

Vickers®

Cartridge Valves



Solenoid Bi-Directional Valves

Screw-in Cartridge Valves

350 bar (5000 psi) Maximum Pressure – 114 l/min (30 USgpm) Maximum Flow



Introduction

For over seventy years, Vickers has provided its customers with quality products and innovative solutions for all their power and motion control needs.

We are committed to maintaining this position by offering the most comprehensive range of cartridge valves for industrial and mobile equipment.

The products featured in this catalog represent the very best in screw-in cartridge solenoid valve technology.

Products in this catalog have been fatigue tested for one million cycles at 132% or 10 million cycles at 115% of rated pressure.

Two pressure ratings are shown for all products featured in this catalog – typical application pressure and fatigue pressure. The typical application pressure rating is the maximum recommended operating pressure for the valve in a given system. The fatigue pressure rating is the pressure for the valve to be free, for infinite life, from metal fatigue.

This catalog gives basic specifications for Vickers bi-directional screw-in cartridge solenoid valves. Its purpose is to provide a quick, convenient reference tool when choosing Vickers cartridge valves or designing a system using these components.

Vickers bi-directional solenoid valves are offered with a choice of normally open or normally closed flow paths

Valve Features and Benefits

- Rated flows up to 114 l/min (30 USgpm)
- Poppet designs
- Cartridge industry recognized cavities

- One piece, fully molded coils
- All operating parts are hardened steel, ground and honed for long life and low leakage
- Cartridge design for maximum flexibility and minimal manifold space requirements
- All exposed surfaces are zinc dichromate plated to resist corrosion
- All aluminum manifolds are gold anodized to resist corrosion
- Reliable, economical and compact

Coil Features and Benefits

The solenoid operated bi-directional valves in this catalog are offered with a choice of six standard voltages and several types of electrical connections. For other coil ratings and connections, consult your Vickers representative.

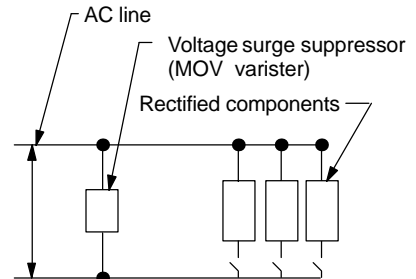
Standard AC coils are internally rectified to supply them with DC current, therefore they have no “inrush” current value.

- Coils are rated for continuous duty
- Coils are interchangeable for serviceability
- Variety of voltages and terminations
- Coils offer a one-piece weather-proof encapsulated design, eliminating the need for extra seals.
- AC voltage coils are internally full-wave rectified for 50 or 60 cycle (Hz) applications.
- An arc suppression diode molded into the coil is available as a standard option on DC coils.

Protection of Internally Rectified Coils

The rectifiers used in these coils may require protection from high voltage surges in some electrical circuits containing highly inductive or capacitive components. These include certain types of motors, solenoids, relays, and transformers.

Protection is simple and inexpensive. It consists of installing a commercially available voltage surge suppressor like the General Electric MOV varister V130LA20A for 120 volts AC, or the V250LA20A for 240 volts AC, across the AC line supplying the rectified components. A single suppressor will normally protect all of the rectified components in the circuit, as shown in the surge suppressor circuit diagram below.



All voltage surge producing components must be installed on this side of suppressor

Switches or relay contacts only. Relay coils must be connected on the line side of the surge suppressor.

No inductive or capacitive loads can be installed between the surge suppressor and rectified valves



WARNING: Application of these products beyond published performance specifications may cause valve malfunction which may result in personal injury and/or damage to the machine.



Maintain 5-8 Nm (4-6 lbf ft) maximum torque on valve tube nut. Overtightening may cause valve failure.



Aluminum housings can be used for pressures up to 210 bar (3000 psi)
Steel housings **must** be used for operating pressures **above** 210 bar (3000 psi)

Viton is a registered trademark of E.I. DuPont Co.

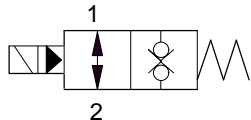
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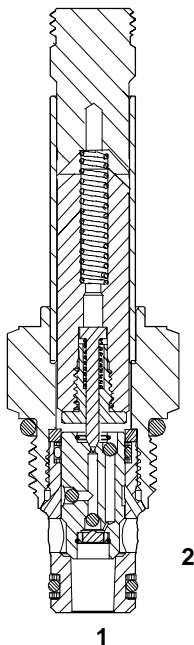
SBV11-8-C

Bi-directional, normally closed solenoid valve

Functional symbol



Sectional view



Description

The SBV11-8-C is a 2-way, 2-position, bi-directional, normally closed, poppet type, screw-in cartridge solenoid valve.

Operation

In the de-energized position, flow is blocked in both directions. In the energized position, flow is allowed in both directions.

Ratings and specifications

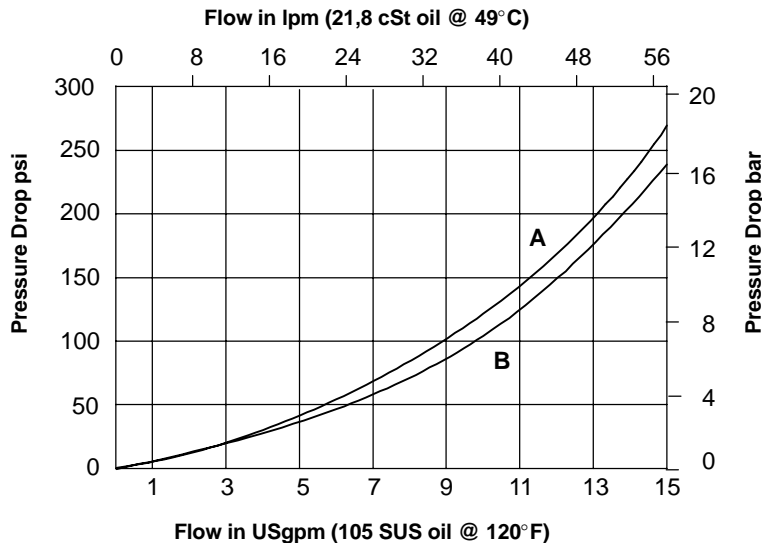
Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49°C (120°F)

Typical application pressure (all ports)	350 bar (5000 psi)
Cartridge fatigue pressure (infinite life)	310 bar (4500 psi)
Rated flow	60 l/min (15 USgpm)
Internal leakage (port 1 to port 2 & port 2 to port 1)	5 drops/min. max. @ 350 bar (5000 psi)
Temperature range	-40° to 100°C (-40° to 212°F)
Coil duty	Continuous from 85% to 110% of nominal voltage
Cavity	C-8-2 (See page 18)
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Standard housing material	Aluminum or steel
Weight cartridge only	0,12 kg (0.26 lb.)
Seal kit	02-160777 Buna-N 02-160778 Viton®

Viton is a registered trademark of E.I.DuPont

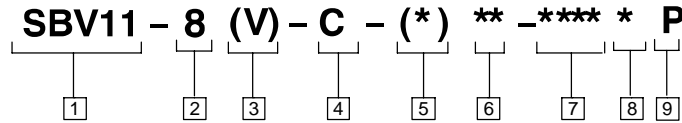
Pressure Drop Curves

Cartridge only



A – Port 1 to 2

B – Port 2 to 1



1 Function

SBV11 – Solenoid bi-directional valve

2 Size

8 – 8 Size

3 Seals

Blank – Buna-N
V – Viton

4 Style

C – Normally closed

5 Housing material

Blank – Cartridge only
A – Aluminum
S – Steel



Aluminum housings can be used for pressures up to 210 bar (3000 psi)

Steel housings **must** be used for operating pressures **above** 210 bar (3000 psi)

6 Port size/housing part number

0 – Cartridge only

Code	Port size	Aluminum	Steel
2G	1/4" BSPP	02-160727	02-160733
3G	3/8" BSPP	02-160728	02-160734
4T	SAE4	02-160730	02-160736
6T	SAE6	02-160731	02-160737
8T	SAE8	02-160732	02-160738

See pages 19 and 20 for housings

7 Voltage Rating

00 – No coil
12D – 12 VDC
24D – 24 VDC
36D – 36 VDC
24A – 24 VAC
120A – 120 VAC
240A – 240 VAC
12B – 12 VDC/w diode*
24B – 24 VDC/w diode*
*optional arc suppression diode

8 Connector type/coil part number

Blank – No coil

Coil Voltage	G ISO 4400 DIN 43650	N Deutsch	P 1/2" NPT conduit port w/ leadwire	Q Spade terminals	W Leadwire	Y Amp junior
12D	02-178143	02-178146	02-178137	02-178134	02-178131	02-178704
24D	02-178144	02-178147	02-178138	02-178135	02-178132	02-178705
36D	02-178145	02-178148	02-178139	02-178136	02-178133	02-178706
24A	02-178160	–	02-178157	02-178156	02-178155	–
120A	02-178161	–	02-178158	–	–	–
240A	02-178162	–	02-178159	–	–	–
12B	02-178824	02-178826	02-178820	02-178818	02-178816	02-178830
24B	02-178825	02-178827	02-178821	02-178819	02-178817	02-178831

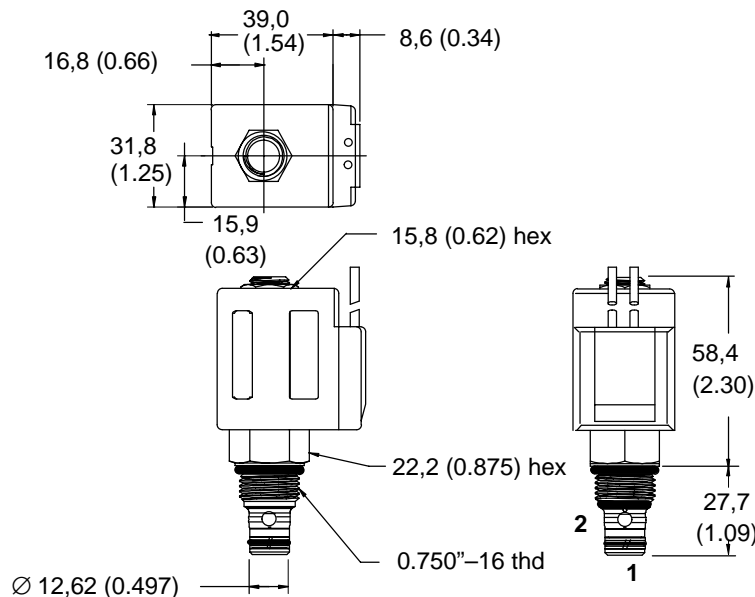
9 Coil type

P – 20W coil

For coil dimensions see page 21.

