



HPRV Proportional Relief Valves

Catalog 4190-HPRV

aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding



ENGINEERING YOUR SUCCESS.

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WARNING

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This document and other information from Parker Hannifin Corporation, its subsidiaries or its authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application and review the information concerning the product or system in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met. The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

Offer of Sale

The items described in this document are available for sale by Parker Hannifin Corporation, its subsidiaries or its authorized distributors. Any sale contract entered into by Parker will be governed by the provisions stated in Parker's standard terms and conditions of sale (copy available upon request).

Introduction: High Pressure Relief Valve

The Parker High Pressure Relief Valve (HPRV) provides an automatic protection mechanism for process instrumentation systems. When upstream pressure exceeds the closing force exerted by the valve's spring, the lower stem opens and permits flow through the valve's outlet port - which can be ducted to a safe place or released to atmosphere. Flow rate increases proportionately to the increase in upstream pressure.

CE marked and certified to the highest Category-IV level of the Pressure Equipment Directive (PED), the HPRV valve's design provides users with accurate and consistent cracking and resealing operation. The valve's innovative seat design additionally operates over an extremely wide pressure range (150 to 6000 psi, 10.3 to 414 bar), providing a universal solution for the vast majority of instrumentation applications.

Pressure settings are externally adjustable. Eight different spring ranges provide greater system sensitivity and enhanced performance.



Features

- **Captured moulded seat design is blow-out and chip resistant**
- **Colour coded springs and labels indicate spring cracking range**
- **Unique Tru-loc™ facility prevents accidental adjustment**
- **Lock wire feature secures a given pressure setting**
- **Low friction stem seal design prevents friction which increases accuracy of cracking pressure and reseal pressure**
- **Balanced poppet design ensures consistent cracking pressure regardless of system back pressure**
- **Orifice size: 3.6mm (0.142")**
- **Multiple end connections available**

Specifications

Working Pressure

Maximum Cold Working Pressure: 6000 psi (414 bar).
Up to 8000 psi (552 bar) during relief with no internal seal damage. Maximum back pressure: 2000 psi (137.9 bar).

Cracking Pressure

Eight springs, from 150 psi to 6000 psi in the following ranges: 150-375 psi, 325-775 psi, 725-1525 psi, 1475-2275 psi, 2225-3025 psi, 2975-4025 psi, 3975-5025 psi, 4975-6000 psi.

(See table on page 4 for bar equivalents).

Cracking pressure within 3% of set pressure.
Reseat pressure within 15% of cracking pressure.

Note: Valves which are not actuated for a period of time may initially crack at higher than set pressures.

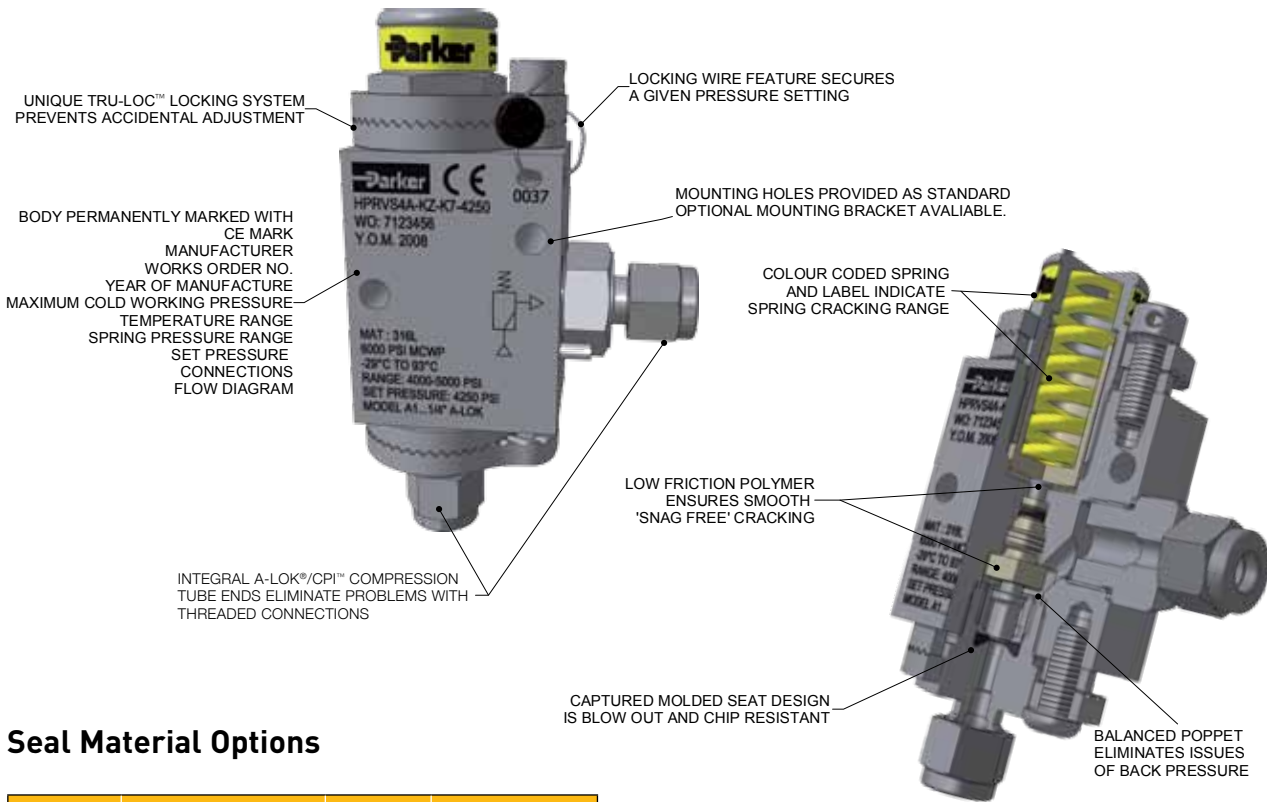
Maximum Relieving Flow

Water 1.686 l/min @ 150 psi with zero back pressure.
Nitrogen 313 l/min @ 150 psi with zero back pressure.

