



SPARTAN —SCIENTIFIC—

Solenoid Valves & Accessories

BUYER'S GUIDE



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www.spartanscientific.com



About Spartan Scientific

Spartan Scientific was formed in 1978 with a goal to redefine industrial solenoid valves and related products. First with DIN quick connect solenoid coils, quick mounting solenoid operators and interchangeable coil versions. At Spartan Scientific we provide solenoid and stepping valves to control the flow of air, water and media with innovation and consistency.

Our Philosophy

- Our Vision: Helping our customers meet their goals, one valve at a time.
- Our Mission: Customer centered product development committed to reliable and innovative media control products coupled with service excellence.
- Our Business Policy: Initiative and Continuous self-improvement, Innovation, development, together with Partnership and Cooperation.
- Our Core Value: Excellence, Awareness to detail and Gratitude with a sense of urgency all with a foundation based on integrity.
- Spartan Scientific Spirit: Say what we do, Do what we say. No excuses. Action and response Pursuit of excellence.

Spartan Customer Focus is our Goal

- The customer is the reason Spartan Scientific exists; Customer demand is our passion.
- Spartan strives to deliver excellent service and high quality products. Our customer's ability to succeed is our top priority. Meeting customer requirements is our primary area of concern.
- Active passion for continuous improvement in all departments all the time.
- Two Ears and One Mouth policy...Listen to our customers

Cost Efficiency, Quality & Rapid Response

Value we bring is the key to success. Spartan Scientific implements continuous improvement in all areas of our business. Our score strength is our ability to react and produce a product quickly to specification that incorporates electronics coupled with fluid power.

Quality Policy

Total customer satisfaction through unmatched quality, products, service, and integrity.

Environmental Policy

Spartan Scientific is committed to global stewardship by minimizing the impact of business activities on the environment. The keys to this strategy are:

- Minimize waste by evaluating operations and ensuring we are as efficient as possible.
- Promote reclamation and recycling.
- Design and specify materials that are environment friendly.
- Meet or exceed all the environmental legislation that relates to the industry and products.



MADE IN USA

Canfield Industries, Inc.



ISO 9001:2015
with design
Cert # 05.096.1



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Standard Terms of Sale and Restocking

- 1. PAYMENT:** Terms as shown (subject to credit approval) f.o.b. Seller's plant. Payment shall not prejudice claims on account of omissions or shortage in shipment, but no such claim will be allowed unless made within 30 days after receipt by Buyer.
- 2. DELIVERY:** Sellers shall not be liable for any delays in or failures of delivery due to acts of God or public authority, labor disturbances, accidents, fires, floods, extreme weather conditions, failures of and delays by carriers, shortages of material, delays of a supplier due to causes beyond its control, or any other cause beyond the control of Seller. Seller shall notify Buyer of any such delays as soon as it becomes apparent. In no event shall Seller be liable for consequential or special damage arising out of delay in or failure of delivery. Buyer's requested delivery date or schedule shall be approximate and subject to Seller's approval and acceptance.
- 3. PACKING:** All goods shall be packed in suitable containers for protection in shipment and storage. No special charges for packing or crating shall be made unless specifically listed as an additional and separate charge on Seller's quotation or acceptance of Buyer's order.
- 4. INSPECTION:** All goods ordered by the Buyer shall be subject to final inspection and approval of Buyer and/or Government at destination. All products, material and workmanship shall be open to inspection and test at Seller's plant by authorized representatives of Buyer and/or of the United States.
- 5. WARRANTIES:** All goods sold hereunder are warranted to be free from defects in material and workmanship for a period of one year from the date of manufacture unless otherwise agreed upon in writing, and to conform to applicable specifications, drawings, blueprints and/or samples. These express warranties are in lieu of and exclude all other warranties, express or implied. Seller's sole obligation under these warranties shall be to issue credit, repair, or replace any item or part thereof which is proved to be other than as warranted. No allowance shall be made for any labor charges of Buyer for replacement of parts, adjustment or repairs, or any other work, unless such charges are authorized in advance by Seller. If goods are claimed to be defective in material or workmanship or not to conform to specifications, drawings, blueprints and/or samples, Seller upon notice promptly given will either examine the goods at their site, or issue shipping instructions for return to Seller (transportation costs prepaid by Buyer). In the event any goods are proved to be other than as warranted, transportation costs to and from Seller's plant will be borne by Seller and reimbursement or credit will be made for amounts so expended by Buyer. These warranties shall not extend to any goods or parts thereof which have been subjected to misuse or neglect, damage by accident, rendered defective by reason of improper installation or by the performance of repairs or alterations outside of Seller's plant except when performed under Seller's specific authority. These warranties shall not apply to any goods or parts thereof furnished by Buyer or acquired from others at Buyer's request and/or to Buyer's specifications.
- 6. CHANGES IN SPECIFICATION OR DESIGNS:** Should Buyer request that changes be made in the specifications or design relating to any goods, delivery dates and schedules shall be revised accordingly, if necessary, and an equitable adjustment, upward or downward, shall be made in price in so far as warranted.
- 7. TERMINATION, REDUCTION IN QUANTITY, RESCHEDULING DELIVERY:** In the event Buyer desires to terminate any part or all of the work to be done hereunder, reduce the quantity of goods ordered, or reschedule the delivery of any goods, fair compensation shall be made to Seller. Seller shall recover, without duplication, the contract price for items, which have been completed, the actual costs incurred by Seller which are properly allocatable or apportionable under recognized commercial accounting practices to terminate work (including cost of discharging liabilities) plus a reasonable profit, the reasonable costs and expenses incurred by Seller in making settlement hereunder and in protecting property in which Buyer has an interest, and/or the increased costs incurred by Seller by reason of a revision in the delivery schedule.
- 8. BUYER'S PROPERTY:** Any designs, tools, patterns, material, drawings, information or equipment furnished by Buyer, or any special tools made or acquired for the Buyer by the Seller which becomes Buyer's property, shall be used only in the production of the goods called for herein and not otherwise, unless by Buyer's written consent. Seller agrees to exercise reasonable care with respect to such property and equipment while in its possession and control, but shall not be responsible for loss or damage occurring without its fault or negligence or for ordinary wear and tear.
- 9. PATENTS:** Unless the design for the goods shall have been furnished by the Buyer to the Seller and used by the Seller in manufacturing the goods, Seller shall defend and save harmless the Buyer from any claim that any product or article sold to the Buyer hereunder in and of itself infringes any United States letters patent by reason of its sale or use/ provided Seller is notified in writing within ten (10) days after any such claim is made against the Buyer, and provided further that Seller is permitted to defend the same in Buyer's name if action be brought. If the product or article sold to the Buyer hereunder is manufactured by the Seller according to a design furnished by the Buyer, the Buyer will defend and save harmless the Seller from any claims of infringement of any United States Letters patent.
- 10. TAXES:** Sales and use taxes, payable by Buyer, which are presently or may hereafter be imposed by any taxing authority, are not included in the sale price; any direct or indirect tax, payable by Seller, which may hereafter be imposed by any taxing authority upon the manufacture, sale or delivery of products covered by this order, or any increase in rate of such tax now in force, shall be added to the sale price; if not collected at time of payment of sale price, Buyer will hold Seller harmless.
- 11. COMPLIANCE WITH LAW:** Seller agrees to comply with all federal, state and local laws which may be applicable to the manufacture or sale of the products furnished hereunder. Seller agrees to furnish Buyer with a written statement on its invoice representing that the goods produced or services performed hereunder were produced in compliance with the requirements of Section 12(A) and all other applicable requirements of the Fair Labor Standards Act of 1938, all amendments thereof, all applicable regulations and orders of the Administrator of the Wage and Hour Division of the Department of Labor issued thereto.
- 12. PRICE REVISION:** Prices are binding on Seller when Buyer's order is accepted; no revision of prices shall be made on request, except as specifically provided herein, unless there is attached to Seller's quotation and/or acceptance of Buyer's order a rider specifically setting forth the terms and conditions of such revision, which rider shall become a part of Seller's terms as though fully set forth in Seller's quotation and acceptance of Buyer's order.
- 13. GOVERNMENT CONTRACTS:** Should the Buyer notify the Seller that its order is placed under a prime contract with an agency of the United States Government, the following terms and conditions shall be incorporated into Seller's terms of sale in so far as the Buyer is required to incorporate such provisions in its purchase orders or subcontracts of terms in so far as applicable to the goods sold hereunder.
A) Armed Services Procurement Regulation: The following clause set forth or referred to in Sections 7 and 12 of the Armed Services Procurement Regulations are hereby incorporated by reference: Renegotiation (7-103.13), Eight Hour Law of 1912 (7-103.16 12-303.1), Walsh-Healy Public Contracts Act (7-103.17 12-604), Nondiscrimination in Employment (7-103.18 12-802), Officials Not to Benefit (7-103.19), Buy American Act (7-104.3 6-104.5), Notice to the Government of Labor Disputes (7-104.4), Excess Profit (7-104.11), Military Security Requirements (7-104.12), Examination of Records (7-104.15), Convict Labor (7-104.17 12-203). In order to make the context of the above clauses applicable to these terms of sale, the word "Buyer" shall be substituted for the word "Government" and the word "Seller" shall be substituted for the word "contractor" whenever necessary.
- 14. RESTOCKING POLICY:** Merchandise that is returned must be accompanied by pre-approved Returned Goods Authorization (RGA). Return authorizations will be approved by Spartan Scientific. When materials are received, an inspection will be performed to determine if restocking charges are applicable. Material that does not have an authorization will be returned to the purchaser at their expense.

**DISCLAIMER: Product changes including specifications, features, designs, and availability are subject to change anytime without notice. For critical dimensions or specifications, contact factory.*



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Solenoid Valve Selection Checklist

Fill in parameters for your application to help Spartan engineers recommend the right valve to suit your needs.

1) TYPE OF MEDIA†

- AIR
- WATER
- INERT GAS
- HYDRAULIC OIL
- OTHER _____

DATE: _____
NAME: _____
COMPANY: _____

2) PRESSURE RANGE

MINIMUM _____ MAXIMUM _____ NOMINAL _____

3) FUNCTION

- 2-Way, 2 POSITION Normally Closed
- 2-Way, 2 POSITION Normally Open
- 3-Way, 2 POSITION Normally Closed
- 3-Way, 2 POSITION Normally Open
- 3-Way DIVERTER FUNCTION †
- 3-Way Mixing FUNCTION †

4) VALVE TYPE

DIRECT ACTING INTERNAL PILOT EXTERNAL PILOT

5) PORT SIZE OR TYPE

- | | |
|-------------------------------------|--------------------------------------|
| <input type="checkbox"/> #10-32 UNF | <input type="checkbox"/> 1/2" NPT |
| <input type="checkbox"/> 1/8" NPT | <input type="checkbox"/> 3/4" NPT |
| <input type="checkbox"/> 1/4" NPT | <input type="checkbox"/> 1.0" NPT |
| <input type="checkbox"/> 3/8" NPT | <input type="checkbox"/> 2.0" NPT |
| | <input type="checkbox"/> OTHER _____ |

6) ORIFICE SIZES

- | | | |
|---|---|---|
| <input type="checkbox"/> 0.6 MM | <input type="checkbox"/> 2.0 MM | <input type="checkbox"/> 8.0 MM (5/16") |
| <input type="checkbox"/> 0.8 MM (1/32") | <input type="checkbox"/> 2.4 MM (3/32") | <input type="checkbox"/> 12.5 MM (1/2") |
| <input type="checkbox"/> 1.0 MM (3/64") | <input type="checkbox"/> 3.0 MM (1/8") | <input type="checkbox"/> 25 MM (1") |
| <input type="checkbox"/> 1.2 MM | <input type="checkbox"/> 4.0 MM (5/32") | <input type="checkbox"/> 38 MM (1 1/2") |
| <input type="checkbox"/> 1.5 MM (1/16") | <input type="checkbox"/> 6.0 MM (1/4") | <input type="checkbox"/> 50 MM (2") |
| | | <input type="checkbox"/> OTHER _____ |

7) FLOW RATE

GALLONS PER MINUTE _____ GALLONS PER HOUR _____
 LITERS PER MINUTE _____ STANDARD CU FT. PER MIN. _____
 OTHER _____

8) FLOW FACTOR (Cv) _____

9) MATERIALS IN CONTACT WITH MEDIA

- | | |
|---|---|
| <input type="checkbox"/> ACETAL POM | <input type="checkbox"/> MINERAL-FILLED NYLON |
| <input type="checkbox"/> ALUMINUM | <input type="checkbox"/> PEI |
| <input type="checkbox"/> BRASS | <input type="checkbox"/> SILVER |
| <input type="checkbox"/> COPPER | <input type="checkbox"/> STAINLESS STEEL |
| <input type="checkbox"/> GLASS-FILLED NYLON | <input type="checkbox"/> OTHER |

SEAL MATERIAL

- FKM
- NBR
- PERFLUORELASTOMER
- OTHER

10) MANUAL OVERRIDE

YES NO

11) COIL DATA

_____ VOLTAGE _____ WATTAGE _____ HERTZ

12) COIL TYPE

DIN SPADE FLYING LEAD DIN SPADE WITH CONNECTOR

13) TEMPERATURE

_____ AMBIENT _____ MEDIA

14) OTHER SPECIAL CONSIDERATIONS...

(i.e. MOUNTING THREADS, PLATING, SPECIAL ARMATURE AND/OR BODY MATERIAL)

NOTE: NOT ALL COMBINATIONS ARE POSSIBLE. CONSULT FACTORY FOR ANY SPECIAL APPLICATIONS.
 †NOTE: Standard pressure ratings of orifices do not apply for these functions. Please contact factory for details.
 ††NOTE: Caution should be taken when requiring media in AC (alternating current) applications that are not compatible with copper.



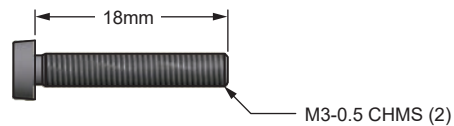
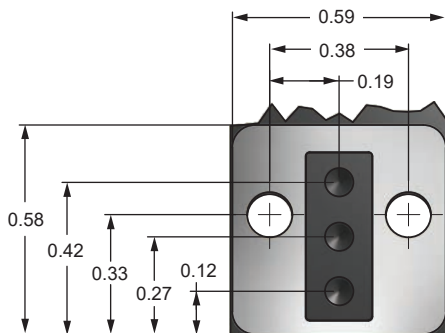
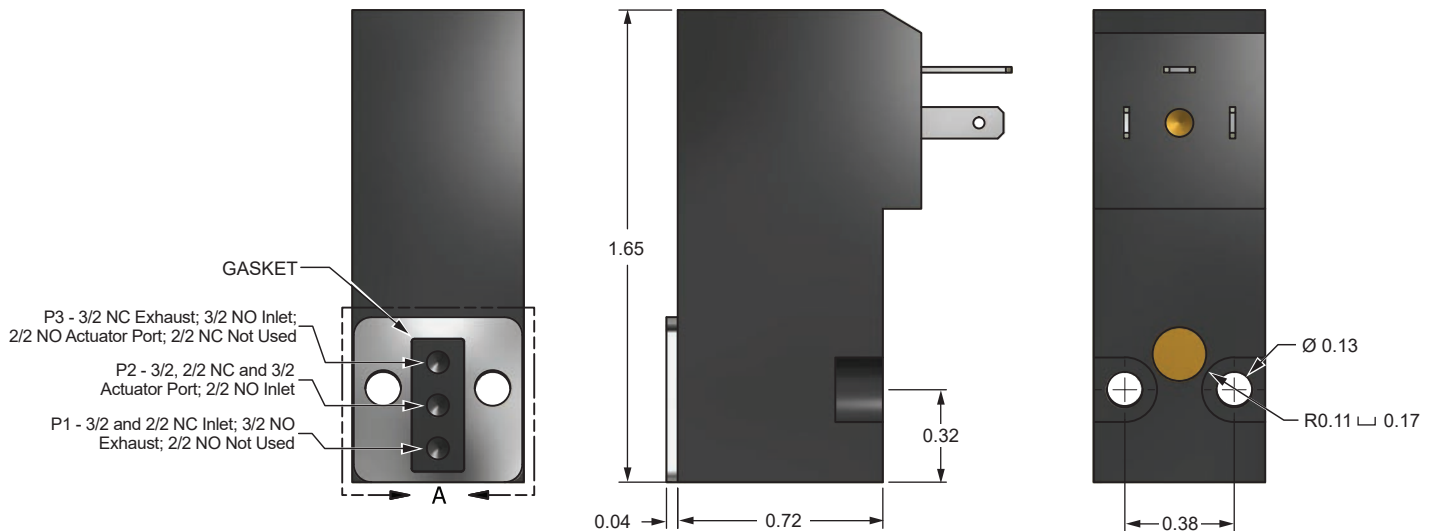
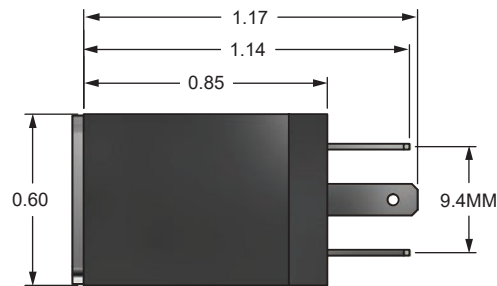
Series 1500

Solenoid Operators 15mm Sub-Base Mount

The Spartan Scientific Series 1500 is a 15 mm wide 2-Way & 3-Way, 2-Position solenoid valve which features small size with large flow and consistent, repeatable function. Available in orifice sizes 0.8, 1.0, 1.1 and 1.5 mm, the Series 1500 can flow up to a Cv of 0.04 and offers pressure range from 0 to 145 PSI in the 2.5 watt versions. The 9.4 mm electrical pin spacing is an industry standard. The valve body is made from durable thermoplastic and comes standard with a push non-locking manual override. Featuring an environment resistant IP 65 rating, the valve can withstand humid and dirty conditions. The Series 1500 features a captured exhaust port that is connected through the sub-base. Available in 12 or 24 VDC or 24, 110 and 220 VAC, the Series 1500 boasts power consumptions of 1.0 to 2.5 watts.

Dimensional Data

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED



MOUNTING HOLE / PASSAGE PATTERN (Gasket and mounting screws provided)



Series 1500

Solenoid Operators 15mm Sub-Base Mount

Technical Data

Function: 2-Way, 2-Position; Direct Acting
Normally Closed or Normally Open
3-Way 2-Position; Direct Acting
Normally Closed or Normally Open; 3-Ported Body

Orifice Size/ 0.8mm / 0.02 Cv
1.0mm / 0.02 Cv

Flow Factor: 1.1mm / 0.03 Cv
1.5mm / 0.04 Cv

Pressure Range: 0 to 145 psi (depending on orifice size and function)

Temp. Range: Fluid Max.: +60°C
Dry Range: Ambient +10° to +50°C

Response Time: 10 to 15ms complete cycle

Media: Air

Manual Override: Push, non-lock (standard)

Environment Protection: IP65 (IEC 144), NEMA 4
Dust-tight and water resistant
(with electrical connector)

Mounting: M3 x 18mm machine screws (2).

Wetted Materials: Elastomers: NBR (others available on request)
Operator: 300 and 400 Series Stainless Steel
Shading Ring: Copper (AC Only)
Springs: 300 Series Stainless Steel
Valve Body: PPS or Zamak

Coil Data: Duty Cycle: Continuous (within specifications)
Encapsulation: Glass-Filled Nylon
Insulation: Class F
Power Rating: 2.5 Watt VDC, 4 VA VAC
(others available on request)
Voltage: 12, 24 VDC
24, 110, 220 VAC 50/60 Hz
Voltage Tolerance: +/- 10% Nominal
Winding: Class H

Connections: Spades: Accordance with AMP 2.8x0.5; 9.4mm
Flying Lead Wires: PVC 22 AWG, Multi-Strand
Copper Wire, 300V, 12" minimum length

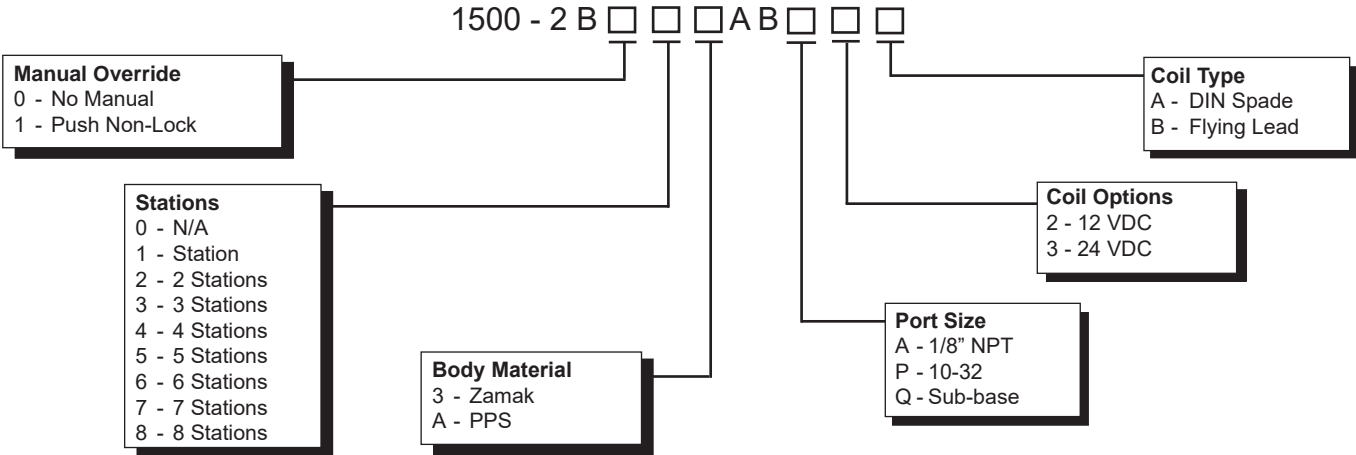
Packaged Weight: 0.91 lbs.

SOLENOID OPERATORS

PERFORMANCE DATA TABLE						
Function	Orifice mm (port 1)	Orifice mm (port 3)	Pressure psi		Power	
			MIN	MAX	W DC	VA AC
3/2 NC	0.8	1	0	115	1	3
3/2 NC	1.1	1.5	0	145	2.5	3
3/2 NC	1.5	1.5	0	85	2.5	3
2/2 NC	0.8	-	0	115	1	3
2/2 NC	1.1	-	0	145	2.5	3
2/2 NC	1.5	-	0	85	2.5	3
3/2 NO	1.0	1.1	0	100	2.5	3
3/2 NO	1.5	1.5	0	50	2.5	3
2/2 NO	1.0	-	0	145	2.5	3
2/2 NO	1.5	-	0	145	2.5	3



How To Order



Order Example: 1500-2B103ABA2A
No Manual Override, 1 Station, Zamak Die Cast,
1/8" NPT, 12 VDC, DIN Spade.



Series 3800

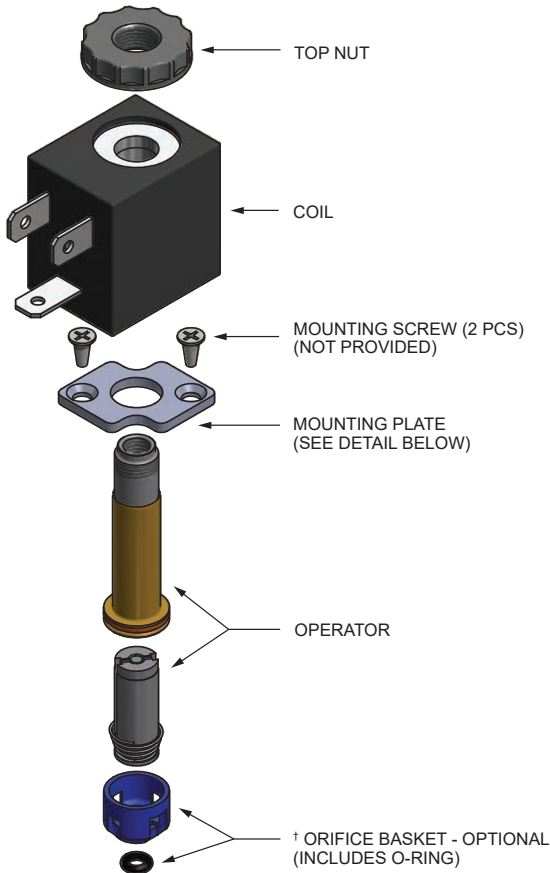
Solenoid Operators Mini

The Spartan Scientific Series 3800 solenoid operators are specially designed for the pilot function of 3-Way & 4-Way pneumatic directional control valves. Available in plate mount, the operators are interchangeable with most solenoid operator interfaces. Sealing discs are spring compensated. Shading ring is standard so that both AC and DC coils can be used on all armatures. Coils are Glass-Filled Nylon encapsulated.

Dimensional Data

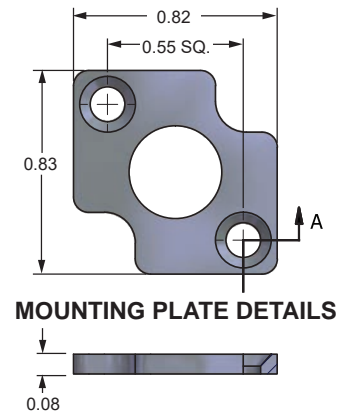
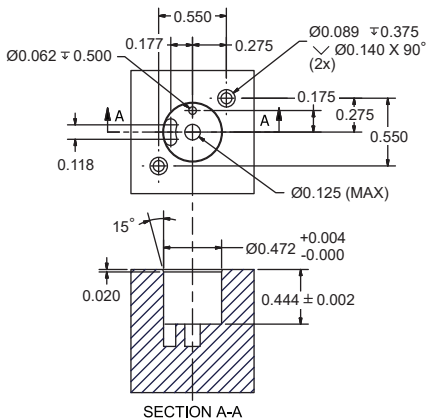
ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED

SOLENOID OPERATORS



† Consult factory for part numbers and pricing.

Orifice Basket / Armature Cavity Details





Series 3800

Solenoid Operators Mini

Technical Data

Function: 2-Way, 2-Position; Solenoid Operating Pilot;
Normally Closed or Normally Open.
3-Way, 2-Position; Solenoid Operating Pilot;
Diverting, Mixing, Normally Closed or Normally Open

Orifice Sizes / Flow Factor: 1.5mm
0.08 Cv

Pressure Range: Vacuum to 200 psi (depending on orifice size and function)

Temp. Range: Fluid Max.: +90°C
Dry Range: Ambient +10° to +50°C

Response Time: 12ms Complete Cycle

Media: Air, inert gases, light oil, water

Environment Protection: IP65 (IEC 144), NEMA 4
Dust-tight and water resistant (with electrical connector)

Mounting: #4-40 x 0.25" long screws (2) or
#4-40 x 0.37" long screws (2)
(screws not provided)

Wetted Materials: Elastomers: EPDM, FKM, NBR
(others available on request)
Operator: 300 and 400 Series Stainless Steel and Brass
Shading Ring: Copper (AC Only)
Springs: 300 Series Stainless Steel

Coil Data: Duty Cycle: Continuous (within specifications)
Encapsulation: Glass-Filled Nylon
Insulation: Class F
Power Rating: 6.5 Watt, 8.5VA VAC
(others available on request)
Voltage: 12, 24 VDC
24, 120, 220, 240 VAC 50/60 Hz
Voltage Tolerance: +/- 10% Nominal
Winding: Class H

Connections: Spades: Terminals AMP 6.3x0.8 width 11mm
(Available in DIN Style "A" EN175301-803 for
3.0mm orifice or larger)
Flying Lead: PVC 22 AWG, Multi-Strand Copper Wire,
300V, 12" minimum length

Packaged Weight: 0.20 lbs.

ORIFICE SIZE / VOLTAGE

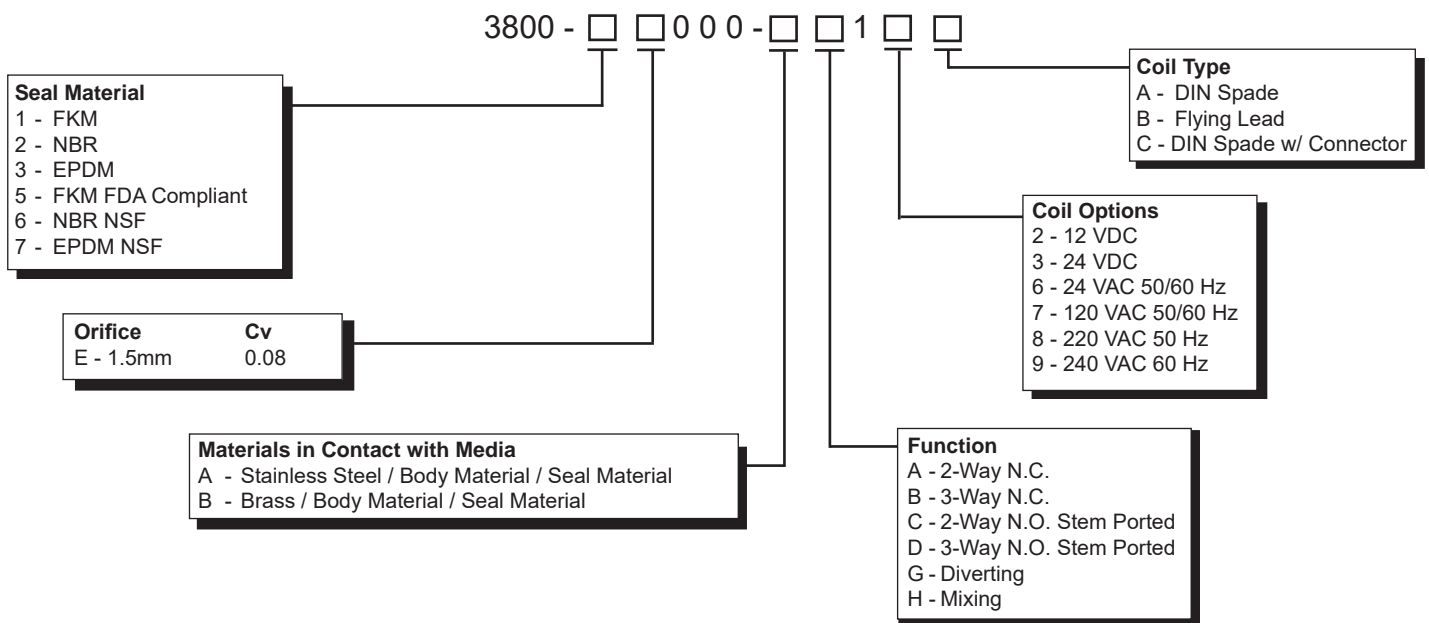
FUNCTION

	1.5mm	
	AC	DC
2/2 NC	200	200
2/2 NO	200	200
3/2 NC	150	150
3/2 NO	150	150
3/2 Mix	100	90
3/2 Div	120	110

MAX. PRESSURE RANGE (psi)

SOLENOID OPERATORS

How To Order



Order Example: 3800-1E000-AA12A
FKM, 1.5mm orifice, Stainless Steel / Body Material /
Seal Material, 2-Way N.C., 12 VDC, DIN Spade.



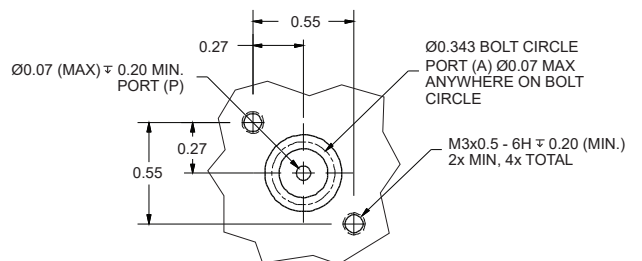
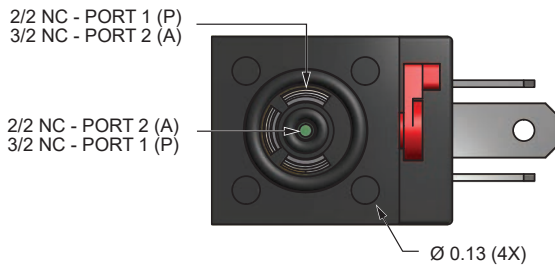
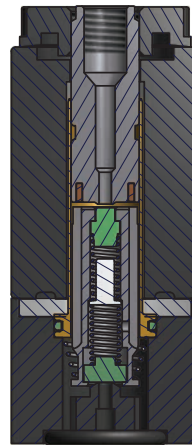
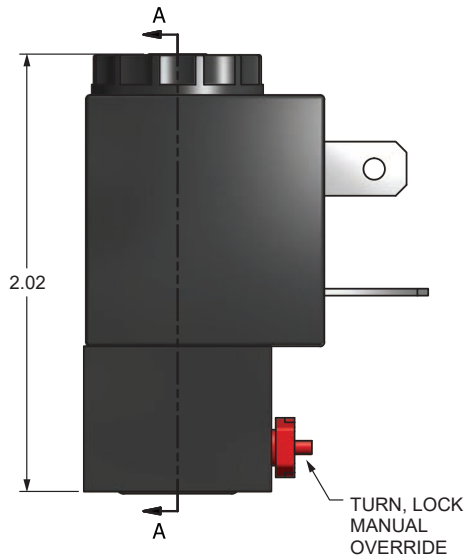
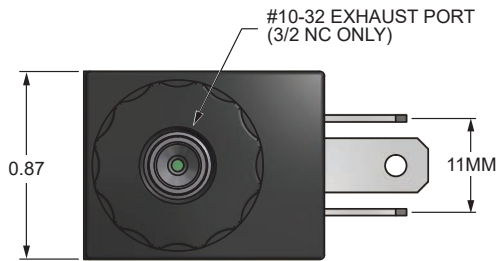
Series 38KRE

Solenoid Operators 2-Way & 3-Way Manifold Mount Pilot Assembly

The Spartan Scientific Series 38KRE is a miniature solenoid operator pilot assembly designed to control inert gases and liquids and is made to easily mount to a flat manifold surface. The 38KRE features a fully molded coil assembly that is available in spaded or flying lead configurations. The plunger and tube assembly are made from highest quality materials and exacting standards for long life and reliability. The valve body comes with turn locking manual override as standard. It can be assembled quickly to a manifold block by the use of two screws (provided).

Dimensional Data

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED



MOUNTING HOLE / PASSAGE PATTERN



Series 38KRE

Solenoid Operators 2-Way & 3-Way Manifold Mount Pilot Assembly

SOLENOID OPERATORS

Technical Data

Function: 2-Way, 2-Position; Solenoid Operating Pilot; Normally Closed.
3-Way, 2-Position; Solenoid Operating Pilot; Normally Closed.

Orifice Sizes / Flow Factor: 1.2mm / 0.06 Cv
1.5mm / 0.05 Cv
Note: All values shown are for pressure rating of 90 psi.

Pressure Range: 0 to 150 psi (depending on orifice size and function)

Temp. Range: Fluid Max.: +10° to +50°C
Dry Range: Ambient +10° to +50°C

Response Time: 8 to 15ms Complete Cycle

Media: Air, inert gases

Manual Override: Turn Lock

Environment IP65 (IEC 144), NEMA 4

Protection: Dust-tight and water resistant (with electrical connector)

Mounting: M3 x 0.5 20mm long flathead mounting screws (2)

Wetted Materials: Elastomers: EPDM, FKM, NBR
Operator: 300 and 400 Series Stainless Steel and Brass
Shading Ring: Copper (AC Only)
Springs: 300 Series Stainless Steel
Valve Body: Glass-Filled Polyester

Coil Data: Duty Cycle: Continuous (within specifications)
Encapsulation: Glass-Filled Nylon
Insulation: Class F
Power Rating: 6.5 Watt VDC, 8.5 VAC (others available on request)
Voltage: 6, 12, 24 VDC
24, 120, 220, 240 VAC 50/60 Hz
Voltage Tolerance: +/- 10% Nominal
Winding: Class H

Connections: Spades: Terminals AMP 6.3x0.8 width 11mm (Available in DIN Style "A" EN175301-803 for 3.0mm orifice or larger)
Flying Lead: PVC 22 AWG, Multi-Strand Copper Wire, 300V, 12" minimum length

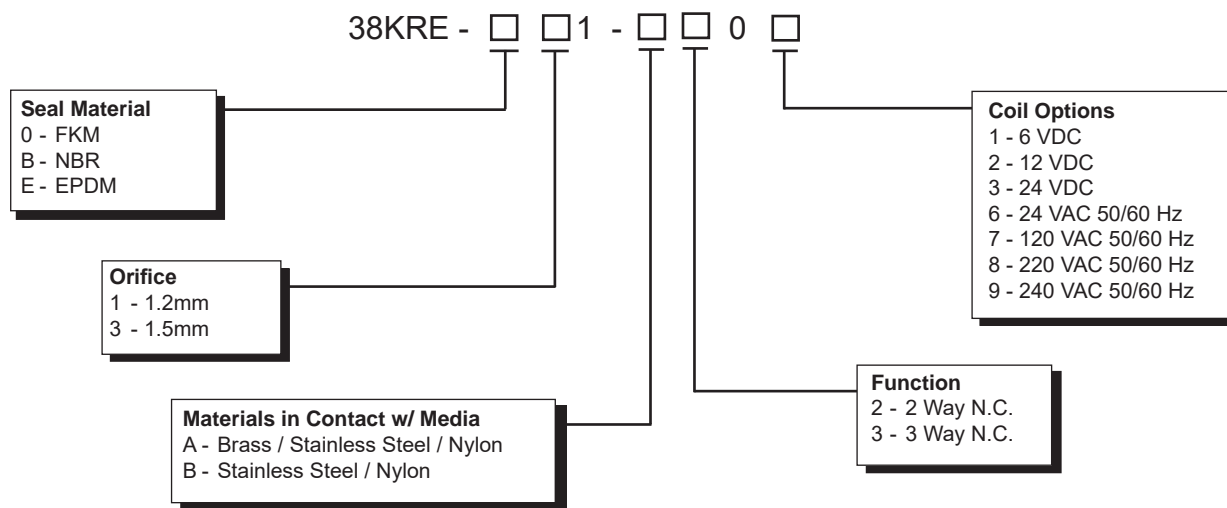
Packaged Weight: 0.20 lbs.

ORIFICE SIZE / VOLTAGE

FUNCTION		1.2mm	1.5mm
	2/2 NC	150	150
	3/2 NC	150	150

MAX. PRESSURE RANGE (psi)

How To Order



Order Example: 38KRE-011-B201
FKM, 1.2mm Orifice, Stainless Steel / Nylon, 2 Way N.C., 6 VDC



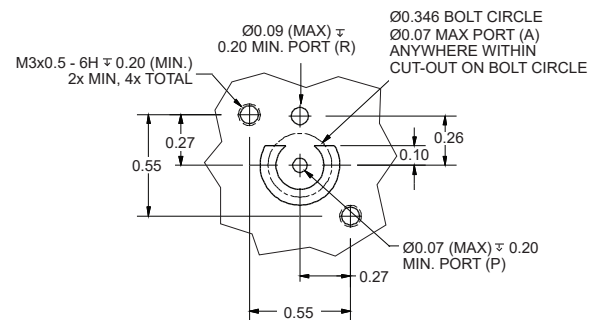
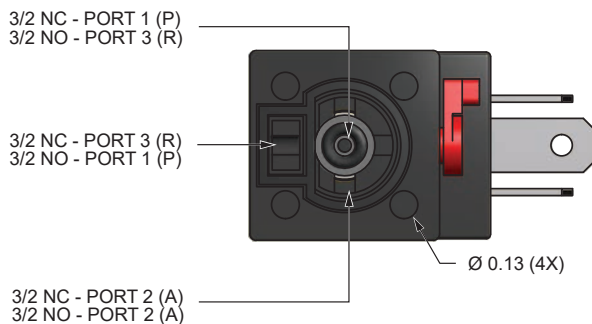
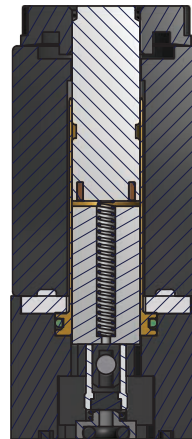
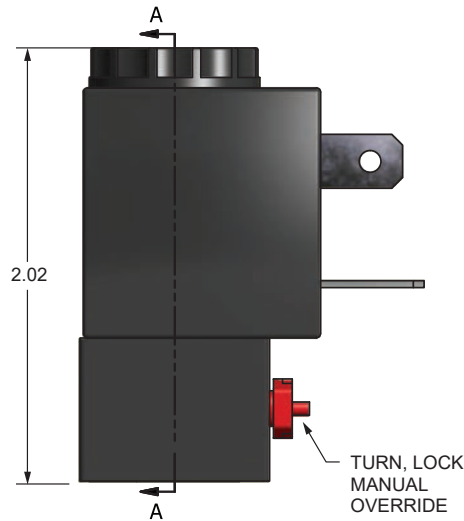
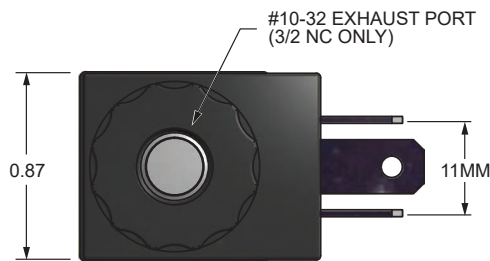
Series 38KRI

Solenoid Operators 2-Way & 3-Way Manifold Mount Pilot Assembly

The Spartan Scientific Series 38KRI is a miniature solenoid operator pilot assembly designed to control inert gases and liquids and is made to easily mount to a flat manifold surface. The 38KRI features a fully molded coil assembly that is available in spaded or flying lead configurations. The plunger and tube assembly are made from highest quality materials and exacting standards for long life and reliability. The valve body comes with turn locking manual override as standard. It can be assembled quickly to a manifold block by use of two screws (provided). The 38KRI is unique due to the fact that the valve has an internally piloted exhaust making the Normally Open version less expensive by having all of the ports contained within the valve body.

Dimensional Data

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED



MOUNTING HOLE / PASSAGE PATTERN



Series 38KRI

Solenoid Operators 2-Way & 3-Way Manifold Mount Pilot Assembly

Technical Data

Function: 3-Way, 2-Position; Solenoid Operating Pilot;
Normally Closed, Normally Open

Orifice Sizes / Flow Factor:

	Main Body	Exhaust
1.2mm / 0.05 Cv	1.4mm	
1.4mm / 0.05 Cv	1.6mm	
1.6mm / 0.66 Cv	1.6mm	

Note: All values shown are for pressure rating of 90 psi

Pressure Range: 0 to 150 psi (depending on orifice size and function)

Temp. Range: Fluid Max.: +10° to +50°C
Dry Range: Ambient +10° to +50°C

Response Time: 8 to 15ms Complete Cycle

Media: Air, inert gases

Manual Override: Turn Lock

Environment Protection: IP65 (IEC 144), NEMA 4
Dust-tight and water resistant (with electrical connector)

Mounting: M3 x 0.5 20mm long flathead mounting screws (2)

Wetted Materials: Elastomers: EPDM, FKM, NBR
Operator: 300 and 400 Series Stainless Steel and Brass
Shading Ring: Copper (AC Only)
Springs: 300 Series Stainless Steel
Valve Body: Glass-Filled Polyester

Coil Data: Duty Cycle: Continuous (within specifications)
Encapsulation: Glass-Filled Nylon
Insulation: Class F
Power Rating: 6.5 Watt VDC, 8.5 VA VAC (others available on request)
Voltage: 6, 12, 24 VDC
24, 120, 220, 240 VAC 50/60 Hz
Voltage Tolerance: +/- 10% Nominal
Winding: Class H

Connections: Spades: Terminals AMP 6.3x0.8 width 11mm (Available in DIN Style "A" EN175301-803 for 3.0mm orifice or larger)
Flying Lead: PVC 22 AWG, Multi-Strand Copper Wire, 300V, 12" minimum length

Packaged Weight: 0.20 lbs.

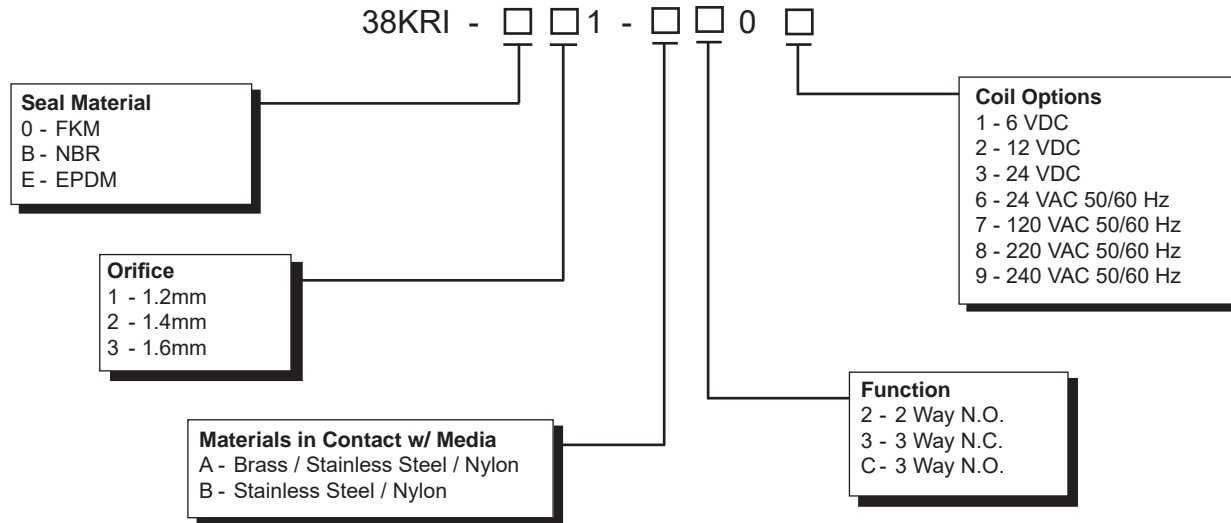
FUNCTION

ORIFICE SIZE / VOLTAGE

	1.2mm	1.4mm	1.6mm
3/2 NC	150	N/A	150
3/2 NO	N/A	100	100

MAX. PRESSURE RANGE (psi)

How To Order



Order Example: 38KRI-011-B201
FKM, 1.2mm Orifice, Stainless Steel /
Nylon, 2 Way N.O., 6VDC



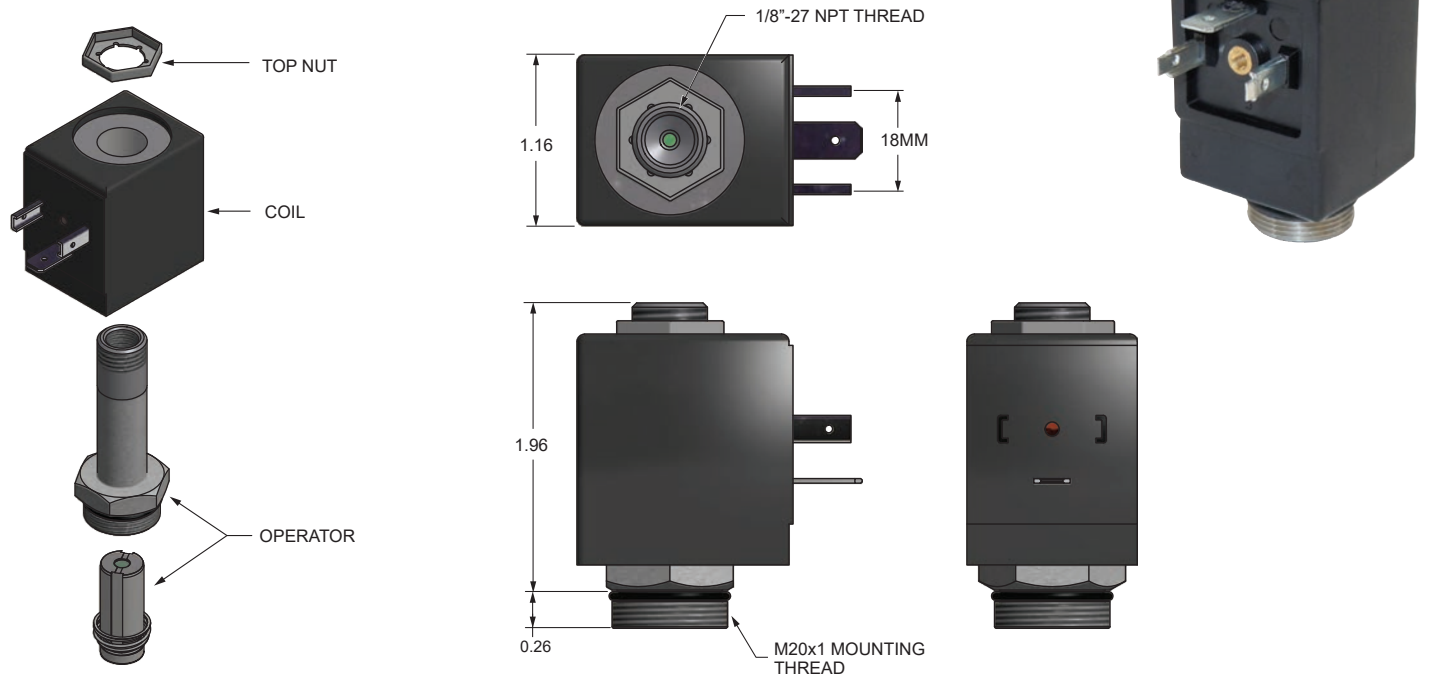
Series 40A0

Solenoid Operators Air-Sol 2-Way & 3-Way

The Spartan Scientific Series 40A0 solenoid valve operators are used as 2-Way & 3-Way, 2-Position Normally Closed or Normally Open, functions for the control of air, light oil, water and inert gases. The robust design incorporates all stainless steel stop, plunger and tube assembly as well as spring compensated top seat. Available in 0.8mm (0.03 Cv) to 6.0mm (0.72 Cv) orifice sizes, the 40A0 can control a broad range of flow and pressure ratings. Standard elastomers are FKM, NBR and EPDM. The class F coils are all nylon encapsulated, 100% duty, all standard voltage and are available in DIN Style "A" EN175301-803 (Formerly DIN 43650), flying lead, 1/2" conduit. Available in UL recognized and CSA approved as well as other institutional approvals and oxygen cleaned upon request.

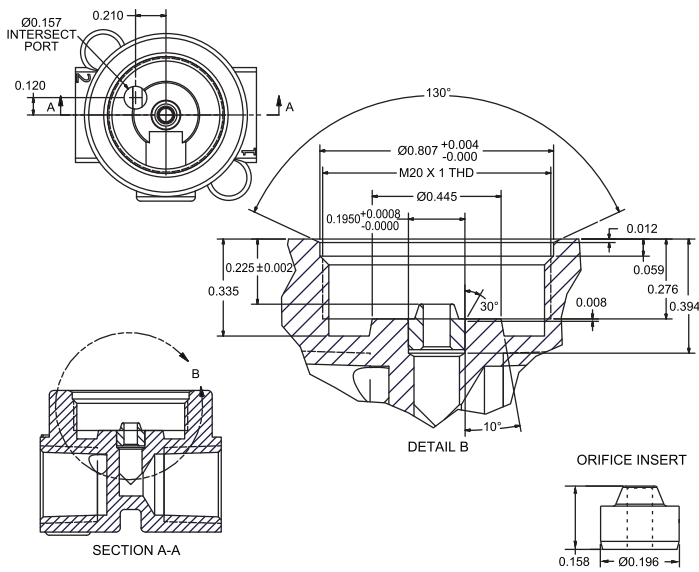
Dimensional Data

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED

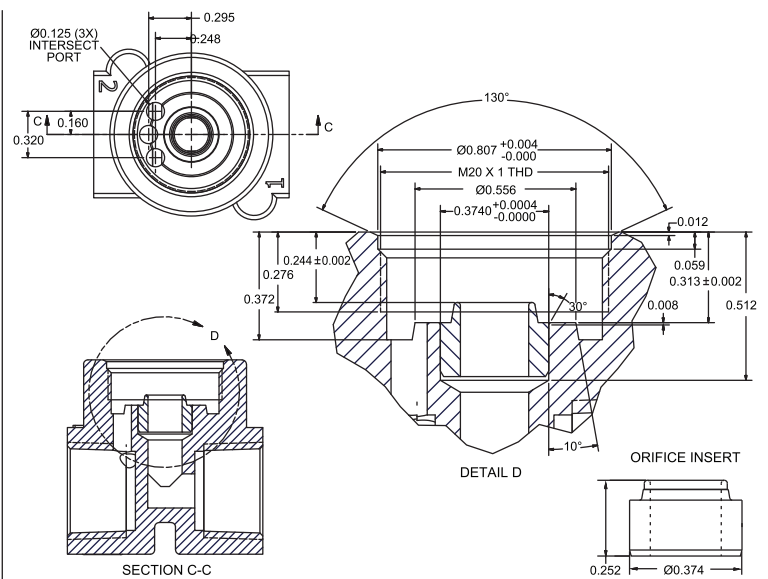


Orifice Insert / Armature Cavity Details

MOUNTING CAVITY
0.8MM TO 4.0MM ORIFICE



MOUNTING CAVITY
3.0MM TO 6.0MM ORIFICE





Series 40A0

Solenoid Operators
Air-Sol 2-Way & 3-Way

Technical Data

Function: 2-Way, 2-Position; Direct Acting;
Normally Closed or Normally Open
3-Way, 2-Position; Direct Acting;
Normally Closed or Normally Open

Orifice Sizes / Flow Factor:
0.8mm / 0.03 Cv
1.6mm / 0.12 Cv
2.4mm / 0.24 Cv
3.0mm / 0.31 Cv
4.0mm / 0.52 Cv
6.0mm / 0.72 Cv

Pressure Range: Vacuum to 1200 psi
(depending on orifice size and function)

Temp. Range: Fluid Max.: +90°C
Dry Range: Ambient +10° to +50°C

Response Time: 12ms Complete Cycle

Media: Air, inert gases, light oil, water
(contact factory for compatibilities)

Environment Protection: IP65 (IEC 144), NEMA 4
Dust-tight and water resistant (with electrical connector)

Wetted Materials: Elastomers: EPDM, FKM, NBR
Operator: 300 and 400 Series Stainless Steel
Orifice Insert: 300 Series Stainless Steel
Shading Ring: Copper (AC Only)
Springs: 300 Series Stainless Steel

Coil Data: Duty Cycle: Continuous (within specifications)
Encapsulation: Glass-Filled Nylon
Insulation: Class F
Power Rating: 10 Watt VDC, 11 VA VAC
(others available on request)
Voltage: 6, 12, 24 VDC
24, 120, 220, 240 VAC 50/60 Hz
Voltage Tolerance: +/- 10% Nominal
Winding: Class H

Connections: Spades: Accordance with DIN Style "A" EN175301-803
Flying Lead: PVC 22 AWG, Multi-Strand Copper Wire,
300V, 12" minimum length

Packaged Weight: With Coil: 0.43 lbs.
Without Coil: 0.15 lbs.