Dimensions

mm (inch)



Note

When solenoid valve is ordered as cartridge only, nut is included.

Torque cartridge in housing
34–41 Nm (25–30 lbf ft)



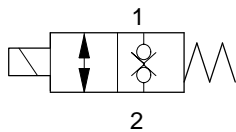
WARNING

Maintain 5-8 Nm (4-6 lbf ft) maximum torque on valve tube nut. Overtightening may cause valve failure.

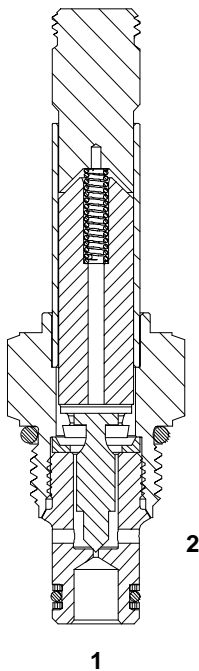
SBV12-8-C

Bi-directional, normally closed solenoid valve

Functional symbol



Sectional view



Description

The SBV12-8-C is a 2-way, 2-position, bi-directional, direct acting, normally closed, poppet type, screw-in cartridge solenoid valve.

Operation

In the de-energized position, flow is blocked in both directions. In the energized position, flow is allowed in both directions.

Ratings and specifications

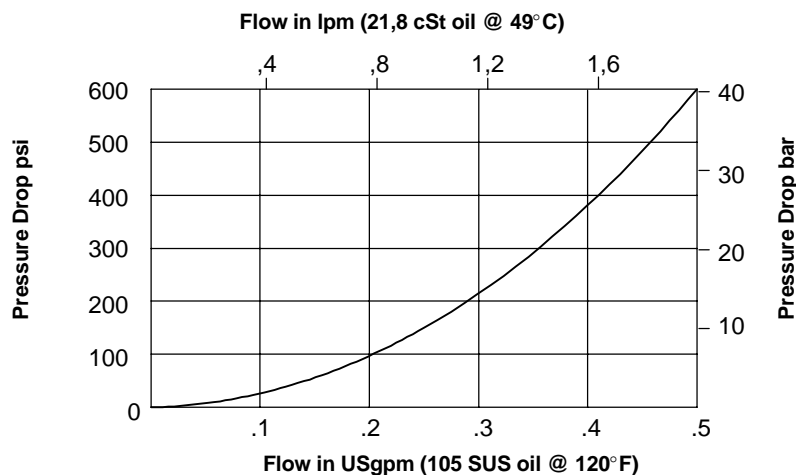
Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49° C (120° F)

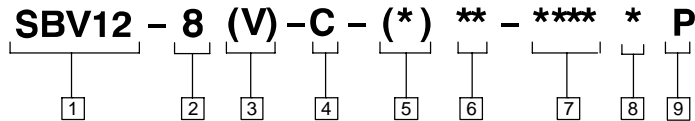
Typical application pressure (all ports)	350 bar (5000 psi)
Cartridge fatigue pressure (infinite life)	310 bar (4500 psi)
Rated flow	1 l/min (0.25) USgpm
Internal leakage (port 1 to port 2 & port 2 to port 1)	5 drops/min. max. @ 350 bar (5000 psi)
Temperature range	-40° to 100° C (-40° to 212° F)
Coil duty	Continuous from 85% to 110% of nominal voltage
Cavity	C-8-2 (See page 18)
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Standard housing material	Aluminum or steel
Weight cartridge only	0,120 kg (0.26 lb.)
Seal kit	02-160777 Buna-N 02-160778 Viton®

Viton is a registered trademark of E.I.DuPont

Pressure Drop Curves

Cartridge only





1 Function

SBV12– Solenoid
bi-directional valve

2 Size

8 – 8 Size

3 Seals

Blank – Buna-N
V – Viton

4 Style

C – Normally closed

5 Housing material

Blank – Cartridge only
A – Aluminum
S – Steel



Aluminum housings can be used for pressures up to 210 bar (3000 psi)

Steel housings **must** be used for operating pressures **above** 210 bar (3000 psi)

6 Port size/housing part number

0 – Cartridge only

Code	Port size	Aluminum	Steel
2G –	1/4" BSPP	02-160727	02-160733
3G –	3/8" BSPP	02-160728	02-160734
4T –	SAE4	02-160730	02-160736
6T –	SAE6	02-160731	02-160737
8T –	SAE8	02-160732	02-160738

See pages 19 and 20 for housings

7 Voltage Rating

00 – No coil
12D – 12 VDC
24D – 24 VDC
36D – 36 VDC
24A – 24 VAC
120A– 120 VAC
240A– 240 VAC
12B – 12 VDC/w diode*
24B – 24 VDC/w diode*

*optional arc suppression diode

8 Connector type/coil part number

Blank – No coil

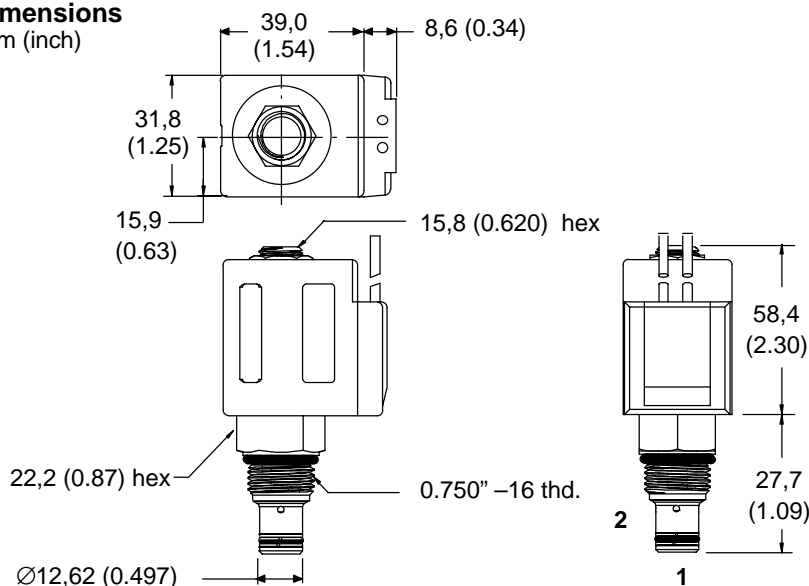
Coil Voltage	G ISO 4400 DIN 43650	N Deutsch	P 1/2" NPT conduit port w/ leadwire	Q Spade terminals	W Leadwire	Y Amp junior
12D	02-178143	02-178146	02-178137	02-178134	02-178131	02-178704
24D	02-178144	02-178147	02-178138	02-178135	02-178132	02-178705
36D	02-178145	02-178148	02-178139	02-178136	02-178133	02-178706
24A	02-178160	–	02-178157	02-178156	02-178155	–
120A	02-178161	–	02-178158	–	–	–
240A	02-178162	–	02-178159	–	–	–
12B	02-178824	02-178826	02-178820	02-178818	02-178816	02-178830
24B	02-178825	02-178827	02-178821	02-178819	02-178817	02-178831

9 Coil type

P – 20W coil

For coil dimensions see page 21.

Dimensions
mm (inch)



Note

When solenoid valve is ordered as cartridge only, nut is included.

Torque cartridge in housing
34–41 Nm (25–30 lbf ft)



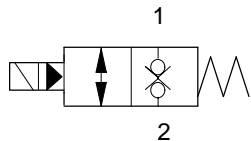
WARNING

Maintain 5-8 Nm (4-6 lbf ft) maximum torque on valve tube nut. Overtightening may cause valve failure.

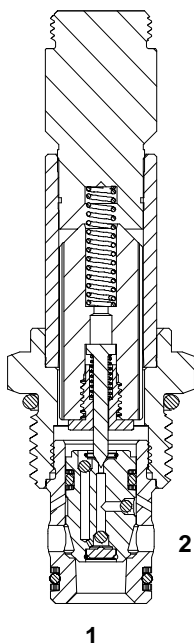
SBV11-10-C

Bi-directional, normally closed solenoid valve

Functional symbol



Sectional view



Description

The SBV11-10-C is a 2-way, 2-position, bi-directional, normally closed, poppet type, screw-in cartridge, solenoid valve.

Operation

In the de-energized position, flow is blocked in both directions. In the energized position, flow is allowed in both directions.

