
ASY-181 Compressed Air Kit

Installation and Operator Manual V1.0



Contents	
Overview and Requirements.....	2
Compressed Air Requirements.....	6
Regulated Filter Assembly Specification.....	7
Installation of the Compressed Air Kit.....	8
Warnings	8
Assembling the Flow Restrictor.....	8
Mounting the Regulated Filter Assembly.....	9
Installing the Tubing	10
Operation of the Air-Purge System	12
Warnings	12
Setting the Pressure.....	12
Maintenance	13
Warnings	13
Revision Control.....	16

Overview and Requirements

The DSL range of stack monitors use optical techniques to make dust/opacity measurements. Each measurement head therefore has an optical surface exposed to the dirty and potentially harmful environment of the stack interior. In order to protect the optical surfaces from contamination by particle depositions and the damaging effects of heat and/or corrosive stack gas, it is necessary to employ an air-purge system to repel the stack gas and prevent it from coming into contact with the heads.

The air-purge system achieves this by producing a flow of clean and dry air flowing away from the head and into the stack. This air-flow provides a clean air barrier between the optics and the stack gas. More information about the use of purge air can be found in the DSL technical report “Air Supply for Optical Stack Monitor Purge Systems”.

Compressed air can be used as the source of purge air, a typical system to supply purge air to two optical head is illustrated below.

