
# Breathing Air Purifier

## BAC-4015

User Guide

EN Original Language

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

Parker domnick hunter

ENGINEERING YOUR SUCCESS.

# Table of Contents

# 1 Safety Information

**Do not operate this equipment until the safety information and instructions in this user guide have been read and understood by all personnel concerned.**

**USER RESPONSIBILITY**

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 authorised 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 authorised distributors.

To the extent that Parker or its subsidiaries or authorised 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.

This equipment is safe and will not present a risk to health when properly used in accordance with this user guide. It is essential that users familiarise themselves with its contents and be fully conversant with this equipment and the correct operating procedures before use.

Breathing air equipment is by its very nature used in critical applications. It is therefore essential that only competent personnel trained, qualified, and approved by Parker Hannifin should perform installation, commissioning, service and repair procedures.

Use of the equipment in a manner not specified within this user guide may result in an unplanned release of pressure, which may cause serious personal injury or damage.

When handling, installing or operating this equipment, personnel must employ safe engineering practices and observe all related regulations, health & safety procedures, and legal requirements for safety.

Compressed air must be delivered at a comfortable temperature for breathing.

Ensure that the equipment is depressurised prior to carrying out any maintenance.

Maintenance MUST be carried out regularly to ensure optimum performance. All maintenance, filter element changes and a record of working hours usage, should be detailed in a maintenance and examination record.

Provision should be made to test the quality of delivered air. Use suitable test equipment, e.g. detection tubes and/or in-line monitoring equipment and retain the appropriate records.

Parker Hannifin can not anticipate every possible circumstance which may represent a potential hazard. The warnings in this manual cover the most known potential hazards, but by definition can not be all-inclusive. If the user employs an operating procedure, item of equipment or a method of working which is not specifically recommended by Parker Hannifin the user must ensure that the equipment will not be damaged or become hazardous to persons or property.

Should you require an extended warranty, tailored service contracts or training on this equipment, or any other equipment within the Parker Hannifin range, please contact your local Parker Hannifin office.

Details of your nearest Parker Hannifin sales office can be found at www.parker.com/dhfns

Retain this user guide for future reference.

# 2 Description

The Parker domnick hunter BAC-4015 is a fully portable pneumatically controlled air purification system designed to provide breathing quality air to a higher level than specified in EN12021 for oil mist, vapour, odour and particulate removal. The BAC-4015 will also remove carbon monoxide (CO) and reduce carbon dioxide (CO2) to fully meet EN12021 and other international specifications.

The BAC-4015 breathing air purifier utilises 5 separate stages of compressed air treatment, combined together in a compact and robust housing.

**1st Stage** - Grade AA - high efficiency coalescing filter for removal of oil/water aerosols and dirt particulate down to 0.01 micrometre, giving a maximum remaining oil content of 0.01 mg/$m^3$.

**2nd Stage** - Grade AC - adsorption bed of activated carbon for removal of oil vapours and odours. The downstream air after this stage now has a maximum remaining oil content of 0.003 mg/$m^3$ at a filtration temperature of 21°C.

**3rd Stage** - Adsorption Purifier regenerative adsorption bed of desiccant for removing water vapour and also reducing the CO2 content prior to the catalyst stage. The desiccant purifier maintains a low dewpoint by utilising the heatless pressure swing adsorption principle. Cycle time is controlled by a pneumatic cam timer.

**4th Stage** - Grade HC - catalytic element for removal of carbon monoxide by oxidation to carbon dioxide through chemisorption and catalysis. The catalyst is kept active by maintaining a low dewpoint prior to the catalytic bed. This is achieved by the integral adsorption purifier (stage 3).

