



HENRY GROUP

®



- SELECTION & SIZING
- OPERATING PARAMETERS & TOLERANCES
- SHELF-LIFE & MAINTENANCE

- TESTING & CERTIFICATION
- INSTALLATION & COMMISSIONING
- FAQ

PRV USER SUPPORT MANUAL



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Henry Group Pressure Relief Valves (PRVs) are sophisticated and highly sensitive safety devices, designed to provide overpressure protection on industrial and commercial pressurised refrigeration systems. They achieve this by ensuring that system pressure never rises 10% above the PRV setting, even in a fire scenario, when sized correctly. The purpose of this document is to provide the end user with guidance and recommendations regarding the selection, commissioning, operation and maintenance of Henry PRVs, whilst also answering frequently asked questions.

All Henry Group PRVs are manufactured at our Scottish Facility, Henry Technologies LTD.

PRV Selection & Sizing

It is essential that PRVs are sized correctly for the application and system they are designed to protect. Whilst a common misconception is to select a PRV with an appropriate threaded connection to that supplied on the vessel or unit, it is the flow capacity rating of the valve which should always be used to determine the correct model.

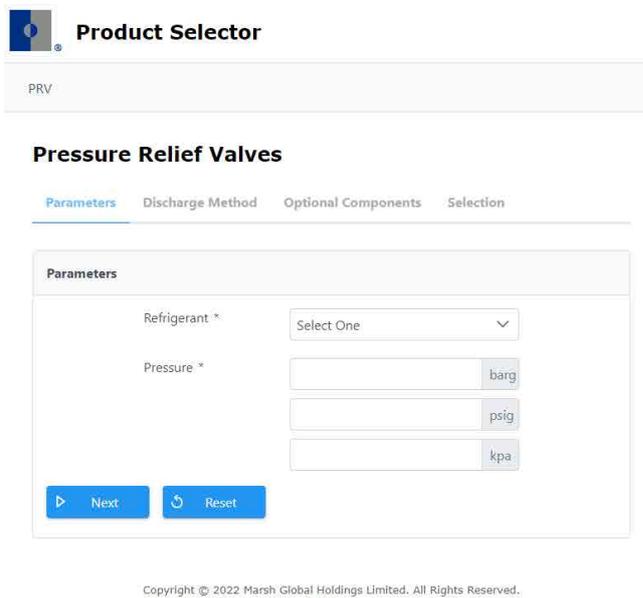
Henry Group recommends following the selection methodology outlined in the EN 13136 Standard. This gives a comprehensive guide to not only ensuring that the flow capacity of the PRV is suitable to protect the system, but also provides a means to ensure that upstream and downstream piping/components do not compromise the operation of the valve by ensuring pressure drops are below acceptable limits.

Over-sizing of a PRV is also an important consideration, as a valve that has too high a rated capacity for a given system will often 'chatter' (vibrate rapidly between open and closed) during discharge. This can damage, or in extreme cases destroy, the seal altogether. As a general rule when using EN 13136 to select a PRV; always ensure that the actual relieving capacity of the valve (Q_m) is larger, or at least equal to the required relieving capacity for the system (Q_{md}), but it should never be more than five times the figure to avoid oversizing ($Q_m \leq 5 \times Q_{md}$).

Henry PRV Selector

Henry Group offers a free online PRV selector tool, which carries out the full selection process to the EN 13136 Standard. The most appropriate three-way valve and rupture disc add-ons can also be identified using the tool, allowing you to quickly and easily find the ideal safety device assembly for your application.

You can access the selection tool via the link below or by scanning the QR code on page 3:
<https://portal.henry-group.net/product/selector/prv.xhtml>



Operating Parameters & Tolerances

Pressure

The maximum and minimum set pressure available on a Henry PRV varies by model. All PRVs are factory-set at the marked set pressure and cannot be adjusted to alter this setting; any such action by a third party will void the product warranty.

Pressure Tolerances

All PRVs are subject to the same operational tolerances on pressure, namely;

- Set point* +/-3% of stamped set pressure
- Full lift** (pop) before or at 110% of the set point

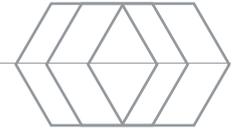
* The PRV set point is defined by Henry as the pressure at which a minimum of one bubble per second is observed on a Henry Technologies Ltd PRV test rig.

