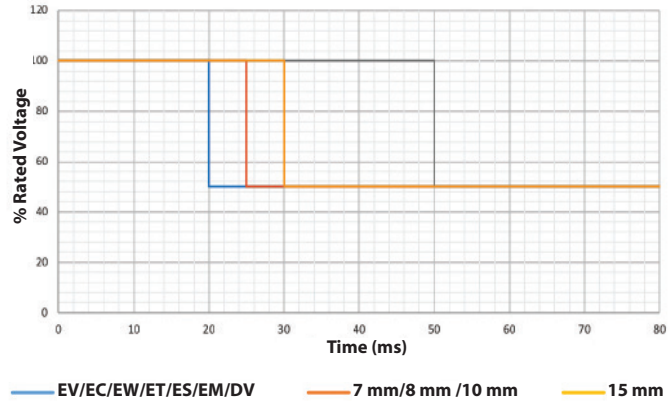


HIT & HOLD CIRCUIT RECOMMENDATIONS

Hit and hold circuits allow valves to be held on for long periods of time at a lower voltage than their rated voltage. The general principle is that the valve is energized to full power for a short period of time before dropping the voltage and current to a specified level. In a typical hit and hold circuit, the hit is at the standard rated voltage for a specified period of time. The hold is usually 50% (or less) of the rated voltage. Here are some of our recommendations for designing successful hit and hold circuits using Clippard valves.



EV, ES, EM, AND DV VALVES

For our standard mouse valves, Clippard recommends hitting the valve with 100% of the rated voltage for 20 ms minimum, and then dropping the voltage to 50% of the rated value. If the valve is being used with reverse flow, the hit time may need to be extended depending on the pressure.

- EV Series (p. 4)
- ES (p. 23)
- EM Series (p. 22)
- DV Series (p. 32)

Example:

For a 12 VDC valve, hit the valve with 12 VDC for 20 ms, then drop the voltage to 6 VDC



7 MM (SV), 8 MM (ST), AND 10 MM VALVES

For our 7 mm, 8 mm, and 10 mm valves, Clippard recommends hitting the valve with 100% of the rated voltage for 25 ms minimum, and then dropping the voltage to 50% of the rated value.

- 7 mm SV Series (p. 29)
- 8 mm ST Series (p. 30)
- 10 mm (p. 40)

Example:

For a 12 VDC valve, hit the valve with 12 VDC for 25 ms, then drop the voltage to 6 VDC

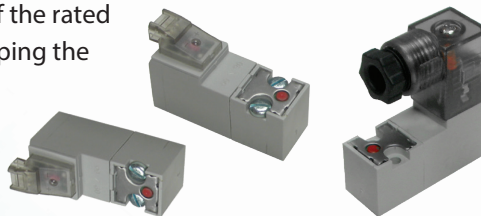
15 MM VALVES

For our 15 mm manifold mounted valves, Clippard recommends hitting the valve with 100% of the rated voltage for 30 ms minimum, and then dropping the voltage to 50% of the rated value.

- 15 mm (p. 42)

Example:

For a 12 VDC valve, hit the valve with 12 VDC for 30 ms, then drop the voltage to 6 VDC



10 & 15 MM MINIATURE VALVES

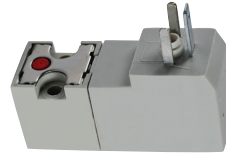
All of the benefits of Clippard quality and reliability are available in these 10 mm and 15 mm miniature valves. Offered in both Normally-Open or Normally-Closed models, these 2-Way and 3-Way valves are perfect for small areas where compact electronically-controlled pneumatics are needed.

A high strength, engineered lightweight glass-filled nylon body—along with stainless steel, FKM and nitrile—makes this series suitable for a broad range of applications. With exceptional life and reliability, this versatile miniature valve is a smart choice for many types of systems across many different industries.



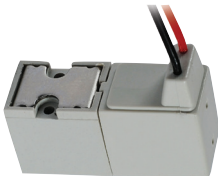
10 MM STANDARD

Direct operating valves well-suited for single- or multiple-valve mounting in small spaces.
(90° connector shown)



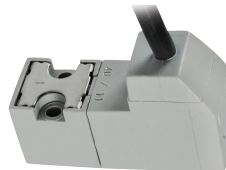
15 MM STANDARD

Direct operating valves well-suited for single- or multiple-valve mounting in small spaces.
(DIN connector shown)



10 MM LATCHING

A short pulse of current shifts this valve which “latches” indefinitely; another pulse returns the valve.
(Wire leads shown)



15 MM LATCHING

A short pulse of current shifts this valve which “latches” indefinitely; another pulse returns the valve.
(Wire lead shown)



