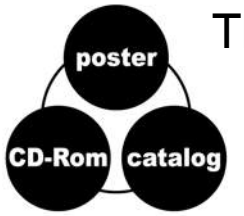
aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding

# Moduflex Valve System

## Instant control
## for all pneumatic actuators

Catalogue PDE2536TCUK April 2010

ENGINEERING YOUR SUCCESS.




# The machine designer Moduflex workshop


Valves are the centre of electro-pneumatic automation. They are now designed into compact islands that are easily configured to each application.
For full efficiency in this enhanced automation practice, machine designers are helped by 3 complementary design tools :

1 - the Moduflex valve island configurator, an easy to use **CD-ROM** (see p.30) ;

2 - the Moduflex functional **poster**, a "one glance synopsis" of the Moduflex System;

3 - this **catalogue**, that includes "The manual of modular pneumatic valves islands".

4 - The Moduflex valve island **e-configurator** and **3D models** are available on website :
**http://www.parker.com/pneu/moduflex**

*Make sure your Moduflex workshop is complete.*

## Summary Page

# Moduflex Valve System

**The Moduflex Valve System redefines flexibility for pneumatic users. Whether configured from basic components or ordered as a pre-assembled and tested valve island, Moduflex flexibility is unmatched in the market place.**

**V Series**

**T Series**

**S Series**

**P Series**

## Innovative

The 6 patents awarded to the Moduflex Valve System reflect that innovation is core to the Parker design process. Maintaining a clear understanding of our customer's expectations has defined the individuality of the Moduflex, and clearly differentiated it as a leading automation solution.

## Adaptive

No other system can be adapted so simply once specified. Unique, captive fitting release system, quick release electrical connectors and single mechanical screw connection between manifolds offer the ultimate capability for late system design changes.

## Multi-Functional

From stand-alone valves to fieldbus ready valve islands, from cylinder flow controls to vacuum generators with integrated blow-off, the Moduflex Valve System meets the requirements of the whole automation spectrum.

## Light-weight

An As-i compatible valve manifold with 8 electrical inputs and 8 pneumatic outputs weighs a mere 800grams, making the Moduflex Valve System the perfect choice for end of arm tooling application.

## Moduflex Valve technology

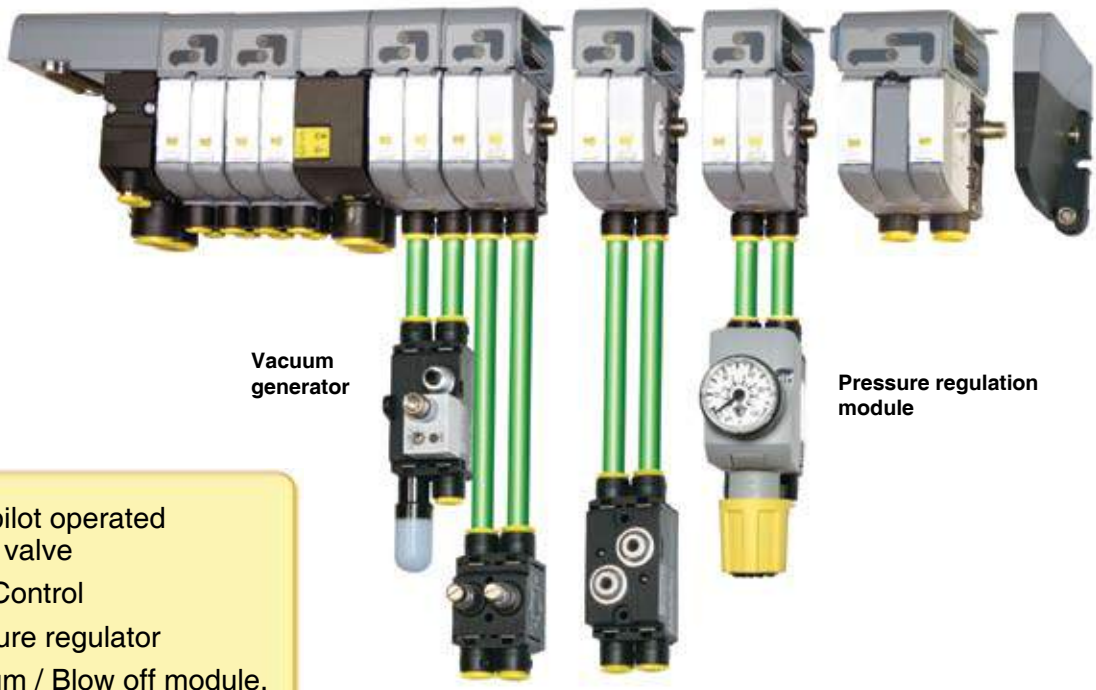
Two technology platforms enable the compact design and high performance of the Moduflex Valve System.
The compact dual 4/2 and 3/2 valves utilize well proven Parker seal technology. The standard 4/2 valves adopt the long life super durable ceramic switching technology.

### Dual 4/2 valve

### 4/2 Valve

## Moduflex Complete Control

With the introduction of the dual 4/2 size 1 valves, Moduflex now offers unrivaled ability of matching valves to exact flow requirements, ensuring cost and space are minimized.
In addition, Moduflex Valve System offers all the necessary control peripherals to provide a complete automation solution. Moduflex is the complete control package.



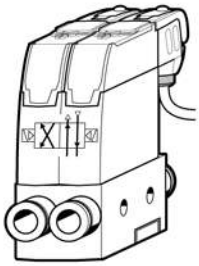

- Dual pilot operated check valve
- Flow Control
- Pressure regulator
- Vacuum / Blow off module.

With high performance technology, Moduflex opens a new era in the field of electro-pneumatic automation. Valves are easily assembled into compact islands that conform to any application requirement.

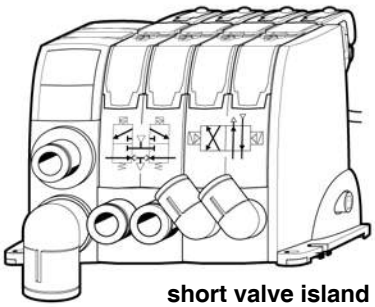
## Adaptive pneumatic

With the Moduflex Valve design, pneumatic automation is now totally flexible.

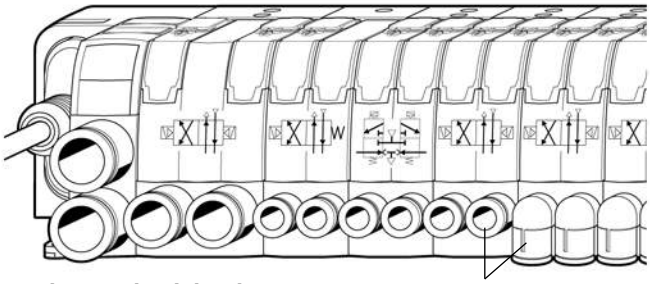
- Valves may be stand-alone or assembled into short or long islands, depending on application.
- IP 65-67 water and dust protection allows valve to be installed near the cylinders for shorter response time and lower air consumption.
- Valve island electrical connections may be integrated.
- Push-in pneumatic connectors may be straight or elbow, for 4, 6, 8 or 10 mm OD tubes.
- A given island may incorporate different valve sizes in order to fullfill each cylinder flow requirement. A single island will accomodate all cylinders, up to 100 mm bore size.
- Island modifications are easy : add or remove a valve, change a valve function, change tubing size, change piloting in minutes.
- Manual overrides are also adaptive : locking for set up, non-locking for production, ...



**stand-alone valve**



**short valve island**

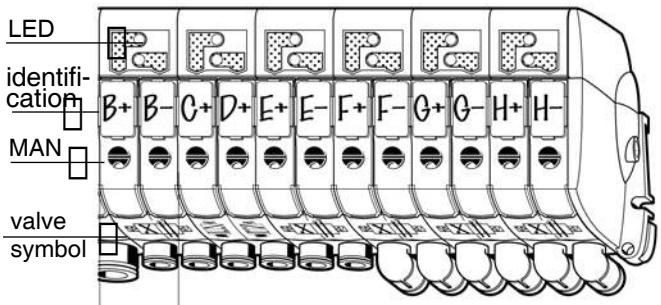


**or long valve island**

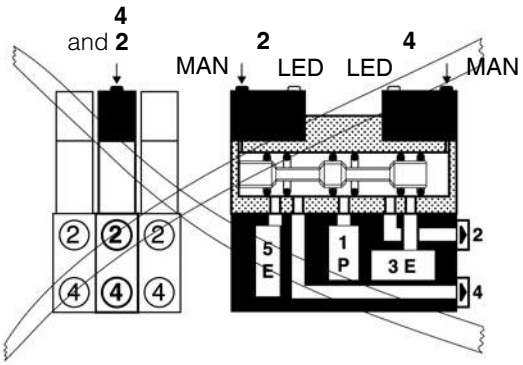
**straight or elbow pneumatics connectors**

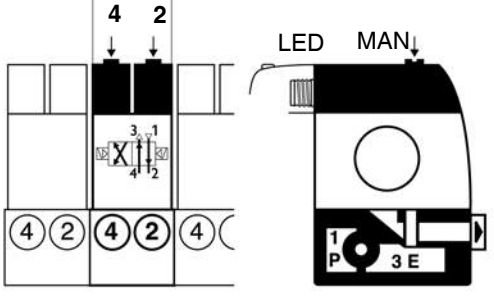
## Easy man-machine dialog

- Moduflex incorporates LED indicators, manual overrides (MAN), in conjunction with valve symbols and identification.
- As compared to traditional 5/2 valve islands, Moduflex offers a more user friendly dialog : each marking, LED and MAN are all lined up with the corresponding cylinder output.



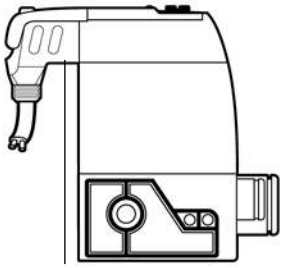

**Island with traditional 5/2 spool valves :** Before any action, LED and MAN have to be carefully related to the corresponding output. Man-machine dialog is difficult.



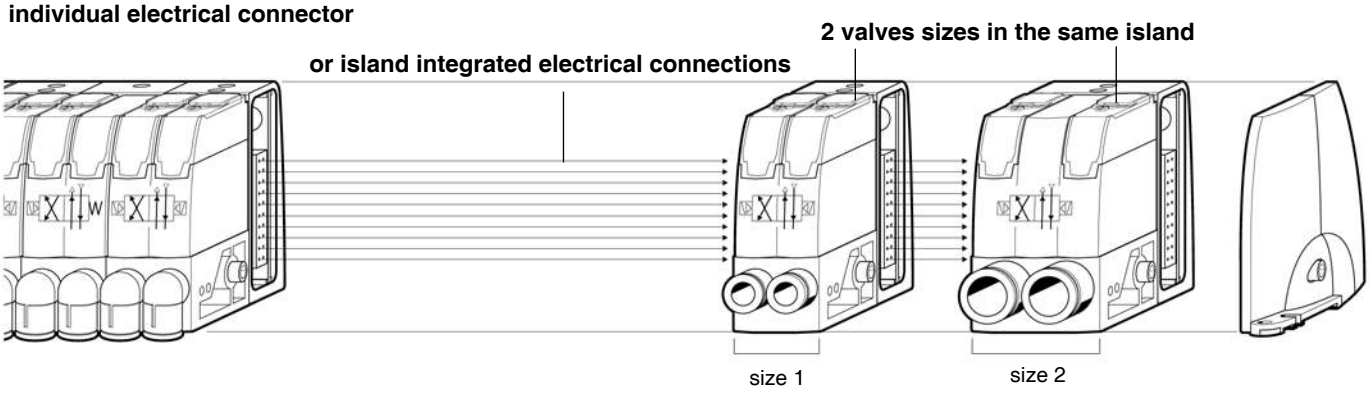




**Island with Moduflex 4/2 slides valves:** Each marking, LED and MAN line up with the corresponding output.

Man-machine dialog is easy.



**individual electrical connector**

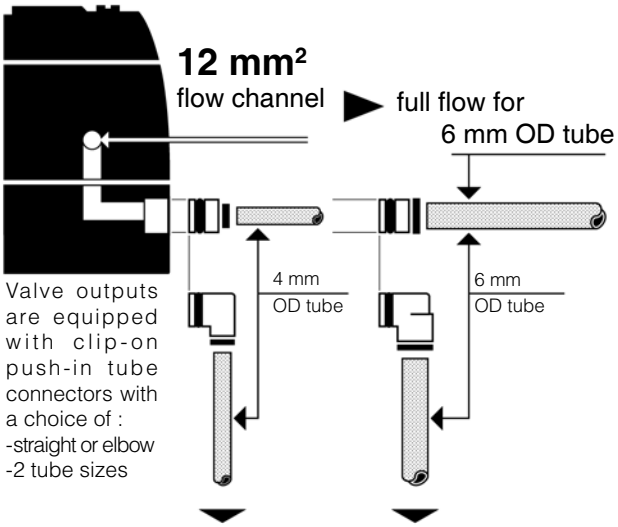



## Flows and tube connections

2 valves sizes lead to a global choice of 4 tubes sizes, thus covering all usual applications

### Size 1
### Flow : Qmax. > 400 Nl/min

12 mm² flow channel, for 4 and 6 mm OD tubes

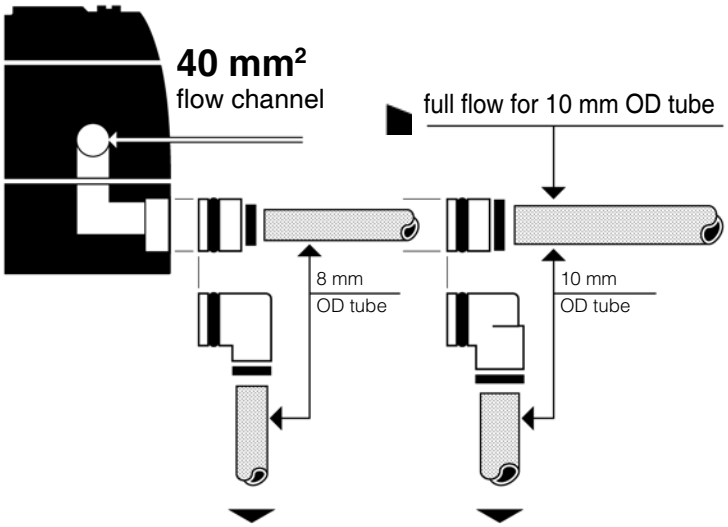



**to cylinders** — **6 to 25 mm bore size** — **25 to 40 mm bore size**

### Size 2
### Flow : Qmax. > 1200 Nl/min *

40 mm² flow channel, for 8 and 10 mm OD tubes

* except 3/2 and dual 4/2 functions : see p.10




**to cylinders** — **40 to 63 mm bore size** — **63 to 100 mm bore size**

Typical cylinder speeds are shown on pages 8 and 9. Module size, tube diameter and length, cylinder size and load and exhaust collection are taken into account.

## Cylinder working speed charts

The charts below give the cylinder working speeds at 6 bar, under different conditions :
- non loaded or 50 % loaded double acting cylinder ;
- exhaust piped through 2 m. long tubing, or exhaust muffled.

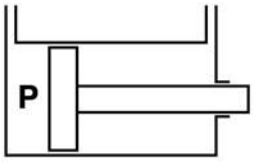
**cylinder working speeds, in cm/s**

standard conditions :

- double acting cylinder
- working pressure : P = 6 bar

specific conditions :

- exhaust piped through tube 2 m long, with next ID above ID tube from valve to cylinder.
- non loaded cylinder




| valve module | tube ID | tube OD | tube length | cylinder bore size 25 mm | 32 mm | 40 mm | 50 mm | 63 mm | 80 mm | 100 mm |
|---|---|---|---|---|---|---|---|---|---|---|
| Size 1 | 2 x 4 mm | | 1 m. | 43 cm/s | 28 cm/s | | | | | |
| | | | 3 m. | 27 | 17 | | | | | |
| | 2 .7 x 4 mm | | 1 m. | 85 | 52 | 33 cm/s | | | | |
| | | | 3 m. | 55 | 34 | 21 | | | | |
| | 4 x 6 mm | | 1 m. | 167 | 100 | 62 | 41 cm/s | 27 cm/s | | |
| | | | 2 m. | 157 | 86 | 54 | 37 | 23 | | |
| | | | 4 m. | 125 | 73 | 46 | 31 | 19 | | |
| | | | 8 m. | 94 | 57 | 36 | 24 | 14 | | |
| Size 2 | 5.5 x 8 mm | | 1 m. | | | 146 | 102 | 67 | 40 cm/s | 25 cm/s |
| | | | 3 m. | | | 122 | 84 | 54 | 32 | 20 |
| | 6 x 8 mm | | 1 m. | | | | 125 | 78 | 46 | 30 |
| | | | 3 m. | | | | 105 | 65 | 39 | 25 |
| | 7 x 10 mm | | 1 m. | | | | 135 | 88 | 53 | 33 |
| | | | 3 m. | | | | 120 | 77 | 47 | 30 |
| | 8 x 10 mm | | 1 m. | | | | | 94 | 57 | 40 |
| | | | 3 m. | | | | | 85 | 53 | 37 |

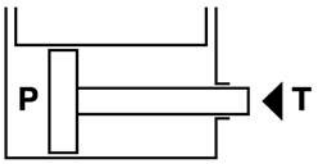
**cylinder working speeds, in cm/s**

standard conditions :

- double acting cylinder
- working pressure : P = 6 bar

specific conditions :

- exhaust piped through tube 2 m long, with next ID above ID tube from valve to cylinder.
- 50% loaded cylinder




| valve module | tube ID | tube OD | tube length | cylinder bore size 25 mm | 32 mm | 40 mm | 50 mm | 63 mm | 80 mm | 100 mm |
|---|---|---|---|---|---|---|---|---|---|---|
| Size 1 | 2 x 4 mm | | 1 m. | 32 cm/s | 20 cm/s | | | | | |
| | | | 3 m. | 21 | 13 | | | | | |
| | 2 .7 x 4 mm | | 1 m. | 65 | 43 | 25 cm/s | | | | |
| | | | 3 m. | 43 | 27 | 16 | | | | |
| | 4 x 6 mm | | 1 m. | 100 | 85 | 53 | 36 cm/s | 22 cm/s | | |
| | | | 2 m. | 93 | 75 | 44 | 30 | 19 | | |
| | | | 4 m. | 83 | 62 | 36 | 24 | 15 | | |
| | | | 8 m. | 68 | 46 | 27 | 18 | 11 | | |
| Size 2 | 5.5 x 8 mm | | 1 m. | | | 83 | 67 | 44 | 27 cm/s | 18 cm/s |
| | | | 3 m. | | | 79 | 54 | 35 | 21 | 15 |
| | 6 x 8 mm | | 1 m. | | | | 77 | 51 | 32 | 21 |
| | | | 3 m. | | | | 69 | 43 | 26 | 17 |
| | 7 x 10 mm | | 1 m. | | | | 88 | 59 | 37 | 24 |
| | | | 3 m. | | | | 81 | 51 | 30 | 21 |
| | 8 x 10 mm | | 1 m. | | | | | 63 | 39 | 27 |
| | | | 3 m. | | | | | 58 | 35 | 25 |

## Field of application :

- stand-alone valve modules **S** series
- valve island modules, **T** series and **V** series

Note : a complete machine cycle includes :
- the cylinder displacement times that can be deducted from the cylinder speeds given bellow
- the cylinders starting times that depend on the cylinder strokes and thus could not be included in the charts below.

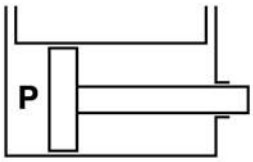
### cylinder working speeds, in cm/s

standard conditions :

- double acting cylinder
- working pressure : P = 6 bar

specific conditions :

- muffled exhaust (non collected)
- non loaded cylinder




| valve module | tube ID | tube OD | tube length | cylinder bore size 25 mm | 32 mm | 40 mm | 50 mm | 63 mm | 80 mm | 100 mm |
|---|---|---|---|---|---|---|---|---|---|---|
| **Size 1** | 2 | 4 mm | 1 m. | 43 cm/s | 27cm/s | | | | | |
| | | | 3 m. | 27 | 17 | | | | | |
| | 2 .7 | 4 mm | 1 m. | 88 | 54 | 34 cm/s | | | | |
| | | | 3 m. | 55 | 34 | 22 | | | | |
| | 4 | 6 mm | 1 m. | 170 | 98 | 62 | 42 cm/s | 26 cm/s | | |
| | | | 2 m. | 150 | 85 | 55 | 37 | 23 | | |
| | | | 4 m. | 125 | 70 | 45 | 31 | 19 | | |
| | | | 8 m. | 95 | 56 | 35 | 24 | 15 | | |
| **Size 2** | 5.5 | 8 mm | 1 m. | | | 181 | 126 | 80 | 48 cm/s | 30 cm/s |
| | | | 3 m. | | | 134 | 91 | 58 | 35 | 22 |
| | 6 | 8 mm | 1 m. | | | | 139 | 89 | 54 | 34 |
| | | | 3 m. | | | | 112 | 70 | 43 | 27 |
| | 7 | 10 mm | 1 m. | | | | 148 | 94 | 57 | 37 |
| | | | 3 m. | | | | 125 | 81 | 49 | 31 |
| | 8 | 10 mm | 1 m. | | | | | 102 | 60 | 42 |
| | | | 3 m. | | | | | 90 | 55 | 38 |

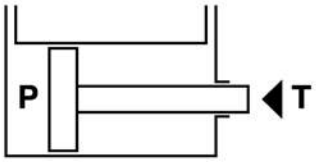
### cylinder working speeds, in cm/s

standard conditions :

- double acting cylinder
- working pressure : P = 6 bar

specific conditions :

- muffled exhaust (non collected)
- 50% loaded cylinder



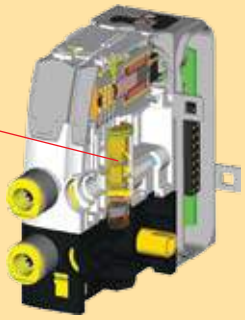

| valve module | tube ID | tube OD | tube length | cylinder bore size 25 mm | 32 mm | 40 mm | 50 mm | 63 mm | 80 mm | 100 mm |
|---|---|---|---|---|---|---|---|---|---|---|
| **Size 1** | 2 | 4 mm | 1 m. | 35 cm/s | 22 cm/s | | | | | |
| | | | 3 m. | 23 | 14 | | | | | |
| | 2 .7 | 4 mm | 1 m. | 67 | 44 | 27cm/s | | | | |
| | | | 3 m. | 44 | 28 | 17 | | | | |
| | 4 | 6 mm | 1 m. | 100 | 87 | 56 | 38 cm/s | 23 cm/s | | |
| | | | 2 m. | 93 | 77 | 46 | 31 | 19 | | |
| | | | 4 m. | 83 | 63 | 37 | 25 | 16 | | |
| | | | 8 m. | 69 | 46 | 28 | 18 | 12 | | |
| **Size 2** | 5.5 | 8 mm | 1 m. | | | 102 | 85 | 54 | 33 cm/s | 22 cm/s |
| | | | 3 m. | | | 87 | 61 | 40 | 24 | 16 |
| | 6 | 8 mm | 1 m. | | | | 91 | 59 | 37 | 25 |
| | | | 3 m. | | | | 77 | 46 | 29 | 19 |
| | 7 | 10 mm | 1 m. | | | | 98 | 63 | 40 | 26 |
| | | | 3 m. | | | | 87 | 54 | 33 | 22 |
| | 8 | 10 mm | 1 m. | | | | | 68 | 43 | 30 |
| | | | 3 m. | | | | | 61 | 38 | 27 |

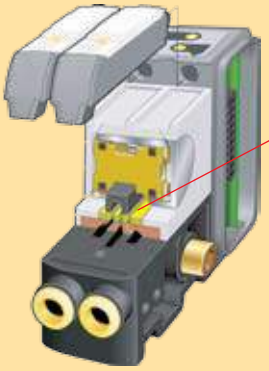
## Two technology platforms

**The well proven Parker seal technology**

WCS Wear Compensating System

For 3/2 and dual 4/2 functions



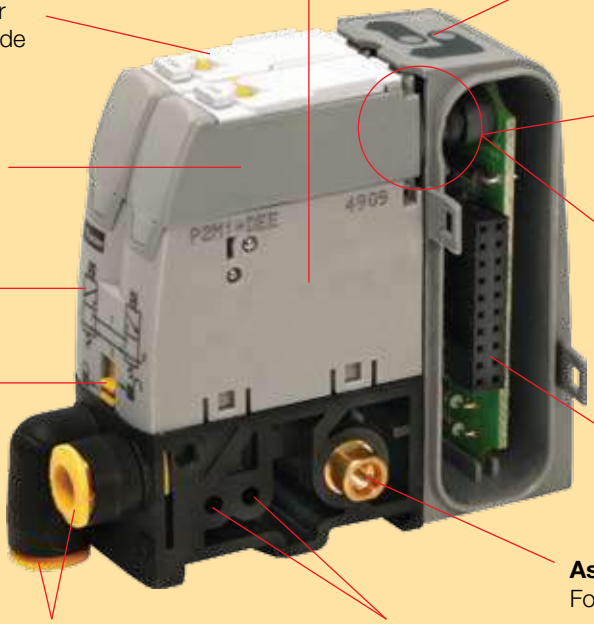


**Ceramic switching technology**
For single 4/2 functions

**Pneumatic valve body**

**Visualisation LED's**
For easy man-machine dialog

**Configurable manual override**
For locking, non-locking or condamned manual override



**24 V DC solenoid valve**

**Pneumatic symbol**

**Locking system for clip-on fittings**

**M8 3 pins connector**
For traditional wiring

**4 mm push-in fitting**
For pneumatic pilot

**Internal connection**
Up to 19 solenoids

**Associating tie-rod**
For easy module assembly

**Straight or elbow clip-on push-in fittings**
For size 1 : 4 or 6 mm OD tubing
For size 2 : from 6 to 12 mm OD tubing

**Auxilliary channels**
Independant pilot pressure and exhaust

## Material Specification

| | | |
|---|---|---|
| Plastics | : | Polyamide reinforced fibreglass |
| Screws | : | Zinc plated steel |
| Seals | : | Nitrile rubber |
| Valve mechanism | : | Aluminium alloy |
| Plate | : | Ceramic |

## Certification

| | | |
|---|---|---|
| EMC / CE mark | : | According to EN 61 000-6-2 |
| Dust & water protection | : | According to EN 60529 - NEMA 4 |
| - S & T series | : | IP67 |
| - V series | : | IP65* |

* For Sub-D 25 connection : IP40 or IP65 depending on the cable

Moduflex specifications answer most industries automation requirements.
Applications run from clean room electronic manufacturing to process industries in aggressive environments.

# *Pneumatic specifications*

## General specifications

| | |
|---|---|
| Fluid | Air, inert gas, filtered 40 µ①, dry② or lubricated③ |
| Operating pressures | - 0.9 to 8 bar |
| Piloting pressures | 3 to 8 bar ④ for operating pressures below, use external pilot supply available on all head modules |
| Pilot supply | Internal with S series, mixed internal/external with T and V series |
| Exhaust collection | All exhausts are collectable, including solenoid pilot exhaust |
| Life cycle | 100 million operations ⑤(with dry air, 3 Hz, 20°C, 6 bar) |
| Operating temperatures | - 15°C to 60°C (0° C to 55°C for field bus systems) |
| Stocking temperatures | - 40°C to 70°C |
| Vibration resistance | According to IEC 68 - 2 - 6 2G 2 to 150 Hz |
| Impact resistance | According to IEC 68 - 2 - 27 15G 11 ms |
| | ① class 5 according to ISO 8573-1<br>② class 4 according to ISO 8573-1<br>③ with lubricated air, we recommend external pilot supply with non lubricated air<br>④ For 2 x 3/2 and 3/2 piloting pressure : 3.5 to 8 bar<br>⑤ For 4/2 valve |

## Flow specifications

| | | Dual 4/2 | Dual 3/2 | Single 3/2 | Single 4/2 |
|---|---|---|---|---|---|
| Size 1 | Q max. (Nl/mn) | 275 | 415 | 415 | 510 |
| | Qn (Nl/mn) | 165 | 235 | 235 | 310 |
| Size 2 | Q max. (Nl/mn) | - | 805 | 805 | 1340 |
| | Qn (Nl/mn) | - | 450 | 440 | 800 |

# *Electrical specifications*

## Solenoid pilot specifications

Solenoid pilot common to all the Moduflex system

| | |
|---|---|
| Rated coil voltage | 24 V DC |
| Allowable voltage fluctuation | - 15 % to + 10 % of rated voltage at 20° C |
| Electrical connection | Polarity insensitive : PNP and NPN compatible |
| Coil insulation type | Class B |
| Power consumption | 1 W (42 mA) |
| Manual override | Configurable: Locking or non-locking, isolated if required |
| Response time of the complete valve | 4/2 bistable valve size 1 9.6 ms ± 1.2 on 4/2 According<br>4/2 bistable valve size 2 14.8 ms ± 2 on 4/2 to ISO 12238 |
| Duty factor | 100 % |
| Dust and water protection | According to EN 60 529, NEMA4 S and T series : IP 67<br>V series : IP 65 *<br>* For Sub-D 25 connection : IP40 or IP65 depending on the cable |

## Communication module specifications

| | | | | | |
|---|---|---|---|---|---|
| All protocols | EMC / CE mark | According to EN 61 000-6-2 EN 50081-2 | | | |
| AS-interface | AS-i line | According to EN 50295 | | | |
| | Module consumption | 70 mA max. (2 slaves) | | | |
| | Max supply for all inputs | 240mA (including internal input consumption) | | | |
| | Internal input consumption | 9 mA for each active input | | | |
| | Inputs | According to IEC 1131-2 classe 2 | | | |
| Device protocols | | Profibus DP | DeviceNet | CANopen | interBus-S |
| | Bus line | According to each bus specification | | | |
| | Module Voltage | 20 to 30 V DC | | | |
| | Module consumption | 1,5 W max. | 1,5 W max. | 1,5 W max. | 2 W max. |
| | Outputs | Overload protection | | | |

## Technical characteristics

### Vacuum module

**Fluid**
Compressed air or inert gas, filtered 40µ mini., not lubricated

**Working pressure**
1 to 8 bar

**Working temperature**
-15°C to +60°C

**Materials**

| | |
|---|---|
| Body : | Polyamide 6,6 reinforced fibreglass |
| Poppet : | Nitrile |
| Nozzle : | Brass |
| Clip connector : | Treated steel |

### Pressure sensor

**Fluid**
Air or inert gas, filtered 40µ mini., not lubricated

**Working temperature**
0°C to +50°C

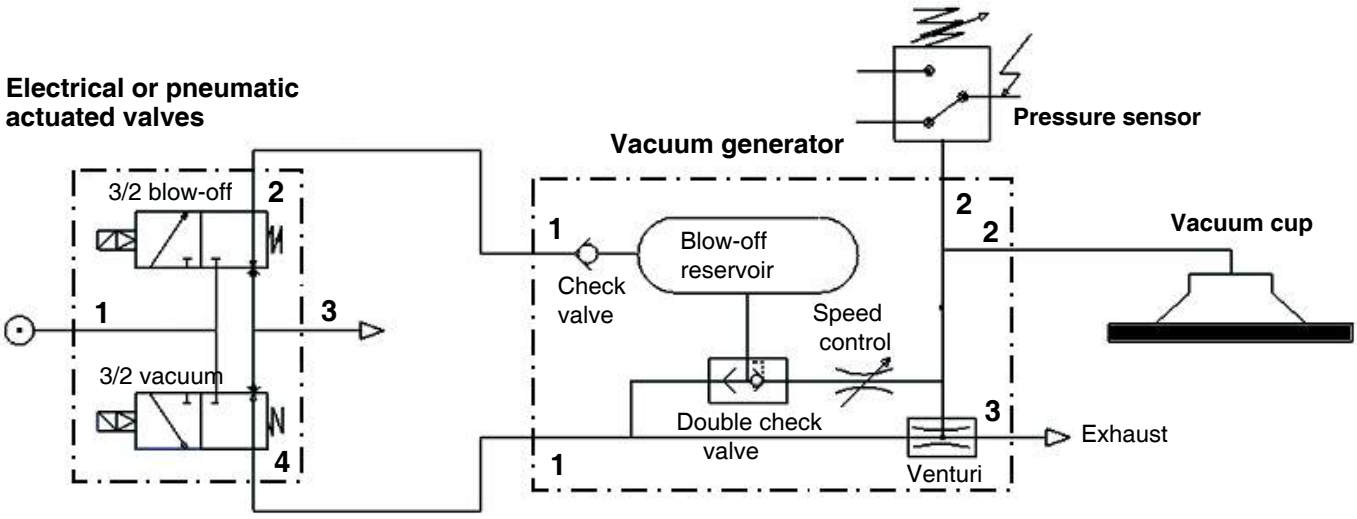
**Supply**
10,8 to 30 V DC

**Digital output**
PNP 125 mA

**Materials**

| | |
|---|---|
| Body : | Polycarbonate |

## Connection drawing



## Specific characteristics

**Maximum vacuum**
Vacuum level : 90% at 6,5 bar

**Air consumption**
Consumption : 46 Nl/min at 5 bar

**Vacuum flow**
Flow : 25Nl/min at 0 % vacuum and 6,5 bar

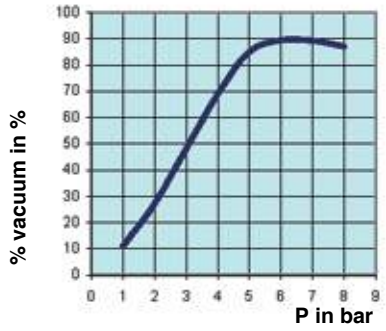
## Evacuation time in s/l to reach different vacuum levels % (at P = 6,5 bar)

| Vacuum % | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 |
|---|---|---|---|---|---|---|---|---|---|---|
| Time in s | 0,0 / 0,0 | 0,3 / 0,3 | 0,4 / 0,5 | 0,8 / 0,9 | 1,4 / 1,5 | 2,0 / 2,2 | 2,7 / 3,2 | 3,7 / 4,9 | 5,9 / 9,8 | 10,7 / - |
| Flow in Nl/min | 24,9 / 23,2 | 22,1 / 20,3 | 19,3 / 17,3 | 16,6 / 14,4 | 13,8 / 11,5 | 11,0 / 8,5 | 8,2 / 5,6 | 5,5 / 2,7 | 2,7 / 0,0 | 0,0 / - |

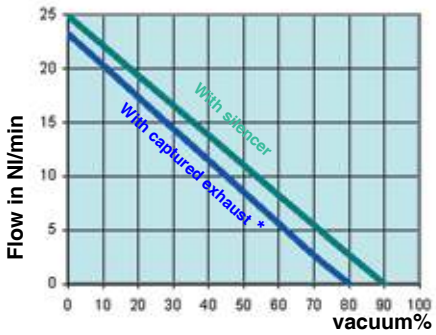
With silencer / With captured exhaust *

## Performances

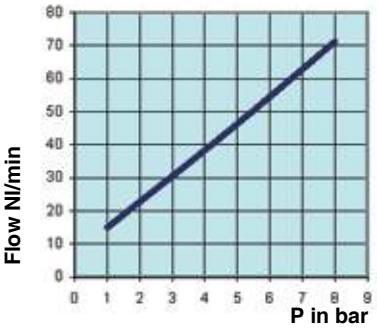
### Vacuum level




### Vacuum flow




### Air consumption




* 1 m exhaust - tube Ø6 mm
3 m exhaust - tube Ø8 mm

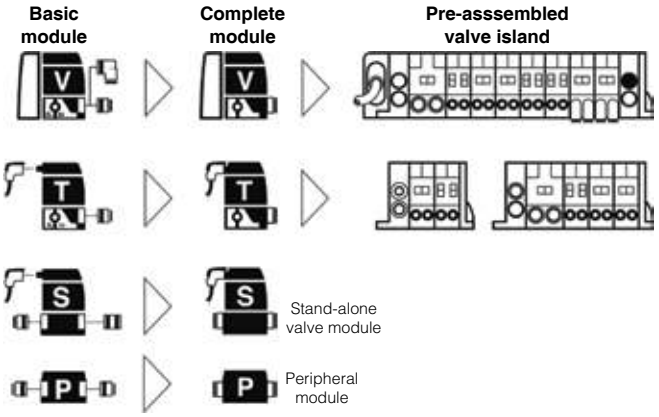
## Operating information

| | |
|---|---|
| Working pressure | -0,9 to 8 bar |
| Pilot pressure | 3 to 8 bar * |
| Working temperature | -15 °C to 60 °C |
| Protection individual connectors | IP 67 NEMA4 |
| Protection integrated connectors | IP 65 |
| Voltage | 24 V DC |
| * Single and double 3/2 | 3,5 to 8 bar |

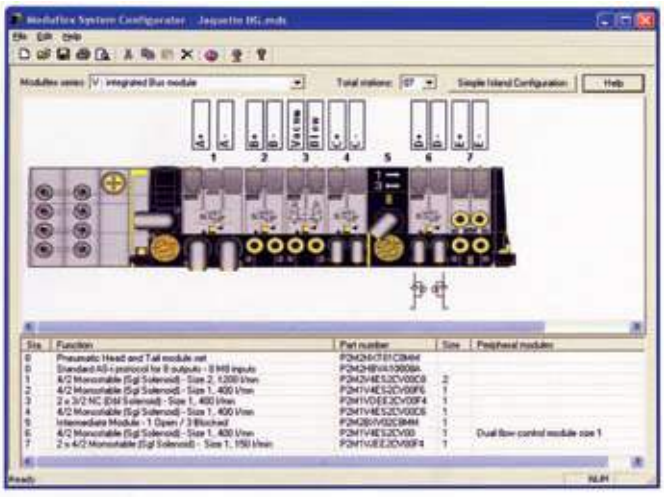
| | | Dual 4/2 | Dual 3/2 | 3/2 | 4/2 |
|---|---|---|---|---|---|
| **Size 1** | **Qmax.** | 275 l/min | 415 l/min | 415 l/min | 510 l/min |
| | **Qn** | 165 l/min | 235 l/min | 235 l/min | 310 l/min |
| **Size 2** | **Qmax.** | - | 805 l/min | 805 l/min | 1340 l/min |
| | **Qn** | - | 450 l/min | 440 l/min | 800 l/min |

## Total ordering flexibillity

Additionally to the complete product adaptability, the Moduflex Valve range offers for V, T, S and P series an ordering flexibility with 3 different designs; from all components separately ordered (basic module) to pre-assembled and tested valve island.




The Moduflex Valve Island Configurator software is the easy way to, step by step, configure and order the required valve island for the application.



## Ordering options

### 1 - Basic modules ordering

Using this option, all basic components are separately ordered :

- Head and Tail set
- Valve modules
- Intermediate module kit
- Peripheral modules
- Pneumatic connectors, mufflers and plugs
- Electrical connection or fieldbus module

The complete bill of material needed for the valve island assembly can be easily details using page 1 of the Moduflex Valve Configurator software report.

### 2 - Complete modules ordering

Using this option, modules are defined, ordered and supplied, pneumatic connectors and electrical connection equiped. One part number defines :

- Function module
- Pneumatic connectors, muffler and plugs
- Electrical connection and cable

For an entire valve island configuration, the list of complete modules can be easily details using page 3 of the Moduflex Valve Configurator software report.

### 3 - Pre-assembled valve islands ordering

Using this option, the complete valves island configuration has to be defined, and may be ordered, delivered fully assembly and tested under one part number.

The Moduflex Valve Configurator software is an easy way for a clear definition of the requested valve island configuration.

# Moduflex Valve System - P2M

## V series

**Integrated connection field bus or multi-connector valve island**

Pages 16-19

## T series

**Individual connector valve islands**
Solenoid or air pilot

Pages 20-21

Pages 26-27

## S series

**Stand alone valves**
Solenoid or air pilot

Pages 22-23

Page 28

## P series

**Peripheral modules**
Flow control, check valves, pressure regulator, vacuum

Pages 24-25

Page 29

## Moduflex Valve Configurator software

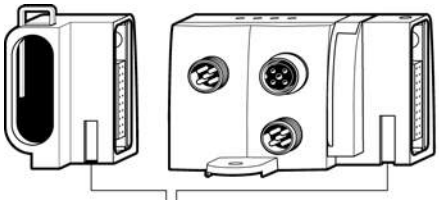

Page 30

## Integrated connections valve islands : V series

In a V series Moduflex valve island, electrical controls are all received by the head module and transmitted to the concerned valve modules through the modular integrated circuit.

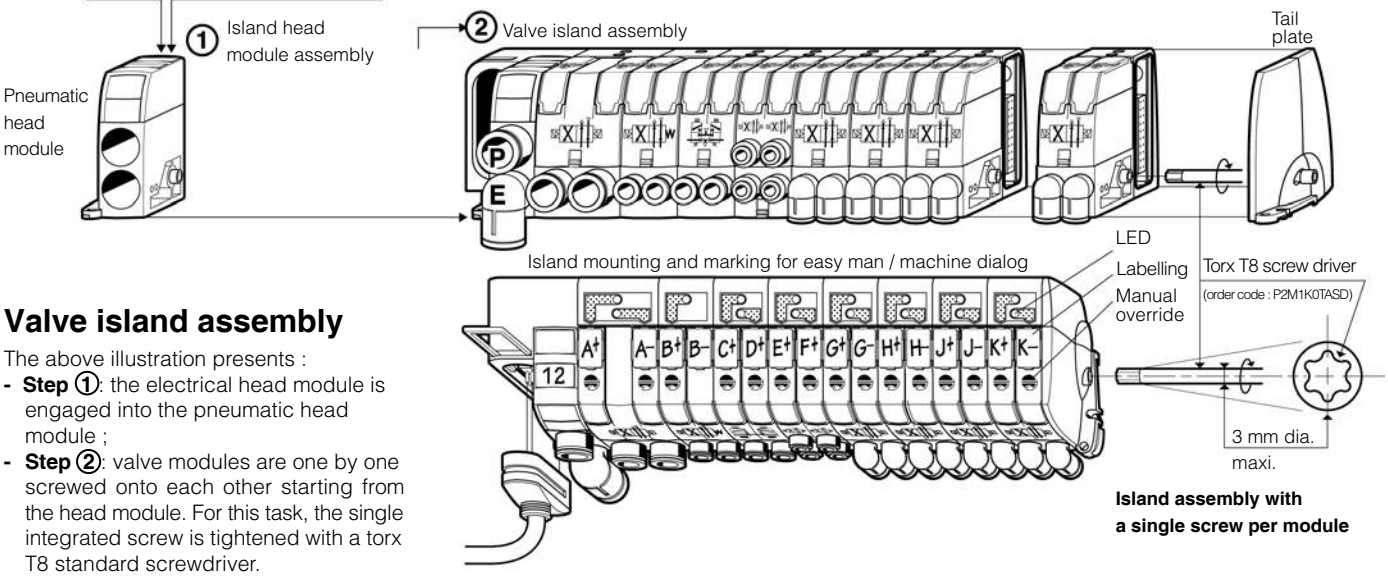
The head module may either be a cable multi-connector or a Fieldbus communication module : the next pages show multi-connector cable and a complete choice of bus protocoles.

Valve island electrical head module :
multi-connector or field bus connection



## Valve island configuration

The following page shows all valve sizes and functions that may enter into a V series valve island and, for each valve size, a choice of clip-on pneumatic connectors : tubing size, straight, elbow...
To receive its pressure supply and collect its exhaust, the island also requires a pneumatic head and tail module set and sometimes an intermediate module set with 4 configuration plates for different functions.
To receive its electrical controls, the island is completed by an electrical head module, either a multi-connector or by a bus module to be chosen from the next pages.




## Valve island assembly

The above illustration presents :
- **Step ①**: the electrical head module is engaged into the pneumatic head module ;
- **Step ②**: valve modules are one by one screwed onto each other starting from the head module. For this task, the single integrated screw is tightened with a torx T8 standard screwdriver.

The pneumatic connectors may be clipped or unclipped at any stage.

With a LED, a manual override and a labelling for each valve pilot (see illustration), the island front face eases the "man / machine" dialog.

The resulting valve island length is expressed by the drawing below, while further size details and mountings are presented on dimensions pages.

## Modules and island ordering

Choice between 3 approaches :
**1 - Basic modules ordering :**
The following page shows these modules supplied without connector, together with the choice of clip-on connectors separately supplied (10 units packs). This approach gives the maximum flexibility.

**2 - Complete modules ordering :**
Page 27 shows the ordering chart for modules supplied with their connectors.
**3 - Assembled island ordering :**
Page 30 shows the valve island configurator CD-Rom to specify a valve island that may be delivered assembled.

.