** The point at which the PRV reaches its full rated discharge capacity.

The closing (reseal) point of PRVs varies by certification, but will typically be between 50% and 70% of the set point for most models. Valves certified to EN ISO 4126-1 (X-series) are guaranteed to reseal at or above 85% of the set point.

Adequate seat tightness of a PRV is determined by Henry to be zero bubbles from the outlet of the valve (connected to a container of test fluid) when pressurised to 90% of the stamped set pressure following the final valve set during production. This is closely aligned with the API 527 Standard.

Due to the inherent sensitivity of a PRV and the tolerances detailed above, it is recommended to select a pressure setting which is at least 25% higher than the normal system operating pressure (but no higher than the MWP of system components) to avoid accidental discharge of the valve during service.



Temperature

The operating temperature window for each PRV varies by series. This temperature range refers to that of the refrigerant gas with which the PRV is used.

Medium

All Henry PRVs are certified for gas use only and should be installed in the refrigerant vapour space.

Shelf-Life & Maintenance

The recommended maximum shelf-life for a Henry PRV is two years from the date of manufacture.

Henry recommend following the Institute of Refrigeration (UK) guidelines on PRV maintenance. Specifically, PRVs should be replaced after five years in service.

All PRVs are designed as single-use items. Once they have discharged, it is recommended to replace the valve as the set point can no longer be guaranteed. This is due to a number of factors including system debris, seal deformation and the force of the reclosing action.

Testing, Certification, Installation & Commissioning

All Henry PRVs are hand-tested in our bespoke facility; using a methodology aligned closely with the API 527 standard and audited by third parties including the HPIVS EU Notified Body / UK Approved Body and the National Board of Pressure Vessel Inspectors. Once they leave the Henry facility, any third party testing on the valves is not recommended and will void the product warranty.

Each PRV is supplied with an electronic EU/UK Declaration of Conformity as standard. This contains all certification information for the series of valves to which the model belongs and is unique to each production batch. See the 'Frequently Asked Questions' section for instructions on how to locate, view and download the applicable DoC for any given valve.

An additional level of certification can be supplied if required, via a 'Test Certificate', which is individually linked to the PRV by a unique serial number. Test Certificates must be specified at the point of order.

Henry PRVs should always be installed as close to vertical as possible (inlet connection at the bottom) so that the risk of liquid pooling at the valve inlet is minimised.

If a PRV is installed outdoors, care should be taken to protect it from environmental forces such as wind, rain or debris. In particular, the outlet connection on straight-through valves should be shielded from rain to prevent water ingress. It is common to fit a small elbow to the outlet to achieve this, but care should be taken to ensure excessive back-pressure is not created by doing so.

Upstream and downstream pressure drops due to components and lines should be minimised at all times to ensure correct operation of the PRV. Henry Group

recommends following the methodology and calculations outlined in the EN 13136 Standard. Particular care should be taken for transcritical and supercritical CO₂ installations, where the possibility of solids forming in the discharge line should be accounted for.

As per the Institute of Refrigeration (UK) guidelines and the EN 378 Standard, PRVs should be removed or isolated from the system during the pre-commissioning pressure strength test. This is because in most cases the strength test will cause the PRV to lift or pop, after which it should be replaced.

