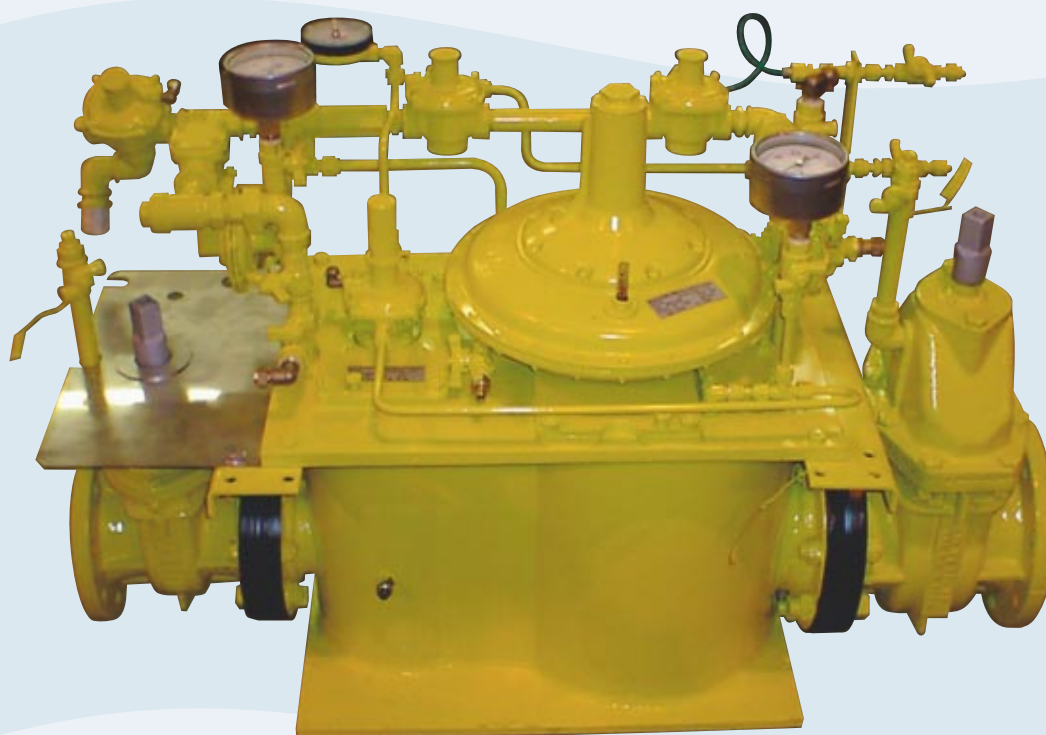


280 Vector Module™

A unique concept for below
& above ground modules



Bryan Donkin RMG
Gas Controls Limited

A unique concept for Below Ground Modules



The 280 Vector Module™

contains all the elements required for a gas pressure reduction station. The main elements, e.g. the regulator and slamshut, are well-established products designed as removable cartridges to simplify maintenance.

For use on gas distribution systems the module is designed principally for below ground installation, this simplifies planning by limiting the need for mains diversion, eliminates housing costs, reduces noise levels and the opportunity for vandalism is also greatly reduced.