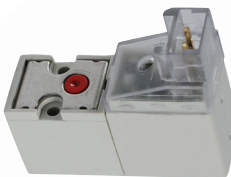
10 MM HIGH FLOW 2-WAY

Specialty series for high flow applications.
(In-line connector shown)



15 MM HIGH FLOW 2-WAY

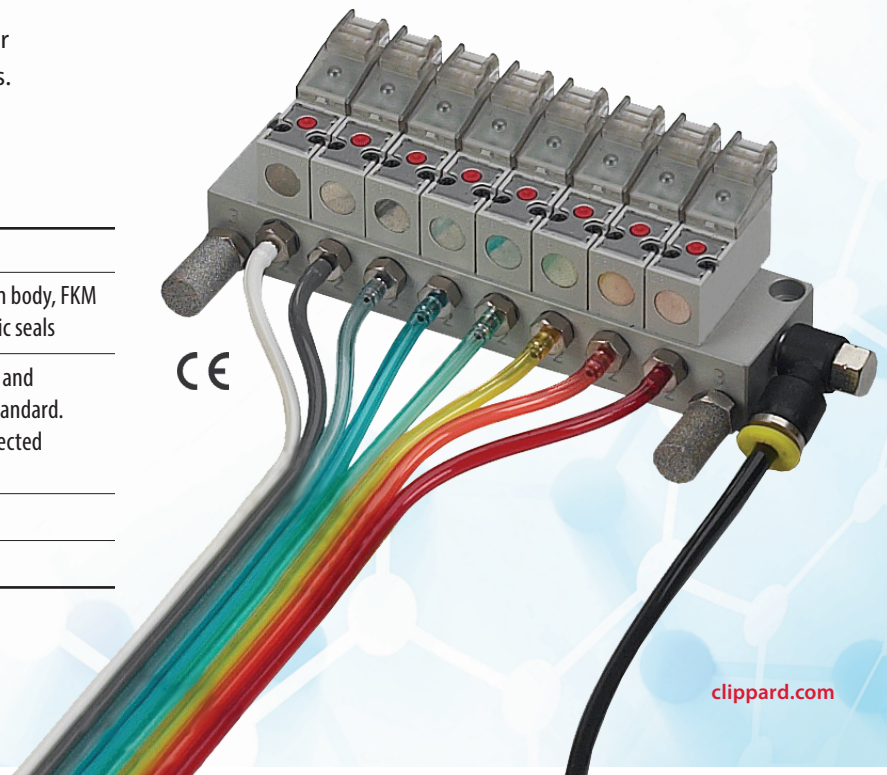
Specialty series for high flow applications.
(In-line connector shown)



10 MM ISO 15218 SERIES

Conforms to ISO standard for mounting and port locations.
(90° connector shown)

Medium	Air, gas, or other compatible fluids
Material	Stainless steel core and springs, Nylon body, FKM dynamic seals, nitrile gasket and static seals
Electrical	The coil is constructed of copper wire and insulated according to the class "F" standard. All circuitry and connections are protected from corrosion
CE, RoHS Compliant	
More Details	clippard.com/link/10-15mm

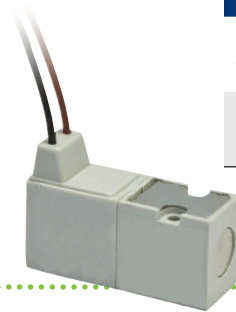


10 MM MINIATURE VALVES

LATCHING 10 MM MINIATURE VALVES

Clippard's Latching series features a careful balance of forces—through the precise placement of a permanent magnet in the valve core—produces a bi-stable valve. A short pulse of current opens the valve, which “latches” open indefinitely after the current stops. A subsequent pulse of current in the opposite direction closes the valve. The valve consumes less energy and produces less heat than a standard solenoid valve.

Working Pressure	0 to 100 psig
Flow Rate	30 l/min @ 100 psig
Orifice	0.030"
Electrical Connection	2-Wire reverse polarity, 300 mm, 24 AWG
Wattage	2.0 watts
Voltage Tolerance	±10%
Connector	Wire leads



- 2-Way & 3-Way Normally-Closed configurations
- Pulse-actuated (on or off)
- Polarity reverse required
- Stable latch

Minimum order quantities may apply.

