



安全阀 · 背压阀

Relief Valve

Back Pressure Valve

使用说明

Operation Instructions

上海莫迪流体技术有限公司
Shanghai Metec Fluid Systems Co., Ltd.

A. Brief Introduction

Relief valve: A kind of protective device, when the system parts fail or line clogs, the relief valve can open and relieve pressure to protect the pump and pipeline parts not be damaged by the increasing pressure.

Back pressure valve: It can maintain certain pressure between the pump and the back pressure valve during the pump works. In the pump suction stroke, it can ensure pump outlet pressure is higher than the entry pressure. When the pump without flow, back pressure valve shuts down, avoiding siphon phenomenon. In the low pressure system, back pressure valve can make pulsation dampeners maintain certain pressure and improve the performance of pulsation dampeners. Back pressure valve can also prevent pipe liquid back-flow, playing the role of shut-off valve when the pump disassembled.

一、产品概述

安全阀：一种保护装置，当系统零件发生故障或管路发生堵塞时，安全阀可以自动开启并泄压，保护泵及管路零件不至于因压力升高而损坏。

背压阀：在泵工作时，使泵与背压阀间保持一定的压力。在泵的吸入冲程，保证泵出口端压力高于入口端压力。在泵流量为零时，背压阀能够关闭管路，使系统管路不会发生虹吸现象。在压力较低的系统，背压阀可以使缓冲器保持一定的压力，提高缓冲器的工作性能。背压阀在拆卸泵时还能防止管路液体回流，起到止回阀的作用。

B. Working Principle

Relief valve: Normally, the diaphragm shuts off the valve channel under the pressure of spring. When the system pressure surpasses the design pressure, the diaphragm move backward under the liquid pressure, by now the line opens and liquid flows back to sewage tank or medicine box through the relief pipeline. The relief valve keeps open until the system pressure decreases. Under the action of spring forces , the relief valve shuts down, the system restores to the normal condition.

Back pressure valve: It is commonly used in metering pump whose outlet pressure lower 3 bar and pump system that inlet pressure is higher than the outlet pressure. In the pump discharge stroke, liquid props the diaphragm and flows through the back pressure valve. In the pump suction stroke, diaphragm shuts channel under the action of spring, and maintain certain pressure between the pump and back pressure valve to prevent the flow. In the system that the level of drainage outlet below the solution box's, install back pressure valve to prevent siphon.

二、工作原理

安全阀：正常情况下，隔膜片在弹簧的压力下，关闭阀的通道。当系统压力超过预设压力时，在液体的压力作用下，隔膜片向后移动，管路开启，液体通过泄压管路流入排污槽或流回药箱。安全阀保持开启状态，直到系统压力回落，在弹簧力的作用下安全阀重新关闭，系统恢复到正常工作状态。

背压阀：常用在计量泵出口压力低于3bar和泵入口压力高于出口压力的系统中。在泵排出冲程，液体顶开隔膜，通过背压阀。在泵的吸入冲程，在弹簧的作用下，膜片关闭通道，使泵与背压阀之间保持一定的压力，防止过流。在排液口低于溶液箱液位的系统

中，安装背压阀，防止虹吸。

C. Installation

Relief valve:

1. The relief valve should be installed near the protected equipment or pipe. If not, be sure the pipe pressure drop between the protected equipment outlet and the relief valve inlet is not exceed the values 's 3%.

2. The relief valve should be installed in the place where is easy for maintenance and adjustment, and that have enough work space beside it.

3. Consider the disassemble conveniences of large diameter relief valve in the layout, when necessary, set up the boom.

4. The relief valve inlet lines should use long radius elbow.

5. The relief valve outlet piping design should consider back pressure not more than the relief valve's certain pressure value. For common relief valve, its back pressure is not more than 10% of the relief valve pressure value.

6. In the closed system the relief valve should be set along with medium flow direction and 45degree bevelled joint the top of the main pressure relief pipe, in order to avoid the condensate in the main pipe outflow, and can reduce the back pressure of the relief valve.

7. The relief valve outlet piping can't appear " Bag Shape ". Set certain gradient when the relief valve outlet pipe is too long.