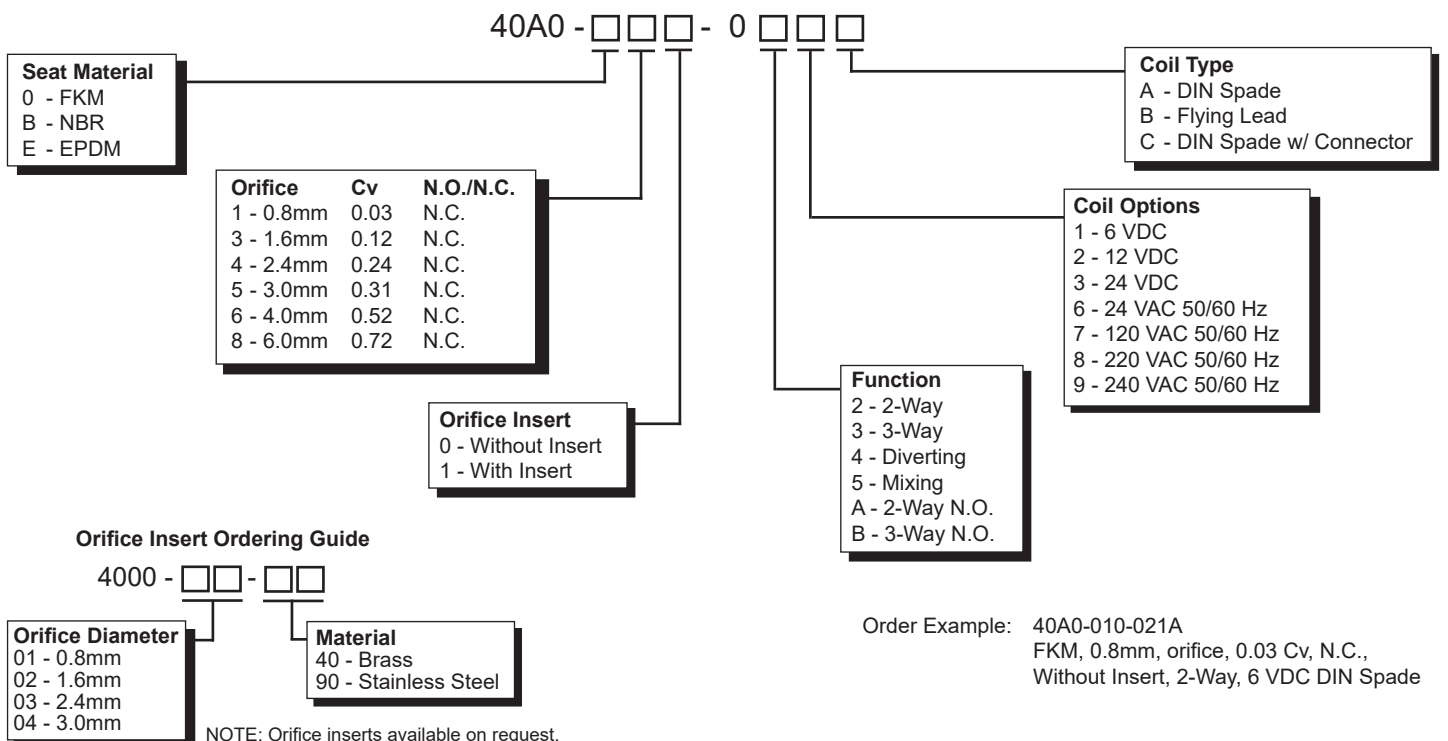
SOLENOID OPERATORS

ORIFICE SIZE / VOLTAGE

FUNCTION	0.8mm		1.6mm		2.4mm		3.0mm		4.0mm		6.0mm	
	AC	DC	AC	DC	AC	DC	AC	DC	AC	DC	AC	DC
2/2 NC	1200	900	900	525	450	225	270	150	100	80	70	60
2/2 NO	525	345	255	225	150	120	90	82	N/A	N/A	N/A	N/A
3/2 NC	525	375	255	225	150	120	90	82	60	50	30	20
3/2 NO	450	345	255	225	150	120	105	90	N/A	N/A	N/A	N/A

MAX. PRESSURE RANGE (psi)

How To Order





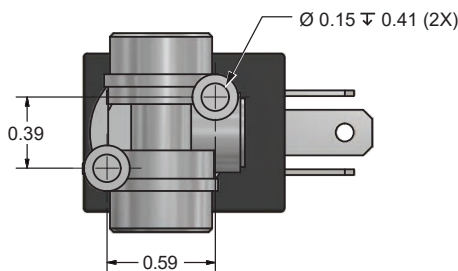
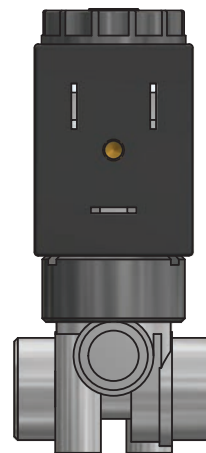
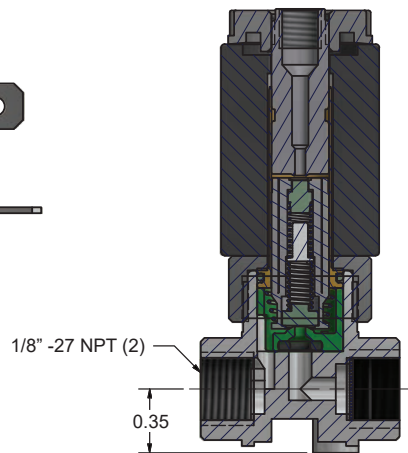
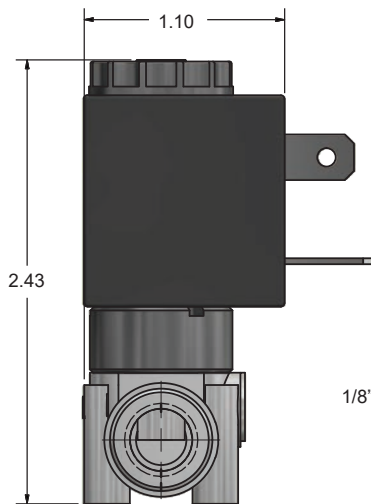
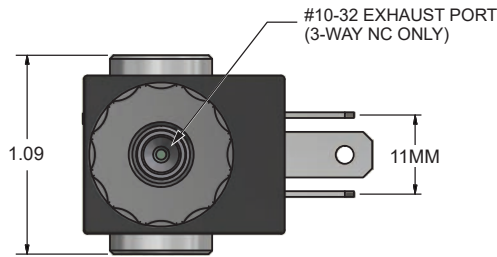
Series 3822

Direct Acting
2-Way & 3-Way

The Spartan Scientific Series 3822 is a metal body solenoid valve offered in both 2-Way & 3-Way, 2-Position Normally Closed or Normally Open functions and eight orifice sizes. Component features include the proven Series 3800 solenoid operator available in brass/stainless steel or all stainless steel pilot design, optional seal materials and Glass-Filled Nylon encapsulated coil in both DIN spade and flying lead. The "basket" orifice design feature allows the possibility of changing the orifice diameter to meet flow requirements within a matter of seconds. The rugged metal body coupled with the high cycle life, proven solenoid meet to make a solid solution for media and inert gas control. Available in all standard voltages, the valve saves energy while giving you the confidence of high quality in small envelope size.

Dimensional Data

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED



ORIFICE SIZE / VOLTAGE

FUNCTION	0.6mm		0.8mm		1.0mm		1.2mm		1.5mm		2.0mm		2.4mm		*3.0mm	
	AC	DC	AC	DC	AC	DC	AC	DC	AC	DC	AC	DC	AC	DC	AC	DC
2/2 NC	200	200	200	200	200	200	200	200	200	200	200	200	200	200	75	60
2/2 NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	150	150	N/A	N/A	N/A	N/A	N/A	N/A
3/2 NC	200	200	200	200	200	200	180	180	150	150	90	75	60	60	25	25
3/2 NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	150	150	N/A	N/A	N/A	N/A	N/A	N/A

MAX. PRESSURE RANGE (psi)

DIRECT ACTING



Series 3822

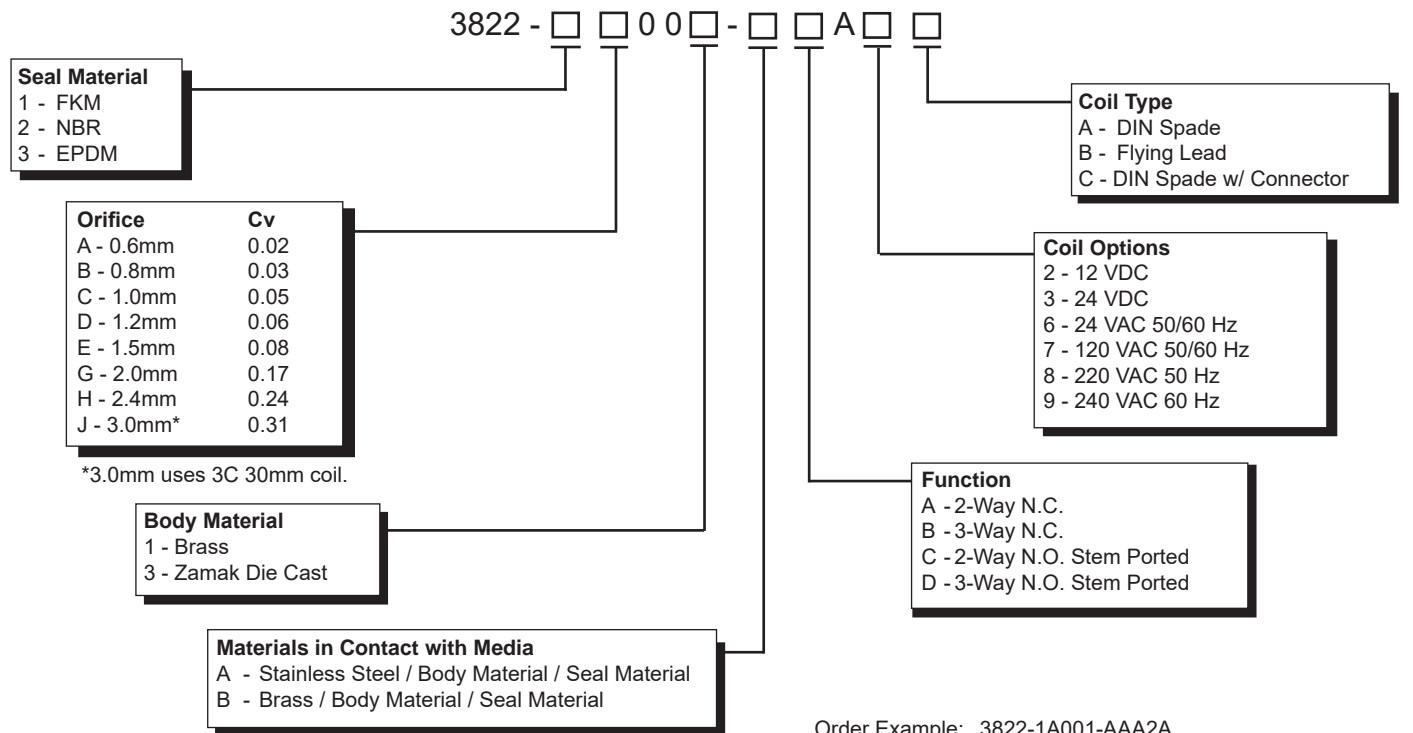
Direct Acting
2-Way & 3-Way

Technical Data

Function:	2-Way, 2-Position; Direct Acting; Normally Closed or Normally Open 3-Way, 2-Position; Direct Acting Normally Closed or Normally Open	Mounting:	#8 x 0.150" Self-Tapping Screw (2) not provided
Port Size:	1/8" NPT	Wetted Materials:	Elastomers: EPDM, FKM, NBR Operator: 300 and 400 Series Stainless Steel; or Brass Orifice Basket: APOM Shading Ring: Copper (AC only) Springs: 300 Series Stainless Steel Valve Body: Brass or Zamak
Orifice Size / Flow Factor:	0.6mm / 0.02 Cv 0.8mm / 0.03 Cv 1.0mm / 0.05 Cv 1.2mm / 0.06 Cv 1.5mm / 0.08 Cv 2.0mm / 0.17 Cv 2.4mm / 0.24 Cv 3.0mm / 0.31 Cv	Coil Data:	Duty Cycle: Continuous (within specifications) Encapsulation: Glass-Filled Nylon Insulation: Class F Power Rating: 6.5 Watt VDC, 8.5VA VAC (others available on request) Voltage: 12, 24 VDC 24, 120, 220, 240 VAC 50/60 Hz Voltage Tolerance: +/- 10% Nominal Winding: Class H
Pressure Range:	Vacuum to 200 psi (depending on orifice size and function)	Connections:	Spades: Terminals AMP 6.3x0.8 width 11mm (Available in DIN Style "A" EN175301-803 for 3.0mm orifice or larger) Flying Lead: PVC 22 AWG, Multi-Strand Copper Wire, 300V, 12" minimum length
Temp. Range:	Fluid Max.: +90°C Dry Range: Ambient +10° to +50°C	Packaged Weight:	0.21 lbs.
Response Time:	12 to 14ms Complete Cycle		
Media:	Air, inert gas, light oil, water (contact factory for compatibilities)		
Environment Protection:	IP65 (IEC 144), NEMA 4 Dust-tight and water resistant (with electrical connector)		

DIRECT
ACTING

How To Order



Order Example: 3822-1A001-AAA2A
FKM, 0.6mm orifice, 0.02 Cv, Brass,
Stainless Steel / Body Material / Seal Material,
2-Way N.C., 12 VDC, DIN Spade.



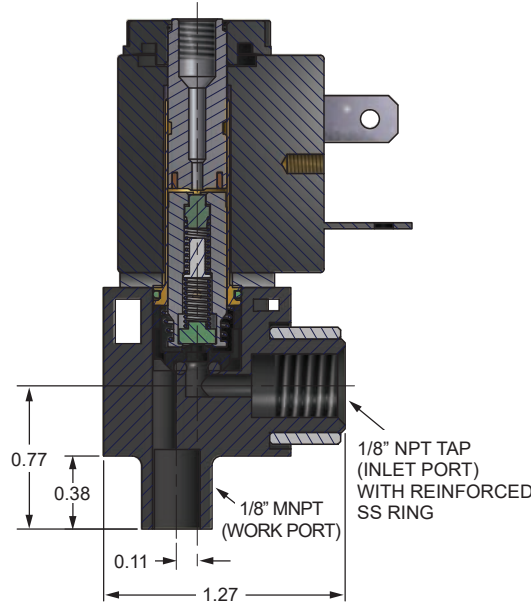
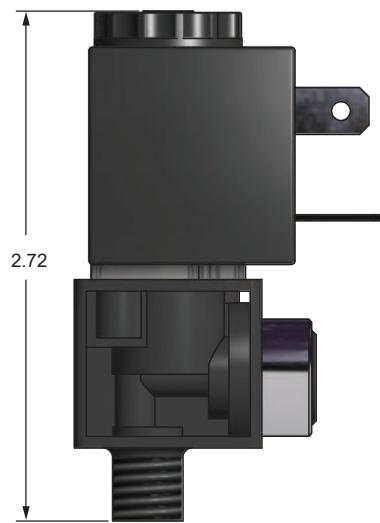
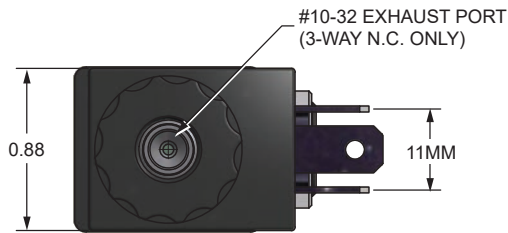
Series 3824

Direct Acting
Composite 2-Way & 3-Way

The Series 3824 is a 2-Way & 3-Way, 2-Position composite body solenoid valve designed to take the place of a fitting using a female inlet and male outlet port. The valve is generally mounted into an air cylinder port to control a single acting linear actuator. Component features include the proven solenoid operator available in brass/stainless steel or all stainless steel pilot design, optional seal materials and nylon encapsulated coil. The "basket" orifice design feature allows the possibility of changing the orifice diameter to meet flow requirements within a matter of seconds.

Dimensional Data

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED



ORIFICE SIZE / VOLTAGE

FUNCTION	0.6mm		0.8mm		1.0mm		1.2mm		1.5mm		2.0mm		2.4mm		*3.0mm		
	AC	DC	AC	DC	AC	DC	AC	DC	AC	DC	AC	DC	AC	DC	AC	DC	
2/2 NC	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	75	60
2/2 NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	150	150	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3/2 NC	200	200	200	200	200	200	180	180	150	150	90	75	60	60	25	25	
3/2 NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	150	120	N/A	N/A	N/A	N/A	N/A	N/A	

MAX. PRESSURE RANGE (psi)

DIRECT ACTING



Series 3824

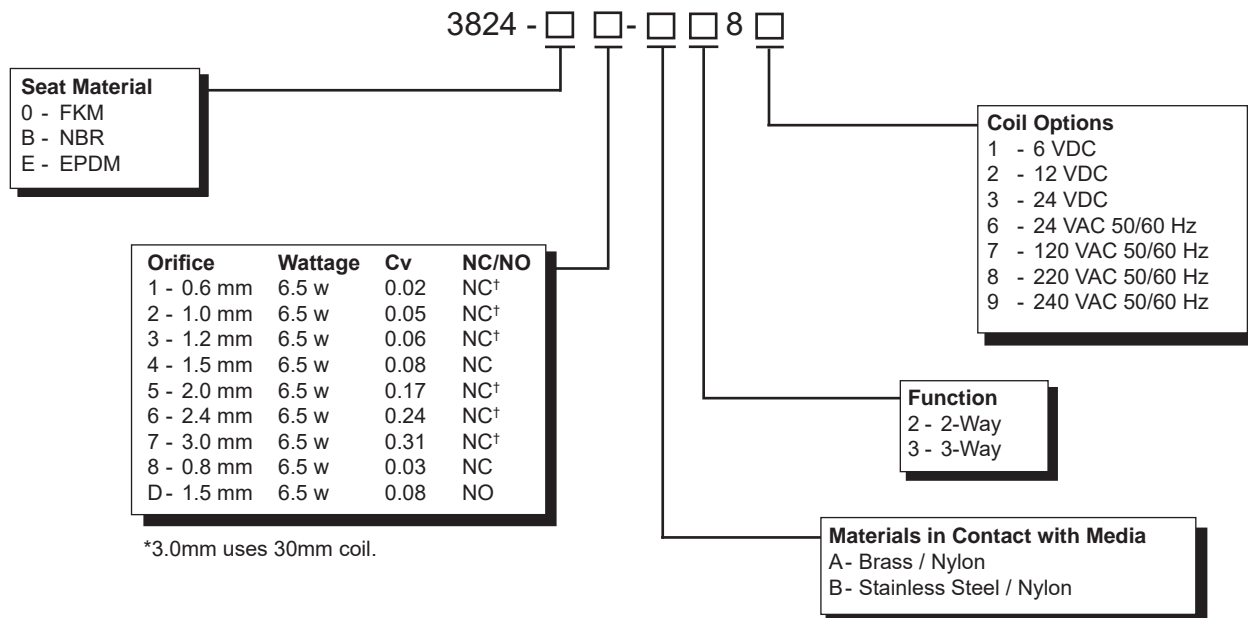
Direct Acting
Composite 2-Way & 3-Way

Technical Data

Function:	2-Way, 2-Position; Direct Acting; Normally Closed or Normally Open 3-Way, 2-Position; Direct Acting; Normally Closed or Normally Open	Mounting:	1/8" NPT Male Port
Port Size:	1/8" NPT 1/8" MNPT	Wetted Materials:	Elastomers: EPDM, FKM, NBR Operator: 400 Series Stainless Steel and Brass Shading Ring: Copper (AC Only) Springs: 300 Series Stainless Steel Valve Body: Glass-Filled Nylon
Orifice Sizes / Flow Factor:	0.6mm / 0.02 Cv 0.8mm / 0.03 Cv 1.0mm / 0.05 Cv 1.2mm / 0.06 Cv 1.5mm / 0.08 Cv 2.0mm / 0.17 Cv 2.4mm / 0.24 Cv 3.0mm / 0.31 Cv	Coil Data:	Duty Cycle: Continuous (within specifications) Encapsulation: Glass-Filled Nylon Insulation: Class F Power Rating: 6.5 Watt VDC, 8.5VA VAC (others available on request) Voltage: 6, 12, 24 VDC 24, 120, 220, 240 VAC 50/60 Hz Voltage Tolerance: +/- 10% Nominal Winding: Class H
Pressure Range:	Vacuum to 200 psi (depending on orifice size and function)	Connections:	Spades: Terminals AMP 6.3x0.8 width 11mm (Available in DIN Style "A" EN175301-803 for 3.0mm orifice or larger) Flying Lead: PVC 22 AWG, Multi-Strand Copper Wire, 300V, 12" minimum length
Temp. Range:	Fluid Max.: +60°C Dry Range: Ambient +10° to +50°C	Packaged Weight:	22mm Coil: 0.27 lbs. 30mm Coil: 0.34 lbs.
Response Time:	12 to 14ms Complete Cycle		
Media:	Air, caustics, inert gas, oil, water		
Environment Protection:	IP65 (IEC 144), NEMA 4 Dust-tight and water resistant (with electrical connector)		

DIRECT
ACTING

How To Order



† Not available in all configurations

Order Example: 3824-01-A387
FKM, 0.6mm orifice, 0.02 Cv, N.C.,
Brass / Nylon, 3-Way, 120VAC 50/60 Hz



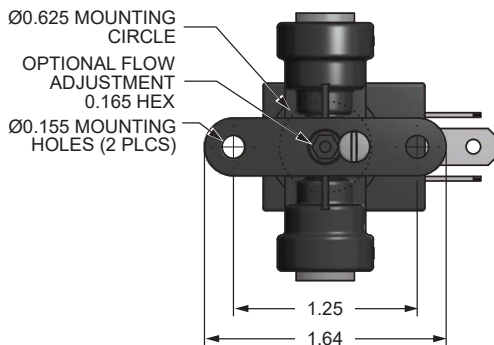
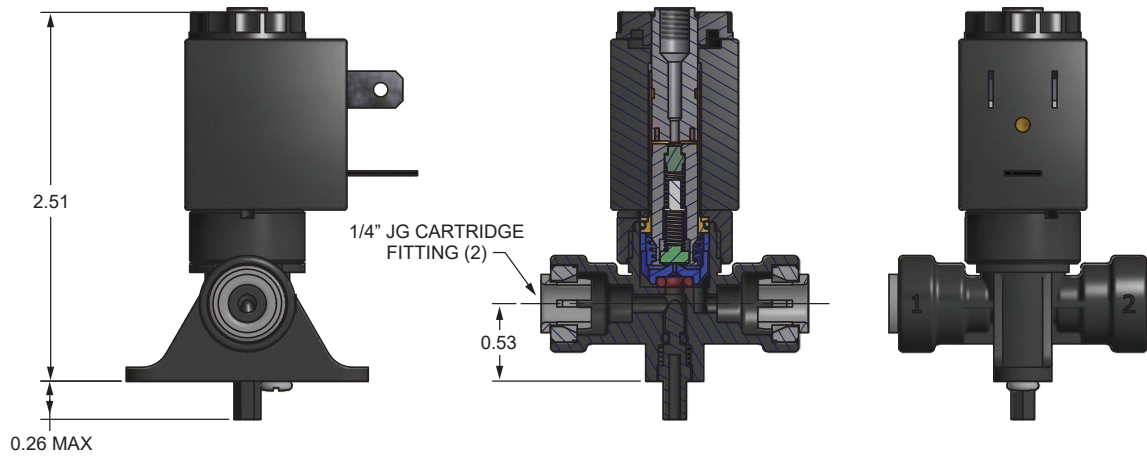
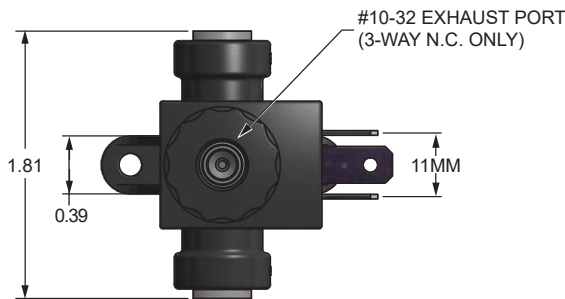
Series 3825

Direct Acting
Composite 2-Way & 3-Way

The Spartan Scientific Series 3825 is a composite body solenoid valve featuring integrated .250 inch O.D. quick connect tube fittings right in the valve body. Advantages include reduced leak points and a lower installation cost. Additional features include 2-Way & 3-Way, 2-Position function in either Normally Closed or Normally Open, Mixing or Diverting versions. This versatile series incorporates the orifice basket technology ensuring rapid assembly of many orifice sizes from 0.6 to 3.0 mm. A unique option is that this valve can be made with an externally adjustable flow control effectively giving the operator the ability to dial in a custom flow rate after the valve has been installed in the application. The valve coil is available in all standard voltages with flying leads or industry standard quick connect and all versions are fully nylon encapsulated. The 3825 is available in media compatible materials that include stainless steel, or brass, and FDA and NSF approved thermo-plastics. Many seal materials are available with FKM as standard.

Dimensional Data

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED



ORIFICE SIZE / VOLTAGE

FUNCTION	0.6mm		0.8mm		1.0mm		1.2mm		1.5mm		2.0mm		2.4mm		*3.0mm	
	AC	DC	AC	DC	AC	DC	AC	DC	AC	DC	AC	DC	AC	DC	AC	DC
2/2 NC	150	150	150	150	150	150	150	150	150	150	150	150	150	150	75	60
2/2 NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	150	150	N/A	N/A	N/A	N/A	N/A	N/A
3/2 NC	150	150	150	150	150	150	150	150	150	150	90	75	60	60	25	25
3/2 NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	150	150	N/A	N/A	N/A	N/A	N/A	N/A

MAX. PRESSURE RANGE (psi)

DIRECT ACTING



Series 3825

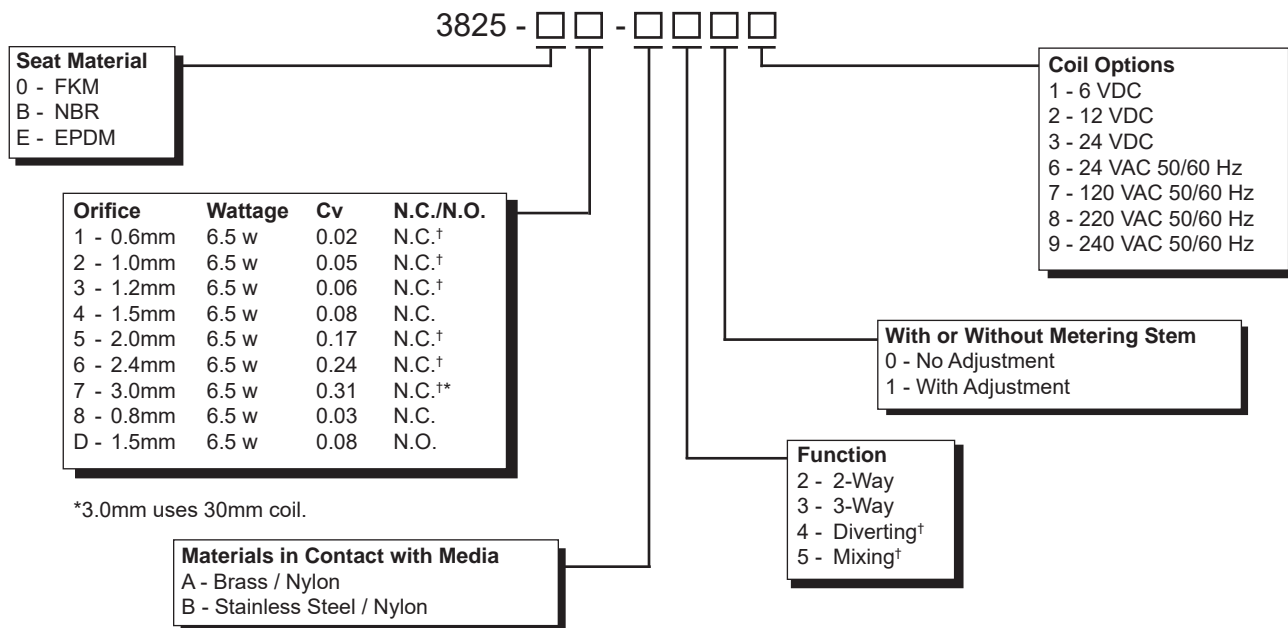
Direct Acting
Composite 2-Way & 3-Way

Technical Data

Function:	2-Way, 2-Position; Direct Acting; Diverting, Mixing, Normally Closed or Normally Open 3-Way, 2-Position; Direct Acting; Diverting, Mixing, Normally Closed or Normally Open	Mounting:	Ø0.155" Mounting holes (2)
Port Size:	1/4" O.D. John Guest tube cartridges (2)	Wetted Materials:	Elastomers: EPDM, FKM, NBR Operator: 400 Series Stainless Steel and Brass (others available on request) Shading Ring: Copper (AC Only) Springs: 300 Series Stainless Steel Valve Body: Acetal Resin (others available on request)
Orifice Sizes / Flow Factor:	0.6mm / 0.02 Cv 0.8mm / 0.03 Cv 1.0mm / 0.05 Cv 1.2mm / 0.06 Cv 1.5mm / 0.08 Cv 2.0mm / 0.17 Cv 2.4mm / 0.24 Cv 3.0mm / 0.31 Cv	Coil Data:	Duty Cycle: Continuous (within specifications) Encapsulation: Glass-Filled Nylon Insulation: Class F Power Rating: 6.5 Watt VDC, 8.5VA VAC (others available on request) Voltage: 6, 12, 24 VDC 24, 120, 220, 240 VAC 50/60 Hz Voltage Tolerance: +/- 10% Nominal Winding: Class H
Pressure Range:	Vacuum to 150 psi (depending on orifice size and function)	Connections:	Spades: Terminals AMP 6.3x0.8 width 11mm (Available in DIN Style "A" EN175301-803 for 3.0mm orifice or larger) Flying Lead: PVC 22 AWG, Multi-Strand Copper Wire, 300V, 12" minimum length
Temp. Range:	Fluid Max.: +60°C Dry Range: Ambient +10° to +50°C	Package Weight:	22mm Coil: 0.23 lbs. 30mm Coil: 0.36 lbs.
Response Time:	14 to 20ms Complete Cycle		
Media:	Air, caustics, light oils, potable water, water (contact factory for compatibilities)		
Environment Protection:	IP65 (IEC 144), NEMA 4 Dust-tight and water resistant (with electrical connector)		

DIRECT ACTING

How To Order



Order Example: 3825-01-A307
FKM, 0.6mm orifice, 0.02 Cv, N.C., Brass / Nylon,
3-Way, without metering stem, 120 VAC 50/60 Hz

† Not available in all configurations



Series 3827

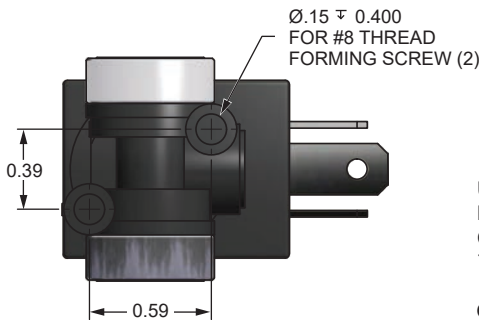
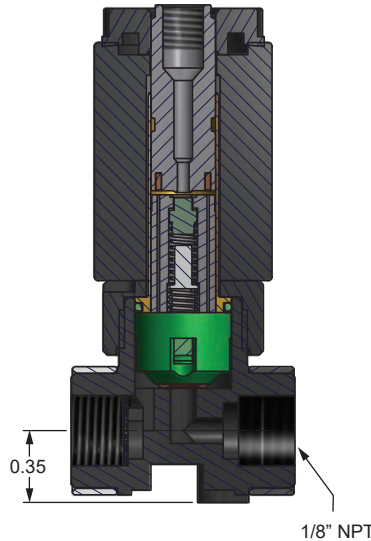
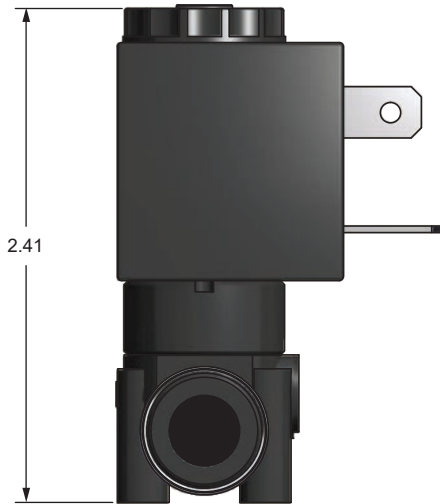
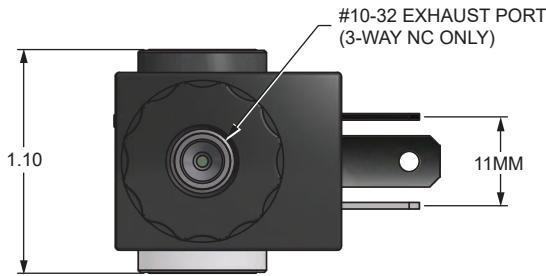
Direct Acting
Composite 2-Way & 3-Way

The Spartan Scientific Series 3827 is a composite body solenoid valve offered in both 2-Way & 3-Way, 2-Position Normally Closed or Normally Open functions and eight orifice sizes. Component features include the proven Series 3800 solenoid operator available in brass/stainless steel or all stainless steel pilot design, optional seal materials and nylon encapsulated coil. The "basket" orifice design feature allows the possibility of changing the orifice diameter to meet flow requirements within a matter of seconds. The composite material is media compatible, eliminating the need for stocking multiple body materials.

Dimensional Data

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED

NOTE: SHOWN WITHOUT MANUAL OVERRIDE OPTION



ORIFICE SIZE / VOLTAGE

FUNCTION	0.6mm		0.8mm		1.0mm		1.2mm		1.5mm		2.0mm		2.4mm		*3.0mm			
	AC	DC	AC	DC	AC	DC	AC	DC	AC	DC	AC	DC	AC	DC	AC	DC		
	2/2 NC	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	75
2/2 NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	150	150	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3/2 NC	200	200	200	200	200	200	180	180	150	150	90	75	60	60	25	25		
3/2 NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	150	150	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3/2 MIX	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	100	90	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3/2 DIV	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	120	110	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

MAX. PRESSURE RANGE (psi)

DIRECT ACTING




Series 3827

Direct Acting
Composite 2-Way & 3-Way

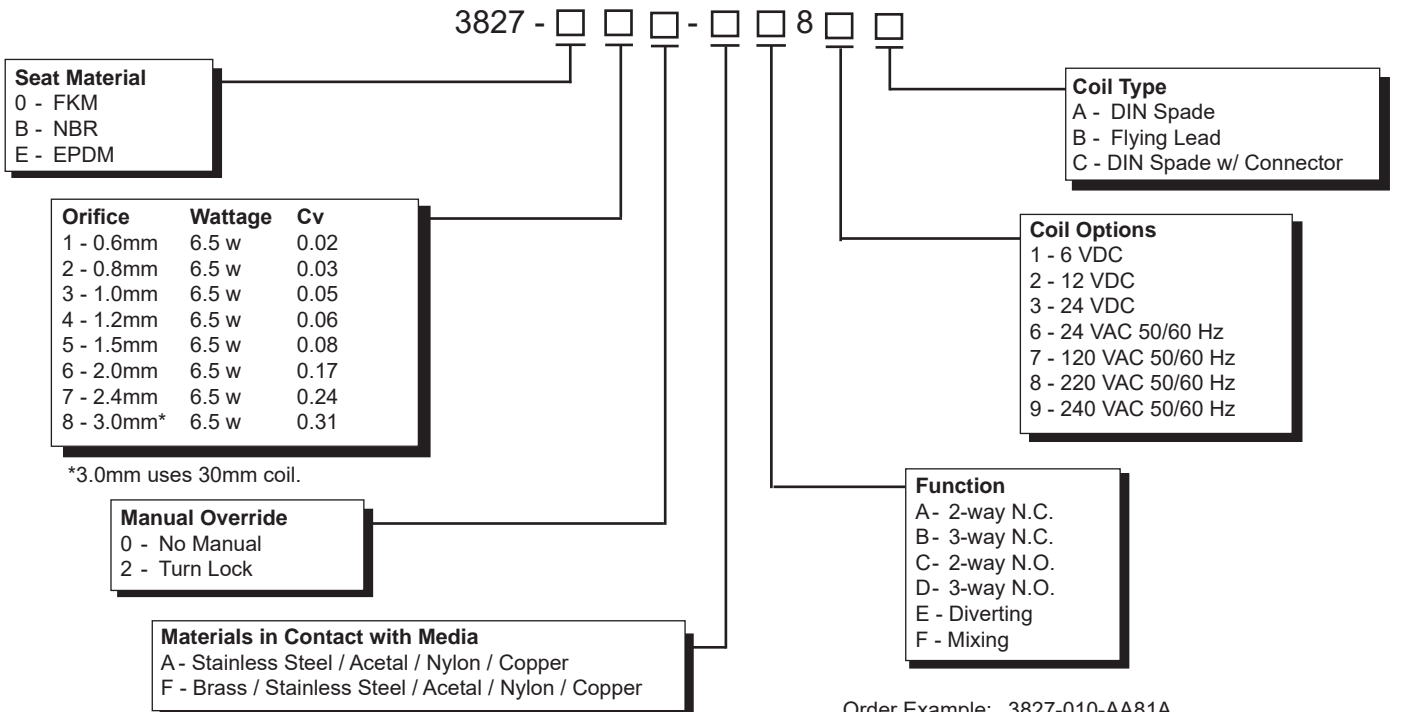
Technical Data

Function:	2-Way, 2-Position; Direct Acting; Normally Closed or Normally Open 3-Way, 2-Position; Direct Acting; Normally Closed or Normally Open Diverting or Mixing	Mounting:	#8 x 0.150" self-tapping screw (2) not provided
Port Size:	1/8" NPT	Wetted Materials:	Elastomers: EPDM, FKM, NBR (others available on request) Operator: 400 Series Stainless Steel and Brass (others available on request) Shading Ring: Copper (AC Only) Springs: 300 Series Stainless Steel Valve Body: Glass-Filled Nylon (FDA Approved)
Orifice Sizes / Flow Factor:	0.6mm / 0.02 Cv 0.8mm / 0.03 Cv 1.0mm / 0.05 Cv 1.2mm / 0.06 Cv 1.5mm / 0.08 Cv 2.0mm / 0.17 Cv 2.4mm / 0.24 Cv 3.0mm / 0.31 Cv	Coil Data:	Duty Cycle: Continuous (within specifications) Encapsulation: Glass-Filled Nylon Insulation: Class F Power Rating: 6.5 Watt, 8.5VA (others available on request) Voltage: 6, 12, 24 VDC 24, 120, 220, 240 VAC 50/60 Hz Voltage Tolerance: +/- 10% Nominal Winding: Class H
Pressure Range:	Vacuum to 200 psi (depending on orifice size and function)	Connections:	Spades: Terminals AMP 6.3x0.8 width 11mm (Available in DIN Style "A" EN175301-803 for 3.0mm orifice or larger) Flying Lead: PVC 22 AWG, Multi-Strand Copper Wire, 300V, 12" minimum length
Temp. Range:	Fluid Max.: +60°C Dry Range: Ambient +10° to +50°C	Packaged Weight:	22mm Coil: 0.22 lbs. 30mm Coil: 0.31 lbs.
Response Time:	12 to 14ms Complete Cycle		
Media:	Air, caustics, light oils, water (contact factory for compatibilities)		
Environment Protection:	IP65 (IEC 144), NEMA 4 Dust-tight and water resistant (with electrical connector)		

 Consult factory for available versions recognized under the Component Program of Underwriters Laboratories, Inc.

DIRECT ACTING

How To Order



Order Example: 3827-010-AA81A
FKM, 0.6mm orifice, No Manual Override,
Stainless Steel / Acetal / Nylon, Copper,
2-Way N.C., 6 VDC, DIN Spade.



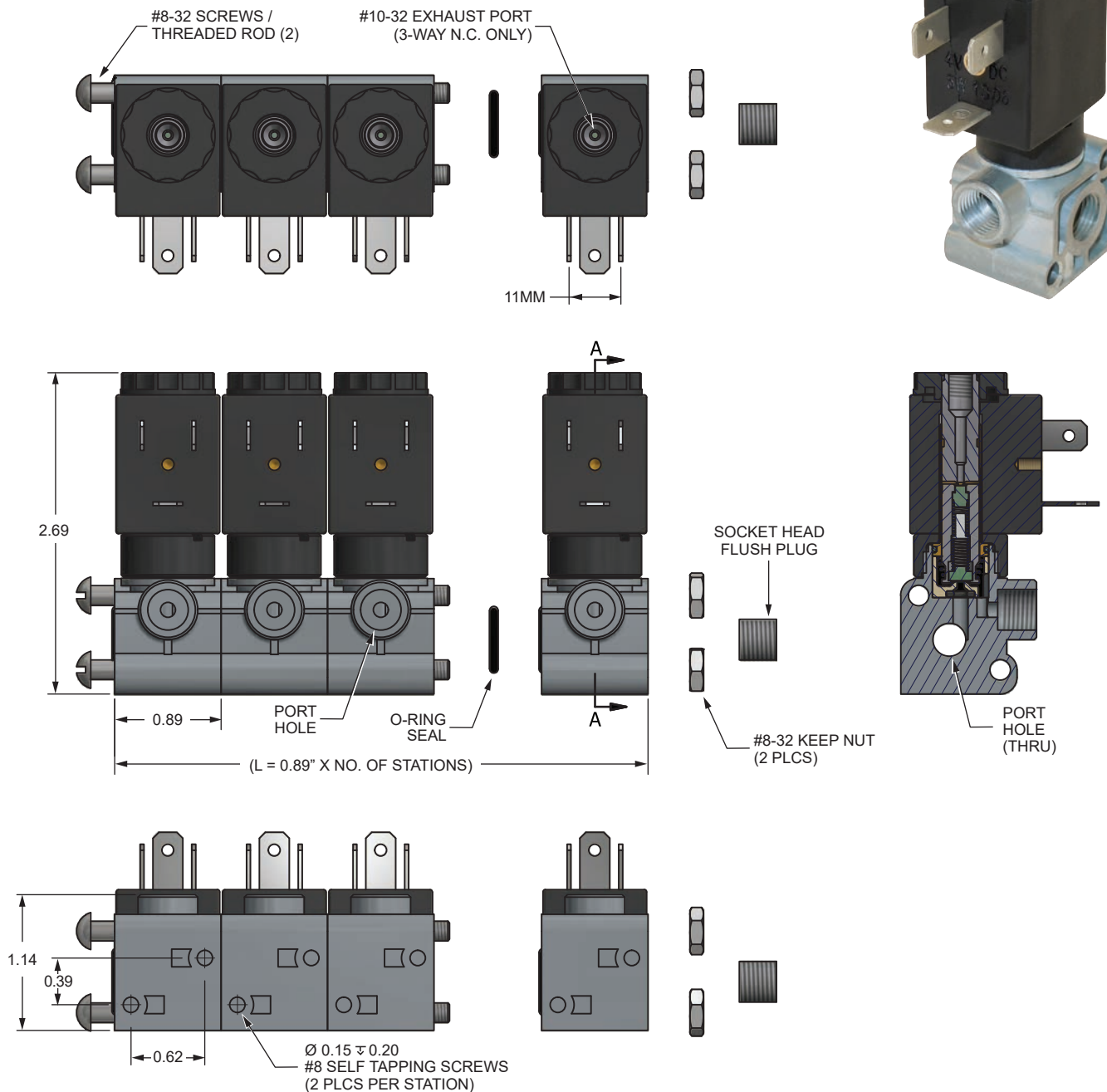
Series 3922

Direct Acting
Stackable

The Spartan Scientific Series 3922 is a 2-Way & 3-Way, 2-Position Normally Closed solenoid valve for control of air, caustics, inert gases, oil, and water. Constructed from highest grade materials, the Series 3922 features a completely glass filled nylon encapsulated coil, stainless steel plunger and stop, and spring compensated plunger seals for long trouble free service. Key to the 3922 is a stackable body giving the customer the ability to build manifolds as needed using one inlet and many outlets. The 3922 is available in orifice sizes from 0.6 (0.02 Cv) to 2.4mm (0.24 Cv). Seat materials are EPDM, FKM and NBR standard. Coils are class F 100% duty and incorporate the industry standard quick connect, or flying leads. The valve body is made from robust zinc-aluminum die casting and comes standard with 1/8" NPT connections. The body is designed to incorporate our interchangeable "basket" style orifice simplifying valve assembly and re-fit. The Series 3922 is a long life, low cost solution to many automation applications.

Dimensional Data

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED



DIRECT
ACTING



Series 3922

Direct Acting
Stackable

Technical Data

Function: 2-Way, 2-Position; Direct Acting; Normally Closed
3-Way, 2-Position; Direct Acting; Normally Closed

Port Size: 1/8" NPT

Orifice Sizes / Flow Factor:
0.6mm / 0.02 Cv
0.8mm / 0.03 Cv
1.0mm / 0.05 Cv
1.2mm / 0.06 Cv
1.5mm / 0.08 Cv
2.0mm / 0.17 Cv
2.4mm / 0.24 Cv

Pressure Range: Vacuum to 200 psi (depending on orifice size and function)

Temp. Range: Fluid Max.: +90°C
Dry Range: Ambient +10° to +50°C

Response Time: 12 to 14ms Complete Cycle

Media: Air, caustics, inert gases, oil, water
(contact factory for compatibilities)

Environment Protection: IP65 (IEC 144), NEMA 4
Dust-tight and water resistant (with electrical connector)

Mounting: #8-32 x 0.250" (2) not provided

Wetted Materials: Elastomers: EPDM, FKM, NBR
(other materials available on request)
Operator: Brass
(other materials available on request)
Shading Ring: Copper (AC Only)
Springs: 300 Series Stainless Steel
Valve Body: Die Cast Aluminum

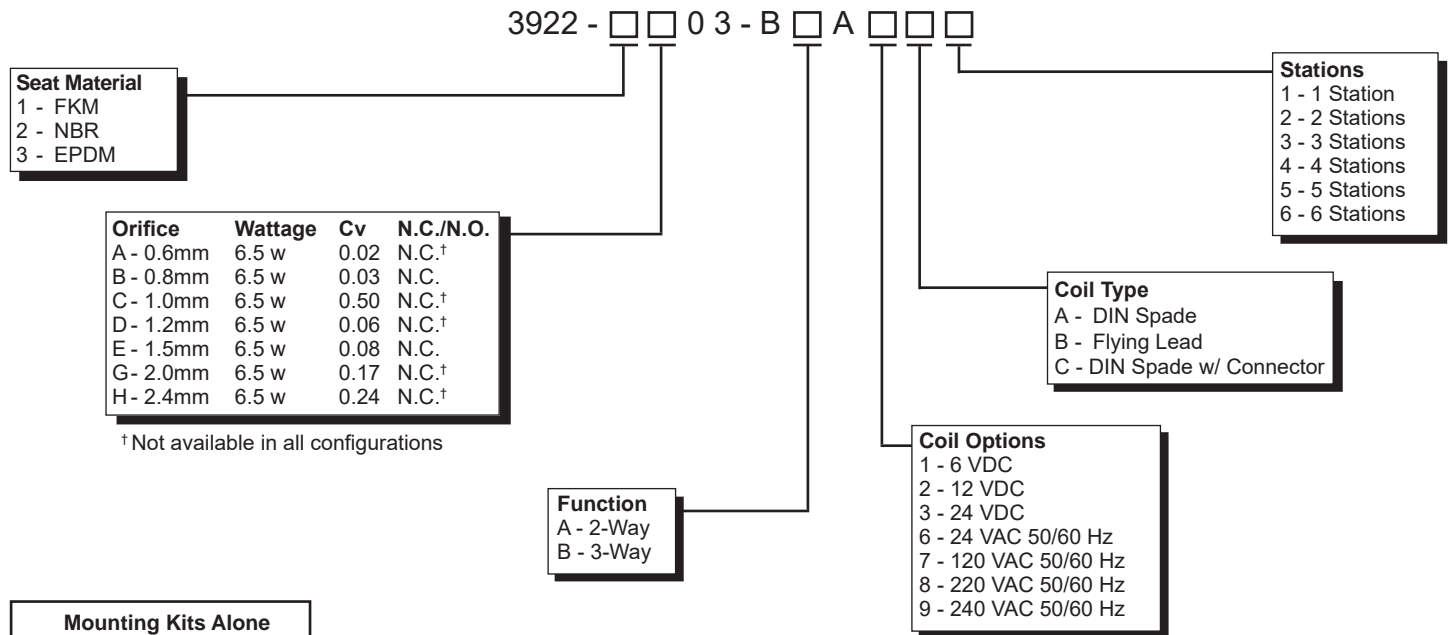
Coil Data: Duty Cycle: Continuous (within specifications)
Encapsulation: Glass-Filled Nylon
Insulation: Class F
Power Rating: 6.5 Watt VDC, 8.5VA
(others available on request)
Voltage: 6, 12, 24 VDC
24, 120, 220, 240 VAC 50/60 Hz
Voltage Tolerance: +/- 10% Nominal
Winding: Class H

Connections: Spades: Terminals AMP 6.3x0.8 width 11mm
(Available in DIN Style "A" EN175301-803 for 3.0mm orifice or larger)
Flying Lead: PVC 22 AWG, Multi-Strand Copper Wire, 300V, 12" minimum length

Packaged Weight: 0.22 lbs.

DIRECT ACTING

How To Order



Mounting Kits Alone	
Description	Model Number
2 Station	3900-02-00
3 Station	3900-03-00
4 Station	3900-04-00
5 Station	3900-05-00
6 Station	3900-06-00

Mounting kit contains:
Two mounting screws,
two locking nuts and o-rings.

Order Example: 3922-0A03-AAA1A3
FKM, 0.6mm orifice, N.C., 2-Way,
6 VDC, DIN Spade, 3 Station.