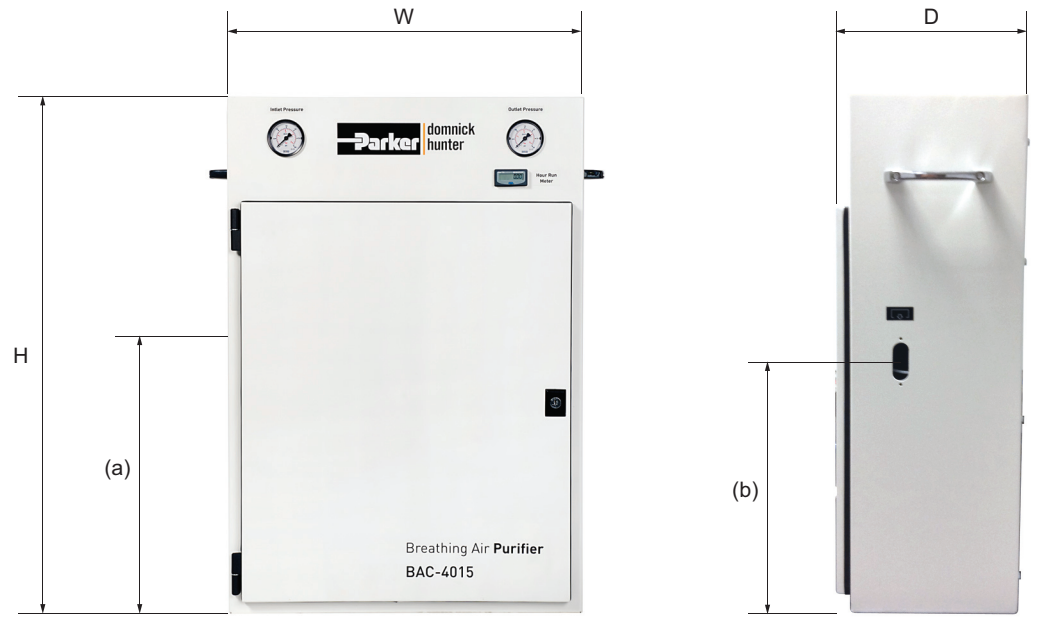
**5th Stage** - Grade AA - high efficiency coalescing filter for removal of oil/water aerosols and dirt particulate down to 0.01 micrometre, giving a maximum remaining oil content of 0.01 mg/$m^3$.

These air purification stages are installed in an epoxy painted steel cabinet with lifting handles and a lockable door. Inlet and outlet pressure gauges are mounted on the upper facia panel. The outlet pressure can be set as desired using the pressure regulator.

## 2.1 Technical Specification

| BAC-4015 | | |
|---|---|---|
| **Connections** | Inlet | G 1/2 BSPP female |
| | Outlet | G 1/4 BSPP female (x3) |
| **Maximum Inlet Flow Rate** | | 11 L/sec @ 7 bar g (23 scfm @ 102 psi g) |
| **Maximum Outlet Flow Rate** | | 9 L/sec @ 7 bar g (18 scfm @102 psi g) |
| **Maximum Inlet Pressure** | | 10 bar g (145 psi g) |
| **Minimum Inlet Pressure** | | 4 bar g (58 psi g) |
| **Maximum Operating Temperature** | | 30°C (86°F) |
| **Minimum Operating Temperature** | | 1.5°C (35°F) |

## 2.2 Weights and Dimensions




| BAC-4015 | |
|---|---|
| **H** | 752mm (29.6”) |
| **W** | 515mm (20.3”) |
| **D** | 272mm (10.7”) |
| **(a)** | 430mm (16.9”) |
| **(b)** | 394mm (15.5”) |
| **Weight** | 40Kgs (88.2lbs) |

## 2.3 Receiving and Inspecting the Equipment

The equipment is supplied in a sturdy wooden crate designed to be moved using a forklift truck or pallet truck. On delivery of the equipment check the crate and its contents for damage.

If there are any signs of damage to the crate, or there are any parts missing please inform the delivery company immediately and contact your local Parker domnick hunter office.

