Isys Micro Series Air Control Valves

Catalog 0682

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

Parker

ENGINEERING YOUR SUCCESS.

Global Pneumatics, Warning, Offer of Sale

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Pneumatic Division
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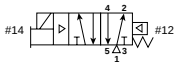
Single Solenoid

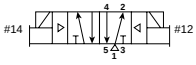


Single Pressure At Inlet Port 1:

De-energized position – Solenoid operator #14 de-energized. Pressure at inlet port 1 connected to outlet port 2. Outlet port 4 connected to exhaust port 5.

Energized position – Solenoid operator #14 energized. Pressure at inlet port 1 connected to outlet port 4. Outlet port 2 connected to exhaust port 3.

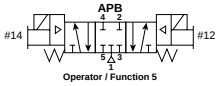
Double Solenoid



Single Pressure At Inlet Port 1:

Solenoid operator #14 energized last. Pressure at inlet port 1 connected to outlet port 4. Outlet port 2 connected to exhaust port 3.

Solenoid operator #12 energized last. Pressure at inlet port 1 connected to outlet port 2. Outlet port 4 connected to exhaust port 5.



Operator / Function 5

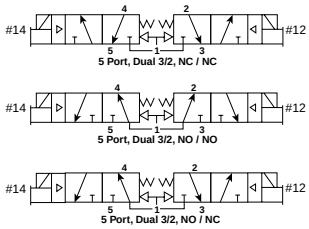
Double Solenoid 3-Position

Function 5: All Ports Blocked

With #12 operator energized – inlet port 1 connected to cylinder port 2, cylinder port 4 connected to exhaust port 5.

With #14 operator energized – inlet port 1 connected to cylinder port 4, cylinder port 2 connected to exhaust port 3.

All ports blocked in the center position.



Double Solenoid
Dual 3-Way, 2-Position NC / NC (NNP)

With #14 & #12 operators both de-energized – pressure at inlet port 1 blocked, outlet port 4 connected to exhaust port 5, outlet port 2 connected to exhaust port 3.

With #14 operator energized – pressure at inlet port 1 connected to outlet port 4, exhaust port 5 blocked, outlet port 2 connected to exhaust port 3.

With #12 operator energized – pressure at inlet port 1 connected to outlet port 2, exhaust port 3 blocked, outlet port 4 connected to exhaust port 5.

With #14 & #12 operators both energized – pressure at inlet port 1 connected to outlet ports 4 & 2, exhaust ports 3 & 5 blocked.

Dual 3-Way, 2-Position NO / NO (NP)

With #14 & #12 operators both de-energized – pressure at inlet port 1 connected to outlet ports 4 & 2, exhaust ports 3 & 5 blocked.

With #14 operator energized – pressure at inlet port 1 connected to outlet port 2, exhaust port 3 blocked, outlet port 4 connected to exhaust port 5.

With #12 operator energized – pressure at inlet port 1 connected to outlet port 4, exhaust port 5 blocked, outlet port 2 connected to exhaust port 3.

With #14 & #12 operators both energized – pressure at inlet port 1 blocked, outlet port 4 connected to exhaust port 5, outlet port 2 connected to exhaust port 3.

Dual 3-Way, 2-Position 14 End NO / 12 End NC (NP / NNP)

With #14 & #12 operators both de-energized – pressure at inlet port 1 connected to outlet port 4, exhaust port 5 blocked, outlet port 2 connected to exhaust port 3.

With #14 operator energized – pressure at inlet port 1 blocked, outlet port 4 connected to exhaust port 5, outlet port 2 connected to exhaust port 3.

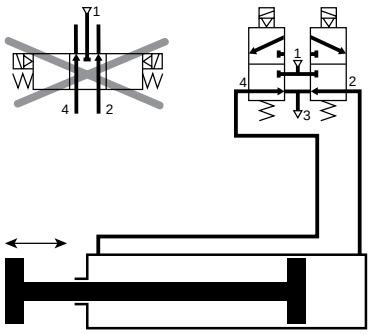
With #12 operator energized – pressure at inlet port 1 connected to outlet ports 4 & 2, exhaust ports 3 & 5 blocked.

With #14 & #12 operators both energized – pressure at inlet port 1 connected to outlet port 2, exhaust port 3 blocked, outlet port 4 connected to exhaust port 5.

Dual 3/2 Valves Replace 3-Position Valves for Better Performance

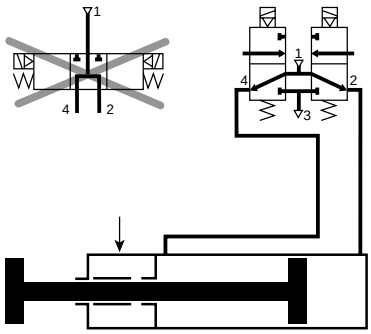
3-Position Center Exhaust

A traditional 5/3 center exhaust valve is now replaced by a double 3/2 NC+NC valve module. Both cylinder chambers are exhausted and rod and piston are free to move.



3-Position Pressure Center

A traditional 5/3 pressure center valve is now replaced by a double 3/2 NO+NO valve module. The function is identical.



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Specifications

2-Position & Dual 3/2	3-Position
0.35 Cv	0.30 Cv
C = 1.2 Nl/s x bar, b = 0.13	C = 1 Nl/s x bar, b = 0.13
Qn = 282 Nl/min	Qn = 228 Nl/min
Qmax = 510 Nl/min	Qmax = 402 Nl/min

Materials of Construction

- Valve Spool: Brass
- Valve Spool Enclosure: Brass
- Dynamic Seals: Nitrile
- Valve Body: Polyamide Reinforced Fiberglass
- Seals: Nitrile
- Springs: Stainless Steel
- Screws: Zinc Plated Steel
- Top Cover: Polyester
- Manifold - End Plates: Aluminum

Operating Pressure

- Vacuum to 145 PSIG
- Minimum Operating Pressure
  - 2-Position, Double Solenoid: 25 PSI
  - 2-Position, Single Solenoid: 40 PSI
  - 3-Position: 45 PSI
  - Dual 3/2: 40 PSI

Ports

- M7 on Manifolds
- NPT and BSPP “G” on End Plates

Manifolds

- Collective Wiring
  - 25-Pin, D-Sub
  - Moduflex Fieldbus
  - Isysnet Fieldbus

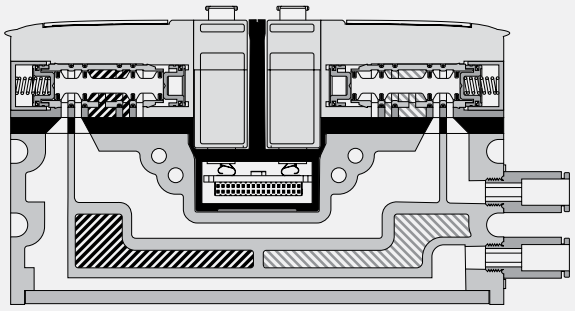
Certification / Approval

- EMC / CE Mark: According to EN 61 000-6-2
- Dust & Water Protection: IP65 According to EN 60529

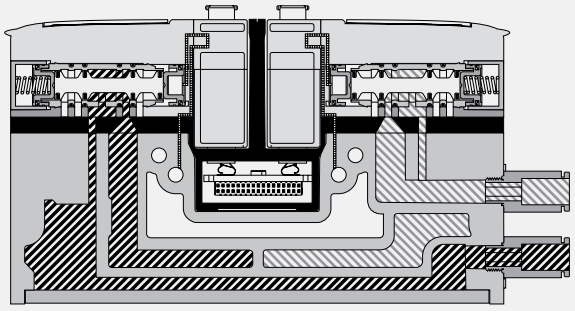
Solenoids

- Bi-Polar
- Surge Suppression (Standard)
- Low Watt – 1.0, 24VDC
- Indicator Lights

Single Solenoid Valves Shown
Solenoid is De-energized



Side Exhaust
4 Ports Connected to Exhaust Port
(5 & 3 Common)

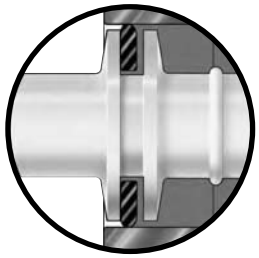


Side Pressure
2 Ports Connected to Inlet Port 1

Inlet Port #1 for Rear Valves
Inlet Port #1 for Front Valves
3 & 5 Common Exhaust for Front & Rear Valves

*W*ear Compensation *S*ystem

- **Maximum Performance**
  - Low Friction - Lower Operating Pressures
  - Fast Response - Less Wear
- **Long Cycle Life** - Under pressure, radial expansion of the seal occurs to maintain sealing contact with the valve bore.
- **Non-Lube Service** - No lubrication required for continuous valve shifting.
- **Bi-Directional Spool Seals** - Common spool used for any pressure, including vacuum.



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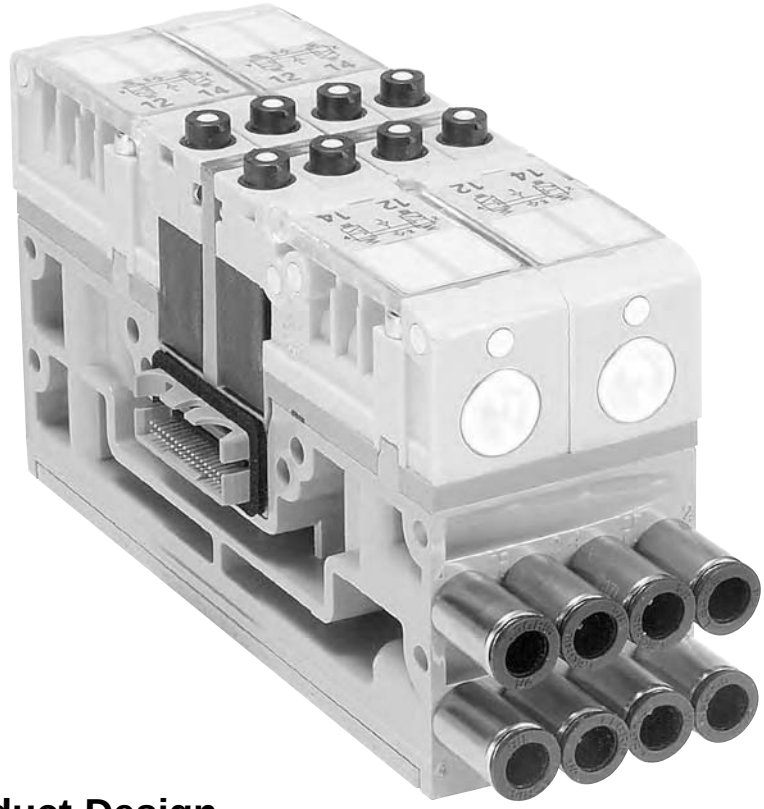

Innovative Product Design

- Back to Back Valve Mounting Design Centralizes Wiring in the Manifold
- 4 Valves on a 42mm Wide Manifold Provides a 10.5mm Wide Valve Solution with a Reduced Cost
- High flow of 0.35 Cv Allows for Broad Application Use
- Plug-in Valve Electronics Reduce and Eliminate Wiring System Costs
- Multiple Pressure Zones for Many Applications on the Same Manifold

Standard Features

- Integrated LED's Identify when Solenoids are Active
- Side and Bottom Porting Options on Manifolds and End Plates for Versatile Mounting
- All Valve Functions Available for Complete Product Offering
- Valves can be Arranged in Any Combination for Maximum Flexibility
- Internal and External Pilot Options Available for Vacuum to 145 PSI Applications
- IP65 Protection Enables Direct Machine Mounting
- Product Identification, Valve Function, and Port Description Tags are Standard on Every Manifold and are Clearly Visible thru a Protective Cover
- User Configurable Overrides for Non-Locking, Locking, or No Override Options

Manifold Platforms

- 25 Pin D-Sub Manifolds for Control Systems with Discrete Outputs
- Cost Effective Moduflex Fieldbus Manifolds for Control Systems with DeviceNet™, Profibus®, Interbus and CANopen Fieldbus and no Inputs or Outputs Near Valves
- Cost Effective Moduflex Fieldbus Manifolds with AS-i Communication offer both Inputs and Solenoid Control
- Fully Functional Isysnet Fieldbus Manifolds for Control Systems with Inputs and Outputs Attached to the Valve Manifold
- Enhanced Isysnet Bus Expansion Allows 4 Isysnet Valve Manifolds to be Connected to a Single Communication Module Significantly Reducing Costs on Large Machines
- Rockwell Automation RS Logix 5000™ Users can take Advantage of Preferred Connectivity, by Using the Preloaded Device Profibus

Complete Assemblies

- All Products Offered as Component Level Parts for Individual Assembly
- Simple Manifolds Offer Sub-Assembly Level Products with Valves and Fittings Attached to Manifold Bases in a Single Part Number
- Add-A-Fold Systems Offer Complete Assemblies; Including Valves, Manifolds, End Plates, Fittings, and Mufflers in as few as 2 Part Numbers

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Cv Values - Isys Micro

The charts below represent the minimum required Cv values for pneuumatic systems operating at 80 PSI with a 5 PSI pressure drop.

To use the chart, locate the diameter of the cylinder across the horizontal axis, then the average required rod speed of the cycle. The intersection point is Cv value needed.

Grayed out values are not attainable with Isys Micro. Please select a larger Parker valve.

Average Rod Speed (mm/s)	Cylinder Diameter (mm)												
	6	8	10	12	16	20	25	32	40	50	63	80	100
25	0.000	0.001	0.001	0.002	0.003	0.005	0.008	0.013	0.021	0.032	0.051	0.083	0.129
50	0.001	0.002	0.003	0.004	0.007	0.010	0.016	0.026	0.041	0.065	0.103	0.166	0.259
75	0.001	0.002	0.004	0.006	0.010	0.016	0.024	0.040	0.062	0.097	0.154	0.248	0.388
100	0.002	0.003	0.005	0.007	0.013	0.021	0.032	0.053	0.083	0.129	0.205	0.331	0.517
125	0.002	0.004	0.006	0.009	0.017	0.026	0.040	0.066	0.103	0.162	0.257	0.414	0.647
150	0.003	0.005	0.008	0.011	0.020	0.031	0.049	0.079	0.124	0.194	0.308	0.497	0.776
175	0.003	0.006	0.009	0.013	0.023	0.036	0.057	0.093	0.145	0.226	0.359	0.580	0.906
200	0.004	0.007	0.010	0.015	0.026	0.041	0.065	0.106	0.166	0.259	0.411	0.662	1.035
225	0.004	0.007	0.012	0.017	0.030	0.047	0.073	0.119	0.186	0.291	0.462	0.745	1.164
250	0.005	0.008	0.013	0.019	0.033	0.052	0.081	0.132	0.207	0.323	0.513	0.828	1.294
275	0.005	0.009	0.014	0.020	0.036	0.057	0.089	0.146	0.228	0.356	0.565	0.911	1.423
300	0.006	0.010	0.016	0.022	0.040	0.062	0.097	0.159	0.248	0.388	0.616	0.994	1.552
350	0.007	0.012	0.018	0.026	0.046	0.072	0.113	0.185	0.290	0.453	0.719	1.159	1.811
400	0.007	0.013	0.021	0.030	0.053	0.083	0.129	0.212	0.331	0.517	0.822	1.325	2.070
450	0.008	0.015	0.023	0.034	0.060	0.093	0.146	0.238	0.373	0.582	0.924	1.490	2.329
500	0.009	0.017	0.026	0.037	0.066	0.103	0.162	0.265	0.414	0.647	1.027	1.656	2.587

Average Rod Speed (in/s)	Cylinder Diameter (in)																
	5/16"	7/16"	9/16"	3/4"	7/8"	1"	1-1/16"	1-1/8"	1-1/4"	1-1/2"	1-3/4"	2"	2-1/2"	3"	3-1/4"	3-5/8"	4"
1	0.001	0.002	0.003	0.005	0.006	0.008	0.010	0.011	0.013	0.019	0.026	0.034	0.053	0.076	0.090	0.111	0.136
2	0.002	0.003	0.005	0.010	0.013	0.017	0.019	0.021	0.026	0.038	0.052	0.068	0.106	0.153	0.179	0.223	0.271
3	0.002	0.005	0.008	0.014	0.019	0.025	0.029	0.032	0.040	0.057	0.078	0.102	0.159	0.229	0.269	0.334	0.407
4	0.003	0.006	0.011	0.019	0.026	0.034	0.038	0.043	0.053	0.076	0.104	0.136	0.212	0.305	0.358	0.446	0.543
5	0.004	0.008	0.013	0.024	0.032	0.042	0.048	0.054	0.066	0.095	0.130	0.170	0.265	0.382	0.448	0.557	0.678
6	0.005	0.010	0.016	0.029	0.039	0.051	0.057	0.064	0.079	0.114	0.156	0.204	0.318	0.458	0.537	0.669	0.814
7	0.006	0.011	0.019	0.033	0.045	0.059	0.067	0.075	0.093	0.134	0.182	0.237	0.371	0.534	0.627	0.780	0.950
8	0.007	0.013	0.021	0.038	0.052	0.068	0.077	0.086	0.106	0.153	0.208	0.271	0.424	0.611	0.717	0.891	1.085
9	0.007	0.015	0.024	0.043	0.058	0.076	0.086	0.097	0.119	0.172	0.234	0.305	0.477	0.687	0.806	1.003	1.221
10	0.008	0.016	0.027	0.048	0.065	0.085	0.096	0.107	0.132	0.191	0.260	0.339	0.530	0.763	0.896	1.114	1.357
11	0.009	0.018	0.030	0.052	0.071	0.093	0.105	0.118	0.146	0.210	0.286	0.373	0.583	0.839	0.985	1.226	1.492
12	0.010	0.019	0.032	0.057	0.078	0.102	0.115	0.129	0.159	0.229	0.312	0.407	0.636	0.916	1.075	1.337	1.628
14	0.012	0.023	0.038	0.067	0.091	0.119	0.134	0.150	0.185	0.267	0.364	0.475	0.742	1.068	1.254	1.560	1.899
16	0.013	0.026	0.043	0.076	0.104	0.136	0.153	0.172	0.212	0.305	0.415	0.543	0.848	1.221	1.433	1.783	2.171
18	0.015	0.029	0.048	0.086	0.117	0.153	0.172	0.193	0.238	0.343	0.467	0.611	0.954	1.374	1.612	2.006	2.442
20	0.017	0.032	0.054	0.095	0.130	0.170	0.191	0.215	0.265	0.382	0.519	0.678	1.060	1.526	1.791	2.229	2.713

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Basic Systems: 25 Pin D-Sub Wiring

- Up to 24 solenoids per manifold
- Discretely wired solenoids - Optimized for PLCs with onboard Inputs and Outputs
- Routinely used with smaller machines

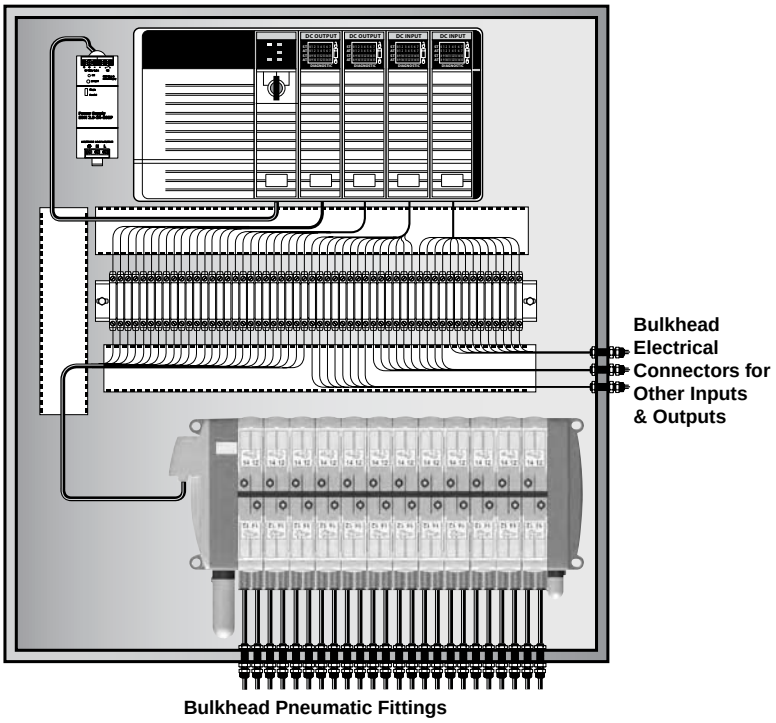
Centralized Application

Isys Micro Inside Control Cabinet

- Valves located near machine control
- Applications with caustic wash down, hazardous areas, or extreme temperatures

Advantages

- Highest degree of environmental protection
- One location for all control devices
- Small size requires minimal cabinet space
- No junction boxes required for valves
- Eliminates conduit runs for valves



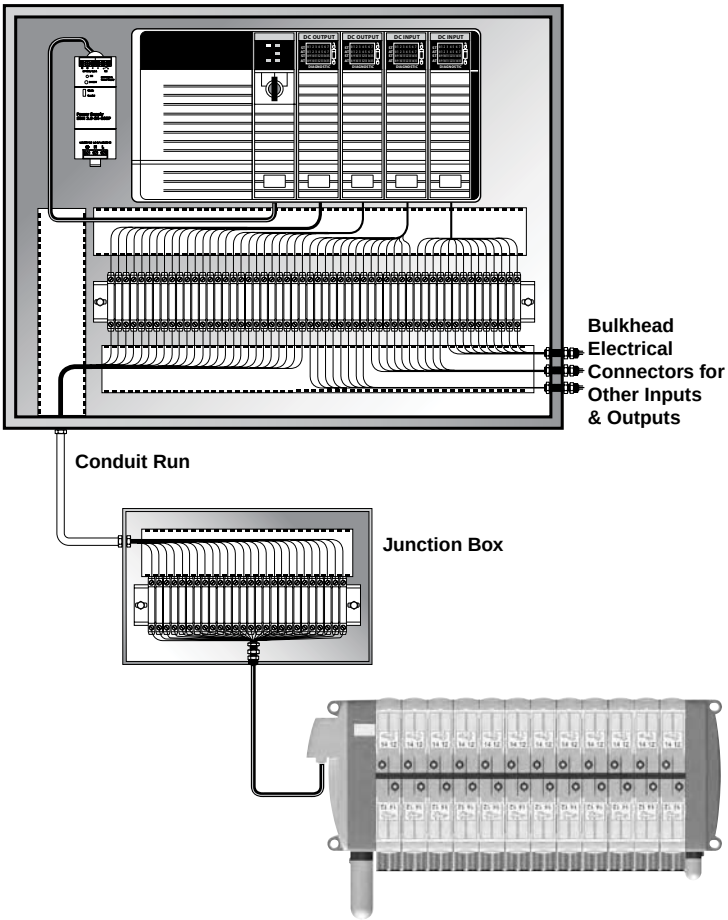
Decentralized Application

Isys Micro Outside Control Cabinet

- Valves located near application - Ready for machine mounting
- IP65 rating suitable for dusty and wet environments

Advantages

- Reduces control cabinet size
- Reduces tubing length and improves response time
- Eliminates pneumatic bulk fittings on control cabinet



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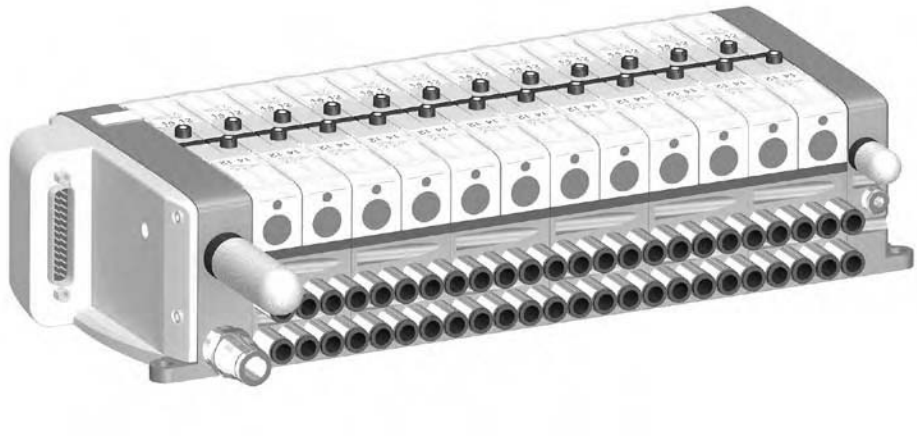
25-Pin, D-Sub Manifolds



24 Single Solenoid Valves

Add-A-Fold

Manifold is factory assembled and tested for pneumatic leaks and electrical continuity.

Item	Qty	Part Number	Description
01	1	AAHMD5249M0M	24 Valve Add-A-Fold with End Plates
02	6	PSM31JAPE7E7E7E7	4 Valve Simple Manifold Slice

Component Level

Item	Qty	Part Number	Description
01	1	PSML25AP	25-Pin, D-Sub, End Plate
02	24	HMEVX2049A	Single Solenoid Valve
03	6	PSM21JAP	Manifold, Side Ported, Single Address
04	50	PS567925	1/4" Tube Fittings (In box quantity)
05	10	PS568338	3/8" Tube Fittings (In box quantity)
06	1	P6M-PAB3	3/8" Exhaust Muffler
07	1	P6M-PAB1	1/8" Exhaust Muffler

Additional Components

25-Pin, D-Sub Cable (Female)

Part Number	Description	Length
P8LMH25M3A	25-Pin, D-Sub Cable, IP20	3 Meters
SCD259D	25-Pin, D-Sub Cable, IP20	9 Meters
SCD253W	25-Pin, D-Sub Cable, IP65	3 Meters
SCD259WE	25-Pin, D-Sub Cable, IP65	9 Meters

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Basic Systems: Moduflex Fieldbus

- Up to 16 solenoids per manifold
- Fieldbus equipped manifolds – optimized for PLCs with fieldbus capability
- Routinely used on medium sized machines

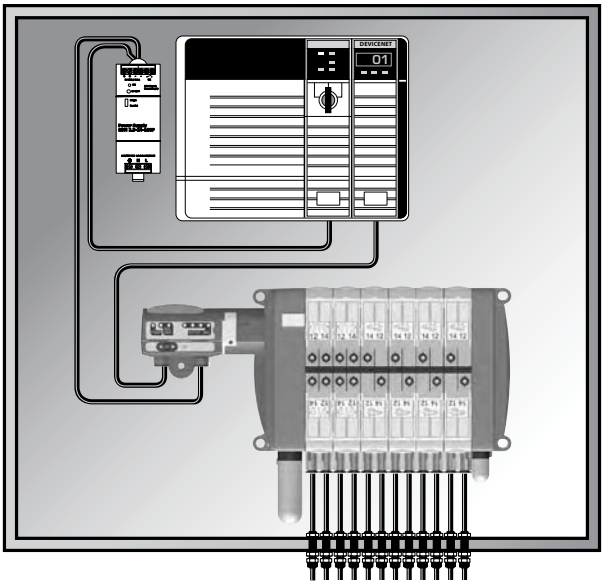
Centralized Application

Isys Micro Inside Control Cabinet

- Valves located near machine control
- Applications with caustic wash down, hazardous areas, or extreme temperatures
- Additional inputs and outputs are not directly attached to valve manifold or PLC

Advantages

- Highest degree of environmental protection
- One location for all control devices
- Small size requires minimal cabinet space
- Eliminates terminal strips and wire ways
- Greatly reduces wiring time
- Eliminates junction boxes
- Eliminates conduit runs



Bulkhead Pneumatic Fittings

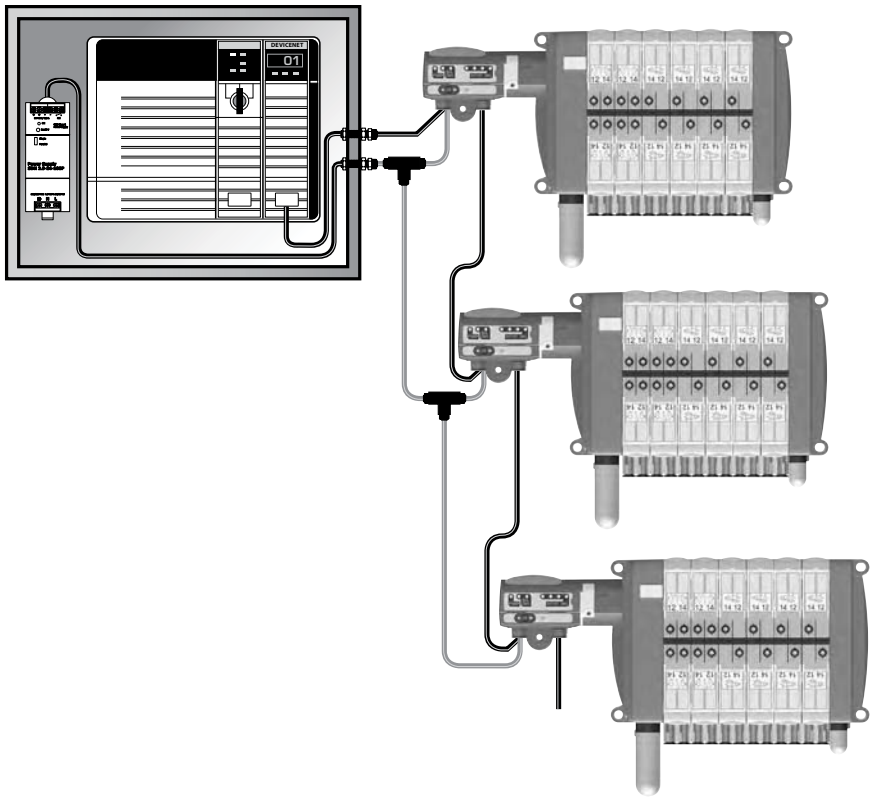
Decentralized Application

Isys Micro Outside Control Cabinet

- Valves located near application - Ready for machine mounting
- IP65 rating suitable for dusty and wet environments
- Additional inputs and outputs are not directly attached to valve manifold or PLC

Advantages

- Smallest control cabinet
- Reduces tubing length and improves response time
- Eliminates pneumatic bulk fittings on control cabinet
- Many fieldbus nodes can be attached to the network with little incremental cost – valve manifolds, inputs, outputs or other devices.
- Eliminates terminal strips and wire ways
- Greatly reduces wiring time
- Eliminates junction boxes
- Eliminates conduit runs



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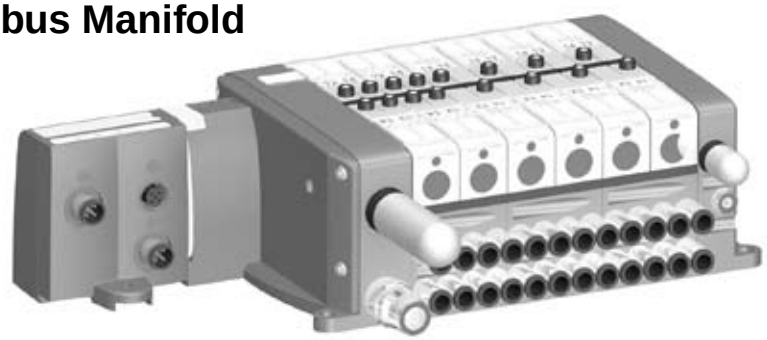
Moduflex Fieldbus Manifold



4 Double Solenoid Valves, 8 Single Solenoid Valves

Add-A-Fold

Manifold is factory assembled and tested for pneumatic leaks and electrical continuity.