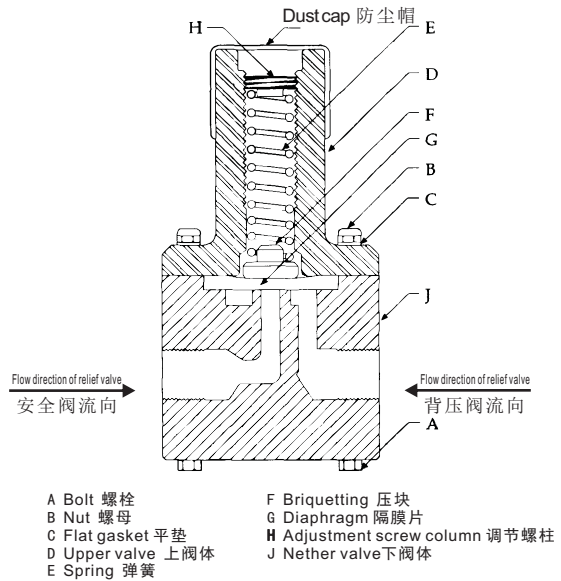
8. When the relief valve discharge pipe discharge thing into the atmosphere, be sure its export not toward the equipment, platform, ladders, cables, etc.

9. Wet gas pressure relief system discharge pipe internal should set "Bag Shape" effusion place, the relief valve shall be higher than the height of pressure relief system. If not or discharge pipe should join up the main pipe, set liquid package in proper place.

10. When the relief valve export pipelines set with cut-off valve, should choose single sluice gate, and seal "open". The valve stem should be installed horizontally to lest the valve stem and disc connection pin corrosion or loose and the valve plate fall. When the relief valve set with bypass valve, the valve should be seal "off".

Back pressure valve

Back pressure valve application in the pump that outlet instantaneous pressure may be lower than the inlet pressure in the system. Usually the pump system should set back pressure valve when the pipeline pressure less than 3 bar. Back pressure valve should be set near to pump export, and there are parts of the system, which will take back pressure valve installed in the near some shots, this kind of situation more exist in the pump that export pipe diameter is small and pipeline is very long.



Install pulsation dampener between pump and back pressure valve to improve the performance of back pressure valve observably. The pulsation dampener smooth away most pulsation coming from the pump, and make back pressure valve remains partially open. Avoid the back pressure valve frequently open and shut with the pump stroke; The diaphragm will keep in balanced position, not greatly disturbed. Not only can obviously reduce the movement part wear of the back pressure valve, but also can make the liquid flow close to the constant speed. Unless there is a special instructions, the pressure of the back pressure valve we product are set in 3 bar.

Attention:

- 1、 The liquid flow direction is different between the relief valve and the back pressure valve, which is marked on the valve body.
- 2、 If the deferent liquid contains solid particles, the relief valve and back pressure valve will wear away quickly, and will be shut down laxly.
- 3、 Complete the installation, before open the system, be sure the pressure of relief valve and back pressure valve meet the system's requirements and pipeline connection is correct.

三、安装事项

安全阀：

1. 安全阀的安装应尽量靠近被保护的设备或管道，如不能，则要求从被保护的设备管口到安全阀入口之间管道的压力降幅不超过该阀定压值的3%。
2. 安全阀应安装在易于检修和调节之处，周围要有足够的工作空间。
3. 对于大直径的安全阀，在布置时要考虑安全阀拆卸后吊装的可能，必要时设置吊杆。
4. 安全阀入口管道应采用长半径弯头。
5. 安全阀出口管道的设计应考虑背压不超过安全阀设定压力的一定值。对于普通弹簧安全阀，其背压不超过安全阀定压值的10%。
6. 排入密闭系统的安全阀出口管道应顺介质流向45度斜接在泄压总管的顶部，以免总管内的凝液倒流入支管，并可减少安全阀的背压。
7. 安全阀出口管道不能出现“袋形”，安全阀出口管较长时，宜设一定的坡度。
8. 安全阀排放管向大气排放时，其出口不能朝向设备、平台、梯子、电缆等。
9. 湿气体泄压系统排放管内部应有“袋形”积液处，安全阀的安装高度应高于泄压系统。若安全阀出口低于泄压总管或排出管道需要抬高接入总管时，应在低点易于接近处设分液包。
10. 当安全阀出口管道上设有切断阀时，应选用单闸板闸阀，并铅封“开”，阀杆应水平安装，以免阀杆合阀板连接的销钉腐蚀或松动时，阀板下滑。当安全阀设有旁通阀时，该阀应铅封“关”。

背压阀：

背压阀应用在泵出口瞬时压力可能会低于入口压力的系统上，通常情况下泵出口管路系统压力低于3bar便需安装背压阀。背压阀应靠近泵出口安装，也有部分系统，会把背压阀安装在靠近投加点端，这种情况多出现在泵出口管路直径较小且管路很长的系统中。在泵与背压阀之间最好能安装缓冲器，这将会显著提高背压阀的性能。缓冲器会平滑掉泵产生的大部分脉动，使背压阀保持在半开关闭的状态。避免了背压阀随泵的冲程频繁

