VALVE

HYDROLIC CONTROL

选 型 样 本

Hons M45 整体式多路阀

Monoblock Directional Control Valve



HYDROLIC CONTROL

产品概览与目录

Product overview and contents

M45 为整体式多路换向阀，采用并联油路，提供 1-6 联配置。恒石订货系列为 UV-M45，可按执行机构选择阀芯、控制与复位组件。

M45 is a monoblock directional control valve with parallel galleries and 1-6 working sections. The Hons ordering series is UV-M45, with selectable spools, actuation and return kits.

典型应用

Typical applications

起重机、高空作业平台、农业机械、小型滑移装载机、小型自卸车、叉车、煤矿机械、凿岩台车和平地机。

Cranes, aerial work platforms, agricultural equipment, mini skid-steer loaders, small dump trucks, forklifts, mining machinery, rock-drilling rigs and graders.

样册目录

Catalogue contents

03 技术规格 Specifications

04 介质与密封 Fluids and seals

05 油路与过桥 Circuits and HPCO

06 外形与重量 Dimensions and weight

07 油口与螺纹 Ports and threads

08 特性曲线 Performance curves

09 订货示例 Ordering example

10 进油配置 Inlet arrangement

11 阀芯类型 Spool types

12 阀芯流量与限制 Spool flow and limits

13 控制方式 Spool actuation

14 复位与定位 Return and detents

15 电控与先导控制 Electrical and pilot control

16 回油配置 Outlet arrangement

17 安装与维护 Installation and maintenance

18 逐联选型记录 Selection record

19 技术注释与依据 Notes and sources

20 品牌与联系方式 Brand and contact

尺寸单位 mm，压力单位 bar；本册以恒石原订货代码为主。

Dimensions in mm and pressure in bar. Hons original ordering codes are primary.

技术规格

Technical specifications

项目 / Parameter	M45
工作联数 Working sections	1-6
额定流量 Rated flow	45 L/min
最高工作压力 Maximum working pressure	350 bar
标准阀芯行程 Standard spool stroke	5 + 5 mm
浮动附加行程（恒石） Additional float stroke (Hons)	4 mm
阀芯间距 Spool pitch	35 mm
回路类型 Circuit type	并联 Parallel

恒石标准工作条件

Hons standard working conditions

项目 / Parameter	恒石 / Hons
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 Recommended filtration	β10 > 75 (ISO 16889:2008)

HC-M45 另列主 T 口上限 20 bar；此值不能用作电液先导回油上限。

HC-M45 lists a 20 bar main T limit; it is not the electrohydraulic pilot-return limit.

工作介质与密封

Hydraulic fluids and seals

以下为恒石资料的介质与 NBR 密封相容范围。整阀标准工作温度仍按第 3 页执行。

The table gives fluid compatibility with NBR seals from the Hons source. Complete-valve standard operating temperature remains as given on page 3.

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
水包油乳化液 HFA Oil-in-water emulsion HFA	+5°C to +55°C	NBR
油包水乳化液 HFB Water-in-oil emulsion HFB	+5°C to +55°C	NBR
聚乙二醇基水溶液 HFC Polyglycol-based aqueous fluid HFC	-10°C to +60°C	NBR

曲线测试条件

Curve test conditions

恒石目录的数据和曲线采用 50°C、32 cSt 的矿物油。压降与联数、阀芯和黏度有关，图示曲线不能代替实际配置试验。

Hons catalogue data and curves use mineral oil at 50°C and 32 cSt. Pressure loss depends on section count, spool and viscosity; curves do not replace tests of the actual configuration.

HC 补充条件

HC supplementary conditions

HC 专册列出 -25°C 至 +80°C、10-460 mm²/s、ISO 4406 19/16 和 β10 > 75。这些条件保留为 HC 参考，不与恒石标准混合成新的额定值。

HC lists -25°C to +80°C, 10-460 mm²/s, ISO 4406 19/16 and β10 > 75. These remain HC references and are not combined with Hons conditions into a new rating.