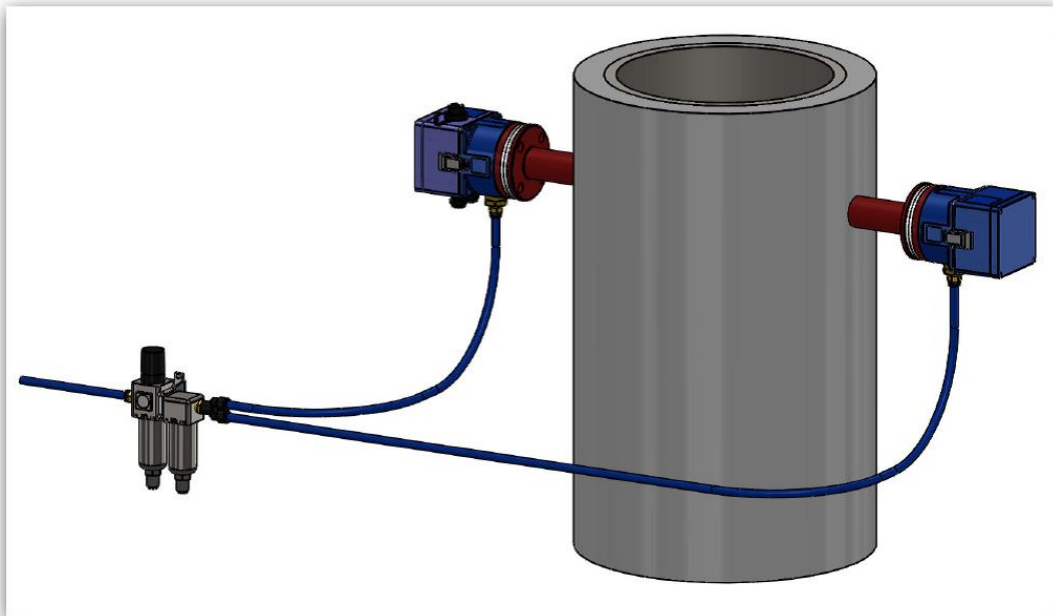


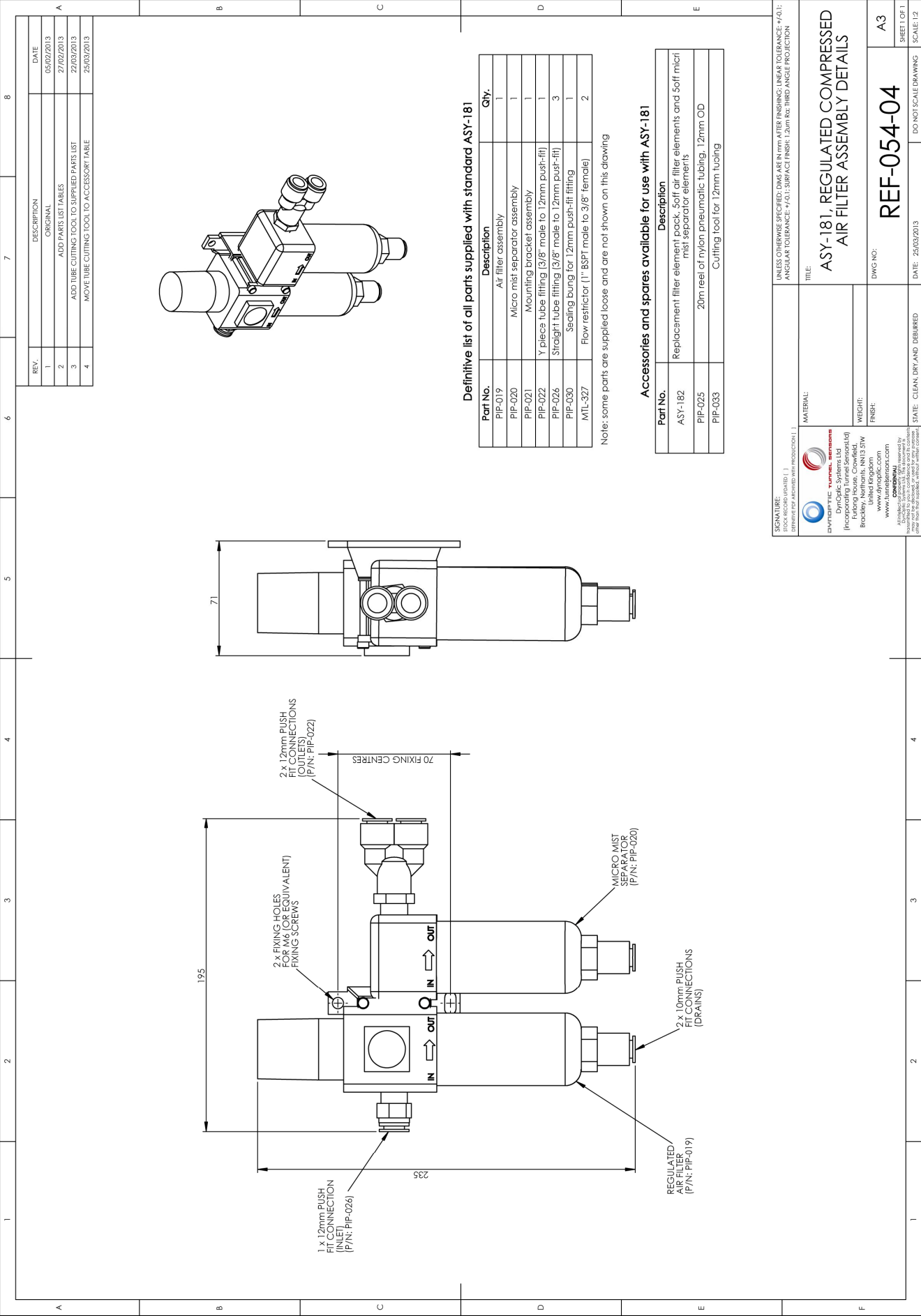
Figure 1: DynOptic stack mounted monitor, with two air-purge bodies, fed by compressed air

The complete compressed air purge system comprises the following:

- **Source of Compressed Air** provided by the site with sufficient pressure (>5 bar) and capacity (>200 litres/min) for the air-purge application.
- **Air-purge bodies** mounted between the optical head and the flange which serve to duct the purge air over the optical surfaces and into the stack (provided with the instrument).
- **Flow restrictor** at each air-purge body to control the air flow from the high pressure compressed air (supplied with compressed air kit).
- **Regulated filter assembly** to control the pressure and clean the compressed air going into the air-purge bodies (supplied with compressed air kit).
- **Tubing** necessary to connect from the output of the regulated filter to the flow restrictor at the head (available as an accessory).

The following drawing shows the critical dimensions of the regulated filter assembly, it also provides a list of all the parts supplied with the standard compressed air kit and a list of accessories and spares.

ASY-181 Compressed Air Kit - Installation and Operator Manual



The air-purge bodies have a 1" BSPT threaded inlet port to provide a large bore entry for the required high volume supply of clean dry air. When used with compressed air this inlet port must have a DSL flow restrictor inserted, as illustrated below.