的开启与关闭；隔膜会保持在平衡位置，不会大幅度的扰动。缓冲器不但能明显的减轻背压阀运动部分的磨损，还能使管路内的液体以接近恒定的速度流动。除非有特殊说明，我公司生产的背压阀出厂压力均设定在3bar。

注意：

- 1、安全阀与背压阀液体的流向不同，在阀体上有箭头指示。
- 2、若输送的液体含有固体颗粒，安全阀、背压阀都将会出现过快的磨损，且会出现关闭不严的现象。
- 3、安装完成后，在开启系统前，应确定安全阀、背压阀压力设定满足系统要求；管路连接正确。

D. Adjustment

Make sure the set pressure of relief valve and back pressure valve comply with system requirements before open the system. Usually, the factory set pressure of relief valve is 10-12 bar, back pressure valve factory is 3 bar. If factory set pressure does not accord with system requirements, please refer to the next section of the instructions on the adjustment. Please make sure the relief valve and back pressure valve size accord with system requirements, and the installation direction is right.

Back pressure valve adjustment:

Back pressure valve can adjust online with pressure. Install a pressure gauge between the pump and back pressure valve, observe the pressure gauge instructions, and turn adjusting studs until the pressure meet the system requirements. (clockwise pressure increases, counter-clockwise pressure decreases.)

Relief valve adjustment:

The open pressure of relief valve can be set online or on the experiment table.

The experiment table set methods refer to the provisions of the experimental equipment.

The premise of pressure online set is that pump and relief valve are installed in the system, and operate in work environment.

- 1, Install shut-off valve in the pump export pipeline.
- 2, Install pressure gauge between pump and relief valve, and its indicated pressure is at least 30% higher than the relief valve set pressure.
- 3, Keep the shut-off valve partly open, open the pump, and make pump work with the system maximum flow.
- 4, Use the tool (according to the model, divided into hex wrench, hex wrench or even a screwdriver) counter-clockwise adjust studs, adjusting screw until it flush with the upper valve, meanwhile the relief valve's open pressure is 0.
- 5, Close shut-off valve slowly, at the same time observe the pressure gauge's instructions.(note: not closed to end one time)
- 6, The relief valve will relieve pressure in due time. Observe the gauge indicates, meanwhile, continue to close the shut-off valve until the shut-off valve is fully closed. (in the whole process, pressure gauge instructions should not be greater than the relief valve open pressure system requires. Otherwise open the shut-off valve quickly. Check every step after the step 2, and be sure the relief valve size meet the system's

requirements. This step banned pressure more than the system set pressure)

7, Use the tool clockwise adjust studs, until the pressure gauge instructions accord with set the pressure.

8, Open the shut-off valve, shut down the pump.

9, Test the relief valve's setting. Open pump with the shut-off valve in full open state, close the shut-off valve slowly, the relief valve should be opened under the set pressure. Otherwise, reset the relief valve.

Note:

The relief valve opening pressure is 1.1 ~ 1.2 times of the system pressure, and the set pressure shall be higher than the highest instantaneous pressure of the pump in the condition of no pulsation dampeners in the system.

The relief valve pressure should be set slowly, fast adjustment may lead to liquid releasing and injuries.

Back pressure valve set pressure must be inside the pump rated pressure, otherwise pump will be damaged.

Back pressure is not the bigger the better, the more the pressure back pressure, the higher the pump load. On the premise of satisfying using, pressure smaller may be more beautiful.

Back pressure valve factory set pressure is 3 bar which conditions: pipe flow is constant, system export pressure ordinary pressure. It is strictly prohibited to use over-pressure, that will lead damage to the valve and other parts in the system.

四、调节事项

在开启系统前，请确定安全阀和背压阀压力设定符合系统要求。如没有特殊要求，一般安全阀的出厂设定压力为10-12bar，背压阀的出厂设定压力为3bar，如果出厂设定的压力不符合系统的要求，请参照下一节的说明进行调节。请确定安全阀、背压阀的通径符合系统要求，且安装方向正确。

背压阀调节:

背压阀调节可以在管路上带压调节。在泵与背压阀之间安装一压力表，旋转调节螺柱，观察压力表指示，直到压力满足系统要求。（顺时针旋转压力增加，逆时针旋转压力减小。）

安全阀调节:

安全阀的开启压力设定可以在线设定，也可以在实验台上设定。

实验台设定方法参照实验设备的规定。

在线设定安全阀开启压力要求泵及安全阀均安装在系统上，且在工作环境状态下运转。

- 1、在泵出口管路上安装截止阀。
- 2、在泵与安全阀之间安装压力表，压力表的最高指示压力至少要比安全阀设定压力高出30%。
- 3、使截止阀处在开启状态，开启泵，使泵处在系统要求的最大流量下工作。
- 4、用工具（根据型号不同，分为六角扳手，内六角扳手或平头螺丝刀）逆时针方向旋转调节螺柱，直到调节螺柱与上阀体齐平，即把安全阀开启压力调为0。
- 5、在观察压力表指示的同时，缓慢关闭截止阀。（注意:不可一次关到底）
- 6、在适当的位置，安全阀会开始泄压。观察压力表指示的同时，继续关闭截止阀，直到截止阀完全关闭。（在整个过程，压力表指示不应大于系统要求的安全阀开启压

力。若超过系统要求压力，应迅速打开截止阀。检查步骤2以后的各步骤，并确定安全阀通路满足系统要求。此步骤禁止压力超过系统设计压力)

7、用工具顺时针方向旋转调节螺柱，直到压力表指示在需要设定的压力上。

8、打开截止阀，关闭泵。

9、检验安全阀设定。在截止阀处在全开的状态下开启泵，缓慢关闭截止阀，安全阀应在设定的压力下开启。否则，重新设定安全阀。

注：

安全阀开启压力一般设定在系统压力的1.1~1.2倍，在没有缓冲器的系统中，设定的压力应高于泵的瞬时最高压力。

安全阀压力设定时应缓慢调节，快速的调节可能会导致液体快速泄出而发生伤人事故。

背压阀的设定压力必须在泵的额定压力之内，否则会损坏泵。

背压压力并不是越大越好，背压压力越大，泵的负荷就越高。在满足使用的前提下，压力越小越好。

背压阀开启压力出厂设定3bar的工况为：管路流量恒定，系统出口压力为常压。严禁超压使用，超压使用会导致阀及系统其它组成部分损坏。

E. Maintenance

The unique design makes the relief valve and back pressure valve can check and repair online, don't need to remove from the line.

Warning: make sure that system is without pressure and the drug in pipeline has discharged before maintenance.

Twist the adjusting screw, remove the spring, loosen nut, remove the upper valve, check and repair the internal parts of the valve. Then reassemble, adjust the studs to the original position. When need accurate open pressure or change the system pressure, please to readjust. (details please refer to adjustments)

Relief valve:

Usually, Check relief valve every 12 months, and change quick-wear parts. If the relief valve is used constantly, check it every 6 months

1, Change the diaphragm.

2, Check the spring, support, nether valve if exits apparent rust, wear, leakage, corrosion. Any damaged parts should be replaced promptly.

Back pressure valve:

Usually, Check back pressure valve every 12 months, and change quick-wear parts.

1, Change the diaphragm.

2, Check the spring, support, nether valve if exits apparent rust, wear, leakage, corrosion. Any damaged parts should be replaced promptly.

五、维护事项

独特的设计使安全阀、背压阀允许在线检查维修，无需从管路上卸下。

警告：应确保在检修前系统不带压且管路中的药剂已排放。

拧出调节螺柱，取出弹簧，松开螺母，卸下上阀体，便可对阀的内部零件进行检修和更换。然后重新组装，调节螺柱重新拧到原来的位置。如果需要精确的开启压力或系统压力改变，请重新调节。（详情请参照调节事项）

安全阀:

在正常使用情况下，每12个月对安全阀进行一次检修，更换易损件。如果安全阀频繁开启泄压，则每6个月检修一次。

1、更换膜片。

2、检查弹簧、支撑块、下阀体是否有明显的生锈、磨损、渗漏、腐蚀。任何受损件都应及时进行更换。

背压阀:

在正常使用情况下，每12个月对背压阀进行一次检修，更换易损件。

1、更换膜片。

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F. Common fault analysis

Relief valve:

First: The open pressure becomes low or the valve can't shut down after relieving pressure.

Check the bleed piping(relief valve export pipeline) and the I pressure. The specific requirements refer to the relief valve installation .

Second: There is abnormal sound when open or close the safety valve.

Daub lubricating oil to the back-up block.

Third: Leakage from the valve hole.

The diaphragm broke, replace it.

Back pressure valve:

First: Back pressure is insufficient

1, The pressure set is not correct. Turn adjusting studs to the appropriate pressure.

2, There are impurity, or debris caught in between the diaphragm and the nether valve. Remove them.

3, Support cannot fall. Open the valve, and daub lubricating oil to the support.

Second: The back pressure is too high

1、 The set pressure is not correct. Turn screw column to reset the back pressure.

