Cryogenic Pressure Relief Valve Nozzle 10, 15 & 20

Installation, Operation and Maintenance Manual

Reference Number:	IOM 022	Date:	January 2017	Issue:	C

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WARNING!

BEFORE ANY INSTALLATION AND MAINTENANCE WORK CAN COMMENCE ENSURE THE VALVE AND SURROUNDING SYSTEM IS DRAINED OF PRESSURE AND ISOLATED.

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Contents

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Disclaimer

PLEASE NOTE:
If the valves produced by Parker Hannifin are refurbished by a third party organisation that is not approved by Parker Hannifin, then the safety and performance will not be guaranteed and the warranty may be invalid.

If unsure about the installation and operation procedures for this valve, please contact Parker Hannifin.

Parker Hannifin has produced this manual in order to provide engineering personnel with sufficient general information to enable the operation and installation of the valve manufactured by Parker Hannifin.

In the interest of product development, the designs and specifications for our products are constantly under review and we therefore reserve the right to make changes and improvements without notice.

This document has been authorised for use by:

Name:	Christopher Hey
Title:	Design/Production Engineer
Signed:	
Date:	25/012017

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Introduction

Outline

This manual is broken down into separate sections:

- **Introduction**

This section provides information about important safety requirements as well as highlighting the precautions taken at Parker Bestobell to ensure the cleanliness of products.

- **Installation**

This details the method of installing the valve on site, and includes information on storage, unpacking and inspection. Preparation of the valve and site is also discussed to allow ease of installation and operation.

- **Hardware Description**

Introduces the product as well as providing a more detailed description including operating conditions and suitable media. Any further requirements for the effective operation of the valve are also discussed.

- **Operation**

Provides information on how to operate the valve.

Safety

Read and understand these instructions before installing the valve. Improper installation, operation or maintenance by the owner or operator of this valve can result in personal injury.

Prior to the installation of the valve into the system, ensure the system is de-pressurised and isolated for the duration of the installation.

The valve must be installed within a system that has adequate draining and venting provisions.

In cryogenic applications the area of pipe-work to receive the valve must be allowed to reach ambient temperature.

It is essential that the installers and operators are conversant with all of the safety issues relating to the medium within the system, and are fully trained to an adequate standard.
Wear safety glasses and gloves during any installation or operation of the valve.

Valves must only be used in a circuit protected by suitable equipment.

The valve should be inspected for wear as part of a regular system maintenance programme.

Cryogenic burns can occur if the valve is handled during or after the valve has operated.

Minor leaks from the outlet side of the valve, if allowed to build up in a confined area, can be hazardous. This can be avoided by dissipating into the atmosphere or a well ventilated area.

If valve is to be installed in hazardous climatic conditions or seismic areas, please inform Parker Bestobell .

Identify the intended flow direction and match the valve orientation with its flow direction arrow.

Ensure that all end connections to the valve are in line and that the pipe work is supported to reduce unwanted stresses, loading and vibration on the valve and system pipe work.

Ensure that all joining materials / components used during the installation of the valve are compatible, and will not cause any deterioration to the valve structure.

When using on CO_2, the internal atmosphere must be dry and moisture free as any bronze components could be affected by carbonic acid.

Safety

Adjacent pipe work should be anchored to minimise pipe work forces acting on valve.

During the valve operation, noise levels can exceed 85dB; therefore the necessary precautions should be carried out to avoid hearing damage.

Jet reaction may occur if the relevant pipe work is not restrained.

DO NOT check leaks with hands.

Hazards

Jet Reaction - Can occur of the relevant pipework is not restrained.

Excessive Loads - Adjacent pipe work should be anchored to minimise pipe work forces acting on the valve.

Cryogenic Burns - Can occur if the valve is handled during or after the valve has operated.

Noise Levels - During the valve operation, noise levels can exceed 85dB, therefore the necessary precautions should be carried out to avoid hearing damage.

Asphyxiation - Can occur in confined spaces with certain gases during the operation of the valve.

Leaks & Exhaust Gases - Potential minor leaks from the outlet side of the valve may cause a hazard if allowed to accumulate in confined areas - therefore the confined installation areas are to be avoided, alternatively, thorough ventilation must be provided. Flammable gases are to be vented safely.

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Cleanliness

Immediately after assembly in a controlled clean room, the valve is sealed in an airtight plastic bag to maintain cleanliness i.e.: (Clean for Oxygen use) standard. As such, it is essential to maintain this cleanliness throughout all stages of installation. Particular care should be taken not to contaminate the internals of the valve with grease, moisture, grinding dust, weld/brazing spatter etc.

Clean practices will save time later with reduced ‘flushing’ and maintenance.

Service Intervals

Inspections are suggested on a regular basis to ensure product is still performing to requirements

If a problem is found the valve should be replaced and returned to Parker Bestobell for Service activities to be undertaken.