Type	Part No.	Voltage
2-Way	E2L10C-7W012	12 VDC
	E2L10C-7W024	24 VDC
3-Way	E3L10C-7W012	12 VDC
	E3L10C-7W024	24 VDC

HIGH FLOW 2-WAY 10 MM MINIATURE VALVES

Working Pressure	0 to 40 psig
Flow Rate	35 l/min @ 40 psig
Orifice	0.055"
Power Consumption	3.5 watts in-rush phase; 0.35 watts maintenance phase
Voltage Tolerance	±10%

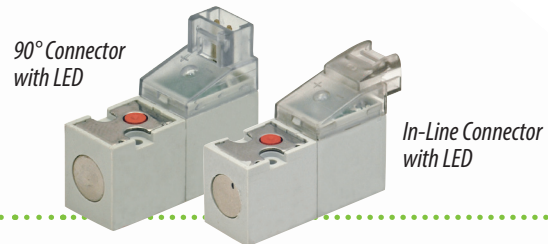


10 MM HIGH FLOW SINGLE-STATION MANIFOLD

Spare hardware available.

Part No.	Description
E10HM-01	10 mm Single-Station Manifold

Part No.	Connector	Voltage
E210H-3L012	90° Connector with LED	12 VDC
E210H-3L024		24 VDC
E210H-3C012	In-Line Connector with LED	12 VDC
E210H-3C024		24 VDC



ISO 15218 10 MM 3-WAY MINIATURE VALVES

Working Pressure	0 to 100 psig
Flow Rate	42 l/min @ 100 psig
Orifice	0.043" (inlet to outlet), 0.051" (outlet to exhaust)
Power Consumption	3.5 watts in-rush phase; 0.35 watts maintenance phase
Voltage Tolerance	±10%

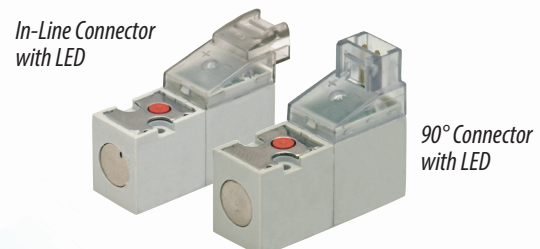


10 MM SINGLE-STATION ISO MANIFOLD

Spare hardware available.

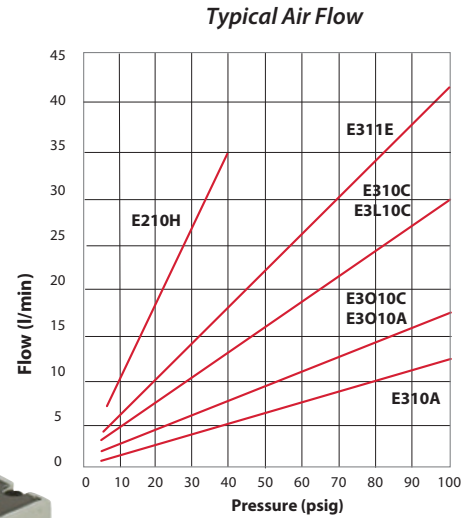
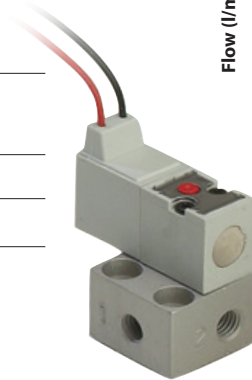
Part No.	Description
E10LM-01	ISO 10 mm Single-Station Manifold

Part No.	Connector	Voltage
E311E-3L012	90° Connector with LED	12 VDC
E311E-3L024		24 VDC
E311E-3C012	In-Line Connector with LED	12 VDC
E311E-3C024		24 VDC



10 MM MINIATURE VALVES

Medium	Air, gas, or other compatible fluids
Flow Rate	0.020" Orifice: 13 l/min @ 100 psig 0.030" Orifice: 30 l/min @ 100 psig 0.028" Orifice: 17 l/min @ 100 psig
Response Time	0.6 Watts: 10 ms nominal 1.3 Watts: 8 ms nominal
Voltage Tolerance	±10%
Power Consumption	0.6 or 1.3 watts <i>Dependent on orifice size and pressure</i>
Material	Stainless steel core and springs, nylon body, FKM dynamic seals, nitrile gasket and static seals
Coil Insulation Class	F 311°F
Temperature Range	14 to 122°F (If below 32°F, must use clean, dry air)
CE, RoHS Compliant	