Note: For a 'safe' system the relieving flow capacity should exceed the maximum input flow. The maximum discharge capacity is not a given design specification for this valve, therefore the maximum discharge capacity quoted within the instructions is for informative purposes only. Should this guideline value not be sufficient to protect equipment or systems from exceeding maximum pressure, another type of relief or safety valve should be used.

HPRV (High Pressure)

Seal & Spring Options

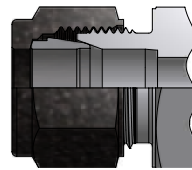


Seal Material Options

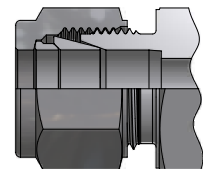
| Designator | Material | Shore Hardness | Temperature Range |
|------------|--|----------------|-----------------------------------|
| V | Fluorocarbon Rubber | 90 | -23°C to +204°C (-10°F to +400°F) |
| EPR | Ethylene Propylene Rubber | 90 | -57°C to +135°C (-70°F to +135°F) |
| BN | Nitrile Rubber (Buna-N) | 90 | -34°C to +107°C (-30°F to +225°F) |
| KZ | Highly Fluorinated Fluorocarbon Rubber | 90 | -29°C to +93°C (-20°F to +200°F) |
| NE | Neoprene Rubber | 70 | -43°C to +121°C (-45°F to +250°F) |

Available End Connections

Z - Single ferrule CPI™ compression port



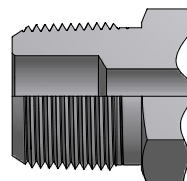
A - Two ferrule A-LOK® compression port



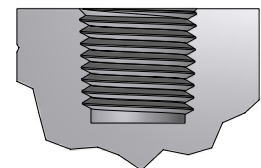
Spring Cracking Pressures

| Designator | Pressure Range | | Colour Code |
|------------|----------------|-------------|--------------|
| | psi | bar | |
| K1 | 150-375 | 10.3-25.9 | Grey |
| K2 | 325-775 | 22.4-53.4 | Red |
| K3 | 725-1525 | 50.0-105.1 | Orange |
| K4 | 1475-2275 | 101.7-156.9 | Yellow |
| K5 | 2225-3025 | 153.4-208.6 | Light Green |
| K6 | 2975-4025 | 205.1-277.5 | Light Blue |
| K7 | 3975-5025 | 274.1-346.5 | Violet |
| K8 | 4975-6000 | 343.0-414.0 | Lemon Yellow |

M - ANSI/ASME B1.20.1 External pipe threads

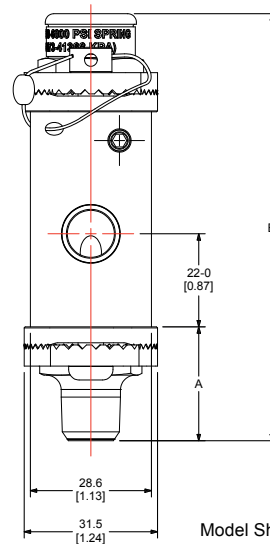
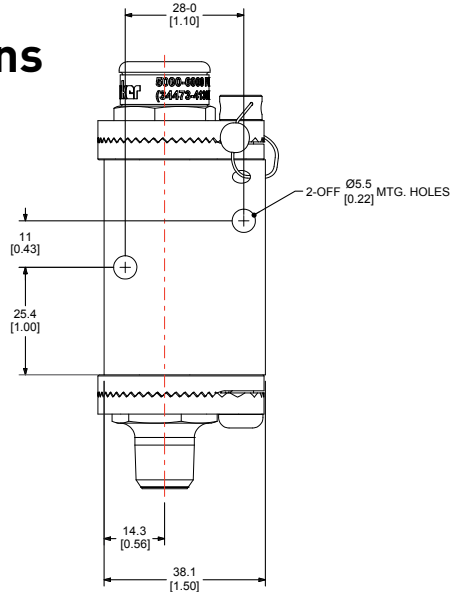


F - ANSI/ASME B1.20.1 Internal pipe threads

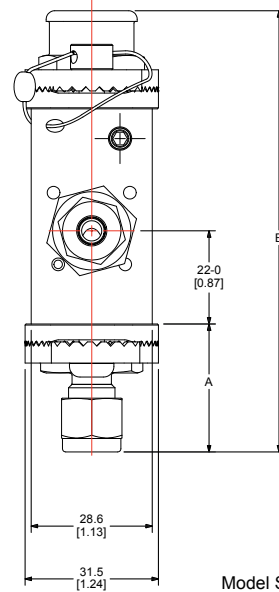
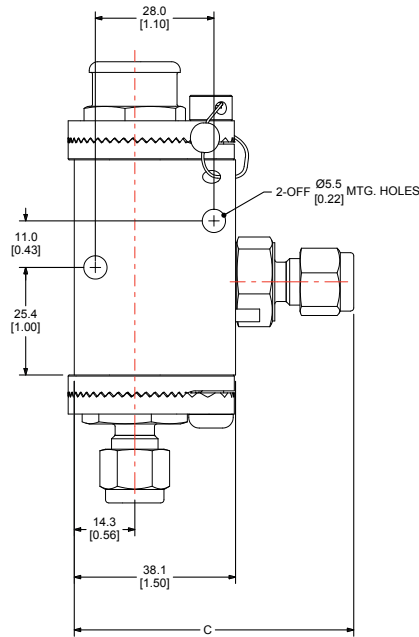


HPRV (High Pressure)