Field bus head module :
▪ width : 94 mm

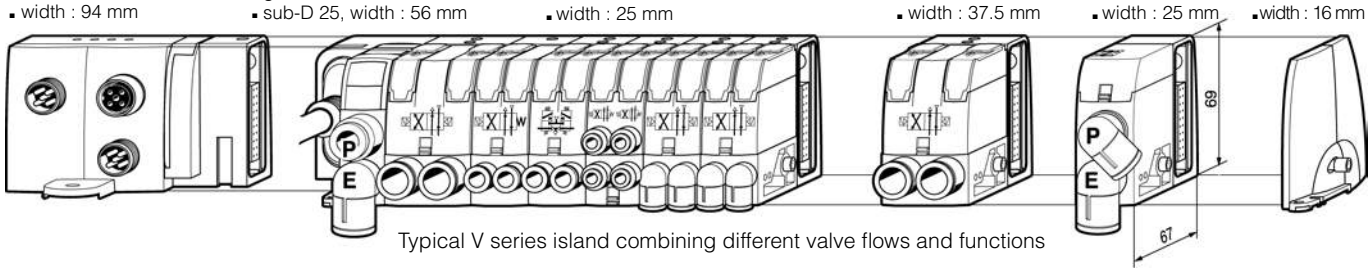
Multi-connector head module :
▪ guillotine, width : 47 mm
▪ sub-D 25, width : 56 mm

Valve modules size 1 :
▪ width : 25 mm

Valve module size 2 :
▪ width : 37.5 mm

Intermediate module :
▪ width : 25 mm

Tail plate :
▪ width : 16 mm




Typical V series island combining different valve flows and functions

## Basic modules (without connector)

| Valve Modules | | | Size 1 | | Size 2 | |
|---|---|---|---|---|---|---|
| | Symbol | Description | Weight (g) | **Order code** | Weight (g) | **Order code** |
| Size 1  |  | 4/2 Solenoid spring | 94 | **P2M1V4ES2CV** | 100 | **P2M2V4ES2CV** |
| |  | 4/2 Double solenoid | 103 | **P2M1V4EE2CV** | 110 | **P2M2V4EE2CV** |
| |  | 2 x 3/2 NC + NC<br>with exhaust check valves | 106 | **P2M1VDEE2CV** | 115 | **P2M2VDEE2CV** |
| |  | 2 x 3/2 NO + NO<br>with exhaust check valves | 106 | **P2M1VCEE2CV** | 115 | **P2M2VCEE2CV** |
| Size 2  |  | 2 x 3/2 NC + NO<br>with exhaust check valves | 106 | **P2M1VEEE2CV** | 115 | **P2M2VEEE2CV** |
| |  | 2 x 4/2 Solenoid spring<br>with exhaust check valves | 114 | **P2M1VJEE2CV** | | |
| |  | 3/2 NC<br>with exhaust check valves | 102 | **P2M1V3ES2CV** | 110 | **P2M2V3ES2CV** |
| |  | 4/3 Centre exhaust<br>2 x 3/2 NC + NC<br>without exhaust check valves | 106 | **P2M1VGEE2CV** | 115 | **P2M2VGEE2CV** |

## Island head and intermediate module sets

| Valve Modules | | | Size 2 | |
|---|---|---|---|---|
| | Description | | Weight (g) | **Order code** |
|  **P2M2HXT01** | Valve island pneumatic<br>head and tail module set | | 64 | **P2M2HXT01** |
|  **P2M2BXV0A** | Valve island intermediate<br>supply module with a set<br>of 4 configuration plates | | 68 | **P2M2BXV0A** |

## Clip-On pneumatic connectors *

| Valve Modules | | | Size 1 | | Size 2 | |
|---|---|---|---|---|---|---|
| | Description | Tube OD | Weight (g) | **Order code** | Weight (g) | **Order code** |
|  | Straight connector | G1/8" | 2 | **FMDG1-1** | | |
| | | 4 mm | 2 | **FMD04-1** | | |
| | | 6 mm | 3 | **FMD06-1** | 3 | **FMD06-2** |
| | | 8 mm | | | 4 | **FMD08-2** |
| | | 10 mm | | | 5 | **FMD10-2** |
| | | 12 mm | | | 6 | **FMD12-2** |
|  | Elbow connector | G1/8" | 3 | **CMDG1-1** | | |
| | | 4 mm | 3 | **CMD04-1** | | |
| | | 6 mm | 5 | **CMD06-1** | 5 | **CMD06-2** |
| | | 8 mm | | | 6 | **CMD08-2** |
| | | 10 mm | | | 7 | **CMD10-2** |
| | | 12 mm | | | 8 | **CMD12-2** |
|  | Silencer | | | | 5 | **MMDVA2** |
| | Plug | | 3 | **PMDXX1** | 5 | **PMDXX2** |

* Fittings and plugs pack quantity : 10

## Electrical multi-connection and field bus head modules

Multiconnector or field bus head module to be chosen from next pages.

## V series valve island : Electrical multi-connector head module

| Description | | Protection | Cable length | Weight (g) | Order code |
|---|---|---|---|---|---|
| **Guillotine type** | Multi-connection head module | | | 38 | **P2M2HEV0A** |
| | Guillotine connector with flying leads multi-cable | IP65 | 2 m | 335 | **P8LMH20M2A** |
| | | | 5 m | 802 | **P8LMH20M5A** |
| | | | 9 m | 1425 | **P8LMH20M9A** |
| **Standard Sub-D 25 type** | Multi-connection head module | | | 60 | **P2M2HEV0D** |
| | Sub-D 25 connector with flying leads multi-cable | IP40 | 3 m | 435 | **P8LMH25M3A** |
| | | | 9 m | 1425 | **P8LMH25M9A** |
| | | IP65 | 9 m | 1425 | **P8LMH25B9A** |

## V series valve island : Electrical field bus head modules for AS-i protocol

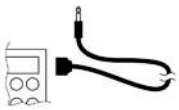
| Description | No outputs / node add. | Input connections | Weight (g) | Order code |
|---|---|---|---|---|
| **Standard AS-i protocol** (Up to 31 nodes) | 8 Outputs / 2 addresses | No. input | 150 | **P2M2HBVA10800** |
| | | 8 M8 inputs | 200 | **P2M2HBVA10808A** |
| | | 8 inputs on 4 M12 | 200 | **P2M2HBVA10808B** |
| | 4 Outputs / 1 address | No. input | 150 | **P2M2HBVA10400** |
| | | 4 inputs on 4 M12 | 200 | **P2M2HBVA10404B** |
| **Extended AS-i protocol** (Up to 62 nodes - A/B coding) | 8 Outputs / 2 addresses | No. input | 150 | **P2M2HBVA20600** |
| | | 8 M8 inputs | 200 | **P2M2HBVA20608A** |
| | | 8 inputs on 4 M12 | 200 | **P2M2HBVA20608B** |

## AS-i head module accessories

**P8CS0803J**

**P8CSY1212A**

| Description | Connector type | Weight (g) | Order code |
|---|---|---|---|
| Cable quick connect connector | M8 Male | 25 | **P8CS0803J** |
| | M12 Male - A coding | 25 | **P8CS1204J** |
| « Y » shape | M12 Male - 2 x M12 Female | 25 | **P8CSY1212A** |



| | | | |
|---|---|---|---|
| Addressing cable 1 meter | M12 Male - Jack | 100 | **P8LS12JACK** |

## V series valve island : Electrical field bus head modules for device bus

Electrical modules for 16 outputs
(The V series modules may have up to 16 solenoid pilot valves)

| Description | Bus Protocol | Bus In / Bus Out | Power supply | Weight (g) | Order code |
|---|---|---|---|---|---|
| **Moduflex Bus Communication module** | **Profibus DP** | M12 - B coding | M12 - A coding | 250 | **P2M2HBVP21600** |
| | For GSD file, go to http://www.parker.com/pneu/moduflex | | | | |
| | **DeviceNet** | M12 - A coding | M12 - A coding | 250 | **P2M2HBVD21600** |
| | For EDS file, go to http://www.parker.com/pneu/moduflex | | | | |
| | **CANopen** | M12 - A coding | M12 - A coding | 250 | **P2M2HBVC21600** |
| | For EDS file, go to http://www.parker.com/pneu/moduflex | | | | |
| | **InterBus-S** | M23 - 9 Pins | M12 - A coding | 300 | **P2M2HBVS11600** |

## Device Bus connection accessories

**P2M2HBVP21600**

**P8CS1205AA**

| Description | Bus Protocol | Connector type | Weight (g) | Order code |
|---|---|---|---|---|
| Power supply female straight connector | All | M12 - A coding | 25 | **P8CS1205AA** |
| Bus IN female connector | DeviceNet CANopen | M12 - A coding | 25 | **P8CS1205AA** |
| | Profibus DP | M12 - B coding | 25 | **P8CS1205AB** |
| Bus OUT male connector | DeviceNet CANopen | M12 - A coding | 25 | **P8CS1205BA** |
| | Profibus DP | M12 - B coding | 25 | **P8CS1205BB** |
| Line termination | DeviceNet CANopen | M12 - A coding | 25 | **P8BPA00MA** |
| | Profibus DP | M12 - B coding | 25 | **P8BPA00MB** |

M12 - A coding connector

M12 - B coding connector

## Individual connection valve islands : T series

In a T series valve island, electrical controls are individually connected to each valve module, onto its solenoid pilot.

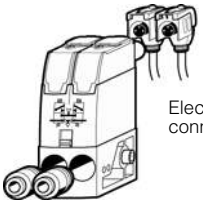
As an alternative, air pilot valve modules are also available, to be controlled by individual pneumatic signals.

## Valve island assembly

As shown by the above illustration, the valve modules are one by one screwed onto each other, starting from the head module. For this task, the single integrated screw is tightened with a torx T8 standard screwdriver.
The pneumatic connectors may be clipped or unclipped at any stage.
With a LED, a manual override and a labelling for each valve pilot (see above illustration), the island front face eases the "man / machine" dialog.
The resulting valve island length is expressed by the drawing below, while further size details and mountings are presented on dimensions pages.

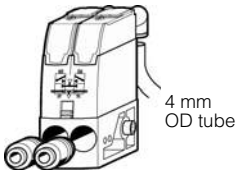
## Valve pilot connections

**1 - Solenoid valve modules**




Each solenoid shows a M8 connection. Lockable clip-on connectors, IP67 protected, with LED, voltage surge protection and flying lead cable may be ordered for the required lenght (separate order on next page or see p.27 for complete module order).

**2 - Air pilot valve modules**

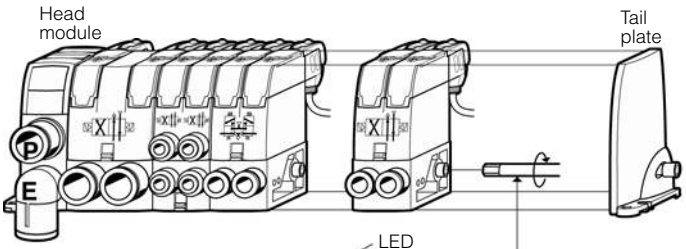



No connector has to be ordered : each pneumatic pilot port includes its integrated swivable elbow 4 mm OD tube push-in connector.

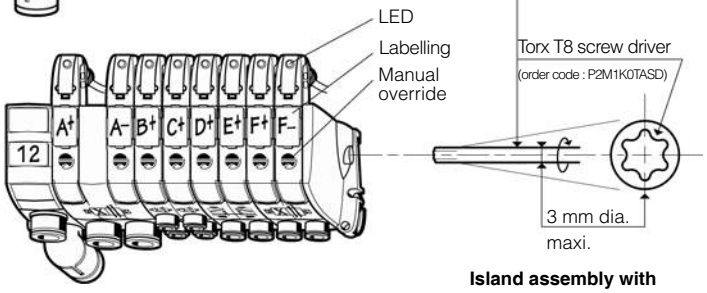
## Valve island configuration

The following page presents all valve sizes and functions that may enter into a T series valve island and, for each valve size, a choice of clip-on pneumatic connectors : tubing size, straight, elbow...
To receive its pressure supply and collect its exhaust, the island also requires a pneumatic head and tail module set and sometimes an intermediate module set including 4 configuration plates for different functions. Valve modules may either be solenoid versions or air pilot versions. Mixing both versions into the same valve island is possible.

**Valve island assembly**




**Island mounting and marking for easy man / machine dialog**



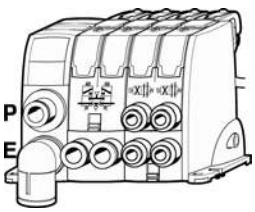

**Island assembly with a single screw per module**

## Modules and island ordering

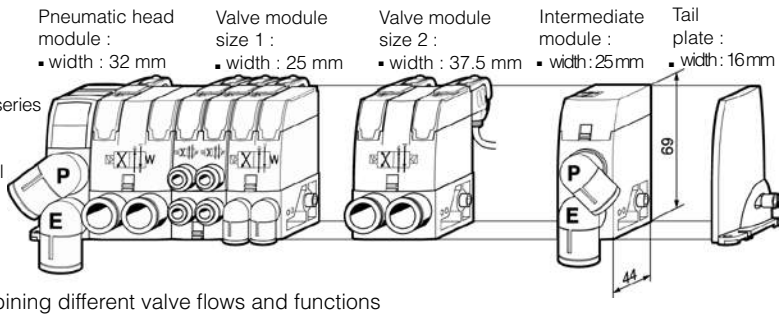
Choice between 3 approaches :
**1 - Basic modules ordering :**
The following page shows these modules supplied without connector, together with the choice of clip-on connectors separately supplied (10 units packs). This approach gives the maximum flexibility.

**2 - Complete modules ordering :**
Page 27 shows the ordering chart for modules supplied with their connectors.
**3 - Assembled island ordering :**
Page 30 shows the valve island configurator CD-Rom to specify a valve island that may be delivered assembled.

Typical T series short island for single or double acting small cylinders.




Typical T series hight flow island for both small and large cylinders.




Typical T series islands combining different valve flows and functions

## Basic modules (without connector)

| Valve Modules | | | | | Size 1 | | Size 2 |
|---|---|---|---|---|---|---|---|
| | Symbol | Description | Actuator | Weight (g) | **Order code** | Weight (g) | **Order code** |
|  Size 1 Dual 4/2 |  | 4/2 Spring return | Solenoid<br>Air pilot | 68<br>63 | **P2M1T4ES2C**<br>**P2M1T4PS** | 74<br>69 | **P2M2T4ES2C**<br>**P2M2T4PS** |
| |  | 4/2 Double pilot | Solenoid<br>Air pilot | 77<br>67 | **P2M1T4EE2C**<br>**P2M1T4PP** | 83<br>73 | **P2M2T4EE2C**<br>**P2M2T4PP** |
|  Size 1 |  | 2 x 3/2 NC + NC<br>with exhaust check valves | Solenoid<br>Air pilot | 80<br>70 | **P2M1TDEE2C**<br>**P2M1TDPP** | 94<br>84 | **P2M2TDEE2C**<br>**P2M2TDPP** |
| |  | 2 x 3/2 NO + NO<br>with exhaust check valves | Solenoid<br>Air pilot | 80<br>70 | **P2M1TCEE2C**<br>**P2M1TCPP** | 94<br>84 | **P2M2TCEE2C**<br>**P2M2TCPP** |
| |  | 2 x 3/2 NC + NO<br>with exhaust check valves | Solenoid<br>Air pilot | 80<br>70 | **P2M1TEEE2C**<br>**P2M1TEPP** | 94<br>84 | **P2M2TEEE2C**<br>**P2M2TEPP** |
|  Size 2 |  | 2 x 4/2 Spring return<br>with exhaust check valves | Solenoid<br>Air pilot | 88<br>78 | **P2M1TJEE2C**<br>**P2M1TJPP** | | |
| |  | 3/2 NC<br>with exhaust check valves | Solenoid<br>Air pilot | 76<br>71 | **P2M1T3ES2C**<br>**P2M1T3PS** | 90<br>70 | **P2M2T3ES2C**<br>**P2M2T3PS** |
| |  | 4/3 Centre exhaust<br>2 x 3/2 NC + NC<br>without exhaust check valves | Solenoid<br>Air pilot | 80<br>70 | **P2M1TGEE2C**<br>**P2M1TGPP** | 94<br>84 | **P2M2TGEE2C**<br>**P2M2TGPP** |

## Island head and intermediate module sets

| Valve Modules | | | | Size 2 |
|---|---|---|---|---|
| | Description | | Weight (g) | **Order code** |
|  P2M2HXT01 | Valve island pneumatic head and tail module set | | 64 | **P2M2HXT01** |
|  P2M2BXT0A | Valve island intermediate supply module with a set of 4 configuration plates | | 64 | **P2M2BXT0A** |

## Clip-On pneumatic connectors *

| Valve Modules | | | | Size 1 | | Size 2 |
|---|---|---|---|---|---|---|
| | Description | Tube OD | Weight (g) | **Order code** | Weight (g) | **Order code** |
|  | Straight connector | G1/8" | 2 | **FMDG1-1** | | |
| | | 4 mm | 2 | **FMD04-1** | | |
| | | 6 mm | 3 | **FMD06-1** | 3 | **FMD06-2** |
| | | 8 mm | | | 4 | **FMD08-2** |
| | | 10 mm | | | 5 | **FMD10-2** |
| | | 12 mm | | | 6 | **FMD12-2** |
|  | Elbow connector | G1/8" | 3 | **CMDG1-1** | | |
| | | 4 mm | 3 | **CMD04-1** | | |
| | | 6 mm | 5 | **CMD06-1** | 5 | **CMD06-2** |
| | | 8 mm | | | 6 | **CMD08-2** |
| | | 10 mm | | | 7 | **CMD10-2** |
| | | 12 mm | | | 8 | **CMD12-2** |
| | Silencer | | | | 5 | **MMDVA2** |
| | Plug | | 3 | **PMDXX1** | 5 | **PMDXX2** |

* Fittings and plugs pack quantity : 10

## Electrical connectors

| | Description | Connector type | Cable length | Weight (g) | **Order code** |
|---|---|---|---|---|---|
|  | Clip-on individual electrical connector, for each solenoid pilot IP67 protected, including LED, voltage surge protection and flying lead cable | M8 / 2 x Flying leads | 2 meters | 62 | **P8LS08L226C** |
| | | | 5 meters | 155 | **P8LS08L526C** |
| | | | 9 meters | 180 | **P8LS08L926C** |
| | Straight cable quick connect to thread connector, IP67 protected | M8 | | 12 | **P8CS0803J** |
| | | M12 | | 15 | **P8CS1204J** |

## Stand-Alone Valve Modules : S series

Very useful to control isolated cylinders, these stand-alone valves module are compact and easy to mount on the machines with neat electrical and pneumatic connections.

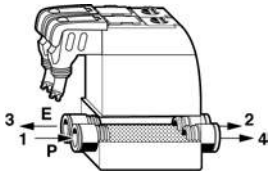
As an alternative to electrical controls, valves with air pilots are also available, to be controlled by individual pneumatic signals.

## Valve functions

The following page shows all valve sizes and functions and, for each valve size, a choice of clip-on pneumatic connectors : tubing size, straight, elbow, ...

## Valve main connections

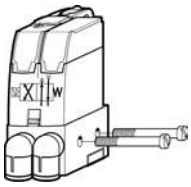
- Outlets to cylinders (ports 2 and 4) on one side.
- Supply P (port 1) and exhaust E (port 3) on the other side. At port 3, exhaust may be collected or receive a clip-on muffler.




## Valve mounting

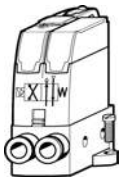
All valves may be mounted either with side screws or with their integrated retractable brackets.

**Side screw mounting**



The brackets are then retracted.

**Optional foot mounting**

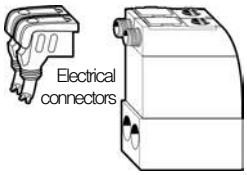


The brackets are then extended.

## Valve pilot connections

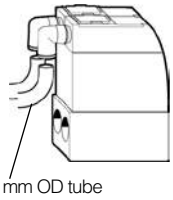
**1- Solenoid valve modules**

Each solenoid presents an M8 connection. Lockable clip-on connectors, IP 67 protected, with LED, voltage surge protection and flying lead cable may be ordered for the required length. (Separate order on next page, or see page 28 for complete module order).




**2- Air pilot valve modules**

No connector has to be ordered : each pneumatic pilot port includes its integrated swivable elbow 4 mm OD tube push-in connector.



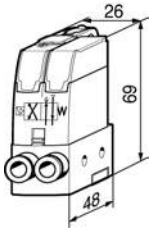

## Modules and island ordering

Choice between 2 approaches :

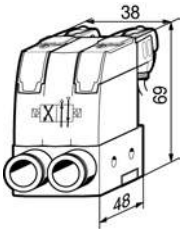
**1 - Basic modules ordering :**
The following page shows these modules supplied without connector, together with the choice of clip-on connectors separately supplied (10 units packs). This approach gives the maximum flexibility.

**2 - Complete modules ordering :**
Page 28 shows the ordering chart for modules supplied with their pneumatic and electrical connectors and muffler.

Valve module
size 1




Valve module
size 2



## Basic modules (without connector)

| Valve Modules | | | | | Size 1 | | Size 2 |
|---|---|---|---|---|---|---|---|
| | Symbol | Description | Actuator | Weight (g) | **Order code** | Weight (g) | **Order code** |
|  Size 1 |  | 4/2 Spring return | Solenoid<br>Air pilot | 72<br>67 | **P2M1S4ES2C**<br>**P2M1S4PS** | 72<br>67 | **P2M2S4ES2C**<br>**P2M2S4PS** |
| |  | 4/2 Double pilot | Solenoid<br>Air pilot | 87<br>77 | **P2M1S4EE2C**<br>**P2M1S4PP** | 87<br>77 | **P2M2S4EE2C**<br>**P2M2S4PP** |
| |  | 2 x 3/2 NC + NC<br>with exhaust check valves | Solenoid<br>Air pilot | 85<br>75 | **P2M1SDEE2C**<br>**P2M1SDPP** | 85<br>75 | **P2M2SDEE2C**<br>**P2M2SDPP** |
| |  | 2 x 3/2 NO + NO<br>with exhaust check valves | Solenoid<br>Air pilot | 85<br>75 | **P2M1SCEE2C**<br>**P2M1SCPP** | 85<br>75 | **P2M2SCEE2C**<br>**P2M2SCPP** |
|  Size 2 |  | 2 x 3/2 NC + NO<br>with exhaust check valves | Solenoid<br>Air pilot | 85<br>75 | **P2M1SEEE2C**<br>**P2M1SEPP** | 85<br>75 | **P2M2SEEE2C**<br>**P2M2SEPP** |
| |  | 3/2 NC<br>with exhaust check valves | Solenoid<br>Air pilot | 85<br>75 | **P2M1S3ES2C**<br>**P2M1S3PS** | 85<br>75 | **P2M2S3ES2C**<br>**P2M2S3PS** |
| |  | 4/3 Centre exhaust<br>2 x 3/2 NC + NC<br>without exhaust check valves | Solenoid<br>Air pilot | 85<br>75 | **P2M1SGEE2C**<br>**P2M1SGPP** | 85<br>75 | **P2M2SGEE2C**<br>**P2M2SGPP** |

## Clip-On pneumatic connectors *

| Valve Modules | | | | Size 1 | | Size 2 |
|---|---|---|---|---|---|---|
| | Description | Tube OD | Weight (g) | **Order code** | Weight (g) | **Order code** |
|  | Straight connector | G1/8" | 2 | **FMDG1-1** | | |
| | | 4 mm | 2 | **FMD04-1** | | |
| | | 6 mm | 3 | **FMD06-1** | 3 | **FMD06-2** |
| | | 8 mm | | | 4 | **FMD08-2** |
| | | 10 mm | | | 5 | **FMD10-2** |
| | | 12 mm | | | 6 | **FMD12-2** |
|  | Elbow connector | G1/8" | 3 | **CMDG1-1** | | |
| | | 4 mm | 3 | **CMD04-1** | | |
| | | 6 mm | 5 | **CMD06-1** | 5 | **CMD06-2** |
| | | 8 mm | | | 6 | **CMD08-2** |
| | | 10 mm | | | 7 | **CMD10-2** |
| | | 12 mm | | | 8 | **CMD12-2** |
|  | Silencer | | 3 | **MMDVA1** | 5 | **MMDVA2** |
| | Plug | | 3 | **PMDXX1** | 5 | **PMDXX2** |

* Fittings and plugs pack quantity : 10

## Electrical connectors

|  | Description | Connector type | Cable length | Weight (g) | **Order code** |
|---|---|---|---|---|---|
| | Clip-on individual electrical connector, for each solenoid pilot IP67 protected, including LED, voltage surge protection and flying lead cable | M8 / 2 x Flying leads | 2 meters | 62 | **P8LS08L226C** |
| | | | 5 meters | 155 | **P8LS08L526C** |
| | | | 9 meters | 180 | **P8LS08L926C** |
| | Straight cable quick connect to thread connector, IP67 protected | M8 | | 12 | **P8CS0803J** |
| | | M12 | | 15 | **P8CS1204J** |

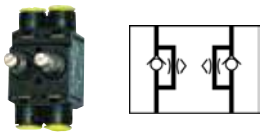
## Peripheral Valve Modules : P series

Four additional peripheral modules complete the valve system in order to facilitate the installation of specific cylinder controls :
- Dual flow control, for cylinder speed adjusting;
- Dual pilot operated check valve, for cylinder positionning;
- Pressure regulator, for cylinder thrust adjusting;
- Vacuum generator, for vacuum pad controls.

## Module function selection

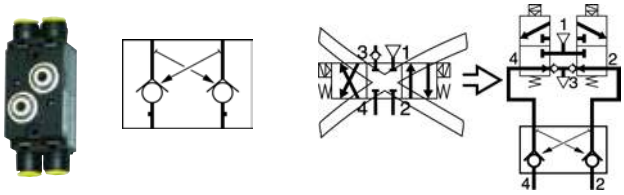
### Dual flow control

By controlling the exhaust flows of a double acting cylinder, this module can adjust both speeds : forward and backward.



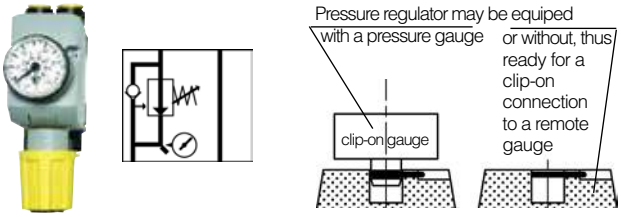
### Dual pilot operated check valve

Combined with a double 3/2 NC + NC valve, this module will block flows and stop cylinder movement as soon as the valve outputs are both exhausted. Better than a 3 position closed centre valve, it provides accurate positionning when mounted close to the cylinder.



### Pressure regulator

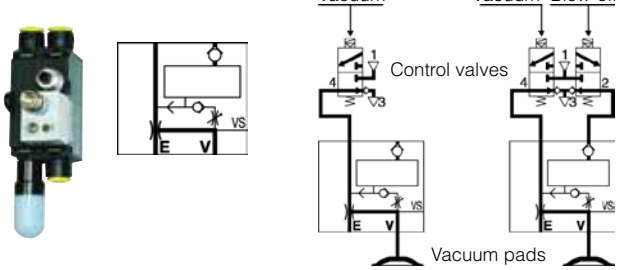
The thrust developped by a cylinder often requires adjustment by controlling the pressure to the front or back of the piston. This pressure regulator module enables manual adjustment of pressure on one side of the piston, with visual indication provided by the pressure gauge.



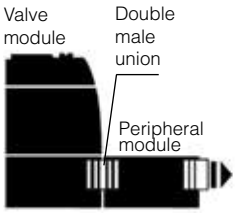

### Vacuum generator

This multi-purpose module controls vacuum pads with a choice between two basics schematics :
- Controlled with only one 3/2 NC valve, the vacuum generator provides vacuum to the pads during valve actuation and then blow-off supplied from an integrated chamber.
- Controlled with a double 3/2 NC + NC, the vacuum generator provides vacuum during the first valve actuation, and then strong blow-off from the second valve.

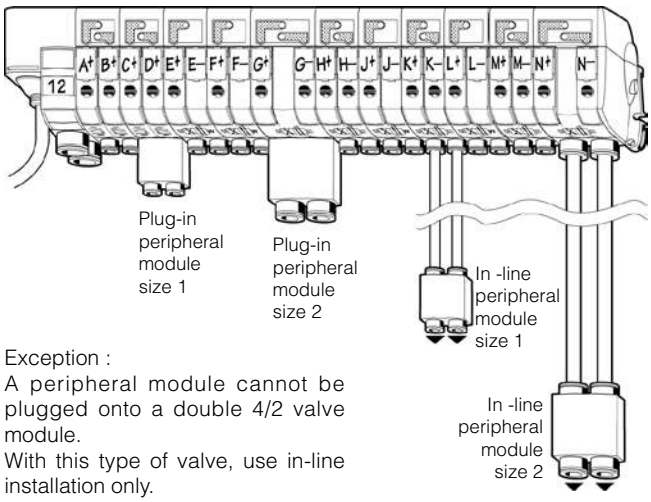
Integrated blow-off flow controller. Optional plug-in vacuum sensor.




## Module installation selection



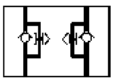
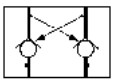
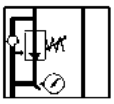
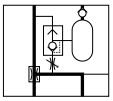

Stand alone valve complete with a plug-in peripheral module


Peripheral modules may either be mounted :
- Plugged into the valve module through double male unions;
- Or in line, close to the cylinder to control it better.


Exception :
A peripheral module cannot be plugged onto a double 4/2 valve module.
With this type of valve, use in-line installation only.

## Basic peripheral modules (without connector)

| Peripheral Modules | | | | | Size 1 | | Size 2 |
|---|---|---|---|---|---|---|---|
| | Symbol | Description | | Weight (g) | **Order code** | Weight (g) | **Order code** |
|  |  | Dual flow control | | 50 | **P2M1PXFA** | 50 | **P2M2PXFA** |
|  |  | Dual P.O. check valve | | 50 | **P2M1PXCA** | 50 | **P2M2PXCA** |
|  |  | Pressure regulator | Pressure range / Gauge | | | | |
| | | | 0 - 2 bar / 0 - 4 bar | 135 | **P2M1PXSR** | 135 | **P2M2PXSR** |
| | | | 0 - 2 bar / Without | 105 | **P2M1PXST** | 165 | **P2M2PXST** |
| | | | 0 - 4 bar / 0 - 7 bar | 135 | **P2M1PXSM** | 135 | **P2M2PXSM** |
| | | | 0 - 4 bar / Without | 105 | **P2M1PXSL** | 165 | **P2M2PXSL** |
| | | | 0 - 8 bar / 0 - 11 bar | 135 | **P2M1PXSG** | 135 | **P2M2PXSG** |
| | | | 0 - 8 bar / Without | 105 | **P2M1PXSN** | 165 | **P2M2PXSN** |
|  |  | 90% Vacuum generator | | 30 | **P2M1PXVA** | | |

## Clip-On pneumatic connectors *

| Valve Modules | | | | Size 1 | | Size 2 |
|---|---|---|---|---|---|---|
| | Description | Tube OD | Weight (g) | **Order code** | Weight (g) | **Order code** |
|  | Straight connector | G1/8" | 2 | **FMDG1-1** | | |
| | | 4 mm | 2 | **FMD04-1** | | |
| | | 6 mm | 3 | **FMD06-1** | 3 | **FMD06-2** |
| | | 8 mm | | | 4 | **FMD08-2** |
| | | 10 mm | | | 5 | **FMD10-2** |
| | | 12 mm | | | 6 | **FMD12-2** |
|  | Elbow connector | G1/8" | 3 | **CMDG1-1** | | |
| | | 4 mm | 3 | **CMD04-1** | | |
| | | 6 mm | 5 | **CMD06-1** | 5 | **CMD06-2** |
| | | 8 mm | | | 6 | **CMD08-2** |
| | | 10 mm | | | 7 | **CMD10-2** |
|  | | 12 mm | | | 8 | **CMD12-2** |
| | Double male union | | 5 | **HMDXX1** | 8 | **HMDXX2** |
| | Silencer | | 3 | **MMDVA1** | | |
| | Plug | | 3 | **PMDXX1** | 5 | **PMDXX2** |

* Fittings and plugs pack quantity : 10

## Clip-on accessories

| | Description | Connection | Pressure range | Weight (g) | **Order code** |
|---|---|---|---|---|---|
|  | Clip-on pressure gauge for pressure regulator modules, size 1 or size 2 | Clip-on | 0 to 4 bar | 30 | **P2M1K0GT** |
| | | | 0 to 7 bar | 30 | **P2M1K0GL** |
| | | | 0 to 11 bar | 30 | **P2M1K0GN** |
|  | Clip-on vacuum sensor for vacuum generator module | M8 | 0 to -1 bar | 25 | **MPS-V6T-PC** |
| | Pressure sensors are equipped with an output LED and a switch point trimmer | Flying lead 2 meter cable | 0 to -1 bar | 25 | **MPS-V6T-PG** |

## Complete module ordering, as compared to basic module ordering

### Complete modules

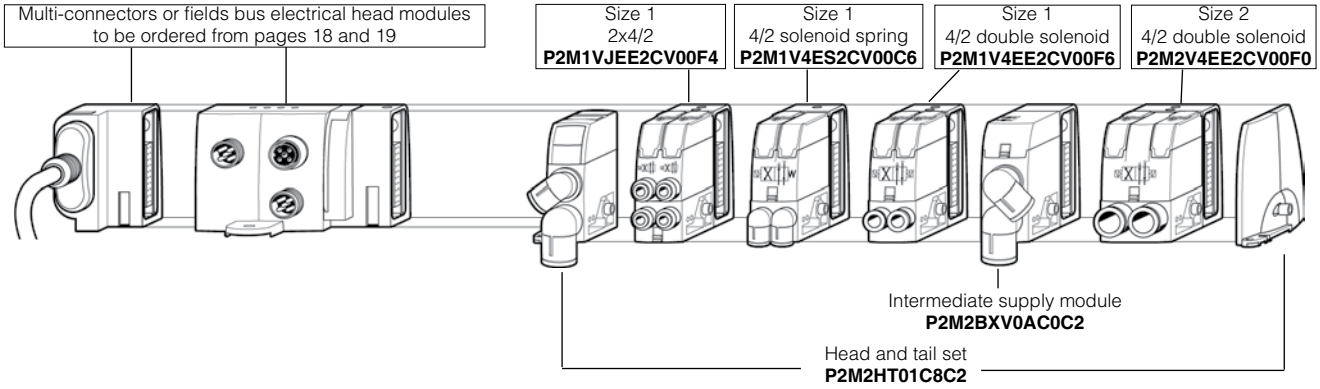
Ordered from the following pages, the complete modules are supplied all equiped with their electrical and pneumatic connectors.
Only one order line is necessary, and each module comes complete, with just the necessary chosen connectors.

### Basic modules

Ordered from the previous pages, the basic modules are to be equiped with their connectors. There clip-on assembly to the module is easy. The main advantage is flexibility : connector type and size may be chosen at the last moment, to fit better the machine needs.

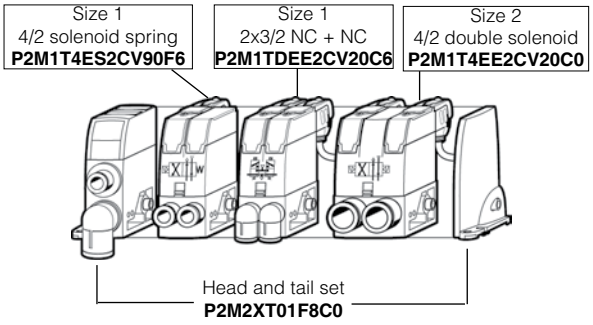

## V series

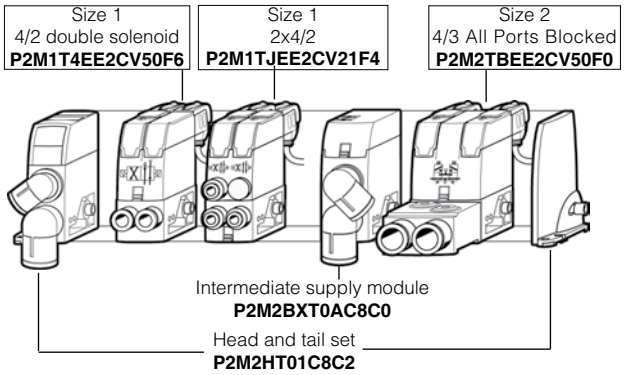
See opposite page for complete module order code chart




## T series

See opposite page for complete module order code chart

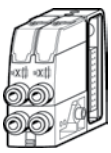



### Special case : the 2 x 4/2 mini-module plug configuration

For micro-cylinders, this very compact 2 x 4/2 module (order code. JEE) may also be used to obtain 3/2 valves, either Normally Closed or Normally Open.
To do so, the complete module may be supplied with plugs that may replace some of the plug-in connectors.
To order, use the top chart from opposite page.

**P2M1VJEE2CV00F4**



2x4/2 No plug

The module will be used as a 2x4/2 valve

**P2M1TJEE2CV21F4**

2x4/2 1 plug

The module will be used as a 4/2 +3/2 valve

## S and P series

See page 28 and 29 for complete module order code charts.

Complete Moduflex modules, equipped with their electrical and pneumatic connectors, may be ordered. To do so, use the below chart to define the complete module order codes.

## Valve modules

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P | 2 | M | 1 | V | 4 | E | E | 2 | C | V | 0 | 0 | F | 6 |

Minimum ordering quantity : 10 pieces

| Size | |
|---|---|
| 1 | Size 1 |
| 2 | Size 2 |

| Series | |
|---|---|
| V | Integrated connections |
| T | Individual connectors |

| Electrical connections | |
|---|---|
| **V Series** | |
| V0 | Integrated connection |
| **T Series** | |
| 00 | No cable |
| V2 | 2 m cable |
| V5 | 5 m cable |
| V9 | 9 m cable |

| Pneumatic connectors Ports 2 & 4 | |
|---|---|
| **Size 1 modules** | |
| F4 | Straight 4 mm OD |
| C4 | Elbow 4 mm OD |
| F6 | Straight 6 mm OD |
| C6 | Elbow 6 mm OD |
| **Size 2 modules** | |
| F6 | Straight 6 mm OD |
| C6 | Elbow 6 mm OD |
| F8 | Straight 8 mm OD |
| C8 | Elbow 8 mm OD |
| F0 | Straight 10 mm OD |
| C0 | Elbow 10 mm OD |

| Valve Function - Solenoid Versions * | |
|---|---|
| 4 E S | 4/2 Solenoid spring |
| 4 E E | 4/2 Double solenoid |
| D E E | 2 x 3/2NC + NC (with exhaust check valve) |
| C E E | 2 x 3/2 NO + NO (with exhaust check valve) |
| E E E | 2 x 3/2 NC + NO (with exhaust check valve) |
| 3 E S | 3/2 NC (with exhaust check valve) |
| G E E | 4/3 centre exhaust (= 2x3/2 without exhaust check valve) |
| B E E | 2x3/2 + clipped dual PO check (= 4/3 APB) |

| Size | | |
|---|---|---|
| 1 only | J E E | 2x4/2 with exhaust check valve with plug configuration |

| Plug configurations | |
|---|---|
| 0 | No plug |

| Only for JEE 2x4/2 modules (1) | |
|---|---|
| 0 | 0 plug ( 2x 4/2) |
| 1 | 1 plug (4/2 + 3/2) |
| 2 | 2 plugs (2x3/2 or 1x4/2) |
| 3 | 3 plugs (1x3/2) |

* For T series only, air pilot versions p21, as basic modules.

(1) more informations on p26.

## Head/Tail & Intermediate Modules

Minimum ordering quantity : 10 pieces

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P | 2 | M | 2 | H | X | T | 0 | 1 | F | 0 | C | 2 |

| | Head and intermediate module | |
|---|---|---|
|  | HXT01 | **V** and **T** series Pneumatic head and tail set |
|  | BXV0A | **V** series intermediate supply module with a set of 4 configuration plates |
|  | BXT0A | **T** series intermediate supply module with a set of 4 configuration plates |

| Pressure port connector | |
|---|---|
| F6 | Straight 6 mm OD |
| C6 | Elbow 6 mm OD |
| F8 | Straight 8 mm OD |
| C8 | Elbow 8 mm OD |
| F0 | Straight 10 mm OD |
| C0 | Elbow 10 mm OD |
| F2 | Straight 12 mm OD |
| C2 | Elbow 12 mm OD |
| PP | Plug |
| MM | Muffler |

| Exhaust port connector | |
|---|---|
| F6 | Straight 6 mm OD |
| C6 | Elbow 6 mm OD |
| F8 | Straight 8 mm OD |
| C8 | Elbow 8 mm OD |
| F0 | Straight 10 mm OD |
| C0 | Elbow 10 mm OD |
| F2 | Straight 12 mm OD |
| C2 | Elbow 12 mm OD |
| PP | Plug |
| MM | Muffler |

Complete Moduflex stand alone valves, equipped with their electrical and pneumatic connectors, may be ordered. To do so, use the below chart to define the complete module order codes.

## Stand alone valve modules

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P | 2 | M | 1 | S | 4 | E | E | 2 | C | V | 5 | A | F | 6 |

Minimum ordering quantity : 10 pieces

| Size | |
|---|---|
| **1** | Size 1 |
| **2** | Size 2 |

| Series | |
|---|---|
| **S** | Stand alone valve modules |

| Electrical connector | |
|---|---|
| **00** | No cable |
| **V2** | 2 m cable |
| **V5** | 5 m cable |
| **V9** | 9 m cable |

| Valve Function - Solenoid Versions * | |
|---|---|
| **4 E S** | 4/2 Solenoid spring |
| **4 E E** | 4/2 Double solenoid |
| **D E E** | 2 x 3/2NC + NC (with exhaust check valve) |
| **C E E** | 2 x 3/2 NO + NO (with exhaust check valve) |
| **E E E** | 2 x 3/2 NC + NO (with exhaust check valve) |
| **3 E S** | 3/2 NC (with exhaust check valve) |
| **G E E** | 4/3 centre exhaust (= 2x3/2 without exhaust check valve) |
| **B E E** | 2x3/2 + clipped dual PO check (= 4/3 APB) |

**Pneumatic connectors**

| Ports 1 & 3 | |
|---|---|
| **A** | Straight & straight |
| **B** | Elbow & elbow |
| **C** | Straight & muffler |
| **D** | Elbow & muffler |

| Outlet ports 2 & 4 | |
|---|---|
| **F** | Straight & straight |
| **C** | Elbow & elbow |
| **0** | No connector for plug-in P module |

| Tube OD | |
|---|---|
| **Size 1 modules** | |
| **4** | 4 mm OD |
| **6** | 6 mm OD |
| **Size 2 modules** | |
| **6** | 6 mm OD |
| **8** | 8 mm OD |
| **0** | 10 mm OD |

* Air pilot version, p23, as basic modules.

Size 1
4/2 solenoid spring
**P2M1S4ES2CV5CC6**

Size 2
4/2 double solenoid
**P2M2S4EE2CV9CC8**



Size 2
2x3/2 NC + NC
**P2M2SDEE2CV2CC0**

Size 1
2x3/2 NC + NC
**P2M1SDEE2CV2BC6**

Size 2
4/3 All Ports Blocked
**P2M2SBEE2CV2AF0**

Complete Moduflex peripheral module, equipped with their pneumatic connectors, may be ordered. To do so, use the below chart to define the complete module order codes.

## Dual flow control, dual pilot operated check valve, and pressure regulator peripheral modules

Minimum ordering quantity : 10 pieces

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| P | 2 | M | 1 | P | X | F | A | J | J | F | 6 |

| Size | |
|---|---|
| 1 | Size 1 |
| 2 | Size 2 |

| Peripheral module function | |
|---|---|
| F A | Dual flow control |
| C A | Dual P.O. check valve |
| ***Pressure regulators*** | |
| S R | 0-2 bar, with pressure gauge |
| S M | 0-4 bar, with pressure gauge |
| S G | 0-8 bar, with pressure gauge |

| Inlet port pneumatic connectors | |
|---|---|
| **Size 1 modules** | |
| F4 | Straight 4 mm OD |
| C4 | Elbow 4 mm OD |
| F6 | Straight 6 mm OD |
| C6 | Elbow 6 mm OD |
| **Size 2 modules** | |
| F6 | Straight 6 mm OD |
| C6 | Elbow 6 mm OD |
| F8 | Straight 8 mm OD |
| C8 | Elbow 8 mm OD |
| F0 | Straight 10 mm OD |
| C0 | Elbow 10 mm OD |

| Outlet port pneumatic connectors | |
|---|---|
| **Size 1 modules** | |
| F4 | Straight 4 mm OD |
| C4 | Elbow 4 mm OD |
| F6 | Straight 6 mm OD |
| C6 | Elbow 6 mm OD |
| **Size 2 modules** | |
| F6 | Straight 6 mm OD |
| C6 | Elbow 6 mm OD |
| F8 | Straight 8 mm OD |
| C8 | Elbow 8 mm OD |
| F0 | Straight 10 mm OD |
| C0 | Elbow 10 mm OD |

## Vacuum generator peripheral module

Minimum ordering quantity : 10 pieces

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P | 2 | M | 1 | P | X | V | A | F | 6 | A | F | 6 | C | M | A |

| Size | |
|---|---|
| 1 | Size 1 |

| Peripheral module function | |
|---|---|
| V A | Vacuum generator |

| Exhaust port (3) * | |
|---|---|
| F4 | Straight 4 mm OD |
| C4 | Elbow 4 mm OD |
| F6 | Straight 6 mm OD |
| C6 | Elbow 6 mm OD |
| MA | Clip-on muffler |

| Vacuum connectors and vacuum sensors (2) * | | | |
|---|---|---|---|
| F4 | Straight 4 mm OD | A | 2 push-in connectors |
| C4 | Elbow 4 mm OD | | |
| F6 | Straight 6 mm OD | B | 1 push-in connector + 1 plug on blow-off port |
| C6 | Elbow 6 mm OD | | |
| JJ | Clip-on double male | | |

| Vacuum connectors and vacuum sensors (2) * | | | |
|---|---|---|---|
| F4 | Straight 4 mm OD | A | 2 push-in connectors |
| C4 | Elbow 4 mm OD | | |
| F6 | Straight 6 mm OD | B | 1 push-in connector + 1 plug |
| C6 | Elbow 6 mm OD | | |
| F1 | Straight threaded 1/8" | C | 1 push-in connector + 1 vacuum sensor MPS-V6T-PC |
| C1 | Elbow threaded 1/8" | | |

## Moduflex Valve Island Configurator

This software facilitates any valve island configuration and its bill ordering through basic or complete modules.


