 / Fluid	温度 / Temperature	密封 / Seal
矿物油 HL、HM 或 HLP Mineral oil HL, HM or HLP	-25°C to +80°C	NBR
高水基液压液 High-water-content hydraulic fluid	+5°C to +55°C	NBR
油包水乳化液 HFB Water-in-oil emulsion HFB	+5°C to +55°C	NBR
水乙二醇 HFC Water-glycol HFC	-10°C to +60°C	NBR

温度范围的使用

Applying temperature limits

介质表列出介质与密封的温度适用范围；整阀标准工作温度按第 3 页的 -20°C 至 +80°C 使用。例如，矿物油表列的 -25°C 不自动扩大整阀的标准使用范围。

The fluid table lists fluid and seal temperature compatibility. The standard operating temperature of the complete valve remains -20°C to +80°C as shown on page 3. The -25°C fluid value does not automatically extend the standard valve operating range.

测试条件

Test conditions

恒石样册中的数据及性能曲线以 50°C、黏度 32 cSt 的矿物油为测试介质。实际压降会随阀芯、联数、黏度及配置而变化。

The Hons catalogue data and curves use mineral oil at 50°C and 32 cSt. Actual pressure loss varies with spool type, number of sections, viscosity and configuration.

特殊介质及超出标准条件的应用，应由恒石技术部门确认。

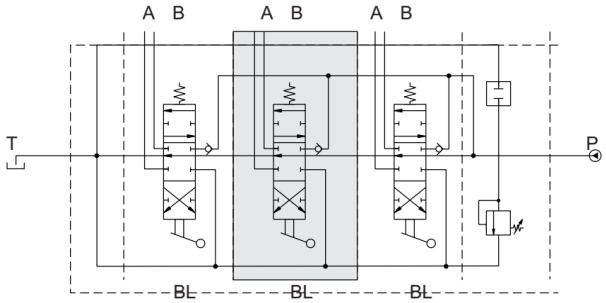
Special fluids and applications outside standard conditions require confirmation by Hons technical support.

液压回路

Hydraulic circuits

BL 并联回路

Parallel circuit

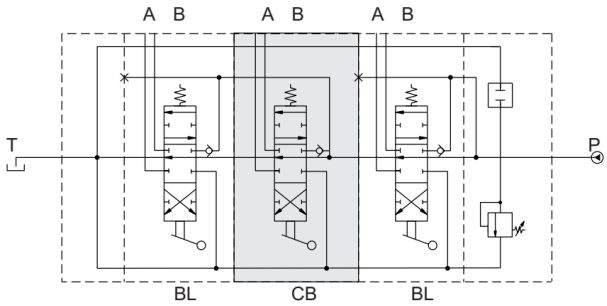


多个阀芯同时动作时，流量优先流向较低负载，可通过阀芯节流分配流量。

With several spools actuated, flow follows the lower-load path. Spool metering can share flow between services.

CB 串并联回路

Tandem circuit

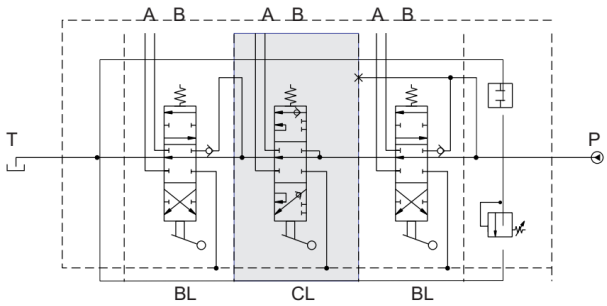


工作片由中位通道供油；上游已动作的串并联片可阻断下游供油。

The section is supplied through the open-centre gallery. An actuated upstream tandem section can interrupt supply to downstream sections.