Ratings and specifications

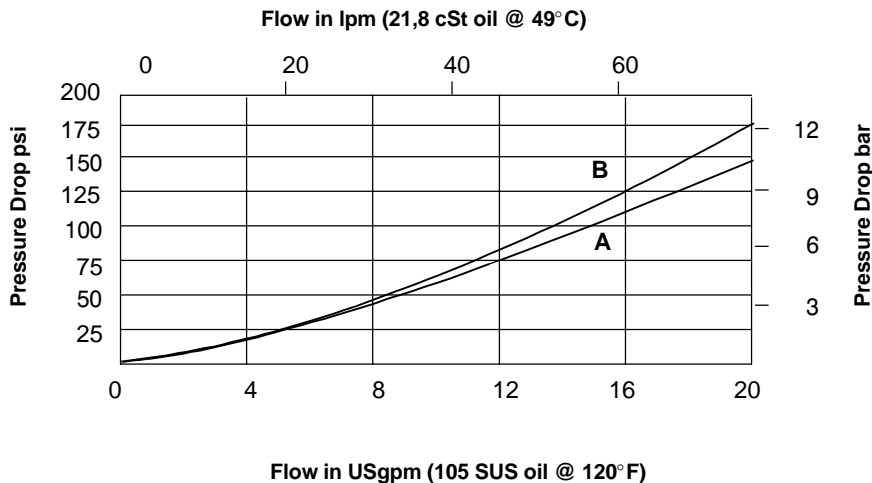
Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49° C (120° F)

Typical application pressure (all ports)	350 bar (5000 psi)
Cartridge fatigue pressure (infinite life)	310 bar (4500 psi)
Rated flow	76 l/min (20 USgpm)
Internal leakage (port 1 to port 2)	5 drops/min. maximum @ 350 bar (5000 psi)
Temperature range	-40 to 100° C (-40° to 212° F)
Coil duty	continuous from 85% to 110% of nominal voltage
Cavity	C-10-2 (See page 18)
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Standard housing material	Aluminum or steel
Weight, cartridge only	0,18 kg (0.39 lb.)
Seal kit	565806 Buna-N 889627 Viton®

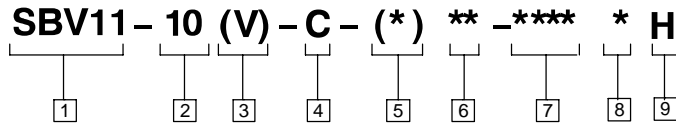
Viton is a registered trademark of E.I.DuPont

Pressure Drop Curves

Cartridge only



A – Port 1 to 2
B – Port 2 to 1



1 Function

SBV11 – Solenoid bi-directional valve

2 Size

10 – 10 Size

3 Seals

Blank – Buna-N
V – Viton

4 Style

C – Normally closed

5 Housing material

Blank – Cartridge only
A – Aluminum
S – Steel



Aluminum housings can be used for pressures up to 210 bar (3000 psi)

Steel housings **must** be used for operating pressures **above** 210 bar (3000 psi)

6 Port size/housing part number

0 – Cartridge only

Code	Port size	Aluminum	Steel
2G	1/4" BSPP	876702	02-175102
3G	3/8" BSPP	876703	02-175103
3B	3/8" BSPP	02-175462	–
6H	SAE6	876700	–
6T	SAE6	566151	02-175100
8H	SAE8	876701	–
8T	SAE 8	–	02-175101

See pages 19 and 20 for housings

7 Voltage Rating

00 – No coil
12D – 12 VDC
24D – 24 VDC
36D – 36 VDC
24A – 24 VAC
120A – 120 VAC
240A – 240 VAC
12B – 12 VDC/w diode*
24B – 24 VDC/w diode*

*optional arc suppression diode

8 Connector type/coil part number

Blank – No coil

Coil Voltage	G ISO 4400 DIN 43650	N Deutsch	P 1/2" NPT conduit port w/ leadwire	Q Spade terminals	W Leadwire	Y Amp junior
12D	02-178027	02-178030	02-178021	02-178018	02-178015	02-178035
24D	02-178028	02-178031	02-178022	02-178019	02-178016	02-178036
36D	02-178029	02-178032	02-178023	02-178028	02-178017	02-178037
24A	02-178047	–	02-178044	02-178043	02-178042	–
120A	02-178048	–	02-178045	–	–	–
240A	02-178049	–	02-178046	–	–	–
12B	02-178855	02-178857	02-178851	02-178849	02-178847	02-178861
24B	02-178856	02-178858	02-178852	02-178850	02-178848	02-178862

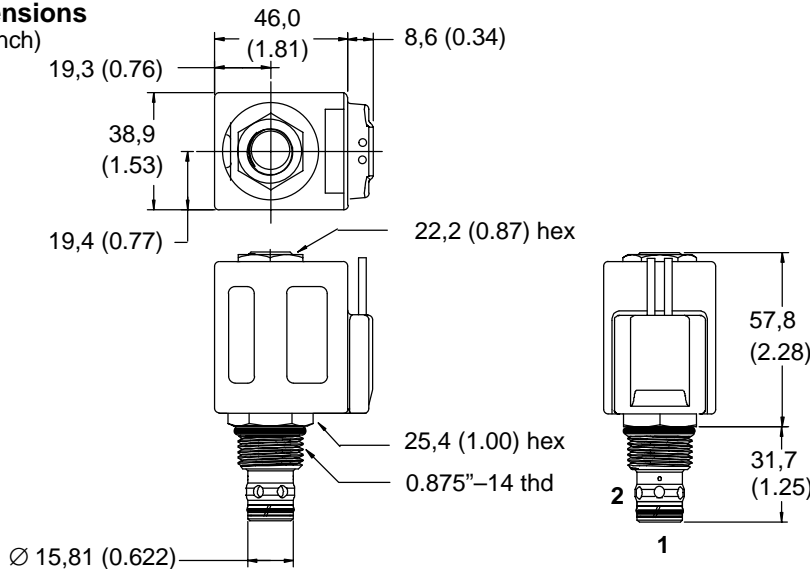
9 Coil type

H – 26W coil

For coil dimensions see page 22.

Dimensions

mm (inch)



Note

When solenoid valve is ordered as cartridge only, nut is included.

Torque cartridge in housing
A–47–54 Nm (35–40 lbf ft)
S–68–75 Nm (50–55 lbf ft)



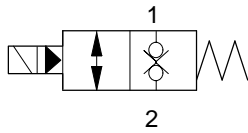
WARNING

Maintain 5-8 Nm (4-6 lbf ft) maximum torque on valve tube nut. Overtightening may cause valve failure.

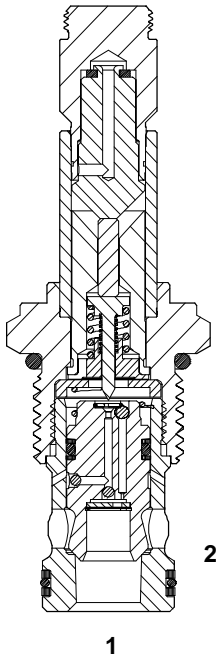
SBV11-12-C

Bi-directional, normally closed solenoid valve

Functional symbol



Sectional view



Description

The SBV11-12-C is a 2-way, 2-position, bi-directional, normally closed, poppet type, screw-in cartridge solenoid valve.

Operation

In the de-energized position, flow is blocked in both directions. In the energized position, flow is allowed in both directions.

Ratings and specifications

Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49° C (120° F)

Typical application pressure (all ports) 350 bar (5000 psi)

Cartridge fatigue pressure (infinite life) 310 bar (4500 psi)

Rated flow 114 l/min (30 USgpm)

Internal leakage (port 1 to port 2 & port 2 to port 1) 5 drops/min.max. @ 350 bar (5000 psi)

Temperature range -40° to 100°C (-40° to 212°F)

Coil duty continuous from 85% to 110% of nominal voltage

Cavity C-12-2 or C-12-2U (See page 18)

Add "U" after number if undercut is required.
If undercut is not specified, expect 10 psi@15 USgpm and
20 psi @ 30 USgpm higher pressure drop.

Fluids All general purpose hydraulic fluids such as:
MIL-H-5606, SAE 10, SAE 20, etc.

Filtration Cleanliness code 18/16/13

Standard housing material Aluminum or steel

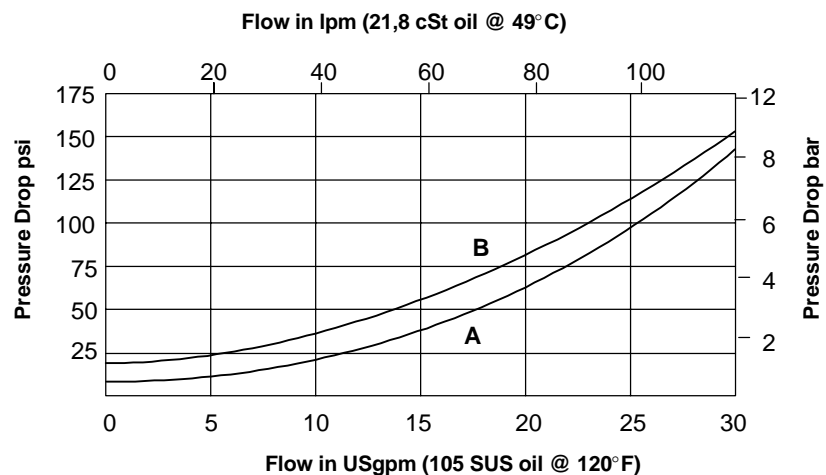
Weight cartridge only 0,27 kg (0.59 lb.)