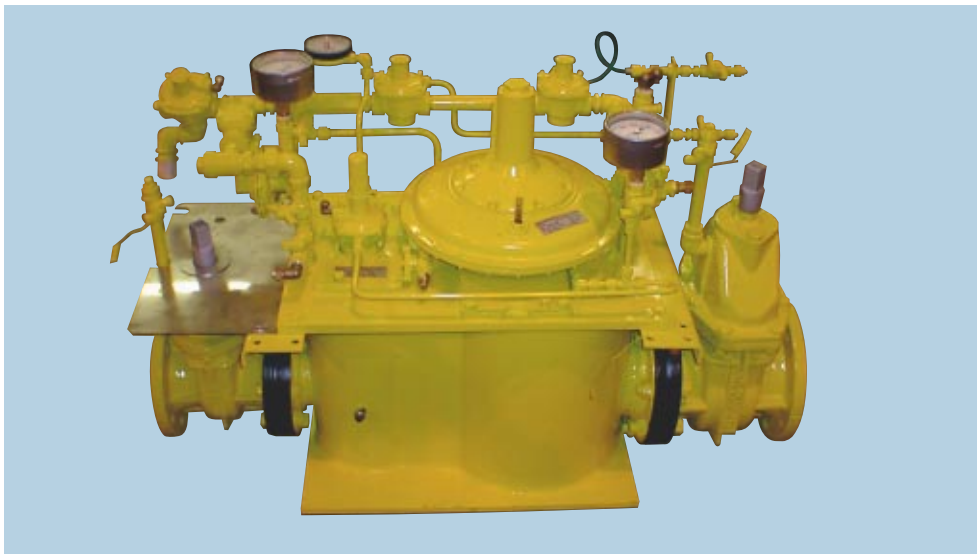
The design of the module is such that it can also be utilised as a compact above ground installation.

Take a look at these benefits:-

- A Totally Buried Module -
- Compact Design with all control elements contained within an underground housing
- Separate filter chamber - allows removal of the filter element, without the need to remove the main control unit.
- Noise levels virtually eliminated
- Easily adaptable to suit various types of control systems, e.g. Clocking, Profiling etc.
- All equipment is of standard design and cartridge type for ease of maintenance
- Simplified planning
- Below or Above Ground Installation

Service Conditions

Maximum Inlet Pressure	4.0 Bar g		
Outlet Pressure	10 to 138 Mbar g (other ranges on request)		
Configuration	Active/Slam		
Operation	Direct-Acting or Pilot Control (up to 2 Bar g) Pilot Control (>2 to 4 Bar g)		
Corrosion Protection (Below Ground Parts)	Coated with glass filled epoxy coating 400 micron dry film thickness		
Size Range (mm)	Inlet	Regulator	Outlet
	80	50	80
	100	50	100
	100	50	150
	150	80	150
Connections	Flanged to BS EN 1092-2-1977 or ASA 150		



Major Components

Filter	200 or 50 Micron Stainless Steel Element
Regulator	Series 280 Regulator Cartridge
Safety Cut-Off Valve	Series 309 - approved to GBE/PS/V9
Safety Relief Valve	Series 226 MR Relief Valve
Stream Isolating Valves (standard)	Donkin Fig 555 Softseal Wedge Gate, double block and bleed.
Stream Isolating Valves (optional)	Ball or Butterfly Valves
Stream Discrimination (optional)	Series 580 Waferchek Non-Return Valve

Capacities in scmh (SG 0.6)

Direct Acting & Pilot Control - Up to 2 Bar g

Pilot Control - >2 to 4 Bar g

Inlet: 100mm Cartridge: 50mm Outlet: 100 & 150mm

Outlet Pressure Set Point (mbar g)	Droop and Control Accuracy Class AC	Inlet Pressure bar					
		0.14	0.35	0.7	1	2	4
20	10% (AC5) direct	560	970	1500	1900	2800	n/a
	20% (AC10) direct	610	1000	1600	2000	3000	
	5% (AC2.5) pilot	620	1000	1600	1900	2800	4500
50	10% (AC5) direct	400	800	1450	1800	2750	n/a
	20% (AC10) direct	510	950	1500	1850	2800	
	5% (AC2.5) pilot	450	950	1550	2000	2900	4400
70	10% (AC5) direct	400	850	1450	1900	2850	n/a
	20% (AC10) direct	500	960	1500	1950	2950	
	5% (AC2.5) pilot	500	900	1500	1850	2500	4200

Note As the principal controlling element is the cartridge the capacities are similar for both outlet sizes.