CL 串联回路

Series circuit



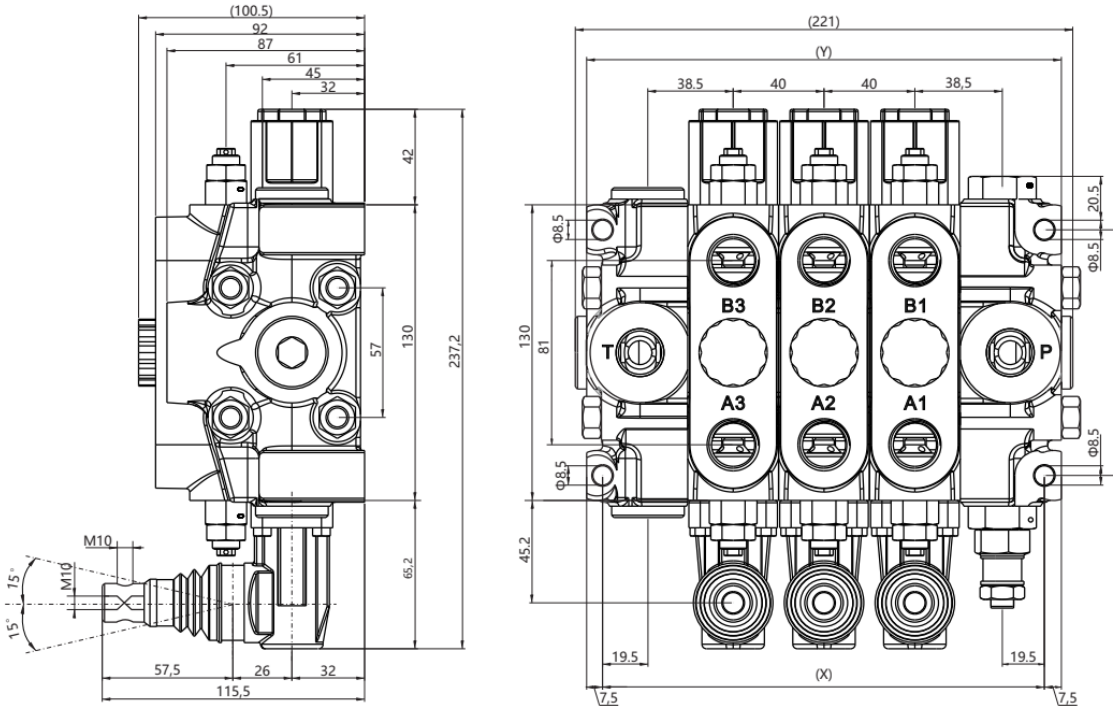
上游执行机构的回油可供下游使用；串联工作时需考虑各级压力的叠加。

Return flow from an upstream actuator can feed downstream services. Pressures across active series stages must be considered together.

图中 BL、CB、CL 为恒石油路代码。 / BL, CB and CL are Hons circuit codes.

外形尺寸与重量

Overall dimensions and weight



联数 / Sections	X (mm)	Y (mm)	重量 / Weight (kg)
1	114	129	8
2	154	169	10.8
3	194	209	13.7
4	234	249	16.5
5	274	289	19.4
6	314	329	22.3
7	354	369	25.2
8	394	409	28
9	434	449	30.8
10	474	489	33.7
11	514	529	36.6
12	554	569	39.5

尺寸及重量对应图示标准配置。中间片、控制组件等会改变外形及重量；安装请采用最终确认图。
Dimensions and weights refer to the illustrated standard configuration. Intermediate sections and controls change the assembly; use the approved installation drawing.

油口与螺纹

Ports and threads

油口 Port	功能 / Function	常用公制 / Metric	常用 BSP
P	进油 Pressure inlet	M18 × 1.5	G 1/2
A, B	工作油口 Service ports	M18 × 1.5	G 1/2
T	回油至油箱 Tank return	M22 × 1.5	G 1/2
HPCO	中位压力输出 Power beyond	M22 × 1.5	G 1/2

恒石螺纹订货代码

Hons thread ordering codes

代码 / Code	螺纹 / Thread	代码 / Code	螺纹 / Thread
G04	G 1/4	U03	3/4"-16 UNF
G08	G 1/2	U04	7/8"-14 UNF
G10	G 3/4	U05	1 1/16"-12 UNF
M01	M18 × 1.5	M02	M22 × 1.5

G04 在恒石代码体系中为 G 1/4；HC D4 专册的 G04 为 G 1/2。两套代码不可混用。

G04 means G 1/4 in the Hons code system, while it means G 1/2 in the HC D4 dedicated catalogue. The two code systems must be kept separate.

