

Instructions for Use
Housings Range



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1 INTRODUCTION

The Instructions for Use (IFU) contain important information covering installation, operation and maintenance for liquid and gas filter housings, including important safety and handling information. These instructions should be retained to provide guidance on the safe use of the equipment.

Please read and understand this manual prior to de-crating and installation.

This document applies to Parker supplied ranges with the following housing ranges (Table 1)

| Filter Housing Range | Fluid Group |
|-----------------------|----------------------------|
| PHB Demi | Gas (Group 1 & 2) |
| PHS Demi | Gas (Group 1 & 2) |
| PHB Single | Gas (Group 2) |
| PHB Multi | Gas (Group 2) |
| PHS Single (Standard) | Gas (Group 2) |
| PHS Pharma | Gas (Group 1 & 2) |
| PHI (In Line) | Liquid & Gas (Group. 2) |
| PHV (Vent) | Gas (Vent to Atmosphere) |
| PHW Single | Liquid (Group 1 & 2) |
| PHW Multi | Liquid (Group2) |
| PHF Demi | Liquid & Gas (Group 1 & 2) |
| PHP | Liquid & Gas (Group 2) |
| PHL | Liquid & Gas (Group 1 & 2) |

Table 1

User Safety Responsibility Statement for All Parker Products

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from Parker-Hannifin Corporation, its subsidiaries and authorized distributors provide product or system options for further investigation by users having technical expertise.

The user, through its own analysis and testing, is solely responsible for making the final selection of the system and components and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyse all aspects of the application, follow applicable industry standards, and follow the information concerning the product in the current product catalogue and in any other materials provided from Parker or its subsidiaries or authorized distributors.

To the extent that Parker or its subsidiaries or authorized distributors provide component or system options based upon data or specifications provided by the user, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the components or systems.

2 DEFINITIONS AND SYMBOLS

Key terms are defined below, and symbols are included in Error! Reference source not found..

IOMI – Installation, operation and maintenance instructions

Filter Housing - Vessel or container for filter cartridges or elements operating greater than atmospheric pressure (pressure envelope)

Vessel - a housing designed and built to contain fluids under pressure including its direct attachments up to the coupling point connecting it to other equipment; a vessel may be composed of more than one chamber.

Filter Cartridge - Filter element installed inside the 'housing' with a sealing feature

Fluid - gases, liquids and vapours in pure phase as well as mixtures thereof; fluids may contain a suspension of solids.

PED - Pressure Equipment Directive 2014/68/EU (for products supplied and sold within Europe)

PE(S)R – Pressure Equipment (Safety) Regulations 2016/1105 (for products supplied and sold within Great Britain)

ATEX - Explosive Atmospheres Directive 2014/34/EU

UKEX – The Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016.

PPE - Personal Protective Equipment

Relaxation time - Time during which the electrostatic charge on a solid or in the bulk of a liquid or powder decays exponentially to $1/e$ (i.e. about 37%) of its original value.

Equipment - Machines, apparatus, fixed or mobile devices, control components and instrumentation thereof and detection or prevention systems which, separately or jointly, are intended for the generation, transfer, storage, measurement, control and conversion of energy and/or the processing of material and which can cause an explosion through their own potential sources of ignition.

Explosive atmosphere - A mixture with air, under atmospheric conditions, of flammable substances in the form of gases, vapours, mists or dusts in which, after ignition has occurred, combustion spreads to the entire unburned mixture

Potentially explosive atmosphere - An atmosphere which could become explosive due to local and operational conditions.

Equipment category - The classification of equipment, within each equipment-group, specified in Annex I, determining the requisite level of protection to be ensured.

Protective systems - Devices other than components of equipment which are intended to halt incipient explosions immediately and/or to limit the effective range of an explosion and which are separately made available on the market for use as autonomous systems.







| | | | |
|---|--|---|----------------------|
|  | General prohibition - instructs when certain behaviours or actions are not allowed |  | CE Conformity Mark |
|  | Mandatory signs – instructs that a course of action must be undertaken |  | UKCA Conformity Mark |
|  | Warning signs - used to identify potential hazards. |  | Ex Mark |

Table 2

3 GENERAL SAFETY INFORMATION

A filter housing is potentially hazardous if used improperly, and without complying with the instructions included in this document. This document describes permissible uses, applicable safety regulations and prescribes training for maintenance personnel – refer to **Table 3**




| | |
|---|--|
|  | <ul style="list-style-type: none"> • Do not perform unauthorised modifications or repairs; Parker is not liable for any modifications undertaken by end users. • Do not operate outside of the pressure and temperature rating – refer to section 4. • Do not install in an active seismic zone or where weather may impart additional loads. • Do not use in an ATEX or UKEX designated zone, unless the filter housing is rated to do so with the appropriate control measures implemented that conform to the governing regulations, directives and standards in the country of use. Refer to section 15. • Do not use with fluids and/or under conditions that are different to the design specification. • Do use in a manner that is deemed contrary to specific national or regional regulations. • Do not use spare parts that are not specific to the model or type of filter housing installed. |
|  | <ul style="list-style-type: none"> • Compliance to National and local codes of practice, environmental regulations and Health & Safety directives have precedence over this guidance.^{1,2} • Installation, operation and maintenance should only be performed by competent personnel using appropriate risk assessment methodology. • Read and understand any documentation provided for the accessories and comply with the instructions for use. • Suitable protective systems should be fitted to prevent out of control events. • Filter housings must be supported to connecting pipework, as they are not designed to sustain load, vibration or cyclic loading. • The filter housing should be maintained and inspected regularly to ensure it meets the design specification during its service life. |
|  | <ul style="list-style-type: none"> • If the filter housing shows signs of damage it must not be placed into service. • Residual process fluid in the filter housing or on used filters cartridges may lead to injury or death. • Rapid depressurisation may lead to injury or death. • Poorly installed, operated and maintained pressure equipment may lead to injury or death. |

Table 3

¹ Directive 2014/68/EU (Europe) & PE(S)R 2016 (Great Britain) relating to the making available on the market of pressure equipment

² Directive 2014/34/EU (Europe) & Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016 (GB), relating to equipment and protective systems intended for use in potentially explosive atmospheres

4 TECHNICAL INFORMATION



| | |
|---|---|
|  | <ul style="list-style-type: none"> Ensure the process fluid is compatible with the materials of construction of the filter housing and accessories. |
|  | <ul style="list-style-type: none"> Incompatible process fluids may impact the design specification of the filter housing resulting in injury or death. |

Table 4

4.1 Product Description

Filter housings are pressure retaining containers that are designed to locate filter cartridges used to remove particulate from gas or liquid. They are fabricated from 316L Stainless steel.

4.2 Housing – General Layout

A general layout identifying major components of filter housings can be seen in Figure 1, Figure 2, Figure 3, Figure 4, Figure 5 and Figure 6. A more detailed view of the product layout can be seen within the product specific general arrangement drawings. For details of specific product general arrangements, refer to drawing number 179502500.