Item	Qty	Part Number	Description
01	1	AAHMT5129M0M	12 Valve Add-A-Fold with End Plates
02	1	PSM31MAPN7N7N7N7	4 Valve Simple Manifold Slice
3	2	PSM31JAPE7E7E7E7	4 Valve Simple Manifold Slice

Component Level

Item	Qty	Part Number	Description
01	1	PSMM45AP	Moduflex Fieldbus, End Plate
02	4	HMNVX2049A	Double Solenoid, Dual 3/2, NC/NC
03	1	PSM21MAP	Manifold, Side Ported, Double Address
4	8	HMEVX2049A	Single Solenoid Valve
5	2	PSM21JAP	Manifold, Side Ported, Single Address
6	30	PS567925	1/4" Tube Fittings (In box quantity)
05	10	PS568338	3/8" Tube Fittings (In box quantity)
06	1	P6M-PAB3	3/8" Exhaust Muffler
07	1	P6M-PAB1	1/8" Exhaust Muffler

Additional Components

Moduflex Communication Modules

Bus Protocol	Order Code
Profibus DP	**P2M2HBVP21600**
DeviceNet	**P2M2HBVD21600**
CANopen	**P2M2HBVC21600**
Interbus S	P2M2HBVS11600

Fieldbus Accessories

	Bus Protocol	Connector Type	Order Code
Power Supply Female Straight Connector	Profibus DP / Interbus S	M12 type A	**P8CS1205AA**
	DeviceNet / CANopen	M12 type B	**P8CS1205AB**
Line Termination Resistor	Profibus DP	M12 type B	**P8BPA00MB**
	DeviceNet / CANopen	M12 type A	**P8BPA00MA**

Standard AS-i Protocol (up to 31 nodes)

Communication Module for 8 Solenoids Max. (2 nodes per module, 4 inputs, 4 solenoids per node)

Input / Output Capability	Order Code
0 inputs and 8 solenoid outputs	**P2M2HBVA10800**
8 (PNP) inputs on eight (M8) connectors and 8 solenoid outputs	**P2M2HBVA10808A**
8 (PNP) inputs on four (M12) connectors and 8 solenoid outputs	P2M2HBVA10808B

AS-i Version 2.1 Protocol (up to 62 nodes)

Communication Module for 6 Solenoids Max. (2 nodes per module, 4 inputs, 4 solenoids per node)

Input / Output Capability	Order Code
0 inputs and 6 solenoid outputs	**P2M2HBVA20600**
8 (PNP) inputs on eight (M8) connectors and 6 solenoid outputs	**P2M2HBVA20608A**
8 (PNP) inputs on four (M12) connectors and 6 solenoid outputs	P2M2HBVA20608B

AS-i Bus Accessories

M12 Cable with Jack for Addressing

Length	Order Code
1 m	**P8LS12JACK**

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Complete Fieldbus Systems: Isysnet Fieldbus System

- Up to 32 Solenoids per Manifold
- With Bus Extension Functionality, 4 Manifolds with up to 32 Solenoids each can be connected on the same Node
- Add Inputs and Outputs to the Isysnet Network
- Fieldbus equipped Manifolds – optimized for PLC's with Fieldbus capability
- Routinely used on medium and large sized machines

Centralized Application

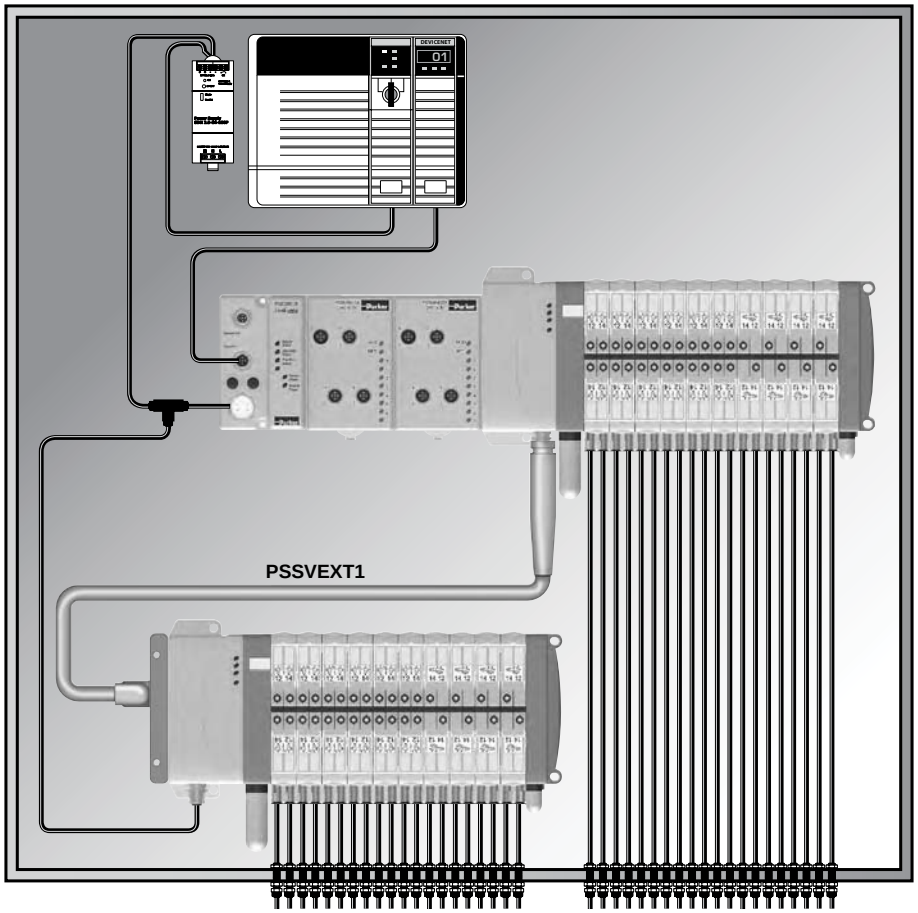
Isys Micro Inside Control Cabinet

- Isysnet Fieldbus System with Inputs and Outputs
- Valves located near machine control
- Applications with caustic wash down, hazardous areas, or extreme temperatures
- Additional inputs and outputs are directly attached to valve manifold

Advantages

- Handle All I/O from One Node
- Eliminate PLC Input / Output Cards
- Up to 128 Solenoids per Node with Bus Extension Cable
- Up to 256 Inputs and 256 Outputs
- Integrate Larger Isys ISO Valves into System
- Analog Inputs / Outputs
- Highest degree of environmental protection
- One location for all control devices
- Small size requires minimal cabinet space
- Eliminates terminal strips and wire ways
- Greatly reduces wiring time

DeviceNet™ EtherNet/IP™ ControlNet™ PROFIBUS PROCESS FIELD BUS



Bulkhead Pneumatic Fittings

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Isysnet Fieldbus Manifold

12 Double Solenoid Valves, 8 Single Solenoid Valves

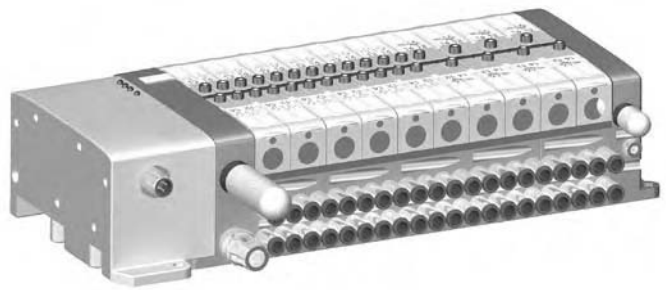
Add-A-Fold

Manifold is factory assembled and tested for pneumatic leaks and electrical continuity.

Item	Qty	Part Number	Description
01	1	AAHMW5209M0M	20 Valve Add-A-Fold with End Plates
02	3	PSM31MAPN7N7N7N7	4 Valve Simple Manifold Slice
03	2	PSM31JAPE7E7E7E7	4 Valve Simple Manifold Slice

Component Level

Item	Qty	Part Number	Description
01	1	PSMM55AP	Isysnet, with Valve Driver Module and Bus Extension Connector
02	12	HMNVX2049A	Double Solenoid, Dual 3/2, NC/NC
03	3	PSM21MAP	Manifold, Side Ported, Double Address
04	8	HMEVX2049A	Single Solenoid, 2-Position, Air Return, Spring Assist
05	2	PSM21JAP	Manifold, Side Ported, Single Address
06	40	PS567925	1/4" Tube Fittings (In box quantity)
07	10	PS568338	3/8" Tube Fittings (In box quantity)
08	1	P6M-PAB3	3/8" Exhaust Muffler
09	1	P6M-PAB1	1/8" Exhaust Muffler



12 Double Solenoid Valves, 8 Single Solenoid Valves

Add-A-Fold

Manifold is factory assembled and tested for pneumatic leaks and electrical continuity.

Item	Qty	Part Number	Description
01	1	AAHMX5209M0M	20 Valve Add-A-Fold with End Plates
02	3	PSM31MAPN7N7N7N7	4 Valve Simple Manifold Slice
03	2	PSM31JAPE7E7E7E7	4 Valve Simple Manifold Slice

Component Level

Item	Qty	Part Number	Description
01	1	PSMM65AP	Isysnet, with Valve Driver Module and 24VDC Connector
02	12	HMNVX2049A	Double Solenoid, Dual 3/2, NC/NC
03	3	PSM21MAP	Manifold, Side Ported, Double Address
04	8	HMEVX2049A	Single Solenoid, 2-Position, Air Return, Spring Assist
05	2	PSM21JAP	Manifold, Side Ported, Single Address
06	40	PS567925	1/4" Tube Fittings (In box quantity)
07	10	PS568338	3/8" Tube Fittings (In box quantity)
08	1	P6M-PAB3	3/8" Exhaust Muffler
09	1	P6M-PAB1	1/8" Exhaust Muffler

Additional Components

Part Number	Description
PSSCDM12A	Isysnet Devicenet Communication
PSSN8M12A	8 Digital Input, 24VDC, M12 Connectors
PSSVEXT1	Isys Micro Bus Extender Cable

See Isysnet section of catalog for more information.

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

Complete Fieldbus Systems: Isysnet Fieldbus System

- Up to 32 Solenoids per Manifold
- With Bus Extension Functionality, 4 Manifolds with up to 32 Solenoids each can be connected on the same Node
- Add Inputs and Outputs to the Isysnet Network
- Fieldbus equipped Manifolds – optimized for PLC's with Fieldbus capability
- Routinely used on medium and large sized machines

Decentralized Application

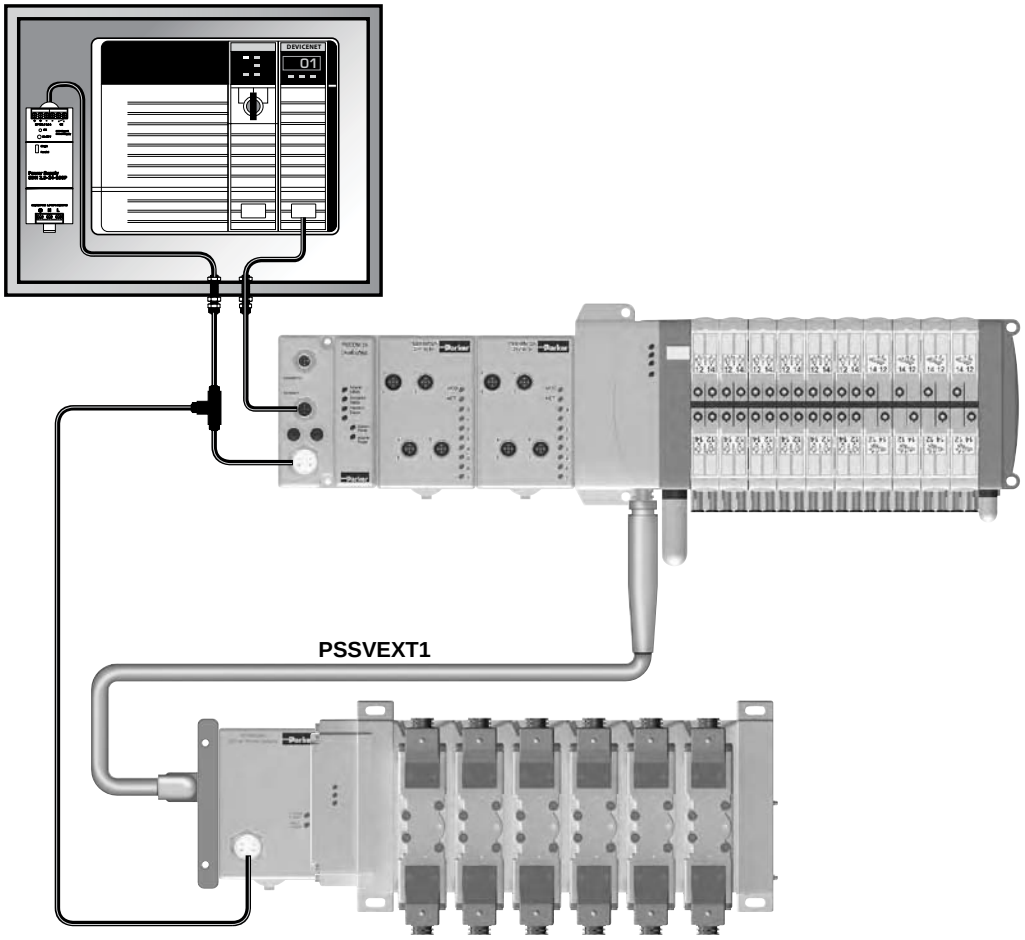
Isys Micro Outside Control Cabinet

- Isysnet Fieldbus System with Inputs and Outputs
- Valves located near application - Ready for machine mounting
- IP65 rating suitable for dusty and wet environments
- Additional inputs and outputs are directly attached to valve manifold

Advantages

- Handle All I/O from One Node
- Eliminate PLC Input / Output Cards
- Up to 128 Solenoids per Node with Bus Extension Cables
- Up to 256 Inputs and 256 Outputs
- Wiring Reduction
- Integrate Larger Isys ISO Valves into System
- Smallest control cabinet
- Reduces tubing length and improves response time
- Eliminates pneumatic bulk fittings on control cabinet
- Many fieldbus nodes can be attached to the network with little incremental cost – valve manifolds, inputs, outputs or other devices.
- Eliminates terminal strips and wire ways
- Greatly reduces wiring time
- Eliminates junction boxes
- Eliminates conduit runs

DeviceNet™ EtherNet/IP™ ControlNet™ PROFIBUS PROCESS FIELD BUS



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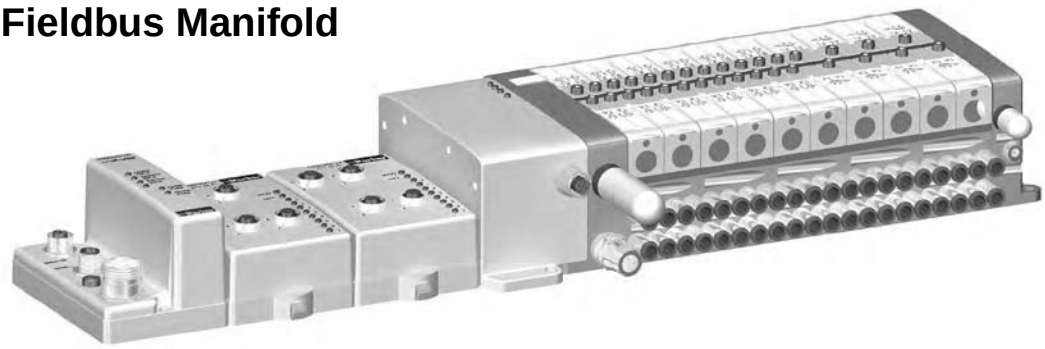
Isysnet Fieldbus Manifold



12 Double Solenoid Valves, 8 Single Solenoid Valves

Add-A-Fold

Manifold is factory assembled and tested for pneumatic leaks and electrical continuity.

Item	Qty	Part Number	Description
01	1	AAHMW5209M0M	20 Valve Add-A-Fold with End Plates
02	3	PSM31MAPN7N7N7N7	4 Valve Simple Manifold Slice
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Component Level

Item	Qty	Part Number	Description
01	1	PSMM55AP	Isysnet, with Valve Driver Module and Bus Extension Connector
02	12	HMNVX2049A	Double Solenoid, Dual 3/2, NC/NC
03	3	PSM21MAP	Manifold, Side Ported, Double Address
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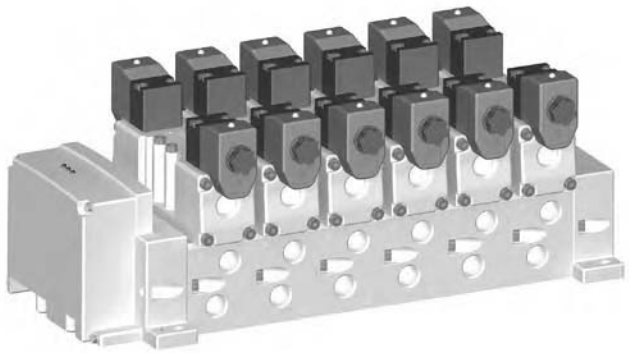

6 Double Solenoid Valves

Add-A-Fold

Manifold is factory assembled and tested for pneumatic leaks and electrical continuity.

Item	Qty	Part Number	Description
01	1	AAH1X006	Isys ISO Size 1 Add-A-Fold with End Plates
02	6	H12VXBG0B9C	Isys ISO Size 1 Double Solenoid, 2-Position Valve
03	6	PS401155MCP	Isys ISO Size 1 Manifold, Side Ported, Double Address

Additional Components

Part Number	Description
PSSCDM12A	Isysnet Devicenet Communication
PSSN8M12A	8 Digital Input, 24VDC, M12 Connectors
PSSVEXT1	Isys Micro Bus Extender Cable
PSSSE24A	24VDC Power Extender Module

See Isysnet section of catalog for more information.

Component Level

Item	Qty	Part Number	Description
01	1	PS4020L60CP	Isys ISO Size 1 Isysnet End Plate
02	6	H12VXBG0B9C	Isys ISO Size 1 Double Solenoid, 2-Position Vavle
03	6	PS401155MCP	Isys ISO Size 1 Manifold, Side Ported, Double Address

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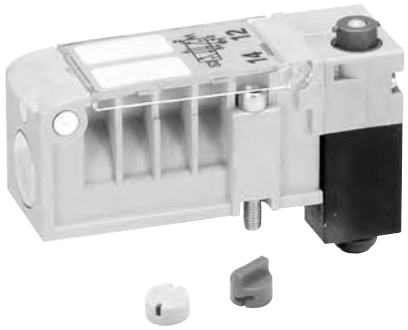
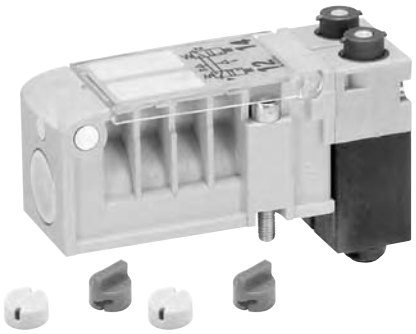
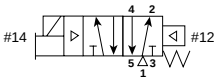
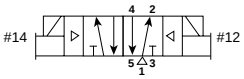
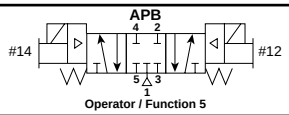
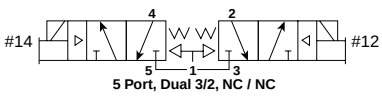
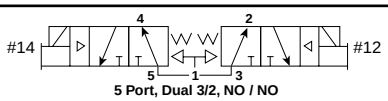
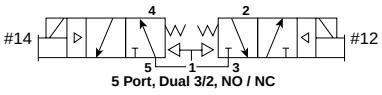
HM Series Single Solenoid



HM Series Double Solenoid



	**HMEVX2049A**	Single Solenoid, 2-Position, Air Return, Spring Assist
	**HM2VX2049A**	Double Solenoid, 2-Position
	**HM5VX2049A**	Double Solenoid, 3-Position, APB
	**HMNVX2049A**	Double Solenoid, Dual 3/2, NC/NC
	**HMPVX2049A**	Double Solenoid, Dual 3/2, NO/NO
	**HMQVX2049A**	Double Solenoid, Dual 3/2, 14 End NO, 12 End NC

- All valves ship with multi functional overrides. Standard valve configuration is non-locking manual override. Each solenoid can be configured for locking override or no override with the included manual override caps.
- All valve options include an LED, which is built into the manifold.
- All valve options pull pilot pressure from the manifold. The manifold assembly can be configured for internal or external pilot on the end plate.

Blanking Plate Kits

Kit Number
HMBVX00XXA

Kit includes: Blanking Plugs, Gasket, and Mounting Screws.

Blanking Plugs must be inserted into the 2 and 4 ports of the manifold corresponding to the Blanking Plate.

Intermediate Air Supply Base

Kit Number
HMCVX00XXA

Kit includes: Gasket and Mounting Screws.
Fittings (Not Included) must be inserted into the 2 and 4 ports of the manifold corresponding to the intermediate air supply. Auxiliary pressure should be supplied through these fittings, which will directly feed the #1 pressure galley.

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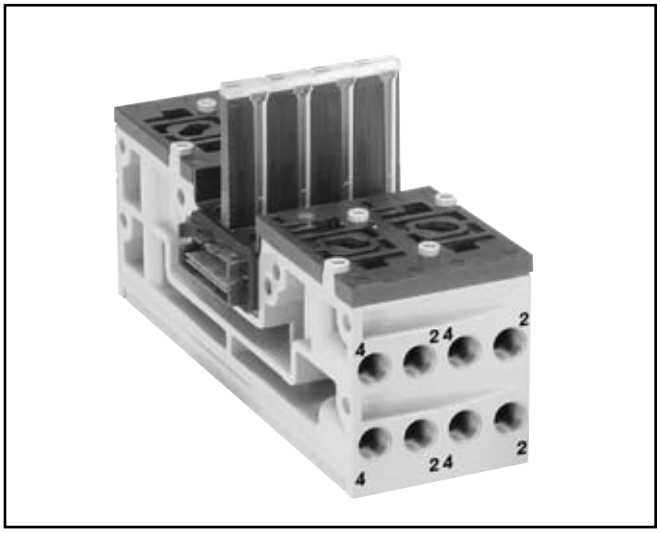
Each manifold holds 4 Isys Micro Valves. Double address circuit boards contain outputs for 8 solenoids, and can be used with any valve. When a single solenoid valve is used, one address is not used but is still present on the manifold. Single address circuit boards contain outputs for 4 solenoids. Only single solenoid valves can be used.

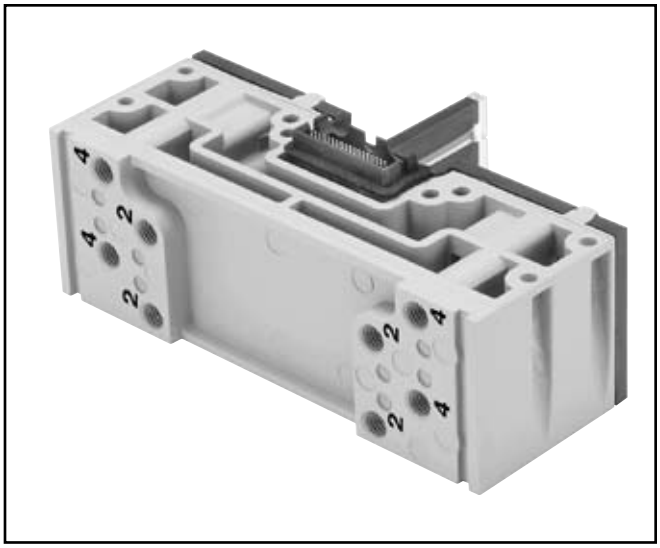
Side Ported, Plug-in Manifold Kits

Kit Number	Description
PSM21JAP	Circuit Board, Single Address
PSM21MAP	Circuit Board, Double Address



Bottom Ported, Plug-in Manifold Kits

Kit Number	Description
PSM22JAP	Circuit Board, Single Address
PSM22MAP	Circuit Board, Double Address

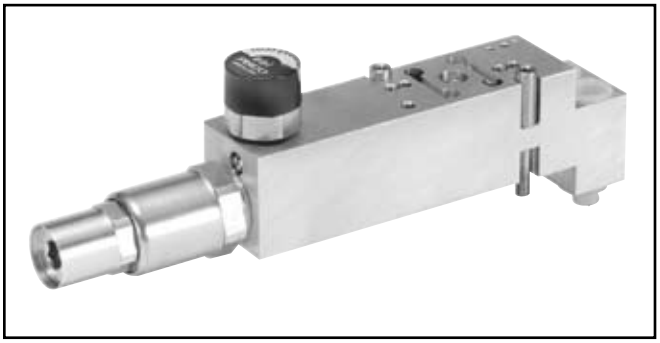


Sandwich Regulator

Kit Number	Description
PSMRAX6AP	Common Port Regulator, 5 to 125 PSI with Gauge

Note: Cv values are reduced when using a sandwich regulator to 0.20 for 2-Position and Dual 3/2 valves, and 0.17 for 3-Position APB valves.

Note: The sandwich regulator passes full pilot pressure from the manifold, allowing the regulated pressure to adjusted down to 5 PSI without affecting valve functionality.



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Plug-in End Plate Kits

BOLD OPTIONS ARE MOST POPULAR.

PSM L2 1 A P

Basic Series	
Isys Micro End Plate Kits	PSM

Engineering Level	
A	Current

End Plate Options	
25-Pin, D-Sub	**L2**
Isysnet with Valve Driver Module	**L6**
Isysnet with Valve Driver Module and Bus Extension Connector	**M5**
Isysnet with Valve Driver Module and 24VDC Connector	**M6**
Isysnet with Valve Driver Module, Bus Extension Connector and 24VDC Connector	**M7**
Moduflex 16 Outputs	**M4**

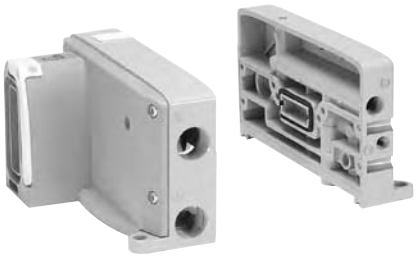
	Port Size / Thread Type, Base Style
1	**BSPP, Side Port, Internal Pilot**
2	**BSPP, Bottom Port, Internal Pilot**
3	BSPP, Side Port, External Pilot
4	BSPP, Bottom Port, External Pilot
5	**NPT, Side Port, Internal Pilot**
6	**NPT, Bottom Port, Internal Pilot**
7	NPT, Side Port, External Pilot
8	NPT, Bottom Port, External Pilot

All End Plate Options can be converted to either internal or external pilot. See Technical Section.

Isysnet and Moduflex communication modules must be ordered separately.

L2: **25-Pin, D-Sub End Plates**

L6: **Isysnet Fieldbus End Plates**



M4: **Moduflex Fieldbus End Plates**

M5: **Isysnet Fieldbus with Bus Extension End Plates**

M7: **Isysnet Fieldbus with Bus Extension & 24VDC Connector End Plates**

M6: **Isysnet Fieldbus with 24VDC Connector End Plates**

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Simple Manifold Assemblies

Includes a valve manifold with 4 valves and fittings installed. End Plates must be ordered separately.