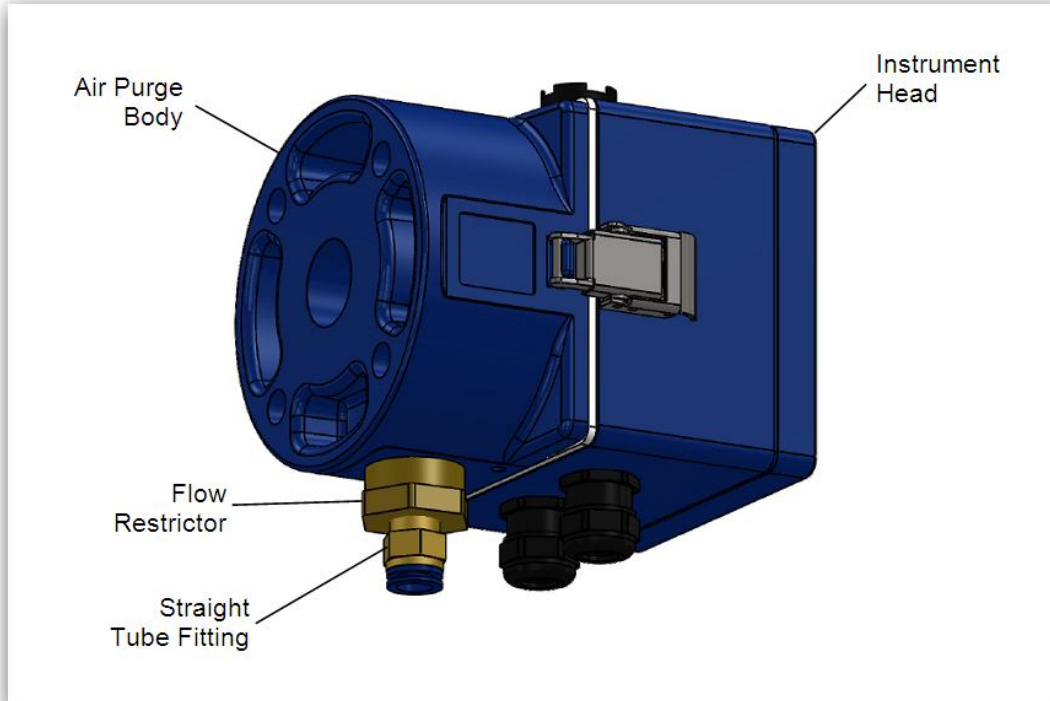


Figure 2: Air-purge body

It is essential that the supply of purge air to the purge body is clean, dry and free from oil. When compressed air is used it must be dry and filtered with a suitable 5µm particulate filter followed by an oil mist filter (0.01µm). This filtering is provided by the regulated filter assembly.

The supply of compressed air must be sufficient to provide air to each purge body with a volumetric flow rate in the range 50 to 200 litres/min. This flow is controlled by the flow restrictor and by regulating the pressure of the compressed air to the range of 3 to 5 bar (44 to 73 psi).

Most stacks are negative pressure and will have a natural “draft” drawing air into the stack. But some stacks can be positive pressure, or may have periods of positive pressure during certain conditions. In these circumstances the pressure of the air supply into the flow restrictor will need to be higher in order to provide sufficient pressure to overcome the maximum possible positive pressure that may be experienced in the stack and still provide the required air flow.

A single compressed air system can be used to supply two heads of a standard DSL Opacity/Dust Monitor by using the Y-splitter tube connector fitted on the outlet of the regulated filter. Under this condition the source of compressed air and the filter system must be capable of operating with flow

rates of 100 to 400 litres/min. If the application is for only one head then the supplied 12mm plug should be inserted in the unused output of the Y-splitter as shown below.