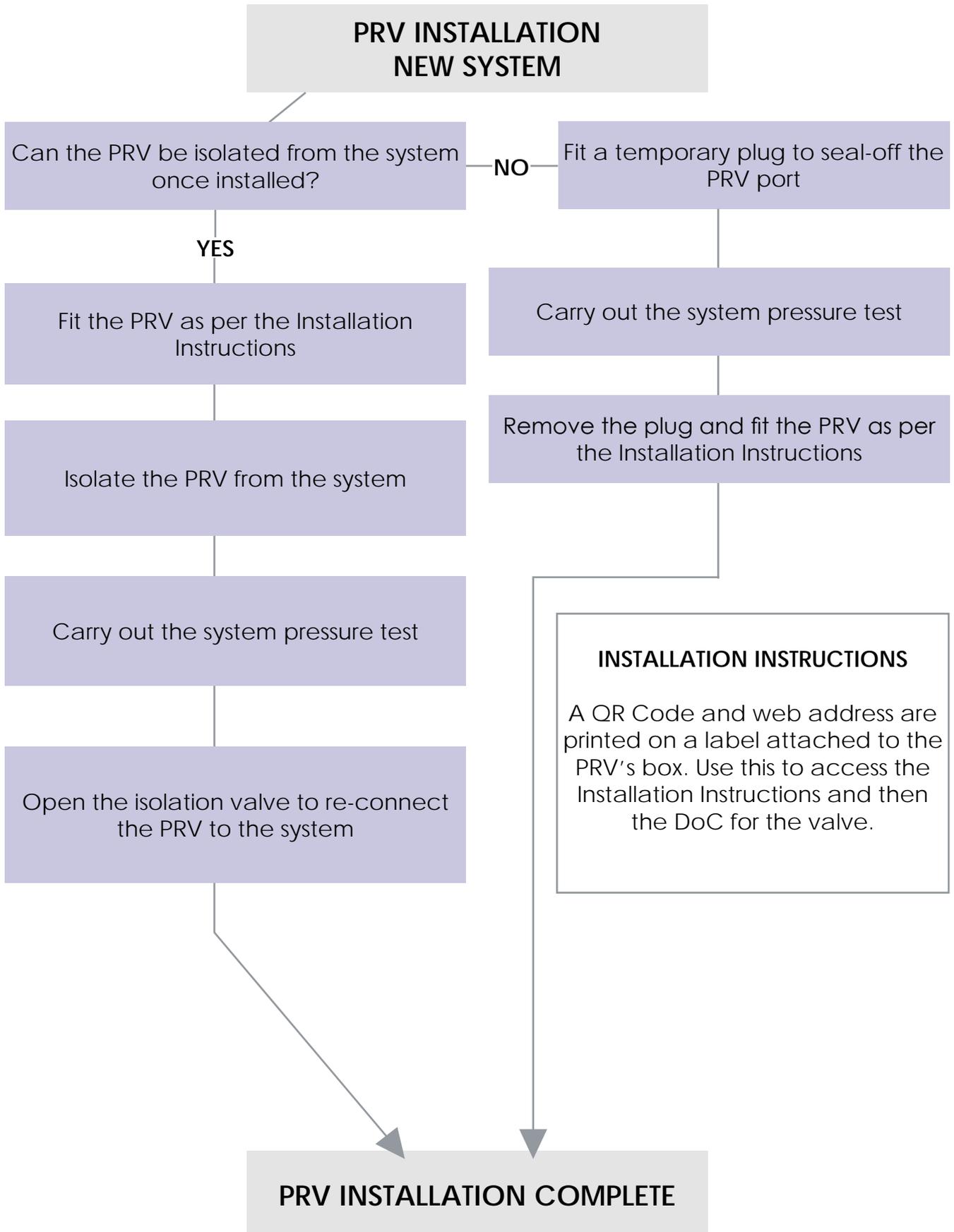
PRV Selector Tool:

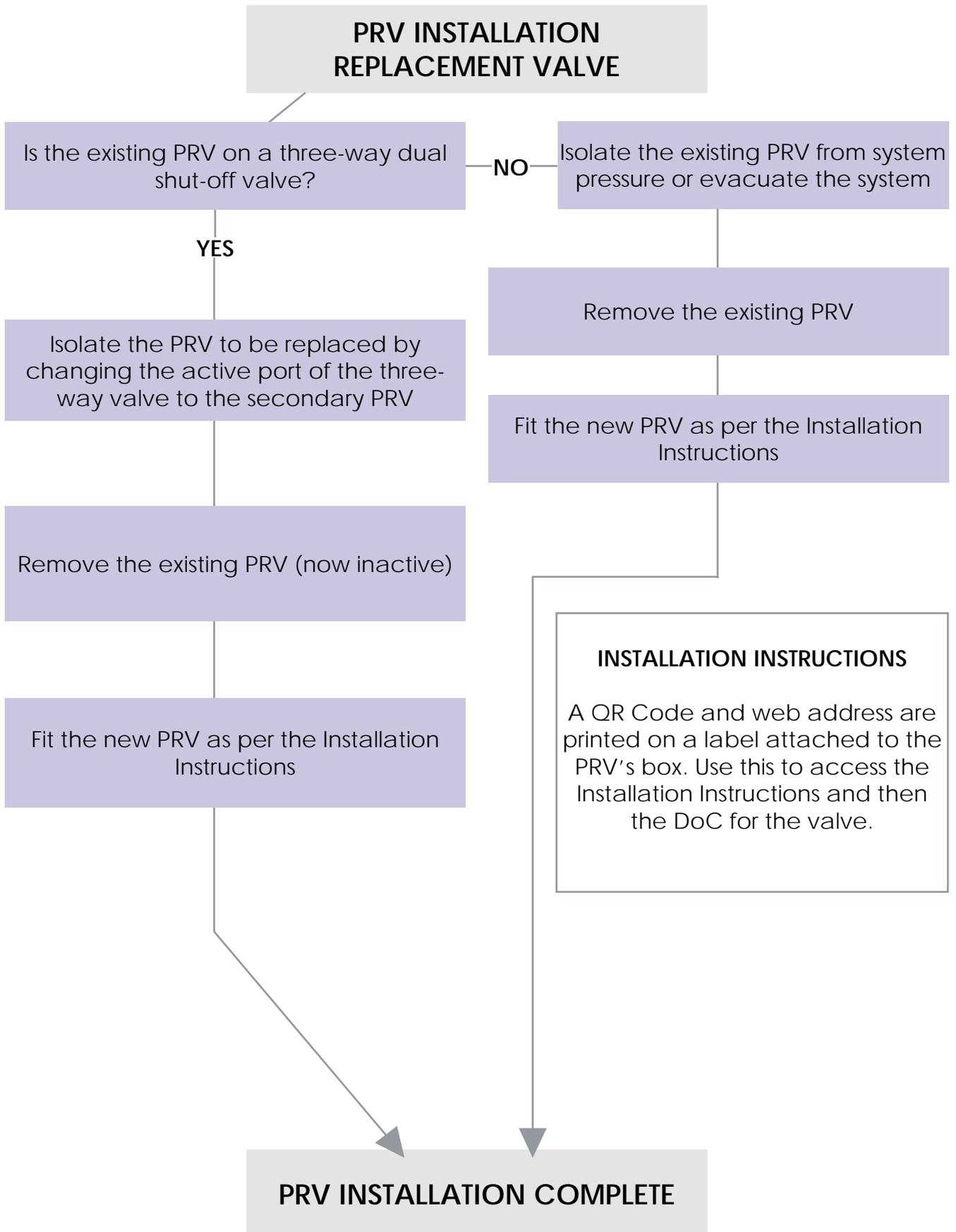


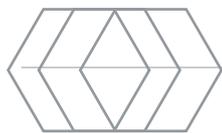
<https://portal.henry-group.net/product/selector/prv.xhtml>



PRV INSTALLATION GUIDES







FAQ

1. How do I locate, view and download the electronic Declaration of Conformity for my valves?

As we introduced UKCA marking to our full range of PRVs in 2022, we also took the opportunity to make our documentation more convenient, clear, and eco-friendly.

All PRVs will be supplied with an additional label on the box, which contains a web address and QR Code that will allow you to immediately download and view the appropriate Instruction Sheet from any PC, laptop, smartphone, or tablet:



**OPERATING INSTRUCTIONS
MODE D'EMPLOI
BEDIENUNGSANLEITUNG
INSTRUCCIONES DE OPERACIÓN
ISTRUZIONI PER L'USO**

<https://portal.henry-group.net/product/rest/file/is/eu/6-025-5030>

Each Instruction Sheet then contains a hyperlink, QR Code and instructions for locating and downloading the joint EU/UK Declaration of Conformity for your PRV from our online database:

DECLARATION OF CONFORMITY

To view and download the Declaration of Conformity for your PRV, visit:
www.henry-group.net/technical/united-kingdom
or scan the QR Code opposite:

Select Products Manufactured in the UK > Pressure Relief Valves, and open the folder matching the ID Code on your valve. Use the Model Number (e.g. 5231B) and Set Pressure (e.g. 27.6 barg) to locate, open and download your DoC.



Henry PRV DoCs are linked to the valve by the ID Code, which is effectively a production batch number. Therefore, a single DoC will often cover several PRVs, (this is likely if multiple valves are ordered together) when they share the same pressure setting, model number and ID Code.