BOLD OPTIONS ARE MOST POPULAR.

	A		B		C		D	
	9	10	11	12	13	14	15	16
PSM3 1 M A P	N	7	N	7	N	7	N	7

Base Style	
4-Station Manifold with Valve and / or Fitting	PSM3

Mounting Style	
Side Ported	1
Bottom Ported	2

Enclosure / Lead Length	
Single Address Circuit Board	J
Double Address Circuit Board	M

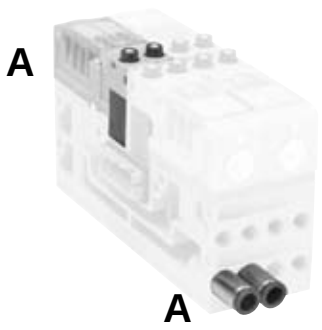
Engineering Level	
Current	A

10, 12, 14, 16	Fitting
0	Without Fitting
4	Straight Fitting for 5/32 Inch or 4mm OD Tube
6	Straight Fitting for 6mm OD Tube
7	Straight Fitting for 1/4 Inch OD Tube
P	Plug for Blanking Module

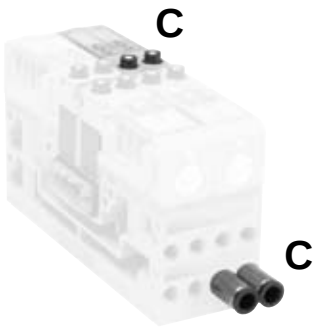
9, 11, 13, 15	Valve Type
N*	Double Solenoid, Dual 3/2, NC/NC
P*	Double Solenoid, Dual 3/2, NO/NO
Q*	Double Solenoid, Dual 3/2, 14 End NO - 12 End NC
X	No Valve
E	Single Solenoid, 2-Position - Air Return, Spring Assist
2*	Double Solenoid, 2-Position
5*	Double Solenoid, 3-Position - APB
B**	Blanking Module
C	Intermediate Air Supply Module

* Requires Double Address Circuit Board, Enclosure "M".

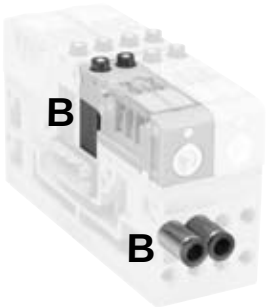
** Requires Fitting "P".



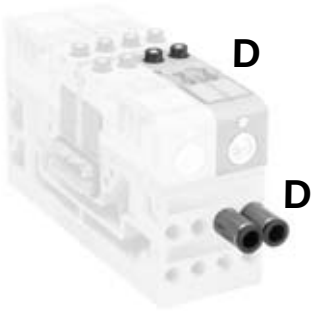
Valve Position A - Character 9
Fitting Position A - Character 10



Valve Position C - Character 13
Fitting Position C - Character 14



Valve Position B - Character 11
Fitting Position B - Character 12



Valve Position D - Character 15
Fitting Position D - Character 16

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How To Order Plug-in Add-A-Fold Assemblies

1. List Add-A-Fold Assembly call out. This automatically includes the end plate kit assembly.
2. List Simple Manifold Assemblies. List left to right, LOOKING AT THE CYLINDER PORTS on the manifold.

Maximum Number of Solenoids (Maximum Energized Simultaneously)

	25-Pin D-Sub	Moduflex	Isysnet*
24VDC	24 (24)	16 (16)	32 (32)

*Maximum of 32 solenoids per manifold. With Bus Extension functionality, 4 manifolds with up to 32 solenoids each can be connected on the same network.

Add-A-Fold Assembly Model Number

AAHM D 3 24 0 0 0 0

Valve Series	
Isys Micro Add-A-Fold	AAHM

End Plate Option	
25-Pin, D-Sub - 24 Outputs	D
Isysnet with Valve Drive Module - 32 Outputs	Y
Isysnet with Valve Drive Module and Bus Extension Connector - 32 Outputs	W
Isysnet with Valve Drive Module and 24VDC Connector - 32 Outputs	X
Isysnet with Valve Drive Module and Bus Extension and 24VDC Connector - 32 Outputs	Z
Moduflex - 16 Outputs	T

Isysnet and Moduflex communication modules must be ordered separately.

	End Plate Type	
BSPP Threads	BSPP Side Port, Internal Pilot	1
	BSPP Bottom Port, Internal Pilot	2
	BSPP Side Port, External Pilot	3
	BSPP Bottom Port, External Pilot	4
NPT Threads	NPT Side Port, Internal Pilot	5
	NPT Bottom Port, Internal Pilot	6
	NPT Side Port, External Pilot	7
	NPT Bottom Port, External Pilot	8

Number of Stations	
4 Valve Manifold	04
8 Valve Manifold	08
12 Valve Manifold	12
16 Valve Manifold	16
20 Valve Manifold	20
24 Valve Manifold	24
28 Valve Manifold	28
32 Valve Manifold	32

3/8" Inlet Port on End Plate		
0	Without Fitting	
8	Straight Fitting for 8mm OD Tube	*BSPP Threads*
A	Straight Fitting for 10mm OD Tube	
7	Straight Fitting for 1/4 Inch OD Tube	*NPT Threads*
9	Straight Fitting for 3/8 Inch OD Tube	

3/8" Exhaust on End Plate		
0	Without Fitting	
M	Muffler	
8	Straight Fitting for 8mm OD Tube	*BSPP Threads*
A	Straight Fitting for 10mm OD Tube	
7	Straight Fitting for 1/4 Inch OD Tube	*NPT Threads*
9	Straight Fitting for 3/8 Inch OD Tube	

M7 Pilot Port on End Plate		
	Internal Pilot End Plate	
0	With Standard Plug	
	External Pilot End Plate	
0	Without Fitting	
4	Straight Fitting for 4mm OD Tube	*BSPP Threads*
6	Straight Fitting for 6mm OD Tube	
4	Straight Fitting for 5/32 Inch OD Tube	*NPT Threads*
7	Straight Fitting for 1/4 Inch OD Tube	

Pilot Exhaust on End Plate		
0	Without Fitting	
M	Muffler	
4	Straight Fitting for 4mm OD Tube	*BSPP Threads*
6	Straight Fitting for 6mm OD Tube	
4	Straight Fitting for 5/32 Inch OD Tube	*NPT Threads*
7	Straight Fitting for 1/4 Inch OD Tube	

Note:
BSPP fittings can only be used with BSPP Manifolds.

NPT fittings can only be used with NPT Manifolds.

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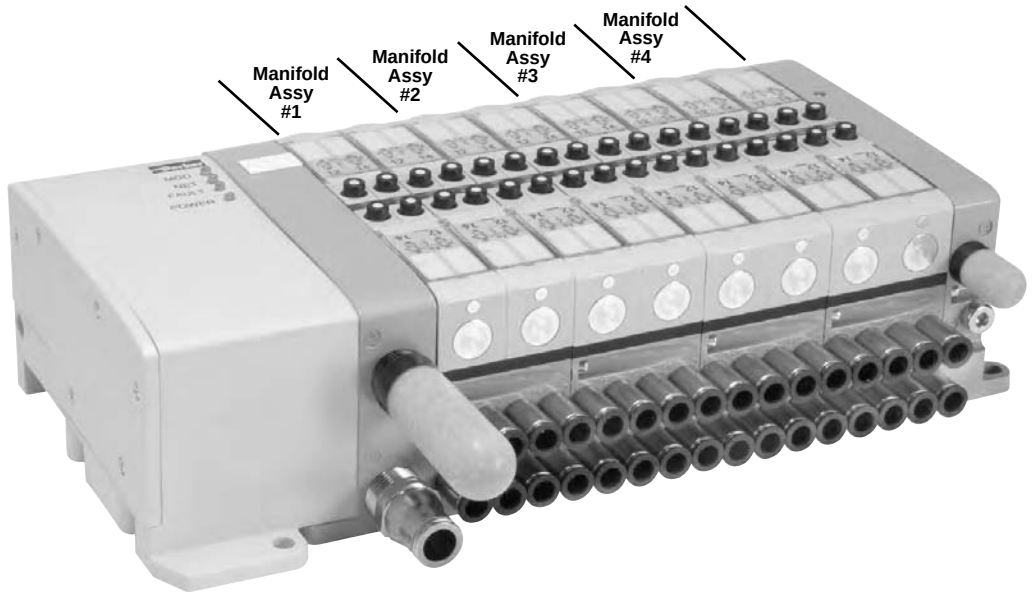

Example:
16-Station Manifold Isysnet and Valve Driver Module

Collective Wiring System

16 Dual 3/2 Valves, Normally Closed Orientation
1/4" Tube Fittings for all Valves
Side Ported Manifolds, Internally Piloted
3/8" Tube Fitting for Inlet
Muffler on Exhaust Ports

Add-A-Fold Example

Item	Qty.	Part No.	Location
01	1	AAHMY5169M0M	End Plates and Assembly
02	4	PSM31MAPN7N7N7N7	Manifold 1 thru 4, Valves 1 thru 16

NOTE: Construct manifold assemblies from left to right while looking at the ports.

Component Level

Item	Qty	Part Number	Location
01	1	PSML65AP	Isysnet End Plate
02	16	HMNVX2049A	Valves 1 thru 16
03	4	PSM21MAP	Manifold 1 thru 4
04	40	PS567925	1/4" Tube Fittings (In box Quantity)
05	10	PS568338	3/8" Tube Fittings (In box Quantity)
06	1	P6M-PAB3	3/8" Muffler
07	1	P6M-PAB1	1/8" Muffler

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Intermediate Air Supply and Manifold Isolation Gaskets

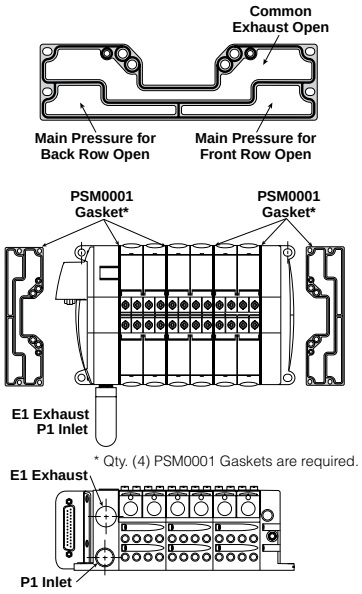
- Run Multiple Pressure Zones in the Same Manifold
- Block Supply Ports, Exhaust Ports or Both
- Intermediate Air Supplies can be placed anywhere within the pressure zone.

NOTE: Internal pilot pressure is supplied to the entire manifold from the right hand end plate, where the main pressure for the front row of valves is connected to the pilot pressure galley. See Technical Section for more information.

Multiple Pressure Zones

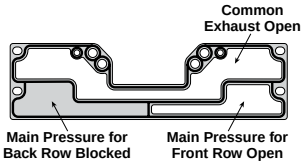
PSM0001 –

All Ports Open. Common Pressure for Front and Rear Manifold.
Common Exhausts.
Standard gasket included with each Manifold and End Plate

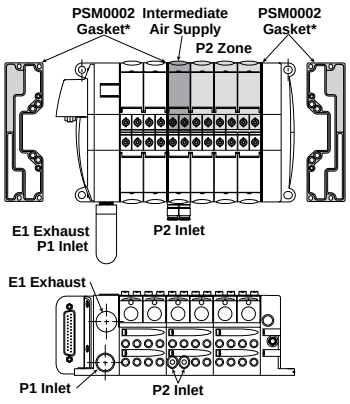


PSM0002 –

Rear Manifold Blocked for Separate Pressure Supply.
Common Exhausts.

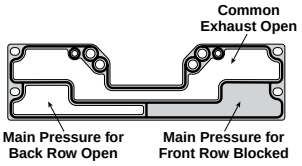


Internal Pilot Pressure from P1 Inlet

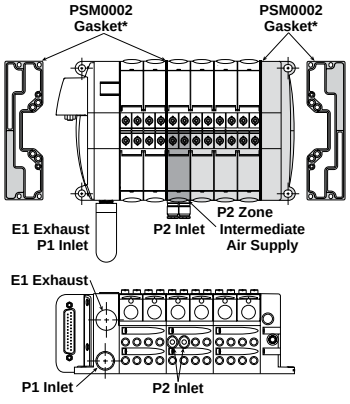


* Qty. (2) PSM0002 Gaskets are required.
Remainder are PSM0001 Gaskets (Not shown)

Front Manifold Blocked for Separate Pressure Supply.
Common Exhausts.



Internal Pilot Pressure from P2 Inlet



* Qty. (2) PSM0002 Gaskets are required.
Remainder are PSM0001 Gaskets (Not shown)

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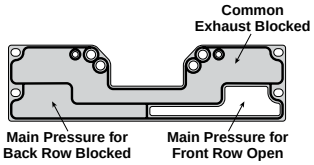
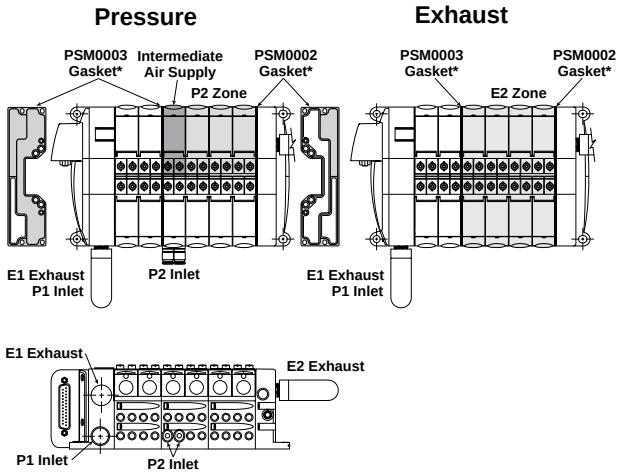
PSM0003 –

Rear Manifold Blocked for Separate Pressure Supply.
Exhaust Blocked Also.

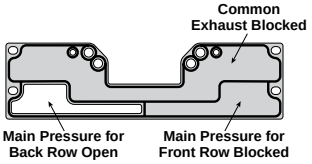


Internal Pilot Pressure from P1 Inlet

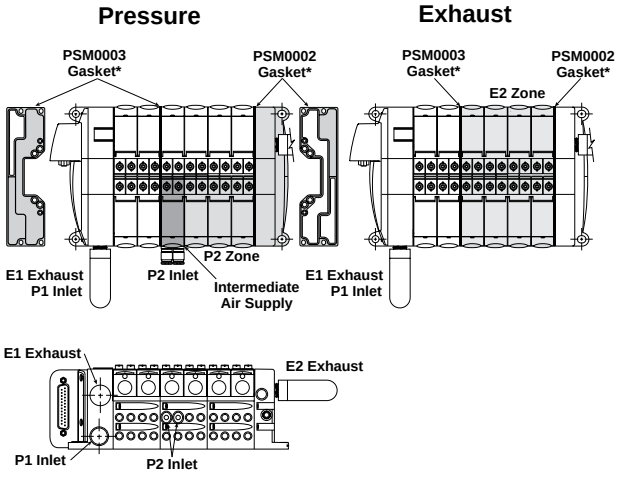


* Qty. (1) PSM0003 and Qty. (1) PSM0002 Gaskets are required.
Remainder are PSM0001 Gaskets (Not shown)

Front Manifold Blocked for Separate Pressure Supply.
Exhaust Blocked Also.



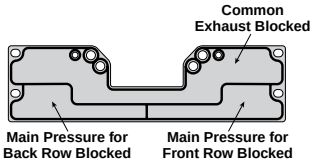
Internal Pilot Pressure from P2 Inlet



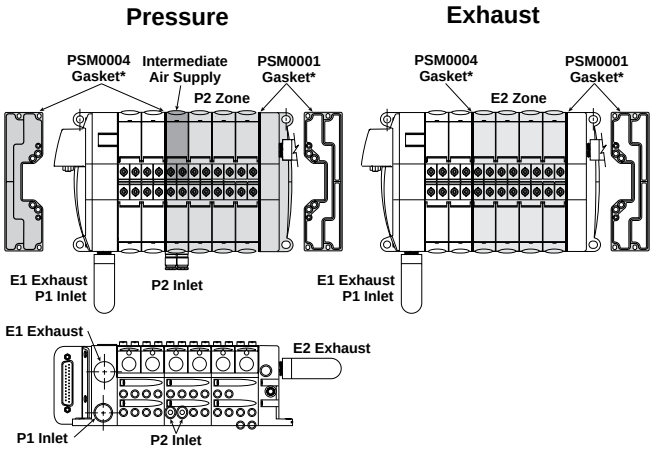
* Qty. (1) PSM0003 and Qty. (1) PSM0002 Gaskets are required.
Remainder are PSM0001 Gaskets (Not shown)

PSM0004 –

All Galleys Blocked.
Two Pressure Zones and Two Exhaust Zones.

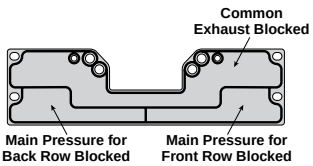


Internal Pilot Pressure from P2 Inlet

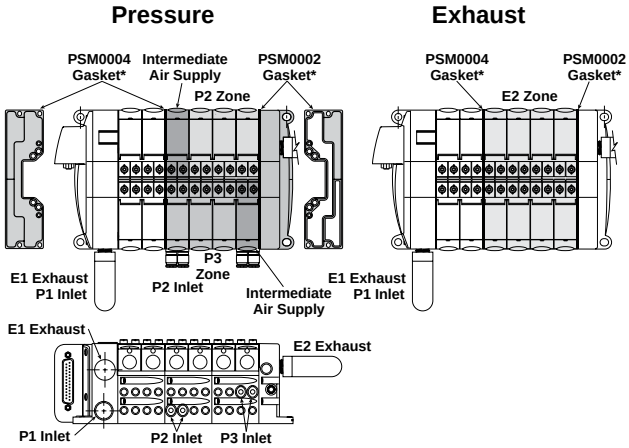


* Qty. (1) PSM0004 Gasket is required.
Remainder are PSM0001 Gaskets (Not shown)

All Galleys Blocked.
Three Pressure Zones and Two Exhaust Zones.



Internal Pilot Pressure from P3 Inlet



* Qty. (1) PSM0004 and Qty. (1) PSM0002 Gaskets are required.
Remainder are PSM0001 Gaskets (Not shown)

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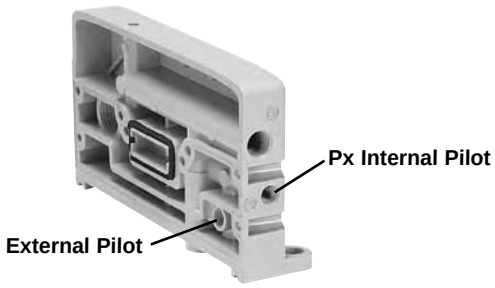
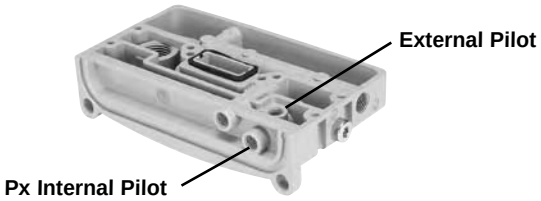
Pilot Configuration

Manifolds can be configured for either internal or external pilot in the field. Side ported manifolds are configured for internal pilot when the M7 plug is located in the Px port on the front of the right hand end plate. Moving this plug to the inside of the right hand end plate and replacing it with a fitting allows an external pilot to be used.



Bottom ported manifolds are configured for internal pilot when the M7 plug is located in the Px port on the bottom of the right hand end plate. Moving this plug to the inside of the right hand end plate and replacing it with a fitting allows an external pilot to be used.

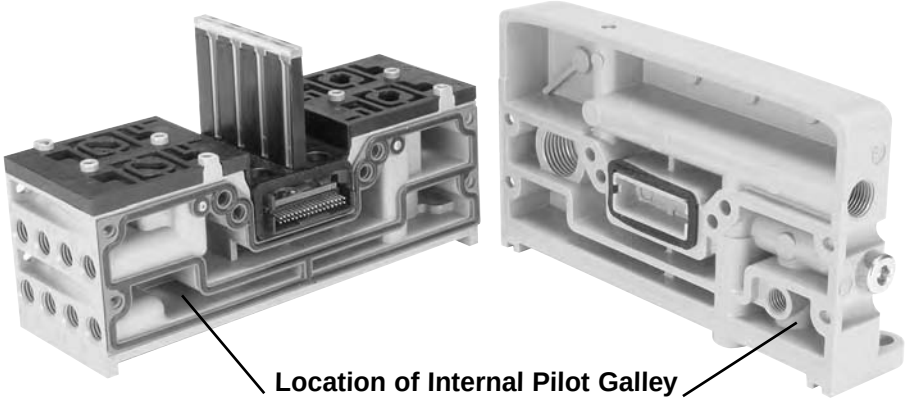


Pilot Pressure Requirements

Internal pilot pressure is supplied to the entire manifold from the right hand end plate, where the main pressure for the front row of valves is connected to the pilot pressure galley.

Maximum Pilot Pressure is 120 PSI. For applications requiring working pressures from 120 to 145 PSI, an External Pilot supply less than 120 PSI is required.

Valve Number	Minimum Pilot Pressure	Maximum Pilot Pressure
HMEVX2049A	40 PSI	120 PSI
HM2VX2049A	25 PSI	120 PSI
HM5VX2049A	45 PSI	120 PSI
HMNVX2049A	40 PSI	120 PSI
HMPVX2049A	40 PSI	120 PSI
HMQVX2049A	40 PSI	120 PSI



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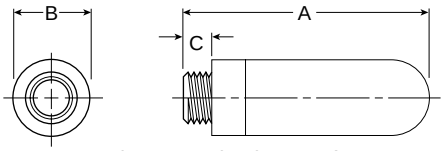
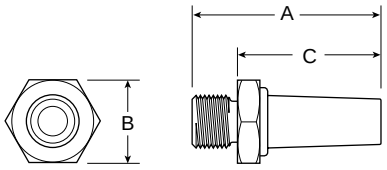
P6M-PAB3 **P6M-PAB1** **P0568800**

Mufflers

P6M-PAB1	1/8" Pilot Exhaust – BSPP or NPT
P6M-PAB3	3/8" Main Exhaust – BSPP or NPT
P0568800	M7 Bottom Port Pilot Exhaust
PS568800	Set of 10 M7 Bottom Port Pilot Exhaust

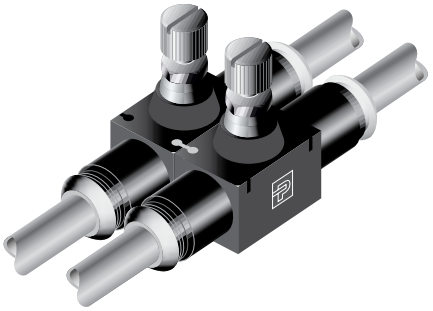


P6M-PAB1 & P6M-PAB3



P0568800

Port Thread	A	Diameter B	C	Weight (grams)	Part Number
1/8	1.14 (29)	0.55 (14)	0.24 (6)	0.02	**P6M-PAB1**
3/8	2.36 (60)	0.98 (25)	0.35 (9)	0.06	**P6M-PAB3**
M7 x 1	0.98 (25)	0.43 (11)	0.75 (19)	5	**P0568800**



Flow Controls

FC800-5/32	4mm to 4mm or 5/32" to 5/32" OD Tube
FC800-4	1/4" to 1/4" O.D. Tube

Fittings – Must be ordered in multiples of 10

	Kit Number	Thread	Tube O.D.
Manifold or Pilot Supply Ports – Straight			
	**PS567904**	M7	4mm or 5/32"
	PS567906	M7	6mm
	PS567925	M7	1/4"
Main Inlet or Exhaust Ports			
	**PS568325**	3/8" NPT	1/4"
	PS568338	3/8" NPT	3/8"
	PS568308	3/8" BSPP	8mm
	PS568310	3/8" BSPP	10mm
Pilot Exhaust Ports			
	**PS568215**	1/8" NPT	5/32"
	PS568225	1/8" NPT	1/4"
	PS568204	1/8" BSPP	4mm
	PS568206	1/8" BSPP	6mm

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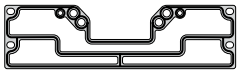
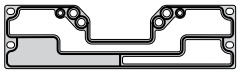
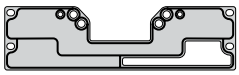
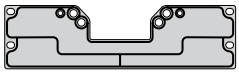
Manifold to Manifold Gaskets*

	**PSM0001**	All Galleys Passing
	**PSM0002**	Main Pressure to Rear or Front Valves Blocked, Exhaust Passing
	**PSM0003**	Main Pressure to Rear or Front Valves Blocked, Exhaust Blocked
	**PSM0004**	All Galleys Blocked

* Includes 1 Gasket

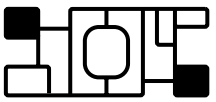
Replacement Solenoid Kit

	**PSM0010**	24VDC Solenoid Kit with Screws

Replacement Override Caps

	**PSM0011**	Set of 10 Manual Override Caps

Replacement Gaskets and Valve Screws

	**PSM0012**	Set of 5 Valve to Manifold Gaskets and 10 Screws

Replacement Plugs

	**PSM0013**	Set of 10 M7 Plugs (Part No. PS567900) for Auxiliary and Pilot Pressure Ports

Valve Labels*

PSM002E	Single Solenoid Diagram
PSM0022	Double Solenoid Diagram
PSM0025	Double Solenoid Diagram – APB
PSM002N	Double Solenoid Diagram – Dual 3/2 NC/NC
PSM002P	Double Solenoid Diagram – Dual 3/2 NO/NO
PSM002Q	Double Solenoid Diagram – Dual 3/2, 14 End NO, 12 End NC

*Includes 10 Labels.

Replacement Screws

	**PSM0014**	Set of 10 Manifold to Manifold M3 Screws

Replacement Regulator Gauge

	**P0566202**	5 to 125 PSI Gauge

Replacement Protective Cover

	**PS5706**	Protective Polyester Cover Set of 10

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Maximum Number of Solenoids
(Maximum Energized Simultaneously)

	25-Pin D-Sub	Moduflex	Isysnet*
24VDC	24 (24)	16 (16)	32 (32)

*Maximum of 32 solenoids per manifold. With Bus Extension functionality, 4 manifolds with up to 32 solenoids each can be connected on the same network.

Operating Pressure

Maximum: 145 PSIG (10 bar)

Minimum: Vacuum

Maximum and minimum values with external pilot pressure

Temperature Rating

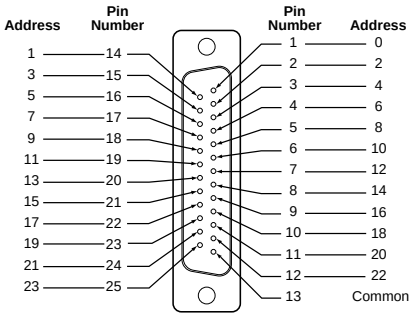
-15°C to 49°C (5°F to 120°F)

Pilot Pressure Requirements

Valve Number	Minimum Pilot Pressure	Maximum Pilot Pressure
HMEVX2049A	40 PSI	120 PSI
HM2VX2049A	25 PSI	120 PSI
HM5VX2049A	45 PSI	120 PSI
HMNVX2049A	40 PSI	120 PSI
HMPVX2049A	40 PSI	120 PSI
HMQVX2049A	40 PSI	120 PSI

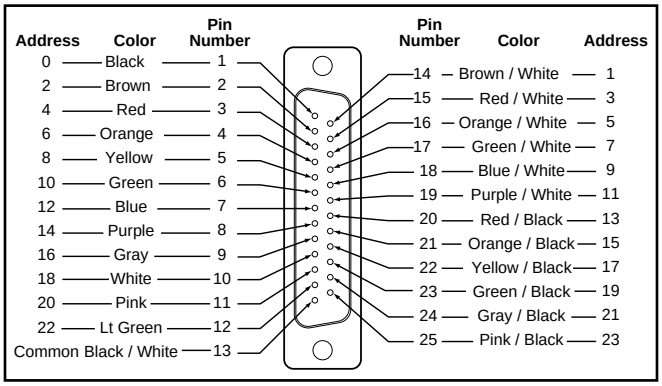
Vibration According to IEC 68-2-6	2G to 150Hz
Shock According to IEC-68-2-27	15G – 11ms
Rated Coil Voltage	24VDC / -15% / +10%
Power Consumption	1W (42mA) with LED
Duty Factor	100% at 20°C

25-Pin, D-Sub Connector (Male)



View into End Plate Connector - Male D-Sub, 25-Pin

25-Pin, D-Sub Cable (Female)



Part Number	Description	Length
P8LMH25M3A	25-Pin, D-Sub Cable, IP20	3 Meters
SCD259D	25-Pin, D-Sub Cable, IP20	9 Meters
SCD253W	25-Pin, D-Sub Cable, IP65	3 Meters
SCD259WE	25-Pin, D-Sub Cable, IP65	9 Meters

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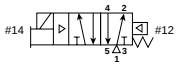
Single Solenoid



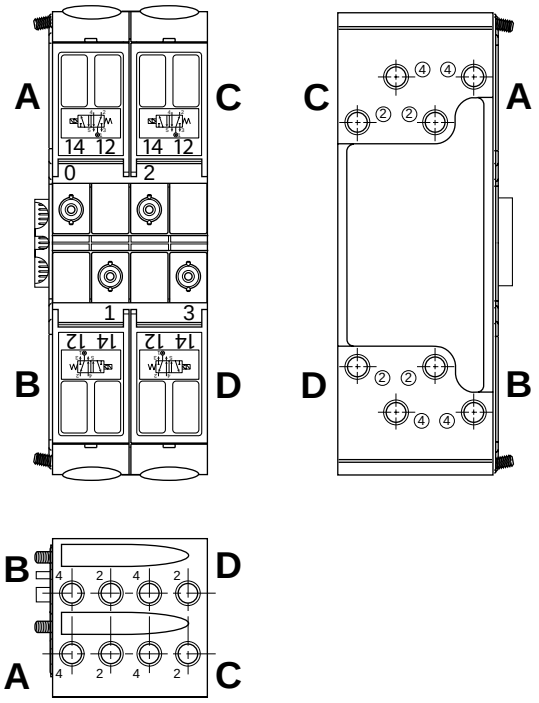
Single Pressure At Inlet Port 1:

De-energized position – Solenoid operator #14 de-energized. Pressure at inlet port 1 connected to outlet port 2. Outlet port 4 connected to exhaust port 5.