Inlet: 150mm Cartridge: 80mm Outlet: 150mm

Outlet Pressure Set Point (mbar g)	Droop and Control Accuracy Class AC	Inlet Pressure bar					
		0.14	0.35	0.7	1	2	4
20	10% (AC5) direct	700	1250	1440	1500*	2100*	n/a
	20% (AC10) direct	850	1630	2350	2850	4000	
	5% (AC2.5) pilot	1050	1800	2600	3350	5700	8800
50	10% (AC5) direct	840	1500	2300	3100	5200	n/a
	20% (AC10) direct	860	1600	2500	3200	5300	
	5% (AC2.5) pilot	900	1650	2650	3250	5400	8750
70	10% (AC5) direct	690	1400	2500	3000	5350	n/a
	20% (AC10) direct	730	1600	2600	3150	5450	
	5% (AC2.5) pilot	840	1650	2700	3250	5550	8700

Note *The 50 mm cartridge outperforms the 80 mm at these conditions due to the valve/diaphragm ratio.

Full Open Capacity

Cartridge	Inlet pressure bar								
	0.07	0.14	0.2	0.35	0.5	0.7	1	2	4
50mm	530	650	800	1000	1350	1650	2000	3000	4700
80mm	700	1150	1350	1850	2350	2800	3400	5800	8900

Pipe Velocity Limits

The maximum capacities given in the table above do not take into account pipe velocity restrictions, which will be dependent upon the inlet/outlet pipe size.

Typically:

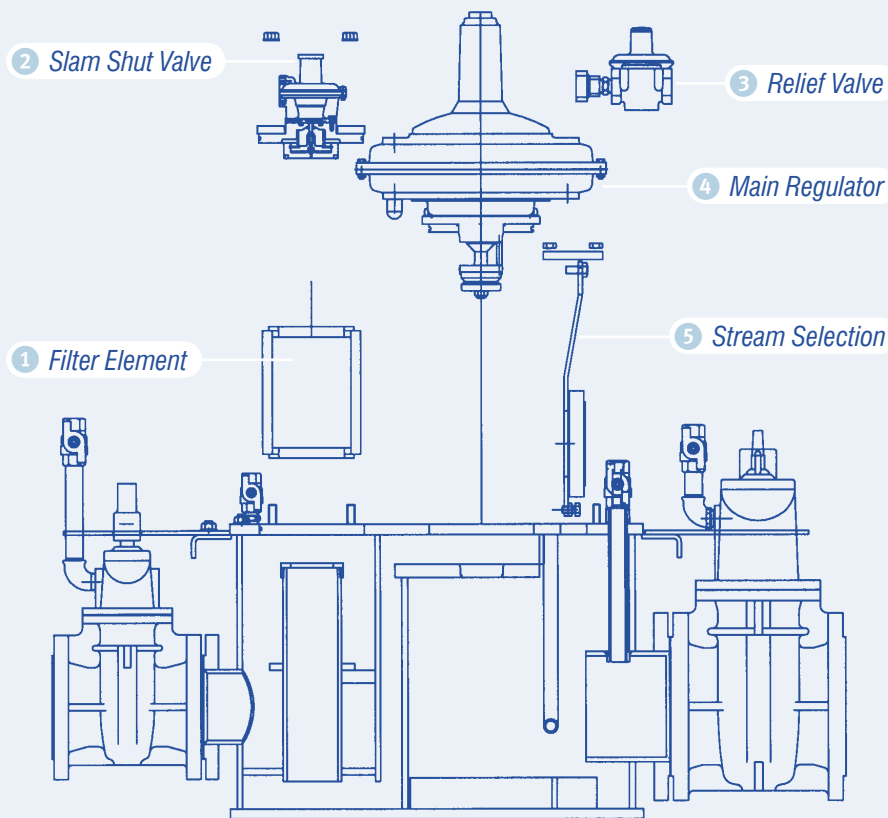
Inlet Velocity = 20 m/sec Outlet Velocity = 40 m/sec

Ease of Maintenance

- Widely Used Standard Components
- Light-Weight Cartridge Construction
- Easy Access via GRP Housing or Optional Spring Assisted, Heavy Duty, Galvanised Cover
- No lifting devices necessary for Cartridge Removal
- Standard Spares for Major Components



The 280 Vector Module™



KEY

- 1 50 or 200 micron, stainless steel element
- 2 Over or Under/Over Pressure Safety Cut-Off Valve - Cartridge Type
- 3 Safety Relief Valve (S.226 MR)
- 4 Main Regulator - Cartridge Type (S.280)
- 5 Stream Discrimination Valve - integral design, that allows easy removal or retro fitting

NB: all spring ranges embrace spring changes.