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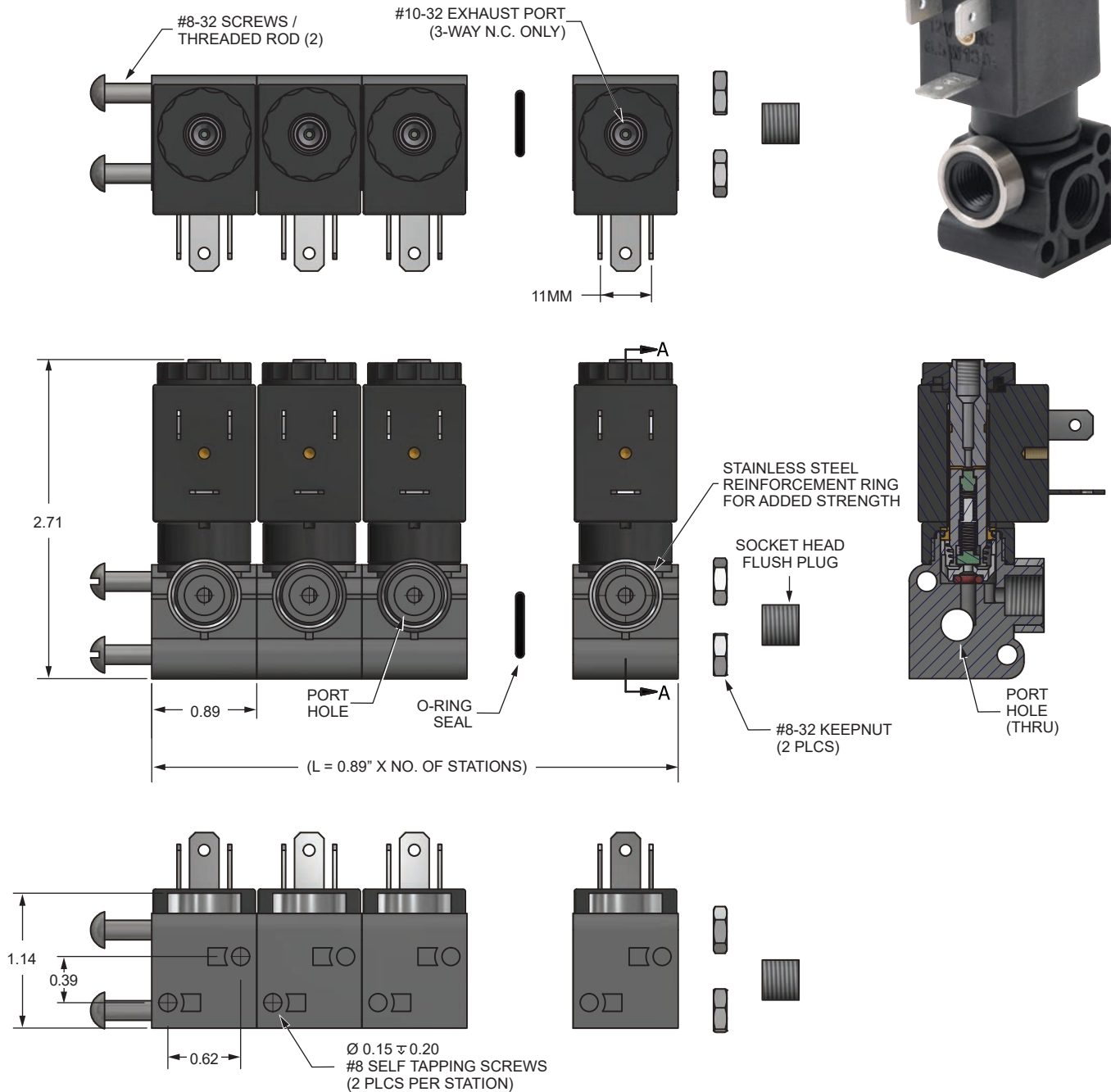
Series 3923

Direct Acting
Composite Stackable

The Spartan Scientific Series 3923 features a fully encapsulated coil, spring compensated plunger seats for long life, and a miniature stackable composite valve body. Key to the 3923 is a stackable body giving the customer the ability to build manifolds as needed using one inlet and many outlets. The 3923 is available in orifice sizes from 0.6 (0.02 Cv) to 2.4mm (0.24 Cv). Seat materials are EPDM, FKM and NBR standard. Coils are class F 100% duty and incorporate the industry standard quick connect, or flying leads. In most cases the Series 3923 reduces inventory costs and lowers cost per installation over a conventional manifold valve series.

Dimensional Data

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED



DIRECT ACTING



Series 3923

Direct Acting
Composite Stackable

Technical Data

Function: 2-Way, 2-Position; Direct Acting; Normally Closed
3-Way, 2-Position; Direct Acting; Normally Closed

Port Size: 1/8" NPT

Orifice Sizes / Flow Factor:
0.6mm / 0.02 Cv
0.8mm / 0.03 Cv
1.0mm / 0.05 Cv
1.2mm / 0.06 Cv
1.5mm / 0.08 Cv
2.0mm / 0.17 Cv
2.4mm / 0.24 Cv

Pressure Range: Vacuum to 200 psi (depending on orifice size and function)

Temp. Range: Fluid Max.: +60°C
Dry Range: Ambient +10° to +50°C

Response Time: 12 to 14ms Complete Cycle

Media: Air, caustics, inert gas, oil, water
(contact factory for compatibilities)

Environment Protection: IP65 (IEC 144), NEMA 4
Dust-tight and water resistant (with electrical connector)

Mounting: #8-32 x 0.250" (2) not provided

Wetted Materials: Elastomers: EPDM, FKM, NBR
(other materials available on request)
Operator: 400 Series Stainless Steel and Brass
(other materials available on request)
Shading Ring: Copper (AC Only)
Springs: 300 Series Stainless Steel
Valve Body: Glass-Filled Nylon (FDA Approved)

Coil Data: Duty Cycle: Continuous (within specifications)
Encapsulation: Glass-Filled Nylon
Insulation: Class F
Power Rating: 6.5 Watt VDC, 8.5VA
(others available on request)
Voltage: 6, 12, 24 VDC
24, 120, 220, 240 VAC 50/60 Hz
Voltage Tolerance: +/- 10% Nominal
Winding: Class H

Connections: Spades: Terminals AMP 6.3x0.8 width 11mm
(Available in DIN Style "A" EN175301-803 for 3.0mm orifice or larger)
Flying Lead: PVC 22 AWG, Multi-Strand Copper Wire, 300V, 12" minimum length

Packaged Weight: 0.22 lbs.

FUNCTION

ORIFICE SIZE / VOLTAGE

	0.6mm		0.8mm		1.0mm		1.2mm		1.5mm		2.0mm		2.4mm	
	AC	DC	AC	DC	AC	DC	AC	DC	AC	DC	AC	DC	AC	DC
2/2 NC	200	200	200	200	200	200	200	200	200	200	200	200	200	200
3/2 NC	200	200	200	200	180	180	160	160	150	150	90	75	60	60

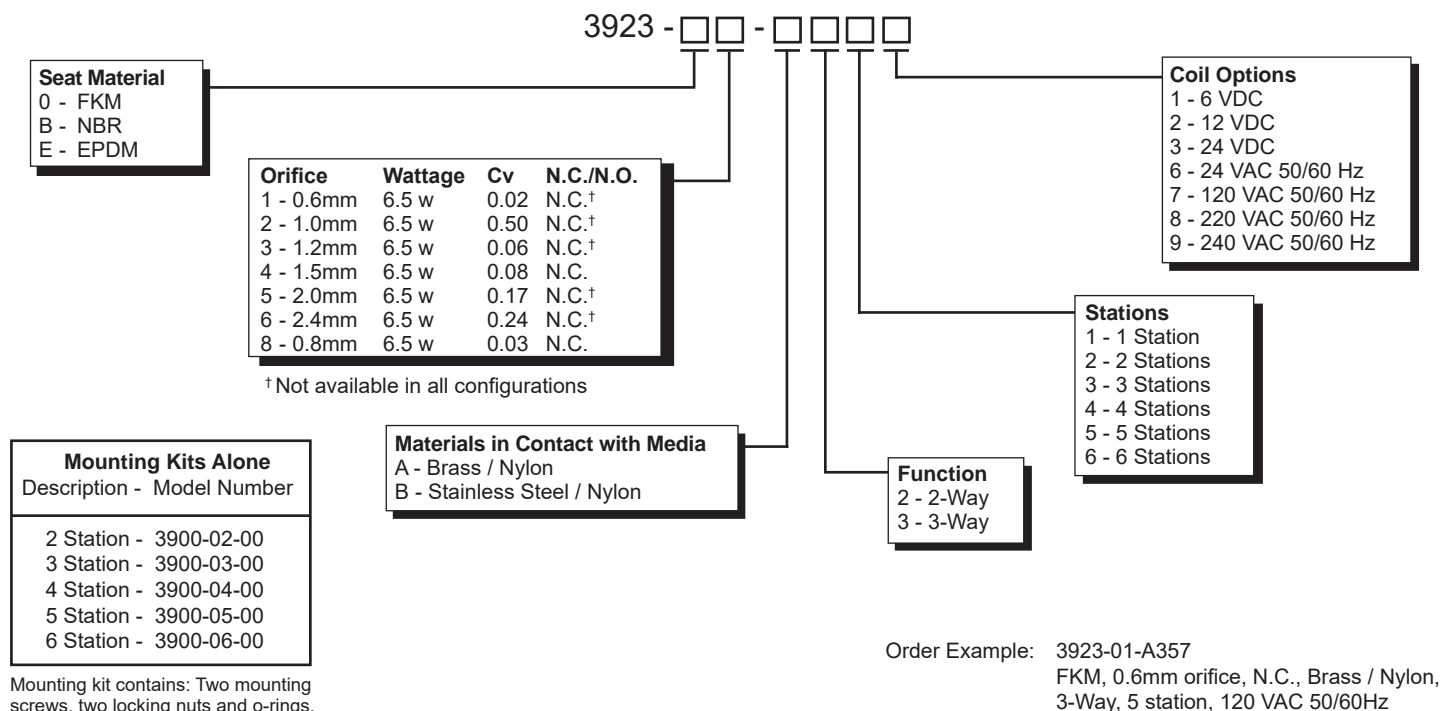
MAX. PRESSURE RANGE (psi)



Consult factory for available versions recognized under the Component Program of Underwriters Laboratories, Inc.

DIRECT ACTING

How To Order





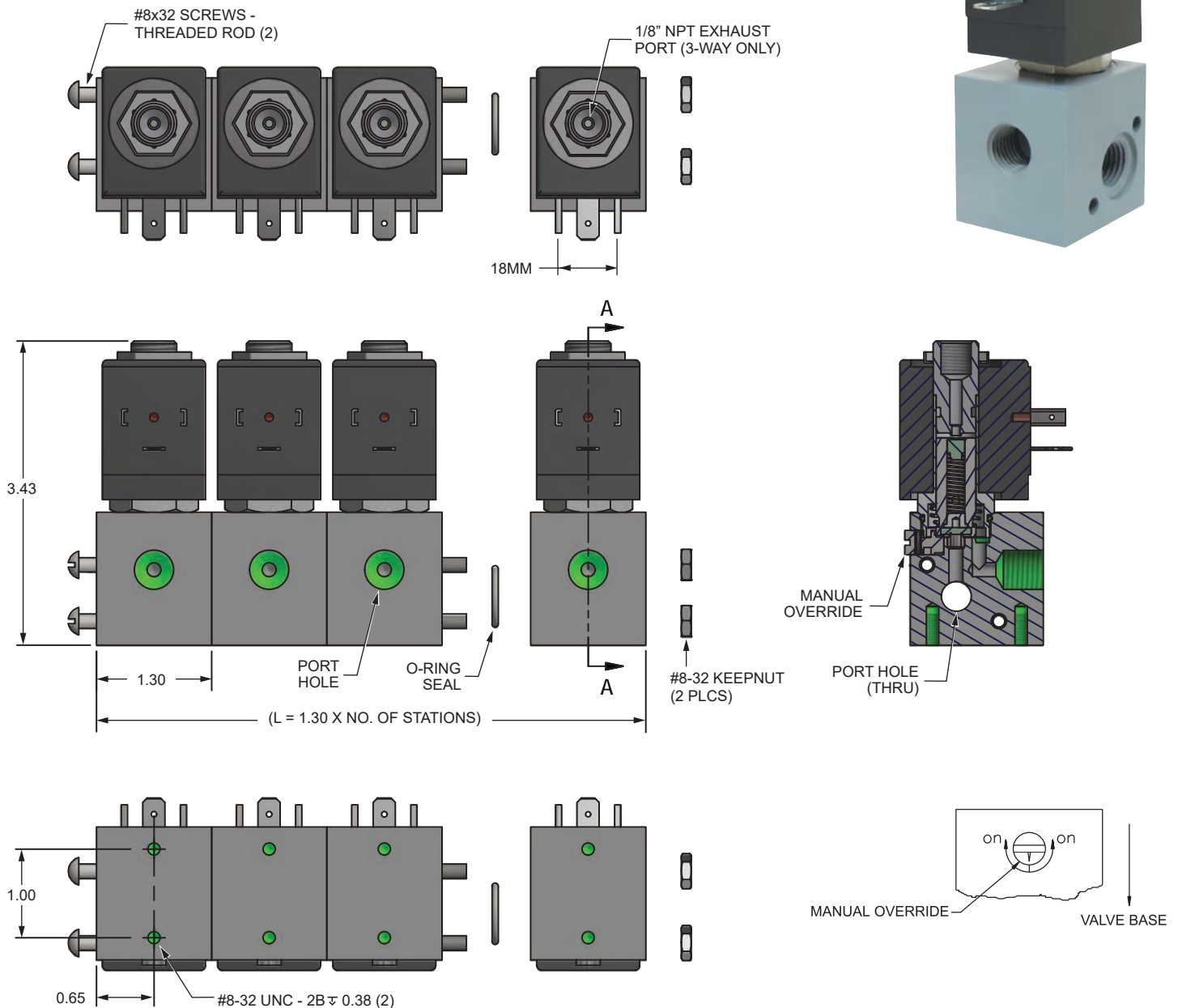
Series 4290

Direct Acting
Stackable

The Spartan Scientific Series 4290 is a 2-Way & 3-Way, 2-Position Normally Closed or Normally Open solenoid valve for electrical control of air, caustics, inert gases, oil, and water. Constructed from highest grade materials, the Series 4290 features a completely glass-filled nylon encapsulated coil, stainless steel plunger and stop, and spring compensated plunger seals for long trouble-free service. Key to the Series 4290 is a stackable body giving the customer the ability to build manifolds as needed using one inlet and many outlets. The Series 4290 is available in orifice sizes from 0.8mm to 3.0mm. Seat materials are EPDM, FKM and NBR standard. The class F coils are 100% continuous duty, all standard voltages, and are available in DIN Style "A" EN175301-803 (Formerly DIN 43650) or flying leads. The valve body is made from robust PVC and comes standard with 1/4" NPT connections. The Series 4290 is a long life, low cost solution to many automation applications.

Dimensional Data

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED





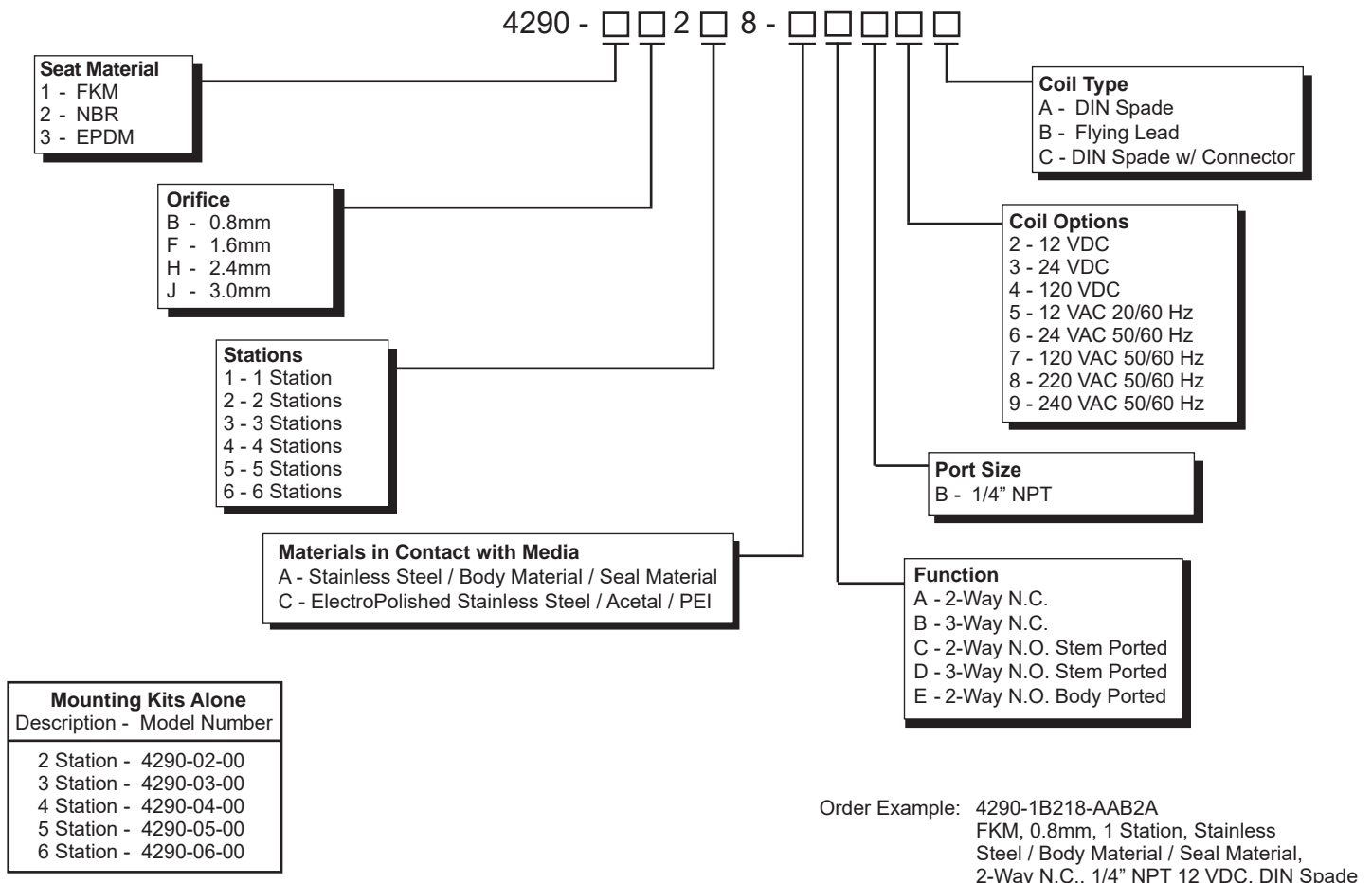
Series 4290

Direct Acting
Stackable

Technical Data

Function:	2-Way, 2-Position; Direct Acting; Normally Closed or Normally Open 3-Way, 2-Position; Direct Acting; Normally Closed or Normally Open	Mounting:	#8-32 x 0.375" DP tapped holes (2)
Port Size:	1/4" NPT	Wetted Materials:	Elastomers: EPDM, FKM, NBR (other materials available on request) Operator: 300 and 400 Series Stainless Steel Shading Ring: Copper (AC Only) Springs: 300 Series Stainless Steel Valve Body: PVC
Orifice Sizes / Flow Factor:	0.8mm / 0.03 Cv 1.6mm / 0.12 Cv 2.4mm / 0.24 Cv 3.0mm / 0.31 Cv	Coil Data:	Duty Cycle: Continuous (within specifications) Encapsulation: Glass-Filled Nylon Insulation: Class F Power Rating: 10 Watt VDC, 11.5 VA VAC (others available on request) Voltage: 12, 24, 120 VDC 12, 24, 120, 220, 240 VAC 50/60 Hz Voltage Tolerance: +/- 10% Nominal Winding: Class H
Pressure Range:	Vacuum to 250 psi (depending on orifice size and function)	Connections:	Spades: Accordance with DIN Style "A" EN175301-803 Flying Lead: PVC 22 AWG, Multi-Strand Copper Wire, 300V, 12" minimum length
Temp. Range:	Fluid Max.: +60°C Dry Range: Ambient +10° to +50°C	Packaged Weight:	0.22 lbs.
Response Time:	14 to 16ms Complete Cycle		
Manual Override:	Turn-lock (Normally Closed only)		
Media:	Air, caustics, inert gases, oil, water (contact factory for compatibilities)		
Environment Protection:	IP65 (IEC 144), NEMA 4 Dust-tight and water resistant (with electrical connector)		

How To Order



Mounting kit contains: Two mounting screws, two locking nuts and o-rings.



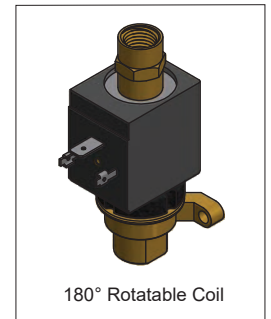
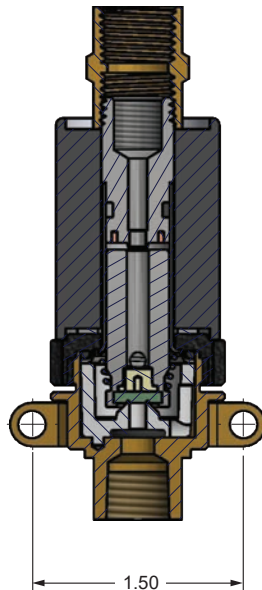
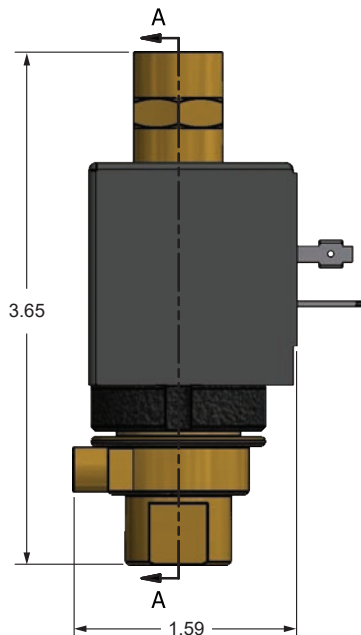
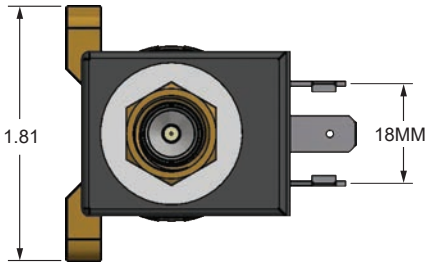
Series 6100

Direct Acting
2-Way

The Spartan Scientific Series 6100 is a 2-Way, 2-Position direct acting In-Line style solenoid valve utilizing a long-life spring compensated solenoid poppet at the heart of an all stainless steel solenoid operator. The standard body material is brass and is available in 1/8" and 1/4" NPT. With orifice sizes ranging from 0.8mm up to 3.0mm standard, the 6100 valve can handle a wide variety of flow rates as well as pressure ranges from 0 to 600PSI in various versions. The Series 6100 employs use of the orifice basket design unique to Spartan Scientific valves which allows for quick change-over for production of any orifice size as standard. This aids in versatility of valve manufacture and increases valve availability. The brass valve body is of robust design and is compatible with liquids and gases at lowest possible cost. All common voltages are offered as well as electrical connection styles which include a DIN Style "A" EN175301-803 (Formerly DIN 43650) spaded coil as well as flying lead styles. Coils are sealed to IP 65.

Dimensional Data

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED



FUNCTION	ORIFICE SIZE / VOLTAGE							
	0.8mm		1.6mm		2.4mm		3.0mm	
	AC	DC	AC	DC	AC	DC	AC	DC
2/2 NC	600	600	600	480	255	200	150	120

MAX. PRESSURE RANGE (psi)



Series 6100

Direct Acting
2-Way

Technical Data

Function: 2-Way, 2-Position; Direct Acting; Normally Closed

Port Sizes: 1/8" NPT
1/4" NPT

Orifice Sizes / Flow Factor: 0.8mm / 0.03 Cv
1.6mm / 0.08 Cv
2.4mm / 0.24 Cv
3.0mm / 0.31 Cv

Pressure Range: Vacuum to 600 psi (depending on orifice size and function)

Temp. Range: Fluid max.: +90°C
Dry Range: Ambient +10° to +50°C

Response Time: 12 to 16 ms Complete Cycle

Media: Air, fuels, inert gases, oil, water
(contact factory for compatibilities)

Manual Override: Push non-locking

Environment Protection: IP65 (IEC 144), NEMA 4
Dust-tight and water resistant (with electrical connector)

Mounting: Ø0.195 holes for #8 screws (2); not included

Wetted Materials: Elastomers: EPDM, FKM, NBR
Operator: 300 and 400 Series Stainless Steel
Shading Ring: Copper (AC Only)
Springs: 300 Series Stainless Steel
Valve Body: Brass

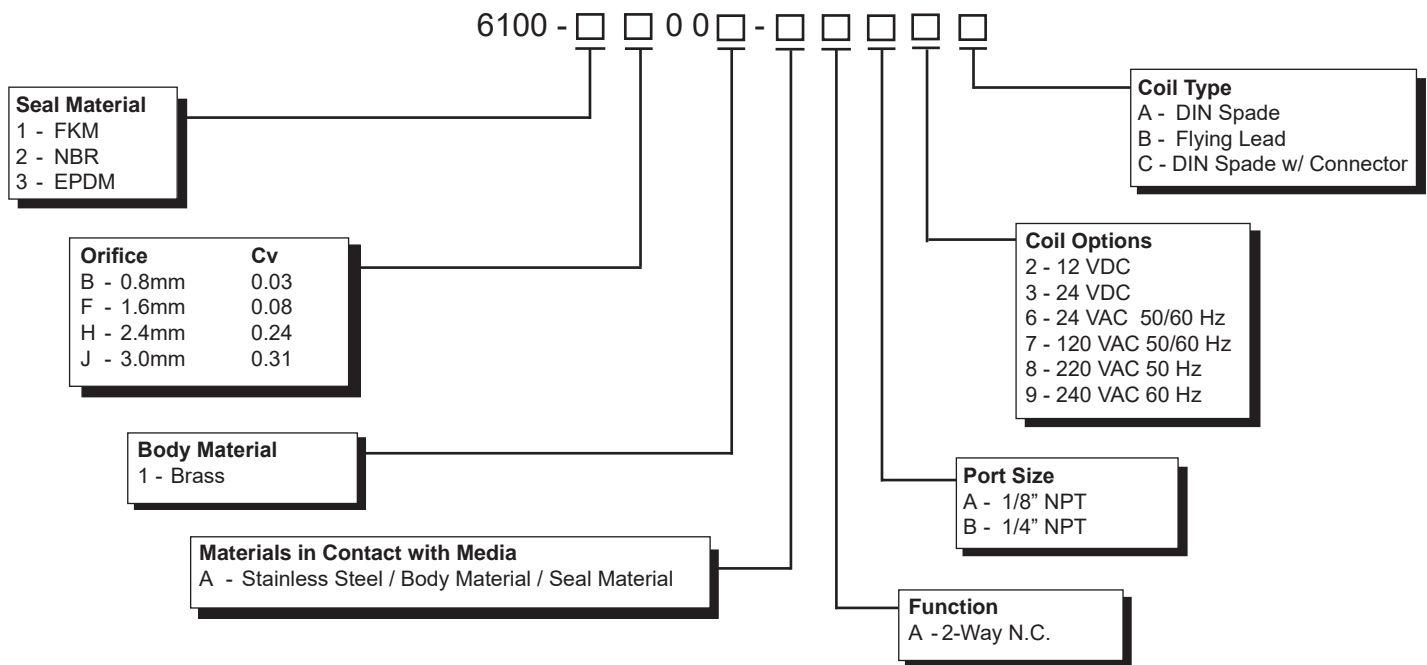
Coil Data: Duty Cycle: Continuous (within specifications)
Encapsulation: Glass-Filled Nylon
Insulation: Class F
Power Rating: 10 Watts VDC, 11.5 VA VAC
(others available on request)
Voltage: 12, 24 VDC
24, 120, 220, 240VAC 50/60 Hz
Voltage Tolerance: +/- 10% Nominal
Winding: Class H

Connections: Spades: Accordance with DIN Style "A" EN175301-803
Flying Lead: PVC, 18 AWG or 22 AWG, Multi-Strand
Copper Wire, 300V, 12" minimum length

Packaged Weight: 0.50 lbs.

DIRECT
ACTING

How To Order



Order Example: 6100-1B001-AAA2A
FKM, 0.8mm orifice, Brass, Stainless Steel,
2-Way N.C., 1/8" NPT, 12 VDC, DIN Spade.



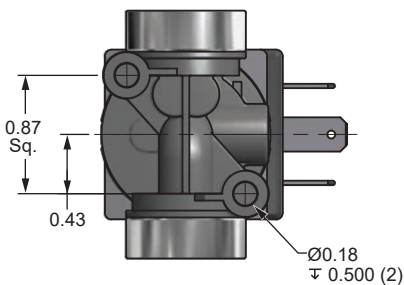
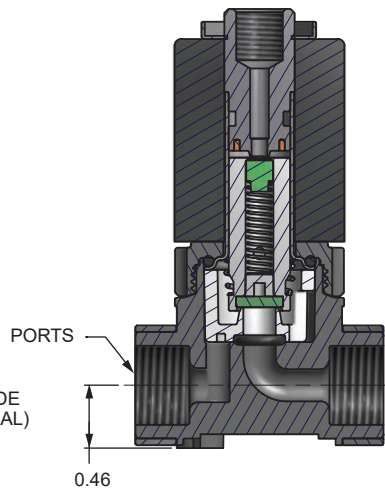
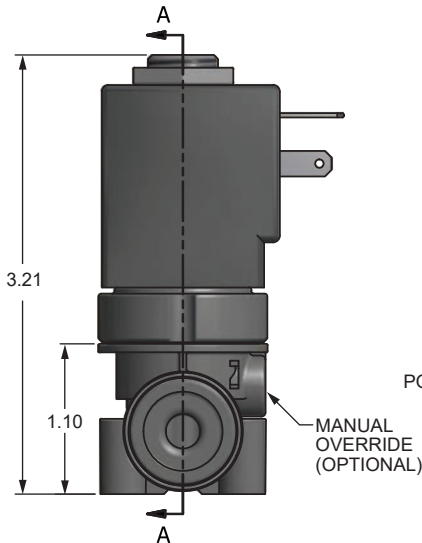
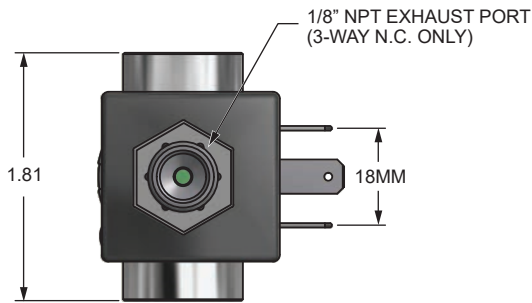
Series 6200

Direct Acting
2-Way & 3-Way

The Spartan Scientific Series 6200 is a 2-Way or 3-Way, 2-Position direct acting solenoid valve utilizing a long life spring compensated solenoid poppet at the heart of an all stainless steel solenoid operator (430FR and 316SS). Standard body material is Glass-Filled Nylon. With orifice sizes ranging from 0.8mm up to 6.0mm standard, the 6200 valve can handle a wide variety of flow rates as well as pressure ranges from 0 to 250PSI in various versions. Offered with or without manual override, the Series 6200 employs use of the orifice basket design unique to Spartan valves which allows for quick change-over for production of any orifice size as standard. This aids in versatility of valve manufacture and increases valve availability. The composite valve body is of robust design and is compatible with liquids and gases at lowest possible cost. The ports available are 1/8", 1/4", 3/8" NPT standard. All common voltages are offered as well as electrical connection styles which include a DIN Style "A" EN175301-803 (Formerly DIN 43650) spaded "A" coils as well as flying lead styles. Coils are sealed to IP 65. Valve functions include Normally Closed, Normally Open, Mixing and Diverting.

Dimensional Data

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED
3/2 WAY VERSION SHOWN



ORIFICE SIZE / VOLTAGE

FUNCTION	0.8mm		1.6mm		2.0mm		2.4mm		3.0mm		4.0mm		5.0mm		6.0mm	
	AC	DC	AC	DC	AC	DC	AC	DC	AC	DC	AC	DC	AC	DC	AC	DC
2/2 NC	250	250	250	250	250	250	250	250	250	150	75	80	50	50	40	30
2/2 NO	250	250	250	250	N/A	N/A	150	120	90	82	N/A	N/A	N/A	N/A	N/A	N/A
3/2 NC	250	250	220	220	N/A	N/A	150	120	90	82	60	50	40	40	30	20
3/2 NO	250	250	215	215	N/A	N/A	150	120	105	90	N/A	N/A	N/A	N/A	N/A	N/A
3/2 MIX	210	210	110	110	N/A	N/A	60	60	40	40	N/A	N/A	N/A	N/A	N/A	N/A
3/2 DIV	250	250	160	160	N/A	N/A	120	120	85	80	N/A	70	N/A	N/A	N/A	N/A

MAX. PRESSURE RANGE (psi)



Series 6200

Direct Acting
2-Way & 3-Way

Technical Data

Function: 2-Way, 2-Position; Direct Acting; Diverting, Mixing Normally Closed, or Normally Open.
3-Way, 2-Position; Direct Acting; Diverting, Mixing Normally Closed, or Normally Open.

Port Sizes: 1/8" NPT
1/4" NPT
3/8" NPT

Orifice Sizes / Flow Factor:
0.8mm / 0.03 Cv
1.6mm / 0.12 Cv
2.0mm / 0.17 Cv
2.4mm / 0.24 Cv
3.0mm / 0.31 Cv
4.0mm / 0.52 Cv
5.0mm / 0.61 Cv
6.0mm / 0.72 Cv

Pressure Range: Vacuum to 250 psi (depending on orifice size and function)

Temp. Range: Fluid Max.: +60°C
Dry Range: Ambient +10° to +50°C

Response Time: 16 to 40 ms Complete Cycle

Media: Air, caustics, inert gases, oil, water (contact factory for compatibilities)

Manual Override: Push button; or Turn lock

Environment Protection: IP65 (IEC 144), NEMA 4
Dust-tight and water resistant (with electrical connector)

Mounting: Ø0.180 x 0.500" deep, for #10 thread forming screws (2); not included

Wetted Materials: Elastomers: EPDM, FKM, NBR
Operator: 300 and 400 Series Stainless Steel
Shading Ring: Copper (AC Only)
Springs: 300 Series Stainless Steel
Valve Body: Glass-filled Nylon

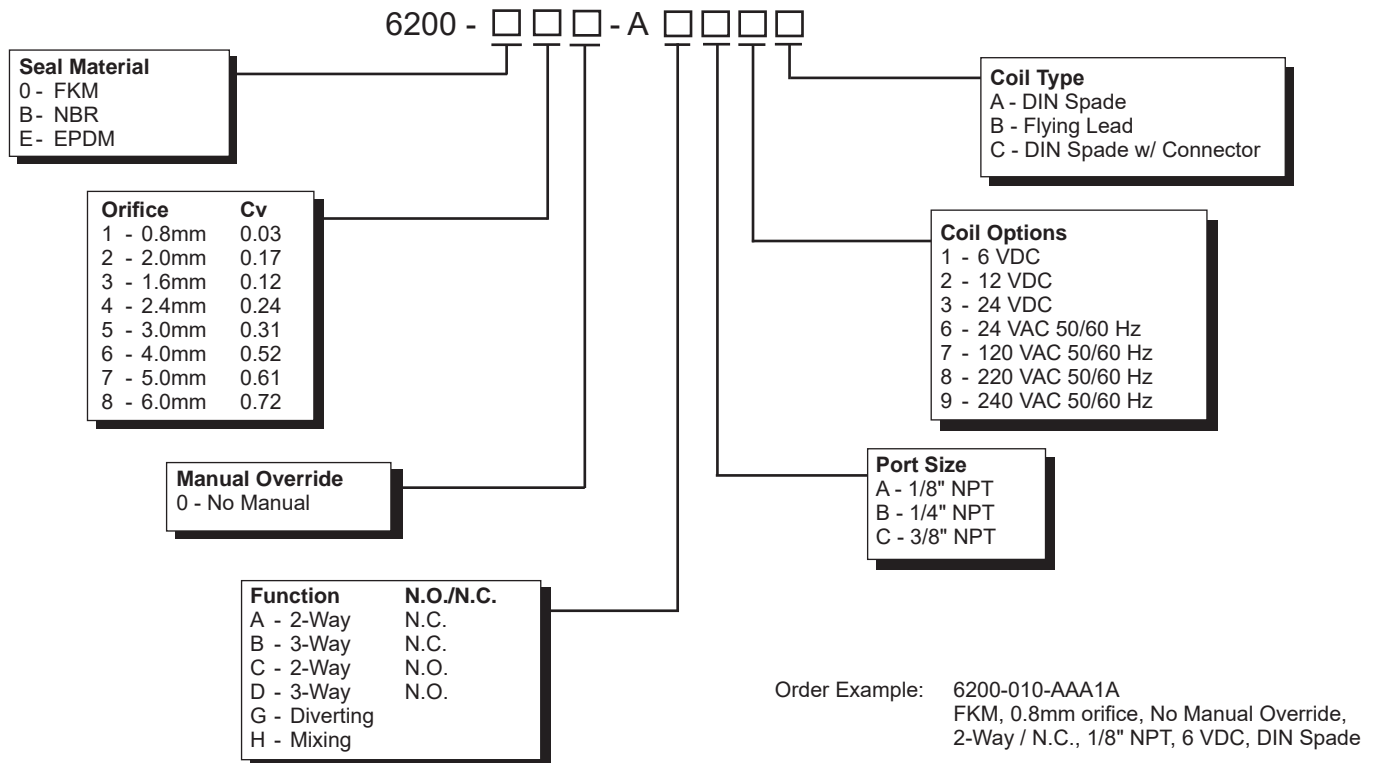
Coil Data: Duty Cycle: Continuous (within specifications)
Encapsulation: Glass-Filled Nylon
Insulation: Class F
Power Rating: 10 Watts VDC, 11.5 VA 60 Hz VAC (others available on request)
Voltage: 6, 12, 24 VDC
24, 120, 220, 240 VAC 50/60 Hz
Voltage Tolerance: +/- 10% Nominal
Winding: Class H

Connections: Spades: Accordance with DIN Style "A" EN175301-803
Flying Lead: PVC, 22 AWG, Multi-Strand Copper Wire, 300V, 12" minimum length

Packaged Weight: 0.57 lbs.

DIRECT ACTING

How To Order





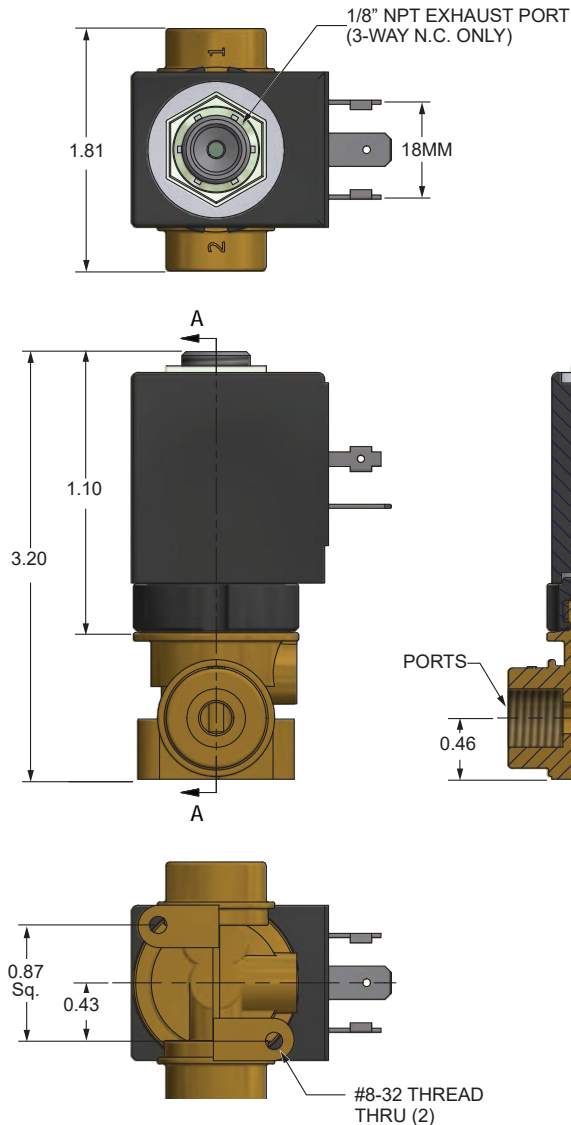
Series 6222

Direct Acting
2-Way & 3-Way

The Spartan Scientific Series 6222 solenoid valves are used as 2-Way & 3-Way, 2-Position, Normally Closed, Normally Open, Mixing or Diverting functions for the control of air, caustics, inert gases, oil, and water. The robust design incorporates all stainless steel stop plunger and tube assembly as well as spring compensated top seats installed in a no-lead brass forged body with 1/8", 1/4" and 3/8" NPT ports standard. Available in 0.8mm (0.03 Cv) to 6.0mm (0.72 Cv) orifice sizes, the 6222 can control a broad range of flow and pressure ratings. Standard elastomers are EPDM, FKM or NBR for media compatibility. The class F coils are all Glass-Filled Nylon encapsulated, 100% duty, all standard voltages, and are available in DIN 43650 Form "A", flying lead, DIN Style "A" EN175301-803 (Formerly DIN 43650) connector with 1/2" conduit.

Dimensional Data

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED
3/2 WAY VERSION SHOWN



ORIFICE SIZE / VOLTAGE

FUNCTION	0.8mm		1.6mm		2.4mm		3.0mm		4.0mm		5.0mm		6.0mm	
	AC	DC	AC	DC	AC	DC	AC	DC	AC	DC	AC	DC	AC	DC
2/2 NC	525	525	400	300	300	225	270	150	125	90	80	60	50	40
2/2 NO	525	525	275	275	200	200	110	100	N/A	N/A	N/A	N/A	N/A	N/A
3/2 NC	290	280	240	220	150	120	90	80	65	60	30	25	25	20
3/2 NO	340	300	220	200	140	120	90	80	-	-	-	-	-	-
3/2 DIV	N/A	N/A	N/A	N/A	160	130	100	90	-	-	-	-	-	-
3/2 MIX	210	210	110	110	60	60	40	40	-	-	-	-	-	-

MAX. PRESSURE RANGE (psi)

DIRECT ACTING



Series 6222

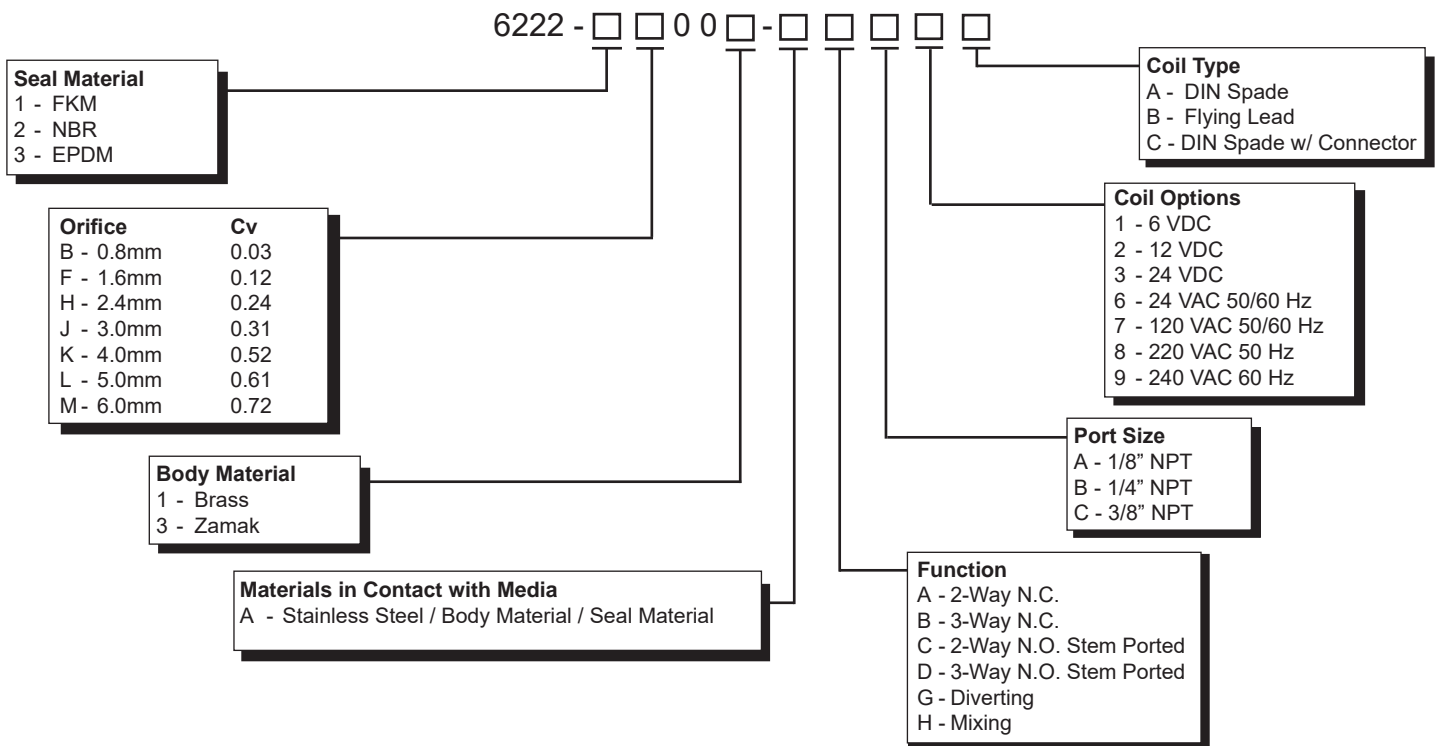
Direct Acting
2-Way & 3-Way

Technical Data

Function:	2-Way, 2-Position; Direct Acting; Diverting, Mixing Normally Closed, or Normally Open. 3-Way, 2-Position; Direct Acting; Diverting, Mixing Normally Closed, or Normally Open.	Mounting:	#8-32 thread thru for #8 screws (2); not included
Port Sizes:	1/8" NPT 1/4" NPT 3/8" NPT	Wetted Materials:	Elastomers: EPDM, FKM, NBR Operator: 300 and 400 Series Stainless Steel Orifice Basket: Celcon POM Shading Ring: Copper (AC Only) Springs: 300 Series Stainless Steel Valve Body: Brass or Zamak
Orifice Sizes / Flow Factor:	0.8mm / 0.03 Cv 1.6mm / 0.12 Cv 2.4mm / 0.24 Cv 3.0mm / 0.31 Cv 4.0mm / 0.52 Cv 5.0mm / 0.61 Cv 6.0mm / 0.72 Cv	Coil Data:	Duty Cycle: Continuous (within specifications) Encapsulation: Glass-Filled Nylon Insulation: Class F Power Rating: 10 Watts VDC, 8 VA VAC (others available on request) Voltage: 6, 12, 24 VDC 24, 120, 220, 240 VAC 50/60 Hz Voltage Tolerance: +/- 10% Nominal Winding: Class H
Pressure Range:	Vacuum to 525 psi (depending on orifice size and function)	Connections:	Spades: Accordance with DIN Style "A" EN175301-803 Flying Lead: PVC, 22 AWG, Multi-Strand Copper Wire, 300V, 12" minimum length
Temp. Range:	Fluid max.: +90°C Dry Range: Ambient +10° to +50°C	Packaged Weight:	0.57 lbs.
Response Time:	16 to 40 ms Complete Cycle		
Media:	Air, caustics, inert gases, oil, water		
Environment Protection:	IP65 (IEC 144), NEMA 4 Dust-tight and water resistant (with electrical connector)		

DIRECT ACTING

How To Order



Order Example: 6222-1B001-AAA1A
FKM, 0.8mm orifice, Brass, Stainless Steel /
Body Material / Seal Material 2-Way / N.C.,
1/8" NPT, 6 VDC, DIN Spade



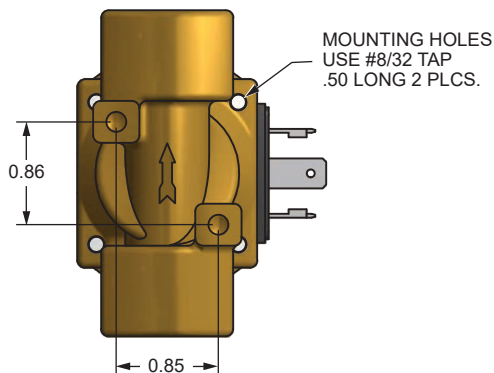
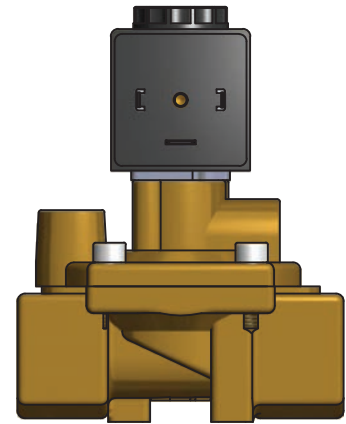
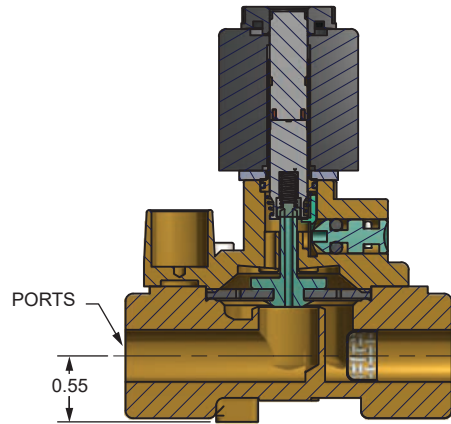
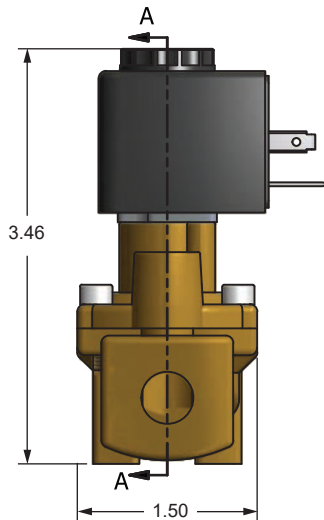
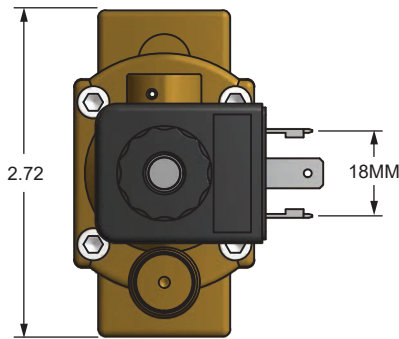
Series 3505

Diaphragm Process
Air-Sol 2-Way

The Spartan Scientific Series 3505 is a 2-Way, 2-Position, internally piloted solenoid valve for the control of air, emulsion, inert gases and water. The valve features an all brass body and a full flow 1/2" orifice while maintaining a 1.5 minimum pressure differential. The design allows for a tight seal on the orifice at 0 psi. Available in 1/4", 3/8" and 1/2" NPT, the 3505 can handle pressures to 230 psi. The encapsulated coil construction ensures that the valve functions well under long periods of activation (100% duty), as well as providing a high degree of environmental protection (NEMA 4). The inner valve functions as a direct assist using a flat diaphragm and orifice plate. Pressure differentials shift the valve to full open or full closed. A push, non-locking manual override is standard.

Dimensional Data

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED



FLOW DATA	
PORT SIZE	FLOW RATE
1/4"	8.2 gpm
3/8"	9.3 gpm
1/2"	11.2 gpm
120 psi Δ p 25 psi	

DIAPHRAGM
PROCESS



Series 3505

Diaphragm Process
Air-Sol 2-Way

Technical Data

Function: 2-Way, 2-Position; Inlet Pilot Diaphragm; Normally Closed

Port Size / Flow Factor: 1/4" NPT / 1.55 Cv
3/8" NPT / 1.95 Cv
1/2" NPT / 2.45 Cv

Orifice Sizes: 12.7mm / 2.45 Cv

Pressure Range: 0 to 230 psi (depending on orifice size and function)
Note: Valve Requires 1.5 psi differential to fully open

Temp. Range: Fluid Max.: +60°C
Dry Range: Ambient +10° to +50°C

Response Time: 20 to 80ms Complete Cycle

Media: Air, emulsion, inert gases, water

Manual Override: Push non-locking

Environment: IP65 (IEC 144), NEMA 4

Protection: Dust-tight and water resistant (with electrical connector)

Mounting: Use #8 x 0.50" long self-tapping screws (2)

Wetted Materials: Elastomers: EPDM, FKM, NBR
Operator: 300 and 400 Series Stainless Steel
Shading Ring: Copper (AC Only)
Springs: 300 Series Stainless Steel
Valve Body: Brass

Coil Data: Duty Cycle: Continuous (within specifications)
Encapsulation: Glass-Filled Nylon
Insulation: Class F
Power Rating: 6.5 Watt VDC, 8.5 VA VAC (others available on request)
Voltage: 6, 12, 24 VDC
24, 120, 220, 240 VAC 50/60 Hz
Voltage Tolerance: +/- 10% Nominal
Winding: Class H

Connections: Spades: Accordance with DIN Style "A" EN175301-803
Flying Lead: PVC 22 AWG, Multi-Strand Copper Wire, 300V, 12" minimum length

Packaged Weight: 1.20 lbs.

