

International Standard 国际水准

Continuous Improvement 持续改进

Customer Satisfaction 客户满意

QP Hydraulics

Make Your Hydraulic Flow and Pressure Solutions Easy



www.QPhydraulics.com

Introduction 公司简介

QP 液压是美国普林斯工业的一个核心事业部。五十多年以来，普林斯工业通过对加工与制造创新的精准控制，为各种液压和行走设备制造商提供高质量的零、部件。今天 QP 液压运用特有的工艺为全世界行走设备制造商研发精准的流量和压力控制方案。

低操控力先导控制阀

通过使用特有的阶梯孔形技术，我们的先导阀提供高达20升/分的流量，操控力却只有常规先导阀的50%，同时能将滞环现象精确到1%以下。

轻质单向阀

创新的轻质量设计，提供稳定及低震动控制来解决液压系统的诸多问题。

大流量比例插装阀

我们的直动式大流量比例阀，在线圈尺寸相同的情况下能提供比常规阀大5-10倍的流量。通过阶梯孔形技术和多年的实践经验取得了尺寸和功率上的优势。

若您希望解决行走机械的液压压力和流量问题，请联系我们的工程师。

QP Hydraulics is a division of Prince Industries. For fifty years, Prince has provided the highest quality parts and components to hydraulic and mobile equipment OEMs through innovative precision control in machining and manufacturing. QP Hydraulics now uses these proprietary processes to develop precision flow and pressure control solutions to mobile equipment OEMs around the world.

Low-Effort Pilot Control Valves

Built using proprietary Step Bore Technology, our valves provide up to 20 lpm flow with up to 50% less effort of conventional pilot valves, while maintaining precision hysteresis below 1%.

Low-Mass Check Valves

The innovative low-mass design gives stable, low-shock control to solve a variety of hydraulic system problems.

High-Flow Proportional Cartridge Valves

Our direct acting high-flow proportional valves have 5 to 10 times the flow compared to conventional valves with similarly sized coils. We use Step-Bore Technology and years of experience to attain this size and power advantage.

Contact our engineering staff to discuss hydraulic pressure and flow solutions for your mobile equipment.

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QP Hydraulics experience on Cranes, Rotary Drilling Rigs, Excavators, Dozers, Wheel Loaders and other equipment can be applied to your Construction Equipment. Let us know your requirements and we can match-up one of our current products or design a new one for you.

QP 液压在各种起重机、旋挖钻机、挖掘机、推土机、装载机和其 它设备上的经验可以应用于您的工程机械设备。告诉我们您的需求，我们可以为您适配现有的产品或定制设计。

- Smooth Crane operation with the lowest Pilot Valve efforts on the market
- Special configurations such as max pressure output Joystick on rough terrain crane
- What does the future hold for crane hydraulics ... smooth reliable responsive EH
- Durable Handle with 3 top buttons for rotary drilling rig applications

- 平稳的起重机操作，市场上操作力最低的先导阀
- 特殊配置如最大压力输出，适用于越野起重机
- 未来起重机液压—平稳、可靠、灵敏的电液控制
- 可靠的上端带三按钮开关的手柄，适用于旋挖钻工况

- QP Exc. Control set - Starts with Compact Joysticks (JSC45), cartridges design w/o plunger friction
- QP Exc. Control set - Includes thin Single Lever controls (SL25)
- QP Exc. Control set - Finishes with the heavy duty Foot Pedal (FP48)
- What does the future hold for excavator hydraulics ... low cost in-line checks

- QP 挖掘机控制—始于紧凑型手先导 JSC45, 插装阀设计、无柱塞摩擦力
- QP 挖掘机控制—包括单片式推土先导 SL25
- QP 挖掘机控制—结束于可重载的脚踏阀 FP48
- 未来挖掘机液压—低成本管式单向阀





- QP Dozer Controls stand up to the track G-loads
- Dozer track relief to reduce maintenance
- Dozer specialty check valves
- What does the future hold for Dozer hydraulics ... EH control and in-line checks

- QP 推土机控制阀经得起履带 G-loads
- 推土机履带溢流阀降低保养成本
- 推土机特有的单向阀
- 未来推土机液压—电液控制和管式单向阀



- QP Wheel Loader Controls have low effort, high flow, quick response and all of the features and benefits of a world class control, additional options: Bumpers, Coils and Sequence valves
- Implement return back-pressure flange style Check (CV-Flange Style)
- What does the future hold for WL hydraulics ... EH control and in-line checks

- QP 装载机先导阀具备一流操控所具有的所有特性和优点：低操控力，大流量，快速响应，可附加选配：阻尼装置、吸合线圈、顺序阀
- 执行回路法兰式背压单向阀
- 未来装载机液压—电液控制和管式单向阀



QP Hydraulics, a division of Prince Industries, answers the OEM's need for value added hydraulic solutions. QP pilot controls feature our exclusive Step Bore Technology™ to give you low effort, high response for precision control with no sacrifices. Our design engineers developed this proprietary technology and we invented the manufacturing process to make it a reality for you. Innovation for low effort AND high response. That's the QP Hydraulics difference. We produce a wide range of configurations. Our pilot controls are making work easier for Crane, Dozer, Wheel Loader and Excavators all over the world. Instead of settling between low effort and high response, choose QP Hydraulics and get both.

JS446 Joystick Pilot Control Cranes and Rotary Drilling Rig Benefits:

- Low effort AND high response
- Precision for smooth control
- All Cartridge with steel cage and spool
- Low hysteresis due to proprietary manufacturing process
- Very stable with use of bias spring and plunger dampening
- Low Noise with spool dampening orifice
- Flat plunger top for no side load and no leakage
- Dust and debris proof boot design
- Compact size for low weight and easy installation
- Durable handles, buttons and switches
- Many options for different configurations
- Cost and Price Competitive



QP 液压作为普林斯工业的一个核心事业部，满足原始设备制造商对于高附加值液压解决方案的需求，QP 先导控制阀的特点是我们特有的阶梯孔形技术（差动式），为精准控制提供低操控力、快速响应，且没有其它损耗。我们的工程师研发了这项具有专利权的技术，并开发了相应制造工艺，为您提供成熟的产品。对于低操控力与快速响应的创新是 QP 液压的过人之处。多种配置供可供选择。我们的先导控制阀，正在使全球范围内的起重机、推土机、装载机和挖掘机操作者的工作变得更轻松。当您为低操控力和快速响应难以取舍的时候，选择 QP 液压则两者兼得！