For more details, visit clippard.com/link/10-15mm

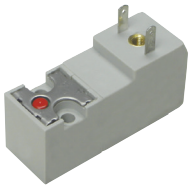
Type	Base Part No.*	Connector	Orifice	Wattage	Working Pressure
2-Way Normally-Closed 	E210A-1E □□□	90° Connector	0.020"	0.6 watts	0 to 100 psig
	E210C-2E □□□		0.030"	1.3 watts	0 to 100 psig
	E210A-1L □□□	90° Connector with LED	0.020"	0.6 watts	0 to 100 psig
	E210C-2L □□□		0.030"	1.3 watts	0 to 100 psig
	E210A-1F □□□	In-Line Connector	0.020"	0.6 watts	0 to 100 psig
	E210C-2F □□□		0.030"	1.3 watts	0 to 100 psig
	E210A-1C □□□	In-Line Connector with LED	0.020"	0.6 watts	0 to 100 psig
	E210C-2C □□□		0.030"	1.3 watts	0 to 100 psig
E210A-1W □□□	Wire Leads, 11.8"	0.020"	0.6 watts	0 to 100 psig	
E210C-2W □□□		0.030"	1.3 watts	0 to 100 psig	
3-Way Normally-Closed 	E310A-1E □□□	90° Connector	0.020"	0.6 watts	0 to 100 psig
	E310C-2E □□□		0.030"	1.3 watts	0 to 100 psig
	E310A-1L □□□	90° Connector with LED	0.020"	0.6 watts	0 to 100 psig
	E310C-2L □□□		0.030"	1.3 watts	0 to 100 psig
	E310A-1F □□□	In-Line Connector	0.020"	0.6 watts	0 to 100 psig
	E310C-2F □□□		0.030"	1.3 watts	0 to 100 psig
	E310A-1C □□□	In-Line Connector with LED	0.020"	0.6 watts	0 to 100 psig
	E310C-2C □□□		0.030"	1.3 watts	0 to 100 psig
E310A-1W □□□	Wire Leads, 11.8"	0.020"	0.6 watts	0 to 100 psig	
E310C-2W □□□		0.030"	1.3 watts	0 to 100 psig	
3-Way Normally-Open 	E3010A-1E □□□	90° Connector	0.020"	0.6 watts	0 to 100 psig
	E3010C-2E □□□		0.028"	1.3 watts	0 to 100 psig
	E3010A-1L □□□	90° Connector with LED	0.020"	0.6 watts	0 to 100 psig
	E3010C-2L □□□		0.028"	1.3 watts	0 to 100 psig
	E3010A-1F □□□	In-Line Connector	0.020"	0.6 watts	0 to 100 psig
	E3010C-2F □□□		0.028"	1.3 watts	0 to 100 psig
	E3010A-1C □□□	In-Line Connector with LED	0.020"	0.6 watts	0 to 100 psig
	E3010C-2C □□□		0.028"	1.3 watts	0 to 100 psig
E3010A-1W □□□	Wire Leads, 11.8"	0.020"	0.6 watts	0 to 100 psig	
E3010C-2W □□□		0.028"	1.3 watts	0 to 100 psig	

*Add voltage choice to the end of each base part number
12 VDC (012) or 24 VDC (024), Example: E210A-1C012

15 MM MINIATURE VALVES

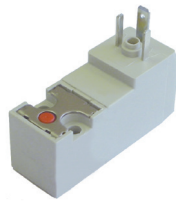
CONNECTOR OPTIONS

Terminal Connector



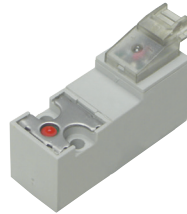
Industrial form C connector ordered separately (p. 44)

DIN Connector

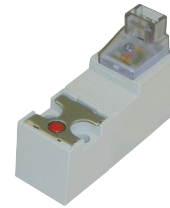


DIN connector ordered separately (p. 44)

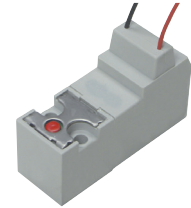
In-Line Connector with LED



90° Connector with LED



Wire Leads

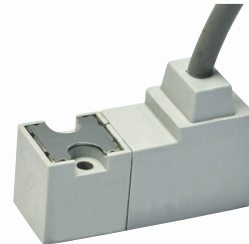
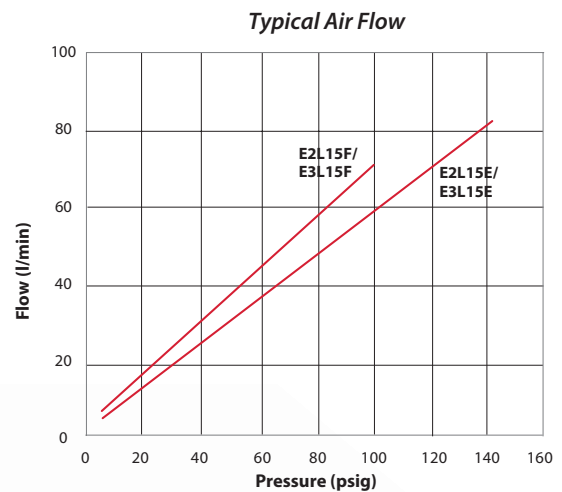


LATCHING 15 MM MINIATURE VALVES

Through the precise placement of a permanent magnet in the valve core, a careful balance of forces produces a bi-stable valve. A short pulse of current to the brown lead opens the valve, which “latches” open indefinitely after the current stops. A subsequent pulse of current to the blue lead closes the valve. The valve consumes less energy and produces less heat than a standard solenoid valve.