Installation

Personnel carrying out Assembly / Joining / Welding / Inspection must be adequately trained and hold the necessary approvals.

Ensure that environmental conditions (atmospheric pollution) are compatible with the valve materials.

The valve is only to be installed on gas or vapour lines. Ensure area for valve installation is adequate for its removal. The valve must be installed vertically i.e. with the inlet connection to the bottom.

Pipe work on inlet and outlet should be designed to minimise pressure drop and comply with the requirements of AD-Merkblatt-A2, section 6 “Cross-sections, Lines and Installation”.

Pipe work on the outlet side should be arranged to prevent the ingress of moisture as his may freeze and inhibit correct functioning of the valve.

The outlet of the valve must not be restricted by any means as this could also inhibit the correct functioning of the valve.

Exhaust gases must not be vented onto any surface that may be affected by localised freezing. Connecting pipe work should be thoroughly cleaned before fitting the relief valve.

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Installation Overview

The quality of performance in service is a function of the care taken to ensure good installation. A careful study of these instructions is therefore recommended, as properly installed equipment will normally operate for long periods without problems.

The most critical point in the lifetime of a valve is the time of installation, therefore, proper care at this stage and during any maintenance will increase the probability of trouble free valve service.

It is important to maintain cleanliness throughout all stages of the installation, with particular care being taken not to contaminate the internals of the valve with grease, moisture, grinding dust, weld / brazing spatter or other foreign matter.
Clean practices will save time later with reduced 'flushing' and maintenance.

STORAGE:

The equipment packing cases are **NOT** waterproof and should be stored in a weatherproof location before use.

UNPACKING:
It is recommended that before any item is unpacked, it should be moved as close as possible to its installed position. This will minimise the possibility of damage during handling.

Installation Overview

It is further recommended that each item should only be unpacked immediately before it is required.

Before installation the engineer should check for:

- Damaged Packaging
- Bent or Distorted Items
- Scratches, Dents or Damage

Particular attention should be paid to the sealing faces on the end connections.

TOOLS REQUIRED:

No special tooling is required for the installation of this valve.

Preparation

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Identify the intended flow direction and match the valve orientation with its flow direction arrow.

Ensure that all end connections to the valve are in line and that the pipe work is supported to reduce unwanted stresses, loading and vibration on the valve and system pipe work.

Ensure that all joining materials / components used during the installation of the valve are compatible, and will not cause any deterioration to the valve structure.

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Cryogenic Pressure Relief Valve Nozzle 10, 15 & 20

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Hardware Description

The Pressure Relief Valve is designed to provide a pressure relief function.

The standard body material is bronze; however, stainless steel bodies are also available.

The Relief Valve is designed for use in all cryogenic pressure areas, where safety valve application is required.

Features and Benefits

A lift limiting stop helps prevent valve instability when discharging from or into the lengthy piping runs that can be characteristic of cryogenic systems, though good piping should be observed when installing these valves.

Each valve is individually set and flow tested and then stamped with the date of manufacture and its own unique serial number prior to despatch. All valves are degreased for oxygen duty, assembled in clean room conditions and sealed in robust polythene bags prior to despatch.

Optional Extras can be fitted with the valve.

Brass Elbow's/C.W Copper Exhaust Pipes
Positional Fittings to allow easy assembly to diverter/change over valves.
Manual Lift/Override Function

Nozzle 10

Nozzle 15 & 20

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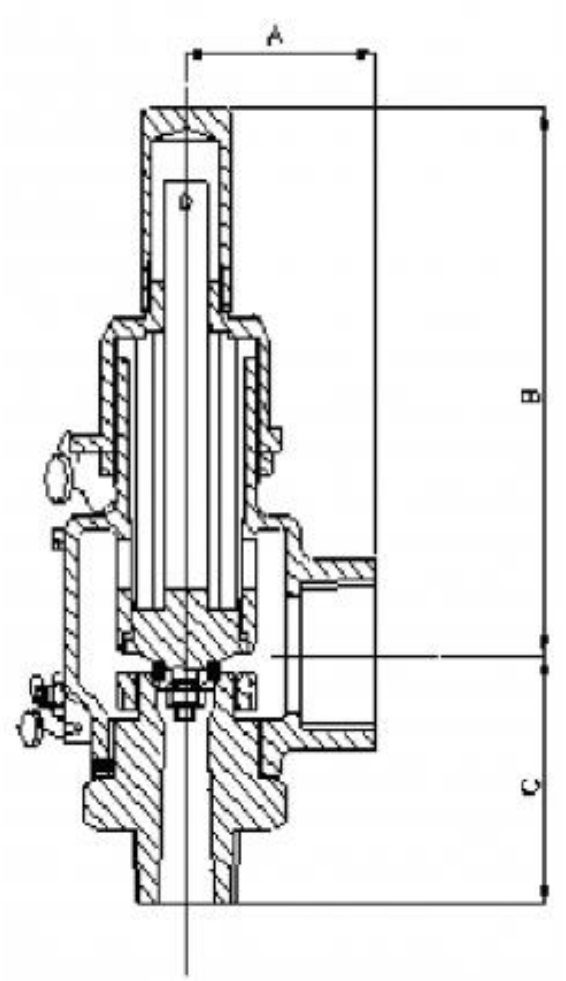
Technical Data