Below or Above Ground Installation

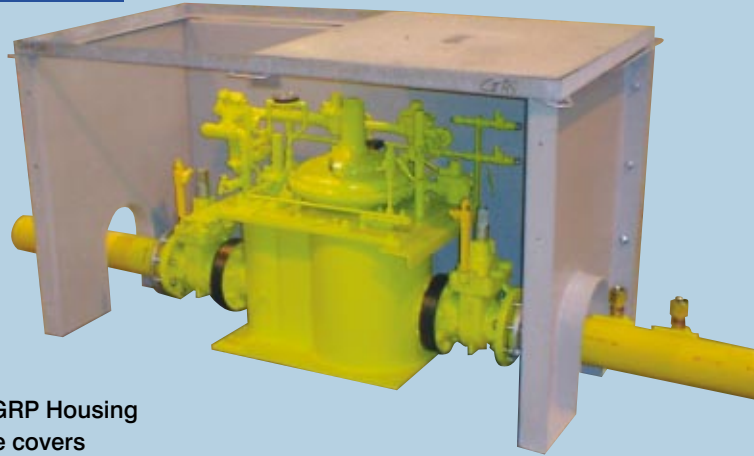
- Simplified Installation
- Compact Design
- Ease of Access
- Noise Levels Virtually Eliminated
- Easily Adaptable to suit various types of Control Systems e.g. Clocking, Profiling etc.



Optional Steel Surface Box

Pre-Packaged Modules

Single Stream



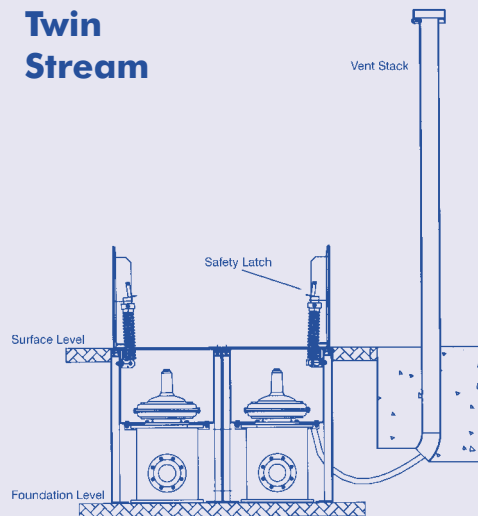
Standard GRP Housing & Concrete covers

- Single Stream
- Twin Stream
- Multi Stream

Typical Installation

- Inlet & Outlet Isolating Valves
- 280 Vector Module™
- Surface Box
- Differential Pressure Gauge (filter)
- Inlet/Outlet Pressure Gauge
- Inlet & Outlet PE Pups or Manifolds
- Vent Stack & Piping
- Auxiliary Control System

Twin Stream



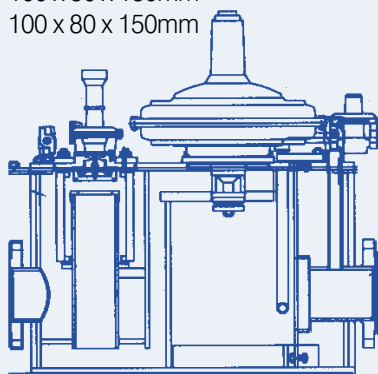
You Choose to suit your Requirements

A standard Pre-Packaged Module, may not always meet with your exact requirements and therefore offer our Standard Unit-'Plus Options' facility.

1 280 Vector Module™ (Basic)

Sizes

- 80 x 50 x 80mm
- 100 x 50 x 100mm
- 100 x 50 x 150mm
- 100 x 80 x 150mm



2 Inlet & Outlet Valves

- Gate Valves (standard)
- Ball Valves (optional)
- Butterfly Valves (optional)

3 Non-Return Valve

- Series 580 Waferchek

4 Housing

- Surface Box (below ground)
- Kiosk (above ground)
- Kiosk to accommodate Clocking, Logger Gauges etc.