- Flow Rate** **0.043” Orifice:** 84 l/min @ 145 psig
 0.063” Orifice: 73 l/min @ 100 psig
- Electrical Connection** 3-Wire molded cord, 300 mm, 24 AWG 4.5 mm external jacket; tinned copper wires; silicone jacket and conductor insulation
- Voltage Tolerance** ±10%
- Wattage** 4.0 watts

Type	Part No.	Orifice	Voltage	Pressure
2-Way	E2L15E-4W012	0.043”	12 VDC	0 to 145 psig
	E2L15E-4W024	0.043”	24 VDC	0 to 145 psig
	E2L15F-4W012	0.063”	12 VDC	0 to 100 psig
	E2L15F-4W024	0.063”	24 VDC	0 to 100 psig
3-Way	E3L15E-4W012	0.043”	12 VDC	0 to 145 psig
	E3L15E-4W024	0.043”	24 VDC	0 to 145 psig
	E3L15F-4W012	0.063”	12 VDC	0 to 100 psig
	E3L15F-4W024	0.063”	24 VDC	0 to 100 psig



- 2-Way & 3-Way Normally-Closed configurations
- Pulse-actuated (on or off)
- 3-wire coil—no polarity reverse required
- Stable latch
- Minimum order quantities may apply

HIGH FLOW 2-WAY N.C. 15 MM VALVES

- Working Pressure** 0 to 50 psig
- Maximum Flow Rate** 140 l/min @ 50 psig
- Orifice** 0.118”
- Voltage Tolerance** ±10%
- Power Consumption** 2.5 watts

Part No.	Connector	Voltage
E215H-3L012	90° Connector	12 VDC
E215H-3L024	with LED	24 VDC
E215H-3C012	In-Line Connector	12 VDC
E215H-3C024	with LED	24 VDC

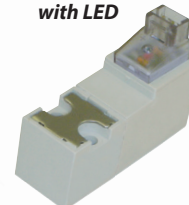


15 MM HIGH FLOW SINGLE-STATION MANIFOLD

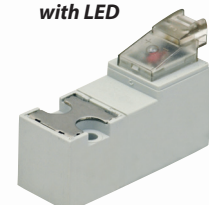
Spare hardware available.

Part No.	Description
E15HM-01	15 mm Single-Station Manifold

90° Connector with LED

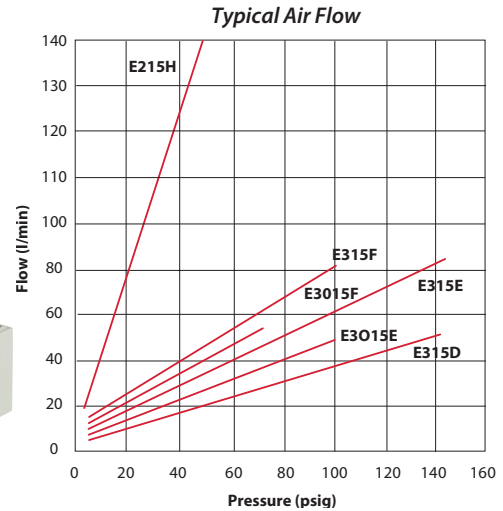
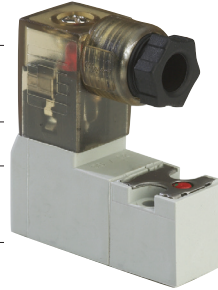


In-Line Connector with LED



15 MM MINIATURE VALVES

Medium	Air, gas, or other compatible fluids
Flow Rate	0.032" Orifice: 44 l/min @ 145 psig 0.043" Orifice: 84 l/min @ 145 psig, 50 l/min @ 100 psig 0.063" Orifice: 85 l/min @ 100 psig
Response Time	1 Watt: 8 ms nominal; 2 Watts: 6 ms nominal; 2.5 Watts: 6 ms nominal
Voltage Tolerance	±10%
Power Consumption	1.0, 2.0 or 2.5 watts <i>Dependent on orifice size and pressure</i>
Material	Stainless steel core and springs, nylon body, FKM seals, nitrile gasket
Coil Insulation Class	H 356°F / F 311°F