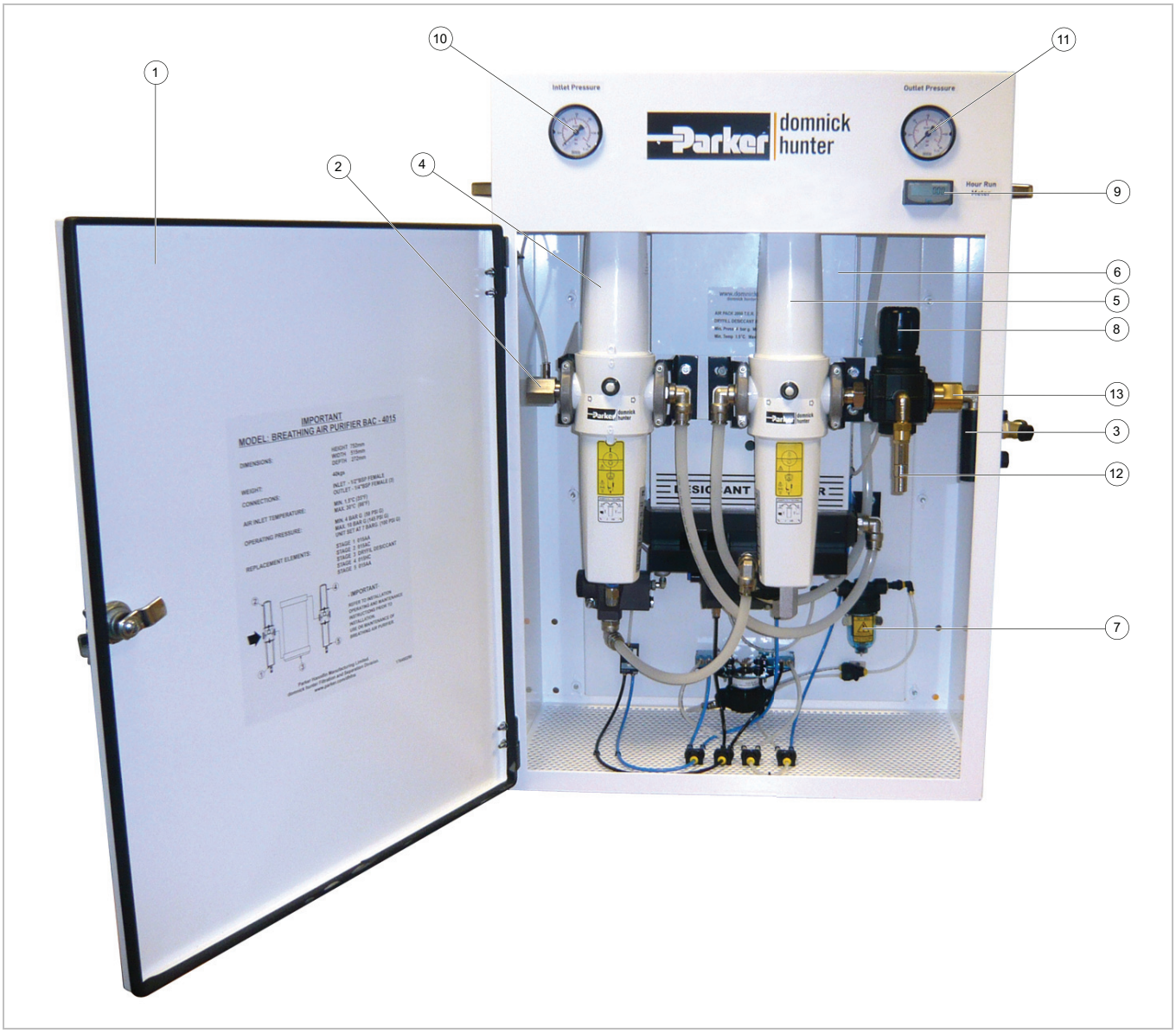
### 2.3.1 Unpacking the Equipment

The panels of the crate are secured using nails. Starting with the top, carefully remove each panel in turn and store them safely for future use.

