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Fieldbus Systems

Section E

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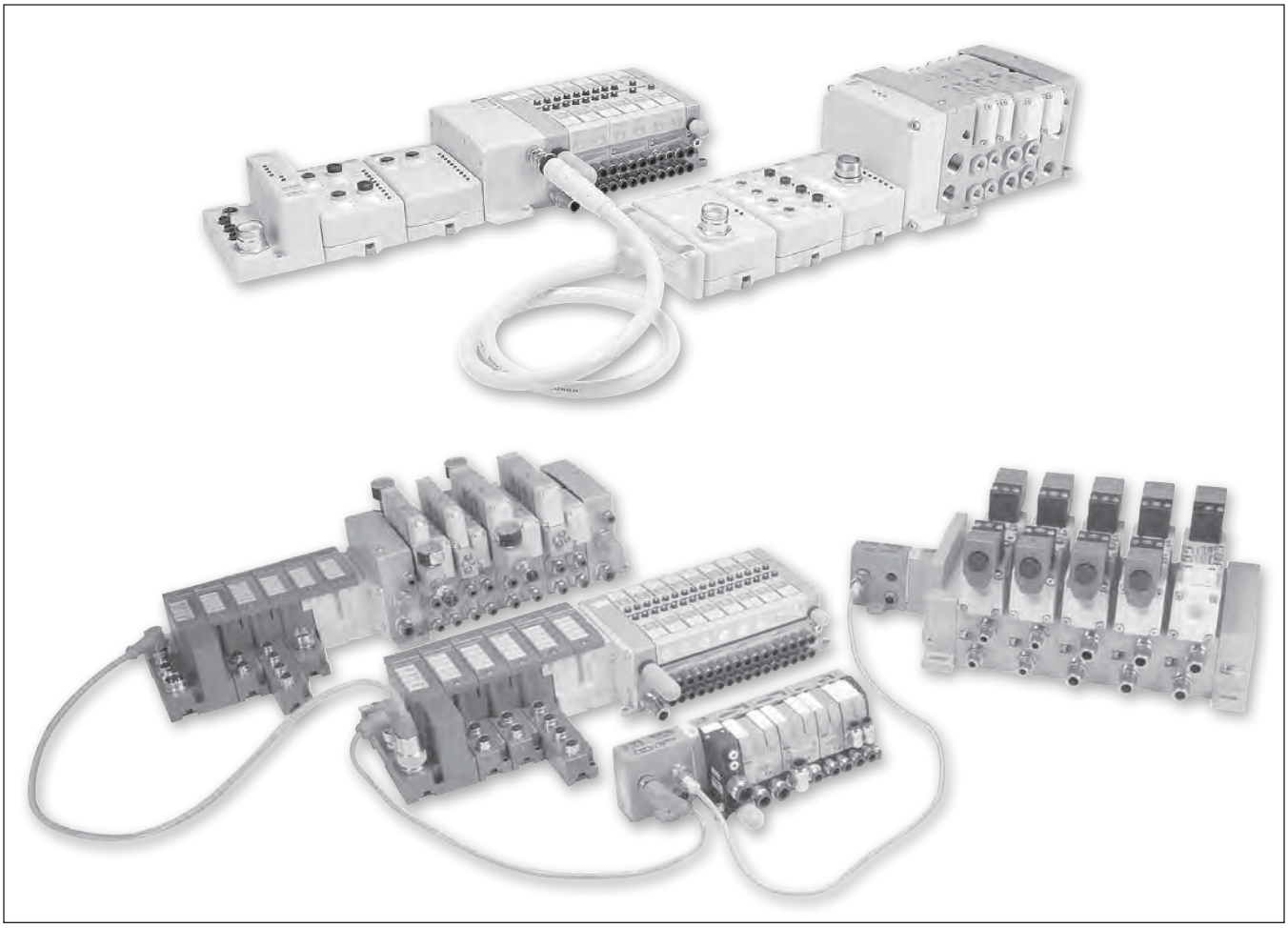

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	Fieldbus Offering		
Valve Series	**Moduflex**	**Isysnet**	**Turck**
Moduflex	X		
Isys Micro	X	X	X
Isys ISO	X	X	X

	Fieldbus Offering		
Protocol	**Moduflex**	**Isysnet**	**Turck**
DeviceNet	X	X	X
Ethernet/IP		X	X
Profibus-DP	X	X	X
Profinet			X
Modbus/TCP			X
AS-i	X		
CANopen	X		X
Interbus-S	X		
ControlNet		X	

	Fieldbus Offering		
Options	**Moduflex**	**Isysnet**	**Turck**
Digital inputs / outputs*		X	X
Analog inputs / outputs		X	X
16 Solenoid control*	X		X
32 Solenoid control		X	X
Short circuit protection on inputs			X
Current sensing outputs			X
Bus expansion		X	
DeviceNet subnet			X
Programmable comm modules			X
Power over DeviceNet / CANopen			X
Preferred Connectivity		X	
CANopen Expansion			X

* Modulfex AS-i modules are available with 6 or 8 inputs and 6 or 8 solenoid outputs

	Turck Fieldbus	**Isysnet**	**Moduflex**
Solenoid Control	Up to 32 solenoids on main valve manifold Devicenet Subnet Allows an additional 32 solenoids per node 63 nodes maximum CANopen expansion Allows an additional 64 solenoids per expansion 5 expansions maximum	Up to 32 solenoids on main valve manifold Isys Micro Bus Expansion Allows an additional 32 solenoids per expansion 3 expansions maximum 1 meter fixed cable length per expansion	Up to 16 solenoids on main valve manifold
I/O Capabilities	256 maximum inputs and outputs directly connected to communication module Devicenet Subnet Allows an additional 256 I/O per node 63 nodes maximum Third party DeviceNet modules can be used CANopen expansion Allows an additional 64 I/O per expansion 5 expansions maximum Third party CANopen modules can be used	Maximum of 256 inputs and 256 outputs directly connected to the communication module, including Isys Micro Bus Expansion	8 Inputs available on AS-i communication only.
Short Circuit Protection	SXG and diagnostic electronic modules have each point isolated All other electronic modules are isolated from the backplane	Devices must be fused between input / output and electronic module.	

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		Moduflex					Isysnet				Turck Fieldbus					
		AS-i	CANopen	DeviceNet	Interbus	Profibus	ControlNet	DeviceNet	EtherNet	Profibus	CANopen	DeviceNet	Ethernet/IP	Modbus/TCP	Profibus	Profinet
Rockwell Automation	PLC-5™			X								X				
	SLC 500™			X								X	X			
	1756 Logix™			X								X	X			
	1769-L32C, -35CR			X			X	X	X			X	X			
	1769 CompactLogix™			X			X	X	X			X	X			
	SoftLogix5800™			X			X	X	X			X	X			
	FlexLogic™			X			X	X	X			X	X			
	1789 ControlLogix™			X			X	X	X			X	X			
Siemens	SIMATIC S7-200	X				X				X					X	
	SIMATIC S7-300	X				X				X					X	
	SIMATIC S7-400					X				X					X	X
	SIMATIC S7-1200					X				X					X	X
Omron	SYSMAC One			X								X				
	SYSMAC CJ1			X								X				
	SYSMAC CJ2			X								X				
	SYSMAC CP1			X								X				
	SYSMAC CS1			X								X				
	SYSMAC CQM1H			X								X				
	SYSMAC Alpha			X								X				
	SYSMAC CVM1/CV			X								X				
	SYSMAC CPM			X								X				
Schneider	Modicon Premium		X		X	X				X	X		X	X	X	
	Quantum	X			X								X	X		
	M340™	X	X								X		X	X		
	Momentum™												X	X		
Automation Direct	Productivity 3000			X								X				
	DirectLogic 05			X								X				
	DirectLogic 06			X								X				
	DirectLogic 105			X								X				
	DirectLogic 205			X								X	X	X		
	DirectLogic 305			X								X	X	X		
	DirectLogic 405			X								X	X	X		

Note: Above information believed correct at the time of printing. Confirm manufacturers specifications to ensure product compatibility.

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Basic Systems

- Up to 24 solenoids per manifold
- Discretely wired solenoids - Optimized for PLCs with onboard Inputs and Outputs
- 25-Pin D-Sub, 19-Pin Brad Harrison or M23, or 12-Pin M23 connectors available.

Centralized Application

Valves 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
- Eliminates junction boxes required for valves
- Eliminates conduit runs for valves

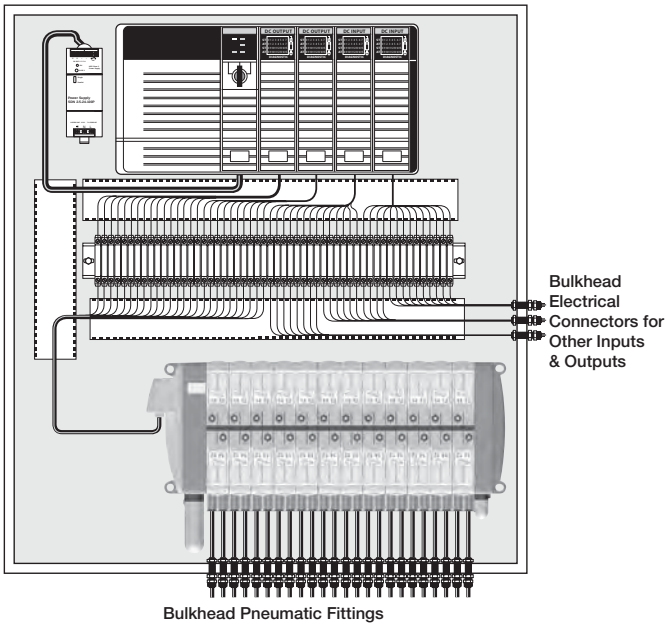
Decentralized Application

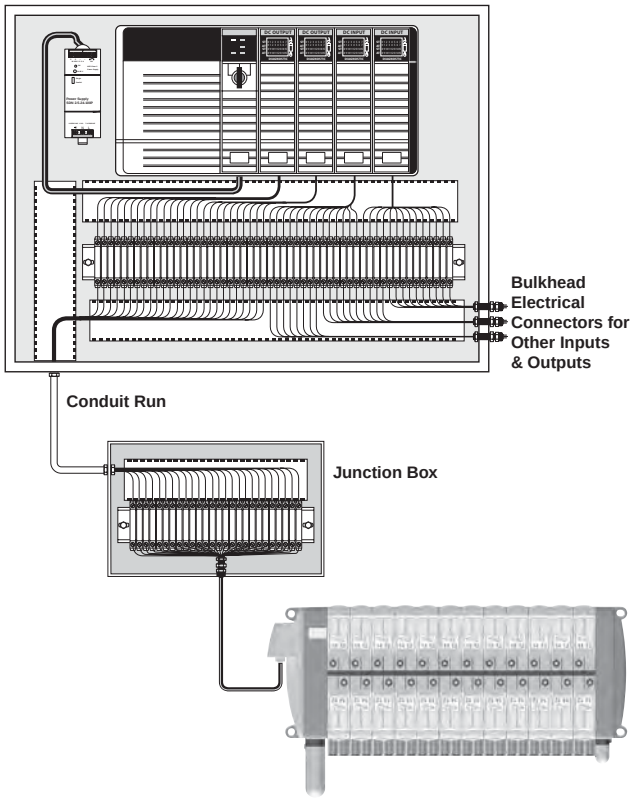
valves Outside Control Cabinet

- 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 pneumatic response time
- Eliminates pneumatic bulk fittings on control cabinet





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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
- Connectivity to Moduflex, Isys Micro and Isys ISO valves.

Centralized Application

Valves 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

Advantages

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

Decentralized Application

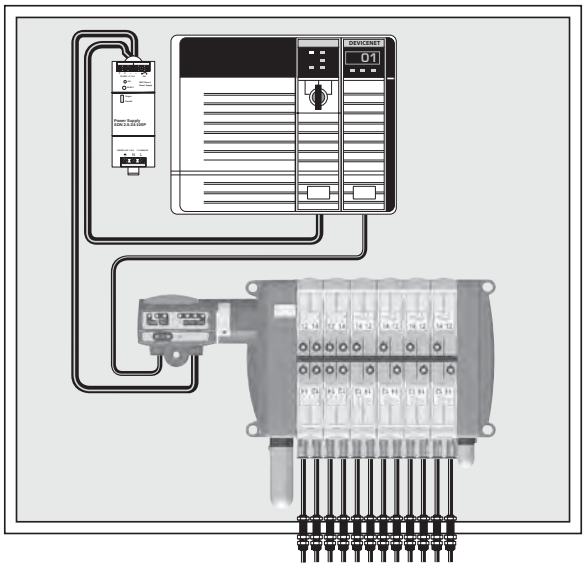
Isys Micro Outside Control Cabinet

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

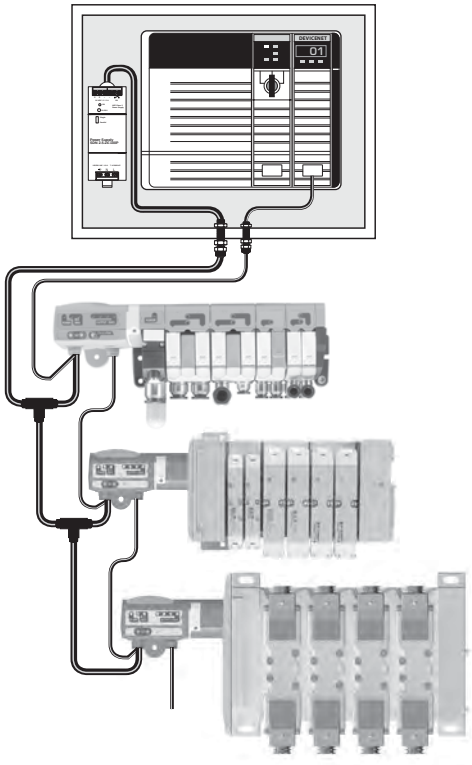
Advantages

- Smallest control cabinet
- Reduces tubing length and improves pneumatic 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 and other devices.
- Eliminates terminal strips and wire ways for valves
- Greatly reduces wiring time
- Eliminates junction boxes for valves
- Eliminates conduit runs for valves

DeviceNet™ PROFIBUS PROCESS FIELD BUS CANopen INTERBUS-S AS-INTERFACE



Bulkhead Pneumatic Fittings



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Complete Fieldbus Systems: Isysnet Fieldbus System

- Up to 32 Solenoids per Manifold
- With Isys Micro 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
- Connectivity to Isys Micro and Isys ISO valves

Centralized Application

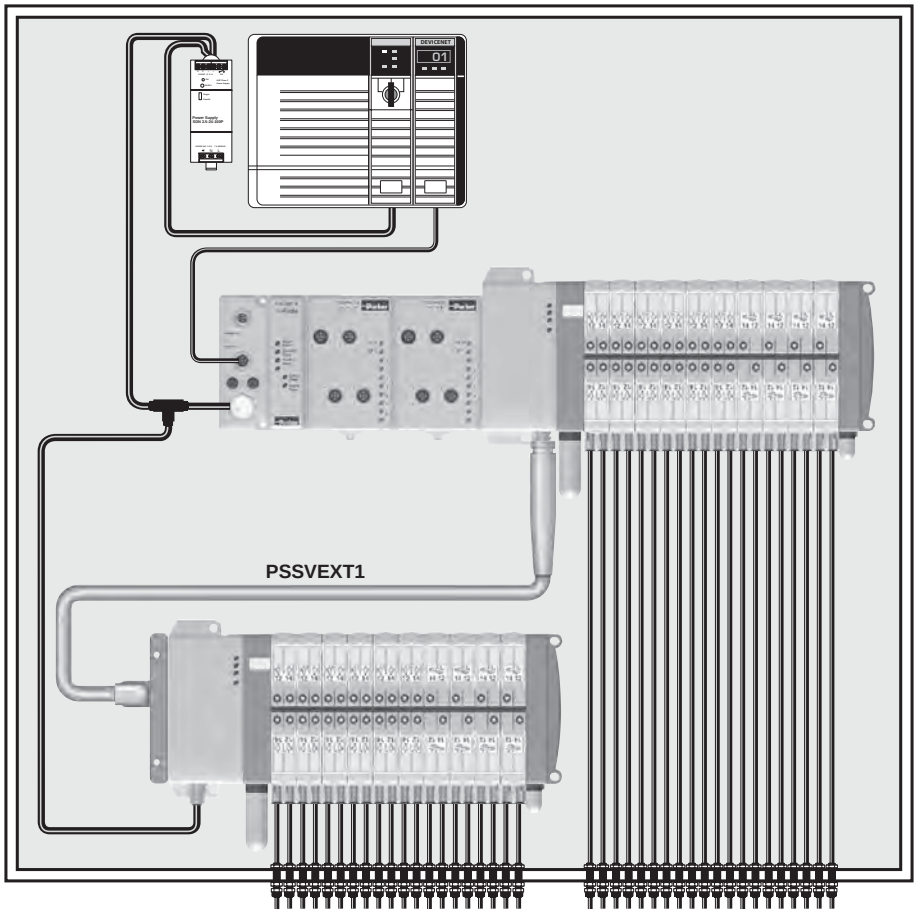
Valves Inside Control Cabinet

- 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 Cables
- Up to 256 Inputs and 256 Outputs per Isysnet Node
- Analog Inputs / Outputs available
- Highest degree of environmental protection
- One location for all control devices
- 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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Complete Fieldbus Systems: Isysnet Fieldbus System

- Up to 32 Solenoids per Manifold
- With Isys Micro 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
- Connectivity to Isys Micro and Isys ISO valves

Decentralized Application

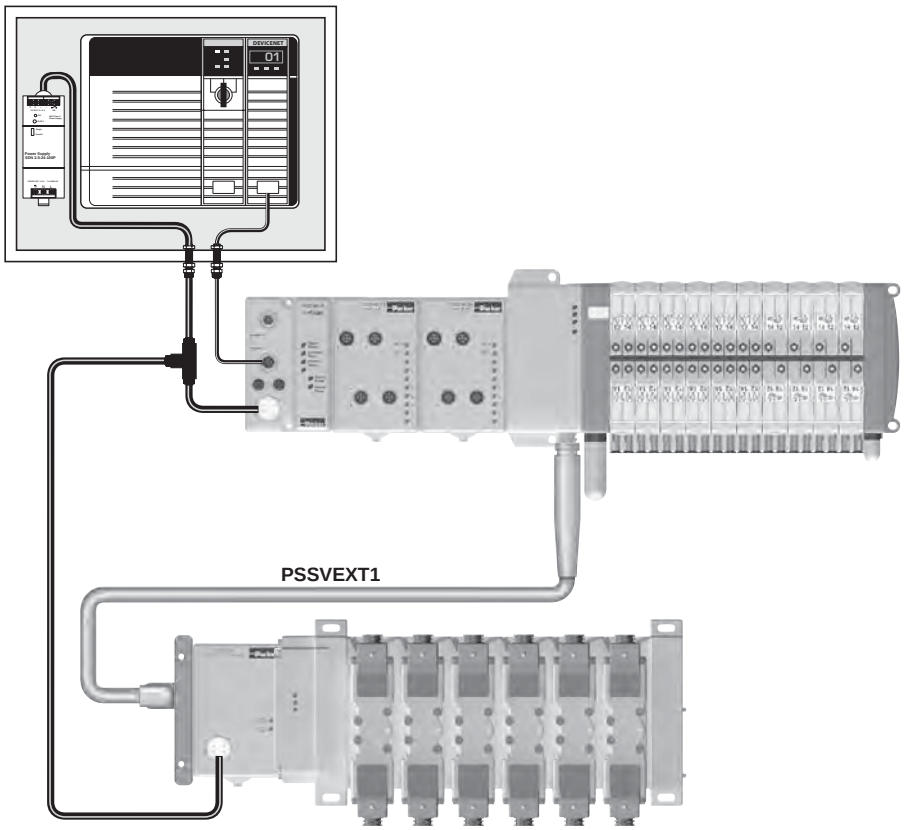
Valves Outside Control Cabinet

- 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

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

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 per Isysnet Nodes
- Analog Inputs / Outputs available
- Smallest control cabinet
- Reduces tubing length and improves pneumatic 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 and other devices.
- Eliminates terminal strips and wire ways
- Greatly reduces wiring time
- Eliminates junction boxes for all inputs and outputs
- Eliminates conduit runs for all inputs and outputs



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Complete Fieldbus Systems: Turck Fieldbus System

General Product Features

- Turck Fieldbus System with up to 256 inputs / outputs and 32 Solenoids per manifold
- Digital inputs / outputs, analog inputs / outputs, serial interface, counter modules, and RFID modules available
- Connectivity to Isys Micro and Isys ISO valves system

Advantages

- Handle all I/O from one node; eliminate PLC input / output cards
- Fieldbus equipped manifolds – optimized for PLC's with fieldbus capability
- Eliminates junction boxes, terminal strips, and conduit runs for all inputs and outputs, greatly reducing wiring time

Centralized Application

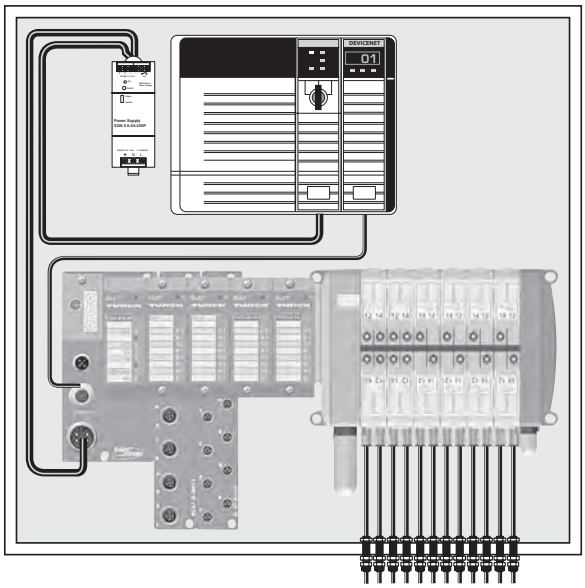
Valves Inside Control Cabinet

- 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

DeviceNet™ EtherNet/IP™ PROFIBUS PROCESS FIELD BUS PROFINET INDUSTRIAL ETHERNET Modbus/TCP™ CANopen



Bulkhead Pneumatic Fittings

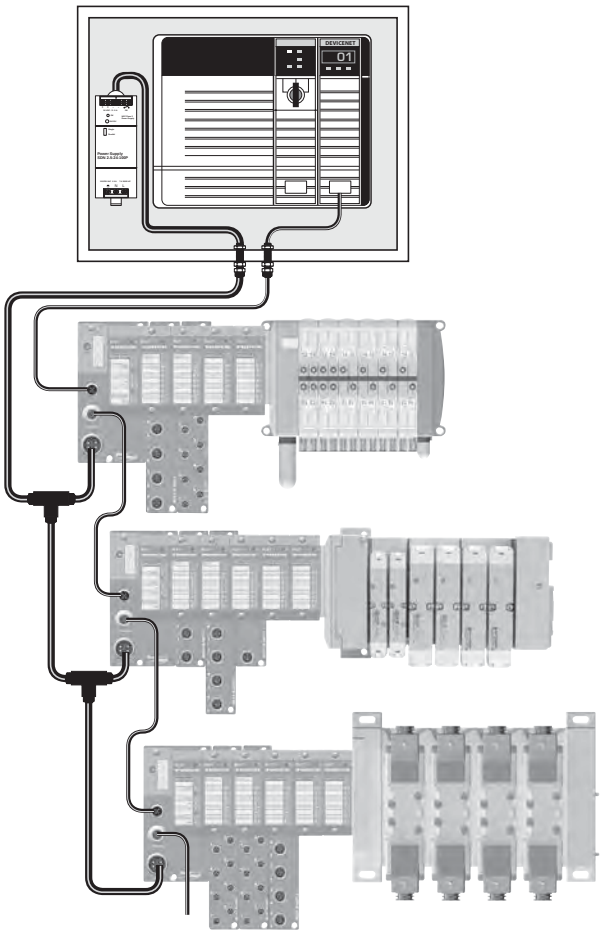
Decentralized Application

Valves Outside Control Cabinet

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

Advantages

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



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Complete Fieldbus Systems: Turck Fieldbus System with CANopen Expansion

General Product Features

- Turck Fieldbus System with up to 256 inputs / outputs and 32 Solenoids per manifold
- Digital inputs / outputs, analog inputs / outputs, serial interface, counter modules, and RFID modules available
- Connectivity to Isys Micro and Isys ISO valves

CANopen Expansion Features

- Using a CANopen Interface module, a CANopen subnet is created within the BL67 network, controlling an additional 64 inputs, outputs, or solenoids.
- The CANopen subnet is independent of the main fieldbus network, and is not visible to the master PLC.
- Additional Moduflex CANopen modules can be attached to the CANopen subnet to provide a connection for 16 solenoids each.
- Other 3rd party CANopen devices can also be used on this network, within the 64 bit CANopen Expansion limit.

System Advantages

- Handle all I/O from one node; eliminate PLC input / output cards
- Fieldbus equipped manifolds – optimized for PLC's with fieldbus capability
- Several CANopen fieldbus nodes can be attached to the network – valve manifolds, inputs, outputs or other devices
- CANopen expansion allows additional devices to be attached to the system without a CANopen scanner card
- Eliminates junction boxes, terminal strips, and conduit runs for all inputs and outputs, greatly reducing wiring time

Centralized Application

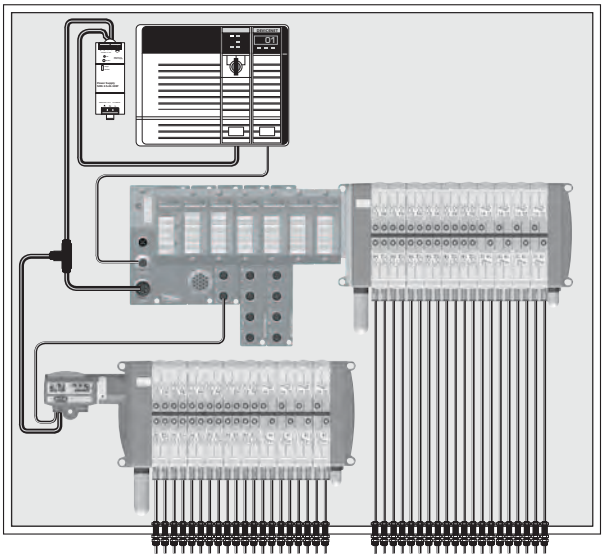
Valves Inside Control Cabinet

- 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

DeviceNet™ EtherNet/IP™ PROFIBUS PROFINET Modbus/TCP™ CANopen



Bulkhead Pneumatic Fittings

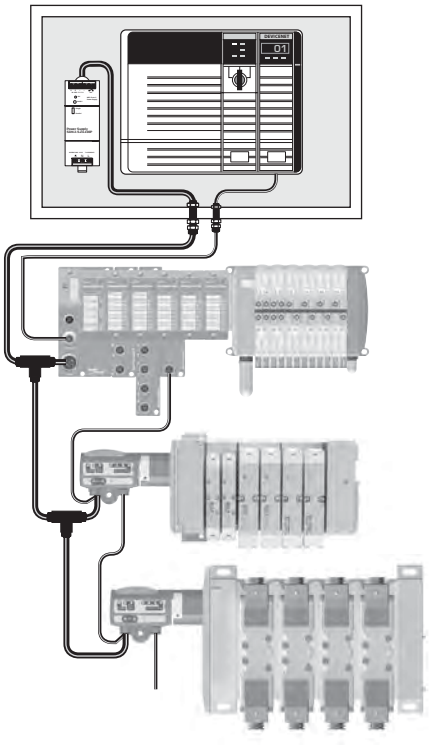
Decentralized Application

Valves Outside Control Cabinet

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

Advantages

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



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Complete Fieldbus Systems: Turck Fieldbus System with BL Remote DeviceNet Subnet

General Product Features

- Turck Fieldbus System with up to 256 inputs / outputs and 32 Solenoids per manifold
- Digital inputs / outputs, analog inputs / outputs, serial interface, counter modules, and RFID modules available
- Connectivity to Isys Micro and Isys ISO valves

BL Remote DeviceNet Subnet Features

- With BL Remote DeviceNet Subnet functionality, each communication module has its own DeviceNet master which provides a connection for 63 DeviceNet nodes with additional inputs, outputs, and solenoid control
- BL Remote DeviceNet Subnet is independent of the main fieldbus network, and is not visible to the master PLC
- Moduflex DeviceNet modules can be attached to the subnet to provide a connection for 16 solenoids each
- Turck DeviceNet modules can be attached to the subnet to provide a connection for 16 or 32 solenoids each and inputs and outputs up to the 256 input and output limitation

System Advantages

- Handle all I/O from one node; eliminate PLC input / output cards
- Fieldbus equipped manifolds – optimized for PLC's with fieldbus capability
- Many DeviceNet nodes can be attached to the network – valve manifolds, inputs, outputs or other devices
- Eliminates junction boxes, terminal strips, and conduit runs for all inputs and outputs, greatly reducing wiring time

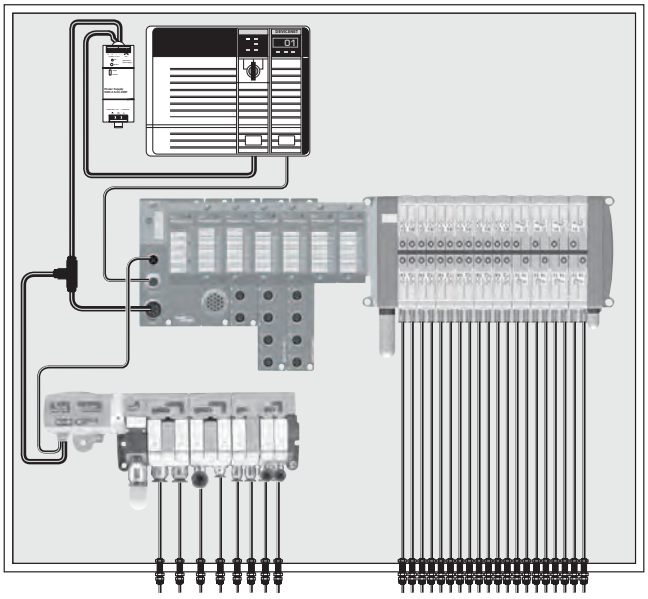
Centralized Application

Valves 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



Bulkhead Pneumatic Fittings

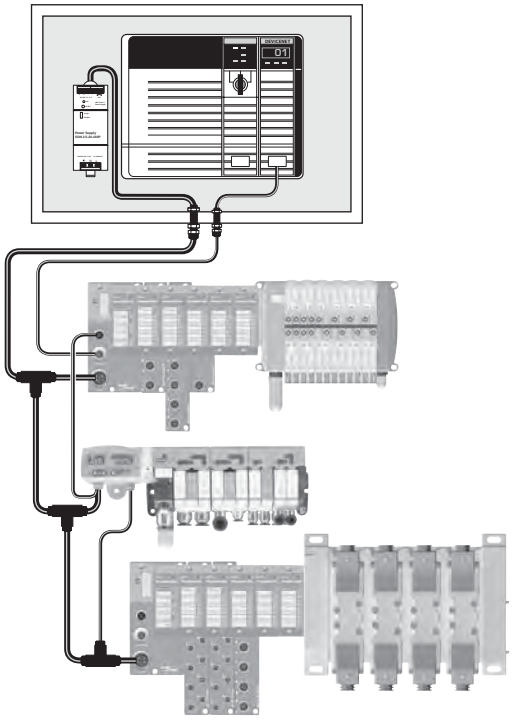
Decentralized Application

Valves Outside Control Cabinet

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

Advantages

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



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Complete Fieldbus Systems: Turck Fieldbus System with Stand alone Control

General Product Features

- Turck Fieldbus System with up to 256 inputs / outputs and 32 Solenoids per manifold
- Digital inputs / outputs, analog inputs / outputs, serial interface, counter modules, and RFID modules available
- Connectivity to Isys Micro and Isys ISO valves

Stand Alone Control Features

- Communication modules equipped with standalone control – programmed according to IEC61131-3 with CoDeSys
- 512KB Program memory with 32 bit RISC processor
- Run 1000 instructions in less than 1 ms
- Fieldbus equipped manifolds – optimized for PLC's with fieldbus capability or standalone controllers that need to interface with other devices

System Advantages

- Handle all I/O and control with one system; eliminate the PLC when used as the main controller for smaller machines
- Reduces programming and bandwith requirements on large machines with a master PLC controller by handling local I/O and interfacing with the PLC over the fieldbus network
- Fieldbus equipped manifolds provide connectivity to other fieldbus devices
- Eliminates junction boxes, terminal strips, and conduit runs for all inputs and outputs, greatly reducing wiring time

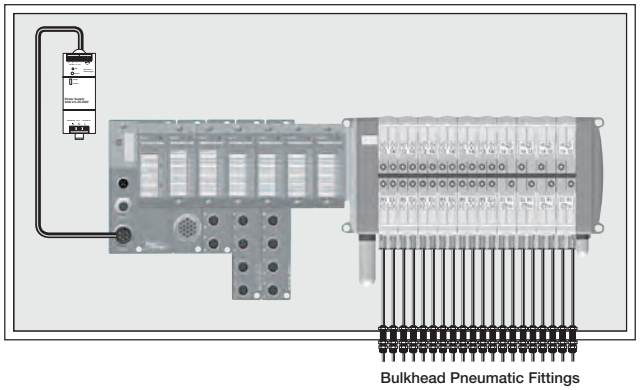
Centralized Application Valves

Inside Control Cabinet

- Valves attached to the machine control
- Applications with caustic wash down, hazardous areas, or extreme temperatures

Advantages

- Highest degree of environmental protection
- One location for all control devices



Bulkhead Pneumatic Fittings

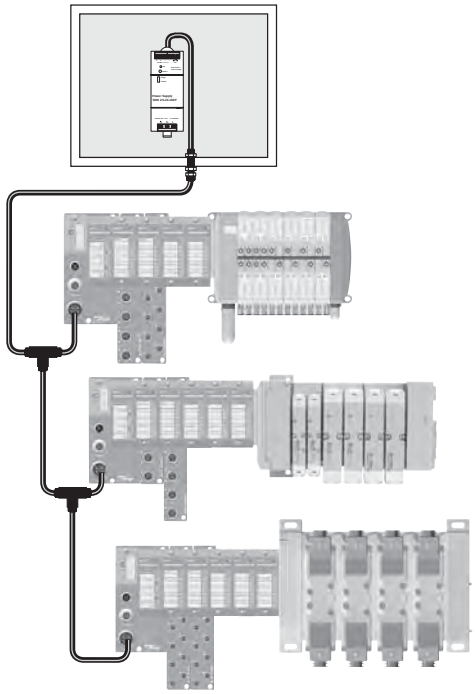
Decentralized Application

Valves Outside Control Cabinet

- Valves and machine control located near application, ready for machine mounting
- IP65 rating suitable for dusty and wet environments

Advantages

- No control cabinet needed when used as the main controller
- Reduces tubing length and improves response time
- Eliminates pneumatic bulk fittings on control cabinet



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Complete Fieldbus Systems: Turck Fieldbus System with Stand Alone Control and BL Remote DeviceNet Subnet

General Product Features

- Turck Fieldbus System with up to 256 inputs / outputs and 32 Solenoids per manifold
- Digital inputs / outputs, analog inputs / outputs, serial interface, counter modules, and RFID modules available
- Connectivity to Isys Micro and Isys ISO valves

Stand Alone Control Features

- Communication modules equipped with standalone control – programmed according to IEC61131-3 with CoDeSys
- 512KB Program memory with 32 bit RISC processor
- Run 1000 instructions in less than 1 ms

BL Remote DeviceNet Subnet Features

- With BL Remote DeviceNet Subnet functionality, each communication module has its own DeviceNet master which provides a connection for 63 DeviceNet nodes with additional inputs, outputs, and solenoid control
- BL Remote DeviceNet Subnet is independent of the main fieldbus network, and is not visible to the master PLC
- Moduflex DeviceNet modules can be attached to the subnet to provide a connection for 16 solenoids each
- Turck DeviceNet modules can be attached to the subnet to provide a connection for 16 or 32 solenoids each and inputs and outputs up to the 256 input and output limitation

System Advantages

- Handle all I/O and control with one system; eliminate the PLC when used as the main controller for smaller machines
- Reduces programming and bandwith requirements on large machines with a master PLC controller by handling local I/O and interfacing with the PLC over the fieldbus network
- Fieldbus equipped manifolds provide connectivity to other fieldbus devices
- Many DeviceNet nodes can be attached to the network – valve manifolds, inputs, outputs or other devices
- Eliminates junction boxes, terminal strips, and conduit runs for all inputs and outputs, greatly reducing wiring time

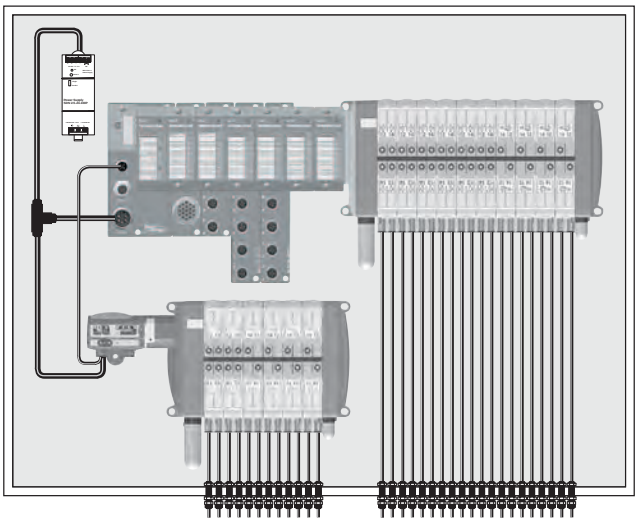
Centralized Application

Valves Inside Control Cabinet

- Valves attached to the 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



Bulkhead Pneumatic Fittings

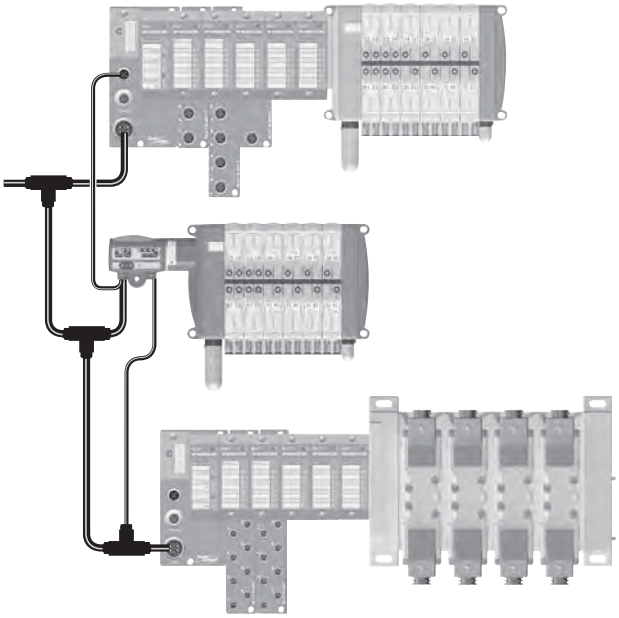
Decentralized Application

Valves Outside Control Cabinet

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

Advantages

- No control cabinet needed when used as the main controller
- Reduces tubing length and improves pneumatic response time
- Eliminates pneumatic bulk fittings on control cabinet



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Complete Fieldbus Systems: Turck Fieldbus System with Stand Alone Control, BL Remote DeviceNet Subnet, and CANopen Expansion

General Product Features

- Turck Fieldbus System with up to 256 inputs / outputs and 32 Solenoids per manifold
- Digital inputs / outputs, analog inputs / outputs, serial interface, counter modules, and RFID modules available
- Connectivity to Isys Micro and Isys ISO valves

Stand Alone Control Features

- Communication modules equipped with standalone control – programmed according to IEC61131-3 with CoDeSys
- 512KB Program memory with 32 bit RISC processor
- Run 1000 instructions in less than 1 ms

BL Remote DeviceNet Subnet Features

- Each communication module has its own DeviceNet master which provides a connection for 63 DeviceNet nodes with additional inputs, outputs, and solenoid control
- BL Remote DeviceNet Subnet is independent of the main fieldbus network, and is not visible to the master PLC
- Moduflex DeviceNet modules can be attached to the subnet to provide a connection for 16 solenoids each
- Turck DeviceNet modules can be attached to the subnet to provide a connection for 16 or 32 solenoids each and inputs and outputs up to the 256 input and output limitation

CANopen Expansion Features

- Using a CANopen Interface module, a CANopen subnet is created within the BL67 network, controlling an additional 64 inputs, outputs, or solenoids
- The CANopen subnet is independent of the main fieldbus network, and is not visible to the master PLC
- Additional Moduflex CANopen modules can be attached to the CANopen subnet to provide a connection for 16 solenoids each
- Other 3rd party CANopen devices can also be used on this network, within the 64 bit CANopen Expansion limit

System Advantages

- Handle all I/O and control with one system; eliminate the PLC when used as the main controller for smaller machines
- Reduces programming and bandwith requirements on large machines with a master PLC controller by handling local I/O and interfacing with the PLC over the fieldbus network
- Fieldbus equipped manifolds provide connectivity to other fieldbus devices
- Many DeviceNet nodes can be attached to the network – valve manifolds, inputs, outputs or other devices
- Several CANopen nodes can be attached to the network – valve manifolds, inputs, outputs or other devices
- CANopen expansion allows additional devices to be attached to the system without a CANopen scanner card
- Eliminates junction boxes, terminal strips, and conduit runs for all inputs and outputs, greatly reducing wiring time

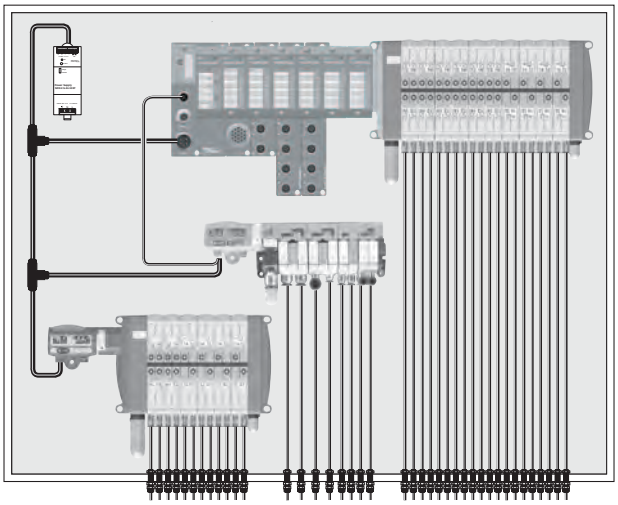
Centralized Application

Valves Inside Control Cabinet

- Valves attached to the 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



Bulkhead Pneumatic Fittings

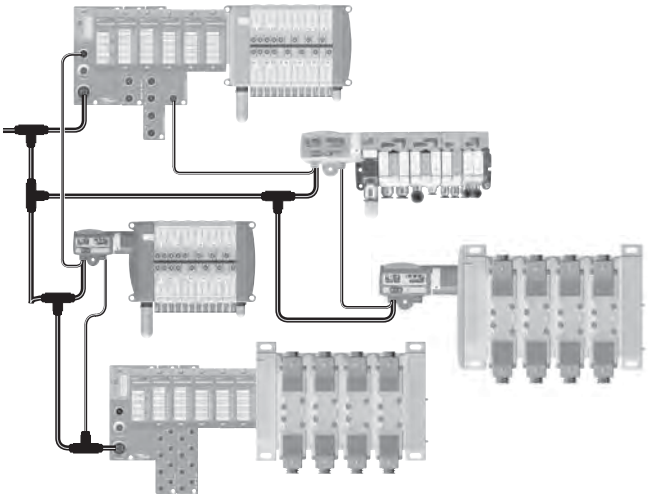
Decentralized Application

Valves Outside Control Cabinet

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

Advantages

- No control cabinet needed when used as the main controller
- Reduces tubing length and improves pneumatic response time
- Eliminates pneumatic bulk fittings on control cabinet



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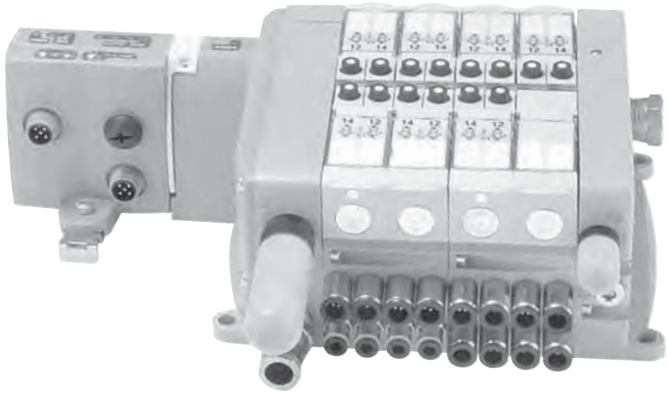
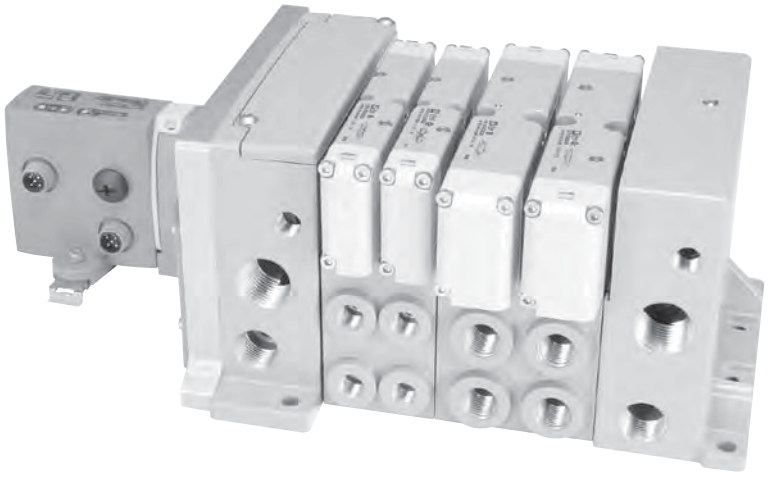
The Moduflex Fieldbus System

Moduflex communication modules directly attach to the end plate. It offers a compact and low cost fieldbus solution.

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
- CE certification





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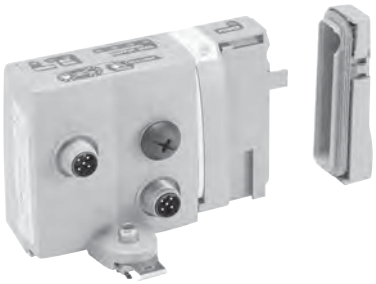
Communication Modules

DeviceNet™ CANopen PROFIBUS PROCESS FIELD BUS INTERBUS-S

Control for up to 16 solenoids



P2M2HBVP11600

Protocol	Part Number
Profibus DP	**P2M2HBVP21600**
DeviceNet	**P2M2HBVD21600**
CANopen	**P2M2HBVC21600**
InterBus-S	P2M2HBVS11600

Fieldbus Accessories

	Protocol	Connector Type	Part Number
Power Supply Field Wireable Connector	Profibus DP / InterBus-S / DeviceNet / CANopen	M12 type A Female	**P8CS1205AA**
Line Termination Resistor	Profibus DP	M12 type B	**P8BPA00MB**
	DeviceNet / CANopen	M12 type A	**P8BPA00MA**

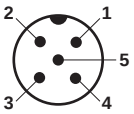
Note: Use standard cables and connectors for bus communications from your electrical supplier.

M12 (Male) Power Supply Connector

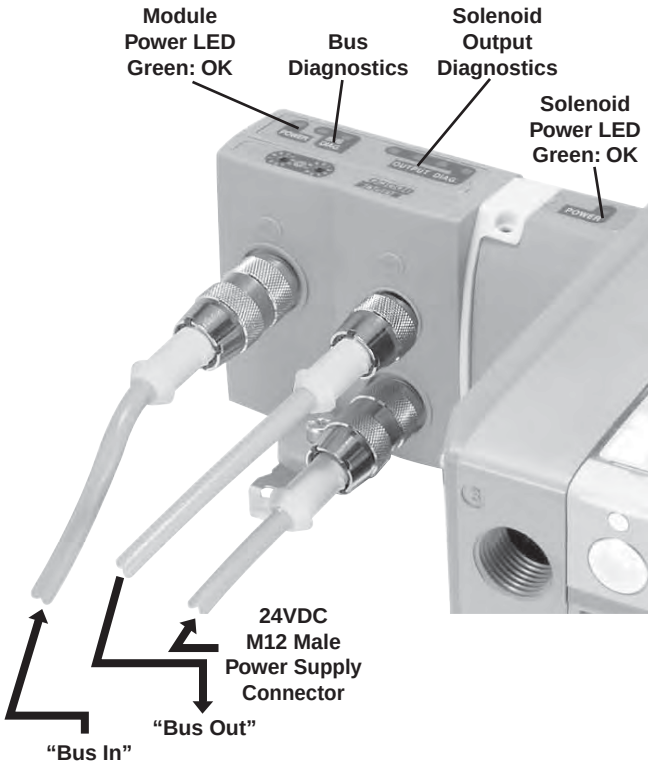
1 - 24VDC Module (Not Connected for DeviceNet and CANopen)
2 - Not Connected
3 - 0VDC Module and Solenoid
4 - 24VDC Solenoid
5 - Protected Earth (PE)

Profibus DP / DeviceNet / CANopen / InterBus-S

24VDC
(As Seen On Module)



M12 Male
Type A



Connection

All communication 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.

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

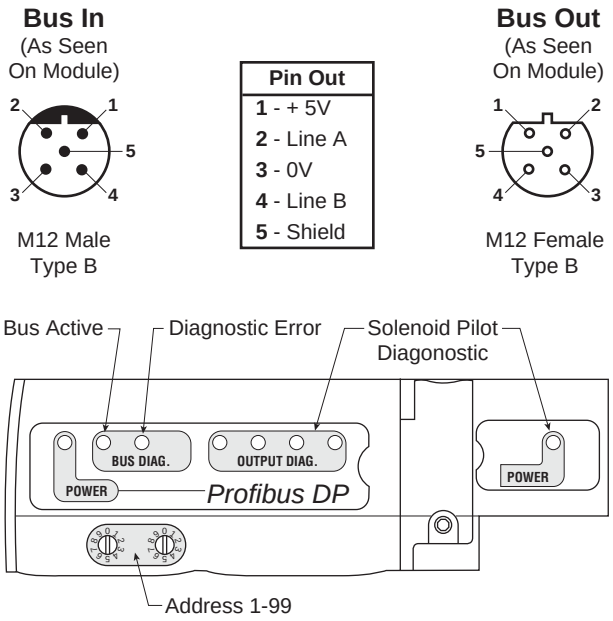
Use the GSD file on web site.

The rotary switches enable configuration of the decimal address.

• www.parker.com/pneu/moduflex

Diagnostic

Diagnostic according to the module dialog shown on the illustration.



Bus Cable Connections

DeviceNet standard male and female type A M12 connectors.

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

Addressing

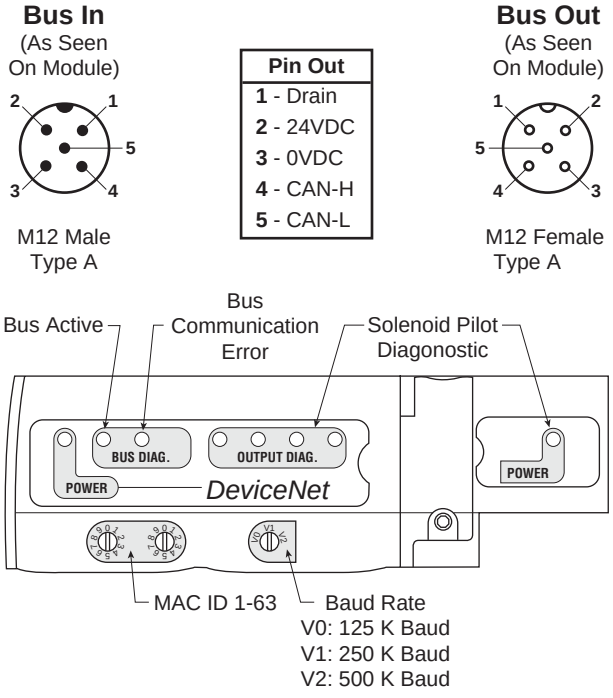
Use the EDS file on web site.

The rotary switches enable configuration of the node address (MAC ID) and the baud rate.

• www.parker.com/pneu/moduflex

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.

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

Addressing

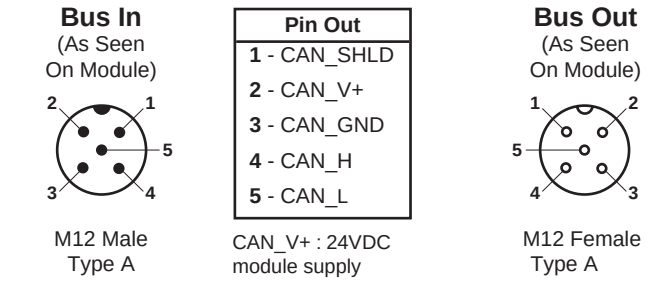
Use the EDS file on web site.

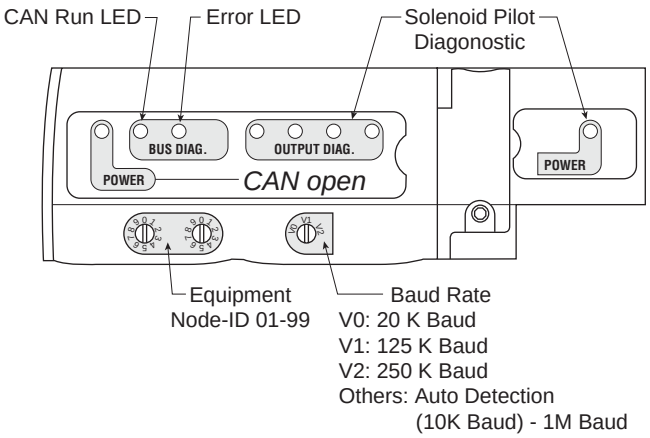
The rotary switches enable configuration of the decimal address.

- www.parker.com/pneu/moduflex

Diagnostic

Diagnostic according to the module dialog shown on the illustration.





INTERBUS-S

Bus Cable Connections

The M23 connectors conform to "Interbus remote bus".

This module operates at 500 kbps.

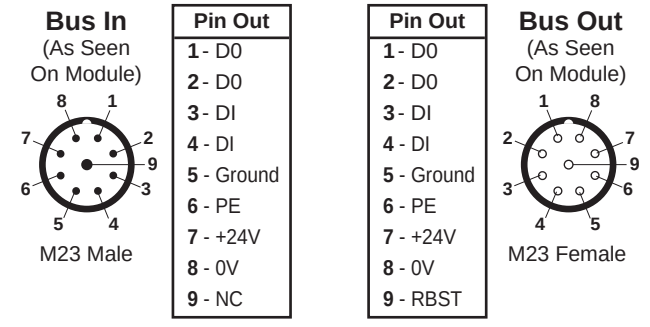
Addressing

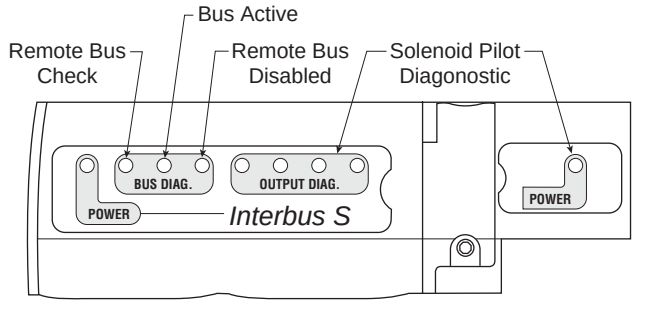
InterBus-S is self addressing; therefore, it does not need any software or hardware configuration.

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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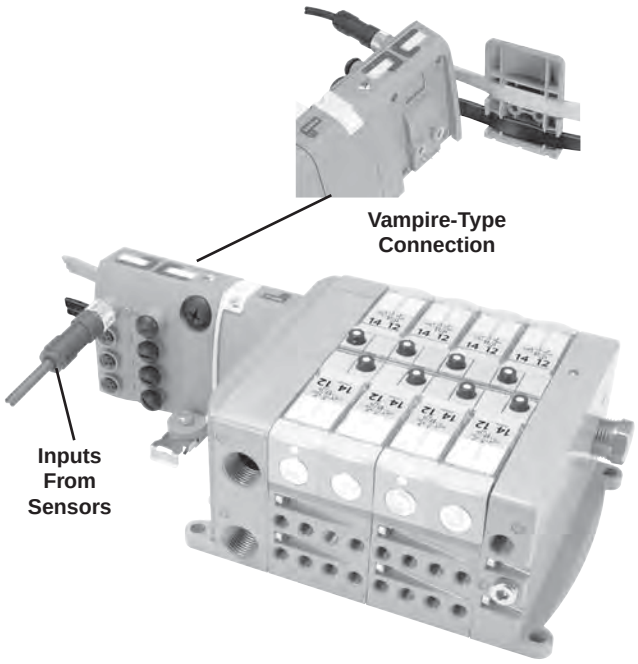
AS-i Bus Communication Modules

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)	Part Number
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, 3 solenoids per node)

Input / Output Capability	Weight (oz)	Part Number
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)	Part Number
1 m	3.53	**P8LS12JACK**

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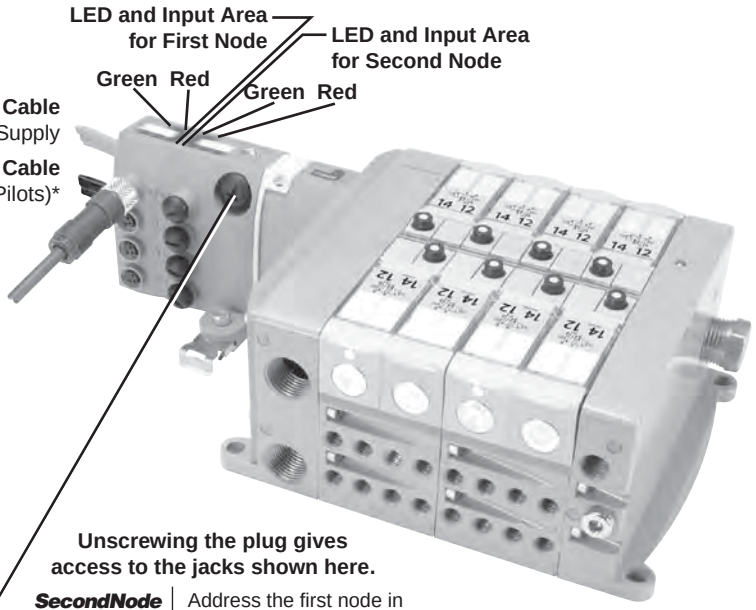
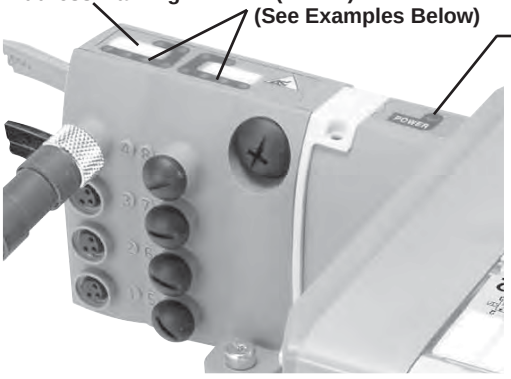
AS-i Bus Communication Module: Addressing, Diagnostic, Input Wiring

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

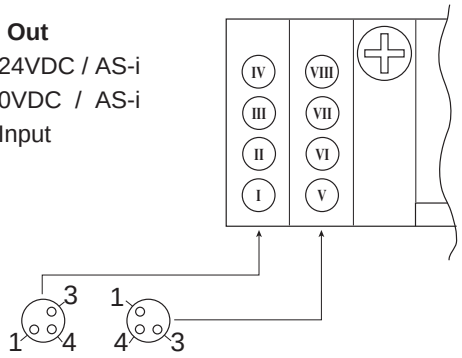
Input Wiring

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.

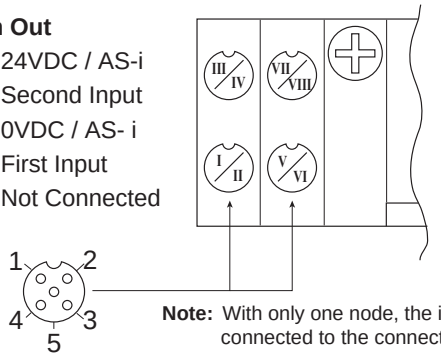
M8 Female Connectors

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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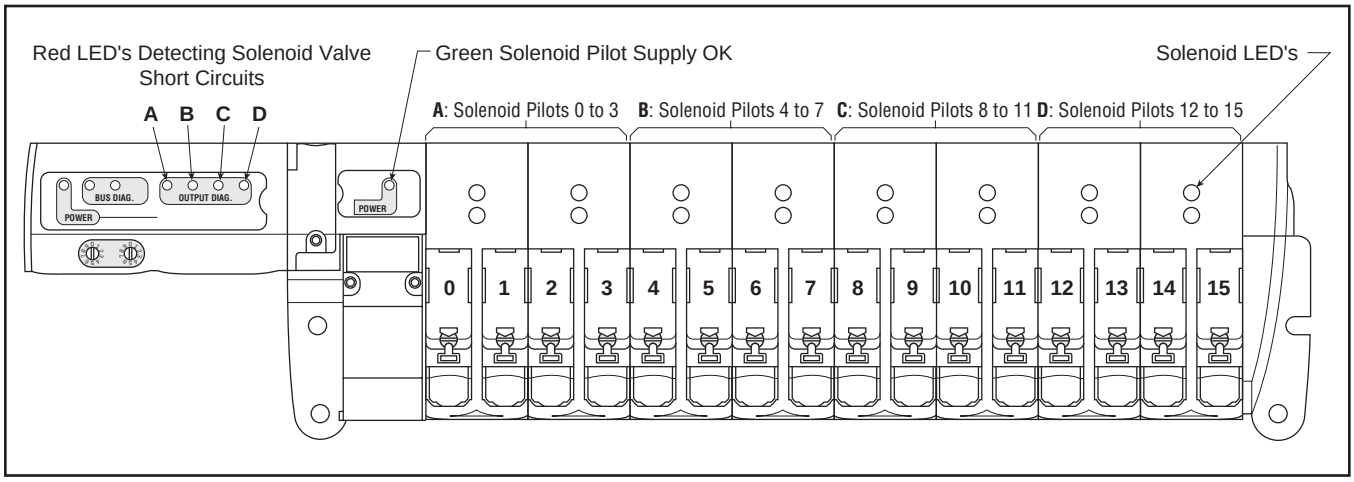
Solenoid Pilot Diagnostic Common to All Device Bus Modules



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

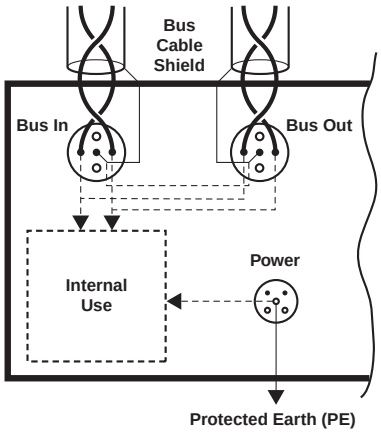
- The red LEDs with code, shown above, detect solenoid valve short-circuits.
- Supply is OK when the solenoid pilot power supply indicator is green.

Bus Cable Protection

Shield Connections for Profibus DP, DeviceNet and CANopen

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

The protected earth must be connected locally on each module for CE accordance.



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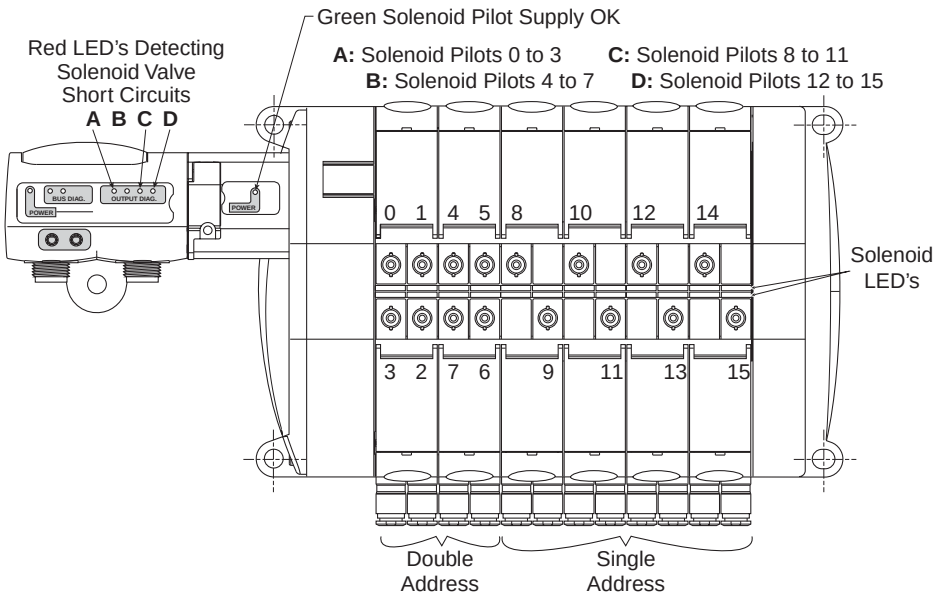
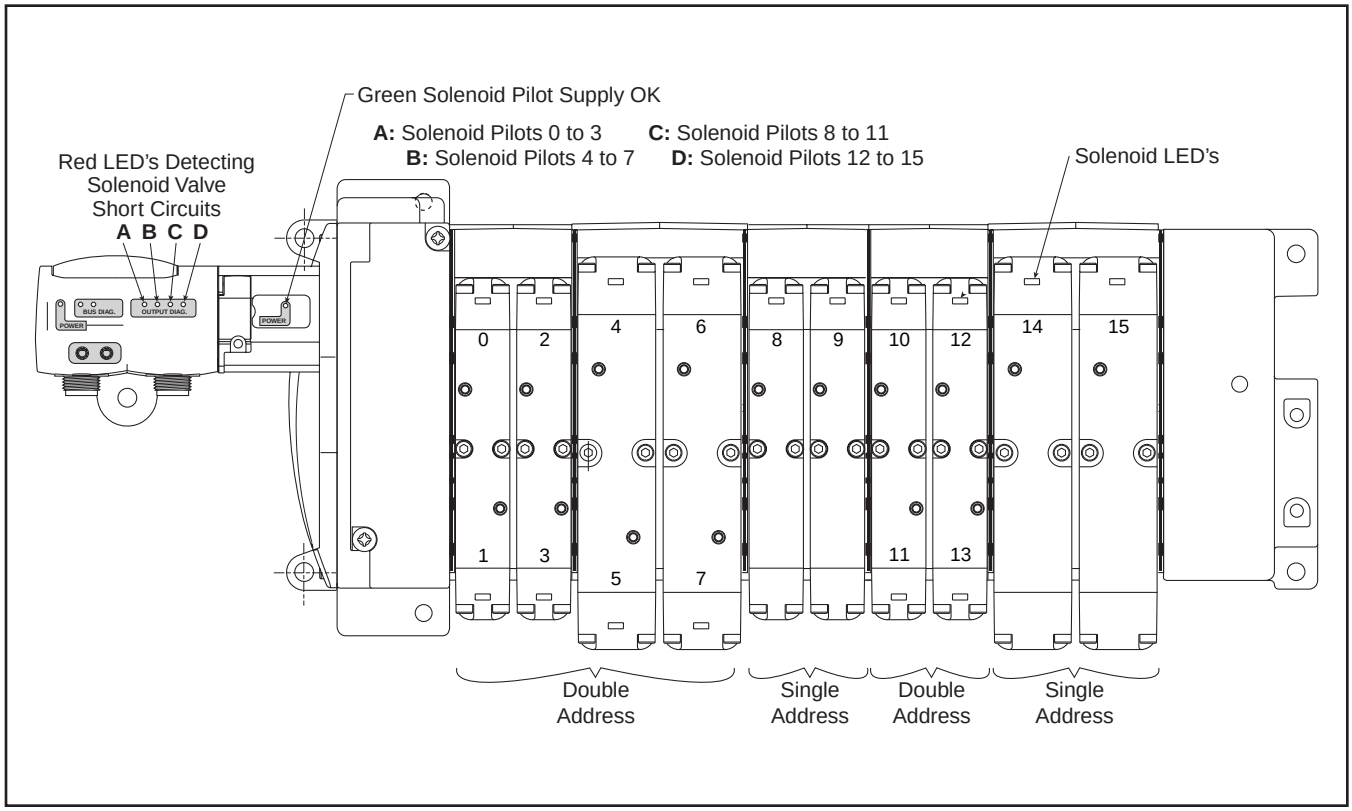
Solenoid Pilot Diagnostic Common to All Moduflex Fieldbus Modules





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- 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 Consump.	9 mA for each active input
	Inputs	According to IEC 1131-2 class 2
	Certification	These products have been developed according to the association complete specification (v.2.11) and to the slave profiles S-7.F.E or S-B.F.E

Device Bus	Bus Line	According to each bus specification		
	Module Voltage	20 to 30VDC		
	Solenoid Pilot Voltage	24VDC		
	Module Consumption	Profibus DP max. 1.5W	DeviceNet / CANopen max. 1.5W	InterBus-S max. 2W
	Outputs	Overload protection		
	Certification	DeviceNet: Compliant to Composite Test Revision 17, Test Suite: M002		
		Profibus-DP: Compliant to Test Specifications for Profibus DP Slaves, Version 2.0, February 2000, based on EN 50170-2 at Siemens AG in Furth.		
		InterBus-S: This product has passed the relevant tests in accordance with the Interbus conformance requirements Certified No. 385.		