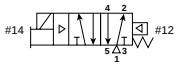
Energized position – Solenoid operator #14 energized. Pressure at inlet port 1 connected to outlet port 4. Outlet port 2 connected to exhaust port 3.

HMEVX2049A - Single Address Manifolds

Valve Position A		Valve Position C	
Output 0		Output 2	
On	Off	On	Off
1→4 3←2	1→2 5←4	1→4 3←2	1→2 5←4
Valve Position B		**Valve Position D**	
Output 1		Output 3	
On	Off	On	Off
1→4 3←2	1→2 5←4	1→4 3←2	1→2 5←4



Single Solenoid



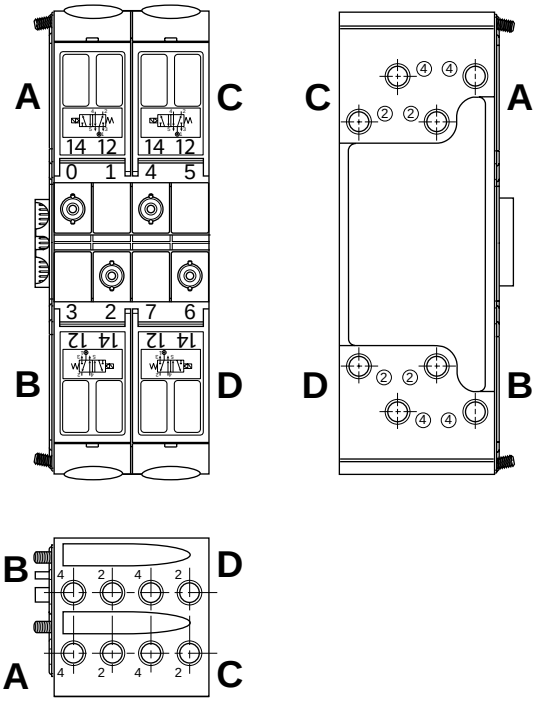
Single Pressure At Inlet Port 1:

De-energized position – Solenoid operator #14 de-energized. Pressure at inlet port 1 connected to outlet port 2. Outlet port 4 connected to exhaust port 5.

Energized position – Solenoid operator #14 energized. Pressure at inlet port 1 connected to outlet port 4. Outlet port 2 connected to exhaust port 3.

HMEVX2049A - Double Address Manifolds

Valve Position A				Valve Position C			
Output 0		Output 1		Output 4		Output 5	
On	Off	On	Off	On	Off	On	Off
1→4 3←2	1→2 5←4	Output Lost 1→2 5←4	 1→2 5←4	1→4 3←2	1→2 5←4	Output Lost 1→2 5←4	 1→2 5←4
Valve Position B				**Valve Position D**			
Output 3		Output 2		Output 7		Output 6	
On	Off	On	Off	On	Off	On	Off
Output Lost 1→2 5←4	 1→2 5←4	1→4 3←2	1→2 5←4	Output Lost 1→2 5←4	 1→2 5←4	1→4 3←2	1→2 5←4



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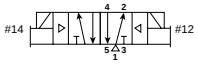
Double Solenoid



Single Pressure At Inlet Port 1:

Solenoid operator #14 energized last. Pressure at inlet port 1 connected to outlet port 4. Outlet port 2 connected to exhaust port 3.

Solenoid operator #12 energized last. Pressure at inlet port 1 connected to outlet port 2. Outlet port 4 connected to exhaust port 5.

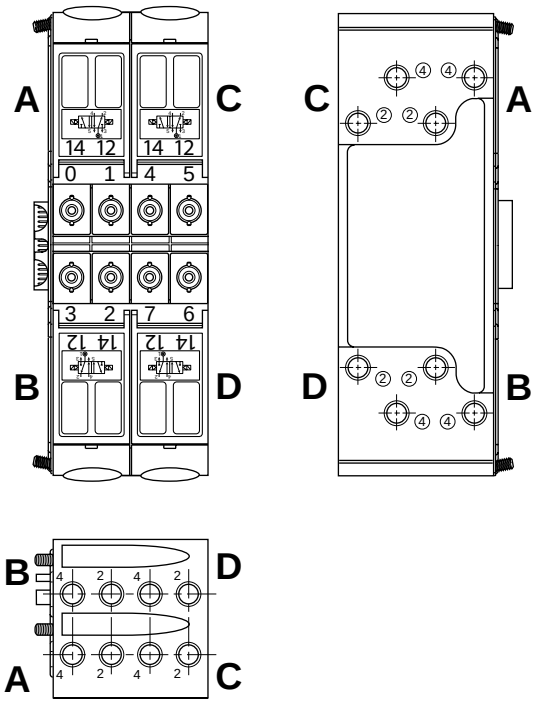
A 2-Position, Double Solenoid Valve is a detented valve. When the output is removed, the spool remains in its position.

HM2VX2049A - Double Address Manifolds - Last state #12 Energized

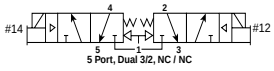
Valve Position A				Valve Position C			
Output 0		Output 1		Output 4		Output 5	
On	Off	On	Off	On	Off	On	Off
1→4 3←2	1→2 5←4	1→2 5←4	1→2 5←4	1→4 3←2	1→2 5←4	1→2 5←4	1→2 5←4
Valve Position B				Valve Position D			
Output 3		Output 2		Output 7		Output 6	
On	Off	On	Off	On	Off	On	Off
1→2 5←4	1→2 5←4	1→4 3←2	1→2 5←4	1→2 5←4	1→2 5←4	1→4 3←2	1→2 5←4

HM2VX2049A - Double Address Manifolds - Last state #14 Energized

Valve Position A				Valve Position C			
Output 0		Output 1		Output 4		Output 5	
On	Off	On	Off	On	Off	On	Off
1→4 3←2	1→4 3←2	1→2 5←4	1→4 3←2	1→4 3←2	1→4 3←2	1→2 5←4	1→4 3←2
Valve Position B				Valve Position D			
Output 3		Output 2		Output 7		Output 6	
On	Off	On	Off	On	Off	On	Off
1→2 5←4	1→4 3←2	1→4 3←2	1→4 3←2	1→2 5←4	1→4 3←2	1→4 3←2	1→4 3←2



Double Solenoid
Dual 3-Way, 2-Position
NC / NC (NNP)



With #14 & #12 operators both de-energized – pressure at inlet port 1 blocked, outlet port 4 connected to exhaust port 5, outlet port 2 connected to exhaust port 3.

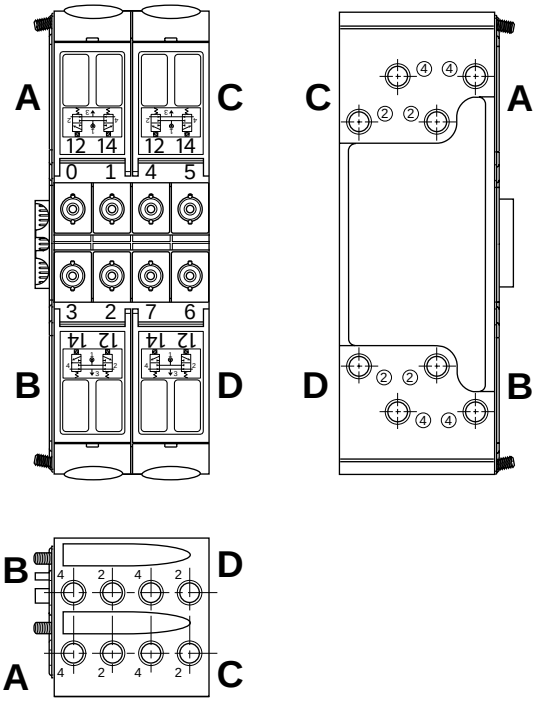
With #14 operator energized – pressure at inlet port 1 connected to outlet port 4, exhaust port 5 blocked, outlet port 2 connected to exhaust port 3.

With #12 operator energized – pressure at inlet port 1 connected to outlet port 2, exhaust port 3 blocked, outlet port 4 connected to exhaust port 5.

With #14 & #12 operators both energized – pressure at inlet port 1 connected to outlet ports 4 & 2, exhaust ports 3 & 5 blocked.

HMNVX2049A - Double Address Manifolds

Valve Position A				Valve Position C			
Output 0		Output 1		Output 4		Output 5	
On	Off	On	Off	On	Off	On	Off
1→2 3⊣	1⊣ 3←2	1→4 5⊣	1⊣ 5←4	1→2 3⊣	1⊣ 3←2	1→4 5⊣	1⊣ 5←4
Valve Position B				Valve Position D			
Output 3		Output 2		Output 7		Output 6	
On	Off	On	Off	On	Off	On	Off
1→4 5⊣	1⊣ 5←4	1→2 3⊣	1⊣ 3←2	1→4 5⊣	1⊣ 5←4	1→2 3⊣	1⊣ 3←2



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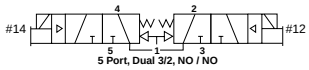
Dual 3-Way, 2-Position NO / NO (NP)

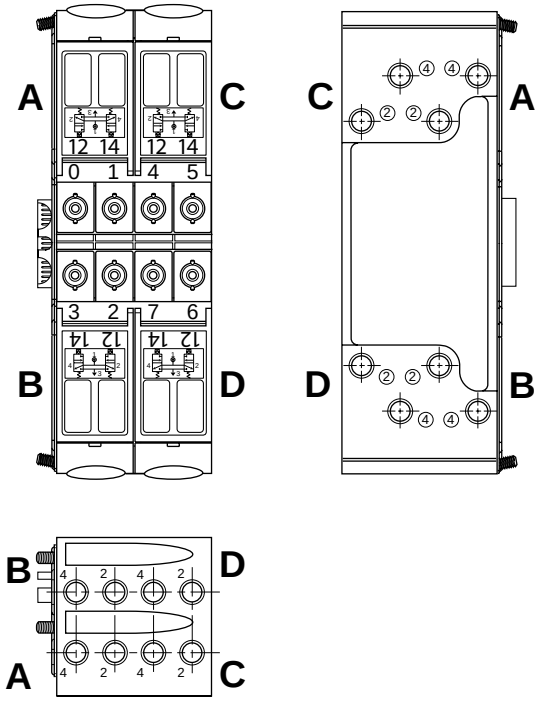


With #14 & #12 operators both de-energized – pressure at inlet port 1 connected to outlet ports 4 & 2, exhaust ports 3 & 5 blocked.

With #14 operator energized – pressure at inlet port 1 connected to outlet port 2, exhaust port 3 blocked, outlet port 4 connected to exhaust port 5.

With #12 operator energized – pressure at inlet port 1 connected to outlet port 4, exhaust port 5 blocked, outlet port 2 connected to exhaust port 3.

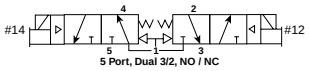
With #14 & #12 operators both energized – pressure at inlet port 1 blocked, outlet port 4 connected to exhaust port 5, outlet port 2 connected to exhaust port 3.



HMPVX2049A - Double Address Manifolds

Valve Position A				Valve Position C			
Output 0		Output 1		Output 4		Output 5	
On	Off	On	Off	On	Off	On	Off
1⊣ 3←2	1→2 3⊣	1⊣ 5←4	1→4 5⊣	1⊣ 3←2	1→2 3⊣	1⊣ 5←4	1→4 5⊣
Valve Position B				Valve Position D			
Output 3		Output 2		Output 7		Output 6	
On	Off	On	Off	On	Off	On	Off
1⊣ 5←4	1→4 5⊣	1⊣ 3←2	1→2 3⊣	1⊣ 5←4	1→4 5⊣	1⊣ 3←2	1→2 3⊣

Dual 3-Way, 2-Position 14 End NO / 12 End NC (NP / NNP)

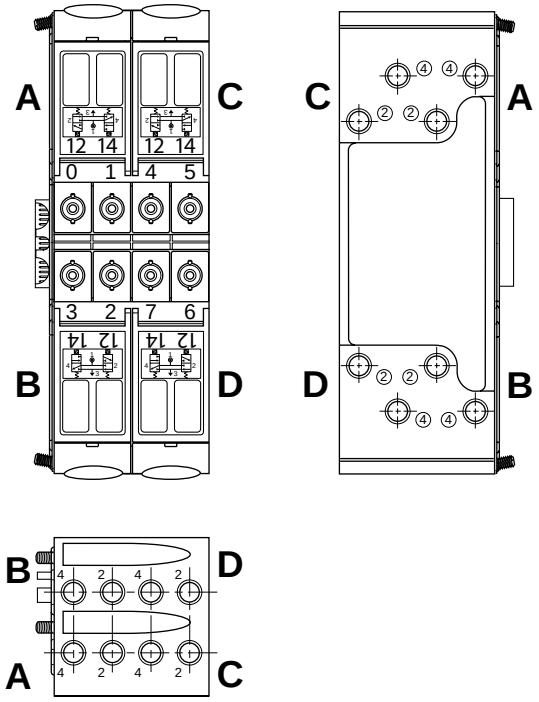


With #14 & #12 operators both de-energized – pressure at inlet port 1 connected to outlet port 4, exhaust port 5 blocked, outlet port 2 connected to exhaust port 3.

With #14 operator energized – pressure at inlet port 1 blocked, outlet port 4 connected to exhaust port 5, outlet port 2 connected to exhaust port 3.

With #12 operator energized – pressure at inlet port 1 connected to outlet ports 4 & 2, exhaust ports 3 & 5 blocked.

With #14 & #12 operators both energized – pressure at inlet port 1 connected to outlet port 2, exhaust port 3 blocked, outlet port 4 connected to exhaust port 5.



HMQVX2049A - Double Address Manifolds

Valve Position A				Valve Position C			
Output 0		Output 1		Output 4		Output 5	
On	Off	On	Off	On	Off	On	Off
1→2 3⊣	1⊣ 3←2	1⊣ 5←4	1→4 5⊣	1→2 3⊣	1⊣ 3←2	1⊣ 5←4	1→4 5⊣
Valve Position B				Valve Position D			
Output 3		Output 2		Output 7		Output 6	
On	Off	On	Off	On	Off	On	Off
1⊣ 5←4	1→4 5⊣	1→2 3⊣	1⊣ 3←2	1⊣ 5←4	1→4 5⊣	1→2 3⊣	1⊣ 3←2

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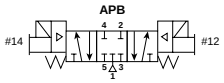
Double Solenoid 3-Position

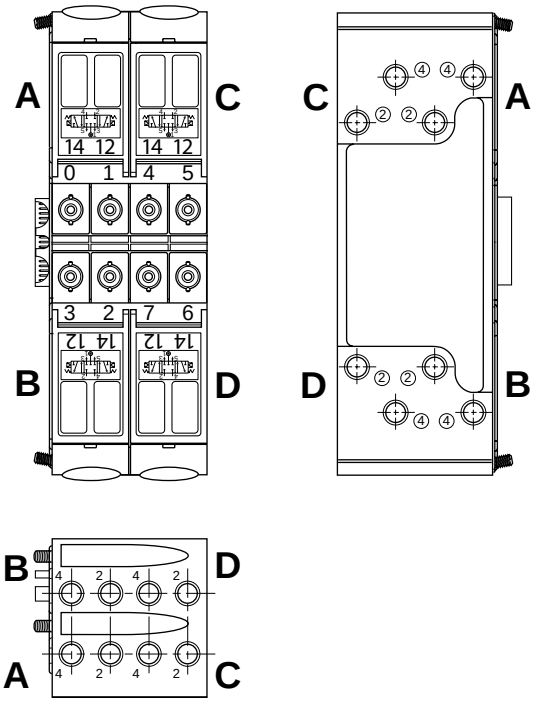


Function 5: All Ports Blocked

With #12 operator energized – inlet port 1 connected to cylinder port 2, cylinder port 4 connected to exhaust port 5.

With #14 operator energized – inlet port 1 connected to cylinder port 4, cylinder port 2 connected to exhaust port 3.

All ports blocked in the center position.



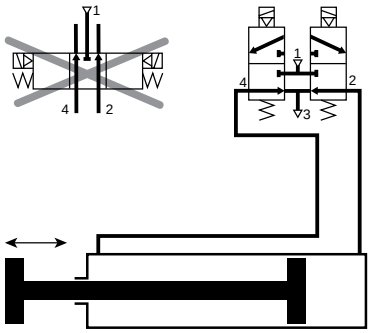
HM5VX2049A - Double Address Manifolds

Valve Position A			Valve Position C		
Output 0 On Output 1 Off	**Output 0 Off Output 1 On**	**Output 0 Off Output 1 Off**	**Output 4 On Output 5 Off**	**Output 4 Off Output 5 On**	**Output 4 Off Output 5 Off**
5⊣ 1→4 3←2	5←4 1→2 3⊣	3⊣ ⊢4 1⊣ ⊢2 5⊣	5⊣ 1→4 3←2	5←4 1→2 3⊣	3⊣ ⊢4 1⊣ ⊢2 5⊣
Valve Position B			**Valve Position D**		
Output 2 On Output 3 Off	**Output 2 Off Output 3 On**	**Output 2 Off Output 3 Off**	**Output 6 On Output 7 Off**	**Output 6 Off Output 7 On**	**Output 6 Off Output 7 Off**
5⊣ 1→4 3←2	5←4 1→2 3⊣	3⊣ ⊢4 1⊣ ⊢2 5⊣	5⊣ 1→4 3←2	5←4 1→2 3⊣	3⊣ ⊢4 1⊣ ⊢2 5⊣

Dual 3/2 Valves Replace 3-Position Valves for Better Performance

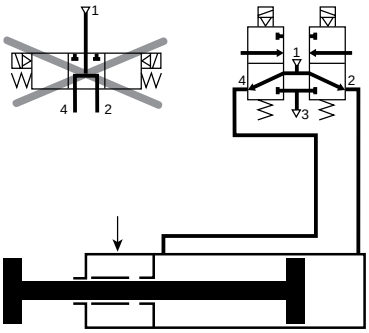
3-Position Center Exhaust

A traditional 5/3 center exhaust valve is now replaced by a double 3/2 NC+NC valve module. Both cylinder chambers are exhausted and rod and piston are free to move.



3-Position Pressure Center

A traditional 5/3 pressure center valve is now replaced by a double 3/2 NO+NO valve module. The function is identical.



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The Isysnet System

Isysnet has four major components:

- **Valve driver module** provide control for 32 solenoids on a manifold, with bus extension providing connectivity to 3 more manifolds
- **I/O modules** provide the field interface, system-interface circuitry, and bases for mounting
- **Communication interface modules** provide the network-interface circuitry
- **Power distribution module** provide the solution to expandability of the Isysnet system

Isysnet Features

- Highly modular design (4pt – 16pt modularity)
- Broad application coverage
- Channel-level diagnostics (LED and electronic)
- Channel-level alarm and annunciation (electronic)
- Channel-level open-wire detection with electronic feedback
- Channel-level short-circuit detection with electronic feedback
- Parameter-level explicit messaging
- Horizontal and vertical mounting without derating
- 5g vibration
- Flash upgradable adapters and digital I/O
- Electronic and mechanical keying
- Robust backplane design
- Quick-disconnects for I/O and network connectivity
- Built-in panel grounding
- Color-coded module labels
- UL, C-UL, and CE certifications (as marked)
- Highly reliable structural integrity
- Optical isolation between field and system circuits

Communications Module

Protocol	Part Number
Device**Net™**	**PSSCDM18PA** (M18) **or PSSCDM12A** (M12)
Control**Net**™	**PSSCCNA**
EtherNet I/P™	**PSSCENA**
Profibus-DP®	**PSSCPBA**

All Modules IP67 Certified
Reference the following Documents for Installation Instructions.
DeviceNet - E101P, PSS-UM001A; Control Net - E103P
Ethernet I/P - E104P; Profibus-DP - E102P
EDS and GSD files located at www.parker.com/pneu/Isysnet

PSSCENA **PSSCCNA**

Devicebus Terminating Resistor

DeviceNet M12 Type A	P8BPA00MA
Profibus-DP M12 Type B	P8BPA00MB

P8BPA00MA

Digital Inputs

I/O Modules	Part Number	Voltage
16 Digital Inputs M12 (NPN Sinking - Requires PNP Sourcing Input Device)	**PSSN16M12A**	10 to 28.8VDC
8 Digital Inputs M12 (NPN Sinking - Requires PNP Sourcing Input Device)	**PSSN8M12A**	10 to 28.8VDC
8 Digital Inputs M12 (PNP Sourcing - Requires NPN Sinking Input Device)	**PSSP8M12A**	10 to 28.8VDC
8 Digital Inputs M8 (NPN Sinking - Requires PNP Sourcing Input Device)	**PSSN8M8A**	10 to 28.8VDC
8 Digital Inputs M8 (PNP Sourcing - Requires NPN Sinking Input Device)	**PSSP8M8A**	10 to 28.8VDC
8 Digital Inputs M23 12-Pin (PNP Sourcing - Requires NPN Sinking Input Device)	**PSSP8M23A**	10 to 28.8VDC
8 Digital Inputs M23 12-Pin (NPN Sinking - Requires PNP Sourcing Input Device)	**PSSN8M23A**	10 to 28.8VDC

All Modules IP67 Certified
Reference E106P Documents for Installation Instructions.
See www.parker.com/pneu/Isysnet

PSSN16M12A

PSSN8M8A

PSSP8M23A

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Digital Outputs

I/O Modules	Part Number	Voltage
+ 16 Digital Outputs M23 (PNP Sourcing)	**PSST16M23A**	10 to 28.8VDC
+ 16 Digital Outputs 25-Pin, D-Sub (PNP Sourcing)	**PSST16D25A**	10 to 28.8VDC
+ 16 Digital Outputs M12 (PNP Sourcing)	**PSST16M12A**	10 to 28.8VDC
+ 8 Digital Outputs M12 (PNP Sourcing)	**PSST8M12A**	10 to 28.8VDC
+ 8 Digital Outputs M8 (PNP Sourcing)	**PSST8M8A**	10 to 28.8VDC
§ 4 Digital Output, High Watt Relay M12 (PNP Sourcing) (2 Amp)	**PSSTR4M12A**	24VDC
+ 8 Digital Outputs M23 (PNP Sourcing)	**PSST8M23A**	10 to 28.8VDC

All Modules IP67 Certified
Reference the following Documents for Installation Instructions.
+ E107P
§ E109P
See www.parker.com/pneu/Isysnet

PSST16D25A

PSST16M12A

PSST8M12A

Analog Inputs

I/O Modules	Part Number	Voltage
‡ 2 Analog Inputs Voltage (M12)	**PSSNAVM12A**	0 to 10V ± 10V
‡ 2 Analog Inputs Current (M12)	**PSSNACM12A**	4 to 20mA or 0 to 20mA

All Modules IP67 Certified
Reference the following Documents for Installation Instructions.
‡ E110P
See www.parker.com/pneu/Isysnet

PSSNACM12A

Analog Outputs

I/O Modules	Part Number	Voltage
** 2 Analog Outputs Voltage (M12)	**PSSTAVM12A**	0 to 10V ± 10V
** 2 Analog Outputs Current (M12)	**PSSTACM12A**	4 to 20mA or 0 to 20mA

All Modules IP67 Certified
Reference the following Documents for Installation Instructions.
**E111P
See www.parker.com/pneu/Isysnet

PSSTACM12A

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Terminating Base Module

Extender Module	Part Number
Termination Base for Stand Alone Units	**PSSTERM**

Used as the last Terminating Module for a Stand Alone Isysnet Assembly.

PSSTERM

Power Extender Module

Extender Module	Part Number
24VDC Field Power Module	**PSSSE24A**

A Power Extender Module must be used on every 14th Module in an Isysnet assembly. See www.parker.com/pneu/Isysnet

Reference Document E105P and PSS-SG001 for configuration instructions. See www.parker.com/pneu/Isysnet

PSSSE24A

Bus Extender Cable

1 Meter Cable*	PSSEXT1	24VDC
3 Meter Cable*	PSSEXT3	24VDC

* Requires a PSSSE24 Power Extender Module

IP67 Certified

Reference the following Documents for Installation Instructions.
E117P

See www.parker.com/pneu/Isysnet

PSSEXT1

Isys Micro Bus Extender Cable

1 Meter Cable*	PSSVEXT1	24VDC

IP67 Certified

PSSVEXT1

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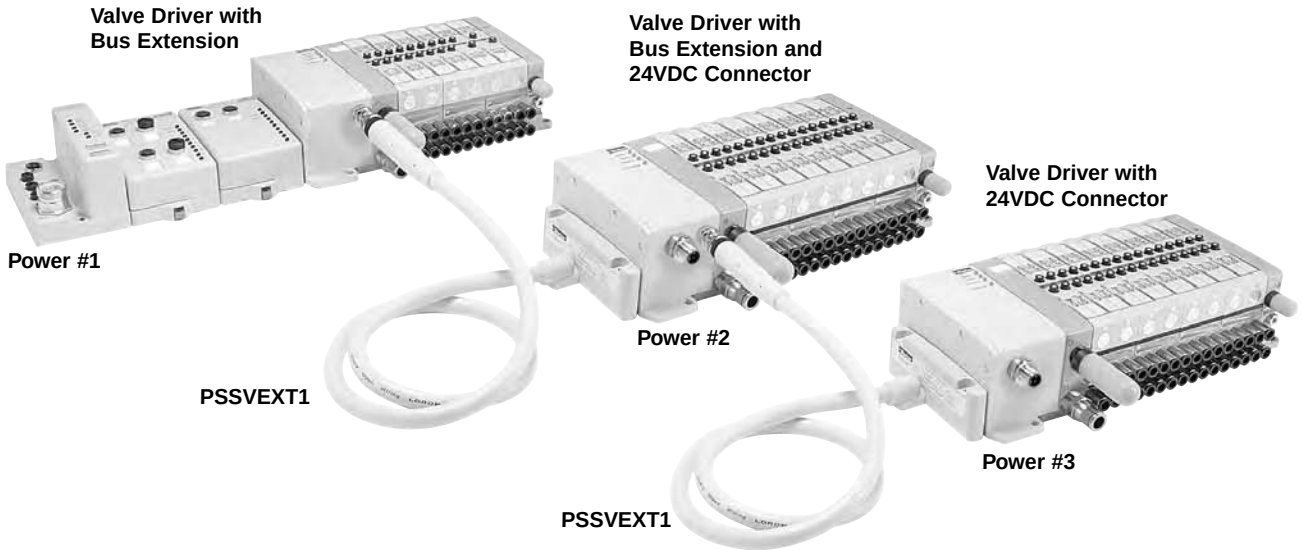
Using Bus Extender Cables

Example #1:
Isys Micro with Standard Bus Extender Cable

- Separate the communication module and a portion of the I/O from other I/O and the valve manifold.
- Commonly used when overall length is restricted.
- PSSSE24A is needed on the extension. No 24VDC connector needed on the Isysnet end plate.

Example #2:
Isys Micro with Bus Extension on Valve Driver Module – No additional I/O at the Extension

- Add up to three additional valve manifolds without adding another communication module.
- No PSSSE24A is needed on the Extension when the Valve Driver Module with 24VDC Connector is used.
- Commonly used when many valves are required.



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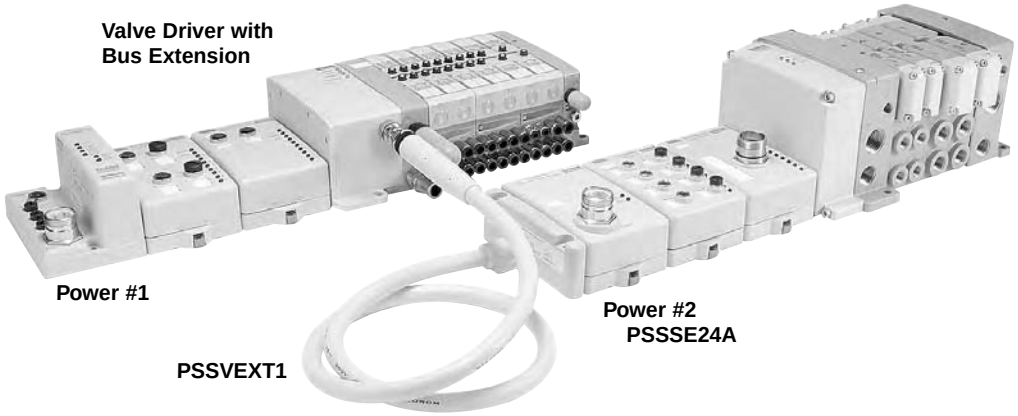
Using Bus Extender Cables

Example #3:
Isys Micro with Bus Extension on Valve Driver – With I/O at Extension

- Add up to three additional valve manifolds without adding another communication module.
- PSSSE24A is needed on the Extension. No 24VDC Connector needed on the Isysnet end plate.
- Commonly used when many valves are required, and each location requires additional I/O.