## Pre-assembled valve island ordering

As an option, so defined with the configurator, any Moduflex Valve island may be ordered as pre-assembled.

## Island configuration practice

An easy step by step procedure, finalized with the complete valve island print, composition report and 2D drawing.

*Valve island modules identification*

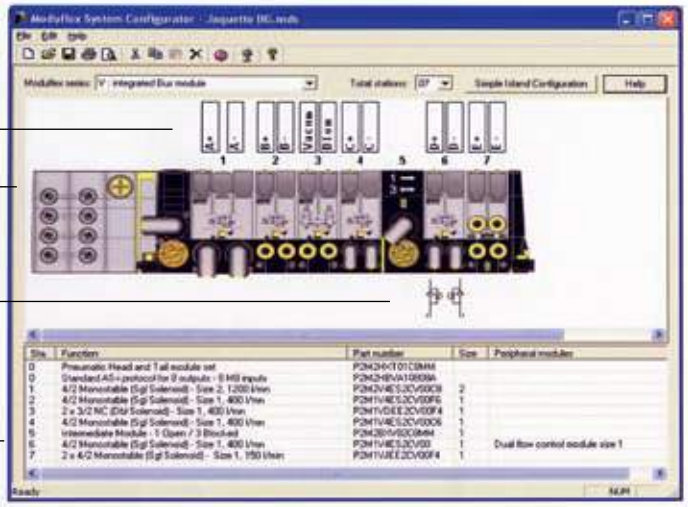
*Valve island graphic description*

*including pneumatic function module symbol, outlet port connector, pneumatic and elecrical head module,...*

*Additional peripheral modules*

*Valve island composition*

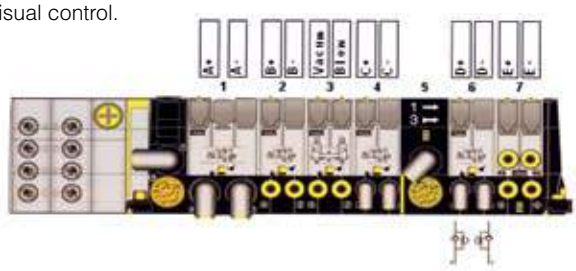
*including each module description and order code*



## An easy to use software for a complete ordering tool

The Moduflex Valve Island Configurator software offers an easy way to, step by step, configure the required valve island for the application.

**Valve island print with symbols and markings**
Once the valve island configured, picture of the configuration allows a visual control.



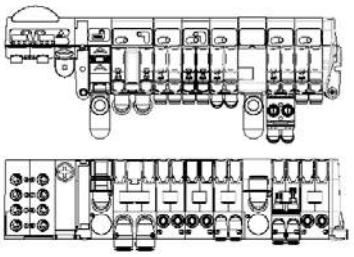
**4 pages report :**
A complete 4 pages report can be edit, giving :

| Page 1 | Page 2 | Page 3 | Page 4 |
|---|---|---|---|
| Complete list of **"basic modules"** pneumatic connectors mufflers and electrical connectors | Complete list of components splited slice by slice | Detail list of **"complete module"** with module width and total valve island lenght | Warnings and advices depending on the configuration |

**Multi-language CD-Rom order code :**
PDE2536CDV3.1-ev

**2D drawing :**

A direct valve island configuration exportation function to .dxf format included.



**3D drawing library :**

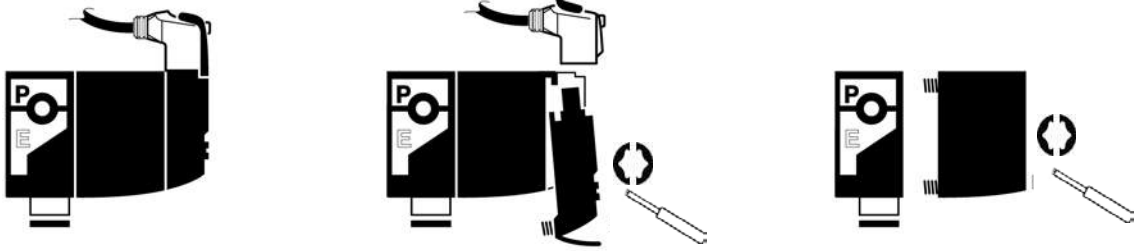
3 formats are available on the CD for each basic module, electrical components and pneumatic connectors.


**3D e-configurator software :**
Also available, a 3D e-configurator on :
http://www.parker.com/pneu/moduflex

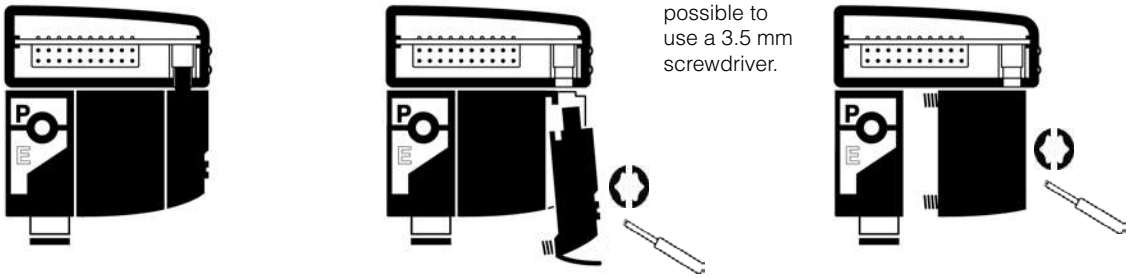
## Maintenance procedure

The latest generations of compact pneumatic valves have a life expectancy which generally exceeds the equipment they control. Therefore, although maintenance is seldom required, when necessary the solenoid pilot, valve or connector can be easily replaced without removing the island base, as shown below.

**S** and **T** series



**V** series



Please, use a Torx T8 screw driver. Also possible to use a 3.5 mm screwdriver.

### With only one universal solenoid pilot for all configurations, maintenance is simple

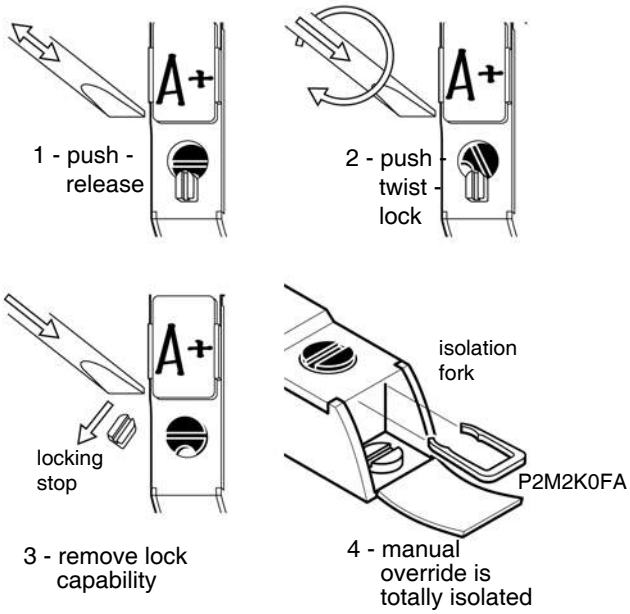
24V DC is now a global standard for all machines.

The Moduflex 24V DC unique solenoid pilot is supplied with the multi-function manual override that can be adapted to all requirements, as explained by the drawings.

Because all Moduflex valve and island configurations are supplied with this unique solenoid pilot, maintenance operations remain very simple.

For more informations : chap. 9, manual section.

### Multi-function adaptable manual override



## Maintenance components


| valve module solenoid pilot 24 V DC | | Weight (g) | Order code |
|---|---|---|---|
| solenoid pilot (without plug-in electrical connector) | | 15 | P2D8V32C5 |
| Pneumatic pilot (with 4 mm OD tubing push-in elbow fitting) | | 10 | P2M2K0PA |


P2M1X4EE

| size 1 valve modules without solenoid pilot and without sub-base | | Weight (g) | Order code |
|---|---|---|---|
| 4/2 | monostable | 26 | P2M1X4ES |
| | bistable | 25 | P2M1X4EE |
| 3/2 | double NC + NC | 28 | P2M1XDEE |
| | double NO + NO | 28 | P2M1XCEE |
| | double NC + NO | 28 | P2M1XEEE |
| | single NC | 25 | P2M1X3ES |
| 4/3 CE | double 3/2 NC + NC without exhaust check valve | 28 | P2M1XGEE |


P2M2X4EE

| size 2 valve modules without solenoid pilot and without sub-base | | Weight (g) | Order code |
|---|---|---|---|
| 4/2 | monostable | 28 | P2M2X4ES |
| | bistable | 30 | P2M2X4EE |
| 3/2 | double NC + NC | 32 | P2M2XDEE |
| | double NO + NO | 32 | P2M2XCEE |
| | double NC + NO | 32 | P2M2XEEE |
| | single NC | 28 | P2M2X3ES |
| 4/3 CE | double 3/2 NC + NC without exhaust check valve | 32 | P2M2XGEE |

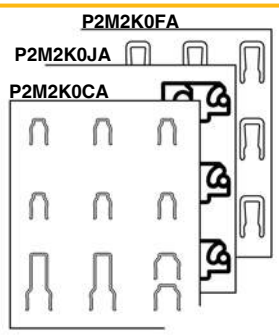
**Device bus electrical head module**


With adaptator


Without adaptator

| Description | Bus In / Bus Out connector type | Power supply connector type | Bus communication module adaptor | Weight (g) | Order code |
|---|---|---|---|---|---|
| Profibus DP head module | M12 - B coding | M12 - A coding | With | 250 | P2M2HBVP11600 |
| | M12 - B coding | M12 - A coding | Without | 210 | P2M2HBVP01600 |
| DeviceNet head module | M12 - A coding | M12 - B coding | With | 250 | P2M2HBVD11600 |
| | M12 - A coding | M12 - B coding | Without | 210 | P2M2HBVD01600 |
| CANopen head module | M12 - A coding | M12 - B coding | With | 250 | P2M2HBVC11600 |
| | M12 - A coding | M12 - B coding | Without | 210 | P2M2HBVC01600 |
| Bus communication module adaptor | | | | 30 | P2M2HEV0B |

For .EDS & .GSD files, go to http://www.parker.com/pneu/moduflex

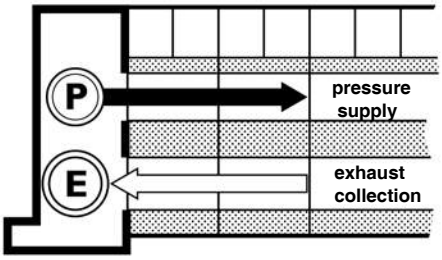



| Set of maintenance parts | | Weight (g) | Order code |
|---|---|---|---|
| Clips | set of 10 clips : 6 for size 1 modules, 2 for size 2 modules, 2 for island head and intermediate module | 6 | P2M2K0CA |
| Seals | set of 10 seals : 3 inter island base seals, 3 under solenoid pilot seals, 4 under valve seals (2 size 1 seal, 2 size 2 seals) | 6 | P2M2K0JA |
| Forks | set of 10 isolation forks for solenoid pilot manual override | 8 | P2M2K0FA |

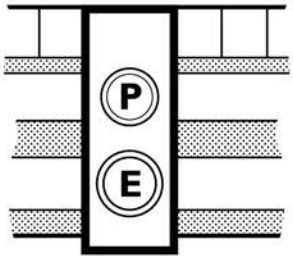
# Island head module port sizing

Moduflex is totally flexible : islands may have up to 19 valves, with a choice of 2 valve sizes, depending on the required flow. Thus, each island has specific needs for the size of it pressure supply and its exhaust collection.

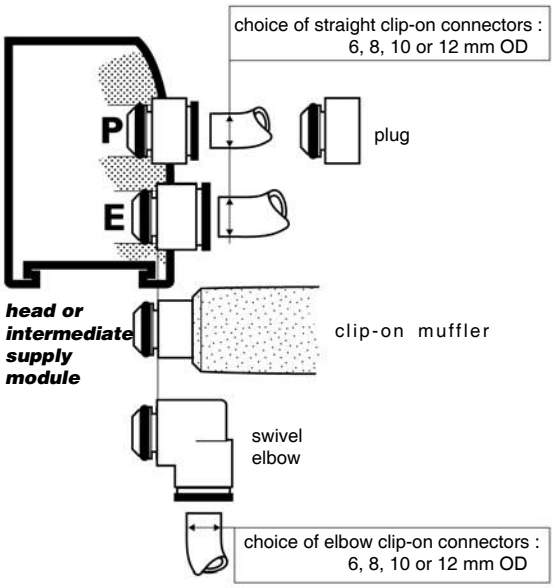
## Choice of connections to an island P and E ports




***head module***



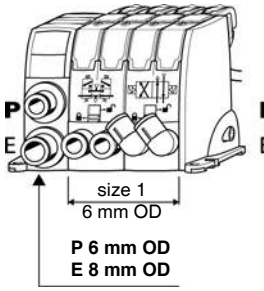

***intermediate supply module***

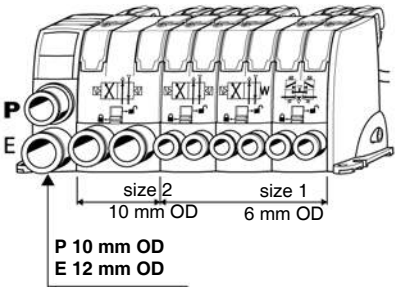


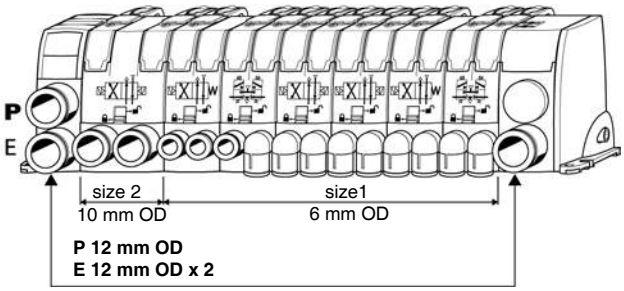

Valve island pressure supply and exhaust collection are connected onto the head module and, if flows require it, onto intermediate supply modules added into the island.

For this purpose, the choice of clip-on connectors is very open : from 6 to 12 mm OD tubing connectors, either straight or elbows. A clip-on muffler and a clip-on plug complete this offer.

## Sizing recommendations




The 3 valve islands above present typical situations for sizing islands pressure supply and exhaust collection.

In a given island, valves do not deliver their flow at the same moment. Thus, the number of valves in an island is not the major factor to consider. More important is the size ot the largest valve and of the largest output tubes to the cylinders.

**ID section areas of standard tubings**

| | | |
|---|---|---|
| 2 x 4 mm : 3 mm² | 5.5 x 8 mm : 24 mm² | 10 x12 mm : 80 mm² |
| 2.7 x 4 mm : 6 mm² | 6 x 8 mm : 28 mm² | |
| 4 x 6 mm : 12 mm² | 7 x 10 mm : 40 mm² | muffler : 100 mm² equivalent |
| | 8 x 10 mm : 50 mm² | |

We would recommend the following :

- air supply connection at least equivalent to largest output tube to cylinders ;
- exhaust collection at least twice the section area of the largest output tube to cylinders.

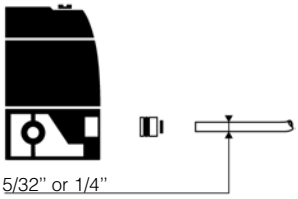
For islands with high flows, the following options are possible :

- use tubes up to 12 mm OD or mufflers providing exhaust collection is not necessary ;
- provide additional P and/or E connection ports by inclusion of intermediate supply modules, thus keeping tube size small.

At the machine commissioning stage, the supply and exhaust connections can be easily modified until the required performance is achieved.

# Recommendations for building machines with imperial OD tubes (US usual standard)

**size 1 modules**



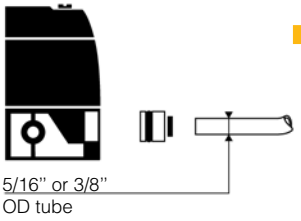

Moduflex being a global product is available in the US with the two standards that are commonly used in this country :
- metric OD tubes with the metric connectors shown in this catalog,
- imperial OD tubes with specific connectors for the US.

Machine builders exporting to the US may propose to their clients one of the following solutions.

- Machines equipped with Moduflex components connected with metric tubes found in this catalog. Parker will provide products locally for maintenance.

- Or machines equipped with Moduflex components connected with imperial size OD tubes. In this case, use the following procedure to order Moduflex and to build the machine.

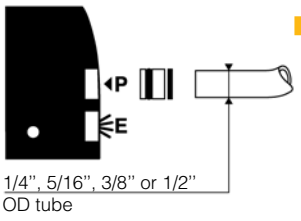
**size 2 modules**




## Imperial OD tube and metric OD tube comparison

| metric standard tube OD | imperial US standard tube OD | metric equivalent | Moduflex clip-on connectors |
|---|---|---|---|
| 4 mm | 5/32" | 4 mm | imperial and metric connectors identical |
| 6 mm | 1/4" | 6,35 mm | specific imperial connector |
| 8 mm | 5/16" | 8 mm | imperial and metric connectors identical |
| 10 mm | 3/8" | 9,53 mm | specific imperial connector |
| 12 mm | 1/2" | 12,7 mm | specific imperial connector |

**head and intermediate island modules**




## Moduflex selection for imperial size OD tubes

Such components will easily be obtained with the following procedure :

1 - Select he required basic modules (with no connector).

2 - Select from the list below the clip-on connectors for the required imperial OD tubes.

3 - Push-in the connectors into the basic modules ports in order to obtain complete modules.





| pneumatic connectors for size 1 modules | | Pack Quant. | elbow version Weight (g) per unit | elbow version Order code | straight version Weight (g) per unit | straight version Order code |
|---|---|---|---|---|---|---|
| clip-on tube push-in connector | 5/32"= 4 mm OD | 10 | 5 | **CMD04-1** | 2 | **FMD04-1** |
| | 1/4"OD | 10 | 5 | **CMD07-1** | 3 | **FMD07-1** |




| pneumatic connectors for size 2 modules head and intermediate island modules | | Pack Quant. | elbow version Weight (g) per unit | elbow version Order code | straight version Weight (g) per unit | straight version Order code |
|---|---|---|---|---|---|---|
| clip-on tube push-in connector | 1/4"OD | 10 | 5 | **CMD07-2** | 3 | **FMD07-2** |
| | 5/16"= 8 mm OD | 10 | 6 | **CMD08-2** | 4 | **FMD08-2** |
| | 3/8"OD | 10 | 7 | **CMD09-2** | 5 | **FMD09-2** |
| | 1/2"OD | 10 | 8 | **CMD13-2** | 6 | **FMD13-2** |

## 1 - Multi-connector or sub-D 25 valve island

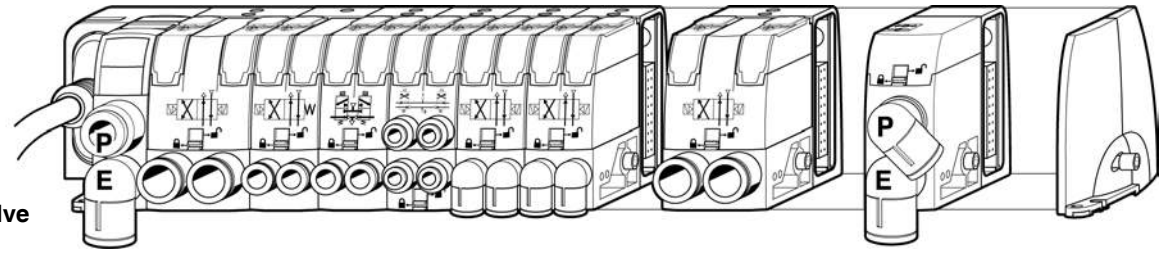
Multi-connector or sub-D 25 electrical head module width : 15 mm

Head and tail pneumatic module set width : 48 mm

Modules size 1 width : 25 mm

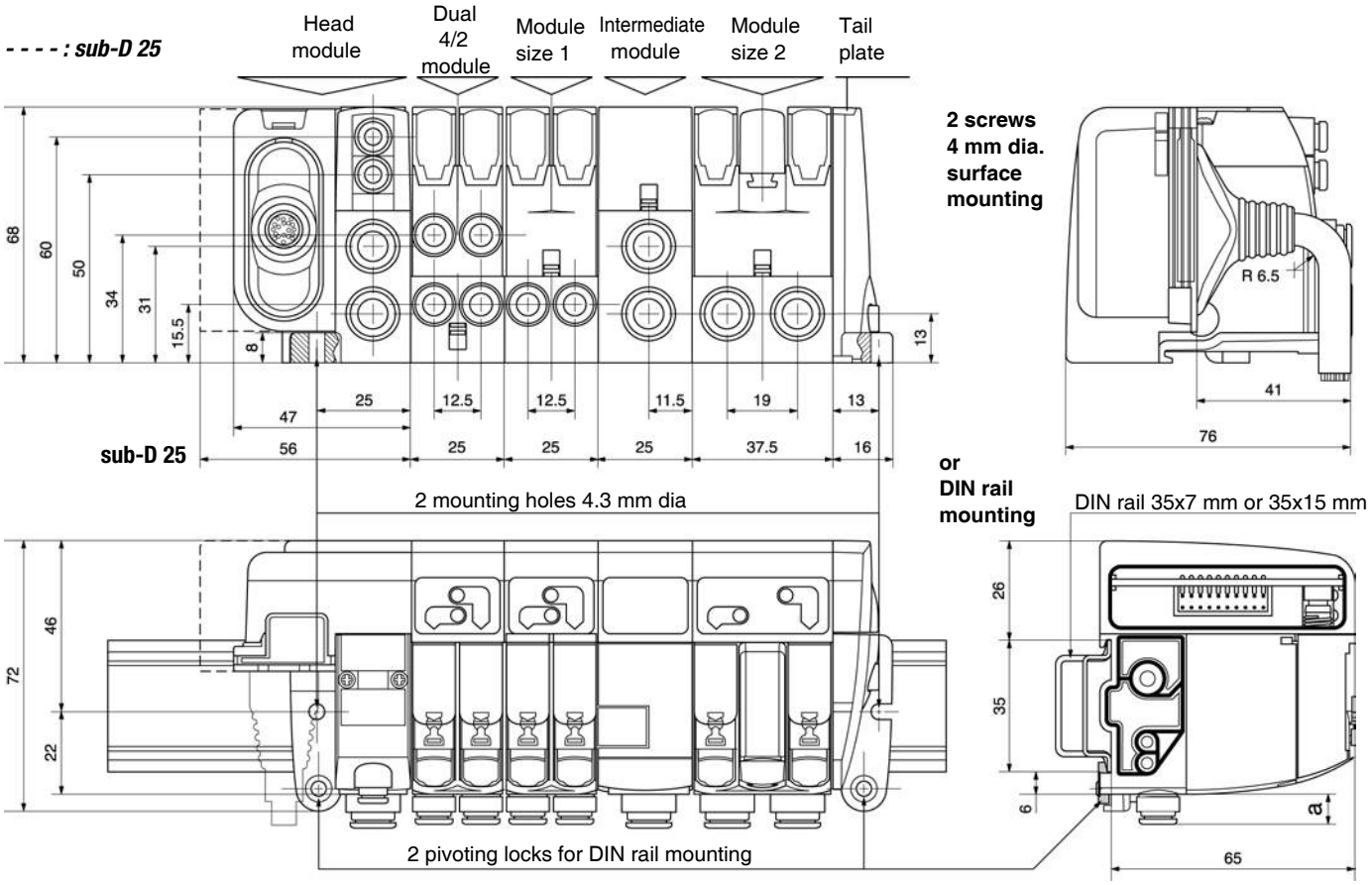
Modules size 2 width : 37.5 mm

Intermediate module width : 25 mm




**Island total width depending on valve composition**

***- - - - : sub-D 25***




**2 screws 4 mm dia. surface mounting**




**or DIN rail mounting**

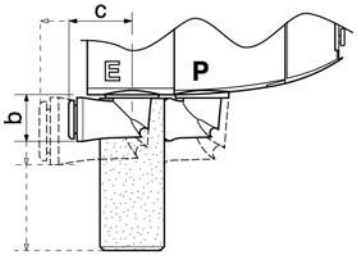
DIN rail 35x7 mm or 35x15 mm




Special case : 4/3 closed centre function within island version : Add the dimensions of the dual P.O. check valve module plugged into the island. See pages 39 and 40 for dimensions.

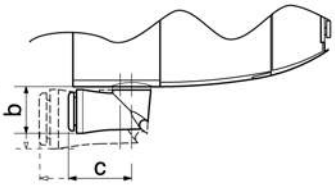
Island head and intermediate modules

| | a | b | c |
|---|---|---|---|
| 6 mm tube OD | 8 | 13 | 16 |
| 8 mm tube OD | 9 | 16 | 19 |
| 10 mm tube OD | 13 | 18 | 22 |
| 12 mm tube OD | 13 | 19 | 25 |
| muffler | | 40 | |

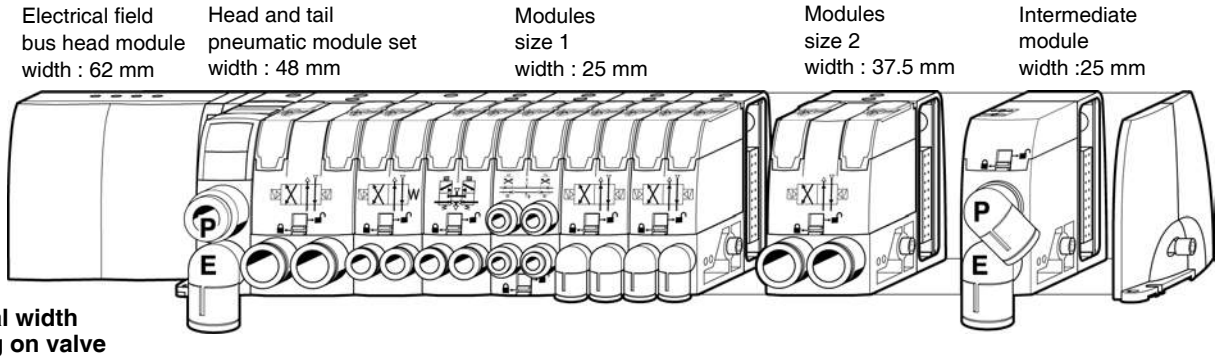



Island valves modules

| | OD tube | a | b | c |
|---|---|---|---|---|
| Size 1 modules | 4 mm | 8 | 10 | 12 |
| | 6 mm | 8 | 13 | 16 |
| Size 2 modules | 8 mm | 9 | 16 | 19 |
| | 10 mm | 13 | 18 | 22 |

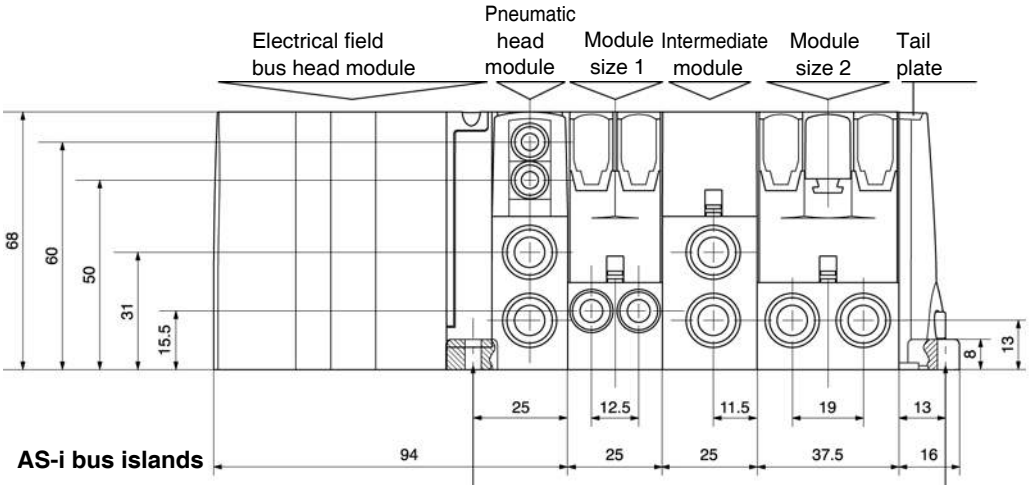


## 2 - Field bus connected islands




**Island total width depending on valve composition**

**AS-i bus islands**

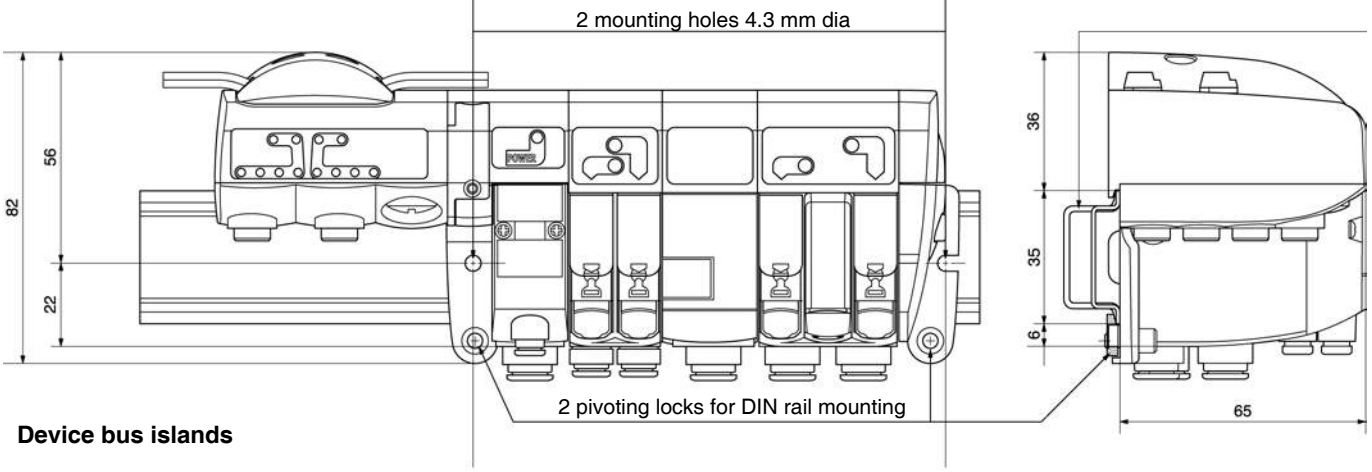


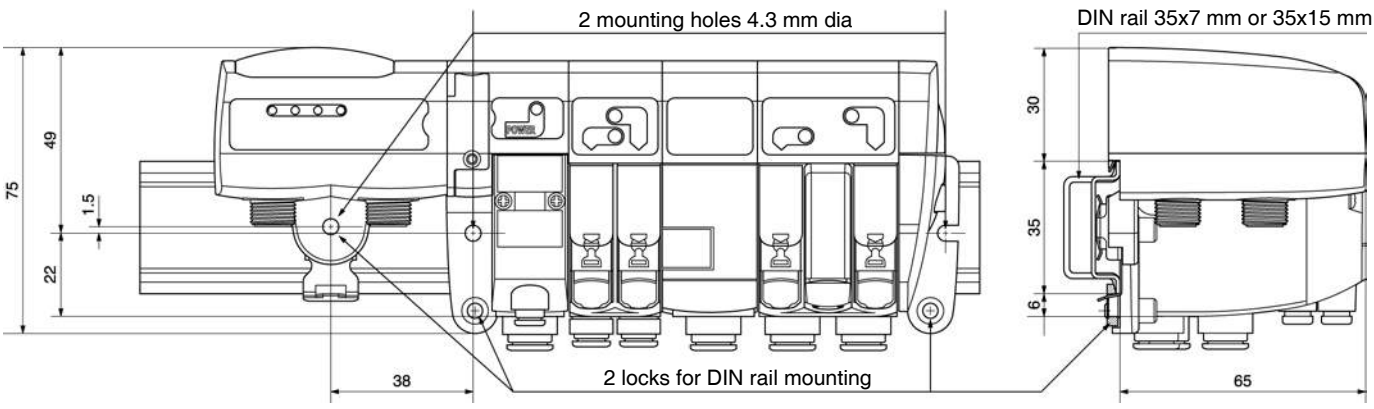

**2 screws 4 mm dia. surface mounting**

**or DIN rail mounting**

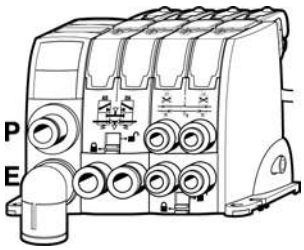
DIN rail 35x7 mm or 35x15 mm

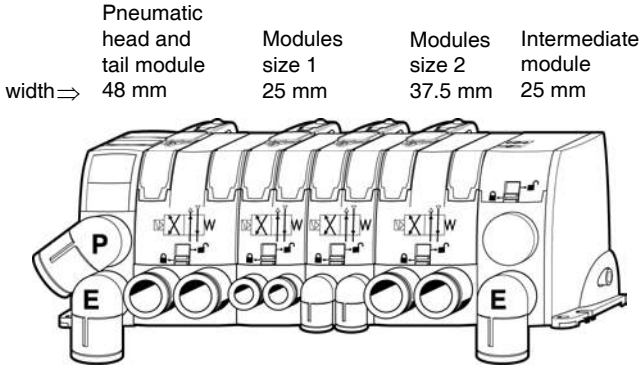
**Device bus islands**

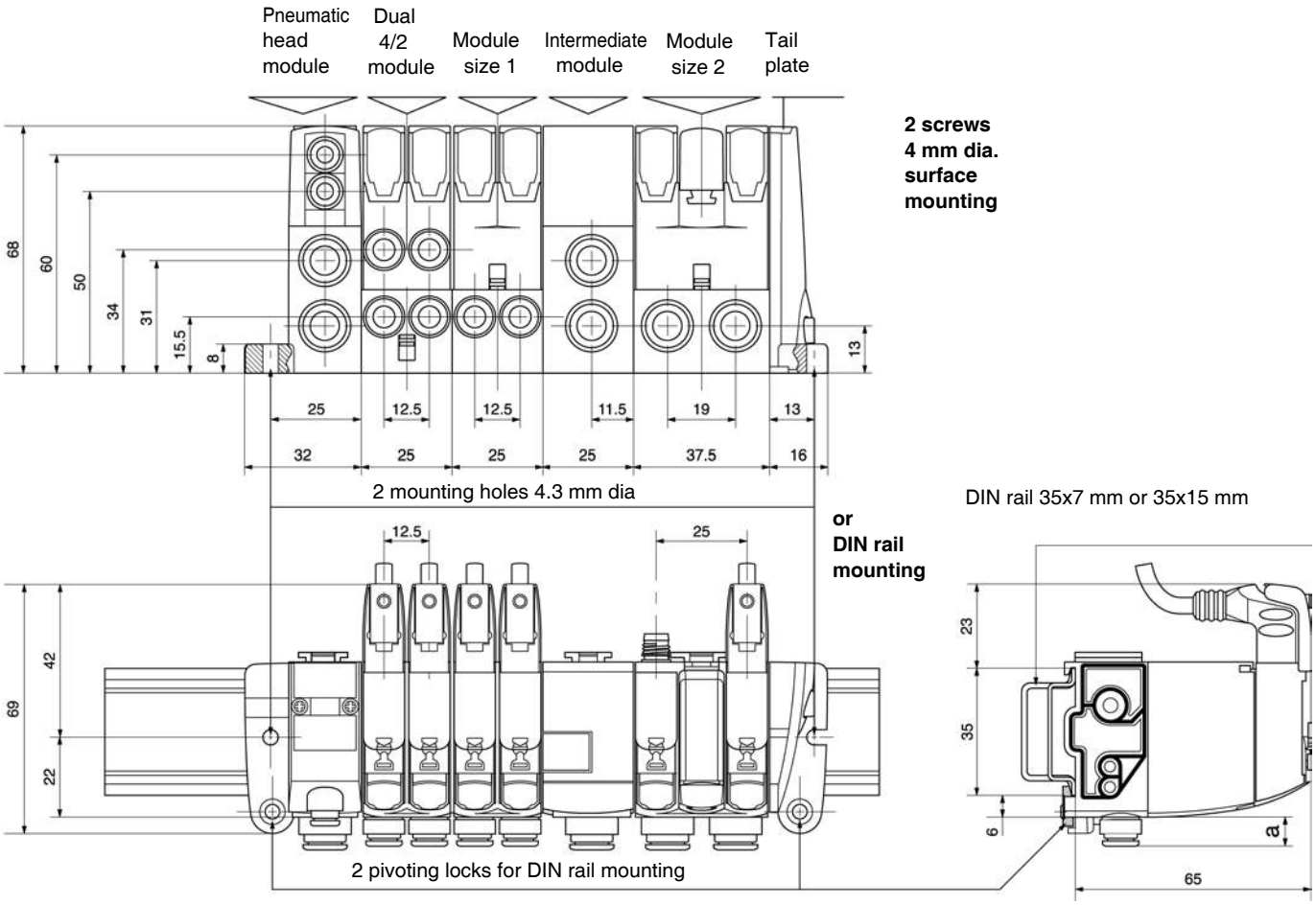


**Island total width depending on valve composition**



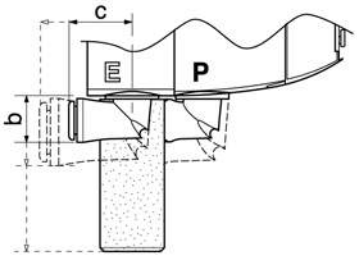




Special case : 4/3 closed centre function within island version : Add the dimensions of the dual P.O. check valve module plugged into the island. See pages 39 and 40 for dimensions.

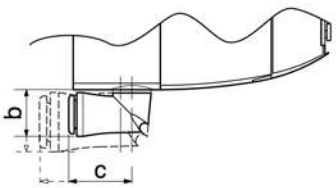
Island head and intermediate modules

| | a | b | c |
|---|---|---|---|
| 6 mm tube OD | 8 | 13 | 16 |
| 8 mm tube OD | 9 | 16 | 19 |
| 10 mm tube OD | 13 | 18 | 22 |
| 12 mm tube OD | 13 | 19 | 25 |
| muffler | | 40 | |



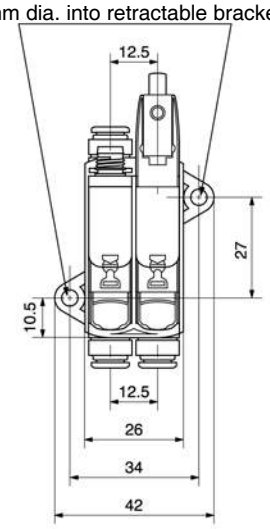

Island valves modules

| | OD tube | a | b | c |
|---|---|---|---|---|
| Size 1 modules | 4 mm | 8 | 10 | 12 |
| | 6 mm | 8 | 13 | 16 |
| Size 2 modules | 8 mm | 9 | 16 | 19 |
| | 10 mm | 13 | 18 | 22 |

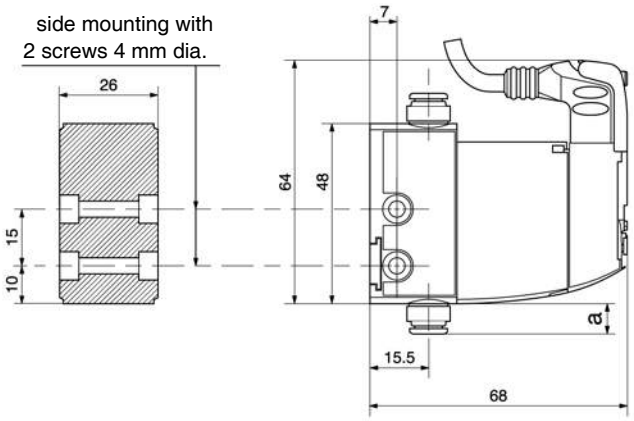


## Stand-alone valve size 1

surface mounting with screws
4 mm dia. into retractable brackets 3 mm thick

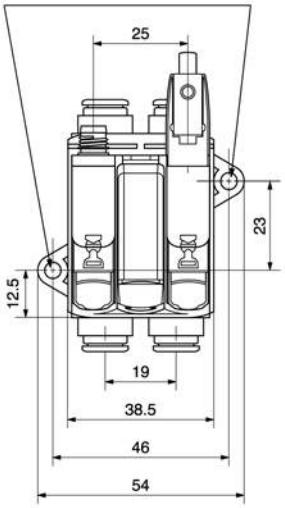



or side mounting with
2 screws 4 mm dia.

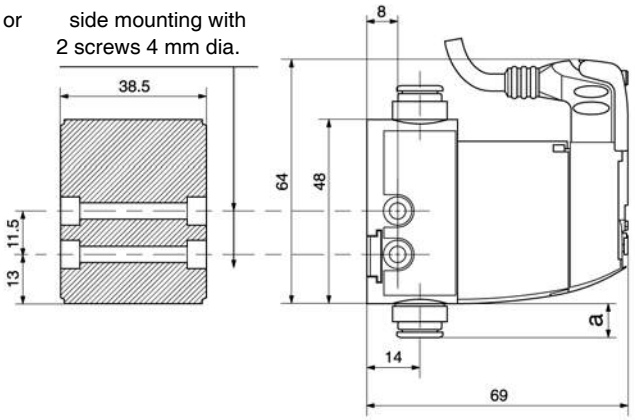



## Stand-alone valve size 2

surface mounting with screws
4 mm dia. into retractable brackets 3 mm thick



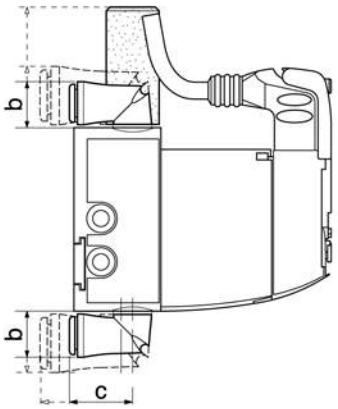

or side mounting with
2 screws 4 mm dia.




Dimensions and mountings of the stand-alone valves 4/2, double and single 3/2, 4/3 vented centre and 4/3 pressure centre.

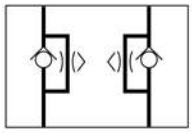
Special case : 4/3 closed centre. Add the dual P.O. check valve module that has been plugged in the basic valve. Dimensions are given pages 39 and 40.