D4 工作片表列油口代码为 G08、U03、U04、M01。进油片及回油片按各自配置表选型。总尺寸表另列 G 3/4、SAE12 扩展回油口，具体可供配置需确认。

The D4 working-section table lists G08, U03, U04 and M01. Select inlet and outlet ports from their respective configuration tables. The overview also lists G 3/4 and SAE12 extended return ports; confirm the required available configuration.

BSP、UN/UNF、公制标准名称沿用供稿样册。 / Thread standard designations follow the supplied catalogue.

特性曲线

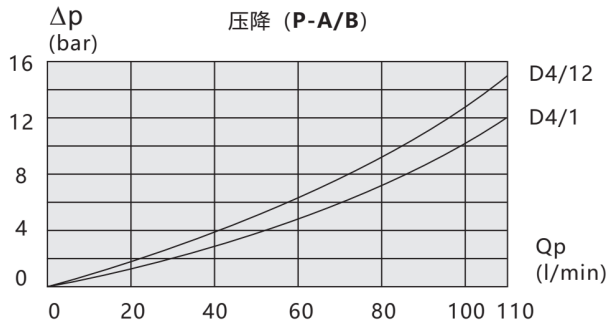
Performance curves

标准阀片配 S001A 阀芯。图中 D4/1 与 D4/12 分别代表 1 联和 12 联；Qp 为流量，Δp 为压降。

Standard working section with an S001A spool. D4/1 and D4/12 indicate one and twelve sections. Qp is flow rate and Δp is pressure loss.

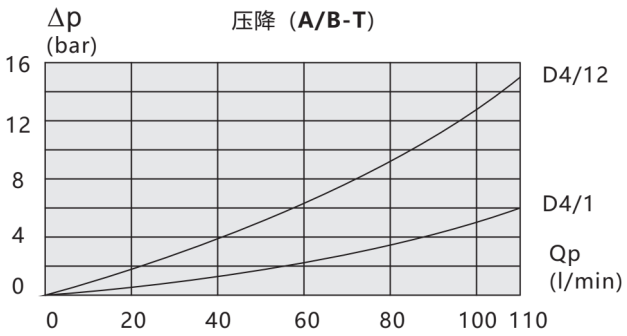
进油至工作口 P → A/B

Pressure inlet to service port P → A/B



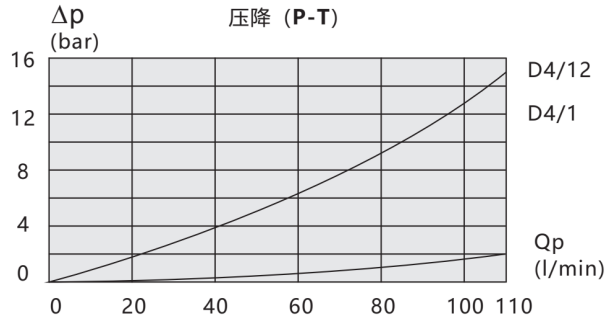
工作口至油箱 A/B → T

Service port to tank A/B → T



中位进油至油箱 P → T

Open-centre inlet to tank P → T



曲线保留原样册图形；曲线延伸到 110 L/min 不表示额定流量提高。D4 额定流量仍为 80 L/min。

Original catalogue curves are retained. A plotted range to 110 L/min does not change the D4 rated flow of 80 L/min.

订货示例

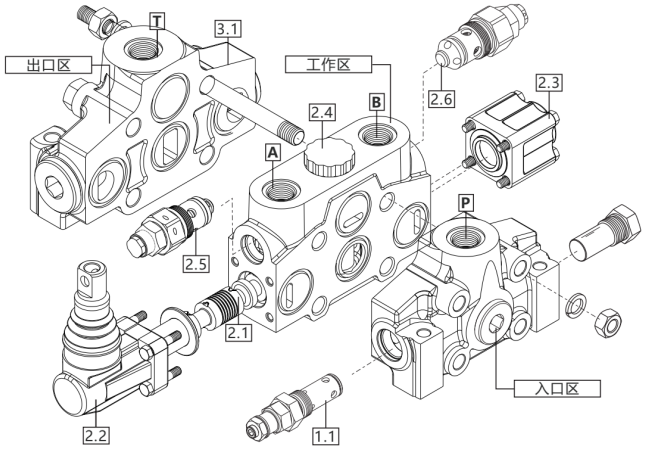
Ordering example

UV-D4/1 : P1 001 (150) A G08

S001A C001 F001A BL G08 01 PA (100) 01 PB (120)