5 Pilot Control System

- Inspirator System ('J' & 'K')
- Insp. System ('J', K1 & 'K2')
- Electronic Clocking System
- Autogas Pressure Profiling System

6 Pipework

- Inlet & Outlet Spool (PE)
- Inlet & Outlet Spool (Steel)
- Inlet & Outlet Manifold (PE)
- Inlet & Outlet Manifold (Steel)

7 Gauges

Filter:

- DP Gauge
- DP Gauge c/w switch

Inlet & Outlet Pressure Gauges:

- Located in Surface Box
- Located in Vent Stack

8 Vent Stacks

- Type 'A' (basic)
- Type 'A1' (basic + access panel)
- Type 'B' for mounting gauges, logger, Electroclock etc. Various other types on request.

9 Piping

- Piping Kit for Vents & Breathers
- Outlet Impulse Piping & Connections

Typical Assembly

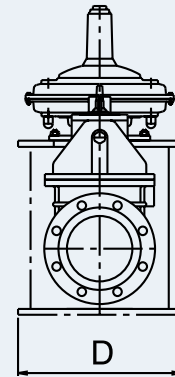
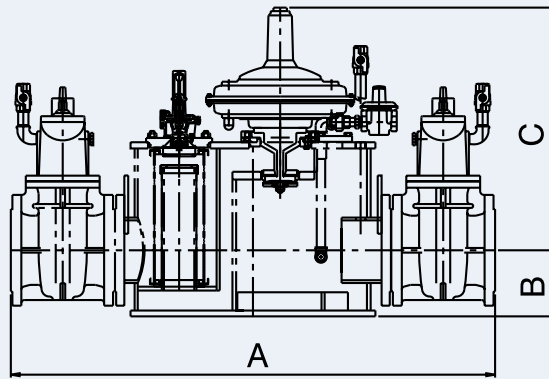
- 280 Vector Module™
- Inlet & Outlet Gate Valves
- Non-Return Valve
- Surface Box and Cover
- Inlet & Outlet Spools (PE)
- Type 'A' Vent Stack
- Filter DP Gauge
- Inlet & Outlet Pressure Gauges

Optional Pressure Profiling System

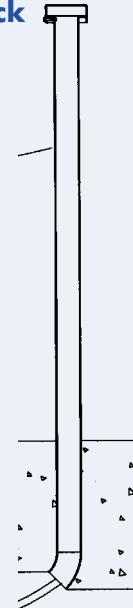


Below Ground Installation

Single Stream



Type 'A' Vent Stack



Weights: Basic Unit

Single Stream

- Size: 80 x 50 x 80 = 270 Kg's
- 100 x 50 x 100 = 260 Kg's
- 100 x 50 x 150 = 300 Kg's
- 150 x 80 x 150 = 330 Kg's

Excluding, Inlet & Outlet Spools/Manifolds

Dimensions

All dimensions in mm

Basic Unit	A	B	C	D
3 x 2 x 3	1900	170	770	420
4 x 2 x 4	979	170	770	420
4 x 2 x 6	1206	170	770	420
6 x 3 x 6	1168	170	795	420

Quick Selection Guide

AC 2.5

Set-Point: 20 mbarg

3000				2692 iv	2737 ov	2737 ov
2500					SINGLE: G2-280VM/636S	
2000			2269 iv		TWIN: G2-280VM/636T	
1500		1650				
1000	1050		1000 iv	1184 iv	1206 ov	1206 ov
950						
900				SINGLE: G2-280VM/424S		
850				TWIN: G2-280VM/424T		
800		799 iv				
750						
700					700 ov	700 ov
650				686 iv		
600	620					
550			581 iv			
500				SINGLE: G2-280VM/323S		
450		463 iv		TWIN: G2-280VM/323T		
400	391 iv					
300						
	0.14	0.35	0.7	1.0	1.4	2.0