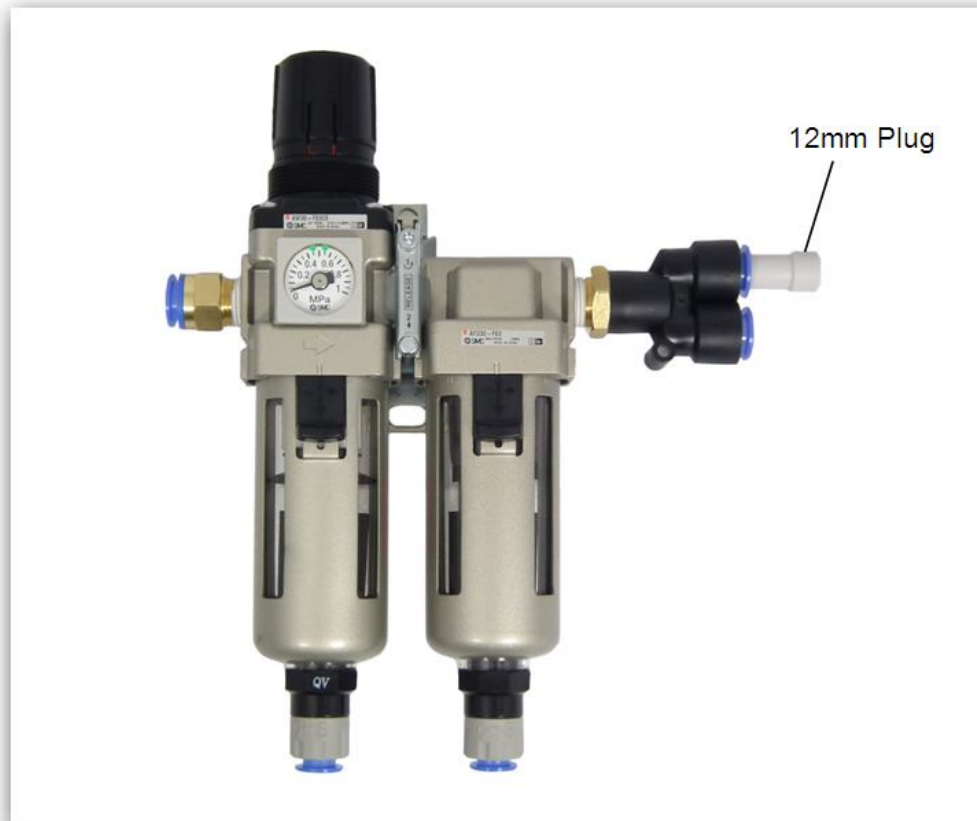


Figure 3: Regulated filter assembly (ASY-180)

Compressed Air Requirements

The compressed air used for the air purge supply will be provided by the site. To operate correctly with the DSL equipment it must meet the following requirements.

Parameter	
Pressure Range	5 to 10 bar (70 to 140 psi)
Capacity	>100 litres/min (single head supply) >200 litres/min (dual head supply)

Table 1: Compressed Air Requirements

Regulated Filter Assembly Specification

The purpose of the regulated filter assembly is to remove particulates and oil mist from the compressed air and to control its pressure. The basic performance is summarised in the table below.

Parameter	
Maximum Inlet Pressure	10 bar 140 psi 1.0 MPa
Regulator Display Pressure	Mpa
Regulated Range	0.5 to 8.5 bar 0.05 to 0.85 MPa
Nominal Operating Pressure	3 to 5 bar
Maximum Air Flow	240 litres / min
Particulate Filter	5µm (auto drain)
Oil Mist Filter	0.01µm (auto drain)
Input Connector	12mm OD, Push Fit
Output Connectors	12mm OD, Push Fit, Y-splitter
Auto Drain Connectors	10mm OD, Push Fit
Weight	0.5 kg

Table 2: Basic performance of the regulated filter assembly (ASY-180)

Installation of the Compressed Air Kit

Warnings

Warning: All aspects of the installation should be carried out by suitably qualified engineers with experience working with compressed air systems.

Warning: The source of compressed air must be turned off and all components must be under atmospheric pressure when any work is being performed on the system.

Assembling the Flow Restrictor

The assembly of the flow restrictor and straight tube fitting into a purge body is illustrated in the following drawing.