T1 A G08

字段 / Field	示例 / Example	含义 / Meaning
产品及联数 Product and section count	UV-D4/1	D4，一联工作片 D4 with one working section
进油片 Inlet arrangement	P1 001 (150) A G08	右进油，组合 001，150 bar，上方 G 1/2 Right inlet, combination 001, 150 bar, upper G 1/2
阀芯与控制 Spool and actuation	S001A C001	标准双作用阀芯，手动控制 Standard double-acting spool; manual control
复位与油路 Return and circuit	F001A BL G08	弹簧复位，并联，工作口 G 1/2 Spring centring; parallel; G 1/2 service ports
油口 A 辅助阀 Port A auxiliary valve	01 PA (100)	A 口过载阀，100 bar Port A relief valve, 100 bar
油口 B 辅助阀 Port B auxiliary valve	01 PB (120)	B 口过载阀，120 bar Port B relief valve, 120 bar
回油片 Outlet arrangement	T1 A G08	右进油用单回油片，上方 G 1/2 Single-return outlet for right inlet; upper G 1/2



每个工作片均需独立列出配置；示例压力用于解释代码，应按系统要求选定。
Specify every working section individually. The example pressures explain the codes; select settings to suit the hydraulic system.

进油片配置

Inlet section configuration

进油侧 / Inlet side	位置 / Position
P1	右侧进油 Right-side inlet
P2	左侧进油 Left-side inlet

阀类型 / Valve type	功能 / Function
1	直动式主溢流阀 Direct-acting main relief valve
2	先导式主溢流阀 Pilot-operated main relief valve
3	溢流阀孔螺塞 Relief cavity plug
4	主防气蚀单向阀 Main anti-cavitation check valve
6	外部先导式溢流阀 Externally piloted relief valve
7 / 8	电磁卸荷阀 12 / 24 VDC Solenoid unloading valve 12 / 24 VDC
11	带测压口螺塞 Plug with pressure-gauge connection

进油口位置

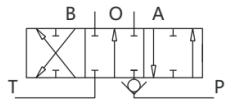
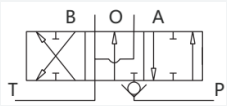
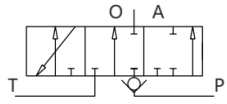
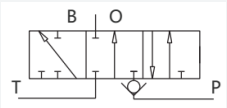
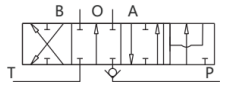
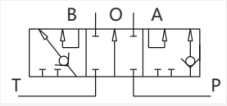
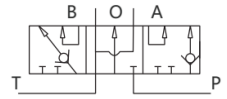
Inlet port positions

代码 / Code	位置 / Position
A	上方进油 Upper inlet
B	上方进油，附 G 1/4 测压口 Upper inlet with G 1/4 gauge connection
C	侧面进油 Side inlet
D	侧面进油，附 G 1/4 测压口 Side inlet with G 1/4 gauge connection

001 = 1A + 3B：A 侧为控制侧，B 侧为复位侧。主溢流阀须注明设定压力。
001 = 1A + 3B: A is the control side and B the return side. Specify the main relief setting.

阀芯类型

Spool types

类型 / Type	原理图 / Symbol	功能 / Function	变型 / Variant
S001		三位双作用 Three-position double-acting	A / B / E
S002		三位双作用，中位 A、B 通 T Double-acting; A and B to T in neutral	A / B / E
S005		三位，A 口单作用 Three-position single-acting on A	A / B / E
S006		三位，B 口单作用 Three-position single-acting on B	A / B / E
S012		四位双作用，第四位浮动 Four-position double-acting with float	A
S015		三位双作用，串联 Three-position double-acting, series	A
S016		串联，中位 A、B 通 T Series; A and B to T in neutral	A

A 为标准阀芯，B 为节流阀芯，E 为直动电控阀芯。表中变型只列恒石 D4 适用标记明确的选项。单作用阀芯需封闭未使用的工作口。

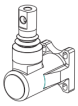
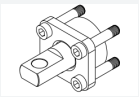
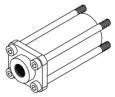
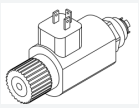
A denotes a standard spool, B a metering spool and E a direct-solenoid spool. Only variants explicitly marked for Hons D4 are listed. The unused service port of a single-acting spool must be plugged.