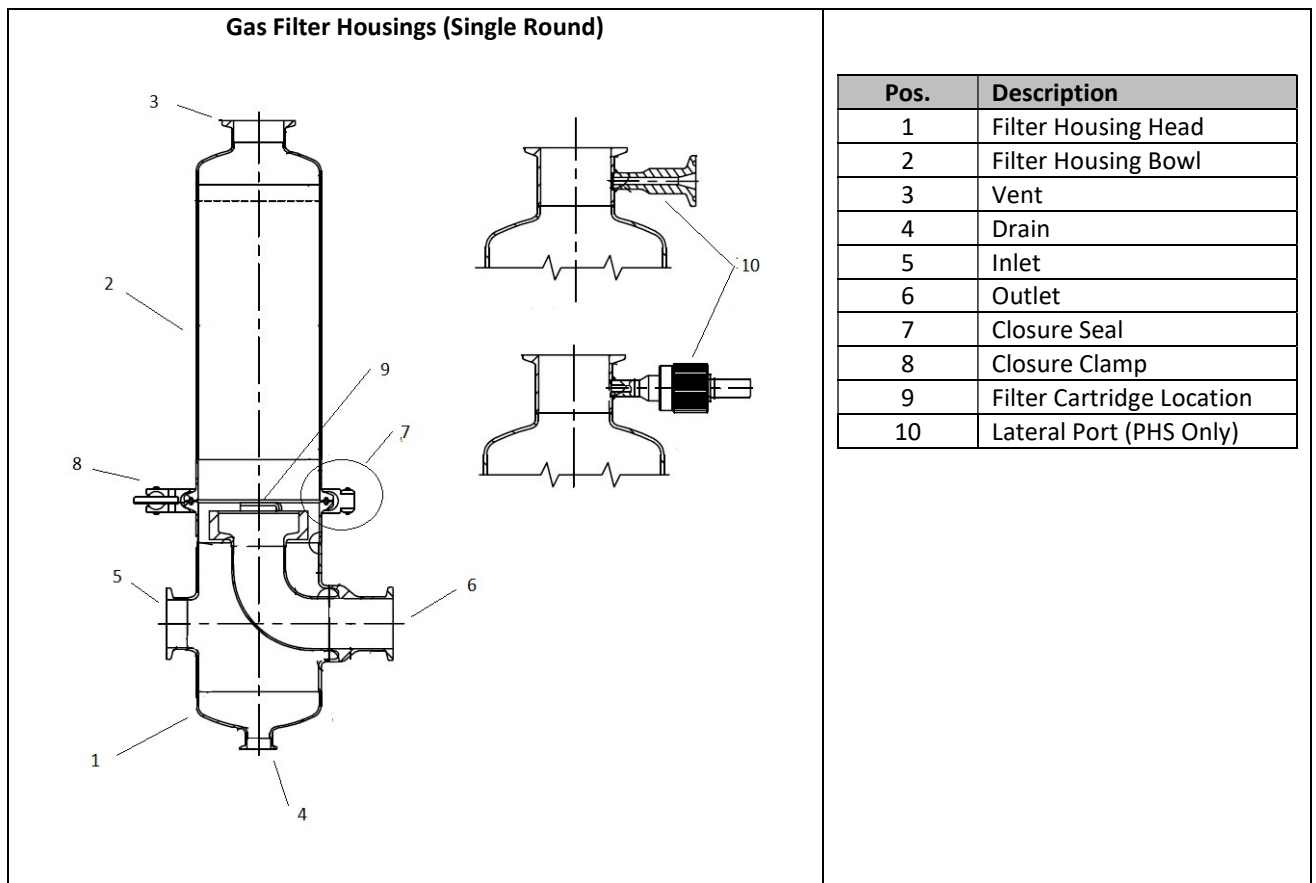


Figure 1

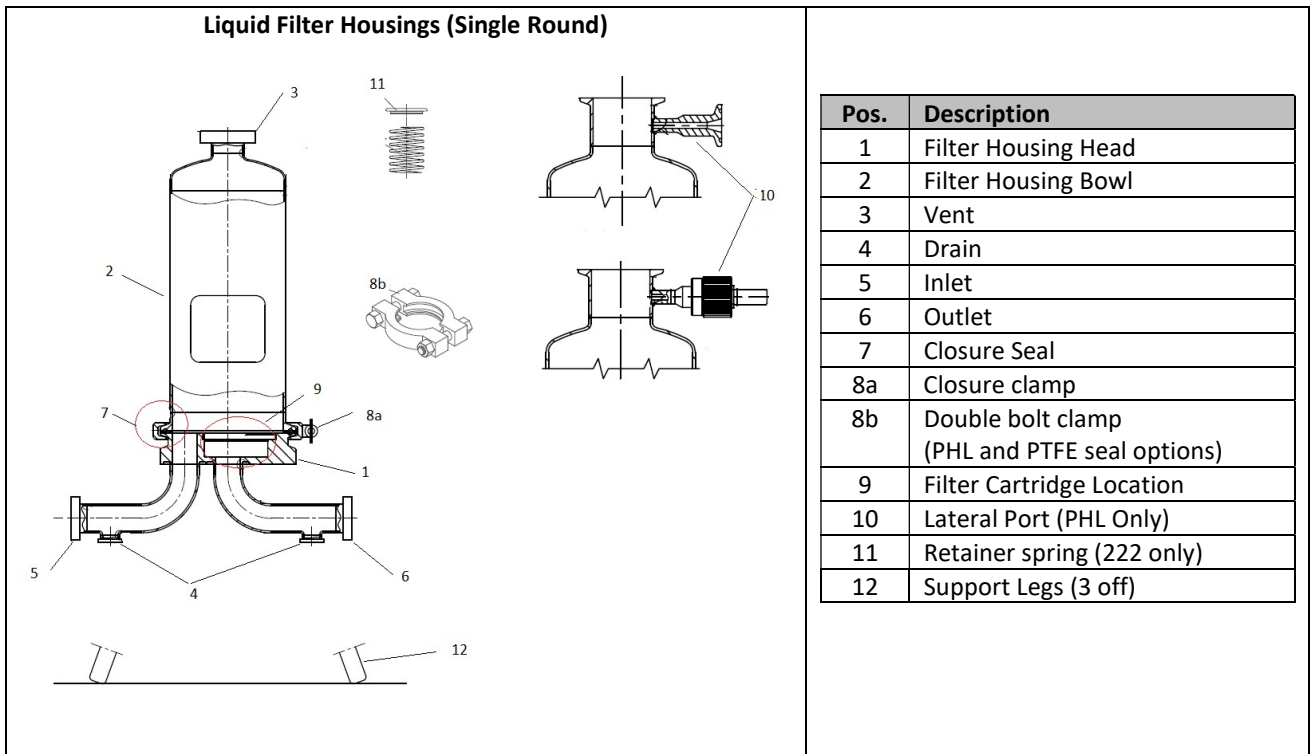


Figure 2

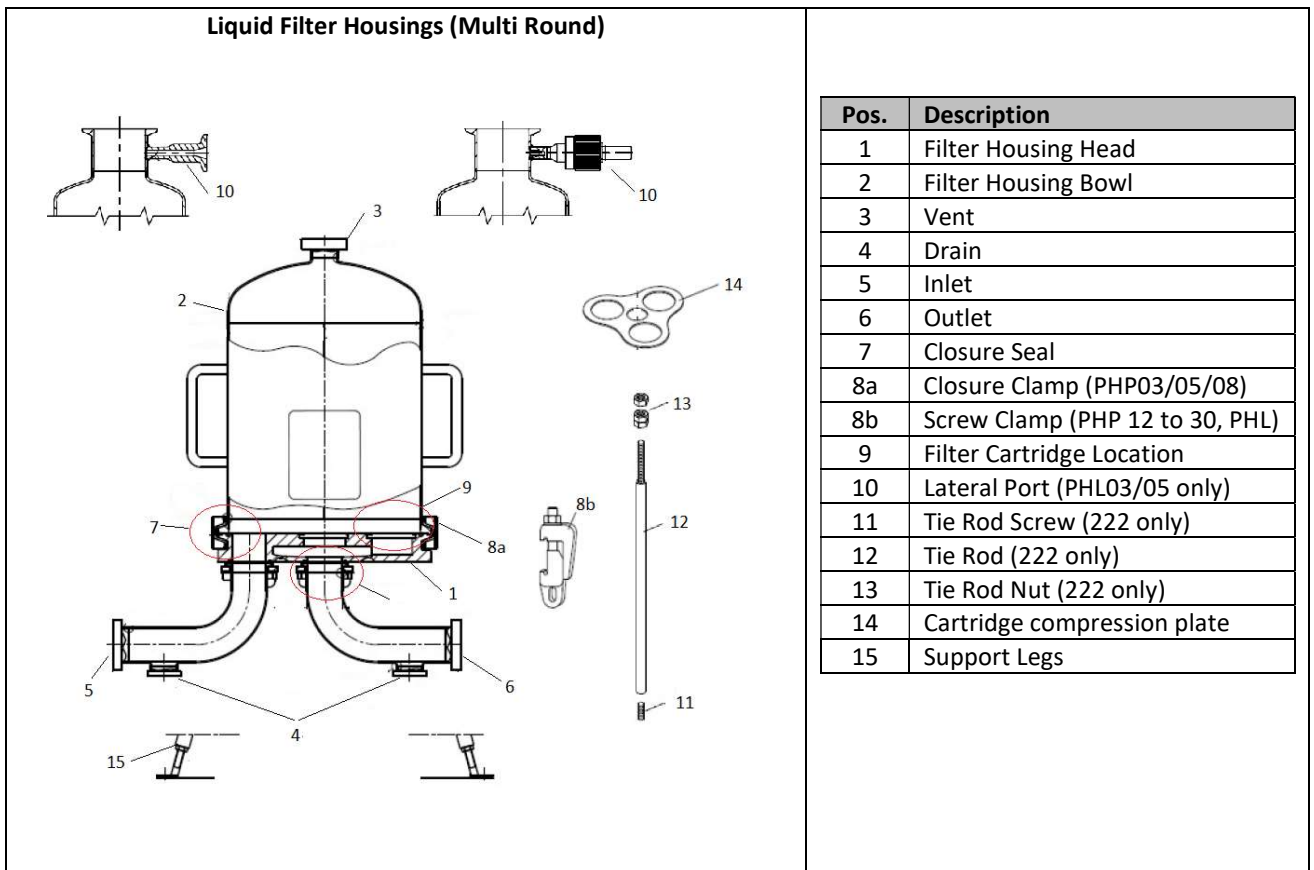


Figure 3

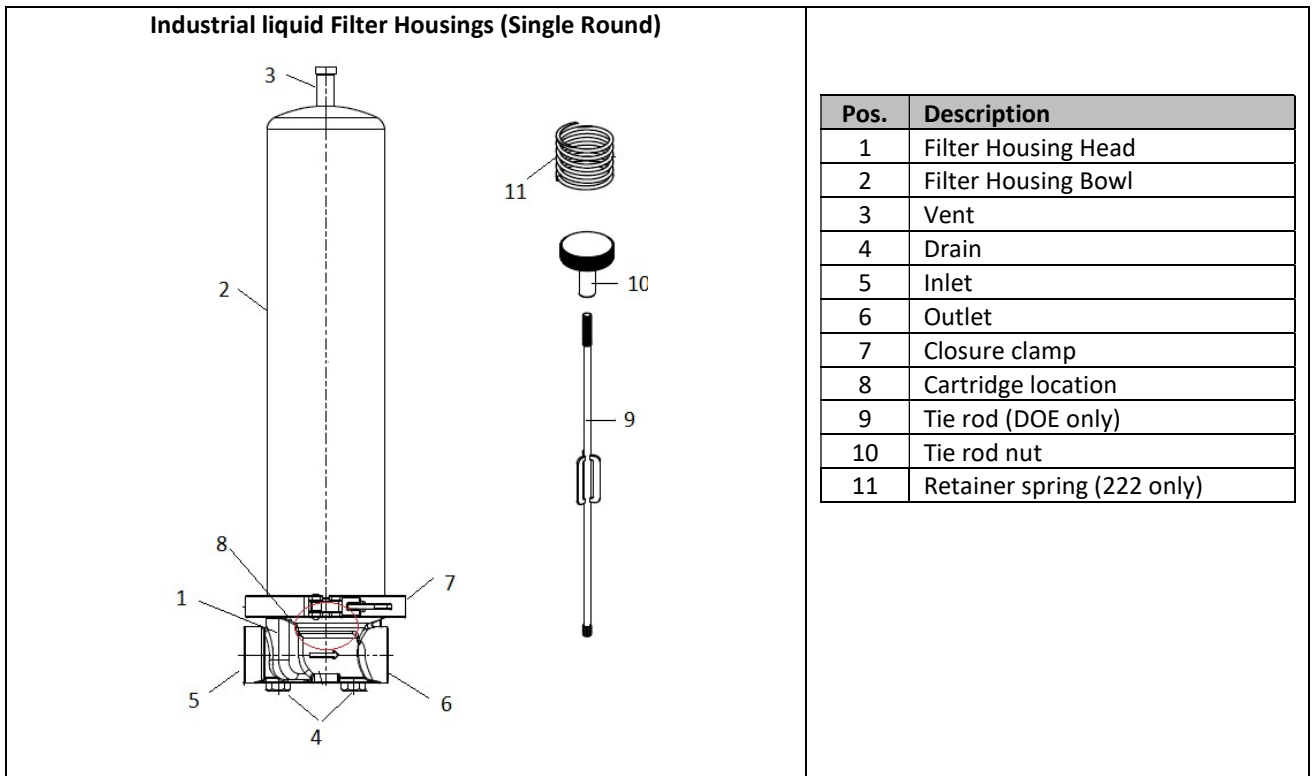


Figure 4