### 2.3.2 Lifting and handling

Lifting handles have been provided on the equipment, however to lift the equipment safely it is suggested that this is to be done by two people.

## 2.4 Overview of the Equipment




| Ref | Description | Ref | Description |
|---|---|---|---|
| 1 | BAC-4015 Lockable door c/w keys | 8 | G 3/8 Regulator |
| 2 | Inlet adaptor | 9 | Hours Run Meter |
| 3 | Outlet manifold | 10 | Inlet pressure gauge |
| 4 | AC Grade filter | 11 | Outlet pressure gauge |
| 5 | HC Grade filter | 12 | Audible warning device |
| 6 | AIR PACK 2000 Dryer | 13 | Flow limiting orifice |
| 7 | AA0003G Filter | | |

# 3 Connecting and Operating the Equipment


**Only competent personnel trained, qualified, and approved by Parker domnick hunter should perform installation, commissioning, service and repair procedures.**

## 3.1 General Installation Requirements

Before the BAC-4015 is installed, the piping should be purged with clean dry air to remove any loose debris and/or water from the line. Downstream piping must be of a type approved and specified for breathing air applications.

Inlet connection to the BAC-4015 is made by a G1/2 BSPP internally threaded pipe connection to IS0228 (BSPP) for use with parallel or taper fittings. The three outlet connections are G1/4 BSPP internally threaded to IS0228 (BSPP) for use with parallel fittings.

The BAC-4015 must be operated in a vertical position and must not be situated where it is able to tilt or be dislodged from its operating position.

The BAC-4015 has a weatherproof cabinet (NOT WATERPROOF) with a rubber edging strip around the door. During operation, the door must be in the closed and locked position and should only be opened for maintenance/filter element changes or operation of the pressure regulator by authorised personnel.

The BAC-4015 must only be used in the direction of flow indicated on the cabinet. No attempt should be made to remove the filters from the cabinet or loosen any of the retaining bolts which could cause malfunction of the purifier.

Ensure that all connections to the equipment are secure and that compressed air of the correct pressure and flow rate is available to the purifier.

If the line pressure exceeds 10 bar g (145 psi g), install a suitable pressure regulator (not supplied). First ensure that the purifiers outlet pressure regulator is closed. Carefully open inlet valve or regulator. This action ensures that down stream equipment cannot be subjected to excessive pressure.

Ensure that the BAC-4015 is securely sited and all air supply lines are safely positioned and not susceptible to damage or constriction.

Air can be supplied from most suitably rated compressors, although care should be taken to ensure that the compressor is operating efficiently and not overheating. Care should also be taken in the location of the compressor intake to ensure that no harmful contaminants are drawn in.

For heavily contaminated compressed air systems a water separator is recommended which will reduce liquid water and oil.

Under normal circumstances, it is not usual to encounter CO concentrations in excessive levels. If detected then the purifier must not be used.

Provision for air sampling should be made to prove the quality of delivered air using a certified testing agency.

All ancillary equipment such as piping, connections, valves, fittings etc. must be suitable for breathing air purposes, and for the pressure and flow capacities involved.

## 3.2 Operating the Equipment

This equipment must be fully checked before every use and any faults MUST be rectified immediately.

To open the BAC-4015 outlet pressure regulator (supplied) and adjust the line pressure, lift locking ring to unlock; turning clockwise to increase secondary pressure, or anticlockwise to decrease pressure. It is recommended that adjustments are made under flow conditions.
**Note: there may be a slight increase in set pressure when flow demand stops until the desired conditions are achieved for the operators breathing equipment**.

Push down locking ring to re-lock. Do not exceed the rated flow - refer to “Technical Specification” on page 3
A limiting orifice is fitted after the outlet pressure regulator to prevent the rated flow from being exceeded.

When the operating condition has been achieved, the breathing air purifier will operate automatically without further adjustments providing that the inlet supply remains stable within the specified limits.