特殊介质和密封组合应与恒石技术部门核对。

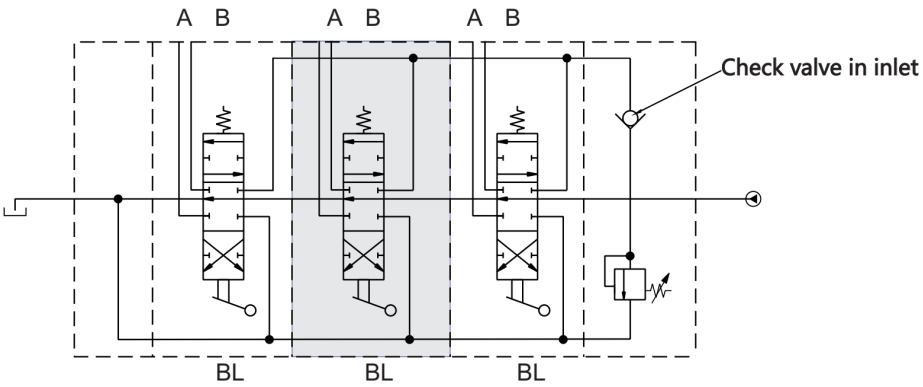
Confirm special fluid and seal combinations with Hons technical support.

并联油路与过桥输出

Parallel circuit and carry-over

阀芯动作时截断中位通道，将压力油导向 A 或 B。多联同时动作时，油液优先流向低负载；通过阀芯节流可分配流量。

An actuated spool interrupts the neutral gallery and directs pressure flow to A or B. With multiple spools operated, flow favours the lower load; spool metering can distribute flow.

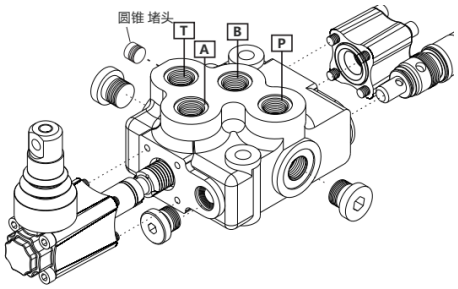


HPCO 过桥输出

HPCO carry-over

安装圆锥堵头可将中位通道延伸至下游阀。带 HPCO 的阀必须通过独立 T 口将执行机构回油送回油箱。

A conical plug extends the open-centre gallery to a downstream valve. A valve with HPCO requires a separate T connection for actuator return flow to tank.



恒石圆锥堵头：450299210，G 1/4 × 6.5，数量 1。HC 对应资料代码：413010210。零件按供应方确认。

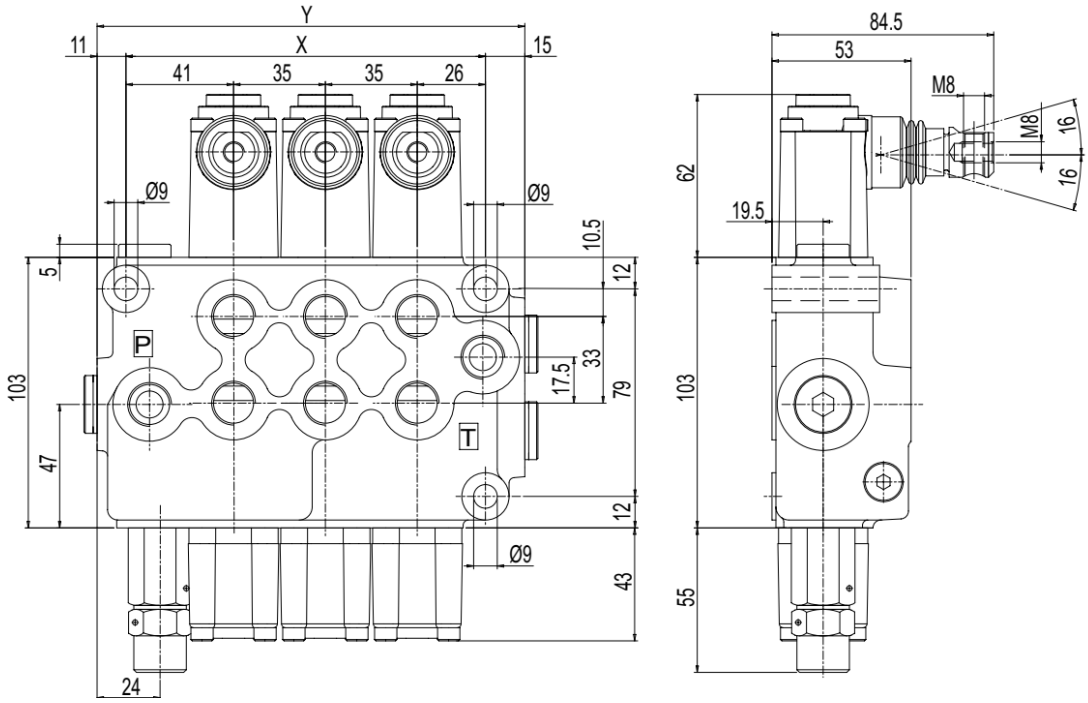
Hons conical plug: 450299210, G 1/4 × 6.5, quantity 1. HC reference code: 413010210. Confirm the part with the selected supplier.