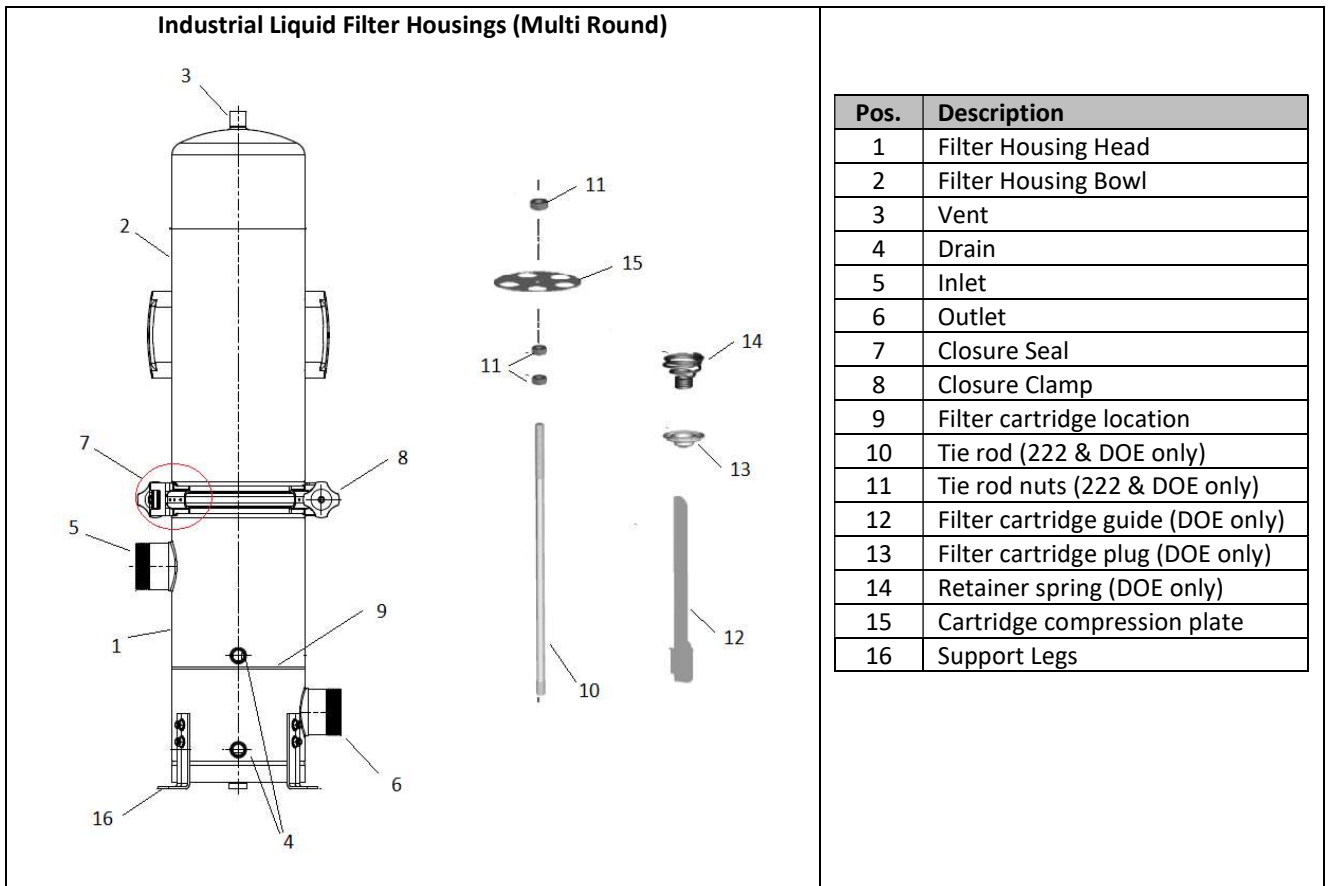


Figure 5

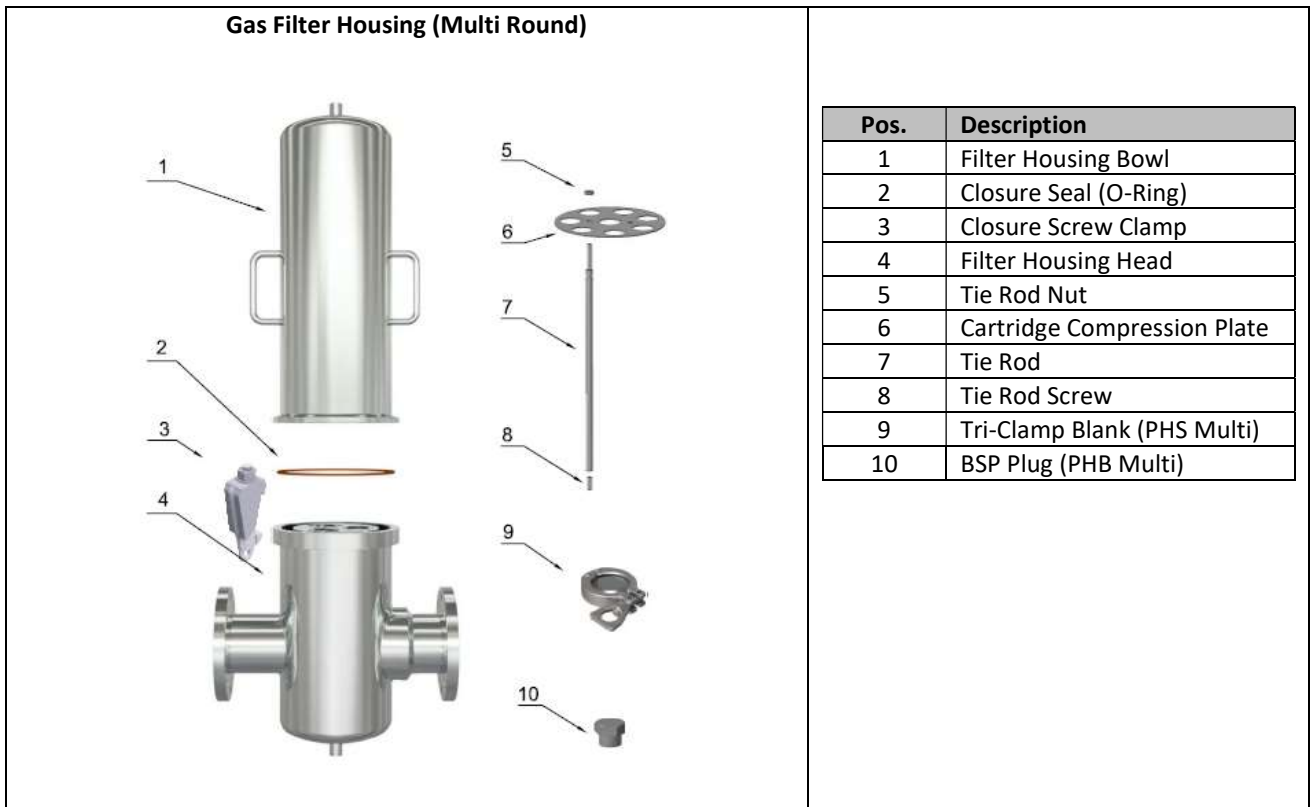


Figure 6

4.3 Spare Parts

Details of product specific spare parts can be found within the general arrangement drawings, as described in 4.2.