Seal kit 02-165889 Buna-N
02-165888 Viton®

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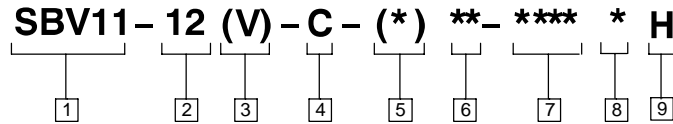
Pressure Drop Curves

Cartridge only



A – Port 1 to 2

B – Port 2 to 1



1 Function

SBV11 – Solenoid bi-directional valve

2 Size

12 – 12 size

3 Seals

Blank – Buna-N
V – Viton

4 Style

C – Normally closed

5 Housing material

Blank – Cartridge only
A – Aluminum
S – Steel



Aluminum housings can be used for pressures up to 210 bar (3000 psi)

Steel housings **must** be used for operating pressures **above** 210 bar (3000 psi)

6 Port size/housing part number

0 – Cartridge only

Code	Port Size	Aluminum	Steel
4G	1/2" BSPP	02-161118	02-172062
4GU	1/2" BSPP	02-161116	02-172512
6G	3/4" BSPP	02-161117	02-169665
6GU	3/4" BSPP	02-161115	02-162922
10T	SAE10	02-160640	02-169744
10TU	SAE10	02-160641	02-169817
12T	SAE12	02-160644	02-169782
12TU	SAE12	02-160645	02-169790

See pages 19 and 20 for housings

8 Connector type/coil part number

Blank – No coil

Coil Voltage	G ISO 4400 DIN 43650	N Deutsch	P 1/2" NPT conduit port w/ leadwire	Q Spade terminals	W Leadwire	Y Amp junior
12D	02-178027	02-178030	02-178021	02-178018	02-178015	02-178035
24D	02-178028	02-178031	02-178022	02-178019	02-178016	02-178036
36D	02-178029	02-178032	02-178023	02-178028	02-178017	02-178037
24A	02-178047	–	02-178044	02-178043	02-178042	–
120A	02-178048	–	02-178045	–	–	–
240A	02-178049	–	02-178046	–	–	–
12B	02-178855	02-178857	02-178851	02-178849	02-178847	02-178861
24B	02-178856	02-178858	02-178852	02-178850	02-178848	02-178862

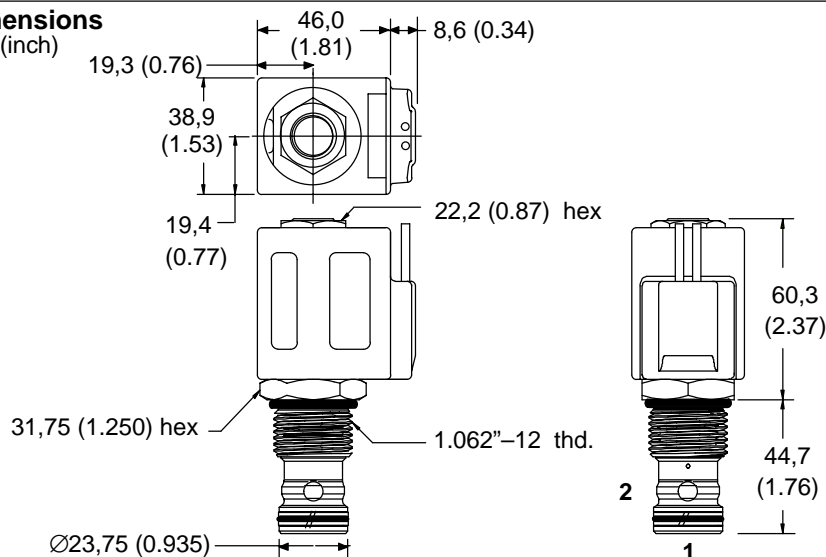
For coil dimensions see page 22.

9 Coil type

H – 26W coil

Dimensions

mm (inch)



Note

When solenoid valve is ordered as cartridge only, nut is included.

Torque cartridge in housing
 A–81–95 Nm (60–70 lbf ft)
 S–102–115 Nm (75–85 lbf ft)



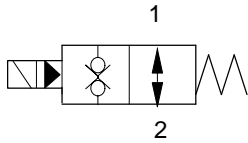
WARNING

Maintain 5-8 Nm (4-6 lbf ft) maximum torque on valve tube nut. Overtightening may cause valve failure.

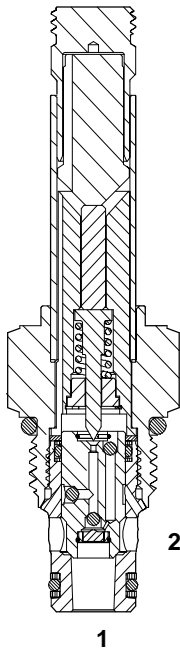
SBV11-8-O

Bi-directional, normally open solenoid valve

Functional symbol



Sectional view



Description

The SBV11-8-O is a 2-way, 2-position, bi-directional, normally open, poppet type, screw-in cartridge solenoid valve.

Operation

In the de-energized position, flow is allowed in both directions. In the energized position, flow is blocked in both directions.

Ratings and specifications

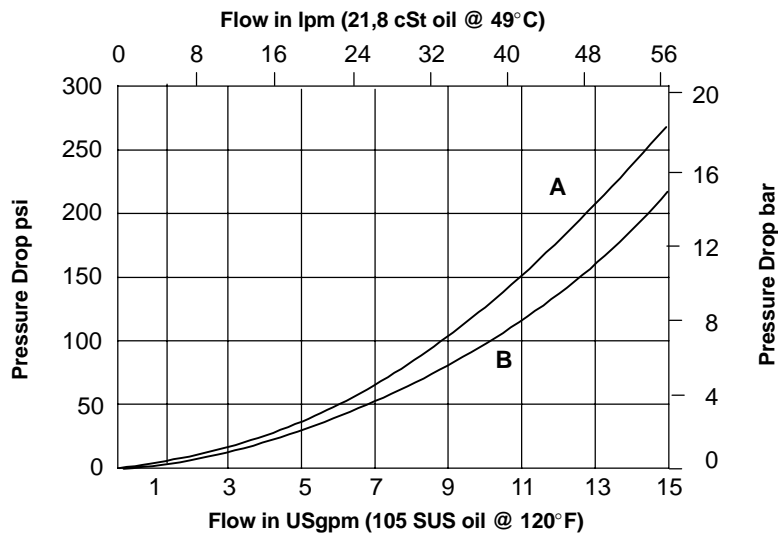
Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49° C (120° F)

Typical application pressure (all ports)	350 bar (5000 psi)
Cartridge fatigue pressure (infinite life)	310 bar (4500 psi)
Rated flow	60 l/min (15 USgpm)
Internal leakage (port 1 to port 2 & port 2 to port 1)	5 drops/min. max. @ 350 bar(5000 psi) when energized
Temperature range	-40° to 100°C (-40° to 212°F)
Coil duty	Continuous from 85% to 110% of nominal voltage
Cavity	C-8-2 (See page 18)
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Standard housing material	Aluminum or steel
Weight cartridge only	0,12 kg (0.26 lb.)
Seal kit	02-160777 Buna-N 02-160778 Viton®

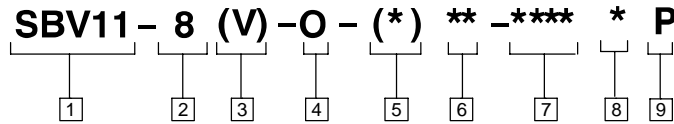
Viton is a registered trademark of E.I.DuPont

Pressure Drop Curves

Cartridge only



A—Port 1 to Port 2
B—Port 2 to Port 1



1 Function

SBV11 – Solenoid bi-directional valve

2 Size

8 – 8 Size

3 Seals

Blank – Buna-N
V – Viton

4 Style

O – Normally open

5 Housing material

Blank – Cartridge only
A – Aluminum
S – Steel



Aluminum housings can be used for pressures up to 210 bar (3000 psi)

Steel housings **must** be used for operating pressures **above** 210 bar (3000 psi)

6 Port size/housing part number

0 – Cartridge only

Code	Port size	Aluminum	Steel
2G	1/4" BSPP	02-160727	02-160733
3G	3/8" BSPP	02-160728	02-160734
4T	SAE4	02-160730	02-160736
6T	SAE6	02-160731	02-160737
8T	SAE8	02-160732	02-160738

See pages 19 and 20 for housings

7 Voltage Rating

00 – No coil
12D – 2 VDC
24D – 24 VDC
36D – 36 VDC
24A – 24 VAC
120A – 120 VAC
240A – 240 VAC
12B – 12 VDC/w diode*
24B – 24 VDC/w diode*

*optional arc suppression diode

8 Connector type/coil part number

Blank – No coil

Coil Voltage	G ISO 4400 DIN 43650	N Deutsch	P 1/2" NPT conduit port w/ leadwire	Q Spade terminals	W Leadwire	Y Amp junior
12D	02-178143	02-178146	02-178137	02-178134	02-178131	02-178704
24D	02-178144	02-178147	02-178138	02-178135	02-178132	02-178705
36D	02-178145	02-178148	02-178139	02-178136	02-178133	02-178706
24A	02-178160	–	02-178157	02-178156	02-178155	–
120A	02-178161	–	02-178158	–	–	–
240A	02-178162	–	02-178159	–	–	–
12B	02-178824	02-178826	02-178820	02-178818	02-178816	02-178830
24B	02-178825	02-178827	02-178821	02-178819	02-178817	02-178831

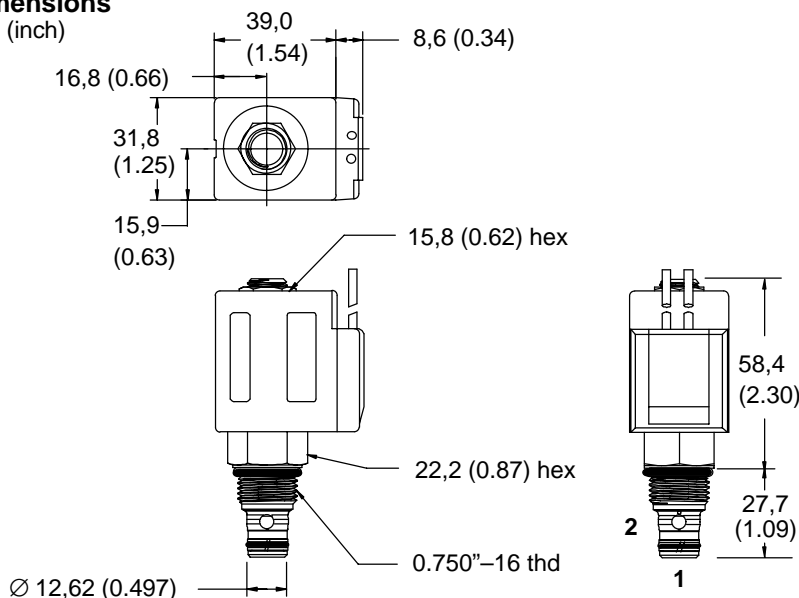
For coil dimensions see page 21.