Example #4:
Isys Micro with Bus Extension on Valve Driver Module – With I/O at the Extension and larger Isys ISO Valve Manifold

- Add up to two additional Isys Micro valve manifolds and one Isys ISO valve manifold without adding another communication module.
- PSSSE24A is needed on the Extension.
- Isys ISO valve manifold must be the last manifold on the Extension
- Commonly used when many valves are required, and each location requires additional I/O.



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Specifying an Isysnet System

Follow these steps as you specify your Isysnet system:

Step		
1	**Select a Communication Interface Module** Choose the interface module for your operating system.	Selecting a Network Selecting the DeviceNet Communication Interface
2	**Select I/O Devices Based on Field Devices** Location of the device Number of Isysnet modules needed Number of I/O available per module Number of modules	 Digital I/O Modules Analog I/O Modules Valve Driver Module
3	**Select Optional Power Component** Choose optional component to extend backplane power	Expansion Power Unit Typical Configurations
4	**Select Accessories**	Cables and Cordsets
5	**Placing Isysnet Modules** Determine necessary dimensions based on the communication interface chosen.	Placing Isysnet Modules Mounting the Isysnet System

Step 1

Select a Communication Interface Module

Selecting Isysnet Communication Interfaces

Rockwell Automation NetLinx Architecture

Separate communication interface adapters are available for different networks. Install adapters into the PointBus backplane to allow Isysnet modules to communicate with a controller.

NetLinx open network architecture is the Rockwell Automation strategy of using open networking technology for seamless, top-floor to shop-floor integration. The networks in the NetLinx architecture, DeviceNet, ControlNet, and EtherNet/IP, speak a common language and share a universal set of communication services. NetLinx architecture, part of the Integrated Architecture, seamlessly integrates all the components in an automation system from a few devices on one network to multiple devices on multiple networks including access to the Internet, helping you to improve flexibility, reduce installation costs, and increase productivity.

Communication Considerations

Isysnet features are impacted by your network choice.

Network	Impact
DeviceNet PSSCDM12A and PSSCDM18PA	DeviceNet offers high-speed access to plant-floor data from a broad range of plant-floor devices and a significant reduction in wiring. The PSSCDM12A and PSSCDM18PA provide two means of connecting a node of I/O to DeviceNet. A total of 63 Isysnet modules can be assembled on a single DeviceNet node.
ControlNet™ PSSCCNA	ControlNet allows intelligent, high-speed control devices to share the information required for supervisory control, work-cell coordination, operator interface, remote device configuration, programming, and troubleshooting. A total of 63 Isysnet modules can be assembled on a single ControlNet node. Up to 25 direct connections and 5 rack connections are allowed.
EtherNet/IP™ PSSCENA	EtherNet/IP is an open industrial networking standard that supports implicit and explicit messaging and uses commercial, off-the-shelf EtherNet equipment and physical media. A total of 63 Isysnet modules can be assembled on a single EtherNet/IP node. Refer to the User Manual, publication PSS-UM004 to determine the ratings for direct and rack connections allowed.
PROFIBUS DP™ PSSCPBA	A total of 63 Isysnet modules can be assembled on a single PROFIBUS node.

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Selecting a Network

You can configure your system for information exchange between a range of devices and computing platforms and operating systems.

Application Requirements	Network	Select
• Plant management (material handling) • Configuration, data collection, and control on a single, high-speed network • Time-critical applications with no established schedule • Data sent regularly • Internet/Intranet connection	EtherNet/IP	PSSCENA
• High-speed transfer of time-critical data between controllers and I/O devices • Deterministic and repeatable data delivery • Media redundancy • Controller redundancy • Intrinsic safety • Redundant controller systems	ControlNet	PSSCCNA
• Connections of low-level devices directly to plant-floor controllers, without interfacing them • Data sent as needed • More diagnostics for improved data collection and fault detection • Less wiring and reduced start-up time than a traditional, hard-wired system	DeviceNet	PSSCDM12A PSSCDM18PA
• Connecting to an existing PROFIBUS DP 5m bus,12 MB network	PROFIBUS	PSSCPBA

Selecting the DeviceNet Communication Interface

Isysnet offers two interfaces for connecting to DeviceNet. Refer to the following table.

For These Features	Remember	Select
Behaves as a slave device on the Main Network and a master on the PointBus.	All Isysnet modules count as a single node on the Main Network.	PSSCDM12A (M12-style network connectors).
Allows a group of I/O modules on the Subnet to act as a single node on the Main Network.	The Main Network distance is acceptable.	PSSCDM18PA (mini-style network connectors with pass-through).
RSNetWorx™ for DeviceNet software is needed for configuration of the PSSCDM12A or PSSCDM18PA on the Main Network and the PointBus Configuration on the PointBus consists of a scan list that is very similar to those used in all of the DeviceNet master scanner modules.	Isysnet expansion power supplies are permitted to add more Isysnet modules.	

It is important that the total amount of data coming from the Subnet does not exceed the data capability of either the PSSCDM12A or PSSCDM18PA.

- 250 bytes (248 data + 2 bytes command info) for output data (used as either COS, cyclic, or poll)
- 250 bytes (248 data + 2 bytes status info) for polled input data
- 250 bytes (248 data + 2 bytes status info) for COS/ cyclic input data
- 8 bytes (6 data + 2 status info) for strobe input data

The data coming through the PSS adapter combined with the other data from the Main Network cannot exceed the data capability of the Main Network master scanner. If this occurs, you will need multiple master scanners on the Main Network and the I/O modules on the Subnet will need to be split between multiple PSSCDM12A or PSSCDM18PA adapters.

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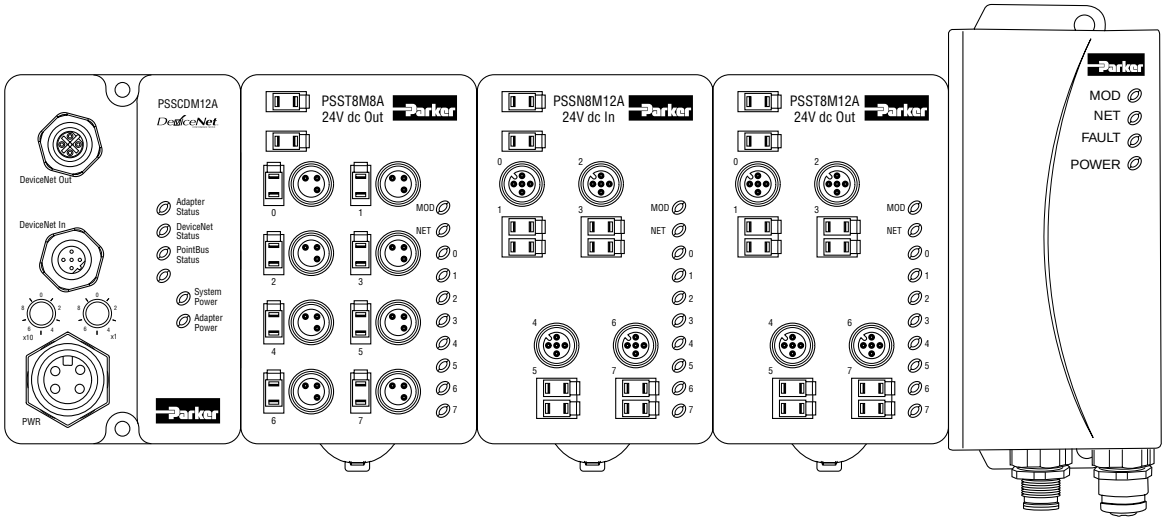
Step 2

Select I/O Modules

Selecting Isysnet Modules

Some modules have diagnostic features, electronic fusing, or individually isolated inputs/outputs.

The Isysnet family provides a wide range of input and output modules to span many applications, from high-speed discrete to process control. Isysnet supports producer/consumer technology, which allows input information and output status to be shared among multiple Logix controllers.



The Isysnet family of I/O modules includes:

- Digital I/O Modules
- Analog I/O Modules
- Valve Driver Module

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Digital I/O Modules

Choose digital I/O modules when you need:

- **Input Modules.** An input module responds to an input signal in the following manner:
  - Input filtering limits the effect of voltage transients caused by contact bounce and/or electrical noise. If not filtered, voltage transients could produce false data. All input modules use input filtering.
  - Optical isolation shields logic circuits from possible damage due to electrical transients.
  - Logic circuits process the signal.
  - An input LED turns on or off indicating the status of the corresponding input device.
- **Output Modules.** An output module controls the output signal in the following manner:
  - Logic circuits determine the output status.
  - An output LED indicates the status of the output signal.
  - Optical isolation separates module logic and bus circuits from field power.
  - The output driver turns the corresponding output on or off.
- **Surge Suppression.** Most output modules have built-in surge suppression to reduce the effects of high-voltage transients. However, we recommend that you use an additional suppression device if an output is being used to control inductive devices, such as:
  - Relays
  - Motor starters
  - Solenoids
  - Motors

  Additional suppression is especially important if your inductive device is in series with, or parallel to, hard contacts such as:
  - Push buttons
  - Selector switches

The digital I/O modules support:

- A wide variety of voltage interface capabilities
- Isolated and non-isolated module types
- Point-level output fault states
- Choice of direct-connect or rack-optimized communications
- Field-side diagnostics on select modules

Connector types are indicated by the catalog number. For example, the PSSN8M12A has an M12 connector.

Digital DC Input Modules

	PSSN8M8A PSSN8M12A PSSN8M23A	**PSSN16M12A**	**PSSP8M8A PSSP8M12A PSSP8M23A**
Number of Inputs	8 Sinking	16 Sinking	8 Sourcing
Keyswitch Position	1		1
Voltage, On-State Input, Nom.	24VDC		24VDC
Voltage, On-State Input, Min.	10VDC		10VDC
Voltage, On-State Input, Max.	28.8VDC		28.8VDC
Input Delay Time, ON to OFF	0.5 ms hardware + (0…65 ms selectable)*		0.5 ms hardware + (0…65 ms selectable)*
Current, On-State Input, Min.	2 mA		2 mA
Current, On-State Input, Max.	5 mA		5 mA
Current, Off-State Input, Max.	1.5 mA		1.5 mA
PointBus Current (mA)	75		75
Power Dissipation, Max.	1.0 W @ 28.8VDC		1.0 W @ 28.8VDC

* Input ON-to-OFF delay time is the time from a valid input signal to recognition by the module.

Digital DC Output Modules

	PSST8M8A PSST8M12A PSST8M23A	**PSST16M223A PSST16D25A PSST16M12A**
Number of Outputs	8 sourcing	16 Sourcing
Keyswitch Position	1	
Voltage, On-State Output, Nom.	24VDC	
Voltage, On-State Output, Min.	10VDC	
Voltage, On-State Output, Max.	28.8VDC	
Output Current Rating, Max.	3.0 A per module, 1.0 A per channel	
PointBus Current (mA)	75	
Power Dissipation, Max.	1.2 W @ 28.8VDC	

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Relay Output Module

	PSSTR4M12A
Number of Outputs	4 Form A (N.O.) relays, isolated
Keyswitch Position	7
Output Delay Time, ON to OFF, Max.	26 ms*
Contact Resistance, Initial	30 mΩ
Current Leakage, Off-State Output, Max.	1.2 mA and bleed resistor thru snubber circuit @ 240V ac
PointBus Current (mA)	90
Power Dissipation, Max.	0.5 W

*Time from valid output off signal to relay de-energization by module.

Analog I/O Modules

The Isysnet analog modules support: on-board, channel-level data alarming (four set-points per channel); scaling to engineering units; channel-level diagnostics (electronic bits and LEDs); and integer format.

Choose analog I/O modules when you need:

- **Individually configurable channels** to use the module(s) with a variety of sensors.
- **On-board scaling** to eliminate the need to scale the data in the controller. Controller processing time and power are preserved for more important tasks, such as I/O control, communications, or other user-driven functions.
- **On-line configuration.** Modules can be configured in the RUN mode using the programming software or the control program. This allows you to change configuration while the system is operating. For example, the input filter for a particular channel could be changed, or a channel could be disabled based on a batch condition. To use this feature, the controller and network interface must also support this feature.
- **Over- and under-range detections and indications.** This eliminates the need to test values in the control program, saving valuable processing power of the controller. In addition, since alarms are handled by the module, the response is faster and only a single bit per channel is monitored to determine if an error condition has occurred.
- **Ability to direct output device operation during an abnormal condition.** Each channel of the output module can be individually configured to hold its last value or assume a user-defined value on a fault condition. This feature allows you to set the condition of your analog devices, and therefore your control process, which may help to ensure a reliable shutdown.
- **Ability to individually enable and disable channels.** Disabling unused channels improves module performance.
- **Selectable input filters** This lets you select the filter frequencies for each channel that best meets the performance needs of your application based on environmental limitations. Lower filter settings provide greater noise rejection and resolution. Higher filter settings provide faster performance. Note: The analog modules provide four input filter selections.
- **Selectable response to broken input sensor.** This feature provides feedback to the controller that a field device is not connected or operating properly. This lets you specify corrective action based on the bit or channel condition.
- **High accuracy.** The modules share a high accuracy rating of ±0.1% of full-scale accuracy at 25 °C.

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Analog Input Modules

	PSSNACM12A	PSSNAVM12A
Number of Inputs	2	2
Keyswitch Position	3	3
Input Signal Range	4…20 mA 0…20 mA	0…10V ±10V
Input Resolution, Bits	16 bits - over 21 mA 0.32 µA/cnt	15 bits plus sign 320 µV/cnt in unipolar or bipolar mode
Absolute Accuracy, Current Input	0.1% Full Scale @ 25°C*†	—
Absolute Accuracy, Voltage Input	—	0.1% Full Scale @ 25°C*†
Input Step Response, per Channel	70 ms @ Notch = 60 Hz (default) 80 ms @ Notch = 50 Hz 16 ms @ Notch = 250 Hz 8 ms @ Notch = 500 Hz	70 ms @ Notch = 60 Hz (default) 80 ms @ Notch = 50 Hz 16 ms @ Notch = 250 Hz 8 ms @ Notch = 500 Hz
Input Conversion Type	Delta Sigma	Delta Sigma
PointBus Current (mA)	75	75
Power Dissipation, Max.	0.6 W @ 28.8VDC	0.6 W @ 28.8VDC

* Includes offet, gain, non-linearity and repeatability error terms.

† Analog input modules support these configurable parameters and diagnostics: open-wire with LED and electronic reporting; four-alarm and annunciation set-points; calibration mode and electronic reporting; under - and over-range and electronic reporting; channel signal range and update rate and on-board scaling; filter-type; channel update rate.

Analog Output Modules

	PSSTACM12A	PSSTAVM12A
Number of Outputs	2	2
Keyswitch Position	4	4
Output Signal Range	4…20 mA 0…20 mA	0…10V ±10V
Output Resolution, Bits	13 bits - over 21 mA 2.5 µA/cnt	14 bits (13 plus sign) 1.28 mV/cnt in unipolar or bipolar mode
Absolute Accuracy, Current Output	0.1% Full Scale @ 25°C*†	—
Absolute Accuracy, Voltage Output	—	0.1% Full Scale @ 25°C*†
Step Response to 63% of FS,	24 µs	— Current Output
Step Response to 63% of FS,	—	20 µs Voltage Output
Output Conversion Rate	16 µs	20 µs
PointBus Current (mA)	75	75
Power Dissipation, Max.	1.0 W @ 28.8VDC	1.0 W @ 28.8VDC

* Includes offet, gain, non-linearity and repeatability error terms.

† Analog output modules support these configurable parameters and diagnostics: open-wire with LED and electronic reporting (PSSTACM12A only); fault mode; idle mode; alarms; channel signal range and on-board scaling.

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Valve Driver Module

PSSVM32A

The PSSVM32A valve driver module provides an interface between the Isysnet serial bus system and the valve assembly. This module will always be the last module on the Isysnet serial bus. It controls 32 digital outputs at 24VDC. Depending on the valve selection, it can control up to 32 single solenoid valves or 16 double solenoid valves.

Valve Driver Module Specifications

	PSSV32A
Outputs per Module	32, sourcing
Voltage Drop, On-State Output, Maximum	0.2VDC
Voltage, Off-State Output, Maximum	28.8VDC
Voltage, On-State Output, Maximum Minimum Nominal	 28.8VDC 10VDC 24VDC
Output Current Rating	200 mA per channel, not to exceed 6.0 A per module
Output Surge Current, Maximum	0.5 A for 10 ms, repeatable every 3 seconds
Current Leakage, Off-State Output, Maximum	0.1 mA
Current, On-State Output Minimum	200 mA per channel
Output Delay Time OFF to ON, Maximum[1]	0.1 ms
Output Delay Time, ON to OFF, Maximum[1]	0.1 ms
External DC Power Supply Voltage Range	10 to 28.8VDC
External DC Power Supply Voltage Nominal	24VDC

1. OFF to ON or ON to OFF delay is time from a valid output “on” or “off” signal to output energization or de-energization.

Step 3

Select the Appropriate Power Unit

Selecting a Power Supply Unit

Isysnet adapters have built-in PointBus power supplies. All Isysnet modules are powered from the PointBus by either an adapter or expansion power supply.

Power Specifications

Part Number	Power Supply Input Voltage, Nom.	Operating Voltage Range	Field Side Power Requirements, Max.	Power Supply Inrush Current, Max.	Input Overvoltage Protection	Power Supply Interruption Protection
PSSCDM12A	24VDC	10...28.8VDC	24VDC (+20% = 28.8VDC) @ 400 mA	6 A for 10 ms	Reverse polarity protected	Output voltage will stay within specifications when input drops out for max. load.
PSSCDM18PA						
PSSCCNA						
PSSCENA						
PSSCPBA						
PSSSE24A						

Power units are divided into two categories:

- Communication adapters with built-in power supply (dc-dc)
- Expansion power supply

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Expansion Power Unit

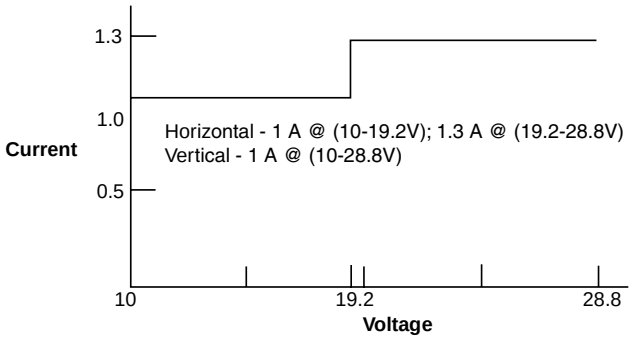
The PSSSE24A expansion power unit passes 24VDC field power to the I/O modules to the right of it. This unit extends the backplane bus power and creates a new field voltage partition segment for driving field devices for up to 13 I/O modules. The expansion power unit separates field power from I/O modules to the left of the unit, effectively providing functional and logical partitioning for:

- Separating field power between input and output modules
- Separating field power to the analog and digital modules
- Grouping modules to perform a specific task or function

You can use multiple expansion power units with any of the communication adapters to assemble a full system. If you are using the PSSCDM12A adapter, you may use a PSSSE24A expansion power unit to add additional modules. For example, if you had a 36 module system with a PSSCDM12A adapter, you would have at least two or more PSSSE24A expansion power units to provide more bus power for modules to the right of the supply.

- 24VDC to 5VDC converter
- 1.3A, 5VDC output (extend backplane power)
- Starts new voltage distribution
- Partitioning

PSSSE24A Current Derating for Mounting



Power Distribution General Specifications

	PSSSE24A
Power Supply Requirements	Note: In order to comply with CE Low Voltage Directives (LVD), you must use a Safety Extra Low Voltage (SELV) or a Protected Extra Low Voltage (PELV) power supply to power this adapter
Field Side Power Requirements	24VDC (+20% = 28.8VDC max.) @ 400 mA
Inrush Current, Max.	6 A for 10 ms
Input Overvoltage Protection	Reverse polarity protected
Power Supply Interruption Protection	Output voltage will stay within specifications when input drops out for 10 ms at 10V with max. load
Power Supply Input Voltage, Nom.	24VDC
Operating Voltage Range	10…28.8VDC
Power Consumption, Max.	9.8 W @ 28.8VDC
Power Dissipation, Max.	3.0 W @ 28.8VDC
Thermal Dissipation, Max.	10.0 BTU/hr @ 28.8VDC
Isolation Voltage	1250V rms
Field Power Bus Supply Voltage, Nom.	12VDC or 24VDC
Field Power Bus Supply Current, Max.	10 A

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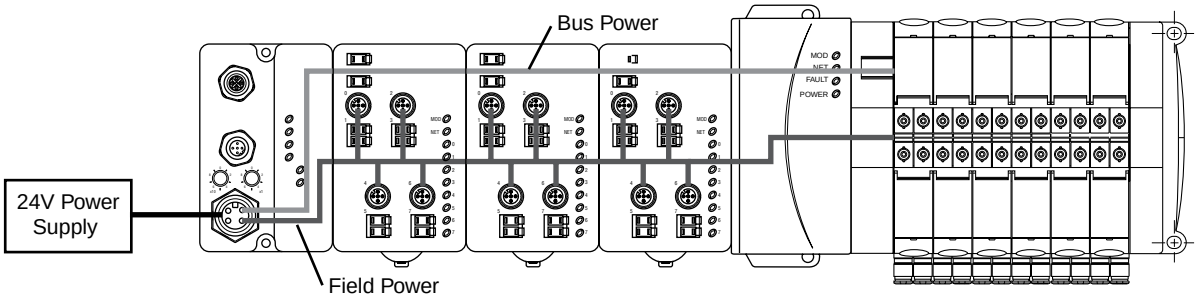
Power Distribution Options

Isysnet Communication Adapter and I/O Modules

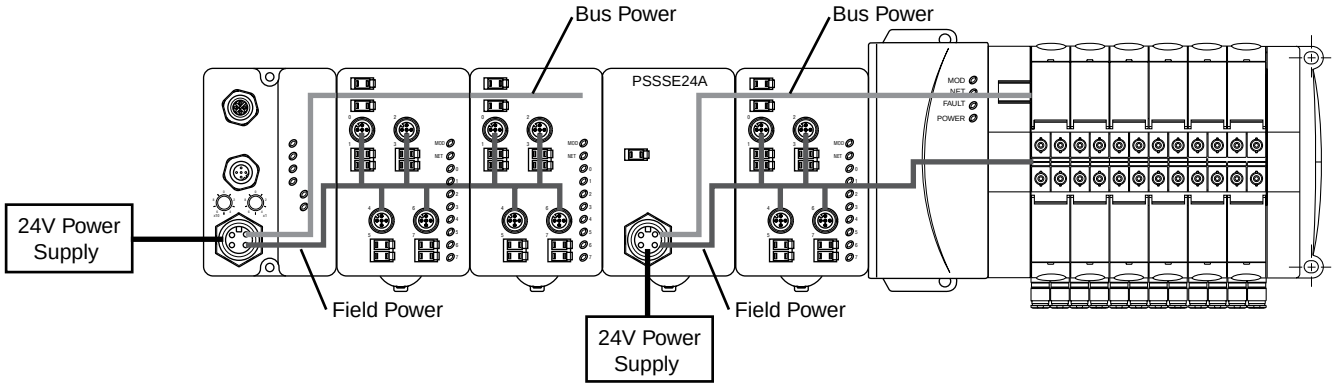
The 24VDC power supply from the Communication Adaptor provides Bus Power and Field Power to the Input, Output and Valve Driver Modules. You can connect up to 13 modules and an adapter with a maximum of 10 A field power, using this power source.



Isysnet Communication Adapter and I/O Modules

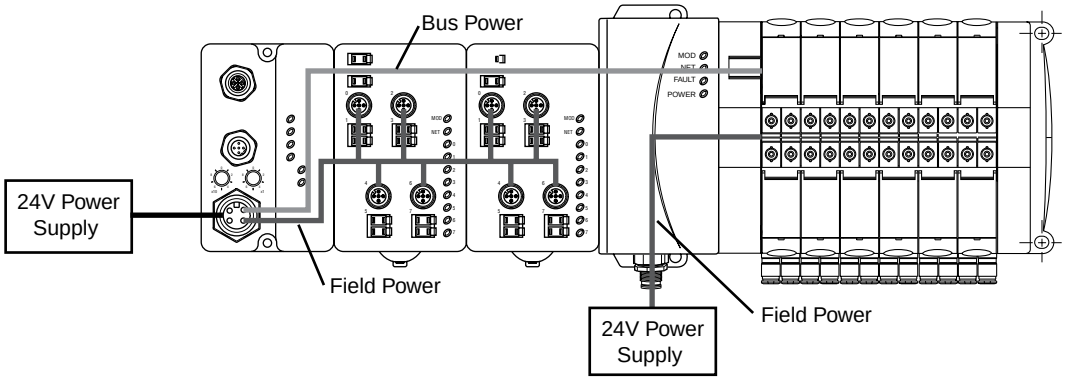
The 24VDC power supply from the Communication Adaptor provides Bus Power and Field Power to the Input and Output Modules. You can connect up to 13 modules and an adapter with a maximum of 10 A field power, using this power source.

The 24VDC expansion power unit (PSSSE24A) extends the Bus Power and Field Power to support up to 13 more Input and Output Modules. Connect additional expansion power units to expand the assembly up to the maximum of 63 I/O modules. The Valve Driver Module is the last module on the system, and will draw Bus Power and Field Power from the PSSSE24A to the left of it.



Isysnet Communication Adapter with 24VDC Connector and I/O Modules

The 24VDC power supply from the Communication Adaptor provides Bus Power and Field Power for up to 13 modules and an adapter with a maximum of 10 A Field Power. In this configuration, Bus Power and Field Power are supplied to the Input and Output Modules. The Communication Adaptor only supplies Bus Power to the Valve Driver Module, as the Isys Micro with 24VDC Connector separates the Field Power from the rest of the network. This secondary 24VDC Connector on the Valve Driver Module supplies Field Power to the valves, and can be wired into an Emergency Stop Circuit.



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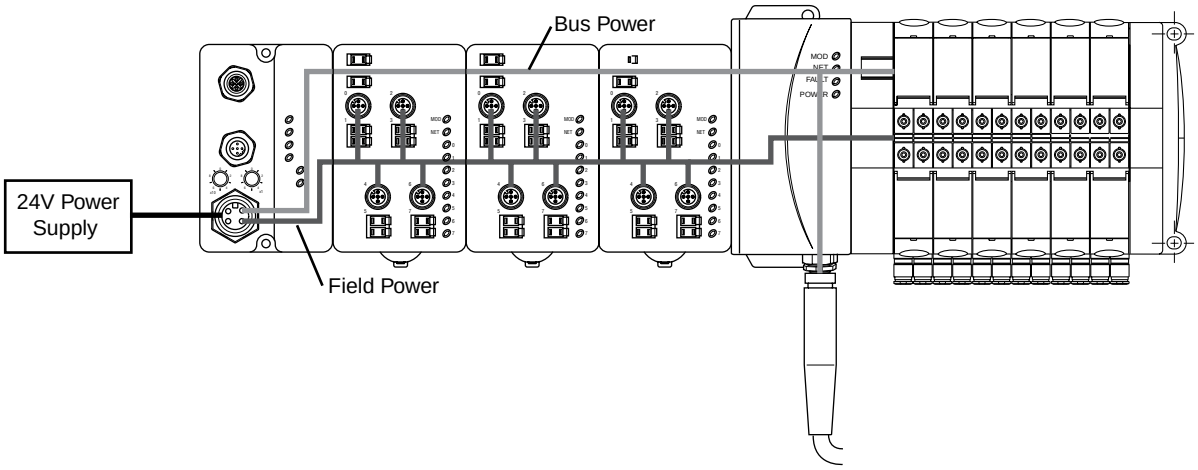
Power Distribution Options

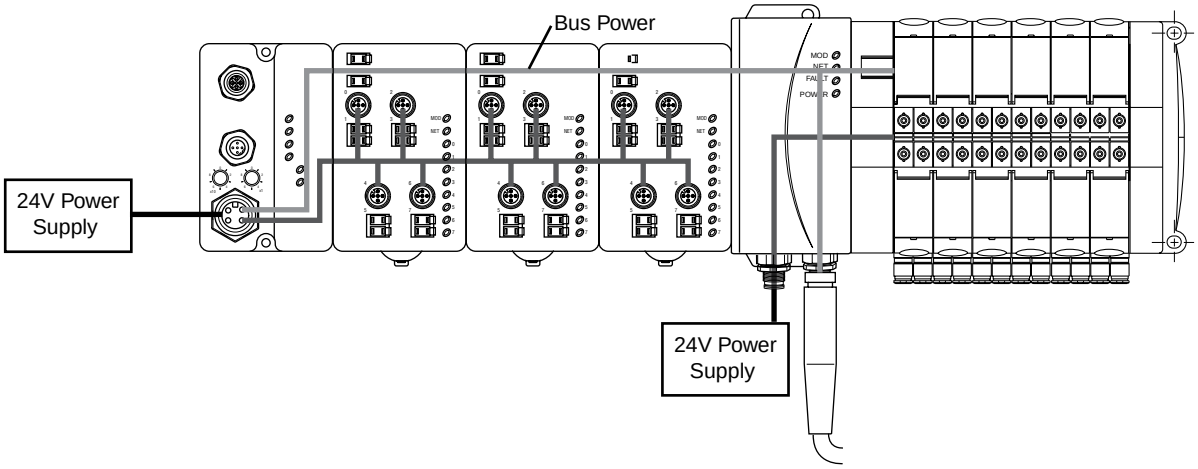
Isysnet Communication Adapter with Bus Extension Connector and I/O Modules

The 24VDC power supply from the Communication Adaptor provides Bus Power and Field Power to the Input, Output and Valve Driver Modules. You can connect up to 13 modules and an adapter with a maximum of 10 A field power, using this power source. The Isys Micro with Bus Extension Connector carries Bus Power and communication down to another Isysnet Assembly through the PSSVEXT1 cable. If additional Isysnet Input and Output Modules or Isys ISO valve manifold is used on this extension, a PSSSE24A Power Extender Module is required to provide Field Power. If the extension is attached directly to an Isys Micro Manifold, Field Power can be supplied directly by using the 24VDC Connector option.