I/O Tables Common to All Device Bus 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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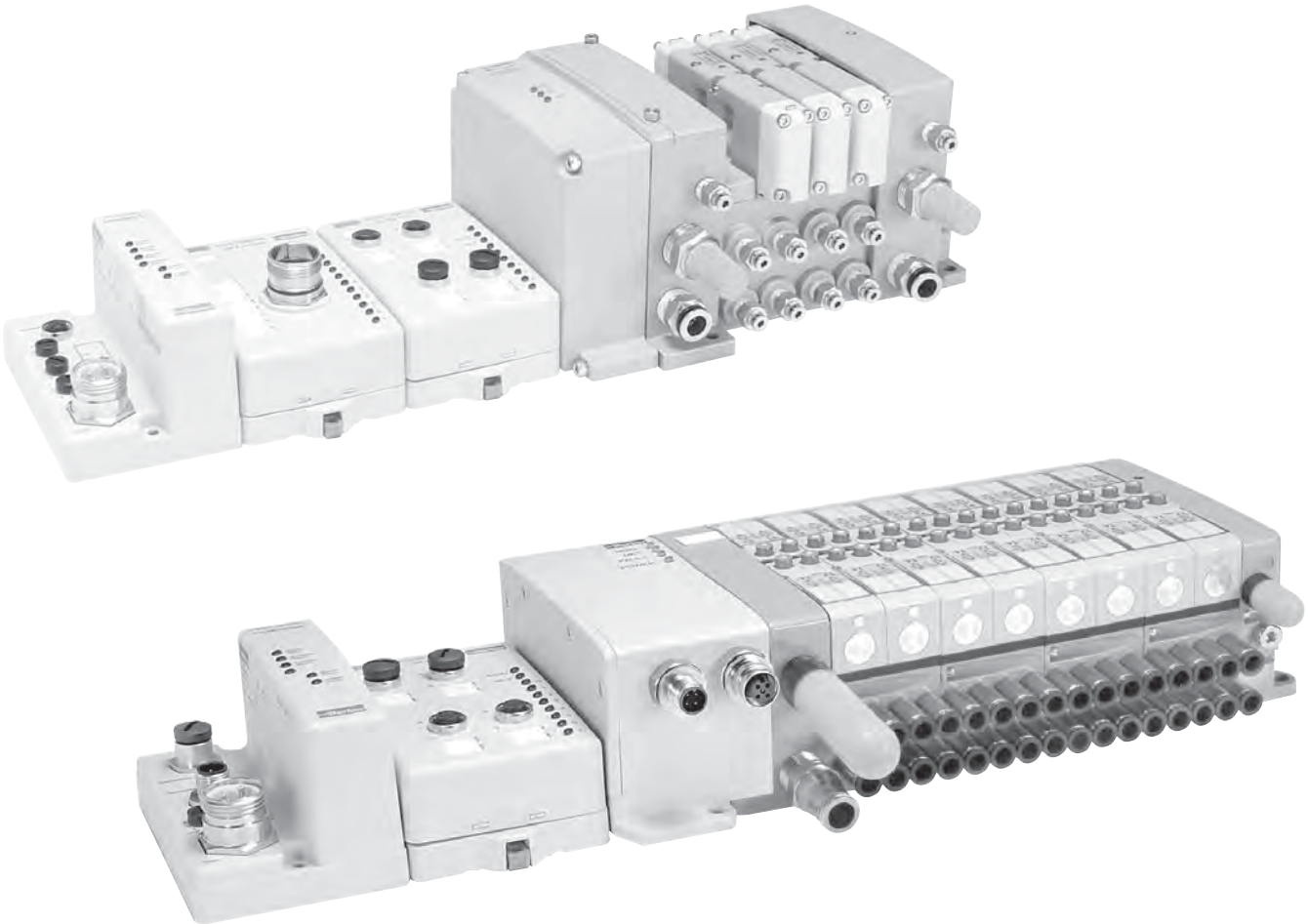
The Isysnet System

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 modules** provide the network-interface circuitry
- **Power distribution module** provide 5 additional power inputs to the Isysnet system

Isysnet Features

- Highly modular design (4pt – 16pt modularity)
- Broad application coverage
- Channel-level diagnostics (LED)
- Channel-level alarm and annunciation (electronic)
- Channel-level open-wire detection with electronic feedback
- Parameter-level explicit messaging
- Horizontal and vertical mounting without derating
- 5g vibration
- 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



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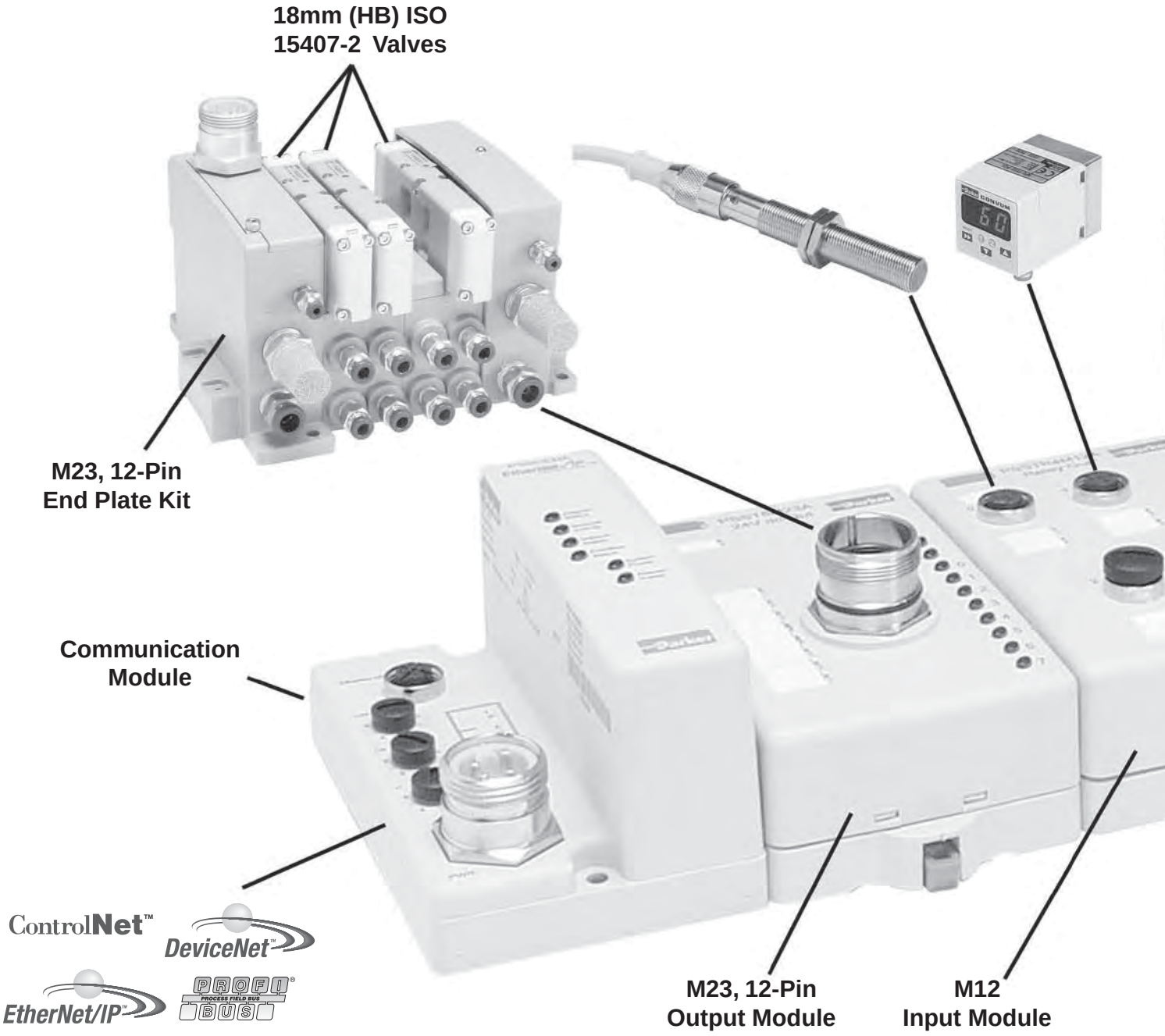
Isys & Isysnet Fieldbus System

- A complete fieldbus communication offering for all Isys ISO and Isys Micro valves.
- CSA, C-US and CE certifications (as marked).



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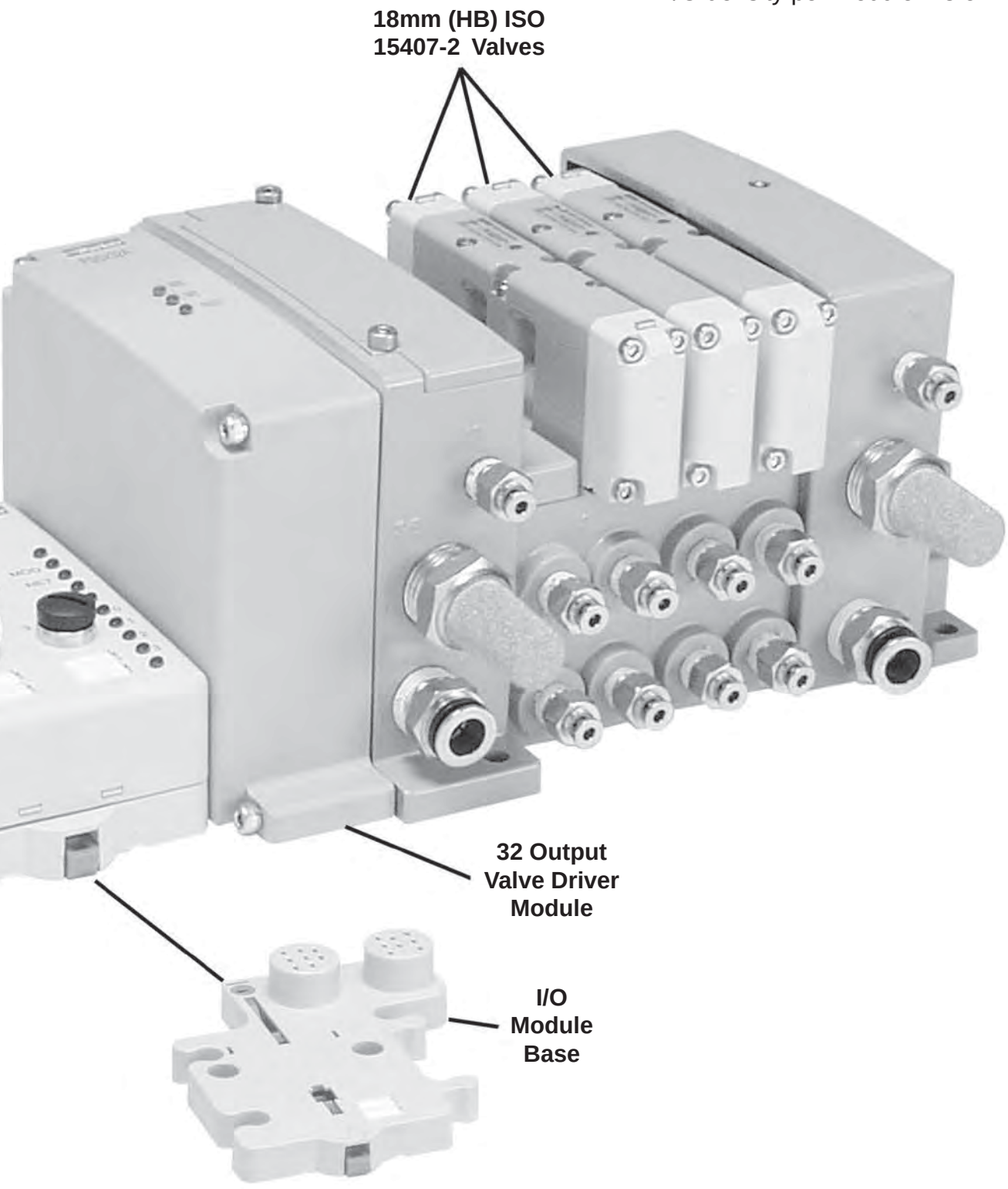
I/O Configuration

- Centralized Isysnet system.
- Pneumatics and I/O are in close proximity to one another.
- I/O density per module = 8 or 16.



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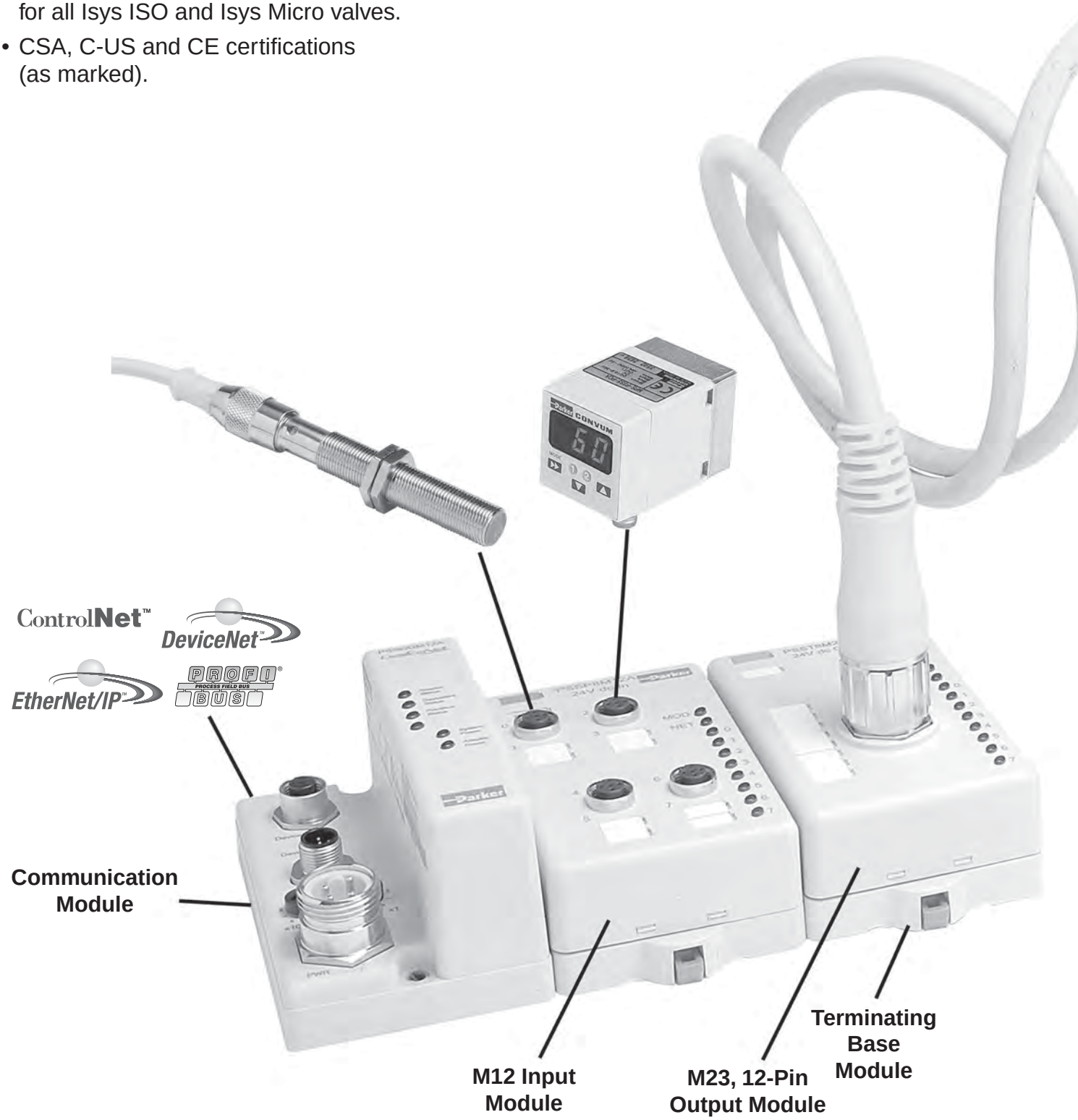
Isys & Isysnet Fieldbus System

- A complete fieldbus communication offering for all Isys ISO and Isys Micro valves.
- CSA, C-US and CE certifications (as marked).



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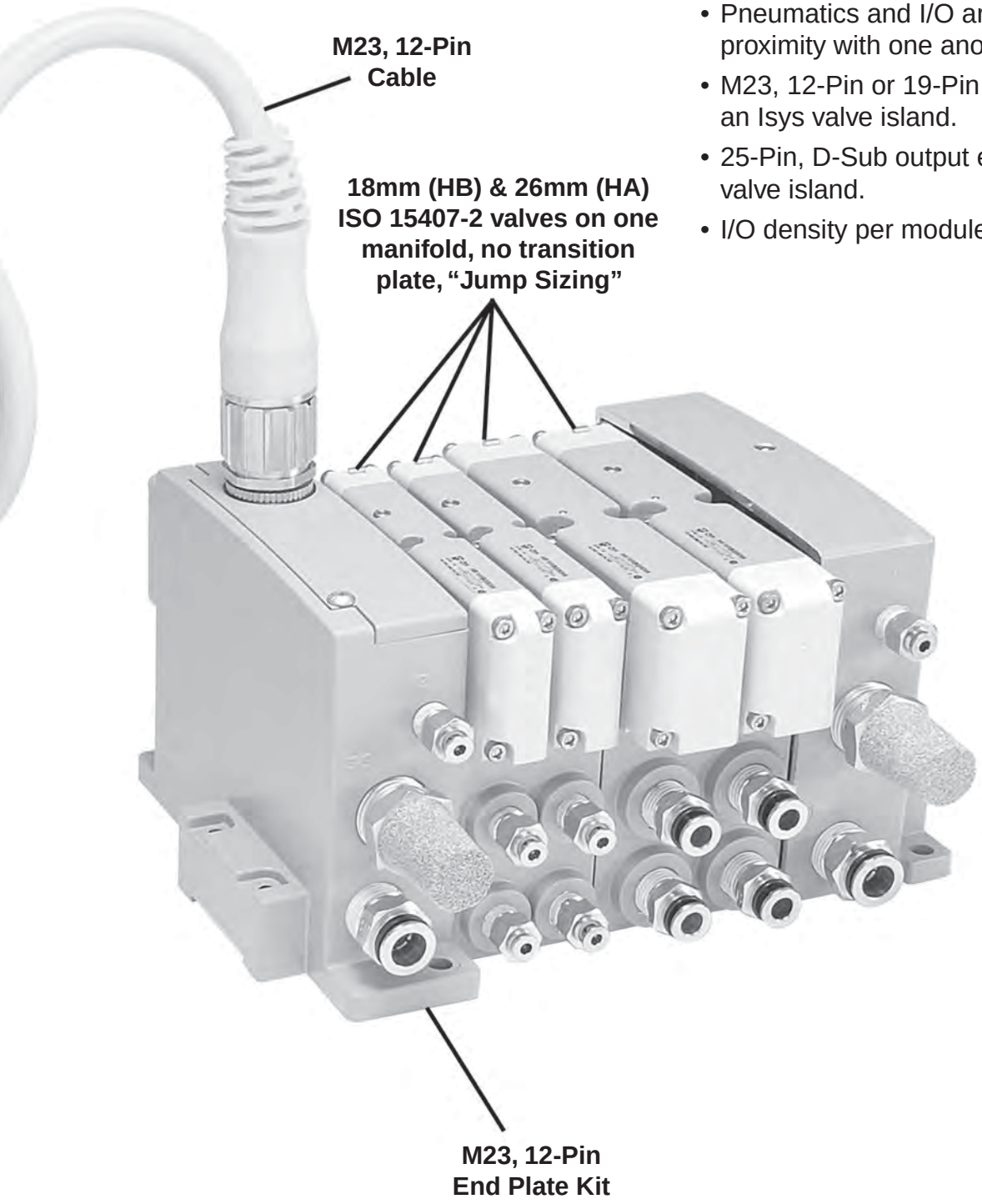
I/O Configuration

- Decentralized Isysnet system.
- Pneumatics and I/O are not in close proximity with one another.
- M23, 12-Pin or 19-Pin output extension to an Isys valve island.
- 25-Pin, D-Sub output extension to an Isys valve island.
- I/O density per module = 8 or 16.



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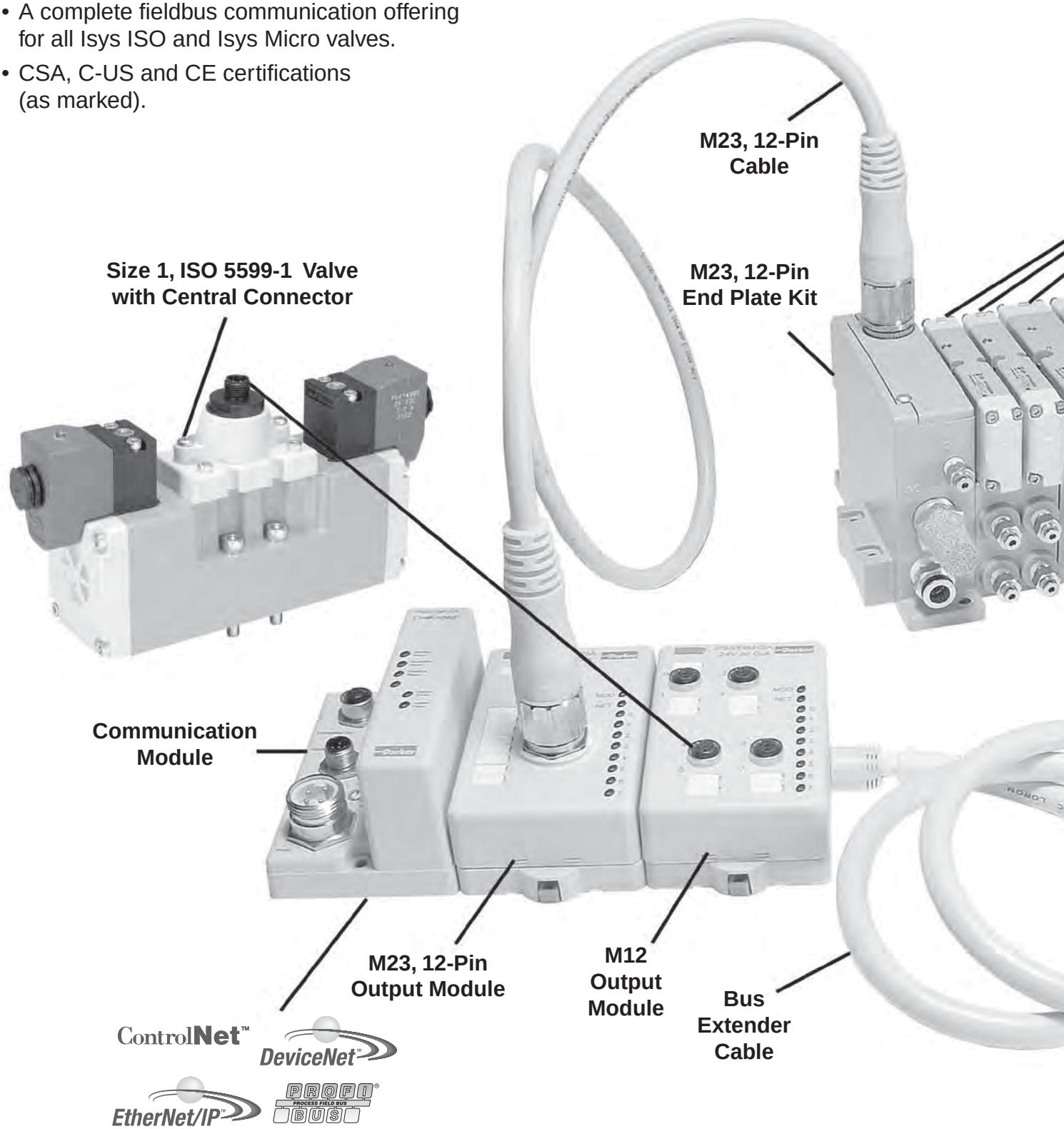
Isys & Isysnet Fieldbus System

- A complete fieldbus communication offering for all Isys ISO and Isys Micro valves.
- CSA, C-US and CE certifications (as marked).



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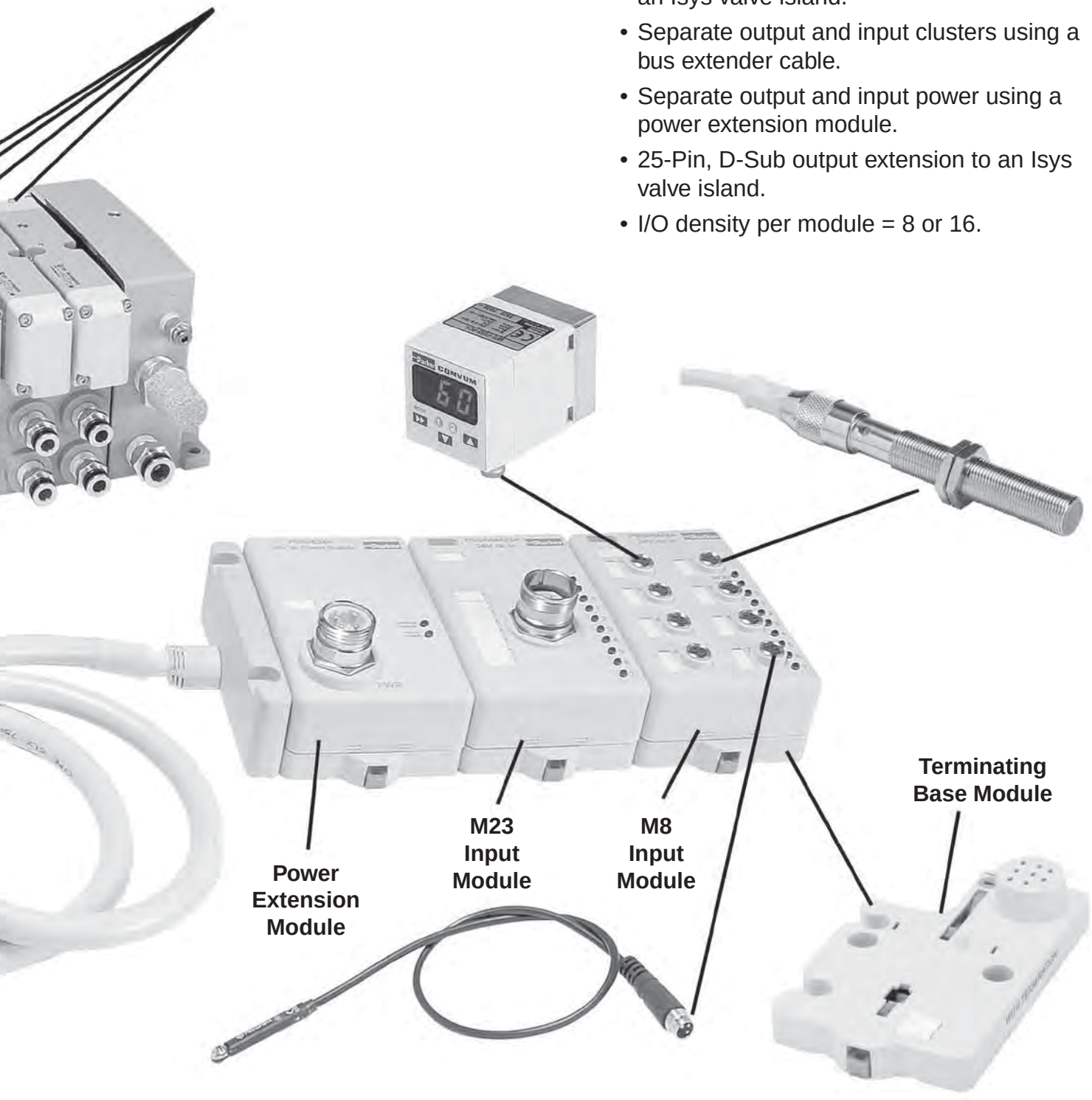
I/O Configuration

- Decentralized Isysnet system.
- Pneumatics and I/O are not in close proximity with one another.
- M23, 12-Pin or 19-Pin output extension to an Isys valve island.
- Separate output and input clusters using a bus extender cable.
- Separate output and input power using a power extension module.
- 25-Pin, D-Sub output extension to an Isys valve island.
- I/O density per module = 8 or 16.

18mm (HB) & 26mm (HA) ISO 15407-2 valves on one manifold, no transition plate, "Jump Sizing"



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Communications Module

Protocol	Part Number
Device**Net™**	**PSSCDM18PA** (7/8" Mini) **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, 5-Pin used with PNP Sourcing Input Device	**PSSN16M12A**	10 to 28.8VDC
8 Digital Inputs M12, 5-Pin used with PNP Sourcing Input Device	**PSSN8M12A**	10 to 28.8VDC
8 Digital Inputs M12, 5-Pin used with NPN Sinking Input Device	**PSSP8M12A**	10 to 28.8VDC
8 Digital Inputs M8, 3-Pin used with PNP Sourcing Input Device	**PSSN8M8A**	10 to 28.8VDC
8 Digital Inputs M8, 3-Pin used with NPN Sinking Input Device	**PSSP8M8A**	10 to 28.8VDC
8 Digital Inputs M23, 12-Pin used with NPN Sinking Input Device	**PSSP8M23A**	10 to 28.8VDC
8 Digital Inputs M23, 12-Pin used with 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, 19-Pin used with PNP Sourcing Outputs	**PSST16M23A**	10 to 28.8VDC
[+] 16 Digital Outputs D-Sub, 25-Pin used with PNP Sourcing Outputs	**PSST16D25A**	10 to 28.8VDC
[+] 16 Digital Outputs M12, 5-Pin used with PNP Sourcing Outputs	**PSST16M12A**	10 to 28.8VDC
[+] 8 Digital Outputs M12, 5-Pin used with PNP Sourcing Outputs	**PSST8M12A**	10 to 28.8VDC
[+] 8 Digital Outputs M8, 3-Pin used with PNP Sourcing Outputs	**PSST8M8A**	10 to 28.8VDC
[§] 4 Digital Output, High Watt Relay M12, 5-Pin used with PNP Sourcing Outputs (2 Amp)	**PSSTR4M12A**	24VDC
[+] 8 Digital Outputs M23, 12-Pin used with PNP Sourcing Outputs	**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, 5-Pin	**PSSNAVM12A**	-10 to 10VDC or 0 to 10VDC
[‡] 2 Analog Inputs Current M12, 5-Pin	**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, 5-Pin	**PSSTAVM12A**	0 to 10V ± 10V
[**] 2 Analog Outputs Current M12, 5-Pin	**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

Base 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

Replacement Base Module

Base Module	PSSBASE

PSSBASE

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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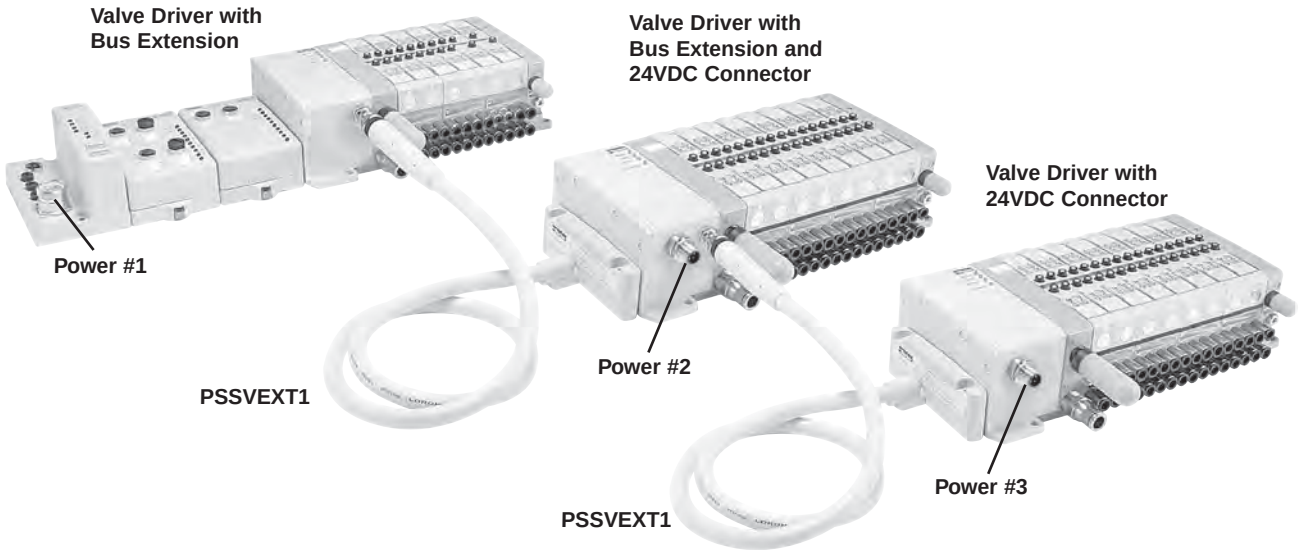
Using Bus Extender Cables

Example #1:
Isys 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.
- Can be used with Isys ISO and Isys Micro valves.

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.
- Bus expansion only available with Isys Micro valves.



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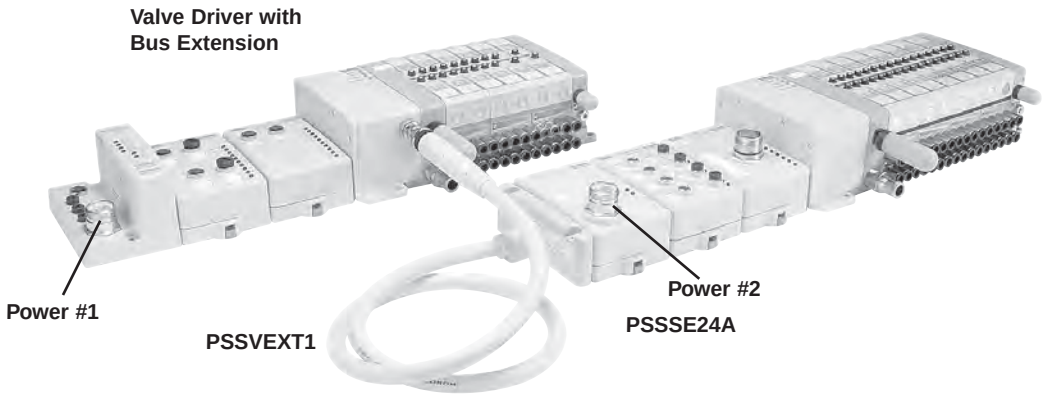
Using Bus Extender Cables

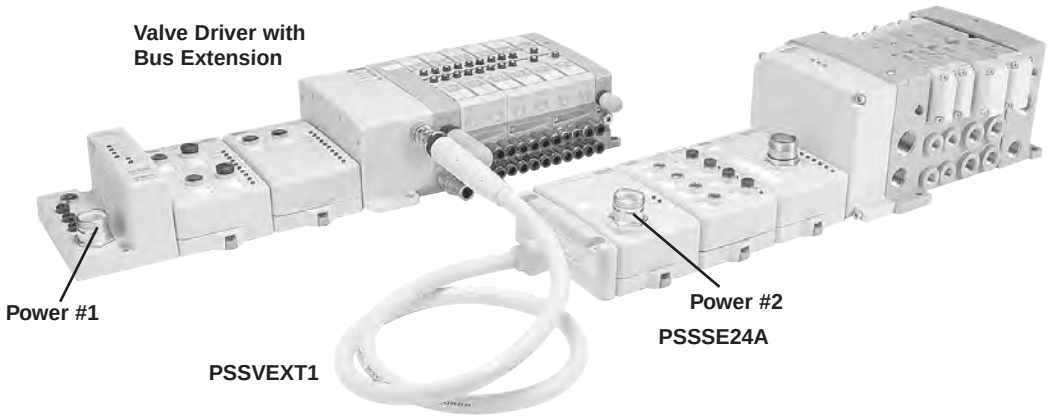
Example #3:
Isys Micro with Bus Extension on Valve Driver – With I/O at Extension

- 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.
- Bus expansion only available with Isys Micro.



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.
- Bus expansion only available with Isys Micro. Isys ISO manifold must be the last manifold in the system.



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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 PNP Sourcing	16 PNP Sourcing	8 NPN Sinking
Keyswitch Position	1		
Voltage, On-State Input, Nom.	24VDC		
Voltage, On-State Input, Min.	10VDC		
Voltage, On-State Input, Max.	28.8VDC		
Input Delay Time, ON to OFF	0.5 ms hardware + (0…65 ms selectable)*		
Current, On-State Input, Min.	2 mA		
Current, On-State Input, Max.	5 mA		
Current, Off-State Input, Max.	1.5 mA		
Bus Power Current (mA)	75		
Power Dissipation, Max.	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 PNP sourcing	16 PNP 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	
Bus Power 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
Key switch 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
Output Current Rating, Max	8.0 A per module, 2.0 A per channel
Bus Power 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
Key switch Position	3	3
Input Signal Range	4…20 mA 0…20 mA	-10 to 10VDC 0 to 10VDC
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
Bus Power Current (mA)	75	75
Power Dissipation, Max.	0.6 W @ 28.8VDC	0.6 W @ 28.8VDC

* Includes offset, 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
Key switch Position	4	4
Output Signal Range	4…20 mA 0…20 mA	-10 to 10VDC 0 to 10VDC
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
Bus Power Current (mA)	75	75
Power Dissipation, Max.	1.0 W @ 28.8VDC	1.0 W @ 28.8VDC

* Includes offset, 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 Modules

The PSSV32A and PSSVM32A valve driver modules provide an interface between the Isysnet serial bus system and the valve assembly. These modules will always be the last on the Isysnet serial bus, and control 32 digital outputs at 24VDC. Depending on the valve selection, a valve driver module can control up to 32 single solenoid valves or 16 double solenoid valves.

PSSV32A is used with Isys ISO valves and PSSVM32A is used with Isys Micro valves.

Valve Driver Module Specifications

	PSSV32A and PSSVM32A
Outputs per Module	32, PNP 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.

Select the Appropriate Power Supply

Power Specifications

Part Number	Power Supply Input Voltage, Nom.	Operating Voltage Range	Maximum Continuous Current Draw	Power Supply Inrush Current, Max.	Input Overvoltage Protection	Power Supply Interruption Protection
PSSCDM12A	24VDC	10...28.8VDC	10 A	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						

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Power Extender Module

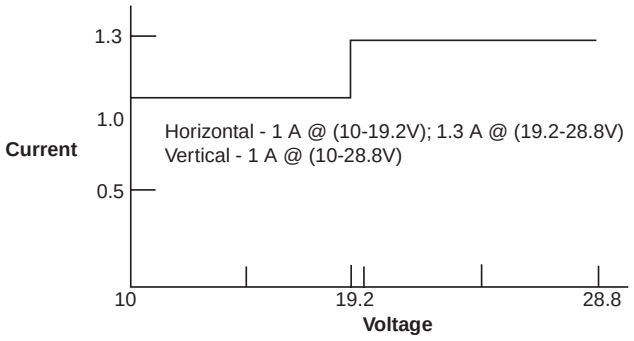
The PSSSE24A expansion power unit passes 24VDC field power to the I/O modules to the right of it. This unit extends the backplane bus power and creates a new field voltage partition segment for driving field devices for up to 13 I/O modules. The expansion power unit separates field power from I/O modules 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 current for modules to the right of the supply.

- 1.3A of additional bus power
- Starts new voltage distribution
- Partitioning for E-Stop wiring

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
Bus Power Supply Current, Max.	1.5 A
Field Power Supply Current, Max.	10 A

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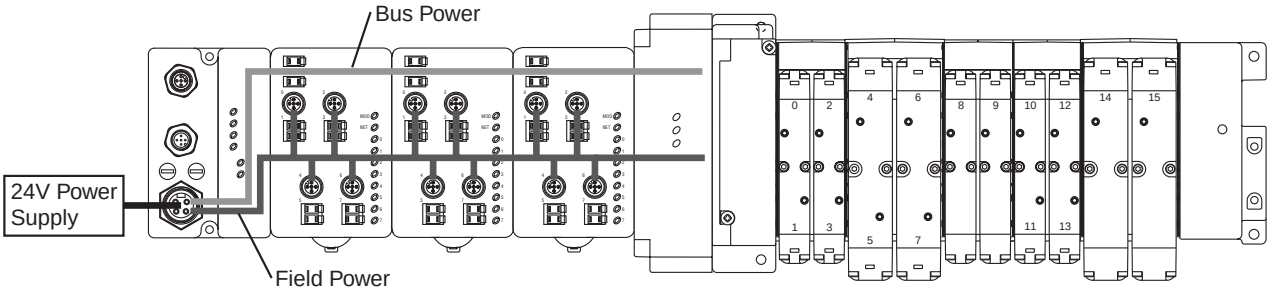
Power Distribution Options for Isys ISO

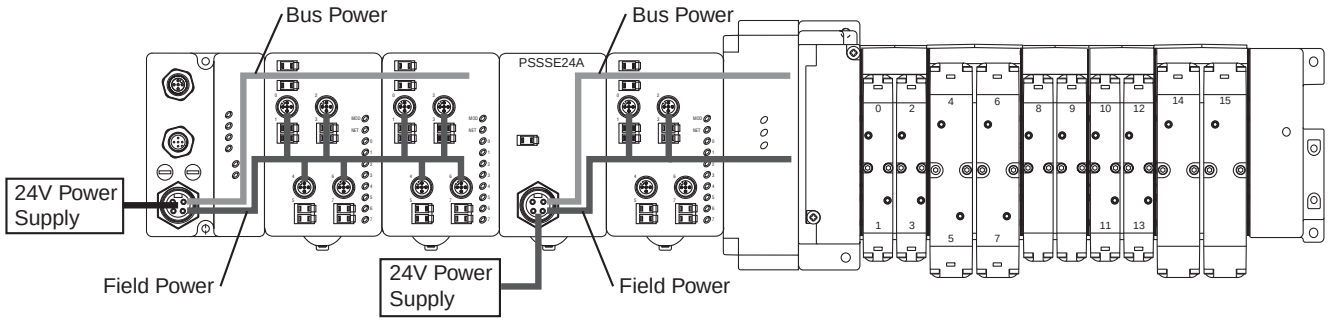
Isysnet Communication and I/O Modules

An auxiliary 24VDC power supply from the communication module provides power to the backplane bus power and I/O module field power. 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 Power Extender Module (PSSSE24A) extends the backplane bus power and I/O Module field power to support up to 13 more I/O modules. Connect additional Power Extender Modules to expand the I/O assembly up to the maximum of 63 I/O modules. This secondary 24VDC connector on the PSSSE24A can be wired into an Emergency Stop circuit.



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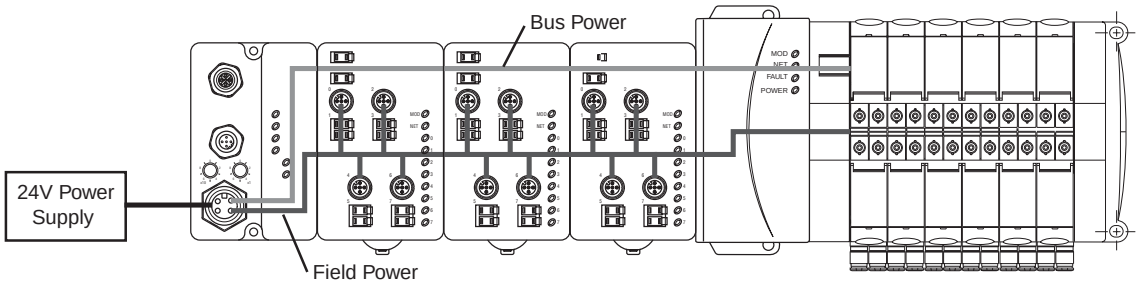
Power Distribution Options for Isys Micro

Isysnet Communication and I/O Modules

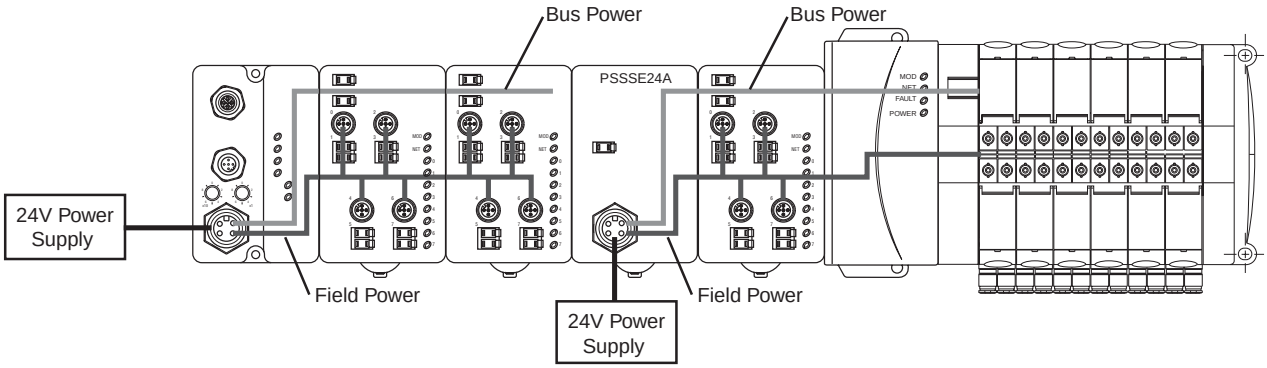
The 24VDC power supply from the communication module provides power to the backplane bus power and I/O module field power. You can connect up to 13 modules and an adapter with a maximum of 10 A field power, using this power source.



Isysnet Communication and I/O Modules

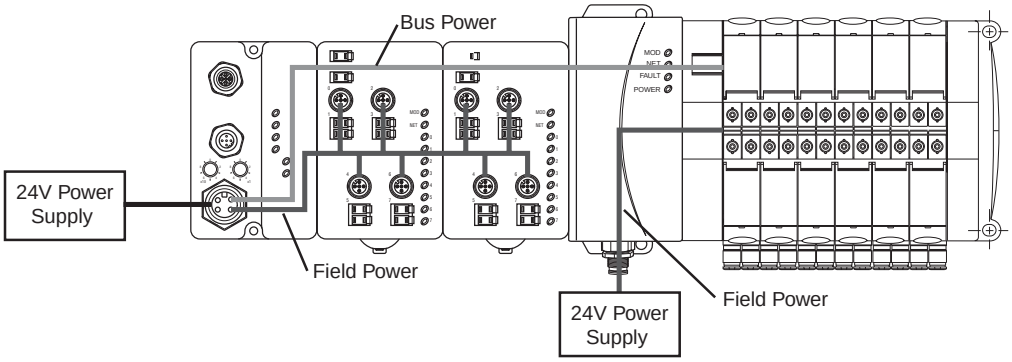
The 24VDC power supply from the communication module provides power to the backplane bus power and I/O module field power. You can connect up to 13 modules and an adapter with a maximum of 10 A field power, using this power source.

The 24VDC Power Extender Module (PSSSE24A) extends the backplane bus power and I/O module field power to support up to 13 more modules. Connect additional Power Extender Modules 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. This secondary 24VDC connector on the PSSSE24A can be wired into an Emergency Stop circuit.



Isysnet Communication Module and Valve Driver Module with 24VDC Connector

The 24VDC power supply from the Communication Adaptor provides power to the backplane bus power and I/O module field power for up to 13 modules and an adapter with a maximum of 10 A Field Power. In this configuration, backplane bus power and I/O module field power are supplied to the input and output modules. The communication module only supplies backplane 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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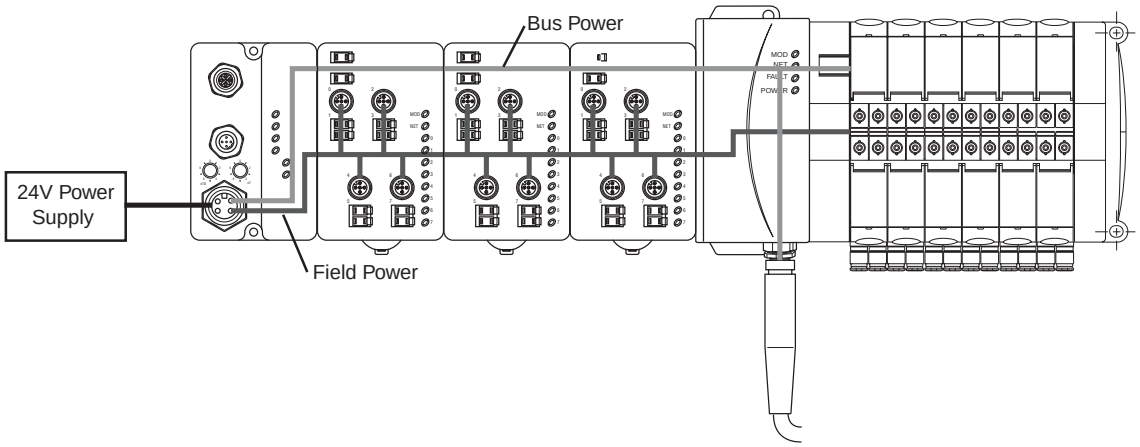
Power Distribution Options for Isys Micro (Continued)

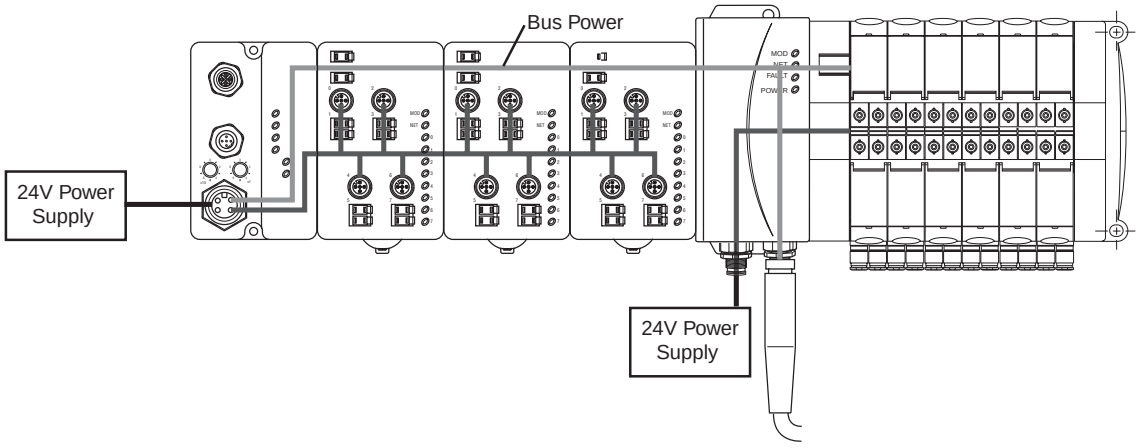
Isysnet Communication Module with Bus Extension Connector and I/O Modules

The 24VDC power supply from the communication module provides power to the backplane bus power and I/O module field power. 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 backplane 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 Module with 24VDC and Bus Extension Connectors and I/O Modules

The 24VDC power supply from the communication module provides power to the backplane bus power and I/O module field power. In this configuration, bus power and field power are supplied to the input and output modules. The communication module 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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Placing Isysnet Modules

Maximum Size Layout

Part Number	Bus Power Supply	Maximum I/O Modules with 24VDC Backplane Current at 75 mA each	Maximum I/O Modules with Expansion Power Supplies
PSSCDM12A on DeviceNet	1000	Up to 13	63
PSSCDM18PA on DeviceNet			
PSSCCNA on ControlNet			
PSSCENA on EtherNet/IP			
PSSCPBA on PROFIBUS			
PSSSE24A Expansion Power	Horizontal mounting: 1A@ 10...19.2V input; 1.3A @ 19.2...28.8V input Vertical mounting: 1A @ 10...28.8V input		

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. A Communication Module provides 1 A current to the PointBus. The Power Extend Module, 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.

Current Requirements

Part Number	PointBus Current Requirements
PSSN8xxx	75 mA
PSSP8xxx	
PSST8xxx	
PSSN16xxx	
PSST16xxx	
PSSTR4MRA	90 mA
PSSNACM12A	75 mA
PSSTACM12A	
PSSNAVM12A	
PSSTAVM12A	
PSSV32A	
PSSVM32A	

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Related Documentation

Additional user documentation presents information according to the tasks you perform and the programming environment you use. Refer to the table below for information on Isysnet products.

Isysnet Related Publications*

	Part Number	Description	Instruction Sheet*
General Information	—	Industrial Automation Wiring and Grounding Guidelines	E115P
		Safety Guidelines for the Application, Installation and Maintenance of Solid State Control	E116P
Communication Interfaces	PSSCDM12A	Isysnet DeviceNet Adapter Module, Drop or Pass-through, with male and female M12 connectors	E101P, Installation Instructions PSS-UM001, User Manual
	PSSCDM18PA	Isysnet DeviceNet Adapter Module, Drop or Pass-through, with male and female M18 connectors	
	PSSCCNA	Isysnet Redundant ControlNet Adapter Module	E103P, Installation Instructions
	PSSCENA	Isysnet Ethernet/IP 10/100 Mbps Adapter Module	E104P, Installation Instructions
	PSSCPBA	Isysnet PROFIBUS Adapter Module	E102P, Installation Instructions
Valve Driver Module	PSSV32A, PSSVM32A	32 Point Valve Driver Module	E100P
DC I/O	PSSN16M12A	24VDC 16 Sink Input w/8 M12 connectors, 2 points per connector	E106P
	PSSN8M8A	24VDC 8 Sink Input w/8 M8 connectors	
	PSSN8M12A	24VDC 8 Sink Input w/4 M12 connectors, 2 points per connector	
	PSSN8M23A	24VDC 8 Sink Input w/1 M23 connector	
	PSSP8M8A	24VDC 8 Source Input w/8 M8 connectors	
	PSSP8M12A	24VDC 8 Source Input w/4 M12 connectors, 2 points per connector	
	PSSP8M23A	24VDC 8 Source Input w/1 M23 connectors	
	PSST16M23A	24VDC 16 Source Output w/1 M23	E107P
	PSST16D25A	24VDC 16 Source Output w/1 25-Pin, D-Sub	
	PSST16M12A	24VDC 16 Source Output w/8 M12	
	PSST8M8A	24VDC 8 Source Output w/1 M23	
	PSST8M12A	24VDC 8 Source Output w/4 M12	
	PSST8M23A	24VDC 8 Source Output w/8 M8	
Analog	PSSNACM12A	24VDC Analog Current Input w/ 2 M12 connectors	E110P
	PSSNAVM12A	24VDC 2 Analog Voltage Input w/ 2 M12 connectors	
	PSSTACM12A	24VDC Analog Current Output w/ 2 M12 connectors	E111P
	PSSTAVM12A	24VDC Analog Voltage Output w/ 2 M12 connectors	
Power Unit	PSSSE24A	24VDC Expansion Power Supply	E105P
Relay Output	PSSTR4M12A	4 From A isolated (normally open) electromechanical relays	E109P

* Publications are electronic versions only. To make copies of these publications, go to: **http://www.parker.com/pneu/Isysnet**

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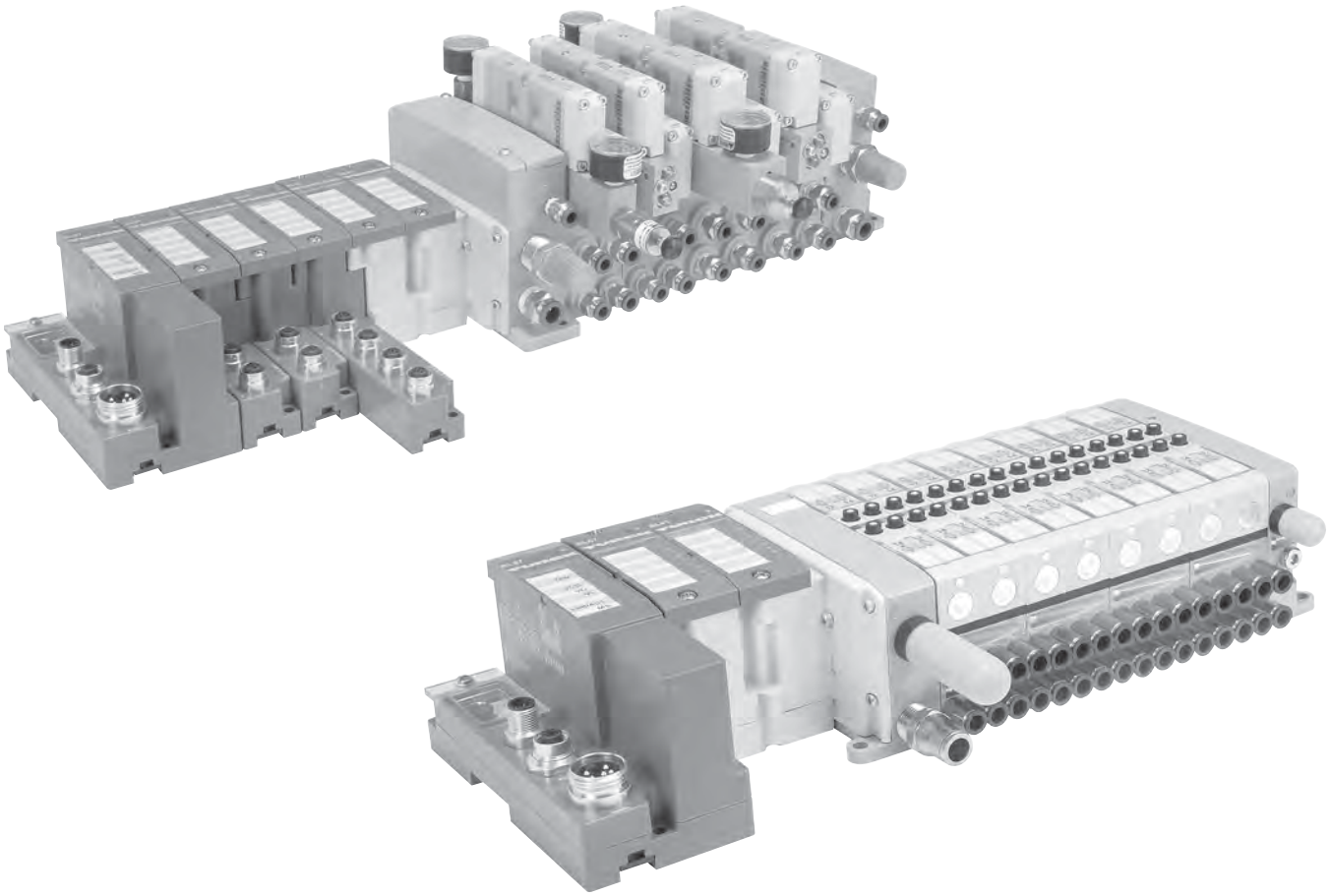
The Turck Fieldbus System

Isysnet has four major components:

- **Valve driver module** provide control for either 16 or 32 solenoids on a manifold
- **I/O modules** provide the field interface and system-interface circuitry
- **Communication modules** provide the network-interface circuitry
- **Power distribution module** provide 5 additional power inputs to the Turck system

Turck 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
- Horizontal and vertical mounting without derating
- 5g vibration
- 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



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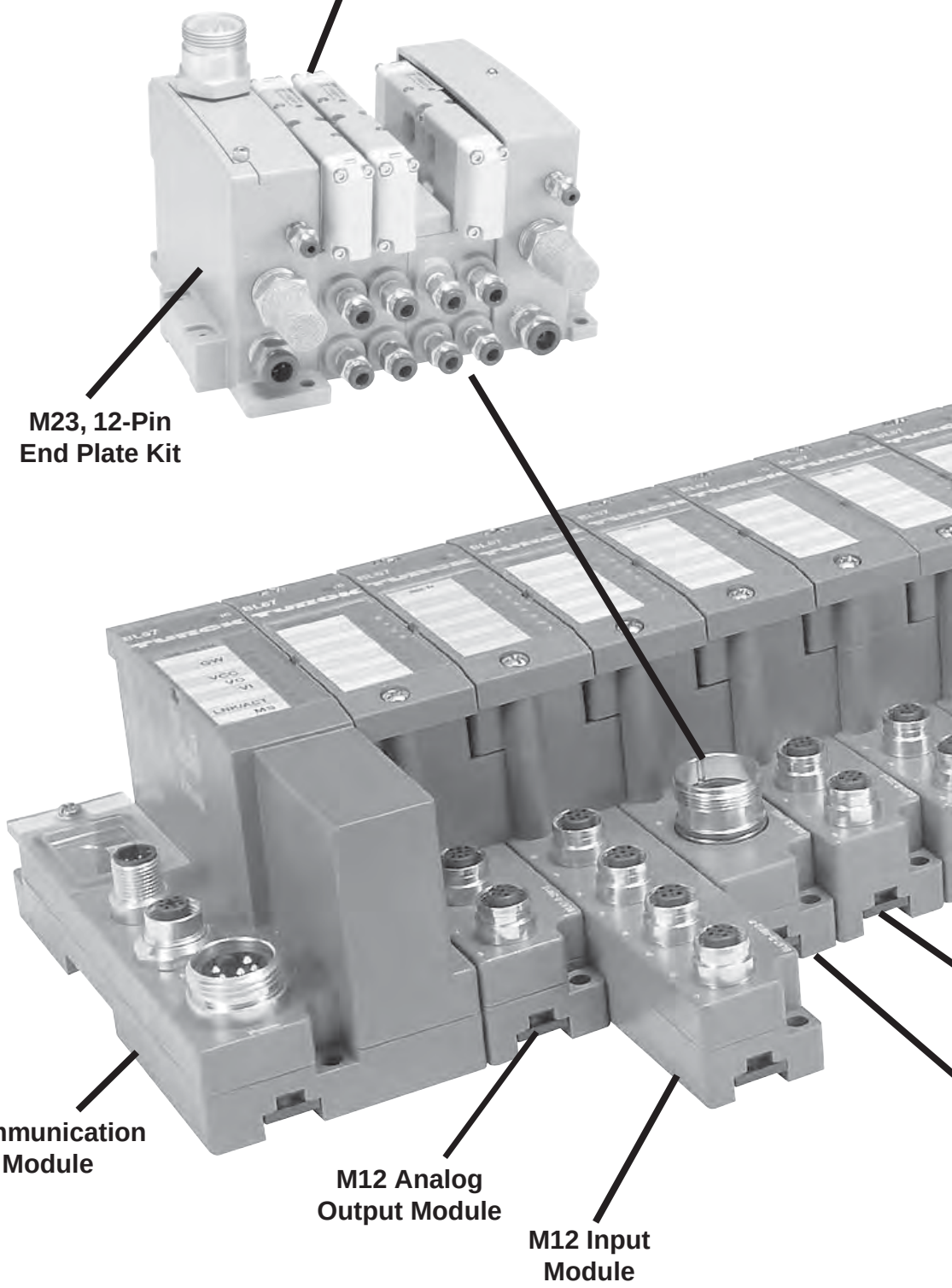
Turck Fieldbus System

- A complete fieldbus communication offering for all Isys ISO and Isys Micro valves.
- CSA, C-US and CE certifications (as marked).

DeviceNet™
EtherNet/IP™
PROFIBUS PROCESS FIELD BUS
PROFINET INDUSTRIAL ETHERNET
Modbus/TCP™
CANopen



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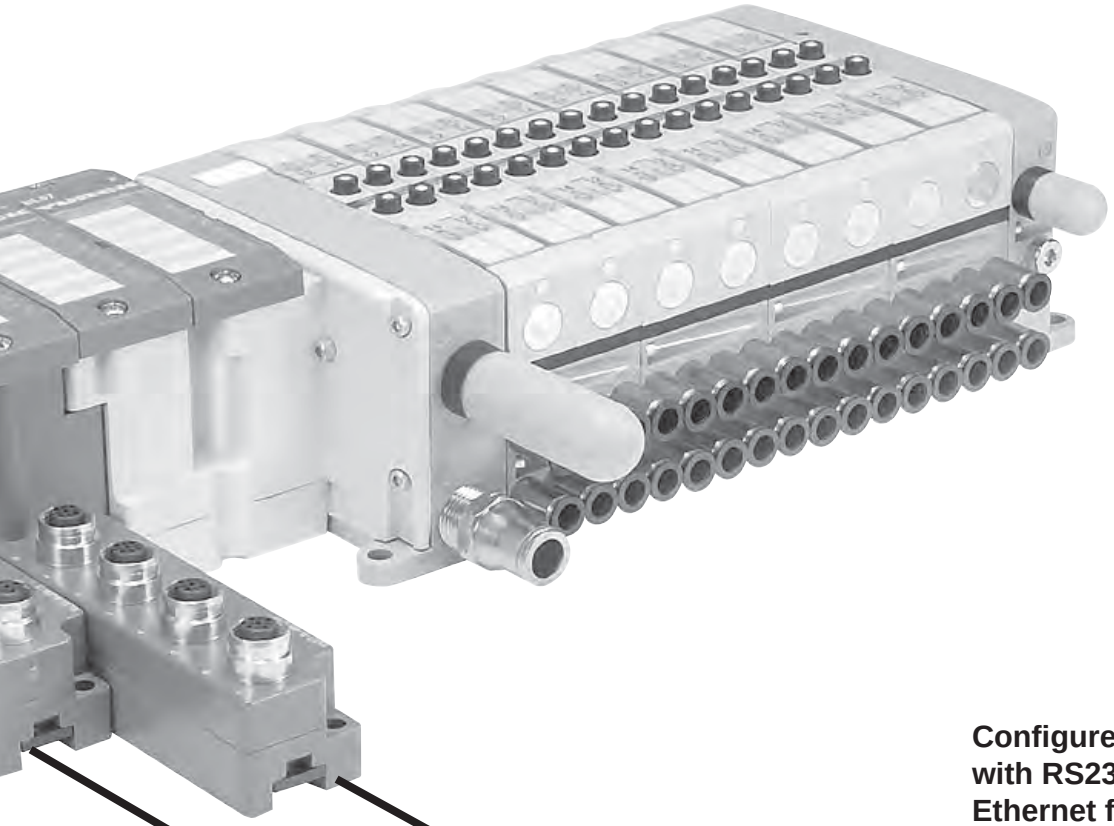
I/O Configuration

- Centralized Turck Fieldbus system.
- Pneumatics and I/O are in close proximity with one another.
- M23, 12-Pin or 19-Pin output extension to an additional Isys valve island.
- I/O density per module = 4, 8 or 16.