Inlet Pressure (bar g)

Set-Point: 50 mbarg

3000				2692 iv	2816 ov	2816 ov
2500					SINGLE: G2-280VM/636S	
2000			2269 iv		TWIN: G2-280VM/636T	
1500		1650				
1000			1000 iv	1184 iv	1241 ov	1241 ov
950						
900	900			SINGLE: G2-280VM/424S		
850				TWIN: G2-280VM/424T		
800		799 iv				
750						
700					700 ov	700 ov
650				686 iv		
600						
550			581 iv			
500				SINGLE: G2-280VM/323S		
450	450	463 iv		TWIN: G2-280VM/323T		
400	391 iv					
300						
	0.14	0.35	0.7	1.0	1.4	2.0

Inlet Pressure (bar g)

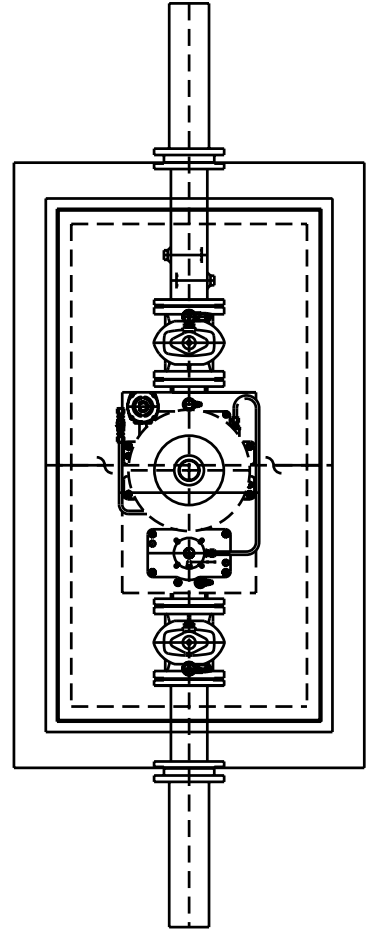
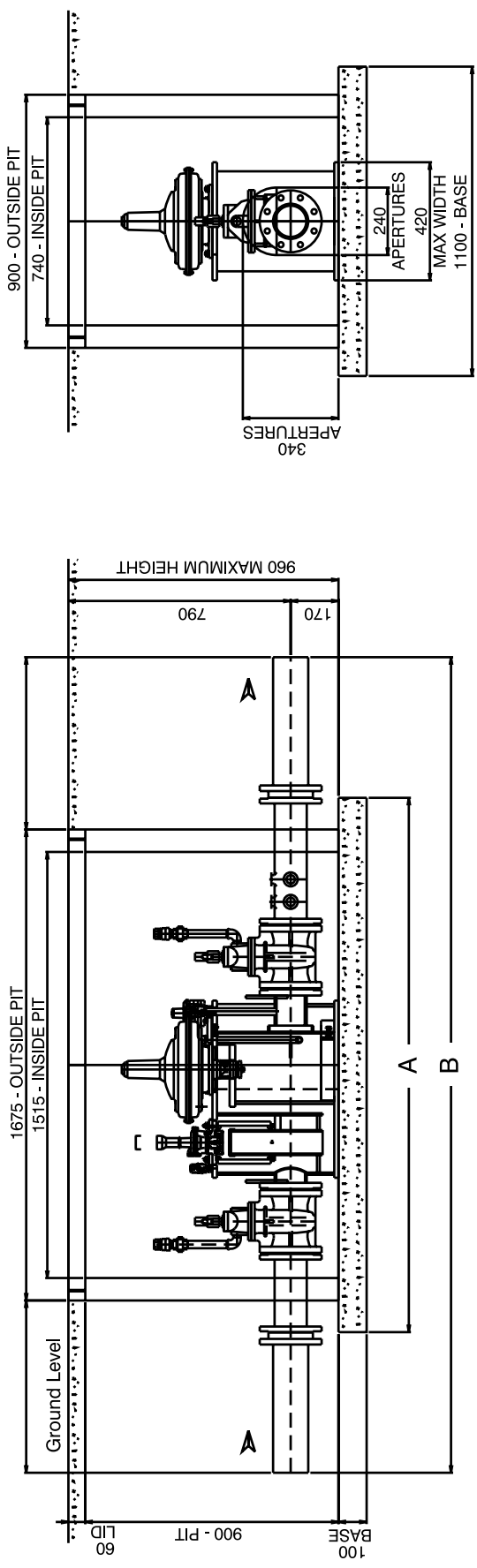
Set-Point: 70 mbarg