When air demand is no longer required the inlet valve regulator (not supplied) must be closed and the BAC-4015 isolated from use.

Any disconnection of the purifier must only be made when the system pressure is fully relieved.

## 3.3 Safety Features

The following safety features are incorporated as standard in the BAC-4015 and must not be disconnected, removed, or bypassed in any manner.

### 3.3.1 Audible warning of system failure

If the BAC-4015 is depressurised without the operator's knowledge (e.g. compressor failure or system pressure loss), a warning whistle will sound when the pressure drops to below 4 bar g (58 psi g) (minimum operating pressure).

Warning

**The fault must be identified and rectified before the equipment is used again.**

### 3.3.2 Flow limiting orifice

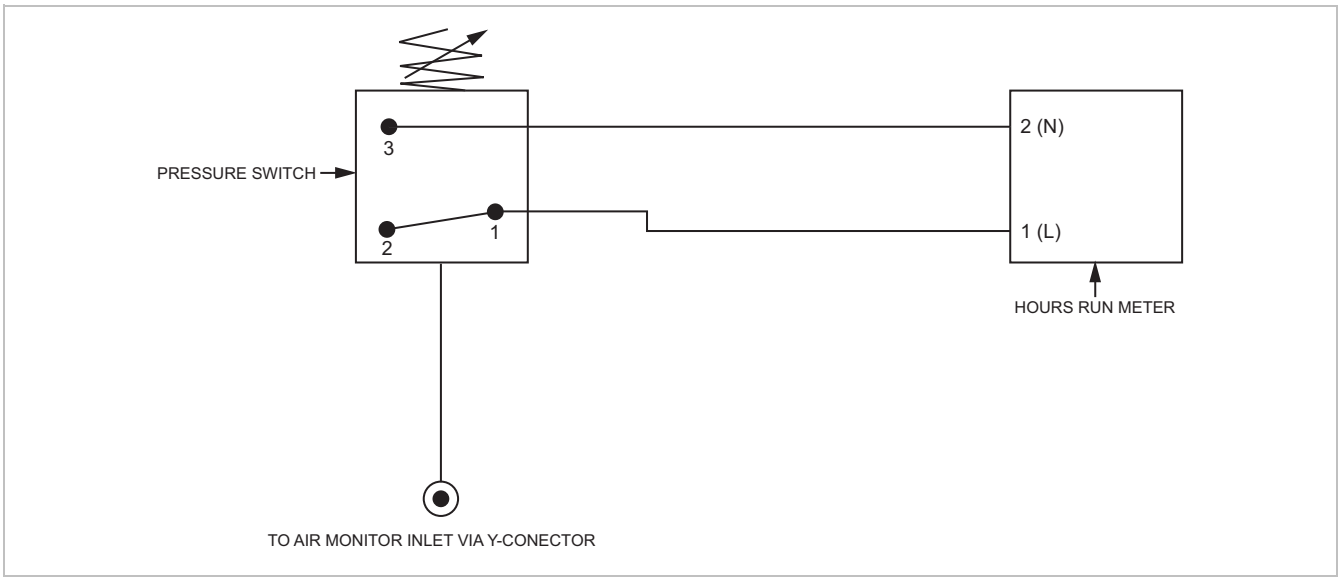
This device limits the outlet flow rate proportionally to the line pressure thus ensuring that the volumetric air flow rate of the BAC-4015 is not exceeded. The flow limiting orifice is located immediately after the outlet pressure regulator.

### 3.3.3 Hours run meter

The meter gives a visual indication of the operating hours of the BAC-4015.

When pressure to the purifier is established an internal pressure switch closes, operating the meter. The decimal point on the display blinks when the meter is working. When pressure is removed from the Breathing Air Purifier the meter stops (see ‘Hours Run Meter Schematic’).