FUNCTION

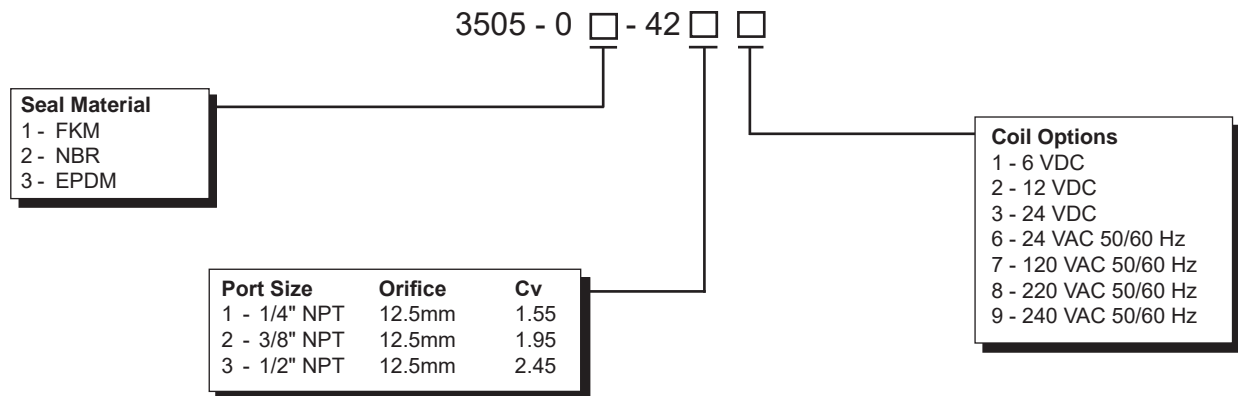
VOLTAGE

	AC	DC
2/2 NC	230	180

MAX. PRESSURE RANGE (psi)

DIAPHRAGM
PROCESS

How To Order



Replacement Diaphragm Kits		
Kit includes: Diaphragm and Orifice insert		
Specify Part Number		
FKM	3500-01-0001	Normally
NBR	3500-B1-0001	Closed
EPDM	3500-E1-0001	

Order Example: 3505-01-4237
2-Way, N.C., FKM, 1/2" NPT,
120 VAC 50/60 Hz



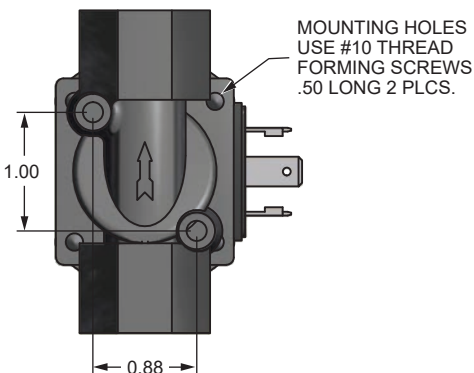
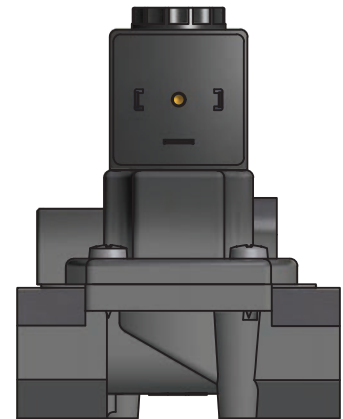
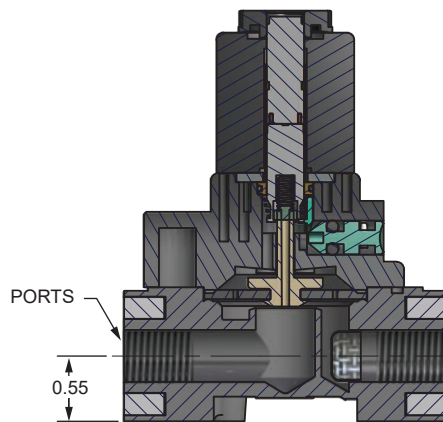
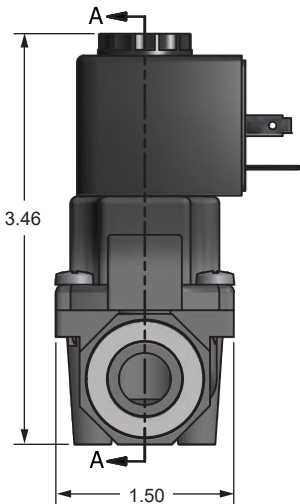
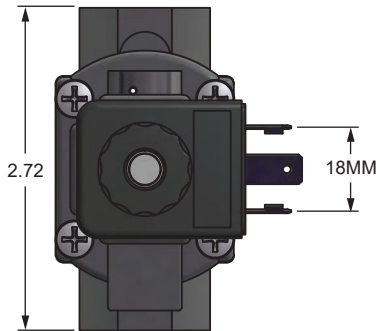
Series 3510

Diaphragm Process Composite Air-Sol 2-Way

The Spartan Scientific Series 3510 2-Way, 2-Position, internally piloted solenoid valve uses the latest technologies for materials and function. This combination provides the user with the highest quality, smallest size per Cv of flow and most competitive pricing of any valve on the market. The 3510 gives full flow throughout the pressure range starting with a Maximum Operating Pressure Differential of 1.5 psi while remaining sealed at 0 psi. The body is available in 1/4", 3/8" and 1/2" NPT sizes and features a stainless steel anti-flex ring for port strength. The molded pilot section features a push, non-locking manual override, high cycle life solenoid parts, and quick connect DIN Style "A" EN175301-803 (Formerly DIN 43650) or "flying lead" electrical connection options. Typical applications include air, emulsion, inert gases, oil and water control, condensate drainage, hot water plumbing and sprinkler systems.

Dimensional Data

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED



FLOW DATA	
PORT SIZE	FLOW RATE
1/4"	8.2 gpm
3/8"	9.3 gpm
1/2"	11.2 gpm
120 psi Δ p 25 psi	

DIAPHRAGM
PROCESS



Series 3510

Diaphragm Process Composite Air-Sol 2-Way

Technical Data

Function: 2-Way, 2-Position; Inlet Pilot Diaphragm; Normally Closed

Port Size / Flow Factor: 1/4" NPT / 1.55 Cv
3/8" NPT / 1.95 Cv
1/2" NPT / 2.45 Cv

Orifice Sizes: 12.5mm / 2.45 Cv

Pressure Range: 0 to 150 psi (depending on orifice size and function)
Note: Valve Requires 1.5 psi differential to fully open

Temp. Range: Fluid Max.: +60°C
Dry Range: Ambient +10° to +50°C

Response Time: 20 to 80ms Complete Cycle

Media: Air, emulsion, inert gases, oil, water

Manual Override: Push non-locking

Environment Protection: IP65 (IEC 144), NEMA 4
Dust-tight and water resistant (with electrical connector)

Mounting: Use #8 x 0.50" long self-tapping screws (2)

Wetted Materials: Elastomers: EPDM, FKM, NBR
Operator: 300 and 400 Series Stainless Steel; Brass
Shading Ring: Copper (AC Only)
Springs: 300 Series Stainless Steel
Valve Body: Glass-filled Nylon (NSF Approved)

Coil Data: Duty Cycle: Continuous (within specifications)
Encapsulation: Glass-Filled Nylon
Insulation: Class F
Power Rating: 10 Watt VDC, 11 VA VAC (others available on request)
Voltage: 6, 12, 24 VDC
24, 120, 220, 240 VAC 50/60 Hz
Voltage Tolerance: +/- 10% Nominal
Winding: Class H

Connections: Spades: Accordance with DIN Style "A" EN175301-803
Flying Lead: PVC 22 AWG, Multi-Strand Copper Wire, 300V, 12" minimum length

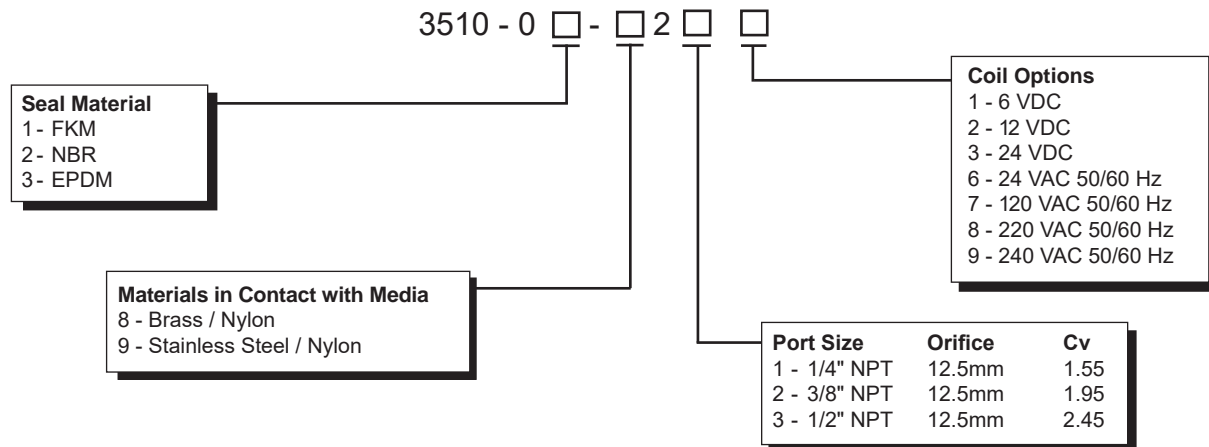
Packaged Weight: 0.55 lbs.

VOLTAGE

	AC	DC
2/2 NC	150	150

MAX. PRESSURE RANGE (psi)

How To Order



Replacement Diaphragm Kits

Kit includes: Diaphragm and Orifice insert

Specify Part Number

FKM	3500-01-0001	Normally
NBR	3500-B1-0001	Closed
EPDM	3500-E1-0001	

Order Example: 3510-01-8237
2-Way, N.C., FKM, Brass / Nylon,
1/2" NPT, 120 VAC 50/60 Hz



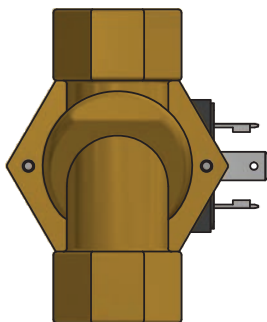
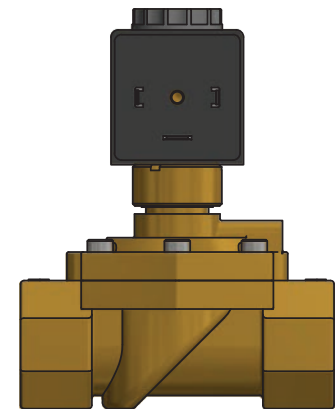
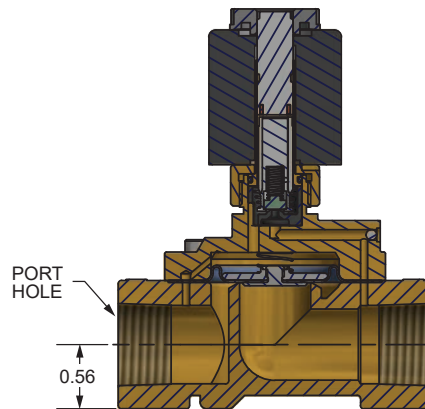
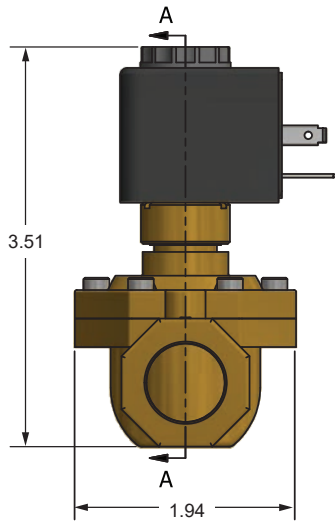
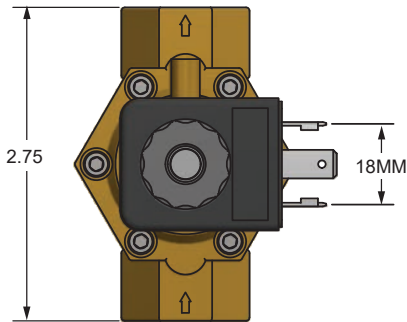
Series 3516

Diaphragm Process
Air-Sol 2-Way

The Spartan Scientific Series 3516 2-Way, 2-Position Normally Closed or Normally Opened solenoid diaphragm process valve offers the highest flow for the smallest overall size in its class as compared to competitive units. The valve is designed from the ground up using modern design technologies and materials. The potable water brass body is media compatible, rugged and virtually indestructible. The body is available in 1/4", 3/8" and 1/2" NPT. The low wattage solenoid features a DIN Style "A" EN175301-803 (Formerly DIN 43650) electrical interface and is nylon encapsulated. FKM, EPDM and NBR are standard elastomers and the operators are made of stainless steel / brass or stainless steel / brass with copper shading rings for AC versions. Typical applications include control of inert gases, water and compatible fluids.

Dimensional Data

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED



DIFFERENTIAL PRESSURE CHART (for Water)	
Port Size NPT	GPM @ 180 psi
1/4"	26
3/8"	32
1/2"	35

DIAPHRAGM
PROCESS



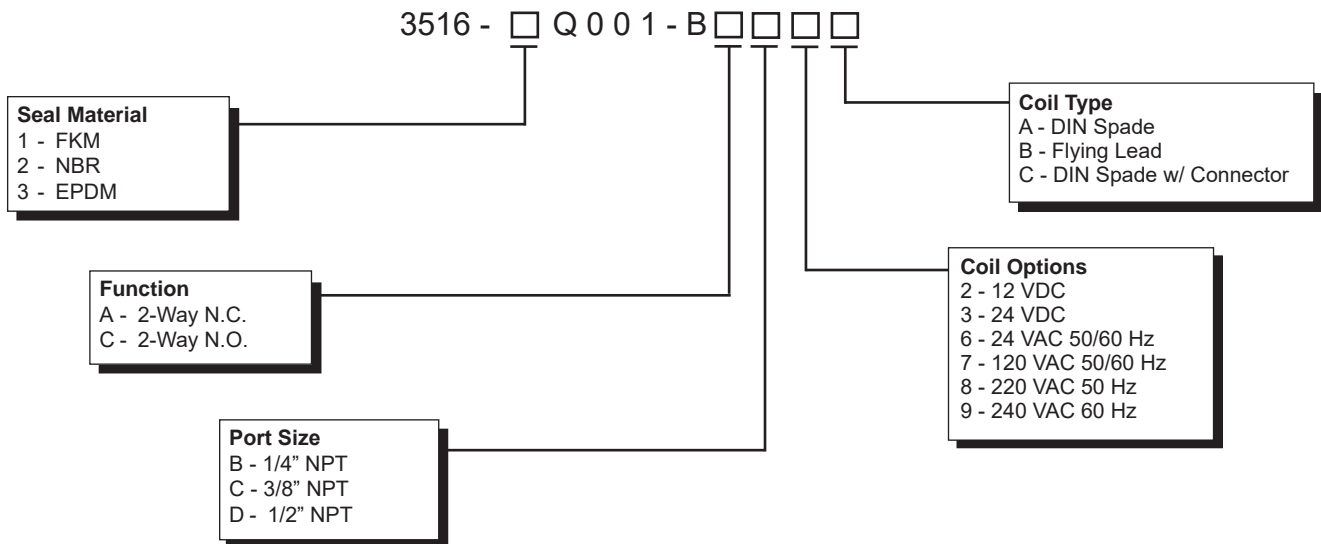
Series 3516

Diaphragm Process
Air-Sol 2-Way

Technical Data

Function:	2-Way, 2-Position; Internal Pilot Solenoid Operated; Normally Closed or Normally Open	Wetted Materials:	Elastomers: EPDM NSF, FKM FDA, NBR Operator: 300 and 400 Series Stainless Steel Shading Ring: Copper (Others available on request. AC only) Springs: 300 Series Stainless Steel Valve Body: Low-lead Brass (suitable for potable water applications)
Port Size:	1/4" NPT / 26 GPM 3/8" NPT / 32 GPM 1/2" NPT / 35 GPM	Coil Data:	Duty Cycle: Continuous (within specifications) Encapsulation: Glass-Filled Nylon Insulation: Class F Power Rating: 6.5 Watts (VDC) 8.5 VA (VAC) Voltage: 12, 24 VDC 24, 120, 220, 240 VAC 50/60 Hz Voltage Tolerance: +/- 10% Nominal Windings: Class H
Orifice Sizes / Flow Factor:	16mm / 4.5 Cv	Connections:	Spades: Accordance with DIN Style "A" EN175301-803 Flying Lead: PVC 22 AWG, Multi-Strand Copper Wire, 300V, 12" minimum length
Pressure Range:	Water: 10 to 180 psi N.C., 150 psi N.O. Air: 10 to 125 psi N.C., 150 N.O.	Package Weight:	1.05 lbs.
Temp. Range:	Fluid Max.: +60°C Dry Range: Ambient +10°C to +50°C		
Reponse Time:	80 to 120ms Complete Cycle		
Media:	Air, light oils, noble gases, water (contact factory for compatibilities)		
Manual Override:	Turn lock (Normally Open version only)		
Environment Protection:	IP65 (IEC 144), NEMA 4 Dust-tight and water resistant (with electrical connector)		
Mounting:	On pipe		

How To Order



Order Example: 3516-1Q001-BAB7A
FKM, 2-Way N.C., 1/4" NPT,
120 VAC 50/60 Hz, DIN Spade



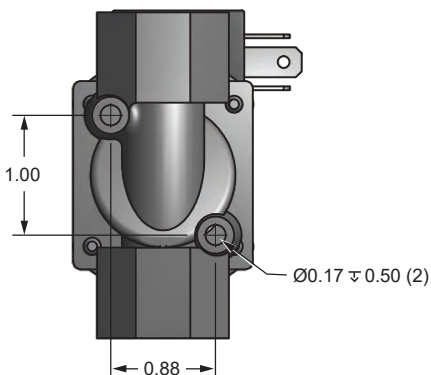
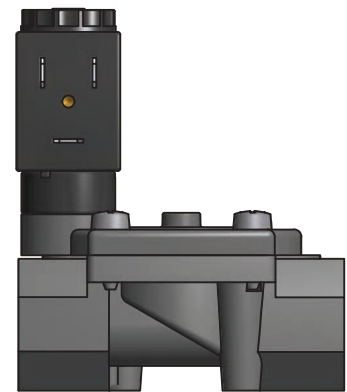
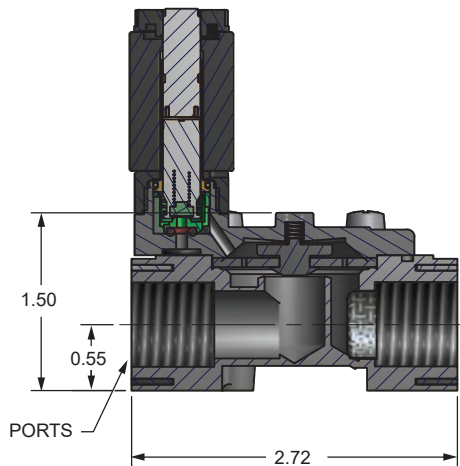
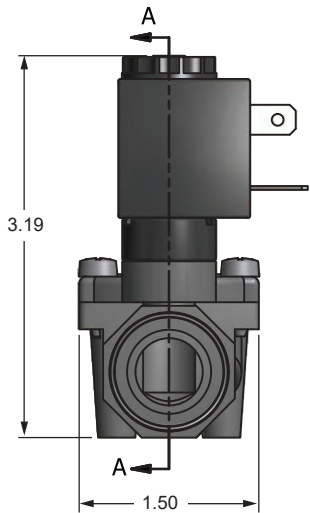
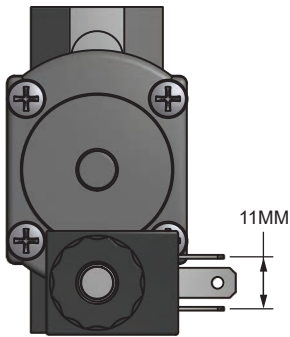
Series 3580

Diaphragm Process Composite Air-Sol 2-Way

The Spartan Scientific Series 3580 is an engineered composite 2-Way, 2-Position solenoid/air operated valve designed for the control of liquid media and inert gas. The valve exhibits a large 1/2" orifice and three port sizes standard, 1/4", 3/8" and 1/2" NPT. The Normally Open version of the 3580 has a unique operator that allows for function without the use of a bypass tube as with the 3510 and has a push non-locking and a turn-lock manual override. The valve's compact design utilizes the latest in material sciences with the use of composite materials in the valve body. The solenoid pilot is power saving low wattage, made of stainless steel working components and is miniaturized to fit in tight places. Standard elastomers available are FKM, NBR, and EPDM. The fully encapsulated coils are available in all standard voltages and with spaded, flying leads or with a connector attached. Typical applications are for installations where there is a need to control inert fluids and gases, condensate drainage, hot water plumbing and sprinkler systems.

Dimensional Data

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED





Series 3580

Diaphragm Process
Composite Air-Sol 2-Way

Technical Data

Function: 2-Way, 2-Position; Inlet Pilot Diaphragm;
Solenoid Operated; Normally Closed, or Normally Open

Port Size / Flow Factor: 1/4" NPT / 1.55 Cv
3/8" NPT / 1.95 Cv
1/2" NPT / 2.45 Cv

Orifice Sizes: 12.5mm / 2.45Cv

Pressure Range: 7 to 150 psi (depending on orifice size and function)

Temp. Range: Fluid Max.: +60°C
Dry Range: Ambient +10° to +50°C

Response Time: 20 to 80ms Complete Cycle

Media: Air, water

Environment Protection: IP65 (IEC 144), NEMA 4
Dust-tight and water resistant (with electrical connector)

Wetted Materials: Elastomers: EPDM, FKM, NBR
Operator: 300 and 400 Series Stainless Steel, or Brass
Orifice Basket: Acetal POM
Shading Ring: Copper (AC Only)
Springs: 300 Series Stainless Steel
Valve Body: Glass-filled Nylon (NSF Approved)

Mounting: Use #8 x 0.50" long self-tapping screws (2) (not provided)

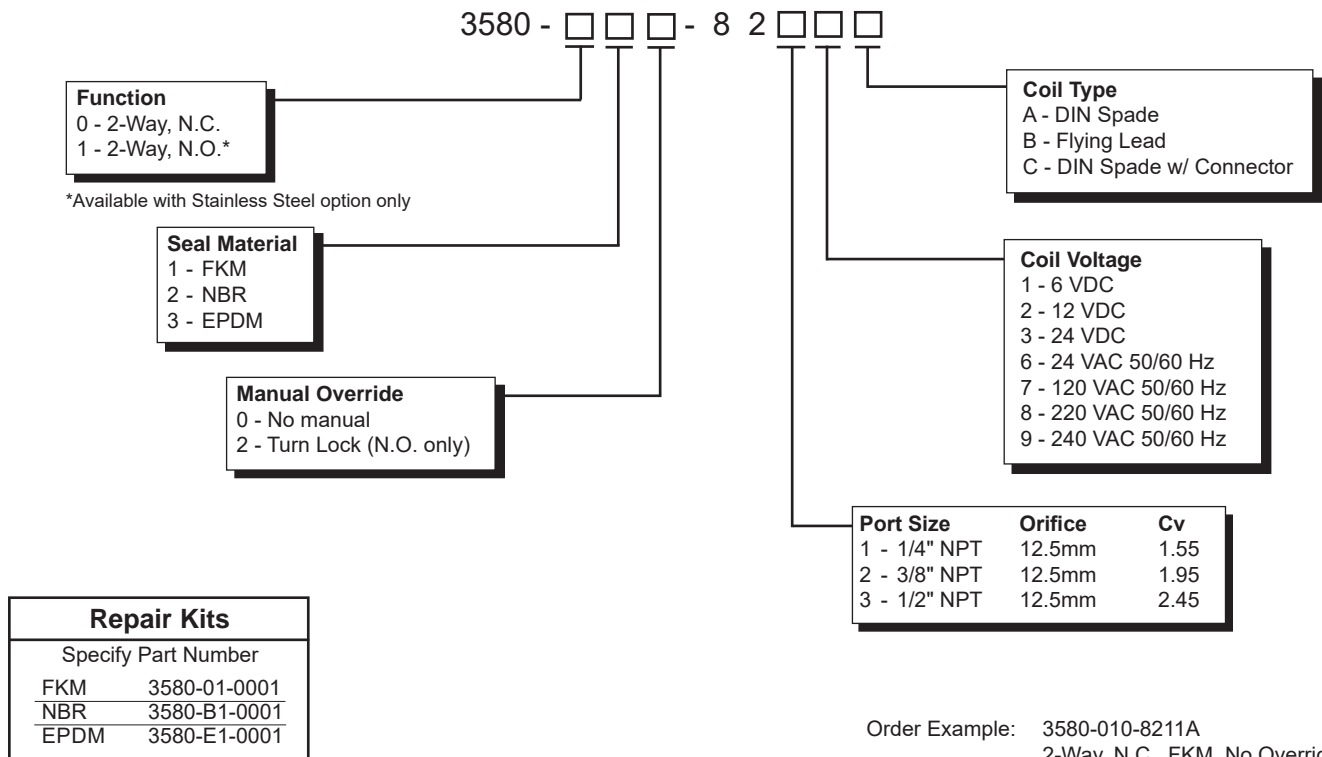
Coil Data: Duty Cycle: Continuous (within specifications)
Encapsulation: Glass-Filled Nylon
Insulation: Class F
Power Rating: 6.5 Watt VDC, 8.5 VA VAC (others available on request)
Voltage: 6, 12, 24 VDC
24, 120, 220, 240 VAC 50/60 Hz
Voltage Tolerance: +/- 10% Nominal
Winding: Class H

Connections: Spades: Terminals AMP 6.3x0.8 width 11mm
Flying Lead: PVC 22 AWG, Multi-Strand Copper Wire, 300V, 12" minimum length

Packaged Weight: 0.48 lbs.

 Consult factory for available versions recognized under the Component Program of Underwriters Laboratories, Inc.

How To Order



Order Example: 3580-010-8211A
2-Way, N.C., FKM, No Override,
1/4" NPT, 6 VDC, DIN Spade

DIAPHRAGM
PROCESS



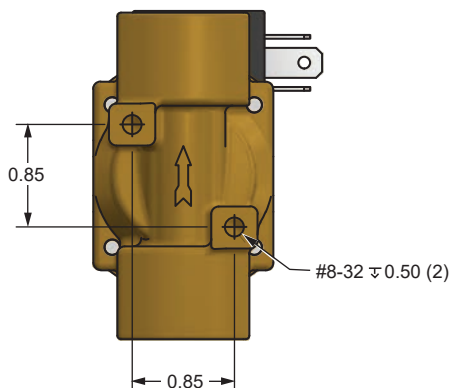
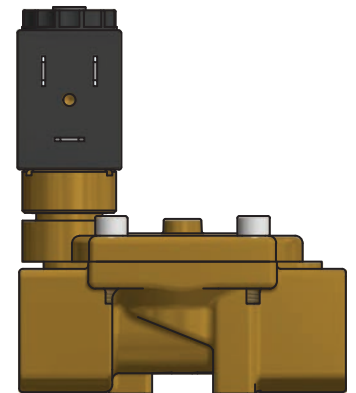
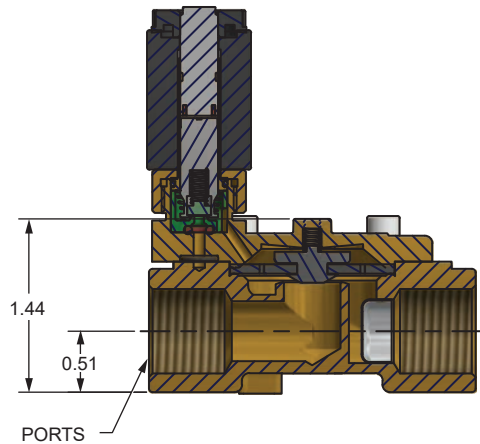
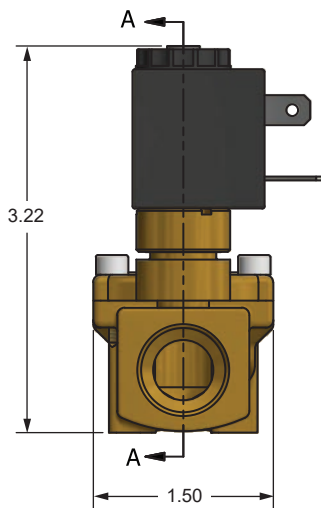
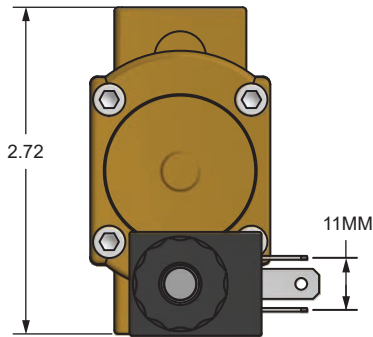
Series 3581

Diaphragm Process
Air-Sol 2-Way

The Spartan Scientific Series 3581 is an engineered brass bodied 2-Way, 2-Position solenoid/air operated valve designed for the control of liquid media, water and inert gas. The valve exhibits a large 1/2" orifice and three port sizes standard, 1/4", 3/8" and 1/2" NPT. The valve's compact is made from rugged brass and features high pressure differential. The solenoid pilot is power saving low wattage, made of stainless steel working components and is miniaturized to fit in tight places. Standard elastomers available are FKM, NBR, and EPDM. The fully encapsulated coils are available in all standard voltages and with spaded, flying leads or with a connector attached. Typical applications are for installations where there is a need to control inert fluids and gases, condensate drainage, hot water plumbing and sprinkler systems.

Dimensional Data

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED





Series 3581

Diaphragm Process
Air-Sol 2-Way

Technical Data

Function: 2-Way, 2-Position; Piloted Diaphragm;
Normally Closed

**Port Size /
Flow Factor:** 1/4" NPT / 1.55 Cv
3/8" NPT / 1.95 Cv
1/2" NPT / 2.45 Cv

Orifice Sizes: 12.7mm

Pressure Range: 7 to 180 psi (depending on orifice size and function)

Temp. Range: Fluid Max.: +60°C
Dry Range: Ambient +10° to +50°C

Response Time: 20 to 80ms Complete Cycle

Media: Air, water (contact factory for compatibilities)

**Environment
Protection:** IP65 (IEC 144), NEMA 4
Dust-tight and water resistant (with electrical connector)

Wetted Materials: Elastomers: EPDM, FKM, NBR
Orifice Basket: Acetal POM
Operator: 300 and 400 Series Stainless Steel, or Brass
Shading Ring: Copper (AC Only)
Springs: 300 Series Stainless Steel
Valve Body: Brass

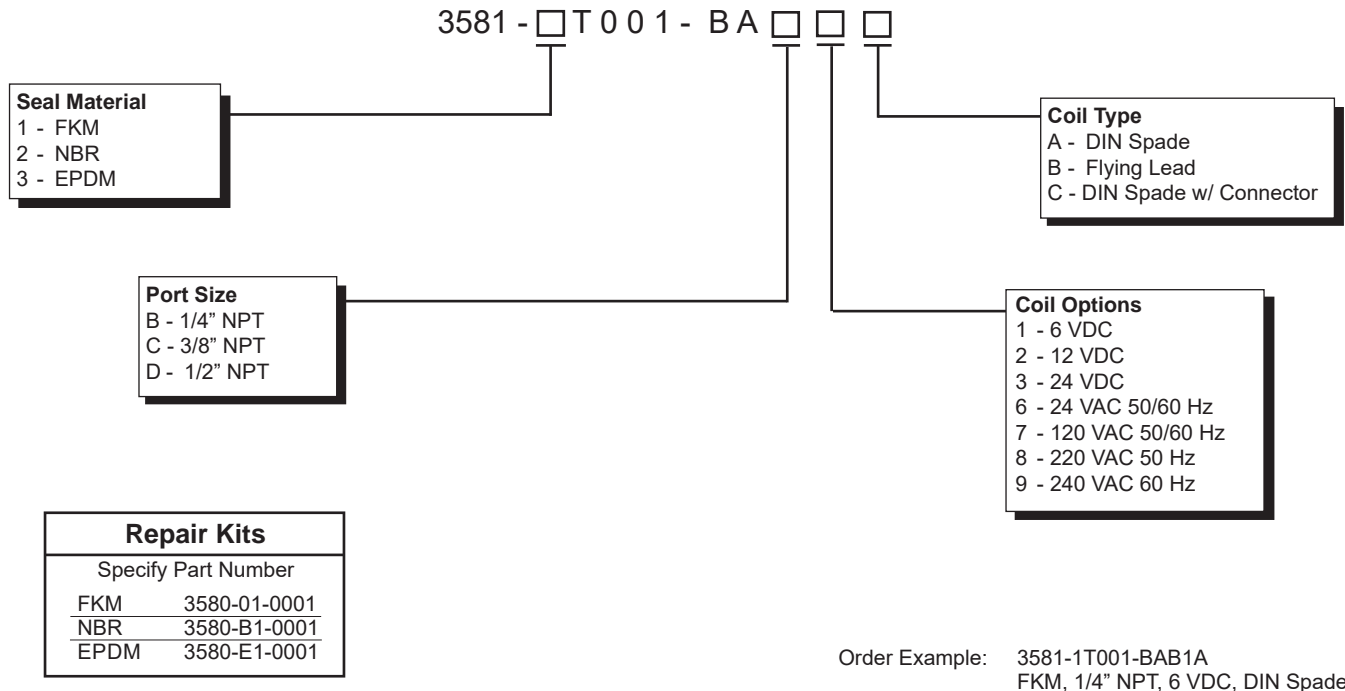
Mounting: Use #8 x 0.50" long self-tapping screws (2)
(not provided)

Coil Data: Duty Cycle: Continuous (within specifications)
Encapsulation: Glass-Filled Nylon
Insulation: Class F
Power Rating: 6.5 Watt VDC, 8.5 VA VAC
(others available on request)
Voltage: 6, 12, 24 VDC
24, 120, 220, 240 VAC 50/60 Hz
Voltage Tolerance: +/- 10% Nominal
Winding: Class H

Connections: Spades: Terminals AMP 6.3x0.8 width 11mm
Flying Lead: PVC, 18 AWG or 22 AWG, Multi-Strand
Copper Wire,
300V, 12" minimum length

Packaged Weight: 1.1 lbs.

How To Order



Order Example: 3581-1T001-BAB1A
FKM, 1/4" NPT, 6 VDC, DIN Spade

DIAPHRAGM
PROCESS



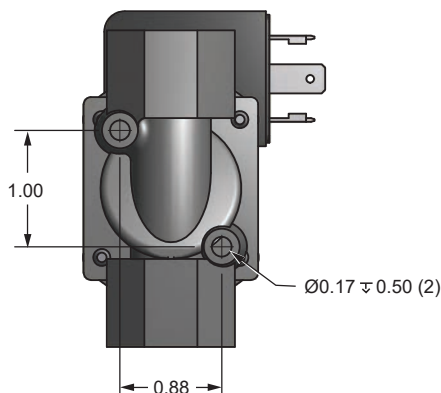
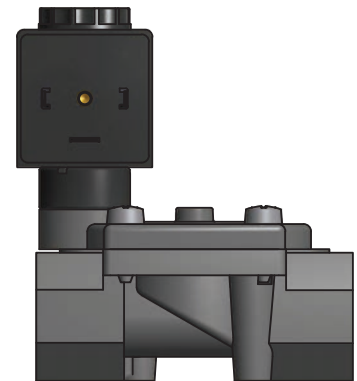
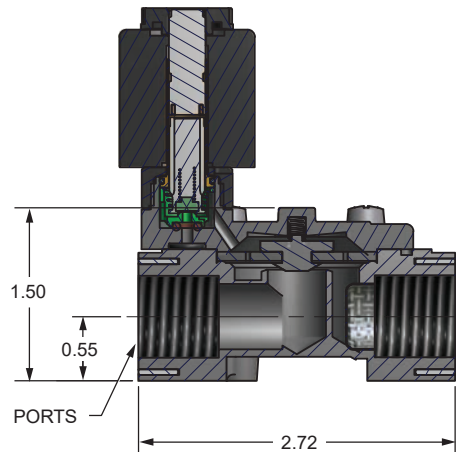
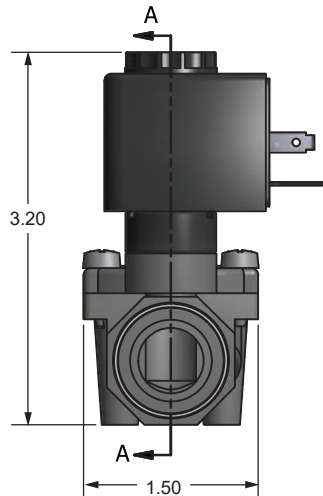
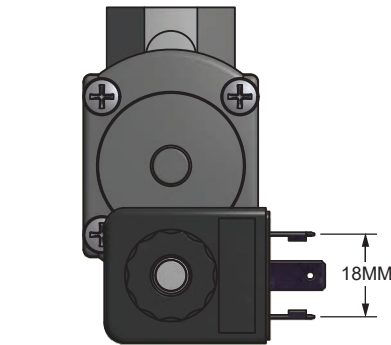
Series 3585

Diaphragm Process Composite Air-Sol 2-Way

The Spartan Scientific Series 3585 2-Way, 2-Position solenoid diaphragm valve offers the highest flow for the lightest weight in its class. The valve is designed from the ground up using modern design technologies and materials. Featuring a full flow 1/2" (12.5 mm) orifice, the 3585 is available in either Normally Closed or Normally Open configurations. The nylon body is media compatible, light in weight, and by use of external metal port rings, is virtually indestructible. The Normally Open version of the valve features an optional turn lock manual override and has no external by-pass tube which eliminates leak points and size. The body is available in 1/4", 3/8" and 1/2" NPT or BSP. The low wattage solenoid features a DIN Style "A" EN175301-803 (Formerly DIN 43650) electrical interface and is nylon encapsulated. FKM, NBR and EPDM are standard elastomers and the operators are made of stainless steel / brass or stainless steel / brass with copper shading rings for AC versions. Typical applications include control of inert gases, water and compatible fluids.

Dimensional Data

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED



DIAPHRAGM
PROCESS



Series 3585

Diaphragm Process
Composite Air-Sol 2-Way

Technical Data

Function: 2-Way, 2-Position; Inlet Pilot Diaphragm; Solenoid Operated; Normally Closed, or Normally Open

Port Size / Flow Factor: 1/4" NPT / 1.55 Cv
3/8" NPT / 1.95 Cv
1/2" NPT / 2.45 Cv

Orifice Sizes: 12.5mm / 2.45 Cv

Pressure Range: 7 to 150 psi (depending on orifice size and function)

Temp. Range: Fluid Max.: +60°C
Dry Range: Ambient +10° to +50°C

Response Time: 20 to 80ms Complete Cycle

Media: Air, water

Environment Protection: IP65 (IEC 144), NEMA 4
Dust-tight and water resistant (with electrical connector)

Wetted Materials: Elastomers: EPDM, FKM, NBR
Operator: 300 and 400 Series Stainless Steel or Brass
Orifice Baskets: Acetal POM
Shading Ring: Copper (AC Only)
Springs: 300 Series Stainless Steel
Valve Body: Glass-filled Nylon (NSF Approved)

Mounting: Use #8 x 0.50" long self-tapping screws (2) (not provided)

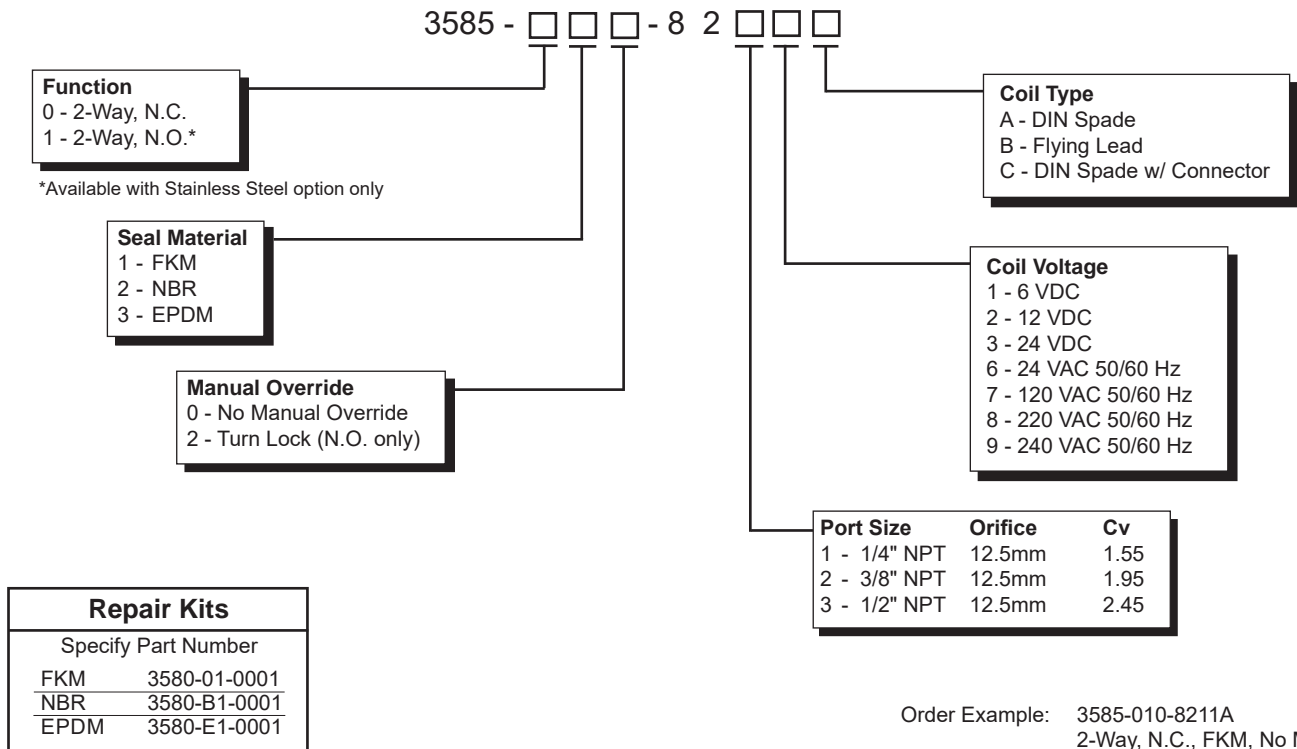
Coil Data: Duty Cycle: Continuous (within specifications)
Encapsulation: Glass-Filled Nylon
Insulation: Class F
Power Rating: 6.5 Watt VDC, 8.5 VA VAC (others available on request)
Voltage: 6, 12, 24 VDC
24, 120, 220, 240 VAC 50/60 Hz
Voltage Tolerance: +/- 10% Nominal
Winding: Class H

Connections: Spades: Accordance with DIN Style "A" EN175301-803
Flying Lead: PVC 22 AWG, Multi-Strand Copper Wire, 300V, 12" minimum length

Packaged Weight: 0.50 lbs.

 Consult factory for available versions recognized under the Component Program of Underwriters Laboratories, Inc.

How To Order



Order Example: 3585-010-8211A
2-Way, N.C., FKM, No Manual,
1/4" NPT, 6 VDC, DIN Spade



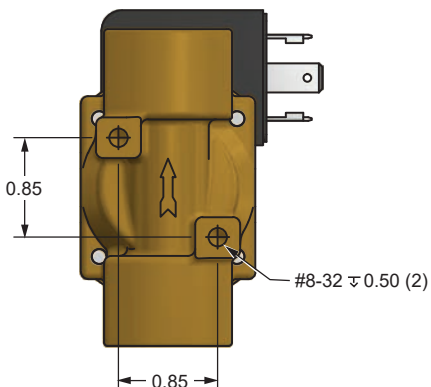
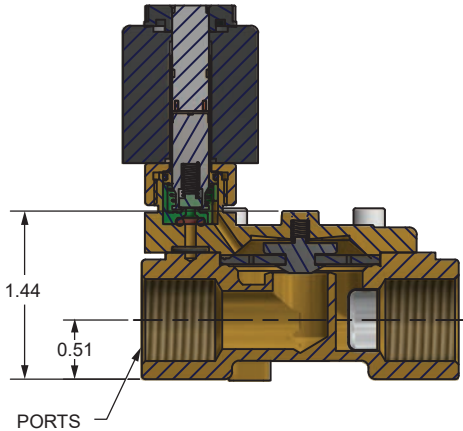
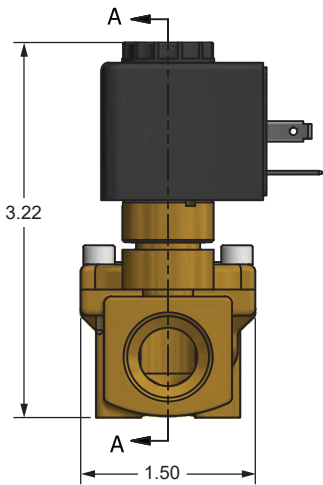
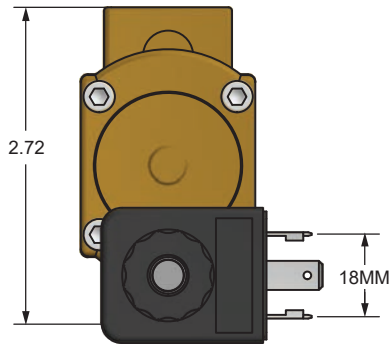
Series 3586

Diaphragm Process
Air-Sol 2-Way

The Spartan Scientific Series 3586 is a brass bodied, 2-Way, 2-Position solenoid diaphragm valve which offers the highest flow for the lightest weight in its class. The valve is designed from the ground up using modern design technologies and materials. Featuring a full flow 1/2" (12.5 mm) orifice, the 3586 is available in a Normally Closed configuration. The brass body construction offers a rugged platform and touts high pressure capacity. The body is available in 1/4", 3/8" and 1/2" NPT. The low wattage solenoid features a DIN Style "A" EN175301-803 (Formerly DIN 43650) electrical interface and is nylon encapsulated. FKM, NBR and EPDM are standard elastomers and the operators are made of stainless steel / brass or stainless steel / brass with copper shading rings for AC versions. Typical applications include control of inert gases, water and compatible fluids.

Dimensional Data

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED





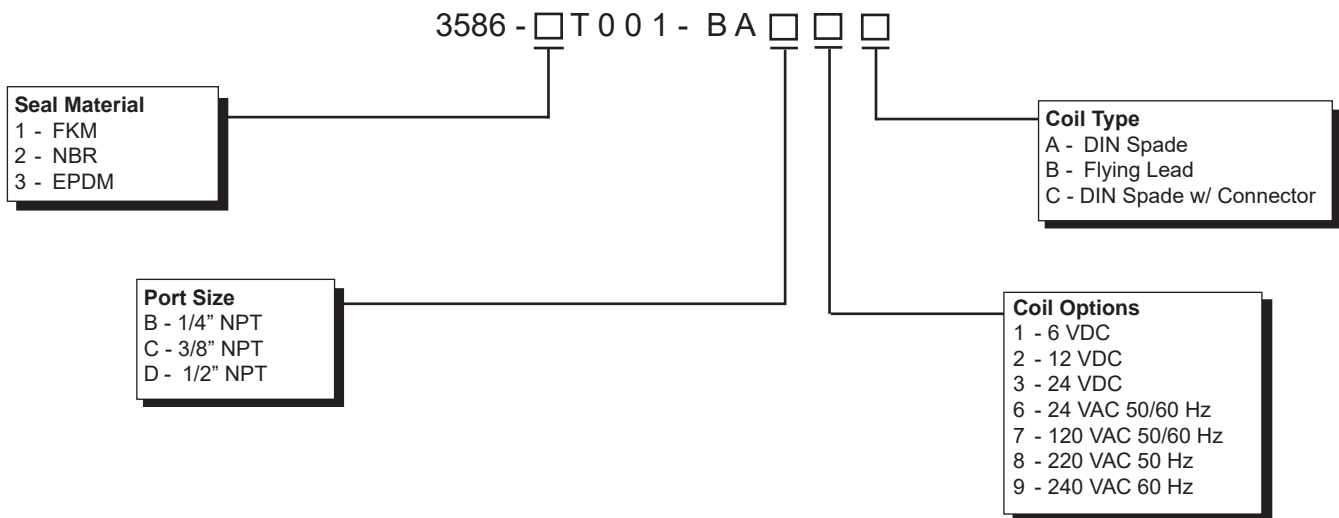
Series 3586

Diaphragm Process
Air-Sol 2-Way

Technical Data

Function:	2-Way, 2-Position; Piloted Diaphragm; Normally Closed	Mounting:	Use #8 x 0.50" long self-tapping screws (2) (not provided)
Port Size / Flow Factor:	1/4" NPT / 1.55 Cv 3/8" NPT / 1.95 Cv 1/2" NPT / 2.45 Cv	Coil Data:	Duty Cycle: Continuous (within specifications) Encapsulation: Glass-Filled Nylon Insulation: Class F Power Rating: 6.5 Watt VDC, 8.5 VA VAC (others available on request) Voltage: 6, 12, 24 VDC 24, 120, 220, 240 VAC 50/60 Hz Voltage Tolerance: +/- 10% Nominal Winding: Class H
Orifice Sizes:	12.7mm	Connections:	Spades: Accordance with DIN Style "A" EN175301-803 Flying Lead: PVC, 18 AWG or 22 AWG, Multi-Strand Copper Wire, 300V, 12" minimum length
Pressure Range:	7 to 180 psi (depending on orifice size and function)	Package Weight:	1.2 lbs.
Temp. Range:	Fluid Max.: +60°C Dry Range: Ambient +10° to +50°C		
Response Time:	20 to 80ms Complete Cycle		
Media:	Air, water (contact factory for compatibilities)		
Environment Protection:	IP65 (IEC 144), NEMA 4 Dust-tight and water resistant (with electrical connector)		
Wetted Materials:	Elastomers: EPDM, FKM, NBR Orifice Basket: Acetal POM Operator: 300 and 400 Series Stainless Steel, or Brass Shading Ring: Copper (AC Only) Springs: 300 Series Stainless Steel Valve Body: Brass		

How To Order



Repair Kits	
Specify Part Number	
FKM	3580-01-0001
NBR	3580-B1-0001
EPDM	3580-E1-0001

Order Example: 3586-1T001-BAB1A
FKM, 1/4" NPT, 6 VDC, DIN Spade



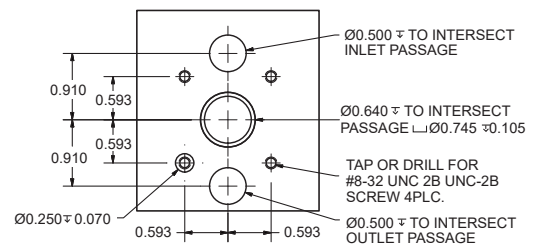
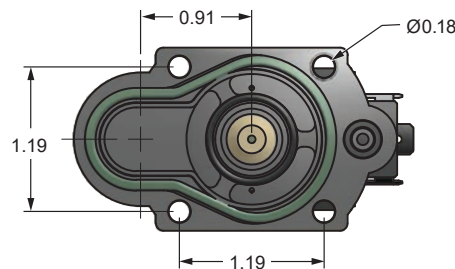
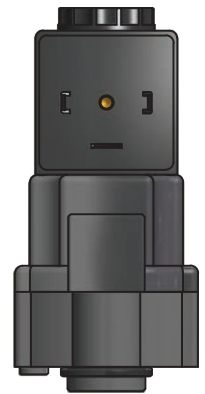
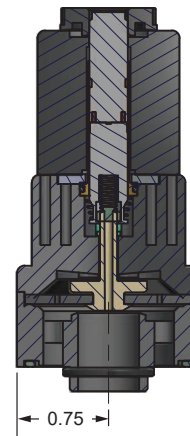
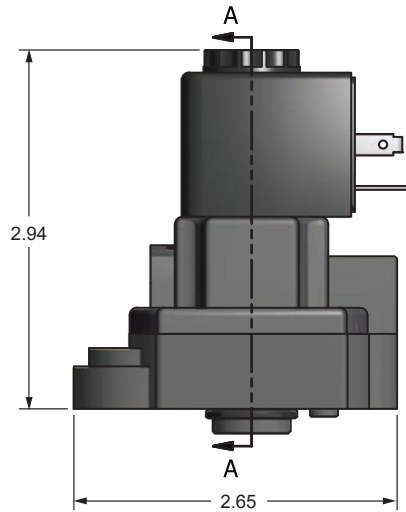
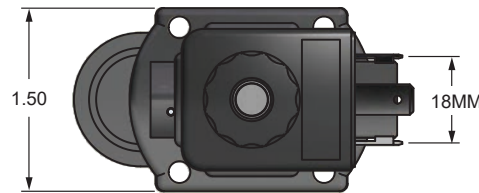
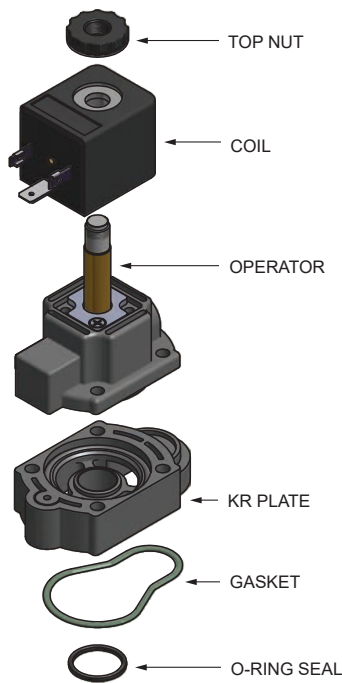
Series 35KR

Diaphragm Process 2-Way Manifold Mount

The Spartan Scientific Series 35KR 2-Way, 2-Position solenoid valve is a variation on the popular Series 3500 valves which feature miniaturized size vs. flow rate while allowing the user to manifold multiple outlets with one inlet. The 35KR design features the direct pilot design which controls 0 to 150 PSI in the all plastic version. The intermediate orifice plate design is the key to the 35KR in that it includes all the details of careful orifice design and creates a simple sealing pattern which can be mounted to integrated equipment and complex manifolds with simple mounting screws. The mounting style reduces leak points and numbers of connections. The 12mm orifice promotes full flow while the valve body, at only 1.5 inches wide, can be gang mounted to give impressively small envelope packages with many outputs. The simple mounting pattern is shown under dimensional data and can be machined into many varied manifold configurations.