3000				2692 iv	2869 iv	2869 iv
2500					SINGLE: G2-280VM/636S	
2000			2269 iv		TWIN: G2-280VM/636T	
1500		1650				
1000			1000 iv	1184 iv	1264 ov	1264 ov
950						
900				SINGLE: G2-280VM/424S		
850	840			TWIN: G2-280VM/424T		
800		799 iv				
750						
700					700 ov	700 ov
650				686 iv		
600						
550			581 iv			
500	500			SINGLE: G2-280VM/323S		
450		463 iv		TWIN: G2-280VM/323T		
400	391 iv					
300						
	0.14	0.35	0.7	1.0	1.4	2.0

Inlet Pressure (bar g)

Capacities given above are based on pilot control, for direct acting capacities refer to table on page 3
IV = Inlet Velocity Limitation **OV** = Outlet Velocity Limitation

Single Stream Options

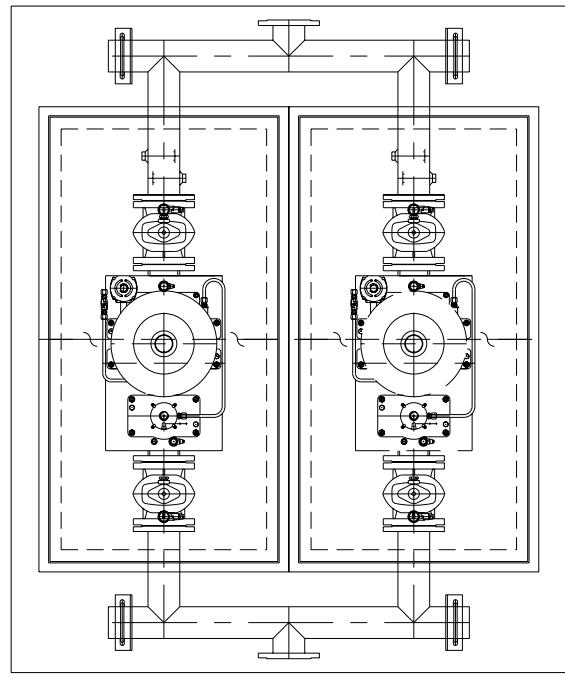
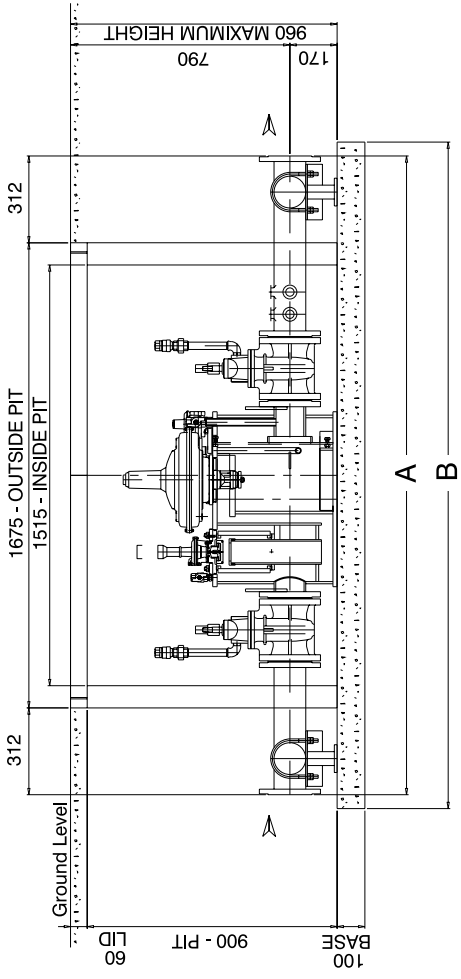
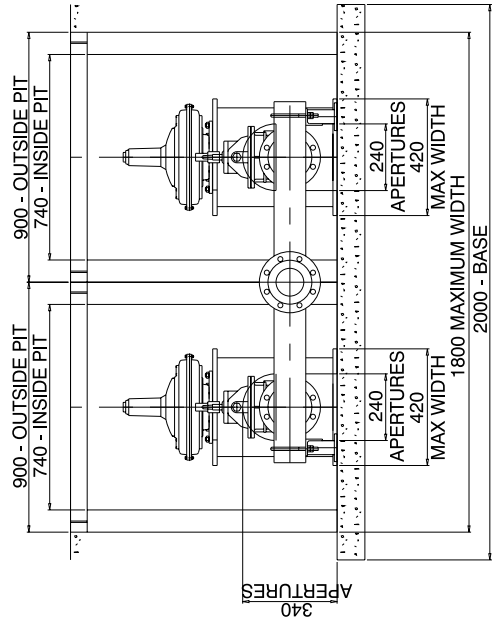