M12 Output Module

M12 Analog Input Module

M23, 12-Pin Output Module

M12 Configurable Input or Output Module

Configure / Program any module with RS232, or directly through Ethernet for any module with an Ethernet physical layer.

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Turck Fieldbus System

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DeviceNet™
EtherNet/IP™
PROFIBUS PROCESS FIELD BUS
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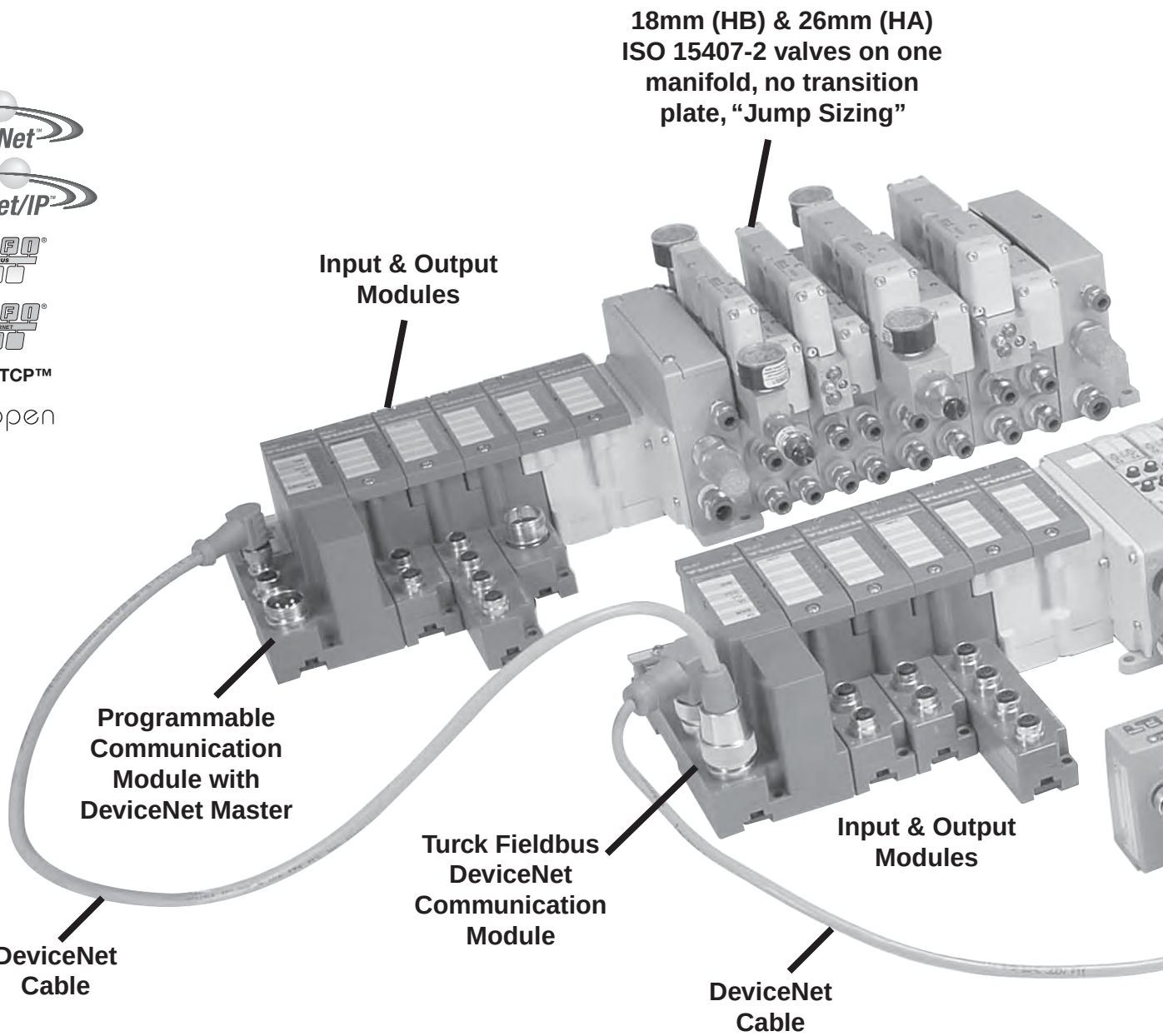
Modbus/TCP™
CANopen



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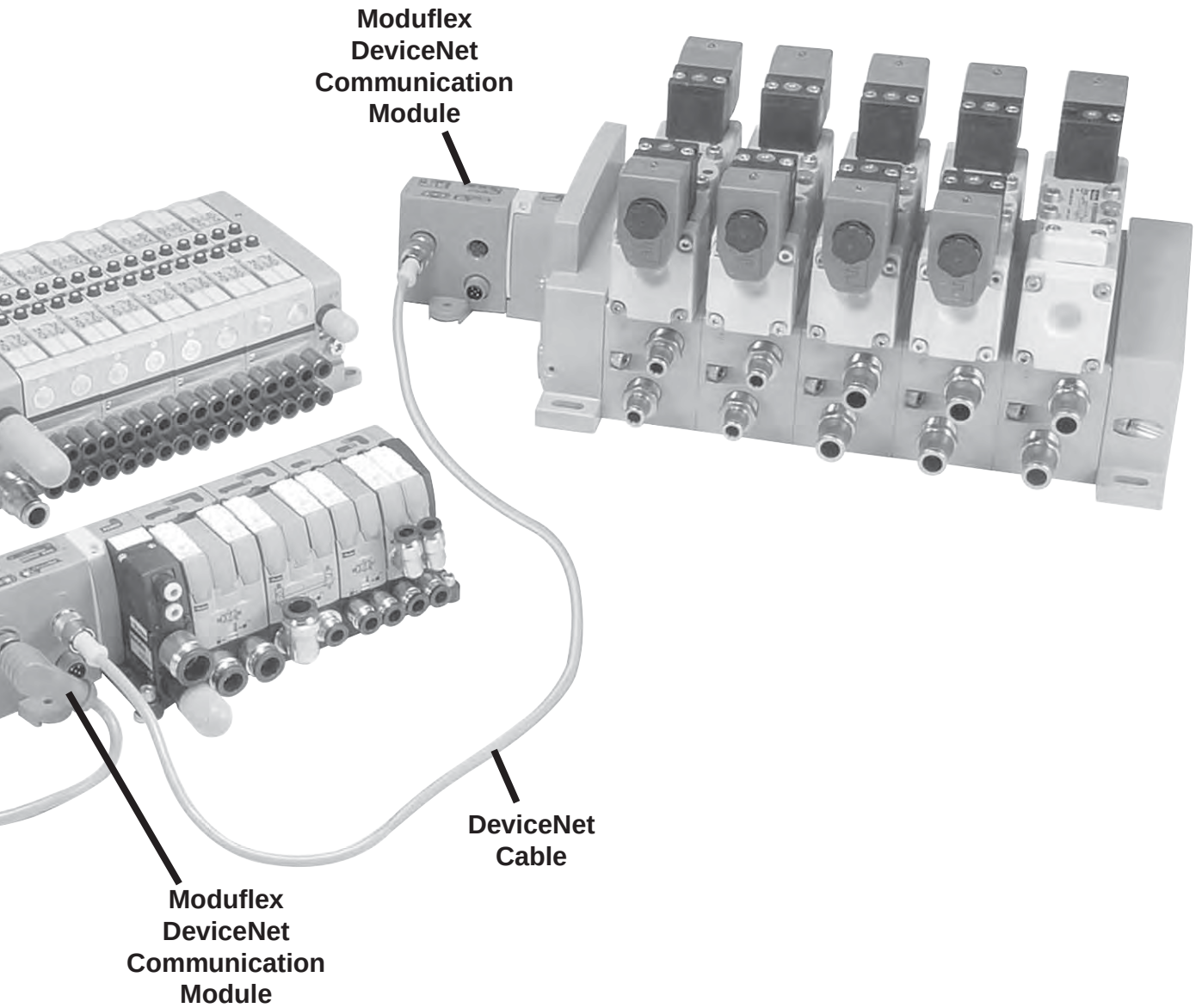
I/O Configuration

- Complete control of all I/O and valves with stand alone control.
- Additional I/O and valves connected over DeviceNet with BL Remote Subnet.
- BL Remote connection to Moduflex and Turck fieldbus DeviceNet equipped communication modules.
- I/O density per module = 4, 8 or 16.



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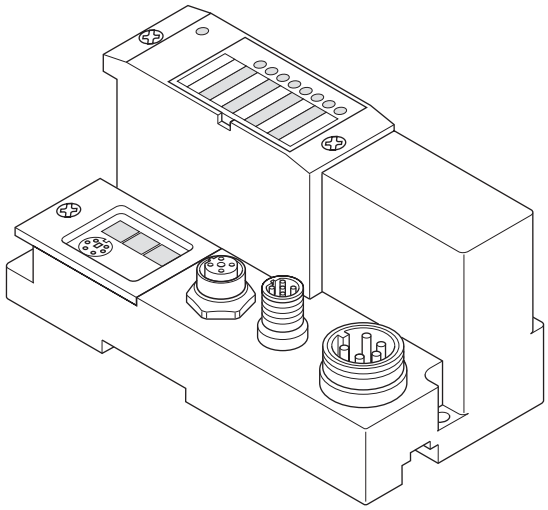
Communications Module

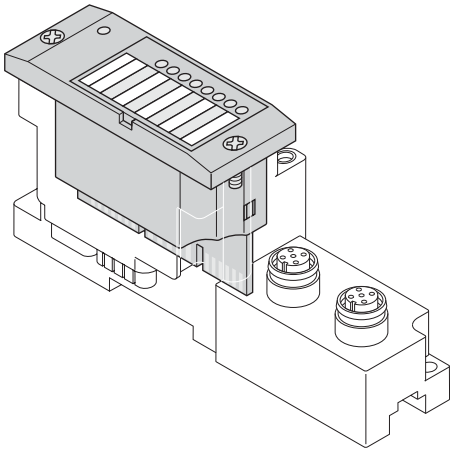


BL67 communication modules are the heart of a BL67 station. They are designed to connect the modular fieldbus nodes to the higher level fieldbus (PROFIBUS-DP, DeviceNet™, CANopen, Ethernet).

All BL67 electronic modules communicate over the internal module bus with the communication modules. The communication module structures the data and sends them clustered via fieldbus nodes to the higher control system.

This way all I/O modules can be configured independently of the fieldbus system.

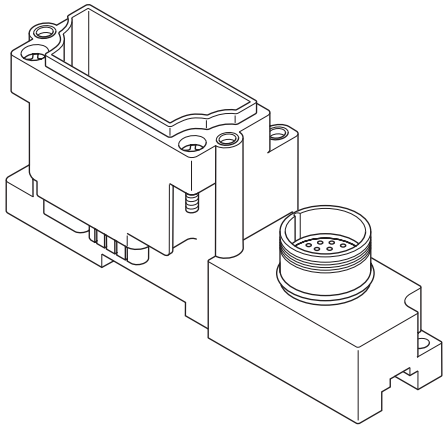
Electronic Module



BL67 electronic modules are inserted into the passive base modules from above and then simply affixed with two screws. Maintenance is extremely simplified due to the separation of connection level and module electronics.

Moreover, flexibility is enhanced because the base modules provide different types of connectors. Voltage supply for the electronic modules is either provided via the communication modules or a Power Extender module. Power Extender modules can be used to create galvanically isolated potential groups.

Base Module



BL67 base modules are aligned one by one to the right of the communication module and are tightened each with two screws, either with the communication modules or with the previous module. A DIN rail is not required. This way a compact and stable unit is created which can be mounted directly on the machine.

The base modules serve for connection of the field devices an are available with different connection types (M8, M12, M23 and 7/8).

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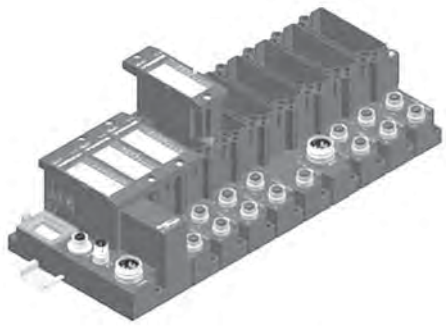

A BL67 system can be extended to a total length of 1 m, comprising of a communication module for PROFIBUS-DP, DeviceNet™/ CANopen or Ethernet and a maximum of 32 modules.

Maximum System Extension PROFIBUS-DP, DeviceNet™ , CANopen

	PROFIBUS		DeviceNet		CANopen	
Module type	**Number of chan.**	**Number of mod.**	**Number of chan.**	**Number of mod.**	**Number of chan.**	**Number of mod.**
Digital inputs, 4 DI	128	32	128	32	128	32
Digital inputs, 8 DI	256	32	256	32	256	32
Digital outputs, 4 DO	128	32	128	32	128	32
Digital outputs, 8 DO	256	32	256	32	256	32
Digital outputs, 16 DO	512	32	512	32	512	32
Analog inputs, 2AI	64	32	64	32	64	32
Analog inputs, 4AI	112	28	124	31	124	31
Analog inputs, 2 AI-PT	56	28	64	32	64	32
Analog inputs, 2 AI-TC	64	32	64	32	64	32
Analog outputs, 2 AO-I	38	19	64	32	64	32
Analog outputs, 2 AO-V	38	19	50	25	50	25

System supply: The power supply for the BL67 system is either derived separately for PROFIBUSDP and Ethernet communication modules or directly from the DeviceNet™ / CANopen cable for the DeviceNet™ / CANopen communication module.

Power Extender modules can be inserted anywhere in the BL67 station. They provide isolated field voltage for the I/O modules mounted to their right.

Thus Power Extender modules can also be used to create different potential groups.

Maximum System Extension EtherNet Based Protocols

	ModbusTCP		EtherNet/IP		PROFIBUS	
Module type	**Number of chan.**	**Number of mod.**	**Number of chan.**	**Number of mod.**	**Number of chan.**	**Number of mod.**
Digital inputs, 4 DI	128	32	128	32	128	32
Digital inputs, 8 DI	256	32	256	32	256	32
Digital outputs, 4 DO	128	32	128	32	128	32
Digital outputs, 8 DO	256	32	256	32	256	32
Digital outputs, 16 DO	512	32	512	32	512	32
Analog inputs, 2AI	64	32	64	32	64	32
Analog inputs, 4AI	128	32	128	32	128	32
Analog inputs, 2 AI-PT	64	32	64	32	64	32
Analog inputs, 2 AI-TC	64	32	64	32	64	32
Analog outputs, 2 AO-I	64	32	64	32	64	32
Analog outputs, 2 AO-V	50	25	50	25	50	25

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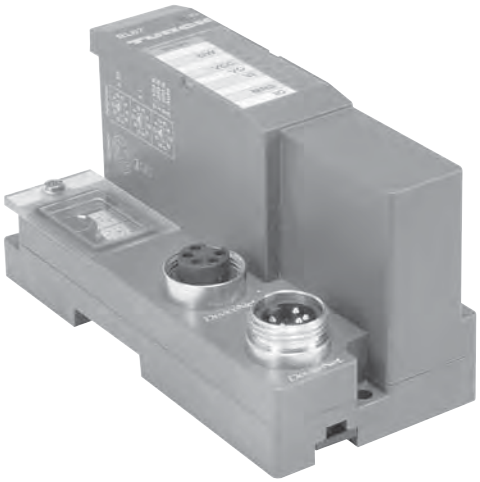
BL67-GW-DN

DeviceNet Communication Module with Power over the Network

BL67-GW-CO-T

CANopen Communication Module with Power over the Network



7/8 Mini bus In wiring,
view into male connector

1 = Shield
2 = RD (V +)
3 = BK (V -)
4 = WH (CAN H)
5 = BU (CAN L)

7/8 Mini bus out wiring,
view into female connector

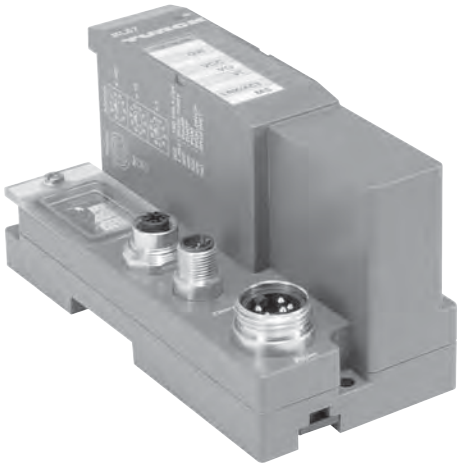
1 = Shield
2 = RD (V +)
3 = BK (V -)
4 = WH (CAN H)
5 = BU (CAN L)

Turck Fieldbus System with up to 256 inputs, outputs, and 32 solenoids per Isys Micro or Isys ISO manifold. Digital inputs / outputs, analog inputs / outputs, serial interface, and counter modules are available. DeviceNet communication speeds selectable between 120, 250, 500 kbps, and CANopen communication speeds are selectable between 10 kbps up to 1 Mbps. Addressing for either module can be selected via rotary switches or set through software.

With the Power over the Network feature, it is only necessary to connect one cable to the communication module. For networks requiring additional power, a Bus Power Tee can be installed to combine separate network and power feeds into the communication module. See the Cables and Cordsets section for additional information.

BL67-GW-CO

CANopen Communication Module



M12 A-code bus out Wiring,
view into female connector

1 = Shield
2 = RD (V +)
3 = BK (V -)
4 = WH (CAN H)
5 = BU (CAN L)

M12 A-code bus In Wiring,
view into male connector

1 = Shield
2 = RD (V +)
3 = BK (V -)
4 = WH (CAN H)
5 = BU (CAN L)

7/8 Mini Power in wiring,
view into male connector

1 = GND
2 = GND
3 = PE
4 = V_i
5 = V_o

Turck Fieldbus System with up to 256 inputs, outputs, and 32 solenoids per Isys Micro or Isys ISO manifold. Digital inputs / outputs, analog inputs / outputs, serial interface, and counter modules are available. CANopen communication speeds are selectable between 10 kbps up to 1 Mbps, and addressing can be selected via rotary switches or set through software.

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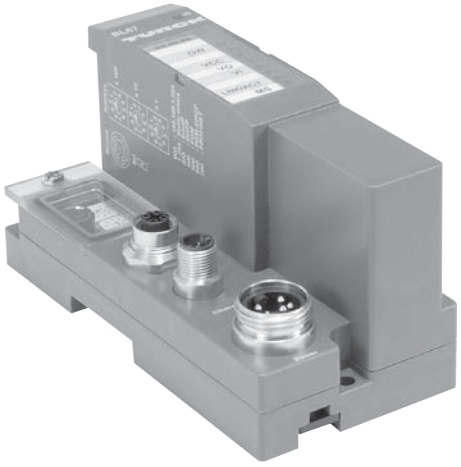
BL67-GW-DPV1

Profibus Communication Module



M12 B-code bus out Wiring,
view into female connector

1 = 5 VDC
2 = GN (Bus A)
3 = GND
4 = RD (Bus B)
5 = Shield

M12 B-code bus In Wiring,
view into male connector

1 = n.c.
2 = GN (Bus A)
3 = n.c.
4 = RD (Bus B)
5 = Shield

7/8 Mini Power in wiring,
view into male connector

1 = GND
2 = GND
3 = PE
4 = V_i
5 = V_o

Turck Fieldbus System with up to 256 inputs, outputs, and 32 solenoids per Isys Micro or Isys ISO manifold. Digital inputs / outputs, analog inputs / outputs, serial interface, and counter modules are available. Profibus communication speeds are selectable between 9.6 kbps up to 12 Mbps, and addressing can be selected via rotary switches or set through software.

BL67-GW-EN

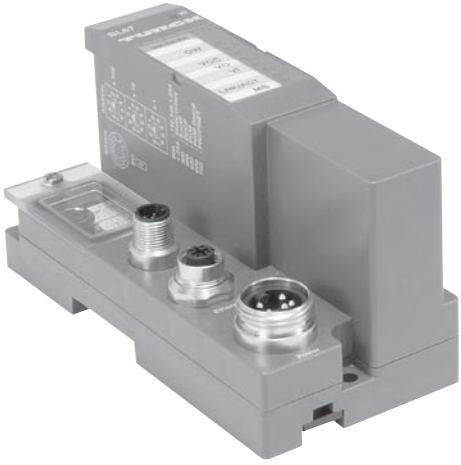
Modbus / TCP Communication Module

BL67-GW-EN-IP

Ethernet / IP Communication Module

BL67-GW-EN-PN

Profinet Communication Module



M12 D-code
Ethernet in Wiring,
view into female connector

1 = YE (TX+)
2 = WH (RX+)
3 = OG (TX-)
4 = BU (RX-)

7/8 Mini Power in wiring,
view into male connector

1 = GND
2 = GND
3 = PE
4 = V_i
5 = V_o

Turck Fieldbus System with up to 256 inputs, outputs, and 32 solenoids per Isys Micro or Isys ISO manifold. Digital inputs / outputs, analog inputs / outputs, serial interface, and counter modules are available. Communication speeds of 10/100 Mbps, and addressing can be selected via rotary switches, BOOTP, DHCP, or through software.

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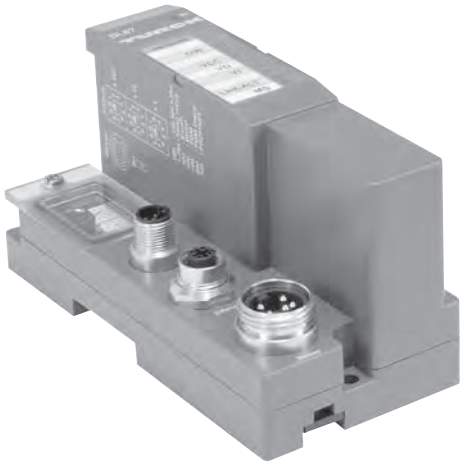
BL67-GW-EN-DN

Modbus / TCP Communication Module with DeviceNet Subnet

BL67-GW-EN-IP-DN

Ethernet / IP Communication Module with DeviceNet Subnet



DeviceNet OUT

1 = Shield
2 = RD (V +)
3 = BK (V -)
4 = WH (CAN H)
5 = BU (CAN L)

M12 D-code
Ethernet in Wiring,
view into female connector

1 = YE (TX+)
2 = WH (RX+)
3 = OG (TX-)
4 = BU (RX-)

7/8 Mini Power in wiring,
view into male connector

1 = GND
2 = GND
3 = PE
4 = V_i
5 = V_o

With BL Remote DeviceNet Subnet functionality, each communication module has its own DeviceNet master which provides a connection for 63 DeviceNet nodes with additional inputs, outputs, and solenoid control. BL Remote DeviceNet Subnet is independent of the main fieldbus network, and is not visible to the master PLC.

BL67-PG-DP

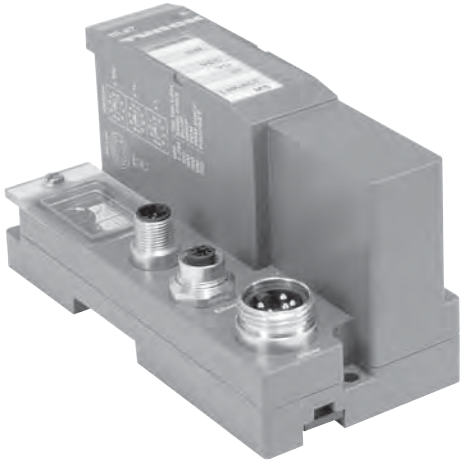
Profibus Programmable Communication Module

BL67-PG-EN

Modbus / TCP Programmable Communication Module

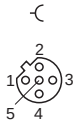
BL67-PG-EN-IP

Ethernet / IP Programmable Communication Module



Profibus Wiring

M12 B-code bus out Wiring,
view into female connector



1 = 5 VDC
2 = GN (Bus A)
3 = GND
4 = RD (Bus B)
5 = Shield

M12 B-code bus in Wiring,
view into female connector

1 = n.c.
2 = GN (Bus A)
3 = n.c.
4 = RD (Bus B)
5 = Shield

Ethernet Wiring

M12 D-code
Ethernet in Wiring,
view into female connector

1 = YE (TX+)
2 = WH (RX+)
3 = OG (TX-)
4 = BU (RX-)

7/8 Mini Power in wiring,
view into male connector
Common to modules

1 = GND
2 = GND
3 = PE
4 = V_i
5 = V_o

Communication modules are equipped with a built in standalone controller which is programmed according to IEC61131-3 with CoDeSys. Each module has 512KB Program memory with 32 bit RISC processor, and can run 1000 instructions in less than 1 ms. These fieldbus equipped modules are optimized to interface with PLC's with fieldbus capability or act as standalone controllers that need to interface with other fieldbus equipped devices.

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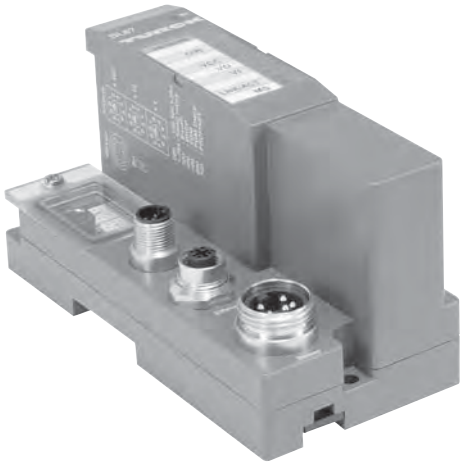
BL67-PG-EN-DN

Modbus / TCP Programmable Communication Module with DeviceNet Subnet

BL67-PG-EN-IP-DN

Ethernet / IP Programmable Communication Module with DeviceNet Subnet



DeviceNet OUT

1 = Shield
2 = RD (V +)
3 = BK (V -)
4 = WH (CAN H)
5 = BU (CAN L)

M12 D-code
Ethernet in Wiring,
view into female connector

1 = YE (TX+)
2 = WH (RX+)
3 = OG (TX-)
4 = BU (RX-)

7/8 Mini Power in wiring,
view into male connector

1 = GND
2 = GND
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Communication modules are equipped with a built in standalone controller which is programmed according to IEC61131-3 with CoDeSys. Each module has 512KB Program memory with 32 bit RISC processor, and can run 1000 instructions in less than 1 ms. These fieldbus equipped modules are optimized to interface with PLC's with fieldbus capability or act as standalone controllers that need to interface with other fieldbus equipped devices.

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	Base Modules												
	BL67-B-4M8	BL67-B-8M8	BL67-B-1M12	BL67-B-1M12-8	BL67-B-2M12	BL67-B-2M12-P	BL67-B-4M12	BL67-B-4M12-P	BL67-B-1M23	BL67-B-1M23-19	BL67-B-1RSM	BL67-B-1RSM-4	BL67-1RSM-VO
Power Extender Modules													
BL67-PF-24VDC											✔	✔	✔
Digital Input Modules													
BL67-4DI-P	✔				✔	✔	✔		✔				
BL67-8DI-P		✔					✔	✔	✔				
BL67-4DI-PD	✔				✔	✔	✔		✔				
BL67-8DI-PD		✔					✔	✔	✔				
BL67-4DI-N	✔				✔	✔	✔		✔				
BL67-8DI-N		✔					✔	✔	✔				
Digital Output Modules													
BL67-4DO-0.5A-P	✔				✔	✔	✔		✔				
BL67-4DO-2A-P	✔				✔	✔	✔		✔				
BL67-8DO-0.5A-P		✔					✔	✔	✔				
BL67-16DO-0.1A-P										✔			
BL67-4DO-2A-N	✔				✔	✔	✔		✔				
BL67-8DO-0.5A-N		✔					✔	✔	✔				
Relay Output Modules													
BL67-8DO-R-NO								✔					
Digital Input / Output Modules													
BL67-4DI4DO-PD		✔					✔	✔	✔				
Configurable Digital Input / Output Modules													
BL67-8XSG-PD		✔					✔	✔	✔				
Analog Input Modules													
BL67-2AI-I					✔								
BL67-2AI-V					✔								
BL67-4AI-V/I							✔						
BL67-2AI-PT					✔								
BL67-2AI-TC					✔								
Analog Output Modules													
BL67-2AO-I					✔								
BL67-2AO-V					✔								
Technology Modules													
BL67-1RS232			✔	✔					✔				
BL67-1RS485/422			✔	✔					✔				
BL67-1SSI				✔					✔				
BL67-1CNT/ENC				✔					✔				
BL67-1CVI			✔										
***BL Ident®* RFID Modules**													
BL67-2RFID-A					✔								
BL67-2RFID-S					✔								

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System Supply via the Module Bus

The number of BL67 modules that can be powered by the communication module, depends on the nominal current draw of all the modules in the system. The total bus power current consumption of the installed BL67 modules may not exceed 1.5 A. The total field power current for inputs may not exceed 4 A, and the total field power for outputs may not exceed 8 A for DeviceNet and CANopen with power over the network, or 10A for all other communication modules.

When using the software PACTware, the menu item <Station - Verify> will automatically generate an error message if the system supply via the module bus is not reliably ensured.

Nominal Current Consumption

The following table shows the nominal current consumption of the various BL67 modules:

Modules	Bus Power Current (mA)	Field Power for Inputs[1] (mA)	Field Power for Outputs (mA)
PROFIBUS-DP Communication Module	0		150
DeviceNet™ Communication Module	0		150
CANopen Communication Module	0		150
Ethernet Communication Module	0		150
Valve Driver with 16 Outputs	30		< 109 mA (Plus Load Current)
Valve Driver with 32 Outputs	60		< 218 mA (Plus Load Current)
BL67-PF-24VDC	30		9
BL67-4DI-P	30	< 49 mA	
BL67-4DI-N	30	< 10 mA	
BL67-4DI-PD	30	< 109 mA	
BL67-8DI-P	30	< 49 mA	
BL67-8DI-N	30	< 10 mA	
BL67-8-DI-PD	30	< 109 mA	
BL67-4DO-0.5A-P	30		< 109 mA (Plus Load Current)
BL67-4DO-2A-P	30		< 109 mA (Plus Load Current)
BL67-4DO-2A-N	30		< 109 mA (Plus Load Current)
BL67-8DO-0.5A-P	30		< 109 mA (Plus Load Current)
BL67-8DO-0.5A-N	30		< 109 mA (Plus Load Current)
BL67-16DO-0.1A-P	30		< 109 mA (Plus Load Current)
BL67-4DI4DO-PD	30		< 109 mA (Plus Load Current)
BL67-8XSG-PD	30		< 109 mA (Plus Load Current)
BL67-8DO-R-NO	30		< 109 mA (Plus Load Current)
BL67-2AI-V	35	< 22 mA	
BL67-2AI-I	35	< 22 mA	
BL67-4AI-I/V	35	< 22 mA	
BL67-2AI-TC	35	< 40 mA	
BL67-2AI-PT	45	< 58 mA	
BL67-2AO-I	40		< 62 mA
BL67-2AO-V	60		< 67 mA
BL67-1RS232	140	< 90 mA	
BL67-1RS485/422	60	< 42 mA	
BL67-1SSI	50	< 39 mA	
BL67-1CNT/ENC	30	< 109 mA	
BL67-1CVI	30	< 109 mA	

1) Is limited to 4 A by means of the integrated short-circuit protection.

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Digital Input Modules

I/O Modules	Voltage	Part Number
8 PNP Input Module	7 to 30 VDC	**BL67-8DI-P**
8 PNP Input Module, with Diagnostics	7 to 30 VDC	**BL67-8DI-PD**
8 NPN Input Module	24 VDC	**BL67-8DI-N**

Base Module	Part Number	
8 x M8, 3 Pole, Female	**BL67-B-8M8**	
4 x M12, 5 Pole, Female, A-code	**BL67-B-4M12**	
4 x M12, 5 Pole, Female, A-code	**BL67-B-4M12-P**	
1 x M23, 12 Pole, Female	**BL67-B-1M23**	

I/O Modules	Voltage	Part Number
4 PNP Input Module	7 to 30 VDC	**BL67-4DI-P**
4 PNP Input Module, with Diagnostics	7 to 30 VDC	**BL67-4DI-PD**
4 NPN Input Module	24 VDC	**BL67-4DI-N**

Base Module	Part Number	
4 x M8, 3 Pole, Female	**BL67-B-4M8**	
2 x M12, 5 Pole, Female, A-code	**BL67-B-2M12**	
2 x M12, 5 Pole, Female, A-code	**BL67-B-2M12-P**	
4 x M12, 5 Pole, Female, A-code	**BL67-B-4M12**	
1 x M23, 12 Pole, Female	**BL67-B-1M23**	

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Digital Output Modules

I/O Modules	Output Current	Part Number
8 PNP Output Module	0.5 Amps per Channel	**BL67-8DO-0.5A-P**
8 NPN Output Module	0.5 Amps per Channel	**BL67-8DO-0.5A-N**

Base Module	Part Number	
8 x M8, 3 Pole, Female	**BL67-B-8M8**	
4 x M12, 5 Pole, Female, A-code	**BL67-B-4M12**	
4 x M12, 5 Pole, Female, A-code	**BL67-B-4M12-P**	
1 x M23, 12 Pole, Female	**BL67-B-1M23**	

I/O Modules	Output Current	Part Number
4 PNP Output Module	0.5 Amps per Channel	**BL67-4DO-0.5A-P**
4 PNP Output Module	2 Amps per Channel	**BL67-4DO-2A-P**
4 PNP Output Module	4 Amps per Channel	**BL67-4DO-4A-P**
4 NPN Output Module	2 Amps per Channel	**BL67-4DO-2A-N**

Base Module	Part Number	
4 x M8, 3 Pole, Female	**BL67-B-4M8**	
2 x M12, 5 Pole, Female, A-code	**BL67-B-2M12**	
2 x M12, 5 Pole, Female, A-code	**BL67-B-2M12-P**	
4 x M12, 5 Pole, Female, A-code	**BL67-B-4M12**	
1 x M23, 12 Pole, Female	**BL67-B-1M23**	

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Digital Output Modules

I/O Modules	Output Current	Part Number
16 PNP Output Module	0.14 Amps per Channel	**BL67-16DO-0.1A-P**

Base Module	Part Number	
1 x M23, 19 Pole, Female	**BL67-B-1M23-19**	

Relay Output Modules

I/O Modules	Output Current	Part Number
8 Normally Open Relays	0.1 Amps per Channel	**BL67-8DO-R-NO**

Base Module	Part Number	
4 x M12, 5 Pole, Female, A-code	**BL67-B-4M12-P**	

Combination Input / Output Modules

I/O Modules	Input Voltage & Output Current	Part Number
4 PNP Output 4 PNP Input Module, with Diagnostics	7 to 30 VDC 0.5 Amps	**BL67-4DI4DO-PD**
8 PNP Configurable Input or Output Module, with Diagnostics	7 to 30 VDC 0.5 Amps	**BL67-8XSG-PD**

Base Module	Part Number	
8 x M8, 3 Pole, Female	**BL67-B-8M8**	
4 x M12, 5 Pole, Female, A-code	**BL67-B-4M12**	
4 x M12, 5 Pole, Female, A-code	**BL67-B-4M12-P**	

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Analog Input Modules

I/O Modules	Input Type	Part Number
4 Configurable Current or Voltage Analog Input Module	4 to 20 mA or 0 to 20 mA -10 to +10 VDC or 0 to +10 VDC	**BL67-4AI-V/I**

Base Module	Part Number	
4 x M12, 5 Pole, Female, A-code	**BL67-B-4M12**	

I/O Modules	Input Type	Part Number
2 Current Analog Input Module	4 to 20 mA or 0 to 20 mA	**BL67-2AI-I**
2 Voltage Analog Input Module	-10 to +10 VDC or 0 to +10 VDC	**BL67-2AI-V**
2 Temperature Analog Input Module	PT100, PT200, PT500, PT1000, Ni100, Ni1000	**BL67-2AI-PT**
2 Temperature Analog Input Module	Type B, E, J, K, N R, S, T	**BL67-2AI-TC**

Base Module	Part Number	
2 x M12, 5 Pole, Female, A-code	**BL67-B-2M12**	

Analog Output Modules

I/O Modules	Input Type	Part Number
4 Voltage Analog Output Module	-10 to +10 VDC or 0 to +10 VDC	**BL67-4AO-V**

Base Module	Part Number	
4 x M12, 5 Pole, Female, A-code	**BL67-B-4M12**	

I/O Modules	Input Type	Part Number
2 Current Analog Output Module	4 to 20 mA or 0 to 20 mA	**BL67-2AO-I**
2 Voltage Analog Output Module	-10 to +10 VDC or 0 to +10 VDC	**BL67-2AO-V**

Base Module	Part Number	
2 x M12, 5 Pole, Female, A-code	**BL67-B-2M12**	

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Combination Analog Input / Output Modules

I/O Modules	Output Current	Part Number
4 Configurable Input and 4 Configurable Output Current or Voltage Analog Module	4 to 20 mA or 0 to 20 mA -10 to +10 VDC or 0 to +10 VDC	**BL67-4AI4AO-V/I**

Base Module	Part Number	
8 x M8, 3 Pole, Female	**BL67-B-8M8**	
4 x M12, 5 Pole, Female, A-code	**BL67-B-4M12**	

I/O Modules	Output Current	Part Number
2 Configurable Input and 2 Configurable Output Current or Voltage Analog Module	4 to 20 mA or 0 to 20 mA -10 to +10 VDC or 0 to +10 VDC	**BL67-2AI2AO-V/I**

Base Module	Part Number	
8 x M8, 3 Pole, Female	**BL67-B-8M8**	

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Power Extender Module

Extender Module	Current Capacity	Part Number
24 VDC Field Power Module	10 Amps Input	**BL67-PF-24VDC**

Base Module	Part Number	
5 Pole Mini Connector to Supply Bus Power and Field Power	**BL67-B-1RSM**	
5 Pole Mini Connector to Field Power Only	**BL67-B-1RSM-VO**	
4 Pole Mini Connector to Supply Bus Power and Field Power	**BL67-B-1RSM-4**	

CANopen Subnet Module

Extender Module	Capacity	Part Number
1 CANopen Connection	64 Bits of Inputs or Outputs	**BL67-1CVI**

Base Module	Part Number	
1 x M12, 5 Pole, Female, A-code	**BL67-B-1M12**	

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Serial Interface Module

Extender Module	Capacity	Part Number
1 RS232 Serial Interface	300 to 115200 bps	**BL67-1RS232**
1 RS485 or 422 Serial Interface	300 to 115200 bps	**BL67-1RS485/422**

Base Module	Part Number	
1 x M12, 5 Pole, Female, A-code	**BL67-B-1M12**	
1 x M12, 8 Pole, Female, A-code	**BL67-B-1M12-8**	
1 x M23, 12 Pole, Female	**BL67-B-1M23**	

SSI and Counting Modules

Extender Module	Capacity	Part Number
1 SSI Sensor Interface	65 kbps up to 1 Mbps	**BL67-1SSI**
1 Counter Interface	Up to 250 kHz	**BL67-1CNT/ENC**

Base Module	Part Number	
1 x M12, 8 Pole, Female, A-code	**BL67-B-1M12-8**	
1 x M23, 12 Pole, Female	**BL67-B-1M23**	

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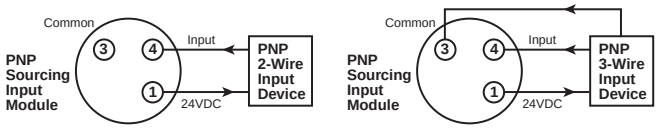
Digital PNP Input Modules

Digital DC Input Module	BL67-4DI-P	BL67-8DI-P	BL67-4DI-PD	BL67-8DI-PD
Number of Inputs	4	8	4	8
Sensor Requirement	PNP Sourcing		PNP Sourcing	
Voltage, On-State Input, Nom.	24 VDC		24 VDC	
Field Power for Inputs Current Consumption	49 mA		109 mA	
Bus Power Current Consumption	30 mA		30 mA	
Low Level Signal Voltage	<4.5 V		<4.5 V	
High Level Signal Voltage	7…30V		7…30V	
Low Level Signal Current	<1.5 mA		<1.5 mA	
High Level Signal Current	2.1…3.7 mA		2.1…3.7 mA	
Type of Diagnositcs	Group Diagnostics		Channel Diagnostics	
Short Circuit Protection	Group Protection		Channel Protection	
Input Delay	0.25 ms		0.25; 2.5 ms	

PNP (Sourcing)

PNP input modules provide sourcing capabilities. When the input field device is passing, current flows from the input device into the Turck input module.

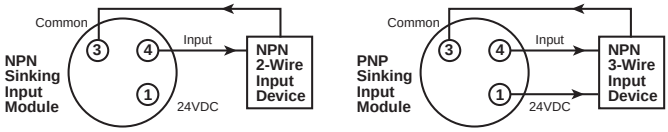


Digital NPN Input Modules

Digital DC Input Module	BL67-4DI-N	BL67-8DI-N
Number of Inputs	4	8
Sensor Requirement	NPN Sinking	
Voltage, On-State Input, Nom.	24 VDC	
Field Power for Inputs Current Consumption	10 mA	
Bus Power Current Consumption	30 mA	
Low Level Signal Voltage	>7 V	
High Level Signal Voltage	<5 V	
Low Level Signal Current	<2.5 mA	<1.2 mA
High Level Signal Current	>3 mA	>1.5 mA
Type of Diagnositcs	Group Diagnostics	
Short Circuit Protection	Group Protection	
Input Delay	0.25 ms	

NPN (Sinking)

NPN input modules provide sinking capabilities. When the input field device is passing, current out of the Turck input module into the field input device.



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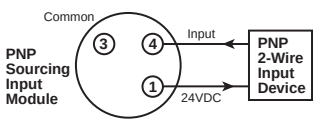
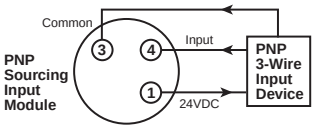
Digital PNP Output Modules

Digital DC Output Module	BL67-4DO-0.5A-P	BL67-8DO-0.5A-P	BL67-4DO-2A-P	BL67-16DO-0.1A-P
Number of Outputs	4	8	4	16
Sensor Requirement	PNP Sourcing			
Output Voltage	24 VDC			
Field Power for Outputs Current Consumption	109 mA (Plus load current)			
Bus Power Current Consumption	30 mA			
Output Current per Channel	0.5 A		2.0A	0.1 A
Output Delay	3 ms			
Load Type	Resistive, Inductive, Lamp Load			Resistive, Inductive
Load Resistance, Resistive	>48 Ohm		>12 Ohm	>250 Ohm
Load Resistance, Inductive	<1.2 H			
Lamp Load	< 3W		< 10W	
Switching Frequency, Resistive	<200 Hz			
Switching Frequency, Inductive	< 2 Hz			
Switching Frequency, Lamp Load	< 20 Hz			
Short-Circuit Protection	Group Protection			
Diagnostic Bits	4	8	4	16

PNP (Sourcing)

PNP input modules provide sourcing capabilities. When the input field device is passing, current flows from the input device into the Turck input module.



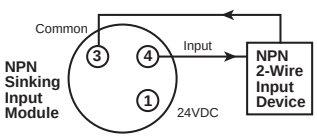


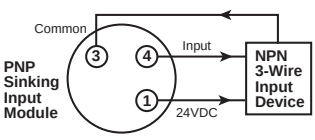
Digital NPN Output Modules

Digital DC Output Module	BL67-8DO-0.5A-N	BL67-4DO-2A-N
Number of Outputs	8	4
Sensor Requirement	NPN Sinking	
Output Voltage	24 VDC	
Field Power for Outputs Current Consumption	109 mA (Plus load current)	
Bus Power Current Consumption	30 mA	
Output Current per Channel	0.5 A	2.0 A
Output Delay	3 ms	
Load Type	Resistive, Inductive, Lamp Load	
Load Resistance, Resistive	>48 Ohm	
Load Resistance, Inductive	<1.2 H	
Lamp Load	< 3W	
Switching Frequency, Resistive	<200 Hz	
Switching Frequency, Inductive	< 2 Hz	
Switching Frequency, Lamp Load	< 20 Hz	
Short-Circuit Protection	Group Protection	
Diagnostic Bits	4	8

NPN (Sinking)

NPN input modules provide sinking capabilities. When the input field device is passing, current out of the Turck input module into the field input device.





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Relay Output Modules

Relay Output Module	BL67-8DO-R-NO
Number of Outputs	8
Output Type	Relay
Output Voltage	24 VDC
Field Power for Outputs Current Consumption	109 mA (Plus load current)
Bus Power Current Consumption	30 mA
Output Current per Channel	100 mA
Output Delay	3 ms
Load Type	Resistive, TTL logic
Switching Resistor	<31 Ohm
Switching Frequency, Resistive	<200 Hz
Short-Circuit Protection	None

Combination Digital Modules

Combination Input and Output Modules	BL67-4DI4DO-PD	BL-67-8XSG-PD
Number of Outputs	4	Configurable 0 to 8
Number of Inputs	4	Configurable 0 to 8
Total Channels	8	8
Sensor Requirement	PNP Sourcing	
Voltage, On-State Input, Nom.	24 VDC	
Output Voltage	24 VDC	
Field Power for Outputs Current Consumption	109 mA	
Bus Power Current Consumption	30 mA	
Input Low Level Signal Voltage	<4.5 V	
Input High Level Signal Voltage	7…30V	
Input Low Level Signal Current	<1.5 mA	
Input High Level Signal Current	2.1…3.7 mA	
Input Delay	0.25; 2.5 ms	
Output Current per Channel	0.5 A	
Output Delay	3 ms	
Load Type	Resistive, Inductive, Lamp Load	
Load Resistance, Resistive	>48 Ohm	
Load Resistance, Inductive	<1.2 H	
Lamp Load	< 3W	
Switching Frequency, Resistive	<200 Hz	
Switching Frequency, Inductive	< 2 Hz	
Switching Frequency, Lamp Load	< 20 Hz	
Short-Circuit Protection	Channel Protection	
Diagnostic Bits	8	12

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Analog Input Modules

Analog Input Module	BL67-2AI-I	BL67-2AI-V	BL67-4AI-V/I
Number of Inputs	2	2	4
Nominal Voltage	24 VDC		
Field Power for Inputs Current Consumption	22 mA		
Bus Power Current Consumption	35 mA		
Analog Input Type	0/4…20mA	-10/0…+10 VDC	0/4…20mA or -10/0…+10 VDC
Input Resistance	<0.125 kOhm	<98.5 kOhm	<0.125 kOhm or <98.5 kOhm
Maximum Limiting Frequency	50 Hz		20 Hz
Fault Limit @ 23 degree C	<0.2%		<0.3%
Repeatability	0.05%		
Temperature Coefficient (ppm/degree C of full scale)	<300	<150	<300
Resolution	16 Bit		
Measuring Principle	Sigma Delta		
Measured Value Display	16 Bit Signed Integer, 12 Bit Full Range Left Justified		
Diagnostic Bits	16		32

Temperature Inputs

Analog Input Module	BL67-2AI-PT	BL67-2AI-TC
Number of Inputs	2	2
Nominal Voltage	24 VDC	
Field Power for Inputs Current Consumption	58 mA	40 mA
Bus Power Current Consumption	45 mA	35 mA
Temperature Input Type	PT100, PT200, PT500, PT1000, Ni100, Ni1000	B, E, J, K, N, R, S, T
Voltage Resolution	n/a	+/- 50mV; <2uV
Fault Limit @ 23 degree C	<0.2%	
Repeatability	0.05%	
Temperature Coefficient (ppm/degree C of full scale)	<300	
Resolution	16 Bit	
Measured Value Display	16 Bit Signed Integer, 12 Bit Full Range Left Justified	
Diagnostic Bits	16	

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Analog Input Modules

Analog Input Module	BL67-2AO-I	BL67-2AO-V
Number of Inputs	2	2
Nominal Voltage	24 VDC	
Field Power for Outputs Current Consumption	62 mA	67 mA
Bus Power Current Consumption	40 mA	60 mA
Analog Output Type	0/4…20mA	-10/0…+10 VDC
Output Current per Channel	n/a	250 mA
Load Resistance, Resistive	<0.45 kOhm	> 1kOhm
Load Resistance, Inductive	<1 mH	n/a
Load Resistance, Capacitive	n/a	> 1 uF
Transmission Frequency	<200 Hz	<100 Hz
Fault Limit @ 23 degree C	<0.2%	
Repeatability	0.05%	
Temperature Coefficient (ppm/degree C of full scale)	<150	<300
Resolution	16 Bit	
Measured Value Display	16 Bit Signed Integer, 12 Bit Full Range Left Justified	

Combination Analog Modules

Analog Combination Module	BL67-4AI4AO-V/I	BL67-2AI2AO-V/I
Number of Analog Inputs	4	2
Number of Analog Outputs	4	2
Nominal Voltage	24 VDC	
Field Power for Outputs Current Consumption	67 mA	
Bus Power Current Consumption	60 mA	
Analog Input Type	0/4…20mA or -10/0…+10 VDC	
Input Resistance	0.065 or 225 kOhm	
Maximum Limiting Frequency	20 Hz	
Fault Limit @ 23 degree C	<0.3%	
Repeatability	0.05%	
Temperature Coefficient (ppm/degree C of full scale)	<300	
Resolution	16 Bit	
Measuring Principle	Sigma Delta	
Measured Value Display	16 Bit Signed Integer 12 Bit Full Range Left Justified	
Analog Output Type	-10/0…+10 VDC	
Output Current per Channel	250 mA	
Load Resistance, Resistive	>1 kOhm	
Load Resistance, Capacitive	<1 uF	
Transmission Frequency	<100 Hz	
Fault Limit @ 23 degree C	<0.3%	
Repeatability	0.05%	
Temperature Coefficient (ppm/degree C of full scale)	<300	
Resolution	16 Bit	
Measured Value Display	16 Bit Signed Integer, 12 Bit Full Range Left Justified	
Diagnostic Bits	8	4

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Power Extender Module

Power Extender Module	BL67-PF-24VDC
Nominal Voltage	24 VDC
Field Power for Outputs Current Consumption	9 mA
Bus Power Current Consumption	30 mA
Supply for Field Power for Inputs Current	4.0 A
Supply for Field Power for Outputs Current	10 A
Diagnostic Bits	3

RS232 Interface

RS232 Interface	BL67-1RS232
Number of Channels	1
Field Power for Inputs Current Consumption	90 mA
Bus Power Current Consumption	140 mA
Transmission Level Active (U RS1)	-15 to -3 VDC
Transmission Level Inactive (URSO)	3 to 15 VDC
Common-mode Range (UGL)	-7 to 12 VDC
Transmission Signals	RxD, TxD, RTS, CTS
Data Buffer Received	128 Byte
Send Data Buffer	64 Byte
Connection Type	Full Duplex
Transmission Rate	300 to 115200 bps
Parameter	Transmission Rate, Diagnostics, Data Bits, Stop Bits, XON - Character, XOFF - Character, Parity, Flow Control
Cable Length	15 m
Diagnostic Bits	8

RS485 / 422 Interface

RS485/422 Interface	BL67-1RS485/422
Number of Channels	1
Field Power for Inputs Current Consumption	42 mA
Bus Power Current Consumption	60 mA
Transmission Signals	RxD, TxD
Connection Type	2 Wire Half Duplex or 4 Wire Full Duplex
Transmission Rate	300 to 115200 bps
Parameter	RS485/422, Transmission Rate, Diagnostics, Data Bits, Stop Bits, XON - Character, XOFF - Character, Parity, Flow Control
Cable Length	1000 m
Line Impedance	120 Ohm
Bus Termination	External
Diagnostic Bits	8

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SSI Sensor Interface

SSI Sensor Interface	BL67-1SSI
Number of Channels	1
Field Power for Inputs Current Consumption	39 mA
Bus Power Current Consumption	50 mA
Transmission Signals	CL, D
Connection Type	4 Wire Full Duplex (Clock Output/Signal Input)
Transmission Rate	62.5 kbps up to 1 Mbps
Parameter	Transmission Rate, Diagnostics, Data Format (Binary / GRAY coded), Data Fram Bits (1-32), Number of Invalid Bits (LSB: 0-15, MSB 0-7)
Cable Length	30 m
Diagnostic Bits	8

Counting Module

Counting Module	BL67-1CNT/ENC
Number of Channels	1
Field Power for Inputs Current Consumption	109 mA
Bus Power Current Consumption	30 mA
Input Type	PNP
Output Type	PNP
Output Current per Channel	0.5 A
Output Delay	2 ms
Load Type	Resistive
Frequency Measurement	Up to 250 kHz
Speed Measurement	Factor Configurable
Period Duration Measurement	2 usec
Upper Count Limit	0x80000000 up to 0xFFFFFFFF
Lower Count Limit	0x80000000 up to 0xFFFFFFFF
Short Circuit Protection	Channel Protection

CANopen Expansion Module

CANopen Expansion Module	BL67-1CVI
Number of Channels	1
Field Power for Inputs Current Consumption	109 mA
Bus Power Current Consumption	30 mA
Transmission Signals	CAN High, CAN Low
Connection Type	CANopen
Transmission Speed	10 kbps up to 1 Mbps
Parameter	Transmission Rate, Diagnostics, Bus Termination, Range of I/O Data
Bus Termination	Internal
Diagnostic Bits	48
Max Number of CANopen Nodes	8
Max Processing Data per Module	8 Byte
Max Data Per Node	4 Byte

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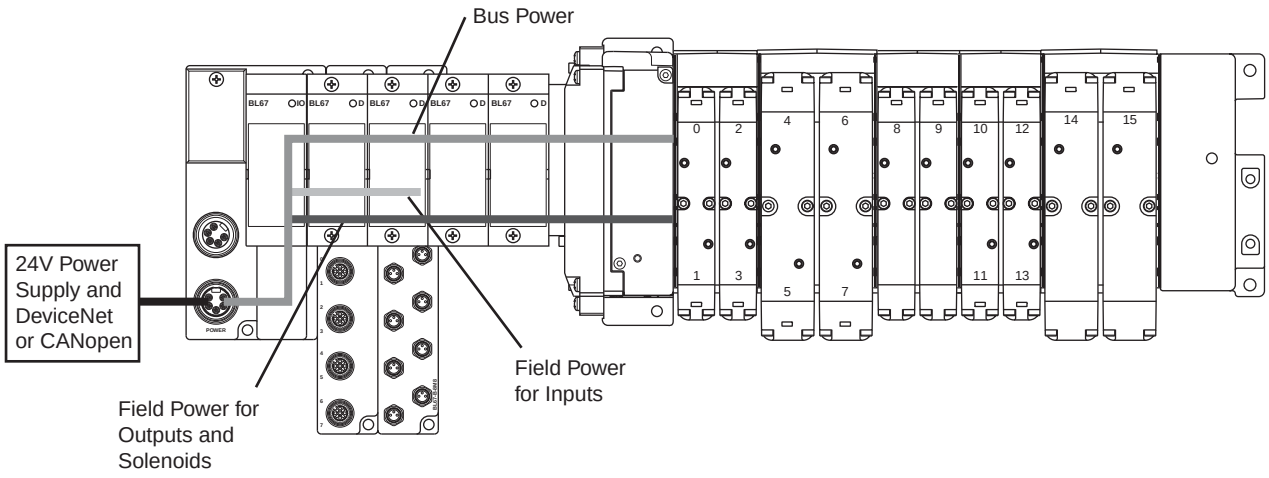
Power Distribution Options for Turck Fieldbus

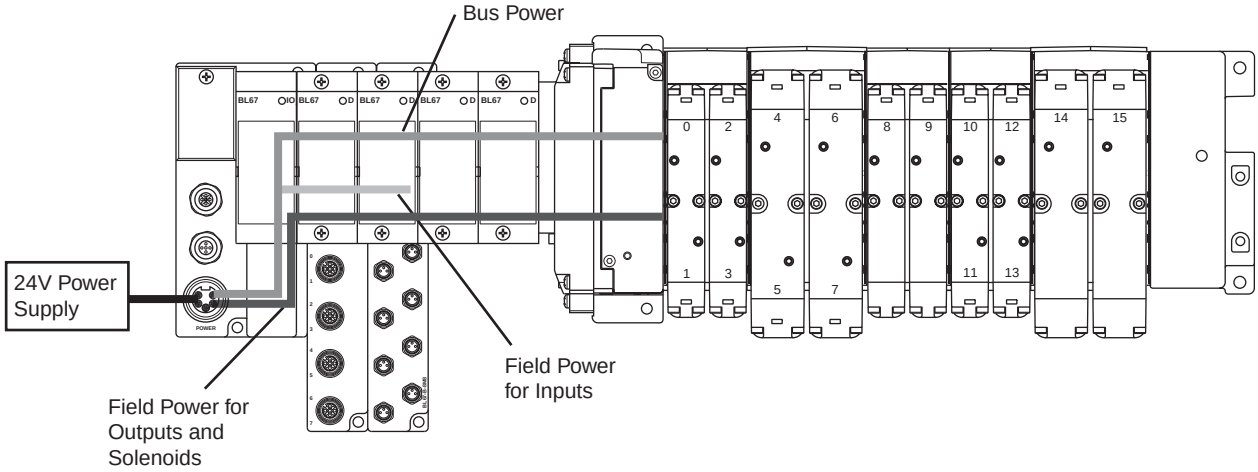
Turck Communication and I/O Modules - DeviceNet and CANopen, Power over Network

The 24VDC power supply pins from the DeviceNet or CANopen network connection on the communication module provides a single power circuit. This circuit provides 1.5 A bus power, 4 A field power for inputs and 8A field power for outputs.



Turck Communication and I/O Modules - Ethernet/IP, Modbus/TCP, Profinet, Profibus, and CANopen

An auxiliary 24VDC power supply from the communication module provides power across two separate circuits. The first circuit provides 1.5 A bus power and 4 A field power for inputs. The second circuit provides 10A field power for outputs which can be wired to an e-stop circuit to kill all outputs.



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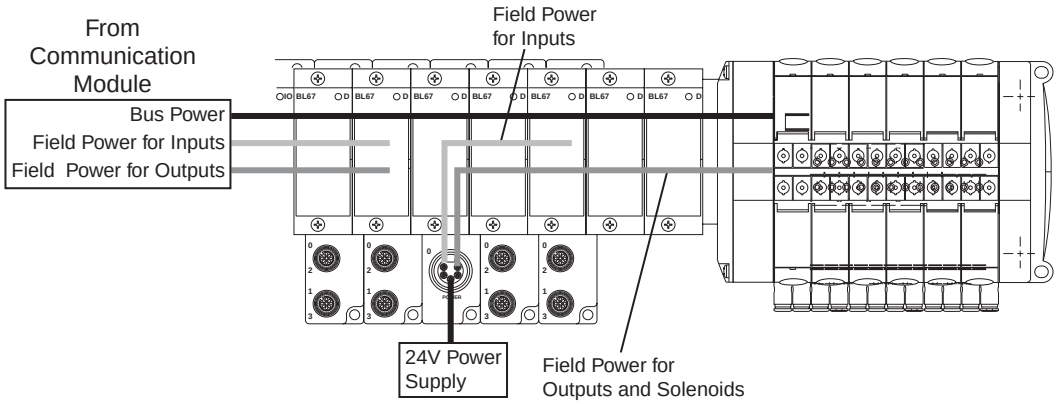
Power Distribution Options for Turck Fieldbus

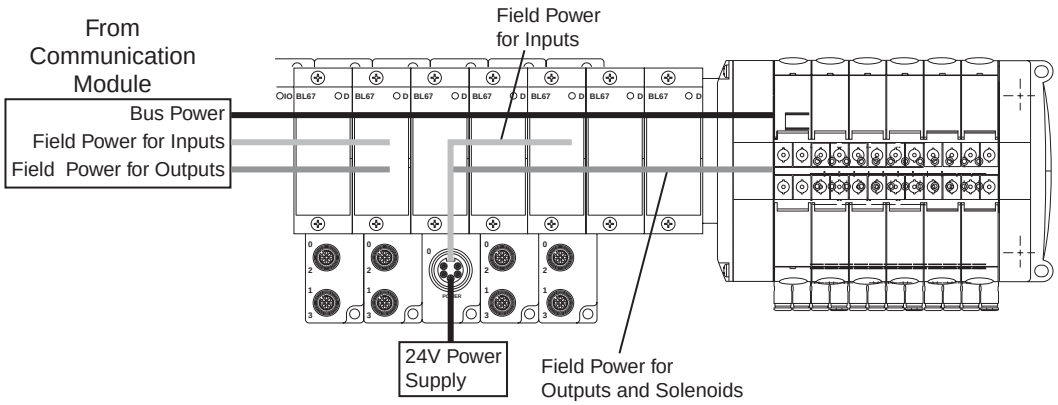
24VDC Power Extender Module (BL67-PF-24VDC) with base module BL67-B-1RSM

This configuration creates an auxiliary 24VDC power supply and provides power across two separate circuits, regardless of the communication module used. The first circuit provides 4 A field power for inputs. The second circuit provides 10A field power for outputs which can be wired to an e-stop circuit to kill all outputs and solenoids to the right of the module. The 1.5 A bus power is uninterrupted, and is still supplied from the communication module.



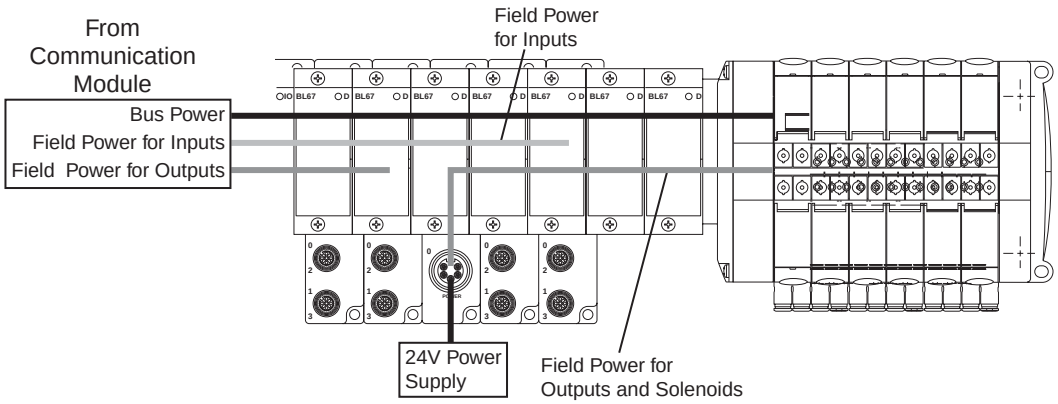
24VDC Power Extender Module (BL67-PF-24VDC) with base module BL67-B-1RSM-4

This configuration creates an auxiliary 24VDC power supply and provides power across one circuit, regardless of the communication module used. This circuit provides 4 A field power for inputs and 10A field power for outputs. The 1.5 A bus power is uninterrupted, and is still supplied from the communication module.



24VDC Power Extender Module (BL67-PF-24VDC) with base module BL67-B-1RSM-VO

This configuration creates an auxiliary 24VDC power supply and provides power across one circuit, regardless of the communication module used. This circuit provides 10A field power for outputs which can be wired to an e-stop circuit to kill all outputs and solenoids to the right of the module. The 1.5 A bus power and 4 A field power for inputs are uninterrupted, and are still supplied from the communication module.



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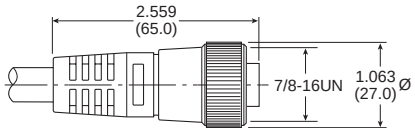
7/8" Mini Power Cables

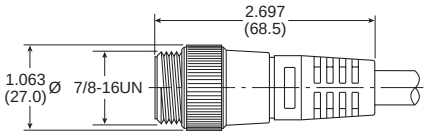
Part Number	Description
RKM 46-xM/S1587	4 Pin Female to Flying Lead Cable, TPE
RKM 56-xM/S1587	5 Pin Female to Flying Lead Cable, TPE
RSM RKM 46-x/S1587	4 Pin Male to Female Cable, TPE
RSM RKM 56-x/S1587	5 Pin Male to Female Cable, TPE
WKM 46-xM/S1587	4 Pin Right Angle Female to Flying Lead Cable, TPE
WKM 56-xM/S1587	5 Pin Right Angle Female to Flying Lead Cable, TPE

Where x = 2, 4, 5, 6, 8, 10 meter standard lengths

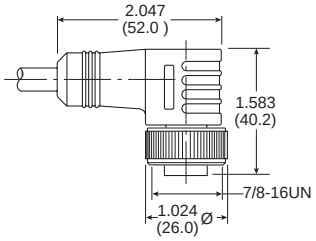
RKM Female Socket

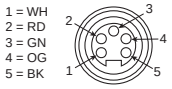


RSM Male Pins

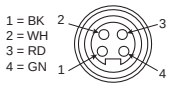


WKM Female Socket





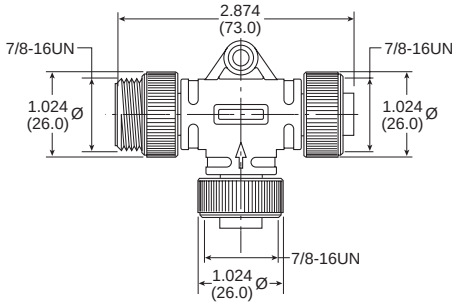
5-Pin Female
Wiring Diagram

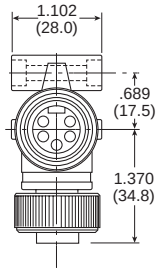


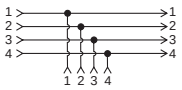
4-Pin Female
Wiring Diagram

Power Tee

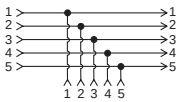
Part Number	Description
RSM-2RKM 40	4 Pin Male to 2 Female Sockets
RSM-2RKM 50	5 Pin Male to 2 Female Sockets







RSM-2RKM 40



RSM-2RKM 50

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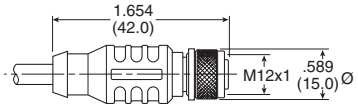
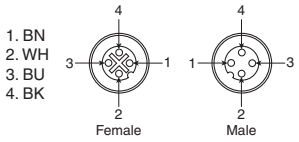
M12 A-code Cables

Part Number	Description
RKC 4.4T-*	4 Pin Female to Flying Lead Cable, PVC
RSC 4.4T-*	4 Pin Male to Flying Lead Cable, PVC
RKC 4.4T-*-RSC 4.4T	4 Pin Male to Female Cable, PVC
RKC 4.5T-*/S1587	5 Pin Female to Flying Lead Cable, TPE
RSC 4.5T-*/S1587	5 Pin Male to Flying Lead Cable, TPE
RKC 4.5T-*-RSC 4.5T/S1587	5 Pin Male to Female Cable, TPE

Where * = 1, 2, 3, 4 meter standard lengths

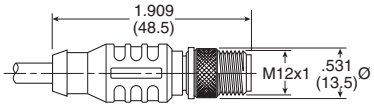
RKC Female Sockets

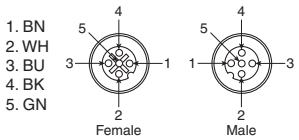




4-Pin Female Wiring Diagram

RSC Male Pins



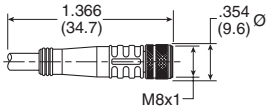


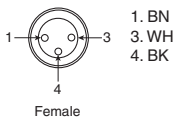
5 -Pin Female Wiring Diagram

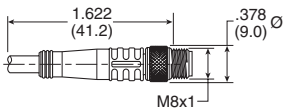
M8 Cables

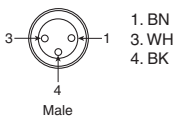
Part Number	Description
PKG 3M-*/S90	3 Pin Female to Flying Lead Cable, PUR
PSG 3M-*/S90	3 Pin Male to Flying Lead Cable, PUR
PKG 3M-*-PSG 3M/S90	3 Pin Male to Female Cable, PUR

Where * = 1, 2, 3, 4 meter standard lengths









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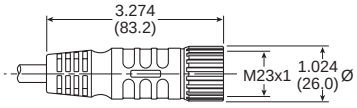
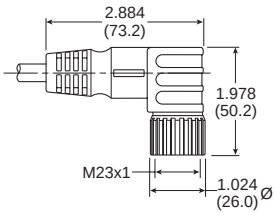
M23 Cables

Part Number	Description
CSCM CKCM 12-11-x/S90	12 Pin, Double Ended Female Thread with Male Pins and Female Socket, PUR. Pinout optimized for Isysnet Fieldbus.
CSM CKM 19-19-x/S90	19 Pin, Double Ended Female Thread with Male Pins and Female Socket, PUR. Pinout optimized for Isysnet Fieldbus.
CSWM CKWM 19-19-x/CS12852	19 Pin, 90° Double Ended Female Thread with Male Pins and Female Socket, PUR. Pinout optimized for Turck Fieldbus.