Dimensions								
	mm			in			weight	
	A	B	C	A	B	C	kg	lb
Nozzle 10	48	115	60	1.9	4.5	2.75	1.5	3.3
Nozzle 15	63.5	133	73	2.5	5.25	2.9	3.0	6.6
Nozzle 20	63.5	133	73	2.5	5.25	2.9	3.0	6.6

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Description

A range of high quality bronze relief valves designed to comply with ISO 4126 (“Safety Valves General Requirement”), Ad-Merkblatt A2 (“Safety Devices against Excess Pressure”), EN13648-1A, TUV and Stoomwesen requirements. They are eminently suited to the protection of static and road going cryogenic storage tanks against damaging over pressure.
There are three basic sizes, defined by the throat diameter, and each is available with a variety of inlet and outlet connections. The valve is designed and factory set to lift repeatedly within 2% of the set pressure, and to reseat above, 92% of set pressure. Spring pre compression and blow down ring settings are sealed after test to inhibit unauthorised tampering.

Flowrates at 10% above set pressure.

Suitable Media

Suitable for operation and safe on Group 1 gases.

Recommended Outlet Arrangement

To ensure backpressure on the outlet is minimised, use a maximum of one 90deg. elbow plus a maximum discharge pipe length of 0.5M of minimum O.D. not less than the normal designated outlet size. Arrangements other than this must not cause the backpressure to exceed 20% of the specified valve set pressure. The maximum torque for the outlet connections is 35Nm (25lb ft.) non-lubricated or Nm 20Nm (15Lb ft.) with PTFE pipe tape.

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Installation

Installation (Taper threaded end connections)

For valves with taper threaded end connections the torque table below are specified for **non-lubricated** threads, when PTFE thread tape is used the torque figure should be reduced by 50%.
NOTE: Carelessly applied thread tape entering the nozzle of the valve is the most common form of valve failure. Hand tighten end connections to reduce risk of crossed threads before finally tightening.

Installation (Flanged connections)

Tighten flange fasteners progressively and in sequence, checking the alignment of the mating flange.

Installation (Parallel threaded end connections)

Torque tightening valves are for **non-lubricated** threads. Lubrication including PTFE tape is **not** permitted under any circumstances with parallel threads. Threads that have become contaminated with lubricants should be fully degreased before use.

Torque Table

Male Thread Size	Maximum Torque
½ ” BSPPL	70Nm (52Lbf ft)
½ ” BSPTR	70Nm (52Lbf ft)
½ ” NPT	70Nm (52Lbf ft)
¾ ” BSPPL	130Nm (96Lbf ft)
¾ ” BSPTR	130Nm (96Lbf ft)
¾ ” NPT	130Nm (96Lbf ft)

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Installation

Installation (Plugged Drain Holes)

Valves with a tapered plugged drain hole to the valve body are supplied with the plug torque set. If the plug is re-tightened or replaced then a maximum torque setting of 6Nm non-lubricated or 2Nm with PTFE pipe tape should be used to avoid damage to the body.

Installation (testing)

Before introducing pressure to the valve, carry out a thorough inspection of all connections. Once pressure is introduced to the valve, a method appropriate to the medium being carried by the system should be employed to test for leaks.

NEVER USE HANDS TO TEST FOR LEAKS

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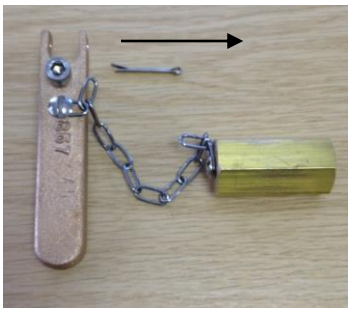
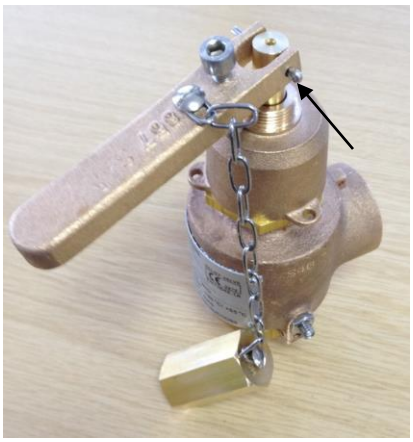
Installation - Fitting Manual Override Lever

STEP 1:
Using a 22mm AF Spanner Remove Brass Weather cap from the Relief Valve Assembly and keep safe

STEP 2:
Remove the split pin from the lever assembly and keep safe. A set of pliers may be needed to remove the pin.