The hours run meter is battery operated with an expected 10 year life (not guaranteed). A knock out panel is provided on the facia of the cabinet to accept the meter. An internal rail is also located behind this panel to house the pressure switch. Air supply to this pressure switch should be taken from the cam timer motor inlet via a ‘Y’ connector (not supplied).



# 4 Preventative Maintenance Kits

## 4.1 Service Intervals

| Description of Service Required | | Service recommended every: | | | |
|---|---|---|---|---|---|
| **Component** | **Operation** | **Week** | **Monthly** | **3-month** | **12-month** |
| **Complete Assembly** | Check for air leaks. | ✓ | | | |
| **Filtration** | Check the pressure gauges during purging for excessive back pressure. | | | ✓ | |
| **Filtration** | Replace the adsorption filter elements - Activated Carbon (1) **Recommended Service** | **See Note (1)** | | | |
| | | | ✓ | | 🔧 |
| **Filtration** | Replace the adsorption filter elements - Hopcolite (2) **Recommended Service** | **See Note (2)** | | | |
| | | | ✓ | | 🔧 |
| **Filtration** | Replace the coalescing filter elements and automatic drains **Recommended Service** | | | | 🔧 |

***(1) Unlike oil aerosol removal filters which are changed annually to guarantee compressed air quality, the lifetime of an oil vapour removal filter can be attributed to various factors and require more frequent changes. Factors affecting the lifetime of adsorption filters are:***
***Oil vapour concentration -*** *The higher the inlet concentration of oil vapour, the faster the activated carbon capacity will expire.*
***Bulk oil*** *- Adsorption filters are designed to remove oil vapour and odours, not liquid oil or aerosols. Poorly maintained or non-existent pre-filtration will cause the OVR filter capacity to quickly expire.*
***Temperature*** *- Oil vapour content increases exponentially to inlet temperature, reducing element life. Additionally, as temperature increases, the adsorption capacity decreases, again reducing element life.*
***Relative Humidity or Dewpoint -*** *Wet air reduces the adsorptive capacity of the carbon.*
***Compressor oil changes*** *- When compressor oil is changed, the new lubricant burns off "light ends" which increases the oil vapour content for hours or even weeks afterwards. This increase in oil vapour content is adsorbed by the OVR filter, significantly reducing its adsorptive life.*
***ACS / AC Element performance is based upon a maximum oil vapour inlet concentration of 0.018mg/m$^3$, with compressed air at 21$^o$c and a pressure dewpoint of -40$^o$c PDP.***
***These elements should be replaced upon detection of vapour, odour or taste.***

***(2) Under normal operating conditions the HC cartridge should be replaced every 12 months. If an oil vapour incident occurs then we recommend that the AC and HC stages are replaced at the same time***

**Key:**

| | | | |
|---|---|---|---|
| ✓ | Check | 🔧 | Replace |

# Preventative Maintenance Kits

## Recommended upon detection of vapour, odour or taste - Maximum of 12 months

| Description | Catalogue No. | Contents | Order Qty |
|---|---|---|---|
| **015AC** | 015AC | AC cartridge | 1 |
| **015HC** | 015HC | HC cartridge | 1 |

## Recommended every 12 months

| Description | Catalogue No. | Contents | Order Qty |
|---|---|---|---|
| **Exhaust Silencer** | 608200337 | 1/2" Silencers | 1 |

***Note. One kit is required for each dryer.***

| Description | Catalogue No. | Contents | Order Qty |
|---|---|---|---|
| **015AA** | 015AA | AA element | 2 |
| **K003AA** | K003AA | AA element | 1 |

| Description | Catalogue No. | Contents | Order Qty |
|---|---|---|---|
| **EF1 Auto Drain Kit** | 601181060 | Auto drain | 2 |

## Recommended every 36 months

| Description | Catalogue Number | Contents |
|---|---|---|
| Kit: Valve Overhaul | 608233690 | Inlet Valve Kit (Catalogue No.608233671)<br>Outlet Valve Kit (Catalogue No.608233674)<br>Exhaust Valve Kit (Catalogue No.608233677)<br>Control Valve Kit (Catalogue No.608233680) |