4.4 Data Label

A data label is etched to the main filter housing body to provide important information about the specification; For demi housings see **Figure 7**, for single & multi housings see **Figure 8**

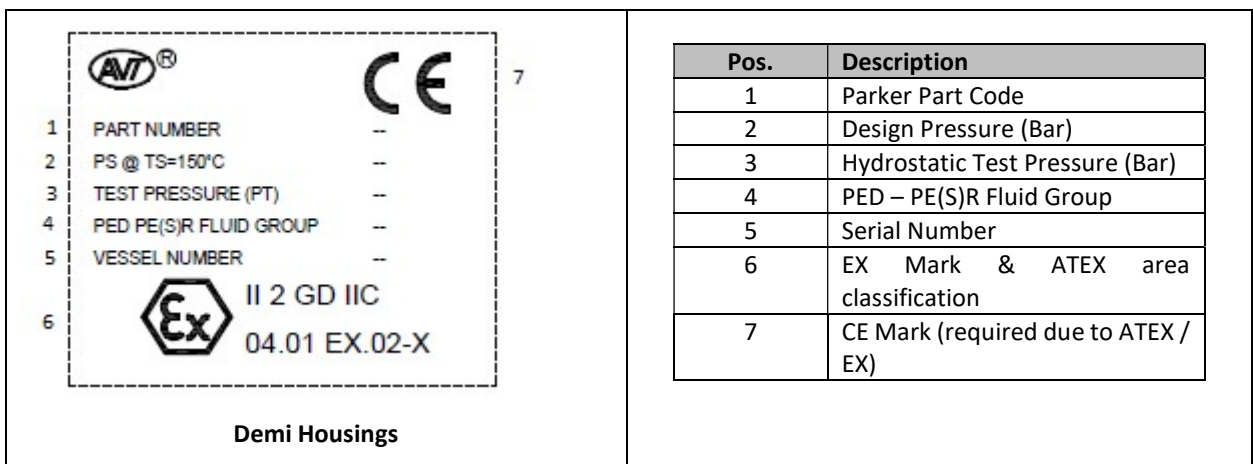


Figure 7

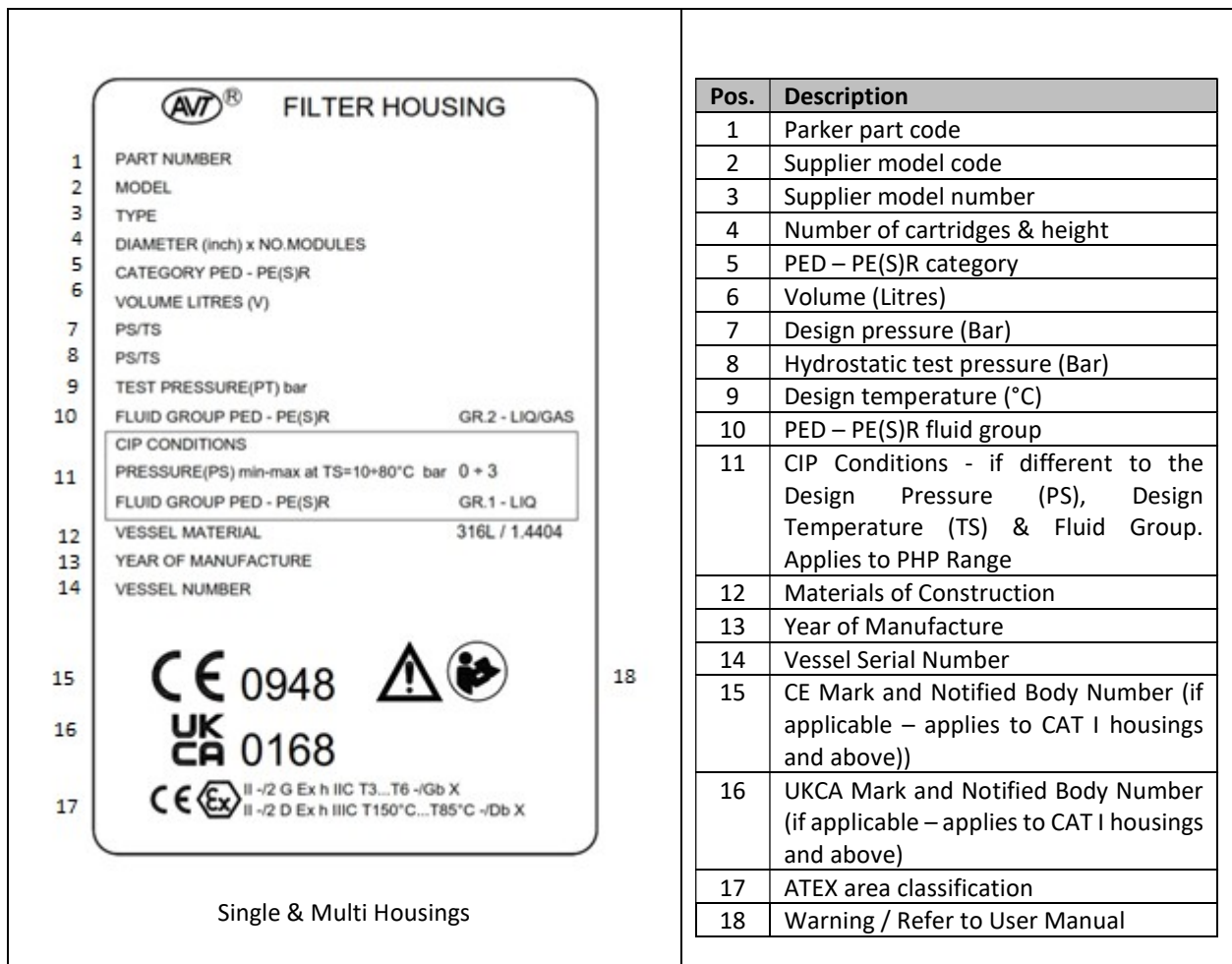


Figure 8

4.5 EU Declaration of Conformity

Filter housings shall display the CE mark and will be supplied with an EU Declaration of Conformity when the PED inspection level is Category I or higher and/or the filter housing is ATEX compliant. When the Filter housing is ATEX compliant it shall also display the Ex Mark.

4.6 UKCA Declaration of Conformity

Filter housings shall display the UKCA mark and will be supplied with a UKCA Declaration of conformity when the PE(S)R inspection level is Category I or higher. Parker filter housings are not UKEX compliant.

5 INSTALLATION

Please read and understand this document before installing the filter housing and accessories. Refer also to the general safety information in Table 2.




| | |
|---|--|
|  | <ul style="list-style-type: none"> • Avoid subjecting the pressure equipment to external stresses. • Do not use the filter housing or accessories if there are signs of damage either to the shell or sealing faces. |
|  | <ul style="list-style-type: none"> • Ensure that connecting pipework is adequately supported, so as not to impose local loads and vibrations onto the filter housing nozzles. • Check for any damage on receipt of the product; inform the supplier immediately of any damage and await instructions whether to proceed. • Packaged filter housings should be stored in a dry environment. • Ensure the use of appropriate PPE during installation. • Ensure necessary and correct handling, assembly, tightening and checking of all joints following installation and maintenance of the filter housing. • Ensure that no stray electrical currents are being transmitted to the filter housing that may result in corrosion or perforation of metal parts; eliminate the source and /or earth appropriately. • Perform a full system check before first use. |
|  | <ul style="list-style-type: none"> • Filter housings may be heavy – follow site safety controls for manual or mechanical handling to avoid harm. |

Table 5

5.1 Receiving and Handling

- Check for any damage on receipt of the product; inform the supplier immediately of any damage and await instructions whether to proceed.
- It is recommended to unpack the filter housing near to final installation location to avoid unnecessary movement.
- Use care when unpacking the filter housing to prevent damage to the contents.
- Check that no small parts, documentation or certification are disposed of with the packing.
- Filter housings may be heavy – follow site safety controls for manual or mechanical handling to avoid harm.
- Immediately notify the supplier if there are too many parts or if parts are missing and await instructions.

5.2 Storage

- Packaged filter housings should be stored in a dry environment.
- Use caution if stacking boxes and/or crates; always follow the instructions on the outside of packaging

5.3 Installation Location

- Protect the installed equipment from mechanical damage that may impact the integrity of the pressure envelope (i.e. physical barriers and appropriate warning signs).
- Ensure to check that the housing is not subject to vibration, thermal expansion and undue load on the nozzles or connections.
- Use appropriate supports to prevent stresses and moments on the filter housing nozzles.
- Ensure the filter housing is installed in a location with adequate clearance to allow cartridge change out.
- The filter housing should be installed so that accidental leaks cannot be dispersed into the environment.
- Take all due measures to prevent fires that could impact the integrity of the pressure envelope.