Dimensions



Model Shown: HPRVS4M4F-V-K8-5500



Model Shown: HPRVS4A-V-K8-5500

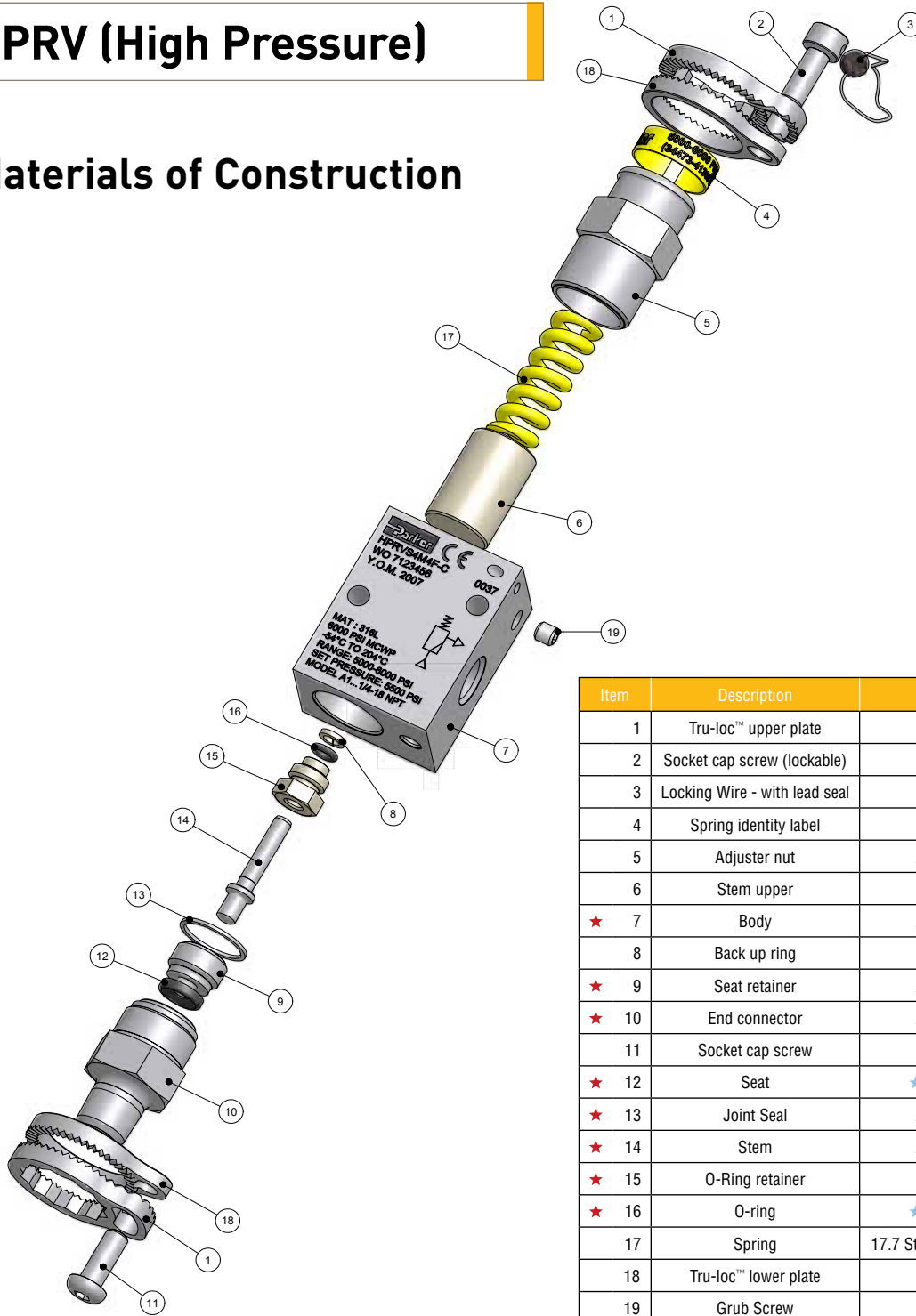
| Basic Part Number | End Connections | | Flow Data | | | | Dimensions | | | | | |
|-------------------|-------------------|---------------------|-----------|------|------|----------------|------------|------|-------|------|------|------|
| | Inlet | Outlet | Outlet | | CV | X _T | A | | B | | C | |
| | | | mm | inch | | | mm | inch | mm | inch | mm | inch |
| HPRV_4A | 1/4" O.D. A-LOK® | 1/4" O.D. A-LOK® | 3.6 | 0.14 | 0.41 | 0.67 | 27.2 | 1.07 | 105.8 | 4.17 | 63.5 | 2.50 |
| HPRV_4Z | 1/4" O.D. CPI™ | 1/4" O.D. CPI™ | | | | | 27.2 | 1.07 | 105.8 | 4.17 | 63.5 | 2.50 |
| HPRV_M6A | 6mm O.D. A-LOK® | 6mm O.D. A-LOK® | | | | | 27.2 | 1.07 | 105.8 | 4.17 | 63.5 | 2.50 |
| HPRV_M6Z | 6mm O.D. CPI™ | 6mm O.D. CPI™ | | | | | 27.2 | 1.07 | 105.8 | 4.17 | 63.5 | 2.50 |
| HPRV_4M4F | 1/4-18 NPT (male) | 1/4-18 NPT (Female) | | | | | 26.9 | 1.06 | 105 | 4.13 | NA | |

For A-LOK® and CPI™, dimensions are measured with nuts in the finger tight position
 Gas flow will be choked when $P_1 - P_2 / P_1 = X_T$

[x] denotes dimensions in inches

HPRV (High Pressure)