Where x = 1, 2, 3, 4 meter standard lengths

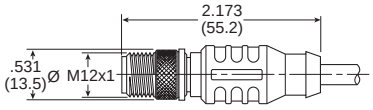




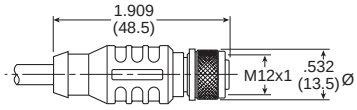
Profibus Cables

Part Number	Description
RSSW RKSW 455-xM	M12 Male to M12 Female, PUR

Where x = 2, 4, 5, 6, 8, 10 meter standard lengths



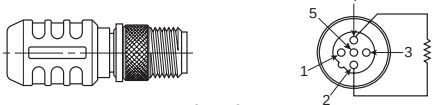
RSSW Side, Male Pins



RKSW Side, Female Sockets

Profibus Terminating Resistor

Part Number	Description
P8BPA00MB	M12 Male Pin Terminating Resistor

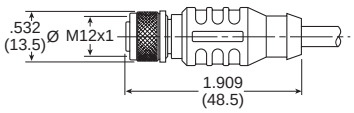


Male Pins

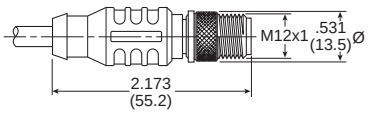
Ethernet Cables

Part Number	Description
RSSD RKSD 443-xM	M12 Female to M12 Male, PUR
RSSD RJ45S 443-xM	RJ45 to M12 Male, PUR

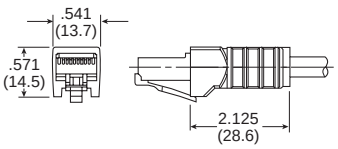
Where x = 2, 5, 10, 15, 20, 30 meter standard lengths



RKSD Side, Female Sockets



RSSD Side, Male Pins



RJ45S Side

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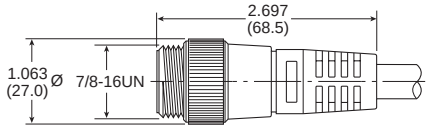
DeviceNet and CANopen Cables

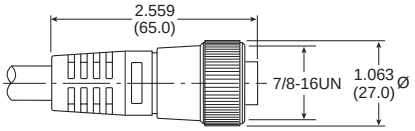
Part Number	Description
RSM RKM 5711-xM	7/8" Mini Male to 7/8" Mini Female, PUR
RSM RKC 5711-xM	7/8" Mini Male to M12 Female, PUR
RSC RKC 5711-xM	M12 Male to M12 Female, PUR
RSC RKM 5711-xM	M12 Male to 7/8" Mini Female, PUR

Where x = 2, 4, 5, 6, 8, 10 meter standard lengths

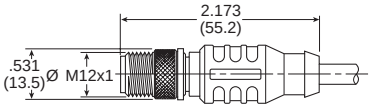
RSM Side, 7/8 Mini with male Pins



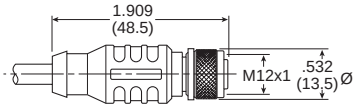
RKM Side, 7/8 Mini with male Pins



RSC Side, Male Pins



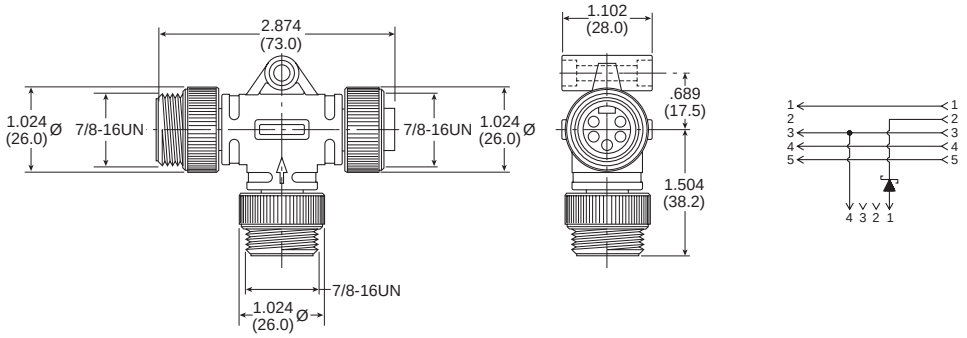
RKC Side, Female Sockets



Bus Power Tee

Part Number	Description
RSM RKM 57 WSM 40 PST	Bus Power Tee

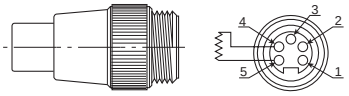
For systems not equipped with Power over network, combines separate network and power feeds into the communication module. Includes reverse current protection



DeviceNet and CANopen Terminating Resistor

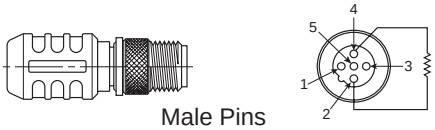
Part Number	Description
RSM 57-TR2	7/8" Mini Male Pin Terminating Resistor
P8BPA00MA	M12 Male Pin Terminating Resistor

RSM 57-TR2



Male Pins

P8BPA00MB



Male Pins

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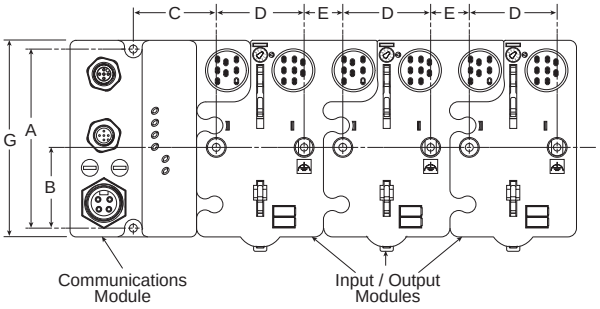
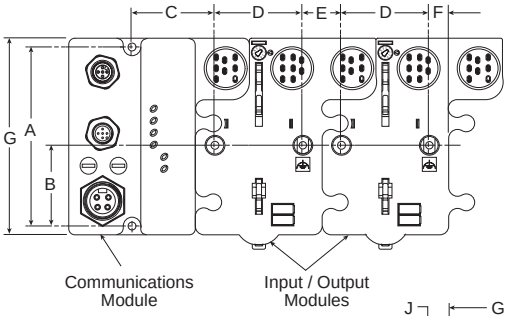
Isysnet with Isys ISO Valves





Dimensions

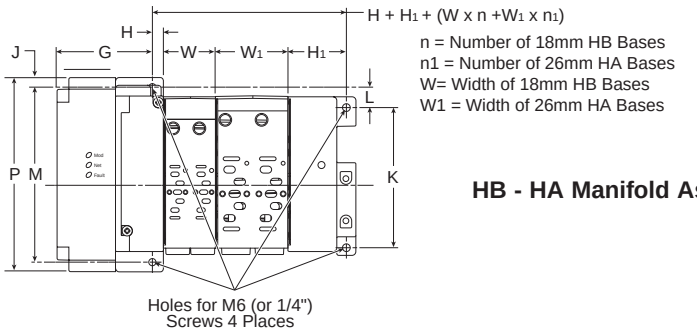
A	B	C	D
4.00 (102)	1.80 (46)	1.90 (48)	2.00 (50)
E	**F**	**G**	
.87 (22)	.43 (11)	4.41 (112)	

Inches (mm)

HB - HA Dimensions

G	H	H_1	J	K
2.68 (68)	.33 (8.4)	1.80 (45.8)	.15 (4)	4.32 (110)
L	**M**	**P**	**W**	**W_1**
.63 (16)	5.39 (137)	5.98 (152)	1.61 (40.8)	2.24 (56.8)

Inches (mm)



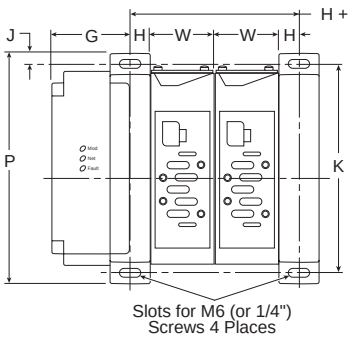
n = Number of 18mm HB Bases
n1 = Number of 26mm HA Bases
W= Width of 18mm HB Bases
W1 = Width of 26mm HA Bases

HB - HA Manifold Assembly

H1 Dimensions

G	H	J	K	P
2.20 (56)	.63 (15.9)	.33 (8.5)	6.50 (165)	7.17 (182)
W				
1.93 (49)				

Inches (mm)



n = Number of H1 Bases
W= Width of H1 Bases

H1 Manifold Assembly

H2 Dimensions

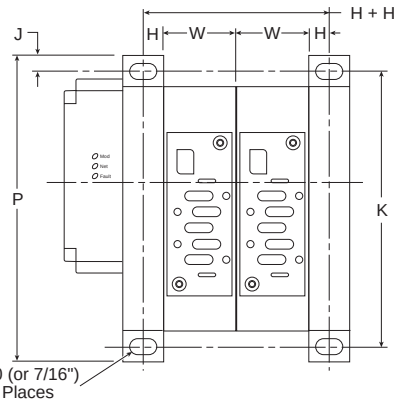
G	H	J	K	P
2.28 (58)	.63 (16)	.47 (12)	8.46 (215)	9.41 (239)
W				
2.20 (56)				

Inches (mm)

H3 Dimensions

G	H	J	K	P
2.52 (64)	.65 (16.5)	.59 (15)	10.43 (265)	11.61 (295)
W				
2.80 (71)				

Inches (mm)



n = Number of H2 / H3 Bases
W= Width of H2 / H3 Bases

H2 - H3 Manifold Assembly

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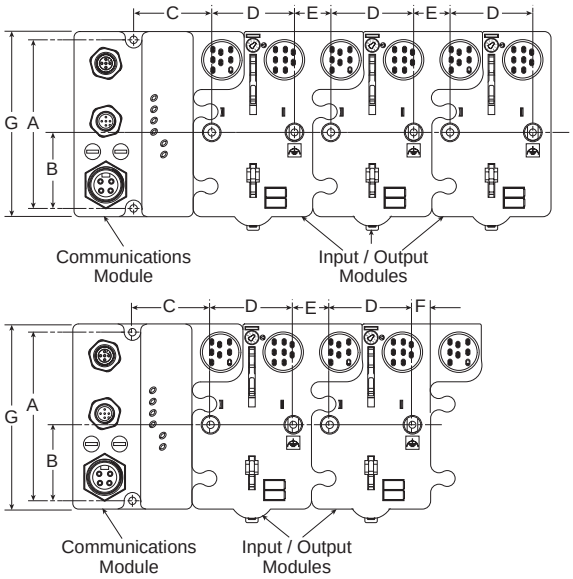
Isysnet with Isys Micro Valves

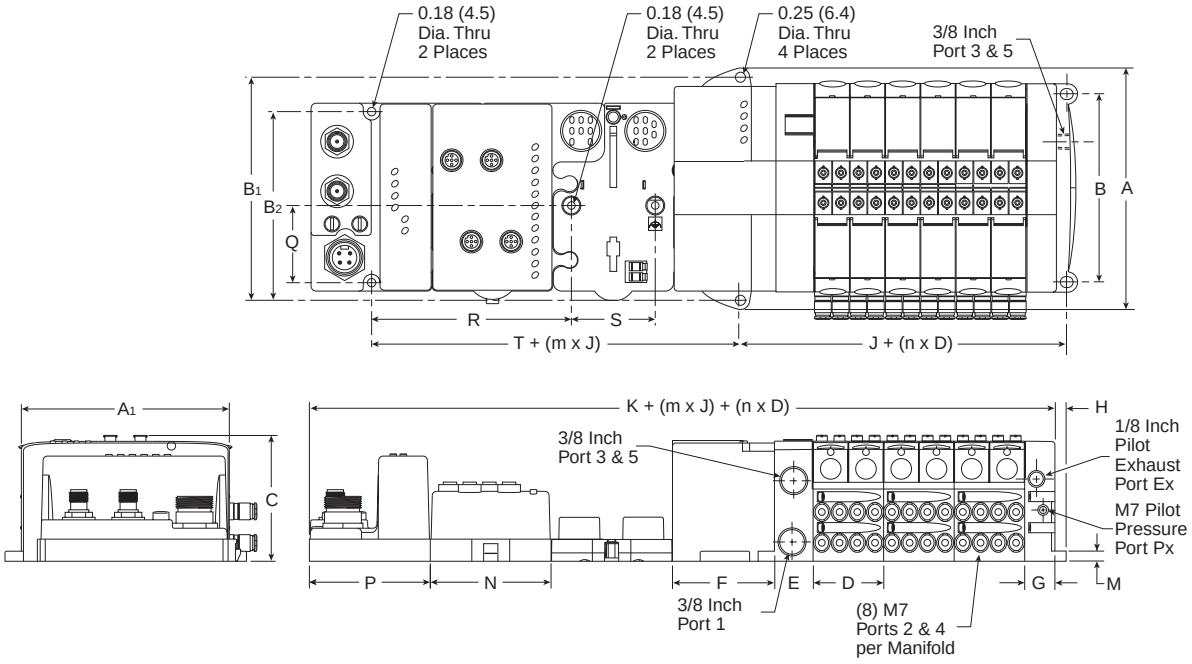


Dimensions

A	B	C	D
4.0 (102)	1.8 (46)	1.9 (48)	2.0 (50)
E	**F**	**G**	
.87 (22)	.43 (11)	4.41 (112)	

Inches (mm)

Isys Micro Manifold Assembly



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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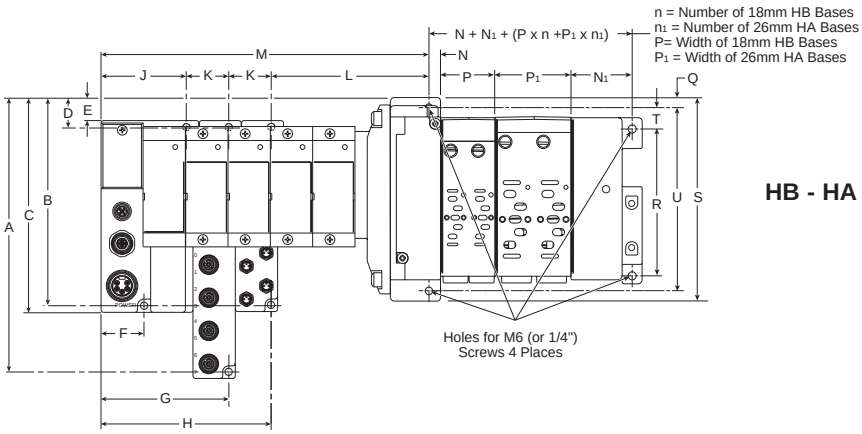
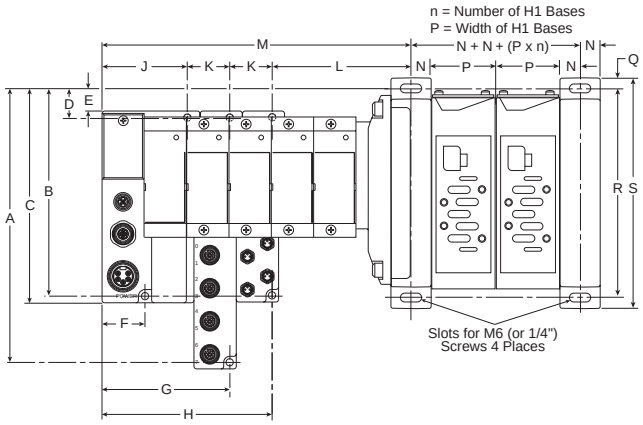
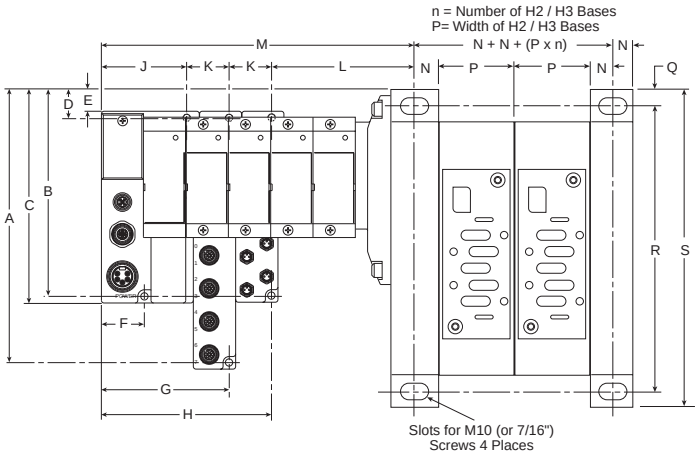
Turck with Isys ISO Valves



HB - HA Manifold Assembly



H1 Manifold Assembly



H2 - H3 Manifold Assembly

Dimensions

	A	B	C	D	E	F	G	H	J	K	L	M	N	N1	P	P1	Q	R	S	T	U
HA / HB	8.05 (204.5)	6.08 (154.5)	6.28 (159.5)	0.75 (19.5)	0.57 (14.5)	1.28 (32.5)	3.79 (96.5)	5.06 (128.5)	2.53 (64.5)	1.26 (32)	4.75 (120.8)	See note 1	.33 (8.4)	1.80 (45.8)	1.61 (40.8)	2.24 (56.8)	.15 (4)	4.32 (110)	5.98 (152)	.63 (16)	5.39 (137)
H1	8.53 (216.7)	6.56 (166.7)	6.76 (171.7)	1.25 (31.7)	1.05 (26.7)	1.28 (32.5)	3.79 (96.5)	5.06 (128.5)	2.53 (64.5)	1.26 (32)	4.27 (108.5)	See note 1	.63 (15.9)	—	1.93 (49)	—	.33 (8.5)	6.50 (165)	7.17 (182)	—	—
H2	8.38 (212.9)	6.41 (162.9)	6.61 (167.9)	1.10 (27.9)	.90 (22.9)	1.28 (32.5)	3.79 (96.5)	5.06 (128.5)	2.53 (64.5)	1.26 (32)	4.26 (108.6)	See note 1	.63 (16)	—	2.20 (56)	—	.47 (12)	8.46 (215)	9.41 (239)	—	—
H3	8.62 (218.9)	6.65 (168.9)	6.85 (173.9)	1.33 (33.9)	1.14 (28.9)	1.28 (32.5)	3.79 (96.5)	5.06 (128.5)	2.53 (64.5)	1.26 (32)	4.59 (116.6)	See note 1	.65 (16.5)	—	2.80 (71)	—	.59 (15)	10.43 (265)	11.61 (295)	—	—

Note 1: M =J+L+n2xK, where n2 = Number of Turck input / output modules
Inches (mm)

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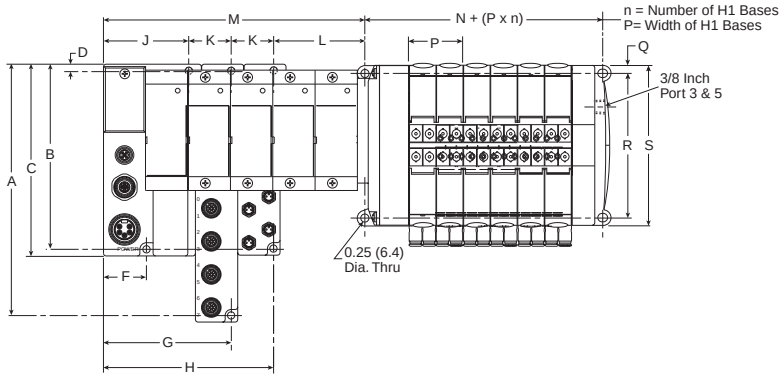
Turck with Isys Micro Valves

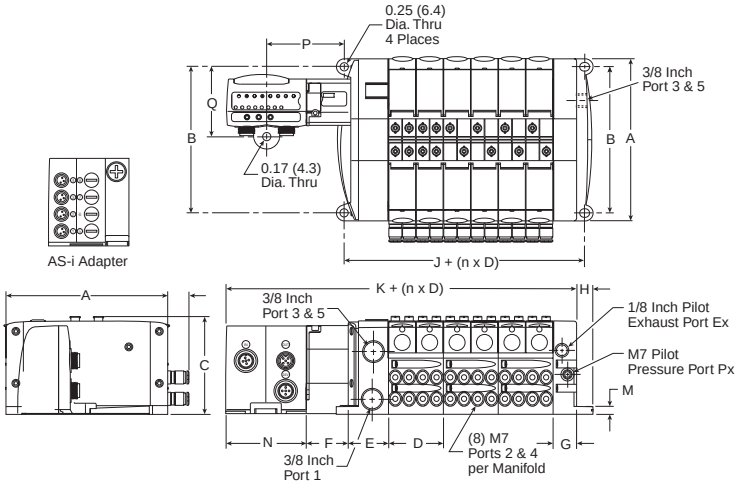


Dimensions

A	B	C	D	F	G	H	J	K	L	M	N	P	Q	R	S
7.48 (190)	5.51 (140)	5.71 (145)	0.20 (5)	1.28 (32.5)	3.79 (96.5)	5.06 (128.5)	2.53 (64.5)	1.26 (32)	2.54 (64)	See note 1	2.28 (58)	1.65 (42)	.19 (4.9)	4.41 (112)	4.88 (124)

Note 1: M =J+L+n2xK, where n2 = Number of Turck input / output modules
Inches (mm)

Moduflex Adapter, Side Ported



Dimensions

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

Inches (mm)
n = Number of Manifolds

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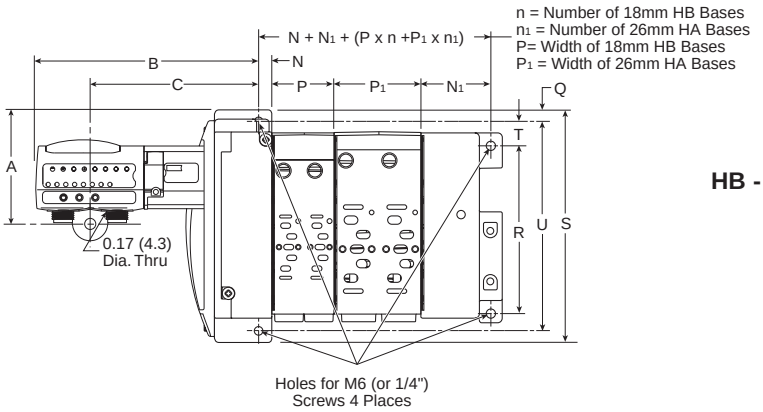
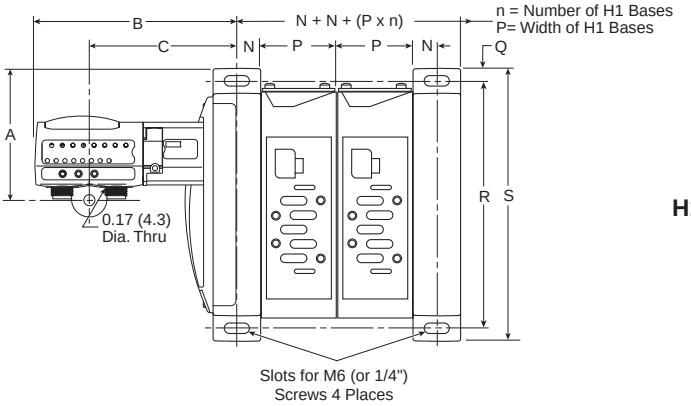
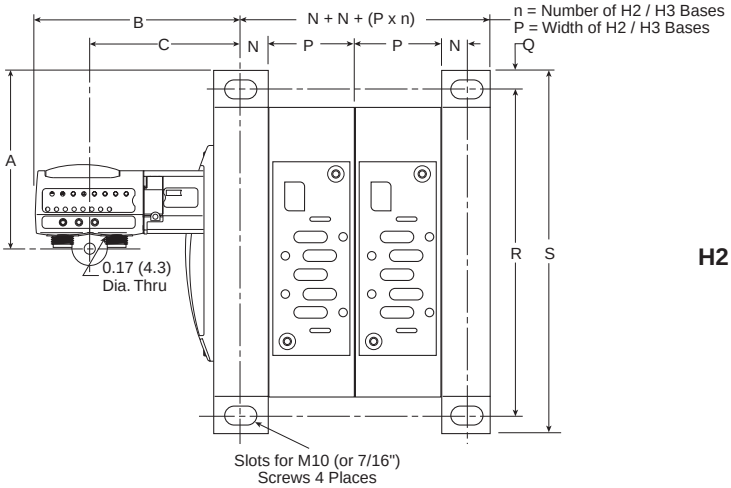
Moduflex with Isys ISO Valves



HB - HA Manifold Assembly



H1 Manifold Assembly



H2 - H3 Manifold Assembly

Dimensions

	A	B	C	N	N1	P	P1	Q	R	S	T	U
HA / HB	2.75 (69.8)	5.61 (142.5)	4.40 (111.8)	.33 (8.4)	1.80 (45.8)	1.61 (40.8)	2.24 (56.8)	.15 (4)	4.32 (110)	5.98 (152)	.63 (16)	5.39 (137)
H1	3.23 (82)	5.13 (130.2)	6.33 (160.9)	.63 (15.9)	—	1.93 (49)	—	.33 (8.5)	6.50 (165)	7.17 (182)	—	—
H2	3.08 (78.2)	5.13 (130.3)	6.34 (161)	.63 (16)	—	2.20 (56)	—	.47 (12)	8.46 (215)	9.41 (239)	—	—
H3	3.31 (84.2)	5.44 (138.2)	6.65 (168.9)	.65 (16.5)	—	2.80 (71)	—	.59 (15)	10.43 (265)	11.61 (295)	—	—

Inches (mm)

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"DX" ISOMAX Series

Directional Control Valves

15407-1 & 5599-1

DX02 – 0.55 Cv **DX01 – 0.75 Cv**
DX1 – 1.15 Cv **DX2 – 2.50 Cv**
DX3 – 4.15 Cv

Section E

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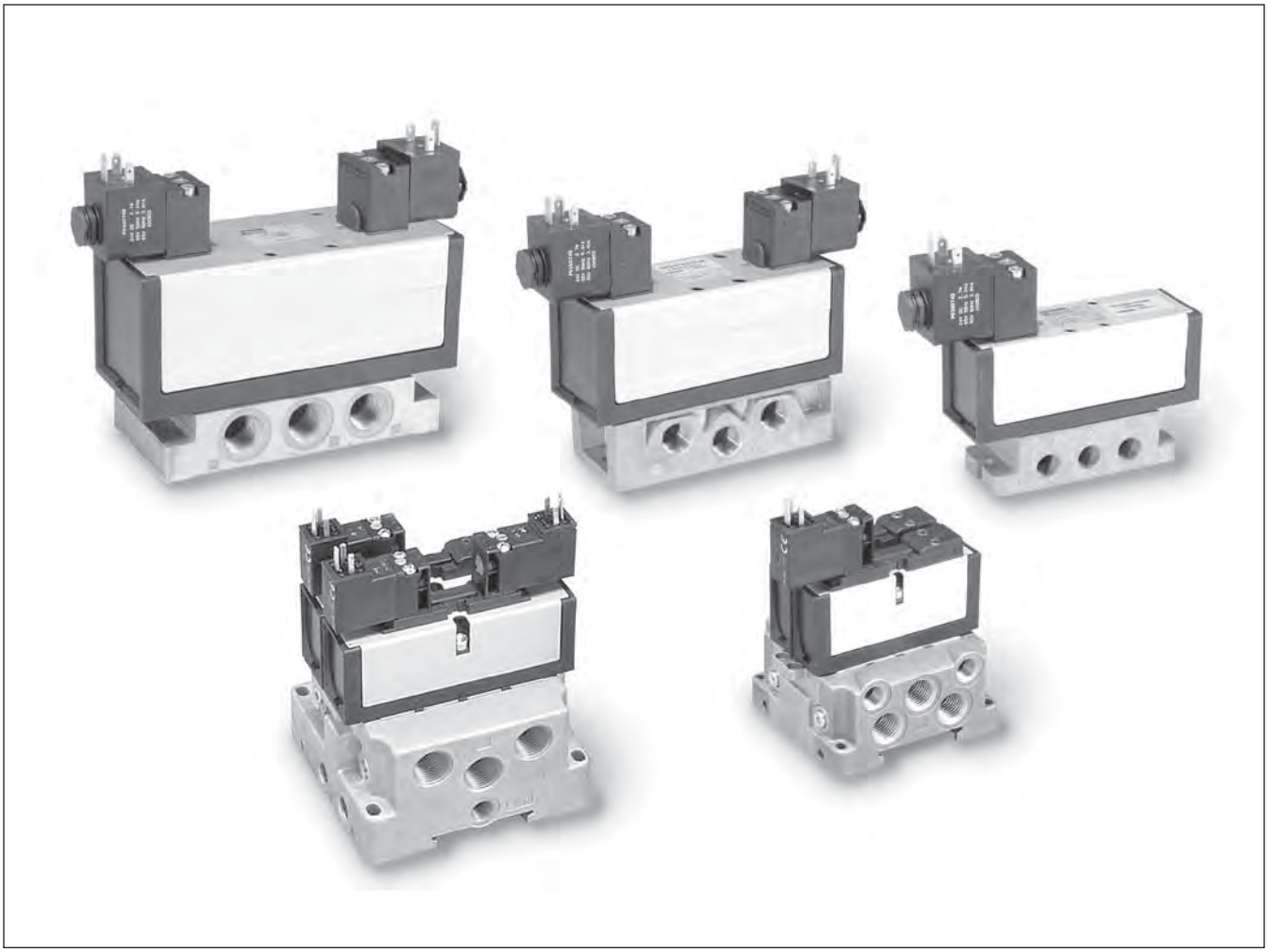

BOLD ITEMS ARE MOST POPULAR.

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Valve Range

DX02 1/8", ISO 15407-1, Size 02
DX01 1/4", ISO 15407-1, Size 01

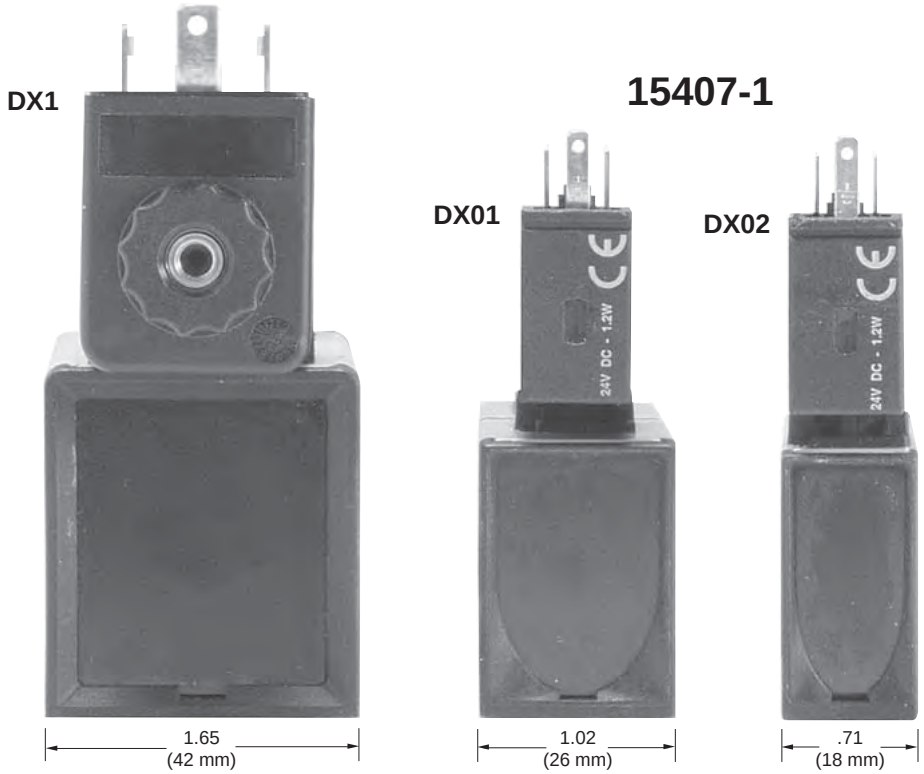
DX1 1/4", ISO 5599-1, Size 1
DX2 3/8", ISO 5599-1, Size 2
DX3 1/2", ISO 5599-1, Size 3

ISO 15407-1

The ISOMAX range of directional control valves complies with ISO 15407-1 and VDMA 24563 for sizes 02 and 01 and ISO 5599-1 for sizes 1, 2 and 3. ISOMAX provides flows from 0.55 Cv to 4.15 Cv.

ISO 5599-1

The ISOMAX range includes valves for pneumatic and electrical actuation with a wide choice of subbases and manifolds to suit different application needs.



Corrosion Free and Modern Design

With the valve body in Polyamide reinforced fiberglass and the casing in anodized aluminium, the complete ISOMAX range presents a coherent modern design to suit most industrial environments.

Vacuum Operation

All ISOMAX valves may be used for either vacuum or pressure applications.

Dual Pressure

In order to supply 2 different pressures to the same actuator, it is possible to connect 2 main pressure supplies to the exhaust ports and use the pressure port 1 as exhaust port.

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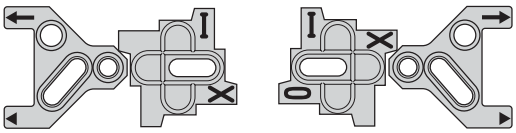
Features

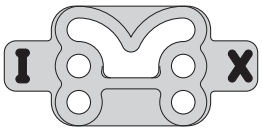
Ceramic Technology

All ISOMAX products use high-tech ceramic switching technology providing:

- **Excellent Reliability**
  Long life in excess of 100 million operations*.
  Operates with lubricated or non-lubricated air.
  Low sensitivity to air quality changes.
- **High Performance**
  Slide valve concept allows high flow / size ratio and short response time due to short slide stroke and low friction.
- **Stable Long Lasting Performances**
  Low friction switching: minimum wear of the valve member / seal assembly.
- **Valves Fitted with Switchable Selector to Give Internal or External Pilot Supply**



DX02 & DX01 Selector Gaskets



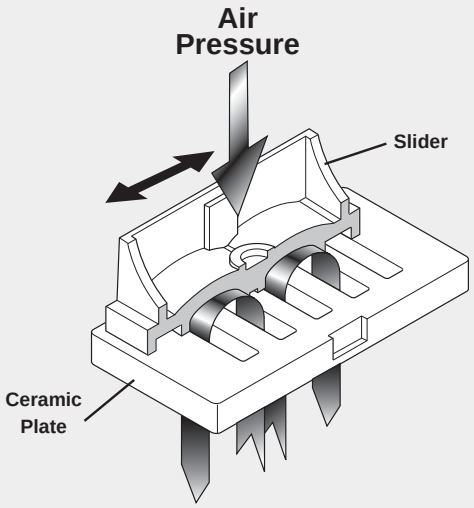
DX1, DX2 & DX3 Selector Gasket

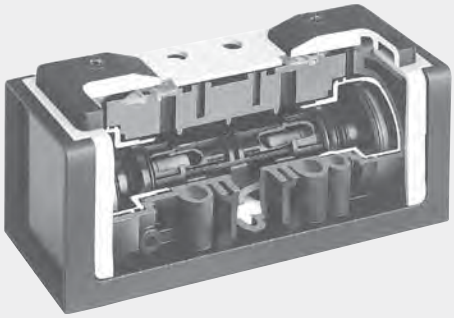
Applicable Markets

Industries where ISO standardization is accepted.

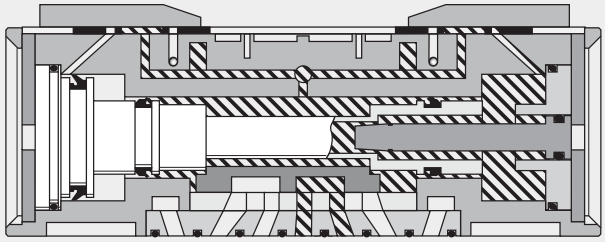
- Automotive
- Food Processing
- Medical
- Chemical
- Tire Manufacturing
- Steel Processing
- Glass Processing
- Where OEM'S Export Globally

* Refer to our warranty conditions.





Remote Pilot



Pressure **Exhaust**

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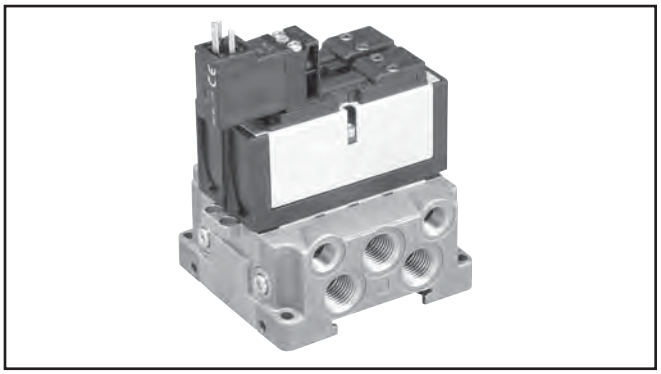
ISOMAX 15407-1



Specifications

Standard Subbase:
ISO 15407-1 and VDMA 24563

Permissible Fluid
Air or Inert Gas, filtered 40µ (Class 5 per ISO 8573-1), Lubricated or Non-lubricated

Pressure Supply:
Possible to supply Exhaust Ports 3 or 5 or Cylinder Ports 2 or 4, with Internal Pilot Supply. (Not possible with APB).

Flow:
DX01 = .75Cv, DX02 = .55Cv

Working Temperatures:
-10°C to 60°C (14°F to 140°F)

Storage Temperatures:
-20°C to 70°C (-4°F to 158°F)

Mechanical Life:
> 100 million operations (Dry air filtered 40µ, 2Hz, 6 bar, 20°C)

Actuation Type:
Electric / Pneumatic with 15mm Solenoid Valve Interface CNOMO E06.36120N

Flow Rating (Cv)

Size	Port Size	Mounting Style	2-Position	3-Position
DX02	1/8"	Manifold	0.45	0.35
		Subbase	0.55	0.40
DX01	1/4"	Manifold	0.70	0.45
		Subbase	0.75	0.50

Cv tested per ANSI / (NFPA) T3.21.3

Solenoid Information

Code	Voltage			Power (W / VA)
	AC		DC	
	60Hz	50Hz		
M	—	—	24	1.2W
J	120	110	—	1.6VA

Data tested with LED and Surge Suppression.

Response Time**
Single Solenoid 2-Position - Air Return / Spring Assist

Valve Size	Port Size	0 Cu. In. Chamber		## Cu. In. Chamber	
		Fill	Exhaust	Fill	Exhaust
DX02	1/8"	0.025	0.030	0.125	0.220
DX01	1/4"	0.015	0.020	0.122	0.200

DX01 (25), DX02 (12.5)

** With 100 PSIG supply, time required to fill from 0 to 90 PSIG and Exhaust from 100 PSIG to 10 PSIG measured from the instant of energizing or de-energizing 24VDC solenoid.

Tested per ANSI / (NFPA) T3.21.8

Operating Pressure

Vacuum to 145 PSIG (10 bar)

Function		M.O.P (PSIG)
20, 21, 22, 23	2-Position, Spring Return	36
50, 51, 53, 54	2-Position, Air Return	30
04, 05, 06, 08	2-Position	15
09, 11, 12, 27	3-Position, CE	45
16, 18, 19, 25	3-Position, APB	45

Material Specifications

Valve Member ..... Self Lubricating Acetal
Seat ..... Ceramic
Body ..... Polyamide Reinforced Fiberglass
Casing ..... Anodized Aluminum
End Plates ..... Painted Zinc Plated Steel
Valve Plate ..... Zinc
Seals ..... Nitrile
Springs ..... Stainless Steel
Screws ..... Zinc Plated Steel
Function Selector ..... Polyamide Reinforced Fiberglass
Top Cover Seal ..... Polyester

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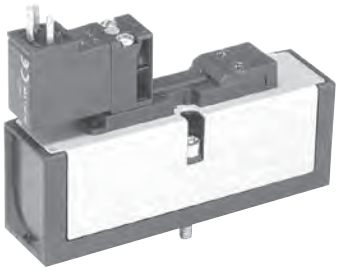
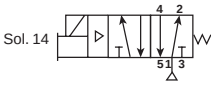
Single Solenoid

2-Position

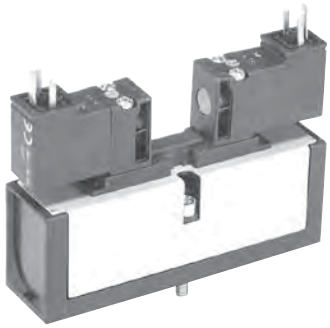


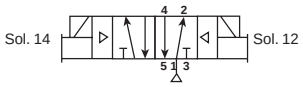


DX02	**DX02-621-951J**	120VAC	0.55 Cv C = 1.5 Nl/s x bar, b = 0.25 Qn = 378 l/min, Qmax = 636 l/min
	DX02-621-951M	24VDC	
DX01	**DX01-621-951J**	120VAC	.75 Cv C = 2.5 Nl/s x bar, b = 0.25 Qn = 588 l/min, Qmax = 1026 l/min
	DX01-621-951M	24VDC	

Double Solenoid

2-Position

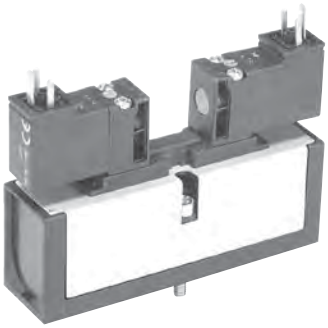


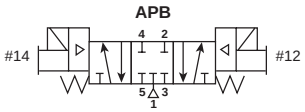


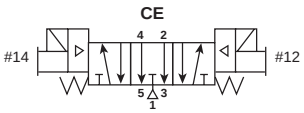
DX02	**DX02-606-951J**	120VAC	0.55 Cv C = 1.5 Nl/s x bar, b = 0.25 Qn = 378 l/min, Qmax = 636 l/min
	DX02-606-951M	24VDC	
DX01	**DX01-606-951J**	120VAC	.75 Cv C = 2.5 Nl/s x bar, b = 0.25 Qn = 588 l/min, Qmax = 1026 l/min
	DX01-606-951M	24VDC	

Double Solenoid

3-Position APB
3-Position CE







APB				CE		
DX02	**DX02-616-951J**	120VAC	0.40 Cv C = 1.1 Nl/s x bar, b = 0.25 Qn = 275 l/min, Qmax = 464 l/min	**DX02-611-951J**	120VAC	0.40 Cv C = 1.1 Nl/s x bar, b = 0.25 Qn = 275 l/min, Qmax = 464 l/min
	DX02-616-951M	24VDC		**DX02-611-951M**	24VDC	
DX01	**DX01-616-951J**	120VAC	.50 Cv C = 1.7 Nl/s x bar, b = 0.25 Qn = 392 l/min, Qmax = 684 l/min	**DX01-611-951J**	120VAC	.50 Cv C = 1.7 Nl/s x bar, b = 0.25 Qn = 392 l/min, Qmax = 684 l/min
	DX01-616-951M	24VDC		**DX01-611-951M**	24VDC	

Torque Specifications
DX02: 15 to 25 in-lbs (1.69 to 2.82 Nm)
DX01: 20 to 30 in-lbs (2.26 to 3.39 Nm)

For Subbases and Manifolds, see page E178 thru E179.

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BOLD OPTIONS ARE MOST POPULAR

DX02 – 6 06 – 95 1 M

Basic Series	
ISO 15407-1 (18mm)	DX02
ISO 15407-1 (26mm)	DX01

Pilot	
Air Operated Remote Pilot	4
Solenoid Operated	6

Function	
Internal Pilot Supply / Captured Exhaust 12	
2-Position, Spring Return	21
2-Position, Air Return	51
2-Position	06
3-Position, CE	11
3-Position, APB	16
External Pilot 14 Supply / Captured Exhaust 12*	
2-Position, Spring Return	23
2-Position, Air Return	54
2-Position	05
3-Position, CE	09
3-Position, APB	19
Internal Pilot Supply / Vented Exhaust	
2-Position, Spring Return	20
2-Position, Air Return	50
2-Position	04
3-Position, CE	27
3-Position, APB	25
External Pilot Supply / Vented Exhaust*	
2-Position, Spring Return	22
2-Position, Air Return	53
2-Position	08
3-Position, CE	12
3-Position, APB	18

* Must be specified when using Sandwich Regulators.

Operator	
60	None, Remote Pilot Valve
95	15mm, 3-Pin, DIN 43650C

Override	
Blank	Remote Pilot
1	Non-Locking, Flush
3	Locking, Flush

Voltage & Frequency			
	AC		DC
	60Hz	50Hz	
J	120	110	
M			24
Blank	Remote Pilot		

Note: DX02 18mm Valve Remote Pilot Option only available with PL02 Individual Subbase Kits

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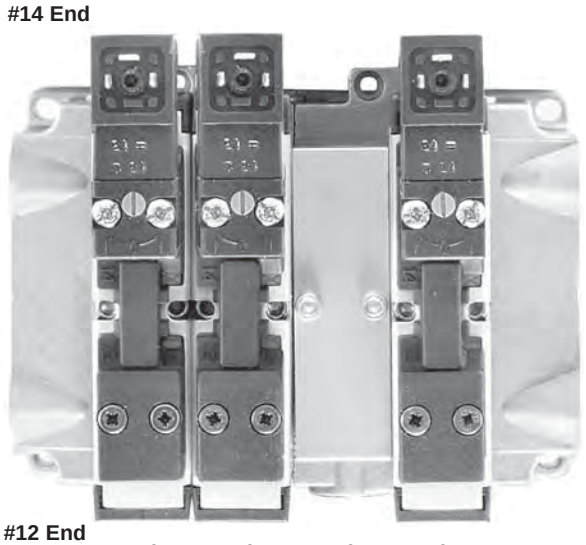

* Each Manifold has two (2) Stations
(Even number of Stations Required)

How To Order Add-A-Fold Assemblies

1. List Add-A-Fold Assembly call out. This automatically includes the end plate kit assembly.
2. List complete valve/base model number. List left to right, looking at the cylinder ports on the #12 end of the manifold. The left most station is station 1.

   (If a blank station is needed, list the blanking plate part number and the individual manifold number in the station specified.)

Model Number

AA 02U 0 04

Valve Series	
Right & Left End Plate 15407-1, DX01	01U†
Right & Left End Plate 15407-1, DX02	02U**
Right & Left End Plate 15407, DX01 & DX02	HBS*

* Common End Plates for DX01 & DX02. For use with PS5 Manifolds.
**For use with PJLP02 Manifolds.
† For use with PJLP01 or PJL01 Manifolds.

	Number of Stations*
02	2 Stations
04	4 Stations
•	
24	24 Stations
•	
32†	32 Stations

* Must be ordered in multiples of 2.
† Maximum Number.

	Port Type
0	NPT
1	BSPP "G"

Example: Application requires a 3-Valve manifold.

Qty.	Part No.	
1	AA02U004	
1	DX02-651-951M	Valve Station 1
1	DX02-651-951M	Valve Station 2
1	PJLP02-201-80	Base Station 1 & 2
1	DX02BLK	Valve Station 3
1	DX02-651-951M	Valve Station 4
1	PJLP02-201-80	Base Station 3 & 4

Note: DX02 Manifolds cannot be used for remote pilot.

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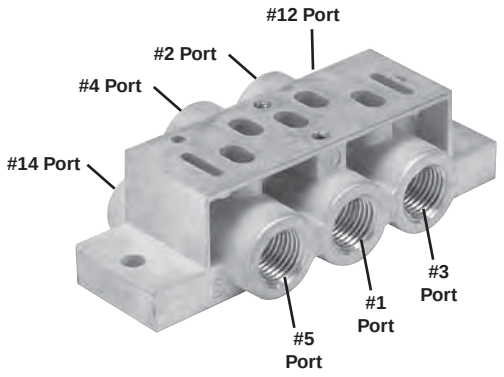
Individual Subbase Kit

with Side Ports

Size	Port Size	Kit Number	
		NPT	BSPP "G"
18mm DX02	1/8"	**PL02-01-80**	PL02-01-70

Note: Can be used for external, single, or double remote pilot.

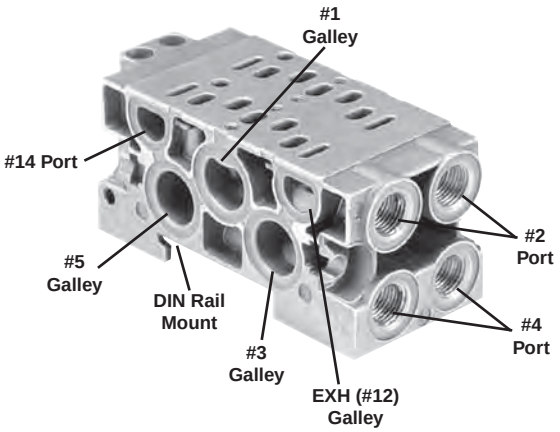


Two Station Manifold Base

with Side Ports

Size	Port Size	Kit Number	
		NPT	BSPP "G"
18mm DX02	1/8"	**PJLP02-201-80**	PJLP02-201-70

Note: Can be used for external pilot, not remote pilot.
Gaskets and assembly hardware included.



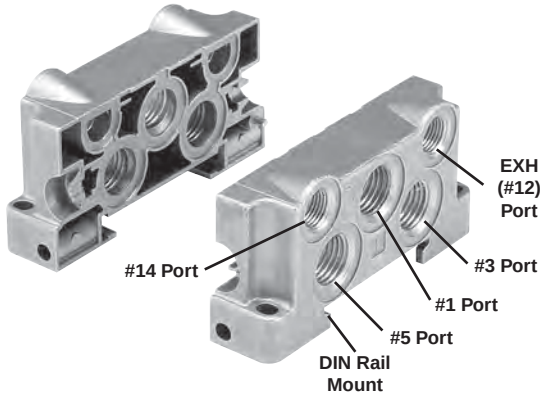
PJLP02

End Plate Kit

for Side Ported Two Station Manifold Base

Size	Port Size	Kit Number	
		NPT	BSPP "G"
18mm DX02	1/8"	**PEJ02-02-80***	PEJ02-02-70

Notes: Put a vent or muffler in "EXH" port when capturing pilot exhaust pressure with a solenoid valve. (See page E182 for gasket selector details.
Gaskets and assembly hardware included.
Torque Specifications: 25 to 35 in-lbs (2.82 to 3.95 Nm)



PEJ02
(Type "P")

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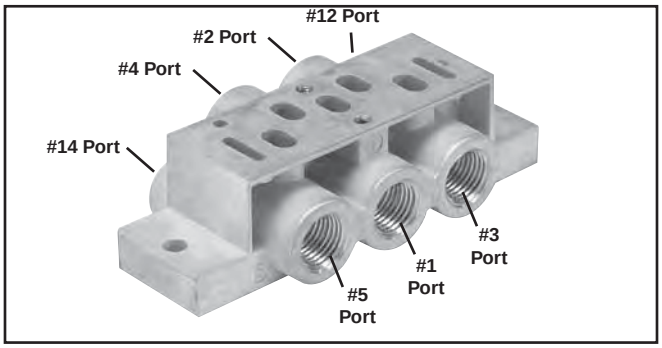
Individual Subbase Kit
with Side Ports

Size	Port Size	Kit Number	
		NPT	BSPP "G"
26mm DX01	1/4"	**PL01-02-80**	PL01-02-70

Note: Can be used for external, single, or double remote pilot.

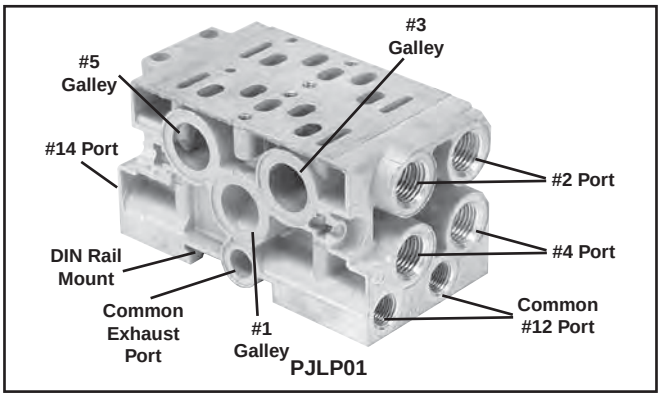


Two Station Manifold Base
with Side Ports

Size	Port Size	Kit Number	
		NPT	BSPP "G"
26mm DX01	1/4"	**PJLP01-202-80**	PJLP01-202-70

Notes: Can be used for single remote pilot using the #14 Port and external pilot.

Gaskets and assembly hardware included.



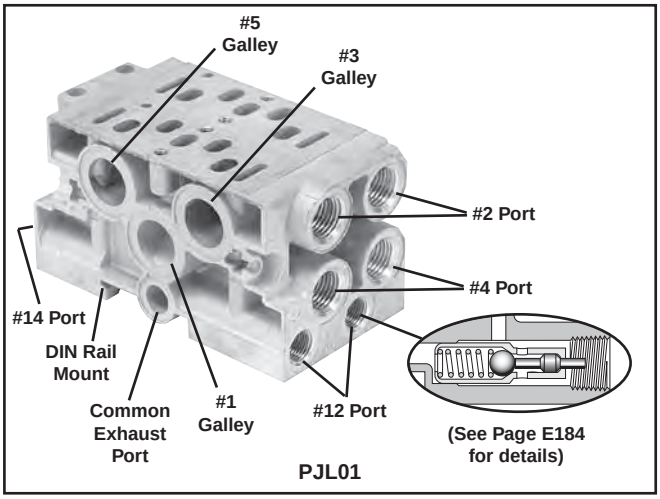
PJLP01

Size	Port Size	Kit Number	
		NPT	BSPP "G"
26mm DX01	1/4"	**PJL01-202-80**	PJL01-202-70

Notes: #12 ports work independently when plunger is not depressed by a plug. When a plug is inserted in #12 Port along with the captured pilot exhaust gasket selector option, pilot exhaust is sent to ther Common Exhaust Port. Do Not plug exhaust, insert a vent of muffler.

Gaskets and assembly hardware included.

Can be used for external, single or double remote pilot.



PJL01

End Plate Kit
for Side Ported Two Station Manifold Base

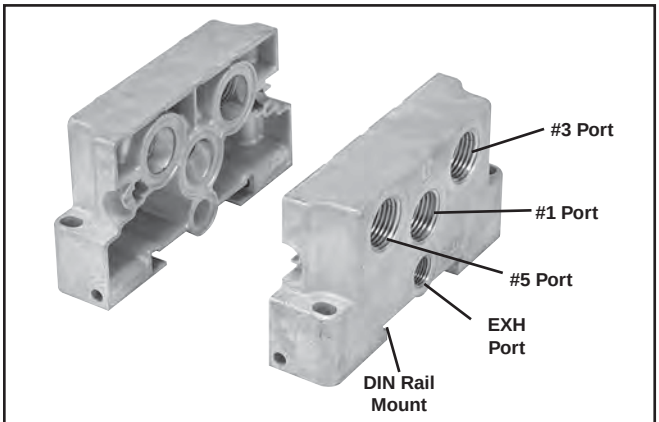
Size	Port Size	Kit Number	
		NPT	BSPP "G"
26mm DX01	1/4"	**PEJ01-03-80***	PEJ01-03-70

* Use with PJLP01 or PJL01

Notes: Put a vent or muffler in "EXH" port when capturing pilot exhaust pressure with a solenoid valve. See page J18 for gasket selector details.

Gaskets and assembly hardware included.

Torque Specifications: 25 to 35 in-lbs (2.82 to 3.95 Nm)



PEJ01

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15407-1, DX02 & DX01 Manifold / Subbase Kits

PS5511 13 0 P

Basic Series	
ISO 15407-1 DX02	PS5611
ISO 15407-1 DX01	PS5511

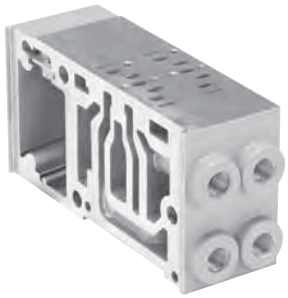
Enclosures / Lead Length	
0	None, No Electrical Plug - 15407-1

Mounting Style / Port Size	
DX02	
Manifold with 1/8 NPT End Ports	**51**
Manifold with 1/8 BSPP End Port	52
Manifold with 1/8 NPT Bottom / End Port	61
Manifold with 1/8 BSPP Bottom / End Port	62
DX01	
Subbase with 1/4 NPT Side Ports	**13**
Subbase with 1/4 BSPP Side Ports	14
Subbase with 1/4 NPT Bottom / Side Port	23
Subbase with 1/4 BSPP Bottom / Side Port	24
Manifold with 1/4 NPT End Port	**53**
Manifold with 1/4 BSPP End Port	54
Manifold with 1/4 NPT Bottom / End Port	63
Manifold with 1/4 BSPP Bottom / End Port	64

Subbase Kits

DX01 Series Subbase

Manifold Kits



DX02 Series 2-Station Manifold

DX01 Series 2-Station Manifold

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15407-1, DX02 & DX01 End Plate Kits

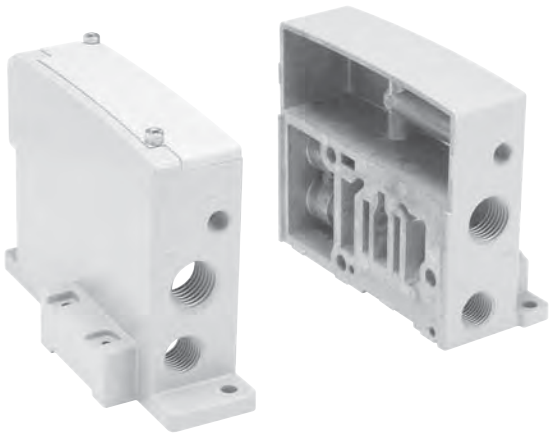
PS56 | 31 | 01 | 0 | P

Basic Series	
ISO 15407, Size DX02, DX01	PS56

End Plate Kit Type	
End Plate, Non-Collective Wiring	31

Options	
01	Non-Collective Wiring

Thread Type	
0	NPT
1	BSPP "G"



DX02 - DX01 Non-Collective Wiring End Plates

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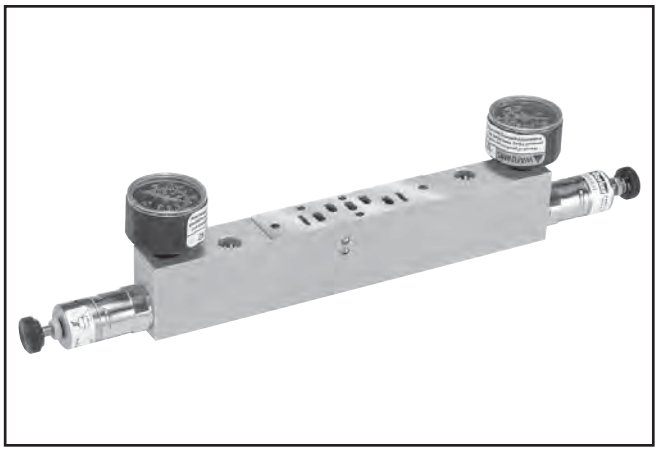
Sandwich Regulators Features

- Remote Air Pilot Operated for hard-to-reach pressure control.
- Unregulated Pilot Pressure to valve for consistent valve shifting regardless of pressure adjustment.

Remote Pilot Access Plate Kit

Size	Port Size	Kit Number	
		NPT	BSPP
26mm DX01	1/8"	**PS551500P**	**PS551501P**

DX02
(Independent Dual Port Regulator Shown)



DX01
(Common Port Regulator Shown)

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PS5637 1 6 6 DX P

Basic Series	
DX02	
15407-1, 18mm	PS5637
DX01	
15407-1, 26mm	PS5537

Regulator Function	
Common Pressure Regulator	1
Independent Pressure Regulator	2

#2 Port Regulator / Gauge*	
5	2-60 PSIG w/Gauge
6	**5-125 PSIG w/Gauge**

* For Common Pressure Regulator Option, Regulator Gauge callout must be the same number for both Port #4 and Port #2. (Example: 166)

#4 Port Regulator / Gauge*	
5	2-60 PSIG w/Gauge
6	**5-125 PSIG w/Gauge**

* For Common Pressure Regulator Option, Regulator Gauge callout must be the same number for both Port #4 and Port #2. (Example: 166)

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Intermediate Air Supply Base

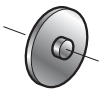
Size	Port Size	Kit Number
		NPT
18mm DX02	1/8" NPT	**D02P-01-80**
26mm DX01	1/4" NPT	**D01P-02-80**

Notes: Gasket & Mounting Bolts included.
Torque Specifications
Size 02: 15 to 25 in-lbs (1.69 to 2.82 Nm)
Size 01: 20 to 30 in-lbs (2.26 to 3.39 Nm)

Manifold Port Isolation Disc

Size	Common Pressure
18mm DX02	**D02BD0**
26mm DX01	**D01BD0**

Notes: 3 Discs per Kit.
Used on PJL Manifolds.



Blanking Plate

Size	Common Pressure
18mm DX02	**PS5634P**
26mm DX01	**PS5534P**

Notes: Gasket & Mounting Bolts included.
Torque Specifications
Size 02: 15 to 25 in-lbs (1.69 to 2.82 Nm)
Size 01: 20 to 30 in-lbs (2.26 to 3.39 Nm)

Sandwich Flow Control Features

- Both adjustment screws are located on the 12 end of the unit.
- Sandwich Flow Control mounts with its own studs, which means the valve uses standard bolts for mounting.
- Sandwich Flow Control is not to be used as a shut off device and is not bubble tight when needles are fully turned down.

Size	Kit Number
18mm DX02	**PS5642P**
26mm DX01	**PS5542P**

DX02
18mm Shown

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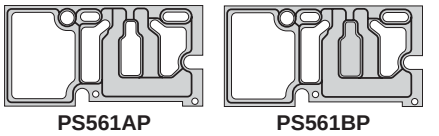
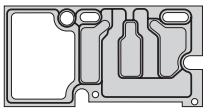
Manifold to Manifold Gasket Kits

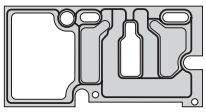
Size	Standard	Blocked #1 Port	Blocked #1, 3, 5 Ports	Blocked #3, 5 Ports
DX02 * / DX01 *	PS561AP	PS561BP	PS561CP	PS561DP
DX02	DX02M2MGSKT (PJLP02)			
DX01	DX01M2MGSKT (PJLP01)			

* Gaskets used with PS5611 & PS5511 Manifolds.


PS561AP

PS561BP


PS561CP


PS561DP


DX02M2MGSKT (PJLP02)


DX01M2MGSKT (PJLP01)

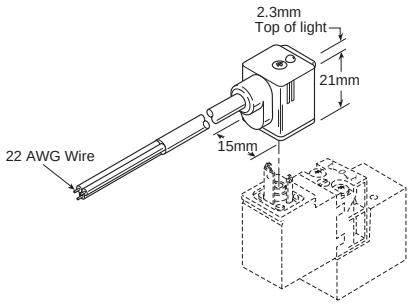
15mm 3-Pin DIN 43650C Connectors

Connector	Connector with 6' (2m) Cord	Description
PS2932BP	PS2932JBP	No Circuit Board
PS294679BP	PS2946J79BP*	Light – 24DC
PS294683BP	PS2946J83BP*	Light – 110/120VAC

* LED with surge suppression.

Note: Max. ø6.5mm cable size required for connector without 6' (2m) cord.
IP65 rated when properly installed.