HPCO 为高压延续输出；T 为回油口，两者按确认油路连接。

HPCO is pressure carry-over and T is tank return. Connect both to the approved circuit.

外形尺寸与重量

Overall dimensions and weight



联数 / Sections	X (mm)	Y (mm)	重量 / Weight (kg)
1	67	93	2.70
2	102	128	4.10
3	137	163	5.50
4	172	198	6.90
5	207	233	8.30
6	242	268	9.70

尺寸与重量表经恒石和 HC 资料相互核对。图示为标准手动配置；电控、先导控制、限位组件和操作杆会改变外形及安装空间。

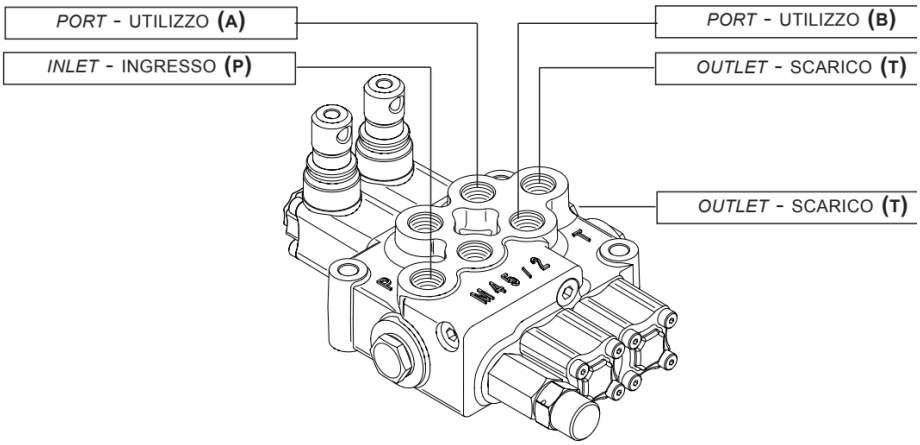
The dimension and weight table agrees in Hons and HC sources. The drawing shows a standard manual configuration; electrical/pilot controls, stroke limiters and levers alter dimensions and required clearance.

尺寸图取自 HC-M45；安装使用最终确认图，照片不作为尺寸依据。

Drawing from HC-M45. Use the approved installation drawing; photographs do not define dimensions.

油口与螺纹

Ports and threads



油口 / Port	用途 / Function	BSP	UNF
P	压力油入口 Pressure inlet	G 3/8	3/4"-16
A / B	执行机构工作口 Actuator service ports	G 3/8	3/4"-16
T	回油至油箱 Tank return	G 3/8	3/4"-16
HPCO	中位供油延续 Open-centre carry-over	G 3/8	3/4"-16

螺纹代码对照

Thread-code comparison

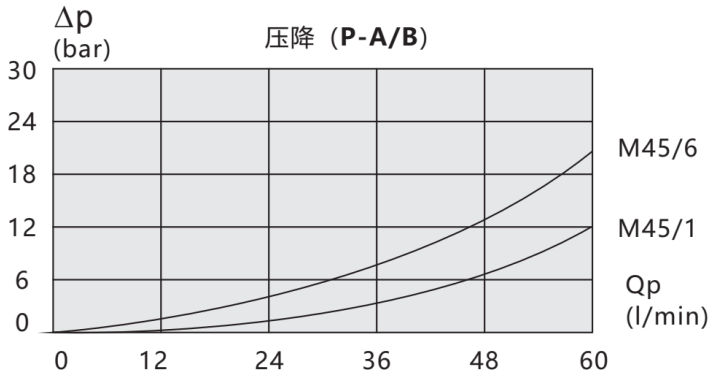
实际螺纹 / Actual thread	恒石 / Hons	HC
G 3/8	G06	G03
3/4"-16 UNF	U03	U03

G06 为恒石 M45 的 G 3/8 代码；不能按代码数字直接推断螺纹尺寸。

G06 is the Hons M45 code for G 3/8. Code digits alone do not determine thread size.