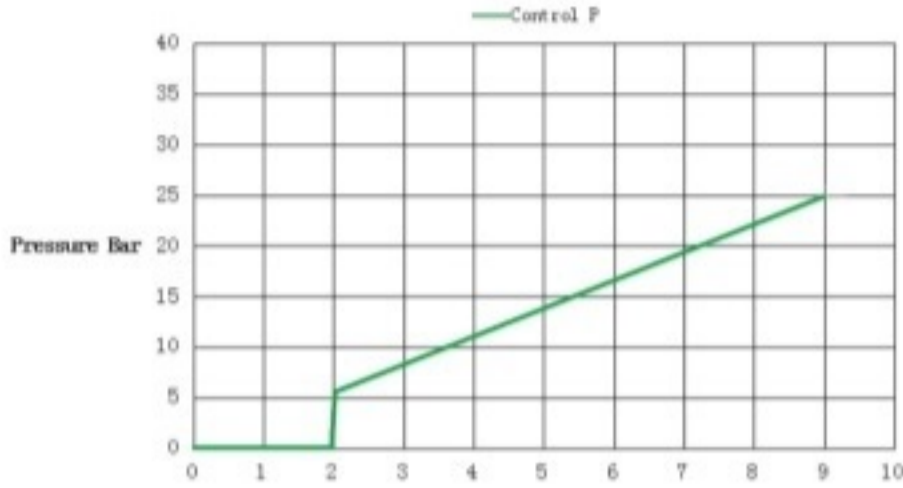
JS446 起重机械和旋挖钻机先导控制阀的优势：

- 低操控力、快速响应
- 精确、平稳操控
- 插装阀设计，钢质阀芯和阀套
- 低滞环现象、专利制造工艺
- 采用偏置弹簧和柱塞阻尼，异常稳定
- 采用阀芯阻尼孔，极低噪音
- 平头柱塞设计，无侧向力，无泄漏
- 防尘、防脏污设计优质护套
- 尺寸紧凑，质量轻，易安装
- 手柄、按钮开关可靠耐用
- 多种不同配置供选择
- 有竞争力的价格



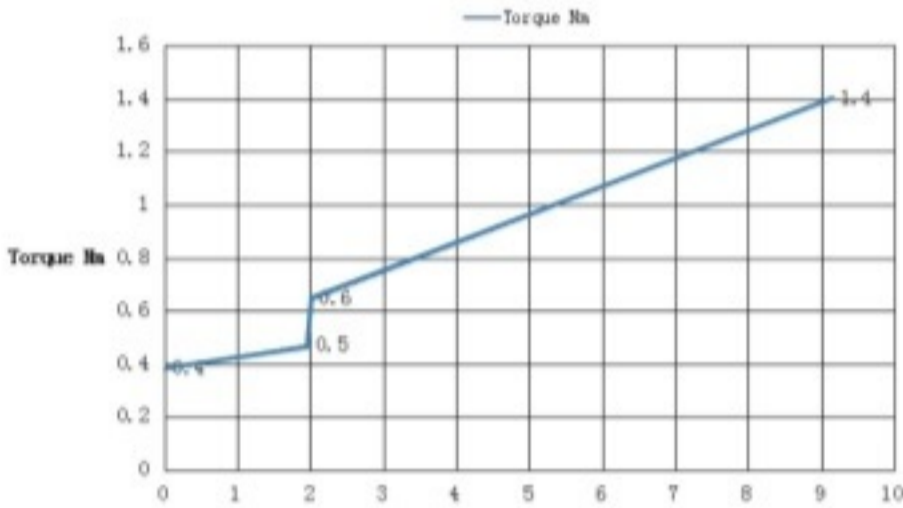
Smooth Modulation

Control P



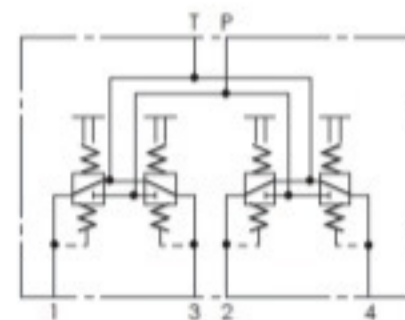
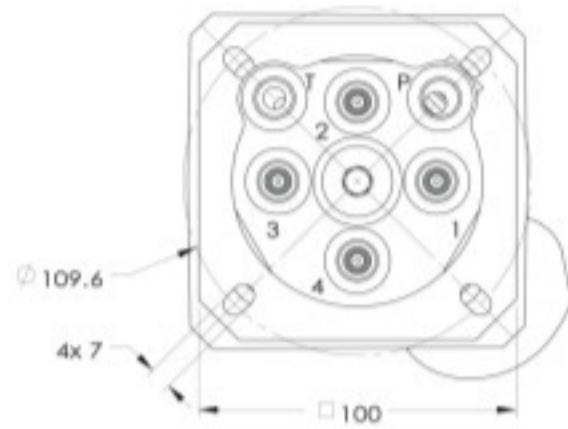
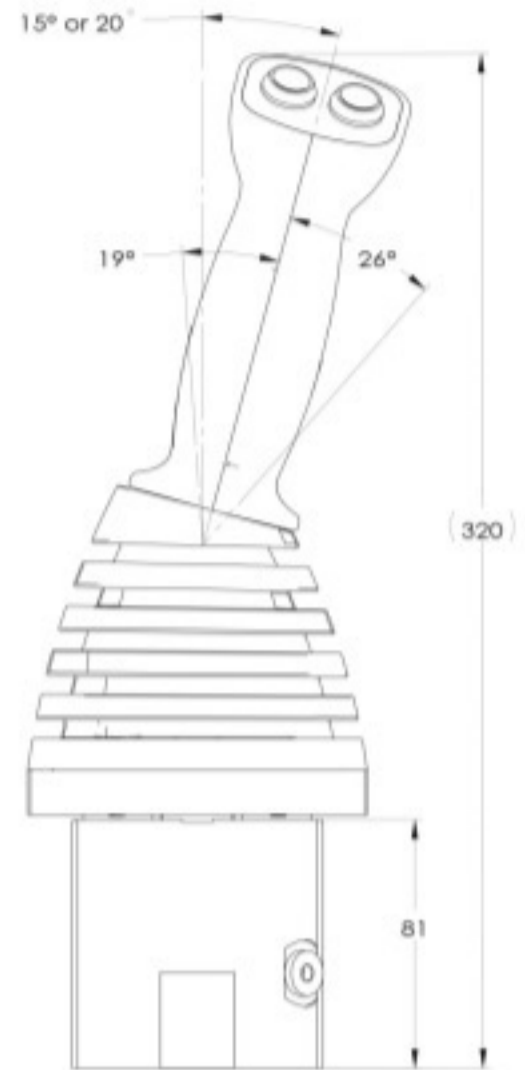
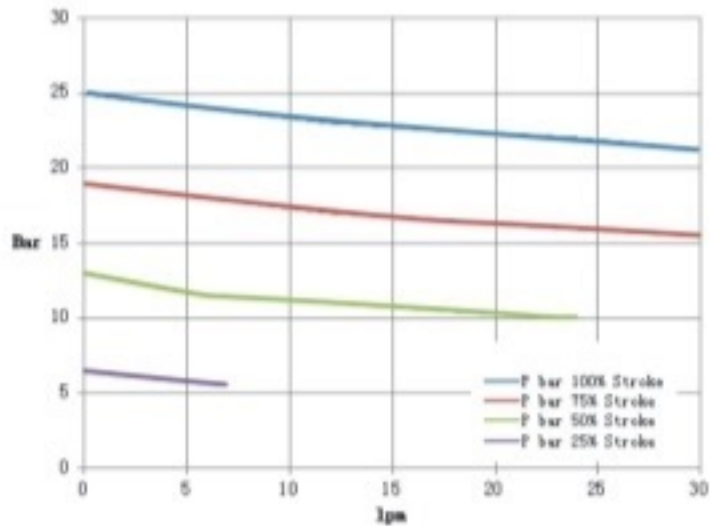
Lowest Efforts