S012 需配 F005 定位套件；先导液控浮动配置需特殊阀体。再生阀芯 S013 属特殊配置，应确认专用阀体与复位套件。

S012 requires an F005 detent kit. Hydraulically piloted float configurations require a special body. Regenerative spool S013 is a special configuration requiring confirmation of the body and return kit.

阀芯控制方式

Spool actuation

代码 / Code	组件 Assembly	说明 / Description
C001 / C002		带护罩操作杆；C002 为旋转 180° Protected lever; C002 rotated 180°
C004		无操作杆控制装置 Actuation without lever
C005		先导液压控制 Hydraulic pilot actuation
C036 / C037		直动电磁控制 12 / 24 VDC Direct solenoid actuation 12 / 24 VDC

直动电磁控制参数

Direct solenoid specifications

参数 / Parameter	C036	C037
额定电压 Rated voltage	12 VDC	24 VDC
额定电流 Rated current	3.75 A	1.88 A
额定功率 Rated power	45 W	45 W
电压允许范围 Voltage tolerance	±10%	±10%
阀芯行程 Spool stroke	2.8 + 2.8 mm	2.8 + 2.8 mm
工作制及防护等级 Duty and protection	S1 100%; IP65	S1 100%; IP65

环境最高 +40°C；油液最高 +80°C；绝缘 H；接插件 DIN 43650。C005、C036、C037 不另列复位端代码。电控 E 型阀芯需专用阀体，组件含应急按钮。

Max. ambient +40°C; fluid +80°C; insulation H; DIN 43650 connector. Omit a separate return code for C005/C036/C037. E spools require a dedicated body; solenoid assemblies include an emergency button.

复位与远程控制

Return arrangements and remote control

代码 / Code	功能 / Function
F001A / B / C	弹簧复位 Spring centring
F002A	A、B 两工作位定位 Detent in both A and B
F003A / F004A	A 位 / B 位定位 Detent in A / B
F005A	第四位定位，用于 S012 Fourth-position detent for S012
F013A / B / C	双向操作 Double-ended actuation
F020A / F022A	气控开关量 / 比例量 Pneumatic on/off / proportional
F1600 / F1610	电液开关量，12 / 24 VDC Electrohydraulic on/off, 12 / 24 VDC
F2600 / F2610	电液比例量，12 / 24 VDC Electrohydraulic proportional, 12 / 24 VDC
F1520 / F1530	带减压阀电液开关量，12 / 24 VDC On/off with pressure reducer, 12 / 24 VDC
F2520 / F2530	带减压阀电液比例量，12 / 24 VDC Proportional with reducer, 12 / 24 VDC

复位弹簧力

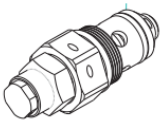
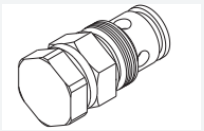
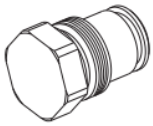
Return spring forces

弹簧 / Spring	预载 K1 / Preload (N)	终点 K2 / End stroke (N)
A 标准 Standard	117.7	145.2
B 软弹簧 Soft	101	117.7
C 重型 Heavy	172.6	246.2

弹簧力为阀芯复位组件参数，不能直接当作操作杆手力。 / Spring forces are return-assembly values and are not lever operating forces.

工作油口辅助阀

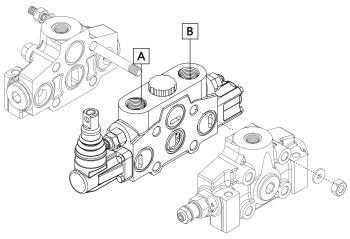
Service-port auxiliary valves

代码 / Code	外形 / View	功能 / Function
01 PA / 01 PB		过载保护阀 Port relief valve
02 PA / 02 PB		补油防气蚀阀 Anti-cavitation make-up valve
05 PA / 05 PB		辅助阀孔堵头 Auxiliary cavity plug

PA 表示工作口 A，PB 表示工作口 B。两个工作口均应明确列出阀或堵头配置。选用过载阀时必须注明设定压力及设定条件。

PA identifies service port A and PB service port B. Specify a valve or plug for both service ports. For relief valves, state the setting pressure and setting condition.