2. How can I tell when my PRV was manufactured without the DoC?

The ID Code marked on every Henry PRV takes the form of the letter 'S' followed by four digits. The 'S' indicated that the valve was manufactured at Henry Technologies Ltd in Glasgow, Scotland, whereas the first and last digit gives the manufacturing year. The middle two digits are simply a production batch number. So a valve with the ID Code **S2351** was manufactured as part of production batch 35 in the year **2021**.

3. Should I have my Henry PRVs certified by a third party specialist testing company prior to installation?

No. All Henry Group PRVs are certified by the manufacturer and stamped with the CE, UKCA, NB, ASME-UV and EN ISO 4126-1 marks as appropriate. Henry Technologies Ltd are independently audited on a regular basis to maintain these certifications and there is no

additional certification or marking that a third party test facility can offer which would supersede those provided by Henry.

Additionally, any lifting of the seat in a PRV to assess the lift or pop point when not using the bespoke and accredited Henry test facilities can in itself affect the set point of the valve and as such will void the product warranty.

4. I believe that my Henry PRV is leaking from the outlet at a pressure earlier than the -3% tolerance allows for. Is it faulty?

The answer depends on both the rate of leakage and the pressure at which the leak is occurring. If it is a noticeable or audible leak at a pressure before the -3% tolerance then the PRV may be at fault (see FAQ 5 below) but smaller refrigerant leakage rates are notoriously difficult to quantify and may not mean a faulty PRV.

If a very small leak (of the order of grams per year of refrigerant or the slow formation of a bubble in test fluid or leak detector spray) is detected at 90% of the set pressure or above, the valve is likely to be performing adequately (see 'Pressure Tolerances' section above).

5. I have a noticeable and/or audible leak from the PRV outlet at a pressure earlier than the -3% tolerance allows for. Is it faulty?

A noticeable or audible leak indicates that the piston in the PRV has lifted from the seat and not returned and re-sealed correctly. Whilst this may be due to a manufacturing fault, it is commonly caused by other factors. Before contacting Henry Group, it is useful to have the following information available (the reason why is given for each):

Has the PRV been tested or lifted prior to installation?

Once a PRV has been lifted outside of the Henry facility, there is no guarantee that the set point will remain as-calibrated by Henry. It is therefore recommended to replace the PRV. This lift may be as the result of a third party test, an accidental lift or pop during a system pressure test or a previous discharge event.

How long has the PRV been installed?

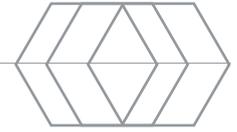
PRVs should be replaced after five years in-service. The set point on older valves cannot be guaranteed.

What is the model number, serial number, stamped set pressure and ID code marked on the PRV?

To help Henry to track the specific valve in question

At what line temperature is the PRV operating?

At temperatures above the rated maximum, the set point



of the PRV can become compromised.

Is the PRV exposed to atmospheric conditions? (wind, rain, debris)

Rain in particular, if it enters valve, can affect the set point of a PRV.

Is the seal wire or tamper-proof seal still in-place on the PRV?

Damage to the seal wire or removal of the tamper-proof seal will void the warranty of the PRV.

How has a leak been detected? If a data recorder was used, can the information be supplied?

If a pressure sensor is used, where is it located in the system relative to the PRV?

At what pressure has a leak been detected?

What level of leak has been detected?