9 Coil type

P – 20W coil

Dimensions

mm (inch)



Note

When solenoid valve is ordered as cartridge only, nut is included.

Torque cartridge in housing
34–41 Nm (25–30 lbf ft)



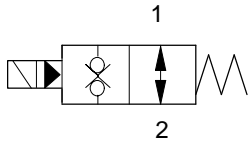
WARNING

Maintain 5-8 Nm (4-6 lbf ft) maximum torque on valve tube nut. Overtightening may cause valve failure.

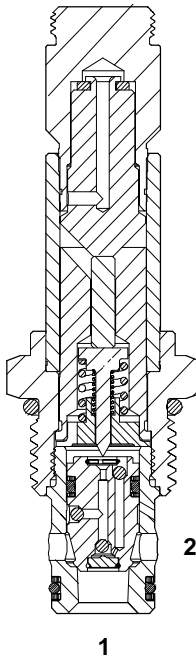
SBV11-10-O

Bi-directional, normally open solenoid valve

Functional symbol



Sectional view



Description

The SBV11-10-O is a bi-directional, 2-way, 2-position, normally open, poppet type, screw-in cartridge, solenoid valve.

Operation

In the de-energized position, flow is allowed in both directions. In the energized position, flow is blocked in both directions.

Ratings and specifications

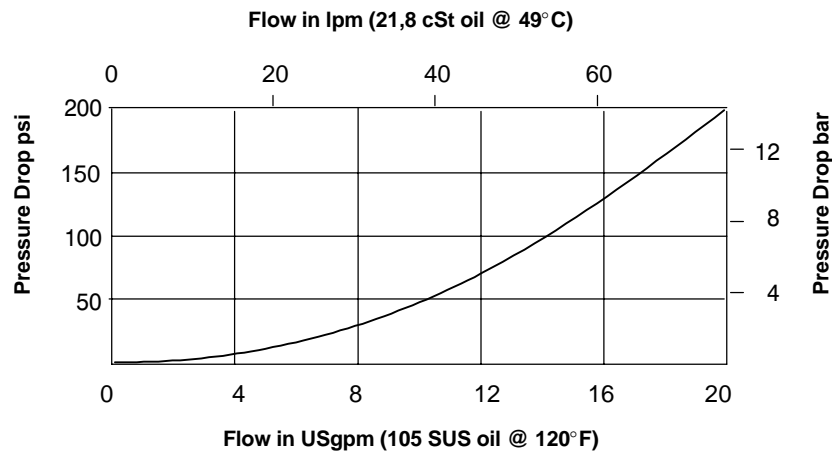
Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49° C (120° F)

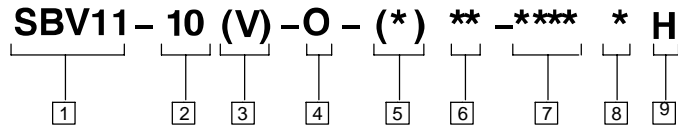
Typical application pressure (all ports)	350 bar (5000 psi)
Cartridge fatigue pressure (infinite life)	310 bar (4500 psi)
Rated flow	76 l/min (20 USgpm)
Internal leakage (port 1 to port 2)	5 drops/min. maximum @ 350 bar (5000 psi)
Temperature range	-40 to 100° C (-40° to 212° F)
Coil duty	continuous from 85% to 110% of nominal voltage
Cavity	C-10-2 (See page 18)
Fluids	All general purpose hydraulic fluids such as: MIL-H-5606, SAE 10, SAE 20, etc.
Filtration	Cleanliness code 18/16/13
Standard housing material	Aluminum or steel
Weight, cartridge only	0,18 kg (0.39 lb.)
Seal kit	565806 Buna-N 889627 Viton®

Viton is a registered trademark of E.I.DuPont

Pressure Drop Curves

Cartridge only





1 Function

SBV11 – Solenoid bi-directional valve

2 Size

10 – 10 Size

3 Seals

Blank– Buna-N
V – Viton

4 Style

O – Normally open

5 Housing material

Blank– Cartridge only
A – Aluminum
S – Steel



Aluminum housings can be used for pressures up to 210 bar (3000 psi)

Steel housings **must** be used for operating pressures **above** 210 bar (3000 psi)

6 Port size/housing part number

0 – Cartridge only

Code	Port size	Aluminum	Steel
2G	1/4" BSPP	876702	02-175102
3G	3/8" BSPP	876703	02-175103
3B	3/8" BSPP	02-175462	–
6H	SAE6	876700	–
6T	SAE6	566151	02-175100
8H	SAE8	876701	–
8T	SAE 8	–	02-175101

See pages 19 and 20 for housings

8 Connector type/coil part number

Blank – No coil

Coil Voltage	G ISO 4400 DIN 43650	N Deutsch	P 1/2" NPT conduit port w/ leadwire	Q Spade terminals	W Leadwire	Y Amp junior
12D	02-178027	02-178030	02-178021	02-178018	02-178015	02-178035
24D	02-178028	02-178031	02-178022	02-178019	02-178016	02-178036
36D	02-178029	02-178032	02-178023	02-178028	02-178017	02-178037
24A	02-178047	–	02-178044	02-178043	02-178042	–
120A	02-178048	–	02-178045	–	–	–
240A	02-178049	–	02-178046	–	–	–
12B	02-178855	02-178857	02-178851	02-178849	02-178847	02-178861
24B	02-178856	02-178858	02-178852	02-178850	02-178848	02-178862

9 Coil type

H – 26W coil

7 Voltage Rating

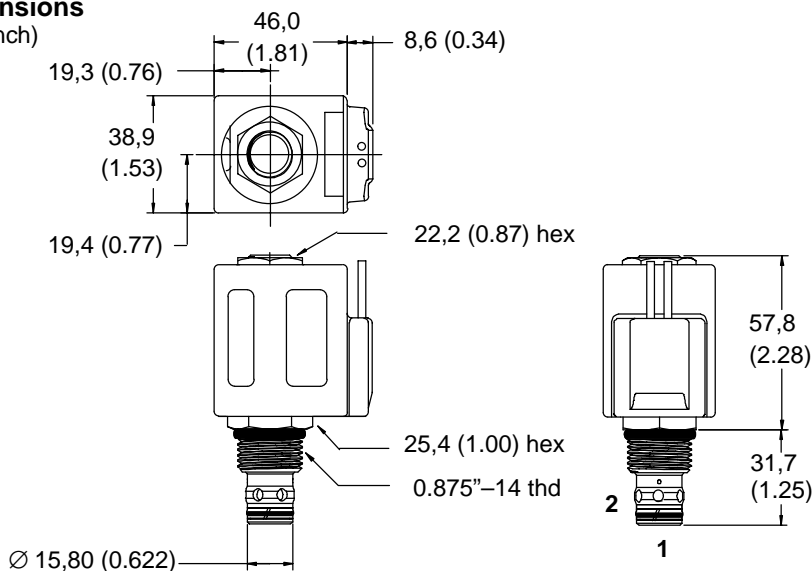
00 – No coil
12D – 12 VDC
24D – 24 VDC
36D – 36 VDC
24A – 24 VAC
120A– 120 VAC
240A– 240 VAC
12B – 12 VDC/w diode*
24B – 24 VDC/w diode*

*optional arc suppression diode

For coil dimensions see page 22.

Dimensions

mm (inch)



Note

When solenoid valve is ordered as cartridge only, nut is included.

Torque cartridge in housing
A–47–54 Nm (35–40 lbf ft)
S–68–75 Nm (50–55 lbf ft)



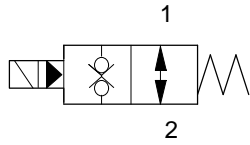
WARNING

Maintain 5-8 Nm (4-6 lbf ft) maximum torque on valve tube nut. Overtightening may cause valve failure.

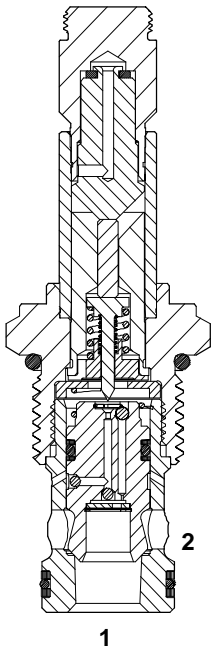
SBV11-12-O

Bi-directional, normally open solenoid valve

Functional symbol



Sectional view



Description

The SBV11-12-O is a bi-directional, 2-way, 2-position, normally open, poppet type, screw-in cartridge, solenoid valve.

Operation

In the de-energized position, flow is allowed in both directions. In the energized position, flow is blocked in both directions.

Ratings and specifications

Performance data is typical with fluid at 21,8 cSt (105 SUS) and 49° C (120° F)

Typical application pressure (all ports) 350 bar (5000 psi)

Cartridge fatigue pressure (infinite life) 310 bar (4500 psi)

Rated flow 114 l/min (30 USgpm)

Internal leakage (port 1 to port 2 & port 2 to port 1) 5 drops/min. max. @ 350 bar (5000 psi)

Temperature range -40° to 100°C (-40° to 212°F)

Coil duty continuous from 85% to 110% of nominal voltage

Cavity C-12-2 or C-12-2U (See page 18)

Add "U" after number if undercut is required.

If undercut is not specified, expect 10 psi@15 USgpm and 20 psi @ 30 USgpm higher pressure drop.

Fluids All general purpose hydraulic fluids such as:
MIL-H-5606, SAE 10, SAE 20, etc.