5.4 Connection and Assembly

- a) Safely isolate all supply lines that will connect to the filter housing.
- b) Install adequate protective equipment i.e. pressure relief valves within the pressure system to prevent an overpressure situation.
- c) All connections to the filter housing, including accessories, should be made by competent personnel.
- d) If the housing is damaged during installation then contact the supplier immediately and await instructions.
- e) Carefully clean the housing with hot water and suitable detergents designed for stainless steel.
- f) Rinse the filter housing with chlorine free to minimise the risk of corrosion. Pay special attention to areas near edges, joints and seals.
- g) Observe the direction of flow marked with arrows on the filter housing, when connecting the inlet and outlet.
- h) Ensure necessary and correct handling, assembly, tightening and checking of all joints following installation of the filter housing.
- i) Ensure that no stray electrical currents are being transmitted to the filter housing that may result in corrosion or perforation of metal parts; eliminate the source and /or earthed appropriately
- j) Conveyancing tubes should be attached to all drain valves and discharges points to prevent fluid from harming personnel, property or the local environment

For special assembly instructions please refer as follows:Appendix

Appendix 1 PHP Multi 03, 05 & 08

Appendix 2 PHP Multi: 12, 18, 24 & 30Appendix 3 PHL Multi: 03, 05 & 08

Appendix 4 PHW Multi:03, 05 & 08

5.5 Clamp Torque Values

| Clamp Type | Size | Closure | Recommended Torque Value |
|--------------------------|-------------|---------|--------------------------|
| Standard (single) Toggle | 0.5" to 4" | M8 Wing | 5 Nm |
| Single Bolted | 2.5" & 3.5" | M8 Nut | 20 Nm |
| Double Bolted | 1" to 4" | M10 Nut | 27 Nm |
| Screw Clamp | M16 | Bolt | 55Nm |
| Screw Clamp | M20 | Bolt | 210Nm |
| Screw Clamp | M24 | Bolt | 190Nm |

Table 6

6 Operation and Maintenance

Please read and understand this document before operating or maintaining the filter housing. Read and understand any manuals supplied with the filter cartridges and accessories. Refer also to the general safety information in Table 3.




| | |
|---|--|
|  | <ul style="list-style-type: none">• Do not touch the filter housing or pipework unprotected, if they are processing hot fluids.• Avoid subjecting the pressure equipment to external stresses.• Never open the filter housing closure system during operation. |
|  | <ul style="list-style-type: none">• Ensure that the filter housing has been fully depressurised and any liquid has been drained before dismantling the housing.• Ensure that the filter housing, accessories and connections are sealed and the drain valves are closed before operation. |
|  | <ul style="list-style-type: none">• Residual process fluid in the filter housing or on used filters cartridges may lead to injury or death.• Rapid depressurisation may lead to injury or death. |

Table 7

6.1 Filter Cartridge Installation and Replacement

To remove or replace the filter cartridge in the filter housing the procedure in this section should be followed. Additionally, a risk assessment and any control measures identified should be implemented and the local environment should be declared safe, prior to opening the housing.

- a) All personnel handling the filter housing should be earthed.
- b) If the process permits, it is recommended that purging the filter housing with nitrogen gas or flushing a suitable non-flammable, miscible conductive fluid prior to commencing a cartridge change-out is undertaken to reduce the potential for a flammable atmosphere.
- c) Allow enough time for the filter housing to stand after operation &/or purging to facilitate charge dissipation (the time should be determined by the liquid conductivity and dielectric constant).
- d) Prior to opening the housing, it is recommended that the local environment is declared safe.
- e) Once the environment has been declared safe, remove the filter housing bowl by removing the clamp / screw clamp fastenings and place the bowl onto a stable, clean surface
- f) Remove the used filter cartridges, including the compression plate, if fitted.
- g) Fit the replacement filter cartridge in accordance with the instructions provided in the filter cartridge IOMI.
- h) Inspect the components for signs of damage and/or replace as part of a maintenance schedule. This includes the housing closure seal. Remove any residue or particles.
- i) Refit the compression plate (if applicable)
- j) Remove any residues or particles.
- k) Replace the filter bowl and secure using the closure clamp to the specified torque value – refer to Table 6
- l) On reassembly of the filter housing, ensure that all earth connections that may have been temporarily removed are restored. It is recommended to test the resistance to earth of conducting parts during reassembly and take appropriate action to ensure the resistance is within current guidelines or site policy.

6.2 Start Up and Operation

- a) Ensure that the filter housing, accessories and connections are sealed before operation.
- b) Ensure the drain valves and isolation valves are closed, if applicable, before operation.
- c) Turn on the supply and partially open the inlet isolation valve to allow the housing to pressurise.
- d) Inspect for leaks and remedy.
- e) Fully open the inlet isolation valve.
- f) Partially open the downstream isolation valve to start flow.
- g) Inspect for leaks and remedy.
- h) Fully open the outlet isolation valve.

6.3 Housing Maintenance

- a) Always be vigilant of pressures, temperatures and residual process fluid when performing maintenance on the filter housing.
- b) Always isolate the filter housing from the process, depressurize and drain process fluids before opening.
- c) Frequently inspect the condition of pressurised parts, accessories and connections for corrosion, abrasions, deformation due to blows, breakage or any other abnormal condition which could lead to the onset of a hazardous situation.
- d) Replace worn parts with those designed for the filter housing. Check the condition of filter housing seals each time the cartridges are replaced; replace if damaged. It is recommended that the seals are replaced annually except for PTFE and/or FEP seals that should be replaced each time the filter housing is opened.

7 ATEX Requirements

Equipment used for operation in potentially explosive atmospheres must comply with DIRECTIVE 2014/34/EU (Europe) / Equipment and Protective Systems Intended for use in Potentially Explosive Atmospheres Regulations 2016 (UK).² Please read and understand this document and any supporting equipment manuals before operating or maintaining the filter housing. Refer also to the general safety information in Table 3




| | |
|---|---|
|  | <ul style="list-style-type: none"> Do not use this equipment or accessories, if not specified for the intended purpose (refer to the filter housing nameplate). Do not use the filter housing (or accessories) if not effectively earthed. Do not paint or apply coatings to surfaces that may reduce conductive bonding. Do not operate the equipment without understanding the properties of the liquid and the process (e.g. temperature, viscosity, conductivity and dielectric constant). Do not operate the equipment without consideration of the residence time required after filtration; filters are designated as high charging equipment and require special consideration. Parker filter housings are not compliant with UKEX and must not be placed into a potentially explosive atmosphere categorised by UKEX. |
|  | <ul style="list-style-type: none"> When risk assessing and/or designing activities involving dangerous substances, all relevant factors must be taken into account, including non-routine maintenance. Compliance to National and local codes of practice, environmental regulations and Health & Safety directives have precedence over this guidance.^{2, 3, 4, 5, 6} Any electrical accessories that are added to the filter housing are fully in compliance with directive 2014/34/EU and are consistent with the ATEX classification of the filter housing. All conductive parts of a liquid handling system should be adequately connected to earth, including people handling flammable liquids. Ensure regular inspections of the equipment and checks of resistance between bonded and earthed components. Vent the filter housing safely to avoid the creation of vapour spaces. Limit charge accumulation in liquids by using appropriate control and charge dissipation practices. |
|  | <ul style="list-style-type: none"> Use of equipment not designed for the intended use or operated incorrectly has the potential to cause an explosion that may lead to injury or death. Electrostatic discharge has the potential to cause an explosion that may lead to injury or death. Residues of dangerous substances may still exist in cleaned and emptied equipment that has the potential to lead to injury or death. Vapour spaces within equipment may be sources of ignition that has the potential to lead to injury or death. Flow through filters can produce significantly higher charge densities that requires consideration in the process design. |

Table 8

³ CLC/TR 60079-32-1 Explosive atmospheres – Part 32-1: Electrostatic guidance (IEC/TS 60079-32-1, IEC/TS 60079-32-1:2013/A1:2017)

⁴ EN 1127-1:2019 Explosive atmospheres - Explosion prevention and protection - Part 1: Basic concepts and methodology

⁵ DSEAR Dangerous Substances and Explosive Atmospheres Regulations 2002

⁶ NFPA 77, Recommended Practice on Static Electricity, 2019 Edition

7.1 Generation and Management of Electrostatic Charge

There is the potential to generate electrostatic charge wherever there is liquid flow. The potential rate of charging increases as the interfacial area between the liquid and the surfaces increase and the flow velocity increases.

The level of charge accumulation in a liquid, and therefore the electrostatic hazard potential, is strongly dependent on its electrical conductivity and dielectric constant (relative permittivity).³ Conductivity is also a factor of temperature and viscosity; hence the conductivity of a liquid will be lower when at lower temperatures. Conductivity can be expressed in terms of picoSiemens per metre (pS/m); for liquids with a dielectric constant around 2 (e.g. hydrocarbons) these can be classified as:^{3,6}

- High conductivity (>10,000 pS/m) - any static generated within the liquid can be conducted to the pipe/filter housing and be dissipated safely via the earthing
- Medium conductivity (50-10,000 pS/m) - the rate of charge generation is critical to understand how charge can dissipate.
- Low conductivity (<50pS/m) - liquids are unable to dissipate the static charge. Static build-up can occur, even if the filter housing is earthed.