2、 The support can't up-spring. Open the valve, and daub lubricating oil to the support.

Third: Leakage from the valve hole.

The diaphragm broke, replace it.

六、常见故障分析

安全阀:

一、开启压力变低或泄压后不能关闭。

检查泄压管路（安全阀出口端管路）是否有异常压力。具体要求参考安全阀的安装。

二、开启或关闭时有异常声响。

给支撑块涂抹润滑油。

三、从上阀体孔中漏液。

隔膜破损，更换膜片。

背压阀

一、背压能力不足

1、压力设定不正确，通过旋转调节螺柱调节到合适的压力。

2、有杂质或碎片夹在隔膜片与下阀体之间。清除杂质。

3、支撑块不能落下。拆开阀体，给支撑块涂抹润滑油。

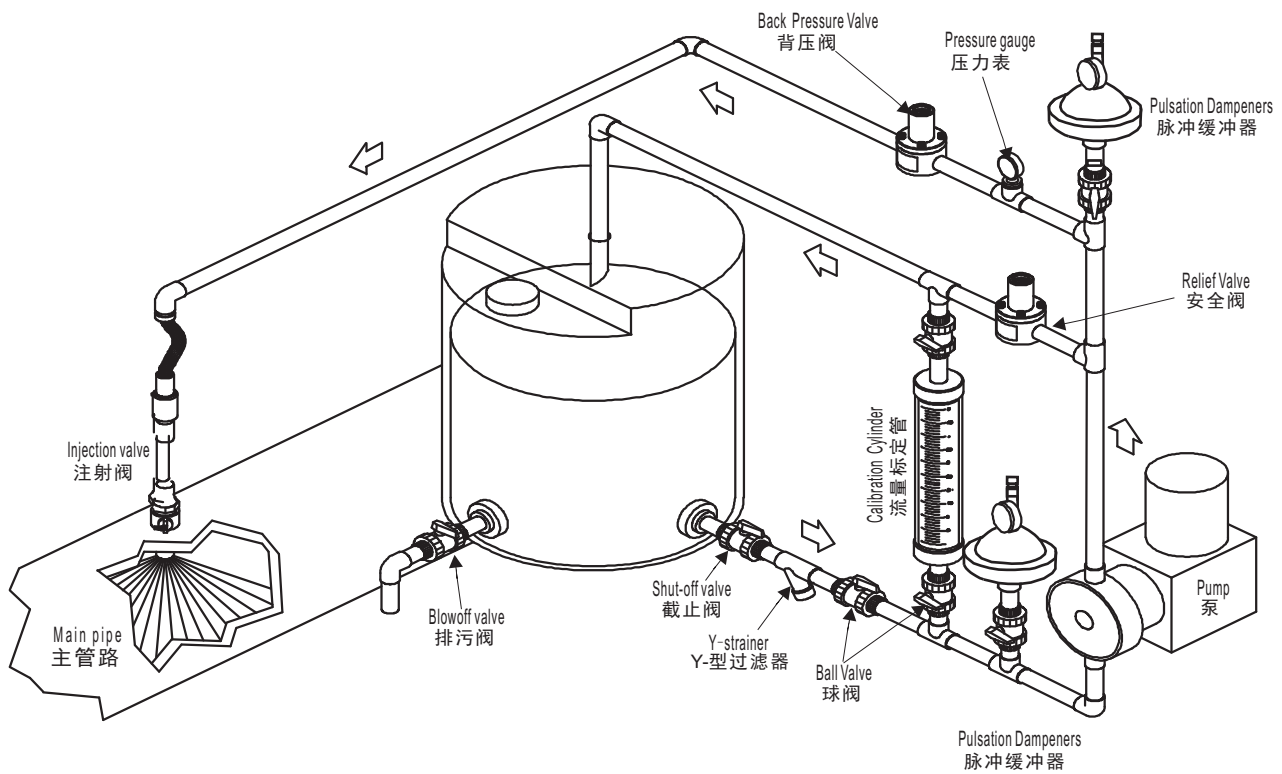
二、背压压力过高

1、压力设定不正确。通过旋转调节螺柱重新设定背压压力。

2、支撑块不能弹起。拆开阀体，给支撑块涂抹润滑油。

三、从上阀体孔中漏液。

隔膜片破损，更换隔膜片。



上海莫迪流体技术有限公司

Shanghai Metec Fluid Systems Co., Ltd.

TEL 电话：021-33606567

FAX 传真：021-33606569

WEB 网址：www.metecchina.com

ADD 地址：Room1-1206, No.955Wuning Road, Putuo Dist, Shanghai, China
上海市武宁路955号1-1206