Materials of Construction



| Item | Description | Material |
|------|-------------------------------|-------------------------------------|
| 1 | Tru-loc™ upper plate | 316 Stainless Steel |
| 2 | Socket cap screw (lockable) | 316 Stainless Steel |
| 3 | Locking Wire - with lead seal | 316 Stainless Steel |
| 4 | Spring identity label | Vinyl |
| 5 | Adjuster nut | ASTM A 479 type 316 |
| 6 | Stem upper | PEEK |
| ★ 7 | Body | ASTM A 479 type 316 |
| 8 | Back up ring | PEEK |
| ★ 9 | Seat retainer | ASTM A 479 type 316 |
| ★ 10 | End connector | ASTM A 479 type 316 |
| 11 | Socket cap screw | 316 Stainless Steel |
| ★ 12 | Seat | ★ Fluorocarbon Rubber |
| ★ 13 | Joint Seal | ASTM A 479 type 316 |
| ★ 14 | Stem | ASTM A 479 type 316 |
| ★ 15 | O-Ring retainer | PEEK |
| ★ 16 | O-ring | ★ Fluorocarbon Rubber |
| 17 | Spring | 17.7 Stainless Steel (Colour Coded) |
| 18 | Tru-loc™ lower plate | 316 Stainless Steel |
| 19 | Grub Screw | 316 Stainless Steel |

★ Wetted parts.

★ Optional seat and seal materials are located in How to Order section.

Declaration of PED Compliance

This relief valve conforms to the Pressure Equipment Directive 97/23/EC, Safety Accessories / Category IV, as per article 1 section 2.1.3. CE 0037. All valves are CE marked and supplied with a full declaration of conformity. Parker Hannifin has been audited by Zurich Risk Services and meets the requirements of assessment procedure module H1 and awarded an EC Design Examination Certificate EN – 044020/B1.

These valves also conform to Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and is ATEX certified.

Introduction: Low Pressure Relief Valve

The Parker Low Pressure Relief Valve provides an automatic protection mechanism for process instrumentation systems. When upstream pressure exceeds the closing force exerted by the valve's spring, the lower stem opens and permits flow through the valve's outlet port - which can be ducted to a safe place or released to atmosphere. Flow rate increases proportionately to the increase in upstream pressure.

CE marked and certified to the highest Category-IV level of the Pressure Equipment Directive (PED), the valve's design provides users with accurate and consistent cracking and resealing operation.



Features

- **Pressure settings are externally adjustable. Six different spring ranges provide greater system sensitivity and enhanced performance**
- **Colour coded springs and labels indicate spring cracking range**
- **Lock wire feature secures a given pressure setting**
- **Back pressure has minimum effect on cracking pressure**
- **Orifice size: 5.2mm (0.203")**
- **Multiple end connections available**

Specifications

Working Pressure

Maximum Cold Working Pressure: 400 psi (27.6 bar).
Up to 600 psi (41 bar) during relief with no internal seal damage.

Cracking Pressure

Six springs, from 10 psi to 400 psi in the following ranges: 10-25 psi (0.7-1.7 bar); 25-50 psi (1.7-3.4 bar); 50-100 psi (3.4-6.9 bar); 100-150 psi (6.9-10.3 bar); 150-225 psi (10.3-15.5 bar); 225-400 psi (15.5-27.6 bar).

Cracking pressure within 3% of set pressure.
Reseat pressure within 15% of cracking pressure.

Note: Valves which are not actuated for a period of time may initially crack at higher than set pressures.

