MPU - Medium Purge Unit
Instruction Booklet

Application

The purge unit is designed for the direct purging of pipework up to 150 mm bore from air to low pressure natural gas up to 100mbar. It can also be used for natural gas to air purging but an air mover must be used which is available as an optional extra item.
Larger Purge Units for above 150 mm bore pipework are also available, contact Duomo sales department for information sales@duomo.co.uk.

The unit can also be used for setting up meter regulators under flow conditions.

All Soundness Testing and Purging must be carried out as set down in Institution of Gas Engineers and Managers publications UP/1, or UP/1A if the volume is less than 1 cubic metre (35.3 cubic feet) and the operating pressure is below 40 mbar.

The unit is mounted in a vinyl coated wooden and aluminium framed box that should be stable under reasonable conditions on a firm base. The box is not intended to be left outside for long periods and should be stored in the dry. The complete assembly weighs less than 25kg.

A valved test point is included for the connection of a Gas Analyser such as a Gascoseeker. The flow meter measures the gas velocity at a flow as given in UP/1A and can be used for pipework up to and including 150mm [6"] bore.

The left hand riser containing the meter can be used without erecting the right hand purge stack for pipe sizes up to 100mm. Ensure the right hand valve is closed for single stack purging. A 1" bsp plug is supplied for the end of the unused outlets.

Hazards

⚠ **It is recommended that fire extinguishers are accessible and the area is cordoned off to keep people more than 5 metres away from the flare unit, especially when purging. A no smoking sign is attached to the box and a Danger sign is also provided for the installation Pipework purge connection.**

⚠ **Pipework must not be left with open ends.**

⚠ **Lift only by the two side handles using the correct manual handling/lifting proceedures.**

⚠ **Never attempt to light the purge gases on the Flame Trap.**

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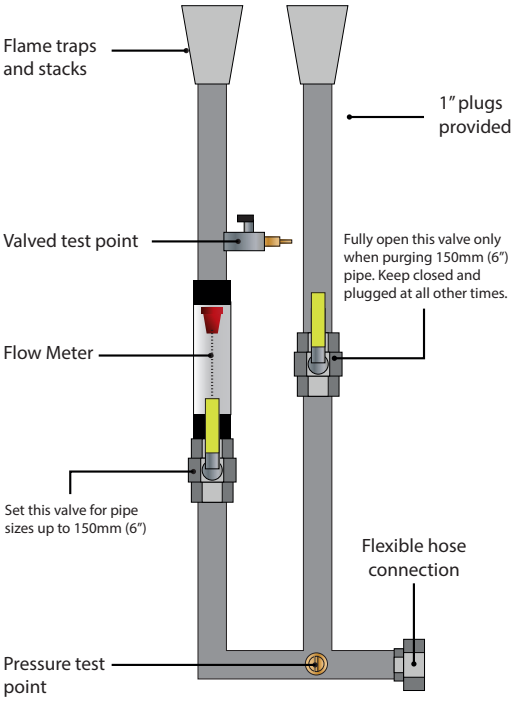
Assembly



The door must be opened out to give the box stability. The length of hose should be carefully removed from the box and connected to the union at the lower right hand side of the box and to the installation pipework. Do not over-tighten the union as it should achieve gas tightness quite easily if not damaged. Additional lengths of hose are available. Check the hose each time it is used to see that it is in good condition. Check the connection inside the building with leak detection fluid.

If a purge is to take place for up to 100 mm pipes, remove three 28mm PVC uprights from the door clips. Unscrew the flame trap from the 1" socket in the base of the box and screw in by hand to the top part of the 28 mm vent stack. Screw the three pieces together by hand to the 1" flange from the left hand meter riser in the 'top' of the box. The flame trap is now over 2.5m above ground level.

If a 150mm pipe is to be purged, assemble as above and also remove the other three 28mm pipes and flame trap, erecting as before but now also to the right hand riser. Two stacks and flame traps are needed for 150mm pipework.

On completion of the work, replace the 28mm pipes in their clips in the box. Expose the disconnected Purge Hose to the open air for a few minutes to vent out the gas and then carefully wind the Purge Hose into the box. If it is extremely cold, the Hose may be too stiff to safely get back inside without damage to the box. Replace the flame traps into their 1" caps in the box. Refit the 1" plugs to the flanges.

Operation

The direct gas to air or air to gas purge operation is detailed in IGEM UP/1 and UP/1A.