Unit Ref	Steel Spool		PE Pup Ends	
	A	B	A	B
G2-280VM/323S-ST	2900	1900		
G2-280VM/323S-PE			2900	1900
G2-280VM/424S-ST	1900	1900		
G2-280VM/424S-PE			2900	1900
G2-280VM/636S-ST	1900	1900		
G2-280VM/636S-PE			2900	1900

PE pup-ends shown for illustration purposes

Note: Base dimensions are for guidance purposes only. BD-RMG recommend civil engineers be consulted with respect to foundation design and suitability for existing site conditions





Unit Ref	Steel Manifolds		PE Manifolds	
	A	B	A	B
G2-280VM/323T-ST	2200	2300		
G2-280VM/323T-PE			3500	1900
G2-280VM/424T-ST	2300	2400		
G2-280VM/424T-PE			3600	1900
G2-280VM/636T-ST	2500	2500		
G2-280VM/636T-PE			3800	1900

Steel Manifolds shown for illustration purposes

Note: Base dimensions are for guidance purposes only. BD-RMG recommend civil engineers be consulted with respect to foundation design and suitability for existing site conditions

Twin stream Options

The Range of Below Ground Modules...

Series	Inlet Pressure	Outlet Pressure	Configuration	Size			Installation	
				Inlet	Reg.	Outlet	Below Ground	Above Ground
280 Vector Module™	4 Bar g	Up to 138 Mbar g	Slam/Active	80	50	80	Yes	Yes
				100	50	100		
				100	50	150		
				150	80	150		
402 Vector Module™	16 Bar g	Up to 4 Bar g	Slam/Active	50	50	80	Yes	Yes
680 Vector Module™	2.4 Bar g	Up to 80 Mbar g	Slam/Active Monitor/Active	200	100	200	Yes	Yes
				250	150	300		
	7.0 Bar g	Up to 80 Mbar g	Slam/Active Monitor/Active	200	100	200	Yes	Yes
				250	150	300		
Krysalis™ 2	2 Bar g	Up to 100 Mbar g	Slam/Active	150	150	200	Yes	-
Krysalis™ 4	4 Bar g	Up to 100 Mbar g	Slam/Active	150	150	200	Yes	-
Krysalis™ 7	7 Bar g	Up to 100 Mbar g	Slam/Active	150	150	200	Yes	-
Krysalis™ 16	16 Bar g	Up to 4 Bar g	Slam/Active	100	50	150	Yes	-

Product Development

Expansion to the range of Bryan Donkin RMG, Above and Below Ground Modules is continuous and we would recommend contacting us for the latest product developments.




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A Member of the  Group

*The Bryan Donkin RMG Gas Controls policy is one of continuous improvement and development.
The company reserves the right to change and introduce improved designs without notice.*

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