Hazardous levels of charge accumulation may occur with all liquids, but special attention is required for low conductivity liquids. Therefore, for liquids having low conductivity properties (<50pS/m) there exists the possibility that static charge may be accumulated more quickly than it is dissipated, leading to a potential discharge. Discharge can lead to various issues from pitting to an explosion.

Table 8 is a summary of high-level precautions that may be effective against ignition hazards with liquid handling operations; refer to the available guidance documents cited.³ Parker has adopted a hierarchical approach to reducing the risk of explosion which involves concentrating on the avoidance of a flammable atmosphere as the basis of safety.

| Precaution | Measure |
|--|---|
| Earthing and avoidance of isolated conductors | <ul style="list-style-type: none"> • All conductive parts of the filter housing should be adequately connected to earth and frequently tested to ensure effective earthing. • People operating the equipment should be earthed. |
| Restricting charge generation by controlling relevant process parameters | <ul style="list-style-type: none"> • Reducing linear flow velocity of the liquid. • Effective residence time for charge relaxation using conductive pipe or conductive relaxation chamber after filtration. |
| Prevent the occurrence of flammable atmospheres | <ul style="list-style-type: none"> • Avoidance of vapour spaces through safe and effective bleeding of the filter housing. • Inerting vapour spaces after handling volatile liquids i.e. flush with an inert gas. |
| Promote charge dissipation by limiting charge accumulation | <ul style="list-style-type: none"> • Bonding components and people to earth • Increasing the conductivity of the liquids (alternative liquids or use of additives). |

Table 9

7.2 High Charging Equipment – Filters and Filter Housings

Liquid flow through filters can produce significant charge densities; the accumulation of charge density is related to the pore size of filters used. Microfilters (pore size <30µm) often generate very high levels of charge, therefore, it is essential that:

- a) There is sufficient residence time between the filter and any downstream tank for the excess charge to dissipate; refer to cited documents for guidance.^{3,4,6}
- b) That all conductive parts in the filter housings are bonded together and earthed. For all metal systems a resistance to earth of less than 25 Ohms is deemed acceptable.³
- c) Ensure that the filter housing and the relaxation chamber, if used, remain full of liquid during normal operation in order to prevent a flammable atmosphere.
- d) All Parker filter housings must be earthed; electrical continuity is achieved by the mechanical connection between conductive parts, where the parts are not coated.

7.3 Bonding Surfaces

When the filter housing is assembled and installed into the process pipework, electrical continuity (bonding) is guaranteed by the mechanical connection of all the parts. Refer to Figure 9.

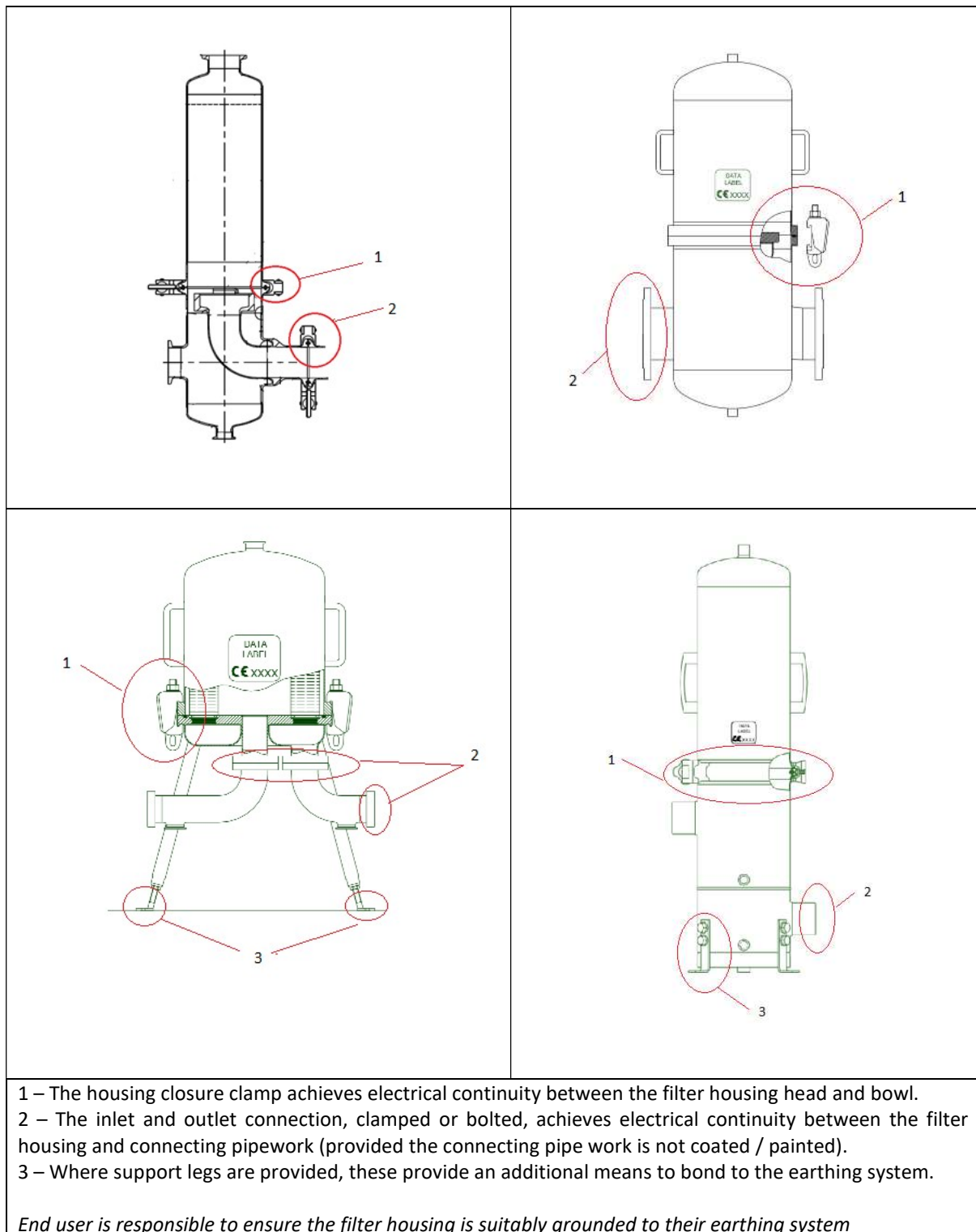


Figure 9

8 Decommissioning and Disposal

Table 10 contains guidelines for safe disposal of materials; local laws take precedence.

| What | Materials | Disposal Route |
|--|---|---|
| Filter housing packaging Filter packaging | Wood, cardboard, plastic film and packaging supports | Wood – widely recyclable Cardboard - widely recyclable Plastic film – potentially recyclable (check locally) Packaging supports - potentially recyclable (check locally) Avoid landfill, where possible, and use incineration to energy schemes |
| Consumables and filter cartridges | Elastomers, polyolefins, thermoplastics (potentially contamination) | Non-hazardous waste - avoid landfill, where possible, and use incineration to energy schemes. Hazardous waste – follow local regulations. |
| Filter Housing | Stainless steel | Recyclable after decontamination (check locally). |

Table 10

9 Trouble Shooting

| Event | Cause | Risk | Remedy |
|---|---|---|--|
| Localized corrosion with perforation of components bathed by the fluid | <ul style="list-style-type: none"> ▪ Process fluid incompatible with the housing material ▪ Insufficient surface cleaning (removal of beginning of corrosion) ▪ Presence of stray currents | Fluid leakage and/or explosion | Replace corroded components |
| Cartridge compression plate visibly bent | <ul style="list-style-type: none"> ▪ Overpressure | Fluid leakage and/or explosion | Replace part and review process parameters |
| Pressure gauge improperly set – the pointer does not go back to its zero position | <ul style="list-style-type: none"> ▪ Overpressure | Fluid leakage and/or explosion | Replace part |
| Closure elements seized | <ul style="list-style-type: none"> ▪ Wear or incorrect use | Closure element ceases to work properly | Replace closure element |
| Leakage of fluids from access connections to the tank | <ul style="list-style-type: none"> ▪ Inadequately tightened connections ▪ Contamination on seal faces ▪ Excessive load applied to connections | Fluid leakage and/or explosion | Re-torque connections Clean sealing faces Use pipeline holders |
| Bowl falls to a hard surface | <ul style="list-style-type: none"> ▪ Incorrect handling ▪ Lifting system not conform to bowl weight and not safety lock | Damage to the pressure envelope, loss of integrity Seal / closure face is damaged | Contact Parker - replace damaged components |
| Corrosion | <ul style="list-style-type: none"> ▪ Fluid not compatible with housing material ▪ Chlorine ions ▪ Ferrous particles deposited ▪ Eddy currents | Fluid contamination Corroded element ceases to work properly Reduced mechanical strength leading to failure below design rating | Contact supplier; remove corroded zone; check the earthing |
| High resistivity to earth | <ul style="list-style-type: none"> ▪ Poor conductivity between conductive components | Explosion in a flammable atmosphere | Check all connections points and consider additional bonding |