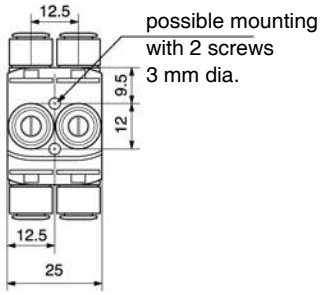
| | | a | b | c |
|---|---|---|---|---|
| **Size 1** modules | 4 mm tube OD | 8 | 10 | 12 |
| | 6 mm tube OD | 8 | 13 | 16 |
| | muffler | | 31 | |
| **Size 2** modules | 8 mm tube OD | 9 | 16 | 19 |
| | 10 mm tube OD | 13 | 18 | 22 |
| | muffler | | 40 | |

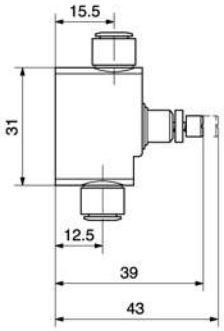


**Reminder** : peripheral modules may either be plugged in the valve output ports or mounted in line separate from the valve


## Dual flow control module size 1



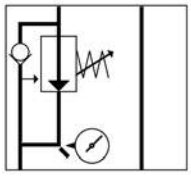


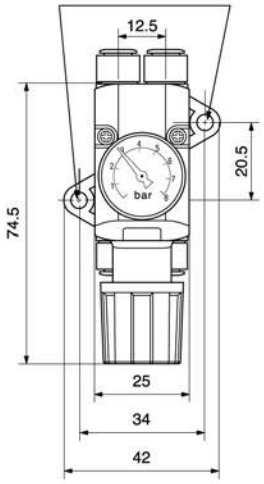



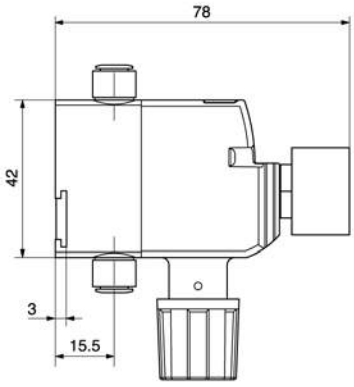

## Pressure regulation module size 1

mounting with 2 screws 4 mm dia.
on retractable brackets

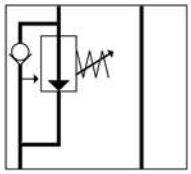
**- with gauge**

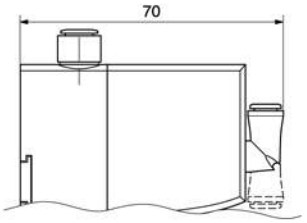




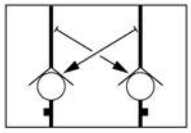

**- without gauge**

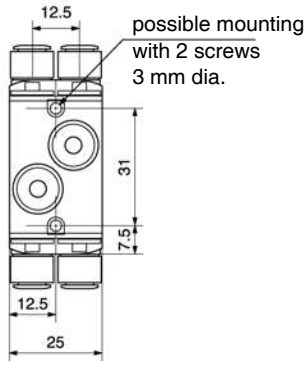


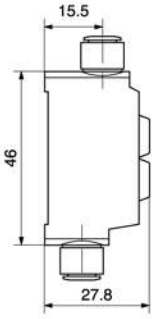



swivel elbow push-in
connector 4 mm OD tube

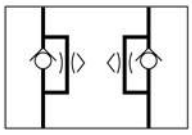
## Dual P.O. check valve module size 1

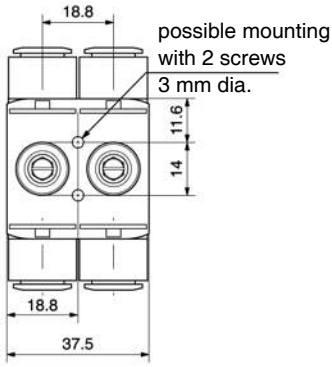




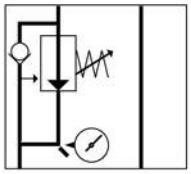
## Dual flow control module size 2

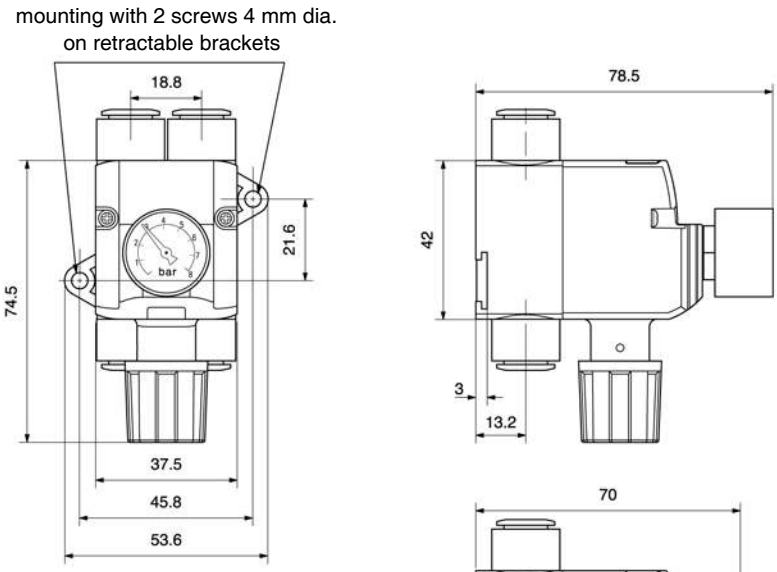




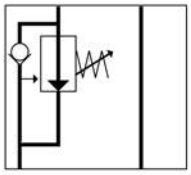

## Pressure regulation module size 2

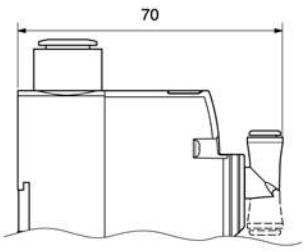
**- with gauge**





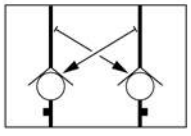

**- without gauge**

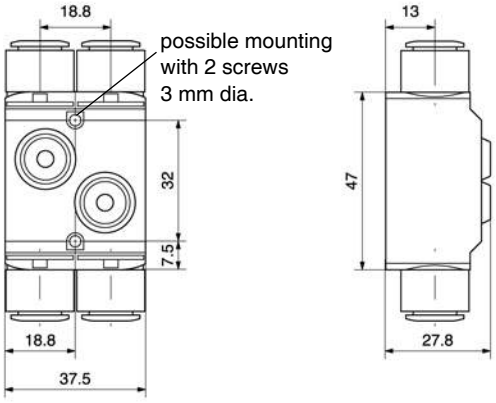





swivel elbow push-in
connector 4 mm OD tube

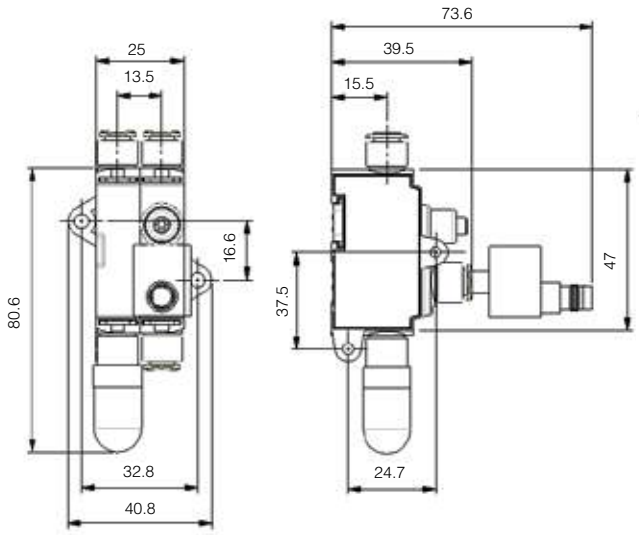
## Dual P.O. check valve module size 2



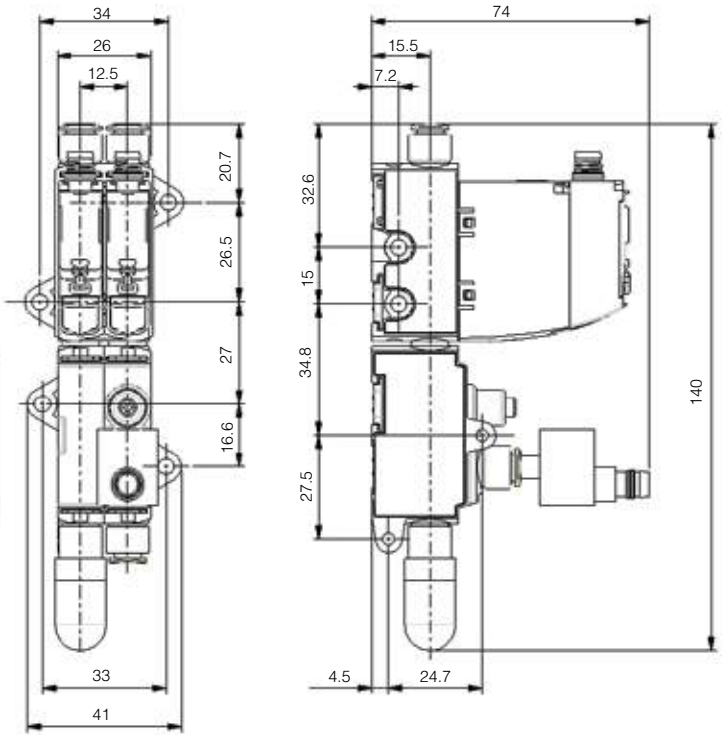


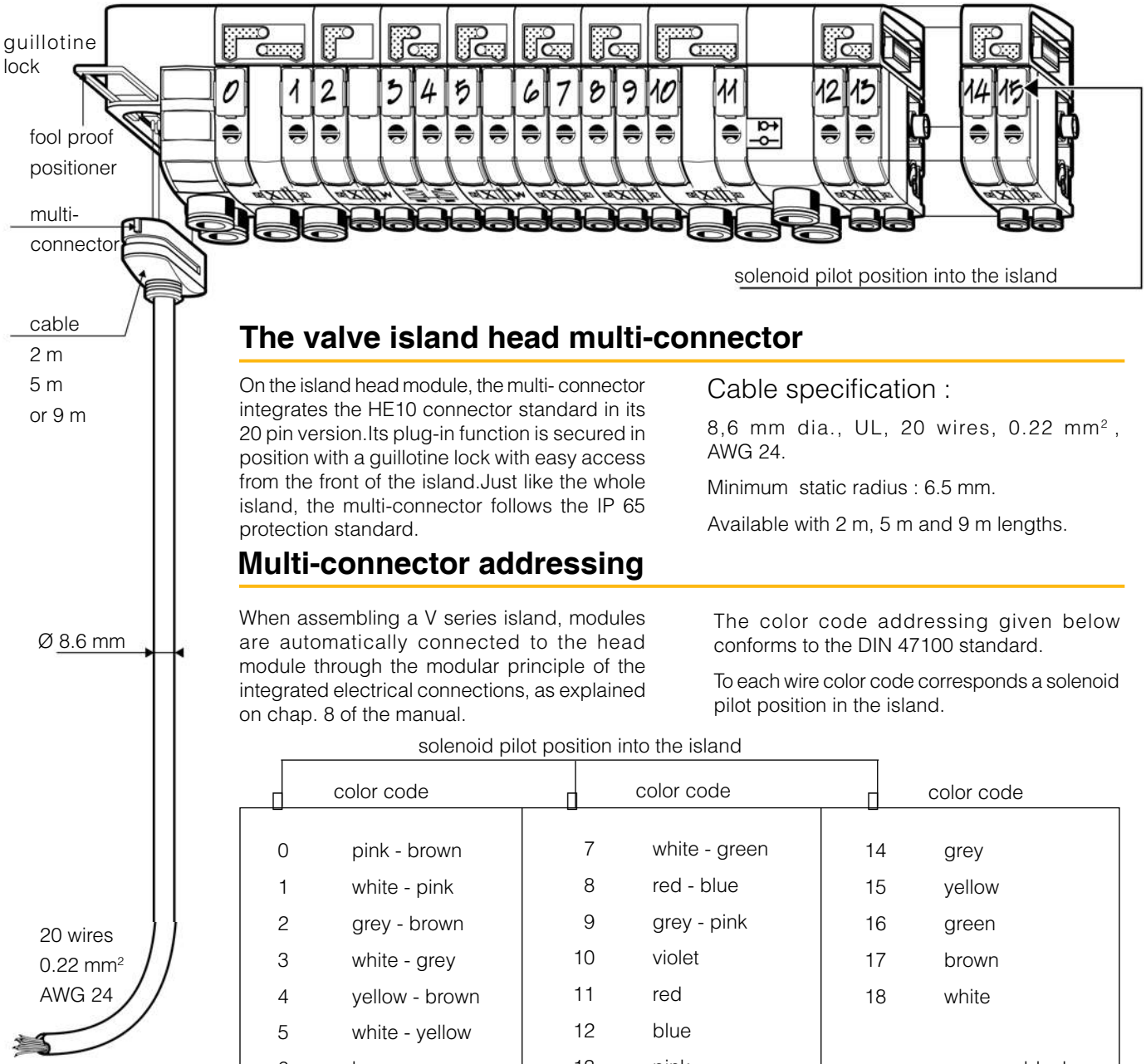
## Vacuum generator module

### In-line




### With Moduflex valve






## The valve island head multi-connector

On the island head module, the multi- connector integrates the HE10 connector standard in its 20 pin version.Its plug-in function is secured in position with a guillotine lock with easy access from the front of the island.Just like the whole island, the multi-connector follows the IP 65 protection standard.

### Cable specification :

8,6 mm dia., UL, 20 wires, 0.22 mm², AWG 24.

Minimum static radius : 6.5 mm.

Available with 2 m, 5 m and 9 m lengths.

## Multi-connector addressing

When assembling a V series island, modules are automatically connected to the head module through the modular principle of the integrated electrical connections, as explained on chap. 8 of the manual.

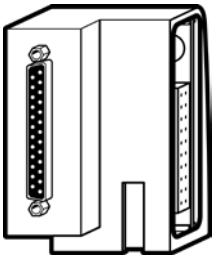
The color code addressing given below conforms to the DIN 47100 standard.

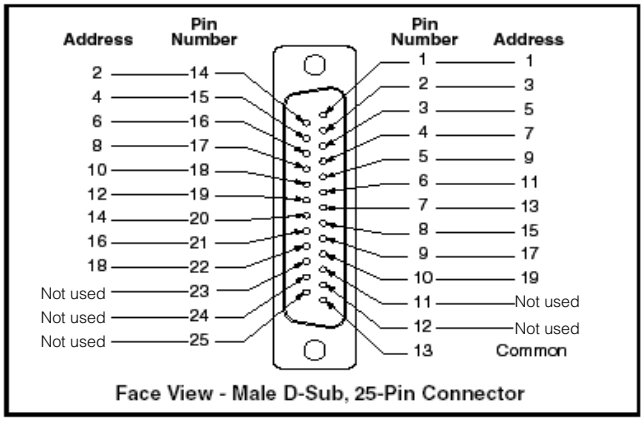
To each wire color code corresponds a solenoid pilot position in the island.

solenoid pilot position into the island

| color code | | color code | | color code | |
|---|---|---|---|---|---|
| 0 | pink - brown | 7 | white - green | 14 | grey |
| 1 | white - pink | 8 | red - blue | 15 | yellow |
| 2 | grey - brown | 9 | grey - pink | 16 | green |
| 3 | white - grey | 10 | violet | 17 | brown |
| 4 | yellow - brown | 11 | red | 18 | white |
| 5 | white - yellow | 12 | blue | | |
| 6 | brown - green | 13 | pink | common : | black |

## Sub-D 25 addressing

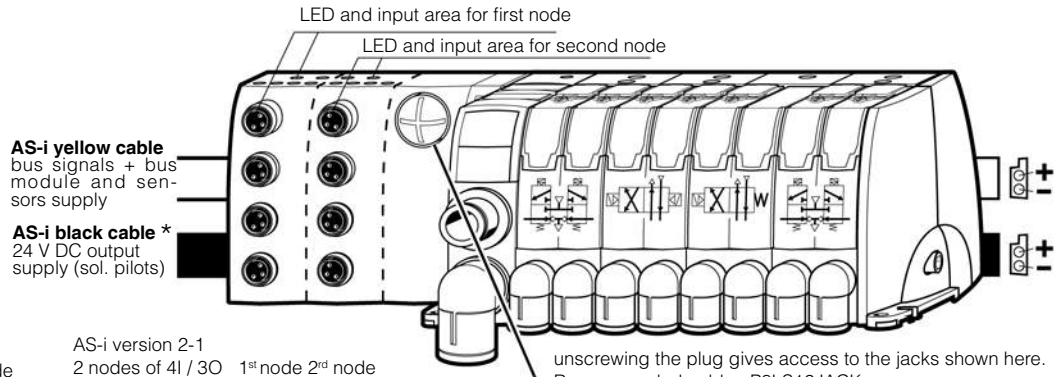




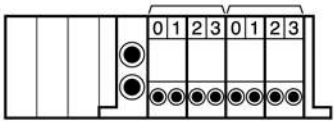
## Bus addressing, first and second node

**In this catalogue :**

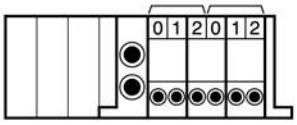
- V series AS-i bus electrical head modules : p.18.
- V series AS-i bus dimensions and mounting : p.36.
- Remote short valve islands with AS-i bus : manual chap. 17.



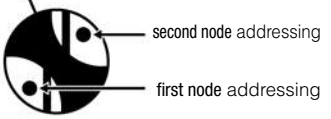

AS-i standard
2 nodes of 4I / 4O 1st node 2rd node




AS-i version 2-1
2 nodes of 4I / 3O 1st node 2rd node




unscrewing the plug gives access to the jacks shown here.
Recommended cable : P8LS12JACK

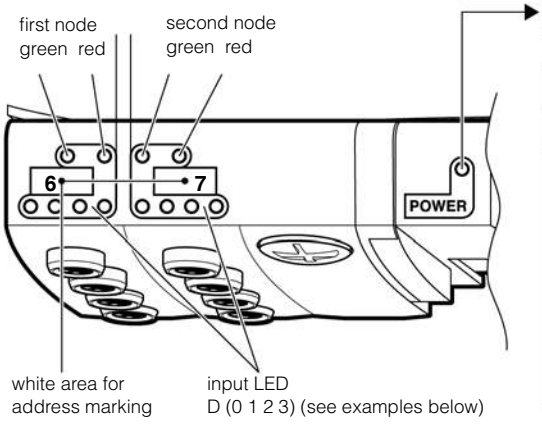



Address the first node in the first step.
Profil :

| ID Code | AS-i V2.0 | AS-i V2.1 |
|---|---|---|
| IO | 7 | 7 |
| ID | F | A |
| ID1 | F | 7 |
| ID2 | F | E |

* The extern supply shall have protective isolation in accordance with IEC 364-4-41 (PELV).

## Bus diagnostic




| «power» LED state | off | green | red |
|---|---|---|---|
| **Power supply** | sol. pilot supply | normal operation | solenoid overload |

| first node LEDs state | | second node LEDs state | | System condition |
|---|---|---|---|---|
| green LED | red LED | green LED | red LED | |
| ☀ | ○ | ☀ | ○ | Normal operation |
| ○ | ○ | ○ | ○ | No module + sensor supply |
| ○ | ☼ | ○ | ☼ | Input overload |
| ○ | ☀ | ○ | ☼ | No AS-i communication |
| ☼ | ☀ | ○ | ☼ | Address first node = 0 |
| ☀ | ○ | ☼ | ☀ | Address second node = 0 |

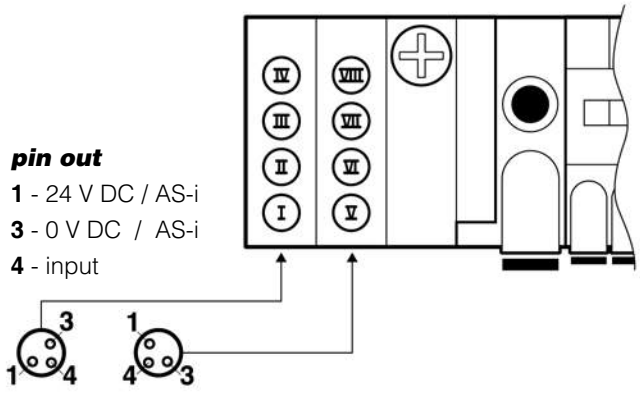
☀ ON ○ OFF ☼ BLINK

## Input wiring

Physical input ( Ⅰ, Ⅱ, Ⅲ, Ⅳ ) = D (0 1 2 3) first node, physical input ( Ⅴ, Ⅵ, Ⅶ, Ⅷ ) = D (0 1 2 3) second node
Examples : physical input Ⅲ = logical input 6.2, physical input Ⅴ = logical input 7.0

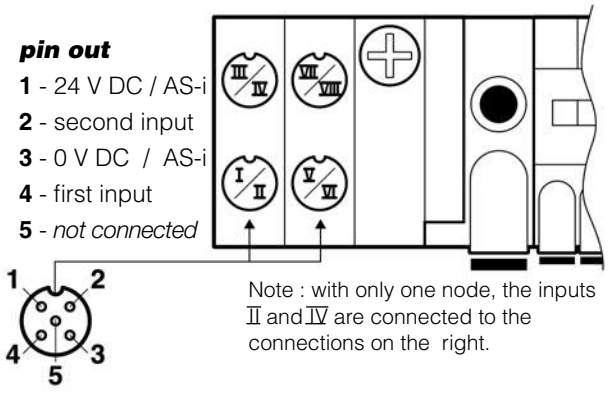
### M8 female connectors

***pin out***
**1** - 24 V DC / AS-i
**3** - 0 V DC / AS-i
**4** - input




### M12 female connectors

***pin out***
**1** - 24 V DC / AS-i
**2** - second input
**3** - 0 V DC / AS-i
**4** - first input
**5** - *not connected*




Note : with only one node, the inputs Ⅱ and Ⅳ are connected to the connections on the right.

# Power supply common to all types of device bus modules

**In this catalogue :**

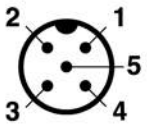
- V series device bus electrical head modules : p.19.
- V series device bus dimensions and mounting : p.36.
- Remote short valve islands with device bus : manual chap. 18.

## 1 - Connection

All bus modules have a M12 male connector for power supply.

M12 supply connector (as seen on module)

**M12**
*type A*

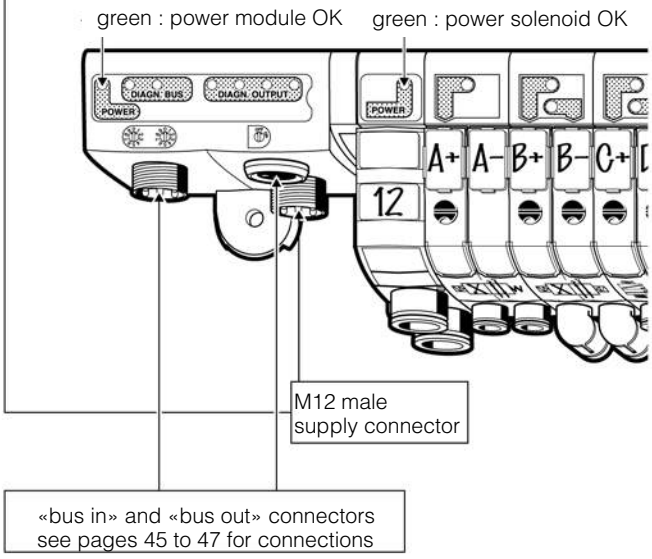



**1** - 24 V DC module (not connected for DeviceNet and CANopen)
**2** - *not connected*
**3** - 0 V DC module and solenoid
**4** - 24 V DC solenoid
**5** - protected earth (PE)

## 2 - Diagnostic

The two «power» indicators shown on the illustrations provide visual indication of the module and solenoid supply status.

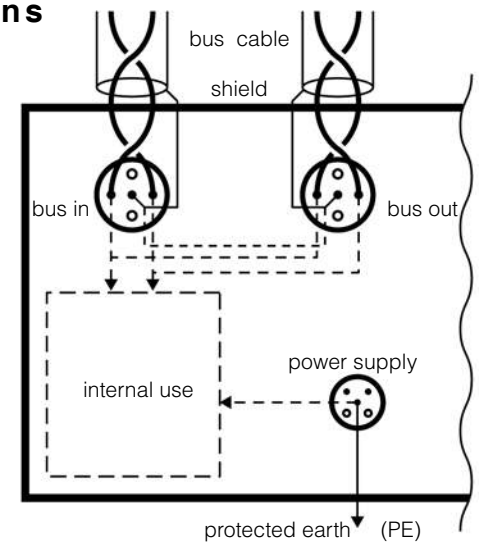
Note : output power to the solenoids can be wired to allow the user to turn the outputs off while allowing the communications to remain on.




## Bus cable protection shield connections for Profibus DP, DeviceNet and CANopen

To provide protection against electro-magnetic interferences, the bus cables are shielded. The module «bus in» and «bus out» connectors each includes a pin for connecting the cable shield (see next pages). It is safer to connect the shield to the protected earth (PE) at both ends of the bus.
Within the bus module, provision is made to enable shield continuity by connection between the two shield pins.

The protected earth have to be connected localy on each module for CE accordance.



PROFI BUS

## Bus cable connections

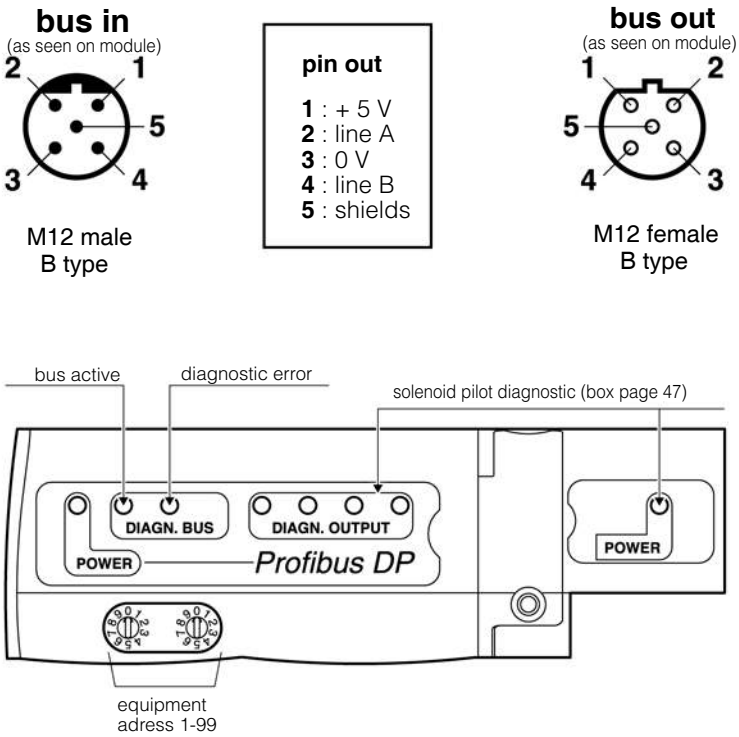
Profibus DP standard male and female type B M12 connectors.
Use of prefabricated cables available from your usual electrical supplier is recommended.
Line termination, P8BPA00MB, is necessary on the «bus out» connector of the last station.

## Addressing

Use the .GSD file on Moduflex web site :
http:/ www.parker.com/pneu/moduflex
The coding wheels enable configuration of the decimal address.

## Diagnostic

Diagnostic according to the module dialog shown on the illustration.




DeviceNet™

## Bus cable connections

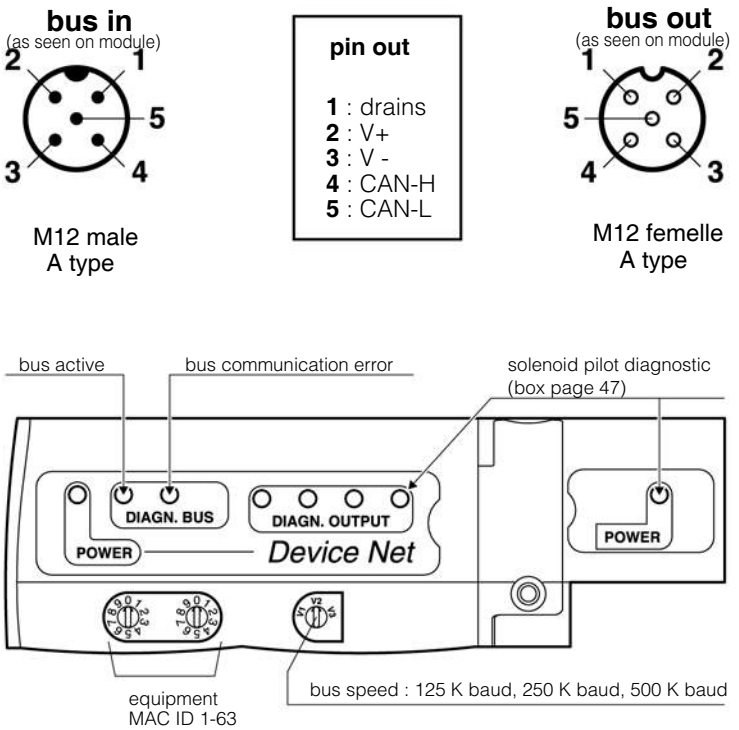
DeviceNet standard male and female type A M12 connectors.
The alimentation for the module is supplied from the V+ and V- (24 V DC) of «bus in» connector.
Use of prefabricated cables available from your usual electrical supplier is recommended.
Line termination, P8BPA00MA, is necessary on the «bus out» connector of the last station.

## Addressing

Use the .EDS file on Moduflex web site :
http:/ www.parker.com/pneu/moduflex
The coding wheels enable configuration of the decimal address.

## Diagnostic

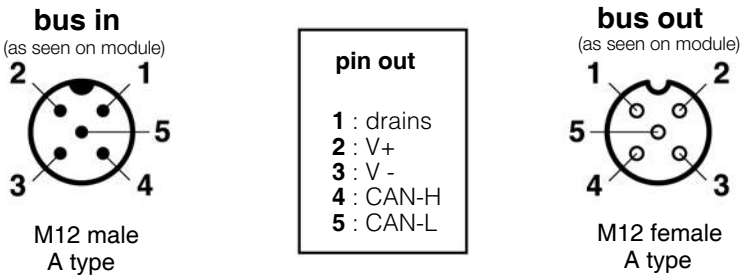
Diagnostic according to the module dialog shown on the illustration.



CANopen

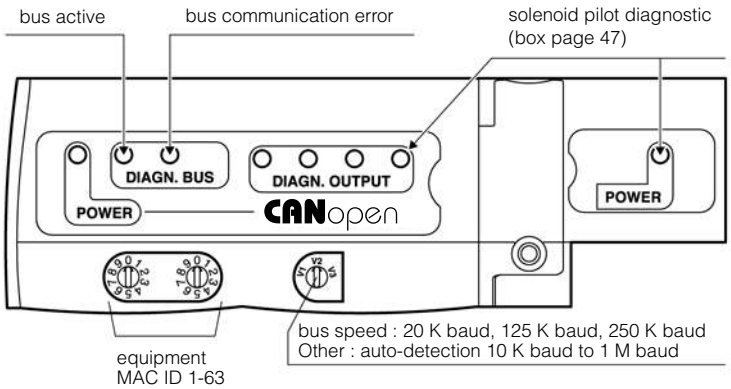
## Bus cable connections

CANopen standard male and female type A M12 connectors.
The alimentation for the module is supplied from the V+ and V- (24 V DC) of «bus in» connector.
Use of prefabricated cables available from your usual electrical supplier is recommended.
Line termination, P8BPA00MA, is necessary on the «bus out» connector of the last station.




## Addressing

Use the .EDS file on Moduflex web site :
http:/ www.parker.com/pneu/moduflex
The coding wheels enable configuration of the decimal address.




## Diagnostic

Diagnostic according to the module dialog shown on the illustration.

# Compatibility

Telemecanique

## Intégration of P2M2 head modules in SRB Advantys

The P2M2HBVC11600 CANopen head modules are integrated in the inputs/outputs Telemecanique Advantys STB whatever bus choosen for the installation.

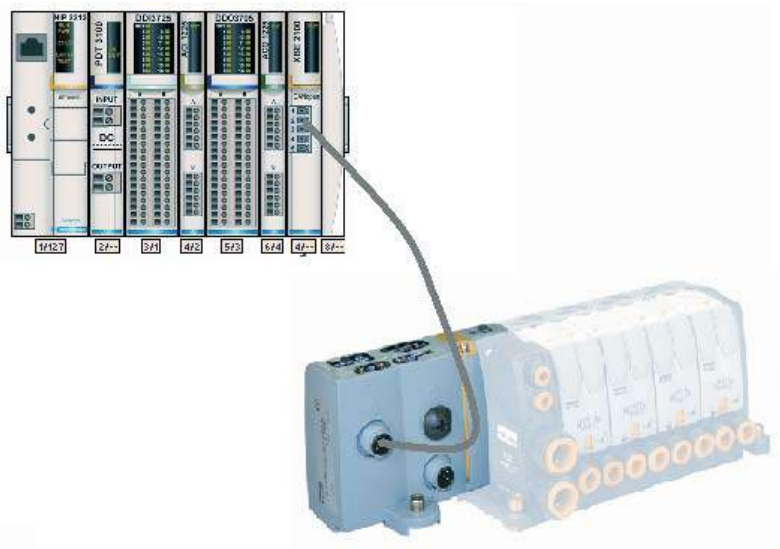
7 types of communication bus Advantys STB are available (Ethernet, CAN Open, FIP I/O, Profibus DP, DeviceNet, InterbusS, Modbus+).

These head modules P2M2 are integrated in the Advantys STB SPU 1xxxx catalogue software. Just use "drag and drop" to use the application.

It is possible to connect up to 12 head modules P2M2 on the same island Advantys STB.

Addressing head modules P2M2 is automaticcaly managed by the Advantys STB island.

The P2M2 head module diagnostic will be included into the Advantys STB island diagnostic.



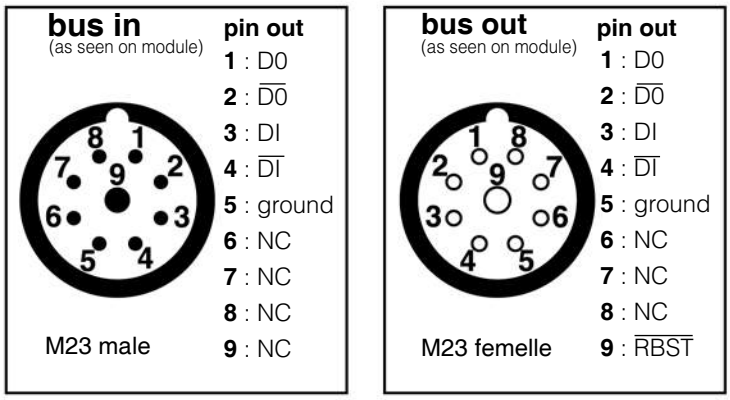
Parker Moduflex valve system p2M2HBCVC11600 : 16 outputs

# INTERBUS-S

## Bus cable connections

The M23 connectors conform to «Interbus remote bus».

Use of prefabricated cables available from your electrical usual supplier is recommended.




Note : for more details please consult «Interbus remote bus» documentation

## Automatic Addressing

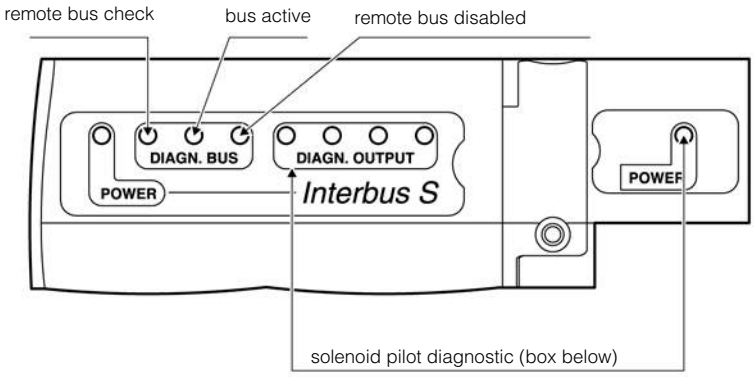
InterBus-S is self addressing. Thus it does not need any software or hardware configuration.

## Manual Addressing

InterBus-S network can also be manually configured using :
- ID code : 03 (hexadecimal)
- Data length : 2 bytes

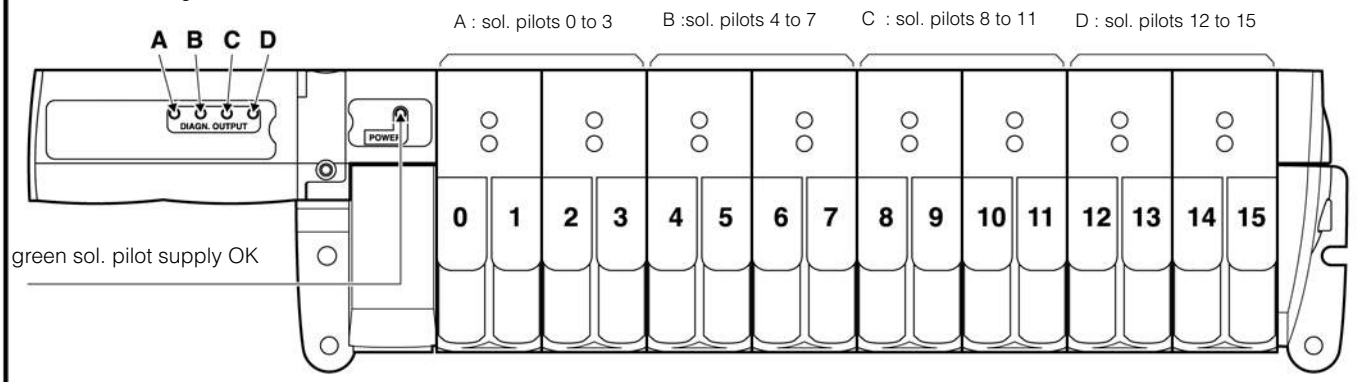
## Diagnostic

Diagnostic according to the module dialog shown on the illustration.
This diagnostic conforms to the InterBus-S standard.




## Solenoid pilot diagnostic common to all device bus modules

Red LEDs detecting solenoid valve short-circuits




Inside the bus module, solenoid valve control is protected against short-circuits, with the following visual indication provided :

- The solenoid pilot power supply indicator, green when supply is OK.
- The red LEDs detecting solenoid valve short-circuits with code shown above.

# Manual

The previous sections explain in detail the features and functions of a specific valve line : Moduflex.

More generally, modern pneumatic valve generations open up new possibilities for electro-pneumatic automation.

Valves are at the center of automation. The progress in valve design facilitates each step : design, installation, machine commissioning, machine maintenance. This results in a more efficient solution for each application.

The following manual explains the evolution of valve design and defines the principles of more simple and more efficient automation practice.

# the manual of modular pneumatic valve islands

Electro-pneumatic automation techniques have progressed through use of PLC's, field buses, cylinder integrated sensors and modular pneumatic valve islands. Pneumatic valves are now designed into compact islands that are easily configured for specific installation requirements. They are at the center of both the automation network and the man-machine dialog.

Defining the best valve island assembly for each application is now the key answer to performance. This manual presents the numerous possibilities that are offered by the latest modular pneumatic valve islands.

# 1 Valve islands change automation practice

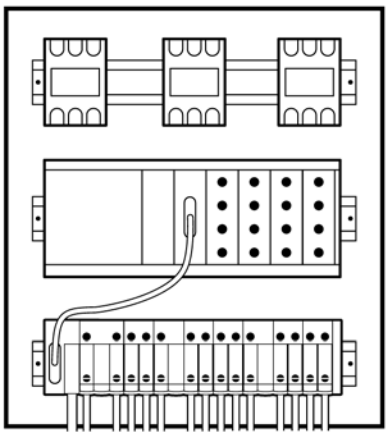
Automation practice is in continual evolution. The latest pneumatic valve island generation offers advantages at several stages : design, installation, machine commissioning and machine maintenance.

## A Design

New compact modular pneumatic valve islands offer numerous possibilities for automation design.

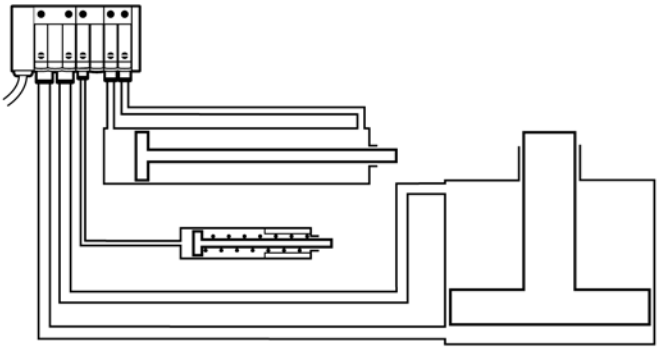
Depending on the machine complexity and the environment, the designer will choose either to centralise or to decentralise the pneumatic valves.

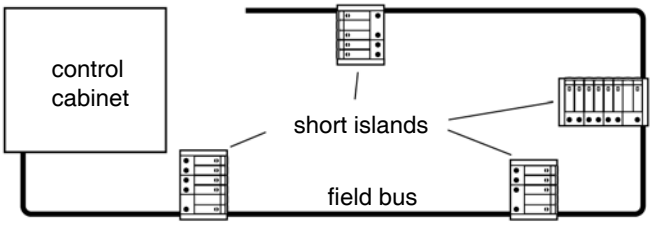
***Central valve island in a cabinet***




*control cabinet with both, electric and pneumatic components*

***Remote short islands located close to the cylinder***



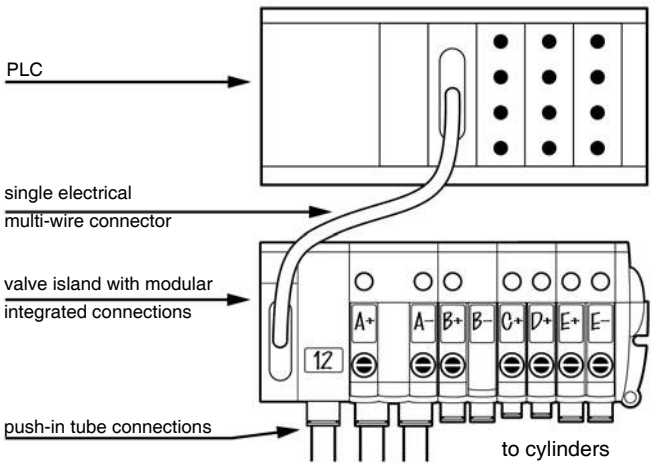



## B Installation

The configuration and the installation of a valve island for a given machine has been simplified with the latest generation of products.

This manual explains each step, from assembling the valve island to plug-in.

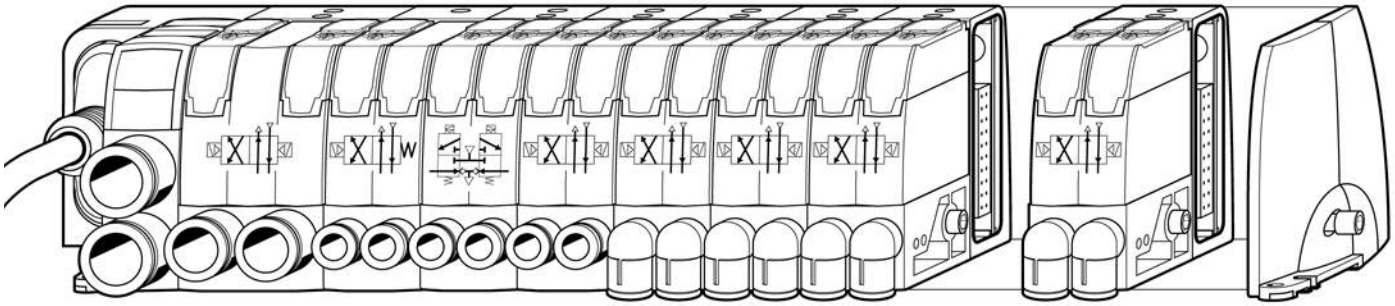
***Valve island plug-in connection to PLC***



## C Machine commissioning

Automation is a step by step procedure. Electro-pneumatic machines generally have a final commissioning procedure stage to ensure they fully achieve their task.

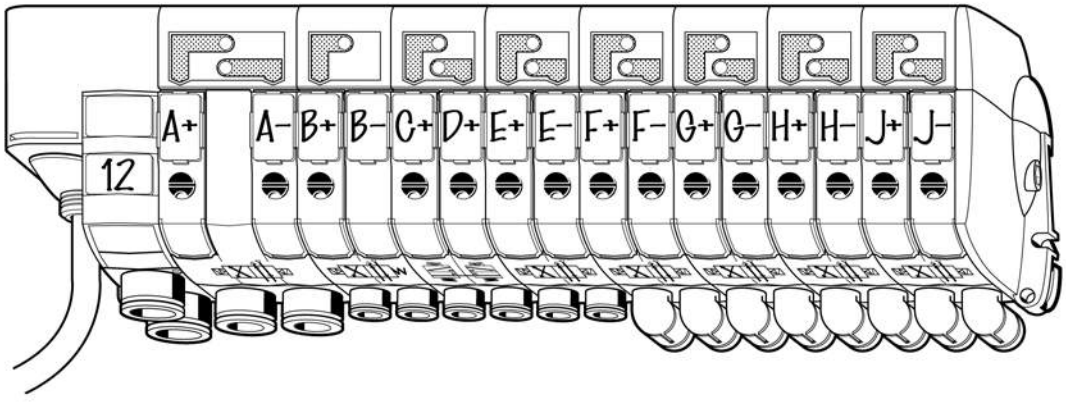
This manual explains how valve islands of the latest generation can easily be configured and re-configured until all cylinders on the machine achieve the required performance.