Dimensional Data

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED



MOUNTING HOLE / PASSAGE PATTERN

DIAPHRAGM
PROCESS



Series 35KR

Diaphragm Process
2-Way Manifold Mount

Technical Data

Function: 2-Way, 2-Position; Inlet Pilot Diaphragm; Normally Closed, or Normally Open

Orifice Size / Flow Factor: 12.5mm
2.45 Cv

Pressure Range: 0 to 150 psi (depending on orifice size and function)

Temp. Range: Fluid Max.: +60°C
Dry Range: Ambient +10° to +50°C

Response Time: 20 to 80ms Complete Cycle

Media: Air, emulsion, inert gases, oil, water (contact factory for compatibilities)

Manual Override: Push non-locking

Environment Protection: IP65 (IEC 144), NEMA 4
Dust-tight and water resistant (with electrical connector)

Materials: Ø0.18" thru (4)

Wetted Materials: Elastomers: EPDM, FKM, NBR
Operator: 300 and 400 Series Stainless Steel or Brass
Shading Ring: Copper (AC Only)
Springs: 300 Series Stainless Steel
Valve Body: Glass-Filled Nylon

Coil Data: Duty Cycle: Continuous (within specifications)
Encapsulation: Glass-Filled Nylon
Insulation: Class F
Power Rating: 10 Watt VDC, 8VA VAC (others available on request)
Voltage: 6, 12, 24 VDC
24, 120, 220, 240 VAC 50/60 Hz
Voltage Tolerance: +/- 10% Nominal
Winding: Class H

Connections: Spades: Accordance with DIN Style "A" EN175301-803
Flying Lead: PVC 22 AWG, Multi-Strand Copper Wire, 300V, 12" minimum length

Packaged Weight: 0.55 lbs.

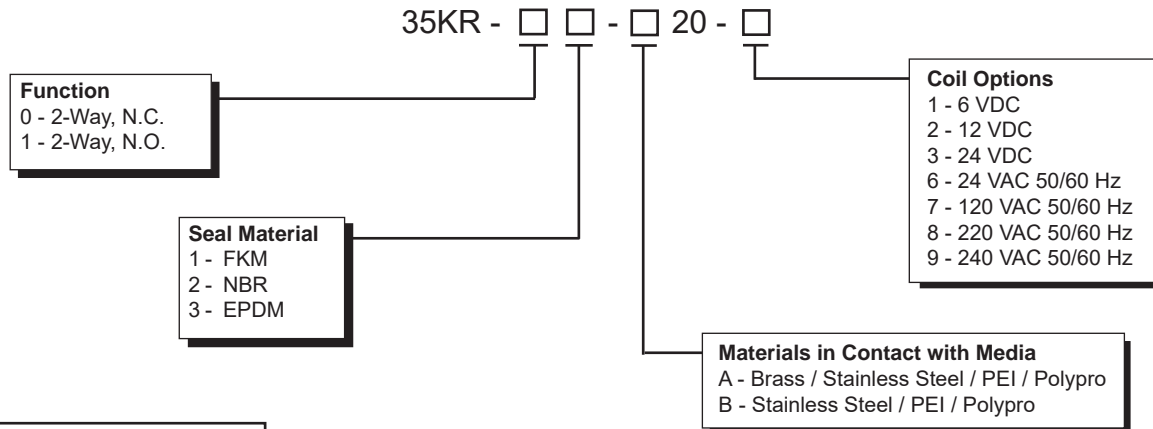
VOLTAGE

FUNCTION		AC	DC
	2/2 NC	150	150
	2/2 NO	150	120

MAX. PRESSURE RANGE (psi)

DIAPHRAGM PROCESS

How To Order



Replacement Diaphragm Kits		
Kit includes: Diaphragm and Orifice insert		
Specify Part Number		
FKM	3500-01-0001	Normally Closed
NBR	3500-B1-0001	
EPDM	3500-E1-0001	
VKM	3500-01-0003	Normally Open
NBR	3500-B1-0003	
EPDM	3500-E1-0003	

Order Example: 35KR-00-A20-7
2-Way, N.C., FKM,
Brass, 120 VAC 50/60 Hz



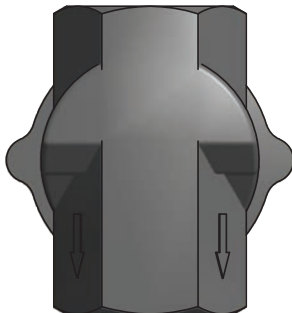
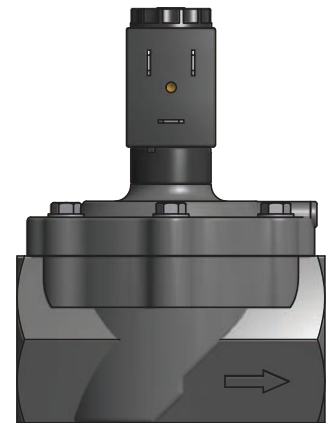
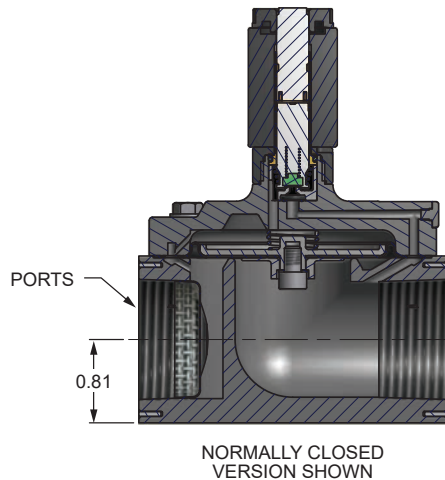
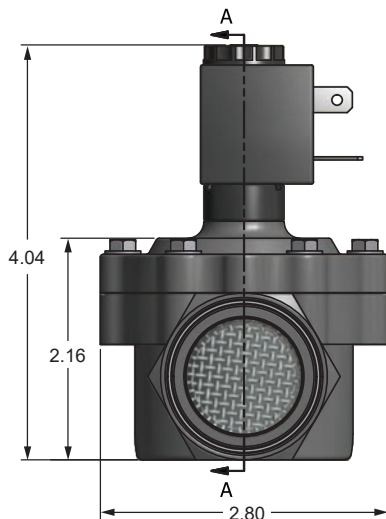
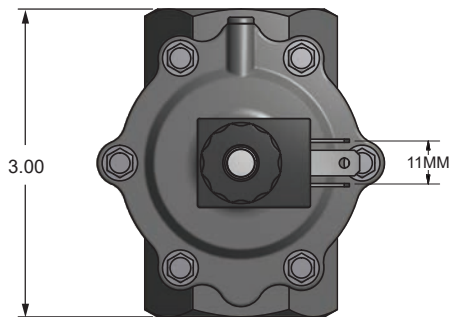
Series 3680

Diaphragm Process Composite Air-Sol 2-Way

The Spartan Scientific Series 3680 2-Way, 2-Position solenoid diaphragm valve offers the highest flow for the smallest overall size in its class. The valve is designed from the ground up using modern design technologies and materials. Featuring a full flow orifice, the 3680 is available in either Normally Closed or Normally Open configurations. The PEI body is media compatible, light in weight, and by use of external metal port rings, is virtually indestructible. The Normally Open version of the valve features an optional turn lock manual override and has no external by-pass tube which eliminates leak points and size. The body is available in 3/4" and 1" NPT. The low wattage solenoid features an Industry Standard 22 mm wide coil electrical interface and is nylon encapsulated. FKM, EPDM and NBR are standard elastomers and the operators are made of stainless steel / brass or stainless steel / brass with copper shading rings for AC versions. Typical applications include control of inert gases, water and compatible fluids.

Dimensional Data

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED



DIAPHRAGM
PROCESS



Series 3680

Diaphragm Process Composite Air-Sol 2-Way

Technical Data

Function: 2-Way, 2-Position; Internal Pilot Solenoid Operated; Normally Closed or Normally Open

Port Sizes / Flow Factor: 3/4" NPT / 9.5 Cv
1" NPT / 14 Cv

Orifice Sizes 28.58mm

Pressure Range: 10 to 120 psi (depending on orifice size and function)

Temp. Range: Fluid Max.: +60°C
Dry Range: Ambient +10° to +50°C

Response Time: 80 to 120ms Complete Cycle

Media: Air, oil, light oil, noble gases, water (contact factory for compatibilities)

Manual Override: Turn Lock
Normally Open Version Only

Environment IP65 (IEC 144), NEMA 4

Protection: Dust-tight and water resistant (with electrical connector)

Mounting: On pipe

Wetted Materials: Elastomers: EPDM, FKM, NBR
Operator: 300 and 400 Series Stainless Steel
Shading Ring: Copper (AC Only)
Springs: 300 Series Stainless Steel
Valve Body: PEI

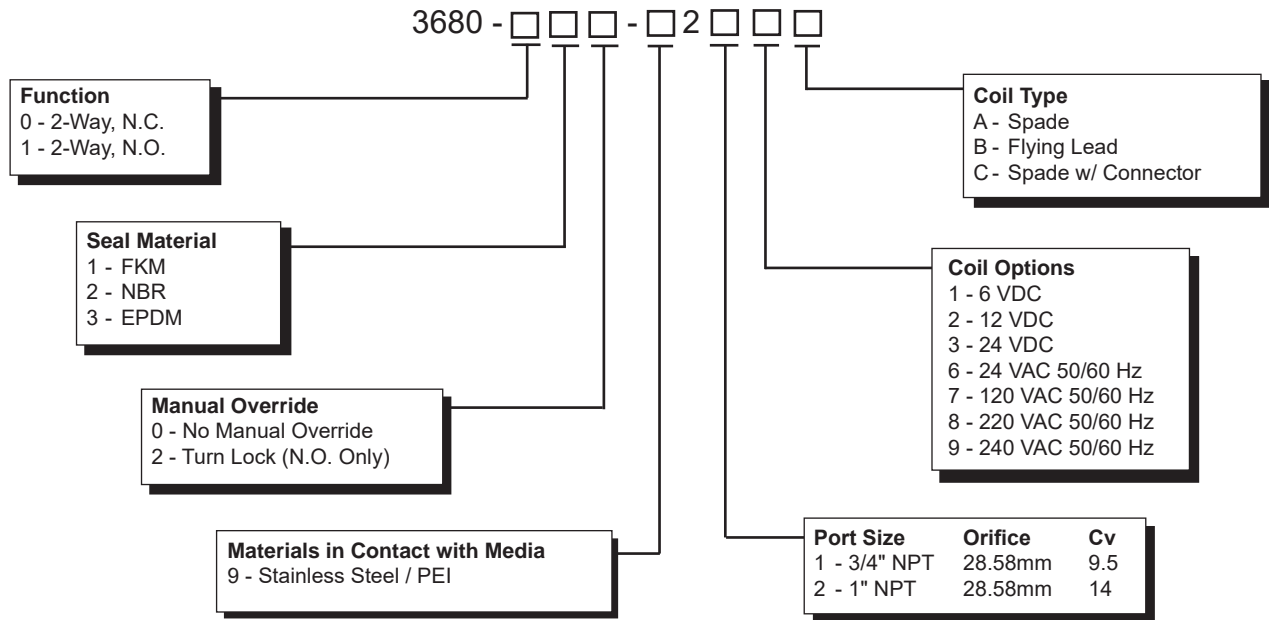
Coil Data: Duty Cycle: Continuous (within specifications)
Encapsulation: Glass-Filled Nylon
Insulation: Class F
Power Rating: 6.5 Watt VDC, 8.5 VA VAC (others available on request)
Voltage: 6, 12, 24 VDC
24, 120, 220, 240 VAC 50/60 Hz
Voltage Tolerance: +/- 10% Nominal
Winding: Class H

Connections: Spades: Terminals AMP 6.3x0.8 width 11mm
Flying Lead: PVC 22 AWG, Multi-Strand Copper Wire, 300V, 12" minimum length

Packaged Weight: 0.77 lbs.

How To Order

DIAPHRAGM PROCESS



Order Example: 3680-010-9211A
2-Way, N.C., FKM, No Override,
3/4" NPT, 6 VDC, Spade



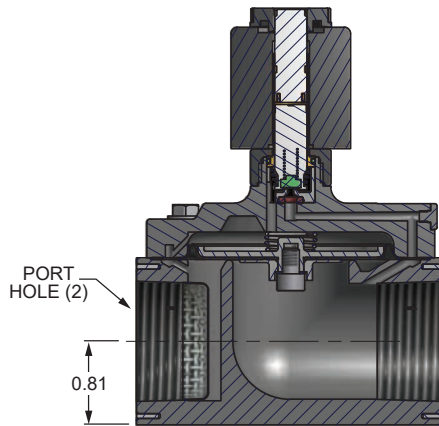
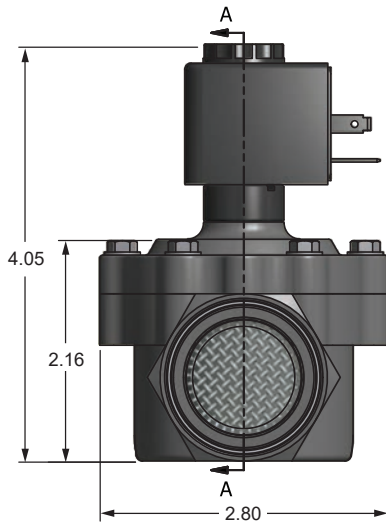
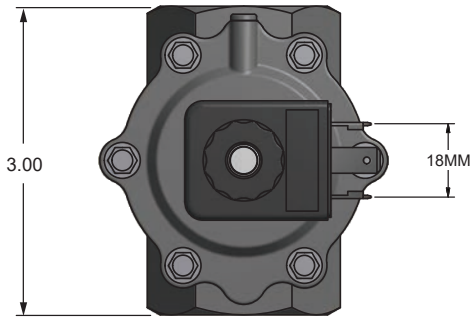
Series 3685

Diaphragm Process Composite Air-Sol 2-Way

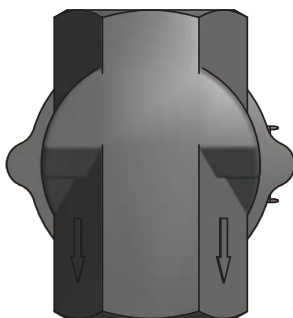
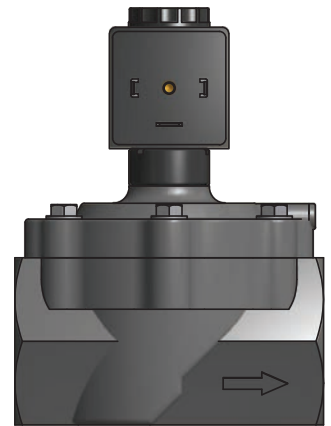
The Spartan Scientific Series 3685 2-Way, 2-Position solenoid diaphragm valve offers the highest flow for the smallest overall size in its class. The valve is designed from the ground up using modern design technologies and materials. Featuring a full flow orifice, the 3685 is available in either Normally Closed or Normally Open configurations. The PEI body is media compatible, light in weight, and by use of external metal port rings, is virtually indestructible. The Normally Open version of the valve features an optional turn lock manual override and has no external by-pass tube which eliminates leak points and size. The body is available in 3/4" and 1.0" NPT. The low wattage solenoid features a DIN Style "A" EN175301-803 (Formerly DIN 43650) electrical interface and is nylon encapsulated. FKM, EPDM and NBR are standard elastomers and the operators are made of stainless steel / brass or stainless steel / brass with copper shading rings for AC versions. Typical applications include control of inert gases, water and compatible fluids.

Dimensional Data

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED



NORMALLY CLOSED VERSION SHOWN



DIAPHRAGM
PROCESS



Series 3685

Diaphragm Process
Composite Air-Sol 2-Way

Technical Data

Function: 2-Way, 2-Position; Internal Pilot Solenoid Operated; Normally Closed or Normally Open

Port Sizes / Flow Factor: 3/4" NPT / 9.5 Cv
1" NPT / 14 Cv

Orifice Sizes 28.58mm

Pressure Range: 10 to 120 psi (depending on orifice size and function)

Temp. Range: Fluid Max.: +60°C
Dry Range: Ambient +10° to +50°C

Response Time: 80 to 120ms Complete Cycle

Media: Air, oil, light oil, noble gases, water (contact factory for compatibilities)

Manual Override: Turn Lock
Normally Open Version Only

Environment IP65 (IEC 144), NEMA 4

Protection: Dust-tight and water resistant (with electrical connector)

Mounting: On pipe

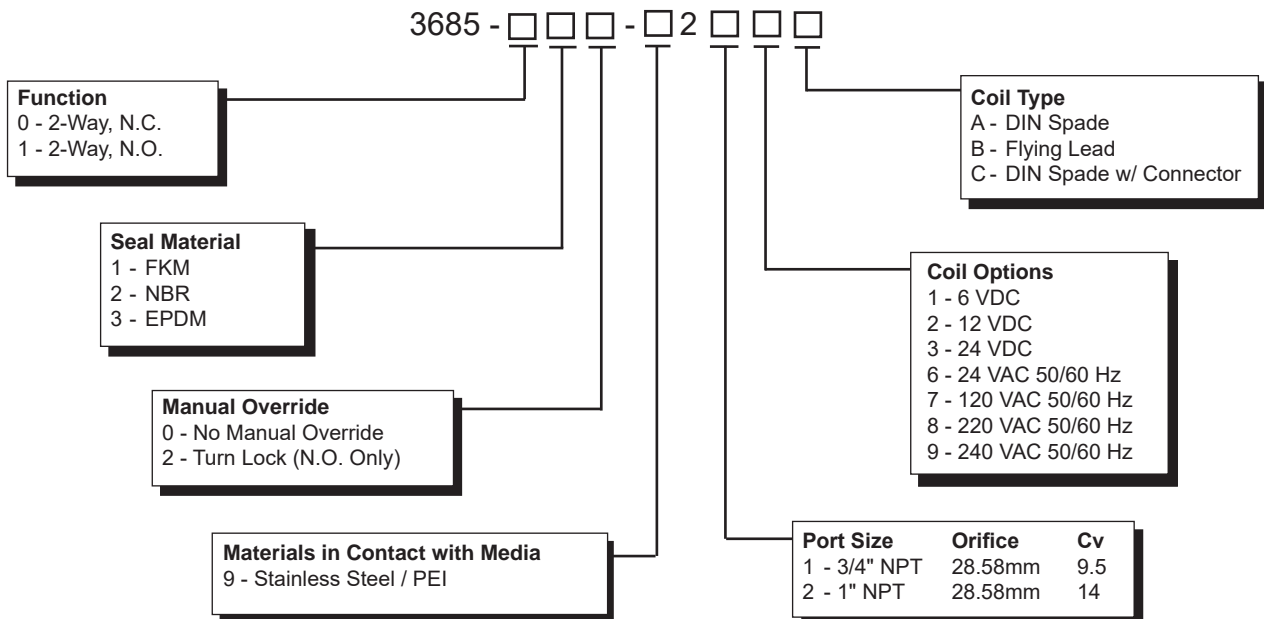
Wetted Materials: Elastomers: EPDM, FKM, NBR
Operator: 300 and 400 Series Stainless Steel
Shading Ring: Copper (AC Only)
Springs: 300 Series Stainless Steel
Valve Body: PEI

Coil Data: Duty Cycle: Continuous (within specifications)
Encapsulation: Glass-Filled Nylon
Insulation: Class F
Power Rating: 6.5 Watt VDC, 8.5 VA VAC (others available on request)
Voltage: 6, 12, 24 VDC
24, 120, 220, 240 VAC 50/60 Hz
Voltage Tolerance: +/- 10% Nominal
Winding: Class H

Connections: Spades: Accordance with DIN Style "A" EN175301-803
Flying Lead: PVC 22 AWG, Multi-Strand Copper Wire, 300V, 12" minimum length

Packaged Weight: 0.78 lbs.

How To Order



Order Example: 3685-010-9211A
2-Way, N.C., FKM, No Override,
3/4" NPT, 6 VDC, DIN Spade



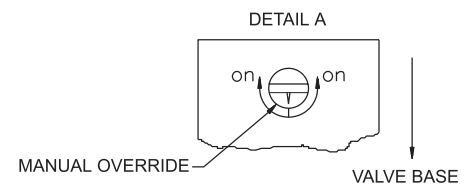
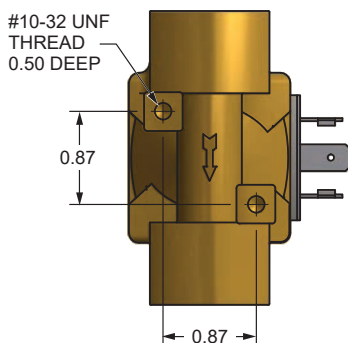
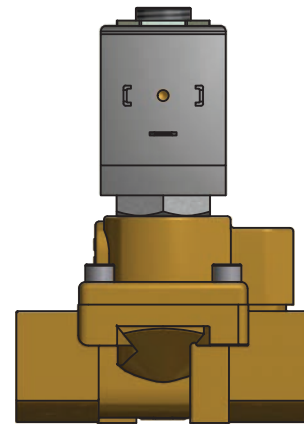
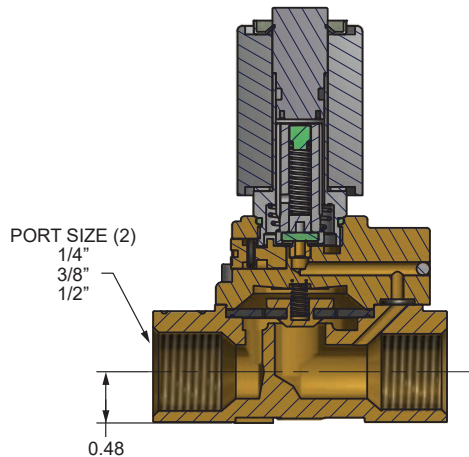
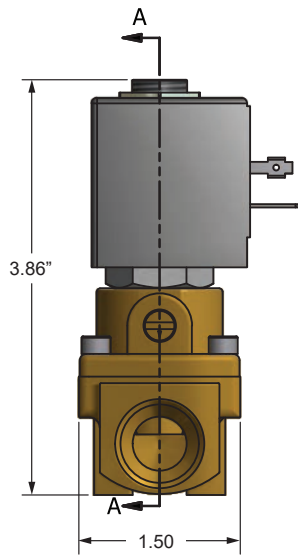
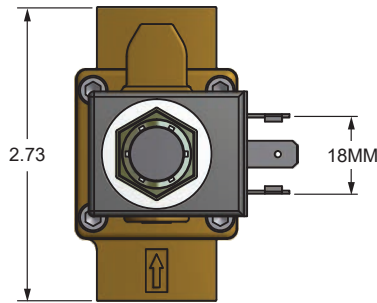
Series 45A0

Diaphragm Process
Air-Sol 2-Way

The Spartan Scientific Series 45A0 2-Way, 2-Position Solenoid Valve is a brass bodied, stainless steel operator valve for electronic control of air, water or any seal compatible media. The versatile design is feature rich including with and without manual override, EPDM, FKM and NBR sealing materials and slow close anti-water hammer options. Additional special options include oxygen clean, and latching versions. Valves are available in 1/4", 3/8" and 1/2" NPT and all standard AC and DC voltages. Coils are fully encapsulated and are available standard with flying lead and DIN Style "A" EN175301-803 (Formerly DIN 43650) with wire grip or 1/2" conduit as options.

Dimensional Data

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED



DIAPHRAGM
PROCESS



Series 45A0

Diaphragm Process
Air-Sol 2-Way

Technical Data

Function: 2-Way, 2-Position; Inlet Pilot, Solenoid Operating; Normally Closed

Port Size: 1/4" NPT / 1.55 Cv
3/8" NPT / 1.95 Cv
1/2" NPT / 2.45 Cv

Orifice Sizes/ Flow Factor: 12.7mm
2.45 Cv

Pressure Range: 10 to 300 psi (depending on orifice size and function)

Temp. Range: Fluid Max.: +60°C
Dry Range: Ambient +10° to +50°C

Response Time: 20 to 80ms Complete Cycle

Media: Air, water or any seal compatible media (contact factory for compatibilities)

Environment Protection: IP65 (IEC 144), NEMA 4
Dust-tight and water resistant (with electrical connector)

Mounting: #10-32 x 0.5" DP Holes (2x)

Wetted Materials: Elastomers: EPDM, FKM, NBR
Operator: 300 and 400 Series Stainless Steel
Shading Ring: Copper (AC Only)
Springs: 300 Series Stainless Steel
Valve Body: Brass

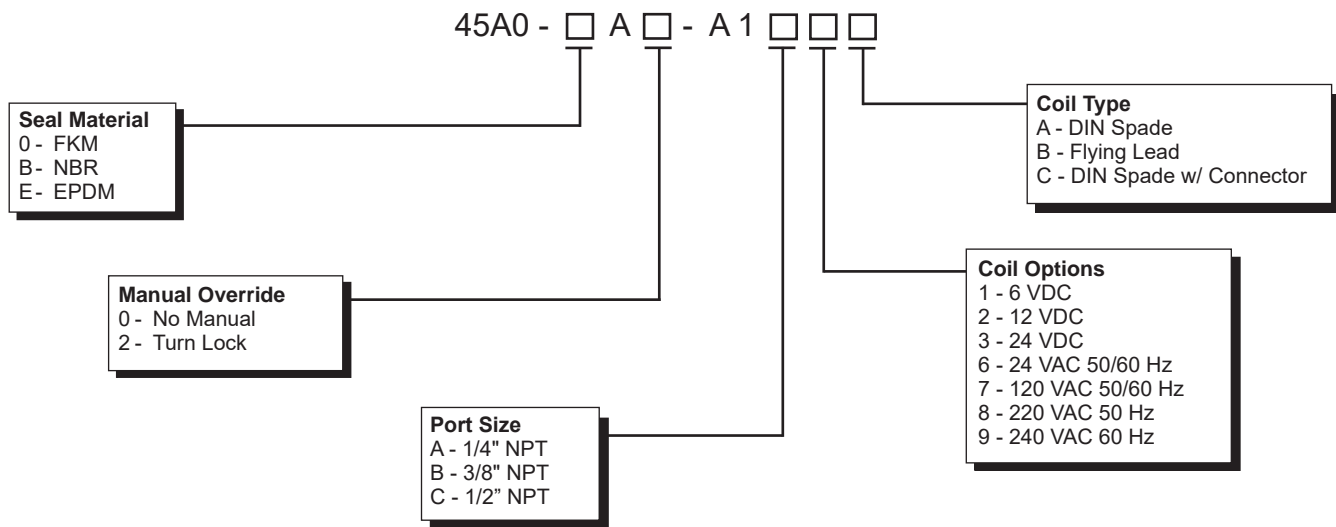
Coil Data: Duty Cycle: Continuous (within specifications)
Encapsulation: Glass-Filled Nylon
Insulation: Class F
Power Rating: 10 Watt VDC, 11VA VAC (others available on request)
Voltage: 6, 12, 24 VDC
24, 120, 220, 240 VAC 50/60 Hz
Voltage Tolerance: +/- 10% Nominal
Winding: Class H

Connections: Spades: Accordance with DIN Style "A" EN175301-803
Flying Lead: PVC 18 AWG, Multi-Strand Copper Wire, 300V, 12" minimum length

Packaged Weight: 1.38 lbs.

 Consult factory for available versions recognized under the Component Program of Underwriters Laboratories, Inc.

How To Order



Replacement Diaphragm Kits

Kit includes: Diaphragm and Orifice insert

Specify Part Number

FKM	45A0-01-0001
NBR	45A0-B1-0001
EPDM	45A0-E1-0001

Order Example: 45A0-0A0-A1A7A
FKM, No Override, 1/4" NPT,
120 VAC 50/60 Hz, DIN Spade



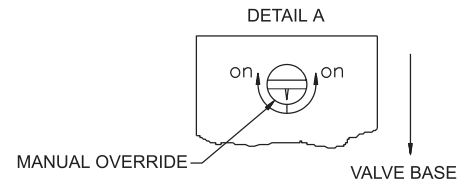
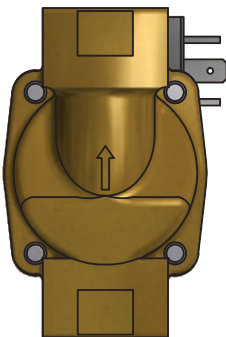
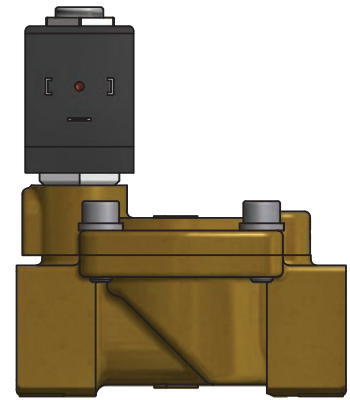
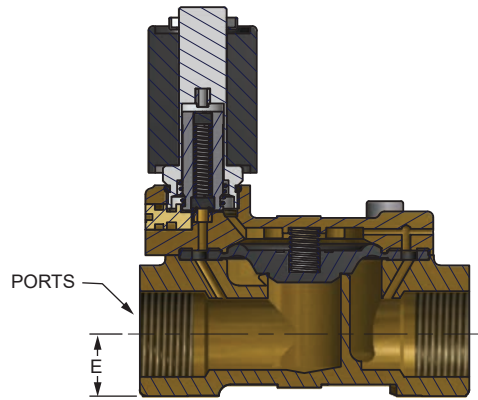
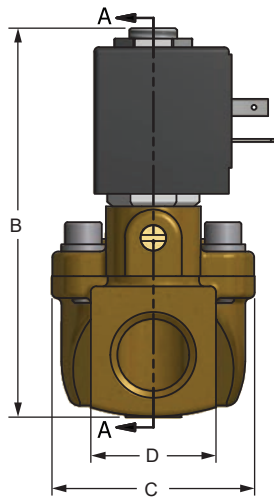
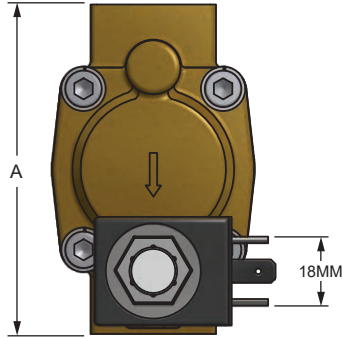
Series 4700

Diaphragm Process
Air-Sol 2-Way

The Spartan Scientific Series 4700 solenoid valves are designed specifically for high flow, high pressure applications. With orifice sizes of 20mm to 25mm and port sizes of 3/4" and 1" NPT, the valve is offered with a manual override standard. The coil is a quick connect DIN Style "A" EN175301-803 (Formerly DIN 43650) design and is encapsulated for environment resistance. Typical applications include condensation removal, car washes, autoclaves or irrigation control.

Dimensional Data

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED



DIMENSIONAL TABLE		
PORTS	3/4"	1"
A	3.54	3.94
B	4.17	4.43
C	2.17	2.56
D	1.30	1.52
E	0.67	0.83

FLOW DATA	
PORT SIZE	FLOW RATE
3/4"	34 gpm
1"	53 gpm
120 psi Δ p 20 psi	

DIAPHRAGM
PROCESS



Series 4700

Diaphragm Process
Air-Sol 2-Way

Technical Data

Function: 2-Way, 2-Position; Internal Pilot Diaphragm;
Normally Closed or Normally Open

Port Size: 3/4" NPT
1" NPT

**Orifice Size /
Flow Factor:** 20mm / 9.10 Cv
25mm / 14.0 Cv

Pressure Range: 4.5 to 220 psi (depending on orifice size and function)

Temp. Range: Fluid Max.: +60°C
Dry Range: Ambient +10° to +50°C

Response Time: 40 to 90ms Complete Cycle

Media: Air, gasoline, oil, water
(contact factory for compatibilities)

Manual Override: Turn Lock (available on request)
Normally Open Version Only

**Environment
Protection:** IP65 (IEC 144), NEMA 4
Dust-tight and water resistant
(with electrical connector)

Mounting: On pipe

Wetted Materials: Elastomers: NBR
Operator: 300 and 400 Series Stainless Steel
Shading Ring: Copper (AC Only)
Springs: 300 Series Stainless Steel
Valve Body: Brass (others available on request)

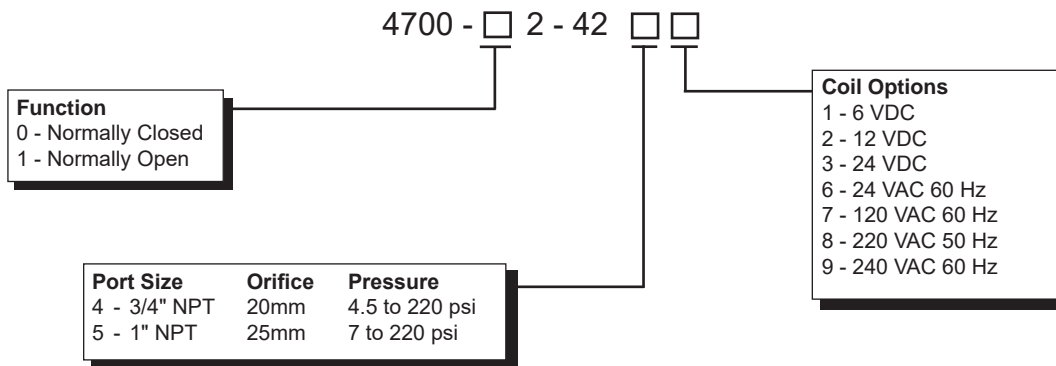
Coil Data: Duty Cycle: Continuous (within specifications)
Encapsulation: Glass-Filled Nylon
Insulation: Class F
Power Rating: 10 Watt VDC, 8 VA VAC
(others available on request)
Voltage: 6, 12, 24 VDC
24, 120, 220, 240 VAC 50/60 Hz
Voltage Tolerance: +/- 10% Nominal
Winding: Class H

Connections: Spades: Accordance with DIN Style "A" EN175301-803
Flying Lead: PVC 18 AWG, Multi-Strand Copper Wire,
300V, 12" minimum length

Packaged Weight: 3/4": 2.0 lbs.
1.0": 2.8 lbs.

DIAPHRAGM
PROCESS

How To Order



Replacement Diaphragm Kits

Kit includes: Diaphragm, Spring and Brass Insert

Specify Part Number

3/4" NPT Nitrile - 4700-00-0004
1" NPT Nitrile - 4700-00-0005

Order Example: 4700-02-4247
Normally Closed, 3/4" NPT, 20mm orifice,
4.5 to 220 psi, 120 VAC 60 Hz



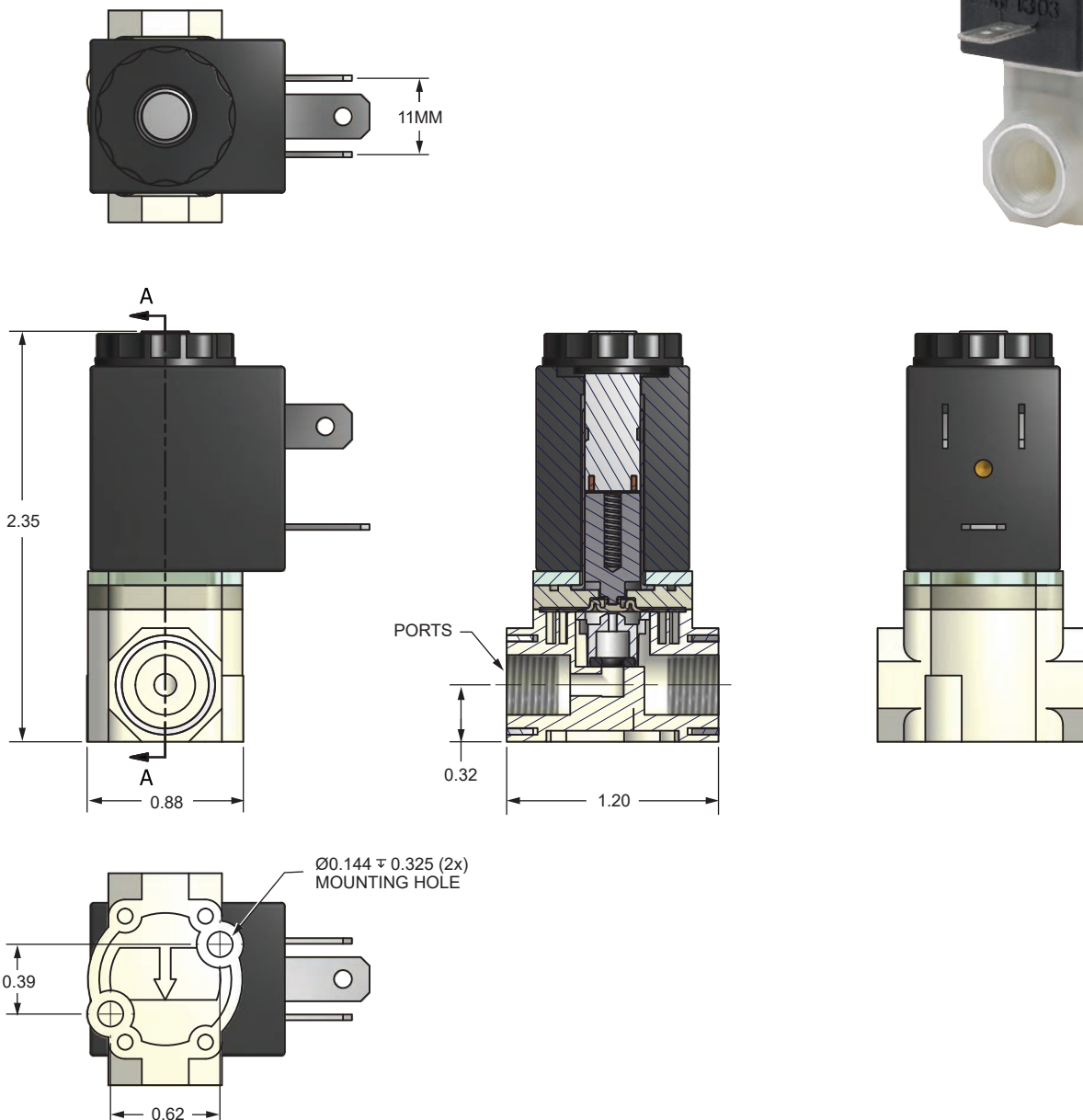
Series 3B23

Media Separated
2-Way

The Spartan Scientific Series 3B23 is a compact, media separated 2-Way Normally Closed solenoid valve for use with air, chemicals, gases or water whereby the media is contained in the nylon body valve cavity and does not come into contact with the metal parts of the solenoid operator. The 3B23 features a long life solenoid that incorporates a fully encapsulated coil, stainless steel plunger and tube assembly as well as a rolling diaphragm which enables the valve to function at pressures up to 120 psi with orifice size of 1.2mm and a flow rate of 0.06Cv. The single in-line valve body features metal reinforced 1/8"NPT threads and has an ultra small volume and simple flow path for clean switching. The valve is available in all standard voltages and comes standard with a 6.5 watt coil.

Dimensional Data

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED



MEDIA
SEPARATED



Series 3B23

Media Separated
2-Way

Technical Data

Function: 2-Way, 2-Position; Direct Acting;
Media Separated Solenoid; Normally Closed

Port Size: 1/8" NPT

**Orifice Size /
Flow Factor:** 1.2mm
0.06 Cv

Pressure Range: 0 to 120 psi (depending on orifice size and function)
Note: Pressure ratings obtained with outlet port open to atmosphere. (15 psi back pressure maximum)

Temp. Range: Fluid Max.: +60°C
Dry Range: Ambient +10° to +50°C

Response Time: 18 to 25ms Complete Cycle

Media: Air, chemicals, gases, water
(contact factory for compatibilities)

**Environment
Protection:** IP65 (IEC 144), NEMA 4
Dust-tight and water resistant
(with electrical connector)

Mounting: Ø0.144" x 0.325" DP holes (2)

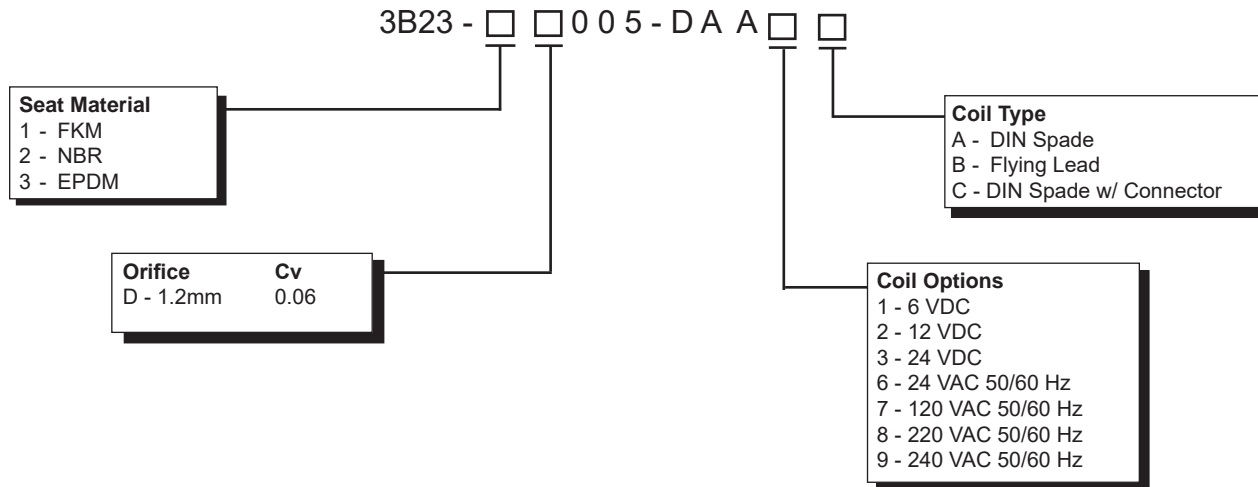
Wetted Materials: Elastomers: EPDM FDA approved, FKM, NBR
(others available on request)
Valve Body: Glass-Filled Nylon NSF approved

Coil Data: Duty Cycle: Continuous (within specifications)
Encapsulation: Glass-Filled Nylon
Insulation: Class F
Power Rating: 6.5 Watt VDC, 8.5 VA VAC
(others available on request)
Voltage: 6, 12, 24 VDC
24, 120, 220, 240 VAC 50/60 Hz
Voltage Tolerance: +/- 10% Nominal
Winding: Class H

Connections: Spades: Terminals AMP 6.3x0.8 width 11mm
Flying Lead: PVC 22 AWG, Multi-Strand Copper Wire,
300V, 12" minimum length

Packaged Weight: 0.34 lbs.

How To Order



MEDIA
SEPARATED

Order Example: 3B23-1D005-DAA1A
FKM, 1.2mm orifice, 6 VDC, DIN Spade.



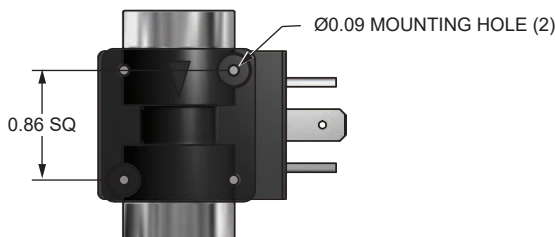
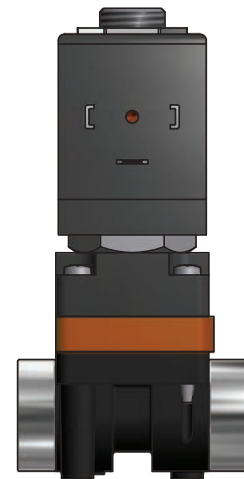
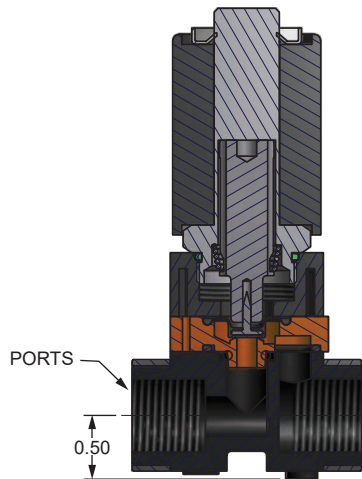
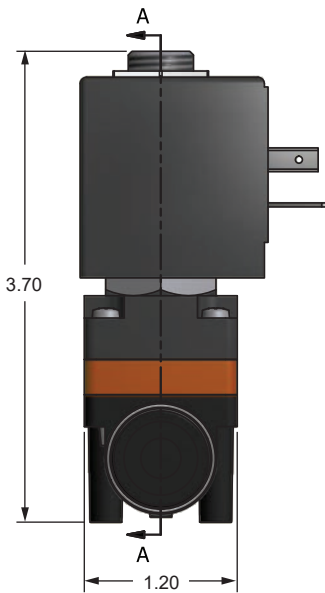
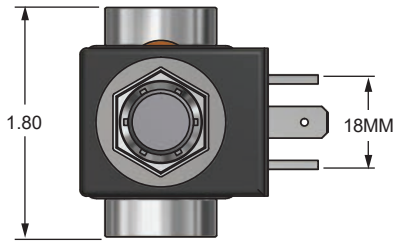
Series 4B23

Media Separated
2-Way In Line Body

The Spartan Scientific Series 4B23 is a media separated, 2-Way 2-Position solenoid operated valve where the media remains isolated from the metal working components within the valve. This creates a barrier to contamination to both the fluid and the operator which serves two purposes. The media remains untainted by the metals in the operator while the close tolerance moving parts of the valve are insulated from the effects of particulates, aggressive chemicals which can affect long term life of solenoid valves. The 4B23 is available in 1/4" or 3/8" NPT connections with orifice ranges from 2.0mm to 5.0mm which gives the 4B23 great flow and operating pressure ranges to meet differing applications. The 4B23 features a DIN quick connect coil or flying leads connection. The valve is designed for long trouble free life with the incorporation of a rolling type diaphragm, life cycle proven metal operator components and a fully encapsulated coil system. The Valve is available in Normally Closed or Normally Open configurations and has two body ports for convenient fluid connection.

Dimensional Data

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED



MEDIA
SEPARATED



Series 4B23

Media Separated
2-Way In Line Body

Technical Data

Function:	2-Way, 2-Position; Direct Acting; Media Separated Solenoid; Normally Closed, Normally Open	Mounting:	Ø.116" for #4 self-tapping screws (not included)
Port Size:	1/4" - 18 NPT 3/8" - 18 NPT	Wetted Materials:	Elastomers: EPDM, FKM, NBR, TFE/P Orifice Plate: PEI Valve Body: PEI
Orifice Size / Flow Factor:	2.0mm / 0.17 Cv 2.4mm / 0.24 Cv 3.0mm / 0.31 Cv 4.0mm / 0.52 Cv 5.0mm / 0.62 Cv	Coil Data:	Duty Cycle: Continuous (within specifications) Encapsulation: Glass-Filled Nylon Insulation: Class F Power Rating: 10 Watt VDC, 8 Watt VAC (others available on request) Voltage: 6, 12, 24 VDC 24, 120, 220, 240 VAC 50/60 Hz Voltage Tolerance: +/- 10% Nominal Winding: Class H
Pressure Range:	Vacuum to 120 psi (depending on orifice size and function)	Connections:	Spades: Accordance with DIN Style "A" EN175301-803 Flying Lead: PVC 18 AWG, Multi-Strand Copper Wire, 300V, 12" minimum length
Temp. Range:	Fluid Max.: +60°C Dry Range: Ambient +10° to +50°C	Packaged Weight:	0.55 lbs.
Response Time:	18 - 26ms Complete Cycle		
Media:	Air, ideal gases, medical fluids, oils (contact factory for compatibilities)		
Environment Protection:	IP65 (IEC 144), NEMA 4 Dust-tight and water resistant (with electrical connector)		

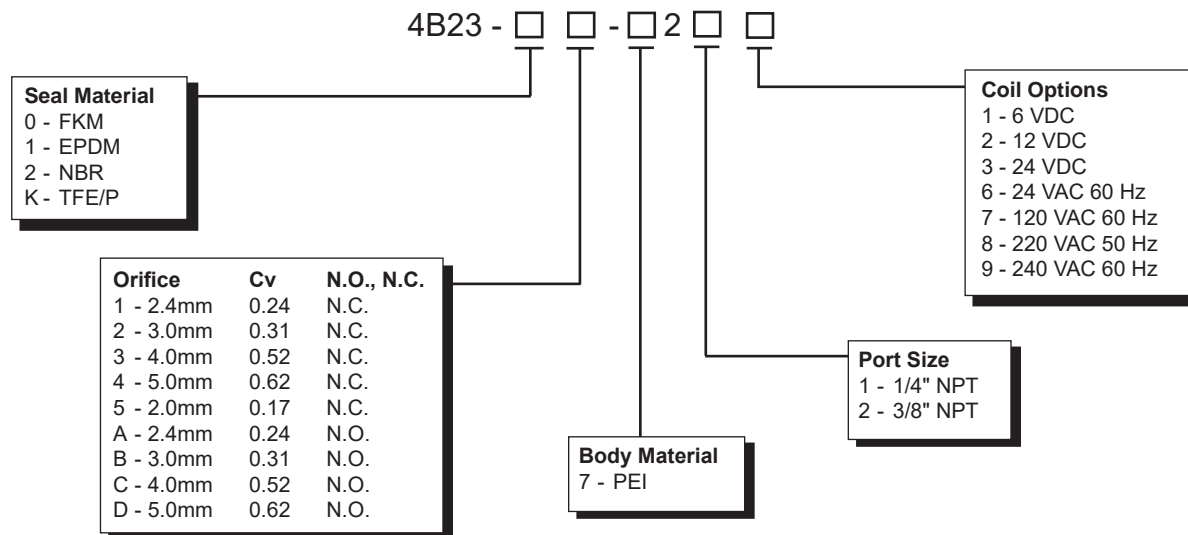
ORIFICE SIZE / VOLTAGE

	2.0mm		2.4mm		3.0mm		4.0mm		5.0mm	
	AC	DC	AC	DC	AC	DC	AC	DC	AC	DC
2/2 NC	120	120	120	120	75	60	55	45	30	20
2/2 NO	N/A	N/A	80	75	60	55	45	40	40	35

*MAX. PRESSURE RANGE (psi)

*Note - Maximum allowable back pressure is 20 psi regardless of voltage.

How To Order



Order Example: 4B23-01-7211
FKM, 2.4mm / 0.24 N.C.,
1/4" NPT, 6 VDC.