写法 / Notation	含义 / Meaning
01 PA (120)	A 口过载阀，120 bar，全流量设定 Port A relief valve, 120 bar at full flow
01 PA (120-A)	A 口过载阀，120 bar，最小流量设定 Port A relief valve, 120 bar at minimum flow



恒石 D4 适用表列出 01、02、05；03、04 组合阀未标为 D4 标准选项。
Hons lists 01, 02 and 05 for D4. Combined valve options 03 and 04 are not marked as standard D4 options.

回油片与 HPCO

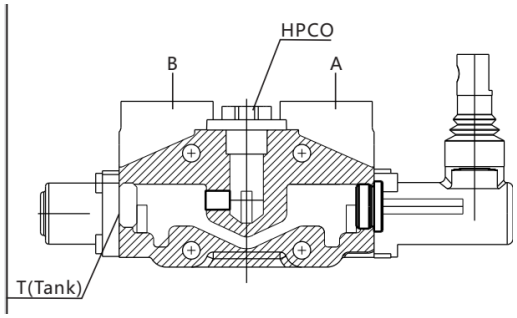
Outlet section and power beyond

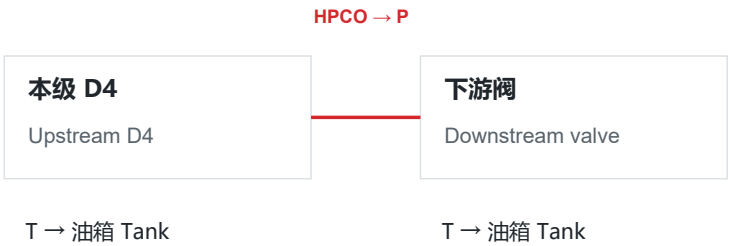
类型 / Type	适配进油侧 / Inlet side	功能 / Function
T1	P1 右进油 P1 right inlet	单回油口 Single tank return
T2	P2 左进油 P2 left inlet	单回油口 Single tank return
T3	P1 右进油 P1 right inlet	HPCO 输出及独立 T 回油 HPCO output and separate T return
T4	P2 左进油 P2 left inlet	HPCO 输出及独立 T 回油 HPCO output and separate T return

位置 / Position	HPCO / T 布置 / Arrangement
A / C	单回油口：上方 / 侧面 Single return: upper / side
M / N	HPCO 上方；T 在 B 侧 / A 侧 Upper HPCO; T on B / A side
P / Q	HPCO 侧面；T 在 B 侧 / A 侧 Side HPCO; T on B / A side

HPCO 将中位通道引至下游多路阀。工作油口回油必须通过独立 T 口接油箱。恒石 D4 锥形堵头编号为 601099034，规格 G 1/4 × 13，数量 1。

HPCO extends the open-centre gallery to a downstream valve. Service-port return oil must flow to tank through a separate T port. The Hons D4 conical plug is 601099034, G 1/4 × 13, quantity one.





回油片螺纹代码 G08、U03、U04、M02。M/N/P/Q 的螺纹代码用于 HPCO，T 口需另核对。
Outlet thread codes: G08, U03, U04, M02. M/N/P/Q thread codes refer to HPCO; verify the T port separately.

中间片配置

Intermediate section configurations

D4 可配置中间进油片、中间回油片及分流中间片，用于多泵供油、不同压力组和下游阀连接。中间片不计入工作联数，需按安装顺序单独列出。

D4 offers intermediate inlet, outlet and flow-divider sections for multiple pump supplies, separate pressure groups and downstream valve connections. List intermediate sections separately in assembly order; they are not working sections.