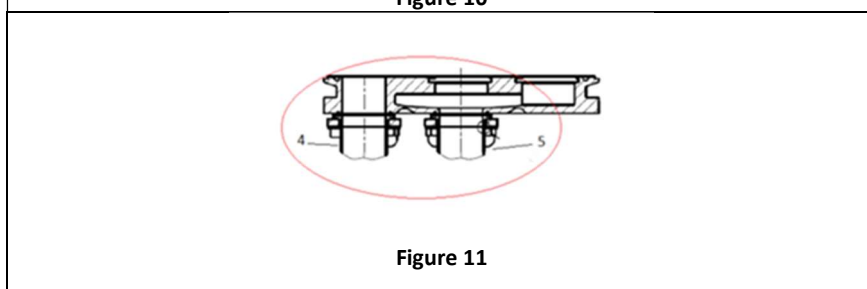
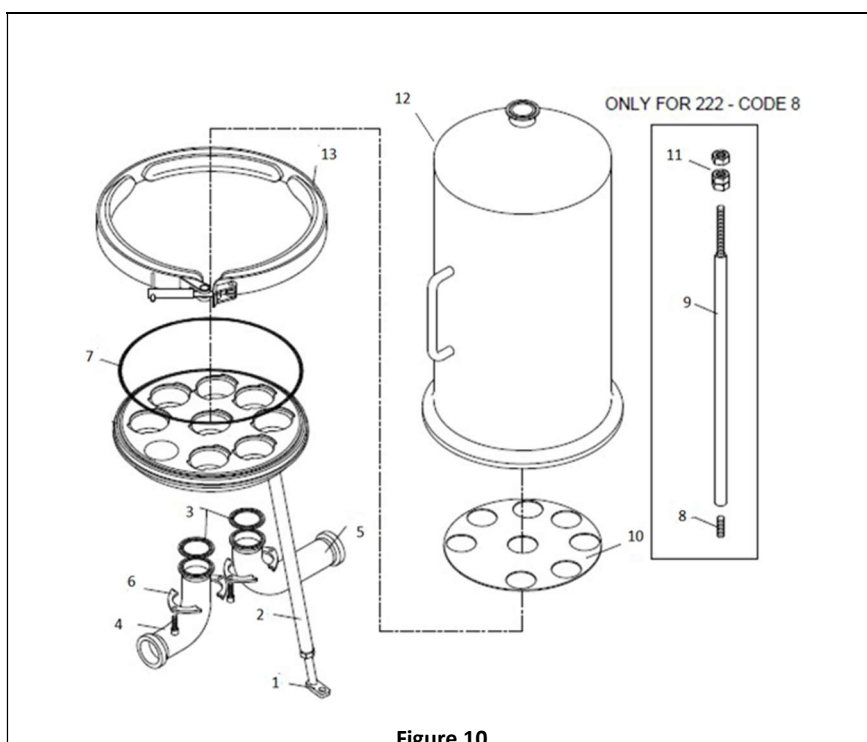
Table 11

10 Appendix

Appendix 1

PHP03/05/08 (Figure 10)Figure 10

- a) Remove the filter bowl from the head and place both parts on a suitable surface where they may not be damaged
- b) Assemble the adjustable feet to the support legs (1)
- c) Screw the support legs (2) into the locations on the under side of the head (3 x positions).
- d) Adjust the feet (1) ensuring the housing is installed level. The foot plate can also be used to bond the housing to the earthing system.
- e) Place the gasket seal (3) onto the inlet elbow (4). Ensure the correct elbow is fitted to each respective nozzle on the filter head (Figure 11Figure 11), by observing the direction arrows on each part. Rotate the nozzles to the desired position then secure to the housing head using the provided clamp and screws (6).
- f) Repeat the same process with the outlet elbow (5). When connecting to the process pipework, ensure to observe the direction of flow is in the same direction as marked on the filter housing.
- g) Locate the closure seal (7) to the o-ring groove on the housing head
- h) For housings with a 222 cartridge location, assemble the tie rod screw(s) (8) to the housing head (and fit the tie rod(s) (9).
- i) Fit the filter cartridges, referring to the filter cartridge IOMI, (see also section 6.1).
- j) Fit the cartridge compression plate (10). For 226 (C-Style) filter cartridges, the compression plate locates and secures over the cartridge fins. For 222 (D-Style) filter cartridges, secure the compression plate using the tie rod nuts (11).
- k) Replace the housing bowl (12) and secure with the closure clamp (13).



Appendix 2

PHP 12/18/24/30 (Figure 12)

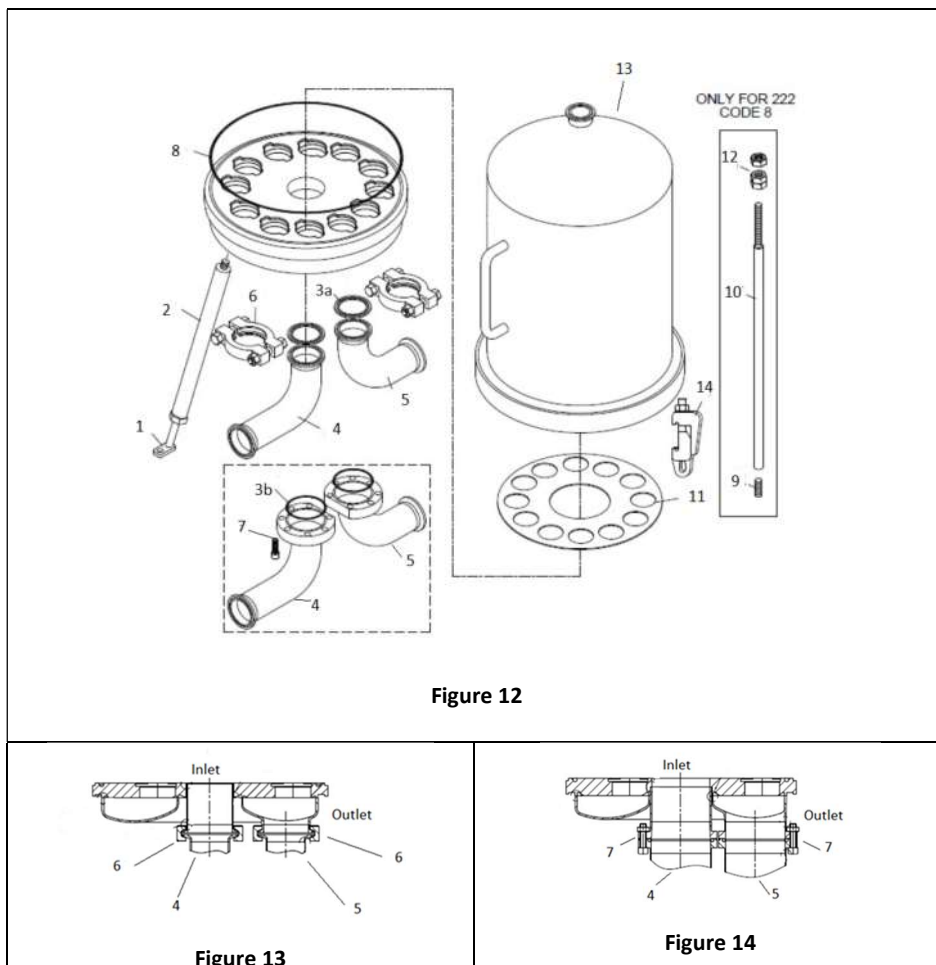
- a) Remove the filter bowl from the head and place both parts on a suitable surface where they may not be damaged
- b) Assemble the adjustable feet to the support legs (1)
- c) Screw the support legs (2) into the available locations on the under side of the head.
- d) Adjust the feet (1) ensuring the housing is installed level. The foot plate can also be used to bond the housing to the earthing system.
- e) The inlet and outlet elbows can be identified by observing the direction arrows etched onto them.

Connection sizes up to 3" / DN80 (Figure 13):

- f) Place the gasket seal (3a) onto the inlet elbow (4), rotate to the desired position and secure to the inlet nozzle on the filter housing head using the double bolt clamp (6). Repeat the same process with the outlet elbow (5).

Connection sizes of 4" / DN100 (Figure 14):

- g) Place the gasket seal (3b) onto the inlet elbow (4) and secure to the inlet nozzle on the filter housing head using the provided bolts (8).
- h) Repeat the same process with the outlet elbow (5). When connecting to the process pipework, ensure to observe the direction of flow is in the same direction as per the direction arrows that are marked on the filter housing.
- i) Locate the closure seal (8) to the o-ring groove on the housing head
- j) For housings with a 222 cartridge location, assemble the tie rod screw(s) (9) to the housing head (and fit the tie rod(s) (10).
- k) Fit the filter cartridges, referring to the filter cartridge IOMI, (see section 6.1)
- l) Fit the cartridge compression plate (11). For 226 (C-Style) filter cartridges, the compression plate locates and secures over the cartridge fins. For 222 (D-Style) filter cartridges, secure the compression plate using the tie rod nuts (12)
- m) Replace the housing bowl (13) and secure with the screw clamps (14).