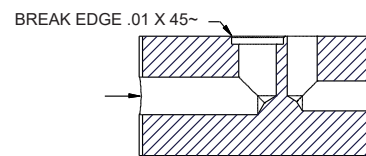
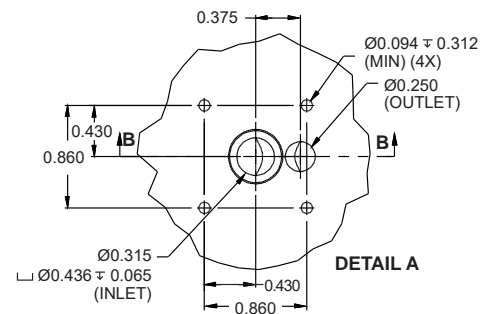
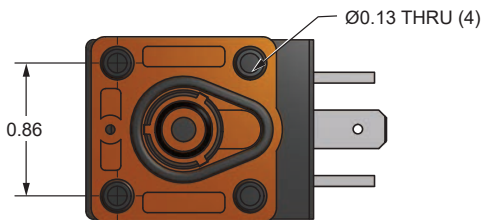
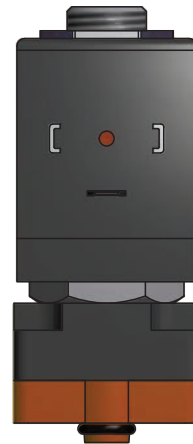
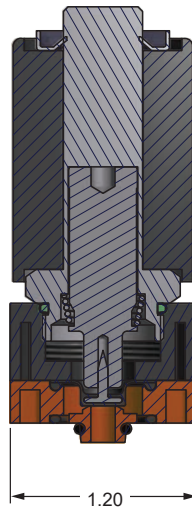
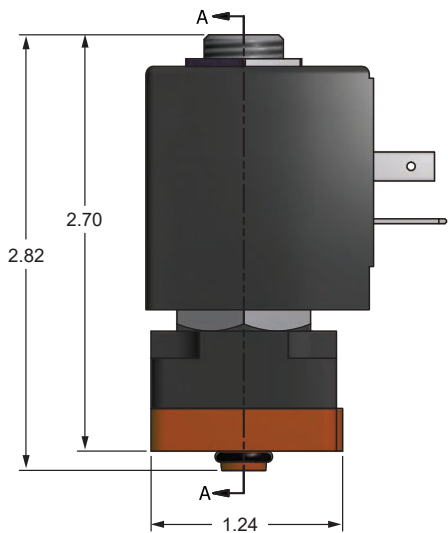
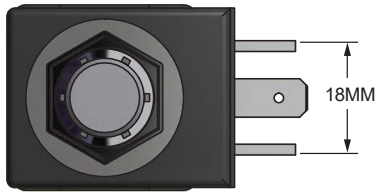
Series 4BKR

Media Separated 2-Way Manifold Mount

The Spartan Scientific Series 4BKR is a 2-Way, 2-Position media separated solenoid valve that is used for the control of ultra pure or corrosive media that would otherwise cause premature failure on wetted type solenoid valves. Featuring the Spartan Scientific low volume valve cavity and the rolling diaphragm, the 4BKR has no convolutions for chemicals to congregate or dead spots for flow. The all encapsulated coil, stainless steel tube and plunger assembly are designed for a long trouble free life. Also featuring a quick connect interface, the valve can be mounted in a gang style on a manifold block by using four fasteners and two o-rings.

Dimensional Data

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED



SECTION B-B
MOUNTING HOLE / PASSAGE PATTERN

MEDIA
SEPARATED



Series 4BKR

Media Separated
2-Way Manifold Mount

Technical Data

Function: 2-Way, 2-Position; Direct Acting, Media Separated; Normally Closed or Normally Open

Orifice Sizes / Flow Factor:
2.0mm / 0.17 Cv
2.4mm / 0.24 Cv
3.0mm / 0.31 Cv
4.0mm / 0.52 Cv
5.0mm / 0.62 Cv

Pressure Range: 15" Hg Vacuum - 120 psi (depending on orifice size and function)

Temp. Range: Fluid Max.: +60°C
Dry Range: Ambient +10° to +50°C

Response Time: 16 to 40ms Complete Cycle

Media: Air, light oil, noble gases, water (contact factory for compatibilities)

Environment Protection: IP65 (IEC 144), NEMA 4
Dust-tight and water resistant (with electrical connector)

Mounting: Ø0.125" for #4 pan-head screws (4)

Wetted Materials: Elastomers: EPDM, FKM, NBR, TFE/P (others, including NSF and FDA compliant, available on request)
Orifice Plate: PEI
Valve Body: Glass-Filled Nylon

Coil Data: Duty Cycle: Continuous (within specifications)
Encapsulation: Glass-Filled Nylon
Insulation: Class F
Power Rating: 10 Watt VDC, 8 VAC (others available on request)
Voltage: 6, 12, 24 VDC
24, 120, 220, 240 VAC 50/60 Hz
Voltage Tolerance: +/- 10% Nominal
Winding: Class H

Connections: Spades: Accordance with DIN Style "A" EN175301-803
Flying Lead: PVC, 18 AWG or 22 AWG, Multi-Strand Copper Wire, 300V, 12" minimum length

Package Weight: 0.52 lbs.

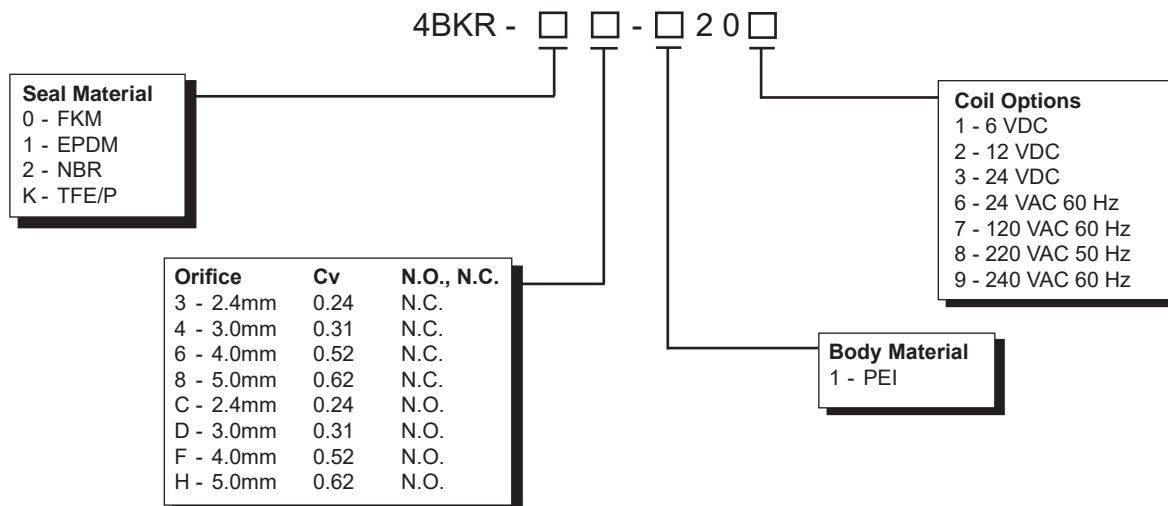
ORIFICE SIZE / VOLTAGE

FUNCTION	2.0mm		2.4mm		3.0mm		4.0mm		5.0mm	
	AC	DC	AC	DC	AC	DC	AC	DC	AC	DC
2/2 NC	120	120	120	120	75	60	55	45	30	20
2/2 NO	N/A	N/A	80	75	60	55	45	40	40	35

*MAX. PRESSURE RANGE (psi)

*Note - Maximum allowable back pressure is 20 psi regardless of voltage.

How To Order



Order Example: 4BKR-03-1207
EPDM, 2.4mm / 0.245 Cv, N.C., 120 VAC 60 Hz

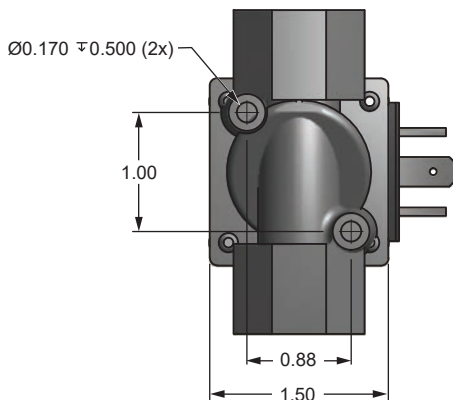
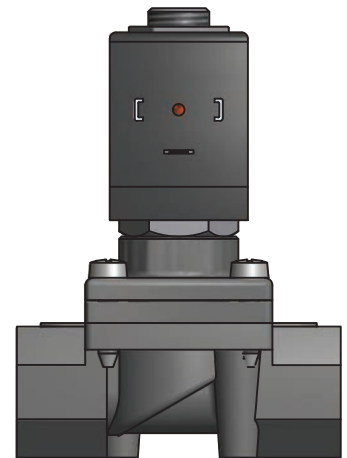
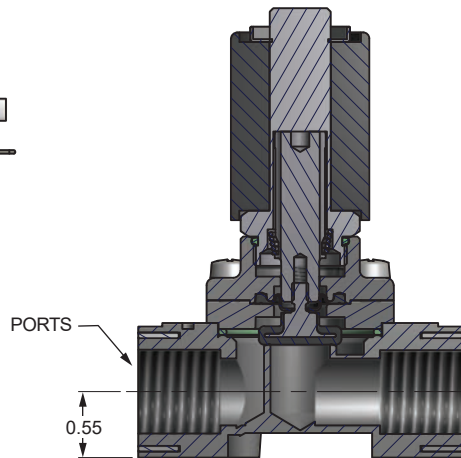
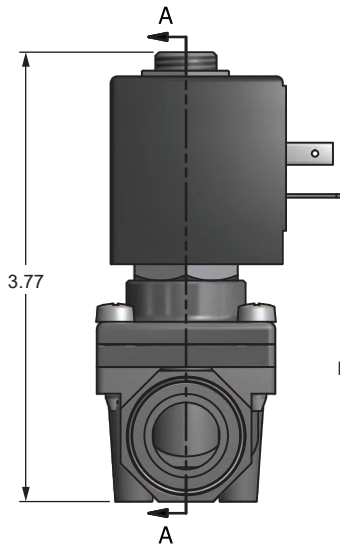
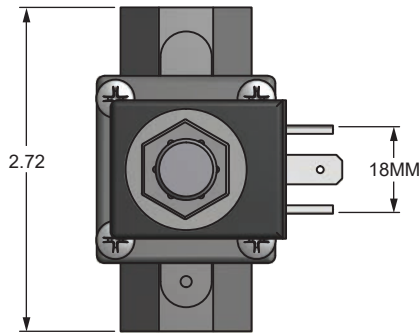


Series 4D85

Media Separated Process Composite Med-Sol 2-Way

The Spartan Scientific Series 4D85 is a direct operating 2-Way 2-Position media separated valve for control of aggressive media that can damage wetted solenoid valve components. The valve incorporates the innovative Spring Diaphragm which retains the media in the valve body effectively separating the metal operator components from the media for extremely long life cycles and media compatibility. The 4D85 is a stand alone body ported valve, available in 1/4", 3/8", and 1/2" NPT port connections and offers a full flow 12mm orifice. The 4D85 can control media compatible with Glass-Filled Nylon, FKM, EPDM, and NBR elastomers. Available in all standard voltages, the 4D85 can control up to 20 PSI inlet pressure with no minimum operating pressure differential. The fully nylon encapsulated coils are available in ISO DIN Style "A" EN175301-803 (Formerly DIN 43650) and flying leads. The 4D85 valve body features robust design elements such as all stainless hardware and metal reinforced port rings which virtually eliminate valve body damage. The 4D85 is designed for a long trouble free life while still controlling compatible aggressive fluids.

Dimensional Data



MEDIA
SEPARATED



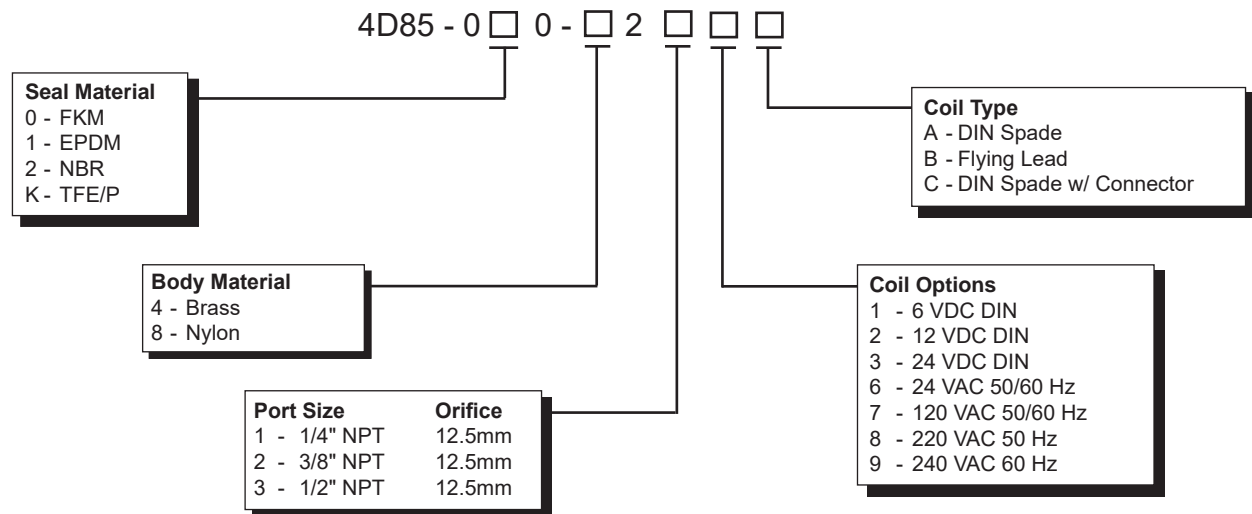
Series 4D85

Media Separated
Process Composite Med-Sol 2-Way

Technical Data

Function:	2-Way, 2-Position; Direct Acting, Media Separated; Normally Closed	Wetted Materials:	Elastomers: EPDM, FKM, NBR, TFE/P (others available on request) Valve Body: Glass-Filled Nylon (NSF Approved); PEI
Port Sizes:	1/4" NPT / 1.55 Cv 3/8" NPT / 1.95 Cv 1/2" NPT / 2.45 Cv	Coil Data:	Duty Cycle: Continuous (within specifications) Encapsulation: Glass-Filled Nylon Insulation: Class F Power Rating: 10 Watts VDC 11 VA VAC (others available on request) Voltage: 6, 12, 24 VDC 24, 120, 220, 240 VAC 50/60 Hz Voltage Tolerance: +/- 10% Nominal Winding: Class H
Orifice Sizes:	12.7mm	Connections:	Spades: Accordance with DIN Style "A" EN175301-803 Flying Lead: PVC, 18 AWG, Multi-Strand Copper Wire, 300V, 12" minimum length
Pressure Range:	Vacuum to 20 psi (depending on orifice size and function)	Packaged Weight:	0.64 lbs.
Temp. Range:	Fluid Max.: +60°C Dry Range: Ambient +10° to +50°C (dry)		
Response Time:	16 to 40 ms Complete Cycle		
Media:	Air, caustics, inert gas, oil, water (contact factory for compatibilities)		
Environment Protection:	IP65 (IEC 144), NEMA 4 Dust-tight and water resistant (with electrical connector)		

How To Order



Order Example: 4D85-010-4211A
FKM seal, Brass, 1/4" NPT, 6VDC, DIN Spade



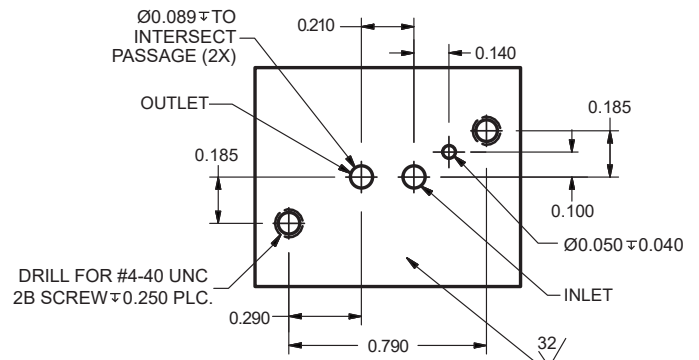
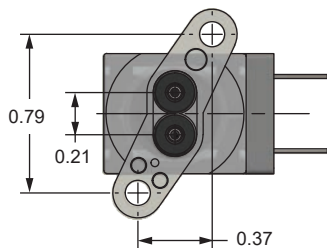
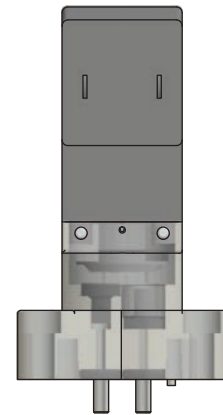
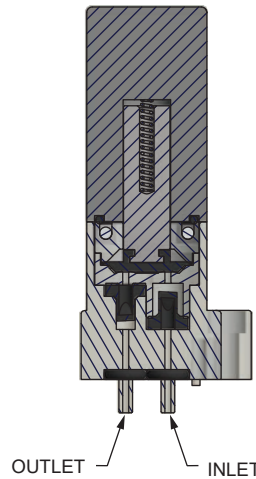
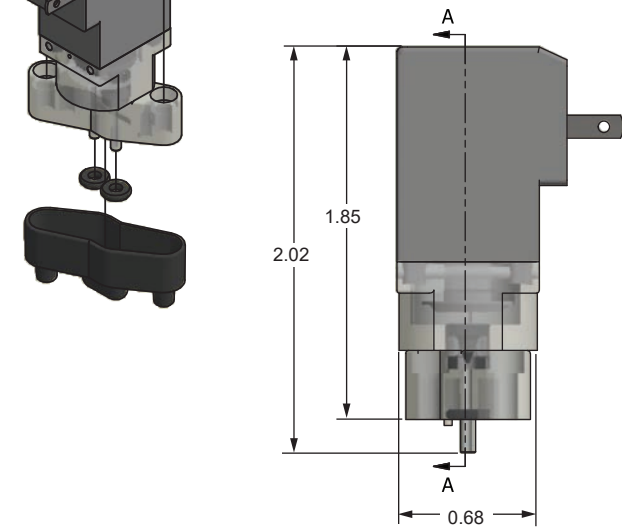
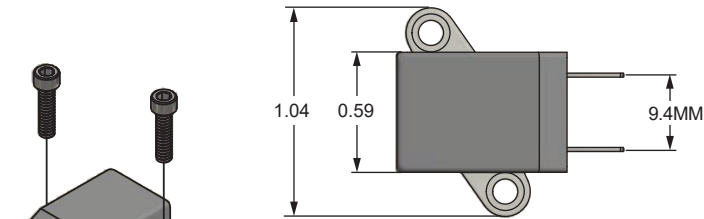
Series SSDP15

Electro-Fluidic Miniature Fixed Displacement Solenoid Pump

The Spartan Scientific Series SSDP15 high precision, fixed volume, fluidic diaphragm solenoid pump is an inert miniaturized pump in an environmentally resistant package that features a fully encapsulated solenoid design offering flying leads, AMP Faston crimp or industry standard quick connector with or without indicator lights. The SSDP15 features a flexible-use form factor interface for a manifold with O-ring static seals or single use models using 1/16" tubing. This self-priming pump draws a low 3.5 watts and is available in 24VDC. The SSDP15 can dispense up to 10.5 mL/min continuous duty cycling at 5 Hz. The maximum cycle rate is 6 Hz and is designed for 20 million cycles of service. It has been designed from the ground up to work within the rigorous environments of scientific and medical industries who employ the need for finite control of fluids.

Dimensional Data

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED



MOUNTING HOLE / PASSAGE PATTERN



Series SSDP15

Electro-Fluidic Miniature Fixed Displacement Solenoid Pump

Technical Data

Function: 2-Way, 2-Position; Metering Diaphragm Solenoid Operated; Normally Closed

Fluidic Interface: 1/16" I.D. Tube Barb (2) or Manifold mount with #4-40x7-16" and standard O-rings (2)

Dispensing Volume: 37µl dispensed per shot ± 3µl. Self-Priming

Temp. Range: Fluid Max.: +60°C
Dry Range: Ambient +10° to +50°C

Response Time: up to 6 Hz Complete Cycle

Media: Liquid chemicals, water
(contact factory for compatibilities)

Environment Protection: IP65 (IEC 144), NEMA 4
Dust-tight and water resistant
(with electrical connector)

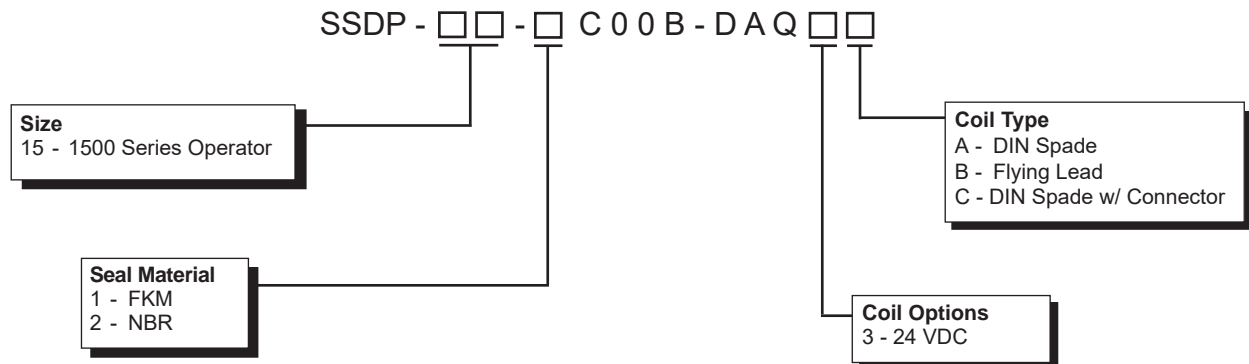
Wetted Materials: Elastomers: FKM, NBR
(other materials available on request)
Valve Body: Polycarbonate

Coil Data: Encapsulation: Glass-Filled Nylon
Insulation: Class F
Power Rating: 3.5 Watts
Voltage: 24 VDC (others available on request)
Voltage Tolerance: +/- 10% Nominal
Winding: Class H

Connections: Spades: Accordance with AMP 2.8x0.5; 9.4mm
Flying Lead: PVC 22 AWG, Multi-Strand Copper Wire, 300V, 15" minimum length

Packaged Weight: 0.11 lbs.

How To Order



Order Example: SSDP-15-1C00B-DAQ2A
1500 Series Operator, FKM,
24 VDC, DIN Spade



Series APVS04

Air Piloted 2-Way
Media Separated Valve

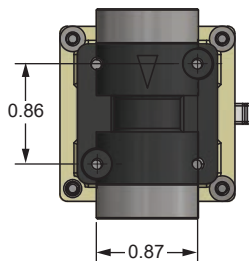
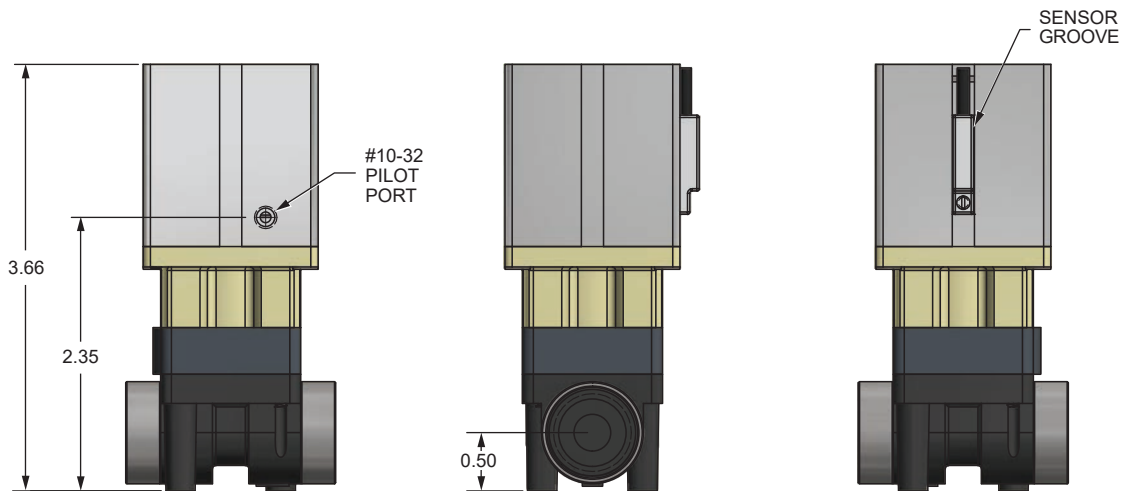
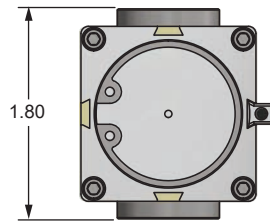
The Spartan Scientific Series APVS04 is an inert gas/spring operated, Single Acting Normally Closed, or Double Acting media compatible diaphragm valve, designed for control of high purity, aggressive and corrosive liquid chemical media. It has a miniature overall footprint, and low dead volume. The Series APVS04 features media compatible composite body, and FKM, NBR, and EPDM elastomers to control the 6mm orifice which afford Cv ratings of .72 that far exceed competitive valves of this type and size. Media pressure ratings go from 0 to 200 psi and pilot pressure is 60 psi minimum. A Normally Open version can be made using a Normally Open pilot valve. In the case of pilot gas failure, the valve will fail closed. In the case where electric power is lost but pilot gas remains, the valve will remain open. Each valve is tested to bubble tight standard ANSI FCI 70-2 Class VI. The Series APVS04 can be controlled by our proven Spartan Scientific 3-way solenoid pilot valve which enhances operation with manual override and indicator lighted connector options, and is used where sampling, draining, or transferring process fluid are performed. An optional magnetic piston is available for end of stroke sensing when combined with the additional valve position sensor.

Dimensional Data

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED



Non-Piloted Version



AIR
PILOTED



Series APVS04

Air Piloted 2-Way
Media Separated Valve

Technical Data

Function:	2-Way, 2-Position; Normally Closed; Double Acting Air Pilot Operated	Pilot Data: (Pilot Option)	Elastomers: FKM, NBR, EPDM Function: 3-Way, 2-Position; Direct Acting; Normally Closed Pressure Range: 60 to 150 PSI Port Size: 1/8" NPT Duty Cycle: Continuous (within specifications) Encapsulation: Glass-Filled Nylon Insulation: Class F Power Rating: 6.5 Watts 8.5 VA Voltage: 12, 24, 120 VDC 120, 220, 240 VAC 50/60 Hz Voltage Tolerance: +/- 10% Nominal Winding: Class H
Port Size:	1/4" NPT 3/8" NPT	Connections:	Spades: Terminals AMP 6.3x0.8 width 11mm (Available in DIN Style "A" EN175301-803 for 3.0mm orifice or larger) Flying Lead: PVC 22 AWG, Multi-Strand Copper Wire, 300V, 12" minimum length
Orifice Sizes / Flow Factor:	6mm / .72 Cv	Packaged Weight:	.448 lbs. (add 0.25 lbs. for pilot)
Pressure Range:	0 to 200 psi		
Temp. Range:	Fluid Max.: +60°C Dry Range: Ambient +10° to +50°C		
Media:	All fluids and gases compatible with wetted materials		
Mounting:	On pipe (2x), Ø 0.170 blind holes for #8 tapping screw		
Wetted Materials:	Actuator: Elastomers: FKM, NBR, EPDM, (others available on request) Seal Coupling: 300 Series Stainless Steel Valve Body: G.F. Nylon or PEI		

How To Order

APVS04 - M 2 8 - D

Seal Material

- 1 - FKM
- 2 - NBR
- 3 - EPDM
- J - PTFE Disc Backed EPDM
- K - PTFE Disc Backed NBR
- L - PTFE Disc Backed FKM

Position Sensing

- 0 - No Magnetic Piston
- 1 - With Magnetic Piston

Coil Type

- 0 - No Coil (No Pilot)
- A - DIN Spade
- B - Flying Lead

Pilot Options

- 0 - No Pilot (No Coil)
- 2 - 12 VDC
- 3 - 24 VDC
- 4 - 120 VDC
- 7 - 120 VAC 50/60 Hz
- 8 - 220 VAC 50/60 Hz
- 9 - 240 VAC 50/60 Hz
- A - 12 VDC w/ Manual Override
- B - 24 VDC w/ Manual Override
- C - 120 VDC w/ Manual Override
- F - 120 VAC w/ Manual Override
- G - 220 VAC w/ Manual Override
- H - 240 VAC w/ Manual Override

Port Size

- B - 1/4" NPT
- C - 3/8" NPT

Function

- A - 2-way Single Acting N.C.
- C - 2-way Double Acting

Additional Options	
Valve Position Sensor	Order Part No.:
<i>Electronic PNP</i>	
9ft PVC cable	9E76-000-031
8mm quick connect	9E76-000-331
<i>Electronic NPN</i>	
9ft PVC cable	9E76-000-032
8mm quick connect	9E76-000-332
<i>Reed SPST</i>	
9ft PVC cable	9E76-000-002
8mm quick connect	9E76-000-302
Sensor Mating Cordsets	Order Part No.:
<i>8mm Quick Connect</i>	
2 meter female 3 pin	RC08S-F0M03120
5 meter female 3 pin	RC08S-F0M03150
Pilot Valve Lighted Connector	Order Part No.:
<i>6ft PVC Cable, Ground Down</i>	
Pilot Options 2, A - 12VDC	5J560-201-US0A
Pilot Options 3, B - 24VDC	5J560-201-US0A
Pilot Options 4, C - 120VDC	5J560-501-US0A
Pilot Options 7, F - 120VAC	5J560-501-US0A
Pilot Options 8, G - 220VAC	5J560-801-US0A
Pilot Options 9, H - 240VAC	5J560-801-US0A

Order Example: APVS08-1Q108-DAB7A
FKM, With magnetic piston, 2-way N.C.,
1/4" NPT, 120 VAC 50/60 Hz, DIN Spade



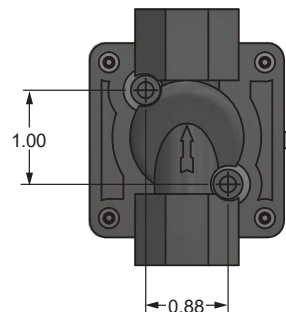
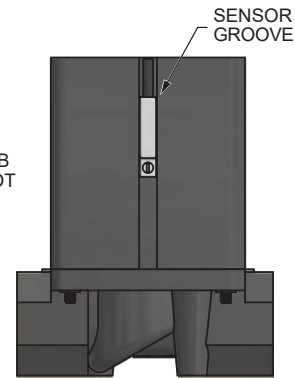
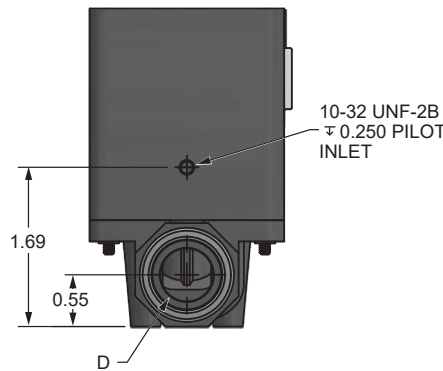
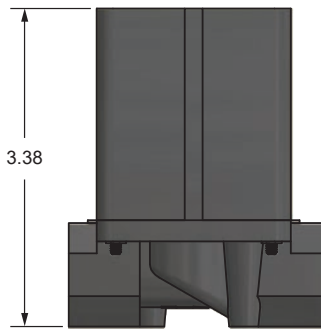
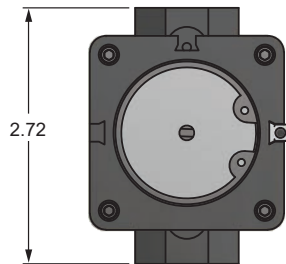
Series APVS06

Air Piloted 2-Way
Media Separated Valve

The Spartan Scientific Series APVS06 is a Normally Open or Normally Closed inert gas/spring operated, Single Acting or Double Acting media compatible diaphragm valve designed for control of high purity, aggressive and corrosive liquid chemical media. The valve has a small overall footprint to orifice/flow ratio plus a low dead volume. The APVS06 features media compatible composite body, and FKM, NBR, and EPDM elastomers to control orifice size of 1/2" which afford Cv rating of 4.70 through port sizes 1/4", 3/8" and 1/2" NPT. Media pressure ratings go from Vacuum to 150 psi and pilot pressure is 60 psi minimum. Each valve is tested to bubble tight standard ANSI FCI 70-2 Class VI and can be configured as a fail closed or open valve. The Series APVS06 can be controlled by our proven Spartan Scientific 3-way solenoid pilot valve which enhances operation with manual override and indicator lighted connector options. The Series APVS06 is used where sampling, draining, or transferring process fluid are performed, and far exceeds competitive valves of this type and size. An optional magnetic piston is available for end of stroke sensing when combined with the additional valve position sensor.

Dimensional Data

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED



DIFFERENTIAL PRESSURE CHART			
Port Size NPT (D)	Orifice Size	GPM @ 100 psi	Pilot Pressure (psi)
1/4"	12.5mm	?/150	60
3/8"	12.5mm	?/150	60
1/2"	12.5mm	32/150	60

AIR
PILOTED



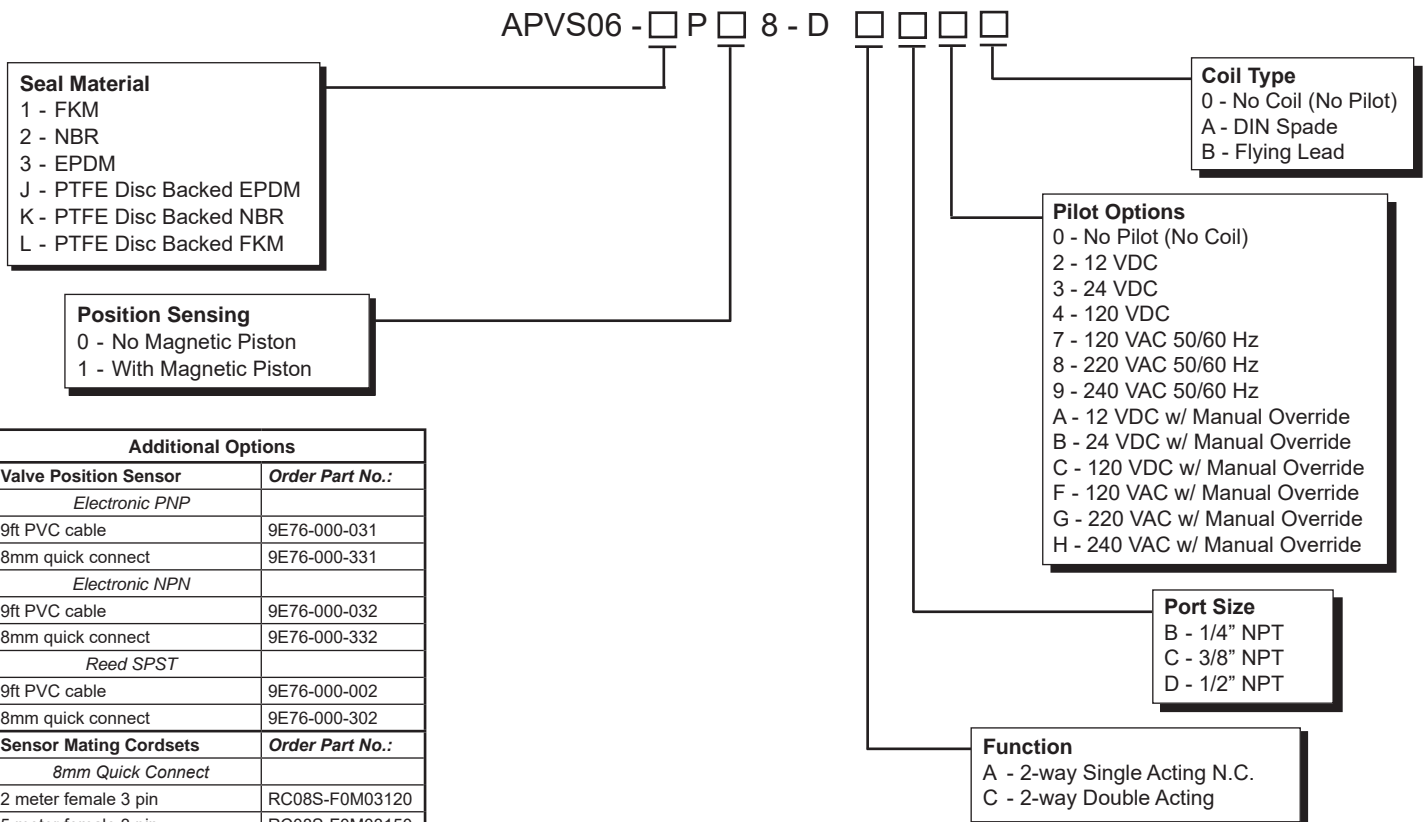
Series APVS06

Air Piloted 2-Way
Media Separated Valve

Technical Data

Function:	2-Way, 2-Position; Normally Closed; Double Acting Air Pilot Operated	Pilot Data:	Elastomers: FKM, NBR, EPDM
Port Size:	1/4" NPT 3/8" NPT 1/2" NPT	(Pilot Option)	Function: 3-Way, 2-Position; Direct Acting; Normally Closed Pressure Range: 60 to 150 PSI Port Size: 1/8" NPT Duty Cycle: Continuous (within specifications) Encapsulation: Glass-Filled Nylon Insulation: Class F Power Rating: 6.5 Watts 8.5 VA Voltage: 12, 24, 120 VDC 120, 220, 240 VAC 50/60 Hz Voltage Tolerance: +/- 10% Nominal Winding: Class H
Orifice Sizes / Flow Factor:	1/2" / 4.70 Cv	Connections:	Spades: Terminals AMP 6.3x0.8 width 11mm (Available in DIN Style "A" EN175301-803 for 3.0mm orifice or larger) Flying Lead: PVC 22 AWG, Multi-Strand Copper Wire, 300V, 12" minimum length
Pressure Range:	Vacuum to 150 psi	Packaged Weight:	0.97 lbs. (add 0.25 lbs. for pilot)
Temp. Range:	Fluid Max.: +60°C Dry Range: Ambient +10° to +50°C		
Media:	All fluids and gases compatible with wetted materials		
Mounting:	On pipe (2x), Ø 0.170 blind holes for #8 tapping screw		
Wetted Materials:	Actuator: Elastomers: FKM, NBR, EPDM, (others available on request) Valve Body: G.F. Nylon		

How To Order



Additional Options	
Valve Position Sensor	Order Part No.:
<i>Electronic PNP</i>	
9ft PVC cable	9E76-000-031
8mm quick connect	9E76-000-331
<i>Electronic NPN</i>	
9ft PVC cable	9E76-000-032
8mm quick connect	9E76-000-332
<i>Reed SPST</i>	
9ft PVC cable	9E76-000-002
8mm quick connect	9E76-000-302
Sensor Mating Cordsets	Order Part No.:
<i>8mm Quick Connect</i>	
2 meter female 3 pin	RC08S-F0M03120
5 meter female 3 pin	RC08S-F0M03150
Pilot Valve Lighted Connector	Order Part No.:
<i>6ft PVC Cable, Ground Down</i>	
Pilot Options 2, A - 12VDC	5J560-201-US0A
Pilot Options 3, B - 24VDC	5J560-201-US0A
Pilot Options 4, C - 120VDC	5J560-501-US0A
Pilot Options 7, F - 120VAC	5J560-501-US0A
Pilot Options 8, G - 220VAC	5J560-801-US0A
Pilot Options 9, H - 240VAC	5J560-801-US0A

Order Example: APVS06-1P18-DAB7A
FKM, With Magnetic Piston, 2-way N.C.,
1/4" NPT, 120 VAC 50/60 Hz, DIN Spade



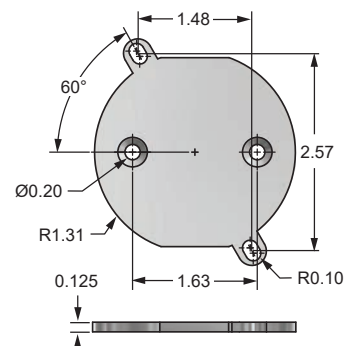
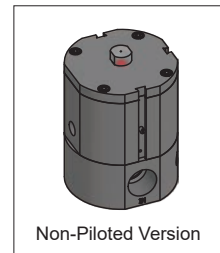
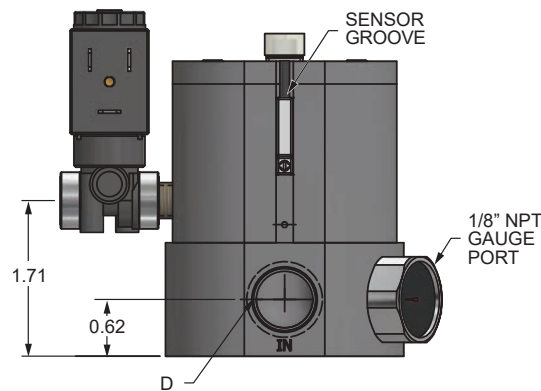
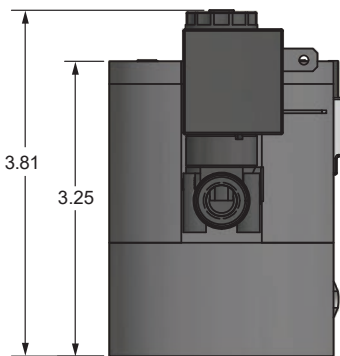
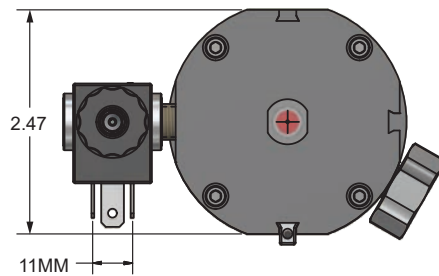
Series APVS08

Air Piloted 2-Way Media Separated Valve

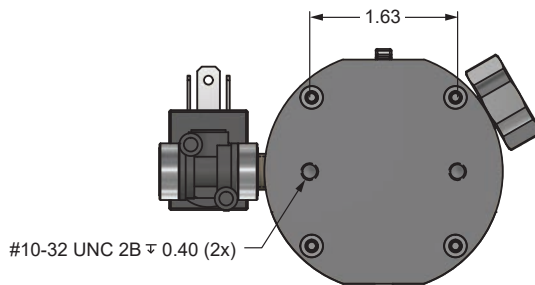
The Spartan Scientific Series APVS08 is an inert gas/spring operated, 2-Way 2-Position Normally Closed (fail safe), Normally Open or Double Acting media compatible diaphragm valve designed for control of high purity, aggressive and corrosive liquid chemical media. With a small overall footprint, and low dead volume, the Series APVS08 features CPVC bodies, and FKM, NBR, EDPM and PTFE diaphragms to control orifice size of 16mm which afford Cv ratings of 4.70 that far exceed competitive valves of this type. Pressure ratings go from 0 to 120 psi and each valve is tested to bubble tight standard ANSI FCI 70-2 Class VI. The Series APVS08 can be controlled by our proven Spartan Scientific 3-way solenoid pilot valve which enhances operation with manual override and indicator lighted connector options. The Normally Closed version features an optical position indicator showing valve open condition. The Series APVS08 is used where sampling, draining, or transferring process fluid are performed. The Normally Open version function is accomplished by use of a Normally Open solenoid pilot valve. Upon loss of power, namely pilot gas, there is an internal spring that will fail closed in the spring closed version. If this is not a preferred condition, Normally Open fail can be accomplished using a Double Acting version and a 4-way valve plumbed to open on spring return, creating a full Normally Open fail mode. An optional magnetic piston is available for end of stroke sensing when combined with the additional valve position sensor.

Dimensional Data

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED



MOUNTING PLATE DETAILS



Port Size (D) NPT	Cv / GPM @ Δ P = 20 psi	Normally Closed Normally Open			Double Acting		
		Δ P (psi)	Pilot Press. (psi)	Cylinder Bore	Δ P (psi)	Pilot Press. (psi)	Cylinder Bore
1/4"	4 / 18	120	60	2.0"	120	120	2.0"
3/8"	5 / 22	120	80	2.0"	120	120	2.0"
1/2"	6.5 / 29	120	80	2.0"	120	120	2.0"

AIR PILOTED



Series APVS08

Air Piloted 2-Way
Media Separated Valve

Technical Data

Function: 2-Way, 2-Position; Single Acting Fail Closed, Normally Closed, Normally Open* and Double Acting (*requires Normally Open pilot valve option)

Port Size: 1/4" NPT
3/8" NPT
1/2" NPT

Orifice Sizes / Flow Factor: 16mm / 4.70 Cv

Pressure Range: 0 to 120 psi

Temp. Range: Fluid Max.: +60°C
Dry Range: Ambient +10° to +50°C

Media: All fluids and gases compatible with wetted materials

Mounting: On pipe; Mounting plate; or #10-32 x 0.40" screws (2) (screws are not provided)

Wetted Materials: Elastomers: FKM, NBR, EPDM, (PTFE Optional)
Valve Body: CPVC

Pilot Option Function: 3-Way, 2-Position; Direct Acting; Normally Closed, Normally Open
Pressure Range: 60 to 120 PSI
Port Size: 1/8" NPT

Coil Data: Duty Cycle: Continuous (within specifications)
Encapsulation: Glass-Filled Nylon
Insulation: Class F
Power Rating: 6.5 Watts
8.5 VA
Voltage: 12, 24, 120 VDC
120, 220, 240 VAC 50/60 Hz
Voltage Tolerance: +/- 10% Nominal
Winding: Class H

Connections: Spades: Terminals AMP 6.3x0.8 width 11mm (Available in DIN Style "A" EN175301-803 for 3.0mm orifice or larger)
Flying Lead: PVC 22 AWG, Multi-Strand Copper Wire, 300V, 12" minimum length

Packaged Weight: 1.05 lbs.
(add 0.25 lbs. for pilot)

How To Order

APVS08 - Q 0 8 - D

Seal Material

- 1 - FKM
- 2 - NBR
- 3 - EPDM
- J - PTFE Disc Backed EPDM
- K - PTFE Disc Backed NBR
- L - PTFE Disc Backed FKM

Position Sensing

- 0 - No Magnetic Piston
- 1 - With Magnetic Piston

Coil Type

- 0 - No Coil (No Pilot)
- A - DIN Spade
- B - Flying Lead

Pilot Options

- 0 - No Pilot (No Coil)
- 2 - 12 VDC
- 3 - 24 VDC
- 4 - 120 VDC
- 7 - 120 VAC 50/60 Hz
- 8 - 220 VAC 50/60 Hz
- 9 - 240 VAC 50/60 Hz
- A - 12 VDC w/ Manual Override
- B - 24 VDC w/ Manual Override
- C - 120 VDC w/ Manual Override
- F - 120 VAC w/ Manual Override
- G - 220 VAC w/ Manual Override
- H - 240 VAC w/ Manual Override

Port Size

- B - 1/4" NPT
- C - 3/8" NPT
- D - 1/2" NPT

Function

- A - 2-way Single Acting N.C.
- C - 2-way Double Acting
- E - 2-way Single Acting N.O. (fail closed configuration)

Additional Options	
Valve Position Sensor	Order Part No.:
<i>Electronic PNP</i>	
9ft PVC cable	9E76-000-031
8mm quick connect	9E76-000-331
<i>Electronic NPN</i>	
9ft PVC cable	9E76-000-032
8mm quick connect	9E76-000-332
<i>Reed SPST</i>	
9ft PVC cable	9E76-000-002
8mm quick connect	9E76-000-302
Sensor Mating Cordsets	Order Part No.:
<i>8mm Quick Connect</i>	
2 meter female 3 pin	RC08S-F0M03120
5 meter female 3 pin	RC08S-F0M03150
Pilot Valve Lighted Connector	Order Part No.:
<i>6ft PVC Cable, Ground Down</i>	
Pilot Options 2, A - 12VDC	5J560-201-US0A
Pilot Options 3, B - 24VDC	5J560-201-US0A
Pilot Options 4, C - 120VDC	5J560-501-US0A
Pilot Options 7, F - 120VAC	5J560-501-US0A
Pilot Options 8, G - 220VAC	5J560-801-US0A
Pilot Options 9, H - 240VAC	5J560-801-US0A
Mounting Plate	Order Part No.:
Anodized Aluminum	APV08-10

Order Example: APVS08-1Q108-DAB7A
FKM, With magnetic piston, 2-way N.C.,
1/4" NPT, 120 VAC 50/60 Hz, DIN Spade



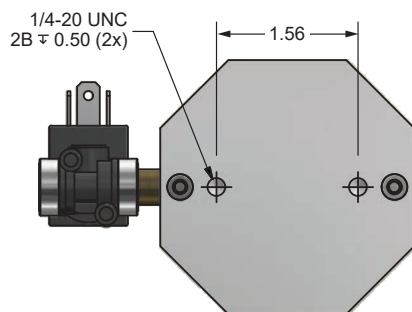
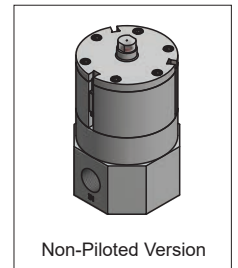
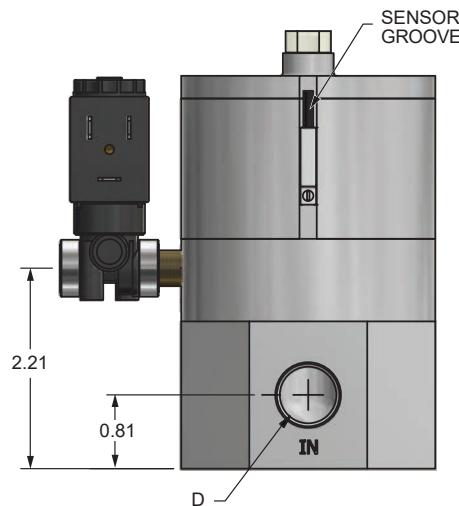
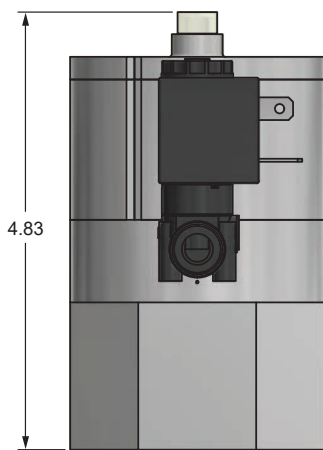
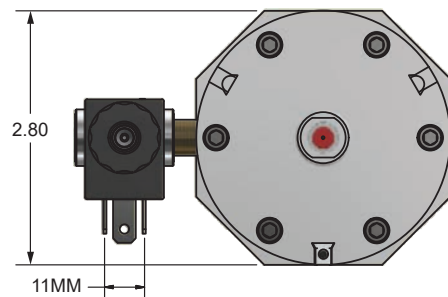
Series APVS15

Air Piloted 2-Way Media Separated Valve

The Spartan Scientific APVS15 is an inert gas/spring operated, Single Acting Normally Closed, or Double Acting media compatible diaphragm valve designed for control of high purity, aggressive and corrosive liquid chemical media. With a small overall footprint, and low dead volume, the APVS15 features CPVC bodies, and FKM, EDPM and NBR elastomers to control orifice sizes 16mm and 20mm which afford Cv ratings of 4.70 and 10.9 that far exceed competitive valves of this type. Pressure ratings go from 10 to 100 psi depending on orifice size and each valve is tested to bubble tight standard ANSI FCI 70-2 Class VI. The APVS15 can be controlled by our proven Spartan Scientific 3-way solenoid pilot valve which enhances operation with manual override and indicator lighted connector options. The Normally Closed version features an optical position indicator showing valve open condition. The APVS15 is used where sampling, draining, or transferring process fluid are performed. A Normally Open version can be made using a Normally Open pilot valve. In the case of pilot gas failure, the valve will fail closed. In the case where electric power is lost but pilot gas remains, the valve will remain open. An optional magnetic piston is available for end of stroke sensing when combined with the additional valve position sensor.

Dimensional Data

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED



DIFFERENTIAL PRESSURE CHART			
Port Size NPT (D)	Orifice Size	GPM @ 100 psi	Pilot Pressure (psi)
1/2"	16mm	30	60-100
3/4"	16mm	50	60-100
3/4"	20mm	58	60-80

AIR PILOTED



Series APVS15

Air Piloted 2-Way
Media Separated Valve

Technical Data

Function: Single Acting Normally Closed; or Double Acting, Air Piloted, media separated diaphragm valve

Port Size: 1/2" NPT
3/4" NPT
(Others available on request)

Orifice Sizes / Flow Factor: 16mm / 4.70 Cv
20mm / 10.9 Cv

Pressure Range: 10 to 100 psi
Pilot Pressure Range: 60 to 100 psi
(depending on orifice size)

Temp. Range: Fluid Max.: +60°C
Dry Range: Ambient +10°C to +50°C

Media: All fluids and gases compatible with wetted materials

Mounting: (2x) 1/4" - 20 UNC Tapped Holes, 0.5" DP. On pipe

Wetted Materials: Valve Body: CPVC (Others available on request)
Elastomers: FKM, NBR, EPDM,

Pilot Option Function: 3-Way, 2-Position; Direct Acting; Normally Closed, Normally Open
Pressure Range: 60 to 100 PSI
Port Size: 1/8" NPT

Coil Data: Duty Cycle: Continuous (within specifications)
Encapsulation: Glass-Filled Nylon
Insulation: Class F
Power Rating: 6.5 Watts
8.5 VA
Voltage: 12, 24, 120 VDC
120, 220, 240 VAC 50/60 Hz
Voltage Tolerance: +/- 10% Nominal
Winding: Class H

Connections: Spades: Terminals AMP 6.3x0.8 width 11mm
(Available in DIN Style "A" EN175301-803 for 3.0mm orifice or larger)
Flying Lead: PVC 22 AWG, Multi-Strand Copper Wire, 300V, 12" minimum length

Packaged Weight: Piloted: 1.72 lbs.
Non-piloted: 1.5 lbs.