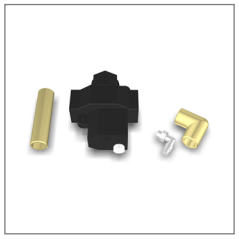
***Inlet Valve Kit***

| Description | Catalogue Number | Contents |
|---|---|---|
| Kit: Inlet Valve | 608233671 | ISO 2 Control Valve<br>Fixing screws |

***Outlet Valve Kit***

| Description | Catalogue Number | Contents |
|---|---|---|
| Kit: Outlet Valve | 608233674 | Check valves<br>Valve seats and guides<br>Circlips<br>Associated seals |

***Exhaust Valve Kit***

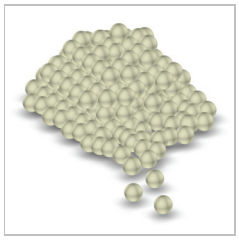


| Description | Catalogue Number | Contents |
|---|---|---|
| Kit: Exhaust Valve DM012 - 040 | 608233677 | 2/2 Isolator valve<br>Exhaust barrel nipple<br>90$^{o}$ elbow<br>1/8" - 4mm swivel elbow |

***Control Valve Kit***

| Description | Catalogue Number | Contents |
|---|---|---|
| Kit: Control Valve DM012 - 080 | 608233680 | Pilot Valves<br>Fixing screws |

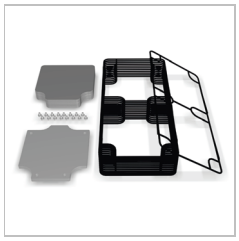
**Desiccant**



| Description | Catalogue Number | Contents |
|---|---|---|
| Kit: Desiccant AA | 608203661 | 11 Litre Container of AA |

***Note. Ensure that the dryer is filled using a Snowstorm filler and replace the column seals.***

**Column Seal Kits**



| Description | Catalogue Number | Contents |
|---|---|---|
| Kit: Column Seals MIDI | 608203733 | Moulded gaskets<br>Support screens<br>Column pads<br>Fixing screws |

***Note. One kit is required for each dryer.***

**Snowstorm Filler**

| Description | Catalogue Number | Contents |
|---|---|---|
| Snowstorm Filler | 608200622 | Maxi / Midi Snowstorm Filler |

## Replacing the Elements

**Warning**

**Ensure that the filter is isolated from the compressed air system and fully depressurised prior to carrying out any maintenance procedures which are to be done by qualified, trained authorised personnel only.**

**1** Unscrew the filter bowls (1) and remove the used elements (2).

**Note. We recommend the use of gloves when touching contaminated elements.**

**2** Unscrew the automatic drain (3) and fit the replacement. Tighten the drain to 2.5Nm.

**3** Replace the O-rings (4) located in the filter head with the new O-rings provided.

**Caution**

**Ensure to lubricate the O-ring and threads with a suitable acid free petroleum jelly.**

**4** Insert the new elements into the filter bowls ensuring that the lugs are seated correctly in the grooves.

**5** Refit the filter bowls and heads ensuring that the threads are fully engaged and the locking details are aligned.

**6** Note: To ensure that the bowl is fully engaged into the head, the 010-030 bowl requires 360$^{o}$ of rotation until the thread stop.

**7** Attach the element change date label to the filter bowl and write on the date the element is to be replaced. i.e 12 months after element change.

**Note. Do not use solvents or alcohol to clean the labels as this could cause damage.**

**8** Slowly open the upstream valves to pressurise the filter, followed by the downstream valves to pressurise the system.