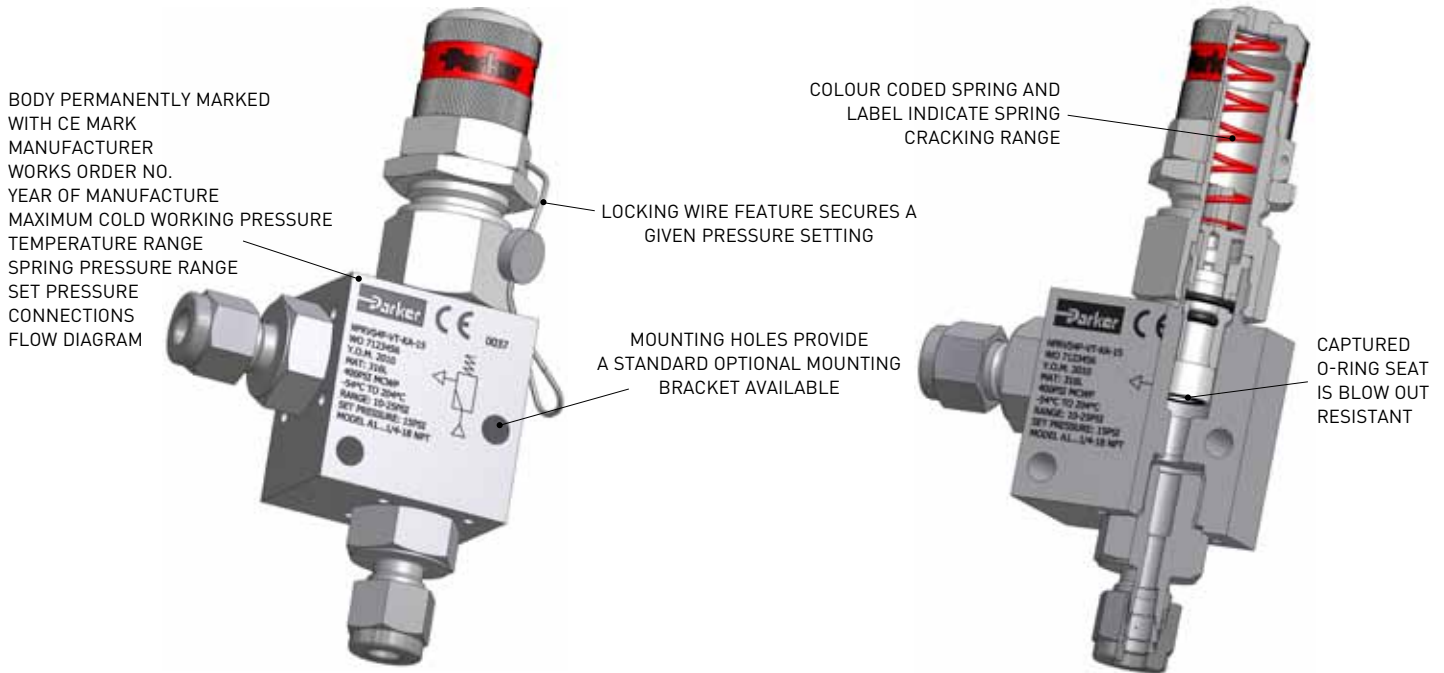
Maximum Relieving Flow

Water 2.4l/min @ 10 psi set pressure with zero back pressure. Nitrogen 6.8 l/min @ 10 psi set pressure with zero back pressure. Both at ambient temperature.

Note: For a 'safe' system the relieving flow capacity should exceed the maximum input flow. The maximum discharge capacity is not a given design specification for this valve, therefore the maximum discharge capacity quoted within the instructions is for informative purposes only. Should this guideline value not be sufficient to protect equipment or systems from exceeding maximum pressure, another type of relief or safety valve should be used.

HPRV (Low Pressure)

Seal & Spring Options



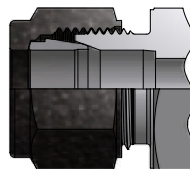
Mounting holes provided as standard. Optional mounting bracket available.

Seal Material Options

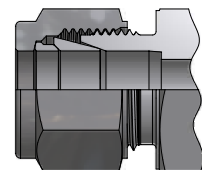
| Designator | Material | Shore Hardness | Temperature Range |
|------------|--|----------------|--------------------------------------|
| V | Fluorocarbon Rubber | 90 | -23°C to +204°C (-10°F to +400°F) |
| EPR | Ethylene Propylene Rubber | 90 | -57°C to +135°C (-70°F to +275°F) |
| BN | Nitrile Rubber (Buna-N) | 90 | -34°C to +107°C (-30°F to +225°F) |
| KZ | Highly Fluorinated Fluorocarbon Rubber | 90 | -29°C to +93°C (-20°F to +200°F) |
| NE | Neoprene Rubber | 70 | -43°C to +121°C (-45°F to +250°F) |

Available End Connections

Z - Single ferrule CPI™ compression port



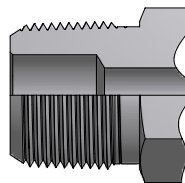
A - Two ferrule A-LOK® compression port



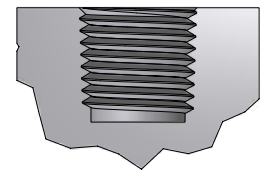
Spring Cracking Pressures

| Designator | Pressure Range | | Colour Code |
|------------|----------------|-----------|-------------|
| | psi | bar | |
| KA | 10-25 | 0.7-1.7 | Magenta |
| KB | 25-50 | 1.7-3.4 | Brown |
| KC | 50-100 | 3.4-6.9 | Purple |
| KD | 100-150 | 6.9-10.3 | Dark Green |
| KE | 150-225 | 10.3-15.5 | Dark Blue |
| KG | 225-400 | 15.5-27.6 | White |