Torque Nm



Flow Response

Pressure vs. Flow



All other pilot controls have a plunger with lots of seal motion and friction. Excavators need quick and repeatable control inputs. This is why we removed the plunger and put the seal on the spool which has 10 times less motion. This means the operator can make quick control motions without the large seal drag variation. Other pilot controls need pilot line stability orifices that delay any quick control response from getting to the bucket. JSC45 has spool dampening so it is very stable on boom and stick gravity lowering. This means the pilot line orifices are not needed or are not as restrictive. So quick control inputs can directly be translated to increased Excavator productivity.

所有其它先导阀都带有相对密封件运动的，产生很多摩擦的柱塞设计，挖掘机需要快速和可靠的控制输入，这是为什么我们取消了柱塞，并将密封件设计在阀芯上，将相对移动量缩小了10倍。这意味着操作者能够快速操作，且没有密封阻力上大的变化。其它先导阀需要先导油路稳定阻尼孔，这延迟了本应快速到达挖斗的控制响应。JSC45具有阀芯阻尼，它在Boom和Stick自然下降时非常稳定。这也意味着不再需要或受制于先导油路阻尼孔。所以快速控制输入能够直接传递，并增加挖机生产力。



- JSC45 has no plunger so seal has 10X less motion for fast AND smooth actuation
- The Spool has extra dampening so boom and stick lowering are stable
- More dampening means less pilot line orifices increasing the response
- Flat top spring inputs directly to the spool for no side load and no leakage
- Dust and debris proof boot design with soft top push button switch
- Very Compact size for low weight and easy installation



- FP48 has a Sturdy Pedal with All Steel or Ductile Pivot Parts
- Cartridge has large 8mm Spool so 77% more of the input goes to modulation
- Integrated plunger dampening for smooth pedal actuation
- Not one but Two X-Ring Seals for durability
- Flat top plunger for no side loads and no seal leakage



- SL25 is the Thinnest Single Lever (22mm) with a Cartridge
- Flat top plunger for no side loads and no seal leaks
- Extruded Aluminum body for steel cage and spool
- Many options for different curves and configurations
- Cost and Price Competitive

- JSC45 采用无柱塞设计，密封件相对运动缩小 10 倍，动作快速、稳定
- 阀芯自带阻尼，Boom 和 Stick 下降稳定
- 先导管路阻尼孔减少，增强响应速度
- 平头弹簧直接作用于阀芯，无侧向力，无泄漏
- 优质防尘、防脏污护套，顶端按钮
- 尺寸紧凑、重量轻、易安装

- FP48 踏板结实可靠，钢质或球铁关节
- 插装阀具有 8mm 阀芯，高于 77% 输入转化成控制
- 集成柱塞阻尼，踏板动作平稳
- 两个 X 型密封圈，增强可靠性
- 平头顶部柱塞设计，无侧向力，无泄漏

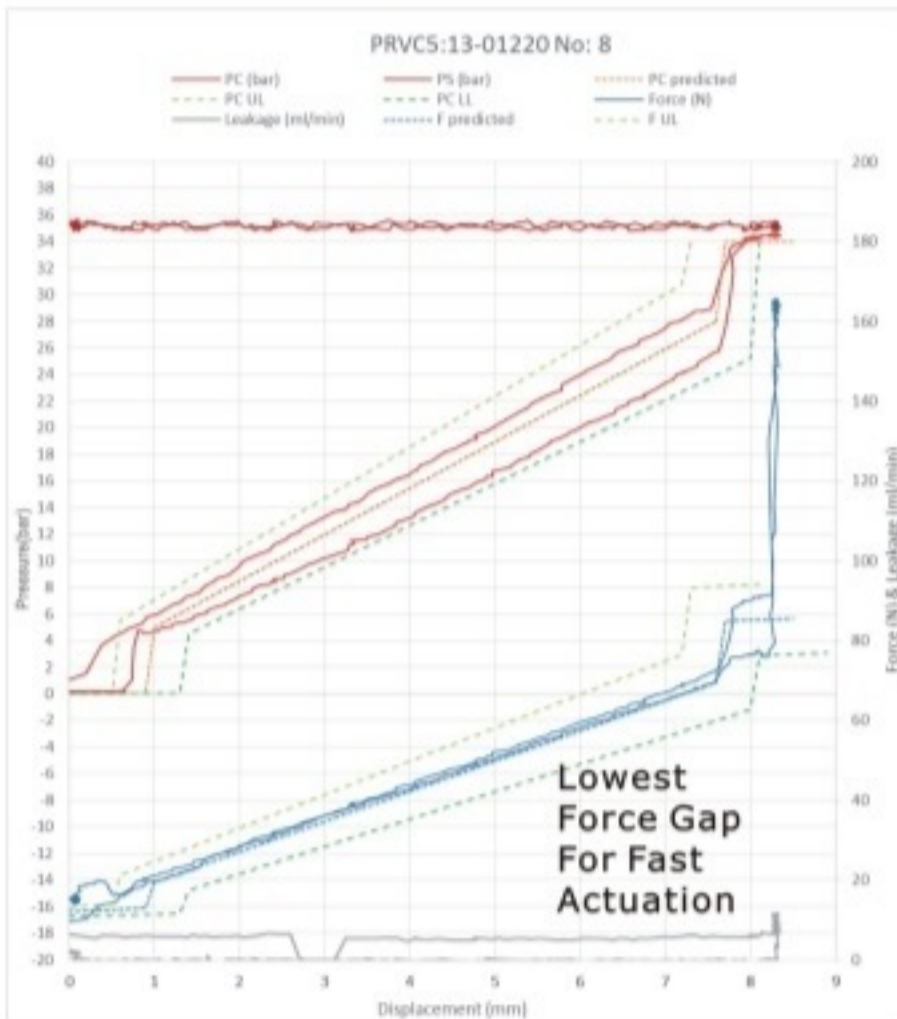
- SL25 是市场最薄的 (22mm) 带插装阀设计的推土阀
- 平头柱塞设计、无侧向力、无泄漏
- 挤压成型铝阀体、钢质阀套和阀芯
- 多种曲线和配置供选择
- 具有竞争力的价格