类型 / Type	功能 / Function	选型重点 / Selection focus
BE	中间进油片 Intermediate inlet section	第二供油口与压力配置 Additional inlet and pressure arrangement
BV	带溢流阀的中间片 Intermediate section with relief valve	下游压力组设定 Downstream pressure-group setting
BF	单回油口中间回油片 Intermediate outlet with one tank return	汇集回油至 T Collect return flow to T
BG	带 HPCO 的中间回油片 Intermediate outlet with HPCO	HPCO 输出与独立 T 回油 HPCO output and separate T return
分流 / Flow divider	带分流阀的中间片 Intermediate flow-divider section	分流流量与系统油路需确认 Confirm flow division and circuit

配置逻辑

Configuration logic

BE 可引入第二泵供油；BV 可用于单泵系统下游压力组。下游压力设定及回路连接应与具体原理图相匹配。

BE can introduce a second pump supply. BV can establish a downstream pressure group in a single-pump system. Match downstream pressure settings and connections to the specific hydraulic diagram.

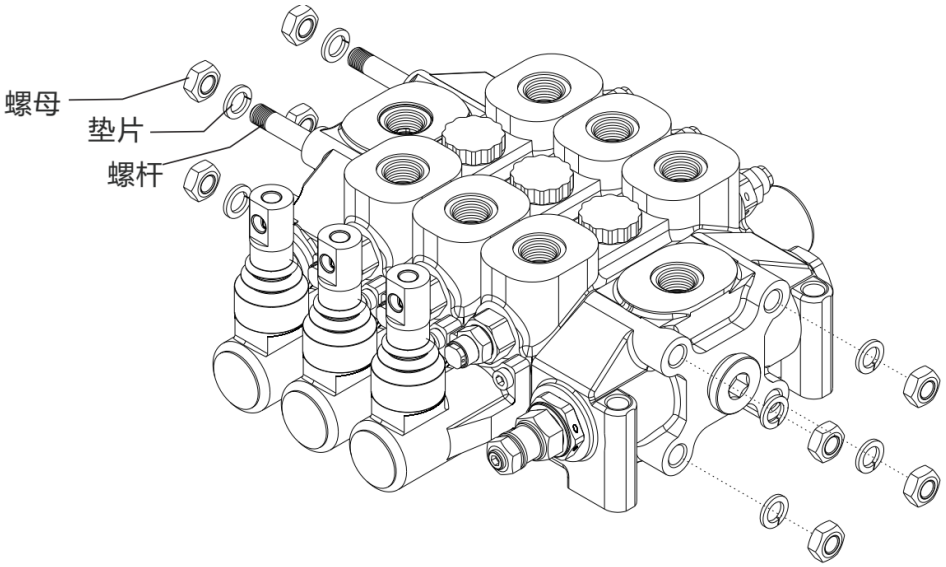
中间回油片的 T 通道连接关系和 BG 的 HPCO 输出须由完整回路核对，不能仅凭型号名称确定管路。

Verify the T-gallery connections of intermediate outlet sections and the HPCO output of BG against the complete circuit. The model designation alone does not define the piping.

功能名称由恒石样册列项与 HC D4 专册说明综合整理；详细可供结构应按恒石确认配置。
Functions combine Hons listings and HC D4 descriptions; confirm the available detailed arrangement with Hons.

装配与维护

Assembly and maintenance



螺母 Nut　垫片 Washer　螺杆 Tie rod

项目 / Item	D4
连接杆套件数量 Tie-rod kits per valve	4
套件构成 Kit contents	1 根连接杆、2 个螺母、2 个垫圈 1 tie rod, 2 nuts, 2 washers
连接杆拧紧扭矩 Tie-rod tightening torque	35 Nm

标准对称阀体可通过旋转阀芯和控制组件改变控制侧。特殊加工阀体不适用此操作；浮动、再生等配置应先核对阀体结构。

Standard symmetrical bodies allow the control side to be changed by rotating the spool and control assembly. This does not apply to specially machined bodies. Check float, regenerative and other special configurations before conversion.

安装前核对 P、T、A、B 和 HPCO 标记，按最终图纸连接。维护时先使系统卸压；保持油液清洁，复装后核对泄漏、复位和各工作位功能。

Before installation, check P, T, A, B and HPCO markings and connect according to the approved drawing. Depressurize before servicing. Keep the fluid clean and check leakage, centring and operating positions after reassembly.

其他紧固件、辅助阀及油口扭矩应按恒石对应零件要求确认。 / Confirm other fastener, auxiliary-valve and port torques for the Hons parts used.

选型信息表

Selection information sheet

请提供以下信息，以便确定每联工作片、进油片、回油片和中间片的完整配置。

Provide the following information to define the working sections, inlet, outlet and intermediate sections.