M - ANSI/ASME B1.20.1 External pipe threads

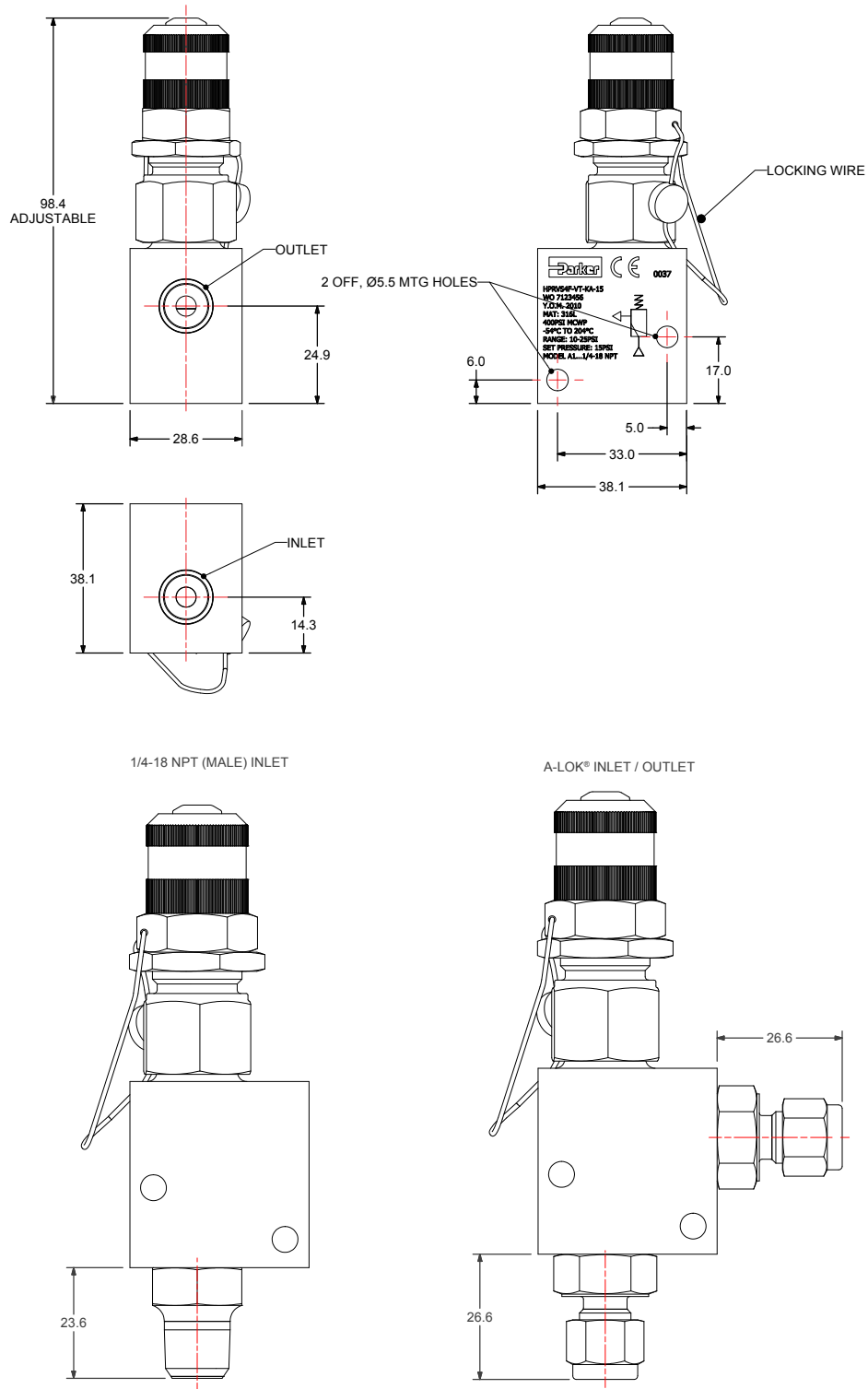


F - ANSI/ASME B1.20.1 Internal pipe threads



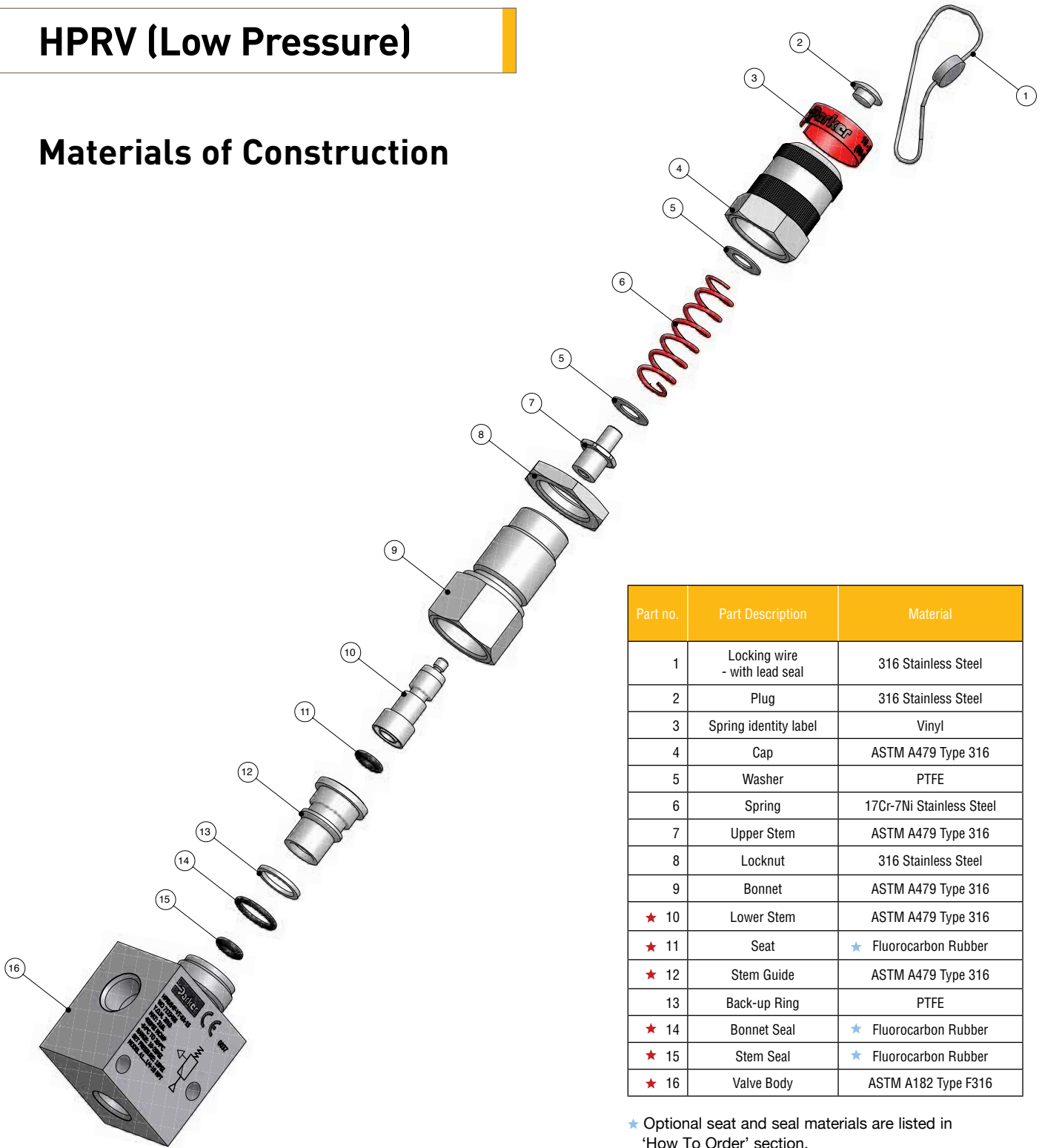
HPRV (Low Pressure)

Dimensions



HPRV (Low Pressure)