JSC45 Designed for Fast AND Smooth Actuation
Why Add pilot line orifices to stabilize Lowering?
This only slows down raise
QP builds the stability into the JSC45 Cartridge
Why create friction at the Operators hand?
10X less Seal Motion means less friction
Less Friction means fast and accurate inputs

JSC45设计用于快速和平稳操控
为什么增加先导油路阻尼孔来稳定下降（动作）？
这只能减缓上升（动作）
QP将稳定性集成在JSC45插装阀里
为什么操作者的手中产生了摩擦力？
缩小10倍的密封件运动意味着减少摩擦力
减少摩擦力意味着快速和精确的输入



FP48 Designed to be sturdy and smooth
Foot Loads can be very high
This is why all our Pivot Parts are Ductile
Why add a pilot bias piston to increase feel?
This only reduces spool modulation
FP48 Cartridge has 77% more spool area

FP48设计用于平稳操作且坚固可靠
用脚产生的负载可能很高
这是为什么所有转动关节件都是球铁
为什么增加一个偏置活塞增加感觉？
这只能减少阀芯调节范围
FP48插装阀具有多于77%的阀芯面积



QP Wheel Loader Controls have the low efforts and all the features and benefits. For over 15 years QP Hydraulics (Division of Prince Industries) has been making Wheel Loader pilot valves for a major construction OEM. The JS446-WL has the lowest efforts available on a Joystick but still keeps the sharp forewarning bumper feel before float. The QP Hydraulic exclusive Hi/Lo bumper doubles the forewarning feel by having a high initial load. However, the final load is twice as low, improving the hold coil latching. This prevents in-advertent bucket float actuation and keeps the hold coil latched when float is activated. If a float sequence valve is needed it can bolt-on as an option. If one or more Single Levers are needed they too can bolt-on without additional supply or return lines.

QP 装载机先导阀独有的低操控力和其它所有特性和优点。从 15 多年前到今天，QP 液压 — 普林斯工业的核心事业部，一直为工程机械主要 OEM 生产装载机先导阀。JS446-WL 不仅具有最低的操控力，同时在浮动位具有灵敏的预警阻尼装置。QP 液压独有的 Hi/Lo 阻尼器通过高初始负载提供双倍的预警效果，但是最终负载却低了两倍来改善线圈锁定。这能够防止无意中触动铲斗浮动且当浮动触发时保持线圈吸合。如果需要浮动顺序阀，可以叠加。如果需要一片或多片单轴先导阀，也同样可以叠加，无需额外管路。

Wheel Loader JS446-WL and SL246-WL benefits:

- JS446-WL has low effort AND high response plus aggressive Loader timing
- Exclusive (Patent Pending) Hi/Lo Bumper has more forewarning feel AND better hold coil latching
- Very stable with low noise using bias spring on the spool, spool and plunger dampening
- Flat plunger top for no side load and no leakage
- Dust and debris proof boot design
- Compact size for low weight and easy installation



- SL246-WL is the single lever with the same advantages as the JS446-WL
- Stack 2,3 or 4 SL246-WL together with single supply and return connections
- High pressure float Sequence valve bolts to Joystick or Single Levers
- Sequence valves are available with 2 or 3 way logic depending on your float

- Any combination of Joystick and Single Levers are available
- Mounting Plates can be easily configured to your cab
- All Extruded Aluminum body but steel cage and spool
- Durable ergonomic handles with multiple button and switch configurations
- Many options for different curves and configurations
- Cost and Price Competitive



装载机用 JS446-WL 和 SL246-WL 的优点：

- JS446-WL 具低操控力和快速响应，以及高效装载
- 独有的（专利申请中）Hi/Lo 阻尼器提升预警手感和更好的线圈锁定
- 通过阀芯上的偏置弹簧和阀芯及柱塞阻尼，操作非常稳定、噪音低
- 平头柱塞设计，无侧向力，无泄漏
- 优质防尘、防脏污护套
- 尺寸紧凑、重量轻、易安装

- SL246-WL 是与 JS446-WL 具有同样优势的单片阀
- 2~3 或 4 片 SL246-WL 可叠加在一起，同一个进、出油口
- 高压浮动顺序阀可叠加在十字阀或单片阀上
- 顺序阀可提供 2 通或 3 通逻辑应用

- 十字阀和单片阀任意叠加组合
- 安装板易于适配驾驶室扶手箱尺寸
- 高强度挤压铝合金阀体，钢质阀套和阀芯
- 可配置耐用且经济，并带多个按钮开关的手柄
- 多种曲线和配置可供选择
- 具有竞争力的价格





Wheel Loader JS446-WL Curves and Benefit Explanations:

JS446-WL Has higher pre-feel AND better latching

Choose QP and get both feel and latching

Low Hysteresis and Low noise Pressure Curve

Hold Coils designed for continuous duty cycle

装载机用 JS446-WL 曲线和优点详解：

JS446-WL 具有强预警手感和更好的锁定功能

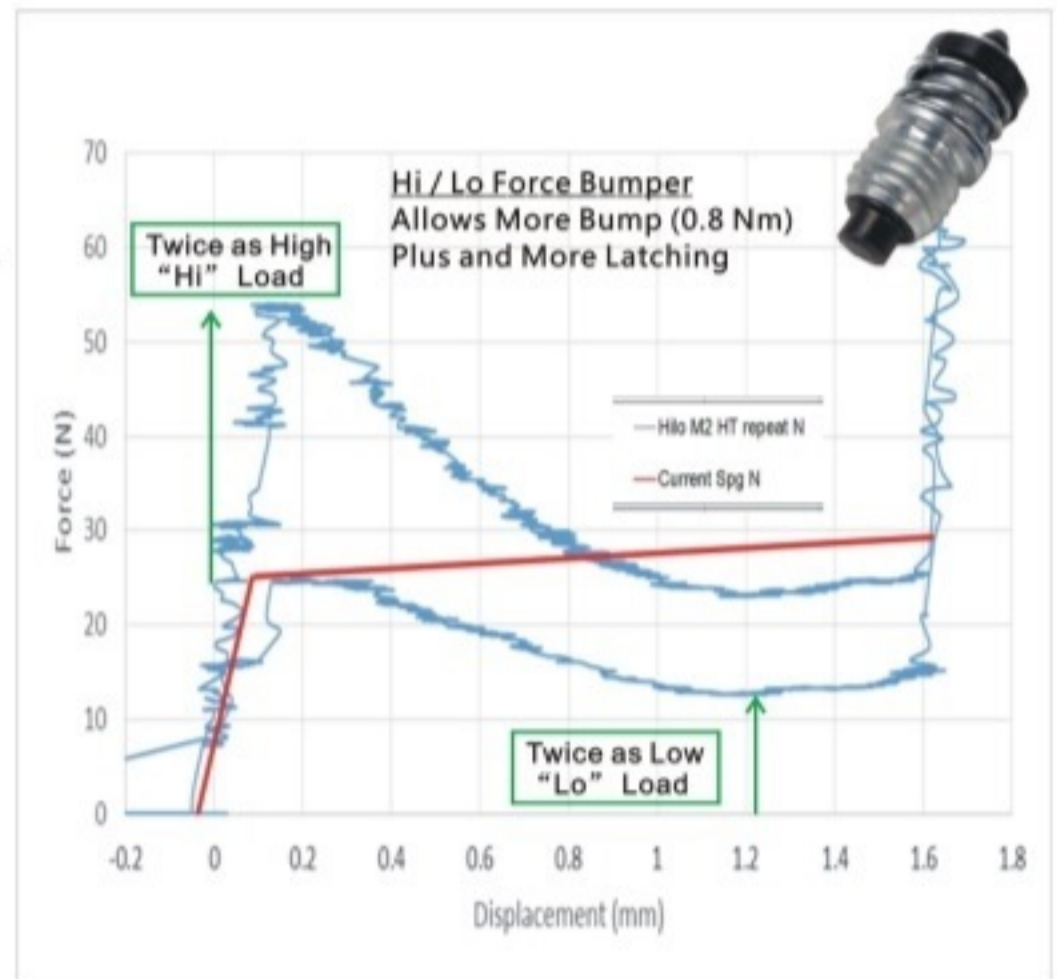
选择 QP ，获得上述两种益处

低滞环现象和低噪音压力曲线

吸合线圈适合连续运行

Hi / Lo Bumper has double the initial load
Load reduces with stroke instead of increases
Final Load drops to half that of a spring plunger
Dual Springs insure reset to hold position
Endurance tested to over one million cycles
Adjusted and locked to your pressure setting
★ Confidential-Patent Pending

Hi / Lo 阻尼器具有双倍初始负载（反馈）
负载不随行程增加而增加，相反降低
最终负载降到弹簧柱塞的一半
双弹簧确保复位
超过 100 万次寿命测试
根据压力设置调节并锁定
★ 保密—专利申请中



Electronic Controls JSE and ePRV

JSE = Joystick Electronic

ePRV = Electronic Pressure Reducing Valve

Together you get the feel AND Response just like pilot controls

电控 JSE 和 ePRV

JSE = 电控先导阀

ePRV = 电磁减压阀

两者结合在一起，您得到的手感和响应如同液控先导

JSE Joystick Electronic benefits:

JSE-A Standard

- Auto Calibrates for pilot control accuracy
- Force Sensing is not sensitive to Radio Frequency like Hall Effect
- Feel like a Pilot Valve with many parts common with our Pilot Valves
- Hardened Electronics with digital or analogue output signal

JSE 电控先导阀优点：

JSE - A 标准产品

- 先导控制精度自动较准
- 力感应不像射频如霍尔效应一样敏感
- 操作感如同我们的普通液控先导阀
- 强化电气，数字或模拟信号输出

JSE-B On/Off Hold

- On/off Hold coil detent near full stroke for Wheel Loader and Dozers
- Exclusive Hi/Lo Bumper for more feel AND more latching force

JSE-B 开 / 关控制

- 开 / 关控制线圈吸合接近于装载机和推土机的全行程
- 独有的 Hi/Lo 阻尼器提供更好的手感和更强的锁紧力

JSE-C Variable Hold

- Programmable feel feedback at any angle
- Programmable Hold at any angle
- Standard and custom configurations and cracking pressure
- Confidential – Patent Pending

JSE-C 可变控制

- 可编程的任意角度手感反馈
- 可编程的任意角度定位
- 标准和定制化的配置和开启压力
- ★ 保密—专利申请中

ePRV = Electronic Pressure Reducing Valve Benefits:

- Step Bore Technology™ delivers 5X the flow with small Solenoid
- Proportional Pressure modulation down to -25 °C
- Common Cavity without threads
- Common DT style connectors