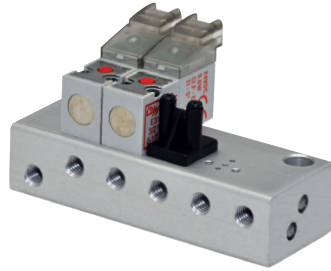
Type	Base Part No.*	Connector	Voltage					Orifice	Wattage	Working Pressure
			12 VDC	24 VDC	24 VAC	110 VAC	220 VAC			
2-Way Normally-Closed 	E215D-1T □□□□	Terminal	•	•				0.032"	1.0	0 to 145 psig
	E215E-2T □□□□		•	•	•			0.043"	2.0	0 to 145 psig
	E215F-2T □□□□		•	•	•			0.063"	2.5	0 to 100 psig
	E215D-1D □□□□	DIN Connector	•	•				0.032"	1.0	0 to 145 psig
	E215E-2D □□□□		•	•	•	•	•	0.043"	2.0	0 to 145 psig
	E215F-2D □□□□		•	•	•	•	•	0.063"	2.5	0 to 100 psig
	E215D-1W □□□□	Wire Leads, 11.8"	•	•				0.032"	1.0	0 to 145 psig
	E215E-2W □□□□		•	•	•			0.043"	2.0	0 to 145 psig
	E215F-2W □□□□		•	•	•			0.063"	2.5	0 to 100 psig
	E215D-1L □□□□	90° Connector with LED	•	•				0.032"	1.0	0 to 145 psig
	E215E-2L □□□□		•	•				0.043"	2.0	0 to 145 psig
	E215F-2L □□□□		•	•				0.063"	2.5	0 to 100 psig
E215D-1C □□□□	In-Line Connector with LED	•	•				0.032"	1.0	0 to 145 psig	
E215E-2C □□□□		•	•				0.043"	2.0	0 to 145 psig	
E215F-2C □□□□		•	•				0.063"	2.5	0 to 100 psig	
3-Way Normally-Closed 	E315D-1T □□□□	Terminal	•	•				0.032"	1.0	0 to 145 psig
	E315E-2T □□□□		•	•	•			0.043"	2.0	0 to 145 psig
	E315F-2T □□□□		•	•	•			0.063"	2.5	0 to 100 psig
	E315D-1D □□□□	DIN Connector	•	•				0.032"	1.0	0 to 145 psig
	E315E-2D □□□□		•	•	•	•	•	0.043"	2.0	0 to 145 psig
	E315F-2D □□□□		•	•	•	•	•	0.063"	2.5	0 to 100 psig
	E315D-1W □□□□	Wire Leads, 11.8"	•	•				0.032"	1.0	0 to 145 psig
	E315E-2W □□□□		•	•	•			0.043"	2.0	0 to 145 psig
	E315F-2W □□□□		•	•	•			0.063"	2.5	0 to 100 psig
	E315D-1L □□□□	90° Connector with LED	•	•				0.032"	1.0	0 to 145 psig
	E315E-2L □□□□		•	•				0.043"	2.0	0 to 145 psig
	E315F-2L □□□□		•	•				0.063"	2.5	0 to 100 psig
E315D-1C □□□□	In-Line Connector with LED	•	•				0.032"	1.0	0 to 145 psig	
E315E-2C □□□□		•	•				0.043"	2.0	0 to 145 psig	
E315F-2C □□□□		•	•				0.063"	2.5	0 to 100 psig	
3-Way Normally-Open (110 psig max.) 	E3015E-2T □□□□	Terminal	•	•	•			0.043"	2.0	0 to 100 psig
	E3015F-2T □□□□		•	•	•			0.063"	2.5	0 to 72 psig
	E3015E-2D □□□□	DIN Connector	•	•	•	•	•	0.043"	2.0	0 to 100 psig
	E3015F-2D □□□□		•	•	•	•	•	0.063"	2.5	0 to 72 psig
	E3015E-2W □□□□	Wire Leads, 11.8"	•	•	•			0.043"	2.0	0 to 100 psig
	E3015F-2W □□□□		•	•	•			0.063"	2.5	0 to 72 psig
	E3015E-2L □□□□	90° Connector with LED	•	•				0.043"	2.0	0 to 100 psig
	E3015F-2L □□□□		•	•				0.063"	2.5	0 to 72 psig
	E3015E-2C □□□□	In-Line Connector with LED	•	•				0.043"	2.0	0 to 100 psig
E3015F-2C □□□□	•		•				0.063"	2.5	0 to 72 psig	

*Add voltage choice to end of base part number: 12 VDC (012), 24 VDC (024), 24 VAC (24A), 110 VAC (110), or 220 VAC (220). Example: E315D-1C012

10 & 15 MM STANDARD MANIFOLDS, COVER PLATES & CONNECTORS

STANDARD MANIFOLDS

Standard manifolds are available for one to 16 valves with ported exhaust. Spare hardware and cover plates also available.