**9** Discard used items in accordance with local regulations.

**10** Repeat these procedures for all filters.

**11** Re pressurise the unit.

**Warning**

**Do not open the valves rapidly, or subject the filter to excessive pressure differential, as damage may occur.**


**Image shows a coalescing filter with an automatic drain**

**The adsorption fIlter is fitted with a manual drain and does not require changing.**

## ELEMENTS

Parker filters are designed to produce clean compressed air, gas and liquid to the highest industry standards. To maintain impeccable results, Elements within the filter must be replaced annually.

Choosing the Parker brand means you can be assured that Elements are readily available, affordable and the most energy efficient product of its kind on the market. The elements are also supplied in 100% recyclable packaging. An additional advantage of purchasing Parker Elements is that you will reduce your company's carbon footprint by 190kg. This is the equivalent of a 700 mile flight from Edinburgh to Berlin!
Parker Filter Elements also prove to be highly efficient when used in any leading competitor's filters.

## PARTS

Parker Kits make everyday maintenance easy. They are available for all of our products and are simply value-for money. The Parts within the kits support our customers' varied maintenance, repair and overhaul activities.

Additionally, Preventative Maintenance Kits can be purchased for dryers and gas generators. These kits mean our customers dryer's and generator's can be serviced easily to ensure optimum performance.
An extensive range of durable Parker Parts can be obtained within 24 hours to any European, Middle East or African destination.

## SPECIALISED SERVICES

Parker Specialist Service Engineers test on-site efficiency measuring many variables including airflow, pressure, temperature, dewpoint and power consumption.

Our team of highly trained experts are the best in the industry. They take into account a range of environmental factors that could affect your system's performance. The results from this Specialist Service are extremely accurate and produce invaluable information.
Importantly, Parker informed recommendations lead to significant savings for our customers, which mean they return time and time again for our advice and products.

## M.R.O

Maintenance Repair & Overhaul - Parker Technicians are the industry's finest. Their skills and qualifications are annually approved to keep their product and legislation knowledge fresh and expertise relevant.

With this in mind, Parker offers onsite and on demand servicing to meet customers' unique requirements in a timely and efficient manner.

Parker MRO service ranges from a basic maintenance check covered under product warranty right through to a comprehensive programme, which even puts the onsite application under the microscope.

With customers at the heart of everything Parker does, the MRO service is no exception to this.
Parker Filter Elements also prove to be highly efficient when used in any leading competitor's filters

## SUPPORT SERVICES

Parker Support Services are the first port of call for customers in need of help or guidance.

The fact that this team is responsible for the production of User Guides and Manuals gives you an insight into the level and detail of their parts and product knowledge.

Over-the-phone support is just one way in which Parker's extremely knowledgeable team, quickly reduces downtime or resolves product queries.

On some occasions engineers need to be on site to carry out a repair. In these cases, the local engineer will be quickly dispatched to ensure our customers can return to production as soon as possible.
One-to-one training can also be provided by our Support Services team. This has enabled hundreds of Parker distributors to gain an in-depth understanding. Training will also ensure distributors can make timely repairs and easily maintain their customers' products.

## Declaration of Conformity EN

**Parker Hannifin Manufacturing Limited, domnick hunter Filtration and Separation**
Dukesway, TVTE, Gateshead, Tyne & Wear, NE11 0PZ. UK

**Breathing Air Purifier**
**BAC-4015**

| | |
|---|---|
| **Directives** | 97/23/EC |
| **Standards used** | Generally in accordance with ASMEVIII Div 1 : 2004. |
| **PED Assessment Route :** | N/A |
| **EC Type-examination Certificate:** | |
| **Notified body for PED:** | N/A |
| **Authorised Representative** | Derek Bankier<br>Divisional Quality Manager<br>Parker Hannifin Manufacturing Limited, dhFNS |

**Declaration**

I declare that as the authorised representative, the above information in relation to the supply / manufacture of this product, is in conformity with the standards and other related documents following the provisions of the above Directives.

**Signature**:  **Date**: 011/2013

**Declaration Number**: 00268/ 011/2013

# NOTES

# NOTES

# NOTES

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