ePRV = 电磁减压阀优点：

- 阶梯孔形™ 在小型线圈下提供 5 倍流量
- 低至 -25 °C 下实现压力比例调节
- 不带螺纹的常规孔形
- 常规 DT 接头



JSE-A
Standard



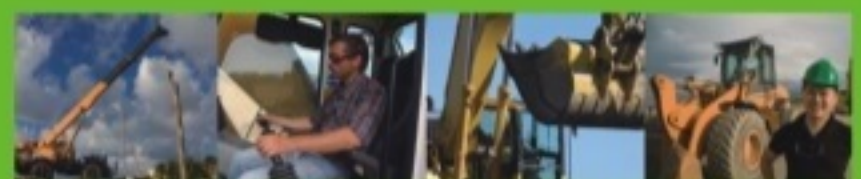
JSE-B
On/Off Hold



JSE-C
Variable Hold



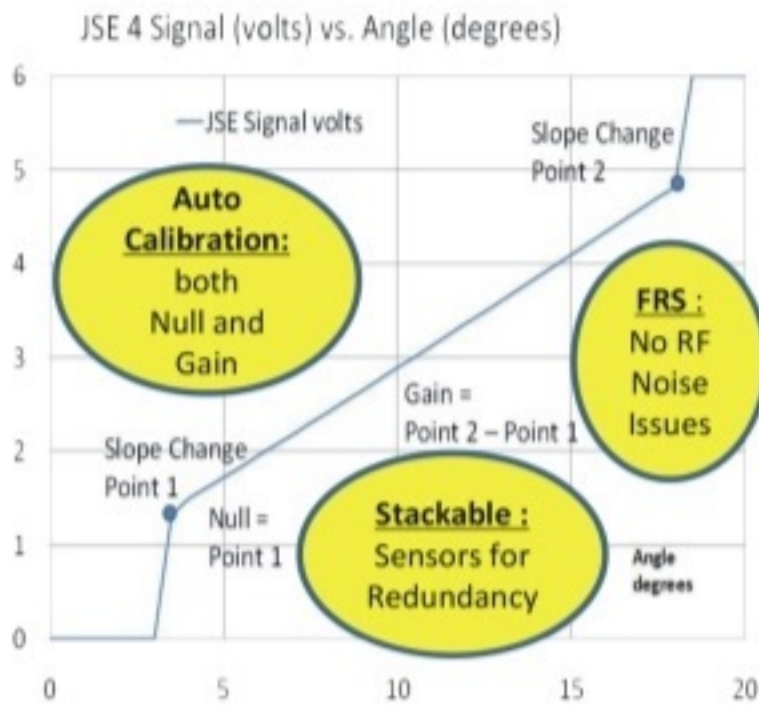
ePRV-K



Auto Calibrated so Accuracy is like Pilot

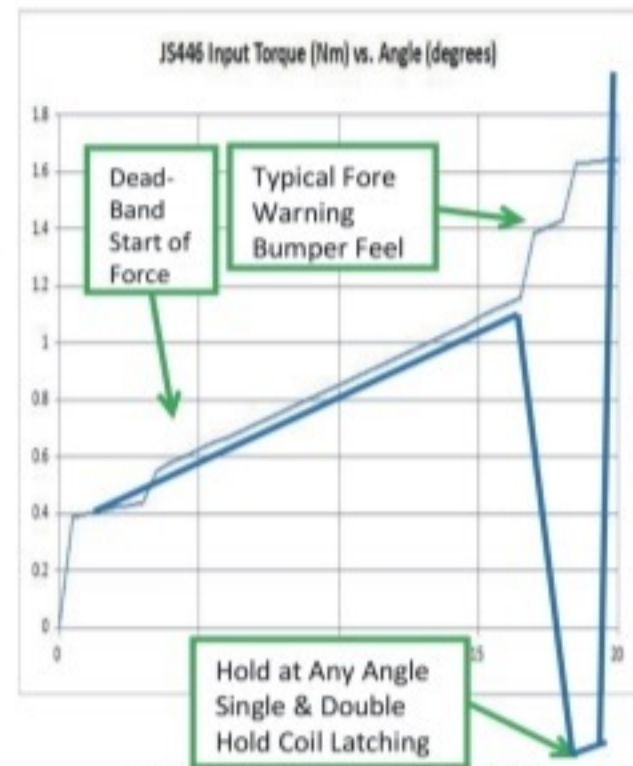


Feel is Like Pilot Controls
Only programmable on the fly!
Any feedback force at any angle



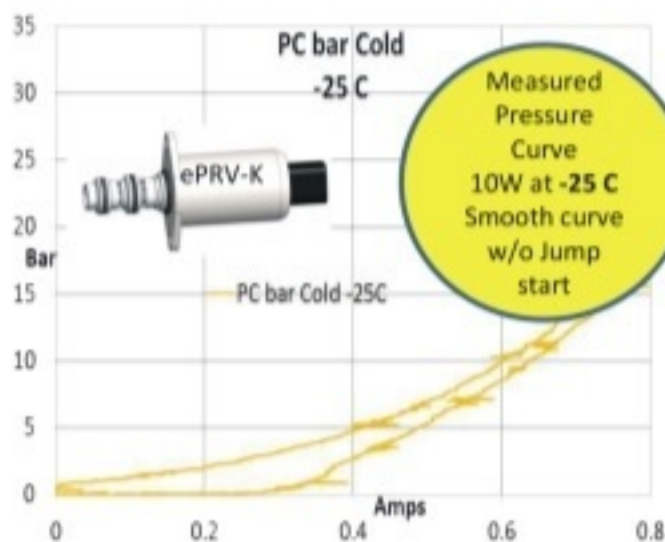
Confidential – Patent Pending

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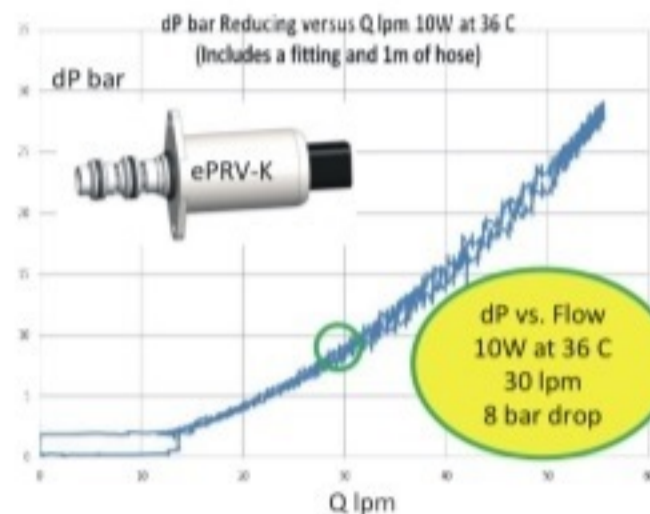
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★ 保密—专利申请中



CV = Check Valves
CV-P - Poppet Style - Stable Low mass aluminum
CV-M - Manifolds - Consolidate Lines
CV-D - Disc Style - No extra fittings needed!

CV = 单向阀
CV-P 锥阀芯设计 - 轻质铝合金材质，性能稳定
CV-M 阀块阀组 - 集成油路
CV-D 碟形设计 - 无需额外附件

QP Check Valve benefits:

CV-P = Poppet Style

- In Line: STOR, Bead, ORFS, 4-Bolt
- Low Mass Aluminum Poppets
- Stable and Low Overshoot
- Limited to 50 bar
- Length similar to fitting
- Low Pressure Drop
- Set Right Cracking Pressures
- Flow Through Orifices Available
- Standard and custom configurations and cracking pressure

CV-M = Manifolds

- Customized for your lines
- Low Mass Aluminum Poppets
- Stable and Low Overshoot
- We can help consolidate checks into your manifolds

CV-D = Disc Style

- Insert into Existing Lines: ORFS, 37 Flare, 4-Bolt
- Low Mass Steel Disc
- Stable and Low Overshoot
- Limited to 250 bar and higher

QP 单向阀优点：

CV-P 锥阀芯

- 管式结构：STOR、Bead、ORFS、4-Bolt
- 轻质铝合金锥阀芯
- 稳定、低超调
- 50Bar 以下应用
- 长度与管接头类似
- 压降低
- 开启压力精度高
- 可增加节流孔
- 可为客户定制相关参数