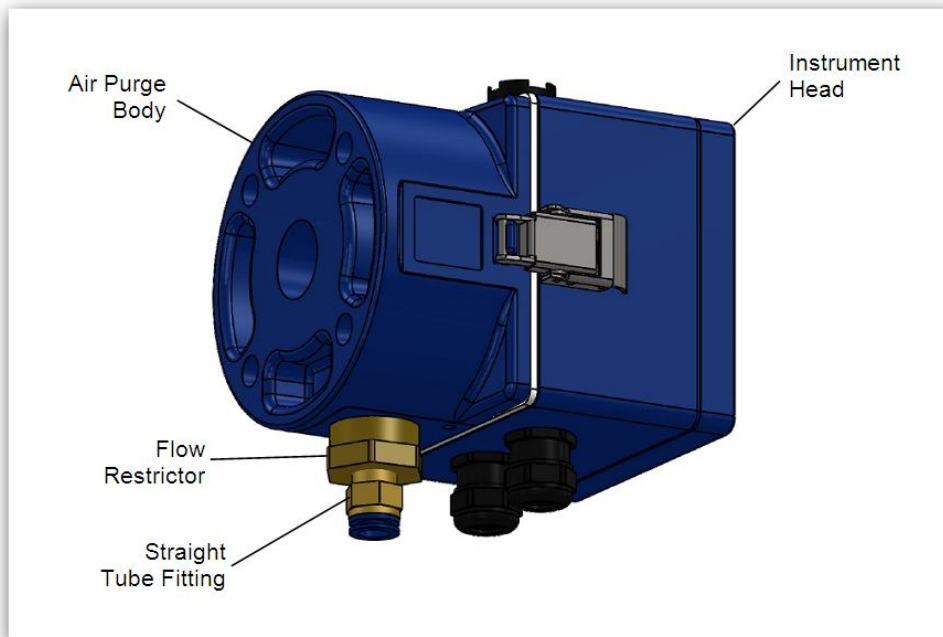


Figure 4: Air-purge body with flow restrictor

The flow restrictor is a brass component with a male 1" BSPT thread on one end and a female 3/8" BSP thread on the other. This needs to be screwed into the female 1" BSPT inlet port on the purge body. Do not over tighten the assembly as this can damage the threads.

The straight tube fitting has a female 3/8" BSP thread with thread lock. This needs to be screwed into the flow restrictor. Do not over tighten the assembly as this can damage the threads.

Mounting the Regulated Filter Assembly

The regulated filter assembly must be fixed vertically to a wall so that the bowls can fill up with any fluid (water or oil) removed from the compressed air. These bowls will automatically drain out of the bottom when full. The assembly must be located where this drainage will not cause any issues. Alternatively the drained fluid can be piped away using 10mm OD tubing attached to the push fit connectors at the bottom of each bowl.

The regulated filter assembly is mounted using two fixing holes, suitable for M6 screws and separated by 70mm.