Filtration Cleanliness code 18/16/13

Standard housing material Aluminum or Steel

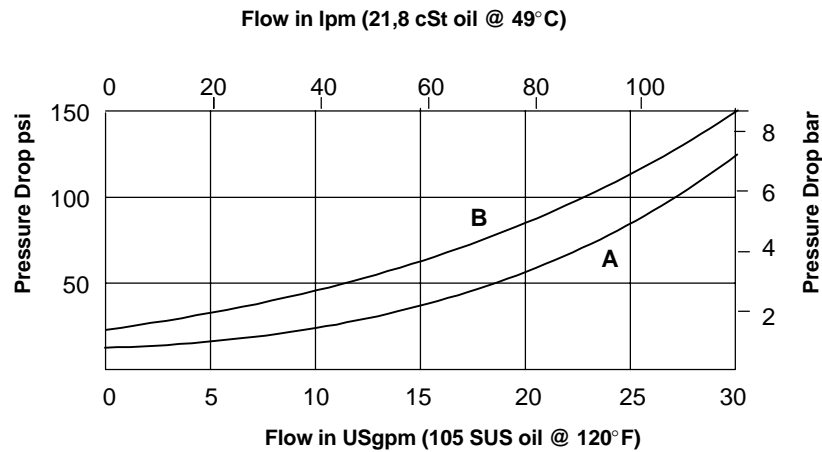
Weight cartridge only 0,27 kg (0.59 lb.)

Seal kit 02-165889 Buna-N
02-165888 Viton®

Viton is a registered trademark of E.I.DuPont

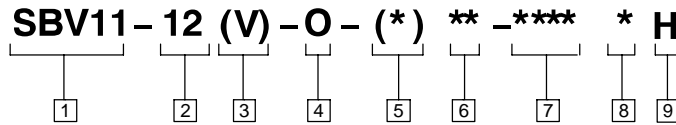
Pressure Drop Curves

Cartridge only



A – Port 1 to 2

B – Port 2 to 1



1 Function

SBV11 – Solenoid bi-directional valve

2 Size

12 – 12 size

3 Seals

Blank – Buna-N
V – Viton

4 Style

O – Normally open

5 Housing material

Blank – Cartridge only
A – Aluminum
S – Steel



Aluminum housings can be used for pressures up to 210 bar (3000 psi)

Steel housings **must** be used for operating pressures **above** 210 bar (3000 psi)

6 Port size/housing part number

0 – Cartridge only

Code	Port Size	Aluminum	Steel
4G	1/2" BSPP	02-161118	02-172062
4GU	1/2" BSPP	02-161116	02-172512
6G	3/4" BSPP	02-161117	02-169665
6GU	3/4" BSPP	02-161115	02-162922
10T	SAE10	02-160640	02-169744
10TU	SAE10	02-160641	02-169817
12T	SAE12	02-160644	02-169782
12TU	SAE12	02-160645	02-169790

See pages 19 and 20 for housings

8 Connector type/coil part number

Blank – No coil

Coil Voltage	G ISO 4400 DIN 43650	N Deutsch	P 1/2" NPT conduit port w/ leadwire	Q Spade terminals	W Leadwire	Y Amp junior
12D	02-178027	02-178030	02-178021	02-178018	02-178015	02-178035
24D	02-178028	02-178031	02-178022	02-178019	02-178016	02-178036
36D	02-178029	02-178032	02-178023	02-178028	02-178017	02-178037
24A	02-178047	–	02-178044	02-178043	02-178042	–
120A	02-178048	–	02-178045	–	–	–
240A	02-178049	–	02-178046	–	–	–
12B	02-178855	02-178857	02-178851	02-178849	02-178847	02-178861
24B	02-178856	02-178858	02-178852	02-178850	02-178848	02-178862

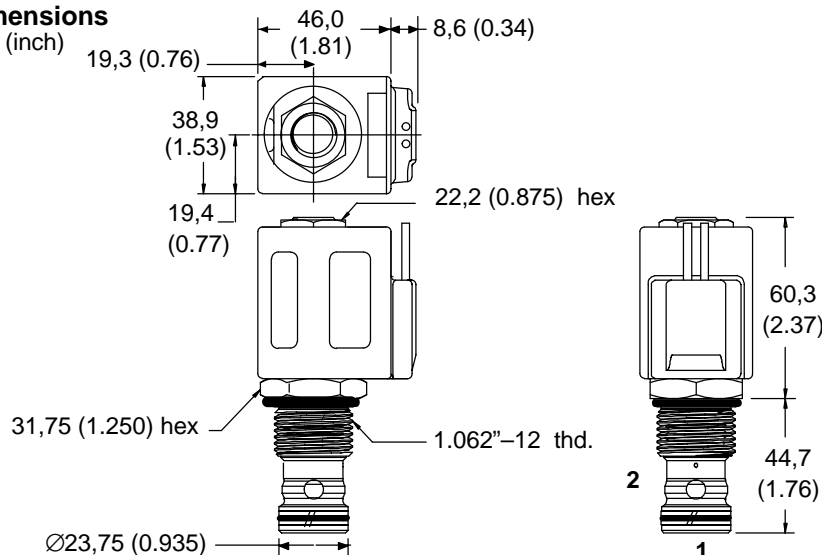
9 Coil type

H – 26W coil

For coil dimensions see page 22

Dimensions

mm (inch)



Note

When solenoid valve is ordered as cartridge only, nut is included.

Torque cartridge in housing
A–81–95 Nm (60–70 lbf ft)
S–102–115 Nm (75–85 lbf ft)



WARNING

Maintain 5-8 Nm (4-6 lbf ft) maximum torque on valve tube nut. Overtightening may cause valve failure.

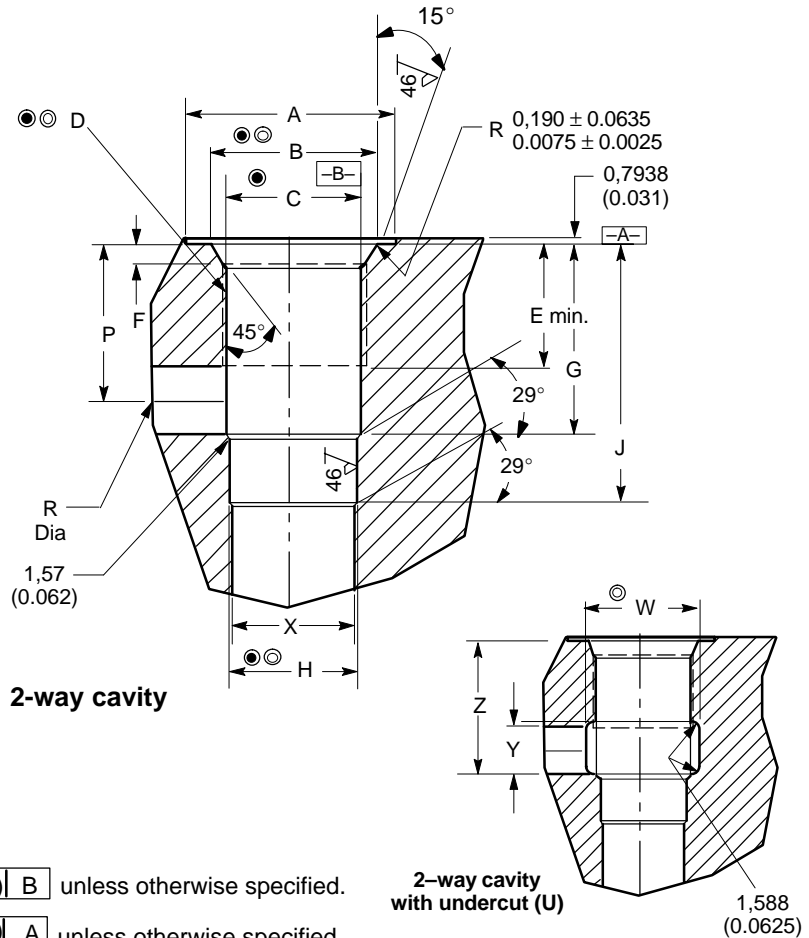
C-**-2 (U) Cavity Dimensions

Dimensions

mm (inch)

Cavity bores can be machined accurately in aluminum or steel. The necessary UNF, or UN threads may be machined using standard small tools, possibly already in your machine shop or from a local tool supplier. For in depth advice on the machining of cavities, consult your Vickers sales specialist.

Either you, our customer, or Vickers can design and manufacture customized manifolds or housings dedicated to individual applications. We call the resulting valve packages Modular Circuit Designs (MCDs). Cartridges selected for your application can be accommodated in one or more MCDs, according to your requirements.



⊙ These diameters $\begin{array}{|c|} \hline \text{0,051 mm (.002 inch)} \\ \hline \end{array}$ B unless otherwise specified.

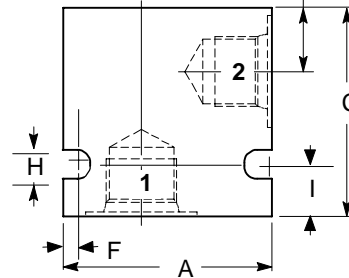
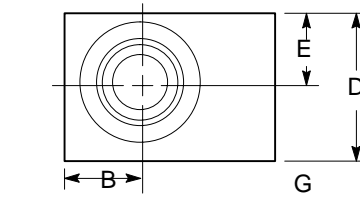
⊙ These diameters $\begin{array}{|c|} \hline \text{0,025 mm (.001 inch)} \\ \hline \end{array}$ A unless otherwise specified.