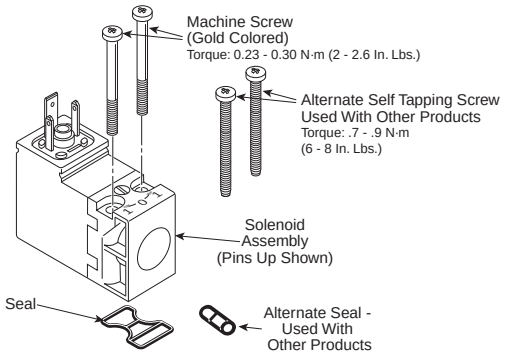
Engineering Data:
Conductors: 2 Poles Plus Ground
Cable Range (Connector Only): 4 to 6mm (0.16 to 0.24 Inch)
Contact Spacing: 8mm



Molded 6' Cord Shown

15mm 3-Pin DIN 43650C Replacement Solenoid Kits

Voltage	Non-Locking	Locking
24VDC	PS2982B49P	PS2982C49P
110/50, 120/60	PS2982B53P	PS2982C53P



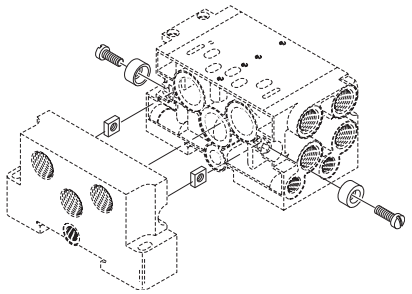
Manifold Hardware Kits

Part Number	Items
DX02M2MB**	Bolt, Washer & Nut*
PS5612P	Tie Rods for PS5611 Manifold (Qty. 12)
PS5512P	Tie Rods for PS5511 Manifold (Qty. 12)

* Includes 10 Bolts, 10 Washers, 10 Nuts

** Use this number for both sizes, PJLP02 & PJLP01.

Torque Specifications: 25 to 35 in-lbs (2.82 to 3.95 Nm)



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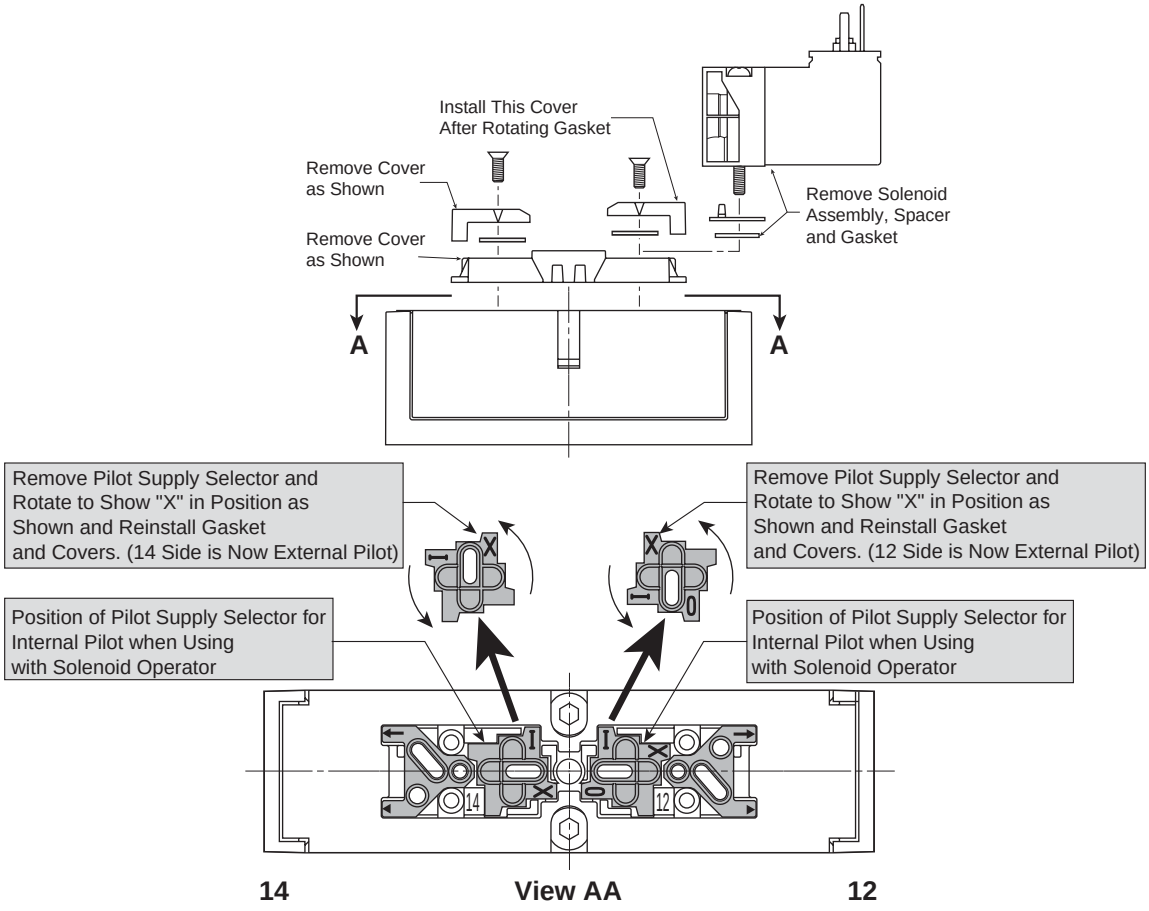
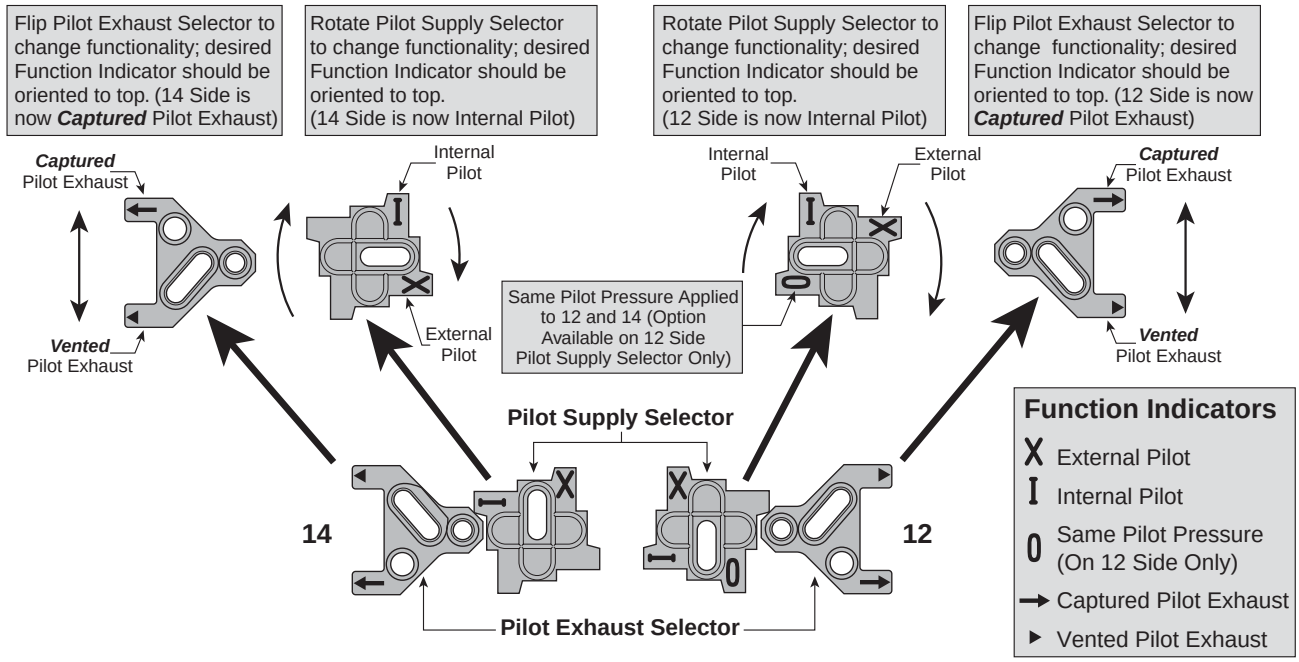
Changing from **Internal** to **External** Pilot Supply



Changing from **External** Pilot Supply, Vented Pilot Exhaust to **Internal** Pilot Supply, Captured Pilot Exhaust



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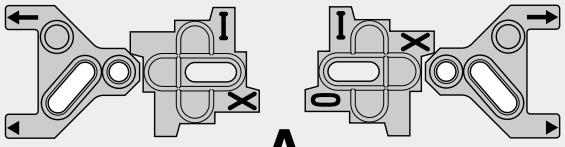
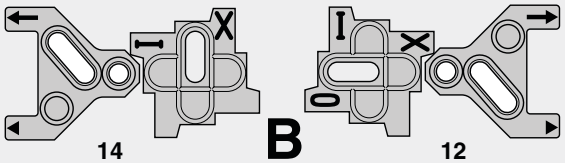
Internal Pilot Supply;
Captured Pilot Exhaust through 12



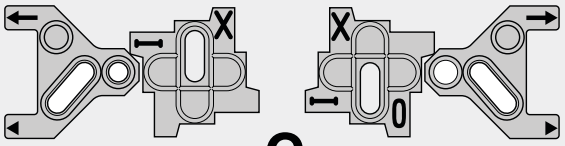
A

External or Single Remote Pilot Supply on 14;
Internal Pilot Supply on 12;
Captured Pilot Exhaust through 12



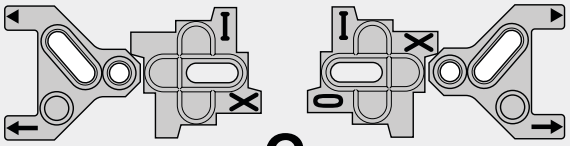
B

External, Double Remote Pilot Supply on 14 & 12;
Captured Pilot Exhaust



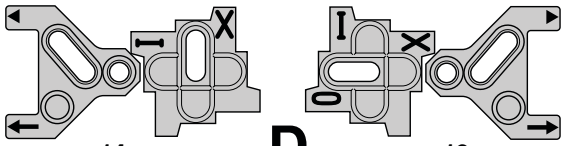
C

Internal Pilot Supply;
Vented Pilot Exhaust



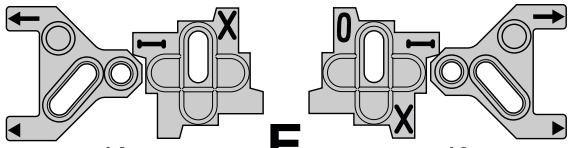
G

External Pilot Supply on 14;
Internal Pilot Supply on 12;
Vented Pilot Exhaust



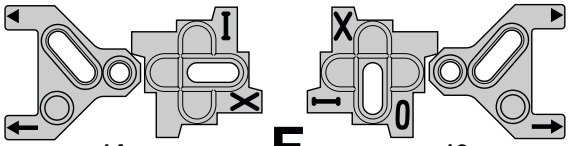
D

External Pilot Supply 14 Common to 12;
Captured Pilot Exhaust through 12



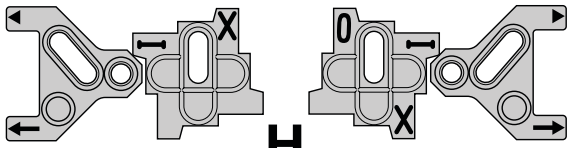
E

Internal Pilot Supply on 14;
External Pilot Supply on 12;
Vented Pilot Exhaust



F

External Pilot Supply 14 Common to 12;
Vented Pilot Exhaust



H

Base Pilot Port Used	None	14	14 and 12	None	14	14	12
Pilot Air Supply	**Internal Pilot Supply**	**14 External Pilot 12 Internal Pilot**	**External, Double Remote Pilot for 14 and 12**	**Internal Pilot Supply**	**14 External Pilot 12 Internal Pilot**	**One Common External Pilot Pressure for 14 and 12**	**14 Internal Pilot 12 External Pilot**
Pilot Exhaust	**Captured**	**Captured**	**Captured**	**Vented**	**Vented**	**Captured**	**Vented**
5/2 Double Solenoid	606 A	—	406 C	604 G	D	E	F
5/2 Single Solenoid	621	421	C	620	D	E	F
5/2 Double Solenoid, on Sandwich Regulator	—	—	—	—	External Pilot Supply 14 Common to 12 Vented Pilot Exhaust – See Diagram '**H**'		
Spring Return	A	B	—	G	—	—	—
5/2 Single Solenoid, Differential Return	651 A	451 B	C	65 G	D	E	F
5/3 Pressure Center Exhaust	611 A	—	411 C	627 G	D	E	F
5/3 Pressure All Ports Blocked	616 A	—	416 C	625 G	D	E	F
	Part Numbers Available From Factory				**See Gasket Configurations Above for These Special Adaptations**		

Insert a muffler or vent in the EXH Port of the PEJ02 & PEJ01 Manifold End Plates or #12 of PL02 & PL01 Subbases when using solenoids with a ***Captured*** Exhaust.

A plug may be inserted in the EXH Port of the PEJ02 & PEJ01 Manifold End Plates #14 or #12 of PL02 & PL01 Subbases when using a ***Vented*** Exhaust.

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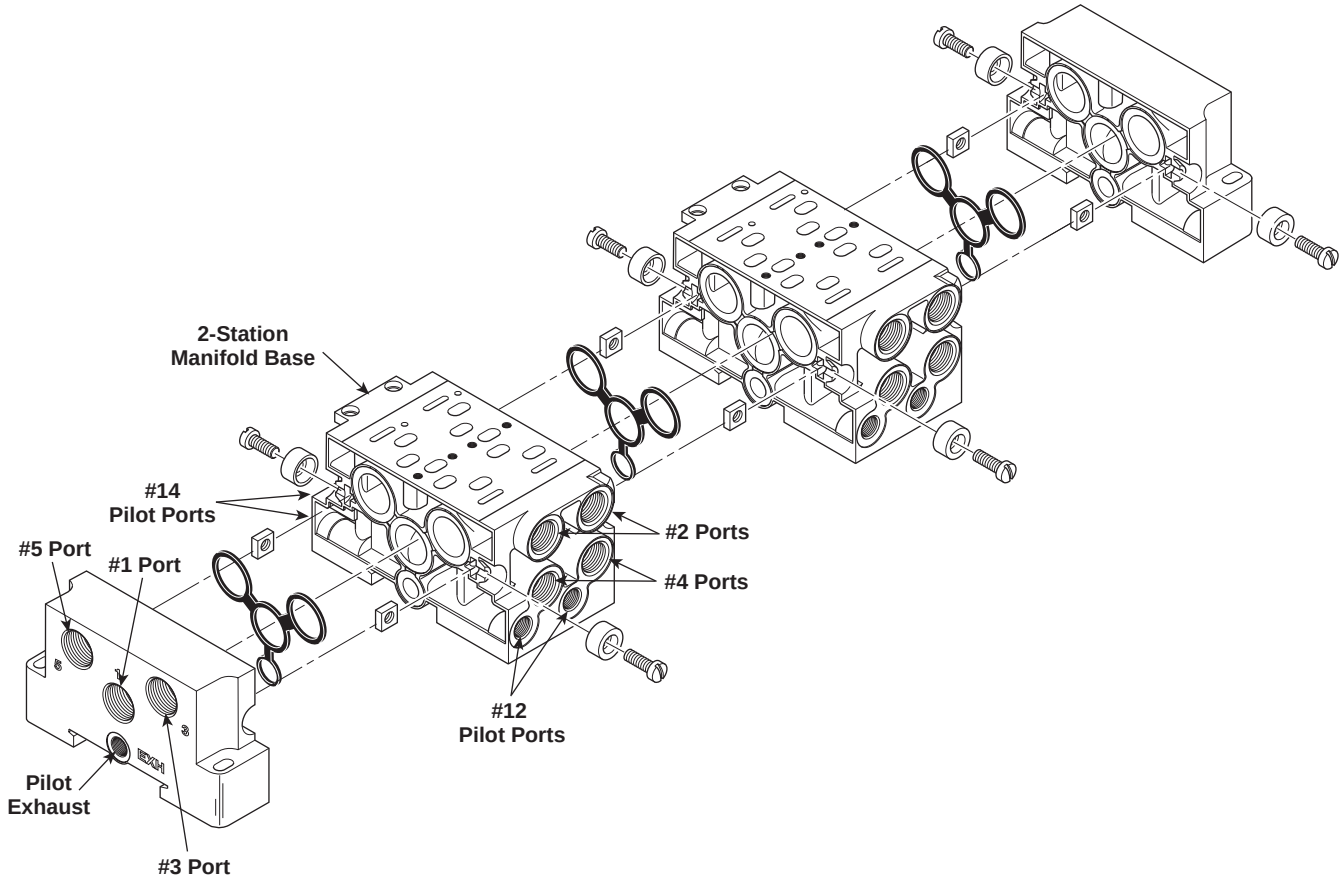
Manifold Assembly

Ports

1 .....Pressure
2 .....#2 Cylinder Port, 1 to 2 Flow Path
3 .....Cylinder Exhaust Port, 2 to 3 Flow Path
4 .....#4 Cylinder Port, 1 to 4 Flow Path
5 .....Cylinder Exhaust Port, 4 to 5 Flow Path
14 .....#14 Pilot Port
12 ..... #12 Pilot Port

Torque Specifications: 25 to 35 in-lbs (2.82 to 3.95 Nm)



DX01 Shown

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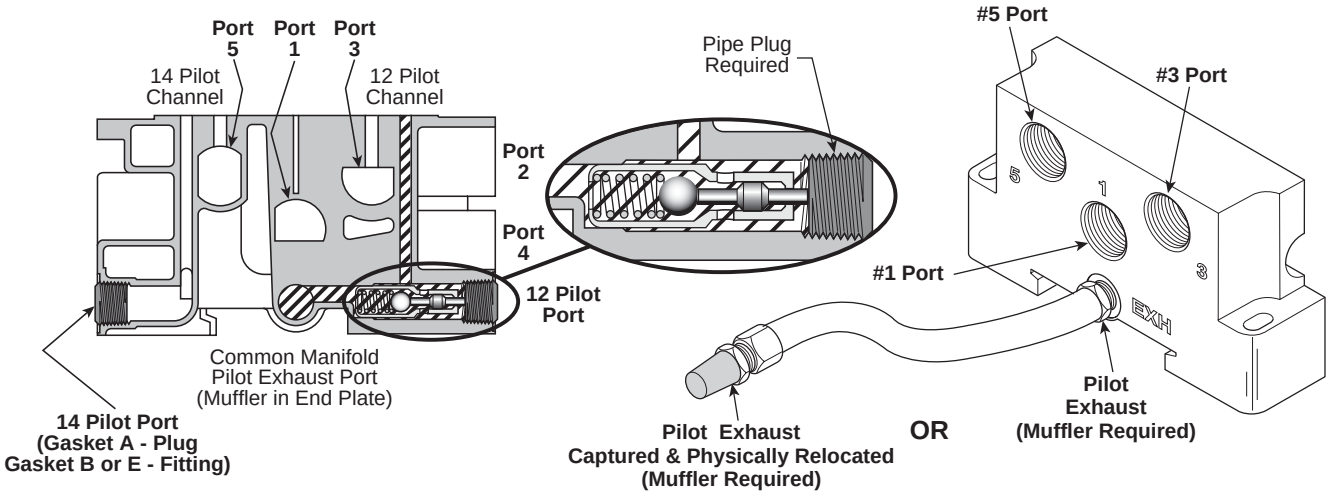
Captured Pilot Exhaust

PJL01, Size 01

A Built-in 2-Position Selector converts the External Pilot Channel (12) into a Common Solenoid Pilot Exhaust Channel.



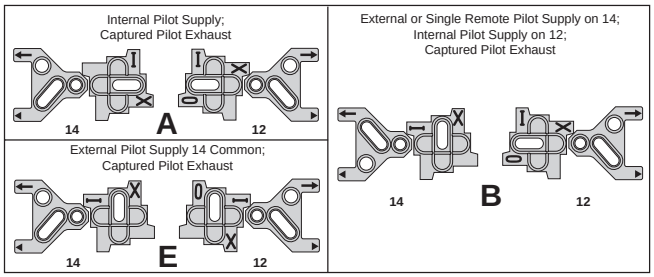
Built-in Selector

When using A, B or E ***Captured*** Selector Gasket Positions, the 12 Pilot Port is plugged. The 14 Pilot Port has a plug when using Gasket A or a fitting when using Gasket B or E. When in place, the Plug in the 12 Pilot Port depresses the Selector to connect the Valve Solenoid Pilot Exhaust to a Common Manifold Exhaust Port. The Plug **must** make contact with the Pin of the Internal Check Valve.

Insert a Muffler in the EXH Port of the End Plate.

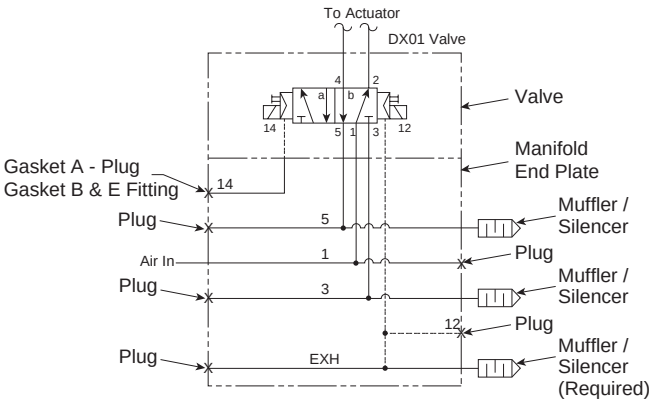
Captured Selector Gasket Positions

When using A, B or E Selector Gasket Positions as shown in the schematic at right.



Insert a muffler or vent in the EXH Port of the PEJ02 & PEJ01 Manifold End Plates or #12 of PL02 & PL01 Subbases when using solenoids with ***Captured*** Pilot Exhaust.

DX01 Manifold Assembly Schematic for *Captured* Selector Gasket Positions A, B and E



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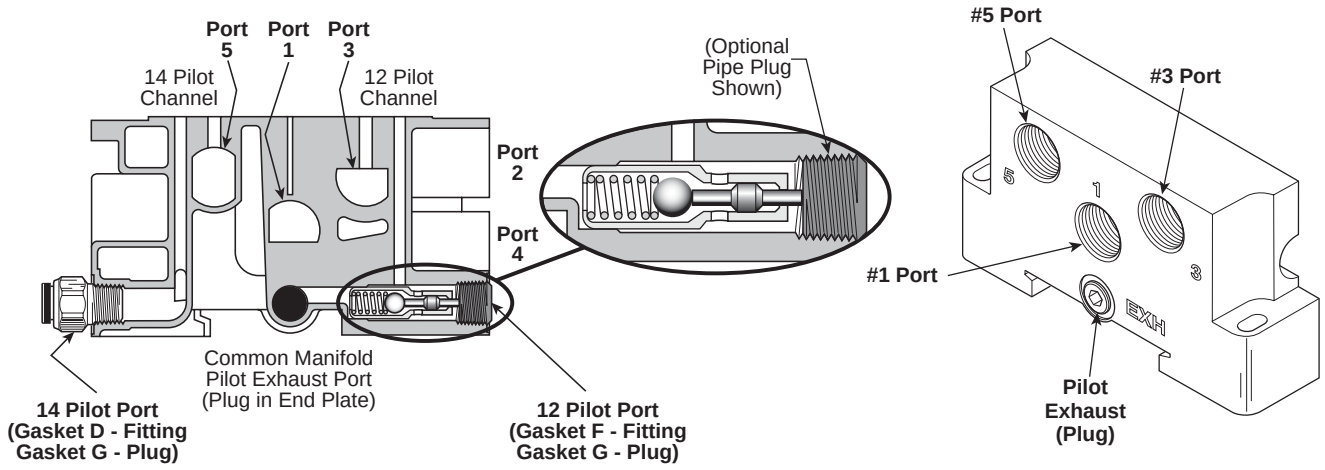
Vented
Pilot Exhaust



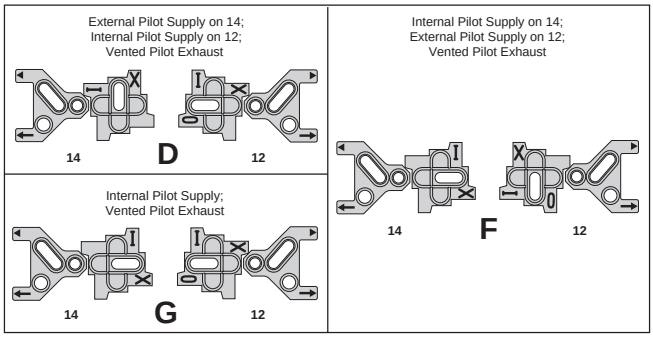
Manifold **End Plate**

Built-in Selector

When using D or G ***Vented*** Selector Gasket Positions, the 12 Pilot Port may be plugged (Optional). The 14 Pilot Port has a plug when using Gasket G or a fitting when using Gasket D or F. The valve solenoid pilot exhaust vents out the pilot adapter on the G Gasket Selection.

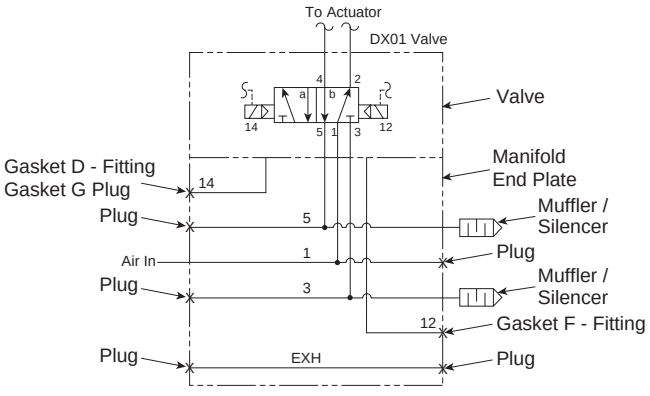
Vented Selector Gasket Positions

When using D, F or G Selector Gasket Positions, pilot exhaust air is vented out the valve.



A plug may be inserted in the EXH Port of the PEJ02 & PEJ01 Manifold End Plates, #12 of PL02 & PL01 Subbases.

DX01 Manifold Assembly Schematic for ***Vented*** Selector Gasket Positions D or G



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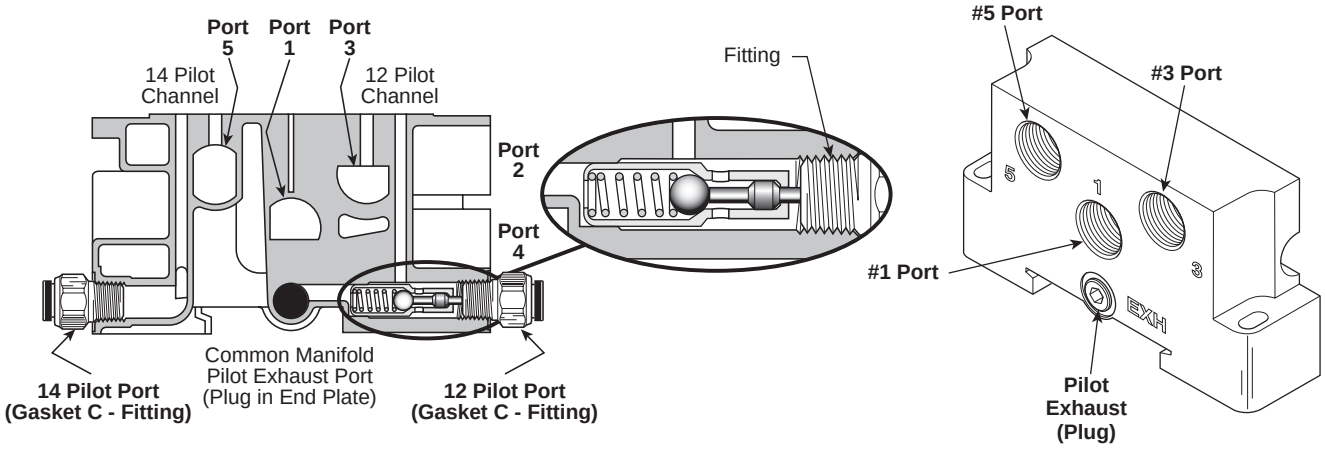
External Double Remote Pilot

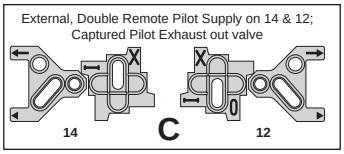


Built-in Selector

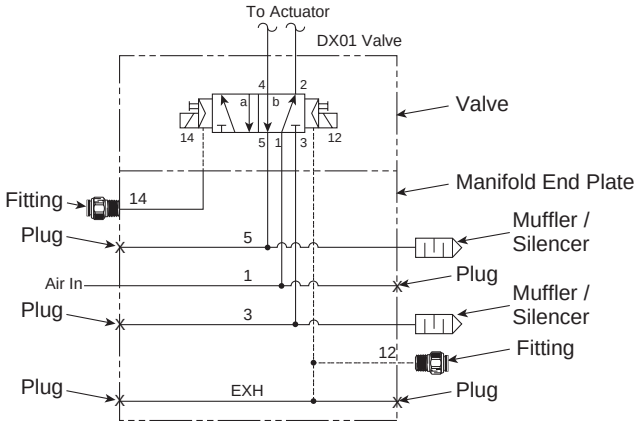
When using C ***External Double Remote Pilot*** Selector Gasket Position, a fitting is used in Pilot Port 14 & 12. Free flow between Port 14 & 12 and the valve allows Remote Pilot Pressure and an exhaust path for the captured pilot exhaust.

External Double Remote Pilot Selector Gasket Position

When using C Selector Gasket Position.



DX01 Manifold Assembly Schematic for *External Double Remote Pilot* Selector Gasket Position C



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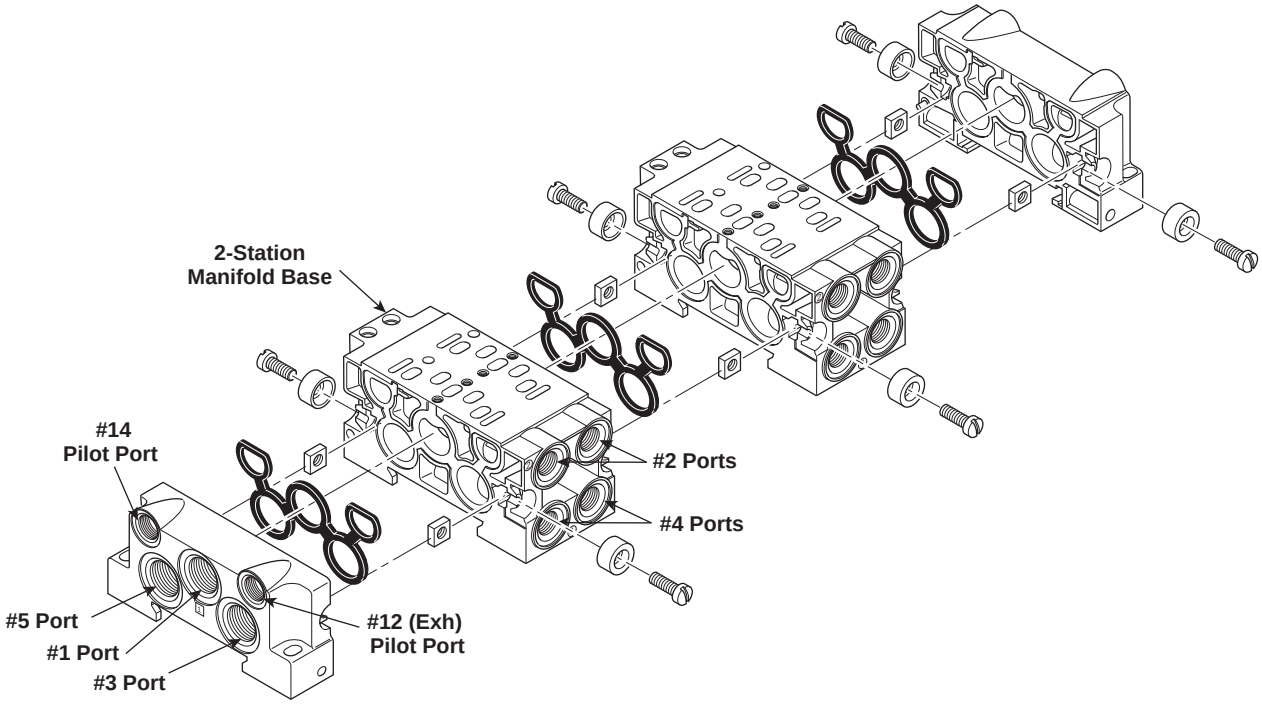
Manifold Assembly

Ports

1.....Pressure
2.....#2 Cylinder Port, 1 to 2 Flow Path
3.....Cylinder Exhaust Port, 2 to 3 Flow Path
4.....#4 Cylinder Port, 1 to 4 Flow Path
5.....Cylinder Exhaust Port, 4 to 5 Flow Path
14.....#14 Pilot Port
12.....#12 Pilot Port

Torque Specifications: 25 to 35 in-lbs (2.82 to 3.95 Nm)



DX02 Shown

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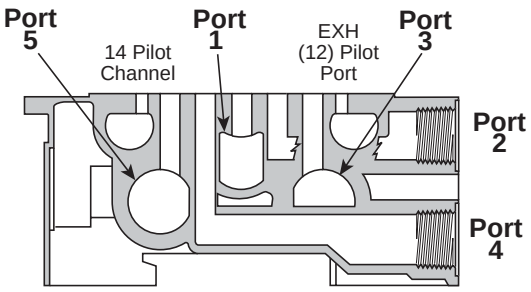
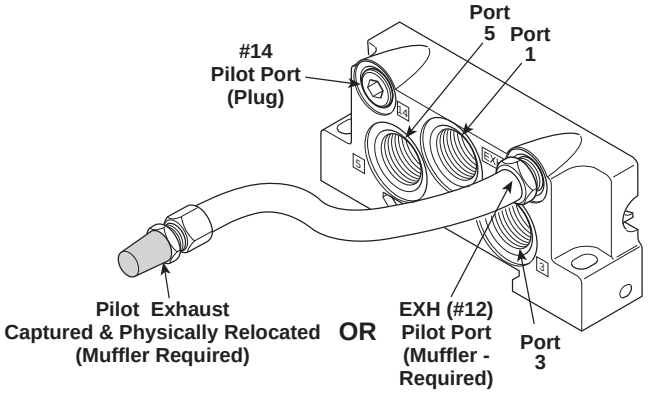
Captured Pilot Exhaust

PJLP02, Size 02*

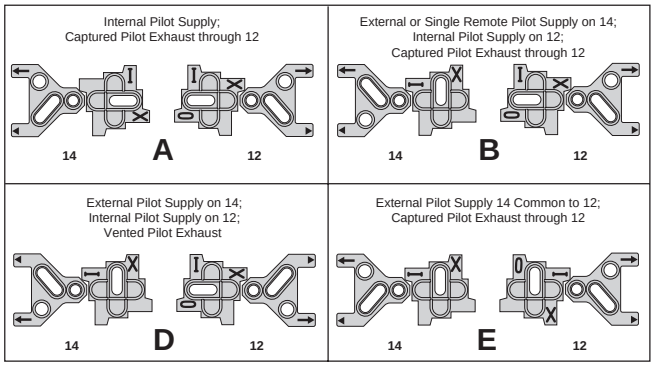
As shown in the illustrations below, the EXH (12) & 14 Pilot Ports are exhausted internally in the valve body into a single chamber labeled EXH on the end plate. When using A, B, D or E Selector Gasket Positions, the EXH (12) Pilot Port is vented with a muffler or micron screen. The 14 Pilot Port is plugged.





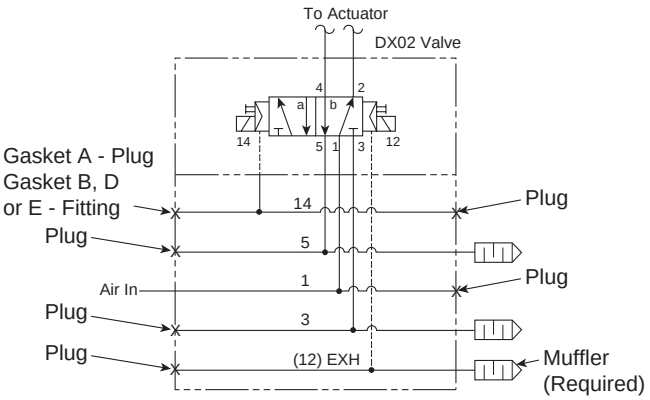
Captured Selector Gasket Positions

When using A, B, D or E, Selector Gasket Positions, the ports must be either plugged or vented with a muffler or micron screen as shown in the schematic at right.



* PJLP02 Manifolds can be used for External Pilot, **NOT** Remote Pilot

DX02 Manifold Assembly Schematic for *Captured* Selector Gasket Positions A, B, D and E



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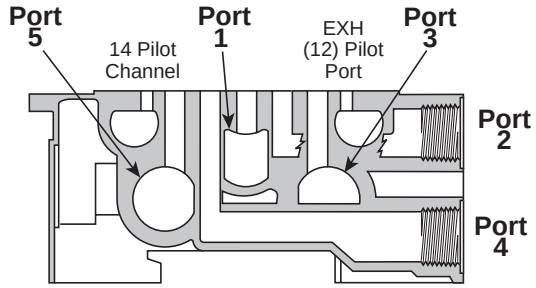
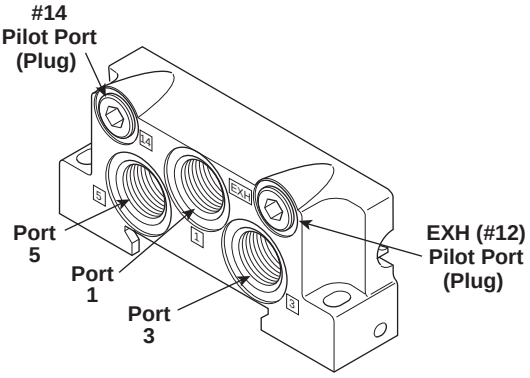
Vented
Pilot Exhaust

PJLP02, Size 02

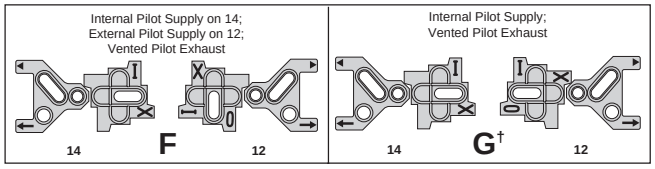
When using F or G Selector Gasket Positions, the EXH (12) Pilot Port and the 14 Pilot Port are plugged and the Pilot Exhaust is vented through the Pilot Adapter.





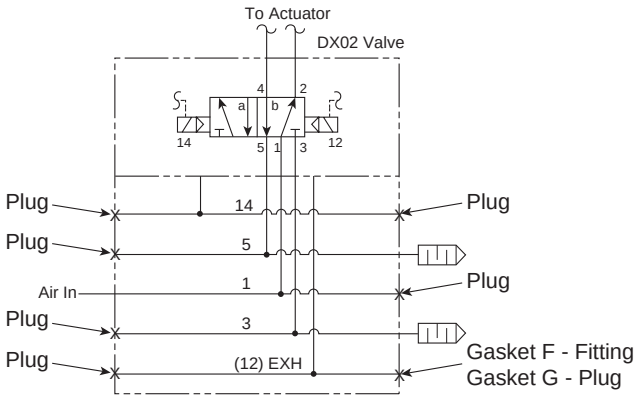
Vented Selector Gasket Positions

When using F or G, Selector Gasket Positions, the ports must be either plugged or vented with a muffler or micron screen as shown in the schematic at right.



† A plug may be inserted in the EXH Port of the PEJ02 & PEJ01 Manifold End Plates or #12 of PL02 & PL01 Subbases.

DX02 Manifold Assembly Schematic for *Vented* Selector Gasket Positions F and G



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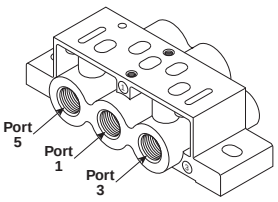
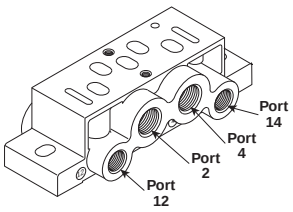
Subbase Assembly

Ports

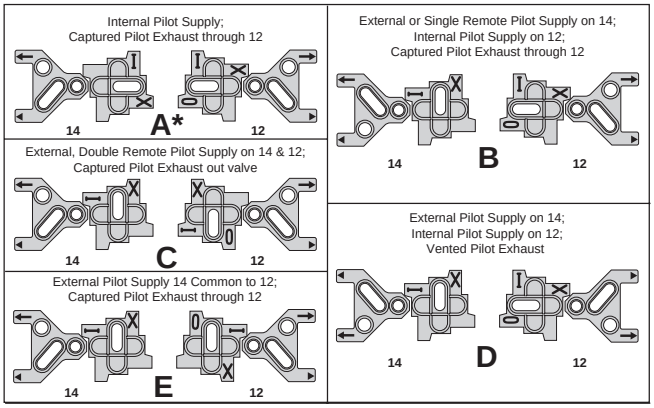
1.....Pressure
2.....#2 Cylinder Port. 1 to 2 Flow Path.
3.....Cylinder Exhaust Port. 2 to 3 Flow Path.
4.....#4 Cylinder Port. 1 to 4 Flow Path.
5.....Cylinder Exhaust Port. 4 to 5 Flow Path.
14..... #14 Pilot Port
12..... #12 Pilot Port



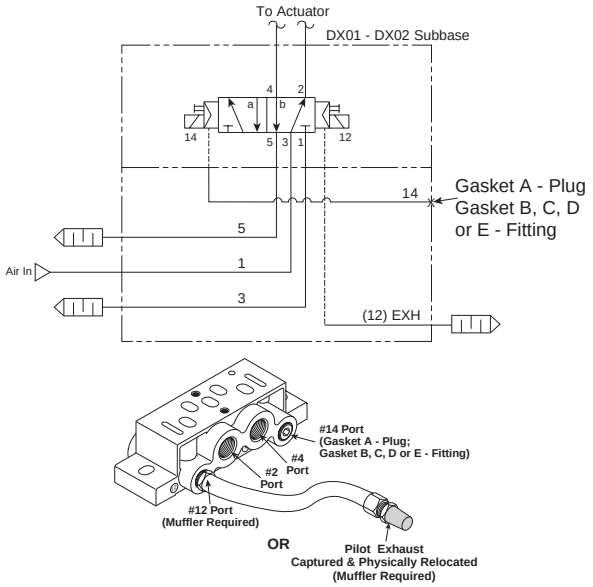


Captured Selector Gasket Positions

When using A, B, C, D or E, Selector Gasket Positions, the ports must be either plugged or vented with a muffler or micron screen as shown in the schematic at right.

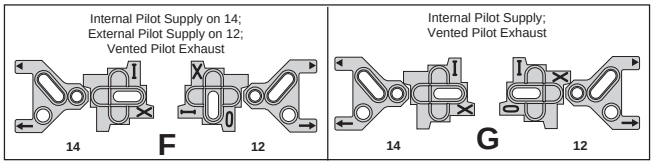


DX02 & DX01 Subbase Assembly Schematic for ***Captured*** Selector Gasket Positions A, B, C, D and E

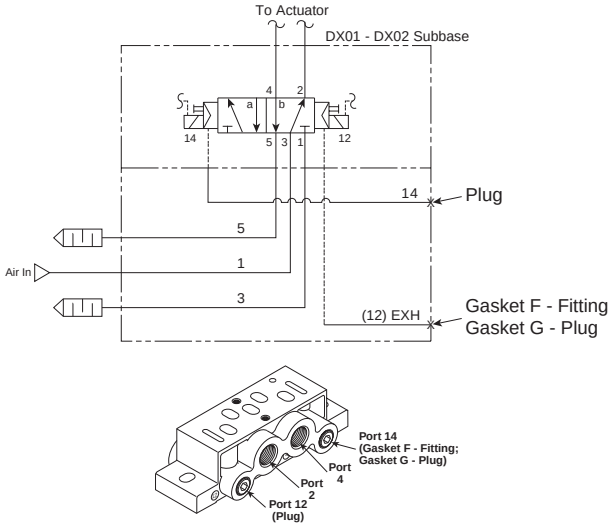


Vented Selector Gasket Positions

When using F or G, Selector Gasket Positions, the ports must be either plugged or vented with a muffler or micron screen as shown in the schematic at right.



DX02 & DX01 Subbase Assembly Schematic for ***Vented*** Selector Gasket Positions F and G



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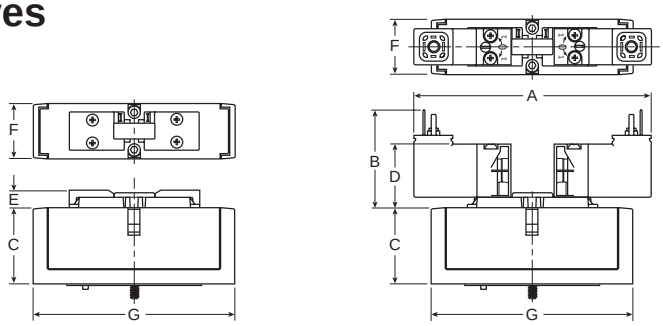
DX02

DX01

Valves



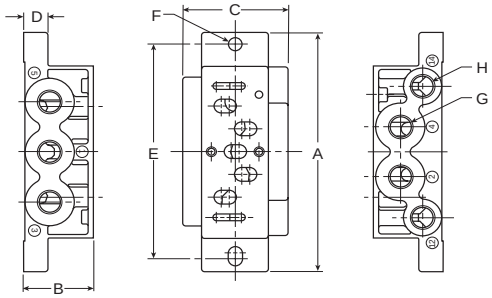
Series	A	B	C	D	E	F	G
DX02	4.06 (103)	1.61 (41)	1.41 (36)	1.06 (27)	.31 (8)	.71 (18)	3.15 (80)
DX01	4.06 (103)	1.61 (41)	1.41 (36)	1.06 (27)	.31 (8)	1.02 (26)	3.94 (100)

Inches (mm)

DX02

DX01

Individual Subbase



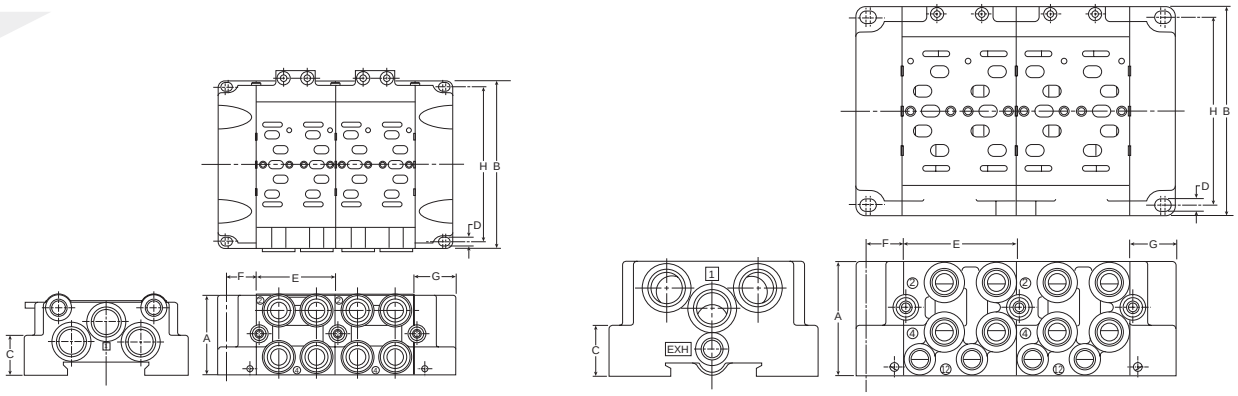
Series	Part Number	A	B	C	D	E	F	G	H
DX02	PL02	3.15 (80)	.87 (22)	1.06 (27)	.31 (8)	2.76 (70)	.216 Dia. (Ø 5.5)	1/8	M5
DX01	PL01	3.94 (100)	1.10 (28)	1.65 (42)	.39 (10)	3.54 (90)	.216 Dia. (Ø 5.5)	1/4	1/8

Inches (mm)

DX02

DX01

2-Station Manifold Bases



Series	Part Number	A	B	C	D	E	F	G	H
DX02	PJLP02 / PEJ02	1.52 (38.5)	3.15 (80)	.47 (12)	.165 Dia. (Ø 4.2)	1.50 (38)	.55 (14)	.71 (18)	2.83 (72)
DX01	PJL01 / PJLP01 / PEJ01	2.17 (55)	3.94 (100)	.94 (24)	.216 Dia. (Ø 5.5)	2.13 (54)	.67 (17)	.87 (22)	3.54 (90)

Inches (mm)

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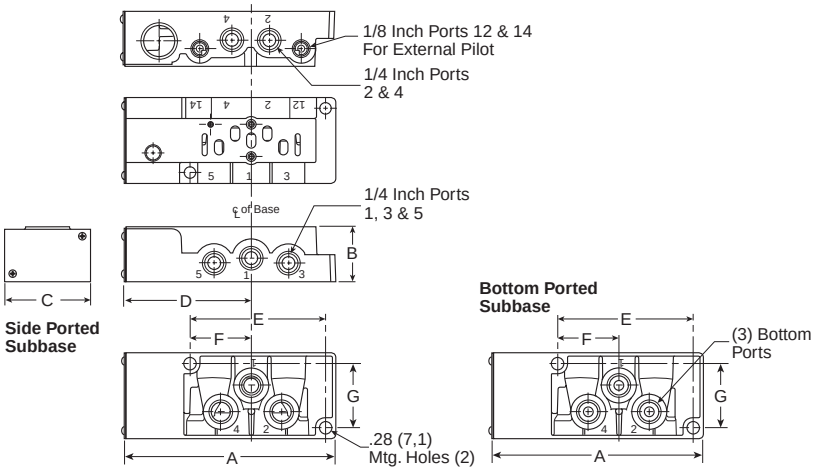
DX01

DX01 15407-1, PS5511 Subbases



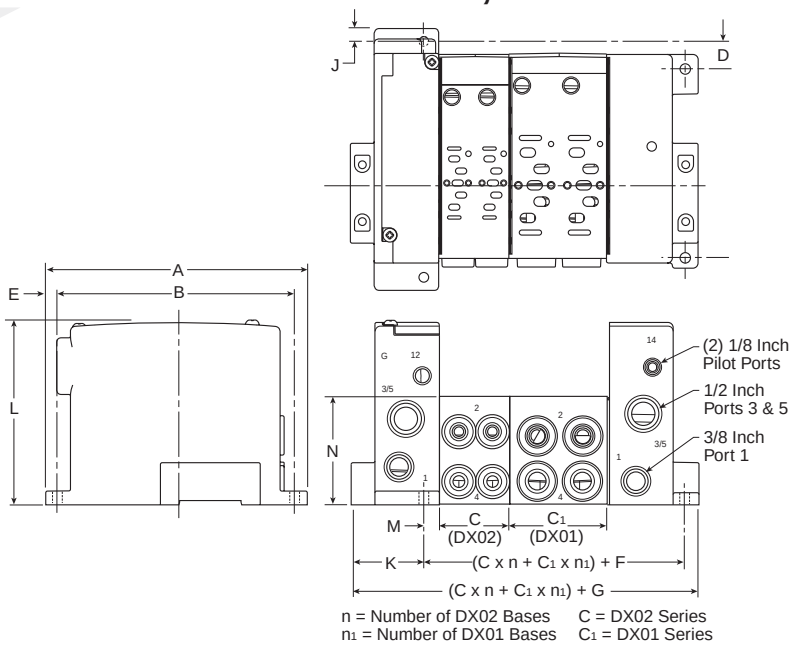
A	B	C	D
4.88 (124)	1.28 (32.5)	2.00 (50.8)	2.91 (74)
E	**F**	**G**	
1.43 (36.2)	3.16 (80.2)	1.49 (37.9)	

Inches (mm)

DX02

DX02 & DX01 15407-1, PS5611 & PS5511 Manifolds

DX01

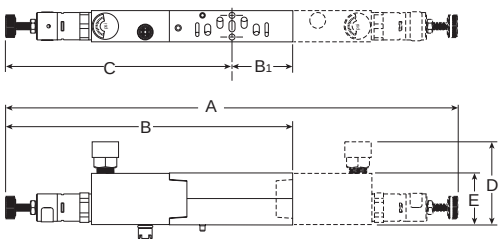


A	B	C	C_1
5.98 (152)	5.39 (137)	1.61 (40.8)	2.24 (56.8)
D	**E**	**F**	**G**
.63 (16)	.30 (7.5)	2.14 (54.4)	4.12 (104.6)
H	**J**	**K**	**L**
4.32 (109.8)	.15 (4)	1.68 (42.7)	4.17 (106)
M	**N**		
.33 (8.4)	2.48 |(63)		

Inches (mm)

DX01

DX02



Series	Part Number	A	B	B_1	C	D	E
DX02	PS5637	10.28 (261)	6.14 (156)	1.02 (26)	5.13 (130)	2.60 (66)	1.18 (30)
DX01	PS5537	10.00 (254)	6.42 (163)	1.42 (36)	5.00 (127)	2.72 (69)	1.18 (30)

Inches (mm)

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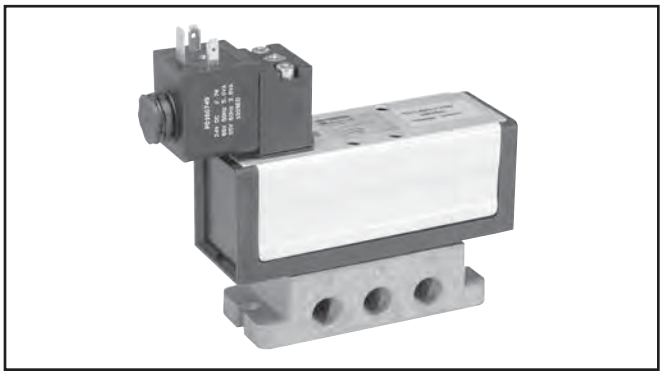
ISOMAX 5599-1



Ceramic Technology / Valve Specifications

- Subbase Mounted Valves Conforming to ISO Standard 5599/1
- High Flow: DX1 (1.15 Cv), DX2 (2.50 Cv), DX3 (4.15 Cv)
- Air or Solenoid Operation Using CNOMO Solenoids
- Can Be Vacuum Operated

Air Condition:
Filtered to 40µ

Dual Pressure Supply from Exhaust Ports:
Yes - Without additional pressure at 12 and 14

Dust and Water Protection:
IP 65 (According to EN 60529)

Mechanical Life:
> 100 million operations (Dry air filtered 40 µ, 2 Hz, 6 bar, 20°C)

Media:
Air or inert gas, filtered 40 µ (Class 5 according to ISO 8573-1), lubricated or non-lubricated

Operating Temperature Range:
-10°C to 60°C (14°F to 140°F)

Flow Rating (Cv)

Size	Port Size	Mounting Style	2-Position	3-Position
DX1	1/4" Ports	Subbase	1.15	0.75
	1/4" Ports	Manifold	0.80	0.60
DX2	3/8" Ports	Subbase	2.50	2.40
	3/8" Ports	Manifold	2.05	1.95
DX3	1/2" Ports	Subbase	4.15	4.00
	1/2" Ports	Manifold	4.10	3.65

Cv tested per ANSI / (NFPA) T3.21.3

Flow Rating (Cv) with Sandwich Regulator

	Common Pressure				Dual Pressure			
	1-2	1-4	2-3	4-5	1-2	1-4	2-3	4-5
DX1	0.55	0.49	1.06	1.02	0.32	0.42	0.25	0.38
DX2	1.06	1.05	2.33	2.17	0.93	0.66	0.77	1.15

Note: All Cv's calculated with regulator adjusted full open.

Response Time**

Single Solenoid 2-Position - Air Return / Spring Assist

Valve Size	Port Size	0 Cu. In. Chamber		## Cu. In. Chamber	
		Fill	Exhaust	Fill	Exhaust
DX1	1/4"	.025	.030	.160	.235
DX2	3/8"	.040	.045	.170	.235
DX3	1/2"	.060	.065	.245	.330

DX1 (50), DX2 (100), DX3 (200)

** With 100 PSIG supply, time required to fill from 0 to 90 PSIG and Exhaust from 100 PSIG to 10 PSIG measured from the instant of energizing or de-energizing 24VDC solenoid.

Tested per ANSI / (NFPA) T3.21.8

Solenoid Information

Code	Voltage			Power (W / VA)
	AC		DC	
	60Hz	50Hz		
19	—	—	24	2.8W
49	—	—	24	2.7W
53	120	115	—	3.7VA

Data tested with LED and Surge Suppression.

Operating Pressure

Vacuum to 145 PSIG (10 bar)

Function		M.O.P. (PSIG)		
Internal Pilot		DX1	DX2	DX3
21	2-Position, Spring Return	36	30	30
51	2-Poswition, Air Return	30	30	30
06	2-Position	15	15	15
11	3-Position, CE	45	36	36
16	3-Position, APB	45	36	36
13	3-Position, PC	45	36	—
External Pilot		DX1	DX2	DX3
22	2-Position, Spring Return	36	30	30
53	2-Position, Air Return	30	30	30
08	2-Position	15	15	15
12	3-Position, CE	45	36	36
18	3-Position, APB	45	36	36
24	3-Position, PC	45	36	—

Material Specification

Body ..... Polyamide Reinforced Fiberglass
Casing - End Plates ..... Anodized Aluminium
Seals ..... Nitrile
Screws ..... Zinc Plated Steel
Valve Member / Seat ..... Self Lubricating / Ceramic
Valve Plate ..... Zinc

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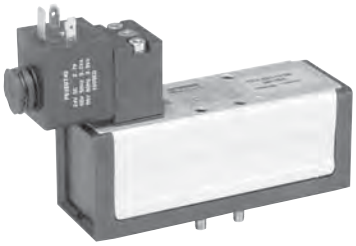
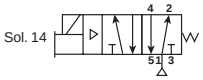
Single Solenoid

2-Position



DX1 Shown

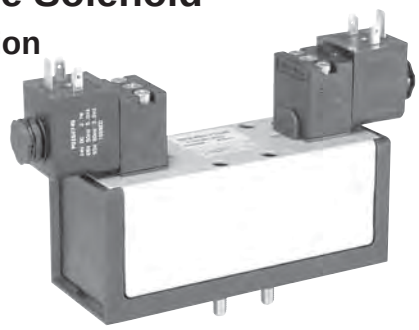


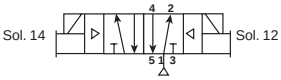
DX1	**DX1-621-BL53**	120VAC	1.15 Cv C = 3.8 Nl/s x bar, b = 0.35 Qn = 1032 l/min, Qmax = 1530 l/min
	DX1-621-BL49	24VDC	
DX2	**DX2-621-BL53**	120VAC	2.50 Cv C = 8.2 Nl/s x bar, b = 0.35 Qn = 2298 l/min, Qmax = 3522 l/min
	DX2-621-BL49	24VDC	
DX3	**DX3-621-BL53**	120VAC	4.15 Cv C = 14.5 Nl/s x bar, b = 0.35 Qn = 3840 l/min, Qmax = 6060 l/min
	DX3-621-BL49	24VDC	

30mm 3-Pin Solenoid, NLMOR, Unlighted, Internal Pilot, Valve Less Base

Double Solenoid

2-Position



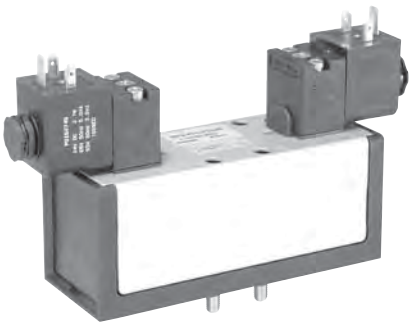


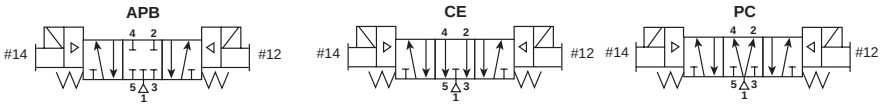
DX1	**DX1-606-BL53**	120VAC	1.15 Cv C = 3.8 Nl/s x bar, b = 0.35 Qn = 1032 l/min, Qmax = 1530 l/min
	DX1-606-BL49	24VDC	
DX2	**DX2-606-BL53**	120VAC	2.50 Cv C = 8.2 Nl/s x bar, b = 0.35 Qn = 2298 l/min, Qmax = 3522 l/min
	DX2-606-BL49	24VDC	
DX3	**DX3-606-BL53**	120VAC	4.15 Cv C = 14.5 Nl/s x bar, b = 0.35 Qn = 3840 l/min, Qmax = 6060 l/min
	DX3-606-BL49	24VDC	

30mm 3-Pin Solenoid, NLMOR, Unlighted, Internal Pilot, Valve Less Base

Double Solenoid

3-Position APB
3-Position CE





	APB	CE	PC		
DX1	**DX1-616-BL53**	**DX1-611-BL53**	**DX1-613-BL53**	120VAC	0.75 Cv C =2.5 Nl/s x bar, b = 0.35 Qn = 672 l/min, Qmax = 995 l/min
	DX1-616-BL49	**DX1-611-BL49**	**DX1-613-BL49**	24VDC	
DX2	**DX2-616-BL53**	**DX2-611-BL53**	**DX2-613-BL53**	120VAC	2.4 Cv C = 7.9 Nl/s x bar, b = 0.35 Qn = 2206 l/min, Qmax = 3381 l/min
	DX2-616-BL49	**DX2-611-BL49**	**DX2-613-BL49**	24VDC	
DX3	**DX3-616-BL53**	**DX3-611-BL53**	—	120VAC	4.0 Cv C = 13.9 Nl/s x bar, b = 0.35 Qn = 3686 l/min, Qmax = 5815 l/min
	DX3-616-BL49	**DX3-611-BL49**	—	24VDC	

30mm 3-Pin Solenoid, NLMOR, Unlighted, Internal Pilot, Valve Less Base.

Torque Specifications
DX1: 25 to 35 in-lbs (2.82 to 3.95 Nm)
DX2: 115 to 130 in-lbs (12.99 to 14.69 Nm)
DX3: 120 to 1430 in-lbs (13.56 to 15.82 Nm)

For Compact and VDMA Subbase and Manifold, see page E201.
For Hi-Flow Subbases and Manifolds, see page E202.

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Basic Series	
ISO 5599-1	**DX1 - Size 1**
ISO 5599-1	**DX2 - Size 2**
ISO 5599-1	**DX3 - Size 3**

Pilot	
Air Operated Remote Pilot	**4**
Solenoid Operated	**6**

Function	
Internal Pilot Supply	
2-Position, Spring Return, Air Assist	**21**
2-Position, Diff Return	**51**
2-Position	**06**
3-Position, CE	**11**
3-Position, APB	**16**
3-Position, PC	**13***
External Pilot Supply†	
2-Position, Spring Return, Air Assist	22
2-Position, Diff Return	53
2-Position	08
3-Position, CE	12
3-Position, APB	18
3-Position, PC	24*

* Not offered with DX3 Valves.
† Must be specified when using Sandwich Regulators.

Voltage & Frequency			
	AC		DC
	60Hz	50Hz	
19*			24
49			**24**
53	**120**	**110**	
Blank	Remote Pilot or Valve Less Coil		

* LED & Surge Suppression.
Only Available with Enclosure "6".

5599-1 Enclosure / Lead Length / Light	
0**	**None, Remote Pilot Valve**
6*	2-Pin, M12 EURO Connector with CNOMO Operator, Light
L	**3-Pin, 30mm DIN 43650A with CNOMO Connector, No Light**
P	3-Pin, 22mm Industrial with CNOMO Connector, No Light
N†	None, Valve Less Coil, No Light

* Only available with Voltage & Frequency "19".
**Must use Overrides Option "6".
† Must use Overrides Option "B" or "C".

5599-1 Overrides	
6	**Remote Pilot / Without Solenoid**
B	**Non-Locking, Flush, Push**
C	Locking, Flush, Push / Turn

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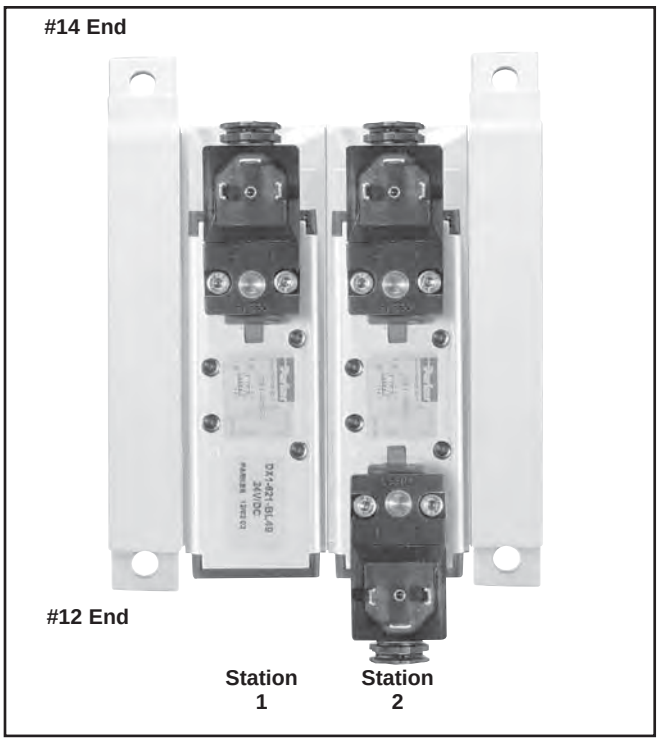

How To Order Add-A-Fold Assemblies

1. List Add-A-Fold Assembly call out. This automatically includes the end plate kit assembly.

2. List complete valve/base model number. List left to right, LOOKING AT THE CYLINDER PORTS on the #12 end of the manifold. The left most station is station 1.

(If a blank station is needed, list the blanking plate part number and the individual manifold number in the station specified.)

Model Number

AA H1 S 0 03 —

Valve Series	
DX1, ISO Size 1	H1
DX2, ISO Size 2	H2
DX3, ISO Size 3	H3

End Plate Type	
Standard Non-Collective Wiring	S
VDMA, 5599-1	V

Port Type	
NPT	0
BSPP "G"	1

Number of Stations	
01	1 Station
•	•
•	•
•	•
21	21 Stations

Transition Plate	
Blank	No Transition Plate
C*	DX1 to DX2
D*	DX1 to DX3
E**	DX2 to DX3

* Use DX1 Valve Series.
** Use DX3 Valve Series.

Example: Application requires a 2-Station manifold.

Qty.	Part No.
1	AAH2S002
1	DX2-621-BL49..... Valve Station 1
1	PS4111570CP.....Base Station 1
1	DX2-606-BL49 ..... Valve Station 2
1	PS4111570CP.....Base Station 2

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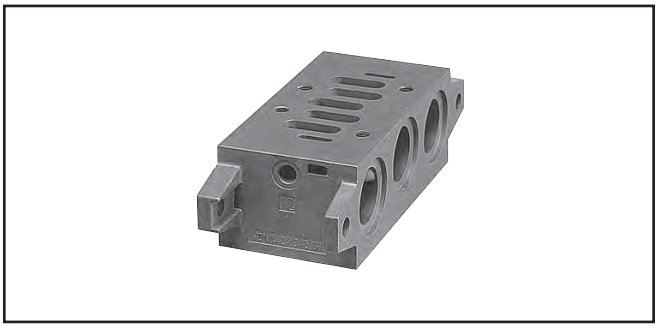
5599-1 Compact Manifolds, Subbases & Accessories

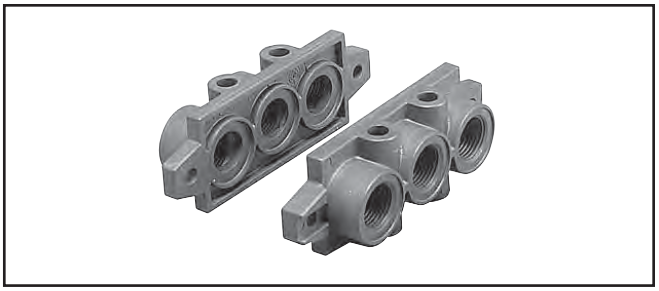
Manifold VDMA – Form C Bottom Port

Size	Port Size	Kit Number
		BSPP "G"
DX1	1/4"	P2N-VM512MB
DX2	3/8"	P2N-WM513MB
DX3	1/2"	P2N-YM514MB



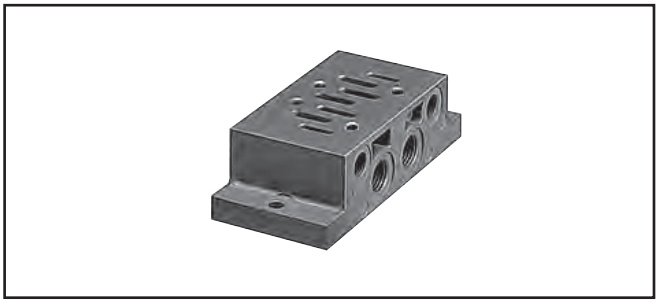
VDMA End Plates – Form D

Size	Port Size	Kit Number
		BSPP "G"
DX1	3/8"	P2N-VM513ES
DX2	1/2"	P2N-WM514ES
DX3	1"	P2N-YM518ES



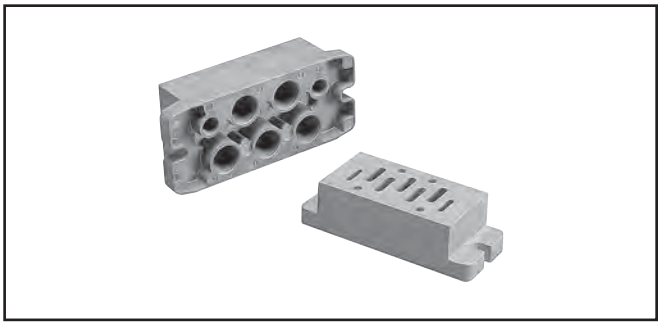
Subbase – Side Ports (5599-1 & VDMA)

Size	Port Size	5599-1 Kit Number		VDMA Kit
		NPT	BSPP "G"	BSPP "G"
DX1	1/4"	**PL1-1/4-80**	PL1-1/4-70	P2N-VS512SD
DX2	3/8"	**PL2-3/8-80**	PL2-3/8-70	P2N-WS513SD
DX3	1/2"	PL3-1/2-80	PL3-1/2-70	P2N-YS514SD



Subbase – Bottom Ports

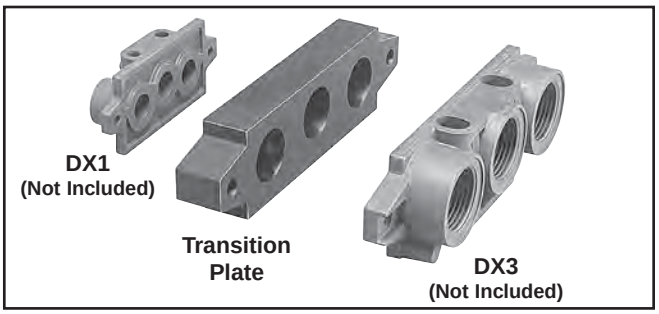
Size	Port Size	5599-1 Kit Number	
		NPT	BSPP "G"
DX1	1/4"	PD1-1/4-80	PD1-1/4-70
DX2	3/8"	PD2-3/8-80	PD2-3/8-70



VDMA Transition Plate

Kit Number
P2N-VM500AK

Kit includes: Transition Plate Only. Order P2N-VM513ES and P2N-YM518ES Separately to Assemble Add-A-Fold



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5599-1, DX1, DX2 & DX3
Hi-Flow Manifold / Subbase Kits

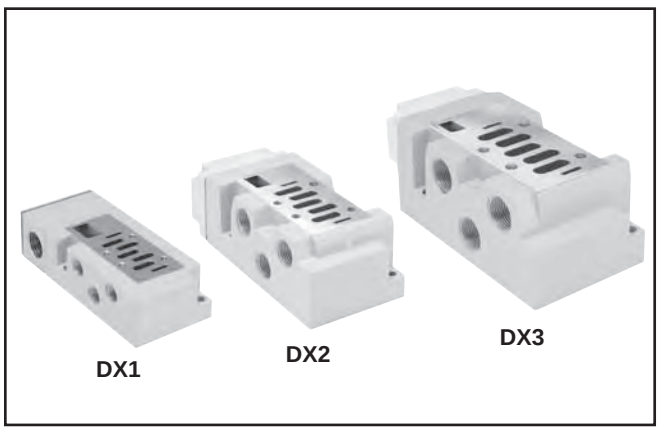
PS401155 | 0 | C | P

Enclosures / Lead Length	
0	None, No Electrical Plug - 5599-1

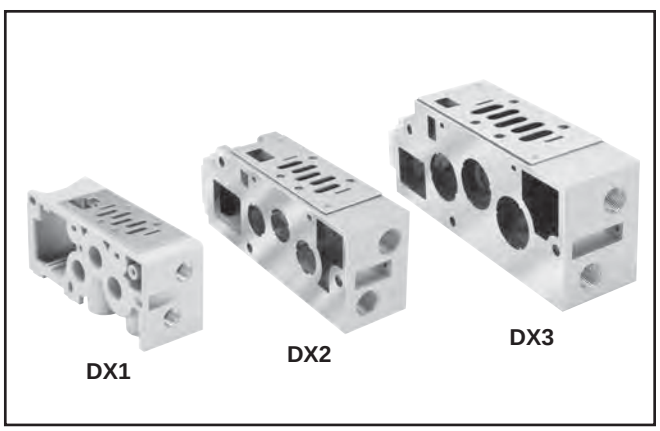
Mounting Base Style / Port Size					
DX1 Series		DX2 Series		DX3 Series	
Subbase: 3/8 NPT Side Ports	**PS401115**	**Subbase: 1/2 NPT Side Ports**	**PS411117**	**Subbase: 3/4 NPT Side Ports**	**PS421119**
Subbase: 3/8 BSPP Side Ports	PS401116	Subbase: 1/2 BSPP Side Ports	PS411118*	Subbase: 3/4 BSPP Side Port	PS421110*
Manifold: 3/8 NPT End Ports	**PS401155**	Subbase: 1/2 NPT Bottom / End Port	PS411127	Subbase: 3/4 NPT Bottom / End Port	PS421129
Manifold: 3/8 BSPP End Ports	PS401156*	Subbase: 1/2 BSPP Bottom / End Port	PS411128*	Subbase: 3/4 BSPP Bottom / End Port	PS421120*
Manifold: 3/8 NPT Bottom / End Port	PS401165†	**Manifold: 1/2 NPT End Port**	**PS411157**	**Manifold: 3/4 NPT End Port**	**PS421159**
Manifold: 3/8 BSPP Bottom / End Port	PS401166*†	Manifold: 1/2 BSPP End Ports	PS411158*	Manifold: 3/4 BSPP End Port	PS421150*
		Manifold: 1/2 NPT Bottom / End Port	PS411167	Manifold: 3/4 NPT Bottom / End Port	PS421169
		Manifold: 1/2 BSPP Bottom / End Port	PS411168*	Manifold: 3/4 BSPP Bottom / End Port	PS421160*

* BSPP Conforms to ISO 1179-1 w 228-1 Theads.
† #1 Bottom Port - 1/4".