特性曲线

Performance curves

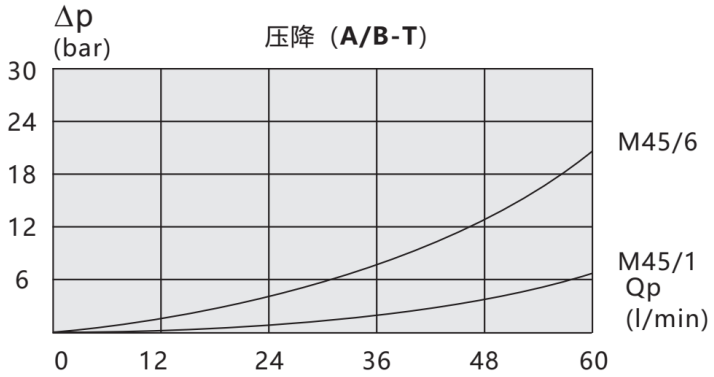


P 至 A/B 压降

P to A/B pressure loss

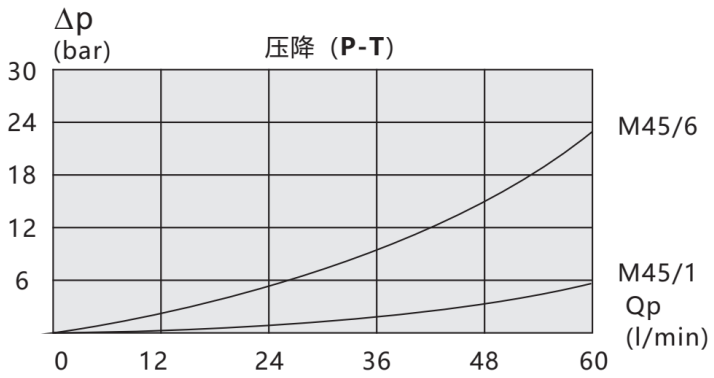
M45/1 与 M45/6 标准阀体，S001A 阀芯。

Standard M45/1 and M45/6 bodies with S001A spools.



A/B 至 T 压降

A/B to T pressure loss



P 至 T 压降

P to T pressure loss

曲线取自恒石原稿；横坐标到 60 L/min 不改变整阀 45 L/min 额定流量。

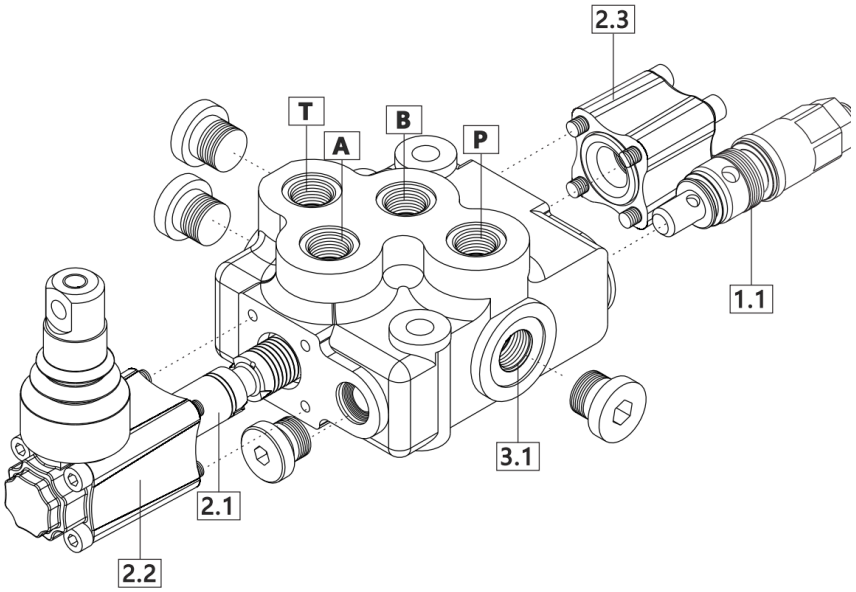
Curves from Hons. A 60 L/min plot axis does not change the complete-valve rating of 45 L/min.