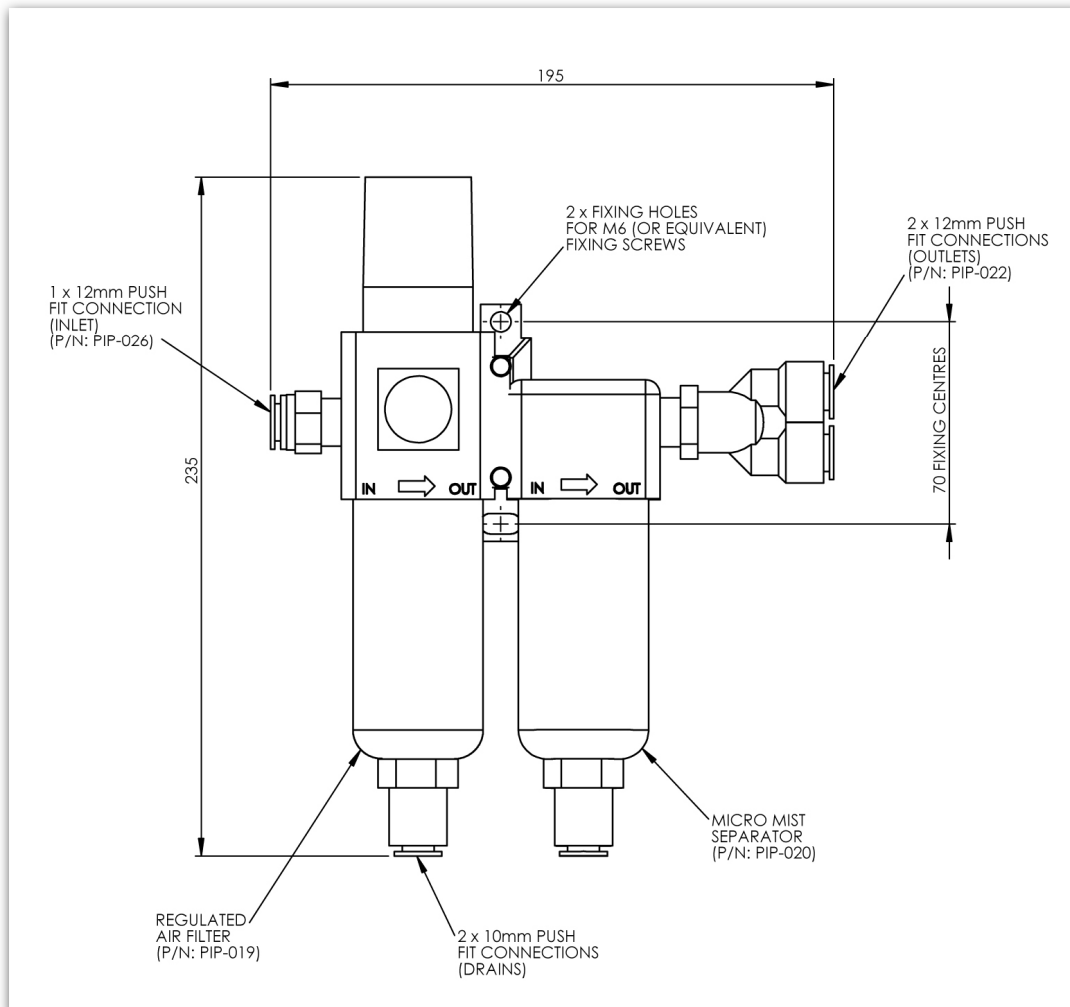


Figure 5: Filter assembly diagram

Installing the Tubing

As standard the compressed air components (regulated filter and flow restrictor) use 12mm push-fit connections. If alternative connectors are required the push-fit connections can be removed and the threaded connections are all female 3/8" BSP.

The push fit connectors require the use of 12mm OD semi flexible tubing (e.g. nylon or hard polyurethane). DynOptic Systems can supply a 20m length of nylon tubing as an optional extra (PIP-025). In order to make a good seal with the push-fit connectors the end of the tubing must be square, clean and free from burrs. It is strongly recommended that a tube cutter is used to cut the ends of the tube before insertion into the connectors. Push the end of the tube into the push-fit connector until it is securely fixed.

An illustration of the tubing assembled to the regulated filter assembly, feeding two purge bodies, is shown below.

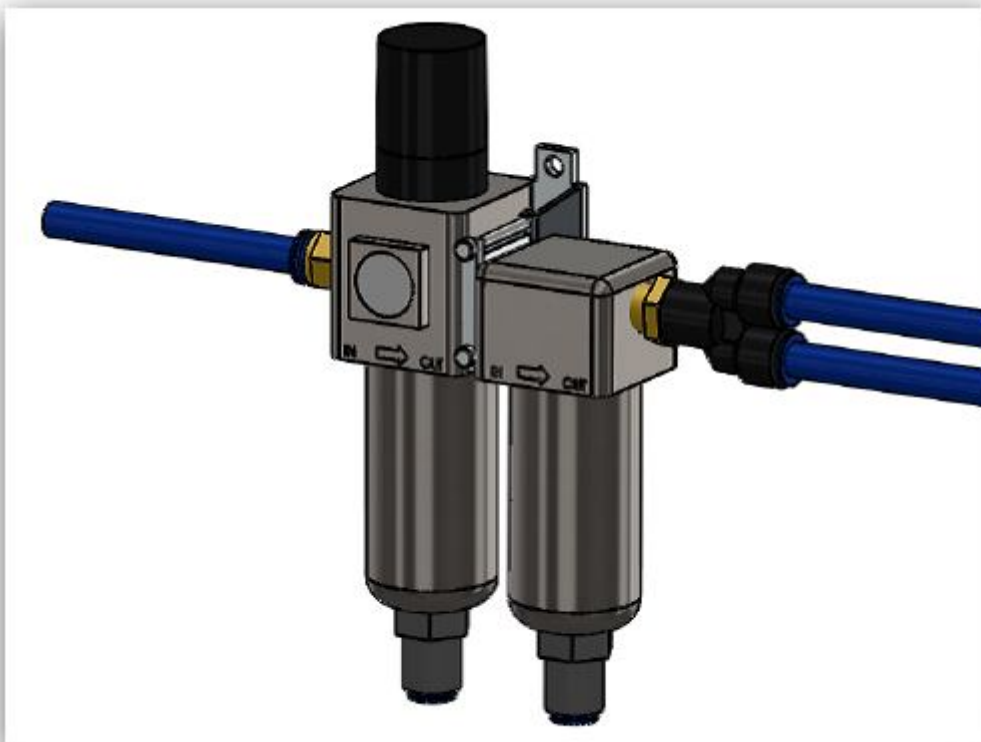


Figure 6: Illustration of filter assembly feeding two purge bodies

If the compressed air assembly is being used to provide air to only one purge-body then the unused port of the outlet Y-splitter must be plugged with the supplied sealing bung, as illustrated below.