Materials of Construction



| Part no. | Part Description | Material |
|----------|----------------------------------|--------------------------|
| 1 | Locking wire - with lead seal | 316 Stainless Steel |
| 2 | Plug | 316 Stainless Steel |
| 3 | Spring identity label | Vinyl |
| 4 | Cap | ASTM A479 Type 316 |
| 5 | Washer | PTFE |
| 6 | Spring | 17Cr-7Ni Stainless Steel |
| 7 | Upper Stem | ASTM A479 Type 316 |
| 8 | Locknut | 316 Stainless Steel |
| 9 | Bonnet | ASTM A479 Type 316 |
| ★ 10 | Lower Stem | ASTM A479 Type 316 |
| ★ 11 | Seat | ★ Fluorocarbon Rubber |
| ★ 12 | Stem Guide | ASTM A479 Type 316 |
| 13 | Back-up Ring | PTFE |
| ★ 14 | Bonnet Seal | ★ Fluorocarbon Rubber |
| ★ 15 | Stem Seal | ★ Fluorocarbon Rubber |
| ★ 16 | Valve Body | ASTM A182 Type F316 |

★ Optional seat and seal materials are listed in 'How To Order' section.

★ Wetted parts.

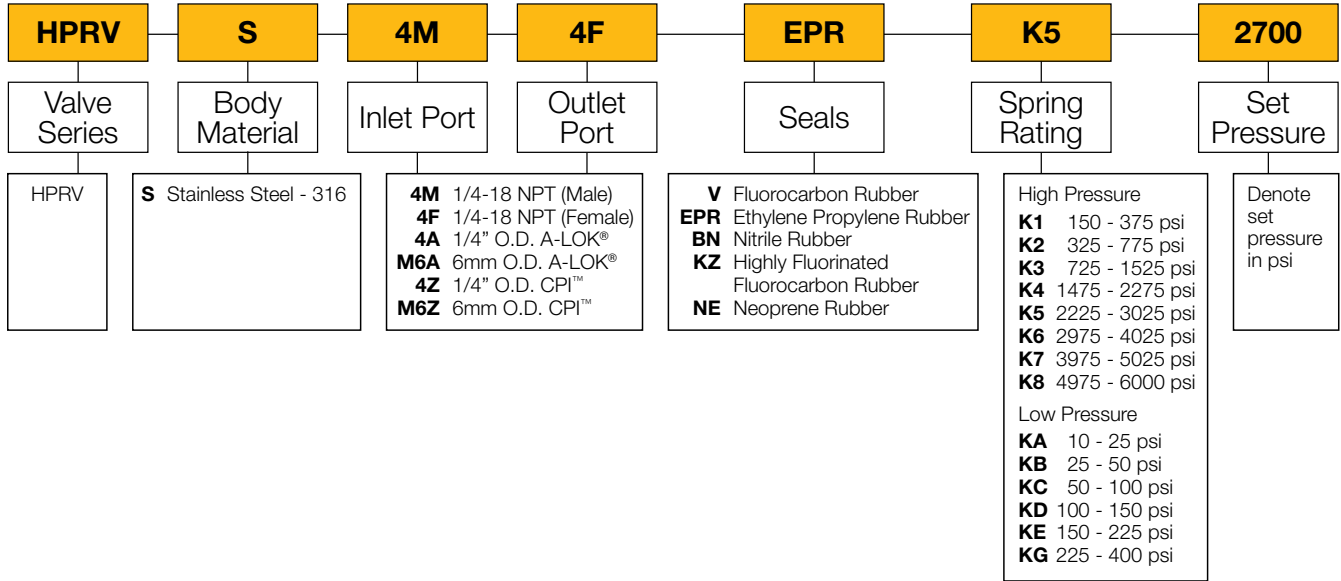
Declaration of PED Compliance

This relief valve conforms to the Pressure Equipment Directive 97/23/EC, Safety Accessories / Category IV, as per article 1 section 2.1.3. CE 0037. All valves are CE marked and supplied with a full declaration of conformity. Parker Hannifin has been audited by Zurich Risk Services and meets the requirements of assessment procedure module H1 and awarded an EC Design Examination Certificate CEN-060749/B1.

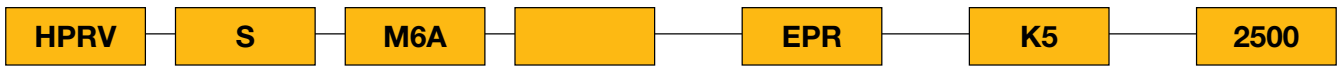
These valves also conform to Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and is ATEX certified.

How to Order - HPRV

The correct part number is easily derived from the following number sequence. The seven product characteristics required are coded as shown below.



Example



Describes a HPRV Series proportional relief valve equipped with 6mm A-LOK® compression inlet and outlet ports, ethylene propylene rubber seals, stainless steel construction, fitted with a 2250 - 3000 psi spring. Supplied pre-set at 2500 psi.

Spares

The following spring and seal kits are only available for low pressure valves.

Spring Kits

| Designator | Kit Part Number | Pressure Range | | Colour Code |
|------------|-------------------|----------------|-----------|-------------|
| | | psi | bar | |
| KA | KIT-RL4SP-10-25 | 10-25 | 0.7-1.7 | Magenta |
| KB | KIT-RL4SP-25-50 | 25-50 | 1.7-3.4 | Brown |
| KC | KIT-RL4SP-50-100 | 50-100 | 3.4-6.9 | Purple |
| KD | KIT-RL4SP-100-150 | 100-150 | 6.9-10.3 | Dark Green |
| KE | KIT-RL4SP-150-225 | 150-225 | 10.3-15.5 | Dark Blue |
| KG | KIT-RL4SP-225-400 | 225-400 | 15.5-27.6 | White |

Spring kit contains:
 Spring; Coded label; PTFE washers;
 Locking wire / lead seal; Installation instructions