Isysnet Communication Adapter with 24VDC and Bus Extension Connectors and I/O Modules

The 24VDC power supply from the Communication Adaptor provides Bus Power and Field Power for up to 13 modules and an adapter with a maximum of 10 A Field Power. In this configuration, Bus Power and Field Power are supplied to the Input and Output Modules. The Communication Adaptor only supplies Bus Power to the Valve Driver Module, as the 24VDC Connector separates the Field Power from the rest of the network. This secondary 24VDC Connector on the Valve Driver Module supplies Field Power to the valves, and can be wired into an Emergency Stop Circuit. The Bus Extension Connector carries Bus Power and communication down to another Isysnet Assembly through the PSSVEXT1 cable. If additional Isysnet Input and Output Modules or Isys ISO valve manifold is used on this extension, a PSSSE24A Power Extender Module is required to provide Field Power. If the extension is attached directly to an Isys Micro Manifold with 24VDC Connector, Field Power can be supplied directly by using the 24VDC Connector option.



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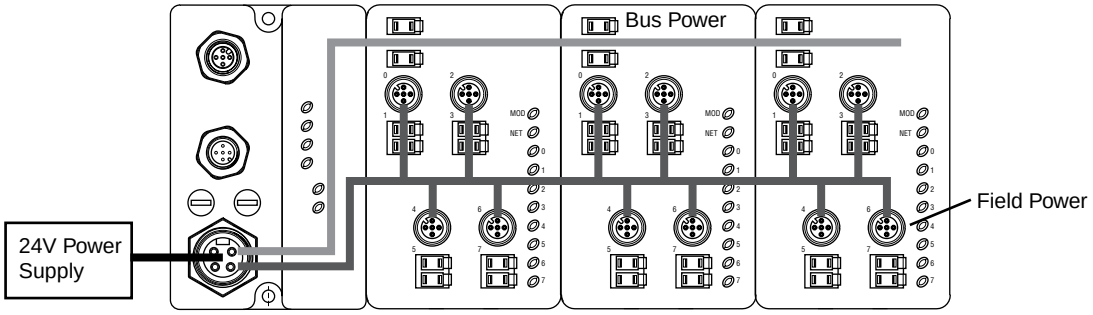
Power Distribution Options

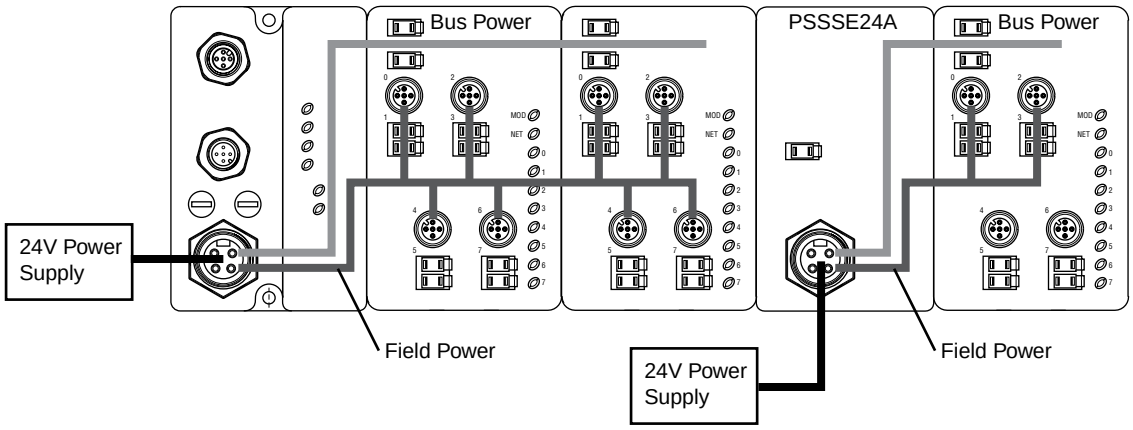
Isysnet Communication Adapter and I/O Modules

An auxiliary 24VDC power supply from the communication module provides power to the PointBus backplane and I/O modules. You can connect up to 13 I/O modules with a maximum of 10 A field power, using the auxiliary power.



Isysnet System with 24VDC Expansion Power Unit (PSSSE24A)

The auxiliary power from the communication module supports up to 13 I/O modules with a maximum of 10 A field power. The 24VDC expansion power unit (PSSSE24A) extends the backplane bus power to support up to 13 more I/O modules. Connect additional expansion power units to expand the I/O assembly up to the maximum of 63 I/O modules.



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Step 4

Select Cables and Cordsets

Selecting Accessories

Isysnet Digital Input Module Cables

Part Number	For Using:	Recommended Rockwell Automation Patchcord (double-ended)	Recommended Rockwell Automation Male Cordset (single-ended)
PSSN8M12A	2 inputs per connector	879D-F4ACDM-x	879-C3AEDM4-5
PSSP8M12A	1 input per connector	889D-F4ACDM-x	889D-M4AC-y
PSSN8M8A	3-Pin pico connectors	889P-F3ABPM-x	889P-M3AB-y
PSSP8M8A	4-Pin pico connectors	889P-F4ABPM3-x	
PSSN8M23A	M23, 12-Pin	889M-F12AHMU-z (Inline Connector) 889M-R12AHMU-2 (Right Angle Connector)	—
PSSP8M23A			
PSST8M23A			

x = length in meters (1, 2, 3, 5, and 10 standard)
y = length in meters (2, 5, and 10 standard)
z = length in meters (1, 2, and 3 standard)

For more cables and cordsets, please refer to www.connector.com

Isysnet Analog Inputs and Outputs

Part Number	For Using:	Recommended Cable
PSSNAVM12A	1 input per connector	804507P20M020 (Shielded)*
PSSNACM12A		
PSSTAVM12A	1 output per connector	
PSSTACM12A		

* Refer to www.comnnector.com

Isysnet Digital Output Module Cables

Part Number	For Using:	Recommended Rockwell Automation Patchcord (double-ended)	Recommended Rockwell Automation Male Cordset (single-ended)
PSST8M12A	2 inputs per connector	879D-F4ACDM-x	879-C3AEDM4-5
	1 input per connector	889D-F4ACDM-x	889D-M4AC-y
PSST8M8A	3-Pin pico connectors	889P-F3ABPM-x	889P-M3AB-y
	4-Pin pico connectors	889P-F4ABPM3-x	

x = length in meters (1, 2, 3, 5, and 10 standard)
y = length in meters (2, 5, and 10 standard)

For more cables and cordsets, please refer to www.connector.com

Isysnet Relay Output Module Cables

Part Number	Recommended Rockwell Automation Patchcord (double-ended)	Recommended Rockwell Automation Male Cordset (single-ended)
PSSTR4M12A	889D-F4ACDM-x	889D-M4AC-y

x = length in meters (1, 2, 3, 5, and 10 standard)
y = length in meters (2, 5, and 10 standard)

For more cables and cordsets, please refer to www.connector.com

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Isysnet DeviceNet and Auxiliary Power Cables

Part Number	Network	Recommended Rockwell Automation Network Cable	Recommended Rockwell Automation Auxiliary Power Cables
PSSCDM12A PSSCDM18PA	DeviceNet	KwikLink Flat Media system standard drop cable: 1485K-PzF5-R5 Thin Round system standard drop cable: 1485R-PzN5-M5 Thick Round system standard drop cable: 1485C-PzN5-M5	Standard Cordset (single-ended): 889N-F4AFC-yF Standard Patchcord (double-ended): 889N-F4AFNC-y
PSSCCNA	ControlNet	BNC to TNC Connector is required when using BNC Cordsets. See **www.amphenolrf.com** 	
PSSCENA	EtherNet/IP	—	
PSSCPBA	PROFIBUS DP	—	Standard Cordset (single- ended): 889N-F5AFC-y

x = length in meters (1, 2, 3, and 6 standard)

y = length in feet (6, 12, and 20 standard)

z = length in feet (1, 2, 3, 4, 5, and 6 standard)

For more cables and cordsets, please refer to **www.connector.com**

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Step 5

Placing Isysnet Modules

Determining Mounting Requirements

The producer/consumer model multicasts messages. This means that multiple nodes can consume the same data at the same time from a single device. Where you place I/O modules in the control system determines how the modules exchange data.

For a Rockwell controller to control Isysnet, the I/O must be:

- On the same network as the controller **or**
- On a ControlNet network that is local to that controller **or**
- On an EtherNet/IP network that is local to that controller

Maximum Size Layout

Part Number	PointBus Current (mA)	Maximum I/O Modules with 24VDC Backplane Current at 75 mA each	Maximum I/O Modules with Expansion Power Supplies	Maximum Number of I/O Module Connections
PSSCDM12A on DeviceNet	1000	Up to 13	63	
PSSCDM18PA on DeviceNet				
PSSCCNA on ControlNet				5 rack and 20 direct
PSSCENA on EtherNet/IP				20 total connections including rack and direct
PSSCPBA on PROFIBUS				
PSSSE24A Expansion Power	Horizontal mounting: 1A@5Vdc for 10...19.2V input; 1.3A @ 5VDC for 19.2...28.8V input Vertical mounting: 1A @ 5VDC for 10...28.8V input			Not to exceed scanner capacity

Power Supply Distance Rating

Modules are placed to the right of the power supply. Each Isysnet module can be placed in any of the slots to the right of the power supply until the usable backplane current of that supply has been exhausted. An adapter provides 1 A current to the PointBus. The PSSSE24A provides up to 1.3 A and I/O modules require from 75 mA (typical for the digital and analog I/O modules) up to 90 mA or more.

PointBus Current Requirements

Part Number	PointBus Current Requirements
PSSN8xxx	75 mA
PSSP8xxx	
PSST8xxx	
PSSN16xxx	
PSST16xxx	
PSSTR4MRA	90 mA
PSSNACM12A	75 mA
PSSTACM12A	
PSSNAVM12A	
PSSTAVM12A	
PSSV32A	

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The Moduflex System

Moduflex communication modules directly attach to the Isys Micro end plates, and offer a low cost fieldbus connection.

Moduflex Features

- Small, compact product design
- Broad protocol offering, including DeviceNet, Profibus, AS-i, CANopen, and Interbus
- Channel-level diagnostics (LED and Electronic)
- Inputs available with AS-i modules
- Horizontal and vertical mounting without derating
- 5g vibration
- Quick-disconnects for I/O and network connectivity
- Built-in panel grounding
- UL, C-UL, and CE certifications (as marked)

Moduflex Communication Modules for Fieldbus Connections and Control

DeviceNet™ CANopen PROFIBUS PROCESS FIELD BUS INTERBUS-S

Electrical Module for 16 Outputs Max.
(Valve Manifolds may have up to 16 solenoids)

P2M2HBVP11600

Bus Protocol	Weight (oz)	Order Code
Profibus DP	8.82	**P2M2HBVP21600**
DeviceNet	8.82	**P2M2HBVD21600**
CANopen	8.82	**P2M2HBVC21600**
Interbus S	10.58	P2M2HBVS11600

Fieldbus Accessories

	Bus Protocol	Connector Type	Weight (oz)	Order Code
Power Supply Female Straight Connector	Profibus DP / Interbus S / DeviceNet / CANopen	M12 type A	0.88	**P8CS1205AA**
Line Termination Resistor	Profibus DP	M12 type B	0.88	**P8BPA00MB**
	DeviceNet / CANopen	M12 type A	0.88	**P8BPA00MA**

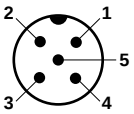
Note: Use standard cables and connectors for bus communications from your electrical supplier.

M12 (Male) Power Supply Connector

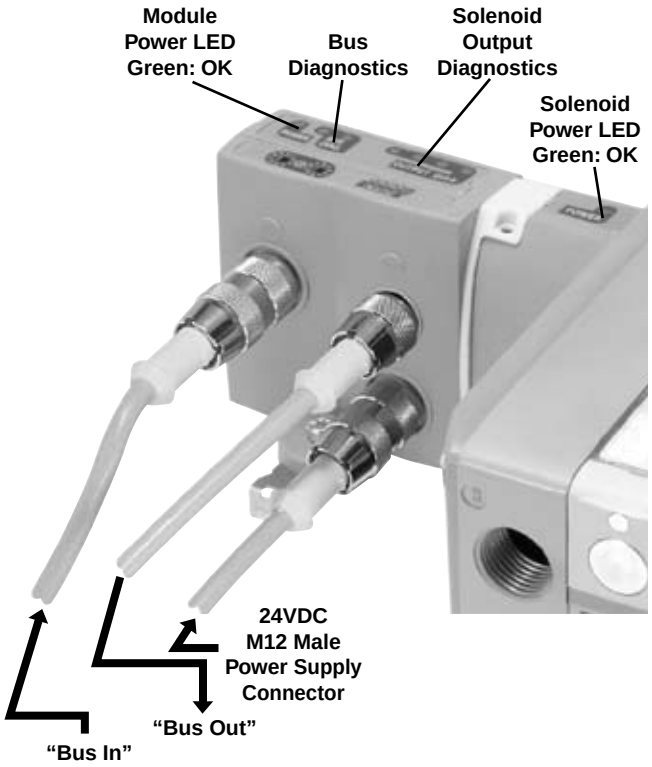
1 - 24VDC Module (Not Connected for DeviceNet and CANopen)
2 - Not Connected
3 - 0VDC Module and Solenoid
4 - 24VDC Solenoid
5 - Protected Earth (PE)

Profibus DP / DeviceNet / CANopen / Interbus S

24VDC
(As Seen On Module)



M12 Male
Type A



Connection

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

Connector on Moduflex Modules are labeled. Bus Connectors are labeled "Bus In" and "Bus Out" while, Power Supply Connections are labeled "24VDC". Connect Fieldbus to "Bus In" and "Bus Out" and Power Supply to "24VDC".

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 communications to remain on. This can be done by placing the user's Emergency Stop switch or other hard-wired control contact between Pin 1 and Pin 4. If this feature is not required, Pin 1 and Pin 4 should be wired together.

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Communication Module: Connections, Addressing, Diagnostic

Bus Cable Connections

Profibus DP standard male and female type B M12 connectors.

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

Line termination P8BPA00MB, is necessary on the “bus out” connector of the last station.

This module incorporates an Autobaud detect feature, eliminating the need to set switches.

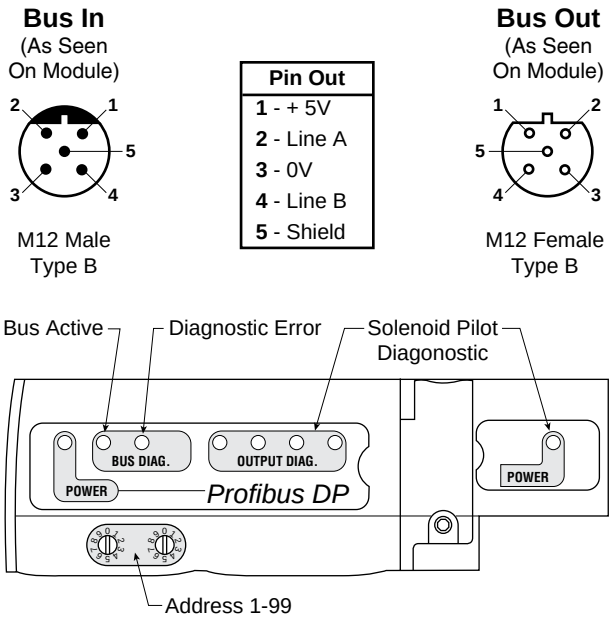
Addressing

Use the GSD file on web site.

The rotary switches enable configuration of the decimal address.

Diagnostic

Diagnostic according to the module dialog shown on the illustration.



Bus Cable Connections

DeviceNet standard male and female type A M12 connectors.

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

Line termination P8BPA00MA, is necessary on the “bus out” connector of the last station.

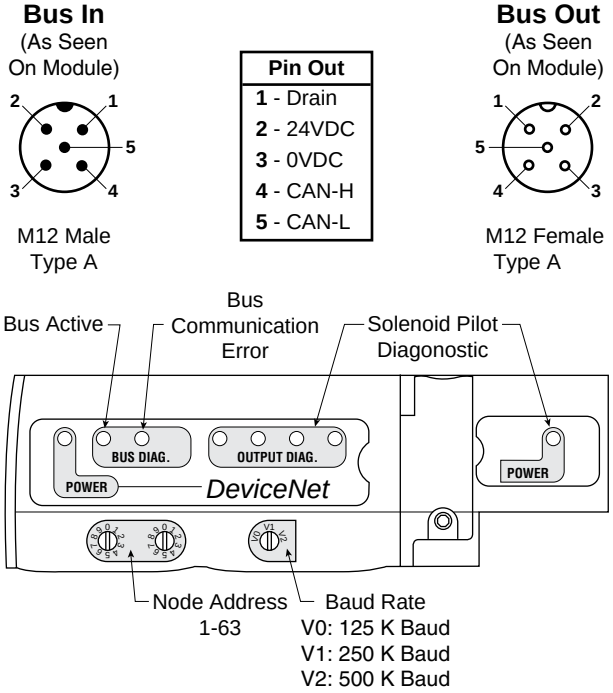
Addressing

Use the EDS file on web site.

The rotary switches enable configuration of the node address and the baud rate.

Diagnostic

Diagnostic according to the module dialog shown on the illustration.



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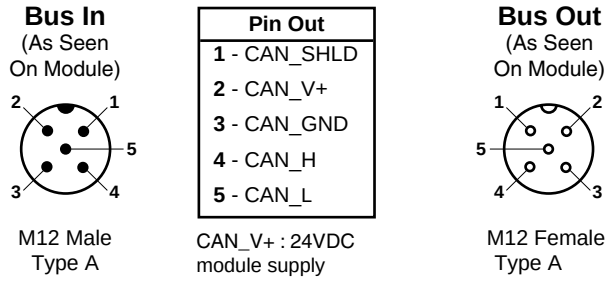
CANopen

Bus Cable Connections

CANopen standard male and female type A M12 connectors.

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

Line termination P8BPA00MA, is necessary on the “bus out” connector of the last station.



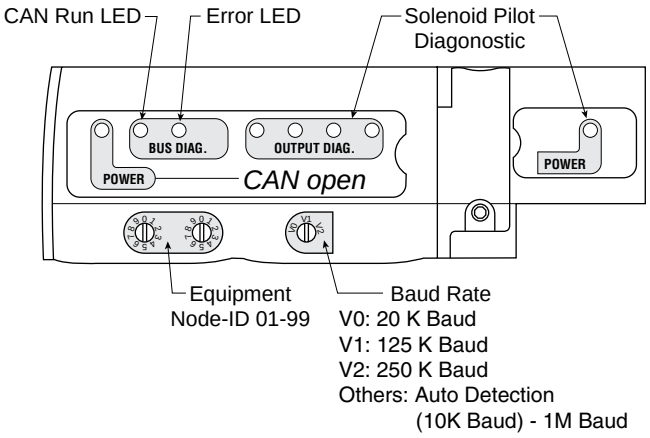
Addressing

Use the EDS file on web site.

The rotary switches enable configuration of the decimal address.

Diagnostic

Diagnostic according to the module dialog shown on the illustration.



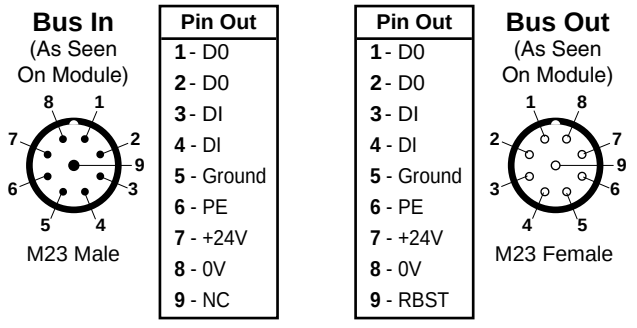
INTERBUS-S

Bus Cable Connections

The M23 connectors conform to “Interbus remote bus”.

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

This module operates at 500 kbps.



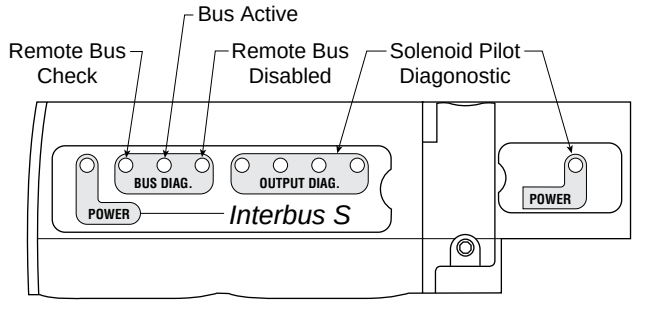
Addressing

Interbus S is self addressing; therefore, it does not need any software or hardware configuration.

Diagnostic

Diagnostic according to the module dialog shown on the illustration.

This diagnostic conforms to the Interbus S standard.



Note: For more details, please consult “Interbus remote bus” documentation.

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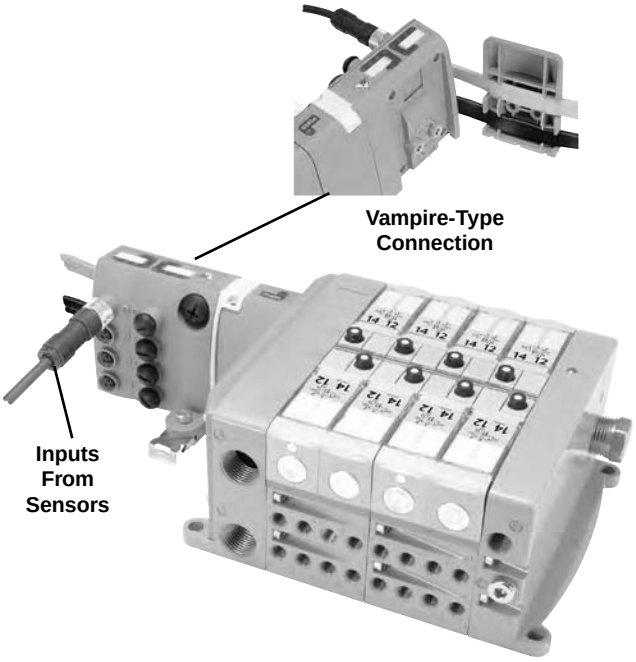
AS-i Bus Communication Modules

P2M2HBVA10808A

P2M2HBVA10808B

P2M2HBVA10800



Standard AS-i Protocol (up to 31 nodes)

Communication Module for 8 Solenoids Max. (2 nodes per module, 4 inputs, 4 solenoids per node)

Input / Output Capability	Weight (oz)	Order Code
0 inputs and 8 solenoid outputs	5.29	**P2M2HBVA10800**
8 (PNP) inputs on eight (M8) connectors and 8 solenoid outputs	7.05	**P2M2HBVA10808A**
8 (PNP) inputs on four (M12) connectors and 8 solenoid outputs	7.05	P2M2HBVA10808B

AS-i Version 2.1 Protocol (up to 62 nodes)

Communication Module for 6 Solenoids Max. (2 nodes per module, 4 inputs, 4 solenoids per node)

Input / Output Capability	Weight (oz)	Order Code
0 inputs and 6 solenoid outputs	5.29	**P2M2HBVA20600**
8 (PNP) inputs on eight (M8) connectors and 6 solenoid outputs	7.05	**P2M2HBVA20608A**
8 (PNP) inputs on four (M12) connectors and 6 solenoid outputs	7.05	P2M2HBVA20608B

AS-i Bus Accessories

M12 Cable with Jack for Addressing

Length	Weight (oz)	Order Code
1 m	3.53	**P8LS12JACK**

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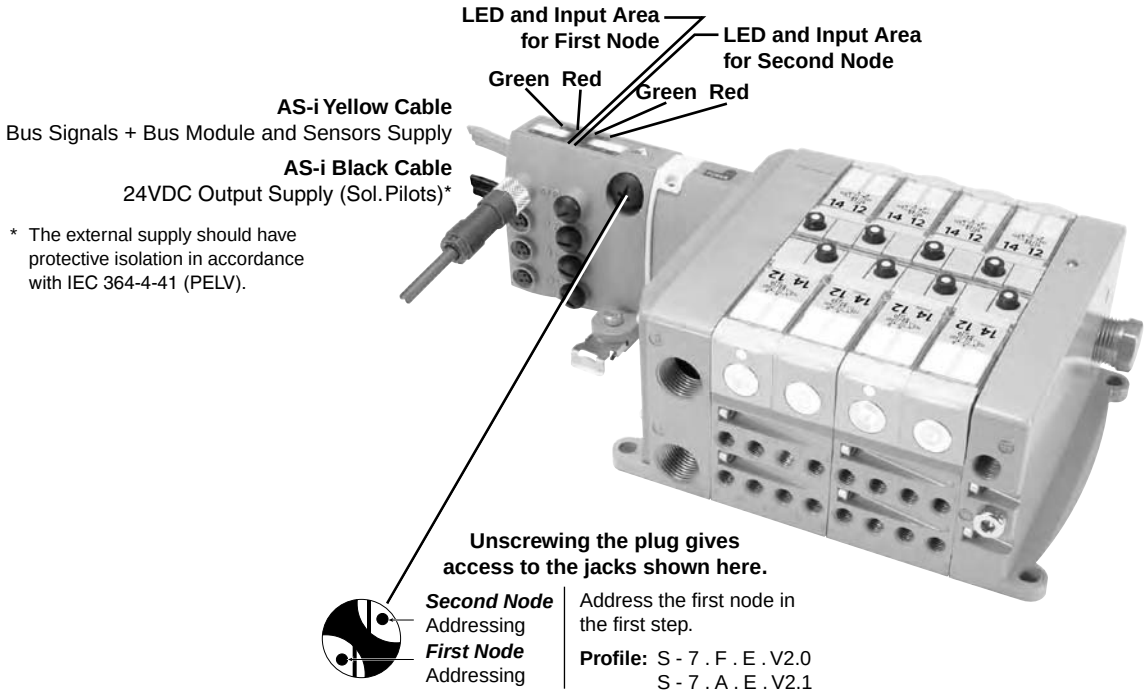
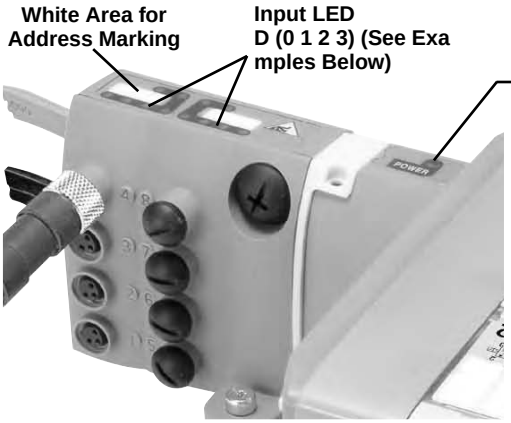
AS-i Bus Communication Module: Addressing, Diagnostic, Input Wiring

Bus Addressing, First and Second Node





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

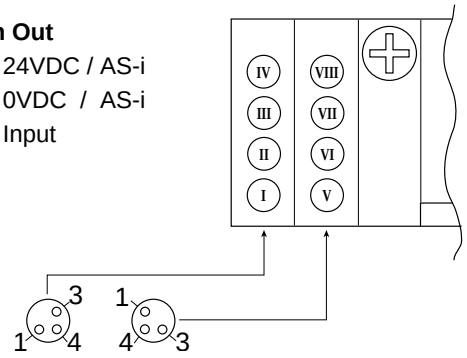
Input Wiring

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.

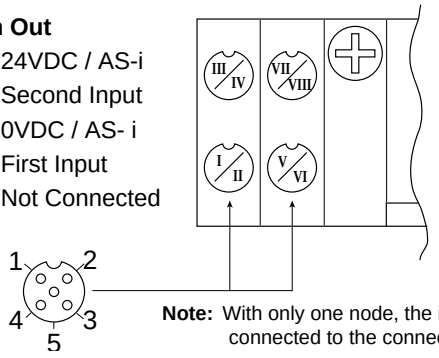
M8 Female Connectors

Pin Out
1 - 24VDC / AS-i
3 - 0VDC / AS-i
4 - Input



M12 Female Connectors

Pin Out
1 - 24VDC / AS-i
2 - Second Input
3 - 0VDC / 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.