订货示例

Ordering example

UV-M45/1: P1 301 150 - S001A C001 F001A - T1 A G06

字段 / Field	示例 / Example	说明 / Meaning
系列与联数 Series and sections	UV-M45/1	恒石 M45，一联 Hons M45, one section
进油位置与溢流 Inlet and relief	P1 301	右进油，复位侧直动溢流阀 Right inlet; relief on return-kit side
主溢流设定 Main relief setting	150	150 bar 示例值 Example setting: 150 bar
工作联 Working section	S001A C001 F001A	阀芯 / 控制 / 复位 Spool / actuation / return
回油类型 Outlet type	T1	右进油，单回油 Right inlet, single outlet
位置与螺纹 Position and thread	A G06	P、T 上方 / G 3/8 P/T on top / G 3/8



每一联重复“阀芯 + 控制 + 复位”字段，按实体顺序排列。操作杆单独订购。压力 150 bar 为订货示例，不是统一出厂设定。

Repeat spool + actuation + return fields for every section in physical order. Order levers separately. The 150 bar value is an ordering example, not a universal factory setting.

保留恒石 UV-M45 原始系列；HC 完整订货行见第 19 页。

The original Hons UV-M45 series is retained. See page 19 for the complete HC reference row.

进油配置与主溢流

Inlet arrangement and main relief

恒石 / Hons	功能 / Function	位置 / Location
P1	右进油 Right inlet	301 / 303
P2	左进油 Left inlet	201 / 203
301 / 201	直动式主溢流阀 Direct-acting main relief	B 侧 / A 侧 B side / A side
303 / 203	主溢流阀座装螺塞 Main relief cavity plugged	B 侧 / A 侧 B side / A side

A 侧为阀芯控制侧，B 侧为复位侧；这里的 A/B 是组件安装侧标记。配溢流阀时须填写设定压力。

A side is the actuation side and B side the return-kit side; these A/B labels indicate component location. Always specify pressure when ordering a relief valve.

HC 直动溢流阀设定范围

HC direct-relief setting ranges

范围 / Range	压力 / Pressure (bar)
A	10-40
B	41-70
C	71-130
D	131-210
E	211-350

HC 右进油代码为 IR；IR 301 为带直动溢流，IR 303 为阀座封堵。设定范围表为 HC 参考，恒石供货范围另行确认。

HC uses IR for right inlet: IR 301 with direct relief and IR 303 with a plugged cavity. The range table is an HC reference; confirm Hons availability separately.

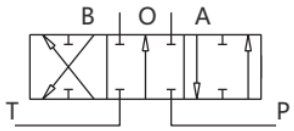
封堵主溢流阀座的配置，应按系统方案确定压力保护。

For a plugged relief cavity, determine pressure protection in the system design.

标准阀芯类型

Standard spool types

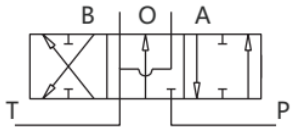
S001



三位双作用，中位 A/B 封闭

3-position double acting; A/B blocked in neutral

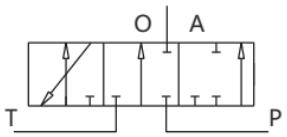
S002



三位双作用，中位 A/B 通 T

3-position double acting; A/B to tank in neutral

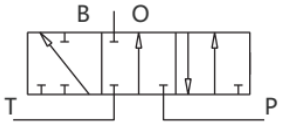
S005



A 口单作用

Single acting on A

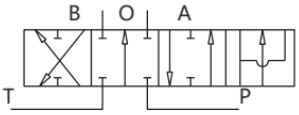
S006



B 口单作用

Single acting on B

S012



四位双作用，第四位浮动

4-position double acting; fourth-position float

S012 配 F005 定位套件；单作用配置封堵未使用的工作口。

S012 requires the F005 detent kit. Plug the unused service port for single-acting configurations.

阀芯流量等级与扩展机能

Spool flow grades and supplementary functions

后缀 / Suffix	恒石资料 / Hons source	HC 资料 / HC source
A	50 L/min	45 L/min
B	30 L/min	30 L/min
C	15 L/min	15 L/min
E	直动电磁控制阀芯 Direct-solenoid spool	按专用组件选型 Select with dedicated kit

恒石 A 级阀芯表写 50 L/min，整阀额定仍为 45 L/min。A/B/C 后缀须结合阀芯功能核对；原表未给所有机能提供全部后缀。

Hons lists 50 L/min for grade A spools; the valve rating remains 45 L/min. Select A/B/C with the required spool function; not every function has every suffix in the source.