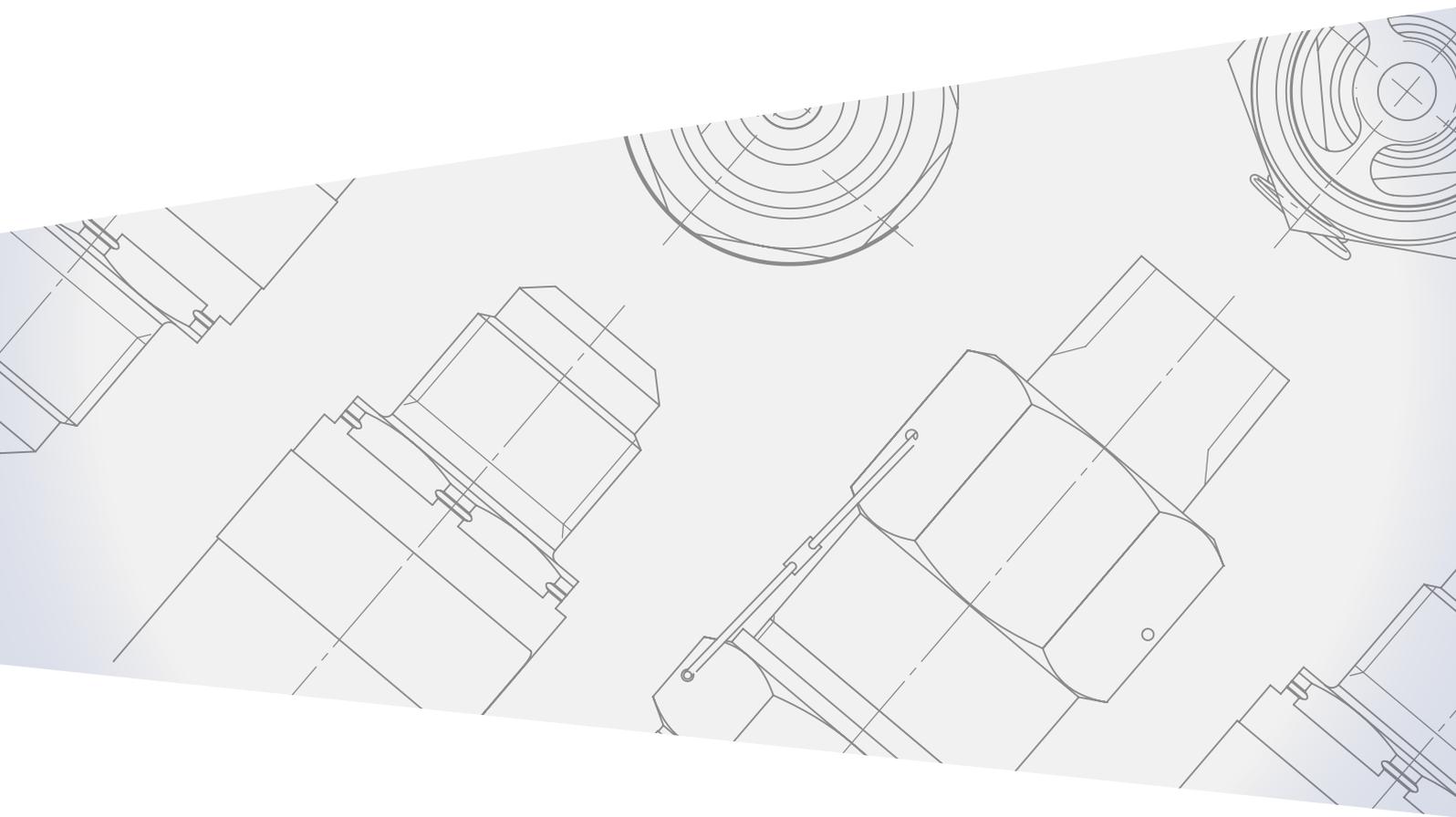
What is the normal operating pressure of the system?

What refrigerant gas is being used in the system?

Where is the PRV located in the system? (on the discharge line, on a liquid receiver etc)

Has the system pressure previously been observed (without any leakage) at or above the current leak pressure before this incident?

All to help Henry quantify the situation and accurately advise on a course of action.



The information contained in this brochure is correct at the time of publication. Henry Group has a policy of continuous product development; we therefore reserve the right to change technical specifications without prior notice. Exclusive changes within our industry have seen products of Henry Group being used in a variety of new applications. We have a policy to offer research and development assistance to our clients. We readily submit our products for assessment at the development stage, to enable our clients to ascertain product suitability for a given design application. It remains the responsibility of the system designer to ensure all products used in the system are suitable for the application. For details of our warranty cover, please refer to our standard terms and conditions of sale. Copies are available upon request.

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Henry Technologies LTD.
76 Mossland Road Hillington
Park
Glasgow G52 4XZ | Scot-
land | UK
Tel +44 141 882 4621
FAX +44 141 810 9199
www.henry-group.net

  
 +44 (141) 882-4621
 www.henry-group.net