How To Order

APVS15 - 2 8 - D

Seal Material

- 1 - FKM
- 2 - NBR
- 3 - EPDM

Orifice Size

- Q - 16mm
- R - 20mm

Position Sensing

- 0 - No magnetic piston
- 1 - With magnetic piston

Coil Type

- 0 - No Coil (No Pilot)
- A - DIN Spade
- B - Flying Lead

Pilot Options

- 0 - No Pilot (No Coil)
- 2 - 12 VDC
- 3 - 24 VDC
- 4 - 120 VDC
- 7 - 120 VAC 50/60 Hz
- 8 - 220 VAC 50/60 Hz
- 9 - 240 VAC 50/60 Hz
- A - 12 VDC w/ Manual Override
- B - 24 VDC w/ Manual Override
- C - 120 VDC w/ Manual Override
- F - 120 VAC w/ Manual Override
- G - 220 VAC w/ Manual Override
- H - 240 VAC w/ Manual Override

Port Size

- D - 1/2" NPT
- E - 3/4" NPT

Function

- A - 2-way N.C.
- C - 2-way Double Acting

Additional Options

Valve Position Sensor	Order Part No.:
<i>Electronic PNP</i>	
9ft PVC cable	9E76-000-031
8mm quick connect	9E76-000-331
<i>Electronic NPN</i>	
9ft PVC cable	9E76-000-032
8mm quick connect	9E76-000-332
<i>Reed SPST</i>	
9ft PVC cable	9E76-000-002
8mm quick connect	9E76-000-302
Sensor Mating Cordsets	Order Part No.:
<i>8mm Quick Connect</i>	
2 meter female 3 pin	RC08S-F0M03120
5 meter female 3 pin	RC08S-F0M03150
Pilot Valve Lighted Connector	Order Part No.:
<i>6ft PVC Cable, Ground Down</i>	
Pilot Options 2, A - 12VDC	5J560-201-US0A
Pilot Options 3, B - 24VDC	5J560-201-US0A
Pilot Options 4, C - 120VDC	5J560-501-US0A
Pilot Options 7, F - 120VAC	5J560-501-US0A
Pilot Options 8, G - 220VAC	5J560-801-US0A
Pilot Options 9, H - 240VAC	5J560-801-US0A

Order Example: APVS15-1Q028-DAD7A
FKM, 16mm Orifice size,
No magnetic piston, 2-way N.C.,
1/2" NPT, 120 VAC 50/60 Hz, DIN Spade



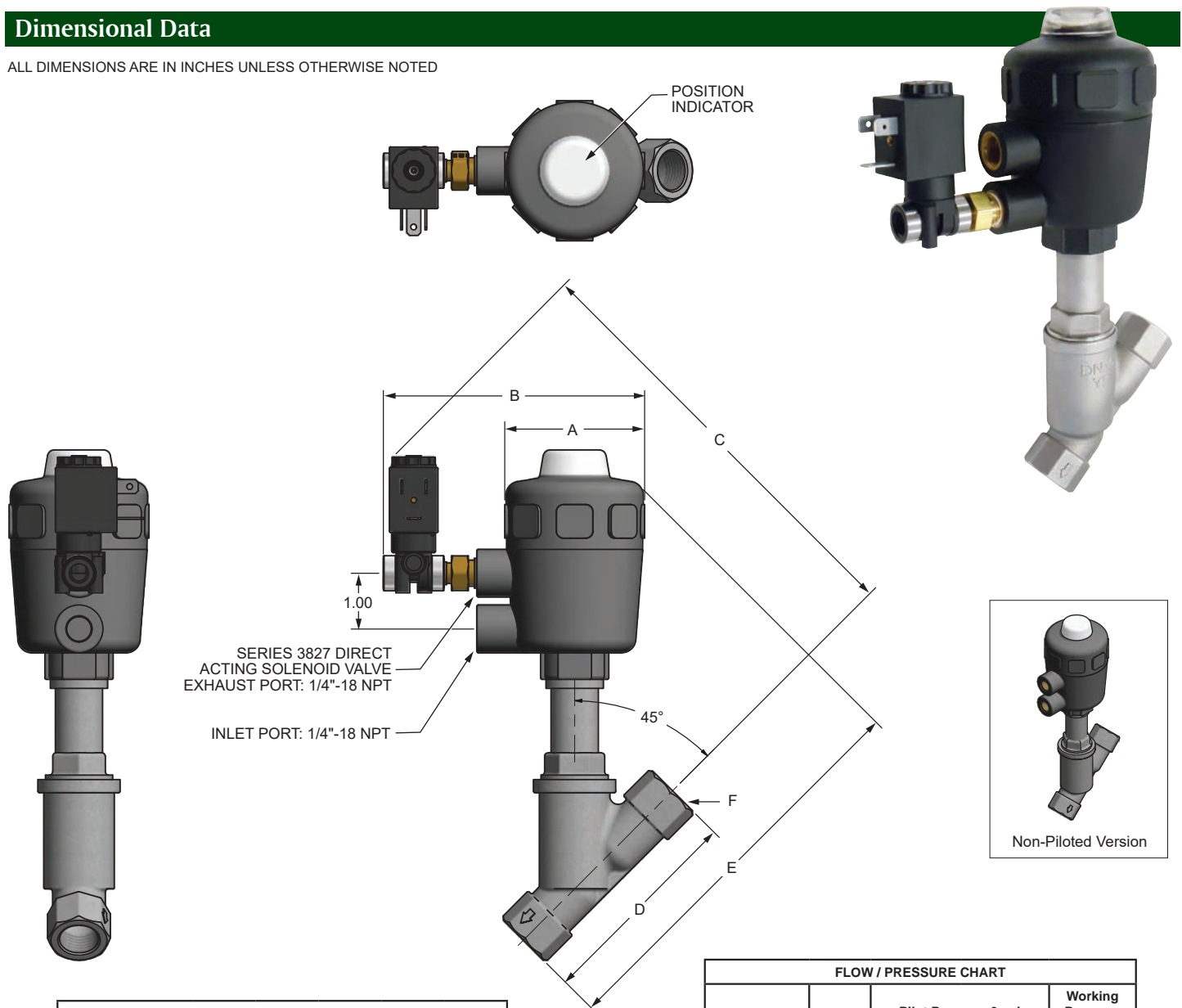
Series APV23

Air Pilot 2-Way
Angle Steam Valve

The Spartan Scientific Series APV23 is 2-way, 2-position valve specifically designed for the control of air, oil or steam. The Series APV23 uses a specially designed Teflon Chevron® seal which ensures separation of the media and pilot sections. In the single acting Normally Closed version, the Series APV23 uses a spring extended pneumatic operator connected to a sealing disc which when retracted unseats from a precision orifice and allows fluid flow. When pilot pressure is removed from the Series APV23 the seat returns to the orifice and flow stops. Features of the Series APV23 are the ON-OFF indicator at the top of the pneumatic actuator and can be used for high temperature liquids compatible with the materials of construction and steam. The stainless steel body is standard and is available in sizes ranging from 1/2" to 2.0" NPT and can control media up to 215 psi in various configurations.

Dimensional Data

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED



AIR
PILOTED

DIMENSIONAL TABLE					
Port Size (F) NPT	A	B	C	D	E
1/2"	2.52"	4.67"	7.70"	3.35"	6.83"
3/4"	2.52"	4.67"	7.70"	3.74"	7.03"
1"	2.52"	4.67"	7.70"	4.13"	7.22"
1 1/4"	3.15"	5.63"	9.25"	4.72"	8.78"
1 1/5"	3.15"	5.75"	9.50"	5.12"	8.98"
2"	3.15"	5.75"	9.88"	5.91"	9.37"

FLOW / PRESSURE CHART				
Port Size (F)	Cv	Pilot Pressure 9 psi		Working Pressure (psi)
		Min.	Max.	
1/2"	5.7	45	115	215
3/4"	9.2	50	115	215
1"	21.9	60	115	215
1 1/4"	31.8	50	115	215
1 1/2"	48.5	50	115	215
2"	60.1	60	115	215



Series APV23

Air Pilot 2-Way
Angle Steam Valve

Technical Data

Function:	2-Way, 2-Position; Remote Air Pilot; Normally Closed	Mounting:	On pipe
Port Size / Flow Factor:	1/2" NPT 3/4" NPT 1" NPT 1 1/4" NPT 1 1/2" NPT 2" NPT (BSP available on request)	Wetted Materials:	Valve Body: 300 Series Stainless Steel and PTFE
Orifice Sizes:	15mm / 5.70 Cv 20mm / 9.2 Cv 25mm / 21.9 Cv 32mm / 31.8 Cv 40mm / 48.5 Cv 50mm / 60.1 Cv	Coil Data:	Duty Cycle: Continuous (within specifications) Encapsulation: Glass-Filled Nylon Insulation: Class F Power Rating: 6.5 Watts VDC 8.5 VA (others available on request) Voltage: 6, 12, 24 VDC 24, 120, 220, 240 VAC 50/60 Hz Voltage Tolerance: +/- 10% Nominal Winding: Class H
Pressure Range:	Main Valve: 0 to 215 psi Pilot Pressure: 45 to 115 psi	Connections:	Spades: Terminals AMP 6.3x0.8 width 11mm (Available in DIN Style "A" EN175301-803 for 3.0mm orifice or larger) Flying Lead: PVC 22 AWG, Multi-Strand Copper Wire, 300V, 12" minimum length
Temp. Range:	Fluid Max.: +60°C Dry Range: Ambient +10° to +50°C	Packaged Weight:	1/2": 1.78 lbs. 1 1/4": 3.80 lbs. 3/4": 1.97 lbs. 1 1/2": 4.55 lbs. 1": 2.29 lbs. 2": 6.40 lbs. (add 0.25 lbs. for pilot)
Media:	All fluids and gases compatible with wetted materials		

How To Order

APV23 - 00 - 91

*Port Size	Orifice	Cv
1 - 1/2" NPT	15mm	5.70
2 - 3/4" NPT	20mm	9.2
3 - 1" NPT	25mm	21.9
4 - 1 1/4" NPT	32mm	31.8
5 - 1 1/2" NPT	40mm	48.5
6 - 2" NPT	50mm	60.1

* All thread sizes available in BSP.
Contact factory for details.

Pilot Options
0 - No Pilot
1 - 6 VDC
2 - 12 VDC
3 - 24 VDC
6 - 24 VAC 50/60 Hz
7 - 120 VAC 50/60 Hz
8 - 220 VAC 50/60 Hz
9 - 240 VAC 50/60 Hz

PTFE Seal and Gasket Kits	
Description	Model Number
1/2" NPT	- APV23-T1-0000
3/4" NPT	- APV23-T2-0000
1.0" NPT	- APV23-T3-0000
1.25" NPT	- APV23-T4-0000
1.5" NPT	- APV23-T5-0000
2.0" NPT	- APV23-T6-0000

Order Example: APV23-00-9127
APV23, 3/4" NPT port size,
120 VAC 50/60 Hz

AIR
PILOTED



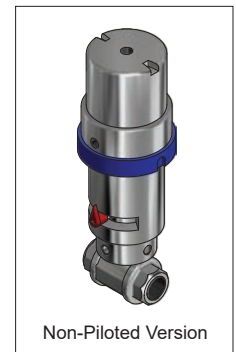
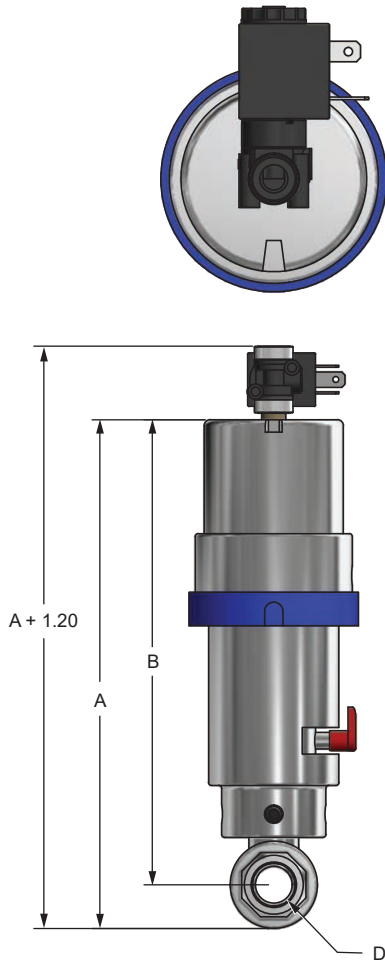
Series APV30

Air Pilot 2-Way Pneumatic Actuated Valve

The Spartan Scientific Series APV30 is a rugged full featured, pneumatically piloted ball valve. The unit is available in Normally Open, Normally Closed or Double Acting versions. The Series APV30 sizes range from 1/2" to 2.0" NPT. This unit is compact as compared to competitive rack and pinion or motorized ball valves and comes standard with an ON-OFF indicator. The Series APV30 features PTFE ball valve sealing using Chrome plated brass or 316 Series Stainless Steel balls. The valve body materials are E-Nickel plated brass and 316 Series Stainless Steel.

Dimensional Data

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED



DIMENSIONAL TABLE			
Port Size (D) NPT	A	B	C
1/2"	8.30"	7.64"	2.70"
3/4"	9.50"	8.70"	3.00"
1"	9.85"	9.25"	3.50"
1 1/4"	11.00"	9.52"	4.00"
1 1/2"	11.60"	10.40"	4.50"
2"	12.50"	10.80"	5.25"

DIFFERENTIAL PRESSURE CHART			
Port Size (D) NPT	Max. Pressure (psi) @ Temp. Range 0 to 25°C	Cv / GPM @ Δ P = 10 psi	Pilot Pressure (psi)
1/2"	750	23.3 / 74.8	70 - 120
3/4"	750	56.4 / 180.5	70 - 120
1"	750	93.7 / 300	70 - 120
1 1/4"	600	165 / 528	70 - 120
1 1/2"	600	272.5 / 872	70 - 120
2"	480	400 / 1277	70 - 120



Series APV30

Air Pilot 2-Way
Pneumatic Actuated Valve

Technical Data

Function:	2-Way, 2-Position; Remote Air Pilot; Double Acting, Normally Closed, Normally Open	Mounting:	On pipe
Port Size:	1/2" NPT 3/4" NPT 1" NPT 1 1/4" NPT 1 1/2" NPT 2" NPT (BSP available on request)	Wetted Materials:	Actuator: Cylinder: Anodized Aluminum Valve Body / Ball: E-nickle plated brass / heavy duty chromium plated: 316 Series Stainless Steel, Teflon bushings
Orifice Sizes / Flow Factor:	15mm / 23.3 Cv 20mm / 56.4 Cv 25mm / 93.7 Cv 32mm / 165.0 Cv 40mm / 272.5 Cv 50mm / 400.0 Cv	Coil Data: (Pilot Option)	Duty Cycle: Continuous (within specifications) Encapsulation: Glass-Filled Nylon Insulation: Class F Power Rating: 6.5 Watts 8.5 VA VAC Voltage: 6, 12, 24 VDC 24, 120, 220, 240 VAC 50/60 Hz Voltage Tolerance: +/- 10% Nominal Winding: Class H (3-Way, 2-Position available on request)
Pressure Range:	0 to 750 psi Pilot Pressure: 70 to 120 psi (depending on orifice size)	Connections:	Spades: Terminals AMP 6.3x0.8 width 11mm (Available in DIN Style "A" EN175301-803 for 3.0mm orifice or larger) Flying Lead: PVC 22 AWG, Multi-Strand Copper Wire, 300V, 12" minimum length
Temp. Range:	Fluid Max.: +60°C Dry Range: Ambient +10° to +50°C	Packaged Weight:	1/2": 2.8 lbs. 1 1/4": 7.9 lbs. 3/4": 3.7 lbs. 1 1/2": 9.3 lbs. 1": 4.3 lbs. 2": 15.9 lbs. (add 0.25 lbs. for pilot)
Media:	All fluids and gases compatible with wetted materials Steam to 180°C		

How To Order

APV30 - 00 -

Body Material
4 - E-Nickel Plated Brass
9 - 316 Stainless Steel

Function
1 - 2/2 N.C.
2 - 2/2 N.O.
3 - Double acting

Pilot Options
0 - No Pilot
1 - 6 VDC
2 - 12 VDC
3 - 24 VDC
6 - 24 VAC 50/60 Hz
7 - 120 VAC 50/60 Hz
8 - 220 VAC 50/60 Hz
9 - 240 VAC 50/60 Hz

*Port Size	Orifice	Cv
1 - 1/2" NPT	15mm	23.3
2 - 3/4" NPT	20mm	56.4
3 - 1" NPT	25mm	93.7
4 - 1 1/4" NPT	32mm	165.0
5 - 1 1/2" NPT	40mm	272.5
6 - 2" NPT	50mm	400.0

* All thread sizes available in BSP.
Contact factory for details.

Order Example: APV30-00-4127
E-Nickel plated Brass, 2/2 N.C.,
3/4" NPT, 120 VAC 50/60 Hz

Replacement Ball Valves	
Description	Model Number
1/2" NPT	APV30-01-0001
3/4" NPT	APV30-01-0002
1" NPT	APV30-01-0003
1 1/4" NPT	APV30-01-0004
1 1/2" NPT	APV30-01-0005
2" NPT	APV30-01-0006

AIR PILOTED

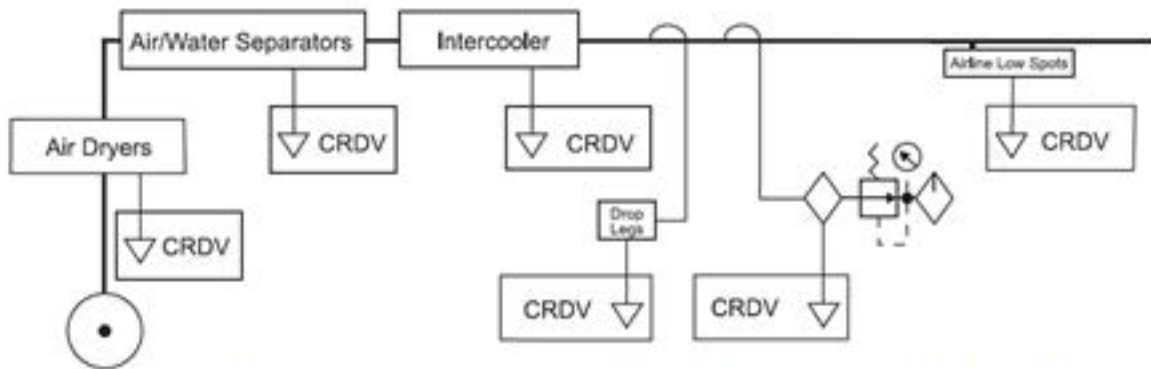


Condensation Removal Drain Valves Systems

Overview

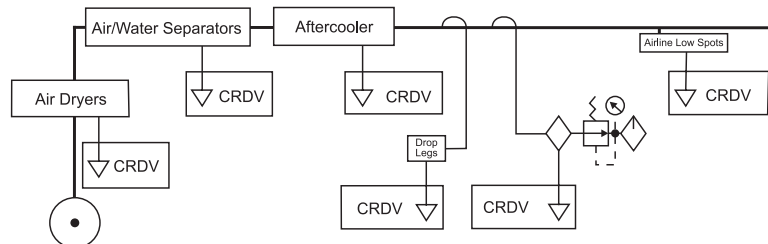
The Spartan Scientific Series CRDV and CRDVS, Condensation Removal Drain Valve Systems, are unique and efficient products that help to remove unwanted water by-product (condensate) from industrial pneumatic systems. The age-old problem of condensation in compressed air systems has plagued users of pneumatic tools and machinery since the invention of the first compressors in 1650 by Otto von Guericke. Compressors convert mechanical power into fluid power and by nature of operation, saturate air with water as a mix during the compression cycle. Outside air and entrained humidity is drawn in through the compressor inlet. The air becomes super-heated during compression which increases the air's ability to hold water. Compression results in water in the form of vapor and mist. This water filled air is normally pushed to a tank at the outlet of the compressor. As the air temperature cools, water droplets begin to form on the tank walls, dropping to the bottom of the tank which begins to fill up. As it fills, the tank can take less and less compressed air. The cycle that fills and empties the tank gets shorter and more often creating more wear and tear on the compressor pump mechanism. Compressor manufacturers size their tanks to accommodate optimal cycling and recommend regular drainage of compressor tanks. Dependent on the humidity outside, the amount of load placed on the compressor, and considering what air is being used for, your decision of just how much water is too much becomes important. A jack hammer has a much higher tolerance to water in the air than does a paint sprayer, for example.

In defining the problem of how much water is too much for your system, consider the requirements and jobs you plan to accomplish. The two forms of water in air systems, mist and vapor should be planned for. Ninety-five percent of water in mist form can be removed by specially designed in-line filtration/separation. Water in vapor form acts as a gas and as such can travel unimpeded throughout your compressed air system coalescing further down the line. To prevent this, air dryers are needed to remove water in vapor form. Air dryers are commonly placed somewhere after the air is compressed, between the compressor and the application and must employ a form of drain valve to remove condensate. Water drip legs can also be placed strategically through the air system and are helpful in removing unwanted condensation that makes its way to further parts of your system. The diagram below illustrates how the Spartan Scientific Series CRDV and CRDVS can help remove water from any one of the points along your air system.



(we should make a much better graphic, examples below. "Intercooler" should be "Aftercooler")

Applications





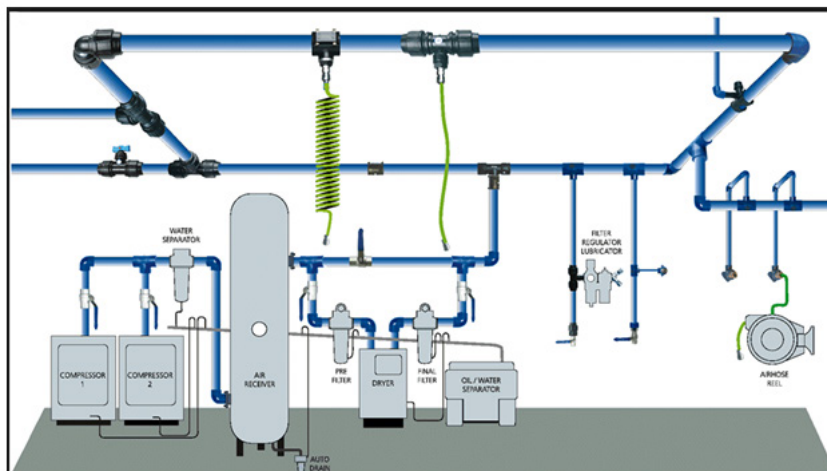
Condensation Removal Drain Valves Systems

Spartan's Two types of Systems:

- **The Series CRDV** (Condensation Removal Drain Valve) is a unique and efficient way to keep your air lines and tanks free of water with this robust electronic timed automatic drain valve. The unit installs in a modular form between an existing coil and connector with a plug and play design and retrofits on virtually any installation. The Cycle and on times are easily adjustable on the compact sandwich timer and features two status indicator lights. The Cycle Time drain has settings to release moisture every 1 to 45 minutes. The on-Time setting allows you to set how long you want the valve open, 0.25 to 25 seconds. Spartan offers a variety of Nylon or Brass valves depending on your application. These 2-Way, 2-Position, Normally Closed valves range from 1/4", 3/8", 1/2", 3/4" or 1" NPT and can handle pressures up to 230 psi max. The Series CRDV offers its users the most versatile combination of timing and flow capacities in the industry today.
- **The Series CRDVS** is the markets first Plug – N- Play Closed Loop Compressor Drain Valve with Wi-Fi (optional). The Spartan Scientific Series CRDVS Condensate Removal Drain Valve Wi-Fi keeps your air compressor tank and air lines free of moisture automatically by coupling a state of the art, all solid state, closed loop sensing system with a robust high flow diaphragm solenoid valve. As a constant sentinel, the CRDVS protects your expensive equipment against premature failure, reducing rust and clogged air components while increasing compressor life, facilitating proper maintenance, proper cycling and machine life. With a host of features, CRDVS has a self-cleaning cycle every 24 hours, status indicator lights, environment resistant design and once setup, is truly plug and play with no adjustments needed. As water/effluent enters the CRDVS, the self-learning mode opens the valve more or less often based on the sensing of the water and demand. The CRDVS drains the water only when it is there, with minimal loss of compressed air. Now available, Spartan has a trouble-free app for connecting the unit to the internet by use of a secure connection to an available access point and secure connection to Spartan web servers. Available for IOS, Android or desktop web site, the app allows the user real-time, data logged statistics on water removal, temperature, cumulative and daily cycling data. Upon connection, the user can set up alerts for alarm conditions that come in the form of texts or emails. More importantly, the user can see daily trends and what is out of the ordinary, on-line, everywhere. The options, utility, size, ease of installation and price rival the cost of conventional timed electric drains that have none of these features. Go to iot.spartanscientific.com, www.spartanscientific.com or download the Spartan Scientific IOT app on IOS or the Google Playstore.



Better diagram examples, can we draw something that's better?





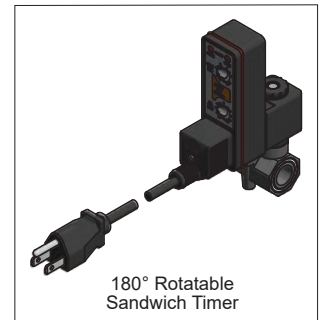
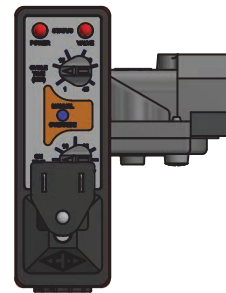
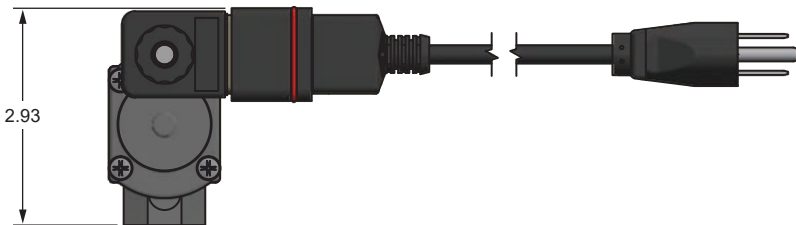
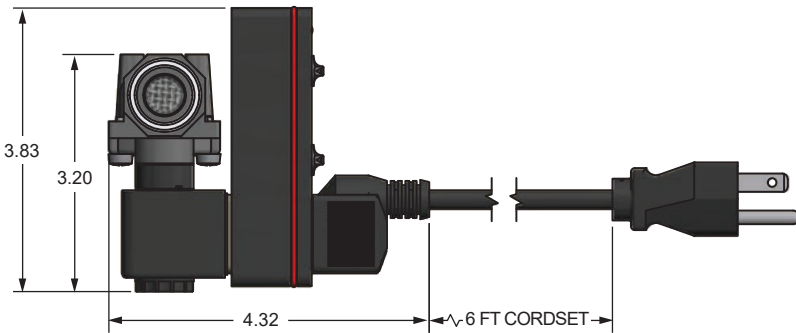
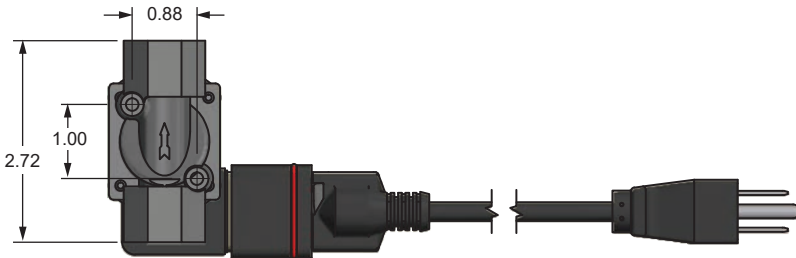
Series CRDV

Condensate Drain Condensation Removal Drain Valve

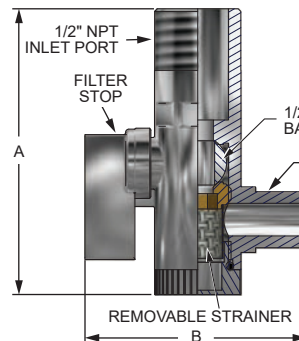
The Spartan Scientific Series CRDV (Condensation Removal Drain Valve) is a unique and efficient way to keep your air lines and tanks free of water with this robust electronic timed automatic drain valve. The unit installs in a modular form between an existing coil and connector with a plug and play design and retrofits on virtually any installation. The Cycle and on times are easily adjustable on the compact sandwich timer and features two status indicator lights. The Cycle Time drain has settings to release moisture every 1 to 45 minutes. The on-time setting allows you to set how long you want the valve open, 0.25 to 25 seconds. Spartan Scientific offers a variety of Nylon or Brass valves depending on your application. These 2-Way, 2-Position, Normally Closed valves range from 1/4", 3/8", 1/2", 3/4" or 1" NPT and can handle pressures up to 230 psi max. The Series CRDV offers its users the most versatile combination of timing and flow capacities in the industry today, and is proudly made in the USA.

Dimensional Data

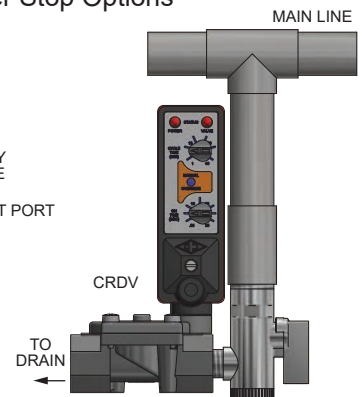
ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED



Ball / Strainer Filter Stop Options



DIMENSIONAL TABLE		
Port NPT	A	B
1/2"	2.74"	2.27"
1/4"	2.73"	2.15"
3/8"	3.57"	2.14"





Series CRDV

Condensate Drain Condensation Removal Drain Valve

Technical Data

Function: 2-Way, 2-Position; Piloted Diaphragm; Normally Closed

3505
Port Size: 1/4" NPT / 1.55 Cv
Flow Factor: 3/8" NPT / 1.95 Cv
 1/2" NPT / 2.45 Cv

Orifice Size: 12.7 mm
Pressure Range: 0 to 230 psi
Response Time: 20 to 80 ms Complete Cycle
Valve Body: Brass

3585
Port Size: 1/4" NPT / 1.55 Cv
Flow Factor: 3/8" NPT / 1.95 Cv
 1/2" NPT / 2.45 Cv

Orifice Size: 12.7 mm
Pressure Range: 7 to 150 psi
Response Time: 20 to 80 ms Complete Cycle
Valve Body: Glass-Filled Nylon

6200
Port Size: 1/4" NPT / 1.55 Cv
Flow Factor: 3/8" NPT / 1.95 Cv

Orifice Size: 4.0 mm
Pressure Range: 0 to 250 psi
Response Time: 16 to 40 ms Complete Cycle
Valve Body: Glass-Filled Nylon

3685
Port Size: 3/4" NPT / 9.50 Cv
Flow Factor: 1" NPT / 14.0 Cv

Orifice Size: 28.5 mm
Pressure Range: 10 to 120 psi
Response Time: 80 to 120 ms Complete Cycle
Valve Body: PEI

Temp. Range: Fluid Max.: +60°C
 Dry Range: Ambient +10° to +50°C

Media: Air, emulsion, water

Manual Override: Valve: Push non-locking (only available for 3505)
 Electronic: Push button (standard for all options)

Environment Protection: IP65 (IEC 144), NEMA 4. Dust-tight and water resistant (with electrical connector)

Mounting: In-line

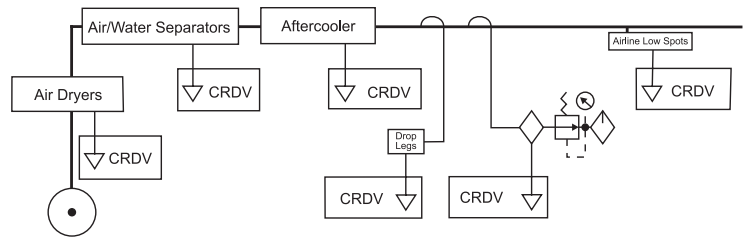
Wetted Materials: Elastomers: EPDM, FKM, NBR
 Operator: 300 and 400 Series Stainless Steel; or Brass
 Orifice Basket: Acetal
 Shading Ring: Copper (AC Only)
 Springs: 300 Series Stainless Steel

Coil Data: (Pilot Option) Duty Cycle: Continuous (within specifications)
 Encapsulation: Glass-Filled Nylon
 Insulation: Class F
 Power Rating: 8.5 VA VAC (6200 11.5 VAC)
 Voltage: 120, 220, 240 VAC 50/60 Hz
 Voltage Tolerance: +/- 10% Nominal
 Winding: Class H

Connections: Spades: Accordance with DIN Style "A" EN175301-803
 Cable: 6 ft. cord set with ground wall plug (wall plug not available on other voltages)

Packaged Weight: 3505: 1.20 lbs. + 6200: 0.57 lbs. +
 3585: 0.50 lbs. + 3685: 0.78 lbs. +

Applications



How To Order

Port Size	Orifice	PSI	Construction
4 - 1/4" NPT	12.5mm	230 psi	Brass (3505)
5 - 3/8" NPT	12.5mm	230 psi	Brass (3505)
6 - 1/2" NPT	12.5mm	230 psi	Brass (3505)
J - 1/4" NPT	12.5mm	180 psi	Nylon (3585)
K - 3/8" NPT	12.5mm	180 psi	Nylon (3585)
L - 1/2" NPT	12.5mm	180 psi	Nylon (3585)
M - 1/4" NPT	4.0mm	135 psi	Nylon (6200)
N - 3/8" NPT	4.0mm	135 psi	Nylon (6200)
Q - 3/4" NPT	28.5mm	120 psi	Nylon (3685)
R - 1" NPT	28.5mm	120 psi	Nylon (3685)

CRDV - 2

Ball / Strainer
 0 - Without
 1 - With

Coil Options
 7 - 120 VAC 50/60 Hz
 8 - 220 VAC 50 Hz
 9 - 240 VAC 60 Hz

Note: CSA version available. Consult factory.

Order Example: CRDV-4270
 1/4" NPT, 12.5mm, 230 psi, Brass (3505)
 120 VAC 50/60 Hz, without Ball / Strainer

CONDENSATE DRAIN



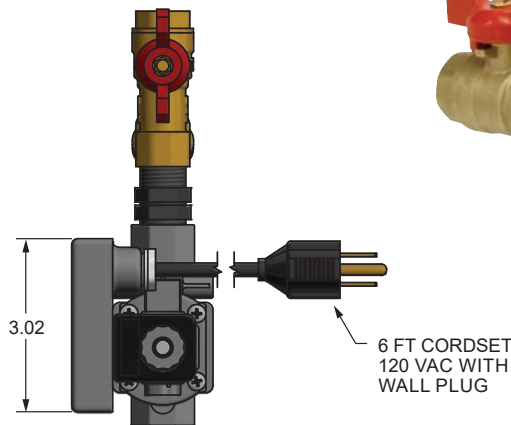
Series CRDVS

Plug-N-Play Closed Loop
Compressor Drain Valve

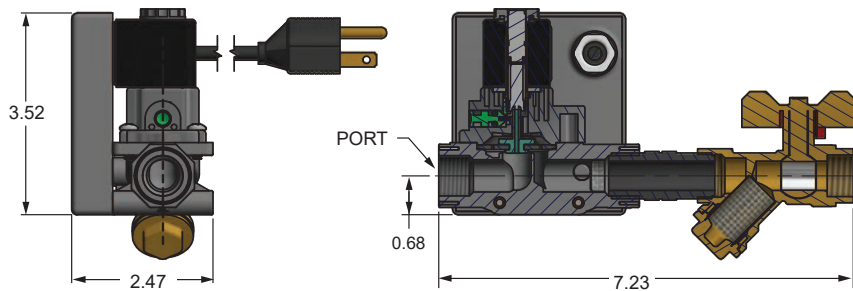
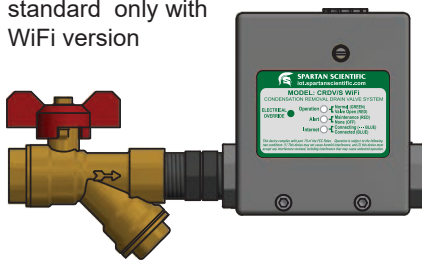
The Spartan Scientific Series CRDVS Condensate Removal Drain Valve with optional Wi-Fi keeps your air compressor tank and air lines free of moisture automatically by coupling a state of the art, closed loop sensing system with a robust high flow diaphragm solenoid valve. As a constant sentinel, the CRDVS protects your expensive equipment against premature failure, reducing rust and clogged air components while increasing compressor life, facilitating proper maintenance, proper cycling and machine life. The CRDVS features a self-cleaning cycle every 24 hours, status indicator lights, environment resistant design and once setup, is truly plug and play. As water/effluent enters the CRDVS, the self-learning mode opens the valve more often or less often based on the sensing of the water and demand. The CRDVS/s drains the water, only when necessary with no loss of compressed air. Spartan Scientific offers a simple app for connecting the unit to the internet by use of a secure internet connection. Available for IOS, Android or desktop web site, the app allows the user real-time, data logged statistics on water removal, temperature, cumulative and daily cycling data. Upon connection, the user can set up alerts for alarm conditions that come in the form of texts or emails. More importantly, the user can see daily trends and have access everywhere. The options, utility, size, ease of installation and price rival the cost of conventional timed electric drains that have none of these features.

Dimensional Data

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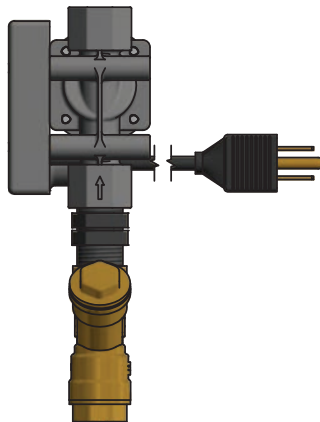


*NOTE: Y-Strainer standard only with WiFi version

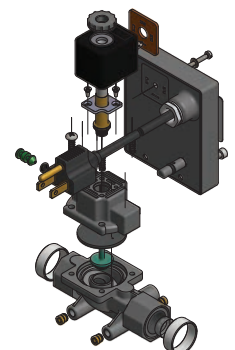


FEATURES

- Wi-Fi app helps with preventative maintenance
- Mobile and PC interfaces for drain history
- Temperature monitoring
- Alert sent to your phone via text or e-mail
- Time sensitive alarms



EXPLODED VIEW





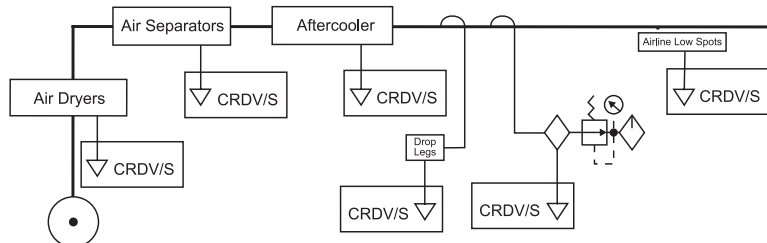
Series CRDVS

Plug-N-Play Closed Loop
Compressor Drain Valve

Technical Data

Function:	2-Way, 2-Position; Inlet Pilot Diaphragm; Normally Closed	Wetted Materials:	Elastomers: FKM (others available on request) Manual Override: Polypropylene Operator: 400 Series Stainless Steel and Brass Orifice Insert: Polypropylene Shading Ring: Copper (AC Only) Springs: 300 Series Stainless Steel Valve Body: Glass-Filled Nylon
Port Size:	1/2" NPT	Coil Data:	Duty Cycle: Continuous (within specifications) Encapsulation: Glass-Filled Nylon Insulation: Class F Power Rating: 8.5 VA Voltage: 120 VAC 50/60 Hz Voltage Tolerance: +/- 10% Nominal Winding: Class H
Orifice Sizes / Flow Factor:	12.5mm / 2.45 Cv	Transient Suppression:	MOV
Pressure Range:	0 to 180 psi	Cable:	6 ft. Cord with grounded wall plug
Temp. Range:	Fluid Max.: +60°C Dry Range: Ambient +10° to +50°C Note: This device is not recommended for use in below freezing temperatures	Packaged Weight:	1.1 lbs.
Response Time:	20 to 80 ms Complete Cycle		
Media:	Air, emulsion, gas, water (contact factory for compatibilities)		
Environment Protection:	IP65 (IEC 144), NEMA 4 Dust-tight and water resistant (with electrical connector)		
Mounting:	On pipe or #8 - 32 mounting holes on valve base		

Applications



How To Order

CRDVS - 3 7

Y Strainer
0 - Without
1 - With*

*Standard with WiFi Version.

Body Material
2 - Nylon
4 - Nylon, WiFi Enabled

Repair Kit
Kit includes: Solenoid Coil, Solenoid
Operator Assembly & Viton Diaphragm

Specify Part Number
CRDVS-RK

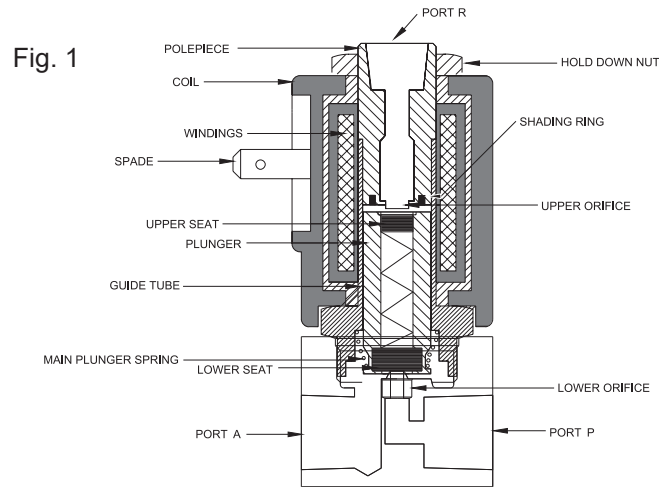
Order Example: CRDVS-3072
Without Y strainer, Nylon.

CONDENSATE
DRAIN



Solenoid Operators and Valves -

Solenoid operators and valves are devices which control the flow of liquids, gases, steam and other media. When electrically energized they either open, shut off or direct the flow of media.



Operation -

The solenoid consists of a coil of wire wound in the form of a cylinder around the bobbin. When an electrical current is introduced, it resembles a bar magnet. When energized by an electrical signal, a magnetic field builds up which attracts the movable plunger to the pole piece against the tension of the main plunger spring. When de-energized, the magnetic field dissipates and the plunger returns to its original position, under the action of the main plunger spring. (See Fig. 1).

In order to be usable on AC current as well as DC, the pole piece contains a shading ring to average the alternating sine wave and minimize AC hum. (Note - It is not necessary to use a shading ring for DC applications as DC current does not produce an alternating wave function.) The flowing media is normally permitted to enter the area between the plunger and plunger guide tube, and caution should be used to assure that these components are compatible with the media when selecting a valve.

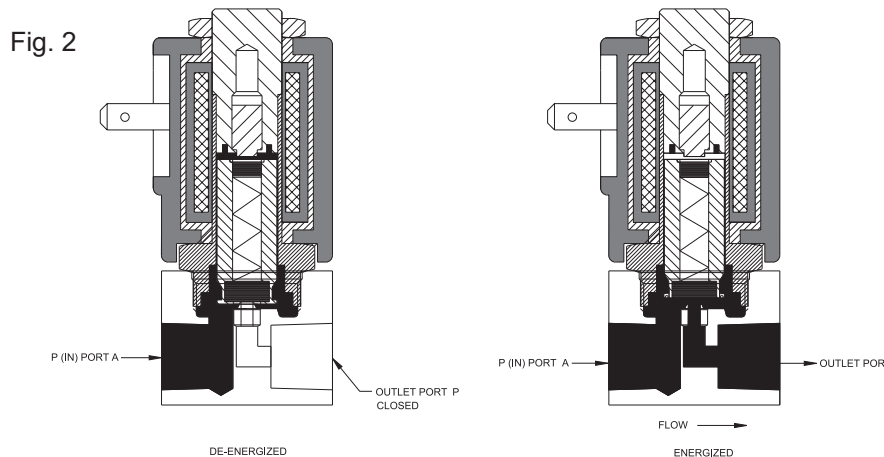
Construction -

There are two types of construction available; Direct-Acting and Internal Pilot Operated.

Direct-Acting Operators and Valves -

With a direct-acting valve, the solenoid plunger directly opens or closes the orifice, and the sealing disc is attached to the plunger. In the case of a Normally Closed operator or valve, the orifice is closed when de-energized. In the energized condition, the orifice is open. The valve will operate from zero (0) psi (pounds per square inch) to its maximum rated pressure. In the case when the operator or valve is Normally Open, the orifice is open when de-energized. When energized, the orifice is closed. The valve begins at its maximum rated pressure and is operated to close flow or zero (0) psi.

Direct-Acting 2-Way valves are shut-off valves with one valve inlet and one valve outlet port (Fig. 2).

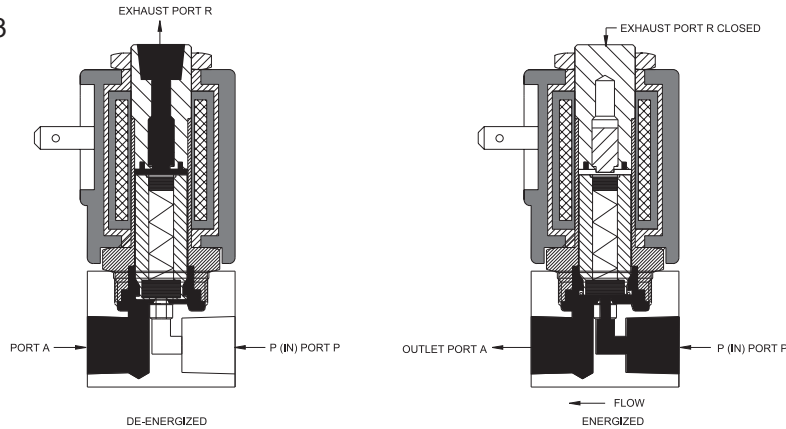




Direct-Acting 3-Way valves -

Direct-Acting 3-Way valves have three port connections and two orifices. One orifice is always open and the other closed. When the valve is energized, the mode reverses, hence the description 2-Position. Figure 3 shows a 3-Way, 2-Position Normally Closed valve. With the coil de-energized, the plunger main spring tension holds the lower seating disc tightly against the lower orifice, and shuts off flow. Port A is exhausted through Port R. When the coil is energized, the plunger is pulled in and the orifice at Port R is sealed off by the spring loaded upper seat disc. The fluid media now flows from Port P to Port A.

Fig. 3

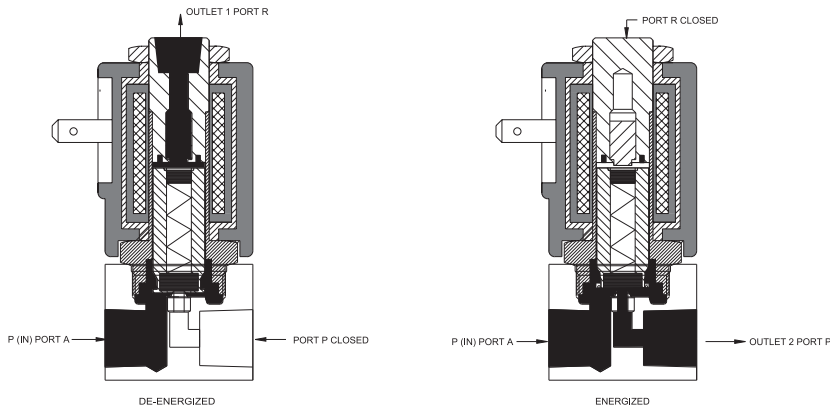


Other Functions -

Various functions can be obtained according to where the fluid media is connected.

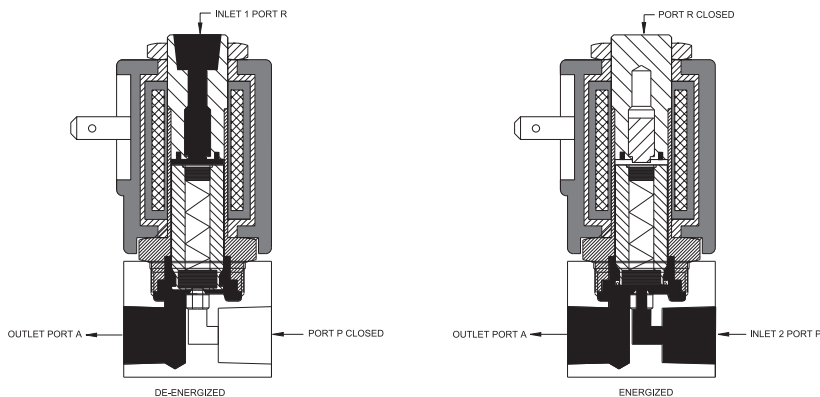
† 3-Way Diverting -

Pressure enters the valve through a common inlet Port A. The flow is diverted through the two outlets Port R and Port P by energizing or de-energizing the solenoid. (See Fig. Below).



† 3-Way Mixing -

This valve allows the selection of two different pressures through two different inlets Port R and Port P by energizing and de-energizing the solenoid. The fluid media is then routed through a common outlet Port A. (See Figure below).



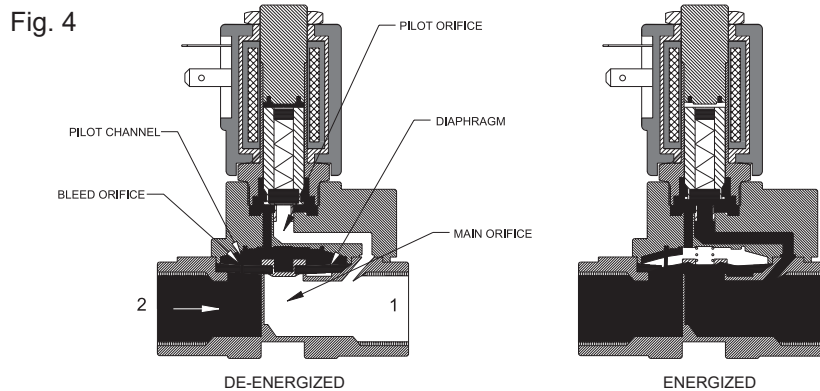
† NOTE: Standard pressure ratings of orifices do not apply for these functions. Please contact factory for details.



Internal Pilot Operated Valves -

This type of valve is provided with a 2-Way pilot solenoid operator. A diaphragm or piston provides the seal for the main seat. These valves are used for switching pressures in conjunction with orifice sizes larger than those available with direct-acting valves. The floating diaphragm construction requires a pressure drop across the main valve seat to remain in the open position, or a coupled diaphragm or piston which is mechanically held open by the solenoid plunger (i.e. Chem-o-sol). The coupled type will operate with zero pressure drop across the main valve seat.

An Internal Pilot Operated 2-Way valve is shown in Fig. 4. When the solenoid is energized, the plunger opens the pilot orifice and relieves pressure from the top of the diaphragm to the outlet side of the valve, through the pilot channel in the main body. This results in an unbalanced condition which causes the main line pressure to lift the diaphragm off the main seat, thereby opening the valve. When the solenoid is de-energized, the pilot orifice is closed and full line pressure is applied to the top of the diaphragm, through the bleed orifice located in the diaphragm, from the inlet side of the valve, thereby providing a seating force for tight shut-off. As long as a pressure differential exists between the inlet and outlet ports, a residual shut-off force is available by virtue of the larger effective area on the top side of the diaphragm. In certain cases an internally piloted valve will require a minimum line pressure to insure sealing of the main orifice. This is due to the fact that the diaphragm is usually produced in a flat fashion and is made of some type of elastomeric material which will have a tendency to pull the diaphragm back to its normal position.