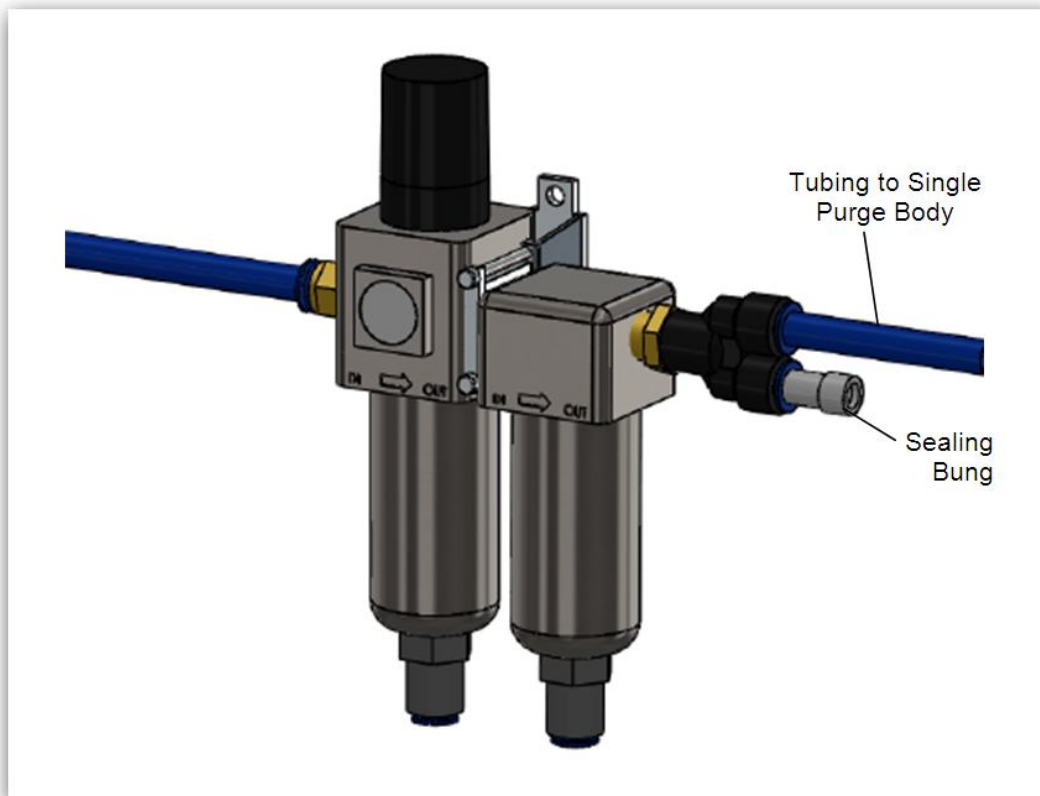


Figure 7: Illustration of filter assembly feeding one purge body

Operation of the Air-Purge System

Warnings

Warning: The source of compressed air must be turned off and all components must be under atmospheric pressure when any work is being performed on the system.

Setting the Pressure

The pressure regulator on the assembly is marked in units of MPa. The flow restrictor at the air-purge body requires the pressure of the compressed air to be in the range of 0.3 to 0.5 MPa. The pressure setting of the regulator must only be adjusted when compressed air is being supplied to the assembly.

To adjust the regulator, first pull up on the black knob to unlock it, this exposes an orange band. Rotate the knob clockwise to increase the pressure or anticlockwise to reduce the pressure. When the pressure gauge displays the required reading (e.g. 0.4 MPa) lock the regulator knob by pushing it downwards.

Once set it is recommended that the regulator pressure is not adjusted. If the compressed air to the filters has to be turned off (e.g. to change the filters) this should be done at the source or by the use of an isolation valve installed on the air tube supplying the regulated filter assembly.

Maintenance

Warnings

Warning: The source of compressed air must be turned off and all components must be under atmospheric pressure when any work is being performed on the system.