Appendix 3

PHL 03/05/08 (Figure 15)

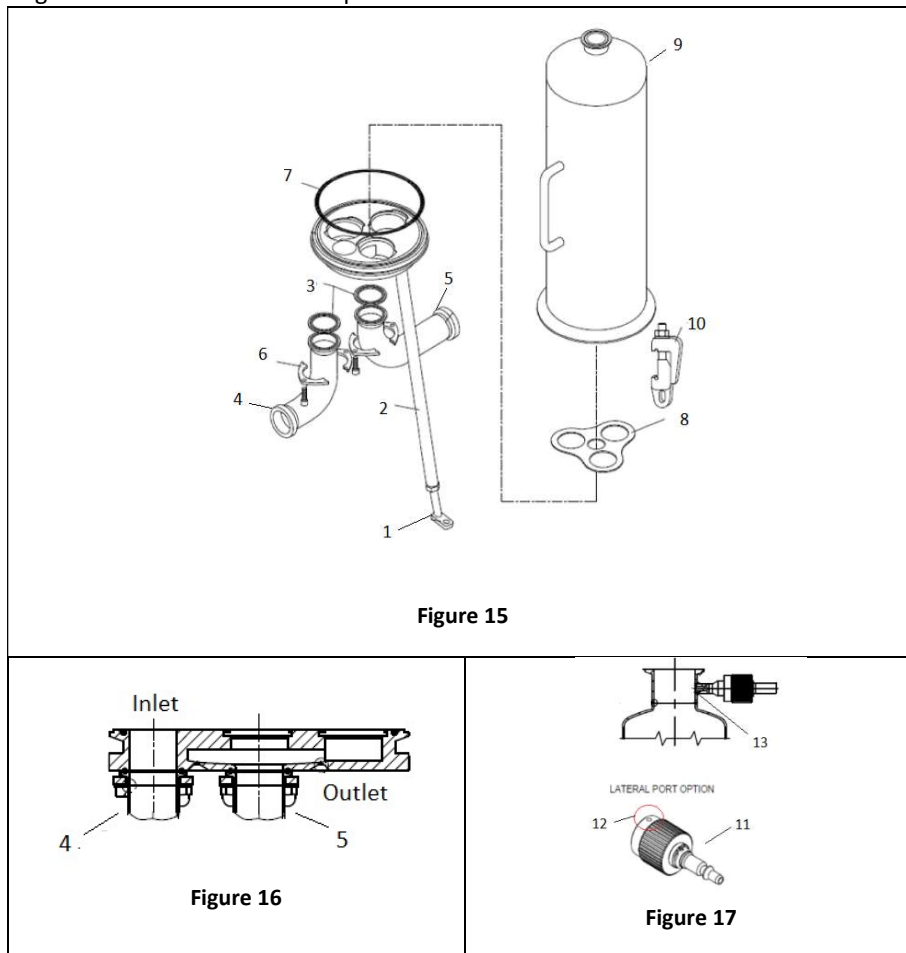
- a) Remove the filter bowl from the head and place both parts on a suitable surface where they may not be damaged
- b) Assemble the adjustable feet to the support legs (1)
- c) Screw the support legs (2) into the available locations on the under side of the head (3 positions)
- d) Adjust the feet (1) ensuring the housing is installed level. The foot plate can also be used to bond the housing to the earthing system.

Clamp, Butt Weld and DIN 11851 inlet and outlet connections⁷

- e) Place the gasket seal (3) onto the inlet elbow (4), observing the direction arrows marked. Ensure the correct elbow is fitted to each respective nozzle on the filter head (Figure 16). Rotate the nozzles to the desired position then secure to the housing head using the provided clamp and screws (6).
- f) Repeat the same process with the outlet elbow (5). When connecting to the process pipework, ensure to observe the direction of flow is in the same direction as marked on the filter housing.
- g) Locate the closure seal (7) to the o-ring groove on the housing head
- h) Fit the filter cartridges, referring to the filter cartridge IOMI, (see also section 6.1)
- i) Fit the cartridge compression plate (8). For 226 (C-Style) filter cartridges, the compression plate locates and secures over the cartridge fins.
- j) Replace the housing bowl (9) and secure with the closure screw clamp (10).

Lateral Vent Port (Figure 17):

- k) Remove the sanitary bleed valve (11) from its packaging.
- l) Loosen the grub screw (12).
- m) Manually screw the valve to the side port (13) located on the filter housing vent/pressure gauge port and tighten the grub screw to secure on the port



⁷ Flange versions: inlet and outlet elbows are welded to the filter housing head

Appendix 4

PHW03/05/08 (Figure 18)

- a) Remove the filter bowl from the head and place both parts on a suitable surface where they may not be damaged
- b) Fit the adjustable legs (1), 3 off, using the provided washer (2) and nuts (3).
- c) Adjust the feet (1) ensuring the housing is installed level. The foot plate can also be used to bond the housing to the earthing system.
- d) Install into the connecting pipework, ensuring to observe the direction of flow as marked by the arrows on the housing inlet (4) and outlet (5)
- e) Position the o-ring seal into the groove on the housing closure.

D-Style (222) cartridges:

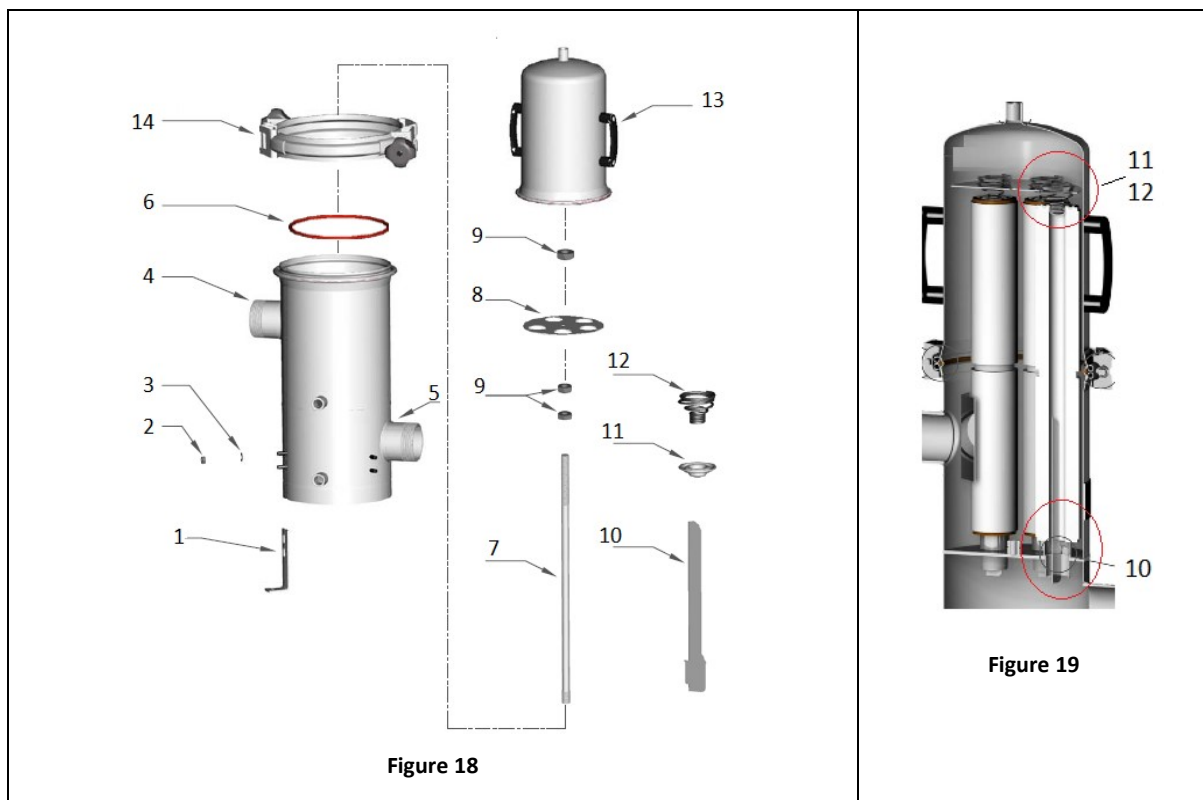
- f) Fit the tie rod (7), this screws into the cartridge plate inside the head.
- g) Fit the filter cartridges, referring to the filter cartridge IOMI, (see also section 6.1)
- h) Secure the compression plate (8) and secure using the hexagonal nuts (9) in the arrangement as shown in the diagram (Figure 19)

DOE cartridges:

- i) Fit the cartridge guides (10), secure them by pushing them into the cartridge locations (see: Figure 19)
- j) Fit the tie rod (7), this screws into the cartridge plate inside the head.
- k) Fit the filter cartridges, referring to the filter cartridge IOMI, (see also section 6.1)
- l) Fit the cartridge plugs (11), locating them into the top of the filter cartridges. Then insert the retainer springs (12) into each plug.
- m) Secure the compression plate (8) and secure using the hexagonal nuts (9) in the arrangement as shown in the diagram (Figure 19)

C-Style cartridges:

- n) Fit the filter cartridges, referring to the filter cartridge IOMI, (see also section 6.1)
- n) Secure the compression plate (8). The compression plate locates and secures over the cartridge fins.
- o) Replace the housing bowl (13) and secure using the closure clamp (14).



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