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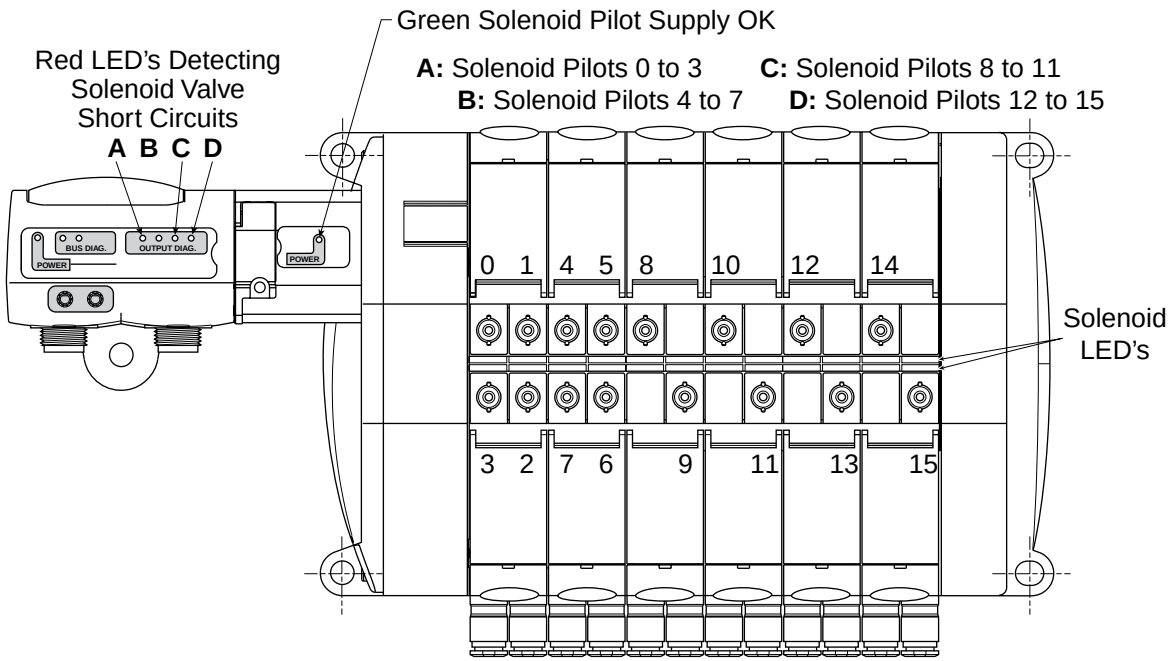
Solenoid Pilot Diagnostic Common to All Moduflex Fieldbus Modules



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

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

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Serial Bus Specifications

All Buses	EMC / CE Mark	According to EN 61 000-6-2	EN 50081-2

AS-i Bus	AS-i Line	According to EN 50295
	Solenoid Pilot Voltage	24VDC
	Module Consumption	max. 70 mA (2 nodes)
	Max. Supply for All Inputs	240 mA (including internal input consumption)
	Internal Input Con-sump.	9 mA for each active input
	Inputs	According to IEC 1131-2 class 2

Fieldbus	Bus Line	According to each bus specification		
	Module Voltage	20 to 30VDC		
	Solenoid Voltage	24VDC		
	Module Consumption	Profibus DP max. 1.5W	DeviceNet / CANopen max. 1.5W	Interbus S max. 2W
	Outputs	Overload protection		

I/O Tables Common to All Fieldbus Modules

Input Data Table								
Byte	**Bit 0**	**Bit 1**	**Bit 2**	**Bit 3**	**Bit 4**	**Bit 5**	**Bit 6**	**Bit 7**
0	Discrete Input 0 (Diagnostic LED 0-3)	Discrete Input 1 (Diagnostic LED 4-7)	Discrete Input 2 (Diagnostic LED 8-11)	Discrete Input 3 (Diagnostic LED 12-15)	—	—	—	—
Output Data Table								
Byte	**Bit 0**	**Bit 1**	**Bit 2**	**Bit 3**	**Bit 4**	**Bit 5**	**Bit 6**	**Bit 7**
0	Discrete Output 0	Discrete Output 1	Discrete Output 2	Discrete Output 3	Discrete Output 4	Discrete Output 5	Discrete Output 6	Discrete Output 7
1	Discrete Output 8	Discrete Output 9	Discrete Output 10	Discrete Output 11	Discrete Output 12	Discrete Output 13	Discrete Output 14	Discrete Output 15

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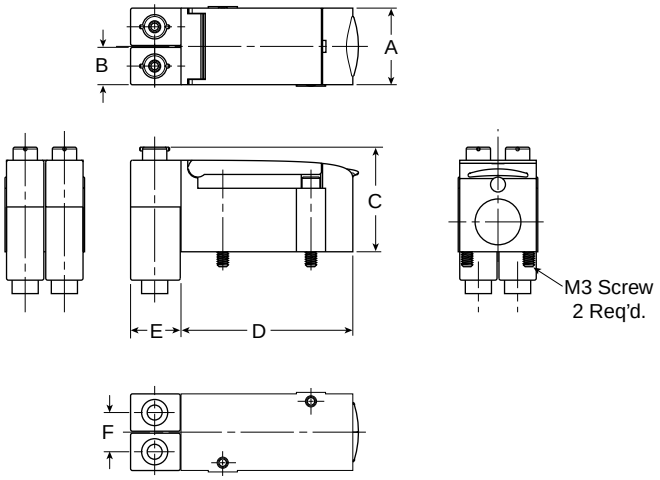
Dimensions

A	B	C	D
0.83 (21.0)	0.40 (10.0)	1.12 (28.4)	1.83 (46.5)
E	**F**		
0.52 (13.3)	0.43 (10.8)		

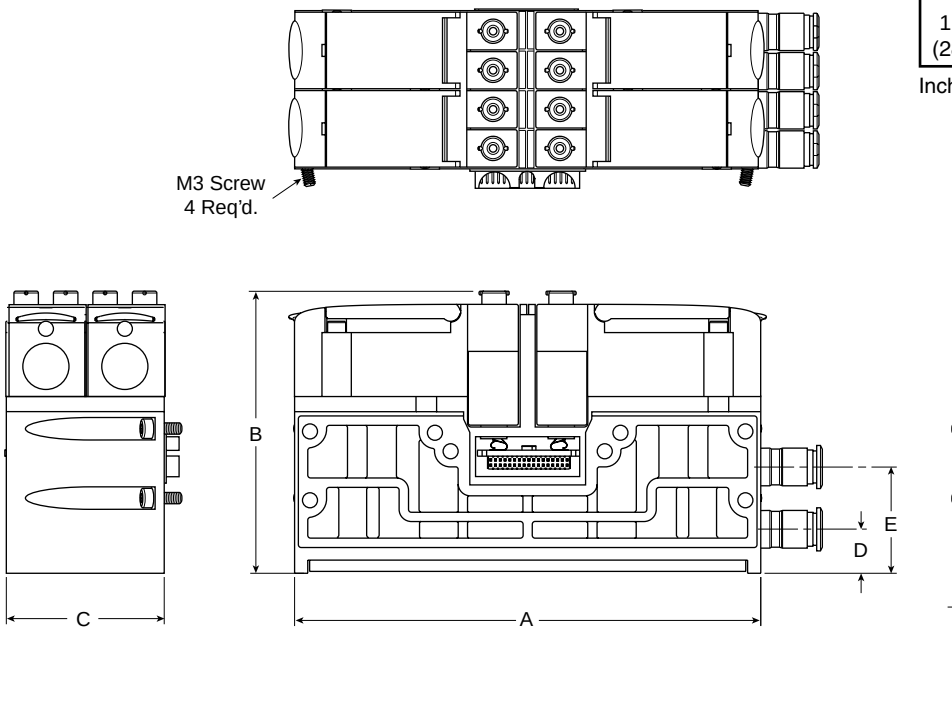
Inches (mm)



Dimensions

A	B	C	D
4.88 (123.8)	2.95 (75.0)	1.65 (42.0)	0.47 (11.9)
E	**F**	**G**	
1.11 (28.3)	0.21 (5.2)	0.41 (10.5)	

Inches (mm)



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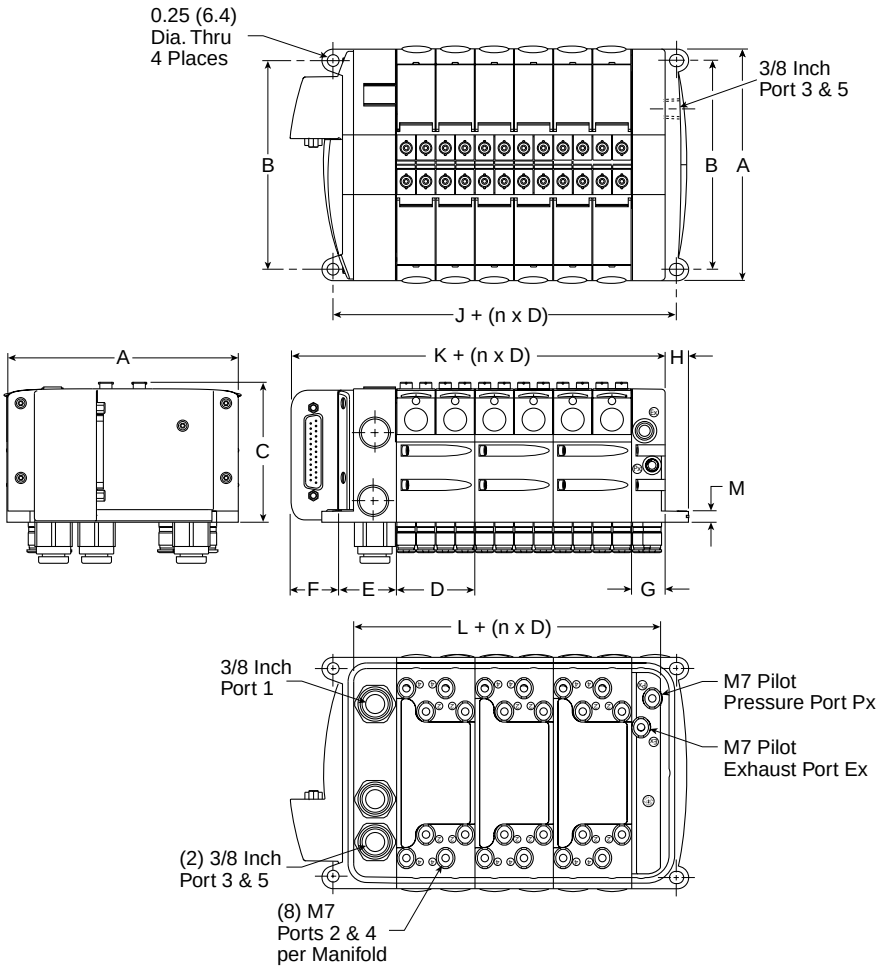
25-Pin, D-Sub, Bottom Ported



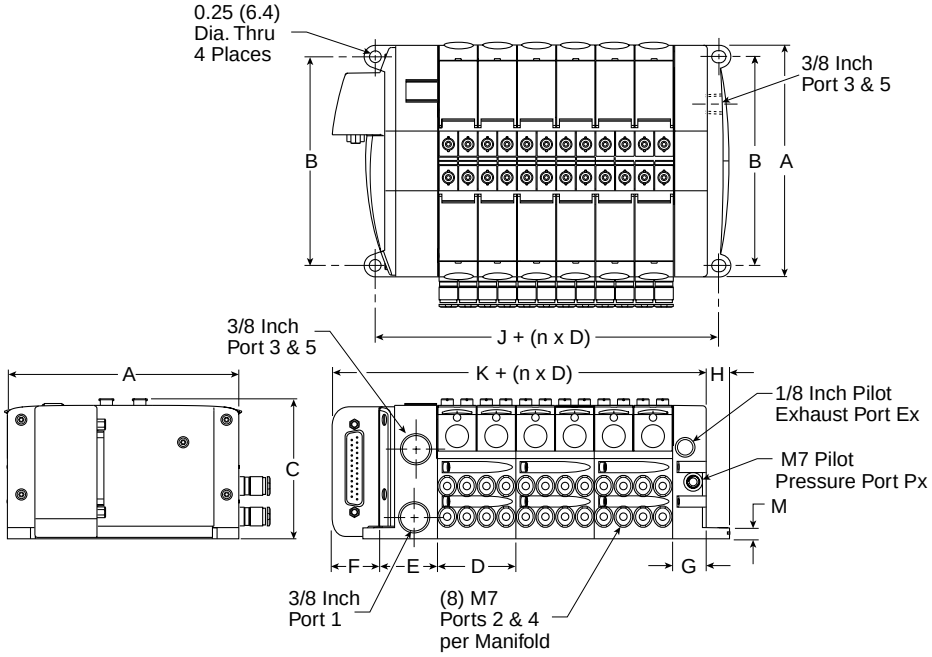
Dimensions

A	B	C	D
4.88 (124.0)	4.41 (112.0)	2.95 (75.0)	1.65 (42.0)
E	**F**	**G**	**H**
1.22 (31.0)	1.02 (26.0)	0.71 (18.0)	0.49 (12.5)
J	**K**	**L**	**M**
2.28 (58.0)	3.44 (87.5)	1.69 (43.0)	0.24 (6.1)

Inches (mm)

n = Number of Manifolds

25-Pin, D-Sub, Side Ported



Dimensions

A	B	C	D
4.88 (124.0)	4.41 (112.0)	2.95 (75.0)	1.65 (42.0)
E	**F**	**G**	**H**
1.22 (31.0)	1.02 (26.0)	0.71 (18.0)	0.49 (12.5)
J	**K**	**M**	
2.28 (58.0)	3.44 (87.5)	0.24 (6.1)	

Inches (mm)

n = Number of Manifolds

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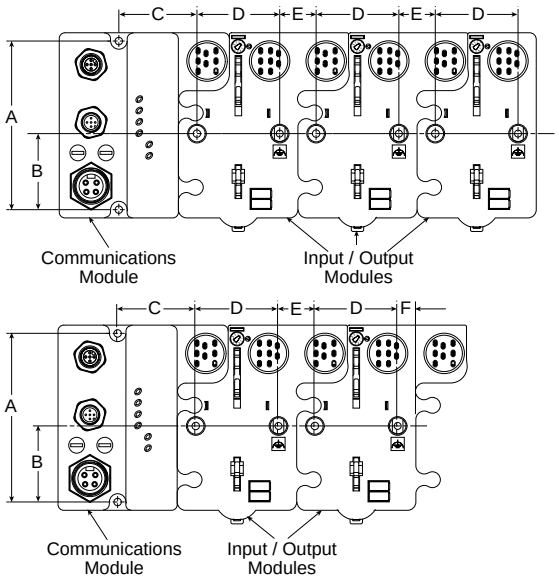
Isysnet Modules

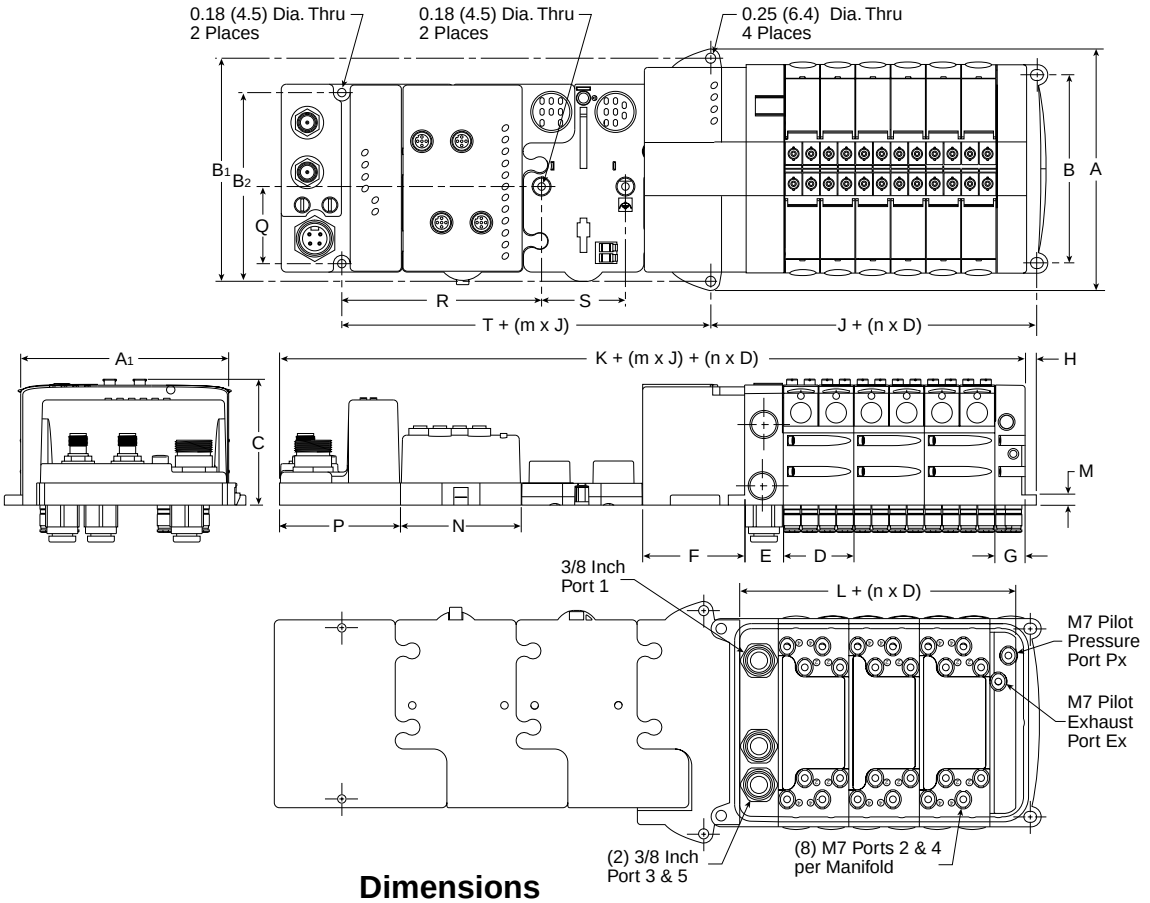


Dimensions

A	B	C	D
4.0 (102)	1.8 (46)	1.9 (48)	2.0 (50)
E	**F**		
.87 (22)	.43 (11)		

Inches (mm)

Isysnet, Bottom Ported



Dimensions

A	A1	B	B1	B2	C	D	E	F	G	H
5.67 (144.0)	4.88 (124.0)	4.41 (112.0)	5.24 (133.0)	4.02 (102.0)	2.95 (75.0)	1.65 (42.0)	0.91 (23.0)	2.40 (61.0)	0.71 (18.0)	0.49 (12.5)
J	**K**	**L**	**M**	**N**	**P**	**Q**	**R**	**S**	**T**	
2.72 (69.0)	7.32 (186.0)	1.69 (43.0)	0.24 (6.1)	2.83 (72.0)	2.83 (72.0)	1.81 (46.0)	4.72 (120.0)	2.01 (51.0)	2.01 (51.0)	

Inches (mm)
n = Number of Manifolds
m = Number of Modules

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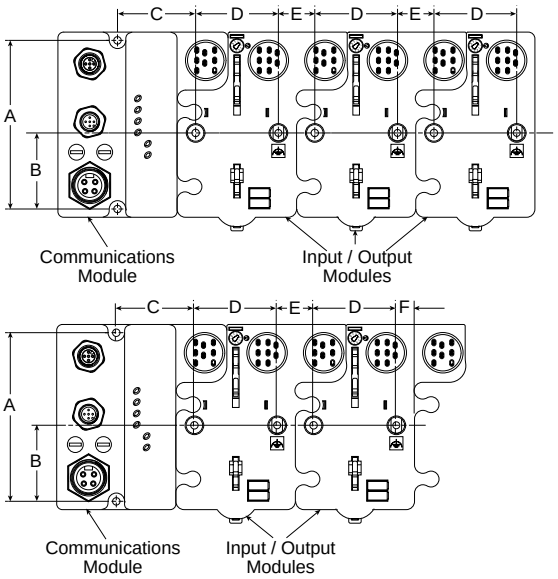
Isysnet Modules

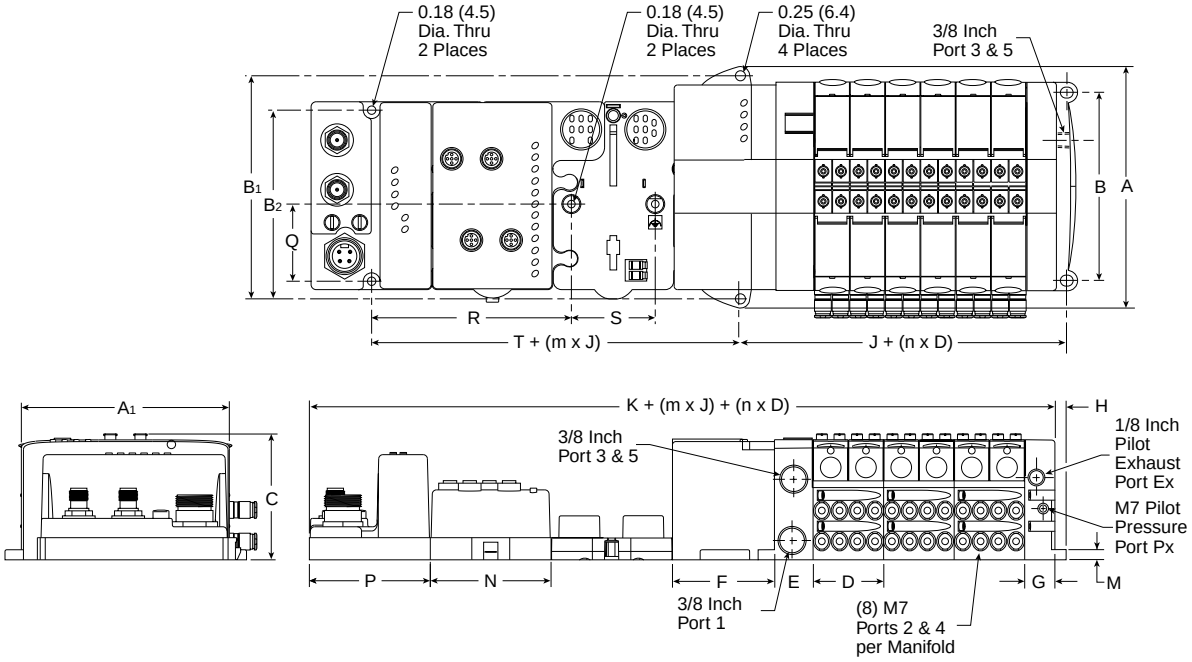


Dimensions

A	B	C	D
4.0 (102)	1.8 (46)	1.9 (48)	2.0 (50)
E	**F**		
.87 (22)	.43 (11)		

Inches (mm)

Isysnet, Side Ported



Dimensions

A	A1	B	B1	B2	C	D	E	F	G
5.67 (144.0)	4.88 (124.0)	4.41 (112.0)	5.24 (133.0)	4.02 (102.0)	2.95 (75.0)	1.65 (42.0)	0.91 (23.0)	2.40 (61.0)	0.71 (18.0)
H	**J**	**K**	**M**	**N**	**P**	**Q**	**R**	**S**	**T**
0.49 (12.5)	2.72 (69.0)	7.32 (186.0)	0.24 (6.1)	2.83 (72.0)	2.83 (72.0)	1.81 (46.0)	4.72 (120.0)	2.01 (51.0)	2.01 (51.0)

Inches (mm)
n = Number of Manifolds
m = Number of Modules

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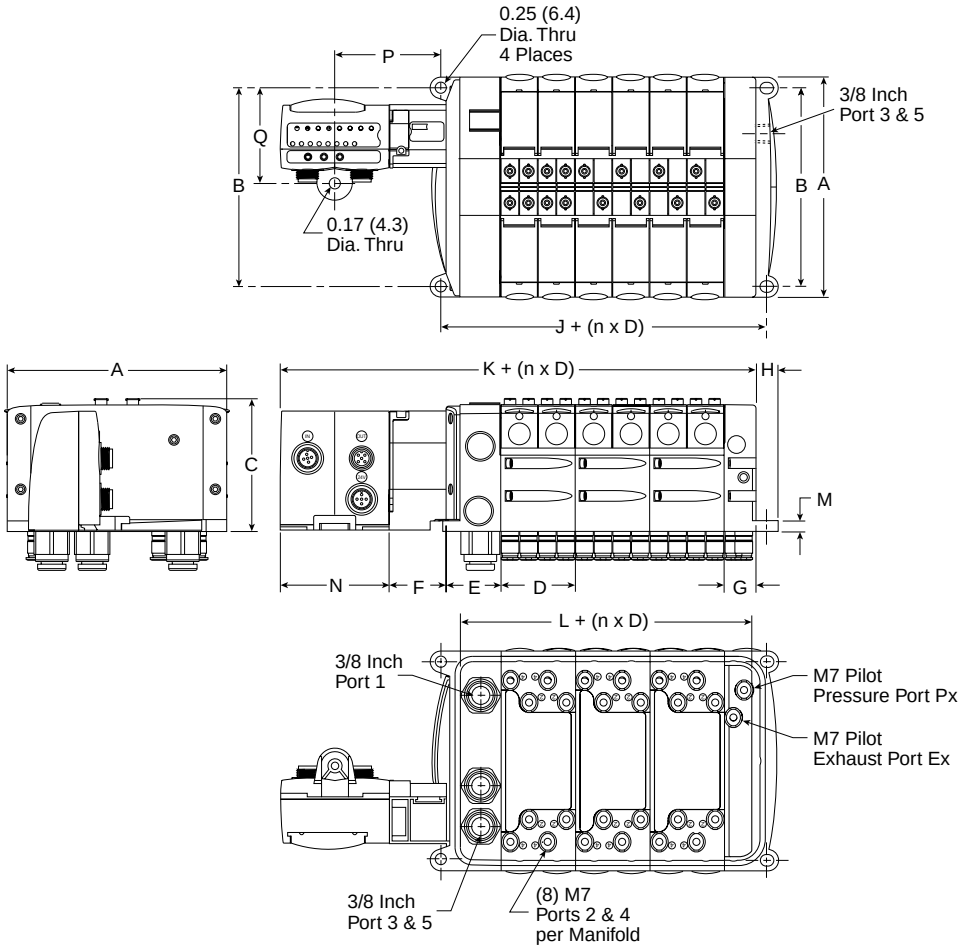
Moduflex Adapter, Bottom Ported

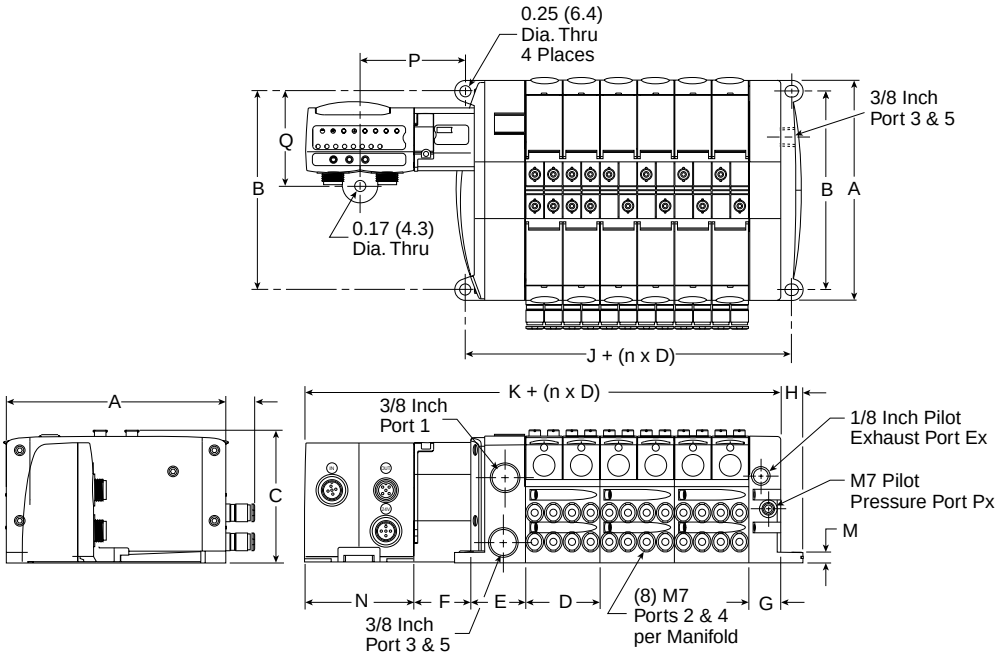


Dimensions

A	B	C	D
4.88 (124.0)	4.41 (112.0)	2.95 (75.0)	1.65 (42.0)
E	**F**	**G**	**H**
1.22 (31.0)	1.28 (32.5)	0.71 (18.0)	0.49 (12.5)
J	**K**	**L**	**M**
2.28 (58.0)	6.10 (155.0)	1.69 (43.0)	0.24 (6.1)
N	**P**	**Q**	
2.40 (61.0)	2.36 (60.0)	2.07 (52.5)	