Verify that the pipe size to the purge connection is large enough to provide the purge flow rate at line gas pressure [below 50mbar] and without excess pressure drops. If the meter sizes are correct and the purge rate cannot be obtained, the pipe to the purge point is too small. If possible, move the purge connection to a larger section of pipe and purge to that point

before finishing the purge on the original smaller pipe.

If this is not practicable, a purge with nitrogen according to UP/1 must be carried out.

A flow rate of below 3 cubic metres per hour will be adequate for pipe sizes below 50mm [2"] bore and can be easily set by the left hand 1" full bore manual valve inside the Purge Unit. **Keep the right hand valve fully closed for all purges up to 100mm.**

For 50 mm [2"] bore set the left hand control valve to give a flow of 4.5 m3/h. The primary meter must be U6 rating or larger.
For 80 mm [3"] bore set the left hand control valve to give a flow of 11 m3/h. The primary meter must be U16 rating or larger.
For 100 mm [4"] bore set the left hand control valve to give a flow of 20 m3/h. The primary meter must be at least U16 rating.

For 150mm bore, fully open the right hand valve and set the left hand control valve to give a flow reading of 10 m3/h. This gives a purge flow in excess of the required 38 m3/h. The primary meter must be at least U40 rating.

The purge gases may be tested after 30 seconds of flow. The purge should be completed after a time in seconds equal to about 1.5 to 3 times the full length of the pipe plus any installed 'U' meter and hose in metres. For example, a 25m length of pipe, U16 meter [20m equivalent] and the 5m of purge hose should purge in about 75 to 150 seconds at the correct flow rate for the largest pipe being purged. Where a 'U' meter is installed add 20m for U16 & U25, 30m for U40 & U60, and 35m for U100 & U160.

During the purge to gas, the flow rate may change. This is normal and is caused by the change in specific gravity as the flow of air is replaced by the lighter gas. This flow is above that necessary but speeds the purge operation. Conversely, when purging from gas to air, the flow will change and must be adjusted upwards to maintain the ideal minimum velocity.

It should not be necessary with this design of unit to monitor the gas pressure during purging since the indication of the correct flow on the meter shows that adequate pressure exists. Please note that if an electronic gauge is used it must be intrinsically safe if used in flammable environments. Do not forget to have any test instrumentation checked and calibrated at least annually. **Never attempt to light the purge gases on the Flame Trap.**

On completion of a successful purge to gas, you should have achieved at least 90% methane. Higher levels may not be possible due to the constituents of the gas itself.

When removing redundant pipework and gas meters it is essential to purge to air and to get less than 40% LFL or more than 20.5% oxygen. An optional airflow mover is available for gas to air purges. **All removed components must be capped or sealed correctly. Open ended pipework must not be left.**

Finally, replace the parts in their clips in the box. Expose the disconnected Purge Hose to the open air for several minutes to vent out the gas and then carefully wind the Purge Hose into the box. If it is extremely cold, the Hose may be too stiff to safely get back inside without damage to the box. Replace the flame traps onto their 1" sockets in the base of the box.

Duomo Purge Unit Guide	
Flow Settings	**10m length Pipe Volumes**
Below 2" BSP - 2.5m^3	1" = 0.0064 m^3
2" - 4.5 m^3 /h, 3" - 11 m^3 /h	1¼" = 0.011 m^3
4" - 20 m^3 /h, 5" - 30 m^3 /h	1½" = 0.015 m^3 & 2" = 0.024 m^3
6" set at 10 for 38 m^3 /h	3" = 0.054 m^3
8" - 79 m^3 /h	4" = 0.09 m^3 & 6" = 0.2 m^3
10" - 141 m^3 /h	8" = 0.35 m^3 & 10" = 0.53 m^3

Engineer Notes:

APU 150 - Fan Purge Unit

Instruction Booklet

Application

The Fan Purge Unit is designed for the direct purging of pipework from natural gas to air. It is intended to be used in conjunction with the Purge Unit with integral meter which is available as an optional extra item in 100 and 150 mm models, contact Duomo sales department for information. sales@duomo.co.uk.

It can also be used to pressurize pipework for tightness testing. This fan is capable of providing about 100 mbar and can be used for combined strength and tightness tests.

All Soundness Testing and Purging must be carried out as set down in IGEM publications UP/1, or UP/1A if the volume is less than 1 cubic metre [35.3 cubic feet] with operating pressure below 40 mbar]. Depending upon resistances, the unit provides up to about 50 m3/h of air.