Subbase Kits



Manifold Kits



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5599-1, DX1, DX2 & DX3
End Plate Kits for PS4 Manifolds

PS403101 0 C P

Basic Series	
DX1	PS403101
DX2	PS413101
DX3	PS423101

Thread Type	
0	NPT
1	BSPP "G"

Engineering Level	
C	Current

DX1 Non-Collective Wiring End Plates

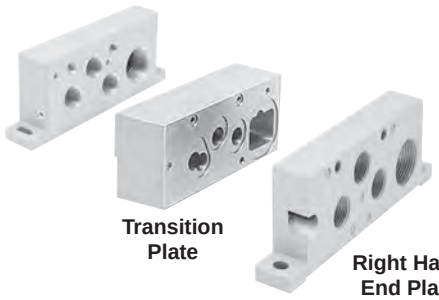
5599-1, DX1, DX2 & DX3
Transition Plate Kits for PS4 Manifolds

PS402701 0 C P

Transition Plate Type	
DX1 to DX2 to DX3	PS402501
DX1 to DX3	PS402601
DX1 to DX2	PS402701
DX2 to DX3	PS402801

Thread Type	
0	NPT
1	BSPP "G"

Engineering Level	
C	Current



DX1 to DX2 Shown

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Blanking Plate Kits

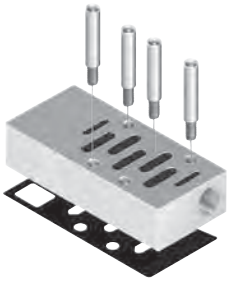
Size	Kit Number
DX1	**PS4034CP**
DX2	**PS4134CP**
DX3	**PS4234CP**

Kit includes: Blanking Plate, Gasket, and Mounting Bolts.

Remote Pilot Access Plate Kits

Size	Port Size	Kit Number	
		NPT	BSPP "G"
H1	1/8"	PS401500CP	PS401501CP
H2	1/8"	PS411500CP	PS411501CP
H3	1/8"	PS421500CP	PS421501CP

Kit includes: Pilot Port Access Plate, Gasket and Mounting Studs.



Manifold Port Isolation Kits

Main Galley (1, 3, 5)

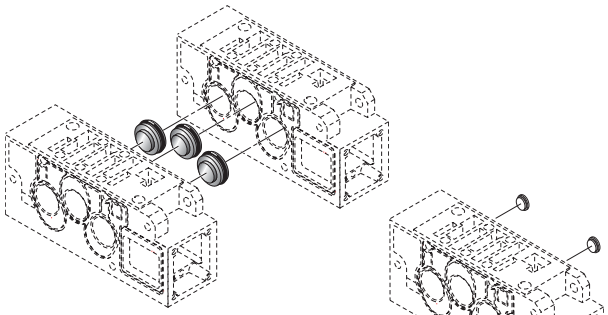
Size	Kit Number	
	PS4 Manifolds	P2N Manifolds
DX1	**PS4032CP**	P2N-VK0P
DX2	**PS4132CP**	P2N-WK0P
DX3	**PS4232CP**	P2N-YK0P

Kit includes: Plugs with O-rings.

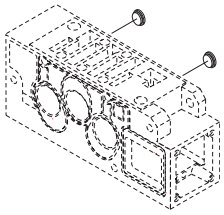
Pilot Galley

Size			Kit Number
DX1	DX2	DX3	**PS4033CP**

Kit includes: Plugs with O-rings.
For use with PS4 Series Manifolds.



DX1, DX2, DX3 Main Galley

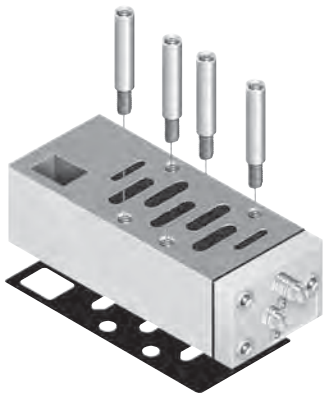


DX1, DX2, DX3 Pilot Galley

Sandwich Flow Controls Features

- Both adjustment screws are located on the 12 end of the unit.
- Sandwich Flow Control mounts with its own studs, which means the valve uses standard bolts for mounting.
- Sandwich Flow Control is not to be used as a shut off device and is not bubble tight when needles are fully turned down.

Size	Kit Number
DX1	PS4042CP
DX2	PS4142CP
DX3	PS4242CP



DX2 Shown

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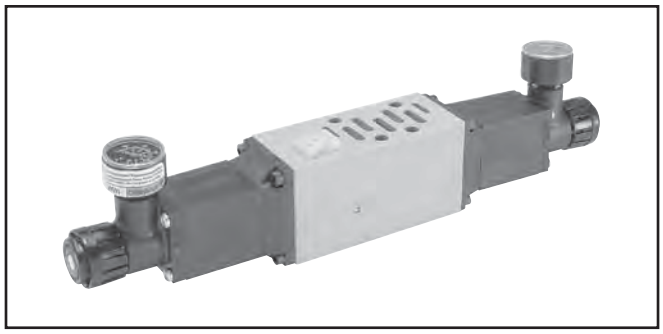
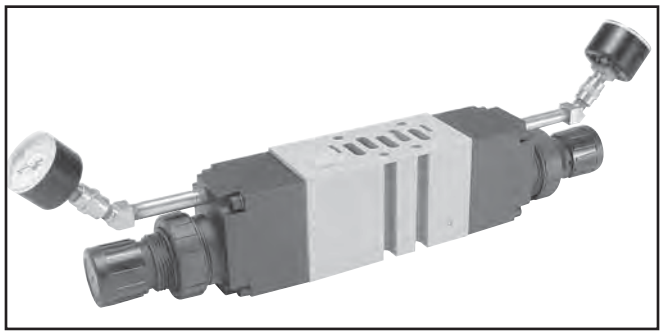
Sandwich Regulators Features

- Remote Air Pilot Operated for hard-to-reach pressure control.
- Unregulated Pilot Pressure to valve for consistent valve shifting regardless of pressure adjustment.

DX1 - Size 1
(Independent Dual Port Regulator Shown)



DX2 - Size 2
(Independent Dual Port Regulator Shown)



BOLD OPTIONS ARE MOST POPULAR

PS4037 | 1 | 6 | 6 | C | P

Basic Series	
DX1	
5599-1	PS4037
DX2	
5599-1	PS4137
DX3	
5599-1	PS4237

Regulator Function	
Common Pressure Regulator	1
Independent Pressure Regulator	2

#2 Port Regulator / Gauge*	
0**	Line By-Pass Plate
4	1-30 PSIG w/Gauge
5	2-60 PSIG w/Gauge
6	5-125 PSIG w/Gauge

* For Common Pressure Regulator Option, Regulator Gauge callout must be the same number for both Port #4 and Port #2. (Example: 166)

** Pressure Line By-Pass Option can only be used with Independent and Selector Regulators (Option 2 & 3 in Sandwich Block Function).

#4 Port Regulator / Gauge*	
0**	Line By-Pass Plate
4	1-30 PSIG w/Gauge
5	2-60 PSIG w/Gauge
6	5-125 PSIG w/Gauge

* For Common Pressure Regulator Option, Regulator Gauge callout must be the same number for both Port #4 and Port #2. (Example: 166)

** Pressure Line By-Pass Option can only be used with Independent and Selector Regulators (Option 2 & 3 in Sandwich Block Function).

Ordering Components
- *Manifold or Subbase Kit required.*
- *Sandwich Regulator Kit configured for Internal Pilot as standard.*
- *Order valve as External Pilot.*

How to Configure Sandwich Regulator / Valve Combinations

Internal Pilot Configuration -
Pressure in Base Port 1 feeds regulator configured for Internal Pilot which feeds valve configured for External Pilot.

External Pilot Configuration - DX1, DX2, DX3
An External Pilot pressure in Port 12 or 14 of the base feeds thru the Sandwich Regulator 12 or 14 galley directly to the 12/14 pilot of the valve. This configuration takes an External Pilot from the 12 port of the base and passes it thru the regulator to feed the 12 galley of the valve.

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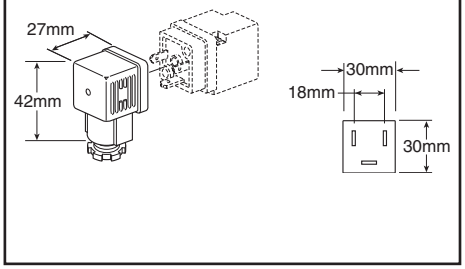
Female Electrical Connectors / Accessories

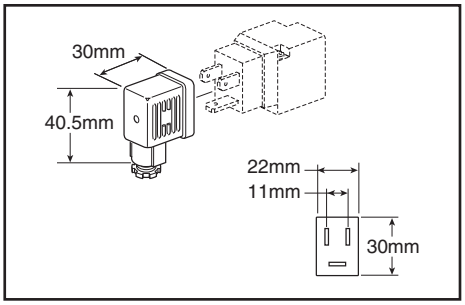
30mm Square 3-Pin – ISO 4400, DIN 43650A (Use with Enclosure "A")



Connector	Connector with 6' (2m) Cord	Description
PS2028BP	PS2028JCP	Unlighted
PS203279BP	PS2032J79CP*	Light – 6-48V, 50/60Hz, 6-48VDC
PS203283BP	PS2032J83CP*	Light – 120V/60Hz
PS203283BP	N/A	Light – 240V/60Hz

* LED with surge suppression.
Note: Max ø6.5mm cable size required for connector w/o 6' (2m) cord. IP65 rated when properly installed.
Engineering Data: Conductors: 2 Poles Plus Ground; Cable Range (Connector Only): 8 to 10mm (0.31 to 0.39 Inch); Contact Spacing: 18mm

22mm Rectangular 3-Pin – Type B Industrial (Use with Enclosure "B")



Connector	Connector with 6' (2m) Cord	Description
PS2429BP	PS2429JBP	Unlighted
PS243079BP	PS2430J79BP*	Light – 24V60Hz, 24VDC
PS243083BP	PS2430J83BP*	Light – 120V/60Hz
PS243087BP	N/A	Light – 240V/60Hz

* LED with surge suppression.
Note: Max ø6.5mm cable size required for connector w/o 6' (2m) cord. IP65 rated when properly installed.
Engineering Data: Conductors: 2 Poles Plus Ground; Cable Range (Connector Only): 6 to 8mm (0.24 to 0.31 Inch); Contact Spacing: 11mm

CNOMO Operator Adapter

Description	Kit Number
Operator Adapter	**PS2855P**

PS2855P

5599-1 CNOMO Solenoid Kits

Voltage Code	3-Pin 30mm 'L' Coil Kit	2-Pin M12 Euro '6' Coil Kit
19 (24VDC)	—	PS2828619P
42 (24VAC)	P2FCA442	—
45 (12VDC)	P2FCA445	—
49 (24VDC)	P2FCA449	—
53 (120VAC)	P2FCA453	—
57 (240VAC)	P2FCA457	—

Quantity 1

CNOMO Operator Kit

Description	Kit Number
Locking 30mm CNOMO Pilot Operator with Diffuser Nut	**PS4052CP**
Non-Locking 30mm CNOMO Pilot Operator with Diffuser Nut	**PS4053CP**

Seal Kits

Size	Kit Number	Description
1	**JJDX10**	1 base seal, 2 pilot selector seals
2	**JJDX20**	1 base seal, 2 pilot selector seals
3	**JJDX30**	1 base seal, 2 pilot selector seals

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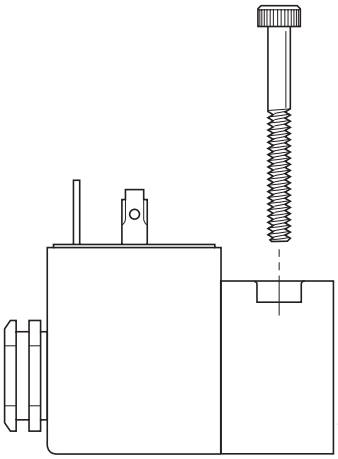
DX1
DX2
DX3

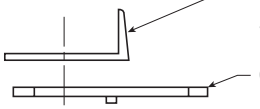
DX1 / DX2 / DX3

Internal / External Pilot Conversion Instructions



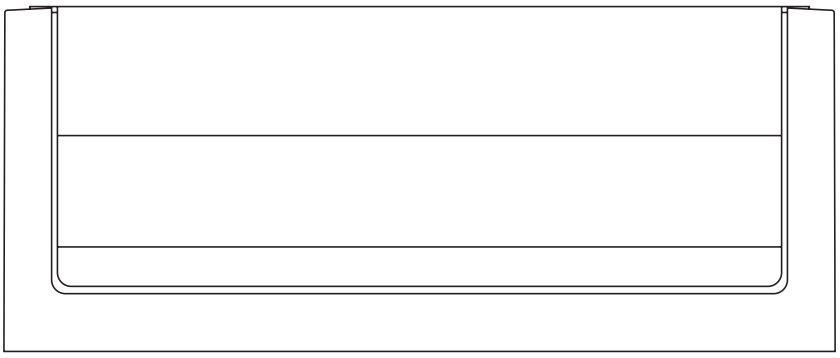
NOTE:

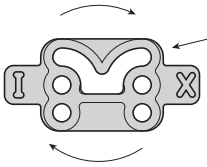
For Single Solenoid & Double Solenoid – Both 14 & 12 end Gaskets must be converted and both 12 & 14 ports in the Manifold & Subbase must have external pilot supplied.



Remove
Solenoid Assembly, CNOMO Operator Adapter

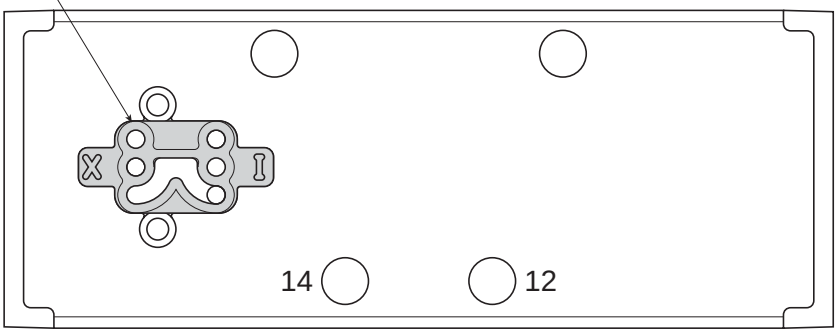
Gasket





Remove Gasket and Rotate to Show "I" in Position as Shown and Reinstall Gasket and Covers. (Valve is Now External Pilot)

Position of Gasket for Internal Pilot when Using with Solenoid Operator



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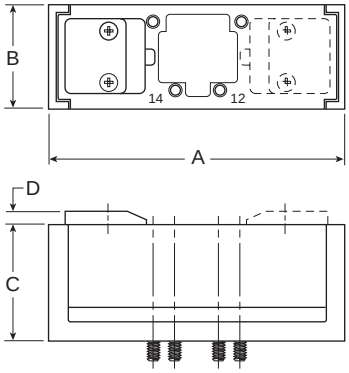
DX1
DX2
DX3

Air Operated Valves

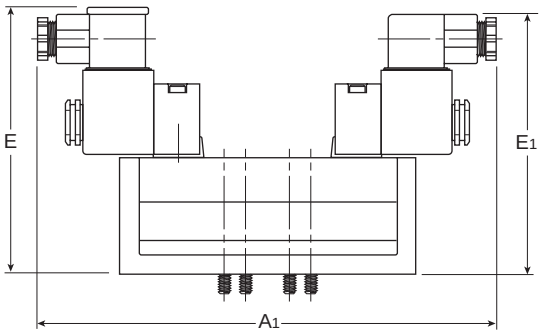
Series	A	B	C	D
DX1	4.72 (120)	1.65 (42)	1.85 (47)	.20 (5)
DX2	5.51 (140)	2.13 (54)	2.30 (58.5)	.20 (5)
DX3	6.69 (170)	2.68 (68)	2.80 (71)	.20 (5)

Inches (mm)



DX1
DX2
DX3

Solenoid Operated Valves



Series	A_1	E	E_1	E_2
DX1	7.97 (202.5)	4.43 (112.5)	4.69 (119)	4.53 (115)
DX2	8.58 (218)	4.86 (123.5)	5.12 (130)	4.98 (126.5)
DX3	9.27 (235.5)	5.35 (136)	5.61 (142.5)	5.47 (139)

Inches (mm)

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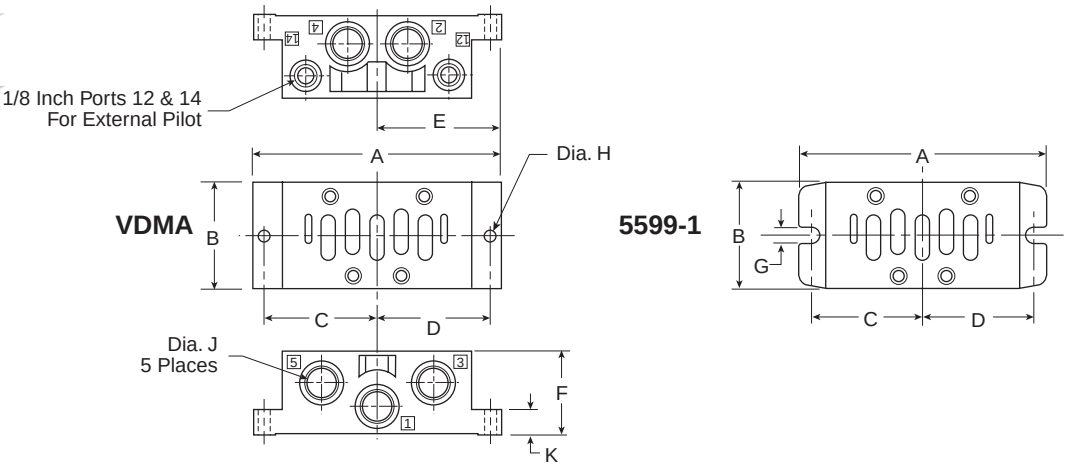
DX1
DX2
DX3

VDMA & 5599-1 Side Ported Subbase

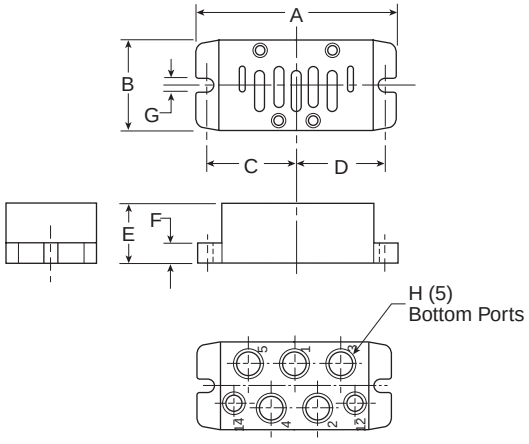


	Series	Part Number	J	A	B	C	D	E	F	G	H	K
VDMA	DX1	P2N-VS512SD	BSPP G1/4	4.33 (110)	1.89 (48)	1.93 (49)	1.93 (49)	2.17 (55)	1.26 (32)	—	.22 (5.6)	.39 (9.9)
	DX2	P2N-WS513SD	BSPP G3/8	4.88 (124)	2.21 (56)	2.21 (56)	2.21 (56)	2.44 (62)	1.57 (40)	—	0.26 (6.6)	.51 (13)
	DX3	P2N-YS514SD	BSPP G1/2	5.87 (149)	2.80 (71)	2.68 (68)	2.68 (68)	2.93 (74.5)	2.05 (52)	—	0.26 (6.6)	0.71 (18)
5599-1	DX1	PL1-1/4-70	BSPP G1/4	4.33 (110)	1.81 (46)	1.93 (49)	1.93 (49)	2.17 (55)	1.14 (29)	0.22 (5.5)	—	0.24 (6)
		PL1-1/4-80	NPT 1/4									
	DX2	PL2-3/8-70	BSPP G3/8	4.88 (124)	2.21 (56)	2.17 (55)	2.17 (55)	2.44 (62)	1.46 (37)	0.22 (5.5)	—	0.24 (6)
		PL2-3/8-80	NPT 3/8									
	DX3	PL3-1/2-70	BSPP G1/2	5.87 (149)	2.80 (71)	2.68 (68)	2.68 (68)	2.93 (74.5)	2.36 (60)	0.26 (6.6)	—	0.71 (18)
		PL3-1/2-80	NPT 1/2									

Inches (mm)

DX1
DX2

5599-1 Bottom Ported Subbase



Bottom Ported Subbase

Series	Part Number	H	A	B	C	D	E	F	G
DX1	PD1-1/4-70	BSPP G1/4	4.33 (110)	1.81 (46)	1.93 (49)	1.93 (49)	1.14 (29)	.24 (6)	0.22 (5.5)
	PD1-1/4-80	NPT1/4							
DX2	PD2-3/8-70	BSPP G3/8	4.88 (124)	2.20 (56)	2.17 (55)	2.17 (55)	1.46 (37)	.24 (6)	.0.22 (5.5)
	PD2-3/8-80	NPT3/8							

Inches (mm)

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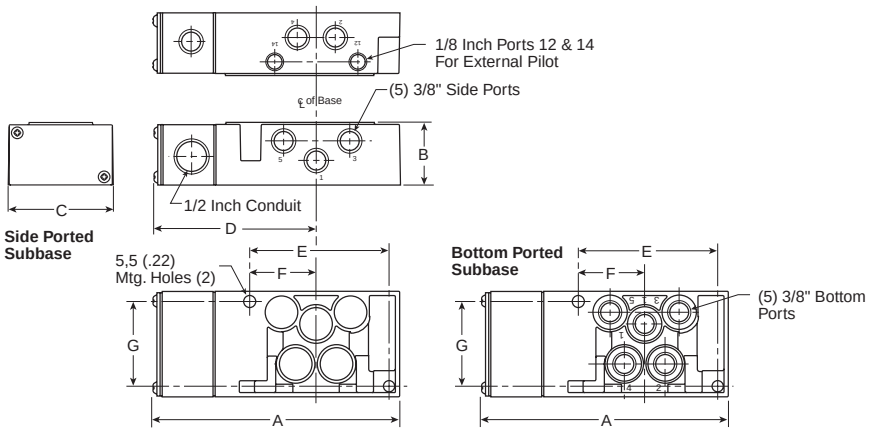
DX1

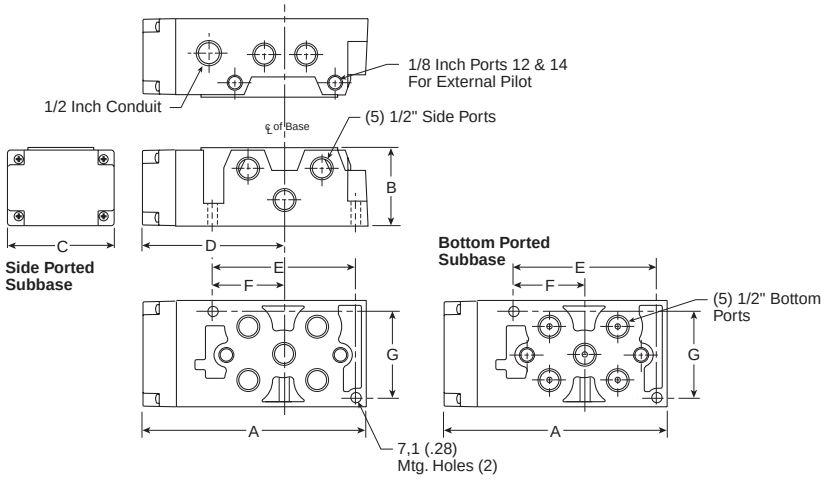


PS4011 Subbase

A	B	C	D
5.83 (148)	1.48 (38)	2.50 (64)	3.86 (98)
E	**F**	**G**	
3.29 (84)	1.57 (40)	2.00 (51)	

Inches (mm)

DX2

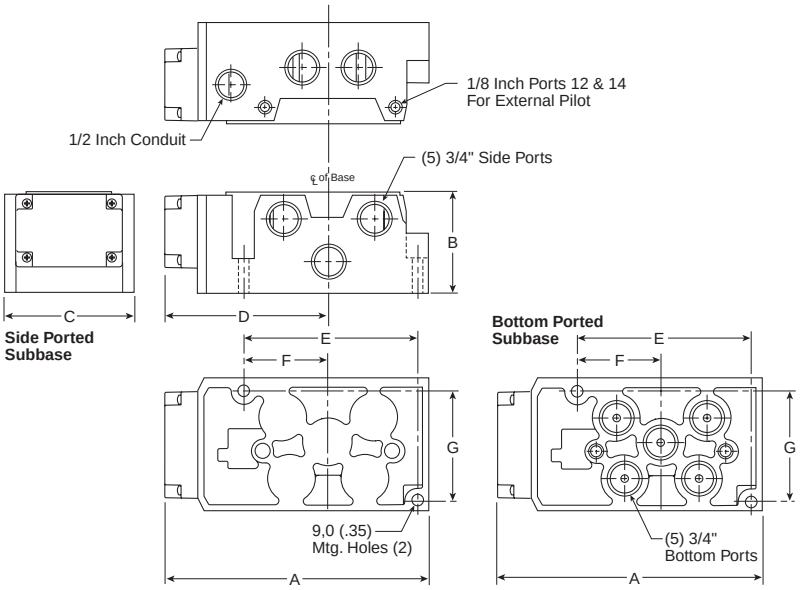


PS4111 Subbase

A	B	C	D
6.69 (170)	2.33 (59)	3.15 (80)	4.25 (108)
E	**F**	**G**	
4.21 (107)	2.07 (52)	2.56 (65)	

Inches (mm)

DX3



PS4211 Subbase

A	B	C	D
7.90 (201)	2.96 (75)	3.90 (990)	4.92 (125)
E	**F**	**G**	
5.14 (131)	2.50 (64)	3.24 (82)	

Inches (mm)

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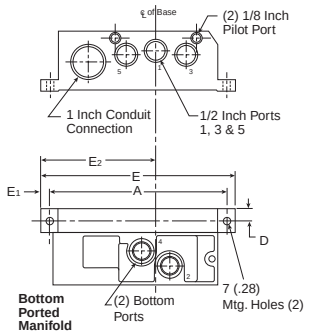
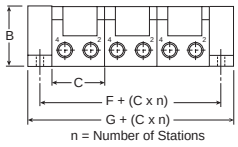
DX1



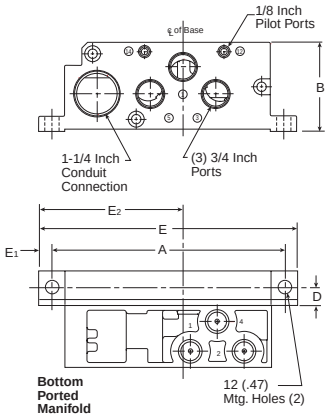


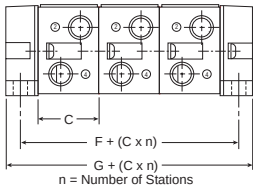
PS4011 Manifold

A	B	C	D	E
6.50 (165)	2.20 (56)	1.93 (49)	.44 (11)	7.15 (182)
E₁	**E₂**	**F**	**G**	
.33 (8)	4.25 (108)	.87 (22)	1.80 (46)	

Inches (mm)

DX2



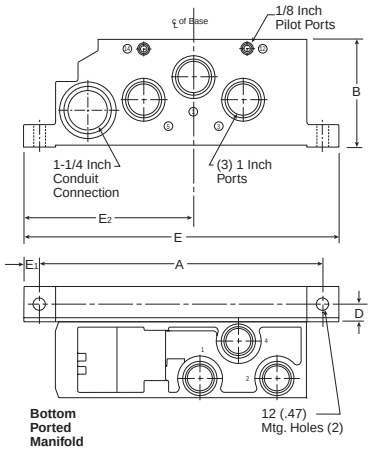


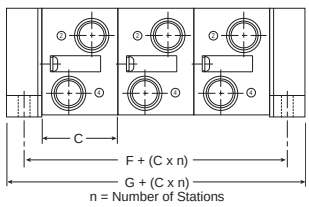
PS4111 Manifold

A	B	C	D	E
8.46 (215)	3.35 (85)	2.20 (56)	.59 (15)	9.41 (239)
E₁	**E₂**	**F**	**G**	
.47 (12)	5.28 (134)	1.18 (30)	2.36 (60)	

Inches (mm)

DX3





PS4211 Manifold

A	B	C	D	E
10.41 (265)	4.13 (105)	2.80 (71)	.65 (175)	11.61 (295)
E₁	**E₂**	**F**	**G**	
.59 (15)	6.26 (159)	1.30 (33)	2.60 (63)	

Inches (mm)

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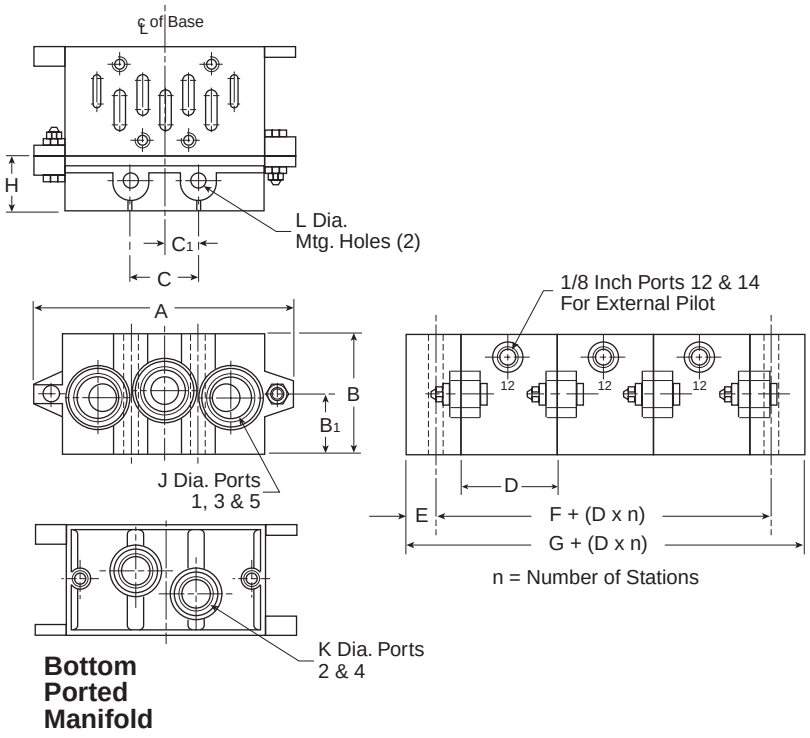
DX1
DX2
DX3

5599-1 VDMA – Form C Manifold
&
5599-1 VDMA - Form D End Plates



Bottom Ported Manifold

VDMA Form C Manifold

Series	Part Number	A	B	B_1	D	E	F	G	J	K
DX1	P2N-VM512MB	4.33 (110)	1.81 (46)	0.94 (24)	1.69 (55)	0.43 (22)	0.87 (22)	1.73 (44)	BSPP G3/8	BSPP G1/4
DX2	P2N-WM513MB	5.31 (135)	1.85 (47)	0.94 (24)	2.20 (56)	0.51 (13)	1.02 (26)	2.05 (52)	BSPP G1/2	BSPP G3/8
DX3	P2N-YM514MB	7.48 (190)	2.20 (56)	1.34 (34)	2.80 (71)	0.59 (15)	1.18 (30)	2.36 (60)	BSPP G1/2	BSPP G1/2

VDMA Form D End Plate

Series	Part Number	A	B	B_1	C	C_1	H	L
DX1	P2N-VM513ES	4.33 (110)	1.81 (46)	0.94 (24)	1.10 (28)	0.55 (14)	0.87 (22)	0.28 (7)
DX2	P2N-WM514ES	5.31 (135)	1.85 (47)	0.94 (24)	1.38 (35)	0.69 (18)	1.02 (26)	0.34 (9)
DX3	P2N-YM518ES	7.48 (190)	2.20 (56)	1.34 (34)	2.05 (52)	1.03 (26)	1.18 (30)	0.47 (12)

Inches (mm)

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Valvair II

Solenoid Operated Directional Spool Valves

Section E

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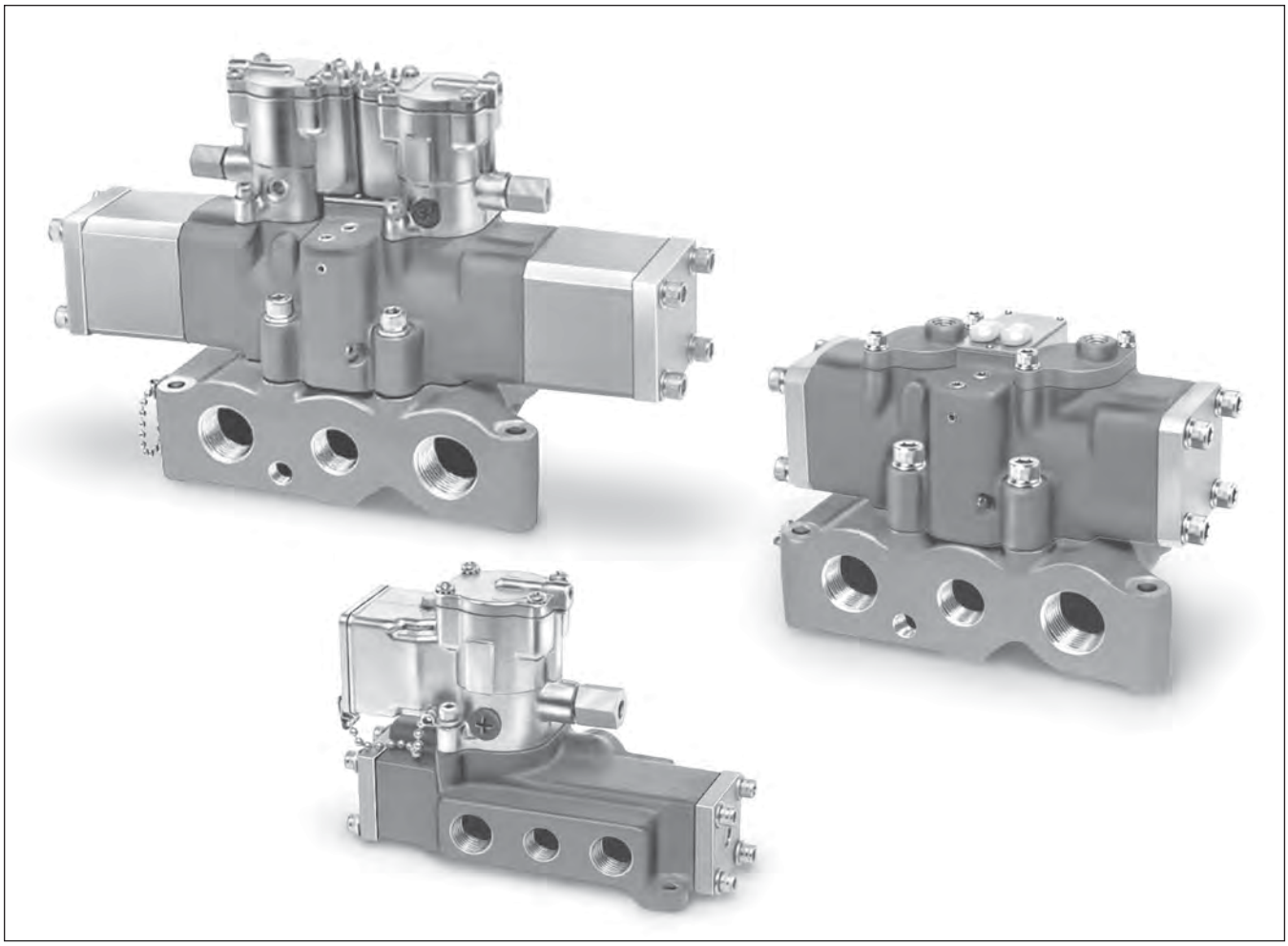

BOLD ITEMS ARE MOST POPULAR.

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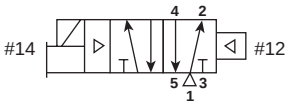
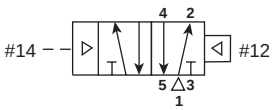
Single Solenoid
4-Way, 2-Position



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.

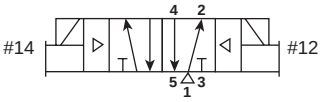
Single Remote Pilot
4-Way, 2-Position



Normal position – Pressure at inlet port 1 connected to outlet port 2. Outlet port 4 connected to exhaust port 5.

Operated position – Maintained air signal at port 14. Pressure at inlet port 1 connected to outlet port 4. Outlet port 2 connected to exhaust port 3.

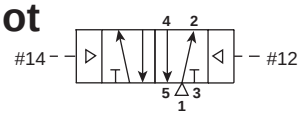
Double Solenoid
4-Way, 2-Position



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.

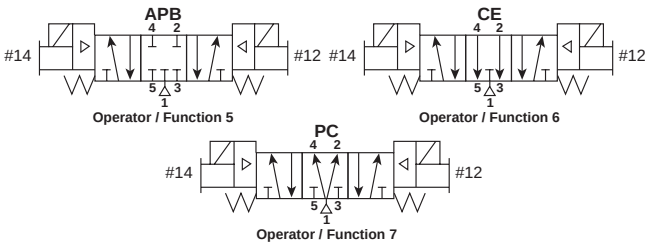
Double Remote Pilot
4-Way, 2-Position



Momentary air signal at port 14 last. Pressure at inlet port 1 connected to outlet port 4. Outlet port 2 connected to exhaust port 3.

Momentary air signal at port 12 last. Pressure at inlet port 1 connected to outlet port 2. Outlet port 4 connected to exhaust port 5.

Double Solenoid
4-Way, 3-Position



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

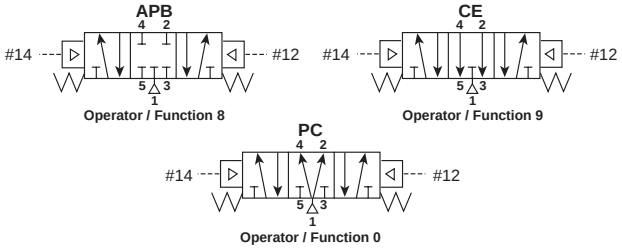
With #14 operator energized – inlet port 1 connected to cylinder port 4, cylinder port 2 connected to exhaust port 3.

Function 5: All Ports Blocked
All ports blocked in the center position.

Function 6: Center Exhaust
Cylinder ports 2 and 4 connected to exhaust ports 3 and 5 in center position. Port 1 is blocked.

Function 7: Pressure Center
Pressure port 1 connected to cylinder ports 2 and 4, and exhaust ports 3 and 5 blocked in center position.

Double Remote Pilot
4-Way, 3-Position



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

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

Function 8: All Ports Blocked
All ports blocked in the center position.

Function 9: Center Exhaust
Cylinder ports 2 and 4 connected to exhaust ports 3 and 5 in center position. Port 1 is blocked.

Function 0: Pressure Center
Pressure port 1 connected to cylinder ports 2 and 4, and exhaust ports 3 and 5 blocked in center position.

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- Full Air Operation for fastest response.
- “Plug-In” Design simplifies maintenance and installation. Reduces downtime. No wiring or plumbing to disturb.
- “Direct Pipe” Design for economy and performance.
- Solenoids Interchange between all styles of plug-in valves.
- Variety of Operators Available; Direct Conduit, (JIC) Junction Box, NEMA 4, Hazardous Duty, (UL, CSA), and remote air pilot.
- Locking Manual Overrides Standard. Non-locking overrides optional.
- Indicator Lights Standard on 120VAC and 24VDC models.
- Encapsulated Coil designed for low-power consumption and maximum life.
- Field Convertible to External Pilot Supply for vacuum or other services.
- “Oversized” Flow Areas.
- Synthetic Rubber O-Ring Seals are specially compounded for minimum compression and friction for superior wear and abrasion resistance.
- Precision Ground Spool “floats” on O-ring seals. Closed center cross-over design saves air.
- Plug-In “Sandwich” Regulators (Available for specific models) fit between valve and base, increase systems design capabilities.
- CSA - Selected Valves are Canadian Standards Association approved for general purpose use.

General Purpose Approvals

CSA - Canadian Standards Association
File Number 42024

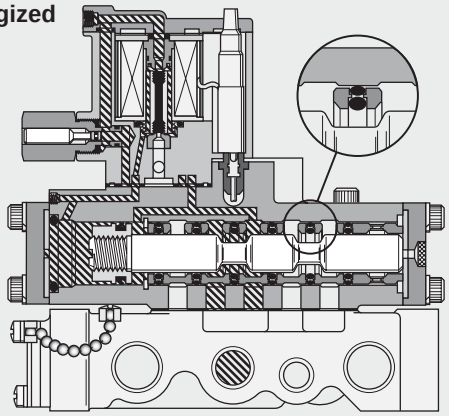
Hazardous Duty Approvals

UL - Underwriters Laboratories, Inc.
File Number E42542
Category Y107

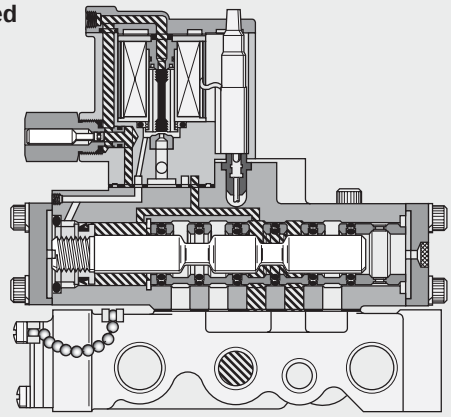
CSA - Canadian Standards Association
File Number 24349

Plug-In

De-Energized

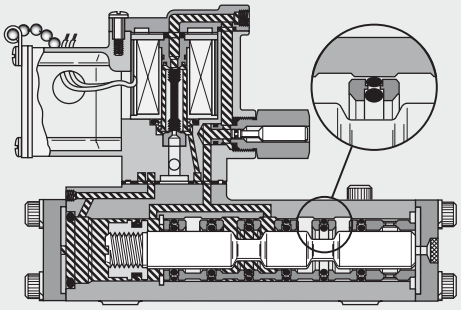


Energized

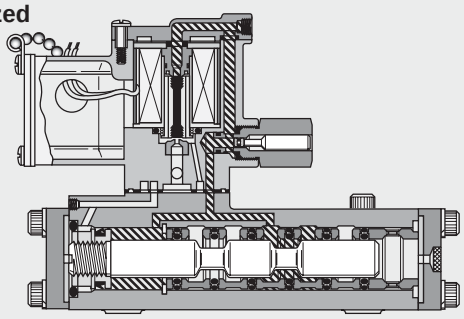


Direct Pipe Ported

De-Energized



Energized



Pressure **Exhaust**

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Richland, Michigan
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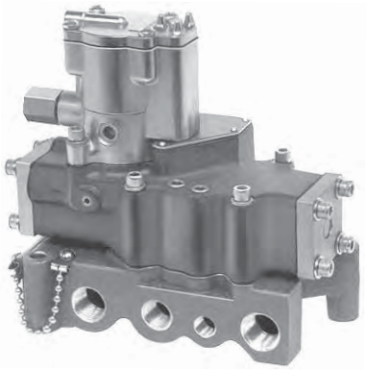
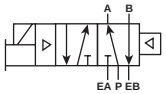
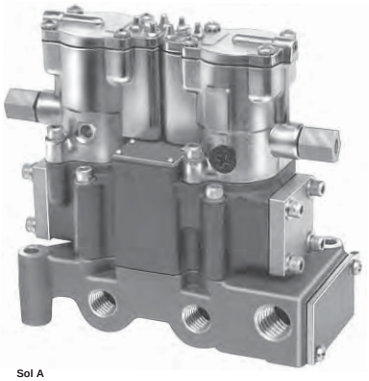
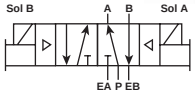
L675 (3/8" Basic Valve)
Single Solenoid
4-Way, 5-Port, 2-Position





L655 (3/8" Basic Valve)
Double Solenoid
4-Way, 5-Port, 2-Position



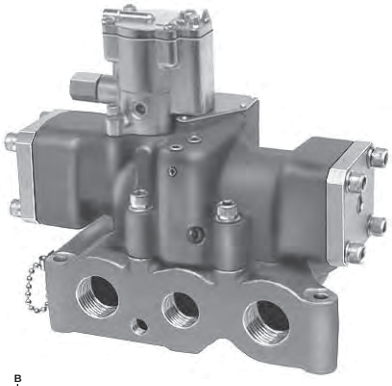


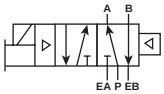
Valve Only		Voltage	Subbase (Side Ports)	Manifold † (End & Bottom Ports)	Port Size (NPT)	Nominal Cv
Single Solenoid	Double Solenoid					
L6753910253	L6553910253	120V 60Hz	K022090	K142230	3/8"	4.8
		110V 50Hz	K022091	K142231	1/2"	4.8
L67533102**	L65533102**	Other	K022101	K142270	3/4"	4.8

See page E236 for variations and (**) voltage codes.

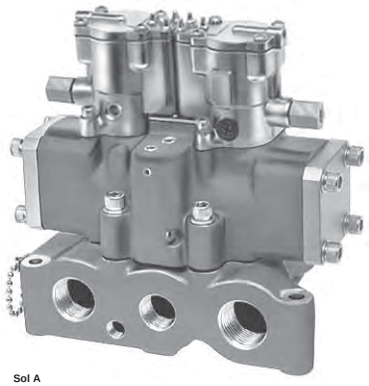
† Manifolds include mounting hardware.

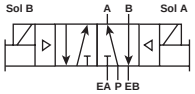
L675 (1" Basic Valve)
Single Solenoid
4-Way, 5-Port, 2-Position





L655 (1" Basic Valve)
Double Solenoid
4-Way, 5-Port, 2-Position





Valve Only		Voltage	Subbase (Side Ports)	Manifold † (End & Bottom Ports)	Port Size (NPT)	Port Adapter (Manifolds)	Nominal Cv
Single Solenoid	Double Solenoid						
L6758910253	L6558910253	120V 60Hz	—	—	3/4"	K122016 Kit Includes Both Ends	11.3
		110V 50Hz	K022095	—	1"		
L67583102**	L65583102**	Other	—	—	1-1/4"		

See page E236 for variations and (**) voltage codes.

† Manifolds include mounting hardware, except for port adapters. See chart, order separately.

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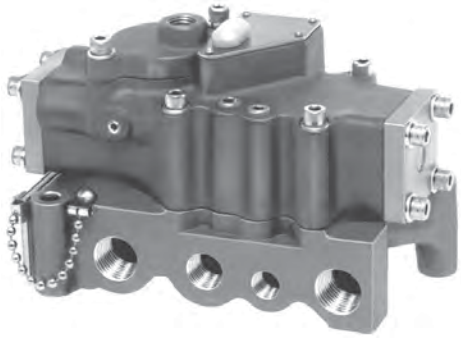
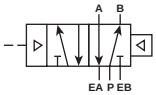
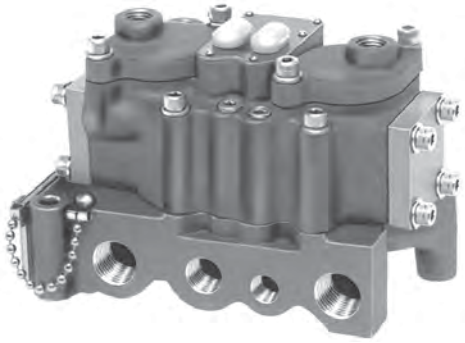
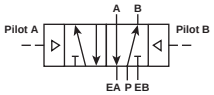
L674 (3/8" Basic Valve)
Single Remote Pilot
4-Way, 5-Port, 2-Position





L654 (3/8" Basic Valve)
Double Remote Pilot
4-Way, 5-Port, 2-Position

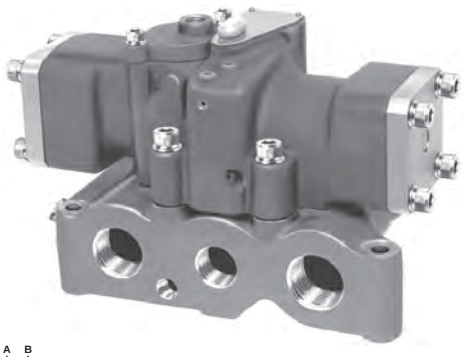


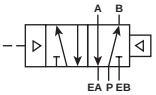


Valve Only		Subbase (Side Ports)	Manifold † (End & Bottom Ports)	Port Size (NPT)	Nominal Cv
Single Remote	Double Remote				
L67431102	L65431102	K022090	K142230	3/8"	4.8
		K022091	K142231	1/2"	4.8
		K022101	K142270	3/4"	4.8

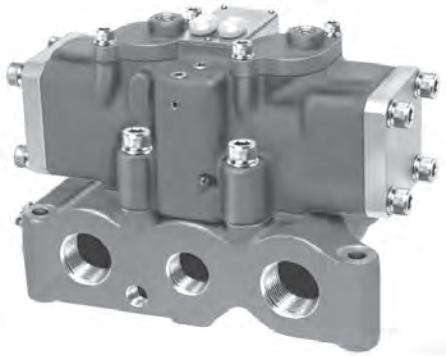
† Manifolds include mounting hardware.

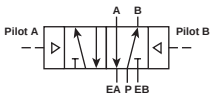
L674 (1" Basic Valve)
Single Remote Pilot
4-Way, 5-Port, 2-Position





L654 (1" Basic Valve)
Double Remote Pilot
4-Way, 5-Port, 2-Position





Valve Only		Subbase (Side Ports)	Manifold † (End & Bottom Ports)	Port Size (NPT)	Port Adapter (Manifolds)	Nominal Cv
Single Remote	Double Remote					
L67481102	L65481102	—	—	3/4"	K122016 Kit Includes Both Ends	11.3
		K022095	—	1"		
		—	—	1-1/4"		

† Manifolds include mounting hardware, except for port adapters.
See chart, order separately.

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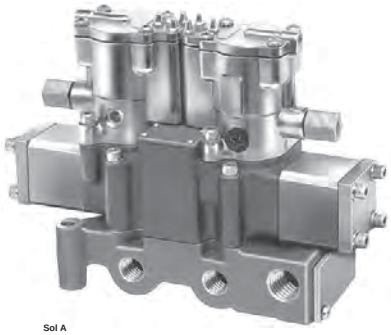
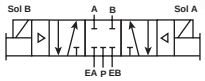
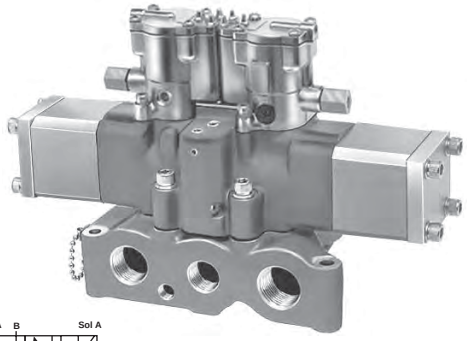
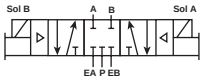
L665 (3/8" Basic Valve)
Double Solenoid
4-Way, 5-Port, 3-Position





L665 (1" Basic Valve)
Double Solenoid
4-Way, 5-Port, 3-Position



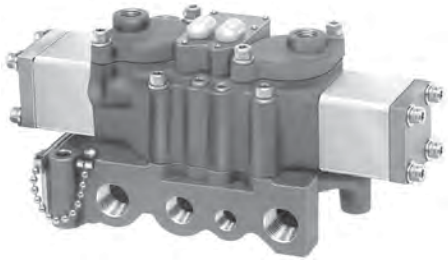


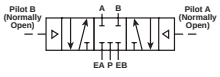
Valve Only	Voltage	Subbase (Side Ports)	Manifold † (End & Bottom Ports)	Port Size (NPT)	Port Adapter	Nominal Cv
L6653921153	120V 60Hz	K022090	K142230	3/8"	Not Req'd	4.8
	110V 50Hz	K022091	K142231	1/2"		
L66533211**	Other	K022101	K142270	3/4"		
L6658921153	120V 60Hz	—	—	3/4"	K122016 Kit Includes Both Ends	11.3
	110V 50Hz	K022095	—	1"		
L66583211**	Other	—	—	1-1/4"		

See page E236 for variations in class of neutral configuration and (**) voltage codes.

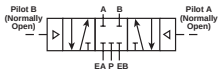
† Manifolds include mounting hardware, except for port adapters. See chart, order separately.

L664 (3/8" Basic Valve)
Double Remote Pilot
4-Way, 5-Port, 3-Position





L664 (1" Basic Valve)
Double Remote Pilot
4-Way, 5-Port, 3-Position



Valve Only	Subbase (Side Ports)	Manifold † (End & Bottom Ports)	Port Size (NPT)	Port Adapter	Nominal Cv
L66431211	K022090	K142230	3/8"	Not Req'd	4.8
	K022091	K142231	1/2"		
	K022101	K142270	3/4"		
L66481211	—	—	3/4"	K122016 Kit Includes Both Ends	11.3
	K022095	—	1"		
	—	—	1-1/4"		

See page E236 for variations in class of neutral configurations.

†Manifolds include mounting hardware.

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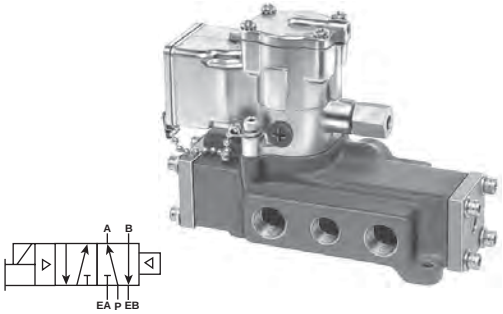
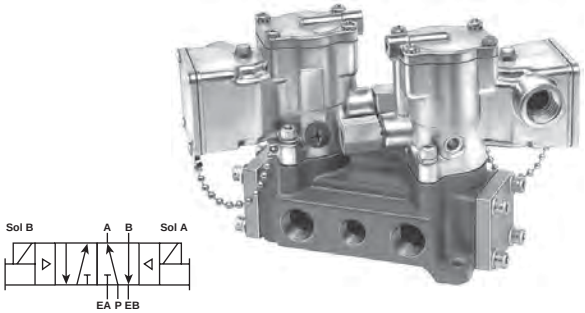
L705 (3/8" Basic Valve)
Single Solenoid
4-Way, 5-Port, 2-Position



L685 (3/8" Basic Valve)
Double Solenoid
4-Way, 5-Port, 2-Position

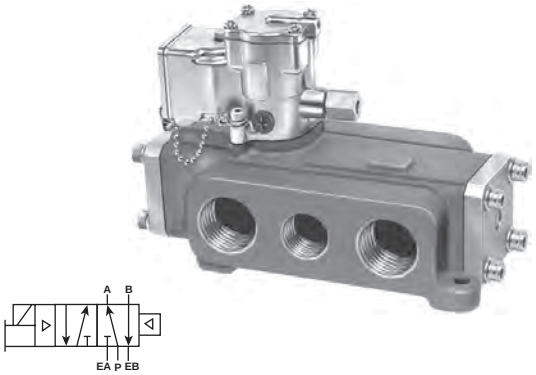


Valve		Voltage	Port Size (NPT)		Operator Type	Nominal Cv
Single Solenoid	Double Solenoid		P, A & B	EA & EB		
L7053910253	**L6853910253**	120V 60Hz 110V 50Hz	3/8"	1/2"	Junction Box	4.8
L7054910253	**L6854910253**		1/2"	1/2"		
L70536102**	**L68536102****	Other	3/8"	1/2"	Junction Box	4.8
L70546102**	**L68546102****		1/2"	1/2"		
L70533102**	**L68533102****	Any	3/8"	1/2"	Basic	4.8
L70543102**	**L68543102****		1/2"	1/2"		
L70533802**	**L68533802****	Any	3/8"	1/2"	NEMA 4	4.8
L70543802**	**L68543802****		1/2"	1/2"		
L70533602**	**L68533602****	See Voltage Chart	3/8"	1/2"	† Hazardous Duty	4.8
L70543602**	**L68543602****		1/2"	1/2"		

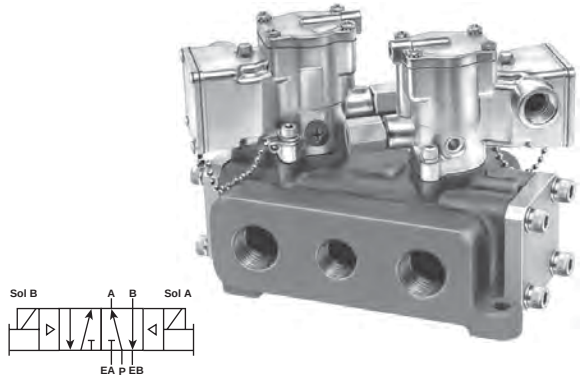
See page E237 for variations and (**) voltage codes.

†UL & CSA Approved.

L705 (1" Basic Valve)
Single Solenoid
4-Way, 5-Port, 2-Position



L685 (1" Basic Valve)
Double Solenoid
4-Way, 5-Port, 2-Position



Valve		Voltage	Port Size (NPT)		Type	Nominal Cv
Single Solenoid	Double Solenoid		P, A & B	EA & EB		
L7058910253	**L6858910253**	110V 50Hz	1"	1-1/4"	Junction Box	12.0
L7059910253	**L6859910253**		1-1/4"	1-1/4"		
L70586102**	**L68586102****	Other	1"	1-1/4"	Junction Box	12.0
L70596102**	**L68596102****		1-1/4"	1-1/4"		
L70583602**	**L68583602****	See Voltage Chart	1"	1-1/4"	†Hazardous Duty	12.0
L70593602**	**L68593602****		1-1/4"	1-1/4"		

See page E237 for variations and (**) voltage codes.

†UL & CSA Approved.

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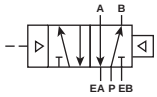
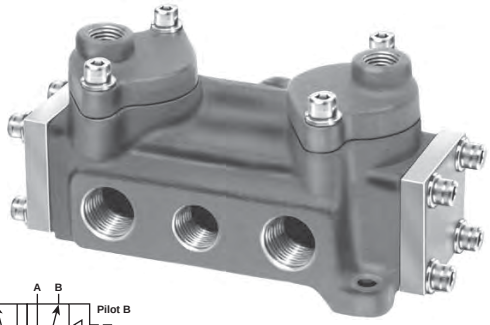
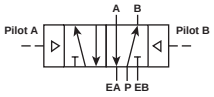
L704 (3/8" Basic Valve)
Single Remote Pilot
4-Way, 5-Port, 2-Position



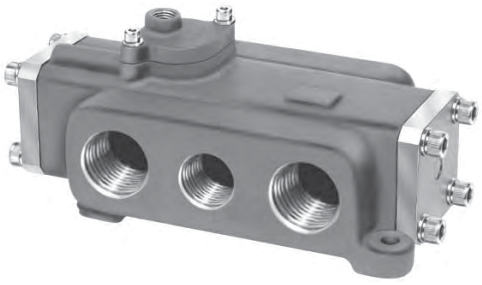
L684 (3/8" Basic Valve)
Double Remote Pilot
4-Way, 5-Port, 2-Position

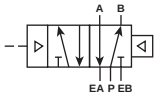




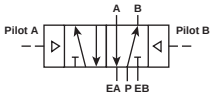
Valve		Port Size (NPT)		Nominal Cv
Single Remote	Double Remote	P, A & B	EA & EB	
L70431102	L68431102	3/8"	1/2"	4.8
L70441102	L68441102	1/2"	1/2"	

L704 (1" Basic Valve)
Single Remote Pilot
4-Way, 5-Port, 2-Position





L684 (1" Basic Valve)
Double Remote Pilot
4-Way, 5-Port, 2-Position



Valve		Port Size (NPT)		Nominal Cv
Single Remote	Double Remote	P, A & B	EA & EB	
L70481102	L68481102	1"	1-1/4"	12.0
L70491102	L68491102	1-1/4"	1-1/4"	

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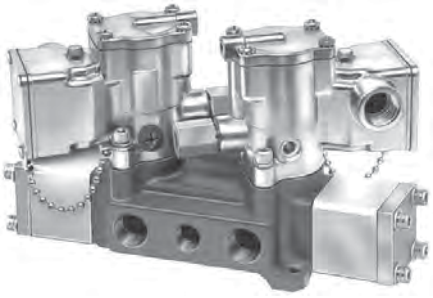
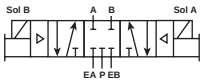
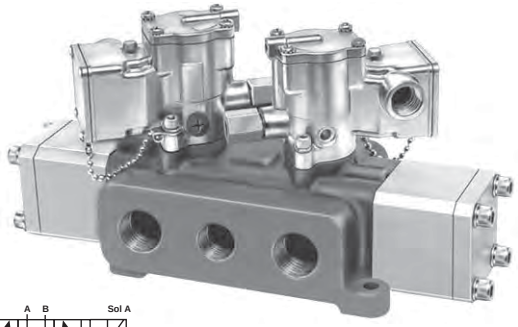
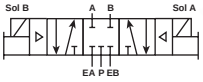
L695 (3/8" Basic Valve)
Double Solenoid
4-Way, 5-Port, 3-Position





L695 (1" Basic Valve)
Double Solenoid
4-Way, 5-Port, 3-Position

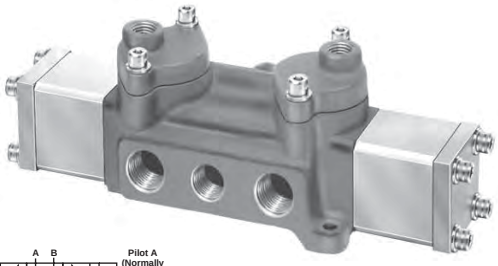


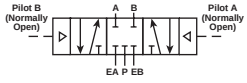


Valve		Voltage	Port Size (NPT)		Type	Nominal Cv
3/8" Basic Size	1" Basic Size		P, A & B	EA & EB		
L6953921153	—	120V 60Hz 110V 50Hz	3/8"	1/2"	Junction Box	4.5
L6954921153	—		1/2"	1/2"		
—	**L6958921153**		1"	1-1/4"		12.0
—	**L6959921153**		1-1/4"	1-1/4"		
L69536211**	—	Other	3/8"	1/2"	Basic	4.5
L69546211**	—		1/2"	1/2"		
—	**L69586211****		1"	1-1/4"		12.0
—	**L69596211****		1-1/4"	1-1/4"		

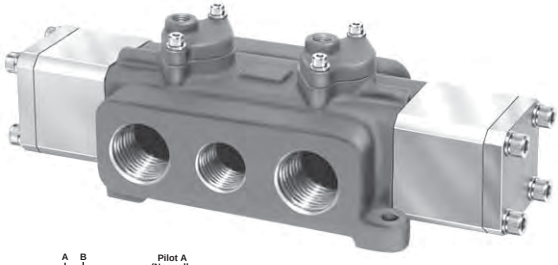
See page E237 for variations in class of neutral configuration and (**) voltage codes.

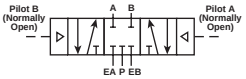
L695 (3/8" Basic Valve)
Double Remote Pilot
4-Way, 5-Port, 3-Position





L695 (1" Basic Valve)
Double Remote Pilot
4-Way, 5-Port, 3-Position





Valve	Port Size (NPT)		Nominal Cv
	P, A & B	EA & EB	
L69431211	3/8"	1/2"	4.5
L69441211	1/2"	1/2"	
L69481211	1"	1-1/4"	12.0
L69491211	1-1/4"	1-1/4"	

See page E237 for ordering other neutral configurations.

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Lubricated Non-Lubricated Service
2-Position, Plug-In
3/8" & 1" Basic Size

BOLD ITEMS ARE MOST POPULAR.