Cavity mm (inch)	A Spotface	B $\begin{array}{ c } \hline +0,051 \\ 0 \\ (+0,002 \\ 0) \\ \hline \end{array}$	C $\begin{array}{ c } \hline +0,051 \\ 0 \\ (+0,002 \\ 0) \\ \hline \end{array}$	D Thread	E Full Thread	F	G	H $\begin{array}{ c } \hline \pm 0,0254 \\ (\pm 0,001) \\ \hline \end{array}$	J	P	R Max. Dia.	X Max. Dia.
C-8-2	30,16 (1.188)	20,65 (0.813)	17,47 (0.688)	.750"-16	12,70 (0.500)	2,54/2,92 (0.100/0.115)	19,05 (0.750)	12,72 (0.501)	30,17 (1.188)	14,68 (0.578)	8,74 (0.344)	11,11 (0.438)
C-10-2	30,16 (1.188)	24,00 (0.945)	20,62 (0.812)	.875"-14	15,88 (0.625)	2,54/2,92 (0.100/0.115)	23,80 (0.937)	15,90 (0.626)	33,32 (1.312)	18,26 (0.718)	11,11 (0.438)	14,29 (0.562)
C-12-2(U)	38,10 (1.500)	29,15 (1.148)	24,76 (0.975)	1.062"-12	22,22 (0.875)	3,30/3,68 (0.130/0.145)	34,92 (1.375)	23,82 (0.938)	46,35 (1.825)	27,94 (1.100)	12,70 (0.500)	22,22 (0.875)

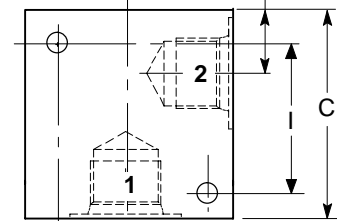
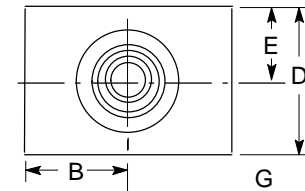
Cavity mm (inch)	W	Y	Z
C-12-2U (only)	30,83 (1.214)	12,70 (0.500)	34,29 (1.350)

C-**-2 Aluminum Housings

Housing	Ports 1 & 2	Part Number
C-10-2 Light duty	3/8" BSPP	02-175462
	SAE 6	566151
C-8-2 Fatigue rated	1/4" BSPP	02-160727
	3/8" BSPP	02-160728
	SAE 4	02-160730
	SAE 6	02-160731
C-10-2 Fatigue rated	SAE 8	02-160732
	1/4" BSPP	876702
	3/8" BSPP	876703
	SAE 6	876700
C-12-2U Fatigue rated	SAE 8	876701
	1/2" BSPP	02-161116
	3/4" BSPP	02-161115
C-12-2 Fatigue rated	SAE 10	02-160641
	SAE 12	02-160645
	1/2" BSPP	02-161118
	3/4" BSPP	02-161117
C-12-2 Fatigue rated	SAE 10	02-160640
	SAE 12	02-160644



All except
C-12-2U



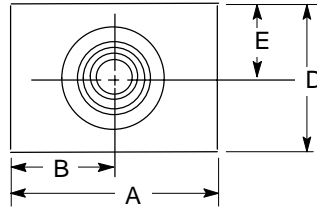
C-12-2U

Note: BSPP porting is designated by "B" or "G" in the model code
SAE porting is designated by "H" or "T" in the model code

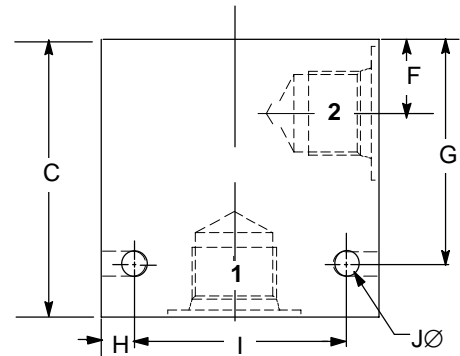
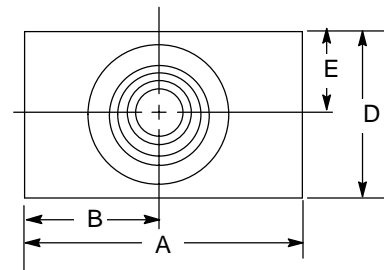
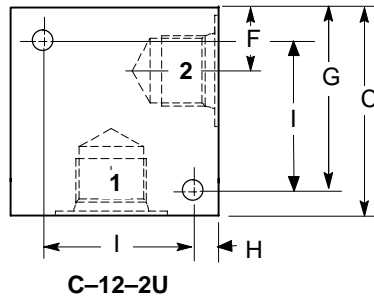
Cavity mm (inch)	A	B	C	D	E	F	G	H	I	Mass kg (lb.)
C-10-2 Light duty	50,8 (2.00)	19,0 (0.75)	50,8 (2.00)	31,7 (1.25)	15,9 (0.62)	3,1 (0.12)	19,0 (0.75)	7,1 (0.28)	12,7 (0.50)	0,1 (0.35)
C-8-2 Fatigue rated	50,8 (2.00)	19,0 (0.75)	51,0 (2.00)	38,1 (1.50)	19,0 (0.75)	6,7 (0.27)	15,5 (0.61)	7,1 (0.28)	12,7 (0.50)	0,2 (0.46)
C-10-2 Fatigue rated	63,5 (2.50)	25,4 (1.00)	63,5 (2.50)	50,8 (2.00)	25,4 (1.00)	9,5 (0.37)	20,8 (0.81)	7,1 (0.28)	19,0 (0.75)	0,4 (1.00)
C-12-2(U) Fatigue rated	88,9 (3.50)	44,5 (1.75)	88,9 (3.50)	50,8 (2.00)	25,4 (1.00)	12,7 (0.50)	28,7 (1.13)	63,5 (2.50)	63,5 (2.50)	0,8 (1.96)

C-**-2 Steel Housings

Housing	Ports 1 & 2	Part Number
C-8-2	1/4" BSPP	02-160733
	3/8" BSPP	02-160734
	SAE 4	02-160736
	SAE 6	02-160737
	SAE 8	02-160738
C-10-2	1/4" BSPP	02-175102
	3/8" BSPP	02-175103
	SAE 6	02-175100
	SAE 8	02-175101
C-12-2U	1/2" BSPP	02-172512
	3/4" BSPP	02-162922
	SAE 10	02-169817
	SAE 12	02-169790
C-12-2	1/2" BSPP	02-172062
	3/4" BSPP	02-169665
	SAE 10	02-169744
	SAE 12	02-169782



NOTE
8 series utilize slot in place of mounting hole



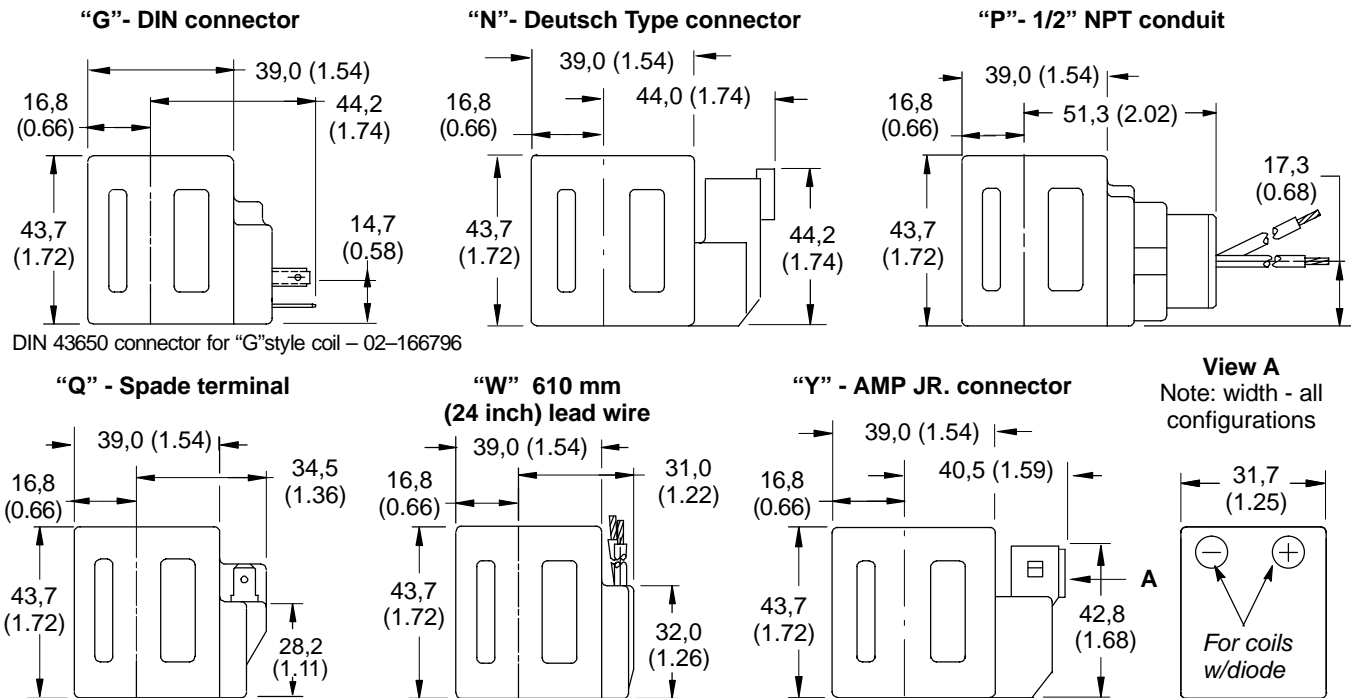
Note: BSPP porting is designated by "G" in the model code
SAE porting is designated by "T" in the model code

Cavity mm (inch)	A	B	C	D	E	F	G	H	I	J	Mass kg (lb.)
C-8-2	50,8 (2.00)	19,0 (0.75)	50,8 (2.00)	38,1 (1.50)	19,0 (0.75)	15,5 (0.61)	38,1 (1.50)	3,3 (0.13)	43,9 (1.73)	7,1 (0.28)	0,5 (1.19)
C-10-2	63,5 (2.50)	25,4 (1.00)	63,5 (2.50)	44,4 (1.75)	22,2 (0.87)	19,0 (0.75)	50,8 (2.00)	9,5 (0.37)	44,4 (1.75)	7,1 (0.28)	0,3 (0.83)
C-12-2(U)	88,9 (3.50)	28,5 (1.12)	88,9 (3.50)	50,8 (2.00)	25,4 (1.00)	28,7 (1.13)	76,2 (3.00)	12,7 (0.50)	63,5 (2.50)	10,3 (0.40)	1,9 (4.28)