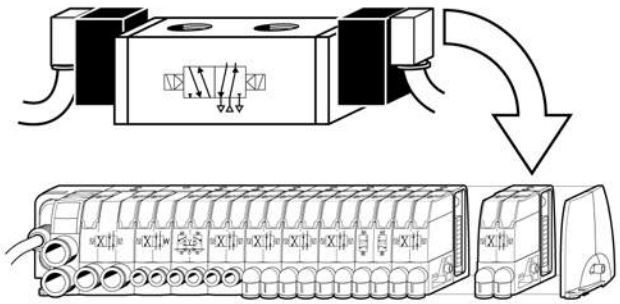
## D Machine maintenance

Man-machine dialog has been much improved with the latest pneumatic valve islands. They now provide a key function for machine troubleshooting.

This manual shows how each island module, with its identification marking, LED indicators and manual overrides, improves and simplifies the troubleshooting of a machine.



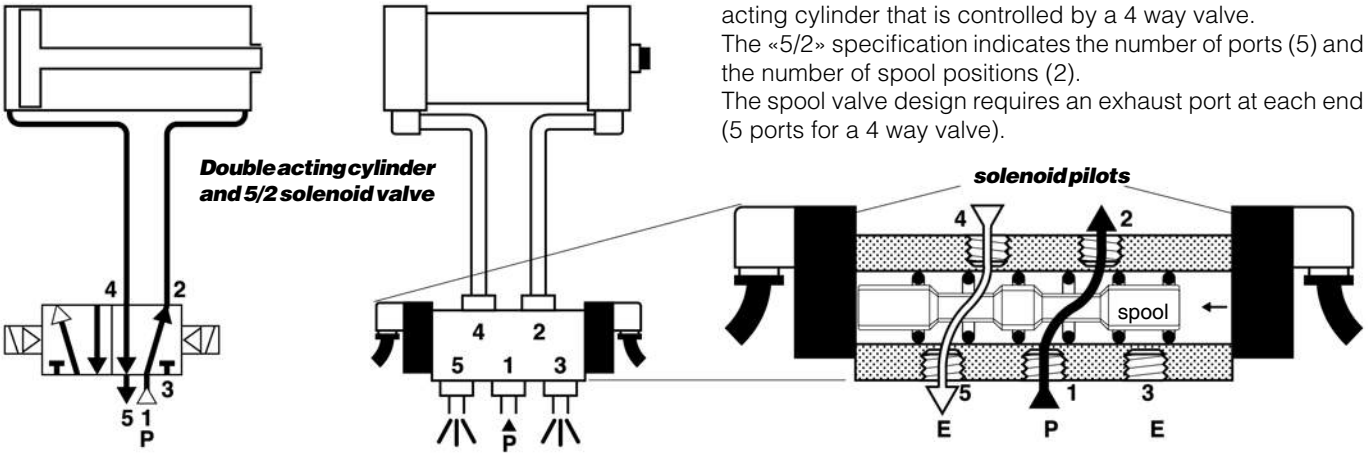
# 2 History : from stand-alone to pneumatic valve islands



*To answer the needs of more and more complex and compact machines, pneumatic automation has continuously progressed :*
*- in order to be compatible with PLC,s, it became low power electrically controlled ;*
*- what were originally stand-alone valves are now manifolded together into compact, flexible valve islands that include a complete range of functions.*

## A The stand-alone valves

The sketches represent the basic sub-assembly of a double acting cylinder that is controlled by a 4 way valve.
The «5/2» specification indicates the number of ports (5) and the number of spool positions (2).
The spool valve design requires an exhaust port at each end (5 ports for a 4 way valve).

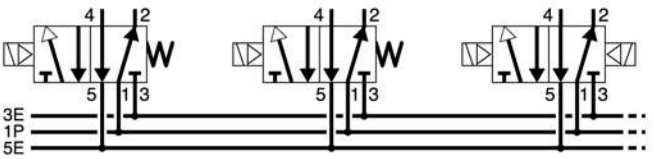


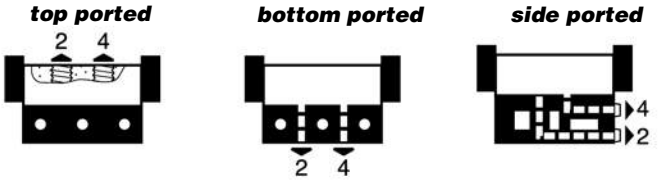

## B The valve manifolds

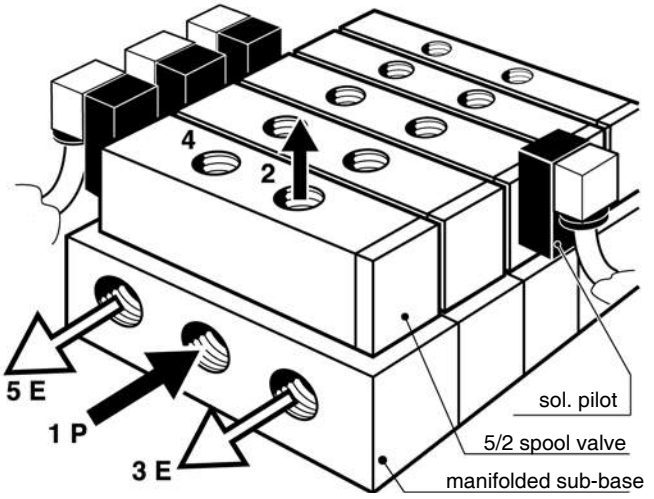
As early as the 80's, large numbers of stand-alone valves on each machine made the installation and piping work long and costly. As with hydraulic valves, designers developed manifolded pneumatic valves, thus reducing the number of tube connections to be made.

The sketches show a typical 5/2 valve manifold incorporating 3 common channels : common pressure supply 1 and exhaust collection channels 3 and 5.
Depending on the valve and manifold design, output ports to cylinders can either be on top of the valve or in the bottom or on the side of the manifold.

Installation and piping time was tremendously reduced. This manifold design led the way for more than 10 years.



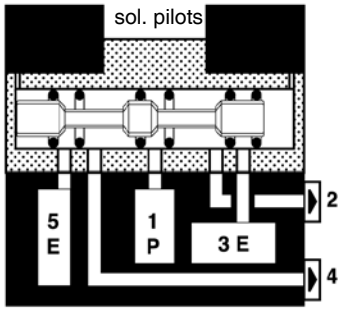



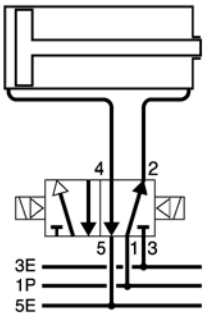
# C The 3 channel compact islands

In the 90's, with the number of pneumatic valves still increasing on the machines, valve manifolds appeared big and bulky. On the same 3 channel principle, compact islands were developed and took over, with also a wider choice of options.

It included :
– pilot exhaust collection for cleaner environment,
– 5/2 valves (4 ways) as well as 3/2 valves (3 ways) as shown on sketches below.

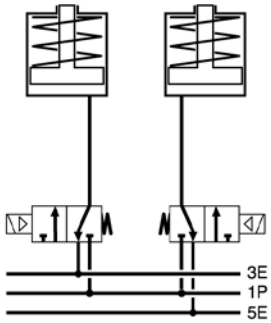
***5/2 module (4 way) for double acting cylinder***

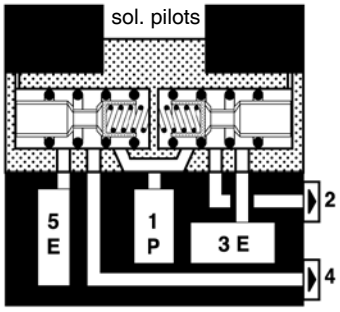



spool valve design

***double 3/2 module (3 way) for single acting cylinder***



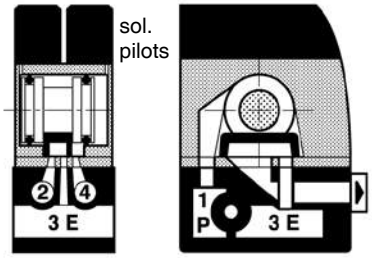



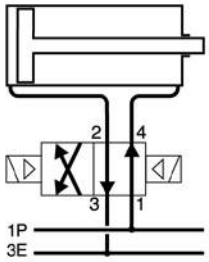

spool valve design

# D The 2 channel compact islands

Today, additional needs must be satisfied : more flexible islands, different valve sizes in the same island,... With appropriate valve designs (see sketches below), islands with only 2 common channels represent a new generation still more compact, with a complete solution for all needs. This allows to new and efficient automation pratice.

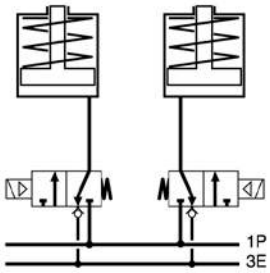
***4/2 module (4 way) for double acting cylinder***

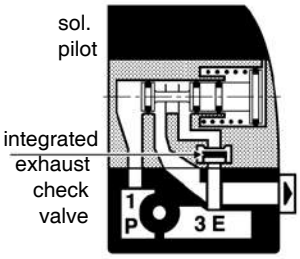


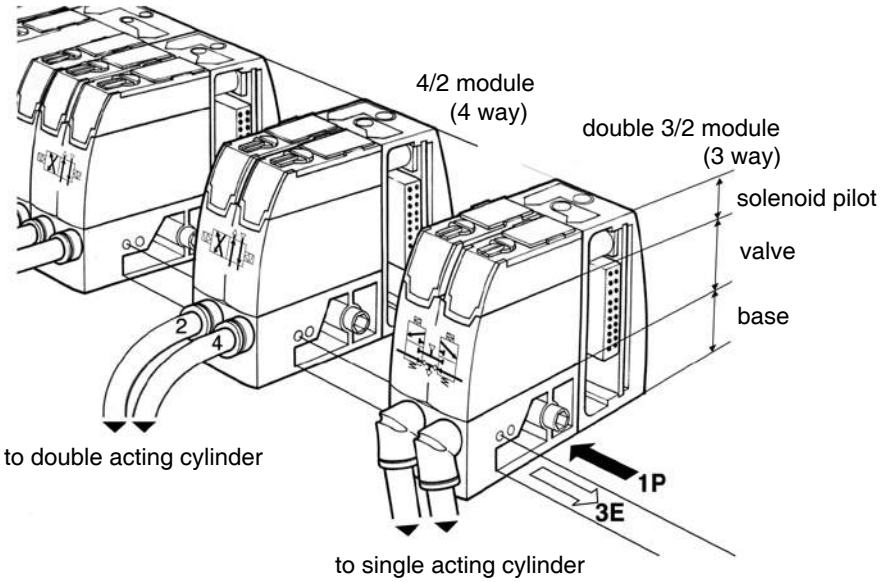

slide valve design

***double 3/2 module (3 way) for single acting cylinder***



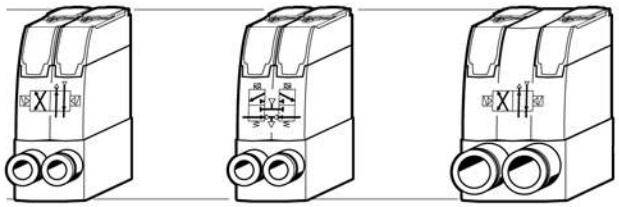




piston + spool design




This 2 channel compact island generation allows considerable progress in automation practice. This manual's target is to describe the progress made.

# 3 Basic valve choice for a given island

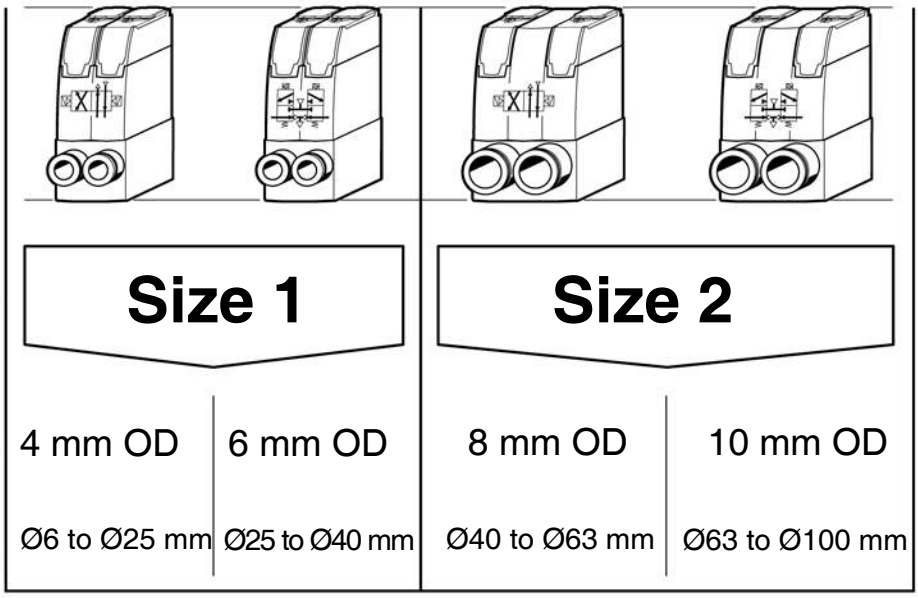


*Compact pneumatic valve ranges have been developed and proven. They can now be adapted to all practical situations :*
*- different island sizes : long islands, short remote islands near the cylinders , stand-alone valves,...*
*- in a given island, different flows and different valve functions.*

## The right valve module for each cylinder

### A- Valve flow passage

One island may control both large and small cylinders.
This is why valve modules of different flow capabilities can be combined into the same island.

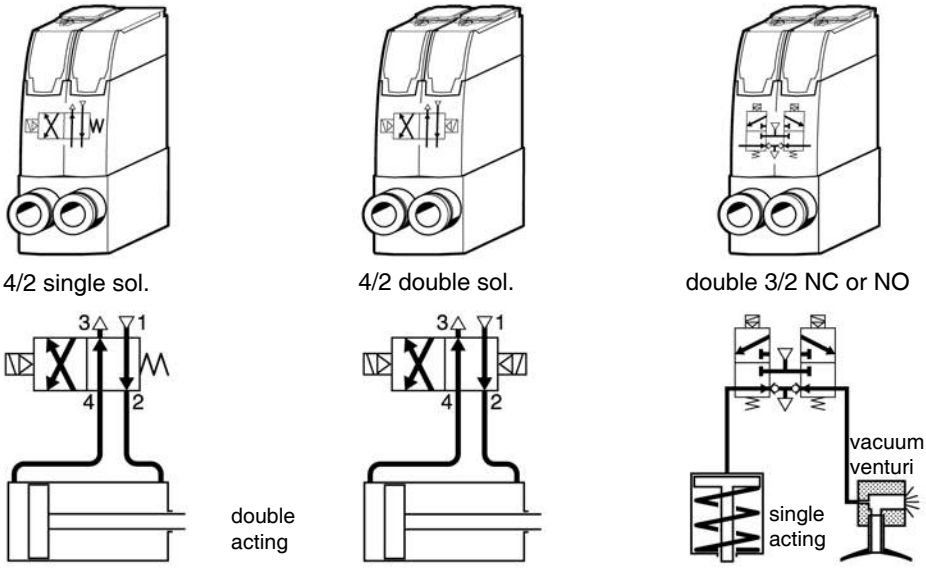



### B- Valve function

One island may control single or double acting cylinders, requiring 3/2 or 4/2 valves.

Control may require single or double solenoid pilot valves, or both.

All these valve functions can be combined into the same island together with 3 position valve functions (chapter 11) and peripheral flow control and pressure regulation modules (chapter 10).

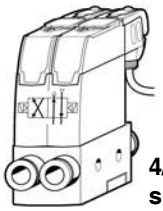


# Pneumatic valves and islands for all applications

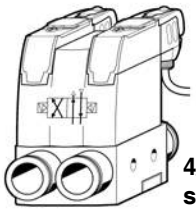
The flow and function variations that have been explained on the previous page are completed with the following additional ones.

## A- Stand-alone modules

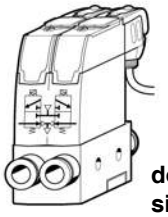
For isolated cylinders on a machine, it is preferable to locate the valve close by. Thus a stand-alone module is required. Response time and air consumption are then reduced to a minimum.



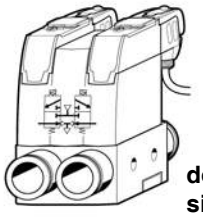
**4/2 size 1**



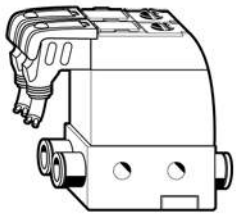
**4/2 size 2**



**double 3/2 size 1**

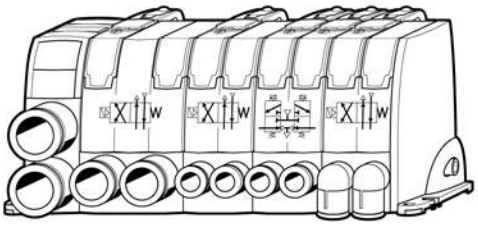


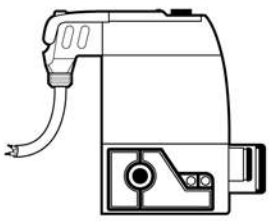
**double 3/2 size 2**



## B - Modules for islands with individual electrical connectors

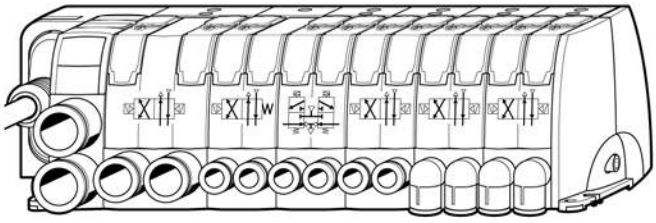
For small groups of cylinders, short valve islands can be used.
In this case, it is practicle to use individual electrically connected valves.

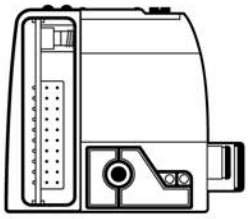




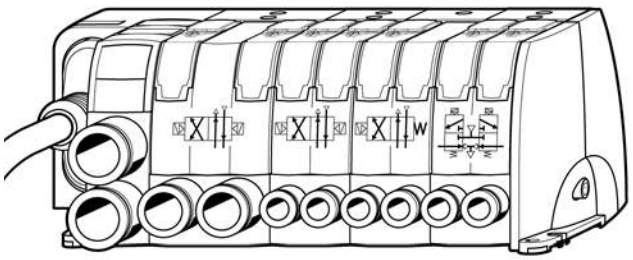
## C - Modules for islands with integrated connections

When the number of valves is larger, modular islands are easily assembled with their integrated electrical connection series.
Such islands are then connected to the control PLC with an electric multi-connector that plugs into the island head module or with a field bus connection.





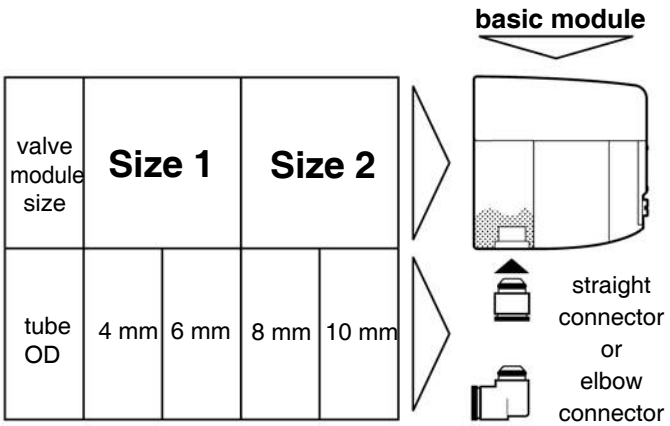
# 4 A valve island for each application

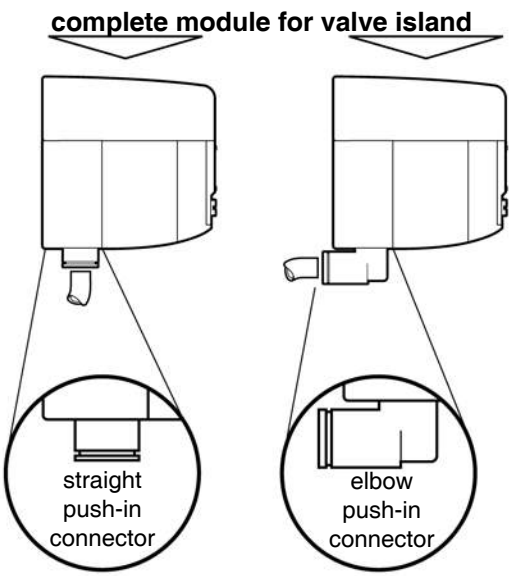


*Valve modules selected from the previous pages are assembled into a specif c islaind for each application.*

*The valve island features push-in connections that clip into the valve modules. For each application, the most effective conf guiration may be obtained.*

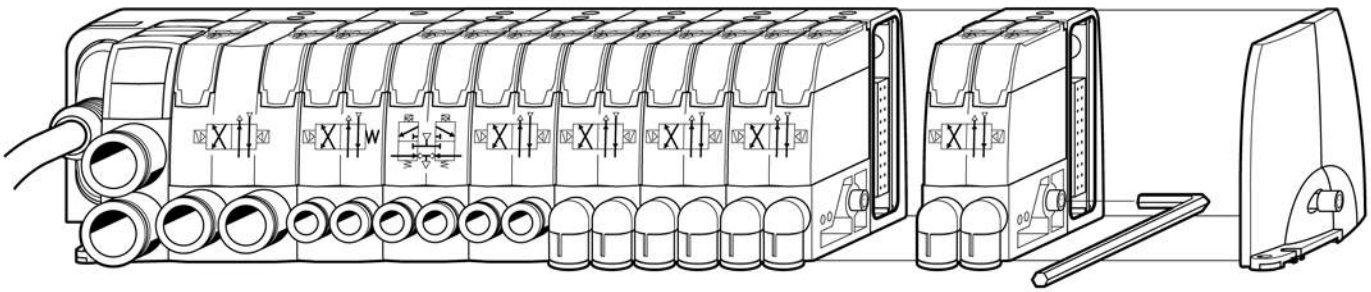
## Tube connections to cylinders



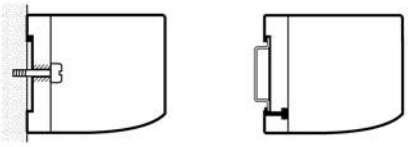




Each valve module is equiped with push-in tube connectors of the required size and configuration. All connectors simply clip into the *basic modules* to obtain the required *complete modules* for valve islands.

## Valve island assembly and installation

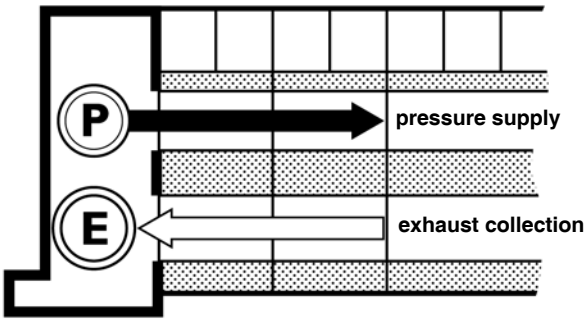


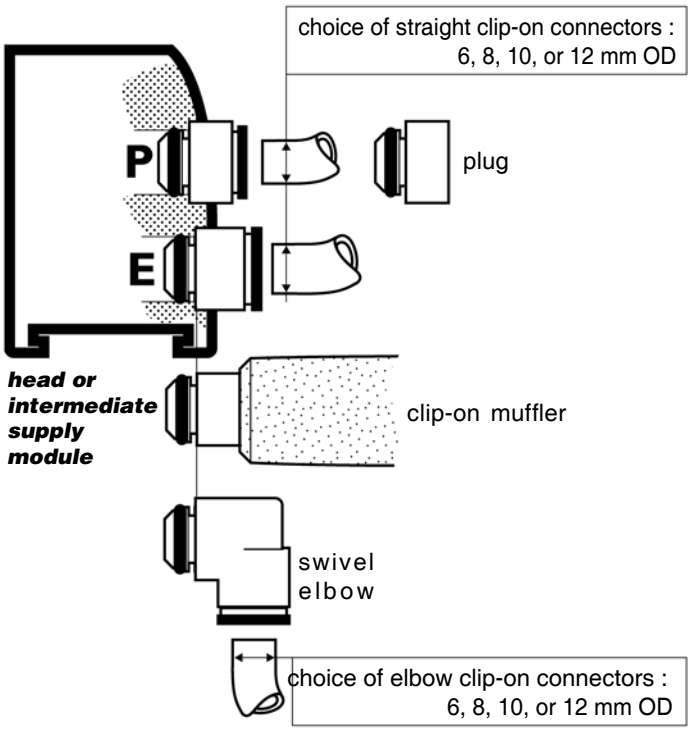
To assemble the valve island, modules are fastened side by side at their base. The resulting island is compact and rigid, and can be mounted directly onto the machine or inside an enclosure.



screw mounting and DIN rail mounting

# Valve island pressure supply and exhaust collection




Pressure supply and exhaust connections are provided on the head module, at the left end of the island.

Push-in tube connectors are simply clipped into the head module and are available in various sizes as either straight or elbow connections to suit a particular application.

On some large and/or noisy machines, the exhaust may not need to be piped away. Therefore, in such cases, a clip-on muffler will provide the best options for flow and noise reduction.

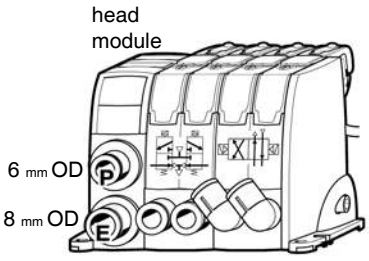
# Valve island configurations to meet flow requirements

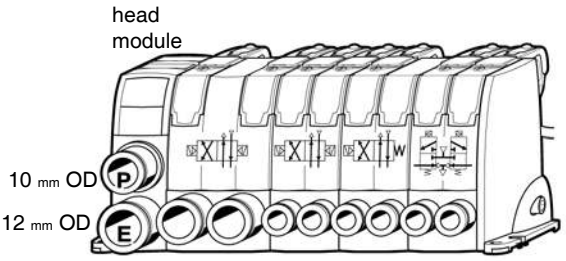
Depending on the island size (short or long) and on the size of its valves, the flow requirements can be very different. Each island is easily configured to conform to the flow requirements, and can be easily modified if the cylinder speeds are insufficient.

## ● Short islands

With only size 1 valves, a short island requires limited flow supply : the tail module is a simple plate.
When a size 2 valve is integrated into the island, its flow needs drive the island supply and exhaust choices.

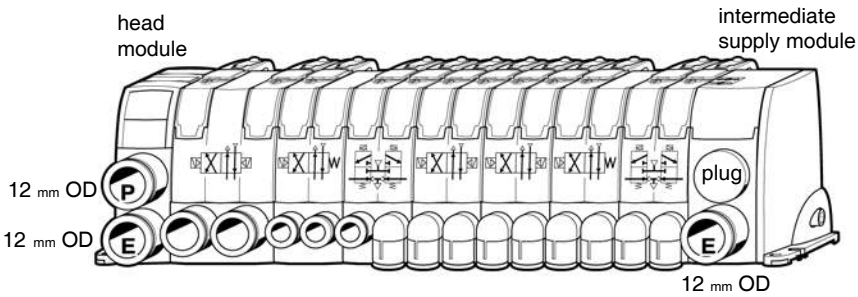
In all cases, the exhaust section area must be bigger than the supply section area.



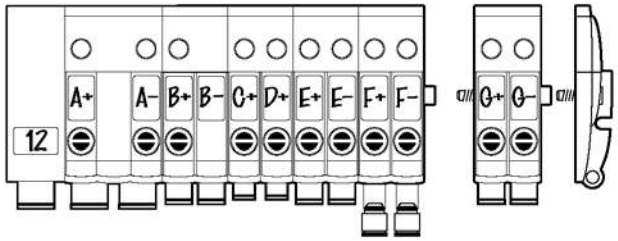




## ● Long islands

The double exhaust connector E (Ø 12 mm) with maximum flow is generally required, while only one pressure supply connector P is necessary.



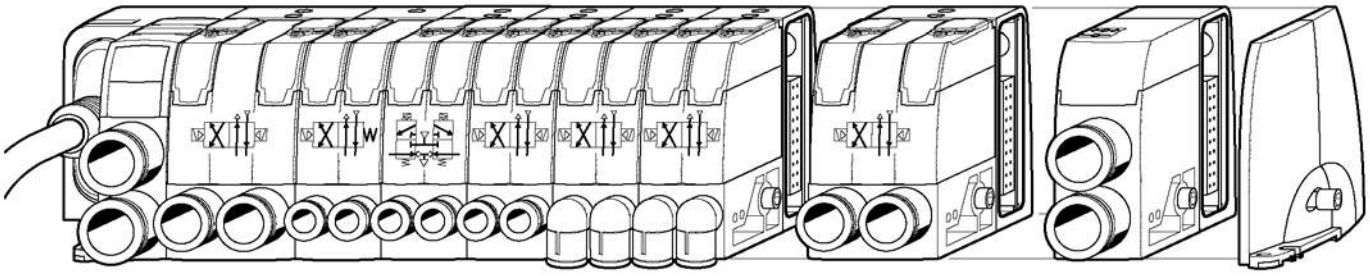
# 5 The internal flexibility of valve islands




*In order to simplify machine commissioning procedures, valve islands must be flexible.*

*Totally modular, they can easily be expanded or reconfigured until they precisely answer the application needs : different cylinders, different flows to achieve the required cylinder speeds, different sections in a given island, ....*

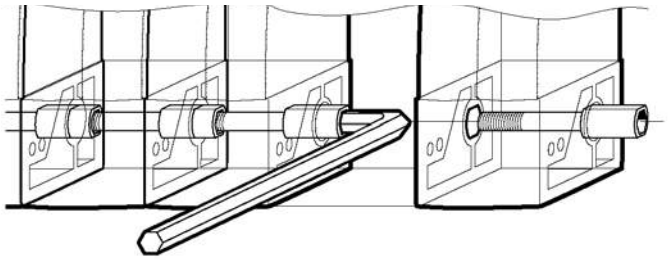
## Island composition adaptations



The initial island may be modified until it achieves all requirements. As an example, on the island shown above, the last valve module is being changed for a higher flow and in consequence, the pressure supply and exhaust collection are being doubled.

1 - This size 2 valve module will provide the required speed for the cylinder.

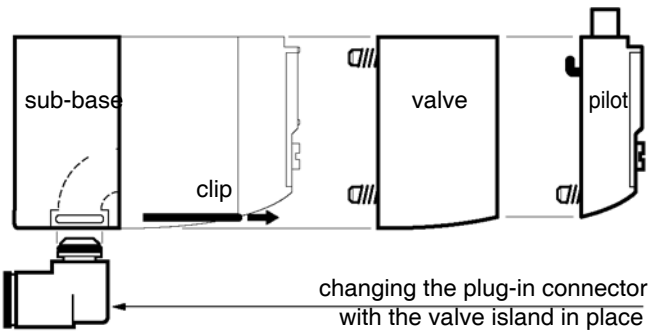
2 - This additional intermediate module will increase the island flow supply and exhaust connection to the required levels.



### Easy island assembly and disassembly

When assembling a valve island, the screw head must be orientated (see drawing) so that the following module will prevent the screw from turning.
This facilitates the disassembly of the island in the correct order.

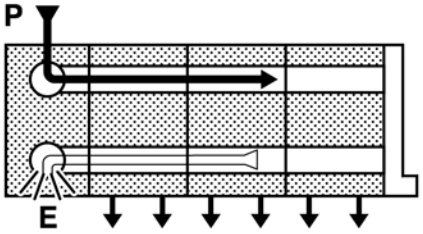
## Tube connection variations



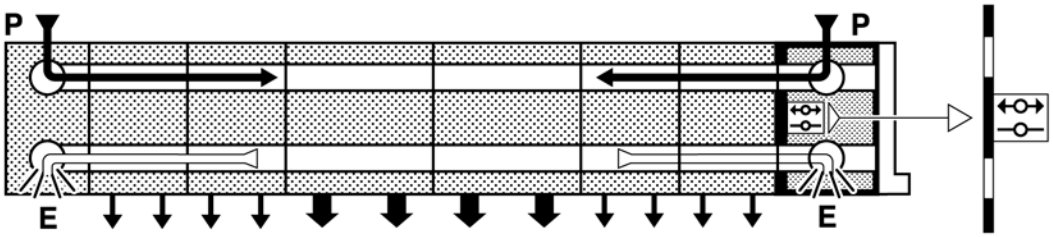

For each application, the valve flow passage and the tube size are independently selected.
If however a cylinder does not reach the required speed, the flexible valve island design allows a change in tube size with the valve island in place. Simply remove the solenoid pilot and the valve, pull out the clip, and replace the tube connector with a larger one.

# Island division into different pressure sections

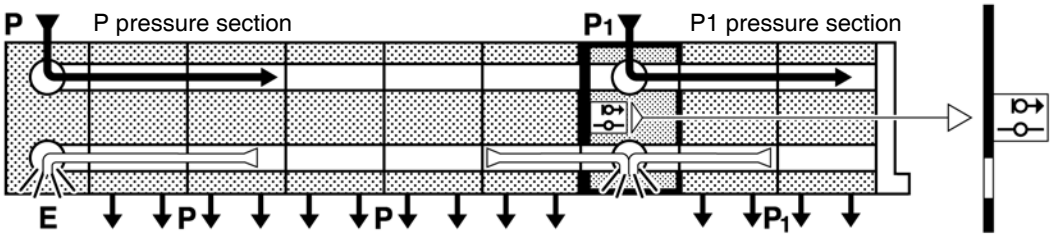
Valve islands may require two or more different pressure sections. The universal intermediate supply module is available to provide any required combination, as shown by the following examples.



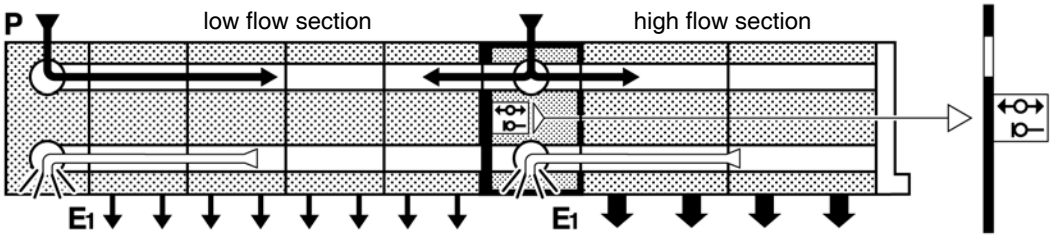

*Typical short island with single supply and exhaust collection.*



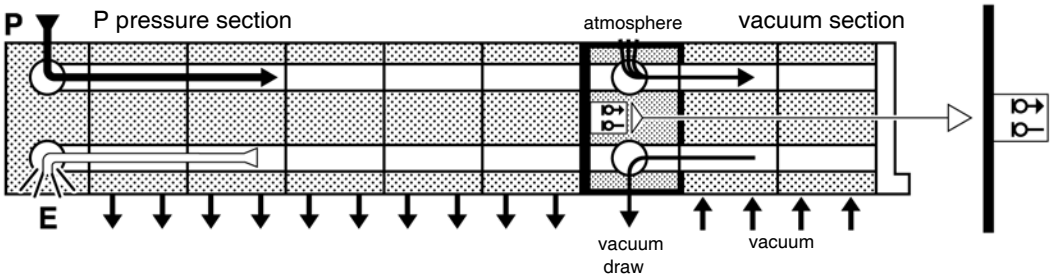

*Typical long island with double supply and exhaust collection.*
*P and E channels are both open.*




*Two section island for different pressures P and P1.*
*P channel is blocked.*
*E channel is open.*

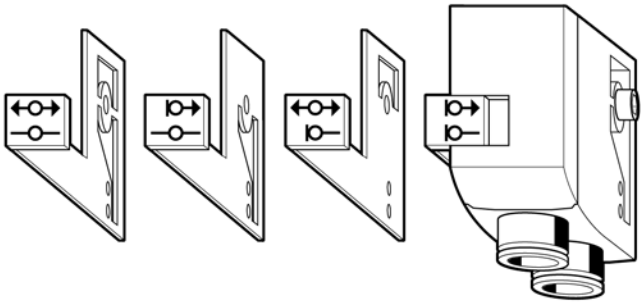



*Two section island for exhaust separation of hight flow valves.*
*P channel is open.*
*E channel is blocked.*

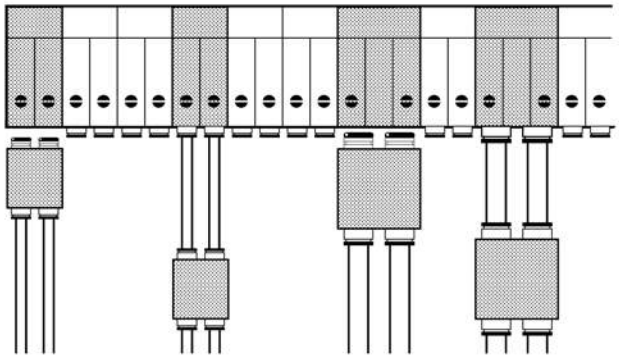



*Two section island :*
*- one section with P pressure .*
*- one section with vacuum.*
*P and E channels are both blocked.*

The universal intermediate supply module is supplied with four configuration plates that achieve two functions :
- block P or E channel, or none, or both ;
- present a simple diagram on the island front to indicate the internal configuration.



# 6 The peripheral f exibility of valve islands



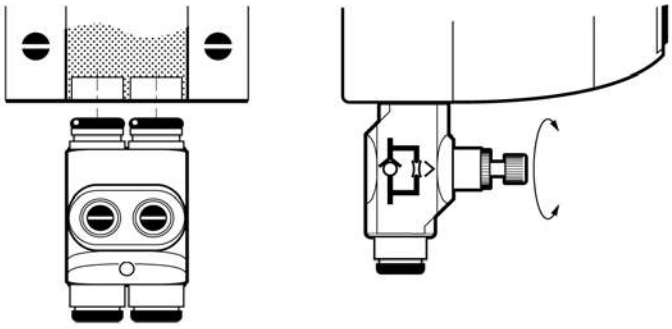
*Peripheral control modules add to the valve island f exibility.*
*These modules answer the complementary needs of the cylinders : f ow contrlols, pressure regulation or positioning.*
*They may be plugged-in directly to the valve island or installed in-line closer to the cylinder.*

## Valve islands output functions

### A- Dual flow control module

This dual flow control module is suitable for adjusting cylinder speeds by :
- controlling exhaust flows from a double acting cylinder ;
- controlling supply flow to a single acting cylinder.

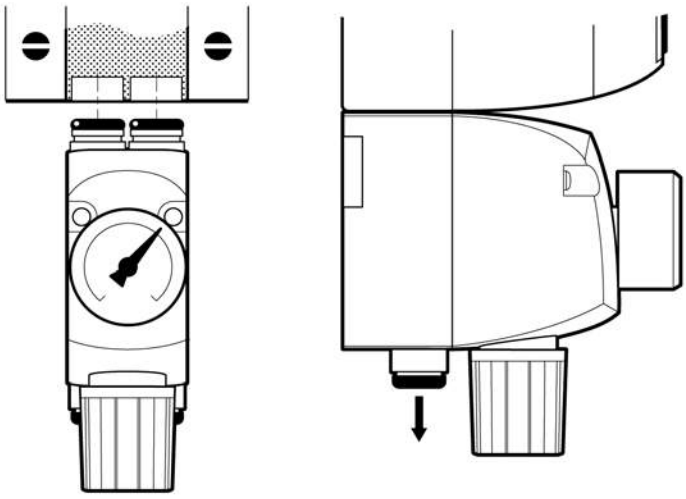
Chap. 10 gives full details.



### B- Pressure regulation module

Adjusting the thrust developed by a cylinder is often necessary. This pressure regulation module enables adjustment of the $P_1$ pressure required for a given cylinder, and to read it on the attached pressure gauge.

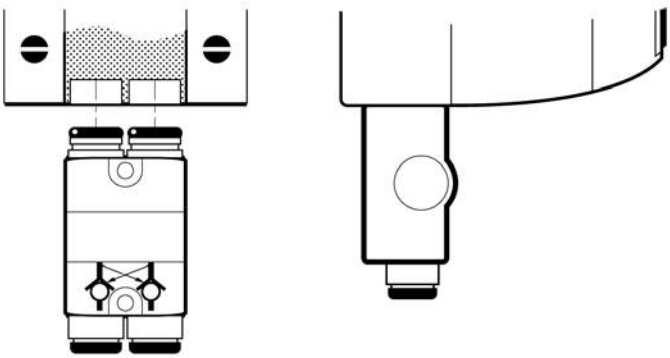
Chap. 10 gives full details.



### C- Dual pilot operated check module

With two internally piloted check valves, this module will block both flows and stop cylinder movement as soon as the valve's outputs are both exhausted.

Chap. 11 gives full details.

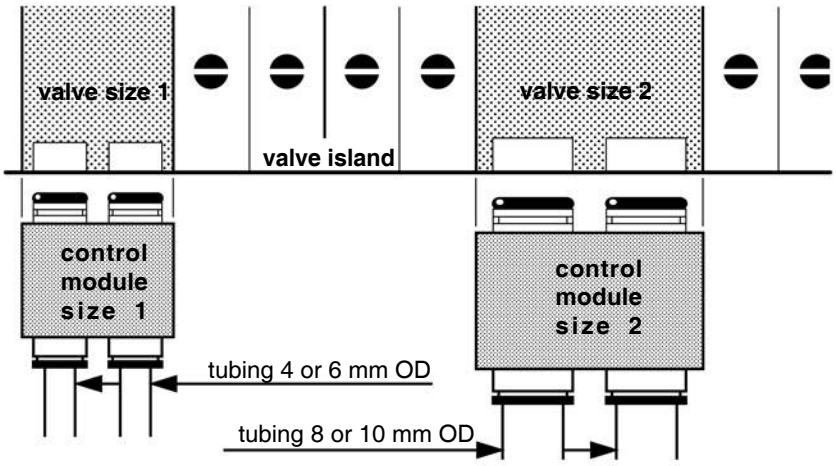


# Peripheral flexibility with control modules

## ● Sizes and flows

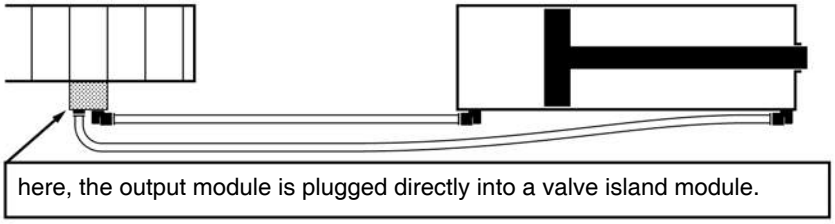
Corresponding to the two valve sizes, peripheral control modules are available in 2 sizes :
- size 1,
- size 2.

All cylinders can thus be accomodated, from 6 mm to 100 mm in bore size.



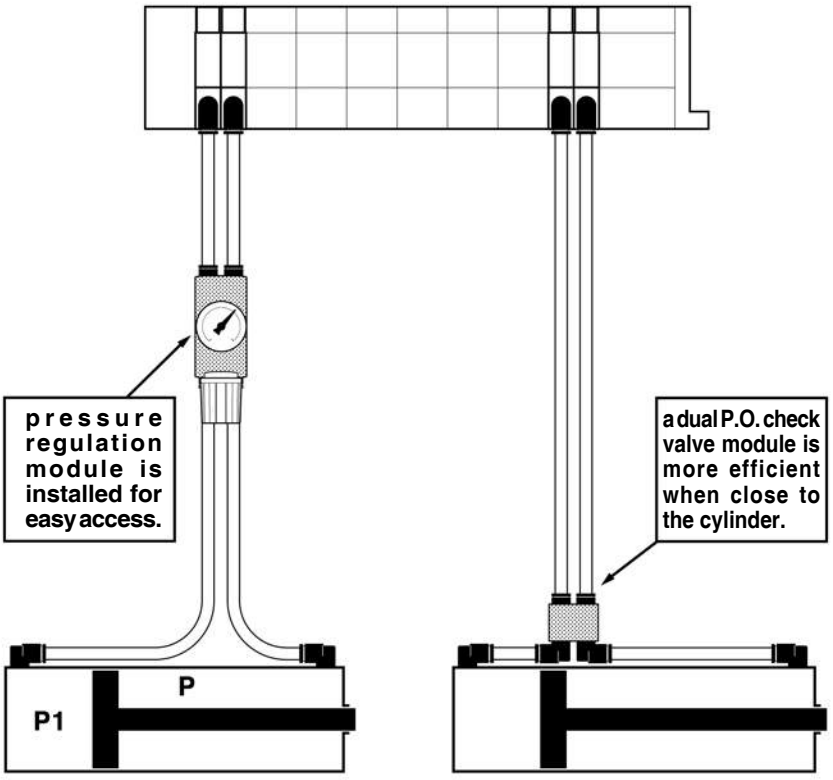

## ● Different installations

In order to accommodate machine design, and depending on cylinder requirements, the peripheral modules may be plugged into the island or installed in-line, between the valve island and the cylinder.