L	67	5	3	9	10	2	53

Type	
Double	**65**
Single	**67**

Operator	
Remote	4
Solenoid	**5**

Size	
3/8" Basic	**3**
1" Basic	**8**

Operator Options	
Solenoid (Basic) or Remote	**1**
Solenoid with Locking Override	3
Solenoid w/Light (120VAC, 24VDC) & Non-Locking Override	8
Solenoid w/Light (120VAC, 24VDC) & Locking Override	**9**

Enclosure "Class"	
10	**Standard (NEMA 1 & 12) or Remote**

Duty Cycle	
2	**Standard Service, Solenoid or Remote**
4	Continuous Service Solenoid

Voltage & Frequency			
	60Hz	**50Hz**	**DC**
45	—	—	12
49	**—**	**—**	**24**
53	**120**	**110**	**—**
57	240	220	—

Lubricated or Non-Lubricated Service
3-Position, Plug-In
3/8" & 1" Basic Size

L	66	5	3	9	21	1	53

Type	
Double	**66**

Operator	
Remote	4
Solenoid	**5**

Size	
3/8" Basic	**3**
1" Basic	**8**

Operator Options	
Solenoid (Basic) or Remote	**1**
Solenoid with Locking Override	3
Solenoid w/Light (120VAC, 24VDC) & Non-Locking Override	8
Solenoid w/Light (120VAC, 24VDC) & Locking Override	**9**

Enclosure "Class"	
21	**All Ports Blocked in Neutral (NEMA 1 & 12 Enclosure) or Remote**
22	Cyl. Ports Open to Exh. in Neutral (NEMA 1 & 12 Enclosure) or Remote
23	Cyl. Ports Open to Inlet in Neutral (NEMA 1 & 12 Enclosure) or Remote

Duty Cycle	
1	**Standard Service, Solenoid or Remote**
5	Continuous Service Solenoid

Voltage & Frequency			
	60Hz	**50Hz**	**DC**
45	—	—	12
49	**—**	**—**	**24**
53	**120**	**110**	**—**
57	240	220	—

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Lubricated or Non-Lubricated Service 2-Position, Direct Pipe Ported, 3/8" & 1" Basic Size

BOLD ITEMS ARE MOST POPULAR.

L	70	5	3	9	10	2	53	—

Type	
Double	**68**
Single	**70**

Operator	
Remote	4
Solenoid	**5**

Size	
3/8" NPT Inlet & Cylinder 1/2" NPT Exhaust	**3**
1/2" NPT Inlet, Cylinder & Exhaust	**4**
1" NPT Inlet & Cylinder 1-1/4" NPT Exhaust	**8**
1-1/4" NPT Inlet Cylinder & Exhaust	9*

* Not available operator option 4 - Remote Pilot.

Operator Options	
Solenoid (Basic) or Remote	1
Solenoid with Locking Override	**3**
Solenoid w/ Junction Box & Locking Override	6
Solenoid w/ Junction Box & Light (120VAC, 24VDC) & Non-Locking Override	8
Solenoid w/ Junction Box & Light (120VAC, 24VDC) & Locking Override	**9**

Enclosure "Class"	
10	**Standard (NEMA 1 & 12) or Remote**
60*†	Hazardous Duty (NEMA 7 & 9)
80†	NEMA 4

* Voltage 49 / 53 only.
† Use with operator options 1, 2 & 3 only, voltage 53 only.

Duty Cycle	
2	**Standard Service, Solenoid or Remote**
4	Continuous Service Solenoid

Voltage & Frequency			
	60Hz	**50Hz**	**DC**
45	—	—	12
49	**—**	**—**	**24**
53	**120**	**110**	**—**
57	240	220	—

Lead Length	
Blank	**19" (Standard)**

Lubricated or Non-Lubricated Service 3-Position, Direct Pipe Ported, 3/8" & 1" Basic Size

L	69	5	3	9	21	1	53	—

Type	
Double	**69**

Operator	
Remote	4
Solenoid	**5**

Size	
3/8" NPT Inlet & Cylinder 1/2" NPT Exhaust	**3**
1/2" NPT Inlet, Cylinder & Exhaust	**4**
1" NPT Inlet & Cylinder 1-1/4" NPT Exhaust	8
1-1/4" NPT Inlet Cylinder & Exhaust	9*

* Not available operator option 4 - Remote Pilot.

Operator Options	
Solenoid (Basic) or Remote	1
Solenoid with Locking Override	**3**
Solenoid w/ Junction Box & Locking Override	6
Solenoid w/ Junction Box & Light (120VAC, 24VDC) & Non-Locking Override	8
Solenoid w/ Junction Box & Light (120VAC, 24VDC) & Locking Override	**9**

Enclosure "Class"	
All Ports Blocked in Neutral	
21	**Standard (NEMA 1 & 12) or Remote**
71*†	Hazardous Duty (NEMA 7 & 9)
91†	NEMA 4
Cyl. Ports Open to Exh. in Neutral	
22	Standard (NEMA 1 & 12) or Remote
72*†	Hazardous Duty (NEMA 7 & 9)
92†	NEMA 4
Cyl. Ports Open to Inlet in Neutral	
23	Standard (NEMA 1 & 12) or Remote
73*†	Hazardous Duty (NEMA 7 & 9)
93†	NEMA 4

* Voltage 49 / 53 only.
† Use with operator options 1, 2 & 3 only, voltage 53 only.

Duty Cycle	
1	**Standard Service, Solenoid or Remote**
5	Continuous Service Solenoid

Voltage & Frequency			
	60Hz	**50Hz**	**DC**
45	—	—	12
49	**—**	**—**	**24**
53	**120**	**110**	**—**
57	240	220	—

Lead Length	
Blank	**19" (Standard)**

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Modular Pneumatic Controls Plug-In Sandwich Block Design for Modular Port Regulation

These modular regulators assemble to any 3/8" basic valve interface pattern.

Port Regulation Made Easy

Place the sandwich on the manifold or subbase, tighten the four securing screws, then plug the valve into the sandwich and tighten its securing screws to complete the assembly.

Within minutes, these modular components can be installed in new, or used to improve existing manifold systems, without disturbing wiring or air connections.

3-Configurations

1. **Common Port Regulation** - A common regulated pressure is selected to both cylinder ports.
2. **Single Port Regulation** - Line pressure is available to one cylinder port, while a single regulated pressure is selected to the other cylinder port.
3. **Independent Port Regulation** - Two independently regulated pressures selected to the cylinder ports.

NOTE: When using single or independent port sandwich regulators, be aware that:

1. Cylinder port outlets are reversed.
2. 3-Position, cylinder ports open to exhaust and cylinder ports open to inlet functions are reversed. To produce a cylinder ports open to exhaust function, order valve with cylinder ports open to inlet. To produce a cylinder ports open to inlet function, order valve with cylinder ports open to exhaust.

Manual or Remote secondary pressure adjustment.

Three Pressure Ranges are standard for manual units:

1-30 PSIG

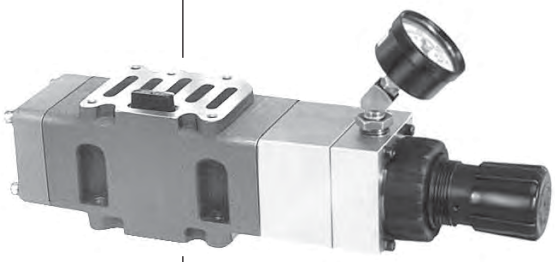
1-60 PSIG

2-125 PSIG

Range for Remote: 0-140 PSIG

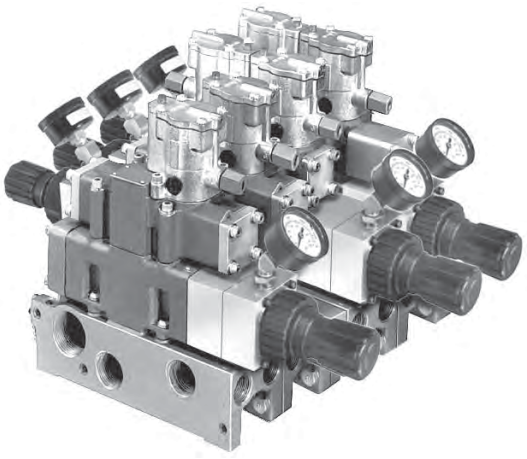
Gauges are furnished standard; liquid filled gauges are optional.

Solenoid Valve Assembly



Regulator Assembly

Manifold



Typical Assembly

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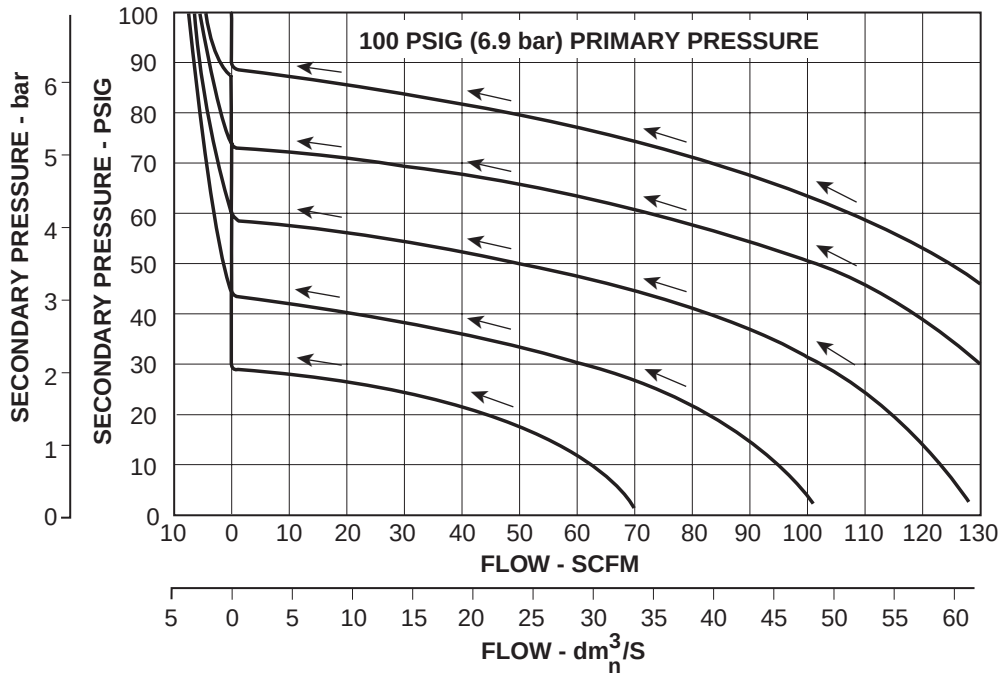
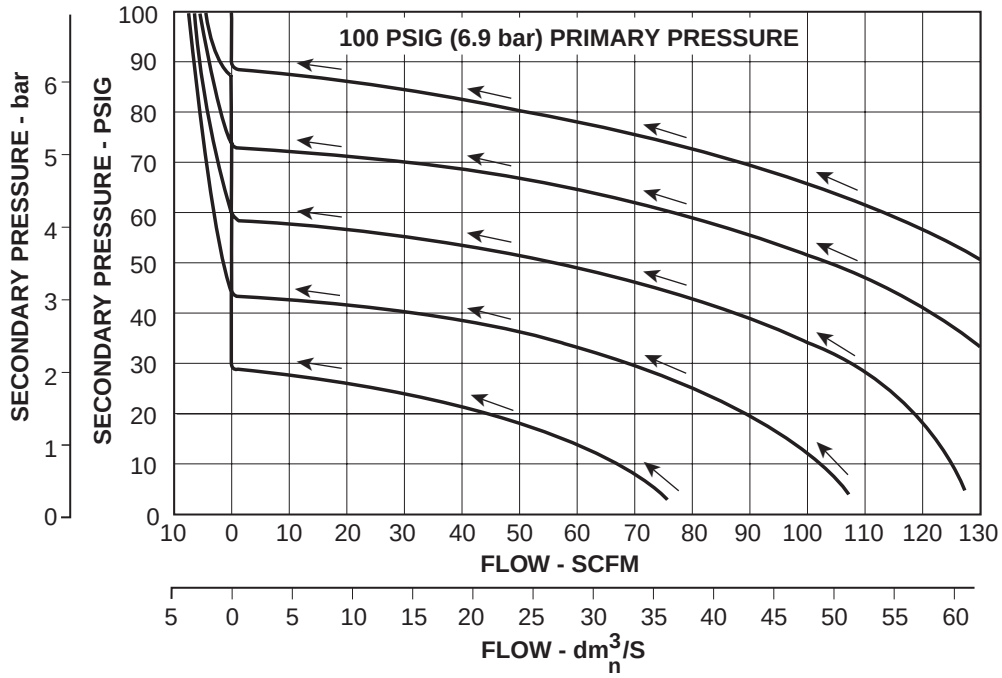
RELIEF AND FLOW CHARACTERISTICS
COMMON PORT REGULATION



RELIEF AND FLOW CHARACTERISTICS
INDEPENDENT OR SINGLE PORT REGULATION



The above curves illustrate flow characteristics through an assembled valve, air regulator, and base (or modular manifold) unit.

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Function

This modular air pressure regulator assembly, installed between a 3/8" basic, 4-Way valve and subbase, supplies regulated pressures to both cylinder ports.

Valve must be converted to external pilot supply.

Features

Regulated pressure output from the valve is adjusted by knob on the manually set model or by air pressure signal applied to the regulator pilot port on the remotely set model.

Furnished with pressure gauge as standard.

Assembly “A” (Shown at right) or Assembly “B” may be specified as a matter of convenience, or to satisfy space limitations.*

Pressure Range Options

Maximum Supply Pressure.....140 PSIG

Output Pressure Range.....1 - 60 PSIG
2 - 125 PSIG

Operating Temperature Range

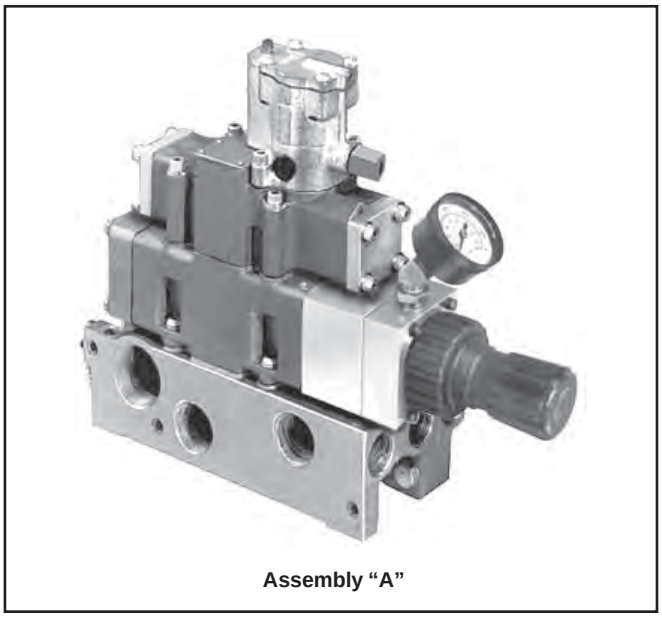
32°F (0°C) to 175°F (79°C)

How To Order

1. Select type of adjustment.
2. Select pressure range.
3. Select assembly style.

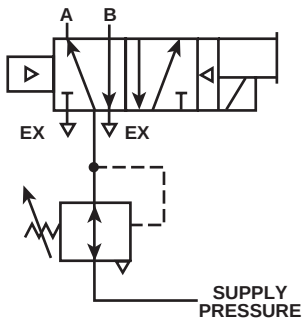
Example: Manual adjusted.
1-60 PSIG with regulator positioned over the junction box.

Model No. L55408302C

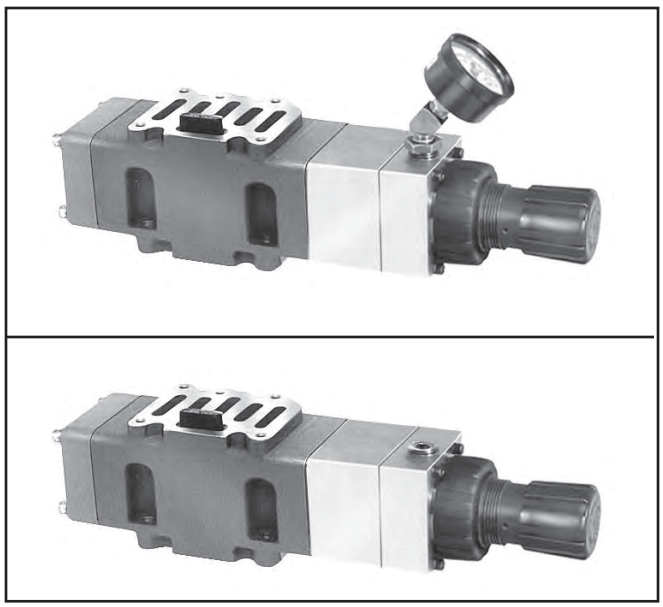


Assembly “A”

Graphic Symbol



Regulated Pressure at Both “A” & “B”



Pressure Adjustment	Pressure Range	Model Number	
	PSIG	Assembly “A”	Assembly “B”
Manual	1 - 60	L55402308C	L55408302C
	2 - 125	L55403308C	L55408303C
Remote	0 - 140	L55411308C	L55408311C

* Assembly “A” places the regulator on the end opposite the electrical junction box. Assembly “B” places the regulator over the electrical junction box.

See page E245 for gauges.

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Function

This modular air pressure regulator assembly, when installed between a 3/8" basic, 4-Way valve and subbase or modular manifold, supplies one or more regulated pressures to one of the valve cylinder ports and supply pressure to the other cylinder port.

On Single Port Cylinder Port Regulation Units controlled by a single solenoid valve, cylinder port “B” is the normally open cylinder port. The solenoid is energized to open cylinder Port “A”. On double solenoid operated valves, energizing solenoid “B” opens cylinder port “A” and energizing solenoid “A” opens cylinder port “B”.

Valve must be converted to external pilot supply.

Features

Regulated pressure output from the valve is adjusted by knob on the manually set model or by air pressure signal applied to the regulator pilot port on the remotely set model.

For reduced pressure at “A” cylinder port, the regulator is mounted per assembly “A” on end opposite the electrical junction box. For reduced pressure at “B” cylinder port the regulator is mounted per Assembly “B” which places the regulator over the electrical junction box.

Furnished with pressure gauge as standard.

Pressure Range Options

Maximum Supply Pressure.....140 PSIG

Output Pressure Range.....1 - 30 PSIG
1 - 60 PSIG
2 - 125 PSIG

Operating Temperature Range

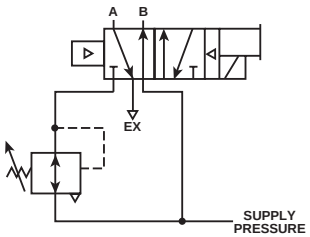
32°F (0°C) to 175°F (79°C)

How To Order

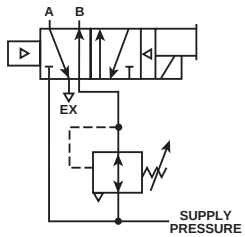
1. Select type of adjustment desired.
2. Select pressure range.
3. Select working port for reduced pressure.

Example: Manual adjustment, 5-60 PSIG, Port A reduced.
Model No. L55405307C

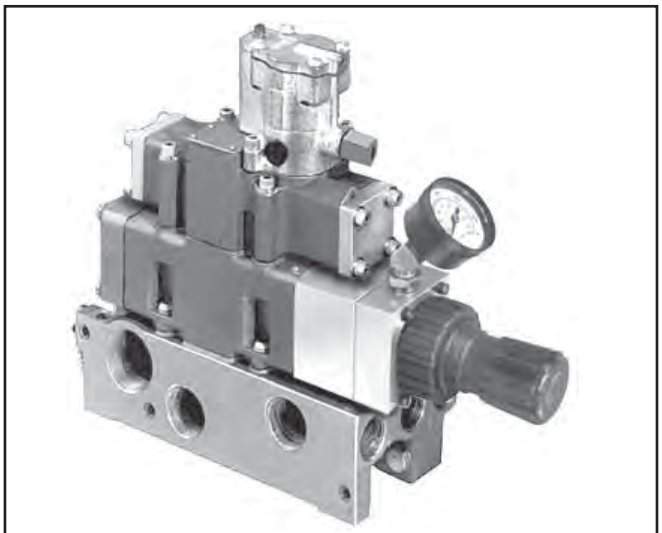
Graphic Symbol



Supply Pressure at “B” & Regulated at “A”



Supply Pressure at “A” & Regulated at “B”

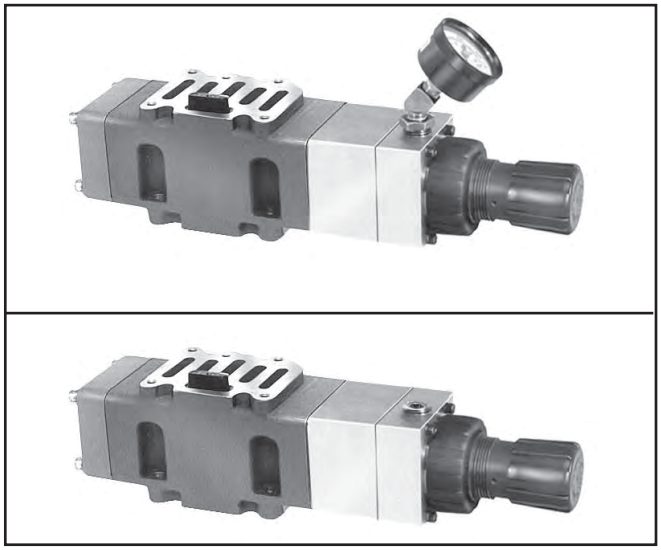


Assembly “A”

Pressure Adjustment	Pressure Range	Model Number	
		Reduced Pressure	
	PSIG	Cyl. Port “A”	Cyl. Port “B”
Manual	1 - 60	L55405307C	L55407305C
	2 - 125	L55406307C	L55407306C
Remote	0 - 140	L55414307C	L55407314C

Note: When using single or independent port sandwich regulators, be aware that:
1. Cylinder port outlets are reversed.
2. 3-Position, cylinder ports open to exhaust and cylinder ports open to inlet functions are reversed. To produce a cylinder ports open to exhaust function, order valve with cylinder ports open to inlet. To produce a cylinder ports open to inlet function, order valve with cylinder ports open to exhaust.

See page E245 for gauges.



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Function

This modular air pressure regulation assembly, when installed between a 3/8" basic, 4-Way valve and subbase or modular manifold, supplies one or more regulated pressures to each of the valve cylinder ports.

Regulated pressure to cylinder port “A”, and a second regulated pressure to cylinder port “B”; independently adjustable.

On Independent Cylinder Port Regulation Units controlled by a single solenoid valve, cylinder port “B” is the normally open cylinder port. The solenoid is energized to open cylinder port “A”. On double solenoid operated valves, energizing solenoid “B” opens cylinder port “A” and energizing solenoid “A” opens cylinder port “B”

Valve must be converted to external pilot supply.

Features

Regulated pressure output from the valve is adjusted by knob on the manually set model or by air pressure signal applied to the regulator pilot port on the remotely set model.

Furnished with pressure gauge as standard.

The regulator controlling pressure to port “A” is mounted on the end opposite the electrical junction box (Assembly “A”). Regulated pressure from cylinder port “B” is controlled by the regulator installed over the electrical junction box (Assembly “B”).

Pressure Range Options

Maximum Supply Pressure.....140 PSIG

Output Pressure Range.....1 - 60 PSIG
2 - 125 PSIG

Operating Temperature Range

32°F (0°C) to 175°F (79°C)

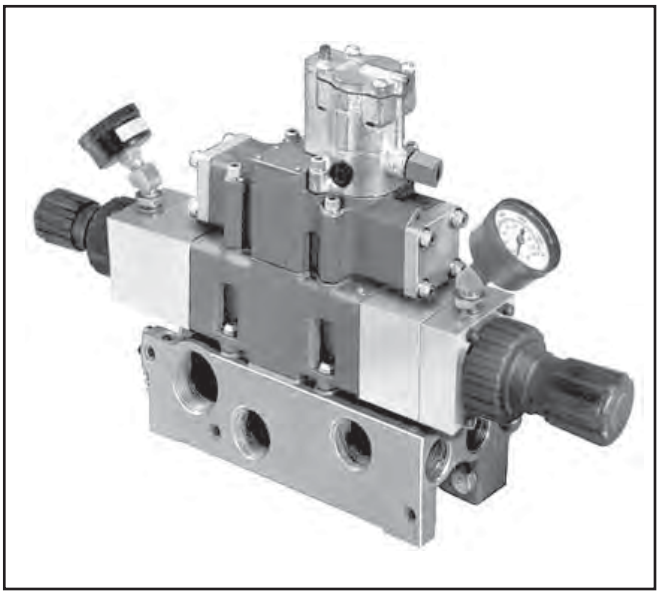
How To Order

1. Select type of adjustment.
2. Select pressure range for each cylinder port.

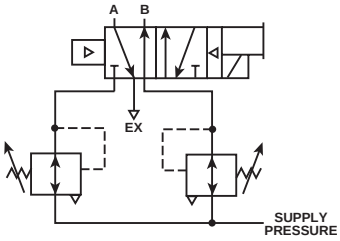
Example: Manual adjusted.
5-60 PSIG range for cylinder port “A”
and 10-125 PSIG for cylinder port “B”
Model No. L55406305C

NOTE: When using single or independent port sandwich regulators, be aware that:

1. Cylinder port outlets are reversed.
2. 3-Position, cylinder ports open to exhaust and cylinder ports open to inlet functions are reversed. To produce a cylinder ports open to exhaust function, order valve with cylinder ports open to inlet. To produce a cylinder ports open to inlet function, order valve with cylinder ports open to exhaust.



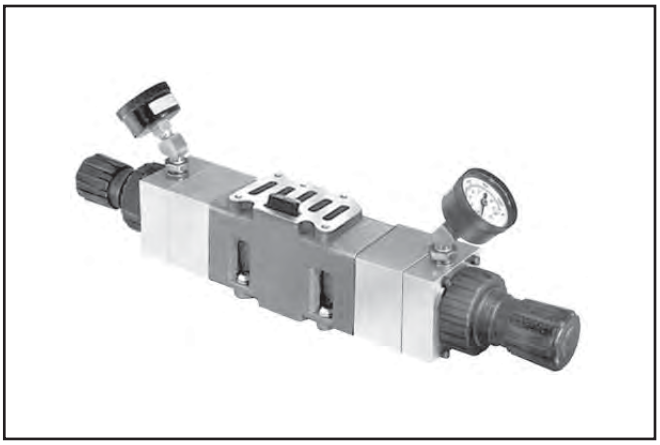
Graphic Symbol



Independently Regulated Pressure at Both “A” & “B”

Pressure Adjustment	Cylinder Port “A”	Model Number	
		Cylinder Port “B”	
	PSIG	5 - 60	10 - 125†
Manual	1 - 60	L55405305C	—
Remote	0 - 140	—	L55414314C†

† Remote operator units 0-140 PSIG



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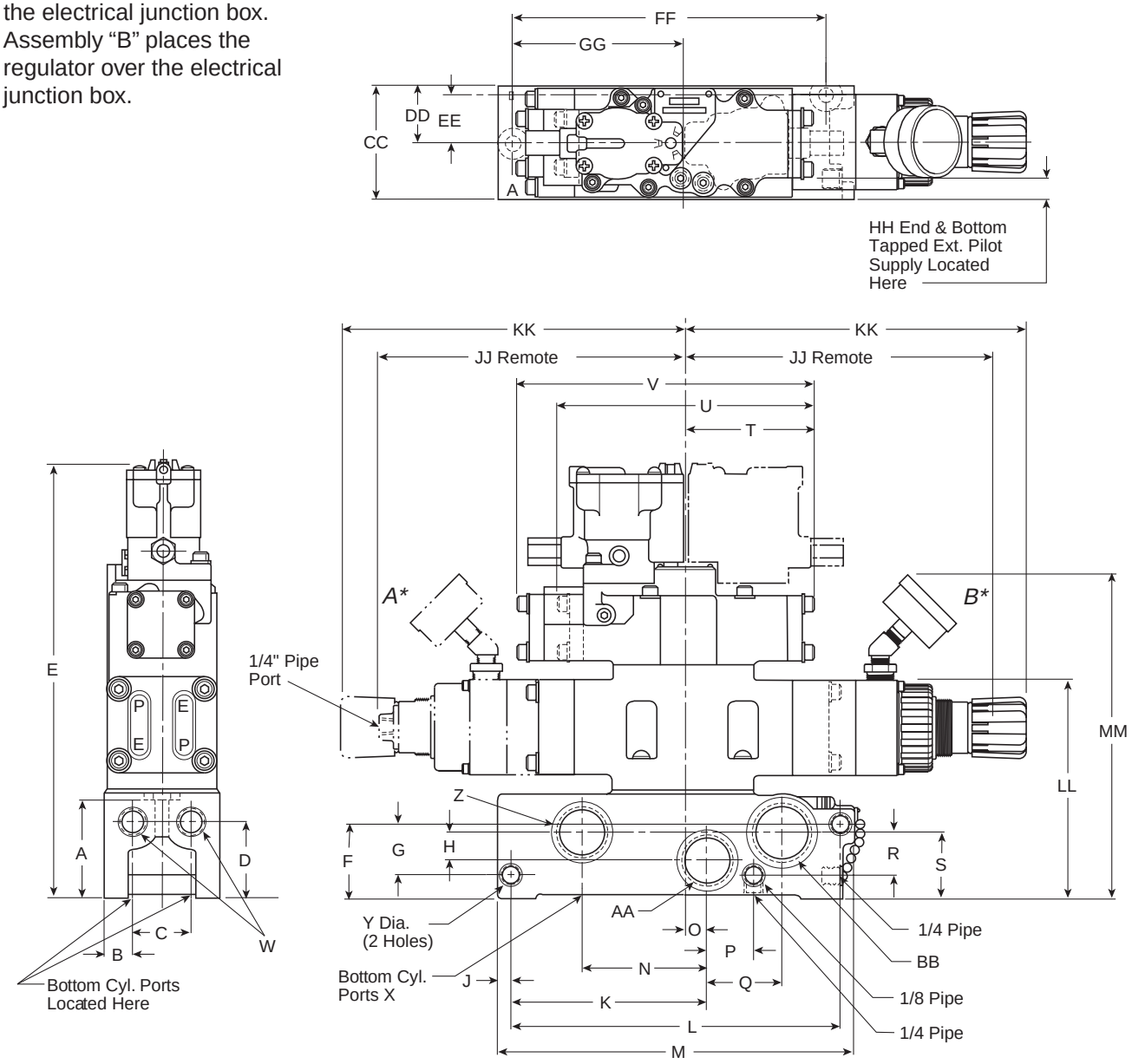
* Assembly “A” places the regulator on the end opposite the electrical junction box. Assembly “B” places the regulator over the electrical junction box.



A	B	C	D	E	F	G	H	J	K	L	M	N
2.56 (65.0)	.75 (19.1)	1.50 (38.1)	2.09 (53.1)	11.28 (286.5)	2.06 (52.3)	1.41 (35.8)	.75 (19.1)	.34 (8.64)	5.00 (127.0)	8.44 (214.4)	9.09 (230.9)	3.19 (81.0)
O	**P**	**Q**	**R**	**S**	**T**	**U**	**V**	**W**	**X**	**Y**	**Z**	**AA**
.61 (15.5)	1.19 (30.2)	1.91 (48.5)	1.09 (27.7)	1.81 (46.0)	3.32 (84.3)	6.64 (168.7)	7.56 (192.0)	3/8", 1/2" or 3/4" NPTF		.39 (9.9)	1" NPTF	1" NPTF
BB	**CC**	**DD**	**EE**	**FF**	**GG**	**HH**	**JJ**	**KK**	**LL**	**MM**		
1-1/4" NPTF	3.00 (76.2)	1.50 (38.1)	1.24 (31.5)	7.97 (202.4)	4.34 (110.2)	.40 (10.2)	8.53 (216.6)	10.15 (257.8)	5.46 (138.6)	8.80 (223.5)		

Inches (mm)

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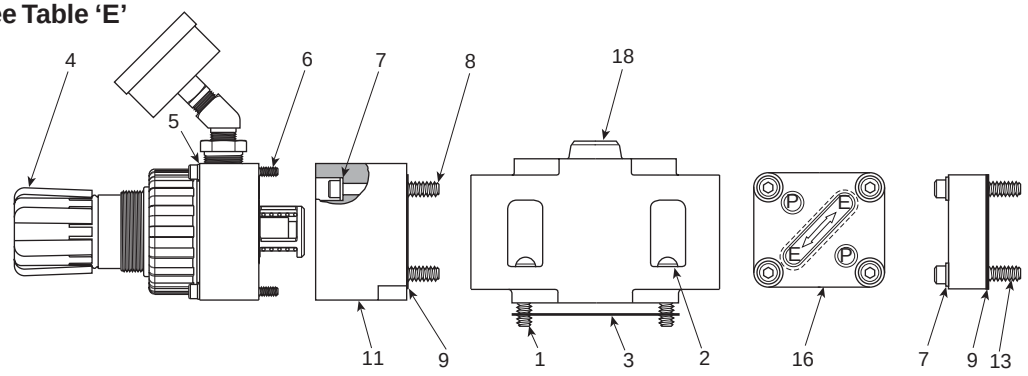
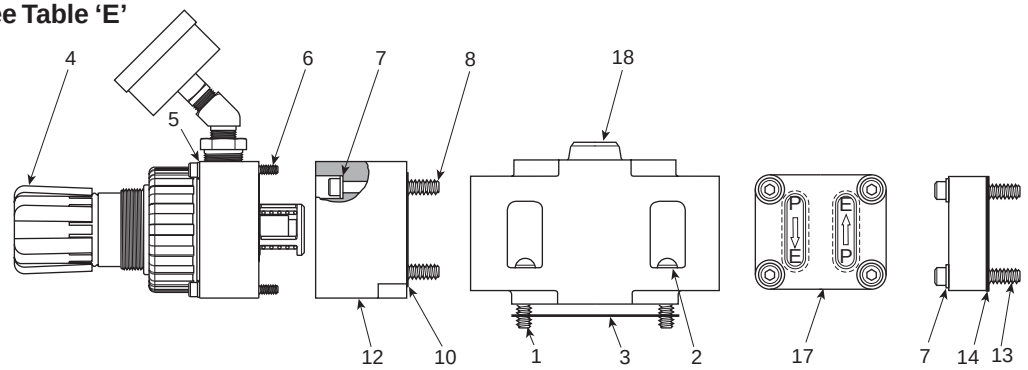
Common Port Regulation

Parts: See Table 'E'



Single Port Regulation

Parts: See Table 'E'



Independent Port Regulation

Parts: See Table 'E'

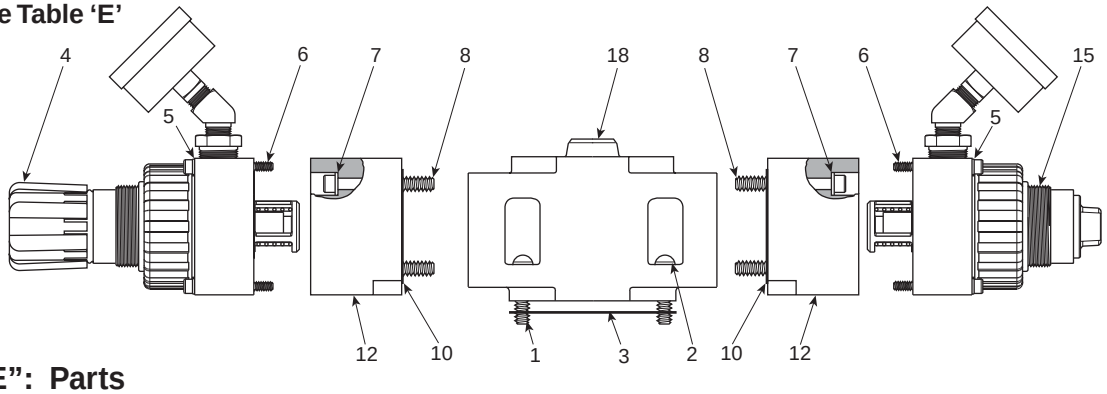


Table "E": Parts

Item No.	Part Number	Description
1	H09815	Screw (4)
2	H17512	Lockwasher (4)
3	K183077	Gasket
4	Standard	Manual Reg. Assy. (w/Gauge)
	K472001C	1-30 PSIG
	K472002C	1-60 PSIG
	K472003C	2-125 PSIG
5	H17509	#10 Lockwasher
6	H10032	#10-32 x 1.75" Lg. SHCS
7	H17511	1/4" Lockwasher
8	H10069	1/4-20 x 2.25" Lg. SHCS

Item No.	Part Number	Description
9	K183082	Gasket
10	K183084	Gasket
11	K043012	Function Block (P to P)
12	K043011	Function Block (P to E)
13	H100107	1/4-20 x 1-1/2" Lg. SHCS
14	K183083	Gasket
15	Standard	Remote Reg. Assy. (w/Gauge)
	K472009C	0-140 PSIG
16	K362308	Function Plate Assy. (Incl. 7, 9, 13)
17	K362307	Function Plate Assy. (Incl. 7, 13, 14)
18	K032270	Body Assy. (Incl. 1, 2, 3)

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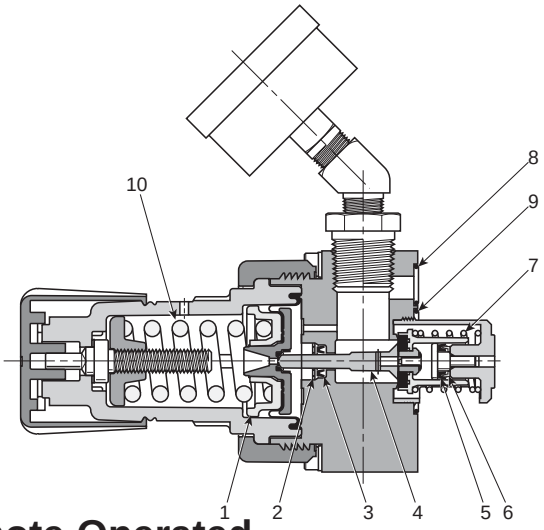
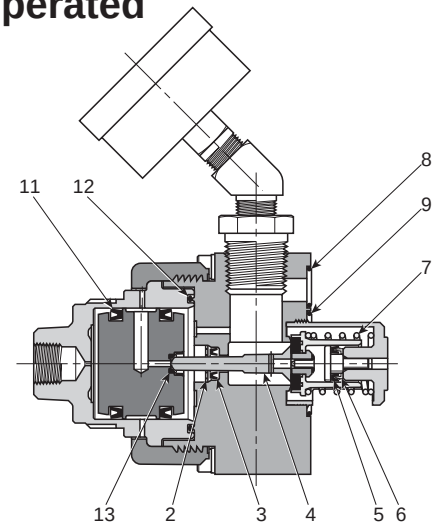
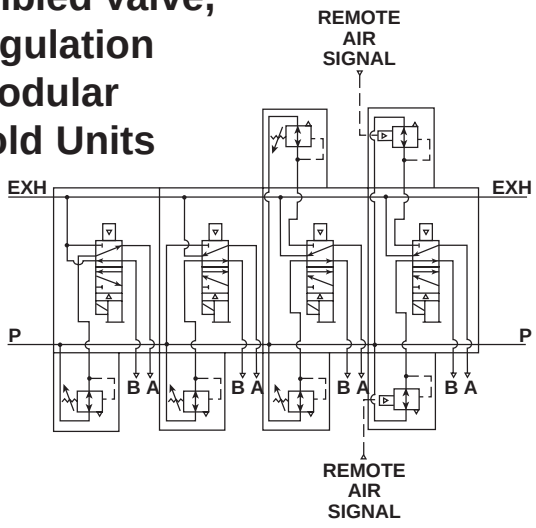
Manual Adjusting



Remote Operated



Suggested Schematic of Assembled Valve, Air Regulation and Modular Manifold Units



Replacement Parts

Item No.	Part Number		Description
1	○		Diaphragm Assembly
2	○	●	Retaining Ring
3	○	●	Vee Packing
4	○	●	Poppet Assembly
5	○	●	Vee Packing
6	○	●	Backflow Retainer
7	○	●	Poppet Spring
8	○	●	.989 ID x .070 W O-Ring
9	○	●	1.301 ID x .070 W O-Ring
10	P01698		1-30 PSI Spring
	P04062		1-60 PSI Spring (Blue)
	P04063		2-125 PSI Spring
11	●		Vee Packing
12	●		1.674 ID x .103 W O-Ring
13	●		Vent Seal

○ Parts included in K352409 Service Kit for Manual Operated Modular Regulators.

● Parts included in K352411 Service Kit for Remote Operated Modular Regulators.

Replacement Gauges

PSIG	Standard
0-60	K4520N14060
0-160	K4520N14160
0-300	K4520N14300

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Blank Station Covers

Manifold Assembly	Blank Cover Kit
—	K06020007
K142230	K06020003
K142231	
K142270	
K142233	K06020009
K142236	K06020004

Flush Type" Hex Drive Pipe Plugs for Port Isolation

Part No.	Size (NPTF)
K21R02012L	1/8"
K21R02025L	1/4"
K21R02037L	3/8"
K21R02050L	1/2"
K21R02075L	3/4"

Conversion Kits: Lubricated to Non-Lubricated Operation

Basic Size	Operators (Solenoid or Remote Pilot)	
	Single	Double (2-Position)
3/8"	K322012	K322013

Interchangeable Manual Override Assemblies for Solenoid Operators

Non-Locking Type	Locking Type
K162001	K152003

To override valve, use a flat head screwdriver to press in and rotate plunger 90° until plunger locks in place. For proper valve operation, override should be in the out position.

Service Kits

To use this chart you must know the Basic Valve Series, Quantity, and Type of Operators, or the first three characters of the Valve Model Number.

Basic Valve		Solenoid Operated *				Remote Pilot Operated	
		Standard Service (Intermittent Duty)		Special Service ** (Continuous Duty)			
Size	Series (Prefix)	Single	Double 2 & 3-Position	Single	Double 2 & 3-Position	Single	Double 2 & 3-Position
3/8"	L65	–	K352126	–	K352127	–	K352355
	L66	–	K352126	–	K352127	–	K352355
	L67	K352124	–	K352125	–	K352362	–
	L68	–	K352126	–	K352127	–	K352355
	L69	–	K352126	–	K352127	–	K352355
	L70	K352124	–	K352125	–	K352362	–
1"	L65	–	K352130	–	K352131	–	K352360
	L66	–	K352130	–	K352131	–	K352360
	L67	K352128	–	K352129	–	K352359	–
	L68	–	K352130	–	K352131	–	K352360
	L69	–	K352130	–	K352131	–	K352360
	L70	K352128	–	K352129	–	K352359	–

Notes:
* Kits for solenoid operated valves include solenoid service kits.
** Special service (continuous duty) solenoids may be identified as having gold colored solenoid tops.

Voltage Suffix Codes

L□□□ □□ □□□ **
Voltage Code

Code	Voltage			Coil Number	
**	60 Hz	50 Hz	DC	Plug-In	Flying Lead (19") *
49	–	–	24†	K593060 K593274‡	K593014
53	120†	110	–	K593071 K593125‡	K593025
57	240†	220	–	K593081	K593035

Notes: Bold Face type indicated primary coil rating.
† Indicates voltages approved for solenoid operators designed for use in hazardous locations. (See page E251.)
* 19" Coil lead length is standard. Other lead lengths may be available, consult supplier.
‡ Assembly includes indicator light socket, less light.

Electrical Connectors Single or Double Solenoid Valves

Basic Size	Valve Body		Subbase / Manifold	
	Single Solenoid	Double Solenoid	10" Leads	72" Leads
3/8"	H02723	H02722	H02713	H02789
1"				

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Plug-In Pilot

With Indicator Light

Description	Standard Service		Special Service	
Override Type	**Locking**	**Non-Locking**	**Locking**	**Non-Locking**
With Override (120VAC)	K175903553	K175803553	K185902553	K185802553
With Override (Other than 120VAC)	K1753035**	—	K1853025**	—

** See voltages on page E246.

NEMA 1 & 12

Basic Pilot

JIC Pilot

Description	Standard Service		Special Service	
Override Type	**Locking**	**Non-Locking**	**Locking**	**Non-Locking**
Basic with Override	K0653035**	—	K0853025**	—
JIC with Junction Box & Override	K0656035**	K0655035**	K0856025**	K0855025**
JIC Pilot with Junction Box & Override & Indicator Lights (120VAC Only)	K0659035**	K0658035**	K0859025**	K0858025**

** See voltages on page E246.

NEMA 4, 7 & 9

Hazardous Duty

NEMA 4 Pilot

Description	Standard Service		Special Service	
Hazardous Duty Pilot - UL & CSA	K0251035**†		K0451025**†	
NEMA 4 Pilot	K2351035**†		—	
Override Type	**Locking**	**Non-Locking**	**Locking**	**Non-Locking**
Hazardous Duty with Override	K0253035**†	K0252035**†	K0453025**†	K0452025**†
NEMA 4 with Override	—	K2353035**†	K2352035**†	—

† 49 / 53 only ** See voltages on page E246.

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Installation

Valves should be installed with reasonable accessibility for service. Exercise care in keeping piping lengths to a minimum. Piping should be free of dirt, chips & scale. Pipe joint compound should be used sparingly applied only to the thread, never to the valve body. Avoid undue strain at piping joints. Protect the valve from exposure to extreme temperatures, dirt and moisture to maximize life.

Note: Valves equipped with locking manual overrides. Override(s) must be in the fully extended position for proper valve operation.

Double Solenoid / Remote Caution

Note: It is recommended that double solenoid and double remote 2-Position valves be mounted with the main spool in the horizontal plane.

Wiring Instructions for Base Mounted Valves

Single Solenoid:
Use wires marked “2” & “3” for connection. Units with DC Solenoids and indicator lights are polarity sensitive. Wire marked “3” is positive (+).

Double Solenoid:
Use wires marked “1” & “2” for Solenoid “A”. Use wires marked “3” & “4” for Solenoid “B”. Units with DC Solenoids and indicator lights are polarity sensitive. Wires marked “1” and “3” are positive.

⚠ ***Caution:***
DC Solenoids are polarity sensitive. Observe polarities indicated above.

Units with Flying Leads

Wires are not polarity sensitive.

⚠ ***Caution:***
DC solenoids with indicator lights and / or arc suppression coils are polarity sensitive. Use red wire as positive.

Listing Agencies

General Purpose Approvals

CSA - Canadian Standards Association
File Number 42024

Hazardous Duty Approvals

UL - Underwriters Laboratories, Inc.
File Number E42542
Category Y107

CSA - Canadian Standards Association
File Number 24349

See page E251 for Approved Hazardous Location Class, Group & Division.

“Special Service” Solenoid (Continuous Duty)

Special Service Solenoids are designed for use when the solenoid duty cycle is greater that 70% or when energization times are for 10 minutes or longer.

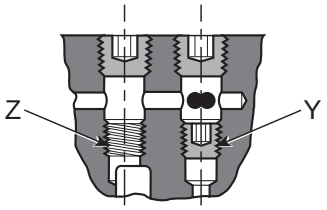
These solenoids should be used when valves are to be held energized for hours, days or weeks… or when extended ambient temperature operation is required. Apply the duty cycle formula to determine if this type of solenoid is required.

Duty Cycle Formula

$$\frac{\text{Time Energized}}{\text{Time Energized + Time Off}} \times 100 = \%\ \text{Duty Cycle}$$

If Duty Cycle is 70% or greater, then Special Service (Continuous Duty) Solenoid should be used.

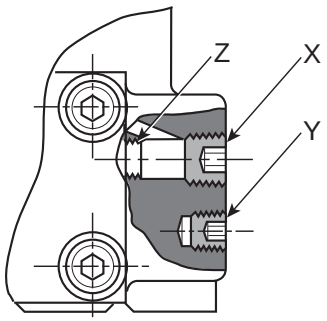
Pilot Supply Conversion



Base Mounted

For field conversion to external pilot supply, remove two 1/8" NPTF plugs from top of valve body and move bottom plug from “Y” to “Z”.

Replace 1/8" NPTF plugs and connect pilot pressure to the 1/4" NPTF external pilot supply port “X” in subbase.



Direct Pipe Ported

For field conversion to external pilot supply, remove and discard 1/4" NPTF plug in external pilot supply port “X”. Move stored plug “Y” to location “Z” in bottom of pilot supply port “X”. Then connect pilot pressure to port “X” in valve body.

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Flow Capacities

Valve Type	Cylinder Port Size (NPTF)	Mounting Style	Cv Flow Rating Inlet to Cylinder "A"
3/8" Double	3/4"	Subbase	5.0
	3/4"	Manifold	4.9
3/8" Double 3-Position	3/4"	Subbase	4.5
	3/4"	Manifold	4.1
1" Single & Double	1"	Subbase	11.3

Valve Type	Cylinder Port Size (NPTF)	Mounting Style	Cv Flow Rating Inlet to Cylinder "A"
3/8" Single	3/8"	Direct Pipe	4.7
	1/2"	Direct Pipe	5.3
3/8" Double	3/8"	Direct Pipe	4.5
	1/2"	Direct Pipe	5.5
3/8" Double 3-Position	3/8"	Direct Pipe	4.1
	1/2"	Direct Pipe	4.5
1" Single & Double	1"	Direct Pipe	12.0

Materials of Construction

Valve Bodies ..... Aluminum alloy

Valve Spool –
* Aluminum alloy with special coating on 3/8" basic valves

Hard chrome plated AISI type 416 stainless steel on 1/4" & 1/2" basic valves.

Resilient Seals: In Valve Body -
Dynamic ..... Polyurethane base on 3/8" basic valves*
Static / Dynamic ..... Nitrile base w / 12% Molybdenum Disulphide on 1/4" & 1/2" basic valves

Other Seals ..... Nitrile

Shock Pads ..... Polyurethane

Valve Spacers ..... Brass

Manifolds & Subbases ..... Aluminum alloy

Solenoid Bodies ..... Plated zinc alloy
Internal Components ..... Corrosion resistant steel
Resilient Seals –
Standard Service ..... Nitrile
Special Service (continuous duty) ..... Fluorocarbon & Silicone

Other Seals ..... Nitrile

Coil ..... Class "B" epoxy encapsulated (Class "H" also available on some models, consult supplier)

* These materials are specially designed for valves used on non-lubricated service

Recommended Filtration

Maintained 40 Micron Filtration

Life Expectancy

Valves designed for non-lubricated service as well as those designed for lubricated service will provide millions of maintenance free cycles. Under laboratory conditions service life exceeds 25,000,000 cycles.

Factory Pre-Lubrication

Valves are lubricated at assembly with Sunaplex 781 or equivalent. Valves specified for vacuum service are lubricated with Dow Corning Valve Seal A.

Valves for Non-Lubricated Service

3/8" basic valve sizes are designed to operate in applications where in-service lubrication is not desirable. Valves are factory pre-lubed as noted above. These valves may be used for lubricated service as well.

Lubrication

Air Line Lubricant (compatible with Nitrile & Polyurethane seals) must readily atomize and be of the medium analine type. Analine point range must be between 180° and 220°F.
Viscosity @ 100°F: 140-170 SUS.

Recommended Lubricant

If in-service lubrication is required, use F442 oil, or equivalent. F442 is specially formulated to provide peak performance and maximum service life for air operated equipment.

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Pressure Range for Solenoid Operated Valves

Media	Internal Pilot Supply Basic Valve Size			External Pilot Supply Basic Valve Size				
	1/4"	3/8"	1/2"	1/4"		3/8"	1/2"	1"
Air	35-140* PSIG			N.A.	Main	0-250 PSIG		
					Pilot	35-140* PSIG		
Vacuum	Do Not Use			N.A.	Main	Within 1 Hg of Perfect		
					Pilot	35-140* PSIG		
Other	Consult Supplier							

* 200 PSIG Solenoid Is Optional (consult supplier).

Pressure Range for Remote Pilot Operated Valves

Media		Valve Type	
		Single	Double & 3-Position
Air	Main	35-250 PSIG	0-250 PSIG
	Pilot	35-200 PSIG	35-200 PSIG
Vacuum	Main	Do Not Use	Within 1" Hg of Perfect
	Pilot	Do Not Use	35-200 PSIG
Other	Consult Supplier		

Ambient Temperature Range Standard Service Solenoid Operator

Minimum	Maximum	
	Intermittent Duty	Continuous Duty
0°F	125°F	100°F

Special Service (Continuous Duty) Solenoid Operator

Minimum	Maximum	
	Intermittent Duty	Continuous Duty
0°F	125°F	125°F

As the above chart indicates, Standard Duty Solenoids may be used on continuous duty but ambient temperature is de-rated.

In some cases, Special Service Solenoids may be rated for higher ambient temperatures (consult supplier).

Ambient Temperature Range Remote Pilot Operated Valves

Minimum	Maximum
0°F	200°F

Caution:

If it is possible that the ambient temperature may fall below freezing, the medium must be moisture free to prevent internal damage and unpredictable behavior.

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Solenoid Enclosure Ratings

Type	Listing Agency	NEMA Rating	Description
Plug-In	CSA	1 & 12	General Purpose Indoor Only Dust Tight
Conduit / Flying Lead	CSA	1 & 12	General Purpose Indoor Only Dust Tight
* Conduit (As Specified)	UL & CSA	7 & 9	Hazardous Location See Chart Below)
* Conduit (As Specified)	CSA	4	General Purpose Indoor / Outdoor

* See ordering information on specific valve type. (Direct Pipe Ported Valves Only.)

Solenoid Characteristics Chart

Voltage Range +10/-15% of Nominal

3/8" & 3/4" Basic – L-Pilot					
Voltage/ Cycles	**Amps Inrush**	**Amps Holding**	**Resistance Ohms**	**Watts**	**Insulation Class**
120/60VAC	.29	.18	122	12	B
110/50VAC	.21	.14	122	12	B
240/60VAC	.18	.12	610	12	B
24/60VAC	1.6	1.0	4.5	9.5	B
24/50VAC	1.2	.75	6.4	9.5	B
6VDC	–	1.4	4.5	7.6	B
12VDC	–	.66	17.7	9	B
24VDC	–	.32	71	9	B
48VDC	–	.22	216	11	B

Hazardous Duty Solenoid Listing

Valves with solenoid operators designated for hazardous locations are UL & CSA Approved as follows:

National Electric Code	Ambient Conditions	NEMA Classification
Class I Div. 1 Group C	Ethyl, Ether, Etc., Gases & Vapors	VII (7)
Class I Div. 1 Group D	Gasoline, Etc., Gases & Vapors	VII (7)
Class I Div. 2 Group B	Butadiene, Etc., Liquid, Fluid or Vapor Normally Contained, or Atmosphere Ventilated	VII (7)
Class II Div. 1 Group E	Metal Dust	IX (9)
Class II Div. 1 Group F	Coal, Coke, Carbon Black Dust	IX (9)
Class II Div. 1 Group G	Flour, Starch, Grain Dust	IX (9)

See Article 500 - Hazardous (Classified) Locations, National Electric Code.

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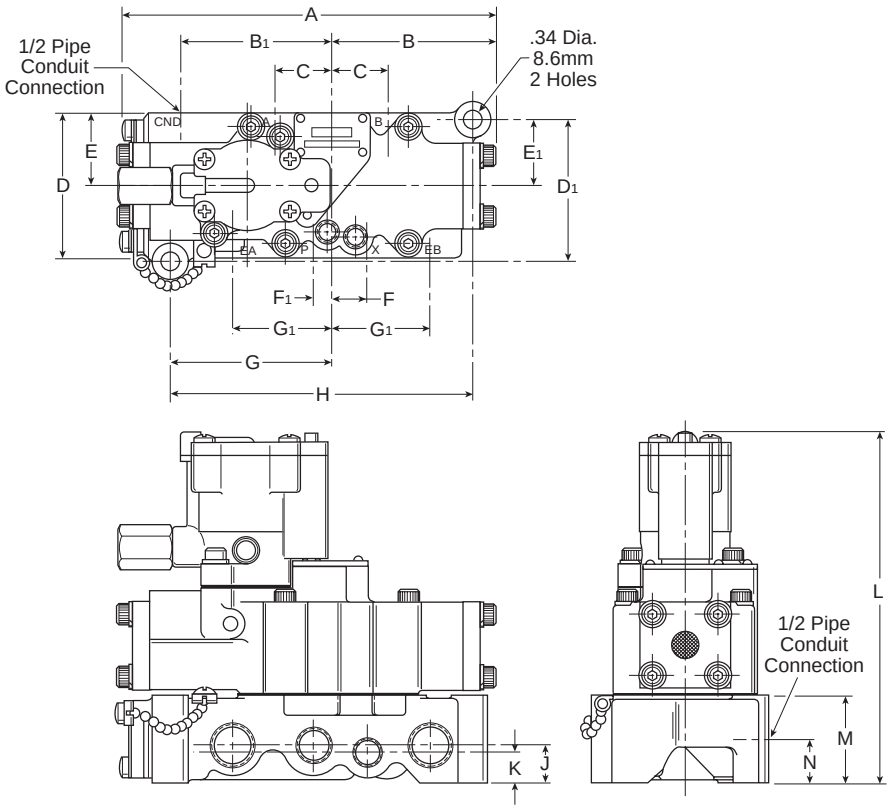
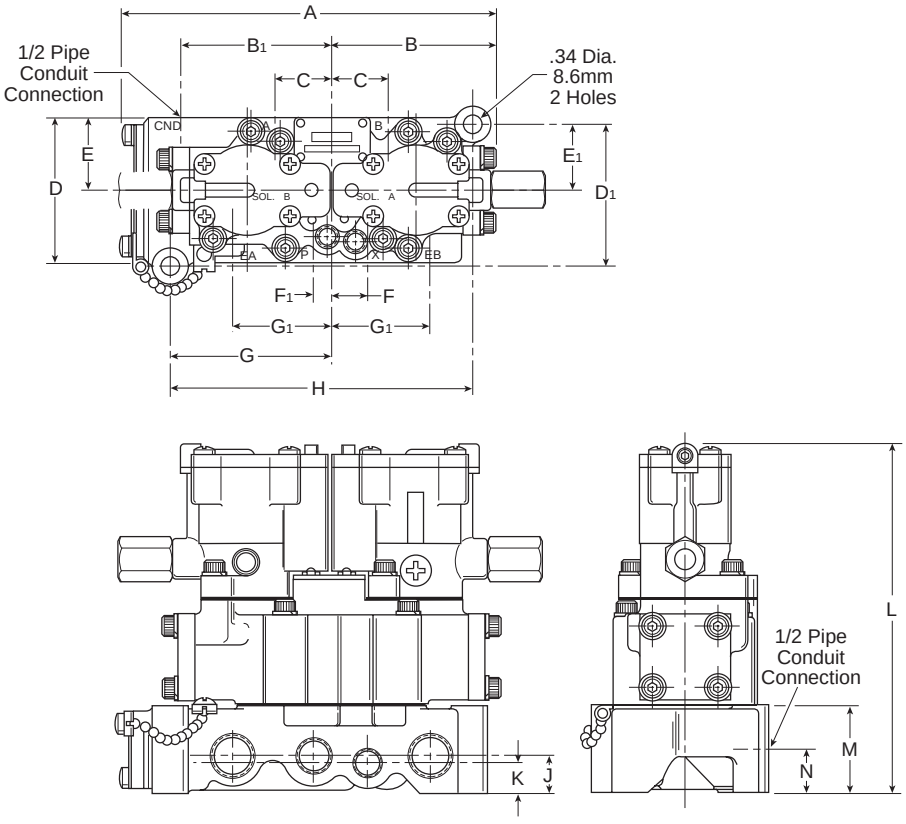


Dimensions

A	B	B1	C
7.56 (192)	3.32 (84.3)	2.94 (74.7)	1.12 (28.4)
D	**D1**	**E**	**E1**
2.88 (73.2)	2.84 (72.1)	1.44 (36.6)	1.34 (34)
F	**F1**	**G**	**G1**
75 (19.1)	.38 (9.7)	3.16 (80.3)	2.00 (50.8)
H	**J**	**K**	**L**
6.03 (153.2)	.75 (19.1)	.62 (15.7)	6.93 176)
M	**N**		
1.75 (44.5)	1.00 (25.4)		

Inches (mm)



Dimensions

A	B	B1	C
7.38 (187.5)	3.32 (84.3)	2.94 (74.7)	1.12 (28.4)
D	**D1**	**E**	**E1**
2.88 (73.2)	2.84 (72.1)	1.44 (36.6)	1.34 (34)
F	**F1**	**G**	**G1**
.75 (19.1)	.38 (9.7)	3.16 (80.3)	2.00 (50.8)
H	**J**	**K**	**L**
6.03 (153.2)	.75 (19.1)	.62 (15.7)	6.93 (176)
M	**N**		
1.75 (44.5)	1.00 (25.4)		

Inches (mm)

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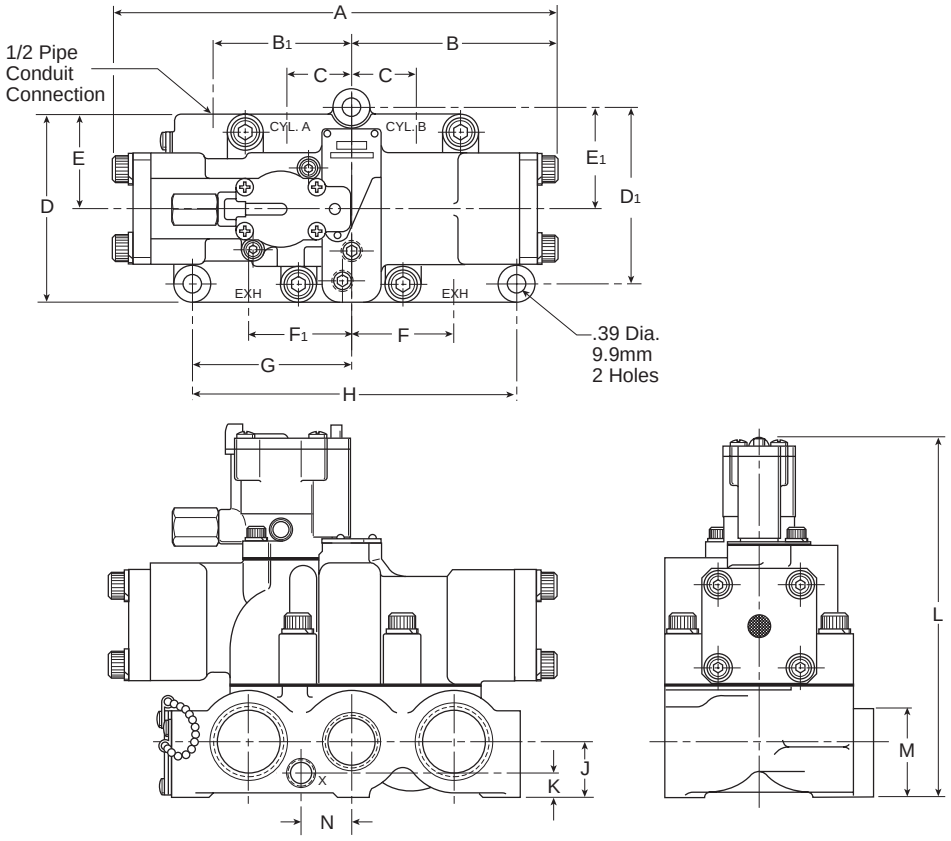
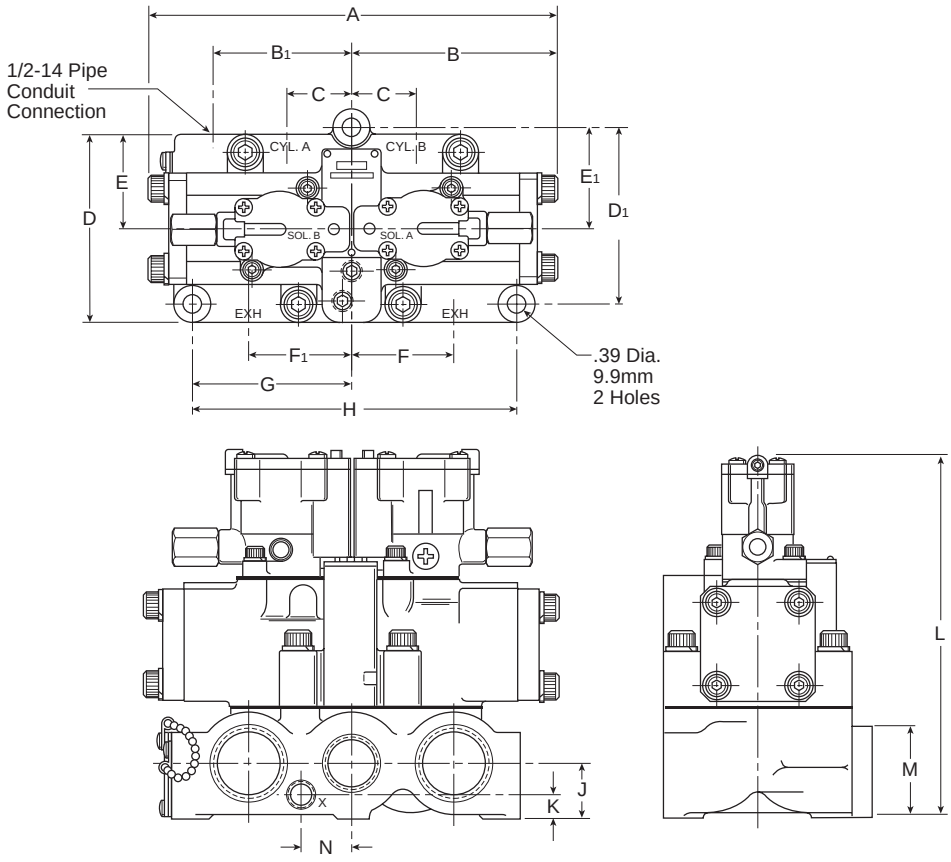


Dimensions

A	B	B1	C
10.46 (265.7)	4.75 (120.6)	3.38 (85.8)	1.53 (38.9)
D	**D1**	**E**	**E1**
4.56 (115.8)	4.28 (108.7)	2.28 (57.9)	2.44 (62)
F	**F1**	**G**	**H**
2.45 (62.2)	2.46 (62.5)	3.81 (96.8)	7.62 (193.5)
J	**K**	**L**	**M**
1.31 (33.3)	.59 (15)	8.74 (222)	2.09 (53.1)
N			
1.22 (31)			

Inches (mm)



Dimensions

A	B	B1	C
9.50 (241.3)	4.75 (120.6)	3.38 (85.8)	1.53 (38.9)
D	**D1**	**E**	**E1**
4.56 (115.8)	4.28 (108.7)	2.28 (57.9)	2.44 (62)
F	**F1**	**G**	**H**
2.45 (62.2)	2.46 (62.5)	3.81 (96.8)	7.62 (193.5)
J	**K**	**L**	**M**
1.31 (33.3)	.59 (15)	8.74 (222)	2.09 (53.1)
N			
1.22 (31)			

Inches (mm)