客户及设备

Customer and machine

泵流量与系统压力

Pump flow and system pressure

工作联数与安装顺序

Working section count and assembly order

进油侧及油口位置

Inlet side and port positions

各联执行机构与负载

Actuator and load for each section

各联阀芯及控制方式

Spool and actuation for each section

各联复位或定位方式

Return or detent for each section

A、B 口辅助阀与压力

A/B auxiliary valves and settings

螺纹规格与 HPCO 需求

Thread sizes and HPCO requirement

介质、油温及清洁度

Fluid, temperature and cleanliness

电压及远程控制要求

Voltage and remote-control requirements

定型时以最终确认型号、液压原理图和安装图为准。 / Final selection is governed by the confirmed model code, hydraulic diagram and installation drawing.

技术注释与资料版本

Technical notes and source editions

本样册的标准参数与主要订货代码采用恒石 UV-D4 体系。HC 资料用于补充功能说明；相同功能名称不代表零件互换或代码兼容。

Standard parameters and main ordering codes use the Hons UV-D4 system. HC information supplements functional descriptions. Matching function names do not establish part interchangeability or code compatibility.

功能 / Function	恒石 / Hons	HC D4
右 / 左进油 Right / left inlet	P1 / P2	IR / IL
标准双作用阀芯 Standard double-acting spool	S001A	W001A
手动控制 Manual actuation	C001	H001
并联 / 串并联 / 串联 Parallel / tandem / series	BL / CB / CL	RP / RT / RS
单回油片 Single-return outlet	T1 / T2	TJ / TK
带 HPCO 回油片 Outlet with HPCO	T3 / T4	TM / TN
G 1/2 螺纹代码 G 1/2 thread code	G08	G04
HPCO 锥形堵头编号 HPCO conical plug	601099034	413010203

HC D4 专册的油温 -25°C 至 +80°C、黏度 10–460 mm²/s、清洁度 19/16 与恒石版不同；本样册采用恒石及 HC 中文综合样本一致的标准条件。HC 专册另列 T 口最高压力 20 bar，该数值未作为恒石额定参数，需另确认。

The HC D4 dedicated catalogue lists -25°C to +80°C, 10–460 mm²/s and cleanliness 19/16. This catalogue uses the conditions shared by Hons and the HC Chinese general catalogue. HC also lists a maximum T-port pressure of 20 bar; this is not adopted as a Hons rating and requires confirmation.

恒石浮动阀芯表的 S0012/S012、串联阀芯 S0015/S015 和 S0016/S016 写法不一致；本样册统一为 S012、S015、S016，订单须核对。M/N 说明及 C036/C037 行标题电流有原稿矛盾；位置按图、额定电流按技术参数表整理。

Hons uses inconsistent S0012/S012, S0015/S015 and S0016/S016 labels. S012, S015 and S016 are used here; verify order codes. Conflicting M/N descriptions and C036/C037 row currents are resolved using the illustrations and electrical specification table.

资料来源

Source documents

恒石产品样册 20200411：PDF 第 3–16、36 页（印刷页 03–30、69）；HC D4 专册 HCD4-04：PDF 第 3–53 页；HC 综合样本中文 HC-02：第 8–9、20–21、44–55 页。

Hons 20200411: PDF pp. 3–16, 36. HC D4 HCD4-04: PDF pp. 3–53. HC Chinese general catalogue HC-02: pp. 8–9, 20–21, 44–55.

恒石液压

Hons Hydraulics

D4

片式多路阀

Sectional Directional Control Valve

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湖南恒石液压技术有限公司

Hunan Hons Hydraulic Technology Co., Ltd.

多路阀、负载敏感阀与片式电磁阀，面向工程机械、环卫机械及其他液压设备应用。

Directional control valves, load-sensing valves and sectional solenoid valves for construction machinery, municipal vehicles and other hydraulic equipment.

80 L/min | 350 bar | 1–12 sections

选型与技术服务，请联系恒石。

For product selection and technical support, contact Hons.

本样册为标准产品选型资料。特殊配置、可供范围及最终安装参数以确认的技术文件为准。

This catalogue provides standard selection information. Confirm special options, availability and final installation data in the approved technical documentation.