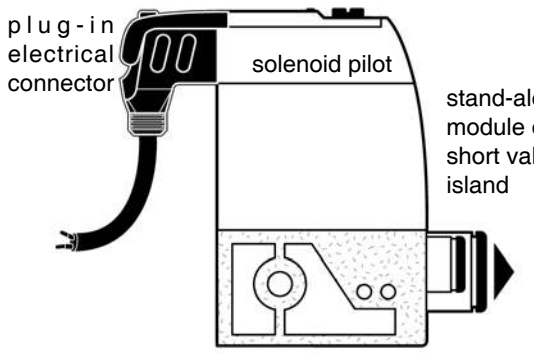



Flow controls and dual P.O. check valve modules are more efficient when close to the cylinder, while the location of a pressure regulation module makes no difference.

The control modules enable flexibility in designing machines as well as improving their performance during machine commissioning.



# 7 Modules with individual electrical connectors



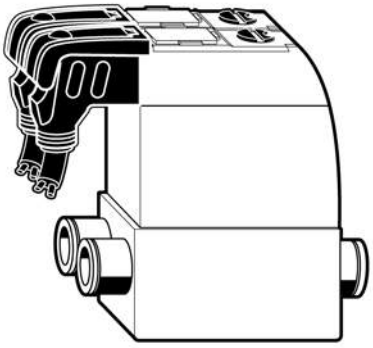

*For stand-alone modules, or for short valve islands, individual electrical connectors are generally appropriate.*

*These plug-in connectors are dust and waterproof (IP 67), and include the LED indicator and the voltage surge suppressor.*

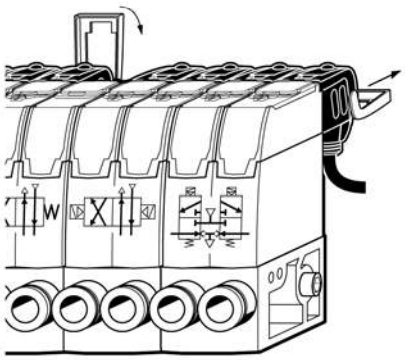
## The plug-in dust and waterproof connector

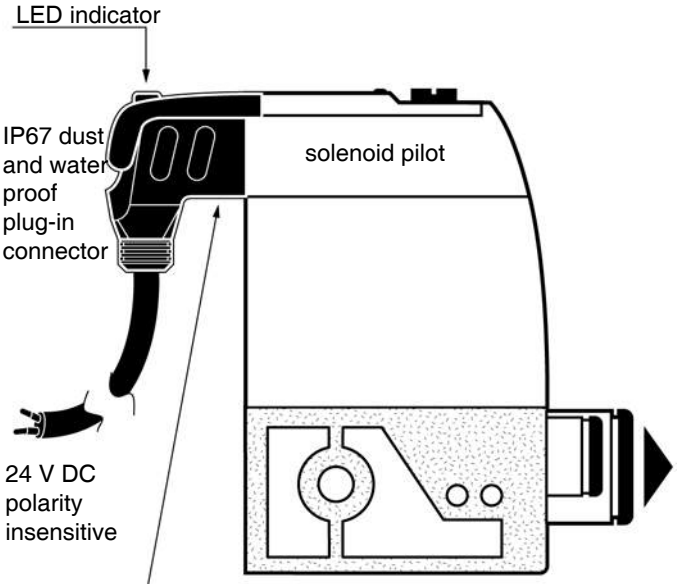
This electric connector plugs onto the solenoid pilot standard M8 male thread. It features a LED indicator and a voltage surge supressor with a cable for a polarity insensitive connection.

All stand alone modules incorporate solenoid pilots with individual «plug-in» connectors. With short valve islands, the individual connector is still preferred. However, for longer island, integrated electrical connections become more viable (see next chapter).

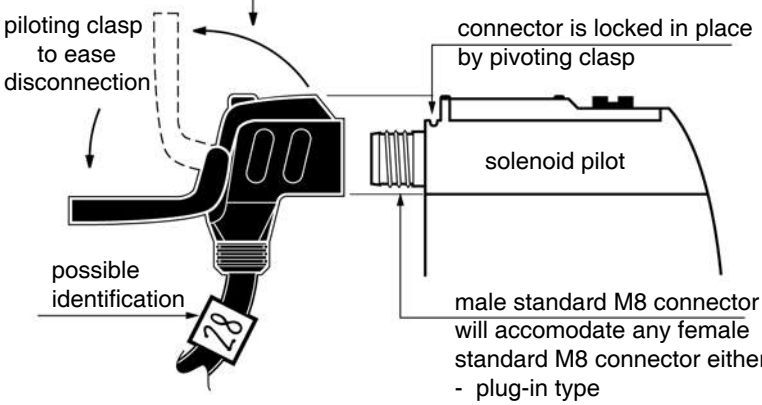


plug-in connector arrangement onto stand-alone modules or short valve island






individual electrical connector with
- connections to solenoid pilot
- LED indicator
- voltage surge surpressor

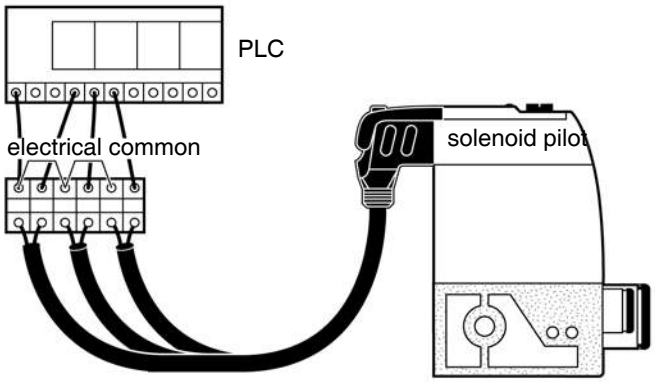


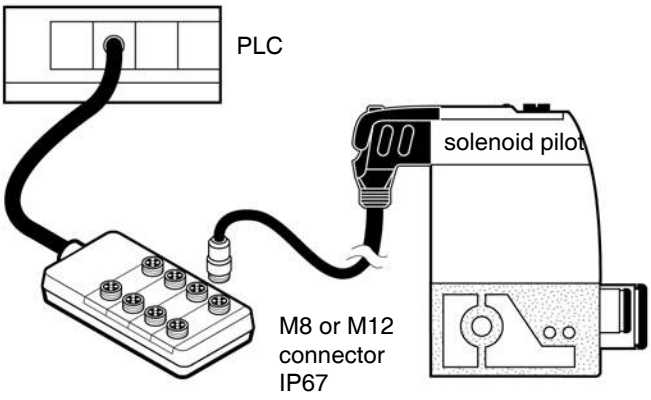

male standard M8 connector : will accomodate any female standard M8 connector either,
- plug-in type
- screw-in type.

## Connections to PLC's and other controls

The 2 wires of each connector cable can be taken directly to the output terminals of a PLC or field bus module.
If all outputs have a single common terminal, it will be necessary to use an intermediate terminal block with the commons linked as shown in the drawing below.

Connections outside enclosures may be IP 67 protected, using the standard M8 or M 12 connectors of a terminal box, as shown in the drawing below.




## Pneumatic valve islands conform to the latest electrical requirements

Pneumatic valve islands now have to whithstand many different conditions in their various applications :
- installed inside or outside enclosures ;
- combined with electrical components sensitive to solenoid «spikes» and inside machines subjected to voltage drop ;
- integrated with either positive logic or negative logic controls.

Therefore, the latest generation of valve islands has been developed to satisfy the following requirements in both their individual or integrated connection forms.

### 1- IP 65-67 dust and water protection.

Valve islands may be installed close to the cylinders they control ; this can prove to be a difficult environment. Therefore the electrical parts are dust and water protected. They conform to the the following standard : IP 67 for individual connector valves and islands, IP 65 for integrated electric connections islands.

### 2- Collection of exhausts, including pilot exhausts.

Increasingly, valve islands are incorporated into the electrical enclosure of a machine.
Therefore, in this case and applications involving clean rooms or food industry, the latest valve islands enable collection of all air exhaust including these of the solenoid pilots.

### 3- Protection of controls from voltage surges.

The voltage surge generated when a coil is de-energised is a common problem and can disrupt control circuits upstream of the valve island. To overcome this problem, the latest generations of valve islands incorporate a voltage surge suppressor with each solenoid pilot.

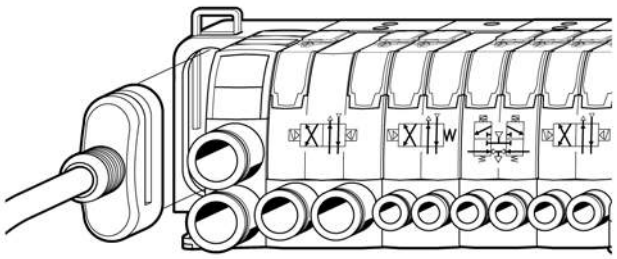
### 4- Positive logic (PNP) and negative (NPN) compatibility.

The increasing use of global automation components and machines can raise problems of compatibility between «PNP» and «NPN» circuit design. The latest generation valves and islands overcome this problem as the solenoid pilots are polarity insensitive and can accept 24 VDC in any orientation.

### 5- Dependability even with voltage drop.

Electro-pneumatic automation is often integrated to machines that are submitted to voltage drop for example when an electrical motor is started. In order to overcome such working conditions, standard requirements state that the solenoid pilot should still operate 15 % under the voltage rating, i.e. 20.4 V for a 24 V rating. To fulfill such a specification, the solenoid pilot power has to be sufficiently high : for example, 1 W is better than 0.5 W.

# 8 Islands with integrated electrical connections



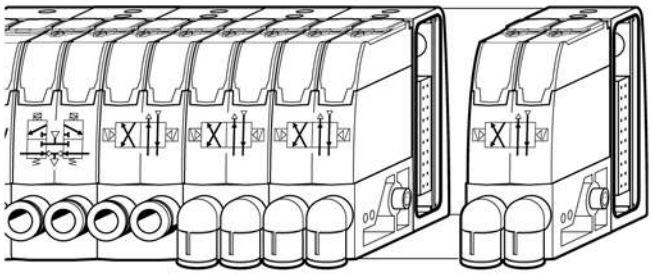
*This valve island conf guration considerably simplif es inst allation : with the multi-connector, the time taken in connecting the valve island to controls is reduced to a minimum.*

*Inside the island, modular integrated circuitry conveys the signals from the multi-connector to each solenoid pilot.*

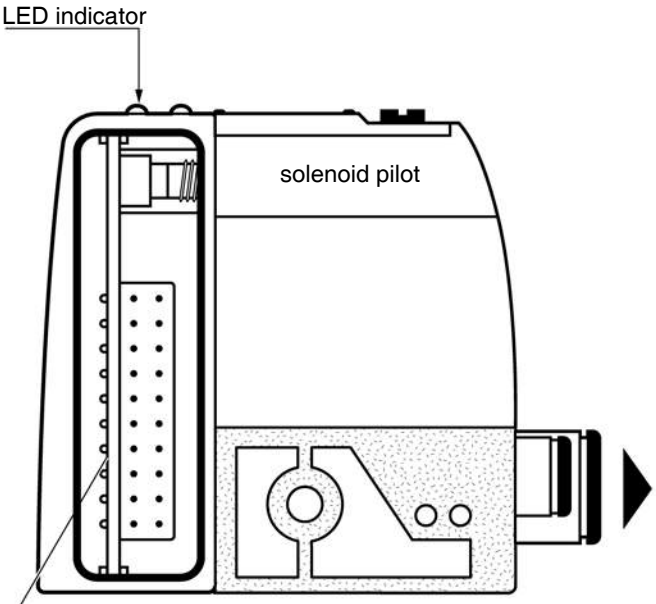
## Integrated electrical connections

The island's pneumatic modularity is complemented by the electrical connection modularity. When modules are assembled into an island they are automatically inter-connected. They follow the electrical connection modularity principle that is described in the box below.

The island connections to controls are then made from the electrical head module by one of the methods shown on the next page.

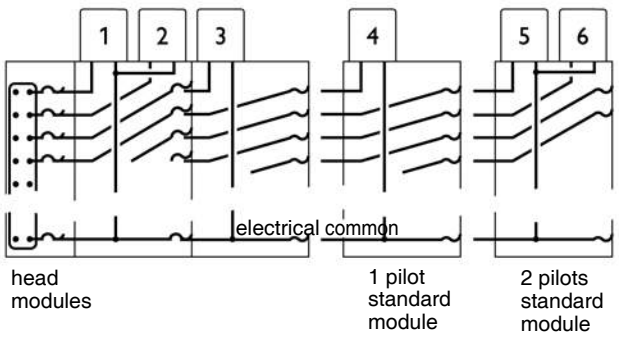


***modular valve island with integrated electrical connections***




modular electrical circuit including :
- multiple connections between island modules
- connections to solenoid pilots
- LED indicators and voltage surge protection
- self-adressing (see below)

## Valve self-addressing modularity principle

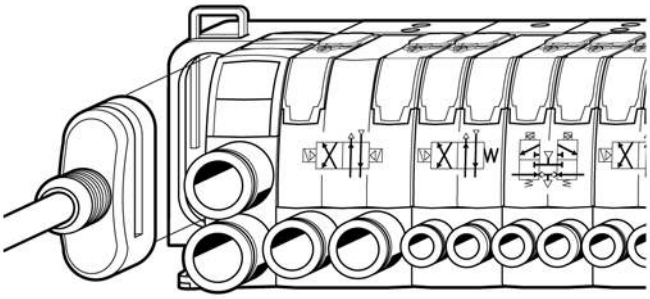



The schematic on the left illustrates the connection principle between each island module :
– an electrical common crosses the whole island connecting one pole of each of the solenoid pilots ;
– connections from the head module are self-addressing ; one step adjusted at each pilot, they step by step progress upwards until they reach the solenoid that they will control.

All modules are standard and easily assembled to build the valve island.

# Valve island connection to PLCs and other controls

An electrical multi-connector is simply added to the basic pneumatic head module, to form the complete island with each pin of the connector self addressed to the corresponding solenoid pilot.



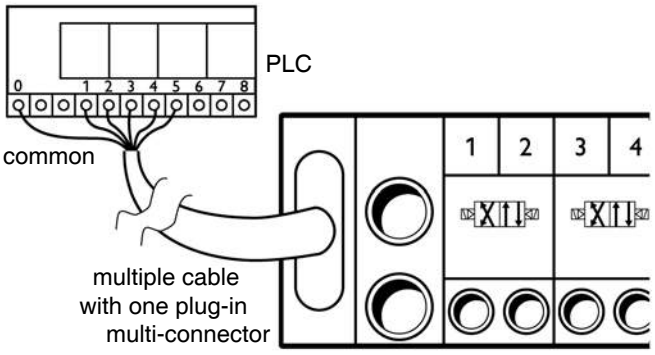
plug-in multi-connector

## ● Wired connection to PLC

A multiple cable is plugged into the island head module and each individual wire is connected to the PLC's terminals.

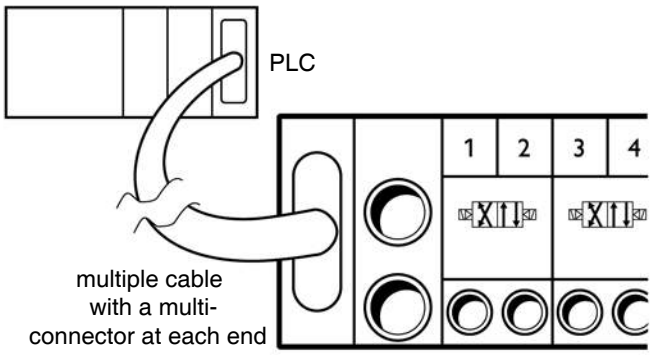
The multi-colored cable is a guide to addressing, with each color unique to a solenoid pilot row within the island.

When compared with the individual electrical connector (see chapter 7) the integrated electrical connection island with multi-connector reduces the connections to be made by almost one half.




## ● Plug-in connection to PLC

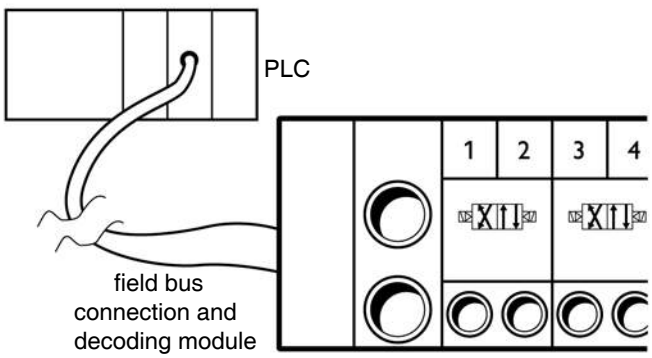
It is possible with some well known PLC models to have a dedicated double multi-connector cable enabling the PLC plug-in card to connect directly to the standard valve island.



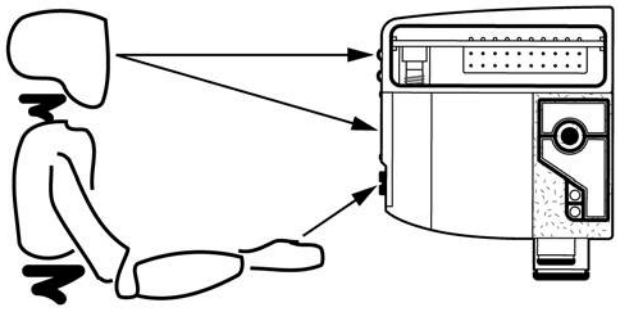

## ● Field-bus communication with PLC

The multi-connector at the head of the island can be replaced by a field-bus connection and decoding module.

Valve islands with this option can be connected at any point along the field bus that the PLC controls (see chapter 15, 16 and 17).



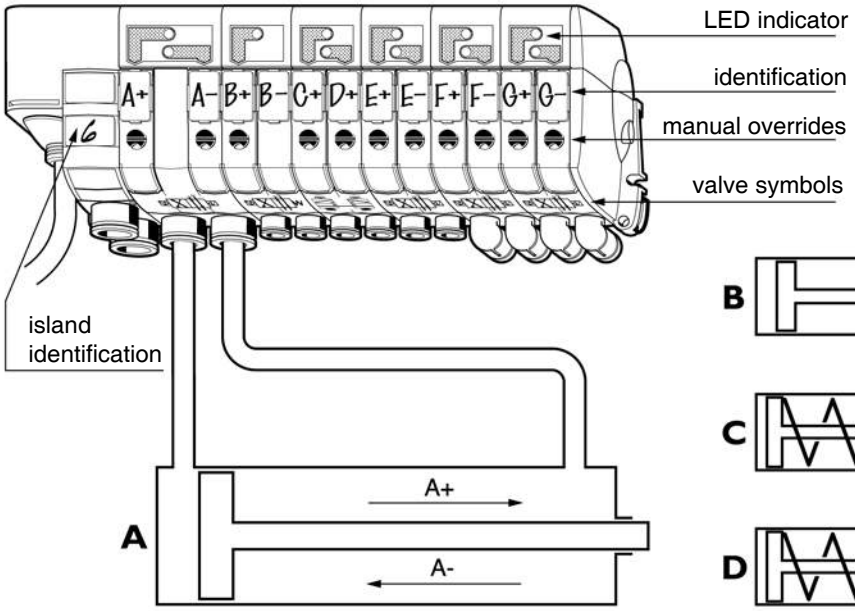
# 9 Man-machine dialog through valve islands



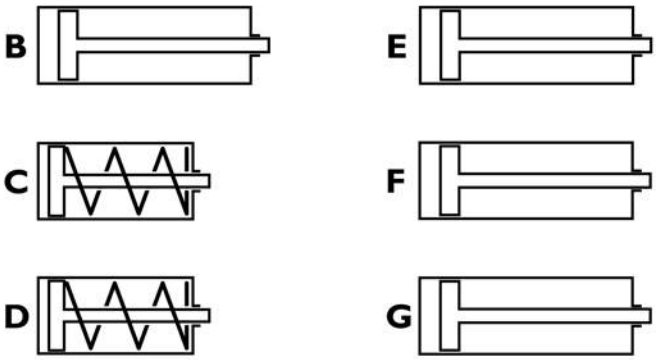
*Pneumatic valves are at the center of electro-pneumatic automation systems. This is why pneumatic valve islands with built-in features enable eff cient man-imachine dialog.*

*This achieved with their method of identification, the LED indicator and the manual overrides, all of which simplify troubleshooting on the machine.*

## Identification marking on valve islands



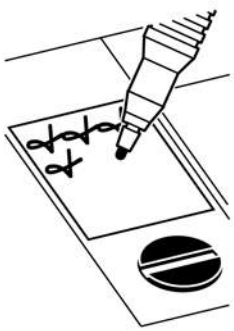

It is often useful to relate a module to a movement within the machine. This is made possible with the ability for each module to have an identification marking corresponding to each movement. The LED reading and manual override action can now be easily identified for a particular movement within the machine.



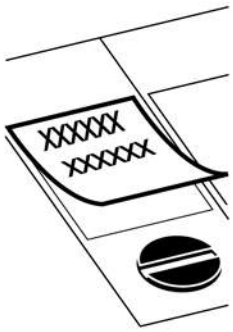

## Valve island marking process

Valve islands have standard 9 x 17 mm identification areas.

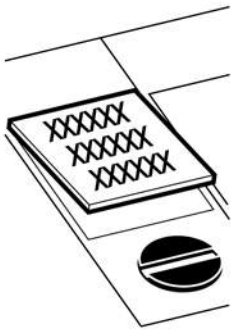
Depending on the application, one can choose between the different marking procedures shown here, from a simple hand marking to a more permanent label or tag marking using computerized equipment.



**Hand made marking**
with an indeleble pencil

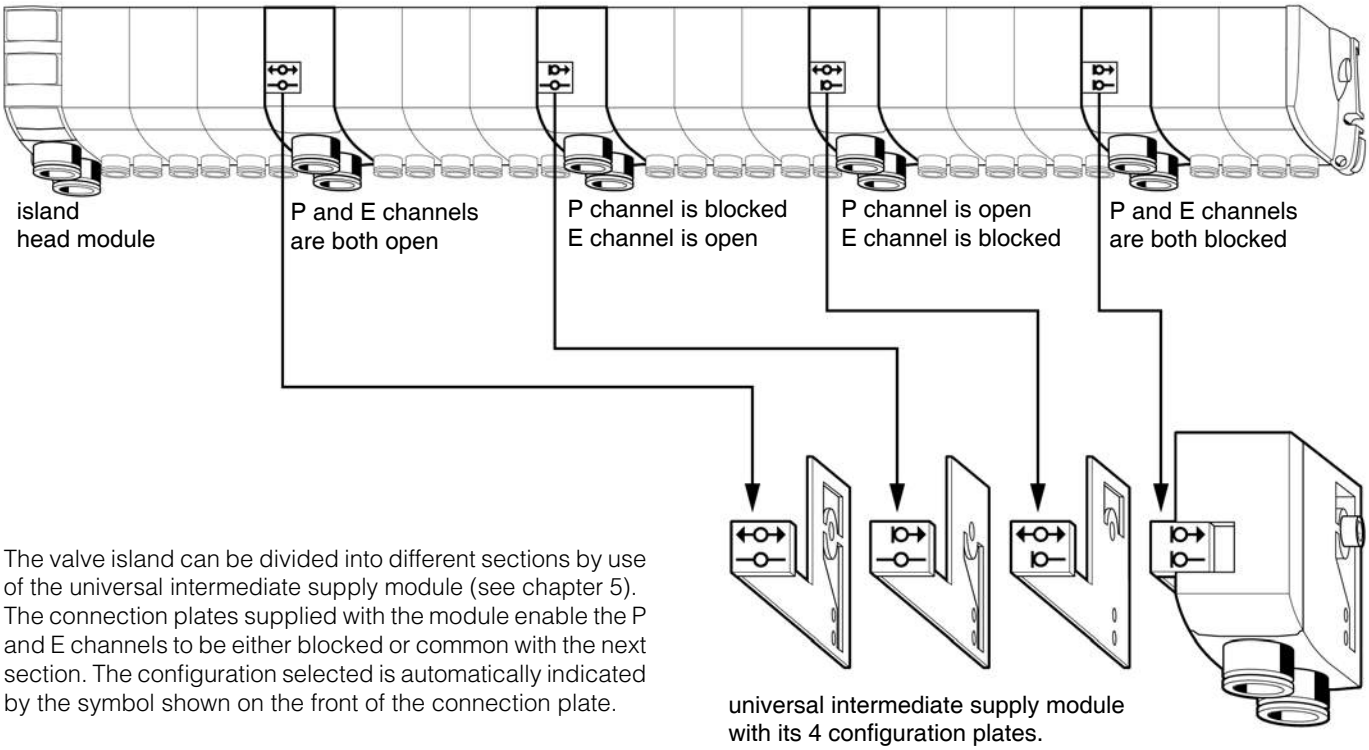



**Sticking label marked**
with a laser printer
standard label 9 x 17 mm




**Sticking tag marked**
with a tracing table
standard tag 9 x 17 mm

## Identification of valve island sections




The valve island can be divided into different sections by use of the universal intermediate supply module (see chapter 5). The connection plates supplied with the module enable the P and E channels to be either blocked or common with the next section. The configuration selected is automatically indicated by the symbol shown on the front of the connection plate.

universal intermediate supply module
with its 4 configuration plates.

## Unique solenoid pilot with multi-function and adaptable manual override

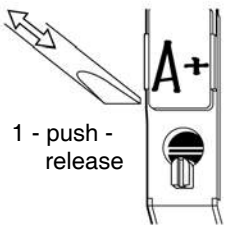
For safety and standardisation reasons, most machine builders now use 24 VDC. This convergence towards only one voltage leads to a more simple system with a unique solenoid pilot. In order to cater for the man-machine dialog requirements this solenoid pilot manual override is both multi-function and adaptable to each stage, from the machine installation to its maintenance.

The standard modules have solenoid pilots with multifunction manual overrides :
- push-release function ;
- push-twist-lock function.

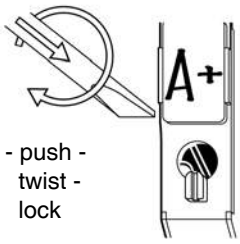
Man-machine dialog is then complete facilitating the commissioning of each machine sub-assembly. Later, when electrical controls are connected, the manual override may be adapted.

Depending on the machine and its conditions of use, one may either :
- keep complete multi-function manual overrides ;
- or delete the lock capability by removing the locking stop : this will prevent the manual override being left in the locked position ;
- or make completely inoperative the manual override when automatic controls take care of access for maintenance : an isolation fork is available for this operation.

### A - Multi-function manual override

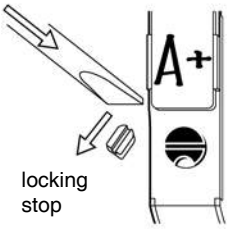



1 - push - release

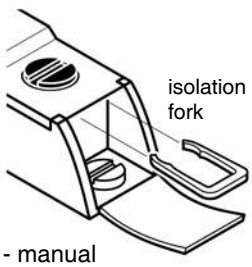



2 - push - twist - lock

### B - Manual override adaptations

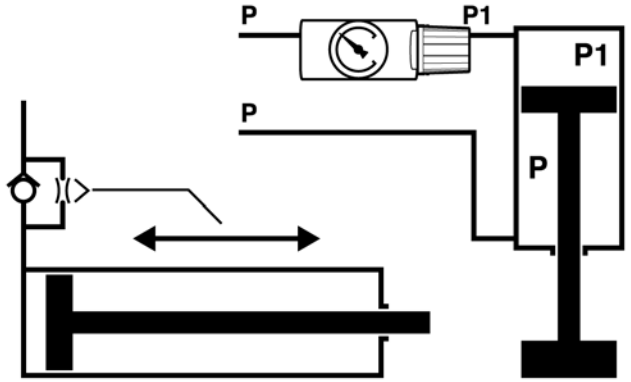



1 - remove lock capability




2 - manual override is totally isolated

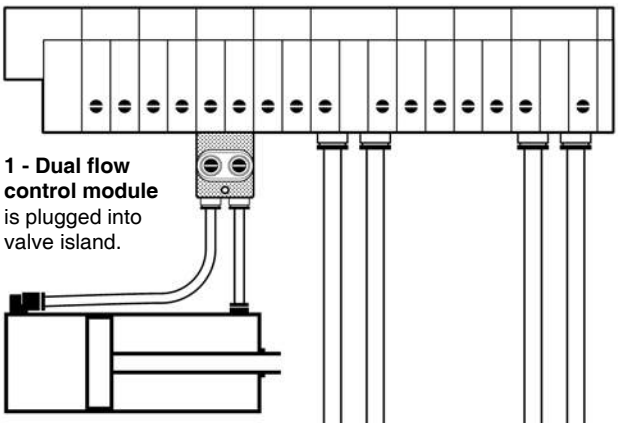
# 10 Islands with f ow and pressure controls




*As automation develops, pneumatic cylinders require better controls.*
*- Speed controls : for this purpose, flow adjustment means are continuously improved for better efficiency and easier access.*
*- Thrust controls : for this purpose, pressure regulation to the cylinder is now easily added to a circuit that requires it.*

## Flow adjustment = speed control

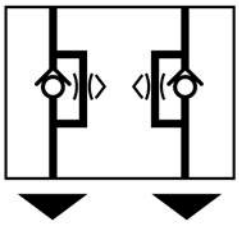
On a double acting cylinder, forward and retract speeds are adjusted separatly by control of air flow exhaust. The control becomes more precise when the flow adjustment is close to the cylinder. The examples show different solutions which are dependant upon the valve to cylinder distance and accessibility to the cylinder.



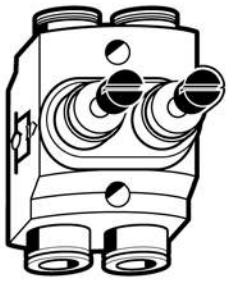
**1 - Dual flow control module** is plugged into valve island.

### Dual flow control module

This valve island control module (see chapter 6) may also be used close to the cylinder.

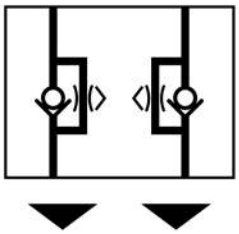


**to double acting cylinder**



**2 - Dual flow control module** is installed close to the cylinder.

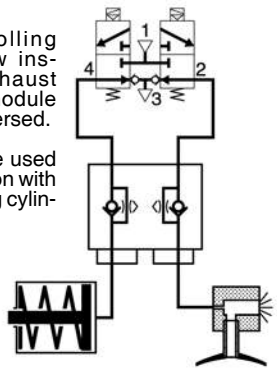
Note : flow control to single acting cylinders.



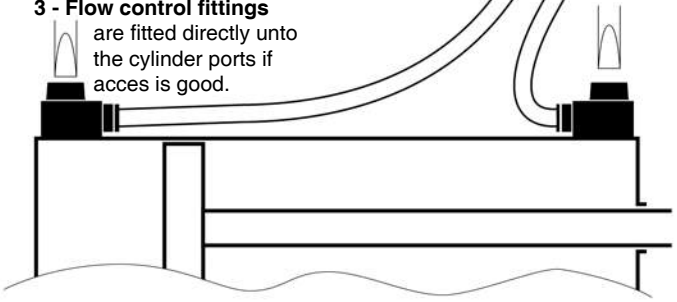
**to single acting cylinders**

For controlling supply flow instead of exhaust flow, the module may be reversed.

This may be used in conjunction with single acting cylinders.



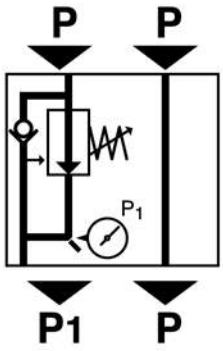

**3 - Flow control fittings** are fitted directly unto the cylinder ports if acces is good.

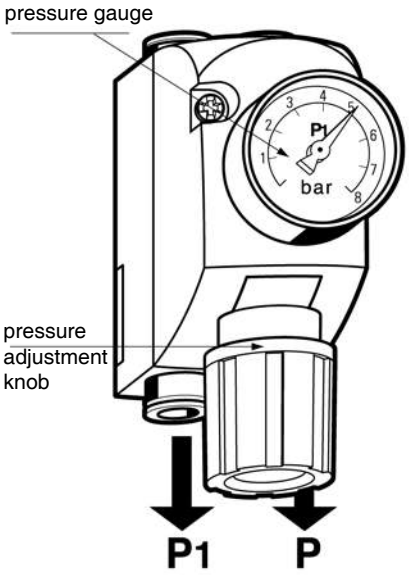


# Pressure regulation = thrust control

Pressure regulation to individual cylinders is increasingly used in automation (see box below).
Most of the time single port regulation is sufficient : only one chamber of the cylinder is concerned.
Such a regulation may be specified initially but, most often, it has to be added at the machine commissioning stage. The valve island pressure regulation module is available for this.

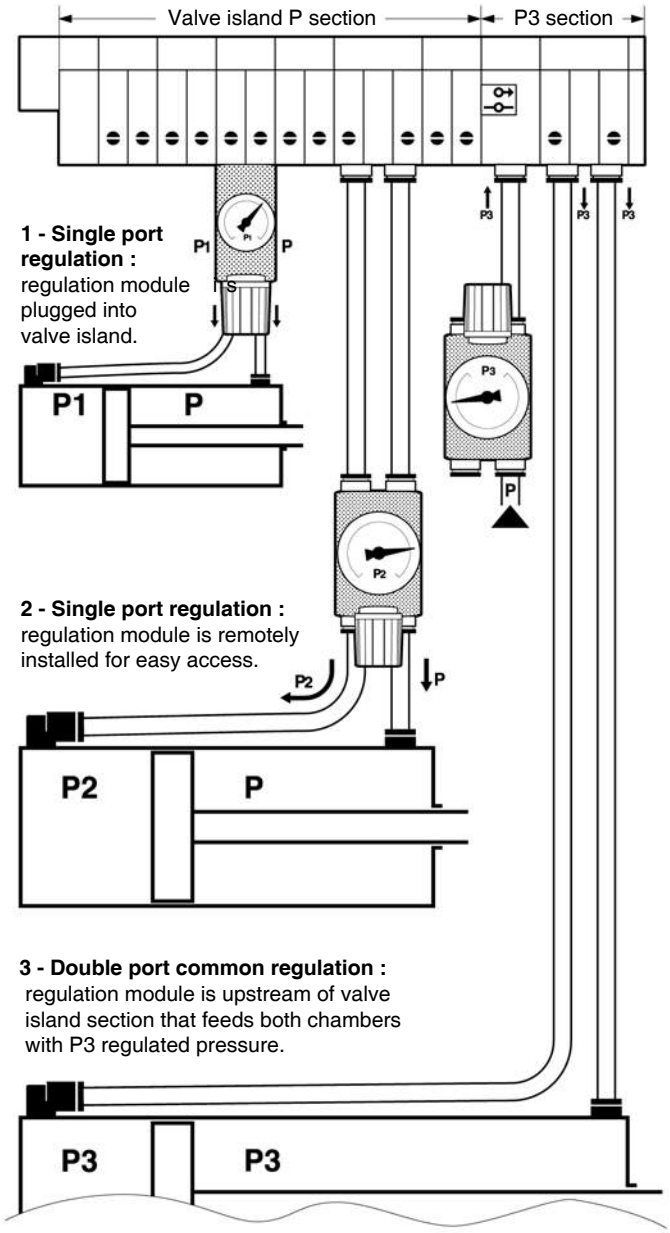
## Pressure regulation module



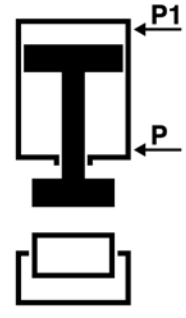



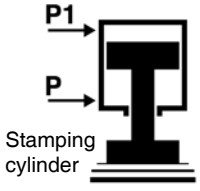

An integrated pressure regulator reduces the P pressure to the $P_1$ pressure required. The regulator is of the vented type. Therefore, when lowering the pressure level, it exhausts the excess pressure to the new level.

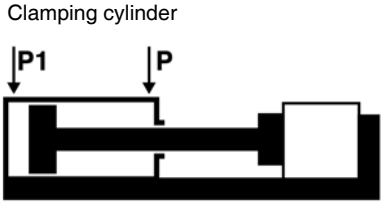
It also includes a non-return valve allowing full exhaust flow. This module is normally installed downstream of the valve. Depending on the application, the pressure gauge may be remotely mounted, or integrated into the machine control panel.

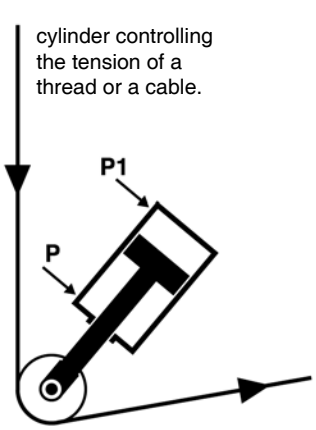


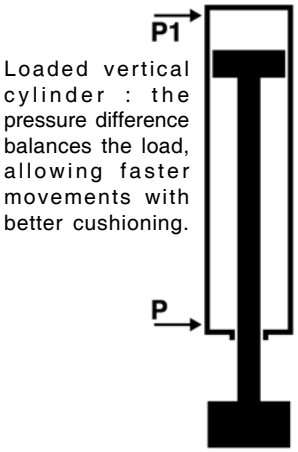

## Typical applications of pressure regulation to cylinders



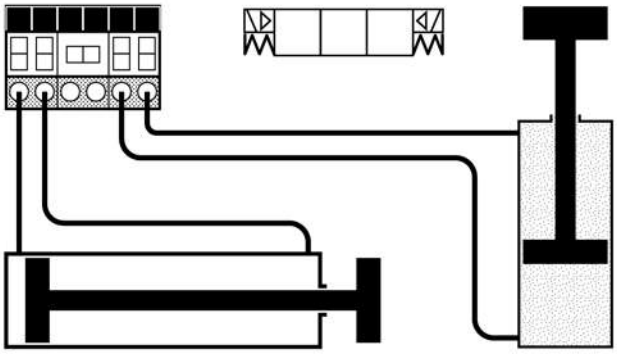



# 11 Islands for 3 position valve applications

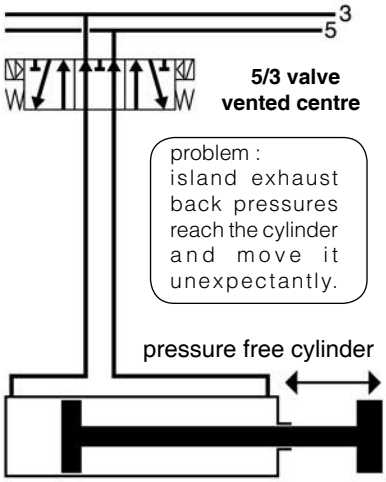


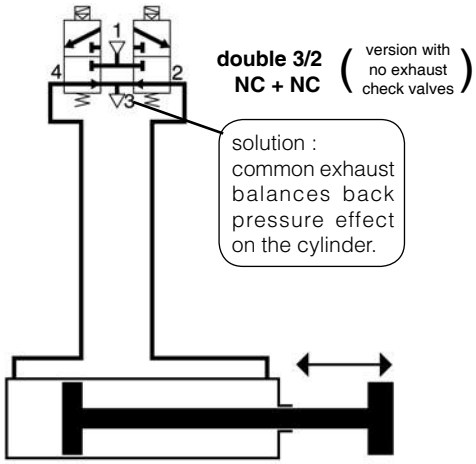
*3 position valves are traditional for positioning, blocking or venting pneumatic cylinders.*

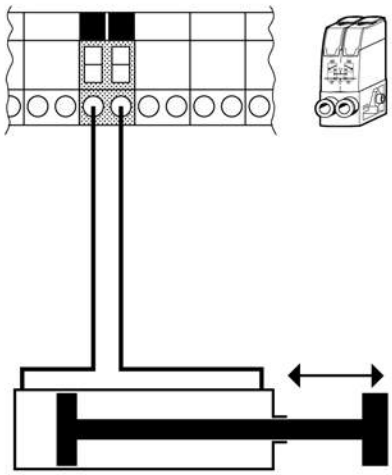
*Because pneumatic valves are now commonly assembled into islands, 3 position valve functions have to be adapted in order to meet all applications allowing for exhaust back pressures and long distances between valves and cylinders.*

## 3 position vented centre : pressure free cylinder

**Traditional configuration :** **New generation : double 3/2 NC + NC**

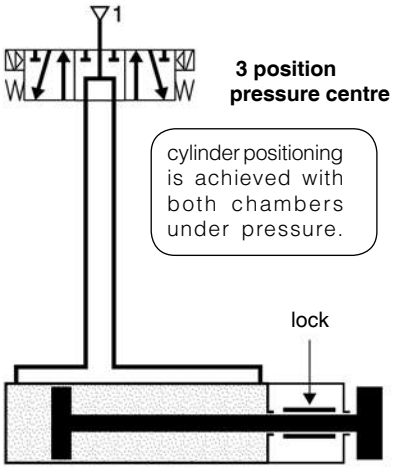


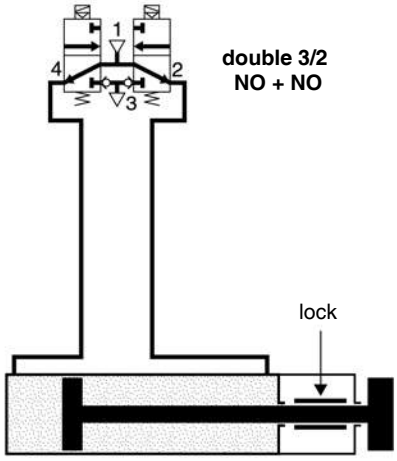



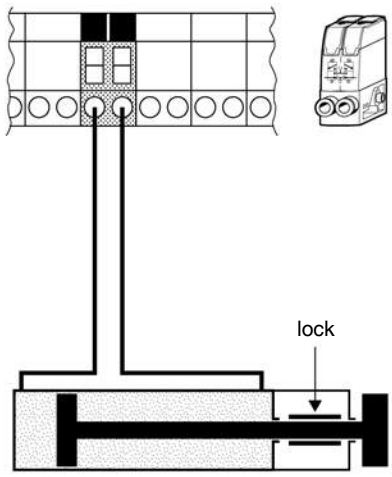



## 3 position pressure centre : cylinder fitted with locking device

**Traditional configuration :** **New generation : double 3/2 NO + NO**

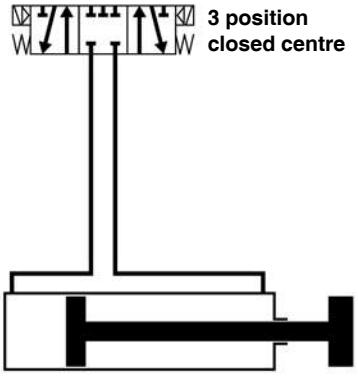


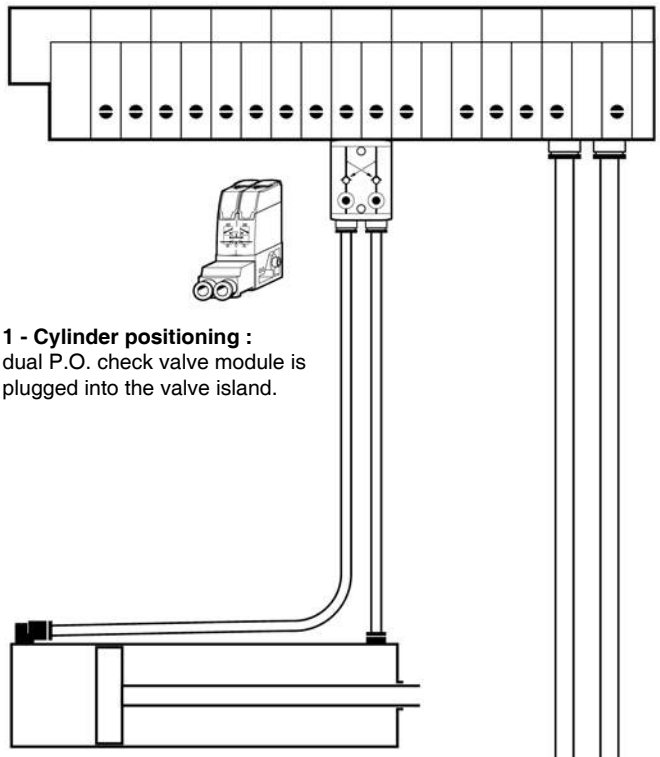



# 3 position, closed centre : cylinder positioning

## Traditional configuration



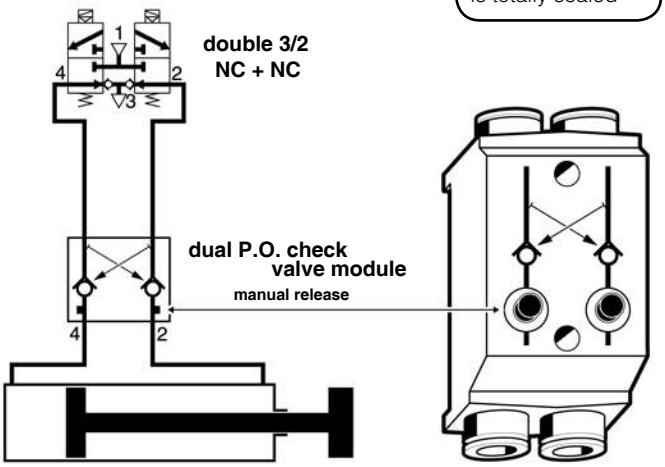

problem : in centre position, compact valves are not perfectly sealed : cylinder position cannot be held indefinitely

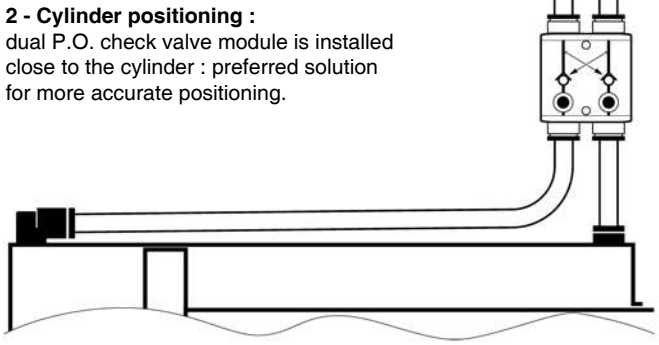


**1 - Cylinder positioning :**
dual P.O. check valve module is plugged into the valve island.

## Double 3/2 NC + NC and dual P.O. check valve

solution : a dual P.O. check module is totally sealed



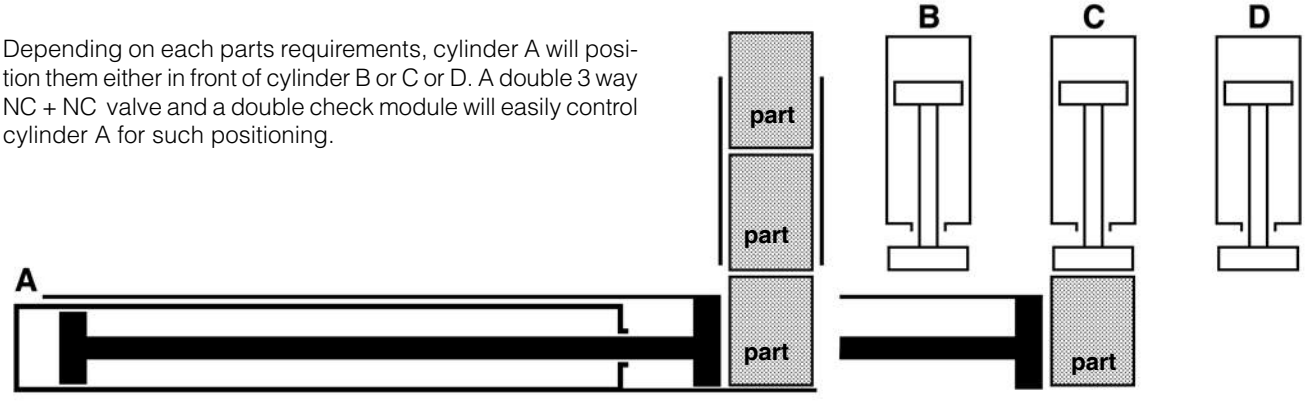



**2 - Cylinder positioning :**
dual P.O. check valve module is installed close to the cylinder : preferred solution for more accurate positioning.