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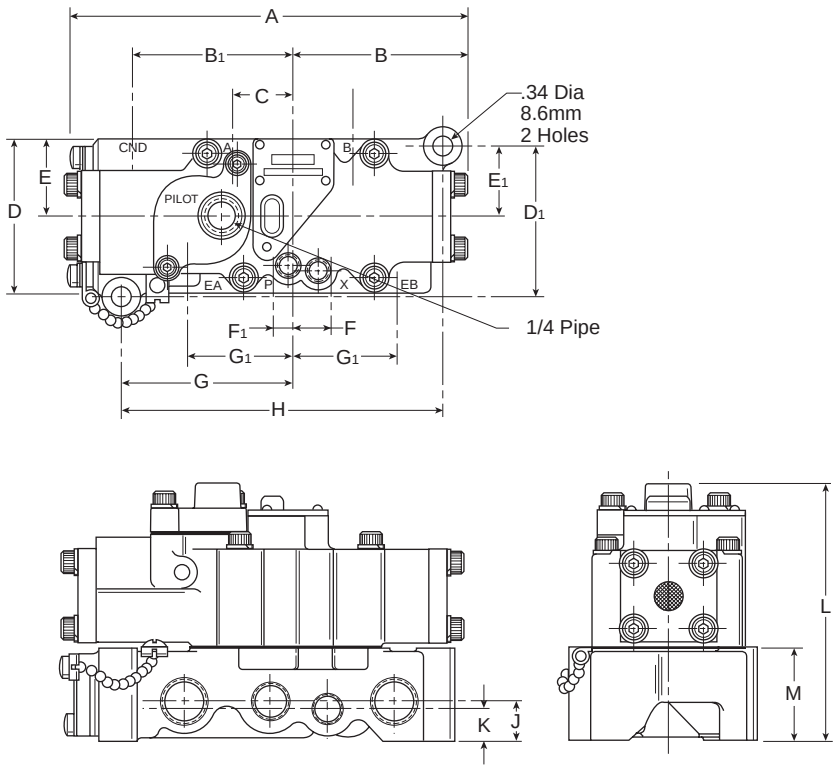
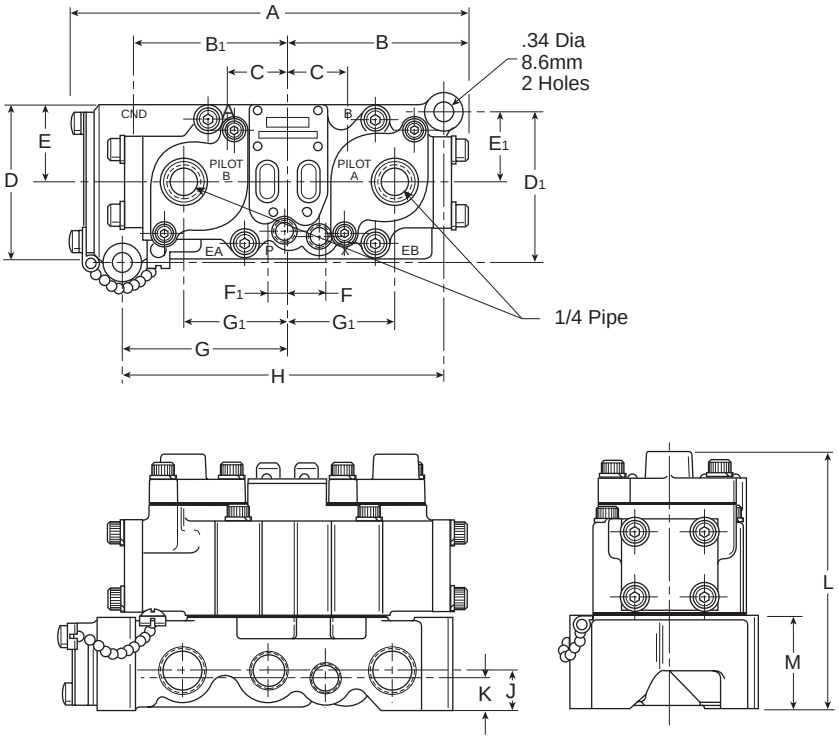


Dimensions

A	B	B1	C
7.56 (192)	3.32 (84.3)	2.94 (74.7)	1.12 (28.4)
D	**D1**	**E**	**E1**
2.88 (73.2)	2.84 (72.1)	1.44 (36.6)	1.34 (34)
F	**F1**	**G**	**G1**
.75 (19.1)	.38 (9.7)	3.16 (80.3)	2.00 (50.8)
H	**J**	**K**	**L**
6.03 (153.2)	.75 (19.1)	.62 (15.7)	4.76 (120.9)
M			
1.75 (44.5)			

Inches (mm)



Dimensions

A	B	B1	C
7.56 (192)	3.32 (84.3)	2.94 (74.7)	1.12 (28.4)
D	**D1**	**E**	**E1**
2.88 (73.2)	2.84 (72.1)	1.44 (36.6)	1.34 (34)
F	**F1**	**G**	**G1**
.75 (19.1)	.38 (9.7)	3.16 (80.3)	2.00 (50.8)
H	**J**	**K**	**L**
6.03 (153.2)	.75 (19.1)	.62 (15.7)	4.76 (120.9)
M			
1.75 (44.5)			

Inches (mm)

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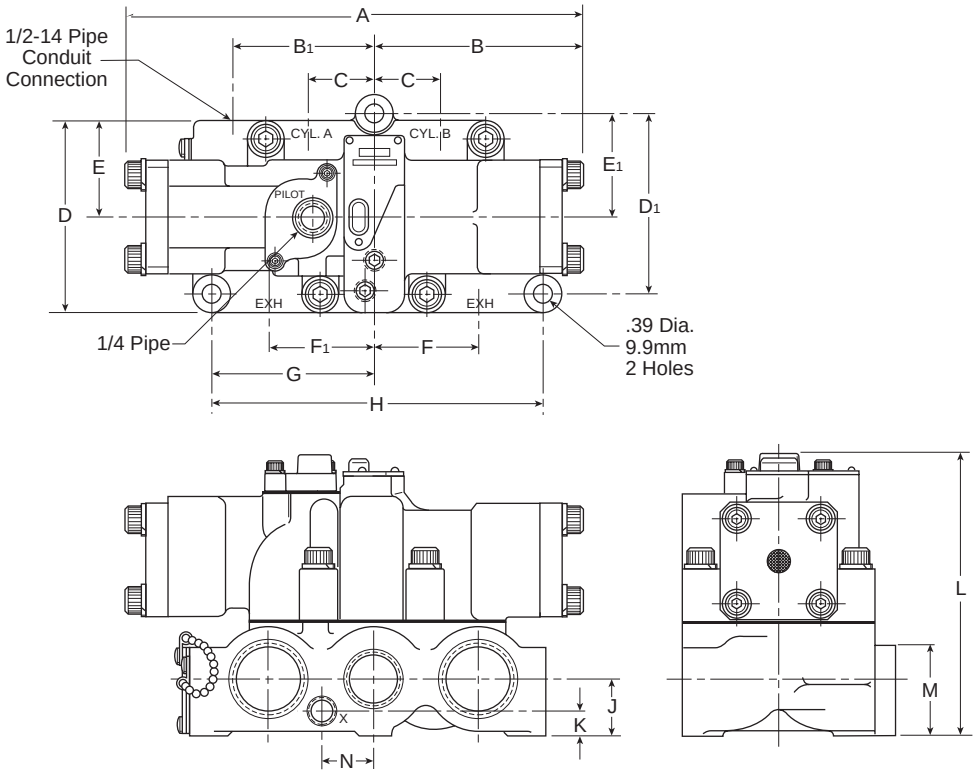
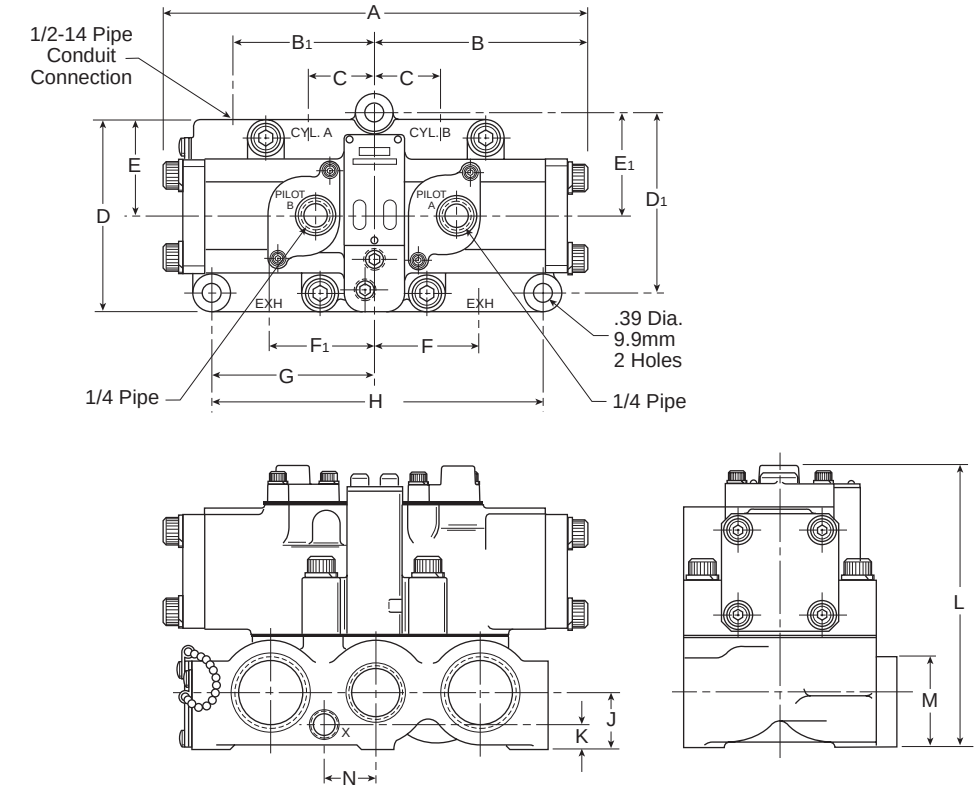


Dimensions

A	B	B1	C
10.46 (265.7)	4.75 (120.6)	3.38 (85.8)	1.53 (38.9)
D	**D1**	**E**	**E1**
4.56 (115.8)	4.28 (108.7)	2.28 (57.9)	2.44 (62)
F	**F1**	**G**	**H**
2.45 (62.2)	2.46 (62.5)	3.81 (96.8)	7.62 (193.5)
J	**K**	**L**	**M**
1.31 (33.3)	.59 (15)	6.57 (166.9)	2.09 (53.1)
N			
1.22 (31)			

Inches (mm)



Dimensions

A	B	B1	C
9.50 (241.3)	4.75 (120.6)	3.38 (85.8)	1.53 (38.9)
D	**D1**	**E**	**E1**
4.56 (115.8)	4.28 (108.7)	2.28 (57.9)	2.44 (62)
F	**F1**	**G**	**H**
2.45 (62.2)	2.46 (62.5)	3.81 (96.8)	7.62 (193.5)
J	**K**	**L**	**M**
1.31 (33.3)	.59 (15)	6.57 (166.9)	2.09 (53.1)
N			
1.22 (31)			

Inches (mm)

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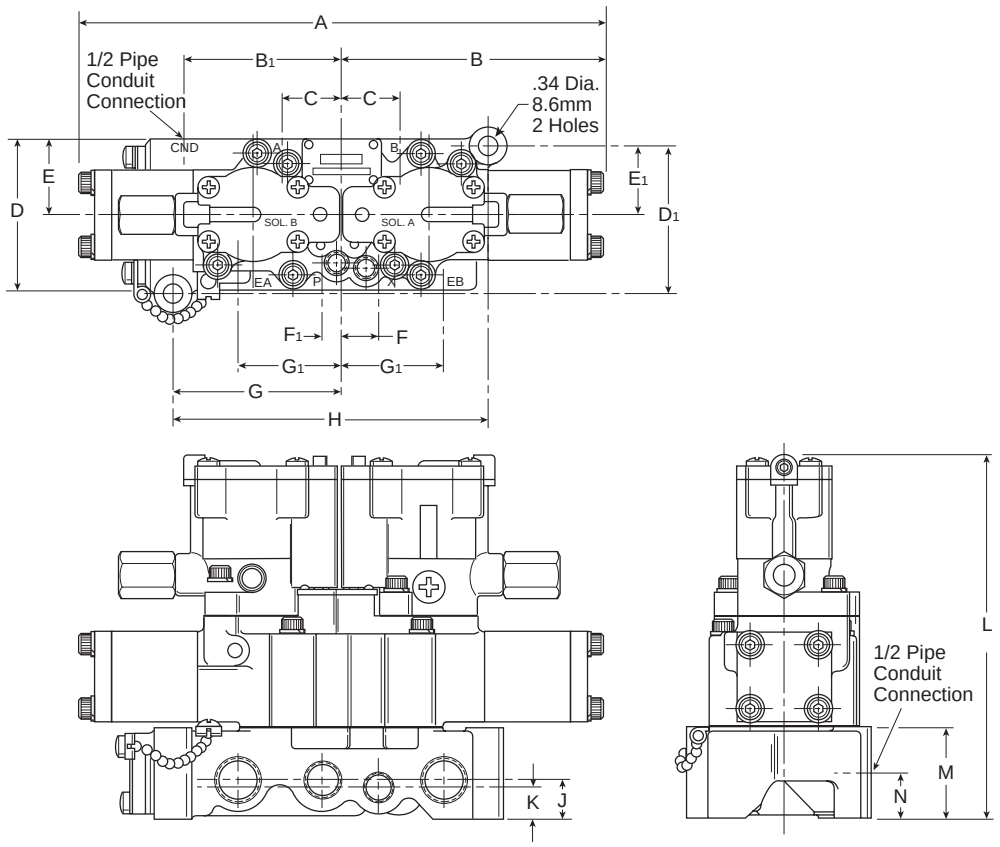
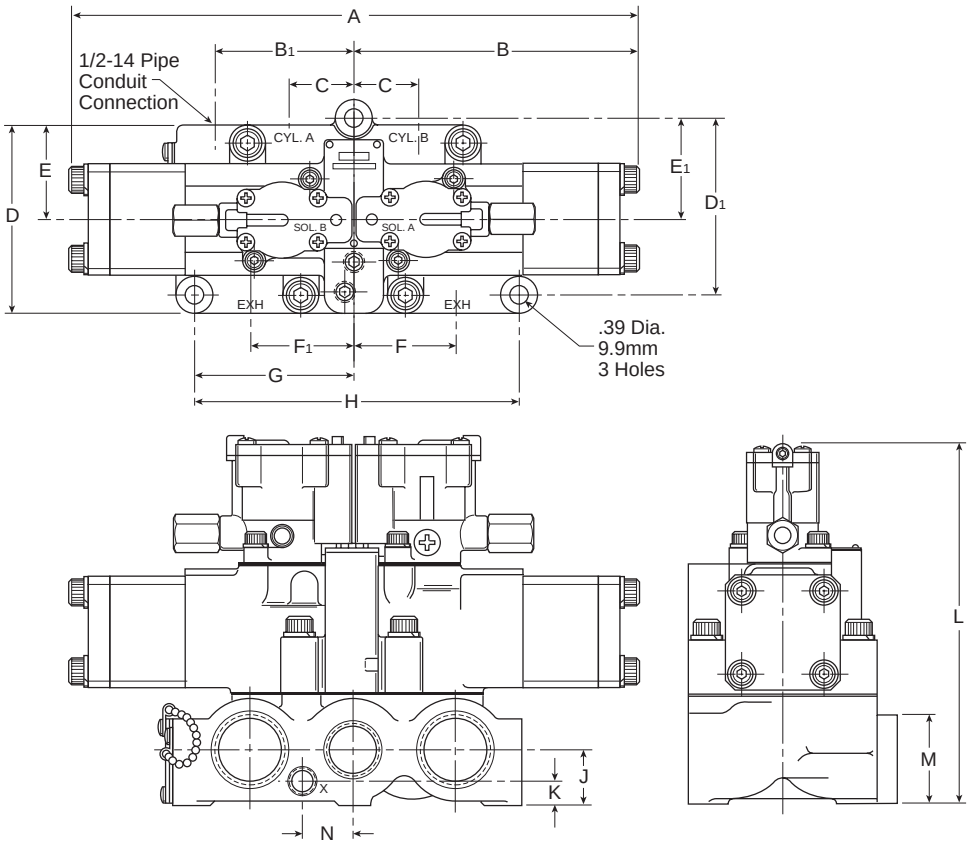


Dimensions

A	B	B1	C
9.64 (244.8)	4.82 (122.4)	2.94 (74.7)	1.12 (28.4)
D	**D1**	**E**	**E1**
2.88 (73.2)	2.84 (72.1)	1.44 (36.6)	1.34 (34)
F	**F1**	**G**	**G1**
.75 (19.1)	.38 (9.7)	3.16 (80.3)	2.00 (50.8)
H	**J**	**K**	**L**
6.03 (153.2)	.75 (19.1)	.62 (15.7)	6.93 (176)
M			
1.00 (25.4)			

Inches (mm)



Dimensions

A	B	B1	C
13.62 (345.9)	6.81 (173)	3.38 (85.8)	1.53 (38.9)
D	**D1**	**E**	**E1**
4.56 (115.8)	4.28 (108.7)	2.28 (57.9)	2.44 (62)
F	**F1**	**G**	**H**
2.45 (62.2)	2.46 (62.5)	3.81 (96.8)	7.62 (193.5)
J	**K**	**L**	**M**
1.31 (33.3)	.59 (15)	8.74 (222)	2.09 (53.1)
N			
1.22 (31)			

Inches (mm)

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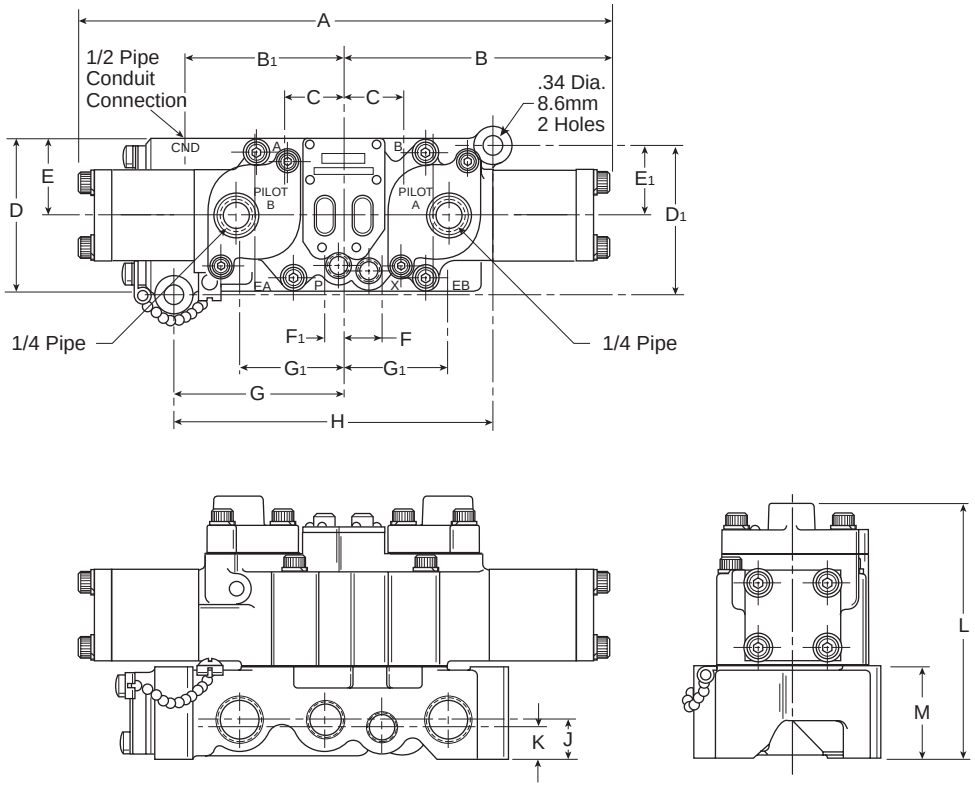
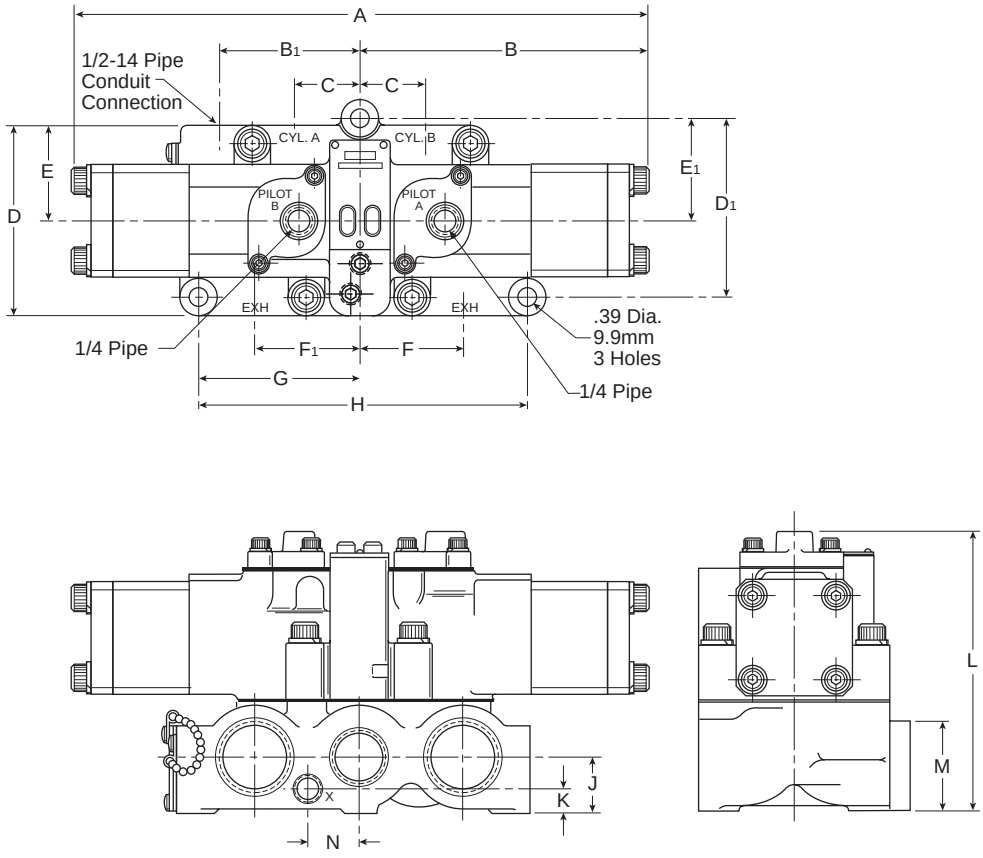


Dimensions

A	B	B1	C
9.64 (244.8)	4.82 (122.4)	2.94 (74.7)	1.12 (28.4)
D	**D1**	**E**	**E1**
2.88 (73.2)	2.84 (72.1)	1.44 (36.6)	1.34 (34)
F	**F1**	**G**	**G1**
.75 (19.1)	.38 (9.7)	3.16 (80.3)	2.00 (50.8)
H	**J**	**K**	**L**
6.03 (153.2)	.75 (19.1)	.62 (15.7)	4.76 (120.9)
M			
1.75 (44.5)			

Inches (mm)



Dimensions

A	B	B1	C
13.62 (345.9)	6.81 (173)	3.38 (85.8)	1.53 (38.9)
D	**D1**	**E**	**E1**
4.56 (115.8)	4.28 (108.7)	2.28 (57.9)	2.44 (62)
F	**F1**	**G**	**H**
2.45 (62.2)	2.46 (62.5)	3.81 (96.8)	7.62 (193.5)
J	**K**	**L**	**M**
1.31 (33.3)	.59 (15)	6.57 (166.8)	2.09 (53.1)
N			
1.22 (31)			

Inches (mm)

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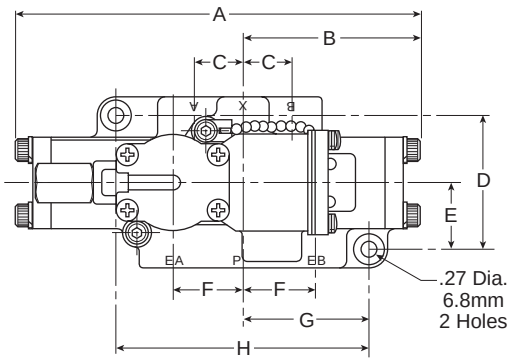
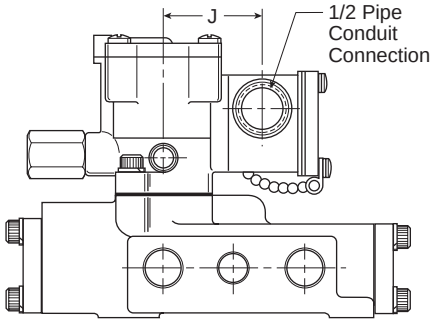
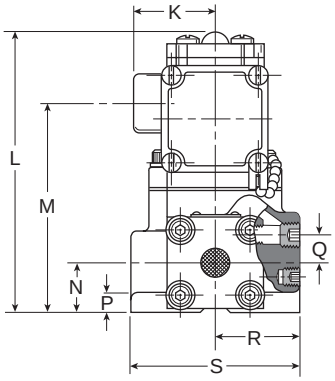


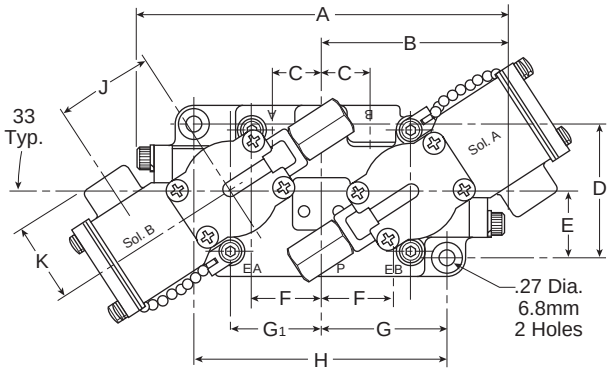


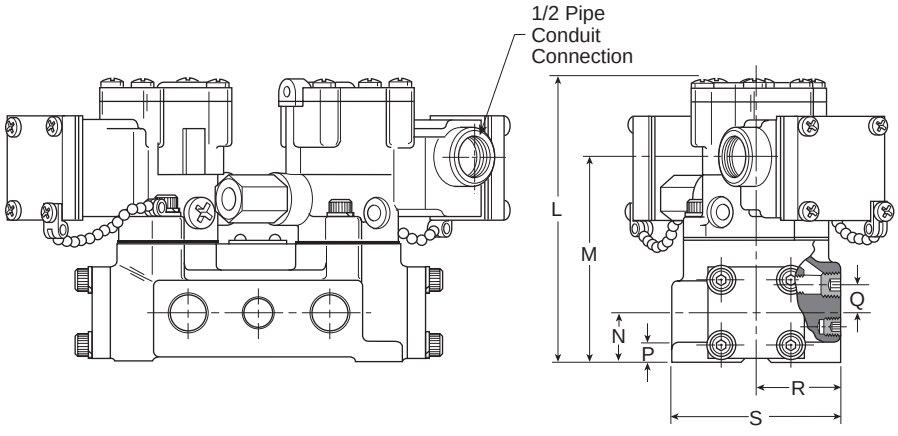


Dimensions

A 7.56 (192)	**B** 3.32 (84.3)	**C** .90 (22.9)	**D** 2.56 (65)
E 1.28 (32.5)	**F** 1.33 (33.8)	**G** 2.34 (59.4)	**H** 4.69 (119.1)
J 1.82 (46.2)	**K** 1.50 (38.1)	**L** 5.35 (135.9)	**M** 3.91 (99.3)
N .94 (23.9)	**P** .38 (9.7)	**Q** .53 (13.5)	**R** 1.62 (41.1)
S 3.25 (82.6)			

Inches (mm)





Dimensions

A 7.56 (192)	**B** 3.32 (84.3)	**C** .90 (22.9)	**D** 2.56 (65)
E 1.28 (32.5)	**F** 1.33 (33.8)	**G** 2.34 (59.4)	**G1** 1.66 (42.4)
H 4.69 (119.1)	**J** 1.82 (46.2)	**K** 1.50 (38.1)	**L** 5.35 (135.9)
M 3.91 (99.3)	**N** .94 (23.9)	**P** .38 (9.7)	**Q** .53 (13.5)
R 1.62 (41.1)	**S** 3.25 (82.6)		

Inches (mm)

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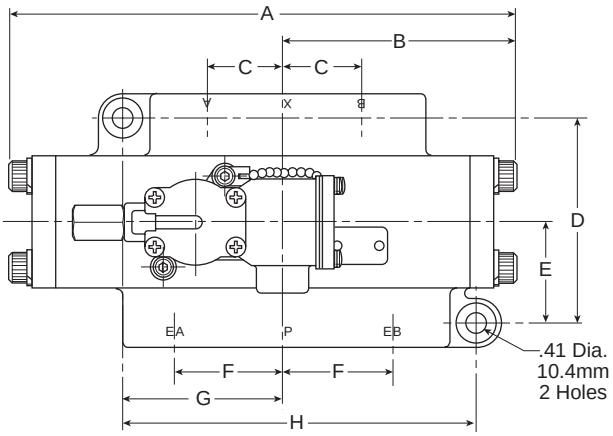
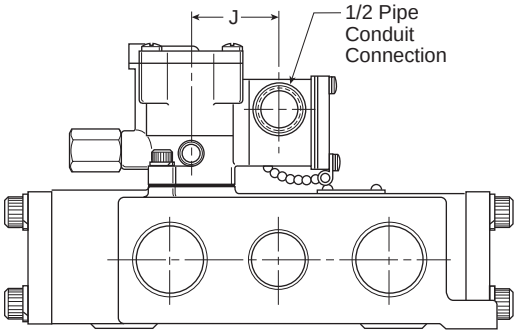
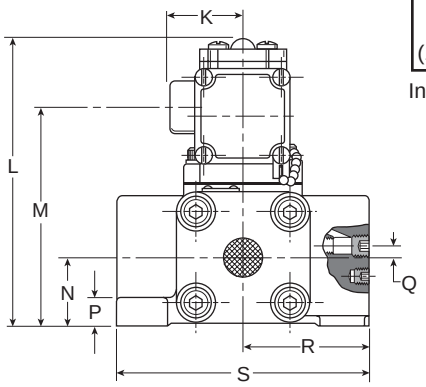


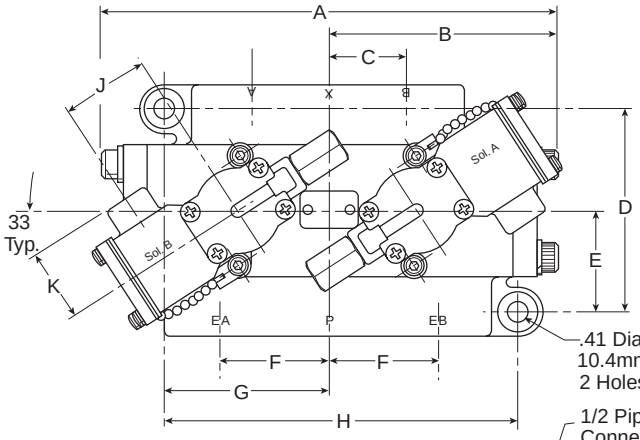


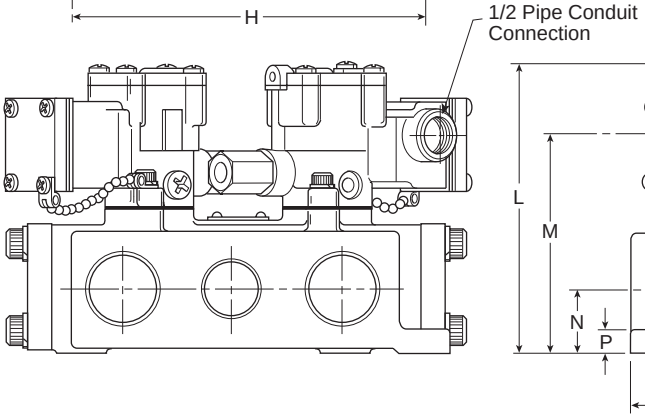


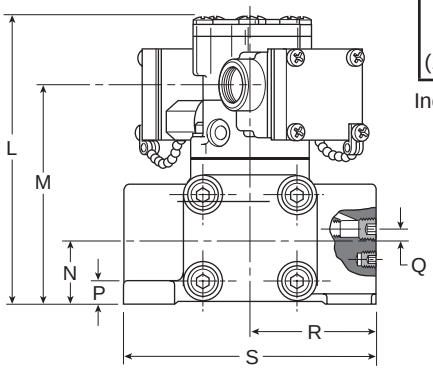
Dimensions

A	B	C	D
10.46 (265.7)	4.75 (120.6)	1.62 (41.1)	4.25 (108)
E	**F**	**G**	**H**
2.12 (53.8)	2.19 (55.6)	3.44 (87.4)	7.44 (189)
J	**K**	**L**	**M**
1.82 (46.2)	1.50 (38.1)	6.44 (163.6)	4.95 (125.7)
N	**P**	**Q**	**R**
1.50 (38.1)	.69 (17.5)	.20 (5.1)	2.62 (66.5)
S			
5.25 (133.4)			

Inches (mm)







Dimensions

A	B	C	D
9.50 (241.3)	4.75 (120.6)	1.62 (41.1)	4.25 (108)
E	**F**	**G**	**H**
2.12 (53.8)	2.19 (55.6)	3.44 (87.4)	7.44 (189)
J	**K**	**L**	**M**
1.82 (46.2)	1.50 (38.1)	6.44 (163.6)	4.95 (125.7)
N	**P**	**Q**	**R**
1.50 (38.1)	.69 (17.5)	.20 (5.1)	2.62 (66.5)
S			
5.25 (133.4)			

Inches (mm)

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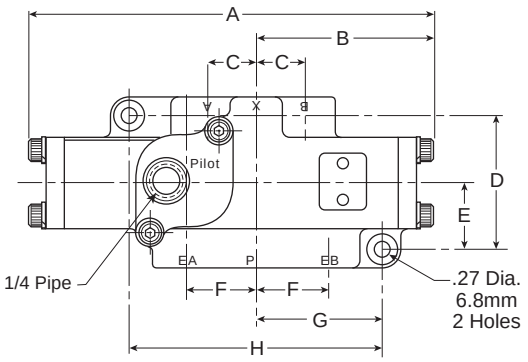
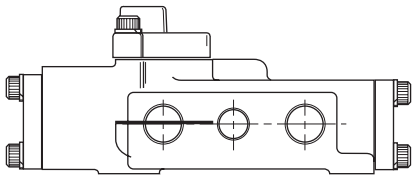
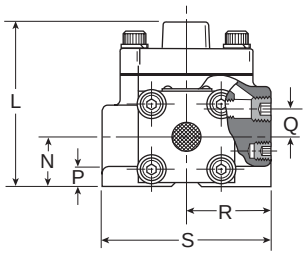


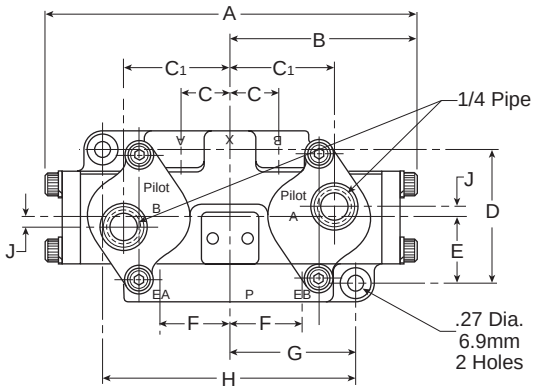


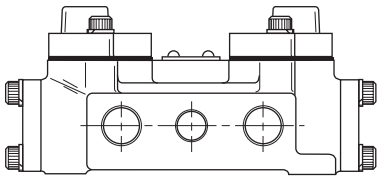


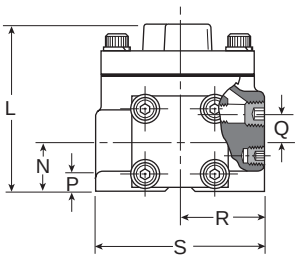
Dimensions

A	B	C	D
7.56 (192)	3.32 (84.3)	.90 (22.9)	2.56 (65)
E	**F**	**G**	**H**
1.28 (32.5)	1.33 (33.8)	2.34 (59.4)	4.69 (119.1)
L	**N**	**P**	**Q**
3.18 (80.8)	.94 (23.9)	.38 (9.7)	.53 (13.5)
R	**S**		
1.62 (41.1)	3.25 (82.6)		

Inches (mm)







Dimensions

A	B	C	C_1
6.64 (168.7)	3.32 (84.3)	.90 (22.9)	1.98 (50.3)
D	**E**	**F**	**G**
2.56 (65)	1.28 (32.5)	1.33 (33.8)	2.34 (59.4)
H	**J**	**L**	**N**
4.69 (119.1)	.22 (5.6)	3.05 (77.5)	.94 (23.9)
P	**Q**	**R**	**S**
.38 (9.7)	.53 (13.5)	1.62 (41.1)	3.25 (82.6)

Inches (mm)

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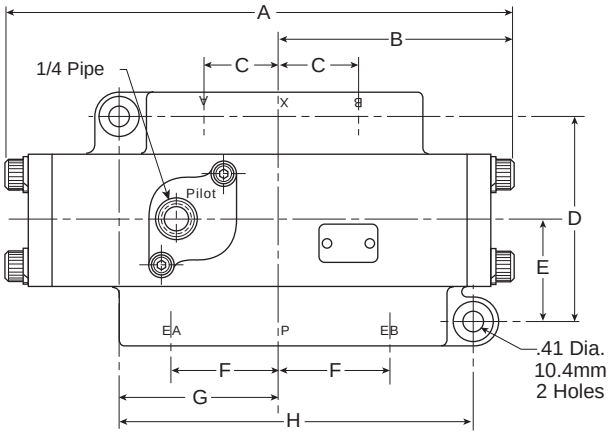
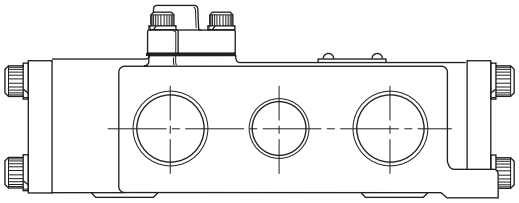
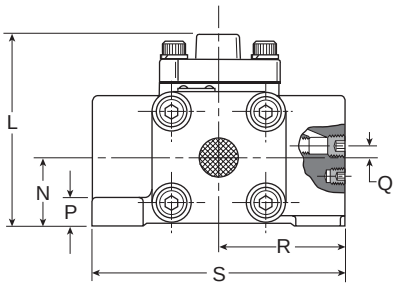


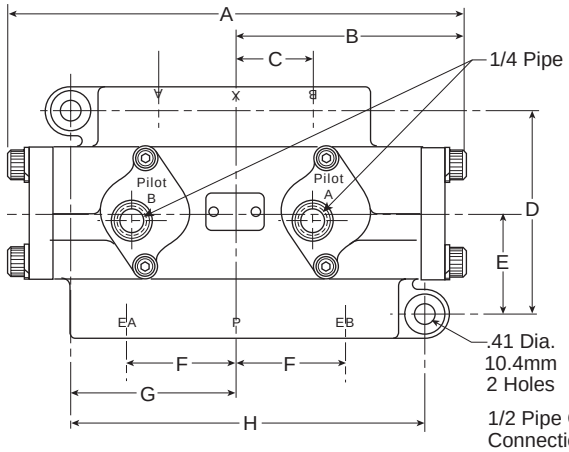


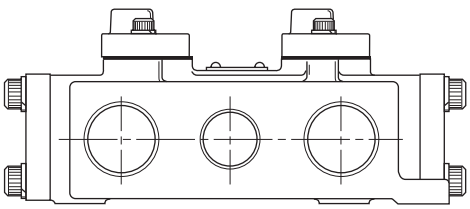


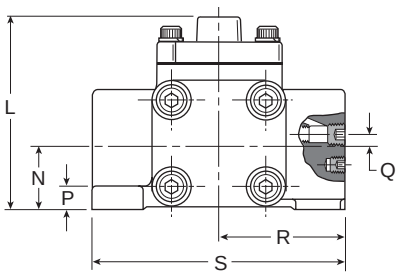
Dimensions

A	B	C	D
10.46 (265.7)	4.75 (120.6)	1.62 (41.1)	4.25 (108)
E	**F**	**G**	**H**
2.12 (53.8)	2.19 (55.6)	3.44 (87.4)	7.44 (189)
L	**N**	**P**	**Q**
4.09 (103.9)	1.50 (38.1)	.69 (17.5)	.20 (5.1)
R	**S**		
2.62 (66.5)	5.25 (133.4)		

Inches (mm)







Dimensions

A	B	C	D
9.50 (241.3)	4.75 (120.6)	1.62 (41.1)	4.25 (108)
E	**F**	**G**	**H**
2.12 (53.8)	2.19 (55.6)	3.44 (87.4)	7.44 (189)
L	**N**	**P**	**Q**
4.09 (103.9)	1.50 (38.1)	.69 (17.5)	.20 (5.1)
R	**S**		
2.62 (66.5)	5.25 (133.4)		

Inches (mm)

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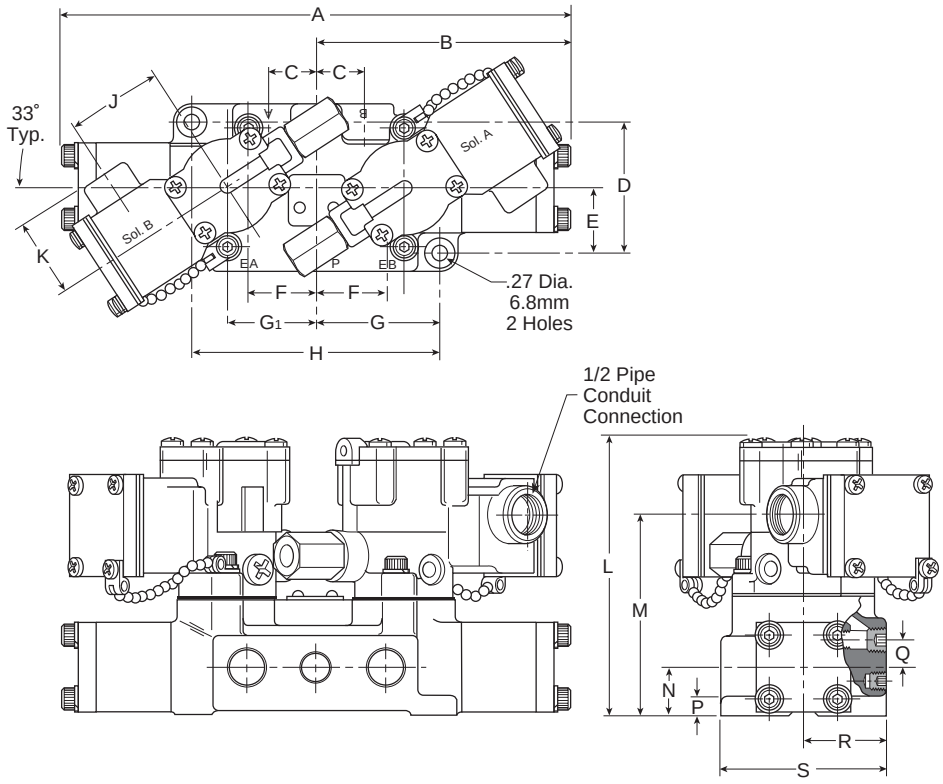
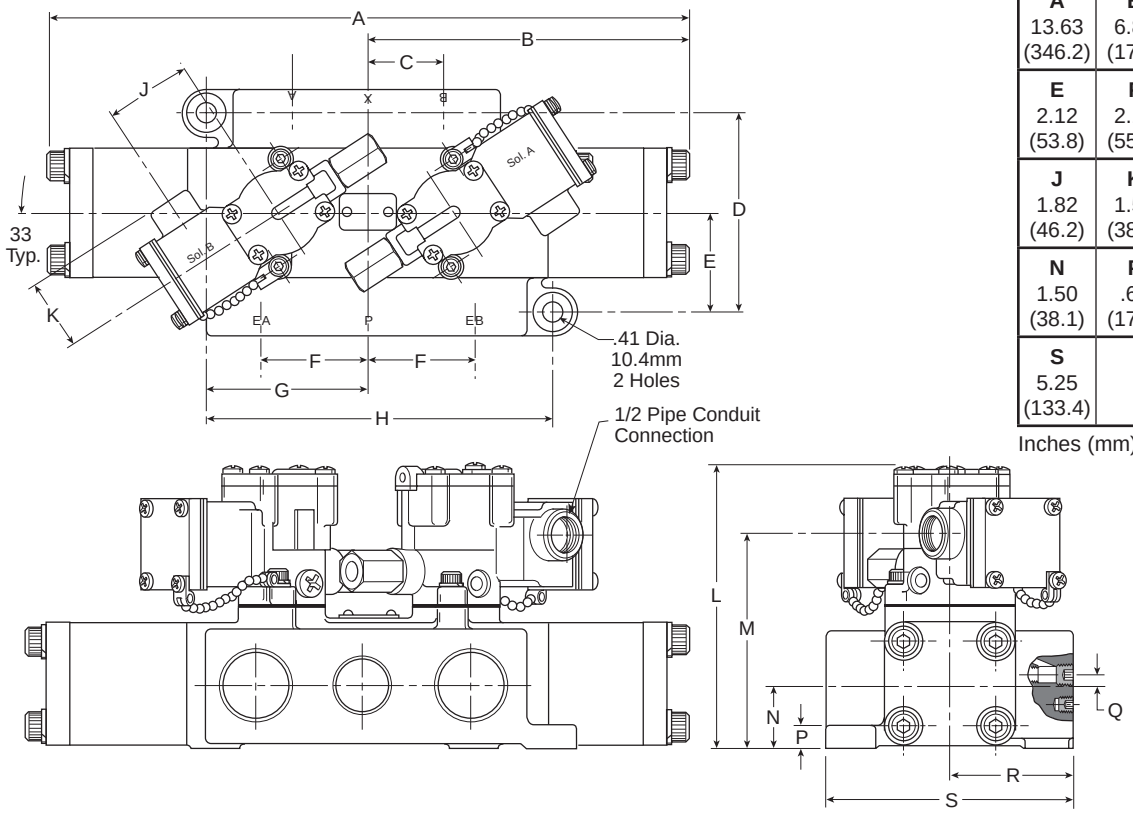


Dimensions

A	B	C	D
9.64 (244.8)	4.82 (122.4)	.90 (22.9)	2.56 (65)
E	**F**	**G**	**G1**
1.28 (32.5)	1.33 (33.8)	2.34 (59.4)	1.66 (42.4)
H	**J**	**K**	**L**
4.69 (119.1)	1.82 (46.2)	1.50 (38.1)	5.35 (135.9)
M	**N**	**P**	**Q**
3.91 (99.3)	.94 (23.9)	.38 (9.7)	.53 (13.5)
R	**S**		
1.62 (41.1)	3.25 (82.6)		

Inches (mm)



Dimensions

A	B	C	D
13.63 (346.2)	6.81 (173)	1.62 (41.1)	4.25 (108)
E	**F**	**G**	**H**
2.12 (53.8)	2.19 (55.6)	3.44 (87.4)	7.44 (189)
J	**K**	**L**	**M**
1.82 (46.2)	1.50 (38.1)	6.44 (163.6)	4.95 (125.7)
N	**P**	**Q**	**R**
1.50 (38.1)	.69 (17.5)	.20 (5.1)	2.62 (66.5)
S			
5.25 (133.4)			

Inches (mm)

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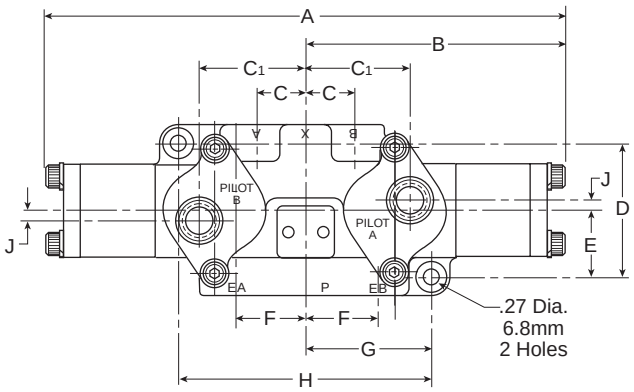
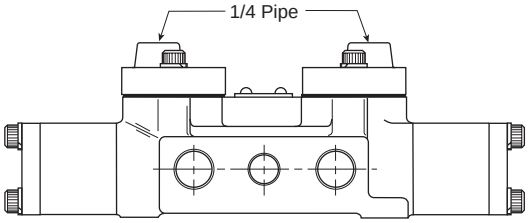
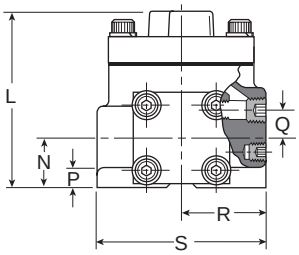


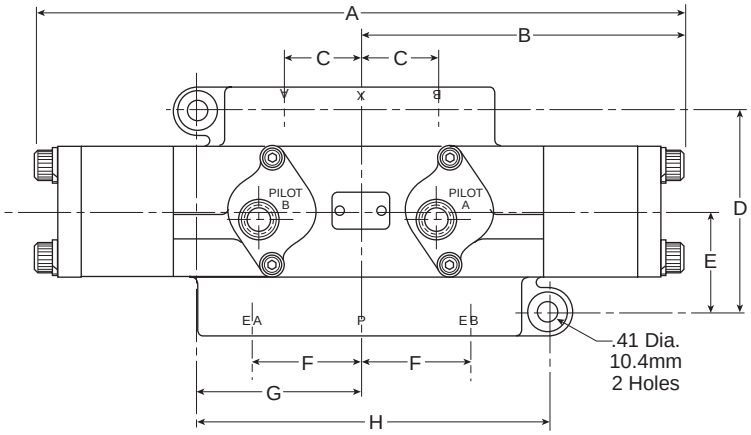


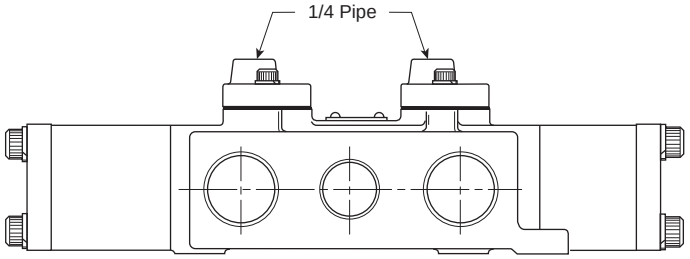


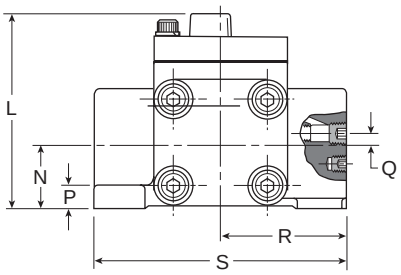
Dimensions

A	B	C	C1
9.64 (244.8)	4.82 (122.4)	.90 (22.9)	1.98 (50.3)
D	**E**	**F**	**G**
2.56 (65)	1.28 (32.5)	1.33 (33.8)	2.34 (59.4)
H	**J**	**L**	**N**
4.69 (119.1)	.22 (5.6)	3.05 (77.5)	.94 (23.9)
P	**Q**	**R**	**S**
.38 (9.7)	.53 (13.5)	1.62 (41.1)	3.25 (82.6)

Inches (mm)







Dimensions

A	B	C	D
13.63 (346.2)	6.81 (173)	1.62 (41.1)	4.25 (108)
E	**F**	**G**	**H**
2.12 (53.8)	2.19 (55.6)	3.44 (87.4)	7.44 (189)
L	**N**	**P**	**Q**
6.44 (163.6)	1.50 (38.1)	.69 (17.5)	.20 (5.1)
R	**S**		
2.62 (66.5)	5.25 (133.4)		

Inches (mm)

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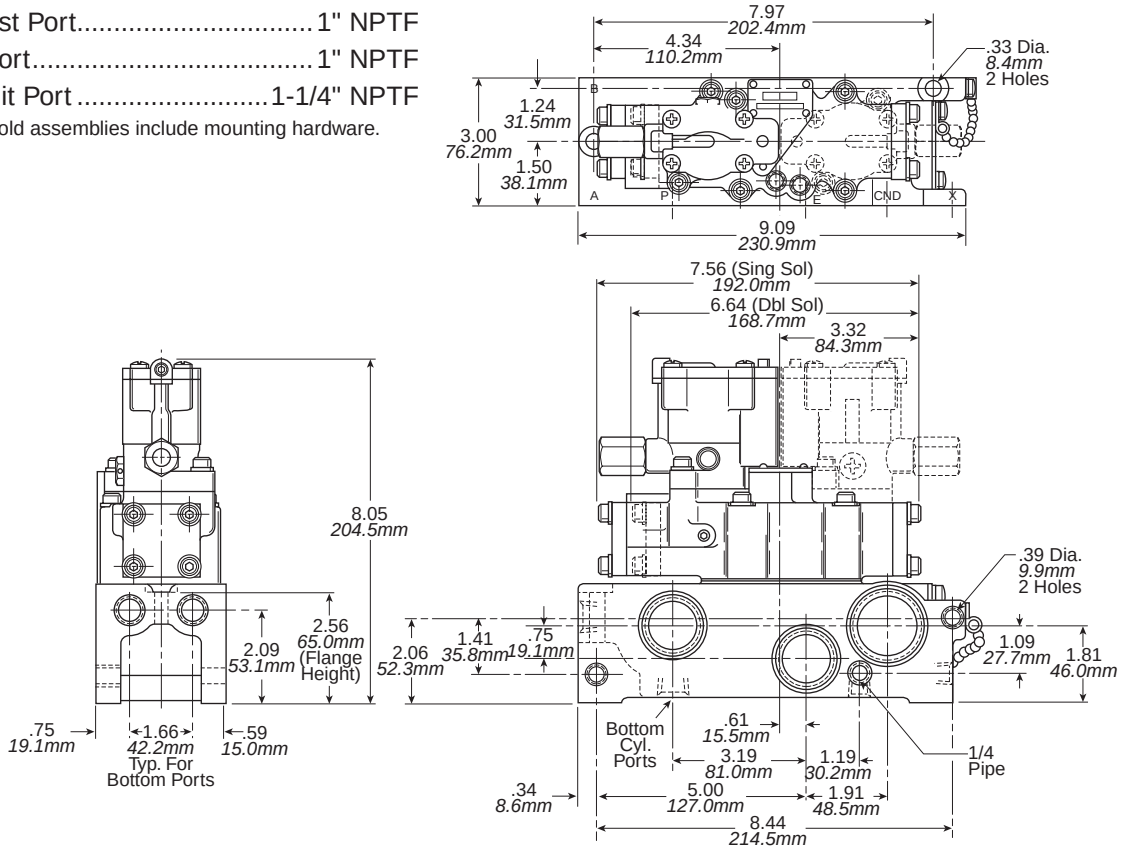
3/8" Basic

K142230 ..... Cyl. Ports 3/8" NPTF
K142231 ..... Cyl. Ports 1/2" NPTF
K142270 ..... Cyl. Ports 3/4" NPTF
Exhaust Port..... 1" NPTF
Inlet Port..... 1" NPTF
Conduit Port ..... 1-1/4" NPTF

Note: Manifold assemblies include mounting hardware.



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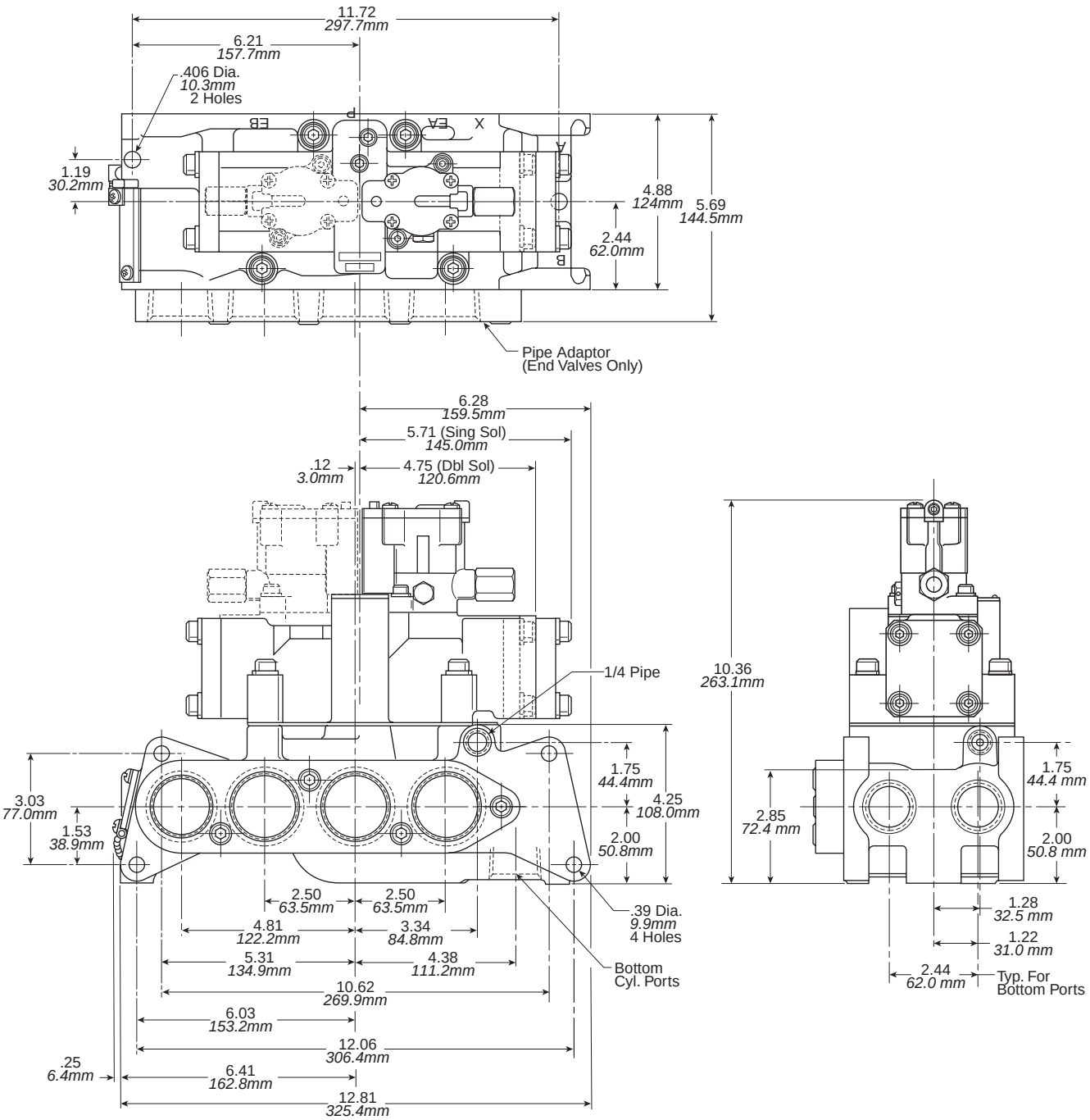
1" Basic

K142236 ..... Cyl. Ports 1" NPTF
K122016 ..... End Plate Kit (Both Plates)
Exhaust Port..... 1-1/2" NPTF (Port Plate)
Inlet Port..... 1-1/2" NPTF (Port Plate)
Conduit Port ..... 1-1/4" NPTF (Port Plate)

Note:

K142236 dimension is for reference only. The manifold is discontinued as of August 15, 2008.



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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.

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.

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Offer of Sale

The goods, services or work (referred to as the "Products") offered by **Parker-Hannifin Corporation**, its subsidiaries, groups, divisions, and authorized distributors ("Seller") are offered for sale at prices indicated in the offer, or as may be established by Seller. The offer to sell the Products and acceptance of Seller's offer by any customer ("Buyer") is contingent upon, and will be governed by all of the terms and conditions contained in this Offer of Sale. Buyer's order for any Products specified in Buyer's purchase document or Seller's offer, proposal or quote ("Quote") attached to the purchase order, when communicated to Seller verbally, or in writing, shall constitute acceptance of this offer.

1. Terms and Conditions. Seller's willingness to offer Products for sale or accept an order for Products is subject to the terms and conditions contained in this Offer of Sale or any newer version of the same, published by Seller electronically at www.parker.com/saleterms/. Seller objects to any contrary or additional terms or conditions of Buyer's order or any other document or other communication issued by Buyer.

2. Price; Payment. Prices stated on Seller's Quote are valid for thirty (30) days, except as explicitly otherwise stated therein, and do not include any sales, use, or other taxes or duties unless specifically stated. Seller reserves the right to modify prices to adjust for any raw material price fluctuations. Unless otherwise specified by Seller, all prices are F.C.A. Seller's facility (INCOTERMS 2010). Payment is subject to credit approval and payment for all purchases is due thirty (30) days from the date of invoice (or such date as may be specified by Seller's Credit Department). Unpaid invoices beyond the specified payment date incur interest at the rate of 1.5% per month or the maximum allowable rate under applicable law.

3. Shipment; Delivery; Title and Risk of Loss. All delivery dates are approximate. Seller is not responsible for damages resulting from any delay. Regardless of the manner of shipment, delivery occurs and title and risk of loss or damage pass to Buyer, upon placement of the Products with the shipment carrier at Seller's facility. Unless otherwise stated, Seller may exercise its judgment in choosing the carrier and means of delivery. No deferment of shipment at Buyers' request beyond the respective dates indicated will be made except on terms that will indemnify, defend and hold Seller harmless against all loss and additional expense. Buyer shall be responsible for any additional shipping charges incurred by Seller due to Buyer's acts or omissions.

4. Warranty. Seller warrants that the Products sold hereunder shall be free from defects in material or workmanship for a period of twelve (12) months from the date of delivery or 2,000 hours of normal use, whichever occurs first. All prices are based upon the exclusive limited warranty stated above, and upon the following disclaimer: DISCLAIMER OF WARRANTY: THIS WARRANTY IS THE SOLE AND ENTIRE WARRANTY PERTAINING TO PRODUCTS PROVIDED. SELLER DISCLAIMS ALL OTHER WARRANTIES, EXPRESS AND IMPLIED, INCLUDING DESIGN, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

5. Claims; Commencement of Actions. Buyer shall promptly inspect all Products upon receipt. No claims for shortages will be allowed unless reported to the Seller within ten (10) days of delivery. No other claims against Seller will be allowed unless asserted in writing within thirty (30) days after delivery. Buyer shall notify Seller of any alleged breach of warranty within thirty (30) days after the date the defect is or should have been discovered by Buyer. Any claim or action against Seller based upon breach of contract or any other theory, including tort, negligence, or otherwise must be commenced within twelve (12) months from the date of the alleged breach or other alleged event, without regard to the date of discovery.

6. LIMITATION OF LIABILITY. IN THE EVENT OF A BREACH OF WARRANTY, SELLER WILL, AT ITS OPTION, REPAIR OR REPLACE A DEFECTIVE PRODUCT, OR REFUND THE PURCHASE PRICE WITHIN A REASONABLE PERIOD OF TIME. **IN NO EVENT IS SELLER LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR AS THE RESULT OF, THE SALE, DELIVERY, NON-DELIVERY, SERVICING, USE OR LOSS OF USE OF THE PRODUCTS OR ANY PART THEREOF, OR FOR ANY CHARGES OR EXPENSES OF ANY NATURE INCURRED WITHOUT SELLER'S WRITTEN CONSENT, WHETHER BASED IN CONTRACT, TORT OR OTHER LEGAL THEORY. IN NO EVENT SHALL SELLER'S LIABILITY UNDER ANY CLAIM MADE BY BUYER EXCEED THE PURCHASE PRICE OF THE PRODUCTS.**

7. User Responsibility. The user, through its own analysis and testing, is solely responsible for making the final selection of the system and Product and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application and follow applicable industry standards and Product information. If Seller provides Product or system options based upon data or specifications provided by the user, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the Products or systems.

8. Loss to 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, will be considered obsolete and may be destroyed by Seller after two (2) consecutive years have elapsed without Buyer ordering the items 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. Special Tooling. A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture Products. 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 Products, even if such apparatus has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller has the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

10. Buyer's Obligation; Rights of Seller. To secure payment of all sums due or otherwise, Seller retains a security interest in all Products delivered to Buyer and this agreement is deemed to be a Security Agreement under the Uniform Commercial Code. Buyer authorizes Seller as its attorney to execute and file on Buyer's behalf all documents Seller deems necessary to perfect its security interest.

11. Improper Use and Indemnity. Buyer shall indemnify, defend, and hold Seller harmless from any losses, claims, liabilities, damages, lawsuits, judgments and costs (including attorney fees and defense costs), whether for personal injury, property damage, patent, trademark or copyright infringement or any other claim, brought by or incurred by Buyer, Buyer's employees, or any other person, arising out of: (a) improper selection, application, design, specification or other misuse of Products purchased by Buyer from Seller; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of patterns, plans, drawings, or specifications furnished by Buyer to manufacture Products; or (d) Buyer's failure to comply with these terms and conditions. Seller shall not indemnify Buyer under any circumstance except as otherwise provided.

12. Cancellations and Changes. Buyer may not cancel or modify or cancel any order for any reason, except with Seller's written consent and upon terms that will indemnify, defend and hold Seller harmless against all direct, incidental and consequential loss or damage. Seller may change Product features, specifications, designs and availability.

13. Limitation on Assignment. Buyer may not assign its rights or obligations under this agreement without the prior written consent of Seller.

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

15. Waiver and Severability. Failure to enforce any provision of this agreement will not invalidate that provision; nor will any such failure prejudice Seller's right to enforce that provision in the future. Invalidation of any provision of this agreement by legislation or other rule of law shall not invalidate any other provision herein. The remaining provisions of this agreement will remain in full force and effect.

16. Termination. Seller may terminate this agreement for any reason and at any time by giving Buyer thirty (30) days prior written notice. Seller may immediately terminate this agreement, in writing, if Buyer: (a) breaches any provision of this agreement (b) appoints a trustee, receiver or custodian for all or any part of Buyer's property (c) files a petition for relief in bankruptcy on its own behalf, or one if filed by a third party (d) makes an assignment for the benefit of creditors; or (e) dissolves its business or liquidates all or a majority of its assets.

17. Governing Law. This agreement and the sale and delivery of all Products are deemed to have taken place in, and shall be governed and construed in accordance with, the laws of the State of Ohio, as applicable to contracts executed and wholly performed therein and without regard to conflicts of laws principles. Buyer irrevocably agrees and consents to the exclusive jurisdiction and venue of the courts of Cuyahoga County, Ohio with respect to any dispute, controversy or claim arising out of or relating to this agreement.

18. Indemnity for Infringement of Intellectual Property Rights. Seller is not liable for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Section. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets ("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 a Product sold pursuant to this agreement 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 a Product 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 the Product, replace or modify the Product so as to make it noninfringing, or offer to accept return of the Product and refund the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller is not liable for claims of infringement based on information provided by Buyer, or directed to Products 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 Product sold hereunder. The foregoing provisions of this Section constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

19. Entire Agreement. This agreement contains the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of sale. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter are herein merged. The terms contained herein may not be modified unless in writing and signed by an authorized representative of Seller.

20. Compliance with Laws. Buyer agrees to comply with all applicable laws, regulations, and industry and professional standards of care, including those of the United Kingdom, the United States of America, and the country or countries in which Buyer may operate, including without limitation the U. K. Bribery Act, the U.S. Foreign Corrupt Practices Act ("FCPA"), the U.S. Anti-Kickback Act ("Anti-Kickback Act") and the U.S. Food Drug and Cosmetic Act ("FDCA"),each as currently amended, and the rules and regulations promulgated by the U.S. Food and Drug Administration ("FDA"), and agrees to indemnify and hold harmless Seller from the consequences of any violation of such provisions by Buyer, its employees or agents. Buyer acknowledges that it is familiar with the provisions of the U. K. Bribery Act, the FCPA, the FDA, and the Anti-Kickback Act, and certifies that Buyer will adhere to the requirements thereof. In particular, Buyer represents and agrees that Buyer will not make any payment or give anything of value, directly or indirectly to any governmental official, any foreign political party or official thereof, any candidate for foreign political office, or any commercial entity or person, for the purpose of influencing such person to purchase Products or otherwise benefit the business of Seller.

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