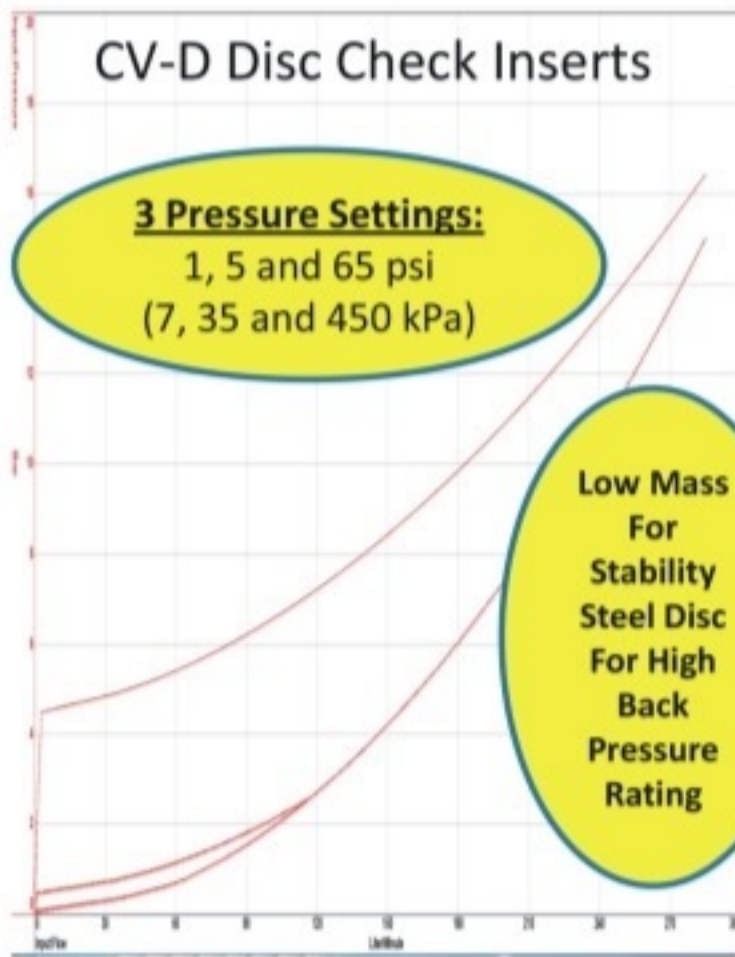
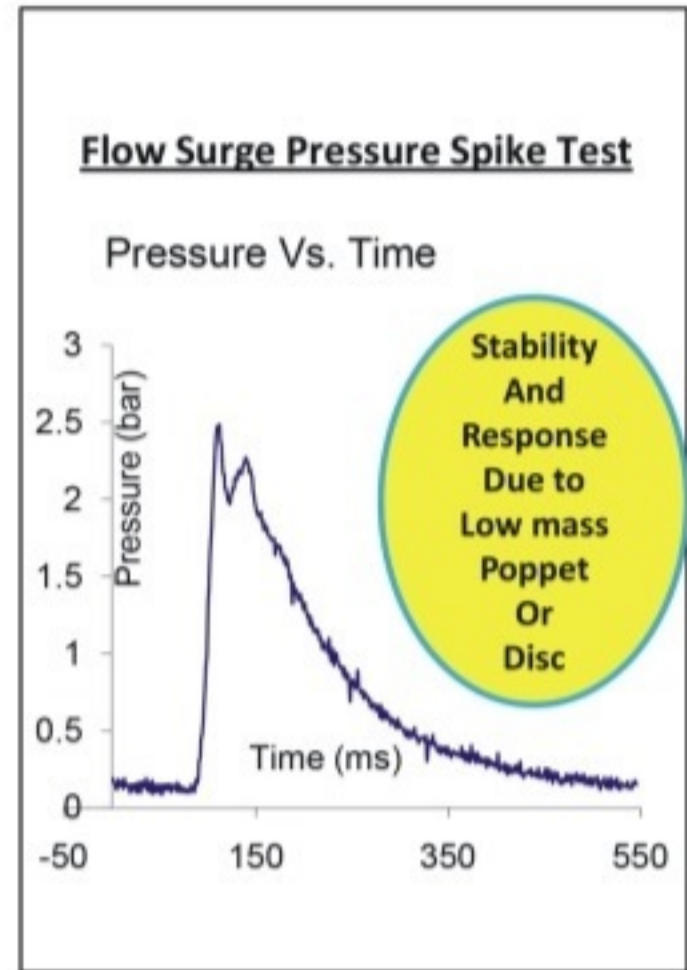
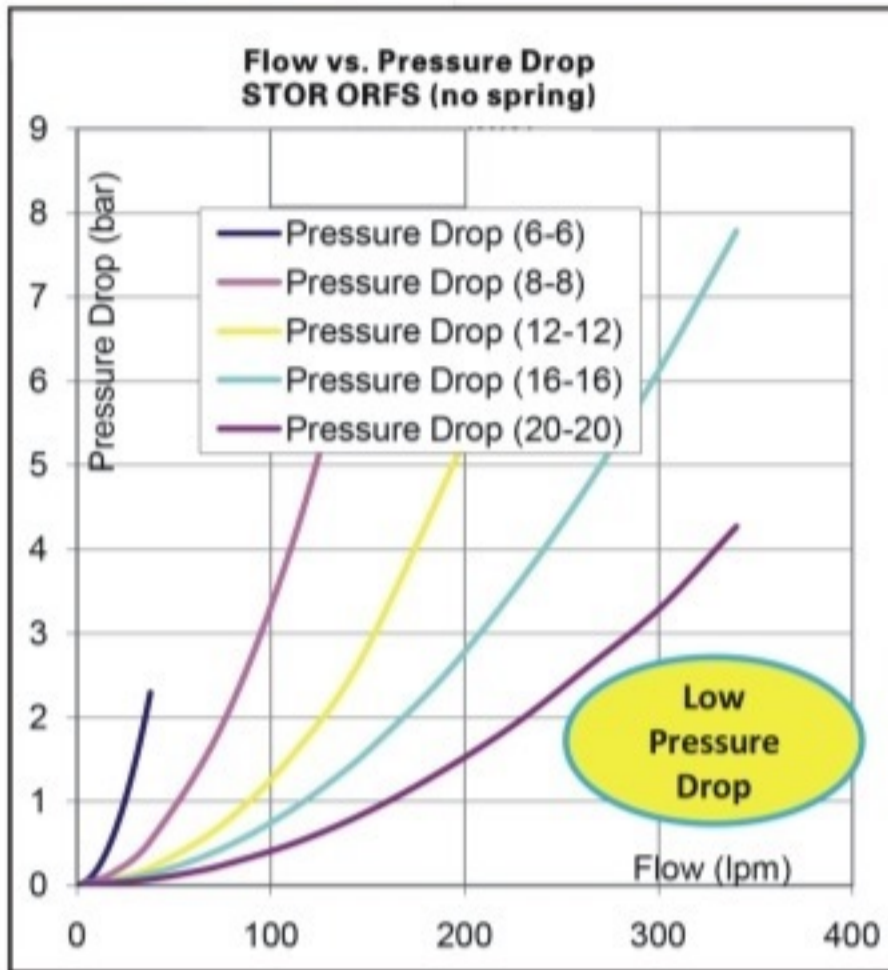
CV-M 集成阀组