10 mm	15 mm	Description
E10M-01	E15M-01	Single-Station Manifold
E10M-02	E15M-02	2-Station Manifold
E10M-04	E15M-04	4-Station Manifold
E10M-06	E15M-06	6-Station Manifold
E10M-08	E15M-08	8-Station Manifold
E10M-10	E15M-10	10-Station Manifold
E10M-12	E15M-12	12-Station Manifold
E10M-14	E15M-14	14-Station Manifold
E10M-16	E15M-16	16-Station Manifold

STANDARD VALVE COVER PLATES

Includes plate, gasket and two screws.

Part No.	Description
E10M-CP	10 mm Cover Plate
E15M-CP	15 mm Cover Plate



CONNECTORS

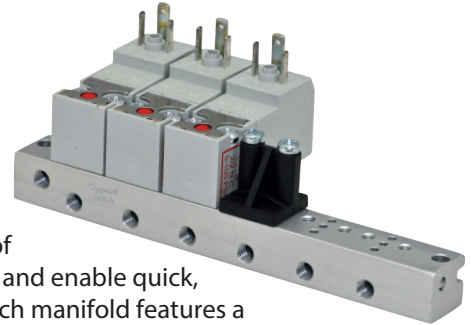
Wire connector must be ordered separately. 24 AWG. Stranding 7/32.



Part No.	Description
C2A-RB300	Connector with Cable, 11.8"
C2A-RB500	Connector with Cable, 19.7"
C2A-RB1000	Connector with Cable, 39.4"

MINIATURE MANIFOLDS

Small, compact manifolds provide efficient grouping of 10 or 15 mm valves and enable quick, easy installation. Each manifold features a common inlet, individually ported outlets, and exhaust to atmosphere.



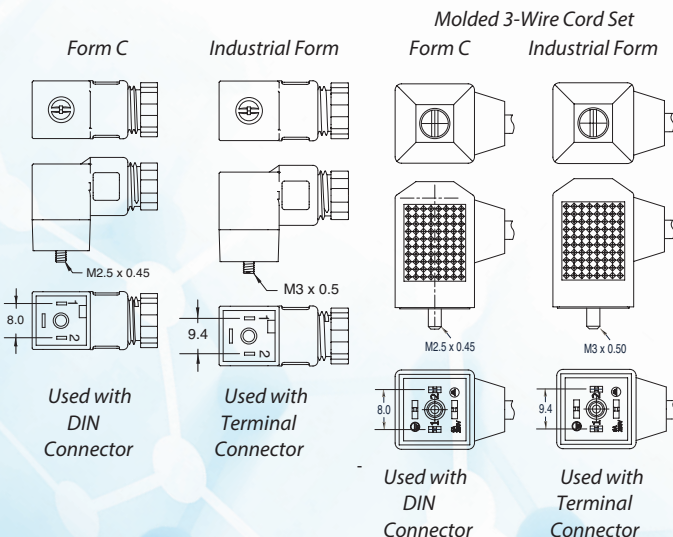
10 mm	15 mm	Description	Supply Ports
E10SM-02	E15SM-02	2-Station Manifold	1
E10SM-04	E15SM-04	4-Station Manifold	1
E10SM-06	E15SM-06	6-Station Manifold	1
E10SM-08	E15SM-08	8-Station Manifold	1
E10SM-10	E15SM-10	10-Station Manifold	2
E10SM-12	E15SM-12	12-Station Manifold	2
E10SM-14	E15SM-14	14-Station Manifold	2
E10SM-16	E15SM-16	16-Station Manifold	2

Note: When using these multi-station manifolds with Normally-Open valve configurations, they cannot be used with Normally-Closed valves on the same manifold.

DIN CONNECTORS

For use with 15 mm valves only

DIN 43650 Form C connectors with 8 mm spade center spacing mate with the 15 mm DIN connector coil. Industrial Form connectors with 9.4 mm spade center spacing are designed to connect to 15 mm terminal coils. Both are available with or without surge suppression, and PVC molded three-wire cord set.