Seal Kits

| Seal kit order number | Seat / Seal Material |
|-----------------------|--|
| KIT - RL4 - VT | Fluorocarbon Rubber |
| KIT - RL4 - BNT | Nitrile Rubber |
| KIT - RL4 - EPRT | Ethylene Propylene Rubber |
| KIT - RL4 - NET | Neoprene Rubber |
| KIT - RL4 - KZT | Highly Fluorinated Fluorocarbon Rubber |

Seal kit contains:
 Stem seal; Bonnet seal; PTFE Back-Up Ring;
 Lower Stem Assembly

Parker Worldwide

AE – UAE, Dubai

Tel: +971 4 8875600
parker.me@parker.com

AR – Argentina, Buenos Aires

Tel: +54 3327 44 4129

AT – Austria, Wiener Neustadt

Tel: +43 (0)2622 23501-0
parker.austria@parker.com

AT – Eastern Europe, Wiener Neustadt

Tel: +43 (0)2622 23501 970
parker.easteurope@parker.com

AU – Australia, Castle Hill

Tel: +61 (0)2-9634 7777

AZ – Azerbaijan, Baku

Tel: +994 50 2233 458
parker.azerbaijan@parker.com

BE/LX – Belgium, Nivelles

Tel: +32 (0)67 280 900
parker.belgium@parker.com

BR – Brazil, Cachoeirinha RS

Tel: +55 51 3470 9144

BY – Belarus, Minsk

Tel: +375 17 209 9399
parker.belarus@parker.com

CA – Canada, Grimsby, Ontario

Tel: +1 905-945-2274
ipd_canada@parker.com

CH – Switzerland, Etoy

Tel: +41 (0) 21 821 02 30
parker.switzerland@parker.com

CN – China, Shanghai

Tel: +86 21 5031 2525

CZ – Czech Republic, Klecany

Tel: +420 284 083 111
parker.czechrepublic@parker.com

DE – Germany, Kaarst

Tel: +49 (0)2131 4016 0
parker.germany@parker.com

DK – Denmark, Ballerup

Tel: +45 43 56 04 00
parker.denmark@parker.com

ES – Spain, Madrid

Tel: +34 902 33 00 01
parker.spain@parker.com

FI – Finland, Vantaa

Tel: +358 (0)20 753 2500
parker.finland@parker.com

FR – France, Contamine s/Arve

Tel: +33 (0)4 50 25 80 25
parker.france@parker.com

GR – Greece, Athens

Tel: +30 210 933 6450
parker.greece@parker.com

HK – Hong Kong

Tel: +852 2428 8008

HU – Hungary, Budapest

Tel: +36 1 220 4155
parker.hungary@parker.com

IE – Ireland, Dublin

Tel: +353 (0)1 466 6370
parker.ireland@parker.com

IN – India, Mumbai

Tel: +91 22 6513 7081-85

IT – Italy, Corsico (MI)

Tel: +39 02 45 19 21
parker.italy@parker.com

JP – Japan, Fujisawa

Tel: +(81) 4 6635 3050

KR – South Korea, Seoul

Tel: +82 2 559 0400

KZ – Kazakhstan, Almaty

Tel: +7 7272 505 800
parker.easteurope@parker.com

LV – Latvia, Riga

Tel: +371 6 745 2601
parker.latvia@parker.com

MX – Mexico, Apodaca

Tel: +52 81 8156 6000

MY – Malaysia, Shah Alam

Tel: +603-78490800

NL – The Netherlands, Oldenzaal

Tel: +31 (0)541 585 000
parker.nl@parker.com

NO – Norway, Stavanger

Tel: +47 (0)51 826 300
parker.norway@parker.com

NZ – New Zealand, Mt Wellington

Tel: +64 9 574 1744

PL – Poland, Warsaw

Tel: +48 (0)22 573 24 00
parker.poland@parker.com

PT – Portugal, Leca da Palmeira

Tel: +351 22 999 7360
parker.portugal@parker.com

RO – Romania, Bucharest

Tel: +40 21 252 1382
parker.romania@parker.com

RU – Russia, Moscow

Tel: +7 495 645-2156
parker.russia@parker.com

SE – Sweden, Spånga

Tel: +46 (0)8 59 79 50 00
parker.sweden@parker.com

SG – Singapore,

Tel: +65 6887 6300

SK – Slovakia, Banská Bystrica

Tel: +421 484 162 252
parker.slovakia@parker.com

SL – Slovenia, Novo Mesto

Tel: +386 7 337 6650
parker.slovenia@parker.com

TH – Thailand, Bangkok

Tel: +662 717 8140

TR – Turkey, Istanbul

Tel: +90 216 4997081
parker.turkey@parker.com

TW – Taiwan, Taipei

Tel: +886 2 2298 8987

UA – Ukraine, Kiev

Tel: +380 44 494 2731
parker.ukraine@parker.com

UK – United Kingdom, Barnstaple

Tel: +44 (0)1271 313131
parker.uk@parker.com

US – USA, Cleveland

Tel: +1 216 896 3000

VE – Venezuela, Caracas

Tel: +58 212 238 5422

ZA – South Africa, Kempton Park

Tel: +27 (0)11 961 0700
parker.southafrica@parker.com

European Product Information Centre

Free phone: 00 800 27 27 5374

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Parker Hannifin Ltd
**Instrumentation Products
Division Europe,**
Riverside Road,
Pottington Business Park,
Barnstaple, Devon, EX31 1NP
United Kingdom
Tel.: +44 (0) 1271 313131
Fax: +44 (0) 1271 373636
www.parker.com/ipd

Parker Hannifin Corporation
Instrumentation Products Division
1005 A Cleaner Way
Huntsville, AL 35805
Tel: + 1 (256) 881-2040
Fax: + 1 (256) 881-5072
www.parker.com/ipdus

Catalogue 4190-HPRV