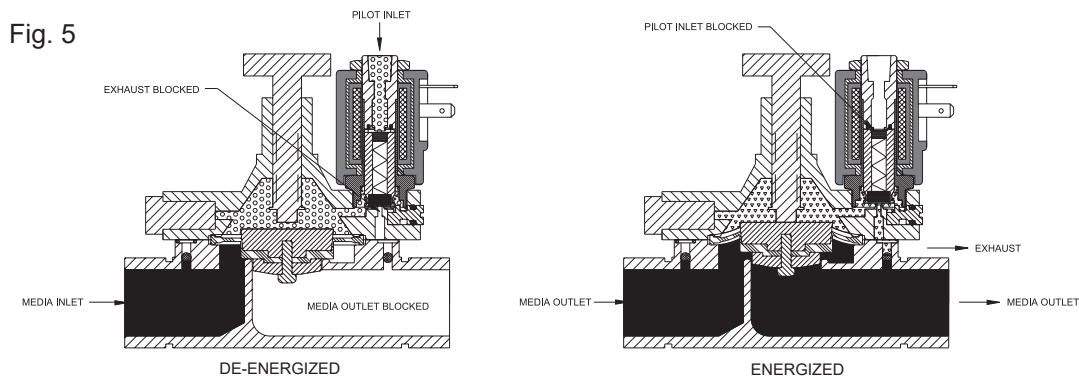


External Pilot Operated Valves -

With these types of valves, an independent external pilot source is used for controlling the pressure for actuation purposes. These valves are either piston or diaphragm types and may be actuated by either air or liquids.

A 3-Way solenoid pilot valve controls the independent external pilot media. In the case of externally piloted valves, the standard internal pilot valves are manipulated in a manner which separates the main valve into two sections. The upper section is the pilot pressure chamber and the lower section is for main media control. In the normal position, with pilot pressure, the main valve is closed preventing the flow of media. Pilot pressure is interrupted when the solenoid is energized. The plunger is pulled from its normal position to the raised position, closing off the pilot inlet orifice. At the same time the pressure is released from the pilot chamber of the valve by means of an exhaust port. When the solenoid is de-energized, the plunger returns to its normal position closing the exhaust port and the pilot pressure again builds in the pilot chamber, creating the diaphragm closing force. Fig. 5. (Note - All externally piloted valves will fail to open if for some reason the pilot supply pressure is interrupted).

The Normally Open and closed functions of the main valve rely on the function of the pilot valve. For example, a Normally Closed external pilot valve requires a Normally Open pilot valve. Conversely, a Normally Open external pilot valve requires a Normally Closed pilot valve.





Component Construction -

Coils -
All Spartan Scientific solenoid valves contain a completely nylon encapsulated magnetic circuit. The bobbin windings have a class H insulation rating or 390°F. For the DIN spaded version, each connector tab is silver plated to assure excellent conductivity. Each coil is fastened to the plunger guide tube by means of a hold down nut for ease of change-over without interrupting the pneumatic circuit.

Armature Assembly -
The armature assemblies are constructed of metallic components designed to provide protection against incompatibilities of various fluid medias. However it is necessary to use caution when specifying a solenoid valve for an unfamiliar fluid. Use caution when selecting a material suited specifically for the media.

Valve Bodies -
It is suggested to use caution in selecting a body material for unfamiliar media.

Temperature Considerations -
Most Spartan Scientific valves are manufactured to operate with fluids at a maximum of +60°C (140°F), and an ambient temperature range of +10°C to +50°C. (+50°F to +122°F). Other temperature limits can be supplied upon request for special applications.

Response Times -
With Direct-Acting valves, the response time is measured from the moment of electrical energization to the point when a figure of 90% of the pressure rating is attained at the valve outlet. The small moving masses and relatively high magnetic forces involved means that rapid response times, mostly in the region of 10 to 20 milliseconds, are obtained. The response time for an internally piloted valve is determined by the size, design, operating function, fluid media, temperature, inlet pressure and pressure drop.

Pressure Range -
Spartan Scientific valves will work reliably within the pressure ranges as shown in the catalog. The data is valid for a voltage band from -10% to +10% of nominal rated voltage. When a 3-Way valve is used for a function other than that which it was supplied, the permissible pressure range is altered. DC voltage valves operate at a lower maximum pressure than AC counterparts. Pressure ranges listed in the catalog are for DC voltages.

Flow Rates -
The flow rate through a valve is basically determined by the nature of the design and flow path through the valve. The size of the valve required for a particular application is generally established by the Cv flow factor. The Cv Flow Coefficient is defined as "the number of gallons per minute of water that will pass through a given flow restriction with a pressure drop of 1 psi". In most cases, the size of a valve can be determined graphically given a few known factors: gallons per minute, cubic feet per minute, pressure drop, inlet pressure, outlet pressure & Cv coefficient.



Choosing The Right Valve

Determining the rate of flow for a valve used on air -

To properly choose the right valve by size or flow capacity, the following things must be known: the fluid used, upstream and downstream pressures in PSIG, and the Cv factor of the solenoid valve.

To show the use of this flow chart we'll use the following information:

Media - Air
 Downstream Pressure - 100 PSIG
 Upstream Pressure - 120 PSIG
 Sample Valve 4200-03-534 - 2.4mm Orifice, Cv factor .245

Step 1: Locate the downstream pressure (100 PSIG) on the chart (Fig. 1)

Step 2: Draw a vertical line from 100 PSIG until it intersects the upstream pressure line (120 PSIG).

Step 3: Now draw a horizontal line to meet the left hand scale; then read the scale: 45. This is the flow in SCFM (standard cubic feet per minute) for a valve with a Cv factor of 1.

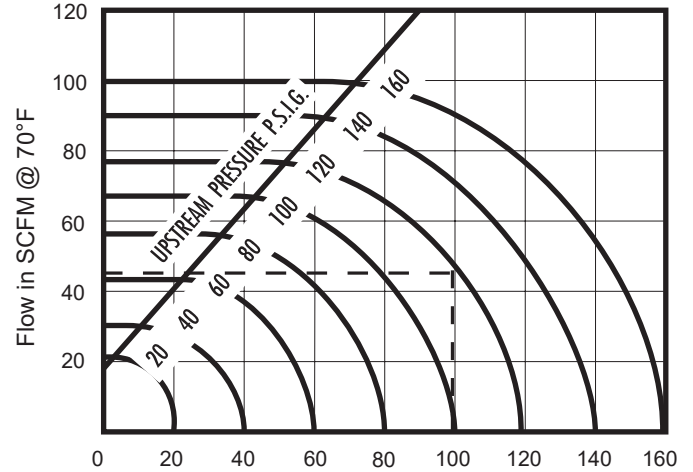
Step 4: The Cv factor of the valve sample is .245. We multiply this by 45 to get the air flow through the valve.

$$\begin{aligned} \text{Cv factor} \times 45 &= \text{Flow (SCFM)} \\ .245 \times 45 &= 11.02 \text{ SCFM} \end{aligned}$$

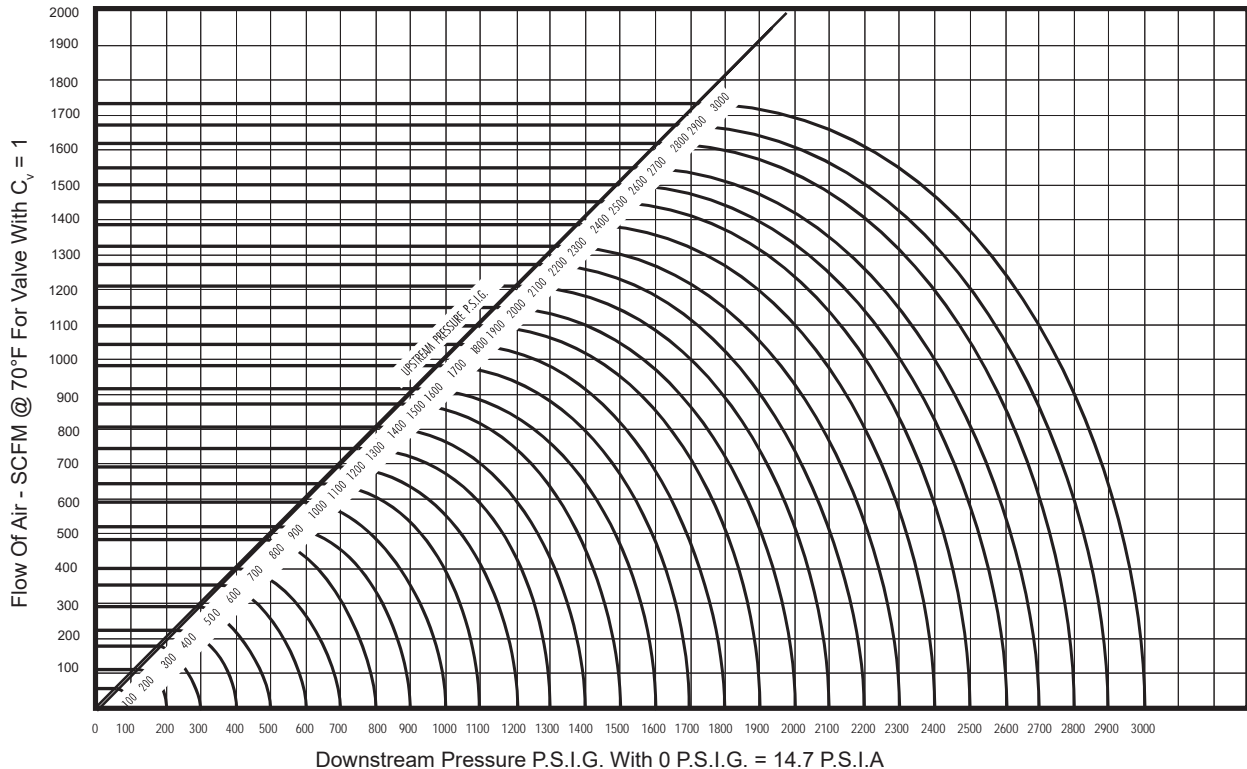
Since the media is air, no correction is needed. If using another media, it would be necessary to multiply 11.02 by a correction factor for the fluid used. (Table 1, on the following page)

Flow charts -

The flow charts for air and water are based on a valve with a Cv factor of 1. Correction factors are included for other media.



Downstream Pressure PSIG (Fig. 1)





Choosing The Right Valve

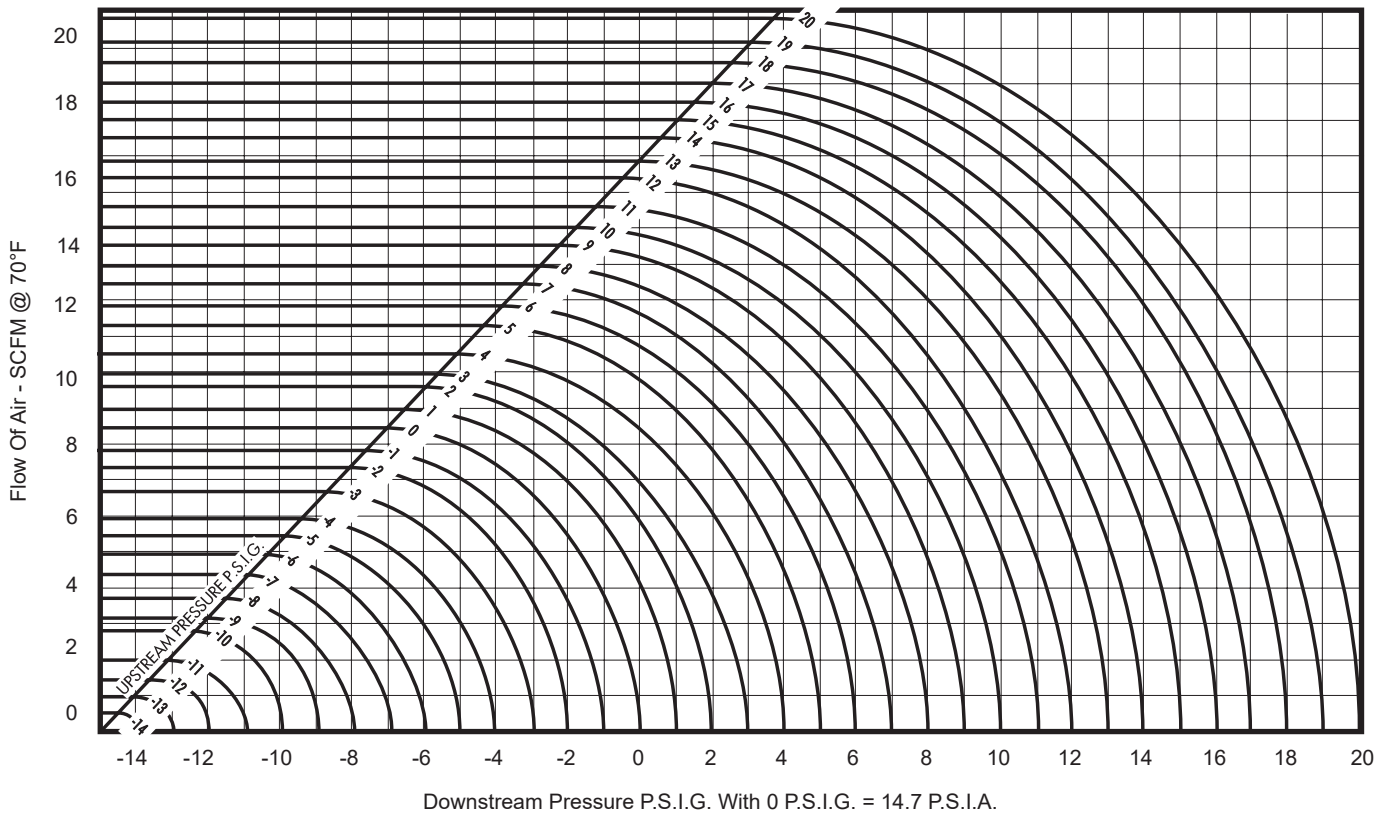
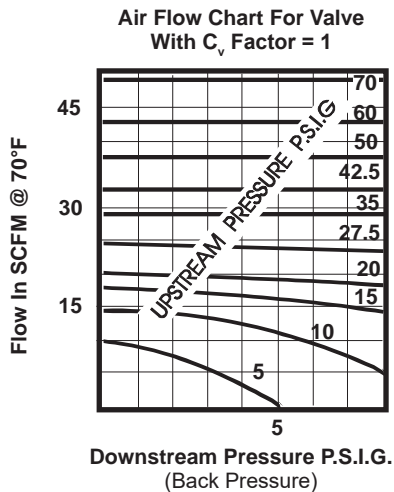


Table 1

Correction Factors @ 70°F				For correction factor of gases not listed, use the following formula:
Acetylene	1.05	Methane	1.34	$\text{Correction Factor} = \sqrt{\frac{1}{\text{Specific gravity of gas}}}$
Ammonia	1.30	Neon	1.20	
Argon	.85	Nitrogen	1.02	
Hydrogen	3.79	Oxygen	.95	



NOTE: Table for specific gravity of various gases provided on page 85.



Choosing The Right Valve

Determining the rate of flow for a valve used to control liquid -

As stated earlier, to choose the right valve by size or flow capacity, the following information must be known: the fluid used, upstream and downstream pressures in PSIG, and the Cv factor of the solenoid valve.

To show the use of this flow chart, use the following information:

Media - Water
 Pressure Drop - 50 PSIG
 Valve 4500-01-421 - 8mm Orifice, Cv factor .84

Step 1: Locate the pressure drop (50 psi) on the Cv scale of the chart (Fig. 2).
 Draw a vertical line up to intersect curve.

Step 2: Now draw a horizontal line to meet the left hand scale; then read the C scale: 7. This is the flow in GPM (gallon per minute) for a valve with a Cv factor of 1.

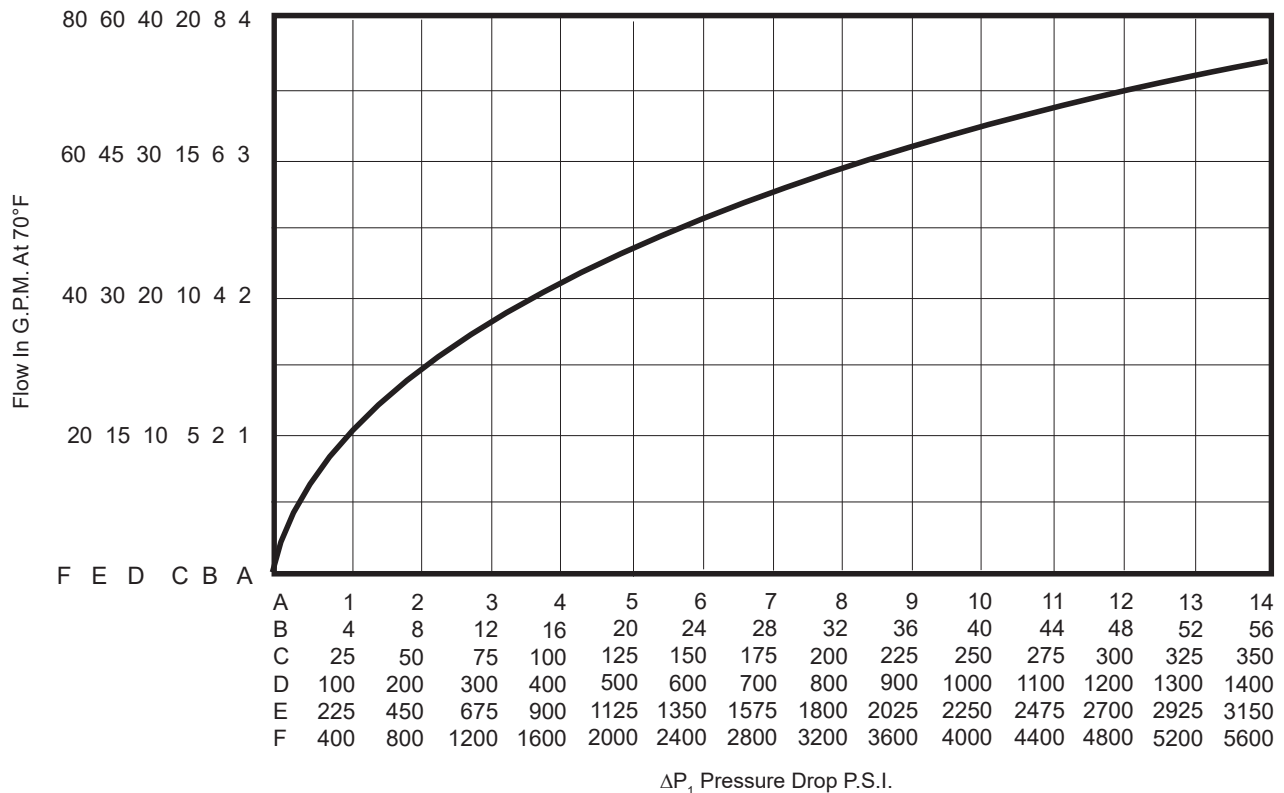
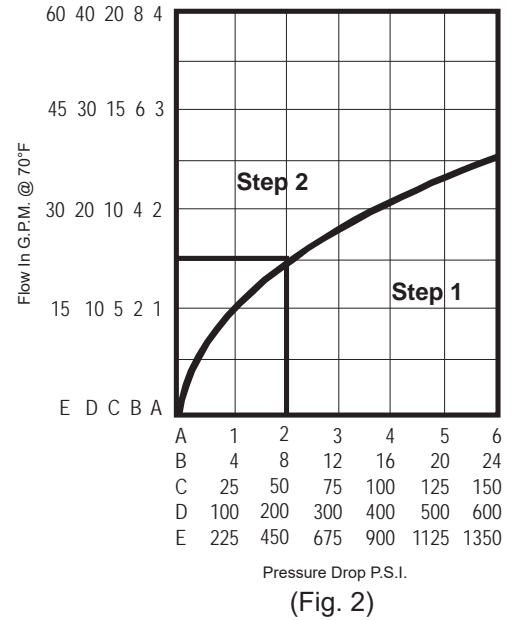
Step 3: Multiply 7gpm by the Cv factor of known value: .84.

Cv factor x 7 = Flow (GPM)
 .84 x 7 = 5.88 GPM Water flow

Step 4: If the media is something other than water, it will be necessary to multiply our value by a correction factor corresponding to our specific media. The correction factor can be obtained by the following formula.

$$\text{Correction Factor} = \sqrt{\frac{1}{\text{Specific Gravity of Fluid}}}$$

NOTE: Tables 2 & 3 on the following page provide lists of specific gravities for some common fluids and gases.





Specific Gravity Of Gases And Liquids

Specific gravity is the ratio of the density of a substance, with respect to the density of air or water, at a reference temperature and pressure.

For both gases and liquids, the reference temperature is 60°F and the reference pressure is atmospheric pressure, 14.7 psi absolute.

Gas specific gravities are density ratios with respect to air, the weight of which is .0793 pounds/ft³ at 60°F and 14.7 psi absolute.

Liquid specific gravities are density ratios with respect to water, the weight of 62.4 pounds/ft³ at 60°F - the pressure being irrelevant since liquids are non-compressible.

Gases (in relationship to Air)

Table 2

GASES	SPECIFIC GRAVITY
Acetylene	0.897
Air	1.000
Butane	2.050
Carbon Dioxide	1.516
Carbon Monoxide	0.967
Chlorine	2.423
Dimethylamine	1.521
Ethane	1.049
Ethylene	0.967
Fluorine	1.312
Helium	0.138
Hydrogen	0.069
Hydrogen Sulfide	1.190
Illuminating Gas	0.400
Methane	0.554
Methylamine	1.080
Methyl Chloride	1.785
Methyl Fluoride	1.195
Natural Gas	0.570
Nitrogen	0.966
Nitric Oxide	1.039
Nitrous Oxide	1.527
Oxygen	1.103
Sulphur Dioxide	2.208

Liquids (in relationship to Water)

Table 3

LIQUIDS	SPECIFIC GRAVITY
Acetic Acids	1.05
Acetone	0.79
Alcohol, Commercial	0.83
Alcohol, Ethyl	0.79
Alcohol, Methyl	0.81
Ammonia	0.66
Benzoic Acid	1.27
Calcium Chloride 25%	1.23
Sodium Chloride 25%	1.19
Hydrochloric Acid, Concentrated	1.19
Hydrofluoric Acid, Concentrated	0.99
Kerosene	0.81
Linseed Oil	0.94
Milk	1.03
Mineral Oil	0.92
Muriatic Acid	1.20
Bromine	2.97
Carbolic Acid	0.96
Carbonic Acid	0.92
Carbon Disulfide	1.26
Carbon Tetrachloride	1.59
Chlorine	1.56
Ether	0.73
Ethyl Acetate	0.90
Fuel Oil	0.82
Gasoline	0.72
Glycerine	1.26
Naphtha	0.77
Nitric Acid	1.50
Oleic Acid	0.90
Petroleum Oil	0.82
Phosphoric Acid	1.78
Sulphuric Acid	1.83
Tar	1.00
Turpentine	0.87
Vinegar	1.07
Water	1.00
Water, Sea	1.02



Chemical Compatibility Selection Guide- Material Selection

The type of media being controlled by the solenoid valve will have a direct effect on its ability to function properly. The purpose of this guide is to briefly introduce some materials commonly used when selecting a solenoid valve for specific applications. The Chemical Compatibility Table (pages 89 - 96) lists commonly used materials and rates their performance when exposed to various media. This information is a basic material selection guide only because the development of new and improved alloys, thermoplastics and elastomeric compounds are a continuing process.

Acetal POM

Standard Color: White

Description: Acetals are polymers of formaldehyde which technically are called polyoxymethylenes. Acetals are widely used engineering thermoplastics with high load-bearing characteristics and low coefficient of friction.

Key Uses: Industrial/mechanical products, appliances and plumbing. Based on excellent performance of Acetal copolymers in water at temperatures up to 212° F, they are widely used to mold faucet underbodies, shower heads, housings for pumps and filters, valves and fittings.

Maximum Working Temperature: +212° F

Features: Acetals are available in several specific grades. Easy-flow acetals which can be used in very thin-walled injection moldings, lubricated for low coefficient of friction and glass reinforced for strength and dimensional stability to name a few.

Limitations: Acetals are attacked by ultraviolet radiation, becoming brittle with long term exposure to sun light. UV-stabilization can provide significant improvements.

Aluminum

Description: Pure aluminum is a silver-white metal characterized by a slightly bluish cast. It has a specific gravity of 2.70, resists the corrosive effects of many chemicals and has a malleability approaching that of gold. When alloyed with other metals, numerous properties are obtained which make these alloys useful over a wide range of applications.

Key Uses: The automotive industry is the prime user of aluminum alloys for wheels and wheel covers and other light weight and decorative trim. It is also used in the pneumatic industry to produce light weight valve bodies and components.

Features: When aluminum surfaces are exposed to the atmosphere, a thin invisible oxide forms immediately which protects the metal from further oxidation. This self-protecting characteristic gives aluminum its high resistance to corrosion.

Limitations: Although the metal can safely be used in the presence of certain mild alkalies with the aid of inhibitors, in general, direct contact with alkalies should be avoided. Direct contact with certain other metals should be avoided in the presence of electrolyte; otherwise galvanic corrosion of aluminum takes place in the vicinity of the contact area. The use of a bituminous paint coating or insulating tape is recommended.

Cast Bronze and Brass

Description: Bronze and brass are high copper alloys which are highly malleable, and are of the first to be found and utilized. These alloys are widely used because of their excellent electrical and thermal conductivities, outstanding resistance to corrosion, ease of fabrication, and a broad range of obtainable strengths and special properties.

Key Uses: Safety tools, molds for plastic parts, cams, bushings, bearings, valves, pump parts and gears.

Features: There are almost 400 commercial copper and copper-alloy compositions available from mills as wrought products (rod, plate, sheet, strip, tube, pipe, extrusions, foil, forgings and wire) and from foundries as castings.

Limitations: Bronze and brass are restricted to a narrow range of corrosion conditions as the copper tends to oxidize and sometimes dissolve in some damp and harsh chemical environments.

EPDM (Ethylene-Propylene)

Standard Color: Black

Description: A copolymer of ethylene and propylene. Ethylene propylene has gained acceptance for its excellent ozone and chemical resistance.

Key Uses: Outdoor weather resistant uses. Hydraulic and automotive brake systems. Water appliances.

Temperature Range: -60° F to +300° F (Dry Heat Only)

Features: EPDM features good resistance to polar solvents such as MEK and acetone. It is also highly recommended for effective resistance to steam (to 400° F); hot water; silicone oils and greases; dilute acids and alkalies; alcohol and automotive brake fluids.

Limitations: With the exception of resistance to polar solvents, EPDM is not recommended for its overall solvent resistance.



Chemical Compatibility Selection Guide- Material Selection

FKM (Fluorocarbon)

Standard Color: Black

Description: Combining high temperature resistance with outstanding chemical resistance, Fluorocarbon-based compounds are the ideal seal material.

Key Uses: High temperature/low compression set applications. Wide chemical exposure situations.

Temperature Range: -20° F to +400° F (Dry Heat Only)

Features: Fluorocarbons are highly resistant to swelling in gasoline and gasoline/alcohol blends, as well as resistant to the degrading effects of U.V. light and ozone.

Limitations: Fluorocarbons are not recommended for exposure to ketones. They are also not recommended for situations requiring good low temperature flexibility.

NBR

Standard Color: Black

Description: NBR is the most widely used elastomer. It combines excellent resistance to petroleum-based oils and fuels, silicone greases, hydraulic fluids, water and alcohols, with a combination of working properties such as low compression set, high tensile strength, and abrasion resistance.

Key Uses: Oil resistant applications of all types. Low temperature military uses. Fuel systems. Can be compounded for FDA applications.

Temperature Range: -40° F to +250° F (Dry Heat Only)

Features: Increasing acryloNBR content gives Buna its better resistance to petroleum-based oils and hydrocarbon fuels, enhancing resistance to the degrading effects of heat, at a cost of reduced low temperature performance.

Limitations: Precautions should be taken to avoid exposure of Buna to such highly polar solvents as acetone, MEK, chlorinated hydrocarbons and nitro hydrocarbons, which are known to cause rapid deterioration.

Neoprene

Standard Color: Black

Description: Neoprene is a homopolymer of chloroprene and is one of the earliest of the synthetic materials to be developed as an oil-resistant substitute for Natural Rubber.

Key Uses: Recommended for exposure to weathering. Preferred sealing material for refrigeration industry. FDA approved for food and beverage industry use.

Temperature Range: -45° F to +250° F (Dry Heat Only)

Features: Neoprene has a good resistance to ozone, sunlight and oxygen aging; relatively low compression set; good resilience; and reasonable production cost.

Limitations: Neoprene is generally attacked by strong oxidizing acids, esters, ketones, chlorinated, aromatic and nitro hydrocarbons.

Nylon

Standard Color: Neutral, Black

Description: Nylons, or polyamides, are melt processable thermoplastics that contain an amide group as a recurring part of the chain. The first and largest volume of the engineering thermoplastics, they offer a combination of properties including high strength even at elevated temperatures, ductility, wear and abrasion resistance and good chemical resistance.

Key Uses: Nylons are used in virtually every industry and market. Transportation represents the largest single market for unreinforced and glass-reinforced nylons ranging from electrical connectors and wire jackets to engine fans and brake and power steering reservoirs.

Maximum Working Temperature: +266° F

Features: The mechanical properties of nylons are strength, stiffness and toughness and the combination thereof. Fiber reinforcement increases stiffness, strength and heat resistance. Excellent chemical resistance to hydrocarbon fuels, lubricants and various organic solvents is a distinguishing feature of nylons compared to other engineering plastics.

Limitations: Nylons are attacked by strong acids, oxidizing agents and concentrated solutions of certain salts. Absorbed moisture acts as a plasticizer and causes slight dimensional changes that must be considered in design.



Chemical Compatibility Selection Guide- Material Selection

Perfluoroelastomer

Standard Color: Black

Description: A perfluoroelastomer possessing exceptional resistance to degradation by aggressive fluids and/or gases.

Key Uses: Severe chemical exposure and high temperatures. Seals for chemical processing & transportation.

Temperature Range: -35° F to +500° F (Dry Heat Only)

Features: Perfluoroelastomer parts combine the high temperature toughness of a fluorocarbon elastomer, with the chemical inertness of Teflon®. As a group, parts resist attack by nearly ALL chemical reagents and provide long term service in virtually ALL chemical and petrochemical process streams.

Limitations: Perfluoroelastomer parts can be made to significantly swell upon exposure to some fluorinated solvents; fully halogenated freons; and uranium hexafluoride.

PTFE Fluoroelastomer

Standard Color: Black

Description: A copolymer of tetrafluoroethylene and propylene, Aflas exhibits excellent chemical resistance properties.

Key Uses: Seals for oil field, industrial and chemical applications.

Temperature Range: +60° F to +400° F (Dry Heat Only)

Features: Aflas features good resistance to petroleum fluids; steam; a number of acids and alkalies; amines (anti-freeze); phosphate esters and brake fluids. It has generated considerable interest as a seal material for oil field, industrial and chemical applications.

Limitations: Compression set of 52% after 30 days at 400° F may be considered too high for some sealing applications.

PVC

Standard Color: Gray

Description: PVC is a vinyl-based resin and is produced by an oxyhydrochlorination process. It is the most versatile of all plastics because of its ability to be used to manufacture products ranging from heavy-walled pressure pipe to thin, crystal clear food packaging. PVC is easily machinable and can be injection molded.

Key Uses: Traditional uses for PVC compounds are hot- and cold-water distribution piping and industrial liquid handling pipe, fittings, valves and the like.

Maximum Working Temperature: +219° F

Features: The chemical resistance of PVC has prompted its use in industrial liquid handling, especially for high temperature liquids in paper and pulp operations, and acids and bases in plating and electrochemical operations.

Limitations: PVC is highly flammable and subject to rigorous protective measures because of health hazards.

Stainless Steel

Description: Stainless steels are high-alloy steels and have superior corrosion resistance to the carbon and conventional low-alloy steels because they contain relatively large amounts of chromium. In the broadest sense, the standard stainless steels can be divided into three groups based on their structures: austenitic (300 Series), ferritic (400 Series), and martensitic.

Key Uses: Applications for 300 series stainless steels include highly corrosive environments. Spartan utilizes 300 stainless steel in production of valve bodies where control of corrosive media and compatibility is an issue.

Applications for 400 series stainless steels include magnetic solenoid plungers and stops.

Features: 300 series stainless steels are austenitic and are nonmagnetic in the annealed condition. They combine outstanding corrosion and heat resistance with good mechanical properties over a broad temperature range.

400 series stainless steels are ferritic grades and are always magnetic and contain chromium but no nickel. They combine corrosion and heat resistance with moderate mechanical properties.

Limitations: The ferritic grades are generally restricted to a narrower range of corrosion conditions than the austenitic grades.



Chemical Compatibility Table

Exposure Rating Guide: A Good B Fair C Questionable D Poor Blank Insufficient Data	Acetic Acid					Phenolic Nylon Delrin* (Acetal) Ryton* to 200°F	Teflon* Stainless steel (316) Stainless steel (304) Stainless steel (440) Titanium	Cast bronze Cast iron Aluminum Hastelloy C Carbon/ceramic Cermagnet A	FKM* Buna N Neoprene Nitrile Natural rubber Hypalon*	EPDM Chemraz* Silicone Ceramic Carbon/graphite
	Epoxy Polypropylene Polyethylene PVC Cyclocac* (ABS)									
Acetaldehyde Acetamide Acetate Solvent Glacial Acetic Acid 20%	A A A A	A A A A	C D D D	D D D D	D D D D	A A A A	A A A A	A C D D	D D D D	A A A A
Acetic Acid 80% Acetic Acid Acetic Anhydride Acetone Acetyl Bromide	C C B D	A B A A	D D D D	D D D D	C C C C	A A A A	A A A A	C C C C	B B D D	A A A A
Acetyl Chloride (dry) Acetylene Acrylonitrile Alcohols: Amyl Benzyl	A A A D	A A A B	D C A A	D A D D	A A A A	A A A A	A A A A	C A A A	A D B B	A A A A
Butyl Diacetone Ethyl Hexyl Isobutyl	A A A A	A B B A	A B C A	A B C B	C A A A	A A A A	A A A A	A A A A	A D C A	B A C A
Isopropyl Methyl Octyl Propyl Aluminum Chloride 20%	A B A A	A A A A	A A A A	D A A A	A A A A	A A A A	A A A A	A A B A	A B B A	A A A A
Aluminum Chloride Aluminum Fluoride Aluminum Hydroxide Aluminum Potassium Sulfate 10% Aluminum Potassium Sulfate 100%	A B A A	A A A A	B A A A	A A A A	D A D D	A A C C	A A A A	D C A D	A A A A	A A A A
Aluminum Sulfate Alums Amines Ammonia 10% Ammonia, anhydrous	A A A A	A A A A	A C C B	D D B A	A A A A	A A A A	A A A A	D D D D	A D D B	A A A A
Ammonia, liquid Ammonia Nitrate Ammonium Acetate Ammonium Bifluoride Ammonium Carbonate	A A A A	A A A A	C A A A	A B A A	A D A D	A A A A	A A B B	D D D D	D C C A	A A A A
Ammonium Casenite Ammonium Chloride Ammonium Hydroxide Ammonium Nitrate Ammonium Oxalate	A A A A	A A A A	A A A A	B A A A	D A D D	C A A B	A A A A	D D D D	A B D A	A A A A
Ammonium Persulfate Ammonium Phosphate, Dibasic Ammonium Phosphate, Monobasic Ammonium Phosphate, Tribasic Ammonium Sulfate	A A A A	A A A A	A A C A	D B B A	C A B A	D B B B	A A A A	D C D C	A A A A	A A A A
Ammonium Thiosulfate Amyl Acetate Amyl Alcohol Amyl Chloride Aniline	A D D C	B B D B	A C D C	C A D D	A A C C	B A A A	A A A A	D C A C	D B C D	A A D A
Aniline Hydrochloride Anti-Freeze Antimony Trichloride Aqua Regia (80%HCl, 20%HNO ₃) Arochlor 1248	A D D A	D B B C	D A A A	B A A A	A D D D	A A A A	D D D A	A A D D	A A D D	B C A A
Aromatic Hydrocarbons Arsenic Acid Asphalt Barium Carbonate Barium Chloride	A A A A	D B A A	C B A A	D A A A	A A A A	A A A A	C A B A	C D B C	A A A A	D A A A
Barium Cyanide Barium Hydroxide Barium Nitrate Barium Sulfate Barium Sulfide	A A C C	D B B B	D A B A	D A A A	A A A A	B D A A	A B B B	C D B D	A A A A	A A A A

*Delrin, Hypalon, Teflon, FKM - Reg TM E. I. Du Pont de Nemours & Co.
 *Chemraz - Reg TM Green, Tweed & Co., Inc.
 *Ryton - Reg TM Phillips Petroleum Co.
 *Cyclocac - Reg TM Borg-Warner Corp.
 *Aflas - Reg TM Asahi Glass Co., Ltd. (This chart is available upon request)



Units and Conversion Factors

TAP DRILL SIZES								
TAP SIZE	DRILL SIZE	PROBABLE % THREAD	TAP SIZE	DRILL SIZE	PROBABLE % THREAD	TAP SIZE	DRILL SIZE	PROBABLE % THREAD
0-80	3/64	71-81	10-32	21	68-76	5/8-18	37/64	58-65
M1.6 X .35	1.25mm	69-77	M5 X .8	4.2mm	69-77	M16 X 2	35/64	76-81
1-64	53	59-67	12-24	16	66-72	3/4-10	21/32	68-72
M2 X .4	1/16	72-79	12-28	15	70-78	3/4-16	11/16	71-77
1-72	53	67-75	M6 X 1	10	76-84	M20 X 2.5	11/16*	74-78
2-56	50	62-69	1/4-20	7	70-75	7/8-9	49/64	72-76
2-64	50	70-79	1/4-28	3	72-80	7/8-14	13/16	62-67
M2.5 X .45	2.05mm	69-77	5/16-18	F	72-77	M24 X 3	53/64	72-76
3-48	5/64	70-77	5/16-24	1	67-75	1-8	7/8	73-77
3-56	46	69-78	M8 X 1.25	6.7mm	74-80	1-12	59/64	67-72
4-40	43	65-71	3/8-16	5/16	72-77	1-14	15/16	61-67
4-48	42	61-68	3/8-24	Q	71-79	1-1/8-7	63/64	72-76
M3 X .5	40	70-79	M10 X 1.5	8.4mm	76-82	1-1/8-12	1-3/34	66-72
5-40	38	65-72	7/16-14	U	70-75	M30 X 3.5	1-3/64*	75
5-44	37	63-71	7/16-20	25/64	65-72	1-1/4-7	1-7/64*	76
M3.5 X 6	33	72-81	M12 X 1.75	13/32	69-74	1-1/4-12	1-11/64*	72
6-32	36	71-78	1/2-13	27/64	73-78	1-3/8-6	1-7/32*	72
6-40	33	69-77	1/2-20	29/34	65-72	1-3/8-12	1-16/64*	72
M4 X .7	3.25mm	74-82	M14 X 2	15/32	76-81	M36 X 4	1-1/4*	82
8-32	29	62-69	9/16-12	31/64	68-72	1-1/2-6	1-11/32*	72
8-36	29	70-78	9/16-18	33/64	58-65	1-1/2-12	1-27/64	72
10-24	25	69-75	5/8-11	17/3	75-79			

PIPE TAP DRILL SIZES				
TAP SIZE	TAPER PIPE NPT & NPTF	DECIMAL EQUIVALENT	STRAIGHT PIPE NPS	DECIMAL EQUIVALENT
1/8-27	R	.3390	11/32	.3438
1/4-18	7-16	.4375	29/64	.4531
3/8-18	37/64	.5781	37/64	.5781
1/2-14	45/64	.7031	23/32	.7188
3/4-14	59/64	.9219	59/64	.9219
1 - 11-1/2	1-5/32	1.1562	1-5/32	1.1562
1-1/4 - 11-1/2	1-1/2	1.5000	1-1/2	1.5000
1-1/2 - 11-1/2	1-47/64	1.7344	1-3/4	1.7500
2 - 11-1/2	2-7/32	2.2188	2-7/32	2.2188
2-1/8 - 8	2-41/64	2.6406	2-21/32	2.6562
3 - 8	3-17/64	3.2656	-	-

METRIC TO STANDARD CONVERSIONS	
Millimeters (mm) x 0.03937	= inches (") (in)
Centimeters (cm) x 0.3937	= inches (") (in)
Meters (m) x 39.37	= inches (") (in)
Meters (m) x 3.281	= feet (') (ft)
Meters (m) x 1.094	= yards (yds)
Kilometers (km) x 0.62137	= miles (mi)
Kilometers (km) x 3280.87	= feet (') (ft)
Liters (l) x 0.2642	= gallons (U.S.) (gals)
Liters (l) x 0.0353	= cubic feet
Bars x 14.5038	= pounds per square inch (PSI)
Kilograms (kg) x 2.205	= pounds (P)
Kilometers (km) x 1093.62	= yards (yds)
Square centimeters x 0.155	= square inches
Square meters x 10.76	= square feet
Square kilometers x 0.386	= square miles
Cubic centimeters x 0.06102	= cubic inches
Cubic meters x 35.315	= cubic feet



Units and Conversion Factors

Density

	slug / ft ³	Kilogram / Meters ³	g / cm ³	lb / ft ³	lb / in. ³
1 slug per ft ³ =	1	515.4	.5154	32.17	1.862 x 10 ⁻²
1 Kilogram per Meter ³ =	1.940 x 10 ⁻³	1	0.001	6.243 x 10 ⁻²	3.613 x 10 ⁻⁵
1 gram per cm ³ =	1.940	1000	1	62.43	3.613 x 10 ⁻²
1 pound per ft ³ =	3.108 x 10 ⁻²	16.02	1.602 x 10 ⁻²	1	5.787 x 10 ⁻⁴
1 pound per in. ³ =	53.71	2.768 x 10 ⁴	27.68	1728	1

Force

Quantities in the shaded areas are not force units but are often used as such. For instance, if we write 1 gram-force "=" 980.7 dynes, we mean that a gram-mass experiences a force of 980.7 dynes under standard conditions of gravity (g = 9.80667 m/s²)

	dyne	NEWTON	lb	pdl	gf	kgf
1 dyne =	1	10 ⁻⁵	2.248 x 10 ⁻⁶	7.233 x 10 ⁻⁵	1.020 x 10 ⁻³	1.020 x 10 ⁻⁶
1 NEWTON =	10	1	0.2248	7.233	102.0	0.1020
1 pound =	4.448 x 10 ⁵	4.448	1	32.17	453.6	0.4536
1 poundal =	1.383 x 10 ⁴	0.1383	3.108 x 10 ⁻²	1	14.10	1.410 x 10 ⁻²
1 gram-force =	980.7	9.807 x 10 ⁻³	2.205 x 10 ⁻³	7.093 x 10 ⁻²	1	0.001
1 kilogram-force =	9.807 x 10 ⁵	9.807	2.205	70.93	1000	1

Pressure

	atm	dyne / cm ²	inch of water	cm Hg	PASCAL	lb / in. ²	lb / ft ²
1 atmosphere =	1	1.013 x 10 ⁶	406.8	76	1.013 x 10 ⁵	14.70	2116
1 dyne per cm ² =	9.869 x 10 ⁻⁷	1	4.015 x 10 ⁻⁴	7.501 x 10 ⁻⁵	0.1	1.405 x 10 ⁻⁵	2.089 x 10 ⁻³
1 inch of water ^a at 4°C =	2.458 x 10 ⁻³	2491	1	0.1868	249.1	3.613 x 10 ⁻²	5.202
1 centimeter of mercury at 0°C =	1.316 x 10 ⁻²	1.333 x 10 ⁴	5.353	1	1333	0.1934	27.85
1 PASCAL =	9.869 x 10 ⁻⁶	10	4.015 x 10 ⁻³	7.501 x 10 ⁻⁴	1	1.450 x 10 ⁻⁴	2.089 x 10 ⁻²
1 pound per in. ² =	6.805 x 10 ⁻²	6.895 x 10 ⁴	27.68	5.171	6.895 x 10 ³	1	144
1 pound per ft ² =	4.725 x 10 ⁻⁴	478.8	0.1922	3.591 x 10 ⁻²	47.88	6.944 x 10 ⁻³	1

^a Where the acceleration of gravity has the standard value 9.80665 m/s².

1 bar = 10⁶ dyne / cm² = 0.1 MPa 1 millibar = 10³ dyne / cm² = 10² Pa 1 Torr = 1 millimeter of mercury



Glossary

Bubbletight Sealing - Air leakage between the internal sealed ports of a valve in either the energized or de-energized position is undetectable in a 5 second soap bubble test.

Continuous Duty - A rating given to a valve that can be energized continuously without overheating.

Current Drain - The amount of current (expressed in amperes) that flows through the coil of a solenoid valve when it is energized.

Cv Factor - The Cv factor of a valve is the quantity of 60°F water, expressed in gallons per minute, which will flow through a valve with a one psi pressure drop. Spartan Cv factors for solenoid valves are listed for each series in the catalog.

Cycle - The normal opening of a closed valve and then closing is one complete cycle.

Cycle Rate - The number of times a valve can open and close in a given time frame.

Dead-End Gas Service - A condition in which a valve is energized but has no cooling fluid flowing through it because of a dead-end line (a cylinder pressurized for a long period).

Drip-Proof - See NEMA classifications.

Dust-Tight - See NEMA classifications.

Duty Cycle - The longest time that a valve is energized, followed by the shortest time that it is de-energized. Expressed in percent =

$$\frac{\text{ON}}{\text{ON} + \text{OFF}} \times 100$$

Explosion-Proof Construction - A solenoid valve constructed to meet the specifications of Underwriter's Laboratories, Inc. for operation in hazardous locations. See NEMA classifications also.

Floating Bottom or Top Seal - A plunger assembly construction in 2-Way and 3-Way valves in which the seal is movable against a spring within the plunger.

Flow - The movement of fluid created by a pressure differential.

Flow Capacity - The amount of fluid a valve will pass under given temperature and pressure conditions in gallons per minute or cubic feet per minute as measured at the outlet port. Cv is a measure of flow capacity.

Flow-Rate - The amount of fluid that passes a given point at a given period of time.

Flux Plate - A magnetic steel plate used in the magnetic circuit of a solenoid valve to help carry magnetic flux from the enclosure to the sleeve assembly. A flux plate is required on valves with non-metallic body material.

General Purpose Valve - Valves suitable for application indoors under normal atmospheric conditions. See NEMA classifications.

Intermittent Duty Coil - A valve coil not designed for continuous duty but which will perform satisfactory for a specified duty cycle.

Heat Rise - The difference between the stabilized temperature of the solenoid coil when energized and de-energized in a constant ambient temperature. As current flows through a coil, heat is generated. The coil temperature rises until the coil enclosure dissipates heat as fast as it is generated, and the temperature stays at a stabilized level.

Insert - A material used in the plunger assembly to seal an orifice.

Insert Materials

NBR - A soft synthetic rubber which has excellent compatibility characteristics for most air, water and light oil applications up to the 180°F - 200°F range.

EPDM - A soft synthetic rubber which is suitable for water above 180°F and steam under 50 psi. EPDM has a wide range of fluid compatibilities but cannot be used with petroleum based fluids or fluids so contaminated (such as lubricated air).

Kel-F®** - A combination of carbon and halogens which yields a colorless material that is exceptionally stable, temperature resistant, chemically inert, and a true thermo plastic. The Kel-F®** plastic is an extremely versatile material and is impervious to the action of corrosive chemicals and highly resistant to most organic solvents.

Teflon®* - A synthetic material used for many semi-corrosive and corrosive media. It is virtually indestructible by any fluid, and its temperature resistance makes it especially suitable for steam application. Teflon®* has excellent lubricating characteristics. It is not recommended for vacuum service.

FKM®* - A soft fluorocarbon insert material, developed primarily for handling hydrocarbons and high temperatures. FKM®* is the standard seal material in most Spartan Scientific general purpose direct poppet 2-Way and directional 3-Way valves.

Intermittent Duty Coil - A valve coil not designed for continuous duty but which will perform satisfactory for a specified duty cycle.

Leakage, External - The leakage between the internal part of the valve and the external part of the valve. Spartan valves are bubbletight.

Leakage, Internal - The leakage between the internal sealed ports of a valve in either the energized or de-energized position. Leakage rate is normally described in cc (cubic centimeters) per minute or as bubbletight.

Manual Override - A mechanical device that permits manual opening of Normally Closed valves or closing of Normally Open valves.

Maximum Operating Pressure Differential (MOPD) - The maximum difference in pounds per square inch between the pressure at an inlet port and the pressure at an outlet port at which a solenoid valve will operate.



Glossary

Minimum Operating Pressure Differential - The minimum difference in pounds per square inch between the pressure at an inlet port and the pressure at an outlet port required for proper operation of the solenoid valve. The minimum operating pressure must be maintained throughout the operating cycle of pilot-operated valves to ensure proper shifting from the closed position to the open position or vice versa.

Note: 2-Way and 3-Way pilot-operated valves will start to move to their normal positions when the pressure falls below the minimum operating pressure. Direct acting valves do not require a minimum pressure to operate.

Metering - A mechanical device that permits manual adjustment of fluid flow through a valve. Speed control.

NEMA CLASSIFICATIONS (Solenoid Enclosures)

Type 1: General Purpose - Enclosures are intended for indoor use, primarily to prevent accidental contact of personnel with the enclosed equipment in areas where unusual service conditions do not exist.

Type 2: Drip-Proof - Enclosures are intended for indoor use to protect the enclosed equipment against falling non-corrosive liquids and falling dirt.

Type 3R: Rainproof and Sleet Resistant (Ice Resistant) - Enclosures are intended for outdoor use to protect the enclosed equipment against rain, sleet and external ice formation.

Type 4: Watertight and Dust-Tight - Enclosures are intended for indoor or outdoor use to protect the enclosed equipment against splashing water, seepage of water, falling or hose-directed water and severe external condensation.

Type 4X: Watertight, Dust-Tight and Corrosion-Resistant - Enclosures have the same provisions as Type 4 enclosures and are corrosion-resistant.

Type 6: Submersible - Enclosure protected against entry of water during occasional temporary submersion at a limited depth.

Type 7: Explosion-Proof - Designed to be used in hazardous atmospheres classified as Class I, Groups A, B, C or D, as defined by NEC (National Electric Code). The explosion-proof enclosure must be able to withstand an internal explosion and prevent the ignition of atmospheric gases which may be caused by the shorts or sparks occurring within the enclosure. Additionally, the external enclosure temperature must be low enough as to not ignite a surrounding flammable atmosphere.

Type 9: Class II, Division I, Group E, F or G - Enclosures are intended for indoor use in the atmospheres and locations as defined as Class II, Division I or Division II, and Group E, F or G in the NEC to prevent the entrance of explosive amounts of hazardous dust. If gaskets are used, they must be of non-combustible, non-deteriorating, vermin proof material.

Type 12: Industrial Use - Dust-Tight and Drip-Tight - Enclosures are intended for indoor use to protect enclosed equipment against fibers, filings, lint, dust and dirt; and light splashing, seepage, dripping and external condensation of non-corrosive liquids.

Port - An opening or passageway for the inlet or outlet of a fluid in a valve. The terminus of the port is threaded (NPT) to accommodate a line connection. A port designated with an NPTF indicates dry seal threads.

Port, Cylinder - A port which provides a passage to or from an actuator.

Port, Exhaust - A port which provides a passage to the atmosphere.

Port, In - A port which provides a passage from the source of fluid.

Port, Out - A port where the fluid leaves a two-way valve.

Port, Normally Closed - A port that is closed to fluid flow when the valve is de-energized.

Port, Normally Open - A port that is open to fluid flow when the valve is energized.

Power Consumption - The number of watts a solenoid valve draws when energized.

Pressure - Force per unit area. Pressure is induced into a system by means of a pump, compressor or by gravity. Pressure may be expressed as pounds per square inch absolute (PSIA) or as pounds per square inch gauge (PSIG). PSIG is most often used for valve ratings and is 14.7 psi greater than absolute pressure, when measured at sea level.

Pressure, Burst - The maximum pressure that would not cause the weakest section of the valve to fail and cause external leakage when pressure is reduced back to rated pressure. Depends on the individual valve construction. For most valves it is at least 5 times rated pressure.

Pressure, Differential (Drop) - The difference in pressure measured between two given points. ($P_1 - P_2$).

Proof Pressure - The maximum pressure the valve may be exposed to without suffering any damage. It does not have to be capable of operating at this pressure. For most valves it is at least 1-1/2 times the rated pressure. (This is a non-destructive test).

Response Time - The length of time required for an operating mechanism of a valve to move from the fully closed to the open position, or vice versa. Response time will vary according to pressure, fluid, voltage and system. It also varies with type of valve (direct operated or pilot operated). For specific valves, consult factory with complete application details.

Spring-Loaded - The term used to indicate that the valve has a plunger return spring. A spring-loaded plunger permits the valve to be mounted in any position without causing malfunction.

Temperature Range - Spartan Scientific valves are equipped with high quality coils suitable for continuous energization. The permissible coil temperature, as measured by the change in resistance method, is 155°C for Class F and 180°C for Class H.

Vibration and Shock - Most valves will resist 10 G's or more.



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