HC 扩展阀芯参考

HC supplementary spool reference

HC 代码 / Code	机能 / Function
W003 / W004	A 通 T、B 封闭 / A 封闭、B 通 T A to tank, B blocked / A blocked, B to tank
W007 / W008	单作用 A / B，非驱动位工作口通 T Single acting A / B with the service port to tank
W010 / W011	切换时中位通道封闭，A/B 封闭或通 T Closed switching gallery; A/B blocked or to tank
W013	三位双作用差动 3-position double-acting regenerative

恒石 S013 / S014 差动配置使用特殊阀体 SPC；特殊阀体不对称，不能反转阀芯。HC 同尾号不能直接替换恒石代码。

Hons S013/S014 regenerative arrangements require a special SPC body. The asymmetric body does not permit spool reversal. Equal code suffixes do not establish interchangeability.

HC 回油节流 J/K/Y 代码按 A+B / A / B 回 T 区分，需确认具体配置。

HC restricted-return J/K/Y codes refer to A+B / A / B to T; confirm the exact arrangement.

阀芯控制方式

Spool actuation

恒石代码 / Hons code	控制方式 / Actuation	配套 / Required pairing
C001	带护罩操作杆 Protected lever	操作杆单独订购 Lever ordered separately
C002	带护罩，旋转 180° Protected lever rotated 180°	确认安装方向 Confirm orientation
C004	无操作杆控制组件 Actuation kit without lever	配置外部连接 Specify external linkage
C005	液压控制 Hydraulic control	原表省略独立复位代码 Source omits separate return code
C036 / C037	12 / 24 VDC 直动电磁 12 / 24 VDC direct solenoid	E 阀芯与特殊阀体 E spool and special body

HC 扩展机械控制

HC supplementary mechanical controls

HC 代码 / Code	控制方式 / Actuation
H001 / H002	带护罩操作杆 / 旋转 180° Protected lever / rotated 180°
H019 / H020	带行程限位 / 旋转 180° With stroke limiter / rotated 180°
H004 / H128	无操作杆 / 快接软轴预装 No lever / quick-connect cable provision
H348 / H349 / H350	支架反向 / 朝进油侧 90° / 朝回油侧 90° Reversed bracket / 90° toward inlet / 90° toward outlet
H009 / H010 + H120	双联万向节，按支点位置配对 Two-section joystick paired for selected fulcrum

恒石 M8 球形杆长度 135、210、295 mm；HC ZA 另列 395 mm。

Hons M8 knob levers: 135, 210 and 295 mm; HC ZA additionally lists 395 mm.

复位弹簧与定位

Return springs and detents

弹簧 / Spring	预载 / Preload	末端 / End load
A 标准 A standard	130 N	166 N
B 软弹簧 B soft	100 N	145 N
C 重型 C heavy	140 N	195 N

恒石标准复位套件

Hons standard return kits

代码 / Code	机能 / Function
F001A / B / C	三位弹簧中位复位 3-position spring centring
F002A / F003A / F004A	A+B / A / B 位定位，带复位弹簧 Detent in A+B / A / B with return spring
F149	A、B 位定位，不带复位弹簧 A/B detents without return spring
F005A	第四位定位，配浮动阀芯 Fourth-position detent for float spool
F013A / B / C	双向操作预装 Dual-control provision
F020A / F022A	气动开关量 / 比例气动 Pneumatic ON/OFF / proportional pneumatic

HC 另列 F009-F012 两位复位/定位，F014 行程限位，以及 F024-F035 液压负载限制与双向操作组件。这些为 HC 扩展项，恒石可供范围需确认。

HC additionally lists F009-F012 two-position return/detents, F014 stroke limiting and F024-F035 hydraulic load-limit/dual-control kits. These are HC supplements; confirm Hons availability.

弹簧负荷值为套件载荷，不能直接作为操作杆握把处的操作力。

Spring loads describe kit loads and are not directly the force at the lever grip.

电控与电液先导控制

Electrical and electrohydraulic control

恒石直动控制 / Hons direct control	C036 / C037
电压 / 电流 / 功率 Voltage / current / power	12 VDC / 3.75 A / 45 W 24 VDC / 1.88 A / 45 W
工作制 / 防护 / 行程 Duty / protection / stroke	S1 (100%) / IP65 / 2.5 + 2.5 mm
允许电压 / 环境温度 / 介质温度 Voltage tolerance / ambient / fluid	±10% / +40°C max / +80°C max

直动电控含控制端和复位端套件、应急按钮，必须配 E 类阀芯及特殊阀体。

Direct control includes actuation and return-end kits and emergency override; it requires E spools and a special body.