Solenoid Coils, 8-Series

Coil Dimensions

millimeter (inch)



Voltage	COIL PART NUMBERS					
	G Connector	N Connector	P Connector	Q Connector	W Connector	Y Connector
12 VDC	02-178143	02-178146	02-178137	02-178134	02-178131	02-178704
24 VDC	02-178144	02-178147	02-178138	02-178135	02-178132	02-178705
36 VDC	02-178145	02-178148	02-178139	02-178136	02-178133	02-178706
24 VAC	02-178160	N/A	02-178157	02-178156	02-178155	N/A
115 VAC	02-178161		02-178158	N/A	N/A	
240 VAC	02-178162		02-178159			
12 VDC*	02-178824	02-178826	02-178820	02-178818	02-178816	02-178830
24 VDC*	02-178825	02-178827	02-178821	02-178819	02-178817	02-178831

*optional arc suppression diode

Specifications

Standard Voltages	Amperes*	Lead Color
12 DC	1.67	red
24 DC	0.83	black
36 DC	0.56	blue
24 AC	0.97	orange
120 AC	0.19	yellow
240 AC	0.09	red/white

*Nominal voltage @ 25°C (77°F)

Duty Rating

Continuous from 85% to 110% of nominal voltage

Operating Temperature –100°C (212°F)

continuous @ nominal voltage

Lead Wires – 18 gauge, 610 mm (24" long), UL style 3173 CSA CL 1251 (meets SAE J1128 XLPE style SXL)

Wattage –All coils are nominally 20 watts @ 25°C (77°F)

Encapsulent –P.E.T.

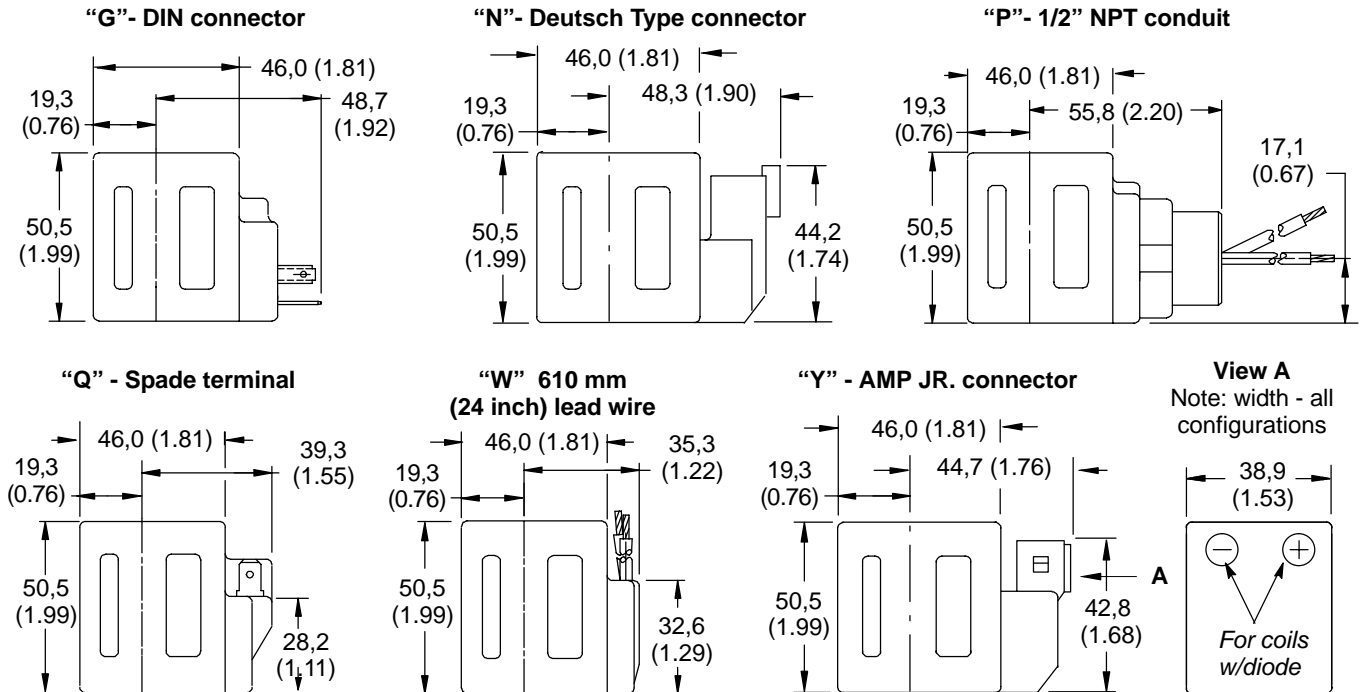
Magnet Wire –U.L. class N, 200°C (392°F) NEMA pub. no. MW 1000, section MW 35-C (single)

Flyback diode (arc suppressor)–Maximum recurrent peak reverse voltage – 800 V (optional)

For other voltages and connectors contact a Vickers representative.

Solenoid Coils, 10 & 12 Series

Dimensions millimeter (inch)



Voltage w/o diode*	COIL PART NUMBERS					
	G Connector	N Connector	P Connector	Q Connector	W Connector	Y Connector
12 VDC	02-178027	02-178030	02-178021	02-178018	02-178015	02-178035
24 VDC	02-178028	02-178031	02-178022	02-178019	02-178016	02-178036
36 VDC	02-178029	02-178032	02-178023	02-178028	02-178017	02-178037
24 VAC	02-178047	N/A	02-178044	02-178043	02-178042	N/A
120 VAC	02-178048		02-178045	N/A	N/A	
240 VAC	02-178049		02-178046			
12 VDC*	02-178855	02-178857	02-178851	02-178849	02-178847	02-178861
24 VDC*	02-178856	02-178858	02-178852	02-178850	02-178848	02-178862

*optional arc suppression diode

Specifications

Standard Voltages	Amperes*	Lead Color
12 VDC	2.20	red
24 VDC	1.09	black
36 VDC	0.73	blue
24 VAC	1.26	orange
120 VAC	0.25	yellow
240 VAC	0.12	red/white

*Nominal voltage @ 25°C (77°F)

Duty Rating

Continuous from 85% to 110% of nominal voltage

Lead Wires –18 gauge, 610 mm (24") long, UL style 3173 CSA CL 1251 (meets SAE J1128 XLPE style SXL)

Wattage – All coils are nominally 26 watts @ 25°C (77°F)

Encapsulant – P.E.T.

Magnet Wire – U.L. class N, 200°C (392°F) NEMA pub. no. MW 1000, section MW 35-C (single)

Operating Temperature – 100°C (212°F) continuous @ nominal voltage

Flyback diode (arc suppressor)–Maximum recurrent peak reverse voltage – 800 V (optional)

For other voltages and connectors contact a Vickers representative.

Form Tools

Roughing Tools

Roughers are basically step drills which leave .030" per cutting diameter and .015" above all radii for the finishing reamer, with an additional .015" depth in the cavity bottom as clearance.

The roughing tool is necessary to prepare the cavity for the finishing reamer, which has not been designed for the primary forming or bottom cutting.

We offer two types of roughers, one for aluminum and one for steel. The aluminum rougher is manufactured with

a 4 facet point and polished flutes. The steel rougher is supplied with a standard drill point. Both types will work in either material, however, longevity of an aluminum tool will be sacrificed when used continually in steel.

Cavity	Material	Model Code	Assembly Number	Cavity	Material	Model Code	Assembly Number
2-Way							
C-8-2	Aluminum/Steel	RT1-8-2-AS-8028	02-165580	C-10-2	Steel	RT-10-2-S-8035	889510
C-10-2	Aluminum	RT-10-2-A-8030	889509	C-12-2	Aluminum/Steel	RT-12-2-AS-8213	02-160625

Finishing Tools

These finishing tools have been designed as precision reamers for

finishing operations only. They are not intended for primary forming or bottom cutting operations. Vickers recommends that a finishing tool only be used in a

properly roughed hole. Failure to conform to this practice will produce unsatisfactory size and finishes and possibly break the tool.

Cavity	Material	Model Code	Assembly Number	Cavity	Material	Model Code	Assembly Number
2-Way							
C-8-2	Aluminum/Steel	FT1-8-2-AS-8070	02-112933	C-12-2(U)	Aluminum/Steel	FT-12-2-AS-8214	02-162162
C-10-2	Aluminum/Steel	FT-10-2-AS-8048	566235				

Finishing Form Tools Speed & Feed for Aluminum 6061-T6 (T651)

This information is recommended as a good starting point. Speeds and/or feeds

may be increased or decreased depending on actual machining conditions.

NOTE: Finish form tools may require 1/2 to 1-1/2 second dwell to obtain necessary finish.

CNC MACHINE TOOL			BRIDGEPORT / LAGUN TYPE MACHINES		
Tool Size	RPM	IPM	Tool Size	RPM	IPM
C-8-2, C-10-2	600	4	C-8-2, C-10-2	800-1000	6-5
C-12-2(U)			C-12-2(U)	250	2 1/2

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Fluid Cleanliness

The recommended cleanliness code for the valves in this publication is 18/16/13.

Proper fluid condition is essential for long and satisfactory life of hydraulic components and systems. Hydraulic fluid must have the correct balance of cleanliness, materials, and additives for protection against wear of components, elevated viscosity, and inclusion of air.

Essential information on the correct methods for treating hydraulic fluid is included in Vickers publication 561 "Vickers Guide to Systemic Contamination Control" available from your local Vickers distributor or by contacting Vickers, Incorporated. Recommendations on filtration and the selection of products to control fluid condition are included in 561.

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