Inches (mm)
n = Number of Manifolds

Moduflex Adapter, Side Ported



Dimensions

A	B	C	D
4.88 (124.0)	4.41 (112.0)	2.95 (75.0)	1.65 (42.0)
E	**F**	**G**	**H**
1.22 (31.0)	1.28 (32.5)	0.71 (18.0)	0.49 (12.5)
J	**K**	**M**	**N**
2.28 (58.0)	6.10 (155.0)	0.24 (6.1)	2.40 (61.0)
P	**Q**		
2.36 (60.0)	2.07 (52.5)		

Inches (mm)
n = Number of Manifolds

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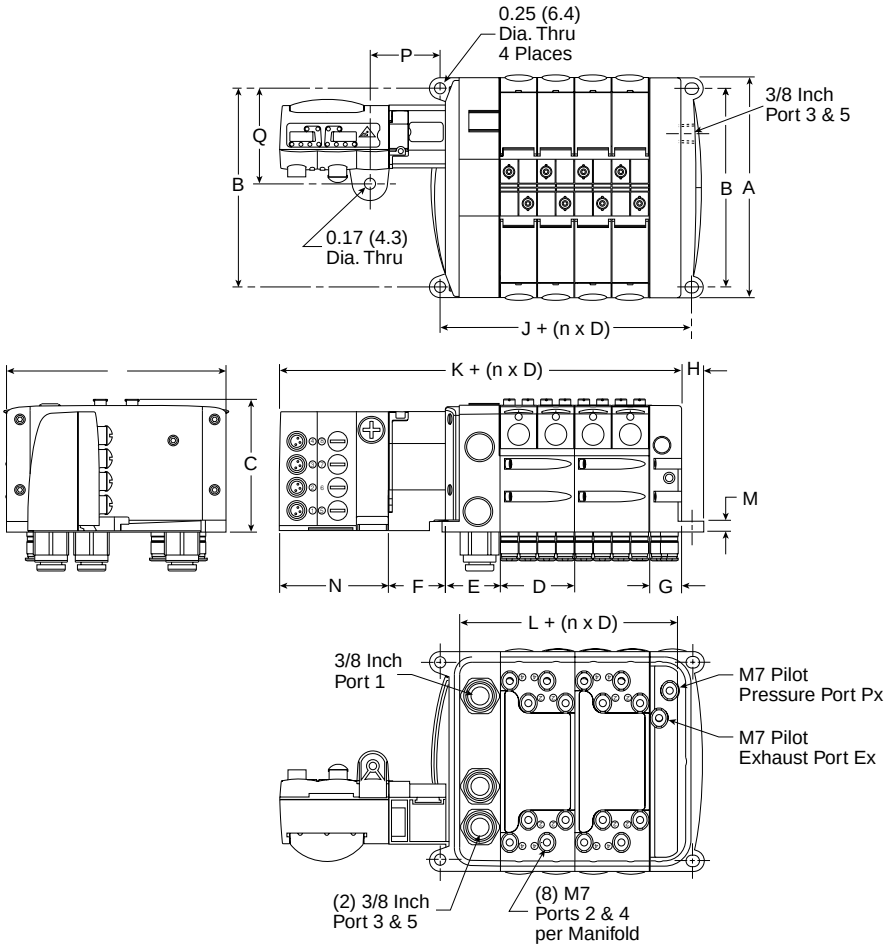
Moduflex AS-i Adapter, Bottom Ported

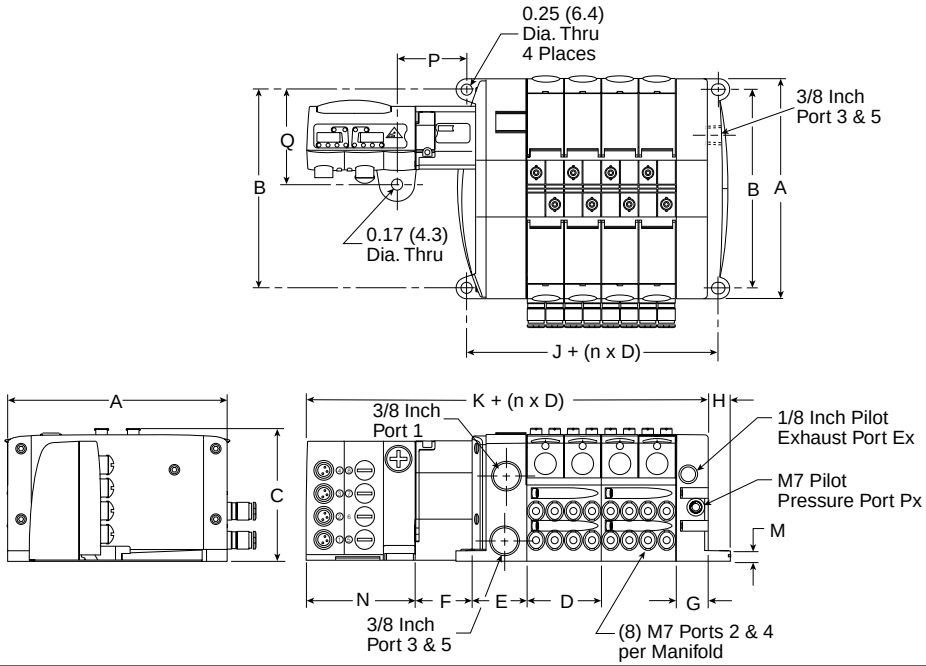


Dimensions

A	B	C	D
4.88 (124.0)	4.41 (112.0)	2.95 (75.0)	1.65 (42.0)
E	**F**	**G**	**H**
1.22 (31.0)	1.28 (32.5)	0.71 (18.0)	0.49 (12.5)
J	**K**	**L**	**M**
2.28 (58.0)	6.10 (155.0)	1.69 (43.0)	0.24 (6.1)
N	**P**	**Q**	
2.40 (61.0)	2.36 (60.0)	2.07 (52.5)	

Inches (mm)
n = Number of Manifolds

Moduflex AS-i Adapter, Side Ported



Dimensions

A	B	C	D
4.88 (124.0)	4.41 (112.0)	2.95 (75.0)	1.65 (42.0)
E	**F**	**G**	**H**
1.22 (31.0)	1.28 (32.5)	0.71 (18.0)	0.49 (12.5)
J	**K**	**M**	**N**
2.28 (58.0)	6.10 (155.0)	0.24 (6.1)	2.40 (61.0)
P	**Q**		
2.36 (60.0)	2.07 (52.5)		

Inches (mm)
n = Number of Manifolds

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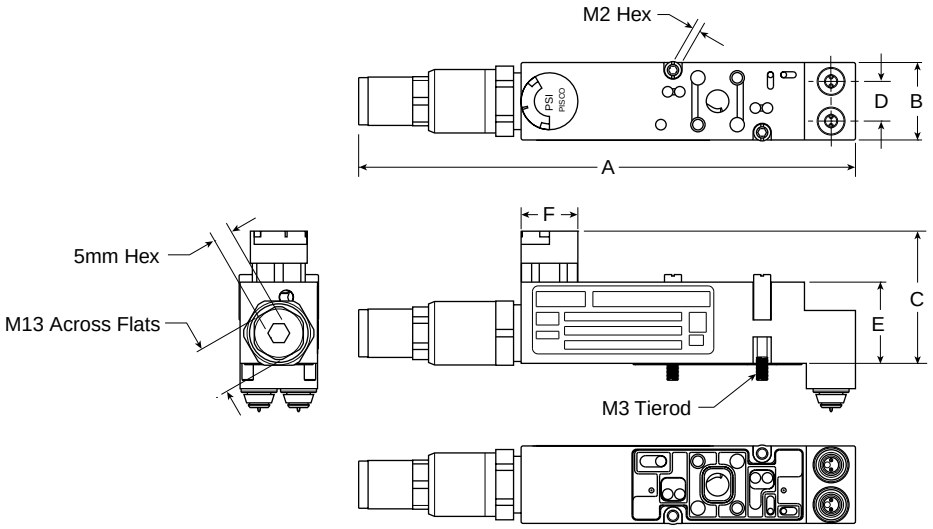
Sandwich Regulator

Dimensions

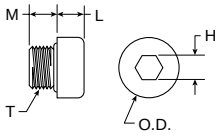
A	B	C	D
5.20 (132.0)	0.81 (20.5)	1.38 (35.0)	0.41 (10.5)
E	**F**		
0.85 (21.5)	0.59Ø (15Ø)		

Inches (mm)



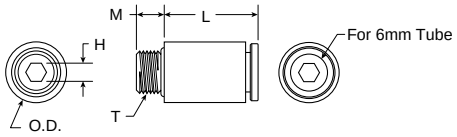
M7 Fittings

PS567900 – Kit PSM0013



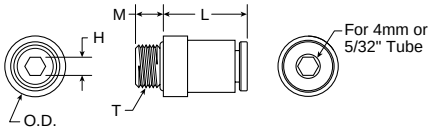
Part No.	L	M	H Hex	T Thread	O.D.
PS567900	0.18 (4.5)	0.20 (5)	0.16 (4)	M7 x 1	0.39 (10)

PS567906



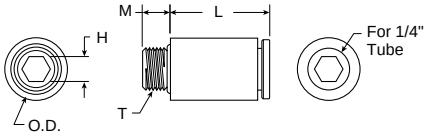
Part No.	Tube Size	L	M	H Hex	T Thread	O.D.
PS567906	6mm	0.63 (16)	0.20 (5)	0.12 (3)	M7 x 1	0.39 (10)

PS567904



Part No.	Tube Size	L	M	H Hex	T Thread	O.D.
PS567904	4mm or 5/32"	0.55 (14)	0.20 (5)	0.12 (3)	M7 x 1	0.39 (10)

PS567925



Part No.	Tube Size	L	M	H Hex	T Thread	O.D.
PS567925	1/4"	0.65 (16.5)	0.18 (4.6)	0.16 (4)	M7 x 1	0.41 (10.3)

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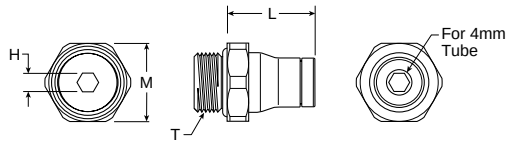
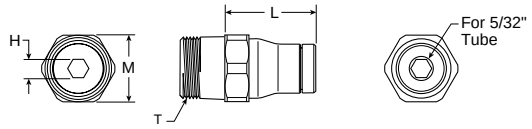
1/8 Inch Fittings

PS568204



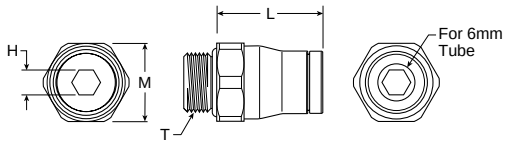
Part No.	Tube Size	L	M Hex	H Hex	T Thread
PS568204	4mm	0.57 (14.5)	0.51 (13)	0.12 (3)	G1 /8

PS568215



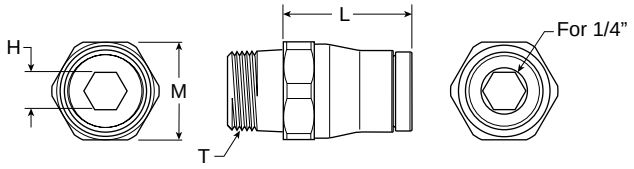
Part No.	Tube Size	L	M Hex	H Hex	T Thread
PS568215	5/32"	0.59 (15)	0.43 (11)	0.12 (3)	1/8 NPT

PS568206



Part No.	Tube Size	L	M Hex	H Hex	T Thread
PS568206	6mm	0.69 (17.5)	0.51 (13)	0.16 (4)	G1/8

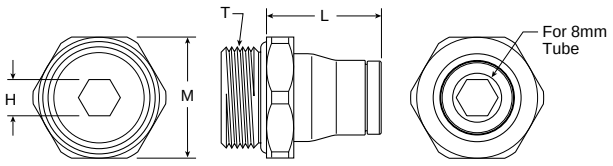
PS568225



Part No.	Tube Size	L	M Hex	H Hex	T Thread
PS568225	1/4"	0.67 (17)	0.51 (13)	0.20 (5)	1/8 NPT

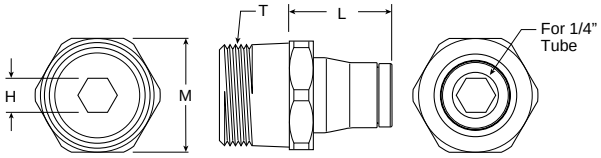
3/8 Inch Fittings

PS568308



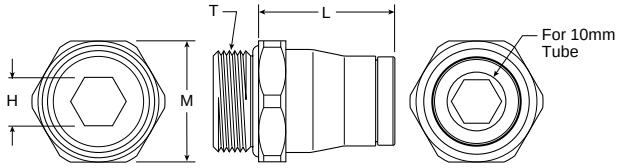
Part No.	Tube Size	L	M Hex	H Hex	T Thread
PS568308	8mm	0.75 (19)	0.79 (20)	0.24 (6)	G3/8

PS568325



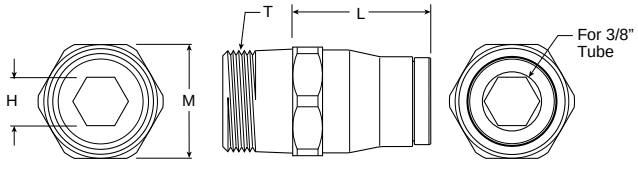
Part No.	Tube Size	L	M Hex	H Hex	T Thread
PS568325	1/4"	0.67 (17)	0.71 (18)	0.20 (5)	3/8 NPT

PS568310



Part No.	Tube Size	L	M Hex	H Hex	T Thread
PS568310	10mm	0.89 (22.5)	0.79 (20)	0.31 (8)	G3/8

PS568338



Part No.	Tube Size	L	M Hex	H Hex	T Thread
PS568338	3/8"	0.91 (23)	0.71 (18)	0.31 (8)	3/8 NPT

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Safety Guide For Selecting And Using Pneumatic Division Products And Related Accessories

⚠ WARNING:

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF PNEUMATIC DIVISION PRODUCTS, ASSEMBLIES OR RELATED ITEMS ("PRODUCTS") CAN CAUSE DEATH, PERSONAL INJURY, AND PROPERTY DAMAGE. POSSIBLE CONSEQUENCES OF FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THESE PRODUCTS INCLUDE BUT ARE NOT LIMITED TO:

- Unintended or mistimed cycling or motion of machine members or failure to cycle
- Work pieces or component parts being thrown off at high speeds.
- Failure of a device to function properly for example, failure to clamp or unclamp an associated item or device.
- Explosion
- Suddenly moving or falling objects.
- Release of toxic or otherwise injurious liquids or gasses.

Before selecting or using any of these Products, it is important that you read and follow the instructions below.

1. GENERAL INSTRUCTIONS

1.1. Scope: This safety guide is designed to cover general guidelines on the installation, use, and maintenance of Pneumatic Division Valves, FRLs (Filters, Pressure Regulators, and Lubricators), Vacuum products and related accessory components.

1.2. Fail-Safe: Valves, FRLs, Vacuum products and their related components can and do fail without warning for many reasons. Design all systems and equipment in a fail-safe mode, so that failure of associated valves, FRLs or Vacuum products will not endanger persons or property.

1.3 Relevant International Standards: For a good guide to the application of a broad spectrum of pneumatic fluid power devices see: ISO 4414:1998, Pneumatic Fluid Power – General Rules Relating to Systems. See www.iso.org for ordering information.

1.4. Distribution: Provide a copy of this safety guide to each person that is responsible for selection, installation, or use of Valves, FRLs or Vacuum products. Do not select, or use Parker valves, FRLs or vacuum products without thoroughly reading and understanding this safety guide as well as the specific Parker publications for the products considered or selected.

1.5. User Responsibility: Due to the wide variety of operating conditions and applications for valves, FRLs, and vacuum products Parker and its distributors do not represent or warrant that any particular valve, FRL or vacuum product is suitable for any specific end use system. This safety guide does not analyze all technical parameters that must be considered in selecting a product. The user, through its own analysis and testing, is solely responsible for:

- Making the final selection of the appropriate valve, FRL, Vacuum component, or accessory.
- Assuring that all user's performance, endurance, maintenance, safety, and warning requirements are met and that the application presents no health or safety hazards.
- Complying with all existing warning labels and / or providing all appropriate health and safety warnings on the equipment on which the valves, FRLs or Vacuum products are used; and,
- Assuring compliance with all applicable government and industry standards.

1.6. Safety Devices: Safety devices should not be removed, or defeated.

1.7. Warning Labels: Warning labels should not be removed, painted over or otherwise obscured.

1.8. Additional Questions: Call the appropriate Parker technical service department if you have any questions or require any additional information. See the Parker publication for the product being considered or used, or call 1-800-CPARKER, or go to www.parker.com, for telephone numbers of the appropriate technical service department.

2. PRODUCT SELECTION INSTRUCTIONS

2.1. Flow Rate: The flow rate requirements of a system are frequently the primary consideration when designing any pneumatic system. System components need to be able to provide adequate flow and pressure for the desired application.

2.2. Pressure Rating: Never exceed the rated pressure of a product. Consult product labeling, Pneumatic Division catalogs or the instruction sheets supplied for maximum pressure ratings.

2.3. Temperature Rating: Never exceed the temperature rating of a product. Excessive heat can shorten the life expectancy of a product and result in complete product failure.

2.4. Environment: Many environmental conditions can affect the integrity and suitability of a product for a given application. Pneumatic Division products are designed for use in general purpose industrial applications. If these products are to be used in unusual circumstances such as direct sunlight and/or corrosive or caustic environments, such use can shorten the useful life and lead to premature failure of a product.

2.5. Lubrication and Compressor Carryover: Some modern synthetic oils can and will attack nitrile seals. If there is any possibility of synthetic oils or greases migrating into the pneumatic components check for compatibility with the seal materials used. Consult the factory or product literature for materials of construction.

2.6. Polycarbonate Bowls and Sight Glasses: To avoid potential polycarbonate bowl failures:

- Do not locate polycarbonate bowls or sight glasses in areas where they could be subject to direct sunlight, impact blow, or temperatures outside of the rated range.
- Do not expose or clean polycarbonate bowls with detergents, chlorinated hydro-carbons, keytones, esters or certain alcohols.
- Do not use polycarbonate bowls or sight glasses in air systems where compressors are lubricated with fire resistant fluids such as phosphate ester and di-ester lubricants.

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2.7. Chemical Compatibility: For more information on plastic component chemical compatibility see Pneumatic Division technical bulletins Tec-3, Tec-4, and Tec-5

2.8. Product Rupture: Product rupture can cause death, serious personal injury, and property damage.
- Do not connect pressure regulators or other Pneumatic Division products to bottled gas cylinders.
- Do not exceed the maximum primary pressure rating of any pressure regulator or any system component.
- Consult product labeling or product literature for pressure rating limitations.

3. PRODUCT ASSEMBLY AND INSTALLATION INSTRUCTIONS

3.1. Component Inspection: Prior to assembly or installation a careful examination of the valves, FRLs or vacuum products must be performed. All components must be checked for correct style, size, and catalog number. DO NOT use any component that displays any signs of nonconformance.

3.2. Installation Instructions: Parker published Installation Instructions must be followed for installation of Parker valves, FRLs and vacuum components. These instructions are provided with every Parker valve or FRL sold, or by calling 1-800-CPARKER, or at www.parker.com.

3.3. Air Supply: The air supply or control medium supplied to Valves, FRLs and Vacuum components must be moisture-free if ambient temperature can drop below freezing

4. VALVE AND FRL MAINTENANCE AND REPLACEMENT INSTRUCTIONS

4.1. Maintenance: Even with proper selection and installation, valve, FRL and vacuum products service life may be significantly reduced without a continuing maintenance program. The severity of the application, risk potential from a component failure, and experience with any known failures in the application or in similar applications should determine the frequency of inspections and the servicing or replacement of Pneumatic Division products so that products are replaced before any failure occurs. A maintenance program must be established and followed by the user and, at minimum, must include instructions 4.2 through 4.10.

4.2. Installation and Service Instructions: Before attempting to service or replace any worn or damaged parts consult the appropriate Service Bulletin for the valve or FRL in question for the appropriate practices to service the unit in question. These Service and Installation Instructions are provided with every Parker valve and FRL sold, or are available by calling 1-800-CPARKER, or by accessing the Parker web site at www.parker.com.

4.3. Lockout / Tagout Procedures: Be sure to follow all required lockout and tagout procedures when servicing equipment. For more information see: OSHA Standard – 29 CFR, Part 1910.147, Appendix A, The Control of Hazardous Energy – (Lockout / Tagout)

4.4. Visual Inspection: Any of the following conditions requires immediate system shut down and replacement of worn or damaged components:
- Air leakage: Look and listen to see if there are any signs of visual damage to any of the components in the system. Leakage is an indication of worn or damaged components.
- Damaged or degraded components: Look to see if there are any visible signs of wear or component degradation.
- Kinked, crushed, or damaged hoses. Kinked hoses can result in restricted air flow and lead to unpredictable system behavior.
- Any observed improper system or component function: Immediately shut down the system and correct malfunction.
- Excessive dirt build-up: Dirt and clutter can mask potentially hazardous situations.

Caution: Leak detection solutions should be rinsed off after use.

4.5. Routine Maintenance Issues:
- Remove excessive dirt, grime and clutter from work areas.
- Make sure all required guards and shields are in place.

4.6. Functional Test: Before initiating automatic operation, operate the system manually to make sure all required functions operate properly and safely.

4.7. Service or Replacement Intervals: It is the user's responsibility to establish appropriate service intervals. Valves, FRLs and vacuum products contain components that age, harden, wear, and otherwise deteriorate over time. Environmental conditions can significantly accelerate this process. Valves, FRLs and vacuum components need to be serviced or replaced on routine intervals. Service intervals need to be established based on:
- Previous performance experiences.
- Government and / or industrial standards.
- When failures could result in unacceptable down time, equipment damage or personal injury risk.

4.8. Servicing or Replacing of any Worn or Damaged Parts: To avoid unpredictable system behavior that can cause death, personal injury and property damage:
- Follow all government, state and local safety and servicing practices prior to service including but not limited to all OSHA Lockout Tagout procedures (OSHA Standard – 29 CFR, Part 1910.147, Appendix A, The Control of Hazardous Energy – Lockout / Tagout).
- Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to system and Pneumatic Division products before installation, service, or conversion.
- Installation, servicing, and / or conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversions air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or if the product does not operate properly, do not put product or system into use.
- Warnings and specifications on the product should not be covered or painted over. If masking is not possible, contact your local representative for replacement labels.

4.9. Putting Serviced System Back into Operation: Follow the guidelines above and all relevant Installation and Maintenance Instructions supplied with the valve FRL or vacuum component to insure proper function of the system.

Offer of Sale

The items described in this document and other documents or descriptions provided by Parker Hannifin Corporation, its subsidiaries and its authorized distributors, are hereby offered for sale at prices to be established by Parker Hannifin Corporation, its subsidiaries and its authorized distributors. This offer and its acceptance by any customer ("Buyer") shall be governed by all of the following Terms and Conditions. Buyer's order for any such item, when communicated to Parker Hannifin Corporation, its subsidiaries or an authorized distributor ("Seller") verbally or in writing, shall constitute acceptance of this offer.

1. Terms and Conditions of Sale: All descriptions, quotations, proposals, offers, acknowledgments, acceptances and sales of Seller's products are subject to and shall be governed exclusively by the terms and conditions stated herein. Buyer's acceptance of any offer to sell is limited to these terms and conditions. Any terms or conditions in addition to, or inconsistent with those stated herein, proposed by Buyer in any acceptance of an offer by Seller, are hereby objected to. No such additional, different or inconsistent terms and conditions shall become part of the contract between Buyer and Seller unless expressly accepted in writing by Seller. Seller's acceptance of any offer to purchase by Buyer is expressly conditional upon Buyer's assent to all the terms and conditions stated herein, including any terms in addition to, or inconsistent with those contained in Buyer's offer. Acceptance of Seller's products shall in all events constitute such assent.

2. Payment: Payment shall be made by Buyer net 30 days from the date of delivery of the items purchased hereunder. Amounts not timely paid shall bear interest at the maximum rate permitted by law for each month or portion thereof that the Buyer is late in making payment. Any claims by Buyer for omissions or shortages in a shipment shall be waived unless Seller receives notice thereof within 30 days after Buyer's receipt of the shipment.

3. Delivery: Unless otherwise provided on the face hereof, delivery shall be made F.O.B. Seller's plant. Regardless of the method of delivery, however, risk of loss shall pass to Buyer upon Seller's delivery to a carrier. Any delivery dates shown are approximate only and Seller shall have no liability for any delays in delivery.

4. Warranty: Seller warrants that the items sold hereunder shall be free from defects in material or workmanship for a period of 18 months from date of shipment from Parker Hannifin Corporation. THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO ITEMS PROVIDED HEREUNDER. SELLER MAKES NO OTHER WARRANTY, GUARANTEE, OR REPRESENTATION OF ANY KIND WHATSOEVER. ALL OTHER WARRANTIES, INCLUDING BUT NOT LIMITED TO, MERCHANTABILITY AND FITNESS FOR PURPOSE, WHETHER EXPRESS, IMPLIED, OR ARISING BY OPERATION OF LAW, TRADE USAGE, OR COURSE OF DEALING ARE HEREBY DISCLAIMED.

NOTWITHSTANDING THE FOREGOING, THERE ARE NO WARRANTIES WHATSOEVER ON ITEMS BUILT OR ACQUIRED WHOLLY OR PARTIALLY, TO BUYER'S DESIGN OR SPECIFICATIONS.

5. Limitation of Remedy: SELLER'S LIABILITY ARISING FROM OR IN ANY WAY CONNECTED WITH THE ITEMS SOLD OR THIS CONTRACT SHALL BE LIMITED EXCLUSIVELY TO REPAIR OR REPLACEMENT OF THE ITEMS SOLD OR REFUND OF THE PURCHASE PRICE PAID BY BUYER, AT SELLER'S SOLE OPTION. IN NO EVENT SHALL SELLER BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES OF ANY KIND OR NATURE WHATSOEVER, INCLUDING BUT NOT LIMITED TO LOST PROFITS ARISING FROM OR IN ANY WAY CONNECTED WITH THIS AGREEMENT OR ITEMS SOLD HEREUNDER, WHETHER ALLEGED TO ARISE FROM BREACH OF CONTRACT, EXPRESS OR IMPLIED WARRANTY, OR IN TORT, INCLUDING WITHOUT LIMITATION, NEGLIGENCE, FAILURE TO WARN OR STRICT LIABILITY.

6. Changes, Reschedules and Cancellations: Buyer may request to modify the designs or specifications for the items sold hereunder as well as the quantities and delivery dates thereof, or may request to cancel all or part of this order, however, no such requested modification or cancellation shall become part of the contract between Buyer and Seller unless accepted by Seller in a written amendment to this Agreement. Acceptance of any such requested modification or cancellation shall be at Seller's discretion, and shall be upon such terms and conditions as Seller may require.

7. Special Tooling: A tooling charge may be imposed for any special tooling, including without limitations, dies, fixtures, molds and patterns, acquired to manufacture items sold pursuant to this contract. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the items sold hereunder, even if such apparatus has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

8. Buyer's Property: Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer, or any other items which become Buyer's property, may be considered obsolete and may be destroyed by Seller after two (2) consecutive years have elapsed without Buyer placing an order for the items which are manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

9. Taxes: Unless otherwise indicated on the face hereof, all prices and charges are exclusive of excise, sales, use, property, occupational or like taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of the items sold hereunder. If any such taxes must be paid by Seller or if Seller is liable for the collection of such tax, the amount thereof shall be in addition to the amounts for the items sold. Buyer agrees to pay all such taxes or to reimburse Seller therefore upon receipt of its invoice. If Buyer claims exemption from any sales, use or other tax imposed by any taxing authority, Buyer shall save Seller harmless from and against any such tax, together with any interest or penalties thereon which may be assessed if the items are held to be taxable.

10. Indemnity For Infringement of Intellectual Property Rights: Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Part 10. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets (hereinafter "Intellectual Property Rights"). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that an item sold pursuant to this contract infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If an item sold hereunder is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using said item, replace or modify said item so as to make it noninfringing, or offer to accept return of said item and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to items delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any item sold hereunder. The foregoing provisions of this Part 10 shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

If a claim is based on information provided by Buyer or if the design for an item delivered hereunder is specified in whole or in part by Buyer, Buyer shall defend and indemnify Seller for all costs, expenses or judgements resulting from any claim that such item infringes any patent, trademark, copyright, trade dress, trade secret or any similar right.

11. Force Majeure: Seller does not assume the risk of and shall not be liable for delay or failure to perform any of Seller's obligations by reason of circumstances beyond the reasonable control of Seller (hereinafter "Events of Force Majeure"). Events of Force Majeure shall include without limitation, accidents, acts of God, strikes or labor disputes, acts, laws, rules or regulations of any government or government agency, fires, floods, delays or failures in delivery of carriers or suppliers, shortages of materials and any other cause beyond Seller's control.

12. Entire Agreement/Governing Law: The terms and conditions set forth herein, together with any amendments, modifications and any different terms or conditions expressly accepted by Seller in writing, shall constitute the entire Agreement concerning the items sold, and there are no oral or other representations or agreements which pertain thereto. This Agreement shall be governed in all respects by the law of the State of Ohio. No actions arising out of sale of the items sold hereunder or this Agreement may be brought by either party more than two (2) years after the cause of action accrues.

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