HC 电液组件参考

HC electrohydraulic-kit reference

项目 / Parameter	HC 数值 / Value
最大进口 / 减压后 / 先导 T 背压 Max inlet / reduced / pilot T pressure	350 / 16 / 3 bar
12 V 比例控制 R20 / 电流 12 V proportional R20 / current	3.7 Ω / 0.9-1.7 A
24 V 比例控制 R20 / 电流 24 V proportional R20 / current	15.5 Ω / 0.45-0.85 A
推荐 PWM / 过滤 / 先导管路 Suggested PWM / filtration / pilot pipe	60-80 Hz / 25 µm absolute Ø6 mm, G 1/4

HC F1600/F1610 为 12/24 V 开关电液；F2600/F2610 为比例电液。内置减压方案要求中位通道至少 8 bar 阻力并示出 1 mm 节流孔；该要求与 3 bar 先导 T 上限分别核对。

HC F1600/F1610 are 12/24 V ON/OFF electrohydraulic; F2600/F2610 are proportional. The integral reducing circuit specifies at least 8 bar neutral-gallery resistance and a 1 mm orifice, distinct from the 3 bar pilot T limit.

HC 控制连接杆套件单独订购，减压单元计入套件选型长度；按专册完整配置核对。

Order HC control tie rods separately and count the reducing unit in kit sizing; verify the full catalogue configuration.

回油配置与油口位置

Outlet arrangement and port positions

恒石 / Hons	进油侧 / Inlet	回油方案 / Outlet
T1	P1	右进油，单 T 回油 Right inlet, single T outlet
T2	P2	左进油，单 T 回油 Left inlet, single T outlet
T3	P1	右进油，T + HPCO Right inlet, T + HPCO
T4	P2	左进油，T + HPCO Left inlet, T + HPCO

恒石标准位置代码

Hons standard position codes

方案 / Arrangement	位置 / Position	螺纹 / Thread
T1 / T2: A	P、T 在上方，A/B 在上方 P/T on top; A/B on top	G06 / U03
T1 / T2: C	P、T 在侧面，A/B 在上方 P/T on sides; A/B on top	G06 / U03
T3 / T4: T	P、T、HPCO 在侧面 P/T/HPCO on sides	G06 / U03
T3 / T4: U	P、T 在上方，HPCO 在侧面 P/T on top; HPCO on side	G06 / U03

HC MJ 为单回油，MM 为 HPCO 方案；HC 还列 K/L 和 V/X 混合位置。恒石标准表未逐一列出这些扩展位置，不能直接用 HC 位置代码生成恒石订货行。

HC MJ denotes a single outlet and MM an HPCO arrangement; HC additionally lists mixed positions K/L and V/X. These are not individually listed in the Hons standard table and should not be used directly in Hons orders.

选型时同时填写进油侧、回油类型、位置和实际螺纹尺寸。

Specify inlet side, outlet type, position and actual thread dimensions together.

安装与维护

Installation and maintenance

核对铭牌、联数、完整订货代码与确认图。清洁安装面和管路，检查密封，连接 P、T、A/B 与 HPCO，预留操作杆和控制组件空间。

Verify the nameplate, section count, full ordering code and approved drawing. Clean mounting surfaces and pipes, check seals, connect P/T/A/B/HPCO and allow clearance for levers and controls.

HC 组件锁紧扭矩参考

HC component torque references

部位 / Component	扭矩 / Torque
主溢流阀阀体 Main relief valve body	80 N·m
主溢流阀调节帽 Main relief adjustment cap	20 N·m
A、B、P、T 油口 G03 / U03 堵头 A/B/P/T G03 / U03 plugs	40 N·m
控制与复位组件内六角紧固件 Control/return kit Allen fasteners	4-6 N·m

以上扭矩来自 HC-M45，适用于相应 HC 组件。恒石组件和不同接头的扭矩按供货技术文件执行。

These torques are from HC-M45 and apply to the corresponding HC parts. Use supplied technical documents for Hons components and other fittings.

首次调试与日常检查

Commissioning and routine checks

低压启动，检查中位循环和回油是否畅通；逐联确认 A/B 动作、复位、定位和浮动功能。检测泄漏与异常发热，再按确认参数调整压力。定期检查油液清洁度、管路、紧固件和操作机构。

Start at low pressure and check neutral circulation and tank return. Verify A/B operation, centring, detents and float per section. Check leakage and heat, then adjust pressure to approved values. Periodically inspect fluid cleanliness, piping, fasteners and actuation.