STEP 3:
Place the lever assembly on the Relief Stem. Align the hole in the Relief Valve Stem with the hole through the lever. Replace the split pin from step 3 through the lever and through the stem. This should then retain the lever assembly to the relief valve.



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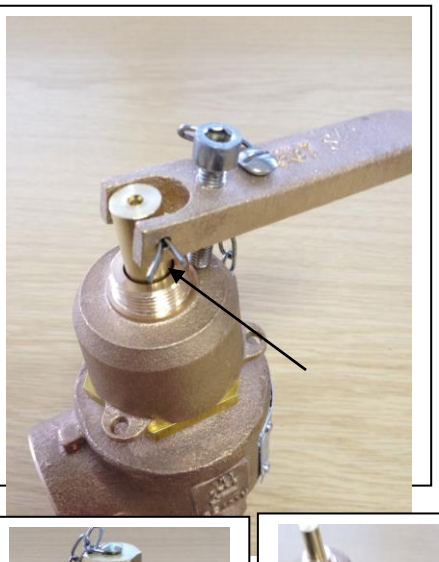
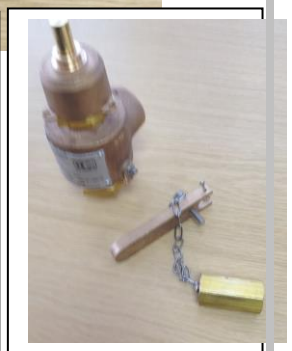
STEP 4:
Using a pair of pliers bend over one of the ends of the pin to secure it in place.

The override system is now ready to be used



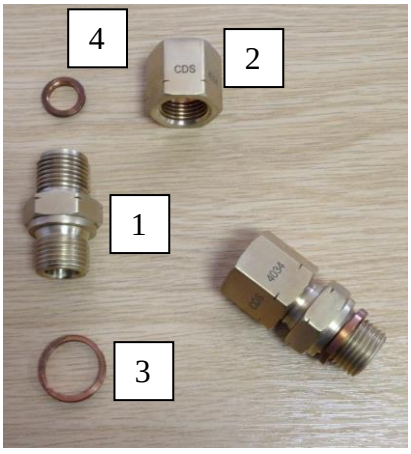
STEP 5:
After Override function has been used **IT IS MANDATORY** to remove the lever and refit the cap. To complete this carry out STEPS 1 to 4 in **REVERSE** order.



Installation - Fitting Positional Coupling to Relief Valve/Diverter Valve

STEP 1:
Dis-assemble the coupling from the kit supplied. Part contents should be:
1 - 1 x ½" BSP-PL Left Hand/Right Hand Male/Male Nipple
2 - 1 x ½" BSP-PL Left Hand/Right Hand Female/Female Nipple
3 - 1 x ½" BSP-PL Copper Washer
4 - 1 x Stepped Copper Washer (Nipple to Valve)

See Photo Opposite for Parts



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STEP 2:
Place (Item 3) directly on to the cover or face of a diverter/change over valve.

STEP3:
Screw (Item 1) into the cover of the changeover/diverter valve on to the copper washer. Ensure the copper washer is located on the male/male nipple. **NOTE:** The coupling will only fit one way as the one thread is a left hand thread and the other is a right hand thread.

STEP 4:
Tighten the coupling to a torque of 70Nm

STEP 5:
Place (Item 4) directly into the recess of the male/male nipple (Item 1) **NOTE:** The washer will only fit one way on to the adaptor.

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STEP 6:
Screw the female/female coupling (Item 2) on to the male/male nipple (Item 1). Note: This is a left hand thread. Screw the coupling on and measure the distance and shown. The gap should be 5mm between the nut faces.

STEP 7:
Hold the coupling (Item 2 and fully screw the relief valve on to the assembly. Once screwed down hold both the coupling and relief valve assembly and position to the desired location.

STEP 8:
Using a suitable spanners, hold the relief valve seat to prevent movement of the valve, and tighten the coupling anti-clockwise to a torque of 70Nm to seal the relief valve to the coupling.

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Maintenance

This valve is designed to be maintenance free, for refurbishment contact:

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Troubleshooting

SYMPTOM:	FAULT:	SOLUTION:

Contact Details

For further maintenance instructions and spares contact:

United Kingdom Enquiries:

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Service Record

Valve Tag Number:	Date:	Date:	Date:	Date:

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