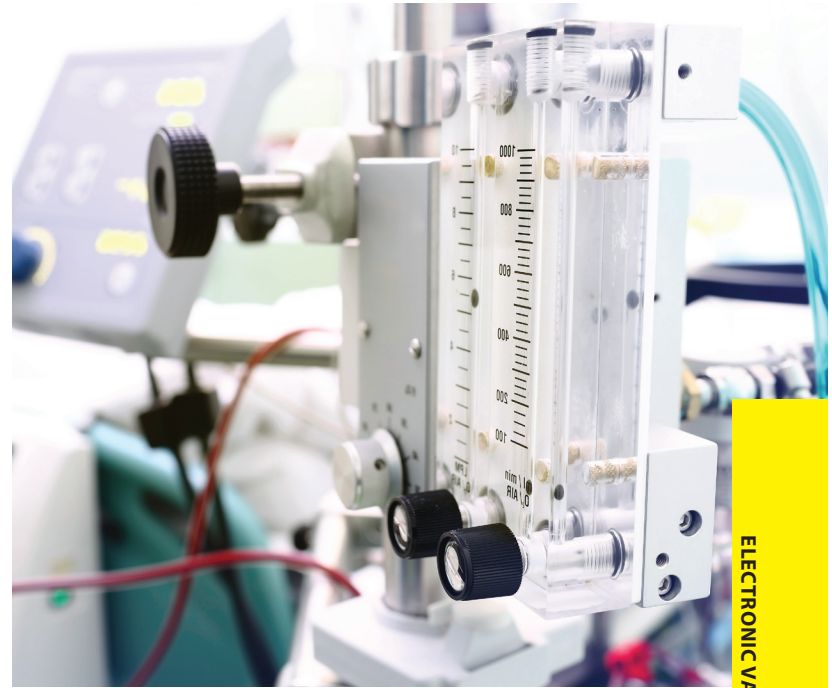


PROBLEM

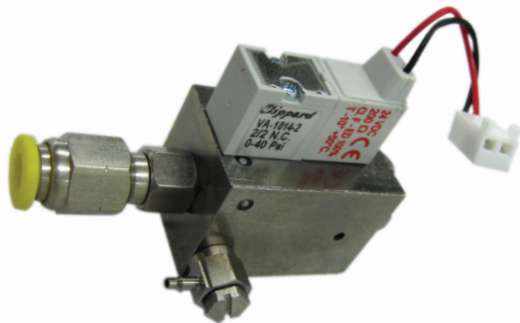
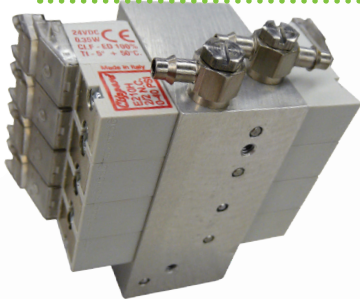
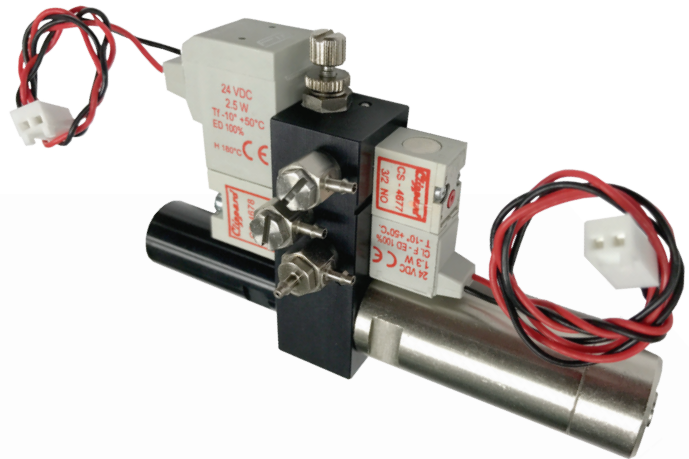
In many situations, an existing supplier may be providing an adequate solution from a product standpoint, yet other aspects of the relationship leave much to be desired. Often, this is related to problems with deliverability. This particular application needed to handle a variety of different medicaments while maintaining a tight flow tolerance at a specific pressure. Additionally, the OEM needed the solution to fit the existing footprint within their equipment.

SOLUTION

Clippard was able to design a special assembly utilizing standard miniature 10 mm and 15 mm electronic valves to meet the requirements of this application. Using standard Clippard catalog products, the OEM was assured that the valves would always be available for quick delivery. This drop-in solution not only proved to be an excellent value, but also enhanced the performance of the OEM's system.



ELECTRONIC VALVES



"Clippard's staff are great people—we have been working with them for years. That longevity speeds up problem solving because they know how the system works and can provide options to better solve particular issues."

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