本页安装流程为整理后的检查建议；扭矩数据按组件来源标注。

Installation checks are compiled guidance; torque data is identified by component source.

逐联选型与配置记录

Section-by-section selection record

项目 / Item	需填写信息 / Required information
系统参数 System duty	流量、压力、介质、温度、T 背压 Flow, pressure, fluid, temperature and T pressure
阀体与进油 Body and inlet	1-6 联、P1/P2、主溢流与设定 1-6 sections, P1/P2, main relief and setting
逐联机能 Function per section	执行机构、阀芯机能与流量等级 Actuator, spool function and flow grade
操控组件 Controls	手动/先导/电控、复位、定位与电压 Manual/pilot/electrical, return, detents and voltage
回油与接口 Outlet and ports	T1-T4、位置、G 3/8 或 UNF、HPCO T1-T4, position, G 3/8 or UNF and HPCO
安装条件 Installation	X/Y、重量、组件与操作杆空间 X/Y, weight, control and lever clearance

工作联记录表

Working-section record

联号 Section	执行机构 Actuator	阀芯 Spool	控制 Actuation	复位 Return
1				
2				
3				
4				
5				
6				

每联记录后组合完整订货行；特殊阀体、特殊阀芯与远程控制分别核对。

Compile the complete order after recording every section; verify special bodies, spools and remote controls.

技术注释与资料依据

Technical notes and source references

核对项目 / Item	整理原则 / Treatment
额定流量与阀芯流量 Valve rating and spool grade	整阀 45 L/min；恒石 A 级表列 50，HC 表列 45 Valve rating 45 L/min; Hons A grade lists 50, HC lists 45
主阀与先导回油 Main and pilot returns	HC 主 T 上限 20 bar，电液先导 T 上限 3 bar HC main T limit 20 bar; electrohydraulic pilot T limit 3 bar
订货代码 Ordering codes	恒石 S/C/P/T/G06 与 HC W/H/IR/MJ-MM/G03 分别记录 Keep Hons S/C/P/T/G06 distinct from HC W/H/IR/MJ-MM/G03
直接电控行程 Direct-solenoid stroke	C036/C037 为 2.5+2.5 mm；标准手动为 5+5 mm C036/C037: 2.5+2.5 mm; standard manual: 5+5 mm

HC 完整订货参考

Complete HC ordering reference

HC-M45/1 IR 301 150 W001A H001 F001A MJ A G03

该行来自 HC 示例，仅用于理解字段，不能直接作为恒石供货代码。HC 还含液压负载限制、电气位置触点和电气气动扩展；需按专册图示与供应方确认。

This HC example explains the fields and is not a Hons supply code. HC also includes hydraulic load limiting, electrical position contacts and electropneumatic options; verify the catalogue diagrams with the supplier.

编制依据

Sources

恒石《产品样册 20200411》PDF 第 5、17-23 页（原页码 7-8、31-44）；HC-M45《hcm45_01.pdf》PDF 第 3-33 页。D4 样册用作版式与品牌参考。封面使用用户提供的 M45 六联实拍原图。

Hons Product Catalogue 20200411, PDF pages 5 and 17-23 (printed pages 7-8 and 31-44); HC-M45 hcm45_01.pdf, PDF pages 3-33. D4 supplies layout/brand references. The cover uses the supplied original six-section M45 photograph.

本册为中英双语选型整理；特殊配置、可供范围及安装参数以确认技术文件为准。

This bilingual selection compilation uses approved technical documents for special options, availability and installation.

恒石液压

Hons Hydraulics

M45

官网 / Website

扫码访问官网

微信 / WeChat

扫码添加微信

整体式多路阀

Monoblock Directional Control Valve

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，为工程机械、农业机械和其他液压设备提供选型与技术支持。

Directional control valves, load-sensing valves and sectional solenoid valves, with selection and technical support for construction, agricultural and other hydraulic equipment.

45 L/min | 350 bar | 1-6 sections

选型与技术服务，请联系恒石。

For selection and technical support, contact Hons.

实拍图为配置展示；交付型号和技术参数以完整订货代码及确认文件为准。

Photographs illustrate a configuration. The complete order and approved documents define the supplied model and parameters.