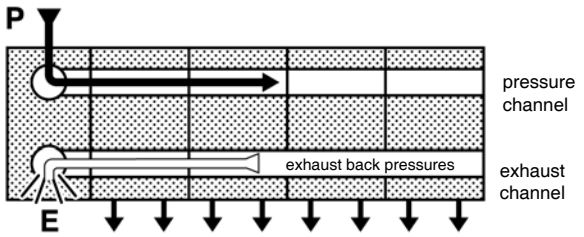
At the outputs of a double 3/2 NC + NC valve, the dual P.O. check valve module achieves efficient and stable cylinder positioning. As soon as both lines are exhausted by the main control valve, the two internally piloted check valves close tight. The cylinder is then stabilised.
the manual pressure releases may then eventually be used for an adequate machine positionning.

## Typical application using cylinder positioning

Depending on each parts requirements, cylinder A will position them either in front of cylinder B or C or D. A double 3 way NC + NC valve and a double check module will easily control cylinder A for such positioning.



# 12 Valve islands exhaust back pressure control




*The problems associated with exhaust back pressures are well known already with traditional valve manifolds.*

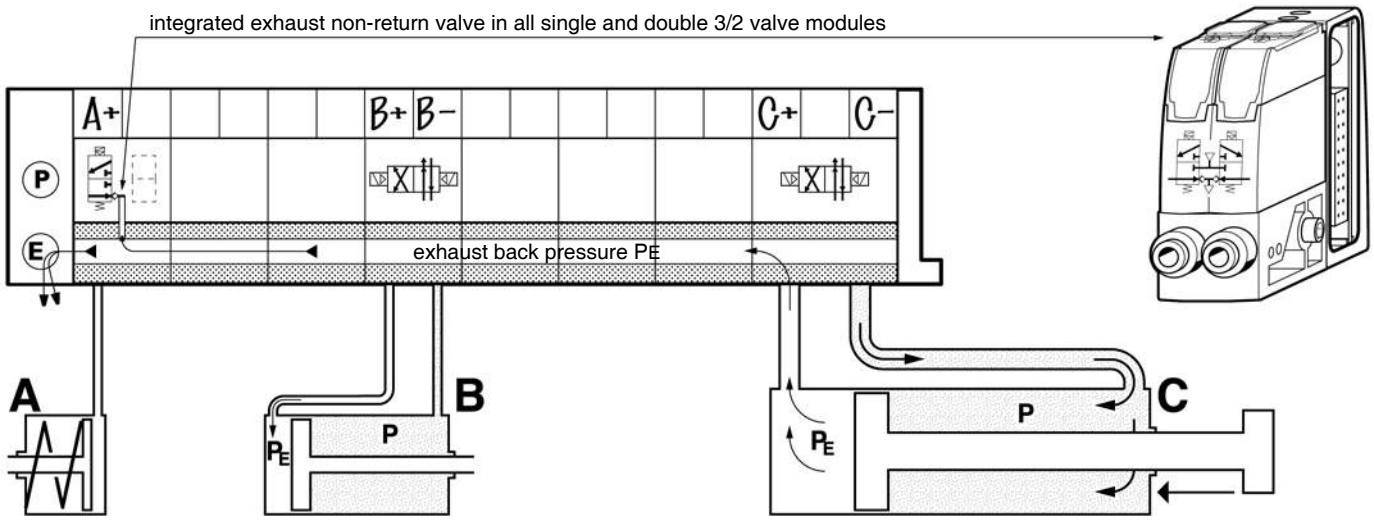
*The latest generation of valve islands provides new solutions to this problem : either to block exhaust back pressures or to limit them to a level that would not affect the application*

## Blocking exhaust back pressures with 3/2 modules

From the example shown below, one can see the followings :

- C cylinder, large and fast moving, may feed the island exhaust channel with an exhaust back pressure PE.
- Such a back pressure is normaly under 1 bar . Thus, it will not affect double acting cylinders such as B since the opposite pressure P is high.
- However such a back pressure may affect a single acting cylinder A if its pressure theshold is low.

Such single acting cylinders may pop out unexpectantly whenever an exhaust back pressure rises into the island. To avoid such malfunctions 3/2 valves modules feature integrated exhaust non-return valves that will block any exhaust back pressure from reaching acting cylinders that they control.

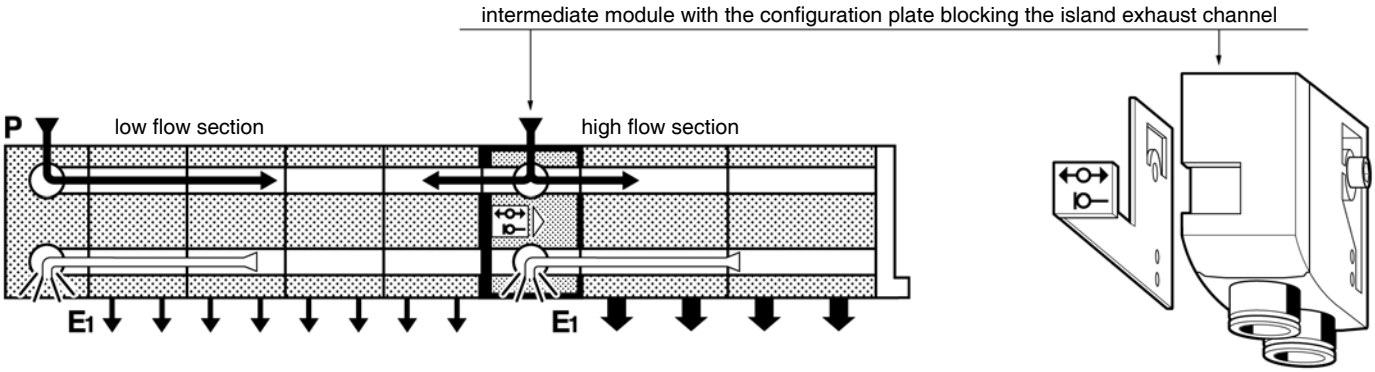



single acting cylinder controlled by a 3/2 valve

double acting cylinders controlled by 4/2 valve modules

## Blocking exhaust back pressures inside the island

Another method to block exhaust back pressures when they may affect the application is to isolate in the islan the valves that control the largest and fastest cylinders. The illustration below shows how this may be easily achieved with an intermediate module (see chap. 5).




## Limiting exhaust back pressures in a valve island

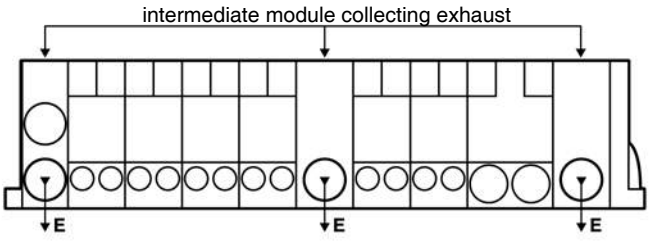
In a valve island, it is important to limit exhaust back pressures to about 1 bar maximum so that all double acting cylinders efficiently achieve their function at 6 bar.

By reducing the exhaust flows of the largest cylinders, one kills back pressures at their birth, particularly for their return stroke that does not affect the cycle time.

### a - collected exhaust

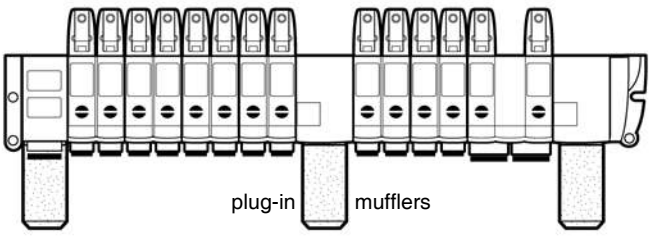
Depending on the sizes of the cylinders and the speed required by the application, exhaust back pressures may still remain too high in the island after cylinder exhaust flow adjustement.

Such back pressures in the island may be efficiently evacuated through multiple exhaust collections using the intermediate module (see chap. 5).

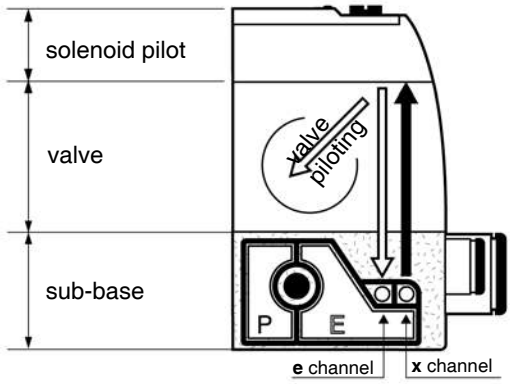



### b - exhaust through mufflers

For applications that do not require the exhausts to be collected, a plug-in muffler into each exhaust port of the island will evacuate exhaust back pressures.



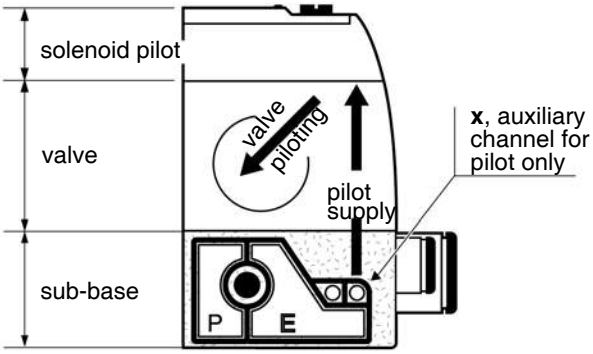
# 13 Valve islands internal / external pilot supply and exhaust




*Valve islands of the last generation integrate :*
*- an x channel to supply pressure to the pilots,*
*- an e channel to collect exhaust from the pilots.*

*The island universal pneumatic head module provides selectors for different types of pilot supply and exhaust :*
*- internal or external pressure supply through x,*
*- internal or external exhaust collection through e.*

## External / internal pilot supply



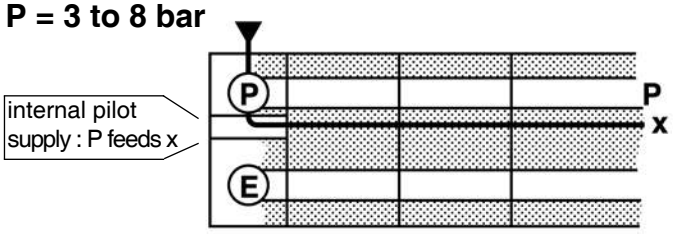

In all valve islands, sub-bases incorporate an auxiliary channel x to supply pressure to the solenoid pilots. Depending on the application, this channel :
- may be fed by the main pressure P if it is between 3 to 8 bar ; this is the «internal pilot supply» of the valve island,
- may be fed separatly, when pressure P is lower than 3 bar (3 bar being the minimum pressure to pilot the valves) ; this is the «external pilot supply» of the valve island.

The new valve island generations have a universal pneumatic head module that allows these two types of pilot supplies. This head module incorporates a 2 position x selector :
- The internal pilot supply position is the normal position ; no connection port is visible since no external supply is necessary.
- If required, the external pilot supply position can be obtained manually by rotating the selector ; it then presents a push-in connection port for a 4 mm OD tubing that will feed the pilot pressure (3 to 8 bar) to the x channel.

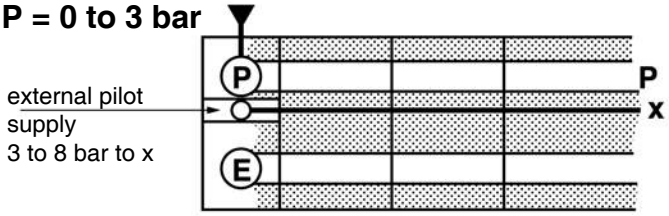
### Special case : multi-section valve island.

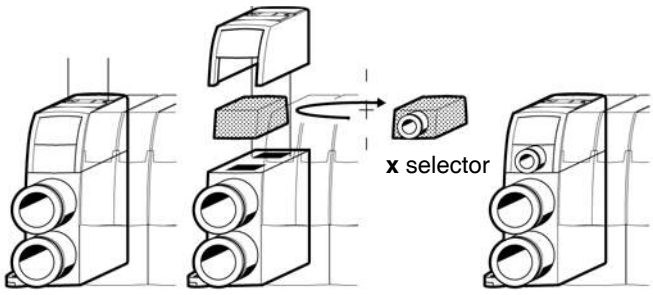
The intermediate module that separates two island sections is crossed by the auxiliary channel x. Thus, when an island includes several sections working at different pressures, an internal pilot supply pressure is satisfactory, if the first section operates at 3 to 8 bar pressure.

**P = 3 to 8 bar**




**P = 0 to 3 bar**

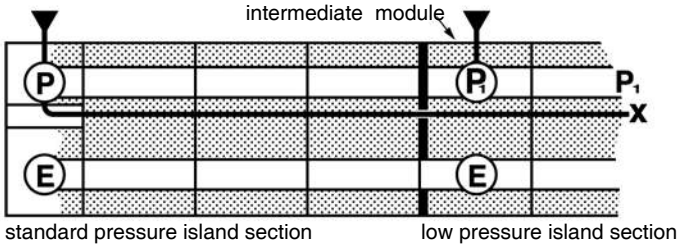



**x** selector is positioned for internal pilot supply

**x** selector is positioned for external pilot supply

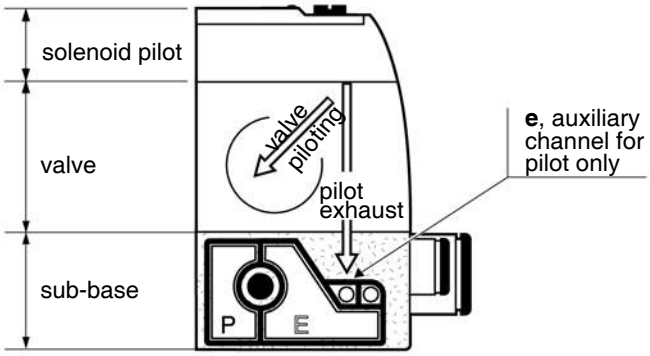
**P = 3 to 8 bar** **$P_1$ = 0 to 3 bar**

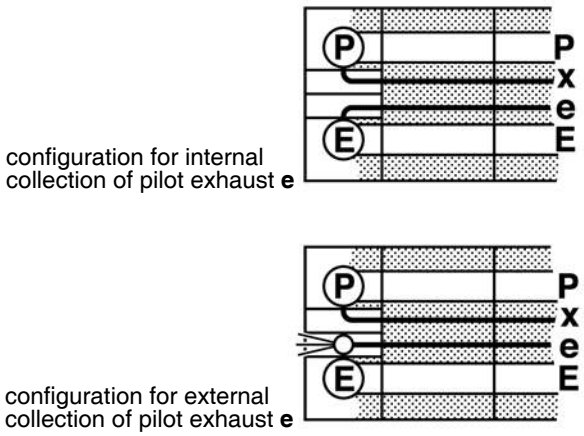



standard pressure island section

low pressure island section

## External / internal pilot exhaust collection

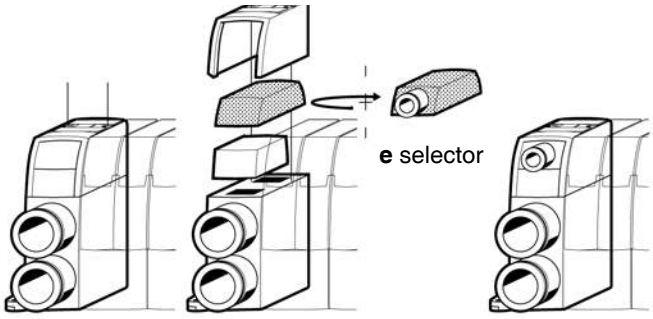



In all valve islands, sub-bases also incorporate an auxiliary channel e to collect the solenoid pilot exhausts. Depending on the application, this channel :

- may exhaust directly into the main exhaust channel E if no important exhaust back pressure is to be feared (see chapter.
- 12).
  may be collected separatly when a persistant back pressure will possibly delay the depiloting of some of the valves into the island, or for vacuum applications (see chap.14).

In order to chose between the internal or the external collection of the island pilot exhaust a second two position selector is integrated into the pneumatic island head module, as shown here.

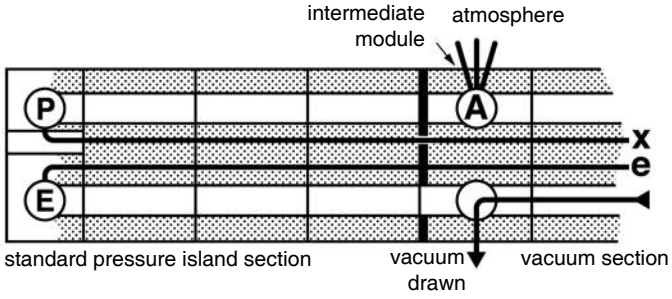



**e** selector is positionned for internal collection of pilot exhaust

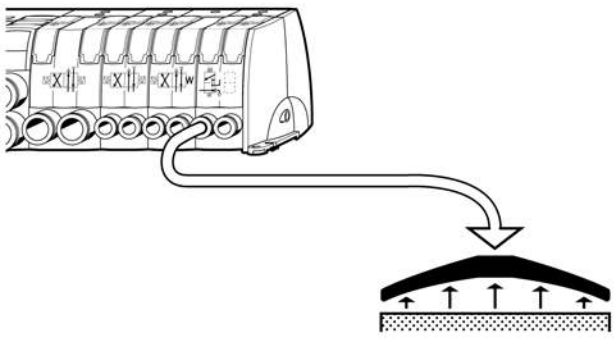
**e** selector is positionned for external collection of pilot exhaust

### Special case : multi-section valve island.

The intermediate module that separates two island sections is crossed by both auxiliary channel x and e. Thus, when an island includes several sections including a section working with vacuum where no exhaust should polute the vacuum drawn (see chapter 14), an internal collection of pilot exhaust is satisfactory, if the first section is the one that works at a usual pressure.



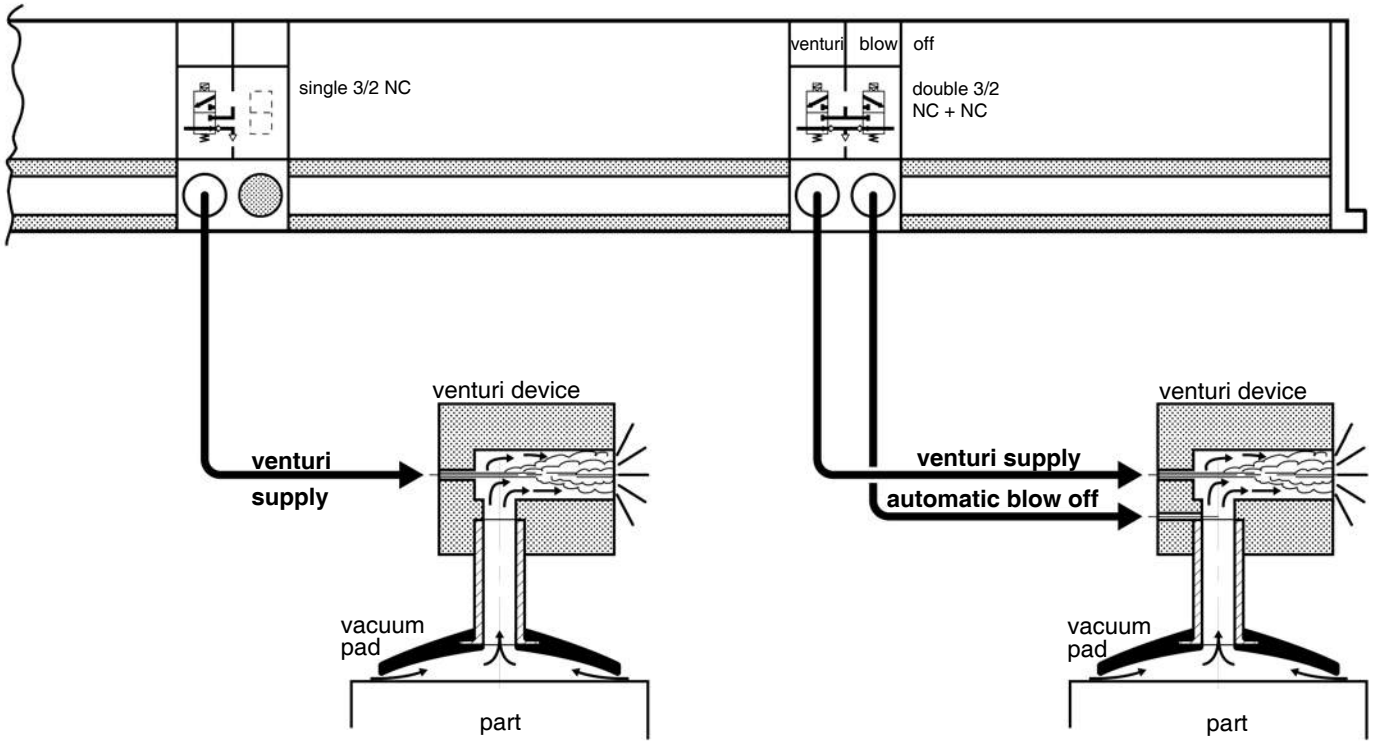
# 14 Valve islands for vacuum applications



*Pneumatic automation is often combined with vacuum applications :*
*- to pick-up parts and to move them ;*
*- to vacuum pack or to process under vacuum.*

*Within electro-pneumatic circuits and machines, new generation pneumatic valve islands can simplify circuit design and installation of combined pneumatic and vacuum systems.*

## Providing controls for vacuum venturi devices




The venturi device is also called an «ejector» or a vacuum generator and is well known to pneumatic engineers. It produces vacuum from an air pressure supply : the air jet generates a fast moving flow stream that draws the surrounding atmospheric air ; the resulting air movement creates a vacuum when the entry of atmospheric air is blocked by a part.

This simple and compact system replaces costly and cumbersome vacuum pumps and their piping. It is mostly used to pick-up and move parts.
The vacuum pad that picks-up the part is ideally combined with the venturi device.

In order to supply the venturi, a single 3/2 NC valve is integrated into the closest valve island. To limit air consumption, it is advantegeous to adjust the pressure that reaches the venturi. This is easily done by adding a pressure regulation module to the valve island.

If besides the venturi supply an automatic blow off is required, a double 3/2 NC + NC will control the complete system :
- one 3/2 for the venturi supply ;
- one 3/2 for the automatic blow off : the integrated exhaust non return valve in all 3/2 modules size 1 (chap.12) will prevent external air from polluting the venturi vacuum.

# Valve island in a vacuum distribution network

When the vacuum level or the flow requirement is high, an electric vacuum pump is installed on the machine with a vacuum distribution network.

In this case, 3/2 pneumatic valves are used to control the different vacuum circuits or 4/2 pneumatic valves when a bistable function is necessary. 3/2 pneumatic valves should be Normally Open, in order to obtain vacuum outputs when electrical signals will be on.
Vacuum controls generally require large flows : most of the time, size 2 valves are necessary.

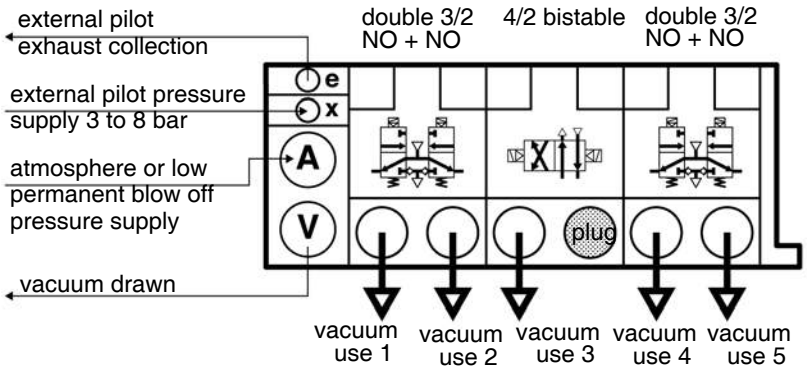
In the valve island, vacuum is drawn through the channel normally used for the common exhaust while the other channel may be used differently, depending of the application :

**1 - no blow off or permanent blow off**
The top illustration presents a typical vacuum valve island whose channel normally used for the main pressure supply is either connected to atmosphere (no blow off) or to a low pressure supply that will act as permanent blow off towards the vacuum pads when they are not connected to vacuum.

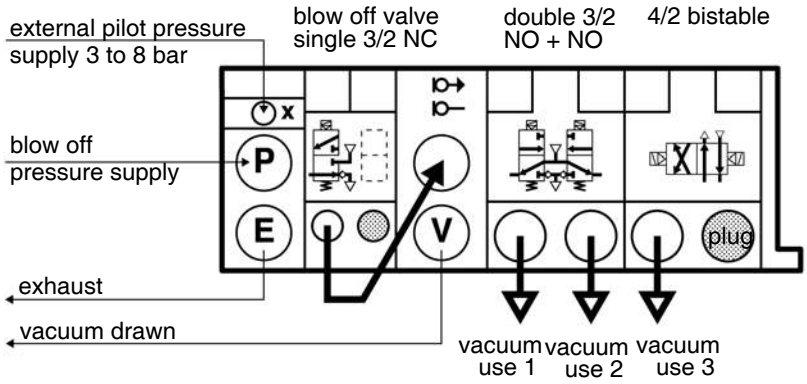
**2 - intermittent blow off**
The second illustration presents a vacuum valve island equiped with a head blow off valve that will send a pressure for blow off only when required. A size 1 single 3/2 is sufficient for this purpose.

In both cases, the auxiliary channel x will be supplied with a 3 or 8 bar pressure for solenoid pilots (chap.13). In the first case, the auxiliary channel e is collected externally in order to avoid pressurizing the vacuum channel with the pilot exhausts.

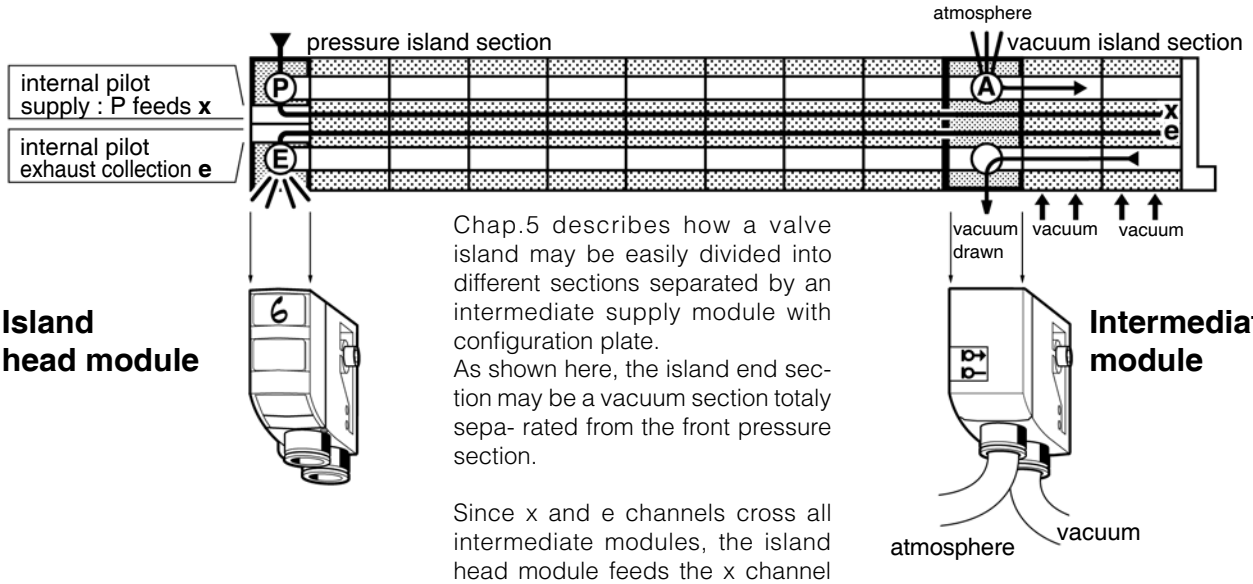
**Vacuum valve island with no blow off or with permanent blow off**




**Vacuum valve island equiped for intermittent blow off**



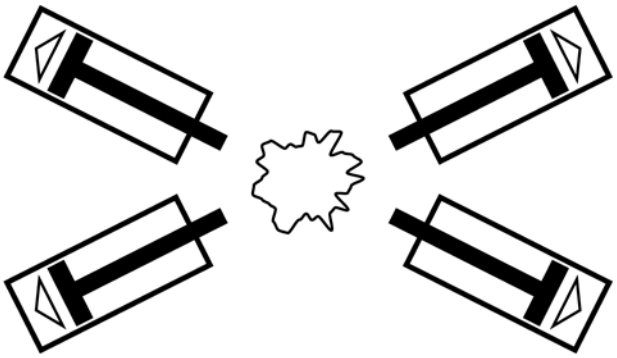

# Pressure and vacuum combined in the same island




Chap.5 describes how a valve island may be easily divided into different sections separated by an intermediate supply module with configuration plate.
As shown here, the island end section may be a vacuum section totaly sepa- rated from the front pressure section.

Since x and e channels cross all intermediate modules, the island head module feeds the x channel for the whole island, and collects the e channel for the whole island, including the vacuum section.

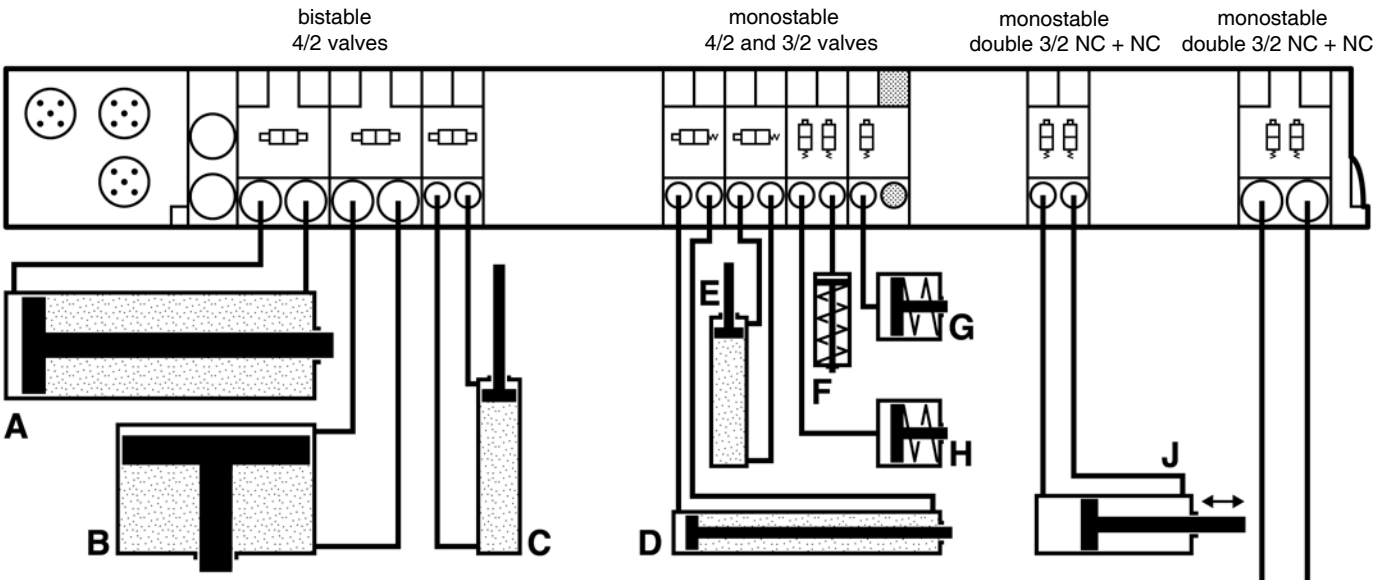
# 15 Valve islands and emergency machine positioning



*Pneumatic cylinder/valve circuit design must take into account the machine positioning in case of electrical supply cut-off or other emergency events.*

*Valve islands now offer many means to do so, with bistable and monostable valves, peripheral modules, integrated dump valves,etc...*

## Bistable/monostable valve choice for adequate emergency positioning



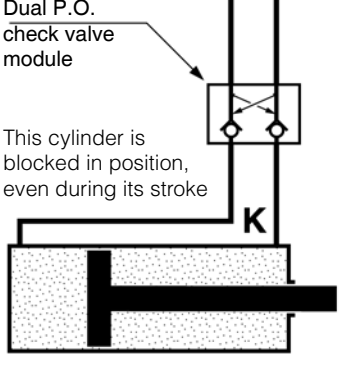

These cylinders maintain their last position and action in case of electrical cut-off.

These cylinders rectract in a chosen position.

This cylinder becomes totally pressure free.

Designers of electro-pneumatic machines have to define the cylinder positioning when electrical supply happens to be cut-off, for example for an emergency requirement.
A clamping cylinder will maintain its action so that the part it is holding does not take off under the action of a cutting tool.
On the contrary, a stamping cylinder will retract in its initial position, and a transfer cylinder may be blocked along its stroke.
Pneumatic valve islands provide all means to obtain these emergency machine positioning. The different solutions are presented on the valve island above.

- A, B and C double acting cylinders are controlled with bistable valves : these will keep their position in case of electrical cut-off. The cylinders will maintain their positions and
- actions.
  D and E double acting cylinders are controlled with monostable valves. Their spring return will bring them back in the initial position corresponding to the
- required initial position of the cylinder.
  F, G, and H single acting cylinders will
- retract as well with the help of their spring.
  Controlled with a monostable double 3/2 NC+NC valve, the double acting J cylinder will be exhausted on both
- chambers when an electrical cut-off will happen (see chap. 11).
  Due to the double P.O. check valve module, the double acting K cylinder will be blocked along its stoke (see chap. 11).



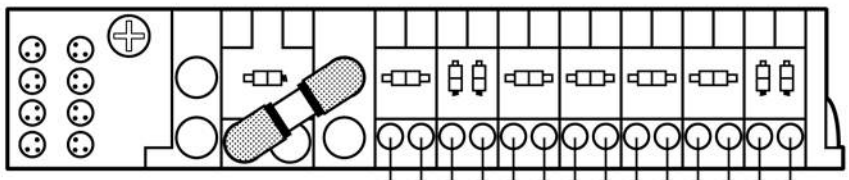
# Valve island with integrated dump functions

In case of emergency electrical supply cut-off, a general dump action on many cylinders may often be required. This is easily done with a valve island by mounting a dump valve controlling the island pressure supply channel. The dump valve will be monostable in order to automatically dump the pressure when electrical is cut-off. A 4/2 size 2 valve will have enough flow to dump a whole size 1 valve island.

The dump action will either concern :

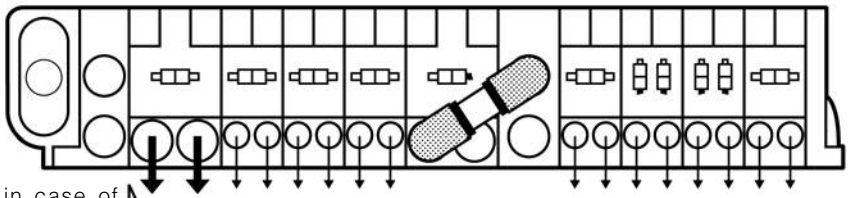
- all the cylinders controlled by the valve island : the dump valve will then be at the island's head (top drawing).
- or just a few cylinders among the ones controlled by the valve island : the dump valve will concern only the valves on its right (second drawing).
- or several valve islands all controlled by only one dump valve (third drawing).

Dump valve
4/2 monostable
size 2



in case of electrical cut-off, pressure is dumped on all cylinders.

Dump valve
4/2 monostable
size 2

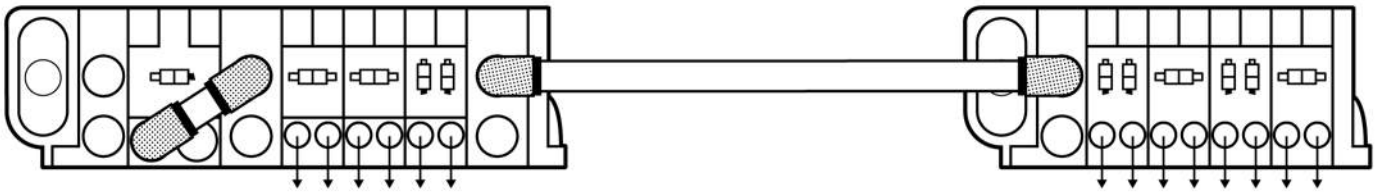


in case of electrical cut-off,

pressure remains on these cylinders,

pressure in dumped on these cylinders.

Dump valve
4/2 monostable
size 2



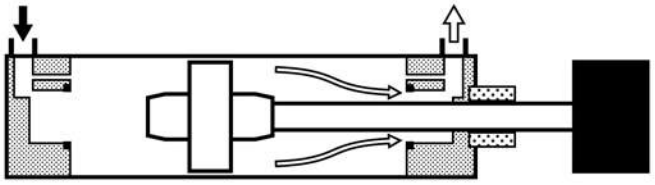
A dump valve may control several valves islands.

# Dump and soft start functions

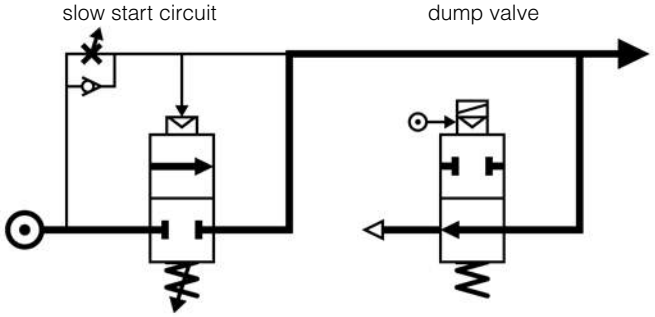
Double acting cylinders have adjustable cushions at the end of their stroke. Such cushioning is necessary for loaded cylinders. They are efficient when the movement is controlled by the working pressure but also by the exhausting back-pressure that limits the speed through external flow control. When such an exhausting back-pressure has been previously totally exhausted by a dump action, when restarting, the cylinder movement may be brutal and the cushioning less efficient.

Thus, for average and big loaded double acting cylinders, a dump action will have to be followed by a soft start. For this purpose, a dump and soft start FRL unit will replace the dump valve into the valve island.

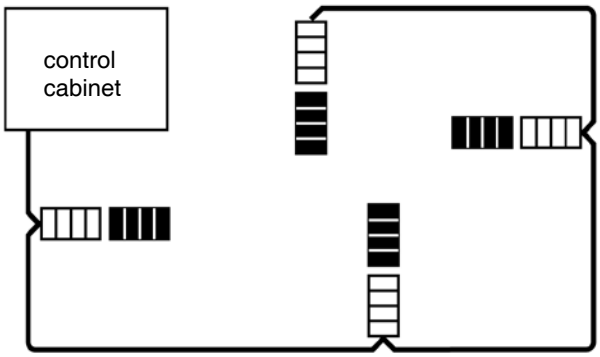
The circuit of such an FRL unit describes the two following functions :
- the dump 2/2 valve, solenoid pilot controlled ;
- the slow start pneumatic circuit : the downstream valve and cylinders receive a small flow supply until the pressure reaches a sufficient level to pilot the main flow 2/2 valve whose pilot pressure may be adjusted.