- 定制油路
- 轻质铝合金锥阀芯
- 稳定、低超调
- 能够集成单向阀

CV-D 碟形

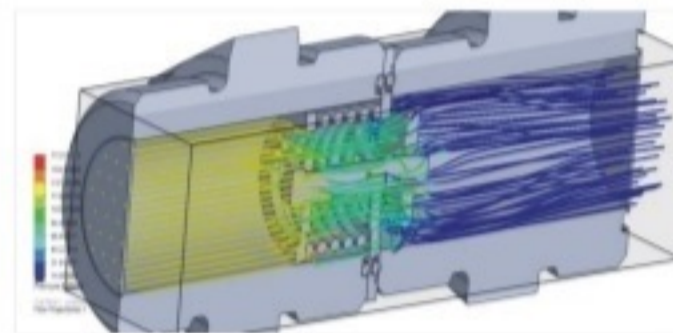
- 放置于现有管路中：ORFS, 37 Flare, 4-Bolt
- 轻质碟形钢片
- 稳定、低超调
- 250 bar 或更高压



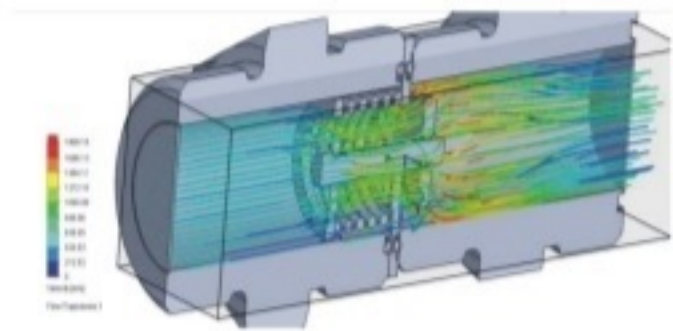


CFD Analysis on Check Valve - Disc

dP = 137-14 Given: 0.02088 Pa s At 60 gpm (127 lpm)
 = 123 psi 8.5 bar = 22 cSt = 110 SUS 227 lpm = 231 in³/s



Pressure Drop Lines

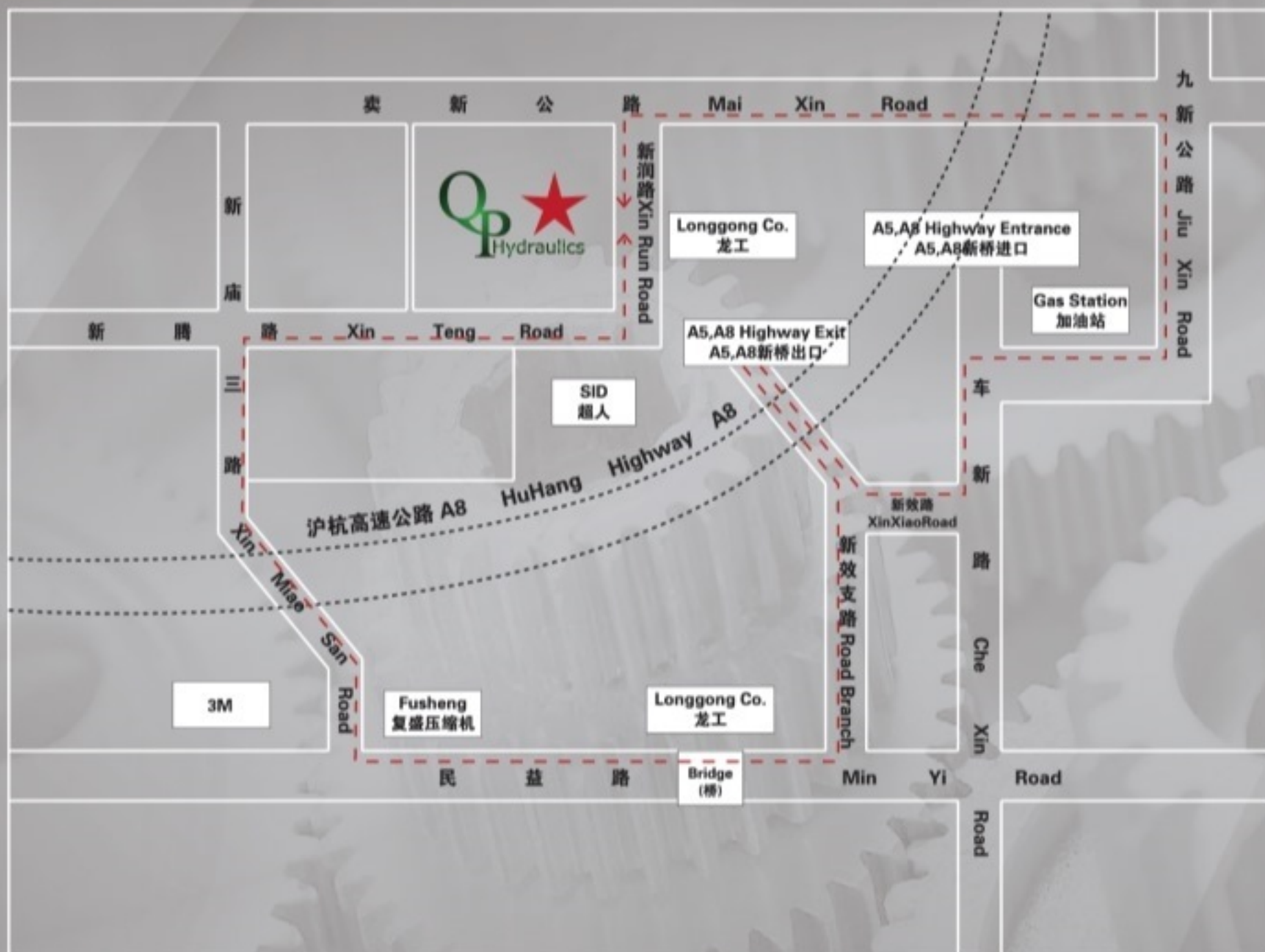


Velocity Lines



QP
Hydraulics





QP Hydraulics

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