The fan unit is mounted in a vinyl coated wooden and aluminium framed box that should be stable under reasonable conditions on a firm base. The box is not intended to be left outside for long periods and should be stored in the dry. Use correct Manual Handling procedures for lifting. See also fan instruction manual regarding storage, maintenance and use.

A check valve is fitted as a protection against reverse flow of gas into the fan. Some units may have a different internal layout from that shown above.

Hazards

⚠ **Do NOT use the unit inside a Hazardous Area, or a in a meter room unless it has been tested and proven to be free of gas.**

⚠ **Always visually check the connecting cable and plug before use. Fit the plug into a 110V safety transformer or 230V RCD, as appropriate. If you have any doubt about the electrical safety of the cables, fan or transformer, consult a qualified electrician.**

⚠ **NEVER run the fan under no-flow conditions for long periods as it may overheat or cause serious damage**

⚠ **Running the fan with all outlets closed may damage the fan, always keep a small volume of air flowing.**

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Assembly

1. Place the fan box in the open air in a safe, dry and level location.
2. Remove the length of hose and connect it to the fan using the union connection. Do not over-tighten the union on the fan as it achieves air tightness quite easily if not damaged.
3. Connect the other end of the hose to the installation pipe or meter assembly at an appropriate valved point.
4. Ensure this valve is closed.

Always visually check the connecting cable and plug before use. Fit the plug into a 110 V safety transformer or 230V RCD, as appropriate. If you have any doubt about the electrical safety of the cables, fan or transformer, consult a qualified electrician.

Operation

Vinyl coated wooden and aluminium framed box

WARNING: Do NOT use the unit inside a Hazardous Area, or a in a meter room unless it has been tested and proven to be free of gas. The direct gas to air purge operation is detailed in IGEM UP/1 and UP/1A.

When purging pipework, verify that the pipe size to the purge connection is large enough to provide the purge flow rate without excess pressure drops. If the meter sizes are correct and the purge rate cannot be obtained, the pipe to the purge hose point is too small. If possible move the purge connection to a larger section of pipe and purge to that point before finishing the purge on the original smaller pipe. If this is not practicable, a purge with nitrogen according to UP/1 must be carried out.

The following procedure must be followed in order to prevent the reverse flow of gas back into the Fan Purge Unit.

1. With the connecting valve to the Fan Purge Unit closed, de-pressurise the installation pipework or meter installation through the Purge vent pipe. Check the gas pressure within the pipework to ensure the pressure has dropped to atmospheric.
2. Turn on the Power to start the fan and open the valve at the end of the fan hose to admit air into the system. NEVER run the fan under no-flow conditions for long periods as it may overheat or cause serious damage
3. Immediately open the Purge valve at the base of the vent pipe and adjust to give the correct flow rate as required by UP/1 or UP/1A. When the gas concentration has reduced at the test point to give less than 40% LFL or more than 20.5% oxygen, the purge may be considered to be complete. Testing of gases must be with calibrated instrumentation in accordance with the manufacturer's instructions.
4. Running the fan with all outlets closed may damage the fan, always keep a small volume of air flowing.
5. Close all valves and turn off the Power, disconnecting the lead and transformer. Disconnect the hose.
6. All removed pipe components, meters and controls must be capped or sealed correctly. Installation pipework must not be left open ended.
7. Finally, replace the hose, union ends and cable in the box.

Special Notes

Purging meters after removal for a Gas Transporter/Shipper/Supplier.

In this instance, if the meter is to be purged without being connected to any installation pipework, e.g. on return to stores. The same basic use of the Fan Purge Unit and vent stack applies. The purge rate must not at any time cause the meter to over-speed. To achieve this, the pressure difference between the inlet and outlet of the meter should not exceed 1 mbar if the meter is not to be scrapped, measured by inlet and outlet meter pressure tappings, and controlled by a meter outlet valve. The purge end points remain as stated above. The outlet connection from the meter should always be vented to a safe open air location away from all sources of ignition.

Setting regulators prior to connection to an incoming gas supply.

The fan and associated purge unit can also be used for setting up regulators and over pressure shut off valves prior to the system being connected to an inlet gas supply. The maximum supplied pressure under low flow conditions is about 100 mbar.

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Flow Settings	**10m length Pipe Volumes**
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