**FRL integrated dump and soft start function**



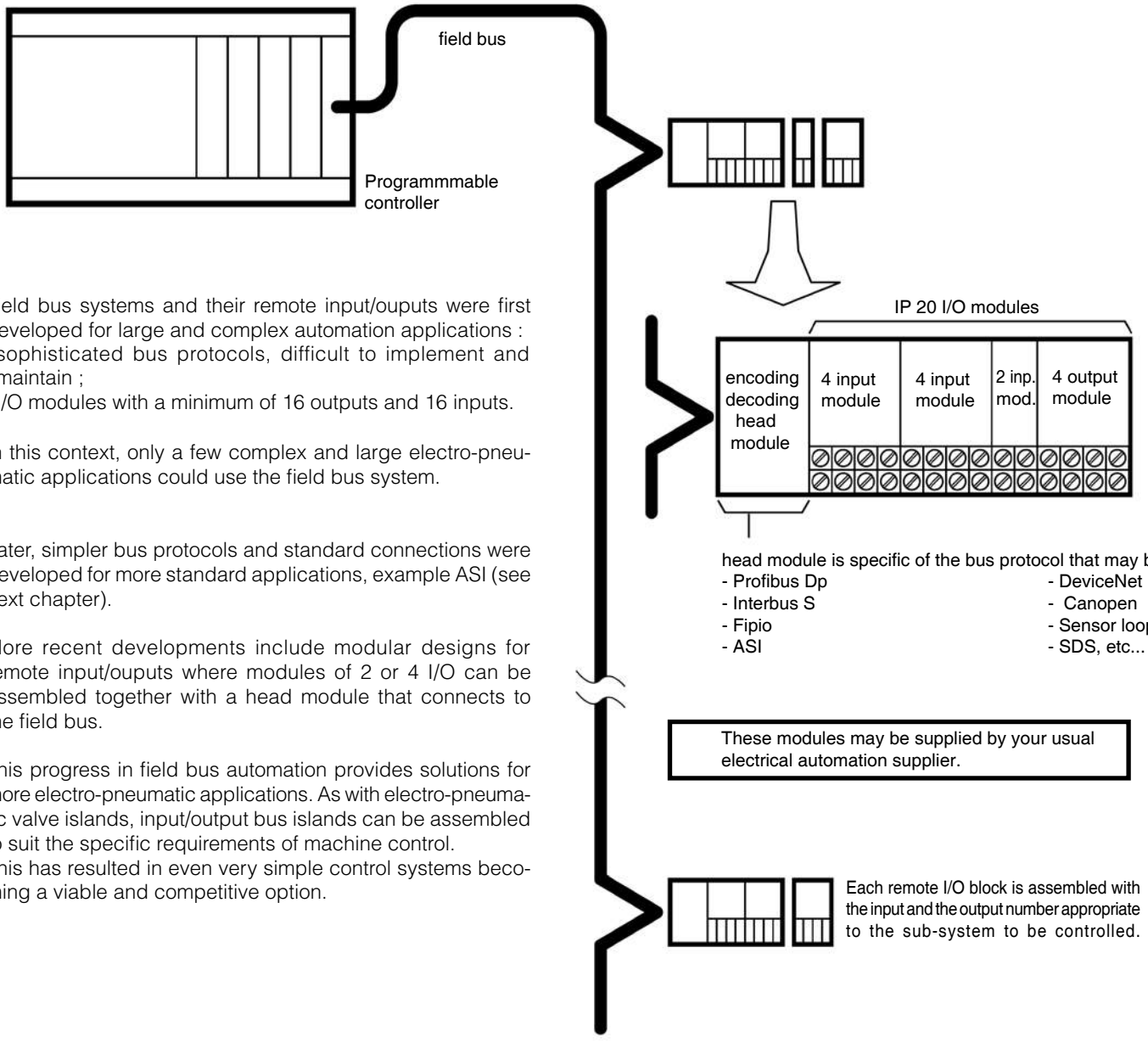
# 16 Valve islands connected to IP 20 input/output modules




*Industrial automation has progressed with the introduction of remote input / output modules which can be adapted to most electro-pneumatic applications and communicate via a field bus system.*

*Offered as IP 20 only (non protected), these field bus connected I/O are very modular and lead to efficient and competitive electro-pneumatic applications.*

## The evolution of bus connected IP 20 input/output modules




Field bus systems and their remote input/ouputs were first developed for large and complex automation applications :
- sophisticated bus protocols, difficult to implement and maintain ;
- I/O modules with a minimum of 16 outputs and 16 inputs.

In this context, only a few complex and large electro-pneumatic applications could use the field bus system.

Later, simpler bus protocols and standard connections were developed for more standard applications, example ASI (see next chapter).

More recent developments include modular designs for remote input/ouputs where modules of 2 or 4 I/O can be assembled together with a head module that connects to the field bus.

This progress in field bus automation provides solutions for more electro-pneumatic applications. As with electro-pneumatic valve islands, input/output bus islands can be assembled to suit the specific requirements of machine control.
This has resulted in even very simple control systems becoming a viable and competitive option.

## Electro-pneumatic applications with IP 20 inputs/outputs

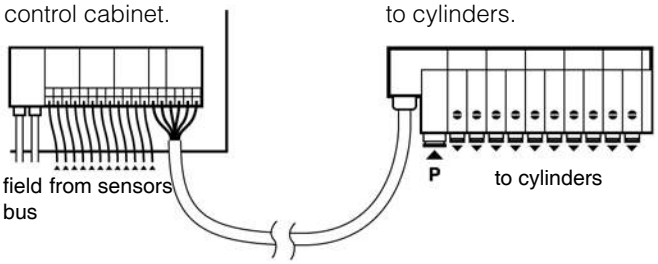
In most electro-pneumatic applications, IP 20 would need additional protection within an enclosure.

Depending upon the applications, the valve island can be mounted in the same enclosure.

Alternatively, the IP 65 valve island could be mounted outside the enclosure and closer to the cylinders as shown on the diagram.

Field bus connected IP 20 I/O modules in control cabinet.

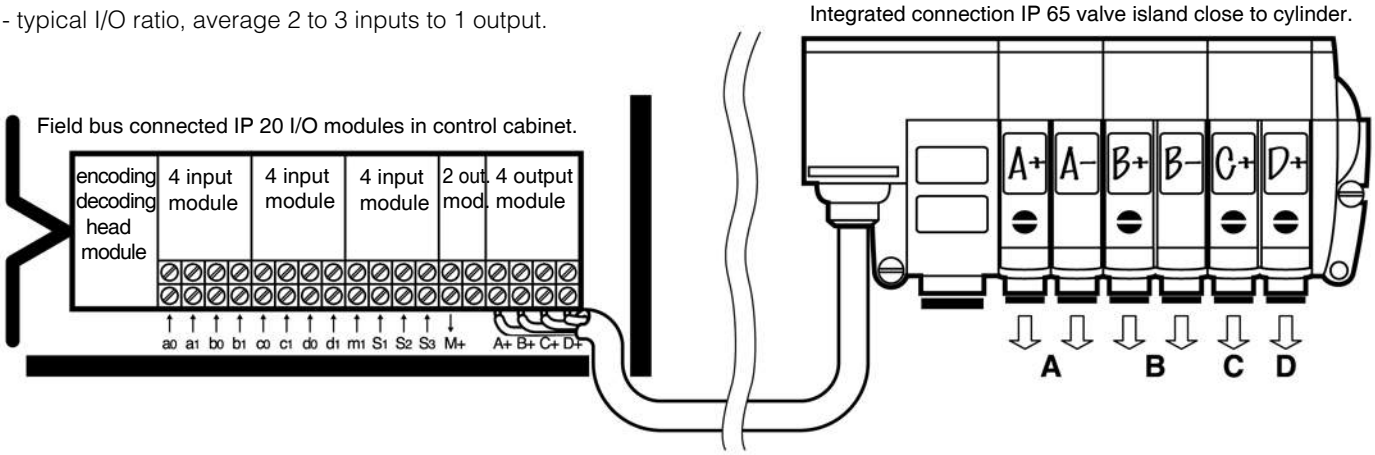
Integrated connection IP 65 valve island close to cylinders.

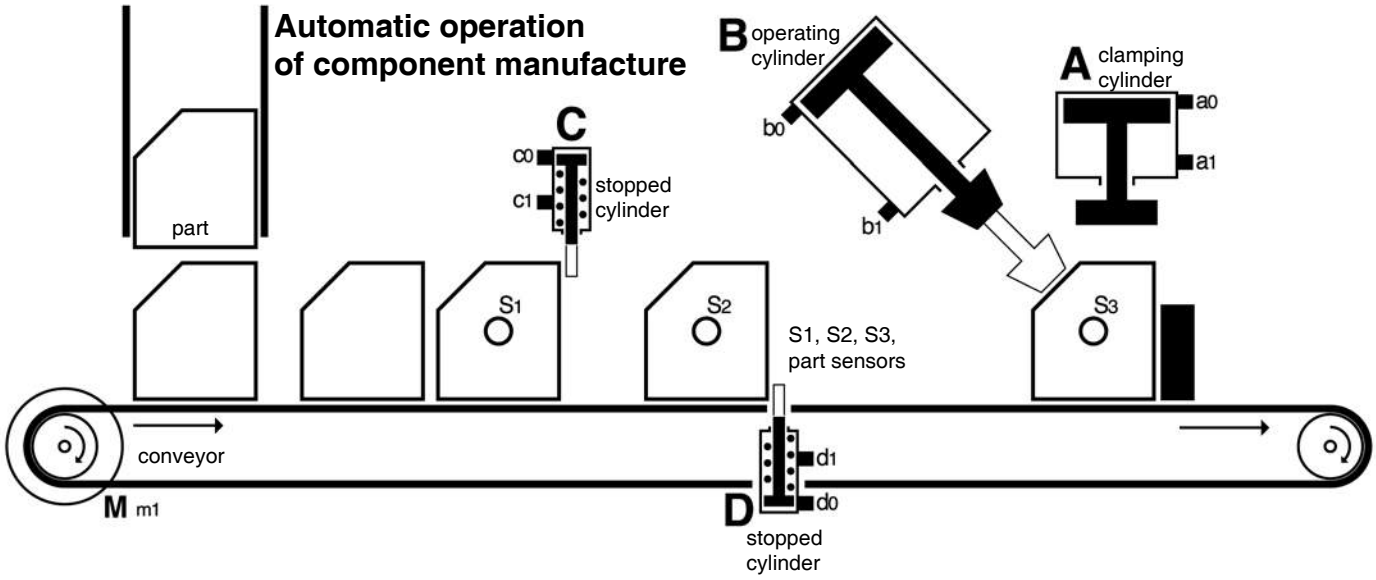



## A typical example

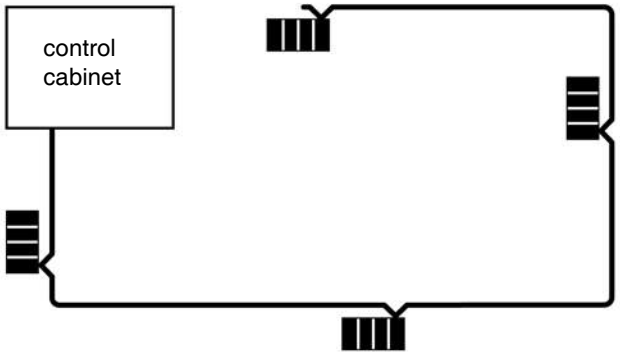
The application shown is a fairly typical simple electro-pneumatic sub-assembly which may form only a small part of a larger application covered by the field bus.

This application demonstrates :
- the ease of mounting and interconnecting the I/O island and a valve island.
- typical I/O ratio, average 2 to 3 inputs to 1 output.



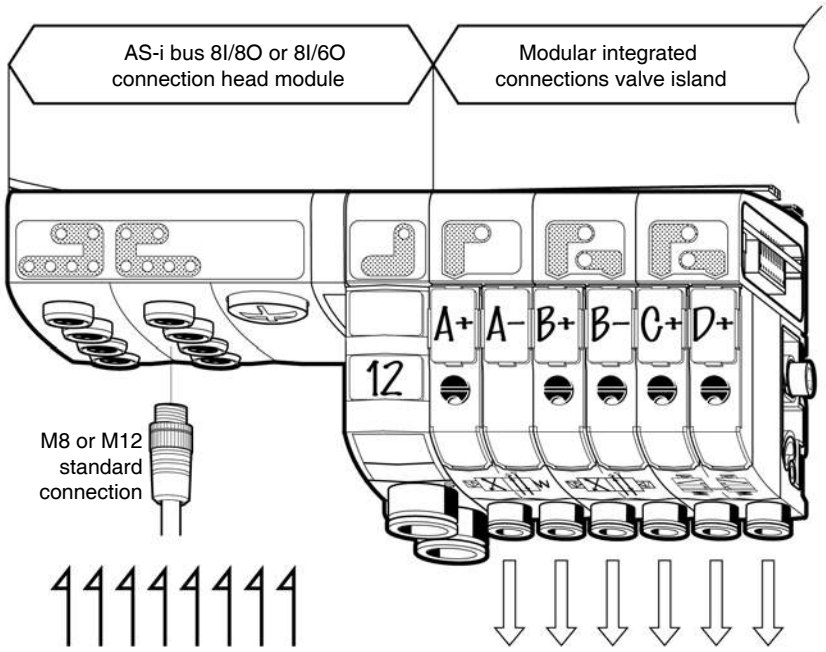
# 17 Remote short valve islands with AS-i bus

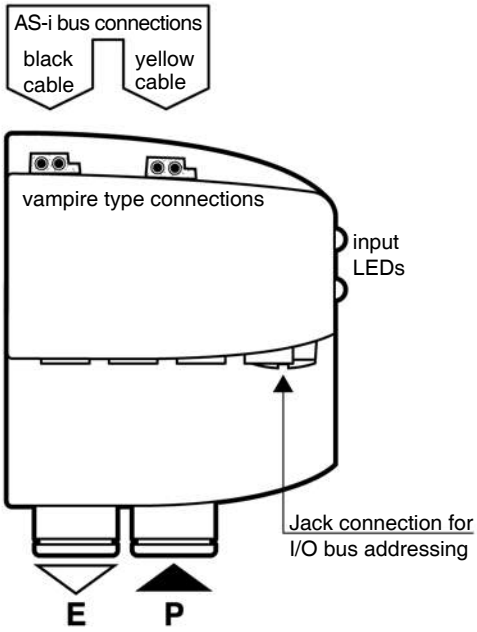


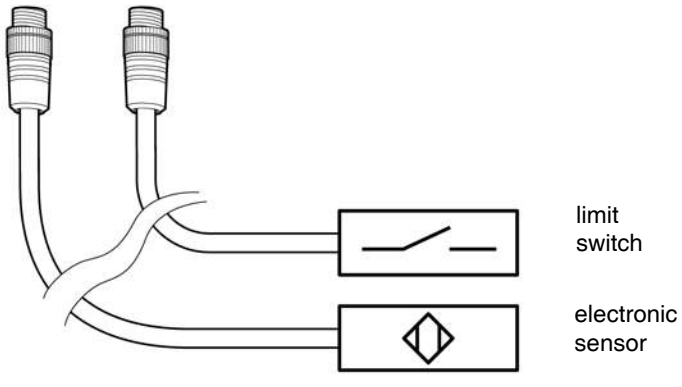

*The «Actuator Sensor interface» (AS-i) bus protocol is ideally suited to most electro-pneumatic applications. AS-i standards also include transmission cables for easy IP65 protected vampire connections.*

*New generations of pneumatic valve islands now include specific modules for AS-i bus connections.*

## Valve islands for AS-i bus connections



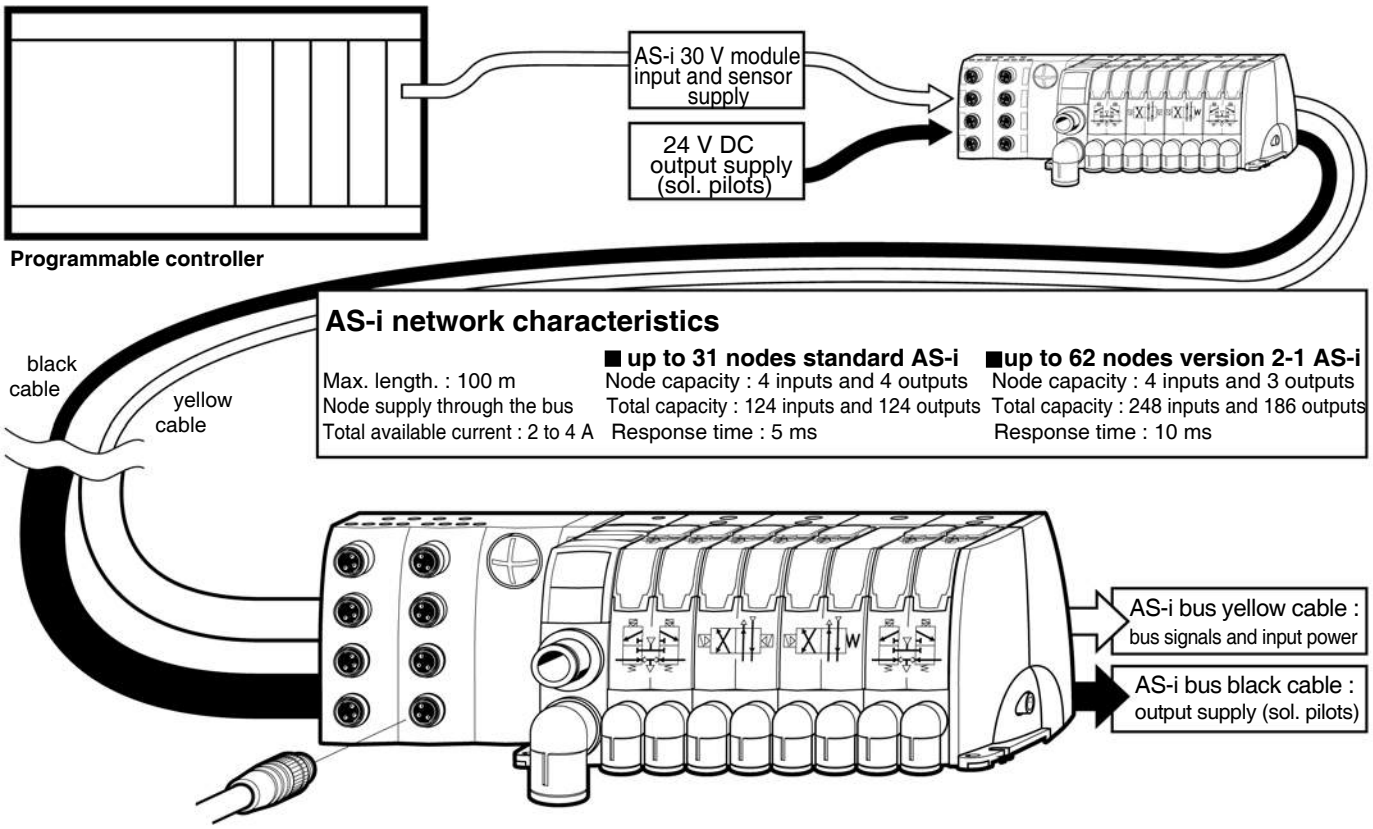

Valve islands with integrated connections can be supplied with an AS-i bus head enabling the following :

1 - IP65 vampire connections for the two AS-i bus cables.
2 - Decoding the bus signals and energising the required solenoid.
3 - Supply of power to sensors, receive input signals and coding them for the AS-i bus transmission.

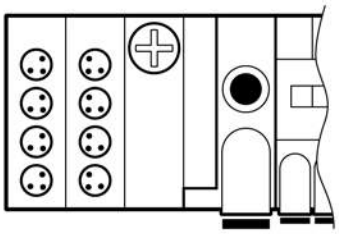
Any type of electrical or electronic sensor may be connected to AS-i bus island head modules.

Outputs and inputs have separate power supplies, thus preventing any interference.

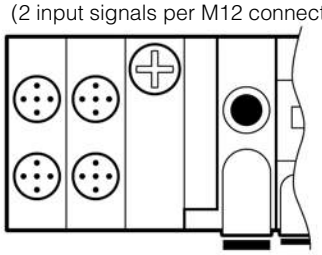
# AS-i bus electro-pneumatic automation practice



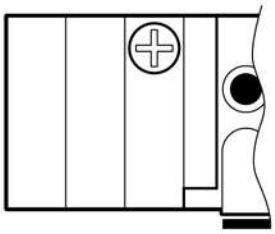

**head module versions** ▶ **8 M8 input connections**
for 8 input signals to the island



**4 M12 input connections**
for 8 input signals to the island
(2 input signals per M12 connection)



**no input connection**
for no input signal to the island



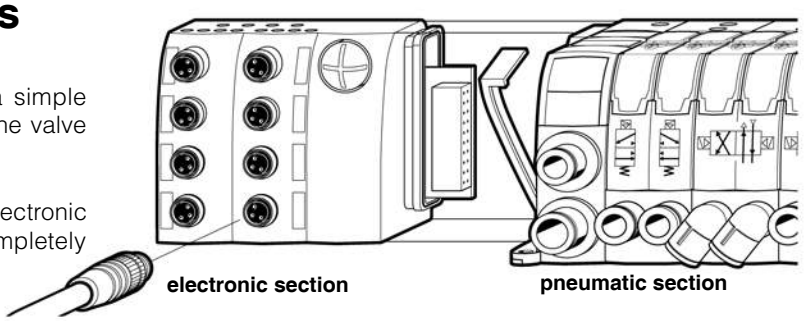
Depending upon the application, the valve island may be supplied with 8 M8 input connections, 4 M12 input connections or no input connection when inputs and outputs are separate.

Islands are IP 65 water and dust protected. They may be installed remote from enclosure near pneumatic actuators, this resulting in simpler piping, reduced air consumption and reduced response time.

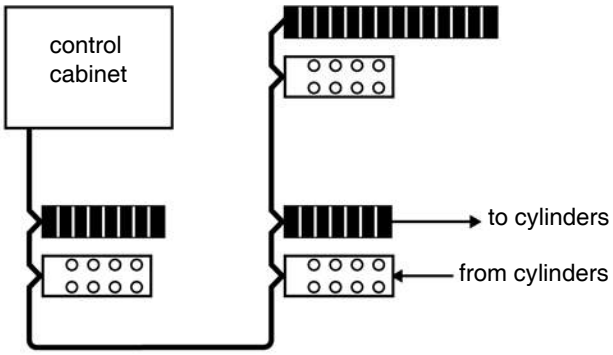
# Separate access to pneumatic and to electronic sections

When the valve island has been installed, it is a simple operation to separate the AS-i head module from the valve island as shown in the diagram.

This will ease maintenance if necessary as the electronic and pneumatic sections of the island can be completely separated.



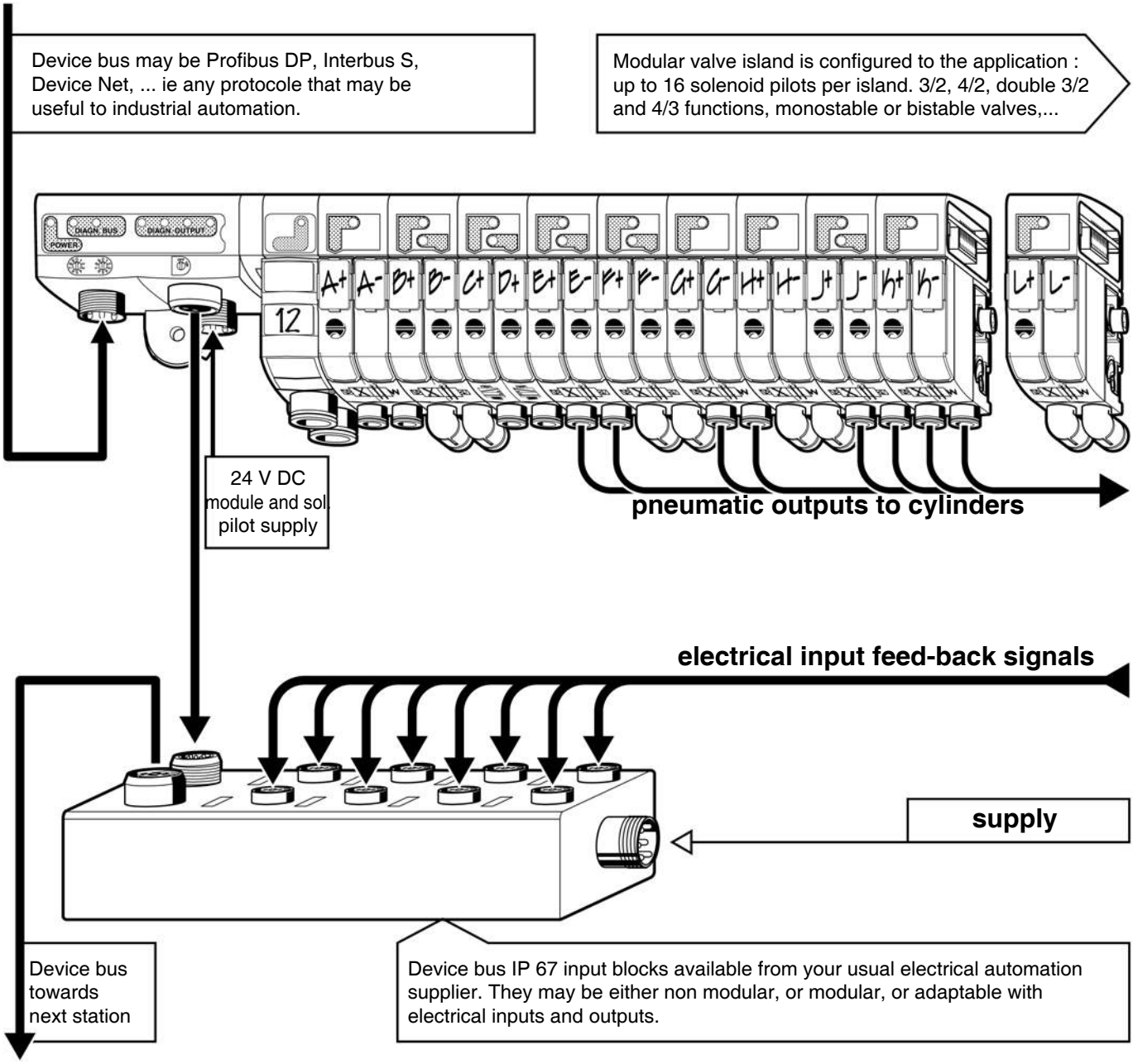
# 18 Valve islands with device bus connections




*Some applications require device bus controls with IP 65 - 67 protection requirements ;*

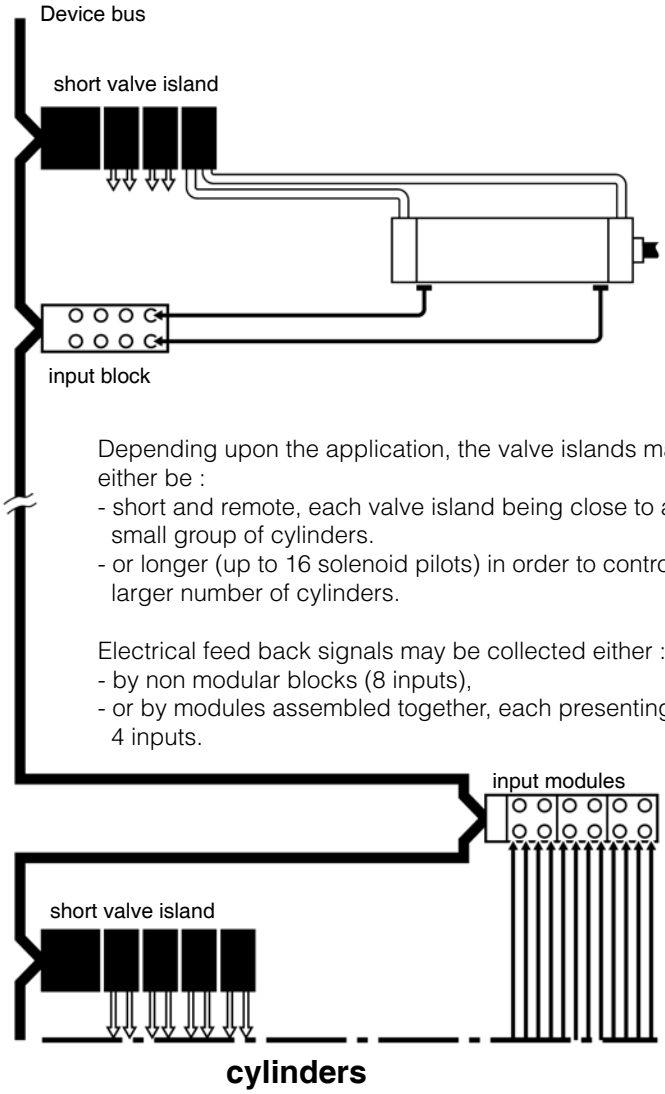
*The IP 65 integrated electrical connections valve islands with their electrical head module version for direct device bus connections, are designed for this purpose.*

## Valve islands with device bus connections



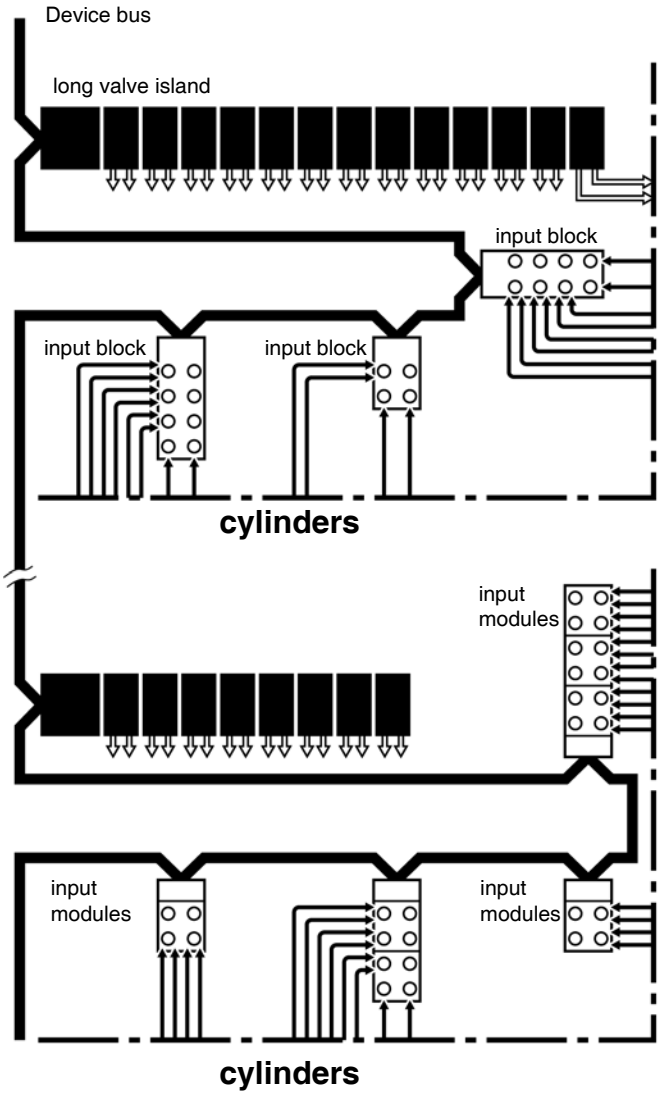
# Device bus electro-pneumatic automation practice

## from short remote valve islands.....to longer valve islands




Depending upon the application, the valve islands may either be :
- short and remote, each valve island being close to a small group of cylinders.
- or longer (up to 16 solenoid pilots) in order to control a larger number of cylinders.

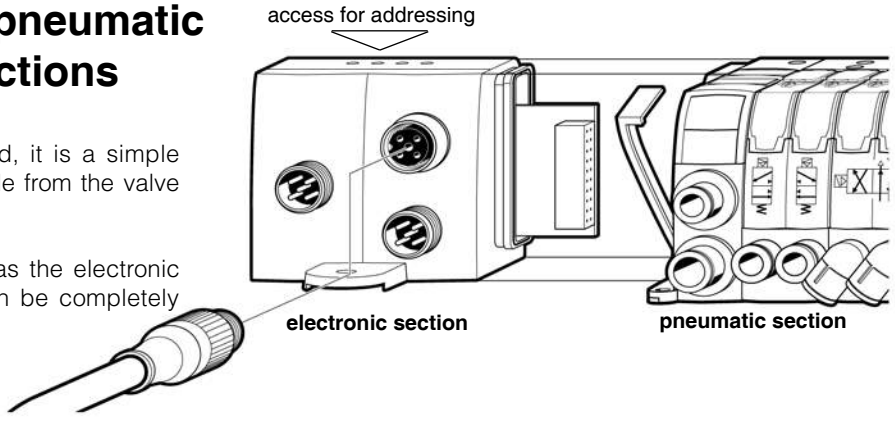
Electrical feed back signals may be collected either :
- by non modular blocks (8 inputs),
- or by modules assembled together, each presenting 4 inputs.




## Separate access to pneumatic and to electronic sections

When the valve island has been installed, it is a simple operation to separate the bus head module from the valve island as shown in the diagram.

This will ease maintenance if necessary as the electronic and pneumatic sections of the island can be completely separated.

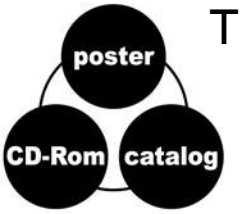


# Moduflex : a simple and complete «user system»

The illustration of the opposite page resumes the system organization with :
- the 4 module series V, T, S and P ;
- the module and pneumatic connector sizes 1 and 2 ;
- all basic modules functions and order codes;
- all electrical and pneumatic plug-in connector order codes.

With local inventories reduced to the modules and connectors shown here, any local distributor, machine manufacturer or user easily obtains the valve island or stand-alone that he needs and will then completely master any evolution required by the machine commissioning.

*Note : the functional poster proposed below reproduces this illustration at A1 format (60 x 84 cm).*




# The machine designer Moduflex workshop

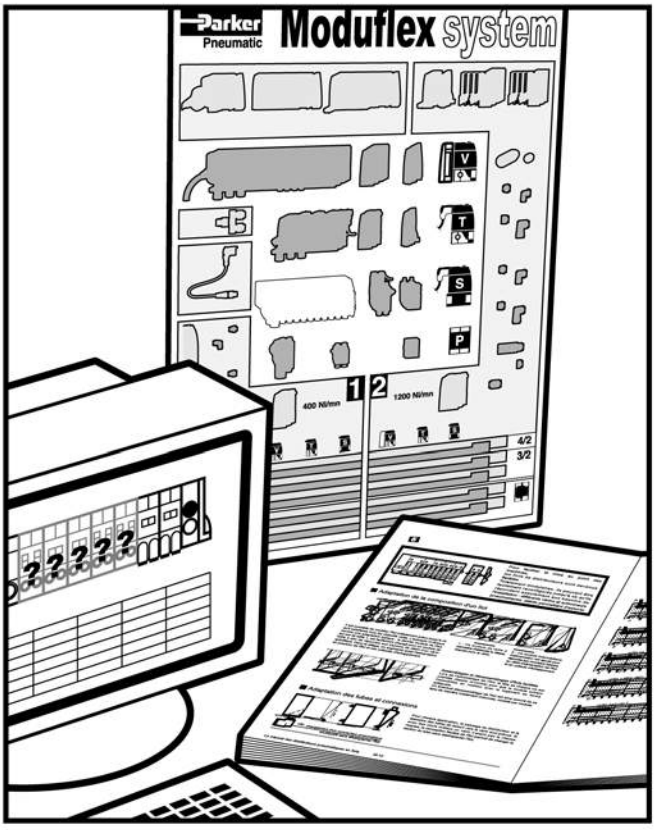
Valves are the centre of electro-pneumatic automation. They are now designed into compact islands that are easily configured to each application.
For full efficiency in this enhanced automation practice, machine designers are helped by 3 complementary design tools :

1 - the Moduflex valve island configurator, an easy to use **CD-ROM** (see p. 12 and 13) ;

2 - the Moduflex functional **poster**, a «one glance synopsis» of the Moduflex System;

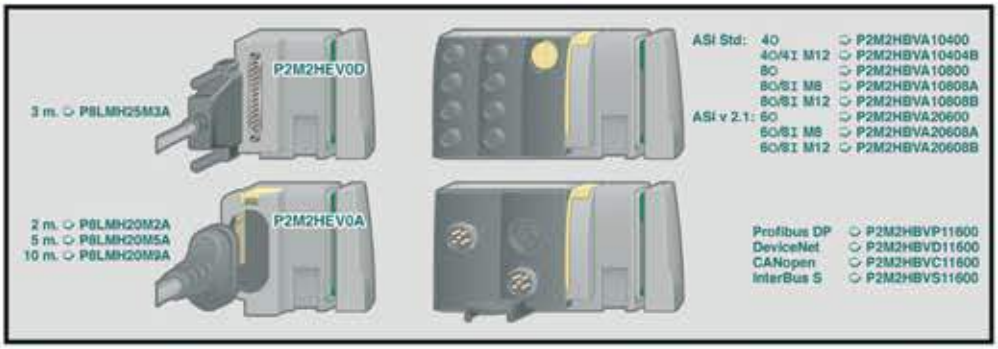
3 - this **catalogue**, that includes «The manual of modular pneumatic valves islands».

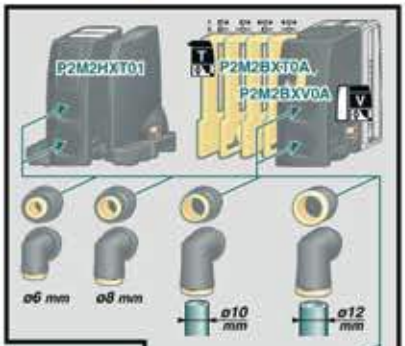
*Make sure your Moduflex workshop is complete.*

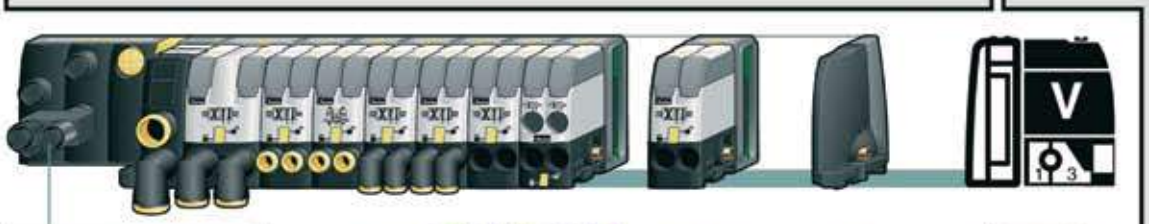


# Parker Moduflex valve system

24 V⎓ P= -0.9 bar / +8 bar

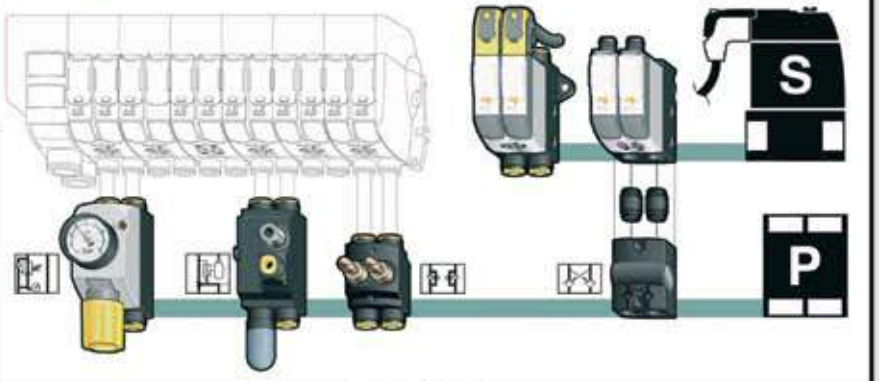


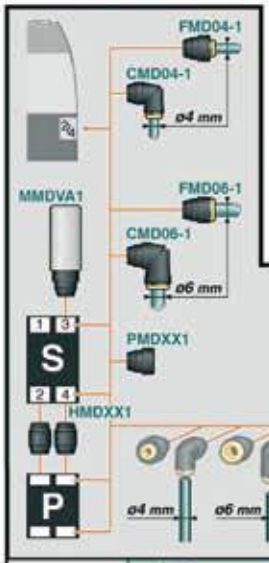



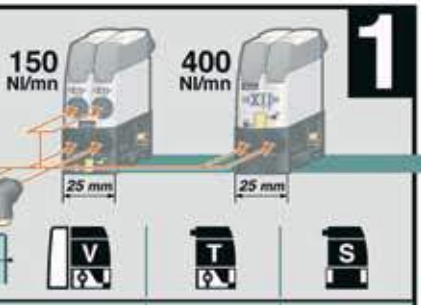



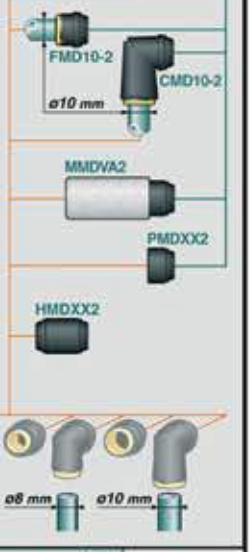







| | | | | | | |
|---|---|---|---|---|---|---|
| 4/2 | P2M1V4ES2CV | P2M1T4ES2C | P2M1S4ES2C | P2M2V4ES2CV | P2M2T4ES2C | P2M2S4ES2C |
| | P2M1V4EE2CV | P2M1T4EE2C | P2M1S4EE2C | P2M2V4EE2CV | P2M2T4EE2C | P2M2S4EE2C |
| | P2M1VJEE2CV | P2M1TJEE2C | – | | | |
| 3/2 | P2M1VDEE2CV | P2M1TDEE2C | P2M1SDEE2C | P2M2VDEE2CV | P2M2TDEE2C | P2M2SDEE2C |
| | P2M1VCEE2CV | P2M1TCEE2C | P2M1SCEE2C | P2M2VCEE2CV | P2M2TCEE2C | P2M2SCEE2C |
| | P2M1VEEE2CV | P2M1TEEE2C | P2M1SEEE2C | P2M2VEEE2CV | P2M2TEEE2C | P2M2SEEE2C |
| | P2M1V3ES2CV | P2M1T3ES2C | P2M1S3ES2C | P2M2V3ES2CV | P2M2T3ES2C | P2M2S3ES2C |

| P | 0 - 2 bar | 0 - 4 bar | 0 - 8 bar | 0 - 2 bar | 0 - 4 bar | 0 - 8 bar | P |
|---|---|---|---|---|---|---|---|
| | P2M1PXST | P2M1PXSL | P2M1PXSN | P2M2PXST | P2M2PXSL | P2M2PXSN | |
| | – | P2M1K0GL | P2M1K0GN | – | P2M2K0GL | P2M2K0GN | |
| | – | – | P2M1PXFA | – | – | P2M2PXFA | |
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# Parker Worldwide

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Tel: +971 4 8127100
parker.me@parker.com

**AR – Argentina,** Buenos Aires
Tel: +54 3327 44 4129

**AT – Austria,** Wiener Neustadt
Tel: +43 (0)2622 23501-0
parker.austria@parker.com

**AT – Eastern Europe,**
Wiener Neustadt
Tel: +43 (0)2622 23501 900
parker.easteurope@parker.com

**AU – Australia,** Castle Hill
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**AZ – Azerbaijan,** Baku
Tel: +994 50 2233 458
parker.azerbaijan@parker.com

**BE/LU – Belgium,** Nivelles
Tel: +32 (0)67 280 900
parker.belgium@parker.com

**BR – Brazil,** Cachoeirinha RS
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**BY – Belarus,** Minsk
Tel: +375 17 209 9399
parker.belarus@parker.com

**CA – Canada,** Milton, Ontario
Tel: +1 905 693 3000

**CH – Switzerland,** Etoy
Tel: +41 (0)21 821 87 00
parker.switzerland@parker.com

**CL – Chile,** Santiago
Tel: +56 2 623 1216

**CN – China,** Shanghai
Tel: +86 21 2899 5000

**CZ – Czech Republic,** Klecany
Tel: +420 284 083 111
parker.czechrepublic@parker.com

**DE – Germany,** Kaarst
Tel: +49 (0)2131 4016 0
parker.germany@parker.com

**DK – Denmark,** Ballerup
Tel: +45 43 56 04 00
parker.denmark@parker.com

**ES – Spain,** Madrid
Tel: +34 902 330 001
parker.spain@parker.com

**FI – Finland,** Vantaa
Tel: +358 (0)20 753 2500
parker.finland@parker.com

**FR – France,** Contamine s/Arve
Tel: +33 (0)4 50 25 80 25
parker.france@parker.com

**GR – Greece,** Athens
Tel: +30 210 933 6450
parker.greece@parker.com

**HK – Hong Kong**
Tel: +852 2428 8008

**HU – Hungary,** Budapest
Tel: +36 1 220 4155
parker.hungary@parker.com

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parker.ireland@parker.com

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parker.italy@parker.com

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parker.easteurope@parker.com

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parker.latvia@parker.com

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parker.nl@parker.com

**NO – Norway,** Ski
Tel: +47 64 91 10 00
parker.norway@parker.com

**NZ – New Zealand,** Mt Wellington
Tel: +64 9 574 1744

**PL – Poland,** Warsaw
Tel: +48 (0)22 573 24 00
parker.poland@parker.com

**PT – Portugal,** Leca da Palmeira
Tel: +351 22 999 7360
parker.portugal@parker.com

**RO – Romania,** Bucharest
Tel: +40 21 252 1382
parker.romania@parker.com

**RU – Russia,** Moscow
Tel: +7 495 645-2156
parker.russia@parker.com

**SE – Sweden,** Spånga
Tel: +46 (0)8 59 79 50 00
parker.sweden@parker.com

**SG – Singapore**
Tel: +65 6887 6300

**SK – Slovakia,** Banská Bystrica
Tel: +421 484 162 252
parker.slovakia@parker.com

**SL – Slovenia,** Novo Mesto
Tel: +386 7 337 6650
parker.slovenia@parker.com

**TH – Thailand,** Bangkok
Tel: +662 717 8140

**TR – Turkey,** Istanbul
Tel: +90 216 4997081
parker.turkey@parker.com

**TW – Taiwan,** Taipei
Tel: +886 2 2298 8987

**UA – Ukraine,** Kiev
Tel +380 44 494 2731
parker.ukraine@parker.com

**UK – United Kingdom,**
Warwick
Tel: +44 (0)1926 317 878
parker.uk@parker.com

**US – USA,** Cleveland
Tel: +1 216 896 3000

**VE – Venezuela,** Caracas
Tel: +58 212 238 5422

**ZA – South Africa,**
Kempton Park
Tel: +27 (0)11 961 0700
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**European Product Information Centre**
**Free phone: 00 800 27 27 5374**
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**Parker Hannifin Ltd**
Pneumatic Division Europe
The Collins Centre,
Lichfield South, Wall Island,
Birmingham Road, Lichfield.
WS14 0QP United Kingdom
Tel.: +44 (0) 1543 483800
Fax: +44 (0) 1543 483801
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