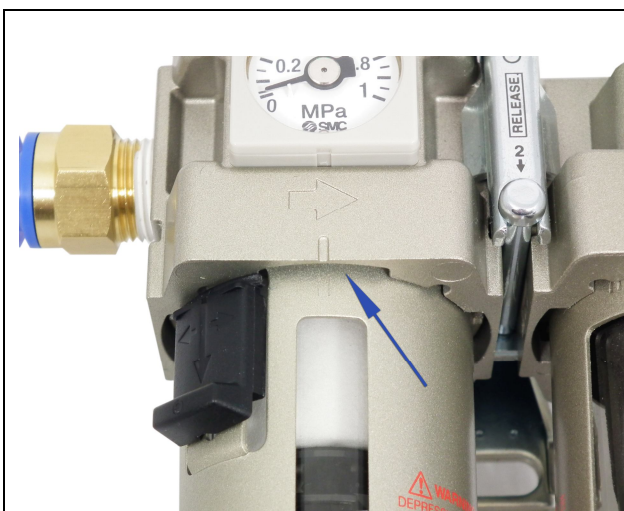
A correctly installed compressed air purge system utilising the ASY-181 compressed air kit, will require very little maintenance apart from periodic changing of the filters. The required interval between checking / replacing the filters will vary between installations, it is very dependent on the cleanliness of the source of compressed air. The maximum period between filter changes for a continuously operated purge system is 6 months.

It is recommended that the filters are initially replaced after two months of operation. If the removed filters are found to be clean then this replacement period can be extended.

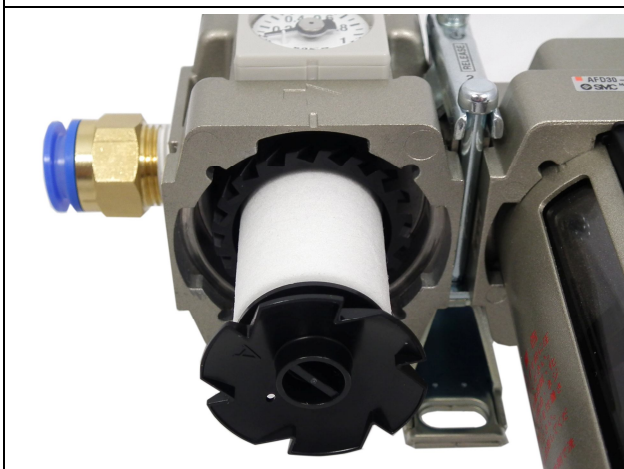
A pack of replacement filters (five air filter and five oil mist filters) are available from DynOptic Systems (ASY-182).

The following illustrates the method used to replace the air filter. The same process is used for the oil mist filter.

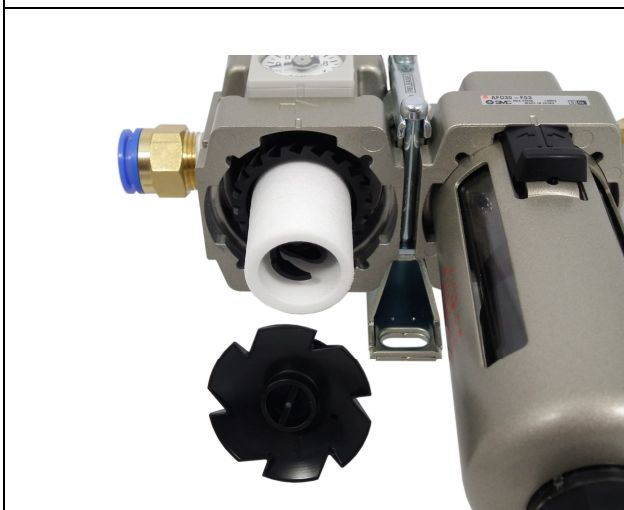
ASY-181 Compressed Air Kit - Installation and Operator Manual



Remove the bowl by releasing the catch on the bowl guard, rotating it 45°, aligning the markers as shown and then pulling both the guard and bowl out of the main body.





To release the filter first remove the fluid guard by rotating it anticlockwise.



Lift out the old filter and replace it with a new one.

ASY-181 Compressed Air Kit - Installation and Operator Manual

	<p>Reverse the above process to re-assemble the filter. Note that the bowl is a tight fit into the main body (in order to make a good air seal).</p>
	<p>Use the same procedure to change the oil mist filter. The oil mist filter is removed by unscrewing it from the body.</p>

Other routine maintenance includes checking that the tubing is not damaged or leaking and that all connections are secure.

16